PART A – ADMINISTRATIVE CONDITIONS

1. Construction Certificate & PCA Notification

Before any site works, building or use is commenced, the person having the benefit of the development consent must:

a. obtain a Construction Certificate from Shellharbour City Council or other accredited certifier, and

b. appoint a Principal Certifying Authority.

2. Prescribed Conditions

This development consent is subject to the prescribed conditions made under the *Environmental Planning & Assessment Regulation 2000*.

3. Development in Accordance with Plans and Documents

The development must be in accordance with the following approved Development Application plans and documents as endorsed by Council's stamp. Where there is an inconsistency between the approved plans/documentation and conditions of consent, the conditions of consent take precedence to the extent of the inconsistency.

Name of Plan/Document	Prepared By	Drawing/Document No./Revision	Drawing/Document Date
Site Plan	Noel Thomson Architecture	1620-DA1 Rev. D 1620-DA2 Rev. D 1620-DA3 Rev. D	29/03/2019
Ground Floor Plan	Noel Thomson Architecture	1620-DA4 Rev. C 1620-DA10 Rev. C	31/08/2018
Roof Plan	Noel Thomson Architecture	1620-DA7 Rev. C	31/08/2018
Elevations Plan	Noel Thomson Architecture	1620-DA5 Rev. C 1620-DA11 Rev. C	31/08/2018
Section Plan	Noel Thomson Architecture	1620-DA6 Rev. C 1620-DA12 Rev. C	31/08/2018
Waste Management Plan	GHD	Appendix I – Statement of Environmental Effects	September 2018
Concept Landscape Plan	Noel Thomson Architecture	1620-DA8 Rev. C	29/03/2019
Colour/Material Schedule	Noel Thomson Architecture	Illawarra Regional Airport (Three sheets)	Dec 2017
Concept Drainage Plan	Noel Thomson Architecture, Shellharbour City Council	1620-DA8 Rev. C SC81 Sheet 1-3 Rev. A June 2018	
Contamination Assessments	Douglas Partners	Preliminary Site Investigation for Contaminated Land Project 78505.03, Detailed Site Investigation for Contaminated Land Proposed long stay car park Project 78505.04, Detailed Site Investigation for Contaminated Land Proposed Passenger Terminal Project 78505.04	March 2019 May 2019

Name of Plan/Document	Prepared By	Drawing/Document No./Revision	Drawing/Document Date
Pedestrian Access Strategy	Applicant	Illawarra Regional Airport Access Strategy	Received 9/04/2019
Traffic and Parking Assessment	GHD	Illawarra Regional Airport Passenger Terminal DA, Passenger and Parking Assessment	September 2018

4. Staged Consent

This consent provides approval for a two staged development. All conditions need to be addressed for each stage unless otherwise specified within the condition of consent.

5. Compliance with Notations on Drawings

Works must comply with any notations highlighted on the approved plans and specifications.

6. NSW Rural Fire Service Conditions

The NSW Rural Fire Service have issued conditions relevant to this development. The conditions are detailed in Part G of this Development Consent.

PART B - PRIOR TO ISSUE OF CONSTRUCTION CERTIFICATE

7. Section 94 Contributions

A contribution of $1,253.02, subject to annual indexation, must be paid to Council towards the provision of public amenities and public services prior to the issue of the Construction Certificate. This amount has been calculated in accordance with Shellharbour City Council's *Section 94 Contributions Plan 2016 Amendment 1 dated 8 March 2017* in the following manner:

- Non-residential contribution - Tier 2 - $1,253.02

The contribution amount contained in this condition is the base rate indexed to the date the consent is issued. The contribution amount will be adjusted in accordance with the indexation methods detailed in the *Contributions Plan*. Current indexed rates are available from Council.

The *Contributions Plan* may be inspected or a copy purchased at the Customer Service Counter at Council's offices, or downloaded from:

www.shellharbour.nsw.gov.au <http://www.shellharbour.nsw.gov.au>

The *Contributions Plan* may be inspected or a copy purchased at the Customer Service Counter at Council's offices, or downloaded from:

www.shellharbour.nsw.gov.au <http://www.shellharbour.nsw.gov.au/>

8. Landscape Plan Required

Prior to the issue of a Construction Certificate a landscape plan including the following details must be submitted to and approved by the Principal Certifying Authority:

Details must include:

a. Landscape bays planted with trees, shrubs and groundcovers.

The plan must be prepared by a Landscape Architect or Landscape Designer whom possesses a Diploma in Landscape Design and extensive postgraduate experience in landscape design (minimum five years) and prepared in accordance with Council's Development Control Plan, particularly Section 20.10 (p.266) and Appendix 7 (pp.396-411), available from Customer Service or Council's website.

9. Construction Environmental Management Plan (CEMP)

Construction Environmental Management Plan must be prepared including but not restricted to the following:

a. Specific Work Health and Safety (WH&S) measures to safeguard contractors from dust inhalation on the Long Term Car Park Site during earthworks (in relation to site being subject to previous Per- and Poly-Flouroalkyl Substances (PFAS) investigation by GHS 2017),

b. Sediment and erosion controls,

c. Management of fuels and chemicals,

d. Contaminated lands unexpected finds protocol,

e. Acid Sulfate Soil unexpected finds protocol,

f. Construction noise controls,

g. Dust control measures,

h. Native fauna protection,

i. Retained tree protection measures; and,

j. Unexpected cultural heritage finds stop work protocol.

10. Cultural Heritage

A stop work protocol must be included in the Construction Environmental Management Plan and implemented for any potential heritage items found during excavation including ceasing work immediately if any items or Aboriginal objects are found/uncovered, secure the site and inform the Office of Environment and Heritage and Shellharbour Council's Aboriginal Liaison Officer immediately.

11. Acoustics

Noise mitigation measures shall be incorporated into the building design to reduce the noise level from aircraft activity on the tarmac and to maintain health and wellbeing of workers and patrons within the terminal.

An acoustic assessment is required to be prepared by a suitably qualified consultant. The acoustic assessment shall include;

- Predicted noise levels at the façade of the proposed terminal;
- Recommended noise mitigation measures;
- Predicted internal noise levels with acoustic mitigation measures incorporated into the building design;

- Certification that the terminal will comply with the NSW Work health and Safety Regulation 2017 Part 4.1 – Noise, based on assessment of the technical specifications for noise mitigation measures.

The acoustic assessment must be submitted to the Principle Certifying Authority prior to the issue of a Construction Certificate.

12. External Street Lighting of Carpark

Prior to the issue of a Construction Certificate a Public Lighting Design Brief and Design Plan must be submitted to the Principal Certifying Authority for approval for the provision of street lighting on all public carparks included in the development. All lighting elements shall comply with the Manual of Standards Part 139-Aerodromes, Lighting in the Vicinity of Aerodromes (currently Section 9.21) for Zone A requirements, energy efficient LED or equivalent luminaires is a requirement.

13. Bureau of Meteorology Equipment

Prior to issue of a Construction Certificate, confirmation is to be obtained from the Airport Manager confirming that the Bureau of Meteorology equipment has been relocated as appropriate. This confirmation is to be provided to the Principal Certifying Authority.

14. Detail Design of Long-Term Carpark

Prior to the issue of a Construction Certificate a detailed design of the Long-Term Carpark layout must be submitted to the Principal Certifying Authority. The detailed plan must comply with AS 2890.1 - 2004 requirements, as interpreted by Austroads Guide to Traffic Management Part 11 - Parking. More specifically, compliance should be assessed with respect to AGTM Part 11 sections including Parking Facility Layout (7.3), Parking Facility Access Design (7.4) and Pedestrian Treatments (7.5.2) to be deemed in accordance with AS 2890.1 provisions. The detailed plan must be accompanied by a compliance report written by a suitably qualified person.

15. Food Premises - Plans & Specifications

Details of the construction and fit out of food premises (including store rooms, garbage areas) must be submitted to Principal Certifying Authority prior to issue of a Construction Certificate.

The plans and specifications must demonstrate compliance with the:

- *Food Act 2003* (as amended),
- Food Regulation 2010 (as amended);
- *Food Standards Code* as published by Food Standards Australia;
- New Zealand and Australian Standard AS 4674:2004 Design, Construction and fit out of food premises (as amended);
- Sydney Water - Trade Waste Section

16. Food Premises - Waste Facility

Details of the construction and fit out of the waste facility of the food premises must be submitted to the Principal Certifying Authority for approval prior to issue of a Construction Certificate. Such details must demonstrate compliance with the *Food Act 2003* (as amended), *Food Regulation 2010* (as amended); the Food Standards Code as published by Food Standards Australia and New Zealand and Australian Standard AS 4674:2004 Design, Construction and Fit out of Food Premises (as amended.) and must be:

a. provided with a hose tap connected to the water supply,

b. paved with impervious floor materials,

c. coved at the intersection of the floor and the walls,

d. graded and drained to a waste disposal system in accordance with the requirements of the relevant regulatory authority (Sydney Water), and

e. adequately ventilated (mechanically or naturally) so that odour emissions do not cause offensive odour as defined by the *Protection of the Environment Operations Act 1997*.

17. Hand Wash Basin

Prior to issue of a Construction Certificate details of provision of hand basins which must be provided in food preparation areas and in or adjacent to toilets, must be provided to the Principal Certifying Authority. Each hand basin must have hot and cold water delivered through a single outlet. Soap and single use towels must also be provided adjacent to each hand basin.

18. Sinks Within Food Premises

Prior to the issue of a Construction Certificate details of the location of the following must be provided to the Principal Certifying Authority:

a. a dishwasher,

b. a single bowl sink, or a double bowl sink, with a supply of cold and hot water, and

c. a cleaner's sink/slop sink with hot and cold water.

These requirements must be included within the food premises for cleaning utensils, receptacles, tools of trade, benches, fittings, machinery and other appliances.

19. Car Parking Wheel Stops

All car parking spaces within the car parks must be fitted with wheel stops.

20. Road Design

The road design must comply with the following:

a. the grading and layout of all roads and lots must not allow for trapped low points and ensure that overland flow is passed safely over public land,

b. the pavement design for the proposed roads must be carried out by a qualified Geotechnical/Civil engineer in accordance with AUSTROADS Guide to Pavement Technology and subdivision designs code,

c. the relevant drawings must be annotated and properly referenced showing compliance with this condition.

d. The drawings must be submitted with application for a Construction Certificate for approval by the Certifying Authority.

21. Flooding

The Probable Maximum Flood (PMF) Level for this site is RL 6.7m AHD.

The development shall comply with the following restrictions:

a. Structural soundness and engineers certificate: An IEAust or NER Structural Engineer's certificate certifying that structures are designed to withstand forces of floodwaters, debris and buoyancy up to and including the PMF is to be submitted with the Construction Certificate Application and,

b. Storage of materials: There shall be no external storage of materials below the design floor level which may cause pollution or be potentially hazardous during PMF flood.

22. Kitchen Exhaust Design

The kitchen exhaust and any mechanical ventilation must discharge through the roof of the building. The kitchen exhaust and any mechanical ventilation and associated ductwork must not discharge through, or be attached to, the outside wall or outside face of the building. Detailed plans showing the location, ducting, pipework of the proposed exhaust system, manufacturers details of the proposed exhaust system and documentation verifying the proposed exhaust system will comply with AS 1668.2 - Part 2 (Ventilation Design for Indoor Air Contaminant Control) must be provided to the Principal Certifying Authority prior to the issue of a Construction Certificate.

23. Sydney Water Trade Waste Agreement

Provide written approval from Sydney Water that indicates that a trade waste agreement has been entered into for the grease trap that will be utilised for the food business operations. This information must be provided to the Principal Certifying Authority prior to issue of the Construction Certificate.

24. Building Plan Approval - Sydney Water

The approved plans must be submitted to a Sydney Water Tap in™ to determine whether the development will affect Sydney Water wastewater and water mains, stormwater drains and/or easements, and if any requirements need to be met. Sydney Water's Tap in™ online service is available at:

<https://www.sydneywater.com.au/SW/plumbing-building-developing/building/sydney-water-tap-in/index.htm>

The Certifier must ensure that Sydney Water Tap in™ has issued the appropriate electronic approval prior to the commencement of any works.

25. Detailed Drainage Design

A detailed drainage design of the site must be submitted and approved prior to the release of the Construction Certificate. The detailed plan must assess the capacity of the existing drainage being connected to. The capacity of the existing stormwater systems must be able to handle the additional flows from the terminal building. All calculations including hydrological and hydraulic calculations are to be in accordance with the Shellharbour Subdivision Design code requirements.

With this information the drainage design must also:

a. drain to the council pit and pipe network,

b. indicate the method of disposal of all stormwater and must include rainwater tanks, existing ground levels, finished surface levels on all paved areas, estimated flow rates, invert levels and sizes of all pipelines,

c. be to the satisfaction of the Certifying Authority,

d. be designed to cater for a 1 in 20 year Average Recurrence Interval storm event,

e. overflow drainage paths are to be provided and be designed to cater for 1 in 100 year Average Recurrence Interval storm event,

f. comply with Council's *Shellharbour Development Control Plan* unless variation is specifically noted and approved on the concept drainage plan, and

g. All pits must have flush fitting grates. All pits larger than 600mm x 600mm are to be grated galvanised steel grid hinged and be heavy duty type where traffic loading is expected.

26. Construction Traffic Management Plan (CTMP)

Prior to the issue of a Construction Certificate, a Construction Traffic Management Plan (CTMP) must be submitted to and approved by the Certifying Authority. The plan must include:

a. Details of vehicle routes,

b. number of trucks and movements,

c. hours of operation,

d. access arrangements,

e. impact on pedestrians,

f. traffic control,

g. Parking for workers vehicles, and

h. Parking for heavy machinery, if appropriate.

All construction workers, sub-contractors and supervisors must be adequately informed to ensure that the Construction Traffic Management procedures are adhered to at all times during construction.

27. Building Materials

All building materials must be low reflective. The use of zincalume or simular is prohibited. The visible light reflectivity (reflectivity index) of the roof and other external building materials/colours (including exposed windows) must not exceed 20%. Written evidence that this requirement is not exceeded must be submitted to the Principal Certifying Authority prior to the issue of a Construction Certificate.

28. Airport Restrictions

- All plant during construction shall be below 27m AHD unless approved by Airport Manager. Fees and Charges may apply where flight operations are effected by works.
- All permanent structures on site including aerials shall be lower than 27m AHD.
- All plants and trees on site shall have a mature height of no more than 27 m AHD.

Documentary Evidence must be provided demonstrating that all the above matters comply with the requirements prior to the issue of the Construction Certificate and is to the satisfaction of the Certifying Authority.

29. Car Parking Dimensions and Number of Spaces

All car parking facilities and spaces must be in accordance with the following Australian Standards:

a. AS 2890.1 - 2004 for Off-street Car Parking Facilities,

b. AS 2890.2 - 2002 for Off-street Commercial Vehicle Parking Facilities, and

c. AS 2890.6 - 2009 for Off-street Parking Facilities for People with a Disability.

An Australian Standards compliance assessment of the proposed parking facilities is to be undertaken to the satisfaction of the Principal Certifying Authority prior to the issue of a Construction Certificate.

A total of 203 parking spaces is required including a minimum of 5 accessible spaces.

30. Site Management Plan

Prior to the commencement of works, the applicant must submit to and obtain approval for a construction and site management plan from the Certifying Authority that clearly sets out the following:

a. what actions are proposed to ensure safe access to and from the site and what protection will be provided to the road and footpath area from building activities, crossings by heavy equipment, plant and materials delivery and static load from cranes, concrete pumps and the like,

b. the proposed method of loading and unloading excavation machines, building materials and formwork within the site,

c. the proposed areas within the site to be used for the storage of excavated material, construction materials and waste containers during the construction period,

d. sediment and erosion control measures as per Landcom's publication ‘Managing Urban Stormwater - Soils and Construction (2004)' also known as the 'Blue Book' or subsequent revisions,

e. how it is proposed to ensure that soil/excavated materials are not transported on wheels or tracks of vehicles or plant and deposited on the roadway, and

f. the proposed method of support to any excavation adjacent to adjoining buildings or the road reserve. The proposed method of support is to be certified by an appropriately qualified and experienced engineer.

PART C - PRIOR TO COMMENCEMENT OF WORKS

31. Engineer Designed Pavement

All car parking areas, manoeuvring areas and the access aisle must be paved, drained and marked. The pavement must be designed by a qualified civil engineer and certified to be satisfactory for the expected traffic loadings from a development of this size and type. AUSTROADS Guide to Pavement Technology can be used as the design guideline for the pavement design.

The laybacks and crossings must be designed to accommodate expected traffic loadings. In this regard they must be constructed to a commercial/industrial standard with the work carried out by Council or a Council approved contractor at the Developer's expense, including all alteration to public infrastructure where necessary.

32. Site Management Plan

The measures required in the Site Management Plan approved by the Certifying Authority must be implemented prior to the commencement of works.

33. Open or Occupy a Roadway or Footpath (Section 138 *Roads Act 1993*)

Prior to any physical works within Council's road reserve such as (but not limited to) installing a driveway or connecting stormwater facilities you will need to apply for approval under Section 138 of the *Roads Act 1993*. There is no additional cost as this is paid for at the time of development application.

To lodge your application you will need to submit the following information:

a. details of the proposed works in the road and footpath area,

b. traffic management plan,

c. provision of public risk insurance and,

d. details of timing and length of works.

34. Dilapidation Report

It is the applicant's responsibility to notify Council of any existing damage to public areas in the vicinity of the development site through the submission of a Dilapidation Report. The report must be supported with suitable photographic records. This information must be submitted to Council prior to the commencement of work.

PART D - DURING CONSTRUCTION WORKS

35. Construction Environmental Management Plan Implementation (CEMP)

Prior to the commencement of any construction on site, the site must be prepared in accordance with the approved CEMP including sediment controls, bunded areas and spill kits.

36. Acoustic Attenuation

Noise mitigation measures as required by Condition No. 10 of this consent must be implemented according to the approved plans.

37. Road Construction and Road Drainage Construction

The site manager must arrange for a satisfactory inspection by Shellharbour City Council of the following works:

a. all road drainage works prior to backfilling of the work and,

b. all road construction inspections as per Council's *Subdivision Design Code*.

38. Lighting Details

Lighting for the car parking areas must be constructed in accordance with the details approved under Condition No. 11 of this consent.

39. Excavation Material

Any excavation material from the Long Term Car Park that is to be taken offsite must be classified in accordance “Waste classification Guidelines, Part 1: Classifying Waste” NSW EPA (2015). This includes testing for Per- and Poly-Flouroalkyl Substances (PFAS) by a qualified consultant

40. Traffic Committee - Signposting and Line Marking Plan

Prior to the implementation of the Signposting and Line Marking Plan, the plan must be lodged with the City of Shellharbour Traffic Committee for written approval. This plan must detail all facilities, signage and line marking required within and surrounding the development.

41. Hours of Work During Building Work

Noise generating activities, including excavation, construction and delivery of equipment and materials, must only be carried out between:

- 7am to 5pm Mondays to Fridays
- 8am to 1pm Saturdays.

Work must not be carried out on Sundays or public holidays.

42. Waste Management

The management of waste must comply with the approved Waste Management Plan. Any variations to the Waste Management Plan must have prior written approval of Council.

43. Storage of Materials

Building materials and equipment must not be stored on the road reserve/footpath area.

44. Maintenance of Site Management Plan

The site management controls must be maintained at all times during each stage of the development and checked for adequacy daily. The controls must not be removed until the development is completed and the disturbed areas have been stabilised.

Maintenance must include but is not limited to ensuring:

a. all sediment fences, sediment traps and socks are properly placed and are working effectively and,

b. drains, gutters and roads are maintained clear of sediment at all times.

Note: It is an offence under the *Protection of the Environment Operations Act 1997* to allow soil or other pollutants to fall or be washed into any waters or be placed where it is likely to fall or be washed into any waters. Substantial penalties may be issued for any offence.

45. Building Height - Survey Certification

The building must not exceed the height shown on the approved plans.

A report from a registered surveyor must be provided to the Certifying Authority on completion of the roof frame, prior to covering the roof, certifying that the height of the building is in accordance with the approved plans.

PART E - PRIOR TO OCCUPATION

46. Acoustic Attenuation

Prior to the issue of an Occupation Certificate an acoustic report prepared by a suitably qualified acoustic consultant is required to be submitted to the Principal Certifying Authority. This report must verify that the noise mitigation measures have been constructed according to the requirements of Condition No. 10 of this consent.

47. Removal of Temporary Terminal Building

Within three months of the issue of an Occupation Certificate the temporary terminal building is to be removed from the site, unless suitable consent is in place for its retention.

48. Coving

Prior to the issue of an Occupation Certificate coving must be installed at the intersection of floors with walls/plinths of the food premises and shall be integral to the surface finish of both the floor and wall so as to form a continuous uninterrupted surface.

49. Food Premises - Inspection and Registration

Prior to the issue of any Occupation Certificate or occupation or use of any food premises:

a. a satisfactory final inspection must have been undertaken by the Principal Certifying Authority certifying that the food premises including any food storage, cleaning and garbage areas complies with the:

- *Food Act 2003*, Food Regulation 2010, *Food Standards Code* as published by Food Standards Australia (as amended);
- New Zealand and Australian Standard AS4674:2004 Design, Construction and fit out of food premises (as amended);
- Sydney Water - trade Waste Section.

b. the food proprietor must submit to Shellharbour City Council a *'Food Business Registration Form'*. The form can be found on Council's website by visiting:

http://www.shellharbour.nsw.gov.au/Documents/Forms-and-application/Compliance/Food-business-registration-form.aspx

50. Occupation Certificate

Compliance with all conditions of Parts A to E must be verified by the Principal Certifying Authority prior to issue of a final Occupation Certificate. The building must not be used until the Principal Certifying Authority issues an Occupation Certificate.

51. Repairs to Public Infrastructure

Any damage to public infrastructure, other than that previously noted in the Dilapidation Report (refer Part C), is the responsibility of the developer. All damage must be repaired and reinstated prior to the issue of the Occupation Certificate. This work must be carried out by Council, or Council approved contractor, at the developer's expense.

52. Section 73 Certificate

A Section 73 Compliance Certificate under the *Sydney Water Act 1994* must be obtained from Sydney Water. This Section 73 Certificate must be submitted to the Principal Certifying Authority prior to the issue of an Occupation Certificate.

It is recommended that applicants apply early for te certificate, as there may be water and sewer popes to be built and this can take some time. This can also impact on other services and building, driveway or landscape design.

Application must be made through an authorised Water Servicing Coordinator. For help either visit www.sydneywater.com.au > Plumbing, building and developing > Developing > Land development or telephone 13 2092.

53. Works As Executed - Stormwater Drainage

Prior to the issue of an Occupation Certificate, Works As Executed Plans must be submitted the Certifying Authority by a registered surveyor certifying compliance of all drainage works with the approved design plans. The Works As Executed dimensions and levels must be shown in red on a copy of the approved Construction Certificate plans. This plan must verify surface and invert levels on all pits, invert levels and sizes of all pipelines, and finished surface levels on all paved areas. All levels must relate to Australian Height Datum.

54. Completion of Landscape Works

The unbuilt upon land, with the exception of the paving, must be landscaped in accordance with the approved landscape plan prior to the issue of an Occupation Certificate. Landscape or turf areas must not be reduced or replaced with hard impermeable surfaces. Any variations to the design or species used must be authorised by Council in writing before any changes are made.

A report from a suitably qualified person must be provided to the Principal Certifying Authority on completion of the landscape works certifying that the landscape is in accordance with the approved Landscape Plan.

55. Electricity Supply

Prior to the release of the Occupation Certificate the relevant electricity provider must provide written advice the Principal Certifying Authority that all requirements for the supply of electricity to the proposed development has been satisfied.

PART F - AFTER ISSUE OF OCCUPATION CERTIFICATE/DURING OCCUPATION

56. Food Premises - Storage of Waste - Used Cooking Oil

Used oil shall be contained in a leak proof container and stored in a covered and bunded area prior to off-site disposal. Copies of receipts for the disposal of used cooking oil shall be kept on-site and made available to Council Officers upon request.

57. Garbage Odour

A waste contractor shall be engaged to remove all waste from the garbage storage area on a regular basis so that no overflow of rubbish will occur. Practical measures are also to be taken to ensure that odour emission from the garbage storage area does not cause offensive odour as defined under the provision of the *Protection of the Environment Operations Act 1997* (as amended).

58. Hours of Operation

Hours of operation of the Passenger Transport Facility must be confined to the working hours 5.30am to 10.00pm Monday to Sunday.

PART G – OTHER APPROVALS

59. Rural Fire Service Conditions

All communications to be addressed to:

Headquarters
15 Carter Street
Lidcombe NSW 2141

Telephone: 1300 NSW RFS
e-mail: records@rfs.nsw.gov.au

Headquarters
Locked Bag 17
Granville NSW 2142

Facsimile: 8741 5433

The General Manager
Shellharbour City Council
Locked Bag 155
SHELLHARBOUR CITY CENTRE NSW 2529

Your Ref: DA0523/2018
Our Ref: D18/7756
DA18102315682 AJ

ATTENTION: Madeline Cartwright

2 November 2018

Dear Madam

Development Application - 10//1157377 - Airport Road Albion Park Rail 2527;

I refer to your correspondence dated 17 October 2018 seeking advice regarding bush fire protection for the above Development Application in accordance with Section 4.14 of the 'Environmental Planning and Assessment Act 1979'.

The New South Wales Rural Fire Service (NSW RFS) has considered the information submitted and provides the following recommended conditions:

Evacuation and Emergency Management

The intent of measures is to provide suitable emergency and evacuation (and relocation) arrangements for occupants of special fire protection purpose developments. To achieve this, the following conditions shall apply:

1. Arrangements for emergency and evacuation are to comply with section 4.2.7 of 'Planning for Bush Fire Protection 2006'.

ID:115682/109473/5

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Should you wish to discuss this matter please contact Anna Jones on 1300 NSW RFS.

Yours sincerely

Martha Dotter
A/Team Leader Development Assessment & Planning

For general information on bush fire protection please visit www.rfs.nsw.gov.au

REASONS FOR THE IMPOSITION OF CONDITIONS

1. To minimise any possible adverse environmental impacts of the proposed development.

2. To ensure that the amenity and character of the surrounding area is protected.

3. To ensure that the design and siting of the development complies with the provisions of Environmental Planning Instruments and Council's Codes and Policies.

4. To ensure that the development does not conflict with the public interest.

Advisory Notes – General

Obstacle Height Limitation - Airport

There are height limitations relating to the operation of the airport for developments/activities/construction that may involve cranes, plant or machinery in the Shellharbour Local Government Area. Further details can be obtained from Council concerning the obstacle height limitations.

Critical Stage Mandatory Inspections

Mandatory inspections of the building work must be carried out by the Principal Certifying Authority at various stages of construction in accordance with clause 162A of the *Environmental Planning & Assessment Regulation 2000.*

It is recommended that you discuss with your Principal Certifying Authority the occasions when the building work is to be inspected prior to work commencing.

Erection of Signs

The principal contractor and the Principal Certifying Authority will need to have a sign (or signs) erected and maintained on the development site that provides their name and contact telephone number (during and outside work hours for the principal contractor), and stating that unauthorised entry to the site is prohibited. The principal contractor and Principal Certifying Authority can have separate signs or they can both use one sign if they choose.

A maximum penalty of 10 penalty units applies for failure to erect and maintain sign(s) detailing principal contractor and Principal Certifying Authority identification.

SafeWork NSW

The requirements of SafeWork NSW must be satisfied at all times.

Failure to Comply with Consent

Failure to comply with any of the conditions of consent may result in a Penalty Infringement Notice being issued against the owner/applicant/builder. Substantially greater penalties may be imposed by the Court for non-compliance.

Lapsing of Development Consent

In accordance with Part 4, Division 4.9, section 4.53 of the *Environmental Planning & Assessment Act 1979*, the development approval lapses five years after the approval date unless building, engineering or construction work relating to the building has physically commenced.

Right to Appeal

If you are dissatisfied with this decision, Part 8, Division 8.3, section 8.7 of the *Environmental Planning & Assessment Act 1979* gives you the right to appeal to the Land & Environment Court within six months after the date on which you receive this notice.

Review of Determination

If you are dissatisfied with this decision, Part 8, Division 8.2 of the *Environmental Planning & Assessment Act 1979* provides that you may request Council to review its determination. The request cannot be made after the time limit for making of an appeal under section 97 expires.

To Vary Development Consent

The plans and/or conditions of this consent are binding and may only be varied upon application to Council under section 4.55 of the *Environmental Planning & Assessment Act 1979*. The appropriate fee shall accompany the application and no action shall be taken on the requested variation unless and until the written authorisation of Council is received by way of an amended consent.

Dial Before You Dig

Underground assets may exist in the area that is subject to your application. In the interests of health and safety and in order to protect damage to third party assets, please contact Dial Before You Dig at www.1100.com.au <http://www.1100.com.au/> or telephone on 1100 before excavating or erecting structures (this is the law in New South Wales). If alterations are required to the configuration, size, form or design of the development upon contacting the Dial Before You Dig service, an amendment to the development consent (or a new development application) may be necessary. Individuals owe asset owners a duty of care that must be observed when working in the vicinity of plant or assets. It is the individual's responsibility to anticipate and request the nominal location of plant or assets on the relevant property via contacting the Dial Before You Dig service in advance of any construction or planning activities.

***Telecommunications Act 1997* (Commonwealth)**

Telstra (and its authorised contractors) are the only companies that are permitted to conduct works on Telstra's network and assets. Any person interfering with a facility or installation owned by Telstra is committing an offence under the *Criminal Code Act 1995* (Commonwealth) and is liable for prosecution. Furthermore, damage to Telstra's infrastructure may result in interruption to the provision of essential services and significant costs. If you are aware of any works or proposed works which may affect or impact on Telstra's assets in any way, you are required to contact Telstra's Network Integrity Team on 1800810443.

Development within Vicinity of a High Pressure Gas Main

Contact Dial Before You Dig on 1100 or www.dialbeforeyoudig.com.au <http://www.dialbeforeyoudig.com.au/> Proposed works in the vicinity of any high pressure gas main must be directed to:

Jemena Asset Management Pty Ltd
PO Box 6507
SILVERWATER NSW 2128

Attention: Land Services Department

Compliance with *Building Code of Australia*

The development must comply with the *Building Code of Australia* and all related standards and legislation.

Prescribed Payment System Tax Obligations

You may have a taxation obligation under the Prescribed Payment System. For more information, contact the Australian Taxation Office on telephone 132866.

Earthing

The construction of any building or structure (including fencing, signage, flag poles etc.) whether temporary or permanent that is connected to or in close proximity to Endeavour Energy's electrical network is required to comply with Australian/New Zealand Standard AS/NZS 3000:2007 'Electrical installations' to ensure that there is adequate connection to the earth. Inadequate connection to the earth places persons, equipment connected to the network and the electricity network itself at risk if there is a leaking/fault current which cannot flow into the grounding system and be properly dissipated.

Vegetation Management

The planting of large trees in the vicinity of electricity infrastructure is not supported by Endeavour Energy. Low growing shrubs not exceeding 3.0 metres in height, ground covers and smaller shrubs with non-invasive root systems are the best plants to use. Ideally larger trees should be planted well away from electricity infrastructure, including underground cables (or installed with a root barrier around the root ball of the plant), as they can restrict safe access by maintenance workers and may damage the electricity network eg. falling branches. Landscaping that interferes with electricity infrastructure may become subject to Endeavour Energy's Vegetation Management program and/or the provisions of the *Electricity Supply Act 1995* (NSW) Section 48 'Interference with electricity works by trees' by which under certain circumstances the cost of carrying out such work may be recovered.

Public Safety

Workers involved in work near electricity infrastructure run the risk of receiving an electric shock and causing substantial damage to plant and equipment. Ordinary persons must maintain a minimum safe approach distance to live exposed conductors of 3.0 metres to all voltages up to and including 132,000 volts/132 kV high voltage. I have attached Endeavour Energy's public safety training resources, which were developed to help general public/workers to understand why you may be at risk and what you can do to work safely. The public safety training resources are also available via Endeavour Energy's website via the following link:

http://www.endeavourenergy.com.au/wps/wcm/connect/ee/nsw/nsw+homepage/communitynav/safety/safety+brochures

If the applicant has any concerns over the proposed works in proximity of the Endeavour Energy's electricity infrastructure, as part of a public safety initiative Endeavour Energy has set up an email account that is accessible by a range of multiple stakeholders across the company in order to provide more effective lines of communication with the general public who may be undertaking construction activities in proximity of electricity infrastructure such as builders, construction industry workers etc. The email address is Construction.Works@endeavourenergy.com.au .

Emergency Contact

In case of an emergency relating to Endeavour Energy's electrical network, the applicant should note Emergencies Telephone is 131 003 which can be contact 24 hours/7 days.

END OF RECOMMENDED CONDITIONS

			CLIENT: SHELLHARBOUR CITY COUNCIL	ARCHITECT: Noel Thomson Architecture Pty Ltd.			PROJECT NO: 1620 - DA1		
D: UPGRADE AS INDICATED	29.03.2019	NT		PROJECT TITLE: ILLAWARRA REGIONAL AIRPORT					
C: STAGING ADDED	31.08.2018	NT	PROPERTY ADDRESS: AIRPORT RD						
B: DEVELOPMENT APPLICATION SUBMISSION	28.06.2018	NT							
A: DEVELOPMENT APPLICATION SUBMISSION	19.12.2017	NT	TOWN: ALBION PARK RAIL NSW 2527	SCALE: AS NOTED @ A1	DATE: AUG 2018	DWG NO: DA1	REVISION NO: D	DRAWN BY: HH/CN	
Revision Notes:	**Date:**	**Check:**							

NOEL THOMSON ARCHITECTURE PTY LTD
20 CHURCHILL AVE WAGGA WAGGA
T: 69263320 F: 69266011

NOMINATED ARCHITECT
NOEL THOMSON 5869
ACN: 077 973 623
ABN: 82 077 973 623

NOTES

THE CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE PRIOR TO COMMENCEMENT OF ANY WORK

FIGURED DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALE

PLANS TO BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS & SPECIFICATIONS

ALL WORK TO COMPLY WITH RELEVANT CODES AND THE BCA

ANY DESCREPANCIES TO BE REPORTED TO PRIMARY CONSULTANT PRIOR TO PROCEEDING WITH WORK

AUSTRALIAN STANDARDS

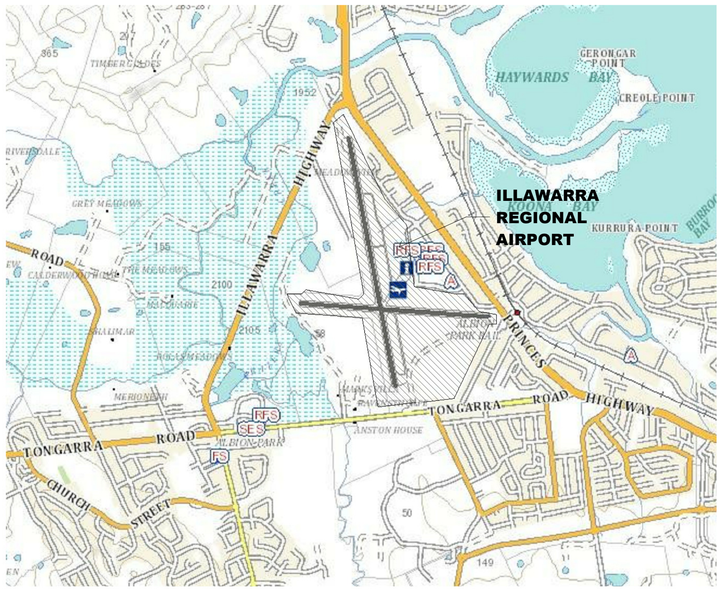
ALL WORKS TO COMPLY WITH, BUT NOT LIMITED TO THE FOLLOWING STANDARDS

ELECTRICAL INSTALLATIONS	AS 3000
GLAZING IN BUILDINGS	AS 1288
LIGHT TIMBER FRAMING	AS 1684
WATERPROOFING WET AREAS	AS 3740
SMOKE DETECTORS	AS 1670
EMERGENCY LIGHTING	AS 2293.1
INTERIOR LIGHTING	AS 1680
WINDOWS IN BUILDINGS	AS 2047
PLUMBING & DRAINAGE	AS 3500
TERMITE MANAGEMENT	AS 3660.1
GUIDE TO PAINTING OF BUILDINGS	AS 2311
DESIGN FOR ACCESS & MOBILITY	AS 1428.1
AUTOMATIC FIRE SPRINKLER SYSTEMS	AS 2118
MASONARY STRUCTURES	AS 3700
CONCRETE STRUCTURES	AS 3600
PARKING FACILITIES OFF STREET	AS 2890.1

WARNING - UNDERGROUND SERVICES

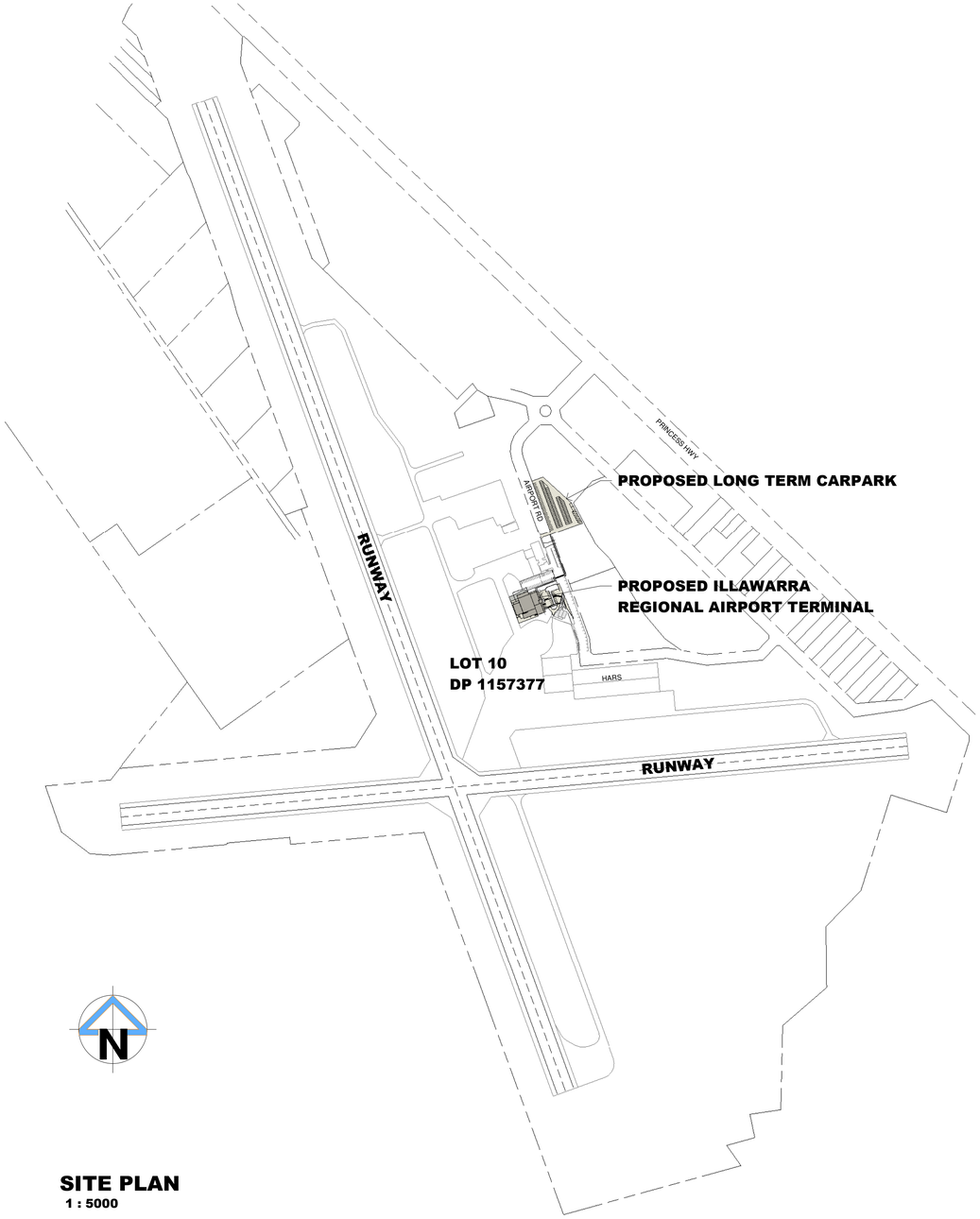
DIAL BEFORE YOU DIG www.1100.com.au

LOCATIONS FOR UNDERGROUND SERVICES ARE APPROXIMATE ONLY, THEIR ACTUAL POSITIONS AND DEPTHS MUST BE PROVEN ONSITE PRIOR TO ANY EXCAVATION. NOT ALL SERVICES MAY BE SHOWN ON THE DRAWINGS. THE CONTRACTOR MUST MAKE HIS OWN ENQUIRES WITH ALL UTILITY AND SERVICE COMPANIES BEFORE COMMENCEMENT OF WORKS.



LOCALITY PLAN
NTS

DRAWING REGISTER	
SHEET No	SHEET NAME
CD1	PERSPECTIVE IMAGES
DA1	LOCALITY PLAN
DA2	SITE LOCALITY PLAN
DA3	SITE PLAN
DA4	FLOOR PLAN - STAGE 1
DA5	ELEVATIONS - STAGE 1
DA6	SECTIONS - STAGE 1
DA7	ROOF PLAN - STAGE 1
DA8	LANDSCAPE PLAN
DA9	NOT USED
DA10	FLOOR PLAN STAGE 2
DA11	ELEVATIONS STAGE 2
DA12	SECTIONS STAGE 2

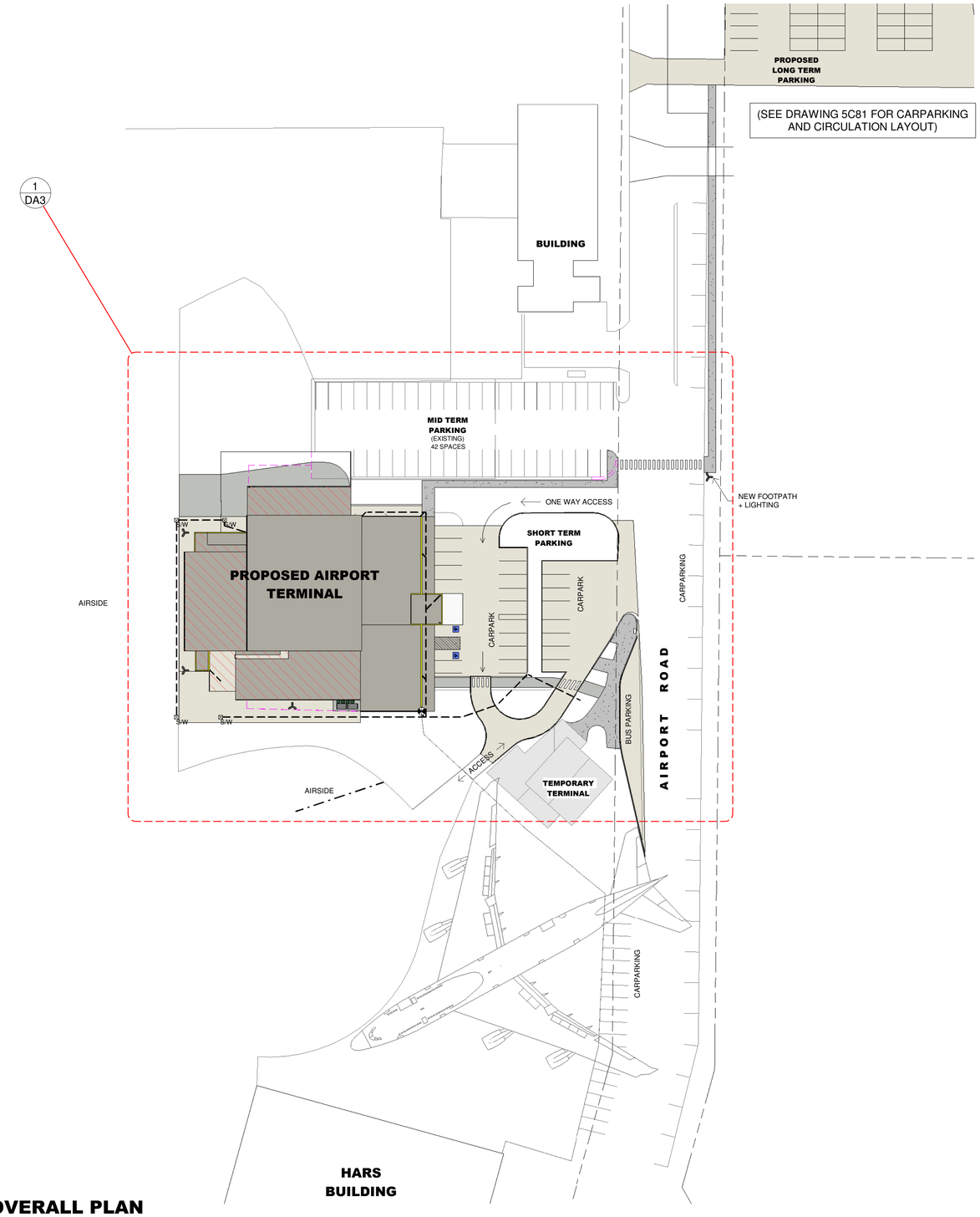


SITE PLAN
1 : 5000

			CLIENT: SHELLHARBOUR CITY COUNCIL	ARCHITECT: Noel Thomson Architecture Pty Ltd.			PROJECT NO: **1620 - DA2**		
D: UPGRADE AS INDICATED	29.03.2019	NT		PROJECT TITLE: ILLAWARRA REGIONAL AIRPORT					
C: STAGING ADDED	31.08.2018	NT	PROPERTY ADDRESS: AIRPORT RD						
B: DEVELOPMENT APPLICATION SUBMISSION	28.06.2018	NT							
A: DEVELOPMENT APPLICATION SUBMISSION	19.12.2017	NT	TOWN: ALBION PARK RAIL NSW 2527	SCALE: AS NOTED @ A1	DATE: AUG 2018	DWG NO: DA2	REVISION NO: D	DRAWN BY: **HH/CN**	
Revision Notes:	**Date:**	**Check:**							

NOEL THOMSON ARCHITECTURE PTY LTD
20 CHURCHILL AVE WAGGA WAGGA
T: 69263320 F: 69266011

NOMINATED ARCHITECT
NOEL THOMSON 5869
ACN: 077 973 623
ABN: 82 077 973 623



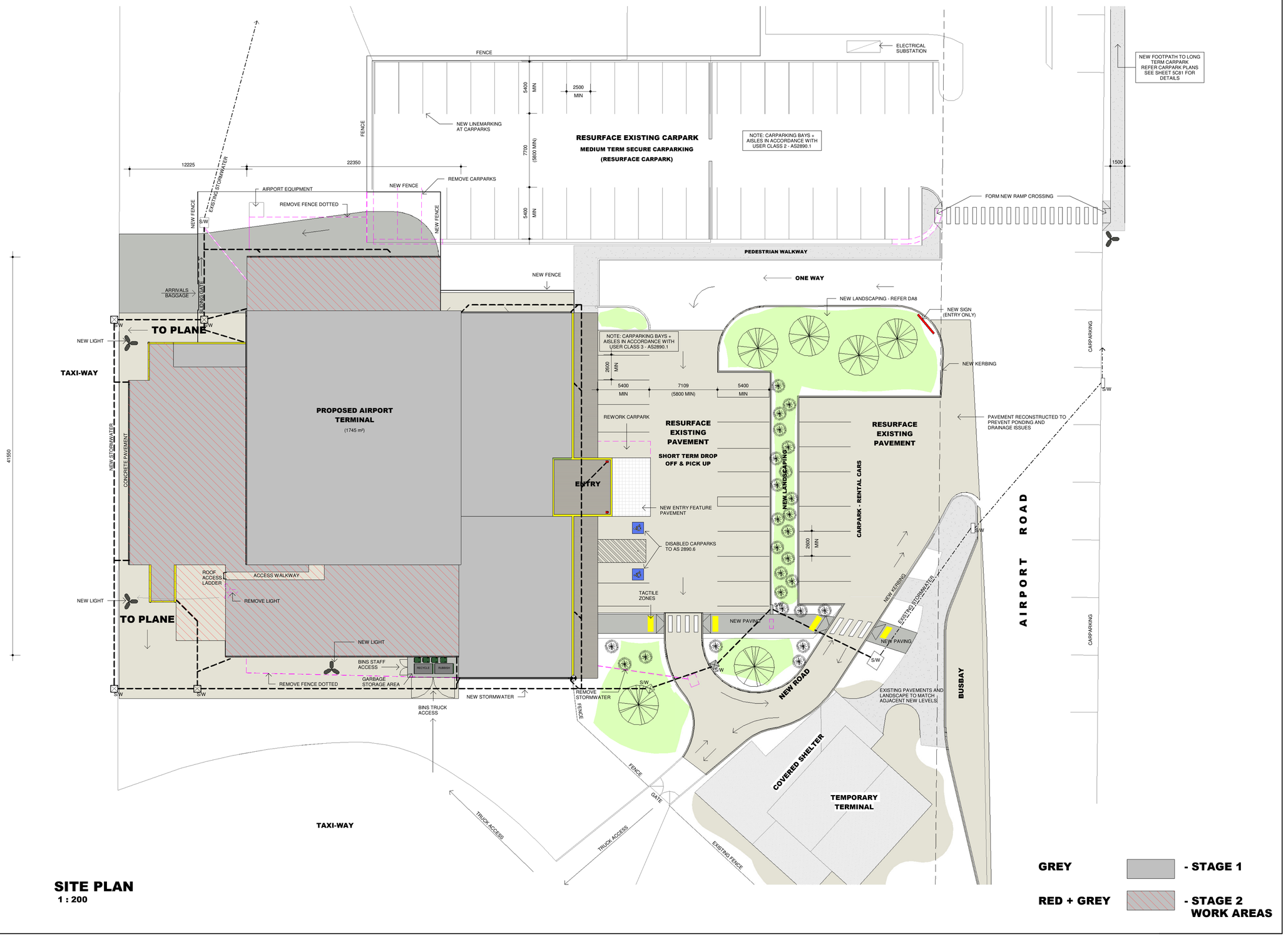
SITE OVERALL PLAN
1 : 500

GREY - **STAGE 1**

RED + GREY - **STAGE 2 WORK AREAS**

			CLIENT: SHELLHARBOUR CITY COUNCIL	ARCHITECT: Noel Thomson Architecture Pty Ltd.			PROJECT NO: 1620 - DA3		NOEL THOMSON ARCHITECTURE PTY LTD 20 CHURCHILL AVE WAGGA WAGGA T: 69263320 F: 69266011 NOMINATED ARCHITECT NOEL THOMSON 5869 ACN: 077 973 623 ABN: 82 077 973 623	
D: UPGRADE AS INDICATED	29.03.2019	NT		PROJECT TITLE: ILLAWARRA REGIONAL AIRPORT						
C: STAGING ADDED	31.08.2018	NT	PROPERTY ADDRESS: AIRPORT RD							
B: DEVELOPMENT APPLICATION SUBMISSION	28.06.2018	NT		SCALE: AS NOTED @ A1	DATE: AUG 2018	DWG NO: DA3	REVISION NO: D	DRAWN BY: SB/CN		
A: DEVELOPMENT APPLICATION SUBMISSION	19.12.2017	NT	TOWN: ALBION PARK RAIL NSW 2527							
Revision Notes:	**Date:**	**Check:**								

AREA SCHEDULE STAGE 1&2	
STAGE 1	1126.2m²
STAGE 2	482.5m²
TOTAL FLOOR AREA STAGE 1&2	**1608.7m²**



SITE PLAN
1 : 200

GREY - STAGE 1

RED + GREY - STAGE 2 WORK AREAS

C: STAGING ADDED	31.08.2018	NT
B: DEVELOPMENT APPLICATION SUBMISSION	28.06.2018	NT
A: DEVELOPMENT APPLICATION SUBMISSION	19.12.2017	NT
Revision Notes:	**Date:**	**Check:**

CLIENT: SHELLHARBOUR CITY COUNCIL

PROPERTY ADDRESS: AIRPORT RD

TOWN: ALBION PARK RAIL NSW 2527

ARCHITECT: Noel Thomson Architecture Pty Ltd.

PROJECT TITLE: ILLAWARRA REGIONAL AIRPORT

PROJECT NO: **1620 - DA4**

SCALE: AS NOTED @ A1

DATE: AUG 2018

DWG NO: DA4

REVISION NO: C

DRAWN BY: **SB/CN**

NOEL THOMSON ARCHITECTURE PTY LTD
20 CHURCHILL AVE WAGGA WAGGA
T: 69263320 F: 69266011

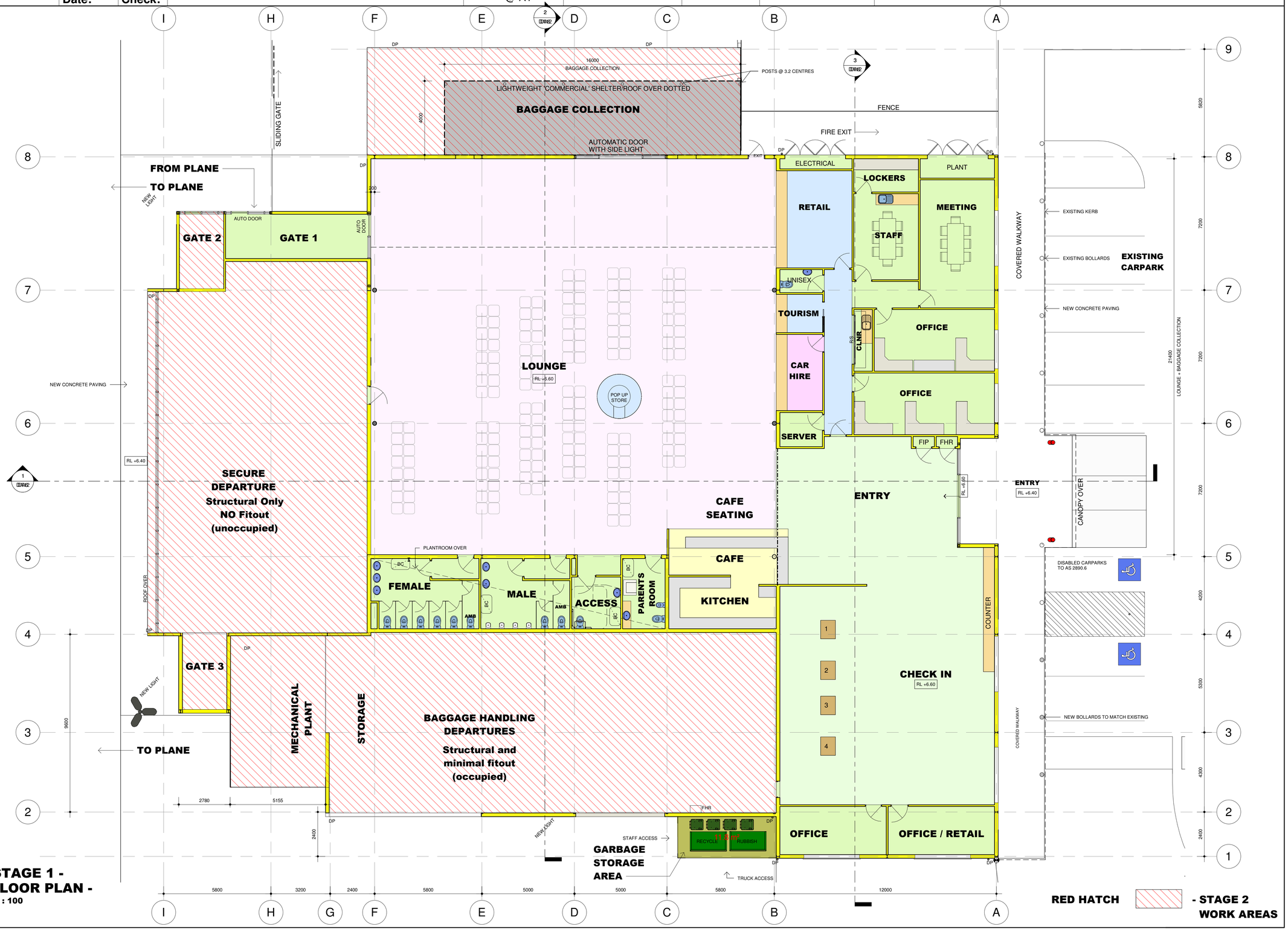
NOMINATED ARCHITECT
NOEL THOMSON 5869
ACN: 077 973 623
ABN: 82 077 973 623

AREA SCHEDULE STAGE 1

NAME	AREA
ENTRY	70.1m²
LOUNGE	358.6m²
CHECK IN	148m²
BAGGAGE COLLECTION	107.4m²
ADMINISTRATION / OFFICES	142.6m²
BAGGAGE HANDLING - ARRIVALS	64m²
CAFE	34.7m²
AMENITIES	64.4m²
GATE 1	19.3m²
CAR HIRE	10.3m²
RETAIL	59.4m²
TOTAL FLOOR AREA	**1126.2m²**

AREA SCHEDULE STAGE 2

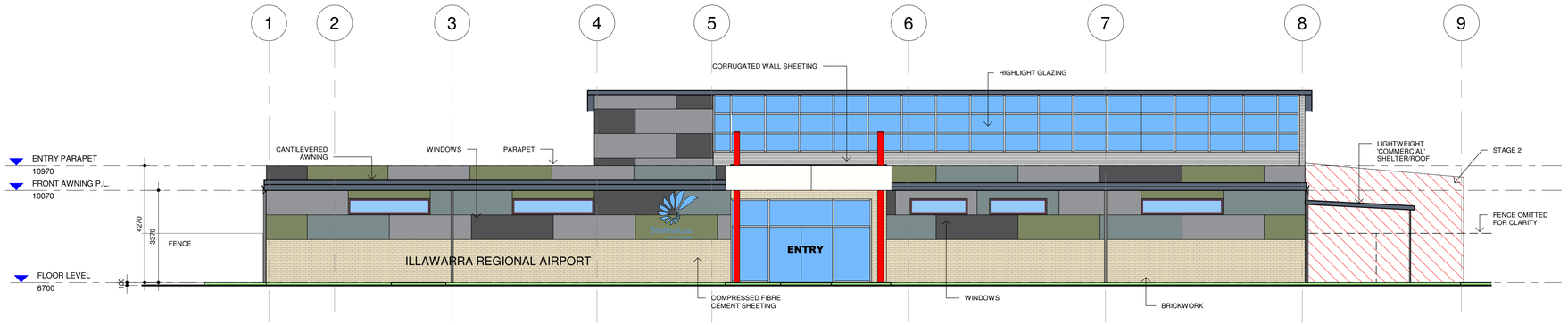
NAME	AREA
SECURE DEPARTURE	224.1m²
BAGGAGE HANDLING - DEPARTURES	238.4m²
BAGGAGE HANDLING - ARRIVALS	114m²
GATE 2	10m²
GATE 3	10m²
TOTAL FLOOR AREA STAGE 2	**482.5m²**
TOTAL FLOOR AREA STAGE 1&2	**1608.7m²**



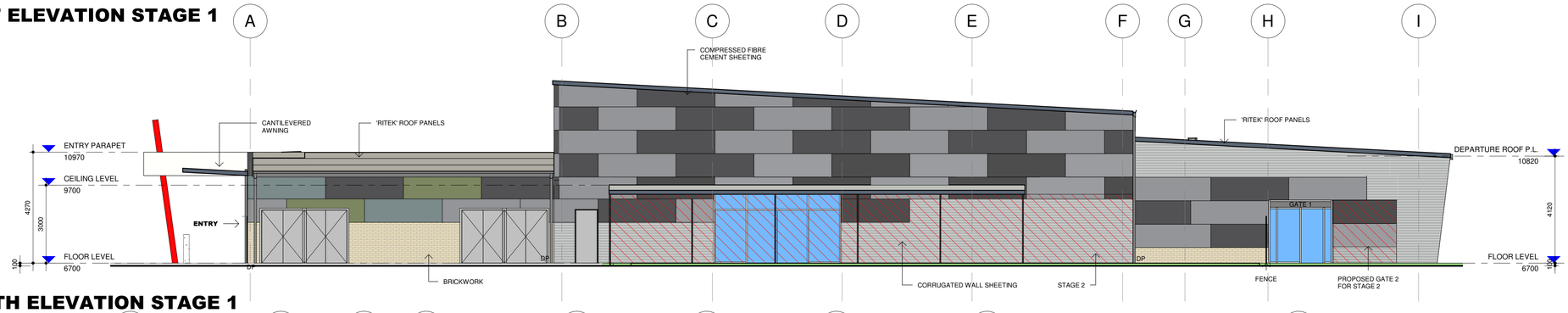
STAGE 1 - FLOOR PLAN -
1 : 100

RED HATCH - STAGE 2 WORK AREAS

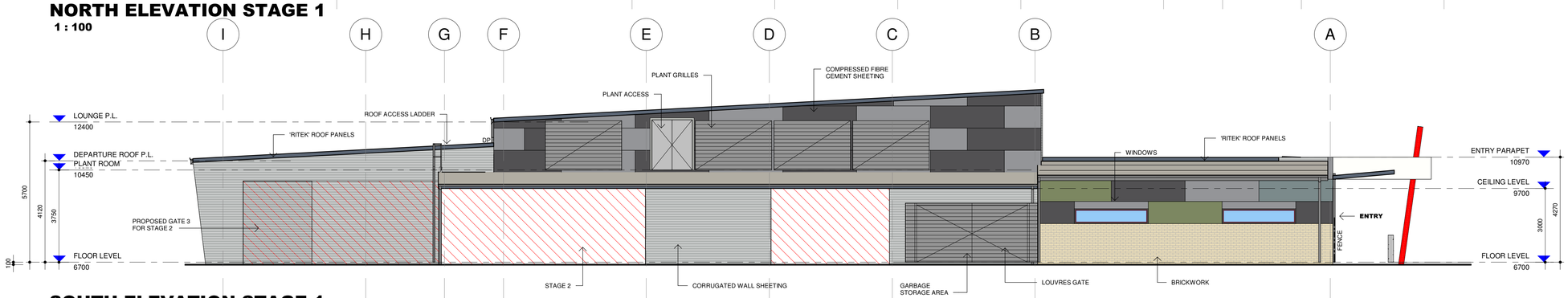
			CLIENT: SHELLHARBOUR CITY COUNCIL	ARCHITECT: Noel Thomson Architecture Pty Ltd.		PROJECT NO:		NOEL THOMSON ARCHITECTURE PTY LTD 20 CHURCHILL AVE WAGGA WAGGA T: 69263320 F: 69266011 NOMINATED ARCHITECT NOEL THOMSON 5869 ACN: 077 973 623 ABN: 82 077 973 623	
				PROJECT TITLE: ILLAWARRA REGIONAL AIRPORT		1620 - DA5			
C: STAGING ADDED	31.08.2018	NT	PROPERTY ADDRESS: AIRPORT RD						
B: DEVELOPMENT APPLICATION SUBMISSION	28.06.2018	NT		SCALE: AS NOTED @ A1	DATE: AUG 2018	DWG NO: DA5	REVISION NO: C	DRAWN BY: SB/CN	
A: DEVELOPMENT APPLICATION SUBMISSION	19.12.2017	NT	TOWN: ALBION PARK RAIL NSW 2527						
Revision Notes:	**Date:**	**Check:**							



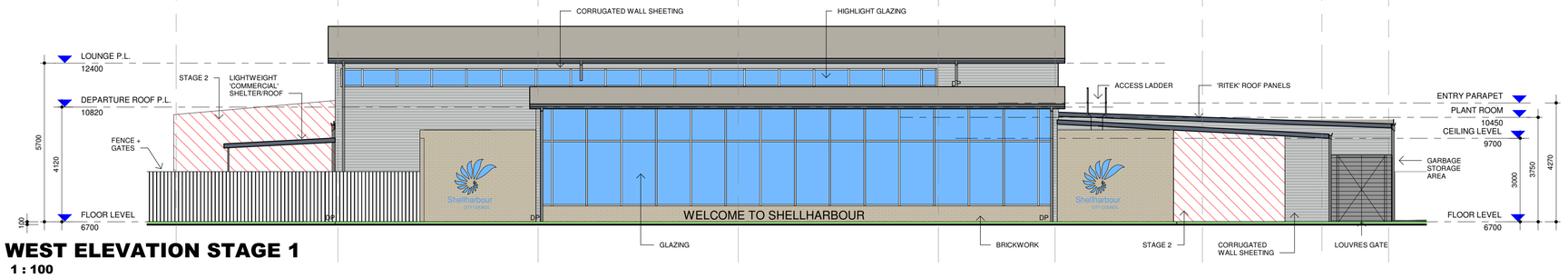
EAST ELEVATION STAGE 1
1 : 100



NORTH ELEVATION STAGE 1
1 : 100



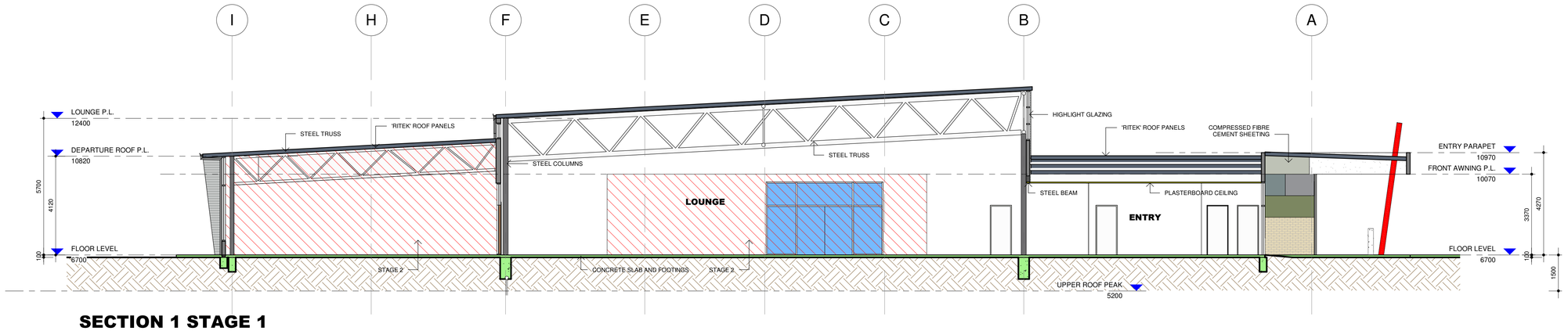
SOUTH ELEVATION STAGE 1
1 : 100



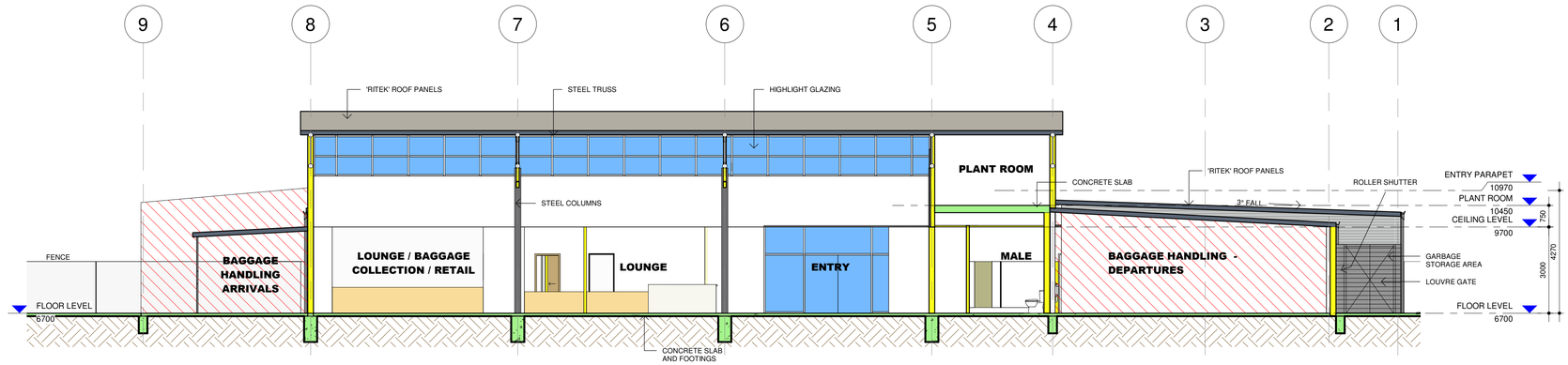
WEST ELEVATION STAGE 1
1 : 100

RED - **STAGE 2 WORK AREAS**

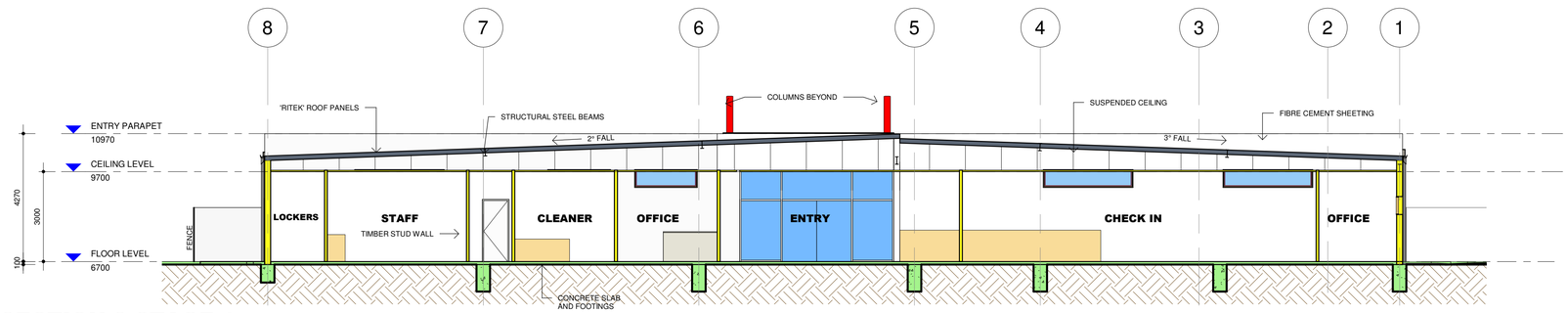
			CLIENT: SHELLHARBOUR CITY COUNCIL	ARCHITECT: Noel Thomson Architecture Pty Ltd.			PROJECT NO: **1620 - DA6**		**NOEL THOMSON ARCHITECTURE PTY LTD** 20 CHURCHILL AVE WAGGA WAGGA T: 69263320 F: 69266011 NOMINATED ARCHITECT NOEL THOMSON 5869 ACN: 077 973 623 ABN: 82 077 973 623
				PROJECT TITLE: ILLAWARRA REGIONAL AIRPORT					
C: STAGING ADDED	31.08.2018	NT	PROPERTY ADDRESS: AIRPORT RD						
B: DEVELOPMENT APPLICATION SUBMISSION	28.06.2018	NT							
A: DEVELOPMENT APPLICATION SUBMISSION	19.12.2017	NT	TOWN: ALBION PARK RAIL NSW 2527	SCALE: AS NOTED @ A1	DATE: AUG 2018	DWG NO: DA6	REVISION NO: C	DRAWN BY: **SB/CN**	
Revision Notes:	**Date:**	**Check:**							



SECTION 1 STAGE 1
1 : 100



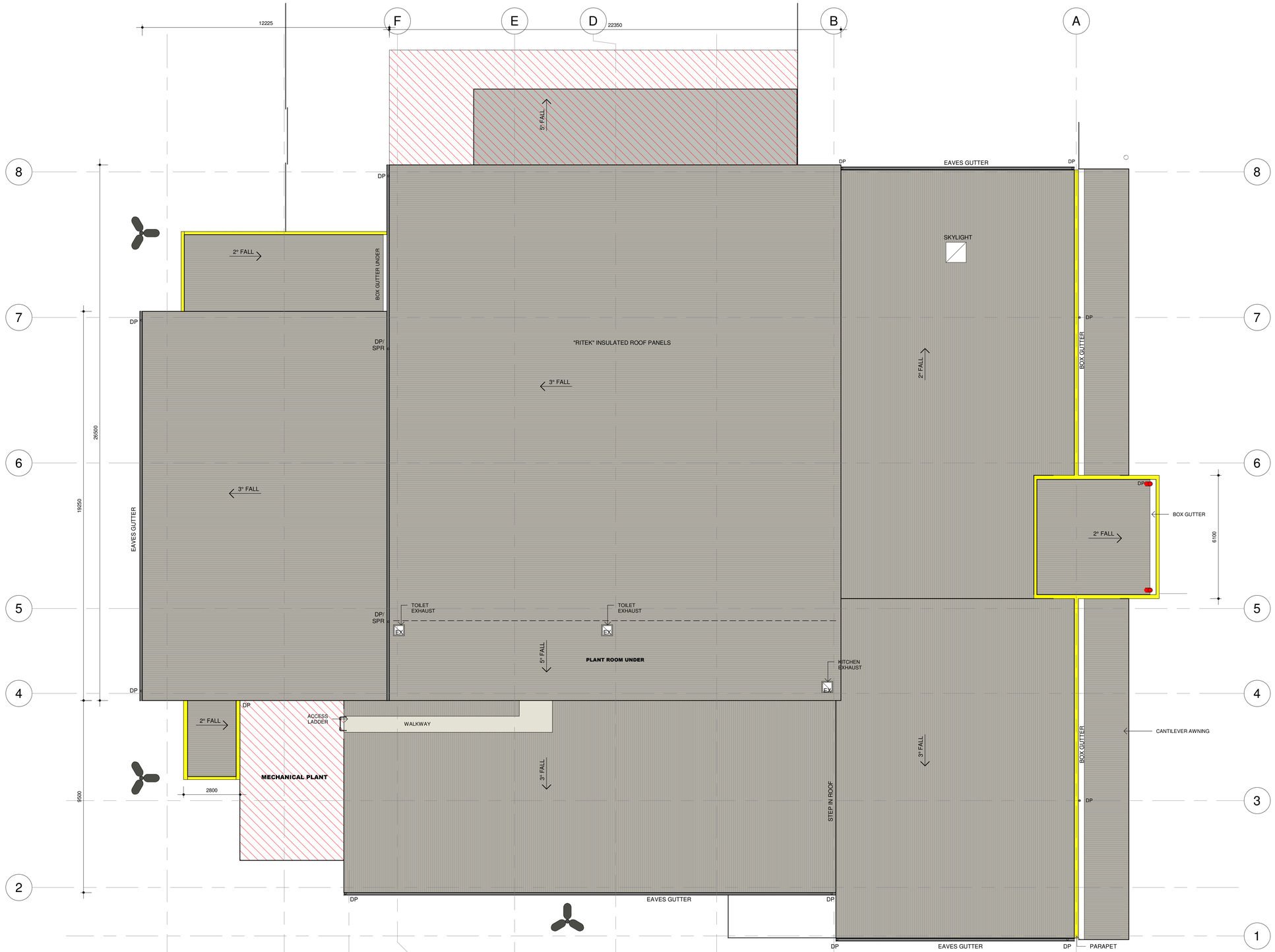
SECTION 2 STAGE 1
1 : 100



SECTION 3 STAGE 1
1 : 100

RED - **STAGE 2 WORK AREAS**

			CLIENT: SHELLHARBOUR CITY COUNCIL	ARCHITECT: Noel Thomson Architecture Pty Ltd.		PROJECT NO: 1620 - DA7		NOEL THOMSON ARCHITECTURE PTY LTD 20 CHURCHILL AVE WAGGA WAGGA T: 69263320 F: 69266011 NOMINATED ARCHITECT NOEL THOMSON 5869 ACN: 077 973 623 ABN: 82 077 973 623	
				PROJECT TITLE: ILLAWARRA REGIONAL AIRPORT					
C: STAGING ADDED	31.08.2018	NT	PROPERTY ADDRESS: AIRPORT RD						
B: DEVELOPMENT APPLICATION SUBMISSION	28.06.2018	NT		SCALE: AS NOTED @ A1	DATE: AUG 2018	DWG NO: DA7	REVISION NO: C	DRAWN BY: SB/CN	
A: DEVELOPMENT APPLICATION SUBMISSION	19.12.2017	NT	TOWN: ALBION PARK RAIL NSW 2527						
Revision Notes:	**Date:**	**Check:**							



ROOF PLAN STAGE 1
1 : 100

RED - **STAGE 2 WORK AREAS**

			CLIENT: SHELLHARBOUR CITY COUNCIL	ARCHITECT: Noel Thomson Architecture Pty Ltd.		PROJECT NO: 1620 - DA8		NOEL THOMSON ARCHITECTURE PTY LTD 20 CHURCHILL AVE WAGGA WAGGA T: 69263320 F: 69266011 NOMINATED ARCHITECT NOEL THOMSON 5869 ACN: 077 973 623 ABN: 82 077 973 623	
				PROJECT TITLE: ILLAWARRA REGIONAL AIRPORT					
C: UPGRADE AS INDICATED	29.03.2019	NT	PROPERTY ADDRESS: AIRPORT RD						
B: DEVELOPMENT APPLICATION SUBMISSION	28.06.2018	NT							
A: DEVELOPMENT APPLICATION SUBMISSION	19.12.2017	NT	TOWN: ALBION PARK RAIL 2527	SCALE: AS NOTED @ A1	DATE: AUG 2018	DWG NO: DA8	REVISION NO: C	DRAWN BY: SB/CN	
Revision Notes:	**Date:**	**Check:**							

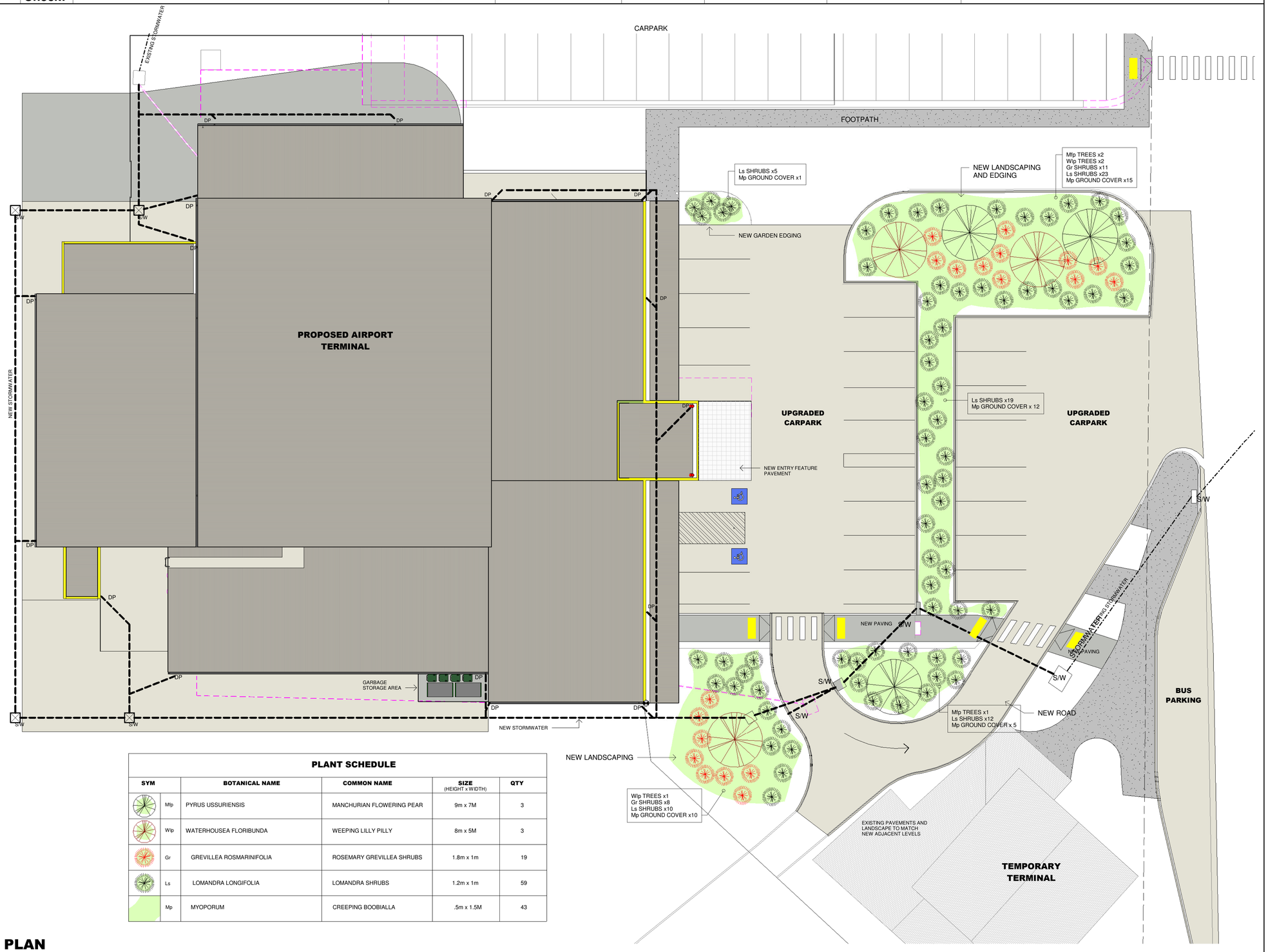
MANCHURIAN FLOWERING PEAR
(PYRUS USSURIENSIS)

WEEPING LILLY PILLY
(WATERHOUSEA FLORIBUNDA)

LOMANDRA SHRUBS
(LOMANDRA LONGIFOLIA)

ROSEMARY GREVILLEA SHRUBS
(GREVILLEA ROSMARINIFOLIA)

CREEPING BOOBIALLA
(MYOPORUM)



PLANT SCHEDULE

SYM		BOTANICAL NAME	COMMON NAME	SIZE (HEIGHT x WIDTH)	QTY
	Mfp	PYRUS USSURIENSIS	MANCHURIAN FLOWERING PEAR	9m x 7M	3
	Wlp	WATERHOUSEA FLORIBUNDA	WEEPING LILLY PILLY	8m x 5M	3
	Gr	GREVILLEA ROSMARINIFOLIA	ROSEMARY GREVILLEA SHRUBS	1.8m x 1m	19
	Ls	LOMANDRA LONGIFOLIA	LOMANDRA SHRUBS	1.2m x 1m	59
	Mp	MYOPORUM	CREEPING BOOBIALLA	.5m x 1.5M	43

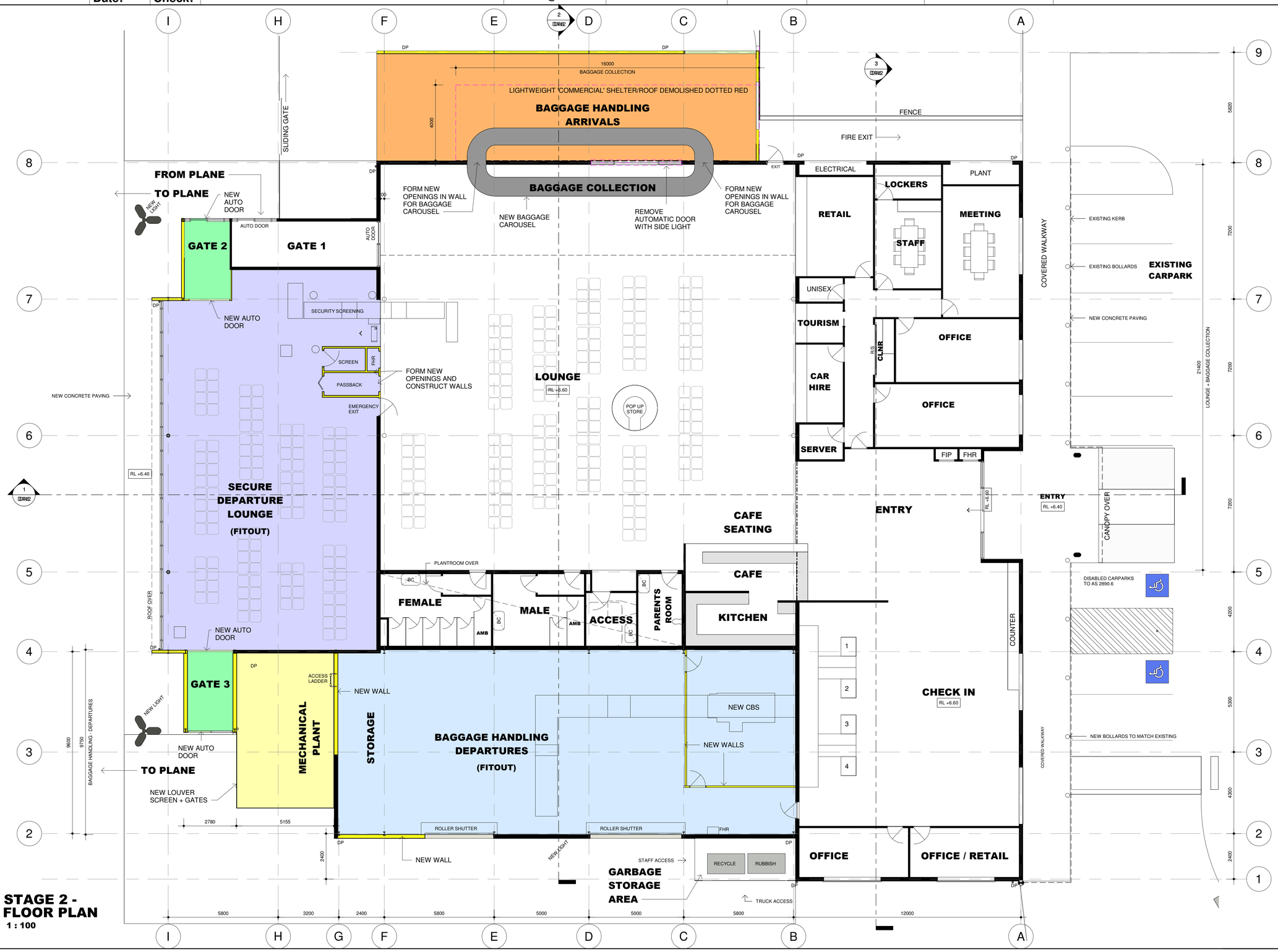
LANDSCAPE AND STORMWATER PLAN

1 : 150

			CLIENT: SHELLHARBOUR CITY COUNCIL	ARCHITECT: Noel Thomson Architecture Pty Ltd.		PROJECT NO: 1620 - DA10		NOEL THOMSON ARCHITECTURE PTY LTD 20 CHURCHILL AVE WAGGA WAGGA T: 69263320 F: 69266011 NOMINATED ARCHITECT NOEL THOMSON 5869 ACN: 077 973 623 ABN: 82 077 973 623	
			PROPERTY ADDRESS: AIRPORT RD	PROJECT TITLE: ILLAWARRA REGIONAL AIRPORT					
C: STAGING ADDED	31.08.2018	NT	TOWN: ALBION PARK RAIL NSW 2527	SCALE: AS NOTED @ A1	DATE: AUG 2018	DWG NO: DA10	REVISION NO: C	DRAWN BY: CN	
Revision Notes:	**Date:**	**Check:**							

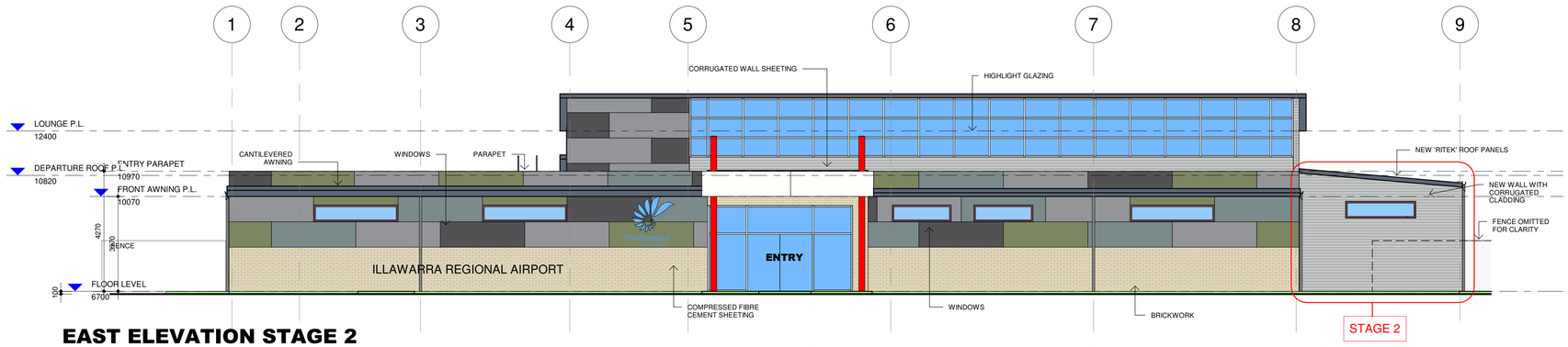
AREA SCHEDULE STAGE 2

NAME	AREA
SECURE DEPATUTURE	224.1m²
BAGGAGE HANDLING - DEPARTURES	238.4m²
BAGGAGE HANDLING - ARRIVALS	114m²
GATE 2	10m²
GATE 3	10m²
TOTAL FLOOR AREA	**482.5m²**

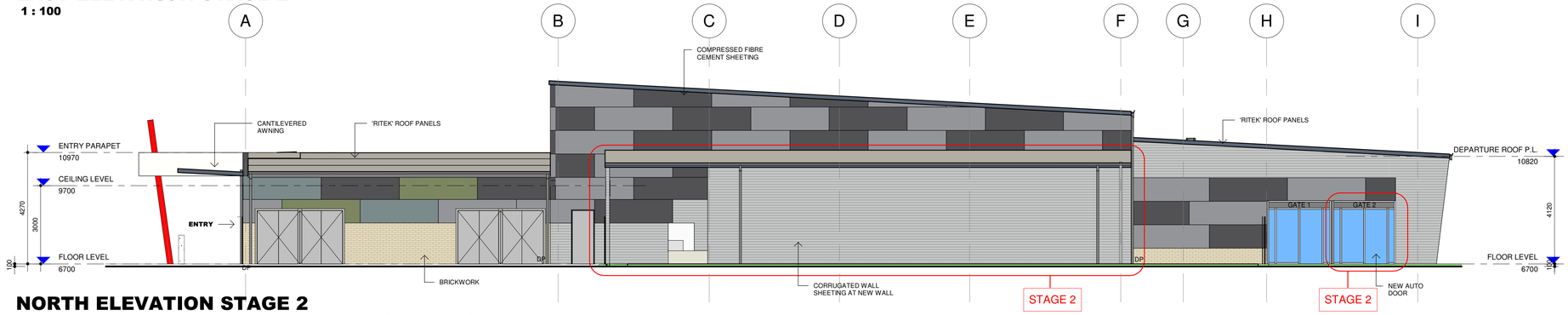


STAGE 2 - FLOOR PLAN
1 : 100

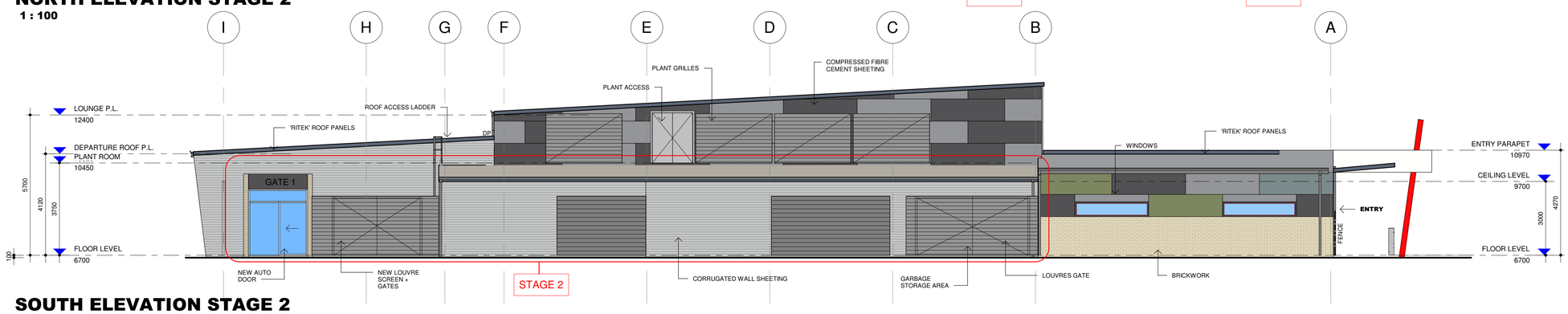
			CLIENT: SHELLHARBOUR CITY COUNCIL	ARCHITECT: Noel Thomson Architecture Pty Ltd.		PROJECT NO: **1620 - DA11**		**NOEL THOMSON ARCHITECTURE PTY LTD** 20 CHURCHILL AVE WAGGA WAGGA T: 69263320 F: 69266011 NOMINATED ARCHITECT NOEL THOMSON 5869 ACN: 077 973 623 ABN: 82 077 973 623	
			PROPERTY ADDRESS: AIRPORT RD	PROJECT TITLE: ILLAWARRA REGIONAL AIRPORT					
C: STAGING ADDED	31.08.2018	NT	TOWN: ALBION PARK RAIL NSW 2527	SCALE: AS NOTED @ A1	DATE: AUG 2018	DWG NO: DA11	REVISION NO: C	DRAWN BY: **CN**	
Revision Notes:	**Date:**	**Check:**							



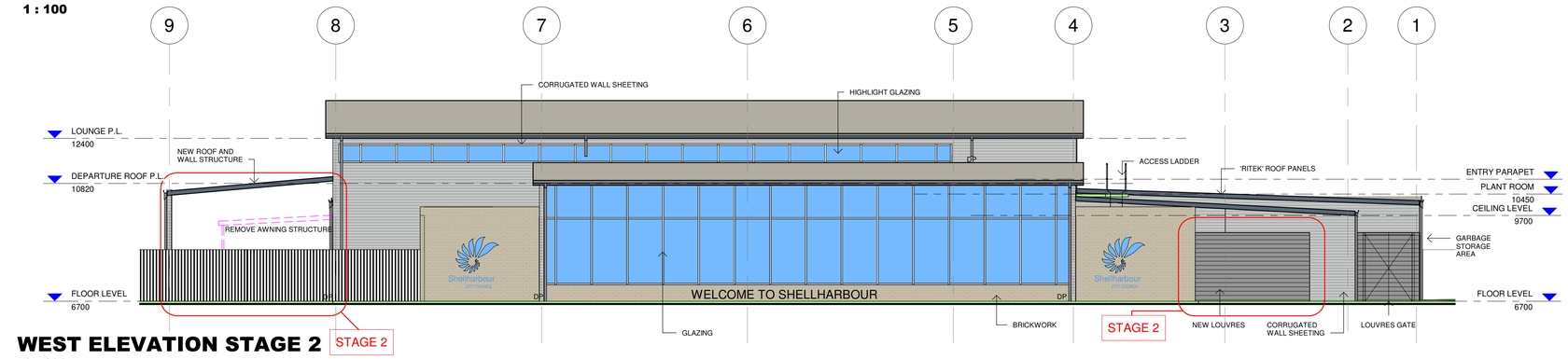
EAST ELEVATION STAGE 2
1 : 100



NORTH ELEVATION STAGE 2
1 : 100

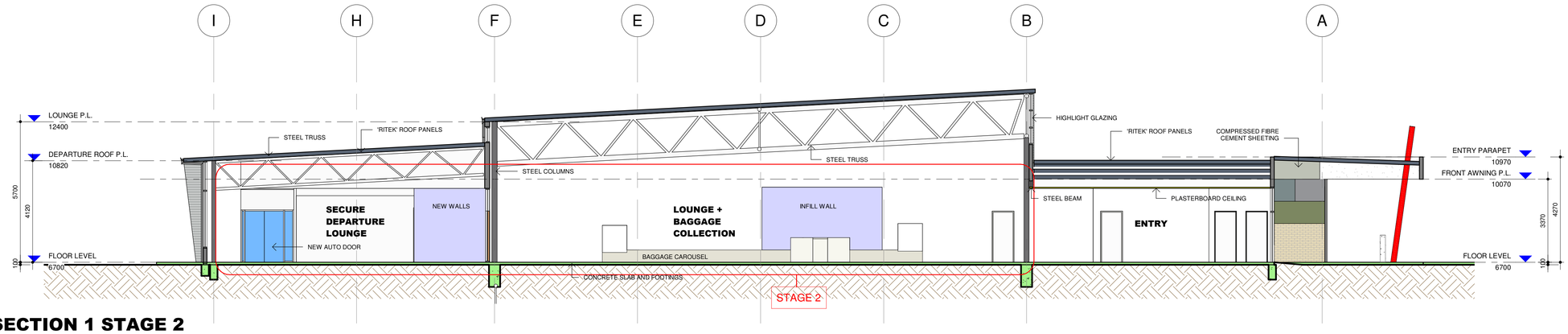


SOUTH ELEVATION STAGE 2
1 : 100

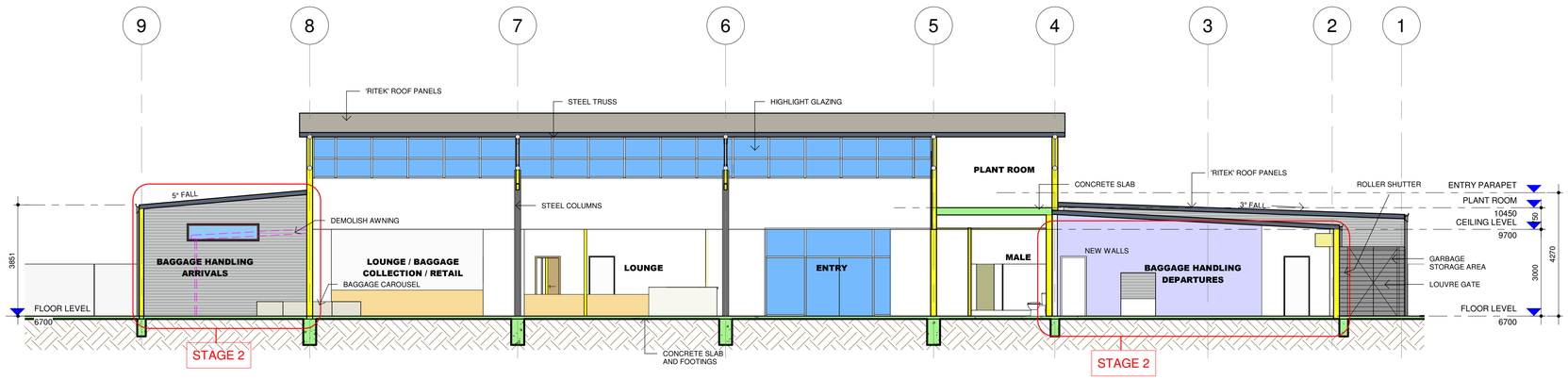


WEST ELEVATION STAGE 2
1 : 100

			CLIENT: SHELLHARBOUR CITY COUNCIL	ARCHITECT: Noel Thomson Architecture Pty Ltd.			PROJECT NO: 1620 - DA12		NOEL THOMSON ARCHITECTURE PTY LTD 20 CHURCHILL AVE WAGGA WAGGA T: 69263320 F: 69266011 NOMINATED ARCHITECT NOEL THOMSON 5869 ACN: 077 973 623 ABN: 82 077 973 623
			PROPERTY ADDRESS: AIRPORT RD	PROJECT TITLE: ILLAWARRA REGIONAL AIRPORT					
C: STAGING ADDED	31.08.2018	NT	TOWN: ALBION PARK RAIL NSW 2527	SCALE: AS NOTED @ A1	DATE: AUG 2018	DWG NO: DA12	REVISION NO: C	DRAWN BY: CN	
Revision Notes:	**Date:**	**Check:**							



SECTION 1 STAGE 2
1 : 100



SECTION 2 STAGE 2
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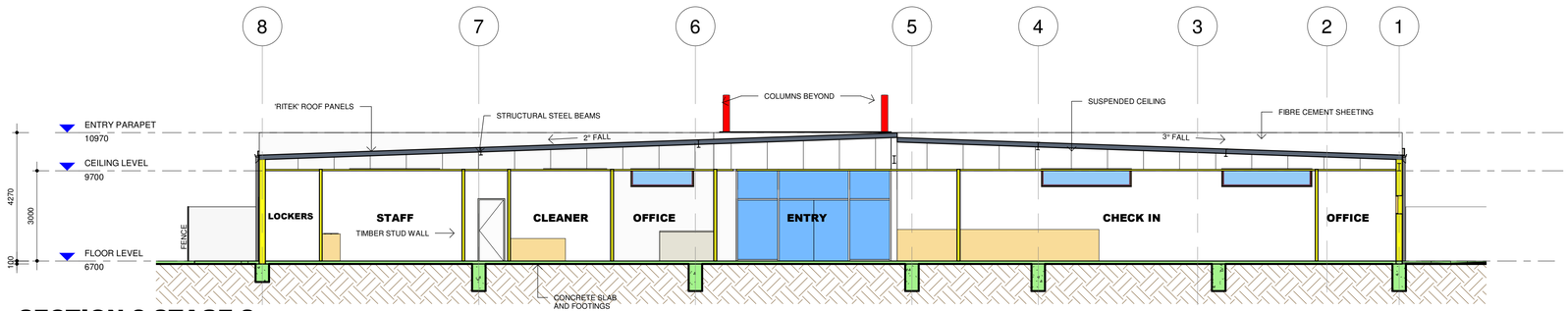

SECTION 3 STAGE 2
1 : 100

COLOUR & FINISHES SCHEDULE – ILLAWARRA REGIONAL AIRPORT DEC 2017

No.	COMPONENT / ITEM	FINISH / TYPE	FINISH / COLOUR
EXTERNAL AREAS / FACADES			
P-01	Paths	Concrete	Grey
BK-01	Walls (Brick Base)	Brickwork / "PGH"	'Morada' / Ceniza
WC-01	Panel Wall (colour 1)	Fibre Cement / "CEMINTEL"	'Leather' / Black
WC-02	Panel Wall (colour 2)	Fibre Cement / "CEMINTEL"	'Leather' / Blue
WC-03	Panel Wall (colour 3)	Fibre Cement / "CEMINTEL"	'Leather' / Green
WC-04	Panel Wall (colour 4)	Fibre Cement / "CEMINTEL"	'Leather' / Grey
WC-05	Canopy	Composite panel / "ALUCOBOND"	White
WC-06	Corrugated Cladding	Colorbond / "STRAMIT"	Windspray
W-01	Windows / Sidelights	Aluminium / Powdercoated	Anodic Natural
AD-01	Automatic Doors	Aluminium / Powdercoated	Anodic Natural
GL-01	Glazing - Facade	Double Glazed / "VIRIDIAN"	Neutral
GL-02	Glazing	Energy Glass / "VIRIDIAN"	Green
D-01	Door Frames	Steel / Paint	Basalt
D-02	Doors	Timber / Colorbond	Basalt
D-03	Roller Door/Shutters	Steel / Colorbond	Basalt
LS-01	Louvre Screens	Aluminium / Powdercoated	Basalt
P-01	Awning Post	Metal / Powdercoated	Lobster
CA-01	Cantilever Awning	Steel / Powdercoated	Basalt
F-01	Fence & Gates	Metal / Colorbond	Basalt
R-01	Roof , Cappings, etc	Colorbond / "STRAMIT"	Windspray
RP-01	Downpipes	Colorbond / "STRAMIT"	Windspray

NOEL THOMSON RAIA
Noel Thomson Architecture Pty Ltd
IllawarraRegionalAirport_colour&finishesschedule

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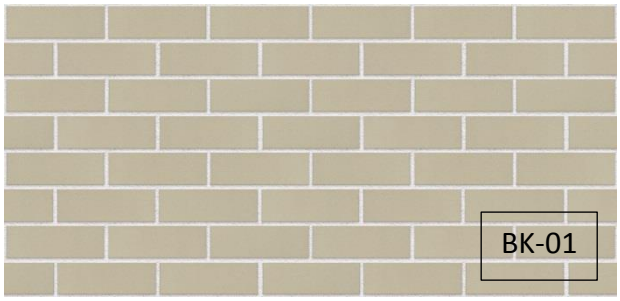
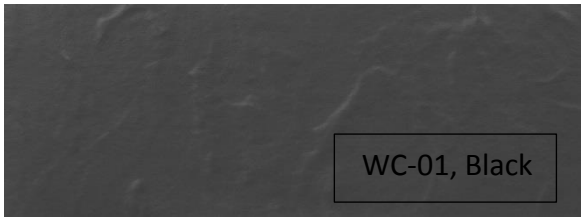
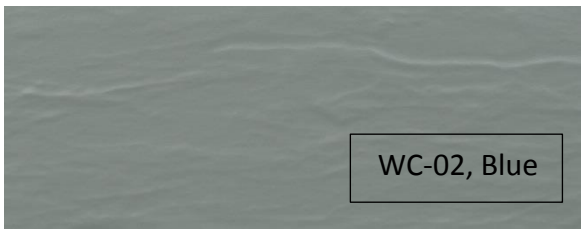
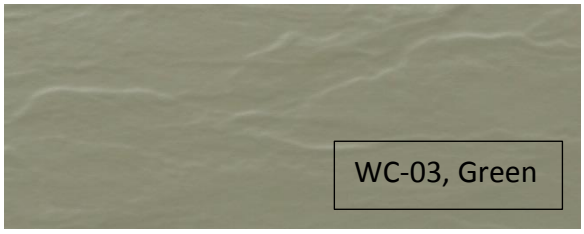


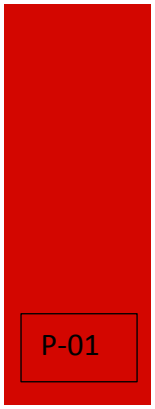
Brickwork

Wall Cladding - example





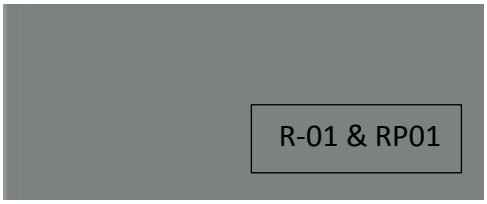




Canopy Posts & Cladding

Corrugated Wall Cladding Example

Corrugated Roofing Example



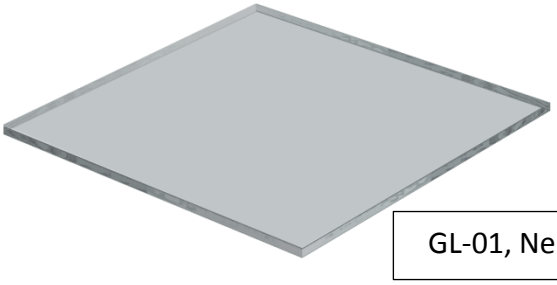
Louvre Screen & Door Example

D-01, D-02, LS-01

Roller Shutter Example

D-03, CA-01, F-01

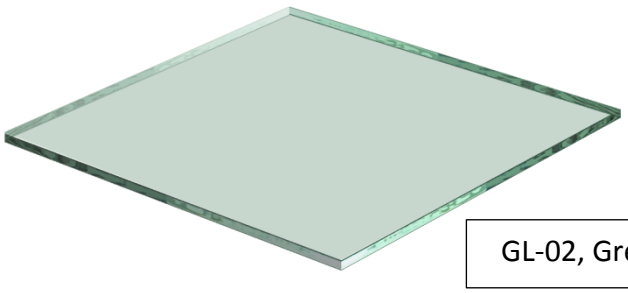
Automatic Door Example



GL-01, Neutral

AD-01, W-01

Window Example



GL-02, Green

Attachment 3 State Environmental Planning Policy 64 - Schedule 1 Assessment Criteria	
Character of the area	**Comments**
Is the proposal compatible with the existing or desired future character of the area or locality in which it is proposed to be located?	The proposed signage is simple and clear. It is compatible with the character of the airport.
Is the proposal consistent with a particular theme for outdoor advertising in the area or locality?	The proposed signage is consistent with other signage within the locality. Complies
Special Areas	
Does the proposal detract from the amenity or visual quality of any environmentally sensitive areas, heritage areas, natural or other conservation areas, open space areas, waterways, rural landscapes or residential areas?	The proposed signage will be wall mounted and will appear as a component of the building. It will not detract from the amenity of the adjoining airport. Complies
Views and Vistas	
Does the proposal obscure or compromise important views?	No. The signage will form part of the proposed building and will not compromise views. Complies
Does the proposal dominate the skyline and reduce the quality of vistas?	No. The signage will be in keeping with the scale of the elevation within which it is to be mounted and will not dominate the skyline or obstruct or compromise any views.
Does the proposal respect the viewing rights of other advertisers?	Yes – The signage will relate to the use of the building within which it is located on and will not obstruct or compromise any other advertising signs.
Streetscape, setting or landscape	
Is the scale, proportion and form of the proposal appropriate for the streetscape, setting or landscape?	Yes. The signage will be of suitable scale in relation to the elevations which it is to be located. The signage is not overly prominent or obtrusive whilst still being clear and informative. Complies

Attachment 3 State Environmental Planning Policy 64 - Schedule 1 Assessment Criteria	
Character of the area	**Comments**
Does the proposal contribute to the visual interest of the streetscape, setting or landscape?	The signage will be used to identify the terminal building. The design and layout of the signs is considered to contribute to the visual interest of the airport. Complies
Does the proposal reduce clutter by rationalising and simplifying existing advertising?	No. There is no existing advertising.
Does the proposal screen unsightliness?	Not applicable.
Does the proposal protrude above buildings, structures or tree canopies in the area or locality?	No. The signage will be wall mounted to the side of the building. The proposed signage will not protrude above the building. Complies.
Does the proposal require ongoing vegetation management?	No.
Site and building	
Is the proposal compatible with the scale, proportion and other characteristics of the site or building, or both, on which the proposed signage is to be located?	Yes. The simple design and proportions of the signage will compliment the style and design of the building which they are mounted upon. The signage will be mounted next to the entrances to the building. The signs are suitably proportioned in relation to the elevation within which they are located. Complies.
Does the proposal respect important features of the site or building, or both?	The signage will be mounted next to the entrances to the building. Complies
Does the proposal show innovation and imagination in its relationship to the site or building, or both?	Yes. The proposal provides clear signage for customers and highlights the location of the facility. The signage will not detract from the design and character of the proposed terminal building.

Attachment 3 State Environmental Planning Policy 64 - Schedule 1 Assessment Criteria	
Character of the area	**Comments**
Associated devices and logos with advertisements and advertising structures	
Have any safety devices, platforms, lighting devices or logos been designed as an integral part of the signage or structure on which it is to be displayed?	The signage will not be internally illuminated. No external lighting devices, platforms etc proposed as part of the signage.
Illumination	
Would illumination result in unacceptable glare?	Signage will not be illuminated.
Would illumination affect safety for pedestrians, vehicles or aircraft?	Signage will not be illuminated.
Would illumination detract from the amenity of any residence or other form of accommodation?	Signage will not be illuminated.
Can the intensity of the illumination be adjusted, if necessary?	Not applicable.
Is the illumination subject to a curfew?	Not applicable.
Would the proposal reduce the safety for any public road?	No.
Would the proposal reduce the safety for pedestrians or bicyclists?	No. The proposed signage is wall mounted and will not protrude onto the pedestrian route adjacent to the site.The signage is of suitable scale that it will not dominate the area where it is to be located and is not considered to reduce the safety for pedestrians or cyclists.
Would the proposal reduce the safety for pedestrians, particularly children, by obscuring sightlines from public areas?	No. The signage proposed is to be wall mounted and will not obscure sightlines from public areas.

Shellharbour Development Control Plan Compliance Table		
DCP Provision	**Proposal**	**Compliance**
Chapter 10 Advertising and Signage		
Objectives 1. To ensure that signage: a. is compatible with the desired amenity and visual character of a locality b. provides effective communication in suitable locations c. does not threaten the safety of pedestrians or traffic d. is of high quality design and finish which achieves a high level of design quality in terms of its relationship to the architectural design of the buildings and streetscape character of a particular locality e. is in proportion with and does not dominate the host building regarding its size and location. 2. To reduce the proliferation of advertising signs and structures through the rationalisation of advertising signs by the use of common directory pylon signs for multi-occupancy developments and by limiting the number of signs that may be erected on any one building or site. 3. To ensure that advertising signs do not affect the amenity of any surrounding residential locality from light spillage impacts associated with illuminated signs. 4. To ensure that the use of corporate logos, colour and illumination schemes are	• Three Shellharbour City Council shell emblems are proposed. One on the front (eastern) elevation of the terminal fronting the short term car park and two on the airside (western) elevation of the terminal fronting the runway. Each shell will have Shellharbour City Council written underneath. The dimensions of each sign including the writing will be approximately 1.8 metres by 1.7 metres. • One written sign is proposed on the front (eastern) elevation dimensions approximately 6.7 metres wide by 0.3 metres high. • One written sign is proposed on the airside (western) elevation. Dimensions approximately 6.4 metres wide by 0.3 metres high.	The proposed signage will comply with the objectives of the chapter in that it is compatible with the desired amenity and visual character of the locality, provides effective communication in suitable locations and does not threaten the safety of pedestrians or traffic. The signage is considered to be in proportion to the building which it is to be located upon and will be of sufficient high quality design. The signage proposed will not have a significant impact on the amenity of the surrounding future residential locality. The signage is considered to allow equal advertising rights as it is wholly within the building footprint.

Shellharbour Development Control Plan Compliance Table		
DCP Provision	**Proposal**	**Compliance**
compatible with the architectural style of the host building and does not cause any significant adverse visual impact upon the surrounding streetscape character of the locality. 5. To ensure signage allows equal advertising rights.		
Chapter 13 – Parking, Traffic and Transport		
Objectives 1. On-site parking facilities, loading and unloading areas and manoeuvring areas for all vehicles likely to access the development must meet user requirements and allow the development to satisfactorily function within the site without adversely affecting surrounding land uses. 2. Vehicular movements to and from the site must not adversely impact on the safety or operations of the road system. 3. On-site parking facilities must be designed to be easily accessible and to minimize risk of crime to property and persons while ensuring the parking facilities integrate with the aesthetics and amenity of the locality. 4. Pedestrian and cyclist access to and within the site must be designed to be convenient, accessible and safe.		

Shellharbour Development Control Plan Compliance Table		
DCP Provision	**Proposal**	**Compliance**
13.1.3 An airport passenger terminal is not included in the minimum parking requirement table included in this chapter of the DCP.	The application has been accompanied by a Traffic and Parking Assessment (GHD, Shellharbour City Council Illawarra Regional Airport Passenger Terminal DA, Traffic and Parking Assessment) dated September 2018. The recommendations of this assessment are: ***Construction and Operation Traffic*** *The permanent terminal building will be separated into two stages. This is likely to have a reduction in the daily constructional vehicles that will arrive on site, however the project duration will be extended. Given the low construction traffic expected to be generated, the impact is expected to be negligible on the surrounding road network. In terms of operational traffic, the number of trips generated by the airport during each stage is not expected to change.* ***Road Network Performance*** *Given that a significant investment has been committed to reducing traffic volumes on the Princes Highway at this location, no significant road improvements are recommended based on the relatively low traffic volumes generated by the Illawarra Airport during peak times.* ***Parking*** *A high-level parking estimate was carried out on previous flight schedules to Illawarra Airport. Based on these estimates, it was*	The proposed development includes three separate car parks, providing a total of 203 parking spaces, including 5 accessible spaces. These carparks are broken down as shown in **figure 4** of the report. - Car Park A (drop off/pick up, directly adjacent to the entrance to building) – 24 spaces (including two accessible). - Car Park B (short/medium term, adjoining terminal building) – 43 spaces. - Car Park C (long term, located to the north along Airport Road, approximately 130 metres from terminal building, footpaths and pedestrian crossings proposed facilitating pedestrian access from this car park) – 136 spaces (including 3 accessible spaces). The number, dimensions and layout of the parking provided as part of this development is considered acceptable for the scale of operation at the terminal (including futureproofing for additional flights and/or routes when applicable).

Shellharbour Development Control Plan Compliance Table		
DCP Provision	**Proposal**	**Compliance**
	shown that the capacity of the proposed short and long-term parking is likely to be acceptable given the conservative assumptions made to determine parking requirement.	
13.2.1 Car Parking Dimensions and grades The minimum dimensions for car parking spaces are as follows: 5.5m x 2.6 m - open car space 5.5 m x 2.9 m – car space abuts one wall. 6.1 m x 2.5 m – parallel spaces	As shown on the proposed site plan and long term parking drainage plan.	Each car parking space complies with the required minimum dimensions for each type of space proposed.
13.2.2 The maximum allowable longitudinal grade and cross fall for an open car parking space is 5% and 6.25% respectively. A longitudinal grade and cross fall of 3% is recommended for a car space for people with a disability.	Relatively flat site.	Proposed longitudinal grades proposed across all three car parks complies.
13.2.31 – Car park design and layout Vehicle parking must not have an adverse impact on the residents of adjoining sites in terms of noise, odour or run-off. Car parking areas: a. Must be screened from nearby sensitive receiving environments b. Stormwater from the car park must not flow directly into sensitive receiving environments.		Suitably conditioned with regards with regards to detailed drainage design information given shows that this can be achieved.

<table>
<tr><th colspan="3">Shellharbour Development Control Plan Compliance Table</th></tr>
<tr><th>DCP Provision</th><th>Proposal</th><th>Compliance</th></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>13.2.33
The design of parking areas must minimize the potential for vehicular/pedestrian conflict. Pedestrian pathways between the parking areas and the building access should be provided.</td><td>Pedestrian pathways provided for each car park.

Pedestrian Access Strategy submitted detailing how each car park will be linked to the proposed terminal building and how the passengers will access the airplanes from the terminal. Information included below.

<table><tr><th>Bay Number</th><th>Walking Distance</th></tr><tr><td>Bay 1</td><td>70m</td></tr><tr><td>Bay 2</td><td>50m</td></tr><tr><td>Bay 3</td><td>35m</td></tr></table>Table 1 Approximate walking distance from Gate 1 to Plane

<table><tr><th>Bay Number</th><th>Walking Distance</th></tr><tr><td>Bay 1</td><td>30m from gate 3</td></tr><tr><td>Bay 2</td><td>35m from gate 3</td></tr><tr><td>Bay 3</td><td>35m from gate 2</td></tr></table>Table 2 Approximate walking distance from Gate to Plane</td><td>Assessment of the pedestrian pathways provided show that compliance is achieved for Car park A and B, however the pedestrian pathways provided for long term car park (C) do not comply.

Suitable condition recommended to ensure that with AS2890.1 – 2004 requirements, as interpreted by Austroads Guide to Traffic Management Part 11 – Parking. More specifically, compliance should be assessed with respect to AGTM Part 11 sections including Parking Facility Layout (7.3), Parking Facility Access Design (7.4) and Pedestrian Treatments (7.5.2) to be deemed in accordance with AS2890.1 provisions.

The pedestrian access strategy is considered suitable for the intended numbers of passengers. The distances given between the airplanes and terminal are considered acceptable. The access is level and accessible to all.</td></tr>
<tr><td>13.2.34
Visitor/customer parking spaces must be located to be readily visible and accessible from the road frontage to encourage their use by their intended users and discourage on-street parking.</td><td>All parking proposed will be readily visible and accessible from the road frontage.</td><td>Complies</td></tr>
<tr><td>13.2.40
Access aisles adjacent to car parking areas must be 7 metres wide, however, Council</td><td>Aisle widths exceed 7 metres.</td><td>Suitable aisle widths provided for each car park to comply.</td></tr>
</table>

Shellharbour Development Control Plan Compliance Table		
DCP Provision	**Proposal**	**Compliance**
may allow a reduction in aisle widths down to 5.8 metres subject to car parking spaces being increased in width by 0.1 metres for every 0.4 metre reduction in aisle width below 7 metres.		
13.2.41 As a minimum standard for all new developments, waste collection trucks, delivery vehicles and large single unit trucks must be able to manoeuvre on-site so as to enter and exit the site in a forward direction. Swept paths must assume all parking spaces are filled.	Swept path analysis provided for a 12.5 metre heavy rigid vehicle.	Complies
13.2.43 Off-street loading and unloading facilities must be provided for commercial premises and industrial developments as required by Council. The size and number of loading bays provided will be determined by Council having regard to: a. Frequency of deliveries b. Size and bulk of the goods c. Size of the trucks d. Intended use of the premises Full details of the anticipated volume and frequency of deliveries must be submitted with the development application.	The café and retail areas proposed as part of the terminal are small and will not require frequent or large deliveries. The applicant has confirmed that deliveries will be carried out via the main entrance and will not be of a size or frequency that will impact passengers.	Complies
Chapter 15 Waste Minimisation and Management		

Shellharbour Development Control Plan Compliance Table		
DCP Provision	**Proposal**	**Compliance**
Objectives 1. To maximise reuse and recycling of demolition and construction materials and materials from subdivision. 2. To ensure storage and collection of waste is designed and managed having appropriate regard to space, location, amenity and ongoing management of waste management facilities. 3. To ensure waste management systems are compatible with collection services. 4. Ensure developments provide adequate space for kerbside collection services. 5. To minimise potential adverse impacts relating to the management of waste on the amenity of adjoining properties and within the development. 6. To minimise the amount waste being deposited in landfill. 7. To provide information to applicants on how to prepare a Waste Management Plan.		The proposed waste strategy report shows compliance with the chapter objectives.
15.1.1 A waste management plan is to be submitted with development applications for demolition, construction and operational works.		Complies
Commercial Developments and Change of Use		
15.1.7		(a) Waste storage room will have a floor area of approximately 12 sqm. This is considered a suitable size and layout for the proposed use.

Shellharbour Development Control Plan Compliance Table		
DCP Provision	**Proposal**	**Compliance**
In addition to submitting a WMP, development applications must show/demonstrate: (a) That the location of a designated waste/recycling storage area or room/s have been sized to meet the waste and recycling needs of all future tenants and designed so that the size and layout of the waste/recycling storage room/area is capable of accommodating reasonable future changes in use of the development. (b) That the waste/recycling storage room/area is able to accommodate bins that are of sufficient volume to contain the quantity of waste generated. (c) That separate containers for the separation of recyclable materials and general waste have been provided in the waste/recycling storage room/area. Standard and consistent signage on how to use the waste management facilities should be clearly displayed. (d) That there is safe and convenient access from each tenancy to the waste/recycling storage room(s) or area(s). There must be step-free access between the point at which		(b) The bins detailed in the Waste Strategy Report are considered to be of sufficient volume to contain the quantity of waste generated. (c) The provision of 1 x 3 cubic metre bin for general waste; 1 x 3 cubic metre bin for paper / Cardboard recycling; 1 x cubic metre bin for organic waste; complies. (d) The waste storage room will have step free access and is suitably sized for the proposed building. Complies. (e) The waste storage room will not be accessed by the public, the access will be externally with separate staff and vehicle access points provided. (f) Not applicable the proposed waste storage area will be sufficient for the commercial uses (café) included within the building. (g) Collection and emptying of waste will be done from the access door provided on the southern elevation. The vehicle access will be separate from the pedestrian access and entrance and will be sited away from the public parking areas. (h) The access path from the commercial uses (café) included within the terminal building does not include any steps or ramps. (i)The applicant has provided plans detailing that a 12.5 metre heavy ridged vehicle can access the site to collect waste. (i) Suitably complies (j) Suitably complies. (k) Suitably complies. (l) Suitably conditioned.

Shellharbour Development Control Plan Compliance Table		
DCP Provision	**Proposal**	**Compliance**
bins are collected/emptied and the waste/recycling storage room(s) or area(s). (e) That arrangements are in place so that the waste/recycling storage area is not accessible to the general public. (f) That depending upon the size and type of the development, whether it is necessary to include a separate waste/recycling storage room/area for each tenancy. (g) The identified collection point for the collection and emptying of waste, recycling and garden waste bins. (h) The path of travel including gradients for moving bins from the storage area to the identified collection point (if collection is to occur away from the storage area). (i) That where waste collection will occur onsite, access driveways and internal roads must be designed in accordance with Australian Standard 2890.2– 2002 Parking Facilities – Off-Street Commercial Vehicle Facilities. (j) That servicing arrangements for the emptying of bins is compatible with the operation of any other loading/unloading facilities onsite.		(m) Not applicable to this development.

Shellharbour Development Control Plan Compliance Table		
DCP Provision	**Proposal**	**Compliance**
(k) The location of temporary waste and recycling storage areas within each tenancy. These should be of sufficient size to store a minimum of a single day's waste. (l) That a waste/recycling cupboard has been provided for each and every kitchen area in a development. Each waste/recycling cupboard must be of sufficient size to hold a minimum of a single day's waste and to hold separate containers for general waste and recyclable materials. (m) Where waste containers are located in public places, they should be clearly visible and located in well-lit areas.		
Chapter 16 Access for people with a disability		
Objectives The guiding principles of the Premises Standards are the objects of the Disability Discrimination Act 1992 (DDA) which are: 1. to eliminate, as far as possible, discrimination against persons on the basis of their disabilities in various areas, and in particular access to premises, work, accommodation and the provision of facilities, services and land. 2. to ensure, as far as practicable, that persons with disabilities have the same	The proposed terminal building will be a single storey premises. The staff and public entrances will be step free.	Complies

Shellharbour Development Control Plan Compliance Table		
DCP Provision	**Proposal**	**Compliance**
rights to equality before the law as the rest of the community 3. to promote recognition and acceptance within the community of the principle that persons with disabilities have the same fundamental rights as the rest of the community.		
Chapter 17 – Crime Prevention Though Environmental Design (CPTED)		
Objectives To encourage the use of lighting to create safer places after dark. To ensure that plans for new or redeveloped public spaces consider areas that will be utilized at night. Facilitate casual surveillance, create pleasant environments. Reduce the opportunity for intruder access. Reduce the opportunity for graffiti and malicious damage. Reduce opportunities for unauthorised access. Ensure entrances are clearly visible and avoid confusion. Enhance natural surveillance within car parks.		Building - The proposed building utilises glass, increasing the passive surveillance between the street and the building. - The layout of the building will reduce the opportunities for unauthorised access. - The entrance to the building will be clearly visible and avoid confusion. Car parks - Suitable lighting has been proposed. - Grade of car parks will allow surveillance between the street and car park. - Landscaping proposed facilitates casual surveillance, create pleasant environments The proposed development has achieved the objectives of this chapter and has been designed to maximise natural surveillance from the street to the building, minimize graffiti opportunities, minimize the opportunities for intruders to hide.

Shellharbour Development Control Plan Compliance Table		
DCP Provision	**Proposal**	**Compliance**
		Design of building, car parking areas and landscaped areas suitably comply with this chapter.
Chapter 19 – Reflectivity		
Objective To avoid discomfort or hazard from excessive glare and/or heat. 19.1 Where the proposed development proposes large expanses of external glass, a reflectivity index of less than 10% must be achieved. Further it must be demonstrated that the glazing will not cause hazard or discomfort	The western elevation of the building includes a significant amount of external glass across the majority of the elevation from floor to ceiling. The eastern elevation includes a significant amount of glass on the upper sections of the elevation.	Suitable condition recommended to ensure compliance.
Chapter 20 - Landscaping		
20.1.1 A detailed landscape plan must accompany the development application for all types of development.	A concept landscape plan has been submitted as part of application.	The landscape plan generally complies with the requirements of the DCP as confirmed by the Council's Landscape Officer. Suitable condition recommended.
Chapter 22 – Contamination		
22.1 The potential for and possibility of contamination must be considered in the development process for all development.	A Detailed Site Investigation for Contaminated Land dated May 2019 has been prepared by Douglas Partners reference project 78505.04. This report was requested following the preliminary contamination assessment dated March 2019 reference Project 78505.03. The report dated May 2019 provides details on the potential contamination of the site and conclude that the terminal site is deemed to be compatible with proposed passenger terminal	Council is suitably satisfied that the site does not require remediation and the proposed use is suitable for the site. Suitable conditions recommended relating to construction measures to be implemented and un-expected finds protocol.

Shellharbour Development Control Plan Compliance Table		
DCP Provision	**Proposal**	**Compliance**
	development and has recommended that an unexpected finds protocol should be included as part of a Construction Environmental Management Plan.	
Chapter 24 – Floodplain Risk Management		
The site lies within the Macquarie Rivulet catchment area. Council flood engineers have provided comments on the proposed application and have recommended relevant conditions.		
Chapter 25 Stormwater management		
Objectives 1. To encourage consideration of Ecologically Sustainable Development and Catchment Management while providing requirements for water management when developing a site. 2. To provide requirements and advice to applicants in regard to stormwater management. 3. Maintain and improve water quality within Shellharbour City and to the receiving waters. 4. To ensure no increase (and where reasonable a reduction) in the frequency and adversity of flooding. 5. To ensure public health and safety is maintained. 6. To ensure development is designed having regard to existing or proposed drainage easements. 7. To ensure the structural integrity of existing and proposed structures is maintained.	Concept stormwater plan provided. The proposed development drains to a Council pit on Airport Road.	Council engineers have reviewed the submitted concept stormwater plan and have raised no objections. Suitable conditions recommended.

Shellharbour Development Control Plan Compliance Table		
DCP Provision	**Proposal**	**Compliance**
8. To ensure all development is adequately drained and minimises adverse impacts from surface and/or stormwater flows. 9. To encourage design that allows some on-site infiltration of water. 10. To ensure the risks of flooding are minimised for residential development.		
Chapter 26 – Bushfire Hazard		
The objectives of the bushfire hazard chapter are met by the development and referral advice has been received from the Rural Fire Service (RFS). The recommended conditions received from the RFS have been included as part of **attachment 1.**		
Chapter 28 – European Heritage The proposal is not considered to undermine the heritage conservation objectives of this clause as the proposed building and car parks are compatible with Heritage Item I338 and are unlikely to have a negative impact on the heritage significance of that item or any other Heritage Items in the surrounding locality. Un-expected finds protocol condition recommended in accordance with the advice received from Council Heritage Officer.		
Chapter 32 – Airport and Environs Development		
Objectives To protect the airport's operations To protect the community from airport impacts		The proposed development is required to facilitate the expansion and continued operation of the Illawarra Regional Airport. The proposed building has been designed to meet the current and projected future needs of passengers. The design and limited scale of the building respects the location of the airport, which is relatively close to residential properties.
32.5 Lighting within a 6 km vicinity of the airport	Lighting is proposed for each of the car parks associated with the proposed terminal.	Suitably conditioned to comply with airport lighting restrictions.
Reflectivity 32.8	Materials proposed are corrugated wall sheeting, glass, compressed fibre	Materials proposed comply with these restrictions – suitably conditioned.

Shellharbour Development Control Plan Compliance Table		
DCP Provision	**Proposal**	**Compliance**
Development on, adjoining or neighbouring the airport must account for the need to minimize the hazard to aircraft operations by reflectivity. All building materials must be low-reflective. Under no circumstances will the use of zincalume or similar be permitted.	cement sheeting, and Ritek roof panels.	Low reflective materials to be used and no zincalume. Suitably conditioned to ensure compliance.
32.11 Development on, adjoining or neighbouring the airport is to account for the need to minimize the hazard to aircraft operations created by the presence of birds and or animals on or in the vicinity of the aerodrome	Landscaping design and species proposed have been suitably proposed to minimize the presence of birds and or animals within the airport.	Suitably complies
32.12 Development applications on, adjoining or neighbouring the airport will be assessed on a case by case basis for bird and animal hazard management implications in consultation with the Airport Manager.		Mature height maximum condition recommended. Suitable species and location proposed.

Attachment 5

Table detailing potential impact on surrounding heritage items

Heritage Item and listing number.	Significance	Relationship with the study area	Discussion of significance
Illawarra Regional Airport Shellharbour LEP 2013 #I338	Local	Within	The Illawarra Regional Airport is recognised on the Shellharbour LEP as a locally significant heritage item. It has been used for aviation purposes since 1942 when Australian Government compulsorily acquired the land for the construction of an airstrip for emergency and Royal Australian Air Force (RAAF) training. The airstrip played an important part in World War Two, protecting Port Kembla. In addition, the site contains ecological flora communities, 'Endangered Ecological Community – Illawarra lowland grassy woodland', assigned with a high conservation priority, which contributes to the views at Ravensthorpe Grounds and Worker's Cottages.
Illawarra Light Rail Steam Museum and Trees Shellharbour LEP 2013 # I167	Local	600 metres south of the study area. The proposed works at Illawarra Regional Airport would not be visible from the Illawarra Light Rail Steam Museum and Trees due to the visual barrier of the trees north of the property.	The Illawarra Light Rail Steam Museum and Trees are listed on the Shellharbour LEP as a locally significant heritage item. The museum was established in 1972 to store the remnants of the NSW and Illawarra rail networks. The collection contains steam locomotives, trams and station buildings. In addition, the trees are an 'Endangered Ecological Community – Illawarra lowland grassy woodland' remnant and have been assigned a very high conservation policy.
Albion Park Railway Station Group SHR #01072 Railcorp s170 #4801171 Shellharbour LEP 2013 #I018	State	650 metres east of the study area. The proposed works at Illawarra Regional Airport would not be visible from the Albion Railway Park Station Group due to the trees to the north west of the property.	Albion Park Railway Station Group is of state significance and is listed on the Railcorp s170 register. Construction on the station began in 1887 as part of the Wollongong to North Kiama line. In 1913, a siding was provided for the Central Co-operative Dairy Company factory, with which the station still retains a physical relationship.

Heritage Item and listing number.	Significance	Relationship with the study area	Discussion of significance
Illawarra Cooperative Central Dairy Factory (former) or Albion Park Dairy' Shellharbour LEP 2013 #I016 Railcorp s170 register #4804464.	Local	530 metres east of the study area. The proposed works at Illawarra Regional Airport would not be visible from the Illawarra Cooperative Central Dairy Factory due to the trees to the west of the property.	The Illawarra Cooperative Central Dairy Factory is listed on the Shellharbour LEP as a locally significant heritage item. The building is of the Edwardian era, with interwar additions and represents 86 years of an industrial dairy processing complex. The building is the last remaining example of an industrial building of its era which displays an individual design.
Ravensthorpe Grounds and Worker's Cottages Shellharbour LEP 2013 #I006	Local	900 metres south west of the study area. The views and vistas of the heritage item would not be negatively impacted due to the approximate 900-metre distance at which the proposed works are to take place.	Ravensthorpe Grounds and Worker's Cottages are listed on the Shellharbour LEP as a locally significant heritage item. Constructed between 1893 and 1895, as a surgery, Ravensthorpe is a locally rare late 19th century house and local landmark.
Boles Meadows Shellharbour LEP 2013 #I138	Local	One kilometre west of the study area. The proposed works at Illawarra Regional Airport would not negatively impact the views from Boles Meadows due to the approximate 1-kilometre distance at which the proposed works are to take place.	Boles Meadows are listed on the Shellharbour LEP as a locally significant heritage item. Built on the original 2000-acre 1821 homestead block grant of Samuel Terry, the land has strong associations with pioneering families Russell and Boles. In addition, the weatherboard homestead at the property is a good example of Victorian era architecture.
Norris Homestead Shellharbour LEP 2013 #I280	Local	One kilometre south of the study area. The proposed works at Illawarra Regional Airport would not be visible from Norris Homestead due to the trees to the north of the property.	The Norris Homestead is listed on the Shellharbour LEP as a locally significant heritage item. Located on the original Terry's Meadows' estate, the homestead was built in 1876 and is a rare example of two separate but joined dwellings. The buildings are representative of mid Victorian and early Federation era architecture.

Fire & Rescue NSW

Albion Park Training Facility

Environmental Site Assessment - PFAS

April 2017

27 April 2017

Sally Langley
Fire & Rescue NSW
PO Box A249
Sydney South NSW 1232

Our ref: 21/25583
Your ref:

Dear Sally

Fire and Rescue NSW - Albion Park Training Facility Environmental Site Assessment - PFAS Addendum 1

1 Introduction

Between November and December 2016, GHD completed a combined preliminary and detailed site investigation at the Albion Park Training Facility located at Airport Road, Albion Park Rail, NSW 2527 (the site). The site has historically been used for the training of firefighters, which has potentially included the use of aqueous film forming foams (AFFF). The foams used may have contained perfluoro alkyl substances (PFAS), which are potentially harmful to human health and the environment.

The findings of the environmental site assessment (ESA) are presented in:

- GHD Pty Ltd (2017) *Report for Fire and Rescue NSW – Albion Park Training Facility Environmental Site Assessment – PFAS*. Final Report, April 2017 (the ESA report).

This addendum has been prepared following the release of new guidelines since the completion of the ESA report. This addendum must be read in conjunction with the GHD 2017 ESA report.

2 Basis for assessment

As a result of the emerging nature of this issue, screening criteria for the assessment of PFAS impacted sites are still in the process of being developed in Australia. Only a few values have been published by Australian regulatory agencies, some of which are interim, draft or are “to be reviewed”.

Section 5 of the ESA report outlines the investigation levels used for the purpose of screening data reported from soil, groundwater, surface water and sediment samples collected during the November / December 2016 ESA.

For the purpose of screening groundwater and surface water data, reference was made to the interim screening criteria released by the Western Australia Department of Environment and Regulation (DER)[1] which are based on the enHealth (2016)[2] recommendations.

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[1] Department of Environment Regulation (DER), January 2017. *Interim Guideline on the Assessment and Management of Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS),* Contaminated Sites Guidelines, Government of Western Australia (WA)

[2] EnHealth, June 2016. *Interim national guidance on human health reference values for per- and poly-fluoroalkyl substances for use in site investigations in Australia*

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In April 2017, Food Standards Australia New Zealand (FSANZ) released new guidance for the assessment of PFAS impacted sites. These new guidelines resulted in a reduction of the Tolerable Daily Intake (TDI) for key contaminants of concern including

- Perfluorooctane sulfonate (PFOS)
- Perfluorohexane sulfonate (PFHxS)
- Perfluorooctanoic acid (PFOA)

Changes to the TDI resulted in re-calculation of health based screening levels for the protection of drinking water and recreational water resources. These new values supersede the previous enHealth (2016) interim screening levels which were the basis of GHD's interpretation of data as outlined in the ESA report. Comparison of the FSANZ screening values, and the previous enHealth (2016) guidelines is provided in **Table 1**.

Table 1 Screening level comparison

Toxicity Reference Value	PFOS / PFHxS		PFOA	
	enHealth (2016)	FSANZ (2017)	enHealth (2016)	FSANZ (2017)
TDI	0.15 ug/kg/d	**0.02 ug/kg/d**	1.5 ug/kg/d	**0.16 ug/kg/d**
Drinking water quality guideline	0.5 ug/L	**0.07 ug/L**	5 ug/L	**0.56 ug/L**
Recreational water quality guideline	5 ug/L	**0.7 ug/L**	50 ug/L	**5.6 ug/L**

The revised FSANZ values focus on the assessment of potential risks to human health. These guidelines do not change any screening levels for the protection of ecological receptors and the screening criteria referenced in the ESA report (GHD, 2017) remain valid at the time of issue of this addenda.

3 Data review

Table 2 presents a summary of the groundwater and surface water data reported by GHD (2017) compared against the new FSANZ guidelines. For analytical data, reference is made to the ESA report.

Table 2 Interim data review

Summary information	Groundwater Data	Surface Water Data
Number of samples collected	Five groundwater samples were collected including three on site samples (GW01 to GW03) and two off-site sample (GW04 and GW05)	Five surface water samples were collected including one sample collected within the bounds of the training facility (SW05) and four off-site samples (SW01 to SW04) collected from surface water receptors down-gradient of the site.
Review of data for protection of drinking water quality	All locations reported concentrations of PFOS / PFHxS above the FSANZ (2017) screening value for the protection of drinking water quality. One location (GW03) reported a concentration of PFOA above the	All surface water samples reported concentrations of PFOS / PFHxS above the FSANZ (2017) screening value for the protection of drinking water quality. One location (SW05) reported a concentration of PFOA above the FSANZ (2017) screening value for the protection of drinking water

Summary information	Groundwater Data	Surface Water Data
	FSANZ (2017) screening value for the protection of drinking water quality.	quality.
Review of data for protection of recreational water quality	One on-site location (GW03) reported a concentration of PFOS/PFHxS in groundwater above the FSANZ (2017) screening value for the protection of recreational water quality.	Surface water samples SW01, SW03 and SW05 reported concentrations of PFOS / PFHxS above the FSANZ (2017) screening value for the protection of recreational water quality. One location (SW05) reported a concentration of PFOA above the FSANZ (2017) screening value for the protection of recreational water quality.

Overall, the changes to the guidelines has resulted in the following changes to the interpretation of data reported by GHD (2017):

- Three additional groundwater locations (GW02, GW04 and GW05) reported concentrations of PFOS / PFHxS and one additional groundwater location (GW03) reported a concentration of PFOA above the screening criteria for the protection of drinking water. GHD is currently embarking on a program of further site investigations including additional groundwater investigations. As part of these works, a water use survey is being released to understand groundwater usage in the area and further assist in the assessment of the potential for exposure to PFAS impacted groundwater.
- Groundwater sample GW03 previously reported PFAS concentrations above the nominated enHealth (2016) screening values for the protection of recreational water quality. All other samples remain below the new 2017 FSANZ investigation levels. The revision to the FSANZ (2017) guidelines does not impact on the overall interpretation of this data and is not considered to affect the overall conceptual site model (CSM) and evaluation of risks to current site employees.
- Two additional surface water locations (SW02 and SW04) report concentrations of PFOS / PFHxS above the screening criteria for the protection of drinking water. Two additional surface water locations (SW01 and SW03) report concentrations of PFOS / PFHxS above the screening criteria for the protection of recreational water quality. One additional surface water location (SW05) reported concentrations of PFOA above the screening criteria for the protection of recreational water quality. As outlined above, GHD is currently embarking on a program of further site investigations including additional surface water investigations. As part of these works, a water use survey is being released to understand surface water usage in the area and further assist in the assessment of the potential for exposure to PFAS impacted surface water.

A detailed review of all data with respect to the new guidelines will be undertaken as part of the next stage of investigation and full interpretation of all results will be reported at the completion of these works.

Sincerely
GHD Pty Ltd

Jacqui Hallchurch
Principal Environmental Scientist
02 9239 7046

Executive summary

GHD Pty Ltd (GHD) was engaged by Fire and Rescue NSW (FRNSW) to provide environmental assessment services (the Project) for a land parcel identified within Lot 10 DP 1157377 located at Airport Road, Albion Park Rail NSW 2527.

The site has previously been used for the training of firefighters, which has potentially included the use of aqueous film forming foams (AFFF). The foams used may have contained perfluoro alkyl substances (PFASs) including perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA), which are potentially harmful to human health and the environment.

The site is owned by Shellharbour City Council and the site is currently leased by FRNSW for use as a firefighting training facility. The surrounding land use includes the Illawarra airport located to the west and south of the site and the Rural Fire Service (RFS) located to the north of the site followed by vacant lot. To the west is a small area of bushland followed by Hargraves Avenue and residential properties.

The overall objective of the investigation is to characterise impacts and subsequently assess the potential risks to human health and the environment from historical firefighting training activities at the site.

The scope of work comprised:

- Drilling and installation of five groundwater monitoring wells including two on-site locations (GW01 and GW02) and three off-site locations (GW03 to GW05).
- A groundwater monitoring event (GME) including slug testing of five groundwater wells.
- Collection of five surface water samples (SW01 to SW05) and five sediment samples (SS01 to SS05)
- Laboratory analysis of selected soil, sediment, surface water and groundwater samples for chemicals of potential concern (COPC) including
  - PFAS, total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene, and xylene (collectively referred to as BTEX), polycyclic aromatic hydrocarbons (PAH), heavy metals. total organic carbon (TOC), total iron, potassium, aluminium, silicon in selected soil and sediment samples
  - PFAS, TRH, BTEXN, PAH and heavy metals (standard laboratory limit of reporting), major ions and total dissolved solids (TDS) in groundwater and surface water samples
- Laboratory analysis of a selection of soil samples for Australian standard leaching procedure (ASLP) and toxicity characteristics leaching procedure (TCLP)
- Laboratory analysis of a retrieved section of asphalt for PFAS
- A quality control and quality assurance (QA/QC) program
- Preparation of this environmental site assessment report (this report)
- Surveying of newly installed wells.

The following conclusions were made:

- The subsurface investigations encountered silty sand fill underlain by alluvial clay to a maximum investigation depth of 6.6 m bgl.

- Standing water levels in on-site wells were recorded to be between 2.61 m btoc (GW04) and 3.35 m btoc (GW02). The general groundwater flow direction was inferred to be towards the north-east.
- Analysis of the soil and sediment samples indicated the following:
  - Heavy metal ecological exceedances were reported at two locations on site (SB08 and SB07) and one off site (GW05).
  - Concentrations of PFAS exceeded human health guidelines in one onsite location sample (SB09_0.0_0.1).
  - PAH recreational exceedances were reported in sediment sample SS02.

  Leachability testing confirmed that PFAS impacted soils and sediments have the potential to release PFAS to the environment at concentrations exceeding the nominated screening levels.

  All off-site sediment samples reported detects of PFAS. This indicates that PFAS is likely to be migrating off-site via the surface water drainage pathways.
- Analysis of the groundwater samples collected during the GME indicated the following:
  - Heavy metal exceedances were reported at various monitoring locations on and offsite.
  - The highest value of PFAS contamination on-site is from the surface water retention pond in the north-eastern corner of the fire training ground.
  - PFAS was detected in all the surface water drainage lines leading from the retention pond.
  - PFAS is detected down gradient in Albion Creek and its unnamed tributary adjacent Poplar Avenue.
  - Levels of PFAS in surface water decrease with increasing distance from site.
  - Concentrations of PFAS in a surface water sample near the discharge point of Albion Creek to Lake Illawarra exceeded ecological guidelines.
- A conceptual site model has been developed for the site and it is considered that complete or potentially complete exposure pathways between PFAS contamination and identified receptors are present.
- Based on the EnRisk (2016) decision tree process for prioritisation, the site is currently classified as a priority 1 site based on detections of PFAS in surface water on site and at the site boundary at concentrations exceeding trigger value 1. It is important to note that the trigger point system has not been designed to be protective of all risks to people or the environment but is designed to assist with prioritisation of sites for further assessment and management.
  - The highest value of PFAS contamination on-site is from the surface water retention pond in the north-eastern corner of the fire training ground.
  - PFAS was detected in all the surface water drainage lines leading from the retention pond.
  - PFAS is detected down gradient in Albion Creek and its unnamed tributary adjacent Poplar Avenue.
  - Levels of PFAS in surface water decrease with increasing distance from site.
  - Concentrations of PFAS in a surface water sample near the discharge point of Albion Creek to Lake Illawarra exceeded ecological guidelines.

- A conceptual site model has been developed for the site and it is considered that complete or potentially complete exposure pathways between PFAS contamination and identified receptors are present.
- Based on the EnRisk (2016) decision tree process for prioritisation, the site is currently classified as a priority 1 site based on detections of PFAS in surface water on site and at the site boundary at concentrations exceeding trigger value 1. It is important to note that the trigger point system has not been designed to be protective of all risks to people or the environment but is designed to assist with prioritisation of sites for further assessment and management.

Based on these conclusions, and in conjunction with the limitations set out in Section 11 and the assumptions contained throughout the report, the following recommendations are made:

- A residential survey of water use be conducted to better characterise groundwater and surface water use down gradient of the FRNSW site.
- Consideration of immediate management actions which can be implemented to address the mass of PFAS present on site and minimise further migration. These management actions may include, but not be limited to:
  - Assess and implement measures to stop the retention basin on the FRNSW site overflowing, and restrict access/use of the water currently in this dam.
  - Sediment trap on the centralised pit to stop the transport of sediment leaving the site.
  - Removal of impacted soils around the fire training ground on the FRNSW site to remove the primary source zone
- Additional sampling should be undertaken following the implementation of any management actions. Sampling should be undertaken to accommodate seasonal fluctuation and, for example, following rainfall events to enable assessment of the areas where surface water collects from the ponds.
- Additional investigation to assess whether impacted groundwater is migrating off-site towards other potential abstraction points down gradient of the site. Data collected during the additional stage of investigations should include re-sampling of all surface and groundwater bore locations to validate the initial data set owing to the discrepancy reported by the laboratory.
- Risk assessment to evaluate risks to the identified receptors in the CSM.

Glossary

Abbreviation	Description
AHD	Australian Height Datum
ALS	Australian Laboratory Services
ANZECC	Australian and New Zealand Environment and Conservation Council
BTEXN	Benzene, toluene, ethylbenzene, xylenes and naphthalene
COC	Chain of custody
COPC	Contaminants of potential concern
CSM	Conceptual site model
DBYD	Dial Before You Dig
DO	Dissolved oxygen
DQI	Data quality indicator
DQO	Data quality objective
DTW	Depth to water
EC	Electrical conductivity
EIL	Ecological Investigation Level
EPA	NSW Environment Protection Authority
ESA	Environmental Site Assessment
ESL	Ecological Screening Level
GIL	Groundwater Investigation Level
GME	Groundwater monitoring event
GPR	Ground penetrating radar
HIL	Health Investigation Level
HSL	Health Screening Level
JSEA	Job Safety Environmental Analysis
LOR	Limit of reporting
mAHD	metres Australian Height Datum
m bgl	Metres below ground level
mbTOC	Metres below top of casing
mg/L	Milligrams per litre
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NHMRC	National Health and Medical Research Council
PID	Photo-ionisation detector
QA/ QC	Quality assurance/ quality control
REDOX	Oxidation-reduction potential
RPD	Relative Percent Difference
SFOP	Standard field operating procedures
SPR	Source pathway receptor

Abbreviation	Description
SWL	Standing water level
TOC	Top of casing
TPH	Total petroleum hydrocarbons
TRH	Total recoverable hydrocarbons
µg/L	Micrograms per litre
UPSS	Underground Petroleum Storage System
USCS	Unified Soil Classification System

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Appendix B – Analytical results summary tables

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Appendix E – Field sampling sheets and calibration certificates

Appendix F – Borehole logs

Appendix G – Assessment of data quality

Appendix H – NATA accredited laboratory reports and chain of custody documentation

Appendix I – Slug test data

1. Introduction

GHD Pty Ltd (GHD) was engaged by Fire and Rescue NSW (FRNSW) to provide environmental assessment services (the Project) for a land parcel identified within Lot 10 DP 1157377 located at Airport Road, Albion Park Rail NSW 2527.

The site has previously been used for the training of firefighters, which has potentially included the use of aqueous film forming foams (AFFF). The foams used may have contained perfluoro alkyl substances (PFASs) including perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA), which are potentially harmful to human health and the environment.

A preliminary site investigation (PSI) was undertaken by GHD in 2016 to identify potential sources of contamination and areas of potential concern and develop a sampling and analytical plan for further intrusive investigations on the site. The findings of the PSI are reported in:

- GHD (2016) *Albion Park PFAS Investigation, Preliminary Site Investigation and Sampling and Analysis Quality Plan*. Draft report, August 2016.

This report documents the outcomes of intrusive site investigations undertaken as part of the second stage of works on the site. For full details on the site history, reference is made to GHD 2016.

1.1 Background

The site is owned by Shellharbour City Council and the site is currently leased by FRNSW for use as a firefighting training facility. The surrounding land use includes the Illawarra airport located to the west and south of the site and the Rural Fire Service (RFS) located to the north of the site followed by vacant lot. To the west is a small area of bushland followed by Hargraves Avenue and residential properties.

GHD understands the use of AFFF and other firefighting foams potentially containing PFASs were used at a number of FRNSW locations in NSW for firefighting training purposes. For this reason, PFAS may have been released to the environment, which may have resulted in contamination.

The NSW Environmental Protection Authority (NSW EPA) is currently undertaking an investigation program to assess the historical legacy of PFAS use across NSW. As part of this program they have identified impact in surface water down gradient of the site and have requested further investigation to understand potential contamination issues be undertaken by FRNSW.

The site is approximately 15 000 m^2 and comprises part of Lot 10 LP 1157377. The approximate site boundaries are presented in Figure 1, Appendix A.

1.2 Objective

The overall objective of the investigation is to characterise impacts and subsequently assess the potential risks to human health and the environment from historical firefighting training activities at the site.

1.3 Scope

The scope of work comprised:

- A desktop review of available information including geological/hydrogeological map sheets, aerial imagery, site plans and any reports on previous environmental investigations provided by Fire and Rescue NSW (if available)
- Preparation of a project wide Health, Safety and Environment Plan (HSEP) and site specific Job Safety and Environmental Analysis (JSEA)
- Service location including a review of site plans (where available), dial before you dig (DBYD) plans, and scanning using ground penetrating radar to identify the presence of underground services
- Drilling and installation of five groundwater monitoring wells including two on-site locations (GW01 and GW02) and three off-site locations (GW03 to GW05).
- A groundwater monitoring event (GME) including slug testing of five groundwater wells.
- Collection of five surface water samples (SW01 to SW05) and five sediment samples (SS01 to SS05)
- Laboratory analysis of selected soil, sediment, surface water and groundwater samples for chemicals of potential concern (COPC) including
  - PFAS, total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene, and xylene (collectively referred to as BTEX), polycyclic aromatic hydrocarbons (PAH), heavy metals. total organic carbon (TOC), total iron, potassium, aluminium, silicon in selected soil and sediment samples
  - PFAS, TRH, BTEXN, PAH and heavy metals (standard laboratory limit of reporting), major ions and total dissolved solids (TDS) in groundwater and surface water samples
- Laboratory analysis of a selection of soil samples for Australian standard leaching procedure (ASLP) and toxicity characteristics leaching procedure (TCLP)
- Laboratory analysis of a retrieved section of asphalt for PFAS
- A quality control and quality assurance (QA/QC) program
- Preparation of this environmental site assessment report (this report)
- Surveying of newly installed wells.

1.4 Limitations

This report is subject to the limitations provided in Section 11.

2. Site description

2.1 Site identification

A summary of site identification details is provided in Table 2-1. The site location is presented in Figure 1 in Appendix A.

Table 2-1 Site identification summary

Item	Description
Street Address	Airport Road, Albion Park Rail NSW 2527
Lot and DP number	Part of Lot 10, DP 1157377
Site Area	Approximately 15,000 m2 (1 ha), with a perimeter of approximately 1 km
Local Government Area	Shellharbour City Council
Current Land Use	Fire Training site for FRNSW stations around the area to use.
Ownership	Land parcel owned by Shellharbour City Council. Site leased by FRNSW for use as a training facility. The site has been occupied by FRNSW since 1997.

2.2 Surrounding land use and zoning

The surrounding land uses are summarised below in Table 2-2.

Table 2-2 Description of surrounding land use and respective zonings

Orientation	Description of Surrounding Land Use	Zoning (North Sydney Council LEP 2013)
North	Illawarra Rural Fire Services compound and vacant land beyond	IN1 – General Industrial
East	Vegetation identified as Environmentally Sensitive Land in the Terrestrial Biodiversity Map from the Shellharbour City Council Online Mapping system. Residential properties beyond.	E3 – Environmental management
South	Boomerang Avenue immediately followed by an airport hangar and Illawarra Regional Airport beyond.	SP1 – Special Activities: Air Transport Facility
West	Airport Road and Illawarra Regional Airport beyond.	SP1 – Special Activities: Air Transport Facility

2.3 Site environmental setting

2.3.1 Topography

The site has an elevation of approximately 6 m above Australian Height Datum (m AHD), according to Survey data collected as part of the current scope of works. The natural ground level across the investigation area is relatively flat.

The regional topography appears to rise to the north, west and south and fall towards Lake Illawarra approximately 650 m east of site.

2.3.2 Soils

General

According to eSPADE from Office of Environment & Heritage, the site is within the Fairy Meadow 'fa' landscape. The Fair Meadow soil landscape has the following characteristics:

- **Landscape:** Alluvial plains, floodplains, valley flats and terraces below the Illawarra Escarpment. Local Relief <10 m. Slopes usually <5%. Almost completely cleared low open-forest and woodland.
- **Soils:** moderately deep (50-100 cm). Alluvial Loams and Siliceous Sands on terraces. Prairie Soils and Yellow Podzolic Soils occur on the drainage plains.
- **Limitations:** flood hazard, low wet bearing strength, highly permeable topsoils, high water tables.

Acid Sulfate Soils

The acid sulfate soil class at the site has a low probability of occurrence and at depths greater than 3 metres below the ground surface (reference from the Department of Land and Water Conservation, Albion Park, Acid Sulfate Soil risk map, Edition 2, 1997).

The site is situated in AP4 (alluvial plains elevation of >4 m AHD). Around the stormwater channel located to the north of the site there is a zone of AP2 (*low probability depths of 2 meters below ground surface*) and AP1 (*high probability at depths of 1 metre below ground surface*) which means the chance of encountering acid sulfate soils increases at these areas.

2.3.3 Hydrology

Surface water flow is expected to follow the local topography on site and flow towards the north-east. Dial before you dig underground utilities information did not provide an indication of stormwater infrastructure through the site. However, it appeared during the site visit that the majority of onsite drainage flowed into the retention pond in the north-eastern corner of the site.

Stormwater grates are located within the asphalted training area and larger concrete drains are located around the site. All underground stormwater pipes potentially drain into a centralised pit, located in the north eastern corner of the site, before leaving the site. The predicted underground flow of the site and where the surface water is draining to is presented in Figure 2, Appendix A.

The only surface water on site is the retention pond located in the north-eastern corner of the site. The pond has the potential to overflow during heavy rainfall periods due to the site and surrounding area being low lying in elevation. This overflow could potentially go offsite to the grassed area immediately east of the site or the grated pit (stormwater) in the north eastern corner of the site.

The nearest surface water feature is Albion Creek, located approximately 420 m north of the site, which discharges in Lake Illawarra 650 m north-east of site. The general catchment hydrology and slope is presented in Figure 3, Appendix A.

2.3.4 Geology

The 1:250,000 geological map series for Wollongong (Department of Mines, 1966) suggests that the regional geology of the area is Berry Formation. This lithology is part of the Permian Shoalhaven Group that is characteristic of siltstone, shale and sandstone, including lenticular development of the Megalong Conglomerate.

2.3.5 Hydrogeology

Existing Groundwater Bores

A groundwater bore search was completed by GHD on 6 February 2017. A review of the Department of Primary Industries *All Groundwater Data Map,* indicates that there no registered bores within a 500 m radius of the site. The nearest bore is located approximately 1.1 km south-west of site. The bore is a private bore and the intended use is stock, domestic. This well was installed to 30 m with the water bearing zone located around 20 m bgl. Appendix D show the groundwater database record for the bore and the location in regards to the site. This aquifer is a deeper aquifer than the one targeted on-site.

Groundwater risk map

The *1:2,000,000 Groundwater in New South Wales, Assessment of Pollution Risk Map* indicates the site is likely to be underlain by sandstone in sedimentary basins, which potentially have low hydraulic conductivities. Groundwater salinity is expected to range from 0 – 1000 mg/L, which is suitable for stock, domestic and some irrigation purposes.

2.3.6 Surface water and drainage

On-site surface water features

Surface water bodies relevant to the site include:

- On-site surface water retention pond located in the north-eastern corner of the site, receiving onsite surface water drained through a variety of manmade drains.

Off-site surface water features

Hydraulically down gradient of the site (north to north-east), surface water appears to flow into a subsurface drainage culvert that extends north-east towards Hargraves Avenue, eventually draining into an unnamed tributary of Albion Creek, located approximately 420 m north of the investigation area. Albion Creek discharges in Lake Illawarra approximately 650 m east of site.

The general catchment hydrology and slope is presented in Figure 3, Appendix A.

2.4 Site layout and key site features

A site inspection was undertaken initially by GHD in June 2016. Observations made during the site inspection are presented in GHD (2016). Table 2-4 provides a summary of site details including site layout and key site features.

Item	Summary Observations
Fencing and access	The general layout of the site comprises a main cyclone fence which encompasses the FRNSW property (part of Lot 10, LP 1157377) identified as 'the site' for the purpose of this investigation. The site is secure access, for authorised entry only. This boundary is presented in Figure 2, Appendix A.
FRNSW site features	Key features of the area occupied by FRNSW include: - Administration buildings and site offices. - Main fire training area located to the south of the main driveway to the site. The fire training area was primarily covered with asphalt and GHD understands that the area has not been re-surfaced for at least five years.

Item	Summary Observations
	- A surface water retention pond, receiving water draining from the fire training area.
Key features of the broader property	Key features of the broader land parcel, outside of the FRNSW fenced area, include: - NSW Rural Fire Service located to the north of the FRNSW site and Illawarra airport located to the west and south of the site.

3. Data Quality Objectives

The Data Quality Objectives (DQOs) for the investigation are based on guidance presented in:

- NEPC (2013) *National Environmental Protection (Assessment of Site Contamination) Amended Measure (NEPM) No. 1 – Schedule B1, Guideline on Investigation Levels for Soil and Groundwater.*

The DQOs establish a framework for contamination investigations which incorporates a seven stepped continuum that defines the problem at the site. A series of stages then optimises the design of the investigation. The seven steps are outlined below:

- Step 1: State the Problem
- Step 2: Identify the Principal Study Question
- Step 3: Inputs to the Decision
- Step 4: Boundaries of the Study
- Step 5: Decision Rules
- Step 6: Tolerable Limits on Decision Errors
- Step 7: Optimisation of the Data Collection Process

An overview of the DQOs for the investigation are presented in the following steps.

Step 1: State the problem

The site has previously been used for the training of firefighters, which has potentially included the use of aqueous film forming foams (AFFF). The AFFF used may have contained PFAS including (PFOS) and perfluorooctanoic acid (PFOA), which are potentially harmful to human health and the environment.

Given the short shelf life, storage of AFFF was reportedly limited on site and instead, the product was reportedly brought onto site for specific training purposes as required. 20L containers of AFFF concentrate were reportedly brought to site and mixed for immediate use in training exercises.

The problem as it stands is that the use of AFFF containing PFAS may have resulted in contamination of soil, surface water, groundwater and sediments both on site and surrounding land.

Step 2: Identify the decision/goal of the study

The key study questions to be answered as part of the works is:

- Are contaminants present on the site at concentrations which pose a potentially unacceptable risk to human health or the environment under the current land use (training facility) and adjacent land-uses (including rural residential land use)?
- Is the data obtained of an acceptable quality to enable appropriate conclusions to be made in relation to the overall risks to human health and/ or the environment?

Should contamination present at the site pose a potentially unacceptable risk to human health for the current land uses or the environment based on concentrations of PFAS in soils, sediments, groundwater or surface waters, the other decisions to be made are:

- Is the extent of the impact adequately delineated?
- Is further assessment or remediation/management required?

Step 3: Identify the information inputs

The following inputs are required for the decision:

- The location of potential PFAS contamination sources
- The concentrations of PFAS in soil, sediment, groundwater and surface water from laboratory analysis.
- Identify potential exposure routs and contamination migration pathways.
- The likelihood of PFAS migrating to groundwater and subsequently off-site.

Step 4: Define the boundaries of the study

Boundaries of the investigation are summarised in Table 3-1.

Table 3-1 Investigation boundaries

Boundary	Definition
Spatial boundaries	The spatial boundaries for the investigation area are identified as the lateral extent of the sampling locations as shown in Figure 4, Appendix A and down to a depth of approximately 6.6 m bgl, which is the maximum intrusive investigation depth.
Temporal boundaries	The timeframe for this investigation's scope of work primarily defined to the period of works undertaken in the investigation area as part of this assessment; namely June (initial site investigation) to December 2016.
Scale of decision making	The scale of the decision making is limited to the boundaries of the investigation area and identified off-site receptors
Potential constraints on data collection	Locations SB14, SB15 and GW05 had to be moved due to the airport antennas in the area having an exclusion zone.

Step 5: Decision rules

The degree of impact by contaminants and the decisions associated with accepting data will be assessed with reference to the chosen site investigation levels, which were established within the framework of guidelines made or approved by the NSW EPA.

The criteria used for screening analytical results are discussed in Section 5.

The decision rule was considered to be:

- If concentrations of the COPC in soil, sediment, surface water, or groundwater on or off-site exceed the adopted criteria for permissible land use(s) (as per current zoning), then further assessment, remediation and/or management may be required.
- Conversely, no further action may be required in the event that concentrations are below adopted site criteria.

Step 6: Tolerable limits on decision errors

Data generated during this investigation must be appropriate to allow decisions to be made with confidence.

Specific limits for this investigation have been adopted in accordance with the appropriate guidance from the AS4482.1, which includes appropriate indicators of data quality (data quality indicators [DQIs] used to assess QA/QC, and GHD's Standard Field Operating Procedures). The pre-determined DQIs established for the investigation are discussed in Appendix G.

If any of the DQIs are not met, further investigation will be necessary to determine whether the non-conformance will significantly affect the usefulness of the data.

Step 7: Optimisation of the data collection process

This step involves identifying the most resource effective sampling and analysis design which is required to satisfy the DQOs. The sampling and analysis plan which was developed to meet this objective is summarised in Section 4.

4. Methodology

4.1 General

The scope of work is summarised in Section 1.3. The tables in Section 4.2 to 4.5, summarise the groundwater well installation and soil sampling, sediment sampling, groundwater sampling and surface water sampling methodologies.

4.2 Groundwater well installation and soil sampling Soil bore sampling

Table 4-1 Soil bore sampling methodology

Item	Description
Date of fieldwork	5 - 8 December 2016
Work clearance	JSEA including daily pre-work assessment and hazard identification
Technical guideline	National Uniform Drillers Licensing Committee (2011) Minimum Construction Requirements for Water Bores in Australia (Edition 3, 2012)
Ground clearance	Scanning using electromagnetic locating prior to mechanical drilling.
Drilling technique	Following hand auguring, solid flight augers were employed to refusal, followed by air hammer.
Bore logging	All field observations and subsurface conditions were recorded on borehole logs (Appendix F).
Field screening	Field screening for volatiles was undertaken prior to collection of soil samples for laboratory analysis using a PID, the results of which are included in Appendix E. PID calibration data is presented in Appendix E.
Soil sampling	Discrete soil samples were collected from the surface and from each lithological zone. Samples for VOC screening were collected in separate snap lock bags. Additionally, soil was sampled into laboratory supplied jars.
Sample Analysis	Two soil samples from each borehole were submitted for laboratory analysis of COPC including PFAS, TRH, BTEXN, PAH, 8 heavy metals, total organic carbon (TOC), total iron, potassium, aluminium, silicon.
Sample handling and transport	Following collection, soil samples were immediately placed on ice and stored in a cool, dark environment (esky) prior to being forwarded to the analytical laboratory within the specified holding times along with a chain of custody (COC) form (Appendix H).
QA/QC	A QA/QC sampling procedure was implemented and further details are described in Section 3 and Appendix G. QA/QC sampling included one intra-laboratory duplicate sample, one inter laboratory duplicate sample, four field rinsates, two trip blanks and three trip spikes..
Well construction	Wells were installed with the following general characteristics: - 50 mm polyvinyl chloride (PVC) Class 18 blank and screened casings - Primary filter pack material comprising a chemically inert material which was well rounded, with a high coefficient of uniformity and extended at least 0.5 m above the screened PVC casing - Bentonite pellets used as annular sealant which extended at least 0.5 m above the filter pack, followed by a cement slurry to the ground surface

Item	Description
	- Monitoring wells were finished with trafficable gatic covers and concrete
Development	Well development occurred following installation using bailers until: - No further noticeable sand or silt was recovered - The water was relatively clear when removed from the well - All water was removed from the well
Surveying	Following well installation, all newly installed were surveyed by a registered surveyor. The survey report for the wells is provided in Appendix C.
Waste disposal	Soil cuttings and purged groundwater was transferred to three 205 L drums on site and are pending transfer to a to a licenced waste facility. Waste disposal documentation will be provided in the Stage 2 report.

4.3 Sediment sampling

Table 4-2 Sediment sampling methodology

Item	Description
Date of fieldwork	16 December 2016
Work clearance	JSEA including daily pre-work assessment and hazard identification
Technical guideline	GHD's Standard Field Operating Procedures
Sampling	Samples were collected by hand using a trowel and were placed directly into laboratory supplied sample jars.
Sample handling and transport	Following collection, sediment samples were immediately placed on ice and stored in a cool, dark environment (esky) prior to being forwarded to the analytical laboratory within the specified holding times along with a COC form (Appendix H).
Decontamination	Prior to and following the collection of each groundwater sample, all non-disposable sampling equipment underwent decontamination including: Washing of equipment with phosphate-free detergent (Decon Neutracon) • Rinsing of equipment with fresh water
Sample analysis	All sediment samples were submitted for laboratory analysis of COPC including PFAS, TRH, BTEXN, PAH, 8 heavy metals, total organic carbon (TOC), total iron, potassium, aluminium, silicon.
QA/QC	QA/QC sampling included one intra-laboratory duplicate sample.

4.4 Groundwater sampling

Table 4-3 Groundwater sampling methodology

Item	Description
Date of fieldwork	15 and 16 December 2016
Work clearance	JSEA including daily pre-work assessment and hazard identification
Technical guideline	ASTM D6771–02, Standard practice for low-flow purging and sampling for wells and devices used for groundwater quality investigations, ASTM International Australian Standard 5667:1998 Water Quality – Sampling, Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples (AS 5667.1:1998) Australian Standard 5667:1998 Water Quality – Sampling, Part 11: Guidance on the Sampling of Groundwaters (AS 566.11:1998)
Gauging	Two on-site monitoring wells (GW01 and GW02) and three off-site monitoring wells (GW03, GW04 and GW05) were gauged using an oil/water interface probe to measure standing water levels (SWL) and assess for the potential presence of light non-aqueous phase liquid (LNAPL). LNAPL was not encountered, therefore no LNAPL sampling was required.
Field chemistry	Field measurements were taken using a calibrated water quality meter and flow through cell, with measurements of temperature, pH, electrical conductivity (EC), dissolved oxygen (DO) and oxidation-reduction potential (REDOX) recorded. Field sampling sheets are presented in Appendix E.
Sampling	All five monitoring wells were purged using a submersible pump within 24 hours of sampling as part of a slug test. The water column in each of the wells during the time of sampling is considered to be representative of the underlying aquifer.
Sample handling and transport	Following collection, samples for heavy metal analysis were filtered through a 0.45um filter before being placed in the sample bottles. The groundwater samples were then immediately placed on ice and stored in a cool, dark environment (esky) prior to being forwarded to the analytical laboratory within the specified holding times along with a COC form (Appendix H).
Decontamination	Prior to and following the collection of each groundwater sample, all non-disposable sampling equipment underwent decontamination including: • Washing of equipment with phosphate-free detergent (Decon Neutracon) • Rinsing of equipment with fresh water
Sample analysis	All groundwater samples (five) were submitted for laboratory analysis of COPC including PFAS, TRH, BTEXN, PAH and eight heavy metals (standard laboratory limit of reporting), major ions, alkalinity, pH and total dissolved solids (TDS).

Item	Description
	Laboratory results are summarised in Appendix B and certificates of analysis and COC included in Appendix H.
QA/QC	QA/QC sampling included the collection of one intra-laboratory duplicate sample.
Waste disposal	Waste drums are pending transfer to a licenced waste facility and will occur after the Stage 2 field works.

4.5 Surface water sampling

Table 4-4 Surface water sampling methodology

Item	Description
Date of fieldwork	16 December 2016
Work clearance	JSEA including daily pre-work assessment and hazard identification
Technical guideline	GHD's Standard Field Operating Procedures
Field chemistry	Field parameters temperature, pH, electrical conductivity (EC), dissolved oxygen (DO), reduction-oxidation potential (redox) and temperature of the surface water were also recorded at each sample point using a water quality meter placed directly into a bucket of water from the water body. Field sampling sheets are presented in Appendix E.
Sampling	Surface water samples were collected from locations close to the water's edge using a hand held water sampler fitted with a laboratory provided plastic unpreserved container that was changed between locations.
Sample handling and transport	The surface water samples were then transferred into laboratory provided bottles. Samples for heavy metal analysis were filtered through a 0.45um filter before being placed in the sample bottles. The sample bottles were transferred to an ice filled cool box for sample preservation prior to and during shipment to the sampling laboratory. A chain of custody form was completed, and forwarded with the samples to the testing laboratory.
Decontamination	Dedicated sample bottles were used to collect surface water samples, eliminating the need for decontamination of equipment and rinsate samples.
Sample analysis	All surface water samples were submitted for laboratory analysis of COPC including PFAS, TRH, BTEXN, PAHs, metals (8), TDS and major ions.
QA/QC	QA/QC sampling included the collection of one intra-laboratory duplicate sample.
Waste disposal	No excess surface water was collected during surface water sampling.

5. Assessment criteria

5.1 Basis for assessment

The following guidelines were adopted for the assessment of contamination.

- NSW EPA (1995) *Contaminated Sites: Sampling Design Guidelines*
- NSW DEC (2006) *Contaminated Sites: Guidelines for NSW Site Auditor Scheme*
- NSW DECC (2015) *Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997*
- NSW EPA (2011) *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites*
- NEPM (2013) *National Environment Protection (Assessment of Site Contamination) Amendment Measure (No.1),* National Environment Protection Council (NEPC)

Screening criteria for the assessment of PFAS impacted sites are still in the process of development in Australia. Only a few values have been published by Australian regulatory agencies, some of which are interim, draft or are "to be reviewed". GHD is involved with the development of National guidelines for the assessment and management of PFAS contamination which has included drafting of the guidelines for a working group organised by CRC CARE and involving State and Commonwealth regulatory agencies and organisations.

In addition to works undertaken by GHD, published guideline documents currently available and considered as part of this review include:

- Department of Environment Regulation (DER), January 2017. *Interim Guideline on the Assessment and Management of Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS),* Contaminated Sites Guidelines, Government of Western Australia (WA).
- Department of Environment and Energy (DEE), October 2016. DRAFT *Commonwealth Environmental Management Guidance on Perfluorooctane Sulfonic Acid (PFOS) and Perfluorooctanoic Acid (PFAS)*
- EnHealth, June 2016. *Interim national guidance on human health reference values for per- and poly-fluoroalkyl substances for use in site investigations in Australia*.
- Environmental Risk Sciences Pty Ltd, February 2016. *Proposed Decision Tree for Prioritising Sites Potentially Contaminated with PFASs, New South Wales Environment Protection Authority* (NSW EPA)

For the purpose of the assessment of data collected as part of these investigations, a number of guidelines and information sources have been reviewed in order to identify the most appropriate and current site assessment criteria at the time of preparation of this report. GHD notes that these criteria differ slightly to those initially outlined in the SAQP presented in GHD (2016) as new documentation has come to light since the preparation of the PSI (GHD, 2016). The screening criteria documented herein supersede any criteria previously specified in the PSI.

It is noted that the assessment of PFAS impacted sites is a rapidly developing field and consequently site assessment criteria are continually under review and may be revised as new scientific information becomes known.

5.2 Rationale for assessment criteria

The assessment criteria were selected to allow decisions to be made for the following identified receptors (from Section 2.2):

- On-site (FRNSW) and off-site commercial workers associated with the council yards and RFS.
- Off-site hydraulically down-gradient residential receptors north of the site.
- Recreational users of surface waters down hydraulic gradient from the site
- Beneficial uses of groundwater, including domestic groundwater resources and ecological receptors in surface water bodies recharged by groundwater
- Environmentally sensitive land offsite to the east of site.

5.3 Nominated PFAS assessment criteria

5.3.1 Surface water and groundwater

To assess the potential contamination risk to the adjacent ecosystem, the WA DER (2017) interim screening levels are adopted for the surface water and groundwater assessment. The nominated screening levels are outlined in Table 5-1.

Table 5-1 Nominated screening criteria for surface water and groundwater

Exposure Scenario	PFOS / PFHxS	PFOA	Basis for nomination of criteria
Drinking water quality	0.5 µg/L	5 µg/L	Criteria adopted from DER (2017) which are based on the enHealth (2016) recommendations. Drinking water is not extracted on site and no registered groundwater bores were located in a 1 km radius of the site. However, the potential for localised use of groundwater for domestic or stock purposes cannot be discounted and as such drinking water criteria are considered for the purpose of this initial screening.
Ecological – freshwater*	0.00023 µg/L	19 µg/L	Criteria adopted from DER (2017) freshwater criteria for high conservation value systems (99% species protection). The draft guidelines recommend that the 99% level of protection is used for slightly to moderately disturbed systems as PFAS and PFOA have been shown to bio accumulate in wildlife.
Recreational water	5 µg/L (sum of PFOS and PFHxS)	50 µg/L	Criteria adopted from DER (2017) which are based on the enHealth (2016) recommendations. The closest water body to the site is Albion Creek, located approximately 430 metres north of the site, which discharges into Lake Illawarra, approximately 650 metres north-east of the site. Lake Illawarra is used for recreational activities and fishing purposes.

Note: * Lake Illawarra is classified as a marine ecosystem; however marine criteria have not yet been published for PFOS/PFHxS or PFOA. In this context freshwater guidelines have been considered.

5.3.2 Soil and sediment

Most of the currently available PFAS guidelines are based on direct contact with contaminated soils, however, as PFAS is highly soluble in water, and can be washed through soil into underlying groundwater or discharged into river systems, the leaching potential of the PFAS in soil should be the focus of an initial assessment (NSW EPA, 2016).

To assess the potential contamination risk to human health, the WA DER (2017) interim screening levels are adopted for the soil assessment. There are no published guidelines available for the assessment of ecological risk, therefore the Department of the Environment and Energy (DEE) draft *'Commonwealth Environmental Management Guidance on Perfluorooctane sulfonic acid (PFOS) and Perfluorooctanoic acid (PFOA)*' were considered. These DEE draft guidelines have been considered as a comparative screening tool only, not as an action level or similar. The guideline screening values from Table 1 (developed for CRC Care through the application of Australia's ASC NEPM methodology) were used considering a separate water assessment has been included in the scope of works for this site.

In accordance to the NSW EPA guideline, the ASLP criteria for soil/sediment leachate assessment were the surface water/groundwater criteria multiplied by a dilution factor of 10. A dilution factor of 20 is recommended by the USEPA as the minimum dilution that is likely to occur as a chemical move from soil into underlying groundwater, using a dilution factor of 10 provides some additional conservatism (NSW EPA, 2016).

The nominated screening criteria for the assessment of leachable concentrations of PFOS and PFOA from soils are presented in Table 5-2.

Table 5-2 Nominated screening criteria for soil - leachate

Exposure Scenario	PFOS / PFHxS	PFOA	Basis for nomination of criteria
Drinking water quality	5 µg/L	50 µg/L	Criteria adopted from DER (2017) which are based on the enHealth (2016) recommendations. Dilution factor of 10 applied
Ecological – marine*	0.0023 µg/L	190 µg/L	Criteria adopted from DER (2017) freshwater criteria for high conservation value systems (99% species protection). Dilution factor of 10 applied
Recreational water	50 µg/L (sum of PFOS and PFHxS)	500 µg/L	Criteria adopted from DER (2017) which are based on the enHealth (2016) recommendations. Dilution factor of 10 applied

Note: Lake Illawarra is classified as a marine ecosystem; however marine criteria have not yet been established for PFOS/PFHxS or PFOA. In this context freshwater guidelines have been considered.

Health and ecological based screening levels to be applied to the assessment of soil and sediment data are summarised in Table 5-3.

Table 5-3 Nominated screening criteria for soil and sediment

Exposure Scenario	PFOS / PFHxS	PFOA	Basis for nomination of criteria
Health Based			
Residential	4 mg/kg (sum of PFOS and PFHxS)	40 mg/kg	Criteria adopted from DER (2017). Guideline values are based on interim tolerable daily intake value of 0.15 µg/kg/d for PFOS/PFHxS and 1.5 µg/kg/d for PFOA.
Commercial / industrial	100 mg/kg (sum of PFOS and PFHxS)	1000 mg/kg	Criteria adopted from DER (2017). Guideline values are based on interim tolerable daily intake value of 0.15 µg/kg/d for PFOS/PFHxS and 1.5 µg/kg/d for PFOA.

Exposure Scenario	PFOS / PFHxS	PFOA	Basis for nomination of criteria
Ecological based			
Sensitive ecological vegetation	6.6 mg/kg	1 mg/kg	Published guideline values unavailable at the time of preparation of this report. Draft guideline value derived DEE (2016) – used as a comparative tool only.

5.4 Assessment criteria –other CoPCs

5.4.1 Soil and sediment

The assessment of risk to human health, was undertaken in accordance with NEPC 2013. The following criteria have been adopted:

- NEPC (2013) Health investigation level (HIL)-D and Health screening level (HSL) D; for on-site commercial/industrial land uses
- NEPC (2013) Health investigation level (HIL)-C and Health screening level (HSL) C; for off-site open space land use
- CRC Care direct contact HSL-C for off-site open space use
- CRC Care direct contact HSL-D for on-site commercial/industrial land use
- CRC Care direct contact and HSL vapour intrusion for intrusive maintenance works on and off-site
- NEPC (2013) Ecological investigation level (EILs) D / ESL-D; for on-site commercial/industrial land uses
- NEPC (2013) Ecological investigation level (EILs) and Ecological screening level (ESL) Urban Residential/Public open space for off-site rural residential land uses

HSL guidelines take into account the sub-surface material and have different guidelines for sand, silt and clay at varying depths. Based on the soil samples HSLs for SAND have been adopted for this site.

The adopted soil criteria are presented in Table A1 and Table A2 in Appendix B. If the nominated assessment guidelines do not provide screening values for the analytes shown in the summary tables, the guideline was removed from the summary table.

All sediment samples collected in this investigation were considered to be classified as ‘soil’. Specific sediment based guidelines (ANZECC 2000, Interim-sediment quality guidelines, high and low) were reviewed and compared to the adopted soil assessment criteria, which were found to be more conservative and no change to the investigation results were identified. Therefore considering this and the physical nature of the samples, no sediment specific assessment criteria were adopted for the assessment of these samples.

5.4.2 Groundwater investigation levels

In accordance with NSW EPA (2007) *Guidelines for the Assessment and Management of Groundwater Contamination*, contaminants identified in groundwater have been screened against existing generic groundwater investigation levels (GILs) which protect the following environmental values:

- Drinking water

- Aquatic ecosystems

The groundwater investigation levels (GILs) presented in NEPC 2013 are based on ANZECC 2000 and NHMRC 2011. These criteria are considered to be protective of the environmental and drinking water values referenced by NSW EPA (2007). On the basis that groundwater could discharge to a marine water system (Lake Illawarra, located approximately 650 m north-east of the site), NEPM GILs for marine waters have been adopted.

The National Health Medical Research Council (NHMRC) recreational guidelines have also been adopted to account for potential use of groundwater for recreation use off-site.

The HSLs presented in NEPC 2013 are based on CRC CARE 2011 and HSL D commercial/industrial (vapour intrusion for sand soils, 2-4 m) have been adopted for this investigation.

CRC Care groundwater HSLs for vapour intrusion to intrusive maintenance workers (vapour intrusion for sand soils, 2-4 m) were included in this investigation. However, GHD notes that these guidelines are non-limiting for all analytes.

6. Results

6.1 General

This section presents the results of all soil, groundwater, sediment and surface water investigations undertaken on the site by GHD in December 2016.

Analytical results and groundwater / surface water field parameters are summarised in the following tables in Appendix B:

- Table A1: Soil analytical results: Human health
- Table A2: Soil analytical results: Ecological and intrusive maintenance workers
- Table A3: Sediment analytical results: Human Health
- Table A4: Sediment analytical results: Ecological
- Table B: ASLP analytical results
- Table C: Groundwater and surface water analytical results and field parameters

6.2 Quality assurance and quality control

An evaluation of the field and laboratory data quality was undertaken in accordance with the NEPM – Schedule B2, Assessment of data quality.

Laboratory report ES1629123 was re-analysed for the full PFAS suite and the results were reported under a new laboratory report ES1701791. The two reports showed a number of large discrepancies with respect to the analytical data reported at the same locations. In all instances, data reported from the second analyses for the full PFAS suite (laboratory report ES1701791) was higher than the original results, in some samples by an order of magnitude. As a result of these discrepancies, the laboratory run duplicate analysis on selected samples and confirmed that the results from the second laboratory report ES1701791 were correct. For the purpose of these investigations, GHD has accepted the data reported in laboratory report ES1701791 (the most conservative data set) and PFAS results from laboratory report ES1629123 have not been discussed further in this report.

Overall, the review of the QA/QC program indicates that the soil, groundwater, surface water and sediment analytical data are of an acceptable quality upon which to draw meaningful conclusions regarding impacts to groundwater and soil at the site.

6.3 Soil results

Soil was examined by GHD during drilling works at newly installed groundwater wells (GW01 to GW05) and soil bores (SB6 to SB15). Descriptions of the site lithology including visual and olfactory observations, sample identifications along with the well construction details and elevations are presented in borehole logs contained in Appendix F.

6.3.1 Soil profile

The observed lithology at across the 15 soil sampling locations is summarised in Table 6-1.

Table 6-1 Generalised lithology encountered

Depth range (m)	Lithology
0.0 – 0.6	Silty SAND (fill)
0.6 – 5.0	CLAY pale grey mottled brown (alluvial)

Depth range (m)	Lithology
5.0 – 6.6	Gravelly and or sandy CLAY (alluvial)

6.3.2 Soil analytical results

Soil samples were collected from 10 soil bores (SB06 to SB15) and five monitoring wells (GW01 to GW05) installed at various locations on and off site. Five soil bores (SB06 to SB10) and two groundwater wells (GW01 and GW02) were installed within the FR NSW compound. Soil bores SB11 to SB15 and monitoring wells GW03, GW04 and GW05 were installed in the area surrounding the site. The soil laboratory results are presented in Figure 6 in Appendix A and Tables A1 and A2, Appendix B. Laboratory certificates of analysis are presented in Appendix H.

PFAS summary results

PFAS concentrations in soil were generally low with concentrations of the sum of PFOS and PFHxS generally two to three orders of magnitude below the relevant screening levels with the following exceptions:

- SB06_0.5-0.6, reporting a total sum PFOS + PFHxS concentration of 3.73 mg/kg.
- SB09_0-0.1, reporting a total sum PFOS +PFHxS concentration of 4.21 mg/kg.

In both instances, these samples were collected on site and as such reference to the commercial land use criteria protective of human health (100 mg/kg) was considered and no exceedance of this value was identified.

Detectible concentrations of PFOS + PFHxS concentration were reported in the soil analyses from asphalt sample SB07_ASHPALT_0.0_0.3 (0.0146 mg/kg) albeit below the adopted guidelines.

In all instances, concentrations of PFOS and PFOA were below the nominated draft ecological screening criteria of 6.6 mg/kg and 1 mg/kg respectively.

Other COPCs

Soil COPCs reported in excess of the nominated screening criteria are summarised in Table 6-2. Further comment pertaining to these exceedances is provided in Section 7.

Table 6-2 Summary soil exceedances

Analyte	Exceedance type	Location
Copper	NEPM 2013 EIL-Commercial/Industrial	Soil – SB07_0.5_0.6 (143 mg/kg)
	NEPM 2013 EIL-Urban Residential- Public Open Space	Soil – SB08_0.0_0.15 (64 mg/kg) (duplicate) and SB07_0.5_0.6 (143 mg/kg)
Zinc	NEPM 2013 EIL-Commercial/Industrial NEPM 2013 EIL-Urban Residential- Public Open Space	Soil – GW05_1.6_1.7 (278 mg/kg)

All samples were also analysed for TRH, BTEX and PAH and the concentrations of these analytes were near or below the detection limit of the laboratory and nominated screening levels protective of human health and ecological receptors under the relevant land use scenario.

6.3.1 Leachate –ASLP

A total of 16 soil samples were submitted for ASLP to assess the leaching potential of PFAS from site soils (GW01_0-0.2, GW02_0.5-0.6, GW03_0-0.1, GW04_0.5-0.6, GW05_1.6-1.7, SB06_5.0-5.1, SB07_3.0-3.1, SB08_0.5-0.6, SB09_4.0-4.1, SB10_0-0.1, SB12_0-0.1, SB13_0.5-0.6, SB14_0.5-0.6 and SB15_1.0-1.1). The leachate laboratory results are presented

in Table B, Appendix B and shown on Figure 7, Appendix A. Laboratory certificates of analysis are presented in Appendix H.

The results indicate elevated levels of PFAS leaching from the soils, in particular locations SB06_0.5-0.6 and SB09_0-0.1, corresponding with sampling locations reporting the maximum total PFOS + PFHxS concentrations in soil.

PFAS leachate reported in excess of the nominated screening criteria are summarised in Table 6-3. Further comment pertaining to the relevance of this data is provided in Section 7.

Table 6-3 PFAs ASLP exceedances

Analyte	Exceedance type	Location
PFHxS and PFOS (Sum of Total)	NEPM GIL ecological, freshwater	Detection level exceedance in all samples
	NEPM GIL, drinking water	GW03_0.0-0.1 (76.9 ug/L), SB06_0.5-0.6 (192 ug/L), SB06_5.0-5.1 (10.8 ug/L), SB08_0.5-0.6 (21.5 ug/L), SB09_0.0-0.1 (550 ug/L), SB09_4.0-4.1 (10.7 ug/L) and SB10_0.0-0.1 (11.5 ug/L)
	NHMRC recreational	GW03_0.0-0.1 (76.9 ug/L), SB06_0.5-0.6 (192 ug/L) and SB09_0.0-0.1 (550 ug/L)

6.4 Sediment results

6.4.1 Analytical results

Sediment samples were collected at locations SS01 to SS05. The sediment laboratory results presented in Figure 6 in Appendix A and Table A3 and A4, Appendix B. Laboratory certificates of analysis are presented in Appendix H.

There were no exceedances of the nominated screening criteria for sediment.

Excluding SS03 and SS05, concentrations of PFAS in sediments were low and generally below or close to the laboratory limit of reporting. In the absence of current screening criteria for PFAS in sediments, the DER (2017) screening criteria for soils have been applied. Given the location and profile of the samples collected the application of soil screening criteria for initial analysis of the data set is considered appropriate for this investigation.

The maximum concentrations reported for PFOS and PFOA in sediments were 0.186 mg/kg and 0.0051 mg/kg respectively. All PFAS concentrations were several orders of magnitude below the nominated investigation levels, however still represent a potential on-going source of PFAS to surface water receptors.

6.5 Groundwater and surface water results

6.5.1 Groundwater gauging results

Gauging results are summarised in Table 6-4. The top of casing (TOC) elevation was determined by a professional surveyor and was used to calculate the groundwater elevation in metres Australian Height Datum (AHD).

Table 6-4 Groundwater Gauging Data

Well ID	Depth of well (m)	Depth to groundwater (m bTOC)	TOC (m AHD)	Corrected groundwater elevation (m AHD)
GW01	6.304	3.296	6.170	2.874
GW02	6.660	3.350	6.293	2.943

Well ID	Depth of well (m)	Depth to groundwater (m bTOC)	TOC (m AHD)	Corrected groundwater elevation (m AHD)
GW03	6.395	2.721	5.398	2.677
GW04	6.045	2.610	5.036	2.426
GW05	6.20	2.815	4.814	1.999

Note: TOC = top of casing

A groundwater contour map showing the interpolated groundwater contours and the inferred groundwater flow direction is presented on Figure 8 in Appendix A. Groundwater contours were calculated based on groundwater elevations using an inbuilt ArcGIS interpolation tool to derive the contours with a kriging method.

The local groundwater flow was inferred to be in a north to north-easterly direction.

6.5.2 Groundwater quality

Prior to groundwater sample collection, field parameters and observations were recorded during the purging of the well. Field parameters for the site are summarised in Table 6-5.

Table 6-5 Summary of water quality field parameters

Parameter	Results and Comments
pH	pH range was 3.75 (GW04) and 6.04 (GW01)
Temp (°C)	Temperature was between 18.3°C (GW03) and 19.4°C (GW01)
EC (µS/cm)	EC ranged between 10,004 µS/cm (GW01) and 16,983 µS/cm (GW04)
DO (mg/L)	DO ranged between 1.81 mg/L (GW03) and 6.24 mg/L (GW01)
ORP* (mV)	Field redox ranged between 73.6 mV and 283.5 mV

* Oxidation Reduction Potential

6.5.3 Analytical results

Groundwater samples were collected from two onsite wells; GW01 and GW02 and three offsite monitoring wells; GW03, GW04 and GW05. Surface water samples were collected from four offsite locations; SW01, SW02, SW03, SW04 and one on-site location; SW05. The groundwater and surface water laboratory results presented in Figure 5 in Appendix A and Table C, Appendix B. Laboratory certificates of analysis are presented in Appendix H.

Groundwater and surface water COPC reported in excess of the nominated screening criteria are summarised in Table 6-6. Further discussion pertaining to these exceedances is provided in Section 7.

Table 6-6 Summary groundwater and surface water exceedances

Analyte	Exceedance type	Monitoring location
Sum PFHxS and PFOS	NEPM GIL ecological, marine water (inclusive of WA DER PFAS criterion)	All surface water and groundwater locations excceded this criteria. Maximum concentrations at SW05 (162 ug/L).
	NEPM GIL, drinking water (inclusive of WA DER PFAS criterion)	Surface water – SW01, SW03 and SW05. Maximum concentration at SW05 (162 ug/L). Groundwater – GWQA3 (GW01) and GW03 Maximum concentration at GW03 (46.5 ug/L).
	NHMRC recreational (inclusive of WA DER PFAS criterion)	Surface water – SW05 (162 ug/L) Groundwater - GW03 (46.5 ug/L)

Analyte	Exceedance type	Monitoring location
PFOA	NEPM GIL ecological, marine water (inclusive of WA DER PFAS criterion)	Surface water –SW05 (9.13 ug/L).
Arsenic	NEPM GIL, drinking water	Groundwater - GW04 (0.018 ug/L)
Copper	NEPM GIL ecological, marine water	Surface water - SW01, SW02 and SW03. Maximum concentrations at SW02 (0.006 ug/L) Groundwater – GW02, GW04 and GW05. Maximum concentrations at GW04 (0.052 ug/L)
Lead	NEPM GIL ecological, marine water	Groundwater – GW02 and GW04 (0.004 ug/L and 0.007 ug/L, respectively).
Nickel	NEPM GIL, drinking water	Groundwater – GW01, GW02, GW03, GW04 and GW05. Maximum concentrations at GW04 (0.323 ug/L).
	NHMRC Recreational	Groundwater – GW04 (0.323 ug/L)
Zinc	NEPM GIL ecological, marine water	Surface water – SW04 (0.01 ug/L) Groundwater - GW01, GW02, GW03, GW04 and GW05. Maximum concentrations at GW04 (0.744 ug/L).

Concentrations of TRH and PAH were below detection levels for majority of sampled analysed. No exceedances were reported.

6.6 Slug test results

Location	Bouwer-Rice – Low (m/day)	Bouwer-Rice – High (m/day)	Bouwer – Rice – Mean (m/day)
GW01	0.018	0.029	0.024
GW02	0.020	0.070	0.045
GW03	0.032	0.123	0.078
GW04	0.005	0.010	0.008
GW05	0.023	0.043	0.033

In December 2016, GHD conducted groundwater hydraulic conductivity testing including short term single well pumping tests to characterise the hydraulic conductivity (k) of the aquifer encountered beneath the site. The testing was undertaken at five locations (GW01, GW02, GW03, GW04 and GW05). These monitoring location were installed within the alluvial floodplain clays surrounding Lake Illawarra.

The data was processed with the AQTESOLV Pro software (HydroSOLVE Inc, 1996-2007) using the Theis (recovery) analytical solution. The analytical outputs from AQTESOLV are provided in Appendix I.

The results indicated that the hydraulic conductivity ranged from <0.01 m/day to 0.078 m/day and are in the literature range of a clay to silt aquifer (Weight and Sondregger, 2000).

7. Discussion

7.1 PFAS Contamination status

7.1.1 Soil and sediment

On-site

No soil and sediment samples exceeded the adopted PFAS screening criteria for both human health and ecological receptors based on a direct contact scenario. The concentration of PFAS in soils and sediments were low with the results generally being less than the LOR and/or several orders of magnitude below the nominated investigation levels under commercial/industrial land use scenarios.

Soil samples SB06_0.5-0.6 and SB09_0.0-0.1 reported the highest concentrations of PFAS. These samples were collected to the north and south of the fire training ground respectively, in an area which has historically and is currently used for firefighting training purposes.

The one on-site sediment sample (SS05) reported detectable concentrations of PFAS and the concentrations were the highest at this location.

The results of the soil and sediment sampling confirm that the areas of firefighting training that are known to have used AFFF containing PFAS remain impacted, albeit at concentrations below screening criteria adopted for the protection of human health and ecological receptors based on a direct contact or ingestion scenario. The presence of PFAS impact in soils however remains, and the potential for on-going release to the environment can not be discounted and is discussed further below.

Off-site

No off-site soil bores reported detects of PFAS. However, all off-site sediment samples report detections of PFAS excluding SB11. This indicates that PFAS is likely to be migrating off-site via the surface water drainage pathways.

Vegetation identified as environmentally sensitive land is located immediately east of the site. Soil bores (SB11, SB12 and SB13) were carried out within this area and detections of PFAs were reported in concentrations several orders of magnitude below the adopted sensitive ecological guidelines. GHD acknowledges these values are draft and are considered in the context of the boarder site setting and potential source pathway receptor linkages.

The concentration of PFAS in off-site sediment samples was comparable with sediment samples from with-in the FRNSW site and wider training facility, suggesting that attenuation of PFAS within the drainage lines is limited.

All off-site sediment samples, excluding SS02, contained detectible concentrations of PFAS. Levels of PFAs were highest in sediments collected from SS03 located in Albion Creek near Princes Hwy. No exceedances of the adopted criteria were reported. The concentration of PFAS in off-site sediment samples was comparable with the on-site sediment sample, suggesting that attenuation of PFAS within the drainage lines is limited.

PFAS leachability from soils

The most important process by which PFASs present in soil may pose a risk to people or the environment is contamination of surface and groundwater's from leaching from the soil (NSW EnRisk, 2016)

Despite the low concentration of PFAS in all soil and sediment samples, leachate testing completed on a number of these samples shows that there is potential for the release of PFAS to groundwater and surface water environments and the presence of PFAS in soils represents a likely on-going source to the environment.

All soil samples analysed for leachate potential (ASLP) exceeded the nominated leachability screening criteria adapted from WA DER (2017) ecological freshwater guidelines suggesting that the impacted soils both on and off site may continue to pose a risk to ecological aquatic receptors. The concentration of PFHxS and PFOS (sum of total) from shallow samples at GW03, SB06, SB08, SB09 and SB10 and deeper samples at SB06 and SB09 were noted to also exceed the leachability screening criteria adapted from the WA DER (2017) Drinking water guidelines. GW03, SB06 and SB09 shallow samples exceeded the adapted WA DER (2017) recreational guidelines. Each of these locations are also associated with the main training area on and just off-site the FRNSW site. Based on the findings of this preliminary stage of assessment, this area is considered likely to be a primary source zone of ongoing PFAS contamination to surface water and groundwater receptors.

7.1.2 Groundwater

Groundwater contours indicate that the groundwater is flowing generally to the north to north-east towards Lake Illawarra. This aligns with the expected groundwater flow from the regional topography, geology and hydrogeology outlined in Section 2.3.

Concentrations of PFAs have been detected in groundwater both on and off-site. The highest concentration and inferred source of PFAS contamination on-site is from the surface water retention pond in the north-eastern corner of the fire training ground. PFAS was detected in all the surface water drainage lines leading from the retention pond. Once off-site, PFAS is detected down gradient in Albion Creek and its unnamed tributary adjacent Poplar Avenue. Levels of PFAS in surface water decrease with increasing distance from site. The lowest concentrations of PFAS were reported in the sample (SW02) collected the Illawarra Airport stormwater canal situated north of the site and up gradient of Albion Creek. Considering the highly mobile and soluble nature of PFAS this may suggest that AFFF use has been limited to the Fire and Rescue compound.

Drinking water exceedances of PFAS are reported in groundwater adjacent the retention pond and down gradient surface waters. Considering that groundwater flow direction is to the north-east towards Lake Illawarra, groundwater conditions down gradient of the source zone remain un-delineated. However, the exposure pathway of groundwater being abstracted for potable and or domestic purposes is not considered likely as no registered groundwater abstraction bores are located within 1 km of the site and that there is the availability of local mains water supply.

As a conservative measure GHD has adopted the DER (2017) fresh water ecology criteria (99% species protection level) and for surface water assessment levels for recreational use. DER states that the bio accumulative properties of PFAS are reason enough to use the draft ANZECC trigger levels for the protection of 99% of species.

The nearest surface water body and significant ecological receptor is Lake Illawarra located approximately 650 m north-east of site. Concentrations of PFAS within a surface water sample collected near the discharge point of Albion Creek to Lake Illawarra reported a detection level exceedance of ecological guidelines. GHD acknowledges that the 99% ecological guideline is below the quantifiable limit of reporting however, the current approach by ANZECC on the use of guideline value recommends moving away from relying solely on chemical concentrations for managing water quality and encourages a more integrated approach.

7.2 Prioritisation

EnRisk (2016) presents a decision tree process and trigger points to enable prioritisation of sites based on the findings of investigation. Trigger points for soil leachate, surface water and groundwater as reported by EnRisk (2016), are summarised below with reference to the analytical data collected during this preliminary stage of assessment.

Soil leachate data

- Trigger point 1: Soil leachate data reported above 100 µg/L[1]
- Trigger point 2: Soil leachate data reported above 1 µg/L

The maximum total PFAS concentration reported for soil leachate data was 550 µg/L collected from SB09_0.0-0.1, classifying the site as a 'Priority 1 site' under the EnRisk (2016) decision tree process based on soil leachate data.

Groundwater and surface water data

- Trigger point 1 (elevated contamination): Groundwater or surface water data reported above 10 µg/L[2]
- Trigger point 2: Groundwater or surface water data reported between 0.1 µg/L to 10 µg/L
- Trigger point 3 (low levels of contamination): Groundwater or surface water data reported between 0.05 µg/L to 0.1 µg/L

The maximum total PFAS concentration reported for surface water was 162 µg/L in SW05 collected from the retention pond located adjacent to the fire training area. Based on review of the surface water data, the site would be classified as a priority 1 site (where on-site surface water results are above trigger point 1).

Total PFAS concentrations in groundwater on site range between 0.1 to 46.5 µg/L with the highest off-site sample reporting a concentration of 46.5 µg/L. Under the EnRisk (2016) decision tree process, the site would be classified as priority 1.

Prioritisation of the site

As outlined above, soil leachate, surface water and groundwater analytical data would classify the site as a priority 1 site for further investigation based on the data reported both on and off site.

The conclusions and recommendations made in Section 9 of this report take into account this prioritisation.

[1] Trigger points values can be applied to PFOS alone or to the sum of PFAS as discussed by EnRisk (2016)
[2] Trigger points values can be applied to PFOS alone or to the sum of PFAS as discussed by EnRisk (2016)

8. Conceptual site model

It is noted that the primary objective of this investigation is to assess the historical impacts from fire training activities. While other minor sources of contamination have been identified, based on our review, firefighting training activities are the key issue of concern for the site. The primary contaminants of potential concern (COPC) are therefore PFAS, notably PFOS and PFOA, which were components of AFFF. The CSM concentrates primarily on PFAS as the main COPC for the site and is the key driver for any additional work at the site.

Based on the sampling analytical results, the conceptual site model from the PSI (GHD, 2016) has been refined. The potential source-pathway-receptor linkages are summarised below (Table 8-1).

8.1.1 Sources

The site is currently occupied by FRNSW and is used by staff as office space, meeting areas for crewing staff, storage and fire training. AFFF containing PFAS are no longer used at the site.

Based on the findings of the PSI (GHD, 2016) and the results of intrusive investigations undertaken to date, the following primary sources of contamination and associated COPC have been identified:

- The site has historically been used as a firefighting training site for approximately 20 years.
- Potential source areas include:
  - The concrete pad and asphalt surface in the north eastern area of site, where most AFFF and fuel for ignition are likely to have been used.
  - The retention pond in the north eastern area of site which showed elevated PFOS concentration after EPA sampling.
  - The grassed area immediately off-site where overflow of the retention pond would occur.
  - All other areas of the site where different fire training scenarios have historically taken place. Based on discussions with site personnel, the historical use of AFFF in these areas cannot be discounted.
  - Minor spills of petroleum hydrocarbons and oils from vehicles traversing the asphalt surfaces within the investigation area.

Impacted soils and sediments which have migrated from the main source zones (including to off-site locations), with subsequent leaching of PFAS, represent a secondary source of contamination.

Other potential historical COPC included TRH, BTEX and PAHs from fire accelerants and motor oils from vehicles (historic and current). However, analytical results for these compounds were generally low or below the LOR in soil, sediment, surface water and groundwater samples indicating that they are unlikely to be an ongoing source of contamination.

8.1.2 PFAS fate and transport

PFAS forms a component of AFFF which is sprayed onto fires during training events. The mode of use of AFFF through roof monitors and hoses allows for it to spread through airborne dispersion beyond the training area. Typically, this results in diffuse low levels of PFAS over a wider area. Generally, the highest soil concentrations tend to be at the point source.

PFAS are stable and persistent compounds that do not readily degrade in the environment.

Once in soil, PFAS can leach from soil to water (due to its solubility in water) as water migrates downward through soil to the water table, resulting in contaminated groundwater. Generally, the shorter chain PFAS species are more soluble than the longer chain PFAS. Groundwater will migrate and discharge into the nearest down-gradient surface water body – in the case of the site the main discharge area is likely to be Lake Illawarra 650 m east of site, as well as through stormwater drainage to Albion Creek which drains to Lake Illawarra. Lake Illawarra is used commercially for recreational activities and fishing purposes.

If the groundwater in the area is shallow, groundwater and PFAS may 'daylight' during high rainfall events and result in overland flow to surface drains and creeks.

Studies have indicated that as fresh water contacts sea water, PFAS's can partition into sediments suggesting a significant mass of dissolved phase PFAS's may partition into the sediment rather than become dissolved in sea water (You et al 2010, Zhang and Lerner 2012). This, combined with tidal effects, makes the discharge mechanisms in coastal regions very complex. Benthic organisms living in the sediment may then be impacted through ingestion of the sediments.

Migration through the soil will depend on the attenuation properties of the soil. Some components of the soil (notably organic carbon) can sorb PFAS components. Generally, the longer chain PFAS species will sorb more readily. This, combined with the lower solubility of the longer PFAS species, can result in mainly shorter chain PFAS species being dissolved in water while the large molecules remain in the soil.

The surface water on-site collects in the stormwater pit in the north eastern corner of the site. This then connects to the stormwater pipe that meets Albion Creek 400 m north of the site. The main surface water receptors considered to be Lake Illawarra located approximately.

Plants (including aquatic plants) have the ability to uptake PFAS in through impacted soil water. Grasses and other flora can be consumed by micro- and macro-fauna which may in turn be predated.

The main risks to human health mainly arise through ingestion of impacted media i.e. soil, water or organisms.

In terms of risks to ecological receptors, while contamination can give rise to direct toxic effects on ecosystems, the limiting factor can be the bioaccumulation of contaminants in fish or other species affecting persons or other animals that consume these fish or other species.

8.1.3 Receptors

When evaluating potential adverse health / environmental effects from exposure to a contaminated site, all potentially exposed populations should be considered. For this site, the key populations or receptors of interest are considered to include:

- Current and future onsite workers.
- Current and future construction/intrusive maintenance (utility) workers (on-site and off-site).
- Residential properties down gradient of the site.
- Users of off-site water bodies for recreational and fishing purposes.
- Users of groundwater. GHD understands that groundwater is not extracted at the site for any purpose suggesting this may be a low risk. However, the potential for extraction remains both on-site and off-site.
- Aquatic ecological receptors – invertebrates, molluscs, fish, eels etc.

- Terrestrial ecological receptors – local invertebrates (worms, insects etc), mammals, birds, reptiles that might consume impacted animals, plants and surface water.

8.1.4 Exposure pathways

The primary pathways by which receptors could be exposed to the sources of contamination outlined above are considered to be:

- Dermal contact with contaminated soil, surface water and groundwater.
- Incidental ingestion of contaminated soils, surface water and groundwater.
- Ingestion of groundwater and impacted plant and animal material.
- Terrestrial animal consumption of impacted animals, water, soils and plants.
- Inhalation of contaminated soils or dust and water (aquatic animals). (PFAS are not considered to be a vapour hazard due to its low volatility).
- Extraction and use of groundwater.
- Surface runoff and sediment transport into storm water drainage and subsequent transport and discharge to surface waters. This may be enhanced during significant rain events and flooding.
- Inhalation of contaminated soils or dust.
- Vertical and horizontal migration of contaminated liquid through the unsaturated zone into the saturated zone, and subsequent horizontal migration within the groundwater and subsequent discharge to surface waters. The US EPA (2014) notes that PFAS are water soluble and can migrate readily from soil to groundwater, where they can be transported long distances.

8.1.5 Potential source-pathway-receptor linkages

Based on the current information, the following preliminary CSM has been developed for potential on site sources of contamination in Table 8-1 below and presented in **Figure 9, Appendix A**.

Table 8-1 Updated CSM

Potential Source	Primary pathway	Receptor	Pathway present?
Soils in firefighting training areas	Dermal contact	FRNSW and wider training facility commercial workers	Unlikely – PFAS impact detected in shallow soil samples from this area (SB06, GW03 and SB09) however impact below adopted assessment criteria
		Intrusive maintenance workers	Unlikely – PFAS impact detected in shallow soil samples from this area (SB06, GW03 and SB09) however impact below adopted assessment criteria
	Vertical/horizontal migration of leachate through unsaturated zone	Groundwater – subsequent migration in groundwater (secondary)	Yes – PFAS impact in GW03 and GW04, down gradient of training facility
	Surface runoff and sediment transport	Surface waters (including drainage systems –	Yes – PFAS detected in sediment samples from surface waters and drainage lines associated with this area.

Potential Source	Primary pathway	Receptor	Pathway present?
		secondary pathway)	
		Off-site open space	Yes – sediment samples along drainage line contain PFAS
		Off-site ecological	Yes – off-site surface water indicate PFAS impact above ecological screening criteria, which is likely to be associated with the FRNSW site
Surface water retention basin	Dermal contact and ingestion	FRNSW and wider training facility commercial workers	Possible – PFAS impact present greater than drinking water and recreational criterion at SW01, SW03, SW05.
	Vertical/horizontal migration of water through unsaturated zone	Groundwater – subsequent migration in groundwater (secondary)	Yes - PFAS impact in GW03, GW04 and GW05, down gradient of training facility.
		Down gradient surface waters	Yes – Albion Creek and at the outlet to Koona Bay down gradient report PFAS impact
Surface Water off-site – Albion Creek and Lake Illawarra	Dermal contact and ingestion	Down gradient surface waters	Yes – Albion Creek and at the outlet to Koona Bay down gradient report PFAS impact
	Down gradient ecological receptors	Down gradient surface waters	Yes – Albion Creek and at the outlet to Koona Bay down gradient report PFAS impact
Contaminated groundwater	Vertical/horizontal migration	Down gradient surface waters recharged by groundwater	Yes – GW03 and GW04 have PFAS impact above adopted assessment criteria off-site.
		Abstraction bores (stock and/or domestic use)	Unlikely – There are no known user of groundwater down gradient of the site.
Soils impacted by fire accelerants and motor oils from vehicles (historic and current, TRH, BTEX and PAH)	Dermal contact and ingestion and/or Inhalation of vapours and/or Vertical/horizontal migration through unsaturated zone	FRNSW and wider training facility commercial workers, intrusive maintenance workers and/or groundwater	No – the majority of samples below the LOR and all samples below the adopted assessment criteria for each assessed receptor.

It is noted that SW05 exceeds the recreational guidelines for PFHxS and PFOS. The location of the sample point is within the retention pond located within the secure Fire and Rescue compound. A recreational scenario is not applicable to this location and the likelihood of a human coming into accidental contact with this water is highly unlikely.

9. Conclusions and recommendations

9.1 Conclusions

The overall objective of this investigation is to characterise impacts and subsequently assess the potential risks to human health and the environment from historical firefighting training activities (specifically those involving PFAS) in the FRNSW site and wider training facility area. Based on the scope of works presented in Section 1.3 of this report, the findings of the investigation and subject to the limitations presented in Section 11, the following conclusions are made:

- The subsurface investigations encountered silty sand fill underlain by alluvial clay to a maximum investigation depth of 6.6 m bgl.
- Standing water levels in on-site wells were recorded to be between 2.61 m btoc (GW04) and 3.35 m btoc (GW02). The general groundwater flow direction was inferred to be towards the north-east.
- Analysis of the soil and sediment samples indicated the following:
  - Heavy metal ecological exceedances were reported at two locations on site (SB08 and SB07) and one off site (GW05).
  - Concentrations of PFAS exceeded human health guidelines in one onsite location sample (SB09_0.0_0.1).
  - PAH recreational exceedances were reported in sediment sample SS02.

  Leachability testing confirmed that PFAS impacted soils and sediments have the potential to release PFAS to the environment at concentrations exceeding the nominated screening levels.

  All off-site sediment samples reported detects of PFAS. This indicates that PFAS is likely to be migrating off-site via the surface water drainage pathways.
- Analysis of the groundwater samples collected during the GME indicated the following:
  - Heavy metal exceedances were reported at various monitoring locations on and offsite.
  - The highest value of PFAS contamination on-site is from the surface water retention pond in the north-eastern corner of the fire training ground.
  - PFAS was detected in all the surface water drainage lines leading from the retention pond.
  - PFAS is detected down gradient in Albion Creek and its unnamed tributary adjacent Poplar Avenue.
  - Levels of PFAS in surface water decrease with increasing distance from site.
  - Concentrations of PFAS in a surface water sample near the discharge point of Albion Creek to Lake Illawarra exceeded ecological guidelines.
- A conceptual site model has been developed for the site and it is considered that complete or potentially complete exposure pathways between PFAS contamination and identified receptors are present.
- Based on the EnRisk (2016) decision tree process for prioritisation, the site is currently classified as a priority 1 site based on detections of PFAS in surface water on site and at the site boundary at concentrations exceeding trigger value 1. It is important to note that the trigger point system has not been designed to be protective of all risks to people or

the environment but is designed to assist with prioritisation of sites for further assessment and management.

9.2 Recommendations

Based on the findings of these works, the following recommendations are made:

- A residential survey of water use be conducted to better characterise groundwater and surface water use down gradient of the FRNSW site.
- Consideration of immediate management actions which can be implemented to address the mass of PFAS present on site and minimise further migration. These management actions may include, but not be limited to:
  - Assess and implement measures to stop the retention basin on the FRNSW site overflowing, and restrict access/use of the water currently in this dam.
  - Sediment trap on the centralised pit to stop the transport of sediment leaving the site.
  - Removal of impacted soils around the fire training ground on the FRNSW site to remove the primary source zone
- Additional sampling should be undertaken following the implementation of any management actions. Sampling should be undertaken to accommodate seasonal fluctuation and, for example, following rainfall events to enable assessment of the areas where surface water collects from the ponds.
- Additional investigation to assess whether impacted groundwater is migrating off-site towards other potential abstraction points down gradient of the site. Data collected during the additional stage of investigations should include re-sampling of all surface and groundwater bore locations to validate the initial data set owing to the discrepancy reported by the laboratory.
- Risk assessment to evaluate risks to the identified receptors in the CSM.

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11. Limitations

This report has been prepared by GHD for Fire & Rescue NSW and may only be used and relied on by Fire & Rescue NSW for the purpose agreed between GHD and the Fire & Rescue NSW as set out in this report.

GHD otherwise disclaims responsibility to any person other than Fire & Rescue NSW arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described throughout this report. GHD disclaims liability arising from any of the assumptions being incorrect.

Where data supplied by Fire & Rescue NSW or other external sources, including previous site investigation data and site plans, have been used, it has been assumed that the information is correct unless otherwise stated. No responsibility is accepted by GHD for incomplete or inaccurate data supplied by others.

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

Site conditions (including the presence of hazardous substances and/or site contamination) may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.

Appendices

Appendix A – Figures

LEGEND

- Site Boundary
- Streets
- Major Waterways
- Minor Waterways

0 50 100 200 300 400 500

Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

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Fire & Rescue NSW
Albion Park Site Investigation

Site Location and Key Off-site Receptors

Job Number	21-25583
Revision	A
Date	21 Feb 2017

Figure 1

G:\21\25583\GIS\Maps\Deliverables\Albion Park\21_25583_Z001_AlbionPark_SiteLocation.mxd Level 15, 133 Castlereagh Street Sydney NSW 2000 T 61 2 9239 7100 F 61 2 9239 7199 E sydmail@ghd.com.au W www.ghd.com.au

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Data source: Imagery - Google Earth Pro; Streets, Waterways - NSW LPI 2012 DTDB. Created by:mweber

LEGEND

- Site Boundary
- Cadastre
- Environmentally Sensitive Land
- Streets
- Major Waterways
- Minor Waterways
- Inferred Surface Drainage (Aboveground)
- Inferred Surface Drainage (Underground)

Paper Size A4

0 20 40 80 120

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

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Fire & Rescue NSW
Albion Park Site Investigation

Job Number 21-25583
Revision A
Date 17 Feb 2017

Site Layout

Figure 2

G:\21\25583\GIS\Maps\Deliverables\Albion Park\21_25583_Z002_AlbionPark_SiteLayout.mxd

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Data source: Imagery - ©Land and Property Information (Extracted: 17/02/17); Streets, Waterways - NSW LPI 2012 DTDB. Created by:mweber

LEGEND

- Site Boundary
- Streets
- Contours
- Major Waterways
- Minor Waterways

Value

High : 8.185

Low : 0.686

0 10 20 40 60 80 100

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

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Fire & Rescue NSW
Albion Park Site Investigation

Job Number 21-25583
Revision A
Date 20 Jan 2017

Elevation

Figure 3

G:\21\25583\GIS\Maps\Deliverables\Albion Park\21_25583_Z003_AlbionPark_Elevation.mxd Level 15, 133 Castlereagh Street Sydney NSW 2000 **T** 61 2 9239 7100 **F** 61 2 9239 7199 **E** sydmail@ghd.com.au **W** www.ghd.com.au

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Data source: Imagery - Google Earth Pro; Streets, Waterways - NSW LPI 2012 DTDB; LIDAR - NSW LPI. Created by:tnham

LEGEND

- Site Boundary
- Streets
- Major Waterways
- Minor Waterways
- Inferred Surface Drainage (Aboveground)
- Inferred Surface Drainage (Underground)
- Groundwater Monitoring Well (GHD, 2016) (5)
- Soil Borehole (GHD, 2016) (10)
- Sediment Sample Location (GHD, 2016) (5)
- Surface Water Sample Location (GHD, 2016) (5)

0 10 20 40 60 80 100

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Fire & Rescue NSW
Albion Park Site Investigation

Job Number 21-25583
Revision A
Date 17 Feb 2017

Investigation Locations

Figure 4

G:\21\25583\GIS\Maps\Deliverables\Albion Park\21_25583_Z004_AlbionPark_InvestigationLocations.mxd

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Data source: Imagery - Land and Property Information 2017; Streets, Waterways - NSW LPI 2012 DTDB. Created by:mweber

LEGEND

- Site Boundary
- Streets
- Major Waterways
- Minor Waterways
- Inferred Surface Drainage (Aboveground)
- Inferred Surface Drainage (Underground)
- Groundwater Monitoring Well (GHD, 2016) (5)
- Soil Borehole (GHD, 2016) (10)
- Sediment Sample Location (GHD, 2016) (5)
- Surface Water Sample Location (GHD, 2016) (5)

0 10 20 40 60 80 100
Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Fire & Rescue NSW
Albion Park Site Investigation

Job Number 21-25583
Revision A
Date 06 Apr 2017

Groundwater and Surface Water Exceedances & PFAS Results

Figure 5

\\ghdnet\ghd\AU\Sydney\Projects\21\25583\GIS\Maps\Deliverables\Albion Park\21_25583_Z005_AlbionPark_Water_Exceedances.mxd

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Data source: Imagery - Land and Property Information; Streets, Waterways - NSW LPI 2012 DTDB. Created by:fcheong

LEGEND

- Site Boundary
- Streets
- Major Waterways
- Minor Waterways
- Inferred Surface Drainage (Aboveground)
- Inferred Surface Drainage (Underground)
- Groundwater Monitoring Well (GHD, 2016) (5)
- Soil Borehole (GHD, 2016) (10)
- Sediment Sample Location (GHD, 2016) (5)
- Surface Water Sample Location (GHD, 2016) (5)

0 10 20 40 60 80 100
Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

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Fire & Rescue NSW
Albion Park Site Investigation

Job Number 21-25583
Revision A
Date 21 Feb 2017

Soil and Sediment Exceedances & PFAS Results

Figure 6

G:\21\25583\GIS\Maps\Deliverables\Albion Park\21_25583_Z006_AlbionPark_Soil_Sediment_Exceedances.mxd

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Data source: Imagery - Land and Property Information; Streets, Waterways - NSW LPI 2012 DTDB. Created by:mweber

LEGEND

- Site Boundary
- Streets
- Major Waterways
- Minor Waterways
- Inferred Surface Drainage (Aboveground)
- Inferred Surface Drainage (Underground)
- Groundwater Monitoring Well (GHD, 2016) (5)
- Soil Borehole (GHD, 2016) (10)
- Sediment Sample Location (GHD, 2016) (5)
- Surface Water Sample Location (GHD, 2016) (5)

0 10 20 40 60 80 100
Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Fire & Rescue NSW
Albion Park Site Investigation

Job Number 21-25583
Revision A
Date 21 Feb 2017

ASLP Exceedances & PFAS Results

Figure 7

G:\21\25583\GIS\Maps\Deliverables\Albion Park\21_25583_Z007_AlbionPark_ASLP_Exceedances.mxd

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Data source: Imagery - Land and Property Information; Streets, Waterways - NSW LPI 2012 DTDB. Created by:mweber

LEGEND

- Site Boundary
- Streets
- Major Waterways
- Minor Waterways
- Inferred Surface Drainage (Aboveground)
- Inferred Surface Drainage (Underground)
- Groundwater Elevation Contours (mAHD)
- Groundwater Monitoring Well (GHD, 2016) (5)
- Soil Borehole (GHD, 2016) (10)
- Sediment Sample Location (GHD, 2016) (5)
- Surface Water Sample Location (GHD, 2016) (5)

0 10 20 40 60 80 100
Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Fire & Rescue NSW
Albion Park Site Investigation

Job Number 21-25583
Revision A
Date 17 Feb 2017

Groundwater Elevation Contours

Figure 8

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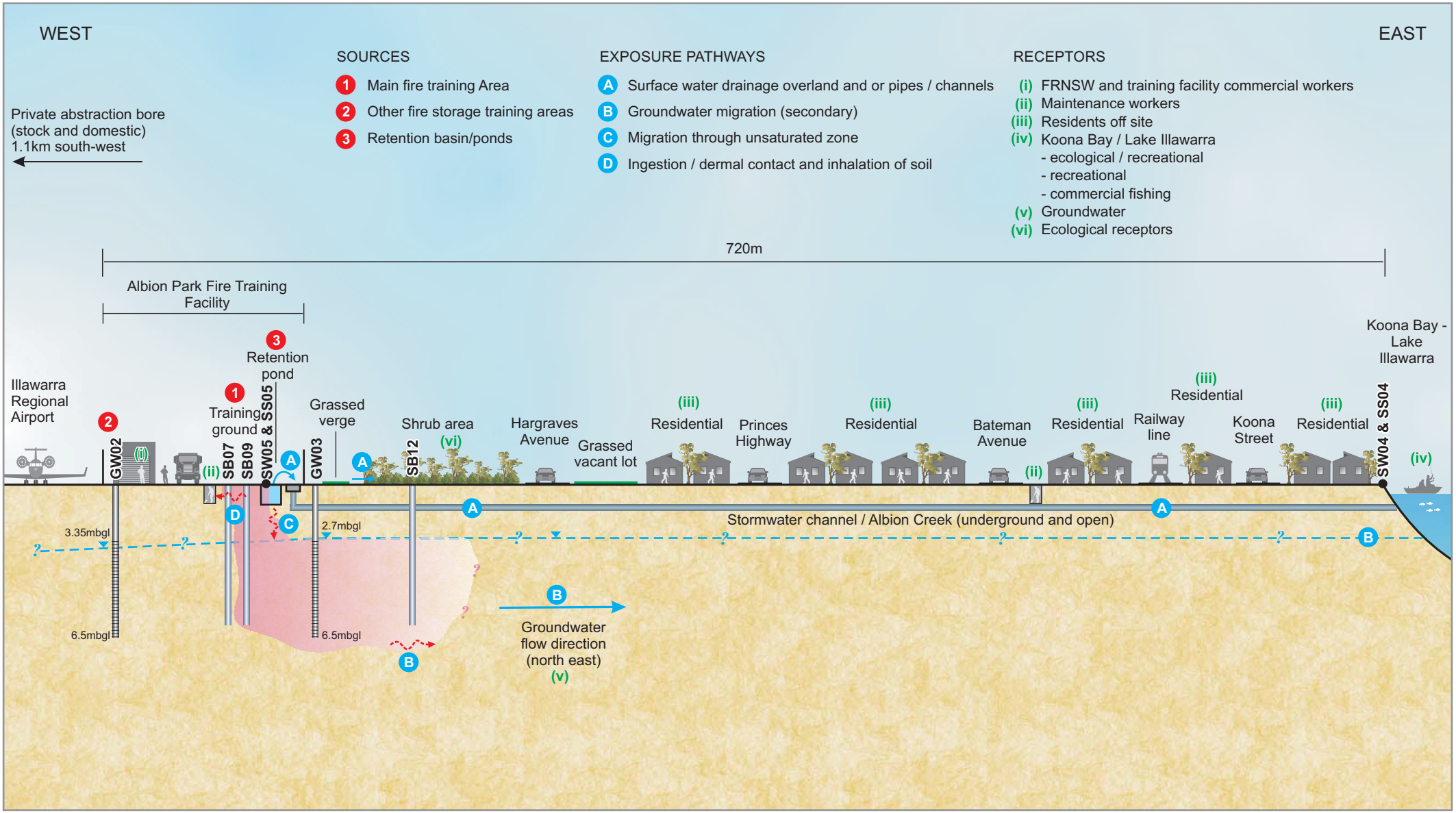
Data source: Imagery - Land and Property Information 2017; Streets, Waterways - NSW LPI 2012 DTDB. Created by:mweber



Conceptual diagram only - not to scale

LEGEND

Sandy CLAY
Groundwater table
Surface water flows
PFAS impact
Sample location
Migration
Soil bore
Piezometer (groundwater well)
Screen

Fire & Rescue NSW
Albion Park Fire Training Centre

Conceptual Site Model

Job Number	21-25583
Revision	A
Date	20 Feb 2017

Figure 9

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Appendix B – Analytical results summary tables

	Cations					TOC	Unassigned	Inorganics						Metals								TRH - NEPM 2013							TRH - NEPM 1999					
	Exchangeable Calcium	Exchangeable Magnesium	Exchangeable Potassium	Exchangeable Sodium	CEC	Total Organic Carbon	TCLP Fluid	pH (Final)	pH (Initial)	Moisture	Moisture Content (dried @ 103°C)	pH (Lab)	pH (after HCL)	Arsenic	Cadmium	Chromium (III+VI)	Copper	Lead	Mercury	Nickel	Zinc	C6-C10 minus BTEX (F1)	C6 - C10 Fraction	>C10-C16 minus Naphthalene (F2)	>C10 - C16 Fraction	>C16 - C34 Fraction (F3)	>C34 - C40 Fraction (F4)	>C10 - C40 (Sum of Total)	C6 - C9 Fraction	C10 - C14 Fraction	C15 - C28 Fraction	C29 - C36 Fraction	C10 - C36 (Sum of Total)
	meq/100g	meq/100g	meq/100g	meq/100g	meq/100g	%	mg/kg	pH Units	pH Units	%	%	pH Units	pH Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.1	0.1	0.1	0.1	0.1	0.5	1	0.1	0.1	1	1	0.1	0.1	5	1	2	5	5	0.1	2	5	10	10	50	50	100	100	50	10	50	100	100	50
DER (2017) Interim PFAS Guidelines - commercial/industrial																																	
DER (2017) Interim PFAS Guidelines - residential																																	
CRCCare Soil Direct Contact HSL-C Recreational / Open Space																							**5100**		**3800**	**5300**	**7400**						
NEPM 2013 Table 1A(1) HIL C Rec														*300* [#1]	*90*	*300* [#2]	*17000*	*600* [#3]	*80* [#4]	*1200*	*30000*												
NEPM 2013 Table 1A(3) HSL D Comm/Ind Soil for Vapour Intrusion, Sand																																	
0-1m																						260 [#6]		NL									
1-2m																						370 [#6]		NL									
2-4m																						630 [#6]		NL									
>4m																						NL		NL									

Field_ID	Location_Code	Sample_Depth_Range	Sampled_Date_Time																																
BD1_051216	SB08	0-0.15	5/12/2016	-	-	-	-	-	-	-	-	-	9	-	-	-	<5	<1	9	64	10	<0.1	5	28	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
BD3_071216	SB12	0-0.1	7/12/2016	-	-	-	-	-	-	-	-	-	-	16	-	-	<2	<0.4	22	15	18	<0.1	5.2	14	<20	<20	<50	<50	<100	<100	-	<20	<20	<50	<50	<50
GW01_0.0_0.2	GW01	0-0.2	6/12/2016	-	-	-	-	-	-	-	-	-	9.3	-	-	-	<5	<1	15	16	16	<0.1	3	20	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
GW01_0.5_0.6	GW01	0.5-0.6	6/12/2016	-	-	-	-	-	-	-	-	-	25.3	-	-	-	<5	<1	39	18	16	<0.1	6	9	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
GW01_4.0_4.1	GW01	4-4.1	6/12/2016	-	-	-	-	-	-	-	-	-	21.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW02_0.5_0.6	GW02	0.5-0.6	6/12/2016	0.4	9.1	0.3	10.6	20.4	0.8	-	-	-	22.8	-	4.5	-	-	-	-	-	-	-	-	-	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
GW02_0.5-0.6	GW02	0.5-0.6	6/12/2016	-	-	-	-	-	-	1	4.9	5.1	-	-	-	1.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW02_5.0_5.1	GW02	5-5.1	6/12/2016	-	-	-	-	-	-	-	-	-	23.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW02_6.0_6.1	GW02	6-6.1	6/12/2016	-	-	-	-	-	-	-	-	-	18	-	-	-	-	-	-	-	-	-	-	-	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
GW03_0.0_0.1	GW03	0-0.1	7/12/2016	-	-	-	-	-	-	-	-	-	9.9	-	-	-	<5	<1	16	16	18	<0.1	4	26	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
GW03_0.0-0.1	GW03	0-0.1	7/12/2016	-	-	-	-	-	-	1	4.9	6.3	-	-	-	1.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW03_5.0_5.1	GW03	5-5.1	7/12/2016	0.8	3.6	<0.1	2.5	6.9	<0.5	-	-	-	17.6	-	4.7	-	<5	<1	16	16	9	<0.1	4	18	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
GW04_0.5_0.6	GW04	0.5-0.6	8/12/2016	1.3	7	0.2	6.8	15.2	0.7	-	-	-	16.2	-	4.7	-	<5	<1	22	12	11	<0.1	4	8	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
GW04_6.0_6.1	GW04	6-6.1	8/12/2016	-	-	-	-	-	-	-	-	-	22.6	-	-	-	<5	<1	14	42	18	<0.1	5	30	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
GW05_1.6_1.7	GW05	1.6-1.7	8/12/2016	-	-	-	-	-	-	-	-	-	22	-	-	-	<5	<1	19	54	79	<0.1	11	278	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
GW05_3.4_3.5	GW05	3.4-3.5	8/12/2016	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	-	-	-	19.1	-	5	-	<5	<1	20	29	11	<0.1	4	27	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
SB06_0.5_0.6	SB06	0.5-0.6	6/12/2016	-	-	-	-	-	-	-	-	-	18.9	-	-	-	<5	<1	22	26	15	<0.1	6	17	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
SB06_2.0_2.1	SB06	2-2.1	6/12/2016	0.2	5.3	0.1	1.2	15.1	0.8	-	-	-	20.7	-	5.1	-	<5	<1	26	33	15	<0.1	3	19	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
SB06_5.0_5.1	SB06	5-5.1	6/12/2016	-	-	-	-	-	-	-	-	-	18.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB07_0.5_0.6	SB07	0.5-0.6	5/12/2016	-	-	-	-	-	-	-	-	-	8.4	-	-	-	<5	<1	<2	143	<5	<0.1	5	37	<10	<10	<50	<50	160	360	520	<10	<50	<100	260	260
SB07_3.0_3.1	SB07	3-3.1	5/12/2016	<0.1	10.7	0.2	5	16.5	<0.5	-	-	-	20	-	5.6	-	<5	<1	12	14	13	0.3	3	12	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
SB07_ASHPALT_0.0_0.3	SB07	0-0.3	5/12/2016	-	-	-	-	-	-	-	-	-	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB08_0.0_0.15	SB08	0-0.15	5/12/2016	-	-	-	-	-	-	-	-	-	9.7	-	-	-	<5	<1	17	30	12	<0.1	7	17	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
SB08_0.5_0.6	SB08	0.5-0.6	5/12/2016	-	-	-	-	-	-	-	-	-	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB08_2.0_2.1	SB08	2-2.1	5/12/2016	0.2	7.2	0.2	4.3	11.9	<0.5	-	-	-	21.1	-	5.2	-	<5	<1	20	29	14	<0.1	3	13	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
SB08_5.0_5.1	SB08	5-5.1	5/12/2016	-	-	-	-	-	-	-	-	-	17.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB09_0.0_0.1	SB09	0-0.1	5/12/2016	-	-	-	-	-	-	-	-	-	19.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB09_0.5_0.6	SB09	0.5-0.6	5/12/2016	<0.1	11.2	0.2	8.9	20.4	2.1	-	-	-	29	-	5	-	<5	<1	15	12	10	<0.1	4	6	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
SB09_4.0_4.1	SB09	4-4.1	6/12/2016	-	-	-	-	-	-	-	-	-	20.8	-	-	-	<5	<1	16	13	12	<0.1	2	10	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
SB10_0.0_0.1	SB10	0-0.1	6/12/2016	-	-	-	-	-	-	-	-	-	11	-	-	-	<5	<1	11	6	11	<0.1	2	<5	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
SB10_2.3_2.5	SB10	2.3-2.5	6/12/2016	4.1	8.8	0.5	1.2	14.5	<0.5	-	-	-	10.7	-	5.4	-	6	<1	15	15	8	<0.1	2	10	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
SB11_0.5_0.6	SB11	0.5-0.6	7/12/2016	-	-	-	-	-	-	-	-	-	12.8	-	-	-	<5	<1	21	6	10	<0.1	4	<5	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
SB11_1.0_1.1	SB11	1-1.1	7/12/2016	<0.1	2.1	<0.1	1	3.1	<0.5	-	-	-	13.5	-	5	-	<5	<1	28	9	19	<0.1	4	23	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
SB11_5.4-5.5	SB11	5.4-5.5	6/12/2016	-	-	-	-	-	-	-	-	-	14.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB12_0.0_0.1	SB12	0-0.1	7/12/2016	-	-	-	-	-	-	-	-	-	12.6	-	-	-	<5	<1	24	12	13	<0.1	6	9	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
SB12_0.5_0.6	SB12	0.5-0.6	7/12/2016	<0.1	5	<0.1	1	6.2	0.8	-	-	-	15	-	4.5	-	9	<1	35	11	20	<0.1	4	5	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
SB12_5.6_5.7	SB12	5.6-5.7	7/12/2016	-	-	-	-	-	-	-	-	-	14.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB13_0.5_0.6	SB13	0.5-0.6	7/12/2016	-	-	-	-	-	-	-	-	-	11	-	-	-	<5	<1	13	10	10	<0.1	2	7	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
SB13_2.0_2.1	SB13	2-2.1	7/12/2016	<0.1	4.8	<0.1	2.5	7.5	<0.5	-	-	-	10.4	-	5.4	-	<5	<1	7	7	<5	<0.1	<2	<5	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
SB14_0.5_0.6	SB14	0.5-0.6	8/12/2016	<0.1	4.6	<0.1	1.1	5.8	2.7	-	-	-	14	-	4.9	-	<5	<1	27	15	19	<0.1	9	9	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
SB14_2.0_2.1	SB14	2-2.1	8/12/2016	-	-	-	-	-	-	-	-	-	22.9	-	-	-	<5	<1	20	35	11	0.1	5	18	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
SB14_3.0_3.1	SB14	3-3.1	8/12/2016	-	-	-	-	-	-	-	-	-	21.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB15_0.5_0.6	SB15	0.5-0.6	8/12/2016	0.5	2.3	0.1	1.1	4.3	1.2	-	-	-	14.7	-	5	-	<5	<1	28	13	18	<0.1	12	7	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
SB15_1.0_1.1	SB15	1-1.1	8/12/2016	-	-	-	-	-	-	-	-	-	23.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB15_2.0_2.1	SB15	2-2.1	8/12/2016	-	-	-	-	-	-	-	-	-	24.5	-	-	-	<5	<1	16	33	13	<0.1	3	11	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
SB15_5.0_5.1	SB15	5-5.1	8/12/2016	-	-	-	-	-	-	-	-	-	16.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Env Stds Comments
#1:Arsenic: HIL assumes 70% oral bioavailability. Site-specific bioavailability maybe important and should be considered where appropriate (refer Shedule B7).
#2:In the absence of a guideline value for total chromium, chromium VI value adopted
#3:Lead: HILs A,B,C based on blood lead models (IEUBK & HIL D on adult lead model for where 50% bioavailability considered. Site-specific bioavailability should be considered where appropriate.
#4:Elemental mercury: HIL does not address elemental mercury. a site specific assessment should be considered if elemental mercury is present, or suspected to be present.
#5:Total PAHs: Based on sum of 16 most common reported (WHO 98). HIL application should consider presence of carcinogenic PAHs (should meet BaP TEQ HIL) & napthalene (should meet relevant HSL)
#6:To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.
#7:To obtain F2 subtract napthalene from the >C10 - C16 fraction.
#8:Derived soil HSL exceeds soil saturation concentration

Data Comments
#1 Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.

Appendix B
Table A1
Soil Analytical Results Human Health 2017

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Appendix B
Table A1
Soil Analytical Results Human Health 2017

																		PFAS																
	Perfluorodecanesulfonic acid (PFDS)	PFHxS and PFOS (Sum of Total) - Lab Calc	4:2 Fluorotelomer sulfonic acid	10:2 Fluorotelomer sulfonic acid	N-Ethyl perfluorooctane sulfonamidoacetic acid	N-Methyl perfluorooctane sulfonamidoacetic acid	Perfluorobutane sulfonic acid	Perfluoroheptane sulfonic acid	Perfluorohexane sulfonic acid (PFHxS)	Perfluoropentanoic acid	8:2 Fluorotelomer sulfonic acid	N-Ethyl perfluorooctane sulfonamide	N-Ethyl perfluorooctane sulfonamidoethanol	N-Methyl perfluorooctane sulfonamide	N-Methyl perfluorooctane sulfonamidoethanol	6:2 Fluorotelomer Sulfonate (6:2 FTS)	Perfluorooctanoic acid (PFOA)	Perfluoropentane sulfonic acid	Perfluorobutanoic acid	Perfluorodecanoic acid	Perfluorododecanoic acid	Perfluoroheptanoic acid	Perfluorohexanoic acid (PFHxA)	Perfluorononanoic acid	Perfluorooctane sulfonic acid (PFOS)	Perfluorooctane sulfonamide (FOSA)	Perfluorotetradecanoic acid	Perfluorotridecanoic acid	Perfluoroundecanoic acid	PFAS (Sum of Total)	PFAS (Sum of Total)WA DER List)
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.0002	0.0002	0.0005	0.0005	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0002	0.0002	0.001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0005	0.0002	0.0002	0.0002	0.0002	0.0002
DER (2017) Interim PFAS Guidelines - commercial/industrial		100															1000															
DER (2017) Interim PFAS Guidelines - residential		4															40															
CRCCare Soil Direct Contact HSL-C Recreational / Open Space																																
NEPM 2013 Table 1A(1) HIL C Rec																																
NEPM 2013 Table 1A(3) HSL D Comm/Ind Soil for Vapour Intrusion, Sand																																
0-1m																																
1-2m																																
2-4m																																
>4m																																

Field_ID	Location_Code	Sample_Depth_Range	Sampled_Date_Time																															
BD1_051216	SB08	0-0.15	5/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BD3_071216	SB12	0-0.1	7/12/2016	<0.005	-	<0.005	-	-	-	<0.005	-	0.007[#1]	<0.005	<0.005	<0.01	-	<0.01	-	<0.01	<0.005	-	0.006	<0.005	<0.005	<0.005	0.008[#1]	<0.005	0.009[#1]	<0.01	<0.005	<0.005	<0.005	-	-
GW01_0.0_0.2	GW01	0-0.2	6/12/2016	<0.0002	0.0347	<0.0005	<0.0005	<0.0002	<0.0002	0.0015	0.0015	0.0154	0.003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0018	0.001	<0.001	<0.0002	<0.0002	0.0014	0.0042	<0.0002	0.0193	<0.0002	<0.0005	<0.0002	<0.0002	0.0491	0.0466
GW01_0.5_0.6	GW01	0.5-0.6	6/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW01_4.0_4.1	GW01	4-4.1	6/12/2016	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002
GW02_0.5_0.6	GW02	0.5-0.6	6/12/2016	<0.0002	0.0603	<0.0005	<0.0005	<0.0002	<0.0002	0.0024	0.0007	0.034	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0004	0.0014	<0.001	<0.0002	<0.0002	0.0002	0.0028	<0.0002	0.0263	<0.0002	<0.0005	<0.0002	<0.0002	0.0688	0.0667
GW02_0.5-0.6	GW02	0.5-0.6	6/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW02_5.0_5.1	GW02	5-5.1	6/12/2016	<0.0002	0.002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	0.0008	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0012	<0.0002	<0.0005	<0.0002	<0.0002	0.002	0.002
GW02_6.0_6.1	GW02	6-6.1	6/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW03_0.0_0.1	GW03	0-0.1	7/12/2016	0.0008	0.816	<0.0005	<0.0005	<0.0002	<0.0002	0.0147	0.0185	0.14	0.0081	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0243	0.0099	0.001	<0.0002	<0.0002	0.0105	0.0323	<0.0002	0.676	0.0005	<0.0005	<0.0002	<0.0002	0.937	0.907
GW03_0.0-0.1	GW03	0-0.1	7/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW03_5.0_5.1	GW03	5-5.1	7/12/2016	<0.0002	0.0005	<0.0005	<0.0005	<0.0002	<0.0002	0.0002	<0.0002	0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	0.0003	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	0.001	0.001
GW04_0.5_0.6	GW04	0.5-0.6	8/12/2016	<0.0002	0.0019	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	0.0012	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0007	<0.0002	<0.0005	<0.0002	<0.0002	0.0019	0.0019
GW04_6.0_6.1	GW04	6-6.1	8/12/2016	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002
GW05_1.6_1.7	GW05	1.6-1.7	8/12/2016	<0.0002	0.0036	<0.0005	<0.0005	<0.0002	<0.0002	0.0005	<0.0002	0.0021	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0003	0.0003	<0.001	<0.0002	<0.0002	<0.0002	0.0006	<0.0002	0.0015	<0.0002	<0.0005	<0.0002	<0.0002	0.0053	0.005
GW05_3.4_3.5	GW05	3.4-3.5	8/12/2016	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002
SB06_0.5_0.6	SB06	0.5-0.6	6/12/2016	0.0036	3.73	<0.0005	<0.0005	<0.0005	<0.0005	0.0055	0.0506	0.164	0.0036	<0.0005	<0.0012	<0.0012	<0.0012	<0.0012	<0.0005	0.0599	0.007	<0.001	<0.0005	<0.0005	0.0086	0.0163	<0.0005	3.57	0.0018	<0.0012	<0.0005	<0.0005	3.89	3.83
SB06_2.0_2.1	SB06	2-2.1	6/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB06_5.0_5.1	SB06	5-5.1	6/12/2016	<0.0002	0.0959	<0.0005	<0.0005	<0.0002	<0.0002	0.0153	0.0032	0.0733	0.0038	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0043	0.0054	0.0102	<0.001	<0.0002	<0.0002	0.0043	0.0193	<0.0002	0.0226	<0.0002	<0.0005	<0.0002	<0.0002	0.162	0.148
SB07_0.5_0.6	SB07	0.5-0.6	5/12/2016	<0.0002	0.0035	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0015	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0035	<0.0002	<0.0005	<0.0002	<0.0002	0.005	0.005
SB07_3.0_3.1	SB07	3-3.1	5/12/2016	<0.0002	0.0037	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	0.0003	<0.0002	0.0032	<0.0002	<0.0005	<0.0002	<0.0002	0.004	0.004
SB07_ASHPALT_0.0_0.3	SB07	0-0.3	5/12/2016	<0.0002	0.0146	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	0.0003	0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0144	<0.0002	<0.0005	<0.0002	<0.0002	0.0151	0.0148
SB08_0.0_0.15	SB08	0-0.15	5/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB08_0.5_0.6	SB08	0.5-0.6	5/12/2016	<0.0002	0.138	<0.0005	<0.0005	<0.0002	<0.0002	0.0005	0.0046	0.0137	0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0019	0.0013	<0.001	<0.0002	<0.0002	0.0005	0.004	<0.0002	0.124	<0.0002	<0.0005	<0.0002	<0.0002	0.152	0.146
SB08_2.0_2.1	SB08	2-2.1	5/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB08_5.0_5.1	SB08	5-5.1	5/12/2016	<0.0002	0.0103	<0.0005	<0.0005	<0.0002	<0.0002	0.002	0.0003	0.0103	0.0012	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0008	0.0027	<0.001	<0.0002	<0.0002	0.0005	0.0063	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	0.0241	0.0211
SB09_0.0_0.1	SB09	0-0.1	5/12/2016	0.0218	4.21	<0.0005	0.0008	0.0004	0.0005	0.0172	0.104	0.143	0.0231	0.0028	<0.0005	<0.0005	<0.0005	<0.0005	0.0175	0.0671	0.0431	0.012	0.0015	<0.0002	0.0136	0.127	<0.0002	4.07	0.0068	<0.0005	<0.0002	0.0004	4.67	4.49
SB09_0.5_0.6	SB09	0.5-0.6	5/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB09_4.0_4.1	SB09	4-4.1	6/12/2016	<0.0002	0.0903	<0.0005	<0.0005	<0.0002	<0.0002	0.0056	0.0033	0.0444	0.0044	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0013	0.0049	0.0091	<0.001	<0.0002	<0.0002	0.0028	0.0299	<0.0002	0.0459	<0.0002	<0.0005	<0.0002	<0.0002	0.152	0.139
SB10_0.0_0.1	SB10	0-0.1	6/12/2016	<0.0002	0.146	<0.0005	<0.0005	<0.0002	<0.0002	0.0004	0.0079	0.0496	0.0075	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0097	0.0027	<0.001	<0.0002	<0.0002	0.0039	0.0169	0.0002	0.0967	<0.0002	<0.0005	<0.0002	<0.0002	0.196	0.185
SB10_2.3_2.5	SB10	2.3-2.5	6/12/2016	<0.0002	0.0013	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	0.0006	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	0.0007	<0.0002	<0.0005	<0.0002	<0.0002	0.0015	0.0015
SB11_0.5_0.6	SB11	0.5-0.6	7/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB11_1.0_1.1	SB11	1-1.1	7/12/2016	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002
SB11_5.4-5.5	SB11	5.4-5.5	6/12/2016	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002
SB12_0.0_0.1	SB12	0-0.1	7/12/2016	<0.0002	0.0163	<0.0005	<0.0005	<0.0002	<0.0002	0.0032	0.0005	0.0111	0.0021	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0004	0.0036	<0.001	<0.0002	<0.0002	0.0006	0.0071	<0.0002	0.0052	<0.0002	<0.0005	<0.0002	<0.0002	0.0338	0.0297
SB12_0.5_0.6	SB12	0.5-0.6	7/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB12_5.6_5.7	SB12	5.6-5.7	7/12/2016	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002
SB13_0.5_0.6	SB13	0.5-0.6	7/12/2016	<0.0002	0.0068	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0066	<0.0002	<0.0005	<0.0002	<0.0002	0.0068	0.0068
SB13_2.0_2.1	SB13	2-2.1	7/12/2016	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002
SB14_0.5_0.6	SB14	0.5-0.6	8/12/2016	<0.0002	0.0123	<0.0005	<0.0005	<0.0002	<0.0002	0.0005	<0.0002	0.0103	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	0.0016	<0.001	<0.0002	<0.0002	<0.0002	0.0003	<0.0002	0.002	<0.0002	<0.0005	<0.0002	<0.0002	0.0147	0.0131
SB14_2.0_2.1	SB14	2-2.1	8/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB14_3.0_3.1	SB14	3-3.1	8/12/2016	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002
SB15_0.5_0.6	SB15	0.5-0.6	8/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB15_1.0_1.1	SB15	1-1.1	8/12/2016	<0.0002	0.029	<0.0005	<0.0005	<0.0002	<0.0002	0.0006	0.0116	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.001	0.0006	<0.001	<0.0002	<0.0002	0.0004	0.0047	0.0008	0.0174	<0.0002	<0.0005	<0.0002	<0.0002	0.0377	0.0357
SB15_2.0_2.1	SB15	2-2.1	8/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB15_5.0_5.1	SB15	5-5.1	8/12/2016	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002

Env Stds Comments
#1:Arsenic: HIL assumes 70% oral bioavailability. Site-specific bioavailability maybe important
#2:In the absence of a guideline value for total chromium, chromium VI value adopted
#3:Lead: HILs A,B,C based on blood lead models (IEUBK & HIL D on adult lead model for wher
#4:Elemental mercury: HIL does not address elemental mercury. a site specific assessment sh
#5:Total PAHs: Based on sum of 16 most common reported (WHO 98). HIL application should
#6:To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.
#7:To obtain F2 subtract napthalene from the >C10 - C16 fraction.
#8:Derived soil HSL exceeds soil saturation concentration

Data Comments
#1 Quantification of linear and branched isomers has been conducted as a single total respo

	Cations					TOC	Unassigned	Inorganics						Metals								TRH - NEPM 2013							TRH - NEPM 1999					BTEX & MAH							PAH							
	Exchangeable Calcium	Exchangeable Magnesium	Exchangeable Potassium	Exchangeable Sodium	CEC	Total Organic Carbon	TCLP Fluid	pH (Final)	pH (Initial)	Moisture	Moisture Content (dried @ 103°C)	pH (Lab)	pH (after HCL)	Arsenic	Cadmium	Chromium (III+VI)	Copper	Lead	Mercury	Nickel	Zinc	G6-C10 minus BTEX (F1)	G6 - C10 Fraction	>C10-C16 minus Naphthalene (F2)	>C10 - C16 Fraction	>C16 - C34 Fraction (F3)	>C34 - C40 Fraction (F4)	>C10 - C40 (Sum of Total)	G6 - C9 Fraction	C10 - C14 Fraction	C15 - C28 Fraction	C29 - C36 Fraction	C10 - C36 (Sum of Total)	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	BTEX (Sum of Total) - Lab Calc	Polycyclic aromatic hydrocarbons	Pyrene	Acenaphthene	Acenaphthylene	Anthracene	Benz[a]anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene
	meq/100g	meq/100g	meq/100g	meq/100g	meq/100g	%	mg/kg	pH Units	pH Units	%	%	pH Units	pH Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.1	0.1	0.1	0.1	0.1	0.5	1	0.1	0.1	1	1	0.1	0.1	5	1	2	5	5	0.1	2	5	10	10	50	50	100	100	50	10	50	100	100	50	0.2	0.5	0.5	0.5	0.5	0.5	0.2	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
NEPM 2013 EIL-Commercial/Industrial														160			85	1800		55	110																												
NEPM 2013 EIL-Urban Residential- Public Open Space														100			60	1100		30	70																												
Draft Environmental Guidance PFOS PFOA - ecological																																																
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil 0-2m																						**215**[#6]		**170**[#7]		**1700**	**3300**							**75**	**135**	**165**		**180**						**1.4**			

Field_ID	Location_Code	Sample_Depth_Range	Sampled_Date_Time																																														
BD1_051216	SB08	0-0.15	5/12/2016	-	-	-	-	-	-	-	-	9	-	-	-	<5	<1	9	64	10	<0.1	5	28	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
BD3_071216	SB12	0-0.1	7/12/2016	-	-	-	-	-	-	-	-	-	16	-	-	<2	<0.4	22	15	18	<0.1	5.2	14	<20	<20	<50	<50	<100	<100	-	<20	<20	<50	<50	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GW01_0.0_0.2	GW01	0-0.2	6/12/2016	-	-	-	-	-	-	-	-	9.3	-	-	-	<5	<1	15	16	16	<0.1	3	20	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GW01_0.5_0.6	GW01	0.5-0.6	6/12/2016	-	-	-	-	-	-	-	-	25.3	-	-	-	<5	<1	39	18	16	<0.1	6	9	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GW01_4.0_4.1	GW01	4-4.1	6/12/2016	-	-	-	-	-	-	-	-	21.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW02_0.5_0.6	GW02	0.5-0.6	6/12/2016	0.4	9.1	0.3	10.6	20.4	0.8	-	-	-	-	22.8	-	4.5	-	-	-	-	-	-	-	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GW02_0.5-0.6	GW02	0.5-0.6	6/12/2016	-	-	-	-	-	-	1	4.9	5.1	-	-	1.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW02_5.0_5.1	GW02	5-5.1	6/12/2016	-	-	-	-	-	-	-	-	23.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW02_6.0_6.1	GW02	6-6.1	6/12/2016	-	-	-	-	-	-	-	-	18	-	-	-	-	-	-	-	-	-	-	-	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GW03_0.0_0.1	GW03	0-0.1	7/12/2016	-	-	-	-	-	-	-	-	9.9	-	-	-	<5	<1	16	16	18	<0.1	4	26	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GW03_0.0-0.1	GW03	0-0.1	7/12/2016	-	-	-	-	-	-	1	4.9	6.3	-	-	1.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW03_5.0_5.1	GW03	5-5.1	7/12/2016	0.8	3.6	<0.1	2.5	6.9	<0.5	-	-	-	-	17.6	-	4.7	-	<5	<1	16	16	9	<0.1	4	18	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GW04_0.5_0.6	GW04	0.5-0.6	8/12/2016	1.3	7	0.2	6.8	15.2	0.7	-	-	-	-	16.2	-	4.7	-	<5	<1	22	12	11	<0.1	4	8	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GW04_6.0_6.1	GW04	6-6.1	8/12/2016	-	-	-	-	-	-	-	-	22.6	-	-	-	<5	<1	14	42	18	<0.1	5	30	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GW05_1.6_1.7	GW05	1.6-1.7	8/12/2016	-	-	-	-	-	-	-	-	22	-	-	-	<5	<1	19	54	79	<0.1	11	278	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GW05_3.4_3.5	GW05	3.4-3.5	8/12/2016	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	-	-	-	-	19.1	-	5	-	<5	<1	20	29	11	<0.1	4	27	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SB06_0.5_0.6	SB06	0.5-0.6	6/12/2016	-	-	-	-	-	-	-	-	18.9	-	-	-	<5	<1	22	26	15	<0.1	6	17	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SB06_2.0_2.1	SB06	2-2.1	6/12/2016	0.2	5.3	0.1	1.2	15.1	0.8	-	-	-	-	20.7	-	5.1	-	<5	<1	26	33	15	<0.1	3	19	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SB06_5.0_5.1	SB06	5-5.1	6/12/2016	-	-	-	-	-	-	-	-	18.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB07_0.5_0.6	SB07	0.5-0.6	5/12/2016	-	-	-	-	-	-	-	-	8.4	-	-	-	<5	<1	<2	143	<5	<0.1	5	37	<10	<10	<50	<50	160	360	520	<10	<50	<100	260	260	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SB07_3.0_3.1	SB07	3-3.1	5/12/2016	<0.1	10.7	0.2	5	16.5	<0.5	-	-	-	-	20	-	5.6	-	<5	<1	12	14	13	0.3	3	12	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SB07_ASHPALT_0.0_0.3	SB07	0-0.3	5/12/2016	-	-	-	-	-	-	-	-	1.1	-	-	-	-	-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB08_0.0_0.15	SB08	0-0.15	5/12/2016	-	-	-	-	-	-	-	-	9.7	-	-	-	<5	<1	17	30	12	<0.1	7	17	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SB08_0.5_0.6	SB08	0.5-0.6	5/12/2016	-	-	-	-	-	-	-	-	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB08_2.0_2.1	SB08	2-2.1	5/12/2016	0.2	7.2	0.2	4.3	11.9	<0.5	-	-	-	-	21.1	-	5.2	-	<5	<1	20	29	14	<0.1	3	13	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SB08_5.0_5.1	SB08	5-5.1	5/12/2016	-	-	-	-	-	-	-	-	17.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB09_0.0_0.1	SB09	0-0.1	5/12/2016	-	-	-	-	-	-	-	-	19.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB09_0.5_0.6	SB09	0.5-0.6	5/12/2016	<0.1	11.2	0.2	8.9	20.4	2.1	-	-	-	-	29	-	5	-	<5	<1	15	12	10	<0.1	4	6	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SB09_4.0_4.1	SB09	4-4.1	6/12/2016	-	-	-	-	-	-	-	-	20.8	-	-	-	<5	<1	16	13	12	<0.1	2	10	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SB10_0.0_0.1	SB10	0-0.1	6/12/2016	-	-	-	-	-	-	-	-	11	-	-	-	<5	<1	11	6	11	<0.1	2	<5	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SB10_2.3_2.5	SB10	2.3-2.5	6/12/2016	4.1	8.8	0.5	1.2	14.5	<0.5	-	-	-	-	10.7	-	5.4	-	6	<1	15	15	8	<0.1	2	10	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SB11_0.5_0.6	SB11	0.5-0.6	7/12/2016	-	-	-	-	-	-	-	-	12.8	-	-	-	<5	<1	21	6	10	<0.1	4	<5	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SB11_1.0_1.1	SB11	1-1.1	7/12/2016	<0.1	2.1	<0.1	1	3.1	<0.5	-	-	-	-	13.5	-	5	-	<5	<1	28	9	19	<0.1	4	23	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SB11_5.4-5.5	SB11	5.4-5.5	6/12/2016	-	-	-	-	-	-	-	-	14.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB12_0.0_0.1	SB12	0-0.1	7/12/2016	-	-	-	-	-	-	-	-	12.6	-	-	-	<5	<1	24	12	13	<0.1	6	9	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SB12_0.5_0.6	SB12	0.5-0.6	7/12/2016	<0.1	5	<0.1	1	6.2	0.8	-	-	-	-	15	-	4.5	-	9	<1	35	11	20	<0.1	4	5	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SB12_5.6_5.7	SB12	5.6-5.7	7/12/2016	-	-	-	-	-	-	-	-	14.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB13_0.5_0.6	SB13	0.5-0.6	7/12/2016	-	-	-	-	-	-	-	-	11	-	-	-	<5	<1	13	10	10	<0.1	2	7	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SB13_2.0_2.1	SB13	2-2.1	7/12/2016	<0.1	4.8	<0.1	2.5	7.5	<0.5	-	-	-	-	10.4	-	5.4	-	<5	<1	7	7	<5	<0.1	<2	<5	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SB14_0.5_0.6	SB14	0.5-0.6	8/12/2016	<0.1	4.6	<0.1	1.1	5.8	2.7	-	-	-	-	14	-	4.9	-	<5	<1	27	15	19	<0.1	9	9	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SB14_2.0_2.1	SB14	2-2.1	8/12/2016	-	-	-	-	-	-	-	-	22.9	-	-	-	<5	<1	20	35	11	0.1	5	18	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SB14_3.0_3.1	SB14	3-3.1	8/12/2016	-	-	-	-	-	-	-	-	21.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB15_0.5_0.6	SB15	0.5-0.6	8/12/2016	0.5	2.3	0.1	1.1	4.3	1.2	-	-	-	-	14.7	-	5	-	<5	<1	28	13	18	<0.1	12	7	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SB15_1.0_1.1	SB15	1-1.1	8/12/2016	-	-	-	-	-	-	-	-	23.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB15_2.0_2.1	SB15	2-2.1	8/12/2016	-	-	-	-	-	-	-	-	24.5	-	-	-	<5	<1	16	33	13	<0.1	3	11	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SB15_5.0_5.1	SB15	5-5.1	8/12/2016	-	-	-	-	-	-	-	-	16.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Env Stds Comments
#1:Arsenic: HIL assumes 70% oral bioavailability. Site-specific bioavailability maybe important and should be considered where appropriate (refer Shedule B7).
#2:In the absence of a guideline value for total chromium, chromium VI value adopted
#3:Lead: HILs A,B,C based on blood lead models (IEUBK & HIL D on adult lead model for where 50% bioavailability considered. Site-specific bioavailability should be considered where appropriate.
#4:Elemental mercury: HIL does not address elemental mercury. a site specific assessment should be considered if elemental mercury is present, or suspected to be present.
#5:Total PAHs: Based on sum of 16 most common reported (WHO 98). HIL application should consider presence of carcinogenic PAHs (should meet BaP TEQ HIL) & napthalene (should meet relevant HSL)
#6:To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.
#7:To obtain F2 subtract napthalene from the >C10 - C16 fraction.
#8:Derived soil HSL exceeds soil saturation concentration
#9: Draft default guideline values prepared for CRC Care. These values are for use to understand the context of any measurements, not as an action level.

Data Comments
#1 Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.

											SVOCs		PFAS																													
	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	PAHs (Sum of total) - Lab calc	Benzo(a)pyrene TEQ (zero)	Benzo(a)pyrene TEQ (LOR)	Benzo(a)pyrene TEQ (half LOR)	Perfluorodecanesulfonic acid (PFDS)	PFHxS and PFOS (Sum of Total) - Lab Calc	4:2 Fluorotelomer sulfonic acid	10:2 Fluorotelomer sulfonic acid	N-Ethyl perfluorooctane sulfonamidoacetic acid	N-Methyl perfluorooctane sulfonamidoacetic acid	Perfluorobutane sulfonic acid	Perfluoroheptane sulfonic acid	Perfluorohexane sulfonic acid (PFHxS)	Perfluoropentanoic acid	8:2 Fluorotelomer sulfonic acid	N-Ethyl perfluorooctane sulfonamide	N-Ethyl perfluorooctane sulfonamidoethanol	N-Methyl perfluorooctane sulfonamide	N-Methyl perfluorooctane sulfonamidoethanol	6:2 Fluorotelomer Sulfonate (6:2 FTS)	Perfluorooctanoic acid (PFOA)	Perfluoropentane sulfonic acid	Perfluorobutanoic acid	Perfluorodecanoic acid	Perfluorododecanoic acid	Perfluoroheptanoic acid	Perfluorohexanoic acid (PFHxA)	Perfluorononanoic acid	Perfluorooctane sulfonic acid (PFOS)	Perfluorooctane sulfonamide (FOSA)	Perfluorotetradecanoic acid	Perfluorotridecanoic acid	Perfluoroundecanoic acid	PFAS (Sum of Total)	PFAS (Sum of Total)(WA DER List)
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.0002	0.0002	0.0005	0.0005	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0002	0.0002	0.001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0005	0.0002	0.0002	0.0002
NEPM 2013 EIL-Commercial/Industrial						370																																		
NEPM 2013 EIL-Urban Residential- Public Open Space						170																																		
Draft Environmental Guidance PFOS PFOA - ecological																													1[#9]								6.6[#9]				
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil 0-2m																																								
Field_ID	**Location_Code**	**Sample_Depth_Range**	**Sampled_Date_Time**																																						
BD1_051216	SB08	0-0.15	5/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	1.2	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BD3_071216	SB12	0-0.1	7/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<0.005	-	<0.005	-	-	-	<0.005	-	0.007[#1]	<0.005	<0.005	<0.01	-	<0.01	<0.005	-	0.006	<0.005	<0.005	<0.005	0.008[#1]	<0.005	0.009[#1]	<0.01	<0.005	<0.005	<0.005	-	-
GW01_0.0_0.2	GW01	0-0.2	6/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	1.2	0.6	<0.0002	0.0347	<0.0005	<0.0005	<0.0002	<0.0002	0.0015	0.0015	0.0154	0.003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0018	0.001	<0.001	<0.0002	<0.0002	0.0014	0.0042	<0.0002	0.0193	<0.0002	<0.0005	<0.0002	0.0491	0.0466
GW01_0.5_0.6	GW01	0.5-0.6	6/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	1.2	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW01_4.0_4.1	GW01	4-4.1	6/12/2016	-	-	-	-	-	-	-	-	-	-	-	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002
GW02_0.5_0.6	GW02	0.5-0.6	6/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	1.2	0.6	<0.0002	0.0603	<0.0005	<0.0005	<0.0002	<0.0002	0.0024	0.0007	0.034	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0004	0.0014	<0.001	<0.0002	<0.0002	0.0002	0.0028	<0.0002	0.0263	<0.0002	<0.0005	<0.0002	0.0688	0.0667
GW02_0.5-0.6	GW02	0.5-0.6	6/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW02_5.0_5.1	GW02	5-5.1	6/12/2016	-	-	-	-	-	-	-	-	-	-	-	<0.0002	0.002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	0.0008	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0012	<0.0002	<0.0005	<0.0002	0.002	0.002
GW02_6.0_6.1	GW02	6-6.1	6/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	1.2	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW03_0.0_0.1	GW03	0-0.1	7/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	1.2	0.6	0.0008	0.816	<0.0005	<0.0005	<0.0002	<0.0002	0.0147	0.0185	0.14	0.0081	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0243	0.0099	0.001	<0.0002	<0.0002	0.0105	0.0323	<0.0002	0.676	0.0005	<0.0005	<0.0002	0.937	0.907
GW03_0.0-0.1	GW03	0-0.1	7/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW03_5.0_5.1	GW03	5-5.1	7/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	1.2	0.6	<0.0002	0.0005	<0.0005	<0.0005	<0.0002	<0.0002	0.0002	<0.0002	0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	0.0003	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	0.001	0.001
GW04_0.5_0.6	GW04	0.5-0.6	8/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	1.2	0.6	<0.0002	0.0019	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	0.0012	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0007	<0.0002	<0.0005	<0.0002	0.0019	0.0019
GW04_6.0_6.1	GW04	6-6.1	8/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	1.2	0.6	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002
GW05_1.6_1.7	GW05	1.6-1.7	8/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	1.2	0.6	<0.0002	0.0036	<0.0005	<0.0005	<0.0002	<0.0002	0.0005	<0.0002	0.0021	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0003	0.0003	<0.001	<0.0002	<0.0002	<0.0002	0.0006	<0.0002	0.0015	<0.0002	<0.0005	<0.0002	0.0053	0.005
GW05_3.4_3.5	GW05	3.4-3.5	8/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	1.2	0.6	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002
SB06_0.5_0.6	SB06	0.5-0.6	6/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	1.2	0.6	0.0036	3.73	<0.0005	<0.0005	<0.0005	<0.0005	0.0055	0.0506	0.164	0.0036	<0.0005	<0.0012	<0.0012	<0.0012	<0.0005	0.0599	0.007	<0.001	<0.0005	<0.0005	0.0086	0.0163	<0.0005	3.57	0.0018	<0.0012	<0.0005	<0.0005	3.89	3.83
SB06_2.0_2.1	SB06	2-2.1	6/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	1.2	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB06_5.0_5.1	SB06	5-5.1	6/12/2016	-	-	-	-	-	-	-	-	-	-	-	<0.0002	0.0959	<0.0005	<0.0005	<0.0002	<0.0002	0.0153	0.0032	0.0733	0.0038	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0043	0.0054	0.0102	<0.001	<0.0002	<0.0002	0.0043	0.0193	<0.0002	0.0226	<0.0002	<0.0005	<0.0002	0.162	0.148
SB07_0.5_0.6	SB07	0.5-0.6	5/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	1.2	0.6	<0.0002	0.0035	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0015	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0035	<0.0002	<0.0005	<0.0002	0.005	0.005
SB07_3.0_3.1	SB07	3-3.1	5/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	1.2	0.6	<0.0002	0.0037	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	0.0003	<0.0002	0.0032	<0.0002	<0.0005	<0.0002	0.004	0.004
SB07_ASHPALT_0.0_0.3	SB07	0-0.3	5/12/2016	-	-	-	-	-	-	-	-	-	-	-	<0.0002	0.0146	<0.0005	<0.0005	<0.0002	<0.0002	0.0003	0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0144	<0.0002	<0.0005	<0.0002	0.0151	0.0148
SB08_0.0_0.15	SB08	0-0.15	5/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	1.2	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB08_0.5_0.6	SB08	0.5-0.6	5/12/2016	-	-	-	-	-	-	-	-	-	-	-	<0.0002	0.138	<0.0005	<0.0005	<0.0002	<0.0002	0.0005	0.0046	0.0137	0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0019	0.0013	<0.001	<0.0002	<0.0002	0.0005	0.004	<0.0002	0.124	<0.0002	<0.0005	<0.0002	0.152	0.146
SB08_2.0_2.1	SB08	2-2.1	5/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	1.2	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB08_5.0_5.1	SB08	5-5.1	5/12/2016	-	-	-	-	-	-	-	-	-	-	-	<0.0002	0.0103	<0.0005	<0.0005	<0.0002	<0.0002	0.002	0.0003	0.0103	0.0012	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0008	0.0027	<0.001	<0.0002	<0.0002	0.0005	0.0063	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	0.0241	0.0211
SB09_0.0_0.1	SB09	0-0.1	5/12/2016	-	-	-	-	-	-	-	-	-	-	-	0.0218	4.21	<0.0005	0.0008	0.0004	0.0005	0.0172	0.104	0.143	0.0231	0.0028	<0.0005	<0.0005	<0.0005	<0.0005	0.0175	0.0671	0.0431	0.012	0.0015	<0.0002	0.0136	0.127	<0.0002	4.07	0.0068	<0.0005	<0.0002	0.0004	4.49
SB09_0.5_0.6	SB09	0.5-0.6	5/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	1.2	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB09_4.0_4.1	SB09	4-4.1	6/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	1.2	0.6	<0.0002	0.0903	<0.0005	<0.0005	<0.0002	<0.0002	0.0056	0.0033	0.0444	0.0044	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0013	0.0049	0.0091	<0.001	<0.0002	0.0028	0.0299	<0.0002	0.0459	<0.0002	<0.0005	<0.0002	0.152	0.139
SB10_0.0_0.1	SB10	0-0.1	6/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	1.2	0.6	<0.0002	0.146	<0.0005	<0.0005	<0.0002	<0.0002	0.0004	0.0079	0.0496	0.0075	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0097	0.0027	<0.001	<0.0002	<0.0002	0.0039	0.0169	0.0002	0.0967	<0.0002	<0.0005	<0.0002	0.196	0.185
SB10_2.3_2.5	SB10	2.3-2.5	6/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	1.2	0.6	<0.0002	0.0013	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	0.0006	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	0.0007	<0.0002	<0.0005	<0.0002	0.0015	0.0015
SB11_0.5_0.6	SB11	0.5-0.6	7/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	1.2	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB11_1.0_1.1	SB11	1-1.1	7/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	1.2	0.6	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002
SB11_5.4-5.5	SB11	5.4-5.5	6/12/2016	-	-	-	-	-	-	-	-	-	-	-	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002
SB12_0.0_0.1	SB12	0-0.1	7/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	1.2	0.6	<0.0002	0.0163	<0.0005	<0.0005	<0.0002	<0.0002	0.0032	0.0005	0.0111	0.0021	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0004	0.0036	<0.001	<0.0002	<0.0002	0.0006	0.0071	<0.0002	0.0052	<0.0002	<0.0005	<0.0002	0.0338	0.0297
SB12_0.5_0.6	SB12	0.5-0.6	7/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	1.2	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB12_5.6_5.7	SB12	5.6-5.7	7/12/2016	-	-	-	-	-	-	-	-	-	-	-	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002
SB13_0.5_0.6	SB13	0.5-0.6	7/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	1.2	0.6	<0.0002	0.0068	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0066	<0.0002	<0.0005	<0.0002	0.0068	0.0068
SB13_2.0_2.1	SB13	2-2.1	7/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	1.2	0.6	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002
SB14_0.5_0.6	SB14	0.5-0.6	8/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	1.2	0.6	<0.0002	0.0123	<0.0005	<0.0005	<0.0002	<0.0002	0.0005	<0.0002	0.0103	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	0.0016	<0.001	<0.0002	<0.0002	<0.0002	0.0003	<0.0002	0.002	<0.0002	<0.0005	<0.0002	0.0147	0.0131
SB14_2.0_2.1	SB14	2-2.1	8/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	1.2	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB14_3.0_3.1	SB14	3-3.1	8/12/2016	-	-	-	-	-	-	-	-	-	-	-	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002
SB15_0.5_0.6	SB15	0.5-0.6	8/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	1.2	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB15_1.0_1.1	SB15	1-1.1	8/12/2016	-	-	-	-	-	-	-	-	-	-	-	<0.0002	0.029	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	0.0006	0.0116	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.001	0.0006	<0.001	<0.0002	<0.0002	0.0004	0.0047	0.0008	0.0174	<0.0002	<0.0005	<0.0002	0.0377	0.0357
SB15_2.0_2.1	SB15	2-2.1	8/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	1.2	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB15_5.0_5.1	SB15	5-5.1	8/12/2016	-	-	-	-	-	-	-	-	-	-	-	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002

Env Stds Comments

#1:Arsenic: HIL assumes 70% oral bioavailability. Site-specific bioavailability maybe important an
#2:In the absence of a guideline value for total chromium, chromium VI value adopted
#3:Lead: HILs A,B,C based on blood lead models (IEUBK & HIL D on adult lead model for where 5
#4:Elemental mercury: HIL does not address elemental mercury. a site specific assessment shoul
#5:Total PAHs: Based on sum of 16 most common reported (WHO 98). HIL application should cor
#6:To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.
#7:To obtain F2 subtract napthalene from the >C10 - C16 fraction.
#8:Derived soil HSL exceeds soil saturation concentration
#9: Draft default guideline values prepared for CRC Care. These values are for use to understanc

Data Comments

#1 Quantification of linear and branched isomers has been conducted as a single total response

	TOC	Inorganics		TRH - NEPM 2013							TRH - NEPM 1999					BTEX & MAH							PAH													
	Total Organic Carbon	Moisture	pH (Lab)	C6-C10 minus BTEX (F1)	C6 - C10 Fraction	>C10-C16 minus Naphthalene (F2)	>C10 - C16 Fraction	>C16 - C34 Fraction (F3)	>C34 - C40 Fraction (F4)	>C10 - C40 (Sum of Total)	C6 - C 9 Fraction	C10 - C14 Fraction	C15 - C28 Fraction	C29 - C36 Fraction	C10 - C36 (Sum of Total)	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	BTEX (Sum of Total) - Lab Calc	Polycylic aromatic hydrocarbons	Pyrene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo[b+j]fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene
	%	%	pH Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.5	1	0.1	10	10	50	50	100	100	50	10	50	100	100	50	0.2	0.5	0.5	0.5	0.5	0.5	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
DER (2017) Interim PFAS Guidelines - commercial/industrial																																			
DER (2017) Interim PFAS Guidelines - residential																																			
NEPM 2013 Table 1A(1) HIL C Rec																																			
NEPM 2013 Table 1A(1) HIL D Comm/Ind																																			
NEPM 2013 Table 1A(3) HSL C Rec Soil for Vapour Intrusion, Sand																																			
0-1m				NL[#6]		NL[#6]										NL[#6]	NL[#6]	NL[#6]			NL[#6]															
1-2m				NL[#6]		NL[#6]										NL[#6]	NL[#6]	NL[#6]			NL[#6]															
2-4m				NL[#6]		NL[#6]										NL[#6]	NL[#6]	NL[#6]			NL[#6]															
>4m				NL[#6]		NL[#6]										NL[#6]	NL[#6]	NL[#6]			NL[#6]															
NEPM 2013 Table 1A(3) HSL D Comm/Ind Soil for Vapour Intrusion, Sand																																			
0-1m				260[#7]		NL[#6]										3	NL[#6]	NL[#6]			230															
1-2m				370[#7]		NL[#6]										3	NL[#6]	NL[#6]			NL[#6]															
2-4m				630[#7]		NL[#6]										3	NL[#6]	NL[#6]			NL[#6]															
>4m				NL[#6]		NL[#6]										3	NL[#6]	NL[#6]			NL[#6]															

Field_ID	Location_Code	Sample_Depth_Range	Sampled_Date_Time																																	
SS01	SS01		16/12/2016	0.6	28.2	6.6	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<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
SS02	SS02		16/12/2016	4	35	6.8	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	8.4	2	<0.5	<0.5	<0.5	0.6	0.6	0.8	<0.5	0.7	0.7	<0.5	2.1	<0.5
SS03	SS03		16/12/2016	12.1	76.1	6.6	<10	<10	<60	<60	<100	<100	<60	<10	<60	<110	<110	<60	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
SS04	SS04		16/12/2016	1.8	25.1	8.6	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<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
SS05	SS05		16/12/2016	0.7	32.9	5.4	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<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
SSQA2	SS05		16/12/2016	0.6	37.7	5.2	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<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

Statistical Summary

Number of Results	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Number of Detects	6	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	1	0	1	1	0	1	0
Minimum Concentration	0.6	25.1	5.2	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<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
Minimum Detect	0.6	25.1	5.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.4	2	ND	ND	ND	0.6	0.6	0.8	ND	0.7	0.7	ND	2.1	ND
Maximum Concentration	12.1	76.1	8.6	<10	<10	<60	<60	<100	<100	<60	<10	<60	<110	<110	<60	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	8.4	2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2.1	<1
Maximum Detect	12.1	76.1	8.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.4	2	ND	ND	ND	0.6	0.6	0.8	ND	0.7	0.7	ND	2.1	ND
Average Concentration	3.3	39	6.5	5	5	26	26	50	50	26	5	26	51	51	26	0.1	0.25	0.25	0.25	0.25	0.25	0.1	1.6	0.58	0.29	0.29	0.29	0.35	0.35	0.38	0.29	0.37	0.37	0.29	0.6	0.29
Median Concentration	1.25	33.95	6.6	5	5	25	25	50	50	25	5	25	50	50	25	0.1	0.25	0.25	0.25	0.25	0.25	0.1	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Standard Deviation	4.5	19	1.2	0	0	2	2	0	0	2	0	2	2	2	2	0	0	0	0	0	0	0	3.3	0.7	0.1	0.1	0.1	0.16	0.16	0.23	0.1	0.19	0.19	0.1	0.74	0.1
Number of Guideline Exceedances	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Env Stds Comments

#1:Arsenic: HIL assumes 70% oral bioavailability. Site-specific bioavailability maybe important and should be considered where appropriate (refer Shedule B7).
#2:In the absence of a guideline value for total chromium, chromium VI value adopted
#3:Lead: HILs A,B,C based on blood lead models (IEUBK & HIL D on adult lead model for where 50% bioavailability considered. Site-specific bioavailability should be considered where appropriate.
#4:Elemental mercury: HIL does not address elemental mercury. a site specific assessment should be considered if elemental mercury is present, or suspected to be present.
#5:Total PAHs: Based on sum of 16 most common reported (WHO 98). HIL application should consider presence of carcinogenic PAHs (should meet BaP TEQ HIL) & napthalene (should meet relevant HSL)
#6:Derived soil HSL exceeds soil saturation concentration
#7:To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.

Data Comments

#1 Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.

Appendix B
Table A3
Sediment Analytical Results 2017

					SVOCs		PFAS													
	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Benzo(a)pyrene TEQ (zero)	Benzo(a)pyrene TEQ (LOR)	Benzo(a)pyrene TEQ (half LOR)	PFHxS and PFOS (Sum of Total) - Lab Calc	4:2 Fluorotelomer sulfonic acid	10:2 Fluorotelomer sulfonic acid	Perfluorobutane sulfonic acid	Perfluorohexane sulfonic acid (PFHxS)	Perfluoropentanoic acid	8:2 Fluorotelomer sulfonic acid	6:2 Fluorotelomer Sulfonate (6:2 FTS)	Perfluorooctanoic acid (PFOA)	Perfluorobutanoic acid	Perfluoroheptanoic acid	Perfluorohexanoic acid (PFHxA)	Perfluorooctane sulfonic acid (PFOS)	PFAS (Sum of Total)(WA DER List)
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.5	0.5	0.5	0.5	0.5	0.5	0.0002	0.0005	0.0005	0.0002	0.0002	0.0002	0.0005	0.0005	0.0002	0.001	0.0002	0.0002	0.0002	0.0002
DER (2017) Interim PFAS Guidelines - commercial/industrial							100								1000					
DER (2017) Interim PFAS Guidelines - residential							4								40					
NEPM 2013 Table 1A(1) HIL C Rec																				
NEPM 2013 Table 1A(1) HIL D Comm/Ind																				
NEPM 2013 Table 1A(3) HSL C Rec Soil for Vapour Intrusion, Sand																				
0-1m		NL[#6]																		
1-2m		NL[#6]																		
2-4m		NL[#6]																		
>4m		NL[#6]																		
NEPM 2013 Table 1A(3) HSL D Comm/Ind Soil for Vapour Intrusion, Sand																				
0-1m		NL[#6]																		
1-2m		NL[#6]																		
2-4m		NL[#6]																		
>4m		NL[#6]																		

Field_ID	Location_Code	Sample_Depth_Range	Sampled_Date_Time																		
SS01	SS01		16/12/2016	<0.5	<0.5	<0.5	<0.5	1.2	0.6	0.0049	<0.0005	<0.0005	<0.0002	0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	0.0047	0.0049
SS02	SS02		16/12/2016	<0.5	<0.5	0.9	0.8	1.4	1	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
SS03	SS03		16/12/2016	<1	<1	<1	<0.5	1.2	0.6	0.115	<0.0005	<0.0005	<0.0002	0.0027	0.0004	<0.0005	0.0008	0.0006	<0.001	<0.0002	<0.0002	0.112	0.116
SS04	SS04		16/12/2016	<0.5	<0.5	<0.5	<0.5	1.2	0.6	0.0015	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	0.0015	0.0015
SS05	SS05		16/12/2016	<0.5	<0.5	<0.5	<0.5	1.2	0.6	0.0757	<0.0005	<0.0005	0.0005	0.0039	0.0014	<0.0005	0.0007	0.0024	<0.001	0.0007	0.0031	0.0718	0.0845
SSQA2	SS05		16/12/2016	<0.5	<0.5	<0.5	<0.5	1.2	0.6	0.197	<0.0005	0.0006	0.0008	0.0108	0.0019	<0.0005	0.0019	0.0051	<0.001	0.0012	0.0045	0.186	0.212

Statistical Summary

Number of Results	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Number of Detects	0	0	1	1	6	6	5	0	1	2	4	3	0	3	3	0	2	2	5	5
Minimum Concentration	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
Minimum Detect	ND	ND	0.9	0.8	1.2	0.6	0.0015	ND	0.0006	0.0005	0.0002	0.0004	ND	0.0007	0.0006	ND	0.0007	0.0031	0.0015	0.0015
Maximum Concentration	<1	<1	<1	0.8	1.4	1	0.197	<0.0005	0.0006	0.0008	0.0108	0.0019	<0.0005	0.0019	0.0051	<0.001	0.0012	0.0045	0.186	0.212
Maximum Detect	ND	ND	0.9	0.8	1.4	1	0.197	ND	0.0006	0.0008	0.0108	0.0019	ND	0.0019	0.0051	ND	0.0012	0.0045	0.186	0.212
Average Concentration	0.29	0.29	0.4	0.34	1.2	0.67	0.066	0.00025	0.00031	0.00028	0.003	0.00067	0.00025	0.00069	0.0014	0.0005	0.00038	0.0013	0.063	0.07
Median Concentration	0.25	0.25	0.25	0.25	1.2	0.6	0.0403	0.00025	0.00025	0.0001	0.00145	0.00025	0.00025	0.000475	0.00035	0.0005	0.0001	0.0001	0.03825	0.0447
Standard Deviation	0.1	0.1	0.26	0.22	0.082	0.16	0.08	0	0.00014	0.0003	0.0042	0.00079	0	0.00064	0.002	0	0.00047	0.002	0.076	0.085
Number of Guideline Exceedances	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Env Stds Comments

#1:Arsenic: HIL assumes 70% oral bioavailability. Site-specific bioavailability maybe important an
#2:In the absence of a guideline value for total chromium, chromium VI value adopted
#3:Lead: HILs A,B,C based on blood lead models (IEUBK & HIL D on adult lead model for where 5
#4:Elemental mercury: HIL does not address elemental mercury. a site specific assessment shoul
#5:Total PAHs: Based on sum of 16 most common reported (WHO 98). HIL application should cor
#6:Derived soil HSL exceeds soil saturation concentration
#7:To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.

Data Comments

#1 Quantification of linear and branched isomers has been conducted as a single total response

																				PFAS																
				Perfluorodecanesulfonic acid (PFDS)	PFHxS and PFOS (Sum of Total) - Lab Calc	4:2 Fluorotelomer sulfonic acid	10:2 Fluorotelomer sulfonic acid	N-Ethyl perfluorooctane sulfonamidoacetic acid	N-Methyl perfluorooctane sulfonamidoacetic acid	Perfluorobutane sulfonic acid	Perfluoroheptane sulfonic acid	Perfluorohexane sulfonic acid (PFHxS)	Perfluoropentanoic acid	8:2 Fluorotelomer sulfonic acid	N-Ethyl perfluorooctane sulfonamide	N-Ethyl perfluorooctane sulfonamidoethanol	N-Methyl perfluorooctane sulfonamide	N-Methyl perfluorooctane sulfonamidoethanol	6:2 Fluorotelomer Sulfonate (6:2 FTS)	Perfluorooctanoic acid (PFOA)	Perfluoropentane sulfonic acid	Perfluorobutanoic acid	Perfluorodecanoic acid	Perfluorododecanoic acid	Perfluoroheptanoic acid	Perfluorohexanoic acid (PFHxA)	Perfluorononanoic acid	Perfluorooctane sulfonic acid (PFOS)	Perfluorooctane sulfonamide (FOSA)	Perfluorotetradecanoic acid	Perfluorotridecanoic acid	Perfluoroundecanoic acid	PFAS (Sum of Total)	PFAS (Sum of Total)(WA DER List)
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL				0.02	0.01	0.05	0.05	0.02	0.02	0.02	0.02	0.02	0.02	0.05	0.05	0.05	0.05	0.05	0.05	0.01	0.02	0.1	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.05	0.02	0.02	0.01	0.01
WA DER (2017) Drinking water quality					5 [#6]															50 [#6]														
WA DER (2017) Ecolgocial freshwater					0.0023 [#5]															190														
WA DER (2017) Recreational water					**50** [#7]															**500** [#7]														
Field_ID	**Location_Code**	**Sample_Depth_Range**	**Sampled_Date_Time**	**Matrix_Description**																															
GW01_0.0-0.2	GW01	0-0.2	6/12/2016		<0.02	1.37	<0.05	<0.05	<0.02	<0.02	0.05	0.06	0.49	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	0.05	<0.1	<0.02	<0.02	0.02	0.16	<0.02	0.88	<0.02	<0.05	<0.02	<0.02	1.82	1.71
GW02_0.5-0.6	GW02	0.5-0.6	6/12/2016		<0.02	2.55	<0.05	<0.05	<0.02	<0.02	0.14	0.04	1.17	0.04	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.04	0.09	<0.1	<0.02	<0.02	<0.02	0.14	<0.02	1.38	<0.02	<0.05	<0.02	<0.02	3.04	2.91
GW03_0.0-0.1	GW03	0-0.1	7/12/2016		<0.02	**76.9**	<0.05	<0.05	<0.02	<0.02	0.75	1.47	9.52	0.36	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	1.39	0.86	<0.1	<0.02	<0.02	0.42	1.92	<0.02	67.4	<0.02	<0.05	<0.02	<0.02	84.1	81.8
GW04_0.5-0.6	GW04	0.5-0.6	8/12/2016		<0.02	0.49	<0.05	<0.05	<0.02	<0.02	<0.02	<0.02	0.06	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	0.43	<0.02	<0.05	<0.02	<0.02	0.49	0.49
GW05_1.6-1.7	GW05	1.6-1.7	8/12/2016		<0.02	0.21	<0.05	<0.05	<0.02	<0.02	<0.02	<0.02	0.06	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	0.03	<0.02	0.15	<0.02	<0.05	<0.02	<0.02	0.24	0.24
SB06_0.5-0.6	SB06	0.5-0.6	6/12/2016		0.03	**192**	<0.05	<0.05	<0.02	<0.02	0.48	2.49	8.53	0.26	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.08	1.81	0.42	<0.1	0.02	<0.02	0.24	1.13	<0.02	183	0.02	<0.05	<0.02	<0.02	198	196
SB06_5.0-5.1	SB06	5-5.1	6/12/2016		<0.02	10.8	<0.05	<0.05	<0.02	<0.02	1.03	0.2	9.67	0.22	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.23	0.7	<0.1	<0.02	<0.02	0.12	1.31	<0.02	1.15	<0.02	<0.05	<0.02	<0.02	14.6	13.7
SB07_3.0-3.1	SB07	3-3.1	5/12/2016		<0.02	0.75	<0.05	<0.05	<0.02	<0.02	<0.02	<0.02	0.04	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	0.02	<0.02	0.71	<0.02	<0.05	<0.02	<0.02	0.77	0.77
SB08_0.5-0.6	SB08	0.5-0.6	5/12/2016		<0.02	21.5	<0.05	<0.05	<0.02	<0.02	0.15	0.55	1.96	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.23	0.14	<0.1	<0.02	<0.02	0.04	0.18	<0.02	19.5	<0.02	<0.05	<0.02	<0.02	22.8	22.1
SB09_0.0-0.1	SB09	0-0.1	5/12/2016		0.29	**550**	<0.05	<0.05	<0.02	<0.02	1.93	6.58	26	0.69	0.18	<0.05	<0.05	<0.05	<0.05	1.35	3.13	1.89	<0.1	0.07	<0.02	0.37	2.77	<0.02	524	1.27	<0.05	<0.02	<0.02	570	560
SB09_4.0-4.1	SB09	4-4.1	6/12/2016		<0.02	10.7	<0.05	<0.05	<0.02	<0.02	0.97	0.41	4.78	0.27	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.38	0.73	<0.1	<0.02	<0.02	0.23	1.59	<0.02	5.88	<0.02	<0.05	<0.02	<0.02	15.2	14.1
SB10_0.0-0.1	SB10	0-0.1	6/12/2016		<0.02	11.5	<0.05	<0.05	<0.02	<0.02	0.09	0.32	2.63	0.35	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.37	0.12	<0.1	<0.02	<0.02	0.19	0.65	<0.02	8.84	0.05	<0.05	<0.02	<0.02	13.6	13.1
SB12_0.0-0.1	SB12	0-0.1	7/12/2016		<0.02	0.44	<0.05	<0.05	<0.02	<0.02	0.32	<0.02	0.37	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	0.1	<0.1	<0.02	<0.02	<0.02	0.15	<0.02	0.07	<0.02	<0.05	<0.02	<0.02	1.07	0.97
SB13_0.5-0.6	SB13	0.5-0.6	7/12/2016		<0.02	0.17	<0.05	<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	0.17	<0.02	<0.05	<0.02	<0.02	0.17	0.17
SB14_0.5-0.6	SB14	0.5-0.6	8/12/2016		<0.02	0.59	<0.05	<0.05	<0.02	<0.02	0.02	<0.02	0.45	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	0.04	<0.1	<0.02	<0.02	<0.02	0.02	<0.02	0.14	<0.02	<0.05	<0.02	<0.02	0.67	0.63
SB15_1.0-1.1	SB15	1-1.1	8/12/2016		<0.02	2.71	<0.05	<0.05	<0.02	<0.02	0.03	0.08	1.18	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	0.06	<0.1	<0.02	<0.02	0.03	0.22	0.05	1.53	<0.02	<0.05	<0.02	<0.02	3.29	3.1

Env Stds Comments

#1: Criteria adopted from DER (2017) which are based on the enHealth (2016) recommendations. Dilution factor of 10 applied

Appendix B
Table A4
Sediment Analytical Results - Ecological 2017

				TOC	Inorganics		TRH - NEPM 2013							TRH - NEPM 1999						BTEX & MAH							PAH									
				Total Organic Carbon	Moisture	pH (Lab)	C6-C10 minus BTEX (F1)	C6 - C10 Fraction	>C10-C16 minus Naphthalene (F2)	>C10 - C16 Fraction	>C16 - C34 Fraction (F3)	>C34 - C40 Fraction (F4)	>C10 - C40 (Sum of Total)	C6 - C9 Fraction	C10 - C14 Fraction	C15 - C28 Fraction	C29 - C36 Fraction	C10 - C36 (Sum of Total)	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	BTEX (Sum of Total) - Lab Calc	Polycylic aromatic hydrocarbons	Pyrene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo[b+j]fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene
				%	%	pH Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.5	1	0.1	10	10	50	50	100	100	50	10	50	100	100	50	0.2	0.5	0.5	0.5	0.5	0.5	0.2	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
DER 2017 Ecological PFOS/PFOA (Commercial/Industrial)																																			
DER 2017 Ecological PFOS/PFOA (Urban residential)																																			
NEPM 2013 EIL-Commercial/Industrial																																			
NEPM 2013 EIL-Urban Residential- Public Open Space																																			
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil 0-2m							215[#1]		170[#2]		1700	3300							75	135	165			180							1.4			
NEPM 2013 Table 1B(6) ESLs for Urban Res, Coarse Soil 0-2m							180[#1]		120[#2]		300	2800							50	85	70			105							0.7			
Field_ID	**Location_Code**	**Sample_Depth_Range**	**Sampled_Date_Time**																																
SS01	SS01		16/12/2016	0.6	28.2	6.6	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SS02	SS02		16/12/2016	4	35	6.8	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	8.4	2	<0.5	<0.5	<0.5	0.6	0.6	0.8	<0.5	0.7
SS03	SS03		16/12/2016	12.1	76.1	6.6	<10	<10	<60	<60	<100	<100	<60	<10	<60	<110	<110	<60	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1
SS04	SS04		16/12/2016	1.8	25.1	8.6	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SS05	SS05		16/12/2016	0.7	32.9	5.4	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SSQA2	SS05		16/12/2016	0.6	37.7	5.2	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Statistical Summary																																			
Number of Results				6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Number of Detects				6	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	1	0	1
Minimum Concentration				0.6	25.1	5.2	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Minimum Detect				0.6	25.1	5.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.4	2	ND	ND	ND	0.6	0.6	0.8	ND	0.7
Maximum Concentration				12.1	76.1	8.6	<10	<10	<60	<60	<100	<100	<60	<10	<60	<110	<110	<60	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	8.4	2	<1	<1	<1	<1	<1	<1	<1	<1
Maximum Detect				12.1	76.1	8.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.4	2	ND	ND	ND	0.6	0.6	0.8	ND	0.7
Average Concentration				3.3	39	6.5	5	5	26	26	50	50	26	5	26	51	51	26	0.1	0.25	0.25	0.25	0.25	0.25	0.1	1.6	0.58	0.29	0.29	0.29	0.35	0.35	0.38	0.29	0.37
Median Concentration				1.25	33.95	6.6	5	5	25	25	50	50	25	5	25	50	50	25	0.1	0.25	0.25	0.25	0.25	0.25	0.1	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Standard Deviation				4.5	19	1.2	0	0	2	2	0	0	2	0	2	2	2	2	0	0	0	0	0	0	0	3.3	0.7	0.1	0.1	0.1	0.16	0.16	0.23	0.1	0.19
Number of Guideline Exceedances				0	0	0	1	0	1	0	1	1	0	0	0	0	0	0	1	1	1	0	0	1	0	0	0	0	0	0	0	2	0	0	0
Number of Guideline Exceedances(Detects Only)				0	0	0	1	0	1	0	1	1	0	0	0	0	0	0	1	1	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0

Env Stds Comments
#1:To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.
#2:To obtain F2 subtract napthalene from the >C10 - C16 fraction.
#3:enHealth Interim Human Health PFC Guidelines (Drinking Water)
#4: enHealth Interim Human Health PFC Guidelines (Recreational Water)
#5:WA DER 2017 - Ecological PFC 99% species protection Guidelines

Data Comments
#1 Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.

Appendix B
Table A4
Sediment Analytical Results - Ecological 2017

											SVOCs		PFAS														
				Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Benzo(a)pyrene TEQ (zero)	Benzo(a)pyrene TEQ (LOR)	Benzo(a)pyrene TEQ (half LOR)	PFHxS and PFOS (Sum of Total) - Lab Calc	4:2 Fluorotelomer sulfonic acid	10:2 Fluorotelomer sulfonic acid	Perfluorobutane sulfonic acid	Perfluorohexane sulfonic acid (PFHxS)	Perfluoropentanoic acid	8:2 Fluorotelomer sulfonic acid	6:2 Fluorotelomer Sulfonate (6:2 FTS)	Perfluorooctanoic acid (PFOA)	Perfluorobutanoic acid	Perfluoroheptanoic acid	Perfluorohexanoic acid (PFHxA)	Perfluorooctane sulfonic acid (PFOS)	PFAS (Sum of Total)(WA DER List)
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.0002	0.0005	0.0005	0.0002	0.0002	0.0002	0.0005	0.0005	0.0002	0.001	0.0002	0.0002	0.0002	0.0002
DER 2017 Ecological PFOS/PFOA (Commercial/Industrial)																						2				4	
DER 2017 Ecological PFOS/PFOA (Urban residential)																						**7**				**15**	
NEPM 2013 EIL-Commercial/Industrial									*370*																		
NEPM 2013 EIL-Urban Residential- Public Open Space									*170*																		
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil 0-2m																											
NEPM 2013 Table 1B(6) ESLs for Urban Res, Coarse Soil 0-2m																											
Field_ID	**Location_Code**	**Sample_Depth_Range**	**Sampled_Date_Time**																									
SS01	SS01		16/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	0.0049	<0.0005	<0.0005	<0.0002	0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	0.0047	0.0049
SS02	SS02		16/12/2016	0.7	<0.5	2.1	<0.5	<0.5	<0.5	0.9	0.8	1.4	1	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
SS03	SS03		16/12/2016	<1	<1	<1	<1	<1	<1	<1	<0.5	1.2	0.6	0.115	<0.0005	<0.0005	<0.0002	0.0027	0.0004	<0.0005	0.0008	0.0006	<0.001	<0.0002	<0.0002	0.112	0.116
SS04	SS04		16/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	0.0015	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	0.0015	0.0015
SS05	SS05		16/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	0.0757	<0.0005	<0.0005	0.0005	0.0039	0.0014	<0.0005	0.0007	0.0024	<0.001	0.0007	0.0031	0.0718	0.0845
SSQA2	SS05		16/12/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	0.197	<0.0005	0.0006	0.0008	0.0108	0.0019	<0.0005	0.0019	0.0051	<0.001	0.0012	0.0045	0.186	0.212
Statistical Summary																											
Number of Results				6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Number of Detects				1	0	1	0	0	0	1	1	6	6	5	0	1	2	4	3	0	3	3	0	2	2	5	5
Minimum Concentration				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
Minimum Detect				0.7	ND	2.1	ND	ND	ND	0.9	0.8	1.2	0.6	0.0015	ND	0.0006	0.0005	0.0002	0.0004	ND	0.0007	0.0006	ND	0.0007	0.0031	0.0015	0.0015
Maximum Concentration				<1	<1	2.1	<1	<1	<1	<1	0.8	1.4	1	0.197	<0.0005	0.0006	0.0008	0.0108	0.0019	<0.0005	0.0019	0.0051	<0.001	0.0012	0.0045	0.186	0.212
Maximum Detect				0.7	ND	2.1	ND	ND	ND	0.9	0.8	1.4	1	0.197	ND	0.0006	0.0008	0.0108	0.0019	ND	0.0019	0.0051	ND	0.0012	0.0045	0.186	0.212
Average Concentration				0.37	0.29	0.6	0.29	0.29	0.29	0.4	0.34	1.2	0.67	0.066	0.00025	0.00031	0.00028	0.003	0.00067	0.00025	0.00069	0.0014	0.0005	0.00038	0.0013	0.063	0.07
Median Concentration				0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1.2	0.6	0.0403	0.00025	0.00025	0.0001	0.00145	0.00025	0.00025	0.000475	0.00035	0.0005	0.0001	0.0001	0.03825	0.0447
Standard Deviation				0.19	0.1	0.74	0.1	0.1	0.1	0.26	0.22	0.082	0.16	0.08	0	0.00014	0.0003	0.0042	0.00079	0	0.00064	0.002	0	0.00047	0.002	0.076	0.085
Number of Guideline Exceedances				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances(Detects Only)				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Env Stds Comments
#1:To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.
#2:To obtain F2 subtract napthalene from the >C10 - C16 fraction.
#3:enHealth Interim Human Health PFC Guidelines (Drinking Water)
#4: enHealth Interim Human Health PFC Guidelines (Recreational Water)
#5:WA DER 2017 - Ecological PFC 99% species protection Guidelines

Data Comments
#1 Quantification of linear and branched isomers has been conducted as a single total response

Appendix B
Table C
Groundwater and Surface Water Analytical Results - 2017

				Inorganics			Metals								TRH - NEPM 2013							TRH - NEPM 1999						BTEX & MAH														
				Sulfate as SO4 - Turbidimetric (Filtered)	pH (Lab)	Total Dissolved Solids (Filtered)	Arsenic (Filtered)	Cadmium (Filtered)	Chromium (III+VI) (Filtered)	Copper (Filtered)	Lead (Filtered)	Mercury (Filtered)	Nickel (Filtered)	Zinc (Filtered)	C6-C10 minus BTEX (F1)	C6 - C10 Fraction	>C10-C16 minus Naphthalene (F2)	>C10 - C16 Fraction	>C16 - C34 Fraction (F3)	>C34 - C40 Fraction (F4)	>C10 - C40 (Sum of Total)	C6 - C9 Fraction	C10 - C14 Fraction	C15 - C28 Fraction	C29 - C36 Fraction	C10 - C36 (Sum of Total)	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	BTEX (Sum of Total) - Lab Calc	Polycylic aromatic hydrocarbons	Pyrene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene
				mg/L	pH Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL				1	0.01	10	0.001	0.0001	0.001	0.001	0.001	0.0001	0.001	0.005	20	20	100	100	100	100	100	20	50	100	50	50	1	2	2	2	2	2	1	0.5	1	1	1	1	1	0.5
CRCCare GW HSL for vap.int Intrusive Maint. - Sand, 2-4m																NL		NL								NL	NL	NL			NL									
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand 2-4m															6000[#1]		NL[#2]									5000	NL	NL			NL									
NEPM 2013 Table 1C GILs, Drinking Water (inclusive of WA DER PFAS criterion)							*0.01*	*0.002*[#3]		*2*[#3]	*0.01*[#3]	*0.001*	*0.02*[#3]														*1*	*800*	*300*			*600*								*0.01*	
NEPM 2013 Table 1C GILs, Marine Waters (inclusive of WA DER PFAS criterion)								0.0007[#4]		0.0013[#3]	0.0044[#3]	0.0001[#5]	0.007[#3]	0.015[#6]													500[#7]														
NHMRC Recreational Guidelines 2008 (inclusive of WA DER PFAS criterion)							**0.1**	**0.02**		**20**	**0.1**	**0.01**	**0.2**														**10**	**8000**	**3000**			**6000**									
SampleCode	**Field_ID**	**Location_Code**	**Sampled_Date_Time**																																							
ES1629123013	GW01	GW01	16/12/2016	457	6.37	8140	0.001	<0.0001	<0.001	0.001	<0.001	<0.0001	*0.045*	0.11	<20	<20	140	140	<100	<100	140	<20	<50	150	<50	150	<1	<2	<2	<2	<2	<2	<1	<0.5	<1	<1	<1	<1	<1	<0.5
ES1629123018	GWQA3	GW01	16/12/2016	479	6.42	7780	0.001	<0.0001	<0.001	0.002	<0.001	<0.0001	*0.047*	0.119	<20	<20	120	120	<100	<100	120	<20	<50	130	<50	130	<1	<2	<2	<2	<2	<2	<1	<0.5	<1	<1	<1	<1	<1	<0.5
ES1701791007	GW01	GW01	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES1701791007R1	GW01	GW01	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES1701791007R2	GW01	GW01	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES1701791012	GWQA3	GW01	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES1629123014	GW02	GW02	16/12/2016	660	4.64	12,000	0.009	<0.0001	0.002	0.033	0.004	<0.0001	*0.121*	0.338	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<2	<2	<2	<2	<2	<1	<0.5	<1	<1	<1	<1	<1	<0.5
ES1701791008	GW02	GW02	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES1629123015	GW03	GW03	16/12/2016	812	5.25	11,100	0.002	0.0001	<0.001	<0.001	<0.001	<0.0001	*0.086*	0.158	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<2	<2	<2	<2	<2	<1	<0.5	<1	<1	<1	<1	<1	<0.5
ES1701791009	GW03	GW03	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES1701791009R1	GW03	GW03	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES1701791009R2	GW03	GW03	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES1629123016	GW04	GW04	16/12/2016	1140	3.99	16,800	*0.018*	<0.0001	0.006	0.052	0.007	<0.0001	***0.323***	0.744	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<2	<2	<2	<2	<2	<1	<0.5	<1	<1	<1	<1	<1	<0.5
ES1701791010	GW04	GW04	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES1629123017	GW05	GW05	16/12/2016	1220	4.55	8220	0.007	0.0001	0.002	0.005	0.002	<0.0001	*0.171*	0.405	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<2	<2	<2	<2	<2	<1	<0.5	<1	<1	<1	<1	<1	<0.5
ES1701791011	GW05	GW05	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES1629123007	SW01	SW01	16/12/2016	10	7.54	101	<0.001	<0.0001	<0.001	0.002	<0.001	<0.0001	<0.001	<0.005	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<2	<2	<2	<2	<2	<1	<0.5	<1	<1	<1	<1	<1	<0.5
ES1701791001	SW01	SW01	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES1701791001R1	SW01	SW01	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES1701791001R2	SW01	SW01	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES1629123008	SW02	SW02	16/12/2016	44	7.53	165	0.002	<0.0001	<0.001	0.006	<0.001	<0.0001	<0.001	<0.005	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<2	<2	<2	<2	<2	<1	<0.5	<1	<1	<1	<1	<1	<0.5
ES1701791002	SW02	SW02	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES1629123009	SW03	SW03	16/12/2016	12	7.22	107	<0.001	<0.0001	<0.001	0.002	<0.001	<0.0001	0.001	<0.005	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<2	<2	<2	<2	<2	<1	<0.5	<1	<1	<1	<1	<1	<0.5
ES1701791003	SW03	SW03	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES1701791003R1	SW03	SW03	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES1701791003R2	SW03	SW03	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES1629123010	SW04	SW04	16/12/2016	264	7.39	3440	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.0001	<0.001	0.01	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<2	<2	<2	<2	<2	<1	<0.5	<1	<1	<1	<1	<1	<0.5
ES1701791004	SW04	SW04	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES1629123011	SW05	SW05	16/12/2016	4	7.47	151	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.0001	<0.001	<0.005	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<2	<2	<2	<2	<2	<1	<0.5	<1	<1	<1	<1	<1	<0.5
ES1629123012	SWQA1	SW05	16/12/2016	4	7.47	137	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.0001	<0.001	<0.005	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<2	<2	<2	<2	<2	<1	<0.5	<1	<1	<1	<1	<1	<0.5
ES1701791005	SW05	SW05	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES1701791005R1	SW05	SW05	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES1701791005R2	SW05	SW05	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES1701791006	SWQA1	SW05	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Env Stds Comments

#1:To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.
#2:To obtain F2 subtract napthalene from the >C10 - C16 fraction.
#3:Values calculated using hardness of 30 mg/L CaCO3. Refer ANZECC & ARMCANZ (2000) for site specific hardness guidance
#4:Values calculated using hardness of 30 mg/L CaCO3. Chemical for which possible bioaccumulation and secondary poisoning effects should be considered.
#5:Chemical for which possible bioaccumulation and secondary poisoning effects should be considered, refer to ANZECC & ARMCANZ (2000) for further guidance.
#6:Values calculated using hardness of 30 mg/L CaCO3. Figure may not protect key species from chronic toxicity. Refer ANZECC & ARMCANZ (2000) for guidance
#7:Figure may not protect key species from chronic toxicity, refer to ANZECC & ARMCANZ (2000) for further guidance.
#8: WA DER 2017 - Ecological PFC 99% species protection guidelines
#9: WA DER 2017 - Drinking water guideline, based on enHealth (2016) recommendations
#10: WA DER 2017 - Recreational waters guideline, based on enHealth (2016) recommendations

| | | | | PAH | | | | | | | | | | | PFAS | | | | | | | | | | |

Appendix B
Table C
Groundwater and Surface Water Analytical Results - 2017

				Alkalinity				Major Ions							
				Alkalinity (Carbonate as CaCO3)	Alkalinity (Hydroxide as CaCO3)	Alkalinity (total as CaCO3)	Bicarbonate Alkalinity as CaCO3	Calcium (Filtered)	Chloride	Magnesium (Filtered)	Anions Total	Potassium (Filtered)	Sodium (Filtered)	Cations Total	Ionic Balance
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	meq/L	mg/L	mg/L	meq/L	%
EQL				1	1	1	1	1	1	1	0.01	1	1	0.01	0.01
CRCCare GW HSL for vap.int Intrusive Maint. - Sand, 2-4m															
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand 2-4m															
NEPM 2013 Table 1C GILs, Drinking Water (inclusive of WA DER PFAS criterion)															
NEPM 2013 Table 1C GILs, Marine Waters (inclusive of WA DER PFAS criterion)															
NHMRC Recreational Guidelines 2008 (inclusive of WA DER PFAS criterion)															
SampleCode	**Field_ID**	**Location_Code**	**Sampled_Date_Time**												
ES1629123013	GW01	GW01	16/12/2016	<1	<1	124	124	108	4260	228	132	11	2470	132	0.11
ES1629123018	GWQA3	GW01	16/12/2016	<1	<1	121	121	112	4340	229	135	11	2440	131	1.49
ES1701791007	GW01	GW01	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-
ES1701791007R1	GW01	GW01	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-
ES1701791007R2	GW01	GW01	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-
ES1701791012	GWQA3	GW01	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-
ES1629123014	GW02	GW02	16/12/2016	<1	<1	<1	<1	62	6750	424	204	5	3540	192	3.04
ES1701791008	GW02	GW02	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-
ES1629123015	GW03	GW03	16/12/2016	<1	<1	12	12	54	5160	252	163	4	2830	147	5.19
ES1701791009	GW03	GW03	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-
ES1701791009R1	GW03	GW03	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-
ES1701791009R2	GW03	GW03	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-
ES1629123016	GW04	GW04	16/12/2016	<1	<1	<1	<1	63	7440	528	234	6	3960	219	3.23
ES1701791010	GW04	GW04	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-
ES1629123017	GW05	GW05	16/12/2016	<1	<1	<1	<1	72	4640	267	156	7	2500	134	7.5
ES1701791011	GW05	GW05	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-
ES1629123007	SW01	SW01	16/12/2016	<1	<1	27	27	7	6	2	0.92	2	8	0.91	-
ES1701791001	SW01	SW01	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-
ES1701791001R1	SW01	SW01	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-
ES1701791001R2	SW01	SW01	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-
ES1629123008	SW02	SW02	16/12/2016	<1	<1	49	49	25	19	5	2.43	2	11	2.19	-
ES1701791002	SW02	SW02	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-
ES1629123009	SW03	SW03	16/12/2016	<1	<1	28	28	8	13	2	1.18	2	11	1.09	-
ES1701791003	SW03	SW03	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-
ES1701791003R1	SW03	SW03	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-
ES1701791003R2	SW03	SW03	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-
ES1629123010	SW04	SW04	16/12/2016	<1	<1	38	38	44	1500	108	48.6	37	891	50.8	2.23
ES1701791004	SW04	SW04	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-
ES1629123011	SW05	SW05	16/12/2016	<1	<1	60	60	14	23	5	1.93	4	24	2.26	-
ES1629123012	SWQA1	SW05	16/12/2016	<1	<1	72	72	16	23	5	2.17	4	20	2.18	-
ES1701791005	SW05	SW05	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-
ES1701791005R1	SW05	SW05	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-
ES1701791005R2	SW05	SW05	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-
ES1701791006	SWQA1	SW05	16/12/2016	-	-	-	-	-	-	-	-	-	-	-	-

Env Stds Comments
#1:To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.
#2:To obtain F2 subtract napthalene from the >C10 - C16 fraction.
#3:Values calculated using hardness of 30 mg/L CaCO3. Refer ANZECC & ARMCANZ (2000) for site specific har
#4:Values calculated using hardness of 30 mg/L CaCO3. Chemical for which possible bioaccumulation and sec
#5:Chemical for which possible bioaccumulation and secondary poisoning effects should be considered, refer
#6:Values calculated using hardness of 30 mg/L CaCO3. Figure may not protect key species from chronic toxici
#7:Figure may not protect key species from chronic toxicity, refer to ANZECC & ARMCANZ (2000) for further g
#8: WA DER 2017 - Ecological PFC 99% species protection guidelines
#9: WA DER 2017 - Drinking water guideline, based on enHealth (2016) recommendations
#10: WA DER 2017 - Recreational waters guideline, based on enHealth (2016) recommendations

Appendix C –Survey results

CODE	EASTING	NORTHING	RL (GPS AHD)	DESCRIPTION
GW02	297323.869	6173480.065	6.270	TOP OF GATIC
GW02-1	297323.906	6173479.980	6.293	TOP OF CASE
GW01	297398.977	6173432.086	6.168	TOP OF GATIC
GW01-1	297398.909	6173432.014	6.170	TOP OF CASE
GW03	297393.100	6173559.973	5.400	TOP OF GATIC
GW03-1	297393.098	6173559.972	5.398	TOP OF CASE
GW04	297307.595	6173658.896	5.041	TOP OF GATIC
GW04-1	297307.563	6173658.845	5.036	TOP OF CASE
GW05	297258.358	6173898.054	4.803	TOP OF GATIC
GW05-1	297258.293	6173898.098	4.814	TOP OF CASE

Appendix D – Groundwater database search results

All Groundwater

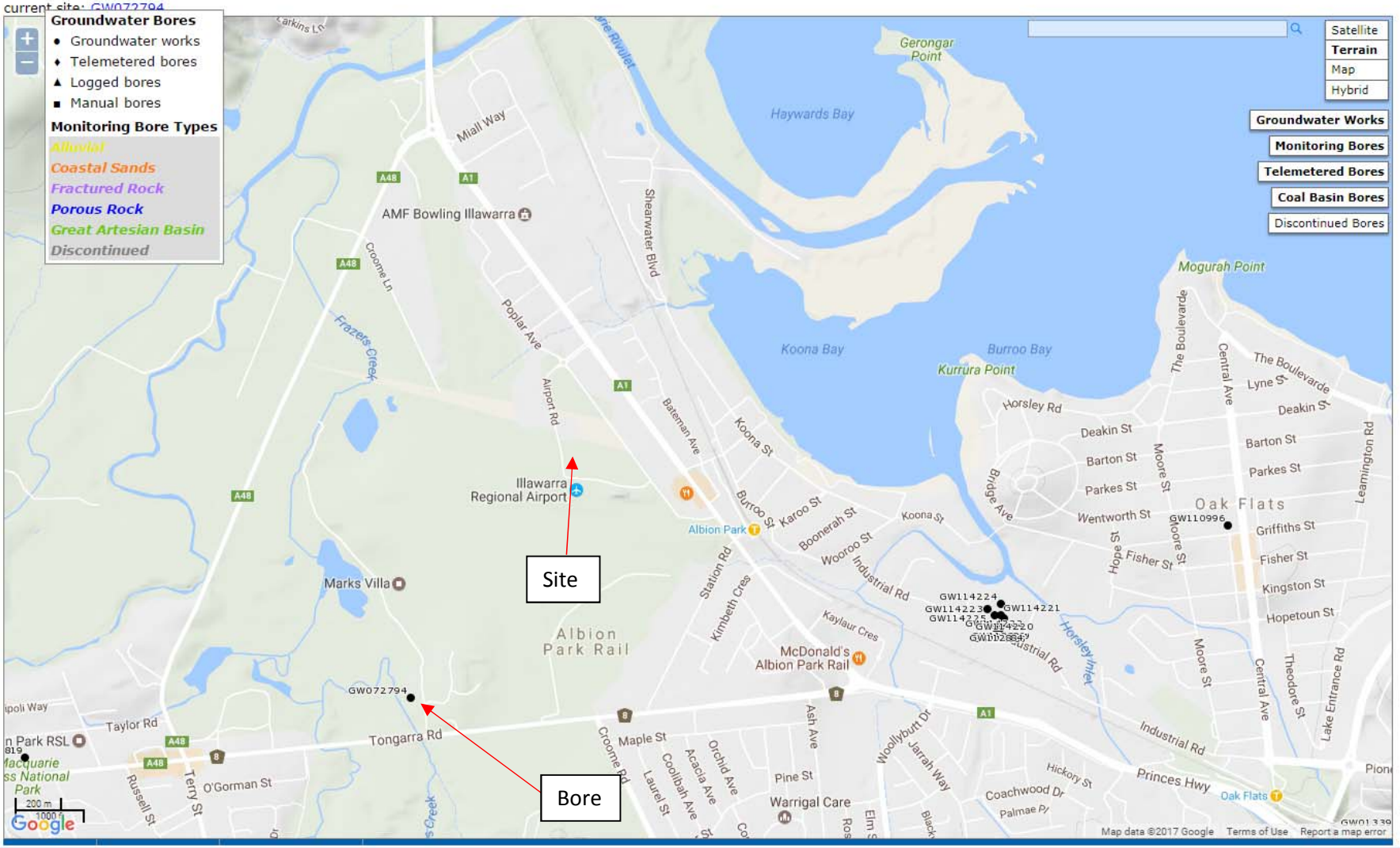
All Groundwater Map

bookmark this page

All data times are Eastern Standard Time

Map | Info

current site: GW072794



NSW Office of Water
Work Summary

GW072794

Licence:
Licence Status:
Authorised Purpose(s):
Intended Purpose(s): STOCK, DOMESTIC

Work Type: Bore open thru rock
Work Status:
Construct.Method: Rotary Air
Owner Type: Private

Commenced Date:
Completion Date: 06/02/1995
Final Depth: 30.00 m
Drilled Depth: 30.00 m

Contractor Name:
Driller: Phillip Arthur Windley
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description: Salty
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CAMDE	CAMDE.027	L6 DP70360
Licensed:			

Region: 10 - Sydney South Coast
River Basin: 214 - WOLLONGONG COAST
Area/District:
CMA Map:
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown
Northing: 6172563.0
Easting: 296754.0
Latitude: 34°34'07.0"S
Longitude: 150°47'04.0"E

GS Map: -
MGA Zone: 0
Coordinate Source: GD.,ACC.GIS

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Casing	P.V.C.	0.00	7.00	160			Driven into Hole

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
20.00	20.50	0.50	Fractured	6.00		0.30			

Geologists Log

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	1.00	1.00		Unknown	
1.00	7.00	6.00	Clay	Clay	
7.00	30.00	23.00	Shale	Shale	

Remarks

***** End of GW072794 *****

Warning To Clients: This raw data has been supplied to the NSW Office of Water by drillers, licensees and other sources. The NOW does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

Appendix E – Field sampling sheets and calibration certificates

Purging and Sampling Record

Surface Water.

Bore ID: SW02 SW03 SW04 SW05

Job Information

Client:
Project: Albion Park
Proj. No.: 2125583
Sampler: JL/TG
Date: 16/12/2016
Round .....

Sampling Information

Purge Method: grab
Sample Method: .....
WQ Meter Type: .....
Flow Cell: Y / N Pump Depth:.....m
WLevel Meter Type: Dip / Fox / Int.Fce / Gge
Field Filtered? Y / N (filter vessel, disposable filter, filter/syringe)

Bore Information

SWL(mbTOC): ~~2.76~~ ..... m Logic Check: .....
Screen: From:.....to..... m Stick Up: ..... m
NAPL Check:.....
Ref.datum: ..... Bore Diam.: ..... mm
Bore Depth: ~~6.95~~ ..... m Well Cap Secure?.....

Time (.....)	Volume (L)	Temp (°C)	SWL (m TOC)	Dis.Oxygen (.....)	Elec.Cond (.....)	pH (pH units)	Ox-Red Pt. (± mV)	.....	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	stable	+/- 10%	+/- 3%	+/- 0.05 pH	+/- 10 mV		
SW02		21.5	—	5.08	200.0	7.26	69.7		Slightly yellow.
		21.5	—	5.06	199.9	7.26	59.6.		↓
		21.5	—	5.11	199.8	7.25	59.6		yellow
SW021		19.7		4.60	84.4	8.12	52.7		↓
		19.7		4.49	84.6	8.09	52.8		Slightly yellow.
		19,7		4.43	84.6	8.07	52.9		↓
SW03		18.8	—	4.64	96.8	7.41	62.5		grey/brown/yellow
		18.8	—	4.34	96.8	7.33	63.1		↓
		18.8	—	4.15	96.9	7.28	63.2		brown/orange
SW04		19.6	—	5.51	4527	8.40	77.2		↓
		19.6	—	5.32	4518	8.36	77.6		
		19.6	—	5.17	4515	8.31	77.9		
SW05	10L	18.5	—	4.26	162.9	7.37	72.5		
	10L	18.5	—	4.01	163.0	7.35	72.1		
	10L	18.5	—	3.74	162.9	7.32	71.6		

Field QA Checks:

Air bubbles in vials? Y / N Any violent reactions? Y / N
Decontamination as per GHD procedure? Y / N
Was sampling equipment pre-cleaned? Y / N
COC updated? Y / N

Parameters / Preservatives	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.	PFAS	TOSI PFAS		
	✓	✓								✓	✓		

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

0417625595

Purge Volumes

Casing Int. Dia (mm)	50	100	150
Vol (L/m of casing)	2.0	7.9	17.7

GHD MANAGEMENT ENGINEERING ENVIRONMENT

Purging and Sampling Record

~~Sediment sampling~~ Sediment sampling.

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (.....)	Dis.Oxygen (.....)	Ox-Red Pt. (± mV)	SWL (m)	(.....)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate purged dry?
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
									Grey and orange mottled clay. VM.
SS05/SSQA3									Dark brown soil. VM.
									Dark brown organic matter
SS02									Gravelly dark brown (road base fragments)
SS03									
SS04									
SS01									

Purging and Sampling Record

Bore ID: CWO1

Job Information	Sampling Information	Bore Information
Client:	**Purge Method:** peri	**SWL(mbTOC):** 3.296 m **Logic Check:**
Project: Albion Park	**Sample Method:** low flow	**Screen:** From: to m **Stick Up:** m
Proj. No.: 2125583	**WQ Meter Type:** YSI	**NAPL Check:** **Bore Diam.:** 50 mm
Sampler: JL/TG	**Flow Cell:** Y / N **Pump Depth:** 5.0 m	**Ref.datum:** **Well Cap Secure?** Y
Date: 16/12/2016	**WLevel Meter Type:** Dip / Fox / Int.Fce / Gge	**Bore Depth:** 6.304 m
Round	**Field Filtered? Y / N** (filter vessel, disposable filter, filter/syringe)	

Time (.....)	Volume (L)	Temp (°C)	SWL (m TOC)	Dis.Oxygen (.....)	Elec.Cond (.....)	pH (pH units)	Ox-Red Pt. (± mV)	.....	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	*stable*	*+/- 10%*	*+/- 3%*	*+/- 0.05 pH*	*+/- 10 mV*		
1228	1	19.4	3.71	4.40	10082	5.77	93.4		purged dry at 0750 16/12/16. clear ↓
1230	2	19.5	3.870	4.41	10077	5.79	91.6		
1232	3	19.5	4.031	4.40	10064	5.81	88.9		
1235	4	19.4	3.870	6.24	10004	6.04	73.6		

Field QA Checks:

Air bubbles in vials? Y / (N) Any violent reactions? Y / (N)
Decontamination as per GHD procedure? (Y) / N
Was sampling equipment pre-cleaned? (Y) / N
COC updated? (Y) / N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.				
Preservatives	✓	✓								HCl	green		

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

duplicate GWQA3 10 bottles

Purge Volumes

Casing Int. Dia (mm)	50	100	150
Vol (L/m of casing)	2.0	7.9	17.7

*Double for gravel pack

Purging and Sampling Record

Bore ID: GW02

Job Information	Sampling Information	Bore Information
Client:	**Purge Method:** peri	**SWL(mbTOC):** 3.350 m **Logic Check:**
Project: Albion Park	**Sample Method:** low	**Screen:** From: to m **Stick Up:** — m
Proj. No.: 2125583	**WQ Meter Type:** YSI	**NAPL Check:** - **Bore Diam.:** 50 mm
Sampler: JL/TG	**Flow Cell:** Y / N **Pump Depth:** 4.5 m	**Ref.datum:** **Well Cap Secure?** yes
Date: 16/12/2016	**WLevel Meter Type:** Dip / Fox / Int.Fce / Gge	**Bore Depth:** 6.660 m
Round	**Field Filtered? Y / N** (filter vessel, disposable filter, filter/syringe)	

Time (.....)	Volume (L)	Temp (°C)	SWL (m TOC)	Dis.Oxygen (.....)	Elec.Cond (.....)	pH (pH units)	Ox-Red Pt. (± mV)	.....	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	*stable*	*+/- 10%*	*+/- 3%*	*+/- 0.05 pH*	*+/- 10 mV*		
1211	1	19.3	3.76	3.01	15363	4.33	219.2		purged dry. 0720 16/12/16.
1214	2	19.3	3.925	3.00	15327	4.37	217.7		cloudy orange
1216	3	19.2	4.142	3.02	15320	4.37	217.9		↓

Field QA Checks:

Air bubbles in vials? Y / N Any violent reactions? Y / N
Decontamination as per GHD procedure? Y / N
Was sampling equipment pre-cleaned? Y / N
COC updated? Y / N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.	PFAS	grech		
Preservatives	✓	✓								✓	✓		
	2	1								1	1		

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

5 bottles

Purge Volumes

Casing Int. Dia (mm)	50	100	150
Vol (L/m of casing)	2.0	7.9	17.7

*Double for gravel pack

Purging and Sampling Record

Bore ID: CW03

Job Information	Sampling Information	Bore Information
Client:	**Purge Method:** peri	**SWL(mbTOC):** 2.721 m **Logic Check:**
Project: Albion Park	**Sample Method:** low flow	**Screen:** From: to m **Stick Up:** - m
Proj. No.: 2125583	**WQ Meter Type:** YSI	**NAPL Check:** **Bore Diam.:** 50 mm
Sampler: JL/TG	**Flow Cell:** Y / N **Pump Depth:** 5 m	**Ref.datum:** **Well Cap Secure?** Y
Date: 16/12/2016	**WLevel Meter Type:** Dip / Fox / Int.Fce / Gge	**Bore Depth:** 6.395 m
Round	**Field Filtered? Y / N** (filter vessel, disposable filter, filter/syringe)	

Time (.....)	Volume (L)	Temp (°C)	SWL (m TOC)	Dis.Oxygen (.....)	Elec.Cond (.....)	pH (pH units)	Ox-Red Pt. (± mV)	.....	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	*stable*	*+/- 10%*	*+/- 3%*	*+/- 0.05 pH*	*+/- 10 mV*		
106	1	18.3	3.000	1.92	11699	4.77	132.6		purged dry 0850 16/12/16. brown / yellow / orange ↓
108	2	18.3	3.070	1.80	11703	4.72	129.0		
110	3	18.3	3.140	1.81	11706	4.72	128.0		

Field QA Checks:

Air bubbles in vials? Y / N Any violent reactions? Y / N
Decontamination as per GHD procedure? Y / N
Was sampling equipment pre-cleaned? Y / N
COC updated? Y / N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.				
Preservatives													

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes

Casing Int. Dia (mm)	50	100	150
Vol (L/m of casing)	2.0	7.9	17.7

*Double for gravel pack

Purging and Sampling Record

Bore ID: CW04

Job Information

Client:
Project: Albion Park
Proj. No.: 2125583
Sampler: JL/TG
Date: 16/12/2016
Round .....

Sampling Information

Purge Method: .....
Sample Method: ....
WQ Meter Type: ....
Flow Cell: Y / N Pump Depth:.....m
WLevel Meter Type: Dip / Fox / Int.Fce / Gge
Field Filtered? Y / N (filter vessel, disposable filter, filter/syringe)

Bore Information

SWL(mbTOC): 2.610 m Logic Check: .....
Screen: From:.....to..... m Stick Up: ..... m
NAPL Check:..... Bore Diam.: ..... mm
Ref.datum: ..... Well Cap Secure?.....
Bore Depth: 6.045 m

Time (.....)	Volume (L)	Temp (°C)	SWL (m TOC)	Dis.Oxygen (.....)	Elec.Cond (.....)	pH (pH units)	Ox-Red Pt. (± mV)	.....	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	*stable*	*+/- 10%*	*+/- 3%*	*+/- 0.05 pH*	*+/- 10 mV*		
1157	1	18.6	3.001	3.29	16923	3.76	275.5		purged dry 5 pm 15/12/16
1159	2	18.5	3.210	3.34	16962	3.75	281.1		clear
1201	3	18.5		3.32	16983	3.75	283.5		↓
~~1203~~	~~4~~								

Field QA Checks:

Air bubbles in vials? Y / N Any violent reactions? Y / N
Decontamination as per GHD procedure? Y / N
Was sampling equipment pre-cleaned? Y / N
COC updated? Y / N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.	PFAS	Oregon		
Preservatives	✓	✓								✓	✓		

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

1 green

Purge Volumes

Casing Int. Dia (mm)	50	100	150
Vol (L/m of casing)	2.0	7.9	17.7

*Double for gravel pack

Purging and Sampling Record

Bore ID: GW05

Job Information

Client:
Project: Albion Park
Proj. No.: 2125583
Sampler: JL/TG
Date: 16/12/2016
Round

Sampling Information

Purge Method: peri
Sample Method: low flow
WQ Meter Type: YSI
Flow Cell: Y / N Pump Depth: 4.5 m
WLevel Meter Type: (Dip) / Fox / Int.Fce / Gge
Field Filtered? Y / N (filter vessel, disposable filter, filter/syringe)

Bore Information

SWL(mbTOC): 2.815 m Logic Check:
Screen: From: to: m Stick Up: - m
NAPL Check: Bore Diam.: 50 mm
Ref.datum: Well Cap Secure? yes
Bore Depth: 6.20 m

Time (.....)	Volume (L)	Temp (°C)	SWL (m TOC)	Dis.Oxygen (.....)	Elec.Cond (.....)	pH (pH units)	Ox-Red Pt. (± mV)	.....	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	stable	+/- 10%	+/- 3%	+/- 0.05 pH	+/- 10 mV		
1113	2	18.8	3.100	3.13	10840	4.43	154.7		purged dry 430pm 15/12/16. clear
1127	~~3~~ 3	18.7	3.550	2.75	11332	4.34	167.2		
1132	~~4~~ 4.	18.7	3.840	3.05	11069	4.39	165.9		

Field QA Checks:

Air bubbles in vials? Y / N Any violent reactions? Y / N
Decontamination as per GHD procedure? Y / N
Was sampling equipment pre-cleaned? Y / N
COC updated? Y / N

Parameters / Preservatives	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.	PFAS			
	✓	✓											

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

GW0403

Purge Volumes

Casing Int. Dia (mm)	50	100	150
Vol (L/m of casing)	2.0	7.9	17.7

*Double for gravel pack

Multi Parameter Water Meter

Instrument YSI Quatro Pro Plus
Serial No. 10H100325

airmet
Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
Switch/keypad	Operation	✓	
Display	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	1. pH	✓	
	2. mV	✓	
	3. EC	✓	
	4. D.O	✓	
	5. Temp	✓	
Alarms	Beeper		
	Settings		
Software	Version		
Data logger	Operation		
Download	Operation		
Other tests:			

Certificate of Calibration

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

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. pH 7.00		pH 7.00		288773	pH 6.99
2. pH 4.00		pH 4.00		288994	pH 4.08
3. pH 10.00		pH 10.00		291176	pH 9.65
4. mV		229.6mV		OB1388/OB1390	229.3mV
5. EC		2.76mS		290786	2.76mS
6. D.O		0.00ppm		4347	0.00ppm
7. Temp		22.0°C		MultiTherm	21.8°C

Calibrated by: Lin Wang

Calibration date: 15/12/2016

Next calibration due: 14/01/2017

Oil / Water Interface Meter

Instrument Geotech Interface Meter (30M)
Serial No. 4253

airmet
Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Compartment	✓	
	Capacity	✓	
Probe	Cleaned/Decon.	✓	
	Operation	✓	
Connectors	Condition	✓	
		✓	
Tape Check	Cleaned	✓	
Connectors	Checked for cuts	✓	
Instrument Test	At surface level	✓	

Certificate of Calibration

This is to certify that the above instrument has been cleaned and tested.

Calibrated by: _____ **Jenny Shao**

Calibration date: **14/12/2016**

Next calibration due: **12/02/2017**

PID Calibration Certificate

Instrument PhoCheck Tiger
Serial No. T-105759

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	✓	Low	High	TWA	STEL
	Settings	✓	50ppm	100ppm	N/A	N/A
Software	Version	✓				
Data logger	Operation					
Download	Operation	✓				
Other tests:						

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		98ppm Isobutylene	NATA	SY137		98.4ppm

Calibrated by: Joanna Wong

Calibration date: 2/12/2016

Next calibration due: 1/01/2017

Appendix F – Borehole logs

BOREHOLE LOG

ENVIRONMENTAL-GROUNDWATER

MONITORING WELL GW01

Client Fire & Rescue NSW
Project Albion Park FRNSW Site Investigation
Project No. 212558302
Site Albion Park FRNSW
Location Airport Road, Albion Park Rail, NSW 2527
Date Drilled 06/12/2016 - 06/12/2016

Drill Co. BG Drilling Pty Ltd
Driller Luke
Rig Type Hanjin D&B 8-D
Drill Method HA, PT & SFA
Total Depth (m) 6
Diameter (mm) 125

Easting, Northing 297398.909, 6173432.014
Grid Ref GDA94_MGA_zone_56
Elevation 6.168
Collar RL 6.17
Logged By Matt West
Checked By

B.C.L No. N/A **Casing** PVC (Class 18) **Screen** 0.5mm Slotted PVC (Class 18) **Surface Completion** Gatic

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0	HA	all samples <1 ppm	GW01_0.0_0.1		Grout		silty SAND, fine, pale brown brown (possible FILL)	D	L		6
0.5	PT		GW01_0.5_0.6				CLAY, medium plasticity, pale brown mottled pale grey (NATURAL - SOIL)	SM	ST		5.5
1			GW01_1.0_1.1								5
1.5											4.5
2			GW01_2.0_2.1								4
2.5											3.5
3			GW01_3.0_3.1		Bentonite						3
3.5											2.5
4			GW01_4.0_4.1				gravelly CLAY, low plasticity, orange and pale grey, fine and coarse gravel (NATURAL - SOIL)	M	VST	iron oxide staining	2
4.5					Gravel						1.5
5			GW01_5.0_5.1								1
5.5	SFA										0.5
6							Termination Depth at:6.00 m. Target depth achieved.				0
6.5											-0.5
7											-1
7.5											-1.5

Notes

GHD Soil Classifications The GHD Soil Classification is based on Australian Standards AS 1726-1993. This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-GROUNDWATER

MONITORING WELL GW02

Client Fire & Rescue NSW
Project Albion Park FRNSW Site Investigation
Project No. 212558302
Site Albion Park FRNSW
Location Airport Road, Albion Park Rail, NSW 2527
Date Drilled 06/12/2016 - 06/12/2016

Drill Co. BG Drilling Pty Ltd
Driller Luke
Rig Type Hanjin D&B 8-D
Drill Method HA, PT & SFA
Total Depth (m) 6.5
Diameter (mm) 125

Easting, Northing 297323.906, 6173479.98
Grid Ref GDA94_MGA_zone_56
Elevation 6.27
Collar RL 6.293
Logged By Matt West
Checked By

B.C.L No. N/A **Casing** PVC (Class 18) **Screen** 0.5mm Slotted PVC (Class 18) **Surface Completion** Gatic

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0	HA	all samples <1 ppm	GW02_0.0_0.2		Grout		silty SAND, fine, pale brown (possible FILL)	SM	L		6
0.5			GW02_0.5_0.6 (BD2_061216)				sandy CLAY, low plasticity, dark orange-brown, medium to coarse sand (FILL)	SM	VST		5.5
1	PT		GW02_1.0_1.1				CLAY, medium to high plasticity, pale grey mottled brown (NATURAL - SOIL)	SM	ST		5
1.5											4.5
2			GW02_2.0_2.1								4
2.5											3.5
3			GW02_3.0_3.1								3
3.5					Bentonite						2.5
4			GW02_4.0_4.1								2
4.5	SFA										1.5
5			GW02_5.0_5.1		Gravel						1
5.5							sandy CLAY, low plasticity, pale grey mottled pale brown (NATURAL - SOIL)	M	ST		0.5
6			GW02_6.0_6.1								0
6.5							Termination Depth at:6.50 m. Target depth achieved.				-0.5
7											-1
7.5											-1.5

Notes

GHD Soil Classifications The GHD Soil Classification is based on Australian Standards AS 1726-1993. This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-GROUNDWATER

MONITORING WELL GW03

Client Fire & Rescue NSW	**Drill Co.** BG Drilling Pty Ltd	**Easting, Northing** 297393.098, 6173559.972
Project Albion Park FRNSW Site Investigation	**Driller** Luke	**Grid Ref** GDA94_MGA_zone_56
Project No. 212558302	**Rig Type** Hanjin D&B 8-D	**Elevation** 5.4
Site Albion Park FRNSW	**Drill Method** HA & PT	**Collar RL** 5.398
Location Airport Road, Albion Park Rail, NSW 2527	**Total Depth (m)** 6.4	**Logged By** Matt West
Date Drilled 07/12/2016 - 07/12/2016	**Diameter (mm)** 125	**Checked By**

B.C.L No. N/A **Casing** PVC (Class 18) **Screen** 0.5mm Slotted PVC (Class 18) **Surface Completion** Gatic

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0	HA	all samples <1 ppm	GW03_0.0_0.1				silty SAND, medium, dark brown				5
0.5			GW03_0.5_0.6				sandy CLAY, low to medium plasticity, pale brown (NATURAL - SOIL)	D	F		4.5
1	PT		GW03_1.0_1.1		Grout						
1.5							CLAY, medium to high plasticity, pale grey mottled pale brown (NATURAL - SOIL)	SM	ST		4
2			GW03_2.0_2.1								3.5
2.5					Bentonite						3
3			GW03_3.0_3.1								2.5
3.5											2
4			GW03_4.0_4.1								1.5
4.5					Gravel		CLAY, medium plasticity, pale grey, some fine sand (NATURAL - SOIL)	VM	ST		1
5			GW03_5.0_5.1								0.5
5.5							sandy CLAY, low plasticity, pale grey pale brown (NATURAL - SOIL)	M	S		0
6			GW03_6.1_6.2	▽							-0.5
6.5							Termination Depth at:6.40 m. Target depth achieved.				-1
7											-1.5
7.5											-2
											-2.5

Notes

GHD Soil Classifications The GHD Soil Classification is based on Australian Standards AS 1726-1993. This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-GROUNDWATER

MONITORING WELL GW04

Client Fire & Rescue NSW
Project Albion Park FRNSW Site Investigation
Project No. 212558302
Site Albion Park FRNSW
Location Airport Road, Albion Park Rail, NSW 2527
Date Drilled 08/12/2016 - 07/12/2016

Drill Co. BG Drilling Pty Ltd
Driller Luke
Rig Type Hanjin D&B 8-D
Drill Method HA & PT
Total Depth (m) 6.2
Diameter (mm) 125

Easting, Northing 297307.563, 6173658.845
Grid Ref GDA94_MGA_zone_56
Elevation 5.041
Collar RL 5.036
Logged By Matt West
Checked By

B.C.L No. N/A **Casing** PVC (Class 18) **Screen** 0.5mm Slotted PVC (Class 18) **Surface Completion** Gatic

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0	HA	all samples <1 ppm	GW04_0.0_0.1				silty SAND, medium, dark brown				5
0.5			GW04_0.5_0.6				CLAY, medium to high plasticity, pale grey mottled pale brown (NATURAL - SOIL)	SM	F		4.5
1	PT		GW04_1.0_1.1		Grout						4
1.5											3.5
2			GW04_2.0_2.1								3
2.5					Bentonite						2.5
3			GW04_3.0_3.1								2
3.5											1.5
4			GW04_4.0_4.1								1
4.5					Gravel		CLAY, medium plasticity, pale grey, some fine sand (NATURAL - SOIL)	VM	ST		0.5
5			GW04_5.0_5.1								0
5.5							sandy CLAY, medium plasticity, fine, pale grey pale brown (NATURAL - SOIL)	M	F		-0.5
6			GW04_6.1_6.2				CLAY, medium plasticity, pale grey mottled pale brown, some ferrous nodules (NATURAL - SOIL)	VM	VST		-1
6.5							Termination Depth at:6.20 m. Target depth achieved.				-1.5
7											-2
7.5											-2.5

Notes

GHD Soil Classifications The GHD Soil Classification is based on Australian Standards AS 1726-1993. This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-GROUNDWATER

MONITORING WELL GW05

Client Fire & Rescue NSW
Project Albion Park FRNSW Site Investigation
Project No. 212558302
Site Albion Park FRNSW
Location Airport Road, Albion Park Rail, NSW 2527
Date Drilled 08/12/2016 - 08/12/2016

Drill Co. BG Drilling Pty Ltd
Driller Luke
Rig Type Hanjin D&B 8-D
Drill Method HA, PT & SFA
Total Depth (m) 6
Diameter (mm) 125

Easting, Northing 297258.293, 6173898.098
Grid Ref GDA94_MGA_zone_56
Elevation 4.803
Collar RL 4.814
Logged By Matt West
Checked By

B.C.L No. N/A **Casing** PVC (Class 18) **Screen** 0.5mm Slotted PVC (Class 18) **Surface Completion** Gatic

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0	HA	all samples <1 ppm	GW05_0.0_0.1		Grout		silty SAND, fine to coarse, dark brown, with coarse gravel (FILL)	D	D		4.5
0.5			GW05_0.5_0.6								4
1	PT		GW05_1.0_1.1								3.5
1.5			GW05_1.6_1.7				silty CLAY, low plasticity, dark grey, with organics, with peat (NATURAL - SOIL)	M	VS	distinct organic odour	3
2											2.5
2.5			GW05_2.8_2.9								2
3					Bentonite		CLAY, medium to high plasticity, pale grey mottled pale brown (NATURAL - SOIL)	M	ST		1.5
3.5			GW05_3.4_3.5								1
4	SFA										0.5
4.5					Gravel						0
5			GW05_5.0_5.1								-0.5
5.5											-1
6			GW05_5.9_6								-1.5
6.5							Termination Depth at:6.00 m. Target depth achieved.				-2
7											-2.5
7.5											-3

Notes

GHD Soil Classifications The GHD Soil Classification is based on Australian Standards AS 1726-1993. This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE SB06

Client Fire & Rescue NSW
Project Albion Park FRNSW Site Investigation
Project No. 212558302
Site Albion Park FRNSW
Location Airport Road, Albion Park Rail, NSW 2527
Date Drilled 06/12/2016 - 06/12/2016

Drill Co. BG Drilling Pty Ltd
Driller Luke
Rig Type Hanjin D&B 8-D
Drill Method HA & PT
Total Depth (m) 6
Diameter (mm) 125

Easting
Northing
Grid Ref GDA94_MGA_zone_56
Elevation
Logged By Matt West
Checked By

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0	HA	all samples <1 ppm	SB06_0.0_0.15			silty SAND, fine, poorly graded, pale brown, some gravel, coarse gravel (FILL)	SM	L		0
0.5			SB06_0.5_0.6			sandy GRAVEL, medium to high plasticity, medium to coarse, dark brown, some silt (FILL)	D	MD		-0.5
1	PT		SB06_1.0_1.1			CLAY, medium to high plasticity, pale grey with pale orange- brown (NATURAL - SOIL)	SM	ST		-1
1.5										-1.5
2			SB06_2.0_2.1							-2
2.5										-2.5
3			SB06_3.0_3.1							-3
3.5										-3.5
4			SB06_4.0_4.1							-4
4.5										-4.5
5			SB06_5.0_5.1							-5
5.5						sandy CLAY, pale grey mottled pale brown, fine to medium sand (NATURAL - SOIL)	M	ST		-5.5
6			SB06_5.9_6.0			Termination Depth at:6.00 m. Target depth achieved.				-6
6.5										-6.5
7										-7
7.5										-7.5

Notes

GHD Soil Classifications The GHD Soil Classification is based on Australian Standards AS 1726-1993. This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE SB07

Client Fire & Rescue NSW
Project Albion Park FRNSW Site Investigation
Project No. 212558302
Site Albion Park FRNSW
Location Airport Road, Albion Park Rail, NSW 2527
Date Drilled 05/12/2016 - 02/12/2016

Drill Co. BG Drilling Pty Ltd
Driller Luke
Rig Type Hanjin D&B 8-D
Drill Method CC, HA, PT and SFA
Total Depth (m) 6
Diameter (mm) 125

Easting
Northing
Grid Ref GDA94_MGA_zone_56
Elevation
Logged By Matt West
Checked By

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0	CC	all samples <1 ppm	SB07_0.0_0.03			ASPHALT	SM	VD	Ashpalt sample collected	0
0.5	HA		SB07_0.05_0.1	▽		sandy GRAVEL, coarse, poorly graded, angular, dark grey- (FILL)				-0.5
1	PT		SB07_1.0_1.1			silty CLAY, medium to high plasticity, mottled brown-grey	M	ST		-1
1.5										-1.5
2			SB07_2.0_2.1			clayey SAND, medium to coarse, poorly graded, pale grey- (NATURAL - SOIL)	M	D		-2
2.5										-2.5
3			SB07_3.0_3.1			CLAY, pale grey- mottled pale brown-, subrounded, fine to medium, poorly graded gravel (NATURAL - SOIL)	M	ST		-3
3.5										-3.5
4	SFA		SB07_3.9_4							-4
4.5										-4.5
5			SB07_5.0_5.1							-5
5.5										-5.5
6			SB07_5.9_6			Termination Depth at:6.00 m. Target depth achieved.				-6
6.5										-6.5
7										-7
7.5										-7.5

Notes

GHD Soil Classifications The GHD Soil Classification is based on Australian Standards AS 1726-1993. This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE SB08

Client Fire & Rescue NSW
Project Albion Park FRNSW Site Investigation
Project No. 212558302
Site Albion Park FRNSW
Location Airport Road, Albion Park Rail, NSW 2527
Date Drilled 05/12/2016 - 05/12/2016

Drill Co. BG Drilling Pty Ltd
Driller Luke
Rig Type Hanjin D&B 8-D
Drill Method HA and PT
Total Depth (m) 6.7
Diameter (mm) 125

Easting
Northing
Grid Ref GDA94_MGA_zone_56
Elevation
Logged By Matt West
Checked By

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0	HA	all samples <1 ppm	SB08_0.0_0.15_477 (BD1_05122016)			silty SAND, fine, brown (FILL)	D	L		0
0.5			SB08_0.5_0.6			sandy GRAVEL, medium to coarse, poorly graded, angular, brown- grey (FILL)	D	VD		-0.5
1	PT		SB08_1.0_1.1			CLAY, medium to high plasticity, pale brown mottled pale grey (NATURAL - SOIL)	VM	VST		-1
1.5										-1.5
2			SB08_2.0_2.1							-2
2.5										-2.5
3			SB08_3.0_3.1							-3
3.5										-3.5
4			SB08_4.0_4.1							-4
4.5										-4.5
5			SB08_5.0_5.1			CLAY, low to medium plasticity, pale brown mottled pale grey, some fine to medium sand (NATURAL - SOIL)	VM	VST		-5
5.5										-5.5
6			SB08_5.9_6			sandy CLAY, low to medium plasticity, pale brown mottled pale grey, fine to medium sand (NATURAL - SOIL)	VM	ST		-6
6.5										-6.5
7						Termination Depth at:6.70 m. Target depth achieved.				-7
7.5										-7.5

Notes

GHD Soil Classifications The GHD Soil Classification is based on Australian Standards AS 1726-1993. This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE SB09

Client Fire & Rescue NSW
Project Albion Park FRNSW Site Investigation
Project No. 212558302
Site Albion Park FRNSW
Location Airport Road, Albion Park Rail, NSW 2527
Date Drilled 06/12/2016 - 06/12/2016

Drill Co. BG Drilling Pty Ltd
Driller Luke
Rig Type Hanjin D&B 8-D
Drill Method HA and PT
Total Depth (m) 5.9
Diameter (mm) 125

Easting
Northing
Grid Ref GDA94_MGA_zone_56
Elevation
Logged By Matt West
Checked By

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0	HA	all samples <1 ppm	SB09_0.0_0.1			clayey SAND, medium, poorly graded, dark brown, some silt (FILL)	VM	L		0
0.5			SB09_0.5_0.6			silty CLAY, medium to high plasticity, dark brown (NATURAL - SOIL)	VM	F		-0.5
	PT									
1			SB09_1.0_1.1			sandy CLAY, dark orange mottled pale grey (NATURAL - SOIL)	SM	ST		-1
1.5										-1.5
2			SB09_2.0_2.1			CLAY, medium to high plasticity, pale grey with pale orange- brown (NATURAL - SOIL)	SM	ST		-2
2.5										-2.5
3			SB09_3.0_3.1							-3
3.5										-3.5
4			SB09_4.0_4.1							-4
4.5										-4.5
5			SB09_5.0_5.1							-5
5.5						sandy CLAY, pale grey, fine to medium sand (NATURAL - SOIL)	M	ST		-5.5
			SB09_5.8_5.9							
6						Termination Depth at:5.90 m. Target depth achieved.				-6
6.5										-6.5
7										-7
7.5										-7.5

Notes

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Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE SB10

Client Fire & Rescue NSW
Project Albion Park FRNSW Site Investigation
Project No. 212558302
Site Albion Park FRNSW
Location Airport Road, Albion Park Rail, NSW 2527
Date Drilled 06/12/2016 - 06/12/2016

Drill Co. BG Drilling Pty Ltd
Driller Luke
Rig Type Hanjin D&B 8-D
Drill Method HA and PT
Total Depth (m) 5.2
Diameter (mm) 125

Easting
Northing
Grid Ref GDA94_MGA_zone_56
Elevation
Logged By Matt West
Checked By

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0	HA	all samples <1 ppm	SB10_0.0_0.1			silty SAND, fine, poorly graded, brown (FILL)	D	L		0
0.5	PT		SB10_0.5_0.6			CLAY, medium to high plasticity, dark brown with pale grey (NATURAL - SOIL)	SM	F		-0.5
1			SB10_1.0_1.1							-1
1.5										-1.5
2			SB10_2.0_2.1			sandy CLAY, low plasticity, medium to coarse, pale orange mottled pale grey (NATURAL - SOIL)	M	F		-2
2.5						CLAY, pale grey, fine to medium sand (NATURAL - SOIL)	SM	ST		-2.5
3			SB10_3.0_3.1							-3
3.5										-3.5
4			SB10_4.0_4.1							-4
4.5										-4.5
5			SB10_5.1_5.2							-5
5.5						Termination Depth at:5.20 m. Target depth achieved.				-5.5
6										-6
6.5										-6.5
7										-7
7.5										-7.5

Notes

GHD Soil Classifications The GHD Soil Classification is based on Australian Standards AS 1726-1993. This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE SB11

Client Fire & Rescue NSW
Project Albion Park FRNSW Site Investigation
Project No. 212558302
Site Albion Park FRNSW
Location Airport Road, Albion Park Rail, NSW 2527
Date Drilled 07/12/2016 - 07/12/2016

Drill Co. BG Drilling Pty Ltd
Driller Luke
Rig Type Hanjin D&B 8-D
Drill Method HA, PT and SFA
Total Depth (m) 5.5
Diameter (mm) 125

Easting
Northing
Grid Ref GDA94_MGA_zone_56
Elevation
Logged By Matt West
Checked By

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0	HA	all samples <1 ppm	SB11_0.0_0.1			silty SAND, medium, dark brown				0
0.5	PT		SB11_0.5_0.6			silty CLAY, low to medium plasticity, brown (NATURAL - SOIL)	D	F		-0.5
1	SFA		SB11_1.0_1.1			SAND, medium to high plasticity, medium to coarse, dark grey mottled dark orange- brown, trace clay, moderate to strong cementation (NATURAL - SOIL)	D	VD		-1
1.5										-1.5
2										-2
2.5										-2.5
3	PT		SB11_3.0_3.1							-3
	SFA									
3.5										-3.5
4										-4
4.5										-4.5
5										-5
5.5			SB11_5.4_5.5			Termination Depth at:5.50 m. Target depth achieved.				-5.5
6										-6
6.5										-6.5
7										-7
7.5										-7.5

Notes

GHD Soil Classifications The GHD Soil Classification is based on Australian Standards AS 1726-1993. This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE SB12

Client Fire & Rescue NSW
Project Albion Park FRNSW Site Investigation
Project No. 212558302
Site Albion Park FRNSW
Location Airport Road, Albion Park Rail, NSW 2527
Date Drilled 07/12/2016 - 07/12/2016

Drill Co. BG Drilling Pty Ltd
Driller Luke
Rig Type Hanjin D&B 8-D
Drill Method HA and PT
Total Depth (m) 5.7
Diameter (mm) 125

Easting
Northing
Grid Ref GDA94_MGA_zone_56
Elevation
Logged By Matt West
Checked By

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0	HA	all samples <1 ppm	SB12_0.0_0.1 (BD3_071216)			silty SAND, medium, dark brown				0
0.5			SB12_0.5_0.6			silty CLAY, low to medium plasticity, brown (NATURAL - SOIL)	D	F		-0.5
1	PT		SB12_1.0_1.1			CLAY, medium to high plasticity, pale grey mottled pale brown (NATURAL - SOIL)	SM	ST		-1
1.5										-1.5
2			SB12_2.0_2.1							-2
2.5										-2.5
3										-3
3.5										-3.5
4			SB12_4.0_4.1							-4
4.5						CLAY, medium plasticity, pale grey, some fine sand (NATURAL - SOIL)	VM	ST		-4.5
5						sandy CLAY, low plasticity, pale grey pale brown (NATURAL - SOIL)	M	S		-5
5.5			SB12_5.6_5.7							-5.5
6						Termination Depth at:5.70 m. Target depth achieved.				-6
6.5										-6.5
7										-7
7.5										-7.5

Notes

GHD Soil Classifications The GHD Soil Classification is based on Australian Standards AS 1726-1993. This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE SB13

Client Fire & Rescue NSW
Project Albion Park FRNSW Site Investigation
Project No. 212558302
Site Albion Park FRNSW
Location Airport Road, Albion Park Rail, NSW 2527
Date Drilled 07/12/2016 - 07/12/2016

Drill Co. BG Drilling Pty Ltd
Driller Luke
Rig Type Hanjin D&B 8-D
Drill Method HA, PT and SFA
Total Depth (m) 4
Diameter (mm) 125

Easting
Northing
Grid Ref GDA94_MGA_zone_56
Elevation
Logged By Matt West
Checked By

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0	HA	all samples <1 ppm	SB13_0.0_0.1			silty SAND, fine, pale brown (possible FILL)	D	L		0
0.5			SB13_0.5_0.6							-0.5
	PT					CLAY, low to medium plasticity (NATURAL - SOIL)	SM	ST		
1			SB13_1.0_1.1							-1
1.5										-1.5
2						clayey SAND, medium to coarse, dark grey and brown, some fine gravel, moderate to strong cementation (NATURAL - SOIL)	M	VD		-2
2.5	SFA									-2.5
3										-3
3.5						CLAY, medium to high plasticity, pale grey mottled pale brown (NATURAL - SOIL)	M	ST		-3.5
4						Termination Depth at:4.00 m. Target depth achieved.				-4
4.5										-4.5
5										-5
5.5										-5.5
6										-6
6.5										-6.5
7										-7
7.5										-7.5

Notes

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Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE SB14

Client Fire & Rescue NSW
Project Albion Park FRNSW Site Investigation
Project No. 212558302
Site Albion Park FRNSW
Location Airport Road, Albion Park Rail, NSW 2527
Date Drilled 08/12/2016 - 08/12/2016

Drill Co. BG Drilling Pty Ltd
Driller Luke
Rig Type Hanjin D&B 8-D
Drill Method HA and PT
Total Depth (m) 6
Diameter (mm) 125

Easting
Northing
Grid Ref GDA94_MGA_zone_56
Elevation
Logged By Matt West
Checked By

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0	HA	all samples <1 ppm	SB14_0.0_0.1			silty SAND, medium, dark brown				0
0.5	PT		SB14_0.5_0.6 (BD4_081216)			silty CLAY, low plasticity, brown, some fine sand (NATURAL - SOIL)	D	ST		-0.5
1			SB14_1.0_1.1			CLAY, medium to high plasticity, pale grey mottled pale brown (NATURAL - SOIL)	SM	F		-1
1.5										-1.5
2			SB14_2.0_2.1							-2
2.5										-2.5
3			SB14_3.0_3.1							-3
3.5										-3.5
4										-4
4.5										-4.5
5			SB14_5.0_5.1			sandy CLAY, medium plasticity, fine, pale grey pale brown (NATURAL - SOIL)	M	F		-5
5.5										-5.5
6			SB14_5.9_6							-6
6.5						Termination Depth at:6.00 m. Target depth achieved.				-6.5
7										-7
7.5										-7.5

Notes

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Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE SB15

Client Fire & Rescue NSW
Project Albion Park FRNSW Site Investigation
Project No. 212558302
Site Albion Park FRNSW
Location Airport Road, Albion Park Rail, NSW 2527
Date Drilled 08/12/2016 - 08/12/2016

Drill Co. BG Drilling Pty Ltd
Driller Luke
Rig Type Hanjin D&B 8-D
Drill Method HA and PT
Total Depth (m) 5.7
Diameter (mm) 125

Easting
Northing
Grid Ref GDA94_MGA_zone_56
Elevation
Logged By Matt West
Checked By

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0	HA	all samples <1 ppm	SB15_0.0_0.1			silty SAND, medium, dark brown				0
0.5	PT		SB15_0.5_0.6 (BD4_081216)			CLAY, medium to high plasticity, pale grey mottled pale brown (NATURAL - SOIL)	SM	F		-0.5
1			SB15_1.0_1.1							-1
1.5										-1.5
2			SB15_2.0_2.1							-2
2.5										-2.5
3			SB15_3.0_3.1							-3
3.5										-3.5
4			SB15_4.0_4.1							-4
4.5										-4.5
5			SB15_5.0_5.1			sandy CLAY, medium plasticity, fine, pale grey pale brown (NATURAL - SOIL)	M	F		-5
5.5			SB15_5.5_5.6							-5.5
6						Termination Depth at:5.70 m. Target depth achieved.				-6
6.5										-6.5
7										-7
7.5										-7.5

Notes

GHD Soil Classifications The GHD Soil Classification is based on Australian Standards AS 1726-1993. This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

Appendix G – Assessment of data quality

Quality Assurance and Quality Control Report

Data Quality Indicators

Data generated during this investigation must be appropriate to allow decisions to be made with confidence. Specific limits for this investigation have been adopted in accordance with guidance from the AS4482.1 which includes appropriate indicators of data quality (data quality indicators [DQIs] used to assess QA/QC, and GHD's Standard Field Operating Procedures).

To assess the usability of the data prior to making decisions, the data is assessed against pre-determined DQIs. The DQIs including precision, accuracy, representativeness, comparability and completeness, will be reviewed at the completion of the investigation works to assess for the presence of decision errors.

The pre-determined DQIs established for the investigation are discussed below and shown in Table 1.

- Precision - measures the reproducibility of measurements under a given set of conditions. The precision of the laboratory data and sampling techniques is assessed by calculating the Relative Percentage Difference (RPD) of duplicate samples.
- Accuracy - measures the bias in a measurement system. The accuracy of the laboratory data that are generated during this investigation is a measure of the closeness of the analytical results obtained by a method to the 'true' (or standard) value. Accuracy is assessed by reference to the analytical results of laboratory control samples, laboratory spikes and analyses against reference standards.
- Representativeness - expresses the degree to which sample data accurately and precisely represent a characteristic of a population or an environmental condition. Representativeness is achieved by collecting samples on a representative basis across the site, and by using an adequate number of sample locations to characterise the site to the required accuracy.
- Comparability - expresses the confidence with which one data set can be compared with another. This is achieved through maintaining a level of consistency in techniques used to collect samples; ensuring analysing laboratories use consistent analysis techniques and reporting methods.
- Completeness - is defined as the percentage of measurements made which are judged to be valid measurements.

Table 1 Summary of quality assurance / quality control criteria for groundwater

Data quality indicator	Frequency	Data quality acceptance criteria
Precision		
Inter/ intra duplicates	1 / 10 samples	<30-50% RPD
Accuracy		
Surrogate spikes Laboratory control samples Matrix spikes	All organic samples 1 per lab batch 1 per lab batch	70-130% <LOR 70-130%
Representativeness		
Sampling appropriate for media and analytes Samples extracted and analysed within holding times	All samples All samples	- Organics (7-14 days) Inorganics (6 months)

Data quality indicator	Frequency	Data quality acceptance criteria
		Some exceptions to these holding times are listed below ([1])
LORs appropriate and consistent	All samples	All samples
Comparability		
Consistent field conditions, sampling staff and laboratory analysis	All samples	All samples
Standard operating procedures for sample collection & handling	All samples	All samples
Standard analytical methods used for all analyses	All samples	All samples
Completeness		
Sample description and COCs completed and appropriate	All Samples	All Samples
Appropriate documentation	All Samples	All Samples
Satisfactory frequency and result for QA/QC samples	All QA/QC samples	-
Data from critical samples is considered valid	-	Critical samples valid
Acronyms COC: Chain of Custody LOR: Limit of Reporting QA/QC: Quality assurance / quality control		

[1] Holding times with exception to the above include:

If any of the DQIs are not met, further investigation will be necessary to determine whether the non-conformance will significantly affect the usefulness of the data.

Field quality assurance and quality control

The quality assurance/quality control (QA/QC) procedures are based on NSW EPA *Guidelines for the Site Auditor Scheme* (2006) and AS 4482.1 – 2005 and AS 4482.2 – 1999.

QA involves all the actions, procedures, checks and decisions undertaken to ensure the representativeness and integrity of samples and accuracy and reliability of analytical results (NEPC 2013). QC involves protocols to monitor and measure the effectiveness of QA procedures.

All fieldwork was conducted with reference to the Australian Standards AS 4482.1 – 2005 and AS 4482.2 – 1999 and GHD's Standard Field Operating Procedures, which ensure all samples, are collected by a set of uniform and systematic methods, as required by GHD's QA system. Key requirements of these procedures are listed below:

- Decontamination procedures – including washing and rinsing of re-useable equipment, the use of new disposable gloves and sampling tubing between each sampling location and the use of sampling containers provided by the laboratory.
- Sample identification procedures - samples were immediately transferred to sample containers of appropriate composition and preservation for the required laboratory analysis. All sample containers were clearly labelled with a sample number, job number, and sample date. The sample containers were then transferred to a chilled insulated container for sample preservation prior to and during shipment to the analytical laboratory.

- Chain of custody information requirements - a chain of custody form was completed and forwarded to the testing laboratory with the samples.
- Inter and intra duplicate and sample frequency.
- Calibration was undertaken by the rental supplier and certificates are provided in Appendix E.
- Field instrument field checks were undertaken on the equipment:
  - Interface probe: A daily equipment check was undertaken to ensure that the equipment worked correctly when immersed in water and that it has had no unauthorised repairs.
  - Low flow pump: The low flow sampling equipment was provided by the equipment supplier in good working condition. The equipment was inspected by GHD at the start of each day to ensure that all parts of the equipment were in good working order. GHD measured the rate of water discharge during purging to ensure that the rate did not exceed 1 L per minute. Purge volumes were recorded on the groundwater sampling field sheets for each site.

Groundwater sampling and analysis quality control

The QC samples collected during the investigation are described below.

- Intra laboratory duplicate: Intra duplicates are used to identify the variation in the analyte concentration between samples from the same sampling point and the repeatability of the laboratory's analysis.
- Inter laboratory duplicate: Inter duplicates provide an indication of the repeatability of the results between laboratories.

Table 2 Quality control (QC) sampling frequency

Sample	Recommended sampling rate	Media	No. QC samples	No. of primary samples	Total
Intra	1/10 samples	Soil	1	46	48
Inter	1/10 samples		1		
Intra	1/10 samples	Groundwater	1	5	6
Intra	1/10 samples	Surface water	1	5	6
Intra	1/10 samples	Sediment	1	5	6

- Two soil trip blanks and one water trip blank accompanied the samples to the laboratory. All trip blanks were less than the limit of detection of the laboratory.
- Four rinsates were collected during the soil sampling on each day from hand tools used during the investigation. All rinsates were less than the limit of detection of the laboratory.
- Three trip spikes were collected during the investigation. The water trip spike and trip spikes 1 and 2 for within the 70-130 % recovery. However, there were some outliner in Trip spike 7 (soil)

Relative percentage difference calculations

Relative percentage difference (RPD) calculations are used to assess how closely primary and inter/intra duplicate sample results match. RPDs are a quantitative measure of the accuracy of the analytical results and are calculated in accordance with the procedure described in *AS 4482.1 – 2005* (Standards Australia 2005). According to *AS 4482.1 – 2005* typical RPDs are expected to range between 30% and 50%; however, this may be higher for organics and for low

concentrations of analytes. GHD adopts 30% for inorganics and 50% for organics as the general assessment criteria.

Where a result is below the laboratory limit of reporting (LOR) for one of the paired samples, the concentration assigned to that sample is the LOR. Where both results are reported below laboratory LOR the RPD is not calculated.

The QC samples analysed during the groundwater investigation are listed in Table 3.

Table 3 Analysed quality control (QC) samples

Primary sample	Duplicate type	QC sample laboratory ID	QC sample field ID	Date sampled	Lab report number	Matrix
SB08_0.0_0.15	Intra	ES1628401057	BD1_051216	5/12/2016	ES1628401	Soil
SB12_0.0_0.1	Inter	ES1628401086	BD3_071216	7/12/2016	527586	Soil
SS05	Intra	ES1629123006	SSQA2	16/12/2016	ES1629123	Soil
SW05	Intra	ES1629123011	SWQA1	16/12/2016	ES1629123	Water
GW01	Intra	ES1629123013	GWQA3	16/12/2016	ES1629123	Water

RPD exceedances were reported during this investigation.

BD1_051216 – Primary sample SB08_0.0_0.15 – Copper 72%

BD3_071216 – Primary sample SB12_0.0_0.1 – Perfluorooctane sulfonic acid (PFOS) 54%

SSQA2 – Primary sample SS05:

- Perfluorohexane sulfonic acid (PFHxS) 94%
- Perfluorooctanoic acid (PFOA) 72%
- Perfluorooctane sulfonic acid (PFOS) 89%

GW01 – Primary sample GWQA3 – Cations Total 173%

Laboratory quality assurance / quality control

Laboratory methods used by the primary laboratory were suitable for environmental contaminant analysis and are based on established internationally recognised procedures such as those published by the United States Environmental Protection Agency (US EPA), American Public Health Association (APHA), AS and National Environment Protection (Assessment of Site Contamination) Measure (NEPM).

The individual testing laboratory conducted an assessment of the laboratory QC program however the results were also independently reviewed and assessed internally by GHD. Recovery targets below are defined in the ALS QA/QC section of the certificates of analysis reports. All laboratory QA/QC results are documented with the laboratory certificates of analysis in the appendices of the relevant site report.

Laboratory quality control procedures

Laboratory QC samples incorporated in the analytical process include:

Laboratory blind duplicate samples

A laboratory blind duplicate provides data on the analytical precision and reproducibility of the analytical result. The laboratory blind duplicate is created by sub sampling from one of the primary samples submitted for analysis. Laboratory blind duplicates are analysed at a rate equivalent to one in twenty samples per analytical batch, or one sample per batch if less than twenty samples are analysed in a batch.

The permitted ranges for the RPD of laboratory blind duplicates are dependent on the magnitude of the results in comparison to the level of reporting as shown in Table 4.

Table 4 Permitted laboratory blind duplicate relative percentage difference (RPD) ranges

Magnitude of result	Permitted RPD range
< 10 x limit of reporting (LOR)	No limits
10 – 20 x LOR	0% - 50%
> 20 x LOR	0% - 30%

Matrix spike recoveries

Matrix spike sample analysis is the analysis of one or more replicate portions of samples from the batch, after fortifying the additional portion(s) with known quantities of the analyte(s) of interest. The percentage recovery of target analyte(s) from matrix spike samples is used to determine the bias of the method in the specific sample matrix. Recoveries must lie between 70% and 130%.

Laboratory control sample

The laboratory control sample (LCS) analysis of either a reference material or a control matrix fortified with analytes representative of the analyte class. The purpose of LCS is to monitor method precision and accuracy independent of the sample matrix. Typically, the percentage recovery of the LCS is compared to the dynamic recovery limit based on the statistical analysis of the processed LCS analysis. The ALS acceptance criteria, indicates recoveries must lie between 70% and 130%.

Surrogate spike recoveries

Surrogate Spikes provide a means of checking that no gross errors have occurred during any stage of the analytical method leading to significant analyte loss. Surrogate recoveries are similar to the analyte of interest in terms of chemical composition, extractability, and chromatographic conditions (retention time), but which are not normally found in environmental samples. Surrogate compounds are spiked into blanks, standards and samples submitted for organic analyses by gas-chromatographic techniques prior to sample extraction. Recoveries must lie between 50% and 150% for all analytes.

Method blank samples

Method or analysis blank sample analysis is the analysis of a sample that is as free as possible of the analytes of interest, but has been prepared the same manner as the samples under investigation. The analysis is to ascertain if laboratory reagent, glassware and other laboratory consumables contribute to the observed concentration of analytes in the process batch. If below the maximum acceptable method blank (20% of the practical quantification limit), the contribution is subtracted from the gross analytical signal for each analysis before calculating the sample analyte concentration. The method blank should return analyte concentrations as ‘not detected’.

The individual testing laboratory conducted an assessment of the laboratory QC program internally. However, the results were also independently reviewed and assessed by GHD.

Laboratory quality control results

Laboratory RPDs, matrix spike, LCSs and method blanks were within the ALS acceptable ranges with the exception in Table 5.

Table 5 Summary of outliers

Laboratory report	Quality Control Sample	Analytes	Sample Code	results	Comment
ES1628401	LCSs - soil	TOC	QC-689655-002	100% (81-99% limits)	Recovery greater than upper control limit
	LCS - water	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	Anonymous	Not determined	MS recovery not determined. Background level greater than or equal to 4x spike level.
	Regular Sample Surrogates	PAH surrogates – 2-Fluorobiphenyl	SB14-2.0-2.1	125% (70-122% limits)	Recovery greater than upper data quality objective
	Frequency of quality control samples	Exchangeable cations with pre-treatment	-	0 (expected 5)	-
ES1629123	LCS – soil	TOC	QC-697532-002	99.3% (81-99% limits)	Recovery greater than upper control limit
	Frequency of quality control samples	2 x Laboratory dups and 2 x Matrix Spikes		0 (expected 10) 0 (expected 5)	
ES1700845	Matrix Spikes	Perfluorohexane sulfonic acid (PFHxS)	GW03_0.0-0.1	Not determined	MS recovery not determined. Background level greater than or equal to 4x spike level.
		Perfluorooctane sulfonic acid (PFOS)	Anonymous		
		Perfluorooctane sulfonic acid (PFOS)	GW03_0.0-0.1		
ES1701294	Matrix Spike	Perfluorooctane sulfonic acid (PFOS)	MW02_1.0-1.1	Not determined	MS recovery not determined. Background level greater than or equal to 4x spike level.

Sample holding times

All samples were extracted and analysed by the laboratory within holding times.

ES1628401 – SB06_2.0-2.1 Organic matter was 1 day overdue

Sample preservation

Laboratory report 527586 detailed that appropriately preserved sample container was not used. The sample was collected in an approved ALS sample jar and therefore is acceptable.

Laboratory report ES1629123 detailed all samples were 2 days overdue for pH analysis.

Evaluation of DQI

To minimise the potential for decision errors, the sampling and analysis program completed at the site by GHD has been evaluated with consideration of the Data Quality Indicators (DQIs) described in **Section 3** namely representativeness, completeness, comparability, precision and accuracy.

- Data representativeness: The sampling methodology ensured all environmental samples were collected by a set of uniform and systematic methods. Laboratory and field QA/QC procedures were carried out to ensure data representativeness. All samples were provided to the laboratory with adequate preservation and in compliant containers as stated in the laboratory sample receipt documentation. Consequently, data representativeness is considered to have been satisfied.
- Completeness: It is considered that the field QA/QC procedures carried out such as blind duplicate collection frequencies and the analytes tested provide completeness in terms of the required number of field duplicate samples. Laboratory QA/QC sample analysis is considered sufficient to provide a complete overview of QA/QC procedures.
- Precision: Field blind duplicate results reported RPDs below the adopted criterion (30% for inorganics and 50% for organics). GHD therefore considers that laboratory results are acceptable for interpretation in this report.
- Accuracy: Environmental sampling procedures ensured that collection, preservation and laboratory analytical techniques are appropriate for analysis of environmental contaminants.
- Comparability: All field work was conducted with reference to the Australian Standards, which ensured all environmental samples were collected by a set of uniform and systematic methods, as required by GHD's QA system. GHD considers that the laboratory data are of a suitable quality for assessing the environmental status of the site.

Laboratory report ES1629123 was re-analysed for the full PFAS suite and the results were reported under a new laboratory report ES1701791. The results between the two reports showed some large discrepancies at the same locations. As a result of these discrepancies the laboratory run duplicate analysis on some of the samples and confirmed the results from the second laboratory report ES1701791. Therefore the PFAS results from laboratory report ES1629123 have not been discussed in this report.

The overall review of the QC results from the primary and secondary laboratories indicates that the current analytical data are of an acceptable quality upon which to draw meaningful conclusions regarding impacts at the site as part of this investigation.

Appendix G
Table G1
Soil Duplicate Table

Field Duplicates (soil)
Filter: ALL

	SDG	ALSE-Sydney 09-Dec-16	ALSE-Sydney 09-Dec-16			ALSE-Sydney 09-Dec-16	12-Dec-16		
	Field ID	SB08_0.0_0.15	BD1_051216	**RPD**		SB12_0.0_0.1	BD3_071216	**RPD**	
	Sampled Date/Time	5/12/2016	5/12/2016			7/12/2016	7/12/2016		
Chem_Group	**ChemName**	**Units**	**EQL**						
Inorganics	Moisture	%	1	9.7	9	7			
Metals	Arsenic	mg/kg	5 : 2 (Interlab)	<5	<5	0	<5	<2	0
	Cadmium	mg/kg	1 : 0.4 (Interlab)	<1	<1	0	<1	<0.4	0
	Chromium (III+VI)	mg/kg	2 : 5 (Interlab)	17	9	62	24	22	9
	Copper	mg/kg	5	**30**	**64**	**72**	12	15	22
	Lead	mg/kg	5	12	10	18	13	18	32
	Mercury	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	Nickel	mg/kg	2 : 5 (Interlab)	7	5	33	6	5.2	14
	Zinc	mg/kg	5	17	28	49	9	14	43
TRH - NEPM 2013	C6-C10 minus BTEX (F1)	mg/kg	10 : 20 (Interlab)	<10	<10	0	<10	<20	0
	C6 - C10 Fraction	mg/kg	10 : 20 (Interlab)	<10	<10	0	<10	<20	0
	>C10-C16 minus Naphthalene (F2)	mg/kg	50	<50	<50	0	<50	<50	0
	>C10 - C16 Fraction	mg/kg	50	<50	<50	0	<50	<50	0
	>C16 - C34 Fraction (F3)	mg/kg	100	<100	<100	0	<100	<100	0
	>C34 - C40 Fraction (F4)	mg/kg	100	<100	<100	0	<100	<100	0
	>C10 - C40 (Sum of Total)	mg/kg	50	<50	<50	0			
TRH - NEPM 1999	C6 - C 9 Fraction	mg/kg	10 : 20 (Interlab)	<10	<10	0	<10	<20	0
	C10 - C14 Fraction	mg/kg	50 : 20 (Interlab)	<50	<50	0	<50	<20	0
	C15 - C28 Fraction	mg/kg	100 : 50 (Interlab)	<100	<100	0	<100	<50	0
	C29 - C36 Fraction	mg/kg	100 : 50 (Interlab)	<100	<100	0	<100	<50	0
	C10 - C36 (Sum of Total)	mg/kg	50	<50	<50	0	<50	<50	0
BTEX & MAH	Benzene	mg/kg	0.2 : 0.1 (Interlab)	<0.2	<0.2	0	<0.2	<0.1	0
	Toluene	mg/kg	0.5 : 0.1 (Interlab)	<0.5	<0.5	0	<0.5	<0.1	0
	Ethylbenzene	mg/kg	0.5 : 0.1 (Interlab)	<0.5	<0.5	0	<0.5	<0.1	0
	Xylene (o)	mg/kg	0.5 : 0.1 (Interlab)	<0.5	<0.5	0	<0.5	<0.1	0
	Xylene (m & p)	mg/kg	0.5 : 0.2 (Interlab)	<0.5	<0.5	0	<0.5	<0.2	0
	Xylene Total	mg/kg	0.5 : 0.3 (Interlab)	<0.5	<0.5	0	<0.5	<0.3	0
	BTEX (Sum of Total) - Lab Calc	mg/kg	0.2	<0.2	<0.2	0			
PAH	Polycylic aromatic hydrocarbons	mg/kg	0.5	<0.5	<0.5	0			
	Pyrene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Acenaphthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Acenaphthylene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Anthracene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Benz(a)anthracene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Benzo(a)pyrene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Benzo[b+j]fluoranthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Benzo(k)fluoranthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Benzo(g,h,i)perylene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Chrysene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Dibenz(a,h)anthracene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Fluoranthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Fluorene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Naphthalene	mg/kg	1 : 0.5 (Interlab)	<1	<1	0	<1	<0.5	0
	Naphthalene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Phenanthrene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Benzo(a)pyrene TEQ (zero)	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
SVOCs	Benzo(a)pyrene TEQ (LOR)	mg/kg	0.5	1.2	1.2	0	1.2	1.2	0
	Benzo(a)pyrene TEQ (half LOR)	mg/kg	0.5	0.6	0.6	0	0.6	0.6	0
PFAS	Perfluorodecanesulfonic acid (PFDS)	mg/kg	0.0002 : 0.005 (Interlab)				<0.0002	<0.005	0
	4:2 Fluorotelomer sulfonic acid	mg/kg	0.0005 : 0.005 (Interlab)				<0.0005	<0.005	0
	Perfluorobutane sulfonic acid	mg/kg	0.0002 : 0.005 (Interlab)				0.0032	<0.005	0
	Perfluorohexane sulfonic acid (PFHxS)	mg/kg	0.0002 : 0.005 (Interlab)				0.0111	0.007	45
	Perfluoropentanoic acid	mg/kg	0.0002 : 0.005 (Interlab)				0.0021	<0.005	0
	8:2 Fluorotelomer sulfonic acid	mg/kg	0.0005 : 0.005 (Interlab)				<0.0005	<0.005	0
	N-Ethyl perfluorooctane sulfonamide	mg/kg	0.0005 : 0.01 (Interlab)				<0.0005	<0.01	0
	N-Methyl perfluorooctane sulfonamide	mg/kg	0.0005 : 0.01 (Interlab)				<0.0005	<0.01	0
	6:2 Fluorotelomer Sulfonate (6:2 FTS)	mg/kg	0.0005 : 0.01 (Interlab)				<0.0005	<0.01	0
	Perfluorooctanoic acid (PFOA)	mg/kg	0.0002 : 0.005 (Interlab)				0.0004	<0.005	0
	Perfluorobutanoic acid	mg/kg	0.001 : 0.005 (Interlab)				<0.001	0.006	143
	Perfluorodecanoic acid	mg/kg	0.0002 : 0.005 (Interlab)				<0.0002	<0.005	0
	Perfluorododecanoic acid	mg/kg	0.0002 : 0.005 (Interlab)				<0.0002	<0.005	0
	Perfluoroheptanoic acid	mg/kg	0.0002 : 0.005 (Interlab)				0.0006	<0.005	0
	Perfluorohexanoic acid (PFHxA)	mg/kg	0.0002 : 0.005 (Interlab)				0.0071	0.008	12
	Perfluorononanoic acid	mg/kg	0.0002 : 0.005 (Interlab)				<0.0002	<0.005	0
	Perfluorooctane sulfonic acid (PFOS)	mg/kg	0.0002 : 0.005 (Interlab)				**0.0052**	**0.009**	**54**
	Perfluorooctane sulfonamide (FOSA)	mg/kg	0.0002 : 0.01 (Interlab)				<0.0002	<0.01	0
	Perfluorotetradecanoic acid	mg/kg	0.0005 : 0.005 (Interlab)				<0.0005	<0.005	0
	Perfluorotridecanoic acid	mg/kg	0.0002 : 0.005 (Interlab)				<0.0002	<0.005	0
	Perfluoroundecanoic acid	mg/kg	0.0002 : 0.005 (Interlab)				<0.0002	<0.005	0

*RPDs have only been considered where a concentration is greater than 1 times the EQL.
**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: 200 (1-10 x EQL); 50 (10-30 x EQL); 50 (> 30 x EQL))
***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory

Appendix G
Table G2
Sediment Duplicate Table

Field Duplicates (Sediment)
Filter: ALL

SDG	ALSE-Sydney 16-Dec-16	ALSE-Sydney 16-Dec-16	
Field ID	SS05	SSQA2	RPD
Sampled Date/Time	16/12/2016 21:25	16/12/2016 21:25	

Chem_Group	ChemName	Units	EQL			
TOC	Total Organic Carbon	%	0.5	0.7	0.6	15
Inorganics	Moisture	%	1	32.9	37.7	14
	pH (Lab)	pH Units	0.1	5.4	5.2	4
TRH - NEPM 2013	C6-C10 minus BTEX (F1)	mg/kg	10	<10	<10	0
	C6 - C10 Fraction	mg/kg	10	<10	<10	0
	>C10-C16 minus Naphthalene (F2)	mg/kg	50	<50	<50	0
	>C10 - C16 Fraction	mg/kg	50	<50	<50	0
	>C16 - C34 Fraction (F3)	mg/kg	100	<100	<100	0
	>C34 - C40 Fraction (F4)	mg/kg	100	<100	<100	0
	>C10 - C40 (Sum of Total)	mg/kg	50	<50	<50	0
TRH - NEPM 1999	C6 - C 9 Fraction	mg/kg	10	<10	<10	0
	C10 - C14 Fraction	mg/kg	50	<50	<50	0
	C15 - C28 Fraction	mg/kg	100	<100	<100	0
	C29 - C36 Fraction	mg/kg	100	<100	<100	0
	C10 - C36 (Sum of Total)	mg/kg	50	<50	<50	0
BTEX & MAH	Benzene	mg/kg	0.2	<0.2	<0.2	0
	Toluene	mg/kg	0.5	<0.5	<0.5	0
	Ethylbenzene	mg/kg	0.5	<0.5	<0.5	0
	Xylene (o)	mg/kg	0.5	<0.5	<0.5	0
	Xylene (m & p)	mg/kg	0.5	<0.5	<0.5	0
	Xylene Total	mg/kg	0.5	<0.5	<0.5	0
	BTEX (Sum of Total) - Lab Calc	mg/kg	0.2	<0.2	<0.2	0
PAH	Polycylic aromatic hydrocarbons	mg/kg	0.5	<0.5	<0.5	0
	Pyrene	mg/kg	0.5	<0.5	<0.5	0
	Acenaphthene	mg/kg	0.5	<0.5	<0.5	0
	Acenaphthylene	mg/kg	0.5	<0.5	<0.5	0
	Anthracene	mg/kg	0.5	<0.5	<0.5	0
	Benz(a)anthracene	mg/kg	0.5	<0.5	<0.5	0
	Benzo(a)pyrene	mg/kg	0.5	<0.5	<0.5	0
	Benzo[b+j]fluoranthene	mg/kg	0.5	<0.5	<0.5	0
	Benzo(k)fluoranthene	mg/kg	0.5	<0.5	<0.5	0
	Benzo(g,h,i)perylene	mg/kg	0.5	<0.5	<0.5	0
	Chrysene	mg/kg	0.5	<0.5	<0.5	0
	Dibenz(a,h)anthracene	mg/kg	0.5	<0.5	<0.5	0
	Fluoranthene	mg/kg	0.5	<0.5	<0.5	0
	Fluorene	mg/kg	0.5	<0.5	<0.5	0
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5	<0.5	<0.5	0
	Naphthalene	mg/kg	1	<1	<1	0
	Naphthalene	mg/kg	0.5	<0.5	<0.5	0
	Phenanthrene	mg/kg	0.5	<0.5	<0.5	0
	Benzo(a)pyrene TEQ (zero)	mg/kg	0.5	<0.5	<0.5	0
SVOCs	Benzo(a)pyrene TEQ (LOR)	mg/kg	0.5	1.2	1.2	0
	Benzo(a)pyrene TEQ (half LOR)	mg/kg	0.5	0.6	0.6	0
PFAS	PFHxS and PFOS (Sum of Total) - Lab Calc	mg/kg	0.0002	**0.0757**	**0.197**	**89**
	4:2 Fluorotelomer sulfonic acid	mg/kg	0.0005	<0.0005	<0.0005	0
	10:2 Fluorotelomer sulfonic acid	mg/kg	0.0005	<0.0005	0.0006	18
	Perfluorobutane sulfonic acid	mg/kg	0.0002	0.0005	0.0008	46
	Perfluorohexane sulfonic acid (PFHxS)	mg/kg	0.0002	**0.0039**	**0.0108**	**94**
	Perfluoropentanoic acid	mg/kg	0.0002	0.0014	0.0019	30
	8:2 Fluorotelomer sulfonic acid	mg/kg	0.0005	<0.0005	<0.0005	0
	6:2 Fluorotelomer Sulfonate (6:2 FTS)	mg/kg	0.0005	0.0007	0.0019	92
	Perfluorooctanoic acid (PFOA)	mg/kg	0.0002	**0.0024**	**0.0051**	**72**
	Perfluorobutanoic acid	mg/kg	0.001	<0.001	<0.001	0
	Perfluoroheptanoic acid	mg/kg	0.0002	0.0007	0.0012	53
	Perfluorohexanoic acid (PFHxA)	mg/kg	0.0002	0.0031	0.0045	37
	Perfluorooctane sulfonic acid (PFOS)	mg/kg	0.0002	**0.0718**	**0.186**	**89**
	PFAS (Sum of Total)(WA DER List)	mg/kg	0.0002	**0.0845**	**0.212**	**86**

*RPDs have only been considered where a concentration is greater than 1 times the EQL.
**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: 200 (1-10 x EQL); 50 (10-30 x EQL); 50 (> 30 x EQL))

***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories.
Any methods in the row header relate to those used in the primary laboratory

Appendix G
Table G3
Water Duplicate Table

Field Duplicates (water)
Filter: SDG in('ALSE-Sydney 16-Dec-16','ALSE-Sydney 24-Jan-17','ALSE-S

			SDG	ALSE-Sydney 16-Dec-16	ALSE-Sydney 16-Dec-16		ALSE-Sydney 16-Dec-16	ALSE-Sydney 16-Dec-16		
			Field ID	SW05	SWQA1	**RPD**	GW01	GWQA3	**RPD**	
			Sampled Date/Time	16/12/2016 15:00	16/12/2016 15:00		16/12/2016	16/12/2016		
Chem_Group	**ChemName**	**Units**	**EQL**							
Inorganics	Sulfate as SO4 - Turbidimetric (Filtered)	mg/l	1	4	4	0	457	479	5	
	pH (Lab)	pH Units	0.01	7.47	7.47	0	6.37	6.42	1	
	Total Dissolved Solids (Filtered)	mg/l	10	151	137	10	8140	7780	5	
Metals	Arsenic (Filtered)	mg/l	0.001	<0.001	<0.001	0	0.001	0.001	0	
	Cadmium (Filtered)	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	0	
	Chromium (III+VI) (Filtered)	mg/l	0.001	<0.001	<0.001	0	<0.001	<0.001	0	
	Copper (Filtered)	mg/l	0.001	<0.001	<0.001	0	0.001	0.002	67	
	Lead (Filtered)	mg/l	0.001	<0.001	<0.001	0	<0.001	<0.001	0	
	Mercury (Filtered)	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	0	
	Nickel (Filtered)	mg/l	0.001	<0.001	<0.001	0	0.045	0.047	4	
	Zinc (Filtered)	mg/l	0.005	<0.005	<0.005	0	0.11	0.119	8	
TRH - NEPM 2013	C6-C10 minus BTEX (F1)	µg/L	20	<20	<20	0	<20	<20	0	
	C6 - C10 Fraction	µg/L	20	<20	<20	0	<20	<20	0	
	>C10-C16 minus Naphthalene (F2)	µg/L	100	<100	<100	0	140	120	15	
	>C10 - C16 Fraction	µg/L	100	<100	<100	0	140	120	15	
	>C16 - C34 Fraction (F3)	µg/L	100	<100	<100	0	<100	<100	0	
	>C34 - C40 Fraction (F4)	µg/L	100	<100	<100	0	<100	<100	0	
	>C10 - C40 (Sum of Total)	µg/L	100	<100	<100	0	140	120	15	
M 2013										
TRH - NEPM 1999	C6 - C 9 Fraction	µg/L	20	<20	<20	0	<20	<20	0	
	C10 - C14 Fraction	µg/L	50	<50	<50	0	<50	<50	0	
	C15 - C28 Fraction	µg/L	100	<100	<100	0	150	130	14	
	C29 - C36 Fraction	µg/L	50	<50	<50	0	<50	<50	0	
	C10 - C36 (Sum of Total)	µg/L	50	<50	<50	0	150	130	14	
M 1999										
BTEX & MAH	Benzene	µg/L	1	<1	<1	0	<1	<1	0	
	Toluene	µg/L	2	<2	<2	0	<2	<2	0	
	Ethylbenzene	µg/L	2	<2	<2	0	<2	<2	0	
	Xylene (o)	µg/L	2	<2	<2	0	<2	<2	0	
	Xylene (m & p)	µg/L	2	<2	<2	0	<2	<2	0	
	Xylene Total	µg/L	2	<2	<2	0	<2	<2	0	
	BTEX (Sum of Total) - Lab Calc	µg/L	1	<1	<1	0	<1	<1	0	
AH										
PAH	Polycylic aromatic hydrocarbons	µg/L	0.5	<0.5	<0.5	0	<0.5	<0.5	0	
	Pyrene	µg/L	1	<1	<1	0	<1	<1	0	
	Acenaphthene	µg/L	1	<1	<1	0	<1	<1	0	
	Acenaphthylene	µg/L	1	<1	<1	0	<1	<1	0	
	Anthracene	µg/L	1	<1	<1	0	<1	<1	0	
	Benz(a)anthracene	µg/L	1	<1	<1	0	<1	<1	0	
	Benzo(a)pyrene	µg/L	0.5	<0.5	<0.5	0	<0.5	<0.5	0	
	Benzo[b+j]fluoranthene	µg/L	1	<1	<1	0	<1	<1	0	
	Benzo(k)fluoranthene	µg/L	1	<1	<1	0	<1	<1	0	
	Benzo(g,h,i)perylene	µg/L	1	<1	<1	0	<1	<1	0	
	Chrysene	µg/L	1	<1	<1	0	<1	<1	0	
	Dibenz(a,h)anthracene	µg/L	1	<1	<1	0	<1	<1	0	
	Fluoranthene	µg/L	1	<1	<1	0	<1	<1	0	
	Fluorene	µg/L	1	<1	<1	0	<1	<1	0	
	Indeno(1,2,3-c,d)pyrene	µg/L	1	<1	<1	0	<1	<1	0	
	Naphthalene	µg/L	5	<5	<5	0	<5	<5	0	
	Naphthalene	µg/L	1	<1	<1	0	<1	<1	0	
	Phenanthrene	µg/L	1	<1	<1	0	<1	<1	0	
	Benzo(a)pyrene TEQ (zero)	mg/l	0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	0	
PFAS	Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02							
	PFHxS and PFOS (Sum of Total) - Lab Calc	µg/L	0.01	146	133	9	<0.01	<0.01	0	
	4:2 Fluorotelomer sulfonic acid	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0	
	10:2 Fluorotelomer sulfonic acid	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0	
	N-Ethyl perfluorooctane sulfonamidoacetic acid	µg/L	0.02							
	N-Methyl perfluorooctane sulfonamidoacetic acid	µg/L	0.02							
	Perfluorobutane sulfonic acid	µg/L	0.02	1.39	1.42	2	<0.02	<0.02	0	
	Perfluoroheptane sulfonic acid	µg/L	0.02							
	Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.02	9.41	9.11	3	<0.02	<0.02	0	
	Perfluoropentanoic acid	µg/L	0.02	2.24	2.14	5	<0.02	<0.02	0	
	8:2 Fluorotelomer sulfonic acid	µg/L	0.05	0.22	0.2	10	<0.05	<0.05	0	
	N-Ethyl perfluorooctane sulfonamide	µg/L	0.05							
	N-Ethyl perfluorooctane sulfonamidoethanol	µg/L	0.05							
	N-Methyl perfluorooctane sulfonamide	µg/L	0.05							
	N-Methyl perfluorooctane sulfonamidoethanol	µg/L	0.05							
	6:2 Fluorotelomer Sulfonate (6:2 FTS)	µg/L	0.05	0.77	0.88	13	<0.05	<0.05	0	
	Perfluorooctanoic acid (PFOA)	µg/L	0.01	3.12	2.99	4	<0.01	<0.01	0	
	Perfluoropentane sulfonic acid	µg/L	0.02							
	Perfluorobutanoic acid	µg/L	0.1	0.2	0.2	0	<0.1	<0.1	0	
	Perfluorodecanoic acid	µg/L	0.02							
	Perfluorododecanoic acid	µg/L	0.02							
	Perfluoroheptanoic acid	µg/L	0.02	1.02	0.79	25	<0.02	<0.02	0	
	Perfluorohexanoic acid (PFHxA)	µg/L	0.02	7.02	6.79	3	<0.02	<0.02	0	
	Perfluorononanoic acid	µg/L	0.02							
	Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01	137	124	10	<0.01	<0.01	0	
	Perfluorooctane sulfonamide (FOSA)	µg/L	0.02							
	Perfluorotetradecanoic acid	µg/L	0.05							
	Perfluorotridecanoic acid	µg/L	0.02							
	Perfluoroundecanoic acid	µg/L	0.02							
	PFAS (Sum of Total)	µg/L	0.01							
	PFAS (Sum of Total)(WA DER List)	µg/L	0.01	162	148	9	<0.01	<0.01	0	
Alkalinity	Alkalinity (Carbonate as CaCO3)	mg/l	1	<1	<1	0	<1	<1	0	
	Alkalinity (Hydroxide as CaCO3)	mg/l	1	<1	<1	0	<1	<1	0	
	Alkalinity (total as CaCO3)	mg/l	1	60	72	18	124	121	2	
	Bicarbonate Alkalinity as CaCO3	mg/l	1	60	72	18	124	121	2	
Major Ions	Calcium (Filtered)	mg/l	1	14	16	13	108	112	4	
	Chloride	mg/l	1	23	23	0	4260	4340	2	
	Magnesium (Filtered)	mg/l	1	5	5	0	228	229	0	
	Anions Total	meq/L	0.01	1.93	2.17	12	132	135	2	
	Potassium (Filtered)	mg/l	1	4	4	0	11	11	0	
	Sodium (Filtered)	mg/l	1	24	20	18	2470	2440	1	
	Cations Total	meq/L	0.01	2.26	2.18	4	132	131	1	
	Ionic Balance	%	0.01				**0.11**	**1.49**	**173**	

*RPDs have only been considered where a concentration is greater than 1 times the EQL.
**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: 200 (1-10 x EQL); 30 (10-30 x EQL); 30 (> 30 x EQL))
***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory

Appendix G
Table G3
Water Duplicate Table

Field Duplicates (water)
Filter: SDG in('ALSE-Sydney 16-Dec-16','ALSE-Sydney 24-Jan-17','ALSE-S

SDG		ALSE-Sydney 24-Jan-17	ALSE-Sydney 24-Jan-17		ALSE-Sydney 24-Jan-17	ALSE-Sydney 24-Jan-17	
Field ID		SW05	SWQA1	**RPD**	GW01	GWQA3	**RPD**
Sampled Date/Time		16/12/2016	16/12/2016		16/12/2016	16/12/2016	
Chem_Group	**ChemName**	**Units**	**EQL**						
Inorganics	Sulfate as SO4 - Turbidimetric (Filtered)	mg/l	1						
	pH (Lab)	pH Units	0.01						
	Total Dissolved Solids (Filtered)	mg/l	10						
Metals	Arsenic (Filtered)	mg/l	0.001						
	Cadmium (Filtered)	mg/l	0.0001						
	Chromium (III+VI) (Filtered)	mg/l	0.001						
	Copper (Filtered)	mg/l	0.001						
	Lead (Filtered)	mg/l	0.001						
	Mercury (Filtered)	mg/l	0.0001						
	Nickel (Filtered)	mg/l	0.001						
	Zinc (Filtered)	mg/l	0.005						
TRH - NEPM 2013	C6-C10 minus BTEX (F1)	µg/L	20						
	C6 - C10 Fraction	µg/L	20						
	>C10-C16 minus Naphthalene (F2)	µg/L	100						
	>C10 - C16 Fraction	µg/L	100						
	>C16 - C34 Fraction (F3)	µg/L	100						
	>C34 - C40 Fraction (F4)	µg/L	100						
	>C10 - C40 (Sum of Total)	µg/L	100						
M 2013									
TRH - NEPM 1999	C6 - C 9 Fraction	µg/L	20						
	C10 - C14 Fraction	µg/L	50						
	C15 - C28 Fraction	µg/L	100						
	C29 - C36 Fraction	µg/L	50						
	C10 - C36 (Sum of Total)	µg/L	50						
M 1999									
BTEX & MAH	Benzene	µg/L	1						
	Toluene	µg/L	2						
	Ethylbenzene	µg/L	2						
	Xylene (o)	µg/L	2						
	Xylene (m & p)	µg/L	2						
	Xylene Total	µg/L	2						
	BTEX (Sum of Total) - Lab Calc	µg/L	1						
AH									
PAH	Polycylic aromatic hydrocarbons	µg/L	0.5						
	Pyrene	µg/L	1						
	Acenaphthene	µg/L	1						
	Acenaphthylene	µg/L	1						
	Anthracene	µg/L	1						
	Benz(a)anthracene	µg/L	1						
	Benzo(a)pyrene	µg/L	0.5						
	Benzo[b+j]fluoranthene	µg/L	1						
	Benzo(k)fluoranthene	µg/L	1						
	Benzo(g,h,i)perylene	µg/L	1						
	Chrysene	µg/L	1						
	Dibenz(a,h)anthracene	µg/L	1						
	Fluoranthene	µg/L	1						
	Fluorene	µg/L	1						
	Indeno(1,2,3-c,d)pyrene	µg/L	1						
	Naphthalene	µg/L	5						
	Naphthalene	µg/L	1						
	Phenanthrene	µg/L	1						
	Benzo(a)pyrene TEQ (zero)	mg/l	0.0005						
PFAS	Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02	1.15	1.13	2	<0.1	<0.1	0
	PFHxS and PFOS (Sum of Total) - Lab Calc	µg/L	0.01	162	159	2	0.45	0.57	24
	4:2 Fluorotelomer sulfonic acid	µg/L	0.05	<0.05	<0.05	0	<0.25	<0.25	0
	10:2 Fluorotelomer sulfonic acid	µg/L	0.05	<0.05	<0.05	0	<0.25	<0.25	0
	N-Ethyl perfluorooctane sulfonamidoacetic acid	µg/L	0.02	<0.02	<0.02	0	<0.1	<0.1	0
	N-Methyl perfluorooctane sulfonamidoacetic acid	µg/L	0.02	0.06	0.08	29	<0.1	<0.1	0
	Perfluorobutane sulfonic acid	µg/L	0.02	3.85	3.77	2	<0.1	<0.1	0
	Perfluoroheptane sulfonic acid	µg/L	0.02	1.44	1.48	3	<0.1	<0.1	0
	Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.02	27.2	26.2	4	**0.22**	**0.34**	**43**
	Perfluoropentanoic acid	µg/L	0.02	4.78	4.69	2	<0.1	<0.1	0
	8:2 Fluorotelomer sulfonic acid	µg/L	0.05	0.4	0.42	5	<0.25	<0.25	0
	N-Ethyl perfluorooctane sulfonamide	µg/L	0.05	<0.05	<0.05	0	<0.25	<0.25	0
	N-Ethyl perfluorooctane sulfonamidoethanol	µg/L	0.05	<0.05	<0.05	0	<0.25	<0.25	0
	N-Methyl perfluorooctane sulfonamide	µg/L	0.05	<0.05	<0.05	0	<0.25	<0.25	0
	N-Methyl perfluorooctane sulfonamidoethanol	µg/L	0.05	<0.05	<0.05	0	<0.25	<0.25	0
	6:2 Fluorotelomer Sulfonate (6:2 FTS)	µg/L	0.05	3.64	3.33	9	<0.25	<0.25	0
	Perfluorooctanoic acid (PFOA)	µg/L	0.01	9.13	8.55	7	<0.05	<0.05	0
	Perfluoropentane sulfonic acid	µg/L	0.02	3.5	3.46	1	<0.1	<0.1	0
	Perfluorobutanoic acid	µg/L	0.1	<0.1	<0.1	0	<0.5	<0.5	0
	Perfluorodecanoic acid	µg/L	0.02	0.08	0.08	0	<0.1	<0.1	0
	Perfluorododecanoic acid	µg/L	0.02	<0.02	<0.02	0	<0.1	<0.1	0
	Perfluoroheptanoic acid	µg/L	0.02	2.93	2.87	2	<0.1	<0.1	0
	Perfluorohexanoic acid (PFHxA)	µg/L	0.02	18.5	18.3	1	0.12	0.14	15
	Perfluorononanoic acid	µg/L	0.02	0.13	0.1	26	<0.1	<0.1	0
	Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01	135	133	1	0.23	0.23	0
	Perfluorooctane sulfonamide (FOSA)	µg/L	0.02	1.01	1.05	4	<0.1	<0.1	0
	Perfluorotetradecanoic acid	µg/L	0.05	<0.05	<0.05	0	<0.25	<0.25	0
	Perfluorotridecanoic acid	µg/L	0.02	<0.02	<0.02	0	<0.1	<0.1	0
	Perfluoroundecanoic acid	µg/L	0.02	<0.02	<0.02	0	<0.1	<0.1	0
	PFAS (Sum of Total)	µg/L	0.01	213	208	2	0.57	0.71	22
	PFAS (Sum of Total)(WA DER List)	µg/L	0.01	205	201	2	0.57	0.71	22
Alkalinity	Alkalinity (Carbonate as CaCO3)	mg/l	1						
	Alkalinity (Hydroxide as CaCO3)	mg/l	1						
	Alkalinity (total as CaCO3)	mg/l	1						
	Bicarbonate Alkalinity as CaCO3	mg/l	1						
Major Ions	Calcium (Filtered)	mg/l	1						
	Chloride	mg/l	1						
	Magnesium (Filtered)	mg/l	1						
	Anions Total	meq/L	0.01						
	Potassium (Filtered)	mg/l	1						
	Sodium (Filtered)	mg/l	1						
	Cations Total	meq/L	0.01						
	Ionic Balance	%	0.01						

*RPDs have only been considered where a concentration is greater than 1 times the EQL.
**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: 200 (1-10 x EQL); 30 (10-30 x EQ
***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any meth

Appendix G
Table G4
Soil and Water Blank Summary

Field Blanks (soil)
Filter: ALL

SDG	ALSE-Sydney 16-Dec-16	ALSE-Sydney 16-Dec-16
Field ID	Trip Blank 1	Trip Blank 2
Sampled_Date/Time	16/12/2016	16/12/2016
Sample Type	Trip_B	Trip_B

Chem_Group	ChemName	Units	EQL		
BTEX & MAH	Benzene	mg/kg	0.1	<0.2	<0.2
	Toluene	mg/kg	0.1	<0.5	<0.5
	Ethylbenzene	mg/kg	0.1	<0.5	<0.5
	Xylene (o)	mg/kg	0.1	<0.5	<0.5
	Xylene (m & p)	mg/kg	0.2	<0.5	<0.5
	Xylene Total	mg/kg	0.3	<0.5	<0.5
	BTEX (Sum of Total) - Lab Calc	mg/kg	0.2	<0.2	<0.2
PAH	Naphthalene	mg/kg	0.5	<1	<1
TRH - NEPM 1999	C6 - C 9 Fraction	mg/kg	10	<10	<10
	C10 - C14 Fraction	mg/kg	20		
	C15 - C28 Fraction	mg/kg	50		
	C29 - C36 Fraction	mg/kg	50		
	C10 - C36 (Sum of Total)	mg/kg	50		
TRH - NEPM 2013	C6-C10 minus BTEX (F1)	mg/kg	10	<10	<10
	C6 - C10 Fraction	mg/kg	10	<10	<10
	>C10-C16 minus Naphthalene (F2)	mg/kg	50		
	>C10 - C16 Fraction	mg/kg	50		
	>C16 - C34 Fraction (F3)	mg/kg	100		
	>C34 - C40 Fraction (F4)	mg/kg	100		
	>C10 - C40 (Sum of Total)	mg/kg	50		
Unassigned	TCLP Fluid	mg/kg	1		

Field Blanks (water)
Filter: ALL

SDG	ALSE-Sydney 09-Dec-16	ALSE-Sydney 09-Dec-16	ALSE-Sydney 09-Dec-16	ALSE-Sydney 09-Dec-16	ALSE-Sydney 16-Dec-16
Field ID	RB_051216	RB_061216	RB_071216	RB_081216	Trip Blank
Sampled_Date/Time	5/12/2016	6/12/2016	7/12/2016	8/12/2016	16/12/2016
Sample Type	Rinsate	Rinsate	Rinsate	Rinsate	Trip_B

Chem_Group	ChemName	Units	EQL					
BTEX & MAH	Benzene	µg/L	1	<1	<1	<1	<1	<1
	Toluene	µg/L	2	<2	<2	<2	<2	<2
	Ethylbenzene	µg/L	2	<2	<2	<2	<2	<2
	Xylene (o)	µg/L	2	<2	<2	<2	<2	<2
	Xylene (m & p)	µg/L	2	<2	<2	<2	<2	<2
	Xylene Total	µg/L	2	<2	<2	<2	<2	<2
	BTEX (Sum of Total) - Lab Calc	µg/L	1	<1	<1	<1	<1	<1
PAH	Naphthalene	µg/L	1	<5	<5	<5	<5	<5
PFAS	Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02					
	PFHxS and PFOS (Sum of Total) - La	µg/L	0.01			<0.01		
	4:2 Fluorotelomer sulfonic acid	µg/L	0.05			<0.05		
	10:2 Fluorotelomer sulfonic acid	µg/L	0.05			<0.05		
	N-Ethyl perfluorooctane sulfonamidoa	µg/L	0.02					
	N-Methyl perfluorooctane sulfonamid	µg/L	0.02					
	Perfluorobutane sulfonic acid	µg/L	0.02			<0.02		
	Perfluoroheptane sulfonic acid	µg/L	0.02					
	Perfluorohexane sulfonic acid (PFHxS	µg/L	0.02			<0.02		
	Perfluoropentanoic acid	µg/L	0.02			<0.02		
	8:2 Fluorotelomer sulfonic acid	µg/L	0.05			<0.05		
	N-Ethyl perfluorooctane sulfonamide	µg/L	0.05					
	N-Ethyl perfluorooctane sulfonamidoe	µg/L	0.05					
	N-Methyl perfluorooctane sulfonamide	µg/L	0.05					
	N-Methyl perfluorooctane sulfonamid	µg/L	0.05					
	6:2 Fluorotelomer Sulfonate (6:2 FTS	µg/L	0.05			<0.05		
	Perfluorooctanoic acid (PFOA)	µg/L	0.01			<0.01		
	Perfluoropentane sulfonic acid	µg/L	0.02					
	Perfluorobutanoic acid	µg/L	0.1			<0.1		
	Perfluorodecanoic acid	µg/L	0.02					
	Perfluorododecanoic acid	µg/L	0.02					
	Perfluoroheptanoic acid	µg/L	0.02			<0.02		
	Perfluorohexanoic acid (PFHxA)	µg/L	0.02			<0.02		
	Perfluorononanoic acid	µg/L	0.02					
	Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01			<0.01		
	Perfluorooctane sulfonamide (FOSA)	µg/L	0.02					
	Perfluorotetradecanoic acid	µg/L	0.05					
	Perfluorotridecanoic acid	µg/L	0.02					
	Perfluoroundecanoic acid	µg/L	0.02					
	PFAS (Sum of Total)(WA DER List)	µg/L	0.01			<0.01		
TRH - NEPM 1999	C6 - C 9 Fraction	µg/L	20	<20	<20	<20	<20	<20
	C10 - C14 Fraction	µg/L	50					
	C15 - C28 Fraction	µg/L	100					
	C29 - C36 Fraction	µg/L	50					
	C10 - C36 (Sum of Total)	µg/L	50					
TRH - NEPM 2013	C6-C10 minus BTEX (F1)	µg/L	20	<20	<20	<20	<20	<20
	C6 - C10 Fraction	µg/L	20	<20	<20	<20	<20	<20
	>C10-C16 minus Naphthalene (F2)	µg/L	100					
	>C10 - C16 Fraction	µg/L	100					
	>C16 - C34 Fraction (F3)	µg/L	100					
	>C34 - C40 Fraction (F4)	µg/L	100					
	>C10 - C40 (Sum of Total)	µg/L	100					

Appendix H – NATA accredited laboratory reports and chain of custody documentation

CHAIN OF CUSTODY

ALS Laboratory: please tick →

ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com

BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com

MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com

MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com

NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsglobal.com

NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com

PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

SYDNEY 277-289 Woodpark Road Smithfield NSW 2164

Environmental Division Sydney
Work Order Reference
ES1628401

Telephone : +61-2-8784 8555

CLIENT: GHD Pty Ltd	TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)	X Standard TAT (List due date): ☐ Non Standard or urgent TAT (List due date):
OFFICE: SYDNEY (CASTLEREAGH ST)		
PROJECT: ALBION PARK	ALS QUOTE NO: EN/005/16	
ORDER NUMBER: 21-25583/02		COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7
PROJECT MANAGER: BEN ANDERSON	CONTACT PH: 0408 713 343	
SAMPLER: Matthew West	SAMPLER MOBILE: 0408 650 579	
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default): ESDAT	
Email Reports to: Ben.Anderson@ghd.com; Matthew West@ghd.com and Melissa.Weber@ghd.com		
Email Invoice to (will default to PM if no other addresses are listed): Ben.Anderson@ghd.com and		

FOR LABORATORY USE ONLY: Custody Seal Intact ☐ Yes ☐ No ☐ N/A; Temperature; Cooling Method; Random Sample Temp.; Other comments

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:
MATTHEW WEST	Frank ALS	
DATE/TIME: 2:30PM 08/12/2016	DATE/TIME: 9-12-16 0830	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS — MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	PFAS (FULL SUITE)	TRH	BTEX	PAH's	TOC	CEC	PH	METAL (8)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	GW05_0.0_0.1	8-Dec	S	PLASTIC JAR	1									
2	GW05_0.5_0.6	8-Dec	S	GLASS JAR + TEFLON LID REMOVED	2									
3	GW05_1.0_1.1	8-Dec	S	GLASS JAR + TEFLON LID REMOVED	2									
4	GW05_1.6_1.7	8-Dec	S	PLASTIC JAR + GLASS JAR	2	X	X	X	X				X	
5	GW05_2.8_2.9	8-Dec	S	PLASTIC JAR	1									
6	GW05_3.4_3.5	8-Dec	S	PLASTIC JAR + GLASS JAR	2	X	X	X	X	X	X	X	X	
7	GW05_5.0_5.1	8-Dec	S	PLASTIC JAR	1									
8	GW05_5.9_6.0	8-Dec	S	PLASTIC JAR + GLASS JAR	2									
9	GW04_0.0_0.1	8-Dec	S	PLASTIC JAR + GLASS JAR	2									
10	GW04_0.5_0.6	8-Dec	S	PLASTIC JAR + GLASS JAR	2	X	X	X	X	X	X	X	X	
11	GW04_1.0_1.1	8-Dec	S	PLASTIC JAR + GLASS JAR	2									
12	GW04_2.0_2.1	8-Dec	S	PLASTIC JAR	1									
				TOTAL										

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

ALS Environmental

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com

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☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com

☐NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsglobal.com

☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com

☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com

☐TOWNSVILLE 14-16 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com

☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: GHD Pty Ltd	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)	X Standard TAT **(List due date):** ☐ Non Standard or urgent TAT **(List due date):**
OFFICE: SYDNEY (CASTLEREAGH ST)		**FOR LABORATORY USE ONLY (Circle)** Custody Seal Intact? Yes / No / N/A
PROJECT: ALBION PARK	**ALS QUOTE NO: EN/005/16**	Cooling Method: ICE / ICEPACK / NONE
ORDER NUMBER: 21-25583/02		**COC SEQUENCE NUMBER (Circle)** COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7
PROJECT MANAGER: BEN ANDERSON	**CONTACT PH:** 0408 713 343	Random Sample Temperature on Receipt: °C
SAMPLER: Matthew West	**SAMPLER MOBILE:** 0408 650 579	Other comments:
COC emailed to ALS? (YES / NO)	**EDD FORMAT (or default):** ESDAT	
Email Reports to: Ben.Anderson@ghd.com; Matthew West@ghd.com and Melissa.Weber@ghd.com		
Email Invoice to (will default to PM if no other addresses are listed):Ben.Anderson@ghd.com and		

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
MATTHEW WEST	Frank MS		
DATE/TIME: 2:30PM 08/12/2016	DATE/TIME: 9-12-16 0830	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL CONTAINERS	PFAS	TRH	BTEX	PAH's	TOC	CEC	PH	METALS (8)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
13	GW04_3.0_3.1	8-Dec	S	GLASS JAR + TEFLON LID REMOVED	1									
14	GW04_4.0_4.1	8-Dec	S	GLASS JAR + TEFLON LID REMOVED	1									
15	GW04_5.0_5.1	8-Dec	S	PLASTIC JAR	1									
16	GW04_6.0_6.1	8-Dec	S	PLASTIC JAR + GLASS JAR	2	X	X	X	X				X	
17	GW03_0.0_0.1	7-Dec	S	PLASTIC JAR + GLASS JAR	2	X	X	X	X				X	
18	GW03_0.5_0.6	7-Dec	S	PLASTIC JAR + GLASS JAR	2									
19	GW03_1.0_1.1	7-Dec	S	PLASTIC JAR + GLASS JAR	2									
20	GW03_2.0_2.1	7-Dec	S	PLASTIC JAR + GLASS JAR	2									
21	GW03_3.0_3.1	7-Dec	S	PLASTIC JAR	1									
22	GW03_4.0_4.1	7-Dec	S	PLASTIC JAR + GLASS JAR	2									
23	GW03_5.0_5.1	7-Dec	S	PLASTIC JAR + GLASS JAR	2	X	X	X	X	X	X	X	X	
24	GW03_6.1_6.2	7-Dec	S	PLASTIC JAR + GLASS JAR	2									
				TOTAL										

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

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☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: GHD Pty Ltd	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	X Standard TAT **(List due date):**
OFFICE: SYDNEY (CASTLEREAGH ST)		☐ Non Standard or urgent TAT **(List due date):**
PROJECT: ALBION PARK	**ALS QUOTE NO:** EN/005/16	
ORDER NUMBER: 21-25583/02		
PROJECT MANAGER: BEN ANDERSON	**CONTACT PH:** 0408 713 343	
SAMPLER: Matthew West	**SAMPLER MOBILE:** 0408 650 579	
COC emailed to ALS? (YES / NO)	**EDD FORMAT (or default):** ESDAT	
Email Reports to: Ben.Anderson@ghd.com; Matthew West@ghd.com and Melissa.Weber@ghd.com		
Email Invoice to (will default to PM if no other addresses are listed):Ben.Anderson@ghd.com and		

COC SEQUENCE NUMBER (Circle)

COC:	1	2	3	4	5	6	7
OF:	1	2	3	4	5	6	7

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact? Yes No N/A

Cooling Method: Ice Ice Pack None

Cooler Temperature(s) °C

Random Sample Temperature on Receipt °C

Other comments:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
MATTHEW WEST	Frank ALS		
DATE/TIME: 2:30PM 08/12/2016	DATE/TIME: 9-12-16 0830	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS — MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL CONTAINERS	PFAS	TRH	BTEX	PAH's	TOC	CEC	PH	METALS (8)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
25	GW02_0.0_0.2	8-Dec	S	GLASS JAR + TEFLON LID REMOVED	2									
26	GW02_0.5_0.6	6-Dec	S	GLASS JAR + TEFLON LID REMOVED	2	X	X	X	X	X	X	X		
27	GW02_1.0_1.1	6-Dec	S	PLASTIC JAR + GLASS JAR	2									
28	GW02_2.0_2.1	6-Dec	S	PLASTIC JAR	1									
29	GW02_3.0_3.1	6-Dec	S	PLASTIC JAR	1									
30	GW02_4.0_4.1	6-Dec	S	PLASTIC JAR	1									
31	GW02_5.0_5.1	6-Dec	S	PLASTIC JAR	1	X								
32	GW02_6.0_6.1	6-Dec	S	PLASTIC JAR + GLASS JAR	2		X	X	X					
33	GW01_0.0_0.2	6-Dec	S	PLASTIC JAR + GLASS JAR	2	X	X	X	X				X	
34	GW01_0.5_0.6	6-Dec	S	PLASTIC JAR + GLASS JAR	2		X	X	X				X	
35	GW01_1.0_1.1	6-Dec	S	PLASTIC JAR	1									
36	GW01_2.0_2.1	6-Dec	S	PLASTIC JAR	1									
				TOTAL										

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

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CLIENT: GHD Pty Ltd	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	X Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)
OFFICE: SYDNEY (CASTLEREAGH ST)		☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact? Yes / No / N/A
PROJECT: ALBION PARK	**ALS QUOTE NO:** EN/005/16		Correct containers and preservation? Yes / No / N/A
ORDER NUMBER: 21-25583/02		COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt
PROJECT MANAGER: BEN ANDERSON	**CONTACT PH:** 0408 713 343		Cooling Method:
SAMPLER: Matthew West	**SAMPLER MOBILE:** 0408 650 579		Free Ice / Blue Ice / Dry Ice / None
COC emailed to ALS? (YES / NO)	**EDD FORMAT (or default):** ESDAT		Sample Comments
Email Reports to: Ben.Anderson@ghd.com; Matthew West@ghd.com and Melissa.Weber@ghd.com			
Email Invoice to (will default to PM if no other addresses are listed): Ben.Anderson@ghd.com and			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
MATTHEW WEST	Frank MS		
DATE/TIME: 2:30PM 08/12/2016	DATE/TIME: 9-12-16 0830	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL CONTAINERS	PFAS (FULL SUITE)	TRH	BTEX	PAH's	TOC	CEC	PH	METAL (8)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
37	GW01_3.0_3.1	6-Dec	S	PLASTIC JAR	1									
38	GW01_4.0_4.1	6-Dec	S	PLASTIC JAR	1	X								
39	GW01_5.0_5.1	6-Dec	S	PLASTIC JAR	1									
40	SB06_0.0_0.15	6-Dec	S	PLASTIC JAR + GLASS JAR	2									
41	SB06_0.5_0.6	6-Dec	S	PLASTIC JAR + GLASS JAR	2	X	X	X	X				X	
42	SB06_1.0_1.1	6-Dec	S	PLASTIC JAR + GLASS JAR	2									
43	SB06_2.0_2.1	6-Dec	S	PLASTIC JAR	1		X	X	X	X	X	X	X	
44	SB06_3.0_3.1	6-Dec	S	PLASTIC JAR	1									
45	SB06_4.0_4.1	6-Dec	S	PLASTIC JAR	1									
46	SB06_5.0_5.1	6-Dec	S	PLASTIC JAR + GLASS JAR	2	X								
47	SB06_5.9_6.0	6-Dec	S	PLASTIC JAR	1									
48	SB07_ASHPALT_0.0_0.3	5-Dec	M	MATERIAL SAMPLE	NA	X								
				TOTAL										

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

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☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: GHD Pty Ltd	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	X Standard TAT **(List due date):**	**FOR LABORATORY USE ONLY (Circle)** Custody Seal Intact? Yes No N/A
OFFICE: SYDNEY (CASTLEREAGH ST)		☐ Non Standard or urgent TAT **(List due date):**	Cooling Method: ICE GEL NONE Cooler Temperature on Receipt (°C):
PROJECT: ALBION PARK	**ALS QUOTE NO: EN/005/16**		Sample Temperature on Receipt (°C):
ORDER NUMBER: 21-25583/02		**COC SEQUENCE NUMBER (Circle)** COC: 1 2 3 4 5 6 7	Other comments:
PROJECT MANAGER: BEN ANDERSON	**CONTACT PH:** 0408 713 343	OF: 1 2 3 4 5 6 7	
SAMPLER: Matthew West	**SAMPLER MOBILE:** 0408 650 579		
COC emailed to ALS? (YES / NO)	**EDD FORMAT (or default):** ESDAT		
Email Reports to: Ben.Anderson@ghd.com; Matthew West@ghd.com and Melissa.Weber@ghd.com			
Email Invoice to (will default to PM if no other addresses are listed): Ben.Anderson@ghd.com and			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
MATTHEW WEST	Frank ALS		
DATE/TIME: 2:30PM 08/12/2016	DATE/TIME: 9-12-16 0830	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS — MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where **Metals** are required, specify **Total** (unfiltered bottle required) or **Dissolved** (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL CONTAINERS	PFAS	TRH	BTEX	PAH's	TOC	CEC	PH	METALS (8)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
49	SB07_0.05_0.1	5-Dec	S	PLASTIC JAR + GLASS JAR	2									
50	SB07_0.5_0.6	5-Dec	S	PLASTIC JAR + GLASS JAR	2	X	X	X	X				X	
51	SB07_1.0_1.1	5-Dec	S	PLASTIC JAR + GLASS JAR	2									
52	SB07_2.0_2.1	5-Dec	S	PLASTIC JAR + GLASS JAR	2									
53	SB07_3.0_3.1	5-Dec	S	PLASTIC JAR + GLASS JAR	2	X	X	X	X	X	X	X	X	
54	SB07_3.9_4.0	5-Dec	S	PLASTIC JAR + GLASS JAR	2									
55	SB07_5.0_5.1	5-Dec	S	PLASTIC JAR + GLASS JAR	2									
56	SB07_5.9_6.0	5-Dec	S	PLASTIC JAR + GLASS JAR	2									
57	SB08_0.0_0.15	5-Dec	S	PLASTIC JAR + GLASS JAR	2		X	X	X				X	
58	SB08_0.5_0.6	5-Dec	S	PLASTIC JAR + GLASS JAR	2	X								
59	SB08_1.0_1.1	5-Dec	S	PLASTIC JAR + GLASS JAR	2									
60	SB08_2.0_2.1	5-Dec	S	PLASTIC JAR + GLASS JAR	2		X	X	X	X	X	X	X	
				TOTAL										

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

ALS Environmental

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CLIENT: GHD Pty Ltd	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	**X** Standard TAT (List due date): ☐ Non Standard or urgent TAT (List due date):
OFFICE: SYDNEY (CASTLEREAGH ST)		FOR LABORATORY USE ONLY (Circle)
PROJECT: ALBION PARK	**ALS QUOTE NO:** EN/005/16	COC SEQUENCE NUMBER (Circle)
ORDER NUMBER: 21-25583/02		COC: 1 2 3 4 5 6 7
PROJECT MANAGER: BEN ANDERSON	**CONTACT PH:** 0408 713 343	OF: 1 2 3 4 5 6 7
SAMPLER: Matthew West	**SAMPLER MOBILE:** 0408 650 579	
COC emailed to ALS? (YES / NO)	**EDD FORMAT (or default):** ESDAT	
Email Reports to: Ben.Anderson@ghd.com; Matthew West@ghd.com and Melissa.Weber@ghd.com		
Email Invoice to (will default to PM if no other addresses are listed): Ben.Anderson@ghd.com and		

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
MATTHEW WEST	Frank MS		
DATE/TIME: 2:30PM 08/12/2016	DATE/TIME: 9-12-16 0830	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS (MATRIX: SOLID (S) WATER (W))			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	PFAS	TRH	BTEX	PAH's	TOC	CEC	PH	METALS (8)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
61	SB08_3.0_3.1	5-Dec	S	PLASTIC JAR	1									
62	SB08_4.0_4.1	5-Dec	S	PLASTIC JAR	1									
63	SB08_5.0_5.1	5-Dec	S	PLASTIC JAR	1	X								
64	SB08_5.9_6.0	5-Dec	S	PLASTIC JAR	1									
65	SB09_0.0_0.1	5-Dec	S	PLASTIC JAR + GLASS JAR	2	X								
66	SB09_0.5_0.6	5-Dec	S	PLASTIC JAR + GLASS JAR	2		X	X	X	X	X	X	X	
67	SB09_1.0_1.1	6-Dec	S	PLASTIC JAR + GLASS JAR	2									
68	SB09_2.0_2.1	6-Dec	S	PLASTIC JAR	1									
69	SB09_3.0_3.1	6-Dec	S	PLASTIC JAR	1									
70	SB09_4.0_4.1	6-Dec	S	PLASTIC JAR	1	X	X	X	X				X	
71	SB09_5.0_5.1	6-Dec	S	PLASTIC JAR + GLASS JAR	2									
72	SB09_5.8_5.9	6-Dec	S	PLASTIC JAR + GLASS JAR	2									
				TOTAL										

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

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CLIENT: GHD Pty Ltd	**TURNAROUND REQUIREMENTS :** X Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)
OFFICE: SYDNEY (CASTLEREAGH ST)	(Standard TAT may be longer for some tests e.g.. Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact? Yes / No / N/A
PROJECT: ALBION PARK	**ALS QUOTE NO:** EN/005/16	Correct Containers & Sufficient Quantity? Yes / No / N/A
ORDER NUMBER: 21-25583/02		Cooling Method: Ice / Ice Bricks / Blue Ice / Frozen / None
PROJECT MANAGER: BEN ANDERSON	**CONTACT PH:** 0408 713 343	Random Sample Temperature on Receipt: °C
SAMPLER: Matthew West	**SAMPLER MOBILE:** 0408 650 579	Other comments:
COC emailed to ALS? (YES / NO)	**EDD FORMAT (or default):** ESDAT	
Email Reports to: Ben.Anderson@ghd.com; Matthew West@ghd.com and Melissa.Weber@ghd.com		
Email Invoice to (will default to PM if no other addresses are listed): Ben.Anderson@ghd.com and		

COC SEQUENCE NUMBER (Circle)

COC: 1 2 3 4 5 6 7

OF: 1 2 3 4 5 6 7

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
MATTHEW WEST	Frank MS		
DATE/TIME: 2:30PM 08/12/2016	DATE/TIME: 9-12-16 0830	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL CONTAINERS	PFAS	TRH	BTEX	PAH's	TOC	CEC	PH	METALS (8)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
73	SB10_0.0_0.1	6-Dec	S	PLASTIC JAR + GLASS JAR	2	X	X	X	X				X	
74	SB10_0.5_0.6	6-Dec	S	PLASTIC JAR + GLASS JAR	2									
75	SB10_1.0_1.1	6-Dec	S	PLASTIC JAR + GLASS JAR	2									
76	SB10_2.0_2.1	6-Dec	S	PLASTIC JAR	1									
77	SB10_2.3_2.5	6-Dec	S	PLASTIC JAR + GLASS JAR	2	X	X	X	X	X	X	X	X	
78	SB10_3.0_3.1	6-Dec	S	PLASTIC JAR	1									
79	SB10_4.0_4.1	6-Dec	S	PLASTIC JAR + GLASS JAR	2									
80	SB10_5.1-5.2	6-Dec	S	PLASTIC JAR + GLASS JAR	2									
81	SB11_0.0_0.1	7-Dec	S	PLASTIC JAR + GLASS JAR	2									
82	SB11_0.5_0.6	7-Dec	S	PLASTIC JAR + GLASS JAR	2		X	X	X				X	
83	SB11_1.0_1.1	7-Dec	S	PLASTIC JAR + GLASS JAR	2	X	X	X	X	X	X	X	X	
84	SB11_3.0_3.1	7-Dec	S	PLASTIC JAR	1									
				TOTAL										

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

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☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: GHD Pty Ltd	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	X Standard TAT **(List due date):** ☐ Non Standard or urgent TAT **(List due date):**
OFFICE: SYDNEY (CASTLEREAGH ST)		
PROJECT: ALBION PARK	**ALS QUOTE NO: EN/005/16**	
ORDER NUMBER: 21-25583/02		
PROJECT MANAGER: BEN ANDERSON	**CONTACT PH: 0408 713 343**	
SAMPLER: Matthew West	**SAMPLER MOBILE: 0408 650 579**	
COC emailed to ALS? (YES / NO)	**EDD FORMAT (or default): ESDAT**	
Email Reports to: Ben.Anderson@ghd.com; Matthew West@ghd.com and Melissa.Weber@ghd.com		
Email Invoice to (will default to PM if no other addresses are listed):Ben.Anderson@ghd.com and		

COC SEQUENCE NUMBER (Circle)

COC: 1 2 3 4 5 6 7

OF: 1 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)

On Ice: Yes No N/A

Temp: 4 Cooling Initiated

Other Comments:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
MATTHEW WEST	Frank MS		
DATE/TIME: 2:30PM 08/12/2016	DATE/TIME: 9-12-16 0830	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	PFAS	TRH	BTEX	PAH's	TOC	CEC	PH	METALS (8)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
85	SB11_5.4-5.5	6-Dec	S	PLASTIC JAR	1	X								
86	SB12_0.0_0.1	7-Dec	S	PLASTIC JAR + GLASS JAR	2	X	X	X	X				X	
87	SB12_0.5_0.6	7-Dec	S	PLASTIC JAR + GLASS JAR	2		X	X	X	X	X	X	X	
88	SB12_1.0_1.1	7-Dec	S	PLASTIC JAR + GLASS JAR	2									
89	SB12_2.0_2.1	7-Dec	S	PLASTIC JAR	1									
90	SB12_4.0_4.1	7-Dec	S	PLASTIC JAR + GLASS JAR	2									
91	SB12_5.6_5.7	7-Dec	S	PLASTIC JAR	1	X								
92	SB13_0.0_0.1	6-Dec	S	PLASTIC JAR + GLASS JAR	2									
93	SB13_0.5_0.6	7-Dec	S	PLASTIC JAR + GLASS JAR	2	X	X	X	X				X	
94	SB13_1.0_1.1	7-Dec	S	PLASTIC JAR + GLASS JAR	2									
95	SB13_2.0_2.1	7-Dec	S	PLASTIC JAR + GLASS JAR	2	X	X	X	X	X	X	X	X	
96	SB13_2.3_2.4	7-Dec	S	PLASTIC JAR + GLASS JAR	2									
				TOTAL										

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

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☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: GHD Pty Ltd	**TURNAROUND REQUIREMENTS :** X Standard TAT **(List due date):**
OFFICE: SYDNEY/CASTLEREAGH ST	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) ☐ Non Standard or urgent TAT **(List due date):**
PROJECT: ALBION PARK	**ALS QUOTE NO:** EN/005/16
ORDER NUMBER: 21-25583/02	
PROJECT MANAGER: BEN ANDERSON	**CONTACT PH:** 0408 713 343
SAMPLER: Matthew West	**SAMPLER MOBILE:** 0408 650 579
COC emailed to ALS? (YES / NO)	**EDD FORMAT (or default):** ESDAT
Email Reports to: Ben.Anderson@ghd.com; Matthew West@ghd.com and Melissa.Weber@ghd.com	
Email Invoice to (will default to PM if no other addresses are listed):Ben.Anderson@ghd.com and	

COC SEQUENCE NUMBER (Circle)

COC: 1 2 3 4 5 6 7

OF: 1 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact? Yes No N/A

Cooling Method: Ice Gel Ice Pack None

Cooling Initiated: Yes No N/A

Package Sample Temperature on Receipt: °C

Other Comments:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
MATTHEW WEST	Frank ALS		
DATE/TIME: 2:30PM 08/12/2016	DATE/TIME: 9-12-16 0830	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	PFAS	TRH	BTEX	PAH's	TOC	CEC	PH	METALS (8)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
97	SB13_3.9-4.0	6-Dec	S	PLASTIC JAR	1									
98	SB14_0.0_0.1	8-Dec	S	GLASS JAR + TEFLON LID REMOVED	1									
99	SB14_0.5_0.6	8-Dec	S	GLASS JAR + TEFLON LID REMOVED	1	X	X	X	X	X	X	X	X	
100	SB14_1.0_1.1	8-Dec	S	PLASTIC JAR	1									
101	SB14_2.0_2.1	8-Dec	S	PLASTIC JAR	1		X	X	X				X	
102	SB14_3.0_3.1	8-Dec	S	PLASTIC JAR	1	X								
103	SB14_5.0_5.1	8-Dec	S	GLASS JAR + TEFLON LID REMOVED	1									
104	SB14_5.9_6.0	8-Dec	S	GLASS JAR + TEFLON LID REMOVED	1									
105	SB15_0.0_0.1	8-Dec	S	PLASTIC JAR + GLASS JAR	2									
106	SB15_0.5_0.6	8-Dec	S	PLASTIC JAR + GLASS JAR	2		X	X	X	X	X	X	X	
107	SB15_1.0_1.1	8-Dec	S	PLASTIC JAR + GLASS JAR	2	X								
108	SB15_2.0_2.1	8-Dec	S	GLASS JAR + TEFLON LID REMOVED	2		X	X	X				X	
				TOTAL										

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

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WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: GHD Pty Ltd	**TURNAROUND REQUIREMENTS :** X Standard TAT **(List due date):** (Standard TAT may be longer for some tests e.g. Ultra Trace Organics) ☐ Non Standard or urgent TAT **(List due date):**	**FOR LABORATORY USE ONLY (Circle)** Custody Seal Intact? Yes No N/A; Cooling Agent Present? Yes No N/A; Random Sample Temperature on Receipt °C; Cooling Method:
OFFICE: SYDNEY (CASTLEREAGH ST)		
PROJECT: ALBION PARK	**ALS QUOTE NO: EN/005/16**	
ORDER NUMBER: 21-25583/02		**COC SEQUENCE NUMBER (Circle)** COC: 1 2 3 4 5 6 7; OF: 1 2 3 4 5 6 7
PROJECT MANAGER: BEN ANDERSON	**CONTACT PH: 0408 713 343**	
SAMPLER: Matthew West	**SAMPLER MOBILE: 0408 650 579**	
COC emailed to ALS? (YES / NO)	**EDD FORMAT (or default): ESDAT**	
Email Reports to: Ben.Anderson@ghd.com; Matthew West@ghd.com and Melissa.Weber@ghd.com		
Email Invoice to (will default to PM if no other addresses are listed):Ben.Anderson@ghd.com and		

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
MATTHEW WEST	Frank MS		
DATE/TIME: 2:30PM 08/12/2016	DATE/TIME: 9-12-16 0830	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL CONTAINERS	PFAS (LIMITED SUITE)	TRH	BTEX	PAH's	TOC	CEC	PH	METALS (8)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
105	SB15_3.0_3.1	8-Dec	S	GLASS JAR + TEFLON LID REMOVED	1									
110	SB15_4.0_4.1	8-Dec	S	GLASS JAR + TEFLON LID REMOVED	1									
111	SB15_5.0_5.1	8-Dec	S	GLASS JAR + TEFLON LID REMOVED	1	X								
112	SB15_5.5_5.6	8-Dec	S	GLASS JAR + TEFLON LID REMOVED	1									
113	BD1_051216	5-Dec	S	PLASTIC JAR + GLASS JAR	2		X	X	X				X	
114	BD2_061216	6-Dec	S	PLASTIC JAR + GLASS JAR	2									
—	BD3_071216	7-Dec	S	PLASTIC JAR + GLASS JAR	2	X	X	X	X				X	PLEASE FORWARD TO EUROFINS AS BLIND DUP
115	BD4_081216	8-Dec	S	PLASTIC JAR + GLASS JAR	2									
116	RB_051216	8-Dec	W	2 VIAL, 1 METALS BOTTLE	3	X	X	X						
117	RB_061216	8-Dec	W	2 VIAL, 1 METALS BOTTLE	3		X	X						
118	RB_071216	8-Dec	W	2 VIAL, 1 METALS BOTTLE, 1 500mL	4	X	X	X						
119	RB_081216	8-Dec	W	2 VIAL, 1 METALS BOTTLE, 1 500mL	4		X	X						
				TOTAL										

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☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: GHD Pty Ltd	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)	X Standard TAT **(List due date):**	**FOR LABORATORY USE ONLY (Circle)**
OFFICE: SYDNEY (CASTLEREAGH ST)		☐ Non Standard or urgent TAT **(List due date):**	Custody seal intact? Yes / No / N/A
PROJECT: ALBION PARK	**ALS QUOTE NO: EN/005/16**		Cooling Method: ICE / ICEPACK / NONE
ORDER NUMBER: 21-25583/02		**COC SEQUENCE NUMBER (Circle)** COC: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt:
PROJECT MANAGER: BEN ANDERSON	**CONTACT PH:** 0408 713 343	OF: 1 2 3 4 5 6 7	Other comments:
SAMPLER: Matthew West	**SAMPLER MOBILE:** 0408 650 579	**RELINQUISHED BY:** *MATTHEW WEST* DATE/TIME: 2:30PM 08/12/2016	**RECEIVED BY:** Frank ALS DATE/TIME: 9-12-16 0830
COC emailed to ALS? (YES / NO)	**EDD FORMAT (or default):** ESDAT		**RELINQUISHED BY:** DATE/TIME:
Email Reports to: Ben.Anderson@ghd.com; Matthew West@ghd.com and Melissa.Weber@ghd.com			**RECEIVED BY:** DATE/TIME:
Email Invoice to (will default to PM if no other addresses are listed):Ben.Anderson@ghd.com and			

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	PFAS	TRH	BTEX	PAH's	TOC	CEC	PH	METALS (8)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
120	TRIP SPIKE	5-8/12/2016	S	GLASS JAR	1		X	X						
121	TS C													
				TOTAL										

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1628401**	Page	: 1 of 52
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR BEN ANDERSON	Contact	: Customer Services ES
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 08 6222 8222	Telephone	: +61-2-8784 8555
Project	: ALBION PARK	Date Samples Received	: 09-Dec-2016 08:30
Order number	: 21-25583/02	Date Analysis Commenced	: 12-Dec-2016
C-O-C number	: ----	Issue Date	: 19-Dec-2016 17:57
Sampler	: Matthew West		
Site	: ----		
Quote number	: EN/005/15		
No. of samples received	: 123		
No. of samples analysed	: 49		

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*
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ashesh Patel	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Dian Dao		Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Lana Nguyen	Senior LCMS Chemist	Sydney Organics, Smithfield, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW

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 no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

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.

- EP071: Results of sample SB07_0.5-0.6 have been confirmed by re-extraction and re-analysis
- The trip spike and its control have been analysed for volatile TPH and BTEX only. EP080: The trip spike and control were prepared in the lab using reagent grade sand spiked with petrol. The spike was dispatched from the lab and the control retained.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) 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.
- ED007 and ED008: When Exchangeable Al is reported from these methods, it should be noted that Rayment & Lyons (2011) suggests Exchange Acidity by 1M KCl - Method 15G1 (ED005) is a more suitable method for the determination of exchange acidity (H+ + Al3+).

Analytical Results

Sub-Matrix: ASPHALT (Matrix: SOIL)				Client sample ID	SB07_ASHPALT_0.0_0.3	----	----	----	----
				Client sampling date / time	05-Dec-2016 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1628401-048	--------	--------	--------	--------
					Result	----	----	----	----
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		**1.1**	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		**0.0002**	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		**0.0003**	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		**0.0144**	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		**0.0002**	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		<0.0005	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	----	----	----	----

Analytical Results

Sub-Matrix: ASPHALT (Matrix: SOIL)				Client sample ID	SB07_ASHPALT_0.0_0.3	----	----	----	----
				Client sampling date / time	05-Dec-2016 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1628401-048	--------	--------	--------	--------
					Result	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	----	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg		<0.0005	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	----	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	----	----	----	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		**0.0151**	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		**0.0146**	----	----	----	----
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		**0.0148**	----	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**115**	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	GW05_1.6_1.7	GW05_3.4_3.5	GW04_0.5_0.6	GW04_6.0_6.1	GW03_0.0_0.1
			Client sampling date / time	08-Dec-2016 00:00	08-Dec-2016 00:00	08-Dec-2016 00:00	08-Dec-2016 00:00	07-Dec-2016 00:00
Compound	CAS Number	LOR	Unit	ES1628401-004	ES1628401-006	ES1628401-010	ES1628401-016	ES1628401-017
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	----	5.0	4.7	----	----
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	22.0	19.1	16.2	22.6	9.9
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	----	1.3	----	----
Exchangeable Magnesium	----	0.1	meq/100g	----	----	7.0	----	----
Exchangeable Potassium	----	0.1	meq/100g	----	----	0.2	----	----
Exchangeable Sodium	----	0.1	meq/100g	----	----	6.8	----	----
Cation Exchange Capacity	----	0.1	meq/100g	----	----	15.2	----	----
ED008: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	<0.1	----	----	----
Exchangeable Magnesium	----	0.1	meq/100g	----	<0.1	----	----	----
Exchangeable Potassium	----	0.1	meq/100g	----	<0.1	----	----	----
Exchangeable Sodium	----	0.1	meq/100g	----	<0.1	----	----	----
Cation Exchange Capacity	----	0.1	meq/100g	----	<0.1	----	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	19	20	22	14	16
Copper	7440-50-8	5	mg/kg	54	29	12	42	16
Lead	7439-92-1	5	mg/kg	79	11	11	18	18
Nickel	7440-02-0	2	mg/kg	11	4	4	5	4
Zinc	7440-66-6	5	mg/kg	278	27	8	30	26
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP004: Organic Matter								
Total Organic Carbon	----	0.5	%	----	<0.5	0.7	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	GW05_1.6_1.7	GW05_3.4_3.5	GW04_0.5_0.6	GW04_6.0_6.1	GW03_0.0_0.1
				Client sampling date / time	08-Dec-2016 00:00	08-Dec-2016 00:00	08-Dec-2016 00:00	08-Dec-2016 00:00	07-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1628401-004	ES1628401-006	ES1628401-010	ES1628401-016	ES1628401-017
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	GW05_1.6_1.7	GW05_3.4_3.5	GW04_0.5_0.6	GW04_6.0_6.1	GW03_0.0_0.1
				Client sampling date / time	08-Dec-2016 00:00	08-Dec-2016 00:00	08-Dec-2016 00:00	08-Dec-2016 00:00	07-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1628401-004	ES1628401-006	ES1628401-010	ES1628401-016	ES1628401-017
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ **Total Xylenes**	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		**0.0005**	<0.0002	<0.0002	<0.0002	**0.0147**
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		**0.0003**	<0.0002	<0.0002	<0.0002	**0.0099**
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		**0.0021**	<0.0002	**0.0012**	<0.0002	**0.140**
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	**0.0185**
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		**0.0015**	<0.0002	**0.0007**	<0.0002	**0.676**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	**0.0008**
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	<0.001	<0.001	<0.001	**0.001**
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	**0.0081**
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		**0.0006**	<0.0002	<0.0002	<0.0002	**0.0323**
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	**0.0105**
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		**0.0003**	<0.0002	<0.0002	<0.0002	**0.0243**
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	GW05_1.6_1.7	GW05_3.4_3.5	GW04_0.5_0.6	GW04_6.0_6.1	GW03_0.0_0.1
				Client sampling date / time	08-Dec-2016 00:00	08-Dec-2016 00:00	08-Dec-2016 00:00	08-Dec-2016 00:00	07-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1628401-004	ES1628401-006	ES1628401-010	ES1628401-016	ES1628401-017
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	**0.0005**
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		**0.0053**	<0.0002	**0.0019**	<0.0002	**0.937**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		**0.0036**	<0.0002	**0.0019**	<0.0002	**0.816**
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		**0.0050**	<0.0002	**0.0019**	<0.0002	**0.907**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**75.2**	**73.8**	**83.2**	**73.4**	**77.3**
2-Chlorophenol-D4	93951-73-6	0.5	%		**82.9**	**83.6**	**81.9**	**83.7**	**87.9**
2.4.6-Tribromophenol	118-79-6	0.5	%		**85.7**	**78.1**	**76.1**	**71.6**	**89.3**
EP075(SIM)T: PAH Surrogates									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	GW05_1.6_1.7	GW05_3.4_3.5	GW04_0.5_0.6	GW04_6.0_6.1	GW03_0.0_0.1
				Client sampling date / time	08-Dec-2016 00:00	08-Dec-2016 00:00	08-Dec-2016 00:00	08-Dec-2016 00:00	07-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1628401-004	ES1628401-006	ES1628401-010	ES1628401-016	ES1628401-017
					Result	Result	Result	Result	Result
EP075(SIM)T: PAH Surrogates - Continued									
2-Fluorobiphenyl	321-60-8	0.5	%		90.6	94.0	93.3	94.9	96.7
Anthracene-d10	1719-06-8	0.5	%		100	107	101	107	107
4-Terphenyl-d14	1718-51-0	0.5	%		82.2	86.2	84.0	86.3	90.9
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		94.8	125	123	123	106
Toluene-D8	2037-26-5	0.2	%		108	119	118	114	116
4-Bromofluorobenzene	460-00-4	0.2	%		102	117	120	120	99.0
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		111	85.5	83.5	82.8	103

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	GW03_5.0_5.1	GW02_0.5_0.6	GW02_5.0_5.1	GW02_6.0_6.1	GW01_0.0_0.2
			Client sampling date / time	07-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00
Compound	CAS Number	LOR	Unit	ES1628401-023	ES1628401-026	ES1628401-031	ES1628401-032	ES1628401-033
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	4.7	4.5	----	----	----
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	17.6	22.8	23.1	18.0	9.3
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	0.8	0.4	----	----	----
Exchangeable Magnesium	----	0.1	meq/100g	3.6	9.1	----	----	----
Exchangeable Potassium	----	0.1	meq/100g	<0.1	0.3	----	----	----
Exchangeable Sodium	----	0.1	meq/100g	2.5	10.6	----	----	----
Cation Exchange Capacity	----	0.1	meq/100g	6.9	20.4	----	----	----
ED008: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	----	----	----	----
Exchangeable Magnesium	----	0.1	meq/100g	----	----	----	----	----
Exchangeable Potassium	----	0.1	meq/100g	----	----	----	----	----
Exchangeable Sodium	----	0.1	meq/100g	----	----	----	----	----
Cation Exchange Capacity	----	0.1	meq/100g	----	----	----	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	----	----	----	<5
Cadmium	7440-43-9	1	mg/kg	<1	----	----	----	<1
Chromium	7440-47-3	2	mg/kg	16	----	----	----	15
Copper	7440-50-8	5	mg/kg	16	----	----	----	16
Lead	7439-92-1	5	mg/kg	9	----	----	----	16
Nickel	7440-02-0	2	mg/kg	4	----	----	----	3
Zinc	7440-66-6	5	mg/kg	18	----	----	----	20
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	----	----	<0.1
EP004: Organic Matter								
Total Organic Carbon	----	0.5	%	<0.5	0.8	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	GW03_5.0_5.1	GW02_0.5_0.6	GW02_5.0_5.1	GW02_6.0_6.1	GW01_0.0_0.2
				Client sampling date / time	07-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1628401-023	ES1628401-026	ES1628401-031	ES1628401-032	ES1628401-033
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	----	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	----	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	----	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	----	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	----	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	----	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	----	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	----	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	----	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	----	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	----	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	----	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	----	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	----	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	----	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	----	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	----	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	----	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	----	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	----	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	----	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	----	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	----	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	----	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	----	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	----	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	----	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	----	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	----	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	----	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	GW03_5.0_5.1	GW02_0.5_0.6	GW02_5.0_5.1	GW02_6.0_6.1	GW01_0.0_0.2
				Client sampling date / time	07-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1628401-023	ES1628401-026	ES1628401-031	ES1628401-032	ES1628401-033
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	----	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	----	<0.2	<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	----	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	----	<1	<1
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		**0.0002**	**0.0024**	<0.0002	----	**0.0015**
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		<0.0002	**0.0014**	<0.0002	----	**0.0010**
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		**0.0005**	**0.0340**	**0.0008**	----	**0.0154**
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		<0.0002	**0.0007**	<0.0002	----	**0.0015**
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		<0.0002	**0.0263**	**0.0012**	----	**0.0193**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	----	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	<0.001	<0.001	----	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0002	**0.0006**	<0.0002	----	**0.0030**
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		**0.0003**	**0.0028**	<0.0002	----	**0.0042**
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	**0.0002**	<0.0002	----	**0.0014**
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		<0.0002	**0.0004**	<0.0002	----	**0.0018**
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	----	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	----	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	----	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	----	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	----	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	<0.0005
EP231C: Perfluoroalkyl Sulfonamides									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	GW03_5.0_5.1	GW02_0.5_0.6	GW02_5.0_5.1	GW02_6.0_6.1	GW01_0.0_0.2
				Client sampling date / time	07-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1628401-023	ES1628401-026	ES1628401-031	ES1628401-032	ES1628401-033
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	----	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	----	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	----	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	<0.0005
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		**0.0010**	**0.0688**	**0.0020**	----	**0.0491**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		**0.0005**	**0.0603**	**0.0020**	----	**0.0347**
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		**0.0010**	**0.0667**	**0.0020**	----	**0.0466**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**81.6**	**80.5**	----	**78.0**	**79.3**
2-Chlorophenol-D4	93951-73-6	0.5	%		**72.4**	**72.0**	----	**73.6**	**84.6**
2.4.6-Tribromophenol	118-79-6	0.5	%		**76.2**	**83.1**	----	**73.0**	**101**
EP075(SIM)T: PAH Surrogates									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	GW03_5.0_5.1	GW02_0.5_0.6	GW02_5.0_5.1	GW02_6.0_6.1	GW01_0.0_0.2
				Client sampling date / time	07-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1628401-023	ES1628401-026	ES1628401-031	ES1628401-032	ES1628401-033
					Result	Result	Result	Result	Result
EP075(SIM)T: PAH Surrogates - Continued									
2-Fluorobiphenyl	321-60-8	0.5	%		106	91.0	----	87.7	108
Anthracene-d10	1719-06-8	0.5	%		102	97.6	----	113	113
4-Terphenyl-d14	1718-51-0	0.5	%		96.7	82.5	----	84.0	90.1
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		111	105	----	118	113
Toluene-D8	2037-26-5	0.2	%		119	115	----	112	120
4-Bromofluorobenzene	460-00-4	0.2	%		124	114	----	104	123
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		72.1	89.7	78.8	----	98.4

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	GW01_0.5_0.6	GW01_4.0_4.1	SB06_0.5_0.6	SB06_2.0_2.1	SB06_5.0_5.1
			Client sampling date / time	06-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00
Compound	CAS Number	LOR	Unit	ES1628401-034	ES1628401-038	ES1628401-041	ES1628401-043	ES1628401-046
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	----	----	----	5.1	----
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	25.3	21.1	18.9	20.7	18.1
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	----	----	0.2	----
Exchangeable Magnesium	----	0.1	meq/100g	----	----	----	5.3	----
Exchangeable Potassium	----	0.1	meq/100g	----	----	----	0.1	----
Exchangeable Sodium	----	0.1	meq/100g	----	----	----	1.2	----
Cation Exchange Capacity	----	0.1	meq/100g	----	----	----	15.1	----
ED008: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	----	----	----	----
Exchangeable Magnesium	----	0.1	meq/100g	----	----	----	----	----
Exchangeable Potassium	----	0.1	meq/100g	----	----	----	----	----
Exchangeable Sodium	----	0.1	meq/100g	----	----	----	----	----
Cation Exchange Capacity	----	0.1	meq/100g	----	----	----	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	----	<5	<5	----
Cadmium	7440-43-9	1	mg/kg	<1	----	<1	<1	----
Chromium	7440-47-3	2	mg/kg	39	----	22	26	----
Copper	7440-50-8	5	mg/kg	18	----	26	33	----
Lead	7439-92-1	5	mg/kg	16	----	15	15	----
Nickel	7440-02-0	2	mg/kg	6	----	6	3	----
Zinc	7440-66-6	5	mg/kg	9	----	17	19	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	<0.1	<0.1	----
EP004: Organic Matter								
Total Organic Carbon	----	0.5	%	----	----	----	0.8	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	----	<0.5	<0.5	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	----	<0.5	<0.5	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	----	<0.5	<0.5	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	----	<0.5	<0.5	----
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	----	<0.5	<0.5	----
Anthracene	120-12-7	0.5	mg/kg	<0.5	----	<0.5	<0.5	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	GW01_0.5_0.6	GW01_4.0_4.1	SB06_0.5_0.6	SB06_2.0_2.1	SB06_5.0_5.1
				Client sampling date / time	06-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1628401-034	ES1628401-038	ES1628401-041	ES1628401-043	ES1628401-046
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	----	<0.5	<0.5	----
Pyrene	129-00-0	0.5	mg/kg		<0.5	----	<0.5	<0.5	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	----	<0.5	<0.5	----
Chrysene	218-01-9	0.5	mg/kg		<0.5	----	<0.5	<0.5	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	----	<0.5	<0.5	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	----	<0.5	<0.5	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	----	<0.5	<0.5	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	----	<0.5	<0.5	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	----	<0.5	<0.5	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	----	<0.5	<0.5	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	----	<0.5	<0.5	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	----	<0.5	<0.5	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	----	**0.6**	**0.6**	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	----	**1.2**	**1.2**	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	----	<10	<10	----
C10 - C14 Fraction	----	50	mg/kg		<50	----	<50	<50	----
C15 - C28 Fraction	----	100	mg/kg		<100	----	<100	<100	----
C29 - C36 Fraction	----	100	mg/kg		<100	----	<100	<100	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	----	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	<10	<10	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	----	<10	<10	----
>C10 - C16 Fraction	----	50	mg/kg		<50	----	<50	<50	----
>C16 - C34 Fraction	----	100	mg/kg		<100	----	<100	<100	----
>C34 - C40 Fraction	----	100	mg/kg		<100	----	<100	<100	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	----	<50	<50	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	----	<50	<50	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	----	<0.2	<0.2	----
Toluene	108-88-3	0.5	mg/kg		<0.5	----	<0.5	<0.5	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	----	<0.5	<0.5	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	----	<0.5	<0.5	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	GW01_0.5_0.6	GW01_4.0_4.1	SB06_0.5_0.6	SB06_2.0_2.1	SB06_5.0_5.1
				Client sampling date / time	06-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1628401-034	ES1628401-038	ES1628401-041	ES1628401-043	ES1628401-046
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	----	<0.5	<0.5	----
^ Sum of BTEX	----	0.2	mg/kg		<0.2	----	<0.2	<0.2	----
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	----	<0.5	<0.5	----
Naphthalene	91-20-3	1	mg/kg		<1	----	<1	<1	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		----	<0.0002	**0.0055**	----	**0.0153**
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		----	<0.0002	**0.0070**	----	**0.0102**
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		----	<0.0002	**0.164**	----	**0.0733**
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		----	<0.0002	**0.0506**	----	**0.0032**
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		----	<0.0002	**3.57**	----	**0.0226**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		----	<0.0002	**0.0036**	----	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		----	<0.001	<0.001	----	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		----	<0.0002	**0.0036**	----	**0.0038**
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		----	<0.0002	**0.0163**	----	**0.0193**
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		----	<0.0002	**0.0086**	----	**0.0043**
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		----	<0.0002	**0.0599**	----	**0.0054**
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		----	<0.0002	<0.0005	----	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		----	<0.0002	<0.0005	----	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		----	<0.0002	<0.0005	----	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		----	<0.0002	<0.0005	----	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		----	<0.0002	<0.0005	----	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		----	<0.0005	<0.0012	----	<0.0005
EP231C: Perfluoroalkyl Sulfonamides									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	GW01_0.5_0.6	GW01_4.0_4.1	SB06_0.5_0.6	SB06_2.0_2.1	SB06_5.0_5.1
				Client sampling date / time	06-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1628401-034	ES1628401-038	ES1628401-041	ES1628401-043	ES1628401-046
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		----	<0.0002	**0.0018**	----	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		----	<0.0005	<0.0012	----	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		----	<0.0005	<0.0012	----	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg		----	<0.0005	<0.0012	----	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		----	<0.0005	<0.0012	----	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		----	<0.0002	<0.0005	----	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		----	<0.0002	<0.0005	----	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		----	<0.0005	<0.0005	----	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		----	<0.0005	<0.0005	----	**0.0043**
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		----	<0.0005	<0.0005	----	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		----	<0.0005	<0.0005	----	<0.0005
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		----	<0.0002	**3.89**	----	**0.162**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		----	<0.0002	**3.73**	----	**0.0959**
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		----	<0.0002	**3.83**	----	**0.148**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**75.7**	----	**77.8**	**87.9**	----
2-Chlorophenol-D4	93951-73-6	0.5	%		**83.3**	----	**85.6**	**79.7**	----
2.4.6-Tribromophenol	118-79-6	0.5	%		**87.7**	----	**101**	**77.0**	----
EP075(SIM)T: PAH Surrogates									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	GW01_0.5_0.6	GW01_4.0_4.1	SB06_0.5_0.6	SB06_2.0_2.1	SB06_5.0_5.1
				Client sampling date / time	06-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1628401-034	ES1628401-038	ES1628401-041	ES1628401-043	ES1628401-046
					Result	Result	Result	Result	Result
EP075(SIM)T: PAH Surrogates - Continued									
2-Fluorobiphenyl	321-60-8	0.5	%		89.5	----	96.9	86.2	----
Anthracene-d10	1719-06-8	0.5	%		100	----	107	102	----
4-Terphenyl-d14	1718-51-0	0.5	%		97.8	----	84.2	93.4	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		115	----	123	115	----
Toluene-D8	2037-26-5	0.2	%		113	----	120	109	----
4-Bromofluorobenzene	460-00-4	0.2	%		112	----	120	110	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		----	80.0	106	----	74.3

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	SB07_0.5_0.6	SB07_3.0_3.1	SB08_0.0_0.15	SB08_0.5_0.6	SB08_2.0_2.1
			Client sampling date / time	05-Dec-2016 00:00	05-Dec-2016 00:00	05-Dec-2016 00:00	05-Dec-2016 00:00	05-Dec-2016 00:00
Compound	CAS Number	LOR	Unit	ES1628401-050	ES1628401-053	ES1628401-057	ES1628401-058	ES1628401-060
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	----	5.6	----	----	5.2
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	8.4	20.0	9.7	15.0	21.1
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	<0.1	----	----	0.2
Exchangeable Magnesium	----	0.1	meq/100g	----	10.7	----	----	7.2
Exchangeable Potassium	----	0.1	meq/100g	----	0.2	----	----	0.2
Exchangeable Sodium	----	0.1	meq/100g	----	5.0	----	----	4.3
Cation Exchange Capacity	----	0.1	meq/100g	----	16.5	----	----	11.9
ED008: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	----	----	----	----
Exchangeable Magnesium	----	0.1	meq/100g	----	----	----	----	----
Exchangeable Potassium	----	0.1	meq/100g	----	----	----	----	----
Exchangeable Sodium	----	0.1	meq/100g	----	----	----	----	----
Cation Exchange Capacity	----	0.1	meq/100g	----	----	----	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	----	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	----	<1
Chromium	7440-47-3	2	mg/kg	<2	12	17	----	20
Copper	7440-50-8	5	mg/kg	143	14	30	----	29
Lead	7439-92-1	5	mg/kg	<5	13	12	----	14
Nickel	7440-02-0	2	mg/kg	5	3	7	----	3
Zinc	7440-66-6	5	mg/kg	37	12	17	----	13
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	0.3	<0.1	----	<0.1
EP004: Organic Matter								
Total Organic Carbon	----	0.5	%	----	<0.5	----	----	<0.5
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	----	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	----	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	----	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	----	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	----	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	----	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB07_0.5_0.6	SB07_3.0_3.1	SB08_0.0_0.15	SB08_0.5_0.6	SB08_2.0_2.1
				Client sampling date / time	05-Dec-2016 00:00	05-Dec-2016 00:00	05-Dec-2016 00:00	05-Dec-2016 00:00	05-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1628401-050	ES1628401-053	ES1628401-057	ES1628401-058	ES1628401-060
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	----	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	----	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	----	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	----	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	----	<100
C29 - C36 Fraction	----	100	mg/kg		**260**	<100	<100	----	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		**260**	<50	<50	----	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	----	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	----	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	----	<50
>C16 - C34 Fraction	----	100	mg/kg		**160**	<100	<100	----	<100
>C34 - C40 Fraction	----	100	mg/kg		**360**	<100	<100	----	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		**520**	<50	<50	----	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	----	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	----	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB07_0.5_0.6	SB07_3.0_3.1	SB08_0.0_0.15	SB08_0.5_0.6	SB08_2.0_2.1
				Client sampling date / time	05-Dec-2016 00:00	05-Dec-2016 00:00	05-Dec-2016 00:00	05-Dec-2016 00:00	05-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1628401-050	ES1628401-053	ES1628401-057	ES1628401-058	ES1628401-060
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	----	<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	----	<1
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		<0.0002	<0.0002	----	**0.0005**	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		<0.0002	<0.0002	----	**0.0013**	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		<0.0002	**0.0005**	----	**0.0137**	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		<0.0002	<0.0002	----	**0.0046**	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		**0.0035**	**0.0032**	----	**0.124**	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	<0.0002	----	<0.0002	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	<0.001	----	<0.001	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0002	<0.0002	----	**0.0010**	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		<0.0002	**0.0003**	----	**0.0040**	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	<0.0002	----	**0.0005**	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		<0.0002	<0.0002	----	**0.0019**	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0002	<0.0002	----	<0.0002	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0002	<0.0002	----	<0.0002	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		<0.0002	<0.0002	----	<0.0002	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		<0.0002	<0.0002	----	<0.0002	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		<0.0002	<0.0002	----	<0.0002	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		<0.0005	<0.0005	----	<0.0005	----
EP231C: Perfluoroalkyl Sulfonamides									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB07_0.5_0.6	SB07_3.0_3.1	SB08_0.0_0.15	SB08_0.5_0.6	SB08_2.0_2.1
				Client sampling date / time	05-Dec-2016 00:00	05-Dec-2016 00:00	05-Dec-2016 00:00	05-Dec-2016 00:00	05-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1628401-050	ES1628401-053	ES1628401-057	ES1628401-058	ES1628401-060
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	<0.0002	----	<0.0002	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	----	<0.0005	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	----	<0.0005	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg		<0.0005	<0.0005	----	<0.0005	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	----	<0.0005	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	----	<0.0002	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	----	<0.0002	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	----	<0.0005	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		**0.0015**	<0.0005	----	<0.0005	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	----	<0.0005	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	----	<0.0005	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		**0.0050**	**0.0040**	----	**0.152**	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		**0.0035**	**0.0037**	----	**0.138**	----
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		**0.0050**	**0.0040**	----	**0.146**	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**85.6**	**92.6**	**91.0**	----	**87.2**
2-Chlorophenol-D4	93951-73-6	0.5	%		**87.5**	**83.5**	**90.6**	----	**90.4**
2.4.6-Tribromophenol	118-79-6	0.5	%		**87.0**	**78.9**	**82.4**	----	**87.8**
EP075(SIM)T: PAH Surrogates									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB07_0.5_0.6	SB07_3.0_3.1	SB08_0.0_0.15	SB08_0.5_0.6	SB08_2.0_2.1
				Client sampling date / time	05-Dec-2016 00:00	05-Dec-2016 00:00	05-Dec-2016 00:00	05-Dec-2016 00:00	05-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1628401-050	ES1628401-053	ES1628401-057	ES1628401-058	ES1628401-060
					Result	Result	Result	Result	Result
EP075(SIM)T: PAH Surrogates - Continued									
2-Fluorobiphenyl	321-60-8	0.5	%		97.2	90.7	91.5	----	91.4
Anthracene-d10	1719-06-8	0.5	%		105	95.5	107	----	96.6
4-Terphenyl-d14	1718-51-0	0.5	%		87.5	84.8	85.2	----	80.4
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		109	121	124	----	119
Toluene-D8	2037-26-5	0.2	%		107	112	119	----	109
4-Bromofluorobenzene	460-00-4	0.2	%		89.7	106	124	----	110
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		98.5	94.7	----	97.7	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	SB08_5.0_5.1	SB09_0.0_0.1	SB09_0.5_0.6	SB09_4.0_4.1	SB10_0.0_0.1
			Client sampling date / time	05-Dec-2016 00:00	05-Dec-2016 00:00	05-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00
Compound	CAS Number	LOR	Unit	ES1628401-063	ES1628401-065	ES1628401-066	ES1628401-070	ES1628401-073
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	----	----	5.0	----	----
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	17.8	19.9	29.0	20.8	11.0
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	----	<0.1	----	----
Exchangeable Magnesium	----	0.1	meq/100g	----	----	11.2	----	----
Exchangeable Potassium	----	0.1	meq/100g	----	----	0.2	----	----
Exchangeable Sodium	----	0.1	meq/100g	----	----	8.9	----	----
Cation Exchange Capacity	----	0.1	meq/100g	----	----	20.4	----	----
ED008: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	----	----	----	----
Exchangeable Magnesium	----	0.1	meq/100g	----	----	----	----	----
Exchangeable Potassium	----	0.1	meq/100g	----	----	----	----	----
Exchangeable Sodium	----	0.1	meq/100g	----	----	----	----	----
Cation Exchange Capacity	----	0.1	meq/100g	----	----	----	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	----	----	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	----	----	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	----	----	15	16	11
Copper	7440-50-8	5	mg/kg	----	----	12	13	6
Lead	7439-92-1	5	mg/kg	----	----	10	12	11
Nickel	7440-02-0	2	mg/kg	----	----	4	2	2
Zinc	7440-66-6	5	mg/kg	----	----	6	10	<5
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	----	<0.1	<0.1	<0.1
EP004: Organic Matter								
Total Organic Carbon	----	0.5	%	----	----	2.1	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	----	----	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	----	----	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB08_5.0_5.1	SB09_0.0_0.1	SB09_0.5_0.6	SB09_4.0_4.1	SB10_0.0_0.1
				Client sampling date / time	05-Dec-2016 00:00	05-Dec-2016 00:00	05-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1628401-063	ES1628401-065	ES1628401-066	ES1628401-070	ES1628401-073
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Fluoranthene	206-44-0	0.5	mg/kg		----	----	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		----	----	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		----	----	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		----	----	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		----	----	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		----	----	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		----	----	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		----	----	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		----	----	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		----	----	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		----	----	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		----	----	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		----	----	**0.6**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		----	----	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		----	----	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		----	----	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		----	----	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		----	----	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		----	----	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		----	----	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		----	----	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		----	----	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		----	----	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		----	----	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		----	----	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		----	----	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		----	----	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		----	----	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		----	----	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		----	----	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB08_5.0_5.1	SB09_0.0_0.1	SB09_0.5_0.6	SB09_4.0_4.1	SB10_0.0_0.1
				Client sampling date / time	05-Dec-2016 00:00	05-Dec-2016 00:00	05-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1628401-063	ES1628401-065	ES1628401-066	ES1628401-070	ES1628401-073
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
ortho-Xylene	95-47-6	0.5	mg/kg		----	----	<0.5	<0.5	<0.5
^ **Sum of BTEX**	----	0.2	mg/kg		----	----	<0.2	<0.2	<0.2
^ **Total Xylenes**	1330-20-7	0.5	mg/kg		----	----	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		----	----	<1	<1	<1
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		**0.0020**	**0.0172**	----	**0.0056**	**0.0004**
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		**0.0027**	**0.0431**	----	**0.0091**	**0.0027**
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		**0.0103**	**0.143**	----	**0.0444**	**0.0496**
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		**0.0003**	**0.104**	----	**0.0033**	**0.0079**
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		<0.0002	**4.07**	----	**0.0459**	**0.0967**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	**0.0218**	----	<0.0002	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	**0.012**	----	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		**0.0012**	**0.0231**	----	**0.0044**	**0.0075**
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		**0.0063**	**0.127**	----	**0.0299**	**0.0169**
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		**0.0005**	**0.0136**	----	**0.0028**	**0.0039**
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		**0.0008**	**0.0671**	----	**0.0049**	**0.0097**
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0002	<0.0002	----	<0.0002	**0.0002**
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0002	**0.0015**	----	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		<0.0002	**0.0004**	----	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		<0.0002	<0.0002	----	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		<0.0002	<0.0002	----	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		<0.0005	<0.0005	----	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB08_5.0_5.1	SB09_0.0_0.1	SB09_0.5_0.6	SB09_4.0_4.1	SB10_0.0_0.1
				Client sampling date / time	05-Dec-2016 00:00	05-Dec-2016 00:00	05-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1628401-063	ES1628401-065	ES1628401-066	ES1628401-070	ES1628401-073
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	**0.0068**	----	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	----	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	----	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg		<0.0005	<0.0005	----	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	----	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	**0.0005**	----	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	**0.0004**	----	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	----	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	**0.0175**	----	**0.0013**	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	**0.0028**	----	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	**0.0008**	----	<0.0005	<0.0005
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		**0.0241**	**4.67**	----	**0.152**	**0.196**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		**0.0103**	**4.21**	----	**0.0903**	**0.146**
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		**0.0211**	**4.49**	----	**0.139**	**0.185**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		----	----	**86.2**	**87.4**	**87.9**
2-Chlorophenol-D4	93951-73-6	0.5	%		----	----	**82.9**	**78.9**	**84.4**
2.4.6-Tribromophenol	118-79-6	0.5	%		----	----	**93.7**	**83.5**	**86.5**
EP075(SIM)T: PAH Surrogates									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB08_5.0_5.1	SB09_0.0_0.1	SB09_0.5_0.6	SB09_4.0_4.1	SB10_0.0_0.1
				Client sampling date / time	05-Dec-2016 00:00	05-Dec-2016 00:00	05-Dec-2016 00:00	06-Dec-2016 00:00	06-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1628401-063	ES1628401-065	ES1628401-066	ES1628401-070	ES1628401-073
					Result	Result	Result	Result	Result
EP075(SIM)T: PAH Surrogates - Continued									
2-Fluorobiphenyl	321-60-8	0.5	%		----	----	91.3	91.3	93.7
Anthracene-d10	1719-06-8	0.5	%		----	----	102	96.8	103
4-Terphenyl-d14	1718-51-0	0.5	%		----	----	81.9	81.1	82.2
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		----	----	121	124	124
Toluene-D8	2037-26-5	0.2	%		----	----	104	107	116
4-Bromofluorobenzene	460-00-4	0.2	%		----	----	106	104	110
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		116	93.9	----	105	93.3

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	SB10_2.3_2.5	SB11_0.5_0.6	SB11_1.0_1.1	SB11_5.4-5.5	SB12_0.0_0.1
			Client sampling date / time	06-Dec-2016 00:00	07-Dec-2016 00:00	07-Dec-2016 00:00	06-Dec-2016 00:00	07-Dec-2016 00:00
Compound	CAS Number	LOR	Unit	ES1628401-077	ES1628401-082	ES1628401-083	ES1628401-085	ES1628401-086
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	5.4	----	5.0	----	----
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	10.7	12.8	13.5	14.8	12.6
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	4.1	----	<0.1	----	----
Exchangeable Magnesium	----	0.1	meq/100g	8.8	----	2.1	----	----
Exchangeable Potassium	----	0.1	meq/100g	0.5	----	<0.1	----	----
Exchangeable Sodium	----	0.1	meq/100g	1.2	----	1.0	----	----
Cation Exchange Capacity	----	0.1	meq/100g	14.5	----	3.1	----	----
ED008: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	----	----	----	----
Exchangeable Magnesium	----	0.1	meq/100g	----	----	----	----	----
Exchangeable Potassium	----	0.1	meq/100g	----	----	----	----	----
Exchangeable Sodium	----	0.1	meq/100g	----	----	----	----	----
Cation Exchange Capacity	----	0.1	meq/100g	----	----	----	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	6	<5	<5	----	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	----	<1
Chromium	7440-47-3	2	mg/kg	15	21	28	----	24
Copper	7440-50-8	5	mg/kg	15	6	9	----	12
Lead	7439-92-1	5	mg/kg	8	10	19	----	13
Nickel	7440-02-0	2	mg/kg	2	4	4	----	6
Zinc	7440-66-6	5	mg/kg	10	<5	23	----	9
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	----	<0.1
EP004: Organic Matter								
Total Organic Carbon	----	0.5	%	<0.5	----	<0.5	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	----	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	----	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	----	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	----	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	----	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	----	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB10_2.3_2.5	SB11_0.5_0.6	SB11_1.0_1.1	SB11_5.4-5.5	SB12_0.0_0.1
				Client sampling date / time	06-Dec-2016 00:00	07-Dec-2016 00:00	07-Dec-2016 00:00	06-Dec-2016 00:00	07-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1628401-077	ES1628401-082	ES1628401-083	ES1628401-085	ES1628401-086
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	----	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	----	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	----	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	----	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	----	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	----	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	----	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	----	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	----	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	----	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	----	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	----	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	----	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	----	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	----	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB10_2.3_2.5	SB11_0.5_0.6	SB11_1.0_1.1	SB11_5.4-5.5	SB12_0.0_0.1
				Client sampling date / time	06-Dec-2016 00:00	07-Dec-2016 00:00	07-Dec-2016 00:00	06-Dec-2016 00:00	07-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1628401-077	ES1628401-082	ES1628401-083	ES1628401-085	ES1628401-086
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	----	<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	----	<1
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		<0.0002	----	<0.0002	<0.0002	**0.0032**
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		<0.0002	----	<0.0002	<0.0002	**0.0036**
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		**0.0006**	----	<0.0002	<0.0002	**0.0111**
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		<0.0002	----	<0.0002	<0.0002	**0.0005**
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		**0.0007**	----	<0.0002	<0.0002	**0.0052**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	----	<0.0002	<0.0002	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	----	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0002	----	<0.0002	<0.0002	**0.0021**
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		**0.0002**	----	<0.0002	<0.0002	**0.0071**
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	----	<0.0002	<0.0002	**0.0006**
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		<0.0002	----	<0.0002	<0.0002	**0.0004**
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0002	----	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0002	----	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		<0.0002	----	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		<0.0002	----	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		<0.0002	----	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		<0.0005	----	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB10_2.3_2.5	SB11_0.5_0.6	SB11_1.0_1.1	SB11_5.4-5.5	SB12_0.0_0.1
				Client sampling date / time	06-Dec-2016 00:00	07-Dec-2016 00:00	07-Dec-2016 00:00	06-Dec-2016 00:00	07-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1628401-077	ES1628401-082	ES1628401-083	ES1628401-085	ES1628401-086
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	----	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	----	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	----	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg		<0.0005	----	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	----	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	----	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	----	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	----	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	----	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	----	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	----	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		**0.0015**	----	<0.0002	<0.0002	**0.0338**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		**0.0013**	----	<0.0002	<0.0002	**0.0163**
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		**0.0015**	----	<0.0002	<0.0002	**0.0297**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**89.5**	**73.2**	**84.0**	----	**98.7**
2-Chlorophenol-D4	93951-73-6	0.5	%		**81.6**	**100**	**103**	----	**103**
2.4.6-Tribromophenol	118-79-6	0.5	%		**79.4**	**112**	**124**	----	**124**
EP075(SIM)T: PAH Surrogates									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB10_2.3_2.5	SB11_0.5_0.6	SB11_1.0_1.1	SB11_5.4-5.5	SB12_0.0_0.1
				Client sampling date / time	06-Dec-2016 00:00	07-Dec-2016 00:00	07-Dec-2016 00:00	06-Dec-2016 00:00	07-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1628401-077	ES1628401-082	ES1628401-083	ES1628401-085	ES1628401-086
					Result	Result	Result	Result	Result
EP075(SIM)T: PAH Surrogates - Continued									
2-Fluorobiphenyl	321-60-8	0.5	%		91.7	113	110	----	114
Anthracene-d10	1719-06-8	0.5	%		102	120	117	----	118
4-Terphenyl-d14	1718-51-0	0.5	%		84.2	100	87.4	----	104
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		122	129	112	----	110
Toluene-D8	2037-26-5	0.2	%		116	117	95.4	----	91.7
4-Bromofluorobenzene	460-00-4	0.2	%		113	110	90.1	----	88.7
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		91.9	----	96.3	116	82.3

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	SB12_0.5_0.6	SB12_5.6_5.7	SB13_0.5_0.6	SB13_2.0_2.1	SB14_0.5_0.6
			Client sampling date / time	07-Dec-2016 00:00	07-Dec-2016 00:00	07-Dec-2016 00:00	07-Dec-2016 00:00	08-Dec-2016 00:00
Compound	CAS Number	LOR	Unit	ES1628401-087	ES1628401-091	ES1628401-093	ES1628401-095	ES1628401-099
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	4.5	----	----	5.4	4.9
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	15.0	14.7	11.0	10.4	14.0
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	<0.1	----	----	<0.1	<0.1
Exchangeable Magnesium	----	0.1	meq/100g	5.0	----	----	4.8	4.6
Exchangeable Potassium	----	0.1	meq/100g	<0.1	----	----	<0.1	<0.1
Exchangeable Sodium	----	0.1	meq/100g	1.0	----	----	2.5	1.1
Cation Exchange Capacity	----	0.1	meq/100g	6.2	----	----	7.5	5.8
ED008: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	----	----	----	----
Exchangeable Magnesium	----	0.1	meq/100g	----	----	----	----	----
Exchangeable Potassium	----	0.1	meq/100g	----	----	----	----	----
Exchangeable Sodium	----	0.1	meq/100g	----	----	----	----	----
Cation Exchange Capacity	----	0.1	meq/100g	----	----	----	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	9	----	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	----	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	35	----	13	7	27
Copper	7440-50-8	5	mg/kg	11	----	10	7	15
Lead	7439-92-1	5	mg/kg	20	----	10	<5	19
Nickel	7440-02-0	2	mg/kg	4	----	2	<2	9
Zinc	7440-66-6	5	mg/kg	5	----	7	<5	9
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	<0.1	<0.1	<0.1
EP004: Organic Matter								
Total Organic Carbon	----	0.5	%	0.8	----	----	<0.5	2.7
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB12_0.5_0.6	SB12_5.6_5.7	SB13_0.5_0.6	SB13_2.0_2.1	SB14_0.5_0.6
				Client sampling date / time	07-Dec-2016 00:00	07-Dec-2016 00:00	07-Dec-2016 00:00	07-Dec-2016 00:00	08-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1628401-087	ES1628401-091	ES1628401-093	ES1628401-095	ES1628401-099
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	----	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	----	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	----	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	----	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	----	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	----	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	----	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	----	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	----	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	----	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	----	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	----	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	----	**0.6**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	----	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	----	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	----	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	----	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	----	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	----	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	----	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	----	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	----	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	----	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	----	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	----	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	----	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	----	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	----	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	----	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB12_0.5_0.6	SB12_5.6_5.7	SB13_0.5_0.6	SB13_2.0_2.1	SB14_0.5_0.6
				Client sampling date / time	07-Dec-2016 00:00	07-Dec-2016 00:00	07-Dec-2016 00:00	07-Dec-2016 00:00	08-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1628401-087	ES1628401-091	ES1628401-093	ES1628401-095	ES1628401-099
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	----	<0.5	<0.5	<0.5
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	----	<0.2	<0.2	<0.2
^ **Total Xylenes**	1330-20-7	0.5	mg/kg		<0.5	----	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	----	<1	<1	<1
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		----	<0.0002	<0.0002	<0.0002	**0.0005**
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		----	<0.0002	<0.0002	<0.0002	**0.0016**
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		----	<0.0002	**0.0002**	<0.0002	**0.0103**
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		----	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		----	<0.0002	**0.0066**	<0.0002	**0.0020**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		----	<0.0002	<0.0002	<0.0002	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		----	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		----	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		----	<0.0002	<0.0002	<0.0002	**0.0003**
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		----	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		----	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		----	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		----	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		----	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		----	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		----	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		----	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB12_0.5_0.6	SB12_5.6_5.7	SB13_0.5_0.6	SB13_2.0_2.1	SB14_0.5_0.6
				Client sampling date / time	07-Dec-2016 00:00	07-Dec-2016 00:00	07-Dec-2016 00:00	07-Dec-2016 00:00	08-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1628401-087	ES1628401-091	ES1628401-093	ES1628401-095	ES1628401-099
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		----	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		----	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		----	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg		----	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		----	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		----	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		----	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		----	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		----	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		----	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		----	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		----	<0.0002	**0.0068**	<0.0002	**0.0147**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		----	<0.0002	**0.0068**	<0.0002	**0.0123**
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		----	<0.0002	**0.0068**	<0.0002	**0.0131**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**91.3**	----	**90.6**	**89.6**	**97.8**
2-Chlorophenol-D4	93951-73-6	0.5	%		**102**	----	**103**	**105**	**109**
2.4.6-Tribromophenol	118-79-6	0.5	%		**120**	----	**124**	**118**	**119**
EP075(SIM)T: PAH Surrogates									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB12_0.5_0.6	SB12_5.6_5.7	SB13_0.5_0.6	SB13_2.0_2.1	SB14_0.5_0.6
				Client sampling date / time	07-Dec-2016 00:00	07-Dec-2016 00:00	07-Dec-2016 00:00	07-Dec-2016 00:00	08-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1628401-087	ES1628401-091	ES1628401-093	ES1628401-095	ES1628401-099
					Result	Result	Result	Result	Result
EP075(SIM)T: PAH Surrogates - Continued									
2-Fluorobiphenyl	321-60-8	0.5	%		108	----	113	112	119
Anthracene-d10	1719-06-8	0.5	%		125	----	125	119	120
4-Terphenyl-d14	1718-51-0	0.5	%		108	----	110	106	113
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		121	----	128	128	128
Toluene-D8	2037-26-5	0.2	%		109	----	114	111	116
4-Bromofluorobenzene	460-00-4	0.2	%		99.7	----	102	105	104
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		----	84.5	102	99.1	105

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	SB14_2.0_2.1	SB14_3.0_3.1	SB15_0.5_0.6	SB15_1.0_1.1	SB15_2.0_2.1
			Client sampling date / time	08-Dec-2016 00:00	08-Dec-2016 00:00	08-Dec-2016 00:00	08-Dec-2016 00:00	08-Dec-2016 00:00
Compound	CAS Number	LOR	Unit	ES1628401-101	ES1628401-102	ES1628401-106	ES1628401-107	ES1628401-108
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	----	----	5.0	----	----
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	22.9	21.9	14.7	23.8	24.5
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	----	0.5	----	----
Exchangeable Magnesium	----	0.1	meq/100g	----	----	2.3	----	----
Exchangeable Potassium	----	0.1	meq/100g	----	----	0.1	----	----
Exchangeable Sodium	----	0.1	meq/100g	----	----	1.1	----	----
Cation Exchange Capacity	----	0.1	meq/100g	----	----	4.3	----	----
ED008: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	----	----	----	----
Exchangeable Magnesium	----	0.1	meq/100g	----	----	----	----	----
Exchangeable Potassium	----	0.1	meq/100g	----	----	----	----	----
Exchangeable Sodium	----	0.1	meq/100g	----	----	----	----	----
Cation Exchange Capacity	----	0.1	meq/100g	----	----	----	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	----	<5	----	<5
Cadmium	7440-43-9	1	mg/kg	<1	----	<1	----	<1
Chromium	7440-47-3	2	mg/kg	20	----	28	----	16
Copper	7440-50-8	5	mg/kg	35	----	13	----	33
Lead	7439-92-1	5	mg/kg	11	----	18	----	13
Nickel	7440-02-0	2	mg/kg	5	----	12	----	3
Zinc	7440-66-6	5	mg/kg	18	----	7	----	11
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	0.1	----	<0.1	----	<0.1
EP004: Organic Matter								
Total Organic Carbon	----	0.5	%	----	----	1.2	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	----	<0.5	----	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB14_2.0_2.1	SB14_3.0_3.1	SB15_0.5_0.6	SB15_1.0_1.1	SB15_2.0_2.1
				Client sampling date / time	08-Dec-2016 00:00	08-Dec-2016 00:00	08-Dec-2016 00:00	08-Dec-2016 00:00	08-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1628401-101	ES1628401-102	ES1628401-106	ES1628401-107	ES1628401-108
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	----	**0.6**	----	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	----	**1.2**	----	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	----	<10	----	<10
C10 - C14 Fraction	----	50	mg/kg		<50	----	<50	----	<50
C15 - C28 Fraction	----	100	mg/kg		<100	----	<100	----	<100
C29 - C36 Fraction	----	100	mg/kg		<100	----	<100	----	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	----	<50	----	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	<10	----	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	----	<10	----	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	----	<50	----	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	----	<100	----	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	----	<100	----	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	----	<50	----	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	----	<50	----	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	----	<0.2	----	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	----	<0.5	----	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB14_2.0_2.1	SB14_3.0_3.1	SB15_0.5_0.6	SB15_1.0_1.1	SB15_2.0_2.1
				Client sampling date / time	08-Dec-2016 00:00	08-Dec-2016 00:00	08-Dec-2016 00:00	08-Dec-2016 00:00	08-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1628401-101	ES1628401-102	ES1628401-106	ES1628401-107	ES1628401-108
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	----	<0.2	----	<0.2
^ **Total Xylenes**	1330-20-7	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	----	<1	----	<1
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		----	<0.0002	----	<0.0002	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		----	<0.0002	----	**0.0006**	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		----	<0.0002	----	**0.0116**	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		----	<0.0002	----	**0.0006**	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		----	<0.0002	----	**0.0174**	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		----	<0.0002	----	<0.0002	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		----	<0.001	----	<0.001	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		----	<0.0002	----	**0.0006**	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		----	<0.0002	----	**0.0047**	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		----	<0.0002	----	**0.0004**	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		----	<0.0002	----	**0.0010**	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		----	<0.0002	----	**0.0008**	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		----	<0.0002	----	<0.0002	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		----	<0.0002	----	<0.0002	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		----	<0.0002	----	<0.0002	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		----	<0.0002	----	<0.0002	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		----	<0.0005	----	<0.0005	----
EP231C: Perfluoroalkyl Sulfonamides									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB14_2.0_2.1	SB14_3.0_3.1	SB15_0.5_0.6	SB15_1.0_1.1	SB15_2.0_2.1
				Client sampling date / time	08-Dec-2016 00:00	08-Dec-2016 00:00	08-Dec-2016 00:00	08-Dec-2016 00:00	08-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1628401-101	ES1628401-102	ES1628401-106	ES1628401-107	ES1628401-108
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		----	<0.0002	----	<0.0002	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		----	<0.0005	----	<0.0005	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		----	<0.0005	----	<0.0005	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg		----	<0.0005	----	<0.0005	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		----	<0.0005	----	<0.0005	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		----	<0.0002	----	<0.0002	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		----	<0.0002	----	<0.0002	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		----	<0.0005	----	<0.0005	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		----	<0.0005	----	<0.0005	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		----	<0.0005	----	<0.0005	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		----	<0.0005	----	<0.0005	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		----	<0.0002	----	**0.0377**	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		----	<0.0002	----	**0.0290**	----
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		----	<0.0002	----	**0.0357**	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**99.8**	----	**89.9**	----	**93.3**
2-Chlorophenol-D4	93951-73-6	0.5	%		**112**	----	**101**	----	**104**
2.4.6-Tribromophenol	118-79-6	0.5	%		**116**	----	**116**	----	**110**
EP075(SIM)T: PAH Surrogates									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB14_2.0_2.1	SB14_3.0_3.1	SB15_0.5_0.6	SB15_1.0_1.1	SB15_2.0_2.1
				Client sampling date / time	08-Dec-2016 00:00	08-Dec-2016 00:00	08-Dec-2016 00:00	08-Dec-2016 00:00	08-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1628401-101	ES1628401-102	ES1628401-106	ES1628401-107	ES1628401-108
					Result	Result	Result	Result	Result
EP075(SIM)T: PAH Surrogates - Continued									
2-Fluorobiphenyl	321-60-8	0.5	%		125	----	114	----	116
Anthracene-d10	1719-06-8	0.5	%		127	----	122	----	120
4-Terphenyl-d14	1718-51-0	0.5	%		114	----	102	----	106
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		126	----	126	----	92.2
Toluene-D8	2037-26-5	0.2	%		110	----	112	----	74.0
4-Bromofluorobenzene	460-00-4	0.2	%		103	----	102	----	72.0
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		----	104	----	110	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	SB15_5.0_5.1	BD1_051216	TRIP SPIKE 7	TSC	----
			Client sampling date / time	08-Dec-2016 00:00	05-Dec-2016 00:00	28-Nov-2016 00:00	28-Nov-2016 00:00	----
Compound	CAS Number	LOR	Unit	ES1628401-111	ES1628401-113	ES1628401-120	ES1628401-121	--------
				Result	Result	Result	Result	----
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	----	----	----	----	----
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	**16.7**	**9.0**	----	----	----
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	----	----	----	----
Exchangeable Magnesium	----	0.1	meq/100g	----	----	----	----	----
Exchangeable Potassium	----	0.1	meq/100g	----	----	----	----	----
Exchangeable Sodium	----	0.1	meq/100g	----	----	----	----	----
Cation Exchange Capacity	----	0.1	meq/100g	----	----	----	----	----
ED008: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	----	----	----	----
Exchangeable Magnesium	----	0.1	meq/100g	----	----	----	----	----
Exchangeable Potassium	----	0.1	meq/100g	----	----	----	----	----
Exchangeable Sodium	----	0.1	meq/100g	----	----	----	----	----
Cation Exchange Capacity	----	0.1	meq/100g	----	----	----	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	----	<5	----	----	----
Cadmium	7440-43-9	1	mg/kg	----	<1	----	----	----
Chromium	7440-47-3	2	mg/kg	----	**9**	----	----	----
Copper	7440-50-8	5	mg/kg	----	**64**	----	----	----
Lead	7439-92-1	5	mg/kg	----	**10**	----	----	----
Nickel	7440-02-0	2	mg/kg	----	**5**	----	----	----
Zinc	7440-66-6	5	mg/kg	----	**28**	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	<0.1	----	----	----
EP004: Organic Matter								
Total Organic Carbon	----	0.5	%	----	----	----	----	----
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	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB15_5.0_5.1	BD1_051216	TRIP SPIKE 7	TSC	----
				Client sampling date / time	08-Dec-2016 00:00	05-Dec-2016 00:00	28-Nov-2016 00:00	28-Nov-2016 00:00	----
Compound	CAS Number	LOR	Unit		ES1628401-111	ES1628401-113	ES1628401-120	ES1628401-121	--------
					Result	Result	Result	Result	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
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		----	<0.5	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		----	<0.5	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		----	<0.5	----	----	----
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		----	<0.5	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		----	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		----	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		----	**0.6**	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		----	**1.2**	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		----	<10	**12**	**20**	----
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		----	<50	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		----	<10	**14**	**22**	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		----	<10	<10	<10	----
>C10 - C16 Fraction	----	50	mg/kg		----	<50	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		----	<100	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		----	<100	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		----	<50	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		----	<50	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		----	<0.2	<0.2	<0.2	----
Toluene	108-88-3	0.5	mg/kg		----	<0.5	**3.5**	**6.3**	----
Ethylbenzene	100-41-4	0.5	mg/kg		----	<0.5	<0.5	**0.8**	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		----	<0.5	**3.1**	**5.0**	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB15_5.0_5.1	BD1_051216	TRIP SPIKE 7	TSC	----
				Client sampling date / time	08-Dec-2016 00:00	05-Dec-2016 00:00	28-Nov-2016 00:00	28-Nov-2016 00:00	----
Compound	CAS Number	LOR	Unit		ES1628401-111	ES1628401-113	ES1628401-120	ES1628401-121	--------
					Result	Result	Result	Result	----
EP080: BTEXN - Continued									
ortho-Xylene	95-47-6	0.5	mg/kg		----	<0.5	**1.2**	**2.0**	----
^ Sum of BTEX	----	0.2	mg/kg		----	<0.2	**7.8**	**14.1**	----
^ Total Xylenes	1330-20-7	0.5	mg/kg		----	<0.5	**4.3**	**7.0**	----
Naphthalene	91-20-3	1	mg/kg		----	<1	<1	<1	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		<0.0005	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB15_5.0_5.1	BD1_051216	TRIP SPIKE 7	TSC	----
				Client sampling date / time	08-Dec-2016 00:00	05-Dec-2016 00:00	28-Nov-2016 00:00	28-Nov-2016 00:00	----
Compound	CAS Number	LOR	Unit		ES1628401-111	ES1628401-113	ES1628401-120	ES1628401-121	--------
					Result	Result	Result	Result	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	----	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg		<0.0005	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	----	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	----	----	----	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		<0.0002	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		<0.0002	----	----	----	----
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		<0.0002	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		----	**91.9**	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		----	**102**	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		----	**115**	----	----	----
EP075(SIM)T: PAH Surrogates									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB15_5.0_5.1	BD1_051216	TRIP SPIKE 7	TSC	----
				Client sampling date / time	08-Dec-2016 00:00	05-Dec-2016 00:00	28-Nov-2016 00:00	28-Nov-2016 00:00	----
Compound	CAS Number	LOR	Unit		ES1628401-111	ES1628401-113	ES1628401-120	ES1628401-121	--------
					Result	Result	Result	Result	----
EP075(SIM)T: PAH Surrogates - Continued									
2-Fluorobiphenyl	321-60-8	0.5	%		----	112	----	----	----
Anthracene-d10	1719-06-8	0.5	%		----	126	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		----	103	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		----	125	117	121	----
Toluene-D8	2037-26-5	0.2	%		----	107	105	107	----
4-Bromofluorobenzene	460-00-4	0.2	%		----	97.3	91.5	92.2	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		104	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	RB_051216	RB_061216	RB_071216	RB_081216	----
				Client sampling date / time	05-Dec-2016 00:00	06-Dec-2016 00:00	07-Dec-2016 00:00	08-Dec-2016 00:00	----
Compound	CAS Number	LOR	Unit		ES1628401-116	ES1628401-117	ES1628401-118	ES1628401-119	--------
					Result	Result	Result	Result	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	----
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	----
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	----
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	----
^ Total Xylenes	1330-20-7	2	µg/L		<2	<2	<2	<2	----
^ Sum of BTEX	----	1	µg/L		<1	<1	<1	<1	----
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		----	----	<0.02	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		----	----	<0.02	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		----	----	<0.01	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		----	----	<0.1	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		----	----	<0.02	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		----	----	<0.02	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		----	----	<0.02	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		----	----	<0.01	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L		----	----	<0.05	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		----	----	<0.05	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		----	----	<0.05	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	RB_051216	RB_061216	RB_071216	RB_081216	----
				Client sampling date / time	05-Dec-2016 00:00	06-Dec-2016 00:00	07-Dec-2016 00:00	08-Dec-2016 00:00	----
Compound	CAS Number	LOR	Unit		ES1628401-116	ES1628401-117	ES1628401-118	ES1628401-119	--------
					Result	Result	Result	Result	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued									
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		----	----	<0.05	----	----
EP231P: PFAS Sums									
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		----	----	<0.01	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L		----	----	<0.01	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**108**	**113**	**109**	**120**	----
Toluene-D8	2037-26-5	2	%		**91.8**	**96.0**	**90.8**	**103**	----
4-Bromofluorobenzene	460-00-4	2	%		**93.7**	**94.9**	**90.0**	**98.1**	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		----	----	**88.6**	----	----

Surrogate Control Limits

Sub-Matrix: ASPHALT		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	70	130

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130
EP231S: PFAS Surrogate			
13C4-PFOS	----	70	130

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1628401**	Page	: 1 of 22
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR BEN ANDERSON	Telephone	: +61-2-8784 8555
Project	: ALBION PARK	Date Samples Received	: 09-Dec-2016
Site	: ----	Issue Date	: 19-Dec-2016
Sampler	: Matthew West	No. of samples received	: 123
Order number	: 21-25583/02	No. of samples analysed	: 49

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.**
- **Laboratory Control outliers exist - please see following pages for full details.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **Surrogate recovery outliers exist for all regular sample matrices - please see following pages for full details.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EP004: Organic Matter	QC-689655-002	----	**Total Organic Carbon**	----	100 %	81-99%	**Recovery greater than upper control limit**

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP231D: (n:2) Fluorotelomer Sulfonic Acids	EB1629099--001	Anonymous	**6:2 Fluorotelomer sulfonic acid (6:2 FTS)**	27619-97-2	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Regular Sample Surrogates

Sub-Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted							
EP075(SIM)T: PAH Surrogates	ES1628401-101	SB14_2.0_2.1	**2-Fluorobiphenyl**	321-60-8	125 %	70-122 %	**Recovery greater than upper data quality objective**

Outliers : Analysis Holding Time Compliance

Matrix: **SOIL**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EP004: Organic Matter						
HDPE Soil Jar						
SB06_2.0_2.1	14-Dec-2016	13-Dec-2016	**1**	----	----	----

Outliers : Frequency of Quality Control Samples

Matrix: **SOIL**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Control Samples (LCS)					
Exchangeable Cations with pre-treatment	0	1	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

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
EA002 : pH (Soils)							
HDPE Soil Jar (EA002)							
SB06_2.0_2.1	**06-Dec-2016**	**13-Dec-2016**	13-Dec-2016	✓	**13-Dec-2016**	13-Dec-2016	✓
HDPE Soil Jar (EA002)							
GW05_3.4_3.5	**08-Dec-2016**	**14-Dec-2016**	15-Dec-2016	✓	**14-Dec-2016**	14-Dec-2016	✓
Soil Glass Jar - Unpreserved (EA002)							
SB07_3.0_3.1, SB08_2.0_2.1, SB09_0.5_0.6	**05-Dec-2016**	**12-Dec-2016**	12-Dec-2016	✓	**12-Dec-2016**	12-Dec-2016	✓
Soil Glass Jar - Unpreserved (EA002)							
GW02_0.5_0.6, SB10_2.3_2.5	**06-Dec-2016**	**13-Dec-2016**	13-Dec-2016	✓	**13-Dec-2016**	13-Dec-2016	✓
Soil Glass Jar - Unpreserved (EA002)							
GW03_5.0_5.1, SB11_1.0_1.1, SB12_0.5_0.6, SB13_2.0_2.1	**07-Dec-2016**	**14-Dec-2016**	14-Dec-2016	✓	**14-Dec-2016**	14-Dec-2016	✓
Soil Glass Jar - Unpreserved (EA002)							
GW04_0.5_0.6, SB14_0.5_0.6, SB15_0.5_0.6	**08-Dec-2016**	**14-Dec-2016**	15-Dec-2016	✓	**14-Dec-2016**	14-Dec-2016	✓

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
EA055: Moisture Content								
HDPE Soil Jar (EA055-103)								
SB08_5.0_5.1		**05-Dec-2016**	**----**	----	----	**13-Dec-2016**	19-Dec-2016	✓
HDPE Soil Jar (EA055-103)								
GW02_5.0_5.1,	GW01_4.0_4.1,	**06-Dec-2016**	**----**	----	----	**13-Dec-2016**	20-Dec-2016	✓
SB06_2.0_2.1,	SB09_4.0_4.1,							
SB11_5.4-5.5								
HDPE Soil Jar (EA055-103)								
SB12_5.6_5.7		**07-Dec-2016**	**----**	----	----	**13-Dec-2016**	21-Dec-2016	✓
HDPE Soil Jar (EA055-103)								
GW05_3.4_3.5,	SB14_2.0_2.1,	**08-Dec-2016**	**----**	----	----	**13-Dec-2016**	22-Dec-2016	✓
SB14_3.0_3.1								
Snap Lock Bag (EA055-103)								
SB07_ASHPALT_0.0_0.3		**05-Dec-2016**	**----**	----	----	**13-Dec-2016**	19-Dec-2016	✓
Soil Glass Jar - Unpreserved (EA055-103)								
SB07_0.5_0.6,	SB07_3.0_3.1,	**05-Dec-2016**	**----**	----	----	**13-Dec-2016**	19-Dec-2016	✓
SB08_0.0_0.15,	SB08_0.5_0.6,							
SB08_2.0_2.1,	SB09_0.0_0.1,							
SB09_0.5_0.6,	BD1_051216							
Soil Glass Jar - Unpreserved (EA055-103)								
GW02_0.5_0.6,	GW02_6.0_6.1,	**06-Dec-2016**	**----**	----	----	**13-Dec-2016**	20-Dec-2016	✓
GW01_0.0_0.2,	GW01_0.5_0.6,							
SB06_0.5_0.6,	SB06_5.0_5.1,							
SB10_0.0_0.1,	SB10_2.3_2.5							
Soil Glass Jar - Unpreserved (EA055-103)								
GW03_0.0_0.1,	GW03_5.0_5.1,	**07-Dec-2016**	**----**	----	----	**13-Dec-2016**	21-Dec-2016	✓
SB11_0.5_0.6,	SB11_1.0_1.1,							
SB12_0.0_0.1,	SB12_0.5_0.6,							
SB13_0.5_0.6,	SB13_2.0_2.1							
Soil Glass Jar - Unpreserved (EA055-103)								
GW05_1.6_1.7,	GW04_0.5_0.6,	**08-Dec-2016**	**----**	----	----	**13-Dec-2016**	22-Dec-2016	✓
GW04_6.0_6.1,	SB14_0.5_0.6,							
SB15_0.5_0.6,	SB15_1.0_1.1,							
SB15_2.0_2.1,	SB15_5.0_5.1							

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
ED007: Exchangeable Cations							
HDPE Soil Jar (ED007)							
SB06_2.0_2.1	**06-Dec-2016**	**19-Dec-2016**	03-Jan-2017	✓	**19-Dec-2016**	03-Jan-2017	✓
Soil Glass Jar - Unpreserved (ED007)							
SB07_3.0_3.1, SB08_2.0_2.1, SB09_0.5_0.6	**05-Dec-2016**	**19-Dec-2016**	02-Jan-2017	✓	**19-Dec-2016**	02-Jan-2017	✓
Soil Glass Jar - Unpreserved (ED007)							
GW02_0.5_0.6, SB10_2.3_2.5	**06-Dec-2016**	**19-Dec-2016**	03-Jan-2017	✓	**19-Dec-2016**	03-Jan-2017	✓
Soil Glass Jar - Unpreserved (ED007)							
GW03_5.0_5.1, SB11_1.0_1.1, SB12_0.5_0.6, SB13_2.0_2.1	**07-Dec-2016**	**19-Dec-2016**	04-Jan-2017	✓	**19-Dec-2016**	04-Jan-2017	✓
Soil Glass Jar - Unpreserved (ED007)							
GW04_0.5_0.6, SB14_0.5_0.6, SB15_0.5_0.6	**08-Dec-2016**	**19-Dec-2016**	05-Jan-2017	✓	**19-Dec-2016**	05-Jan-2017	✓
ED008: Exchangeable Cations							
HDPE Soil Jar (ED008)							
GW05_3.4_3.5	**08-Dec-2016**	**15-Dec-2016**	05-Jan-2017	✓	**15-Dec-2016**	05-Jan-2017	✓
EG005T: Total Metals by ICP-AES							
HDPE Soil Jar (EG005T)							
SB06_2.0_2.1, SB09_4.0_4.1	**06-Dec-2016**	**15-Dec-2016**	04-Jun-2017	✓	**15-Dec-2016**	04-Jun-2017	✓
HDPE Soil Jar (EG005T)							
GW05_3.4_3.5, SB14_2.0_2.1	**08-Dec-2016**	**15-Dec-2016**	06-Jun-2017	✓	**15-Dec-2016**	06-Jun-2017	✓
Soil Glass Jar - Unpreserved (EG005T)							
SB07_0.5_0.6, SB07_3.0_3.1, SB08_0.0_0.15, SB08_2.0_2.1, SB09_0.5_0.6, BD1_051216	**05-Dec-2016**	**15-Dec-2016**	03-Jun-2017	✓	**15-Dec-2016**	03-Jun-2017	✓
Soil Glass Jar - Unpreserved (EG005T)							
GW01_0.0_0.2, GW01_0.5_0.6, SB06_0.5_0.6, SB10_0.0_0.1, SB10_2.3_2.5	**06-Dec-2016**	**15-Dec-2016**	04-Jun-2017	✓	**15-Dec-2016**	04-Jun-2017	✓
Soil Glass Jar - Unpreserved (EG005T)							
GW03_0.0_0.1, GW03_5.0_5.1, SB11_0.5_0.6, SB11_1.0_1.1, SB12_0.0_0.1, SB12_0.5_0.6, SB13_0.5_0.6, SB13_2.0_2.1	**07-Dec-2016**	**15-Dec-2016**	05-Jun-2017	✓	**15-Dec-2016**	05-Jun-2017	✓
Soil Glass Jar - Unpreserved (EG005T)							
GW05_1.6_1.7, GW04_0.5_0.6, GW04_6.0_6.1, SB14_0.5_0.6, SB15_0.5_0.6, SB15_2.0_2.1	**08-Dec-2016**	**15-Dec-2016**	06-Jun-2017	✓	**15-Dec-2016**	06-Jun-2017	✓

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
EG035T: Total Recoverable Mercury by FIMS							
HDPE Soil Jar (EG035T)							
SB06_2.0_2.1, SB09_4.0_4.1	**06-Dec-2016**	**15-Dec-2016**	03-Jan-2017	✓	**16-Dec-2016**	03-Jan-2017	✓
HDPE Soil Jar (EG035T)							
GW05_3.4_3.5, SB14_2.0_2.1	**08-Dec-2016**	**15-Dec-2016**	05-Jan-2017	✓	**16-Dec-2016**	05-Jan-2017	✓
Soil Glass Jar - Unpreserved (EG035T)							
SB07_0.5_0.6, SB07_3.0_3.1, SB08_0.0_0.15, SB08_2.0_2.1, SB09_0.5_0.6, BD1_051216	**05-Dec-2016**	**15-Dec-2016**	02-Jan-2017	✓	**16-Dec-2016**	02-Jan-2017	✓
Soil Glass Jar - Unpreserved (EG035T)							
GW01_0.0_0.2, GW01_0.5_0.6, SB06_0.5_0.6, SB10_0.0_0.1, SB10_2.3_2.5	**06-Dec-2016**	**15-Dec-2016**	03-Jan-2017	✓	**16-Dec-2016**	03-Jan-2017	✓
Soil Glass Jar - Unpreserved (EG035T)							
GW03_0.0_0.1, GW03_5.0_5.1, SB11_0.5_0.6, SB11_1.0_1.1, SB12_0.0_0.1, SB12_0.5_0.6, SB13_0.5_0.6, SB13_2.0_2.1	**07-Dec-2016**	**15-Dec-2016**	04-Jan-2017	✓	**16-Dec-2016**	04-Jan-2017	✓
Soil Glass Jar - Unpreserved (EG035T)							
GW05_1.6_1.7, GW04_0.5_0.6, GW04_6.0_6.1, SB14_0.5_0.6, SB15_0.5_0.6, SB15_2.0_2.1	**08-Dec-2016**	**15-Dec-2016**	05-Jan-2017	✓	**16-Dec-2016**	05-Jan-2017	✓
EP004: Organic Matter							
HDPE Soil Jar (EP004)							
SB06_2.0_2.1	**06-Dec-2016**	**14-Dec-2016**	13-Dec-2016	×	**14-Dec-2016**	11-Jan-2017	✓
HDPE Soil Jar (EP004)							
GW05_3.4_3.5	**08-Dec-2016**	**14-Dec-2016**	15-Dec-2016	✓	**14-Dec-2016**	11-Jan-2017	✓
Soil Glass Jar - Unpreserved (EP004)							
SB07_3.0_3.1, SB08_2.0_2.1, SB09_0.5_0.6	**05-Dec-2016**	**14-Dec-2016**	02-Jan-2017	✓	**14-Dec-2016**	02-Jan-2017	✓
Soil Glass Jar - Unpreserved (EP004)							
GW02_0.5_0.6, SB10_2.3_2.5	**06-Dec-2016**	**14-Dec-2016**	03-Jan-2017	✓	**14-Dec-2016**	03-Jan-2017	✓
Soil Glass Jar - Unpreserved (EP004)							
GW03_5.0_5.1, SB11_1.0_1.1, SB12_0.5_0.6, SB13_2.0_2.1	**07-Dec-2016**	**14-Dec-2016**	04-Jan-2017	✓	**14-Dec-2016**	04-Jan-2017	✓
Soil Glass Jar - Unpreserved (EP004)							
GW04_0.5_0.6, SB14_0.5_0.6, SB15_0.5_0.6	**08-Dec-2016**	**14-Dec-2016**	05-Jan-2017	✓	**14-Dec-2016**	05-Jan-2017	✓

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
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
HDPE Soil Jar (EP075(SIM)) SB06_2.0_2.1, SB09_4.0_4.1	**06-Dec-2016**	**13-Dec-2016**	20-Dec-2016	✓	**15-Dec-2016**	22-Jan-2017	✓
HDPE Soil Jar (EP075(SIM)) SB14_2.0_2.1	**08-Dec-2016**	**13-Dec-2016**	22-Dec-2016	✓	**14-Dec-2016**	22-Jan-2017	✓
HDPE Soil Jar (EP075(SIM)) GW05_3.4_3.5	**08-Dec-2016**	**13-Dec-2016**	22-Dec-2016	✓	**15-Dec-2016**	22-Jan-2017	✓
Soil Glass Jar - Unpreserved (EP075(SIM)) BD1_051216	**05-Dec-2016**	**13-Dec-2016**	19-Dec-2016	✓	**14-Dec-2016**	22-Jan-2017	✓
Soil Glass Jar - Unpreserved (EP075(SIM)) SB07_0.5_0.6, SB07_3.0_3.1, SB08_0.0_0.15, SB08_2.0_2.1, SB09_0.5_0.6	**05-Dec-2016**	**13-Dec-2016**	19-Dec-2016	✓	**15-Dec-2016**	22-Jan-2017	✓
Soil Glass Jar - Unpreserved (EP075(SIM)) GW02_0.5_0.6, GW02_6.0_6.1, GW01_0.0_0.2, GW01_0.5_0.6, SB06_0.5_0.6, SB10_0.0_0.1, SB10_2.3_2.5	**06-Dec-2016**	**13-Dec-2016**	20-Dec-2016	✓	**15-Dec-2016**	22-Jan-2017	✓
Soil Glass Jar - Unpreserved (EP075(SIM)) SB11_0.5_0.6, SB11_1.0_1.1, SB12_0.0_0.1, SB12_0.5_0.6, SB13_0.5_0.6, SB13_2.0_2.1	**07-Dec-2016**	**13-Dec-2016**	21-Dec-2016	✓	**14-Dec-2016**	22-Jan-2017	✓
Soil Glass Jar - Unpreserved (EP075(SIM)) GW03_0.0_0.1, GW03_5.0_5.1	**07-Dec-2016**	**13-Dec-2016**	21-Dec-2016	✓	**15-Dec-2016**	22-Jan-2017	✓
Soil Glass Jar - Unpreserved (EP075(SIM)) SB14_0.5_0.6, SB15_0.5_0.6, SB15_2.0_2.1	**08-Dec-2016**	**13-Dec-2016**	22-Dec-2016	✓	**14-Dec-2016**	22-Jan-2017	✓
Soil Glass Jar - Unpreserved (EP075(SIM)) GW05_1.6_1.7, GW04_0.5_0.6, GW04_6.0_6.1	**08-Dec-2016**	**13-Dec-2016**	22-Dec-2016	✓	**15-Dec-2016**	22-Jan-2017	✓

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
EP080/071: Total Petroleum Hydrocarbons								
HDPE Soil Jar (EP071)								
SB06_2.0_2.1,	SB09_4.0_4.1	**06-Dec-2016**	**13-Dec-2016**	20-Dec-2016	✓	**15-Dec-2016**	22-Jan-2017	✓
HDPE Soil Jar (EP080)								
SB06_2.0_2.1,	SB09_4.0_4.1	**06-Dec-2016**	**14-Dec-2016**	20-Dec-2016	✓	**16-Dec-2016**	20-Dec-2016	✓
HDPE Soil Jar (EP080)								
SB14_2.0_2.1		**08-Dec-2016**	**12-Dec-2016**	22-Dec-2016	✓	**16-Dec-2016**	22-Dec-2016	✓
HDPE Soil Jar (EP071)								
SB14_2.0_2.1		**08-Dec-2016**	**13-Dec-2016**	22-Dec-2016	✓	**14-Dec-2016**	22-Jan-2017	✓
HDPE Soil Jar (EP071)								
GW05_3.4_3.5		**08-Dec-2016**	**13-Dec-2016**	22-Dec-2016	✓	**15-Dec-2016**	22-Jan-2017	✓
HDPE Soil Jar (EP080)								
GW05_3.4_3.5		**08-Dec-2016**	**14-Dec-2016**	22-Dec-2016	✓	**16-Dec-2016**	22-Dec-2016	✓
Soil Glass Jar - Unpreserved (EP080)								
BD1_051216		**05-Dec-2016**	**12-Dec-2016**	19-Dec-2016	✓	**16-Dec-2016**	19-Dec-2016	✓
Soil Glass Jar - Unpreserved (EP071)								
BD1_051216		**05-Dec-2016**	**13-Dec-2016**	19-Dec-2016	✓	**14-Dec-2016**	22-Jan-2017	✓
Soil Glass Jar - Unpreserved (EP071)								
SB07_0.5_0.6,	SB07_3.0_3.1,	**05-Dec-2016**	**13-Dec-2016**	19-Dec-2016	✓	**15-Dec-2016**	22-Jan-2017	✓
SB08_0.0_0.15,	SB08_2.0_2.1,							
SB09_0.5_0.6								
Soil Glass Jar - Unpreserved (EP080)								
SB07_0.5_0.6,	SB07_3.0_3.1,	**05-Dec-2016**	**14-Dec-2016**	19-Dec-2016	✓	**16-Dec-2016**	19-Dec-2016	✓
SB08_0.0_0.15,	SB08_2.0_2.1,							
SB09_0.5_0.6								
Soil Glass Jar - Unpreserved (EP071)								
GW02_0.5_0.6,	GW02_6.0_6.1,	**06-Dec-2016**	**13-Dec-2016**	20-Dec-2016	✓	**15-Dec-2016**	22-Jan-2017	✓
GW01_0.0_0.2,	GW01_0.5_0.6,							
SB06_0.5_0.6,	SB10_0.0_0.1,							
SB10_2.3_2.5								
Soil Glass Jar - Unpreserved (EP080)								
GW02_0.5_0.6,	GW02_6.0_6.1,	**06-Dec-2016**	**14-Dec-2016**	20-Dec-2016	✓	**16-Dec-2016**	20-Dec-2016	✓
GW01_0.0_0.2,	GW01_0.5_0.6,							
SB06_0.5_0.6,	SB10_0.0_0.1,							
SB10_2.3_2.5								
Soil Glass Jar - Unpreserved (EP080)								
SB11_0.5_0.6,	SB11_1.0_1.1,	**07-Dec-2016**	**12-Dec-2016**	21-Dec-2016	✓	**16-Dec-2016**	21-Dec-2016	✓
SB12_0.0_0.1,	SB12_0.5_0.6,							
SB13_0.5_0.6,	SB13_2.0_2.1							
Soil Glass Jar - Unpreserved (EP071)								
SB11_0.5_0.6,	SB11_1.0_1.1,	**07-Dec-2016**	**13-Dec-2016**	21-Dec-2016	✓	**14-Dec-2016**	22-Jan-2017	✓
SB12_0.0_0.1,	SB12_0.5_0.6,							
SB13_0.5_0.6,	SB13_2.0_2.1							
Soil Glass Jar - Unpreserved (EP071)								
GW03_0.0_0.1,	GW03_5.0_5.1	**07-Dec-2016**	**13-Dec-2016**	21-Dec-2016	✓	**15-Dec-2016**	22-Jan-2017	✓

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
EP080/071: Total Petroleum Hydrocarbons - Continued								
Soil Glass Jar - Unpreserved (EP080)								
GW03_0.0_0.1,	GW03_5.0_5.1	**07-Dec-2016**	**14-Dec-2016**	21-Dec-2016	✓	**16-Dec-2016**	21-Dec-2016	✓
Soil Glass Jar - Unpreserved (EP080)								
SB14_0.5_0.6,	SB15_0.5_0.6,	**08-Dec-2016**	**12-Dec-2016**	22-Dec-2016	✓	**16-Dec-2016**	22-Dec-2016	✓
SB15_2.0_2.1								
Soil Glass Jar - Unpreserved (EP071)								
SB14_0.5_0.6,	SB15_0.5_0.6,	**08-Dec-2016**	**13-Dec-2016**	22-Dec-2016	✓	**14-Dec-2016**	22-Jan-2017	✓
SB15_2.0_2.1								
Soil Glass Jar - Unpreserved (EP071)								
GW05_1.6_1.7,	GW04_0.5_0.6,	**08-Dec-2016**	**13-Dec-2016**	22-Dec-2016	✓	**15-Dec-2016**	22-Jan-2017	✓
GW04_6.0_6.1								
Soil Glass Jar - Unpreserved (EP080)								
GW05_1.6_1.7,	GW04_0.5_0.6,	**08-Dec-2016**	**14-Dec-2016**	22-Dec-2016	✓	**16-Dec-2016**	22-Dec-2016	✓
GW04_6.0_6.1								
Soil Glass Jar - Unpreserved (EP080)								
TRIP SPIKE 7,	TSC	**28-Nov-2016**	**12-Dec-2016**	12-Dec-2016	✓	**12-Dec-2016**	12-Dec-2016	✓

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
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
HDPE Soil Jar (EP071)								
SB06_2.0_2.1,	SB09_4.0_4.1	**06-Dec-2016**	**13-Dec-2016**	20-Dec-2016	✓	**15-Dec-2016**	22-Jan-2017	✓
HDPE Soil Jar (EP080)								
SB06_2.0_2.1,	SB09_4.0_4.1	**06-Dec-2016**	**14-Dec-2016**	20-Dec-2016	✓	**16-Dec-2016**	20-Dec-2016	✓
HDPE Soil Jar (EP080)								
SB14_2.0_2.1		**08-Dec-2016**	**12-Dec-2016**	22-Dec-2016	✓	**16-Dec-2016**	22-Dec-2016	✓
HDPE Soil Jar (EP071)								
SB14_2.0_2.1		**08-Dec-2016**	**13-Dec-2016**	22-Dec-2016	✓	**14-Dec-2016**	22-Jan-2017	✓
HDPE Soil Jar (EP071)								
GW05_3.4_3.5		**08-Dec-2016**	**13-Dec-2016**	22-Dec-2016	✓	**15-Dec-2016**	22-Jan-2017	✓
HDPE Soil Jar (EP080)								
GW05_3.4_3.5		**08-Dec-2016**	**14-Dec-2016**	22-Dec-2016	✓	**16-Dec-2016**	22-Dec-2016	✓
Soil Glass Jar - Unpreserved (EP080)								
BD1_051216		**05-Dec-2016**	**12-Dec-2016**	19-Dec-2016	✓	**16-Dec-2016**	19-Dec-2016	✓
Soil Glass Jar - Unpreserved (EP071)								
BD1_051216		**05-Dec-2016**	**13-Dec-2016**	19-Dec-2016	✓	**14-Dec-2016**	22-Jan-2017	✓
Soil Glass Jar - Unpreserved (EP071)								
SB07_0.5_0.6,	SB07_3.0_3.1,	**05-Dec-2016**	**13-Dec-2016**	19-Dec-2016	✓	**15-Dec-2016**	22-Jan-2017	✓
SB08_0.0_0.15,	SB08_2.0_2.1,							
SB09_0.5_0.6								
Soil Glass Jar - Unpreserved (EP080)								
SB07_0.5_0.6,	SB07_3.0_3.1,	**05-Dec-2016**	**14-Dec-2016**	19-Dec-2016	✓	**16-Dec-2016**	19-Dec-2016	✓
SB08_0.0_0.15,	SB08_2.0_2.1,							
SB09_0.5_0.6								
Soil Glass Jar - Unpreserved (EP071)								
GW02_0.5_0.6,	GW02_6.0_6.1,	**06-Dec-2016**	**13-Dec-2016**	20-Dec-2016	✓	**15-Dec-2016**	22-Jan-2017	✓
GW01_0.0_0.2,	GW01_0.5_0.6,							
SB06_0.5_0.6,	SB10_0.0_0.1,							
SB10_2.3_2.5								
Soil Glass Jar - Unpreserved (EP080)								
GW02_0.5_0.6,	GW02_6.0_6.1,	**06-Dec-2016**	**14-Dec-2016**	20-Dec-2016	✓	**16-Dec-2016**	20-Dec-2016	✓
GW01_0.0_0.2,	GW01_0.5_0.6,							
SB06_0.5_0.6,	SB10_0.0_0.1,							
SB10_2.3_2.5								
Soil Glass Jar - Unpreserved (EP080)								
SB11_0.5_0.6,	SB11_1.0_1.1,	**07-Dec-2016**	**12-Dec-2016**	21-Dec-2016	✓	**16-Dec-2016**	21-Dec-2016	✓
SB12_0.0_0.1,	SB12_0.5_0.6,							
SB13_0.5_0.6,	SB13_2.0_2.1							
Soil Glass Jar - Unpreserved (EP071)								
SB11_0.5_0.6,	SB11_1.0_1.1,	**07-Dec-2016**	**13-Dec-2016**	21-Dec-2016	✓	**14-Dec-2016**	22-Jan-2017	✓
SB12_0.0_0.1,	SB12_0.5_0.6,							
SB13_0.5_0.6,	SB13_2.0_2.1							
Soil Glass Jar - Unpreserved (EP071)								
GW03_0.0_0.1,	GW03_5.0_5.1	**07-Dec-2016**	**13-Dec-2016**	21-Dec-2016	✓	**15-Dec-2016**	22-Jan-2017	✓

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
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued								
Soil Glass Jar - Unpreserved (EP080)								
GW03_0.0_0.1,	GW03_5.0_5.1	**07-Dec-2016**	**14-Dec-2016**	21-Dec-2016	✓	**16-Dec-2016**	21-Dec-2016	✓
Soil Glass Jar - Unpreserved (EP080)								
SB14_0.5_0.6,	SB15_0.5_0.6,	**08-Dec-2016**	**12-Dec-2016**	22-Dec-2016	✓	**16-Dec-2016**	22-Dec-2016	✓
SB15_2.0_2.1								
Soil Glass Jar - Unpreserved (EP071)								
SB14_0.5_0.6,	SB15_0.5_0.6,	**08-Dec-2016**	**13-Dec-2016**	22-Dec-2016	✓	**14-Dec-2016**	22-Jan-2017	✓
SB15_2.0_2.1								
Soil Glass Jar - Unpreserved (EP071)								
GW05_1.6_1.7,	GW04_0.5_0.6,	**08-Dec-2016**	**13-Dec-2016**	22-Dec-2016	✓	**15-Dec-2016**	22-Jan-2017	✓
GW04_6.0_6.1								
Soil Glass Jar - Unpreserved (EP080)								
GW05_1.6_1.7,	GW04_0.5_0.6,	**08-Dec-2016**	**14-Dec-2016**	22-Dec-2016	✓	**16-Dec-2016**	22-Dec-2016	✓
GW04_6.0_6.1								
Soil Glass Jar - Unpreserved (EP080)								
TRIP SPIKE 7,	TSC	**28-Nov-2016**	**12-Dec-2016**	12-Dec-2016	✓	**12-Dec-2016**	12-Dec-2016	✓

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
EP080: BTEXN								
HDPE Soil Jar (EP080)								
SB06_2.0_2.1,	SB09_4.0_4.1	**06-Dec-2016**	**14-Dec-2016**	20-Dec-2016	✓	**16-Dec-2016**	20-Dec-2016	✓
HDPE Soil Jar (EP080)								
SB14_2.0_2.1		**08-Dec-2016**	**12-Dec-2016**	22-Dec-2016	✓	**16-Dec-2016**	22-Dec-2016	✓
HDPE Soil Jar (EP080)								
GW05_3.4_3.5		**08-Dec-2016**	**14-Dec-2016**	22-Dec-2016	✓	**16-Dec-2016**	22-Dec-2016	✓
Soil Glass Jar - Unpreserved (EP080)								
BD1_051216		**05-Dec-2016**	**12-Dec-2016**	19-Dec-2016	✓	**16-Dec-2016**	19-Dec-2016	✓
Soil Glass Jar - Unpreserved (EP080)								
SB07_0.5_0.6, SB08_0.0_0.15, SB09_0.5_0.6	SB07_3.0_3.1, SB08_2.0_2.1,	**05-Dec-2016**	**14-Dec-2016**	19-Dec-2016	✓	**16-Dec-2016**	19-Dec-2016	✓
Soil Glass Jar - Unpreserved (EP080)								
GW02_0.5_0.6, GW01_0.0_0.2, SB06_0.5_0.6, SB10_2.3_2.5	GW02_6.0_6.1, GW01_0.5_0.6, SB10_0.0_0.1,	**06-Dec-2016**	**14-Dec-2016**	20-Dec-2016	✓	**16-Dec-2016**	20-Dec-2016	✓
Soil Glass Jar - Unpreserved (EP080)								
SB11_0.5_0.6, SB12_0.0_0.1, SB13_0.5_0.6,	SB11_1.0_1.1, SB12_0.5_0.6, SB13_2.0_2.1	**07-Dec-2016**	**12-Dec-2016**	21-Dec-2016	✓	**16-Dec-2016**	21-Dec-2016	✓
Soil Glass Jar - Unpreserved (EP080)								
GW03_0.0_0.1,	GW03_5.0_5.1	**07-Dec-2016**	**14-Dec-2016**	21-Dec-2016	✓	**16-Dec-2016**	21-Dec-2016	✓
Soil Glass Jar - Unpreserved (EP080)								
SB14_0.5_0.6, SB15_2.0_2.1	SB15_0.5_0.6,	**08-Dec-2016**	**12-Dec-2016**	22-Dec-2016	✓	**16-Dec-2016**	22-Dec-2016	✓
Soil Glass Jar - Unpreserved (EP080)								
GW05_1.6_1.7, GW04_6.0_6.1	GW04_0.5_0.6,	**08-Dec-2016**	**14-Dec-2016**	22-Dec-2016	✓	**16-Dec-2016**	22-Dec-2016	✓
Soil Glass Jar - Unpreserved (EP080)								
TRIP SPIKE 7,	TSC	**28-Nov-2016**	**12-Dec-2016**	12-Dec-2016	✓	**12-Dec-2016**	12-Dec-2016	✓

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
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE Soil Jar (EP231X) SB07_3.0_3.1, SB08_0.5_0.6, SB08_5.0_5.1, SB09_0.0_0.1	**05-Dec-2016**	**15-Dec-2016**	03-Jun-2017	✓	**15-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) SB07_0.5_0.6	**05-Dec-2016**	**15-Dec-2016**	03-Jun-2017	✓	**16-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) SB09_4.0_4.1, SB10_0.0_0.1, SB10_2.3_2.5, SB11_5.4-5.5	**06-Dec-2016**	**15-Dec-2016**	04-Jun-2017	✓	**15-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) GW02_0.5_0.6, GW02_5.0_5.1, GW01_0.0_0.2, GW01_4.0_4.1, SB06_0.5_0.6, SB06_5.0_5.1	**06-Dec-2016**	**15-Dec-2016**	04-Jun-2017	✓	**16-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) SB11_1.0_1.1, SB12_0.0_0.1, SB12_5.6_5.7, SB13_0.5_0.6, SB13_2.0_2.1	**07-Dec-2016**	**15-Dec-2016**	05-Jun-2017	✓	**15-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) GW03_0.0_0.1	**07-Dec-2016**	**15-Dec-2016**	05-Jun-2017	✓	**16-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) SB14_3.0_3.1, SB15_1.0_1.1	**08-Dec-2016**	**15-Dec-2016**	06-Jun-2017	✓	**15-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) GW05_1.6_1.7, GW05_3.4_3.5, GW04_0.5_0.6, GW04_6.0_6.1	**08-Dec-2016**	**15-Dec-2016**	06-Jun-2017	✓	**16-Dec-2016**	24-Jan-2017	✓
Snap Lock Bag (EP231X) SB07_ASHPALT_0.0_0.3	**05-Dec-2016**	**18-Dec-2016**	03-Jun-2017	✓	**18-Dec-2016**	27-Jan-2017	✓
Soil Glass Jar - Unpreserved (EP231X) GW03_5.0_5.1	**07-Dec-2016**	**15-Dec-2016**	05-Jun-2017	✓	**16-Dec-2016**	24-Jan-2017	✓
Soil Glass Jar - Unpreserved (EP231X) SB14_0.5_0.6, SB15_5.0_5.1	**08-Dec-2016**	**15-Dec-2016**	06-Jun-2017	✓	**15-Dec-2016**	24-Jan-2017	✓

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
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE Soil Jar (EP231X) SB07_3.0_3.1, SB08_0.5_0.6, SB08_5.0_5.1, SB09_0.0_0.1	**05-Dec-2016**	**15-Dec-2016**	03-Jun-2017	✓	**15-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) SB07_0.5_0.6	**05-Dec-2016**	**15-Dec-2016**	03-Jun-2017	✓	**16-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) SB09_4.0_4.1, SB10_0.0_0.1, SB10_2.3_2.5, SB11_5.4-5.5	**06-Dec-2016**	**15-Dec-2016**	04-Jun-2017	✓	**15-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) GW02_0.5_0.6, GW02_5.0_5.1, GW01_0.0_0.2, GW01_4.0_4.1, SB06_0.5_0.6, SB06_5.0_5.1	**06-Dec-2016**	**15-Dec-2016**	04-Jun-2017	✓	**16-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) SB11_1.0_1.1, SB12_0.0_0.1, SB12_5.6_5.7, SB13_0.5_0.6, SB13_2.0_2.1	**07-Dec-2016**	**15-Dec-2016**	05-Jun-2017	✓	**15-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) GW03_0.0_0.1	**07-Dec-2016**	**15-Dec-2016**	05-Jun-2017	✓	**16-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) SB14_3.0_3.1, SB15_1.0_1.1	**08-Dec-2016**	**15-Dec-2016**	06-Jun-2017	✓	**15-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) GW05_1.6_1.7, GW05_3.4_3.5, GW04_0.5_0.6, GW04_6.0_6.1	**08-Dec-2016**	**15-Dec-2016**	06-Jun-2017	✓	**16-Dec-2016**	24-Jan-2017	✓
Snap Lock Bag (EP231X) SB07_ASHPALT_0.0_0.3	**05-Dec-2016**	**18-Dec-2016**	03-Jun-2017	✓	**18-Dec-2016**	27-Jan-2017	✓
Soil Glass Jar - Unpreserved (EP231X) GW03_5.0_5.1	**07-Dec-2016**	**15-Dec-2016**	05-Jun-2017	✓	**16-Dec-2016**	24-Jan-2017	✓
Soil Glass Jar - Unpreserved (EP231X) SB14_0.5_0.6, SB15_5.0_5.1	**08-Dec-2016**	**15-Dec-2016**	06-Jun-2017	✓	**15-Dec-2016**	24-Jan-2017	✓

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
EP231C: Perfluoroalkyl Sulfonamides							
HDPE Soil Jar (EP231X) SB07_3.0_3.1, SB08_0.5_0.6, SB08_5.0_5.1, SB09_0.0_0.1	**05-Dec-2016**	**15-Dec-2016**	03-Jun-2017	✓	**15-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) SB07_0.5_0.6	**05-Dec-2016**	**15-Dec-2016**	03-Jun-2017	✓	**16-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) SB09_4.0_4.1, SB10_0.0_0.1, SB10_2.3_2.5, SB11_5.4-5.5	**06-Dec-2016**	**15-Dec-2016**	04-Jun-2017	✓	**15-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) GW02_0.5_0.6, GW02_5.0_5.1, GW01_0.0_0.2, GW01_4.0_4.1, SB06_0.5_0.6, SB06_5.0_5.1	**06-Dec-2016**	**15-Dec-2016**	04-Jun-2017	✓	**16-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) SB11_1.0_1.1, SB12_0.0_0.1, SB12_5.6_5.7, SB13_0.5_0.6, SB13_2.0_2.1	**07-Dec-2016**	**15-Dec-2016**	05-Jun-2017	✓	**15-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) GW03_0.0_0.1	**07-Dec-2016**	**15-Dec-2016**	05-Jun-2017	✓	**16-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) SB14_3.0_3.1, SB15_1.0_1.1	**08-Dec-2016**	**15-Dec-2016**	06-Jun-2017	✓	**15-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) GW05_1.6_1.7, GW05_3.4_3.5, GW04_0.5_0.6, GW04_6.0_6.1	**08-Dec-2016**	**15-Dec-2016**	06-Jun-2017	✓	**16-Dec-2016**	24-Jan-2017	✓
Snap Lock Bag (EP231X) SB07_ASHPALT_0.0_0.3	**05-Dec-2016**	**18-Dec-2016**	03-Jun-2017	✓	**18-Dec-2016**	27-Jan-2017	✓
Soil Glass Jar - Unpreserved (EP231X) GW03_5.0_5.1	**07-Dec-2016**	**15-Dec-2016**	05-Jun-2017	✓	**16-Dec-2016**	24-Jan-2017	✓
Soil Glass Jar - Unpreserved (EP231X) SB14_0.5_0.6, SB15_5.0_5.1	**08-Dec-2016**	**15-Dec-2016**	06-Jun-2017	✓	**15-Dec-2016**	24-Jan-2017	✓

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
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE Soil Jar (EP231X) SB07_3.0_3.1, SB08_0.5_0.6, SB08_5.0_5.1, SB09_0.0_0.1	**05-Dec-2016**	**15-Dec-2016**	03-Jun-2017	✓	**15-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) SB07_0.5_0.6	**05-Dec-2016**	**15-Dec-2016**	03-Jun-2017	✓	**16-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) SB09_4.0_4.1, SB10_0.0_0.1, SB10_2.3_2.5, SB11_5.4-5.5	**06-Dec-2016**	**15-Dec-2016**	04-Jun-2017	✓	**15-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) GW02_0.5_0.6, GW02_5.0_5.1, GW01_0.0_0.2, GW01_4.0_4.1, SB06_0.5_0.6, SB06_5.0_5.1	**06-Dec-2016**	**15-Dec-2016**	04-Jun-2017	✓	**16-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) SB11_1.0_1.1, SB12_0.0_0.1, SB12_5.6_5.7, SB13_0.5_0.6, SB13_2.0_2.1	**07-Dec-2016**	**15-Dec-2016**	05-Jun-2017	✓	**15-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) GW03_0.0_0.1	**07-Dec-2016**	**15-Dec-2016**	05-Jun-2017	✓	**16-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) SB14_3.0_3.1, SB15_1.0_1.1	**08-Dec-2016**	**15-Dec-2016**	06-Jun-2017	✓	**15-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) GW05_1.6_1.7, GW05_3.4_3.5, GW04_0.5_0.6, GW04_6.0_6.1	**08-Dec-2016**	**15-Dec-2016**	06-Jun-2017	✓	**16-Dec-2016**	24-Jan-2017	✓
Snap Lock Bag (EP231X) SB07_ASHPALT_0.0_0.3	**05-Dec-2016**	**18-Dec-2016**	03-Jun-2017	✓	**18-Dec-2016**	27-Jan-2017	✓
Soil Glass Jar - Unpreserved (EP231X) GW03_5.0_5.1	**07-Dec-2016**	**15-Dec-2016**	05-Jun-2017	✓	**16-Dec-2016**	24-Jan-2017	✓
Soil Glass Jar - Unpreserved (EP231X) SB14_0.5_0.6, SB15_5.0_5.1	**08-Dec-2016**	**15-Dec-2016**	06-Jun-2017	✓	**15-Dec-2016**	24-Jan-2017	✓

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
EP231P: PFAS Sums							
HDPE Soil Jar (EP231X) SB07_3.0_3.1, SB08_0.5_0.6, SB08_5.0_5.1, SB09_0.0_0.1	**05-Dec-2016**	**15-Dec-2016**	03-Jun-2017	✓	**15-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) SB07_0.5_0.6	**05-Dec-2016**	**15-Dec-2016**	03-Jun-2017	✓	**16-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) SB09_4.0_4.1, SB10_0.0_0.1, SB10_2.3_2.5, SB11_5.4-5.5	**06-Dec-2016**	**15-Dec-2016**	04-Jun-2017	✓	**15-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) GW02_0.5_0.6, GW02_5.0_5.1, GW01_0.0_0.2, GW01_4.0_4.1, SB06_0.5_0.6, SB06_5.0_5.1	**06-Dec-2016**	**15-Dec-2016**	04-Jun-2017	✓	**16-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) SB11_1.0_1.1, SB12_0.0_0.1, SB12_5.6_5.7, SB13_0.5_0.6, SB13_2.0_2.1	**07-Dec-2016**	**15-Dec-2016**	05-Jun-2017	✓	**15-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) GW03_0.0_0.1	**07-Dec-2016**	**15-Dec-2016**	05-Jun-2017	✓	**16-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) SB14_3.0_3.1, SB15_1.0_1.1	**08-Dec-2016**	**15-Dec-2016**	06-Jun-2017	✓	**15-Dec-2016**	24-Jan-2017	✓
HDPE Soil Jar (EP231X) GW05_1.6_1.7, GW05_3.4_3.5, GW04_0.5_0.6, GW04_6.0_6.1	**08-Dec-2016**	**15-Dec-2016**	06-Jun-2017	✓	**16-Dec-2016**	24-Jan-2017	✓
Snap Lock Bag (EP231X) SB07_ASHPALT_0.0_0.3	**05-Dec-2016**	**18-Dec-2016**	03-Jun-2017	✓	**18-Dec-2016**	27-Jan-2017	✓
Soil Glass Jar - Unpreserved (EP231X) GW03_5.0_5.1	**07-Dec-2016**	**15-Dec-2016**	05-Jun-2017	✓	**16-Dec-2016**	24-Jan-2017	✓
Soil Glass Jar - Unpreserved (EP231X) SB14_0.5_0.6, SB15_5.0_5.1	**08-Dec-2016**	**15-Dec-2016**	06-Jun-2017	✓	**15-Dec-2016**	24-Jan-2017	✓

Matrix: **WATER**

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
EP080/071: Total Petroleum Hydrocarbons							
Amber VOC Vial - Sulfuric Acid (EP080) RB_071216	**07-Dec-2016**	**16-Dec-2016**	21-Dec-2016	✓	**16-Dec-2016**	21-Dec-2016	✓
Amber VOC Vial - Sulfuric Acid (EP080) RB_081216	**08-Dec-2016**	**16-Dec-2016**	22-Dec-2016	✓	**16-Dec-2016**	22-Dec-2016	✓
Clear glass VOC vial - HCl (EP080) RB_051216	**05-Dec-2016**	**16-Dec-2016**	19-Dec-2016	✓	**16-Dec-2016**	19-Dec-2016	✓
Clear glass VOC vial - HCl (EP080) RB_061216	**06-Dec-2016**	**16-Dec-2016**	20-Dec-2016	✓	**16-Dec-2016**	20-Dec-2016	✓

Matrix: **WATER**

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
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber VOC Vial - Sulfuric Acid (EP080) RB_071216	**07-Dec-2016**	**16-Dec-2016**	21-Dec-2016	✓	**16-Dec-2016**	21-Dec-2016	✓
Amber VOC Vial - Sulfuric Acid (EP080) RB_081216	**08-Dec-2016**	**16-Dec-2016**	22-Dec-2016	✓	**16-Dec-2016**	22-Dec-2016	✓
Clear glass VOC vial - HCl (EP080) RB_051216	**05-Dec-2016**	**16-Dec-2016**	19-Dec-2016	✓	**16-Dec-2016**	19-Dec-2016	✓
Clear glass VOC vial - HCl (EP080) RB_061216	**06-Dec-2016**	**16-Dec-2016**	20-Dec-2016	✓	**16-Dec-2016**	20-Dec-2016	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080) RB_071216	**07-Dec-2016**	**16-Dec-2016**	21-Dec-2016	✓	**16-Dec-2016**	21-Dec-2016	✓
Amber VOC Vial - Sulfuric Acid (EP080) RB_081216	**08-Dec-2016**	**16-Dec-2016**	22-Dec-2016	✓	**16-Dec-2016**	22-Dec-2016	✓
Clear glass VOC vial - HCl (EP080) RB_051216	**05-Dec-2016**	**16-Dec-2016**	19-Dec-2016	✓	**16-Dec-2016**	19-Dec-2016	✓
Clear glass VOC vial - HCl (EP080) RB_061216	**06-Dec-2016**	**16-Dec-2016**	20-Dec-2016	✓	**16-Dec-2016**	20-Dec-2016	✓
EP231A: Perfluoroalkyl Sulfonic Acids							
Clear Plastic Bottle - Natural (EP231X) RB_071216	**07-Dec-2016**	**----**	----	----	**13-Dec-2016**	05-Jun-2017	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
Clear Plastic Bottle - Natural (EP231X) RB_071216	**07-Dec-2016**	**----**	----	----	**13-Dec-2016**	05-Jun-2017	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
Clear Plastic Bottle - Natural (EP231X) RB_071216	**07-Dec-2016**	**----**	----	----	**13-Dec-2016**	05-Jun-2017	✓
EP231P: PFAS Sums							
Clear Plastic Bottle - Natural (EP231X) RB_071216	**07-Dec-2016**	**----**	----	----	**13-Dec-2016**	05-Jun-2017	✓

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)							
Exchangeable Cations	ED007	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations with pre-treatment	ED008	2	1	**200.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Moisture Content	EA055-103	6	60	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organic Matter	EP004	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	4	39	**10.26**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	5	40	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	4	28	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	4	39	**10.26**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	4	39	**10.26**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	6	59	**10.17**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Exchangeable Cations	ED007	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations with pre-treatment	ED008	0	1	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Organic Matter	EP004	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	39	**5.13**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	40	**7.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	39	**5.13**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	39	**5.13**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	3	59	**5.08**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Exchangeable Cations	ED007	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations with pre-treatment	ED008	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organic Matter	EP004	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	39	**5.13**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	40	**7.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	39	**5.13**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	39	**5.13**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	3	59	**5.08**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Organic Matter	EP004	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	39	**5.13**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	40	**7.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	39	**5.13**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

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*	
Matrix Spikes (MS) - Continued							
Total Metals by ICP-AES	EG005T	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	39	**5.13**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	3	59	**5.08**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

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)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**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 (1:5)	EA002	SOIL	In house: Referenced to APHA 4500H+. pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3) (Method 103)
Moisture Content	EA055-103	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Exchangeable Cations	ED007	SOIL	In house: Referenced to Rayment & Lyons (2011) Method 15A1. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM (2013) Schedule B(3) (Method 301)
Exchangeable Cations with pre-treatment	ED008	SOIL	In house: Referenced to Rayment & Higginson (2011) Method 15A2. Soluble salts are removed from the sample prior to analysis. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM (2013) Schedule B(3) (Method 301)
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)
Organic Matter	EP004	SOIL	In house: Referenced to AS1289.4.1.1 - 1997., Dichromate oxidation method after Walkley and Black. This method is compliant with NEPM (2013) Schedule B(3)
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.
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.
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	SOIL	In-House. A portion of soil is extracted with MTBE. The extract is taken to dryness, made up in mobile phase. Analysis is by LC/MSMS, ESI Negative Mode using MRM. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers.
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In house: Direct injection analysis of fresh waters after dilution (1:1) with methanol. Analysis by LC-Electrospray-MS-MS, Negative Mode using MRM. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers.

Preparation Methods	Method	Matrix	Method Descriptions
Exchangeable Cations Preparation Method	ED007PR	SOIL	In house: Referenced to Rayment & Higginson (1992) method 15A1. A 1M NH4Cl extraction by end over end tumbling at a ratio of 1:20. There is no pretreatment for soluble salts. Extracts can be run by ICP for cations.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of distilled water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
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)
Organic Matter	EP004-PR	SOIL	In house: Referenced to AS1289.4.1.1 - 1997. Dichromate oxidation method after Walkley and Black. This method is compliant with NEPM (2013) Schedule B(3) (Method 105)
Sample Extraction for PFAS	EP231-PR	SOIL	In house
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.
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.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1628401**	Page	: 1 of 29
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR BEN ANDERSON	Contact	: Customer Services ES
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 08 6222 8222	Telephone	: +61-2-8784 8555
Project	: ALBION PARK	Date Samples Received	: 09-Dec-2016
Order number	: 21-25583/02	Date Analysis Commenced	: 12-Dec-2016
C-O-C number	: ----	Issue Date	: 19-Dec-2016
Sampler	: Matthew West		
Site	: ----		
Quote number	: EN/005/15		
No. of samples received	: 123		
No. of samples analysed	: 49		

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*
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ashesh Patel	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
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Lana Nguyen	Senior LCMS Chemist	Sydney Organics, Smithfield, NSW
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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 (%)*
EA002 : pH (Soils) (QC Lot: 687598)									
ES1628079-001	Anonymous	EA002: pH Value	----	0.1	pH Unit	7.6	7.6	0.00	0% - 20%
EA002 : pH (Soils) (QC Lot: 689161)									
ME1601728-002	Anonymous	EA002: pH Value	----	0.1	pH Unit	7.5	7.6	0.00	0% - 20%
EA002 : pH (Soils) (QC Lot: 691006)									
ES1628401-006	GW05_3.4_3.5	EA002: pH Value	----	0.1	pH Unit	5.0	5.0	0.00	0% - 20%
ES1628554-002	Anonymous	EA002: pH Value	----	0.1	pH Unit	8.2	7.6	8.61	0% - 20%
EA055: Moisture Content (QC Lot: 689905)									
ES1628279-025	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	15.4	14.8	4.08	0% - 50%
ES1628279-041	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	3.3	4.0	19.9	No Limit
EA055: Moisture Content (QC Lot: 689906)									
ES1628401-031	GW02_5.0_5.1	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	23.1	22.1	4.68	0% - 20%
ES1628401-057	SB08_0.0_0.15	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	9.7	8.8	9.45	No Limit
EA055: Moisture Content (QC Lot: 689907)									
ES1628401-082	SB11_0.5_0.6	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	12.8	13.3	3.88	0% - 50%
ES1628401-106	SB15_0.5_0.6	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	14.7	15.4	4.53	0% - 50%
ED007: Exchangeable Cations (QC Lot: 697920)									
ES1628143-001	Anonymous	ED007: Exchangeable Calcium	----	0.1	meq/100g	9.5	8.8	7.43	0% - 20%
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	2.0	2.0	0.00	0% - 20%
		ED007: Exchangeable Potassium	----	0.1	meq/100g	0.5	0.5	0.00	No Limit
		ED007: Exchangeable Sodium	----	0.1	meq/100g	1.9	1.8	0.00	0% - 50%
		ED007: Cation Exchange Capacity	----	0.1	meq/100g	13.9	13.1	6.08	0% - 20%
ES1628401-060	SB08_2.0_2.1	ED007: Exchangeable Calcium	----	0.1	meq/100g	0.2	0.2	0.00	No Limit
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	7.2	7.5	3.34	0% - 20%
		ED007: Exchangeable Potassium	----	0.1	meq/100g	0.2	0.2	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 (%)*
ED007: Exchangeable Cations (QC Lot: 697920) - continued									
ES1628401-060	SB08_2.0_2.1	ED007: Exchangeable Sodium	----	0.1	meq/100g	4.3	4.7	8.16	0% - 20%
		ED007: Cation Exchange Capacity	----	0.1	meq/100g	11.9	12.6	5.20	0% - 20%
ED008: Exchangeable Cations (QC Lot: 694077)									
ES1628143-001	Anonymous	ED008: Exchangeable Calcium	----	0.1	meq/100g	<0.1	<0.1	0.00	0% - 20%
		ED008: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	<0.1	0.00	0% - 20%
		ED008: Exchangeable Potassium	----	0.1	meq/100g	<0.1	<0.1	0.00	0% - 20%
		ED008: Exchangeable Sodium	----	0.1	meq/100g	<0.1	<0.1	0.00	0% - 20%
		ED008: Cation Exchange Capacity	----	0.1	meq/100g	<0.1	<0.1	0.00	0% - 20%
ES1628401-053	SB07_3.0_3.1	ED008: Exchangeable Calcium	----	0.1	meq/100g	<0.1	<0.1	0.00	0% - 20%
		ED008: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	<0.1	0.00	0% - 20%
		ED008: Exchangeable Potassium	----	0.1	meq/100g	<0.1	<0.1	0.00	0% - 20%
		ED008: Exchangeable Sodium	----	0.1	meq/100g	<0.1	<0.1	0.00	0% - 20%
		ED008: Cation Exchange Capacity	----	0.1	meq/100g	<0.1	<0.1	0.00	0% - 20%
EG005T: Total Metals by ICP-AES (QC Lot: 693466)									
ES1627937-001	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	4	3	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	8	5	55.1	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	7	6	20.8	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	29	18	47.6	No Limit
ES1628401-041	SB06_0.5_0.6	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	22	22	0.00	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	6	4	24.8	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	26	33	24.8	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	15	13	17.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	17	9	59.9	No Limit
EG005T: Total Metals by ICP-AES (QC Lot: 693468)									
ES1628401-082	SB11_0.5_0.6	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	21	21	0.00	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	4	3	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	6	5	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	10	8	19.8	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	<5	<5	0.00	No Limit
ES1628401-113	BD1_051216	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	9	10	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	5	5	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<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 (%)*
EG005T: Total Metals by ICP-AES (QC Lot: 693468) - continued									
ES1628401-113	BD1_051216	EG005T: Copper	7440-50-8	5	mg/kg	64	49	25.8	0% - 50%
		EG005T: Lead	7439-92-1	5	mg/kg	10	10	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	28	29	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 693467)									
ES1627937-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1628401-041	SB06_0.5_0.6	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 693469)									
ES1628401-082	SB11_0.5_0.6	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1628401-113	BD1_051216	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP004: Organic Matter (QC Lot: 689655)									
ES1628279-010	Anonymous	EP004: Total Organic Carbon	----	0.5	%	1.1	1.1	0.00	No Limit
ES1628401-043	SB06_2.0_2.1	EP004: Total Organic Carbon	----	0.5	%	0.8	0.8	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 687685)									
ES1628401-004	GW05_1.6_1.7	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	<0.5	<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
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
ES1628401-041	SB06_0.5_0.6	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

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 687685) - continued									
ES1628401-041	SB06_0.5_0.6	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
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 687699)									
ES1628354-001	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
		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
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
ES1628401-086	SB12_0.0_0.1	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

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: 687699) - continued									
ES1628401-086	SB12_0.0_0.1	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
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 687085)									
EB1628872-002	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EB1628916-006	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 687361)									
ES1628401-004	GW05_1.6_1.7	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
ES1628401-041	SB06_0.5_0.6	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 687367)									
ES1628354-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
ES1628354-008	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 687686)									
ES1628401-004	GW05_1.6_1.7	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
ES1628401-041	SB06_0.5_0.6	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
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 687700)									
ES1628354-001	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
ES1628401-086	SB12_0.0_0.1	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
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 687085)									
EB1628872-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	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 (%)*
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 687085) - continued									
EB1628916-006	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: 687361)									
ES1628401-004	GW05_1.6_1.7	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1628401-041	SB06_0.5_0.6	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: 687367)									
ES1628354-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1628354-008	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: 687686)									
ES1628401-004	GW05_1.6_1.7	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
ES1628401-041	SB06_0.5_0.6	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
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 687700)									
ES1628354-001	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
ES1628401-086	SB12_0.0_0.1	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
EP080: BTEXN (QC Lot: 687085)									
EB1628872-002	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
		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
EB1628916-006	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
		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
EP080: BTEXN (QC Lot: 687361)									
ES1628401-004	GW05_1.6_1.7	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: 687361) - continued									
ES1628401-004	GW05_1.6_1.7	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
ES1628401-041	SB06_0.5_0.6	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
		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
EP080: BTEXN (QC Lot: 687367)									
ES1628354-001	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
		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
ES1628354-008	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
		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
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 687518)									
ES1628401-053	SB07_3.0_3.1	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	0.0005	0.0006	25.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0032	0.0034	6.44	0% - 50%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
ES1628401-091	SB12_5.6_5.7	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	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 (%)*
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 687680)									
ES1628401-004	GW05_1.6_1.7	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	0.0005	0.0004	21.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	0.0003	0.0002	40.0	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	0.0021	0.0018	16.0	0% - 50%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0015	0.0010	37.5	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
ES1628401-041	SB06_0.5_0.6	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	0.0055	0.0068	22.0	0% - 50%
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	0.0070	0.0076	7.59	0% - 50%
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	0.164	0.170	3.58	0% - 20%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	0.0506	0.0583	14.3	0% - 20%
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	3.57	3.44	3.64	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0036	0.0042	14.2	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 694846)									
EM1615098-070	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	0.0005	0.0003	30.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0015	0.0012	20.2	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 687518)									
ES1628401-053	SB07_3.0_3.1	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	0.0003	0.0004	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.00	No Limit
ES1628401-091	SB12_5.6_5.7	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	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 (%)*
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 687518) - continued									
ES1628401-091	SB12_5.6_5.7	EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 687680)									
ES1628401-004	GW05_1.6_1.7	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	0.0006	0.0006	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	0.0003	0.0003	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.00	No Limit
ES1628401-041	SB06_0.5_0.6	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	0.0036	0.0032	10.9	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	0.0163	0.0155	5.03	0% - 20%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	0.0086	0.0067	25.8	0% - 50%
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	0.0599	0.0590	1.66	0% - 20%
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0012	<0.0012	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.003	100	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 694846)									
EM1615098-070	Anonymous	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 687518)									
ES1628401-053	SB07_3.0_3.1	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	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 (%)*
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 687518) - continued									
ES1628401-053	SB07_3.0_3.1	EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
ES1628401-091	SB12_5.6_5.7	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 687680)									
ES1628401-004	GW05_1.6_1.7	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
ES1628401-041	SB06_0.5_0.6	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	0.0018	0.0026	33.3	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 (%)*
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 687680) - continued									
ES1628401-041	SB06_0.5_0.6	EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0012	<0.0012	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0012	<0.0012	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0012	<0.0012	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0012	<0.0012	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 694846)									
EM1615098-070	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 687518)									
ES1628401-053	SB07_3.0_3.1	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
ES1628401-091	SB12_5.6_5.7	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 687518) - continued									
ES1628401-091	SB12_5.6_5.7	EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 687680)									
ES1628401-004	GW05_1.6_1.7	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
ES1628401-041	SB06_0.5_0.6	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 694846)									
EM1615098-070	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 694907)									
ES1628653-032	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES1628653-072	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 694907)									
ES1628653-032	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1628653-072	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 694907)									
ES1628653-032	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit

Sub-Matrix: **WATER**

				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: 694907) - continued									
ES1628653-032	Anonymous	EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
ES1628653-072	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 689720)									
EB1629099-001	Anonymous	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
ES1628503-001	Anonymous	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.05	0.02	84.9	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.13	0.12	9.76	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 689720)									
EB1629099-001	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.25	0.24	5.34	0% - 20%
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.07	0.06	15.6	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.43	0.45	3.62	0% - 20%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.05	0.03	52.6	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
ES1628503-001	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 689720)									
EB1629099-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	11.4	11.6	1.53	0% - 20%
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	0.18	0.12	37.7	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
ES1628503-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 689720) - continued									
ES1628503-001	Anonymous	EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	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
ED007: Exchangeable Cations (QCLot: 697920)								
ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	1 meq/100g	110	76	122
ED007: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	1.67 meq/100g	98.2	76	118
ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	0.51 meq/100g	108	80	120
ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	0.87 meq/100g	110	80	120
ED007: Cation Exchange Capacity	----	0.1	meq/100g	<0.1	----	----	----	----
ED008: Exchangeable Cations (QCLot: 694077)								
ED008: Exchangeable Calcium	----	0.1	meq/100g	<0.1	----	----	----	----
ED008: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	----	----	----	----
ED008: Exchangeable Potassium	----	0.1	meq/100g	<0.1	----	----	----	----
ED008: Exchangeable Sodium	----	0.1	meq/100g	<0.1	----	----	----	----
ED008: Cation Exchange Capacity	----	0.1	meq/100g	<0.1	----	----	----	----
EG005T: Total Metals by ICP-AES (QCLot: 693466)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	98.3	86	126
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	94.0	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	108	76	128
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	102	86	120
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	102	80	114
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	103	87	123
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	105	80	122
EG005T: Total Metals by ICP-AES (QCLot: 693468)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	101	86	126
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	99.5	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	113	76	128
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	99.5	86	120
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	103	80	114
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	108	87	123
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	110	80	122
EG035T: Total Recoverable Mercury by FIMS (QCLot: 693467)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	79.7	70	105
EG035T: Total Recoverable Mercury by FIMS (QCLot: 693469)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	80.0	70	105
EP004: Organic Matter (QCLot: 689655)								
EP004: Total Organic Carbon	----	0.5	%	<0.5	1.46 %	# 100	81	99

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: 687685)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	95.5	77	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	93.9	72	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	93.8	73	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	90.5	72	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	93.1	75	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	88.2	77	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	96.0	73	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	95.4	74	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	83.1	69	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	89.9	75	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	80.4	68	116
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	89.5	74	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	89.5	70	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	84.1	61	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	85.5	62	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	84.7	63	121
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 687699)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	115	77	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	114	72	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	114	73	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	110	72	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	112	75	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	108	77	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	115	73	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	113	74	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	99.6	69	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	110	75	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	96.4	68	116
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	110	74	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	109	70	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	104	61	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	105	62	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	103	63	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 687085)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	95.3	68	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 687361)								

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
EP080/071: Total Petroleum Hydrocarbons (QCLot: 687361) - continued								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	114	68	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 687367)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	90.4	68	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 687686)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	107	75	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	99.4	77	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	100	71	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 687700)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	112	75	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	119	77	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	114	71	129
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 687085)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	91.5	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 687361)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	116	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 687367)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	89.0	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 687686)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	250 mg/kg	107	77	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	103	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	150 mg/kg	100	63	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 687700)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	250 mg/kg	114	77	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	104	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	150 mg/kg	113	63	131
EP080: BTEXN (QCLot: 687085)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	95.2	62	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	94.8	67	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	89.4	65	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	94.8	66	118
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	94.3	68	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	96.4	63	119
EP080: BTEXN (QCLot: 687361)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	98.0	62	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	105	67	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	89.6	65	117

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
EP080: BTEXN (QCLot: 687361) - continued								
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	95.6	66	118
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	96.9	68	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	95.4	63	119
EP080: BTEXN (QCLot: 687367)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	86.2	62	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	96.1	67	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	87.4	65	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	92.0	66	118
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	92.4	68	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	87.2	63	119
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 687518)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.00125 mg/kg	105	57	121
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	83.7	55	125
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	81.6	52	126
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	79.0	54	123
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	98.4	55	127
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	84.7	54	125
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 687680)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.00125 mg/kg	109	57	121
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	59.5	55	125
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	84.1	52	126
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	84.2	54	123
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	82.7	55	127
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	77.2	54	125
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 694846)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.00125 mg/kg	63.9	57	121
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	72.2	55	125
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	99.4	52	126
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	94.6	54	123
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	72.8	55	127
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	110	54	125
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 687518)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	95.7	52	128
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	88.4	54	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	120	58	127
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	86.7	57	128

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
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 687518) - continued								
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	99.8	60	134
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	109	63	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	114	55	130
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	109	62	130
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	105	53	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	114	49	129
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	94.6	59	129
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 687680)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	64.1	52	128
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	102	54	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	86.9	58	127
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	99.5	57	128
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	122	60	134
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	120	63	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	106	55	130
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	95.2	62	130
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	86.7	53	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	109	49	129
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	99.0	59	129
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 694846)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	78.4	52	128
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	85.0	54	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	62.0	58	127
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	69.7	57	128
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	81.4	60	134
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	104	63	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	116	55	130
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	114	62	130
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	104	53	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	89.2	49	129
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	88.0	59	129
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 687518)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	75.8	52	132
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	96.3	65	126
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	93.7	64	126
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	79.1	63	124

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
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 687518) - continued								
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	80.2	58	125
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	91.9	61	130
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	104	55	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 687680)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	93.2	52	132
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	121	65	126
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	87.9	64	126
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	70.6	63	124
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	71.0	58	125
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	108	61	130
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	118	55	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 694846)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	71.0	52	132
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	106	65	126
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	106	64	126
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	80.3	63	124
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	73.4	58	125
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	66.3	61	130
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	61.4	55	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 687518)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00125 mg/kg	120	54	130
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.00125 mg/kg	102	61	130
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	0.00125 mg/kg	100	62	130
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.00125 mg/kg	108	60	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 687680)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00125 mg/kg	116	54	130
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.00125 mg/kg	97.8	61	130
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	0.00125 mg/kg	85.8	62	130

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 687680) - continued								
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.00125 mg/kg	108	60	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 694846)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00125 mg/kg	91.2	54	130
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.00125 mg/kg	83.7	61	130
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	0.00125 mg/kg	97.7	62	130
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.00125 mg/kg	65.4	60	130

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 694907)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	87.6	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 694907)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	90.5	75	127
EP080: BTEXN (QCLot: 694907)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	88.0	70	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	88.2	69	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	91.3	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	91.4	69	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	94.7	72	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	103	70	120
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 689720)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.5 µg/L	118	70	130
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.5 µg/L	117	70	130
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.5 µg/L	92.6	70	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 689720)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	2.5 µg/L	96.1	70	130
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.5 µg/L	115	70	130
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.5 µg/L	96.2	70	130
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.5 µg/L	84.4	70	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.5 µg/L	107	70	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 689720)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.5 µg/L	81.6	70	130
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.5 µg/L	106	70	130
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.5 µg/L	89.6	70	130
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.5 µg/L	105	70	130

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
EG005T: Total Metals by ICP-AES (QCLot: 693466)							
ES1627937-001	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	98.1	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	101	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	103	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	101	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	105	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	96.0	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	97.1	70	130
EG005T: Total Metals by ICP-AES (QCLot: 693468)							
ES1628401-082	SB11_0.5_0.6	EG005T: Arsenic	7440-38-2	50 mg/kg	90.4	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	106	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	111	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	106	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	108	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	106	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	106	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 693467)							
ES1627937-001	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	96.4	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 693469)							
ES1628401-082	SB11_0.5_0.6	EG035T: Mercury	7439-97-6	5 mg/kg	93.2	70	130
EP004: Organic Matter (QCLot: 689655)							
ES1628279-010	Anonymous	EP004: Total Organic Carbon	----	2.66 %	112	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 687685)							
ES1628401-004	GW05_1.6_1.7	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	87.2	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	98.0	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 687699)							
ES1628354-001	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	104	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	114	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 687085)							
EB1628872-002	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	103	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 687361)							
ES1628401-004	GW05_1.6_1.7	EP080: C6 - C9 Fraction	----	32.5 mg/kg	104	70	130

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
EP080/071: Total Petroleum Hydrocarbons (QCLot: 687367)							
ES1628354-001	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	106	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 687686)							
ES1628401-004	GW05_1.6_1.7	EP071: C10 - C14 Fraction	----	523 mg/kg	77.1	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	90.0	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	100	52	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 687700)							
ES1628354-001	Anonymous	EP071: C10 - C14 Fraction	----	523 mg/kg	75.9	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	91.0	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	99.9	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 687085)							
EB1628872-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	97.3	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 687361)							
ES1628401-004	GW05_1.6_1.7	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	108	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 687367)							
ES1628354-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	106	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 687686)							
ES1628401-004	GW05_1.6_1.7	EP071: >C10 - C16 Fraction	----	860 mg/kg	77.8	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	100	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	95.8	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 687700)							
ES1628354-001	Anonymous	EP071: >C10 - C16 Fraction	----	860 mg/kg	79.8	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	97.6	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	87.7	52	132
EP080: BTEXN (QCLot: 687085)							
EB1628872-002	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	102	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	98.5	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	101	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	97.9	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	100	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	106	70	130
EP080: BTEXN (QCLot: 687361)							
ES1628401-004	GW05_1.6_1.7	EP080: Benzene	71-43-2	2.5 mg/kg	99.4	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	100	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	94.7	70	130

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: 687361) - continued							
ES1628401-004	GW05_1.6_1.7	EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	89.9	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	89.6	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	88.3	70	130
EP080: BTEXN (QCLot: 687367)							
ES1628354-001	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	91.0	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	101	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	99.9	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	99.3	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	100	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	100	70	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 687518)							
ES1628401-053	SB07_3.0_3.1	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.00125 mg/kg	76.1	50	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00125 mg/kg	88.6	50	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00125 mg/kg	82.1	50	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00125 mg/kg	89.4	50	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00125 mg/kg	115	50	130
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.00125 mg/kg	102	50	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 687680)							
ES1628401-004	GW05_1.6_1.7	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.00125 mg/kg	52.9	50	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00125 mg/kg	63.6	50	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00125 mg/kg	80.1	50	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00125 mg/kg	114	50	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00125 mg/kg	66.8	50	130
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.00125 mg/kg	68.0	50	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 694846)							
EM1615098-070	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.00125 mg/kg	57.0	50	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00125 mg/kg	59.3	50	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00125 mg/kg	73.4	50	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00125 mg/kg	83.4	50	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00125 mg/kg	114	50	130
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.00125 mg/kg	122	50	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 687518)							
ES1628401-053	SB07_3.0_3.1	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	80.7	30	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	88.6	50	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	103	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	100	50	130

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
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 687518) - continued							
ES1628401-053	SB07_3.0_3.1	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	105	50	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	104	50	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	113	50	130
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	96.8	50	130
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	108	50	130
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	124	30	130
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00312 mg/kg	84.9	30	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 687680)							
ES1628401-004	GW05_1.6_1.7	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	93.6	30	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	100.0	50	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	93.1	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	91.7	50	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	108	50	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	113	50	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	77.5	50	130
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	59.1	50	130
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	59.9	50	130
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	84.4	30	130
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00312 mg/kg	58.0	30	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 694846)							
EM1615098-070	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	77.6	30	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	53.0	50	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	53.4	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	52.4	50	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	86.3	50	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	120	50	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	97.2	50	130
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	113	50	130
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	117	50	130
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	95.4	30	130
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00312 mg/kg	48.3	30	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 687518)							
ES1628401-053	SB07_3.0_3.1	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	65.2	50	130
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	68.5	30	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	54.8	30	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.00312 mg/kg	55.3	30	130

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
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 687518) - continued							
ES1628401-053	SB07_3.0_3.1	EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	72.6	30	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	113	30	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	83.8	30	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 687680)							
ES1628401-004	GW05_1.6_1.7	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	74.5	50	130
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	46.9	30	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	39.6	30	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.00312 mg/kg	44.2	30	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	33.4	30	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	91.6	30	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	106	30	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 694846)							
EM1615098-070	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	54.4	50	130
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	89.9	30	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	109	30	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.00312 mg/kg	95.2	30	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	36.9	30	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	60.0	30	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	55.2	30	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 687518)							
ES1628401-053	SB07_3.0_3.1	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00125 mg/kg	112	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00125 mg/kg	114	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.00125 mg/kg	105	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.00125 mg/kg	104	50	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 687680)							
ES1628401-004	GW05_1.6_1.7	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00125 mg/kg	111	50	130

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	Matrix Spike (MS) Report: SpikeRecovery(%) MS	Matrix Spike (MS) Report: Recovery Limits (%) Low	Matrix Spike (MS) Report: Recovery Limits (%) High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 687680) - continued							
ES1628401-004	GW05_1.6_1.7	EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00125 mg/kg	124	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.00125 mg/kg	88.4	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.00125 mg/kg	123	50	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 694846)							
EM1615098-070	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00125 mg/kg	90.0	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00125 mg/kg	90.3	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.00125 mg/kg	86.8	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.00125 mg/kg	63.4	50	130

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	Matrix Spike (MS) Report: SpikeRecovery(%) MS	Matrix Spike (MS) Report: Recovery Limits (%) Low	Matrix Spike (MS) Report: Recovery Limits (%) High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 694907)							
ES1628653-058	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	106	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 694907)							
ES1628653-058	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	108	70	130
EP080: BTEXN (QCLot: 694907)							
ES1628653-058	Anonymous	EP080: Benzene	71-43-2	25 µg/L	79.0	70	130
		EP080: Toluene	108-88-3	25 µg/L	88.8	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	103	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	107	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	115	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	124	70	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 689720)							
EB1629099-001	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.5 µg/L	114	50	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.5 µg/L	99.8	50	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.5 µg/L	106	50	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 689720)							
EB1629099-001	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	2.5 µg/L	74.0	50	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.5 µg/L	76.2	50	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.5 µg/L	91.4	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.5 µg/L	77.2	50	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.5 µg/L	81.4	50	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 689720)							
EB1629099-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.5 µg/L	92.4	50	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 689720) - continued							
EB1629099-001	Anonymous	EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.5 µg/L	# Not Determined	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.5 µg/L	130	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.5 µg/L	91.4	50	130

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0390 E: adelaide@alsglobal.com
☐BRISBANE 2 Byth Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
☐MUDGEE 1/29 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee mail@alsglobal.com
☐NEWCASTLE 5 585 Maitland Road Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
☐NOWRA 4-13 Geary Place North Nowra NSW 2541 Ph: 02 4423 2063 E: nowra@alsglobal.com
☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: wollongong@alsglobal.com

CLIENT: GHD	TURNAROUND REQUIREMENTS: (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	☑ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)
OFFICE: Sydney		☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact? Yes / No / N/A
PROJECT: Albion Park PROJECT NO.:	ALS QUOTE NO.:		Free ice / frozen ice bricks present upon receipt? Yes / No / N/A
ORDER NUMBER: 2125583 PURCHASE ORDER NO.:	COUNTRY OF ORIGIN: AUS	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
PROJECT MANAGER: Ben Anderson CONTACT PH:			Other comment:
SAMPLER: James Lear SAMPLER MOBILE: 0425389666	RELINQUISHED BY: James Lear	RECEIVED BY: Frank Ng	RELINQUISHED BY: / RECEIVED BY:
COC Emailed to ALS? (YES / NO) EDD FORMAT (or default):	DATE/TIME: 1600 16/12/16	DATE/TIME: 16-12-16 1600	DATE/TIME: / DATE/TIME:
Email Reports to (will default to PM if no other addresses are listed): Ben.anderson@ghd.com			
Email Invoice to (will default to PM if no other addresses are listed): nicole.rosen@ghd.com			

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).				Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	PFAS TRH/BTEX metals	Suite M8	PFAS, TRH, BTEX, PAHs, TOC, pH,	HT	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	SS01	16.12.16	S		2			X		
2	SS02							X		please use suites where possible
3	SS03							X		
4	SS04							X		
5	SS05							X		
6	SSQA2							X		
7	SW01		W		6		X			
8	SW02						X			
9	SW03						X			
10	SW04						X			
11	SW05						X			
12	SWQA1						X			
					TOTAL					

Environmental Division
Sydney
Work Order Reference
ES1629123

Telephone : +61-2-8784 8555

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic; V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; U = Lugols Iodine Preserved Bottles; STT = Sterile-Sodium Thiosulfate Preserved Bottles.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com

BRISBANE 2 Byth Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

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TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com

WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: wollongong@alsglobal.com

CLIENT: GHD	TURNAROUND REQUIREMENTS: (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	☑ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)
OFFICE: Sydney		☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact? Yes No N/A
PROJECT: 12-5583 PROJECT NO.:	ALS QUOTE NO.:		Free ice / frozen ice bricks present upon receipt? Yes No N/A
ORDER NUMBER: PURCHASE ORDER NO.:	COUNTRY OF ORIGIN: AUS	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
PROJECT MANAGER: Ben Anderson CONTACT PH:			Other comment:
SAMPLER: James Lean SAMPLER MOBILE: 0425389666	RELINQUISHED BY: James Lean	RECEIVED BY: Frank Ace	RELINQUISHED BY: RECEIVED BY:
COC Emailed to ALS? (YES / NO) EDD FORMAT (or default):	DATE/TIME: 1600 16/12/16	DATE/TIME: 16-12-16 1600	DATE/TIME: DATE/TIME:
Email Reports to (will default to PM if no other addresses are listed): Ben.anderson@ghd.com			
Email Invoice to (will default to PM if no other addresses are listed): Nicole.rosen@ghd.com			
COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:			

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).			Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	Suite M8.	PFAS, TRH, BTEX, metals, pH, TDS, major ions, alkalinity	C6 - C9 + BTEX.	
13	GW01	16/12/16	W		6	X			Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
14	GW02					X			
15	GW03					X			
16	GW04					X	X		
17	GW05					X			
18	GWQA3					X			
19, 20, 24	Trip Spikes		S/W		many			X	
21, 22, 25	Trip blanks		S/W		many			X	
23, 26	TSC								
27	RB1 - Extra								
				TOTAL					

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; LI = Lugols Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1629123**	Page	: 1 of 24
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR BEN ANDERSON	Contact	: Customer Services ES
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 07 5413 8161	Telephone	: +61-2-8784 8555
Project	: Albion Park	Date Samples Received	: 16-Dec-2016 16:00
Order number	: 2125583	Date Analysis Commenced	: 18-Dec-2016
C-O-C number	: ----	Issue Date	: 30-Dec-2016 16:44
Sampler	: JAMES LEAN		
Site	: ----		
Quote number	: EN/005/15		
No. of samples received	: 27		
No. of samples analysed	: 26		

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*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ashesh Patel	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Gaston Allende	R&D Chemist	Sydney Organics, Smithfield, NSW
Raymond Commodore	Instrument Chemist	Sydney Inorganics, Smithfield, NSW

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 no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

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.

- EP071: LOR of sample SS03 have been confirmed by re-extraction and re-analysis.
- EA015 TDS, result has been confirmed for sample 9 by re-analysis.
- TDS by method EA-015 may bias high for sample 7 due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- EP080: The trip spike and its control have been analysed for volatile TPH and BTEX only. The trip spike and control were prepared in the lab using reagent grade sand spiked with petrol. The spike was dispatched from the lab and the control retained.
- EP080: Sample TRIP SPIKE contains volatile compounds spiked into the sample containers prior to dispatch from the laboratory. BTEX compounds spiked at 20 ug/L.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) 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.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) 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.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	SS01	SS02	SS03	SS04	SS05
			Client sampling date / time	[16-Dec-2016]	[16-Dec-2016]	[16-Dec-2016]	[16-Dec-2016]	[16-Dec-2016]
Compound	CAS Number	LOR	Unit	ES1629123-001	ES1629123-002	ES1629123-003	ES1629123-004	ES1629123-005
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	6.6	6.8	6.6	8.6	5.4
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	28.2	35.0	76.1	25.1	32.9
EP004: Organic Matter								
Total Organic Carbon	----	0.5	%	0.6	4.0	12.1	1.8	0.7
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<1.0	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<1.0	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<1.0	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<1.0	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	0.9	<1.0	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<1.0	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	2.1	<1.0	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	2.0	<1.0	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	0.6	<1.0	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	0.7	<1.0	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	0.8	<1.0	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<1.0	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	0.6	<1.0	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<1.0	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<1.0	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	0.7	<1.0	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	8.4	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	0.8	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	0.6	1.0	0.6	0.6	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2	1.4	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg	<50	<50	<60	<50	<50
C15 - C28 Fraction	----	100	mg/kg	<100	<100	<110	<100	<100
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<110	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	<60	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	<10	<10	<10

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	SS01	SS02	SS03	SS04	SS05
			Client sampling date / time	[16-Dec-2016]	[16-Dec-2016]	[16-Dec-2016]	[16-Dec-2016]	[16-Dec-2016]
Compound	CAS Number	LOR	Unit	ES1629123-001	ES1629123-002	ES1629123-003	ES1629123-004	ES1629123-005
				Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued								
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg	<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg	<50	<50	<60	<50	<50
>C16 - C34 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg	<50	<50	<60	<50	<50
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg	<50	<50	<60	<50	<50
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ **Sum of BTEX**	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
^ **Total Xylenes**	1330-20-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	<1
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	**0.0005**
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	**0.0002**	<0.0002	**0.0027**	<0.0002	**0.0039**
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	**0.0047**	<0.0002	**0.112**	**0.0015**	**0.0718**
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	**0.0004**	<0.0002	**0.0014**
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	**0.0031**
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	**0.0007**
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	**0.0006**	<0.0002	**0.0024**
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	**0.0008**	<0.0005	**0.0007**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SS01	SS02	SS03	SS04	SS05
				Client sampling date / time	[16-Dec-2016]	[16-Dec-2016]	[16-Dec-2016]	[16-Dec-2016]	[16-Dec-2016]
Compound	CAS Number	LOR	Unit		ES1629123-001	ES1629123-002	ES1629123-003	ES1629123-004	ES1629123-005
					Result	Result	Result	Result	Result
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued									
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums									
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		**0.0049**	<0.0002	**0.115**	**0.0015**	**0.0757**
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		**0.0049**	<0.0002	**0.116**	**0.0015**	**0.0845**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**93.3**	**95.3**	**97.0**	**99.1**	**83.8**
2-Chlorophenol-D4	93951-73-6	0.5	%		**89.9**	**96.1**	**83.5**	**88.6**	**80.9**
2.4.6-Tribromophenol	118-79-6	0.5	%		**100**	**100**	**103**	**97.5**	**94.4**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**91.7**	**90.1**	**95.5**	**94.7**	**87.6**
Anthracene-d10	1719-06-8	0.5	%		**108**	**109**	**107**	**107**	**104**
4-Terphenyl-d14	1718-51-0	0.5	%		**101**	**103**	**90.6**	**103**	**108**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**106**	**80.5**	**75.7**	**81.2**	**75.4**
Toluene-D8	2037-26-5	0.2	%		**91.7**	**76.0**	**83.4**	**84.1**	**83.4**
4-Bromofluorobenzene	460-00-4	0.2	%		**93.6**	**79.5**	**81.0**	**87.6**	**86.7**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**99.9**	**112**	**103**	**98.0**	**110**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	SSQA2	Trip Spike 1	Trip Blank 1	TSC 1	Trip Spike 2
			Client sampling date / time	[16-Dec-2016]	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00
Compound	CAS Number	LOR	Unit	ES1629123-006	ES1629123-019	ES1629123-021	ES1629123-023	ES1629123-024
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	5.2	----	----	----	----
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	37.7	----	----	----	----
EP004: Organic Matter								
Total Organic Carbon	----	0.5	%	0.6	----	----	----	----
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	<0.5	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	----	----	----	----
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	<0.5	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	0.6	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	40	<10	44	42
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	<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	46	<10	53	50

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SSQA2	Trip Spike 1	Trip Blank 1	TSC 1	Trip Spike 2
				Client sampling date / time	[16-Dec-2016]	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1629123-006	ES1629123-019	ES1629123-021	ES1629123-023	ES1629123-024
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg		<10	**24**	<10	**25**	**24**
>C10 - C16 Fraction	----	50	mg/kg		<50	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	----	----	----	----
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		<50	----	----	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg		<50	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	**0.3**	<0.2	**0.3**	**0.3**
Toluene	108-88-3	0.5	mg/kg		<0.5	**10.3**	<0.5	**12.3**	**12.1**
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	**1.4**	<0.5	**1.8**	**1.8**
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	**7.2**	<0.5	**9.1**	**8.8**
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	**2.9**	<0.5	**3.9**	**3.7**
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	**22.1**	<0.2	**27.4**	**26.7**
^ **Total Xylenes**	1330-20-7	0.5	mg/kg		<0.5	**10.1**	<0.5	**13.0**	**12.5**
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		**0.0008**	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		**0.0108**	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		**0.186**	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		**0.0019**	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		**0.0045**	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		**0.0012**	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		**0.0051**	----	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		**0.0019**	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SSQA2	Trip Spike 1	Trip Blank 1	TSC 1	Trip Spike 2
				Client sampling date / time	[16-Dec-2016]	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1629123-006	ES1629123-019	ES1629123-021	ES1629123-023	ES1629123-024
					Result	Result	Result	Result	Result
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued									
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		**0.0006**	----	----	----	----
EP231P: PFAS Sums									
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		**0.197**	----	----	----	----
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		**0.212**	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**93.8**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		**95.0**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		**101**	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**96.4**	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%		**112**	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		**104**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**90.8**	**85.9**	**100**	**101**	**90.9**
Toluene-D8	2037-26-5	0.2	%		**78.2**	**74.4**	**87.2**	**91.3**	**77.4**
4-Bromofluorobenzene	460-00-4	0.2	%		**81.7**	**76.3**	**88.8**	**93.2**	**81.7**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**99.0**	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	Trip Blank 2	TSC 2	----	----	----
			Client sampling date / time	16-Dec-2016 00:00	16-Dec-2016 00:00	----	----	----
Compound	CAS Number	LOR	Unit	ES1629123-025	ES1629123-026	--------	--------	--------
				Result	Result	----	----	----
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	----	----	----	----	----
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	----	----	----	----	----
EP004: Organic Matter								
Total Organic Carbon	----	0.5	%	----	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	----	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	----	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg	----	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	----	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg	----	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	----	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg	----	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg	----	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	----	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	----	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	----	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	----	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	----	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	**48**	----	----	----
C10 - C14 Fraction	----	50	mg/kg	----	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg	----	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg	----	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	----	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	**57**	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	Trip Blank 2	TSC 2	----	----	----
				Client sampling date / time	16-Dec-2016 00:00	16-Dec-2016 00:00	----	----	----
Compound	CAS Number	LOR	Unit		ES1629123-025	ES1629123-026	--------	--------	--------
					Result	Result	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg		<10	**29**	----	----	----
>C10 - C16 Fraction	----	50	mg/kg		----	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		----	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		----	----	----	----	----
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		----	----	----	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg		----	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	**0.4**	----	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	**13.1**	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	**1.9**	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	**9.4**	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	**3.8**	----	----	----
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	**28.6**	----	----	----
^ **Total Xylenes**	1330-20-7	0.5	mg/kg		<0.5	**13.2**	----	----	----
Naphthalene	91-20-3	1	mg/kg		<1	<1	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		----	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		----	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		----	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		----	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		----	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		----	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		----	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		----	----	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		----	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		----	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	Trip Blank 2	TSC 2	----	----	----
				Client sampling date / time	16-Dec-2016 00:00	16-Dec-2016 00:00	----	----	----
Compound	CAS Number	LOR	Unit		ES1629123-025	ES1629123-026	--------	--------	--------
					Result	Result	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued									
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		----	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		----	----	----	----	----
EP231P: PFAS Sums									
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		----	----	----	----	----
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		----	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		----	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		----	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		----	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		----	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%		----	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		----	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		98.8	97.9	----	----	----
Toluene-D8	2037-26-5	0.2	%		84.2	84.4	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		87.4	88.2	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		----	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	SW01	SW02	SW03	SW04	SW05
			Client sampling date / time	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00
Compound	CAS Number	LOR	Unit	ES1629123-007	ES1629123-008	ES1629123-009	ES1629123-010	ES1629123-011
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	7.54	7.53	7.22	7.39	7.47
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	101	165	107	3440	151
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	27	49	28	38	60
Total Alkalinity as CaCO3	----	1	mg/L	27	49	28	38	60
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	10	44	12	264	4
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	6	19	13	1500	23
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	7	25	8	44	14
Magnesium	7439-95-4	1	mg/L	2	5	2	108	5
Sodium	7440-23-5	1	mg/L	8	11	11	891	24
Potassium	7440-09-7	1	mg/L	2	2	2	37	4
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.001	0.002	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	0.002	0.006	0.002	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	0.010	<0.005
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EN055: Ionic Balance								
Total Anions	----	0.01	meq/L	0.92	2.43	1.18	48.6	1.93
Total Cations	----	0.01	meq/L	0.91	2.19	1.09	50.8	2.26
Ionic Balance	----	0.01	%	----	----	----	2.23	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SW01	SW02	SW03	SW04	SW05
				Client sampling date / time	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1629123-007	ES1629123-008	ES1629123-009	ES1629123-010	ES1629123-011
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Acenaphthene	83-32-9	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g.h.i)perylene	191-24-2	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	<100	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	<2

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SW01	SW02	SW03	SW04	SW05
				Client sampling date / time	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1629123-007	ES1629123-008	ES1629123-009	ES1629123-010	ES1629123-011
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L		<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L		<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	**1.39**
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		**0.09**	<0.02	**0.10**	<0.02	**9.41**
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		**0.61**	<0.01	**0.34**	**0.04**	**137**
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	**0.2**
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	**2.24**
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		**0.03**	<0.02	**0.02**	<0.02	**7.02**
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	**1.02**
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.01	<0.01	<0.01	<0.01	**3.12**
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	**0.77**
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	**0.22**
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums									
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**0.70**	<0.01	**0.44**	**0.04**	**146**
Sum of PFAS (WA DER List)	----	0.01	µg/L		**0.73**	<0.01	**0.46**	**0.04**	**162**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1	%		**18.8**	**22.9**	**23.3**	**24.6**	**22.9**
2-Chlorophenol-D4	93951-73-6	1	%		**40.9**	**49.8**	**51.1**	**51.0**	**46.6**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SW01	SW02	SW03	SW04	SW05
				Client sampling date / time	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1629123-007	ES1629123-008	ES1629123-009	ES1629123-010	ES1629123-011
					Result	Result	Result	Result	Result
EP075(SIM)S: Phenolic Compound Surrogates - Continued									
2.4.6-Tribromophenol	118-79-6	1	%		45.8	40.6	39.6	44.2	40.1
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1	%		56.9	59.4	59.1	60.9	57.8
Anthracene-d10	1719-06-8	1	%		71.8	58.0	56.0	61.6	52.9
4-Terphenyl-d14	1718-51-0	1	%		72.9	87.1	87.7	92.4	84.2
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		109	108	104	116	113
Toluene-D8	2037-26-5	2	%		114	112	110	117	115
4-Bromofluorobenzene	460-00-4	2	%		100	97.6	96.6	103	103
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		110	89.8	104	75.5	119

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SWQA1	GW01	GW02	GW03	GW04
				Client sampling date / time	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1629123-012	ES1629123-013	ES1629123-014	ES1629123-015	ES1629123-016
					Result	Result	Result	Result	Result
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		7.47	6.37	4.64	5.25	3.99
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		137	8140	12000	11100	16800
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		72	124	<1	12	<1
Total Alkalinity as CaCO3	----	1	mg/L		72	124	<1	12	<1
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		4	457	660	812	1140
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		23	4260	6750	5160	7440
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		16	108	62	54	63
Magnesium	7439-95-4	1	mg/L		5	228	424	252	528
Sodium	7440-23-5	1	mg/L		20	2470	3540	2830	3960
Potassium	7440-09-7	1	mg/L		4	11	5	4	6
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		<0.001	0.001	0.009	0.002	0.018
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	0.002	<0.001	0.006
Copper	7440-50-8	0.001	mg/L		<0.001	0.001	0.033	<0.001	0.052
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	0.004	<0.001	0.007
Nickel	7440-02-0	0.001	mg/L		<0.001	0.045	0.121	0.086	0.323
Zinc	7440-66-6	0.005	mg/L		<0.005	0.110	0.338	0.158	0.744
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		2.17	132	204	163	234
Total Cations	----	0.01	meq/L		2.18	132	192	147	219
Ionic Balance	----	0.01	%		----	0.11	3.04	5.19	3.23
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthylene	208-96-8	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SWQA1	GW01	GW02	GW03	GW04
				Client sampling date / time	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1629123-012	ES1629123-013	ES1629123-014	ES1629123-015	ES1629123-016
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Acenaphthene	83-32-9	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g.h.i)perylene	191-24-2	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L		<100	**150**	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	**150**	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L		<100	**140**	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	**140**	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	**140**	<100	<100	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	<2

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SWQA1	GW01	GW02	GW03	GW04
				Client sampling date / time	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1629123-012	ES1629123-013	ES1629123-014	ES1629123-015	ES1629123-016
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L		<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L		<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		**1.42**	<0.02	<0.02	**0.78**	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		**9.11**	<0.02	<0.02	**2.15**	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		**124**	<0.01	<0.01	**0.35**	<0.01
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		**0.2**	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		**2.14**	<0.02	<0.02	**0.25**	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		**6.79**	<0.02	<0.02	**0.93**	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		**0.79**	<0.02	<0.02	**0.15**	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		**2.99**	<0.01	<0.01	**0.21**	<0.01
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		**0.88**	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		**0.20**	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums									
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**133**	<0.01	<0.01	**2.50**	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L		**148**	<0.01	<0.01	**4.82**	<0.01
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1	%		**20.6**	**26.5**	**25.0**	**24.6**	**23.3**
2-Chlorophenol-D4	93951-73-6	1	%		**43.3**	**56.0**	**50.8**	**51.7**	**47.1**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SWQA1	GW01	GW02	GW03	GW04
				Client sampling date / time	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1629123-012	ES1629123-013	ES1629123-014	ES1629123-015	ES1629123-016
					Result	Result	Result	Result	Result
EP075(SIM)S: Phenolic Compound Surrogates - Continued									
2.4.6-Tribromophenol	118-79-6	1	%		40.2	50.2	43.7	43.7	40.9
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1	%		52.6	67.5	59.5	60.7	57.1
Anthracene-d10	1719-06-8	1	%		52.0	66.0	59.7	60.1	52.9
4-Terphenyl-d14	1718-51-0	1	%		88.5	90.6	98.2	102	85.6
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		121	112	117	118	100
Toluene-D8	2037-26-5	2	%		117	110	112	112	95.8
4-Bromofluorobenzene	460-00-4	2	%		102	98.3	98.6	103	84.1
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		116	107	106	111	84.3

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW05	GWQA3	Trip Spike	Trip Blank	----
				Client sampling date / time	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	----
Compound	CAS Number	LOR	Unit		ES1629123-017	ES1629123-018	ES1629123-020	ES1629123-022	--------
					Result	Result	Result	Result	----
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		4.55	6.42	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		8220	7780	----	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		<1	121	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L		<1	121	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		1220	479	----	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		4640	4340	----	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		72	112	----	----	----
Magnesium	7439-95-4	1	mg/L		267	229	----	----	----
Sodium	7440-23-5	1	mg/L		2500	2440	----	----	----
Potassium	7440-09-7	1	mg/L		7	11	----	----	----
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		0.007	0.001	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		0.0001	<0.0001	----	----	----
Chromium	7440-47-3	0.001	mg/L		0.002	<0.001	----	----	----
Copper	7440-50-8	0.001	mg/L		0.005	0.002	----	----	----
Lead	7439-92-1	0.001	mg/L		0.002	<0.001	----	----	----
Nickel	7440-02-0	0.001	mg/L		0.171	0.047	----	----	----
Zinc	7440-66-6	0.005	mg/L		0.405	0.119	----	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	----	----	----
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		156	135	----	----	----
Total Cations	----	0.01	meq/L		134	131	----	----	----
Ionic Balance	----	0.01	%		7.50	1.49	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		<1.0	<1.0	----	----	----
Acenaphthylene	208-96-8	1	µg/L		<1.0	<1.0	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW05	GWQA3	Trip Spike	Trip Blank	----
				Client sampling date / time	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	----
Compound	CAS Number	LOR	Unit		ES1629123-017	ES1629123-018	ES1629123-020	ES1629123-022	--------
					Result	Result	Result	Result	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Acenaphthene	83-32-9	1	µg/L		<1.0	<1.0	----	----	----
Fluorene	86-73-7	1	µg/L		<1.0	<1.0	----	----	----
Phenanthrene	85-01-8	1	µg/L		<1.0	<1.0	----	----	----
Anthracene	120-12-7	1	µg/L		<1.0	<1.0	----	----	----
Fluoranthene	206-44-0	1	µg/L		<1.0	<1.0	----	----	----
Pyrene	129-00-0	1	µg/L		<1.0	<1.0	----	----	----
Benz(a)anthracene	56-55-3	1	µg/L		<1.0	<1.0	----	----	----
Chrysene	218-01-9	1	µg/L		<1.0	<1.0	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L		<1.0	<1.0	----	----	----
Benzo(k)fluoranthene	207-08-9	1	µg/L		<1.0	<1.0	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	<0.5	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L		<1.0	<1.0	----	----	----
Dibenz(a.h)anthracene	53-70-3	1	µg/L		<1.0	<1.0	----	----	----
Benzo(g.h.i)perylene	191-24-2	1	µg/L		<1.0	<1.0	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		<0.5	<0.5	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	----	<20	----
C10 - C14 Fraction	----	50	µg/L		<50	<50	----	----	----
C15 - C28 Fraction	----	100	µg/L		<100	**130**	----	----	----
C29 - C36 Fraction	----	50	µg/L		<50	<50	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	**130**	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	----	<20	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	----	<20	----
>C10 - C16 Fraction	----	100	µg/L		<100	**120**	----	----	----
>C16 - C34 Fraction	----	100	µg/L		<100	<100	----	----	----
>C34 - C40 Fraction	----	100	µg/L		<100	<100	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	**120**	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	**120**	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	**16**	<1	----
Toluene	108-88-3	2	µg/L		<2	<2	**15**	<2	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW05	GWQA3	Trip Spike	Trip Blank	----
				Client sampling date / time	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	----
Compound	CAS Number	LOR	Unit		ES1629123-017	ES1629123-018	ES1629123-020	ES1629123-022	--------
					Result	Result	Result	Result	----
EP080: BTEXN - Continued									
Ethylbenzene	100-41-4	2	µg/L		<2	<2	**14**	<2	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	**15**	<2	----
ortho-Xylene	95-47-6	2	µg/L		<2	<2	**15**	<2	----
^ Total Xylenes	1330-20-7	2	µg/L		<2	<2	**30**	<2	----
^ Sum of BTEX	----	1	µg/L		<1	<1	**75**	<1	----
Naphthalene	91-20-3	5	µg/L		<5	<5	**17**	<5	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		<0.01	<0.01	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	<0.1	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.01	<0.01	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L		<0.05	<0.05	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		<0.05	<0.05	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	<0.05	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.05	----	----	----
EP231P: PFAS Sums									
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		<0.01	<0.01	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L		<0.01	<0.01	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1	%		**24.5**	**23.5**	----	----	----
2-Chlorophenol-D4	93951-73-6	1	%		**52.4**	**50.1**	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW05	GWQA3	Trip Spike	Trip Blank	----
				Client sampling date / time	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	----
Compound	CAS Number	LOR	Unit		ES1629123-017	ES1629123-018	ES1629123-020	ES1629123-022	--------
					Result	Result	Result	Result	----
EP075(SIM)S: Phenolic Compound Surrogates - Continued									
2.4.6-Tribromophenol	118-79-6	1	%		47.4	44.7	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1	%		64.2	61.0	----	----	----
Anthracene-d10	1719-06-8	1	%		60.0	59.9	----	----	----
4-Terphenyl-d14	1718-51-0	1	%		98.2	94.7	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		114	113	112	97.9	----
Toluene-D8	2037-26-5	2	%		112	110	108	99.8	----
4-Bromofluorobenzene	460-00-4	2	%		95.8	96.7	103	83.7	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		112	102	----	----	----

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130
EP231S: PFAS Surrogate			
13C4-PFOS	----	70	130

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	44
2-Chlorophenol-D4	93951-73-6	14	94
2.4.6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1629123**	Page	: 1 of 13
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR BEN ANDERSON	Telephone	: +61-2-8784 8555
Project	: Albion Park	Date Samples Received	: 16-Dec-2016
Site	: ----	Issue Date	: 30-Dec-2016
Sampler	: JAMES LEAN	No. of samples received	: 27
Order number	: 2125583	No. of samples analysed	: 26

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 Matrix Spike outliers occur.**
- **Laboratory Control outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EP004: Organic Matter	QC-697532-002	----	**Total Organic Carbon**	----	99.3 %	81-99%	**Recovery greater than upper control limit**

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method / Container / Client Sample ID(s)		Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Days overdue	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Days overdue
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural							
SW01,	SW02,	----	----	----	18-Dec-2016	16-Dec-2016	**2**
SW03,	SW04,						
SW05,	SWQA1,						
GW01,	GW02,						
GW03,	GW04,						
GW05,	GWQA3						

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count: QC	Count: Regular	Rate (%): Actual	Rate (%): Expected	Quality Control Specification
Laboratory Duplicates (DUP)					
PAH/Phenols (GC/MS - SIM)	0	12	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	12	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
PAH/Phenols (GC/MS - SIM)	0	12	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	12	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

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: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Evaluation	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Evaluation

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
EA002 : pH (Soils)							
Soil Glass Jar - Unpreserved (EA002)							
SS01, SS02, SS03, SS04, SS05, SSQA2	**16-Dec-2016**	**20-Dec-2016**	23-Dec-2016	✓	**20-Dec-2016**	20-Dec-2016	✓
EA055: Moisture Content							
Soil Glass Jar - Unpreserved (EA055-103)							
SS01, SS02, SS03, SS04, SS05, SSQA2	**16-Dec-2016**	**----**	----	----	**19-Dec-2016**	30-Dec-2016	✓
EP004: Organic Matter							
Soil Glass Jar - Unpreserved (EP004)							
SS01, SS02, SS03, SS04, SS05, SSQA2	**16-Dec-2016**	**28-Dec-2016**	13-Jan-2017	✓	**28-Dec-2016**	13-Jan-2017	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM))							
SS01, SS02, SS03, SS04, SS05, SSQA2	**16-Dec-2016**	**19-Dec-2016**	30-Dec-2016	✓	**19-Dec-2016**	28-Jan-2017	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP071)							
SS01, SS02, SS03, SS04, SS05, SSQA2	**16-Dec-2016**	**19-Dec-2016**	30-Dec-2016	✓	**19-Dec-2016**	28-Jan-2017	✓
Soil Glass Jar - Unpreserved (EP080)							
SS01, SS02, SS03, SS04, SS05, SSQA2, Trip Spike 1, Trip Blank 1, TSC 1, Trip Spike 2, Trip Blank 2, TSC 2	**16-Dec-2016**	**19-Dec-2016**	30-Dec-2016	✓	**20-Dec-2016**	30-Dec-2016	✓

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
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP071)							
SS01, SS02, SS03, SS04, SS05, SSQA2	**16-Dec-2016**	**19-Dec-2016**	30-Dec-2016	✓	**19-Dec-2016**	28-Jan-2017	✓
Soil Glass Jar - Unpreserved (EP080)							
SS01, SS02, SS03, SS04, SS05, SSQA2, Trip Spike 1, Trip Blank 1, TSC 1, Trip Spike 2, Trip Blank 2, TSC 2	**16-Dec-2016**	**19-Dec-2016**	30-Dec-2016	✓	**20-Dec-2016**	30-Dec-2016	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
SS01, SS02, SS03, SS04, SS05, SSQA2, Trip Spike 1, Trip Blank 1, TSC 1, Trip Spike 2, Trip Blank 2, TSC 2	**16-Dec-2016**	**19-Dec-2016**	30-Dec-2016	✓	**20-Dec-2016**	30-Dec-2016	✓
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE Soil Jar (EP231X)							
SS01, SS02, SS03, SS04, SS05, SSQA2	**16-Dec-2016**	**21-Dec-2016**	14-Jun-2017	✓	**21-Dec-2016**	30-Jan-2017	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE Soil Jar (EP231X)							
SS01, SS02, SS03, SS04, SS05, SSQA2	**16-Dec-2016**	**21-Dec-2016**	14-Jun-2017	✓	**21-Dec-2016**	30-Jan-2017	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE Soil Jar (EP231X)							
SS01, SS02, SS03, SS04, SS05, SSQA2	**16-Dec-2016**	**21-Dec-2016**	14-Jun-2017	✓	**21-Dec-2016**	30-Jan-2017	✓
EP231P: PFAS Sums							
HDPE Soil Jar (EP231X)							
SS01, SS02, SS03, SS04, SS05, SSQA2	**16-Dec-2016**	**21-Dec-2016**	14-Jun-2017	✓	**21-Dec-2016**	30-Jan-2017	✓

Matrix: **WATER**

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

Matrix: **WATER**

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
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural (EA005-P)							
SW01, SW02, SW03, SW04, SW05, SWQA1, GW01, GW02, GW03, GW04, GW05, GWQA3	**16-Dec-2016**	**----**	----	----	**18-Dec-2016**	16-Dec-2016	×
EA015: Total Dissolved Solids dried at 180 ± 5 °C							
Clear Plastic Bottle - Natural (EA015H)							
SW01, SW02, SW03, SW04, SW05, SWQA1, GW01, GW02, GW03, GW04, GW05, GWQA3	**16-Dec-2016**	**----**	----	----	**21-Dec-2016**	23-Dec-2016	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P)							
SW01, SW02, SW03, SW04, SW05, SWQA1, GW01, GW02, GW03, GW04, GW05, GWQA3	**16-Dec-2016**	**----**	----	----	**18-Dec-2016**	30-Dec-2016	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
SW01, SW02, SW03, SW04, SW05, SWQA1, GW01, GW02, GW03, GW04, GW05, GWQA3	**16-Dec-2016**	**----**	----	----	**18-Dec-2016**	13-Jan-2017	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G)							
SW01, SW02, SW03, SW04, SW05, SWQA1, GW01, GW02, GW03, GW04, GW05, GWQA3	**16-Dec-2016**	**----**	----	----	**18-Dec-2016**	13-Jan-2017	✓

Matrix: **WATER**

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
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
SW01, SW02, SW03, SW04, SW05, SWQA1, GW01, GW02, GW03, GW04, GW05, GWQA3	**16-Dec-2016**	**----**	----	----	**21-Dec-2016**	13-Jan-2017	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
SW01, SW02, SW03, SW04, SW05, SWQA1, GW01, GW02, GW03, GW04, GW05, GWQA3	**16-Dec-2016**	**----**	----	----	**21-Dec-2016**	14-Jun-2017	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
SW01, SW02, SW03, SW04, SW05, SWQA1, GW01, GW02, GW03, GW04, GW05, GWQA3	**16-Dec-2016**	**----**	----	----	**22-Dec-2016**	13-Jan-2017	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
SW01, SW02, SW03, SW04, SW05, SWQA1, GW01, GW02, GW03, GW04, GW05, GWQA3	**16-Dec-2016**	**22-Dec-2016**	23-Dec-2016	✓	**22-Dec-2016**	31-Jan-2017	✓

Matrix: **WATER**

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
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071)								
SW01,	SW02,	**16-Dec-2016**	**22-Dec-2016**	23-Dec-2016	✓	**22-Dec-2016**	31-Jan-2017	✓
SW03,	SW04,							
SW05,	SWQA1,							
GW01,	GW02,							
GW03,	GW04,							
GW05,	GWQA3							
Amber VOC Vial - Sulfuric Acid (EP080)								
SW01,	SW02,	**16-Dec-2016**	**21-Dec-2016**	30-Dec-2016	✓	**21-Dec-2016**	30-Dec-2016	✓
SW03,	SW04,							
SW05,	SWQA1,							
GW01,	GW02,							
GW03,	GW04,							
GW05,	GWQA3,							
Trip Blank								
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071)								
SW01,	SW02,	**16-Dec-2016**	**22-Dec-2016**	23-Dec-2016	✓	**22-Dec-2016**	31-Jan-2017	✓
SW03,	SW04,							
SW05,	SWQA1,							
GW01,	GW02,							
GW03,	GW04,							
GW05,	GWQA3							
Amber VOC Vial - Sulfuric Acid (EP080)								
SW01,	SW02,	**16-Dec-2016**	**21-Dec-2016**	30-Dec-2016	✓	**21-Dec-2016**	30-Dec-2016	✓
SW03,	SW04,							
SW05,	SWQA1,							
GW01,	GW02,							
GW03,	GW04,							
GW05,	GWQA3,							
Trip Blank								
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)								
SW01,	SW02,	**16-Dec-2016**	**21-Dec-2016**	30-Dec-2016	✓	**21-Dec-2016**	30-Dec-2016	✓
SW03,	SW04,							
SW05,	SWQA1,							
GW01,	GW02,							
GW03,	GW04,							
GW05,	GWQA3,							
Trip Spike,	Trip Blank							

Matrix: **WATER**

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
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE (no PTFE) (EP231X)							
SW01, SW02, SW03, SW04, SW05, SWQA1, GW01, GW02, GW03, GW04, GW05, GWQA3	**16-Dec-2016**	**----**	----	----	**27-Dec-2016**	14-Jun-2017	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X)							
SW01, SW02, SW03, SW04, SW05, SWQA1, GW01, GW02, GW03, GW04, GW05, GWQA3	**16-Dec-2016**	**----**	----	----	**27-Dec-2016**	14-Jun-2017	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X)							
SW01, SW02, SW03, SW04, SW05, SWQA1, GW01, GW02, GW03, GW04, GW05, GWQA3	**16-Dec-2016**	**----**	----	----	**27-Dec-2016**	14-Jun-2017	✓
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X)							
SW01, SW02, SW03, SW04, SW05, SWQA1, GW01, GW02, GW03, GW04, GW05, GWQA3	**16-Dec-2016**	**----**	----	----	**27-Dec-2016**	14-Jun-2017	✓

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	EA055-103	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Organic Matter	EP004	2	6	33.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	6	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	10	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	2	14	14.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	8	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Organic Matter	EP004	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Organic Matter	EP004	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Organic Matter	EP004	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

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)							
Alkalinity by PC Titrator	ED037-P	3	24	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	16	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	12	0.00	10.00	×	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

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) - Continued							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by PC Titrator	EA005-P	3	26	**11.54**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	12	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	2	24	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Chloride by Discrete Analyser	ED045G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	12	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	12	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	40	**5.00**	**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 (1:5)	EA002	SOIL	In house: Referenced to APHA 4500H+. pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3) (Method 103)
Moisture Content	EA055-103	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Organic Matter	EP004	SOIL	In house: Referenced to AS1289.4.1.1 - 1997., Dichromate oxidation method after Walkley and Black. This method is compliant with NEPM (2013) Schedule B(3)
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.
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.
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	SOIL	In-House. A portion of soil is extracted with MTBE. The extract is taken to dryness, made up in mobile phase. Analysis is by LC/MSMS, ESI Negative Mode using MRM. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers.
pH by PC Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM (2013) Schedule B(3)
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (2013) Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (2013) Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003

Analytical Methods	Method	Matrix	Method Descriptions
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM (2013) Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (2013) Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The 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)
Ionic Balance by PCT DA and Turbi SO4 DA	EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In house: Direct injection analysis of fresh waters after dilution (1:1) with methanol. Analysis by LC-Electrospray-MS-MS, Negative Mode using MRM. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers.

Preparation Methods	Method	Matrix	Method Descriptions
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of distilled water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
Organic Matter	EP004-PR	SOIL	In house: Referenced to AS1289.4.1.1 - 1997. Dichromate oxidation method after Walkley and Black. This method is compliant with NEPM (2013) Schedule B(3) (Method 105)
Sample Extraction for PFAS	EP231-PR	SOIL	In house
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.
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1629123**	Page	: 1 of 14
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR BEN ANDERSON	Contact	: Customer Services ES
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 07 5413 8161	Telephone	: +61-2-8784 8555
Project	: Albion Park	Date Samples Received	: 16-Dec-2016
Order number	: 2125583	Date Analysis Commenced	: 18-Dec-2016
C-O-C number	: ----	Issue Date	: 30-Dec-2016
Sampler	: JAMES LEAN		
Site	: ----		
Quote number	: EN/005/15		
No. of samples received	: 27		
No. of samples analysed	: 26		

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*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ashesh Patel	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Gaston Allende	R&D Chemist	Sydney Organics, Smithfield, NSW
Raymond Commodore	Instrument Chemist	Sydney Inorganics, Smithfield, NSW

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 (%)*
EA002 : pH (Soils) (QC Lot: 697669)									
ES1629123-001	SS01	EA002: pH Value	----	0.1	pH Unit	6.6	6.5	0.00	0% - 20%
ES1629144-002	Anonymous	EA002: pH Value	----	0.1	pH Unit	6.1	6.0	0.00	0% - 20%
EA055: Moisture Content (QC Lot: 697710)									
ES1628993-003	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	16.5	18.3	10.1	0% - 50%
ES1629072-002	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	25.5	27.2	6.18	0% - 20%
EA055: Moisture Content (QC Lot: 697711)									
ES1629131-001	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	26.6	27.0	1.36	0% - 20%
ES1629138-012	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	19.0	18.5	2.53	0% - 50%
EP004: Organic Matter (QC Lot: 697532)									
ES1629123-001	SS01	EP004: Total Organic Carbon	----	0.5	%	0.6	0.6	0.00	No Limit
ES1629144-005	Anonymous	EP004: Total Organic Carbon	----	0.5	%	1.6	1.4	13.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 696977)									
ES1629123-001	SS01	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	<0.5	<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: 696977) - continued									
ES1629123-001	SS01	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
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 696976)									
ES1629123-001	SS01	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
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 697091)									
ES1628953-011	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
ES1629123-003	SS03	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 696976)									
ES1629123-001	SS01	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
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 697091)									
ES1628953-011	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1629123-003	SS03	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080: BTEXN (QC Lot: 697091)									
ES1628953-011	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
		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
ES1629123-003	SS03	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
		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
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 696262)									
ES1629123-001	SS01	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 696262) - continued									
ES1629123-001	SS01	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0047	0.0039	18.4	0% - 20%
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 696262)									
ES1629123-001	SS01	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 696262)									
ES1629123-001	SS01	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA005P: pH by PC Titrator (QC Lot: 696497)									
ES1629120-001	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	6.18	6.04	2.29	0% - 20%
ES1629120-010	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	6.33	6.32	0.158	0% - 20%
EA005P: pH by PC Titrator (QC Lot: 696500)									
ES1629123-017	GW05	EA005-P: pH Value	----	0.01	pH Unit	4.55	4.57	0.438	0% - 20%
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 699326)									
ES1629110-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	9250	9810	5.88	0% - 20%
ES1629123-013	GW01	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	8140	7840	3.75	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 696498)									
ES1629120-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	7	5	30.2	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	7	5	30.2	No Limit
ES1629120-010	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	5	5	0.00	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	5	5	0.00	No Limit
ED037P: Alkalinity by PC Titrator (QC Lot: 696501)									
ES1629123-017	GW05	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 696501) - continued									
ES1629123-017	GW05	ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	<1	0.00	No Limit
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 696294)									
ES1629120-007	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	<1	0.00	No Limit
ES1629123-012	SWQA1	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	4	4	0.00	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 696293)									
ES1629120-007	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	19	18	0.00	0% - 50%
ES1629123-012	SWQA1	ED045G: Chloride	16887-00-6	1	mg/L	23	23	0.00	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 701367)									
ES1629122-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	14	13	0.00	0% - 50%
		ED093F: Magnesium	7439-95-4	1	mg/L	27	28	0.00	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	112	113	0.944	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	25	24	0.00	0% - 20%
ES1629123-008	SW02	ED093F: Calcium	7440-70-2	1	mg/L	25	25	0.00	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	5	6	0.00	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	11	11	0.00	0% - 50%
		ED093F: Potassium	7440-09-7	1	mg/L	2	2	0.00	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 701368)									
ES1629123-017	GW05	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	0.0001	0.0002	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.007	0.007	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.005	0.005	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.171	0.173	1.11	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.405	0.411	1.49	0% - 20%
ES1629123-008	SW02	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.006	0.005	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 701369)									
ES1629123-017	GW05	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
ES1629123-008	SW02	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 699641)									
ES1629117-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES1629123-010	SW04	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 699650)									

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 699650) - continued									
ES1629215-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES1629215-006	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 699641)									
ES1629117-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1629123-010	SW04	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 699650)									
ES1629215-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1629215-006	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 699641)									
ES1629117-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
ES1629123-010	SW04	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EP080: BTEXN (QC Lot: 699650)									
ES1629215-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
ES1629215-006	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 704475)									

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 704475) - continued									
ES1629123-007	SW01	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.61	0.64	4.65	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.02	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.09	0.08	12.0	No Limit
ES1629123-015	GW03	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.35	0.30	15.0	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.78	0.76	3.00	0% - 20%
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	2.15	2.37	9.65	0% - 20%
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 704475)									
ES1629123-007	SW01	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.03	0.02	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
ES1629123-015	GW03	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.21	0.21	0.00	0% - 20%
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.25	0.24	4.43	0% - 50%
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.93	0.94	1.18	0% - 20%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.15	0.15	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 704475)									
ES1629123-007	SW01	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
ES1629123-015	GW03	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	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
EP004: Organic Matter (QCLot: 697532)								
EP004: Total Organic Carbon	----	0.5	%	<0.5	1.46 %	# 99.3	81	99
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 696977)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	91.4	77	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	96.7	72	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	98.0	73	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	90.7	72	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	96.2	75	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	91.2	77	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	95.8	73	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	93.8	74	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	91.9	69	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	92.9	75	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	93.0	68	116
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	96.6	74	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	93.8	70	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	94.4	61	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	95.8	62	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	92.9	63	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 696976)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	93.1	75	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	99.5	77	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	104	71	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 697091)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	109	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 696976)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	250 mg/kg	102	77	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	109	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	150 mg/kg	104	63	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 697091)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	107	68	128
EP080: BTEXN (QCLot: 697091)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	90.8	62	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	95.4	67	121

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
EP080: BTEXN (QCLot: 697091) - continued								
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	86.8	65	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	93.4	66	118
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	93.3	68	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	90.1	63	119
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 696262)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.00125 mg/kg	65.0	57	121
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	69.2	52	126
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	120	55	127
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 696262)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	69.2	52	128
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	77.2	54	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	58.5	58	127
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	76.0	57	128
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	106	60	134
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 696262)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00125 mg/kg	71.8	54	130
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.00125 mg/kg	126	61	130
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	0.00125 mg/kg	90.8	62	130
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.00125 mg/kg	110	60	130

Sub-Matrix: **WATER**

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
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 699326)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10 <10	2000 mg/L 293 mg/L	102 122	87 66	109 126
ED037P: Alkalinity by PC Titrator (QCLot: 696498)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	98.0	81	111
ED037P: Alkalinity by PC Titrator (QCLot: 696501)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	95.1	81	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 696294)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	117	82	122
ED045G: Chloride by Discrete Analyser (QCLot: 696293)								
ED045G: Chloride	16887-00-6	1	mg/L	<1 <1	10 mg/L 1000 mg/L	97.4 98.0	81 81	127 127
ED093F: Dissolved Major Cations (QCLot: 701367)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	96.1	80	114

Sub-Matrix: **WATER**

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
ED093F: Dissolved Major Cations (QCLot: 701367) - continued								
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	111	90	116
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	108	82	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	108	85	113
EG020F: Dissolved Metals by ICP-MS (QCLot: 701368)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	95.8	85	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	93.9	84	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	92.8	85	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	91.3	81	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	89.8	83	111
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	93.3	82	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	90.5	81	117
EG035F: Dissolved Mercury by FIMS (QCLot: 701369)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	95.3	83	105
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 697569)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	65.3	50	94
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	68.4	64	114
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	83.2	62	113
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	70.0	64	115
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	73.0	63	116
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	72.0	64	116
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	74.9	64	118
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	75.0	63	118
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	69.5	64	117
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	65.3	63	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	5 µg/L	65.8	62	119
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	67.9	63	115
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	70.4	63	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	70.2	60	118
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	71.2	61	117
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	67.4	59	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 697570)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	94.1	76	116
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	90.9	83	109
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	89.8	75	113
EP080/071: Total Petroleum Hydrocarbons (QCLot: 699641)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	78.8	75	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 699650)								

Sub-Matrix: **WATER**

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
EP080/071: Total Petroleum Hydrocarbons (QCLot: 699650) - continued								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	80.2	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 697570)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	2500 µg/L	87.4	76	114
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	92.9	81	111
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1500 µg/L	98.3	77	119
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 699641)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	78.2	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 699650)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	79.8	75	127
EP080: BTEXN (QCLot: 699641)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	86.9	70	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	91.4	69	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	86.3	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	92.7	69	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	93.2	72	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	91.2	70	120
EP080: BTEXN (QCLot: 699650)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	86.5	70	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	87.2	69	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	86.4	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	85.7	69	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	87.1	72	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	87.2	70	120
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 704475)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.5 µg/L	110	70	130
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.5 µg/L	95.2	70	130
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.5 µg/L	102	70	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 704475)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	2.5 µg/L	85.5	70	130
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.5 µg/L	104	70	130
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.5 µg/L	99.8	70	130
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.5 µg/L	82.2	70	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.5 µg/L	86.6	70	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 704475)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.5 µg/L	89.2	70	130
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.5 µg/L	103	70	130

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 704475) - continued								
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.5 µg/L	90.4	70	130
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.5 µg/L	103	70	130

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**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EP004: Organic Matter (QCLot: 697532)							
ES1629123-001	SS01	EP004: Total Organic Carbon	----	2.66 %	92.4	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 696977)							
ES1629123-001	SS01	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	86.7	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	91.7	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 696976)							
ES1629123-001	SS01	EP071: C10 - C14 Fraction	----	523 mg/kg	78.4	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	99.9	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	106	52	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 697091)							
ES1628953-011	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	96.3	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 696976)							
ES1629123-001	SS01	EP071: >C10 - C16 Fraction	----	860 mg/kg	85.5	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	100	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	109	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 697091)							
ES1628953-011	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	95.9	70	130
EP080: BTEXN (QCLot: 697091)							
ES1628953-011	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	80.3	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	82.5	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	86.5	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	89.4	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	88.0	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	89.8	70	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 696262)							

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
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 696262) - continued							
ES1629123-001	SS01	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.00125 mg/kg	99.2	50	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00125 mg/kg	76.2	50	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00125 mg/kg	106	50	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 696262)							
ES1629123-001	SS01	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	80.3	30	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	79.1	50	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	61.3	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	89.9	50	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	118	50	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 696262)							
ES1629123-001	SS01	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00125 mg/kg	67.7	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00125 mg/kg	122	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.00125 mg/kg	124	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.00125 mg/kg	108	50	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 696294)							
ES1629120-007	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	123	70	130
ED045G: Chloride by Discrete Analyser (QCLot: 696293)							
ES1629120-007	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	106	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 701368)							
ES1629123-008	SW02	EG020A-F: Arsenic	7440-38-2	1 mg/L	96.2	70	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	95.0	70	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	89.7	70	130
		EG020A-F: Copper	7440-50-8	1 mg/L	91.6	70	130
		EG020A-F: Lead	7439-92-1	1 mg/L	91.3	70	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	91.0	70	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	100	70	130
EG035F: Dissolved Mercury by FIMS (QCLot: 701369)							
ES1629123-007	SW01	EG035F: Mercury	7439-97-6	0.01 mg/L	91.4	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 699641)							
ES1629117-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	75.3	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 699650)							
ES1629215-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	79.8	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 699641)							

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 699641) - continued							
ES1629117-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	75.6	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 699650)							
ES1629215-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	81.1	70	130
EP080: BTEXN (QCLot: 699641)							
ES1629117-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	71.3	70	130
		EP080: Toluene	108-88-3	25 µg/L	84.8	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	94.3	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	100	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	105	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	110	70	130
EP080: BTEXN (QCLot: 699650)							
ES1629215-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	73.9	70	130
		EP080: Toluene	108-88-3	25 µg/L	82.6	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	97.2	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	97.4	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	101	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	111	70	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 704475)							
ES1629123-007	SW01	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.5 µg/L	100	50	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.5 µg/L	99.8	50	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.5 µg/L	120	50	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 704475)							
ES1629123-007	SW01	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	2.5 µg/L	79.7	50	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.5 µg/L	81.8	50	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.5 µg/L	77.6	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.5 µg/L	89.4	50	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.5 µg/L	111	50	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 704475)							
ES1629123-007	SW01	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.5 µg/L	86.4	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.5 µg/L	109	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.5 µg/L	96.2	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.5 µg/L	86.6	50	130

Fadi Soro

FADI 13/1/17 12:40pm

From: Sepan Mahamad
Sent: Friday, 13 January 2017 12:28 PM
To: Fadi Soro
Subject: FW: ASLP required from lab report ES1628401

Environmental Division
Sydney
Work Order Reference
ES1700845

Telephone : +61-2-8784 8555

Hi Fadi,

Can you please organise rebatch of ES1628401 as per the email below?

Thanks.

Kind regards,

Sepan Mahamad
Client Services Officer, Environmental
Sydney

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From: Nicole Rosen [mailto:Nicole.Rosen@ghd.com]
Sent: Friday, 13 January 2017 10:29 AM

To: Sepan Mahamad <Sepan.Mahamad@alsglobal.com>
Cc: ALSEnviro Sydney <ALSEnviro.Sydney@ALSGlobal.com>
Subject: ASLP required from lab report ES1628401

Hi Sepan,
Albion Park 21/25583/02 – From lab report ES1628401

The following samples are required for **ASLP** – PFAS full suite

1 GW01_0.0-0.2 33
2 GW02_0.5-0.6 26
3 GW03_0.0-0.1 17
4 GW04_0.5-0.6 10
5 GW05_1.6-1.7 4
6 SB06_0.5-0.6 41
7 SB06_5.0-5.1 46
8 SB07_3.0-3.1 53
9 SB08_0.5-0.6 58
10 SB09_0.0-0.1 65
11 SB09_4.0-4.1 70
12 SB10_0.0-0.1 73
13 SB12_0.0-0.1 86
14 SB13_0.5-0.6 93
15 SB14_0.5-0.6 99
16 SB15_1.0-1.1 107

S579- 588

Thanks,

Nicole Rosen
Senior Environmental Consultant - Contamination Assessment and Remediation

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ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1700845**	Page	: 1 of 15
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR BEN ANDERSON	Contact	: Customer Services ES
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 07 5413 8161	Telephone	: +61-2-8784 8555
Project	: ALBION PARK	Date Samples Received	: 13-Jan-2017 12:40
Order number	: 21-25583/02	Date Analysis Commenced	: 18-Jan-2017
C-O-C number	: ----	Issue Date	: 27-Jan-2017 10:45
Sampler	: MATTHEW WEST		
Site	: ----		
Quote number	: EN/005/15		
No. of samples received	: 16		
No. of samples analysed	: 16		

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*
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW

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 no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

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.

Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	GW01_0.0-0.2	GW02_0.5-0.6	GW03_0.0-0.1	GW04_0.5-0.6	GW05_1.6-1.7
				Client sampling date / time	06-Dec-2016 00:00	06-Dec-2016 00:00	07-Dec-2016 00:00	08-Dec-2016 00:00	08-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1700845-001	ES1700845-002	ES1700845-003	ES1700845-004	ES1700845-005
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		**0.05**	**0.14**	**0.75**	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		**0.05**	**0.09**	**0.86**	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		**0.49**	**1.17**	**9.52**	**0.06**	**0.06**
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		**0.06**	**0.04**	**1.47**	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		**0.88**	**1.38**	**67.4**	**0.43**	**0.15**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		**0.05**	**0.04**	**0.36**	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		**0.16**	**0.14**	**1.92**	<0.02	**0.03**
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		**0.02**	<0.02	**0.42**	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		**0.06**	**0.04**	**1.39**	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	GW01_0.0-0.2	GW02_0.5-0.6	GW03_0.0-0.1	GW04_0.5-0.6	GW05_1.6-1.7
				Client sampling date / time	06-Dec-2016 00:00	06-Dec-2016 00:00	07-Dec-2016 00:00	08-Dec-2016 00:00	08-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1700845-001	ES1700845-002	ES1700845-003	ES1700845-004	ES1700845-005
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		**1.82**	**3.04**	**84.1**	**0.49**	**0.24**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**1.37**	**2.55**	**76.9**	**0.49**	**0.21**
Sum of PFAS (WA DER List)	----	0.01	µg/L		**1.71**	**2.91**	**81.8**	**0.49**	**0.24**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**101**	**99.9**	**93.4**	**112**	**110**

Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	SB06_0.5-0.6	SB06_5.0-5.1	SB07_3.0-3.1	SB08_0.5-0.6	SB09_0.0-0.1
				Client sampling date / time	06-Dec-2016 00:00	06-Dec-2016 00:00	05-Dec-2016 00:00	05-Dec-2016 00:00	05-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1700845-006	ES1700845-007	ES1700845-008	ES1700845-009	ES1700845-010
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		**0.48**	**1.03**	<0.02	**0.15**	**1.93**
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		**0.42**	**0.70**	<0.02	**0.14**	**1.89**
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		**8.53**	**9.67**	**0.04**	**1.96**	**26.0**
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		**2.49**	**0.20**	<0.02	**0.55**	**6.58**
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		**183**	**1.15**	**0.71**	**19.5**	**524**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		**0.03**	<0.02	<0.02	<0.02	**0.29**
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		**0.26**	**0.22**	<0.02	**0.05**	**0.69**
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		**1.13**	**1.31**	**0.02**	**0.18**	**2.77**
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		**0.24**	**0.12**	<0.02	**0.04**	**0.37**
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		**1.81**	**0.23**	<0.01	**0.23**	**3.13**
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		**0.02**	<0.02	<0.02	<0.02	**0.07**
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		**0.02**	<0.02	<0.02	<0.02	**1.27**
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	SB06_0.5-0.6	SB06_5.0-5.1	SB07_3.0-3.1	SB08_0.5-0.6	SB09_0.0-0.1
				Client sampling date / time	06-Dec-2016 00:00	06-Dec-2016 00:00	05-Dec-2016 00:00	05-Dec-2016 00:00	05-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1700845-006	ES1700845-007	ES1700845-008	ES1700845-009	ES1700845-010
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		**0.08**	<0.05	<0.05	<0.05	**1.35**
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	**0.18**
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		**198**	**14.6**	**0.77**	**22.8**	**570**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**192**	**10.8**	**0.75**	**21.5**	**550**
Sum of PFAS (WA DER List)	----	0.01	µg/L		**196**	**13.7**	**0.77**	**22.1**	**560**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**89.7**	**95.8**	**98.4**	**104**	**100**

Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	SB09_4.0-4.1	SB10_0.0-0.1	SB12_0.0-0.1	SB13_0.5-0.6	SB14_0.5-0.6
				Client sampling date / time	06-Dec-2016 00:00	06-Dec-2016 00:00	07-Dec-2016 00:00	07-Dec-2016 00:00	08-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1700845-011	ES1700845-012	ES1700845-013	ES1700845-014	ES1700845-015
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		**0.97**	**0.09**	**0.32**	<0.02	**0.02**
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		**0.73**	**0.12**	**0.10**	<0.02	**0.04**
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		**4.78**	**2.63**	**0.37**	<0.02	**0.45**
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		**0.41**	**0.32**	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		**5.88**	**8.84**	**0.07**	**0.17**	**0.14**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		**0.27**	**0.35**	**0.06**	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		**1.59**	**0.65**	**0.15**	<0.02	**0.02**
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		**0.23**	**0.19**	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		**0.38**	**0.37**	<0.01	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<0.02	**0.05**	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	SB09_4.0-4.1	SB10_0.0-0.1	SB12_0.0-0.1	SB13_0.5-0.6	SB14_0.5-0.6
				Client sampling date / time	06-Dec-2016 00:00	06-Dec-2016 00:00	07-Dec-2016 00:00	07-Dec-2016 00:00	08-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1700845-011	ES1700845-012	ES1700845-013	ES1700845-014	ES1700845-015
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		**15.2**	**13.6**	**1.07**	**0.17**	**0.67**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**10.7**	**11.5**	**0.44**	**0.17**	**0.59**
Sum of PFAS (WA DER List)	----	0.01	µg/L		**14.1**	**13.1**	**0.97**	**0.17**	**0.63**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**96.1**	**101**	**103**	**98.3**	**99.2**

Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	SB15_1.0-1.1	----	----	----	----
				Client sampling date / time	08-Dec-2016 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1700845-016	--------	--------	--------	--------
					Result	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		**0.03**	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		**0.06**	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		**1.18**	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		**0.08**	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		**1.53**	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		**0.05**	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		**0.22**	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		**0.03**	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		**0.06**	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		**0.05**	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<0.02	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	----	----	----	----

Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	SB15_1.0-1.1	----	----	----	----
				Client sampling date / time	08-Dec-2016 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1700845-016	--------	--------	--------	--------
					Result	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L		<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L		<0.05	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L		<0.02	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L		<0.02	----	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L		<0.05	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		<0.05	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	----	----	----	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		**3.29**	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**2.71**	----	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L		**3.10**	----	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**101**	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	GW01_0.0-0.2	GW02_0.5-0.6	GW03_0.0-0.1	GW04_0.5-0.6	GW05_1.6-1.7
			Client sampling date / time	06-Dec-2016 00:00	06-Dec-2016 00:00	07-Dec-2016 00:00	08-Dec-2016 00:00	08-Dec-2016 00:00
Compound	CAS Number	LOR	Unit	ES1700845-001	ES1700845-002	ES1700845-003	ES1700845-004	ES1700845-005
				Result	Result	Result	Result	Result
EN60: Bottle Leaching Procedure								
Final pH	----	0.1	pH Unit	**6.5**	**5.7**	**6.0**	**5.8**	**6.6**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	SB06_0.5-0.6	SB06_5.0-5.1	SB07_3.0-3.1	SB08_0.5-0.6	SB09_0.0-0.1
			Client sampling date / time	06-Dec-2016 00:00	06-Dec-2016 00:00	05-Dec-2016 00:00	05-Dec-2016 00:00	05-Dec-2016 00:00
Compound	CAS Number	LOR	Unit	ES1700845-006	ES1700845-007	ES1700845-008	ES1700845-009	ES1700845-010
				Result	Result	Result	Result	Result
EN60: Bottle Leaching Procedure								
Final pH	----	0.1	pH Unit	**6.8**	**6.7**	**6.8**	**8.2**	**7.5**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	SB09_4.0-4.1	SB10_0.0-0.1	SB12_0.0-0.1	SB13_0.5-0.6	SB14_0.5-0.6
			Client sampling date / time	06-Dec-2016 00:00	06-Dec-2016 00:00	07-Dec-2016 00:00	07-Dec-2016 00:00	08-Dec-2016 00:00
Compound	CAS Number	LOR	Unit	ES1700845-011	ES1700845-012	ES1700845-013	ES1700845-014	ES1700845-015
				Result	Result	Result	Result	Result
EN60: Bottle Leaching Procedure								
Final pH	----	0.1	pH Unit	**6.8**	**7.0**	**7.0**	**5.6**	**7.0**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB15_1.0-1.1	----	----	----	----
				Client sampling date / time	08-Dec-2016 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1700845-016	--------	--------	--------	--------
					Result	----	----	----	----
EN60: Bottle Leaching Procedure									
Final pH	----	0.1	pH Unit		**5.4**	**----**	**----**	**----**	**----**

Surrogate Control Limits

Sub-Matrix: **DI WATER LEACHATE**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1700845**	Page	: 1 of 6
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR BEN ANDERSON	Telephone	: +61-2-8784 8555
Project	: ALBION PARK	Date Samples Received	: 13-Jan-2017
Site	: ----	Issue Date	: 27-Jan-2017
Sampler	: MATTHEW WEST	No. of samples received	: 16
Order number	: 21-25583/02	No. of samples analysed	: 16

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.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **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.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP231A: Perfluoroalkyl Sulfonic Acids	ES1700845--003	GW03_0.0-0.1	**Perfluorohexane sulfonic acid (PFHxS)**	355-46-4	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP231A: Perfluoroalkyl Sulfonic Acids	EP1700173--004	Anonymous	**Perfluorooctane sulfonic acid (PFOS)**	1763-23-1	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP231A: Perfluoroalkyl Sulfonic Acids	ES1700845--003	GW03_0.0-0.1	**Perfluorooctane sulfonic acid (PFOS)**	1763-23-1	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

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
EN60: Bottle Leaching Procedure							
Non-Volatile Leach: 180 day HT (e.g. metals ex.Hg) (EN60-Dla)							
SB07_3.0-3.1, SB08_0.5-0.6, SB09_0.0-0.1	**05-Dec-2016**	**20-Jan-2017**	03-Jun-2017	✓	**----**	----	----
Non-Volatile Leach: 180 day HT (e.g. metals ex.Hg) (EN60-Dla)							
GW01_0.0-0.2, GW02_0.5-0.6	**06-Dec-2016**	**18-Jan-2017**	04-Jun-2017	✓	**----**	----	----
Non-Volatile Leach: 180 day HT (e.g. metals ex.Hg) (EN60-Dla)							
SB06_0.5-0.6, SB06_5.0-5.1, SB09_4.0-4.1, SB10_0.0-0.1	**06-Dec-2016**	**20-Jan-2017**	04-Jun-2017	✓	**----**	----	----
Non-Volatile Leach: 180 day HT (e.g. metals ex.Hg) (EN60-Dla)							
SB12_0.0-0.1, SB13_0.5-0.6	**07-Dec-2016**	**20-Jan-2017**	05-Jun-2017	✓	**----**	----	----
Non-Volatile Leach: 180 day HT (e.g. metals ex.Hg) (EN60-Dla)							
GW03_0.0-0.1	**07-Dec-2016**	**23-Jan-2017**	05-Jun-2017	✓	**----**	----	----
Non-Volatile Leach: 180 day HT (e.g. metals ex.Hg) (EN60-Dla)							
GW04_0.5-0.6, GW05_1.6-1.7, SB14_0.5-0.6, SB15_1.0-1.1	**08-Dec-2016**	**20-Jan-2017**	06-Jun-2017	✓	**----**	----	----

Matrix: **WATER**

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

Matrix: **WATER**

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
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE (no PTFE) (EP231X)							
GW01_0.0-0.2, GW02_0.5-0.6	**18-Jan-2017**	**----**	----	----	**19-Jan-2017**	17-Jul-2017	✓
HDPE (no PTFE) (EP231X)							
GW04_0.5-0.6, GW05_1.6-1.7, SB06_0.5-0.6, SB06_5.0-5.1, SB07_3.0-3.1, SB08_0.5-0.6, SB09_0.0-0.1, SB09_4.0-4.1, SB10_0.0-0.1, SB12_0.0-0.1, SB13_0.5-0.6, SB14_0.5-0.6, SB15_1.0-1.1	**20-Jan-2017**	**----**	----	----	**23-Jan-2017**	19-Jul-2017	✓
HDPE (no PTFE) (EP231X)							
GW03_0.0-0.1	**23-Jan-2017**	**----**	----	----	**24-Jan-2017**	22-Jul-2017	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X)							
GW01_0.0-0.2, GW02_0.5-0.6	**18-Jan-2017**	**----**	----	----	**19-Jan-2017**	17-Jul-2017	✓
HDPE (no PTFE) (EP231X)							
GW04_0.5-0.6, GW05_1.6-1.7, SB06_0.5-0.6, SB06_5.0-5.1, SB07_3.0-3.1, SB08_0.5-0.6, SB09_0.0-0.1, SB09_4.0-4.1, SB10_0.0-0.1, SB12_0.0-0.1, SB13_0.5-0.6, SB14_0.5-0.6, SB15_1.0-1.1	**20-Jan-2017**	**----**	----	----	**23-Jan-2017**	19-Jul-2017	✓
HDPE (no PTFE) (EP231X)							
GW03_0.0-0.1	**23-Jan-2017**	**----**	----	----	**24-Jan-2017**	22-Jul-2017	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X)							
GW01_0.0-0.2, GW02_0.5-0.6	**18-Jan-2017**	**----**	----	----	**19-Jan-2017**	17-Jul-2017	✓
HDPE (no PTFE) (EP231X)							
GW04_0.5-0.6, GW05_1.6-1.7, SB06_0.5-0.6, SB06_5.0-5.1, SB07_3.0-3.1, SB08_0.5-0.6, SB09_0.0-0.1, SB09_4.0-4.1, SB10_0.0-0.1, SB12_0.0-0.1, SB13_0.5-0.6, SB14_0.5-0.6, SB15_1.0-1.1	**20-Jan-2017**	**----**	----	----	**23-Jan-2017**	19-Jul-2017	✓
HDPE (no PTFE) (EP231X)							
GW03_0.0-0.1	**23-Jan-2017**	**----**	----	----	**24-Jan-2017**	22-Jul-2017	✓

Matrix: **WATER**

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
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X) GW01_0.0-0.2, GW02_0.5-0.6	**18-Jan-2017**	**----**	----	----	**19-Jan-2017**	17-Jul-2017	✓
HDPE (no PTFE) (EP231X) GW04_0.5-0.6, GW05_1.6-1.7, SB06_0.5-0.6, SB06_5.0-5.1, SB07_3.0-3.1, SB08_0.5-0.6, SB09_0.0-0.1, SB09_4.0-4.1, SB10_0.0-0.1, SB12_0.0-0.1, SB13_0.5-0.6, SB14_0.5-0.6, SB15_1.0-1.1	**20-Jan-2017**	**----**	----	----	**23-Jan-2017**	19-Jul-2017	✓
HDPE (no PTFE) (EP231X) GW03_0.0-0.1	**23-Jan-2017**	**----**	----	----	**24-Jan-2017**	22-Jul-2017	✓
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X) GW01_0.0-0.2, GW02_0.5-0.6	**18-Jan-2017**	**----**	----	----	**19-Jan-2017**	17-Jul-2017	✓
HDPE (no PTFE) (EP231X) GW04_0.5-0.6, GW05_1.6-1.7, SB06_0.5-0.6, SB06_5.0-5.1, SB07_3.0-3.1, SB08_0.5-0.6, SB09_0.0-0.1, SB09_4.0-4.1, SB10_0.0-0.1, SB12_0.0-0.1, SB13_0.5-0.6, SB14_0.5-0.6, SB15_1.0-1.1	**20-Jan-2017**	**----**	----	----	**23-Jan-2017**	19-Jul-2017	✓
HDPE (no PTFE) (EP231X) GW03_0.0-0.1	**23-Jan-2017**	**----**	----	----	**24-Jan-2017**	22-Jul-2017	✓

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: **WATER**

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)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	5	38	**13.16**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	38	**7.89**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	38	**7.89**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	38	**7.89**	**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
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	SOIL	In house: Direct injection analysis of fresh waters after dilution (1:1) with methanol. Analysis by LC-Electrospray-MS-MS, Negative Mode using MRM. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers.

Preparation Methods	Method	Matrix	Method Descriptions
Deionised Water Leach	EN60-Dla	SOIL	In house QWI-EN/60 referenced to AS4439.3 Preparation of Leachates

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1700845**	Page	: 1 of 14
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR BEN ANDERSON	Contact	: Customer Services ES
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 07 5413 8161	Telephone	: +61-2-8784 8555
Project	: ALBION PARK	Date Samples Received	: 13-Jan-2017
Order number	: 21-25583/02	Date Analysis Commenced	: 18-Jan-2017
C-O-C number	: ----	Issue Date	: 27-Jan-2017
Sampler	: MATTHEW WEST		
Site	: ----		
Quote number	: EN/005/15		
No. of samples received	: 16		
No. of samples analysed	: 16		

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*
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW

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: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 726282)									
EP1700173-004	Anonymous	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	46.3	45.2	2.29	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.25	0.25	0.00	0% - 50%
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.14	0.13	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	1.33	1.28	4.22	0% - 20%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.08	0.08	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 728892)									
ES1700845-004	GW04_0.5-0.6	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.43	0.46	6.35	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.06	0.05	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
ES1700845-014	SB13_0.5-0.6	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.17	0.18	0.00	0% - 50%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 731237)									
ES1700845-003	GW03_0.0-0.1	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	67.4	67.7	0.324	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.75	0.77	2.89	0% - 20%
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.86	0.85	0.00	0% - 20%
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	9.52	9.88	3.70	0% - 20%

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 731237) - continued									
ES1700845-003	GW03_0.0-0.1	EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	1.47	1.40	4.45	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
ES1701175-006	Anonymous	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	671	699	4.12	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	11.3	11.4	1.32	0% - 20%
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	9.11	9.21	1.09	0% - 20%
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	84.7	83.0	2.09	0% - 20%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	15.8	16.2	2.19	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.20	<0.20	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 726282)									
EP1700173-004	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.12	0.11	0.00	0% - 50%
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.10	0.10	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.35	0.34	2.91	0% - 50%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 728892)									
ES1700845-004	GW04_0.5-0.6	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
ES1700845-014	SB13_0.5-0.6	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 728892) - continued									
ES1700845-014	SB13_0.5-0.6	EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 731237)									
ES1700845-003	GW03_0.0-0.1	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	1.39	1.33	4.05	0% - 20%
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.36	0.38	6.49	0% - 50%
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	1.92	2.00	4.14	0% - 20%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.42	0.44	2.78	0% - 20%
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
ES1701175-006	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	9.88	9.54	3.50	0% - 20%
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	5.21	5.59	7.04	0% - 20%
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	18.2	18.2	0.110	0% - 20%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	2.31	1.75	27.6	0% - 50%
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.20	<0.20	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.20	<0.20	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.20	<0.20	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.20	<0.20	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.20	<0.20	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.50	<0.50	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	4.4	5.3	19.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 726282)									
EP1700173-004	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 728892)									
ES1700845-004	GW04_0.5-0.6	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
ES1700845-014	SB13_0.5-0.6	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 731237)									
ES1700845-003	GW03_0.0-0.1	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
ES1701175-006	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	2.01	2.10	4.38	0% - 50%

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 731237) - continued									
ES1701175-006	Anonymous	EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.20	<0.20	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.20	<0.20	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.50	<0.50	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.50	<0.50	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.50	<0.50	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.50	<0.50	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 726282)									
EP1700173-004	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 728892)									
ES1700845-004	GW04_0.5-0.6	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
ES1700845-014	SB13_0.5-0.6	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 731237)									
ES1700845-003	GW03_0.0-0.1	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 731237) - continued									
ES1700845-003	GW03_0.0-0.1	EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
ES1701175-006	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	0.54	0.53	1.87	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	45.9	44.7	2.76	0% - 20%
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	8.63	8.27	4.26	0% - 50%
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.50	<0.50	0.00	No Limit
EP231P: PFAS Sums (QC Lot: 728892)									
ES1700845-004	GW04_0.5-0.6	EP231X: Sum of PFAS	----	0.01	µg/L	0.49	0.51	4.00	0% - 20%
ES1700845-014	SB13_0.5-0.6	EP231X: Sum of PFAS	----	0.01	µg/L	0.17	0.18	5.71	No Limit
EP231P: PFAS Sums (QC Lot: 731237)									
ES1700845-003	GW03_0.0-0.1	EP231X: Sum of PFAS	----	0.01	µg/L	84.1	84.8	0.782	0% - 20%
ES1701175-006	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	889	915	2.86	0% - 20%

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: **WATER**

				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
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 726282)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.5 µg/L	83.2	70	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.5 µg/L	89.8	70	130
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.5 µg/L	80.4	70	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.5 µg/L	78.8	70	130
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.5 µg/L	93.2	70	130
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.5 µg/L	96.0	70	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 728892)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.5 µg/L	122	70	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.5 µg/L	107	70	130
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.5 µg/L	116	70	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.5 µg/L	108	70	130
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.5 µg/L	91.0	70	130
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.5 µg/L	120	70	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 731237)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.5 µg/L	83.6	70	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.5 µg/L	79.8	70	130
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.5 µg/L	92.6	70	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.5 µg/L	78.6	70	130
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.5 µg/L	98.4	70	130
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.5 µg/L	111	70	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 726282)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	2.5 µg/L	81.0	70	130
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.5 µg/L	91.2	70	130
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.5 µg/L	87.8	70	130
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.5 µg/L	85.8	70	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.5 µg/L	88.6	70	130
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.5 µg/L	99.4	70	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.5 µg/L	87.4	70	130
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.5 µg/L	112	70	130
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.5 µg/L	122	70	130
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.5 µg/L	79.4	70	130
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	1.25 µg/L	79.5	70	124
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 728892)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	2.5 µg/L	98.8	70	130

Sub-Matrix: **WATER**

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
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 728892) - continued								
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.5 µg/L	88.6	70	130
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.5 µg/L	117	70	130
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.5 µg/L	103	70	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.5 µg/L	111	70	130
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.5 µg/L	98.6	70	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.5 µg/L	113	70	130
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.5 µg/L	116	70	130
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.5 µg/L	86.6	70	130
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.5 µg/L	82.4	70	130
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	1.25 µg/L	113	70	124
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 731237)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	2.5 µg/L	82.6	70	130
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.5 µg/L	89.8	70	130
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.5 µg/L	89.4	70	130
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.5 µg/L	89.8	70	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.5 µg/L	101	70	130
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.5 µg/L	87.8	70	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.5 µg/L	110	70	130
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.5 µg/L	102	70	130
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.5 µg/L	92.2	70	130
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.5 µg/L	89.6	70	130
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	1.25 µg/L	92.3	70	124
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 726282)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.5 µg/L	93.4	70	130
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	1.25 µg/L	84.8	70	130
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	1.25 µg/L	102	70	129
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	1.25 µg/L	90.4	70	129
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	1.25 µg/L	104	70	126
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.5 µg/L	81.6	70	130
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.5 µg/L	84.4	70	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 728892)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.5 µg/L	86.6	70	130
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	1.25 µg/L	116	70	130
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	1.25 µg/L	109	70	129

Sub-Matrix: **WATER**

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
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 728892) - continued								
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	1.25 µg/L	94.2	70	129
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	1.25 µg/L	93.5	70	126
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.5 µg/L	86.0	70	130
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.5 µg/L	87.4	70	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 731237)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.5 µg/L	104	70	130
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	1.25 µg/L	97.4	70	130
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	1.25 µg/L	101	70	129
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	1.25 µg/L	109	70	129
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	1.25 µg/L	110	70	126
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.5 µg/L	108	70	130
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.5 µg/L	114	70	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 726282)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.5 µg/L	89.0	70	130
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.5 µg/L	88.8	70	130
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.5 µg/L	92.8	70	130
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.5 µg/L	88.6	70	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 728892)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.5 µg/L	98.2	70	130
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.5 µg/L	91.4	70	130
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.5 µg/L	111	70	130
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.5 µg/L	81.2	70	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 731237)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.5 µg/L	81.8	70	130
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.5 µg/L	111	70	130
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.5 µg/L	104	70	130
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.5 µg/L	86.2	70	130

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: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 726282)							
EP1700173-004	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.5 µg/L	86.6	50	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.5 µg/L	71.2	50	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.5 µg/L	66.2	50	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.5 µg/L	75.6	50	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.5 µg/L	# Not Determined	50	130
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.5 µg/L	114	50	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 728892)							
ES1700845-004	GW04_0.5-0.6	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.5 µg/L	106	50	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.5 µg/L	106	50	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.5 µg/L	114	50	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.5 µg/L	108	50	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.5 µg/L	109	50	130
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.5 µg/L	108	50	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 731237)							
ES1700845-003	GW03_0.0-0.1	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.5 µg/L	80.6	50	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.5 µg/L	77.6	50	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.5 µg/L	# Not Determined	50	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.5 µg/L	99.0	50	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.5 µg/L	# Not Determined	50	130
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.5 µg/L	119	50	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 726282)							
EP1700173-004	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	2.5 µg/L	68.4	50	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.5 µg/L	72.6	50	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.5 µg/L	70.0	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.5 µg/L	86.2	50	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.5 µg/L	84.8	50	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.5 µg/L	82.8	50	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.5 µg/L	121	50	130
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.5 µg/L	101	50	130
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.5 µg/L	116	50	130
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.5 µg/L	69.0	50	130
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	1.25 µg/L	73.7	50	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 728892)							

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 728892) - continued							
ES1700845-004	GW04_0.5-0.6	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	2.5 µg/L	106	50	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.5 µg/L	113	50	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.5 µg/L	109	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.5 µg/L	120	50	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.5 µg/L	109	50	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.5 µg/L	118	50	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.5 µg/L	104	50	130
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.5 µg/L	121	50	130
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.5 µg/L	120	50	130
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.5 µg/L	85.6	50	130
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	1.25 µg/L	80.2	50	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 731237)							
ES1700845-003	GW03_0.0-0.1	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	2.5 µg/L	111	50	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.5 µg/L	86.4	50	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.5 µg/L	93.2	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.5 µg/L	95.6	50	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.5 µg/L	88.8	50	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.5 µg/L	108	50	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.5 µg/L	111	50	130
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.5 µg/L	115	50	130
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.5 µg/L	97.4	50	130
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.5 µg/L	104	50	130
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	1.25 µg/L	98.5	50	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 726282)							
EP1700173-004	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.5 µg/L	90.6	50	130
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	1.25 µg/L	80.8	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	1.25 µg/L	101	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	1.25 µg/L	91.4	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	1.25 µg/L	107	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.5 µg/L	78.6	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.5 µg/L	76.8	50	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 728892)							
ES1700845-004	GW04_0.5-0.6	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.5 µg/L	86.4	50	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 728892) - continued							
ES1700845-004	GW04_0.5-0.6	EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	1.25 µg/L	110	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	1.25 µg/L	111	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	1.25 µg/L	76.1	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	1.25 µg/L	93.8	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.5 µg/L	83.8	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.5 µg/L	105	50	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 731237)							
ES1700845-003	GW03_0.0-0.1	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.5 µg/L	116	50	130
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	1.25 µg/L	107	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	1.25 µg/L	107	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	1.25 µg/L	106	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	1.25 µg/L	108	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.5 µg/L	112	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.5 µg/L	106	50	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 726282)							
EP1700173-004	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.5 µg/L	75.0	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.5 µg/L	89.8	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.5 µg/L	118	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.5 µg/L	94.8	50	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 728892)							
ES1700845-004	GW04_0.5-0.6	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.5 µg/L	111	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.5 µg/L	103	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.5 µg/L	77.4	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.5 µg/L	82.0	50	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 731237)							
ES1700845-003	GW03_0.0-0.1	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.5 µg/L	99.4	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.5 µg/L	95.0	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.5 µg/L	116	50	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 731237) - continued							
ES1700845-003	GW03_0.0-0.1	EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.5 µg/L	85.2	50	130

Frank Ferraro Frank ars 24-1-17 1200

From: Natalie Emsies
Sent: Tuesday, 24 January 2017 10:40 AM
To: Frank Ferraro
Subject: FW: Full PFAS suite - Lab report ES1629123
Attachments: ES1629123_0_COA.pdf; ES1629123_COC.pdf

Hey Frank,

Can you please arrange this rebatch to have the full suite logged for the samples below....we should still have them.

Kind Regards
Natalie Emsies

From: Nicole Rosen [mailto:Nicole.Rosen@ghd.com]
Sent: Monday, 23 January 2017 6:03 PM
To: Natalie Emsies <Natalie.Emsies@alsglobal.com>
Cc: ALSEnviro Sydney <ALSEnviro.Sydney@ALSGlobal.com>
Subject: Full PFAS suite - Lab report ES1629123

Hi Natalie,
I have just noticed in the following lab report ES1629123 that only had the limited PFAs suite and we needed the full suite.
Do you still have the samples? Are we able to schedule them for the full suite?

The following samples required the full PFAs suite.

	Sample Code	ID
1	ES1629123007	SW01
2	ES1629123008	SW02
3	ES1629123009	SW03
4	ES1629123010	SW04
5	ES1629123011	SW05
6	ES1629123012	SWQA1
7	ES1629123013	GW01
8	ES1629123014	GW02
9	ES1629123015	GW03
10	ES1629123016	GW04
11	ES1629123017	GW05
12	ES1629123018	GWQA3

Environmental Division
Sydney
Work Order Reference
ES1701791

Telephone : + 61-2-8784 8555

Thanks,

Nicole Rosen
Senior Environmental Consultant - Contamination Assessment and Remediation

GHD

T: +61 2 9239 7683 | F: 61 2 9239 7199 | V: 217683 | M: 0421 045 835 | E: nicole.rosen@ghd.com
Level 15 133 Castlereagh St Sydney NSW 2000 Australia | http://www.ghd.com/
Water | Energy & Resources | Environment | Property & Buildings | Transportation

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ALS Group: Click here to report this email as spam.

SAMPLE RECEIPT INFORMATION & BOTTLE TYPE

WORKORDER No:

To be completed by Sample Receipt				Samples checked, labelled and put in trays by:	Analysis creation by: (Starlims only)
Sorting Times *(Only record for BP, Mobil & URS)*	**Temperature Details** (record if NOT on COC)	**Packaging**	**Courier Details** (Mandatory for Quarantine)		
Time Sorting Commenced:	Sample Temp 25.7 'C	Seal Intact - Y / N / NA	Con Note:		
Time Placed in Fridge:	Chilling Method - Circle if sample temp is less than 6'C it is not necessary to complete this section	**Type** / **No.**		Initial:	Initial:
Sorting to Fridge Target Time <1 Hour	Ice / Ice Bricks / No Chilling	Esky / Other	*Cells shaded grey don't need to be completed on this form if they are entered directly into LIMS/ANGEL by Sample Receipt staff.*		

Sample Receipt Advice Comments - To be completed by Sorting Staff

VOC analysis may be compromised as sample containers contained **headspace** *(list):*

Details of any samples damaged during transit:

Other Information (eg. Were bottles received that weren't completely filled) (eg. If sample temperature is above 6'C add further detail here - *Internal use only - Not for SRN*):

Metals Bottles: F = Field filtered. T = Total. N/S = Not Specified.
Cyanide Bottles: Tr = Treated, meaning the client has ticked the pre-treated box on the bottle. Un = Untreated, meaning the box is not ticked.
Ferrous Iron, Hexavalent Chromium & Geosmin and MIB: F = Field filtered. N/S = Not Specified.
Soil Bags: S = Small. M = Medium (~500mL asbestos or PSD bag). L = Large (~6kg FMT bag)

Lab No.	S-							SV-		LC-		Scores by	V-				T-			W-				P-		OG-	M-			MA-			IN-												Micro			UTW-		Crypto Lab	Other
	Soil jar	Sediment jar	SOIL BAG *CIRCE* Plastic / Paper Frozen / Not Frozen			Plastic jar (PFAS)	Potent'l ACM Board	Glass Orange (SVOC)		Grey HDPE - No PTFE (PFOS & PFOA etc)	Glass Green / White (LCMS)	Red Glass (AOX)	Purple (VOC)	Dark Blue / White (Halo Acetic Acids)	Grey (Acrylamide Acrolein)	Green (Geosmin & MIB)	Purple		Black on White EDA preserved (ED013)	Natural Plastic Green		Opaque Plastic Green (Chlor a)		Plastic Purple (Nutr, Total Phen & COD) (250 = Thiocyan)		Purple Glass (O&G)	Red Metal Bottle		Maroon on White Plastic (As / Se Specialn)	Red / Green Metal Bottle			Opaque Blue Plastic (CN)	Yellow Plastic (Sulfide)		Light Blue Plastic (UHS)	Light Orange Plastic (Sulfite)	Maroon Plastic (Ferrous Iron)		Blue Plastic (Cr VI)		Brown/ Green Stripe Glass (Surft or Alkyl Ethox's)		Sterile Micro Jar		Dark Green Plastic (Algae)	Light Green & White Plastic (UT Nutrients - Unfiltered)	Turquoise & White Plastic (UT Nutrients - Filtered)	Plastic Carboy (Crypto & Giardia)	
																	TOC	DOC											*CIRCLE* Standard OR ORC			*CIRCLE* Standard OR ORC															Black	Grey					
	150	250	S	M	L	200	Bag	100	500	60	100	500	40	40	40	F	N/S	40	40	40	1L	500	250	1L	60	250	250	F	T	N/S	60	F	T	N/S	Tr	Un	Flec	N/S	250	250	F	N/S	F	N/S	100	500	120	250	200	60	80	10L	
	This line allows for an initial indication of bottle types received without specifying the exact number for each sample. When using this function tick the boxes matching the containers received for this work order.																																															
										1																																								

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1701791**	Page	: 1 of 9
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: JAMES LEAN	Contact	: Customer Services ES
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9239 7100	Telephone	: +61-2-8784 8555
Project	: Albion Park	Date Samples Received	: 24-Jan-2017 12:00
Order number	: 2125583	Date Analysis Commenced	: 31-Jan-2017
C-O-C number	: ----	Issue Date	: 02-Feb-2017 12:08
Sampler	: JAMES LEAN		
Site	: ----		
Quote number	: EN/005/15		
No. of samples received	: 12		
No. of samples analysed	: 12		

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*
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW

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 no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

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.

- EP231: Particular samples required dilution due to sample matrix . LOR values have been adjusted accordingly.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SW01	SW02	SW03	SW04	SW05
				Client sampling date / time	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1701791-001	ES1701791-002	ES1701791-003	ES1701791-004	ES1701791-005
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		**0.04**	<0.02	**0.03**	<0.02	**3.85**
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		**0.04**	<0.02	**0.03**	<0.02	**3.50**
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		**0.34**	<0.02	**0.21**	**0.05**	**27.2**
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	**1.44**
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		**1.68**	**0.08**	**1.14**	**0.19**	**135**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	**1.15**
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		**0.06**	<0.02	**0.05**	<0.02	**4.78**
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		**0.08**	<0.02	**0.05**	<0.02	**18.5**
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		**0.02**	<0.02	<0.02	<0.02	**2.93**
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		**0.03**	<0.01	**0.04**	**0.01**	**9.13**
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	**0.13**
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	**0.08**
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	**1.01**
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SW01	SW02	SW03	SW04	SW05
				Client sampling date / time	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1701791-001	ES1701791-002	ES1701791-003	ES1701791-004	ES1701791-005
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	**0.06**
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	**3.64**
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	**0.40**
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		**2.29**	**0.08**	**1.55**	**0.25**	**213**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**2.02**	**0.08**	**1.35**	**0.24**	**162**
Sum of PFAS (WA DER List)	----	0.01	µg/L		**2.25**	**0.08**	**1.52**	**0.25**	**205**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**101**	**106**	**113**	**105**	**99.8**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SWQA1	GW01	GW02	GW03	GW04
				Client sampling date / time	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1701791-006	ES1701791-007	ES1701791-008	ES1701791-009	ES1701791-010
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		**3.77**	<0.10	<0.10	**12.8**	<0.10
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		**3.46**	<0.10	<0.10	**9.22**	<0.10
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		**26.2**	**0.22**	<0.10	**38.2**	<0.10
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		**1.48**	<0.10	<0.10	**1.14**	<0.10
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		**133**	**0.23**	**0.20**	**8.26**	**0.20**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		**1.13**	<0.10	<0.10	<0.10	<0.10
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	<0.5	<0.5	<0.5	<0.5
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		**4.69**	<0.10	<0.10	**2.96**	<0.10
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		**18.3**	**0.12**	<0.10	**14.8**	<0.10
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		**2.87**	<0.10	<0.10	**3.01**	<0.10
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		**8.55**	<0.05	<0.05	**2.57**	<0.05
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		**0.10**	<0.10	<0.10	<0.10	<0.10
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		**0.08**	<0.10	<0.10	<0.10	<0.10
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	<0.10	<0.10	<0.10	<0.10
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	<0.10	<0.10	<0.10	<0.10
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	<0.10	<0.10	<0.10	<0.10
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	<0.25	<0.25	<0.25	<0.25
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		**1.05**	<0.10	<0.10	<0.10	<0.10
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.05	<0.25	<0.25	<0.25	<0.25
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	<0.25	<0.25	<0.25	<0.25

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SWQA1	GW01	GW02	GW03	GW04
				Client sampling date / time	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00	16-Dec-2016 00:00
Compound	CAS Number	LOR	Unit		ES1701791-006	ES1701791-007	ES1701791-008	ES1701791-009	ES1701791-010
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L		<0.05	<0.25	<0.25	<0.25	<0.25
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L		<0.05	<0.25	<0.25	<0.25	<0.25
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L		**0.08**	<0.10	<0.10	<0.10	<0.10
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L		<0.02	<0.10	<0.10	<0.10	<0.10
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L		<0.05	<0.25	<0.25	<0.25	<0.25
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		**3.33**	<0.25	<0.25	<0.25	<0.25
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		**0.42**	<0.25	<0.25	<0.25	<0.25
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.25	<0.25	<0.25	<0.25
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		**208**	**0.57**	**0.20**	**93.0**	**0.20**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**159**	**0.45**	**0.20**	**46.5**	**0.20**
Sum of PFAS (WA DER List)	----	0.01	µg/L		**201**	**0.57**	**0.20**	**82.6**	**0.20**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**101**	**114**	**110**	**106**	**105**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW05	GWQA3	----	----	----
				Client sampling date / time	16-Dec-2016 00:00	16-Dec-2016 00:00	----	----	----
Compound	CAS Number	LOR	Unit		ES1701791-011	ES1701791-012	--------	--------	--------
					Result	Result	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		**0.12**	<0.10	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.10	<0.10	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		<0.10	**0.34**	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.10	<0.10	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		**0.10**	**0.23**	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.10	<0.10	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.5	<0.5	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		<0.10	<0.10	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.10	**0.14**	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.10	<0.10	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.05	<0.05	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.10	<0.10	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.10	<0.10	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.10	<0.10	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.10	<0.10	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.10	<0.10	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.25	<0.25	----	----	----
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<0.10	<0.10	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.25	<0.25	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.25	<0.25	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW05	GWQA3	----	----	----
				Client sampling date / time	16-Dec-2016 00:00	16-Dec-2016 00:00	----	----	----
Compound	CAS Number	LOR	Unit		ES1701791-011	ES1701791-012	--------	--------	--------
					Result	Result	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L		<0.25	<0.25	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L		<0.25	<0.25	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L		<0.10	<0.10	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L		<0.10	<0.10	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L		<0.25	<0.25	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		<0.25	<0.25	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.25	<0.25	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.25	<0.25	----	----	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		**0.22**	**0.71**	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**0.10**	**0.57**	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L		**0.22**	**0.71**	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**105**	**111**	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1701791**	Page	: 1 of 5
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: JAMES LEAN	Telephone	: +61-2-8784 8555
Project	: Albion Park	Date Samples Received	: 24-Jan-2017
Site	: ----	Issue Date	: 02-Feb-2017
Sampler	: JAMES LEAN	No. of samples received	: 12
Order number	: 2125583	No. of samples analysed	: 12

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: **WATER**

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
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE Soil Jar (EP231X)							
SW01, SW02, SW03, SW04, SW05, SWQA1, GW01, GW02, GW03, GW04, GW05, GWQA3	**16-Dec-2016**	**----**	----	----	**31-Jan-2017**	14-Jun-2017	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE Soil Jar (EP231X)							
SW01, SW02, SW03, SW04, SW05, SWQA1, GW01, GW02, GW03, GW04, GW05, GWQA3	**16-Dec-2016**	**----**	----	----	**31-Jan-2017**	14-Jun-2017	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE Soil Jar (EP231X)							
SW01, SW02, SW03, SW04, SW05, SWQA1, GW01, GW02, GW03, GW04, GW05, GWQA3	**16-Dec-2016**	**----**	----	----	**31-Jan-2017**	14-Jun-2017	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE Soil Jar (EP231X)							
SW01, SW02, SW03, SW04, SW05, SWQA1, GW01, GW02, GW03, GW04, GW05, GWQA3	**16-Dec-2016**	**----**	----	----	**31-Jan-2017**	14-Jun-2017	✓

Matrix: **WATER**

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
EP231P: PFAS Sums							
HDPE Soil Jar (EP231X)							
SW01, SW02, SW03, SW04, SW05, SWQA1, GW01, GW02, GW03, GW04, GW05, GWQA3	**16-Dec-2016**	**----**	----	----	**31-Jan-2017**	14-Jun-2017	✓

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: **WATER**

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)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	20	**5.00**	**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
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In house: Direct injection analysis of fresh waters after dilution (1:1) with methanol. Analysis by LC-Electrospray-MS-MS, Negative Mode using MRM. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers.

QUALITY CONTROL REPORT

Work Order	: **ES1701791**	Page	: 1 of 7
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: JAMES LEAN	Contact	: Customer Services ES
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9239 7100	Telephone	: +61-2-8784 8555
Project	: Albion Park	Date Samples Received	: 24-Jan-2017
Order number	: 2125583	Date Analysis Commenced	: 31-Jan-2017
C-O-C number	: ----	Issue Date	: 02-Feb-2017
Sampler	: JAMES LEAN		
Site	: ----		
Quote number	: EN/005/15		
No. of samples received	: 12		
No. of samples analysed	: 12		

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*
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW

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: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 735757)									
ES1701714-001	Anonymous	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.03	0.04	0.00	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.02	0.02	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
ES1701791-003	SW03	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	1.14	1.14	0.00	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.03	0.03	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.03	0.02	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.21	0.22	0.00	0% - 50%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 735757)									
ES1701714-001	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.02	0.02	0.00	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
ES1701791-003	SW03	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.04	0.04	0.00	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 735757) - continued									
ES1701791-003	SW03	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.05	0.05	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.05	0.05	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 735757)									
ES1701714-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
ES1701791-003	SW03	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 735757)									
ES1701714-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 735757) - continued									
ES1701714-001	Anonymous	EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
ES1701791-003	SW03	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231P: PFAS Sums (QC Lot: 735757)									
ES1701714-001	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	0.07	0.08	13.3	No Limit
ES1701791-003	SW03	EP231X: Sum of PFAS	----	0.01	µg/L	1.55	1.55	0.00	0% - 20%

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: **WATER**

				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
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 735757)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.5 µg/L	109	70	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.5 µg/L	112	70	130
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.5 µg/L	113	70	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.5 µg/L	108	70	130
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.5 µg/L	123	70	130
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.5 µg/L	109	70	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 735757)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	2.5 µg/L	83.0	70	130
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.5 µg/L	93.4	70	130
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.5 µg/L	114	70	130
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.5 µg/L	111	70	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.5 µg/L	111	70	130
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.5 µg/L	117	70	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.5 µg/L	96.4	70	130
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.5 µg/L	109	70	130
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.5 µg/L	111	70	130
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.5 µg/L	120	70	130
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	1.25 µg/L	109	70	124
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 735757)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.5 µg/L	110	70	130
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	1.25 µg/L	117	70	130
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	1.25 µg/L	114	70	129
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	1.25 µg/L	96.0	70	129
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	1.25 µg/L	103	70	126
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.5 µg/L	106	70	130
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.5 µg/L	111	70	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 735757)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.5 µg/L	113	70	130
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.5 µg/L	93.2	70	130
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.5 µg/L	113	70	130

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 735757) - continued								
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.5 µg/L	117	70	130

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: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 735757)							
ES1701714-001	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.5 µg/L	110	50	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.5 µg/L	114	50	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.5 µg/L	94.2	50	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.5 µg/L	98.6	50	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.5 µg/L	99.8	50	130
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.5 µg/L	102	50	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 735757)							
ES1701714-001	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	2.5 µg/L	77.5	50	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.5 µg/L	86.6	50	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.5 µg/L	109	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.5 µg/L	111	50	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.5 µg/L	89.2	50	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.5 µg/L	85.6	50	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.5 µg/L	94.2	50	130
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.5 µg/L	119	50	130
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.5 µg/L	108	50	130
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.5 µg/L	110	50	130
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	1.25 µg/L	103	50	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 735757)							
ES1701714-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.5 µg/L	109	50	130
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	1.25 µg/L	98.2	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	1.25 µg/L	99.8	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	1.25 µg/L	97.3	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	1.25 µg/L	106	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.5 µg/L	112	50	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 735757) - continued							
ES1701714-001	Anonymous	EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.5 µg/L	104	50	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 735757)							
ES1701714-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.5 µg/L	110	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.5 µg/L	103	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.5 µg/L	111	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.5 µg/L	115	50	130

19/01/17 14:00
J. Grealy

Jessie Grealy

From: Natalie Emsies
Sent: Thursday, 19 January 2017 2:11 PM
To: Samples Sydney; Jessie Grealy; Frank Ferraro; ALS Enviro Melbourne
Cc: ALSEnviro Sydney
Subject: FW: Additional analysis required - TCLP

Hi All,

Can you please arrange the highlighted rebatch requested below?

TAT

Kind Regards
Natalie Emsies

From: Nicole Rosen [mailto:Nicole.Rosen@ghd.com]
Sent: Thursday, 19 January 2017 12:06 PM
To: Natalie Emsies
Cc: ALSEnviro Sydney
Subject: FW: Additional analysis required - TCLP

Hi Natalie,
I also sent this email yesterday to Sepan and haven't had a response. Are you able to schedule these for me?
Are you able to let me know what is the best email to use for these request?
Thanks
Nicole

Environmental Division
Sydney
Work Order Reference
ES1701294

Telephone : +61-2-8784 8555

From: Nicole Rosen
Sent: Wednesday, 18 January 2017 2:41 PM
To: Sepan Mahamad <Sepan.Mahamad@alsglobal.com>
Cc: 'ALSEnviro.Sydney@alsglobal.com' <ALSEnviro.Sydney@alsglobal.com>
Subject: Additional analysis required - TCLP

Hi Sepan,

Apologies for this but just realised that the four sites we need some TCLP analysis as well for the full suite PFAS. Can they please be on 48 hour TAT.

Greenacre – 21/25583/06
ES1629370001 – MW02_1.0-1.1
ES1629370004 – MW01_5.9-6.0

Deniliquin - 21/25583/05
EM1614608035 – MW01_0.1
EM1614608037 - MW01_9.0

Armidale - 21/25583/04
ES1627710001 – MW1_0.5-0.6
ES1627710013 – MW04_1.9-2.0

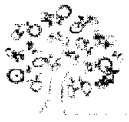
Albion Park – 21/25583/02
ES1628401017 – GW03_0.0-0.1

ES1628401026 – GW02_0.5-0.6

Thanks,

Nicole Rosen
Senior Environmental Consultant - Contamination Assessment and Remediation

GHD
T: +61 2 9239 7683 | F: 61 2 9239 7199 | V: 217683 | M: 0421 045 835 | E: nicole.rosen@ghd.com
Level 15 133 Castlereagh St Sydney NSW 2000 Australia | http://www.ghd.com/
Water | Energy & Resources | Environment | Property & Buildings | Transportation



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ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1701294**	Page	: 1 of 9
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MS NICOLE ROSEN	Contact	: Customer Services ES
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9239 7100	Telephone	: +61-2-8784 8555
Project	: ----	Date Samples Received	: 19-Jan-2017 14:00
Order number	: ----	Date Analysis Commenced	: 20-Jan-2017
C-O-C number	: ----	Issue Date	: 24-Jan-2017 14:07
Sampler	: ----		
Site	: ----		
Quote number	: EN/005/15		
No. of samples received	: 8		
No. of samples analysed	: 8		

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*
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW

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 no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

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.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	MW02_1.0-1.1	MW01_5.9-6.0	MW01_0.1	MW01_9.0	MW1_0.5-0.6
			Client sampling date / time	19-Dec-2016 00:00	19-Dec-2016 00:00	30-Nov-2016 00:00	30-Nov-2016 00:00	29-Nov-2016 00:00
Compound	CAS Number	LOR	Unit	ES1701294-001	ES1701294-002	ES1701294-003	ES1701294-004	ES1701294-005
				Result	Result	Result	Result	Result
EN33: TCLP Leach								
Initial pH	----	0.1	pH Unit	**5.2**	**9.5**	**8.4**	**9.3**	**7.2**
After HCl pH	----	0.1	pH Unit	**1.7**	**1.9**	**1.8**	**1.8**	**1.7**
Extraction Fluid Number	----	1	-	**1**	**1**	**1**	**1**	**1**
Final pH	----	0.1	pH Unit	**4.4**	**5.6**	**4.9**	**5.1**	**4.9**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	MW04_1.9-2.0	GW03_0.0-0.1	GW02_0.5-0.6	----	----
			Client sampling date / time	01-Dec-2016 00:00	07-Dec-2016 00:00	06-Dec-2016 00:00	----	----
Compound	CAS Number	LOR	Unit	ES1701294-006	ES1701294-007	ES1701294-008	--------	--------
				Result	Result	Result	----	----
EN33: TCLP Leach								
Initial pH	----	0.1	pH Unit	**7.3**	**6.3**	**5.1**	**----**	**----**
After HCl pH	----	0.1	pH Unit	**1.8**	**1.8**	**1.8**	**----**	**----**
Extraction Fluid Number	----	1	-	**1**	**1**	**1**	**----**	**----**
Final pH	----	0.1	pH Unit	**4.9**	**4.9**	**4.9**	**----**	**----**

Analytical Results

Sub-Matrix: **TREATED LEACHATE** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	MW02_1.0-1.1	MW01_5.9-6.0	MW01_0.1	MW01_9.0	MW1_0.5-0.6
				Client sampling date / time	19-Dec-2016 00:00	19-Dec-2016 00:00	30-Nov-2016 00:00	30-Nov-2016 00:00	29-Nov-2016 00:00
					ES1701294-001	ES1701294-002	ES1701294-003	ES1701294-004	ES1701294-005
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		**0.22**	**0.07**	**0.56**	**0.16**	**0.03**
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		**0.16**	**0.04**	**0.37**	**0.08**	**0.03**
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		**1.63**	**0.36**	**4.72**	**0.25**	**0.37**
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		**0.30**	<0.02	**1.73**	**0.02**	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		**6.02**	**0.04**	**106**	**1.83**	**0.22**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		**0.06**	**0.03**	**0.45**	**0.11**	**0.03**
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		**0.22**	**0.12**	**1.62**	**0.25**	**0.06**
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		**0.03**	<0.02	**0.13**	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		**0.11**	**0.02**	**0.90**	**0.02**	**0.02**
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	<0.02	**0.11**	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	<0.02	**0.08**	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: TREATED LEACHATE (Matrix: WATER)				Client sample ID	MW02_1.0-1.1	MW01_5.9-6.0	MW01_0.1	MW01_9.0	MW1_0.5-0.6
				Client sampling date / time	19-Dec-2016 00:00	19-Dec-2016 00:00	30-Nov-2016 00:00	30-Nov-2016 00:00	29-Nov-2016 00:00
Compound	CAS Number	LOR	Unit		ES1701294-001	ES1701294-002	ES1701294-003	ES1701294-004	ES1701294-005
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		<0.05	<0.05	**0.97**	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	<0.05	**0.33**	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		**8.75**	**0.68**	**118**	**2.72**	**0.76**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**7.65**	**0.40**	**111**	**2.08**	**0.59**
Sum of PFAS (WA DER List)	----	0.01	µg/L		**8.29**	**0.64**	**116**	**2.62**	**0.73**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**105**	**113**	**99.1**	**98.9**	**104**

Analytical Results

Sub-Matrix: **TREATED LEACHATE** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	MW04_1.9-2.0	GW03_0.0-0.1	GW02_0.5-0.6	----	----
				Client sampling date / time	01-Dec-2016 00:00	07-Dec-2016 00:00	06-Dec-2016 00:00	----	----
					ES1701294-006	ES1701294-007	ES1701294-008	--------	--------
					Result	Result	Result	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	**0.94**	**0.14**	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.02	**0.95**	**0.11**	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		**0.11**	**10.2**	**2.21**	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	**1.28**	**0.08**	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		**0.29**	**34.7**	**1.74**	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02	<0.02	<0.02	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	<0.1	<0.1	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		<0.02	**0.42**	**0.05**	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.02	**1.89**	**0.20**	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.02	**0.26**	<0.02	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.01	**0.92**	**0.04**	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	<0.02	<0.02	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	<0.02	<0.02	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	<0.02	<0.02	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	<0.02	<0.02	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	<0.02	<0.02	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	<0.05	<0.05	----	----
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<0.02	<0.02	<0.02	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.05	<0.05	<0.05	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	<0.05	<0.05	----	----

Analytical Results

Sub-Matrix: TREATED LEACHATE (Matrix: WATER)				Client sample ID	MW04_1.9-2.0	GW03_0.0-0.1	GW02_0.5-0.6	----	----
				Client sampling date / time	01-Dec-2016 00:00	07-Dec-2016 00:00	06-Dec-2016 00:00	----	----
Compound	CAS Number	LOR	Unit		ES1701294-006	ES1701294-007	ES1701294-008	--------	--------
					Result	Result	Result	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L		<0.05	<0.05	<0.05	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L		<0.05	<0.05	<0.05	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L		<0.02	<0.02	<0.02	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L		<0.02	<0.02	<0.02	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L		<0.05	<0.05	<0.05	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		<0.05	<0.05	<0.05	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	<0.05	<0.05	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.05	<0.05	----	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		**0.40**	**51.6**	**4.57**	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**0.40**	**44.9**	**3.95**	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L		**0.40**	**49.3**	**4.38**	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**110**	**107**	**103**	----	----

Surrogate Control Limits

Sub-Matrix: **TREATED LEACHATE**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1701294**	Page	: 1 of 5
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MS NICOLE ROSEN	Telephone	: +61-2-8784 8555
Project	: ----	Date Samples Received	: 19-Jan-2017
Site	: ----	Issue Date	: 24-Jan-2017
Sampler	: ----	No. of samples received	: 8
Order number	: ----	No. of samples analysed	: 8

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.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **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.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP231A: Perfluoroalkyl Sulfonic Acids	ES1701294--001	MW02_1.0-1.1	**Perfluorooctane sulfonic acid (PFOS)**	1763-23-1	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

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
EN33: TCLP Leach							
Non-Volatile Leach: 180 day HT (e.g. metals ex.Hg) (EN33a)							
MW04_1.9-2.0	**01-Dec-2016**	**20-Jan-2017**	30-May-2017	✓	**----**	----	----
Non-Volatile Leach: 180 day HT (e.g. metals ex.Hg) (EN33a)							
GW02_0.5-0.6	**06-Dec-2016**	**20-Jan-2017**	04-Jun-2017	✓	**----**	----	----
Non-Volatile Leach: 180 day HT (e.g. metals ex.Hg) (EN33a)							
GW03_0.0-0.1	**07-Dec-2016**	**20-Jan-2017**	05-Jun-2017	✓	**----**	----	----
Non-Volatile Leach: 180 day HT (e.g. metals ex.Hg) (EN33a)							
MW02_1.0-1.1, MW01_5.9-6.0	**19-Dec-2016**	**20-Jan-2017**	17-Jun-2017	✓	**----**	----	----
Non-Volatile Leach: 180 day HT (e.g. metals ex.Hg) (EN33a)							
MW1_0.5-0.6	**29-Nov-2016**	**20-Jan-2017**	28-May-2017	✓	**----**	----	----
Non-Volatile Leach: 180 day HT (e.g. metals ex.Hg) (EN33a)							
MW01_0.1, MW01_9.0	**30-Nov-2016**	**20-Jan-2017**	29-May-2017	✓	**----**	----	----

Matrix: **WATER**

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
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE (no PTFE) (EP231X)							
MW02_1.0-1.1, MW01_5.9-6.0, MW01_0.1, MW01_9.0, MW1_0.5-0.6, MW04_1.9-2.0, GW03_0.0-0.1, GW02_0.5-0.6	**20-Jan-2017**	**----**	----	----	**23-Jan-2017**	19-Jul-2017	✓

Matrix: **WATER**

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
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X)								
MW02_1.0-1.1,	MW01_5.9-6.0,	**20-Jan-2017**	**----**	----	----	**23-Jan-2017**	19-Jul-2017	✓
MW01_0.1,	MW01_9.0,							
MW1_0.5-0.6,	MW04_1.9-2.0,							
GW03_0.0-0.1,	GW02_0.5-0.6							
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X)								
MW02_1.0-1.1,	MW01_5.9-6.0,	**20-Jan-2017**	**----**	----	----	**23-Jan-2017**	19-Jul-2017	✓
MW01_0.1,	MW01_9.0,							
MW1_0.5-0.6,	MW04_1.9-2.0,							
GW03_0.0-0.1,	GW02_0.5-0.6							
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X)								
MW02_1.0-1.1,	MW01_5.9-6.0,	**20-Jan-2017**	**----**	----	----	**23-Jan-2017**	19-Jul-2017	✓
MW01_0.1,	MW01_9.0,							
MW1_0.5-0.6,	MW04_1.9-2.0,							
GW03_0.0-0.1,	GW02_0.5-0.6							
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X)								
MW02_1.0-1.1,	MW01_5.9-6.0,	**20-Jan-2017**	**----**	----	----	**23-Jan-2017**	19-Jul-2017	✓
MW01_0.1,	MW01_9.0,							
MW1_0.5-0.6,	MW04_1.9-2.0,							
GW03_0.0-0.1,	GW02_0.5-0.6							

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*	
Method Blanks (MB)							
TCLP for Non & Semivolatile Analytes	EN33a	1	8	**12.50**	**9.09**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

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)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	8	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	8	**12.50**	**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
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	SOIL	In house: Direct injection analysis of fresh waters after dilution (1:1) with methanol. Analysis by LC-Electrospray-MS-MS, Negative Mode using MRM. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers.

Preparation Methods	Method	Matrix	Method Descriptions
TCLP for Non & Semivolatile Analytes	EN33a	SOIL	In house QWI-EN/33 referenced to USEPA SW846-1311: The TCLP procedure is designed to determine the mobility of both organic and inorganic analytes present in wastes. The standard TCLP leach is for non-volatile and Semivolatile test parameters.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1701294**	Page	: 1 of 6
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MS NICOLE ROSEN	Contact	: Customer Services ES
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9239 7100	Telephone	: +61-2-8784 8555
Project	: ----	Date Samples Received	: 19-Jan-2017
Order number	: ----	Date Analysis Commenced	: 20-Jan-2017
C-O-C number	: ----	Issue Date	: 24-Jan-2017
Sampler	: ----		
Site	: ----		
Quote number	: EN/005/15		
No. of samples received	: 8		
No. of samples analysed	: 8		

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*
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW

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: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 728894)									
ES1701294-001	MW02_1.0-1.1	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	6.02	5.48	9.49	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.22	0.20	5.69	0% - 50%
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.16	0.17	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	1.63	1.65	1.10	0% - 20%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.30	0.32	5.49	0% - 50%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 728894)									
ES1701294-001	MW02_1.0-1.1	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.11	0.10	0.00	0% - 50%
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.06	0.06	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.22	0.21	0.00	0% - 50%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.03	0.03	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 728894)									
ES1701294-001	MW02_1.0-1.1	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 728894) - continued									
ES1701294-001	MW02_1.0-1.1	EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 728894)									
ES1701294-001	MW02_1.0-1.1	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231P: PFAS Sums (QC Lot: 728894)									
ES1701294-001	MW02_1.0-1.1	EP231X: Sum of PFAS	----	0.01	µg/L	8.75	8.22	6.25	0% - 20%

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: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EN33: TCLP Leach (QCLot: 727403)								
EN33a: Initial pH	----	0.1	pH Unit	1.0	----	----	----	----
EN33a: After HCl pH	----	0.1	pH Unit	1.0	----	----	----	----
EN33a: Final pH	----	0.1	pH Unit	1.0	----	----	----	----

Sub-Matrix: **WATER**

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
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 728894)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.5 µg/L	105	70	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.5 µg/L	122	70	130
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.5 µg/L	113	70	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.5 µg/L	115	70	130
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.5 µg/L	107	70	130
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.5 µg/L	112	70	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 728894)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	2.5 µg/L	102	70	130
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.5 µg/L	102	70	130
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.5 µg/L	110	70	130
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.5 µg/L	116	70	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.5 µg/L	122	70	130
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.5 µg/L	114	70	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.5 µg/L	116	70	130
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.5 µg/L	107	70	130
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.5 µg/L	114	70	130
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.5 µg/L	105	70	130
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	1.25 µg/L	82.2	70	124
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 728894)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.5 µg/L	108	70	130
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	1.25 µg/L	109	70	130
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	1.25 µg/L	101	70	129
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	1.25 µg/L	89.8	70	129
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	1.25 µg/L	91.4	70	126

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 728894) - continued								
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.5 µg/L	92.2	70	130
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.5 µg/L	106	70	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 728894)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.5 µg/L	104	70	130
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.5 µg/L	117	70	130
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.5 µg/L	103	70	130
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.5 µg/L	110	70	130

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: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 728894)							
ES1701294-001	MW02_1.0-1.1	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.5 µg/L	97.0	50	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.5 µg/L	112	50	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.5 µg/L	80.6	50	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.5 µg/L	97.2	50	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.5 µg/L	# Not Determined	50	130
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.5 µg/L	114	50	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 728894)							
ES1701294-001	MW02_1.0-1.1	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	2.5 µg/L	98.7	50	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.5 µg/L	107	50	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.5 µg/L	119	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.5 µg/L	104	50	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.5 µg/L	114	50	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.5 µg/L	108	50	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.5 µg/L	110	50	130
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.5 µg/L	98.2	50	130
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.5 µg/L	98.2	50	130
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.5 µg/L	90.8	50	130
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	1.25 µg/L	73.4	50	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 728894)							

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 728894) - continued							
ES1701294-001	MW02_1.0-1.1	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.5 µg/L	94.2	50	130
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	1.25 µg/L	106	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	1.25 µg/L	110	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	1.25 µg/L	74.1	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	1.25 µg/L	91.8	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.5 µg/L	83.6	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.5 µg/L	91.8	50	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 728894)							
ES1701294-001	MW02_1.0-1.1	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.5 µg/L	119	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.5 µg/L	107	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.5 µg/L	78.0	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.5 µg/L	103	50	130

ES-8401

CHAIN OF CUSTODY

ALS Environmental

ALS Laboratory: please tick →

ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
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TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: GHD Pty Ltd	TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	X Standard TAT (List due date):	
OFFICE: SYDNEY (CASTLEREAGH ST)		☐ Non Standard or urgent TAT (List due date):	
PROJECT: ALBION PARK	ALS QUOTE NO.: EN/005/16		
ORDER NUMBER: 21-25583/02			
PROJECT MANAGER: BEN ANDERSON	CONTACT PH: 0408 713 343		
SAMPLER: Matthew West	SAMPLER MOBILE: 0408 650 579		
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default): ESDAT		
Email Reports to: Ben.Anderson@ghd.com; Matthew.West@ghd.com and Melissa.Weber@ghd.com			
Email Invoice to (will default to PM if no other addresses are listed): Ben.Anderson@ghd.com and			

COC SEQUENCE NUMBER (Circle)

COC: 1 2 3 4 5 6 7

OF: 1 2 3 4 5 6 7

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
MATTHEW WEST	Frank ms		Ellenwg
DATE/TIME: 2:30PM 08/12/2016	DATE/TIME: 9-12-16 0830	DATE/TIME:	DATE/TIME: 12/12/16 1455.

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required). PFAS (LIMITED SUITE)	TRH	BTEX	PAH's	TOC	CEC	PH	METALS (8)	Additional Information
109	SB15_3.0_3.1	8-Dec	S	GLASS JAR + TEFLON LID REMOVED	1									
110	SB15_4.0_4.1	8-Dec	S	GLASS JAR + TEFLON LID REMOVED	1									
111	SB15_5.0_5.1	8-Dec	S	GLASS JAR + TEFLON LID REMOVED	1	X								
112	SB15_5.5_5.6	8-Dec	S	GLASS JAR + TEFLON LID REMOVED	1									
113	BD1_051216	5-Dec	S	PLASTIC JAR + GLASS JAR	2		X	X	X				X	
114	BD2_061216	6-Dec	S	PLASTIC JAR + GLASS JAR	2									
—	BD3_071216	7-Dec	S	PLASTIC JAR + GLASS JAR	2	X	X	X	X				X	PLEASE FORWARD TO EUROFINS AS BLIND DUP
115	BD4_081216	8-Dec	S	PLASTIC JAR + GLASS JAR	2									
116	RB_051216	8-Dec	W	2 VIAL, 1 METALS BOTTLE	3	X	X	X						
117	RB_061216	8-Dec	W	2 VIAL, 1 METALS BOTTLE	3		X	X						
118	RB_071216	8-Dec	W	2 VIAL, 1 METALS BOTTLE, 1 500mL	4	X	X	X						
119	RB_081216	8-Dec	W	2 VIAL, 1 METALS BOTTLE, 1 500mL	4		X	X						
				TOTAL										527586

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

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NATA # 1261 Site # 20794

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2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261 Site # 18217

ABN – 50 005 085 521 e.mail : EnviroSales@eurofins.com web : www.eurofins.com.au

Sample Receipt Advice

Company name:	**GHD Pty Ltd NSW**
Contact name:	Ben Anderson
Project name:	ALBION PARK
Project ID:	21-25583/02
COC number:	Not provided
Turn around time:	5 Day
Date/Time received:	Dec 12, 2016 2:55 PM
Eurofins | mgt reference:	**527586**

Sample information

☑ A detailed list of analytes logged into our LIMS, is included in the attached summary table.

☑ Sample Temperature of a random sample selected from the batch as recorded by Eurofins | mgt Sample Receipt : 13.5 degrees Celsius.

☑ All samples have been received as described on the above COC.

☑ COC has been completed correctly.

☑ Attempt to chill was evident.

☒ Appropriately preserved sample containers have been used.

☑ All samples were received in good condition.

☑ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.

☑ Appropriate sample containers have been used.

☒ Some samples have been subcontracted.

N/A Custody Seals intact (if used).

Notes

PFAS analysis conducted

Contact notes

If you have any questions with respect to these samples please contact:

Nibha Vaidya on Phone : +61 (2) 9900 8400 or by e.mail: NibhaVaidya@eurofins.com

Results will be delivered electronically via e.mail to Ben Anderson - ben.anderson@ghd.com.

eurofins | mgt

Certificate of Analysis

GHD Pty Ltd NSW
Level 15, 133 Castlereagh Street
Sydney
NSW 2000

NATA Accredited
Accreditation Number 1261
Site Number 18217

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: **Ben Anderson**

Report **527586-S**
Project name ALBION PARK
Project ID 21-25583/02
Received Date Dec 12, 2016

Client Sample ID			**BD3_071216**
Sample Matrix			**Soil**
Eurofins | mgt Sample No.			**S16-De13878**
Date Sampled			**Dec 07, 2016**
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 C10-36 (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	%	53
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
Naphthalene[N02]	0.5	mg/kg	< 0.5
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50
TRH C6-C10	20	mg/kg	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20
Polycyclic Aromatic Hydrocarbons			
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2
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	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5
Chrysene	0.5	mg/kg	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5
Fluorene	0.5	mg/kg	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5

Client Sample ID			BD3_071216
Sample Matrix			Soil
Eurofins | mgt Sample No.			S16-De13878
Date Sampled			Dec 07, 2016
Test/Reference	LOR	Unit	
Polycyclic Aromatic Hydrocarbons			
Naphthalene	0.5	mg/kg	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5
Pyrene	0.5	mg/kg	< 0.5
Total PAH*	0.5	mg/kg	< 0.5
2-Fluorobiphenyl (surr.)	1	%	86
p-Terphenyl-d14 (surr.)	1	%	93
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
TRH >C10-C16	50	mg/kg	< 50
TRH >C16-C34	100	mg/kg	< 100
TRH >C34-C40	100	mg/kg	< 100
Per- and Polyfluorinated Alkyl Substances (PFASs)			
Perfluorobutanesulfonic acid (PFBS)	0.005	mg/kg	< 0.005
Perfluorobutanoic acid (PFBA)	0.005	mg/kg	0.006
Perfluorohexanesulfonic acid (PFHxS)	0.005	mg/kg	[N09]0.007
Perfluorooctanesulfonic acid (PFOS)	0.005	mg/kg	[N09]0.009
Perfluorodecanesulfonic acid (PFDS)	0.005	mg/kg	< 0.005
Perfluoropentanoic acid (PFPeA)	0.005	mg/kg	< 0.005
Perfluorohexanoic acid (PFHxA)	0.005	mg/kg	[N09]0.008
Perfluoroheptanoic acid (PFHpA)	0.005	mg/kg	< 0.005
Perfluorooctanoic acid (PFOA)	0.005	mg/kg	< 0.005
Perfluorononanoic acid (PFNA)	0.005	mg/kg	< 0.005
Perfluorodecanoic acid (PFDA)	0.005	mg/kg	< 0.005
Perfluoroundecanoic acid (PFUnA)	0.005	mg/kg	< 0.005
Perfluorododecanoic acid (PFDoA)	0.005	mg/kg	< 0.005
Perfluorotridecanoic acid (PFTrDA)	0.005	mg/kg	< 0.005
Perfluorotetradecanoic acid (PFTeDA)	0.005	mg/kg	< 0.005
Perfluorooctanesulfonamide (PFOSA)	0.01	mg/kg	< 0.01
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.01	mg/kg	< 0.01
N-methyl-perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.01	mg/kg	< 0.01
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTS)	0.005	mg/kg	< 0.005
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTS)	0.01	mg/kg	< 0.01
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTS)	0.005	mg/kg	< 0.005
d5-n-EtFOSAA (surr.)	1	%	92
13C-PFHxA (surr.)	1	%	87
13C8-PFOS (surr.)	1	%	99
Heavy Metals			
Arsenic	2	mg/kg	< 2
Cadmium	0.4	mg/kg	< 0.4
Chromium	5	mg/kg	22
Copper	5	mg/kg	15
Lead	5	mg/kg	18
Mercury	0.1	mg/kg	< 0.1
Nickel	5	mg/kg	5.2
Zinc	5	mg/kg	14
% Moisture	1	%	16

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 (regarding both quality and NATA accreditation).

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 - 1999 NEPM Fractions	Sydney	Dec 16, 2016	14 Day
- Method: TRH C6-C36 - LTM-ORG-2010			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Dec 16, 2016	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Dec 16, 2016	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
BTEX	Sydney	Dec 16, 2016	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Polycyclic Aromatic Hydrocarbons	Sydney	Dec 16, 2016	14 Day
- Method: E007 Polyaromatic Hydrocarbons (PAH)			
Per- and Polyfluorinated Alkyl Substances (PFASs)	Brisbane	Dec 13, 2016	180 Day
- Method: LTM-ORG-2100 Per- and Polyfluorinated Alkyl Substances by LC-MS/MS			
Metals M8	Sydney	Dec 16, 2016	28 Day
- Method: LTM-MET-3040_R0 TOTAL AND DISSOLVED METALS AND MERCURY IN WATERS BY ICP-MS			
% Moisture	Sydney	Dec 13, 2016	14 Day
- Method: LTM-GEN-7080 Moisture			

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NATA # 1261
Site # 18217

Company Name: GHD Pty Ltd NSW
Address: Level 15, 133 Castlereagh Street
Sydney
NSW 2000

Project Name: ALBION PARK
Project ID: 21-25583/02

Order No.:
Report #: 527586
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Dec 12, 2016 2:55 PM
Due: Dec 19, 2016
Priority: 5 Day
Contact Name: Ben Anderson

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Polycyclic Aromatic Hydrocarbons	Metals M8	BTEX	Per- and Polyfluorinated Alkyl Substances (PFASs)	Moisture Set	Total Recoverable Hydrocarbons
Melbourne Laboratory - NATA Site # 1254 & 14271											
Sydney Laboratory - NATA Site # 18217						X	X	X		X	X
Brisbane Laboratory - NATA Site # 20794									X		
Perth Laboratory - NATA Site # 18217											
External Laboratory											
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**						
1	BD3_071216	Dec 07, 2016		Soil	S16-De13878	X	X	X	X	X	X
Test Counts						1	1	1	1	1	1

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
4. Results are uncorrected for matrix spikes or surrogate recoveries.
5. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
6. Samples were analysed on an 'as received' basis. 7. 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.

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

Units

mg/kg: milligrams per Kilogram

ug/l: micrograms per litre

ppb: Parts per billion

org/100ml: Organisms per 100 millilitres

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/l: milligrams per litre

ppm: Parts per million

%: Percentage

NTU: Nephelometric Turbidity Units

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. 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.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
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 50-150%-Phenols & PFASs 20-130%

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							
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	
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							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
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							
Per- and Polyfluorinated Alkyl Substances (PFASs)							
Perfluorobutanesulfonic acid (PFBS)	mg/kg	< 0.005			0.005	Pass	
Perfluorobutanoic acid (PFBA)	mg/kg	< 0.005			0.005	Pass	
Perfluorohexanesulfonic acid (PFHxS)	mg/kg	< 0.005			0.005	Pass	
Perfluorooctanesulfonic acid (PFOS)	mg/kg	< 0.005			0.005	Pass	
Perfluorodecanesulfonic acid (PFDS)	mg/kg	< 0.005			0.005	Pass	
Perfluoropentanoic acid (PFPeA)	mg/kg	< 0.005			0.005	Pass	
Perfluorohexanoic acid (PFHxA)	mg/kg	< 0.005			0.005	Pass	
Perfluoroheptanoic acid (PFHpA)	mg/kg	< 0.005			0.005	Pass	
Perfluorooctanoic acid (PFOA)	mg/kg	< 0.005			0.005	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Perfluorononanoic acid (PFNA)	mg/kg	< 0.005			0.005	Pass	
Perfluorodecanoic acid (PFDA)	mg/kg	< 0.005			0.005	Pass	
Perfluoroundecanoic acid (PFUnA)	mg/kg	< 0.005			0.005	Pass	
Perfluorododecanoic acid (PFDoA)	mg/kg	< 0.005			0.005	Pass	
Perfluorotridecanoic acid (PFTrDA)	mg/kg	< 0.005			0.005	Pass	
Perfluorotetradecanoic acid (PFTeDA)	mg/kg	< 0.005			0.005	Pass	
Perfluorooctanesulfonamide (PFOSA)	mg/kg	< 0.01			0.01	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	mg/kg	< 0.01			0.01	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	mg/kg	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTS)	mg/kg	< 0.005			0.005	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTS)	mg/kg	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTS)	mg/kg	< 0.005			0.005	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	89			70-130	Pass	
TRH C10-C14	%	86			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	97			70-130	Pass	
Toluene	%	90			70-130	Pass	
Ethylbenzene	%	90			70-130	Pass	
m&p-Xylenes	%	92			70-130	Pass	
o-Xylene	%	91			70-130	Pass	
Xylenes - Total	%	92			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	108			70-130	Pass	
TRH C6-C10	%	82			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	92			70-130	Pass	
Acenaphthylene	%	87			70-130	Pass	
Anthracene	%	75			70-130	Pass	
Benz(a)anthracene	%	85			70-130	Pass	
Benzo(a)pyrene	%	91			70-130	Pass	
Benzo(b&j)fluoranthene	%	84			70-130	Pass	
Benzo(g.h.i)perylene	%	93			70-130	Pass	
Benzo(k)fluoranthene	%	107			70-130	Pass	
Chrysene	%	96			70-130	Pass	
Dibenz(a.h)anthracene	%	81			70-130	Pass	
Fluoranthene	%	80			70-130	Pass	
Fluorene	%	91			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	87			70-130	Pass	
Naphthalene	%	91			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Phenanthrene	%	71			70-130	Pass	
Pyrene	%	84			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	%	77			70-130	Pass	
LCS - % Recovery							
Per- and Polyfluorinated Alkyl Substances (PFASs)							
Perfluorobutanesulfonic acid (PFBS)	%	85			50-150	Pass	
Perfluorobutanoic acid (PFBA)	%	83			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	%	88			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	%	86			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	%	92			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	81			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	84			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	84			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	90			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	89			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	88			50-150	Pass	
Perfluoroundecanoic acid (PFUnA)	%	82			50-150	Pass	
Perfluorododecanoic acid (PFDoA)	%	95			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	%	83			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	97			50-150	Pass	
Perfluorooctanesulfonamide (PFOSA)	%	88			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	%	109			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	%	92			50-150	Pass	
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTS)	%	88			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTS)	%	85			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTS)	%	99			50-150	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	87			70-130	Pass	
Cadmium	%	89			70-130	Pass	
Chromium	%	93			70-130	Pass	
Copper	%	96			70-130	Pass	
Lead	%	84			70-130	Pass	
Mercury	%	107			70-130	Pass	
Nickel	%	91			70-130	Pass	
Zinc	%	104			70-130	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 C6-C9	S16-De13435	NCP	%	84			70-130	Pass	
TRH C10-C14	S16-De13695	NCP	%	123			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S16-De13435	NCP	%	92			70-130	Pass	
Toluene	S16-De13435	NCP	%	84			70-130	Pass	
Ethylbenzene	S16-De13435	NCP	%	84			70-130	Pass	
m&p-Xylenes	S16-De13435	NCP	%	86			70-130	Pass	
o-Xylene	S16-De13435	NCP	%	85			70-130	Pass	
Xylenes - Total	S16-De13435	NCP	%	85			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S16-De13435	NCP	%	83			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
TRH C6-C10	S16-De13435	NCP	%	83			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	S16-De17765	NCP	%	90			70-130	Pass	
Acenaphthylene	S16-De17765	NCP	%	83			70-130	Pass	
Anthracene	S16-De17765	NCP	%	84			70-130	Pass	
Benz(a)anthracene	S16-De17765	NCP	%	87			70-130	Pass	
Benzo(a)pyrene	S16-De17765	NCP	%	94			70-130	Pass	
Benzo(b&j)fluoranthene	S16-De17765	NCP	%	88			70-130	Pass	
Benzo(g.h.i)perylene	S16-De17765	NCP	%	85			70-130	Pass	
Benzo(k)fluoranthene	S16-De17765	NCP	%	105			70-130	Pass	
Chrysene	S16-De17765	NCP	%	94			70-130	Pass	
Dibenz(a.h)anthracene	S16-De17765	NCP	%	83			70-130	Pass	
Fluoranthene	S16-De17765	NCP	%	88			70-130	Pass	
Fluorene	S16-De17765	NCP	%	88			70-130	Pass	
Indeno(1.2.3-cd)pyrene	S16-De17765	NCP	%	84			70-130	Pass	
Naphthalene	S16-De17765	NCP	%	89			70-130	Pass	
Phenanthrene	S16-De17765	NCP	%	72			70-130	Pass	
Pyrene	S16-De17765	NCP	%	91			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	S16-De13695	NCP	%	114			70-130	Pass	
Spike - % Recovery									
Per- and Polyfluorinated Alkyl Substances (PFASs)				Result 1					
Perfluorobutanesulfonic acid (PFBS)	S16-De13878	CP	%	73			50-150	Pass	
Perfluorobutanoic acid (PFBA)	S16-De13878	CP	%	75			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	S16-De13878	CP	%	69			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	S16-De13878	CP	%	73			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	S16-De13878	CP	%	71			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	S16-De13878	CP	%	55			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	S16-De13878	CP	%	76			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	S16-De13878	CP	%	61			50-150	Pass	
Perfluorooctanoic acid (PFOA)	S16-De13878	CP	%	92			50-150	Pass	
Perfluorononanoic acid (PFNA)	S16-De13878	CP	%	66			50-150	Pass	
Perfluorodecanoic acid (PFDA)	S16-De13878	CP	%	70			50-150	Pass	
Perfluoroundecanoic acid (PFUnA)	S16-De13878	CP	%	67			50-150	Pass	
Perfluorododecanoic acid (PFDoA)	S16-De13878	CP	%	74			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	S16-De13878	CP	%	65			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	S16-De13878	CP	%	73			50-150	Pass	
Perfluorooctanesulfonamide (PFOSA)	S16-De13878	CP	%	76			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	S16-De13878	CP	%	63			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	S16-De13878	CP	%	50			50-150	Pass	
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTS)	S16-De13878	CP	%	65			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTS)	S16-De13878	CP	%	84			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTS)	S16-De13878	CP	%	71			50-150	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S16-De14057	NCP	%	86			70-130	Pass	
Cadmium	S16-De14057	NCP	%	85			70-130	Pass	
Chromium	S16-De14057	NCP	%	87			70-130	Pass	
Copper	S16-De14057	NCP	%	92			70-130	Pass	
Lead	S16-De14422	NCP	%	102			70-130	Pass	
Mercury	S16-De12999	NCP	%	100			70-130	Pass	
Nickel	S16-De14057	NCP	%	82			70-130	Pass	
Zinc	S16-De13623	NCP	%	72			70-130	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	S16-De13878	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	S16-De13878	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	S16-De13878	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	S16-De13878	CP	mg/kg	< 50	< 50	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S16-De13878	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S16-De13878	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S16-De13878	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S16-De13878	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S16-De13878	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	S16-De13878	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S16-De13878	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	S16-De13878	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S16-De13878	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S16-De13878	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S16-De13878	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S16-De13878	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	S16-De13878	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	S16-De13878	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	S16-De13878	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	S16-De13878	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	S16-De13878	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	S16-De13878	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S16-De13878	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	S16-De13878	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S16-De13878	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S16-De13878	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S16-De13878	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S16-De13878	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	S16-De13878	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	S16-De13878	CP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	S16-De13878	CP	mg/kg	< 100	< 100	<1	30%	Pass	

Duplicate									
Per- and Polyfluorinated Alkyl Substances (PFASs)				Result 1	Result 2	RPD			
Perfluorobutanesulfonic acid (PFBS)	S16-De12531	NCP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Perfluorobutanoic acid (PFBA)	S16-De12531	NCP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Perfluorohexanesulfonic acid (PFHxS)	S16-De12531	NCP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Perfluorooctanesulfonic acid (PFOS)	S16-De12531	NCP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Perfluorodecanesulfonic acid (PFDS)	S16-De12531	NCP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Perfluoropentanoic acid (PFPeA)	S16-De12531	NCP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Perfluorohexanoic acid (PFHxA)	S16-De12531	NCP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	S16-De12531	NCP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	S16-De12531	NCP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Perfluorononanoic acid (PFNA)	S16-De12531	NCP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Perfluorodecanoic acid (PFDA)	S16-De12531	NCP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnA)	S16-De12531	NCP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Perfluorododecanoic acid (PFDoA)	S16-De12531	NCP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Perfluorotridecanoic acid (PFTrDA)	S16-De12531	NCP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	S16-De12531	NCP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Perfluorooctanesulfonamide (PFOSA)	S16-De12531	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	S16-De12531	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	S16-De12531	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTS)	S16-De12531	NCP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTS)	S16-De12531	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTS)	S16-De12531	NCP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S16-De15084	NCP	mg/kg		< 2	<1	30%	Pass	
Cadmium	S16-De15084	NCP	mg/kg		< 0.4	<1	30%	Pass	
Chromium	S16-De15084	NCP	mg/kg		60	3.0	30%	Pass	
Copper	S16-De15084	NCP	mg/kg		52	4.0	30%	Pass	
Lead	S16-De15084	NCP	mg/kg		18	20	30%	Pass	
Mercury	S16-De12998	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	S16-De15084	NCP	mg/kg		62	13	30%	Pass	
Zinc	S16-De15084	NCP	mg/kg		65	7.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S16-De13878	CP	%	16	16	4.0	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	No
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
N09	Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.

Authorised By

Nibha Vaidya	Analytical Services Manager
Jonathon Angell	Senior Analyst-Organic (QLD)
Ryan Hamilton	Senior Analyst-Inorganic (NSW)
Ryan Hamilton	Senior Analyst-Metal (NSW)
Ryan Hamilton	Senior Analyst-Organic (NSW)
Ryan Hamilton	Senior Analyst-Volatile (NSW)

Glenn Jackson

National Operations 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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Nicole Rosen

From: Marc Centner <Marc.Centner@alsglobal.com>
Sent: Friday, 17 February 2017 2:25 PM
To: Nicole Rosen
Cc: Scott James; Jacqui Hallchurch; Paul Loewy
Subject: RE: Full PFAS suite - Lab report ES1629123 - sample reference amended to GW03

Hi Nicole,

We have scrutinised the instrument data, including instrument QC and find, that continuing calibration verification was somewhat marginal in the run from which the first set of results were reported. Over the course of the instrument run, internal standards responses dropped to half of that when the calibration was run. This is seen as systematic rather than symptomatic of ion suppression due to matrix in individual samples.

Based on instrument QC, the higher results in the following report should stand as the correct ones. I believe that these have been confirmed by the additional tests done recently that have been shared with you.

Looking at the sample, GW03, in particular, the sample does appear to contain much sediment. Water analysis, be it by direct injection (in this case) or by solid phase extraction, essentially looks at dissolved phase PFAS. Whilst the PFAS compounds are stable, we might see changes one way or the other in terms in terms of increase or decreases in dissolve phase PFAS. For example, if re-tests are performed on samples from ambient storage, this may change dissolve concentrations over time. Your particular sample does provide us with some opportunity to test this and I am happy to keep you abreast of further investigations on this subject.

If you have any further questions, please do not hesitate to contact me to discuss this or related matters.

Regards,

Marc Centner
National Technical Manager, Environmental
Australia

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277 289 Woodpark Road
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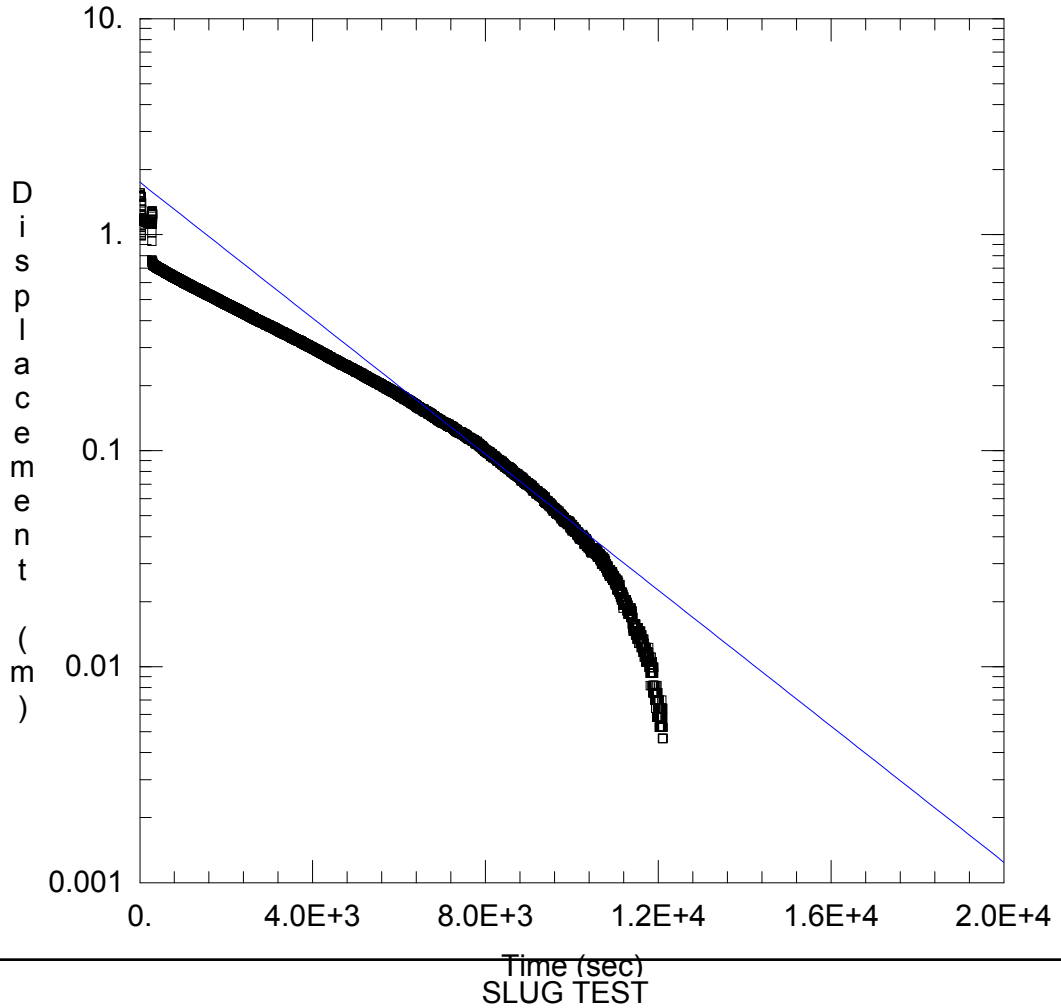
Appendix I – Slug test data



SLUG TEST

Data Set: C:\Users\jrlean\Desktop\WSA slug tests\GW01.aqt
Date: 02/16/17 Time: 15:47:23

PROJECT INFORMATION

Company: GHD Pty Ltd
Client: Fire and Rescue
Project: 2125583
Location: Albion Park
Test Well: GW01
Test Date: 16/12/16

AQUIFER DATA

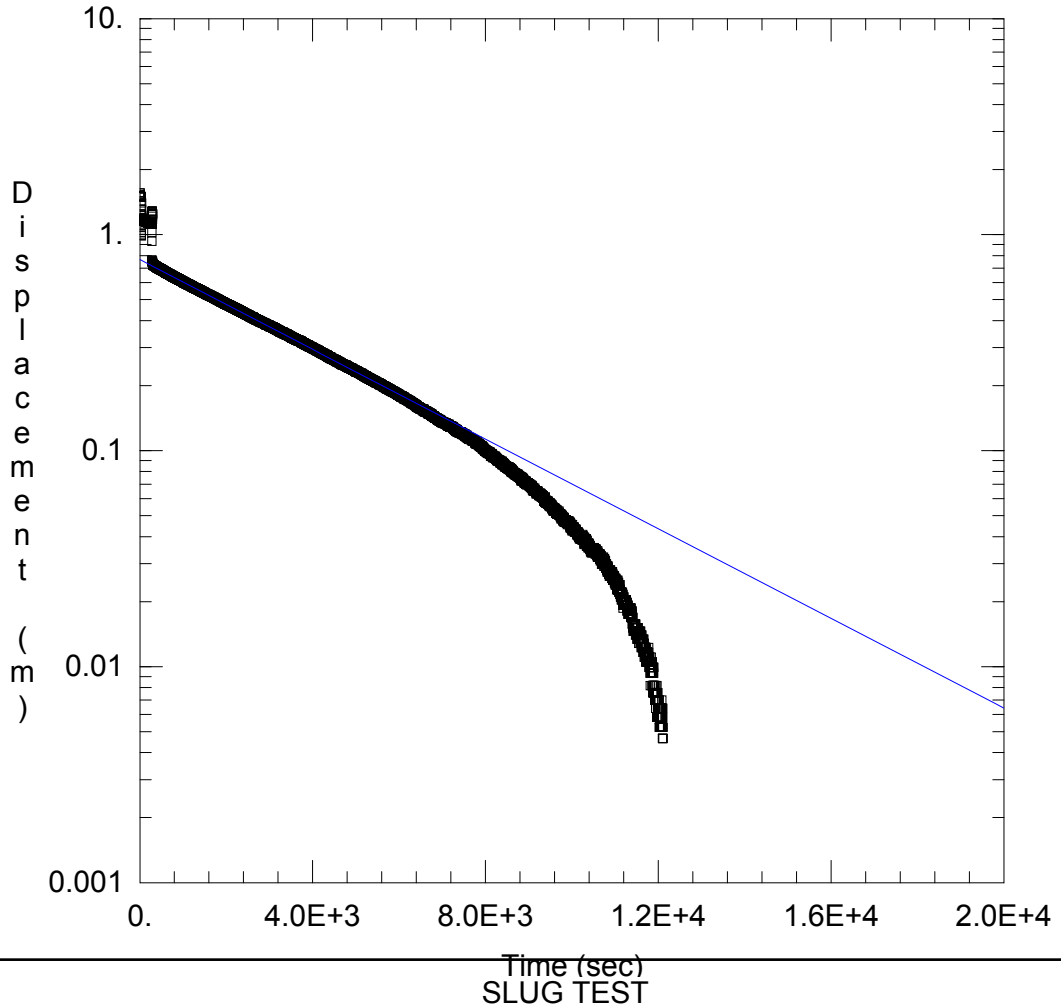
Saturated Thickness: 3.008 m
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (GW01)

Initial Displacement: 1.558 m
Total Well Penetration Depth: 6. m
Casing Radius: 0.025 m
Static Water Column Height: 3.008 m
Screen Length: 2. m
Well Radius: 0.025 m
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.01984 m/day
y0 = 1.75 m



SLUG TEST

Data Set: C:\Users\jrlean\Desktop\WSA slug tests\GW01.aqt
Date: 02/16/17 Time: 15:47:08

PROJECT INFORMATION

Company: GHD Pty Ltd
Client: Fire and Rescue
Project: 2125583
Location: Albion Park
Test Well: GW01
Test Date: 16/12/16

AQUIFER DATA

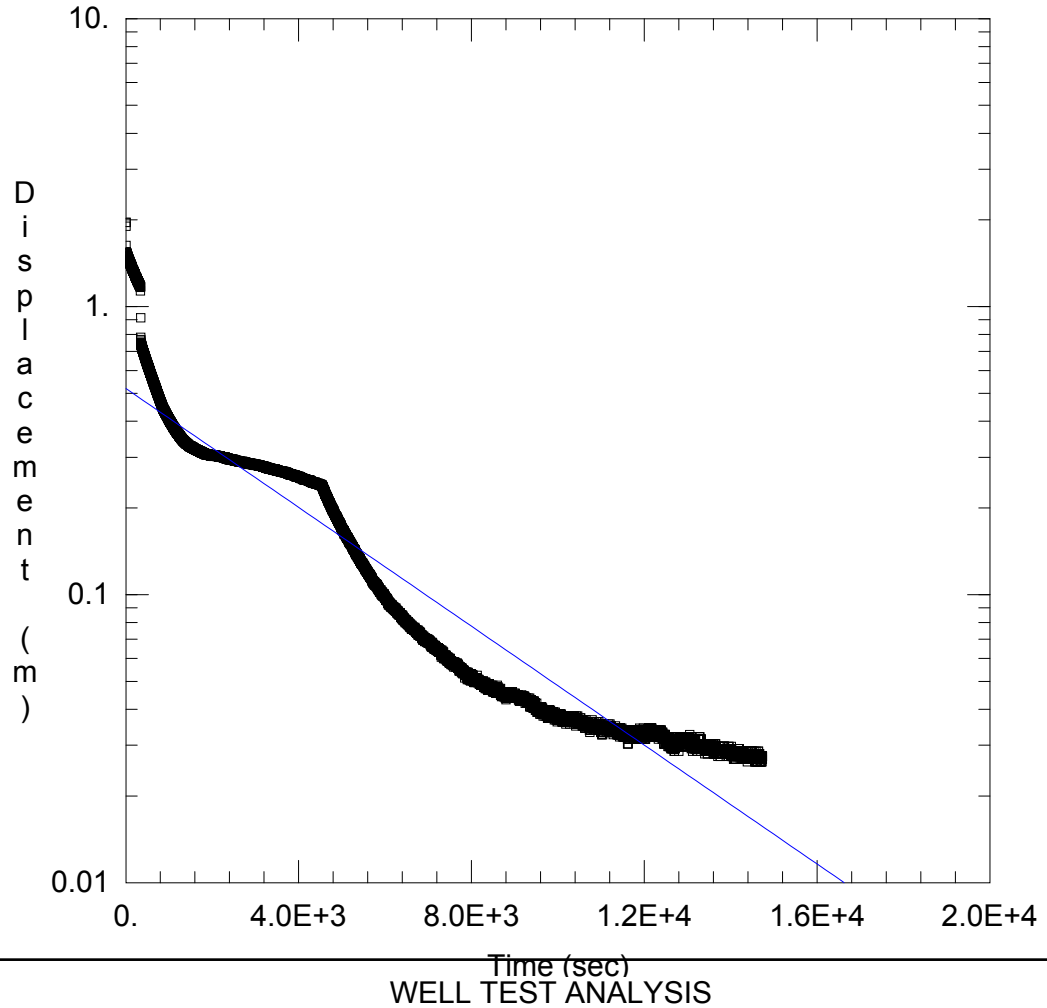
Saturated Thickness: 3.008 m
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (GW01)

Initial Displacement: 1.558 m
Total Well Penetration Depth: 6. m
Casing Radius: 0.025 m
Static Water Column Height: 3.008 m
Screen Length: 2. m
Well Radius: 0.025 m
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.01308 m/day
y0 = 0.7663 m



WELL TEST ANALYSIS

Data Set: C:\Users\jrlean\Desktop\WSA slug tests\GW02_BR.aqt
Date: 02/16/17 Time: 11:25:38

PROJECT INFORMATION

Company: GHD Pty Ltd
Client: Fire and Rescue
Project: 2125583
Location: Albion Park
Test Well: GW02
Test Date: 16/12/16

AQUIFER DATA

Saturated Thickness: 3.31 m Anisotropy Ratio (Kz/Kr): 0.1

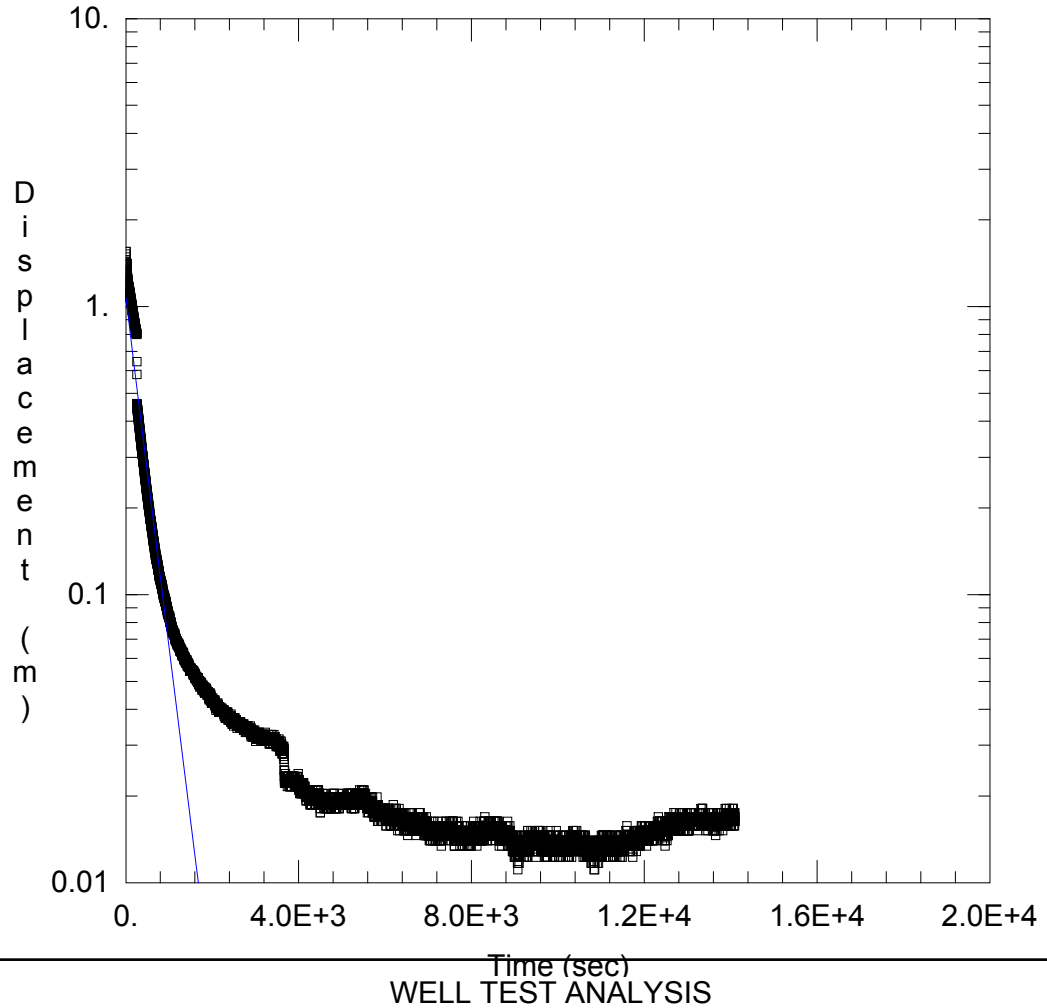
WELL DATA (GW02)

Initial Displacement: 1.963 m
Total Well Penetration Depth: 3.15 m
Casing Radius: 0.025 m
Static Water Column Height: 3.31 m
Screen Length: 2. m
Well Radius: 0.025 m
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 0.01418 m/day y0 = 0.5201 m



WELL TEST ANALYSIS

Data Set: C:\Users\jrlean\Desktop\WSA slug tests\GW03.aqt
Date: 02/16/17 Time: 15:46:02

PROJECT INFORMATION

Company: GHD Pty Ltd
Client: Fire and Rescue
Project: 2125583
Location: Albion Park
Test Well: GW03
Test Date: 16/12/16

AQUIFER DATA

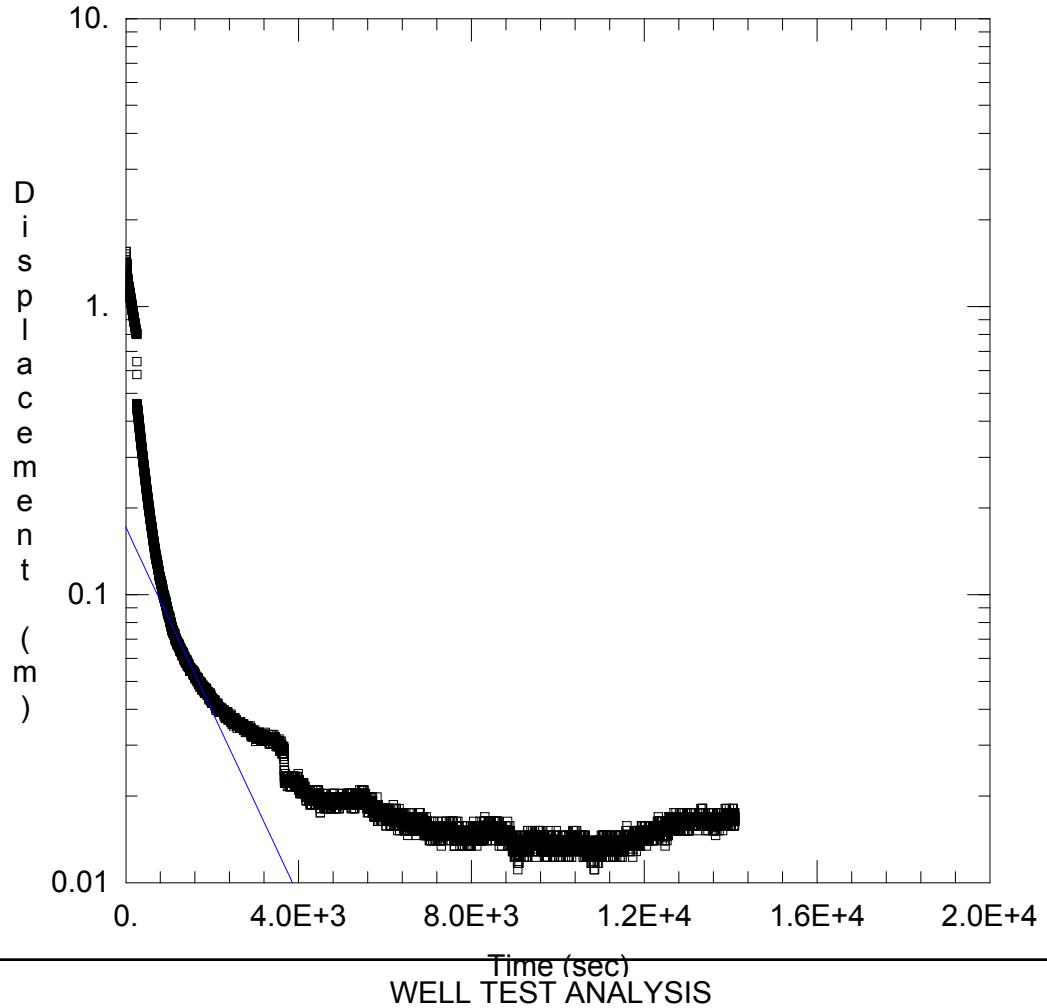
Saturated Thickness: 3.674 m
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (GW03)

Initial Displacement: 1.553 m
Total Well Penetration Depth: 3.779 m
Casing Radius: 0.025 m
Static Water Column Height: 3.674 m
Screen Length: 3. m
Well Radius: 0.025 m
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.1232 m/day
y0 = 1.073 m



WELL TEST ANALYSIS

Data Set: C:\Users\jrlean\Desktop\WSA slug tests\GW03.aqt
Date: 02/16/17 Time: 15:46:20

PROJECT INFORMATION

Company: GHD Pty Ltd
Client: Fire and Rescue
Project: 2125583
Location: Albion Park
Test Well: GW03
Test Date: 16/12/16

AQUIFER DATA

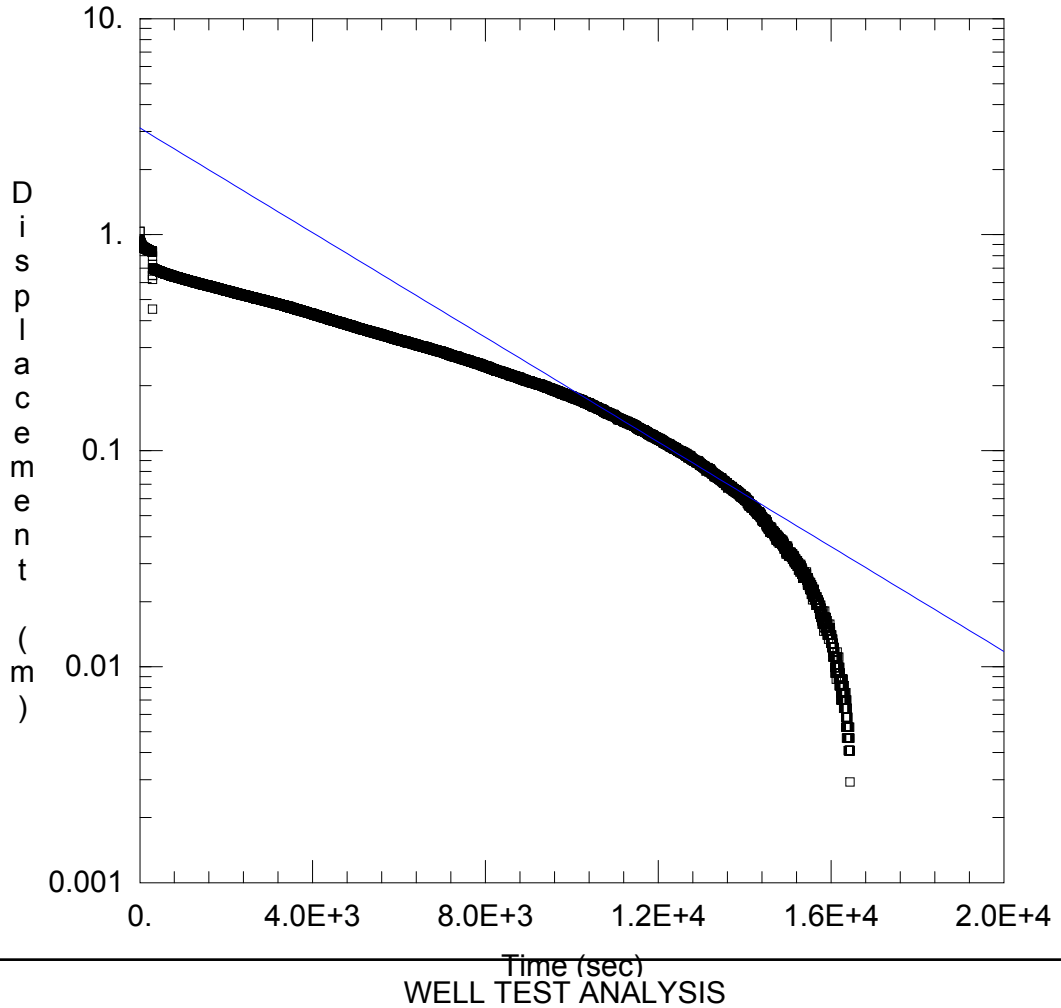
Saturated Thickness: 3.674 m
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (GW03)

Initial Displacement: 1.553 m
Total Well Penetration Depth: 3.779 m
Casing Radius: 0.025 m
Static Water Column Height: 3.674 m
Screen Length: 3. m
Well Radius: 0.025 m
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.03257 m/day
y0 = 0.1715 m



WELL TEST ANALYSIS

Data Set: C:\Users\jrlean\Desktop\WSA slug tests\GW04.aqt
Date: 02/16/17 Time: 13:59:41

PROJECT INFORMATION

Company: GHD
Client: F&R NSW
Project: 21/25583/02
Location: Albion Park
Test Well: GW04
Test Date: 15/12/2016

AQUIFER DATA

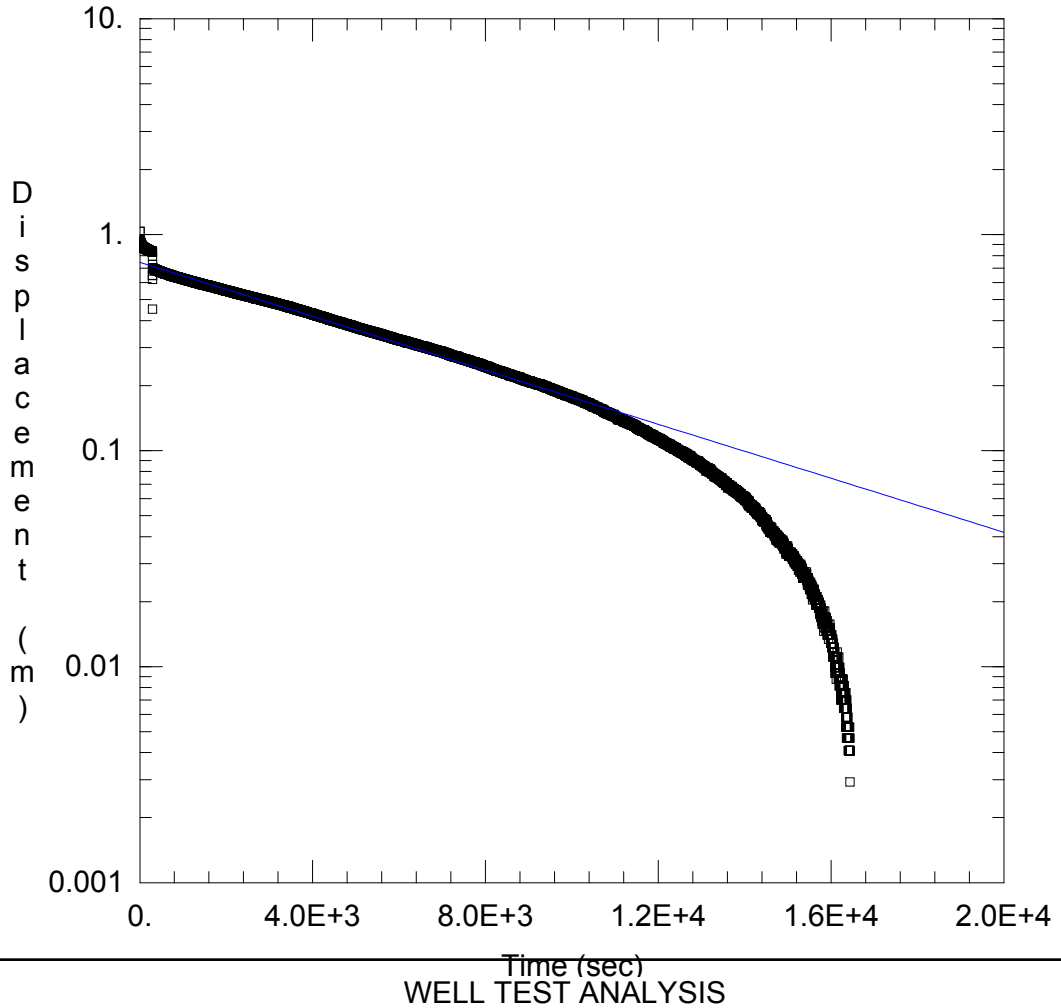
Saturated Thickness: 3.435 m
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (GW04)

Initial Displacement: 1.034 m
Total Well Penetration Depth: 3.59 m
Casing Radius: 0.025 m
Static Water Column Height: 3.435 m
Screen Length: 3. m
Well Radius: 0.0625 m
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.01006 m/day
y0 = 3.118 m



WELL TEST ANALYSIS

Data Set: C:\Users\jrlean\Desktop\WSA slug tests\GW04.aqt
Date: 02/16/17 Time: 13:59:17

PROJECT INFORMATION

Company: GHD
Client: F&R NSW
Project: 21/25583/02
Location: Albion Park
Test Well: GW04
Test Date: 15/12/2016

AQUIFER DATA

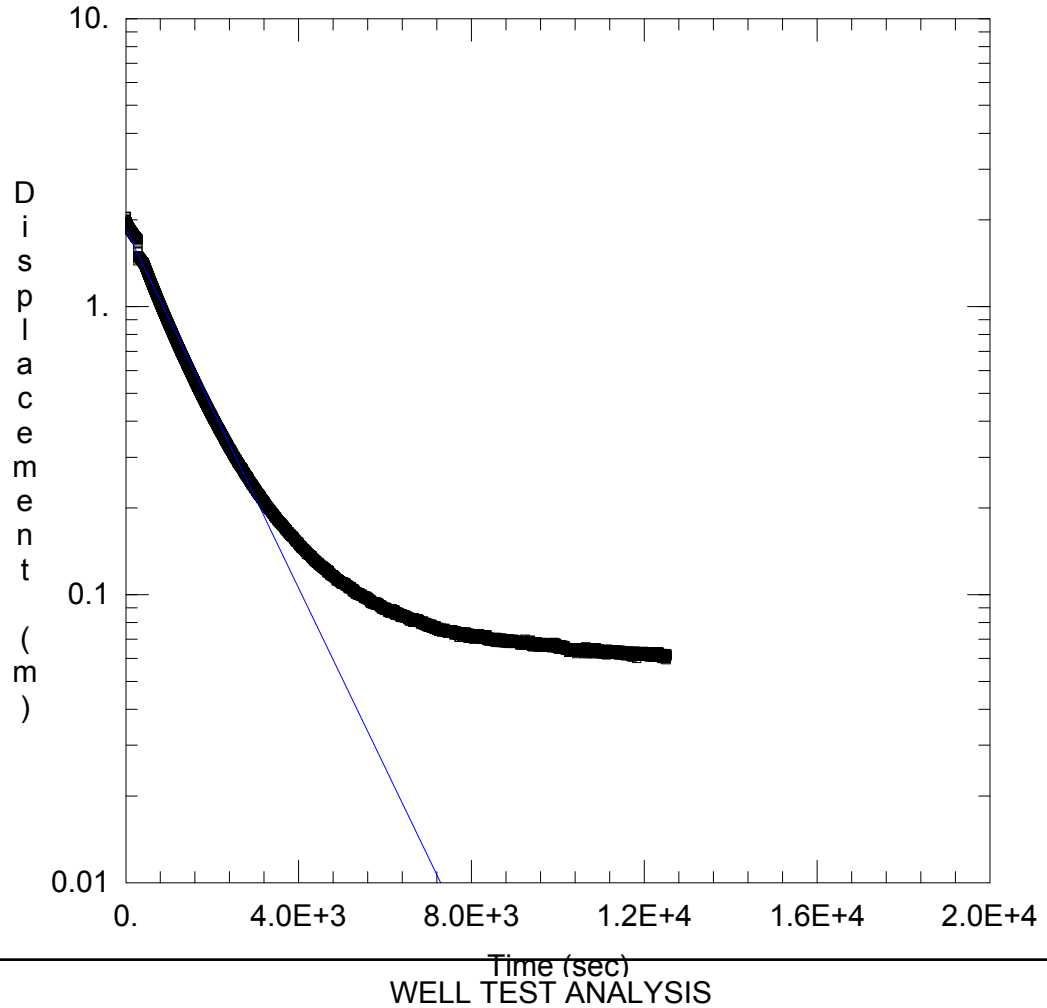
Saturated Thickness: 3.435 m
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (GW04)

Initial Displacement: 1.034 m
Total Well Penetration Depth: 3.59 m
Casing Radius: 0.025 m
Static Water Column Height: 3.435 m
Screen Length: 3. m
Well Radius: 0.0625 m
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.005187 m/day
y0 = 0.7445 m



WELL TEST ANALYSIS

Data Set: C:\Users\jrlean\Desktop\WSA slug tests\GW05.aqt
Date: 02/16/17 Time: 16:09:53

PROJECT INFORMATION

Company: GHD Pty Ltd
Client: Fire and Rescue
Project: 2125583
Location: Albion Park
Test Well: GW05
Test Date: 16/12/16

AQUIFER DATA

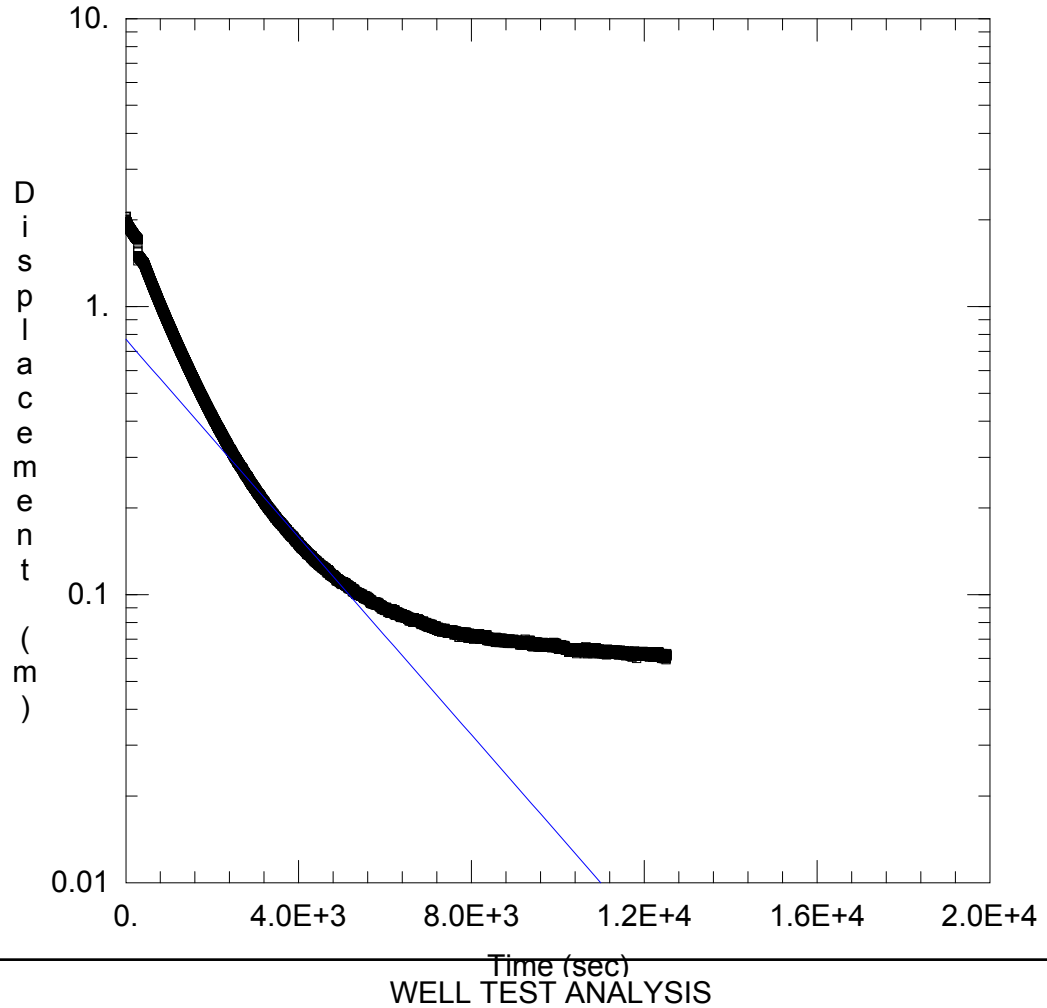
Saturated Thickness: 3.385 m
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (GW05)

Initial Displacement: 2.055 m
Total Well Penetration Depth: 3.185 m
Casing Radius: 0.025 m
Static Water Column Height: 3.385 m
Screen Length: 2. m
Well Radius: 0.025 m
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.04262 m/day
y0 = 1.86 m



WELL TEST ANALYSIS

Data Set: C:\Users\jrlean\Desktop\WSA slug tests\GW05.aqt
Date: 02/16/17 Time: 16:10:10

PROJECT INFORMATION

Company: GHD Pty Ltd
Client: Fire and Rescue
Project: 2125583
Location: Albion Park
Test Well: GW05
Test Date: 16/12/16

AQUIFER DATA

Saturated Thickness: 3.385 m
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (GW05)

Initial Displacement: 2.055 m
Total Well Penetration Depth: 3.185 m
Casing Radius: 0.025 m
Static Water Column Height: 3.385 m
Screen Length: 2. m
Well Radius: 0.025 m
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.02349 m/day
y0 = 0.7707 m

GHD

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Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	M. West J. Lean N. Rosen	J. Hallchurch		J. Hallchurch		21/02/2017
1	N. Rosen	J. Hallchurch		J. Hallchurch		27/04/2017

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