COUNCIL ASSESSMENT PANEL MEETING
10 June 2020
AGENDA – 9.1

Applicant: Mark Musolino	**Landowner:** M A Musolino & R P Musolino
Agent: James Levinson – Botten Levinson	
Development Application: 13/30/473	**Originating Officer:** Melanie Scott
Application Description: Filling of land to a maximum depth of 6.2 metres (non-complying)	
Subject Land: Lot:100 Sec: P957 DP:63108 CT:5917/721; Lot:1 Sec: P957 FP:104215 CT:5141/301; Lot:101 Sec: P957 DP:63108 CT:6137/929	**General Location:** 24 & 28 & 32 Emmett Road Crafers West ***Attachment – Locality Plan***
Development Plan Consolidated : 12 April 2012 **Map** AdHi/22	**Zone/Policy Area:** Hills Face Zone
Form of Development: Non-complying	**Site Area:** 1.7 hectares
Public Notice Category: Category 3 non complying Notice published in The Advertiser on 21 April 2017 & 10 May 2019	**Representations Received:** 2 **Representations to be Heard:** 2 (previously heard 10 July 2019) Application re notified **Representations Received:** 1 **Representations to be Heard:** 0

1. EXECUTIVE SUMMARY

The purpose of this application is to enable extensions to the existing apron of fill to the north and north-west of a dwelling at 28 Emmett Road Crafers West. The works will also enable better access to the northern portion of the land for management purposes and enable the applicant to meet CFS access requirements for fire-fighting purposes. The fill also extends onto two adjoining properties at 24 and 32 Emmett Road, which are owned by others.

The application was submitted to the Council Assessment Panel (CAP) at its meeting of 10 July 2019.

At the 10 July meeting, CAP resolved to DEFER consideration of the application to allow the applicant to:

- Provide clean fill certificates or undertake soil samples, surface and ground water testing and analysis by a suitably experienced and qualified site contamination consultant to provide evidence that the fill placed on the site is not contaminated and suitable for a private open space area associated with a dwelling, and that there is no risk of pollution to surface or underground waters.

- Provide clarification of the pre 2010 land form, the existing land form with the fill in situ and the final form of the land proposed following the landscaping shown in the landscape concept plan.

The CAP report, attachments and minutes from the 10 July 2019 CAP meeting will be provided again electronically (as separate attachments indicated as “previous”) for your reference, together with this report and associated attachments.

Following the above resolution, the applicant has responded with an Environmental Soil Investigation from MUD Environmental dated 23 April 2020 and drawing **ME-296 Revision 1 figures 1, 2 & 3**. The report details seven comments regarding the suitability of the fill for residential use and a private open space area, and notes all results were below the adopted Tier 1 health based and ecological screening levels for residential land use. The report concludes that "the fill materials are not considered to present an unacceptable risk to human health or to the environment in the context of residential land use, including private open space areas." The same consultant has also clarified the actual fill levels on the site through the provision of information from the eleven (11) test pits excavated across the site. With regards to proposed landscaping the concept plan submitted with the previous CAP report has been withdrawn. There is no intent at this time to undertake "landscaping". As previously noted the fill has been in situ for some time and has revegetated naturally so weed management only is proposed at this time.

Following an assessment against the relevant Zone and Council Wide provision within the Development Plan, staff are recommending that **CONCURRENCE** from the State Commission Assessment Panel be sought to **GRANT** Development Plan Consent, subject to conditions.

2. DISCUSSION/ASSESSMENT OF THE APPLICANT'S RESPONSE

1. <u>Evidence the fill is not contaminated</u>

   The applicant's chosen path to address the CAP requests mirrors that requested in part 2 of resolution 1 of the CAP minutes, namely to undertake soil samples, surface and ground water testing and analysis by a suitably experienced and qualified site contamination consultant. MUD consultants advised the following documents were used as their guideline in undertaking the analysis:

   1. EPA '*Guidelines for the assessment and remediation of site contamination'* updated November 2019, herein referred to as the 'GAR, 2019';
   2. *National Environment Protection (Assessment of Site Contamination) Measure, 1999 as amended 2013* (ASC NEPM, 2013); and
   3. Australian Standard AS4482.1-2005 *Guide to the investigation and sampling of sites with potentially contaminated soil, Part 1: Non-volatile and semi-volatile compounds*'.

   The following table and other excerpts provides a summary of the materials encountered across the 11 test pits in the fill area and from the five (5) samples taken from natural ground level areas.

Table 7 – Materials Encountered

Layer	Description
FILL 1	SAND, silty, fine to coarse grained, gravelly, orange-brown to light brown, dry to low moisture, trace oversized (>100mm) mudstone / siltstone cobbles up to 100mm, **trace inclusions of combinations of bitumen / paving bricks / red bricks / concrete fragments / ash + cinders / ceramic tiles / black or orange plastic / PVC pipe** (possibly from adjacent building structure).
FILL 2	GRAVEL, sandy, blue-grey sub-base materials, angular gravels to 50mm, moist.
FILL 3	SAND, silty, fine to medium grained, orange, moist (sandy loam type soils).
FILL 4	CLAY, sandy, gravelly, medium plasticity, brown to dark brown, **trace oversized (>100mm) inclusions of combinations of bitumen / paving bricks / cinders / slag / red brick fragments,** moist.
FILL 5	CLAY, sandy (coarse grained), gravelly, low plasticity, light-brown to brown, **trace bitumen pieces up to 250mm, ultra-trace concrete pieces / bituminous tar, moist.**
FILL 6	CLAY, silty, low-plasticity, orange-brown to red-brown, trace calcareous gravels up to 50mm, trace whole quartz gravels to 50mm, **trace bitumen.**
FILL 7	CLAY, sandy, gravelly, low plasticity, brown, **trace oversized (>100mm) bitumen / concrete fragments, potential ACM fragments**
FILL 8	CLAY, sandy, gravelly, low plasticity, brown, **trace inclusions of combinations of bitumen / concrete / paving bricks / quartz cobble ballast up to 100mm**, moist.
FILL 9	SAND, gravelly, clayey, **trace oversized concrete / bitumen / trace steel reo**, light brown to brown, moist.
FILL 10	CLAY, silty, trace gravels, medium plasticity, red-brown, **trace oversized (>100mm) fragments of brick / pavers / concrete / bitumen.**
FILL 11	SAND, clayey, coarse grained, orange-brown, trace gravels and cobbles throughout up to 150mm.
NATURAL 1	CLAY, silty, low plasticity, trace mudstone cobbles and gravels from 10mm-300mm, orange-brown to brown, moist.
NATURAL 2	SILT, organic matter present (twigs + roots), grey to grey-brown, low moisture.
NATURAL 3	SILT, calcareous, light-brown to orange-brown, low moisture.
NATURAL 4	CLAY, silty, low-plasticity, light-brown to orange-brown, trace calcareous gravels, moist.
NATURAL 5	CLAY, silty, low plasticity, yellow-brown to white, talc-like feel, moist.

The subsurface conditions across the site were highly variable, with 11 distinct layers of fill materials and five distinct layers of natural materials observed within the test pits excavated across the site. In total, 10 out of 11 test pits contained fill materials, with only test pit TP8 containing natural materials only.

The vertical extent of fill materials encountered from the surface ranged between 0.5m depth (TP2) and 3.8m depth (TP10), with underlying natural soils confirmed at all test pit locations with the exception of test pit TP07 where fill materials existed to the maximum depth of investigation of 3.3m below ground surface.

Non-mineralogical inclusions were identified within all test pits except for TP8 (natural soils only), were present in 8 out of the 11 distinct layers of fill materials encountered, and were observed in the form of the following materials:

- Bitumen wastes ranging in size from small fragments of ~10mm up to large pieces ~400mm width (10 out of 11 test pits);
- Concrete, bricks and / or pavers (10 out of 11 test pits);
- Construction and demolition waste / building wastes including ceramic tiles / black or orange plastic / PVC pipe (5 out of 11 test pits);
- Trace ash and cinders (5 out of 11 test pits);
- Trace small fragments of slag (2 out of 11 test pits); and
- Trace remnants of partially solidified bituminous tar (1 out of 11 test pits);
- Potential asbestos containing materials (ACMs) in the form of trace grey fibre cement fragments in test pit TP07 at depths of between 1.9m-2.7m within materials designated as the 'FILL 7' layer. No other potential ACMs were encountered in any of the other test pits excavated at the site, with the 'FILL 7' layer also only observed within soils at test pit TP07.

No other observations of potential chemical impacts (i.e. odours, staining) were observed during test pitting or soil sampling activities.

PID results were recorded up to a maximum of 0.3ppm, indicating that the potential for volatile contaminants was low within the test pits excavated across the site.

1. Suitability of fill for residential and private open space uses:

a. The materials encountered in the filled area are heterogenous, with various layers of fill materials and natural soils observed within the test pits excavated across the inferred filled area at the site.
b. The depth of fill materials ranged between 0.5m and 3.8m depth below the current surface, with underlying natural soils confirmed at all test pit locations except for test pit TP07, where fill materials were present to the maximum depth of investigation of 3.3m.
c. Photoionisation detector (PID) results were recorded up to a maximum of 0.3ppm, indicating that the potential for volatile contaminants was low.
d. In addition to the soil materials, non-mineralogical inclusions were observed within most fill layers, primarily in the form of construction and demolition materials including concrete, bitumen, bricks, pavers, ceramic tiles, plastic sheeting and PVC pipe. Trace inclusions of tar, ash, cinders and slag were observed at some locations.
e. Asbestos containing materials (ACMs) were confirmed in the form of grey fibre cement fragments within test pit TP07 at depths of between 1.9m-2.7m (FILL 7 layer). No other potential ACMs were encountered in any of the other test pits excavated at the site.
f. No significant indicators of potential contamination (i.e. odours, staining) were observed during test pitting or soil sampling activities.
g. All results were below the adopted Tier 1 health based and ecological screening levels for residential land use, except for two individual benzo(a)pyrene concentrations in near surface soils (0.1-0.2m) at locations TP3 and TP6. A Tier 2 risk assessment comprising statistical assessment and review of toxicological data for benzo(a)pyrene was undertaken, which confirmed that these concentrations do not present a risk to human health or ecological risk in the context of residential use. On this basis, the fill materials are not considered to present an unacceptable risk to human health or the environment in the context of residential land use, including private open space areas.

2. Risk to surface or underground waters from the fill:

a. No significant soil concentrations were identified in soils at the site that are considered to threaten surface or groundwater. As stated in the ASC NEPM, '*Groundwater protection may be a particular concern where contamination occurs in sandy soils containing naturally low levels of organic matter, clay and trace elements. In most situations, soil contaminants at levels below appropriate EILs or HILs do not pose a threat to local groundwater sources.*' On this basis, no risk to surface or underground waters has been identified.

In a very brief summary of the report excerpts provided here, the fill is suitable for residential use and is not contaminating ground water. The report recommendations detailed below are proposed as notes should Development Plan Consent be granted.

2. <u>Pre 2010 Land Form and Final Land Form</u>

With regard to the second request from the CAP, drawings have been provided to demonstrate the level of fill. But it should be noted each of the test pits were dug until natural ground was reached and the fill level across the site ranges from nothing (natural ground level) up to a maximum of 5 metres (the maximum depth able to be excavated). All but one test pit was dug to natural ground level (the exception being test pit 7). Of further note, non-mineralogical inclusions were identified in all test pits except test pit 8 where natural soils only were found.

Four recommendations were made by the site contamination consultant:

1. Any soil imported to the site should be sourced from a commercial supplier where possible. Should waste soils be generated from another site to be imported to this site, the soils should be classified and imported in accordance with EPA requirements.
2. All surplus soils to be removed from the site must be managed in accordance with relevant EPA guidelines and/or requirements of waste or recycling depots authorised by the EPA.
3. Construction and demolition waste materials should be disposed off-site in accordance with the requirements of waste or recycling depots authorised by the EPA.
4. Should any unforeseen materials (including asbestos containing materials) be identified during any excavation works and/or soil handling and management activities, it is recommended that these soils are quarantined, and further advice is sought from an appropriately qualified environmental consultant.

It is suggested these recommendations be added as notes to any approval for the development (refer notes 5 - 8 of report recommendation).

No landscaping is now included in the proposal. The landscaping previously proposed was aesthetic and included small rock retaining less than a metre in height and which in my opinion made no contribution to stabilising the fill. Zone PDC 4 requires development not to occur on land where the slope poses an unacceptable risk of soil movement, land slip or erosion. There has been no reported soil movement occurrences in the six years or more that the fill has been on site, including the above average rainfall year of 2013. The removal of the proposed landscaping has not altered staff's assessment of the proposal being in accordance with PDC 4.

Further, staff have referred to the document provided by the applicant in the original CAP attachments from Ecological Associates Pty Ltd dated 23 November 2017 which details the level area of fill as 750m^2 and the battered slopes as being some 650m^2. Noting the fill has been in place for at least six years without movement and, the aforementioned report identifies the battered slope has naturally revegetated with exotic shrubs, grasses and herbs (page 112 of previous CAP attachments) there is no intention to undertake any formal landscaping of the area. Maintenance in the form of weed management will be undertaken in accordance with the recommendations of the aforementioned report. An advisory note is included in the recommendation reminding the applicant further earthworks greater than 9 cubic metres on the subject land require separate development approval.

3. SUMMARY & CONCLUSION

This application was presented to CAP in July 2019 and deferred pending the provision of further information. That information was provided in April and May 2020 and details that the fill is suitable for residential use and is not impacting on groundwater quality.

The application is retrospective for extensive filling of land in the Hills Face Zone. Because of the age of the existing dwelling there are poor records surrounding the associated access and earthworks arrangements and, with the time elapsed since the fill was undertaken, there is speculation regarding the form of the land prior to the works. The extent of the works has now been verified through bore logs. There is no doubt when the work was first undertaken it was a very visible scar on local visual amenity. The fill extends onto two neighbouring properties which are now included as part of the subject land. The MUD report reveals the extent of fill on 32 Emmett Road is minimal as evidenced on site survey drawings on pages 68, 69 & 70 of the MUD Report. Furthermore the findings for test location pit 5, shown on page 27 of the MUD Report, demonstrated 0.7m of fill only and supporting the applicants assertion and the plans provided that there is little to no fill in the vicinity of the boundary with 32 Emmett Road. Page 82 of the report records the bore log findings for test location pit 5.

In considering the merits of the proposal, Council staff have noted that there are many properties in the locality with extensive land modification to accommodate recreational uses. The surface area of the fill is 1,400m^2 or approximately 12% of the 176,000m^2 site area. Thus in the context of the locality this proposal is considered modest. The proposal retains much of the land in its natural character, particularly on the steeper parts of the land. Whilst the proposal does not return the land to its natural form, it does seek to minimise the visual impact through managing the weeds and revegetation on the banks of the fill and creates opportunities for improved vegetation and fire management for the balance of the subject land. The CFS has confirmed there is no increased fire risk as a result of this proposal and that the proposal assists in emergency vehicle access to the dwelling on the site.

It is considered that the proposal is sufficiently consistent with the relevant provisions of the Development Plan, despite its non-complying nature, and variance with some provisions. These variances are not viewed to be significant and it is considered the proposal is not seriously at variance with the Development Plan. In the view of staff, the proposal has sufficient merit to warrant consent. Staff therefore recommend that **CONCURRENCE** from the State Commission Assessment Panel be sought to **GRANT** Development Plan Consent**,** subject to conditions.

4. RECOMMENDATION

A. That the Council Assessment Panel considers that the proposal is not seriously at variance with the relevant provisions of the Adelaide Hills Council Development Plan, and seeks the CONCURRENCE of the State Commission Assessment Panel to GRANT Development Plan Consent to Development Application 13/30/473 by Mark Musolino for Filling of land to a maximum depth of 6.2 metres (non-complying) at 24, 28 & 32 Emmett Road Crafers West subject to the following conditions:

(1) <u>Development In Accordance With The Plans</u>
The development herein approved shall be undertaken in accordance with the following plans, details and written submissions accompanying the application, unless varied by a separate condition:

- **Statement of support prepared by Mark Musolino dated 17 January 2013**
- **Statement of effect prepared by Botten Levinson dated March 2017**
- **Vegetation Restoration Report prepared by Ecological Associates Pty Ltd dated 23 November 2017**

- **Survey plans (sheets 1, 2 and 3 of 3 reference 3856 plan 3856XI) titled site levels & contour plan and enlargements prepared by Olden and Van Senden Pty Ltd dated 4 October 2012 and 1 August 2014**
- **Tree Management Plan prepared by Gordon Sykes dated 23 July 2014 and received by Council 25 February 2016**
- **Site Location and Layout Plan, Site Elevation & Topographic Contours plan and Inferred Extent of Imported Fill Materials & Test Pit Locations (October 2019) prepared by MUD Environmental reference ME-296 Revision 1 figures 1, 2 & 3 received by Council.**

REASON: To ensure the proposed development is undertaken in accordance with the approved plans.

NOTES

(1) Development Approval Expiry

This development approval is valid for a period of twelve months commencing from the date of the decision notification. However if the development hereby approved is substantially commenced within the twelve (12) month period then it shall be completed within three (3) years of the date of such notification. This time period may be further extended beyond the 3 year period by written request to and approval, by Council prior to the approval lapsing. Application for an extension is subject to payment of the relevant fee. Please note that in all circumstances a fresh development application will be required if the above conditions cannot be met within the respective time frames.

(2) Requirement For Further Applications

The applicant is reminded any fencing and earthworks greater than 9 cubic metres requires development approval and will be the subject of separate application.

(3) Existing Encroachment Identified

The fill which encroaches over the side boundary into 24 Emmett Road remains unresolved. This development authorisation in no way implies approval from Council for this encroachment. The applicant is encouraged to continue negotiations with 24 Emmett Road to resolve this new and historical encroachment which will likely require a further application to Council to rectify this situation.

(4) Works On Boundary

The development herein approved involves work within close proximity to the boundary. The onus of ensuring development is in the approved position on the correct allotment is the responsibility of the land owner/applicant. This may necessitate a survey being carried out by a licensed land surveyor prior to the work commencing.

(5) Any soil imported to the site should be sources from a commercial supplier where possible. Should waste soils be generated from another site to be imported to this site, the soils should be classified and imported in accordance with EPA requirements.

(6) All surplus soils to be removed from the site must be managed in accordance with relevant EPA guidelines and/or requirements of waste or recycling depots authorised by the EPA.

(7) Construction and demolition waste materials should be disposed off-site in accordance with the requirements of waste or recycling depots authorised by the EPA.

(8) Should any unforeseen materials (including asbestos containing materials) be identified during any excavation works and/or soil handling and management activities, it is recommended that these soils are quarantined, and further advice is sought from an appropriately qualified environmental consultant.

(9) Erosion Control During Construction
Management of the property during construction shall be undertaken in such a manner as to prevent denudation, erosion or pollution of the environment.

(10) EPA Environmental Duty
The applicant is reminded of his/her general environmental duty, as required by Section 25 of the Environment Protection Act *1993*, to take all reasonable and practical measures to ensure that the activities on the whole site, including during construction, do not pollute the environment in a way which causes, or may cause, environmental harm.

(11) Department of Environment, Water & Natural Resources (DEWNR) – Native Vegetation Council Note
The applicant is advised that any proposal to clear, remove limbs or trim native vegetation on the land, unless the proposed clearance is subject to an exemption under the Regulations of the Native Vegetation Act 1991, requires the approval of the Native Vegetation Council. The clearance of native vegetation includes the flooding of land, or any other act or activity that causes the killing or destruction of native vegetation, the severing of branches or any other substantial damage to native vegetation. For further information visit:
www.environment.sa.gov.au/Conservation/Native_Vegetation/Managing_native_vegetation

Any queries regarding the clearance of native vegetation should be directed to the Native Vegetation Council Secretariat on 8303 9777. This must be sought prior to Full Development Approval being granted by Council.

B. Should Development Plan Consent be granted to this application, staff recommend the CAP provide delegation to the Assessment Manager to resolve any further application to vary the proposal.

6. ATTACHMENTS

Locality Plan
CAP Report – 10 July 2019
Minutes – 10 July 2019 CAP Meeting
Additional Information- MUD Environmental Soil Investigation

Respectfully submitted

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Melanie Scott
Senior Statutory Planner

Concurrence

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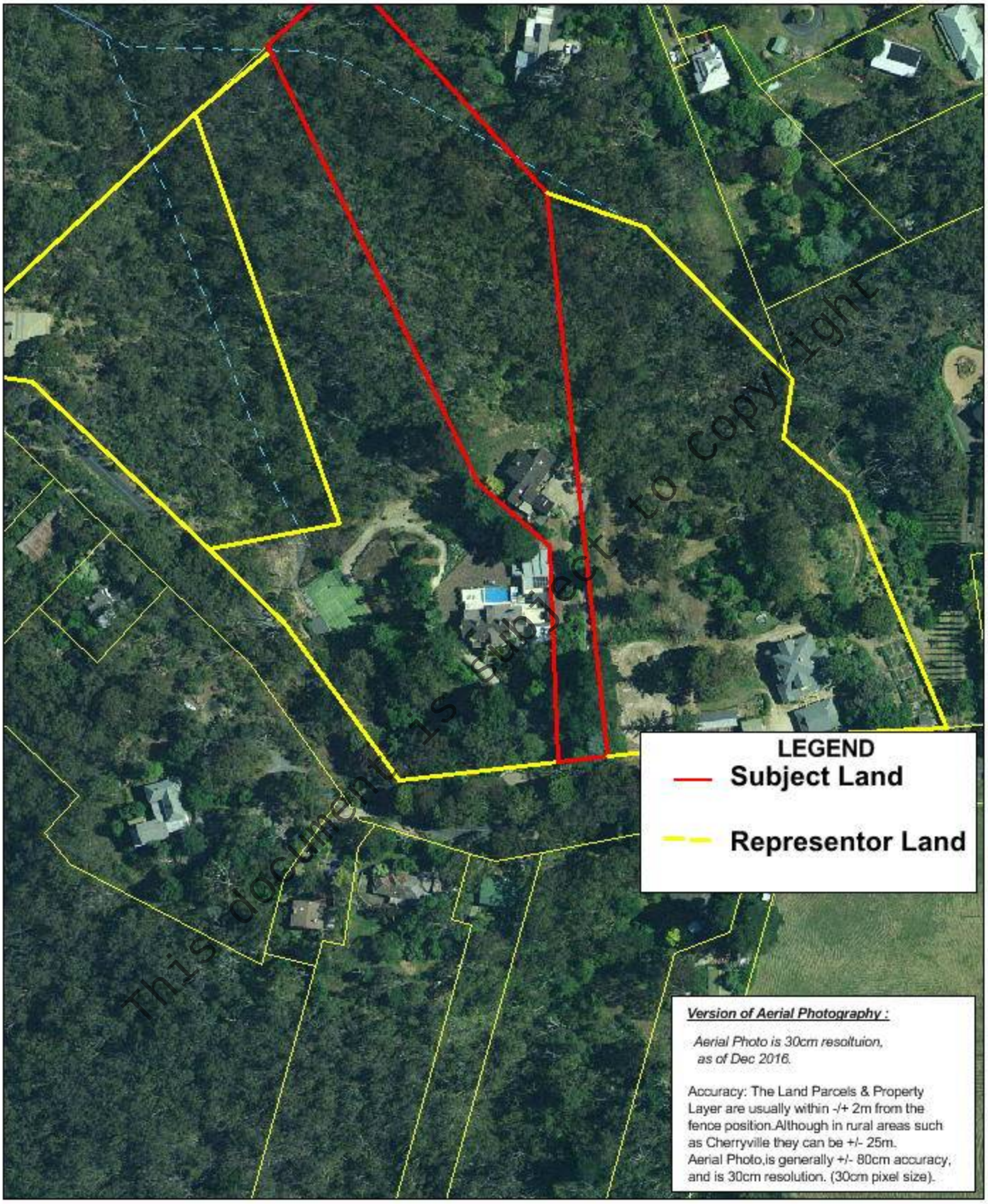
Deryn Atkinson
Manager Development Services

Attachment - Locality Plan



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Adelaide Hills
COUNCIL

M A Musolino.
2 Wilsden Street
WALKERVILLE SA 5081
0418 828 669

January 17, 2013

Adelaide Hills Council
28 Onkaparinga Valley Road
WOODSIDE SA 5244

Subject: Letter of support for Development application.

I would like to indicate my view on the purpose of the proposed development at LOT: 100 SEC: P957 DP: 63108 CT : 5917/721 known as 28 Emmett Road CRAFERS WEST.

The development will incorporate general landfill to areas near the existing dwelling. Clean landfill will cover existing blackberry bushes to create a safe decent to the rear of the dwelling and access for a fire truck. A large rainwater tank and swimming pool is planned for future development that will provide a water reserve in the event of a fire. The proposed development is aligned with the needs of the residents and of our community and we expect a positive impact on the following;

- ✓ A clearer and cleaner zone around the existing dwelling to minimise fire danger to the dwelling and its surrounding neighbours.
- ✓ A larger area for the accommodation of fire trucks in the event of a bush fire.
- ✓ The abolishing of noxious bushes (blackberry) that threatened the safety of young children.
- ✓ Maintaining hills face appeal and further enhancing the habitat with the vegetation of native grasses from the area.

Please accept this letter as formal recognition of the value of this proposal in helping maintain and develop the role of fire safety in the community. In 2004 the Mt Osmond bush fire had threatened the lives of the inhabitants and their property. The fire had crossed the freeway and was heading up the hill towards Crafers West. The residents activated the copper sprinkler system then chose to leave. Thankfully the fire was extinguished before it reached Crafers West.

At that time the ability for fire trucks to enter the property and gain strategic positioning above the hill would have been near impossible. With this proposed development the option is now available and I welcome the fire department to visit the property to confirm and record such for their consideration. Over the years horrendous tragedies have occurred due to bushfires and continue to happen as a result of many factors. This development will minimise the danger to the property and its surroundings without much negative impact to the hills face. In the development the proposal to vegetate exposed soil as a result of covering the blackberry bushes will improve the natural landscape and the green character of the Adelaide Hills.

Sincerely,

Mark Musolino

Owner

BOTTEN LEVINSON
Lawyers

Statement of Effect

DA 2013/30/473

Mark Musolino

MARCH 2017

Statement of Effect pursuant to section 39(2)(d) of the *Development Act 1993* and Regulation 17(4) of the *Development Regulations 2008*

Development application numbered 2013/30/473 seeking development approval for a development described by the Council as '*Filling of land to a maximum depth of 4 metres (non-complying)*' for Mr Mark Musolino at Crafers West.

1. BACKGROUND

Mr Musolino has owned the land at 28 Emmett Road, Crafers West, which land is comprised in Certificate of Title Volume 5917 Folio 721 (**the land**), with his wife Mrs Rosine Musolino, since 2004.

In August 2012, Mrs and Mrs Musolino were served with an enforcement notice by the Council under section 84(2) of the *Development Act 1993* (**the Act**) relating to the alleged unlawful deposit of fill on the land in the vicinity of the existing dwelling. The enforcement notice, amongst other things, required the installation of hay bales along the entire length of the base of the fill. This was actioned immediately by my client and inspected by the Council.

On 17 January 2013, the Council received a development application from Mr Musolino to formalise the situation on the land relating to the abovementioned fill. This application was designated as DA 2013/30/473 by the Council (**the application**).

This Statement of Effect for the application is prepared pursuant to section 39(2)(d) of the *Development Act 1993* and Regulation 17(4) of the *Development Regulations 2008* (**the Regulations**).

In preparing this Statement of Effect, the proposal has been reviewed with respect to the relevant provisions of the Adelaide Hills Council Development Plan, consolidated 12 April 2012 (**the Development Plan**). This was the relevant consolidation of the Council's Development Plan at the time the application was lodged.

The land is located within the Hills Face Zone of the Development Plan. Within the Residential Zone the list of non-complying development includes "*Filling where the height of filling of land exceeds 1.0 metre above natural ground level except for underground homes, underground tanks and cellars*".

In preparing this Statement of Effect, regard has also been had to the following plans and documents, which have been submitted to the Council:

Plans and details:

(a) Tree Management Plan prepared by Gordon Sykes dated 23 July 2014 (**the arborist report**); and

(b) Survey plan prepared by Olden & van Senden Pty Ltd and dated 4 October 2012 (**the survey**).

I also note the Council's letter dated 1 August 2016, which advised that the Council had resolved to proceed with an assessment of the application and invited the production of his Statement of Effect, and invited Mr Musolino to amend the application plans to include a fire access track previously discussed.

Accordingly, Mr Musolino approached Olden and van Senden Surveyors to prepare a supplementary plan,[1] indicating further cutting and filling required for a fire access track. The plan is **enclosed** with this Statement of Effect.

2. DESCRIPTION AND NATURE OF PROPOSED DEVELOPMENT

In or around late 2011, clean soil was brought to the land and spread to the north and western sides of the existing dwelling on the land (**the filling site**) to create a more level area around the existing dwelling (**the development**).

The Council has described the proposed development as being for "*Filling of land to a maximum depth of 4 metres (non-complying)*".

The extent of the filling is depicted by the survey which reflects the post-fill levels of the land

3. SUBJECT LAND AND LOCALITY

The land (depicted in blue on figure 1 below) comprises a single, elongated allotment with an area of approximately 13,300 square metres. At its southern boundary it has frontage to Emmett Road of approximately 19 metres.

Figure 1 *- satellite photograph of the land (Property Location Browser)*

[1] "Track Design Option 1", OLVS Surveys (Ref 3856) dated 1 February 2017.

The land naturally slopes downward from south to north (refer figure 2 below), with the existing dwelling situated on the higher section of the land. The gradient of the land increased significantly to the rear of the existing dwelling.

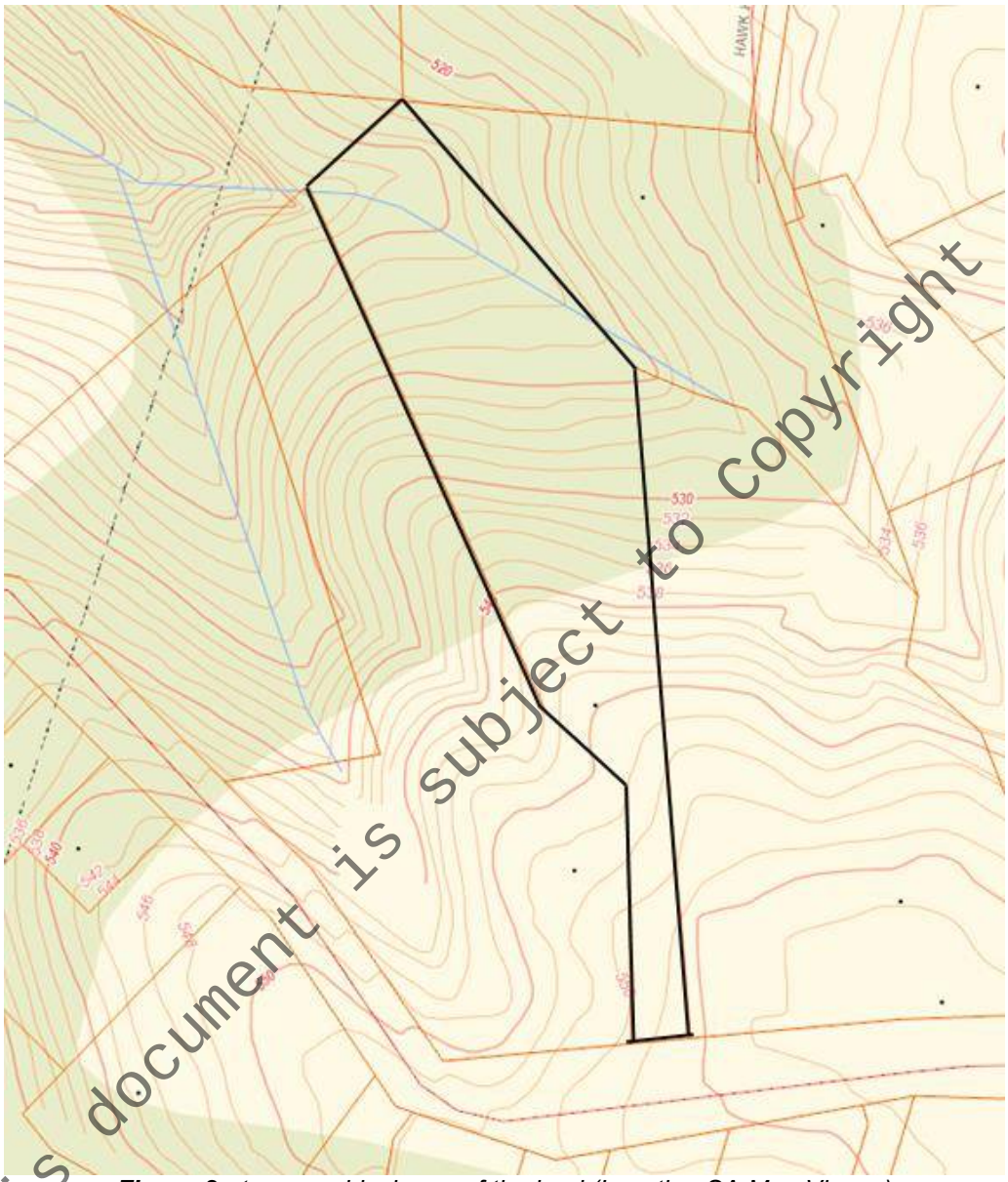

Figure 2 *- topographical map of the land (Location SA Map Viewer)*

One "SA Blue Gum" (*Eucalyptus leucoxylon*) which, by virtue of its size, is classified as a "significant tree" for the purpose of the Act and Regulations is located on the land to the west of the existing dwelling, proximate to the filling site.

Two further SA Blue Gums are located proximate to the filling site, to the north of the existing dwelling. Neither of these two trees is classified as "regulated" or "significant" for the purposes of the Act or Regulations.

Prior to the development being undertaken, I am instructed that the filling site was vegetated intensively with blackberry bushes.

The land is bounded to the east and west by other large residential allotments. Further east and to the north, between the land and the South Eastern Freeway, are smaller residential allotments. The Brooks Gully reserve is located to the northwest of the land.

4. DEVELOPMENT PLAN

As mentioned above, the land is located within the Hills Face Zone of the Development Plan (**the Zone**). The land is also located within a High Bushfire Risk area pursuant to *Figure AdHi(BPA)/1* of the Development Plan.

5. DEVELOPMENT PLAN ASSESSMENT

The provisions of the development plan relevant to an assessment of the application, are listed in Appendix 1, and can be broken down into the broad categories of:

(a) amenity;

(b) access and safety;

(c) natural vegetation and significant trees; and

(d) appropriateness of filling in the Zone.

The application is assessed against these provisions as follows:

5.1 Amenity

The filling site is not in an area that is extensively visible from any public road or neighbouring allotment.[2]

Due to its location in an area which is not prominent, the development has a minimal visual effect of natural features scenically attractive areas[3] and the amenity of the locality is not impaired by the appearance of the filling.[4]

If anything, the development has increased the amenity of the immediate locality by replacing the area of noxious blackberry bushes with a cleaner, more visually appealing area.

The proposed development therefore meets the relevant Development Plan provisions regarding amenity.

5.2 Access and safety

The development has created a flatter area around the existing dwelling on the land. This area created a larger, clearer space around the existing dwelling, and safer vehicular descent towards the rear of the site, which now has the ability to accommodate fire trucks in the event of

[2] Council Wide PDC 230.
[3] Council Wide PDC 201.
[4] Council Wide Objective 87.

bushfire. This access has the potential to benefit both residents of the land and neighbours in the event of bushfire.

Bushfires have historically occurred in the locality and the development will allow fire trucks to utilising the high portion of the subject land as a strategic fire fighting position should the need arise.

As such the development ensures a high level of safety[5] and provides safe and easy access for emergency vehicles to conduct fire fighting operations.[6] The development ensures that emergency vehicles are not faced with rugged terrain upon accessing the land.[7] The development has resulted in residential development which minimises the potential for personal and property damage resulting from bush fire.[8]

The proposed development therefore meets the relevant Development Plan provisions regarding access and safety.

5.3 Natural vegetation and significant trees

The significant tree and other native trees have been unaffected by the protective measures recommended by the arborist report and subsequently implemented by my client. Also, as set out above, the filling, with clean soil, has replaced an area of noxious blackberry bushes with an area that will facilitate the growth of native grasses.

As such, there have been minimal adverse affects to significant trees[9] and natural vegetation has been preserved (with the reestablishment of further natural vegetation facilitated).[10] The arborist report sets out that, in light of the recommended protective measures being implemented, that the aesthetic appearance, health and integrity of the significant tree, including its root system, will not be adversely affected.[11]

The proposed development therefore meets the relevant Development Plan provisions regarding natural vegetation and significant trees.

5.4 Appropriateness of filling in the Zone

It is accepted that the Zone envisages that filling be kept to a minimum[12] and the Council Wide provisions seek that filling be limited to a height no greater than 1.5 metres.[13]

However, given that the filling in question:

(a) does not pollute groundwater;

[5] Council Wide Objective 11.
[6] Council Wide PDCs 49, 80 and 306.
[7] Council Wide PDC 300.
[8] Council Wide PDC 82 and Objective 107.
[9] Council Wide PDC 337.
[10] Council Wide PDC 202.
[11] Council Wide PSC 339.
[12] Zone PDC 2.
[13] Council Wide PDC 7.

(b) does not adversely effect significant trees or other natural vegetation;

(c) provides for the reestablishment of native grasses;

(d) is protected against erosion; and

(e) impacts positively upon the amenity of the locality;[14]

combined with the access and safety benefits mentioned above, it is submitted that, in all the circumstances, it is appropriate in the Zone.

6. ASSESSMENT OF EXPECTED SOCIAL, ECONOMIC & ENVIRONMENTAL EFFECTS

It is to be noted that, unlike many non-complying development applications, the application is for a relatively low key form of development. As such, there are limited social, economic and environmental impacts that stem from it. I will, however, set out these limited impacts below.

6.1 Social

The increase to the amenity of the filling site combined with the increase to the safety of the local community from bushfires that results from the development highlights its positive social impacts. No negative social impacts have arisen as a result of the development.

6.2 Economic

There are no negative economic impacts associated with the development. The increased level of protection to the locality from bush fires can be seen as a positive economic impact.

6.3 Environmental

The development involved the removal of an area of noxious blackberry bushes and its replacement with an area facilitative of native grass regrowth. A significant tree and other natural vegetation have been protected and retained. In these regards, the development has displayed a positive impact on the environment. No negative environmental impacts have arisen as a result of the proposed development.

7. CONCLUSION

The designation of a kind of development as non-complying affects the procedures governing the processing of an application, but is not determinative of whether Development Plan consent should be granted or refused.[15] There is no presumption against the granting of consent to an application simply because it is “non-complying”.

[14] Zone PDC 3.
[15] *Klein Research Institute v District Council of Mount Barker* [2000] SASC 377.

The proposal has been assessed against the relevant provisions of the Development Plan. Amongst other things, it is noted that the filling:

- is not in a location that is visually prominent and, in any event, positively contributes to the amenity of the immediate locality;
- does not adversely impact significant trees or other natural vegetation and provides for the reestablishment of native grasses; and
- allows for greater security from the risk of bushfire for the residents of the land and for their neighbours.

The proposal is therefore considered to be worthy of development approval.

Dated 30 March 2017

Yours faithfully

James Levinson
BOTTEN LEVINSON
Mob: 0407 050 080
Email: jal@bllawyers.com.au

Appendix 1 - relevant Development Plan provisions

Council Wide PDC 7:

The excavation and/or filling of land should:

(a) be kept to a minimum and be limited to no greater than 1.5 metres to preserve the natural form of the land and the native vegetation;

(b) only be undertaken to reduce the visual impact of buildings, including structures, or to construct water storage facilities for use on the allotment;

(c) only be undertaken if the resultant slope can be stabilised to prevent erosion; and

(d) result in stable scree slopes which are covered with top soil and landscaped to preserve and enhance the natural character or assist in the re-establishment of the natural character.

Council Wide Objective 11:

A comprehensive, integrated, and efficient, public and private transport system which will:

...

(c) ensure a high level of safety ...

Council Wide PDC 49:

Development should provide safe and convenient access for private cars, cyclists, pedestrians, service vehicles, emergency vehicles and public utility vehicles ...

Council Wide PDC 80:

Residential development should:

...

(d) provide for easy access for emergency and essential services vehicles ...

Council Wide PDC 82:

Residential development should minimize the potential for personal and property damage arising from natural hazards including landslip, bushfires, and flooding.

Council Wide PDC 201:

Development should be undertaken with the minimum effect on natural features, land adjoining water or scenic routes or scenically attractive areas ...

Council Wide PDC 202:

Natural vegetation should be preserved and replanting should take place.

Council Wide Objective 87:

The amenity of localities not impaired by the appearance of land, buildings and objects ...

Council Wide PDC 230:

Excavation and earthworks should take place in a manner that is not extensively visible from surrounding localities.

Council Wide Objective 107:

Development should minimise the threat and impact of bushfires on life and property while protecting the natural and rural character.

Council Wide PDC 300:

Buildings and structures should be located away from areas that pose an unacceptable bushfire risk as a result of one or more of the following:

(a) vegetation cover comprising trees and/or shrubs;

(b) poor access;

(c) rugged terrain;

(d) inability to provide an adequate building protection zone; or

(e) inability to provide an adequate supply of water for fire-fighting purposes.

Council Wide PDC 306:

Vehicle access and driveways to properties ... should be designed and constructed to:

(a) facilitate safe and effective operational use for fire-fighting and other emergency vehicles and residents ...

Council Wide PDC 337:

Development should be undertaken with the minimum adverse affect on the health of a significant tree.

Council Wide PDC 339:

Development involving ground work activities such as excavation, filling, and sealing of surrounding surfaces (whether such work takes place on the site of a significant tree or otherwise) should only be undertaken where the aesthetic appearance, health and integrity of a significant tree, including its root system, will not be adversely affected.

Zone PDC 2:

The excavation and/or filling of land should:

(a) be kept to a minimum so as to preserve the natural form of the land and the native vegetation;

(b) only be undertaken to reduce the visual impact of buildings, including structures, or to construct water storage facilities for use on the allotment;

(c) result in stable scree slopes which are covered with top soil and landscaped to preserve and enhance the natural character or assist in the re-establishment of the natural character.

Zone PDC 3:

Development should not be undertaken if the operation and management of such development is likely to result in:

(a) pollution of underground or surface water resources;

...

(d) unnecessary loss or damage to native vegetation including the full range of tree, understorey and groundcover species/native grasses so as to maintain and enhance environmental values and functions, including conservation, biodiversity and habitat;

...

(f) erosion;

...

(m) loss of amenity to adjoining land or surrounding localities from:

(i) the visual impact of buildings, structures or earthworks ...

ecological associates pty ltd

Project FO001-1-A

23 November 2017

Mark Musolino
2 Wilsden St
WALKERVILLE SA 5081

Dear Mark,

Assessment of Conservation Values and Vegetation Restoration at 28 Emmett Road Crafers West

INTRODUCTION

Ecological Associates was engaged by you to describe the conservation values, management issues and rehabilitation opportunities for an area of fill at 28 Emmett Road Crafers West.

I understand you intend to develop and rehabilitate the fill by:

- removing weeds from the batter slopes and surrounding area;
- establishing suitable native plants on the batter slopes; and
- providing vehicle access to the lower part of the block comprising a track cut into the batter slope with a turnaround area at the base.

The scope of this project was to:

- meet with you and inspect the site;
- describe the existing conservation values of the site and threats an opportunities presented by the fill and proposed works; and
- provide a report and recommendations.

I understand you have engaged a horticulturist to provide separate advice on vegetation design and establishment.

ECOLOGICAL SETTING

The site is located in Crafers West (836775.06, 6122000.07 MGA Zone 53) in Lot 100, Section P957, DP 63108 5917/721 in the Hundred of Adelaide. The site is in the Mount Lofty sub-region of the Flinders Lofty Block bioregion (IBRA 7.0) in the Adelaide Hills Council area.

The site is on the crest of a ridge between two deeply incised tributaries of Brown Hill Creek (Figure 1). Residential properties are developed along the ridge crest while the slopes and nearby hills support remnant native vegetation. The lower slopes of the Brownhill Creek have been cleared. Native vegetation in the area is *Eucalyptus* forest and woodland.

Mean annual rainfall at Belair (State Flora Nursery (1879 to 2017) is 779.3 mm (BOM data).

The closest protected areas are Cleland Conservation Park 500 m to the north east and Heritage Agreement 1086 560 m to the south west.

The site is not located in or near a wetland habitat.

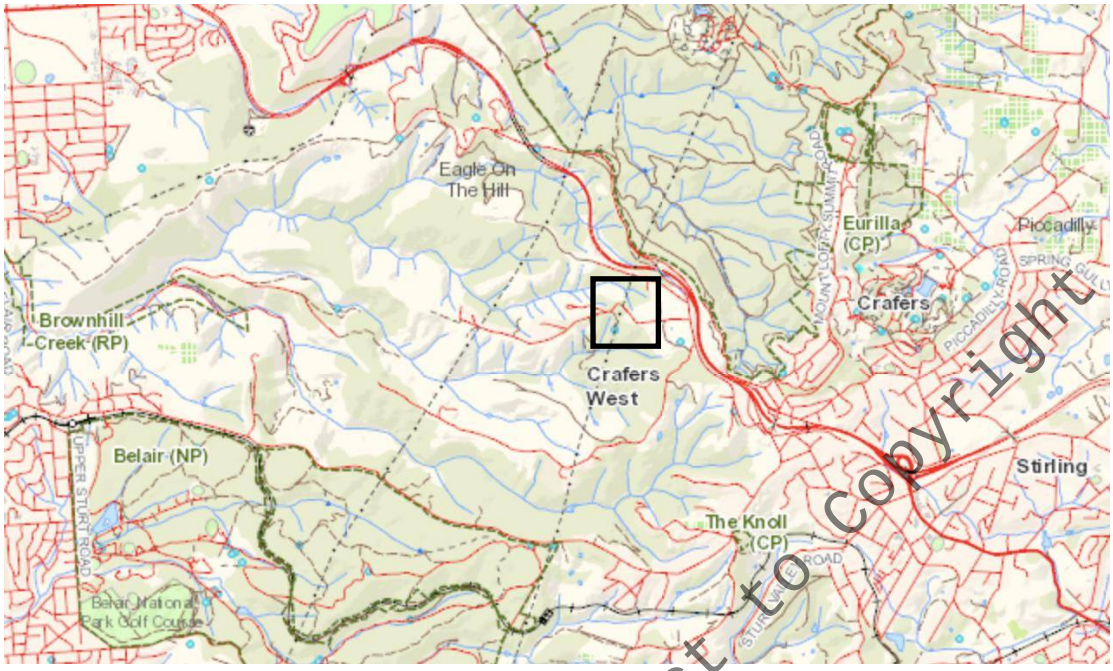

Figure 1. Site location

SITE DESCRIPTION

The site is a 1.3 ha residential property on a steep north-west facing slope. The property extends 310 m north from Emmett Road (Figure 2). The first 90 m of the property north of Emmett Road is a corridor as narrow as 13 m that broadens to over 60 m. The northern 0.9 ha of the block supports native vegetation. The house is located southern part of the block

The ground to the north of the house has been raised by importing fill. The fill has provided a relatively level area of 750 m^2 with a batter slope occupying a further 650 m^2. The fill has raised the surface by about 6 m at the highest point.

The fill was sourced from roadworks and construction projects and comprises clay, rock, concrete debris, bricks and bitumen. The surface of the fill is vegetated by mown grasses and herbs. The batter slope is vegetated by exotic shrubs, grasses and herbs.

Figure 2. Aerial image of 22 Emmett Road (C63108 A100) showing the house, area of fill adjacent to the house and native vegetation in the northern part of the property.

VEGETATION

The scrub at the foot of the slope is vegetated by *Eucalyptus obliqua* woodland with *Eucalyptus cosmophylla*. The mid-storey includes *Allocasuarina verticillata, Leptospermum myrsinoides* and *Exocarpos cupressiformis*. The ground layer includes *Hibbertia* spp., *Lepidosperma semiteres, Lomandra fibrata* and *Tetratheca pilosa*. Pest plants are present in the scrub including Radiata Pine, Boneseed and Cape Weed. An indicative species list is provided in Attachment 1.

The slopes of the fill support mainly exotic plants, including invasive pest species (Figure 2). Trees and shrubs include Radiata Pine, Euryops and Montpellier Broom. Herbs, forbs and grasses include Tangier Pea, Montpellier Broom, Watsonia, Fennel, Brome species, Kikuyu, Gallium and Blackberry.

The level surface of the fill is vegetated by mown grasses and herbs including Kikuyu, Plantago lanceolata, Hop Clover, Brome, *Vulpia*, Burr Clover, Capeweed, Fennel and Wild Barley (Figure 3).

Figure 2. Vegetation growing at edges and base of fill

Figure 3. Surface of the fill

THREATS AND OPPORTUNITIES

The native vegetation in the northern part of the property is largely intact with few signs of disturbance. The conservation value of the vegetation is increased by its continuity with native vegetation in neighbouring properties and the wider landscape. The vegetation is threatened by the invasive pest plants that have colonised the fill.

The slopes of the fill could be rehabilitated by removing the exotic vegetation and establishing local native plant species. The soil is of very poor quality and some treatment may required for successful revegetation to occur including the addition of top soil, watering and weed suppression.

It is recommended to plant hardy, fast-growing tussock grasses and rushes that will tolerate the soil conditions and help suppress weeds. Recommended species are:

- *Poa labillardieri var. labillardieri*
- *Juncus pallidus*
- *Juncus subsecundus*
- *Themeda triandra*
- *Enneapogon nigricans*
- *Austrostipa mollis*
- *Rytidosperma caespitosum*

All of these species are native to the local area. They grow in tussocks 0.3 to 1.5 m high, are drought tolerant and compete successfully with exotic plants.

After these plants are successfully established other species could be added including:

- *Dodoneaa viscosa*
- *Bursaria spinosa*
- *Eutaxia microphylla*
- *Acacia myrtifolia*
- *Leptosperumum myrsinoides*
- *Hakea carinata*
- *Acacia myrtifolia*

These species are local native shrubs 1 to 2 m high. They will suppress weed growth by reducing soil moisture and increasing shade.

It may be desirable to avoid using trees to preserve the view from the house. However if trees are planted suitable local species include:

- *Eucalyptus obliqua*
- *Eucalyptus cosmophylla*
- *Callitris preissii*
- *Acacia pycnantha*

The level surface of the fill will most likely be developed for lawn and garden plants. To prevent garden plants recolonising the batter slope it is recommended that a 1 m wide buffer of bare ground or wood chips is maintained at the top of the slope between the garden and native plantings.

It is recommended that pest plants are removed from the lower part of the property, particularly Euryops, Broom, Blackberry, Watsonia and Boneseed.

VEGETATION CLEARANCE FOR TRACK AND TURNAROUND AREA

The slope of the fill is very steep and does not provide safe access to the lower part of the property. It is proposed to cut a track in the northern edge of the fill and to clear a turnaround area at the base to provide foot and vehicle access.

The track will be constructed by cutting into the northern edge of the fill. Fill removed to cut the track should not contribute to further vegetation clearance. A vehicle turnaround area of up to 25 m^2 will be cleared from the native vegetation at the base of the slope.

The clearance of native vegetation is administered under the Native Vegetation Act. These works are likely be subject to the regulation for Vehicle Tracks, where a track may be cleared to establish or maintain a vehicle track that does not exceed 5 m in width, as long as the track is designed to avoid or minimise native vegetation impacts.

Clearing can proceed on the basis of a self-assessment by the landholder and a notification (email) to the Native Vegetation Council. The notification should provide the following information:

- applicant / landowner information;
- property details (section / hundred, allotment / plan);
- reason for clearance and how other alternatives for less or no clearance have been considered;
- map of clearance area / photographs; and
- description of vegetation.

Further information is available at:

http://www.environment.sa.gov.au/managing-natural-resources/native-vegetation/clearing/vehicle-track

COLLECTION OF FIREWOOD

The collection of firewood from native vegetation is regulated by the Native Vegetation Act.

The Act permits the collection of firewood from your own property in a way that allows for regrowth of cleared vegetation. Up to 6 cubic metres of firewood may be collected. Firewood can only be collected from plants with a stem diameter of 200 mm or less at a height 300 mm above the base of the plant.

Further information is available at:

https://www.environment.sa.gov.au/managing-natural-resources/native-vegetation/clearing/firewood

CONCLUSION

If you have any questions regarding this report or require further information, please do not hesitate to contact me.

Yours faithfully,
ECOLOGICAL ASSOCIATES PTY LTD

Dr Marcus Cooling
Principal Ecologist

Attachments

Attachment A. Indicative species list

APPENDIX A. Indicative Species List

NATIVE SPECIES	
Scientific Name	**Common Name**
Acacia pycnantha	Golden Wattle
Allocasuarina verticillata	Drooping Sheoak
Arthropodium strictum	Common Vanilla-lily
Burchardia umbellata	Milkmaids
Eucalyptus cosmophylla	Cup Gum
Eucalyptus obliqua	Messmate Stringybark
Exocarpus cupressiformis	Native Cherry
Geranium potentilloides var. *potentilloides*	Downy Geranium
Goodenia blackiana	Native Primrose
Hakea carinata	Hakea
Hibbertia exutiaces	Guinea-flower
Hibbertia sericea	Silky Guinea-flower
Ixodia achilllaeoides ssp. *alata*	Hills Daisy
Lepidosperma semiteres	Wire Rapier-sedge
Leptospermum myrsinoides	Heath Tea-tree
Lomandra densiflora	Soft Tussock Mat-rush
Lomandra fibrata	Mount Lofty Mat-rush
Lomandra nana	Small Mat-rush
Pimelea stricta	Gaunt Riceflower
Sisymbrium erysimoides	Smooth Mustard
Stackhousia monogyna	Creamy Candles
Tetratheca pilosa	Hairy Pink-bells
Wahlenbergia multicaulis	Tadgells Bluebell

EXOTIC SPECIES		
Scientific Name	**Common Name**	**Invasive**
Euryops abrotanifolius	Euryops	x
Lathyrus tingitanus	Tangier Pea	
Genista monspessulana	Montpellier Broom	x
Pipthatherum mileaceum	Rice Millet	x
Oxalis pes-caprae	Sour Sob	x
Sonchus oleraceus	Common Sow-thistle	
Hypochaeris radicata	Rough Cats Ear	
Arctotheca calendula	Cape Weed	x
Fumaria capreolata	White-flower Fumitory	x
Chrysanthmeoides monilifera ssp. *monilifera*	Boneseed	x
Plantago anceolata	Ribwort	
Rubus sp.	Blackberry	x
Solanum nigrum	Blackberry Nightshade	x
Bromus sp.	Brome	
Holcus lanatus	Yorkshire Fog	
Watsonia meriana var. *bulbillifera*	Bulbil Watsonia	x
Galium murale	Small Goosegrass	x
Pennisetum clandestinum	Kikuyu	
Foeniculum vulgare	Fennel	x
Hordeum vulgare	Wild Barley	
Pinus radiata	Radiata Pine	x

TRACK DESIGN
OPTION 1

N

1:200

OLVS SURVEYS
3856 REF
1.2.17

BDY

220.780

8:1

1:4

FILL 1:1

CUT 1:1

1:4

HOUSE
28 EMMETT RD
CRAFERS WEST

SHEET 1 OF 3

D59326

D28503

SCALE 0 15 30 45 60 75 METRES

46°41'30"
42.21

137°07'30"
113.46

F150993

100
1.33ha

333°37'40"
187.26

VIDE ENLGT

F104215

SITE, LEVELS & CONTOUR PLAN

ALLOTMENT 100 IN D63108
IN THE AREA NAMED CRAFERS WEST
HUNDRED OF ADELAIDE
CT: 5917/721

CONTOURS AS AT OCTOBER 2012

HOUSE

BOUNDARIES HAVE NOT BEEN MARKED OR CHECKED IN THE COURSE OF THIS SURVEY. THE TITLE BOUNDARIES SHOWN ARE INDICATIVE ONLY AND MAY CHANGE IF A BOUNDARY SURVEY WAS TO BE CARRIED OUT AT SOME FUTURE DATE.

NO ATTEMPT WAS MADE AT THE TIME OF SURVEY TO LOCATE ANY UNDERGROUND SERVICES AND BEFORE ANY EXCAVATION WORK IS CARRIED OUT THE RELEVANT AUTHORITIES SHOULD BE CONTACTED.

D63108

311°21'
36.40

356°21'30"
84.09

173°16'30"
220.78

323°04'30"

EMMETT

61.36
263°27'30"

18.11
262°51'30"

ROAD

CLIENT: LUKE HOFMANN

HEIGHT : AHD APPROX DATUM

LOC.: CRAFERS WEST

CONTOUR: MINOR 1.0
INTERVAL: MAJOR 2.00

SCALE: 1:750m on A3

FILE: 3856d1.lcd

DATE OF: 04/10/2012
SURVEY

OLDEN & van SENDEN PTY. LTD. ABN 47 008 133 159 ACN 008 133 159
SURVEYING & PLANNING CONSULTANTS
3/42 MT BARKER ROAD 11 CHAPEL STREET
STIRLING. S.A. 5152 STRATHALBYN
PH (08) 83709699 SA 5255
FAX (08) 83709699 PH(08) 85363224
EMAIL olvs@bigpond.net.au M 0417878671

CONTOUR COMPARISON

ALLOTMENT 100 IN D63108
AREA NAMED CRAFERS WEST

SCALE 1:250m
ON A3 SHEET

SCALE METRES
0 5 10 15 20 25

100
1.33ha

F104215

D63108

HOUSE

BOTTOM

TOP

BANK

OF

FENCING

300mm CONC PIPE

4.40

4.05

333°37'40"
187.26

311°21'
36.40

356°21'30"
84.09

173°16'30"
220.78

BOUNDARIES HAVE NOT BEEN MARKED OR CHECKED IN THE COURSE OF THIS SURVEY. THE TITLE BOUNDARIES SHOWN ARE INDICATIVE ONLY AND MAY CHANGE IF A BOUNDARY SURVEY WAS TO BE CARRIED OUT AT SOME FUTURE DATE.

NO ATTEMPT WAS MADE AT THE TIME OF SURVEY TO LOCATE ANY UNDERGROUND SERVICES AND BEFORE ANY EXCAVATION WORK IS CARRIED OUT THE RELEVANT AUTHORITIES SHOULD BE CONTACTED.

NATURAL CONTOURS TAKEN FROM MAP 6628-48-N DATED FEB. 1971

NATURAL - MIN CONTOUR

NATURAL - MAJ CONTOUR

NEW CONTOURS FROM FIELD SURVEY OF OCT. 2012

NEW - MIN CONTOUR

NEW - MAJ CONTOUR

01.08.14
REF 3856
PLAN 3856XI

OLDEN & van SENDEN PTY. LTD.
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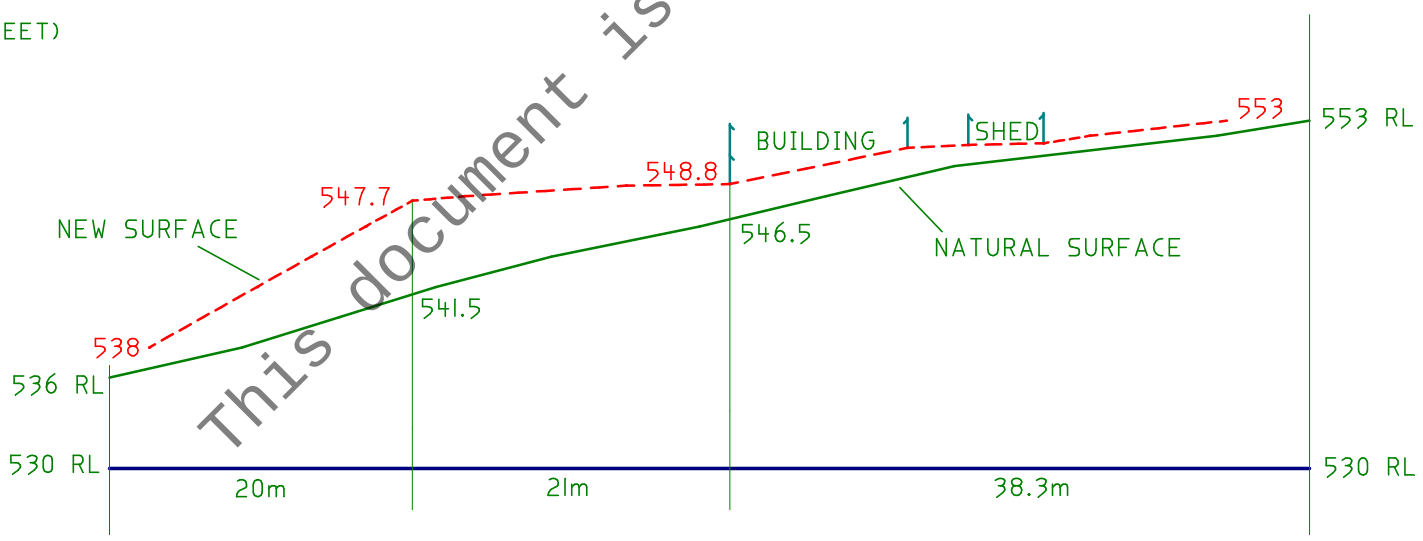
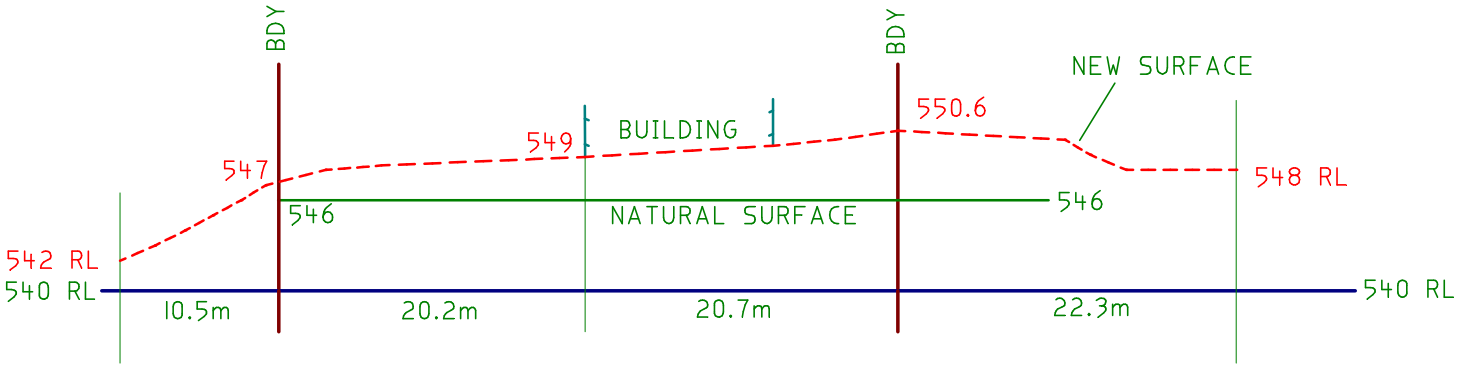
CROSS SECTIONS

(TO SCALE ON A4 SHEET)



XSECTION A-A

HORIZONTAL
AND VERTICAL
SCALE 1:500m



XSECTION B-B

OLDEN & van SENDEN PTY. LTD.
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M 0417878671

REF 3856
PLAN 3856XI
01.08.14

AU-0271A

Tree Management Plan

Prepared by Gordon Sykes

Horticultural & Arboricultural Consultant

4 Hereford Lane, Woodcroft SA 5162

83818593 or 0448369565

gordon.sykes@bigpond.com

for

Mark Musolino
2 Wilsdon Street, Walkerville SA 5081

Site Address - 28 Emmett Road, Crafers West

Subject tree 1 - looking south-west.

Dear Mark

Thank you for meeting with me on Wednesday 23 July 2014 at 10.30 am and inviting me to prepare this Management Plan.

The purpose of this Management Plan is to provide an independent and qualified opinion on the health and safety of the trees and the effects that site filling may have had on the subject trees. This has been requested by the Adelaide Hills Council as soil been placed close to the trees trunks and over their root systems.

I have also recommended measures that would reduce any potential tree damaging activity caused by the placement of fill.

Regulated and Significant trees are protected under the Development Act 1993 and its regulations and as such removal or pruning of any tree including its root system is not permitted without authorization of the local council. This also applies to any works or changes to the site which may cause harm to regulated and significant trees and, as per the Native Vegetation Act, indigenous species.

Site tree species: *Eucalyptus leucoxylon subsp. leucoxylon* "SA Blue Gum" has a distribution throughout Kangaroo Island, most of the Mount Lofty Ranges and has scattered occurrences in the southern Flinders Ranges. This species is very common in the Crafers area.

SA Blue Gums can grow to heights of 30 metres with a canopy spread of 10 metre radius, the main stem has mostly smooth cream to tan bark with loose rough bark around the base that can extend along the main stem. The juvenile leaves are rounded and opposite without stems while the adult leaves are slightly glossy and green. The flowers vary in colour from cream to deep red with fruit capsules (gum nuts) shaped like a wine glass.

These trees provide habitat and are a food source for koalas and native birds.

Ref: Eucalyptus of South Australia – Dean Nicolle

****

Note: *SA Blue Gums have been used as street trees in many Council areas as they are drought tolerant when established and can withstand root damage with the construction of foot paths, kerbs and roads very close to their trunks. The species often causes concrete infrastructure to lift and crack and as such when repairs are made roots are severed close to the trees trunks with minimal harm to the stability and health of the tree.*

Tree Protection on Development Sites.

Trees can be damaged by any works associated with buildings, soil movement (excavations) and storage of materials. This was recognised and an Australian Standard was developed to provide guidelines that would assist developers and authorities in protecting trees during and after site works, the standard also provided methods that could be used to calculate radial distances from the centre of the subject tree near ground level.

This standard is known as AS4970-2009 Protection of trees on development sites.

The two (2) measurements associated with this Australian Standard are;

- **Structural Root Zone (SRZ)** which is the area around the base of a tree required for the tree's stability in the ground. The woody root growth and soil cohesion in this area are necessary to hold the tree upright. The SRZ is normally circular with the trunk at its centre and is expressed by its radius in metres.

- **Tree Protection Zone (TPZ)** is a specified area above and below ground and at a given distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where its is potentially subject to damage by development.

SRZ radius is calculated by the formula $(D \times 50)^{0.42} \times 0.64$ - D being the diameter of the trees base.

TPZ radius is calculated by the formula Diameter at Breast Height (DBH 1.4 metres) x 12. The TPZ radius for multiple trunked trees uses the formula $\sqrt{(DBH)^2 + (DBH)^2 + (DBH)^2} \times 12$

The site 28 Emmett Road, Crafers West.

As advised by your self clean soil has been dumped and spread on the site to the north and western sides of the existing dwelling to create a more level area. This soil has been pushed beneath the canopies and close to the trunks of three (3) *Eucalyptus leucoxylon subsp. leucoxylon* "SA Blue Gums".

These trees remain healthy and vigorous and have not suffered any structural damage to their trunks or branches. However there has been encroachment into both the SRZ and the TPZ which has reduced the aerobic activity of the soil by compaction and has the potential to cause 'collar rot' to the lower trunks of these trees.

This potential damage can be rectified by carefully removing the introduced soil from the entire SRZ and parts of the TPZ.

Western side from dwelling tree: The SA Blue Gum shown as the image on the front page of this document is classified as a "significant" tree as the total of its three trunks is 4.35 metres.

This image shows the lower trunk (looking south) and where the three trunks divide into tri-dominant first order branches.

The unions are sound and there is only a build of loose bark which should not be a concern.

The image also shows the build up of soil near the trees lower trunk.

This tree is in good condition and has an estimated height of 18 metres with a generally symmetrical crown spread of 8 metres radius.

As this tree is significant I considered it appropriate to use the measurements from AS4970-2009 and to use these measurements to recommend how mush of the fill should be removed.

The Base Diameter (BD) of this tree is 0.85 metres and the Diameters at Breast Height (DBH) are 0.44 metres, 0.43 metres and 0.50 metres.

SRZ radius = $(0.85 \times 50)^{0.42} \times 0.64 = 3.10$ metres – this area must not be encroached and all fill soil is to be removed to this radius.

TPZ radius = $\sqrt{(0.44)^2 + (0.43)^2 + (0.50)^2} \times 12 = 9.50$ metres. The soil on the trees eastern side should be further removed back to natural ground level for a distance of 6 metres from the trees trunk centre.

The remaining soil should be battered back at an appropriate angle to direct rain water run off evenly to the trees TPZ area.

The work should be undertaken by experienced operators of a light weight excavator and at no time should this machine enter the SRZ, it is also recommended that soil removal around the trees trunk be manually undertaken to avoid any off target damage to the tree.

This work should be completed before the end of September 2014 which would be just prior to new spring growth.

Northern side fill embankment:

This image shows two other SA Blue Gums which are not classified as 'regulated' or 'significant'.

These trees are in good health although one does have a distinct lean to the north-west.

Fill has been pushed to the trunks of both these trees and it is evident that the SRZ and TPZ have been encroached by this fill.

This image show that recent rain events have washed a lot of the fill away from the trees and it is quite clear what is filling and what is natural ground.

The fill is mainly on the southern sides of these trees and spills to the east and west.

Recommendation: That an excavator with a suitable length reach is used to remove all the fill to the southern drip-line of these trees (about 5 metres), work near the trees trunks should be manual to prevent any machinery damage to the trees trunks.

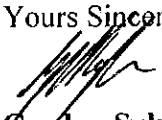
The removed fill should not be transferred to another area where trees may be affected but it could be placed at the top of the embankment in low mounds which would direct rain water run off evenly over the embankment.

Some of this fill could also be used to fill an area that has eroded with the recent rains

Note: On the northern side of the property I did observe that a number of *Eucalyptus oblique* "Messmate Stringy Barks" have died, close inspection identified that the deaths have been caused by infestations of the larvae of the longicorn beetles (borers), this cannot be avoided but is a seasonal occurrence and many trees will survive and others germinate.

Thank you for the opportunity to provide this report and I trust it meets your requirements and provides sufficient information to protect the site trees from damage.

Yours Sincerely



Gordon Sykes
23 July 2014

Advanced Diploma of Horticulture
Diploma of Arboriculture
International Certified Arborist AU - 0271A
Visual Tree Assessment Certificate

Member International Society of Arboriculture (ISA), Member Arboriculture Australia, Life Member South Australian Society of Arboriculture (SASA).

References: *Australian Standard 4373 -2007 - Pruning of Amenity Trees*
AS 4970-2009 Protection of trees on development sites
Trees and Development 'A technical guide to preservation of trees during land development – Matheny and Clark 1998
Dictionary for Managing Trees in Urban Areas – Danny B Draper & Peter A Richards

Disclaimer:

All inspections are visual and comments are based on faults that can be seen, touched or inferred from the ground.
The report and associated recommendations are made in good faith on the basis of what information is available at the time.
Achievement of objectives set out in the report will depend among other things on the actions of the client, council, contractors and the environment over which this consultant has no control.
Notwithstanding anything contained in the report, the consultant will not, except as the law may require, be liable for any loss or other consequences arising out of the services rendered by the Consultant.

Trees are living things that, like any other living thing, are subject to sudden change often caused by unseen or unrecognisable factors which may have detrimental affects on the tree and surrounding environment.

MUD ENVIRONMENTAL

Project:	28 Emmett Road Crafers West,SA
Client:	Botten Levinson Lawyers
Mud Ref.:	ME-296
Revision:	1

FIGURE 1

SITE LOCATION + LAYOUT PLAN

Scale: 1:800 A3

N

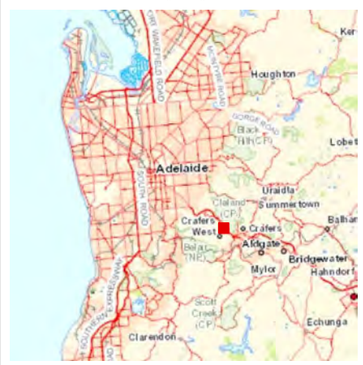
0 20 40
Meters

Coord. Sys.: MGA Zone 54 (GDA 94)

LEGEND

- Fire Track
- Aproximate Observed Fill Extent
- Approximate Current Extent of Flat Yard
- Shed Area (Cut 2018)
- Approximate Pre-filled Yard Extent
- Property Boundary

Image: Google



File: C:\Mud\Projects\ME-296 Levinson Crafers\Baseplan

MUD ENVIRONMENTAL

Project:	28 Emmett Road Crafers West,SA
Client:	Botten Levinson Lawyers
Mud Ref.:	ME-296
Revision:	1

FIGURE 2

SITE ELEVATION + TOPOGRAPHIC CONTOURS PLAN

Scale: 1:400 A3

N

0 10 20
Meters

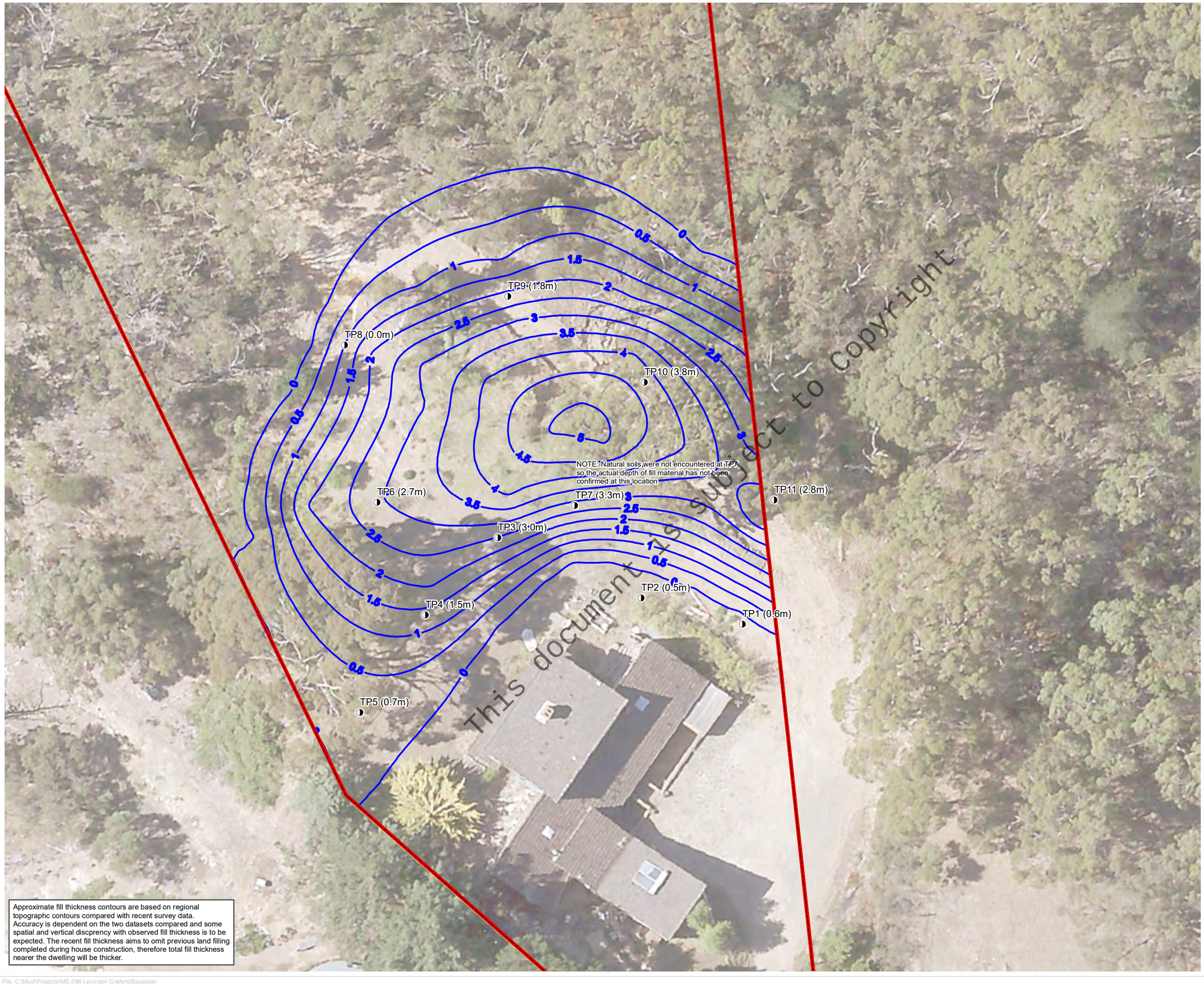
Coord. Sys.: MGA Zone 54 (GDA 94)

LEGEND

Property Boundary

Image: Naturemaps

File: C:\Mud\Projects\ME-296 Levinson Crafers\Baseplan



Approximate fill thickness contours are based on regional topographc contours compared with recent survey data. Accuracy is dependent on the two datasets compared and some spatial and vertical discprency with observed fill thickness is to be expected. The recent fill thickness aims to omit previous land filling completed during house construction, therefore total fill thickness nearer the dwelling will be thicker.

MUD ENVIRONMENTAL

Project:	28 Emmett Road Crafers West,SA
Client:	Botten Levinson Lawyers
Mud Ref.:	ME-296
Revision:	1

FIGURE 3

INFERRED EXTENT OF IMPORTED FILL MATERIALS + TEST PIT LOCATIONS (OCTOBER 2019)

Scale: 1:300 A3

N

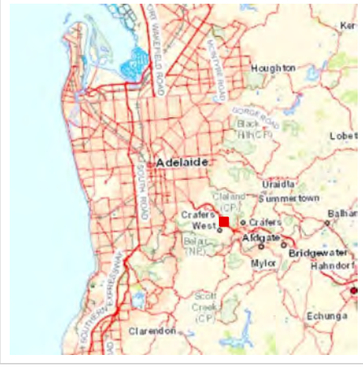
0 7.5 15
Meters

Coord. Sys.: MGA Zone 54 (GDA 94)

LEGEND

- Test Pit (observed fill thickness (m))
- Approx. Recent Fill Thickness Contour (m)
- Property Boundary

Image: Google



File: C:\Mud\Projects\ME-296 Levinson Crafers\Baseplan

MUD ENVIRONMENTAL

ENVIRONMENTAL SOIL INVESTIGATION

Botten Levinson Lawyers

28 Emmett Road, Crafers West,
South Australia

1 May 2020

Mud Ref.: ME-296.R1.2

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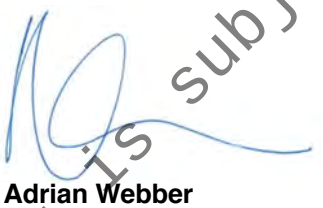

Adrian Webber
BE(CE) CEnvP SC
Director

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EXECUTIVE SUMMARY

Mud Environmental has undertaken an environmental soil investigation at 28 Emmett Road, Crafers West, South Australia ('the site').

Between approximately 2009-2013, part of the site was filled with imported soils from unknown source(s). As outlined in the letter of instruction from Botten Levinson Lawyers, Adelaide Hills Council has requested information from the landowner regarding the contamination status of the fill as part of Development Application 13/30/473. In accordance with the letter of instruction, the objectives of the investigation were to:

1. Confirm that the fill placed on the site is suitable for residential purposes, including the private open space associated with the dwelling;
2. Confirm that there is no risk of pollution to surface or underground waters from the fill; and
3. Ascertain (and plot) the pre 2010 landform, the existing landform including the in-situ fill materials, and the final form of the land as per the proposed site redevelopment plans included within the Development Application.

Eleven test pits were excavated across the inferred filled area at the site. The materials encountered were logged and sampled for laboratory testing and screened in the field for volatile contaminants as well as visual / olfactory indicators of potential contamination. Pre- and post-filling survey data was interrogated using GIS to assess the likely location and depth of fill.

In relation to the stated objectives above, the findings of the investigation are:

1. **Suitability of fill for residential and private open space uses:**

    a. The materials encountered in the filled area are heterogenous, with various layers of fill materials and natural soils observed within the test pits excavated across the inferred filled area at the site.
    b. The depth of fill materials ranged between 0.5m and 3.8m depth below the current surface, with underlying natural soils confirmed at all test pit locations except for test pit TP07, where fill materials were present to the maximum depth of investigation of 3.3m.
    c. Photoionisation detector (PID) results were recorded up to a maximum of 0.3ppm, indicating that the potential for volatile contaminants was low.
    d. In addition to the soil materials, non-mineralogical inclusions were observed within most fill layers, primarily in the form of construction and demolition materials including concrete, bitumen, bricks, pavers, ceramic tiles, plastic sheeting and PVC pipe. Trace inclusions of tar, ash, cinders and slag were observed at some locations.
    e. Asbestos containing materials (ACMs) were confirmed in the form of grey fibre cement fragments within test pit TP07 at depths of between 1.9m-2.7m (FILL 7 layer). No other potential ACMs were encountered in any of the other test pits excavated at the site.
    f. No significant indicators of potential contamination (i.e. odours, staining) were observed during test pitting or soil sampling activities.
    g. All results were below the adopted Tier 1 health based and ecological screening levels for residential land use, except for two individual benzo(a)pyrene concentrations in near surface soils (0.1-0.2m) at locations TP3 and TP6. A Tier 2 risk assessment comprising statistical assessment and review of toxicological data for benzo(a)pyrene was undertaken, which confirmed that these concentrations do not present a risk to human health or ecological risk in the context of residential use. On this basis, the fill materials are not considered to present an unacceptable risk to human health or the environment in the context of residential land use, including private open space areas.

2. **Risk to surface or underground waters from the fill:**

    a. No significant soil concentrations were identified in soils at the site that are considered to threaten surface or groundwater. As stated in the ASC NEPM, '*Groundwater protection may be a particular concern where contamination occurs in sandy soils containing naturally low levels of organic matter, clay and trace elements. In most situations, soil contaminants at levels below appropriate EILs or HILs do not pose a threat to local groundwater sources.*' On this basis, no risk to surface or underground waters has been identified.

3. **Pre- and post-filling levels and depth of fill:**

    a. **Figure 2** shows the pre- and post-filling contours in relation to site features.
    b. **Figure 3** shows the inferred depth of fill based on the difference between these two surveys, which was confirmed through the test pit investigations. The depth of fill ranges from 0m to approximately 5m in the central part of the allotment to the north of the current dwelling.

The following recommendations are made:

- Any soil imported to the site should be sourced from a commercial supplier where possible. Should waste soils be generated from another site to be imported to the site, then the soils should be classified and imported in accordance with EPA requirements.
- All surplus soils to be removed from the site must be managed in accordance with relevant EPA guidelines and/or requirements of waste or recycling depots authorised by the EPA.
- Construction and demolition waste materials should be disposed off-site in accordance with the requirements of waste or recycling depots authorised by the EPA.
- Should any unforeseen materials (including asbestos containing materials) be identified during any excavation works and /or soil handling and management activities, it is recommended that these soils are quarantined, and further advice is sought from an appropriately qualified environmental consultant.

This report and the opinions expressed above are subject to the limitations presented in **Section 5**. It is important that the reader make themselves aware of these limitations.

TABLE OF CONTENTS

TABLES

APPENDICES

1 INTRODUCTION

Mud Environmental was engaged by Botten Levinson Lawyers ('BLL') to undertake an Environmental Soil Investigation at 28 Emmett Road, Crafers West, South Australia ('the site'). The site location and layout are shown on **Figure 1** in **Appendix A**.

Between approximately 2009-2013, part of the site was filled with imported soils from unknown source(s). As outlined in the letter of instruction from BLL (refer **Appendix B**), Adelaide Hills Council ('Council') has requested information from the landowner regarding the contamination status of the fill as part of Development Application 13/30/473.

1.1 Objectives

As outlined in the letter of instruction, the objectives of the investigation were to:

- Confirm that the fill placed on the site is suitable for residential purposes, including the private open space associated with the dwelling;
- Confirm that there is no risk of pollution to surface or underground waters from the fill; and
- Ascertain (and plot) the pre 2010 landform, the existing landform including the in-situ fill materials, and the final form of the land as per the proposed site redevelopment plans included within the Development Application.

2 BACKGROUND

2.1 Site Details

Site details are presented in **Table 1** below.

Table 1 – Site Details

Category	Details
Street Address	28 Emmett Road, Crafers West, South Australia
Certificate of Title	Certificate of Title Volume 5917 Folio 721 Allotment 100 Deposited Plan 63108 in the Area named Crafers West Hundred of Adelaide A copy of Property Location Browser map report identifying the street address and land parcel associated with the above Certificate of Title is provided in **Appendix C**.
Owner(s)	Mr Mark Musolino
Area of Site	Approximately 13,300 m² (1.33 hectares)
Municipality	Adelaide Hills Council
Zoning	The site is zoned Hills Face Zone (HF). The objectives of the Hills Face Zone include: ▪ A zone in which the natural character is preserved and enhanced or in which a natural character is re-established in order to: ▪ (a) provide a natural backdrop to the Adelaide Plain and a contrast to the urban area; ▪ (b) preserve and develop native vegetation and fauna habitats close to metropolitan Adelaide; ▪ (c) provide for passive recreation in an area of natural character close to the metropolitan area; ▪ (d) provide a part of the buffer area between metropolitan districts and prevent the urban area extending into the western slopes of the Mount Lofty Ranges; and ▪ (e) ensure that the community is not required to bear the cost of providing services to land within the zone. ▪ A zone accommodating low intensity agricultural activities and public/private open space and one where structures are located and designed in such a way as to: ▪ (a) preserve and enhance the natural character or assist in the re-establishment of a natural character in the zone; ▪ (b) limit the visual intrusion of development in the zone, particularly when viewed from roads within the zone or from the Adelaide Plain; ▪ (c) not create, either in themselves, or in association with other developments, a potential demand for the provision of services at a cost to the community; and ▪ (d) prevent the loss of life and property resulting from bushfires.
Current Use	The site is used for residential purposes but is currently unoccupied. Architectural drawings of the current residence are included in **Appendix D**.
Proposed Future Use	It is understood that the site will be redeveloped for residential use.
Surrounding Land Use	▪ North - Vacant undeveloped woodland, residential properties (~150m away), then the South Eastern Freeway ▪ East - Vacant undeveloped woodland, residential properties (~100m away), then the South Eastern Freeway ▪ South - Emmett Road, followed by residential properties then vacant undeveloped hills face woodland ▪ West - Residential property, beyond which is Emmett Road, then residential properties and vacant woodland

2.2 Environmental Setting

A summary of the environmental setting of the site and surrounds is provided in **Table 2** overleaf.

2.3 Historical Information

Based on information provided by BLL and discussions with the site owner, it is understood that:

- The existing dwelling was constructed in approximately 1973 (refer to original architectural drawings in **Appendix D,** which also show the pre-filling contours). Prior to fill importation in 2009, the rear yard immediately to the north-west of the residential building was roughly flat until just past the septic tank, an approximate distance of 9m from the rear of the building (shown as a green shaded area on **Figure 1** in **Appendix A**).
- Fill materials were imported to the site between approximately 2009 and 2013. The materials were provided by a civil earthworks contractor as 'clean fill' from multiple unknown sources. Photographs from 2004 (pre-filling) and 2013 (post-filling) are included in **Appendix F.** A survey plan showing the current surface contours is included in **Appendix G**.
- In 2018 an excavator was used on-site to undertake the following minor earthworks:
  - Excavate an area along the western side of the driveway (south of the residential building) to create a flat area for a future shed; and
  - Create a fire access track immediately to the north of the residential building.

Table 2 – Topography, Geology + Hydrogeology

Information	Source	Why this is useful?	Site specific information
Topography + Drainage + Surface Waters	Site Inspection	Topography and drainage provide an indication of the likely direction of movement of surface and subsurface contamination, especially in respect to any nearby sensitive human or ecological receptors.	The site slopes relatively gently to the north from Emmett Road along the southern site boundary and towards central portion of the site, where the site gradient reduces to relatively flat immediately around the existing residential building. The relatively flat rear yard on the northern side the building extends approximately 20m to the north and north-west, beyond which a steep gradient exists over a distance of approximately 20m further to the north and north-west as a result of the extensive importation of fill materials in this area of the site, and which have formed a resulting steep batter slope towards in this area of the site. A slight to moderate site gradient continues towards the north all the way to the northern site boundary. Surface elevation adjacent the residential dwelling is 550m Australian Height Datum (mAHD). The soil investigation area consists entirely of unsealed open spaces consisting of relatively flat to quite steep surface gradients. Rainfall is expected to infiltrate directly into site soils initially, with any surface water runoff expected to migrate down-topographic gradient in a general north-westerly direction, and into the local gully formations approximately 250m away which drain into the Brownhill Creek watercourse system located to the south-west of the site. The marine ecosystems of the Gulf of St. Vincent are located approximately 16km to the west of the site. Site topographic features are illustrated on **Figure 2 and Figure 3** in **Appendix A**. Site photographs showing localised topographic features are included in **Appendix E** (photographs 1 to 9).
	South Australian Resources Information Geoserver Database (SARIG)		
	Naturemaps		
	Adelaide Topographic Map 1:2,500 series, (Sheet 6628-49-h) Department of Lands, South Australia 2nd Edition, 1982		
	Site Levels & Contour Plan (4 October 2012) Olden and van Senden Pty Ltd, Surveying and Planning Consultants		
Regional Geology	1:250,000 Adelaide Geological Map Geological Survey of South Australia, Department of Mines Adelaide, 1st Edition, 1969	The geological conditions at a site help understand how contamination moves in the environment, particularly risks to groundwater associated with surface releases or contamination issues.	The surface geology beneath the site is comprised of flaggy feldspathic Undalya Quartzite (Stonyfell Quartzite), comprising of unnamed siltstone members. Underlying geological formations include various shales, sandstones and dolomite beds, subsequently underlain by the Barossa Complex which consists mica-quartz schists, granitic gneiss, granite, metaquartzite and albitized zones.
	SARIG Database		The site is in an area characterised by the *Stonyfell Quartzite which* consists of flaggy to medium-bedded, pale grey, feldspathic quartzite, of fine to coarse grain.
	Soil Association Map of the Adelaide Region (Sheard & Bowman, 1972)		The site is located approximately 5 kilometres to the south-east of the Eden-Burnside Fault, with very thin surficial soils described as skeletal soils (SK) which exist on bedrock, in conjunction with rock outcrops in general.
	CSIRO ASRIS Acid Sulphate Soils Map		The site is located in an area of extremely low probability / very low confidence of acid sulphate soils.
Hydrogeology + Groundwater Resources	DWLBC Report (2006) '*Overview of the hydrogeology of the Adelaide metropolitan area*'	Hydrogeological information includes an assessment of the likely depth to groundwater and the corresponding water quality. This	The site is located to the east of the Eden-Burnside Fault within Hydrogeological Zone 2, which contains from two to four Quaternary aquifers and from two to four Tertiary aquifers. Only the T1 Aquifer is used significantly as it consists mainly of highly permeable formations (sandy limestone), with groundwater salinity expected to generally range between less than 500mg/L up to 1,500mg/L.

Information	Source	Why this is useful?	Site specific information
	Department of Water (DEW) WaterConnect Database	information assists with the determination of the risk to ground or surface water and the likely impact this may have on its beneficial use.	A search of licensed groundwater wells within a 1km radius of the site was undertaken, with a total of 33 registered bores identified at the locations shown on the plan included in **Appendix H**. Of the 33 registered wells identified, a total of 22 wells were installed to depths of 20m or greater, which suggests that they were installed into deeper aquifers, while four wells did not have depth information recorded. The 33 registered wells returned standing water level (SWL) measurements of between 6.71m and 85m (11 out of 33 wells had SWL information recorded). Total dissolved solids (TDS, or salinity) concentrations were reported at a total of 10 out of 33 wells, with TDS concentrations ranging between 157mg/L and 1,244mg/L, indicating that groundwater in the vicinity of the site is of low salinity. The EPA (2019) *Guidelines for the Assessment and Remediation of Site Contamination* considers that groundwater with a TDS concentration of less than 1,200 mg/L is suitable as a potential drinking water supply. A total of 9 out of 10 registered wells (where TDS data was available) recorded TDS values of less than 1,200 mg/L (average of 597mg/L). While only nine out of 33 registered wells reported purpose information, five of these wells are listed as being used for domestic purposes (1 x operational, 1 x backfilled, 1 x abandoned, 2 x unknown status). One well is also listed as being used for irrigation purposes (operational status). The information obtained from the WaterConnect database indicated that no registered wells exist on-site. A total of seven registered bores were identified within 200m of the site, and are summarised as follows: ▪ **6628-7334** (~500m to the south-east): Unknown purpose, installed to 9.75m depth, SWL of 6.71m, TDS value of 157 mg/L (measured 1936), abandoned. ▪ **6628-21659** (~150m to the east): Domestic well, installed to 91m depth, SWL of 30m, TDS value of 1,244mg/L, yield recorded at 0.56L/sec, backfilled. ▪ **6628-21660** (~170m to the east): Domestic well, installed to 49m depth, SWL of 25m, TDS value of 827mg/L, yield recorded at 1.13L/sec, status unknown. ▪ **6628-19609** (~450m to the east): Domestic well, installed to 189m depth, no SWL / TDS / yield /status information available. ▪ **6628-7330** (~200m to the north-east): Unknown purpose, installed to 60m depth, no SWL / TDS / yield / status information available. ▪ **6628-23612** (~400m to the north): Unknown purpose, installed to 147m depth, no SWL / TDS / yield / status information available. ▪ **6628-7328** (~200m to the north-west): Unknown purpose, installed to 3.05m depth, TDS value of 714mg/L, no SWL / yield / status information available.

3 ENVIRONMENTAL SOIL INVESTIGATIONS

3.1 General Methodology

The main guideline documents referenced as part of this investigation were:

1. EPA '*Guidelines for the assessment and remediation of site contamination'* updated November 2019, herein referred to as the 'GAR, 2019';
2. *National Environment Protection (Assessment of Site Contamination) Measure, 1999 as amended 2013* (ASC NEPM, 2013); and
3. Australian Standard AS4482.1-2005 *Guide to the investigation and sampling of sites with potentially contaminated soil, Part 1: Non-volatile and semi-volatile compounds*'.

The environmental soil investigations were limited to sampling and testing of the fill materials to assess the specific objectives presented in **Section 1.1**.

As required by the GAR, completed *Honesty in reporting* forms are included in **Appendix N**.

3.2 Scope of Work

The following table details the scope of works and associated field methodologies completed as part of the soil investigations undertaken at the site.

The locations of all test pits excavated at the site are illustrated on **Figure 3** in **Appendix A**.

Table 3 – Summary of Investigations

Activity	Item	Description
Site Walkover + Services Clearance	Date	14 October 2019
	Methodology	A review of site conditions was conducted via a thorough walkover of the site. Prior to any ground-breaking activities, all proposed test pit locations were cleared of underground and overhead services via the following methodology: ▪ Review of available Dial Before You Dig (DBYD) services plans. ▪ Inspection of the site and immediate off-site areas for potential evidence of utility services e.g. inspection points, cuts in concrete, signage. ▪ Engagement of an experienced professional service detection contractor (Pipeline Technologies) to clear each of the proposed test pit locations using radio detection and ground penetrating radar (GPR) equipment.
Test Pitting	Date	28 October 2019
	Methodology	Excavation of 11 test pits (TP1 to TP11) was completed across the site, with soil samples collected at approximately 0.5m intervals and from each distinct layer of lithology encountered. Soil logging was consistent with *AS 1726-1993: Geotechnical Site Investigations* and the *Unified Soil Classification System (USCS).* A total of 56 primary soil samples were collected, with 22 primary soil samples submitted for laboratory analyses for a range of chemical substances potentially associated with fill materials as follows: ▪ 23 x samples were submitted for pH; ▪ 21 x samples were submitted for PAHs; ▪ 19 x samples were submitted for metals and OCPs; ▪ 13 x samples were submitted for metals and OPPs; ▪ 6 x samples were submitted for TRH and BTEX; and ▪ 1 x sample was submitted for a SA Waste Screen. In addition, one sample of potential asbestos contain materials in the form of a fibre cement fragment was submitted for the presence / absence of asbestos. A calibrated photo-ionisation detector (PID) was used to screen all soil samples collected in the field for the presence of volatile organic compounds (VOCs). Soil sub-samples were placed into zip-lock bags and the headspace allowed to equilibrate for approximately 2 minutes in a shady area. The PID vacuum inlet was then placed within the bag headspace to measure semi-quantitative VOC concentrations. The PID calibration certificate is provided in **Appendix I**.

Activity	Item	Description
Avoidance of Cross Contamination	Date	28 October 2019
	Soil Sampling	Measures incorporated to prevent cross contamination during soil sampling activities included: ▪ Collection of samples directly from the excavator bucket. ▪ All samples were collected with new disposable nitrile gloves for each sample to avoid cross contamination. ▪ Only dedicated sampling equipment was used during the collection of soil samples thereby minimising the potential for cross contamination during sample handling.
Sample Handling and Preservation	Date	28 October 2019
	Procedures	Samples were stored in a cooler box containing ice with an accompanying chain of custody (COC) document during transit to the laboratories. Sample transportation and handling information are provided on the COC summaries provided in **Appendix L**.

3.3 Tier 1 Investigation / Screening Levels

To assess the significance of soil analytical results in relation to human health and environmental risks, concentrations of chemicals of concern were compared to the adopted health and environmental assessment criteria as outlined in the ASC NEPM.

The ASC NEPM states that site screening criteria are not clean up or response levels, nor are they desirable soil quality criteria. They are to be used for the assessment of existing contamination only and are intended to prompt an appropriate site specific response when exceeded. Site specific health and ecological risk assessments must be conducted where exceedances of investigation levels indicate that there is a likelihood of adverse effects on human health or ecological values for a site.

As the proposed ongoing use of the land is for residential purposes, the following site suitability land use scenarios have been considered:

- Residential with gardens / accessible soils (i.e. low density residential); and
- Public open space such as parks and playgrounds (e.g. recreational use).

On the basis of these identified land uses, the investigation / screening levels highlighted below in **Table 4** were adopted for assessing the significance of chemical concentrations in soils at the site.

Table 4 – ASC NEPM Site Suitability Investigation / Screening Levels

Land Use	HILs		HSLs		EILs	ESLs	Management Limits	Aesthetics
	HIL A	HIL C	HSL A/B	HSL C	Urban Residential + Public Open Space		Fine & Coarse Soil	Visual + Olfactory
Residential with gardens and access to soils	✓		✓		✓	✓	✓	✓
Public open space		✓		✓	✓	✓	✓	✓

The various human health and ecological investigation / screening levels are discussed further below.

3.3.1 Protection of Human Health

The following investigation / screening levels were adopted to assess potential risks to human health from soils.

Table 5 – Soil Investigation / Screening Levels for the Protection of Human Health

Reference	Category	Discussion
ASC NEPM Health Investigation Levels (HILs)	HIL A - Residential with garden / accessible soil HIL C - Public open space	Health Investigation Levels (HILs) have been developed for a broad range of metals and organic substances and are based on generally conservative assumptions for the estimated exposure of occupiers in a variety of exposure settings including residential, public open space and commercial / industrial land uses. The HILs are applicable for assessing human health risk via all relevant pathways of exposure and are generic to all soil types. The ASC NEPM states that '*An investigation level is the concentration of a contaminant above which further appropriate investigation and evaluation will be required (ANZECC/NHMRC Guidelines 1992)*'. Therefore, an exceedance of an investigation level does not indicate that there is a definite risk to human health, but rather that further site-specific assessment is required to quantify the potential risk to human health. Soil results have therefore been compared to the following HILs: ▪ HIL A – residential with garden/accessible soil (home grown produce <10% fruit and vegetable intake (no poultry)) in the first instance as the most conservative measure; and ▪ HIL C – Public open space such as parks, playgrounds and playing fields (e.g. ovals), secondary schools and footpaths. It is considered that the adoption of the most sensitive health-based screening level (i.e. HIL A) is also protective of other sensitive receptors, including childcare / school users, recreational users, commercial / industrial users and construction and maintenance workers.
ASC NEPM Health Screening Levels (HSLs)	HSL A + B Low-high density residential	Health Screening Levels (HSLs) have been developed for selected petroleum compounds and fractions. They are applicable to assessing human health risk via the inhalation of soil vapours. The HSLs depend upon specific soil physiochemical properties, land use scenarios and the characteristics of building structures. They apply to different soils types, and varying depths below the surface. In the first instance, the conservative HSLs for exposure setting HSL A/B (low-high density residential) for sandy soils (0-2m) have been selected, which are also considered protective of other less sensitive users. However, comparison to adopted HSLs A/B for both silt and clay materials has also been undertaken given the observed presence of these soils within the sub-surface.
Schedules B(1) and B(2) of the ASC NEPM	Health screening levels for asbestos	Health screening levels for asbestos are presented in the ASC NEPM for bonded asbestos and friable asbestos in soil, which are based on scenario specific likely exposure levels, and are adopted from the Department of Health (WA) '*Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia'* dated May 2009.

3.3.2 Protection of the Environment

The following investigation / screening levels were adopted to assess risks to ecological receptors from soils.

Table 6 – Soil Investigation / Screening Levels for the Protection of the Environment

Reference	Category	Discussion
ASC NEPM Ecological Investigation Levels (EILs)	Urban residential / public open space	The ASC NEPM provides ecological investigation levels (EILs) to assess the potential risk posed to ecological receptors. The EILs have been developed for selected metals and organic substances, are applicable for assessing risks to terrestrial ecosystems, and depend on specific soil physiochemical properties and land use scenarios which generally apply to the top 2m of soil. The NEPM specifies the following ecologically based investigation levels: ▪ Default EILs for arsenic, lead, DDT and naphthalene. ▪ Derivation of site-specific EILs for nickel, chromium III, copper and zinc. Based upon the land use of the site and surrounding area, the EILs for the generic land use setting (urban residential and public open space) have been used. A method is provided for deriving site specific EILs for copper,

Reference	Category	Discussion
		chromium III, nickel and zinc. This requires an assessment of the ambient background concentration (ABC) for the relevant soil, by applicable measurements of uncontaminated soils either on site or in the broader locality. The EIL is then derived from the sum of the ambient background concentration (ABC) and the added contaminant limit (ACL). The ACL's are listed in the current version of the ASC NEPM for chromium III and nickel (based on clay content), copper (based on the cation exchange capacity and pH of the soil), and for lead (generic ACL irrespective of soil properties). As site-specific soil characteristics of pH, CEC and clay content were not directly measured during soil investigations, the ACLs calculated for the site are based on the average pH values across all soil samples tested (n=22) and by applying highly conservative values for cation exchange capacity (CEC = 5 cmolc/kg dwt) and clay content (1%). In addition, the ABCs for copper, chromium III, nickel and zinc were calculated using the average concentrations from all soil samples analysed (n=20). Site-specific EILs were then calculated for based on this conservation approach to the derivation ABCs and ACLs. Assumptions used in the EIL calculations are presented in **Appendix K**.
ASC NEPM Ecological Screening Levels (ESLs)	Urban residential / public open space	Ecological Screening Levels (ESLs) have been developed for the management of potential risk posed by selected petroleum hydrocarbons. The ESLs broadly apply to coarse and fine-grained soils and various land uses. They are generally applicable to the top 2m of soil. Based upon the land use of the site and surrounding area, the criteria for the generic land use setting (urban residential and public open space) for coarse soils have been used. There are ESLs listed in the current version of the ASC NEPM for petroleum hydrocarbon compounds including BTEX, benzo(a)pyrene, C6-C10 TPH (total TPH in this fraction minus total BTEX), and C10-C16 TPH (total TPH in this fraction minus naphthalene).
ASC NEPM Management Limits	Management Limits (fine and coarse soils)	Petroleum hydrocarbon 'Management Limits' criteria are limited to petroleum hydrocarbon compounds, and are maximum values that should remain at a site following evaluation of potential human health and ecological risks, and potential risks to groundwater resources. The Management Limits apply to all soil depths based on site-specific considerations, and also consider the formation of light non-aqueous phase liquids, fire and explosion risks, and damage to buried infrastructure.

3.3.3 Buildings and Structures

For some substances, such as phenols and sulphates, their impact on structures (effects on PVC piping and cement) may override the health and environmental considerations. As outlined in the ASC NEPM (2013), a structural limit of 2,000 mg/kg is set for sulphate in soil.

Australian Standard AS 2159 (1995) *Piling – Design and Installation* provides exposure classification values for concrete and steel piles in soil (non-aggressive to very severely aggressive). These guidelines are considered to be appropriate in assessing the potential for detrimental impacts of site soils to buildings and structures.

In addition, the presence of other aggressive chemical compounds (e.g. acids) may be potentially detrimental to buildings or structures and pH of site soils has been considered in this context.

The ASC NEPM (2013) Management Limits also consider damage to buried infrastructure from petroleum hydrocarbons in soils.

3.3.4 Aesthetics

Relevant SA EPA and ASC NEPM guidance material requires that potential aesthetic issues must be considered in the site contamination assessment process, and defines aesthetic issues as those that generally relate to the presence of non-hazardous inert foreign material.

The presence of these materials alone at a site would not generally result in site contamination, however, sites that may have been adequately assessed and/or remediated to address potential human health and environmental issues arising from site contamination may still contain residual foreign inert materials that require management.

The aesthetic suitability of the soil materials encountered was therefore considered against the definition of contamination as outlined in the ASC NEPM (2013), which states that:

> *'In arriving at a balanced assessment, the presence of small quantities of non-hazardous inert material and low odour residue (for example, weak petroleum hydrocarbon odours) that will decrease over time should not be a cause of concern or limit the use of a site in most circumstances. Similarly, sites with large quantities of well-covered known inert materials that present no health hazard such as brick fragments and cement wastes (for example, broken cement blocks) are usually of low concern for both non-sensitive and sensitive land uses. Caution should be used for assessing sensitive land uses, such as residential, when large quantities of various fill types and demolition rubble are present.'*

Apart from the typical inclusions of construction and demolition materials, the following characteristics are examples of other aesthetic concerns:

- Highly malodorous soils or extracted groundwater (e.g. residual petroleum hydrocarbons, hydrogen sulphide, organosulfur compounds);
- Hydrocarbon sheen on surface water;
- Discoloured chemical deposits or soil staining with chemical waste other than of a very minor nature;
- Large monolithic deposits of otherwise low-risk material, e.g. gypsum as powder or plasterboard, cement kiln dust;
- The presence of putrescible refuse materials that may generate hazardous levels of methane (e.g. a deep-fill profile of green waste or large quantities of timber waste; and/or
- Soils containing residue from animal burial (e.g. former abattoir sites).

There are no specific numeric aesthetic guidelines, however site assessment requires balanced consideration of the quantity, type and distribution of foreign material or odours in relation to the specific land use and its sensitivity. For example, higher expectations for soil quality would apply to residential properties with gardens compared with industrial settings.

In some cases, documentation of the nature and distribution of the foreign material may be sufficient to address concerns relating to potential land use restrictions.

3.4 Results

3.4.1 Review of Survey Data + Fill Depths

Figure 2 shows the pre- and post-filling contours in relation to site features. Whilst design elevations are not available for the proposed future dwelling, it is understood that the elevation of the home will remain similar to the current surface.

Figure 3 shows the inferred depth of fill based on the difference between these two surveys, which was confirmed through the test pit investigations. The depth of fill ranges from 0m to approximately 5m in the central part of the allotment to the north of the current dwelling.

3.4.2 Materials Encountered + Field Observations

Photographs of soil materials encountered with soil bores are provided in **Appendix E** (photographs 10 to 36). Test pit logs are provided in **Appendix J**.

A general summary of the soil materials encountered is provided in the table below.

Table 7 – Materials Encountered

Layer	Description
FILL 1	SAND, silty, fine to coarse grained, gravelly, orange-brown to light brown, dry to low moisture, trace oversized (>100mm) mudstone / siltstone cobbles up to 100mm, **trace inclusions of combinations of bitumen / paving bricks / red bricks / concrete fragments / ash + cinders / ceramic tiles / black or orange plastic / PVC pipe** (possibly from adjacent building structure).
FILL 2	GRAVEL, sandy, blue-grey sub-base materials, angular gravels to 50mm, moist.
FILL 3	SAND, silty, fine to medium grained, orange, moist (sandy loam type soils).
FILL 4	CLAY, sandy, gravelly, medium plasticity, brown to dark brown, **trace oversized (>100mm) inclusions of combinations of bitumen / paving bricks / cinders / slag / red brick fragments,** moist.
FILL 5	CLAY, sandy (coarse grained), gravelly, low plasticity, light-brown to brown, **trace bitumen pieces up to 250mm, ultra-trace concrete pieces / bituminous tar, moist.**
FILL 6	CLAY, silty, low-plasticity, orange-brown to red-brown, trace calcareous gravels up to 50mm, trace whole quartz gravels to 50mm, **trace bitumen.**
FILL 7	CLAY, sandy, gravelly, low plasticity, brown, **trace oversized (>100mm) bitumen / concrete fragments, potential ACM fragments**
FILL 8	CLAY, sandy, gravelly, low plasticity, brown, **trace inclusions of combinations of bitumen / concrete / paving bricks / quartz cobble ballast up to 100mm**, moist.
FILL 9	SAND, gravelly, clayey, **trace oversized concrete / bitumen / trace steel reo**, light brown to brown, moist.
FILL 10	CLAY, silty, trace gravels, medium plasticity, red-brown, **trace oversized (>100mm) fragments of brick / pavers / concrete / bitumen.**
FILL 11	SAND, clayey, coarse grained, orange-brown, trace gravels and cobbles throughout up to 150mm.
NATURAL 1	CLAY, silty, low plasticity, trace mudstone cobbles and gravels from 10mm-300mm, orange-brown to brown, moist.
NATURAL 2	SILT, organic matter present (twigs + roots), grey to grey-brown, low moisture.
NATURAL 3	SILT, calcareous, light-brown to orange-brown, low moisture.
NATURAL 4	CLAY, silty, low-plasticity, light-brown to orange-brown, trace calcareous gravels, moist.
NATURAL 5	CLAY, silty, low plasticity, yellow-brown to white, talc-like feel, moist.

The subsurface conditions across the site were highly variable, with 11 distinct layers of fill materials and five distinct layers of natural materials observed within the test pits excavated across the site. In total, 10 out of 11 test pits contained fill materials, with only test pit TP8 containing natural materials only.

The vertical extent of fill materials encountered from the surface ranged between 0.5m depth (TP2) and 3.8m depth (TP10), with underlying natural soils confirmed at all test pit locations with the exception of test pit TP07 where fill materials existed to the maximum depth of investigation of 3.3m below ground surface.

Non-mineralogical inclusions were identified within all test pits except for TP8 (natural soils only), were present in 8 out of the 11 distinct layers of fill materials encountered, and were observed in the form of the following materials:

- Bitumen wastes ranging in size from small fragments of ~10mm up to large pieces ~400mm width (10 out of 11 test pits);
- Concrete, bricks and / or pavers (10 out of 11 test pits);
- Construction and demolition waste / building wastes including ceramic tiles / black or orange plastic / PVC pipe (5 out of 11 test pits);
- Trace ash and cinders (5 out of 11 test pits);
- Trace small fragments of slag (2 out of 11 test pits); and
- Trace remnants of partially solidified bituminous tar (1 out of 11 test pits);
- Potential asbestos containing materials (ACMs) in the form of trace grey fibre cement fragments in test pit TP07 at depths of between 1.9m-2.7m within materials designated as the 'FILL 7' layer. No other potential ACMs were encountered in any of the other test pits excavated at the site, with the 'FILL 7' layer also only observed within soils at test pit TP07.

No other observations of potential chemical impacts (i.e. odours, staining) were observed during test pitting or soil sampling activities.

PID results were recorded up to a maximum of 0.3ppm, indicating that the potential for volatile contaminants was low within the test pits excavated across the site.

3.4.3 Soil Analytical Results – Tier 1 Screening

All soil analytical results were compared to the human health and ecological assessment criteria summarised in **Section 4** above, with a summary table results included in **Appendix K** which highlights any exceedances of the soil assessment criteria adopted for the site.

The laboratory Certificates of Analysis and associated Chain of Custody Documentation are included in **Appendix L**.

All soil analytical results reported concentrations of all chemicals below the adopted ASC NEPM (2013) human health and ecological criteria with the exception of the following samples:

- TP3_0.1-0.2 (FILL 1 layer) reported benzo(a)pyrene concentration of 3.8mg/kg which exceeds the ASC NEPM ESL criteria of 3mg/kg;
- TP3_0.1-0.2 (FILL 1 layer) reported a benzo(a)pyrene toxic equivalent (TEQ) concentration of 5.5mg/kg which exceeds the ASC NEPM HIL A + HIL C criteria of 3mg/kg;
- TP6_0.1-0.2 (FILL 1 layer) reported benzo(a)pyrene concentration of 3.7mg/kg which exceeds the ASC NEPM ESL criteria of 3mg/kg; and
- TP6_0.1-0.2 (FILL 1 layer) reported a benzo(a)pyrene TEQ concentration of 5.2mg/kg which exceeds the ASC NEPM HIL A + HIL C criteria of 3mg/kg.

3.4.4 Benzo(a)pyrene in Fill – Tier 2 Screening

Given the above isolated chemical exceedances of benzo(a)pyrene and benzo(a)pyrene TEQ concentrations reported in shallow soils at the site, a statistical analyses of the relevant data sets (where n=22) was completed using US EPA ProUCL software.

Results of the statistical interpretation of benzo(a)pyrene concentrations indicated the following:

- Maximum = 3.8mg/kg which is less than 2.5 x the ESL criteria of 3mg/kg;
- 95% UCL = 1.78mg/kg which is less than 1 x the ESL criteria of 3mg/kg; and
- Standard Deviation = 0.942mg/kg which is less than 0.5 x the ESL criteria of 3mg/kg.

Results of the statistical interpretation of benzo(a)pyrene TEQ concentrations indicated the following:

- Maximum = 5.5mg/kg which is less than 2.5 x the HIL A / HIL C criteria of 3mg/kg;
- 95% UCL = 2.198mg/kg which is less than 1 x the HIL A / HIL C criteria of 3mg/kg; and
- Standard Deviation = 1.2mg/kg which is less than 0.5 x the HIL A / HIL C criteria of 3mg/kg.

On the basis of the above statistical outputs, both the benzo(a)pyrene and benzo(a)pyrene TEQ concentrations reported within shallow soils at the site are considered to statistically comply with the ASC NEPM (2013) human health and environmental investigation / screening levels adopted for the site.

Despite the benzo(a)pyrene concentrations statistically complying with the adopted Tier 1 investigation levels for the protection of human health and the environment in a residential setting, a Tier 2 risk assessment was undertaken, as documented below.

The original ESLs for benzo(a)pyrene adopted in the ASC NEPM (as amended in 2013) were 0.7mg/kg for urban residential and public open space and 1.4mg/kg for commercial and industrial. These numbers were adopted from provisional Canadian environmental health soil quality guidelines (SQG_E), following a review (by Dr Michael Warne) in early 20101 for the ASC NEPM variation.

The Canadian soil quality guidelines for PAHs were revised in 2010, subsequent to the Warne review being completed and the amendment of the ASC NEPM:

- Canadian Council of Ministers of the Environment (CCME), 2010. Canadian Soil Quality Guidelines for Carcinogenic and Other Polycyclic Aromatic Hydrocarbons (Environmental and Human Health Effects). Scientific Criteria Document (revised).
- Canadian Council of Ministers of the Environment, 2010. Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health: Carcinogenic and Other PAHs

New toxicological data/information is used and presented in the 2010 CCME SQG guidance which clearly state that the benzo(a)pyrene values developed in 1997 and presented in the 1999 document have now been superseded by the 2010 values. The 2010 CCME SQGE are 20mg/kg for residential/parkland and 72 mg/kg for commercial. The 2010 Canadian SQGE relevant for residential / parkland use is significantly higher than the corresponding ASC NEPM ESL.

The ASC NEPM ESLs for benzo(a)pyrene are recognised as being based on limited data and are considered to be of low reliability and therefore application and reliance on the B(a)P ESLs (derived from the 1999 SQGE) may lead to an overly conservative approach to site assessment and remediation.

On this basis, the measured benzo(a)pyrene concentrations are not considered to present a risk to ecological receptors in a residential setting.

[1] Review of the appropriateness of selected Canadian Soil Quality Guidelines (benzene, benzo(a)pyrene, ethylbenzene, toluene and xylenes) for incorporation into the Australian National Environment Protection (Assessment of Site Contamination) Measure and recommended Ecological Investigation Levels by Dr Michael Warne (2013 corrected version for benzo(a)pyrene)

3.4.5 Asbestos Containing Materials

During soil investigations completed at the site in October 2019, a number of potential asbestos containing materials ('ACM') fragments in the form of small pieces of bonded fibre cement were observed and collected from the 'FILL 7' layer encountered within test pit TP07 at an approximate depth of between 1.9m-2.7m below ground surface.

The results of laboratory testing of the potential ACM fibre cement fragments confirmed the presence of chrysotile, amosite and crocidolite asbestos.

Potential ACMs were not observed in any other test pits during the site investigations.

3.4.6 Potential Aesthetic Issues

Consideration of the aesthetic suitability of soil materials encountered was undertaken to determine if any potential human health and / or environmental issues are likely to exist that require management due to the presence of residual foreign inert materials

As stated in **Section 4.4** above, sites that contain residual non-hazardous inert materials that present no health hazard (such as brick fragments and cement wastes) are usually of low concern for both non-sensitive and sensitive land uses.

The presence of non-mineralogical inclusions observed within the imported fill layers at the site was primarily in the form of inert materials consisting of concrete, bricks, pavers, ceramic tiles, plastic sheeting and PVC pipe.

While bitumen materials ranging in size from approximately 10mm-400mm were identified within specific layers of fill materials at most test pit locations, remaining soil inclusions in the form of partially solidified bituminous tar, ash, cinders and slag were only noted in trace amounts.

Furthermore, although ACMs in the form of grey fibre cement fragments were confirmed within test pit TP07 at depths of between 1.9m-2.7m (FILL 7 layer), no other potential ACMs were encountered in any of the other test pits excavated at the site.

3.4.7 Soil Data Validation

The soil assessment activities conducted as part of this site investigation were subject to data validation processes to ensure that the data obtained via sample collection, handling, and laboratory analyses procedures is reliable.

All information relating to Data Quality Objectives ('DQOs') and the field and laboratory quality assurance ('QA') and quality control ('QC') measures are presented in **Appendix M**, and have been reviewed and validated in order to provide confidence that the soil analytical data is reliable for the purposes of this assessment.

4 CONCLUSIONS + RECOMMENDATIONS

In relation to the stated objectives above, the findings of the investigation are:

1. **Suitability of fill for residential and private open space uses:**

    a. The materials encountered in the filled area are heterogenous, with various layers of fill materials and natural soils observed within the test pits excavated across the inferred filled area at the site.
    b. The depth of fill materials ranged between 0.5m and 3.8m depth below the current surface, with underlying natural soils confirmed at all test pit locations except for test pit TP07, where fill materials were present to the maximum depth of investigation of 3.3m.
    c. Photoionisation detector (PID) results were recorded up to a maximum of 0.3ppm, indicating that the potential for volatile contaminants was low.
    d. In addition to the soil materials, non-mineralogical inclusions were observed within most fill layers, primarily in the form of construction and demolition materials including concrete, bitumen, bricks, pavers, ceramic tiles, plastic sheeting and PVC pipe. Trace inclusions of tar, ash, cinders and slag were observed at some locations.
    e. Asbestos containing materials (ACMs) were confirmed in the form of grey fibre cement fragments within test pit TP07 at depths of between 1.9m-2.7m (FILL 7 layer). No other potential ACMs were encountered in any of the other test pits excavated at the site.
    f. No significant indicators of potential contamination (i.e. odours, staining) were observed during test pitting or soil sampling activities.
    g. All results were below the adopted Tier 1 health based and ecological screening levels for residential land use, except for two individual benzo(a)pyrene concentrations in near surface soils (0.1-0.2m) at locations TP3 and TP6. A Tier 2 risk assessment comprising statistical assessment and review of toxicological data for benzo(a)pyrene was undertaken, which confirmed that these concentrations do not present a risk to human health or ecological risk in the context of residential use. On this basis, the fill materials are not considered to present an unacceptable risk to human health or the environment in the context of residential land use, including private open space areas.

2. **Risk to surface or underground waters from the fill:**

    a. No significant soil concentrations were identified in soils at the site that are considered to threaten surface or groundwater. As stated in the ASC NEPM, '*Groundwater protection may be a particular concern where contamination occurs in sandy soils containing naturally low levels of organic matter, clay and trace elements. In most situations, soil contaminants at levels below appropriate EILs or HILs do not pose a threat to local groundwater sources.*' On this basis, no risk to surface or underground waters has been identified.

3. **Pre- and post-filling levels and depth of fill:**

    a. **Figure 2** shows the pre- and post-filling contours in relation to site features.
    b. **Figure 3** shows the inferred depth of fill based on the difference between these two surveys, which was confirmed through the test pit investigations. The depth of fill ranges from 0m to approximately 5m in the central part of the allotment to the north of the current dwelling.

The following recommendations are made:

- Any soil imported to the site should be sourced from a commercial supplier where possible. Should waste soils be generated from another site to be imported to the site, then the soils should be classified and imported in accordance with EPA requirements.

- All surplus soils to be removed from the site must be managed in accordance with relevant EPA guidelines and/or requirements of waste or recycling depots authorised by the EPA.
- Construction and demolition waste materials should be disposed off-site in accordance with the requirements of waste or recycling depots authorised by the EPA.
- Should any unforeseen materials (including asbestos containing materials) be identified during any excavation works and /or soil handling and management activities, it is recommended that these soils are quarantined, and further advice is sought from an appropriately qualified environmental consultant.

This report and the opinions expressed above are subject to the limitations presented in **Section 5**. It is important that the reader make themselves aware of these limitations.

5 LIMITATIONS

Scope of Services

This Environmental Soil Investigation ('the report') has been prepared in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Botten Levinson Lawyers and Mud Environmental ('scope of services'). In some circumstances, the scope of services may have been limited by a range of factors such as time, budget, access and/or site disturbance constraints.

Reliance on Data

In preparing the report, Mud Environmental has relied upon data, surveys, analyses, designs, plans and other information provided by Botten Levinson Lawyers and other individuals and organisations, most of which are referred to in the report ('the data'). Except as otherwise stated in the report, Mud Environmental has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report ('conclusions') are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. Mud Environmental will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to Mud Environmental.

Desktop Environmental Conclusions

In accordance with the scope of services, Mud Environmental has relied upon the data and has conducted desktop site history research in the preparation of the report. The nature and extent of investigation conducted is described in the report.

No desktop investigation, no matter how thorough, can eliminate the possibility that not all potentially contaminating activities were identified, or provide sufficient confidence to determine the suitability of a site for a given use. The conclusions are based only upon the data and information available to Mud Environmental at the time of preparing this report.

Within the limitations imposed by the scope of services, the investigation and preparation of this report have been undertaken and performed in a professional manner, in accordance with generally accepted practices and using a degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. No other warranty, expressed or implied, is made.

Report for Benefit of Botten Levinson Lawyers

The report has been prepared for the benefit of Botten Levinson Lawyers and no other party. Mud Environmental assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report (including without limitation matters arising from any negligent act or omission of Mud Environmental or for any loss or damage suffered by any other party relying upon the matters dealt with or conclusions expressed in the report). Other parties should not rely upon the report or the accuracy or completeness of any conclusions and should make their own enquiries and obtain independent advice in relation to such matters.

Other Limitations

Mud Environmental will not be liable to update or revise the report to take into account any events or emergent circumstances or facts occurring or becoming apparent after the date of the report.

APPENDIX A

Figures

Figure 1: Site Location and Layout Plan
Figure 2: Site Elevation & Topographic Contours Plan – Historical (1973) + Post Fill Importation (2012) + Final Proposed Post Site Redevelopment
Figure 3: Inferred Extent of Imported Fill Materials + Test Pit Locations (October 2019)
Figure 4: Final Condition of Site – Residual Soil Exceedances (October 2019)

MUD ENVIRONMENTAL

Project:	28 Emmett Road Crafers West,SA
Client:	Botten Levinson Lawyers
Mud Ref.:	ME-296
Revision:	1

FIGURE 1

SITE LOCATION + LAYOUT PLAN

Scale: 1:800 A3

N

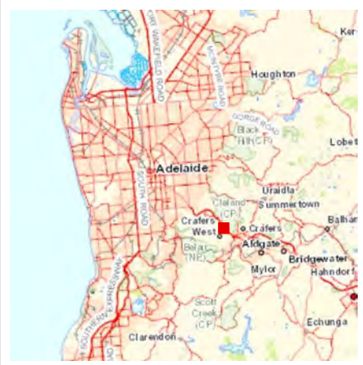
0 20 40
Meters

Coord. Sys.: MGA Zone 54 (GDA 94)

LEGEND

- Fire Track
- Aproximate Observed Fill Extent
- Approximate Current Extent of Flat Yard
- Shed Area (Cut 2018)
- Approximate Pre-filled Yard Extent
- Property Boundary

Image: Google



File: C:\Mud\Projects\ME-296 Levinson Crafers\Baseplan

MUD ENVIRONMENTAL

Project:	28 Emmett Road Crafers West,SA
Client:	Botten Levinson Lawyers
Mud Ref.:	ME-296
Revision:	1

FIGURE 2

SITE ELEVATION + TOPOGRAPHIC CONTOURS PLAN

Scale: 1:400 A3

N

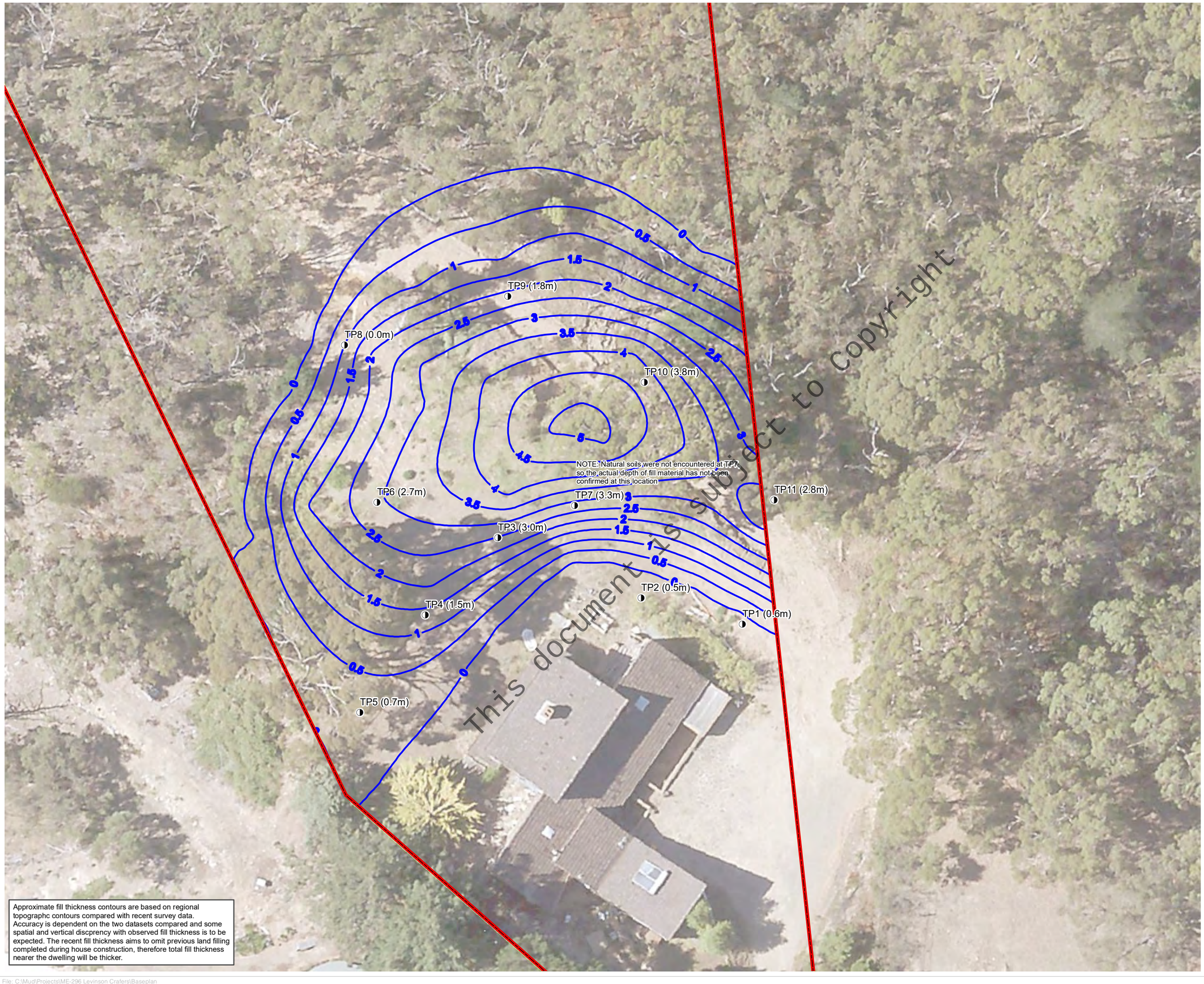
0 10 20
Meters

Coord. Sys.: MGA Zone 54 (GDA 94)

LEGEND

Property Boundary

Image: Naturemaps



Approximate fill thickness contours are based on regional topographc contours compared with recent survey data. Accuracy is dependent on the two datasets compared and some spatial and vertical discprency with observed fill thickness is to be expected. The recent fill thickness aims to omit previous land filling completed during house construction, therefore total fill thickness nearer the dwelling will be thicker.

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FIGURE 3

INFERRED EXTENT OF IMPORTED FILL MATERIALS + TEST PIT LOCATIONS (OCTOBER 2019)

Scale: 1:300 A3

N

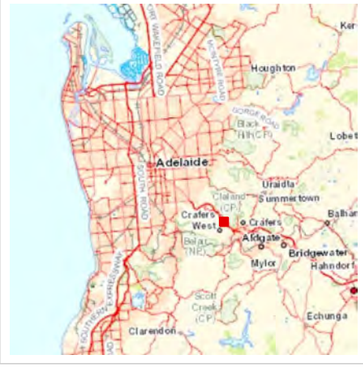
0 7.5 15
Meters

Coord. Sys.: MGA Zone 54 (GDA 94)

LEGEND

- Test Pit (observed fill thickness (m))
- Approx. Recent Fill Thickness Contour (m)
- Property Boundary

Image: Google



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MUD ENVIRONMENTAL

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Mud Ref.:	ME-296
Revision:	1

FIGURE 4

FINAL CONDITION OF SITE – RESIDUAL SOIL EXCEEDANCES (OCTOBER 2019)

Scale: 1:300 A3

N

0 7.5 15
Meters

Coord. Sys.: MGA Zone 54 (GDA 94)

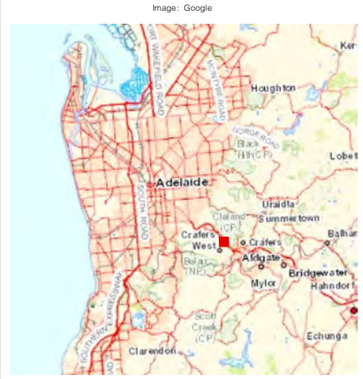
LEGEND

Test Pit

- No results exceeding criteria
- Results exceeding NEPM HIL + ESL
- Asbestos containing material identified *
- Property Boundary

* Asbestos Containing Material (ACM) fragment present within FILL 7 material located at a depth of ~2.0m-2.7m

Image: Google



File: C:\Mud\Projects\ME-296 Levinson Crafers\Baseplan

APPENDIX B

Letter of Instruction

BOTTEN LEVINSON
Lawyers

Our ref: JAL/216265

16 December 2019

Mr Adrian Webber
Mud Environmental Pty Ltd
PO Box 80
HENLEY BEACH SA 5022

By email: adrian@mudenvironmental.com.au

Dear Adrian

DA 13/30/473- 28 Emmett Road, Crafers West

This firm acts for the application for this development proposal.

The Council has requested an assessment be undertaken by a suitably qualified site contamination consultant to -

1. Confirm that the fill placed on the site is suitable for residential purposes (including the private open space associated with the dwelling;

2. Confirm that there is no risk of pollution to surface or underground waters from the fill; and

3. Ascertain (and plot) the pre 2010 land form, the existing land form with the fill in situ and the final form of the land as proposed.

I would be grateful if you would provide a report to me with answers to those questions based on your site investigations and testing.

Yours faithfully

James Levinson
BOTTEN LEVINSON
Mob: 0407 050 080
Email: jal@bllawyers.com.au

Level 1 Darling Building
28 Franklin Street, Adelaide
GPO Box 1042, Adelaide SA 5001
t. 08 8212 9777
f. 08 8212 8099
e. info@bllawyers.com.au
www.bllawyers.com.au

BL Lawyers Pty Ltd trading as Botten Levinson Lawyers ABN 36 611 397 285 ACN 611 397 285

APPENDIX C

Property Location Browser Information

PLB Pro Parcel Report

Date Created: October 10, 2019

The Property Location Browser is available on the Land Services Website: www.sa.gov.au/landservices

Address Details

Unit Number:	
Street Number:	28
Street Name:	EMMETT
Street Type:	RD
Suburb:	CRAFERS WEST
Postcode:	5152

Property Details:

Council:	ADELAIDE HILLS COUNCIL
State Electorate:	HEYSEN (2014), WAITE (2018)
Federal Electorate:	MAYO (2013), MAYO (2016), MAYO (2019)
Hundred:	ADELAIDE
Valuation Number:	3302762258
Title Reference:	CT5917/721
Plan No. Parcel No.:	D63108A100

Scale ≈ 1:2569 (on A4 page)

100 metres≈

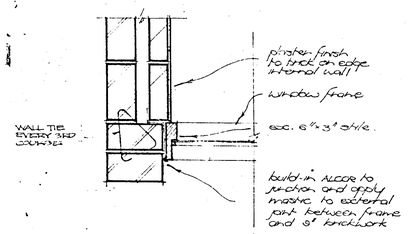
The information provided above, is not represented to be accurate, current or complete at the time of printing this report.

The Government of South Australia accepts no liability for the use of this data, or any reliance placed on it.

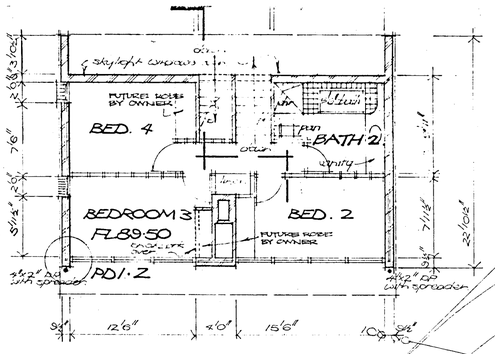
Government of South Australia
Department of Planning, Transport and Infrastructure

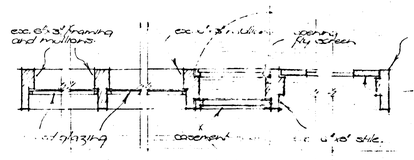
APPENDIX D

Architectural Plans (1973)



PLAN DETAIL 1:2
scale 1" equals 1'0"

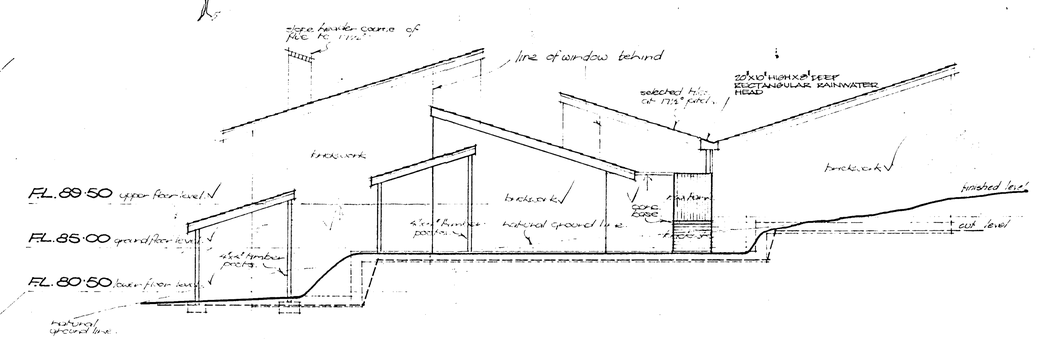




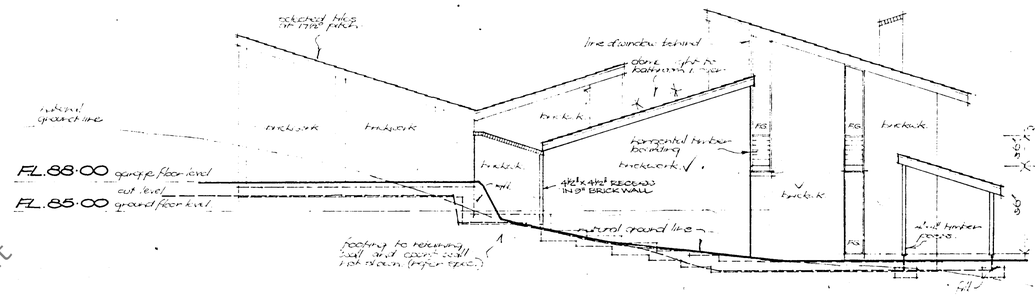
TYPICAL WINDOW PLAN DETAIL
1:0"

PLAN DETAIL 2:2
scale 1" equals 1'0"

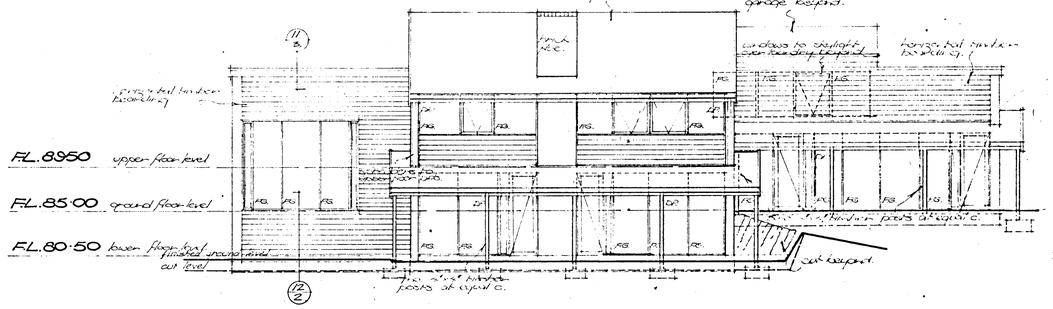
GROUND FLOOR PLAN
scale 1/8" equals 1'0"



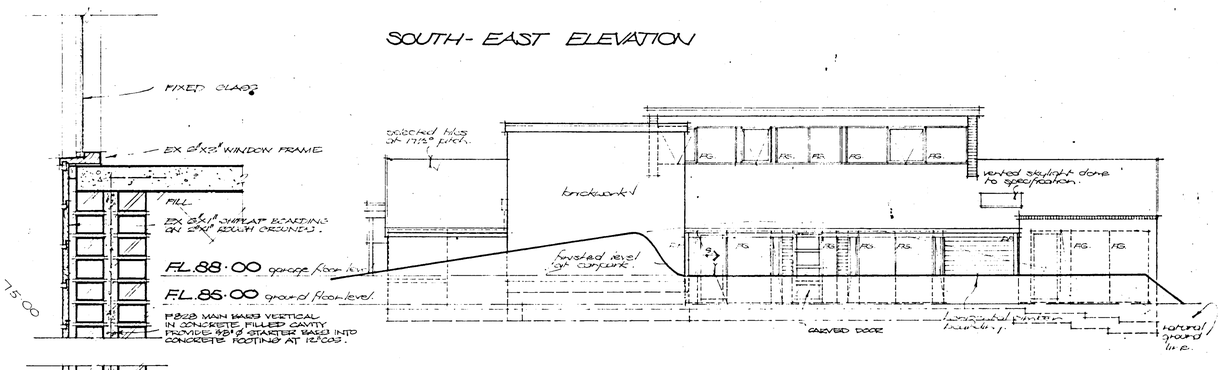
SOUTH-WEST ELEVATION



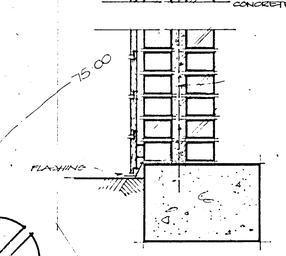
NORTH-EAST ELEVATION



SOUTH-EAST ELEVATION



NORTH-WEST ELEVATION



DETAIL 12.
SCALE: 1"=1'0"

NORTH

AMENDMENTS:

1. PROVIDE RETAINING WALL AT LIVING ROOM/T.V. ROOM AND BELOW BEDROOM 1. (DETAIL 12/2.)
2. STORMWATER SYSTEM REMARKETED
3. CLADDING DETAIL ETC. EXTERNALLY FULL FRAME HEIGHT
4. BATH 2. LAYOUT ALTERED WITH THE ADDITION OF A SEPARATE WC. (SIMILARLY ELECTRICAL)
5. FOOT SUPPORT TO VERANDAHS AMENDED TO 'U' BRACKETS
6. DETAIL 4/3 AMENDED TO 125x7 GUTTER BOARD AND 175x1 F.I. GUTTER.
7. 14"x9" BEAMS RELOCATED OVER CENTRE LINES OF PARALLEL WALLS.
8. ALL INTERNAL DOOR FRAMES TO SUIT 2040 LININGS.
9. ARCHES AT BEDT./PASSAGE AND PASSAGE/KITCHEN
10. CARVED FRONT DOOR.
11. SLIDING DOOR TO FRONT.

MR AND MRS. T.P. LYNCH
LOT 557 BARRETT ROAD CRAIGIES

builder shall verify all the dimensions and levels on the site before commencing work

PROPOSED NEW RESIDENCE

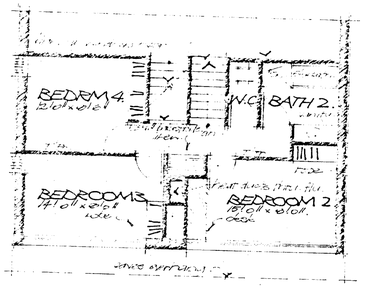
PLAN, ELEVATION AND DETAILS.

date
scale
dwn

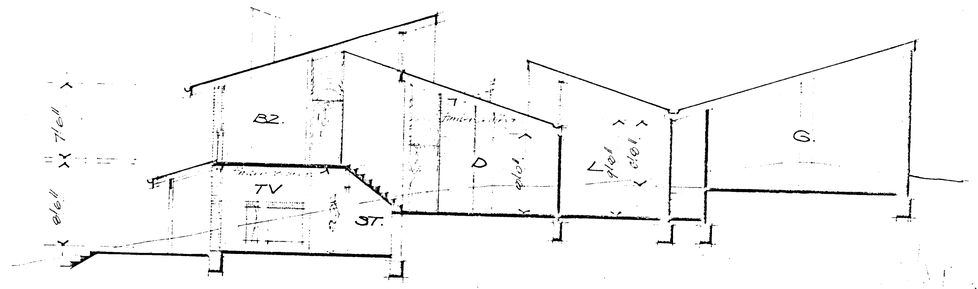
dwg no 97/150-2.

eirkenbeam architects
84 fullarton road norwood sa 5067 ph 42 3788

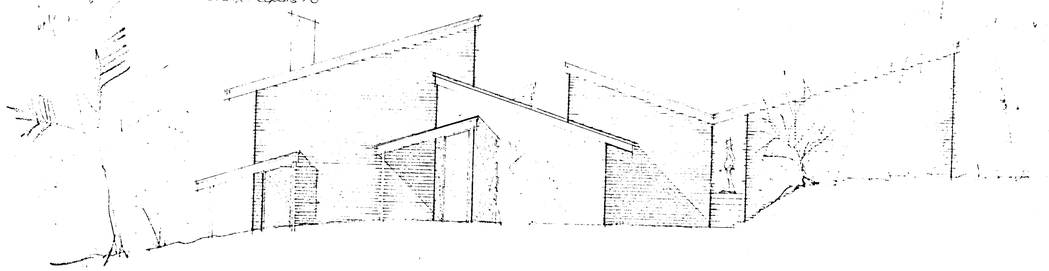
UPPER FLOOR PLAN



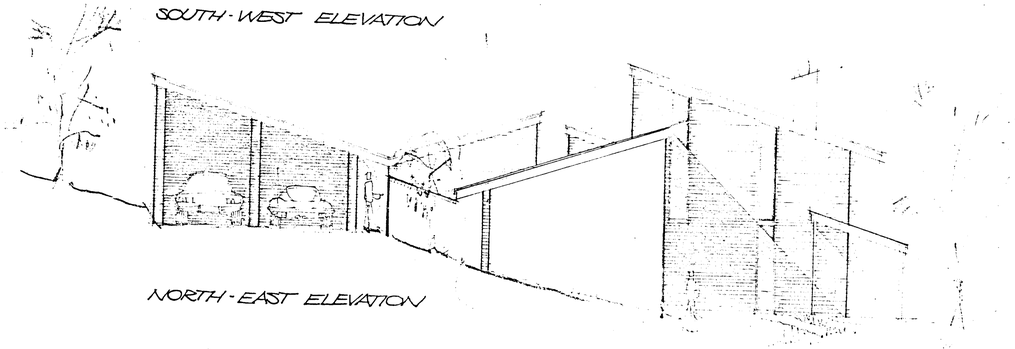
FLOOR PLAN AND SITE PLAN



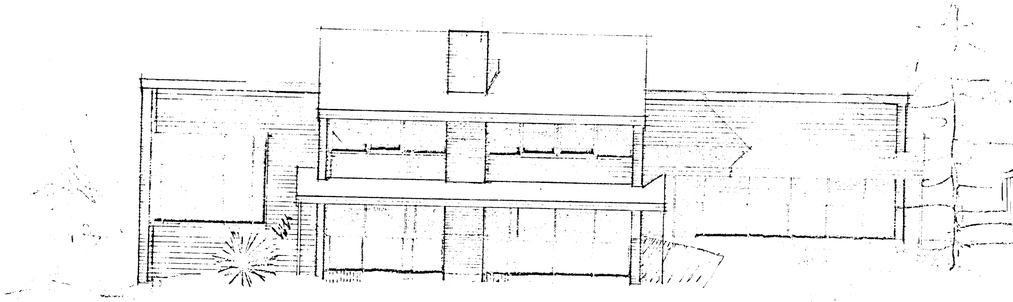
SECTION A A



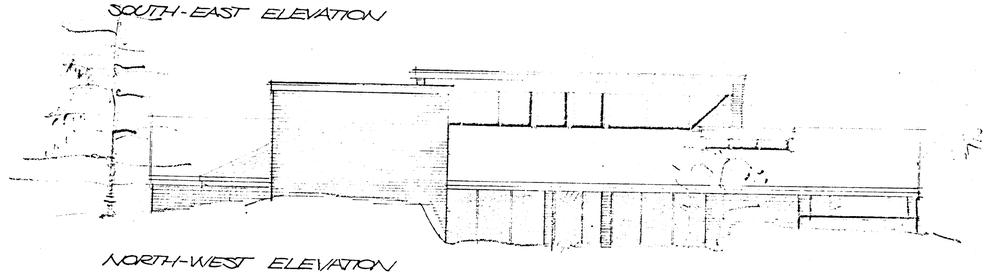
SOUTH-WEST ELEVATION



NORTH-EAST ELEVATION



SOUTH-EAST ELEVATION



NORTH-WEST ELEVATION

NORTH.

PROPOSED RESIDENCE FOR MR. & MRS T. LUNCH AT LOT 957 EMMETT ROAD, CRAFERS.

scales AS SHOWN.

date drawn

drawing no

arkitekton pty ltd
projects design and documentation
64 fullarton rd norwood sa 5067 ph 4256888

APPENDIX E

Site Inspection & Test Pitting Photographs (Mud Environmental, October 2019)

Photograph 1 – View to the west from the eastern site boundary. Excavated fire track is located to the right of photo below the batter slope (14 October 2019).

Photograph 2 – View to the north-east from the grassed area in front (north-west) of the building. Folder location shows approximate site boundary prior to fill importation (14 October 2019).

Photograph 3 – View to the south-west from the grassed area in front (north-west) of the building. Folder location shows approximate site boundary prior to fill importation (14 October 2019).

Photograph 4 – Brick fragments in existing driveway fill materials - view to the north (14 October 2019).

Photograph 5 – Bitumen fragments in fill materials adjacent north-eastern corner of building - view to the north (14 October 2019).

Photograph 6 – Bitumen fragments in fill materials in main batter slope between building and fire track - view to the north-west (14 October 2019).

Photograph 7 – Concrete, bricks and bitumen fragments in wall of main batter slope between building and fire track - view to the west (14 October 2019).

Photograph 8 – View to the south from the bottom of the fire track - looking up topographical gradient at fill materials comprising the main batter slope. Existing building atop the rise (14 October 2019).

Photograph 9 – View to the north away from the site (28 October 2019).

Photograph 10 – Test Pit TP01 profile located adjacent north-western corner of building. FILL 1 (silty SAND) + FILL 2 (grey GRAVEL) layers present to ~0.6m, underlain by natural silty clays (28 October 2019).

Photograph 11 – Paving bricks & trace bitumen in FILL 1 layer (0-0.4m) in TP01 (28 October 2019).

Photograph 12 – View to the south-west at test pit TP02 location (28 October 2019).

Photograph 13 – Paving bricks & trace concrete in FILL 1 layer (0-0.45m) in TP02 (28 October 2019).

Photograph 14 – Test pit TP02: Orange sandy loam (FILL 3 layer) @ 0.45-0.5m between overlying FILL 1 layer (0-0.45m) and underlying NATURAL 1 silty, gravelly, CLAY materials from 0.45m (28 October 2019).

Photograph 15 – Test pit TP03: Trace oversized fragments of concrete and bitumen + bituminous tar pieces within the FILL 5 layer located at ~1.9-2.5m (28 October 2019).

Photograph 16 – Test pit TP03: Trace bituminous tar within the FILL 5 layer at 1.9-2.5m (28 October 2019).

Photograph 17 – Test pit TP03: NATURAL 2 grey-brown organic SILT layer @ ~3.0m (28 October 2019).

Photograph 18 – View to the west at test pit TP04 location (28 October 2019).

Photograph 19 – View of northern wall of test pit TP04 showing bitumen inclusions and trace bituminous tar pieces within mixed (FILL 4 + FILL 5 + FILL 6) fill materials to ~1.5m (28 October 2019).

Photograph 20 – View to the west at TP05 location adjacent the eastern site boundary (28 October 2019).

Photograph 21 – View of test pit TP06 location marked 'X' to the north and down the imported fill batter slope towards the base of the fire track (28 October 2019).

Photograph 22 – View to the north-west at excavation of soils within TP06. Oversized bricks prevalent within the initial FILL 6 layer located at ~0.2-0.8m below surface (28 October 2019).

Photograph 23 – Test pit TP07 excavation view towards the north-west (28 October 2019).

Photograph 24 – Test pit TP07 multiple fill layers within top 1.1m (28 October 2019).

Photograph 25 –TP07 oversized concrete inclusions in FILL 5 layer from 1.1-2.0m (28 October 2019).

Photograph 26 – Test pit TP07: Confirmed Asbestos Containing Materials (ACM) fragments located within the FILL 7 layer present at approximately 2.0-2.7m (28 October 2019).

Photograph 27 – View to the south from the bottom of the fire track. Test pit TP08 excavated within natural soils at base of fill slope (28 October 2019).

Photograph 28 – Test pit TP08 in natural soils at northern end / base of fill batter slope (28 October 2019).

Photograph 29 – Test pit TP09 excavated into wall of batter slope, looking to the south (28 October 2019).

Photograph 30 – Test pit TP09 interface between FILL 10 materials (trace oversized bitumen, rocks and concrete) and NATURAL 2 grey-brown organic SILT layer @ 1.8m below surface (28 October 2019).

Photograph 31 – Excavation of test pit TP10 - View north-west down the fire track (28 October 2019).

Photograph 32 – Excavation of test pit TP10 - View north-west down the fire track (28 October 2019).

Photograph 33 – Test pit TP10: FILL 11 & FILL 9 layers with bitumen in top 1m (28 October 2019).

Photograph 34 –Test pit TP10: Multiple fill layers observed. Bitumen pieces present from ~0.9-1.4m below surface throughout FILL 10 layer (28 October 2019).

Photograph 35 – Excavation of TP11: View south-west towards the existing building (28 October 2019).

Photograph 36 – Test pit TP11 looking to the north-east. Bitumen fragments up to 350mm + oversized physical inclusions of rocks/cobbles/quartz ballast in FILL 8 layer @ ~1.9-2.8m (28 October 2019).

APPENDIX F

Site Photographs (2004 to 2013)

Site Photographs
Circa 2004

Photograph 1 – View to the north-west from the top of the fire track (circa 2004).

Photograph 2 – View to the north from the top of the fire track (circa 2004).

Photograph 3 – View to the west from the top of the fire track (circa 2004).

Photograph 4 – View to the south from the top of the fire track (circa 2004).

Photograph 5 – View to the north-west from the eastern boundary adjacent the residence (circa 2004).

Photograph 6 – View to the west from the rear yard immediately north of the residence (circa 2004).

Site Photographs
Circa 2012

Photograph 7 – View to the south-east from edge of the batter slope (circa 2012).

Photograph 8 – View to the south from edge of the batter slope (circa 2012).

Photograph 9 – View to the north-west from the top of the fire track (circa 2012).

Photograph 10 – View to the north-west from the top of the fire track (circa 2012).

Photograph 11 – View to the north-west from the top of the fire track (circa 2013).

Photograph 12 – View to the south-east from edge of the batter slope (circa 2012).

Photograph 13 – View to the north from edge of the eastern boundary adjacent residence (circa 2013).

APPENDIX G

Site Survey Data (2012)

D59326

D28503

SCALE
0 15 30 45 60 75 METRES

46°41'30"
42.21

137°07'30"
113.46

F150993

100
1.33ha

187.26
332°37'40"

VIDE ENLGT

F104215

SITE, LEVELS &
CONTOUR PLAN

ALLOTMENT 100 IN D63108
IN THE AREA NAMED CRAFERS WEST
HUNDRED OF ADELAIDE
CT: 5917/721

BOUNDARIES HAVE NOT BEEN MARKED OR CHECKED IN THE COURSE OF THIS SURVEY. THE TITLE BOUNDARIES SHOWN ARE INDICATIVE ONLY AND MAY CHANGE IF A BOUNDARY SURVEY WAS TO BE CARRIED OUT AT SOME FUTURE DATE.

NO ATTEMPT WAS MADE AT THE TIME OF SURVEY TO LOCATE ANY UNDERGROUND SERVICES AND BEFORE ANY EXCAVATION WORK IS CARRIED OUT THE RELEVANT AUTHORITIES SHOULD BE CONTACTED.

536 538 540 542 544 546 548 550 552 554 555

014

HOUSE

36.40
311°21'

552
356°21'30"
84.09

220.78
173°16'30"

D63108

EMMETT

323°04'30"

61.36
263°27'30"

18.11
262°51'30"

ROAD

CLIENT: LUKE HOFMANN

HEIGHT : AHD APPROX
DATUM

CONTOUR: MINOR 1.0
INTERVAL: MAJOR 2.00

LOC.: CRAFERS WEST

SCALE: 1:750m on A3

FILE: 3856d1.lcd

DATE OF: 04/10/2012
SURVEY

OLDEN & van SENDEN PTY. LTD.
ABN 47 008 133 159
ACN 008 133 159

SURVEYING & PLANNING CONSULTANTS
3/42 MT BARKER ROAD
STIRLING. S.A. 5152
PH (08) 83709699
FAX (08) 83709699
EMAIL olvs@bigpond.net.au

11 CHAPEL STREET
STRATHALBYN
SA 5255
PH(08) 85363224
M 0417878671

REF 3856

ENLARGEMENT

SCALE METRES

0 5 10 15 20 25

F104215

100

1.33ha

HOUSE

BOTTOM OF BANK

TOP OF BANK

FENCING

FENCING

4.40

36.40

311°21'

84.09

356°21'30"

220.78

173°16'30"

333°37'40"

187.26

D63108

BOUNDARIES HAVE NOT BEEN MARKED OR CHECKED IN THE COURSE OF THIS SURVEY. THE TITLE BOUNDARIES SHOWN ARE INDICATIVE ONLY AND MAY CHANGE IF A BOUNDARY SURVEY WAS TO BE CARRIED OUT AT SOME FUTURE DATE.

NO ATTEMPT WAS MADE AT THE TIME OF SURVEY TO LOCATE ANY UNDERGROUND SERVICES AND BEFORE ANY EXCAVATION WORK IS CARRIED OUT THE RELEVANT AUTHORITIES SHOULD BE CONTACTED.

OLDEN & van SENDEN PTY. LTD.
ACN 008 133 159 ABN 47 008 133 159
SURVEYING CONSULTANTS
3/42 MT BARKER ROAD
STIRLING. S.A. 5152
PH (08) 83709699
FAX (08) 83709699
EMAIL olvs@bigpond.net.au
11 CHAPEL STREET
STRATHALBYN
SA 5255
PH(08) 85363224
M 0417878671

NO ATTEMPT WAS MADE AT THE TIME OF SURVEY TO LOCATE ANY UNDERGROUND SERVICES AND BEFORE ANY EXCAVATION WORK IS CARRIED OUT THE RELEVANT AUTHORITIES SHOULD BE CONTACTED.

100
1.33ha

BOTTOM OF BANK

TOP OF BANK

HOUSE

F104215

D63108

FENCING

FENCING

311°21'

36.40

173°16'30"

220.78

356°21'30"

84.09

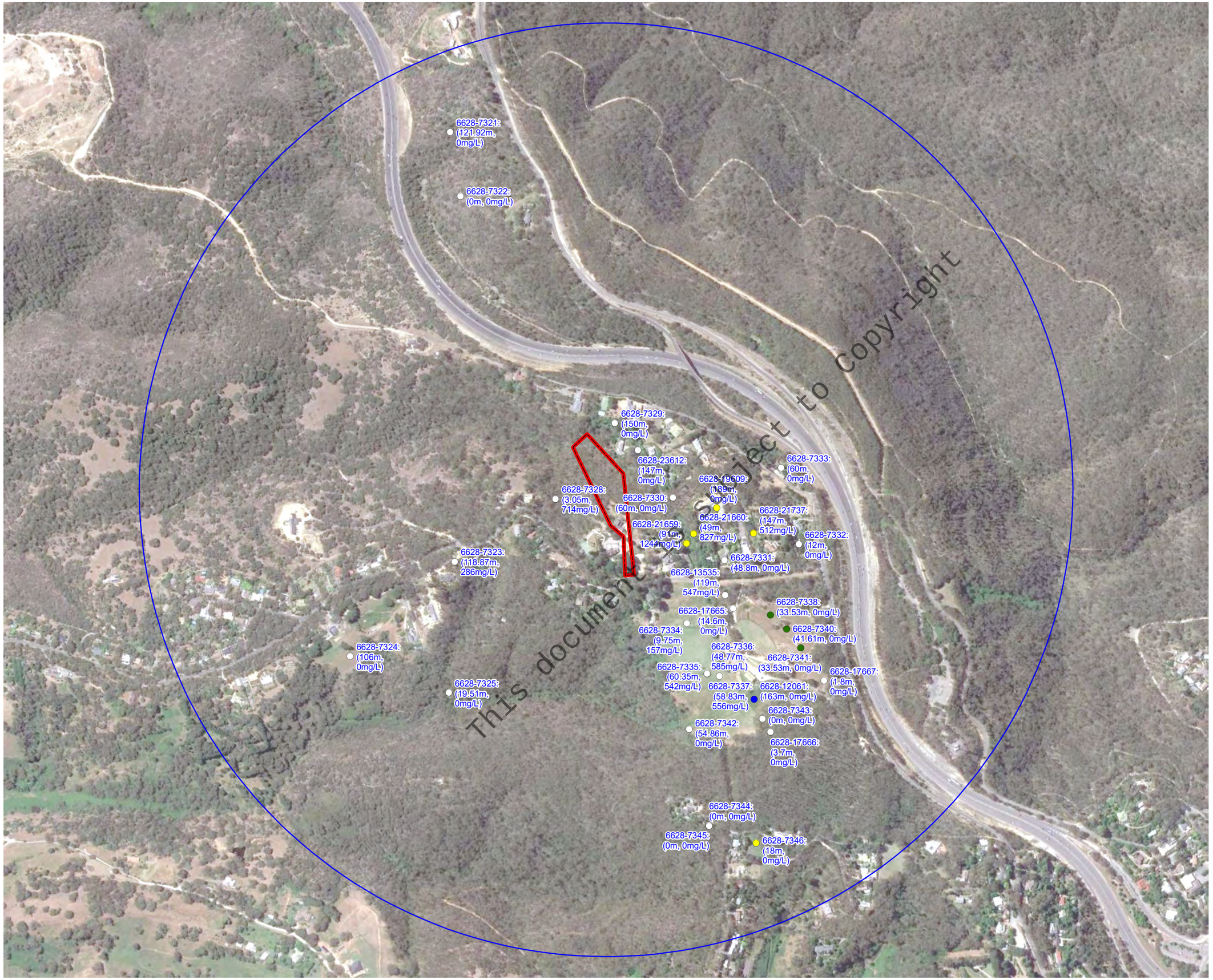
ENLARGEMENT

SCALE
0 5 10 15 20 METRES

OLDEN & van SENDEN PTY LTD
ACN 008 133 159
3/42 MT BARKER RD
STIRLING S.A. 5152
Ph/Fax (08) 83709699
Mobile 0417878671
Email olvs@bigpond.net.au
11 CHAPEL ST.
STRATHALBYN
SA 5255
Ph (08) 85363224
REF 3856

APPENDIX H

WaterConnect Database Information



MUD ENVIRONMENTAL

Project:	28 Emmett Road Crafers West,SA
Client:	Botten Levinson Lawyers
Mud Ref.:	ME-296
Revision:	1

APPENDIX H

WATERCONNECT DATABASE SEARCH RESULTS

Scale: 1:7,500 A3

N

0 190 380
Meters

Coord. Sys.: MGA Zone 54 (GDA 94)

LEGEND

Registered Drillholes (Depth, TDS)

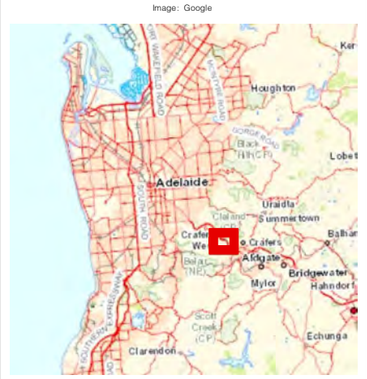
Purpose:

- Unknown
- CMT
- Domestic
- Drainage
- Investigation
- Irrigation
- Monitoring

1km Search Radius

Property Boundary

Image: Google



File: C:\Mud\Projects\ME-296 Levinson Crafers\Baseplan

APPENDIX H
ME-296 LEVINSONS CRAFERS
WATERCONNECT REGISTERED GROUNDWATER BORE SEARCH RESULTS (1km RADIUS)

Unit Number	Drillhole Name	Depth (m)	Drilled Date	Purpose	Status	Depth to Water (m)	Water Level Date	TDS (mg/L)	TDS Date	Yield (L/sec)	Yield Date
6628-7321		121.92	5/12/1967		ABD	76.2	28/07/1966				
6628-7322					CLP						
6628-7323		118.87	18/05/1960		ABD	83.82	18/05/1960	286	18/05/1960	0.16	18/05/1960
6628-7324		106	3/05/1977			51.82	18/05/1960			0.25	18/05/1960
6628-7325		19.51	28/04/1950		ABD						
6628-7328		3.05	12/03/1959					714	12/03/1959		
6628-7329		150	4/05/1977		ABD						
6628-7330		60	4/05/1977		ABD						
6628-7331		48.8	4/04/1977							0.25	1/01/1977
6628-7332		12	2/05/1977		BKF						
6628-7333		60	4/05/1977		ABD						
6628-7334		9.75	28/04/1936		ABD	6.71	28/04/1936	157	28/04/1936		
6628-7335		60.35	1/01/1933					542	24/01/1934		
6628-7336		48.77	18/03/1937			39.62	18/03/1937	585	18/03/1937	0	18/03/1937
6628-7337		58.83	18/03/1937			51.21	18/03/1937	556	18/03/1937	0	18/03/1937
6628-7338	CITY BRICKS 1	33.53	12/11/1954	CMT	UKN	27.13	12/11/1954				
6628-7340	CITY BRICKS 2	41.61	26/11/1954	CMT	UKN					0.32	26/11/1954
6628-7341	CITY BRICKS 3	33.53	3/12/1954	CMT	UKN						
6628-7342		54.86	5/12/1967								
6628-7343					ABD						
6628-7344											
6628-7345											
6628-7346		18	3/05/1977	DOM	OPR						
6628-12061		163	30/10/1982	IRR	OPR	11.4	30/10/1982			2.5	30/10/1982
6628-13535		119	1/10/1985			85	7/01/1986	547	1/10/1985	0.63	1/10/1985
6628-17665	CRAFERS 1	14.6	25/05/1972		UKN						
6628-17666	CRAFERS 8	3.7	25/05/1972		UKN						
6628-17667	CRAFERS 13	1.8	25/05/1972		UKN						
6628-19609		189	17/06/1999	DOM	ABD						
6628-21659	SITE A	91	17/12/2003	DOM	BKF	30	17/12/2003	1244	17/12/2003	0.56	17/12/2003
6628-21660	SITE B	49	18/12/2003	DOM		25	18/12/2003	827	17/12/2003	1.13	18/12/2003
6628-21737		147	30/04/2004	DOM		0	30/04/2004	512	30/04/2004	0.45	30/04/2004
6628-23612		147	10/07/2008		BKF		10/07/2008	0	9/07/2008		

APPENDIX I

Field Equipment Calibration Certificates

PID Calibration Certificate

Instrument: PhoCheck Tiger
Serial No.: T-105925

airmet
Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
	Recharge OK?	✓	
Switch/keypad	Operation	✓	
Display	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
Pump	Operation	✓	
	Filter	✓	
	Flow	✓	
	Valves, Diaphragm	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	PID	✓	10.6 ev
Alarms	Beeper	✓	
	Settings	✓	
Software	Version	✓	
Data logger	Operation	✓	
Download	Operation	✓	
Other tests:	Bump Test		

Low	High	TWA	STEL
50ppm	100ppm		

Certificate of Calibration

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

Sensor	Serial no	Calibration gas and concentration	Certified	Gas bottle No		Instrument Reading
PID Lamp		100ppm Isobutylene	NIST	1006197		100.2ppm

Calibrated by: Giovanni Pambuan

Calibration date: 24/10/2019

APPENDIX J

Test Pit Logs + Explanatory Notes

BORELOG EXPLANATORY NOTES

Unified Soil Classification

Mud Environmental field logging uses symbology consistent with the Unified Soil Classification System (USCS). Appropriate symbols are selected based on limited visual examination only and are not for geotechnical classification, foundation and/or footing design.

Major divisions			Group symbol	Group name
Coarse grained soils - more than 50% retained on 0.075 mm sieve	*gravel* > 50% of coarse fraction retained on 4.75 mm sieve	clean gravel <5% smaller 0.075 mm sieve	**GW**	well-graded gravel, fine to coarse gravel
			GP	poorly graded gravel
		gravel with >12% fines	**GM**	silty gravel
			GC	clayey gravel
	sand ≥ 50% of coarse fraction passes 4.75 mm sieve	clean sand	**SW**	well-graded sand, fine to coarse sand
			SP	poorly graded sand
		sand with >12% fines	**SM**	silty sand
			SC	clayey sand
Fine grained soils - more than 50% passing 0.075 mm sieve	*silt and clay* liquid limit < 50	inorganic	**ML**	silt
			CL	clay of low plasticity, lean clay
		organic	**OL**	organic silt, organic clay
	silt and clay liquid limit ≥ 50	inorganic	**MH**	silt of high plasticity, elastic silt
			CH	clay of high plasticity, fat clay
		organic	**OH**	organic clay, organic silt
Highly organic soils			**Pt**	peat

Additional Lithology Symbols

	Fill material
	Bitumen
	Concrete

Groundwater Well Completion Symbols

	Ground level flush gatic cover, concreted
	Standpipe, concreted
	Grout consisting of cement +/- bentonite mix
	Bentonite plug

	Sand filter pack
	Endcap
	Blank PVC casing
	Slotted PVC casing and standing water level

Contractor: Mud Environmental	Date: 28 October 2019	**TP01**	
Method: Test Pits	Elevation:		
Equipment: Excavator	Easting:	Logged By:	
Bucket Width: 0.9 Meters	Northing:	Trent Gray	

Sample	Sample ID	PID (ppm)	Depth	Lithology	Class	Description	Observations
	0.1-0.2 (QC2)	0.2			SP	FILL 1: SAND, silty, fine to coarse grained, gravelly, orange-brown to light brown, dry to low moisture, trace oversized (>100mm) mudstone / siltstone cobbles up to 100mm, trace inclusions of combinations of: bitumen / paving bricks / red bricks / ash + cinders / ceramic tiles / black or orange plastic / PVC pipe (possibly from adjacent building structure).	
	0.4-0.5	0.1			GW	FILL 2: GRAVEL, sandy, blue-grey sub-base materials, angular gravels to 50mm, moist.	
	0.6-0.7	0.0	1		CL	NATURAL 1: CLAY, silty, low plasticity, trace mudstone cobbles and gravels from 10mm-300mm, orange-brown to brown, moist.	
	1.1-1.2	0.1				End of Test Pit @ 1.4m	
			2				
			3				

Notes:

Site:
Levinsons Crafers

Site Address:
28 Emmett Road, Crafers West, South Australia

Contractor: Mud Environmental	Date: 28 October 2019	**TP02**	
Method: Test Pits	Elevation:		
Equipment: Excavator	Easting:	Logged By:	
Bucket Width: 0.9 Meters	Northing:	Trent Gray	

Sample	Sample ID	PID (ppm)	Depth	Lithology	Class	Description	Observations
	0.1-0.2	0.1			SP	FILL 1: SAND, silty, fine to coarse grained, gravelly, orange-brown to light brown, dry to low moisture, trace oversized (>100mm) mudstone / siltstone cobbles up to 100mm, trace inclusions of combinations of: bitumen / paving bricks / red bricks / ash + cinders / ceramic tiles / orange plastic / PVC pipe (possibly from adjacent building structure).	
	0.45-0.5	0.0			SW	FILL 3: SAND, silty, fine to medium grained, orange, moist (sandy loam type soils).	
	0.5-0.6	0.0				NATURAL 1: CLAY, silty, low plasticity, trace mudstone cobbles and gravels from 10mm-300mm, orange-brown to brown, moist.	
	1.0-1.1	0.1	1		CL		
			2			End of Test Pit @ 2.0m	
			3				

Notes:

Site:
Levinsons Crafers

Site Address:
28 Emmett Road, Crafers West, South Australia

Project No.: **ME-296**

Contractor: Mud Environmental	Date: 28 October 2019	**TP03**	
Method: Test Pits	Elevation:		
Equipment: Excavator	Easting:	Logged By:	
Bucket Width: 0.9 Meters	Northing:	Trent Gray	

Sample	Sample ID	PID (ppm)	Depth	Lithology	Class	Description	Observations
	0.1-0.2	0.1			SP	FILL 1: SAND, silty, fine to coarse grained, gravelly, light brown, dry to low moisture, trace oversized (>100mm) red bricks & ceramic tiles, trace ash + cinders + black plastic.	
	0.5-0.6 (QC3)	0.1	1		CL	FILL 4: CLAY, sandy, gravelly, medium plasticity, brown to dark brown, trace oversized (>100mm) inclusions of combinations of: bitumen / paving bricks / cinders / slag / red brick fragments, moist.	
	1.2-1.3	0.0					
	1.9-2.0	0.0	2		CL	FILL 5: CLAY, sandy (coarse grained), gravelly, low plasticity, light-brown to brown, trace bitumen pieces, concrete pieces, trace bituminous tar, moist.	
	2.6-2.7	0.1			CL	FILL 6: CLAY, silty, low-plasticity, orange-brown to red-brown, trace calcareous gravels up to 50mm, trace whole quartz gravels to 50mm, trace bitumen.	
	3.1-3.2	0.0	3		MH	NATURAL 2: SILT, organic matter present (twigs + roots), grey to grey-brown, low moisture.	
						End of Test Pit @ 3.2m	

Notes:

Site:
Levinsons Crafers

Site Address:
28 Emmett Road, Crafers West, South Australia

Contractor: Mud Environmental	Date: 28 October 2019	**TP04**	
Method: Test Pits	Elevation:		
Equipment: Excavator	Easting:	Logged By:	
Bucket Width: 0.9 Meters	Northing:	Trent Gray	

Sample	Sample ID	PID (ppm)	Depth	Lithology	Class	Description	Observations
	0.1-0.2	0.1			SP	FILL 1: SAND, silty, fine to coarse grained, gravelly, light brown, dry to low moisture, trace oversized (>100mm) red bricks & ceramic tiles, trace ash + cinders + black plastic.	
	0.7-0.8	0.0	1		CL	FILL 4 + FILL 5 + FILL 6 (MIXED): FILL 4 - CLAY, sandy, gravelly, medium plasticity, brown to dark brown, trace oversized (>100mm) inclusions of combinations of: bitumen / paving bricks / cinders / slag / red brick fragments, moist + FILL 5 - CLAY, sandy, gravelly, low plasticity, bitumen pieces up to 300mm, moist + FILL 6 -CLAY, silty, low-plasticity, orange-brown, calcareous & quartz gravels present, trace bitumen pieces.	
	1.5-1.6	0.1			MH	NATURAL 2: SILT, organic matter present (twigs + roots), grey to grey-brown, low moisture.	
	1.8-1.9	0.1	2		MH	NATURAL 3: SILT, calcareous, light-brown to orange-brown, low moisture.	
						End of Test Pit @ 2.0m	
			3				

Notes:

Site:
Levinsons Crafers

Site Address:
28 Emmett Road, Crafers West, South Australia

Contractor: Mud Environmental	Date: 28 October 2019	**TP05**	
Method: Test Pits	Elevation:		
Equipment: Excavator	Easting:	Logged By:	
Bucket Width: 0.9 Meters	Northing:	Trent Gray	

Sample	Sample ID	PID (ppm)	Depth	Lithology	Class	Description	Observations
	0.1-0.2	0.0			CL	FILL 6: CLAY, silty, low-plasticity, orange-brown, trace calcareous and quartz gravels to 50mm, trace bitumen.	
	0.5-0.6	0.0			CL	FILL 5: CLAY, sandy (coarse grained), gravelly, low plasticity, light-brown to brown, trace bitumen pieces up to 400mm, ultra-trace concrete pieces, moist.	
	0.7-0.8	0.1	1		CL	NATURAL 4: CLAY, silty, low-plasticity, light-brown, trace calcareous gravels, moist.	
	1.2-1.4	0.0	2		MH	NATURAL 2: SILT, organic matter present (twigs + roots), grey to grey-brown, low moisture. End of Test Pit @ 1.4m	
			3				

Notes:

Site:
Levinsons Crafers

Site Address:
28 Emmett Road, Crafers West, South Australia

Contractor: Mud Environmental	Date: 28 October 2019	**TP06**	
Method: Test Pits	Elevation:		
Equipment: Excavator	Easting:	Logged By:	
Bucket Width: 0.9 Meters	Northing:	Trent Gray	

Sample	Sample ID	PID (ppm)	Depth	Lithology	Class	Description	Observations
	0.1-0.2	0.1			SM	FILL 1: SAND, silty, fine to coarse grained, gravelly, orange-brown to light brown, dry to low moisture, trace oversized (>100mm) mudstone / siltstone cobbles up to 100mm, trace inclusions of combinations of: bitumen / paving bricks / red bricks / ash + cinders / ceramic tiles / black or orange plastic / PVC pipe (possibly from adjacent building structure).	
	0.4-0.5	0.1			CL	FILL 6: CLAY, silty, low-plasticity, orange-brown to red-brown, trace calcareous and quartz gravels to 50mm, trace bitumen up to 200mm, bricks and pavers up to 250mm.	
	0.9-1.0	0.0	1		CL	FILL 5: CLAY, sandy (coarse grained), gravelly, low plasticity, light-brown to brown, trace bitumen pieces up to 250mm, moist.	
	1.2-1.3	0.0			CL	FILL 6: CLAY, silty, low-plasticity, orange-brown to red-brown, trace calcareous gravels up to 50mm, trace whole quartz gravels to 50mm, trace bitumen.	
	1.8-1.9	0.1	2		CH	FILL 4: CLAY, sandy, gravelly, medium plasticity, dark brown, trace oversized (>100mm) inclusions of bitumen / paving bricks / bricks / concrete, moist.	
	2.8-2.9	0.1	3		MH	NATURAL 2: SILT, organic matter present (twigs + roots), grey to grey-brown, low moisture. End of Test Pit @ 2.9m	

Notes:

Site:
Levinsons Crafers

Site Address:
28 Emmett Road, Crafers West, South Australia

Contractor: Mud Environmental	Date: 28 October 2019	**TP07**	
Method: Test Pits	Elevation:		
Equipment: Excavator	Easting:	Logged By:	
Bucket Width: 0.9 Meters	Northing:	Trent Gray	

Sample	Sample ID	PID (ppm)	Depth	Lithology	Class	Description	Observations
	0.2-0.3	0.1			CL	FILL 4: CLAY, sandy, gravelly, medium plasticity, brown to dark brown, trace oversized (>100mm) inclusions of combinations of: bitumen / paving bricks / concrete, moist.	
	0.6-0.7	0.0			CL	FILL 6: CLAY, silty, low-plasticity, orange-brown, trace calcareous gravels up to 50mm, trace whole quartz gravels to 50mm, trace bitumen up to 200mm, bricks and pvaers up to 250mm.	
	0.8-0.9	0.0	1		CH	FILL 4: CLAY, sandy, gravelly, medium plasticity, dark brown, trace oversized (>100mm) inclusions of combinations of: bitumen / paving bricks / concrete, moist.	
	1.3-1.4	0.0			CL	FILL 5: CLAY, sandy (coarse grained), gravelly, low plasticity, light-brown, trace bitumen pieces up to 250mm, moist.	
	2.1-2.2	0.0	2		CL	FILL 7: CLAY, sandy, gravelly, low plasticity, brown, trace oversized (>100mm) bitumen + concrete fragments, potential ACM fragments	
	2.0-2.7 (PACM)	0.0					
	2.8-2.9	0.0	3		CL	FILL 6: CLAY, silty, low-plasticity, orange-brown, trace calcareous gravels up to 50mm, trace whole quartz gravels to 50mm, trace bitumen up to 200mm, bricks and pvaers up to 250mm.	
	3.1-3.2	0.0			CL	FILL 8: CLAY, sandy, gravelly, low plasticity, brown, trace inclusions of combinations of: bitumen / concrete / paving bricks / quartz cobble ballast up to 100mm, moist.	
						End of Test Pit @ 3.3m (maximum reach of excavator)	

Notes:

Site:
Levinsons Crafers

Site Address:
28 Emmett Road, Crafers West, South Australia

Contractor: Mud Environmental	Date: 28 October 2019	**TP08**	
Method: Test Pits	Elevation:		
Equipment: Excavator	Easting:	Logged By:	
Bucket Width: 0.9 Meters	Northing:	Trent Gray	

Sample	Sample ID	PID (ppm)	Depth	Lithology	Class	Description	Observations
	0-0.1	0.1			MH	NATURAL 2: SILT, organic matter present (twigs + roots), grey to grey-brown, low moisture.	
	0.2-0.3	0.1			MH	NATURAL 3: SILT, calcareous, mudstone throughout, light-brown to orange-brown, low moisture.	
	0.5-0.6	0.1			CL	NATURAL 4: CLAY, silty, low-plasticity, orange-brown, trace calcareous gravels, moist.	
	1.0-1.1	0.1	1		CL	NATURAL 5: CLAY, silty, low plasticity, yellow-brown to white, talc-like feel, moist.	
						End of Test Pit @ 1.3m	
			2				
			3				
			4				

Notes:

Site:
Levinsons Crafers

Site Address:
28 Emmett Road, Crafers West, South Australia

Contractor: Mud Environmental	Date: 28 October 2019	**TP09**	
Method: Test Pits	Elevation:		
Equipment: Excavator	Easting:	Logged By:	
Bucket Width: 0.9 Meters	Northing:	Trent Gray	

Sample	Sample ID	PID (ppm)	Depth	Lithology	Class	Description	Observations
	0.1-0.2	0.1			SP	FILL 9: SAND, gravelly, clayey, trace oversized (>100mm) concrete & bitumen, light brown to brown, trace steel reo, moist.	
	0.6-0.7	0.0			CH	FILL 10: CLAY, silty, trace gravels, medium plasticity, red-brown, trace oversized (>100mm) fragments of brick / rocks / concrete / bitumen.	
	1.2-1.3	0.0	1				
	1.9-2.0	0.1	2		MH	NATURAL 2: SILT, organic matter present (twigs + roots), grey to grey-brown, low moisture. End of Test Pit @ 2.0m	
			3				
			4				

Notes:

Site:
Levinsons Crafers

Site Address:
28 Emmett Road, Crafers West, South Australia

Contractor: Mud Environmental	Date: 28 October 2019	**TP10**	
Method: Test Pits	Elevation:		
Equipment: Excavator	Easting:	Logged By:	
Bucket Width: 0.9 Meters	Northing:	Trent Gray	

Sample	Sample ID	PID (ppm)	Depth	Lithology	Class	Description	Observations
	0.2-0.3	0.1			SP	FILL 11: SAND, clayey, coarse grained, Trace gravels and cobbles throughout up to 150mm.	
	0.7-0.8	0.2			SP	FILL 9: SAND, gravelly, clayey, trace oversized concrete + bitumen, light brown to brown, trace steel reo, moist.	
	1.0-1.1	0.0	1		CH	FILL 10: CLAY, silty, trace gravels, medium plasticity, red-brown, oversized (>100mm) bitumen present	
	1.6-1.7	0.0			CH	FILL 4: CLAY, sandy, gravelly, medium plasticity, dark brown, trace oversized (>100mm) inclusions of combinations of: bitumen / paving bricks / concrete, moist.	
	2.4-2.5	0.1	2		CL	FILL 6: CLAY, silty, low-plasticity, orange-brown to red-brown, trace calcareous gravels up to 50mm, trace whole quartz gravels to 50mm, trace bitumen up to 200mm, bricks and pvaers up to 250mm.	
	3.4-3.5	0.0	3				
	3.9-4.0	0.0			MH	NATURAL 2: SILT, organic matter present (twigs + roots), grey to grey-brown, low moisture.	
			4			End of Test Pit @ 4.0m	

Notes:

Site:
Levinsons Crafers

Site Address:
28 Emmett Road, Crafers West, South Australia

Contractor: Mud Environmental	Date: 28 October 2019	**TP11**	
Method: Test Pits	Elevation:		
Equipment: Excavator	Easting:	Logged By:	
Bucket Width: 0.9 Meters	Northing:	Trent Gray	

Sample	Sample ID	PID (ppm)	Depth	Lithology	Class	Description	Observations
					CH	FILL 4: CLAY, sandy, gravelly, medium plasticity, brown to dark brown, oversized (>100mm) inclusions of bricks & concrete throughout, trace steel fragments, moist.	
	0.1-0.2	0.3					
					CL	FILL 5: CLAY, sandy (coarse grained), gravelly, low plasticity, light-brown, trace bitumen pieces, moist.	
	0.3-0.4	0.2					
	0.5-0.6	0.1				FILL 4: CLAY, sandy, gravelly, medium plasticity, brown to dark brown, oversized (>100mm) inclusions of bricks & concrete throughout, trace steel fragments, moist.	
			1		CH		
	1.5-1.6	0.0					
			2		CL	FILL 8: CLAY, sandy, gravelly, low plasticity, brown, trace inclusions of combinations of: bitumen / concrete / paving bricks / quartz cobble ballast up to 100mm, moist.	
	2.0-2.1	0.0					
			3		MH	NATURAL 2: SILT, organic matter present (twigs + roots), grey to grey-brown, low moisture.	
	2.9-3.0	0.0					
						End of Test Pit @ 3.2m	

Notes:

Site:
Levinsons Crafers

Site Address:
28 Emmett Road, Crafers West, South Australia

APPENDIX K

Soil Analytical Results Tables + ProUCL Statistical Outputs + EIL Calculations

TABLE 1
ME-296 LEVINSONS CRAFERS
SUMMARY OF SOIL RESULTS COMPARED TO ASC NEPM (2013) SITE SUITABILITY CRITERIA + QC RESULTS

MUD ENVIRONMENTAL

							TRH							BTEX						Metals																				
Sample ID	Laboratory Batch	Date	Fill Layer	Cyanide Total	Moisture Content	pH	C6-C10	C10-C16	C16-C34	C34-C40	C10-C40 (Sum of total)	F1 minus BTEX	F2 minus Naphthalene	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	Arsenic	Barium	Beryllium	Cadmium	Chromium (hexavalent)	Chromium (III+VI)	Chromium (Trivalent)	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Nickel	Silver	Zinc
TOTAL CONCENTRATIONS																																								
Units				*mg/kg*	*%*	*-*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*
Limit of Reporting (LOR)				*5*	*1*	*0.1*	*20*	*50*	*100*	*100*	*100*	*20*	*50*	*0.1*	*0.1*	*0.1*	*0.2*	*0.1*	*0.3*	*2*	*10*	*2*	*0.4*	*1*	*5*	*5*	*5*	*5*	*20*	*5*	*5*	*0.1*	*5*	*0.2*	*5*
NEPM 2013 Table 1A(1) HILs Res A Soil																				100		60	20	100			100	6,000		300	3,800	40	400		7,400
NEPM 2013 Table 1A(1) HILs Rec C Soil																				300		90	90	300			300	17,000		600	19,000	80	1,200		30,000
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand (0-1m)												45	110	0.5	160	55			40															
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand (1-2m)												70	240	0.5	220				60															
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand (2-4m)												110	440	0.5	310				95															
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Silt (0-1m)												40	230	0.6	390				95															
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Silt (1-2m)												65		0.7					210															
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Silt (2-4m)												100		1																				
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Clay (0-1m)												50	280	0.7	480				110															
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Clay (1-2m)												90		1					310															
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Clay (2-4m)												150		2																				
NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse Soil							700	1,000	2,500	10,000																								
NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Fine Soil							800	1,000	3,500	10,000																								
NEPM 2013 Tables 1B(1) to 1B(5) Generic & Site-Specific EILs - Urban Res & Public Open Space																				100					210			110		1100			45		280
NEPM 2013 Table 1B(6) ESLs for Urban Res, Coarse Soil (0-2m)									300	2,800		180	120	50	85	70			105															
NEPM 2013 Table 1B(6) ESLs for Urban Res, Fine Soil (0-2m)									1,300	5,600		180	120	65	105	125			45															
TP1_0.1-0.2	685395	28-October-2019	FILL 1: SAND, silty, gravelly, orange-brown to light brown		**6.9**	**7.7**	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	**25**			<0.4		**20**			**24**		**66**		<0.1	**12**		**67**
TP1_0.4-0.5	685395 + 688170	28-October-2019	FILL 2: GRAVEL, sandy, blue-grey sub-base materials		**6.9**	**8.2**														<2			<0.4		<5			<5		<5		<0.1	<5		<5
TP2_0.1-0.2	685395 + 688170	28-October-2019	FILL 1: SAND, silty, gravelly, orange-brown to light brown		**11**	**7.9**																												
TP2_0.45-0.5	685395 + 688170	28-October-2019	FILL 3: SAND, silty, orange (sandy loam)		**5.9**	**6.7**														<2			<0.4		<5			<5		**24**		<0.1	<5		**9.4**
TP3_0.1-0.2	685395 + 688170	28-October-2019	FILL 1: SAND, silty, gravelly, orange-brown to light brown		**6.3**	**8.1**														**17**			<0.4		**18**			**13**		**58**		<0.1	**9.9**		**62**
TP3_0.5-0.6	685395	28-October-2019	FILL 4: CLAY, sandy, gravelly, medium plasticity, brown-dark brown		**16**	**8.2**	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	**20**			<0.4		**28**			**14**		**36**		<0.1	**15**		**46**
TP3_1.9-2.0	685395	28-October-2019	FILL 5: CLAY, sandy, gravelly, low plasticity, light brown-brown	<5	**20**	**8.2**	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	**2.8**	**54**	<2	<0.4	<1	**21**	**21**	**5.9**	**6.9**	**20,000**	**9.6**	**140**	<0.1	**12**	<0.2	**16**
TP4_0.1-0.2	685395	28-October-2019	FILL 1: SAND, silty, gravelly, orange-brown to light brown		**8.7**	**8.1**																												
TP4_0.7-0.8	685395	28-October-2019	FILL 4: CLAY, sandy, gravelly, medium plasticity, brown-dark brown		**20**	**8.6**														**4.6**			<0.4		**38**			**13**		**18**		<0.1	**31**		**34**
TP5_0.5-0.6	685395	28-October-2019	FILL 5: CLAY, sandy, gravelly, low plasticity, light brown-brown		**19**	**8.4**														**4.2**			<0.4		**35**			**12**		**23**		<0.1	**18**		**28**
TP6_0.1-0.2	685395 + 688170	28-October-2019	FILL 1: SAND, silty, gravelly, orange-brown to light brown		**6.3**	**8.2**														**14**			<0.4		**19**			**13**		**52**		<0.1	**10**		**54**
TP6_0.4-0.5	685395	28-October-2019	FILL 6: CLAY, silty, low-plasticity, orange-brown/red-brown, calcareous		**9.7**	**8.1**														**11**			<0.4		**22**			**12**		**52**		<0.1	**11**		**65**
TP6_1.8-1.9	685395	28-October-2019	FILL 4: CLAY, sandy, gravelly, medium plasticity, brown to dark brown		**14**	**8.1**														**27**			<0.4		**29**			**19**		**38**		<0.1	**16**		**55**
TP7_0.6-0.7	685395	28-October-2019	FILL 6: CLAY, silty, low-plasticity, orange-brown/red-brown, calcareous		**18**	**8.1**														**5**			<0.4		**45**			**15**		**20**		<0.1	**25**		**41**
TP7_2.0-2.7	685395	28-October-2019	FILL 7: CLAY, sandy, gravelly, low plasticity, brown, ACM fragments																															
TP7_2.1-2.2	685395	28-October-2019	FILL 7: CLAY, sandy, gravelly, low plasticity, brown, ACM fragments		**12**	**8.3**	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	**12**			<0.4		**18**			**12**		**38**		<0.1	**10**		**56**
TP07_3.1-3.2	685395	28-October-2019	FILL 8: CLAY, sandy, gravelly, low plasticity, brown, quartz ballast to 100mm		**7.8**	**8**	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	**33**			<0.4		**25**			**11**		**27**		<0.1	**13**		**30**
TP09_1.2-1.3	685395	28-October-2019	FILL 10: CLAY, silty, trace gravels, medium plasticity, red-brown		**17**	**8.2**	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	**5.1**			<0.4		**35**			**13**		**17**		<0.1	**20**		**30**
TP10_0.2-0.3	685395	28-October-2019	FILL 11: SAND, clayey, orange-brown, gravels + cobbles to 150mm.		**3.2**	**7.8**														**3.5**			<0.4		**19**			**6.3**		**12**		<0.1	**11**		**18**
TP10_0.7-0.8	685395	28-October-2019	FILL 9: SAND, gravelly, clayey, light brown to brown		**12**	**8.4**	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	**3.1**			<0.4		**19**			**8.1**		**12**		<0.1	**11**		**26**
TP10_2.4-2.5	685395	28-October-2019	FILL 6: CLAY, silty, low-plasticity, orange-brown/red-brown, calcareous		**14**	**8.3**														**10**			<0.4		**33**			**14**		**26**		<0.1	**19**		**48**
TP11_0.5-0.6	685395	28-October-2019	FILL 4: CLAY, sandy, gravelly, medium plasticity, brown-dark brown		**16**	**7.7**														**14**			<0.4		**25**			**21**		**47**		<0.1	**16**		**89**
TP11_2.0-2.1	685395	28-October-2019	FILL 8: CLAY, sandy, gravelly, low plasticity, brown, quartz ballast to 100mm		**15**	**7.4**														**26**			<0.4		**25**			**16**		**67**		<0.1	**12**		**59**
QC RESULTS																																		
TP1_0.1-0.2	685395	28-October-2019	FILL 1: SAND, silty, gravelly, orange-brown to light brown		**6.9**	**7.7**	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	**25**			<0.4		**20**			**24**		**66**		<0.1	**12**		**67**
QC2	685395	28-October-2019	Intra-lab replicate of TP1_0.1-0.2		**9.2**	**8.2**	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	**12**			<0.4		**14**			**12**		**50**		<0.1	**7.3**		**44**
Relative Percentage Difference (RPD, %)					29%	6%	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	70%			NC		35%			67%		28%		NC	49%		41%
TP1_0.1-0.2	685395	28-October-2019	FILL 1: SAND, silty, gravelly, orange-brown to light brown		**6.9**	**7.7**	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	**25**			<0.4		**20**			**24**		**66**		<0.1	**12**		**67**
QC2A	EM1918495	28-October-2019	Inter-lab replicate of TP1_0.1-0.2		**7.7**	**7.6**	<10	<50	**130**	<100	**130**	<10	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	**20**			<1		**12**			**14**		**57**		<0.1	**6**		**74**
Relative Percentage Difference (RPD, %)					11%	1%	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	22%			NC		50%			53%		15%		NC	67%		10%
QC1	685395	28-October-2019	Trip Blank (µg/L)				<0.02																											

NOTES:

NC = Not Calculated

As site-specific soil characteristics of pH, CEC and clay content were not directly measured during soil investigations, the added contaminat limits (ACLs) calculated for the site are based on the average pH values across all soil samples tested (n=22) and by applying highly conservative values for cation exchange capacity (CEC = 5 cmolc/kg dwt) and clay content (1%). In addition, the ambient background concentrations (ABCs) for chromium III (CrIII), copper (Cu), nickel (Ni) and zinc (Zn) were calcuated using the average of all samples anlaysed (n=20). Site-specific EILs were then calculated for chromium III (CrIII), copper (Cu), nickel (Ni) and zinc (Zn) based on this conservation approach to determination ABc and ACLs.

TABLE 1
ME-296 LEVINSONS CRAFERS
SUMMARY OF SOIL RESULTS COMPARED TO ASC NEPM (2013) SITE SUITABILITY CRITERIA + QC RESULTS

MUD ENVIRONMENTAL

TOTAL CONCENTRATIONS

				PAH																				Phenols																
Sample ID	Laboratory Batch	Date	Fill Layer	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Benzo(a)pyrene TEQ calc (Half)	Benzo(a)pyrene TEQ (LOR)	Benzo(a)pyrene TEQ calc (Zero)	PAHs (Sum of total)	3&4-Methylphenol (m&p-cresol)	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,4-Dichlorophenol	2,4-Dimethylphenol	2,4-Dinitrophenol	2,6-Dichlorophenol	2-Chlorophenol	2-Methylphenol	2-Nitrophenol	4,6-Dinitro-2-methylphenol	4,6-Dinitro-o-cyclohexyl phenol	4-chloro-3-methylphenol	4-Nitrophenol	Pentachlorophenol	Tetrachlorophenols	Phenol
Units				*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*
Limit of Reporting (LOR)				*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.4*	*1*	*1*	*0.5*	*0.5*	*5*	*0.5*	*0.5*	*0.2*	*1*	*5*	*20*	*1*	*5*	*1*	*10*	*0.5*
NEPM 2013 Table 1A(1) HILs Res A Soil																				3	3	3	300															100		3,000
NEPM 2013 Table 1A(1) HILs Rec C Soil																				3	3	3	300															120		40,000
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand (0-1m)																	3																							
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand (1-2m)																																								
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand (2-4m)																																								
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Silt (0-1m)																	4																							
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Silt (1-2m)																																								
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Silt (2-4m)																																								
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Clay (0-1m)																	5																							
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Clay (1-2m)																																								
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Clay (2-4m)																																								
NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse Soil																																								
NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Fine Soil																																								
NEPM 2013 Tables 1B(1) to 1B(5) Generic & Site-Specific EILs - Urban Res & Public Open Space																	170																							
NEPM 2013 Table 1B(6) ESLs for Urban Res, Coarse Soil (0-2m)								3																																
NEPM 2013 Table 1B(6) ESLs for Urban Res, Fine Soil (0-2m)								3																																
TP1_0.1-0.2	685395	28-October-2019	FILL 1: SAND, silty, gravelly, orange-brown to light brown	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.6**	**1.2**	<0.5	<0.5																	
TP1_0.4-0.5	685395 + 688170	28-October-2019	FILL 2: GRAVEL, sandy, blue-grey sub-base materials	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**0.6**	**1.2**	< 0.5	< 0.5																	
TP2_0.1-0.2	685395 + 688170	28-October-2019	FILL 1: SAND, silty, gravelly, orange-brown to light brown	< 0.5	< 0.5	< 0.5	< 0.5	**0.7**	**0.5**	< 0.5	< 0.5	**0.6**	< 0.5	**0.6**	< 0.5	< 0.5	< 0.5	< 0.5	**0.9**	**1.1**	**1.4**	**0.8**	**3.3**																	
TP2_0.45-0.5	685395 + 688170	28-October-2019	FILL 3: SAND, silty, orange (sandy loam)	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**0.6**	**1.2**	< 0.5	< 0.5																	
TP3_0.1-0.2	685395 + 688170	28-October-2019	FILL 1: SAND, silty, gravelly, orange-brown to light brown	< 0.5	< 0.5	< 0.5	**1.9**	**3.8**	**2.9**	**2.2**	**2.7**	**2.5**	**0.7**	**2.7**	< 0.5	**1.8**	< 0.5	< 0.5	**3.5**	**5.5**	**5.5**	**5.5**	**24.7**																	
TP3_0.5-0.6	685395	28-October-2019	FILL 4: CLAY, sandy, gravelly, medium plasticity, brown-dark brown	<0.5	<0.5	<0.5	**2.7**	**0.7**	**0.6**	**0.6**	**0.9**	**2.2**	<0.5	**1.2**	<0.5	<0.5	<0.5	<0.5	**1.2**	**1.4**	**1.7**	**1.1**	**10.1**																	
TP3_1.9-2.0	685395	28-October-2019	FILL 5: CLAY, sandy, gravelly, low plasticity, light brown-brown	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.6**	**1.2**	<0.5	<0.5	<0.4	<1	<1	<0.5	<0.5	<5	<0.5	<0.5	<0.2	<1	<5	<20	<1	<5	<1	<10	<0.5
TP4_0.1-0.2	685395	28-October-2019	FILL 1: SAND, silty, gravelly, orange-brown to light brown	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.5**	<0.5	<0.5	<0.5	<0.5	**0.6**	**0.6**	**1.2**	<0.5	**1.1**																	
TP4_0.7-0.8	685395	28-October-2019	FILL 4: CLAY, sandy, gravelly, medium plasticity, brown-dark brown	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.6**	**1.2**	<0.5	<0.5																	
TP5_0.5-0.6	685395	28-October-2019	FILL 5: CLAY, sandy, gravelly, low plasticity, light brown-brown	<0.5	<0.5	<0.5	**0.9**	<0.5	<0.5	<0.5	<0.5	**0.9**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.7**	**1.3**	<0.5	**1.8**																	
TP6_0.1-0.2	685395 + 688170	28-October-2019	FILL 1: SAND, silty, gravelly, orange-brown to light brown	< 0.5	< 0.5	< 0.5	**1.6**	**3.7**	**2.2**	**2**	**2.6**	**2.5**	**0.6**	**1.9**	< 0.5	1.8	< 0.5	< 0.5	**3**	**5.2**	**5.2**	**5.2**	**21.9**																	
TP6_0.4-0.5	685395	28-October-2019	FILL 6: CLAY, silty, low-plasticity, orange-brown/red-brown, calcareous	<0.5	<0.5	<0.5	**0.8**	**1.0**	**1.2**	**0.5**	**1.3**	**1.1**	<0.5	**0.6**	<0.5	**0.9**	<0.5	<0.5	**0.9**	**1.7**	**1.9**	**1.4**	**8.3**																	
TP6_1.8-1.9	685395	28-October-2019	FILL 4: CLAY, sandy, gravelly, medium plasticity, brown to dark brown	<0.5	<0.5	<0.5	**0.7**	**1.1**	**1.0**	<0.5	**1.1**	**1.0**	<0.5	**0.6**	<0.5	**0.7**	<0.5	<0.5	**0.9**	**1.7**	**2.0**	**1.5**	**7.1**																	
TP7_0.6-0.7	685395	28-October-2019	FILL 6: CLAY, silty, low-plasticity, orange-brown/red-brown, calcareous	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.6**	**1.2**	<0.5	<0.5																	
TP7_2.0-2.7	685395	28-October-2019	FILL 7: CLAY, sandy, gravelly, low plasticity, brown, ACM fragments																																					
TP7_2.1-2.2	685395	28-October-2019	FILL 7: CLAY, sandy, gravelly, low plasticity, brown, ACM fragments	<0.5	<0.5	<0.5	**0.8**	**0.6**	<0.5	<0.5	**0.6**	**0.8**	<0.5	**1.0**	<0.5	**0.7**	<0.5	<0.5	**1.0**	**1.1**	**1.4**	**0.8**	**5.5**																	
TP07_3.1-3.2	685395	28-October-2019	FILL 8: CLAY, sandy, gravelly, low plasticity, brown, quartz ballast to 100mm	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.6**	**1.2**	<0.5	<0.5																	
TP09_1.2-1.3	685395	28-October-2019	FILL 10: CLAY, silty, trace gravels, medium plasticity, red-brown	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.6**	**1.2**	<0.5	<0.5																	
TP10_0.2-0.3	685395	28-October-2019	FILL 11: SAND, clayey, orange-brown, gravels + cobbles to 150mm.	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.6**	**1.2**	<0.5	<0.5																	
TP10_0.7-0.8	685395	28-October-2019	FILL 9: SAND, gravelly, clayey, light brown to brown	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.6**	**1.2**	<0.5	<0.5																	
TP10_2.4-2.5	685395	28-October-2019	FILL 6: CLAY, silty, low-plasticity, orange-brown/red-brown, calcareous	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.6**	**1.2**	<0.5	<0.5																	
TP11_0.5-0.6	685395	28-October-2019	FILL 4: CLAY, sandy, gravelly, medium plasticity, brown-dark brown	<0.5	<0.5	<0.5	**0.8**	**1.1**	**0.8**	**0.7**	**0.8**	**1.1**	<0.5	**1.5**	<0.5	**0.6**	<0.5	<0.5	**1.8**	**1.7**	**1.9**	**1.4**	**9.2**																	
TP11_2.0-2.1	685395	28-October-2019	FILL 8: CLAY, sandy, gravelly, low plasticity, brown, quartz ballast to 100mm	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.6**	**1.2**	<0.5	<0.5																	

QC RESULTS

TP1_0.1-0.2	685395	28-October-2019	FILL 1: SAND, silty, gravelly, orange-brown to light brown	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.6**	**1.2**	<0.5	<0.5																	
QC2	685395	28-October-2019	Intra-lab replicate of TP1_0.1-0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.6**	**1.2**	<0.5	<0.5																	
Relative Percentage Difference (RPD, %)				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	0%	0%	NC	NC																	
TP1_0.1-0.2	685395	28-October-2019	FILL 1: SAND, silty, gravelly, orange-brown to light brown	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.6**	**1.2**	<0.5	<0.5																	
QC2A	EM1918495	28-October-2019	Inter-lab replicate of TP1_0.1-0.2	<0.5	<0.5	<0.5	<0.5	**0.7**	**0.6**	**0.7**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.5**	**1.1**	**1.4**	**0.8**	**2.5**																	
Relative Percentage Difference (RPD, %)				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	59%	15%	NC	NC																	
QC1	685395	28-October-2019	Trip Blank (μg/L)																																					

NOTES:

NC = Not Calculated

As site-specific soil characteristics of pH, CEC and clay content were not directly measured during soil investigations, the added contaminat limits (ACLs) calculated for the site are based on the average pH values across all soil samples tested (n=22) and by applying highly conservative values for cation exchange capacity (CEC = 5 cmolc/kg dwt) and clay content (1%). In addition, the ambient background concentrations (ABCs) for chromium III (CrIII), copper (Cu), nickel (Ni) and zinc (Zn) were calcuated using the average of all samples anlaysed (n=20). Site-specific EILs were then calculated for chromium III (CrIII), copper (Cu), nickel (Ni) and zinc (Zn) based on this conservation approach to determination ABc and ACLs.

TABLE 1
ME-296 LEVINSONS CRAFERS
SUMMARY OF SOIL RESULTS COMPARED TO ASC NEPM (2013) SITE SUITABILITY CRITERIA + QC RESULTS

MUD ENVIRONMENTAL

				Organochlorine Pesticides																							PCBs								
Sample ID	Laboratory Batch	Date	Fill Layer	4,4-DDE	a-BHC	Aldrin	Aldrin + Dieldrin	b-BHC	Chlordane	d-BHC	DDD	DDT	DDT+DDE+DDD	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	Endrin ketone	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Methoxychlor	Toxaphene	Parathion	Pirimiphos-methyl	Dinoseb	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	PCBs (Sum of total)
TOTAL CONCENTRATIONS																																			
Units				*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*
Limit of Reporting (LOR)				*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.1*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*1*	*0.2*	*0.2*	*20*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*
NEPM 2013 Table 1A(1) HILs Res A Soil							6		50				240					10				6		300	20											1
NEPM 2013 Table 1A(1) HILs Rec C Soil							10		70				400					20				10		400	30											1
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand (0-1m)																																			
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand (1-2m)																																			
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand (2-4m)																																			
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Silt (0-1m)																																			
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Silt (1-2m)																																			
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Silt (2-4m)																																			
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Clay (0-1m)																																			
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Clay (1-2m)																																			
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Clay (2-4m)																																			
NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse Soil																																			
NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Fine Soil																																			
NEPM 2013 Tables 1B(1) to 1B(5) Generic & Site-Specific EILs - Urban Res & Public Open Space												180																							
NEPM 2013 Table 1B(6) ESLs for Urban Res, Coarse Soil (0-2m)																																			
NEPM 2013 Table 1B(6) ESLs for Urban Res, Fine Soil (0-2m)																																			
TP1_0.1-0.2	685395	28-October-2019	FILL 1: SAND, silty, gravelly, orange-brown to light brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1										
TP1_0.4-0.5	685395 + 688170	28-October-2019	FILL 2: GRAVEL, sandy, blue-grey sub-base materials	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2								
TP2_0.1-0.2	685395 + 688170	28-October-2019	FILL 1: SAND, silty, gravelly, orange-brown to light brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2								
TP2_0.45-0.5	685395 + 688170	28-October-2019	FILL 3: SAND, silty, orange (sandy loam)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2								
TP3_0.1-0.2	685395 + 688170	28-October-2019	FILL 1: SAND, silty, gravelly, orange-brown to light brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2								
TP3_0.5-0.6	685395	28-October-2019	FILL 4: CLAY, sandy, gravelly, medium plasticity, brown-dark brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1										
TP3_1.9-2.0	685395	28-October-2019	FILL 5: CLAY, sandy, gravelly, low plasticity, light brown-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1			<20	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP4_0.1-0.2	685395	28-October-2019	FILL 1: SAND, silty, gravelly, orange-brown to light brown																																
TP4_0.7-0.8	685395	28-October-2019	FILL 4: CLAY, sandy, gravelly, medium plasticity, brown-dark brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2								
TP5_0.5-0.6	685395	28-October-2019	FILL 5: CLAY, sandy, gravelly, low plasticity, light brown-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2								
TP6_0.1-0.2	685395 + 688170	28-October-2019	FILL 1: SAND, silty, gravelly, orange-brown to light brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2								
TP6_0.4-0.5	685395	28-October-2019	FILL 6: CLAY, silty, low-plasticity, orange-brown/red-brown, calcareous	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2								
TP6_1.8-1.9	685395	28-October-2019	FILL 4: CLAY, sandy, gravelly, medium plasticity, brown to dark brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2								
TP7_0.6-0.7	685395	28-October-2019	FILL 6: CLAY, silty, low-plasticity, orange-brown/red-brown, calcareous	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2								
TP7_2.0-2.7	685395	28-October-2019	FILL 7: CLAY, sandy, gravelly, low plasticity, brown, ACM fragments																																
TP7_2.1-2.2	685395	28-October-2019	FILL 7: CLAY, sandy, gravelly, low plasticity, brown, ACM fragments	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1										
TP07_3.1-3.2	685395	28-October-2019	FILL 8: CLAY, sandy, gravelly, low plasticity, brown, quartz ballast to 100mm	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1										
TP09_1.2-1.3	685395	28-October-2019	FILL 10: CLAY, silty, trace gravels, medium plasticity, red-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1										
TP10_0.2-0.3	685395	28-October-2019	FILL 11: SAND, clayey, orange-brown, gravels + cobbles to 150mm.	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2								
TP10_0.7-0.8	685395	28-October-2019	FILL 9: SAND, gravelly, clayey, light brown to brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1										
TP10_2.4-2.5	685395	28-October-2019	FILL 6: CLAY, silty, low-plasticity, orange-brown/red-brown, calcareous	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2								
TP11_0.5-0.6	685395	28-October-2019	FILL 4: CLAY, sandy, gravelly, medium plasticity, brown-dark brown																																
TP11_2.0-2.1	685395	28-October-2019	FILL 8: CLAY, sandy, gravelly, low plasticity, brown, quartz ballast to 100mm	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.2	<0.2								
QC RESULTS																																			
TP1_0.1-0.2	685395	28-October-2019	FILL 1: SAND, silty, gravelly, orange-brown to light brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1										
QC2	685395	28-October-2019	Intra-lab replicate of TP1_0.1-0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1										
Relative Percentage Difference (RPD, %)				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC										
TP1_0.1-0.2	685395	28-October-2019	FILL 1: SAND, silty, gravelly, orange-brown to light brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1										
QC2A	EM1918495	28-October-2019	Inter-lab replicate of TP1_0.1-0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05											
Relative Percentage Difference (RPD, %)				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC										
QC1	685395	28-October-2019	Trip Blank (µg/L)																																

NOTES:

NC = Not Calculated

As site-specific soil characteristics of pH, CEC and clay content were not directly measured during soil investigations, the added contaminat limits (ACLs) calculated for the site are based on the average pH values across all soil samples tested (n=22) and by applying highly conservative values for cation exchange capacity (CEC = 5 cmolc/kg dwt) and clay content (1%). In addition, the ambient background concentrations (ABCs) for chromium III (CrIII), copper (Cu), nickel (Ni) and zinc (Zn) were calcuated using the average of all samples anlaysed (n=20). Site-specific EILs were then calculated for chromium III (CrIII), copper (Cu), nickel (Ni) and zinc (Zn) based on this conservation approach to determination ABc and ACLs.

TABLE 1
ME-296 LEVINSONS CRAFERS
SUMMARY OF SOIL RESULTS COMPARED TO ASC NEPM (2013) SITE SUITABILITY CRITERIA + QC RESULTS

MUD ENVIRONMENTAL

Sample ID	Laboratory Batch	Date	Fill Layer	Organophosphorous Pesticides																																						
				Tokuthion	Azinophos methyl	Bolstar (Sulprofos)	Chlorfenvinphos	Chlorpyrifos	Chlorpyrifos-methyl	Coumaphos	Demeton-O	Demeton-S	Diazinon	Dichlorvos	Dimethoate	Disulfoton	Ethion	Ethoprop	Fenitrothion	Fensulfothion	Fenthion	EPN	Malathion	Merphos	Methyl parathion	Mevinphos (Phosdrin)	Monocrotophos	Naled (Dibrom)	Omethoate	Phorate	Pyrazophos	Ronnel	Terbufos	Trichloronate	Tetrachlorvinphos	Tetrachloroethene	Hexachlorobenzene	Asbestos ID
TOTAL CONCENTRATIONS																																									
Units				*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*Comment*
Limit of Reporting (LOR)				*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*2*	*0.2*	*2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.5*	*0.05*	*Yes / No*
NEPM 2013 Table 1A(1) HILs Res A Soil								160																												10		
NEPM 2013 Table 1A(1) HILs Rec C Soil								250																												10		
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand (0-1m)																																								
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand (1-2m)																																								
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand (2-4m)																																								
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Silt (0-1m)																																								
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Silt (1-2m)																																								
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Silt (2-4m)																																								
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Clay (0-1m)																																								
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Clay (1-2m)																																								
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Clay (2-4m)																																								
NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse Soil																																								
NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Fine Soil																																								
NEPM 2013 Tables 1B(1) to 1B(5) Generic & Site-Specific EILs - Urban Res & Public Open Space																																								
NEPM 2013 Table 1B(6) ESLs for Urban Res, Coarse Soil (0-2m)																																								
NEPM 2013 Table 1B(6) ESLs for Urban Res, Fine Soil (0-2m)																																								
TP1_0.1-0.2	685395	28-October-2019	FILL 1: SAND, silty, gravelly, orange-brown to light brown																																	<0.05		
TP1_0.4-0.5	685395 + 688170	28-October-2019	FILL 2: GRAVEL, sandy, blue-grey sub-base materials	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.05		
TP2_0.1-0.2	685395 + 688170	28-October-2019	FILL 1: SAND, silty, gravelly, orange-brown to light brown	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.05		
TP2_0.45-0.5	685395 + 688170	28-October-2019	FILL 3: SAND, silty, orange (sandy loam)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.05		
TP3_0.1-0.2	685395 + 688170	28-October-2019	FILL 1: SAND, silty, gravelly, orange-brown to light brown	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.05		
TP3_0.5-0.6	685395	28-October-2019	FILL 4: CLAY, sandy, gravelly, medium plasticity, brown-dark brown																																	<0.05		
TP3_1.9-2.0	685395	28-October-2019	FILL 5: CLAY, sandy, gravelly, low plasticity, light brown-brown																																	<0.05		
TP4_0.1-0.2	685395	28-October-2019	FILL 1: SAND, silty, gravelly, orange-brown to light brown																																						
TP4_0.7-0.8	685395	28-October-2019	FILL 4: CLAY, sandy, gravelly, medium plasticity, brown-dark brown	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.05		
TP5_0.5-0.6	685395	28-October-2019	FILL 5: CLAY, sandy, gravelly, low plasticity, light brown-brown	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.05		
TP6_0.1-0.2	685395 + 688170	28-October-2019	FILL 1: SAND, silty, gravelly, orange-brown to light brown	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.05		
TP6_0.4-0.5	685395	28-October-2019	FILL 6: CLAY, silty, low-plasticity, orange-brown/red-brown, calcareous	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.05		
TP6_1.8-1.9	685395	28-October-2019	FILL 4: CLAY, sandy, gravelly, medium plasticity, brown to dark brown	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.05		
TP7_0.6-0.7	685395	28-October-2019	FILL 6: CLAY, silty, low-plasticity, orange-brown/red-brown, calcareous	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.05		
TP7_2.0-2.7	685395	28-October-2019	FILL 7: CLAY, sandy, gravelly, low plasticity, brown, ACM fragments																																						**Yes**
TP7_2.1-2.2	685395	28-October-2019	FILL 7: CLAY, sandy, gravelly, low plasticity, brown, ACM fragments																																	<0.05		
TP07_3.1-3.2	685395	28-October-2019	FILL 8: CLAY, sandy, gravelly, low plasticity, brown, quartz ballast to 100mm																																	<0.05		
TP09_1.2-1.3	685395	28-October-2019	FILL 10: CLAY, silty, trace gravels, medium plasticity, red-brown																																	<0.05		
TP10_0.2-0.3	685395	28-October-2019	FILL 11: SAND, clayey, orange-brown, gravels + cobbles to 150mm.	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.05		
TP10_0.7-0.8	685395	28-October-2019	FILL 9: SAND, gravelly, clayey, light brown to brown																																	<0.05		
TP10_2.4-2.5	685395	28-October-2019	FILL 6: CLAY, silty, low-plasticity, orange-brown/red-brown, calcareous	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.05		
TP11_0.5-0.6	685395	28-October-2019	FILL 4: CLAY, sandy, gravelly, medium plasticity, brown-dark brown																																						
TP11_2.0-2.1	685395	28-October-2019	FILL 8: CLAY, sandy, gravelly, low plasticity, brown, quartz ballast to 100mm	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.05		
QC RESULTS																																									
TP1_0.1-0.2	685395	28-October-2019	FILL 1: SAND, silty, gravelly, orange-brown to light brown																																	<0.05		
QC2	685395	28-October-2019	Intra-lab replicate of TP1_0.1-0.2																																	<0.05		
Relative Percentage Difference (RPD, %)																																				NC		
TP1_0.1-0.2	685395	28-October-2019	FILL 1: SAND, silty, gravelly, orange-brown to light brown																																	<0.05		
QC2A	EM1918495	28-October-2019	Inter-lab replicate of TP1_0.1-0.2																																	<0.05		
Relative Percentage Difference (RPD, %)																																				NC		
QC1	685395	28-October-2019	Trip Blank (µg/L)																																						

NOTES:

NC = Not Calculated

As site-specific soil characteristics of pH, CEC and clay content were not directly measured during soil investigations, the added contaminat limits (ACLs) calculated for the site are based on the average pH values across all soil samples tested (n=22) and by applying highly conservative values for cation exchange capacity (CEC = 5 cmolc/kg dwt) and clay content (1%). In addition, the ambient background concentrations (ABCs) for chromium III (CrIII), copper (Cu), nickel (Ni) and zinc (Zn) were calcuated using the average of all samples anlaysed (n=20). Site-specific EILs were then calculated for chromium III (CrIII), copper (Cu), nickel (Ni) and zinc (Zn) based on this conservation approach to determination ABc and ACLs.

Normal UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.120/11/2019 11:15:19 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%

B(a)P

General Statistics

Total Number of Observations	22	Number of Distinct Observations	7
		Number of Missing Observations	0
Minimum	0.5	Mean	0.905
Maximum	3.8	Median	0.5
SD	0.942	SD of logged Data	0.604
Coefficient of Variation	1.041	Skewness	2.835

Normal GOF Test

Shapiro Wilk Test Statistic	0.474	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.911	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.359	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.184	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	1.25	95% Adjusted-CLT UCL (Chen-1995)	1.365
		95% Modified-t UCL (Johnson-1978)	1.27

Suggested UCL to Use

Data do not follow a Discernible Distribution, May want to try Nonparametric UCLs

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician

Nonparametric UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.120/11/2019 11:16:21 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
mber of Bootstrap Operations	2000

B(a)P

General Statistics

Total Number of Observations	22	Number of Distinct Observations	7
		Number of Missing Observations	0
Minimum	0.5	Mean	0.905
Maximum	3.8	Median	0.5
SD	0.942	Std. Error of Mean	0.201
Coefficient of Variation	1.041	Skewness	2.835
Mean of logged Data	-0.353	SD of logged Data	0.604

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.25	95% Adjusted-CLT UCL (Chen-1995)	1.365
		95% Modified-t UCL (Johnson-1978)	1.27

Nonparametric Distribution Free UCLs

95% CLT UCL	1.235	95% Jackknife UCL	1.25
95% Standard Bootstrap UCL	1.227	95% Bootstrap-t UCL	2.259
95% Hall's Bootstrap UCL	2.848	95% Percentile Bootstrap UCL	1.277
95% BCA Bootstrap UCL	1.355		
90% Chebyshev(Mean, Sd) UCL	1.507	95% Chebyshev(Mean, Sd) UCL	1.78
97.5% Chebyshev(Mean, Sd) UCL	2.159	99% Chebyshev(Mean, Sd) UCL	2.903

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	1.78		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician

Normal UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.120/11/2019 11:19:58 PM
From File	WorkSheet_a.xls
Full Precision	OFF
Confidence Coefficient	95%

B(a)P TEQ

General Statistics

Total Number of Observations	22	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	1.2	Mean	1.732
Maximum	5.5	Median	1.2
SD	1.201	SD of logged Data	0.44
Coefficient of Variation	0.693	Skewness	2.823

Normal GOF Test

Shapiro Wilk Test Statistic	0.488	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.911	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.336	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.184	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.172	95% Adjusted-CLT UCL (Chen-1995)	2.317
		95% Modified-t UCL (Johnson-1978)	2.198

Suggested UCL to Use

Data do not follow a Discernible Distribution, May want to try Nonparametric UCLs

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician

Nonparametric UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.120/11/2019 11:20:26 PM
From File	WorkSheet_a.xls
Full Precision	OFF
Confidence Coefficient	95%
mber of Bootstrap Operations	2000

B(a)P TEQ

General Statistics

Total Number of Observations	22	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	1.2	Mean	1.732
Maximum	5.5	Median	1.2
SD	1.201	Std. Error of Mean	0.256
Coefficient of Variation	0.693	Skewness	2.823
Mean of logged Data	0.424	SD of logged Data	0.44

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.172	95% Adjusted-CLT UCL (Chen-1995)	2.317
		95% Modified-t UCL (Johnson-1978)	2.198

Nonparametric Distribution Free UCLs

95% CLT UCL	2.153	95% Jackknife UCL	2.172
95% Standard Bootstrap UCL	2.144	95% Bootstrap-t UCL	3.502
95% Hall's Bootstrap UCL	4.268	95% Percentile Bootstrap UCL	2.15
95% BCA Bootstrap UCL	2.3		
90% Chebyshev(Mean, Sd) UCL	2.5	95% Chebyshev(Mean, Sd) UCL	2.848
97.5% Chebyshev(Mean, Sd) UCL	3.33	99% Chebyshev(Mean, Sd) UCL	4.279

Suggested UCL to Use

95% Student's-t UCL	2.172	or 95% Modified-t UCL	2.198

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician

SITE SPECIFIC SOIL PROPERTIES FOR ADDED CONTAMINANT LIMITS (ACLs) DERIVATION

	% Clay*	CEC (cmolc/kg dwt)	pH Average (n=22)
	%	meq/100g	-
	1	0.05	0.1
Values	1	1	8

SITE SPECIFIC SOIL CONCENTRATIONS FOR AMBIENT BACKGROUND CONCENTRATIONS (ABCs) DERIVATION

	Chromium (III+VI)	Copper	Nickel	Zinc
	mg/kg	mg/kg	mg/kg	mg/kg
Average (n=20)	26.3	13.5	15.1	43.9

Arsenic

Outputs

Land use	Arsenic generic EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	20	40
Urban residential and open public spaces	50	100
Commercial and industrial	80	160

DDT

Outputs

Land use	DDT generic EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	3	3
Urban residential and open public spaces	180	180
Commercial and industrial	640	640

Lead

Outputs

Land use	Lead generic EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	110	470
Urban residential and open public spaces	270	1100
Commercial and industrial	440	1800

Naphthalene

Outputs

Land use	Naphthalene generic EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	10	10
Urban residential and open public spaces	170	170
Commercial and industrial	370	370

Chromium III

Inputs
Select contaminant from list below
Cr III
Below needed to calculate fresh and aged ACLs
Enter % clay (values from 0 to 100%)
1
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
26.3
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
or for aged ABCs only
Enter State (or closest State)
SA
Enter traffic volume (high or low)
low

Outputs		
Land use	Cr III soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	50	85
Urban residential and open public spaces	100	210
Commercial and industria	150	340

Nickel

Inputs
Select contaminant from list below
Ni
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
5
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
15.1
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
or for aged ABCs only
Enter State (or closest State)
SA
Enter traffic volume (high or low)
low

Outputs		
Land use	Ni soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	15	20
Urban residential and open public spaces	25	45
Commercial and industria	35	70

Zinc

Inputs
Select contaminant from list below
Zn
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
5
Enter soil pH (calcium chloride method) (values from 1 to 14)
8
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
43.9
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
or for aged ABCs only
Enter State (or closest State)
SA
Enter traffic volume (high or low)
low

Outputs		
Land use	Zn soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	65	95
Urban residential and open public spaces	130	280
Commercial and industria	190	410

Copper

Inputs
Select contaminant from list below
Cu
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
5
Enter soil pH (calcium chloride method) (values from 1 to 14)
8
Enter organic carbon content (OOC) (values from 0 to 50%)
1
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
13.5
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
or for aged ABCs only
Enter State (or closest State)
SA
Enter traffic volume (high or low)
low

Outputs		
Land use	Cu soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	35	45
Urban residential and open public spaces	60	110
Commercial and industria	85	150

APPENDIX L

Laboratory Certificates of Analysis + Chain of Custody Documentation

Mud Environmental Pty Ltd
150A East Terrace
Henley Beach
SA 5022

NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Adrian Webber**

Report **685395-S**
Project name LEVINSONS CRATES
Project ID ME-296
Received Date Oct 30, 2019

Client Sample ID			**TP1_0.1-0.2**	**QC2**	**TP1_0.4-0.5**	**TP2_0.1-0.2**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**M19-Oc46588**	**M19-Oc46589**	**M19-Oc46590**	**M19-Oc46591**
Date Sampled			**Oct 28, 2019**	**Oct 28, 2019**	**Oct 28, 2019**	**Oct 28, 2019**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	-	-
TRH C10-C14	20	mg/kg	< 20	< 20	-	-
TRH C15-C28	50	mg/kg	< 50	< 50	-	-
TRH C29-C36	50	mg/kg	< 50	< 50	-	-
TRH C10-C36 (Total)	50	mg/kg	< 50	< 50	-	-
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	-	-
Toluene	0.1	mg/kg	< 0.1	< 0.1	-	-
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	-	-
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	-	-
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	-	-
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	-	-
4-Bromofluorobenzene (surr.)	1	%	138	142	-	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	-	-
TRH C6-C10	20	mg/kg	< 20	< 20	-	-
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	-	-
TRH >C10-C16	50	mg/kg	< 50	< 50	-	-
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	-	-
TRH >C16-C34	100	mg/kg	< 100	< 100	-	-
TRH >C34-C40	100	mg/kg	< 100	< 100	-	-
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	-	-
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	-	-
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	-	-
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	-	-
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	-	-
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	-	-
Anthracene	0.5	mg/kg	< 0.5	< 0.5	-	-
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	-	-
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	-	-
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	-	-
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	-	-
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	-	-
Chrysene	0.5	mg/kg	< 0.5	< 0.5	-	-

Client Sample ID			TP1_0.1-0.2	QC2	TP1_0.4-0.5	TP2_0.1-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M19-Oc46588	M19-Oc46589	M19-Oc46590	M19-Oc46591
Date Sampled			Oct 28, 2019	Oct 28, 2019	Oct 28, 2019	Oct 28, 2019
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	-	-
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	-	-
Fluorene	0.5	mg/kg	< 0.5	< 0.5	-	-
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	-	-
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	-	-
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	-	-
Pyrene	0.5	mg/kg	< 0.5	< 0.5	-	-
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	-	-
2-Fluorobiphenyl (surr.)	1	%	55	69	-	-
p-Terphenyl-d14 (surr.)	1	%	82	93	-	-
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
4.4'-DDD	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDE	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDT	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
a-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Aldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
b-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
d-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Dieldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan I	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin aldehyde	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
g-BHC (Lindane)	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor epoxide	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Hexachlorobenzene	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Methoxychlor	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Toxaphene	1	mg/kg	< 1	< 1	< 1	< 1
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Dibutylchlorendate (surr.)	1	%	50	54	52	51
Tetrachloro-m-xylene (surr.)	1	%	67	73	67	73
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	-	-	< 0.2	< 0.2
Bolstar	0.2	mg/kg	-	-	< 0.2	< 0.2
Chlorfenvinphos	0.2	mg/kg	-	-	< 0.2	< 0.2
Chlorpyrifos	0.2	mg/kg	-	-	< 0.2	< 0.2
Chlorpyrifos-methyl	0.2	mg/kg	-	-	< 0.2	< 0.2
Coumaphos	2	mg/kg	-	-	< 2	< 2
Demeton-S	0.2	mg/kg	-	-	< 0.2	< 0.2
Demeton-O	0.2	mg/kg	-	-	< 0.2	< 0.2
Diazinon	0.2	mg/kg	-	-	< 0.2	< 0.2
Dichlorvos	0.2	mg/kg	-	-	< 0.2	< 0.2

Client Sample ID			TP1_0.1-0.2	QC2	TP1_0.4-0.5	TP2_0.1-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M19-Oc46588	M19-Oc46589	M19-Oc46590	M19-Oc46591
Date Sampled			Oct 28, 2019	Oct 28, 2019	Oct 28, 2019	Oct 28, 2019
Test/Reference	LOR	Unit				
Organophosphorus Pesticides						
Dimethoate	0.2	mg/kg	-	-	< 0.2	< 0.2
Disulfoton	0.2	mg/kg	-	-	< 0.2	< 0.2
EPN	0.2	mg/kg	-	-	< 0.2	< 0.2
Ethion	0.2	mg/kg	-	-	< 0.2	< 0.2
Ethoprop	0.2	mg/kg	-	-	< 0.2	< 0.2
Ethyl parathion	0.2	mg/kg	-	-	< 0.2	< 0.2
Fenitrothion	0.2	mg/kg	-	-	< 0.2	< 0.2
Fensulfothion	0.2	mg/kg	-	-	< 0.2	< 0.2
Fenthion	0.2	mg/kg	-	-	< 0.2	< 0.2
Malathion	0.2	mg/kg	-	-	< 0.2	< 0.2
Merphos	0.2	mg/kg	-	-	< 0.2	< 0.2
Methyl parathion	0.2	mg/kg	-	-	< 0.2	< 0.2
Mevinphos	0.2	mg/kg	-	-	< 0.2	< 0.2
Monocrotophos	2	mg/kg	-	-	< 2	< 2
Naled	0.2	mg/kg	-	-	< 0.2	< 0.2
Omethoate	2	mg/kg	-	-	< 2	< 2
Phorate	0.2	mg/kg	-	-	< 0.2	< 0.2
Pirimiphos-methyl	0.2	mg/kg	-	-	< 0.2	< 0.2
Pyrazophos	0.2	mg/kg	-	-	< 0.2	< 0.2
Ronnel	0.2	mg/kg	-	-	< 0.2	< 0.2
Terbufos	0.2	mg/kg	-	-	< 0.2	< 0.2
Tetrachlorvinphos	0.2	mg/kg	-	-	< 0.2	< 0.2
Tokuthion	0.2	mg/kg	-	-	< 0.2	< 0.2
Trichloronate	0.2	mg/kg	-	-	< 0.2	< 0.2
Triphenylphosphate (surr.)	1	%	-	-	71	81
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	7.7	8.2	8.2	7.9
% Moisture	1	%	6.9	9.2	6.9	11
Heavy Metals						
Arsenic	2	mg/kg	25	12	< 2	-
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	-
Chromium	5	mg/kg	20	14	< 5	-
Copper	5	mg/kg	24	12	< 5	-
Lead	5	mg/kg	66	50	< 5	-
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	-
Nickel	5	mg/kg	12	7.3	< 5	-
Zinc	5	mg/kg	67	44	< 5	-

Client Sample ID			TP2_0.45-0.5	TP3_0.1-0.2	TP3_0.5-0.6	TP3_1.9-2.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M19-Oc46592	M19-Oc46593	M19-Oc46594	M19-Oc46595
Date Sampled			Oct 28, 2019	Oct 28, 2019	Oct 28, 2019	Oct 28, 2019
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	-	-	< 20	< 20
TRH C10-C14	20	mg/kg	-	-	< 20	< 20
TRH C15-C28	50	mg/kg	-	-	< 50	< 50
TRH C29-C36	50	mg/kg	-	-	< 50	< 50
TRH C10-C36 (Total)	50	mg/kg	-	-	< 50	< 50
Volatile Organics						
Tetrachloroethene	0.5	mg/kg	-	-	-	< 0.5
BTEX						
Benzene	0.1	mg/kg	-	-	< 0.1	< 0.1
Toluene	0.1	mg/kg	-	-	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	-	-	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	-	-	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	-	-	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	-	-	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	-	-	74	60
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg		-	< 0.5	< 0.5
TRH C6-C10	20	mg/kg		-	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	-	-	< 20	< 20
TRH >C10-C16	50	mg/kg	-	-	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	-	-	< 50	< 50
TRH >C16-C34	100	mg/kg	-	-	< 100	< 100
TRH >C34-C40	100	mg/kg	-	-	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	-	-	< 100	< 100
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	-	-	1.1	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	-	-	1.4	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	-	-	1.7	1.2
Acenaphthene	0.5	mg/kg	-	-	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	-	-	< 0.5	< 0.5
Anthracene	0.5	mg/kg	-	-	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	-	-	2.7	< 0.5
Benzo(a)pyrene	0.5	mg/kg	-	-	0.7	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	-	-	0.6	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	-	-	0.6	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	-	-	0.9	< 0.5
Chrysene	0.5	mg/kg	-	-	2.2	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	-	-	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	-	-	1.2	< 0.5
Fluorene	0.5	mg/kg	-	-	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	-	-	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	-	-	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	-	-	< 0.5	< 0.5
Pyrene	0.5	mg/kg	-	-	1.2	< 0.5
Total PAH*	0.5	mg/kg	-	-	10.1	< 0.5
2-Fluorobiphenyl (surr.)	1	%	-	-	59	67
p-Terphenyl-d14 (surr.)	1	%	-	-	63	53

Client Sample ID			TP2_0.45-0.5	TP3_0.1-0.2	TP3_0.5-0.6	TP3_1.9-2.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M19-Oc46592	M19-Oc46593	M19-Oc46594	M19-Oc46595
Date Sampled			Oct 28, 2019	Oct 28, 2019	Oct 28, 2019	Oct 28, 2019
Test/Reference	LOR	Unit				
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
4.4'-DDD	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDE	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDT	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
a-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Aldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
b-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
d-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Dieldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan I	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin aldehyde	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
g-BHC (Lindane)	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor epoxide	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Hexachlorobenzene	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Methoxychlor	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Toxaphene	1	mg/kg	< 1	< 1	< 1	< 1
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Dibutylchlorendate (surr.)	1	%	56	64	59	60
Tetrachloro-m-xylene (surr.)	1	%	91	92	80	98
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	< 0.2	< 0.2	-	-
Bolstar	0.2	mg/kg	< 0.2	< 0.2	-	-
Chlorfenvinphos	0.2	mg/kg	< 0.2	< 0.2	-	-
Chlorpyrifos	0.2	mg/kg	< 0.2	< 0.2	-	-
Chlorpyrifos-methyl	0.2	mg/kg	< 0.2	< 0.2	-	-
Coumaphos	2	mg/kg	< 2	< 2	-	-
Demeton-S	0.2	mg/kg	< 0.2	< 0.2	-	-
Demeton-O	0.2	mg/kg	< 0.2	< 0.2	-	-
Diazinon	0.2	mg/kg	< 0.2	< 0.2	-	-
Dichlorvos	0.2	mg/kg	< 0.2	< 0.2	-	-
Dimethoate	0.2	mg/kg	< 0.2	< 0.2	-	-
Disulfoton	0.2	mg/kg	< 0.2	< 0.2	-	-
EPN	0.2	mg/kg	< 0.2	< 0.2	-	-
Ethion	0.2	mg/kg	< 0.2	< 0.2	-	-
Ethoprop	0.2	mg/kg	< 0.2	< 0.2	-	-
Ethyl parathion	0.2	mg/kg	< 0.2	< 0.2	-	-
Fenitrothion	0.2	mg/kg	< 0.2	< 0.2	-	-
Fensulfothion	0.2	mg/kg	< 0.2	< 0.2	-	-
Fenthion	0.2	mg/kg	< 0.2	< 0.2	-	-
Malathion	0.2	mg/kg	< 0.2	< 0.2	-	-
Merphos	0.2	mg/kg	< 0.2	< 0.2	-	-

Client Sample ID			TP2_0.45-0.5	TP3_0.1-0.2	TP3_0.5-0.6	TP3_1.9-2.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M19-Oc46592	M19-Oc46593	M19-Oc46594	M19-Oc46595
Date Sampled			Oct 28, 2019	Oct 28, 2019	Oct 28, 2019	Oct 28, 2019
Test/Reference	LOR	Unit				
Organophosphorus Pesticides						
Methyl parathion	0.2	mg/kg	< 0.2	< 0.2	-	-
Mevinphos	0.2	mg/kg	< 0.2	< 0.2	-	-
Monocrotophos	2	mg/kg	< 2	< 2	-	-
Naled	0.2	mg/kg	< 0.2	< 0.2	-	-
Omethoate	2	mg/kg	< 2	< 2	-	-
Phorate	0.2	mg/kg	< 0.2	< 0.2	-	-
Pirimiphos-methyl	0.2	mg/kg	< 0.2	< 0.2	-	-
Pyrazophos	0.2	mg/kg	< 0.2	< 0.2	-	-
Ronnel	0.2	mg/kg	< 0.2	< 0.2	-	-
Terbufos	0.2	mg/kg	< 0.2	< 0.2	-	-
Tetrachlorvinphos	0.2	mg/kg	< 0.2	< 0.2	-	-
Tokuthion	0.2	mg/kg	< 0.2	< 0.2	-	-
Trichloronate	0.2	mg/kg	< 0.2	< 0.2	-	-
Triphenylphosphate (surr.)	1	%	95	141	-	-
Polychlorinated Biphenyls						
Aroclor-1016	0.1	mg/kg	-	-	-	< 0.1
Aroclor-1221	0.1	mg/kg	-	-	-	< 0.1
Aroclor-1232	0.1	mg/kg	-	-	-	< 0.1
Aroclor-1242	0.1	mg/kg	-	-	-	< 0.1
Aroclor-1248	0.1	mg/kg	-	-	-	< 0.1
Aroclor-1254	0.1	mg/kg	-	-	-	< 0.1
Aroclor-1260	0.1	mg/kg	-	-	-	< 0.1
Total PCB*	0.1	mg/kg	-	-	-	< 0.1
Dibutylchlorendate (surr.)	1	%	-	-	-	60
Tetrachloro-m-xylene (surr.)	1	%	-	-	-	98
Phenols (Halogenated)						
2-Chlorophenol	0.5	mg/kg	-	-	-	< 0.5
2.4-Dichlorophenol	0.5	mg/kg	-	-	-	< 0.5
2.4.5-Trichlorophenol	1	mg/kg	-	-	-	< 1
2.4.6-Trichlorophenol	1	mg/kg	-	-	-	< 1
2.6-Dichlorophenol	0.5	mg/kg	-	-	-	< 0.5
4-Chloro-3-methylphenol	1	mg/kg	-	-	-	< 1
Pentachlorophenol	1	mg/kg	-	-	-	< 1
Tetrachlorophenols - Total	10	mg/kg	-	-	-	< 10
Total Halogenated Phenol*	1	mg/kg	-	-	-	< 1
Phenols (non-Halogenated)						
2-Cyclohexyl-4.6-dinitrophenol	20	mg/kg	-	-	-	< 20
2-Methyl-4.6-dinitrophenol	5	mg/kg	-	-	-	< 5
2-Methylphenol (o-Cresol)	0.2	mg/kg	-	-	-	< 0.2
2-Nitrophenol	1.0	mg/kg	-	-	-	< 1
2.4-Dimethylphenol	0.5	mg/kg	-	-	-	< 0.5
2.4-Dinitrophenol	5	mg/kg	-	-	-	< 5
3&4-Methylphenol (m&p-Cresol)	0.4	mg/kg	-	-	-	< 0.4
4-Nitrophenol	5	mg/kg	-	-	-	< 5
Dinoseb	20	mg/kg	-	-	-	< 20
Phenol	0.5	mg/kg	-	-	-	< 0.5
Total Non-Halogenated Phenol*	20	mg/kg	-	-	-	< 20
Phenol-d6 (surr.)	1	%	-	-	-	65

Client Sample ID			TP2_0.45-0.5	TP3_0.1-0.2	TP3_0.5-0.6	TP3_1.9-2.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M19-Oc46592	M19-Oc46593	M19-Oc46594	M19-Oc46595
Date Sampled			Oct 28, 2019	Oct 28, 2019	Oct 28, 2019	Oct 28, 2019
Test/Reference	LOR	Unit				
Chromium (hexavalent)	1	mg/kg	-	-	-	< 1
Chromium (trivalent)	5	mg/kg	-	-	-	21
Cyanide (total)	5	mg/kg	-	-	-	< 5
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	6.7	8.1	8.2	8.2
% Moisture	1	%	5.9	6.3	16	20
Heavy Metals						
Arsenic	2	mg/kg	< 2	17	20	2.8
Barium	10	mg/kg	-	-	-	54
Beryllium	2	mg/kg	-	-	-	< 2
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	< 5	18	28	21
Cobalt	5	mg/kg	-	-	-	5.9
Copper	5	mg/kg	< 5	13	14	6.9
Iron	20	mg/kg	-	-	-	20000
Lead	5	mg/kg	24	58	36	9.6
Manganese	5	mg/kg	-	-	-	140
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	< 5	9.9	15	12
Silver	0.2	mg/kg	-	-	-	< 0.2
Zinc	5	mg/kg	9.4	62	46	16

Client Sample ID			TP4_0.1-0.2	TP4_0.7-0.8	TP5_0.5-0.6	TP6_0.1-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M19-Oc46596	M19-Oc46597	M19-Oc46598	M19-Oc46599
Date Sampled			Oct 28, 2019	Oct 28, 2019	Oct 28, 2019	Oct 28, 2019
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.7	-
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.3	-
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	0.9	-
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Chrysene	0.5	mg/kg	< 0.5	< 0.5	0.9	-
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Fluoranthene	0.5	mg/kg	0.5	< 0.5	< 0.5	-
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Pyrene	0.5	mg/kg	0.6	< 0.5	< 0.5	-
Total PAH*	0.5	mg/kg	1.1	< 0.5	1.8	-
2-Fluorobiphenyl (surr.)	1	%	94	70	71	-
p-Terphenyl-d14 (surr.)	1	%	109	88	80	-

Client Sample ID			TP4_0.1-0.2	TP4_0.7-0.8	TP5_0.5-0.6	TP6_0.1-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M19-Oc46596	M19-Oc46597	M19-Oc46598	M19-Oc46599
Date Sampled			Oct 28, 2019	Oct 28, 2019	Oct 28, 2019	Oct 28, 2019
Test/Reference	LOR	Unit				
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
4.4'-DDD	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
4.4'-DDE	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
4.4'-DDT	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
a-BHC	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
Aldrin	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
b-BHC	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
d-BHC	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
Dieldrin	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
Endosulfan I	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
Endosulfan II	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
Endosulfan sulphate	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
Endrin	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
Endrin aldehyde	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
Endrin ketone	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
g-BHC (Lindane)	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
Heptachlor	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
Heptachlor epoxide	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
Hexachlorobenzene	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
Methoxychlor	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
Toxaphene	1	mg/kg	-	< 1	< 1	< 1
Aldrin and Dieldrin (Total)*	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
Dibutylchlorendate (surr.)	1	%	-	93	86	67
Tetrachloro-m-xylene (surr.)	1	%	-	78	77	80
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
Bolstar	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
Chlorfenvinphos	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
Chlorpyrifos	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
Chlorpyrifos-methyl	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
Coumaphos	2	mg/kg	-	< 2	< 2	< 2
Demeton-S	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
Demeton-O	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
Diazinon	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
Dichlorvos	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
Dimethoate	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
Disulfoton	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
EPN	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
Ethion	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
Ethoprop	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
Ethyl parathion	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
Fenitrothion	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
Fensulfothion	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
Fenthion	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
Malathion	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
Merphos	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2

Client Sample ID			TP4_0.1-0.2	TP4_0.7-0.8	TP5_0.5-0.6	TP6_0.1-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M19-Oc46596	M19-Oc46597	M19-Oc46598	M19-Oc46599
Date Sampled			Oct 28, 2019	Oct 28, 2019	Oct 28, 2019	Oct 28, 2019
Test/Reference	LOR	Unit				
Organophosphorus Pesticides						
Methyl parathion	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
Mevinphos	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
Monocrotophos	2	mg/kg	-	< 2	< 2	< 2
Naled	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
Omethoate	2	mg/kg	-	< 2	< 2	< 2
Phorate	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
Pirimiphos-methyl	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
Pyrazophos	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
Ronnel	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
Terbufos	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
Tetrachlorvinphos	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
Tokuthion	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
Trichloronate	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
Triphenylphosphate (surr.)	1	%	-	54	54	60
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	8.1	8.6	8.4	8.2
% Moisture	1	%	8.7	20	19	6.3
Heavy Metals						
Arsenic	2	mg/kg	-	4.6	4.2	14
Cadmium	0.4	mg/kg	-	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	-	38	35	19
Copper	5	mg/kg	-	13	12	13
Lead	5	mg/kg	-	18	23	52
Mercury	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	-	31	18	10
Zinc	5	mg/kg	-	34	28	54

Client Sample ID			TP6_0.4-0.5	TP6_1.8-1.9	TP7_0.6-0.7	TP7_2.1-2.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M19-Oc46600	M19-Oc46601	M19-Oc46602	M19-Oc46603
Date Sampled			Oct 28, 2019	Oct 28, 2019	Oct 28, 2019	Oct 28, 2019
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	-	-	-	< 20
TRH C10-C14	20	mg/kg	-	-	-	< 20
TRH C15-C28	50	mg/kg	-	-	-	< 50
TRH C29-C36	50	mg/kg	-	-	-	< 50
TRH C10-C36 (Total)	50	mg/kg	-	-	-	< 50
BTEX						
Benzene	0.1	mg/kg	-	-	-	< 0.1
Toluene	0.1	mg/kg	-	-	-	< 0.1
Ethylbenzene	0.1	mg/kg	-	-	-	< 0.1
m&p-Xylenes	0.2	mg/kg	-	-	-	< 0.2
o-Xylene	0.1	mg/kg	-	-	-	< 0.1
Xylenes - Total	0.3	mg/kg	-	-	-	< 0.3
4-Bromofluorobenzene (surr.)	1	%	-	-	-	72

Client Sample ID			TP6_0.4-0.5	TP6_1.8-1.9	TP7_0.6-0.7	TP7_2.1-2.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M19-Oc46600	M19-Oc46601	M19-Oc46602	M19-Oc46603
Date Sampled			Oct 28, 2019	Oct 28, 2019	Oct 28, 2019	Oct 28, 2019
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	-	-	-	< 0.5
TRH C6-C10	20	mg/kg	-	-	-	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	-	-	-	< 20
TRH >C10-C16	50	mg/kg	-	-	-	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	-	-	-	< 50
TRH >C16-C34	100	mg/kg	-	-	-	< 100
TRH >C34-C40	100	mg/kg	-	-	-	< 100
TRH >C10-C40 (total)*	100	mg/kg	-	-	-	< 100
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	1.4	1.5	< 0.5	0.8
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	1.7	1.7	0.6	1.1
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.9	2.0	1.2	1.4
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	0.8	0.7	< 0.5	0.8
Benzo(a)pyrene	0.5	mg/kg	1.0	1.1	< 0.5	0.6
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	1.2	1.0	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	1.3	1.1	< 0.5	0.6
Chrysene	0.5	mg/kg	1.1	1.0	< 0.5	0.8
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	0.6	0.6	< 0.5	1.0
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	0.9	0.7	< 0.5	0.7
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	0.9	0.9	< 0.5	1.0
Total PAH*	0.5	mg/kg	8.3	7.1	< 0.5	5.5
2-Fluorobiphenyl (surr.)	1	%	75	71	62	62
p-Terphenyl-d14 (surr.)	1	%	56	52	54	70
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
4.4'-DDD	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDE	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDT	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
a-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Aldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
b-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
d-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Dieldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan I	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin aldehyde	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
g-BHC (Lindane)	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05

Client Sample ID			TP6_0.4-0.5	TP6_1.8-1.9	TP7_0.6-0.7	TP7_2.1-2.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M19-Oc46600	M19-Oc46601	M19-Oc46602	M19-Oc46603
Date Sampled			Oct 28, 2019	Oct 28, 2019	Oct 28, 2019	Oct 28, 2019
Test/Reference	LOR	Unit				
Organochlorine Pesticides						
Heptachlor epoxide	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Hexachlorobenzene	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Methoxychlor	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Toxaphene	1	mg/kg	< 1	< 1	< 1	< 1
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Dibutylchlorendate (surr.)	1	%	64	60	63	92
Tetrachloro-m-xylene (surr.)	1	%	80	78	68	63
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
Bolstar	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
Chlorfenvinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
Chlorpyrifos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
Chlorpyrifos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
Coumaphos	2	mg/kg	< 2	< 2	< 2	-
Demeton-S	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
Demeton-O	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
Diazinon	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
Dichlorvos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
Dimethoate	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
Disulfoton	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
EPN	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
Ethion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
Ethoprop	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
Ethyl parathion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
Fenitrothion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
Fensulfothion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
Fenthion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
Malathion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
Merphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
Methyl parathion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
Mevinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
Monocrotophos	2	mg/kg	< 2	< 2	< 2	-
Naled	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
Omethoate	2	mg/kg	< 2	< 2	< 2	-
Phorate	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
Pirimiphos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
Pyrazophos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
Ronnel	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
Terbufos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
Tetrachlorvinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
Tokuthion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
Trichloronate	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
Triphenylphosphate (surr.)	1	%	53	97	50	-
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	8.2	8.1	8.1	8.3
% Moisture	1	%	9.7	14	18	12

Client Sample ID			TP6_0.4-0.5	TP6_1.8-1.9	TP7_0.6-0.7	TP7_2.1-2.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M19-Oc46600	M19-Oc46601	M19-Oc46602	M19-Oc46603
Date Sampled			Oct 28, 2019	Oct 28, 2019	Oct 28, 2019	Oct 28, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	11	27	5.0	12
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	22	29	45	18
Copper	5	mg/kg	12	19	15	12
Lead	5	mg/kg	52	38	20	38
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	11	16	25	10
Zinc	5	mg/kg	65	55	41	56

Client Sample ID			TP07_3.1-3.2	TP09_1.2-1.3	TP10_0.2-0.3	TP10_0.7-0.8
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M19-Oc46605	M19-Oc46606	M19-Oc46607	M19-Oc46608
Date Sampled			Oct 28, 2019	Oct 28, 2019	Oct 28, 2019	Oct 28, 2019
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	-	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	-	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	-	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	-	< 50
TRH C10-C36 (Total)	50	mg/kg	< 50	< 50	-	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	-	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	-	< 0.3
4-Bromofluorobenzene (surr.)	1	%	76	69	-	66
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	-	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	-	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	-	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	-	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	-	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	-	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	-	< 100
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5

Client Sample ID			TP07_3.1-3.2	TP09_1.2-1.3	TP10_0.2-0.3	TP10_0.7-0.8
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M19-Oc46605	M19-Oc46606	M19-Oc46607	M19-Oc46608
Date Sampled			Oct 28, 2019	Oct 28, 2019	Oct 28, 2019	Oct 28, 2019
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	56	70	60	58
p-Terphenyl-d14 (surr.)	1	%	60	87	82	80
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
4.4'-DDD	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDE	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDT	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
a-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Aldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
b-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
d-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Dieldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan I	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin aldehyde	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
g-BHC (Lindane)	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor epoxide	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Hexachlorobenzene	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Methoxychlor	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Toxaphene	1	mg/kg	< 1	< 1	< 1	< 1
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Dibutylchlorendate (surr.)	1	%	60	51	91	82
Tetrachloro-m-xylene (surr.)	1	%	75	80	71	75
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	-	-	< 0.2	-
Bolstar	0.2	mg/kg	-	-	< 0.2	-
Chlorfenvinphos	0.2	mg/kg	-	-	< 0.2	-
Chlorpyrifos	0.2	mg/kg	-	-	< 0.2	-
Chlorpyrifos-methyl	0.2	mg/kg	-	-	< 0.2	-
Coumaphos	2	mg/kg	-	-	< 2	-
Demeton-S	0.2	mg/kg	-	-	< 0.2	-
Demeton-O	0.2	mg/kg	-	-	< 0.2	-

Client Sample ID			TP07_3.1-3.2	TP09_1.2-1.3	TP10_0.2-0.3	TP10_0.7-0.8
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M19-Oc46605	M19-Oc46606	M19-Oc46607	M19-Oc46608
Date Sampled			Oct 28, 2019	Oct 28, 2019	Oct 28, 2019	Oct 28, 2019
Test/Reference	LOR	Unit				
Organophosphorus Pesticides						
Diazinon	0.2	mg/kg	-	-	< 0.2	-
Dichlorvos	0.2	mg/kg	-	-	< 0.2	-
Dimethoate	0.2	mg/kg	-	-	< 0.2	-
Disulfoton	0.2	mg/kg	-	-	< 0.2	-
EPN	0.2	mg/kg	-	-	< 0.2	-
Ethion	0.2	mg/kg	-	-	< 0.2	-
Ethoprop	0.2	mg/kg	-	-	< 0.2	-
Ethyl parathion	0.2	mg/kg	-	-	< 0.2	-
Fenitrothion	0.2	mg/kg	-	-	< 0.2	-
Fensulfothion	0.2	mg/kg	-	-	< 0.2	-
Fenthion	0.2	mg/kg	-	-	< 0.2	-
Malathion	0.2	mg/kg	-	-	< 0.2	-
Merphos	0.2	mg/kg	-	-	< 0.2	-
Methyl parathion	0.2	mg/kg	-	-	< 0.2	-
Mevinphos	0.2	mg/kg	-	-	< 0.2	-
Monocrotophos	2	mg/kg	-	-	< 2	-
Naled	0.2	mg/kg	-	-	< 0.2	-
Omethoate	2	mg/kg	-	-	< 2	-
Phorate	0.2	mg/kg	-	-	< 0.2	-
Pirimiphos-methyl	0.2	mg/kg	-	-	< 0.2	-
Pyrazophos	0.2	mg/kg	-	-	< 0.2	-
Ronnel	0.2	mg/kg	-	-	< 0.2	-
Terbufos	0.2	mg/kg	-	-	< 0.2	-
Tetrachlorvinphos	0.2	mg/kg	-	-	< 0.2	-
Tokuthion	0.2	mg/kg	-	-	< 0.2	-
Trichloronate	0.2	mg/kg	-	-	< 0.2	-
Triphenylphosphate (surr.)	1	%	-	-	94	-
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	8.0	8.2	7.8	8.4
% Moisture	1	%	7.8	17	3.2	12
Heavy Metals						
Arsenic	2	mg/kg	33	5.1	3.5	3.1
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	25	35	19	19
Copper	5	mg/kg	11	13	6.3	8.1
Lead	5	mg/kg	27	17	12	12
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	13	20	11	11
Zinc	5	mg/kg	30	30	18	26

Client Sample ID			TP10_2.4-2.5	TP11_0.5-0.6	TP11_2.0-2.1
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			M19-Oc46609	M19-Oc46610	M19-Oc46611
Date Sampled			Oct 28, 2019	Oct 28, 2019	Oct 28, 2019
Test/Reference	LOR	Unit			
Polycyclic Aromatic Hydrocarbons					
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	1.4	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	1.7	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.9	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	0.8	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	1.1	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	0.8	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	0.7	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	0.8	< 0.5
Chrysene	0.5	mg/kg	< 0.5	1.1	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	1.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	0.6	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	1.8	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	9.2	< 0.5
2-Fluorobiphenyl (surr.)	1	%	65	80	65
p-Terphenyl-d14 (surr.)	1	%	83	80	67
Organochlorine Pesticides					
Chlordanes - Total	0.1	mg/kg	< 0.1	-	< 0.1
4.4'-DDD	0.05	mg/kg	< 0.05	-	< 0.05
4.4'-DDE	0.05	mg/kg	< 0.05	-	< 0.05
4.4'-DDT	0.05	mg/kg	< 0.05	-	< 0.05
a-BHC	0.05	mg/kg	< 0.05	-	< 0.05
Aldrin	0.05	mg/kg	< 0.05	-	< 0.05
b-BHC	0.05	mg/kg	< 0.05	-	< 0.05
d-BHC	0.05	mg/kg	< 0.05	-	< 0.05
Dieldrin	0.05	mg/kg	< 0.05	-	< 0.05
Endosulfan I	0.05	mg/kg	< 0.05	-	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05	-	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05	-	< 0.05
Endrin	0.05	mg/kg	< 0.05	-	< 0.05
Endrin aldehyde	0.05	mg/kg	< 0.05	-	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05	-	< 0.05
g-BHC (Lindane)	0.05	mg/kg	< 0.05	-	< 0.05
Heptachlor	0.05	mg/kg	< 0.05	-	< 0.05
Heptachlor epoxide	0.05	mg/kg	< 0.05	-	< 0.05
Hexachlorobenzene	0.05	mg/kg	< 0.05	-	< 0.05
Methoxychlor	0.05	mg/kg	< 0.05	-	< 0.05
Toxaphene	1	mg/kg	< 1	-	< 1
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	-	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	-	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	-	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	-	< 0.1
Dibutylchlorendate (surr.)	1	%	96	-	87
Tetrachloro-m-xylene (surr.)	1	%	69	-	67

Client Sample ID			TP10_2.4-2.5	TP11_0.5-0.6	TP11_2.0-2.1
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			M19-Oc46609	M19-Oc46610	M19-Oc46611
Date Sampled			Oct 28, 2019	Oct 28, 2019	Oct 28, 2019
Test/Reference	LOR	Unit			
Organophosphorus Pesticides					
Azinphos-methyl	0.2	mg/kg	< 0.2	-	< 0.2
Bolstar	0.2	mg/kg	< 0.2	-	< 0.2
Chlorfenvinphos	0.2	mg/kg	< 0.2	-	< 0.2
Chlorpyrifos	0.2	mg/kg	< 0.2	-	< 0.2
Chlorpyrifos-methyl	0.2	mg/kg	< 0.2	-	< 0.2
Coumaphos	2	mg/kg	< 2	-	< 2
Demeton-S	0.2	mg/kg	< 0.2	-	< 0.2
Demeton-O	0.2	mg/kg	< 0.2	-	< 0.2
Diazinon	0.2	mg/kg	< 0.2	-	< 0.2
Dichlorvos	0.2	mg/kg	< 0.2	-	< 0.2
Dimethoate	0.2	mg/kg	< 0.2	-	< 0.2
Disulfoton	0.2	mg/kg	< 0.2	-	< 0.2
EPN	0.2	mg/kg	< 0.2	-	< 0.2
Ethion	0.2	mg/kg	< 0.2	-	< 0.2
Ethoprop	0.2	mg/kg	< 0.2	-	< 0.2
Ethyl parathion	0.2	mg/kg	< 0.2	-	< 0.2
Fenitrothion	0.2	mg/kg	< 0.2	-	< 0.2
Fensulfothion	0.2	mg/kg	< 0.2	-	< 0.2
Fenthion	0.2	mg/kg	< 0.2	-	< 0.2
Malathion	0.2	mg/kg	< 0.2	-	< 0.2
Merphos	0.2	mg/kg	< 0.2	-	< 0.2
Methyl parathion	0.2	mg/kg	< 0.2	-	< 0.2
Mevinphos	0.2	mg/kg	< 0.2	-	< 0.2
Monocrotophos	2	mg/kg	< 2	-	< 2
Naled	0.2	mg/kg	< 0.2	-	< 0.2
Omethoate	2	mg/kg	< 2	-	< 2
Phorate	0.2	mg/kg	< 0.2	-	< 0.2
Pirimiphos-methyl	0.2	mg/kg	< 0.2	-	< 0.2
Pyrazophos	0.2	mg/kg	< 0.2	-	< 0.2
Ronnel	0.2	mg/kg	< 0.2	-	< 0.2
Terbufos	0.2	mg/kg	< 0.2	-	< 0.2
Tetrachlorvinphos	0.2	mg/kg	< 0.2	-	< 0.2
Tokuthion	0.2	mg/kg	< 0.2	-	< 0.2
Trichloronate	0.2	mg/kg	< 0.2	-	< 0.2
Triphenylphosphate (surr.)	1	%	66	-	51
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	8.3	7.7	7.4
% Moisture	1	%	14	16	15
Heavy Metals					
Arsenic	2	mg/kg	10	14	26
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	33	25	25
Copper	5	mg/kg	14	21	16
Lead	5	mg/kg	26	47	67
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	19	16	12
Zinc	5	mg/kg	48	89	59

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Eurofins | mgt Suite B9			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Nov 01, 2019	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Nov 01, 2019	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Nov 01, 2019	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Nov 01, 2019	
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Melbourne	Nov 01, 2019	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Organochlorine Pesticides	Melbourne	Nov 01, 2019	14 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8270)			
Metals M8	Melbourne	Nov 01, 2019	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
SA Waste Screen			
Volatile Organics	Melbourne	Nov 01, 2019	7 Days
- Method: USEPA 8260 - MGT 350A Volatile Organics by GCMS			
Polychlorinated Biphenyls	Melbourne	Nov 01, 2019	28 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)			
Phenols (Halogenated)	Melbourne	Nov 01, 2019	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (non-Halogenated)	Melbourne	Nov 01, 2019	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Chromium (hexavalent)	Melbourne	Nov 01, 2019	28 Days
- Method: APHA 3500-Cr Hexavalent Chromium- (Extraction:- USEPA3060)			
Cyanide (total)	Melbourne	Nov 01, 2019	14 Days
- Method: LTM-INO-4020 Total Free WAD Cyanide by CFA			
SA Waste Metals : Metals M14SA	Melbourne	Nov 01, 2019	28 Days
- Method: LTM-MET-3030 by ICP-OES (hydride ICP-OES for Mercury)			
Organophosphorus Pesticides	Melbourne	Nov 01, 2019	14 Days
- Method: LTM-ORG-2200 Organophosphorus Pesticides by GC-MS (USEPA 8081)			
pH (1:5 Aqueous extract at 25°C as rec.)	Melbourne	Nov 01, 2019	7 Days
- Method: LTM-GEN-7090 pH in soil by ISE			
% Moisture	Melbourne	Oct 30, 2019	14 Days
- Method: LTM-GEN-7080 Moisture			

eurofins | Environment Testing

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Company Name: Mud Environmental Pty Ltd
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SA 5022

Project Name: LEVINSONS CRATES
Project ID: ME-296

Order No.:
Report #: 685395
Phone: 08 8356 0187
Fax: 08 8356 0187

Received: Oct 30, 2019 3:15 PM
Due: Nov 7, 2019
Priority: 5 Day
Contact Name: Adrian Webber

Eurofins Analytical Services Manager : Michael Cassidy

Sample Detail						Asbestos Absence /Presence	HOLD	pH (1:5 Aqueous extract at 25°C as rec.)	TRH C6-C10	Polycyclic Aromatic Hydrocarbons	Organochlorine Pesticides	Organophosphorus Pesticides	Metals M8	Moisture Set	SA Waste Screen	Eurofins | mgt Suite B9
Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217						X										
Brisbane Laboratory - NATA Site # 20794																
Perth Laboratory - NATA Site # 23736																
External Laboratory																
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**											
1	TP1_0.1-0.2	Oct 28, 2019		Soil	M19-Oc46588			X						X		X
2	QC2	Oct 28, 2019		Soil	M19-Oc46589			X						X		X
3	TP1_0.4-0.5	Oct 28, 2019		Soil	M19-Oc46590			X			X	X	X	X		
4	TP2_0.1-0.2	Oct 28, 2019		Soil	M19-Oc46591			X			X	X		X		
5	TP2_0.45-0.5	Oct 28, 2019		Soil	M19-Oc46592			X			X	X	X	X		
6	TP3_0.1-0.2	Oct 28, 2019		Soil	M19-Oc46593			X			X	X	X	X		
7	TP3_0.5-0.6	Oct 28, 2019		Soil	M19-Oc46594			X						X		X
8	TP3_1.9-2.0	Oct 28, 2019		Soil	M19-Oc46595			X						X	X	
9	TP4_0.1-0.2	Oct 28, 2019		Soil	M19-Oc46596			X		X				X		

eurofins | Environment Testing

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Company Name: Mud Environmental Pty Ltd
Address: 150A East Terrace
Henley Beach
SA 5022

Project Name: LEVINSONS CRATES
Project ID: ME-296

Order No.:
Report #: 685395
Phone: 08 8356 0187
Fax: 08 8356 0187

Received: Oct 30, 2019 3:15 PM
Due: Nov 7, 2019
Priority: 5 Day
Contact Name: Adrian Webber

Eurofins Analytical Services Manager : Michael Cassidy

Sample Detail						Asbestos Absence /Presence	HOLD	pH (1:5 Aqueous extract at 25°C as rec.)	TRH C6-C10	Polycyclic Aromatic Hydrocarbons	Organochlorine Pesticides	Organophosphorus Pesticides	Metals M8	Moisture Set	SA Waste Screen	Eurofins | mgt Suite B9
Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217						X										
Brisbane Laboratory - NATA Site # 20794																
Perth Laboratory - NATA Site # 23736																
10	TP4_0.7-0.8	Oct 28, 2019		Soil	M19-Oc46597			X		X	X	X	X	X		
11	TP5_0.5-0.6	Oct 28, 2019		Soil	M19-Oc46598			X		X	X	X	X	X		
12	TP6_0.1-0.2	Oct 28, 2019		Soil	M19-Oc46599			X			X	X	X	X		
13	TP6_0.4-0.5	Oct 28, 2019		Soil	M19-Oc46600			X		X	X	X	X	X		
14	TP6_1.8-1.9	Oct 28, 2019		Soil	M19-Oc46601			X		X	X	X	X	X		
15	TP7_0.6-0.7	Oct 28, 2019		Soil	M19-Oc46602			X		X	X	X	X	X		
16	TP7_2.1-2.2	Oct 28, 2019		Soil	M19-Oc46603			X						X		X
17	TP7_2.0-2.7	Oct 28, 2019		Building Materials	M19-Oc46604	X										
18	TP07_3.1-3.2	Oct 28, 2019		Soil	M19-Oc46605			X						X		X
19	TP09_1.2-1.3	Oct 28, 2019		Soil	M19-Oc46606			X						X		X
20	TP10_0.2-0.3	Oct 28, 2019		Soil	M19-Oc46607			X		X	X	X	X	X		

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Site # 23736

Company Name: Mud Environmental Pty Ltd
Address: 150A East Terrace
Henley Beach
SA 5022

Project Name: LEVINSONS CRATES
Project ID: ME-296

Order No.:
Report #: 685395
Phone: 08 8356 0187
Fax: 08 8356 0187

Received: Oct 30, 2019 3:15 PM
Due: Nov 7, 2019
Priority: 5 Day
Contact Name: Adrian Webber

Eurofins Analytical Services Manager : Michael Cassidy

Sample Detail						Asbestos Absence /Presence	HOLD	pH (1:5 Aqueous extract at 25°C as rec.)	TRH C6-C10	Polycyclic Aromatic Hydrocarbons	Organochlorine Pesticides	Organophosphorus Pesticides	Metals M8	Moisture Set	SA Waste Screen	Eurofins | mgt Suite B9
Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217						X										
Brisbane Laboratory - NATA Site # 20794																
Perth Laboratory - NATA Site # 23736																
21	TP10_0.7-0.8	Oct 28, 2019		Soil	M19-Oc46608			X						X		X
22	TP10_2.4-2.5	Oct 28, 2019		Soil	M19-Oc46609			X		X	X	X	X	X		
23	TP11_0.5-0.6	Oct 28, 2019		Soil	M19-Oc46610			X		X			X	X		
24	TP11_2.0-2.1	Oct 28, 2019		Soil	M19-Oc46611			X		X	X	X	X	X		
25	QC1	Oct 28, 2019		Water	M19-Oc46612				X							
26	TP1_0.6-0.7	Oct 28, 2019		Soil	M19-Oc46613		X									
27	TP1_1.1-1.2	Oct 28, 2019		Soil	M19-Oc46614		X									
28	TP2_0.5-0.6	Oct 28, 2019		Soil	M19-Oc46615		X									
29	TP2_1.0-1.1	Oct 28, 2019		Soil	M19-Oc46616		X									
30	QC3	Oct 28, 2019		Soil	M19-Oc46617		X									
31	TP3_1.2-1.3	Oct 28, 2019		Soil	M19-Oc46618		X									
32	TP3_2.6-2.7	Oct 28, 2019		Soil	M19-Oc46619		X									

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Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217						X										
Brisbane Laboratory - NATA Site # 20794																
Perth Laboratory - NATA Site # 23736																
33	TP3_3.1-3.2	Oct 28, 2019		Soil	M19-Oc46620		X									
34	TP4_1.5-1.6	Oct 28, 2019		Soil	M19-Oc46621		X									
35	TP4_1.8-1.9	Oct 28, 2019		Soil	M19-Oc46622		X									
36	TP5_0.1-0.2	Oct 28, 2019		Soil	M19-Oc46623		X									
37	TP5_0.7-0.8	Oct 28, 2019		Soil	M19-Oc46624		X									
38	TP5_1.2-1.4	Oct 28, 2019		Soil	M19-Oc46625		X									
39	TP6_0.9-1.0	Oct 28, 2019		Soil	M19-Oc46626		X									
40	TP6_1.2-1.3	Oct 28, 2019		Soil	M19-Oc46627		X									
41	TP6_2.8-2.9	Oct 28, 2019		Soil	M19-Oc46628		X									
42	TP7_0.2-0.3	Oct 28, 2019		Soil	M19-Oc46629		X									
43	TP7_0.3-0.9	Oct 28, 2019		Soil	M19-Oc46630		X									
44	TP7_1.3-1.4	Oct 28, 2019		Soil	M19-Oc46631		X									

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Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217						X										
Brisbane Laboratory - NATA Site # 20794																
Perth Laboratory - NATA Site # 23736																
45	TP7_2.8-2.9	Oct 28, 2019		Soil	M19-Oc46632		X									
46	TP08_0-0.1	Oct 28, 2019		Soil	M19-Oc46633		X									
47	TP08_0.2-0.3	Oct 28, 2019		Soil	M19-Oc46634		X									
48	TP08_0.5-0.6	Oct 28, 2019		Soil	M19-Oc46635		X									
49	TP08_1.0-1.1	Oct 28, 2019		Soil	M19-Oc46636		X									
50	TP09_0.1-0.2	Oct 28, 2019		Soil	M19-Oc46637		X									
51	TP09_0.6-0.7	Oct 28, 2019		Soil	M19-Oc46638		X									
52	TP09_1.9-2.0	Oct 28, 2019		Soil	M19-Oc46639		X									
53	TP10_1.0-1.1	Oct 28, 2019		Soil	M19-Oc46640		X									
54	TP10_1.6-1.7	Oct 28, 2019		Soil	M19-Oc46641		X									
55	TP10_3.4-3.5	Oct 28, 2019		Soil	M19-Oc46642		X									
56	TP10_3.9-4.0	Oct 28, 2019		Soil	M19-Oc46643		X									

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Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217						X										
Brisbane Laboratory - NATA Site # 20794																
Perth Laboratory - NATA Site # 23736																
57	TP11_0.1-0.2	Oct 28, 2019		Soil	M19-Oc46644		X									
58	TP11_0.3-0.4	Oct 28, 2019		Soil	M19-Oc46645		X									
59	TP11_1.5-1.6	Oct 28, 2019		Soil	M19-Oc46646		X									
60	TP11_2.9-3.0	Oct 28, 2019		Soil	M19-Oc46647		X									
Test Counts						1	35	23	1	10	13	13	13	23	1	7

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
ug/L: micrograms per litre
ppm: Parts per million
ppb: Parts per billion
%: Percentage
org/100mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
Method Blank							
Volatile Organics							
Tetrachloroethene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Organochlorine Pesticides							
Chlordanes - Total	mg/kg	< 0.1			0.1	Pass	
4.4'-DDD	mg/kg	< 0.05			0.05	Pass	
4.4'-DDE	mg/kg	< 0.05			0.05	Pass	
4.4'-DDT	mg/kg	< 0.05			0.05	Pass	
a-BHC	mg/kg	< 0.05			0.05	Pass	
Aldrin	mg/kg	< 0.05			0.05	Pass	
b-BHC	mg/kg	< 0.05			0.05	Pass	
d-BHC	mg/kg	< 0.05			0.05	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Dieldrin	mg/kg	< 0.05			0.05	Pass	
Endosulfan I	mg/kg	< 0.05			0.05	Pass	
Endosulfan II	mg/kg	< 0.05			0.05	Pass	
Endosulfan sulphate	mg/kg	< 0.05			0.05	Pass	
Endrin	mg/kg	< 0.05			0.05	Pass	
Endrin aldehyde	mg/kg	< 0.05			0.05	Pass	
Endrin ketone	mg/kg	< 0.05			0.05	Pass	
g-BHC (Lindane)	mg/kg	< 0.05			0.05	Pass	
Heptachlor	mg/kg	< 0.05			0.05	Pass	
Heptachlor epoxide	mg/kg	< 0.05			0.05	Pass	
Hexachlorobenzene	mg/kg	< 0.05			0.05	Pass	
Methoxychlor	mg/kg	< 0.05			0.05	Pass	
Toxaphene	mg/kg	< 1			1	Pass	
Method Blank							
Organophosphorus Pesticides							
Azinphos-methyl	mg/kg	< 0.2			0.2	Pass	
Bolstar	mg/kg	< 0.2			0.2	Pass	
Chlorfenvinphos	mg/kg	< 0.2			0.2	Pass	
Chlorpyrifos	mg/kg	< 0.2			0.2	Pass	
Chlorpyrifos-methyl	mg/kg	< 0.2			0.2	Pass	
Coumaphos	mg/kg	< 2			2	Pass	
Demeton-S	mg/kg	< 0.2			0.2	Pass	
Demeton-O	mg/kg	< 0.2			0.2	Pass	
Diazinon	mg/kg	< 0.2			0.2	Pass	
Dichlorvos	mg/kg	< 0.2			0.2	Pass	
Dimethoate	mg/kg	< 0.2			0.2	Pass	
Disulfoton	mg/kg	< 0.2			0.2	Pass	
EPN	mg/kg	< 0.2			0.2	Pass	
Ethion	mg/kg	< 0.2			0.2	Pass	
Ethoprop	mg/kg	< 0.2			0.2	Pass	
Ethyl parathion	mg/kg	< 0.2			0.2	Pass	
Fenitrothion	mg/kg	< 0.2			0.2	Pass	
Fensulfothion	mg/kg	< 0.2			0.2	Pass	
Fenthion	mg/kg	< 0.2			0.2	Pass	
Malathion	mg/kg	< 0.2			0.2	Pass	
Merphos	mg/kg	< 0.2			0.2	Pass	
Methyl parathion	mg/kg	< 0.2			0.2	Pass	
Mevinphos	mg/kg	< 0.2			0.2	Pass	
Monocrotophos	mg/kg	< 2			2	Pass	
Naled	mg/kg	< 0.2			0.2	Pass	
Omethoate	mg/kg	< 2			2	Pass	
Phorate	mg/kg	< 0.2			0.2	Pass	
Pirimiphos-methyl	mg/kg	< 0.2			0.2	Pass	
Pyrazophos	mg/kg	< 0.2			0.2	Pass	
Ronnel	mg/kg	< 0.2			0.2	Pass	
Terbufos	mg/kg	< 0.2			0.2	Pass	
Tetrachlorvinphos	mg/kg	< 0.2			0.2	Pass	
Tokuthion	mg/kg	< 0.2			0.2	Pass	
Trichloronate	mg/kg	< 0.2			0.2	Pass	
Method Blank							
Polychlorinated Biphenyls							
Aroclor-1016	mg/kg	< 0.1			0.1	Pass	
Aroclor-1221	mg/kg	< 0.1			0.1	Pass	
Aroclor-1232	mg/kg	< 0.1			0.1	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Aroclor-1242	mg/kg	< 0.1			0.1	Pass	
Aroclor-1248	mg/kg	< 0.1			0.1	Pass	
Aroclor-1254	mg/kg	< 0.1			0.1	Pass	
Aroclor-1260	mg/kg	< 0.1			0.1	Pass	
Total PCB*	mg/kg	< 0.1			0.1	Pass	
Method Blank							
Phenols (Halogenated)							
2-Chlorophenol	mg/kg	< 0.5			0.5	Pass	
2.4-Dichlorophenol	mg/kg	< 0.5			0.5	Pass	
2.4.5-Trichlorophenol	mg/kg	< 1			1	Pass	
2.4.6-Trichlorophenol	mg/kg	< 1			1	Pass	
2.6-Dichlorophenol	mg/kg	< 0.5			0.5	Pass	
4-Chloro-3-methylphenol	mg/kg	< 1			1	Pass	
Pentachlorophenol	mg/kg	< 1			1	Pass	
Tetrachlorophenols - Total	mg/kg	< 10			10	Pass	
Method Blank							
Phenols (non-Halogenated)							
2-Cyclohexyl-4.6-dinitrophenol	mg/kg	< 20			20	Pass	
2-Methyl-4.6-dinitrophenol	mg/kg	< 5			5	Pass	
2-Methylphenol (o-Cresol)	mg/kg	< 0.2			0.2	Pass	
2-Nitrophenol	mg/kg	< 1			1.0	Pass	
2.4-Dimethylphenol	mg/kg	< 0.5			0.5	Pass	
2.4-Dinitrophenol	mg/kg	< 5			5	Pass	
3&4-Methylphenol (m&p-Cresol)	mg/kg	< 0.4			0.4	Pass	
4-Nitrophenol	mg/kg	< 5			5	Pass	
Dinoseb	mg/kg	< 20			20	Pass	
Phenol	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Chromium (hexavalent)	mg/kg	< 1			1	Pass	
Cyanide (total)	mg/kg	< 5			5	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Barium	mg/kg	< 10			10	Pass	
Beryllium	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Cobalt	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Iron	mg/kg	< 20			20	Pass	
Lead	mg/kg	< 5			5	Pass	
Manganese	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Silver	mg/kg	< 0.2			0.2	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	106			70-130	Pass	
TRH C10-C14	%	92			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	100			70-130	Pass	
Toluene	%	103			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Ethylbenzene	%	107			70-130	Pass	
m&p-Xylenes	%	113			70-130	Pass	
Xylenes - Total	%	114			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	83			70-130	Pass	
TRH C6-C10	%	109			70-130	Pass	
TRH >C10-C16	%	86			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	75			70-130	Pass	
Acenaphthylene	%	78			70-130	Pass	
Anthracene	%	73			70-130	Pass	
Benz(a)anthracene	%	79			70-130	Pass	
Benzo(a)pyrene	%	74			70-130	Pass	
Benzo(b&j)fluoranthene	%	77			70-130	Pass	
Benzo(g.h.i)perylene	%	73			70-130	Pass	
Benzo(k)fluoranthene	%	107			70-130	Pass	
Chrysene	%	82			70-130	Pass	
Dibenz(a.h)anthracene	%	71			70-130	Pass	
Fluoranthene	%	84			70-130	Pass	
Fluorene	%	82			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	76			70-130	Pass	
Naphthalene	%	83			70-130	Pass	
Phenanthrene	%	70			70-130	Pass	
Pyrene	%	81			70-130	Pass	
LCS - % Recovery							
Organochlorine Pesticides							
Chlordanes - Total	%	119			70-130	Pass	
4.4'-DDD	%	109			70-130	Pass	
4.4'-DDE	%	118			70-130	Pass	
4.4'-DDT	%	76			70-130	Pass	
a-BHC	%	121			70-130	Pass	
Aldrin	%	113			70-130	Pass	
b-BHC	%	90			70-130	Pass	
d-BHC	%	122			70-130	Pass	
Dieldrin	%	112			70-130	Pass	
Endosulfan I	%	115			70-130	Pass	
Endosulfan II	%	107			70-130	Pass	
Endosulfan sulphate	%	95			70-130	Pass	
Endrin	%	73			70-130	Pass	
Endrin aldehyde	%	81			70-130	Pass	
Endrin ketone	%	110			70-130	Pass	
g-BHC (Lindane)	%	90			70-130	Pass	
Heptachlor	%	80			70-130	Pass	
Heptachlor epoxide	%	107			70-130	Pass	
Hexachlorobenzene	%	121			70-130	Pass	
Methoxychlor	%	75			70-130	Pass	
LCS - % Recovery							
Organophosphorus Pesticides							
Diazinon	%	102			70-130	Pass	
Dimethoate	%	92			70-130	Pass	
Ethion	%	81			70-130	Pass	
Fenitrothion	%	125			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Methyl parathion	%	126			70-130	Pass	
Mevinphos	%	72			70-130	Pass	
LCS - % Recovery							
Polychlorinated Biphenyls							
Aroclor-1260	%	96			70-130	Pass	
LCS - % Recovery							
Phenols (Halogenated)							
2-Chlorophenol	%	84			30-130	Pass	
2.4-Dichlorophenol	%	74			30-130	Pass	
2.4.5-Trichlorophenol	%	59			30-130	Pass	
2.4.6-Trichlorophenol	%	68			30-130	Pass	
2.6-Dichlorophenol	%	85			30-130	Pass	
4-Chloro-3-methylphenol	%	91			30-130	Pass	
Pentachlorophenol	%	42			30-130	Pass	
Tetrachlorophenols - Total	%	66			30-130	Pass	
LCS - % Recovery							
Phenols (non-Halogenated)							
2-Cyclohexyl-4.6-dinitrophenol	%	83			30-130	Pass	
2-Methyl-4.6-dinitrophenol	%	40			30-130	Pass	
2-Methylphenol (o-Cresol)	%	85			30-130	Pass	
2-Nitrophenol	%	87			30-130	Pass	
2.4-Dimethylphenol	%	107			30-130	Pass	
2.4-Dinitrophenol	%	34			30-130	Pass	
3&4-Methylphenol (m&p-Cresol)	%	108			30-130	Pass	
4-Nitrophenol	%	52			30-130	Pass	
Dinoseb	%	62			30-130	Pass	
Phenol	%	85			30-130	Pass	
LCS - % Recovery							
Chromium (hexavalent)	%	95			70-130	Pass	
Cyanide (total)	%	118			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	106			80-120	Pass	
Barium	%	115			80-120	Pass	
Beryllium	%	106			80-120	Pass	
Cadmium	%	88			80-120	Pass	
Chromium	%	99			80-120	Pass	
Cobalt	%	107			80-120	Pass	
Copper	%	103			80-120	Pass	
Iron	%	115			80-120	Pass	
Lead	%	120			80-120	Pass	
Manganese	%	95			80-120	Pass	
Mercury	%	100			75-125	Pass	
Nickel	%	99			80-120	Pass	
Silver	%	92			80-120	Pass	
Zinc	%	100			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C10-C14	M19-Oc48439	NCP	%	78			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	M19-Oc48439	NCP	%	74			70-130	Pass	
Spike - % Recovery									

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Organochlorine Pesticides				Result 1					
4.4'-DDT	M19-Oc33152	NCP	%	78			70-130	Pass	
Endrin	M19-Oc33152	NCP	%	85			70-130	Pass	
Methoxychlor	M19-Oc33152	NCP	%	75			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	M19-Oc46589	CP	%	119			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	M19-Oc46589	CP	%	83			70-130	Pass	
Toluene	M19-Oc46589	CP	%	119			70-130	Pass	
Ethylbenzene	M19-Oc46589	CP	%	129			70-130	Pass	
m&p-Xylenes	M19-Oc46589	CP	%	129			70-130	Pass	
o-Xylene	M19-Oc46589	CP	%	125			70-130	Pass	
Xylenes - Total	M19-Oc46589	CP	%	127			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	M19-Oc46589	CP	%	111			70-130	Pass	
TRH C6-C10	M19-Oc46589	CP	%	126			70-130	Pass	
Spike - % Recovery									
Organochlorine Pesticides				Result 1					
Chlordanes - Total	M19-Oc46589	CP	%	124			70-130	Pass	
4.4'-DDD	M19-Oc46589	CP	%	87			70-130	Pass	
4.4'-DDE	M19-Oc46589	CP	%	122			70-130	Pass	
a-BHC	M19-Oc46589	CP	%	110			70-130	Pass	
Aldrin	M19-Oc46589	CP	%	115			70-130	Pass	
b-BHC	M19-Oc46589	CP	%	119			70-130	Pass	
d-BHC	M19-Oc46589	CP	%	84			70-130	Pass	
Dieldrin	M19-Oc46589	CP	%	125			70-130	Pass	
Endosulfan I	M19-Oc46589	CP	%	126			70-130	Pass	
Endosulfan II	M19-Oc46589	CP	%	110			70-130	Pass	
Endosulfan sulphate	M19-Oc46589	CP	%	82			70-130	Pass	
Endrin aldehyde	M19-Oc46589	CP	%	103			70-130	Pass	
Endrin ketone	M19-Oc46589	CP	%	100			70-130	Pass	
g-BHC (Lindane)	M19-Oc46589	CP	%	119			70-130	Pass	
Heptachlor	M19-Oc46589	CP	%	72			70-130	Pass	
Heptachlor epoxide	M19-Oc46589	CP	%	104			70-130	Pass	
Hexachlorobenzene	M19-Oc46589	CP	%	124			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	M19-Oc46589	CP	%	117			75-125	Pass	
Cadmium	M19-Oc46589	CP	%	104			75-125	Pass	
Chromium	M19-Oc46589	CP	%	115			75-125	Pass	
Cobalt	M19-Oc46589	CP	%	110			75-125	Pass	
Copper	M19-Oc46589	CP	%	112			75-125	Pass	
Mercury	M19-Oc46589	CP	%	100			70-130	Pass	
Nickel	M19-Oc46589	CP	%	103			75-125	Pass	
Silver	M19-Oc46589	CP	%	114			75-125	Pass	
Zinc	M19-Oc46589	CP	%	127			75-125	Fail	Q08
Spike - % Recovery									
Organophosphorus Pesticides				Result 1					
Diazinon	S19-Oc44428	NCP	%	103			70-130	Pass	
Dimethoate	S19-Oc44428	NCP	%	90			70-130	Pass	
Ethion	S19-Oc44428	NCP	%	95			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Fenitrothion	S19-Oc44428	NCP	%	126			70-130	Pass	
Methyl parathion	S19-Oc44428	NCP	%	120			70-130	Pass	
Mevinphos	S19-Oc44428	NCP	%	76			70-130	Pass	
Spike - % Recovery									
Polychlorinated Biphenyls				Result 1					
Aroclor-1016	S19-Oc42766	NCP	%	88			70-130	Pass	
Aroclor-1260	S19-Oc42766	NCP	%	92			70-130	Pass	
Spike - % Recovery									
Phenols (Halogenated)				Result 1					
Pentachlorophenol	M19-Oc43417	NCP	%	58			30-130	Pass	
Spike - % Recovery									
Phenols (non-Halogenated)				Result 1					
2-Cyclohexyl-4.6-dinitrophenol	M19-Oc43417	NCP	%	60			30-130	Pass	
2.4-Dinitrophenol	M19-Oc43417	NCP	%	67			30-130	Pass	
Spike - % Recovery									
				Result 1					
Chromium (hexavalent)	M19-Oc48756	NCP	%	106			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Beryllium	B19-No01503	NCP	%	88			75-125	Pass	
Manganese	M19-Oc46698	NCP	%	130			75-125	Fail	Q08
Spike - % Recovery									
Organochlorine Pesticides				Result 1					
Chlordanes - Total	M19-Oc46600	CP	%	120			70-130	Pass	
4.4'-DDD	M19-Oc46600	CP	%	124			70-130	Pass	
4.4'-DDE	M19-Oc46600	CP	%	120			70-130	Pass	
a-BHC	M19-Oc46600	CP	%	105			70-130	Pass	
Aldrin	M19-Oc46600	CP	%	113			70-130	Pass	
b-BHC	M19-Oc46600	CP	%	124			70-130	Pass	
d-BHC	M19-Oc46600	CP	%	97			70-130	Pass	
Dieldrin	M19-Oc46600	CP	%	123			70-130	Pass	
Endosulfan I	M19-Oc46600	CP	%	122			70-130	Pass	
Endosulfan II	M19-Oc46600	CP	%	113			70-130	Pass	
Endosulfan sulphate	M19-Oc46600	CP	%	87			70-130	Pass	
Endrin aldehyde	M19-Oc46600	CP	%	118			70-130	Pass	
Endrin ketone	M19-Oc46600	CP	%	102			70-130	Pass	
g-BHC (Lindane)	M19-Oc46600	CP	%	124			70-130	Pass	
Heptachlor epoxide	M19-Oc46600	CP	%	108			70-130	Pass	
Hexachlorobenzene	M19-Oc46600	CP	%	125			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	M19-Oc46601	CP	%	75			75-125	Pass	
Barium	M19-Oc46601	CP	%	96			75-125	Pass	
Cadmium	M19-Oc46601	CP	%	106			75-125	Pass	
Chromium	M19-Oc46601	CP	%	93			75-125	Pass	
Cobalt	M19-Oc46601	CP	%	84			75-125	Pass	
Copper	M19-Oc46601	CP	%	76			75-125	Pass	
Lead	M19-Oc46601	CP	%	81			75-125	Pass	
Mercury	M19-Oc46601	CP	%	104			70-130	Pass	
Nickel	M19-Oc46601	CP	%	80			75-125	Pass	
Silver	M19-Oc46601	CP	%	116			75-125	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	M19-Oc46605	CP	%	71			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Acenaphthylene	M19-Oc46605	CP	%	75			70-130	Pass	
Anthracene	M19-Oc46605	CP	%	74			70-130	Pass	
Benz(a)anthracene	M19-Oc46605	CP	%	72			70-130	Pass	
Benzo(a)pyrene	M19-Oc46605	CP	%	95			70-130	Pass	
Benzo(b&j)fluoranthene	M19-Oc46605	CP	%	84			70-130	Pass	
Benzo(g.h.i)perylene	M19-Oc46605	CP	%	70			70-130	Pass	
Benzo(k)fluoranthene	M19-Oc46605	CP	%	95			70-130	Pass	
Chrysene	M19-Oc46605	CP	%	88			70-130	Pass	
Dibenz(a.h)anthracene	M19-Oc46605	CP	%	94			70-130	Pass	
Fluoranthene	M19-Oc46605	CP	%	87			70-130	Pass	
Fluorene	M19-Oc46605	CP	%	77			70-130	Pass	
Indeno(1.2.3-cd)pyrene	M19-Oc46605	CP	%	71			70-130	Pass	
Naphthalene	M19-Oc46605	CP	%	80			70-130	Pass	
Phenanthrene	M19-Oc46605	CP	%	84			70-130	Pass	
Pyrene	M19-Oc46605	CP	%	88			70-130	Pass	
Spike - % Recovery									
Phenols (Halogenated)				Result 1					
2-Chlorophenol	M19-Oc46605	CP	%	76			30-130	Pass	
2.4-Dichlorophenol	M19-Oc46605	CP	%	64			30-130	Pass	
2.4.5-Trichlorophenol	M19-Oc46605	CP	%	53			30-130	Pass	
2.4.6-Trichlorophenol	M19-Oc46605	CP	%	55			30-130	Pass	
2.6-Dichlorophenol	M19-Oc46605	CP	%	76			30-130	Pass	
4-Chloro-3-methylphenol	M19-Oc46605	CP	%	78			30-130	Pass	
Tetrachlorophenols - Total	M19-Oc46605	CP	%	56			30-130	Pass	
Spike - % Recovery									
Phenols (non-Halogenated)				Result 1					
2-Methyl-4.6-dinitrophenol	M19-Oc46605	CP	%	32			30-130	Pass	
2-Methylphenol (o-Cresol)	M19-Oc46605	CP	%	74			30-130	Pass	
2-Nitrophenol	M19-Oc46605	CP	%	73			30-130	Pass	
2.4-Dimethylphenol	M19-Oc46605	CP	%	111			30-130	Pass	
3&4-Methylphenol (m&p-Cresol)	M19-Oc46605	CP	%	97			30-130	Pass	
4-Nitrophenol	M19-Oc46605	CP	%	47			30-130	Pass	
Dinoseb	M19-Oc46605	CP	%	63			30-130	Pass	
Phenol	M19-Oc46605	CP	%	77			30-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	M19-Oc46588	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	M19-Oc48870	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	M19-Oc48870	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	M19-Oc48870	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	M19-Oc46588	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	M19-Oc46588	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	M19-Oc46588	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	M19-Oc46588	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	M19-Oc46588	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	

Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	M19-Oc46588	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	M19-Oc46588	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH >C10-C16	M19-Oc48870	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	M19-Oc48870	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	M19-Oc48870	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	M19-Oc46588	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	M19-Oc46588	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	M19-Oc46588	CP	mg/kg	< 0.5	0.6	170	30%	Fail	Q15
Benz(a)anthracene	M19-Oc46588	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	M19-Oc46588	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	M19-Oc46588	CP	mg/kg	< 0.5	0.6	120	30%	Fail	Q15
Benzo(g.h.i)perylene	M19-Oc46588	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	M19-Oc46588	CP	mg/kg	< 0.5	0.8	130	30%	Fail	Q15
Chrysene	M19-Oc46588	CP	mg/kg	< 0.5	0.9	100	30%	Fail	Q15
Dibenz(a.h)anthracene	M19-Oc46588	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	M19-Oc46588	CP	mg/kg	< 0.5	1.3	160	30%	Fail	Q15
Fluorene	M19-Oc46588	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	M19-Oc46588	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	M19-Oc46588	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	M19-Oc46588	CP	mg/kg	< 0.5	0.5	160	30%	Fail	Q15
Pyrene	M19-Oc46588	CP	mg/kg	< 0.5	1.3	150	30%	Fail	Q15
Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	M19-Oc46588	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
4.4'-DDD	M19-Oc46588	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDE	M19-Oc46588	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDT	M19-Oc46588	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
a-BHC	M19-Oc46588	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Aldrin	M19-Oc46588	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
b-BHC	M19-Oc46588	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
d-BHC	M19-Oc46588	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Dieldrin	M19-Oc46588	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan I	M19-Oc46588	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan II	M19-Oc46588	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan sulphate	M19-Oc46588	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin	M19-Oc46588	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin aldehyde	M19-Oc46588	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin ketone	M19-Oc46588	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
g-BHC (Lindane)	M19-Oc46588	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor	M19-Oc46588	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor epoxide	M19-Oc46588	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Hexachlorobenzene	M19-Oc46588	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Methoxychlor	M19-Oc46588	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Azinphos-methyl	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Bolstar	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorfenvinphos	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos-methyl	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Coumaphos	M19-Oc46588	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Demeton-S	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	

Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Demeton-O	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Diazinon	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dichlorvos	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dimethoate	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Disulfoton	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
EPN	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethion	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethoprop	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethyl parathion	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenitrothion	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fensulfothion	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenthion	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Malathion	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Merphos	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Methyl parathion	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Mevinphos	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Monocrotophos	M19-Oc46588	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Naled	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Omethoate	M19-Oc46588	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Phorate	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pirimiphos-methyl	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pyrazophos	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ronnel	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Terbufos	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tetrachlorvinphos	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tokuthion	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Trichloronate	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Duplicate									
Phenols (Halogenated)				Result 1	Result 2	RPD			
2-Chlorophenol	M19-Oc46588	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4-Dichlorophenol	M19-Oc46588	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4.5-Trichlorophenol	M19-Oc46588	CP	mg/kg	< 1	< 1	<1	30%	Pass	
2.4.6-Trichlorophenol	M19-Oc46588	CP	mg/kg	< 1	< 1	<1	30%	Pass	
2.6-Dichlorophenol	M19-Oc46588	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
4-Chloro-3-methylphenol	M19-Oc46588	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Pentachlorophenol	M19-Oc46588	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Tetrachlorophenols - Total	M19-Oc46588	CP	mg/kg	< 10	< 10	<1	30%	Pass	
Duplicate									
Phenols (non-Halogenated)				Result 1	Result 2	RPD			
2-Cyclohexyl-4.6-dinitrophenol	M19-Oc46588	CP	mg/kg	< 20	< 20	<1	30%	Pass	
2-Methyl-4.6-dinitrophenol	M19-Oc46588	CP	mg/kg	< 5	< 5	<1	30%	Pass	
2-Methylphenol (o-Cresol)	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
2-Nitrophenol	M19-Oc46588	CP	mg/kg	< 1	< 1	<1	30%	Pass	
2.4-Dimethylphenol	M19-Oc46588	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4-Dinitrophenol	M19-Oc46588	CP	mg/kg	< 5	< 5	<1	30%	Pass	
3&4-Methylphenol (m&p-Cresol)	M19-Oc46588	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
4-Nitrophenol	M19-Oc46588	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Dinoseb	M19-Oc46588	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Phenol	M19-Oc46588	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
pH (1:5 Aqueous extract at 25°C as rec.)	M19-Oc46588	CP	pH Units	7.7	7.7	pass	30%	Pass	
% Moisture	M19-Oc46588	CP	%	6.9	6.8	1.0	30%	Pass	

Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	M19-Oc46588	CP	mg/kg	25	25	1.0	30%	Pass	
Barium	M19-Oc46588	CP	mg/kg	110	110	1.0	30%	Pass	
Cadmium	M19-Oc46588	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	M19-Oc46588	CP	mg/kg	20	22	7.0	30%	Pass	
Cobalt	M19-Oc46588	CP	mg/kg	8.4	8.1	4.0	30%	Pass	
Copper	M19-Oc46588	CP	mg/kg	24	21	12	30%	Pass	
Lead	M19-Oc46588	CP	mg/kg	66	64	3.0	30%	Pass	
Manganese	M19-Oc46588	CP	mg/kg	360	330	7.0	30%	Pass	
Mercury	M19-Oc46588	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	M19-Oc46588	CP	mg/kg	12	12	4.0	30%	Pass	
Silver	M19-Oc46588	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Zinc	M19-Oc46588	CP	mg/kg	67	65	3.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	M19-Oc46589	CP	mg/kg	12	12	<1	30%	Pass	
Barium	M19-Oc46589	CP	mg/kg	55	55	<1	30%	Pass	
Cadmium	M19-Oc46589	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	M19-Oc46589	CP	mg/kg	14	14	1.0	30%	Pass	
Cobalt	M19-Oc46589	CP	mg/kg	5.2	5.1	1.0	30%	Pass	
Copper	M19-Oc46589	CP	mg/kg	12	12	<1	30%	Pass	
Lead	M19-Oc46589	CP	mg/kg	50	51	2.0	30%	Pass	
Manganese	M19-Oc46589	CP	mg/kg	120	120	<1	30%	Pass	
Mercury	M19-Oc46589	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	M19-Oc46589	CP	mg/kg	7.3	7.3	1.0	30%	Pass	
Silver	M19-Oc46589	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Zinc	M19-Oc46589	CP	mg/kg	44	45	1.0	30%	Pass	
Duplicate									
Volatile Organics				Result 1	Result 2	RPD			
Tetrachloroethene	B19-No06117	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	M19-Oc46595	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	M19-Oc46595	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	M19-Oc46595	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	M19-Oc46595	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	M19-Oc46595	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	M19-Oc46595	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	M19-Oc46595	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	M19-Oc46595	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	M19-Oc46595	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	M19-Oc46595	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	M19-Oc46595	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	M19-Oc46595	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	M19-Oc46595	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	M19-Oc46595	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	M19-Oc46595	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	M19-Oc46595	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	M19-Oc46595	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
4.4'-DDD	M19-Oc46595	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDE	M19-Oc46595	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDT	M19-Oc46595	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
a-BHC	M19-Oc46595	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	

Duplicate								
Organochlorine Pesticides				Result 1	Result 2	RPD		
Aldrin	M19-Oc46595	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
b-BHC	M19-Oc46595	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
d-BHC	M19-Oc46595	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Dieldrin	M19-Oc46595	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Endosulfan I	M19-Oc46595	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Endosulfan II	M19-Oc46595	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Endosulfan sulphate	M19-Oc46595	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Endrin	M19-Oc46595	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Endrin aldehyde	M19-Oc46595	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Endrin ketone	M19-Oc46595	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
g-BHC (Lindane)	M19-Oc46595	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Heptachlor	M19-Oc46595	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Heptachlor epoxide	M19-Oc46595	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Hexachlorobenzene	M19-Oc46595	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Methoxychlor	M19-Oc46595	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Duplicate								
Organophosphorus Pesticides				Result 1	Result 2	RPD		
Azinphos-methyl	M19-Oc46595	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Bolstar	M19-Oc46595	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Chlorfenvinphos	M19-Oc46595	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Chlorpyrifos	M19-Oc46595	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Chlorpyrifos-methyl	M19-Oc46595	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Coumaphos	M19-Oc46595	CP	mg/kg	< 2	< 2	<1	30%	Pass
Demeton-S	M19-Oc46595	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Demeton-O	M19-Oc46595	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Diazinon	M19-Oc46595	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Dichlorvos	M19-Oc46595	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Dimethoate	M19-Oc46595	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Disulfoton	M19-Oc46595	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
EPN	M19-Oc46595	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Ethion	M19-Oc46595	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Ethoprop	M19-Oc46595	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Ethyl parathion	M19-Oc46595	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Fenitrothion	M19-Oc46595	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Fensulfothion	M19-Oc46595	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Fenthion	M19-Oc46595	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Malathion	M19-Oc46595	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Merphos	M19-Oc46595	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Methyl parathion	M19-Oc46595	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Mevinphos	M19-Oc46595	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Monocrotophos	M19-Oc46595	CP	mg/kg	< 2	< 2	<1	30%	Pass
Naled	M19-Oc46595	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Omethoate	M19-Oc46595	CP	mg/kg	< 2	< 2	<1	30%	Pass
Phorate	M19-Oc46595	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Pirimiphos-methyl	M19-Oc46595	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Pyrazophos	M19-Oc46595	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Ronnel	M19-Oc46595	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Terbufos	M19-Oc46595	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Tetrachlorvinphos	M19-Oc46595	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Tokuthion	M19-Oc46595	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Trichloronate	M19-Oc46595	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass

Duplicate									
Phenols (Halogenated)				Result 1	Result 2	RPD			
2-Chlorophenol	M19-Oc46595	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4-Dichlorophenol	M19-Oc46595	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4.5-Trichlorophenol	M19-Oc46595	CP	mg/kg	< 1	< 1	<1	30%	Pass	
2.4.6-Trichlorophenol	M19-Oc46595	CP	mg/kg	< 1	< 1	<1	30%	Pass	
2.6-Dichlorophenol	M19-Oc46595	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
4-Chloro-3-methylphenol	M19-Oc46595	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Pentachlorophenol	M19-Oc46595	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Tetrachlorophenols - Total	M19-Oc46595	CP	mg/kg	< 10	< 10	<1	30%	Pass	
Duplicate									
Phenols (non-Halogenated)				Result 1	Result 2	RPD			
2-Cyclohexyl-4.6-dinitrophenol	M19-Oc46595	CP	mg/kg	< 20	< 20	<1	30%	Pass	
2-Methyl-4.6-dinitrophenol	M19-Oc46595	CP	mg/kg	< 5	< 5	<1	30%	Pass	
2-Methylphenol (o-Cresol)	M19-Oc46595	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
2-Nitrophenol	M19-Oc46595	CP	mg/kg	< 1	< 1	<1	30%	Pass	
2.4-Dimethylphenol	M19-Oc46595	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4-Dinitrophenol	M19-Oc46595	CP	mg/kg	< 5	< 5	<1	30%	Pass	
3&4-Methylphenol (m&p-Cresol)	M19-Oc46595	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
4-Nitrophenol	M19-Oc46595	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Dinoseb	M19-Oc46595	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Phenol	M19-Oc46595	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Chromium (hexavalent)	M19-Oc49292	NCP	mg/kg	< 1	< 1	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Beryllium	M19-Oc45873	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Iron	S19-Oc46531	NCP	mg/kg	33000	33000	1.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
pH (1:5 Aqueous extract at 25°C as rec.)	M19-Oc46598	CP	pH Units	8.4	8.3	pass	30%	Pass	
% Moisture	M19-Oc46598	CP	%	19	18	4.0	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	M19-Oc46599	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	M19-Oc46599	CP	mg/kg	0.5	0.9	50	30%	Fail	Q15
Anthracene	M19-Oc46599	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	M19-Oc46599	CP	mg/kg	2.6	4.1	47	30%	Fail	Q15
Benzo(a)pyrene	M19-Oc46599	CP	mg/kg	3.6	5.6	44	30%	Fail	Q15
Benzo(b&j)fluoranthene	M19-Oc46599	CP	mg/kg	2.0	3.3	50	30%	Fail	Q15
Benzo(g.h.i)perylene	M19-Oc46599	CP	mg/kg	1.0	1.5	39	30%	Fail	Q15
Benzo(k)fluoranthene	M19-Oc46599	CP	mg/kg	3.2	4.8	40	30%	Fail	Q15
Chrysene	M19-Oc46599	CP	mg/kg	2.6	3.6	30	30%	Pass	
Dibenz(a.h)anthracene	M19-Oc46599	CP	mg/kg	< 0.5	0.7	46	30%	Fail	Q15
Fluoranthene	M19-Oc46599	CP	mg/kg	1.8	3.4	63	30%	Fail	Q15
Fluorene	M19-Oc46599	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	M19-Oc46599	CP	mg/kg	1.9	2.8	39	30%	Fail	Q15
Naphthalene	M19-Oc46599	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	M19-Oc46599	CP	mg/kg	2.3	4.3	59	30%	Fail	Q15

Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	M19-Oc46599	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
4.4'-DDD	M19-Oc46599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDE	M19-Oc46599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDT	M19-Oc46599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
a-BHC	M19-Oc46599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Aldrin	M19-Oc46599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
b-BHC	M19-Oc46599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
d-BHC	M19-Oc46599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Dieldrin	M19-Oc46599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan I	M19-Oc46599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan II	M19-Oc46599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan sulphate	M19-Oc46599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin	M19-Oc46599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin aldehyde	M19-Oc46599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin ketone	M19-Oc46599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
g-BHC (Lindane)	M19-Oc46599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor	M19-Oc46599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor epoxide	M19-Oc46599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Hexachlorobenzene	M19-Oc46599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Methoxychlor	M19-Oc46599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Azinphos-methyl	M19-Oc46599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Bolstar	M19-Oc46599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorfenvinphos	M19-Oc46599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos	M19-Oc46599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos-methyl	M19-Oc46599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Coumaphos	M19-Oc46599	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Demeton-S	M19-Oc46599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Demeton-O	M19-Oc46599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Diazinon	M19-Oc46599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dichlorvos	M19-Oc46599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dimethoate	M19-Oc46599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Disulfoton	M19-Oc46599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
EPN	M19-Oc46599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethion	M19-Oc46599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethoprop	M19-Oc46599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethyl parathion	M19-Oc46599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenitrothion	M19-Oc46599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fensulfothion	M19-Oc46599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenthion	M19-Oc46599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Malathion	M19-Oc46599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Merphos	M19-Oc46599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Methyl parathion	M19-Oc46599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Mevinphos	M19-Oc46599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Monocrotophos	M19-Oc46599	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Naled	M19-Oc46599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Omethoate	M19-Oc46599	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Phorate	M19-Oc46599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pirimiphos-methyl	M19-Oc46599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pyrazophos	M19-Oc46599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ronnel	M19-Oc46599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Terbufos	M19-Oc46599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tetrachlorvinphos	M19-Oc46599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	

Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Tokuthion	M19-Oc46599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Trichloronate	M19-Oc46599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Duplicate									
Phenols (Halogenated)				Result 1	Result 2	RPD			
2-Chlorophenol	M19-Oc46599	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4-Dichlorophenol	M19-Oc46599	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4.5-Trichlorophenol	M19-Oc46599	CP	mg/kg	< 1	< 1	<1	30%	Pass	
2.4.6-Trichlorophenol	M19-Oc46599	CP	mg/kg	< 1	< 1	<1	30%	Pass	
2.6-Dichlorophenol	M19-Oc46599	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
4-Chloro-3-methylphenol	M19-Oc46599	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Pentachlorophenol	M19-Oc46599	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Tetrachlorophenols - Total	M19-Oc46599	CP	mg/kg	< 10	< 10	<1	30%	Pass	
Duplicate									
Phenols (non-Halogenated)				Result 1	Result 2	RPD			
2-Cyclohexyl-4.6-dinitrophenol	M19-Oc46599	CP	mg/kg	< 20	< 20	<1	30%	Pass	
2-Methyl-4.6-dinitrophenol	M19-Oc46599	CP	mg/kg	< 5	< 5	<1	30%	Pass	
2-Methylphenol (o-Cresol)	M19-Oc46599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
2-Nitrophenol	M19-Oc46599	CP	mg/kg	< 1	< 1	<1	30%	Pass	
2.4-Dimethylphenol	M19-Oc46599	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4-Dinitrophenol	M19-Oc46599	CP	mg/kg	< 5	< 5	<1	30%	Pass	
3&4-Methylphenol (m&p-Cresol)	M19-Oc46599	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
4-Nitrophenol	M19-Oc46599	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Dinoseb	M19-Oc46599	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Phenol	M19-Oc46599	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	M19-Oc46600	CP	mg/kg	11	9.4	18	30%	Pass	
Barium	M19-Oc46600	CP	mg/kg	94	79	18	30%	Pass	
Cadmium	M19-Oc46600	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	M19-Oc46600	CP	mg/kg	22	20	13	30%	Pass	
Cobalt	M19-Oc46600	CP	mg/kg	7.2	6.2	16	30%	Pass	
Copper	M19-Oc46600	CP	mg/kg	12	11	16	30%	Pass	
Lead	M19-Oc46600	CP	mg/kg	52	38	32	30%	Fail	Q15
Manganese	M19-Oc46600	CP	mg/kg	190	150	25	30%	Pass	
Mercury	M19-Oc46600	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	M19-Oc46600	CP	mg/kg	11	9.1	19	30%	Pass	
Silver	M19-Oc46600	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Zinc	M19-Oc46600	CP	mg/kg	65	53	19	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	M19-Oc46601	CP	mg/kg	27	27	1.0	30%	Pass	
Barium	M19-Oc46601	CP	mg/kg	84	86	3.0	30%	Pass	
Cadmium	M19-Oc46601	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	M19-Oc46601	CP	mg/kg	29	30	3.0	30%	Pass	
Cobalt	M19-Oc46601	CP	mg/kg	10.0	10	2.0	30%	Pass	
Copper	M19-Oc46601	CP	mg/kg	19	20	2.0	30%	Pass	
Lead	M19-Oc46601	CP	mg/kg	38	38	1.0	30%	Pass	
Manganese	M19-Oc46601	CP	mg/kg	360	360	1.0	30%	Pass	
Mercury	M19-Oc46601	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	M19-Oc46601	CP	mg/kg	16	16	1.0	30%	Pass	
Silver	M19-Oc46601	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Zinc	M19-Oc46601	CP	mg/kg	55	57	3.0	30%	Pass	

Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	M19-Oc46603	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	M19-Oc46603	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	M19-Oc46603	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	M19-Oc46603	CP	mg/kg	0.6	< 0.5	130	30%	Fail	Q15
Benzo(b&j)fluoranthene	M19-Oc46603	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	M19-Oc46603	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	M19-Oc46603	CP	mg/kg	0.6	< 0.5	130	30%	Fail	Q15
Chrysene	M19-Oc46603	CP	mg/kg	0.8	< 0.5	130	30%	Fail	Q15
Dibenz(a.h)anthracene	M19-Oc46603	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	M19-Oc46603	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	M19-Oc46603	CP	mg/kg	0.7	< 0.5	110	30%	Fail	Q15
Naphthalene	M19-Oc46603	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	M19-Oc46603	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	M19-Oc46603	CP	mg/kg	1.0	< 0.5	140	30%	Fail	Q15
Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	M19-Oc46603	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
4.4'-DDD	M19-Oc46603	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDE	M19-Oc46603	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDT	M19-Oc46603	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
a-BHC	M19-Oc46603	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Aldrin	M19-Oc46603	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
b-BHC	M19-Oc46603	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
d-BHC	M19-Oc46603	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Dieldrin	M19-Oc46603	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan I	M19-Oc46603	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan II	M19-Oc46603	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan sulphate	M19-Oc46603	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin	M19-Oc46603	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin aldehyde	M19-Oc46603	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin ketone	M19-Oc46603	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
g-BHC (Lindane)	M19-Oc46603	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor	M19-Oc46603	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor epoxide	M19-Oc46603	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Hexachlorobenzene	M19-Oc46603	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Methoxychlor	M19-Oc46603	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Toxaphene	M19-Oc46603	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Azinphos-methyl	M19-Oc46603	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Bolstar	M19-Oc46603	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorfenvinphos	M19-Oc46603	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos	M19-Oc46603	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos-methyl	M19-Oc46603	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Coumaphos	M19-Oc46603	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Demeton-S	M19-Oc46603	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Demeton-O	M19-Oc46603	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Diazinon	M19-Oc46603	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dichlorvos	M19-Oc46603	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dimethoate	M19-Oc46603	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Disulfoton	M19-Oc46603	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
EPN	M19-Oc46603	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethion	M19-Oc46603	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethoprop	M19-Oc46603	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	

Duplicate								
Organophosphorus Pesticides				Result 1	Result 2	RPD		
Ethyl parathion	M19-Oc46603	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Fenitrothion	M19-Oc46603	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Fensulfothion	M19-Oc46603	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Fenthion	M19-Oc46603	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Malathion	M19-Oc46603	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Merphos	M19-Oc46603	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Methyl parathion	M19-Oc46603	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Mevinphos	M19-Oc46603	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Monocrotophos	M19-Oc46603	CP	mg/kg	< 2	< 2	<1	30%	Pass
Naled	M19-Oc46603	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Omethoate	M19-Oc46603	CP	mg/kg	< 2	< 2	<1	30%	Pass
Phorate	M19-Oc46603	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Pirimiphos-methyl	M19-Oc46603	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Pyrazophos	M19-Oc46603	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Ronnel	M19-Oc46603	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Terbufos	M19-Oc46603	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Tetrachlorvinphos	M19-Oc46603	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Tokuthion	M19-Oc46603	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Trichloronate	M19-Oc46603	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Duplicate								
Polychlorinated Biphenyls				Result 1	Result 2	RPD		
Aroclor-1016	M19-Oc46603	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Aroclor-1221	M19-Oc46603	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Aroclor-1232	M19-Oc46603	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Aroclor-1242	M19-Oc46603	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Aroclor-1248	M19-Oc46603	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Aroclor-1254	M19-Oc46603	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Aroclor-1260	M19-Oc46603	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Total PCB*	M19-Oc46603	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Duplicate								
Phenols (Halogenated)				Result 1	Result 2	RPD		
2-Chlorophenol	M19-Oc46603	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
2.4-Dichlorophenol	M19-Oc46603	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
2.4.5-Trichlorophenol	M19-Oc46603	CP	mg/kg	< 1	< 1	<1	30%	Pass
2.4.6-Trichlorophenol	M19-Oc46603	CP	mg/kg	< 1	< 1	<1	30%	Pass
2.6-Dichlorophenol	M19-Oc46603	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
4-Chloro-3-methylphenol	M19-Oc46603	CP	mg/kg	< 1	< 1	<1	30%	Pass
Pentachlorophenol	M19-Oc46603	CP	mg/kg	< 1	< 1	<1	30%	Pass
Tetrachlorophenols - Total	M19-Oc46603	CP	mg/kg	< 10	< 10	<1	30%	Pass
Duplicate								
Phenols (non-Halogenated)				Result 1	Result 2	RPD		
2-Cyclohexyl-4.6-dinitrophenol	M19-Oc46603	CP	mg/kg	< 20	< 20	<1	30%	Pass
2-Methyl-4.6-dinitrophenol	M19-Oc46603	CP	mg/kg	< 5	< 5	<1	30%	Pass
2-Methylphenol (o-Cresol)	M19-Oc46603	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
2-Nitrophenol	M19-Oc46603	CP	mg/kg	< 1	< 1	<1	30%	Pass
2.4-Dimethylphenol	M19-Oc46603	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
2.4-Dinitrophenol	M19-Oc46603	CP	mg/kg	< 5	< 5	<1	30%	Pass
3&4-Methylphenol (m&p-Cresol)	M19-Oc46603	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass
4-Nitrophenol	M19-Oc46603	CP	mg/kg	< 5	< 5	<1	30%	Pass
Dinoseb	M19-Oc46603	CP	mg/kg	< 20	< 20	<1	30%	Pass
Phenol	M19-Oc46603	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
pH (1:5 Aqueous extract at 25°C as rec.)	M19-Oc46609	CP	pH Units	8.3	8.3	pass	30%	Pass

Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Barium	M19-Oc46611	CP	mg/kg	91	78	15	30%	Pass	
Cadmium	M19-Oc46611	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	M19-Oc46611	CP	mg/kg	25	19	28	30%	Pass	
Cobalt	M19-Oc46611	CP	mg/kg	7.2	5.9	20	30%	Pass	
Copper	M19-Oc46611	CP	mg/kg	16	15	9.0	30%	Pass	
Lead	M19-Oc46611	CP	mg/kg	67	80	18	30%	Pass	
Manganese	M19-Oc46611	CP	mg/kg	170	160	6.0	30%	Pass	
Mercury	M19-Oc46611	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	M19-Oc46611	CP	mg/kg	12	10	19	30%	Pass	
Silver	M19-Oc46611	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Zinc	M19-Oc46611	CP	mg/kg	59	50	17	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q08	The matrix spike recovery is outside of the recommended acceptance criteria. An acceptable recovery was obtained for the laboratory control sample indicating a sample matrix interference.
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised By

Michael Cassidy	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal (VIC)
Harry Bacalis	Senior Analyst-Volatile (VIC)
Joseph Edouard	Senior Analyst-Organic (VIC)
Julie Kay	Senior Analyst-Inorganic (VIC)
Nibha Vaidya	Senior Analyst-Asbestos (NSW)

Glenn Jackson
General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Certificate of Analysis

eurofins | Environment Testing

NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025–Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Mud Environmental Pty Ltd
150A East Terrace
Henley Beach
SA 5022

Attention:	Adrian Webber
Report	685395-AID
Project Name	LEVINSONS CRATES
Project ID	ME-296
Received Date	Oct 30, 2019
Date Reported	Nov 07, 2019

Methodology:

Asbestos Fibre Identification	Conducted in accordance with the Australian Standard AS 4964 – 2004: Method for the Qualitative Identification of Asbestos in Bulk Samples and in-house Method LTM-ASB-8020 by polarised light microscopy (PLM) and dispersion staining (DS) techniques. *NOTE: Positive Trace Analysis results indicate the sample contains detectable respirable fibres.*
Unknown Mineral Fibres	Mineral fibres of unknown type, as determined by PLM with DS, may require another analytical technique, such as Electron Microscopy, to confirm unequivocal identity. *NOTE: While Actinolite, Anthophyllite and Tremolite asbestos may be detected by PLM with DS, due to variability in the optical properties of these materials, AS4964 requires that these are reported as UMF unless confirmed by an independent technique.*
Subsampling Soil Samples	The whole sample submitted is first dried and then passed through a 10mm sieve followed by a 2mm sieve. All fibrous matter greater than 10mm, greater than 2mm as well as the material passing through the 2mm sieve are retained and analysed for the presence of asbestos. If the sub 2mm fraction is greater than approximately 30 to 60g then a sub-sampling routine based on ISO 3082:2009(E) is employed. *NOTE: Depending on the nature and size of the soil sample, the sub-2 mm residue material may need to be sub-sampled for trace analysis, in accordance with AS 4964-2004.*
Bonded asbestos-containing material (ACM)	The material is first examined and any fibres isolated for identification by PLM and DS. Where required, interfering matrices may be removed by disintegration using a range of heat, chemical or physical treatments, possibly in combination.The resultant material is then further examined in accordance with AS 4964 - 2004. *NOTE: Even after disintegration it may be difficult to detect the presence of asbestos in some asbestos-containing bulk materials using PLM and DS. This is due to the low grade or small length or diameter of the asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials. Vinyl/asbestos floor tiles, some asbestos-containing sealants and mastics, asbestos-containing epoxy resins and some ore samples are examples of these types of material, which are difficult to analyse.*
Limit of Reporting	The performance limitation of the AS 4964 (2004) method for non-homogeneous samples is around 0.1 g/kg (equivalent to 0.01% (w/w)). Where no asbestos is found by PLM and DS, including Trace Analysis, this is considered to be at the nominal reporting limit of 0.01% (w/w). The NEPM screening level of 0.001% (w/w) is intended as an on-site determination, not a laboratory Limit of Reporting (LOR), per se. Examination of a large sample size (e.g. 500 mL) may improve the likelihood of detecting asbestos, particularly AF, to aid assessment against the NEPM criteria. Gravimetric determinations to this level of accuracy are outside of AS 4964 and hence NATA Accreditation does not cover the performance of this service (non-NATA results shown with an asterisk). *NOTE: NATA News March 2014, p.7, states in relation to AS 4964: "This is a qualitative method with a nominal reporting limit of 0.01 % " and that currently in Australia "there is no validated method available for the quantification of asbestos".This report is consistent with the analytical procedures and reporting recommendations in the NEPM and the WA DoH.*

Project Name LEVINSONS CRATES
Project ID ME-296
Date Sampled Oct 28, 2019
Report 685395-AID

Client Sample ID	Eurofins Sample No.	Date Sampled	Sample Description	Result
TP7_2.0-2.7	19-Oc46604	Oct 28, 2019	Approximate Sample 198g / 180x120x4mm Sample consisted of: Grey compressed fibre cement fragments	Chrysotile, amosite and crocidolite asbestos detected.

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Asbestos - LTM-ASB-8020	Sydney	Nov 07, 2019	Indefinite

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Company Name: Mud Environmental Pty Ltd
Address: 150A East Terrace
Henley Beach
SA 5022

Project Name: LEVINSONS CRATES
Project ID: ME-296

Order No.:
Report #: 685395
Phone: 08 8356 0187
Fax: 08 8356 0187

Received: Oct 30, 2019 3:15 PM
Due: Nov 7, 2019
Priority: 5 Day
Contact Name: Adrian Webber

Eurofins Analytical Services Manager : Michael Cassidy

Sample Detail						Asbestos Absence /Presence	HOLD	pH (1:5 Aqueous extract at 25°C as rec.)	TRH C6-C10	Polycyclic Aromatic Hydrocarbons	Organochlorine Pesticides	Organophosphorus Pesticides	Metals M8	Moisture Set	SA Waste Screen	Eurofins | mgt Suite B9
Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217						X										
Brisbane Laboratory - NATA Site # 20794																
Perth Laboratory - NATA Site # 23736																
External Laboratory																
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**											
1	TP1_0.1-0.2	Oct 28, 2019		Soil	M19-Oc46588			X						X		X
2	QC2	Oct 28, 2019		Soil	M19-Oc46589			X						X		X
3	TP1_0.4-0.5	Oct 28, 2019		Soil	M19-Oc46590			X			X	X	X	X		
4	TP2_0.1-0.2	Oct 28, 2019		Soil	M19-Oc46591			X			X	X		X		
5	TP2_0.45-0.5	Oct 28, 2019		Soil	M19-Oc46592			X			X	X	X	X		
6	TP3_0.1-0.2	Oct 28, 2019		Soil	M19-Oc46593			X			X	X	X	X		
7	TP3_0.5-0.6	Oct 28, 2019		Soil	M19-Oc46594			X						X		X
8	TP3_1.9-2.0	Oct 28, 2019		Soil	M19-Oc46595			X						X	X	
9	TP4_0.1-0.2	Oct 28, 2019		Soil	M19-Oc46596			X		X				X		

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Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217						X										
Brisbane Laboratory - NATA Site # 20794																
Perth Laboratory - NATA Site # 23736																
10	TP4_0.7-0.8	Oct 28, 2019		Soil	M19-Oc46597			X		X	X	X	X	X		
11	TP5_0.5-0.6	Oct 28, 2019		Soil	M19-Oc46598			X		X	X	X	X	X		
12	TP6_0.1-0.2	Oct 28, 2019		Soil	M19-Oc46599			X			X	X	X	X		
13	TP6_0.4-0.5	Oct 28, 2019		Soil	M19-Oc46600			X		X	X	X	X	X		
14	TP6_1.8-1.9	Oct 28, 2019		Soil	M19-Oc46601			X		X	X	X	X	X		
15	TP7_0.6-0.7	Oct 28, 2019		Soil	M19-Oc46602			X		X	X	X	X	X		
16	TP7_2.1-2.2	Oct 28, 2019		Soil	M19-Oc46603			X						X		X
17	TP7_2.0-2.7	Oct 28, 2019		Building Materials	M19-Oc46604	X										
18	TP07_3.1-3.2	Oct 28, 2019		Soil	M19-Oc46605			X						X		X
19	TP09_1.2-1.3	Oct 28, 2019		Soil	M19-Oc46606			X						X		X
20	TP10_0.2-0.3	Oct 28, 2019		Soil	M19-Oc46607			X		X	X	X	X	X		

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Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217						X										
Brisbane Laboratory - NATA Site # 20794																
Perth Laboratory - NATA Site # 23736																
21	TP10_0.7-0.8	Oct 28, 2019		Soil	M19-Oc46608			X						X		X
22	TP10_2.4-2.5	Oct 28, 2019		Soil	M19-Oc46609			X		X	X	X	X	X		
23	TP11_0.5-0.6	Oct 28, 2019		Soil	M19-Oc46610			X		X			X	X		
24	TP11_2.0-2.1	Oct 28, 2019		Soil	M19-Oc46611			X		X	X	X	X	X		
25	QC1	Oct 28, 2019		Water	M19-Oc46612				X							
26	TP1_0.6-0.7	Oct 28, 2019		Soil	M19-Oc46613		X									
27	TP1_1.1-1.2	Oct 28, 2019		Soil	M19-Oc46614		X									
28	TP2_0.5-0.6	Oct 28, 2019		Soil	M19-Oc46615		X									
29	TP2_1.0-1.1	Oct 28, 2019		Soil	M19-Oc46616		X									
30	QC3	Oct 28, 2019		Soil	M19-Oc46617		X									
31	TP3_1.2-1.3	Oct 28, 2019		Soil	M19-Oc46618		X									
32	TP3_2.6-2.7	Oct 28, 2019		Soil	M19-Oc46619		X									

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Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217						X										
Brisbane Laboratory - NATA Site # 20794																
Perth Laboratory - NATA Site # 23736																
33	TP3_3.1-3.2	Oct 28, 2019		Soil	M19-Oc46620		X									
34	TP4_1.5-1.6	Oct 28, 2019		Soil	M19-Oc46621		X									
35	TP4_1.8-1.9	Oct 28, 2019		Soil	M19-Oc46622		X									
36	TP5_0.1-0.2	Oct 28, 2019		Soil	M19-Oc46623		X									
37	TP5_0.7-0.8	Oct 28, 2019		Soil	M19-Oc46624		X									
38	TP5_1.2-1.4	Oct 28, 2019		Soil	M19-Oc46625		X									
39	TP6_0.9-1.0	Oct 28, 2019		Soil	M19-Oc46626		X									
40	TP6_1.2-1.3	Oct 28, 2019		Soil	M19-Oc46627		X									
41	TP6_2.8-2.9	Oct 28, 2019		Soil	M19-Oc46628		X									
42	TP7_0.2-0.3	Oct 28, 2019		Soil	M19-Oc46629		X									
43	TP7_0.3-0.9	Oct 28, 2019		Soil	M19-Oc46630		X									
44	TP7_1.3-1.4	Oct 28, 2019		Soil	M19-Oc46631		X									

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Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217						X										
Brisbane Laboratory - NATA Site # 20794																
Perth Laboratory - NATA Site # 23736																
45	TP7_2.8-2.9	Oct 28, 2019		Soil	M19-Oc46632		X									
46	TP08_0-0.1	Oct 28, 2019		Soil	M19-Oc46633		X									
47	TP08_0.2-0.3	Oct 28, 2019		Soil	M19-Oc46634		X									
48	TP08_0.5-0.6	Oct 28, 2019		Soil	M19-Oc46635		X									
49	TP08_1.0-1.1	Oct 28, 2019		Soil	M19-Oc46636		X									
50	TP09_0.1-0.2	Oct 28, 2019		Soil	M19-Oc46637		X									
51	TP09_0.6-0.7	Oct 28, 2019		Soil	M19-Oc46638		X									
52	TP09_1.9-2.0	Oct 28, 2019		Soil	M19-Oc46639		X									
53	TP10_1.0-1.1	Oct 28, 2019		Soil	M19-Oc46640		X									
54	TP10_1.6-1.7	Oct 28, 2019		Soil	M19-Oc46641		X									
55	TP10_3.4-3.5	Oct 28, 2019		Soil	M19-Oc46642		X									
56	TP10_3.9-4.0	Oct 28, 2019		Soil	M19-Oc46643		X									

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Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217						X										
Brisbane Laboratory - NATA Site # 20794																
Perth Laboratory - NATA Site # 23736																
57	TP11_0.1-0.2	Oct 28, 2019		Soil	M19-Oc46644		X									
58	TP11_0.3-0.4	Oct 28, 2019		Soil	M19-Oc46645		X									
59	TP11_1.5-1.6	Oct 28, 2019		Soil	M19-Oc46646		X									
60	TP11_2.9-3.0	Oct 28, 2019		Soil	M19-Oc46647		X									
Test Counts						1	35	23	1	10	13	13	13	23	1	7

Internal Quality Control Review and Glossary

General

1. QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Samples were analysed on an 'as received' basis.
4. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
5. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

Units

% w/w: weight for weight basis	grams per kilogram
Filter loading:	fibres/100 graticule areas
Reported Concentration:	fibres/mL
Flowrate:	L/min

Terms

Dry	Sample is dried by heating prior to analysis
LOR	Limit of Reporting
COC	Chain of Custody
SRA	Sample Receipt Advice
ISO	International Standards Organisation
AS	Australian Standards
WA DOH	Reference document for the NEPM. Government of Western Australia, Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2009), including supporting document Recommended Procedures for Laboratory Analysis of Asbestos in Soil (2011)
NEPM	National Environment Protection (Assessment of Site Contamination) Measure, 2013 (as amended)
ACM	Asbestos Containing Materials. Asbestos contained within a non-asbestos matrix, typically presented in bonded and/or sound condition. For the purposes of the NEPM, ACM is generally restricted to those materials that do not pass a 7mm x 7mm sieve.
AF	Asbestos Fines. Asbestos containing materials, including friable, weathered and bonded materials, able to pass a 7mm x 7mm sieve. Considered under the NEPM as equivalent to “non-bonded / friable”.
FA	Fibrous Asbestos. Asbestos containing materials in a friable and/or severely weathered condition. For the purposes of the NEPM, FA is generally restricted to those materials that do not pass a 7mm x 7mm sieve.
Friable	Asbestos-containing materials of any size that may be broken or crumbled by hand pressure. For the purposes of the NEPM, this includes both AF and FA. It is outside of the laboratory’s remit to assess degree of friability.
Trace Analysis	Analytical procedure used to detect the presence of respirable fibres in the matrix.

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N/A	Not applicable

Asbestos Counter/Identifier:

Sayeed Abu	Senior Analyst-Asbestos (NSW)

Authorised by:

Laxman Dias	Senior Analyst-Asbestos (NSW)

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested
* Indicates NATA accreditation does not cover the performance of this service
Measurement uncertainty of test data is available on request or please click here.

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Mud Environmental Pty Ltd
150A East Terrace
Henley Beach
SA 5022

NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Adrian Webber**

Report **685395-W**
Project name LEVINSONS CRATES
Project ID ME-296
Received Date Oct 30, 2019

Client Sample ID			**QC1**
Sample Matrix			**Water**
Eurofins Sample No.			**M19-Oc46612**
Date Sampled			**Oct 28, 2019**
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
TRH C6-C10	0.02	mg/L	< 0.02

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons	Melbourne	Oct 31, 2019	7 Days

- Method: LTM-ORG-2010 TRH C6-C40

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Company Name: Mud Environmental Pty Ltd
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Henley Beach
SA 5022

Project Name: LEVINSONS CRATES
Project ID: ME-296

Order No.:
Report #: 685395
Phone: 08 8356 0187
Fax: 08 8356 0187

Received: Oct 30, 2019 3:15 PM
Due: Nov 7, 2019
Priority: 5 Day
Contact Name: Adrian Webber

Eurofins Analytical Services Manager : Michael Cassidy

Sample Detail						Asbestos Absence /Presence	HOLD	pH (1:5 Aqueous extract at 25°C as rec.)	TRH C6-C10	Polycyclic Aromatic Hydrocarbons	Organochlorine Pesticides	Organophosphorus Pesticides	Metals M8	Moisture Set	SA Waste Screen	Eurofins | mgt Suite B9
Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217						X										
Brisbane Laboratory - NATA Site # 20794																
Perth Laboratory - NATA Site # 23736																
External Laboratory																
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**											
1	TP1_0.1-0.2	Oct 28, 2019		Soil	M19-Oc46588			X						X		X
2	QC2	Oct 28, 2019		Soil	M19-Oc46589			X						X		X
3	TP1_0.4-0.5	Oct 28, 2019		Soil	M19-Oc46590			X			X	X	X	X		
4	TP2_0.1-0.2	Oct 28, 2019		Soil	M19-Oc46591			X			X	X		X		
5	TP2_0.45-0.5	Oct 28, 2019		Soil	M19-Oc46592			X			X	X	X	X		
6	TP3_0.1-0.2	Oct 28, 2019		Soil	M19-Oc46593			X			X	X	X	X		
7	TP3_0.5-0.6	Oct 28, 2019		Soil	M19-Oc46594			X						X		X
8	TP3_1.9-2.0	Oct 28, 2019		Soil	M19-Oc46595			X						X	X	
9	TP4_0.1-0.2	Oct 28, 2019		Soil	M19-Oc46596			X		X				X		

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Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217						X										
Brisbane Laboratory - NATA Site # 20794																
Perth Laboratory - NATA Site # 23736																
10	TP4_0.7-0.8	Oct 28, 2019		Soil	M19-Oc46597			X		X	X	X	X	X		
11	TP5_0.5-0.6	Oct 28, 2019		Soil	M19-Oc46598			X		X	X	X	X	X		
12	TP6_0.1-0.2	Oct 28, 2019		Soil	M19-Oc46599			X			X	X	X	X		
13	TP6_0.4-0.5	Oct 28, 2019		Soil	M19-Oc46600			X		X	X	X	X	X		
14	TP6_1.8-1.9	Oct 28, 2019		Soil	M19-Oc46601			X		X	X	X	X	X		
15	TP7_0.6-0.7	Oct 28, 2019		Soil	M19-Oc46602			X		X	X	X	X	X		
16	TP7_2.1-2.2	Oct 28, 2019		Soil	M19-Oc46603			X						X		X
17	TP7_2.0-2.7	Oct 28, 2019		Building Materials	M19-Oc46604	X										
18	TP07_3.1-3.2	Oct 28, 2019		Soil	M19-Oc46605			X						X		X
19	TP09_1.2-1.3	Oct 28, 2019		Soil	M19-Oc46606			X						X		X
20	TP10_0.2-0.3	Oct 28, 2019		Soil	M19-Oc46607			X		X	X	X	X	X		

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Sample Detail						Asbestos Absence /Presence	HOLD	pH (1:5 Aqueous extract at 25°C as rec.)	TRH C6-C10	Polycyclic Aromatic Hydrocarbons	Organochlorine Pesticides	Organophosphorus Pesticides	Metals M8	Moisture Set	SA Waste Screen	Eurofins | mgt Suite B9
Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217						X										
Brisbane Laboratory - NATA Site # 20794																
Perth Laboratory - NATA Site # 23736																
21	TP10_0.7-0.8	Oct 28, 2019		Soil	M19-Oc46608			X						X		X
22	TP10_2.4-2.5	Oct 28, 2019		Soil	M19-Oc46609			X		X	X	X	X	X		
23	TP11_0.5-0.6	Oct 28, 2019		Soil	M19-Oc46610			X		X			X	X		
24	TP11_2.0-2.1	Oct 28, 2019		Soil	M19-Oc46611			X		X	X	X	X	X		
25	QC1	Oct 28, 2019		Water	M19-Oc46612				X							
26	TP1_0.6-0.7	Oct 28, 2019		Soil	M19-Oc46613		X									
27	TP1_1.1-1.2	Oct 28, 2019		Soil	M19-Oc46614		X									
28	TP2_0.5-0.6	Oct 28, 2019		Soil	M19-Oc46615		X									
29	TP2_1.0-1.1	Oct 28, 2019		Soil	M19-Oc46616		X									
30	QC3	Oct 28, 2019		Soil	M19-Oc46617		X									
31	TP3_1.2-1.3	Oct 28, 2019		Soil	M19-Oc46618		X									
32	TP3_2.6-2.7	Oct 28, 2019		Soil	M19-Oc46619		X									

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Sample Detail						Asbestos Absence /Presence	HOLD	pH (1:5 Aqueous extract at 25°C as rec.)	TRH C6-C10	Polycyclic Aromatic Hydrocarbons	Organochlorine Pesticides	Organophosphorus Pesticides	Metals M8	Moisture Set	SA Waste Screen	Eurofins | mgt Suite B9
Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217						X										
Brisbane Laboratory - NATA Site # 20794																
Perth Laboratory - NATA Site # 23736																
33	TP3_3.1-3.2	Oct 28, 2019		Soil	M19-Oc46620		X									
34	TP4_1.5-1.6	Oct 28, 2019		Soil	M19-Oc46621		X									
35	TP4_1.8-1.9	Oct 28, 2019		Soil	M19-Oc46622		X									
36	TP5_0.1-0.2	Oct 28, 2019		Soil	M19-Oc46623		X									
37	TP5_0.7-0.8	Oct 28, 2019		Soil	M19-Oc46624		X									
38	TP5_1.2-1.4	Oct 28, 2019		Soil	M19-Oc46625		X									
39	TP6_0.9-1.0	Oct 28, 2019		Soil	M19-Oc46626		X									
40	TP6_1.2-1.3	Oct 28, 2019		Soil	M19-Oc46627		X									
41	TP6_2.8-2.9	Oct 28, 2019		Soil	M19-Oc46628		X									
42	TP7_0.2-0.3	Oct 28, 2019		Soil	M19-Oc46629		X									
43	TP7_0.3-0.9	Oct 28, 2019		Soil	M19-Oc46630		X									
44	TP7_1.3-1.4	Oct 28, 2019		Soil	M19-Oc46631		X									

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Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217						X										
Brisbane Laboratory - NATA Site # 20794																
Perth Laboratory - NATA Site # 23736																
45	TP7_2.8-2.9	Oct 28, 2019		Soil	M19-Oc46632		X									
46	TP08_0-0.1	Oct 28, 2019		Soil	M19-Oc46633		X									
47	TP08_0.2-0.3	Oct 28, 2019		Soil	M19-Oc46634		X									
48	TP08_0.5-0.6	Oct 28, 2019		Soil	M19-Oc46635		X									
49	TP08_1.0-1.1	Oct 28, 2019		Soil	M19-Oc46636		X									
50	TP09_0.1-0.2	Oct 28, 2019		Soil	M19-Oc46637		X									
51	TP09_0.6-0.7	Oct 28, 2019		Soil	M19-Oc46638		X									
52	TP09_1.9-2.0	Oct 28, 2019		Soil	M19-Oc46639		X									
53	TP10_1.0-1.1	Oct 28, 2019		Soil	M19-Oc46640		X									
54	TP10_1.6-1.7	Oct 28, 2019		Soil	M19-Oc46641		X									
55	TP10_3.4-3.5	Oct 28, 2019		Soil	M19-Oc46642		X									
56	TP10_3.9-4.0	Oct 28, 2019		Soil	M19-Oc46643		X									

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Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217						X										
Brisbane Laboratory - NATA Site # 20794																
Perth Laboratory - NATA Site # 23736																
57	TP11_0.1-0.2	Oct 28, 2019		Soil	M19-Oc46644		X									
58	TP11_0.3-0.4	Oct 28, 2019		Soil	M19-Oc46645		X									
59	TP11_1.5-1.6	Oct 28, 2019		Soil	M19-Oc46646		X									
60	TP11_2.9-3.0	Oct 28, 2019		Soil	M19-Oc46647		X									
Test Counts						1	35	23	1	10	13	13	13	23	1	7

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ug/L:** micrograms per litre
ppm: Parts per million	**ppb:** Parts per billion	**%:** Percentage
org/100mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100mL:** Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions									
TRH C6-C10			mg/L	< 0.02			0.02	Pass	
LCS - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions									
TRH C6-C10			%	89			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH C6-C10	M19-Oc47630	NCP	%	82			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C10	M19-Oc49748	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised By

Michael Cassidy	Analytical Services Manager
Harry Bacalis	Senior Analyst-Volatile (VIC)

Glenn Jackson
General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

MUD ENVIRONMENTAL
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CHAIN OF CUSTODY RECORD

Project Details

Mud Ref.:	ME-296	Laboratory:	Eurofins	Report no.:	
COC Ref.:		Lab quote:	190122 MUD	Temperature on arrival:	
Client:	Levinsons Crates	Contact:	Trent Gray / A. Webb	Data output:	CSV / ESDAT CSV / PDF
Address:		Email for results:	info@mudenvironmental.com.au	Turnaround time:	24hrs / 48hrs / standard

Transport

Relinquished by:	Trent Gray	Received by:		Freight company:	
Date + time:	29/10/19 2:30pm	Date + time:		Shipment method:	
Signature:		Signature:		Consignment no.:	

Testing

Sample ID	Date	Matrix	Analytes: pH	metals (8)	PAHs	OCP/OPP	B9 suite	SA Waste Screen	TRH/BTEXN	Containers: Glass Jar	Comments
TP1_0.1-0.2	28/10/19	Soil	X	X	X	X	X	X	X		B9 suite = TRH BTEXN, PAH, OCP, Metals.
QC2			X	X	X	X	X	X	X		
QC2A			X	X	X	X	X	X	X		
TP1_0.4-0.5			X	X	X	X	X	X	X		
TP1_0.6-0.7			X	X	X	X	X	X	X		
TP1_1.1-1.2			X	X	X	X	X	X	X		
TP2_0.1-0.2			X	X	X	X	X	X	X		
TP2_0.45-0.5			X	X	X	X	X	X	X		
TP2_0.5-0.6			X	X	X	X	X	X	X		
TP2_1.0-1.1			X	X	X	X	X	X	X		
TP3_0.1-0.2			X	X	X	X	X	X	X		
TP3_0.5-0.6			X	X	X	X	X	X	X		
QC3			X	X	X	X	X	X	X		
QC3A			X	X	X	X	X	X	X		
TP3_1.2-1.3			X	X	X	X	X	X	X		
TP3_1.9-2.0			X	X	X	X	X	X	X		* PLEASE * FORWARD TO ALS. SAMPLES QC2A and QC3A * *

Common Holding Times (confirm with lab)

1d (s) / 3d (w)	microbiological	7d (s) / 14d (w)	TRH, PAH, phenols, pesticides	28d (w)	anions
1d (s)	pH, sPOCAS, CrS	7d (s) / 7d (w)	ASLP, TCLP, TDS, TSS	28d (s + w)	Mercury, CrVI
2d (s)	ntrate, nitrite, total N, BOD	14d (s + w)	BTEX, MAH, VOC	6m (s + w)	metals

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Page 1 of 4

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ACN 168 347 537

CHAIN OF CUSTODY RECORD

Project Details

Mud Ref.:	ME-286	Laboratory:	Eurofins	Report no.:	
COC Ref.:		Lab quote:	190122 MUD	Temperature on arrival:	
Client:	Levinsons Craters	Contact:	T. Gray / A. Webber	Data output:	CSV / ESDAT.CSV / PDF
Address:		Email for results:	info@mudenvironmental.com.au	Turnaround time:	24hrs / 48hrs / standard

Transport

Relinquished by:	Trent Gray	Received by:		Freight company:	
Date + time:	29/10/19 2:30pm	Date + time:		Shipment method:	
Signature:		Signature:		Consignment no.:	

Testing

Sample ID	Date	Matrix	Analytes	Containers	Comments
TP3_2.6-2.7	28/10/19	SOIL	pH, metals (8), PAHs, OCP/OPP, 8 Suite, ISA Washscreen, TRH/BTEX	Hold, 6 Glass Jar	
TP3_3.1-3.2					
TP4_0.1-0.2					
TP4_0.7-0.8					
TP4_1.5-1.6					
TP4_1.8-1.9					
TP5_0.1-0.2					
TP5_0.5-0.6					
TP5_0.7-0.8					
TP5_1.2-1.4					
TP6_0.1-0.2					
TP6_0.4-0.5					
TP6_0.7-1.0					
TP6_1.2-1.3					
TP6_1.8-1.9					

Common Holding Times (confirm with lab)

1d (s) / 3d (w)	microbiological	7d (s) / 14d (w)	TRH, PAH, phenols, pesticides	28d (w)	anions
1d (s)	pH, sPOCAS, CrS	7d (s) / 7d (w)	ASLP, TCLP, TDS, TSS	28d (s + w)	Mercury, CrVI
2d (s)	ntrate, nitrite, total N, BOD	14d (s + w)	BTEX, MAH, VOC	6m (s + w)	metals

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CHAIN OF CUSTODY RECORD

Project Details

Mud Ref.:	ME-296	Laboratory:	Envirolab	Report no.:	
COC Ref.:		Lab quote:	190122 MUD	Temperature on arrival:	
Client:	Levinsons Craters	Contact:	Trent Gray / Adrian Webber	Data output:	CSV / ESDAT CSV / PDF
Address:		Email for results:	info@mudenvironmental.com.au	Turnaround time:	24hrs / standard

Transport

Relinquished by:	Trent Gray	Received by:		Freight company:	
Date + time:	29/10/19 2:30pm	Date + time:		Shipment method:	
Signature:		Signature:		Consignment no.:	

Testing

Sample ID	Date	Matrix	Analytes: pH	Metals	PAHs	OCP/OPP	B9 Suite	SA Waite Screen	TRH/BTEXN	Asbestos ID	Containers: Hold	Glass Jar	Double Bagged	Comments
TP6_2-8-2-9	29/10/19	Soil												
TP7_0.2-0.3														
TP7_0.6-0.7			X	X	X	X								
TP7_0.8-0.9														
TP7_1.3-1.4														
TP7_2.1-2.2			X		X									
TP7_2.0-2.7									X					
TP7_2.8-2.9		FIBRE CEMENT												
TP07_3.1-3.2					X									
TP08_0-0.1														
TP08_0.2-0.3														
TP08_0.5-0.6														
TP08_1.0-1.1														
TP09_0.1-0.2														
TP09_0.6-0.7														

Common Holding Times (confirm with lab)

1d (s) / 3d (w)	microbiological	7d (s) / 14d (w)	TRH, PAH, phenols, pesticides	28d (w)	anions
1d (s)	pH, sPOCAS, CrS	7d (s) / 7d (w)	ASLP, TCLP, TDS, TSS	28d (s + w)	Mercury, CrVI
2d (s)	ntrate, nitrite, total N, BOD	14d (s + w)	BTEX, MAH, VOC	6m (s + w)	metals

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JOA

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CHAIN OF CUSTODY RECORD

Project Details

Mud Ref.:	ME-296	Laboratory:	Eurofins	Report no.:	
COC Ref.:		Lab quote:	190122 MUD	Temperature on arrival:	
Client:	Levinsons Crater	Contact:	Trent Gray / A. Webber	Data output:	CSV / ESDAT CSV / PDF
Address:		Email for results:	info@mudenvironmental.com.au	Turnaround time:	24hrs / 48hrs / standard

Transport

Relinquished by:	T. Gray	Received by:		Freight company:	
Date + time:	29/10/19 2:30pm	Date + time:		Shipment method:	
Signature:		Signature:		Consignment no.:	

Testing

Sample ID	Date	Matrix	Analytes: pH	metals	PAHs	OCP/OPP	BG suite	SA Waste Screen	TRH/BTEX	Asbestos	TRH C6-C10	Containers: Glass Jar	40mL vial	Comments
TP09_1.2-1.3	28/10/19	Soil	X			X						1		
TP09_1.9-2.0														
TP10_0.2-0.3			X	X	X	X								
TP10_0.7-0.8			X											
TP10_1.0-1.1														
TP10_1.6-1.7														
TP10_2.4-2.5			X	X	X									
TP10_3.4-3.5														
TP10_3.9-4.0														
TP11_0.1-0.2														
TP11_0.3-0.4														
TP11_0.5-0.6			X	X	X									
TP11_1.5-1.6														
TP11_2.0-2.1			X	X	X	X								
TP11_2.9-3.0														
QC1	28/10/19	WATER							X			2		

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Common Holding Times (confirm with lab)

1d (s) / 3d (w)	microbiological	7d (s) / 14d (w)	TRH, PAH, phenols, pesticides	28d (w)	anions
1d (s)	pH, sPOCAS, CrS	7d (s) / 7d (w)	ASLP, TCLP, TDS, TSS	28d (s + w)	Mercury, CrVI
2d (s)	ntrate, nitrite, total N, BOD	14d (s + w)	BTEX, MAH, VOC	6m (s + w)	metals

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ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EM1918495**	Page	: 1 of 6
Client	: **MUD ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ALL REPORTS	Contact	: Kieren Burns
Address	: PO Box 80 HENLEY BEACH SOUTH AUSTRALIA 5022	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +61881625130
Project	: ME-296	Date Samples Received	: 31-Oct-2019 09:30
Order number	: ----	Date Analysis Commenced	: 04-Nov-2019
C-O-C number	: ----	Issue Date	: 11-Nov-2019 11:57
Sampler	: ----		
Site	: Levinsons Crateus		
Quote number	: EN/222 - Seconday Work		
No. of samples received	: 2		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC

General Comments

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

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

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

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

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	QC2A	----	----	----	----
				Client sampling date / time	28-Oct-2019 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EM1918495-001	--------	--------	--------	--------
					Result	----	----	----	----
EA001: pH in soil using 0.01M CaCl extract									
pH (CaCl2)	----	0.1	pH Unit		**7.6**	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		**7.7**	----	----	----	----
EG005(ED093)T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		**20**	----	----	----	----
Cadmium	7440-43-9	1	mg/kg		<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg		**12**	----	----	----	----
Copper	7440-50-8	5	mg/kg		**14**	----	----	----	----
Lead	7439-92-1	5	mg/kg		**57**	----	----	----	----
Nickel	7440-02-0	2	mg/kg		**6**	----	----	----	----
Zinc	7440-66-6	5	mg/kg		**74**	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	----	----	----	----
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.05	mg/kg		<0.05	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg		<0.05	----	----	----	----
beta-BHC	319-85-7	0.05	mg/kg		<0.05	----	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg		<0.05	----	----	----	----
delta-BHC	319-86-8	0.05	mg/kg		<0.05	----	----	----	----
Heptachlor	76-44-8	0.05	mg/kg		<0.05	----	----	----	----
Aldrin	309-00-2	0.05	mg/kg		<0.05	----	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg		<0.05	----	----	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg		<0.05	----	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg		<0.05	----	----	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg		<0.05	----	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg		<0.05	----	----	----	----
Dieldrin	60-57-1	0.05	mg/kg		<0.05	----	----	----	----
4.4`-DDE	72-55-9	0.05	mg/kg		<0.05	----	----	----	----
Endrin	72-20-8	0.05	mg/kg		<0.05	----	----	----	----
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	----	----	----	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	----	----	----	----
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	----	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	----	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	QC2A	----	----	----	----
				Client sampling date / time	28-Oct-2019 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EM1918495-001	--------	--------	--------	--------
					Result	----	----	----	----
EP068A: Organochlorine Pesticides (OC) - Continued									
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	----	----	----	----
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	----	----	----	----
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	----	----	----	----
^ **Sum of Aldrin + Dieldrin**	309-00-2/60-57-1	0.05	mg/kg		<0.05	----	----	----	----
^ **Sum of DDD + DDE + DDT**	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg		<0.5	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg		<0.5	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg		**0.5**	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		**0.6**	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		**0.7**	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		**0.7**	----	----	----	----
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	mg/kg		**2.5**	----	----	----	----
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	mg/kg		**0.8**	----	----	----	----
^ **Benzo(a)pyrene TEQ (half LOR)**	----	0.5	mg/kg		**1.1**	----	----	----	----
^ **Benzo(a)pyrene TEQ (LOR)**	----	0.5	mg/kg		**1.4**	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg		<50	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg		**100**	----	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	mg/kg		**100**	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	QC2A	----	----	----	----
				Client sampling date / time	28-Oct-2019 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EM1918495-001	--------	--------	--------	--------
					Result	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg		<10	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		**130**	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	----	----	----	----
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		**130**	----	----	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg		<50	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	----	----	----	----
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	----	----	----	----
^ **Total Xylenes**	----	0.5	mg/kg		<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg		<1	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		**94.7**	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		**91.1**	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**94.9**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		**85.7**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		**66.8**	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**99.6**	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%		**96.4**	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		**102**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**76.3**	----	----	----	----
Toluene-D8	2037-26-5	0.2	%		**75.8**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		**108**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	38	128
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	33	139
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	54	125
2-Chlorophenol-D4	93951-73-6	65	123
2.4.6-Tribromophenol	118-79-6	34	122
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	61	125
Anthracene-d10	1719-06-8	62	130
4-Terphenyl-d14	1718-51-0	67	133
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	51	125
Toluene-D8	2037-26-5	55	125
4-Bromofluorobenzene	460-00-4	56	124

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EM1918495**	Page	: 1 of 9
Client	: **MUD ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ALL REPORTS	Contact	: Kieren Burns
Address	: PO Box 80 HENLEY BEACH SOUTH AUSTRALIA 5022	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +61881625130
Project	: ME-296	Date Samples Received	: 31-Oct-2019
Order number	: ----	Date Analysis Commenced	: 04-Nov-2019
C-O-C number	: ----	Issue Date	: 11-Nov-2019
Sampler	: ----		
Site	: Levinsons Crateus		
Quote number	: EN/222 - Seconday Work		
No. of samples received	: 2		
No. of samples analysed	: 1		

ilac-MRA NATA
Accreditation No. 825
Accredited for compliance with ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC

General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 2688027)									
EM1918478-023	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	26	25	6.58	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	133	117	12.7	0% - 20%
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	43	38	12.4	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	56	50	11.3	0% - 50%
EM1918478-040	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	3	4	30.5	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	<5	<5	0.00	No Limit
EA001: pH in soil using 0.01M CaCl extract (QC Lot: 2681096)									
EM1918472-001	Anonymous	EA001: pH (CaCl2)	----	0.1	pH Unit	7.7	7.8	0.00	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 2689356)									
EM1918478-027	Anonymous	EA055: Moisture Content	----	0.1	%	14.0	11.4	20.7	0% - 50%
EM1918478-045	Anonymous	EA055: Moisture Content	----	0.1	%	16.7	17.3	3.31	0% - 50%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 2688026)									
EM1918450-031	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 2685075)									
EM1918450-031	Anonymous	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP068A: Organochlorine Pesticides (OC) (QC Lot: 2685075) - continued									
EM1918450-031	Anonymous	EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 2685072)									
EM1918495-001	QC2A	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	0.6	<0.5	24.1	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	0.7	<0.5	35.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	0.7	<0.5	33.7	No Limit
EM1918450-031	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 2685072) - continued									
EM1918450-031	Anonymous	EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2681619)									
EM1918461-002	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2685073)									
EM1918495-001	QC2A	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
		EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	100	<50	66.7	No Limit
EM1918450-031	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
		EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2681619)									
EM1918461-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2685073)									
EM1918495-001	QC2A	EP071: >C16 - C34 Fraction	----	100	mg/kg	130	<100	27.7	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
		EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	130	<50	88.9	No Limit
EM1918450-031	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
		EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	0.00	No Limit
EP080: BTEXN (QC Lot: 2681619)									
EM1918461-002	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080: BTEXN (QC Lot: 2681619) - continued									
EM1918461-002	Anonymous	EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit

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

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

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 2688027)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	97.8	78.5	107
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	93.8	76.2	108
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	110	77.7	110
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	97.6	78.1	108
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	97.0	78.4	106
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	104	79.9	109
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	104	79.1	110
EG035T: Total Recoverable Mercury by FIMS (QCLot: 2688026)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	105	76.9	110
EP068A: Organochlorine Pesticides (OC) (QCLot: 2685075)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	102	71.8	126
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	98.5	72.2	125
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	103	74.2	124
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	101	69.1	124
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	99.1	65.1	125
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	100.0	66.6	122
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	101	71.8	123
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	99.5	71.1	124
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	98.8	64.8	128
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	101	70.2	126
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	98.9	72.1	124
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	103	68.0	122
EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	96.2	73.0	124
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	105	55.8	130
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	100	72.0	124
EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	104	72.0	127
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	103	66.3	131
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	77.6	62.4	131
EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	94.8	55.4	130
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	95.4	68.8	128
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	103	55.5	132
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 2685072)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	3 mg/kg	116	84.6	128
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	3 mg/kg	109	76.9	127

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 2685072) - continued								
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	3 mg/kg	107	85.3	128
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	3 mg/kg	104	82.1	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	3 mg/kg	100	85.4	133
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	3 mg/kg	107	88.7	136
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	3 mg/kg	103	83.4	136
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	3 mg/kg	108	85.1	140
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	3 mg/kg	100.0	80.7	130
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	3 mg/kg	110	85.2	141
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	3 mg/kg	107	68.5	120
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	3 mg/kg	129	80.1	132
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	3 mg/kg	113	67.4	120
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	3 mg/kg	103	66.0	126
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	3 mg/kg	100	65.4	127
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	3 mg/kg	103	67.8	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2681619)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	36 mg/kg	100	61.2	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2685073)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	750 mg/kg	108	71.8	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	3040 mg/kg	106	83.9	125
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	1450 mg/kg	108	77.9	119
EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2681619)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	45 mg/kg	98.1	59.5	125
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2685073)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	1090 mg/kg	109	72.2	128
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	3930 mg/kg	108	82.1	122
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	268 mg/kg	114	55.1	131
EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	----	----	----	----
EP080: BTEXN (QCLot: 2681619)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	2 mg/kg	86.1	62.7	119
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	2 mg/kg	102	66.6	126
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	2 mg/kg	100	66.3	124
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	4 mg/kg	111	67.5	128
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	2 mg/kg	109	73.0	128
EP080: Naphthalene	91-20-3	1	mg/kg	<1	0.5 mg/kg	92.0	61.2	123

Matrix Spike (MS) Report

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

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 2688027)							
EM1918494-001	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	93.2	78.0	124
		EG005T: Cadmium	7440-43-9	50 mg/kg	85.5	84.0	116
		EG005T: Chromium	7440-47-3	50 mg/kg	97.4	79.0	121
		EG005T: Copper	7440-50-8	50 mg/kg	99.3	82.0	124
		EG005T: Lead	7439-92-1	50 mg/kg	85.7	76.0	124
		EG005T: Nickel	7440-02-0	50 mg/kg	93.0	78.0	120
		EG005T: Zinc	7440-66-6	50 mg/kg	91.4	74.0	128
EG035T: Total Recoverable Mercury by FIMS (QCLot: 2688026)							
EM1918494-001	Anonymous	EG035T: Mercury	7439-97-6	0.5 mg/kg	101	76.0	116
EP068A: Organochlorine Pesticides (OC) (QCLot: 2685075)							
EM1918495-001	QC2A	EP068: gamma-BHC	58-89-9	0.5 mg/kg	98.6	22.0	139
		EP068: Heptachlor	76-44-8	0.5 mg/kg	92.2	18.0	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	106	23.0	136
		EP068: Dieldrin	60-57-1	0.5 mg/kg	106	42.0	136
		EP068: Endrin	72-20-8	0.5 mg/kg	113	23.0	146
		EP068: 4.4`-DDT	50-29-3	0.5 mg/kg	87.3	20.0	133
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 2685072)							
EM1918450-011	Anonymous	EP075(SIM): Acenaphthene	83-32-9	3 mg/kg	103	67.0	117
		EP075(SIM): Pyrene	129-00-0	3 mg/kg	104	52.0	148
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2681619)							
EM1918461-005	Anonymous	EP080: C6 - C9 Fraction	----	28 mg/kg	80.9	42.0	131
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2685073)							
EM1918450-010	Anonymous	EP071: C10 - C14 Fraction	----	750 mg/kg	116	53.0	123
		EP071: C15 - C28 Fraction	----	3040 mg/kg	113	70.0	124
		EP071: C29 - C36 Fraction	----	1450 mg/kg	116	64.0	118
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2681619)							
EM1918461-005	Anonymous	EP080: C6 - C10 Fraction	C6_C10	33 mg/kg	76.2	39.0	129
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2685073)							
EM1918450-010	Anonymous	EP071: >C10 - C16 Fraction	----	1090 mg/kg	116	65.0	123
		EP071: >C16 - C34 Fraction	----	3930 mg/kg	114	67.0	121
		EP071: >C34 - C40 Fraction	----	268 mg/kg	124	44.0	126
EP080: BTEXN (QCLot: 2681619)							

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP080: BTEXN (QCLot: 2681619) - continued							
EM1918461-005	Anonymous	EP080: Benzene	71-43-2	2 mg/kg	84.9	50.0	136
		EP080: Toluene	108-88-3	2 mg/kg	90.5	56.0	139

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM1918495**	Page	: 1 of 5
Client	: **MUD ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ALL REPORTS	Telephone	: +61881625130
Project	: ME-296	Date Samples Received	: 31-Oct-2019
Site	: Levinsons Crateus	Issue Date	: 11-Nov-2019
Sampler	: ----	No. of samples received	: 2
Order number	: ----	No. of samples analysed	: 1

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

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

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA001: pH in soil using 0.01M CaCl extract							
Soil Glass Jar - Unpreserved (EA001)							
QC2A	**28-Oct-2019**	**04-Nov-2019**	04-Nov-2019	✓	**04-Nov-2019**	04-Nov-2019	✓
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055)							
QC2A	**28-Oct-2019**	**----**	----	----	**07-Nov-2019**	11-Nov-2019	✓
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
QC2A	**28-Oct-2019**	**07-Nov-2019**	25-Apr-2020	✓	**07-Nov-2019**	25-Apr-2020	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
QC2A	**28-Oct-2019**	**07-Nov-2019**	25-Nov-2019	✓	**08-Nov-2019**	25-Nov-2019	✓
EP068A: Organochlorine Pesticides (OC)							
Soil Glass Jar - Unpreserved (EP068)							
QC2A	**28-Oct-2019**	**07-Nov-2019**	11-Nov-2019	✓	**08-Nov-2019**	17-Dec-2019	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM))							
QC2A	**28-Oct-2019**	**07-Nov-2019**	11-Nov-2019	✓	**08-Nov-2019**	17-Dec-2019	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080)							
QC2A	**28-Oct-2019**	**04-Nov-2019**	11-Nov-2019	✓	**06-Nov-2019**	11-Nov-2019	✓
Soil Glass Jar - Unpreserved (EP071)							
QC2A	**28-Oct-2019**	**07-Nov-2019**	11-Nov-2019	✓	**08-Nov-2019**	17-Dec-2019	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080)							
QC2A	**28-Oct-2019**	**04-Nov-2019**	11-Nov-2019	✓	**06-Nov-2019**	11-Nov-2019	✓
Soil Glass Jar - Unpreserved (EP071)							
QC2A	**28-Oct-2019**	**07-Nov-2019**	11-Nov-2019	✓	**08-Nov-2019**	17-Dec-2019	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
QC2A	**28-Oct-2019**	**04-Nov-2019**	11-Nov-2019	✓	**06-Nov-2019**	11-Nov-2019	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH in soil using a 0.01M CaCl2 extract	EA001	1	8	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	5	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	7	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
pH in soil using a 0.01M CaCl2 extract	EA001	SOIL	In house: Referenced to Rayment and Lyons (2011) 4B3 (mod.) or 4B4 (mod.) 10 g of soil is mixed with 50 mL of 0.01M CaCl2 and tumbled end over end for 1 hour. pH is measured from the continuous suspension. This method is compliant with NEPM (2013) Schedule B(3)
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Pesticides by GCMS	EP068	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM (2013) Schedule B(3) (Method 504,505)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015A Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM amended 2013.
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270D. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260B. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM amended 2013.

Preparation Methods	Method	Matrix	Method Descriptions
pH in soil using a 0.01M CaCl2 extract	EA001-PR	SOIL	In house: Referenced to Rayment and Higginson 4B1, 10 g of soil is mixed with 50 mL of 0.01M CaCl2 and tumbled end over end for 1 hour. pH is measured from the continuous suspension. This method is compliant with NEPM (2013) Schedule B(3) (Method 103)
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (2013) Schedule B(3) (Method 202)
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.

Preparation Methods	Method	Matrix	Method Descriptions
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

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COPY

CHAIN OF CUSTODY RECORD

Project Details

Mud Ref.:	ME-296	Laboratory:	Eurofins	Report no.:	
COC Ref.:		Lab quote:	190122 MUD	Temperature on arrival:	
Client:	Levinsons Crates	Contact:	Trent Gray / A. Webb	Data output:	CSV / ESDAT CSV / PDF
Address:		Email for results:	info@mudenvironmental.com.au	Turnaround time:	24hrs / 48hrs / standard

Transport

Relinquished by:	Trent Gray	Received by:	CARMEL (ALS)	Freight company:	
Date + time:	29/10/19 2:30pm	Date + time:	31.10.19 9:30	Shipment method:	
Signature:		Signature:		Consignment no.:	

Environmental Division
Melbourne
Work Order Reference
EM1918495

Telephone : +61-3-8549 9600

Testing

Sample ID	Date	Matrix	Analytes: pH; metals (8); PAH; OCP/OPP; B9 suite; SA Waste Screen; TRH/BTEXN	Containers: Glass Jar	Comments
TP1_0.1-0.2	28/10/19	Soil	XXX		B9 suite = TRH BTEXN, PAH, OCP, Metals.
QC2			XXX		
QC2A			XX		
TP1_0.4-0.5			X X		
TP1_0.6-0.7			X X		
TP1_1.1-1.2					
TP2_0.1-0.2			XX		
TP2_0.45-0.5			XXX		
TP2_0.5-0.6			XXX		
TP2_1.0-1.1					
TP3_0.1-0.2			XX		
TP3_0.5-0.6			XXX		
QC3					
QC3A					
TP3_1.2-1.3					
TP3_1.9-2.0			X		

* PLEASE * FORWARD TO ALS. SAMPLES QC2A and QC3A

Common Holding Times (confirm with lab)

1d (s) / 3d (w)	microbiological	7d (s) / 14d (w)	TRH, PAH, phenols, pesticides	28d (w)	anions
1d (s)	pH, sPOCAS, CrS	7d (s) / 7d (w)	ASLP, TCLP, TDS, TSS	28d (s + w)	Mercury, CrVI
2d (s)	ntrate, nitrite, total N, BOD	14d (s + w)	BTEX, MAH, VOC	6m (s + w)	metals

Darwin 31/10 7:30am

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Page 1 of 1

Mud Environmental Pty Ltd
150A East Terrace
Henley Beach
SA 5022

NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Adrian Webber**

Report **688170-S**
Project name LEVINSONS CRATES
Project ID ME-296
Received Date Nov 14, 2019

Client Sample ID			**TP1_0.4-0.5**	**TP2_0.1-0.2**	**TP2_0.45-0.5**	**TP3_0.1-0.2**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**M19-No20739**	**M19-No20740**	**M19-No20741**	**M19-No20742**
Date Sampled			**Oct 28, 2019**	**Oct 28, 2019**	**Oct 28, 2019**	**Oct 28, 2019**
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	0.8	< 0.5	5.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	1.1	0.6	5.5
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.4	1.2	5.5
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	1.9
Benzo(a)pyrene	0.5	mg/kg	< 0.5	0.7	< 0.5	3.8
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	0.5	< 0.5	2.9
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	2.2
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	2.7
Chrysene	0.5	mg/kg	< 0.5	0.6	< 0.5	2.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	0.7
Fluoranthene	0.5	mg/kg	< 0.5	0.6	< 0.5	2.7
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	1.8
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	0.9	< 0.5	3.5
Total PAH*	0.5	mg/kg	< 0.5	3.3	< 0.5	24.7
2-Fluorobiphenyl (surr.)	1	%	68	87	78	71
p-Terphenyl-d14 (surr.)	1	%	85	98	105	87
% Moisture	1	%	5.8	12	6.4	6.1

Client Sample ID			TP6_0.1-0.2
Sample Matrix			Soil
Eurofins Sample No.			M19-No20743
Date Sampled			Oct 28, 2019
Test/Reference	LOR	Unit	
Polycyclic Aromatic Hydrocarbons			
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	5.2
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	5.2
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	5.2
Acenaphthene	0.5	mg/kg	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5
Anthracene	0.5	mg/kg	< 0.5
Benz(a)anthracene	0.5	mg/kg	1.6
Benzo(a)pyrene	0.5	mg/kg	3.7
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	2.2
Benzo(g.h.i)perylene	0.5	mg/kg	2.0
Benzo(k)fluoranthene	0.5	mg/kg	2.6
Chrysene	0.5	mg/kg	2.5
Dibenz(a.h)anthracene	0.5	mg/kg	0.6
Fluoranthene	0.5	mg/kg	1.9
Fluorene	0.5	mg/kg	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	1.8
Naphthalene	0.5	mg/kg	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5
Pyrene	0.5	mg/kg	3.0
Total PAH*	0.5	mg/kg	21.9
2-Fluorobiphenyl (surr.)	1	%	83
p-Terphenyl-d14 (surr.)	1	%	102
% Moisture	1	%	6.7

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Polycyclic Aromatic Hydrocarbons	Melbourne	Nov 15, 2019	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
% Moisture	Melbourne	Nov 14, 2019	14 Days
- Method: LTM-GEN-7080 Moisture			

eurofins | Environment Testing

ABN – 50 005 085 521
e.mail : EnviroSales@eurofins.com
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Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

Company Name:	Mud Environmental Pty Ltd	**Order No.:**		**Received:**	Nov 14, 2019 12:18 PM
Address:	150A East Terrace Henley Beach SA 5022	**Report #:**	688170	**Due:**	Nov 21, 2019
		Phone:	08 8356 0187	**Priority:**	5 Day
		Fax:	08 8356 0187	**Contact Name:**	Adrian Webber
Project Name:	LEVINSONS CRATES				
Project ID:	ME-296				

Eurofins Analytical Services Manager : Michael Cassidy

Sample Detail						Polycyclic Aromatic Hydrocarbons	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X
Sydney Laboratory - NATA Site # 18217							
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	TP1_0.4-0.5	Oct 28, 2019		Soil	M19-No20739	X	X
2	TP2_0.1-0.2	Oct 28, 2019		Soil	M19-No20740	X	X
3	TP2_0.45-0.5	Oct 28, 2019		Soil	M19-No20741	X	X
4	TP3_0.1-0.2	Oct 28, 2019		Soil	M19-No20742	X	X
5	TP6_0.1-0.2	Oct 28, 2019		Soil	M19-No20743	X	X
Test Counts						5	5

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
ug/L: micrograms per litre
ppm: Parts per million
ppb: Parts per billion
%: Percentage
org/100mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	90			70-130	Pass	
Acenaphthylene	%	85			70-130	Pass	
Anthracene	%	88			70-130	Pass	
Benz(a)anthracene	%	92			70-130	Pass	
Benzo(a)pyrene	%	86			70-130	Pass	
Benzo(b&j)fluoranthene	%	75			70-130	Pass	
Benzo(g.h.i)perylene	%	74			70-130	Pass	
Benzo(k)fluoranthene	%	93			70-130	Pass	
Chrysene	%	110			70-130	Pass	
Dibenz(a.h)anthracene	%	72			70-130	Pass	
Fluoranthene	%	102			70-130	Pass	
Fluorene	%	95			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	74			70-130	Pass	
Naphthalene	%	76			70-130	Pass	
Phenanthrene	%	88			70-130	Pass	
Pyrene	%	97			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	M19-No20740	CP	%	80			70-130	Pass	
Acenaphthylene	M19-No20740	CP	%	75			70-130	Pass	
Anthracene	M19-No20740	CP	%	82			70-130	Pass	
Benz(a)anthracene	M19-No20740	CP	%	91			70-130	Pass	
Benzo(a)pyrene	M19-No20740	CP	%	74			70-130	Pass	
Benzo(b&j)fluoranthene	M19-No20740	CP	%	71			70-130	Pass	
Benzo(g.h.i)perylene	M19-No20740	CP	%	71			70-130	Pass	
Benzo(k)fluoranthene	M19-No20740	CP	%	85			70-130	Pass	
Chrysene	M19-No20740	CP	%	105			70-130	Pass	
Dibenz(a.h)anthracene	M19-No20740	CP	%	76			70-130	Pass	
Fluoranthene	M19-No20740	CP	%	95			70-130	Pass	
Fluorene	M19-No20740	CP	%	84			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Indeno(1.2.3-cd)pyrene	M19-No20740	CP	%	73			70-130	Pass	
Naphthalene	M19-No20740	CP	%	71			70-130	Pass	
Phenanthrene	M19-No20740	CP	%	82			70-130	Pass	
Pyrene	M19-No20740	CP	%	97			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	M19-No20739	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	M19-No20739	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	M19-No20739	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	M19-No20739	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	M19-No20739	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	M19-No20739	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	M19-No20739	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	M19-No20739	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	M19-No20739	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	M19-No20739	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	M19-No20739	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	M19-No20739	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	M19-No20739	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	M19-No20739	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	M19-No20739	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	M19-No20739	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	M19-No20739	CP	%	5.8	5.2	10	30%	Pass	

Comments

Sample Integrity

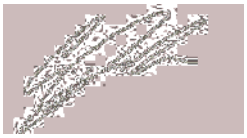
Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs

Authorised By

Michael Cassidy	Analytical Services Manager
Joseph Edouard	Senior Analyst-Organic (VIC)



Glenn Jackson
General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Enviro Sample Vic

From: Michael Cassidy
Sent: Thursday, 14 November 2019 12:18 PM
To: Adrian Webber; Savini Suduweli Kondage
Cc: Enviro Sample Vic; Catherine Wilson
Subject: RE: Eurofins Test Results, Invoice - Report 685395 : Site LEVINSONS CRATES (ME-296)

Thanks Adrian,

Will do!

Kind Regards,

Michael Cassidy

Phone: 8564 5940
Mobile: 0498 700 069
Email : MichaelCassidy@eurofins.com

From: Adrian Webber [mailto:adrian@mudenvironmental.com.au]
Sent: Thursday, 14 November 2019 12:17 PM
To: Michael Cassidy; Savini Suduweli Kondage
Cc: Enviro Sample Vic; Catherine Wilson
Subject: Re: Eurofins Test Results, Invoice - Report 685395 : Site LEVINSONS CRATES (ME-296)

EXTERNAL EMAIL*

Hi Michael

Thanks for chasing this up. We don't need PAH testing on this sample – please amend request.

All the best
Adrian

Adrian Webber
Director

MUD
ENVIRONMENTAL

+61 439 725 754
adrian@mudenvironmental.com.au
PO Box 80 Henley Beach SA 5022

Website | Certified B Corp | Facebook | Instagram | LinkedIn | vCard | Email non-disclaimer

688170
14/11/19
12:19 pm
Joanne

From: Michael Cassidy <MichaelCassidy@eurofins.com>
Date: Thursday, 14 November 2019 at 10:07 am
To: Savini Suduweli Kondage <SaviniSuduweli@eurofins.com>, Adrian Webber <adrian@mudenvironmental.com.au>
Cc: "EnviroSampleVic@eurofins.com" <EnviroSampleVic@eurofins.com>, Catherine Wilson <CatherineWilson@eurofins.com>
Subject: RE: Eurofins Test Results, Invoice - Report 685395 : Site LEVINSONS CRATES (ME-296)

Hi Adrian,

Sample TP7_2.0-2.7 is Building material, was there another sample you had in mind?

Thanks,

Kind Regards,

Michael Cassidy

Phone: 8564 5940
Mobile: 0498 700 069
Email : MichaelCassidy@eurofins.com

From: Savini Suduweli Kondage
Sent: Wednesday, 13 November 2019 6:00 PM
To: Adrian Webber
Cc: Enviro Sample Vic; Catherine Wilson; Michael Cassidy
Subject: RE: Eurofins Test Results, Invoice - Report 685395 : Site LEVINSONS CRATES (ME-296)

Hi Adrian,

We will get that organized.

SR – Please see below for additional analysis on standard TAT.

Kind Regards,
Savini Suduweli

Phone : +61 3 8564 5051
Mobile : +61 447 222 760
Email : SaviniSuduweli@eurofins.com

688170
14/11/19
12:18pm
Some

From: Adrian Webber [mailto:adrian@mudenvironmental.com.au]
Sent: Wednesday, November 13, 2019 5:10 PM
To: Savini Suduweli Kondage
Subject: Re: Eurofins Test Results, Invoice - Report 685395 : Site LEVINSONS CRATES (ME-296)

EXTERNAL EMAIL*

Hi Savini

Can you please arrange for the following additional testing from this batch on **standard TAT**:

D.S 28/10

- **PAH:**
  - **TP1_0.4-0.5** OC46590 - 9466
  - **TP2_0.1-0.2** OC46591
  - **TP2_0.45-0.5** OC46592
  - **TP3_0.1-0.2** OC46593
  - **TP6_0.1-0.2** OC46599
  - **TP7_2.0-2.7**

Thanks in advance
Adrian

Adrian Webber
Director

+61 439 725 754
adrian@mudenvironmental.com.au
PO Box 80 Henley Beach SA 5022

Website | Certified B Corp | Facebook | Instagram | LinkedIn | vCard | Email non-disclaimer

---

From: "SaviniSuduweli@eurofins.com" <SaviniSuduweli@eurofins.com>
Date: Thursday, 7 November 2019 at 7:44 pm
To: Adrian Webber <adrian@mudenvironmental.com.au>
Cc: Trent Gray <trent@mudenvironmental.com.au>
Subject: Eurofins Test Results, Invoice - Report 685395 : Site LEVINSONS CRATES (ME-296)

Hi Adrian,

Please find attached results and invoice for your project in the subject header.

Kind regards,

Savini Suduweli Kondage
Analytical Services Manager

Eurofins Environment Testing
6 Monterey Road
DANDENONG SOUTH VIC 3175
AUSTRALIA
Phone: +61 385 645 051
Email: SaviniSuduweli@eurofins.com

688170
14/11/19
12:18pm
Scanned

APPENDIX M

Soil Data Validation

APPENDIX M - Soil Data Validation

An evaluation of the QA/QC requirements of the laboratory testing data for soil samples collected at the site is provided below.

As part of the evaluation of laboratory chemical data, duplicate pair results were compared by determining the relative percentage difference (RPD) between the results. The RPD was calculated using the formula:

$$RPD\ (\%) = \frac{100 \times (X_1 - X_2)}{\bar{X}}$$

According to AS4482.1-2005 and the ASC NEPM:

- typical RPD values for range between ±30%; and
- a RPD within the range of -30% to 30% is considered to show acceptable agreement and, conversely data outside this range is considered to have poor agreement.

Generally higher RPD values occur for organic compounds than for metals and where low concentrations of an analyte are recorded.

All replicate and field sample results are presented in the summary tables included in **Appendix B**.

The results of internal laboratory quality control procedures are detailed in the laboratory certificates provided in **Appendix L**. The acceptance criterion for internal laboratory replicates is set at an RPD of -30% to 30%. Laboratory recoveries should be in the range 70% to 130%.

Table A below indicates conformance to QA/QC requirements for soil laboratory testing data.

Table A - Soil Data Validation

QA / QC Requirement	Compliant?	Comment
Chain of custody documentation completed	✓	All samples were transported under Mud Environmental chain of custody procedures.
Samples extracted within laboratory holding times	✓	All soil samples were delivered to the laboratories within the sample holding times and in laboratory-supplied containers.
All analyses NATA accredited	✓	The primary and secondary laboratories (Eurofins and ALS) are NATA accredited for all chemical analyses performed.
Equipment calibration	✓	The PID was calibrated by the supplier prior to soil sampling activities, and a fresh air calibration was undertaken on the PID prior to each day of use. A copy of the PID calibration certificate is included in **Appendix J**.
Intra-laboratory replicate frequency of at least 1:20	✓	One intra-laboratory replicate sample (QC2) was analysed for TRH, BTEX, PAHs, OCPs and metals, which complies with the 1:20 of primary samples tested recommended in guidance.
Intra-laboratory replicate sample RPDs within 30%-50%	✓	Where RPDs could be calculated, the field replicate samples were all within or close to between 30-50%, which is considered acceptable in accordance with published guidance. Overall the analyte pair RPD results indicated good data correlation between the primary sample and intra-laboratory replicate sample results.
Inter-laboratory replicate frequency of at least 1:20	✓	One intra-laboratory replicate sample (QC2A) was analysed for TRH, BTEX, PAHs, OCPs and metals, which complies with the 1:20 of primary samples tested recommended in guidance.
Inter-laboratory replicate sample RPDs within 30%-50%	✓	Where RPDs could be calculated, the field replicate samples were all within or close to between 30-50%, which is considered acceptable in accordance with published guidance. Overall the analyte pair RPD results indicated good data correlation between the primary sample and inter-laboratory replicate sample results.
Trip blanks frequency of at least 1 per batch	✓	One trip blank sample (QC1) was collected and submitted for TRH C6-C10 analysis.
Trip blank results below laboratory's LOR	✓	All chemical concentrations in the trip blank sample were reported below the laboratory LOR.

QA / QC Requirement	Compliant?	Comment
Rinsate (equipment) blanks frequency of at least 1 per batch	✓	No rinsate sample was collected as all soil samples were collected using the excavator bucket and dedicated disposable nitrile gloves.
Equipment Blank results below laboratory's LOR.	✓	N/A
Decontamination of Equipment	✓	Dedicated disposable gloves were used for the handling and collection of each individual soil sample.
Sample Preservation and Storage	✓	Samples were collected in laboratory supplied glass jars and were kept in a chilled insulated box and transported to the laboratory.
Laboratory Limits of Reporting (LOR)	✓	The laboratory LORs are presented in the Laboratory Certificates included in Appendix K (Excavation Validation Reports), Appendix L (post-demolition soil validation areas) and Appendix N (Stockpile Classification Reports). All laboratory LORs were below the adopted screening levels.
Acceptable laboratory QC results	✓	Laboratory internal QA/QC data, including duplicates, method blanks, laboratory control spikes and matrix spikes, were reviewed and are considered acceptable.

In summary, it is considered that the field and laboratory QA/QC measures implemented provide confidence that the data collected is reliable for the purposes of this assessment.

APPENDIX N

Honesty in Reporting Form

Site contamination—honesty in reporting

EPA South Australia

1 Site contamination consultant/auditor contact details *(this section is to be completed by the consultant or auditor)*

Form completed whilst engaged as a consultant [ ] or auditor [ ] *(tick only one box)*

Consultant/auditor company: Mud Environmental Pty Ltd.

Auditor accreditation number (if applicable): Not Applicable.

Postal address: PO Box 80
Henley Beach, SA 5022

Telephone: ( ) 0439 725 754

Email: adrian@mudenvironmental.com.au

Consultant/auditor reference: ME-296 Levinsons Crafers.

EPA reference number (if applicable): Not applicable.

Declaration:

I understand that it is an offence to provide false or misleading information to the Authority (section 120A of the Environment Protection Act 1993).

I understand that I must clearly qualify any statement of my opinion as to the existence of site contamination at the site by specifying the land uses that were taken into account in forming that opinion (section 103ZA of the Environment Protection Act 1993).

Maximum penalties range up to $15,000 for individuals to $60,000 for corporations.

Name:

Signature:

Position of signatory: Date:

2 Site information *(this section is to be completed by the consultant or auditor)*

Site name (if applicable): Levinsons Crafers

Site address: 28 Emmett Road, Crafers West, SA.

Certificate of Title number(s): CT 5917/721
DP 63108 A100

Date(s) of assessment: 14-28 October 2019.

Site owner and contact details: Mark Musolino
mark@innoveda.com.au.
0418 828 669.

Site occupier and contact details: As above.

Name, address and position of person requesting report: James Levinson
Botten Levinson Lawyers, jal@bllawyers, 82129777 & 0407 050 080.

Existing or proposed land use: Residential - low density

Consultant/auditor reference: ME-296 Levinsons Crafers.

3 **Person(s) providing information to site contamination consultants or auditors** *(this section is to be completed by each person who provides information to a consultant or an auditor)*

Section 103ZB of the Environment Protection Act 1993 states that:

> A person must not make a statement that the person knows to be false or misleading in a material particular (whether by reason of the inclusion or omission of any particular) in any information furnished to a site contamination auditor or site contamination consultant that might be relied on by the auditor or consultant in preparing a report relating to site contamination (whether or not required under this or any other Act).

Maximum penalties range from $30,000 for individuals to $60,000 for corporations.

Declaration:

I hereby declare I have read and that I understand section 103ZB of the Environment Protection Act 1993 printed above.

Name: ADRIAN WEBBER

Signature:

Position of signatory: DIRECTOR Date: 4 FEBRUARY 2020

Name: Trent Gray

Signature:

Position of signatory: Senior Environmental Scientist. Date: 9 January 2020.

Name:

Signature:

Position of signatory: Date:

Name:

Signature:

Position of signatory: Date:

Name:

Signature:

Position of signatory: Date: