**PROPOSED DEVELOPMENT**
**BARRYSPARKS SITE I**
**SWORDS CO.DUBLIN**
**BOVALE DEVELOPMENTS**

**POGA**
**CONSULTING ENGINEER**

## CONTENTS



## APPENDICES

## FOREWORD

The following Conditions and Notes on Site Investigation Procedures should be read in conjunction with this report.

### General.

Recommendations made, and opinions expressed in the report are based on the strata observed in the exploratory holes, together with the results of in-situ and laboratory tests. No responsibility can be held for conditions which have not been revealed by exploratory work, or which occur between exploratory hole locations. Whilst the report may suggest the likely configuration of strata, both between exploratory hole locations, or below the maximum depth of the investigation, this is only indicative, and liability cannot be accepted for its accuracy.

Unless specifically stated, no account has been taken of possible subsidence due to mineral extraction below or close to the site.

### Boring Procedures.

Unless otherwise stated, the 'Shell and Auger' technique of soft ground boring has been employed. All boring operations sampling and/or logging of soils and in-situ testing complies with the recommendations of the British Standard Code of Practice BS 5930 (1981), 'Site Investigation' and BS 1377:1990, 'Methods of test for soils for civil engineering purposes'.

Whilst the technique allows the maximum data to be obtained in soft ground, some disturbance and variation of soft and layered soils is unavoidable. Attention is drawn to this condition, whenever it is suspected. Where cobbles and boulders are recorded, no conclusion should be drawn concerning the size, presence, lithological nature, or numbers per unit volume of ground.

Where peat has been encountered during siteworks, samples have been logged in accordance with the Von Post Classification (ref. Von Post, L. 1992. Sveriges Gologiska Undersoknings torvinventering och nogra av dess hittils vunna resultat (SGU peat inventory and some preliminary results) Svenska Mosskulturforeningens Tidskrift, Jonkoping, Swedden, 36, 1-37 & Hobbs N. B. Mire morphology and the properties of some British and foreign peats. QJEG, Vol. 19, 1986).

**Routine Sampling.**

Undisturbed samples of soils, predominantly cohesive in nature are obtained unless otherwise stated by a 104mm diameter open-drive tube sampler. In granular soils, and where undisturbed sampling is inappropriate, disturbed samples are collected. Smaller disturbed samples are also recovered at intervals to allow a visual examination of the full strata section.

**In-Situ Testing.**

Standard penetration tests, utilising either the standard split spoon sampler or solid cone and automatic trip-hammer are conducted unless otherwise where required by instruction. Subsequent to a seating drive of 150mm, a summation for the number of blows for 300mm penetration is recorded on the boring records together with the blow count for each 75mm penetration. In cases where incomplete penetration is obtained, the number of blows for the recorded value of penetration are noted. In coarse granular soils, a cone end is fitted to the sampler and a similar procedure adopted.

**Groundwater.**

The depth of entry of any influx of groundwater is recorded during the course of boring operations. However, the normal rate of boring does not usually permit the recording of an equilibrium level for any one water strike. Where possible drilling is suspended for a period of twenty minutes to monitor the subsequent rise in water level.

Groundwater conditions observed in the borings or pits are those appertaining to the period of investigation. It should be noted however, that groundwater levels are subject to diurnal, seasonal and climatic variations and can also be affected by drainage condition, tidal variation or other causes.

**Retention of Samples.**

After satisfactory completion of all the scheduled laboratory tests on any sample, the remaining material is discarded unless a period of retention of samples is agreed, it is our normal practice to discard all soil samples one month after submission of our final report.

# REPORT ON A SITE INVESTIGATION FOR A PROPOSED NEW DEVELOPMENT AT BARRYSPARKS LRD SITE 1

**BOVALE DEVELOPMENTS**

**POGA**
**CONSULTING ENGINEERS**

**Report No. 25473** **August 2024**

## I Introduction

A new commercial development is proposed for a brownfield site located at Barrysparks in Swords, County Dublin.

An investigation of sub soil conditions in the area of the new development has been carried out by IGSL for POGA Consulting Engineers on behalf of Bovale Developments.

The scope of work was scheduled by the Consulting Engineer and comprised the following elements.

- Trial Pits 10 nr.
- Heavy Duty Dynamic Probes 10 nr.
- CBR by Plate Bearing Tests 5 nr.
- BRE Digest 365 Percolation Tests 5 nr
- Geotechnical Laboratory Testing
- Environmental and Chemical Laboratory Testing
- Waste Characterisation Assessment (WCA)

This report includes all factual data available from field and laboratory operations and discusses these findings relative to foundation and infrastructural design for the proposed new development.

## II Fieldwork

This new development is to take place on a brownfield site located close to The Airside Business Park in Swords. The ground surface is variable comprising MADE GROUND with some areas of TOPSOIL.

The site and exploratory locations are noted on the drawings enclosed in Appendix VI, locations were specified by POGA and were marked out by IGSL on site.

The various elements of the investigation are detailed in the following paragraphs. All field works were supervised by an experienced geotechnical engineer who carefully recorded stratification, took photographs as necessary, recovered samples and prepared detailed records.

Close liaison was maintained throughout with Consulting Engineer and client. All appropriate documentation was submitted and approved prior to site commencement. Each location was scanned electronically (CAT) to ensure that existing services were not damaged.

Statutory HSE safety precautions were observed, with working areas restricted to IGSL personnel only, to ensure safety of the general public.

### *Trial Pits*

Trial Pits were scheduled at ten locations and referenced TP01 to TP10.

An 8 tonne JCB excavator was used under engineering supervision. Detailed records for each location are presented in Appendix I. These records note the soil stratification and record sampling, stability and ground water details. Each location was CAT scanned to ensure that underground services were not damaged. Photographs of each excavation are included with the records.

Surface soils comprising Top Soil and Made Ground overlie firm to stiff grey brown gravelly CLAY in turn overlying very stiff grey black gravelly CLAY.

Pits were terminated at depths ranging from 2.50 to 3.60 metres. Excavations were generally dry and stable, some minor ground water seepages were recorded.

Trial Pit data is summarised in the following table.

| Ref No. | Topsoil | FILL | Brown CLAY | Black Clay | Water |
|---|---|---|---|---|---|
| TP01 | | 0 – 0.10 | 0.10 – 2.10 | 2.10 – 3.10 | 2.50 |
| TP02 | | 0 – 0.90 | 0.90 – 2.80 | 2.80 – 3.60 | 2.50 |
| TP03 | | 0 – 0.60 | 0.60 – 2.60 | | 2.30 |
| TP04 | 0 - 0.30 | | 0.30 – 2.50 | | Dry |
| TP05 | 0 – 0.40 | | 0.40 – 2.50 | | Dry |
| TP06 | | 0 – 2.10 | 2.10 – 2.60 | | Dry |
| TP07 | | 0 – 1.80 | 1.80 – 2.50 | | Dry |
| TP08 | 0 – 0.40 | | 0.40 – 2.50 | | Dry |
| TP09 | 0 – 0.20 | | 0.20 – 2.60 | | 2.00 |
| TP10 | 0 – 0.30 | | 0.30 – 3.00 | | Dry |



***HD Dynamic Probes***

Heavy Duty Dynamic Probes were carried out at ten specified locations and referenced DP01 to DP10.

Probing was in accordance with the heavy-duty probe specification of BS 1377: Part 9: 1990. In these tests, the soil resistance is measured in terms of the number of drop-hammer blows required to drive the test probe through each 100 mm increment of penetration. Probing is terminated when the blow count exceeds 25/100mm to avoid damage to the apparatus. Where loose material is present a single blow count may drive the apparatus in excess of 100mm. In this instance blow counts of zero may be recorded. Individual probe records are contained in Appendix II.

A Dynamic Probe resistance of $N_{100} = 5$ is indicative of stiff soil consistency. Probe values of less that $N_{100} = 2$ indicates material unsuitable as a founding medium. Probe data is summarised as follows:

| Ref No. | Soft $N_{100} < 2$ | Firm -Stiff $N_{100}$ 4 to 7 | Stiff – Hard $N_{100} > 8$ |
|---|---|---|---|
| DP01 | 0 – 0.80 | 0.80 – 2.00 | 2.00 – 2.60 |
| DP02 | 0 – 0.40 | 0.40 – 1.40 | 1.40 – 2.40 |
| DP03 | 0 – 0.50 | 0.70 – 1.80 | 1.80 – 2.30 |
| DP04 | 0 - 0.30 | 0.30 – 0.40 | 0.40 – 2.40 |
| DP05 | 0 – 1.10 | 1.10 – 1.20 | 1.20 – 1.70 |
| DP06 | 0 – 1.10 | 1.10 – 2.70 | 2.70 – 3.80 |
| DP07 | 0 – 1.50 | 1.50 – 2.00 | 2.00 – 4.60 |
| DP08 | 0 – 0.50 | 0.50 – 0.80 | 0.80 – 2.50 |
| DP09 | 0 – 1.30 | 1.40 – 1.60 | 1.60 – 2.10 |
| DP10 | 0 – 1.20 | 1.40 – 2.10 | 2.10 – 3.00 |

***Plate Bearing Tests***

In-Situ CBR Values and Moduli of Subgrade Reaction were established at a total of five locations using Plate Bearing test apparatus. The tests were carried out on HARCORE or gravelly CLAY at 0.60 metres BGL.

All CBR test data is presented in Appendix III and summarised in the following table.

***CBR by Plate Test***

| Ref. | Test Depth | CBR@ LOAD % | CBR@ RELOAD % |
|---|---|---|---|
| CBR 01 | 0.60 | 3.3 | 5.9 |
| CBR 02 | 0.60 | 2.6 | 3.8 |
| CBR 03 | 0.60 | 0.4 | 2.7 |
| CBR 04 | 0.60 | 0.4 | 0.9 |
| CBR 05 | 0.60 | 2.3 | 22.3 |

***Infiltration Tests / BRE DIGEST 365***

Infiltration testing was performed at five Trial Pit locations in accordance with BRE Digest 365 'Soakaway Design'. The tests are referenced SA01/SA09 relating to the trial pits where tests were carried out. Full details are presented in Appendix IV.

To obtain a measure of the infiltration rate of the sub-soils, water was poured into the test pit, and records taken of the fall in water level against time. The tests are usually carried over two cycles following initial soakage. Designs are based on the slowest infiltration rate, which is generally calculated from the final cycle.

The infiltration rate is the volume of water dispersed per unit exposed area per unit of time, and is generally expressed as metres/minute or metres/second. In these calculations the exposed area is the sum of the base area and the average internal area of the pit sides over the test duration.

| Ref. No. | Soil Type | Infiltration Rate (Metres/Minute) |
|---|---|---|
| SA01 | Gravelly CLAY | 0.0000 |
| SA03 | Gravelly CLAY | 0.0000 |
| SA06 | Fill / Gravelly CLAY | 6.6E-05 |
| SA08 | Gravelly CLAY | 0.0000 |
| SA09 | Gravelly CLAY | 0.0000 |

All results reflect the IMPERMEABLE nature of the GLACIAL TILL or BOULDER CLAY on this site.

## III. Testing



All samples recovered during the investigation were returned to the IGSL accredited (INAB) laboratory for visual assessment. A number of samples were selected for more detailed analysis.

Geotechnical Testing was carried out by IGSL in it's INAB –Accredited Laboratory Chemical and environmental testing was carried out in the UK by EUROFINS Ltd.

Testing comprised the following elements:

| | |
|---|---|
| Natural Moisture Content | IGSL |
| Classification (Index Properties) | IGSL |
| Grading | IGSL |
| Sulphate / Chloride / pH | EUROFINS |
| RILTA Suite Environmental | EUROFINS |

All laboratory data is presented in Appendix V and individual tests are discussed briefly as follows:

### *Classification / Moisture Content*

Liquid and plastic limits were determined for four samples of the gravelly CLAY soils. Results reflect low plasticity material of similar origin, plotting in the CL / CI zones of the standard Classification Chart and indicative of TILL deposition with a CLAY matrix. Natural Moisture Contents in the gravelly CLAY soils range from 12 to 23%. One samples from TP08 is classed as a SILT with a high moisture content of 52% noted.

### *Grading*

Wet sieve and Hydrometer analysis has been carried out on three samples of the gravelly CLAY from the trial pits. The uniformly straight-line grading curves are typical of GLACIAL TILL deposition with smooth grading from the fine clay to coarse gravel fraction.

### *Chemical*

Two samples were sent for analysis to BRE Chemical Suite parameters. Sulphate concentrations (SO4 2:1 extract) of <0 .010 g/l were established with pH values of 8.2 and 8.3. Low Chloride concentrations (< 0.010 g/l) were also determined.

***RILTA Environmental Suite***

Ten samples of the soils from the site were sent to EUROFINS environmental laboratory and testing was carried out in accordance with RILTA requirements to establish Landfill Waste Acceptance Criteria (WAC).

The detailed test data is enclosed in Appendix VB. This has been assessed by specialist environmental consultants (O'Callaghan Moran) and a Waste Characterisation Assessment has been prepared.

This report has been issued digitally to POGA and is referenced with the test data in Appendix VC.

**IV. Discussion:**

A detailed investigation of ground conditions on the site has been carried out by IGSL under the direction of POGA , Consulting Engineers.

The investigation consisted of conventional Trial Pits and Dynamic Probes with supplementary in-situ CBR tests and Infiltration Tests.

Chemical and Environmental laboratory testing has also been carried out to confirm soil parameters.

***Stratification***

Surface deposits of TOPSOIL / SOFT CLAY / MADE GROUND extend to depths of up to 2.00 metres and overlie GLACIAL TILL..

The traditional pattern of the TILL in the North Dublin area comprises Firm to stiff brown very gravelly CLAY (BROWN BOULDER CLAY) overlying very stiff to hard black gravelly CLAY (BLACK BOULDER CLAY OR LODGEMENT TILL).

This pattern has been noted in the majority of locations with excavations generally terminated at about 3.00 metres BGL. The final trial pit refusal depths are NOT indicative of bedrock horizon, which may be deeper than the Trial Pits.

The heterogeneous nature of the TILL should be noted with variation in composition and strength noted. Zones or pockets of granular soils can typically occur, often in association with ground water. Light water ingress noted as seepage was recorded on several trial pits.

***Foundations / Allowable Bearing Pressures***

The strength of the soils has been established by Dynamic Cone Penetration Tests at ten locations. The visual assessment of the soils during trial pit excavation is also considered in assessing soil strength, as well as geotechnical testing carried out for this project.

The MADE GROUND deposits noted over the site area are unsuitable as a founding medium, varying both in composition and in strength.

Structural and floor loads should be transferred to a competent stratum, on this site, either the firm to stiff brown Boulder Clay or the very stiff to hard black Boulder Clay.

A Dynamic Probe Resistance of $N_{100} = 5$ is indicative of an allowable bearing pressure of 150 kN/sq.m. (assuming no underlying depreciation in strength). The summary probe data chart indicates that this will be available generally at depths ranging from 0.70 to 1.50 metres BGL, probably on the brown boulder clay stratum.

An increased allowable bearing pressure of 250 kN.sq.m. is indicated by probe values of $N_{100} = 10$, this is generally associated with foundations placed on the black boulder clay at an assumed depth of about 2.50 metres.

Settlement in the Boulder Clay under the above loadings will be of the order of 5 to 10mm. Differential settlement should be negligible.

The boulder clays encountered are sensitive to moisture content variation and should be protected from rainfall by blinding as required.

Given the variations noted in the trial pits and inherent possible variations in the natural soils, very careful inspection of excavated formation by experienced personnel is strongly recommended to ensure uniformity and suitability of the founding medium. Any suspect material should be removed and replaced with low-grade concrete.

***Roads and Pavement***

CBR values (at about 0.60 metres BGL) range from 2 to 5%. An average CBR of about 4% is suggested for pavement design purposes. Excavated formation should be carefully inspected to ensure that all organic or very soft material is removed.

Imported granular fill should fully comply with current NRA Standards.

***Percolation***

A significant issue however, relates to the failure of four of the five Infiltration Tests, confirming the Impermeable nature of the Boulder Clay stratum. The results are quite typical of the local GLACIAL TILL.

Conventional soakaways will not function in these soils.

Consideration should therefore be given to the use of an available local watercourse for storm water disposal. Alternatively the use of the Local Authority Drainage System for storm water disposal is recommended.

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***FOUNDATION CONCRETE***

Low Sulphate and Chloride concentrations and near neutral pH values indicate that no special precautions are required to protect foundation concrete from chemical aggression and deterioration.

Below ground concrete should comply with Design Class DS-1 of the ACEC classification.

***ENVIRONMENTAL***

Results of the detailed environmental testing have been assessed by specialist consultants and a Waste Characterisation Assessment (WCA) has been prepared and issued independently to POGA. Details are also included in this document.

***IGSL/JC***
***August 2024***

# Appendix I Trial Pit Records

## Photographs

# TRIAL PIT RECORD

REPORT NUMBER 25473

| | |
|---|---|
| CONTRACT | Barrysparks LRD |
| LOGGED BY | A.R. |
| CO-ORDINATES | |
| GROUND LEVEL (m) | |
| CLIENT | NAMA |
| ENGINEER | POGA |
| TRIAL PIT NO. | TP01 |
| SHEET | Sheet 1 of 1 |
| DATE STARTED | 20/06/2024 |
| DATE COMPLETED | 20/06/2024 |
| EXCAVATION METHOD | JCB 8 TN |



| Geotechnical Description | Legend | Depth (m) | Elevation | Water Strike | Samples: Sample Ref | Samples: Type | Samples: Depth | Vane Test (KPa) | Hand Penetrometer (KPa) |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 TOPSOIL and Fill material with metal bar and pieces of plywood and redbrick. | | 0.10 | | | | | | | |
| Firm to stiff mottled orangey greyish brown sandy gravelly CLAY. Medium plasticity. Gravels were fine, sub-rounded to rounded. | | 0.90 | | | AA218900 | B | 0.90-0.90 | | |
| 1.0 Stiff to very stiff, mottled greyish dark brown very sandy very gravelly CLAY. Low cobble content, up to 200mm and sub-rounded. Gravels fine to coarse, sub-rounded. | | 2.10 | | | | | | | |
| 2.0 Dense blackish grey silty gravelly cobbly bouldery SAND. Low boulder and cobble contentup to 300mm. Gravels fine to coarse. | | 3.10 | | | AA218899 | B | 3.00-3.00 | | |
| 3.0 End of Trial Pit at 3.10m | | | | | | | | | |
| 4.0 | | | | | | | | | |

**Groundwater Conditions**
Slow seepage @ 2.5m

**Stability**
Collapsing between 2 - 2.5m

**General Remarks**
Location CAT scanned prior to excavation

IGSL TP LOG 25271.GPJ IGSL.GDT 2/7/24

# TRIAL PIT RECORD

REPORT NUMBER 25473



| | |
|---|---|
| CONTRACT | Barrysparks LRD |
| LOGGED BY | G.B. |
| CO-ORDINATES | |
| GROUND LEVEL (m) | |
| CLIENT | NAMA |
| ENGINEER | POGA |
| TRIAL PIT NO. | TP02 |
| SHEET | Sheet 1 of 1 |
| DATE STARTED | 20/06/2024 |
| DATE COMPLETED | 20/06/2024 |
| EXCAVATION METHOD | JCB 8 TN |

| Geotechnical Description | Legend | Depth (m) | Elevation | Water Strike | Samples: Sample Ref | Samples: Type | Samples: Depth | Vane Test (KPa) | Hand Penetrometer (KPa) |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 TOPSOIL and Fill material with concrete fragments and red brick fragments | | | | | | | | | |
| Stiff Brown slightly sandy gravelly CLAY with medium cobble, low boulder, occasional concrete fragment and rare red brick content. Medium plasticity. Gravel is sub angular to subrounded, fine to coarse. (MADE GROUND) | | 0.30 | | | AA228872 | B | 0.50-0.50 | | |
| Firm to Stiff mottled grey/brown sandy gravelly CLAY with occasional cobbles. Medium plasticity, gravel is subangular to subrounded, fine to coarse. | | 0.90 | | | | | | | |
| 1.0 Firm to Stiff brown sandy gravelly CLAY with occasional cobbles. Medium plasticity, gravel is subangular to subrounded, fine to coarse. | | 1.20 | | | AA228873 | B | 1.50-1.50 | | |
| 2.0 Stiff brown sandy very gravelly CLAY with cobbles and sand pockets. Medium plasticity, gravel is subangular to subrounded, fine to coarse. | | 2.30 | | | AA228874 | B | 2.30-2.30 | | |
| Very stiff black boulder CLAY | | 2.80 | | | | | | | |
| 3.0 End of Trial Pit at 3.60m | | 3.60 | | | | | | | |
| 4.0 | | | | | | | | | |

**Groundwater Conditions**
Slow seepage @ 2.5m

**Stability**
Stable

**General Remarks**
Location CAT scanned prior to excavation

IGSL TP LOG 25271.GPJ IGSL.GDT 2/7/24

# TRIAL PIT RECORD

REPORT NUMBER 25473



| | | | |
|---|---|---|---|
| CONTRACT | Barrysparks LRD | TRIAL PIT NO. | TP03 |
| | | SHEET | Sheet 1 of 1 |
| LOGGED BY | A.R. | CO-ORDINATES | |
| | | DATE STARTED | 21/06/2024 |
| | | DATE COMPLETED | 21/06/2024 |
| CLIENT | NAMA | GROUND LEVEL (m) | |
| ENGINEER | POGA | EXCAVATION METHOD | JCB 8 TN |

| Geotechnical Description | Legend | Depth (m) | Elevation | Water Strike | Samples: Sample Ref | Samples: Type | Samples: Depth | Vane Test (KPa) | Hand Penetrometer (KPa) |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 MADE GROUND - Topsoil / Fill with concrete fragments and red brick | | 0.20 | | | | | | | |
| Firm - stiff, orangey brown, sandy gravelly CLAY. Gravels fine to coarse, sub-angular to sub-rounded. | | 0.60 | | | AA210634 | B | 0.50-0.50 | | |
| Firm to stiff, mottled grey brown, very sandy gravelly CLAY. Gravels fine to coarse sub-angular to sub-rounded. Sand was fine to medium grained. | | 1.10 | | | | | | | |
| 1.0 Firm to stiff, mottled grey to light brown, very sandy gravelly CLAY. Gravels fine to coarse sub-angular to sub-rounded. Sand was fine to medium grained. | | 1.30 | | | | | | | |
| Soft (very wet) greyish brown, sandy gravelly cobbly CLAY. High cobble content, limestone cobbles up to 250mm angular to sub-rounded. Gravels angular to sub-rounded, fine to coarse. Sand was fine to medium grained. | | | | | AA210635 | B | 1.50-1.50 | | |
| 2.0 | | | | | | | | | |
| End of Trial Pit at 2.30m | | 2.60 | | | AA210636 | B | 2.50-2.50 | | |
| 3.0 | | | | | | | | | |
| 4.0 | | | | | | | | | |

**Groundwater Conditions**
Slow seepage @ 2.3m

**Stability**
Stable

**General Remarks**
Location CAT scanned prior to excavation

IGSL TP LOG 25416.GPJ IGSL.GDT 4/7/24

# TRIAL PIT RECORD

REPORT NUMBER 25473



| | |
|---|---|
| CONTRACT | Barrysparks LRD |
| LOGGED BY | G.B. |
| CO-ORDINATES | |
| GROUND LEVEL (m) | |
| CLIENT | NAMA |
| ENGINEER | POGA |
| TRIAL PIT NO. | TP04 |
| SHEET | Sheet 1 of 1 |
| DATE STARTED | 20/06/2024 |
| DATE COMPLETED | 20/06/2024 |
| EXCAVATION METHOD | JCB 8 TN |

| Geotechnical Description | Legend | Depth (m) | Elevation | Water Strike | Samples: Sample Ref | Samples: Type | Samples: Depth | Vane Test (KPa) | Hand Penetrometer (KPa) |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 TOPSOIL: Firm brown silty sandy gravelly clay with rootlets. | | | | | | | | | |
| Firm to Stiff brown sandy gravelly CLAY with occasional cobbles. Medium plasticity, gravel is subangular to subrounded, fine to coarse. | | 0.30 | | | AA210618 | B | 0.70-0.70 | | |
| 1.0 Stiff mottled grey/brown sandy gravelly CLAY with occasional cobbles and increased gravel content. Medium plasticity, gravel is subangular to subrounded, fine to coarse. | | 1.10 | | | | | | | |
| 2.0 Very stiff mottled grey/brown sandy gravelly CLAY with occasional cobbles and increased gravel content. Medium plasticity, gravel is subangular to subrounded, fine to coarse. Gets stiffer and greyer with depth. | | 1.80 | | | AA210619 | B | 1.70-1.70 | | |
| End of Trial Pit at 2.50m | | 2.50 | | | AA210620 | B | 2.50-2.50 | | |
| 3.0 | | | | | | | | | |
| 4.0 | | | | | | | | | |

**Groundwater Conditions**
DRY

**Stability**
Stable

**General Remarks**
Location CAT scanned prior to excavation

# TRIAL PIT RECORD

REPORT NUMBER 25473



| | |
|---|---|
| CONTRACT | Barrysparks LRD |
| LOGGED BY | G.B. |
| CO-ORDINATES | |
| GROUND LEVEL (m) | |
| CLIENT | NAMA |
| ENGINEER | POGA |
| TRIAL PIT NO. | TP05 |
| SHEET | Sheet 1 of 1 |
| DATE STARTED | 21/06/2024 |
| DATE COMPLETED | 21/06/2024 |
| EXCAVATION METHOD | JCB 8 TN |

| | Geotechnical Description | Legend | Depth (m) | Elevation | Water Strike | Samples: Sample Ref | Samples: Type | Samples: Depth | Vane Test (KPa) | Hand Penetrometer (KPa) |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | TOPSOIL: Soft - firm brown silty sandy gravelly clay with rootlets. | | | | | | | | | |
| | Stiff grey/brown slightly sandy gravelly CLAY with medium cobble content, medium plasticity. Gravel is subangular to subrounded, fine to coarse. Sand is fine to medium. | | 0.40 | | | AA210631 | B | 0.50-0.50 | | |
| 1.0 | Stiff to very stiff grey/brown gravelly CLAY with medium cobble content, medium plasticity. Gravel is subangular to subrounded, fine to coarse. | | 1.00 | | | AA210632 | B | 1.50-1.50 | | |
| 2.0 | Very Stiff grey/brown slightly sandy gravelly CLAY with high cobble content. Gravel is subangular to subrounded, fine to coarse. | | 2.00 | | | | | | | |
| | End of Trial Pit at 2.50m | | 2.50 | | | AA210633 | B | 2.50-2.50 | | |
| 3.0 | | | | | | | | | | |
| 4.0 | | | | | | | | | | |

**Groundwater Conditions**
DRY

**Stability**
Stable

**General Remarks**
Location CAT scanned prior to excavation

IGSL TP LOG 25271.GPJ IGSL.GDT 2/7/24

# TRIAL PIT RECORD

REPORT NUMBER 25473



| | | | |
|---|---|---|---|
| CONTRACT | Barrysparks LRD | TRIAL PIT NO. | TP06 |
| | | SHEET | Sheet 1 of 1 |
| LOGGED BY | G.B. | CO-ORDINATES | |
| | | DATE STARTED | 21/06/2024 |
| | | DATE COMPLETED | 21/06/2024 |
| CLIENT | NAMA | GROUND LEVEL (m) | |
| ENGINEER | POGA | EXCAVATION METHOD | JCB 8 TN |

| Geotechnical Description | Legend | Depth (m) | Elevation | Water Strike | Samples: Sample Ref | Samples: Type | Samples: Depth | Vane Test (KPa) | Hand Penetrometer (KPa) |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 TOPSOIL: Soft brown silty sandy gravelly clay with rootlets. | | | | | | | | | |
| Firm to stiff brown slightly sandy gravelly CLAY with occasional cobbles and rare ceramic fragments. Medium plasticity, gravel is subagular to subrounded, fine to coarse | | 0.30 | | | AA210621 | B | 0.50-0.50 | | |
| 1.0 Firm light brown gravelly CLAY with rare red brick fragmets and low cobbles. Medium plasticity, gravel is subangular to rounded, fine to coarse. (MADE GROUND) | | 1.00 | | | | | | | |
| Firm light mottled grey/brown gravelly CLAY with rare red brick fragmets and low cobbles. Medium plasticity, gravel is subangular to rounded, fine to coarse. (MADE GROUND) | | 1.50 | | | AA210622 | B | 1.50-1.50 | | |
| 2.0 Stiff to very stiff mottled grey slightly gravelly CLAY. Low to medium plasticity, gravel is subrounded, fine to medium. | | 2.10 | | | | | | | |
| End of Trial Pit at 2.60m | | 2.60 | | | AA210623 | B | 2.50-2.50 | | |
| 3.0 | | | | | | | | | |
| 4.0 | | | | | | | | | |

**Groundwater Conditions**
DRY

**Stability**
Stable

**General Remarks**
Location CAT scanned prior to excavation

# TRIAL PIT RECORD

REPORT NUMBER 25473



| | | | |
|---|---|---|---|
| CONTRACT | Barrysparks LRD | TRIAL PIT NO. | TP07 |
| | | SHEET | Sheet 1 of 1 |
| LOGGED BY | G.B. | CO-ORDINATES | |
| | | DATE STARTED | 21/06/2024 |
| | | DATE COMPLETED | 21/06/2024 |
| CLIENT | NAMA | GROUND LEVEL (m) | |
| ENGINEER | POGA | EXCAVATION METHOD | JCB 8 TN |

| Geotechnical Description | Legend | Depth (m) | Elevation | Water Strike | Samples: Sample Ref | Samples: Type | Samples: Depth | Vane Test (KPa) | Hand Penetrometer (KPa) |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 TOPSOIL: Soft brown silty sandy gravelly clay with rootlets. | | | | | | | | | |
| Stiff grey/brown slightly sandy gravelly CLAY with low cobbles, medium plasticity. Gravel is subangular to subrounded, fine to coarse (MADE GROUND) | | 0.40 | | | AA210637 | B | 0.50-0.50 | | |
| 1.0 Stiff grey slightly sandy slightly gravelly CLAY with medium cobble content and rare red brick fragments. Gravel is subangular to subrounded, fine to coarse. (MADE GROUND) | | 1.30 | | | AA210638 | B | 1.50-1.50 | | |
| Soft to Firm grey gravelly CLAY with low cobbles content and with green patches | | 1.80 | | | | | | | |
| 2.0 End of Trial Pit at 2.50m | | 2.50 | | | AA210639 | B | 2.50-2.50 | | |
| 3.0 | | | | | | | | | |
| 4.0 | | | | | | | | | |

**Groundwater Conditions**
DRY

**Stability**
Stable

**General Remarks**
Location CAT scanned prior to excavation

# TRIAL PIT RECORD

REPORT NUMBER 25473



| | | | |
|---|---|---|---|
| CONTRACT | Barrysparks LRD | TRIAL PIT NO. | TP08 |
| | | SHEET | Sheet 1 of 1 |
| LOGGED BY | G.B. | CO-ORDINATES | |
| | | DATE STARTED | 21/06/2024 |
| | | DATE COMPLETED | 21/06/2024 |
| CLIENT | NAMA | GROUND LEVEL (m) | |
| ENGINEER | POGA | EXCAVATION METHOD | JCB 8 TN |

| Geotechnical Description | Legend | Depth (m) | Elevation | Water Strike | Samples: Sample Ref | Samples: Type | Samples: Depth | Vane Test (KPa) | Hand Penetrometer (KPa) |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 TOPSOIL: Soft brown silty sandy gravelly clay with rootlets. | | 0.40 | | | | | | | |
| Stiff to very stiff brown slightly sandy gravlly CLAY with medium cobble content. Medium plasticity, gravel is angular to subrounded, fine to coarse. | | | | | AA210624 | B | 0.60-0.60 | | |
| 1.0 Stiff to very stiff grey/brown slightly sandy gravlly CLAY with medium cobble content. Medium plasticity, gravel is angular to subrounded, fine to coarse. | | 1.30 | | | AA210625 | B | 1.50-1.50 | | |
| Soft to Firm grey slightly gravelly CLAY. High plasticity | | 1.80 | | | AA210627 | B | 2.00-2.00 | | |
| 2.0 Soft to firm grey gravelly very sandy CLAY with low cobbles. Medium plasticity, gravel is subangular to subrounded, fine to coarse. Sand is medium to coarse. | | 2.40 | | | | | | | |
| End of Trial Pit at 2.50m | | 2.50 | | | AA210626 | B | 2.50-2.50 | | |
| 3.0 | | | | | | | | | |
| 4.0 | | | | | | | | | |

**Groundwater Conditions**
DRY

**Stability**
Stable

**General Remarks**
Location CAT scanned prior to excavation

IGSL TP LOG 25271.GPJ IGSL.GDT 2/7/24

# TRIAL PIT RECORD

REPORT NUMBER 25473



| | | | |
|---|---|---|---|
| CONTRACT | Barrysparks LRD | TRIAL PIT NO. | TP09 |
| | | SHEET | Sheet 1 of 1 |
| LOGGED BY | A.R. | CO-ORDINATES | DATE STARTED 22/06/2024 |
| | | GROUND LEVEL (m) | DATE COMPLETED 22/06/2024 |
| CLIENT | NAMA | | EXCAVATION METHOD JCB 8 TN |
| ENGINEER | POGA | | |

| Geotechnical Description | Legend | Depth (m) | Elevation | Water Strike | Samples: Sample Ref | Samples: Type | Samples: Depth | Vane Test (KPa) | Hand Penetrometer (KPa) |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 TOPSOIL and rare Fill material with rare red brick fragments | | 0.20 | | | | | | | |
| Firm to stiff, orangey brown slightly sandy gravelly cobbly CLAY. Low to medium cobble content up to 200mm, sub-rounded to rounded. Gravels were fine to coarse, sub-rounded to rounded. | | | | | AA210630 | B | 1.00-1.00 | | |
| 1.0 Stiff dark brown sandy gravelly slightly cobbly CLAY. Occasional limestone cobbles up to 125mm, sub-rounded. Gravels fine to coarse, angular to sub-rounded. | | 1.20 | | | | | | | |
| 2.0 Stiff to very stiff, mottled orangey greyish brown, very sandy gravelly cobbly CLAY. Limestone cobbles up to 125mm. Gravels angular to sub-rounded. Sand is fine to medium grained | | 1.90 | | | AA210629 | B | 1.90-1.90 | | |
| Stiff to very stiff, mottled greyish brown, silty gravelly CLAY. Gravels fine to coarse, sub-angular to sub-rounded. | | 2.30 | | | | | | | |
| End of Trial Pit at 2.60m | | 2.60 | | | AA210628 | B | 2.60-2.60 | | |
| 3.0 | | | | | | | | | |
| 4.0 | | | | | | | | | |

**Groundwater Conditions**
Slow seepage @ 2.0m

**Stability**
Stable

**General Remarks**
Location CAT scanned prior to excavation

IGSL TP LOG 25271.GPJ IGSL.GDT 2/7/24

# TRIAL PIT RECORD

REPORT NUMBER 25473



| | | | |
|---|---|---|---|
| CONTRACT | Barrysparks LRD | TRIAL PIT NO. | TP10 |
| | | SHEET | Sheet 1 of 1 |
| LOGGED BY | A.R. | CO-ORDINATES | DATE STARTED 24/06/2024 |
| | | GROUND LEVEL (m) | DATE COMPLETED 24/06/2024 |
| CLIENT | NAMA | | EXCAVATION METHOD JCB 8 TN |
| ENGINEER | POGA | | |

| Geotechnical Description | Legend | Depth (m) | Elevation | Water Strike | Samples: Sample Ref | Samples: Type | Samples: Depth | Vane Test (KPa) | Hand Penetrometer (KPa) |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 TOPSOIL with frequent cobbles and coarse gravels. | | | | | | | | | |
| Firm to stiff, orangey brown, sandy gravelly CLAY. Gravels were fine to medium, sub-angular to sub-rounded. Sand is fine to coarse, | | 0.30 | | | | | | | |
| Firm to stiff, mottled greyish orange, slightly sandy slightly gravelly CLAY. Gravels were sub-angular to sub-rounded, fine to coarse.] | | 0.90 | | | AA231543 | B | 0.90-0.90 | | |
| 1.0 Stiff, grey, silty sandy slightly gravelly CLAY. Gravels were sub-angular to sub-rounded, fine to coarse. | | 1.10 | | | | | | | |
| Stiff, mottled greyish orangey brown with pockets of green, very sandy gravelly CLAY. Gravels were fine to medium, sub-angular to sub-rounded. | | 1.40 | | | AA231544 | B | 1.40-1.40 | | |
| 2.0 | | | | | AA231545 | B | 2.30-2.30 | | |
| Dense to very dense, grey with pockets of brown mottling,very clayey gravelly slightly cobbly SAND. Occasional limestone cobbles up to 200mm and sub-rounded. Gravels were fine to coarse but mostly fine. Sand was fine to coarse, but mostly coarse grained. | | 2.50 | | | | | | | |
| 3.0 End of Trial Pit at 3.00m | | 3.00 | | | AA231546 | B | 3.00-3.00 | | |
| 4.0 | | | | | | | | | |

**Groundwater Conditions**
DRY

**Stability**
Stable

**General Remarks**
Location CAT scanned prior to excavation

IGSL TP LOG 25271.GPJ IGSL.GDT 2/7/24

Project Number – 25473
Barrysparks, Swords, Dublin. -Trial Pit Photographs



TP01 – 1 of 3

Picture taken after soakaway.

Project Number – 25473
Barrysparks, Swords, Dublin. -Trial Pit Photographs

TP01 – 2 of 3



Picture taken after soakaway.

Project Number – 25473
Barrysparks, Swords, Dublin. -Trial Pit Photographs

TP01 – 3 of 3

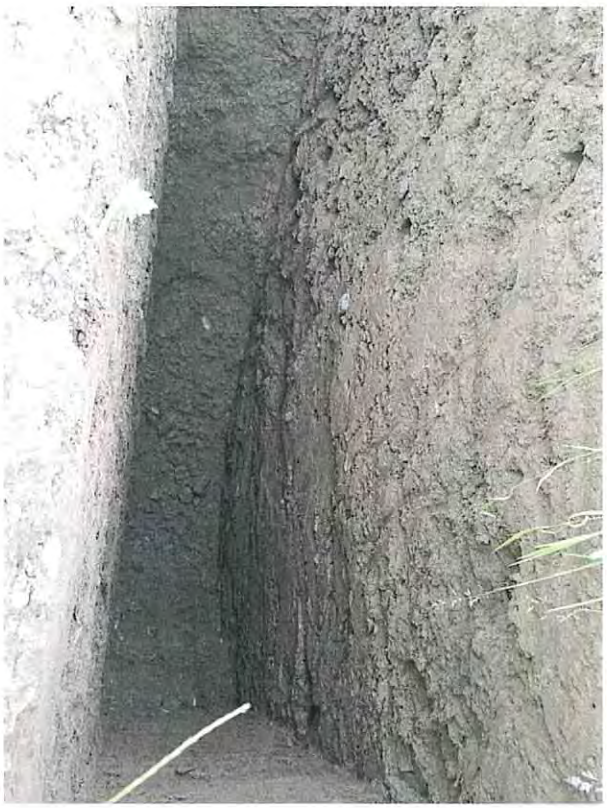


Project Number – 25473
Barrysparks, Swords, Dublin. -Trial Pit Photographs

TP02– 1 of 3



TP02– 2 of 3



Project Number – 25473
Barrysparks, Swords, Dublin. -Trial Pit Photographs

TP02- 3 of 3

Project Number – 25473
Barrysparks, Swords, Dublin. -Trial Pit Photographs

TP03 – 1 of 4



Project Number – 25473
Barrysparks, Swords, Dublin. -Trial Pit Photographs

TP03 – 2 of 4



Project Number – 25473
Barrysparks, Swords, Dublin. -Trial Pit Photographs

TP03 – 3 of 4



Project Number – 25473
Barrysparks, Swords, Dublin. -Trial Pit Photographs

TP03 – 4 of 4

Project Number – 25473
Barrysparks, Swords, Dublin. -Trial Pit Photographs

TP04/IT02 – 1 of 3

TP04/IT02– 2 of 3

TP04/IT02– 3 of 3

TP05 – 1 of 1

TP06/IT03 – 1 of 3

TP06/IT03 – 2 of 3

TP06/IT03 – 3 of 3

TP07 – 1 of 4

Project Number – 25473
Barrysparks, Swords, Dublin. -Trial Pit Photographs



TP07 – 4 of 4

TP08/IT04 – 1 of 2

Project Number – 25473
Barrysparks, Swords, Dublin. -Trial Pit Photographs



TP08/IT04 – 2 of 2

Project Number – 25473
Barrysparks, Swords, Dublin. -Trial Pit Photographs

TP09 – 1 of 3



Project Number – 25473
Barrysparks, Swords, Dublin. -Trial Pit Photographs

TP09 – 2 of 3

Project Number – 25473
Barrysparks, Swords, Dublin. -Trial Pit Photographs

TP09 – 3 of 3



Project Number – 25473
Barrysparks, Swords, Dublin. -Trial Pit Photographs

TP010 – 1 of 3



Project Number – 25473
Barrysparks, Swords, Dublin. -Trial Pit Photographs

TP010 – 2 of 3



Project Number – 25473
Barrysparks, Swords, Dublin. -Trial Pit Photographs

TP010 – 3 of 3

# Appendix II Dynamic Probe Records

# DYNAMIC PROBE RECORD

REPORT NUMBER 25473



| | | | |
|---|---|---|---|
| CONTRACT | Barrysparks LRD | PROBE NO. | DP01 |
| | | SHEET | Sheet 1 of 1 |
| CO-ORDINATES | | DATE DRILLED | 21/06/2024 |
| GROUND LEVEL (mOD) | | DATE LOGGED | 21/06/2024 |
| CLIENT | NAMA | PROBE TYPE | DPH |
| ENGINEER | POGA | | |
| HAMMER MASS (kg) | 50 | | |
| INCREMENT SIZE (mm) | 100 | | |
| FALL HEIGHT (mm) | 500 | | |

| Depth (m) | Geotechnical Description | Legend | Depth (m) | Elevation (mOD) | Water | Depth (m) | Probe Readings (Blows/Increment) |
|---|---|---|---|---|---|---|---|
| 0.0 | | | 0.00 | | | 0.00 | 0 |
| | | | | | | 0.10 | 4 |
| | | | | | | 0.20 | 4 |
| | | | | | | 0.30 | 2 |
| | | | | | | 0.40 | 6 |
| | | | | | | 0.50 | 4 |
| | | | | | | 0.60 | 2 |
| | | | | | | 0.70 | 3 |
| | | | | | | 0.80 | 2 |
| | | | | | | 0.90 | 4 |
| 1.0 | | | | | | 1.00 | 6 |
| | | | | | | 1.10 | 5 |
| | | | | | | 1.20 | 6 |
| | | | | | | 1.30 | 8 |
| | | | | | | 1.40 | 8 |
| | | | | | | 1.50 | 11 |
| | | | | | | 1.60 | 5 |
| | | | | | | 1.70 | 5 |
| | | | | | | 1.80 | 5 |
| | | | | | | 1.90 | 6 |
| 2.0 | | | | | | 2.00 | 25 |
| | | | | | | 2.10 | 12 |
| | | | | | | 2.20 | 14 |
| | | | | | | 2.30 | 16 |
| | | | | | | 2.40 | 21 |
| | | | | | | 2.50 | 25 |
| | End of Probe at 2.60 m | | | | | | |
| 3.0 | | | | | | | |
| 4.0 | | | | | | | |

Graphic Probe Record: 0 5 10 15 20 25

**GROUNDWATER OBSERVATIONS**

**REMARKS**

IGSL DP LOG 100MM INCREMENTS 25271.GPJ IGSL.GDT 1/7/24

# DYNAMIC PROBE RECORD

REPORT NUMBER 25473



| | | | |
|---|---|---|---|
| CONTRACT | Barrysparks LRD | PROBE NO. | DP02 |
| | | SHEET | Sheet 1 of 1 |
| CO-ORDINATES | | DATE DRILLED | 21/06/2024 |
| GROUND LEVEL (mOD) | | DATE LOGGED | 21/06/2024 |
| CLIENT | NAMA | PROBE TYPE | DPH |
| ENGINEER | POGA | | |
| | | HAMMER MASS (kg) | 50 |
| | | INCREMENT SIZE (mm) | 100 |
| | | FALL HEIGHT (mm) | 500 |

| Depth (m) | Geotechnical Description | Legend | Depth (m) | Elevation (mOD) | Water | Depth (m) | Probe Readings (Blows/Increment) |
|---|---|---|---|---|---|---|---|
| 0.0 | . | | 0.00 | | | 0.00 | 1 |
| | | | | | | 0.10 | 2 |
| | | | | | | 0.20 | 3 |
| | | | | | | 0.30 | 2 |
| | | | | | | 0.40 | 3 |
| | | | | | | 0.50 | 8 |
| | | | | | | 0.60 | 11 |
| | | | | | | 0.70 | 9 |
| | | | | | | 0.80 | 8 |
| 1.0 | | | | | | 0.90 | 6 |
| | | | | | | 1.00 | 6 |
| | | | | | | 1.10 | 5 |
| | | | | | | 1.20 | 6 |
| | | | | | | 1.30 | 7 |
| | | | | | | 1.40 | 8 |
| | | | | | | 1.50 | 9 |
| | | | | | | 1.60 | 10 |
| | | | | | | 1.70 | 10 |
| | | | | | | 1.80 | 7 |
| | | | | | | 1.90 | 7 |
| 2.0 | | | | | | 2.00 | 8 |
| | | | | | | 2.10 | 7 |
| | | | | | | 2.20 | 27 |
| | End of Probe at 2.40 m | | | | | 2.30 | 25 |
| 3.0 | | | | | | | |
| 4.0 | | | | | | | |

Graphic Probe Record: 0 5 10 15 20 25; 27

GROUNDWATER OBSERVATIONS

REMARKS

IGSL DP LOG 100MM INCREMENTS 25271.GPJ IGSL.GDT 1/7/24

# DYNAMIC PROBE RECORD

REPORT NUMBER 25473



| | | | |
|---|---|---|---|
| CONTRACT | Barrysparks LRD | PROBE NO. | DP03 |
| | | SHEET | Sheet 1 of 1 |
| CO-ORDINATES | | DATE DRILLED | 21/06/2024 |
| GROUND LEVEL (mOD) | | DATE LOGGED | 21/06/2024 |
| CLIENT | NAMA | PROBE TYPE | DPH |
| ENGINEER | POGA | | |
| HAMMER MASS (kg) | 50 | | |
| INCREMENT SIZE (mm) | 100 | | |
| FALL HEIGHT (mm) | 500 | | |

| Depth (m) | Geotechnical Description | Legend | Depth (m) | Elevation (mOD) | Water | Depth (m) | Probe Readings (Blows/Increment) |
|---|---|---|---|---|---|---|---|
| 0.0 | . | | 0.00 | | | 0.00 | 3 |
| | | | | | | 0.10 | 4 |
| | | | | | | 0.20 | 4 |
| | | | | | | 0.30 | 3 |
| | | | | | | 0.40 | 2 |
| | | | | | | 0.50 | 1 |
| | | | | | | 0.60 | 3 |
| | | | | | | 0.70 | 4 |
| | | | | | | 0.80 | 7 |
| | | | | | | 0.90 | 7 |
| 1.0 | | | | | | 1.00 | 9 |
| | | | | | | 1.10 | 8 |
| | | | | | | 1.20 | 10 |
| | | | | | | 1.30 | 12 |
| | | | | | | 1.40 | 9 |
| | | | | | | 1.50 | 8 |
| | | | | | | 1.60 | 7 |
| | | | | | | 1.70 | 7 |
| | | | | | | 1.80 | 13 |
| | | | | | | 1.90 | 20 |
| 2.0 | | | | | | 2.00 | 22 |
| | | | | | | 2.10 | 24 |
| | | | | | | 2.20 | 25 |
| | End of Probe at 2.30 m | | | | | | |
| 3.0 | | | | | | | |
| 4.0 | | | | | | | |

Graphic Probe Record: 0 5 10 15 20 25

**GROUNDWATER OBSERVATIONS**

**REMARKS**

IGSL DP LOG 100MM INCREMENTS 25271.GPJ IGSL.GDT 1/7/24

# DYNAMIC PROBE RECORD

REPORT NUMBER 25473



| | | | |
|---|---|---|---|
| CONTRACT | Barrysparks LRD | PROBE NO. | DP04 |
| | | SHEET | Sheet 1 of 1 |
| CO-ORDINATES | | DATE DRILLED | 21/06/2024 |
| GROUND LEVEL (mOD) | | DATE LOGGED | 21/06/2024 |
| CLIENT | NAMA | PROBE TYPE | DPH |
| ENGINEER | POGA | | |
| HAMMER MASS (kg) | 50 | | |
| INCREMENT SIZE (mm) | 100 | | |
| FALL HEIGHT (mm) | 500 | | |

| Depth (m) | Geotechnical Description | Legend | Depth (m) | Elevation (mOD) | Water | Depth (m) | Probe Readings (Blows/Increment) |
|---|---|---|---|---|---|---|---|
| 0.0 | | | 0.00 | | | 0.00 | 1 |
| | | | | | | 0.10 | 4 |
| | | | | | | 0.20 | 2 |
| | | | | | | 0.30 | 4 |
| | | | | | | 0.40 | 10 |
| | | | | | | 0.50 | 11 |
| | | | | | | 0.60 | 11 |
| | | | | | | 0.70 | 11 |
| | | | | | | 0.80 | 13 |
| | | | | | | 0.90 | 11 |
| 1.0 | | | | | | 1.00 | 10 |
| | | | | | | 1.10 | 19 |
| | | | | | | 1.20 | 17 |
| | | | | | | 1.30 | 10 |
| | | | | | | 1.40 | 8 |
| | | | | | | 1.50 | 9 |
| | | | | | | 1.60 | 12 |
| | | | | | | 1.70 | 11 |
| | | | | | | 1.80 | 13 |
| | | | | | | 1.90 | 14 |
| 2.0 | | | | | | 2.00 | 17 |
| | | | | | | 2.10 | 18 |
| | | | | | | 2.20 | 23 |
| | | | | | | 2.30 | 25 |
| | End of Probe at 2.40 m | | | | | | |
| 3.0 | | | | | | | |
| 4.0 | | | | | | | |

Graphic Probe Record

0 5 10 15 20 25

**GROUNDWATER OBSERVATIONS**

**REMARKS**

IGSL DP LOG 100MM INCREMENTS 25271.GPJ IGSL.GDT 1/7/24

# DYNAMIC PROBE RECORD

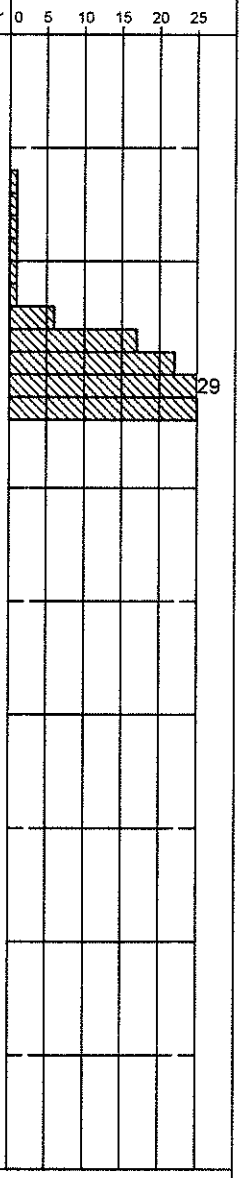
REPORT NUMBER 25473



| | | | |
|---|---|---|---|
| CONTRACT | Barrysparks LRD | PROBE NO. | DP05 |
| | | SHEET | Sheet 1 of 1 |
| CO-ORDINATES | | DATE DRILLED | 21/06/2024 |
| GROUND LEVEL (mOD) | | DATE LOGGED | 21/06/2024 |
| CLIENT | NAMA | PROBE TYPE | DPH |
| ENGINEER | POGA | | |
| | | HAMMER MASS (kg) | 50 |
| | | INCREMENT SIZE (mm) | 100 |
| | | FALL HEIGHT (mm) | 500 |

| Depth (m) | Geotechnical Description | Legend | Depth (m) | Elevation (mOD) | Water | Depth (m) | Probe Readings (Blows/Increment) |
|---|---|---|---|---|---|---|---|
| 0.0 | . | | | | | 0.00 | 0 |
| | | | | | | 0.10 | 0 |
| | | | | | | 0.20 | 0 |
| | | | | | | 0.30 | 0 |
| | | | | | | 0.40 | 0 |
| | | | | | | 0.50 | 0 |
| | | | | | | 0.60 | 1 |
| | | | | | | 0.70 | 1 |
| | | | | | | 0.80 | 1 |
| | | | | | | 0.90 | 1 |
| 1.0 | | | | | | 1.00 | 1 |
| | | | | | | 1.10 | 1 |
| | | | | | | 1.20 | 6 |
| | | | | | | 1.30 | 17 |
| | | | | | | 1.40 | 22 |
| | | | | | | 1.50 | 29 |
| | | | | | | 1.60 | 25 |
| | End of Probe at 1.70 m | | | | | | |
| 2.0 | | | | | | | |
| 3.0 | | | | | | | |
| 4.0 | | | | | | | |

Graphic Probe Record




GROUNDWATER OBSERVATIONS

REMARKS

IGSL DP LOG 100MM INCREMENTS 25416.GPJ IGSL.GDT 4/7/24

# DYNAMIC PROBE RECORD

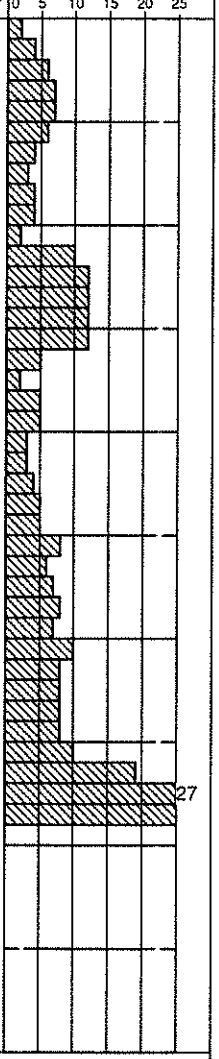
REPORT NUMBER 25473



| | | | |
|---|---|---|---|
| CONTRACT | Barrysparks LRD | PROBE NO. | DP06 |
| | | SHEET | Sheet 1 of 1 |
| CO-ORDINATES | | DATE DRILLED | 21/06/2024 |
| GROUND LEVEL (mOD) | | DATE LOGGED | 21/06/2024 |
| CLIENT | NAMA | PROBE TYPE | DPH |
| ENGINEER | POGA | | |
| | HAMMER MASS (kg) 50 | | |
| | INCREMENT SIZE (mm) 100 | | |
| | FALL HEIGHT (mm) 500 | | |

| Depth (m) | Geotechnical Description | Legend | Depth (m) | Elevation (mOD) | Water | Depth (m) | Probe Readings (Blows/Increment) |
|---|---|---|---|---|---|---|---|
| 0.0 | . | | 0.00 | | | 0.00 | 2 |
| | | | | | | 0.10 | 4 |
| | | | | | | 0.20 | 6 |
| | | | | | | 0.30 | 7 |
| | | | | | | 0.40 | 7 |
| | | | | | | 0.50 | 6 |
| | | | | | | 0.60 | 4 |
| | | | | | | 0.70 | 3 |
| | | | | | | 0.80 | 4 |
| | | | | | | 0.90 | 4 |
| 1.0 | | | | | | 1.00 | 2 |
| | | | | | | 1.10 | 10 |
| | | | | | | 1.20 | 12 |
| | | | | | | 1.30 | 12 |
| | | | | | | 1.40 | 12 |
| | | | | | | 1.50 | 12 |
| | | | | | | 1.60 | 5 |
| | | | | | | 1.70 | 2 |
| | | | | | | 1.80 | 5 |
| | | | | | | 1.90 | 5 |
| 2.0 | | | | | | 2.00 | 3 |
| | | | | | | 2.10 | 3 |
| | | | | | | 2.20 | 4 |
| | | | | | | 2.30 | 5 |
| | | | | | | 2.40 | 5 |
| | | | | | | 2.50 | 8 |
| | | | | | | 2.60 | 6 |
| | | | | | | 2.70 | 7 |
| | | | | | | 2.80 | 8 |
| 3.0 | | | | | | 2.90 | 7 |
| | | | | | | 3.00 | 10 |
| | | | | | | 3.10 | 8 |
| | | | | | | 3.20 | 8 |
| | | | | | | 3.30 | 8 |
| | | | | | | 3.40 | 8 |
| | | | | | | 3.50 | 10 |
| | | | | | | 3.60 | 19 |
| | | | | | | 3.70 | 27 |
| | | | | | | 3.80 | 25 |
| 4.0 | End of Probe at 3.90 m | | | | | | |

Graphic Probe Record




GROUNDWATER OBSERVATIONS

REMARKS

IGSL DP LOG 100MM INCREMENTS 25271.GPJ IGSL.GDT 1/7/24

# DYNAMIC PROBE RECORD

REPORT NUMBER 25473



| | | | |
|---|---|---|---|
| CONTRACT | Barrysparks LRD | PROBE NO. | DP07 |
| | | SHEET | Sheet 1 of 1 |
| CO-ORDINATES | | DATE DRILLED | 21/06/2024 |
| GROUND LEVEL (mOD) | | DATE LOGGED | 21/06/2024 |
| CLIENT | NAMA | PROBE TYPE | DPH |
| ENGINEER | POGA | | |
| | HAMMER MASS (kg) 50 | | |
| | INCREMENT SIZE (mm) 100 | | |
| | FALL HEIGHT (mm) 500 | | |

| Depth (m) | Geotechnical Description | Legend | Depth (m) | Elevation (mOD) | Water | Depth (m) | Probe Readings (Blows/Increment) |
|---|---|---|---|---|---|---|---|
| 0.0 | . | | 0.00 | | | 0.00 | 2 |
| | | | | | | 0.10 | 5 |
| | | | | | | 0.20 | 9 |
| | | | | | | 0.30 | 10 |
| | | | | | | 0.40 | 8 |
| | | | | | | 0.50 | 4 |
| | | | | | | 0.60 | 2 |
| | | | | | | 0.70 | 2 |
| | | | | | | 0.80 | 1 |
| | | | | | | 0.90 | 1 |
| 1.0 | | | | | | 1.00 | 1 |
| | | | | | | 1.10 | 1 |
| | | | | | | 1.20 | 1 |
| | | | | | | 1.30 | 1 |
| | | | | | | 1.40 | 1 |
| | | | | | | 1.50 | 3 |
| | | | | | | 1.60 | 5 |
| | | | | | | 1.70 | 5 |
| | | | | | | 1.80 | 5 |
| | | | | | | 1.90 | 4 |
| 2.0 | | | | | | 2.00 | 9 |
| | | | | | | 2.10 | 8 |
| | | | | | | 2.20 | 9 |
| | | | | | | 2.30 | 11 |
| | | | | | | 2.40 | 11 |
| | | | | | | 2.50 | 11 |
| | | | | | | 2.60 | 10 |
| | | | | | | 2.70 | 10 |
| | | | | | | 2.80 | 10 |
| | | | | | | 2.90 | 9 |
| 3.0 | | | | | | 3.00 | 11 |
| | | | | | | 3.10 | 9 |
| | | | | | | 3.20 | 9 |
| | | | | | | 3.30 | 9 |
| | | | | | | 3.40 | 11 |
| | | | | | | 3.50 | 9 |
| | | | | | | 3.60 | 9 |
| | | | | | | 3.70 | 12 |
| | | | | | | 3.80 | 12 |
| | | | | | | 3.90 | 14 |
| 4.0 | | | | | | 4.00 | 15 |
| | | | | | | 4.10 | 17 |
| | | | | | | 4.20 | 19 |
| | | | | | | 4.30 | 21 |
| | | | | | | 4.40 | 25 |
| | | | | | | 4.50 | 25 |
| | End of Probe at 4.60 m | | | | | | |

Graphic Probe Record: 0 5 10 15 20 25

**GROUNDWATER OBSERVATIONS**

**REMARKS**

IGSL DP LOG 100MM INCREMENTS 25271.GPJ IGSL.GDT 1/7/24

# DYNAMIC PROBE RECORD

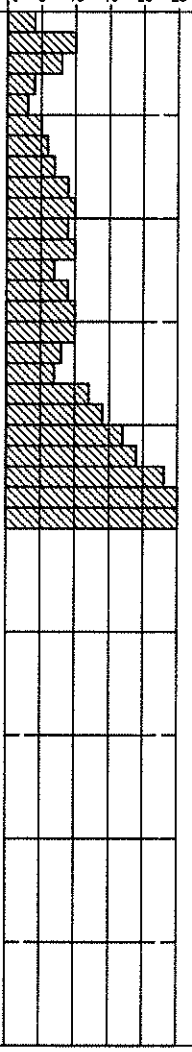
REPORT NUMBER 25473



| | | | |
|---|---|---|---|
| CONTRACT | Barrysparks LRD | PROBE NO. | DP08 |
| | | SHEET | Sheet 1 of 1 |
| CO-ORDINATES | | DATE DRILLED | 21/06/2024 |
| GROUND LEVEL (mOD) | | DATE LOGGED | 21/06/2024 |
| CLIENT | NAMA | PROBE TYPE | DPH |
| ENGINEER | POGA | | |
| HAMMER MASS (kg) | 50 | | |
| INCREMENT SIZE (mm) | 100 | | |
| FALL HEIGHT (mm) | 500 | | |

| Depth (m) | Geotechnical Description | Legend | Depth (m) | Elevation (mOD) | Water | Depth (m) | Probe Readings (Blows/Increment) |
|---|---|---|---|---|---|---|---|
| 0.0 | . | | 0.00 | | | 0.00 | 4 |
| | | | | | | 0.10 | 10 |
| | | | | | | 0.20 | 8 |
| | | | | | | 0.30 | 4 |
| | | | | | | 0.40 | 3 |
| | | | | | | 0.50 | 5 |
| | | | | | | 0.60 | 6 |
| | | | | | | 0.70 | 7 |
| | | | | | | 0.80 | 9 |
| | | | | | | 0.90 | 10 |
| 1.0 | | | | | | 1.00 | 9 |
| | | | | | | 1.10 | 10 |
| | | | | | | 1.20 | 7 |
| | | | | | | 1.30 | 9 |
| | | | | | | 1.40 | 10 |
| | | | | | | 1.50 | 10 |
| | | | | | | 1.60 | 8 |
| | | | | | | 1.70 | 7 |
| | | | | | | 1.80 | 12 |
| | | | | | | 1.90 | 14 |
| 2.0 | | | | | | 2.00 | 17 |
| | | | | | | 2.10 | 19 |
| | | | | | | 2.20 | 23 |
| | | | | | | 2.30 | 25 |
| | | | | | | 2.40 | 25 |
| | End of Probe at 2.50 m | | | | | | |
| 3.0 | | | | | | | |
| 4.0 | | | | | | | |

Graphic Probe Record




**GROUNDWATER OBSERVATIONS**

**REMARKS**

IGSL DP LOG 100MM INCREMENTS 25271.GPJ IGSL.GDT 1/7/24

# DYNAMIC PROBE RECORD

REPORT NUMBER 25473



| | | | |
|---|---|---|---|
| CONTRACT | Barrysparks LRD | PROBE NO. | DP09 |
| | | SHEET | Sheet 1 of 1 |
| CO-ORDINATES | | DATE DRILLED | 21/06/2024 |
| GROUND LEVEL (mOD) | | DATE LOGGED | 21/06/2024 |
| CLIENT | NAMA | PROBE TYPE | DPH |
| ENGINEER | POGA | | |
| HAMMER MASS (kg) | 50 | | |
| INCREMENT SIZE (mm) | 100 | | |
| FALL HEIGHT (mm) | 500 | | |

| Depth (m) | Geotechnical Description | Legend | Depth (m) | Elevation (mOD) | Water | Depth (m) | Probe Readings (Blows/Increment) |
|---|---|---|---|---|---|---|---|
| 0.0 | . | | 0.00 | | | 0.00 | 2 |
| | | | | | | 0.10 | 4 |
| | | | | | | 0.20 | 6 |
| | | | | | | 0.30 | 6 |
| | | | | | | 0.40 | 3 |
| | | | | | | 0.50 | 2 |
| | | | | | | 0.60 | 1 |
| | | | | | | 0.70 | 1 |
| | | | | | | 0.80 | 1 |
| | | | | | | 0.90 | 1 |
| 1.0 | | | | | | 1.00 | 1 |
| | | | | | | 1.10 | 1 |
| | | | | | | 1.20 | 2 |
| | | | | | | 1.30 | 3 |
| | | | | | | 1.40 | 5 |
| | | | | | | 1.50 | 7 |
| | | | | | | 1.60 | 10 |
| | | | | | | 1.70 | 14 |
| | | | | | | 1.80 | 24 |
| | | | | | | 1.90 | 25 |
| 2.0 | | | | | | 2.00 | 25 |
| | End of Probe at 2.10 m | | | | | | |
| 3.0 | | | | | | | |
| 4.0 | | | | | | | |

Graphic Probe Record: 0 5 10 15 20 25

GROUNDWATER OBSERVATIONS

REMARKS

IGSL DP LOG 100MM INCREMENTS 25271.GPJ IGSL.GDT 1/7/24

# DYNAMIC PROBE RECORD

REPORT NUMBER 25473



| | | | |
|---|---|---|---|
| CONTRACT | Barrysparks LRD | PROBE NO. | DP10 |
| | | SHEET | Sheet 1 of 1 |
| CO-ORDINATES | | DATE DRILLED | 21/06/2024 |
| GROUND LEVEL (mOD) | | DATE LOGGED | 21/06/2024 |
| CLIENT | NAMA | PROBE TYPE | DPH |
| ENGINEER | POGA | | |
| HAMMER MASS (kg) | 50 | | |
| INCREMENT SIZE (mm) | 100 | | |
| FALL HEIGHT (mm) | 500 | | |

| Depth (m) | Geotechnical Description | Legend | Depth (m) | Elevation (mOD) | Water | Depth (m) | Probe Readings (Blows/Increment) |
|---|---|---|---|---|---|---|---|
| 0.0 | | | 0.00 | | | 0.00 | 2 |
| | | | | | | 0.10 | 4 |
| | | | | | | 0.20 | 7 |
| | | | | | | 0.30 | 7 |
| | | | | | | 0.40 | 5 |
| | | | | | | 0.50 | 4 |
| | | | | | | 0.60 | 2 |
| | | | | | | 0.70 | 2 |
| | | | | | | 0.80 | 1 |
| | | | | | | 0.90 | 1 |
| 1.0 | | | | | | 1.00 | 1 |
| | | | | | | 1.10 | 1 |
| | | | | | | 1.20 | 3 |
| | | | | | | 1.30 | 3 |
| | | | | | | 1.40 | 5 |
| | | | | | | 1.50 | 4 |
| | | | | | | 1.60 | 5 |
| | | | | | | 1.70 | 8 |
| | | | | | | 1.80 | 7 |
| | | | | | | 1.90 | 5 |
| 2.0 | | | | | | 2.00 | 6 |
| | | | | | | 2.10 | 7 |
| | | | | | | 2.20 | 9 |
| | | | | | | 2.30 | 10 |
| | | | | | | 2.40 | 12 |
| | | | | | | 2.50 | 11 |
| | | | | | | 2.60 | 17 |
| | | | | | | 2.70 | 23 |
| | | | | | | 2.80 | 25 |
| | | | | | | 2.90 | 25 |
| 3.0 | End of Probe at 3.00 m | | | | | | |
| 4.0 | | | | | | | |

Graphic Probe Record: 0 5 10 15 20 25

**GROUNDWATER OBSERVATIONS**

**REMARKS**

IGSL DP LOG 100MM INCREMENTS 25271.GPJ IGSL.GDT 1/7/24

# Appendix III CBR by Plate Bearing Test

## PLATE TEST REPORT SHEET (F3.1)

## Applied Pressure/Settlement Curve

| | |
|---|---|
| Reference No. | R158383 |
| Contract | 25473 Barrysparks LRD |
| Test No. | CBR01 Load |
| Location | See Site Map |
| Depth | 0.60 |
| Client | POGA |
| Plate Diameter: | 450 mm |
| Test Method | BS 1377: Part 9: 1990 Test4 - Incremental Loading Test |
| Technician | A. Rynne |
| Authorised by | |
| Date | 25/06/2024 |

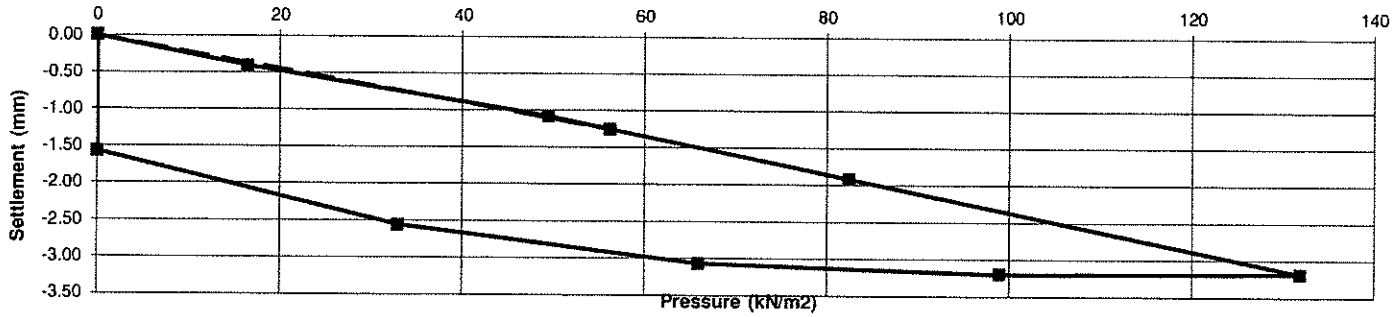
Description of soil under test (natural soil, placed fill, sub-base)

Grey brown sandy gravelly CLAY

Sample Ref No. N/A

Depth 0.00 m bgl

**Pressure / Settlement**




Gradient at 1.25 mm settlement intersection = 45

Modulus of subgrade reaction = 29 MPa/m

Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 3.3 %

## PLATE TEST REPORT SHEET (F3.1)

## Applied Pressure/Settlement Curve

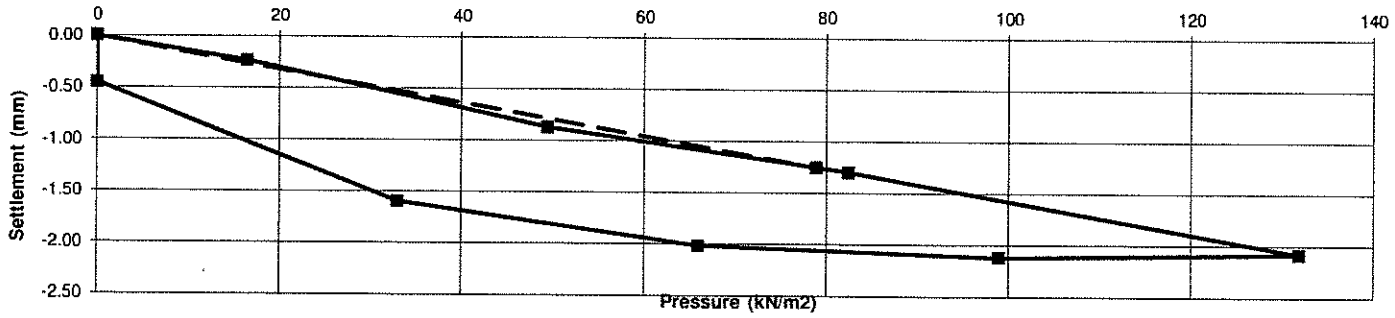
| | |
|---|---|
| Reference No. | R158383 |
| Contract | 25473 Barrysparks LRD |
| Test No. | CBR01 Reload |
| Location | See Site Map |
| Depth | 0.60 |
| Client | POGA |
| Plate Diameter: | 450 mm |
| Test Method | BS 1377: Part 9: 1990 Test4 - Incremental Loading Test |
| Technician | A. Rynne |
| Authorised by | |
| Date | 25/06/2024 |

Description of soil under test
(natural soil, placed fill, sub-base)

Grey brown sandy gravelly CLAY

Sample Ref No. N/A
Depth 0.00 m bgl

**Pressure / Settlement**




Gradient at 1.25 mm settlement intersection = 63
Modulus of subgrade reaction = 41 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 5.9 %

## PLATE TEST REPORT SHEET (F3.1)

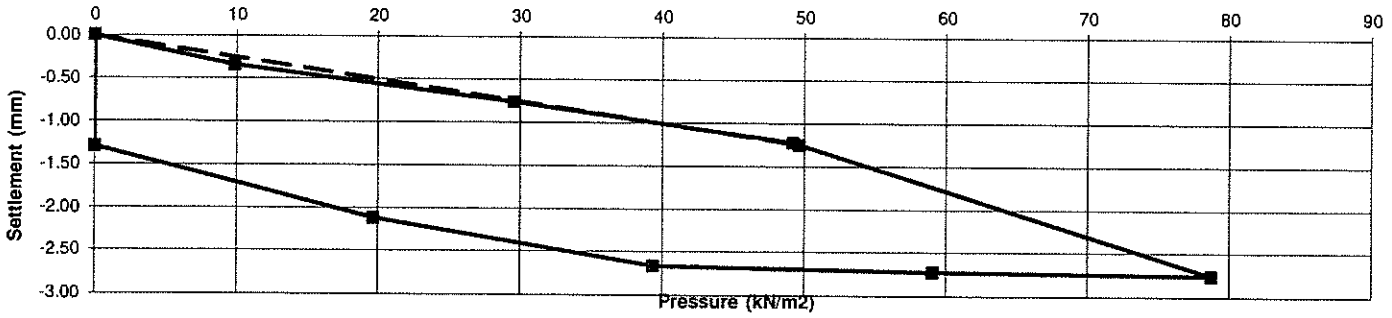
## Applied Pressure/Settlement Curve

| | |
|---|---|
| Reference No. | R158383 |
| Contract | 25473 Barrysparks LRD |
| Test No. | CBR02 Load |
| Location | See Site Map |
| Depth | 0.60 |
| Client | POGA |
| Plate Diameter: | 450 mm |
| Test Method | BS 1377: Part 9: 1990 Test4 - Incremental Loading Test |
| Technician | A. Rynne |
| Authorised by | |
| Date | 25/06/2024 |

Description of soil under test
(natural soil, placed fill, sub-base)
Grey brown sandy gravelly CLAY

Sample Ref No. N/A
Depth 0.00 m bgl

**Pressure / Settlement**




Gradient at 1.25 mm settlement intersection = 40
Modulus of subgrade reaction = 26 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 2.6 %

## PLATE TEST REPORT SHEET (F3.1)

## Applied Pressure/Settlement Curve

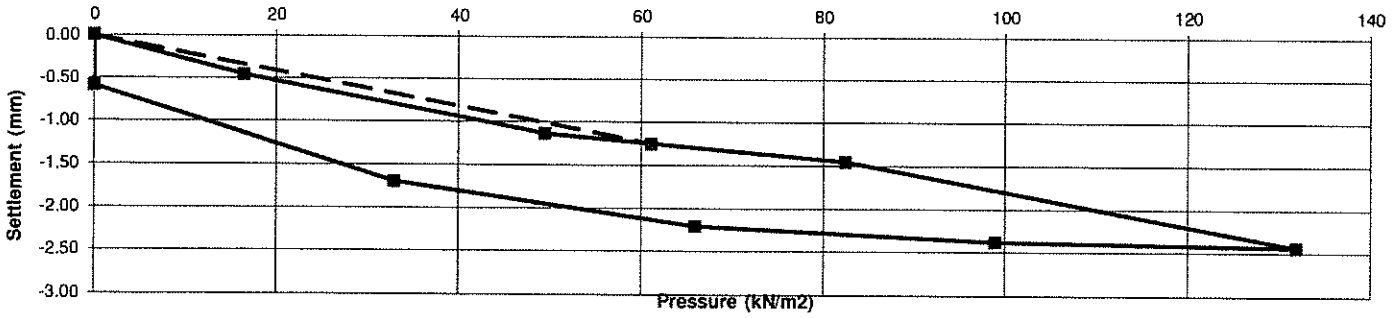
| | |
|---|---|
| Reference No. | R158383 |
| Contract | 25473 Barrysparks LRD |
| Test No. | CBR02 Reload |
| Location | See Site Map |
| Depth | 0.60 |
| Client | POGA |
| Plate Diameter: | 450 mm |
| Test Method | BS 1377: Part 9: 1990 Test4 - Incremental Loading Test |
| Technician | A. Rynne |
| Authorised by | |
| Date | 25/06/2024 |

Description of soil under test
(natural soil, placed fill, sub-base)

Grey brown sandy gravelly CLAY

Sample Ref No. N/A
Depth 0.00 m bgl

**Pressure / Settlement**




Gradient at 1.25 mm settlement intersection = 49
Modulus of subgrade reaction = 31 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 3.8 %

## PLATE TEST REPORT SHEET (F3.1)

## Applied Pressure/Settlement Curve

| | |
|---|---|
| Reference No. | R158381 |
| Contract | 25473 Barrysparks LRD |
| Test No. | CBR03 Load |
| Location | See Site Map |
| Depth | 0.60 |
| Client | POGA |
| Plate Diameter: | 450 mm |
| Test Method | BS 1377: Part 9: 1990 Test4 - Incremental Loading Test |
| Technician | A. Rynne |
| Authorised by | |
| Date | 25/06/2024 |

Description of soil under test
(natural soil, placed fill, sub-base)

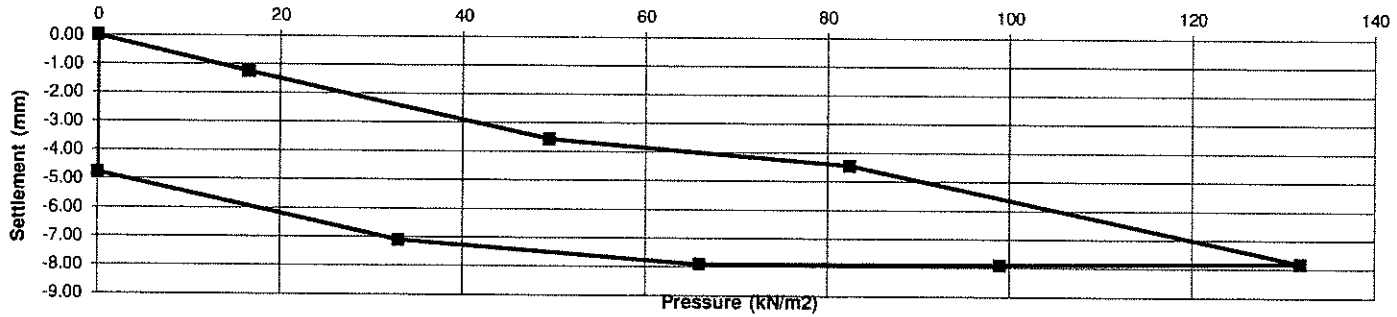
Grey brown sandy gravelly CLAY

Sample Ref No. N/A
Depth 0.00 m bgl

IGSL Ltd.

IVNAB

**Pressure / Settlement**




Gradient at 1.25 mm settlement intersection = 13
Modulus of subgrade reaction = 9 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 0.4 %

## PLATE TEST REPORT SHEET (F3.1)

## Applied Pressure/Settlement Curve

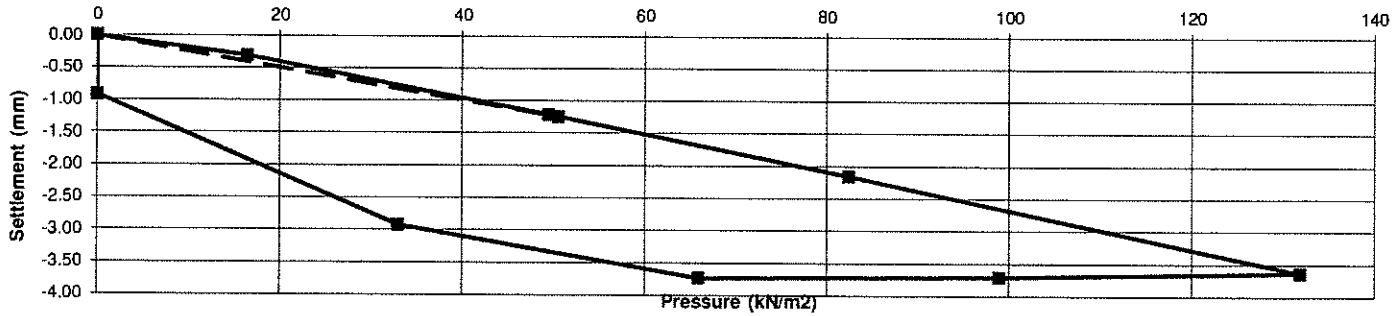
| | |
|---|---|
| Reference No. | R158381 |
| Contract | 25473 Barrysparks LRD |
| Test No. | CBR03 Reload |
| Location | See Site Map |
| Depth | 0.60 |
| Client | POGA |
| Plate Diameter: | 450 mm |
| Test Method | BS 1377: Part 9: 1990 Test4 - Incremental Loading Test |
| Technician | A. Rynne |
| Authorised by | |
| Date | 25/06/2024 |

Description of soil under test
(natural soil, placed fill, sub-base)

Grey brown sandy gravelly CLAY

Sample Ref No. N/A
Depth 0.00 m bgl

**Pressure / Settlement**




Gradient at 1.25 mm settlement intersection = 40
Modulus of subgrade reaction = 26 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 2.7 %

## PLATE TEST REPORT SHEET (F3.1)

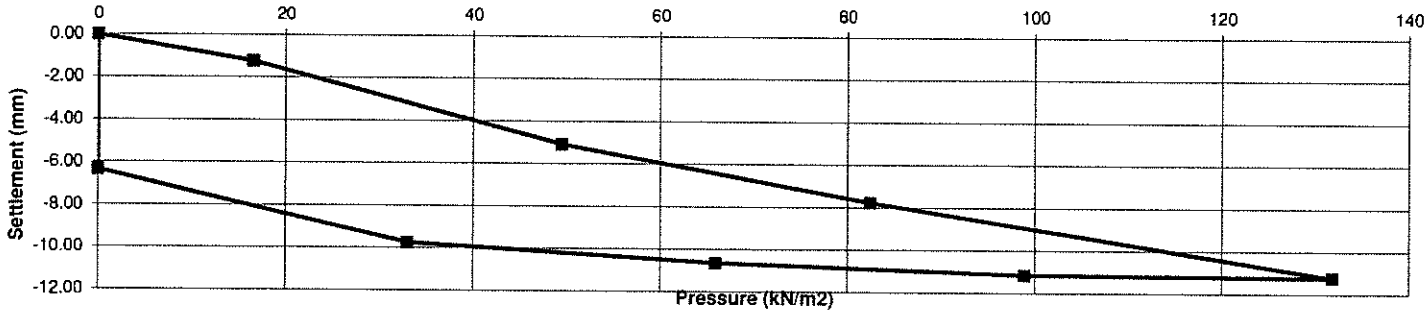
## Applied Pressure/Settlement Curve

| | |
|---|---|
| Reference No. | R158380 |
| Contract | 25473 Barrysparks LRD |
| Test No. | CBR04 Load |
| Location | See Site Map |
| Depth | 0.60 |
| Client | POGA |
| Plate Diameter: | 450 mm |
| Test Method | BS 1377: Part 9: 1990 Test4 - Incremental Loading Test |
| Technician | A. Rynne |
| Authorised by | |
| Date | 27/06/2024 |

Description of soil under test
(natural soil, placed fill, sub-base)
Grey brown sandy gravelly CLAY

Sample Ref No. N/A
Depth 0.00 m bgl

**Pressure / Settlement**




Gradient at 1.25 mm settlement intersection = 13
Modulus of subgrade reaction = 9 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 0.4 %

## PLATE TEST REPORT SHEET (F3.1)

## Applied Pressure/Settlement Curve

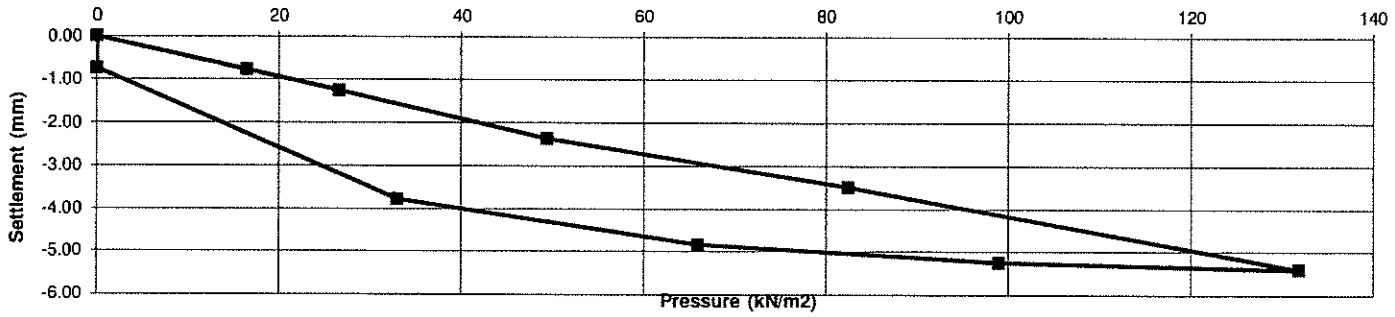
| | |
|---|---|
| Reference No. | R158380 |
| Contract | 25473 Barrysparks LRD |
| Test No. | CBR04 Reload |
| Location | See Site Map |
| Depth | 0.60 |
| Client | POGA |
| Plate Diameter: | 450 mm |
| Test Method | BS 1377: Part 9: 1990 Test4 - Incremental Loading Test |
| Technician | A. Rynne |
| Authorised by | |
| Date | 27/06/2024 |

Description of soil under test
(natural soil, placed fill, sub-base)

Grey brown sandy gravelly CLAY

Sample Ref No. N/A
Depth 0.00 m bgl

**Pressure / Settlement**




Gradient at 1.25 mm settlement intersection = 21
Modulus of subgrade reaction = 14 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 0.9 %

## PLATE TEST REPORT SHEET (F3.1)

## Applied Pressure/Settlement Curve

| | |
|---|---|
| Reference No. | R158382 |
| Contract | 25473 Barrysparks LRD |
| Test No. | CBR05 Load |
| Location | See Site Map |
| Depth | 0.60 |
| Client | POGA |
| Plate Diameter: | 450 mm |
| Test Method | BS 1377: Part 9: 1990 Test4 - Incremental Loading Test |
| Technician | A. Rynne |
| Authorised by | |
| Date | 27/06/2024 |

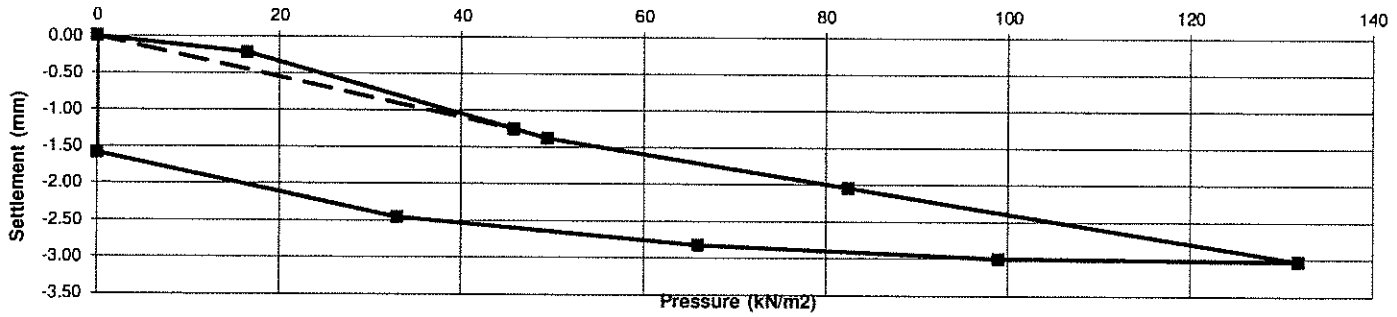
Description of soil under test
(natural soil, placed fill, sub-base)

Grey brown sandy gravelly CLAY

Sample Ref No. N/A

Depth 0.00 m bgl

**Pressure / Settlement**




Gradient at 1.25 mm settlement intersection = 37
Modulus of subgrade reaction = 24 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 2.3 %

## PLATE TEST REPORT SHEET (F3.1)

## Applied Pressure/Settlement Curve

| | |
|---|---|
| Reference No. | R158382 |
| Contract | 25473 Barrysparks LRD |
| Test No. | CBR05 Reload |
| Location | See Site Map |
| Depth | 0.60 |
| Client | POGA |
| Plate Diameter: | 450 mm |
| Test Method | BS 1377: Part 9: 1990 Test4 - Incremental Loading Test |
| Technician | A. Rynne |
| Authorised by | |
| Date | 27/06/2024 |

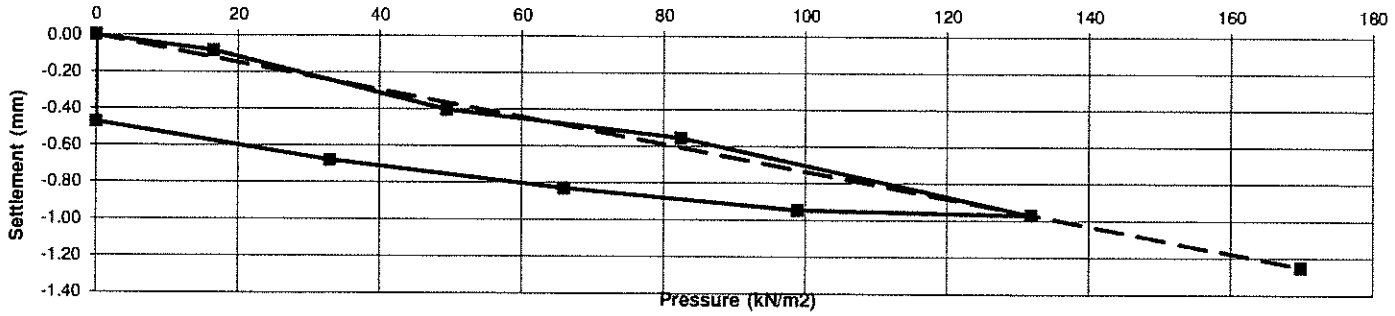
Description of soil under test
(natural soil, placed fill, sub-base)

Grey brown sandy gravelly CLAY

Sample Ref No. N/A

Depth 0.00 m bgl

**Pressure / Settlement**




Gradient at 1.25 mm settlement intersection = 136
Modulus of subgrade reaction = 87 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 22.3 %

# Appendix IV BRE Digest 365 Test Data

# Soakaway Design f -value from field tests (F2C) IGSL

Contract: Swords
Test No. SA01
Client POGA
Date: 20/06/24

Contract No. 25473



Summary of ground conditions

| from | to | Description | Ground water |
|---|---|---|---|
| 0 | 0.1 | TOPSOIL / FILL with metal bar and pieces of plywood and redbrick. | Dry |
| 0.1 | 0.9 | Firm to stiff mottled orangey greyish brown sandy gravelly CLAY | |
| 0.9 | 2.1 | Stiff to very stiff, mottled grey/brown very sandy very gravelly CLAY | |
| 2.1 | 3.1 | Blackish grey silty gravelly cobbly bouldery SAND | |

Notes: Soakaway performed in trial pit TP01

Field Data

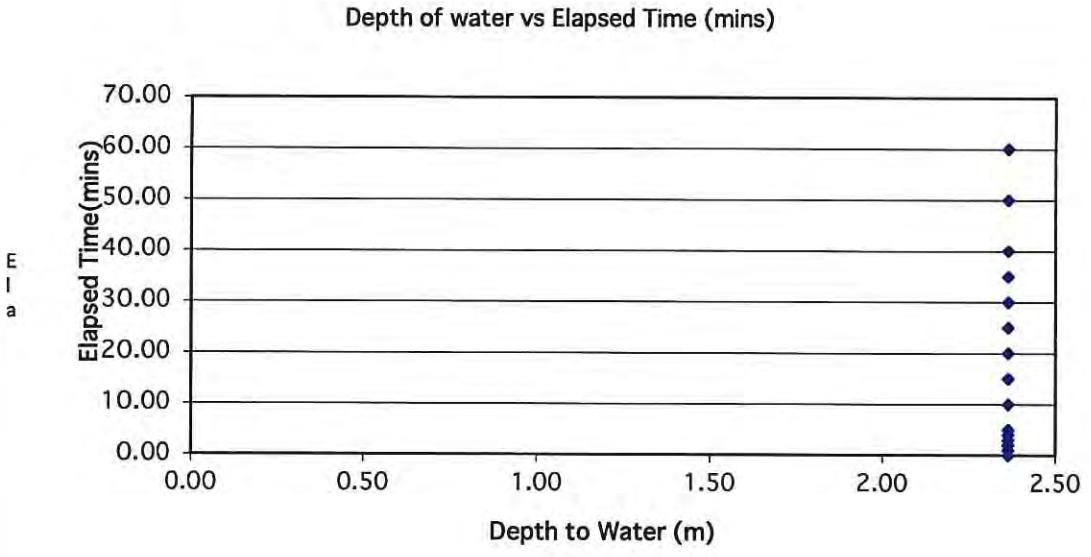
| Depth to Water (m) | Elapsed Time (min) |
|---|---|
| 2.36 | 0.00 |
| 2.36 | 1.00 |
| 2.36 | 2.00 |
| 2.36 | 3.00 |
| 2.36 | 4.00 |
| 2.36 | 5.00 |
| 2.36 | 10.00 |
| 2.36 | 15.00 |
| 2.36 | 20.00 |
| 2.36 | 25.00 |
| 2.36 | 30.00 |
| 2.36 | 35.00 |
| 2.36 | 40.00 |
| 2.36 | 50.00 |
| 2.36 | 60.00 |
| | |
| | |
| | |
| | |

Field Test

| | | |
|---|---|---|
| Depth of Pit (D) | 3.10 | m |
| Width of Pit (B) | 0.60 | m |
| Length of Pit (L) | 2.10 | m |
| Initial depth to Water = | 2.36 | m |
| Final depth to water = | 2.36 | m |
| Elapsed time (mins)= | 60.00 | |
| Top of permeable soil | | m |
| Base of permeable soil | | m |
| Base area= | 1.26 | m2 |
| *Av. side area of permeable stratum over test perio | 3.996 | m2 |
| Total Exposed area = | 5.256 | m2 |

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0 m/min or 0 m/sec



# Soakaway Design f -value from field tests (F2C) IGSL



Contract: Swords
Test No. SA03
Client POGA
Date: 21/06/24

Contract No. 25473

Summary of ground conditions

| from | to | Description | Ground water |
|---|---|---|---|
| 0.00 | 0.20 | MADE GROUND - Fill material with concrete fragments and red brick | Dry |
| 0.20 | 0.60 | Firm to stiff orangey brown sandy gravelly CLAY. | |
| 0.60 | 1.10 | Firm to stiff grey/brown very sandy gravelly CLAY. | |
| 1.10 | 1.30 | Firm to stiff, grey/light brown very sandy gravelly CLAY. | |
| 1.30 | 2.60 | Soft (very wet) greyish brown, sandy gravelly cobbly CLAY | |

Notes: Soakaway performed in trial pit TP03

Field Data

| Depth to Water (m) | Elapsed Time (min) |
|---|---|
| 2.01 | 0.00 |
| 2.01 | 1.00 |
| 2.01 | 2.00 |
| 2.01 | 3.00 |
| 2.01 | 4.00 |
| 2.01 | 5.00 |
| 2.01 | 10.00 |
| 2.01 | 15.00 |
| 2.02 | 20.00 |
| 2.02 | 25.00 |
| 2.02 | 30.00 |
| 2.02 | 35.00 |
| 2.02 | 40.00 |
| 2.02 | 50.00 |
| 2.02 | 60.00 |
| | |
| | |
| | |
| | |

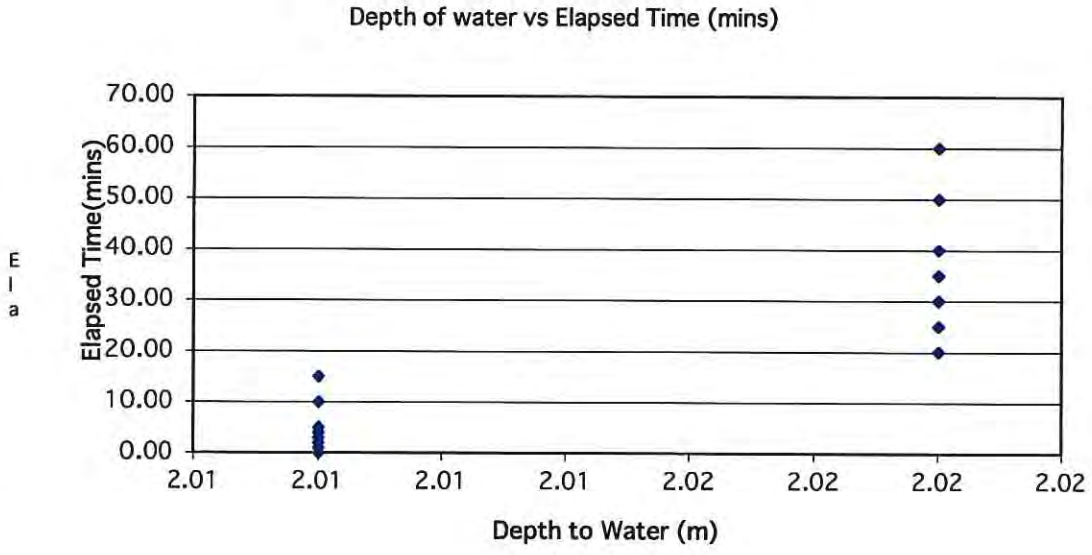
Field Test

| | | |
|---|---|---|
| Depth of Pit (D) | 2.30 | m |
| Width of Pit (B) | 0.80 | m |
| Length of Pit (L) | 3.20 | m |
| Initial depth to Water = | 2.01 | m |
| Final depth to water = | 2.02 | m |
| Elapsed time (mins)= | 60.00 | |
| Top of permeable soil | | m |
| Base of permeable soil | | m |
| Base area= | 2.56 | m2 |
| *Av. side area of permeable stratum over test perio | 2.28 | m2 |
| Total Exposed area = | 4.84 | m2 |

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0 m/min or 0 m/sec

No fall in water after 20 mins



# Soakaway Design f -value from field tests (F2C) IGSL

Contract: Swords
Test No. SA06
Client POGA
Date: 20/6/24

Contract No. 25473



Summary of ground conditions

| from | to | Description | Ground water |
|---|---|---|---|
| 0.00 | 0.30 | TOPSOIL: Soft brown silty sandy gravelly clay with rootlets. | |
| 0.30 | 1.00 | MADE GROUND: Firm - stiff brown sandy gravelly CLAY with ceramic | Dry |
| 1.00 | 1.50 | MADE GROUND: Firm light brown gravelly CLAY with red brick & cobb | |
| 1.50 | 2.10 | Blackish grey silty gravelly cobbly bouldery SAND | |
| 2.10 | 2.60 | Stiff to very stiff mottled grey slightly gravelly CLAY | |

Notes: Soakaway performed in trial pit TP06

Field Data

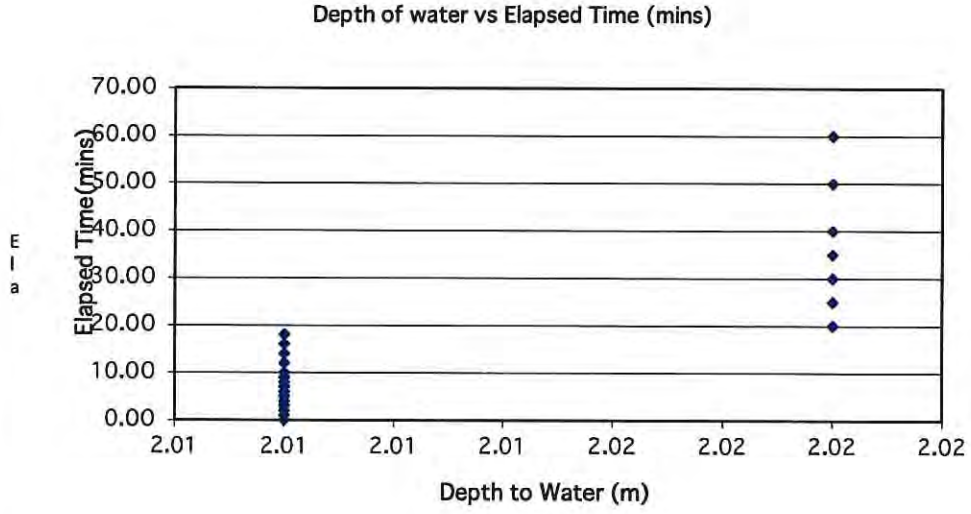
| Depth to Water (m) | Elapsed Time (min) |
|---|---|
| 2.01 | 0.00 |
| 2.01 | 1.00 |
| 2.01 | 2.00 |
| 2.01 | 3.00 |
| 2.01 | 4.00 |
| 2.01 | 5.00 |
| 2.01 | 6.00 |
| 2.01 | 7.00 |
| 2.01 | 8.00 |
| 2.01 | 9.00 |
| 2.01 | 10.00 |
| 2.01 | 12.00 |
| 2.01 | 14.00 |
| 2.01 | 16.00 |
| 2.01 | 18.00 |
| 2.02 | 20.00 |
| 2.02 | 25.00 |
| 2.02 | 30.00 |
| 2.02 | 35.00 |
| 2.02 | 40.00 |
| 2.02 | 50.00 |
| 2.02 | 60.00 |

Field Test

| | | |
|---|---|---|
| Depth of Pit (D) | 2.50 | m |
| Width of Pit (B) | 0.80 | m |
| Length of Pit (L) | 3.20 | m |
| Initial depth to Water = | 2.01 | m |
| Final depth to water = | 2.02 | m |
| Elapsed time (mins)= | 60.00 | |
| Top of permeable soil | | m |
| Base of permeable soil | | m |
| Base area= | 2.56 | m2 |
| *Av. side area of permeable stratum over test perio | 3.88 | m2 |
| Total Exposed area = | 6.44 | m2 |

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 6.6E-05 m/min or 1.104E-06 m/sec



# Soakaway Design f -value from field tests (F2C) IGSL

Contract: Swords
Test No. SA08
Client POGA
Date: 21/06/24

Contract No. 25473



Summary of ground conditions

| from | to | Description | Ground water |
|---|---|---|---|
| 0.00 | 0.40 | TOPSOIL: Soft brown silty sandy gravelly clay with rootlets. | Dry |
| 0.40 | 1.30 | Brown slightly sandy gravlly CLAY with cobbles | |
| 1.30 | 1.80 | Grey/brown slightly sandy gravlly CLAY with cobbles | |
| 1.80 | 2.40 | Grey slightly gravelly CLAY. High plasticity | |
| 2.40 | 2.50 | Grey gravelly very sandy CLAY with low cobbles | |

Notes: Soakaway performed in trial pit TP08

Field Data

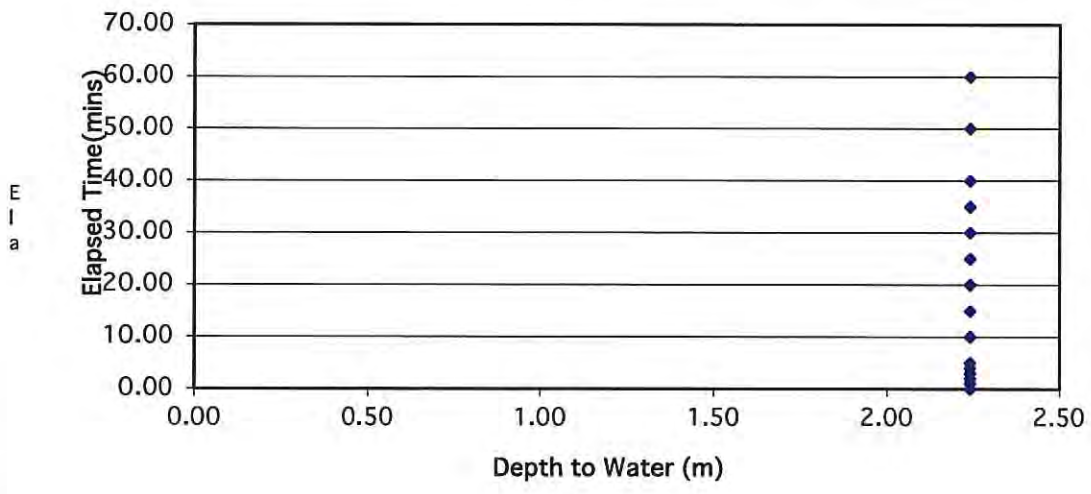
| Depth to Water (m) | Elapsed Time (min) |
|---|---|
| 2.24 | 0.00 |
| 2.24 | 1.00 |
| 2.24 | 2.00 |
| 2.24 | 3.00 |
| 2.24 | 4.00 |
| 2.24 | 5.00 |
| 2.24 | 10.00 |
| 2.24 | 15.00 |
| 2.24 | 20.00 |
| 2.24 | 25.00 |
| 2.24 | 30.00 |
| 2.24 | 35.00 |
| 2.24 | 40.00 |
| 2.24 | 50.00 |
| 2.24 | 60.00 |
| | |
| | |
| | |
| | |

Field Test

| | | |
|---|---|---|
| Depth of Pit (D) | 2.50 | m |
| Width of Pit (B) | 0.70 | m |
| Length of Pit (L) | 3.50 | m |
| Initial depth to Water = | 2.24 | m |
| Final depth to water = | 2.24 | m |
| Elapsed time (mins)= | 60.00 | |
| Top of permeable soil | | m |
| Base of permeable soil | | m |
| Base area= | 2.45 | m2 |
| *Av. side area of permeable stratum over test perio | 2.184 | m2 |
| Total Exposed area = | 4.634 | m2 |

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0 m/min or 0 m/sec



# Soakaway Design f -value from field tests (F2C) IGSL



Contract: Swords
Test No. SA09
Client POGA
Date: 21/06/24

Contract No. 25473

Summary of ground conditions

| from | to | Description | Ground water |
|---|---|---|---|
| 0.00 | 0.20 | MADE GROUND - Brown sandy gravelly CLAY with cobbles and ceramic | |
| 0.20 | 1.20 | Firm to stiff orangey brown slightly sandy gravelly cobbly CLAY | Dry |
| 1.20 | 1.90 | Stiff dark brown sandy gravelly slightly cobbly CLAY. | |
| 1.90 | 2.30 | Stiff to very stiff mottled orange/greyish/brown sandy gravelly cobbly CLAY | |
| 2.30 | 2.60 | Stiff to very stiff, mottled greyish brown, silty gravelly CLAY | |

Notes: Soakaway performed in trial pit TP09.

Field Data

| Depth to Water (m) | Elapsed Time (min) |
|---|---|
| 1.77 | 0.00 |
| 1.77 | 1.00 |
| 1.77 | 2.00 |
| 1.77 | 3.00 |
| 1.77 | 4.00 |
| 1.77 | 5.00 |
| 1.78 | 10.00 |
| 1.78 | 15.00 |
| 1.78 | 20.00 |
| 1.78 | 25.00 |
| 1.78 | 30.00 |
| 1.78 | 35.00 |
| 1.78 | 40.00 |
| 1.78 | 50.00 |
| 1.78 | 60.00 |
| | |
| | |
| | |
| | |

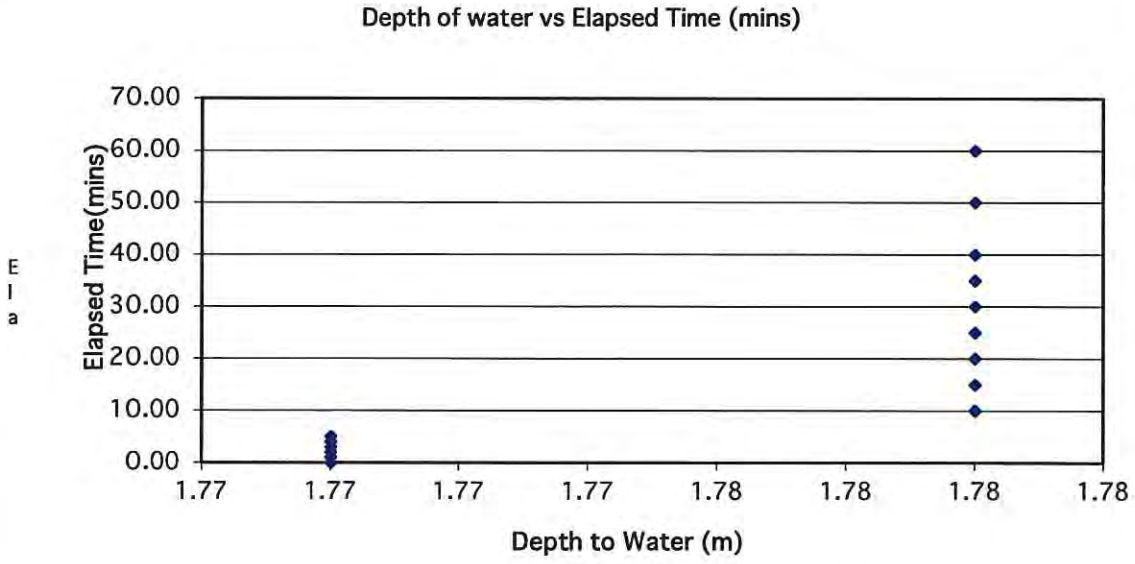
Field Test

| | | |
|---|---|---|
| Depth of Pit (D) | 2.60 | m |
| Width of Pit (B) | 0.70 | m |
| Length of Pit (L) | 3.10 | m |
| Initial depth to Water = | 1.77 | m |
| Final depth to water = | 1.78 | m |
| Elapsed time (mins)= | 60.00 | |
| Top of permeable soil | | m |
| Base of permeable soil | | m |
| Base area= | 2.17 | m2 |
| *Av. side area of permeable stratum over test perio | 6.27 | m2 |
| Total Exposed area = | 8.44 | m2 |

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0 m/min or 0 m/sec

No fall in water after 10 mins



# Appendix V Laboratory Data

## a. Geotechnical

IGSL Ltd
Materials Laboratory
Unit J5, M7 Business Park
Newhall, Naas
Co. Kildare
045 846176

# Test Report

## Determination of Moisture Content, Liquid & Plastic Limits

Tested in accordance with BS1377:Part 2:1990, clauses 3.2, 4.3, 4.4 & 5.3**

Report No. **R160376** Contract No. 25473 Contract Name: Ballysparks Swords Site 1

Customer POGA

Samples Received: 15/07/24 Date Tested: 15/07/24

| BH/TP* | Sample No. | Depth* (m) | Lab. Ref | Sample Type* | Moisture Content % | Liquid Limit % | Plastic Limit % | Plasticity Index | % <425µm | Preparation | Liquid Limit Clause | Classification (BS5930) | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TP02 | AA228873 | 1.5 | A24/3220 | B | 12 | 35 | 17 | 18 | 71 | WS | 4.4 | C L | Brown sandy gravelly CLAY |
| TP04 | AA210619 | 1.7 | A24/3221 | B | 11 | 35 | 17 | 18 | 60 | WS | 4.4 | C L | Brown slightly sandy, gravelly, CLAY |
| TP06 | AA210623 | 2.5 | A24/3222 | B | 18 | 39 | 21 | 18 | 96 | WS | 4.4 | C I | Brown slightly sandy, slightly gravelly, CLAY |
| TP07 | AA210639 | 2.5 | A24/3223 | B | 23 | 40 | 23 | 17 | 91 | WS | 4.4 | C I | Brown sandy gravelly CLAY |
| TP08 | AA210627 | 2.0 | A24/3224 | B | 52 | 67 | NP | NP | 99 | WS | 4.4 | | Brown SILT |

Preparation: WS - Wet sieved
AR - As received
NP - Non plastic

Liquid Limit Clause: 4.3 Cone Penetrometer definitive method
4.4 Cone Penetrometer one point method

Sample Type: B - Bulk Disturbed
U - Undisturbed

Remarks:
Results relate only to the specimen tested,in as received condition unless otherwise noted.
NOTE: **These clauses have been superceded by EN 17892-1 and EN17892-12.
Opinions and interpretations are outside the scope of accreditation. * denotes Customer supplied information.
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IGSL Ltd Materials Laboratory

Persons authorized to approve reports
H Byrne (Laboratory Manager)

| Approved by | Date | Page |
|---|---|---|
| | 30/07/24 | 1 of 1 |

# TEST REPORT

## Determination of Particle Size Distribution

**Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5****

**(note: Sedimentation stage not accredited)**

| particle size | % passing | |
|---|---|---|
| 75 | 100 | COBBLES |
| 63 | 78 | |
| 50 | 78 | GRAVEL |
| 37.5 | 78 | |
| 28 | 76 | |
| 20 | 73 | |
| 14 | 71 | |
| 10 | 67 | |
| 6.3 | 63 | |
| 5 | 60 | |
| 3.35 | 56 | |
| 2 | 52 | |
| 1.18 | 49 | SAND |
| 0.6 | 44 | |
| 0.425 | 42 | |
| 0.3 | 39 | |
| 0.15 | 31 | |
| 0.063 | 20 | SILT/CLAY |

Contract No. 25473 Report No. R160373

Contract Name : Ballysparks Swords Site 1

BH/TP No. TP01

Sample No.* AA218899 Lab. Sample No. A24/3219

Sample Type: B

Depth* (m) 3.00 Customer: POGA

Date Received 15/07/2024 Date Testing started 15/07/2024

Description: Brown clayey/silty, very sandy, GRAVEL with many cobbles

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .

Sample size did not meet the requirements of BS1377

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.

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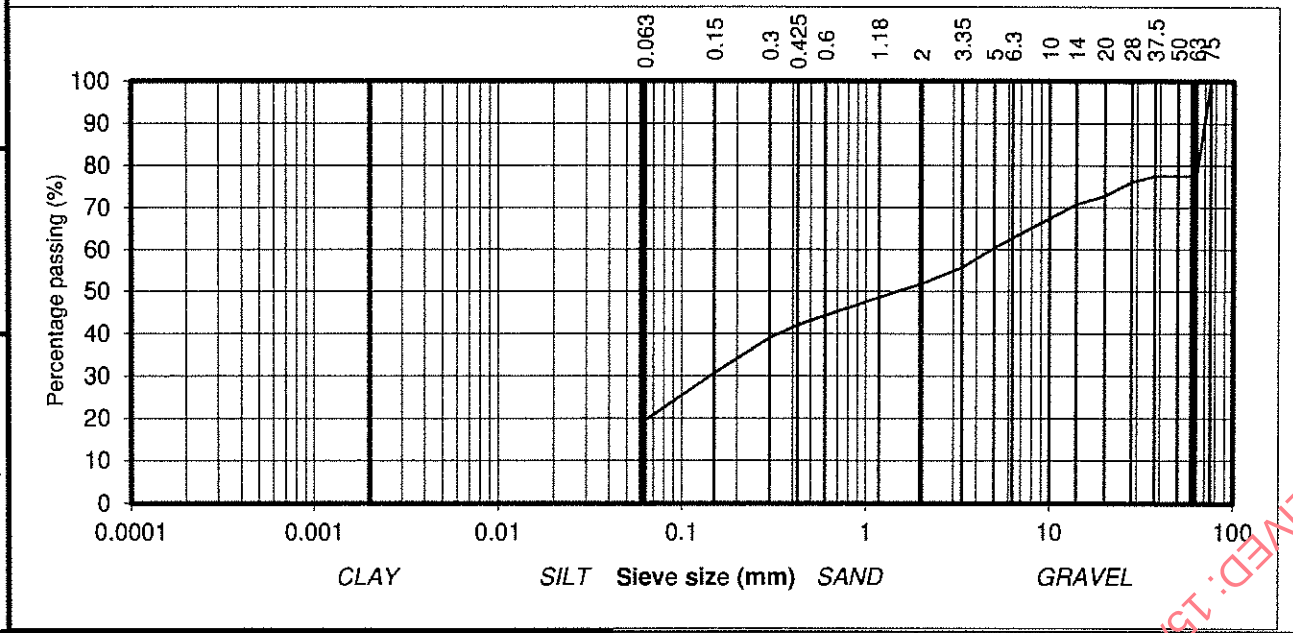


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**IGSL Ltd Materials Laboratory**

| Approved by: | Date: | Page no: |
|---|---|---|
| | 30/07/24 | 1 of 1 |

Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

# TEST REPORT

## Determination of Particle Size Distribution

**Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5****

**(note: Sedimentation stage not accredited)**

| particle size | % passing | |
|---|---|---|
| 75 | 100 | COBBLES |
| 63 | 100 | |
| 50 | 100 | GRAVEL |
| 37.5 | 90 | |
| 28 | 86 | |
| 20 | 83 | |
| 14 | 79 | |
| 10 | 77 | |
| 6.3 | 73 | |
| 5 | 71 | |
| 3.35 | 68 | |
| 2 | 65 | |
| 1.18 | 62 | SAND |
| 0.6 | 59 | |
| 0.425 | 57 | |
| 0.3 | 55 | |
| 0.15 | 47 | |
| 0.063 | 36 | SILT/CLAY |
| 0.037 | 31 | |
| 0.027 | 28 | |
| 0.017 | 25 | |
| 0.010 | 22 | |
| 0.007 | 20 | |
| 0.005 | 17 | |
| 0.002 | 12 | |

Contract No. 25473 Report No. R160375

Contract Name : Ballysparks Swords Site 1

BH/TP No. TP04

Sample No.* AA210619 Lab. Sample No. A24/3221

Sample Type: B

Depth* (m) 1.70 Customer: POGA

Date Received 15/07/2024 Date Testing started 15/07/2024

Description: Brown slightly sandy, gravelly, CLAY

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.

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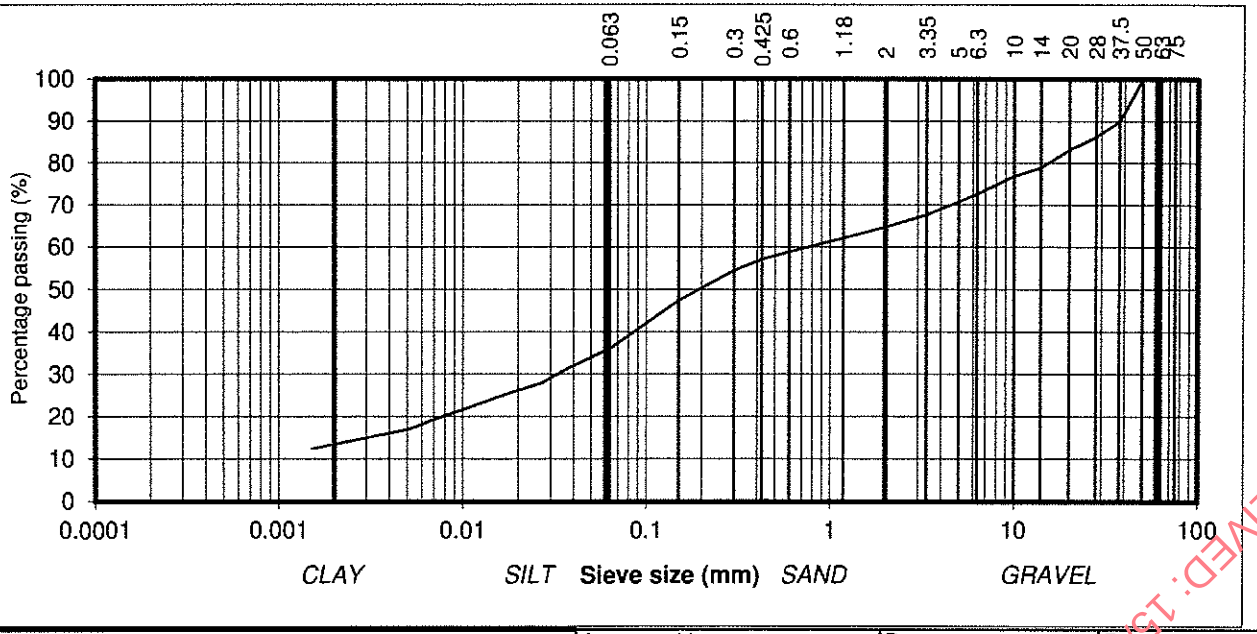


**IGSL Ltd Materials Laboratory**

| Approved by: | Date: | Page no: |
|---|---|---|
| | 30/07/24 | 1 of 1 |

Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

# TEST REPORT

## Determination of Particle Size Distribution

**Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5****

**(note: Sedimentation stage not accredited)**

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

| particle size | % passing | |
|---|---|---|
| 75 | 100 | COBBLES |
| 63 | 100 | |
| 50 | 100 | GRAVEL |
| 37.5 | 92 | |
| 28 | 86 | |
| 20 | 83 | |
| 14 | 81 | |
| 10 | 78 | |
| 6.3 | 74 | |
| 5 | 72 | |
| 3.35 | 69 | |
| 2 | 66 | |
| 1.18 | 62 | SAND |
| 0.6 | 57 | |
| 0.425 | 54 | |
| 0.3 | 50 | |
| 0.15 | 38 | |
| 0.063 | 24 | SILT/CLAY |

Contract No. 25473 Report No. R160374

Contract Name : Ballysparks Swords Site 1

BH/TP No. TP10

Sample No.* AA231546 Lab. Sample No. A24/3225

Sample Type: B

Depth* (m) 3.00 Customer: POGA

Date Received 15/07/2024 Date Testing started 15/07/2024

Description: Brown sandy, slightly gravelly, SILT/CLAY

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.

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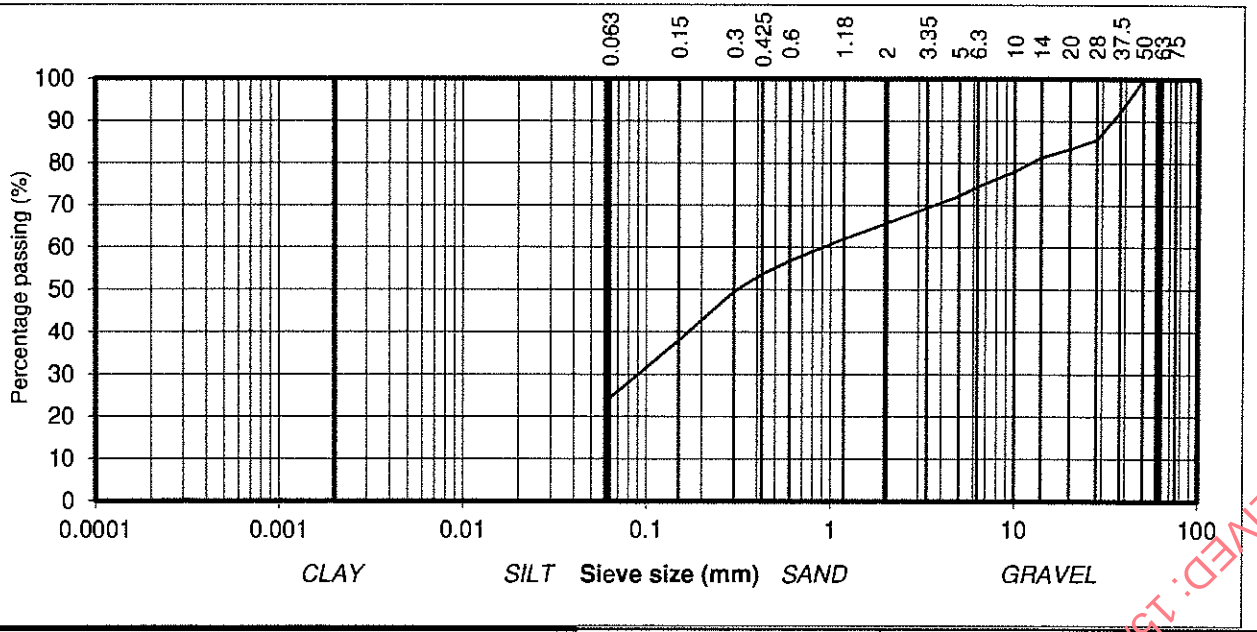


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**IGSL Ltd Materials Laboratory**

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|---|---|---|
| | 30/07/24 | 1 of 1 |

Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

# Appendix V Laboratory Data

## b. Environmental and Chemical

eurofins | Chemtest
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com



UKAS TESTING 2183

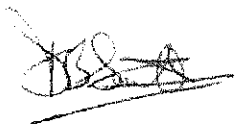
mCERTS

# Final Report

| | |
|---|---|
| **Report No.:** | 24-23031-1 |
| **Initial Date of Issue:** | 30-Jul-2024 |
| **Re-Issue Details:** | |
| **Client** | IGSL |
| **Client Address:** | M7 Business Park<br>Naas<br>County Kildare<br>Ireland |
| **Contact(s):** | Darren Keogh |
| **Project** | 25473 Ballysparks Swords Site 1 LRD Site |

| | | | |
|---|---|---|---|
| **Quotation No.:** | | **Date Received:** | 19-Jul-2024 |
| **Order No.:** | | **Date Instructed:** | 19-Jul-2024 |
| **No. of Samples:** | 20 | | |
| **Turnaround (Wkdays):** | 7 | **Results Due:** | 29-Jul-2024 |
| **Date Approved:** | 30-Jul-2024 | | |

**Approved By:**



**Details:** David Smith, Technical Director

**For details about application of accreditation to specific matrix types, please refer to the Table at the back of this report**

# Results - Leachate

**Project: 25473 Ballysparks Swords Site 1 LRD Site**

| Client: IGSL | | | | Chemtest Job No.: | | 24-23031 | 24-23031 | 24-23031 | 24-23031 | 24-23031 | 24-23031 | 24-23031 | 24-23031 | 24-23031 | 24-23031 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Quotation No.: | | | | Chemtest Sample ID.: | | 1838229 | 1838230 | 1838232 | 1838233 | 1838234 | 1838235 | 1838236 | 1838237 | 1838238 | 1838239 |
| Order No.: | | | | Client Sample Ref.: | | TP1 | TP2 | TP3 | TP4 | TP5 | TP6 | TP7 | TP8 | TP9 | TP10 |
| | | | | Sample Type: | | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL |
| | | | | Top Depth (m): | | 0.90 | 0.50 | 0.50 | 0.70 | 0.50 | 1.50 | 0.50 | 0.60 | 1.00 | 0.90 |
| **Determinand** | **Accred.** | **SOP** | **Type** | **Units** | **LOD** | | | | | | | | | | |
| Ammonium | U | 1220 | 10:1 | mg/l | 0.050 | < 0.050 | 0.065 | < 0.050 | < 0.050 | 0.068 | 0.075 | 0.093 | < 0.050 | 0.065 | 0.061 |
| Ammonium | N | 1220 | 10:1 | mg/kg | 0.10 | 0.50 | 0.88 | 0.56 | 0.48 | 0.88 | 0.85 | 1.1 | 0.60 | 0.87 | 0.65 |

# Results - Soil

**Project: 25473 Ballysparks Swords Site 1 LRD Site**

| Client: IGSL | | | Chemtest Job No.: | | | 24-23031 | 24-23031 | 24-23031 | 24-23031 | 24-23031 | 24-23031 | 24-23031 | 24-23031 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Quotation No.: | | | Chemtest Sample ID.: | | | 1838229 | 1838230 | 1838231 | 1838232 | 1838233 | 1838234 | 1838235 | 1838236 |
| Order No.: | | | Client Sample Ref.: | | | TP1 | TP2 | TP2 | TP3 | TP4 | TP5 | TP6 | TP7 |
| | | | Sample Type: | | | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL |
| | | | Top Depth (m): | | | 0.90 | 0.50 | 1.50 | 0.50 | 0.70 | 0.50 | 1.50 | 0.50 |
| | | | Asbestos Lab: | | | DURHAM | DURHAM | | DURHAM | DURHAM | DURHAM | DURHAM | DURHAM |
| **Determinand** | **HWOL Code** | **Accred.** | **SOP** | **Units** | **LOD** | | | | | | | | |
| ACM Type | | U | 2192 | | N/A | - | - | | - | - | - | - | - |
| Asbestos Identification | | U | 2192 | | N/A | No Asbestos Detected | No Asbestos Detected | | No Asbestos Detected | No Asbestos Detected | No Asbestos Detected | No Asbestos Detected | No Asbestos Detected |
| Moisture | | N | 2030 | % | 0.020 | 9.8 | 12 | 9.6 | 11 | 11 | 9.6 | 13 | 17 |
| Soil Colour | | N | 2040 | | N/A | Brown | Brown | Brown | Brown | Brown | Brown | Brown | Brown |
| Other Material | | N | 2040 | | N/A | Stones | Roots and Stones | Stones | Stones | Stones | Stones | Stones | Stones |
| Soil Texture | | N | 2040 | | N/A | Sand | Sand | Sand | Sand | Sand | Sand | Sand | Sand |
| pH (2.5:1) at 20C | | N | 2010 | | 4.0 | | | [A] 8.3 | | | | | |
| Boron (Hot Water Soluble) | | M | 2120 | mg/kg | 0.40 | [A] < 0.40 | [A] < 0.40 | | [A] < 0.40 | [A] < 0.40 | [A] < 0.40 | [A] < 0.40 | [A] < 0.40 |
| Magnesium (Water Soluble) | | N | 2120 | g/l | 0.010 | | | [A] < 0.010 | | | | | |
| Sulphate (2:1 Water Soluble) as SO4 | | M | 2120 | g/l | 0.010 | | | [A] < 0.010 | | | | | |
| Total Sulphur | | U | 2175 | % | 0.010 | | | [A] 0.020 | | | | | |
| Sulphur (Elemental) | | M | 2180 | mg/kg | 1.0 | [A] 1.1 | [A] 1.1 | | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] 2.7 | [A] 1.1 |
| Chloride (Water Soluble) | | M | 2220 | g/l | 0.010 | | | [A] < 0.010 | | | | | |
| Nitrate (Water Soluble) | | N | 2220 | g/l | 0.010 | | | < 0.010 | | | | | |
| Cyanide (Total) | | M | 2300 | mg/kg | 0.50 | [A] < 0.50 | [A] < 0.50 | | [A] < 0.50 | [A] < 0.50 | [A] < 0.50 | [A] < 0.50 | [A] < 0.50 |
| Sulphide (Easily Liberatable) | | N | 2325 | mg/kg | 0.50 | [A] 4.3 | [A] 6.0 | | [A] 12 | [A] 6.5 | [A] 4.6 | [A] 8.2 | [A] 4.7 |
| Ammonium (Water Soluble) | | M | 2220 | g/l | 0.01 | | | < 0.01 | | | | | |
| Sulphate (Total) | | U | 2430 | % | 0.010 | [A] 0.030 | [A] 0.031 | | [A] 0.026 | [A] 0.030 | [A] 0.019 | [A] < 0.010 | [A] < 0.010 |
| Sulphate (Acid Soluble) | | U | 2430 | % | 0.010 | | | [A] < 0.010 | | | | | |
| Arsenic | | M | 2455 | mg/kg | 0.5 | 8.6 | 11 | | 11 | 17 | 18 | 17 | 9.3 |
| Barium | | M | 2455 | mg/kg | 0.5 | 90 | 110 | | 70 | 110 | 110 | 120 | 52 |
| Cadmium | | M | 2455 | mg/kg | 0.10 | 1.2 | 1.3 | | 1.3 | 1.7 | 1.8 | 0.49 | 0.50 |
| Chromium | | M | 2455 | mg/kg | 0.5 | 19 | 19 | | 15 | 27 | 26 | 54 | 19 |
| Molybdenum | | M | 2455 | mg/kg | 0.5 | 2.5 | 2.9 | | 2.7 | 5.2 | 6.4 | 1.6 | 1.8 |
| Antimony | | N | 2455 | mg/kg | 2.0 | < 2.0 | < 2.0 | | < 2.0 | 2.1 | 2.6 | < 2.0 | < 2.0 |
| Copper | | M | 2455 | mg/kg | 0.50 | 23 | 29 | | 26 | 40 | 44 | 32 | 16 |
| Mercury | | M | 2455 | mg/kg | 0.05 | < 0.05 | 0.05 | | < 0.05 | 0.06 | 0.06 | < 0.05 | < 0.05 |
| Nickel | | M | 2455 | mg/kg | 0.50 | 32 | 39 | | 35 | 61 | 62 | 62 | 32 |
| Lead | | M | 2455 | mg/kg | 0.50 | 14 | 21 | | 18 | 26 | 29 | 23 | 15 |
| Selenium | | M | 2455 | mg/kg | 0.25 | 0.72 | 0.78 | | 0.66 | 1.4 | 1.8 | 0.94 | 0.48 |
| Zinc | | M | 2455 | mg/kg | 0.50 | 49 | 70 | | 59 | 98 | 94 | 80 | 60 |
| Chromium (Trivalent) | | N | 2490 | mg/kg | 1.0 | 19 | 19 | | 15 | 27 | 26 | 54 | 19 |
| Chromium (Hexavalent) | | N | 2490 | mg/kg | 0.50 | < 0.50 | < 0.50 | | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 |
| Aliphatic VPH >C5-C6 | HS_2D_AL | U | 2780 | mg/kg | 0.05 | [A] < 0.05 | [A] < 0.05 | | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 |
| Aliphatic VPH >C6-C7 | HS_2D_AL | U | 2780 | mg/kg | 0.05 | [A] < 0.05 | [A] < 0.05 | | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 |
| Aliphatic VPH >C7-C8 | HS_2D_AL | U | 2780 | mg/kg | 0.05 | [A] < 0.05 | [A] < 0.05 | | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 |
| Aliphatic VPH >C8-C10 | HS_2D_AL | U | 2780 | mg/kg | 0.05 | [A] < 0.05 | [A] < 0.05 | | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 |
| Total Aliphatic VPH >C5-C10 | HS_2D_AL | U | 2780 | mg/kg | 0.25 | [A] < 0.25 | [A] < 0.25 | | [A] < 0.25 | [A] < 0.25 | [A] < 0.25 | [A] < 0.25 | [A] < 0.25 |

# Results - Soil

**Project: 25473 Ballysparks Swords Site 1 LRD Site**

| Client: IGSL | | | | Chemtest Job No.: | | 24-23031 | 24-23031 | 24-23031 | 24-23031 | 24-23031 | 24-23031 | 24-23031 | 24-23031 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Quotation No.: | | | | Chemtest Sample ID.: | | 1838229 | 1838230 | 1838231 | 1838232 | 1838233 | 1838234 | 1838235 | 1838236 |
| Order No.: | | | | Client Sample Ref.: | | TP1 | TP2 | TP2 | TP3 | TP4 | TP5 | TP6 | TP7 |
| | | | | Sample Type: | | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL |
| | | | | Top Depth (m): | | 0.90 | 0.50 | 1.50 | 0.50 | 0.70 | 0.50 | 1.50 | 0.50 |
| | | | | Asbestos Lab: | | DURHAM | DURHAM | | DURHAM | DURHAM | DURHAM | DURHAM | DURHAM |
| **Determinand** | **HWOL Code** | **Accred.** | **SOP** | **Units** | **LOD** | | | | | | | | |
| Aliphatic EPH >C10-C12 MC | EH_2D_AL_#1 | M | 2690 | mg/kg | 2.00 | [A] 4.6 | [A] 4.4 | | [A] 3.9 | [A] 4.8 | [A] 4.2 | [A] 3.2 | [A] 4.4 |
| Aliphatic EPH >C12-C16 MC | EH_2D_AL_#1 | M | 2690 | mg/kg | 1.00 | [A] < 1.0 | [A] < 1.0 | | [A] < 1.0 | [A] < 1.0 | [A] 1.1 | [A] < 1.0 | [A] 1.1 |
| Aliphatic EPH >C16-C21 MC | EH_2D_AL_#1 | M | 2690 | mg/kg | 2.00 | [A] < 2.0 | [A] < 2.0 | | [A] < 2.0 | [A] < 2.0 | [A] < 2.0 | [A] < 2.0 | [A] < 2.0 |
| Aliphatic EPH >C21-C35 MC | EH_2D_AL_#1 | M | 2690 | mg/kg | 3.00 | [A] 6.4 | [A] 6.0 | | [A] 6.0 | [A] 4.3 | [A] 4.5 | [A] 6.7 | [A] 6.8 |
| Aliphatic EPH >C35-C40 MC | EH_2D_AL_#1 | N | 2690 | mg/kg | 10.00 | [A] 13 | [A] < 10 | | [A] 12 | [A] < 10 | [A] < 10 | [A] 14 | [A] 16 |
| Total Aliphatic EPH >C10-C35 MC | EH_2D_AL_#1 | M | 2690 | mg/kg | 5.00 | [A] 12 | [A] 11 | | [A] 9.9 | [A] 10 | [A] 9.8 | [A] 11 | [A] 12 |
| Aromatic VPH >C5-C7 | HS_2D_AR | U | 2780 | mg/kg | 0.05 | [A] < 0.05 | [A] < 0.05 | | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 |
| Aromatic VPH >C7-C8 | HS_2D_AR | U | 2780 | mg/kg | 0.05 | [A] < 0.05 | [A] < 0.05 | | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 |
| Aromatic VPH >C8-C10 | HS_2D_AR | U | 2780 | mg/kg | 0.05 | [A] < 0.05 | [A] < 0.05 | | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 |
| Total Aromatic VPH >C5-C10 | HS_2D_AR | U | 2780 | mg/kg | 0.25 | [A] < 0.25 | [A] < 0.25 | | [A] < 0.25 | [A] < 0.25 | [A] < 0.25 | [A] < 0.25 | [A] < 0.25 |
| Aromatic EPH >C10-C12 MC | EH_2D_AR_#1 | U | 2690 | mg/kg | 1.00 | [A] < 1.0 | [A] < 1.0 | | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 |
| Aromatic EPH >C12-C16 MC | EH_2D_AR_#1 | U | 2690 | mg/kg | 1.00 | [A] < 1.0 | [A] < 1.0 | | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 |
| Aromatic EPH >C16-C21 MC | EH_2D_AR_#1 | U | 2690 | mg/kg | 2.00 | [A] < 2.0 | [A] < 2.0 | | [A] < 2.0 | [A] < 2.0 | [A] 2.1 | [A] < 2.0 | [A] < 2.0 |
| Aromatic EPH >C21-C35 MC | EH_2D_AR_#1 | U | 2690 | mg/kg | 2.00 | [A] < 2.0 | [A] < 2.0 | | [A] < 2.0 | [A] < 2.0 | [A] < 2.0 | [A] < 2.0 | [A] < 2.0 |
| Aromatic EPH >C35-C40 MC | EH_2D_AR_#1 | N | 2690 | mg/kg | 1.00 | [A] < 1.0 | [A] 1.5 | | [A] < 1.0 | [A] < 1.0 | [A] 1.7 | [A] 1.0 | [A] 1.1 |
| Total Aromatic EPH >C10-C35 MC | EH_2D_AR_#1 | U | 2690 | mg/kg | 5.00 | [A] < 5.0 | [A] < 5.0 | | [A] < 5.0 | [A] < 5.0 | [A] < 5.0 | [A] < 5.0 | [A] < 5.0 |
| Total VPH >C5-C10 | HS_2D_Total | U | 2780 | mg/kg | 0.50 | [A] < 0.50 | [A] < 0.50 | | [A] < 0.50 | [A] < 0.50 | [A] < 0.50 | [A] < 0.50 | [A] < 0.50 |
| Total EPH >C10-C35 MC | EH_2D_Total_#1 | U | 2690 | mg/kg | 10.00 | [A] 14 | [A] 13 | | [A] 12 | [A] 12 | [A] 12 | [A] 13 | [A] 15 |
| Mineral Oil EPH | | N | 2670 | mg/kg | 10 | 25 | 11 | | 22 | 10 | < 10 | 25 | 28 |
| Benzene | | M | 2760 | µg/kg | 1.0 | [A] < 1.0 | [A] < 1.0 | | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 |
| Toluene | | M | 2760 | µg/kg | 1.0 | [A] 3.4 | [A] 3.6 | | [A] 2.9 | [A] 2.9 | [A] 3.0 | [A] 3.0 | [A] 3.5 |
| Ethylbenzene | | M | 2760 | µg/kg | 1.0 | [A] < 1.0 | [A] < 1.0 | | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 |
| m & p-Xylene | | M | 2760 | µg/kg | 1.0 | [A] < 1.0 | [A] < 1.0 | | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 |
| o-Xylene | | M | 2760 | µg/kg | 1.0 | [A] < 1.0 | [A] < 1.0 | | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 |
| Methyl Tert-Butyl Ether | | M | 2760 | µg/kg | 1.0 | [A] < 1.0 | [A] < 1.0 | | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 |
| Naphthalene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Acenaphthylene | | N | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Acenaphthene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Fluorene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Phenanthrene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Anthracene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Fluoranthene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Pyrene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Benzo[a]anthracene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Chrysene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Benzo[b]fluoranthene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Benzo[k]fluoranthene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Benzo[a]pyrene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Indeno(1,2,3-c,d)Pyrene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Dibenz(a,h)Anthracene | | N | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |

# Results - Soil

**Project: 25473 Ballysparks Swords Site 1 LRD Site**

| Client: IGSL | | | | | | Chemtest Job No.: | 24-23031 | 24-23031 | 24-23031 | 24-23031 | 24-23031 | 24-23031 | 24-23031 | 24-23031 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Quotation No.: | | | | | | Chemtest Sample ID.: | 1838229 | 1838230 | 1838231 | 1838232 | 1838233 | 1838234 | 1838235 | 1838236 |
| Order No.: | | | | | | Client Sample Ref.: | TP1 | TP2 | TP2 | TP3 | TP4 | TP5 | TP6 | TP7 |
| | | | | | | Sample Type: | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL |
| | | | | | | Top Depth (m): | 0.90 | 0.50 | 1.50 | 0.50 | 0.70 | 0.50 | 1.50 | 0.50 |
| | | | | | | Asbestos Lab: | DURHAM | DURHAM | | DURHAM | DURHAM | DURHAM | DURHAM | DURHAM |
| **Determinand** | **HWOL Code** | **Accred.** | **SOP** | **Units** | **LOD** | | | | | | | | | |
| Benzo[g,h,i]perylene | | M | 2800 | mg/kg | 0.10 | | < 0.10 | < 0.10 | | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Coronene | | N | 2800 | mg/kg | 0.10 | | < 0.10 | < 0.10 | | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| PCB 28 | | U | 2815 | mg/kg | 0.010 | | [A] < 0.010 | [A] < 0.010 | | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 |
| PCB 52 | | U | 2815 | mg/kg | 0.010 | | [A] < 0.010 | [A] < 0.010 | | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 |
| PCB 101 | | U | 2815 | mg/kg | 0.010 | | [A] < 0.010 | [A] < 0.010 | | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 |
| PCB 118 | | U | 2815 | mg/kg | 0.010 | | [A] < 0.010 | [A] < 0.010 | | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 |
| PCB 153 | | U | 2815 | mg/kg | 0.010 | | [A] < 0.010 | [A] < 0.010 | | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 |
| PCB 138 | | U | 2815 | mg/kg | 0.010 | | [A] < 0.010 | [A] < 0.010 | | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 |
| PCB 180 | | U | 2815 | mg/kg | 0.010 | | [A] < 0.010 | [A] < 0.010 | | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 |
| Tot PCBs Low (7 Congeners) | | N | 2815 | mg/kg | 0.05 | | [A] < 0.05 | [A] < 0.05 | | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 |
| Total Phenols | | M | 2920 | mg/kg | 0.10 | | < 0.10 | < 0.10 | | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |

# Results - Soil

**Project: 25473 Ballysparks Swords Site 1 LRD Site**

| **Client: IGSL** | | | | | **Chemtest Job No.:** | 24-23031 | 24-23031 | 24-23031 | 24-23031 |
|---|---|---|---|---|---|---|---|---|---|
| Quotation No.: | | | | | **Chemtest Sample ID.:** | 1838237 | 1838238 | 1838239 | 1838240 |
| Order No.: | | | | | Client Sample Ref.: | TP8 | TP9 | TP10 | TP10 |
| | | | | | Sample Type: | SOIL | SOIL | SOIL | SOIL |
| | | | | | Top Depth (m): | 0.60 | 1.00 | 0.90 | 1.40 |
| | | | | | Asbestos Lab: | DURHAM | DURHAM | DURHAM | |
| **Determinand** | **HWOL Code** | **Accred.** | **SOP** | **Units** | **LOD** | | | | |
| ACM Type | | U | 2192 | | N/A | - | - | - | |
| Asbestos Identification | | U | 2192 | | N/A | No Asbestos Detected | No Asbestos Detected | No Asbestos Detected | |
| Moisture | | N | 2030 | % | 0.020 | 11 | 11 | 30 | 22 |
| Soil Colour | | N | 2040 | | N/A | Brown | Brown | Brown | Brown |
| Other Material | | N | 2040 | | N/A | Stones | Stones | Stones | Stones |
| Soil Texture | | N | 2040 | | N/A | Sand | Sand | Sand | Sand |
| pH (2.5:1) at 20C | | N | 2010 | | 4.0 | | | | [A] 8.2 |
| Boron (Hot Water Soluble) | | M | 2120 | mg/kg | 0.40 | [A] 0.41 | [A] < 0.40 | [A] 2.7 | |
| Magnesium (Water Soluble) | | N | 2120 | g/l | 0.010 | | | | [A] < 0.010 |
| Sulphate (2:1 Water Soluble) as SO4 | | M | 2120 | g/l | 0.010 | | | | [A] < 0.010 |
| Total Sulphur | | U | 2175 | % | 0.010 | | | | [A] 0.030 |
| Sulphur (Elemental) | | M | 2180 | mg/kg | 1.0 | [A] < 1.0 | [A] < 1.0 | [A] 3.1 | |
| Chloride (Water Soluble) | | M | 2220 | g/l | 0.010 | | | | [A] < 0.010 |
| Nitrate (Water Soluble) | | N | 2220 | g/l | 0.010 | | | | < 0.010 |
| Cyanide (Total) | | M | 2300 | mg/kg | 0.50 | [A] < 0.50 | [A] < 0.50 | [A] 0.70 | |
| Sulphide (Easily Liberatable) | | N | 2325 | mg/kg | 0.50 | [A] 6.1 | [A] 13 | [A] 4.0 | |
| Ammonium (Water Soluble) | | M | 2220 | g/l | 0.01 | | | | < 0.01 |
| Sulphate (Total) | | U | 2430 | % | 0.010 | [A] 0.010 | [A] < 0.010 | [A] 0.16 | |
| Sulphate (Acid Soluble) | | U | 2430 | % | 0.010 | | | | [A] 0.021 |
| Arsenic | | M | 2455 | mg/kg | 0.5 | 8.3 | 11 | 15 | |
| Barium | | M | 2455 | mg/kg | 0.5 | 55 | 73 | 140 | |
| Cadmium | | M | 2455 | mg/kg | 0.10 | 0.97 | 0.23 | 0.96 | |
| Chromium | | M | 2455 | mg/kg | 0.5 | 15 | 35 | 26 | |
| Molybdenum | | M | 2455 | mg/kg | 0.5 | 2.0 | 0.9 | 3.2 | |
| Antimony | | N | 2455 | mg/kg | 2.0 | < 2.0 | < 2.0 | < 2.0 | |
| Copper | | M | 2455 | mg/kg | 0.50 | 18 | 24 | 27 | |
| Mercury | | M | 2455 | mg/kg | 0.05 | < 0.05 | < 0.05 | 0.31 | |
| Nickel | | M | 2455 | mg/kg | 0.50 | 28 | 42 | 34 | |
| Lead | | M | 2455 | mg/kg | 0.50 | 20 | 16 | 52 | |
| Selenium | | M | 2455 | mg/kg | 0.25 | 0.81 | 0.62 | 2.2 | |
| Zinc | | M | 2455 | mg/kg | 0.50 | 49 | 58 | 95 | |
| Chromium (Trivalent) | | N | 2490 | mg/kg | 1.0 | 15 | 35 | 26 | |
| Chromium (Hexavalent) | | N | 2490 | mg/kg | 0.50 | < 0.50 | < 0.50 | < 0.50 | |
| Aliphatic VPH >C5-C6 | HS_2D_AL | U | 2780 | mg/kg | 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | |
| Aliphatic VPH >C6-C7 | HS_2D_AL | U | 2780 | mg/kg | 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | |
| Aliphatic VPH >C7-C8 | HS_2D_AL | U | 2780 | mg/kg | 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | |
| Aliphatic VPH >C8-C10 | HS_2D_AL | U | 2780 | mg/kg | 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | |
| Total Aliphatic VPH >C5-C10 | HS_2D_AL | U | 2780 | mg/kg | 0.25 | [A] < 0.25 | [A] < 0.25 | [A] < 0.25 | |

# Results - Soil

**Project: 25473 Ballysparks Swords Site 1 LRD Site**

| Client: IGSL | | | | Chemtest Job No.: | | 24-23031 | 24-23031 | 24-23031 | 24-23031 |
|---|---|---|---|---|---|---|---|---|---|
| Quotation No.: | | | | Chemtest Sample ID.: | | 1838237 | 1838238 | 1838239 | 1838240 |
| Order No.: | | | | Client Sample Ref.: | | TP8 | TP9 | TP10 | TP10 |
| | | | | Sample Type: | | SOIL | SOIL | SOIL | SOIL |
| | | | | Top Depth (m): | | 0.60 | 1.00 | 0.90 | 1.40 |
| | | | | Asbestos Lab: | | DURHAM | DURHAM | DURHAM | |
| **Determinand** | **HWOL Code** | **Accred.** | **SOP** | **Units** | **LOD** | | | | |
| Aliphatic EPH >C10-C12 MC | EH_2D_AL_#1 | M | 2690 | mg/kg | 2.00 | [A] 4.3 | [A] 4.2 | [A] 5.6 | |
| Aliphatic EPH >C12-C16 MC | EH_2D_AL_#1 | M | 2690 | mg/kg | 1.00 | [A] < 1.0 | [A] < 1.0 | [A] 1.1 | |
| Aliphatic EPH >C16-C21 MC | EH_2D_AL_#1 | M | 2690 | mg/kg | 2.00 | [A] < 2.0 | [A] < 2.0 | [A] < 2.0 | |
| Aliphatic EPH >C21-C35 MC | EH_2D_AL_#1 | M | 2690 | mg/kg | 3.00 | [A] 6.7 | [A] 4.3 | [A] 38 | |
| Aliphatic EPH >C35-C40 MC | EH_2D_AL_#1 | N | 2690 | mg/kg | 10.00 | [A] 13 | [A] < 10 | [A] 18 | |
| Total Aliphatic EPH >C10-C35 MC | EH_2D_AL_#1 | M | 2690 | mg/kg | 5.00 | [A] 12 | [A] 9.5 | [A] 46 | |
| Aromatic VPH >C5-C7 | HS_2D_AR | U | 2780 | mg/kg | 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | |
| Aromatic VPH >C7-C8 | HS_2D_AR | U | 2780 | mg/kg | 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | |
| Aromatic VPH >C8-C10 | HS_2D_AR | U | 2780 | mg/kg | 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | |
| Total Aromatic VPH >C5-C10 | HS_2D_AR | U | 2780 | mg/kg | 0.25 | [A] < 0.25 | [A] < 0.25 | [A] < 0.25 | |
| Aromatic EPH >C10-C12 MC | EH_2D_AR_#1 | U | 2690 | mg/kg | 1.00 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | |
| Aromatic EPH >C12-C16 MC | EH_2D_AR_#1 | U | 2690 | mg/kg | 1.00 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | |
| Aromatic EPH >C16-C21 MC | EH_2D_AR_#1 | U | 2690 | mg/kg | 2.00 | [A] < 2.0 | [A] < 2.0 | [A] 2.2 | |
| Aromatic EPH >C21-C35 MC | EH_2D_AR_#1 | U | 2690 | mg/kg | 2.00 | [A] < 2.0 | [A] < 2.0 | [A] 28 | |
| Aromatic EPH >C35-C40 MC | EH_2D_AR_#1 | N | 2690 | mg/kg | 1.00 | [A] 1.6 | [A] 1.5 | [A] 17 | |
| Total Aromatic EPH >C10-C35 MC | EH_2D_AR_#1 | U | 2690 | mg/kg | 5.00 | [A] < 5.0 | [A] < 5.0 | [A] 30 | |
| Total VPH >C5-C10 | HS_2D_Total | U | 2780 | mg/kg | 0.50 | [A] < 0.50 | [A] < 0.50 | [A] < 0.50 | |
| Total EPH >C10-C35 MC | EH_2D_Total_#1 | U | 2690 | mg/kg | 10.00 | [A] 14 | [A] 12 | [A] 77 | |
| Mineral Oil EPH | | N | 2670 | mg/kg | 10 | 25 | < 10 | 64 | |
| Benzene | | M | 2760 | µg/kg | 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | |
| Toluene | | M | 2760 | µg/kg | 1.0 | [A] 2.9 | [A] 3.7 | [A] 3.4 | |
| Ethylbenzene | | M | 2760 | µg/kg | 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | |
| m & p-Xylene | | M | 2760 | µg/kg | 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | |
| o-Xylene | | M | 2760 | µg/kg | 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | |
| Methyl Tert-Butyl Ether | | M | 2760 | µg/kg | 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | |
| Naphthalene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | |
| Acenaphthylene | | N | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | |
| Acenaphthene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | |
| Fluorene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | |
| Phenanthrene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | |
| Anthracene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | |
| Fluoranthene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | |
| Pyrene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | |
| Benzo[a]anthracene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | |
| Chrysene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | |
| Benzo[b]fluoranthene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | |
| Benzo[k]fluoranthene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | |
| Benzo[a]pyrene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | |
| Indeno(1,2,3-c,d)Pyrene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | |
| Dibenz(a,h)Anthracene | | N | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | |

# Results - Soil

**Project: 25473 Ballysparks Swords Site 1 LRD Site**

| Client: IGSL | | | | Chemtest Job No.: | | 24-23031 | 24-23031 | 24-23031 | 24-23031 |
|---|---|---|---|---|---|---|---|---|---|
| Quotation No.: | | | | Chemtest Sample ID.: | | 1838237 | 1838238 | 1838239 | 1838240 |
| Order No.: | | | | Client Sample Ref.: | | TP8 | TP9 | TP10 | TP10 |
| | | | | Sample Type: | | SOIL | SOIL | SOIL | SOIL |
| | | | | Top Depth (m): | | 0.60 | 1.00 | 0.90 | 1.40 |
| | | | | Asbestos Lab: | | DURHAM | DURHAM | DURHAM | |
| **Determinand** | **HWOL Code** | **Accred.** | **SOP** | **Units** | **LOD** | | | | |
| Benzo[g,h,i]perylene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | |
| Coronene | | N | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | |
| PCB 28 | | U | 2815 | mg/kg | 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | |
| PCB 52 | | U | 2815 | mg/kg | 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | |
| PCB 101 | | U | 2815 | mg/kg | 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | |
| PCB 118 | | U | 2815 | mg/kg | 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | |
| PCB 153 | | U | 2815 | mg/kg | 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | |
| PCB 138 | | U | 2815 | mg/kg | 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | |
| PCB 180 | | U | 2815 | mg/kg | 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | |
| Tot PCBs Low (7 Congeners) | | N | 2815 | mg/kg | 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | |
| Total Phenols | | M | 2920 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | |

# Results - Single Stage WAC

**Project: 25473 Ballysparks Swords Site 1 LRD Site**

| | | | | | | Landfill Waste Acceptance Criteria Limits | | |
|---|---|---|---|---|---|---|---|---|
| **Chemtest Job No:** | 24-23031 | | | | | | | |
| **Chemtest Sample ID:** | 1838229 | | | | | | | |
| **Sample Ref:** | TP1 | | | | | | | |
| **Sample ID:** | | | | | | | | |
| **Sample Location:** | | | | | | | | |
| **Top Depth(m):** | 0.90 | | | | | | | |
| **Bottom Depth(m):** | | | | | | | | |
| **Sampling Date:** | | | | | | | | |
| **Determinand** | **SOP** | **HWOL Code** | **Accred.** | **Units** | | **Inert Waste Landfill** | **Stable, Non-reactive hazardous waste in non-hazardous Landfill** | **Hazardous Waste Landfill** |
| Total Organic Carbon | 2625 | | M | % | [A] 0.44 | 3 | 5 | 6 |
| Loss On Ignition | 2610 | | M | % | 1.9 | -- | -- | 10 |
| Total BTEX | 2760 | | M | mg/kg | [A] < 0.010 | 6 | -- | -- |
| Total PCBs (7 Congeners) | 2815 | | M | mg/kg | < 0.10 | 1 | -- | -- |
| TPH Total WAC | 2670 | EH_CU_1D_Total | M | mg/kg | [A] < 10 | 500 | -- | -- |
| Total Of 17 PAHs Lower | 2800 | | N | mg/kg | < 1.0 | 100 | -- | -- |
| pH at 20C | 2010 | | M | | 9.4 | -- | >6 | -- |
| Acid Neutralisation Capacity | 2015 | | N | mol/kg | 0.0080 | -- | To evaluate | To evaluate |
| **Eluate Analysis** | | | | **10:1 Eluate mg/l** | **10:1 Eluate mg/kg** | **Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg** | | |
| Arsenic | 1455 | | U | < 0.0002 | < 0.0020 | 0.5 | 2 | 25 |
| Barium | 1455 | | U | 0.006 | 0.063 | 20 | 100 | 300 |
| Cadmium | 1455 | | U | < 0.00011 | < 0.0011 | 0.04 | 1 | 5 |
| Chromium | 1455 | | U | < 0.0005 | < 0.0050 | 0.5 | 10 | 70 |
| Copper | 1455 | | U | < 0.0005 | < 0.0050 | 2 | 50 | 100 |
| Mercury | 1455 | | U | < 0.00005 | < 0.00050 | 0.01 | 0.2 | 2 |
| Molybdenum | 1455 | | U | 0.0062 | 0.063 | 0.5 | 10 | 30 |
| Nickel | 1455 | | U | < 0.0005 | < 0.0050 | 0.4 | 10 | 40 |
| Lead | 1455 | | U | < 0.0005 | < 0.0050 | 0.5 | 10 | 50 |
| Antimony | 1455 | | U | < 0.0005 | < 0.0050 | 0.06 | 0.7 | 5 |
| Selenium | 1455 | | U | 0.0005 | 0.0050 | 0.1 | 0.5 | 7 |
| Zinc | 1455 | | U | < 0.003 | < 0.025 | 4 | 50 | 200 |
| Chloride | 1220 | | U | < 1.0 | < 10 | 800 | 15000 | 25000 |
| Fluoride | 1220 | | U | 0.25 | 2.5 | 10 | 150 | 500 |
| Sulphate | 1220 | | U | < 1.0 | < 10 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 1020 | | N | 88 | 880 | 4000 | 60000 | 100000 |
| Phenol Index | 1920 | | U | < 0.030 | < 0.30 | 1 | - | - |
| Dissolved Organic Carbon | 1610 | | U | 2.8 | < 50 | 500 | 800 | 1000 |

| **Solid Information** | |
|---|---|
| Dry mass of test portion/kg | 0.090 |
| Moisture (%) | 9.8 |

**Waste Acceptance Criteria**

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

# Results - Single Stage WAC

**Project: 25473 Ballysparks Swords Site 1 LRD Site**

| | | | | | | Landfill Waste Acceptance Criteria Limits | | |
|---|---|---|---|---|---|---|---|---|
| **Chemtest Job No:** | 24-23031 | | | | | | | |
| **Chemtest Sample ID:** | 1838230 | | | | | | | |
| **Sample Ref:** | TP2 | | | | | | | |
| **Sample ID:** | | | | | | | | |
| **Sample Location:** | | | | | | | | |
| **Top Depth(m):** | 0.50 | | | | | | | |
| **Bottom Depth(m):** | | | | | | | | |
| **Sampling Date:** | | | | | | | | |
| **Determinand** | **SOP** | **HWOL Code** | **Accred.** | **Units** | | **Inert Waste Landfill** | **Stable, Non-reactive hazardous waste in non-hazardous Landfill** | **Hazardous Waste Landfill** |
| Total Organic Carbon | 2625 | | M | % | [A] 2.1 | 3 | 5 | 6 |
| Loss On Ignition | 2610 | | M | % | 2.0 | -- | -- | 10 |
| Total BTEX | 2760 | | M | mg/kg | [A] < 0.010 | 6 | -- | -- |
| Total PCBs (7 Congeners) | 2815 | | M | mg/kg | < 0.10 | 1 | -- | -- |
| TPH Total WAC | 2670 | EH_CU_1D_Total | M | mg/kg | [A] < 10 | 500 | -- | -- |
| Total Of 17 PAHs Lower | 2800 | | N | mg/kg | < 1.0 | 100 | -- | -- |
| pH at 20C | 2010 | | M | | 8.5 | -- | >6 | -- |
| Acid Neutralisation Capacity | 2015 | | N | mol/kg | 0.014 | -- | To evaluate | To evaluate |
| **Eluate Analysis** | | | | **10:1 Eluate mg/l** | **10:1 Eluate mg/kg** | **Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg** | | |
| Arsenic | 1455 | | U | 0.0004 | 0.0042 | 0.5 | 2 | 25 |
| Barium | 1455 | | U | < 0.005 | < 0.050 | 20 | 100 | 300 |
| Cadmium | 1455 | | U | < 0.00011 | < 0.0011 | 0.04 | 1 | 5 |
| Chromium | 1455 | | U | < 0.0005 | < 0.0050 | 0.5 | 10 | 70 |
| Copper | 1455 | | U | 0.0012 | 0.012 | 2 | 50 | 100 |
| Mercury | 1455 | | U | < 0.00005 | < 0.00050 | 0.01 | 0.2 | 2 |
| Molybdenum | 1455 | | U | 0.0036 | 0.036 | 0.5 | 10 | 30 |
| Nickel | 1455 | | U | < 0.0005 | < 0.0050 | 0.4 | 10 | 40 |
| Lead | 1455 | | U | < 0.0005 | < 0.0050 | 0.5 | 10 | 50 |
| Antimony | 1455 | | U | < 0.0005 | < 0.0050 | 0.06 | 0.7 | 5 |
| Selenium | 1455 | | U | < 0.0005 | < 0.0050 | 0.1 | 0.5 | 7 |
| Zinc | 1455 | | U | < 0.003 | < 0.025 | 4 | 50 | 200 |
| Chloride | 1220 | | U | < 1.0 | < 10 | 800 | 15000 | 25000 |
| Fluoride | 1220 | | U | 0.22 | 2.2 | 10 | 150 | 500 |
| Sulphate | 1220 | | U | < 1.0 | < 10 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 1020 | | N | 41 | 410 | 4000 | 60000 | 100000 |
| Phenol Index | 1920 | | U | < 0.030 | < 0.30 | 1 | - | - |
| Dissolved Organic Carbon | 1610 | | U | 4.1 | < 50 | 500 | 800 | 1000 |

| **Solid Information** | |
|---|---|
| Dry mass of test portion/kg | 0.090 |
| Moisture (%) | 12 |

**Waste Acceptance Criteria**

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

# Results - Single Stage WAC

**Project: 25473 Ballysparks Swords Site 1 LRD Site**

| | | | | | | Landfill Waste Acceptance Criteria Limits | | |
|---|---|---|---|---|---|---|---|---|
| **Chemtest Job No:** | 24-23031 | | | | | | | |
| **Chemtest Sample ID:** | 1838232 | | | | | | | |
| **Sample Ref:** | TP3 | | | | | | | |
| **Sample ID:** | | | | | | | | |
| **Sample Location:** | | | | | | | | |
| **Top Depth(m):** | 0.50 | | | | | | | |
| **Bottom Depth(m):** | | | | | | | | |
| **Sampling Date:** | | | | | | | | |
| **Determinand** | **SOP** | **HWOL Code** | **Accred.** | **Units** | | **Inert Waste Landfill** | **Stable, Non-reactive hazardous waste in non-hazardous Landfill** | **Hazardous Waste Landfill** |
| Total Organic Carbon | 2625 | | M | % | [A] 0.36 | 3 | 5 | 6 |
| Loss On Ignition | 2610 | | M | % | 2.0 | -- | -- | 10 |
| Total BTEX | 2760 | | M | mg/kg | [A] < 0.010 | 6 | -- | -- |
| Total PCBs (7 Congeners) | 2815 | | M | mg/kg | < 0.10 | 1 | -- | -- |
| TPH Total WAC | 2670 | EH_CU_1D_Total | M | mg/kg | [A] < 10 | 500 | -- | -- |
| Total Of 17 PAHs Lower | 2800 | | N | mg/kg | < 1.0 | 100 | -- | -- |
| pH at 20C | 2010 | | M | | 8.4 | -- | >6 | -- |
| Acid Neutralisation Capacity | 2015 | | N | mol/kg | 0.0080 | -- | To evaluate | To evaluate |
| **Eluate Analysis** | | | | **10:1 Eluate mg/l** | **10:1 Eluate mg/kg** | **Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg** | | |
| Arsenic | 1455 | | U | < 0.0002 | < 0.0020 | 0.5 | 2 | 25 |
| Barium | 1455 | | U | 0.005 | 0.052 | 20 | 100 | 300 |
| Cadmium | 1455 | | U | < 0.00011 | < 0.0011 | 0.04 | 1 | 5 |
| Chromium | 1455 | | U | < 0.0005 | < 0.0050 | 0.5 | 10 | 70 |
| Copper | 1455 | | U | < 0.0005 | < 0.0050 | 2 | 50 | 100 |
| Mercury | 1455 | | U | < 0.00005 | < 0.00050 | 0.01 | 0.2 | 2 |
| Molybdenum | 1455 | | U | 0.0086 | 0.086 | 0.5 | 10 | 30 |
| Nickel | 1455 | | U | < 0.0005 | < 0.0050 | 0.4 | 10 | 40 |
| Lead | 1455 | | U | < 0.0005 | < 0.0050 | 0.5 | 10 | 50 |
| Antimony | 1455 | | U | < 0.0005 | < 0.0050 | 0.06 | 0.7 | 5 |
| Selenium | 1455 | | U | < 0.0005 | < 0.0050 | 0.1 | 0.5 | 7 |
| Zinc | 1455 | | U | < 0.003 | < 0.025 | 4 | 50 | 200 |
| Chloride | 1220 | | U | < 1.0 | < 10 | 800 | 15000 | 25000 |
| Fluoride | 1220 | | U | 0.32 | 3.2 | 10 | 150 | 500 |
| Sulphate | 1220 | | U | < 1.0 | < 10 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 1020 | | N | 42 | 420 | 4000 | 60000 | 100000 |
| Phenol Index | 1920 | | U | < 0.030 | < 0.30 | 1 | - | - |
| Dissolved Organic Carbon | 1610 | | U | 3.8 | < 50 | 500 | 800 | 1000 |

| **Solid Information** | |
|---|---|
| Dry mass of test portion/kg | 0.090 |
| Moisture (%) | 11 |

**Waste Acceptance Criteria**

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

# Results - Single Stage WAC

**Project: 25473 Ballysparks Swords Site 1 LRD Site**

| | | | | | | Landfill Waste Acceptance Criteria Limits | | |
|---|---|---|---|---|---|---|---|---|
| **Chemtest Job No:** | 24-23031 | | | | | | | |
| **Chemtest Sample ID:** | 1838233 | | | | | | | |
| **Sample Ref:** | TP4 | | | | | | | |
| **Sample ID:** | | | | | | | | |
| **Sample Location:** | | | | | | | | |
| **Top Depth(m):** | 0.70 | | | | | | | |
| **Bottom Depth(m):** | | | | | | | | |
| **Sampling Date:** | | | | | | | | |
| **Determinand** | **SOP** | **HWOL Code** | **Accred.** | **Units** | | **Inert Waste Landfill** | **Stable, Non-reactive hazardous waste in non-hazardous Landfill** | **Hazardous Waste Landfill** |
| Total Organic Carbon | 2625 | | M | % | [A] 0.62 | 3 | 5 | 6 |
| Loss On Ignition | 2610 | | M | % | 2.4 | -- | -- | 10 |
| Total BTEX | 2760 | | M | mg/kg | [A] < 0.010 | 6 | -- | -- |
| Total PCBs (7 Congeners) | 2815 | | M | mg/kg | < 0.10 | 1 | -- | -- |
| TPH Total WAC | 2670 | EH_CU_1D_Total | M | mg/kg | [A] < 10 | 500 | -- | -- |
| Total Of 17 PAHs Lower | 2800 | | N | mg/kg | < 1.0 | 100 | -- | -- |
| pH at 20C | 2010 | | M | | 8.3 | -- | >6 | -- |
| Acid Neutralisation Capacity | 2015 | | N | mol/kg | 0.0080 | -- | To evaluate | To evaluate |
| **Eluate Analysis** | | | | **10:1 Eluate mg/l** | **10:1 Eluate mg/kg** | **Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg** | | |
| Arsenic | 1455 | | U | < 0.0002 | < 0.0020 | 0.5 | 2 | 25 |
| Barium | 1455 | | U | 0.005 | 0.051 | 20 | 100 | 300 |
| Cadmium | 1455 | | U | < 0.00011 | < 0.0011 | 0.04 | 1 | 5 |
| Chromium | 1455 | | U | < 0.0005 | < 0.0050 | 0.5 | 10 | 70 |
| Copper | 1455 | | U | < 0.0005 | < 0.0050 | 2 | 50 | 100 |
| Mercury | 1455 | | U | < 0.00005 | < 0.00050 | 0.01 | 0.2 | 2 |
| Molybdenum | 1455 | | U | 0.0066 | 0.066 | 0.5 | 10 | 30 |
| Nickel | 1455 | | U | < 0.0005 | < 0.0050 | 0.4 | 10 | 40 |
| Lead | 1455 | | U | < 0.0005 | < 0.0050 | 0.5 | 10 | 50 |
| Antimony | 1455 | | U | < 0.0005 | < 0.0050 | 0.06 | 0.7 | 5 |
| Selenium | 1455 | | U | < 0.0005 | < 0.0050 | 0.1 | 0.5 | 7 |
| Zinc | 1455 | | U | < 0.003 | < 0.025 | 4 | 50 | 200 |
| Chloride | 1220 | | U | < 1.0 | < 10 | 800 | 15000 | 25000 |
| Fluoride | 1220 | | U | 0.35 | 3.5 | 10 | 150 | 500 |
| Sulphate | 1220 | | U | < 1.0 | < 10 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 1020 | | N | 41 | 410 | 4000 | 60000 | 100000 |
| Phenol Index | 1920 | | U | < 0.030 | < 0.30 | 1 | - | - |
| Dissolved Organic Carbon | 1610 | | U | 2.9 | < 50 | 500 | 800 | 1000 |

| **Solid Information** | |
|---|---|
| Dry mass of test portion/kg | 0.090 |
| Moisture (%) | 11 |

**Waste Acceptance Criteria**

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

# Results - Single Stage WAC

**Project: 25473 Ballysparks Swords Site 1 LRD Site**

| | | | | | | Landfill Waste Acceptance Criteria Limits | | |
|---|---|---|---|---|---|---|---|---|
| **Chemtest Job No:** | 24-23031 | | | | | | | |
| **Chemtest Sample ID:** | 1838234 | | | | | | | |
| **Sample Ref:** | TP5 | | | | | | | |
| **Sample ID:** | | | | | | | | |
| **Sample Location:** | | | | | | | | |
| **Top Depth(m):** | 0.50 | | | | | | | |
| **Bottom Depth(m):** | | | | | | | | |
| **Sampling Date:** | | | | | | | | |
| **Determinand** | **SOP** | **HWOL Code** | **Accred.** | **Units** | | **Inert Waste Landfill** | **Stable, Non-reactive hazardous waste in non-hazardous Landfill** | **Hazardous Waste Landfill** |
| Total Organic Carbon | 2625 | | M | % | [A] 0.51 | 3 | 5 | 6 |
| Loss On Ignition | 2610 | | M | % | 3.0 | -- | -- | 10 |
| Total BTEX | 2760 | | M | mg/kg | [A] < 0.010 | 6 | -- | -- |
| Total PCBs (7 Congeners) | 2815 | | M | mg/kg | < 0.10 | 1 | -- | -- |
| TPH Total WAC | 2670 | EH_CU_1D_Total | M | mg/kg | [A] < 10 | 500 | -- | -- |
| Total Of 17 PAHs Lower | 2800 | | N | mg/kg | < 1.0 | 100 | -- | -- |
| pH at 20C | 2010 | | M | | 8.4 | -- | >6 | -- |
| Acid Neutralisation Capacity | 2015 | | N | mol/kg | 0.010 | -- | To evaluate | To evaluate |
| **Eluate Analysis** | | | | **10:1 Eluate mg/l** | **10:1 Eluate mg/kg** | **Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg** | | |
| Arsenic | 1455 | | U | < 0.0002 | < 0.0020 | 0.5 | 2 | 25 |
| Barium | 1455 | | U | < 0.005 | < 0.050 | 20 | 100 | 300 |
| Cadmium | 1455 | | U | < 0.00011 | < 0.0011 | 0.04 | 1 | 5 |
| Chromium | 1455 | | U | < 0.0005 | < 0.0050 | 0.5 | 10 | 70 |
| Copper | 1455 | | U | < 0.0005 | < 0.0050 | 2 | 50 | 100 |
| Mercury | 1455 | | U | < 0.00005 | < 0.00050 | 0.01 | 0.2 | 2 |
| Molybdenum | 1455 | | U | 0.0052 | 0.052 | 0.5 | 10 | 30 |
| Nickel | 1455 | | U | < 0.0005 | < 0.0050 | 0.4 | 10 | 40 |
| Lead | 1455 | | U | < 0.0005 | < 0.0050 | 0.5 | 10 | 50 |
| Antimony | 1455 | | U | < 0.0005 | < 0.0050 | 0.06 | 0.7 | 5 |
| Selenium | 1455 | | U | < 0.0005 | < 0.0050 | 0.1 | 0.5 | 7 |
| Zinc | 1455 | | U | < 0.003 | < 0.025 | 4 | 50 | 200 |
| Chloride | 1220 | | U | < 1.0 | < 10 | 800 | 15000 | 25000 |
| Fluoride | 1220 | | U | 0.37 | 3.7 | 10 | 150 | 500 |
| Sulphate | 1220 | | U | < 1.0 | < 10 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 1020 | | N | 42 | 420 | 4000 | 60000 | 100000 |
| Phenol Index | 1920 | | U | < 0.030 | < 0.30 | 1 | - | - |
| Dissolved Organic Carbon | 1610 | | U | 2.9 | < 50 | 500 | 800 | 1000 |

| **Solid Information** | |
|---|---|
| Dry mass of test portion/kg | 0.090 |
| Moisture (%) | 9.6 |

**Waste Acceptance Criteria**

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

# Results - Single Stage WAC

**Project: 25473 Ballysparks Swords Site 1 LRD Site**

| | | | | | | Landfill Waste Acceptance Criteria Limits | | |
|---|---|---|---|---|---|---|---|---|
| **Chemtest Job No:** | 24-23031 | | | | | | | |
| **Chemtest Sample ID:** | 1838235 | | | | | | | |
| **Sample Ref:** | TP6 | | | | | | | |
| **Sample ID:** | | | | | | | | |
| **Sample Location:** | | | | | | | | |
| **Top Depth(m):** | 1.50 | | | | | | | |
| **Bottom Depth(m):** | | | | | | | | |
| **Sampling Date:** | | | | | | | | |
| **Determinand** | **SOP** | **HWOL Code** | **Accred.** | **Units** | | **Inert Waste Landfill** | **Stable, Non-reactive hazardous waste in non-hazardous Landfill** | **Hazardous Waste Landfill** |
| Total Organic Carbon | 2625 | | M | % | [A] 0.27 | 3 | 5 | 6 |
| Loss On Ignition | 2610 | | M | % | 3.5 | -- | -- | 10 |
| Total BTEX | 2760 | | M | mg/kg | [A] < 0.010 | 6 | -- | -- |
| Total PCBs (7 Congeners) | 2815 | | M | mg/kg | < 0.10 | 1 | -- | -- |
| TPH Total WAC | 2670 | EH_CU_1D_Total | M | mg/kg | [A] < 10 | 500 | -- | -- |
| Total Of 17 PAHs Lower | 2800 | | N | mg/kg | < 1.0 | 100 | -- | -- |
| pH at 20C | 2010 | | M | | 8.6 | -- | >6 | -- |
| Acid Neutralisation Capacity | 2015 | | N | mol/kg | 0.018 | -- | To evaluate | To evaluate |
| **Eluate Analysis** | | | | **10:1 Eluate mg/l** | **10:1 Eluate mg/kg** | **Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg** | | |
| Arsenic | 1455 | | U | < 0.0002 | < 0.0020 | 0.5 | 2 | 25 |
| Barium | 1455 | | U | < 0.005 | < 0.050 | 20 | 100 | 300 |
| Cadmium | 1455 | | U | < 0.00011 | < 0.0011 | 0.04 | 1 | 5 |
| Chromium | 1455 | | U | < 0.0005 | < 0.0050 | 0.5 | 10 | 70 |
| Copper | 1455 | | U | < 0.0005 | < 0.0050 | 2 | 50 | 100 |
| Mercury | 1455 | | U | < 0.00005 | < 0.00050 | 0.01 | 0.2 | 2 |
| Molybdenum | 1455 | | U | 0.0013 | 0.013 | 0.5 | 10 | 30 |
| Nickel | 1455 | | U | < 0.0005 | < 0.0050 | 0.4 | 10 | 40 |
| Lead | 1455 | | U | < 0.0005 | < 0.0050 | 0.5 | 10 | 50 |
| Antimony | 1455 | | U | < 0.0005 | < 0.0050 | 0.06 | 0.7 | 5 |
| Selenium | 1455 | | U | < 0.0005 | < 0.0050 | 0.1 | 0.5 | 7 |
| Zinc | 1455 | | U | 0.003 | 0.027 | 4 | 50 | 200 |
| Chloride | 1220 | | U | < 1.0 | < 10 | 800 | 15000 | 25000 |
| Fluoride | 1220 | | U | 0.34 | 3.4 | 10 | 150 | 500 |
| Sulphate | 1220 | | U | 3.1 | 31 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 1020 | | N | 63 | 620 | 4000 | 60000 | 100000 |
| Phenol Index | 1920 | | U | < 0.030 | < 0.30 | 1 | - | - |
| Dissolved Organic Carbon | 1610 | | U | 3.1 | < 50 | 500 | 800 | 1000 |

| **Solid Information** | |
|---|---|
| Dry mass of test portion/kg | 0.090 |
| Moisture (%) | 13 |

**Waste Acceptance Criteria**

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

# Results - Single Stage WAC

**Project: 25473 Ballysparks Swords Site 1 LRD Site**

| | | | | | | Landfill Waste Acceptance Criteria Limits | | |
|---|---|---|---|---|---|---|---|---|
| **Chemtest Job No:** | 24-23031 | | | | | | | |
| **Chemtest Sample ID:** | 1838236 | | | | | | | |
| **Sample Ref:** | TP7 | | | | | | | |
| **Sample ID:** | | | | | | | | |
| **Sample Location:** | | | | | | | | |
| **Top Depth(m):** | 0.50 | | | | | | | |
| **Bottom Depth(m):** | | | | | | | | |
| **Sampling Date:** | | | | | | | | |
| **Determinand** | **SOP** | **HWOL Code** | **Accred.** | **Units** | | **Inert Waste Landfill** | **Stable, Non-reactive hazardous waste in non-hazardous Landfill** | **Hazardous Waste Landfill** |
| Total Organic Carbon | 2625 | | M | % | [A] 0.27 | 3 | 5 | 6 |
| Loss On Ignition | 2610 | | M | % | 2.2 | -- | -- | 10 |
| Total BTEX | 2760 | | M | mg/kg | [A] < 0.010 | 6 | -- | -- |
| Total PCBs (7 Congeners) | 2815 | | M | mg/kg | < 0.10 | 1 | -- | -- |
| TPH Total WAC | 2670 | EH_CU_1D_Total | M | mg/kg | [A] < 10 | 500 | -- | -- |
| Total Of 17 PAHs Lower | 2800 | | N | mg/kg | < 1.0 | 100 | -- | -- |
| pH at 20C | 2010 | | M | | 8.7 | -- | >6 | -- |
| Acid Neutralisation Capacity | 2015 | | N | mol/kg | 0.013 | -- | To evaluate | To evaluate |
| **Eluate Analysis** | | | | **10:1 Eluate mg/l** | **10:1 Eluate mg/kg** | **Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg** | | |
| Arsenic | 1455 | | U | < 0.0002 | < 0.0020 | 0.5 | 2 | 25 |
| Barium | 1455 | | U | < 0.005 | < 0.050 | 20 | 100 | 300 |
| Cadmium | 1455 | | U | < 0.00011 | < 0.0011 | 0.04 | 1 | 5 |
| Chromium | 1455 | | U | < 0.0005 | < 0.0050 | 0.5 | 10 | 70 |
| Copper | 1455 | | U | < 0.0005 | < 0.0050 | 2 | 50 | 100 |
| Mercury | 1455 | | U | < 0.00005 | < 0.00050 | 0.01 | 0.2 | 2 |
| Molybdenum | 1455 | | U | 0.0030 | 0.030 | 0.5 | 10 | 30 |
| Nickel | 1455 | | U | < 0.0005 | < 0.0050 | 0.4 | 10 | 40 |
| Lead | 1455 | | U | < 0.0005 | < 0.0050 | 0.5 | 10 | 50 |
| Antimony | 1455 | | U | < 0.0005 | < 0.0050 | 0.06 | 0.7 | 5 |
| Selenium | 1455 | | U | < 0.0005 | < 0.0050 | 0.1 | 0.5 | 7 |
| Zinc | 1455 | | U | < 0.003 | < 0.025 | 4 | 50 | 200 |
| Chloride | 1220 | | U | < 1.0 | < 10 | 800 | 15000 | 25000 |
| Fluoride | 1220 | | U | 0.41 | 4.1 | 10 | 150 | 500 |
| Sulphate | 1220 | | U | < 1.0 | < 10 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 1020 | | N | 50 | 500 | 4000 | 60000 | 100000 |
| Phenol Index | 1920 | | U | < 0.030 | < 0.30 | 1 | - | - |
| Dissolved Organic Carbon | 1610 | | U | 3.7 | < 50 | 500 | 800 | 1000 |

| **Solid Information** | |
|---|---|
| Dry mass of test portion/kg | 0.090 |
| Moisture (%) | 17 |

**Waste Acceptance Criteria**

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

# Results - Single Stage WAC

**Project: 25473 Ballysparks Swords Site 1 LRD Site**

| | | | | | | Landfill Waste Acceptance Criteria Limits | | |
|---|---|---|---|---|---|---|---|---|
| **Chemtest Job No:** | 24-23031 | | | | | | | |
| **Chemtest Sample ID:** | 1838237 | | | | | | | |
| **Sample Ref:** | TP8 | | | | | | | |
| **Sample ID:** | | | | | | | | |
| **Sample Location:** | | | | | | | | |
| **Top Depth(m):** | 0.60 | | | | | | | |
| **Bottom Depth(m):** | | | | | | | | |
| **Sampling Date:** | | | | | | | | |
| **Determinand** | **SOP** | **HWOL Code** | **Accred.** | **Units** | | **Inert Waste Landfill** | **Stable, Non-reactive hazardous waste in non-hazardous Landfill** | **Hazardous Waste Landfill** |
| Total Organic Carbon | 2625 | | M | % | [A] 0.59 | 3 | 5 | 6 |
| Loss On Ignition | 2610 | | M | % | 3.2 | -- | -- | 10 |
| Total BTEX | 2760 | | M | mg/kg | [A] < 0.010 | 6 | -- | -- |
| Total PCBs (7 Congeners) | 2815 | | M | mg/kg | < 0.10 | 1 | -- | -- |
| TPH Total WAC | 2670 | EH_CU_1D_Total | M | mg/kg | [A] < 10 | 500 | -- | -- |
| Total Of 17 PAHs Lower | 2800 | | N | mg/kg | < 1.0 | 100 | -- | -- |
| pH at 20C | 2010 | | M | | 8.2 | -- | >6 | -- |
| Acid Neutralisation Capacity | 2015 | | N | mol/kg | 0.013 | -- | To evaluate | To evaluate |
| **Eluate Analysis** | | | | **10:1 Eluate mg/l** | **10:1 Eluate mg/kg** | **Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg** | | |
| Arsenic | 1455 | | U | 0.0005 | 0.0055 | 0.5 | 2 | 25 |
| Barium | 1455 | | U | < 0.005 | < 0.050 | 20 | 100 | 300 |
| Cadmium | 1455 | | U | < 0.00011 | < 0.0011 | 0.04 | 1 | 5 |
| Chromium | 1455 | | U | < 0.0005 | < 0.0050 | 0.5 | 10 | 70 |
| Copper | 1455 | | U | 0.0013 | 0.014 | 2 | 50 | 100 |
| Mercury | 1455 | | U | < 0.00005 | < 0.00050 | 0.01 | 0.2 | 2 |
| Molybdenum | 1455 | | U | 0.0059 | 0.059 | 0.5 | 10 | 30 |
| Nickel | 1455 | | U | < 0.0005 | < 0.0050 | 0.4 | 10 | 40 |
| Lead | 1455 | | U | < 0.0005 | < 0.0050 | 0.5 | 10 | 50 |
| Antimony | 1455 | | U | < 0.0005 | < 0.0050 | 0.06 | 0.7 | 5 |
| Selenium | 1455 | | U | < 0.0005 | < 0.0050 | 0.1 | 0.5 | 7 |
| Zinc | 1455 | | U | 0.004 | 0.038 | 4 | 50 | 200 |
| Chloride | 1220 | | U | < 1.0 | < 10 | 800 | 15000 | 25000 |
| Fluoride | 1220 | | U | 0.28 | 2.8 | 10 | 150 | 500 |
| Sulphate | 1220 | | U | 1.4 | 14 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 1020 | | N | 57 | 570 | 4000 | 60000 | 100000 |
| Phenol Index | 1920 | | U | < 0.030 | < 0.30 | 1 | - | - |
| Dissolved Organic Carbon | 1610 | | U | 5.4 | 54 | 500 | 800 | 1000 |

| **Solid Information** | |
|---|---|
| Dry mass of test portion/kg | 0.090 |
| Moisture (%) | 11 |

**Waste Acceptance Criteria**

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

# Results - Single Stage WAC

**Project: 25473 Ballysparks Swords Site 1 LRD Site**

| | | | | | | Landfill Waste Acceptance Criteria Limits | | |
|---|---|---|---|---|---|---|---|---|
| **Chemtest Job No:** | 24-23031 | | | | | | | |
| **Chemtest Sample ID:** | 1838238 | | | | | | | |
| **Sample Ref:** | TP9 | | | | | | | |
| **Sample ID:** | | | | | | | | |
| **Sample Location:** | | | | | | | | |
| **Top Depth(m):** | 1.00 | | | | | | | |
| **Bottom Depth(m):** | | | | | | | | |
| **Sampling Date:** | | | | | | | | |
| **Determinand** | **SOP** | **HWOL Code** | **Accred.** | **Units** | | **Inert Waste Landfill** | **Stable, Non-reactive hazardous waste in non-hazardous Landfill** | **Hazardous Waste Landfill** |
| Total Organic Carbon | 2625 | | M | % | [A] < 0.20 | 3 | 5 | 6 |
| Loss On Ignition | 2610 | | M | % | 2.3 | -- | -- | 10 |
| Total BTEX | 2760 | | M | mg/kg | [A] < 0.010 | 6 | -- | -- |
| Total PCBs (7 Congeners) | 2815 | | M | mg/kg | < 0.10 | 1 | -- | -- |
| TPH Total WAC | 2670 | EH_CU_1D_Total | M | mg/kg | [A] < 10 | 500 | -- | -- |
| Total Of 17 PAHs Lower | 2800 | | N | mg/kg | < 1.0 | 100 | -- | -- |
| pH at 20C | 2010 | | M | | 8.1 | -- | >6 | -- |
| Acid Neutralisation Capacity | 2015 | | N | mol/kg | 0.013 | -- | To evaluate | To evaluate |
| **Eluate Analysis** | | | | **10:1 Eluate mg/l** | **10:1 Eluate mg/kg** | **Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg** | | |
| Arsenic | 1455 | | U | 0.0003 | 0.0027 | 0.5 | 2 | 25 |
| Barium | 1455 | | U | < 0.005 | < 0.050 | 20 | 100 | 300 |
| Cadmium | 1455 | | U | < 0.00011 | < 0.0011 | 0.04 | 1 | 5 |
| Chromium | 1455 | | U | < 0.0005 | < 0.0050 | 0.5 | 10 | 70 |
| Copper | 1455 | | U | < 0.0005 | < 0.0050 | 2 | 50 | 100 |
| Mercury | 1455 | | U | < 0.00005 | < 0.00050 | 0.01 | 0.2 | 2 |
| Molybdenum | 1455 | | U | 0.0049 | 0.049 | 0.5 | 10 | 30 |
| Nickel | 1455 | | U | < 0.0005 | < 0.0050 | 0.4 | 10 | 40 |
| Lead | 1455 | | U | < 0.0005 | < 0.0050 | 0.5 | 10 | 50 |
| Antimony | 1455 | | U | < 0.0005 | < 0.0050 | 0.06 | 0.7 | 5 |
| Selenium | 1455 | | U | < 0.0005 | < 0.0050 | 0.1 | 0.5 | 7 |
| Zinc | 1455 | | U | < 0.003 | < 0.025 | 4 | 50 | 200 |
| Chloride | 1220 | | U | < 1.0 | < 10 | 800 | 15000 | 25000 |
| Fluoride | 1220 | | U | 0.21 | 2.1 | 10 | 150 | 500 |
| Sulphate | 1220 | | U | < 1.0 | < 10 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 1020 | | N | 44 | 440 | 4000 | 60000 | 100000 |
| Phenol Index | 1920 | | U | < 0.030 | < 0.30 | 1 | - | - |
| Dissolved Organic Carbon | 1610 | | U | 3.0 | < 50 | 500 | 800 | 1000 |

| **Solid Information** | |
|---|---|
| Dry mass of test portion/kg | 0.090 |
| Moisture (%) | 11 |

**Waste Acceptance Criteria**

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

# Results - Single Stage WAC

**Project: 25473 Ballysparks Swords Site 1 LRD Site**

| | | | | | | Landfill Waste Acceptance Criteria Limits | | |
|---|---|---|---|---|---|---|---|---|
| **Chemtest Job No:** | 24-23031 | | | | | | | |
| **Chemtest Sample ID:** | 1838239 | | | | | | | |
| **Sample Ref:** | TP10 | | | | | | | |
| **Sample ID:** | | | | | | | | |
| **Sample Location:** | | | | | | | | |
| **Top Depth(m):** | 0.90 | | | | | | | |
| **Bottom Depth(m):** | | | | | | | | |
| **Sampling Date:** | | | | | | | | |
| **Determinand** | **SOP** | **HWOL Code** | **Accred.** | **Units** | | **Inert Waste Landfill** | **Stable, Non-reactive hazardous waste in non-hazardous Landfill** | **Hazardous Waste Landfill** |
| Total Organic Carbon | 2625 | | M | % | [A] 5.6 | 3 | 5 | 6 |
| Loss On Ignition | 2610 | | M | % | 14 | -- | -- | 10 |
| Total BTEX | 2760 | | M | mg/kg | [A] < 0.010 | 6 | -- | -- |
| Total PCBs (7 Congeners) | 2815 | | M | mg/kg | < 0.10 | 1 | -- | -- |
| TPH Total WAC | 2670 | EH_CU_1D_Total | M | mg/kg | [A] < 10 | 500 | -- | -- |
| Total Of 17 PAHs Lower | 2800 | | N | mg/kg | < 1.0 | 100 | -- | -- |
| pH at 20C | 2010 | | M | | 8.8 | -- | >6 | -- |
| Acid Neutralisation Capacity | 2015 | | N | mol/kg | 0.0090 | -- | To evaluate | To evaluate |
| **Eluate Analysis** | | | | **10:1 Eluate mg/l** | **10:1 Eluate mg/kg** | **Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg** | | |
| Arsenic | 1455 | | U | 0.0023 | 0.023 | 0.5 | 2 | 25 |
| Barium | 1455 | | U | 0.012 | 0.12 | 20 | 100 | 300 |
| Cadmium | 1455 | | U | 0.00013 | 0.0013 | 0.04 | 1 | 5 |
| Chromium | 1455 | | U | 0.0010 | 0.010 | 0.5 | 10 | 70 |
| Copper | 1455 | | U | 0.0050 | 0.050 | 2 | 50 | 100 |
| Mercury | 1455 | | U | 0.00005 | 0.00051 | 0.01 | 0.2 | 2 |
| Molybdenum | 1455 | | U | 0.0011 | 0.011 | 0.5 | 10 | 30 |
| Nickel | 1455 | | U | 0.0020 | 0.020 | 0.4 | 10 | 40 |
| Lead | 1455 | | U | 0.0063 | 0.063 | 0.5 | 10 | 50 |
| Antimony | 1455 | | U | 0.0009 | 0.0093 | 0.06 | 0.7 | 5 |
| Selenium | 1455 | | U | 0.0009 | 0.0088 | 0.1 | 0.5 | 7 |
| Zinc | 1455 | | U | 0.007 | 0.072 | 4 | 50 | 200 |
| Chloride | 1220 | | U | < 1.0 | < 10 | 800 | 15000 | 25000 |
| Fluoride | 1220 | | U | 0.15 | 1.5 | 10 | 150 | 500 |
| Sulphate | 1220 | | U | 6.0 | 60 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 1020 | | N | 47 | 460 | 4000 | 60000 | 100000 |
| Phenol Index | 1920 | | U | < 0.030 | < 0.30 | 1 | - | - |
| Dissolved Organic Carbon | 1610 | | U | 15 | 150 | 500 | 800 | 1000 |

| **Solid Information** | |
|---|---|
| Dry mass of test portion/kg | 0.090 |
| Moisture (%) | 30 |

**Waste Acceptance Criteria**

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

## Deviations



In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

| Sample: | Sample Ref: | Sample ID: | Sample Location: | Sampled Date: | Deviation Code(s): | Containers Received: |
|---|---|---|---|---|---|---|
| 1838229 | TP1 | | | | A | Amber Glass 250ml |
| 1838229 | TP1 | | | | A | Plastic Tub 500g |
| 1838230 | TP2 | | | | A | Amber Glass 250ml |
| 1838230 | TP2 | | | | A | Plastic Tub 500g |
| 1838231 | TP2 | | | | A | Amber Glass 250ml |
| 1838231 | TP2 | | | | A | Plastic Tub 500g |
| 1838232 | TP3 | | | | A | Amber Glass 250ml |
| 1838232 | TP3 | | | | A | Plastic Tub 500g |
| 1838233 | TP4 | | | | A | Amber Glass 250ml |
| 1838233 | TP4 | | | | A | Plastic Tub 500g |
| 1838234 | TP5 | | | | A | Amber Glass 250ml |
| 1838234 | TP5 | | | | A | Plastic Tub 500g |
| 1838235 | TP6 | | | | A | Amber Glass 250ml |
| 1838235 | TP6 | | | | A | Plastic Tub 500g |
| 1838236 | TP7 | | | | A | Amber Glass 250ml |
| 1838236 | TP7 | | | | A | Plastic Tub 500g |
| 1838237 | TP8 | | | | A | Amber Glass 250ml |
| 1838237 | TP8 | | | | A | Plastic Tub 500g |
| 1838238 | TP9 | | | | A | Amber Glass 250ml |
| 1838238 | TP9 | | | | A | Plastic Tub 500g |
| 1838239 | TP10 | | | | A | Amber Glass 250ml |
| 1838239 | TP10 | | | | A | Plastic Tub 500g |

## Deviations



In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

| Sample: | Sample Ref: | Sample ID: | Sample Location: | Sampled Date: | Deviation Code(s): | Containers Received |
|---|---|---|---|---|---|---|
| 1838240 | TP10 | | | | A | Amber Glass 250ml |
| 1838240 | TP10 | | | | A | Plastic Tub 500g |

# Test Methods



| SOP | Title | Parameters included | Method summary | Water Accred. |
|---|---|---|---|---|
| 1010 | pH Value of Waters | pH at 20°C | pH Meter | |
| 1020 | Electrical Conductivity and Total Dissolved Solids (TDS) in Waters | Electrical Conductivity at 25°C and Total Dissolved Solids (TDS) in Waters | Conductivity Meter | |
| 1220 | Anions, Alkalinity & Ammonium in Waters | Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium | Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser. | |
| 1455 | Metals in Waters by ICP-MS | Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc | Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS). | |
| 1610 | Total/Dissolved Organic Carbon in Waters | Organic Carbon | TOC Analyser using Catalytic Oxidation | |
| 1920 | Phenols in Waters by HPLC | Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded. | Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection. | |
| 2010 | pH Value of Soils | pH at 20°C | pH Meter | |
| 2015 | Acid Neutralisation Capacity | Acid Reserve | Titration | |
| 2030 | Moisture and Stone Content of Soils(Requirement of MCERTS) | Moisture content | Determination of moisture content of soil as a percentage of its as received mass obtained at <30°C. | |
| 2040 | Soil Description(Requirement of MCERTS) | Soil description | As received soil is described based upon BS5930 | |
| 2120 | Water Soluble Boron, Sulphate, Magnesium & Chromium | Boron; Sulphate; Magnesium; Chromium | Aqueous extraction / ICP-OES | |
| 2175 | Total Sulphur in Soils | Total Sulphur | Determined by high temperature combustion under oxygen, using an Eltra elemental analyser. | |
| 2180 | Sulphur (Elemental) in Soils by HPLC | Sulphur | Dichloromethane extraction / HPLC with UV detection | |
| 2192 | Asbestos | Asbestos | Polarised light microscopy / Gravimetry | |
| 2220 | Water soluble Chloride in Soils | Chloride | Aqueous extraction and measurememt by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate. | |
| 2300 | Cyanides & Thiocyanate in Soils | Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate | Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser. | |
| 2325 | Sulphide in Soils | Sulphide | Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine. | |
| 2430 | Total Sulphate in soils | Total Sulphate | Acid digestion followed by determination of sulphate in extract by ICP-OES. | |
| 2455 | Acid Soluble Metals in Soils | Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc | Acid digestion followed by determination of metals in extract by ICP-MS. | |
| 2490 | Hexavalent Chromium in Soils | Chromium [VI] | Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide. | |
| 2610 | Loss on Ignition | loss on ignition (LOI) | Determination of the proportion by mass that is lost from a soil by ignition at 550°C. | |
| 2625 | Total Organic Carbon in Soils | Total organic Carbon (TOC) | Determined by high temperature combustion under oxygen, using an Eltra elemental analyser. | |
| 2670 | Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID | TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40 | Dichloromethane extraction / GC-FID | |

# Test Methods



| SOP | Title | Parameters included | Method summary | Water Accred. |
|---|---|---|---|---|
| 2690 | EPH A/A Split | Aliphatics: >C10–C12, >C12–C16, >C16–C21, >C21– C35, >C35– C40 Aromatics: >C10–C12, >C12–C16, >C16–C21, >C21– C35, >C35– C40 | Acetone/Heptane extraction / GCxGC FID detection | |
| 2760 | Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS | Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule | Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds. | |
| 2780 | VPH A/A Split | Aliphatics: >C5–C6, >C6–C7,>C7–C8,>C8–C10 Aromatics: >C5–C7,>C7-C8,>C8–C10 | Water extraction / Headspace GCxGC FID detection | |
| 2800 | Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS | Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene* | Dichloromethane extraction / GC-MS | |
| 2815 | Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS | ICES7 PCB congeners | Acetone/Hexane extraction / GC-MS. Reported PCB 101 results may contain contributions from PCB 90 due to inseparable chromatography. | |
| 2920 | Phenols in Soils by HPLC | Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded. | 60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection. | |
| 640 | Characterisation of Waste (Leaching C10) | Waste material including soil, sludges and granular waste | ComplianceTest for Leaching of Granular Waste Material and Sludge | |

## Report Information



### Key

| | |
|---|---|
| U | UKAS accredited |
| M | MCERTS and UKAS accredited |
| N | Unaccredited |
| S | This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis |
| SN | This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis |
| T | This analysis has been subcontracted to an unaccredited laboratory |
| I/S | Insufficient Sample |
| U/S | Unsuitable Sample |
| N/E | not evaluated |
| < | "less than" |
| > | "greater than" |
| SOP | Standard operating procedure |
| LOD | Limit of detection |

This report shall not be reproduced except in full, and only with the prior approval of the laboratory.
Any comments or interpretations are outside the scope of UKAS accreditation.
The Laboratory is not accredited for any sampling activities and reported results relate to the samples 'as received' at the laboratory.
Uncertainty of measurement for the determinands tested are available upon request .
None of the results in this report have been recovery corrected.
All results are expressed on a dry weight basis.

The following tests were analysed on samples 'as received' and the results subsequently corrected to a dry weight basis EPH, VPH, TPH, BTEX, VOCs, SVOCs, PCBs, Phenols.

For all other tests the samples were dried at ≤ 30°C prior to analysis.
All Asbestos testing is performed at the indicated laboratory .
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1.

### Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

### Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt.
All water samples will be retained for 14 days from the date of receipt.
Charges may apply to extended sample storage.

### Water Sample Category Key for Accreditation

DW - Drinking Water
GW - Ground Water
LE - Land Leachate
NA - Not Applicable

## Report Information



PL - Prepared Leachate
PW - Processed Water
RE - Recreational Water
SA - Saline Water
SW - Surface Water
TE - Treated Effluent
TS - Treated Sewage
UL - Unspecified Liquid

### Clean Up Codes

NC - No Clean Up
MC - Mathematical Clean Up
FC - Florisil Clean Up

### HWOL Acronym System

HS - Headspace analysis
EH - Extractable hydrocarbons – i.e. everything extracted by the solvent
CU - Clean-up – e.g. by Florisil, silica gel
1D - GC – Single coil gas chromatography
Total - Aliphatics & Aromatics
AL - Aliphatics only
AR - Aromatic only
2D - GC-GC – Double coil gas chromatography
#1 - EH_2D_Total but with humics mathematically subtracted
#2 - EH_2D_Total but with fatty acids mathematically subtracted
+ - Operator to indicate cumulative e.g. EH+EH_Total or EH_CU+HS_Total

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

# Appendix V Laboratory Data

## c. WCA Report (Extract)

Unit 15
Melbourne Business Park
Model Farm Road
Cork T12 WR89

O'Callaghan Moran & Associates
ENVIRONMENTAL MANAGEMENT FOR BUSINESS

T: 021 434 5366
E:admin@ocallaghanmoran.com
www.ocallaghanmoran.com



# Waste Characterisation Assessment

## Barryspark LRD Site 1

## Swords

## Co. Dublin

**Prepared For: -**

IGSL Limited
Unit F
M7 Business Park
Naas
County Kildare

**Prepared By: -**

O'Callaghan Moran & Associates
Unit 15 Melbourne Business Park
Model Farm Road
Cork

**August 2024**

| Project | Waste Characterisation: Barryspark, Swords | | | |
|---|---|---|---|---|
| Client | IGSL Limited | | | |
| Report No | Date | Status | Prepared By | Reviewed By |
| 240014601 | 15/08/2024 | Final | Austin Hynes PGeo MSc | Sean Moran B.Sc. MSc |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

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## APPENDICES

# 1 INTRODUCTION

IGSL Limited requested O'Callaghan Moran & Associates (OCM) to undertake a waste characterisation assessment of ten (10 No.) samples of made ground and natural ground collected from ten (10 No.) trial pits from a site at Barryspark, Swords, Co. Dublin.

## 1.1 Methodology

IGSL provided a description of the ground conditions and collected samples of the soils from the trial pit locations. The samples were analysed at an accredited laboratory and the results formed the basis for a waste classification assessment, which was undertaken by OCM in accordance with the Environmental Protection Agency (EPA) Guidelines on the Classification of Waste (2015).

## 2 WASTE CLASSIFICATION ASSESSMENT

### 2.1 Soil Sampling and Laboratory Analysis

#### 2.1.1 *Site Investigation*

The site investigation was undertaken in June 2024 and included the collection of ten (10 No.) samples of made ground and natural ground collected from ten (10 No.) trial pits. The location of the samples is shown on Drawing No. 107. The logs are in Appendix 1.

There is topsoil at the surface of all locations. The surface of TP01, TP02, TP03, TP06, TP07 and TP09 comprises Made Ground.

At TP02, the Made Ground is 0.90m in thickness and is composed of brown, sandy gravelly CLAY with cobble and boulder content. This is underlain by firm to stiff, sandy gravelly CLAY with cobble content to 2.80 mbgl. Very stiff CLAY was encountered to 3.60 mbgl.

At TP06, the Made Ground extends to 2.10 mbgl. This is composed of firm to stiff, sandy gravelly CLAU with cobble content. This is underlain by stiff to very stiff, sandy gravelly CLAY to 2.60 mbgl.

The Made Ground at TP07 is 1.80m in thickness and comprises stiff, sandy gravelly CLAY with cobble content. This is underlain by soft to firm, gravelly CLAY with cobble content.

The Made Ground at all locations contains non-natural material <2% of the soil matrix including fragments of brick, concrete and plastic.

At TP01, TP03-TP05 and TP08-TP10, the subsurface comprises Natural Ground. The Natural Grouis is generally composed of sandy gravelly CLAY with cobble content which is firm to stiff from 0.50-1.00 mbgl, and stiff becoming very stiff from 1.00-3.00 mbgl.

Dense to very dense, clayey gravelly SAND was encountered in TP01 from 2.10-3.10 and in TP10 from 2.50-3.00 mbgl.

#### 2.1.2 *Sample Collection*

IGSL collected the samples and placed them in laboratory prepared containers that were stored in coolers prior to shipment to Chemtest Ltd.

#### 2.1.3 *Laboratory Analysis*

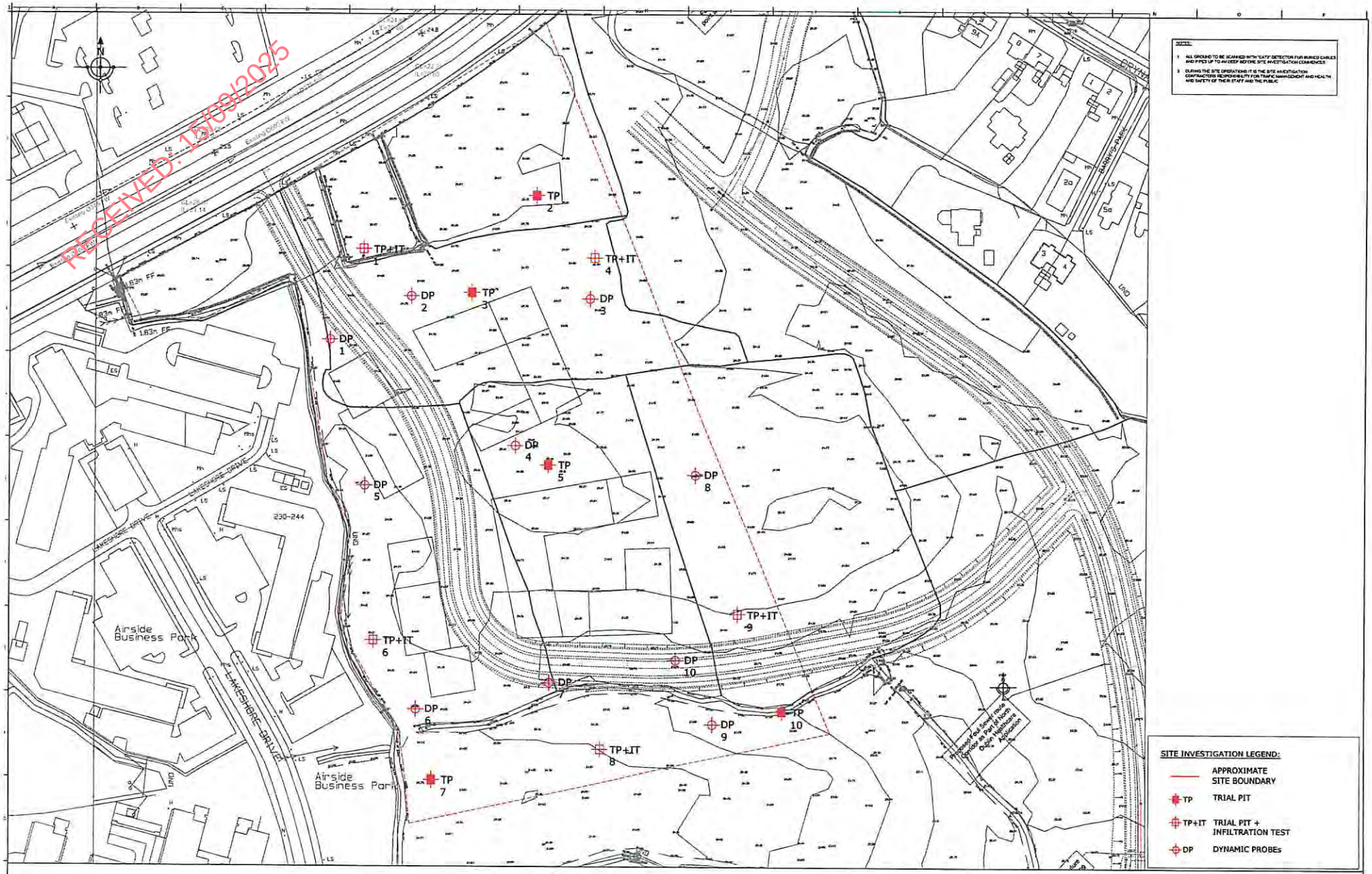
The samples were tested for, metals (arsenic, barium, cadmium, chromium, copper, mercury, molybdenum, nickel, lead, antimony, selenium and zinc, total organic carbon (TOC), BTEX

(benzene, toluene, ethylbenzene and xylene) aliphatic and aromatic hydrocarbons, polychlorinated biphenyls (PCB), mineral oil, polyaromatic hydrocarbons (PAH) and asbestos. Leachate generated from the samples was tested for arsenic, barium, cadmium, chromium, copper, mercury, molybdenum, nickel, lead, antimony, selenium and zinc, chloride, fluoride, soluble sulphate, phenols, dissolved organic carbon (DOC), total dissolved solids (TDS).



This parameter range facilitates an assessment of the hazardous properties of the waste, and also allows a determination of appropriate off-site management options based on the Waste Acceptance Criteria (WAC) applied by landfill operators.

The analytical methods were all ISO/CEN approved and the method detection limits were below the relevant guidance/threshold values. The full laboratory report is in Appendix 2.




NOTES:

1. ALL GROUND TO BE SCANNED WITH "CAT3" DETECTOR FOR BURIED CABLES AND PIPES UP TO 4M DEEP BEFORE SITE INVESTIGATION COMMENCES
2. DURING THE SITE OPERATIONS IT IS THE SITE INVESTIGATION CONTRACTORS RESPONSIBILITY FOR TRAFFIC MANAGEMENT AND HEALTH AND SAFETY OF THEIR STAFF AND THE PUBLIC

**SITE INVESTIGATION LEGEND:**

- APPROXIMATE SITE BOUNDARY
- TP — TRIAL PIT
- TP+IT — TRIAL PIT + INFILTRATION TEST
- DP — DYNAMIC PROBES



| Rev | Date | Description | By |
|---|---|---|---|

Project Title: BARRYSPARKS LRD

Architect: M CROSSSAN O ROURKE MANNING

| Date | By | Checked | Scale @ A1 |
|---|---|---|---|
| MAY 2024 | TS | X | AS SHOWN |

Drawing Title: SITE INVESTIGATION

Drawing Status: PLANNING

| Job No. | Drawing No. | Issue |
|---|---|---|
| 23012 | 107 | T1 |

POGA

## 2.2 Waste Classification

The Haz Waste Online Classification Engine, developed in the UK by One Touch Data Ltd, was used to determine the waste classification. This tool was developed specifically to establish whether waste is non-hazardous or hazardous and has been approved for use in Ireland by the Environmental Protection Agency. The full Waste Classification Report is in Appendix 3 and the results are summarised in Table 2.1.

**Table 2.1 Waste Classification**

| Sample No. | Depth | Classification | LoW Code |
|---|---|---|---|
| TP1 | 0.90 | Non-Hazardous | 17 05 04 |
| TP2 | 0.50 | Non-Hazardous | 17 05 04 |
| TP3 | 0.50 | Non-Hazardous | 17 05 04 |
| TP4 | 0.70 | Non-Hazardous | 17 05 04 |
| TP5 | 0.50 | Non-Hazardous | 17 05 04 |
| TP6 | 1.50 | Non-Hazardous | 17 05 04 |
| TP7 | 0.50 | Non-Hazardous | 17 05 04 |
| TP8 | 0.60 | Non-Hazardous | 17 05 04 |
| TP9 | 1.00 | Non-Hazardous | 17 05 04 |
| TP10 | 0.90 | Non-Hazardous | 17 05 04 |

Asbestos was not detected in any of the samples tested.

All samples are classified as non-hazardous and the appropriate List of Waste Code is 17 05 04 (Soil and Stone other than those mentioned in 17 05 03*).

## 2.3 Waste Acceptance Criteria

The results of the WAC testing are presented in Table 2.2, which includes for comparative purposes the WAC for Inert, Non Hazardous and Hazardous Waste Landfills pursuant to Article 16 of the EU Landfill Directive 1999/31/EC Annex II which establishes criteria and procedures for the acceptance of waste at landfills.

The sample from TP10 exceeds the inert WAC for Total Organic Carbon.

All other samples meet the inert WAC.

## Table 2.2 WAC Results

| Parameter | Unit | TP1 | TP2 | TP3 | TP4 | TP5 | TP6 | TP7 | TP8 | TP9 | TP10 | Inert Landfill | Inert Landfill Increased Limits | Non-Hazardous Landfill | Hazardous Landfill |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Depth | m | 0.90 | 0.50 | 0.50 | 0.70 | 0.50 | 1.50 | 0.50 | 0.60 | 1.00 | 0.90 | | | | |
| | | | | | | | | | | | | | | | |
| Antimony | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0093 | 0.06 | 0.18 | 0.7 | 5 |
| Arsenic | mg/kg | <0.0020 | 0.0042 | <0.0020 | <0.0020 | <0.0020 | <0.0020 | <0.0020 | 0.0055 | 0.0027 | 0.023 | 0.5 | 1.5 | 2 | 25 |
| Barium | mg/kg | 0.063 | <0.050 | 0.052 | 0.051 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.12 | 20 | 20 | 100 | 300 |
| Cadmium | mg/kg | <0.0011 | <0.0011 | <0.0011 | <0.0011 | <0.0011 | <0.0011 | <0.0011 | <0.0011 | <0.0011 | 0.0013 | 0.04 | 0.04 | 1 | 5 |
| Chromium | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.010 | 0.5 | 0.5 | 10 | 70 |
| Copper | mg/kg | <0.0050 | 0.012 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.014 | <0.0050 | 0.050 | 2 | 2 | 50 | 100 |
| Lead | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.063 | 0.5 | 0.5 | 10 | 50 |
| Molybdenum | mg/kg | 0.063 | 0.036 | 0.086 | 0.066 | 0.052 | 0.013 | 0.030 | 0.059 | 0.049 | 0.011 | 0.5 | 1.5 | 10 | 30 |
| Nickel | mg/kg | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.020 | 0.4 | 0.4 | 10 | 40 |
| Selenium | mg/kg | 0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0088 | 0.1 | 0.3 | 0.5 | 7 |
| Zinc | mg/kg | <0.025 | <0.025 | <0.025 | <0.025 | <0.025 | 0.027 | <0.025 | 0.038 | <0.025 | 0.072 | 4 | 4 | 50 | 200 |
| Mercury | mg/kg | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | 0.00051 | 0.01 | 0.01 | 0.2 | 2 |
| Phenol | mg/kg | <0.30 | <0.30 | <0.30 | <0.30 | <0.30 | <0.30 | <0.30 | <0.30 | <0.30 | <0.30 | 1 | 1 | NE | NE |
| Fluoride | mg/kg | 2.5 | 2.2 | 3.2 | 3.5 | 3.7 | 3.4 | 4.1 | 2.8 | 2.1 | 1.5 | 10 | 10 | 150 | 500 |
| Chloride | mg/kg | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | 800 | 2,400 | 15,000 | 25,000 |
| Sulphate | mg/kg | <10 | <10 | <10 | <10 | <10 | 31 | <10 | 14 | <10 | 60 | 1000* | 3,000 | 20000* | 50,000 |
| DOC ** | mg/kg | <50 | <50 | <50 | <50 | <50 | <50 | <50 | 54 | <50 | 150 | 500 | 500 | 800 | 1,000 |
| pH | pH units | 9.4 | 8.5 | 8.4 | 8.3 | 8.4 | 8.6 | 8.7 | 8.2 | 8.1 | 8.8 | NE | NE | NE | NE |
| TDS *** | mg/kg | 880 | 410 | 420 | 410 | 420 | 620 | 500 | 570 | 440 | 460 | 4,000 | 12,000 | 60,000 | 100,000 |
| TOC | % | 0.44 | 2.1 | 0.36 | 0.62 | 0.51 | 0.27 | 0.27 | 0.59 | <0.20 | 5.6 | 3 | 6 | NE | 6 |
| Benzene | mg/kg | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 6 | 6 | NE | NE |
| Toluene | mg/kg | 0.0034 | 0.0036 | 0.0029 | 0.0029 | 0.003 | 0.003 | 0.0035 | 0.0029 | 0.0037 | 0.0034 | 6 | 6 | NE | NE |
| Ethylbenzene | mg/kg | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 6 | 6 | NE | NE |
| m/p-Xylene | mg/kg | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 6 | 6 | NE | NE |
| o-Xylene | mg/kg | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 6 | 6 | NE | NE |
| PCB Total of 7 | mg/kg | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | 1 | 1 | NE | NE |
| Total 17 PAH's | mg/kg | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | NE | 100 | NE | NE |
| Mineral Oil | mg/kg | 25 | 11 | 22 | 10 | <10 | 25 | 28 | 25 | <10 | 64 | 500 | 500 | NE | NE |
| Asbestos | % mass | NAD | NAD | NAD | NAD | NAD | NAD | NAD | NAD | NAD | NAD | NE | NE | NE | NE |

NAD denotes No Asbestos Detected

* denotes sulphate level exceeding inert waste limit may be considered as complying if the TDS value does not exceed 6,000mg/kg at L/S = 10l/kg.

** denotes a higher limit may be accepted provided the DOC alternative values of 500mg/kg is achieved

*** denotes TDS. The values for TDS can be used to sulphate and chloride.

PAH over 1mg/kg and Mineral Oil over 50 mg/kg exceeds limit at soil recovery site in Ireland

## 2.4 Waste Management Options

The EPA has issued guidance on acceptance criteria for a range of parameters for soil recovery sites. This includes;

- Metals (solid conc. not leachability) in soil and stone (including As, Cd, Cr, Cu, Hg, Ni, Pub, Zn);
- Total organic carbon in soil and stone;
- Total BTEX (benzene, toluene, ethylbenzene, xylenes) in soil and stone;
- Mineral oil in soil and stone;
- Polycyclic aromatic hydrocarbons (PAHs) in soil and stone;
- Polychlorinated Biphenyls (PCBs) in soil and stone;
- Asbestos fibres in soil and stone.

The guidance requires that soils from brownfield sites should not exceed the limits for the parameters specified in Table 2.3 and 2.4. For metals limits have been specified for a range of soil types nationally separated into six domain areas.

**Table 2.3 Soil Recovery Site Criteria**

| Parameter | Limit for Soil Recovery Sites |
|---|---|
| Total BTEX | 0.05 mg/kg |
| Mineral Oil | 50 mg/kg |
| Total PAHs | 1 mg/kg |
| Total PCBs | 0.05 mg/kg |

All samples which meet the inert WAC, meet the soil recovery criteria for Total BTEX, Mineral Oil, Total PAH's and Total PCB's.

The soil and stone cannot be sent to soil recovery sites if the trigger levels for a particular domain are exceeded. There is however some flexibility in applying the limits. A derogation applies where up to three parameters can exceed the limit for a sample provided the concentration in the samples is no more than 1.5 times the trigger level. The site which is subject to this investigation is located in Domain 2 and the trigger levels are listed in Table 2.4.

**Table 2.4 Soil Recovery Trigger Levels**

| | | Domain 4 Trigger Level | 1.5 times Trigger Level |
|---|---|---|---|
| Arsenic | mg/kg | 24.90 | 37.35 |
| Cadmium | mg/kg | 3.28 | 4.92 |
| Chromium | mg/kg | 50.30 | 75.45 |
| Copper | mg/kg | 63.50 | 95.25 |
| Mercury | mg/kg | 0.36 | 0.54 |
| Nickel | mg/kg | 61.90 | 92.85 |
| Lead | mg/kg | 86.10 | 129.15 |
| Zinc | mg/kg | 197.00 | 295.5 |

All samples meet the soil recovery criteria for metal concentrations.

Waste management options are summarised on Table 2.5. All are subject to approval of the waste management facility operators. Class A material is suitable for removal to a soil recovery facility. Class B-2 wastes are suitable for disposal to inert landfill with increased limits.

**Table 2.5 Waste Management Options**

| Sample No. | Depth | Classification | LoW Code | Category |
|---|---|---|---|---|
| TP1 | 0.90 | Non-Hazardous | 17 05 04 | A |
| TP2 | 0.50 | Non-Hazardous | 17 05 04 | A |
| TP3 | 0.50 | Non-Hazardous | 17 05 04 | A |
| TP4 | 0.70 | Non-Hazardous | 17 05 04 | A |
| TP5 | 0.50 | Non-Hazardous | 17 05 04 | A |
| TP6 | 1.50 | Non-Hazardous | 17 05 04 | A |
| TP7 | 0.50 | Non-Hazardous | 17 05 04 | A |
| TP8 | 0.60 | Non-Hazardous | 17 05 04 | A |
| TP9 | 1.00 | Non-Hazardous | 17 05 04 | A |
| TP10 | 0.90 | Non-Hazardous | 17 05 04 | B-2 |

| | |
|---|---|
| A | Meets Soil Recovery Criteria |
| B-2 | Suitable for disposal/recovery to Inert Landfill with increased limits |

# 3 CONCLUSIONS AND RECOMMENDATIONS

## 3.1 Conclusions

### 3.1.1 *Waste Classification*

Asbestos was not detected in any of the samples tested.

All samples are classified as non-hazardous and the appropriate List of Waste Code is 17 05 04 (Soil and Stone other than those mentioned in 17 05 03*).

The soils are suitable for retention on site but If the soils have to be removed from the site the disposal options are outlined in Section 2.4.

## 3.2 Recommendations

OCM recommend that a copy of this report be provided in full to the relevant waste management facilities to which the made ground and subsoils will be consigned to confirm its suitability for acceptance.

# Appendix VI Site Plans



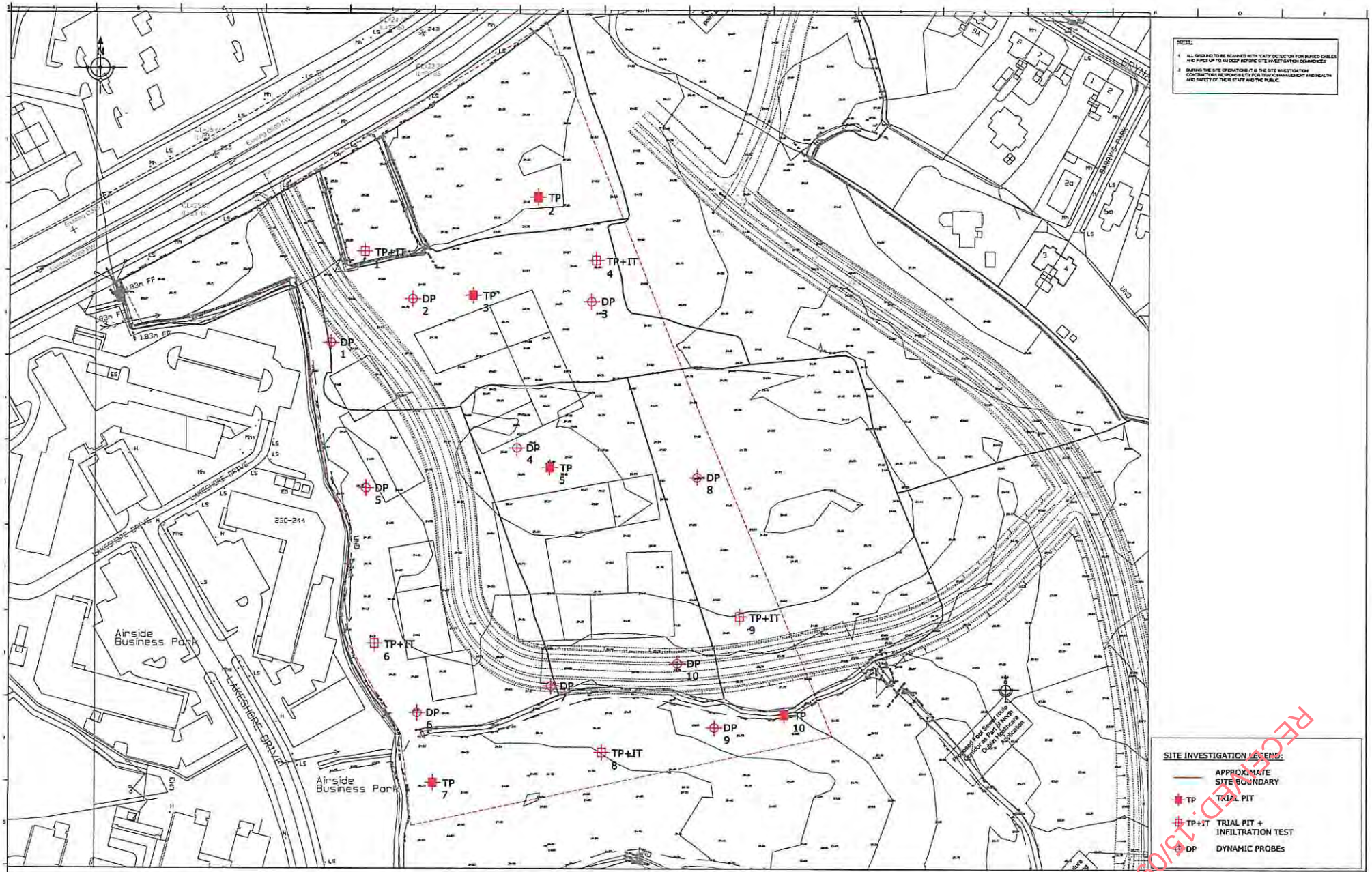

ExpertGPS

# Barrysparks Setout - Site 1

25 0 25 50 75 100 125 150 175 200 225 250 275 300 325 350 375 400 425 450 m

Scale: 1 : 2500.

MN
1°31'


NOTES:
1 ALL GROUND TO BE SCANNED WITH 'CAT3' DETECTOR FOR BURIED CABLES AND PIPES UP TO 4M DEEP BEFORE SITE INVESTIGATION COMMENCES
2 DURING THE SITE OPERATIONS IT IS THE SITE INVESTIGATION CONTRACTORS RESPONSIBILITY FOR TRAFFIC MANAGEMENT AND HEALTH AND SAFETY OF THEIR STAFF AND THE PUBLIC.
TP 2
TP+IT 1
TP+IT 4
DP 2
TP 3
DP 3
DP 1
DP 4
TP 5
DP 5
DP 8
TP+IT 9
TP+IT 6
DP 10
DP
DP 6
TP 10
DP 9
TP+IT 8
TP 7
CHESHIRE DRIVE
Airside Business Park
230-244
Proposed Foul Sewer route Connection to Part 8 North Dublin Healthcare Application
SITE INVESTIGATION LEGEND:
APPROXIMATE SITE BOUNDARY
TP TRIAL PIT
TP+IT TRIAL PIT + INFILTRATION TEST
DP DYNAMIC PROBES
RECEIVED: 15/09/2025
Project Title BARRYSPARKS LRD
Architect M CROSSSAN O ROURKE MANNING
Date MAY 2024 | By TS | Checked X | Scale @ A1 AS SHOWN
Drawing Title SITE INVESTIGATION
Drawing Status PLANNING
Job No. 23012 | Drawing No. 107 | Issue T1
POGA

REPORT REVISED TO INCLUDE ROTARY DRILLING
JANUARY 2025

**PROPOSED DEVELOPMENT**
**BARRYSPARKS SITE 2**
**SWORDS CO.DUBLIN**
**VHI SITE**

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**POGA**
**CONSULTING ENGINEER**

## CONTENTS



## APPENDICES

## FOREWORD

The following Conditions and Notes on Site Investigation Procedures should be read in conjunction with this report.

### General.

Recommendations made, and opinions expressed in the report are based on the strata observed in the exploratory holes, together with the results of in-situ and laboratory tests. No responsibility can be held for conditions which have not been revealed by exploratory work, or which occur between exploratory hole locations. Whilst the report may suggest the likely configuration of strata, both between exploratory hole locations, or below the maximum depth of the investigation, this is only indicative, and liability cannot be accepted for its accuracy.

Unless specifically stated, no account has been taken of possible subsidence due to mineral extraction below or close to the site.

### Boring Procedures.

Unless otherwise stated, the 'Shell and Auger' technique of soft ground boring has been employed. All boring operations sampling and/or logging of soils and in-situ testing complies with the recommendations of the British Standard Code of Practice BS 5930 (1981), 'Site Investigation' and BS 1377:1990, 'Methods of test for soils for civil engineering purposes'.

Whilst the technique allows the maximum data to be obtained in soft ground, some disturbance and variation of soft and layered soils is unavoidable. Attention is drawn to this condition, whenever it is suspected. Where cobbles and boulders are recorded, no conclusion should be drawn concerning the size, presence, lithological nature, or numbers per unit volume of ground.

Where peat has been encountered during siteworks, samples have been logged in accordance with the Von Post Classification (ref. Von Post, L. 1992. Sveriges Gologiska Undersoknings torvinventering och nogra av dess hittils vunna resultat (SGU peat inventory and some preliminary results) Svenska Mosskulturforeningens Tidskrift, Jonkoping, Swedden, 36, 1-37 & Hobbs N. B. Mire morphology and the properties of some British and foreign peats. QJEG, Vol. 19, 1986).

**Routine Sampling.**

Undisturbed samples of soils, predominantly cohesive in nature are obtained unless otherwise stated by a 104mm diameter open-drive tube sampler. In granular soils, and where undisturbed sampling is inappropriate, disturbed samples are collected. Smaller disturbed samples are also recovered at intervals to allow a visual examination of the full strata section.

**In-Situ Testing.**

Standard penetration tests, utilising either the standard split spoon sampler or solid cone and automatic trip-hammer are conducted unless otherwise where required by instruction. Subsequent to a seating drive of 150mm, a summation for the number of blows for 300mm penetration is recorded on the boring records together with the blow count for each 75mm penetration. In cases where incomplete penetration is obtained, the number of blows for the recorded value of penetration are noted. In coarse granular soils, a cone end is fitted to the sampler and a similar procedure adopted.

**Groundwater.**

The depth of entry of any influx of groundwater is recorded during the course of boring operations. However, the normal rate of boring does not usually permit the recording of an equilibrium level for any one water strike. Where possible drilling is suspended for a period of twenty minutes to monitor the subsequent rise in water level.

Groundwater conditions observed in the borings or pits are those appertaining to the period of investigation. It should be noted however, that groundwater levels are subject to diurnal, seasonal and climatic variations and can also be affected by drainage condition, tidal variation or other causes.

**Retention of Samples.**

After satisfactory completion of all the scheduled laboratory tests on any sample, the remaining material is discarded unless a period of retention of samples is agreed, it is our normal practice to discard all soil samples one month after submission of our final report.

# REPORT ON A SITE INVESTIGATION FOR A PROPOSED NEW DEVELOPMENT AT BARRYSPARKS VHI SITE 2

**POGA**
**CONSULTING ENGINEERS**

**Report No. 25474**

**August 2024**
**Revised Jan. 2025**

## I Introduction

A new development is proposed for a brownfield site located at Barrysparks in Swords, County Dublin.

An investigation of sub soil conditions in the area of the new development has been carried out by IGSL for POGA Consulting Engineers on behalf of VHI.

The investigation has been concentrated along a proposed access route along the eastern boundary of the site area.

The scope of work was scheduled by the Consulting Engineer and comprised the following elements.

- Trial Pits 8 nr.
- Rotary Core Boreholes 2 nr.
- CBR by Plate Bearing Tests 9 nr.
- Heavy Duty Dynamic Probes 15 nr.
- Geotechnical Laboratory Testing
- Environmental and Chemical Laboratory Testing
- Waste Characterisation Assessment (WCA)

This report includes all factual data available from field and laboratory operations and discusses these findings relative to foundation and infrastructural design for the proposed new development.

## II Fieldwork



This new development is to take place on a brownfield site located close to The Airside Business Park in Swords. The ground surface generally comprises TOPSOIL with some traces of MADE GROUND.

The site and exploratory locations are noted on the drawings enclosed in Appendix V, locations were specified by POGA and were marked out by IGSL on site. All locations were referenced to National Grid and OD levels were established.

The investigation area is generally level, rising significantly at the southern end close to an existing Roundabout.

The various elements of the investigation are detailed in the following paragraphs. All field works were supervised by an experienced geotechnical engineer who carefully recorded stratification, took photographs as necessary, recovered samples and prepared detailed records.

Close liaison was maintained throughout with Consulting Engineer and client. All appropriate documentation was submitted and approved prior to site commencement. Each location was scanned electronically (CAT) to ensure that existing services were not damaged.

Statutory HSE safety precautions were observed, with working areas restricted to IGSL personnel only, to ensure safety of the general public.

### *Trial Pits*

Trial Pits were scheduled at eight locations and referenced TP01 to TP8.

An 8 tonne JCB excavator was used under engineering supervision. Detailed records for each location are presented in Appendix I. These records note the soil stratification and record sampling, stability and ground water details. Each location was CAT scanned to ensure that underground services were not damaged. Photographs of each excavation are included with the records.

Surface soils comprising Top Soil and Made Ground overlie soft to firm to stiff grey brown gravelly CLAY in turn overlying very stiff grey black gravelly CLAY. The stratification is typical of the North Dublin area with GLACIAL TILLS comprising brown and black BOULDER CLAY below shallow recent deposits (topsoil / fill).

Pits were terminated at depths ranging from 2.50 to 3.60 metres. Excavations were generally dry and stable, some minor ground water seepages were recorded.

Trial Pit data is summarised in the following table.

*Table A. Trial Pits*

| Ref No. | Topsoil | Soft CLAY | Firm / Stiff CLAY (Brown BC) | V,Stiff Clay (Black BC) | Water |
|---|---|---|---|---|---|
| TP01 | 0 – 0.30 | 0.30 – 1.00 | 1.00 – 2.20 | 2.20 – 2.50 | Dry |
| TP02 | 0 – 0.40 | | 0.40 – 2.00 | 2.00 – 2.50 | Dry |
| TP03 | 0 – 0.40 | 0.40 – 0.80 | 0.80 – 2.40 | 2.40 – 2.60 | Dry |
| TP04 | 0 – 0.30 | 0.30 – 0.60 | 0.60 – 2.20 | Refusal at 2.20 | Dry |
| TP05 | 0 – 0.30 | 0.30 – 0.80 | 0.80 – 2.20 | Refusal at 2.20 | 2.20 |
| TP06 | 0 – 0.40 | 0.40 – 1.00 | 1.00 – 2.20 | 2.20 – 3.00 | 1.90 |
| TP07 | 0 – 0.40 | 0.40 – 1.30 | 1.30 – 2.10 | 2.10 - 2.50 | 2.20 |
| TP08 | 0 – 0 – 0.30 | | 0.30 – 1.90 | 1.90 – 3.00 | Dry |

MADE GROUND comprising clay with plastic, brick, cans etc. was noted at TP01 and TP07 (highlighted in RED above).

***Rotary Core Boreholes***

Two deep boreholes have been constructed at a proposed stream crossing using Rotary Drilling Methods and referenced RC01 and RC02.

A GEO-405 drilling rig was used to drill using SYMETRIX equipment.

Detailed drilling records are presented in Appendix IA. These confirm the presence of soft to firm gravelly CLAY extending to about 2.00 metres overlying very stiff to hard grey brown gravelly CLAY with cobbles and occasional boulders. Drilling continued in the gravelly CLAY to respective final depths of 12.00 and 14.70 metres.

Standard penetration tests were carried out in the rotary holes with N values noted in the right hand column of the drilling records. High SPT values generally in excess of N=40 confirmed very stiff to hard strength below about 2.00 metres.

Groundwater was noted as slow ingress at various depths noted in the respective records.

***Plate Bearing Tests***

In-Situ CBR Values and Moduli of Subgrade Reaction were established at a total of nine locations using Plate Bearing test apparatus. The tests were carried out on gravelly CLAY at 0.60 metres BGL.

All CBR test data is presented in Appendix II and summarised in the following table.

***Table B CBR by Plate Test***

| Ref. | Test Depth | CBR@ LOAD % | CBR@ RELOAD % | |
|---|---|---|---|---|
| CBR 01 | 0.60 | 2.4 | 6.8 | |
| CBR 02 | 0.60 | 6.3 | 21.1 | |
| CBR 03 | 0.60 | 13.2 | 41.3 | |
| CBR 04 | 0.60 | 2.0 | 4.6 | |
| CBR 05 | 0.60 | 1.3 | 3.3 | |
| CBR 06 | 0.60 | 0.4 | 1.0 | |
| CBR 07 | 0.60 | 2.2 | 7.0 | |
| CBR 08 | 0.60 | 36.8 | 42.4 | (Possible Boulder) |
| CBR 09 | 0.60 | 8.2 | 8.9 | |

***HD Dynamic Probes***

Heavy Duty Dynamic Probes were carried out at fifteen specified locations and referenced DP01 to DP15, taken at intervals from south to north.

Probing was in accordance with the heavy-duty probe specification of BS 1377: Part 9: 1990. In these tests, the soil resistance is measured in terms of the number of drop-hammer blows required to drive the test probe through each 100 mm increment of penetration. Probing is terminated when the blow count exceeds 25/100mm to avoid damage to the apparatus. Where loose material is present a single blow count may drive the apparatus in excess of 100mm. In this instance blow counts of zero may be recorded. Individual probe records are contained in Appendix III.

A Dynamic Probe resistance of $N_{100} = 4$ is indicative of firm/stiff soil consistency. Probe values of less that $N_{100} = 2$ indicates material unsuitable as a founding medium. Probe data is summarised as follows:

*Table C Dynamic Probe Summary*

| Ref No. | Soft $N_{100} < 2$ | Firm -Stiff $N_{100}$ 4 to 7 | Stiff – Hard $N_{100} > 8$ | Refusal |
|---|---|---|---|---|
| DP01 | 0 – 1.20 | 1.20 – 2.40 | 2.40 – 2.80 | 2.90 * |
| DP02 | 0 – 1.30 | 1.30 – 2.20 | 2.20 – 2.90 | 3.00 * |
| DP03 | 0 – 0.20 | | 0.20 – 2.40 | 2.50 |
| DP04 | 0 – 2.70 | 2.70 – 3.00 | 3.00 – 4.20 | 4.30 * |
| DP05 | 0 – 1.60 | 1.60 – 1.80 | 1.80 – 2.50 | 2.60 * |
| DP06 | 0 – 0.20 | 0.20 – 2.10 | 2.10 – 2.80 | 2.90 |
| DP07 | 0 – 1.60 | 1.70 – 1.80 | 1.80 – 2.50 | 2.60 * |
| DP08 | 0 – 0.70 | 0.70 – 1.50 | 1.50 – 2.80 | 2.90 |
| DP09 | 0 – 0.20 | 0.20 – 1.30 | 1.30 – 2.10 | 2.20 |
| DP10 | 0 – 0.80 | 0.80 – 1.50 | 1.50 -1.90 | 2.00 |
| DP11 | 0 – 0.80 | 0.80 – 2.00 | 2.00 – 2.80 | 2.90 |
| DP12 | 0 – 1.30 | 1.30 - 2.30 | 2.30 – 2.90 | 3.00 * |
| DP13 | 0 – 1.10 | 1.10 – 1.60 | 1.60 – 2.80 | 2.90 |
| DP14 | | | 0.00 – 1.30 | 1.40 ** |
| DP15 | | 0.00 – 2.30 | 2.30 – 3.00 | 3.10 ** |

* Significant soft zones noted below ground level.

** Probe data is indicative of compact material extending from surface, possibly MADE GROUND.

## III. Testing

All samples recovered during the investigation were returned to the IGSL accredited (INAB) laboratory for visual assessment. A number of samples were selected for more detailed analysis.

Geotechnical Testing was carried out by IGSL in it's INAB –Accredited Laboratory Chemical and environmental testing was carried out in the UK by EUROFINS Ltd.

Testing comprised the following elements:

| | |
|---|---|
| Natural Moisture Content | IGSL |
| Classification (Index Properties) | IGSL |
| Grading | IGSL |
| Moisture Condition Value (MCV) | IGSL |
| Sulphate / Chloride / pH | EUROFINS |
| RILTA Suite Environmental | EUROFINS |

All laboratory data is presented in Appendix IV and individual tests are discussed briefly as follows:



***Classification / Moisture Content***

Liquid and plastic limits were determined for six samples of the gravelly CLAY soils. Results reflect low plasticity material of similar origin, plotting in the CL zone of the standard Classification Chart and indicative of TILL deposition with a CLAY matrix. Natural Moisture Contents in the gravelly CLAY soils range from 9 to 11%

***Grading***

Wet sieve and Hydrometer analysis has been carried out on two samples of the gravelly CLAY from the trial pits. The uniformly straight-line grading curves are typical of GLACIAL TILL deposition with smooth grading from the fine clay to coarse gravel fraction.

***MCV***

Moisture Condition Values were established at each trial pit location. Values ranged from 5 to 10 in most locations, however a lower values of 1.6 was noted in samples from TP06 and TP08.

***RILTA Environmental Suite***

Eight samples of the soils from the site were sent to EUROFINS environmental laboratory and testing was carried out in accordance with RILTA requirements to establish Landfill Waste Acceptance Criteria (WAC).

The detailed test data is enclosed in Appendix IVB. This has been assessed by specialist environmental consultants (O'Callaghan Moran) and a Waste Characterisation Assessment has been prepared.

This report has been issued digitally to POGA and is referenced with the test data in Appendix IVC.

**IV. Discussion:**

A detailed investigation of ground conditions on the site has been carried out by IGSL under the direction of POGA , Consulting Engineers.

The investigation consisted of conventional Trial Pits and Dynamic Probes with supplementary in-situ CBR tests. Two boreholes were constructed at a proposed stream crossing using Rotary Drilling Equipment (RC01 and RC02)

Geotechnical and Environmental laboratory testing has also been carried out to confirm soil parameters.

***Stratification***

Surface deposits of TOPSOIL / SOFT CLAY / MADE GROUND generally extend to depths of up to 1.50 metres and overlie GLACIAL TILL. Exceptionally very soft material was noted at DP04 to a depth of 2.70 metres.

The traditional pattern of the TILL in the North Dublin area comprises Firm to stiff brown very gravelly CLAY (BROWN BOULDER CLAY) overlying very stiff to hard black gravelly CLAY (BLACK BOULDER CLAY OR LODGEMENT TILL).

This pattern has been noted in the majority of Trial Pit locations with excavations generally terminated at about 2.50 to 3.00 metres BGL. The final trial pit refusal depths are NOT indicative of bedrock horizon.

Rotary Drilling has been carried out in two locations confirming the continuing presence of very stiff to hard BOULDER CLAY to about 15.00 metres BGL. LIMESTONE bedrock was **NOT** encountered within this depth range.

Dense soils close to surface were also noted on occasion (DP14 and DP15 refer) possibly indicative of compact FILL material. In other locations the dense surface layer overlies softer gravelly CLAY soil.

The heterogeneous nature of the TILL should be noted with variation in composition and strength noted. Zones or pockets of granular soils can typically occur, often in association with ground water. Light water ingress noted as seepage was recorded in several trial pits and on occasion in the boreholes.

***Foundations / Allowable Bearing Pressures***

The strength of the soils has generally been established by Dynamic Cone Penetration Tests at fifteen locations. The visual assessment of the soils during trial pit excavation is also considered in assessing soil strength, as well as geotechnical testing carried out for this project.

Standard Penetration Tests were also carried out at 1.50 metre intervals during rotary core drilling identifying very stiff to hard BOULDER CLAY below 2.50 metres in RC01 and 1.50 metres in RC02.

The MADE GROUND deposits noted over the site area are unsuitable as a founding medium, varying both in composition and in strength.

Structural and floor loads should be transferred to a competent stratum, on this site, either the firm to stiff brown Boulder Clay or the very stiff to hard black Boulder Clay.

***Dynamic Probe Locations***

A Dynamic Probe Resistance of $N_{100} = 5$ is indicative of an allowable bearing pressure of 150 kN/sq.m. (assuming no underlying depreciation in strength). The summary probe data chart indicates that this will be available generally at depths ranging from 1.00 to 1.50 metres BGL, probably on the brown boulder clay stratum.

An increased allowable bearing pressure of 250 kN.sq.m. is indicated by probe values in excess of $N_{100} = 9$, this is generally associated with foundations placed on the black boulder clay at an assumed depth of about 2.00 to 3.00 metres.

***Borehole Locations***

SPT tests in the two borehole locations has identified very stiff to hard gravelly CLAY at respective depths of 2.25 and 1.50 metres with an average value of N=40. Tests continued to a depth of 15 metres with values in excess of N=40 recorded.

These SPT values are indicative of an allowable bearing pressure in excess of 300 kPa.

***Settlement***

Settlement in the stiff to hard Boulder Clay under the above loadings will be of the order of 5 to 10mm. Differential settlement should be negligible.

The boulder clays encountered are sensitive to moisture content variation and should be protected from rainfall by blinding as required.

*Given the variations noted in the trial pits and Dynamic Probes and inherent variations in the natural soils, very careful inspection of excavated formation by experienced personnel is strongly recommended to ensure uniformity and suitability of the founding medium. Any suspect material or Made Ground should be removed and replaced with low-grade concrete.*

***Roads and Pavement***

Significant road construction is to be undertaken along the eastern boundary. Plate bearing Tests have been carried out at intervals along the route at a depth of 0.60 metres in each instance, generally on gravelly CLAY soil.

CBR values range from 0.4 to 36.8 %. The very high value is likely to represent coarse material (Boulders / Made Ground) and should be disregarded.

An average CBR of about 4% is suggested for pavement design purposes. CBR values would be expected to increase significantly in the stiff boulder clay stratum.

Excavated formation should be carefully inspected to ensure that all organic or very soft material is removed. Soft zones should be replaced with well-compacted granular fill.

Imported fill material should fully comply with current NRA Standards, particularly relating to Pyrite Content.

***ENVIRONMENTAL***

Results of the detailed environmental testing have been assessed by specialist consultants and a Waste Characterisation Assessment (WCA) has been prepared and issued independently to POGA. Details are also included in this document.

***IGSL/JC***
***August 2024***
***Revised January 2025***

# Appendix I Trial Pit Records

## Photographs

# TRIAL PIT RECORD

**REPORT NUMBER** 25474



| | | | |
|---|---|---|---|
| **CONTRACT** | BARRYSPARKS VHI | **TRIAL PIT NO.** | **TP01** |
| | | **SHEET** | Sheet 1 of 1 |
| **LOGGED BY** | G.B. | **CO-ORDINATES** | 718,756.02 E 745,660.50 N |
| | | **DATE STARTED** | 24/06/2024 |
| | | **DATE COMPLETED** | 24/06/2024 |
| **CLIENT** | VHI | **GROUND LEVEL (m)** | 26.09 |
| **ENGINEER** | POGA | **EXCAVATION METHOD** | JCB 8T |

| Geotechnical Description | Legend | Depth (m) | Elevation | Water Strike | Samples: Sample Ref | Samples: Type | Samples: Depth | Vane Test (KPa) | Hand Penetrometer (KPa) |
|---|---|---|---|---|---|---|---|---|---|
| TOPSOIL | | 0.10 | 25.99 | | | | | | |
| MADE GROUND: Soft brown sandy gravelly silt/clay with rootlets and rare plastic fragments | | 0.30 | 25.79 | | | | | | |
| Soft to firm mottled grey/brown slightly silty sandy gravelly CLAY with low cobble content. Gravel is subangular to subrounded, fine to coarse | | | | | AA241510 | B | 0.50-0.50 | | |
| Firm to stiff mottled grey/brown slightly silty sandy very gravelly CLAY with low cobble content. Gravel is subangular to subrounded, fine to coarse | | 1.20 | 24.89 | | AA241511 | B | 1.50-1.50 | | |
| Very stiff black slightly sandy gravelly SILT/CLAY with medium plasticity. Gravel is subangular to subrounded, fine to coarse. | | 2.30 | 23.79 | | | | | | |
| End of Trial Pit at 2.50m | | 2.50 | 23.59 | | AA241512 | B | 2.50-2.50 | | |

**Groundwater Conditions**
Dry

**Stability**
Stable

**General Remarks**
Location CAT scanned prior to excavation

IGSL TP LOG 25474.GPJ IGSL.GDT 19/7/24

# TRIAL PIT RECORD

REPORT NUMBER 25474



| | | | |
|---|---|---|---|
| CONTRACT | BARRYSPARKS VHI | TRIAL PIT NO. | TP02 |
| | | SHEET | Sheet 1 of 1 |
| LOGGED BY | G.B. | CO-ORDINATES | 718,758.89 E<br>745,742.56 N |
| | | | DATE STARTED 24/06/2024 |
| | | GROUND LEVEL (m) | 24.86 DATE COMPLETED 24/06/2024 |
| CLIENT | VHI | EXCAVATION METHOD | JCB 8T |
| ENGINEER | POGA | | |

| Geotechnical Description | Legend | Depth (m) | Elevation | Water Strike | Samples: Sample Ref | Samples: Type | Samples: Depth | Vane Test (KPa) | Hand Penetrometer (KPa) |
|---|---|---|---|---|---|---|---|---|---|
| TOPSOIL | | 0.10 | 24.76 | | | | | | |
| SUBSOIL: Soft brown silty sandy gravelly clay with rootlets | | 0.40 | 24.46 | | | | | | |
| Firm to stiff brown slightly sandy gravelly silt/CLAY with low cobble content. Medium plasticity, gravel is subangular to subrounded, fine to coarse | | | | | AA241507 | B | 0.50-0.50 | | |
| Stiff brown slightly sandy gravelly silt/CLAY with low cobble content. low plasticity, gravel is subangular to subrounded, fine to coarse | | 1.30 | 23.56 | | AA241508 | B | 1.50-1.50 | | |
| Very stiff brown sandy gravelly CLAY with low cobble content. Medium plasticity, gravel is subangular to subrounded, fine to coarse | | 2.00 | 22.86 | | | | | | |
| End of Trial Pit at 2.50m | | 2.50 | 22.36 | | AA241509 | B | 2.50-2.50 | | |

0.0
1.0
2.0
3.0
4.0

**Groundwater Conditions**
Dry

**Stability**
Stable

**General Remarks**
Location CAT scanned prior to excavation

# TRIAL PIT RECORD

**REPORT NUMBER** 25474



| | | | |
|---|---|---|---|
| **CONTRACT** | BARRYSPARKS VHI | **TRIAL PIT NO.** | **TP03** |
| | | **SHEET** | Sheet 1 of 1 |
| **LOGGED BY** | G.B. | **CO-ORDINATES** | 718,745.21 E<br>745,835.29 N |
| | | **DATE STARTED** | 24/06/2024 |
| | | **DATE COMPLETED** | 24/06/2024 |
| **CLIENT** | VHI | **GROUND LEVEL (m)** | 22.40 |
| **ENGINEER** | POGA | **EXCAVATION METHOD** | JCB 8T |

| Geotechnical Description | Legend | Depth (m) | Elevation | Water Strike | Samples: Sample Ref | Samples: Type | Samples: Depth | Vane Test (KPa) | Hand Penetrometer (KPa) |
|---|---|---|---|---|---|---|---|---|---|
| TOPSOIL | | 0.10 | 22.30 | | | | | | |
| SUBSOIL: Soft brown silty sandy gravelly clay with rootlets | | 0.40 | 22.00 | | | | | | |
| Soft to firm brown sandy gravelly SILT/CLAY, with low cobble content. Gravel is subangular to subrounded, fine to coarse. Sand is fine to medium. | | | | | AA241504 | B | 0.50-0.50 | | |
| Stiff, mottled grey to brown, slightly sandy gravelly CLAY with low cobble content. Gravel is subangular to subrounded, fine to coarse. | | 1.30 | 21.10 | | AA241505 | B | 1.50-1.50 | | |
| Very stiff grey gravelly CLAY, with low cobble and low boulder content. Gravel is subangular to subrounded, fine to coarse. | | 2.40 | 20.00 | | | | | | |
| End of Trial Pit at 2.60m | | 2.60 | 19.80 | | AA241506 | B | 2.50-2.50 | | |

**Groundwater Conditions**
Dry

**Stability**
Stable

**General Remarks**
Location CAT scanned prior to excavation

IGSL TP LOG 25474.GPJ IGSL.GDT 19/7/24

# TRIAL PIT RECORD

REPORT NUMBER 25474



| | | | |
|---|---|---|---|
| CONTRACT | BARRYSPARKS VHI | TRIAL PIT NO. | TP04 |
| | | SHEET | Sheet 1 of 1 |
| LOGGED BY | AR | CO-ORDINATES | 718,738.17 E<br>745,937.43 N |
| | | DATE STARTED | 24/06/2024 |
| | | DATE COMPLETED | 24/06/2024 |
| CLIENT | VHI | GROUND LEVEL (m) | 23.89 |
| ENGINEER | POGA | EXCAVATION METHOD | JCB 8T |

| Geotechnical Description | Legend | Depth (m) | Elevation | Water Strike | Samples: Sample Ref | Samples: Type | Samples: Depth | Vane Test (KPa) | Hand Penetrometer (KPa) |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 TOPSOIL | | 0.10 | 23.79 | | | | | | |
| SUBSOIL: Soft brown silty sandy gravelly clay with rootlets | | 0.20 | 23.69 | | | | | | |
| Soft to firm orange / brown, sandy gravelly CLAY. Gravels are fine to coarse, sub-angular to sub-rounded. Sand is fine to coarse grained. | | 0.60 | 23.29 | | | | | | |
| Firm mottled greyish brown sandy gravelly CLAY. Low limestone cobble and boulder content, up to 200mm and sub-angular. Limestone gravels are fine to coarse and angular to sub-rounded. Sand is fine to coarse. | | 0.90 | 22.99 | | AA241502 | B | 1.00-1.00 | | |
| 1.0 Firm to stiff, slightly brownish grey, sandy gravelly CLAY. Low limestone cobble and boulder content, up to 200mm and sub-angular. Limestone gravels are fine to coarse and angular to sub-rounded. Sand is fine to coarse. | | 1.30 | 22.59 | | | | | | |
| Stiff to very stiff, slightly brownish grey silty sandy very gravelly CLAY with low limestone cobble and boulder content, up to 200mm and sub-angular. Limestone gravels are fine to coarse and angular to sub-rounded. Sand is fine to coarse. | | | | | | | | | |
| 2.0 | | | | | | | | | |
| Possible bedrock @ 2.2m<br>End of Trial Pit at 2.20m | | 2.20 | 21.69 | | AA241503 | B | 2.20-2.20 | | |
| 3.0 | | | | | | | | | |
| 4.0 | | | | | | | | | |

**Groundwater Conditions**
DRY

**Stability**
Stable

**General Remarks**
Pit terminated @ 2.2m due to possible bedrock. Location CAT scanned prior to excavation

# TRIAL PIT RECORD

REPORT NUMBER 25474



| | | | |
|---|---|---|---|
| CONTRACT | BARRYSPARKS VHI | TRIAL PIT NO. | TP05 |
| | | SHEET | Sheet 1 of 1 |
| LOGGED BY | AR | CO-ORDINATES | 718,713.49 E<br>746,035.31 N |
| | | | DATE STARTED 24/06/2024 |
| | | | DATE COMPLETED 24/06/2024 |
| CLIENT | VHI | GROUND LEVEL (m) | 23.68 |
| ENGINEER | POGA | | EXCAVATION METHOD JCB 8T |

| Geotechnical Description | Legend | Depth (m) | Elevation | Water Strike | Samples: Sample Ref | Samples: Type | Samples: Depth | Vane Test (KPa) | Hand Penetrometer (KPa) |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 TOPSOIL | | 0.10 | 23.58 | | | | | | |
| SUBSOIL: Soft brown silty sandy gravelly clay with rootlets | | 0.30 | 23.38 | | | | | | |
| Soft to firm, mottled orange / grey, sandy gravelly silty CLAY. Gravels are fine to medium, angular to sub-angular. Sand is fine to medium grained. | | 0.50 | 23.18 | | | | | | |
| Soft to firm, mostly grey with slight orange colour mottling, nearly very sandy gravelly silty slightly cobbly CLAY. Low limestone cobble and boulder content, up to 200mm and sub-rounded. Gravels are fine to medium, angular to sub-angular. Sand is fine to medium grained. | | | | | AA231550 | B | 0.90-0.90 | | |
| 1.0 | | | | | | | | | |
| Stiff to very stiff, dark grey with brown colour mottling, sandy very gravelly silty CLAY. Medium to high cobble and boulder content, angular to sub-angular up to 250mm. Gravels are angular, fine to coarse. Sand is fine to coarse. | | 1.30 | 22.38 | | | | | | |
| 2.0 | | | | | | | | | |
| Possible bedrock @ 2.2m<br>End of Trial Pit at 2.20m | | 2.20 | 21.48 | | AA241501 | B | 2.10-2.10 | | |
| 3.0 | | | | | | | | | |
| 4.0 | | | | | | | | | |

**Groundwater Conditions**
Slow seepage @ 2.0m

**Stability**
Stable

**General Remarks**
Pit terminated @ 2.2m due to possible bedrock. Location CAT scanned prior to excavation

IGSL TP LOG 25474.GPJ IGSL.GDT 19/7/24

# TRIAL PIT RECORD

REPORT NUMBER 25474



| | | | |
|---|---|---|---|
| CONTRACT | BARRYSPARKS VHI | TRIAL PIT NO. | TP06 |
| | | SHEET | Sheet 1 of 1 |
| LOGGED BY | AR | CO-ORDINATES | 718,622.81 E 746,092.01 N |
| | | | DATE STARTED 24/06/2024 |
| | | GROUND LEVEL (m) | 23.80 DATE COMPLETED 24/06/2024 |
| CLIENT | VHI | | EXCAVATION METHOD JCB 8T |
| ENGINEER | POGA | | |

| Geotechnical Description | Legend | Depth (m) | Elevation | Water Strike | Samples: Sample Ref | Samples: Type | Samples: Depth | Vane Test (KPa) | Hand Penetrometer (KPa) |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 TOPSOIL | | 0.10 | 23.70 | | | | | | |
| SUBSOIL: Soft brown silty sandy gravelly clay with rootlets | | 0.40 | 23.40 | | | | | | |
| Soft, orange / brown sandy gravelly CLAY. Gravels are fine to coarse, sub-angular to sub-rounded. Sand is fine to coarse. | | 1.00 | 22.80 | | AA231547 | B | 1.00-1.00 | | |
| 1.0 Firm, mottled grey brown, very sandy gravelly CLAY, with occasional pockets of grey sand. Low cobble and boulder content, angular, up to 175mm. Gravels are fine to coarse, angular to sub-rounded. | | | | | AA231548 | B | 1.90-1.90 | | |
| 2.0 Stiff, mottled orange / grey, sandy gravelly CLAY. Gravels are fine to coarse, sub-angular to sub-rounded. Sand is fine to coarse. | | 2.20 | 21.60 | | | | | | |
| 3.0 End of Trial Pit at 3.00m | | 3.00 | 20.80 | | AA231549 | B | 3.00-3.00 | | |
| 4.0 | | | | | | | | | |

**Groundwater Conditions**
Slow seepage @ 1.9m

**Stability**
Sidewall collapsing @ 1.5m

**General Remarks**
Location CAT scanned prior to excavation

IGSL TP LOG 25474.GPJ IGSL.GDT 19/7/24

# TRIAL PIT RECORD

REPORT NUMBER 25474



| | | | |
|---|---|---|---|
| CONTRACT | BARRYSPARKS VHI | TRIAL PIT NO. | TP07 |
| | | SHEET | Sheet 1 of 1 |
| LOGGED BY | G.B. | CO-ORDINATES | 718,550.36 E 746,148.60 N |
| | | | DATE STARTED 24/06/2024 |
| | | | DATE COMPLETED 24/06/2024 |
| CLIENT | VHI | GROUND LEVEL (m) | 24.41 |
| ENGINEER | POGA | | EXCAVATION METHOD JCB 8T |

| Geotechnical Description | Legend | Depth (m) | Elevation | Water Strike | Samples: Sample Ref | Samples: Type | Samples: Depth | Vane Test (KPa) | Hand Penetrometer (KPa) |
|---|---|---|---|---|---|---|---|---|---|
| TOPSOIL | | 0.10 | 24.31 | | | | | | |
| SUBSOIL: Soft brown silty sandy gravelly clay with rootlets | | 0.40 | 24.01 | | | | | | |
| MADE GROUND: Firm mottled grey brown slightly silty sandy gravelly clay with rare plastics, red brick and aluminium cans. Gravel is subangular to subrounded, fine to coarse. | | | | | AA241513 | B | 0.50-0.50 | | |
| Stiff mottled grey brown sandy gravelly CLAY with low cobble. Gravel is subangular to subrounded, fine to coarse | | 1.30 | 23.11 | | AA241514 | B | 1.50-1.50 | | |
| Stiff to very stiff, greyish brown sandy gravelly CLAY with low cobble content. Gravel is angular to subrounded, fine to coarse. Sand is fine to coarse | | 2.10 | 22.31 | | | | | | |
| End of Trial Pit at 2.50m | | 2.50 | 21.91 | | AA241515 | B | 2.50-2.50 | | |

0.0
1.0
2.0
3.0
4.0

**Groundwater Conditions**
Slow seepage @ 2.2m

**Stability**
Stable

**General Remarks**
Location CAT scanned prior to excavation

# TRIAL PIT RECORD

REPORT NUMBER 25474



| | | | |
|---|---|---|---|
| CONTRACT | BARRYSPARKS VHI | TRIAL PIT NO. | TP08 |
| | | SHEET | Sheet 1 of 1 |
| LOGGED BY | AR | CO-ORDINATES | 718,601.16 E<br>746,249.70 N |
| | | DATE STARTED | 24/06/2024 |
| | | DATE COMPLETED | 24/06/2024 |
| CLIENT | VHI | GROUND LEVEL (m) | 24.06 |
| ENGINEER | POGA | EXCAVATION METHOD | JCB 8T |

| Geotechnical Description | Legend | Depth (m) | Elevation | Water Strike | Samples: Sample Ref | Samples: Type | Samples: Depth | Vane Test (KPa) | Hand Penetrometer (KPa) |
|---|---|---|---|---|---|---|---|---|---|
| TOPSOIL | | 0.10 | 23.96 | | | | | | |
| SUBSOIL: Soft brown silty sandy gravelly clay with rootlets | | 0.30 | 23.76 | | | | | | |
| Firm orange / brown sandy gravelly CLAY. Gravels are fine to medium, sub-angular to sub-rounded. | | 0.70 | 23.36 | | | | | | |
| Firm, mottled grey brown, sandy nearly very gravelly CLAY. Gravel is fine to coarse, mostly fine to coarse, and sub-rounded. | | | | | AA231540 | B | 0.90-0.90 | | |
| Stiff, slightly mottled greyish brown, sandy very gravelly CLAY. Low cobble and boulder content, up to 200mm, sub-rounded. Gravels are fine to coarse. | | 1.70 | 22.36 | | | | | | |
| Stiff to very stiff, light grey, sandy very gravelly CLAY. Low boulder content up to 300mm, rounded to sub-rounded. Low cobble content, up to 150 mm, sub-rounded. Gravels are fine to coarse. | | 1.90 | 22.16 | | AA231541 | B | 2.00-2.00 | | |
| | | | | | AA231542 | B | 2.70-2.70 | | |
| Possible bedrock @ 3.0m.<br>End of Trial Pit at 3.00m | | 3.00 | 21.06 | | | | | | |

**Groundwater Conditions**
DRY

**Stability**
Stable

**General Remarks**
possible bedrock @ 3.0m. Location CAT scanned prior to excavation

Project Number – 25474
Barrysparks, Swords, Dublin. -Trial Pit Photographs



TP01 – 1 of 3

TP01 – 2 of 3

Project Number – 25474
Barrysparks, Swords, Dublin. -Trial Pit Photographs



TP01 – 3 of 3

TP02 – 1 of 3

Project Number – 25474
Barrysparks, Swords, Dublin. -Trial Pit Photographs

TP02 – 2 of 3



TP02– 3 of 3

Project Number – 25474
Barrysparks, Swords, Dublin. -Trial Pit Photographs



TP03– 1 of 2

TP03- 2 of 2

Project Number – 25474
Barrysparks, Swords, Dublin. -Trial Pit Photographs

TP04 – 1 of 3



Project Number – 25474
Barrysparks, Swords, Dublin. -Trial Pit Photographs

TP04 – 2 of 3



Project Number – 25474
Barrysparks, Swords, Dublin. -Trial Pit Photographs

TP04 – 3 of 3



Project Number – 25474
Barrysparks, Swords, Dublin. -Trial Pit Photographs

TP05 – 1 of 4



Project Number – 25474
Barrysparks, Swords, Dublin. -Trial Pit Photographs

TP05 – 2 of 4



Project Number – 25474
Barrysparks, Swords, Dublin. -Trial Pit Photographs

TP05 – 3 of 4



Project Number – 25474
Barrysparks, Swords, Dublin. -Trial Pit Photographs

TP05 – 4 of 4



Project Number – 25474
Barrysparks, Swords, Dublin. -Trial Pit Photographs



TP06 – 1 of 3

Project Number – 25474
Barrysparks, Swords, Dublin. -Trial Pit Photographs



TP06 – 2 of 3

Project Number – 25474
Barrysparks, Swords, Dublin. -Trial Pit Photographs



TP06 – 3 of 3

Project Number – 25474
Barrysparks, Swords, Dublin. -Trial Pit Photographs

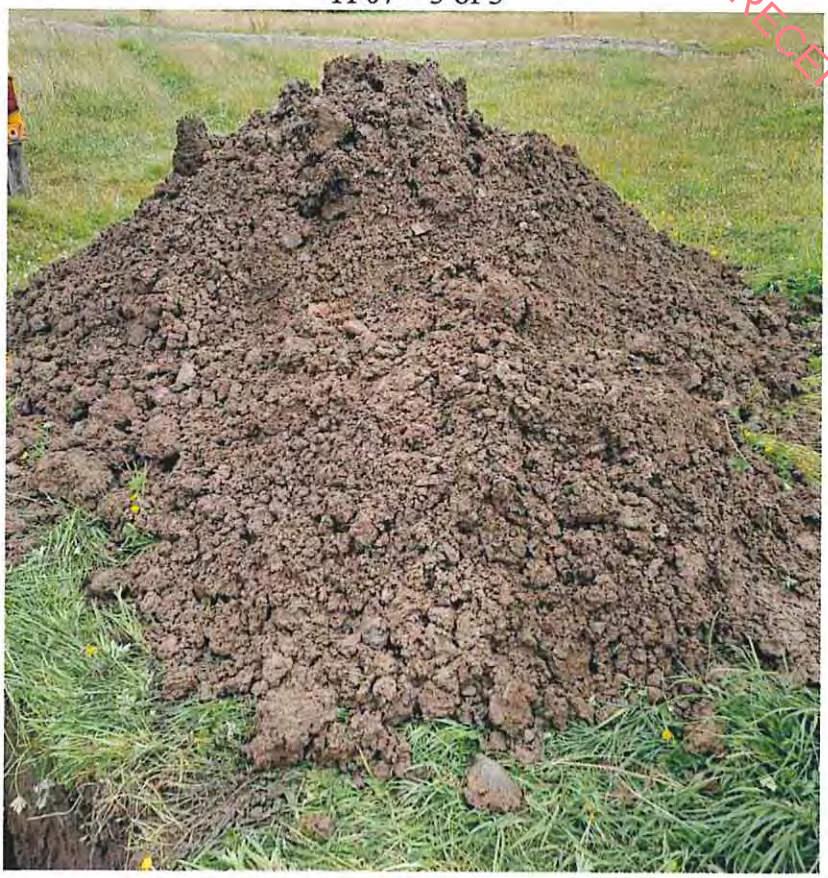


TP07 – 1 of 3

TP07 – 2 of 3

Project Number – 25474
Barrysparks, Swords, Dublin. -Trial Pit Photographs

TP07 – 3 of 3



Project Number – 25474
Barrysparks, Swords, Dublin. -Trial Pit Photographs

TP08 – 1 of 4

Project Number – 25474
Barrysparks, Swords, Dublin. -Trial Pit Photographs

TP08 – 2 of 4

Project Number – 25474
Barrysparks, Swords, Dublin. -Trial Pit Photographs

TP08 – 3 of 4



Project Number – 25474
Barrysparks, Swords, Dublin. -Trial Pit Photographs

TP08 – 4 of 4



# Appendix Ia Rotary Drilling Records

# GEOTECHNICAL CORE LOG RECORD

**REPORT NUMBER** 25474



| | | | |
|---|---|---|---|
| **CONTRACT** | BARRYSPARKS VHI | **DRILLHOLE NO** | RC01 |
| | | **SHEET** | Sheet 1 of 2 |
| **CO-ORDINATES** | 718,751.83 E<br>745,805.23 N | **DATE DRILLED** | 18/12/2024 |
| **GROUND LEVEL (mOD)** | 22.28 | **DATE LOGGED** | 18/12/2024 |
| **CLIENT** | VHI | **DRILLED BY** | IGSL - AK |
| **ENGINEER** | POGA | **LOGGED BY** | D. O'Shea |
| **RIG TYPE** | GEO - 405 | | |
| **FLUSH** | Air/Mist | | |
| **INCLINATION (deg)** | -90 | | |
| **CORE DIAMETER (mm)** | 78 | | |

| Downhole Depth (m) | Core Run Depth (m) | T.C.R.% | S.C.R.% | R.Q.D.% | Fracture Spacing Log (mm) 0 250 500 | Non-intact Zone | Legend | Description | Depth (m) | Elevation | Standpipe Details | SPT (N Value) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | SYMMETRIX DRILLING: No recovery, observed by driller as returns of CLAY | | | | |
| 1 | 1.50 | 0 | 0 | 0 | | | | | 1.50 | 20.78 | | |
| 2 | | | | | | | | SYMMETRIX DRILLING: No recovery, observed by driller as returns of clayey COBBLES | | | | N = 10 (1, 1, 3, 2, 2, 3) |
| 3 | | | | | | | | | | | | N = 66 (5, 11, 21, 14, 16, 15) |
| 4 | | 0 | 0 | 0 | | | | | | | | |
| 5 | | | | | | | | | | | | N = 63 (3, 9, 12, 17, 18, 16) |
| 6 | 6.00 | | | | | | | | 6.00 | 16.28 | | |
| | | | | | | | | SYMMETRIX DRILLING: No recovery, observed by driller as returns of gravelly CLAY | | | | N = 45 (4, 7, 7, 8, 9, 21) |
| 7 | 7.50 | 0 | 0 | 0 | | | | | 7.50 | 14.78 | | |
| 8 | | | | | | | | SYMMETRIX DRILLING: No recovery, observed by driller as returns of gravelly cobbly CLAY | | | | N = 43 (2, 6, 8, 9, 12, 14) |
| 9 | | 0 | 0 | 0 | | | | | | | | N = 25/30 mm (25, 25) |

**REMARKS**

Hole cased from 0.00-12.00m

**WATER STRIKE DETAILS**

| Water Strike | Casing Depth | Sealed At | Rise To | Time (min) | Comments |
|---|---|---|---|---|---|
| 3.50 | 3.50 | N/S | | | Seepage |
| 6.70 | 6.70 | N/S | | | Seepage |

**INSTALLATION DETAILS**

| Date | Tip Depth | RZ Top | RZ Base | Type |
|---|---|---|---|---|
| | | | | |

**GROUNDWATER DETAILS**

| Date | Hole Depth | Casing Depth | Depth to Water | Comments |
|---|---|---|---|---|
| 18-12-24 | 12.00 | 12.00 | 7.20 | Water levels recorded 5 mins after end of drilling |

# GEOTECHNICAL CORE LOG RECORD

**REPORT NUMBER** 25474



| | | | |
|---|---|---|---|
| **CONTRACT** | BARRYSPARKS VHI | **DRILLHOLE NO** | **RC01** |
| | | **SHEET** | Sheet 2 of 2 |
| **CO-ORDINATES** | 718,751.83 E<br>745,805.23 N | **DATE DRILLED** | 18/12/2024 |
| **GROUND LEVEL (mOD)** | 22.28 | **DATE LOGGED** | 18/12/2024 |
| **CLIENT** | VHI | **DRILLED BY** | IGSL - AK |
| **ENGINEER** | POGA | **LOGGED BY** | D. O'Shea |
| **RIG TYPE** | GEO - 405 | | |
| **FLUSH** | Air/Mist | | |
| **INCLINATION (deg)** | -90 | | |
| **CORE DIAMETER (mm)** | 78 | | |

| Downhole Depth (m) | Core Run Depth (m) | T.C.R.% | S.C.R.% | R.Q.D.% | Fracture Spacing Log (mm) 0 250 500 | Non-intact Zone | Legend | Description | Depth (m) | Elevation | Standpipe Details | SPT (N Value) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 10.50 | | | | | | | SYMMETRIX DRILLING: No recovery, observed by driller as returns of gravelly cobbly CLAY *(continued)* | 10.50 | 11.78 | | |
| 11 | 12.00 | 0 | 0 | 0 | | | | SYMMETRIX DRILLING: No recovery, observed by driller as returns of gravelly CLAY | 12.00 | 10.28 | | N = 32 (3, 8, 5, 7, 9, 11) |
| 12 | | | | | | | | End of Borehole at 12.00 m | | | | N = 31 (9, 5, 8, 7, 7, 9) |
| 13 | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | |

**REMARKS**

Hole cased from 0.00-12.00m

**WATER STRIKE DETAILS**

| Water Strike | Casing Depth | Sealed At | Rise To | Time (min) | Comments |
|---|---|---|---|---|---|
| 3.50 | 3.50 | N/S | | | Seepage |
| 6.70 | 6.70 | N/S | | | Seepage |

**INSTALLATION DETAILS**

| Date | Tip Depth | RZ Top | RZ Base | Type |
|---|---|---|---|---|
| | | | | |

**GROUNDWATER DETAILS**

| Date | Hole Depth | Casing Depth | Depth to Water | Comments |
|---|---|---|---|---|
| 18-12-24 | 12.00 | 12.00 | 7.20 | Water levels recorded 5 mins after end of drilling |

# GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER 25474



| | | | |
|---|---|---|---|
| CONTRACT | BARRYSPARKS VHI | DRILLHOLE NO | RC02 |
| | | SHEET | Sheet 1 of 2 |
| CO-ORDINATES | 718,754.40 E<br>745,808.07 N | DATE DRILLED | 18/12/2024 |
| GROUND LEVEL (mOD) | 22.31 | DATE LOGGED | 18/12/2024 |
| CLIENT | VHI | DRILLED BY | IGSL - AK |
| ENGINEER | POGA | LOGGED BY | D. O'Shea |
| RIG TYPE | GEO - 405 | | |
| FLUSH | Air/Mist | | |
| INCLINATION (deg) | -90 | | |
| CORE DIAMETER (mm) | 78 | | |

| Downhole Depth (m) | Core Run Depth (m) | T.C.R.% | S.C.R.% | R.Q.D.% | Fracture Spacing Log (mm) 0 250 500 | Non-intact Zone | Legend | Description | Depth (m) | Elevation | Standpipe Details | SPT (N Value) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | | | | |
| 1 | 1.50 | 0 | 0 | 0 | | | | SYMMETRIX DRILLING: No recovery, observed by driller as returns of CLAY | 1.50 | 20.81 | | |
| 2 | 4.50 | 0 | 0 | 0 | | | | SYMMETRIX DRILLING: No recovery, observed by driller as returns of clayey COBBLES | 4.50 | 17.81 | | N = 37 (1, 3, 5, 9, 11, 12)<br>N = 66 (4, 7, 9, 21, 19, 17) |
| 3 | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | |
| 5 | 6.00 | 0 | 0 | 0 | | | | SYMMETRIX DRILLING: No recovery, observed by driller as returns of cobbly CLAY | 6.00 | 16.31 | | N = 57 (3, 8, 12, 14, 16, 15) |
| 6 | 7.50 | 0 | 0 | 0 | | | | SYMMETRIX DRILLING: No recovery, observed by driller as returns of gravelly cobbly CLAY | 7.50 | 14.81 | | N = 42 (4, 5, 7, 9, 14, 12) |
| 7 | | | | | | | | | | | | |
| 8 | | | | | | | | SYMMETRIX DRILLING: No recovery, observed by driller as returns of gravelly CLAY | | | | N = 38 (7, 14, 9, 8, 10, 11) |
| 9 | | 0 | 0 | 0 | | | | | | | | N = 35 (9, 5, 7, 6, 12, 10) |

**REMARKS**

Hole cased from 0.00-12.00m

**WATER STRIKE DETAILS**

| Water Strike | Casing Depth | Sealed At | Rise To | Time (min) | Comments |
|---|---|---|---|---|---|
| 14.50 | 14.50 | N/S | | | Seepage |

**GROUNDWATER DETAILS**

| Date | Hole Depth | Casing Depth | Depth to Water | Comments |
|---|---|---|---|---|
| 18-12-24 | 14.70 | 14.70 | 12.80 | Water levels recorded 5 mins after end of drilling |

**INSTALLATION DETAILS**

| Date | Tip Depth | RZ Top | RZ Base | Type |
|---|---|---|---|---|
| | | | | |

# GEOTECHNICAL CORE LOG RECORD

**REPORT NUMBER** 25474



| | | | |
|---|---|---|---|
| **CONTRACT** | BARRYSPARKS VHI | **BOREHOLE NO** | **RC02** |
| | | **SHEET** | Sheet 2 of 2 |
| **CO-ORDINATES** | 718,754.40 E<br>745,808.07 N | **DATE DRILLED** | 18/12/2024 |
| **GROUND LEVEL (mOD)** | 22.31 | **DATE LOGGED** | 18/12/2024 |
| **CLIENT** | VHI | **DRILLED BY** | IGSL - AK |
| **ENGINEER** | POGA | **LOGGED BY** | D. O'Shea |
| **RIG TYPE** | GEO - 405 | | |
| **FLUSH** | Air/Mist | | |
| **INCLINATION (deg)** | -90 | | |
| **CORE DIAMETER (mm)** | 78 | | |

| Downhole Depth (m) | Core Run Depth (m) | T.C.R.% | S.C.R.% | R.Q.D.% | Fracture Spacing Log (mm) 0 250 500 | Non-intact Zone | Legend | Description | Depth (m) | Elevation | Standpipe Details | SPT (N Value) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 10.50 | | | | | | | SYMMETRIX DRILLING: No recovery, observed by driller as returns of gravelly CLAY *(continued)* | 10.50 | 11.81 | | |
| 11 | | | | | | | | SYMMETRIX DRILLING: No recovery, observed by driller as returns of gravelly cobbly CLAY | | | | N = 31 (3, 4, 9, 8, 7, 7) |
| 12 | | 0 | 0 | 0 | | | | | | | | N = 40 (1, 5, 6, 9, 11, 14) |
| 13 | 13.50 | | | | | | | | 13.50 | 8.81 | | |
| 14 | | 0 | 0 | 0 | | | | SYMMETRIX DRILLING: No recovery, observed by driller as returns of gravelly CLAY | | | | N = 39 (3, 9, 8, 9, 10, 12) |
| | 14.70 | | | | | | | | 14.70 | 7.61 | | |
| 15 | | | | | | | | End of Borehole at 14.70 m | | | | N = 25/30 mm (25, 25) |
| 16 | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | |

**REMARKS**

Hole cased from 0.00-12.00m

**WATER STRIKE DETAILS**

| Water Strike | Casing Depth | Sealed At | Rise To | Time (min) | Comments |
|---|---|---|---|---|---|
| 14.50 | 14.50 | N/S | | | Seepage |

**GROUNDWATER DETAILS**

| Date | Hole Depth | Casing Depth | Depth to Water | Comments |
|---|---|---|---|---|
| 18-12-24 | 14.70 | 14.70 | 12.80 | Water levels recorded 5 mins after end of drilling |

**INSTALLATION DETAILS**

| Date | Tip Depth | RZ Top | RZ Base | Type |
|---|---|---|---|---|
| | | | | |

# Appendix II CBR by Plate Test

## PLATE TEST REPORT SHEET (F3.1)

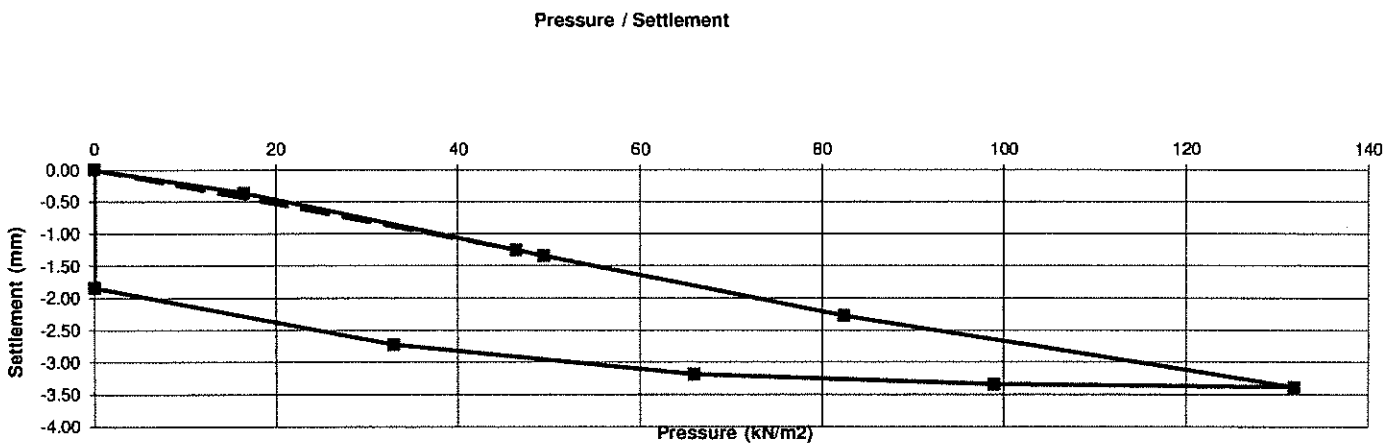
## Applied Pressure/Settlement Curve

| | |
|---|---|
| Reference No. | R159344 |
| Contract | 25474 Barrysparks VHI |
| Test No. | CBR01 Load |
| Location | See Site Map |
| Depth | 0.60 |
| Client | POGA |
| Plate Diameter: | 450 mm |
| Test Method | BS 1377: Part 9: 1990 Test4 - Incremental Loading Test |
| Technician | A. Rynne |
| Authorised by | |
| Date | 27/06/2024 |

Description of soil under test
(natural soil, placed fill, sub-base)

Grey brown sandy gravelly CLAY

Sample Ref No. N/A
Depth 0.00 m bgl




Gradient at 1.25 mm settlement intersection = 37
Modulus of subgrade reaction = 24 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 2.4 %

## PLATE TEST REPORT SHEET (F3.1)

## Applied Pressure/Settlement Curve

| | |
|---|---|
| Reference No. | R159344 |
| Contract | 25474 Barrysparks VHI |
| Test No. | CBR01 Reload |
| Location | See Site Map |
| Depth | 0.60 |
| Client | POGA |
| Plate Diameter: | 450 mm |
| Test Method | BS 1377: Part 9: 1990 Test4 - Incremental Loading Test |
| Technician | A. Rynne |
| Authorised by | |
| Date | 27/06/2024 |

Description of soil under test
(natural soil, placed fill, sub-base)

Grey brown sandy gravelly CLAY

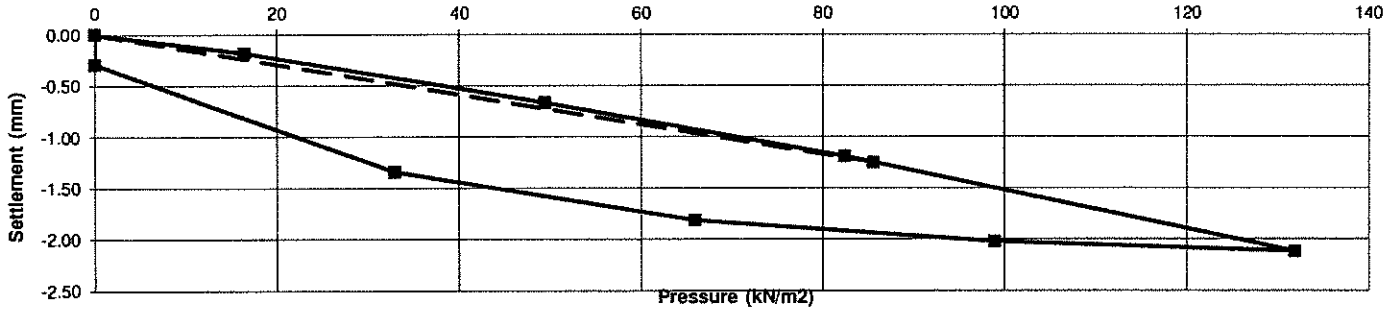
Sample Ref No. N/A

Depth 0.00 m bgl

IGSL

IVNAB

**Pressure / Settlement**




Gradient at 1.25 mm settlement intersection = 68
Modulus of subgrade reaction = 44 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 6.8 %

## PLATE TEST REPORT SHEET (F3.1)

## Applied Pressure/Settlement Curve

| | |
|---|---|
| Reference No. | R159345 |
| Contract | 25474 Barrysparks VHI |
| Test No. | CBR02 Load |
| Location | See Site Map |
| Depth | 0.60 |
| Client | POGA |
| Plate Diameter: | 450 mm |
| Test Method | BS 1377: Part 9: 1990 Test4 - Incremental Loading Test |
| Technician | A. Rynne |
| Authorised by | |
| Date | 27/06/2024 |

Description of soil under test (natural soil, placed fill, sub-base)

Grey brown sandy gravelly CLAY

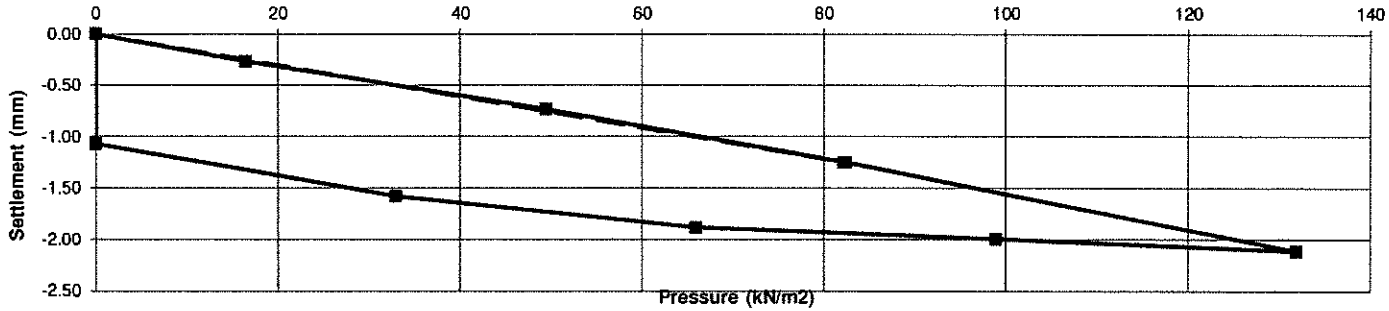
Sample Ref No. N/A

Depth 0.00 m bgl

IGSL Ltd.

INAB

**Pressure / Settlement**




Gradient at 1.25 mm settlement intersection = 66

Modulus of subgrade reaction = 42 MPa/m

Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 6.3 %

## PLATE TEST REPORT SHEET (F3.1)

## Applied Pressure/Settlement Curve

| | |
|---|---|
| Reference No. | R159345 |
| Contract | 25474 Barrysparks VHI |
| Test No. | CBR02 Reload |
| Location | See Site Map |
| Depth | 0.60 |
| Client | POGA |
| Plate Diameter: | 450 mm |
| Test Method | BS 1377: Part 9: 1990 Test4 - Incremental Loading Test |
| Technician | A. Rynne |
| Authorised by | |
| Date | 27/06/2024 |

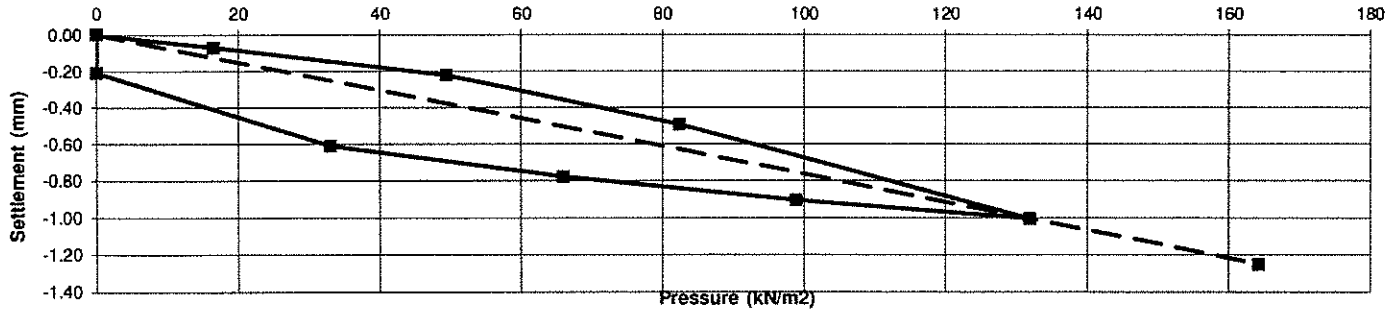
Description of soil under test (natural soil, placed fill, sub-base)

Grey brown sandy gravelly CLAY

Sample Ref No. N/A

Depth 0.00 m bgl

**Pressure / Settlement**




Gradient at 1.25 mm settlement intersection = 131

Modulus of subgrade reaction = 84 MPa/m

Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 21.1 %

## PLATE TEST REPORT SHEET (F3.1)

## Applied Pressure/Settlement Curve

| | |
|---|---|
| Reference No. | R159346 |
| Contract | 25474 Barrysparks VHI |
| Test No. | CBR03 Load |
| Location | See Site Map |
| Depth | 0.60 |
| Client | POGA |
| Plate Diameter: | 450 mm |
| Test Method | BS 1377: Part 9: 1990 Test4 - Incremental Loading Test |
| Technician | A. Rynne |
| Authorised by | |
| Date | 26/06/2024 |

Description of soil under test (natural soil, placed fill, sub-base)

Grey brown sandy gravelly CLAY

Sample Ref No. N/A

Depth 0.00 m bgl

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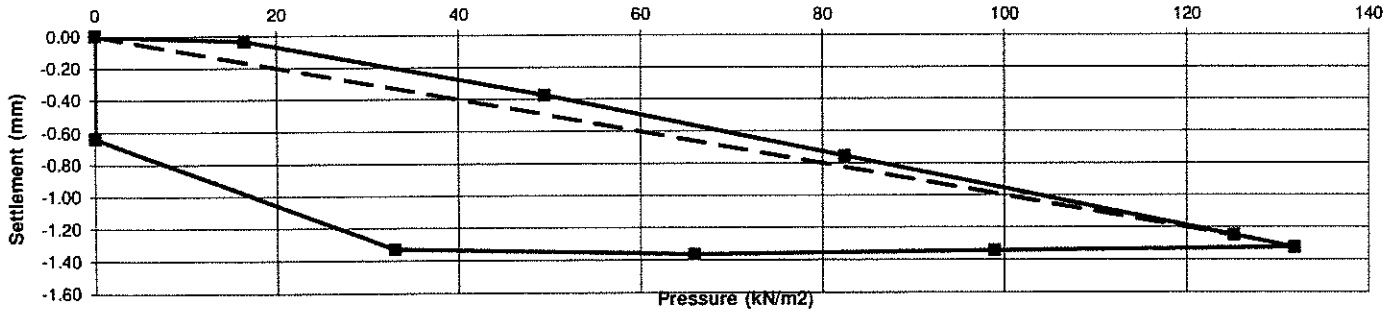
**Pressure / Settlement**




Gradient at 1.25 mm settlement intersection = 100

Modulus of subgrade reaction = 64 MPa/m

Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 13.2 %

## PLATE TEST REPORT SHEET (F3.1)

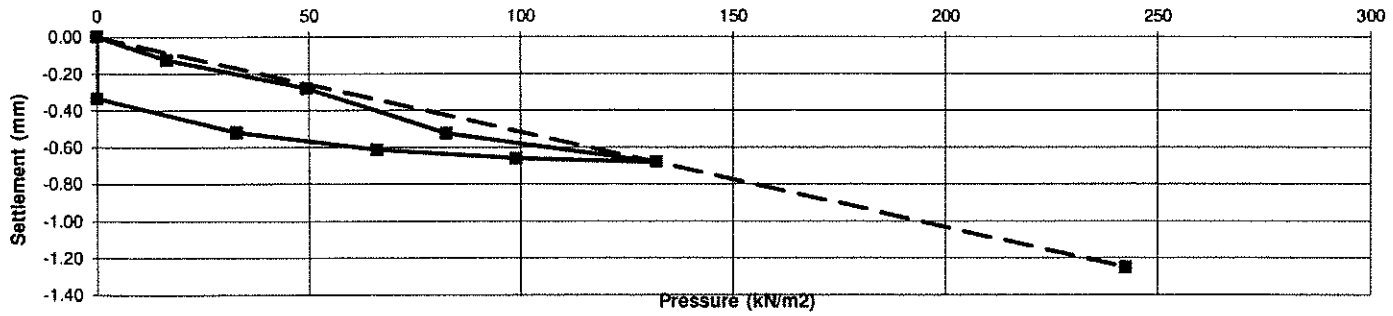
## Applied Pressure/Settlement Curve

| | |
|---|---|
| Reference No. | R159346 |
| Contract | 25474 Barrysparks VHI |
| Test No. | CBR03 Reload |
| Location | See Site Map |
| Depth | 0.60 |
| Client | POGA |
| Plate Diameter: | 450 mm |
| Test Method | BS 1377: Part 9: 1990 Test4 - Incremental Loading Test |
| Technician | A. Rynne |
| Authorised by | |
| Date | 26/06/2024 |

Description of soil under test
(natural soil, placed fill, sub-base)

Grey brown sandy gravelly CLAY

Sample Ref No. N/A
Depth 0.00 m bgl




Gradient at 1.25 mm settlement intersection = 194
Modulus of subgrade reaction = 125 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 41.3 %

## PLATE TEST REPORT SHEET (F3.1)

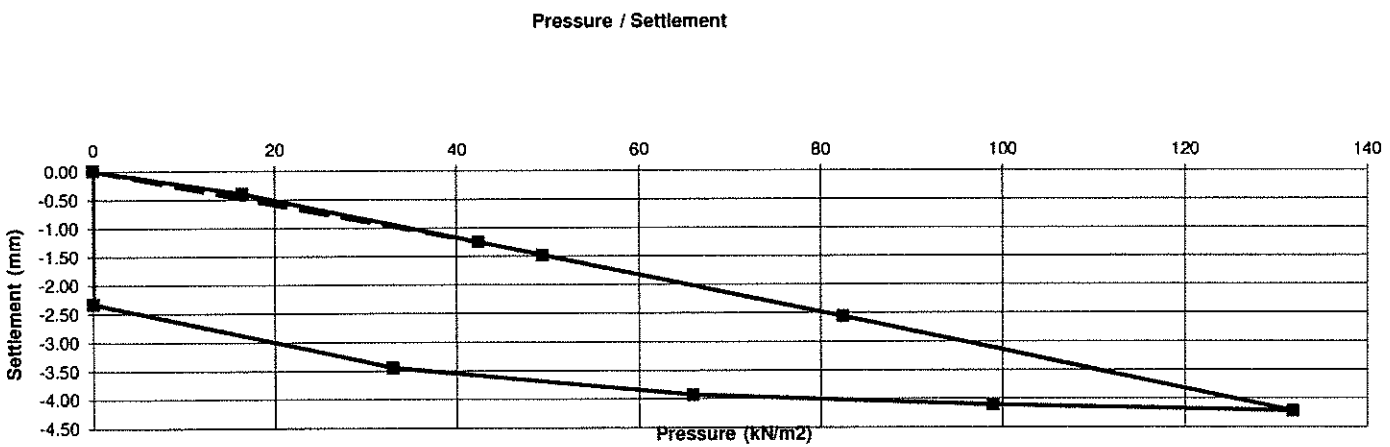
## Applied Pressure/Settlement Curve

| | |
|---|---|
| Reference No. | R159347 |
| Contract | 25474 Barrysparks VHI |
| Test No. | CBR04 Load |
| Location | See Site Map |
| Depth | 0.60 |
| Client | POGA |
| Plate Diameter: | 450 mm |
| Test Method | BS 1377: Part 9: 1990 Test4 - Incremental Loading Test |
| Technician | A. Rynne |
| Authorised by | |
| Date | 26/06/2024 |

Description of soil under test
(natural soil, placed fill, sub-base)

Grey brown sandy gravelly CLAY

Sample Ref No. N/A
Depth 0.00 m bgl




Gradient at 1.25 mm settlement intersection = 34
Modulus of subgrade reaction = 22 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 2.0 %

## PLATE TEST REPORT SHEET (F3.1)

## Applied Pressure/Settlement Curve

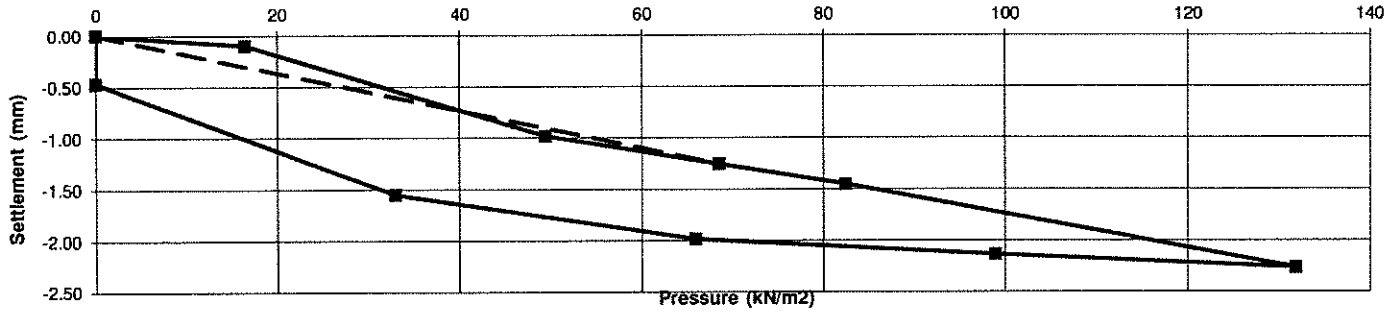
| | |
|---|---|
| Reference No. | R159347 |
| Contract | 25474 Barrysparks VHI |
| Test No. | CBR04 Reload |
| Location | See Site Map |
| Depth | 0.60 |
| Client | POGA |
| Plate Diameter: | 450 mm |
| Test Method | BS 1377: Part 9: 1990 Test4 - Incremental Loading Test |
| Technician | A. Rynne |
| Authorised by | |
| Date | 26/06/2024 |

Description of soil under test
(natural soil, placed fill, sub-base)

Grey brown sandy gravelly CLAY

Sample Ref No. N/A
Depth 0.00 m bgl

**Pressure / Settlement**




Gradient at 1.25 mm settlement intersection = 55
Modulus of subgrade reaction = 35 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 4.6 %

## PLATE TEST REPORT SHEET (F3.1)

## Applied Pressure/Settlement Curve

| | |
|---|---|
| Reference No. | R159348 |
| Contract | 25474 Barrysparks VHI |
| Test No. | CBR05 Load |
| Location | See Site Map |
| Depth | 0.60 |
| Client | POGA |
| Plate Diameter: | 450 mm |
| Test Method | BS 1377: Part 9: 1990 Test4 - Incremental Loading Test |
| Technician | A. Rynne |
| Authorised by | |
| Date | 26/06/2024 |

Description of soil under test
(natural soil, placed fill, sub-base)

Grey brown sandy gravelly CLAY

Sample Ref No. N/A
Depth 0.00 m bgl

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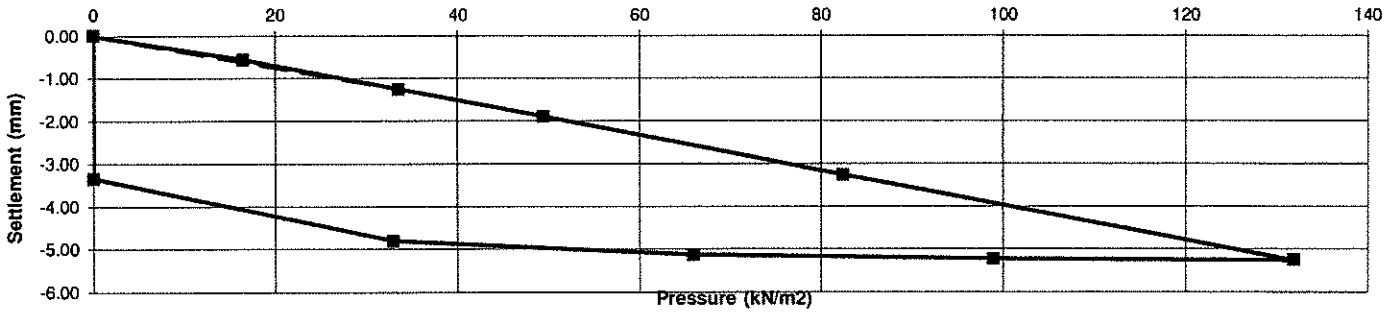
**Pressure / Settlement**




Gradient at 1.25 mm settlement intersection = 27
Modulus of subgrade reaction = 17 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 1.3 %

## PLATE TEST REPORT SHEET (F3.1)

## Applied Pressure/Settlement Curve

| | |
|---|---|
| Reference No. | R159348 |
| Contract | 25474 Barrysparks VHI |
| Test No. | CBR05 Load |
| Location | See Site Map |
| Depth | 0.60 |
| Client | POGA |
| Plate Diameter: | 450 mm |
| Test Method | BS 1377: Part 9: 1990 Test4 - Incremental Loading Test |
| Technician | A. Rynne |
| Authorised by | |
| Date | 26/06/2024 |

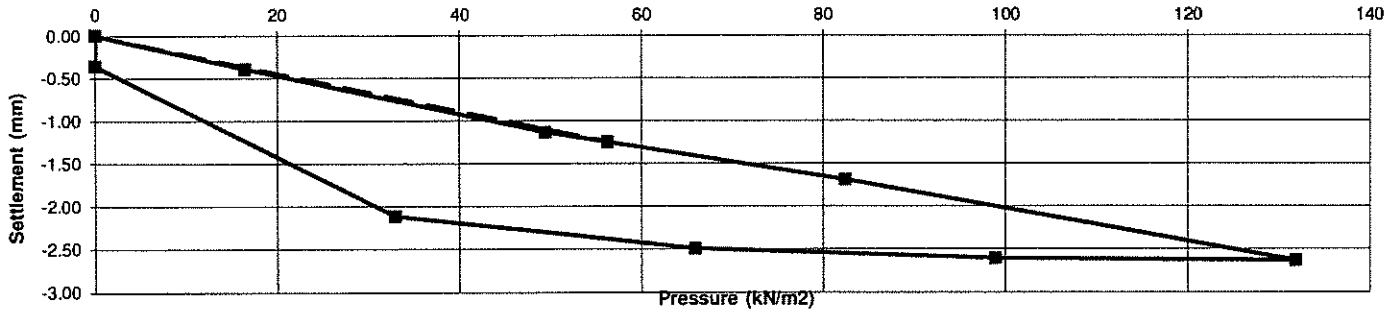
Description of soil under test (natural soil, placed fill, sub-base)

Grey brown sandy gravelly CLAY

Sample Ref No. N/A

Depth 0.00 m bgl

**Pressure / Settlement**




Gradient at 1.25 mm settlement intersection = 45

Modulus of subgrade reaction = 29 MPa/m

Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 3.3 %

## PLATE TEST REPORT SHEET (F3.1)

## Applied Pressure/Settlement Curve

| | |
|---|---|
| Reference No. | R159349 |
| Contract | 25474 Barrysparks VHI |
| Test No. | CBR06 Load |
| Location | See Site Map |
| Depth | 0.60 |
| Client | POGA |
| Plate Diameter: | 450 mm |
| Test Method | BS 1377: Part 9: 1990 Test4 - Incremental Loading Test |
| Technician | A. Rynne |
| Authorised by | |
| Date | 26/06/2024 |

Description of soil under test
(natural soil, placed fill, sub-base)

Grey brown sandy gravelly CLAY

Sample Ref No. N/A

Depth 0.00 m bgl

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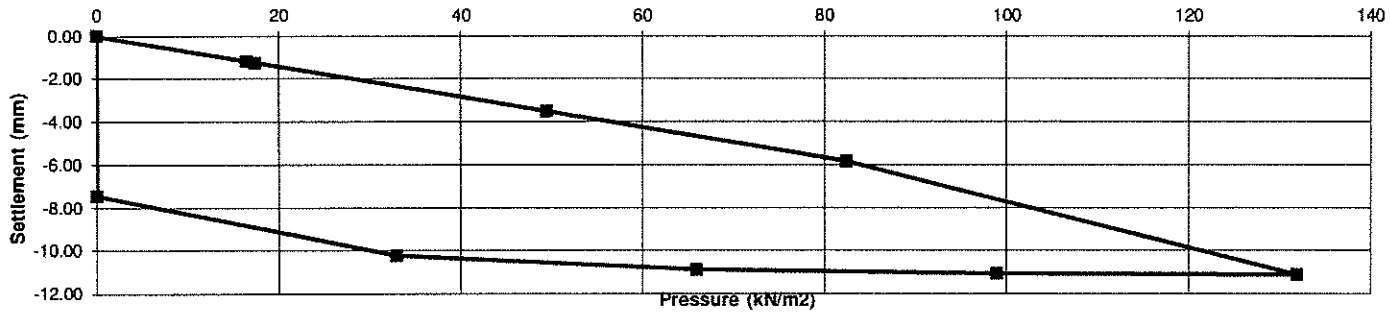
**Pressure / Settlement**




Gradient at 1.25 mm settlement intersection = 14
Modulus of subgrade reaction = 9 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 0.4 %

## PLATE TEST REPORT SHEET (F3.1)

## Applied Pressure/Settlement Curve

| | |
|---|---|
| Reference No. | R159349 |
| Contract | 25474 Barrysparks VHI |
| Test No. | CBR06 Reload |
| Location | See Site Map |
| Depth | 0.60 |
| Client | POGA |
| Plate Diameter: | 450 mm |
| Test Method | BS 1377: Part 9: 1990 Test4 - Incremental Loading Test |
| Technician | A. Rynne |
| Authorised by | |
| Date | 26/06/2024 |

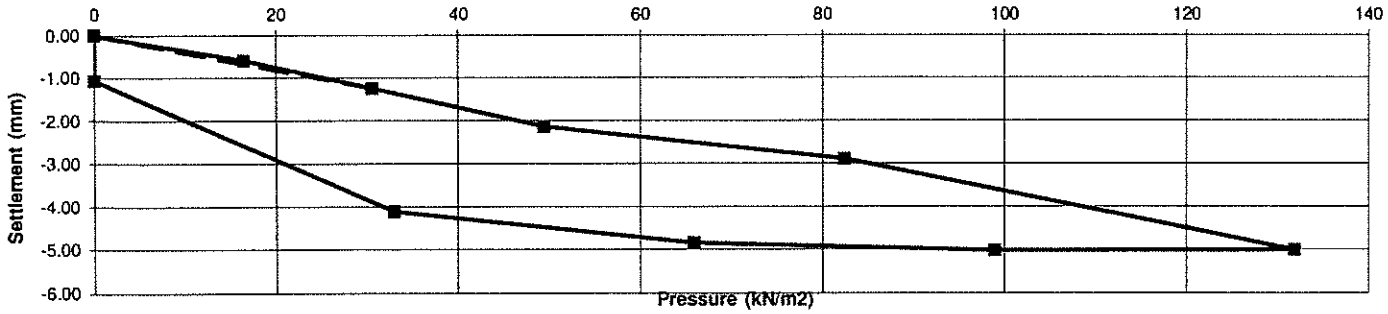
Description of soil under test (natural soil, placed fill, sub-base)

Grey brown sandy gravelly CLAY

Sample Ref No. N/A

Depth 0.00 m bgl

**Pressure / Settlement**




Gradient at 1.25 mm settlement intersection = 24

Modulus of subgrade reaction = 16 MPa/m

Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 1.1 %

## PLATE TEST REPORT SHEET (F3.1)

## Applied Pressure/Settlement Curve

| | |
|---|---|
| Reference No. | R159350 |
| Contract | 25474 Barrysparks VHI |
| Test No. | CBR07 Load |
| Location | See Site Map |
| Depth | 0.60 |
| Client | POGA |
| Plate Diameter: | 450 mm |
| Test Method | BS 1377: Part 9: 1990 Test4 - Incremental Loading Test |
| Technician | A. Rynne |
| Authorised by | |
| Date | 25/06/2024 |

Description of soil under test
(natural soil, placed fill, sub-base)

Grey brown sandy gravelly CLAY

Sample Ref No. N/A

Depth 0.00 m bgl

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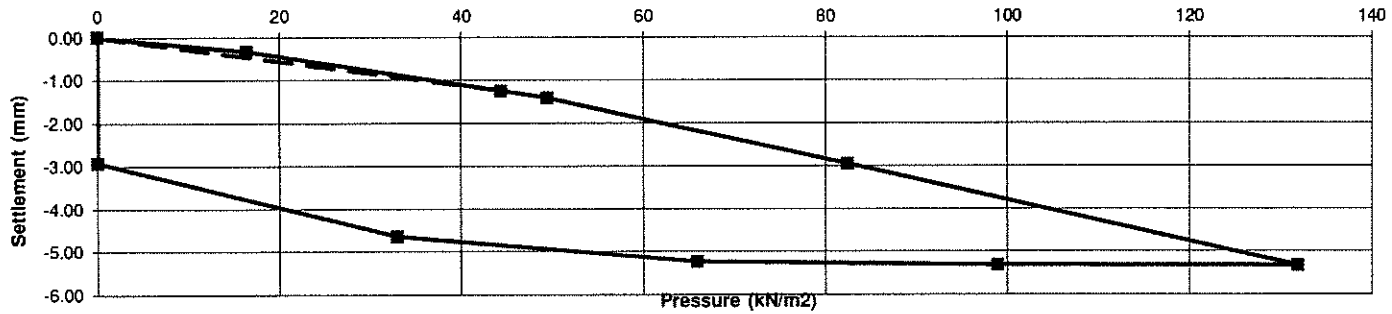
**Pressure / Settlement**




Gradient at 1.25 mm settlement intersection = 35
Modulus of subgrade reaction = 23 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 2.2 %

## PLATE TEST REPORT SHEET (F3.1)

## Applied Pressure/Settlement Curve

| | |
|---|---|
| Reference No. | R159350 |
| Contract | 25474 Barrysparks VHI |
| Test No. | CBR07 Reload |
| Location | See Site Map |
| Depth | 0.60 |
| Client | POGA |
| Plate Diameter: | 450 mm |
| Test Method | BS 1377: Part 9: 1990 Test4 - Incremental Loading Test |
| Technician | A. Rynne |
| Authorised by | |
| Date | 25/06/2024 |

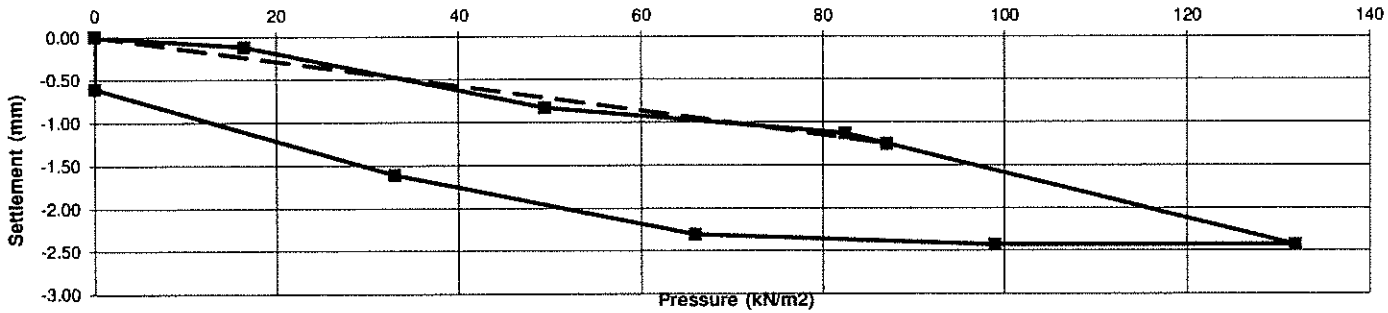
Description of soil under test (natural soil, placed fill, sub-base)

Grey brown sandy gravelly CLAY

Sample Ref No. N/A

Depth 0.00 m bgl

**Pressure / Settlement**




Gradient at 1.25 mm settlement intersection = 70

Modulus of subgrade reaction = 45 MPa/m

Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 7.0 %

## PLATE TEST REPORT SHEET (F3.1)

## Applied Pressure/Settlement Curve

| | |
|---|---|
| Reference No. | R159351 |
| Contract | 25474 Barrysparks VHI |
| Test No. | CBR08 Load |
| Location | See Site Map |
| Depth | 0.60 |
| Client | POGA |
| Plate Diameter: | 450 mm |
| Test Method | BS 1377: Part 9: 1990 Test4 - Incremental Loading Test |
| Technician | A. Rynne |
| Authorised by | |
| Date | 26/06/2024 |

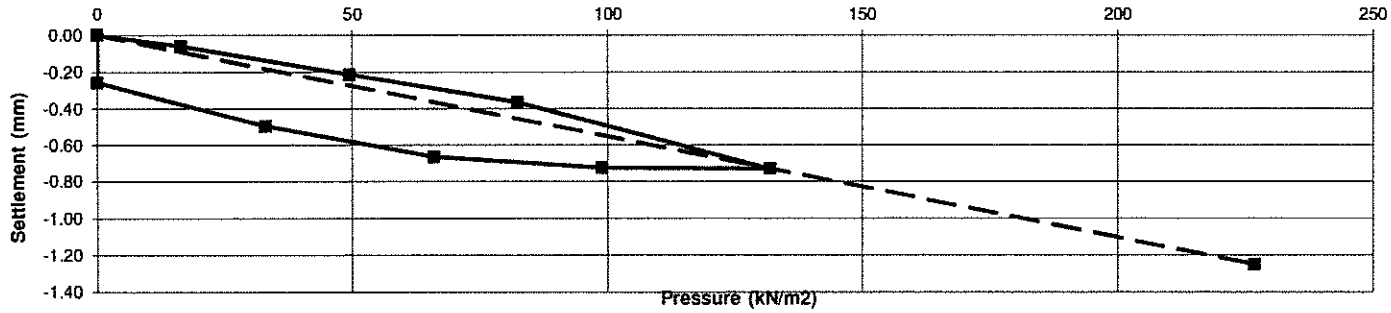
Description of soil under test (natural soil, placed fill, sub-base)

Grey brown sandy gravelly CLAY

Sample Ref No. N/A

Depth 0.00 m bgl

**Pressure / Settlement**




Gradient at 1.25 mm settlement intersection = 181

Modulus of subgrade reaction = 117 MPa/m

Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 36.8 %

## PLATE TEST REPORT SHEET (F3.1)

## Applied Pressure/Settlement Curve

| | |
|---|---|
| Reference No. | R159351 |
| Contract | 25474 Barrysparks VHI |
| Test No. | CBR08 Reload |
| Location | See Site Map |
| Depth | 0.60 |
| Client | POGA |
| Plate Diameter: | 450 mm |
| Test Method | BS 1377: Part 9: 1990 Test4 - Incremental Loading Test |
| Technician | A. Rynne |
| Authorised by | |
| Date | 25/06/2024 |

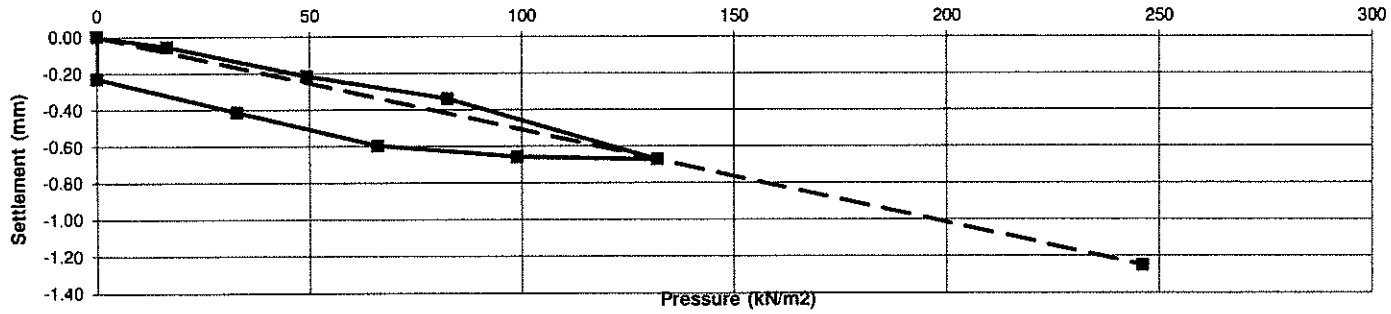
Description of soil under test
(natural soil, placed fill, sub-base)

Grey brown sandy gravelly CLAY

Sample Ref No. N/A

Depth 0.00 m bgt

**Pressure / Settlement**




Gradient at 1.25 mm settlement intersection = 197
Modulus of subgrade reaction = 126 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 42.4 %

## PLATE TEST REPORT SHEET (F3.1)

## Applied Pressure/Settlement Curve

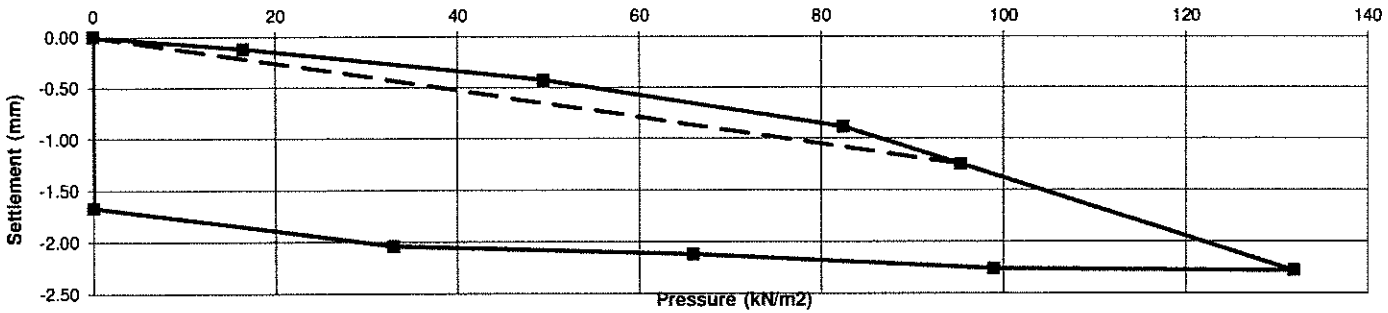
| | |
|---|---|
| Reference No. | R159352 |
| Contract | 25474 Barrysparks VHI |
| Test No. | CBR09 Load |
| Location | See Site Map |
| Depth | 0.60 |
| Client | POGA |
| Plate Diameter: | 450 mm |
| Test Method | BS 1377: Part 9: 1990 Test4 - Incremental Loading Test |
| Technician | A. Rynne |
| Authorised by | |
| Date | 25/06/2024 |

Description of soil under test (natural soil, placed fill, sub-base)

Grey brown sandy gravelly CLAY

Sample Ref No. N/A

Depth 0.00 m bgl




Gradient at 1.25 mm settlement intersection = 76

Modulus of subgrade reaction = 49 MPa/m

Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 8.2 %

## PLATE TEST REPORT SHEET (F3.1)

## Applied Pressure/Settlement Curve

| | |
|---|---|
| Reference No. | R159352 |
| Contract | 25474 Barrysparks VHI |
| Test No. | CBR09 Reload |
| Location | See Site Map |
| Depth | 0.60 |
| Client | POGA |
| Plate Diameter: | 450 mm |
| Test Method | BS 1377: Part 9: 1990 Test4 - Incremental Loading Test |
| Technician | A. Rynne |
| Authorised by | |
| Date | 25/06/2024 |

Description of soil under test
(natural soil, placed fill, sub-base)

Grey brown sandy gravelly CLAY

Sample Ref No. N/A
Depth 0.00 m bgl

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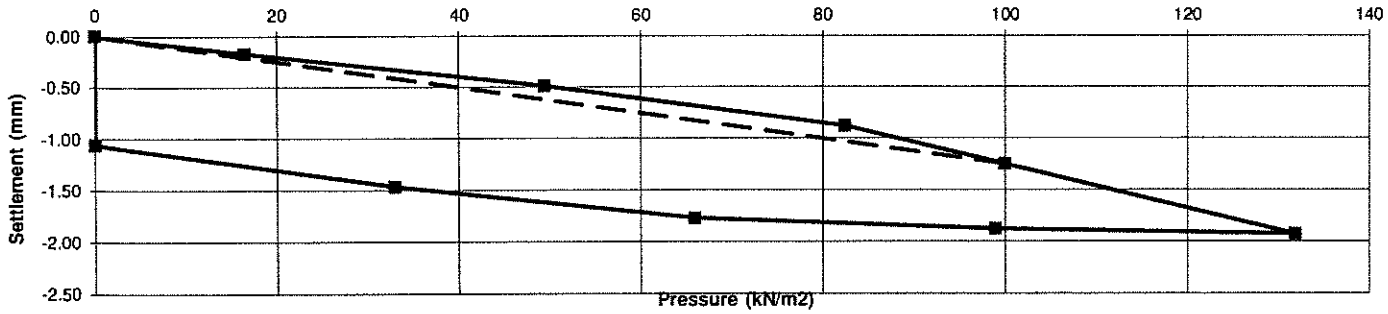
**Pressure / Settlement**




Gradient at 1.25 mm settlement intersection = 80
Modulus of subgrade reaction = 51 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 8.9 %

# Appendix III Dynamic Probe Records

# DYNAMIC PROBE RECORD

REPORT NUMBER 25474



| | | | |
|---|---|---|---|
| CONTRACT | Barrysparks VHI | PROBE NO. | DP01 |
| | | SHEET | Sheet 1 of 1 |
| CO-ORDINATES | | DATE DRILLED | 21/06/2024 |
| GROUND LEVEL (mOD) | | DATE LOGGED | 21/06/2024 |
| CLIENT | VHI | PROBE TYPE | DPH |
| ENGINEER | POGA | | |
| HAMMER MASS (kg) | 50 | | |
| INCREMENT SIZE (mm) | 100 | | |
| FALL HEIGHT (mm) | 500 | | |

| Depth (m) | Geotechnical Description | Legend | Depth (m) | Elevation (mOD) | Water | Depth (m) | Probe Readings (Blows/Increment) |
|---|---|---|---|---|---|---|---|
| 0.0 | | | | | | 0.00 | 2 |
| | | | | | | 0.10 | 6 |
| | | | | | | 0.20 | 8 |
| | | | | | | 0.30 | 5 |
| | | | | | | 0.40 | 3 |
| | | | | | | 0.50 | 3 |
| | | | | | | 0.60 | 4 |
| | | | | | | 0.70 | 2 |
| | | | | | | 0.80 | 2 |
| | | | | | | 0.90 | 1 |
| 1.0 | | | | | | 1.00 | 2 |
| | | | | | | 1.10 | 1 |
| | | | | | | 1.20 | 3 |
| | | | | | | 1.30 | 4 |
| | | | | | | 1.40 | 5 |
| | | | | | | 1.50 | 4 |
| | | | | | | 1.60 | 4 |
| | | | | | | 1.70 | 3 |
| | | | | | | 1.80 | 2 |
| | | | | | | 1.90 | 2 |
| 2.0 | | | | | | 2.00 | 4 |
| | | | | | | 2.10 | 3 |
| | | | | | | 2.20 | 5 |
| | | | | | | 2.30 | 7 |
| | | | | | | 2.40 | 10 |
| | | | | | | 2.50 | 11 |
| | | | | | | 2.60 | 19 |
| | | | | | | 2.70 | 28 |
| | | | | | | 2.80 | 25 |
| 3.0 | End of Probe at 2.90 m | | | | | | |
| 4.0 | | | | | | | |

Graphic Probe Record: 0 5 10 15 20 25; 28

**GROUNDWATER OBSERVATIONS**

**REMARKS**

IGSL DP LOG 100MM INCREMENTS 25416.GPJ IGSL.GDT 4/7/24

# DYNAMIC PROBE RECORD

REPORT NUMBER 25474



| | | | |
|---|---|---|---|
| CONTRACT | Barrysparks VHI | PROBE NO. | DP02 |
| | | SHEET | Sheet 1 of 1 |
| CO-ORDINATES | | DATE DRILLED | 21/06/2024 |
| GROUND LEVEL (mOD) | | DATE LOGGED | 21/06/2024 |
| CLIENT | VHI | PROBE TYPE | DPH |
| ENGINEER | POGA | | |
| HAMMER MASS (kg) | 50 | | |
| INCREMENT SIZE (mm) | 100 | | |
| FALL HEIGHT (mm) | 500 | | |

| Depth (m) | Geotechnical Description | Legend | Depth (m) | Elevation (mOD) | Water | Depth (m) | Probe Readings (Blows/Increment) |
|---|---|---|---|---|---|---|---|
| 0.0 | . | | | | | 0.00 | 3 |
| | | | | | | 0.10 | 5 |
| | | | | | | 0.20 | 7 |
| | | | | | | 0.30 | 5 |
| | | | | | | 0.40 | 4 |
| | | | | | | 0.50 | 2 |
| | | | | | | 0.60 | 4 |
| | | | | | | 0.70 | 2 |
| | | | | | | 0.80 | 1 |
| | | | | | | 0.90 | 1 |
| 1.0 | | | | | | 1.00 | 1 |
| | | | | | | 1.10 | 1 |
| | | | | | | 1.20 | 2 |
| | | | | | | 1.30 | 3 |
| | | | | | | 1.40 | 4 |
| | | | | | | 1.50 | 4 |
| | | | | | | 1.60 | 4 |
| | | | | | | 1.70 | 3 |
| | | | | | | 1.80 | 2 |
| | | | | | | 1.90 | 1 |
| 2.0 | | | | | | 2.00 | 3 |
| | | | | | | 2.10 | 3 |
| | | | | | | 2.20 | 5 |
| | | | | | | 2.30 | 12 |
| | | | | | | 2.40 | 12 |
| | | | | | | 2.50 | 14 |
| | | | | | | 2.60 | 15 |
| | | | | | | 2.70 | 22 |
| | | | | | | 2.80 | 28 |
| | | | | | | 2.90 | 25 |
| 3.0 | End of Probe at 3.00 m | | | | | | |
| 4.0 | | | | | | | |

Graphic Probe Record: 0 5 10 15 20 25; 28

**GROUNDWATER OBSERVATIONS**

**REMARKS**

IGSL DP LOG 100MM INCREMENTS 25416.GPJ IGSL.GDT 4/7/24

# DYNAMIC PROBE RECORD

REPORT NUMBER 25474



| | | | |
|---|---|---|---|
| CONTRACT | Barrysparks VHI | PROBE NO. | DP03 |
| | | SHEET | Sheet 1 of 1 |
| CO-ORDINATES | | DATE DRILLED | 22/06/2024 |
| GROUND LEVEL (mOD) | | DATE LOGGED | 22/06/2024 |
| CLIENT | VHI | PROBE TYPE | DPH |
| ENGINEER | POGA | | |
| HAMMER MASS (kg) | 50 | | |
| INCREMENT SIZE (mm) | 100 | | |
| FALL HEIGHT (mm) | 500 | | |

| Depth (m) | Geotechnical Description | Legend | Depth (m) | Elevation (mOD) | Water | Depth (m) | Probe Readings (Blows/Increment) |
|---|---|---|---|---|---|---|---|
| 0.0 | | | | | | 0.00 | 2 |
| | | | | | | 0.10 | 5 |
| | | | | | | 0.20 | 10 |
| | | | | | | 0.30 | 12 |
| | | | | | | 0.40 | 13 |
| | | | | | | 0.50 | 15 |
| | | | | | | 0.60 | 20 |
| | | | | | | 0.70 | 18 |
| | | | | | | 0.80 | 16 |
| | | | | | | 0.90 | 10 |
| 1.0 | | | | | | 1.00 | 10 |
| | | | | | | 1.10 | 12 |
| | | | | | | 1.20 | 17 |
| | | | | | | 1.30 | 22 |
| | | | | | | 1.40 | 13 |
| | | | | | | 1.50 | 11 |
| | | | | | | 1.60 | 10 |
| | | | | | | 1.70 | 10 |
| | | | | | | 1.80 | 16 |
| | | | | | | 1.90 | 15 |
| 2.0 | | | | | | 2.00 | 17 |
| | | | | | | 2.10 | 20 |
| | | | | | | 2.20 | 23 |
| | | | | | | 2.30 | 25 |
| | | | | | | 2.40 | 25 |
| | End of Probe at 2.50 m | | | | | | |
| 3.0 | | | | | | | |
| 4.0 | | | | | | | |

Graphic Probe Record: 0 5 10 15 20 25

**GROUNDWATER OBSERVATIONS**

**REMARKS**

IGSL DP LOG 100MM INCREMENTS 25416.GPJ IGSL.GDT 4/7/24

# DYNAMIC PROBE RECORD

REPORT NUMBER 25474



| | | | |
|---|---|---|---|
| CONTRACT | Barrysparks VHI | PROBE NO. | DP04 |
| | | SHEET | Sheet 1 of 1 |
| CO-ORDINATES | | DATE DRILLED | 22/06/2024 |
| GROUND LEVEL (mOD) | | DATE LOGGED | 22/06/2024 |
| CLIENT | VHI | PROBE TYPE | DPH |
| ENGINEER | POGA | | |
| HAMMER MASS (kg) | 50 | | |
| INCREMENT SIZE (mm) | 100 | | |
| FALL HEIGHT (mm) | 500 | | |

| Depth (m) | Geotechnical Description | Legend | Depth (m) | Elevation (mOD) | Water | Depth (m) | Probe Readings (Blows/Increment) | Graphic Probe Record (0 5 10 15 20 25) |
|---|---|---|---|---|---|---|---|---|
| 0.0 | . | | | | | 0.00 | 1 | |
| | | | | | | 0.10 | 4 | |
| | | | | | | 0.20 | 7 | |
| | | | | | | 0.30 | 6 | |
| | | | | | | 0.40 | 6 | |
| | | | | | | 0.50 | 4 | |
| | | | | | | 0.60 | 8 | |
| | | | | | | 0.70 | 2 | |
| | | | | | | 0.80 | 2 | |
| | | | | | | 0.90 | 1 | |
| 1.0 | | | | | | 1.00 | 1 | |
| | | | | | | 1.10 | 1 | |
| | | | | | | 1.20 | 1 | |
| | | | | | | 1.30 | 1 | |
| | | | | | | 1.40 | 1 | |
| | | | | | | 1.50 | 1 | |
| | | | | | | 1.60 | 1 | |
| | | | | | | 1.70 | 1 | |
| | | | | | | 1.80 | 1 | |
| | | | | | | 1.90 | 1 | |
| 2.0 | | | | | | 2.00 | 1 | |
| | | | | | | 2.10 | 1 | |
| | | | | | | 2.20 | 3 | |
| | | | | | | 2.30 | 1 | |
| | | | | | | 2.40 | 1 | |
| | | | | | | 2.50 | 2 | |
| | | | | | | 2.60 | 1 | |
| | | | | | | 2.70 | 2 | |
| | | | | | | 2.80 | 5 | |
| | | | | | | 2.90 | 5 | |
| 3.0 | | | | | | 3.00 | 23 | |
| | | | | | | 3.10 | 23 | |
| | | | | | | 3.20 | 10 | |
| | | | | | | 3.30 | 9 | |
| | | | | | | 3.40 | 9 | |
| | | | | | | 3.50 | 10 | |
| | | | | | | 3.60 | 14 | |
| | | | | | | 3.70 | 17 | |
| | | | | | | 3.80 | 16 | |
| | | | | | | 3.90 | 19 | |
| 4.0 | | | | | | 4.00 | 21 | |
| | | | | | | 4.10 | 26 | 26 |
| | End of Probe at 4.30 m | | | | | 4.20 | 25 | |

**GROUNDWATER OBSERVATIONS**

**REMARKS**

IGSL DP LOG 100MM INCREMENTS 25416.GPJ IGSL.GDT 4/7/24

# DYNAMIC PROBE RECORD

REPORT NUMBER 25474



| | | | |
|---|---|---|---|
| CONTRACT | Barrysparks VHI | PROBE NO. | DP05 |
| | | SHEET | Sheet 1 of 1 |
| CO-ORDINATES | | DATE DRILLED | 22/06/2024 |
| GROUND LEVEL (mOD) | | DATE LOGGED | 22/06/2024 |
| CLIENT | VHI | PROBE TYPE | DPH |
| ENGINEER | POGA | | |
| HAMMER MASS (kg) | 50 | | |
| INCREMENT SIZE (mm) | 100 | | |
| FALL HEIGHT (mm) | 500 | | |

| Depth (m) | Geotechnical Description | Legend | Depth (m) | Elevation (mOD) | Water | Depth (m) | Probe Readings (Blows/Increment) |
|---|---|---|---|---|---|---|---|
| 0.0 | . | | | | | 0.00 | 3 |
| | | | | | | 0.10 | 5 |
| | | | | | | 0.20 | 7 |
| | | | | | | 0.30 | 10 |
| | | | | | | 0.40 | 10 |
| | | | | | | 0.50 | 6 |
| | | | | | | 0.60 | 4 |
| | | | | | | 0.70 | 2 |
| | | | | | | 0.80 | 5 |
| | | | | | | 0.90 | 6 |
| 1.0 | | | | | | 1.00 | 5 |
| | | | | | | 1.10 | 2 |
| | | | | | | 1.20 | 3 |
| | | | | | | 1.30 | 3 |
| | | | | | | 1.40 | 1 |
| | | | | | | 1.50 | 1 |
| | | | | | | 1.60 | 3 |
| | | | | | | 1.70 | 6 |
| | | | | | | 1.80 | 8 |
| | | | | | | 1.90 | 7 |
| 2.0 | | | | | | 2.00 | 11 |
| | | | | | | 2.10 | 14 |
| | | | | | | 2.20 | 18 |
| | | | | | | 2.30 | 21 |
| | | | | | | 2.40 | 24 |
| | | | | | | 2.50 | 25 |
| | End of Probe at 2.60 m | | | | | | |
| 3.0 | | | | | | | |
| 4.0 | | | | | | | |

Graphic Probe Record: 0 5 10 15 20 25

**GROUNDWATER OBSERVATIONS**

**REMARKS**

IGSL DP LOG 100MM INCREMENTS 25416.GPJ IGSL.GDT 4/7/24

# DYNAMIC PROBE RECORD

REPORT NUMBER 25474



| | | | |
|---|---|---|---|
| CONTRACT | Barrysparks VHI | PROBE NO. | DP06 |
| | | SHEET | Sheet 1 of 1 |
| CO-ORDINATES | | DATE DRILLED | 22/06/2024 |
| GROUND LEVEL (mOD) | | DATE LOGGED | 22/06/2024 |
| CLIENT | VHI | PROBE TYPE | DPH |
| ENGINEER | POGA | | |
| HAMMER MASS (kg) | 50 | | |
| INCREMENT SIZE (mm) | 100 | | |
| FALL HEIGHT (mm) | 500 | | |

| Depth (m) | Geotechnical Description | Legend | Depth (m) | Elevation (mOD) | Water | Depth (m) | Probe Readings (Blows/Increment) |
|---|---|---|---|---|---|---|---|
| 0.0 | | | | | | 0.00 | 2 |
| | | | | | | 0.10 | 8 |
| | | | | | | 0.20 | 12 |
| | | | | | | 0.30 | 13 |
| | | | | | | 0.40 | 10 |
| | | | | | | 0.50 | 8 |
| | | | | | | 0.60 | 6 |
| | | | | | | 0.70 | 3 |
| | | | | | | 0.80 | 2 |
| | | | | | | 0.90 | 4 |
| 1.0 | | | | | | 1.00 | 5 |
| | | | | | | 1.10 | 6 |
| | | | | | | 1.20 | 5 |
| | | | | | | 1.30 | 1 |
| | | | | | | 1.40 | 4 |
| | | | | | | 1.50 | 8 |
| | | | | | | 1.60 | 9 |
| | | | | | | 1.70 | 4 |
| | | | | | | 1.80 | 6 |
| | | | | | | 1.90 | 5 |
| 2.0 | | | | | | 2.00 | 7 |
| | | | | | | 2.10 | 7 |
| | | | | | | 2.20 | 10 |
| | | | | | | 2.30 | 11 |
| | | | | | | 2.40 | 12 |
| | | | | | | 2.50 | 14 |
| | | | | | | 2.60 | 19 |
| | | | | | | 2.70 | 23 |
| | | | | | | 2.80 | 25 |
| 3.0 | End of Probe at 2.90 m | | | | | | |
| 4.0 | | | | | | | |

Graphic Probe Record: 0 5 10 15 20 25

**GROUNDWATER OBSERVATIONS**

**REMARKS**

IGSL DP LOG 100MM INCREMENTS 25416.GPJ IGSL.GDT 4/7/24

# DYNAMIC PROBE RECORD

REPORT NUMBER 25474



| | | | |
|---|---|---|---|
| CONTRACT | Barrysparks VHI | PROBE NO. | DP07 |
| | | SHEET | Sheet 1 of 1 |
| CO-ORDINATES | | DATE DRILLED | 22/06/2024 |
| GROUND LEVEL (mOD) | | DATE LOGGED | 22/06/2024 |
| CLIENT | VHI | PROBE TYPE | DPH |
| ENGINEER | POGA | | |
| HAMMER MASS (kg) | 50 | | |
| INCREMENT SIZE (mm) | 100 | | |
| FALL HEIGHT (mm) | 500 | | |

| Depth (m) | Geotechnical Description | Legend | Depth (m) | Elevation (mOD) | Water | Depth (m) | Probe Readings (Blows/Increment) |
|---|---|---|---|---|---|---|---|
| 0.0 | | | | | | 0.00 | 2 |
| | | | | | | 0.10 | 7 |
| | | | | | | 0.20 | 11 |
| | | | | | | 0.30 | 10 |
| | | | | | | 0.40 | 6 |
| | | | | | | 0.50 | 3 |
| | | | | | | 0.60 | 2 |
| | | | | | | 0.70 | 4 |
| | | | | | | 0.80 | 7 |
| | | | | | | 0.90 | 10 |
| 1.0 | | | | | | 1.00 | 6 |
| | | | | | | 1.10 | 3 |
| | | | | | | 1.20 | 2 |
| | | | | | | 1.30 | 2 |
| | | | | | | 1.40 | 3 |
| | | | | | | 1.50 | 1 |
| | | | | | | 1.60 | 2 |
| | | | | | | 1.70 | 3 |
| | | | | | | 1.80 | 9 |
| | | | | | | 1.90 | 14 |
| 2.0 | | | | | | 2.00 | 22 |
| | | | | | | 2.10 | 16 |
| | | | | | | 2.20 | 19 |
| | | | | | | 2.30 | 23 |
| | | | | | | 2.40 | 25 |
| | | | | | | 2.50 | 25 |
| | End of Probe at 2.60 m | | | | | | |
| 3.0 | | | | | | | |
| 4.0 | | | | | | | |

Graphic Probe Record: 0 5 10 15 20 25

**GROUNDWATER OBSERVATIONS**

**REMARKS**

IGSL DP LOG 100MM INCREMENTS 25416.GPJ IGSL.GDT 4/7/24

# DYNAMIC PROBE RECORD

REPORT NUMBER 25474



| | | | |
|---|---|---|---|
| CONTRACT | Barrysparks VHI | PROBE NO. | DP08 |
| | | SHEET | Sheet 1 of 1 |
| CO-ORDINATES | | DATE DRILLED | 22/06/2024 |
| GROUND LEVEL (mOD) | | DATE LOGGED | 22/06/2024 |
| CLIENT | VHI | PROBE TYPE | DPH |
| ENGINEER | POGA | | |
| HAMMER MASS (kg) | 50 | | |
| INCREMENT SIZE (mm) | 100 | | |
| FALL HEIGHT (mm) | 500 | | |

| Depth (m) | Geotechnical Description | Legend | Depth (m) | Elevation (mOD) | Water | Depth (m) | Probe Readings (Blows/Increment) |
|---|---|---|---|---|---|---|---|
| 0.0 | . | | | | | 0.00 | 0 |
| | | | | | | 0.10 | 2 |
| | | | | | | 0.20 | 3 |
| | | | | | | 0.30 | 3 |
| | | | | | | 0.40 | 4 |
| | | | | | | 0.50 | 3 |
| | | | | | | 0.60 | 2 |
| | | | | | | 0.70 | 2 |
| | | | | | | 0.80 | 6 |
| | | | | | | 0.90 | 6 |
| 1.0 | | | | | | 1.00 | 6 |
| | | | | | | 1.10 | 6 |
| | | | | | | 1.20 | 5 |
| | | | | | | 1.30 | 5 |
| | | | | | | 1.40 | 6 |
| | | | | | | 1.50 | 7 |
| | | | | | | 1.60 | 8 |
| | | | | | | 1.70 | 9 |
| | | | | | | 1.80 | 11 |
| | | | | | | 1.90 | 8 |
| 2.0 | | | | | | 2.00 | 11 |
| | | | | | | 2.10 | 12 |
| | | | | | | 2.20 | 13 |
| | | | | | | 2.30 | 17 |
| | | | | | | 2.40 | 18 |
| | | | | | | 2.50 | 16 |
| | | | | | | 2.60 | 21 |
| | | | | | | 2.70 | 24 |
| | | | | | | 2.80 | 25 |
| 3.0 | End of Probe at 2.90 m | | | | | | |
| 4.0 | | | | | | | |

Graphic Probe Record: 0 5 10 15 20 25

**GROUNDWATER OBSERVATIONS**

**REMARKS**

IGSL DP LOG 100MM INCREMENTS 25416.GPJ IGSL.GDT 4/7/24

# DYNAMIC PROBE RECORD

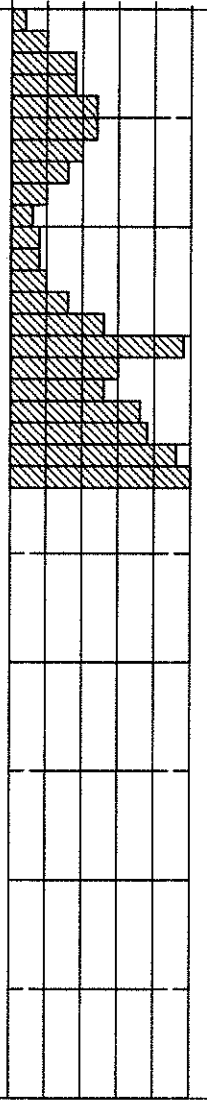
REPORT NUMBER 25474



| | | | |
|---|---|---|---|
| CONTRACT | Barrysparks VHI | PROBE NO. | DP09 |
| | | SHEET | Sheet 1 of 1 |
| CO-ORDINATES | | DATE DRILLED | 22/06/2024 |
| GROUND LEVEL (mOD) | | DATE LOGGED | 22/06/2024 |
| CLIENT | VHI | PROBE TYPE | DPH |
| ENGINEER | POGA | | |
| HAMMER MASS (kg) | 50 | | |
| INCREMENT SIZE (mm) | 100 | | |
| FALL HEIGHT (mm) | 500 | | |

| Depth (m) | Geotechnical Description | Legend | Depth (m) | Elevation (mOD) | Water | Depth (m) | Probe Readings (Blows/Increment) |
|---|---|---|---|---|---|---|---|
| 0.0 | . | | | | | 0.00 | 2 |
| | | | | | | 0.10 | 5 |
| | | | | | | 0.20 | 9 |
| | | | | | | 0.30 | 9 |
| | | | | | | 0.40 | 12 |
| | | | | | | 0.50 | 12 |
| | | | | | | 0.60 | 10 |
| | | | | | | 0.70 | 8 |
| | | | | | | 0.80 | 5 |
| | | | | | | 0.90 | 3 |
| 1.0 | | | | | | 1.00 | 4 |
| | | | | | | 1.10 | 4 |
| | | | | | | 1.20 | 5 |
| | | | | | | 1.30 | 8 |
| | | | | | | 1.40 | 13 |
| | | | | | | 1.50 | 24 |
| | | | | | | 1.60 | 15 |
| | | | | | | 1.70 | 13 |
| | | | | | | 1.80 | 18 |
| | | | | | | 1.90 | 19 |
| 2.0 | | | | | | 2.00 | 23 |
| | End of Probe at 2.20 m | | | | | 2.10 | 25 |
| 3.0 | | | | | | | |
| 4.0 | | | | | | | |

Graphic Probe Record




**GROUNDWATER OBSERVATIONS**

**REMARKS**

IGSL DP LOG 100MM INCREMENTS 25416.GPJ IGSL.GDT 4/7/24

# DYNAMIC PROBE RECORD

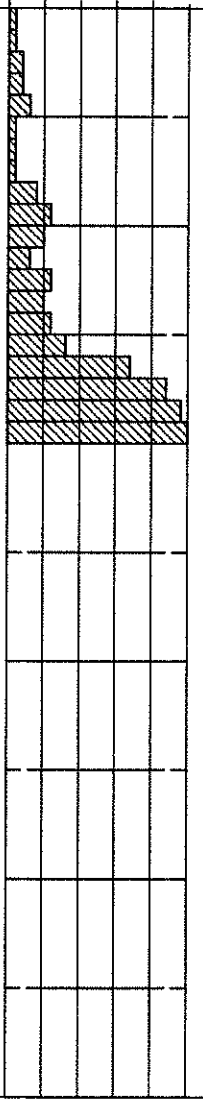
REPORT NUMBER 25474



| | | | |
|---|---|---|---|
| CONTRACT | Barrysparks VHI | PROBE NO. | DP10 |
| | | SHEET | Sheet 1 of 1 |
| CO-ORDINATES | | DATE DRILLED | 22/06/2024 |
| GROUND LEVEL (mOD) | | DATE LOGGED | 22/06/2024 |
| CLIENT | VHI | PROBE TYPE | DPH |
| ENGINEER | POGA | | |
| HAMMER MASS (kg) | 50 | | |
| INCREMENT SIZE (mm) | 100 | | |
| FALL HEIGHT (mm) | 500 | | |

| Depth (m) | Geotechnical Description | Legend | Depth (m) | Elevation (mOD) | Water | Depth (m) | Probe Readings (Blows/Increment) |
|---|---|---|---|---|---|---|---|
| 0.0 | . | | | | | 0.00 | 1 |
| | | | | | | 0.10 | 1 |
| | | | | | | 0.20 | 2 |
| | | | | | | 0.30 | 2 |
| | | | | | | 0.40 | 3 |
| | | | | | | 0.50 | 1 |
| | | | | | | 0.60 | 1 |
| | | | | | | 0.70 | 1 |
| | | | | | | 0.80 | 4 |
| | | | | | | 0.90 | 6 |
| 1.0 | | | | | | 1.00 | 5 |
| | | | | | | 1.10 | 3 |
| | | | | | | 1.20 | 6 |
| | | | | | | 1.30 | 5 |
| | | | | | | 1.40 | 6 |
| | | | | | | 1.50 | 8 |
| | | | | | | 1.60 | 17 |
| | | | | | | 1.70 | 22 |
| | | | | | | 1.80 | 24 |
| | | | | | | 1.90 | 25 |
| 2.0 | End of Probe at 2.00 m | | | | | | |
| 3.0 | | | | | | | |
| 4.0 | | | | | | | |

Graphic Probe Record




**GROUNDWATER OBSERVATIONS**

**REMARKS**

# DYNAMIC PROBE RECORD

REPORT NUMBER 25474



| | | | |
|---|---|---|---|
| CONTRACT | Barrysparks VHI | PROBE NO. | DP11 |
| | | SHEET | Sheet 1 of 1 |
| CO-ORDINATES | | DATE DRILLED | 22/06/2024 |
| GROUND LEVEL (mOD) | | DATE LOGGED | 22/06/2024 |
| CLIENT | VHI | HAMMER MASS (kg) | 50 |
| ENGINEER | POGA | INCREMENT SIZE (mm) | 100 |
| | | FALL HEIGHT (mm) | 500 |
| | | PROBE TYPE | DPH |

| Depth (m) | Geotechnical Description | Legend | Depth (m) | Elevation (mOD) | Water | Depth (m) | Probe Readings (Blows/Increment) |
|---|---|---|---|---|---|---|---|
| 0.0 | | | | | | 0.00 | 1 |
| | | | | | | 0.10 | 3 |
| | | | | | | 0.20 | 3 |
| | | | | | | 0.30 | 5 |
| | | | | | | 0.40 | 4 |
| | | | | | | 0.50 | 3 |
| | | | | | | 0.60 | 2 |
| | | | | | | 0.70 | 1 |
| | | | | | | 0.80 | 2 |
| | | | | | | 0.90 | 3 |
| 1.0 | | | | | | 1.00 | 3 |
| | | | | | | 1.10 | 5 |
| | | | | | | 1.20 | 4 |
| | | | | | | 1.30 | 4 |
| | | | | | | 1.40 | 8 |
| | | | | | | 1.50 | 5 |
| | | | | | | 1.60 | 5 |
| | | | | | | 1.70 | 6 |
| | | | | | | 1.80 | 5 |
| | | | | | | 1.90 | 4 |
| 2.0 | | | | | | 2.00 | 15 |
| | | | | | | 2.10 | 16 |
| | | | | | | 2.20 | 20 |
| | | | | | | 2.30 | 14 |
| | | | | | | 2.40 | 12 |
| | | | | | | 2.50 | 14 |
| | | | | | | 2.60 | 19 |
| | | | | | | 2.70 | 23 |
| | | | | | | 2.80 | 25 |
| 3.0 | End of Probe at 2.90 m | | | | | | |
| 4.0 | | | | | | | |

Graphic Probe Record: 0 5 10 15 20 25

GROUNDWATER OBSERVATIONS

REMARKS

IGSL DP LOG 100MM INCREMENTS 25416.GPJ IGSL.GDT 4/7/24

# DYNAMIC PROBE RECORD

REPORT NUMBER 25474



| | | | |
|---|---|---|---|
| CONTRACT | Barrysparks VHI | PROBE NO. | DP12 |
| | | SHEET | Sheet 1 of 1 |
| CO-ORDINATES | | DATE DRILLED | 22/06/2024 |
| GROUND LEVEL (mOD) | | DATE LOGGED | 22/06/2024 |
| CLIENT | VHI | PROBE TYPE | DPH |
| ENGINEER | POGA | | |
| HAMMER MASS (kg) | 50 | | |
| INCREMENT SIZE (mm) | 100 | | |
| FALL HEIGHT (mm) | 500 | | |

| Depth (m) | Geotechnical Description | Legend | Depth (m) | Elevation (mOD) | Water | Depth (m) | Probe Readings (Blows/Increment) |
|---|---|---|---|---|---|---|---|
| 0.0 | . | | | | | 0.00 | 1 |
| | | | | | | 0.10 | 1 |
| | | | | | | 0.20 | 1 |
| | | | | | | 0.30 | 2 |
| | | | | | | 0.40 | 2 |
| | | | | | | 0.50 | 2 |
| | | | | | | 0.60 | 1 |
| | | | | | | 0.70 | 1 |
| | | | | | | 0.80 | 1 |
| | | | | | | 0.90 | 1 |
| 1.0 | | | | | | 1.00 | 1 |
| | | | | | | 1.10 | 1 |
| | | | | | | 1.20 | 1 |
| | | | | | | 1.30 | 3 |
| | | | | | | 1.40 | 3 |
| | | | | | | 1.50 | 4 |
| | | | | | | 1.60 | 4 |
| | | | | | | 1.70 | 5 |
| | | | | | | 1.80 | 1 |
| | | | | | | 1.90 | 3 |
| 2.0 | | | | | | 2.00 | 3 |
| | | | | | | 2.10 | 3 |
| | | | | | | 2.20 | 3 |
| | | | | | | 2.30 | 6 |
| | | | | | | 2.40 | 8 |
| | | | | | | 2.50 | 9 |
| | | | | | | 2.60 | 16 |
| | | | | | | 2.70 | 22 |
| | | | | | | 2.80 | 26 |
| | | | | | | 2.90 | 25 |
| 3.0 | End of Probe at 3.00 m | | | | | | |
| 4.0 | | | | | | | |

Graphic Probe Record: 0 5 10 15 20 25; 26

GROUNDWATER OBSERVATIONS

REMARKS

IGSL DP LOG 100MM INCREMENTS 25416.GPJ IGSL.GDT 4/7/24

# DYNAMIC PROBE RECORD

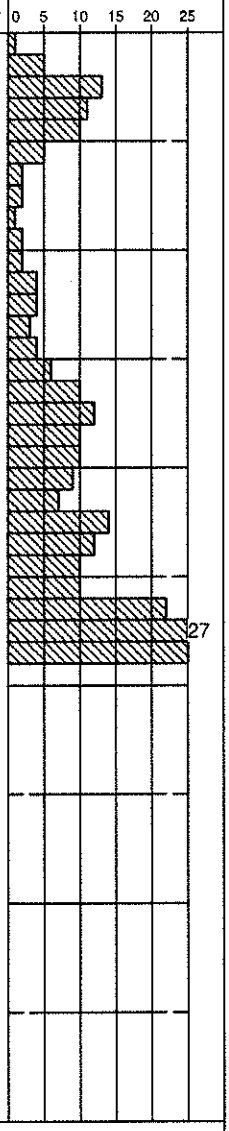
REPORT NUMBER 25474



| | | | |
|---|---|---|---|
| CONTRACT | Barrysparks VHI | PROBE NO. | DP13 |
| | | SHEET | Sheet 1 of 1 |
| CO-ORDINATES | | DATE DRILLED | 22/06/2024 |
| GROUND LEVEL (mOD) | | DATE LOGGED | 22/06/2024 |
| CLIENT | VHI | PROBE TYPE | DPH |
| ENGINEER | POGA | | |
| HAMMER MASS (kg) | 50 | | |
| INCREMENT SIZE (mm) | 100 | | |
| FALL HEIGHT (mm) | 500 | | |

| Depth (m) | Geotechnical Description | Legend | Depth (m) | Elevation (mOD) | Water | Depth (m) | Probe Readings (Blows/Increment) |
|---|---|---|---|---|---|---|---|
| 0.0 | . | | | | | 0.00 | 1 |
| | | | | | | 0.10 | 5 |
| | | | | | | 0.20 | 13 |
| | | | | | | 0.30 | 11 |
| | | | | | | 0.40 | 10 |
| | | | | | | 0.50 | 5 |
| | | | | | | 0.60 | 2 |
| | | | | | | 0.70 | 2 |
| | | | | | | 0.80 | 1 |
| | | | | | | 0.90 | 2 |
| 1.0 | | | | | | 1.00 | 2 |
| | | | | | | 1.10 | 4 |
| | | | | | | 1.20 | 4 |
| | | | | | | 1.30 | 3 |
| | | | | | | 1.40 | 4 |
| | | | | | | 1.50 | 6 |
| | | | | | | 1.60 | 10 |
| | | | | | | 1.70 | 12 |
| | | | | | | 1.80 | 10 |
| | | | | | | 1.90 | 10 |
| 2.0 | | | | | | 2.00 | 9 |
| | | | | | | 2.10 | 7 |
| | | | | | | 2.20 | 14 |
| | | | | | | 2.30 | 12 |
| | | | | | | 2.40 | 10 |
| | | | | | | 2.50 | 10 |
| | | | | | | 2.60 | 22 |
| | | | | | | 2.70 | 27 |
| | | | | | | 2.80 | 25 |
| | End of Probe at 2.90 m | | | | | | |
| 3.0 | | | | | | | |
| 4.0 | | | | | | | |

Graphic Probe Record




**GROUNDWATER OBSERVATIONS**

**REMARKS**

IGSL DP LOG 100MM INCREMENTS 25416.GPJ IGSL.GDT 4/7/24

# DYNAMIC PROBE RECORD

REPORT NUMBER 25474



| | | | |
|---|---|---|---|
| CONTRACT | Barrysparks VHI | PROBE NO. | DP14 |
| | | SHEET | Sheet 1 of 1 |
| CO-ORDINATES | | DATE DRILLED | 22/06/2024 |
| GROUND LEVEL (mOD) | | DATE LOGGED | 22/06/2024 |
| CLIENT | VHI | HAMMER MASS (kg) | 50 |
| ENGINEER | POGA | INCREMENT SIZE (mm) | 100 |
| | | FALL HEIGHT (mm) | 500 |
| | | PROBE TYPE | DPH |

| Depth (m) | Geotechnical Description | Legend | Depth (m) | Elevation (mOD) | Water | Depth (m) | Probe Readings (Blows/Increment) | Graphic Probe Record (0 5 10 15 20 25) |
|---|---|---|---|---|---|---|---|---|
| 0.0 | . | | | | | 0.00 | 7 | |
| | | | | | | 0.10 | 19 | |
| | | | | | | 0.20 | 32 | 32 |
| | | | | | | 0.30 | 35 | 35 |
| | | | | | | 0.40 | 29 | 29 |
| | | | | | | 0.50 | 22 | |
| | | | | | | 0.60 | 15 | |
| | | | | | | 0.70 | 10 | |
| | | | | | | 0.80 | 10 | |
| | | | | | | 0.90 | 6 | |
| 1.0 | | | | | | 1.00 | 10 | |
| | | | | | | 1.10 | 29 | 29 |
| | | | | | | 1.20 | 24 | |
| | | | | | | 1.30 | 25 | |
| | End of Probe at 1.40 m | | | | | | | |
| 2.0 | | | | | | | | |
| 3.0 | | | | | | | | |
| 4.0 | | | | | | | | |

**GROUNDWATER OBSERVATIONS**

**REMARKS**

IGSL DP LOG 100MM INCREMENTS 25416.GPJ IGSL.GDT 4/7/24

# DYNAMIC PROBE RECORD

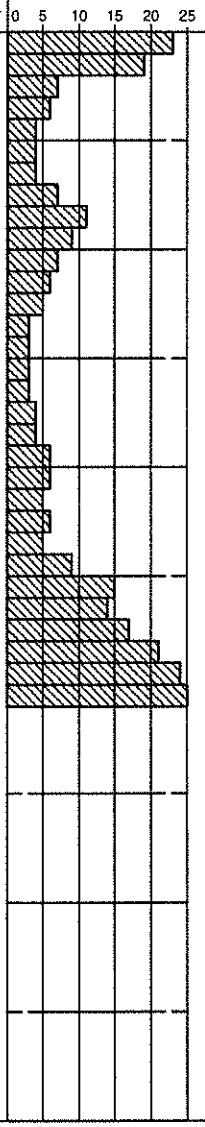
REPORT NUMBER 25474



| | | | |
|---|---|---|---|
| CONTRACT | Barrysparks VHI | PROBE NO. | DP15 |
| | | SHEET | Sheet 1 of 1 |
| CO-ORDINATES | | DATE DRILLED | 22/06/2024 |
| GROUND LEVEL (mOD) | | DATE LOGGED | 22/06/2024 |
| CLIENT | VHI | PROBE TYPE | DPH |
| ENGINEER | POGA | | |
| HAMMER MASS (kg) | 50 | | |
| INCREMENT SIZE (mm) | 100 | | |
| FALL HEIGHT (mm) | 500 | | |

| Depth (m) | Geotechnical Description | Legend | Depth (m) | Elevation (mOD) | Water | Depth (m) | Probe Readings (Blows/Increment) |
|---|---|---|---|---|---|---|---|
| 0.0 | | | | | | 0.00 | 23 |
| | | | | | | 0.10 | 19 |
| | | | | | | 0.20 | 7 |
| | | | | | | 0.30 | 6 |
| | | | | | | 0.40 | 4 |
| | | | | | | 0.50 | 4 |
| | | | | | | 0.60 | 4 |
| | | | | | | 0.70 | 7 |
| | | | | | | 0.80 | 11 |
| | | | | | | 0.90 | 9 |
| 1.0 | | | | | | 1.00 | 7 |
| | | | | | | 1.10 | 6 |
| | | | | | | 1.20 | 5 |
| | | | | | | 1.30 | 3 |
| | | | | | | 1.40 | 3 |
| | | | | | | 1.50 | 3 |
| | | | | | | 1.60 | 3 |
| | | | | | | 1.70 | 4 |
| | | | | | | 1.80 | 4 |
| | | | | | | 1.90 | 6 |
| 2.0 | | | | | | 2.00 | 6 |
| | | | | | | 2.10 | 5 |
| | | | | | | 2.20 | 6 |
| | | | | | | 2.30 | 5 |
| | | | | | | 2.40 | 9 |
| | | | | | | 2.50 | 15 |
| | | | | | | 2.60 | 14 |
| | | | | | | 2.70 | 17 |
| | | | | | | 2.80 | 21 |
| | | | | | | 2.90 | 24 |
| 3.0 | | | | | | 3.00 | 25 |
| | End of Probe at 3.10 m | | | | | | |
| 4.0 | | | | | | | |

Graphic Probe Record




**GROUNDWATER OBSERVATIONS**

**REMARKS**

IGSL DP LOG 100MM INCREMENTS 25416.GPJ IGSL.GDT 4/7/24

# Appendix IV Laboratory Data

## a. Geotechnical

IGSL Ltd
Materials Laboratory
Unit J5, M7 Business Park
Newhall, Naas
Co. Kildare
045 846176

# Test Report

## Determination of Moisture Content, Liquid & Plastic Limits

Tested in accordance with BS1377:Part 2:1990, clauses 3.2, 4.3, 4.4 & 5.3**

Report No. **R159914** Contract No. 25474 Contract Name: Ballysparks Swords Site 2

Customer POGA

Samples Received: 22/07/24 Date Tested: 22/07/24

| BH/TP* | Sample No. | Depth* (m) | Lab. Ref | Sample Type* | Moisture Content % | Liquid Limit % | Plastic Limit % | Plasticity Index | % <425µm | Preparation | Liquid Limit Clause | Classification (BS5930) | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TP01 | AA241511 | 1.5 | A24/3309 | B | 9.6 | 28 | 15 | 13 | 62 | WS | 4.4 | C L | Brown sandy gravelly CLAY |
| TP03 | AA241505 | 1.5 | A24/3312 | B | 12 | 32 | 14 | 18 | 67 | WS | 4.4 | C L | Brown sandy gravelly CLAY |
| TP04 | AA241503 | 2.2 | A24/3314 | B | 11 | 33 | 16 | 17 | 59 | WS | 4.4 | C L | Brown slightly sandy, slightly gravelly, CLAY |
| TP05 | AA241501 | 2.1 | A24/3316 | B | 11 | 35 | 17 | 18 | 64 | WS | 4.4 | C L | Brown sandy gravelly CLAY |
| TP07 | AA241514 | 1.5 | A24/3319 | B | 11 | 30 | 15 | 15 | 59 | WS | 4.4 | C L | Brown sandy gravelly CLAY |
| TP08 | AA231541 | 2.0 | A24/3321 | B | 10 | 31 | 16 | 15 | 63 | WS | 4.4 | C L | Brown slightly sandy, gravelly, CLAY |

Preparation: WS - Wet sieved
AR - As received
NP - Non plastic

Liquid Limit Clause: 4.3 Cone Penetrometer definitive method
4.4 Cone Penetrometer one point method

Sample Type: B - Bulk Disturbed
U - Undisturbed

Remarks:
Results relate only to the specimen tested,in as received condition unless otherwise noted.
NOTE: **These clauses have been superceded by EN 17892-1 and EN17892-12.
Opinions and interpretations are outside the scope of accreditation. * denotes Customer supplied information.


IGSL Ltd Materials Laboratory

Persons authorized to approve reports
H Byrne (Laboratory Manager)

| Approved by | Date | Page |
|---|---|---|
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# TEST REPORT

## Determination of Particle Size Distribution

**Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5****

**(note: Sedimentation stage not accredited)**

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 137T

| particle size | % passing | |
|---|---|---|
| 75 | 100 | COBBLES |
| 63 | 100 | |
| 50 | 100 | GRAVEL |
| 37.5 | 100 | |
| 28 | 95 | |
| 20 | 90 | |
| 14 | 87 | |
| 10 | 84 | |
| 6.3 | 80 | |
| 5 | 78 | |
| 3.35 | 76 | |
| 2 | 72 | |
| 1.18 | 69 | SAND |
| 0.6 | 63 | |
| 0.425 | 61 | |
| 0.3 | 57 | |
| 0.15 | 48 | |
| 0.063 | 39 | SILT/CLAY |
| 0.037 | 34 | |
| 0.027 | 30 | |
| 0.017 | 27 | |
| 0.010 | 23 | |
| 0.007 | 21 | |
| 0.005 | 18 | |
| 0.002 | 13 | |

Contract No. 25474 Report No. R159912

Contract Name : Ballysparks Swords Site 2

BH/TP No. TP04

Sample No.* AA241503 Lab. Sample No. A24/3314

Sample Type: B

Depth* (m) 2.20 Customer: POGA

Date Received 04/07/2024 Date Testing started 04/07/2024

Description: Brown slightly sandy, slightly gravelly, CLAY

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.

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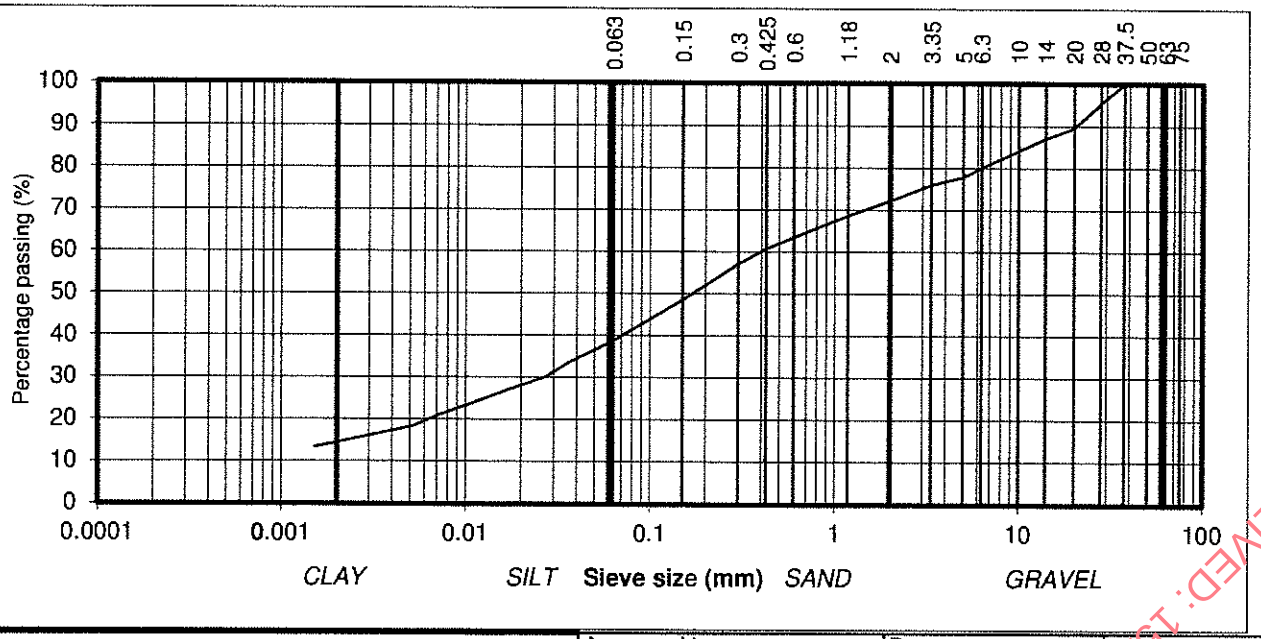


**IGSL Ltd Materials Laboratory**

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|---|---|---|
| | 30/07/24 | 1 of 1 |

Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

# TEST REPORT

## Determination of Particle Size Distribution

**Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5****

**(note: Sedimentation stage not accredited)**

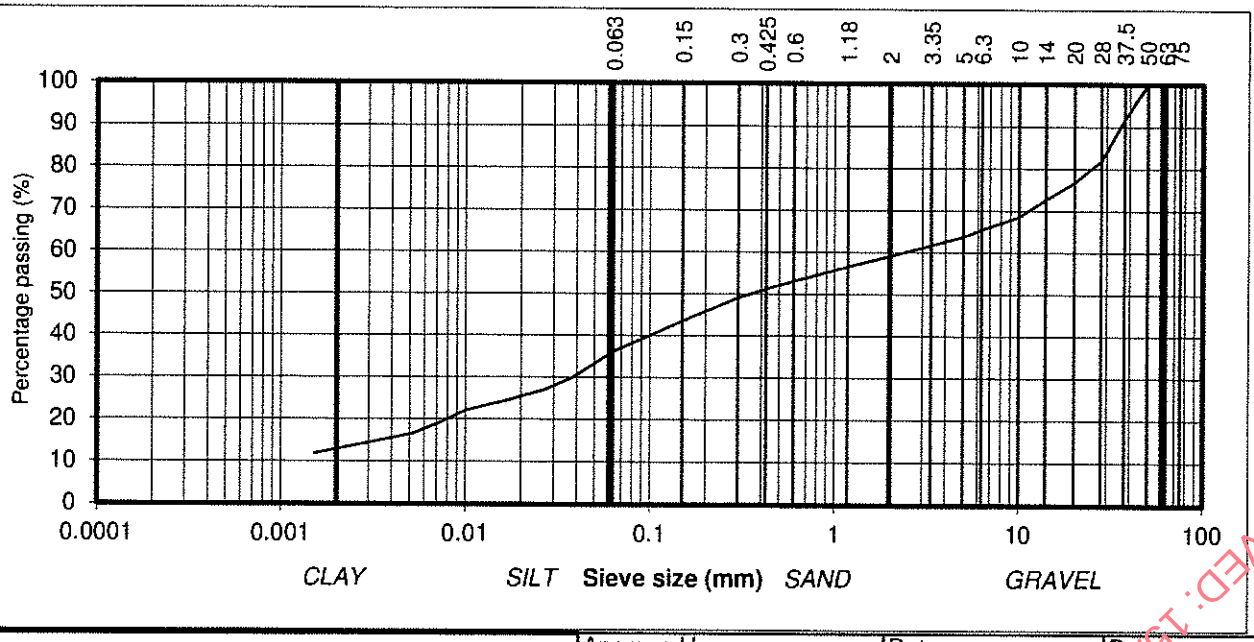
| particle size | % passing | |
|---|---|---|
| 75 | 100 | COBBLES |
| 63 | 100 | |
| 50 | 100 | GRAVEL |
| 37.5 | 92 | |
| 28 | 82 | |
| 20 | 77 | |
| 14 | 73 | |
| 10 | 69 | |
| 6.3 | 65 | |
| 5 | 64 | |
| 3.35 | 62 | |
| 2 | 59 | |
| 1.18 | 57 | SAND |
| 0.6 | 53 | |
| 0.425 | 51 | |
| 0.3 | 49 | |
| 0.15 | 43 | |
| 0.063 | 36 | SILT/CLAY |
| 0.038 | 30 | |
| 0.027 | 27 | |
| 0.017 | 25 | |
| 0.010 | 22 | |
| 0.007 | 19 | |
| 0.005 | 17 | |
| 0.002 | 12 | |

| | | | |
|---|---|---|---|
| Contract No. | 25474 | Report No. | R159913 |
| Contract Name : | Ballysparks Swords Site 2 | | |
| BH/TP No. | TP08 | | |
| Sample No.* | AA231541 | Lab. Sample No. | A24/3221 |
| Sample Type: | B | | |
| Depth* (m) | 2.00 | Customer: | POGA |
| Date Received | 22/07/2024 | Date Testing started | 22/07/2024 |
| Description: | Brown slightly sandy, gravelly, CLAY | | |

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.



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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas
Co. Kildare
045 899324

# Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377-2:2022, clause 13



| | |
|---|---|
| **Report No.** | **R159915** |
| Contract No. | 25474 |
| Contract Name: | Ballysparks Swords Site 2 |
| Customer: | POGA |
| BH/TP* | TP01 |
| Sample No.* | 0 |
| Depth* (m) | 0.50 |
| Sample Type: | B |
| Lab Sample No. | A24/3308 |
| Source* (if applicable) | N/A |
| Material Type* (if applicable): | B |
| Sample Received: | 23/07/24 |
| Date Tested: | 23/07/24 |
| Sample Cert: | N/A |
| Water Content (%): | 16.3 |
| % Particles > 20mm (By dry mass): | 2 |
| MCV: | 5.8 |
| Interpretation of Plot: | Steepest Straight Line |
| Description of Soil: | Brown sandy gravelly SILT/CLAY |

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045 899324

# Test Report

## Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377-2:2022, clause 13



| | |
|---|---|
| **Report No.** | **R159916** |
| Contract No. | 25474 |
| Contract Name: | Ballysparks Swords Site 2 |
| Customer: | POGA |
| BH/TP* | TP02 |
| Sample No.* | AA241507 |
| Depth* (m) | 0.50 |
| Sample Type: | B |
| Lab Sample No. | A24/3310 |
| Source* (if applicable) | N/A |
| Material Type* (if applicable): | B |
| Sample Received: | 23/07/24 |
| Date Tested: | 23/07/24 |
| Sample Cert: | N/A |
| Water Content (%): | 11.8 |
| % Particles > 20mm (By dry mass): | 2 |
| MCV: | 8.8 |
| Interpretation of Plot: | Steepest Straight Line |
| Description of Soil: | Brown sandy gravelly SILT/CLAY |

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# Test Report

## Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377-2:2022, clause 13



| | |
|---|---|
| **Report No.** | **R159917** |
| Contract No. | 25474 |
| Contract Name: | Ballysparks Swords Site 2 |
| Customer: | POGA |
| BH/TP* | TP03 |
| Sample No.* | AA241504 |
| Depth* (m) | 0.50 |
| Sample Type: | B |
| Lab Sample No. | A24/3311 |
| Source* (if applicable) | N/A |
| Material Type* (if applicable): | B |
| Sample Received: | 23/07/24 |
| Date Tested: | 23/07/24 |
| Sample Cert: | N/A |
| Water Content (%): | 12.1 |
| % Particles > 20mm (By dry mass): | 3 |
| MCV: | 8.6 |
| Interpretation of Plot: | Steepest Straight Line |
| Description of Soil: | Brown sandy gravelly SILT/CLAY |



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H Byrne (Laboratory Manager)

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# Test Report

## Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377-2:2022, clause 13



| | |
|---|---|
| **Report No.** | **R159918** |
| Contract No. | 25474 |
| Contract Name: | Ballysparks Swords Site 2 |
| Customer: | POGA |
| BH/TP* | TP04 |
| Sample No.* | AA241503 |
| Depth* (m) | 1.00 |
| Sample Type: | B |
| Lab Sample No. | A24/3313 |
| Source* (if applicable) | N/A |
| Material Type* (if applicable): | B |
| Sample Received: | 23/07/24 |
| Date Tested: | 23/07/24 |
| Sample Cert: | N/A |
| Water Content (%): | 10.7 |
| % Particles > 20mm (By dry mass): | 5 |
| MCV: | 10 |
| Interpretation of Plot: | Steepest Straight Line |
| Description of Soil: | Brown sandy gravelly SILT/CLAY |

Results relate only to the specimen tested, in as received condition unless otherwise noted.
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H Byrne (Laboratory Manager)

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045 899324

# Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377-2:2022, clause 13



| | |
|---|---|
| **Report No.** | **R159919** |
| Contract No. | 25474 |
| Contract Name: | Ballysparks Swords Site 2 |
| Customer: | POGA |
| BH/TP* | TP05 |
| Sample No.* | AA231550 |
| Depth* (m) | 0.90 |
| Sample Type: | B |
| Lab Sample No. | A24/3315 |
| Source* (if applicable) | N/A |
| Material Type* (if applicable): | B |
| Sample Received: | 22/07/24 |
| Date Tested: | 22/07/24 |
| Sample Cert: | N/A |
| Water Content (%): | 23.7 |
| % Particles > 20mm (By dry mass): | 1 |
| MCV: | 4.8 |
| Interpretation of Plot: | Steepest Straight Line |
| Description of Soil: | Brown sandy gravelly SILT/CLAY |

Results relate only to the specimen tested, in as received condition unless otherwise noted.
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Persons authorised to approve reports
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

| IGSL Ltd Materials Laboratory | Approved by | Date | Page |
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IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas
Co. Kildare
045 899324

# Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377-2:2022, clause 13



| | |
|---|---|
| **Report No.** | **R159920** |
| Contract No. | 25474 |
| Contract Name: | Ballysparks Swords Site 2 |
| Customer: | POGA |
| BH/TP* | TP06 |
| Sample No.* | AA231547 |
| Depth* (m) | 1.00 |
| Sample Type: | B |
| Lab Sample No. | A24/3317 |
| Source* (if applicable) | N/A |
| Material Type* (if applicable): | B |
| Sample Received: | 22/07/24 |
| Date Tested: | 22/07/24 |
| Sample Cert: | N/A |
| Water Content (%): | 21.8 |
| % Particles > 20mm (By dry mass): | 10 |
| MCV: | 1.6 |
| Interpretation of Plot: | Steepest Straight Line |
| Description of Soil: | Brown sandy gravelly SILT/CLAY |

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Materials Laboratory
Unit J5,M7 Business Park
Naas
Co. Kildare
045 899324

# Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377-2:2022, clause 13



| | |
|---|---|
| **Report No.** | **R159921** |
| Contract No. | 25474 |
| Contract Name: | Ballysparks Swords Site 2 |
| Customer: | POGA |
| BH/TP* | TP07 |
| Sample No.* | AA241513 |
| Depth* (m) | 0.50 |
| Sample Type: | B |
| Lab Sample No. | A24/3318 |
| Source* (if applicable) | N/A |
| Material Type* (if applicable): | B |
| Sample Received: | 22/07/24 |
| Date Tested: | 22/07/24 |
| Sample Cert: | N/A |
| Water Content (%): | 19.4 |
| % Particles > 20mm (By dry mass): | 1 |
| MCV: | 7.4 |
| Interpretation of Plot: | Steepest Straight Line |
| Description of Soil: | Brown sandy gravelly SILT/CLAY |

Results relate only to the specimen tested, in as received condition unless otherwise noted.
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J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

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IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas
Co. Kildare
045 899324

# Test Report

## Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377-2:2022, clause 13



| | |
|---|---|
| **Report No.** | **R159922** |
| Contract No. | 25474 |
| Contract Name: | Ballysparks Swords Site 2 |
| Customer: | POGA |
| BH/TP* | TP08 |
| Sample No.* | AA231540 |
| Depth* (m) | 0.90 |
| Sample Type: | B |
| Lab Sample No. | A24/3320 |
| Source* (if applicable) | N/A |
| Material Type* (if applicable): | B |
| Sample Received: | 23/07/24 |
| Date Tested: | 23/07/24 |
| Sample Cert: | N/A |
| Water Content (%): | 16.1 |
| % Particles > 20mm (By dry mass): | 5 |
| MCV: | 1.6 |
| Interpretation of Plot: | Steepest Straight Line |
| Description of Soil: | Brown sandy gravelly SILT/CLAY |

Results relate only to the specimen tested, in as received condition unless otherwise noted.
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H Byrne (Laboratory Manager)

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# Appendix IV Laboratory Data

## b. Environmental and Chemical

eurofins | Chemtest
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com



2183

# Final Report

| | |
|---|---|
| **Report No.:** | 24-23033-1 |
| **Initial Date of Issue:** | 01-Aug-2024 |
| **Re-Issue Details:** | |
| **Client** | IGSL |
| **Client Address:** | M7 Business Park<br>Naas<br>County Kildare<br>Ireland |
| **Contact(s):** | Darren Keogh |
| **Project** | 25474 Ballysparks Swords Site 2 UHI Site |

| | | | |
|---|---|---|---|
| **Quotation No.:** | Q23-33421 | **Date Received:** | 19-Jul-2024 |
| **Order No.:** | | **Date Instructed:** | 19-Jul-2024 |
| **No. of Samples:** | 8 | | |
| **Turnaround (Wkdays):** | 7 | **Results Due:** | 29-Jul-2024 |
| **Date Approved:** | 01-Aug-2024 | | |

**Approved By:**

**Details:** David Smith, Technical Director

**For details about application of accreditation to specific matrix types, please refer to the Table at the back of this report**

# Results - Leachate

**Project: 25474 Ballysparks Swords Site 2 UHI Site**



| Client: IGSL | | | | | | Chemtest Job No.: | 24-23033 | 24-23033 | 24-23033 | 24-23033 | 24-23033 | 24-23033 | 24-23033 | 24-23033 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Quotation No.: Q23-33421 | | | | | | Chemtest Sample ID.: | 1838250 | 1838251 | 1838252 | 1838253 | 1838254 | 1838255 | 1838256 | 1838257 |
| Order No.: | | | | | | Client Sample Ref.: | TP01 | TP02 | TP03 | TP04 | TP05 | TP06 | TP07 | TP08 |
| | | | | | | Sample Type: | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL |
| | | | | | | Top Depth (m): | 0.50 | 0.50 | 0.50 | 1.00 | 0.90 | 1.00 | 0.50 | 0.90 |
| **Determinand** | **Accred.** | **SOP** | **Type** | **Units** | **LOD** | | | | | | | | | |
| Ammonium | U | 1220 | 10:1 | mg/l | 0.050 | | 0.074 | 0.069 | 0.092 | 0.052 | 0.051 | 0.052 | < 0.050 | < 0.050 |
| Ammonium | N | 1220 | 10:1 | mg/kg | 0.10 | | 0.76 | 0.77 | 1.0 | 0.66 | 0.57 | 0.62 | 0.47 | 0.45 |

# Results - Soil

**Project: 25474 Ballysparks Swords Site 2 UHI Site**

| Client: IGSL | | | | Chemtest Job No.: | | 24-23033 | 24-23033 | 24-23033 | 24-23033 | 24-23033 | 24-23033 | 24-23033 | 24-23033 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Quotation No.: Q23-33421 | | | | Chemtest Sample ID.: | | 1838250 | 1838251 | 1838252 | 1838253 | 1838254 | 1838255 | 1838256 | 1838257 |
| Order No.: | | | | Client Sample Ref.: | | TP01 | TP02 | TP03 | TP04 | TP05 | TP06 | TP07 | TP08 |
| | | | | Sample Type: | | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL |
| | | | | Top Depth (m): | | 0.50 | 0.50 | 0.50 | 1.00 | 0.90 | 1.00 | 0.50 | 0.90 |
| | | | | Asbestos Lab: | | DURHAM | DURHAM | DURHAM | DURHAM | DURHAM | DURHAM | DURHAM | DURHAM |
| **Determinand** | **HWOL Code** | **Accred.** | **SOP** | **Units** | **LOD** | | | | | | | | |
| ACM Type | | U | 2192 | | N/A | - | - | - | - | - | - | - | - |
| Asbestos Identification | | U | 2192 | | N/A | No Asbestos Detected | No Asbestos Detected | No Asbestos Detected | No Asbestos Detected | No Asbestos Detected | No Asbestos Detected | No Asbestos Detected | No Asbestos Detected |
| Moisture | | N | 2030 | % | 0.020 | 12 | 8.5 | 10 | 9.4 | 15 | 13 | 15 | 12 |
| Soil Colour | | N | 2040 | | N/A | Brown | Brown | Brown | Brown | Brown | Brown | Brown | Brown |
| Other Material | | N | 2040 | | N/A | Stones | Stones | Stones | Stones and Roots | Stones | Stones | Stones | Stones |
| Soil Texture | | N | 2040 | | N/A | Sand | Sand | Sand | Sand | Clay | Sand | Sand | Sand |
| Boron (Hot Water Soluble) | | M | 2120 | mg/kg | 0.40 | [A] < 0.40 | [A] < 0.40 | [A] < 0.40 | [A] < 0.40 | [A] 0.42 | [A] < 0.40 | [A] < 0.40 | [A] < 0.40 |
| Sulphur (Elemental) | | M | 2180 | mg/kg | 1.0 | [A] 1.2 | [A] 1.5 | [A] < 1.0 | [A] < 1.0 | [A] 1.1 | [A] 1.2 | [A] 1.0 | [A] < 1.0 |
| Cyanide (Total) | | M | 2300 | mg/kg | 0.50 | [A] < 0.50 | [A] < 0.50 | [A] < 0.50 | [A] < 0.50 | [A] < 0.50 | [A] < 0.50 | [A] < 0.50 | [A] < 0.50 |
| Sulphide (Easily Liberatable) | | N | 2325 | mg/kg | 0.50 | [A] 12 | [A] 6.5 | [A] 3.9 | [A] 11 | [A] 2.8 | [A] 8.9 | [A] 3.3 | [A] 20 |
| Sulphate (Total) | | U | 2430 | % | 0.010 | [A] 0.019 | [A] < 0.010 | [A] < 0.010 | [A] 0.020 | [A] < 0.010 | [A] 0.028 | [A] < 0.010 | [A] 0.010 |
| Arsenic | | M | 2455 | mg/kg | 0.5 | 11 | 9.0 | 9.1 | 11 | 7.8 | 7.8 | 11 | 7.3 |
| Barium | | M | 2455 | mg/kg | 0.5 | 74 | 49 | 54 | 62 | 50 | 88 | 96 | 86 |
| Cadmium | | M | 2455 | mg/kg | 0.10 | 1.3 | 0.39 | 0.94 | 1.2 | 0.53 | 0.97 | 1.6 | 0.76 |
| Chromium | | M | 2455 | mg/kg | 0.5 | 20 | 22 | 17 | 14 | 15 | 19 | 19 | 15 |
| Molybdenum | | M | 2455 | mg/kg | 0.5 | 2.3 | 1.0 | 1.6 | 4.0 | 1.6 | 1.9 | 2.4 | 2.2 |
| Antimony | | N | 2455 | mg/kg | 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| Copper | | M | 2455 | mg/kg | 0.50 | 25 | 18 | 20 | 26 | 13 | 22 | 22 | 19 |
| Mercury | | M | 2455 | mg/kg | 0.05 | 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | 0.06 | < 0.05 |
| Nickel | | M | 2455 | mg/kg | 0.50 | 36 | 33 | 32 | 37 | 24 | 34 | 40 | 30 |
| Lead | | M | 2455 | mg/kg | 0.50 | 19 | 12 | 15 | 18 | 13 | 15 | 20 | 12 |
| Selenium | | M | 2455 | mg/kg | 0.25 | 0.76 | 0.51 | 0.65 | 0.98 | 0.43 | 0.40 | 0.61 | 0.53 |
| Zinc | | M | 2455 | mg/kg | 0.50 | 66 | 51 | 52 | 62 | 44 | 51 | 59 | 43 |
| Chromium (Trivalent) | | N | 2490 | mg/kg | 1.0 | 20 | 22 | 17 | 14 | 15 | 19 | 19 | 15 |
| Chromium (Hexavalent) | | N | 2490 | mg/kg | 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 |
| Aliphatic VPH >C5-C6 | HS_2D_AL | U | 2780 | mg/kg | 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 |
| Aliphatic VPH >C6-C7 | HS_2D_AL | U | 2780 | mg/kg | 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 |
| Aliphatic VPH >C7-C8 | HS_2D_AL | U | 2780 | mg/kg | 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 |
| Aliphatic VPH >C8-C10 | HS_2D_AL | U | 2780 | mg/kg | 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 |
| Total Aliphatic VPH >C5-C10 | HS_2D_AL | U | 2780 | mg/kg | 0.25 | [A] < 0.25 | [A] < 0.25 | [A] < 0.25 | [A] < 0.25 | [A] < 0.25 | [A] < 0.25 | [A] < 0.25 | [A] < 0.25 |
| Aliphatic EPH >C10-C12 MC | EH_2D_AL_#1 | M | 2690 | mg/kg | 2.00 | [A] 4.2 | [A] 7.3 | [A] 6.0 | [A] 7.6 | [A] 8.0 | [A] 7.8 | [A] 7.3 | [A] 8.4 |
| Aliphatic EPH >C12-C16 MC | EH_2D_AL_#1 | M | 2690 | mg/kg | 1.00 | [A] 1.1 | [A] 7.6 | [A] 8.6 | [A] 10 | [A] 8.0 | [A] 12 | [A] 9.0 | [A] 6.2 |
| Aliphatic EPH >C16-C21 MC | EH_2D_AL_#1 | M | 2690 | mg/kg | 2.00 | [A] < 2.0 | [A] < 2.0 | [A] < 2.0 | [A] < 2.0 | [A] < 2.0 | [A] 2.5 | [A] < 2.0 | [A] < 2.0 |
| Aliphatic EPH >C21-C35 MC | EH_2D_AL_#1 | M | 2690 | mg/kg | 3.00 | [A] 3.9 | [A] 9.2 | [A] 8.2 | [A] 9.6 | [A] 11 | [A] 12 | [A] 9.0 | [A] 8.6 |
| Aliphatic EPH >C35-C40 MC | EH_2D_AL_#1 | N | 2690 | mg/kg | 10.00 | [A] < 10 | [A] < 10 | [A] < 10 | [A] < 10 | [A] 13 | [A] < 10 | [A] < 10 | [A] < 10 |
| Total Aliphatic EPH >C10-C35 MC | EH_2D_AL_#1 | M | 2690 | mg/kg | 5.00 | [A] 9.2 | [A] 24 | [A] 23 | [A] 29 | [A] 27 | [A] 34 | [A] 26 | [A] 23 |
| Aromatic VPH >C5-C7 | HS_2D_AR | U | 2780 | mg/kg | 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 |
| Aromatic VPH >C7-C8 | HS_2D_AR | U | 2780 | mg/kg | 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 |

# Results - Soil

**Project: 25474 Ballysparks Swords Site 2 UHI Site**

| Client: IGSL | | | | | | Chemtest Job No.: | 24-23033 | 24-23033 | 24-23033 | 24-23033 | 24-23033 | 24-23033 | 24-23033 | 24-23033 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Quotation No.: Q23-33421 | | | | | | Chemtest Sample ID.: | 1838250 | 1838251 | 1838252 | 1838253 | 1838254 | 1838255 | 1838256 | 1838257 |
| Order No.: | | | | | | Client Sample Ref.: | TP01 | TP02 | TP03 | TP04 | TP05 | TP06 | TP07 | TP08 |
| | | | | | | Sample Type: | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL |
| | | | | | | Top Depth (m): | 0.50 | 0.50 | 0.50 | 1.00 | 0.90 | 1.00 | 0.50 | 0.90 |
| | | | | | | Asbestos Lab: | DURHAM | DURHAM | DURHAM | DURHAM | DURHAM | DURHAM | DURHAM | DURHAM |
| **Determinand** | **HWOL Code** | **Accred.** | **SOP** | **Units** | **LOD** | | | | | | | | | |
| Aromatic VPH >C8-C10 | HS_2D_AR | U | 2780 | mg/kg | 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 |
| Total Aromatic VPH >C5-C10 | HS_2D_AR | U | 2780 | mg/kg | 0.25 | [A] < 0.25 | [A] < 0.25 | [A] < 0.25 | [A] < 0.25 | [A] < 0.25 | [A] < 0.25 | [A] < 0.25 | [A] < 0.25 |
| Aromatic EPH >C10-C12 MC | EH_2D_AR_#1 | U | 2690 | mg/kg | 1.00 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 |
| Aromatic EPH >C12-C16 MC | EH_2D_AR_#1 | U | 2690 | mg/kg | 1.00 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 |
| Aromatic EPH >C16-C21 MC | EH_2D_AR_#1 | U | 2690 | mg/kg | 2.00 | [A] < 2.0 | [A] < 2.0 | [A] < 2.0 | [A] < 2.0 | [A] < 2.0 | [A] < 2.0 | [A] < 2.0 | [A] < 2.0 |
| Aromatic EPH >C21-C35 MC | EH_2D_AR_#1 | U | 2690 | mg/kg | 2.00 | [A] < 2.0 | [A] < 2.0 | [A] < 2.0 | [A] < 2.0 | [A] 2.0 | [A] < 2.0 | [A] < 2.0 | [A] < 2.0 |
| Aromatic EPH >C35-C40 MC | EH_2D_AR_#1 | N | 2690 | mg/kg | 1.00 | [A] 1.0 | [A] 37 | [A] 2.5 | [A] 1.5 | [A] 2.4 | [A] 1.7 | [A] 2.2 | [A] 1.8 |
| Total Aromatic EPH >C10-C35 MC | EH_2D_AR_#1 | U | 2690 | mg/kg | 5.00 | [A] < 5.0 | [A] < 5.0 | [A] < 5.0 | [A] < 5.0 | [A] < 5.0 | [A] < 5.0 | [A] < 5.0 | [A] < 5.0 |
| Total VPH >C5-C10 | HS_2D_Total | U | 2780 | mg/kg | 0.50 | [A] < 0.50 | [A] < 0.50 | [A] < 0.50 | [A] < 0.50 | [A] < 0.50 | [A] < 0.50 | [A] < 0.50 | [A] < 0.50 |
| Total EPH >C10-C35 MC | EH_2D_Total_#1 | U | 2690 | mg/kg | 10.00 | [A] 12 | [A] 26 | [A] 23 | [A] 29 | [A] 29 | [A] 35 | [A] 27 | [A] 23 |
| Mineral Oil EPH | | N | 2670 | mg/kg | 10 | < 10 | 42 | 23 | 29 | 40 | 34 | 26 | 23 |
| Benzene | | M | 2760 | µg/kg | 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 |
| Toluene | | M | 2760 | µg/kg | 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 |
| Ethylbenzene | | M | 2760 | µg/kg | 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 |
| m & p-Xylene | | M | 2760 | µg/kg | 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 |
| o-Xylene | | M | 2760 | µg/kg | 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 |
| Methyl Tert-Butyl Ether | | M | 2760 | µg/kg | 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 | [A] < 1.0 |
| Naphthalene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Acenaphthylene | | N | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Acenaphthene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Fluorene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Phenanthrene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Anthracene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Fluoranthene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Pyrene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Benzo[a]anthracene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Chrysene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Benzo[b]fluoranthene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Benzo[k]fluoranthene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Benzo[a]pyrene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Indeno(1,2,3-c,d)Pyrene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Dibenz(a,h)Anthracene | | N | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Benzo[g,h,i]perylene | | M | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Coronene | | N | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| PCB 28 | | U | 2815 | mg/kg | 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 |
| PCB 52 | | U | 2815 | mg/kg | 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 |
| PCB 101 | | U | 2815 | mg/kg | 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 |
| PCB 118 | | U | 2815 | mg/kg | 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 |
| PCB 153 | | U | 2815 | mg/kg | 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 |
| PCB 138 | | U | 2815 | mg/kg | 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 |

# Results - Soil

**Project: 25474 Ballysparks Swords Site 2 UHI Site**

| Client: IGSL | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Quotation No.: Q23-33421 | | | | | Chemtest Job No.: | 24-23033 | 24-23033 | 24-23033 | 24-23033 | 24-23033 | 24-23033 | 24-23033 | 24-23033 |
| Order No.: | | | | | Chemtest Sample ID.: | 1838250 | 1838251 | 1838252 | 1838253 | 1838254 | 1838255 | 1838256 | 1838257 |
| | | | | | Client Sample Ref.: | TP01 | TP02 | TP03 | TP04 | TP05 | TP06 | TP07 | TP08 |
| | | | | | Sample Type: | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL |
| | | | | | Top Depth (m): | 0.50 | 0.50 | 0.50 | 1.00 | 0.90 | 1.00 | 0.50 | 0.90 |
| | | | | | Asbestos Lab: | DURHAM | DURHAM | DURHAM | DURHAM | DURHAM | DURHAM | DURHAM | DURHAM |
| **Determinand** | **HWOL Code** | **Accred.** | **SOP** | **Units** | **LOD** | | | | | | | | |
| PCB 180 | | U | 2815 | mg/kg | 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 | [A] < 0.010 |
| Tot PCBs Low (7 Congeners) | | N | 2815 | mg/kg | 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 | [A] < 0.05 |
| Total Phenols | | M | 2920 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |

# Results - Single Stage WAC

**Project: 25474 Ballysparks Swords Site 2 UHI Site**

| | | | | | | Landfill Waste Acceptance Criteria Limits | | |
|---|---|---|---|---|---|---|---|---|
| **Chemtest Job No:** | 24-23033 | | | | | | | |
| **Chemtest Sample ID:** | 1838250 | | | | | | | |
| **Sample Ref:** | TP01 | | | | | | | |
| **Sample ID:** | | | | | | | | |
| **Sample Location:** | | | | | | | | |
| **Top Depth(m):** | 0.50 | | | | | | | |
| **Bottom Depth(m):** | | | | | | | | |
| **Sampling Date:** | | | | | | | | |
| **Determinand** | **SOP** | **HWOL Code** | **Accred.** | **Units** | | **Inert Waste Landfill** | **Stable, Non-reactive hazardous waste in non-hazardous Landfill** | **Hazardous Waste Landfill** |
| Total Organic Carbon | 2625 | | M | % | [A] 0.40 | 3 | 5 | 6 |
| Loss On Ignition | 2610 | | M | % | 3.2 | -- | -- | 10 |
| Total BTEX | 2760 | | M | mg/kg | [A] < 0.010 | 6 | -- | -- |
| Total PCBs (7 Congeners) | 2815 | | M | mg/kg | < 0.10 | 1 | -- | -- |
| TPH Total WAC | 2670 | EH_CU_1D_Total | M | mg/kg | [A] < 10 | 500 | -- | -- |
| Total Of 17 PAHs Lower | 2800 | | N | mg/kg | < 1.0 | 100 | -- | -- |
| pH at 20C | 2010 | | M | | 9.3 | -- | >6 | -- |
| Acid Neutralisation Capacity | 2015 | | N | mol/kg | 0.013 | -- | To evaluate | To evaluate |
| **Eluate Analysis** | | | | **10:1 Eluate mg/l** | **10:1 Eluate mg/kg** | **Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg** | | |
| Arsenic | 1455 | | U | 0.0005 | 0.0047 | 0.5 | 2 | 25 |
| Barium | 1455 | | U | < 0.005 | < 0.050 | 20 | 100 | 300 |
| Cadmium | 1455 | | U | < 0.00011 | < 0.0011 | 0.04 | 1 | 5 |
| Chromium | 1455 | | U | 0.0007 | 0.0072 | 0.5 | 10 | 70 |
| Copper | 1455 | | U | 0.0015 | 0.015 | 2 | 50 | 100 |
| Mercury | 1455 | | U | < 0.00005 | < 0.00050 | 0.01 | 0.2 | 2 |
| Molybdenum | 1455 | | U | 0.0034 | 0.034 | 0.5 | 10 | 30 |
| Nickel | 1455 | | U | 0.0005 | 0.0052 | 0.4 | 10 | 40 |
| Lead | 1455 | | U | < 0.0005 | < 0.0050 | 0.5 | 10 | 50 |
| Antimony | 1455 | | U | < 0.0005 | < 0.0050 | 0.06 | 0.7 | 5 |
| Selenium | 1455 | | U | < 0.0005 | < 0.0050 | 0.1 | 0.5 | 7 |
| Zinc | 1455 | | U | < 0.003 | < 0.025 | 4 | 50 | 200 |
| Chloride | 1220 | | U | < 1.0 | < 10 | 800 | 15000 | 25000 |
| Fluoride | 1220 | | U | 0.42 | 4.2 | 10 | 150 | 500 |
| Sulphate | 1220 | | U | 1.6 | 16 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 1020 | | N | 64 | 640 | 4000 | 60000 | 100000 |
| Phenol Index | 1920 | | U | < 0.030 | < 0.30 | 1 | - | - |
| Dissolved Organic Carbon | 1610 | | U | 5.7 | 57 | 500 | 800 | 1000 |

| **Solid Information** | |
|---|---|
| Dry mass of test portion/kg | 0.090 |
| Moisture (%) | 12 |

**Waste Acceptance Criteria**

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

# Results - Single Stage WAC

**Project: 25474 Ballysparks Swords Site 2 UHI Site**

| | | | | | | Landfill Waste Acceptance Criteria Limits | | |
|---|---|---|---|---|---|---|---|---|
| **Chemtest Job No:** | 24-23033 | | | | | | | |
| **Chemtest Sample ID:** | 1838251 | | | | | | | |
| **Sample Ref:** | TP02 | | | | | | | |
| **Sample ID:** | | | | | | | | |
| **Sample Location:** | | | | | | | | |
| **Top Depth(m):** | 0.50 | | | | | | | |
| **Bottom Depth(m):** | | | | | | | | |
| **Sampling Date:** | | | | | | | | |
| **Determinand** | **SOP** | **HWOL Code** | **Accred.** | **Units** | | **Inert Waste Landfill** | **Stable, Non-reactive hazardous waste in non-hazardous Landfill** | **Hazardous Waste Landfill** |
| Total Organic Carbon | 2625 | | M | % | [A] 0.21 | 3 | 5 | 6 |
| Loss On Ignition | 2610 | | M | % | 1.9 | -- | -- | 10 |
| Total BTEX | 2760 | | M | mg/kg | [A] < 0.010 | 6 | -- | -- |
| Total PCBs (7 Congeners) | 2815 | | M | mg/kg | < 0.10 | 1 | -- | -- |
| TPH Total WAC | 2670 | EH_CU_1D_Total | M | mg/kg | [A] < 10 | 500 | -- | -- |
| Total Of 17 PAHs Lower | 2800 | | N | mg/kg | < 1.0 | 100 | -- | -- |
| pH at 20C | 2010 | | M | | 9.4 | -- | >6 | -- |
| Acid Neutralisation Capacity | 2015 | | N | mol/kg | 0.015 | -- | To evaluate | To evaluate |
| **Eluate Analysis** | | | | **10:1 Eluate mg/l** | **10:1 Eluate mg/kg** | **Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg** | | |
| Arsenic | 1455 | | U | 0.0011 | 0.011 | 0.5 | 2 | 25 |
| Barium | 1455 | | U | 0.032 | 0.32 | 20 | 100 | 300 |
| Cadmium | 1455 | | U | < 0.00011 | < 0.0011 | 0.04 | 1 | 5 |
| Chromium | 1455 | | U | 0.0007 | 0.0068 | 0.5 | 10 | 70 |
| Copper | 1455 | | U | 0.0034 | 0.034 | 2 | 50 | 100 |
| Mercury | 1455 | | U | < 0.00005 | < 0.00050 | 0.01 | 0.2 | 2 |
| Molybdenum | 1455 | | U | < 0.0002 | < 0.0020 | 0.5 | 10 | 30 |
| Nickel | 1455 | | U | < 0.0005 | < 0.0050 | 0.4 | 10 | 40 |
| Lead | 1455 | | U | 0.0008 | 0.0083 | 0.5 | 10 | 50 |
| Antimony | 1455 | | U | 0.0008 | 0.0076 | 0.06 | 0.7 | 5 |
| Selenium | 1455 | | U | 0.0010 | 0.0097 | 0.1 | 0.5 | 7 |
| Zinc | 1455 | | U | 0.017 | 0.17 | 4 | 50 | 200 |
| Chloride | 1220 | | U | < 1.0 | < 10 | 800 | 15000 | 25000 |
| Fluoride | 1220 | | U | 0.23 | 2.3 | 10 | 150 | 500 |
| Sulphate | 1220 | | U | < 1.0 | < 10 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 1020 | | N | 63 | 630 | 4000 | 60000 | 100000 |
| Phenol Index | 1920 | | U | < 0.030 | < 0.30 | 1 | - | - |
| Dissolved Organic Carbon | 1610 | | U | 3.6 | < 50 | 500 | 800 | 1000 |

| **Solid Information** | |
|---|---|
| Dry mass of test portion/kg | 0.090 |
| Moisture (%) | 8.5 |

## Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

# Results - Single Stage WAC

**Project: 25474 Ballysparks Swords Site 2 UHI Site**

| | | | | | | Landfill Waste Acceptance Criteria Limits | | |
|---|---|---|---|---|---|---|---|---|
| **Chemtest Job No:** | 24-23033 | | | | | | | |
| **Chemtest Sample ID:** | 1838252 | | | | | | | |
| **Sample Ref:** | TP03 | | | | | | | |
| **Sample ID:** | | | | | | | | |
| **Sample Location:** | | | | | | | | |
| **Top Depth(m):** | 0.50 | | | | | | | |
| **Bottom Depth(m):** | | | | | | | | |
| **Sampling Date:** | | | | | | | | |
| **Determinand** | **SOP** | **HWOL Code** | **Accred.** | **Units** | | **Inert Waste Landfill** | **Stable, Non-reactive hazardous waste in non-hazardous Landfill** | **Hazardous Waste Landfill** |
| Total Organic Carbon | 2625 | | M | % | [A] 0.32 | 3 | 5 | 6 |
| Loss On Ignition | 2610 | | M | % | 1.8 | -- | -- | 10 |
| Total BTEX | 2760 | | M | mg/kg | [A] < 0.010 | 6 | -- | -- |
| Total PCBs (7 Congeners) | 2815 | | M | mg/kg | < 0.10 | 1 | -- | -- |
| TPH Total WAC | 2670 | EH_CU_1D_Total | M | mg/kg | [A] < 10 | 500 | -- | -- |
| Total Of 17 PAHs Lower | 2800 | | N | mg/kg | < 1.0 | 100 | -- | -- |
| pH at 20C | 2010 | | M | | 9.4 | -- | >6 | -- |
| Acid Neutralisation Capacity | 2015 | | N | mol/kg | 0.016 | -- | To evaluate | To evaluate |
| **Eluate Analysis** | | | | **10:1 Eluate mg/l** | **10:1 Eluate mg/kg** | **Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg** | | |
| Arsenic | 1455 | | U | < 0.0002 | < 0.0020 | 0.5 | 2 | 25 |
| Barium | 1455 | | U | < 0.005 | < 0.050 | 20 | 100 | 300 |
| Cadmium | 1455 | | U | < 0.00011 | < 0.0011 | 0.04 | 1 | 5 |
| Chromium | 1455 | | U | < 0.0005 | < 0.0050 | 0.5 | 10 | 70 |
| Copper | 1455 | | U | 0.0005 | 0.0053 | 2 | 50 | 100 |
| Mercury | 1455 | | U | < 0.00005 | < 0.00050 | 0.01 | 0.2 | 2 |
| Molybdenum | 1455 | | U | 0.0023 | 0.023 | 0.5 | 10 | 30 |
| Nickel | 1455 | | U | < 0.0005 | < 0.0050 | 0.4 | 10 | 40 |
| Lead | 1455 | | U | < 0.0005 | < 0.0050 | 0.5 | 10 | 50 |
| Antimony | 1455 | | U | < 0.0005 | < 0.0050 | 0.06 | 0.7 | 5 |
| Selenium | 1455 | | U | < 0.0005 | < 0.0050 | 0.1 | 0.5 | 7 |
| Zinc | 1455 | | U | < 0.003 | < 0.025 | 4 | 50 | 200 |
| Chloride | 1220 | | U | < 1.0 | < 10 | 800 | 15000 | 25000 |
| Fluoride | 1220 | | U | 0.22 | 2.2 | 10 | 150 | 500 |
| Sulphate | 1220 | | U | < 1.0 | < 10 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 1020 | | N | 40 | 400 | 4000 | 60000 | 100000 |
| Phenol Index | 1920 | | U | < 0.030 | < 0.30 | 1 | - | - |
| Dissolved Organic Carbon | 1610 | | U | 4.5 | < 50 | 500 | 800 | 1000 |

| **Solid Information** | |
|---|---|
| Dry mass of test portion/kg | 0.090 |
| Moisture (%) | 10 |

**Waste Acceptance Criteria**

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

# Results - Single Stage WAC

**Project: 25474 Ballysparks Swords Site 2 UHI Site**

| | | | | | | Landfill Waste Acceptance Criteria Limits | | |
|---|---|---|---|---|---|---|---|---|
| **Chemtest Job No:** | 24-23033 | | | | | | | |
| **Chemtest Sample ID:** | 1838253 | | | | | | | |
| **Sample Ref:** | TP04 | | | | | | | |
| **Sample ID:** | | | | | | | | |
| **Sample Location:** | | | | | | | | |
| **Top Depth(m):** | 1.00 | | | | | | | |
| **Bottom Depth(m):** | | | | | | | | |
| **Sampling Date:** | | | | | | | | |
| **Determinand** | **SOP** | **HWOL Code** | **Accred.** | **Units** | | **Inert Waste Landfill** | **Stable, Non-reactive hazardous waste in non-hazardous Landfill** | **Hazardous Waste Landfill** |
| Total Organic Carbon | 2625 | | M | % | [A] 0.90 | 3 | 5 | 6 |
| Loss On Ignition | 2610 | | M | % | 2.4 | -- | -- | 10 |
| Total BTEX | 2760 | | M | mg/kg | [A] < 0.010 | 6 | -- | -- |
| Total PCBs (7 Congeners) | 2815 | | M | mg/kg | < 0.10 | 1 | -- | -- |
| TPH Total WAC | 2670 | EH_CU_1D_Total | M | mg/kg | [A] < 10 | 500 | -- | -- |
| Total Of 17 PAHs Lower | 2800 | | N | mg/kg | < 1.0 | 100 | -- | -- |
| pH at 20C | 2010 | | M | | 9.3 | -- | >6 | -- |
| Acid Neutralisation Capacity | 2015 | | N | mol/kg | 0.016 | -- | To evaluate | To evaluate |
| **Eluate Analysis** | | | | **10:1 Eluate mg/l** | **10:1 Eluate mg/kg** | **Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg** | | |
| Arsenic | 1455 | | U | < 0.0002 | < 0.0020 | 0.5 | 2 | 25 |
| Barium | 1455 | | U | 0.006 | 0.063 | 20 | 100 | 300 |
| Cadmium | 1455 | | U | < 0.00011 | < 0.0011 | 0.04 | 1 | 5 |
| Chromium | 1455 | | U | < 0.0005 | < 0.0050 | 0.5 | 10 | 70 |
| Copper | 1455 | | U | < 0.0005 | < 0.0050 | 2 | 50 | 100 |
| Mercury | 1455 | | U | < 0.00005 | < 0.00050 | 0.01 | 0.2 | 2 |
| Molybdenum | 1455 | | U | 0.0067 | 0.067 | 0.5 | 10 | 30 |
| Nickel | 1455 | | U | < 0.0005 | < 0.0050 | 0.4 | 10 | 40 |
| Lead | 1455 | | U | < 0.0005 | < 0.0050 | 0.5 | 10 | 50 |
| Antimony | 1455 | | U | < 0.0005 | < 0.0050 | 0.06 | 0.7 | 5 |
| Selenium | 1455 | | U | < 0.0005 | < 0.0050 | 0.1 | 0.5 | 7 |
| Zinc | 1455 | | U | < 0.003 | < 0.025 | 4 | 50 | 200 |
| Chloride | 1220 | | U | < 1.0 | < 10 | 800 | 15000 | 25000 |
| Fluoride | 1220 | | U | 0.28 | 2.8 | 10 | 150 | 500 |
| Sulphate | 1220 | | U | < 1.0 | < 10 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 1020 | | N | 47 | 470 | 4000 | 60000 | 100000 |
| Phenol Index | 1920 | | U | < 0.030 | < 0.30 | 1 | - | - |
| Dissolved Organic Carbon | 1610 | | U | 4.0 | < 50 | 500 | 800 | 1000 |

| **Solid Information** | |
|---|---|
| Dry mass of test portion/kg | 0.090 |
| Moisture (%) | 9.4 |

**Waste Acceptance Criteria**

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

# Results - Single Stage WAC

**Project: 25474 Ballysparks Swords Site 2 UHI Site**

| | | | | | | Landfill Waste Acceptance Criteria Limits | | |
|---|---|---|---|---|---|---|---|---|
| **Chemtest Job No:** | 24-23033 | | | | | | | |
| **Chemtest Sample ID:** | 1838254 | | | | | | | |
| **Sample Ref:** | TP05 | | | | | | | |
| **Sample ID:** | | | | | | | | |
| **Sample Location:** | | | | | | | | |
| **Top Depth(m):** | 0.90 | | | | | | | |
| **Bottom Depth(m):** | | | | | | | | |
| **Sampling Date:** | | | | | | | | |
| **Determinand** | **SOP** | **HWOL Code** | **Accred.** | **Units** | | **Inert Waste Landfill** | **Stable, Non-reactive hazardous waste in non-hazardous Landfill** | **Hazardous Waste Landfill** |
| Total Organic Carbon | 2625 | | M | % | [A] 0.34 | 3 | 5 | 6 |
| Loss On Ignition | 2610 | | M | % | 2.3 | -- | -- | 10 |
| Total BTEX | 2760 | | M | mg/kg | [A] < 0.010 | 6 | -- | -- |
| Total PCBs (7 Congeners) | 2815 | | M | mg/kg | < 0.10 | 1 | -- | -- |
| TPH Total WAC | 2670 | EH_CU_1D_Total | M | mg/kg | [A] < 10 | 500 | -- | -- |
| Total Of 17 PAHs Lower | 2800 | | N | mg/kg | < 1.0 | 100 | -- | -- |
| pH at 20C | 2010 | | M | | 9.2 | -- | >6 | -- |
| Acid Neutralisation Capacity | 2015 | | N | mol/kg | 0.012 | -- | To evaluate | To evaluate |
| **Eluate Analysis** | | | | **10:1 Eluate mg/l** | **10:1 Eluate mg/kg** | **Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg** | | |
| Arsenic | 1455 | | U | < 0.0002 | < 0.0020 | 0.5 | 2 | 25 |
| Barium | 1455 | | U | < 0.005 | < 0.050 | 20 | 100 | 300 |
| Cadmium | 1455 | | U | < 0.00011 | < 0.0011 | 0.04 | 1 | 5 |
| Chromium | 1455 | | U | 0.0006 | 0.0058 | 0.5 | 10 | 70 |
| Copper | 1455 | | U | < 0.0005 | < 0.0050 | 2 | 50 | 100 |
| Mercury | 1455 | | U | < 0.00005 | < 0.00050 | 0.01 | 0.2 | 2 |
| Molybdenum | 1455 | | U | 0.0020 | 0.020 | 0.5 | 10 | 30 |
| Nickel | 1455 | | U | < 0.0005 | < 0.0050 | 0.4 | 10 | 40 |
| Lead | 1455 | | U | < 0.0005 | < 0.0050 | 0.5 | 10 | 50 |
| Antimony | 1455 | | U | < 0.0005 | < 0.0050 | 0.06 | 0.7 | 5 |
| Selenium | 1455 | | U | < 0.0005 | < 0.0050 | 0.1 | 0.5 | 7 |
| Zinc | 1455 | | U | < 0.003 | < 0.025 | 4 | 50 | 200 |
| Chloride | 1220 | | U | < 1.0 | < 10 | 800 | 15000 | 25000 |
| Fluoride | 1220 | | U | 0.24 | 2.4 | 10 | 150 | 500 |
| Sulphate | 1220 | | U | < 1.0 | < 10 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 1020 | | N | 33 | 330 | 4000 | 60000 | 100000 |
| Phenol Index | 1920 | | U | < 0.030 | < 0.30 | 1 | - | - |
| Dissolved Organic Carbon | 1610 | | U | 5.2 | 52 | 500 | 800 | 1000 |

| **Solid Information** | |
|---|---|
| Dry mass of test portion/kg | 0.090 |
| Moisture (%) | 15 |

**Waste Acceptance Criteria**

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

# Results - Single Stage WAC

**Project: 25474 Ballysparks Swords Site 2 UHI Site**

| | | | | | | Landfill Waste Acceptance Criteria Limits | | |
|---|---|---|---|---|---|---|---|---|
| **Chemtest Job No:** | 24-23033 | | | | | | | |
| **Chemtest Sample ID:** | 1838255 | | | | | | | |
| **Sample Ref:** | TP06 | | | | | | | |
| **Sample ID:** | | | | | | | | |
| **Sample Location:** | | | | | | | | |
| **Top Depth(m):** | 1.00 | | | | | | | |
| **Bottom Depth(m):** | | | | | | | | |
| **Sampling Date:** | | | | | | | | |
| **Determinand** | **SOP** | **HWOL Code** | **Accred.** | **Units** | | **Inert Waste Landfill** | **Stable, Non-reactive hazardous waste in non-hazardous Landfill** | **Hazardous Waste Landfill** |
| Total Organic Carbon | 2625 | | M | % | [A] 0.40 | 3 | 5 | 6 |
| Loss On Ignition | 2610 | | M | % | 2.0 | -- | -- | 10 |
| Total BTEX | 2760 | | M | mg/kg | [A] < 0.010 | 6 | -- | -- |
| Total PCBs (7 Congeners) | 2815 | | M | mg/kg | < 0.10 | 1 | -- | -- |
| TPH Total WAC | 2670 | EH_CU_1D_Total | M | mg/kg | [A] < 10 | 500 | -- | -- |
| Total Of 17 PAHs Lower | 2800 | | N | mg/kg | < 1.0 | 100 | -- | -- |
| pH at 20C | 2010 | | M | | 8.3 | -- | >6 | -- |
| Acid Neutralisation Capacity | 2015 | | N | mol/kg | 0.013 | -- | To evaluate | To evaluate |
| **Eluate Analysis** | | | | **10:1 Eluate mg/l** | **10:1 Eluate mg/kg** | **Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg** | | |
| Arsenic | 1455 | | U | < 0.0002 | < 0.0020 | 0.5 | 2 | 25 |
| Barium | 1455 | | U | < 0.005 | < 0.050 | 20 | 100 | 300 |
| Cadmium | 1455 | | U | < 0.00011 | < 0.0011 | 0.04 | 1 | 5 |
| Chromium | 1455 | | U | < 0.0005 | < 0.0050 | 0.5 | 10 | 70 |
| Copper | 1455 | | U | < 0.0005 | < 0.0050 | 2 | 50 | 100 |
| Mercury | 1455 | | U | < 0.00005 | < 0.00050 | 0.01 | 0.2 | 2 |
| Molybdenum | 1455 | | U | 0.0030 | 0.030 | 0.5 | 10 | 30 |
| Nickel | 1455 | | U | < 0.0005 | < 0.0050 | 0.4 | 10 | 40 |
| Lead | 1455 | | U | < 0.0005 | < 0.0050 | 0.5 | 10 | 50 |
| Antimony | 1455 | | U | < 0.0005 | < 0.0050 | 0.06 | 0.7 | 5 |
| Selenium | 1455 | | U | < 0.0005 | < 0.0050 | 0.1 | 0.5 | 7 |
| Zinc | 1455 | | U | < 0.003 | < 0.025 | 4 | 50 | 200 |
| Chloride | 1220 | | U | < 1.0 | < 10 | 800 | 15000 | 25000 |
| Fluoride | 1220 | | U | 0.38 | 3.8 | 10 | 150 | 500 |
| Sulphate | 1220 | | U | < 1.0 | < 10 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 1020 | | N | 52 | 520 | 4000 | 60000 | 100000 |
| Phenol Index | 1920 | | U | < 0.030 | < 0.30 | 1 | - | - |
| Dissolved Organic Carbon | 1610 | | U | 4.2 | < 50 | 500 | 800 | 1000 |

| **Solid Information** | |
|---|---|
| Dry mass of test portion/kg | 0.090 |
| Moisture (%) | 13 |

**Waste Acceptance Criteria**

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

# Results - Single Stage WAC

**Project: 25474 Ballysparks Swords Site 2 UHI Site**

| | | | | | | Landfill Waste Acceptance Criteria Limits | | |
|---|---|---|---|---|---|---|---|---|
| **Chemtest Job No:** | 24-23033 | | | | | | | |
| **Chemtest Sample ID:** | 1838256 | | | | | | | |
| **Sample Ref:** | TP07 | | | | | | | |
| **Sample ID:** | | | | | | | | |
| **Sample Location:** | | | | | | | | |
| **Top Depth(m):** | 0.50 | | | | | | | |
| **Bottom Depth(m):** | | | | | | | | |
| **Sampling Date:** | | | | | | | | |
| **Determinand** | **SOP** | **HWOL Code** | **Accred.** | **Units** | | **Inert Waste Landfill** | **Stable, Non-reactive hazardous waste in non-hazardous Landfill** | **Hazardous Waste Landfill** |
| Total Organic Carbon | 2625 | | M | % | [A] 0.53 | 3 | 5 | 6 |
| Loss On Ignition | 2610 | | M | % | 2.7 | -- | -- | 10 |
| Total BTEX | 2760 | | M | mg/kg | [A] < 0.010 | 6 | -- | -- |
| Total PCBs (7 Congeners) | 2815 | | M | mg/kg | < 0.10 | 1 | -- | -- |
| TPH Total WAC | 2670 | EH_CU_1D_Total | M | mg/kg | [A] < 10 | 500 | -- | -- |
| Total Of 17 PAHs Lower | 2800 | | N | mg/kg | < 1.0 | 100 | -- | -- |
| pH at 20C | 2010 | | M | | 8.4 | -- | >6 | -- |
| Acid Neutralisation Capacity | 2015 | | N | mol/kg | 0.013 | -- | To evaluate | To evaluate |
| **Eluate Analysis** | | | | **10:1 Eluate mg/l** | **10:1 Eluate mg/kg** | **Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg** | | |
| Arsenic | 1455 | | U | 0.0002 | 0.0021 | 0.5 | 2 | 25 |
| Barium | 1455 | | U | < 0.005 | < 0.050 | 20 | 100 | 300 |
| Cadmium | 1455 | | U | < 0.00011 | < 0.0011 | 0.04 | 1 | 5 |
| Chromium | 1455 | | U | 0.0005 | 0.0052 | 0.5 | 10 | 70 |
| Copper | 1455 | | U | 0.0007 | 0.0074 | 2 | 50 | 100 |
| Mercury | 1455 | | U | < 0.00005 | < 0.00050 | 0.01 | 0.2 | 2 |
| Molybdenum | 1455 | | U | 0.0026 | 0.026 | 0.5 | 10 | 30 |
| Nickel | 1455 | | U | 0.0006 | 0.0056 | 0.4 | 10 | 40 |
| Lead | 1455 | | U | < 0.0005 | < 0.0050 | 0.5 | 10 | 50 |
| Antimony | 1455 | | U | < 0.0005 | < 0.0050 | 0.06 | 0.7 | 5 |
| Selenium | 1455 | | U | < 0.0005 | < 0.0050 | 0.1 | 0.5 | 7 |
| Zinc | 1455 | | U | < 0.003 | < 0.025 | 4 | 50 | 200 |
| Chloride | 1220 | | U | < 1.0 | < 10 | 800 | 15000 | 25000 |
| Fluoride | 1220 | | U | 0.49 | 4.9 | 10 | 150 | 500 |
| Sulphate | 1220 | | U | 3.7 | 37 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 1020 | | N | 58 | 580 | 4000 | 60000 | 100000 |
| Phenol Index | 1920 | | U | < 0.030 | < 0.30 | 1 | - | - |
| Dissolved Organic Carbon | 1610 | | U | 4.4 | < 50 | 500 | 800 | 1000 |

| **Solid Information** | |
|---|---|
| Dry mass of test portion/kg | 0.090 |
| Moisture (%) | 15 |

**Waste Acceptance Criteria**

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

# Results - Single Stage WAC

**Project: 25474 Ballysparks Swords Site 2 UHI Site**

| | | | | | | Landfill Waste Acceptance Criteria Limits | | |
|---|---|---|---|---|---|---|---|---|
| **Chemtest Job No:** | 24-23033 | | | | | | | |
| **Chemtest Sample ID:** | 1838257 | | | | | | | |
| **Sample Ref:** | TP08 | | | | | | | |
| **Sample ID:** | | | | | | | | |
| **Sample Location:** | | | | | | | | |
| **Top Depth(m):** | 0.90 | | | | | | | |
| **Bottom Depth(m):** | | | | | | | | |
| **Sampling Date:** | | | | | | | | |
| **Determinand** | **SOP** | **HWOL Code** | **Accred.** | **Units** | | **Inert Waste Landfill** | **Stable, Non-reactive hazardous waste in non-hazardous Landfill** | **Hazardous Waste Landfill** |
| Total Organic Carbon | 2625 | | M | % | [A] 0.20 | 3 | 5 | 6 |
| Loss On Ignition | 2610 | | M | % | 1.9 | -- | -- | 10 |
| Total BTEX | 2760 | | M | mg/kg | [A] < 0.010 | 6 | -- | -- |
| Total PCBs (7 Congeners) | 2815 | | M | mg/kg | < 0.10 | 1 | -- | -- |
| TPH Total WAC | 2670 | EH_CU_1D_Total | M | mg/kg | [A] < 10 | 500 | -- | -- |
| Total Of 17 PAHs Lower | 2800 | | N | mg/kg | < 1.0 | 100 | -- | -- |
| pH at 20C | 2010 | | M | | 8.4 | -- | >6 | -- |
| Acid Neutralisation Capacity | 2015 | | N | mol/kg | 0.016 | -- | To evaluate | To evaluate |
| **Eluate Analysis** | | | | **10:1 Eluate mg/l** | **10:1 Eluate mg/kg** | **Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg** | | |
| Arsenic | 1455 | | U | < 0.0002 | < 0.0020 | 0.5 | 2 | 25 |
| Barium | 1455 | | U | < 0.005 | < 0.050 | 20 | 100 | 300 |
| Cadmium | 1455 | | U | < 0.00011 | < 0.0011 | 0.04 | 1 | 5 |
| Chromium | 1455 | | U | < 0.0005 | < 0.0050 | 0.5 | 10 | 70 |
| Copper | 1455 | | U | < 0.0005 | < 0.0050 | 2 | 50 | 100 |
| Mercury | 1455 | | U | < 0.00005 | < 0.00050 | 0.01 | 0.2 | 2 |
| Molybdenum | 1455 | | U | 0.0044 | 0.044 | 0.5 | 10 | 30 |
| Nickel | 1455 | | U | < 0.0005 | < 0.0050 | 0.4 | 10 | 40 |
| Lead | 1455 | | U | < 0.0005 | < 0.0050 | 0.5 | 10 | 50 |
| Antimony | 1455 | | U | < 0.0005 | < 0.0050 | 0.06 | 0.7 | 5 |
| Selenium | 1455 | | U | < 0.0005 | < 0.0050 | 0.1 | 0.5 | 7 |
| Zinc | 1455 | | U | < 0.003 | < 0.025 | 4 | 50 | 200 |
| Chloride | 1220 | | U | < 1.0 | < 10 | 800 | 15000 | 25000 |
| Fluoride | 1220 | | U | 0.39 | 3.9 | 10 | 150 | 500 |
| Sulphate | 1220 | | U | < 1.0 | < 10 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 1020 | | N | 48 | 480 | 4000 | 60000 | 100000 |
| Phenol Index | 1920 | | U | < 0.030 | < 0.30 | 1 | - | - |
| Dissolved Organic Carbon | 1610 | | U | 4.1 | < 50 | 500 | 800 | 1000 |

| **Solid Information** | |
|---|---|
| Dry mass of test portion/kg | 0.090 |
| Moisture (%) | 12 |

**Waste Acceptance Criteria**

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

## Deviations



In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

| Sample: | Sample Ref: | Sample ID: | Sample Location: | Sampled Date: | Deviation Code(s): | Containers Received: |
|---|---|---|---|---|---|---|
| 1838250 | TP01 | | | | A | Amber Glass 250ml |
| 1838250 | TP01 | | | | A | Plastic Tub 500g |
| 1838251 | TP02 | | | | A | Amber Glass 250ml |
| 1838251 | TP02 | | | | A | Plastic Tub 500g |
| 1838252 | TP03 | | | | A | Amber Glass 250ml |
| 1838252 | TP03 | | | | A | Plastic Tub 500g |
| 1838253 | TP04 | | | | A | Amber Glass 250ml |
| 1838253 | TP04 | | | | A | Plastic Tub 500g |
| 1838254 | TP05 | | | | A | Amber Glass 250ml |
| 1838254 | TP05 | | | | A | Plastic Tub 500g |
| 1838255 | TP06 | | | | A | Amber Glass 250ml |
| 1838255 | TP06 | | | | A | Plastic Tub 500g |
| 1838256 | TP07 | | | | A | Amber Glass 250ml |
| 1838256 | TP07 | | | | A | Plastic Tub 500g |
| 1838257 | TP08 | | | | A | Amber Glass 250ml |
| 1838257 | TP08 | | | | A | Plastic Tub 500g |

# Test Methods



| SOP | Title | Parameters included | Method summary | Water Accred. |
|---|---|---|---|---|
| 1010 | pH Value of Waters | pH at 20°C | pH Meter | |
| 1020 | Electrical Conductivity and Total Dissolved Solids (TDS) in Waters | Electrical Conductivity at 25°C and Total Dissolved Solids (TDS) in Waters | Conductivity Meter | |
| 1220 | Anions, Alkalinity & Ammonium in Waters | Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium | Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser. | |
| 1455 | Metals in Waters by ICP-MS | Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc | Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS). | |
| 1610 | Total/Dissolved Organic Carbon in Waters | Organic Carbon | TOC Analyser using Catalytic Oxidation | |
| 1920 | Phenols in Waters by HPLC | Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded. | Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection. | |
| 2010 | pH Value of Soils | pH at 20°C | pH Meter | |
| 2015 | Acid Neutralisation Capacity | Acid Reserve | Titration | |
| 2030 | Moisture and Stone Content of Soils(Requirement of MCERTS) | Moisture content | Determination of moisture content of soil as a percentage of its as received mass obtained at <30°C. | |
| 2040 | Soil Description(Requirement of MCERTS) | Soil description | As received soil is described based upon BS5930 | |
| 2120 | Water Soluble Boron, Sulphate, Magnesium & Chromium | Boron; Sulphate; Magnesium; Chromium | Aqueous extraction / ICP-OES | |
| 2180 | Sulphur (Elemental) in Soils by HPLC | Sulphur | Dichloromethane extraction / HPLC with UV detection | |
| 2192 | Asbestos | Asbestos | Polarised light microscopy / Gravimetry | |
| 2300 | Cyanides & Thiocyanate in Soils | Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate | Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser. | |
| 2325 | Sulphide in Soils | Sulphide | Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine. | |
| 2430 | Total Sulphate in soils | Total Sulphate | Acid digestion followed by determination of sulphate in extract by ICP-OES. | |
| 2455 | Acid Soluble Metals in Soils | Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc | Acid digestion followed by determination of metals in extract by ICP-MS. | |
| 2490 | Hexavalent Chromium in Soils | Chromium [VI] | Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide. | |
| 2610 | Loss on Ignition | loss on ignition (LOI) | Determination of the proportion by mass that is lost from a soil by ignition at 550°C. | |
| 2625 | Total Organic Carbon in Soils | Total organic Carbon (TOC) | Determined by high temperature combustion under oxygen, using an Eltra elemental analyser. | |
| 2670 | Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID | TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40 | Dichloromethane extraction / GC-FID | |
| 2690 | EPH A/A Split | Aliphatics: >C10–C12, >C12–C16, >C16–C21, >C21– C35, >C35– C40 Aromatics: >C10–C12, >C12–C16, >C16–C21, >C21– C35, >C35– C40 | Acetone/Heptane extraction / GCxGC FID detection | |
| 2760 | Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS | Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule | Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds. | |

# Test Methods



| SOP | Title | Parameters included | Method summary | Water Accred. |
|---|---|---|---|---|
| 2780 | VPH A/A Split | Aliphatics: >C5–C6, >C6–C7,>C7–C8,>C8–C10 Aromatics: >C5–C7,>C7-C8,>C8–C10 | Water extraction / Headspace GCxGC FID detection | |
| 2800 | Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS | Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene* | Dichloromethane extraction / GC-MS | |
| 2815 | Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS | ICES7 PCB congeners | Acetone/Hexane extraction / GC-MS. Reported PCB 101 results may contain contributions from PCB 90 due to inseparable chromatography. | |
| 2920 | Phenols in Soils by HPLC | Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded. | 60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection. | |
| 640 | Characterisation of Waste (Leaching C10) | Waste material including soil, sludges and granular waste | ComplianceTest for Leaching of Granular Waste Material and Sludge | |

## Report Information



| Key | |
|---|---|
| U | UKAS accredited |
| M | MCERTS and UKAS accredited |
| N | Unaccredited |
| S | This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis |
| SN | This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis |
| T | This analysis has been subcontracted to an unaccredited laboratory |
| I/S | Insufficient Sample |
| U/S | Unsuitable Sample |
| N/E | not evaluated |
| < | "less than" |
| > | "greater than" |
| SOP | Standard operating procedure |
| LOD | Limit of detection |

This report shall not be reproduced except in full, and only with the prior approval of the laboratory.
Any comments or interpretations are outside the scope of UKAS accreditation.
The Laboratory is not accredited for any sampling activities and reported results relate to the samples 'as received' at the laboratory.
Uncertainty of measurement for the determinands tested are available upon request .
None of the results in this report have been recovery corrected.
All results are expressed on a dry weight basis.

The following tests were analysed on samples 'as received' and the results subsequently corrected to a dry weight basis EPH, VPH, TPH, BTEX, VOCs, SVOCs, PCBs, Phenols.

For all other tests the samples were dried at ≤ 30°C prior to analysis.
All Asbestos testing is performed at the indicated laboratory .
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1.

### Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

### Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt.
All water samples will be retained for 14 days from the date of receipt.
Charges may apply to extended sample storage.

### Water Sample Category Key for Accreditation

DW - Drinking Water
GW - Ground Water
LE - Land Leachate
NA - Not Applicable

## Report Information



PL - Prepared Leachate
PW - Processed Water
RE - Recreational Water
SA - Saline Water
SW - Surface Water
TE - Treated Effluent
TS - Treated Sewage
UL - Unspecified Liquid

### Clean Up Codes

NC - No Clean Up
MC - Mathematical Clean Up
FC - Florisil Clean Up

### HWOL Acronym System

HS - Headspace analysis
EH - Extractable hydrocarbons – i.e. everything extracted by the solvent
CU - Clean-up – e.g. by Florisil, silica gel
1D - GC – Single coil gas chromatography
Total - Aliphatics & Aromatics
AL - Aliphatics only
AR - Aromatic only
2D - GC-GC – Double coil gas chromatography
#1 - EH_2D_Total but with humics mathematically subtracted
#2 - EH_2D_Total but with fatty acids mathematically subtracted
+ - Operator to indicate cumulative e.g. EH+EH_Total or EH_CU+HS_Total

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

# Appendix IV Laboratory Data

## c. WCA Report (Extract)

Unit 15
Melbourne Business Park
Model Farm Road
Cork T12 WR89

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E:admin@ocallaghanmoran.com
www.ocallaghanmoran.com



# Waste Characterisation Assessment

## Barryspark VHI Site

## Swords

## Co. Dublin

**Prepared For: -**

IGSL Limited
Unit F
M7 Business Park
Naas
County Kildare

**Prepared By: -**

O'Callaghan Moran & Associates
Unit 15 Melbourne Business Park
Model Farm Road
Cork

**August 2024**

| Project | Waste Characterisation: Barryspark, Swords | | | |
|---|---|---|---|---|
| Client | IGSL Limited | | | |
| Report No | Date | Status | Prepared By | Reviewed By |
| 240014701 | 16/08/2024 | Final | Austin Hynes PGeo MSc | Sean Moran B.Sc. MSc |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

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## APPENDICES

# 1 INTRODUCTION

IGSL Limited requested O'Callaghan Moran & Associates (OCM) to undertake a waste characterisation assessment of eight (8 No.) samples of made ground and natural ground collected from eight (8 No.) trial pits from a site at Barryspark, Swords, Co. Dublin.

## 1.1 Methodology

IGSL provided a description of the ground conditions and collected samples of the soils from the trial pit locations. The samples were analysed at an accredited laboratory and the results formed the basis for a waste classification assessment, which was undertaken by OCM in accordance with the Environmental Protection Agency (EPA) Guidelines on the Classification of Waste (2015).

## 2 WASTE CLASSIFICATION ASSESSMENT

### 2.1 Soil Sampling and Laboratory Analysis

#### 2.1.1 *Site Investigation*

The site investigation was undertaken in June 2024 and included the collection of eight (8 No.) samples of made ground and natural ground collected from eight (8 No.) trial pits. The location of the samples is shown on Figure 2.1. The logs are in Appendix 1.

There is topsoil at the surface of all locations.

Made Ground was encountered at TP01 and TP07

At TP01, the Made Ground is 0.30m in thickness and comprises brown, sandy gravelly CLAY. This is underlain by soft to firm, sandy gravelly CLAY with cobble content to 1.20 mbgl. Firm to stiff sandy gravelly CLAY was encountered to 2.30 mbgl. This is underlain by very stiff, sandy gravelly CLAY/SILT to 2.50 mbgl.

At TP07, the Made Ground extends to 1.30 mbgl. This comprises firm , sandy gravelly CLAY with cobble content. Natural Ground comprising stiff, sandy gravelly CLAY with cobble content was encountered to 2.10 mbgl. This is underlain by stiff to very stiff, sandy gravelly CLAY to 2.50 mbgl.

The Made Ground at TP01 and TP07 contains non-natural material <2% of the soil matrix including fragments of brick and plastic, and metal cans.

The subsurface of all other locations comprises Natural Ground. Soft to firm sandy gravelly CLAY was encountered to depths between 0.90-1.20 mbgl. This is underlain by firm to stiff sandy gravelly CLAY to circa 2.00 mbgl. Stiff to very stiff, sandy gravelly CLAY was found below depths of 2.00 mbgl.

#### 2.1.2 *Sample Collection*

IGSL collected the samples and placed them in laboratory prepared containers that were stored in coolers prior to shipment to Chemtest Ltd.

#### 2.1.3 *Laboratory Analysis*

The samples were tested for, metals (arsenic, barium, cadmium, chromium, copper, mercury, molybdenum, nickel, lead, antimony, selenium and zinc, total organic carbon (TOC), BTEX (benzene, toluene, ethylbenzene and xylene) aliphatic and aromatic hydrocarbons, polychlorinated biphenyls (PCB), mineral oil, polyaromatic hydrocarbons (PAH) and asbestos.


ExpertGPS

**Barrysparks Site 2**

50 0 50 100 150 200 250 m

Scale: 1 : 3000.

| | | |
|---|---|---|
| O'Callaghan Moran & Associates | O'Callaghan Moran & Associates,<br>Unit 15 Melbourne Business Park,<br>Model Farm Road, Cork.<br>Tel. (021) 4345366<br>Email: info@ocallaghanmoran.com | **Title:**<br>Figure 2.1 Sample Location Plan |
|  | | **Client:**<br>IGSL Limited |

## 2.2 Waste Classification

The Haz Waste Online Classification Engine, developed in the UK by One Touch Data Ltd, was used to determine the waste classification. This tool was developed specifically to establish whether waste is non-hazardous or hazardous and has been approved for use in Ireland by the Environmental Protection Agency. The full Waste Classification Report is in Appendix 3 and the results are summarised in Table 2.1.

**Table 2.1 Waste Classification**

| Sample No. | Depth | Classification | LoW Code |
|---|---|---|---|
| TP01 | 0.50 | Non-Hazardous | 17 05 04 |
| TP02 | 0.50 | Non-Hazardous | 17 05 04 |
| TP03 | 0.50 | Non-Hazardous | 17 05 04 |
| TP04 | 1.00 | Non-Hazardous | 17 05 04 |
| TP05 | 0.90 | Non-Hazardous | 17 05 04 |
| TP06 | 1.00 | Non-Hazardous | 17 05 04 |
| TP07 | 0.50 | Non-Hazardous | 17 05 04 |
| TP08 | 0.90 | Non-Hazardous | 17 05 04 |

Asbestos was not detected in any of the samples tested.

All samples are classified as non-hazardous and the appropriate List of Waste Code is 17 05 04 (Soil and Stone other than those mentioned in 17 05 03*).

## 2.3 Waste Acceptance Criteria

The results of the WAC testing are presented in Table 2.2, which includes for comparative purposes the WAC for Inert, Non Hazardous and Hazardous Waste Landfills pursuant to Article 16 of the EU Landfill Directive 1999/31/EC Annex II which establishes criteria and procedures for the acceptance of waste at landfills.

All samples meet the inert WAC.

## Table 2.2 WAC Results

| Parameter | Unit | TP01 | TP02 | TP03 | TP04 | TP05 | TP06 | TP07 | TP08 | Inert Landfill | Inert Landfill Increased Limits | Non-Hazardous Landfill | Hazardous Landfill |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Depth | m | 0.50 | 0.50 | 0.50 | 1.00 | 0.90 | 1.00 | 0.50 | 0.90 | | | | |
| | | | | | | | | | | | | | |
| Antimony | mg/kg | <0.0050 | 0.0076 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.06 | 0.18 | 0.7 | 5 |
| Arsenic | mg/kg | 0.0047 | 0.011 | <0.0020 | <0.0020 | <0.0020 | <0.0020 | 0.0021 | <0.0020 | 0.5 | 1.5 | 2 | 25 |
| Barium | mg/kg | <0.050 | 0.32 | <0.050 | 0.063 | <0.050 | <0.050 | <0.050 | <0.050 | 20 | 20 | 100 | 300 |
| Cadmium | mg/kg | <0.0011 | <0.0011 | <0.0011 | <0.0011 | <0.0011 | <0.0011 | <0.0011 | <0.0011 | 0.04 | 0.04 | 1 | 5 |
| Chromium | mg/kg | 0.0072 | 0.0068 | <0.0050 | <0.0050 | 0.0058 | <0.0050 | 0.0052 | <0.0050 | 0.5 | 0.5 | 10 | 70 |
| Copper | mg/kg | 0.015 | 0.034 | 0.0053 | <0.0050 | <0.0050 | <0.0050 | 0.0074 | <0.0050 | 2 | 2 | 50 | 100 |
| Lead | mg/kg | <0.0050 | 0.0083 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.5 | 0.5 | 10 | 50 |
| Molybdenum | mg/kg | 0.034 | <0.0020 | 0.023 | 0.067 | 0.020 | 0.030 | 0.026 | 0.044 | 0.5 | 1.5 | 10 | 30 |
| Nickel | mg/kg | 0.0052 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.0056 | <0.0050 | 0.4 | 0.4 | 10 | 40 |
| Selenium | mg/kg | <0.0050 | 0.0097 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.1 | 0.3 | 0.5 | 7 |
| Zinc | mg/kg | <0.025 | 0.17 | <0.025 | <0.025 | <0.025 | <0.025 | <0.025 | <0.025 | 4 | 4 | 50 | 200 |
| Mercury | mg/kg | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | 0.01 | 0.01 | 0.2 | 2 |
| Phenol | mg/kg | <0.30 | <0.30 | <0.30 | <0.30 | <0.30 | <0.30 | <0.30 | <0.30 | 1 | 1 | NE | NE |
| Fluoride | mg/kg | 4.2 | 2.3 | 2.2 | 2.8 | 2.4 | 3.8 | 4.9 | 3.9 | 10 | 10 | 150 | 500 |
| Chloride | mg/kg | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | 800 | 2,400 | 15,000 | 25,000 |
| Sulphate | mg/kg | 16 | <10 | <10 | <10 | <10 | <10 | 37 | <10 | 1000* | 3,000 | 20000* | 50,000 |
| DOC ** | mg/kg | 57 | <50 | <50 | <50 | 52 | <50 | <50 | <50 | 500 | 500 | 800 | 1,000 |
| pH | pH units | 9.3 | 9.4 | 9.4 | 9.3 | 9.2 | 8.3 | 8.4 | 8.4 | NE | NE | NE | NE |
| TDS *** | mg/kg | 640 | 630 | 400 | 470 | 330 | 520 | 580 | 480 | 4,000 | 12,000 | 60,000 | 100,000 |
| TOC | % | 0.4 | 0.21 | 0.32 | 0.9 | 0.34 | 0.4 | 0.53 | 0.2 | 3 | 6 | NE | 6 |
| Benzene | mg/kg | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 6 | 6 | NE | NE |
| Toluene | mg/kg | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 6 | 6 | NE | NE |
| Ethylbenzene | mg/kg | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 6 | 6 | NE | NE |
| m/p-Xylene | mg/kg | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 6 | 6 | NE | NE |
| o-Xylene | mg/kg | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 6 | 6 | NE | NE |
| PCB Total of 7 | mg/kg | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | 1 | 1 | NE | NE |
| Total 17 PAH's | mg/kg | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | NE | 100 | NE | NE |
| Mineral Oil | mg/kg | <10 | 42 | 23 | 29 | 40 | 34 | 26 | 23 | 500 | 500 | NE | NE |
| Asbestos | % mass | NAD | NAD | NAD | NAD | NAD | NAD | NAD | NAD | NE | NE | NE | NE |

NAD denotes No Asbestos Detected

* denotes sulphate level exceeding inert waste limit may be considered as complying if the TDS value does not exceed 6,000mg/kg at L/S = 10l/kg.

** denotes a higher limit may be accepted provided the DOC alternative values of 500mg/kg is achieved

*** denotes TDS. The values for TDS can be used to sulphate and chloride.

PAH over 1mg/kg and Mineral Oil over 50 mg/kg exceeds limit at soil recovery site in Ireland

## 2.4 Waste Management Options

The EPA has issued guidance on acceptance criteria for a range of parameters for soil recovery sites. This includes;

- Metals (solid conc. not leachability) in soil and stone (including As, Cd, Cr, Cu, Hg, Ni, Pub, Zn);
- Total organic carbon in soil and stone;
- Total BTEX (benzene, toluene, ethylbenzene, xylenes) in soil and stone;
- Mineral oil in soil and stone;
- Polycyclic aromatic hydrocarbons (PAHs) in soil and stone;
- Polychlorinated Biphenyls (PCBs) in soil and stone;
- Asbestos fibres in soil and stone.

The guidance requires that soils from brownfield sites should not exceed the limits for the parameters specified in Table 2.3 and 2.4. For metals limits have been specified for a range of soil types nationally separated into six domain areas.

**Table 2.3 Soil Recovery Site Criteria**

| Parameter | Limit for Soil Recovery Sites |
|---|---|
| Total BTEX | 0.05 mg/kg |
| Mineral Oil | 50 mg/kg |
| Total PAHs | 1 mg/kg |
| Total PCBs | 0.05 mg/kg |

All samples which meet the inert WAC, meet the soil recovery criteria for Total BTEX, Mineral Oil, Total PAH's and Total PCB's.

The soil and stone cannot be sent to soil recovery sites if the trigger levels for a particular domain are exceeded. There is however some flexibility in applying the limits. A derogation applies where up to three parameters can exceed the limit for a sample provided the concentration in the samples is no more than 1.5 times the trigger level. The site which is subject to this investigation is located in Domain 2 and the trigger levels are listed in Table 2.4.

**Table 2.4 Soil Recovery Trigger Levels**

| | | Domain 4 Trigger Level | 1.5 times Trigger Level |
|---|---|---|---|
| **Arsenic** | **mg/kg** | 24.90 | 37.35 |
| **Cadmium** | **mg/kg** | 3.28 | 4.92 |
| **Chromium** | **mg/kg** | 50.30 | 75.45 |
| **Copper** | **mg/kg** | 63.50 | 95.25 |
| **Mercury** | **mg/kg** | 0.36 | 0.54 |
| **Nickel** | **mg/kg** | 61.90 | 92.85 |
| **Lead** | **mg/kg** | 86.10 | 129.15 |
| **Zinc** | **mg/kg** | 197.00 | 295.5 |

All samples meet the soil recovery criteria for metal concentrations.

Waste management options are summarised on Table 2.5. All are subject to approval of the waste management facility operators. Class A material is suitable for removal to a soil recovery facility.

**Table 2.5 Waste Management Options**

| Sample No. | Depth | Classification | LoW Code | Category |
|---|---|---|---|---|
| TP01 | 0.50 | Non-Hazardous | 17 05 04 | A |
| TP02 | 0.50 | Non-Hazardous | 17 05 04 | A |
| TP03 | 0.50 | Non-Hazardous | 17 05 04 | A |
| TP04 | 1.00 | Non-Hazardous | 17 05 04 | A |
| TP05 | 0.90 | Non-Hazardous | 17 05 04 | A |
| TP06 | 1.00 | Non-Hazardous | 17 05 04 | A |
| TP07 | 0.50 | Non-Hazardous | 17 05 04 | A |
| TP08 | 0.90 | Non-Hazardous | 17 05 04 | A |

| | |
|---|---|
| A | Meets Soil Recovery Criteria |

# 3 CONCLUSIONS AND RECOMMENDATIONS

## 3.1 Conclusions

### 3.1.1 *Waste Classification*

Asbestos was not detected in any of the samples tested.

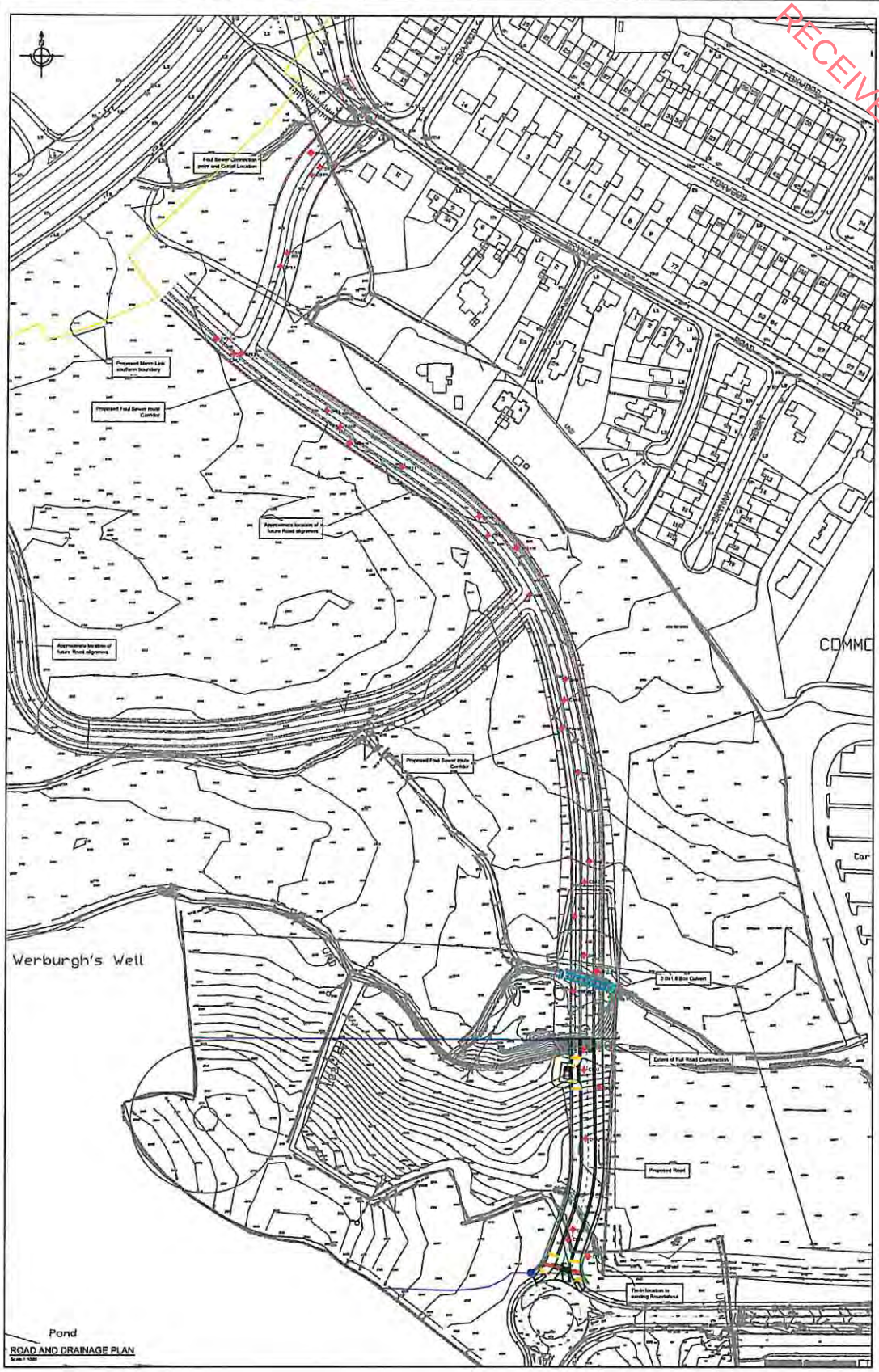
All samples are classified as non-hazardous and the appropriate List of Waste Code is 17 05 04 (Soil and Stone other than those mentioned in 17 05 03*).

The soils are suitable for retention on site but If the soils have to be removed from the site the disposal options are outlined in Section 2.4.

## 3.2 Recommendations

OCM recommend that a copy of this report be provided in full to the relevant waste management facilities to which the made ground and subsoils will be consigned to confirm its suitability for acceptance.

# Appendix V Site Plans




ROAD AND DRAINAGE PLAN

SITE INVESTIGATION LEGEND:

- APPROXIMATE SITE BOUNDARY
- TP+W TRIAL PIT WITH WAC SUITE OF TESTS & MCV
- DP DYNAMIC PROBE
- BH-RC ROTARY CORE BOREHOLE
- CBR CALIFORNIA BEARING RATIO TEST

NOTES:
1. ALL GROUND TO BE SCANNED WITH "CATS" DETECTOR FOR BURIED CABLES AND PIPES UP TO 4M DEEP BEFORE SITE INVESTIGATION COMMENCES
2. DURING THE SITE OPERATIONS IT IS THE SITE INVESTIGATION CONTRACTORS RESPONSIBILITY FOR TRAFFIC MANAGEMENT AND HEALTH AND SAFETY OF THEIR STAFF AND THE PUBLIC.

Ordnance Survey Ireland Licence No. CYAL50133451

| Rev. | Date | Description | By |
|---|---|---|---|

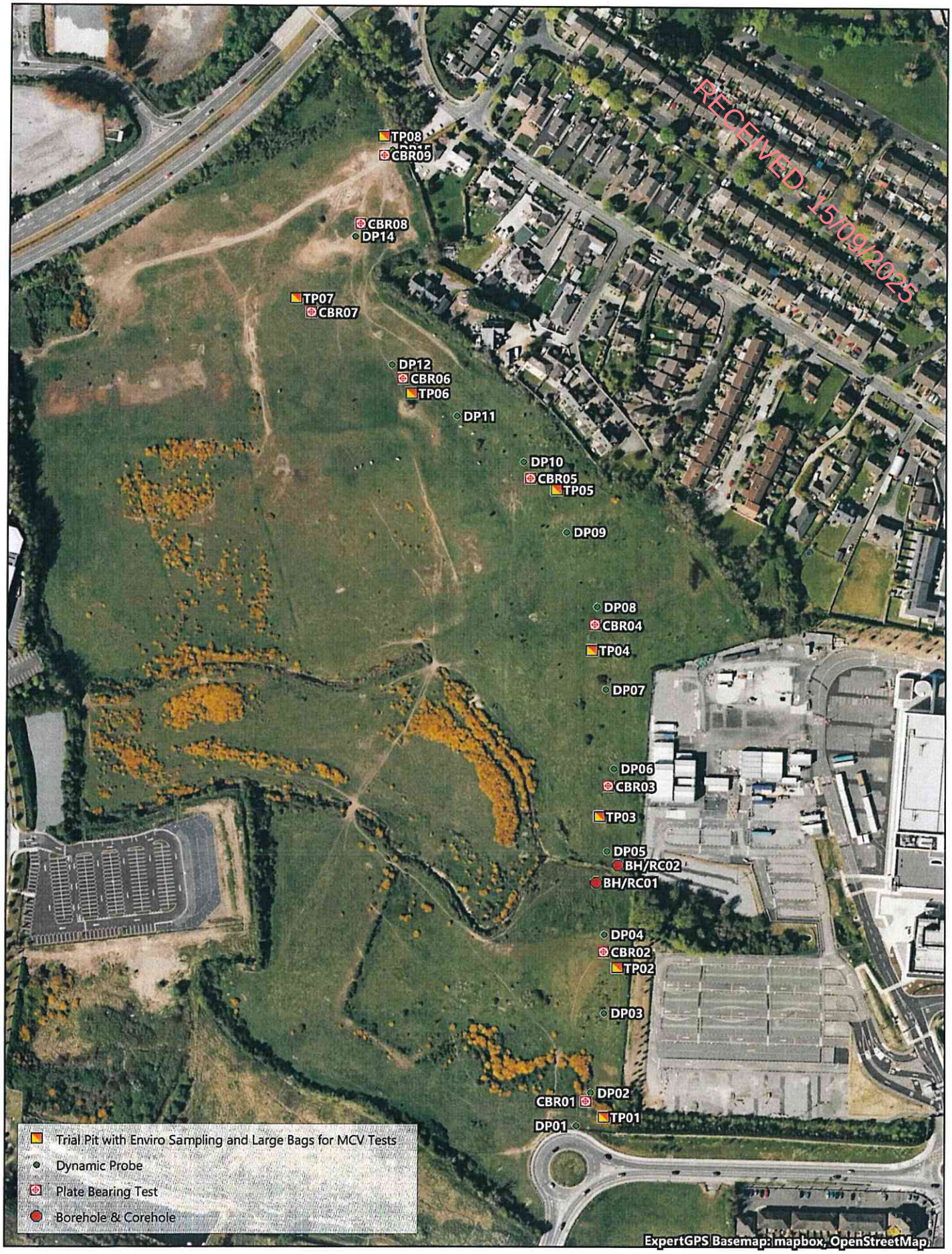
Project Title: BARRYSPARKS (VHI PORTFOLIO DAC)
Architect:

| Date | By | Checked | Scale @ A1 |
|---|---|---|---|
| APR. 2024 | NMM | PM | 1:1000 |

Drawing Title: SITE PLAN SITE INVESTIGATION TENDER
Drawing Status: TENDER

| Job No. | Drawing No. | Issue |
|---|---|---|
| 20021 | 120 | T0 |

POGA CONSULTING ENGINEERS & PROJECT MANAGERS






ExpertGPS

# Barrysparks Site 2

50 0 50 100 150 200 250 m

Scale: 1 : 3000.

MN 1°31'