# Hume Food Organics and Garden Organics Facility

## Sampling Analysis and Quality Plan (SAQP) for targeted contamination investigation

Transport Canberra and City Services

23 October 2023

→ **The Power of Commitment**

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# 1. Introduction

## 1.1 Background

The Australian Capital Territory (ACT) Government is seeking approval for a proposed Food Organics and Garden Organics (FOGO) facility at Block 5, Section 26 Hume, ACT, off John Cory Road (the site) (see Figures 1 and 2, Appendix A). This block of land is currently unoccupied and contains no buildings aside from a hardstand area located in the southern portion of the site. The proposal will allow for the expansion of the existing ACT opt-in garden organics collection service, currently located near Mugga landfill, to a universal FOGO collection for households has been identified as a priority in the 2018 Waste Feasibility Study Roadmap and Recommendations, the 2019-20 Budget Papers for Transport Canberra and City Services and the ACT Climate Change Strategy 2019-2025.

The proposal is considered an Impact Track Development under Schedule 4 of the *Planning and Development Act 2007* (P&D Act), requiring the preparation of an Environmental Impact Assessment (EIS) in accordance with the Scoping Document for application number 202100005. As part of the scoping document requirements, GHD Pty Ltd (GHD) was engaged to undertake a preliminary site investigation (PSI) (GHD, 2022). The PSI identified areas of potential environmental concern (APEC) requiring a targeted site investigation (TSI).

GHD has prepared the following Sampling, Analysis and Quality Plan (SAQP) for ACT Government to support the targeted investigation of these APECs and meet the objectives as defined in Section 1.2.

## 1.2 Objectives

The primary objective of the targeted investigation is to collect soil contamination data from the site to assess the risk to human health in aim to support concept design and planning approval.

## 1.3 Purpose

The purpose of this SAQP is to document the procedures that will be used to obtain data of sufficient quality to meet the objectives set out in Section 1.2 and enable completion of a TSI report.

## 1.4 Scope of work

The scope of this SAQP is as follows:

- Data Quality Objectives (DQO'S) which have been prepared in accordance with the National Environment Protection (Assessment of Site Contamination) Measure (NEPM) (NEPC, 2013) to ensure that field investigations and analyses are undertaken in a way that enables the collection and reporting of reliable data (see Section 4).
- The basis of the assessment including details of the guidelines, policies and legislation that the investigation has been developed for (see Section 5).
- The proposed analytical program and rationale for sampling (see Section 6.1).
- Proposed sampling methodology (see Section 6.2).
- Quality Assurance and Quality Control protocols (see Section 7).
- The reporting requirements (see Section 8)

This SAQP only covers the targeted soil contamination investigation for the site. Other media (for example surface water, groundwater and soil gas) is not included in this report and will be covered at a later stage of the proposal if required.

## 1.5 Applicability

This SAQP applies to GHD personnel working at the site. A copy of this report should be available on-site at all times. All GHD personnel working on-site are to be familiar with the report. If a situation arises in which deviations

from the SAQP are required, ACT Government representatives, and the GHD project manager and technical lead are to be notified prior to undertaking changes.

## 1.6 Limitations

This report has been prepared by GHD for Transport Canberra and City Services and may only be used and relied on by Transport Canberra and City Services for the purpose agreed between GHD and Transport Canberra and City Services as set out in section 1.5 of this report.

GHD otherwise disclaims responsibility to any person other than Transport Canberra and City Services 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 in this report (refer section(s) 1.5 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

If this report is required to be accessible in any other format, this can be provided by GHD upon request and at an additional cost if necessary.

# 2. Site and environmental setting

## 2.1 Site identification

A summary of the site information is provided in Table 1. The site location and layout is shown in Figure 1, Appendix A.

*Table 1 Site information summary*

| | |
|---|---|
| **Address** | 6 Recycling Road, Hume, ACT 2620 |
| **Block and Section** | Hume: Block 5 Section 26 |
| **Current Land Use** | A large proportion of the site is vacant. There is a fenced area on the southern boundary (approximately 3,000 $m^2$) that is used to store vehicles and was not accessible during the site walkover. |
| **Size $m^2$** | 42,957 (Reference source: https://actmapi.act.gov.au) |
| **Land Zoning** | IZ1: General Industry |
| **Immediate Surrounds** | The site is bordered to the:<br>– North: Surface water drainage line (Dog Trap Creek) and retention basin<br>– South: Recycling Road and, across the road, the Materials Recovery Facility<br>– East: John Cory Road and farmland<br>– West: Mugga Lane landfill |
| **Broad description of location** | – The site is located to the north of the Monaro Highway in an industrial and rural area located approximately 12.5 km south of Canberra City.<br>– West of the site is Mugga Lane landfill which includes a number of surface water and leachate management dams.<br>– South of the site is Mugga Lane Solar Park and ACT Skip Hire and Soft Landing Mattress Recycling.<br>– The site has previously been utilised as a materials recycling facility with recycled material treated and stored at the site. |
| **Site walkover Summary** | In summary, the following observations were made during GHD walkover on 27 April 2022:<br>– Most of the site was vacant with a fenced off hardstand area in the south-eastern portion of the site. This area, approximately 300 $m^2$, was surrounded by a green Colourbond fence. The area within the fence was used to store vehicles and was not accessible for closer inspection.<br>– Grasses cover the majority of the northern portion of the site.<br>– One stockpile of soil was observed on the north-eastern boundary. The stockpile was not wholly on the site and was approximately one metre in height and approximately 260 $m^3$ in volume. This stockpile is associated with the APEC 2 in the eastern portion of the site.<br>– A naturally formed rocky outcrop is located adjacent to the south-eastern boundary.<br>– Approximately 100 metres of PVC pipe has been left or discarded across the site. There were no olfactory or visible evidence of contamination associated with the pipe.<br>– A gravel path runs roughly north-east to south-west adjacent to the northern-most site boundary.<br>– An approximate area of 360 $m^2$, located around the centre of the site, contained patches of remnant plastic waste, within the grass cover. This has been identified as APEC 4.<br>– One soil stockpile was observed adjacent to the south-western boundary, and under a remnant eucalyptus tree that is north of the car storage area. It was approximately one metre in height, with a volume of approximately 40 $m^3$.<br>– One stockpile was observed along the northern fence line of the car storage area, adjacent to the stockpile mentioned above. It was approximately one metre in height and had a volume of approximately 140 $m^3$. This stockpile and the aforementioned are associated with the APEC 2 in the western portion of the site.<br>– To the east of the site (along John Cory Road) is a vehicle turnaround area.<br>– There were a number of blackberry thickets across the site, which obscured visual inspection of those areas. |

## 2.2 Heritage

The following is a summary of the Cultural Heritage Assessment (CHA) recommendations. The CHA was undertaken out by Navin Officer Heritage Consultants (NOHC) in June 2022.

– Three previously recorded Aboriginal heritage sites with potential archaeological deposit (PAD) and two areas of archaeological potential have been previously identified within the proposal site.
– The proposed updated boundary of PAD at the north-west portion of the site should be tested through a program of geomorphological gridded auger survey to plot the presence of the upper calcareous layer.
– A program of subsurface testing should be undertaken at the PAD in the eastern portion of the site to determine the nature of the deposit.

The TSI sampling will exclude these areas and cleared soil from the heritage investigations be used for sampling where required.

## 2.3 Environmental setting

Information provided in the following section has been obtained from the preliminary site investigation (PSI) (GHD, 2022) and available mapping as referenced in the text below.

### 2.3.1 Topography

The site area varies between 614 – 611 metres Australia Height Datum (AHD), according to topographic data from the Environmental Protection and Sustainable Development Directorate (EPSDD). The regional topography is mostly flat in the southern area with a slight fall from south to north. The northern area has a relatively steep incline (maximum elevation 730 AHD) on the northern buffer boundary.

### 2.3.2 Soils and landscapes

According to the Atlas of Australian Soils (CSIRO, 2011) the site is within the Williamsdale Landscape. This unit is characterised by Kandosols which are associated with yellow leached earths in intermediate drainage areas and hard neutral and/or alkaline yellow mottled soils in poorly drained areas. Within the one-kilometre site buffer the Disturbed Terrain Landscape is present in the north-west area and the Burra landscape in the northern buffer. Sodosol soils are present in the western area of the report buffer.

According to the Atlas of Australian Acid Sulfate Soils the acid sulphate soils class in the site area is Class C and the works would have an extremely low probability of encountering acid sulphate containing soils (CSIRO, 2011). Approximately 400 m west of the site the soils are Class B soils are present and has a low probability of encountering acid sulphate containing soils.

### 2.3.3 Hydrology

Surface water is expected to follow the local topography and generally flow northwards.

There is a small dam located north of the site, between the creek and the site boundary. Run-off from the site is expected to flow out of the north and north-eastern boundary of the site and then flow westwards into the dam, based on natural topography.

There is a natural creek, Dog Trap Creek, located to the north of the site (the closest point being approximately 25 metres) which is a tributary of Jerrabomberra creek which lay approximately three kilometres to the north-east of the site. This flow into a small dam 500 metres downstream of the site and then branches off into small drainage networks in Gilmore Paddocks. This system is part of the Jerrabomberra Creek Catchment (ACT Government, 2022). The northern most corner contains a stormwater/drainage easement that flows off site to the east into a dam just north of the property.

Dial before you dig (DBYD) underground utilities search found that abandoned sewer mains run through the northern area of the site and inline storage runs around the perimeter of the site block (partially entering the site in the north-west corner). Along the inline storage there are active and decommissioned holes.

A reticulation water main runs along John Corey Road to the south of the site.

### 2.3.4 Geology

The 1:100,000 scale Canberra geological map (Abell, 1992) indicated the site is situated on Silurian aged Deakin Volcanics – Rhyodacitic ignimbrite and minor volcaniclastic and argillaceous sediments.

### 2.3.5 Hydrogeology

The site and surrounding area located on fractured or fissured, extensive aquifers described to have low to moderate productivity. The site is on Symonston Hydrogeological Landscape (HGL) which is characterised by low land salinity and moderate salt store and mobility.

There are no ACT Government boreholes on site or within the report buffer. There are 32 boreholes owned by the Bureau of Meteorology (BoM) within the report buffer however none within the site boundary. The five closest boreholes are shown in Table 2.

***Table 2 BoM five boreholes closest to the site***

| State Bore ID | Purpose | Depth to GW (m) | Drilled Depth (m) | AHD (m) | Distance from site |
|---|---|---|---|---|---|
| 620 | Unknown* | Unknown* | 5.67 | 619.37 | 200m SE |
| 631 | Unknown* | Unknown* | 4.58 | 620.39 | 350m SE |
| 630 | Unknown* | Unknown* | 5.17 | 620.60 | 420m SE |
| 619 | Unknown* | Unknown* | 6.84 | 620.40 | 580m SE |
| 627 | Unknown* | Unknown* | 5.85 | 606.13 | 710m NE |
| **Information could not be found on BoMs Australian Groundwater Explorer (BoM, 2022)* | | | | | |

## 2.4 Summary of site use and history

Based on the review of site history information provided in the PSI (GHD, 2022), the site was used as a recycling storage area with recycled material stored at the site in 2009. The storage was cleared by 2017 and now consists of mostly grassland. There are stockpiles of unknown material also stored at the site however it cannot be determined where they were sourced from. The PSI concluded that the previous site activities (i.e. material recycling) has potential to contaminate soil and / or groundwater.

# 3. Preliminary CSM and data gap review

Section 4 of the PSI (GHD, 2022) presents a preliminary conceptual site model (CSM) for groundwater and soils at the site. In order to achieve the objectives of the investigation, a review of existing pertinent data gaps, relevant available data and data required in order to resolve those gaps was undertaken.

Residual data gaps that are of relevance to achieving the project objectives (refer to Section 1.2) are further defined in Table 3. Supplementary data will be required to resolve these gaps, which will be obtained through additional investigations outlined in this SAQP.

***Table 3 Proposed AECs for site investigation***

| Area of potential environmental concern (APEC) | APEC details | Rationale for site investigation (data gaps) |
|---|---|---|
| APEC 1 | Vehicle storage area / historic waste storage area | – APEC 1 and 4 are known to have been used as historical waste and vehicle storage areas. It is unclear what contaminant concentrations resulted from these activities and their potential migration pathways, which requires further assessment to enable appropriate management strategies to be developed.<br>– APEC 2 contains stockpiles of fill materials of unknown origin or quantity. The stockpiles are approximately 260 $m^3$ and 40$m^3$. It is unclear what contaminant concentrations are present within these stockpiles and their potential for migration, which requires further assessment to enable appropriate management strategies to be developed.<br>– APEC 3 there is potential for fill materials of unknown origin and quality. It is unclear what contaminant concentrations resulted from these activities and their potential migration pathways, which requires further assessment to enable appropriate management strategies to be developed. |
| APEC 2 | Two stockpiles of fill materials within site boundary of unknown origin and quality | |
| APEC 3 | Fill materials in the study area of unknown origin and quality. | |
| APEC 4 | Historic waste storage activities | |

# 4. Data quality objectives

A process for establishing data quality objectives for a site investigation has been defined in the NEPM *Guideline on Site Characterisation* (NEPM, 2013). The Data Quality Objective (DQOs) process will be applied to the site investigation, as described below, to ensure that data collection activities are appropriate and achieve the project objectives. The DQO process involves seven steps as follows:

– Step 1: State the problem
– Step 2: Identify the decision
– Step 3: Identify inputs to the decision
– Step 4: Define the study boundaries
– Step 5: Develop a decision rule
– Step 6: Specify limits on decision errors
– Step 7: Optimise the design for obtaining data

The seven DQO steps for this project are defined in Table 4.

***Table 4 Data quality objectives***

| Step | Description |
|---|---|
| Step 1<br>State the problem | ACT Government are seeking approval for a proposed FOGO facility. The problem is that the potential contamination risks during the project and construction works are presently unknown and the following questions need to be answered:<br>– What is the likelihood that contamination is present on the FOGO site that may be encountered during construction works and future use?<br>– If contamination is present, what level of potential risk does it pose to FOGO facility construction workers, future FOGO facility workers and/or ecological receptors? |
| Step 2<br>Identify the decision / goal of the study | The decisions are issues that need to be addressed arising from Step 1. These are:<br>– What are potential sources of contamination within the proposed FOGO site?<br>– If contamination is present, will the presence of any contamination affect the future use of the site or pose a risk to the identified human receptors?<br>– Do the results of the sampling and analysis indicate potential risk to human health?<br>– Is there a need for further assessment, remediation and/or management? |
| Step 3<br>Identify the information inputs | The inputs to the decision represent the information and data that will be collected as part of the assessment. These include a review of field notes, analytical results and comparison of analytical results with adopted human health and ecological assessment criteria and waste classification guidelines. |
| Step 4<br>Define the study boundaries | *Define the spatial boundaries of the decision*<br>The spatial boundary of the investigation is shown in Figure 1, Appendix A.<br>*Define the temporal boundaries of the decision*<br>Based upon scheduling, it is anticipated that the fieldwork for the investigation will commence in 2023.<br>*Define the scale of decision making*<br>The scale of the decision making is limited to the boundaries of the site and identified off-site receptors. |
| Step 5<br>Develop decision rules | The key decision rule is - Are contaminants of concern present at concentrations above the adopted assessment criteria?<br>– If no, then potential risks to receptors and potential for migration is considered low.<br>– If yes, further assessment or management of the potential risks to potential receptors may be required. |
| Step 6<br>Tolerable limits on decision errors | Data generated must be appropriate to allow decisions to be made with confidence. Specific limits for this assessment have been adopted in accordance with the appropriate guidance. |

| Step | Description |
|---|---|
| Step 7<br>Optimisation data collection process | This step involves identifying the most resource effective assessment design required to satisfy the DQOs. GHD will use specialist personnel with previous experience in contaminated site assessment to cover all aspects of the assessment. |

# 5. Basis for assessment

## 5.1 Relevant guidelines

The framework for the contamination assessment made herein was developed in accordance with the guidelines by the NSW Environment Protection Authority (EPA) under Section 105 of the *Contaminated Land Management Act 1997*. These guidelines include, but are not limited to the following:

– ACT (2019) *Information Sheet 4- Requirements for the reuse and disposal of contaminated soil in the ACT*
– ACT (2020) *Information Sheet 11 – EPA Report Submission Requirements*
– ACT EPA (2021) *Environmental Standards: Assessment and Classification of Liquid and Non-Liquid Wastes*
– ACT Government (2017) *Contaminated Sites Environment Protection Policy* – EPA December 2017
– Heads of the EPAs Australia and New Zealand (HEPA) (2020), *PFAS National Environmental Management Plan (NEMP), Version 2.0*
– NEPC (2013) *National Environmental Protection (Assessment of Site Contamination) Amended Measure (NEPM)*
– NSW EPA (2022) *Contaminated Sites: Sampling Design Guidelines*

GHD will undertake comparison of soil data against appropriate guidelines for the site. The guideline values will be used to evaluate the potential risk of the contamination to human health and the environment.

## 5.2 Contaminants of potential concern

As outlined in the PSI (GHD, 2022), the primary contaminants of potential concern (COPC) associated with the site are the following:

– Asbestos containing material (ACM)
– Heavy metals (including arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc)
– Total recoverable hydrocarbons (TRH)
– Benzene, toluene, ethylbenzene and xylene h(BTEX)
– Polycyclic aromatic hydrocarbons (PAH)
– Chlorinated hydrocarbons (CHC)
– Organochlorine pesticides (OCP)
– Organophosphate pesticides (OPP)
– Polychlorinated biphenyls (PCB)
– Per- and poly- fluoroalkyl substances (PFAS)

## 5.3 Adopted assessment criteria

Soil investigation levels for all soil locations have been adopted from assessment criteria presented in in Table 5 below.

***Table 5 Rationale for adopted criteria for soil assessment***

| Receptor | Guidelines adopted | Assessment criteria | Rationale |
|---|---|---|---|
| Human health | N/A | Presence / absence | Presence or absence of asbestos is considered appropriate for initial screening of asbestos in soil at the proposal site. |
| | National Environmental Protection Council, *National Environment Protection (Assessment* | Health screening levels (HSLs) | The NEPM (2013) presents health screening levels (HSLs) for fuel derived petroleum hydrocarbons, which are generic criteria based on a series of reasonably conservative assumptions in order to be protective of |

| Receptor | Guidelines adopted | Assessment criteria | Rationale |
|---|---|---|---|
| | *of Site Contamination) Measure (NEPM)* (NEPC, 2013) | | human health for a variety of land use types. For the purposes of selecting health-based investigation levels for this study area, industrial/commercial land uses have been adopted.<br>The NEPM (2013) HSL for fuel derived petroleum products are also adopted as initial screening criteria to assess the potential risk to intrusive maintenance workers in construction trenches and excavations. The HSL were selected because they are more stringent than other IMW published values. |
| | | Health investigation levels (HILs) | For non-petroleum hydrocarbons, the NEPM 2013 HILs have been adopted for commercial industrial purposes. The HILs take into account direct contact pathways, including incidental ingestion and dermal contact. |
| | PFAS National Environmental Management Plan (NEMP) (HEPA , 2020) | Human health screening value, industrial / commercial (mg/kg) | |
| Ecology | National Environmental Protection Council, *National Environment Protection (Assessment of Site Contamination) Measure (NEPM)* | Ecological screening levels (ESLs) | The NEPM (2013) includes EILs for heavy metals and naphthalene and ESLs for petroleum hydrocarbons. The applicability of ESLs and EILs to the investigation area were evaluated. Given that the proposal will be developed to a waste facility with the majority of the proposal site will be hard paved, there are considered to be limited sensitive receptors within the proposal site. The EILs and ESLs have therefore not been adopted for this contamination assessment. |
| | | Ecological investigation levels (EILs) | |
| | PFAS National Environmental Management Plan (NEMP) (HEPA , 2020) | Ecological indirect exposure (mg/kg) | PFAS NEMP includes ecological screening criteria for PFAS |

# 6. Sampling and laboratory analysis program

## 6.1 Investigation areas

The sampling design outlined in Table 6 has been informed by the data gap review (Section 3) and the development of DQOs (Section 4). Table 6 below summarises the proposed sampling program, detailing the sampling design, laboratory analysis and contaminants of concern in each APEC. All proposed sample locations are presented in Figure 2, Appendix A.

*Table 6 Proposed soil sampling and analysis program*

| Area of potential environmental concern (APEC) | Proposed scope of works | Analysis plan | Allowance of samples for analysis | Rationale and outcome of work |
|---|---|---|---|---|
| APECs 1, 3 and 4 | **Soil sampling from heritage investigation program**<br>– Soil sampling from 11 locations (HA01 to HA10) from the heritage investigation program from heritage locations (see Figure 2, Appendix A)<br>– A hand auger will be used to a targeted depth of 1.5 metres<br>**Soil sampling from proposed FOGO facility footprint**<br>– Soil sampling from 9 locations (TP12 to TPA20) to cover the footprint of proposed FOGO facility. (see Figure 2, Appendix A)<br>– A hand auger will be used to a targeted depth of 1.5 metres | **Number of primary soil samples:** Approximately 40 soil samples (2 per location)<br>**Analysis:**<br>– Asbestos (presence/absence) (in fill soil only)<br>– Heavy Metals (arsenic. cadmium, chromium, copper, nickel, lead, zinc, mercury)<br>– Total recoverable hydrocarbons (TRH)<br>– Benzene, toluene, ethylbenzene, xylene (BTEX)<br>– Polycyclic aromatic hydrocarbons (PAH)<br>– Chlorinated hydrocarbons (CHC)<br>– Organochlorine and organophosphate pesticides (OCP/OPP/PCB)<br>– Per- and poly- fluoroalkyl substances (PFAS) | – 40 primary samples for metals, TRH, BTEXN and PAH<br>– 20 primary samples for asbestos, CHC, OCP, OPP, PCB and PFAS<br>– 4 duplicate samples for metals, TRH, BTEX, PAH suite<br>– 6 duplicate samples for standard PFAS suite.<br>– 2 rinsate blank samples for metals and PAH | APEC 1 is known to have been used as a vehicle and historic waste storage area. APEC 3 contains fill materials of unknown origin and quality. APEC 4 is known to have been used as a historic waste recovery and storage area.<br>It is unclear what contaminant concentrations are present and the potential for contaminant migration as a result of these activities, which requires further assessment to enable appropriate management strategies to be developed. |
| APEC 2 | **Stockpile sampling**<br>– Soil sampling from 2 stockpiles using a hand auger<br>– One stockpile is approximately 260 $m^3$ (SP01) and the other approximately 40$m^3$ (SP02)<br>– Based on the stockpile sampling density of one sample per 25 $m^3$, and a minimum of three sampling locations per stockpile, 14 samples are required in total | **Number of primary soil samples:** 11 soil samples from SP01 and 3 soil samples from SP02 (14 total).<br>**Analysis:**<br>– Asbestos (presence/absence) (in fill soil only)<br>– Metals suite<br>– TRH<br>– BTEX<br>– PAH<br>– OCP/OPP/PCB<br>– PFAS | – 14 primary samples for all listed analytes<br>– 2 duplicate samples for metals, TRH, BTEX, PAH suite<br>– 3 duplicate samples for standard PFAS suite | APEC 2 contains stockpiles of fill materials of unknown origin or quantity. It is unclear what contaminant concentrations are present within these stockpiles and their potential for migration, which requires further assessment to enable appropriate management strategies to be developed. |

## 6.2 Methodology

### 6.2.1 Health and safety

A task specific Job Safety and Environmental Assessment (JSEA) which will detail hazards, risks and controls with an associated risk matrix, or a Safe Work Method Statement (SWMS) which details the step by step process to undertake the specific task safely, will be developed covering drilling and test pitting works. A copy of this document will be available on site at all times.

### 6.2.2 Underground service clearance

Relevant plans of buried utilities will be obtained from the 'Before You Dig Australia' (BYDA) service and reviewed. In addition, GHD will commission a suitably qualified underground utilities clearance contractor to aid in identifying underground services prior to commencement of works at the locations of all proposed test pit locations.

### 6.2.3 Soil sampling

Soil samples are to be collected by excavator bucket, outside of potential heritage areas, or hand auger, inside potential heritage areas. The excavator will be utilised in test pit locations APEC 1, 3 and 4 and the two stockpiles in APEC 2. Hand augering may also be utilised across all investigation areas, if the use of excavator is limited due to presence of heritage items, dense vegetation, underground services and/or shallow bedrock

The following soil sampling methodology will be conducted:

- Test pits, or hand augers in heritage sensitive areas, will be extended to a maximum depth of 1.5 mbgl or refusal whichever is shallower.
- Sampling will be conducted at the surface, 0.5 m bgl, at 1 m bgl and approximate 1 m intervals thereafter until reaching termination depth.
- Soil samples will be collected directly from the bucket of the excavator using a clean shovel. Clean nitrile gloves will be worn when collecting samples and replaced between samples to prevent cross-contamination.
- All soil samples will be visually inspected, and all field observations and subsurface conditions recorded on field lithological logs, including presence of fill materials and any visual or olfactory indications of contamination.
- GHD will submit samples for analysis as per the sampling program provided in Section 6.
- Unanalysed samples will be retained on-hold for a period of three months in case additional laboratory analysis is required.
- Photographs will be taken of the soil and sampling locations (where possible).
- Test pits will be reinstated with the spoil generated from the test pitting works and the ground surface will be returned to its original state.

## 6.3 Laboratory program

The objective of the analytical program is to gather quantitative data on potential contamination that is of high quality, which is definitive and suitable for comparison against relevant assessment guidelines.

### 6.3.1 Laboratories

The nominated laboratories, which are National Association of Testing Authorities (NATA) accredited for the specific analytical procedures are outlined below:

– Primary laboratory: ALS Environmental, Smithfield, New South Wales
– Secondary laboratory: Eurofins MGT, Girraween, New South Wales

### 6.3.2 Sample handling

Sample handling practices, in accordance with the NEPM (2013) *Schedule B3 Guidelines for the laboratory analysis of potentially contaminated soils* for primary and secondary laboratory are as follows:

– Chain of custody (CoC) signed and dated when the samples arrive at the laboratory.
– Hard copy is filed and stored after login. Electronic copy is filed under unique work order number. A copy of the signed CoC is emailed to GHD along with the sample receipt notification.
– Temperature of samples is recorded at receipt, along with details of chilling and condition of insulated container (i.e., security seals intact). Bench space is allocated per work order so samples cannot be mixed with other work orders.
– Work order is logged and unique sample/jar/bottle waterproof stickers are produced and adhered to containers.
– Samples are organised by sample type and/or preservative.
– Samples are stored below 6$^{\circ C}$ whilst not being analysed.
– Laboratories follow Good Laboratory Practice to ensure samples are not cross contaminated. The maintenance of clean laboratory equipment and instrumentation is part of these processes.

# 7. Quality assurance / quality control program (QA/QC)

The quality assurance/quality control (QA/QC) procedures are based on NEPM (2013), HEPA (2020) PFAS NEMP. QA involves all of the actions, procedures, checks and decisions undertaken to ensure the representativeness and integrity of samples and accuracy and reliability of analytical results (NEPM 2013). QC involves protocols to monitor and measure the effectiveness of QA procedures.

## 7.1 Field program QA/QC

### 7.1.1 Field quality assurance procedures

All field work will be conducted with reference to the NEPM (2013) and GHD's Standard Field Operating Procedures, which ensures 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. Specific requirements for handling PFAS samples to prevent cross-contamination are detailed in HEPA (2020). These requirements will be complied with during sampling:

- **Sampling team:** The sampling team will follow the methodologies presented within Section 6. All field staff involved in sampling will be experienced in their respective fields and considered competent in accordance with GHD's QA system.
- **Sample collection, handling and transport:** Soil samples will be collected using new disposable nitrile gloves for each sample. Specific requirements for handling PFAS samples such as not using water-proofed clothing and having food wrappers on-site, as per the HEPA (2020) guidelines, will be adhered to at all times. Samples will be placed into laboratory provided Teflon-free sample jars and once collected, will be placed on ice (contained in plastic bags) in insulated containers. Samples will be delivered to the laboratory within the recommended holding times for the respective analytes.
- **Sample identification procedures:** Each sample will be labelled with the sample location, date, project identification number and sampler's initials. Sample details will be entered onto a chain of custody (CoC) form that accompanies each batch of samples to the laboratory.
- **CoC information requirements:** A CoC form will be completed and forwarded to the testing laboratory with each batch of samples.
- **Collection of QC samples:** Field QC samples will be collected as detailed in Section 7.1.2.
- **Calibration of field equipment:** Prior to use in the field, all field instruments (i.e. photoionisation detector) will be calibrated by the equipment supplier to optimise the accuracy of the measurements taken.

### 7.1.2 Sampling and analysis quality control

The ASC NEPM (NEPC, 2013) and the PFAS NEMP (HEPA, 2020) outline a recommended approach to QC sampling. The QC samples to be collected during the investigation are described as follows and are included in Table 7.

- Inter-laboratory duplicate: Inter-laboratory duplicate / blind duplicate samples are used to identify the variation in the analyte concentration between samples from the same sampling point.
- Intra-laboratory duplicate: Intra-laboratory duplicate / split duplicate samples provide an indication of the repeatability of the results between laboratories.
- Field blanks: Field blanks are used to estimate contamination of a sample during the collection procedure. Field blanks are collected by pouring laboratory supplied deionised water into laboratory supplied bottles on-Site.

– Rinsate blanks: Rinsate blank samples are used to estimate the amount of contamination introduced by the re-use of sampling equipment. They are obtained by pouring laboratory supplied deionised water over decontaminated sampling equipment (e.g. hand auger) into laboratory supplied bottles.

*Table 7 Sampling and analysis QA/QC analytical program*

| Sample type | Analysis | Rationale | Acceptance criteria |
|---|---|---|---|
| Inter-laboratory duplicate samples | Metals, BTEXN, TRH, PAH | One duplicate sample for every 20 samples | 0-30% |
| | Standard PFAS suite | One duplicate sample for every 10 samples | |
| Intra-laboratory duplicate samples | Metals, BTEXN, TRH, PAH | One duplicate sample for every 20 samples | 0-30% |
| | Short PFAS suite | One duplicate sample for every 10 samples | |
| Field and rinsate blanks | Metals, PAH, PFAS suite | One field blank and one rinsate blank per day per piece of reusable equipment. | <LOR |

In the instance that acceptance criteria listed above are not met, further assessment of the data will be required to determine the impact that this has on the interpretation of the data.

### 7.1.3 Relative percentage difference calculations

Inter- and Intra-laboratory duplicate samples will be assessed by calculating the relative percentage difference (RPD) between the primary, blind and split samples in accordance with the procedure described in AS 4482.1 – 2005 (Standards Australia 2005). Calculation of RPDs provides a quantitative measure of the accuracy of the analytical results reported.

RPD results will be considered acceptable if they are less than or equal to 30%. The only exception to this is when concentrations within the primary and blind or split sample are less than ten times the laboratory LOR. In this case, a greater RPD value is considered acceptable.

## 7.2 Laboratory QA/QC

### 7.2.1 Laboratory analytical programs

Laboratory methods to be used by the primary and secondary laboratories will be suitable for environmental contaminant analysis and are based on established internationally recognised procedures (refer to Section 6.3). Each of the laboratories is NATA accredited for the proposed analysis.

### 7.2.2 Laboratory quality control procedures

The following laboratory QC procedures will be used during the investigation.

#### 7.2.2.1 Laboratory duplicate samples

The analysis of a laboratory derived duplicate sample from the process batch, at a rate equivalent to 1 in 10 samples per analytical batch, or one sample per batch if less than 10 samples are analysed in a batch. A laboratory duplicate provides data on the analytical precision and reproducibility of the analytical results.

The permitted ranges for the RPD of laboratory duplicates are dependent on the magnitude of the results in comparison to the level of reporting as shown in Table 8.

*Table 8 Acceptable laboratory RPD ranges*

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

### 7.2.2.2 Method blank samples

The analysis of a sample that is as free as possible of the analytes of interest but has been prepared the same as the samples under investigation. The analysis is to ascertain if laboratory reagents, 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 quantitation 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'.

### 7.2.2.3 Laboratory control samples

The analysis of either a reference material or a control matrix fortified with analytes representative of the analyte class. The purpose of laboratory control spike samples is to monitor method precision and accuracy independent of the sample matrix. Typically, the percentage recovery of the laboratory control spike sample is compared to the dynamic recovery limits based on the statistical analysis of the processed laboratory control spike sample analysis. Recoveries should lie between 70% and 130%.

### 7.2.2.4 Matrix spike samples

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 should lie between 70% and 130%.

### 7.2.2.5 Surrogate spike samples

Surrogate spike samples are samples with known additions of known amounts of compounds, which are similar to the analytes of interests in terms of extractability, recovery through clean-up procedures and response to chromatographic or other measurement. Surrogate compounds may be alkylated or halogenated analogues or structural isomers of analytes of interest. The purpose of surrogate spikes, which are added immediately before the sample extraction step, is to provide a check for every analysis that no gross processing errors have occurred, which could have led to significant analyte loss or faulty calculation. Recoveries should lie between 50% and 150%.

### 7.2.2.6 Internal standards

Internal standards are known additions of known amounts of compounds which are not found in real samples, will not interfere with quantification of analytes of interest and may be separately and independently quantified. The purpose of internal standards in instrumental techniques is to provide independent signals, which serve to check the consistency of the analytical step. Internal standards are often used for organic compounds and some inorganic compounds.

# 8. Reporting

This SAQP documents the process for the collection and validation of field data as acceptable for use as inputs to the TSI Report.

At the conclusion of this investigation, GHD will provide a TSI report, which will be prepared in accordance with the requirements of the *ASC NEPM* (NEPC, 2013) and the NSW EPA, *Consultants reporting on contaminated land – Contaminated land guidelines* (2020).

The report will include the details and discussion regarding the outcomes of the investigation detailed in this SAQP. The report will include site location, layout, sampling location, sample exceedance plans and definition of areas requiring remediation/management.

As part of the TSI report, the following information will also be included:

– Summary of scope of works, site identification, site history summary and preliminary site investigation information.
– Assessment guidelines and criteria.
– Site observations, field sheets and relevant field photographs.
– Summary and discussion of analytical results, laboratory certificates and COPC information.
– Assessment of QA/QC procedures, and compliance/deviation from SAQP.
– Soil field logs.
– Details and outcomes of the TSI investigation.
– GIS figures/maps showing investigation locations and exceedances (if any).
– Summary of updated site CSM.
– Conclusions and recommendations.

The report will be written in a manner consistent with the relevant guidelines.

# 9. References


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# Appendices

# Appendix A

## Figures


**Legend**

- Proposal site
- Cadastre
- Watercourses

Paper Size ISO A4

0 25 50

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

GHD

**Transport Canberra and City Services**
**Hume Food Organics and Garden Organics Facility**
**Sampling and Analysis Quality Plan**

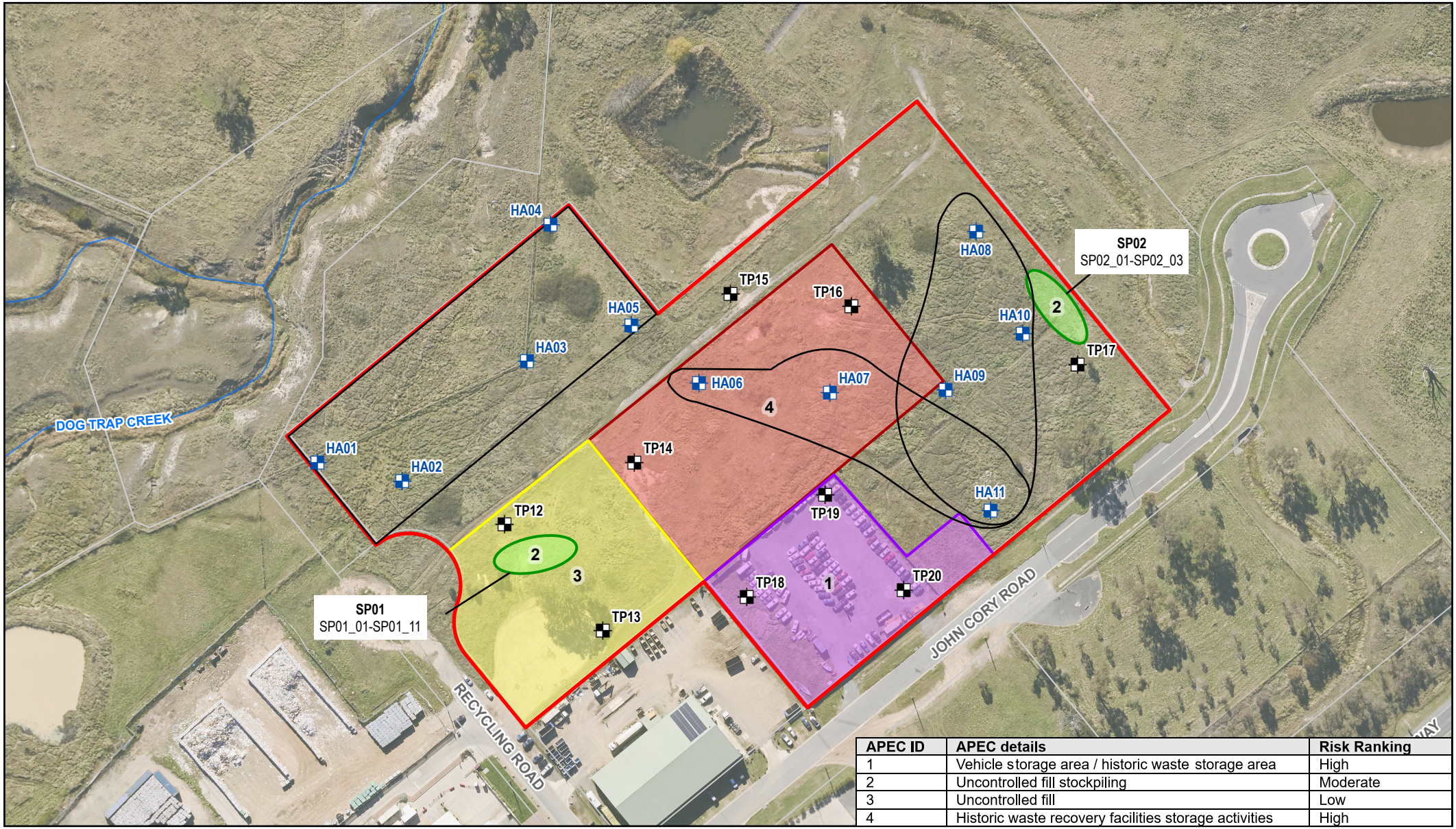
Project No. **12540460**
Revision No. **0**
Date **30/08/2023**

## Proposal site location

# FIGURE 1

\\ghdnet\ghd\AU\Canberra\Projects\23\12540460\GIS\Maps\Deliverables\FOGO_SAQP_0.aprx
Print date: 30 Aug 2023 - 12:00

Data source: Metromap Tile Service: ,Light Gray Base: Vicmap, Esri, HERE, Garmin, FAO, NOAA, USGS,Light Gray Reference: Vicmap, Esri, HERE, Garmin, FAO, NOAA, USGS extracted 30/08/2023; DEM - ACT Government, 2015; Roads, Cadastre - ACTmapi, 2022; Watercourses - NSWSS, 2022. Created by: pfernandes




| APEC ID | APEC details | Risk Ranking |
|---|---|---|
| 1 | Vehicle storage area / historic waste storage area | High |
| 2 | Uncontrolled fill stockpiling | Moderate |
| 3 | Uncontrolled fill | Low |
| 4 | Historic waste recovery facilities storage activities | High |

**Legend**

- Proposal site
- Heritage investigation footprint
- Cadastre
- Watercourses
- FOGO construction footprint sampling location
- Heritage investigation sampling location

**APEC**

- 1
- 2
- 3
- 4

Paper Size ISO A4

0 25 50

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

GHD

**Transport Canberra and City Services**
**Hume Food Organics and Garden Organics Facility**
**Sampling and Analysis Quality Plan**

Project No. **12540460**
Revision No. **0**
Date **30/08/2023**

## Sampling location plan

# FIGURE 2

\\ghdnet\ghd\AU\Canberra\Projects\23\12540460\GIS\Maps\Deliverables\FOGO_SAQP_0.aprx
Print date: 30 Aug 2023 - 12:00

Data source: Metromap Tile Service: extracted 30/08/2023; DEM - ACT Government, 2015; Roads, Cadastre - ACTmapi, 2022; Watercourses - NSWSS, 2022; Heritage investigation area and transects - NOHC, 2022.
Created by: pfernandes

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