Tionscadal Soláthair Uisce
Water Supply Project

Environmental Impact Assessment Report (EIAR)

Volume 6 of 6: Appendices

(Appendix 10.13) TPR Ground Investigations

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IGSL Ltd

Water Supply Project Eastern and Midlands Region Lot 3 – Termination Point Reservoir

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Site Investigation Report

Project No. 23560

September 2022

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FOREWORD
The following conditions and notes on the geotechnical site investigation procedures should be read in conjunction with this report.

Standards
The ground investigation works for this project (**Water Supply Project Eastern and Midlands Region Lot 3 – Termination Point Reservoir**) have been carried out by IGSL Limited in accordance with Eurocode 7 - Part 2: Ground Investigation & Testing (EN 1997-2:2007). This has been used together with complementary documents such as BS 5930 (2015+A1:2020) and BS 1377 (Parts 1 to 9) and the following European Norms:

- EN 1997-2 Eurocode 7: 2007 – Geotechnical Design – Part 2: Ground Investigation & Testing and its associated complementary standards.
- EN ISO 22475-1:2006 Geotechnical Investigation and Sampling – Sampling Methods & Groundwater Measurements
- EN ISO 14688-1:2017 Geotechnical Investigation and Testing – Identification and Classification of Soil, Part 1: Identification and Description
- EN ISO 14688-2:2017 Geotechnical Investigation and Testing – Identification and Classification of Soil, Part 2: Principles for a classification
- EN ISO 14689-1:2017 Geotechnical Investigation and Testing – Identification, description & classification of rock

The Eurocode 7, Part 2 – Ground Investigation and Testing GI specification shall be read in conjunction with the Specification and Related Documents for Ground Investigation in Ireland, 2nd Edition, published by Engineers Ireland in 2016 and the Ervia Particular Specification document entitled 'A Multi-Supplier Framework for the Provision of Site Investigation Works to Ervia (Ref:18/085) - Annex 2 – Works Order Requirement', framework reference 18/085.

Reporting
No responsibility can be held by IGSL Ltd for ground conditions between exploratory hole locations. The engineering logs provide ground profiles and configuration of strata relevant to the investigation depths achieved and caution should be taken when extrapolating between exploratory points. No liability is accepted for ground conditions extraneous to the investigation points. Unless specifically stated, no account has been taken of possible subsidence due to mineral extraction, mining works or karstification below or close to the site.

This report has been prepared for Irish Water. The information should not be used without their prior written permission. The Engineer is Mott MacDonald Ireland. IGSL Ltd accepts no responsibility or liability for this document being used other than for the purposes for which it was intended.

Boring Procedures
Unless otherwise stated, 'shell and auger' or cable percussive boring technique has been employed as defined by Section 6.3 of IS EN ISO 22475-1:2006. The boring operations, sampling and in-situ testing complies with the recommendations of IS EN 1997-2:2007 and BS 1377:1990 and EN ISO 22476-3:2005. The shell and auger boring technique allows for continuous sampling in clay and silt above the water table and sand and gravel below the water table (Table 2 of IS EN ISO 22475-1:2006).

It is highlighted that some disturbance and variation is unavoidable in particular ground (e.g. blowing sands, gravel / cobble dominant glacial deposits etc). 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.

In-Situ Testing

Standard penetration tests were conducted strictly in accordance with Section 4.6 of IS EN 1997-2:2007. The SPT equipment (hammer energy test) has been calibrated in accordance with EN ISO 22476-3:2005 and the Energy Ratio (E_r). A calibration certificate is available upon request. The E_r is defined as the ratio of the actual energy E_{meas} (measured energy during calibration) delivered to the drive weight assembly into the drive rod below the anvil, to the theoretical energy (E_{theor}) as calculated from the drive weight assembly. The measured number of blows (N) reported on the engineering logs are uncorrected. In sands, the energy losses due to rod length and the effect of the overburden pressure should be taken into account (see IS EN ISO 22476-3:2005).

Soil Sampling

Three categories of sampling methods are outlined in EN ISO 22475-1:2006. The categories are referenced A, B and C for any given ground conditions and are shown in Tables 1 and 2 of EN ISO 22475-1:2006. Reference should be made to EN 1997-2:2002 for guidelines on sample class and quality for strength and compressibility testing. Samples of quality classes 1 or 2 can only be obtained by using Category A sampling methods.

Class 1 thin wall undisturbed tube samples (UT100) were obtained in fine grained soils and strictly meet the requirements of EN 1997-2:2002 and EN ISO 22475-1:2006. Soil samples for laboratory tests are divided into five classes with respect to the soil properties that are assumed to remain unchanged during sampling, handling transport and storage. The minimum sample quality required for testing purposes to Eurocode 7 compatibility (EN 1997-2:2002) is shown in Table A.

Table A – Details of Sample Quality Requirements

EN 1997 Clause	Test	Minimum Sample Quality Class
5.5.3	Water Content	3
5.5.4	Bulk Density	2
5.5.5	Particle Density	N/S
5.5.6	Particle Size Analysis	N/S
5.5.7	Consistency Limits	4
5.5.8	Density Index	N/S
5.5.9	Soil Dispersivity	N/S
5.5.10	Frost Susceptibility	N/S
5.6.2	Organic Content	4
5.6.3	Carbonate Content	3
5.6.4	Sulphate Content	3
5.6.5	pH	3
5.6.6	Chloride Content	3
5.7	Strength Index	1
5.8	Strength Tests	1
5.9	Compressibility Tests	1
5.10	Compaction Tests	N/S
5.11	Permeability	2

N/S – not stated. Presume a representative sample of appropriate size.

Samples recovered from trial pits or trenches meet the requirements of IS EN ISO 22475-1. It is highlighted that unforeseen circumstances such as variations in geological strata may lead to lower quality sample classes being obtained.

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 conditions, tidal variations etc.

Engineering Logging

Soil and rock identification has been based on the examination of the samples recovered and conforms with IS EN ISO 14688-1:2002 and IS EN ISO 14689-1:2004. Rock weathering classification conforms to IS EN ISO 14689-1:2003 while discontinuities (bedding planes, joints, cleavages, faults etc) are classified in accordance with 4.3.3 of IS EN ISO 14689-1:2003. Rock mechanical indices (TCR, SCR, RQD) are defined in accordance with IS EN ISO 22475-1:2006.

Where peat has been encountered, 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 and Hobbs N. B. Mire morphology and the properties of some British and foreign peats. QJEG, Vol. 19, 1986.

Retention of Samples

After satisfactory completion of all the scheduled laboratory tests on any sample, the remaining material will be 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.

10.1 INTRODUCTION

IGSL has undertaken a programme of geotechnical site investigation works for the proposed development of a new Termination Point Reservoir [TPR] for the Water Supply Project (WSP) – Eastern and Midlands Region scheme. The proposed WSP will deliver infrastructure to supply treated water from the River Shannon to sustain Ireland's Eastern and Midlands Region. The entire scheme as proposed extends from the Parteen Basin in North Tipperary to Peamount Reservoir in West Dublin, a distance of approximately 170km. The TPR works form part of the larger Lot 3 ground investigation contract. As well as the TPR site, Lot 3 also encompasses a 67km stretch of the pipeline route from Ch.103 000 to Ch.170 000 (Peamount). The ground investigation findings pertaining to this section of pipeline will be reported separately.

The aim of the investigation was to gather representative information on the ground conditions to allow for adequate characterisation of the ground conditions in order to inform the next stage design and construction of the scheme. The GI was designed to identify and investigate geotechnical risks such that adequate mitigation may be implemented to manage those risks in the next stage of works.

In terms of the positioning of SI locations at the TPR site, IGSL fully considered the buried infrastructure traversing the area when setting out as per the coordinates provided. Good practice was to microsite if necessary, to avoid any potential impact on the pipelines already crossing the site. Known buried service locations were pegged beforehand to inform site workers.

In addition to the IGSL and Mott MacDonald representation on site, the works were attended by an ACoW and an ECoW. The ACoW or Archaeologist in Charge of Works was provided by Edmund O'Donovan and Associates. Their attendance was required to maintain a watching brief on freshly opened trial pit excavations to allow immediate identification and recording of any archaeological remains that may have been present. The role of ECoW or Ecologist in Charge of Works was assumed by Sean Meehan (qualified Ecologist). He was tasked with informing on the presence of potentially sensitive ecological habitats on site in addition to the presence of invasive species which could, if disturbed, be detrimentally spread across the site.

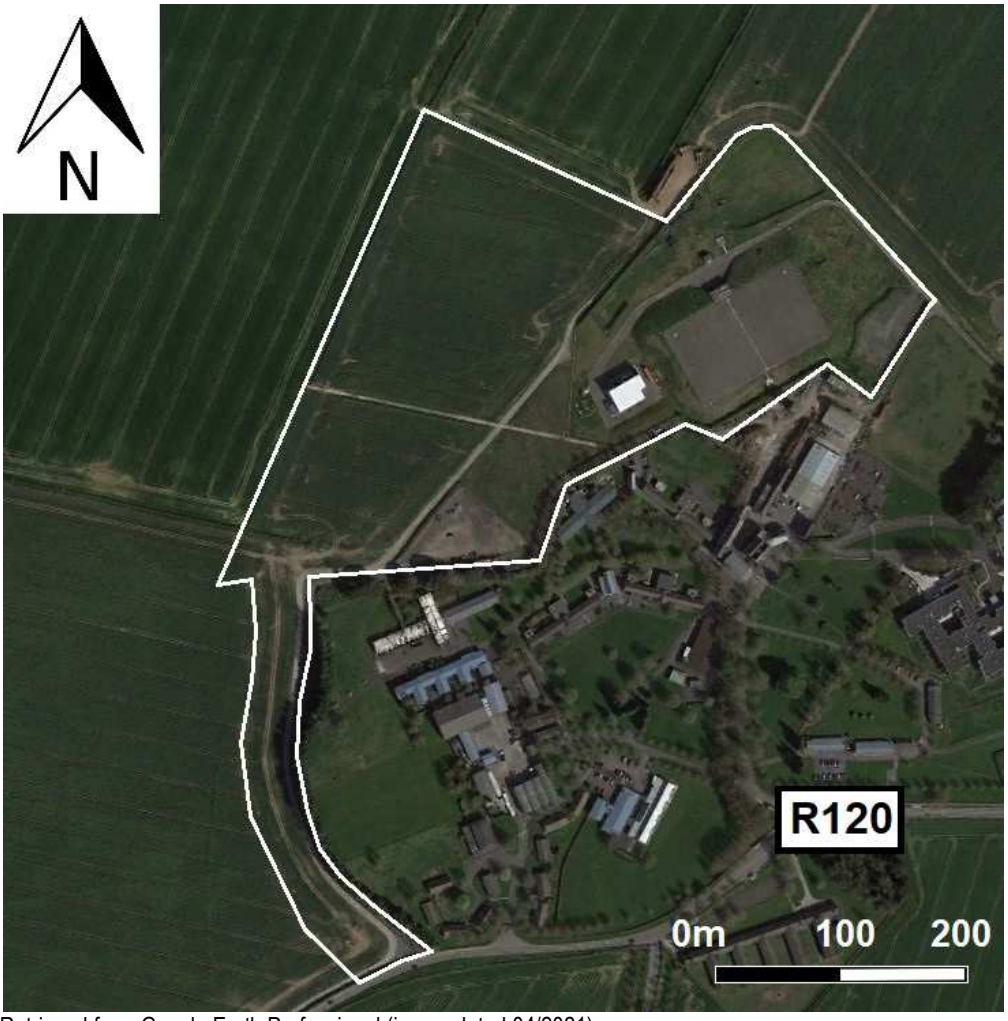
10.2 SITE & GEOLOGY

10.2.1 Site

The TPR site is positioned in predominantly arable farmland adjacent to the existing Peamount 40 Megalitre enclosed reservoir in West Dublin. The site is accessed via a meandering gravel-track leading from the R120 Regional Road (Figure 1). The track follows the boundary with the neighbouring Peamount Healthcare campus.

The proposed TPR is positioned at the extreme eastern end of the scheme and will receive treated potable water. The proposed development comprises structures, infrastructure and access road and covers an area of approximately 7.8 hectares.

Figure 1 – Site Location Plan – SI Locations inside outlined area



Retrieved from Google Earth Professional (image dated 04/2021)

The TPR site comprises typically flat ground, undulating between 78m OD and 81m OD rising to 82m OD in areas where soils appear to have been historically stockpiled (along the eastern flank of the site). The gravel-track towards the R120 road ranges in topography from 79 to 80.5m OD. A number of existing services traverse the site ranging from overhead electrical cabling held on timber poles to a buried foul sewer and water main.

The IGSL Limited intrusive fieldworks at the TPR site commenced in late September 2021 and were completed by mid-November 2021. The investigation comprised cable percussion boring, dynamic (driven) sampling, conventional rotary coring, Geobore-S rotary coring and machine-dug trial pitting in addition to an array of in-situ testing. Such tests included borehole infiltration testing, plate bearing testing, dynamic cone penetrometer testing, packer testing and high-end high pressure dilatometer [HPD] testing. The HPD testing was carried out by In Situ Site Investigation (UK).

Geotechnical, chemical and environmental laboratory testing was scheduled on a range of soil and rock samples by the supervising engineer, Mott MacDonald Ltd. The geotechnical testing included moisture contents, Atterberg Limits, Particle Size Distribution [PSD] testing, California Bearing Ratio [CBR], Moisture Condition Value [MCV] and compaction testing among others. Environmental and chemical analyses were carried out using comprehensive soil, leachate and full WAC testing suites. Water samples were also assessed chemically.

Strength tests were undertaken on the rock cores recovered from rotary and Geobore-S drilling. Rock samples were also subject to indirect tensile strength testing as per the Brazil Test. This was undertaken by Structural Soils (UK). Rock reusability testing was scheduled on Geobore S rock cores (TPR DS006 & TPR DS015). This report presents the factual geotechnical data acquired to date from the 2021 investigation. Ongoing sample retention of untested samples is to be agreed with Irish Water.

Standpipe installations were constructed in boreholes to allow for groundwater measurements. Data loggers were installed in two batches, the first on 29-10-21 with the second on 06-12-21. The loggers were dropped into seven of the groundwater monitoring wells on site to allow for continuous water level measurement over a 12-month period following site works. Given the shallow overburden deposits encountered on site, each logger was placed in bedrock. Downloading of recorded groundwater monitoring data was undertaken initially on 09-02-22 and will be completed every quarter by IGSL for a period of 12 months. The dates are proposed to be April 2022, August 2022, and December 2022.

The investigations were executed in accordance with BS 5930, Code of Practice for Site Investigations (2015+A1:2020) and EN 1997-2 Eurocode 7 Part 2 Ground Investigation & Testing and supervised full-time by an IGSL geotechnical engineer and approved IGSL professional attendant being either Chartered Engineer or Geologist (with a minimum of 10 years relevant experience in planning and supervision of ground investigation works).

10.2.2 Superficial Geology

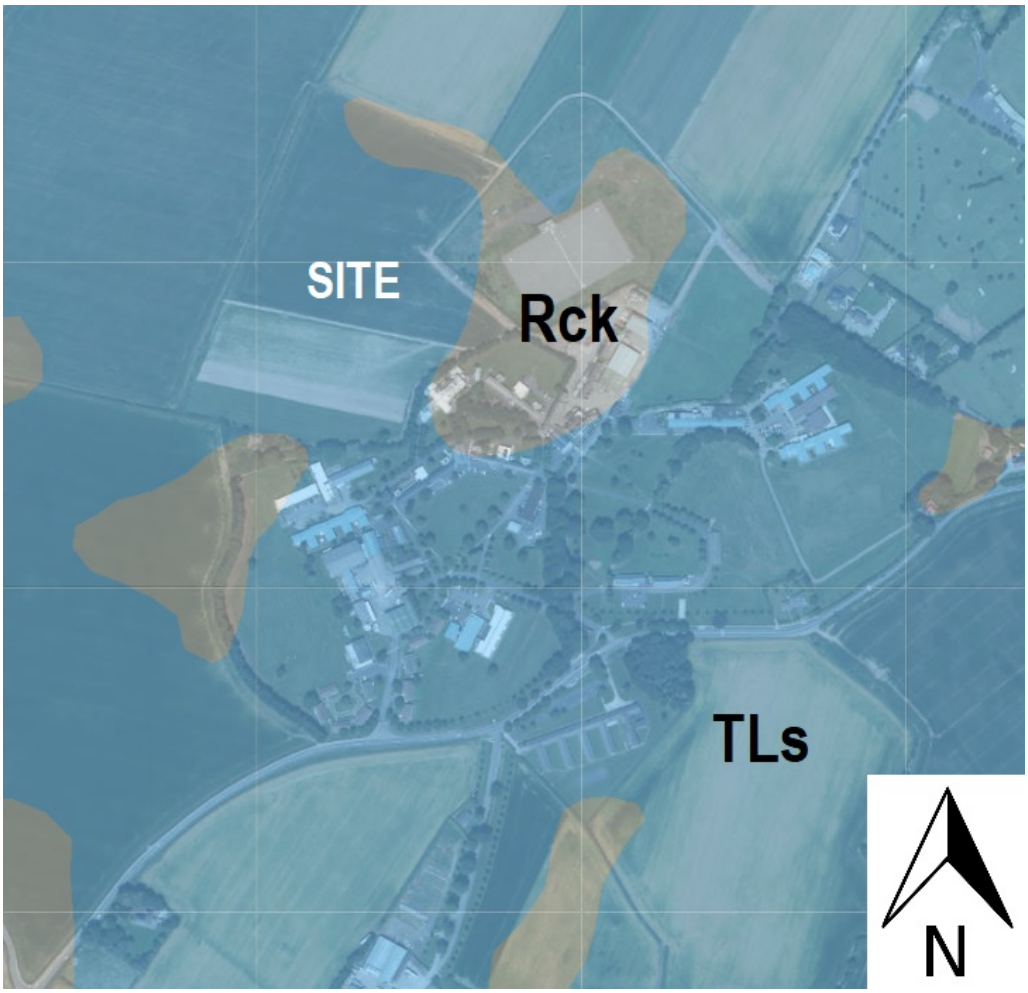
10.2.2.1 GI Findings - Soil

The superficial geology at the site typically comprises a thin cover of glacial till (derived from limestones). The till was described as firm and firm to stiff brown sandy gravelly CLAY with cobbles, becoming stiff and occasionally very stiff ahead of pit termination. The trial pits extended to depths ranging from 0.70m to 1.80m with weathered rockhead generally intercepted at the base signaled by tabular cobbles and boulders of limestone in a clay matrix. Equally, cable percussion boring / window sampling (dynamic sampling) also reported termination at shallow levels.

10.2.2.2 Published Maps - Soil

The Quaternary Soils plot for the area (retrieved from GSI website) reaffirms the findings of the investigation and highlights the presence of near surface rock locally.

Figure 2 – Quaternary Soils Plot for the TPR site (retrieved from GSI website)



Key: **Rck** = Bedrock outcrop or subcrop
TLs = Till derived from limestones

10.2.3 Solid Geology

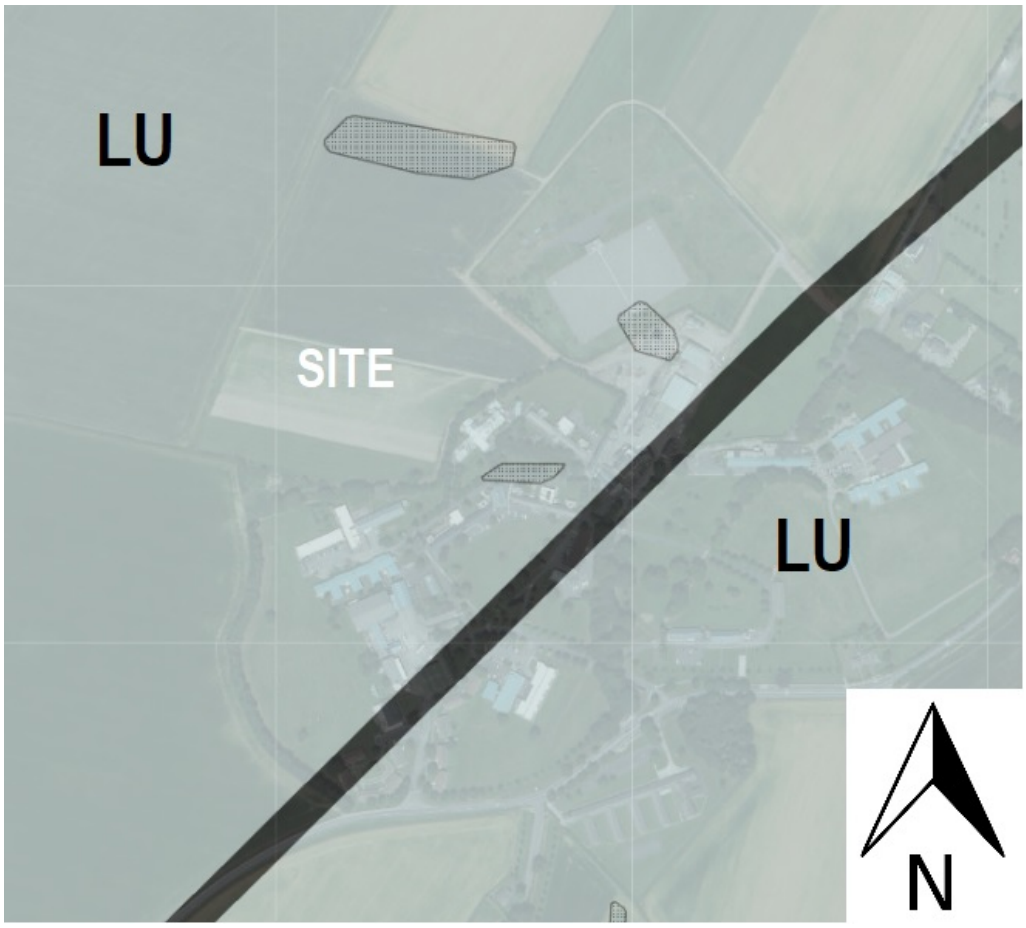
10.2.3.1 Published Maps - Rock

Reference to the GSI map for the area (Figure 3, 1:100,000 Solid Geology series) shows that the site is underlain by the Lucan Formation. The Lucan Formation (Nolan 1986, 1989) forms the bulk of the basinal rocks throughout the geologically termed 'Dublin Basin', and is characterised by

graded, intraclastic skeletal packstone/grainstone interbedded with anoxic calcareous mudstone / black shale, laminated calcisiltite and argillaceous micrite (i.e. impure limestone with clay minerals).

Its base is defined by the first appearance of thick graded beds of limestone, and a marked decrease in the proportion of interbedded shale, compared with the underlying Tober Colleen Formation. The Lucan Formation is widely known as the Calp Limestone (Marchant and Sevastopulo, 1980) but is also referred to as the Upper Dark Limestone and has long been a source of building materials and aggregate for Dublin. The Calp is largely undifferentiated geologically.

Figure 3 - Bedrock Geological Map for the TPR site (Adapted from McConnell & Philcox, 1994)



Key: **LU** = Lucan Formation

10.2.3.2 GI Findings - Rock

The rotary drillholes show that bedrock typically consists of light and dark grey to black, medium strong to very strong fine grained predominantly muddy / argillaceous LIMESTONE with interbeds of medium strong calcisiltite LIMESTONE. Shaley bands, often slightly weathered to moderately weathered, of weak calcareous MUDSTONE and SHALE were observed in a number of holes most especially where fissile bedding marks a pronounced carbonaceous cleavage.

The rotary Geobore S coring proved a transition from overburden to bedrock or 'rockhead' at depths between 0.60m (TPR-BH-008) to 3.75m bgl (TPR-BH-010). Shallow obstructions encountered in dynamic sampling and cable percussion boring generally herald the transition to rockhead.

10.3 FIELDWORK

10.3.1 General

The IGSL Limited intrusive fieldworks at the TPR site commenced on 28th September 2021 and were completed by 17th November 2021. Each site workspace, conforming to Covid-19 protocols, comprised exclusion zones demarcated with safety barriers to reinforce the necessity for appropriate social distancing between site attendees. The works comprised the following:

- Combined Cable Percussion Borehole / Rotary Coreholes (9 No.)
- Rotary-only Drillhole TPR-BH-005A (1 No.)
- Geobore S Coreholes (5 No.)
- Combined Dynamic Sampling / Rotary Coreholes (17 No.)
- Trial Pitting (36 No.)
- Borehole Permeability Test (4 No.)
- Packer Testing (2 No.)
- Plate Bearing Testing (11 No.)
- Dynamic Cone Penetrometer Testing (4 No.)
- High Pressure Dilatometer Testing (4 No.)
- Groundwater Monitoring / Data Loggers
- Surveying of Exploratory Hole Locations

10.3.2 Combined Cable Percussion Borehole / Rotary Coreholes & TPR-BH-005A

Cable percussion boring (200mm diameter) was undertaken at nine locations using a Dando 2000 rig. The boreholes extended to depths between 0.60 and 1.90m. Boring commenced through hand-dug services inspection pits. Each service pit was excavated only after undertaking a careful CAT [Cable Avoidance Tool] survey and following consultation of all available utility plans. Disturbed bulk samples were recovered at 1m intervals or change of strata during boring and these are denoted 'B' on the engineering logs. Small disturbed samples were also acquired in 1kg plastic tubs (denoted 'D' on the pit logs). Undisturbed samples were not acquired during boring as the ground conditions intercepted were not conducive to sample recovery, being too gravelly.

Standard Penetration Tests (SPT's) were performed during boring and reported in accordance with IS EN ISO 22476-3. Given the nature of the soils and presence of shallow rockhead, a solid cone was used. In accordance with Clause 7.6.6 of the Specification and Related Documents for Ground Investigation in Ireland, 2nd Edition (2016), when a standard penetration test (SPT) was carried out, a bulk disturbed sample was taken over the depth range of the test. Additionally, as per Clause 7.6.4, the frequency of SPT testing in boreholes was at 0.50m below the base of the inspection pit, with the next 1.0m deeper, following at one metre centres thereafter to a depth of 5m. SPT tests were also undertaken to prove the presence of a 'hard stratum' or 'obstruction'. In this case, the SPT test shows a resistance in excess of 35 blows/75 mm, or displays two successive 75mm increments achieving in excess of 50 blows (Clause 2.8.5).

It is noted that the SPT N-Values reported are the number of blows for 300mm increment penetration (e.g. TPR-BH005 at 1.20m where N=50). These exclude the seating blow values, which represent the initial 150mm depth of penetration. Where partial penetration was achieved during testing, the number of blows is shown for the actual penetration depth achieved (e.g. TPR-BH001 at 0.80m where N=50/110mm). In accordance with Eurocode 7, the SPT hammer has been calibrated and the energy ratio (Er) value is incorporated on the engineering logs. It is highlighted that the SPT N-Values reported on the engineering logs are uncorrected for energy ratio.

Descriptions of the soils encountered, in-situ tests undertaken and samples recovered are presented on the borehole records in Appendix 10A.1. Details of groundwater strikes and hard strata boring (i.e. chiselling) are also presented on the aforementioned records.

Following completion of the cable percussion bore, the opened borehole was backfilled ahead of rotary drilling. Rotary drilling was carried out through the backfilled borehole using a track-mounted Knebel top-drive rig. Symmetrex drilling system was first utilised to clear the superficial / backfill deposits. Once on rockhead, conventional rotary coring with air/mist flush was used throughout the site at each of the nine holes. In the case of TPR-BH-005, the corehole collapsed at 4.95m bgl during an in-situ high-pressure dilatometer test. In order to achieve the required depth of 8m at this location, rotary drilling was performed from ground level at the adjacent TPR-BH-005A.

Rotary diamond cutting was used to retrieve 78mm diameter bedrock core samples through initial fractured and weathered rockhead, extending to the more competent bedrock at depth. Drilling produced cores of very strong to medium strong, thickly to thinly bedded to very locally thinly laminated where fissile mudstone/shale, grey and dark grey to black, fine-grained, LIMESTONE (predominantly calcisiltite limestone with subordinate MUDSTONE).

The cores were placed in 3m capacity timber boxes and logged by an IGSL engineering geologist. This included photography of the cores with a digital camera. Where rock core was recovered, a graphic fracture log is also presented alongside the mechanical indices. This illustrates the fracture state of the rock cores and allows easy identification of highly fractured / non-intact zones and discontinuity spacings. It should be noted that no correction for dip of the joints has been made and that the spacings shown are successive joint / core intersections within the core.

As with cable percussion boring, Standard Penetration Tests (SPT's) were performed during drilling operations. In accordance with Eurocode 7, the SPT hammer has been calibrated and the energy ratio (Er) value is incorporated on the engineering logs. It is highlighted that the SPT N-Values reported on the engineering logs are uncorrected for energy ratio.

Water monitoring standpipes were installed in four of the completed drillholes (TPR-BH008, 009, 012 & 013 – see Table 1). The standpipes consisted of 50mm diameter HDPE pipework with proprietary 1mm slots and incorporated a pea gravel filter pack and cement / bentonite grout seal. Protective headwork covers were concreted in place. Data loggers were introduced to each of the four wells, as selected by Mott MacDonald supervising engineers. Quarterly return visits are required under the contract to permit the downloading of data logger information. This will be continued for a period of 12 months from first installed.

The core log records are presented along with cable percussion borehole records on combined logs in Appendix 10A.1. The logs include engineering geological descriptions, details of the bedding / discontinuities and mechanical indices (Total Core Recovery [TCR], Solid Core Recovery [SCR] and Rock Quality Designation [RQD]) for each core run. Core photographs are presented in Appendix 10I.3 and these illustrate the structure and fracture state of the bedrock.

10.3.3 Geobore S Coreholes

Rotary Geobore S drilling was carried out using a track-mounted Knebel rotary rig at five corehole locations (TPR-BH-002, 006, 010, 011 & 014). The Knebel drilling unit employed triple-tube Geobore S coring techniques producing 102mm diameter core samples of both overburden soils and underlying bedrock. Recirculated water flush was used to promote sample recovery throughout coring.

The core samples were placed in 2m capacity timber boxes. Photographs of the cores were taken using a digital camera prior to logging by a senior engineering geologist. The boxes were then transported to IGSL's laboratory in Naas for laboratory testing. The core photographs are presented in Appendix 10I.3.

The core log records include engineering geological descriptions of the cores, details of discontinuities and mechanical indices (TCR, SCR and RQD's) for each core run. It is noted that

core comprised of overburden deposits do not form part of the SCR and RQD percentage values. Comments on casing details are included on the rotary records. The rotary drillhole records are presented in Appendix 10A.2 and reference should be made to the Foreword which provides details on the logging of the cores.

Water monitoring standpipes were installed in three of the completed Geobore S drillholes (TPR-BH002, 006 & 014 – see Table 1). As with the installs in combined cable percussion / rotary holes, the standpipes consisted of 50mm diameter HDPE pipework with proprietary 1mm slots and incorporated a pea gravel filter pack and cement / bentonite grout seal. Protective headwork covers were concreted in place. Data loggers were introduced to each of the three wells, as selected by Mott MacDonald supervising engineers. Quarterly return visits are required under the contract to permit the downloading of data logger information. This will be continued for a period of 12 months from first installed.

10.3.4 Combined Dynamic Sampling / Rotary Coreholes

Dynamic sampling was carried out at seventeen locations using a Dando Terrier rig. The Terrier rig uses a 63.5kg weight to drive a hollow cylindrical windowless sampler and the material is retrieved in a semi-rigid plastic core liner. The dynamic sample records are presented in Appendix 10B.1 and include descriptions of the soils encountered and the total recovery per run. Dynamic soil sampling represents the first intrusive phase of investigation at each of the seventeen locations. Upon completion of the final sample run, each hole was backfilled.

The second phase at each of the seventeen locations comprised rotary core drilling. Investigative drilling was carried out using both a track-mounted Knebel top-drive rig and a tracked Beretta T44 rig. The procedure at each rotary drillhole was to attempt coring with air/mist flush at the termination point of the preceding dynamic sample. Where dynamic sampling was proven to have ended shy of competent rockhead, symmetrex drilling system was subsequently used to further the respective holes to the point where cores could be extracted. Rotary barrels tipped with diamond-impregnated bits were used to retrieve 78mm core samples through initial fractured and weathered rockhead, pushing on through to more competent cores in the underlying bedrock.

The cores were placed in 3m capacity timber boxes and logged by an IGSL engineering geologist. This included photography of the cores with a digital camera. Where rock core was recovered, a graphic fracture log is also presented alongside the mechanical indices. This illustrates the fracture state of the rock cores and allows easy identification of highly fractured / non-intact zones and discontinuity spacings. It should be noted that no correction for dip of the joints has been made and that the spacings shown are successive joint / core intersections within the core.

Where individual dynamic sample holes did not terminate in rockhead, Standard Penetration Tests (SPT's) were performed during drilling operations in the intervening soil / weathered rock horizon. In accordance with Eurocode 7, the SPT hammer has been calibrated and the energy ratio (Er) value is incorporated on the engineering logs. It is highlighted that the SPT N-Values reported on the engineering logs are uncorrected for energy ratio.

The combined dynamic sample and core log records are presented in Appendix 10B.1. They include engineering geological descriptions, details of the bedding / discontinuities and mechanical indices (Total Core Recovery [TCR], Solid Core Recovery [SCR] and Rock Quality Designation [RQD]) for each core run. Core photographs are presented in Appendix 10I.3 and these illustrate the structure and fracture state of the bedrock.

10.3.5 Trial Pitting

Trial pitting was undertaken at thirty-six locations in all. The locations were set out as per the coordinates provided with minor micro-siting where necessary, ie., where services / overhead wires were in proximity. Pits were excavated using a Hitachi 8tonne tracked excavator. Pits commenced

only after scanning (CAT & Genny) to verify the presence or absence of service ducts. In addition, all available service drawings were consulted ahead of breaking ground. An on-site archaeologist (Edmund O'Donovan & Associates assuming the role of ACoW) provided full-time observation for all trial pit excavations. The trial pits were excavated, logged and sampled under the direction of an IGSL geotechnical engineer in accordance with BS 5930 (1999+A2:2010). In-situ hand shear vane testing was completed within non-gravelly cohesive strata where encountered. Bulk disturbed samples (typically 20 to 30kg) were taken as the pits progressed. Small disturbed samples were also acquired in 1kg plastic tubs (denoted 'D' on the pit logs). Environmental samples (Env) were acquired where potential contamination was suspected.

The bulk soil samples were placed in heavy-duty polyethylene bags and sealed before being transported to Naas for laboratory testing. The trial pits were backfilled with the as-dug arisings and reinstated to the satisfaction of IGSL's site geotechnical engineer. The trial pit logs are presented in Appendix 10C and include descriptions of the soils encountered, groundwater conditions, in-situ shear vane records and stability of the pit sidewalls. Pit photos are presented in Appendix 10I.1. Prior to accessing specific GI locations with machinery / plant, pre-condition photos of the site were taken. These are presented in Appendix 10I.2.

10.3.6 Borehole Infiltration Testing

In situ infiltration tests were undertaken in four exploratory holes during their construction (TPR-BH003, 009, 011 & 014) in accordance with BS 5930. The tests were undertaken in the 200mm and 150mm diameter bore and drillholes. The records for the tests are presented in Appendix 10E.1.

10.3.7 Packer Testing

Packer permeability testing in rock was undertaken at four locations. Two of the packers failed due to a water breach with subsequent water recirculation to the surface. The test results were carried out and reported in accordance with BS EN ISO 22282-3. Single packer tests were carried out successfully in holes TPR-BH006 and TPR-BH010. The test depths were specified by the Employers Representative. Test sections measured from 3.10m to 4.40m bgl in both cases.

IGSL provided a packer testing technician to oversee the testing. The Contractor's packer testing technician was responsible for recording test results and reporting them. The test records are presented in Appendix 10E.2 with Lugeon values analysed as per by the Houlsby Method (1976).

10.3.8 Plate Bearing Testing

Eleven plate bearing tests were conducted in ten pits each at depths of 0.50m below ground level [bgl], the exception being plate test PBT 12 which was conducted at 0.40m bgl. Following completion of PBT 12, the pit was deepened to 0.50m and a second plate test was conducted (PBT 12A). Plate testing was undertaken to evaluate the modulus of sub-grade reaction (Ks) and equivalent CBR value. A 450mm diameter plate was used for the tests with kentledge provided by a 8t tracked excavator. Two load cycle tests, in accordance with BS 1377, were performed and the load / settlement plots, Ks and equivalent CBR values are presented in Appendix 10E.3 of the report.

10.3.9 Dynamic Cone Penetrometer Testing

In-situ dynamic cone penetrometer tests were carried out at four locations in accordance with TRL recommended procedure* to estimate CBR values* of the indigenous subsurface deposits. Testing was carried out from ground level. The test results with CBR values are presented in Appendix 10E.4 of this report.

**CBR values are estimated using the correlation derived by Kleyn and Van Heerden (1983), which is preferred by TRL.*

10.3.10 High Pressure Dilatometer Testing

Four pressuremeter tests were conducted by In Situ Site Investigation (UK) in general accordance with BS EN ISO 22476-5 (2012) and BS 5930 (2020) using a High Pressure Dilatometer, HPD95 - so-called because it consists of a 95mm diameter cylindrical probe. In each case, the probe was inserted into a pre-cored 99mm diameter test pocket drilled by IGSL using a T6-H core barrel. The HPD is therefore termed a pre-bored type instrument.

The testing was performed at multiple discrete horizons in both TPR-BH005 and TPR-BH007. In the case of TPR-BH005, the HPD membrane ruptured most likely due to the fractured rock present in the test section. The holes required the use of the down-the-hole Robit hammer to widen the diameter of the upper bedrock section. The In Situ Site Investigation report is presented in Appendix 10F.1.

10.3.11 Groundwater Monitoring / Data Loggers

Groundwater monitoring was undertaken both during and following the fieldworks period. Groundwater levels were measured using an electric dipmeter with measurements taken from the wells installed in the coreholes on the project (Table 1). The levels recorded are shown in Appendix 10J.1.

Table 1 – Well installations at TPR Site noting standpipe (SP) diameter and gravel response zones

		Response Zone	
Location (Installation Date)	**SP diameter**	**From (m)**	**To (m)**
TPR-BH-002* (05-11-21)	50mm	2.00	8.75
TPR-BH-006* (09-11-21)	50mm	2.00	7.95
TPR-BH-008 (20-10-21) (BL)	50mm	2.00	6.50
TPR-BH-009 (21-10-21)	50mm	2.00	7.90
TPR-BH-012 (01-11-21)	50mm	2.00	8.00
TPR-BH-013 (02-11-21)	50mm	2.00	8.00
TPR-BH-014* (17-11-21)	50mm	2.50	8.40

**Geobore S Holes*
BL = Barologger

Seven data loggers were installed in designated wells across the project. One barologger was also positioned on site (TPR-BH-008) to record fluctuations in barometric pressure over the long term. The groundwater data loggers were installed in two batches, the first on 29-10-21 with the second on 06-12-21. A once per quarter visit is required by IGSL to download the logger information. The information to hand at the time of this report issue, in the form of summary graphs, is included in Appendix 10J.2 (downloaded data up to 08-08-22). Note that the long-term downloaded raw data (in excel format) is provided as a separate file and does not feature in this report. Dips taken on the day of download are also noted in Appendix 10J.2.

10.3.12 Surveying of Exploratory Hole Locations

Following completion of the exploratory works, surveying was carried out using GPS techniques. Co-ordinates (x, y) were measured to Irish Transverse Mercator and ground levels (z) established to Malin Head. The co-ordinates and ground levels are shown on the exploratory hole logs. An exploratory hole plan is included in Appendix 10K.

10.4 LABORATORY TESTING

Geotechnical laboratory testing was performed at IGSL's INAB-accredited* laboratory (Naas, County Kildare) in accordance with the methods set out in BS1377; British Standard Methods of Test for Soils for Civil Engineering Purposes; British Standards Institute:1990. Soils testing included moisture content, Atterberg Limits (Liquid / Plastic Limits), Particle Size Distribution (*Hydrometer not INAB-accredited), compaction testing and Moisture Condition Value testing. The results from geotechnical testing on selected trial pit, borehole and Geobore S soil samples are presented in Appendix 10H.1.

Soil samples were selected from trial pits and subject to the Mott MacDonald Soil, Leachate and Full WAC Suites of testing as listed in Section 2.13.2 'Geoenvironmental laboratory testing for contamination' contained in the Specification document entitled 'A Multi-Supplier Framework for the Provision of Site Investigation Works to Ervia (Ref:18/085)". The results can be used to classify the material with regard to its potential for disposal to landfill. The results along with pH and water soluble sulphate testing are presented in Appendix 10H.2.

Rock core strength testing comprised Point Load Strength Index [PLSI] testing along with Uniaxial Compressive Strength [UCS] testing. Indirect tensile strength by the Brazil Test in accordance with ISRM suggested methods was scheduled on a select number of rock cores. The strength testing is presented in Appendix 10H.3. As part of a reusability testing scope, rock core samples were subject to water absorption, Los Angeles abrasion, slake durability and flakiness testing to assess their reusability characteristics. These reports feature in Appendix 10H.4. Core specimens were also analysed for total sulphur, acid soluble and water-soluble sulphate contents, parameters listed in BRE SD1 Suite D. These chemical test results are presented in Appendix 10H.5.

A geological classification of two separate Geobore-S core intervals was undertaken. The samples were extracted from the overburden / rockhead transition zone. The assessment, reported in Appendix 10H.7, was performed in accordance with IS EN 14689-1:2004, IS EN 932-3:1997 and IS 398;2013 Part 1, Testing & Categorization Protocol.

A single groundwater sample was retrieved at the nominated water well installation TPR-DS004. Prior to sampling, the installation was developed in accordance with ISO 14868 (2003) and then purged of three times its well volume (in accordance with BS 6068). The water sample was sent for analysis as per the groundwater suite listed in Table 2.13.2c 'Mott MacDonald Groundwater Suite & Maximum Allowable LODs' contained in the Specification document entitled 'A Multi-Supplier Framework for the Provision of Site Investigation Works to Ervia (Ref:18/085)". The chemical results are presented in Appendix 10H.6.

Tables 2, 3 and 4 list the types of laboratory testing performed together with quantities. In all cases, the test schedules were prepared by the Client's Engineer (Mott MacDonald Ireland).

Table 2 – Geotechnical testing performed on disturbed and undisturbed soils

Test Type	Number of Tests	Reported in Appendix
Moisture Content	72	Appendix 10H.1
Atterberg Limits	63	
Particle Size Distribution	122	
Hydrometer	110	
Moisture Condition Value [MCV]	5	
5-Point MCV	1	
CBR	5	
Consolidation	1	
Dry Density / Moisture Condition Value	8	

Table 3 – Geotechnical testing performed on rock cores

Test Type	Number of Tests	Reported in Appendix
Uniaxial Compressive Strength [UCS]	13	Appendix 10H.3
Point Load - Axial	17	
Point Load - Diametral	81	
Indirect Tensile Strength by Brazil Method	4	
Magnesium Sulphate Soundness	2	Appendix 10H.4
Los Angeles Abrasion	2	
Slake Durability	2	
Particle Shape / Flakiness	2	
Particle Density / Water Absorption	2	

Table 4 – Chemical / Environmental testing on soil, rock and groundwater samples

Test Type	Number of Tests	Reported in Appendix
pH	59	Appendix 10H.2
Water Soluble Sulphate	59	
MM Soil Suite – Soil Analysis	8	
MM Soil Suite – Leachate Analysis	3	
MM Groundwater Suite	1	Appendix 10H.6
BRE SD1 Suite D (Brownfield – Pyrite Present)	11	Appendix 10H.5

REFERENCES

1.0 BS 5930:2015 + A1:2020 Code of Practice for Site Investigation, British Standards Institution (BSI).

2.0 BS 1377 (1990) Methods of Testing of Soils for Civil Engineering Purposes, BSI.

3.0 Eurocode 7, Part 2: Ground Investigation & Testing (EN 1997-2:2007)

4.0 Houlsby , A. C. (1976). Routine interpretation of the Lugeon water test. QJEG. Vol 9 1 pp. 303-313.

5.0 Kleyn, E. & Van Heerden, M.J. (1983, July). Using DCP Soundings to Optimize Pavement Rehabilitation. Paper presented at the Annual Transportation Convention, Milner Park Showgrounds, Johannesburg.

6.0 Marchant T.R. and Sevastopulo G. D. (1980). The Calp of the Dublin District. Journal of Earth Sciences, 3(2), pp195-203

7.0 McConnell, B. & Philcox, M.E. (1994). Bedrock Geology 1:100 000 Scale Map Series, Sheet 16, Kildare – Wicklow. Dublin: Geological Survey of Ireland

8.0 Nolan, S. C. (1986). The Carboniferous geology of the Dublin area. Unpublished Ph.D. Thesis, University of Dublin.

9.0 Site Investigation Practice: Assessing BS 5930 (1986), Geological Society Special Publication, No. 2.

Appendix 10A

Borehole Records

LEGEND

Trial Pits / Cable Percussion Boreholes

D	Small Disturbed Sample (Tub)
B	Large Disturbed Sample
U	Undisturbed U100 Sample
AA 11235	Sample Reference No
W	Groundwater Sample
Env	Environmental Tub, Jar & Vial
C	SPT N-Value (Solid Cone)
S	SPT N-Value (Split Spoon / Open Shoe)

Rotary Core Drillholes

TCR	Total Core Recovery (%)
SCR	Solid Core Recovery (%)
RQD	Rock Quality Designation Value (%)
NI	Non-Intact (where rock core is highly fractured)

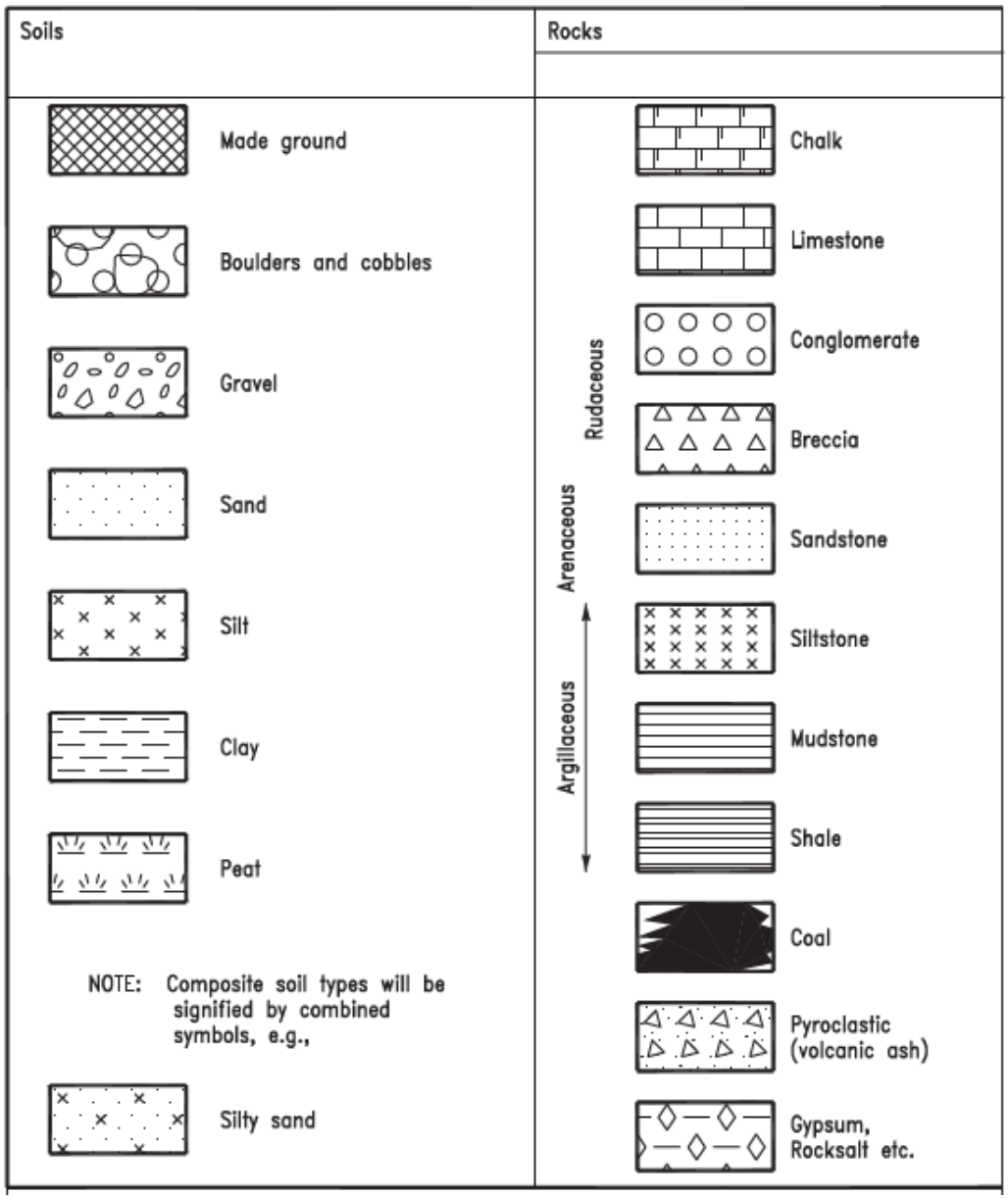
Water Strike Legend



Water Strike

Strata Legends / Symbolic Logs (BS 5930:2015+A1:2020)

Strata legends / symbolic logs reflect main stratum in accordance with BS 5930:2015+A1:2020. Legend codes are selected from GINT software to reflect stratum. Note, due to limited codes, legends may not represent exact constituent proportions (e.g. slightly or very sandy, slightly or very gravelly etc)



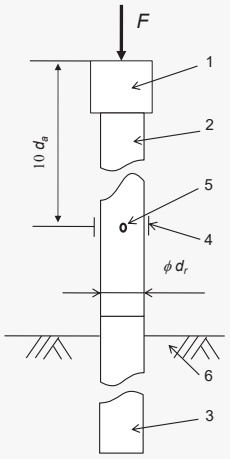
SPT Calibration Report

Hammer Energy Measurement Report

Type of Hammer		SPT HAMMER
Test No		2022_118
Client		IGSL
Test Depth (m)		9.85
Mass of hammer	m =	63.5kg
Falling height	h =	0.76m
E_{theor} =	$m \times g \times h$ =	473J

Characteristics of the instrumented rod

Diameter	d_r =	0.052 m
Length of instrumented rod		0.558 m
Area	A =	11.61 cm²
Modulus	E_a =	206843 MPa



Key

1 Anvil
2 Part of instrumented rod
3 Drive Rod
4 Strain Gauge
5 Accelerometer
6 Ground

F Force
d_r Diameter of rod

Fig. B.1 and B.2
BS EN ISO 22476-3 : 2005 + A1 : 2011

DATE OF TEST	VALID UNTIL	HAMMER ID
21/02/2022	21/02/2023	SA2

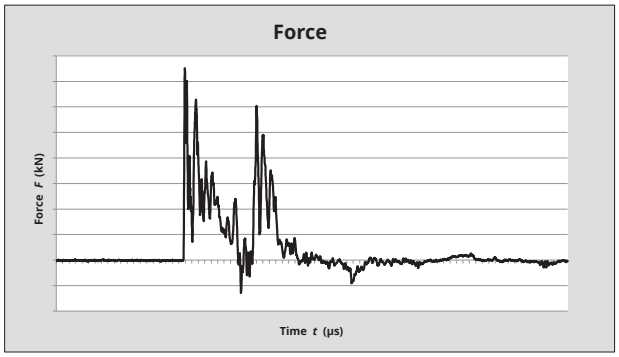
E_{meas} = **0.338** kN-m

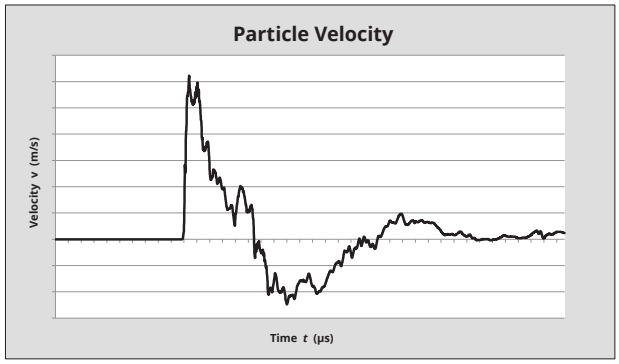
E_{theor} = **0.473** kN-m

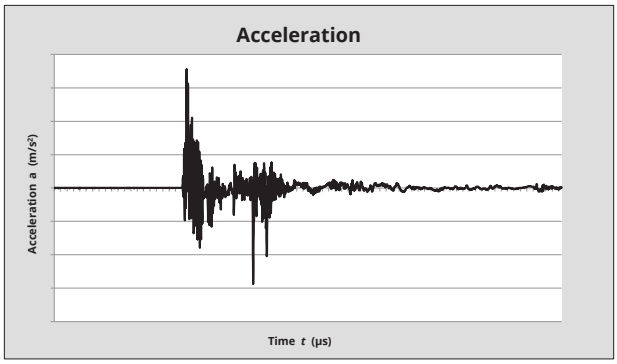
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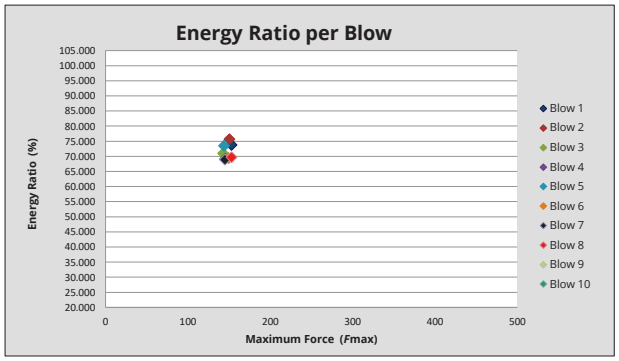
Energy Ratio (Er) = $\frac{E_{meas}}{E_{theor}}$ **71.43%**

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JL			01/03/2022

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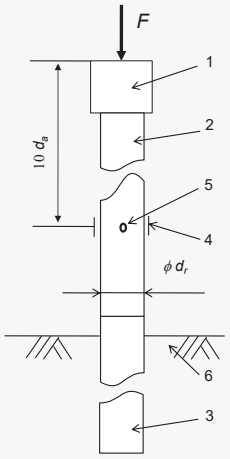
SPT Calibration Report

Hammer Energy Measurement Report

Type of Hammer		SPT HAMMER
Test No		2022_122
Client		IGSL
Test Depth (m)		9.85
Mass of hammer	m =	63.5kg
Falling height	h =	0.76m
E_{theor} =	$m \times g \times h$ =	473J

Characteristics of the instrumented rod

Diameter	d_r =	0.052 m
Length of instrumented rod		0.558 m
Area	A =	11.61 cm²
Modulus	E_a =	206843 MPa



Key

1 Anvil
2 Part of instrumented rod
3 Drive Rod
4 Strain Gauge
5 Accelerometer
6 Ground

F Force
d_r Diameter of rod

Fig. B.1 and B.2
BS EN ISO 22476-3 : 2005 + A1 : 2011

DATE OF TEST	VALID UNTIL	HAMMER ID
21/02/2022	21/02/2023	RC1

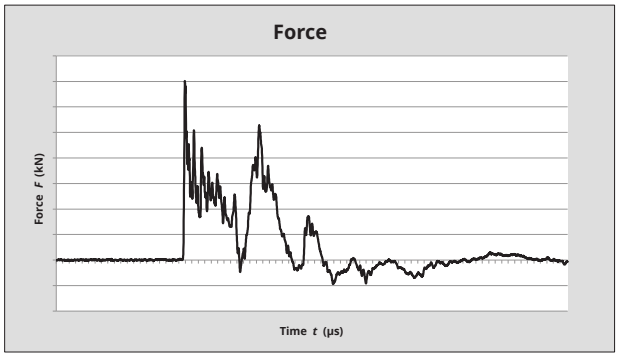
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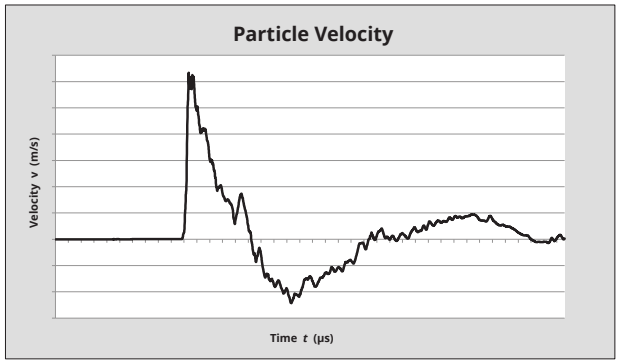
E_{theor} = **0.473** kN-m

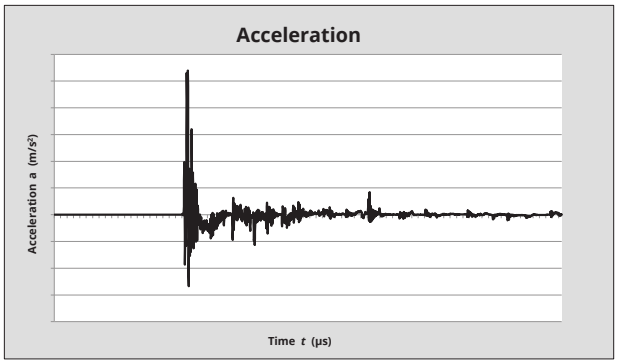
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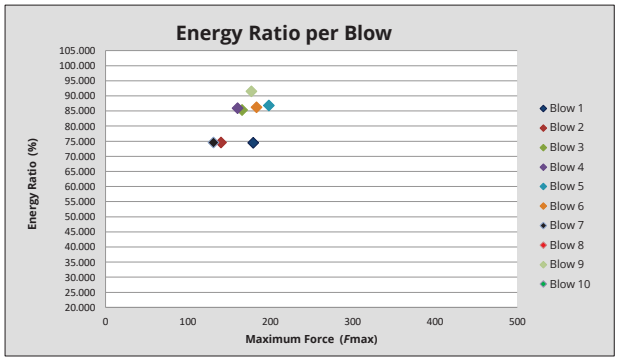
Energy Ratio (Er) = $\frac{E_{meas}}{E_{theor}}$ **73.31%**

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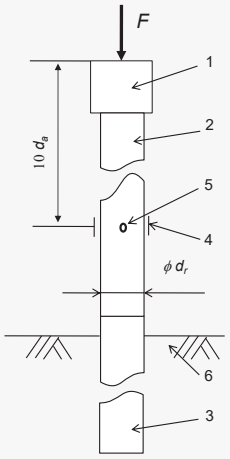
SPT Calibration Report

Hammer Energy Measurement Report

Type of Hammer		Auto Hammer
Test No		2022_130
Client		IGSL
Test Depth (m)		9.85
Mass of hammer	m =	63.5kg
Falling height	h =	0.76m
E_{theor} =	$m \times g \times h$ =	473J

Characteristics of the instrumented rod

Diameter	d_r =	0.052 m
Length of instrumented rod		0.558 m
Area	A =	11.61 cm²
Modulus	E_a =	206843 MPa



Key

1 Anvil
2 Part of instrumented rod
3 Drive Rod
4 Strain Gauge
5 Accelerometer
6 Ground

F Force
d_r Diameter of rod

Fig. B.1 and B.2
BS EN ISO 22476-3 : 2005 + A1 : 2011

DATE OF TEST	VALID UNTIL	HAMMER ID
21/02/2022	21/02/2023	T44

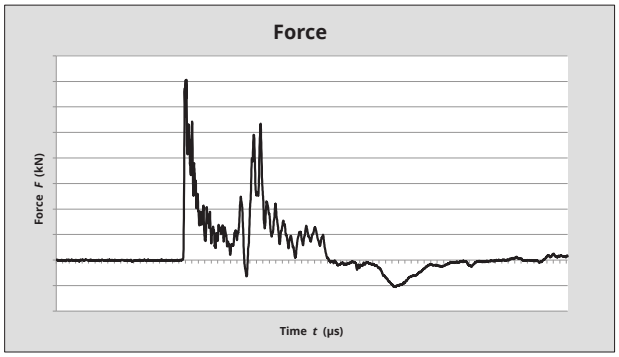
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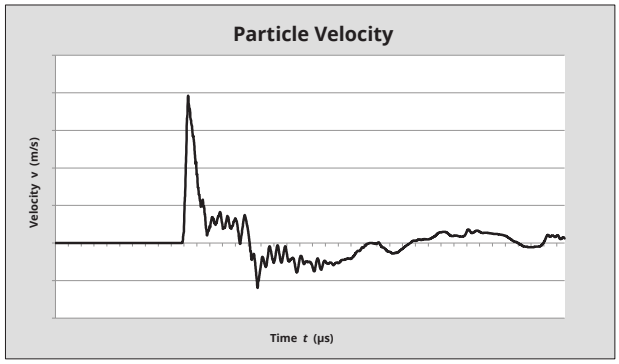
E_{theor} = **0.473** kN-m

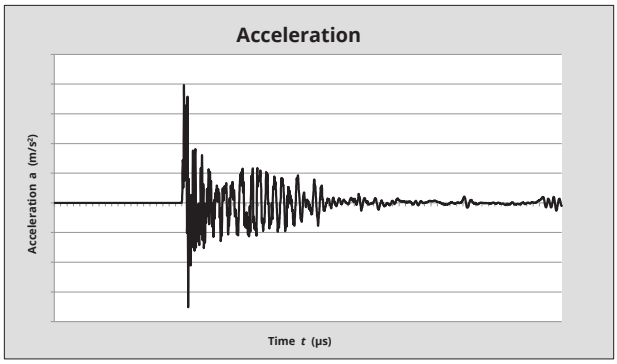
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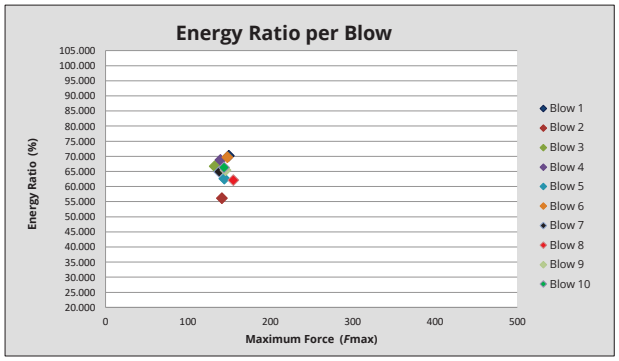
Energy Ratio (Er) = $\frac{E_{meas}}{E_{theor}}$ **65.32%**

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Appendix 10A.1

Combined Cable Percussion Borehole / Rotary Corehole Records

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3
HOLE NO.	**TPR-BH-001**
SHEET	Sheet 1 of 2
CO-ORDINATES(_)	701,032 E 731,167 N
GROUND LEVEL (mOD)	78.36
RIG TYPE	Dando 2000/Knebel
RC FLUSH MEDIUM	Air/Mist
CASING DIAMETER (mm)	200
CORE DIAMETER (mm)	78
BOREHOLE DEPTH (m)	8.15
DATE COMMENCED	19/10/2021
DATE COMPLETED	19/10/2021
CLIENT	Irish Water / Ervia
ENGINEER	Mott MacDonald Ireland
BORED BY	IGSL
PROCESSED BY	D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
0												78.26		0.10	Topsoil	
															Firm brown gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of limestone.	
														0.60		
												77.76		0.80	Very stiff black gravelly CLAY. Gravel is fine to coarse, angular of limestone. (Possible Weathered Rock)	
							155831	B	0.80	50/110mm		77.56		1.00		
1	1.00						RC00027	RC	1.00			77.36			Brown clayey/silty slightly sandy GRAVEL. Sand is fine to medium. Gravel is angular fine to coarse of limestone. (Possible Weathered Rock) *1.0m Cable percussion end depth (77.36m OD)*	
		100	40	0												
	1.60														Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (2.37-2.53m, 4.37-4.50m, 4.68-4.72m & 6.02-6.06m).	
2							RC00028	RC	2.00							
		100	23	9												
	2.75															
3		100	33	0			RC00029	RC	3.00							
	3.30															
		100	56	48												
	3.55														Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, locally clay/gravel-filled (at 2.53-2.75m), locally slightly iron-oxide stained, locally calcite-veined (1-9mm thick). Dips are 10-20° & very locally 70-75°.	
4		100	96	46			RC00030	RC	4.00							
	4.50						RC00108	RC	4.50							

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments
0.8	1	0.5	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS CP date: 15/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-3.00m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 71.43%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-BH-001
SHEET Sheet 2 of 2

CO-ORDINATES(_) 701,032 E
731,167 N
GROUND LEVEL (mOD) 78.36

RIG TYPE Dando 2000/Knebel
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm) 200
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 8.15

DATE COMMENCED 19/10/2021
DATE COMPLETED 19/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
5																
		100	84	60											Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (2.37-2.53m, 4.37-4.50m, 4.68-4.72m & 6.02-6.06m).	
6	6.10															
		100	97	94											Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, locally clay/gravel-filled (at 2.53-2.75m), locally slightly iron-oxide stained, locally calcite-veined (1-9mm thick). Dips are 10-20° & very locally 70-75°. *(continued)*	
	6.80															
7		100	67	52												
	7.20															
		100	69	64												
8														8.15		
	8.15											70.21			End of Borehole at 8.15 (m)	
9																

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS CP date: 15/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-3.00m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 71.43%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-BH-003
SHEET Sheet 1 of 3

CO-ORDINATES(_) 701,077 E
731,142 N
GROUND LEVEL (mOD) 78.78

RIG TYPE Dando 2000/Knebel
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm) 200
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 10.50

DATE COMMENCED 18/10/2021
DATE COMPLETED 18/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
0												78.68		0.10	Topsoil	
															Brown gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of limestone.	
												78.38		0.40		
												78.18		0.60	Dark brown gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of limestone.	
	0.70															
1		100	35	0			155832	B	1.00	50/15mm				1.00	Very dense grey/black clayey/silty sandy angular GRAVEL. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone.	
												77.78			*1.0m Cable percussion end depth (77.78m OD)*	
	1.50						RC00034	RC	1.50							
		100	35	0												
	1.90															
2															Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (1.92-2.09m, 2.84-2.88m, 3.42-3.44m, & 5.83-5.86m).	
		100	67	62												
3							RC00110	RC	3.00							
	3.30															
					670										Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, locally clay/gravel-filled (at 1.01-1.14m, 1.42-1.70m & 2.65-2.74m), locally slightly iron-oxide stained, locally calcite-veined (1-2mm thick). Dips are 10-20° & very locally 70-75°.	
4		100	86	78												
	4.80															

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments
0.7	1	1	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS CP date: 16/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-1.50m. Erect Covid-19 Safe Zone - 1hr. Infiltration test undertaken in CP borehole. SPT Er = 71.43%

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-BH-003
SHEET Sheet 2 of 3

CO-ORDINATES(_) 701,077 E
731,142 N
GROUND LEVEL (mOD) 78.78

RIG TYPE Dando 2000/Knebel
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm) 200
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 10.50

DATE COMMENCED 18/10/2021
DATE COMPLETED 18/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
5															Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (1.92-2.09m, 2.84-2.88m, 3.42-3.44m, & 5.83-5.86m). *(continued)*	
		100	88	79	550		RC00035	RC	5.50				1			
6	6.15															
		100	98	71	670		RC00036	RC	7.50						Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, locally clay/gravel-filled (at 1.01-1.14m, 1.42-1.70m & 2.65-2.74m), locally slightly iron-oxide stained, locally calcite-veined (1-2mm thick). Dips are 10-20° & very locally 70-75°.	
7	7.75															
		100	97	77												
8	8.45															
		100	100	100												
9	8.95				630											
		100	99	92												

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
5.70	1.50				Slow

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS CP date: 16/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-1.50m. Erect Covid-19 Safe Zone - 1hr. Infiltration test undertaken in CP borehole. SPT Er = 71.43%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-BH-003
SHEET Sheet 3 of 3

CO-ORDINATES(_) 701,077 E
731,142 N
GROUND LEVEL (mOD) 78.78

RIG TYPE Dando 2000/Knebel
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm) 200
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 10.50

DATE COMMENCED 18/10/2021
DATE COMPLETED 18/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
10														10.50		
	10.50											68.28			End of Borehole at 10.5 (m)	
11																
12																
13																
14																

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
18-10-21	10.50	1.50	4.80	Water level recorded 5 mins after end of drilling.

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS CP date: 16/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-1.50m. Erect Covid-19 Safe Zone - 1hr. Infiltration test undertaken in CP borehole. SPT Er = 71.43%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3
HOLE NO.	**TPR-BH-004**
SHEET	Sheet 1 of 2
CO-ORDINATES(_)	701,115 E 731,127 N
GROUND LEVEL (mOD)	79.05
RIG TYPE	Dando 2000/Knebel
RC FLUSH MEDIUM	Air/Mist
CASING DIAMETER (mm)	200
CORE DIAMETER (mm)	78
BOREHOLE DEPTH (m)	8.00
DATE COMMENCED	15/10/2021
DATE COMPLETED	15/10/2021
CLIENT	Irish Water / Ervia
ENGINEER	Mott MacDonald Ireland
BORED BY	IGSL
PROCESSED BY	D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
0												78.95		0.10	Topsoil	
														0.40	Brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of limestone.	
							155846 155847	B D	0.50			78.65			Dark brown and brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of limestone.	
1							155848 155849	B D	1.00			78.05		1.00	Very dense grey/black clayey Angular GRAVEL. Gravel is angular to subangular fine to coarse of muddy limestone.	
	1.30	100	0	0						50/30mm				1.40	*1.40m Cable percussion end depth (77.65m OD)*	
	1.60	100	13	0								77.65		1.70	Probable weathered ROCK - recovered as clayey angular gravel with occasional cobbles. Gravel is fine to coarse angular to subangular of limestone. Cobbles are subangular of limestone.	
	1.90						RC00037	RC	1.90			77.35				
2		100	56	44			RC00111	RC	2.00						Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (1.48-1.57m, 3.01-3.05m, 3.92-3.97m, 4.25-4.36m, 4.52-4.56m, 7.78-7.91m & 7.94-8.00m).	
	2.65															
3		100	78	52												
	3.65															
4		100	85	63			RC00038	RC	4.00						Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, locally clay/gravel-filled (at 1.85-2.17m), locally slightly iron-oxide stained, locally calcite-veined (1-8mm thick). Dips are 10-20° & very locally 70-75°.	
	4.30															
		100	73	58												
	4.85															

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments
1.2	1.4	1	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS CP date: 21/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-1.30m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 71.43%

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-BH-004
SHEET Sheet 2 of 2

CO-ORDINATES(_) 701,115 E, 731,127 N
GROUND LEVEL (mOD) 79.05

RIG TYPE Dando 2000/Knebel
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm) 200
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 8.00

DATE COMMENCED 15/10/2021
DATE COMPLETED 15/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
5															Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (1.48-1.57m, 3.01-3.05m, 3.92-3.97m, 4.25-4.36m, 4.52-4.56m, 7.78-7.91m & 7.94-8.00m). Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, locally clay/gravel-filled (at 1.85-2.17m), locally slightly iron-oxide stained, locally calcite-veined (1-8mm thick). Dips are 10-20° & very locally 70-75°. *(continued)*	
6		100	73	49			RC00039	RC	6.00							
	6.25	100	77	46												
	6.60															
7		100	84	23												
8	8.00											71.05		8.00	End of Borehole at 8 (m)	
9																

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
15-10-21	8.00	1.30	3.10	Water level recorded 5 mins after end of drilling.

REMARKS CP date: 21/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-1.30m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 71.43%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-BH-005
SHEET Sheet 1 of 1

CO-ORDINATES(_) 701,143 E
731,116 N
GROUND LEVEL (mOD) 79.68

RIG TYPE Dando 2000/Knebel
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm) 200
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 4.95

DATE COMMENCED 27/10/2021
DATE COMPLETED 27/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
0												79.58		0.10	Topsoil	
															Firm to stiff brown gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of limestone.	
														0.90		
1							155833	B	1.00	50/300mm		78.78			Very stiff dark brown slightly gravelly slightly sandy CLAY. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of limestone.	
	1.50	100	23	0			155834	B	1.70	50/20mm		78.08		1.60		
	1.85											77.88		1.80	Very dense grey/black clayey/silty sandy angular GRAVEL. Sand is fine to medium. Gravel is angular fine to coarse of muddy limestone. *1.80m Cable percussion end depth*	
2		100	41	15											Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered. Driller notes - attempted HPD test, test failed so rig moved and hole re-drilled as TPR-BH/RC005A	
	2.60	100	23	0			RC00040	RC	3.00							
3	3.20	100	93	80			RC00112	RC	3.80						Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, commonly clay/gravel-filled (at 2.50-2.60m & 3.01-3.20m), locally slightly iron-oxide stained, locally calcite-veined (1-15mm thick). Dips are 10-20° & locally 70-75°.	
4	4.10	100	71	51			RC00041	RC	4.50							
	4.55	100	67	0												
	4.70	100	100	100								74.73		4.95	End of Borehole at 4.95 (m)	

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments
1.8		1	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
27-10-21	4.95	3.20	2.60	Water level recorded 5 mins after end of drilling.

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS CP date: 16/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-3.20m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 71.43%

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-BH-005A
SHEET Sheet 1 of 2

CO-ORDINATES(_) 701,143 E
731,116 N
GROUND LEVEL (mOD) 79.69

RIG TYPE Knebel
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm) 150
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 8.00

DATE COMMENCED 27/10/2021
DATE COMPLETED 27/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
0															SYMMETRIX DRILLING: No recovery to 3.0m (See Log TPR-BH-005)	
3	3.00											76.69		3.00		
		100	75	57			RC00042	RC	3.50						Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered. Driller notes - attempted HPD tests, tests completed	
4	4.10															
		100	80	57												
	4.75															

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Hand dug inspection pit to 1.20m. Hole cased 0.00-3.00m. SPT Er = 73.31%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-BH-005A
SHEET Sheet 2 of 2

CO-ORDINATES(_) 701,143 E
731,116 N
GROUND LEVEL (mOD) 79.69

RIG TYPE Knebel
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm) 150
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 8.00

DATE COMMENCED 27/10/2021
DATE COMPLETED 27/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
5		100	53	49			RC00043	RC	5.00						Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered. Driller notes - attempted HPD tests, tests completed Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, commonly clay/gravel-filled (at 5.37-5.50m), locally slightly iron-oxide stained, locally calcite-veined (1-35mm thick). Dips are 10-20° & locally 70-75°. *(continued)*	
	5.45	100	60	27												
	5.90															
6		100	95	95	910		RC00044	RC	6.00							
	6.75															
7		100	89	73												
														8.00		
8	8.00											71.69			End of Borehole at 8 (m)	
9																

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
27-10-21	8.00	3.00	2.60	Water level recorded 5 mins after end of drilling.

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Hand dug inspection pit to 1.20m. Hole cased 0.00-3.00m. SPT Er = 73.31%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3
HOLE NO.	**TPR-BH-007**
SHEET	Sheet 1 of 2
CO-ORDINATES(_)	701,001 E 731,070 N
GROUND LEVEL (mOD)	78.73
RIG TYPE	Dando 2000/Knebel
RC FLUSH MEDIUM	Air/Mist
CASING DIAMETER (mm)	200
CORE DIAMETER (mm)	78
BOREHOLE DEPTH (m)	7.95
DATE COMMENCED	28/10/2021
DATE COMPLETED	29/10/2021
CLIENT	Irish Water / Ervia
ENGINEER	Mott MacDonald Ireland
BORED BY	IGSL
PROCESSED BY	D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
0												78.63		0.10	Topsoil	
														0.30	Brown gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of limestone.	
							155835	B	0.50			78.43		0.50		
												78.23		0.70	Dark brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of limestone.	
1												78.03			Very dense grey/black clayey Angular GRAVEL. Gravel is angular fine to coarse of muddy limestone.	
	1.20													1.20	*0.70m Cable percussion end depth*	
		100	69	16			RC00048	RC	1.50			77.53			SYMMETRIX DRILLING: No recovery, observed by driller as returns of ROCK	
2	1.95	100	63	40											Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (1.67-1.75m, 2.47-2.64m & 4.03-4.08m). Driller notes - attempted HPD tests, tests completed Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, commonly clay-smeared, locally slightly iron-oxide stained, locally calcite-veined (1-10mm thick). Dips are 10-20° & locally 70-75°.	
	2.60						RC00049	RC	3.00							
3		100	70	35			RC00114	RC	3.40							
4	4.10						RC00050	RC	4.00							
		100	97	87												
	4.50															

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments
0.6	0.7	1	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS CP date: 17/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-4.10m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 71.43%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-BH-007
SHEET Sheet 2 of 2

CO-ORDINATES(_) 701,001 E, 731,070 N
GROUND LEVEL (mOD) 78.73

RIG TYPE Dando 2000/Knebel
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm) 200
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 7.95

DATE COMMENCED 28/10/2021
DATE COMPLETED 29/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
5		100	95	71											Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (1.67-1.75m, 2.47-2.64m & 4.03-4.08m). Driller notes - attempted HPD tests, tests completed Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, commonly clay-smeared, locally slightly iron-oxide stained, locally calcite-veined (1-10mm thick). Dips are 10-20° & locally 70-75°. *(continued)*	
	5.60															
6		100	89	71			RC00051	RC	6.00							
	6.25															
7		100	93	71												
	7.55															
		100	72	50										7.95		
8	7.95											70.78			End of Borehole at 7.95 (m)	
9																

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
29-10-21	7.95	4.10	3.75	Water level recorded 5 mins after end of drilling.

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS CP date: 17/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-4.10m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 71.43%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3
HOLE NO.	**TPR-BH-008**
SHEET	Sheet 1 of 2
CO-ORDINATES(_)	700,952 E 731,025 N
GROUND LEVEL (mOD)	78.56
RIG TYPE	Dando 2000/Knebel
RC FLUSH MEDIUM	Air/Mist
CASING DIAMETER (mm)	200
CORE DIAMETER (mm)	78
BOREHOLE DEPTH (m)	7.95
DATE COMMENCED	20/10/2021
DATE COMPLETED	20/10/2021
CLIENT	Irish Water / Ervia
ENGINEER	Mott MacDonald Ireland
BORED BY	IGSL
PROCESSED BY	D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
0												78.46		0.10	Topsoil	
												78.26		0.30	Brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of limestone.	
	0.50													0.60	Brown gravelly sandy CLAY with angular cobbles and boulders. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles and boulders are angular to subangular of limestone (up to 250mm). *0.60m Cable percussion end depth (77.96m OD)*	
		100	38	0			155836	B	0.60	50/30mm		77.96				
1	0.90														Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (0.73-0.98m, 1.07-1.32m, 2.23-2.66m, 3.56-3.64m, 5.96-6.00m & 7.72-7.86m).	
		100	24	0												
	1.40															
		100	42	0												
2	1.90															
		100	51	43												
3							RC00052	RC	3.00							
	3.40														Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, locally clay/gravel-filled (at 2.99-3.03m, 3.21-3.30m & 3.76-3.91m), locally slightly iron-oxide stained, locally calcite-veined (1-10mm thick). Dips are 10-20° & very locally 70-75°.	
		100	69	42												
4							RC00053	RC	4.00							
	4.40															
		100	100	100			RC00115	RC	4.80				1			

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments
0.5	0.6	1	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
5.00	1.40				Slow

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
20/10/2021	6.00	2.00	6.50	50mm SP

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS CP date: 17/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-1.40m. Erect Covid-19 Safe Zone - 1hr. Bentonite seal used to cap well annulus. SPT Er = 71.43%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-BH-008
SHEET Sheet 2 of 2

CO-ORDINATES(_) 700,952 E
731,025 N
GROUND LEVEL (mOD) 78.56

RIG TYPE Dando 2000/Knebel
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm) 200
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 7.95

DATE COMMENCED 20/10/2021
DATE COMPLETED 20/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
5	5.25														Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (0.73-0.98m, 1.07-1.32m, 2.23-2.66m, 3.56-3.64m, 5.96-6.00m & 7.72-7.86m).	
6		100	69	63			RC00054	RC	6.00							
	6.50														Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, locally clay/gravel-filled (at 2.99-3.03m, 3.21-3.30m & 3.76-3.91m), locally slightly iron-oxide stained, locally calcite-veined (1-10mm thick). Dips are 10-20° & very locally 70-75°. *(continued)*	
7		100	91	83												
	7.95													7.95		
8												70.61			End of Borehole at 7.95 (m)	
9																

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
20/10/2021	6.00	2.00	6.50	50mm SP

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
20-10-21	7.95	1.40	3.65	Water level recorded 5 mins after end of drilling.

REMARKS CP date: 17/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-1.40m. Erect Covid-19 Safe Zone - 1hr. Bentonite seal used to cap well annulus. SPT Er = 71.43%

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3
HOLE NO.	**TPR-BH-009**
SHEET	Sheet 1 of 2
CO-ORDINATES(_)	701,098 E 730,999 N
GROUND LEVEL (mOD)	80.99
RIG TYPE	Dando 2000/Knebel
RC FLUSH MEDIUM	Air/Mist
CASING DIAMETER (mm)	200
CORE DIAMETER (mm)	78
BOREHOLE DEPTH (m)	7.90
DATE COMMENCED	21/10/2021
DATE COMPLETED	21/10/2021
CLIENT	Irish Water / Ervia
ENGINEER	Mott MacDonald Ireland
BORED BY	IGSL
PROCESSED BY	D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
0												80.89		0.10	Topsoil	
												80.69		0.30	Brown gravelly sandy clay. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of limestone. (MADE GROUND)	
							155837	B	0.50			80.49		0.50		
												80.39		0.60	Tarmacadam - MADE GROUND	
1							155838	B	1.00					1.10	Grey sandy clayey/silty angular Gravel with cobbles. Sand is fine to coarse. Gravel is angular fine to coarse of muddy limestone. Cobbles are angular of limestone. (MADE GROUND)	
										50/170mm		79.89				
							155839	B	1.50						Brown gravelly slightly sandy SILT/CLAY. Sand is fine to coarse.	
										50/175mm					Very stiff brown gravelly CLAY to clayey/silty GRAVEL with angular cobbles. Gravel is angular fine to coarse of muddy limestone. Cobbles are angular of limestone. (Possible Weathered Rock)	
2	1.90	100	0	0								79.09		1.90	*1.90m Cable percussion end depth (79.09m OD)*	
	2.25	100	11	0			RC00055	RC	2.50						Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered.	
3	3.10	100	40	20			RC00116	RC	3.50						Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, locally clay-smeared, locally slightly iron-oxide stained, locally calcite-veined (1-3mm thick). Dips are 10-20° & very locally 70-75°.	
	3.70												1			
4		100	86	70			RC00056	RC	4.50							

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments
0.3	0.5	1	
1.6	1.9	1	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
4.00	1.90				Slow

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
21/10/2021	7.50	2.00	7.90	50mm SP

REMARKS CP date: 20/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-1.90m. Erect Covid-19 Safe Zone - 1hr. Infiltration test undertaken in CP borehole. Bentonite seal used to cap well annulus. SPT Er = 71.43%

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-BH-009
SHEET Sheet 2 of 2

CO-ORDINATES(_) 701,098 E, 730,999 N
GROUND LEVEL (mOD) 80.99

RIG TYPE Dando 2000/Knebel
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm) 200
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 7.90

DATE COMMENCED 21/10/2021
DATE COMPLETED 21/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
5	5.00															
		100	88	72			RC00057	RC	5.50						Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered. Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, locally clay-smeared, locally slightly iron-oxide stained, locally calcite-veined (1-3mm thick). Dips are 10-20° & very locally 70-75°. *(continued)*	
6	6.40						RC00058	RC	6.50							
7		100	73	63												
	7.90											73.09		7.90	End of Borehole at 7.9 (m)	
8																
9																

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
21-10-21	7.90	1.90	4.10	Water level recorded 5 mins after end of drilling.

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
21/10/2021	7.50	2.00	7.90	50mm SP

REMARKS CP date: 20/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-1.90m. Erect Covid-19 Safe Zone - 1hr. Infiltration test undertaken in CP borehole. Bentonite seal used to cap well annulus. SPT Er = 71.43%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-BH-012
SHEET Sheet 1 of 2

CO-ORDINATES(_) 701,055 E, 730,905 N
GROUND LEVEL (mOD) 81.70

RIG TYPE Dando 2000/Knebel
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm) 200
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 8.00

DATE COMMENCED 29/10/2021
DATE COMPLETED 01/11/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
0												81.60		0.10	Topsoil	
															Brown gravelly sandy clay with plastic fragments. Sand is fine to coarse. Becoming very gravelly from 0.40mbgl - MADE GROUND	
							155842	B	0.50			81.20		0.50	Grey brown clayey/silty sandy GRAVEL. Sand is fine to coarse. Gravel is angular fine to coarse of limestone. (MADE GROUND)	
1							155843	B	1.00			80.70		1.00		
	1.20						155844	B	1.20	50/15mm		80.50		1.20	Dark grey black very gravelly sandy CLAY to sandy clayey/silty GRAVEL. Sand is fine to coarse. Gravel is angular fine to coarse of limestone. (Possible weathered rockhead) *1.30m Cable percussion end depth (80.40m OD)*	
		100	13	0			155845	D								
							RC00013	RC	1.50							
2	1.80														Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (3.95-3.98m, 4.31-4.35m, 4.76-4.78m, 5.32-5.34m, 5.78-5.79m & 7.86-7.89m). Driller notes - attempted HPD tests, tests completed Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, commonly clay-smeared, locally slightly iron-oxide stained, locally calcite-veined (1-8mm thick). Dips are 20-30° & locally 70-75°.	
		100	27	0												
							RC00062	RC	2.50							
	2.70	100	45	0												
	2.90															
3		100	50	31												
	3.60						RC00118	RC	3.60							
		100	97	97												
4	4.30															
		100	78	70												
	4.90															

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments
1	1.2	1	
1.2	1.3	1	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
01/11/2021	7.50	2.00	8.00	50mm SP

REMARKS CP date: 21/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-2.70m. Erect Covid-19 Safe Zone - 1hr. Bentonite seal used to cap well annulus. SPT Er = 71.43%

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-BH-012
SHEET Sheet 2 of 2

CO-ORDINATES(_) 701,055 E, 730,905 N
GROUND LEVEL (mOD) 81.70

RIG TYPE Dando 2000/Knebel
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm) 200
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 8.00

DATE COMMENCED 29/10/2021
DATE COMPLETED 01/11/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
5																
		100	84	70												
6	6.10						RC00063	RC	6.00							
		100	88	88												
	6.75															
7		100	95	78												
8	8.00											73.70		8.00		
9																

Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (3.95-3.98m, 4.31-4.35m, 4.76-4.78m, 5.32-5.34m, 5.78-5.79m & 7.86-7.89m).
Driller notes - attempted HPD tests, tests completed

Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, commonly clay-smeared, locally slightly iron-oxide stained, locally calcite-veined (1-8mm thick). Dips are 20-30° & locally 70-75°.
(continued)

End of Borehole at 8 (m)

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
01/11/2021	7.50	2.00	8.00	50mm SP

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
01-11-21	8.00	3.40	3.75	Water level recorded 5 mins after end of drilling.

REMARKS CP date: 21/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-2.70m. Erect Covid-19 Safe Zone - 1hr. Bentonite seal used to cap well annulus. SPT Er = 71.43%

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-BH-013
SHEET Sheet 1 of 2

CO-ORDINATES(_) 700,909 E
730,893 N
GROUND LEVEL (mOD) 78.61

RIG TYPE Dando 2000/Knebel
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm) 200
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 8.00

DATE COMMENCED 02/11/2021
DATE COMPLETED 02/11/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
0												78.51		0.10	Topsoil	
														0.30	Firm brown gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of limestone.	
							155840	B	0.50			78.31			Stiff black gravelly sandy CLAY to silty/clayey slightly sandy GRAVEL with angular cobbles and boulders. Sand is fine to medium. Gravel is angular to subangular platy of muddy limestone. Cobbles and boulders are angular tabular of muddy limestone (up to 300mm). (Possible Weathered Rockhead) *1.20m Cable percussion end depth (77.41m OD)*	
							155841	D	0.60	50/35mm						
1	1.20	100	0	0								77.41		1.20		
	1.60						RC00014	RC	1.60						Probable weathered ROCK - recovered as clayey angular Gravel with occasional Cobbles. Gravel is fine to coarse angular to subangular of limestone. Cobbles are subangular of limestone.	
2		28	0	0												
	2.50	100	85	52								76.11		2.50	Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (5.47-5.50m). Driller notes - attempted Packer tests, tests completed	
3							RC00119	RC	3.00							
	3.10	100	53	53												
	3.70															
4		100	45	0												
							RC00064	RC	4.50							
	4.70															

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments
0.8	1.2	1	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
02/11/2021	7.50	2.00	8.00	50mm SP

REMARKS CP date: 20/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-1.2m. Erect Covid-19 Safe Zone - 1hr.

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**HOLE NO.**	**TPR-BH-013**
		SHEET	Sheet 2 of 2
CO-ORDINATES(_)	700,909 E 730,893 N	**RIG TYPE**	Dando 2000/Knebel
GROUND LEVEL (mOD)	78.61	**RC FLUSH MEDIUM**	Air/Mist
		CASING DIAMETER (mm)	200
CLIENT	Irish Water / Ervia	**CORE DIAMETER (mm)**	78
ENGINEER	Mott MacDonald Ireland	**BOREHOLE DEPTH (m)**	8.00
		DATE COMMENCED	02/11/2021
		DATE COMPLETED	02/11/2021
		BORED BY	IGSL
		PROCESSED BY	D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
5							RC00015	RC	5.00						Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (5.47-5.50m). Driller notes - attempted Packer tests, tests completed Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, locally clay/gravel-filled (at 3.07-3.11m, 3.48-3.77m, 3.99-4.21m, 4.60-4.84m, 6.39-6.50m & 7.48-7.70m), locally slightly iron-oxide stained, locally calcite-veined (1-8mm thick). Dips are 10-20° & very locally 70-75°. *(continued)*	
		100	57	55												
6	5.90															
		100	41	24												
7	6.85						RC00016	RC	7.00							
		100	70	28												
8	8.00											70.61		8.00	End of Borehole at 8 (m)	
9																

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
5.60	3.00				Slow

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
02/11/2021	7.50	2.00	8.00	50mm SP

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
02-11-21	8.00	3.00	3.20	Water level recorded 5 mins after end of drilling.

REMARKS CP date: 20/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-1.2m. Erect Covid-19 Safe Zone - 1hr.

Appendix 10A.2

Geobore S Corehole Records

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-BH-002
SHEET Sheet 1 of 2

CO-ORDINATES(_) 701,023 E, 731,143 N
GROUND LEVEL (mOD) 78.49
CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

RIG TYPE Knebel
RC FLUSH MEDIUM P.Gel
CASING DIAMETER (mm)
CORE DIAMETER (mm) 102
BOREHOLE DEPTH (m) 8.75

DATE COMMENCED 03/11/2021
DATE COMPLETED 05/11/2021
BORED BY IGSL
PROCESSED BY D.O'Shea

Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Elevation	Depth (m)	Description
0									78.04	0.45	GEOBOR-S Drilling - No recovery - observed by driller as returns of brown CLAY
		69	0	0	Geo002 Geo013	B	0.60		77.84	0.65	GEOBOR-S Drilling - Reddish brown clayey sandy GRAVEL. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of limestone.
1									77.49	1.00	GEOBOR-S Drilling - Medium dense grey clayey GRAVEL. Gravel is angular to subangular fine to medium of limestone.
	1.45								77.19	1.30	GEOBOR-S Drilling - Stiff dark brown slightly sandy CLAY. Sand is fine to medium.
					Geo003 Geo014	B	1.80		76.69	1.80	GEOBOR-S Drilling - Probable COBBLES of limestone
2		100	30	23					76.54	1.95	GEOBOR-S Drilling - Dense dark grey clayey GRAVEL to slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to medium of limestone.
					RC00031	RC	2.50		76.34	2.15	GEOBOR-S Drilling - Firm brown sandy very gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to medium of limestone.
	2.80										GEOBOR-S Drilling - Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered. Driller notes - attempted Packer tests, tests completed
3		100	77	49							
					RC00032	RC	3.50				
	3.75										
4		100	73	70							

Fracture Spacing Log (mm): 0 250 500

Non-intact Zone

Legend

Water

Standpipe Details

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
05/11/2021	7.50	2.00	8.75	50mm SP

REMARKS Hand dug inspection pit to 1.20m. Hole cased 0.00-1.00m. Erect Covid-19 Safe Zone - 1hr. Bentonite seal used to cap well annulus. SPT Er = 73.31%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-BH-002
SHEET Sheet 2 of 2

CO-ORDINATES(_) 701,023 E, 731,143 N
GROUND LEVEL (mOD) 78.49

RIG TYPE Knebel
RC FLUSH MEDIUM P.Gel
CASING DIAMETER (mm)
CORE DIAMETER (mm) 102
BOREHOLE DEPTH (m) 8.75

DATE COMMENCED 03/11/2021
DATE COMPLETED 05/11/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
5					550		RC00109	RC	5.00						GEOBOR-S Drilling - Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered. Driller notes - attempted Packer tests, tests completed Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally open, locally clay/gravel-filled (at 2.51-2.78m, 3.75-3.80m, 4.20-4.27m, 4.41-4.75m, 5.71-5.73m, 7.11-7.14m & 7.82-7.87m), locally slightly iron-oxide stained, locally calcite-veined (1-15mm thick). Dips are 10-20° & locally 70-75°. *(continued)*	
	5.30	100	100	100												
	5.70															
6							RC00033	RC	6.00							
		100	88	72												
7																
	7.25				510											
8		100	83	71												
														8.75		
	8.75											69.74			End of Borehole at 8.75 (m)	
9																

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
05-11-21	8.75	1.00	3.50	Water level recorded 5 mins after end of drilling.

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
05/11/2021	7.50	2.00	8.75	50mm SP

REMARKS Hand dug inspection pit to 1.20m. Hole cased 0.00-1.00m. Erect Covid-19 Safe Zone - 1hr. Bentonite seal used to cap well annulus. SPT Er = 73.31%

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-BH-006
SHEET Sheet 1 of 2

CO-ORDINATES(_) 701,127 E
731,093 N
GROUND LEVEL (mOD) 79.76

RIG TYPE Knebel
RC FLUSH MEDIUM P.Gel
CASING DIAMETER (mm)
CORE DIAMETER (mm) 102
BOREHOLE DEPTH (m) 7.95

DATE COMMENCED 05/11/2021
DATE COMPLETED 09/11/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
0															GEOBOR-S Drilling - Firm reddish brown slighlty sandy gravelly SILT. Sand is fine to coarse. Gravel is fine to coarse angular to subangular of limestone	
		100	5	0			Geo004 Geo011	B	0.70					0.80		
1												78.96			GEOBOR-S Drilling - Medium dense grey clayey cobbly GRAVEL. Gravel is fine to coarse angular to subangular of limestone. Cobbles are subangular of limestone.	
	1.45						Geo005 Geo012	B	1.45					1.45		
												78.31		1.55	GEOBOR-S Drilling - (Medium dense) Dark brown clayey sandy Gravel with many cobbles. Sand is fine to coarse. Gravel is fine to coarse angular to subangular of limestone.	
2		100	21	10			RC00123	B	2.20			78.21			GEOBOR-S Drilling - Medium dense grey clayey sandy cobbly GRAVEL. Gravel is fine to coarse angular to subangular of limestone. Cobbles are subangular of limestone.	
	2.90						RC00045	RC	2.90					3.00		
3							RC00113	RC	3.10			76.76			GEOBOR-S Drilling - Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (3.61-3.68m, 4.62-4.65m, 5.12-5.15m & 6.29-6.32m). Driller notes - attempted Packer tests, tests completed	
		100	63	47												
4							RC00046	RC	4.00							
	4.40															
		100	65	43												
	4.80															
		100	93	73												

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
09/11/2021	7.50	2.00	7.95	50mm SP

REMARKS Hand dug inspection pit to 1.20m. Hole cased 0.00-4.40m. Erect Covid-19 Safe Zone - 1hr. Packer test conducted. Bentonite seal used to cap well annulus. SPT Er = 73.31%

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-BH-006
SHEET Sheet 2 of 2

CO-ORDINATES(_) 701,127 E
731,093 N
GROUND LEVEL (mOD) 79.76

RIG TYPE Knebel
RC FLUSH MEDIUM P.Gel
CASING DIAMETER (mm)
CORE DIAMETER (mm) 102
BOREHOLE DEPTH (m) 7.95

DATE COMMENCED 05/11/2021
DATE COMPLETED 09/11/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
5	5.10														GEOBOR-S Drilling - Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (3.61-3.68m, 4.62-4.65m, 5.12-5.15m & 6.29-6.32m). Driller notes - attempted Packer tests, tests completed Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, commonly clay-smeared, locally slightly iron-oxide stained, locally calcite-veined (1-2mm thick). Dips are 20-30° & locally 70-75°. *(continued)*	
6		100	94	88			RC00047	RC	6.00							
	6.35															
7		100	92	92	570											
	7.35															
		100	100	100												
	7.95													7.95		
8												71.81			End of Borehole at 7.95 (m)	
9																

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
09-11-21	7.95	4.40	3.85	Water level recorded 5 mins after end of drilling.

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
09/11/2021	7.50	2.00	7.95	50mm SP

REMARKS Hand dug inspection pit to 1.20m. Hole cased 0.00-4.40m. Erect Covid-19 Safe Zone - 1hr. Packer test conducted. Bentonite seal used to cap well annulus. SPT Er = 73.31%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-BH-010
SHEET Sheet 1 of 2

CO-ORDINATES(_) 701,064 E
730,973 N
GROUND LEVEL (mOD) 80.85

RIG TYPE Knebel
RC FLUSH MEDIUM P.Gel
CASING DIAMETER (mm)
CORE DIAMETER (mm) 102
BOREHOLE DEPTH (m) 8.15

DATE COMMENCED 10/11/2021
DATE COMPLETED 11/11/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
0												80.50		0.35	GEOBOR-S Drilling - Firm reddish brown sandy very gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse angular to subangular of limestone	
												80.40		0.45		
												80.30		0.55	GEOBOR-S Drilling - Medium dense grey clayey GRAVEL. Gravel is fine to coarse angular to subangular of limestone.	
1		100	9	0			Geo006 Geo015	B	0.50						GEOBOR-S Drilling - Firm reddish brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse angular to subangular of limestone	
	1.35														GEOBOR-S Drilling - Probable weathered ROCK - recovered as: Medium dense grey clayey cobbly GRAVEL. Gravel is fine to coarse angular to subangular of limestone. Cobbles are subangular of limestone.	
		100	20	0												
	1.90															
2																
		100	17	7												
3																
	3.40						RC00011	RC	3.40							
		100	56	45								77.10		3.75	GEOBOR-S Drilling - Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (7.15-7.22m). Driller notes - attempted Packer tests, tests completed	
4							RC00012	RC	4.00							
	4.40															
		100	80	47												

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Hand dug inspection pit to 1.20m. Hole cased 0.00-4.40m. Erect Covid-19 Safe Zone - 1hr. Packer test conducted. Bentonite seal used to cap well annulus. SPT Er = 73.31%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-BH-010
SHEET Sheet 2 of 2

CO-ORDINATES(_) 701,064 E
730,973 N
GROUND LEVEL (mOD) 80.85

RIG TYPE Knebel
RC FLUSH MEDIUM P.Gel
CASING DIAMETER (mm)
CORE DIAMETER (mm) 102
BOREHOLE DEPTH (m) 8.15

DATE COMMENCED 10/11/2021
DATE COMPLETED 11/11/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
5	5.00						RC00117	RC	5.00						GEOBOR-S Drilling - Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (7.15-7.22m). Driller notes - attempted Packer tests, tests completed Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, commonly clay-smeared, locally slightly iron-oxide stained, locally calcite-veined (1-8mm thick). Dips are 20-30° & locally 70-75°. *(continued)*	
		100	87	60												
6	5.85						RC00059	RC	6.00							
		100	84	84												
	6.40															
7		100	74	46												
	7.50															
8		100	88	65			559.999999999999							8.15		
	8.15											72.70			End of Borehole at 8.15 (m)	
9																

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
11-11-21	8.15	4.40	3.65	Water level recorded 5 mins after end of drilling.

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Hand dug inspection pit to 1.20m. Hole cased 0.00-4.40m. Erect Covid-19 Safe Zone - 1hr. Packer test conducted. Bentonite seal used to cap well annulus. SPT Er = 73.31%

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-BH-011
SHEET Sheet 1 of 2

CO-ORDINATES(_) 700,935 E, 730,960 N
GROUND LEVEL (mOD) 78.69

RIG TYPE Knebel
RC FLUSH MEDIUM P.Gel
CASING DIAMETER (mm)
CORE DIAMETER (mm) 102
BOREHOLE DEPTH (m) 8.00

DATE COMMENCED 11/11/2021
DATE COMPLETED 15/11/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
0												78.39		0.30	GEOBOR-S Drilling - Firm reddish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse angular to subangular of limestone	
												77.99		0.70	GEOBOR-S Drilling - Medium dense clayey GRAVEL with occasional cobbles. Gravel is fine to coarse angular to subangular of limestone. Cobbles are subangular of limestone.	
		100	14	0								77.84		0.85	GEOBOR-S Drilling - Firm reddish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse angular to subangular of limestone	
1							Geo007 Geo017	B	1.00							
	1.50														Probable weathered ROCK - recovered as silty/clayey slighlty sandy angular gravel with many cobbles. Gravel is fine to coarse angular to subangular of limestone. Cobbles are subangular of limestone. Driller notes - attempted falling head test, test completed	
2		100	5	0			Geo008 Geo016	B	2.00							
	2.70						Geo009 Geo018	B	2.80							
3		100	73	43										3.45		
	3.45						RC00060	RC	3.50			75.24			GEOBOR-S Drilling - Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (4.29-4.39m, 4.56-4.68m & 7.21-7.36m).	
4		100	44	34												
	4.60															

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Hand dug inspection pit to 1.20m. Hole cased 0.00-8.00m. Erect Covid-19 Safe Zone - 1hr. Falling head permeability test undertaken. SPT Er = 73.31%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-BH-011
SHEET Sheet 2 of 2

CO-ORDINATES(_) 700,935 E
730,960 N
GROUND LEVEL (mOD) 78.69

RIG TYPE Knebel
RC FLUSH MEDIUM P.Gel
CASING DIAMETER (mm)
CORE DIAMETER (mm) 102
BOREHOLE DEPTH (m) 8.00

DATE COMMENCED 11/11/2021
DATE COMPLETED 15/11/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
5		100	52	22			RC00061	RC	5.30						GEOBOR-S Drilling - Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (4.29-4.39m, 4.56-4.68m & 7.21-7.36m). Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, commonly clay/gravel-filled (at 3.66-4.28m, 4.64-4.72m, 4.96-5.04m, 5.77-5.86m & 6.58-6.80m), locally slightly iron-oxide stained, locally calcite-veined (1-3mm thick). Dips are 10-20° & locally 70-75°. *(continued)*	
6	5.90	100	71	56												
7	7.00	100	69	52												
8	8.00											70.69		8.00	End of Borehole at 8 (m)	
9																

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
15-11-21	8.00	8.00	6.35	Water level recorded 5 mins after end of drilling.

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Hand dug inspection pit to 1.20m. Hole cased 0.00-8.00m. Erect Covid-19 Safe Zone - 1hr. Falling head permeability test undertaken. SPT Er = 73.31%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3
HOLE NO.	**TPR-BH-014**
SHEET	Sheet 1 of 2
CO-ORDINATES(_)	701,008 E 730,861 N
GROUND LEVEL (mOD)	80.80
RIG TYPE	Knebel
RC FLUSH MEDIUM	P.Gel
CASING DIAMETER (mm)	
CORE DIAMETER (mm)	102
BOREHOLE DEPTH (m)	8.40
DATE COMMENCED	15/11/2021
DATE COMPLETED	17/11/2021
CLIENT	Irish Water / Ervia
ENGINEER	Mott MacDonald Ireland
BORED BY	IGSL
PROCESSED BY	D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
0												80.50		0.30	SYMMETRIX DRILLING: No recovery, observed by driller as returns of MADE GROUND consisting of gravel	
		100	0	0			Geo010 Geo019	B	0.70			80.00		0.80	GEOBOR-S Drilling - Firm reddish brown sandy gravelly CLAY to clayey slightly sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse angular to subangular of limestone	
1	1.00	100	14	0											GEOBOR-S Drilling - Probable weathered ROCK - recovered as: Medium dense brown clayey cobbly GRAVEL. Gravel is fine to coarse angular to subangular of limestone. Cobbles are subangular of limestone.	
2	2.00	100	18	0												
	2.80	100	30	25												
3	3.85	100	52	23								77.05		3.75	GEOBOR-S Drilling - Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (3.75-3.81m, 5.11-5.18m, 5.43-5.48m & 6.81-6.86m).	
4	4.45															

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
17/11/2021	7.50	2.50	8.40	50mm SP

REMARKS Hand dug inspection pit to 1.20m. Hole cased 0.00-2.30m. Erect Covid-19 Safe Zone - 1hr. Falling head permeability test undertaken. Bentonite seal used to cap well annulus. SPT Er = 73.31%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-BH-014
SHEET Sheet 2 of 2

CO-ORDINATES(_) 701,008 E, 730,861 N
GROUND LEVEL (mOD) 80.80

RIG TYPE Knebel
RC FLUSH MEDIUM P.Gel
CASING DIAMETER (mm)
CORE DIAMETER (mm) 102
BOREHOLE DEPTH (m) 8.40

DATE COMMENCED 15/11/2021
DATE COMPLETED 17/11/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
5		100	53	41			RC00017	RC	5.00						GEOBOR-S Drilling - Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (3.75-3.81m, 5.11-5.18m, 5.43-5.48m & 6.81-6.86m). Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, commonly clay-smeared, locally slightly iron-oxide stained, locally calcite-veined (1-8mm thick). Dips are 10-20° & locally 70-80°. *(continued)*	
6	6.00						RC00120	RC	6.30							
7		100	61	45			RC00065	RC	6.90							
8	7.50	100	73	34												
	8.40											72.40		8.40	End of Borehole at 8.4 (m)	
9																

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
17-11-21	8.40	2.30	3.85	Water level recorded 5 mins after end of drilling.

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
17/11/2021	7.50	2.50	8.40	50mm SP

REMARKS Hand dug inspection pit to 1.20m. Hole cased 0.00-2.30m. Erect Covid-19 Safe Zone - 1hr. Falling head permeability test undertaken. Bentonite seal used to cap well annulus. SPT Er = 73.31%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

Appendix 10B

Dynamic Sampling Records

Appendix 10B.1

Combined Dynamic Sampling / Rotary Corehole Records

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-DS-001
SHEET Sheet 1 of 2

CO-ORDINATES(_) 701,000 E, 731,158 N
GROUND LEVEL (mOD) 78.40

RIG TYPE Dando Terrier/Knebel
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm)
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 6.00

DATE COMMENCED 13/10/2021
DATE COMPLETED 13/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
0							164898 AA164898	B	0.00			78.00		0.40	Stiff orangish brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is fine to medium subangular to subrounded predominantly of limestone.	
	0.60	100	0	0						47/135mm		77.75		0.65	Medium dense brown clayey/silty sandy fine to coarse angular to subangular GRAVEL predominantly of limestone. Sand is fine to coarse. (Possible Weathered Rockhead) *0.60m Dynamic sample end depth (77.80m OD)*	
1	0.95	100	0	0												
	1.60	100	100	0			RC00066	RC	1.50					1.70	Probable weathered ROCK - recovered as clayey angular gravel with occasional cobbles. Gravel is fine to coarse angular to subangular of limestone. Cobbles are subangular of limestone.	
	1.70											76.70				
2		100	80	69			RC00067	RC	2.20						Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (2.52-2.78m, 4.10-4.14m & 4.61-4.65m).	
	2.40															
3		100	65	56											Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, locally clay-smeared, locally slightly iron-oxide stained, locally calcite-veined (1-10mm thick). Dips are 10-20° & locally 70-75°.	
	3.80															
4		100	90	64	510		RC00068	RC	4.00							

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 23/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-1.50m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 73.31%

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-DS-001
SHEET Sheet 2 of 2

CO-ORDINATES(_) 701,000 E, 731,158 N
GROUND LEVEL (mOD) 78.40

RIG TYPE Dando Terrier/Knebel
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm)
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 6.00

DATE COMMENCED 13/10/2021
DATE COMPLETED 13/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
5	5.20	100	85	78										6.00	Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (2.52-2.78m, 4.10-4.14m & 4.61-4.65m).	
6	6.00						RC00069	RC	6.00			72.40			End of Borehole at 6 (m)	
7																
8																
9																

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
13-10-21	6.00	1.50	5.80	Water level recorded 5 mins after end of drilling.

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 23/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-1.50m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 73.31%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-DS-002
SHEET Sheet 1 of 2

CO-ORDINATES(_) 701,073 E, 731,115 N
GROUND LEVEL (mOD) 78.82

RIG TYPE Dando Terrier/Knebel
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm)
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 6.00

DATE COMMENCED 13/10/2021
DATE COMPLETED 13/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
0							164898	B	0.00					0.15	TOPSOIL	
							AA164895	B	0.15			78.67			Firm becoming stiff with depth brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is fine to medium subangular to subrounded predominantly of limestone.	
							AA164895	B	0.55			78.27		0.55		
	0.70	100	20	0			164898	B	0.70	50/75mm		78.12		0.70	Medium dense brown slightly sandy silty/clayey fine to coarse angular to subangular GRAVEL predominantly of limestone with pockets of gravelly silt/clay. Sand is fine to coarse. (Possible weathered bedrock) *0.70m Dynamic sample end depth (78.12m OD)*	
1	1.00	100	33	0			RC00070	RC	1.00							
	1.15	100	10	0												
	1.55	100	100	0			RC00071	RC	1.60			77.27		1.55	Probable weathered ROCK - recovered as clayey angular gravel with occasional cobbles. Gravel is fine to coarse angular to subangular of limestone. Cobbles are subangular of limestone.	
	1.65															
2		100	56	30											Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (3.82-4.02m).	
							RC00072	RC	2.50							
	2.70															
3		100	72	53											Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, locally clay/gravel-filled (at 2.32-2.57m, 2.98-3.05m & 3.26-3.32m), locally slightly iron-oxide stained, locally calcite-veined (1-12mm thick). Dips are 10-20° & very locally 70-75°.	
	3.70															
4		100	86	77												

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 23/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-1.50m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 73.31%

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-DS-002
SHEET Sheet 2 of 2

CO-ORDINATES(_) 701,073 E
731,115 N
GROUND LEVEL (mOD) 78.82

RIG TYPE Dando Terrier/Knebel
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm)
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 6.00

DATE COMMENCED 13/10/2021
DATE COMPLETED 13/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
5	5.15	100	100	96			RC00073	RC	5.00					6.00	Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (3.82-4.02m).	
6	6.00											72.82			End of Borehole at 6 (m)	
7																
8																
9																

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 23/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-1.50m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 73.31%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3
HOLE NO.	**TPR-DS-003**
SHEET	Sheet 1 of 2
CO-ORDINATES(_)	700,971 E 731,096 N
GROUND LEVEL (mOD)	78.54
RIG TYPE	Dando Terrier/Knebel
RC FLUSH MEDIUM	Air/Mist
CASING DIAMETER (mm)	
CORE DIAMETER (mm)	78
BOREHOLE DEPTH (m)	6.30
DATE COMMENCED	12/10/2021
DATE COMPLETED	12/10/2021
CLIENT	Irish Water / Ervia
ENGINEER	Mott MacDonald Ireland
BORED BY	IGSL
PROCESSED BY	D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
0							164898	B	0.00					0.15	TOPSOIL	
							AA164898	B	0.15			78.39			Stiff orangish brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is fine to medium subangular to subrounded predominantly of limestone.	
							AA164898	B	0.60					0.60		
							164898	B	0.70	50/145mm		77.94 77.84		0.70	Medium dense brown slightly clayey sandy fine to coarse angular to subangular GRAVEL predominantly of limestone. Sand is fine to coarse. Possible weathered bedrock. *0.70m Dynamic sample end depth (77.84m OD)*	
	0.90													0.90		
1		100	0	0								77.64			SYMMETRIX DRILLING: No recovery, observed by driller as returns of gravelly CLAY	
	1.20						RC00074	RC	1.30							
		100	0	0											Probable weathered ROCK - recovered as angular gravel with occasional cobbles. Gravel is fine to coarse angular to subangular of limestone. Cobbles are subangular of limestone.	
	1.90													2.10		
2												76.44			Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (3.82-3.92m & 3.97-4.01m).	
		100	39	17			RC00075	RC	2.40							
	3.00															
3							RC00076	RC	3.20							
		100	99	66												
	3.80														Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, locally clay/gravel-filled (at 2.51-2.64m & 2.86-2.91m), locally slightly iron-oxide stained, locally calcite-veined (1-2mm thick). Dips are 10-20° & very locally 70-75°.	
4		100	91	68												
	4.80															

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 23/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-3.00m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 73.31%

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-DS-003
SHEET Sheet 2 of 2

CO-ORDINATES(_) 700,971 E
731,096 N
GROUND LEVEL (mOD) 78.54

RIG TYPE Dando Terrier/Knebel
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm)
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 6.30

DATE COMMENCED 12/10/2021
DATE COMPLETED 12/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
5							RC00077	RC	5.00						Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (3.82-3.92m & 3.97-4.01m).	
	5.83	100	92	77												
6		100	100	100										6.30		
	6.30											72.24			End of Borehole at 6.3 (m)	
7																
8																
9																

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
12-10-21	6.30	3.00	4.75	Water level recorded 5 mins after end of drilling.

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 23/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-3.00m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 73.31%

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**HOLE NO.**	**TPR-DS-004**
		SHEET	Sheet 1 of 2
CO-ORDINATES(_)	701,138 E 731,077 N	**RIG TYPE**	Dando Terrier/Knebel
GROUND LEVEL (mOD)	80.14	**RC FLUSH MEDIUM**	Air/Mist
		CASING DIAMETER (mm)	
CLIENT	Irish Water / Ervia	**CORE DIAMETER (mm)**	78
ENGINEER	Mott MacDonald Ireland	**BOREHOLE DEPTH (m)**	6.00
		DATE COMMENCED	14/10/2021
		DATE COMPLETED	14/10/2021
		BORED BY	IGSL
		PROCESSED BY	D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
0							151651	B	0.00					0.15	TOPSOIL	
							AA151651	B	0.15			79.99			Stiff brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is fine to medium subangular to subrounded predominantly of limestone.	
							AA151651	B	0.45			79.69		0.45		
	0.65						151651	B	0.63	50/100mm		79.49		0.65	Medium dense brown clayey/silty sandy fine to coarse angular to subangular GRAVEL predominantly of limestone. Sand is fine to coarse. Possible weathered bedrock. *0.63m Dynamic sample end depth (79.51m OD)*	
1		100	9	0												
	1.10	100	23	0												
	1.45						RC00078	RC	1.40			78.69		1.45	Probable weathered ROCK - recovered as clayey angular gravel with occasional cobbles. Gravel is fine to coarse angular to subangular of limestone. Cobbles are subangular of limestone.	
		100	45	15												
2							RC00079	RC	2.00							
	2.20	100	100	0												
	2.30	100	41	0											Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (3.54-3.56m & 5.89-5.93m).	
3	3.00	100	58	31												
	3.55						RC00080	RC	4.00						Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, locally clay-smeared, locally slightly iron-oxide stained, locally calcite-veined (1-4mm thick). Dips are 10-20° & locally 70-75°.	
4		100	91	60												
	4.90															

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 24/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-2.00m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 73.31%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-DS-004
SHEET Sheet 2 of 2

CO-ORDINATES(_) 701,138 E
731,077 N
GROUND LEVEL (mOD) 80.14

RIG TYPE Dando Terrier/Knebel
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm)
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 6.00

DATE COMMENCED 14/10/2021
DATE COMPLETED 14/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
5		100	88	68			RC00081	RC	5.70						Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (3.54-3.56m & 5.89-5.93m).	
6	6.00											74.14		6.00	End of Borehole at 6 (m)	
7																
8																
9																

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
14-10-21	6.00	3.00	3.00	Water level recorded 5 mins after end of drilling.

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

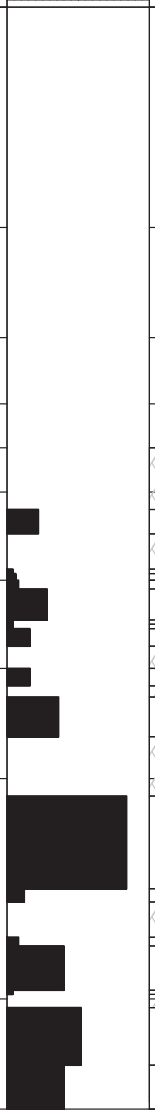
REMARKS Dynamic sample date: 24/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-2.00m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 73.31%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**HOLE NO.**	**TPR-DS-005**
		SHEET	Sheet 1 of 2
CO-ORDINATES(_)	701,148 E 731,053 N	**RIG TYPE**	Dando Terrier/BT-44
GROUND LEVEL (mOD)	80.72	**RC FLUSH MEDIUM**	Air/Mist
		CASING DIAMETER (mm)	
CLIENT	Irish Water / Ervia	**CORE DIAMETER (mm)**	78
ENGINEER	Mott MacDonald Ireland	**BOREHOLE DEPTH (m)**	6.00
		DATE COMMENCED	08/10/2021
		DATE COMPLETED	11/10/2021
		BORED BY	IGSL
		PROCESSED BY	D.O'Shea



Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Non-intact Zone	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
						151652	B	0.00					0.15	TOPSOIL	
						AA151652	B	0.15			80.57			Firm orangish brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is fine to medium subangular to subrounded predominantly of limestone.	
													0.60		
											80.12			Medium dense brown slightly sandy clayey/silty fine to coarse angular to subangular GRAVEL predominantly of limestone. Sand is fine to coarse. (Possible weathered bedrock)	
1	1.00					151652	B	1.00	50/75mm		79.72		1.00	*1.0m Dynamic sample end depth*	
	1.50								50/52mm		79.22		1.50	Openhole drilling returned pulverised arisings from 1.0-1.50m comprising gravelly CLAY	
	1.80													Openhole drilling returned pulverised arisings from 1.50-2.00m comprising gravelly CLAY	
2	2.00	100	30	0							78.72		2.00		
	2.20					RC00082	RC	2.20			78.52		2.20	Probable weathered ROCK - recovered as angular gravel with occasional cobbles. Gravel is fine to coarse angular to subangular of limestone. Cobbles are subangular of limestone.	
		75	43	30											
	2.60	88	55	30										Very strong to medium strong, medium to thinly bedded, grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered. Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, locally clay/gravel-filled (at 4.06-4.22m & 4.48-4.54m), locally slightly iron-oxide stained, locally calcite-veined (1-3mm thick). Dips are 10-20° & locally 70-75°.	
3	3.00					RC00083	RC	3.10							
		100	42	34											
	3.50														
4		100	70	51											
	4.50														

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 24/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-2.00m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 65.32%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-DS-005
SHEET Sheet 2 of 2

CO-ORDINATES(_) 701,148 E
731,053 N
GROUND LEVEL (mOD) 80.72

RIG TYPE Dando Terrier/BT-44
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm)
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 6.00

DATE COMMENCED 08/10/2021
DATE COMPLETED 11/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
5		100	91	69			RC00084	RC	5.00					6.00	Very strong to medium strong, medium to thinly bedded, grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered.	
6	6.00											74.72			End of Borehole at 6 (m)	
7																
8																
9																

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
11-10-21	6.00	2.00	4.10	Water level recorded 5 mins after end of drilling.

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 24/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-2.00m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 65.32%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**HOLE NO.**	**TPR-DS-006**
		SHEET	Sheet 1 of 2
CO-ORDINATES(_)	701,048 E 731,046 N	**RIG TYPE**	Dando Terrier/BT-44
GROUND LEVEL (mOD)	79.32	**RC FLUSH MEDIUM**	Air/Mist
		CASING DIAMETER (mm)	
CLIENT	Irish Water / Ervia	**CORE DIAMETER (mm)**	78
ENGINEER	Mott MacDonald Ireland	**BOREHOLE DEPTH (m)**	6.00
		DATE COMMENCED	07/10/2021
		DATE COMPLETED	08/10/2021
		BORED BY	IGSL
		PROCESSED BY	D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
0							151654 AA151654	B	0.00						Stiff brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is fine to medium subangular to subrounded predominantly of limestone.	
							AA151654	B	0.45			78.87		0.45		
	0.70						161654	B	0.70	50/65mm		78.62		0.70	Medium dense brown clayey/silty sandy fine to coarse angular to subangular GRAVEL predominantly of limestone. Sand is fine to coarse. (Possible weathered bedrock) *0.70m Dynamic sample end depth (78.62m OD)*	
1															Openhole drilling returned pulverised arisings from 0.70-1.50m comprising angular gravel-sized fragments of possible weathered rock	
	1.50						RC00002 RC00004 RC00006 RC00008 RC00010 RC00122	RC	1.50	50/26mm		77.82		1.50	Very strong to medium strong, medium to thinly bedded, grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered.	
		100	47	0												
2							RC00085	RC	2.00							
	2.10														Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, locally clay/gravel-filled (at 1.86-1.97m), locally slightly iron-oxide stained, locally calcite-veined (1-20mm thick). Dips are 10-20° & locally 70-75°.	
		100	54	21												
3							RC00086	RC	3.00							
	3.10															
		100	66	24												
	3.80															
4							RC00087	RC	4.00							
		100	78	43												
	4.45															

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 24/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-2.00m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 65.32%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-DS-006
SHEET Sheet 2 of 2

CO-ORDINATES(_) 701,048 E
731,046 N
GROUND LEVEL (mOD) 79.32

RIG TYPE Dando Terrier/BT-44
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm)
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 6.00

DATE COMMENCED 07/10/2021
DATE COMPLETED 08/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
5		100	82	61											Very strong to medium strong, medium to thinly bedded, grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered.	
														6.00		
6	6.00											73.32			End of Borehole at 6 (m)	
7																
8																
9																

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
08-10-21	6.00	1.50	5.70	Water level recorded 5 mins after end of drilling.

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 24/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-2.00m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 65.32%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**HOLE NO.**	**TPR-DS-007**
		SHEET	Sheet 1 of 2
CO-ORDINATES(_)	701,010 E 730,893 N	**RIG TYPE**	Dando Terrier/BT-44
GROUND LEVEL (mOD)	80.65	**RC FLUSH MEDIUM**	Air/Mist
		CASING DIAMETER (mm)	
CLIENT	Irish Water / Ervia	**CORE DIAMETER (mm)**	78
ENGINEER	Mott MacDonald Ireland	**BOREHOLE DEPTH (m)**	6.00
		DATE COMMENCED	04/10/2021
		DATE COMPLETED	05/10/2021
		BORED BY	IGSL
		PROCESSED BY	D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
0							151657	B	0.00					0.15	TOPSOIL	
							AA151697	B	0.15			80.50			Firm brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is fine to medium subangular to subrounded predominantly of limestone.	
												80.25		0.40		
							151657	B	0.60	50/110mm				0.70	Medium dense brown clayey/silty sandy fine to coarse angular to subangular GRAVEL predominantly of limestone. Sand is fine to coarse. (Possible weathered bedrock) *0.60m Dynamic sample end depth (80.05m OD)*	
1												79.95				
	1.50									50/32mm		79.15		1.50	Openhole drilling returned pulverised arisings from 0.70-1.50m - described by Geologist as grey slightly clayey GRAVEL. Sand is fine to coarse. Gravel is fine to coarse angular to subangular of limestone. Observed by driller as returns of cobbly GRAVEL	
2		100	10	0			RC00088	RC	2.00							
	2.20														Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones (at 3.03-3.06m & 3.64-3.69m).	
		100	28	22												
	2.70															
3		100	67	53			RC00089	RC	3.00						Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, locally clay-smeared, locally slightly iron-oxide stained, locally calcite-veined (1-4mm thick). Dips are 10-20° & locally 70-75°.	
	3.80															
4		100	63	31												
	4.80															

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 24/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-1.50m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 65.32%

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-DS-007
SHEET Sheet 2 of 2

CO-ORDINATES(_) 701,010 E
730,893 N
GROUND LEVEL (mOD) 80.65

RIG TYPE Dando Terrier/BT-44
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm)
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 6.00

DATE COMMENCED 04/10/2021
DATE COMPLETED 05/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
5		100	94	71			RC00090	RC	5.00						Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones (at 3.03-3.06m & 3.64-3.69m).	
6	6.00											74.65		6.00	End of Borehole at 6 (m)	
7																
8																
9																

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
05-10-21	6.00	1.50	5.80	Water level recorded 5 mins after end of drilling.

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 24/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-1.50m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 65.32%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**HOLE NO.**	**TPR-DS-008**
		SHEET	Sheet 1 of 2
CO-ORDINATES(_)	700,923 E 730,992 N	**RIG TYPE**	Dando Terrier/BT-44
GROUND LEVEL (mOD)	78.55	**RC FLUSH MEDIUM**	Air/Mist
		CASING DIAMETER (mm)	
CLIENT	Irish Water / Ervia	**CORE DIAMETER (mm)**	78
ENGINEER	Mott MacDonald Ireland	**BOREHOLE DEPTH (m)**	6.00
		DATE COMMENCED	07/10/2021
		DATE COMPLETED	07/10/2021
		BORED BY	IGSL
		PROCESSED BY	D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
0							151658	B	0.00					0.20	TOPSOIL	
							AA151658	B	0.20			78.35			Stiff orangish brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is fine to medium subangular to subrounded predominantly of limestone.	
												78.05		0.50		
	0.70						151658	D	0.70	50/70mm		77.85		0.70	Medium dense brown clayey/silty sandy fine to coarse angular to subangular GRAVEL predominantly of limestone. Sand is fine to coarse. Possible weathered bedrock. *0.70m Dynamic sample end depth (77.85m OD)*	
1																
	1.50	100	23	0			RC00018	RC	1.50	50/12mm		77.05		1.50	Openhole drilling returned pulverised arisings from 0.70-1.50m - described by Geologist as grey slightly clayey GRAVEL. Sand is fine to coarse. Gravel is fine to coarse angular to subangular of limestone. Observed by driller as returns of probable weathered rock recovered as GRAVEL	
	1.80															
2		100	26	20											Very strong to medium strong, medium to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (2.16-2.21m, 2.60-2.94m, 4.47-4.55m, 4.84-4.89m, 5.45-5.49m & 5.53-5.54m).	
	2.60															
3		100	62	35			RC00019	RC	3.50						Discontinuities are medium to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, locally clay-smeared, locally slightly iron-oxide stained, locally calcite-veined (1-30mm thick). Dips are 10-20° & locally 70-75°.	
	3.90															
4		100	83	61			RC00091	RC	4.50							
	4.90															

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 27/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-2.00m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 65.32%

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-DS-008
SHEET Sheet 2 of 2

CO-ORDINATES(_) 700,923 E
730,992 N
GROUND LEVEL (mOD) 78.55

RIG TYPE Dando Terrier/BT-44
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm)
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 6.00

DATE COMMENCED 07/10/2021
DATE COMPLETED 07/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
5		100	93	49			RC00092	RC	5.50						Very strong to medium strong, medium to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (2.16-2.21m, 2.60-2.94m, 4.47-4.55m, 4.84-4.89m, 5.45-5.49m & 5.53-5.54m).	
6	6.00											72.55		6.00	End of Borehole at 6 (m)	
7																
8																
9																

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
07-10-21	6.00	1.50	5.80	Water level recorded 5 mins after end of drilling.

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 27/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-2.00m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 65.32%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-DS-009
SHEET Sheet 1 of 2

CO-ORDINATES(_) 701,020 E
730,995 N
GROUND LEVEL (mOD) 79.48

RIG TYPE Dando Terrier/BT-44
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm)
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 6.00

DATE COMMENCED 06/10/2021
DATE COMPLETED 06/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
0							151655	B	0.00			79.33		0.15	TOPSOIL	
															Stiff orangish brown slightly gravelly slightly sandy CLAY with medium spaced thin layers of firm yellowish brown clayey fine to coarse sand. Sand is fine to coarse. Gravel is fine to medium subangular to subrounded predominantly of limestone.	
1	1.00						151655	B	1.00	50/105mm		78.48		1.00	*1.0m Dynamic sample end depth (78.48m OD)*	
															Openhole drilling returned pulverised arisings from 1.0-1.50m - described by Geologist as brown clayey sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse angular to subangular of limestone. Observed by driller as returns of clayey GRAVEL	
	1.50									64/150mm		77.98		1.50		
2	2.00	100	69	46			RC00093	RC	2.20			77.48		2.00	Openhole drilling returned pulverised arisings from 1.50-2.0 - described by Geologist as brown clayey sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse angular to subangular of limestone. Observed by driller as returns of GRAVEL	
							RC00094	RC	2.70							
3	2.90	100	26	0											Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (4.72-4.73m & 5.54-5.61m).	
	3.40	100	100	83												
	3.80	100	20	0												
4	4.10	100	94	94			RC00095	RC	4.00							

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 24/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-2.00m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 65.32%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-DS-009
SHEET Sheet 2 of 2

CO-ORDINATES(_) 701,020 E
730,995 N
GROUND LEVEL (mOD) 79.48

RIG TYPE Dando Terrier/BT-44
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm)
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 6.00

DATE COMMENCED 06/10/2021
DATE COMPLETED 06/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
5	5.00	100	37	28			RC00096	RC	5.80					6.00	Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (4.72-4.73m & 5.54-5.61m). Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, commonly clay/gravel-filled (at 2.16-.22m, 2.69-3.07m, 3.35-3.45m, 3.89-4.15m, 5.18-5.46m & 5.69-5.88m), locally slightly iron-oxide stained, locally calcite-veined (1-3mm thick). Dips are 10-20° & locally 70-75°. *(continued)*	
6	6.00											73.48			End of Borehole at 6 (m)	
7																
8																
9																

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
06-10-21	6.00	2.00	5.70	Water level recorded 5 mins after end of drilling.

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 24/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-2.00m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 65.32%

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3
HOLE NO.	**TPR-DS-010**
SHEET	Sheet 1 of 2
CO-ORDINATES(_)	701,086 E 730,963 N
GROUND LEVEL (mOD)	81.64
RIG TYPE	Dando Terrier/BT-44
RC FLUSH MEDIUM	Air/Mist
CASING DIAMETER (mm)	
CORE DIAMETER (mm)	78
BOREHOLE DEPTH (m)	6.00
DATE COMMENCED	11/10/2021
DATE COMPLETED	12/10/2021
CLIENT	Irish Water / Ervia
ENGINEER	Mott MacDonald Ireland
BORED BY	IGSL
PROCESSED BY	D.O'Shea

Depth (m)	Core Run Depth (m)	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Elevation	Depth (m)	Description
0		151659	B	0.00		81.49	0.15	TOPSOIL
		AA151656	B	0.15		81.09	0.55	MADE GROUND Orangish brown clayey/silty sandy GRAVEL. Sand is fine to coarse. Gravel is fine to medium subangular to subrounded predominantly of limestone.
1		151659 AA151659	B	1.00	37/300mm	80.59	1.05	MADE GROUND. Medium dense dark greyish brown slightly clayey sandy fine to coarse angular to subangular GRAVEL of various lithologies. Contains fragments of brick concrete and bitumen. Sand is fine to coarse.
	1.50				50/120mm	79.94	1.70	MADE GROUND Stiff greyish brown slightly sandy slightly gravelly CLAY with occasional cobble. Contains fragments of timber and soft and hard plastic. Sand is fine to coarse. Gravel is fine to coarse angular to subrounded predominantly of limestone. Cobbles are subangular of limestone. *1.70m Dynamic sample end depth (79.94m OD)*
2	2.60					79.04	2.60	Openhole drilling returned pulverised arisings from 1.70-2.60m comprising returns of clayey GRAVEL
3					12/300mm		3.50	SYMMETRIX DRILLING: No recovery, observed by driller as returns of WOOD
	3.50					78.14	3.70	SYMMETRIX DRILLING: No recovery, observed by driller as returns of CLAY
	3.70					77.94	4.20	SYMMETRIX DRILLING: No recovery, observed by driller as returns of weathered ROCK
4	4.20					77.44	4.50	SYMMETRIX DRILLING: No recovery, observed by driller as returns of ROCK
	4.50	RC00097	RC	4.50	50/12mm	77.14		

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 27/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-4.50m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 65.32%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-DS-010
SHEET Sheet 2 of 2

CO-ORDINATES(_) 701,086 E
730,963 N
GROUND LEVEL (mOD) 81.64

RIG TYPE Dando Terrier/BT-44
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm)
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 6.00

DATE COMMENCED 11/10/2021
DATE COMPLETED 12/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
5		100	83	69											Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (4.75-4.79m).	
6	6.00											75.64		6.00	Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, locally clay-smeared, locally slightly iron-oxide stained, locally calcite-veined (1-3mm thick). Dips are 10-20° & locally 70-75°. *(continued)*	
7															End of Borehole at 6 (m)	
8																
9																

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
12-10-21	6.00	4.50	2.80	Water level recorded 5 mins after end of drilling.

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 27/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-4.50m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 65.32%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-DS-011
SHEET Sheet 1 of 2

CO-ORDINATES(_) 701,020 E
730,958 N
GROUND LEVEL (mOD) 80.06

RIG TYPE Dando Terrier/BT-44
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm)
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 6.00

DATE COMMENCED 05/10/2021
DATE COMPLETED 06/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
0							151656	B	0.00					0.15	TOPSOIL	
							AA151656	B	0.15			79.91		0.32	Firm brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is fine to medium subangular to subrounded predominantly of limestone.	
	0.60						151656	D	0.60	50/100mm		79.74		0.60	Medium dense brown slightly clayey sandy fine to coarse angular to subangular GRAVEL predominantly of limestone. Sand is fine to coarse. Possible weathered bedrock. *0.60m Dynamic sample end depth (79.46m OD)*	
1	1.50	100	16	0			RC00020	RC	1.50	50/42mm		79.46		1.50	Openhole drilling returned pulverised arisings from 0.60-1.50m - described by Geologist as brown clayey sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse angular to subangular of limestone. Observed by driller as returns of GRAVEL	
2	2.20	100	43	30			RC00021	RC	2.20			78.56			Probable moderately weathered ROCK with clay infill - recovered as clayey angular gravel with occasional cobbles. Gravel is fine to coarse angular to subangular of limestone. Cobbles are subangular of limestone.	
	2.80													2.80		
3	3.00	100	87	0								77.26		3.00	SYMMETRIX DRILLING: No recovery, observed by driller as returns of ROCK No recovery 2.80-3.00m due to driller re-advancing casing	
	3.30						RC00098	RC	3.30			77.06			Very strong to medium strong, medium to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (4.93-4.98m).	
4		100	88	73												
	4.50						RC00099	RC	4.50							

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 24/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-3.00m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 65.32%

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-DS-011
SHEET Sheet 2 of 2

CO-ORDINATES(_) 701,020 E
730,958 N
GROUND LEVEL (mOD) 80.06

RIG TYPE Dando Terrier/BT-44
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm)
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 6.00

DATE COMMENCED 05/10/2021
DATE COMPLETED 06/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
5		100	77	65											Very strong to medium strong, medium to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (4.93-4.98m). Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, locally clay-smeared, locally slightly iron-oxide stained, locally calcite-veined (1-3mm thick). Dips are 10-20° & locally 70-75°. *(continued)*	
6	6.00											74.06		6.00	End of Borehole at 6 (m)	
7																
8																
9																

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
06-10-21	6.00	3.00	5.60	Water level recorded 5 mins after end of drilling.

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 24/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-3.00m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 65.32%

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-DS-012
SHEET Sheet 1 of 2

CO-ORDINATES(_) 701,045 E, 730,914 N
GROUND LEVEL (mOD) 81.15
CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

RIG TYPE Dando Terrier/BT-44
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm)
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 6.20

DATE COMMENCED 12/10/2021
DATE COMPLETED 12/10/2021
BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
0							151663	B	0.00			81.00		0.15	TOPSOIL	
							AA151663	B	0.55			80.60		0.55	Firm orangish brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is fine to medium subangular to subrounded predominantly of limestone. (Possible MADE GROUND)	
							AA151663	B	0.85			80.30		0.85		
1							151663	D	1.00	50/60mm		80.15		1.00	Firm brown slightly sandy gravelly SILT/CLAY. Gravel is fine to coarse angular to subangular predominantly of limestone. Sand is fine to coarse. Contains fragments of brick. (MADE GROUND)	
	1.50									67/71mm		79.65		1.50	Firm greyish brown slightly sandy gravelly SILT/CLAY with low cobbles content. Sand is fine to coarse. Gravel is fine to coarse angular to subangular predominantly of limestone. Cobbles are subangular predominantly of limestone. Contains fragments of brick. (MADE GROUND)	
2	2.00	100	13	0								79.15		2.00	*1.0m Dynamic sample end depth*	
							RC00022	RC	2.50					2.60	Openhole drilling returned pulverised arisings from 1.0-1.50m - comprising returns of gravelly CLAY	
	2.70											78.55			Openhole drilling returned pulverised arisings from 1.50-2.0m comprising returns of GRAVEL	
3							RC00100	RC	2.90						Probable weathered ROCK - recovered as clayey angular gravel with occasional cobbles. Gravel is fine to coarse angular to subangular of limestone. Cobbles are subangular of limestone.	
		100	82	60											Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (2.70-2.72m).	
4	4.00						RC00101	RC	4.00							
		100	85	64												
	4.80															

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 28/09/2021. Hand dug inspection pit to 1.20m. The dynamic sampling [DS] and follow-on rotary drillhole [RC] location were each set out at two different locations. The original dynamic sampling location was on a slope which proved problematic for rotary rig setup. RC location: E = 701046.387, N = 730915.089, Elevation = 81.49. RC hole cased 0.0-2.0m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 65.32%.

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-DS-012
SHEET Sheet 2 of 2

CO-ORDINATES(_) 701,045 E, 730,914 N
GROUND LEVEL (mOD) 81.15

RIG TYPE Dando Terrier/BT-44
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm)
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 6.20

DATE COMMENCED 12/10/2021
DATE COMPLETED 12/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
5																
		100	100	81												
6														6.20	Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (2.70-2.72m).	
	6.20											74.95			Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, locally clay-smeared, locally slightly iron-oxide stained, locally calcite-veined (1-6mm thick). Dips are 10-20° & locally 70-75°. *(continued)*	
7															End of Borehole at 6.2 (m)	
8																
9																

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
12-10-21	6.20	2.00	5.20	Water level recorded 5 mins after end of drilling.

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 28/09/2021. Hand dug inspection pit to 1.20m. The dynamic sampling [DS] and follow-on rotary drillhole [RC] location were each set out at two different locations. The original dynamic sampling location was on a slope which proved problematic for rotary rig setup. RC location: E = 701046.387, N = 730915.089, Elevation = 81.49. RC hole cased 0.0-2.0m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 65.32%.

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-DS-013
SHEET Sheet 1 of 2

CO-ORDINATES(_) 700,898 E, 730,913 N
GROUND LEVEL (mOD) 78.36

RIG TYPE Dando Terrier/BT-44
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm)
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 6.00

DATE COMMENCED 28/09/2021
DATE COMPLETED 29/09/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
0							161651	B	0.00					0.15	TOPSOIL	
							aa161651	B	0.15			78.21			Stiff orangish brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is fine to medium subangular to subrounded predominantly of limestone.	
														0.45		
												77.91		0.60		
		0	0	0						50/115mm		77.76			Medium dense brown clayey/silty sandy fine to coarse angular to subangular GRAVEL predominantly of limestone. Sand is fine to coarse. Possible weathered bedrock. *0.60m Dynamic sample end depth (77.76m OD)*	
1														1.50	SYMMETRIX DRILLING: No recovery, observed by driller as returns of gravelly CLAY with occasional boulders	
	1.50									55/115mm		76.86			SYMMETRIX DRILLING: No recovery, observed by driller as returns of clayey gravelly COBBLES	
2		0	0	0										2.30		
												76.06			SYMMETRIX DRILLING: No recovery, observed by driller as returns of ROCK	
														3.00		
3	3.00						RC00102	RC	3.00	35/32mm		75.36			Very strong to medium strong, thickly to thinly bedded (to thinly laminated where fissile mudstone/shale), grey/dark grey/black (weathered to a brownish grey at 3.70-4.05m), fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (3.56-61m & 4.48-4.58m). Many incipient fractures throughout. Very small scale solution weathering at a 70° undulose fracture at 4.25m	
		100	55	14												
4	4.50						RC00103	RC	4.50							

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 27/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-3.00m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 65.32%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-DS-013
SHEET Sheet 2 of 2

CO-ORDINATES(_) 700,898 E
730,913 N
GROUND LEVEL (mOD) 78.36

RIG TYPE Dando Terrier/BT-44
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm)
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 6.00

DATE COMMENCED 28/09/2021
DATE COMPLETED 29/09/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
5		100	87	87	360										Very strong to medium strong, thickly to thinly bedded (to thinly laminated where fissile mudstone/shale), grey/dark grey/black (weathered to a brownish grey at 3.70-4.05m), fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (3.56-61m & 4.48-4.58m). Many incipient fractures throughout. Very small scale solution weathering at a 70° undulose fracture at 4.25m Discontinuities are widely to closely spaced, smooth to locally rough, planar to undulose. Apertures are tight to locally moderately open, locally clay-smeared, locally slightly iron-oxide stained, locally calcite-veined (1-2mm thick). Dips are 20-30° & locally 70° & irregular. *(continued)*	
6	6.00											72.36		6.00	End of Borehole at 6 (m)	
7																
8																
9																

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
29-09-21	6.00	3.00	5.70	Water level recorded 5 mins after end of drilling.

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 27/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-3.00m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 65.32%

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-DS-014
SHEET Sheet 1 of 2

CO-ORDINATES(_) 701,052 E, 730,879 N
GROUND LEVEL (mOD) 81.99

RIG TYPE Dando Terrier/BT-44
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm)
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 6.00

DATE COMMENCED 11/10/2021
DATE COMPLETED 12/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
0							151663	B	0.00					0.15	TOPSOIL	
							AA151663	B	0.15			81.84			Firm orangish brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is fine to medium subangular to subrounded predominantly of limestone.	
												81.49		0.50	Medium dense brown clayey/silty sandy fine to coarse angular to subangular GRAVEL predominantly of limestone. Sand is fine to coarse. Possible weathered bedrock. *1.0m Dynamic sample end depth (80.99m OD)*	
1							151663	D	1.00	50/70mm		80.99		1.00	Openhole drilling returned pulverised arisings from 1.0-1.50m comprising returns of gravelly CLAY	
	1.50									50/21mm		80.49		1.50	Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (3.72-3.77m).	
2		100	29	0			RC00104	RC	1.70							
	2.30														Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, locally clay-smeared, locally slightly iron-oxide stained, locally calcite-veined (1-8mm thick). Dips are 10-20° & locally 70-75°.	
3		100	34	0												
	3.50															
4		100	60	17												
	4.20															
		100	96	66			RC00105	RC	4.50							

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 28/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-1.50m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 65.32%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-DS-014
SHEET Sheet 2 of 2

CO-ORDINATES(_) 701,052 E
730,879 N
GROUND LEVEL (mOD) 81.99

RIG TYPE Dando Terrier/BT-44
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm)
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 6.00

DATE COMMENCED 11/10/2021
DATE COMPLETED 12/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
5	5.05														Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (3.72-3.77m).	
		100	93	78												
	5.65															
		100	51	0												
6	6.00											75.99		6.00	End of Borehole at 6 (m)	
7																
8																
9																

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
12-10-21	6.00	1.50	5.10	Water level recorded 5 mins after end of drilling.

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 28/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-1.50m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 65.32%

IGSL COMBINED BH/RC DUB PORT 23560 TPR SITE - REVA - FINAL AGS.GPJ IGSL.GDT 26/8/22

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-DS-015
SHEET Sheet 1 of 2

CO-ORDINATES(_) 700,959 E, 730,866 N
GROUND LEVEL (mOD) 79.81

RIG TYPE Dando Terrier/BT-44
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm)
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 6.00

DATE COMMENCED 01/10/2021
DATE COMPLETED 04/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
0							151660	B	0.00					0.15	TOPSOIL	
							AA151660	B	0.15			79.66			Stiff orangish brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is fine to medium subangular to subrounded predominantly of limestone.	
												79.41		0.40		
							151660	D	0.60	50/60mm		79.21		0.60	Medium dense brown clayey/silty sandy fine to coarse angular to subangular GRAVEL predominantly of limestone. Sand is fine to coarse. Possible weathered bedrock. *0.60m Dynamic sample end depth (79.21m OD)*	
1	0.70						AA151660	B								
	1.50	75	0	0			RC00001 RC00003 RC00005 RC00007 RC00009 RC00121	RC	1.50	50/25mm		78.31		1.50	Openhole drilling returned pulverised arisings from 0.50-1.0m & again from 1.0-1.50m - described by Geologist as grey slightly clayey GRAVEL. Sand is fine to coarse. Gravel is fine to coarse angular to subangular of limestone. Observed by driller as returns of cobbly GRAVEL	
2	2.30											77.51		2.30	Returns of grey cobbly GRAVEL. Gravel is fine to coarse angular to subangular of limestone. Cobbles are subangular of limestone.	
3	3.00	100	37	0						50/14mm		76.81		3.00	Openhole drilling returned pulverised arisings from 2.30-3.0m - described by Geologist as grey slightly clayey GRAVEL. Sand is fine to coarse. Gravel is fine to coarse angular to subangular of limestone. Observed by driller as returns of cobbly GRAVEL	
	3.75						RC00106	RC	3.80						Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones (at 4.50-4.52m, 4.58-4.60m & 5.37-5.40m).	
4		100	77	69												
	4.80															

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 27/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-3.00m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 65.32%

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-DS-015
SHEET Sheet 2 of 2

CO-ORDINATES(_) 700,959 E
730,866 N
GROUND LEVEL (mOD) 79.81

RIG TYPE Dando Terrier/BT-44
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm)
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 6.00

DATE COMMENCED 01/10/2021
DATE COMPLETED 04/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
5		100	98	65											Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones (at 4.50-4.52m, 4.58-4.60m & 5.37-5.40m). Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, locally clay-smeared, locally slightly iron-oxide stained, locally calcite-veined (1-3mm thick). Dips are 10-20° & locally 70-75°. *(continued)*	
6	6.00											73.81		6.00	End of Borehole at 6 (m)	
7																
8																
9																

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
04-10-21	6.00	3.00	5.50	Water level recorded 5 mins after end of drilling.

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 27/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-3.00m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 65.32%

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-DS-016
SHEET Sheet 1 of 2

CO-ORDINATES(_) 700,880 E
730,862 N
GROUND LEVEL (mOD) 78.22

RIG TYPE Dando Terrier/BT-44
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm)
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 6.00

DATE COMMENCED 30/09/2021
DATE COMPLETED 01/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
0							151661	B	0.00			78.07		0.15	TOPSOIL	
														0.55	Stiff orangish brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is fine to medium subangular to subrounded predominantly of limestone.	
							151661	D	0.70	50/50mm		77.67		0.70	Stiff brown slightly sandy very gravelly SILT/CLAY. Gravel is fine to coarse angular to subangular GRAVEL predominantly of limestone. Sand is fine to coarse. (Possible weathered bedrock) *0.70m Dynamic sample end depth (77.52m OD)*	
1												77.52		1.20		
	1.50	100	17	0			RC00023	RC	1.50	50/42mm		77.02		1.50	Openhole drilling returned pulverised arisings from 0.50-1.0m & 1.0-1.20m - described by Geologist as dark brown clayey sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse angular to subangular of limestone	
2	2.25	100	11	0			RC00024	RC	2.50			76.72			SYMMETRIX DRILLING: No recovery, observed by driller as returns of ROCK	
	2.95	100	14	0											Probable moderately weathered ROCK with clay infill - recovered as clayey angular gravel with occasional cobbles. Gravel is fine to coarse angular to subangular of limestone. Cobbles are subangular of limestone.	
3	3.80	100	52	42										3.70		
4	4.30	0	0	0								74.52			Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered. No recovery 4.30-4.50m due to driller re-advancing casing	
	4.50	100	52	52			RC00025	RC	4.80							

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 27/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-4.50m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 65.32%

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-DS-016
SHEET Sheet 2 of 2

CO-ORDINATES(_) 700,880 E
730,862 N
GROUND LEVEL (mOD) 78.22

RIG TYPE Dando Terrier/BT-44
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm)
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 6.00

DATE COMMENCED 30/09/2021
DATE COMPLETED 01/10/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
5	5.00	100	100	89										6.00	Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered. No recovery 4.30-4.50m due to driller re-advancing casing Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally undulose. Apertures are tight to locally moderately open, locally clay-smeared, locally slightly iron-oxide stained, locally calcite-veined (1-6mm thick). Dips are 20-30° & locally 70°. *(continued)*	
6	6.00											72.22			End of Borehole at 6 (m)	
7																
8																
9																

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
01-10-21	6.00	4.50	5.80	Water level recorded 5 mins after end of drilling.

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 27/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-4.50m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 65.32%

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**HOLE NO.**	**TPR-DS-017**
		SHEET	Sheet 1 of 2
CO-ORDINATES(_)	700,918 E 730,848 N	**RIG TYPE**	Dando Terrier/BT-44
GROUND LEVEL (mOD)	79.32	**RC FLUSH MEDIUM**	Air/Mist
		CASING DIAMETER (mm)	
CLIENT	Irish Water / Ervia	**CORE DIAMETER (mm)**	78
ENGINEER	Mott MacDonald Ireland	**BOREHOLE DEPTH (m)**	6.00
		DATE COMMENCED	29/09/2021
		DATE COMPLETED	30/09/2021
		BORED BY	IGSL
		PROCESSED BY	D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
0							151661	B	0.00					0.15	TOPSOIL	
							AA151661	B	0.15			79.17			Stiff orangish brown slightly gravelly slightly sandy SILT. Sand is fine to coarse. Gravel is fine to medium subangular to subrounded predominantly of limestone.	
												78.92		0.40		
							151661	D	0.60	50/75mm		78.72		0.60	Medium dense brown clayey/silty sandy fine to coarse angular to subangular GRAVEL predominantly of limestone with cobbles. Sand is fine to coarse. (Possible weathered bedrock) *0.60m Dynamic sample end depth (78.72m OD)*	
1												78.32		1.00		
	1.50	64	0	0						50/47mm		77.82		1.50	Openhole drilling returned pulverised arisings from 0.50-1.0m - described by Geologist as possible MADE GROUND comprising bright red dark brown mottled very sandy gravelly clay. Sand is fine to coarse. Gravel is fine to medium angular to subangular of limestone.	
2							RC00026	RC	2.00							
	2.20											77.12		2.20	SYMMETRIX DRILLING: No recovery, observed by driller as returns of gravelly CLAY with occasional boulders	
															Returns of brown slightly sandy very gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse angular to subangular of limestone	
3	3.00	100	48	15						50/58mm		76.32		3.00	Coring attempted - Bag sample taken 0.50-1.00m - Described by Geologist as dark brown clayey sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse angular to subangular of limestone.	
	3.75														Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (5.03-5.05m).	
4		100	80	25			RC00107	RC	4.00							
	4.85															

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 28/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-3.00m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 65.32%

BOREHOLE RECORD

REPORT NUMBER 23560

CONTRACT WSP Ground Investigation Contract Lot 3

HOLE NO. TPR-DS-017
SHEET Sheet 2 of 2

CO-ORDINATES(_) 700,918 E
730,848 N
GROUND LEVEL (mOD) 79.32

RIG TYPE Dando Terrier/BT-44
RC FLUSH MEDIUM Air/Mist
CASING DIAMETER (mm)
CORE DIAMETER (mm) 78
BOREHOLE DEPTH (m) 6.00

DATE COMMENCED 29/09/2021
DATE COMPLETED 30/09/2021

CLIENT Irish Water / Ervia
ENGINEER Mott MacDonald Ireland

BORED BY IGSL
PROCESSED BY D.O'Shea

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	Sample Ref. Number	Sample Type	Sample Depth (m)	SPT "N" Value	Legend	Elevation	Water	Depth (m)	Description	Standpipe Details
5	5.35	100	88	58											Very strong to medium strong, thickly to thinly bedded (to very locally thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained, LIMESTONE (predominantly calci-siltite limestone with subordinate MUDSTONE, local stylolites, localised chert formation), slightly weathered to moderately weathered at fissile mudstone/shale zones at (5.03-5.05m).	
		100	100	100												
6	6.00											73.32		6.00	Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally stepped. Apertures are tight to locally moderately open, locally clay-smeared, locally slightly iron-oxide stained, locally calcite-veined (1-2mm thick). Dips are 20-30° & locally 70°. *(continued)*	
															End of Borehole at 6 (m)	
7																
8																
9																

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (hhmm)	Comments

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
30-09-21	6.00	3.00	5.60	Water level recorded 5 mins after end of drilling.

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Dynamic sample date: 28/09/2021. Hand dug inspection pit to 1.20m. Hole cased 0.00-3.00m. Erect Covid-19 Safe Zone - 1hr. SPT Er = 65.32%

Appendix 10C

Trial Pit Records

LEGEND

Trial Pits / Cable Percussion Boreholes

D	Small Disturbed Sample (Tub)
B	Large Disturbed Sample
U	Undisturbed U100 Sample
AA 11235	Sample Reference No
W	Groundwater Sample
Env	Environmental Tub, Jar & Vial
C	SPT N-Value (Solid Cone)
S	SPT N-Value (Split Spoon / Open Shoe)

Rotary Core Drillholes

TCR	Total Core Recovery (%)
SCR	Solid Core Recovery (%)
RQD	Rock Quality Designation Value (%)
NI	Non-Intact (where rock core is highly fractured)

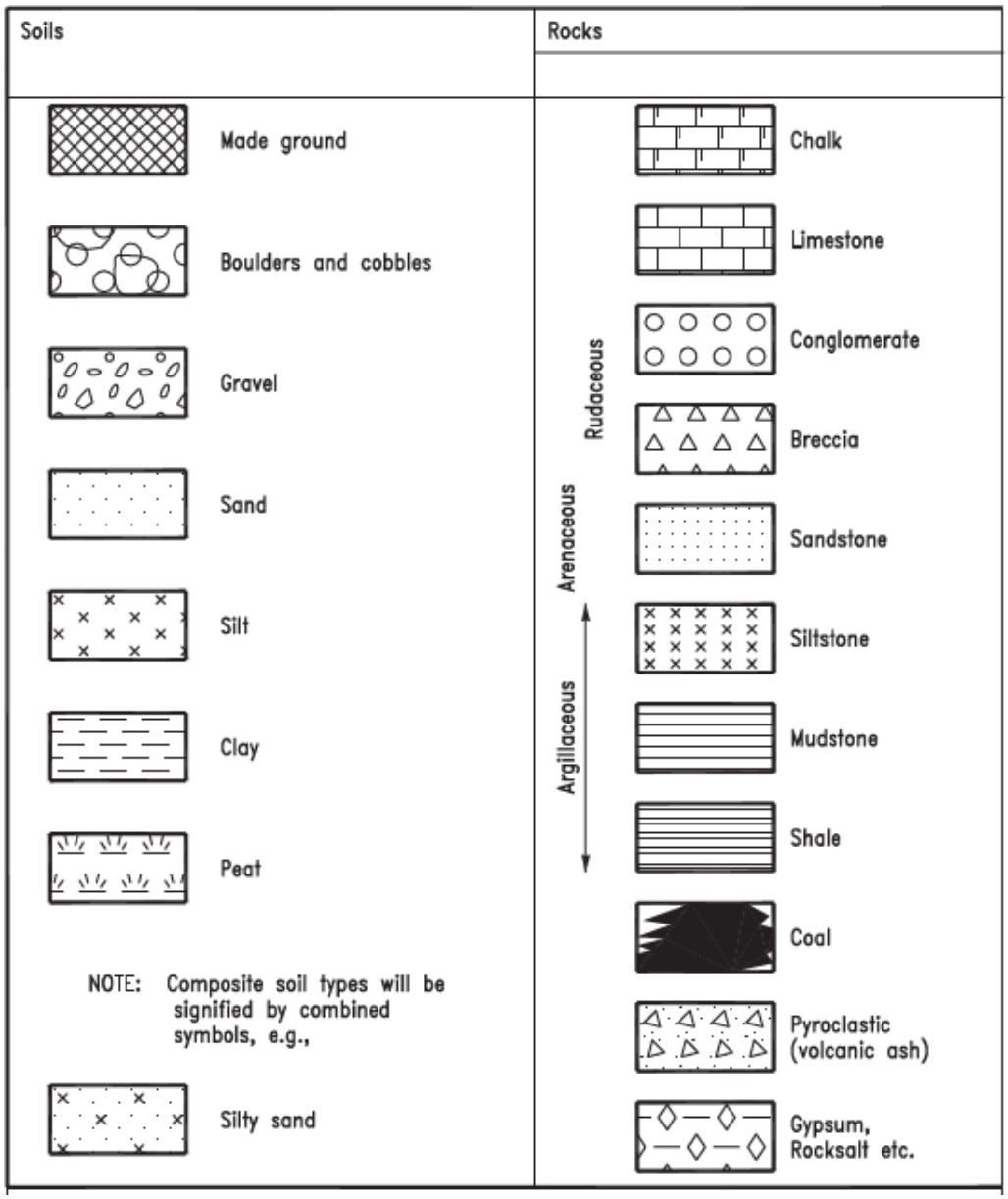
Water Strike Legend



Water Strike

Strata Legends / Symbolic Logs (BS 5930:2015+A1:2020)

Strata legends / symbolic logs reflect main stratum in accordance with BS 5930:2015+A1:2020. Legend codes are selected from GINT software to reflect stratum. Note, due to limited codes, legends may not represent exact constituent proportions (e.g. slightly or very sandy, slightly or very gravelly etc)



TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP001**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	701,011.06 E 731,186.02 N
		DATE STARTED	28/09/2021
		DATE COMPLETED	28/09/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	78.60
ENGINEER	Mott MacDonald Ireland	**EXCAVATION METHOD**	Hitachi 8 Tonne

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 Topsoil		0.20	78.40						
Stiff brown slightly gravelly sandy CLAY with low cobble content. Sand is fine to medium. Gravel is fine to coarse angular to subangular predominantly limestone. Cobbles angular to subangular of limestone						D	0.40-0.40		
0.50m - Plate bearing test					AA152053	B	0.40-0.40		
Possible Weathered Rock recovered as Angular to Tabular cobbles and boulders with little/ residual gravelly sandy clay. Gravel and Cobbles are subangular to tabular predominantly limestone		0.70	77.90						
1.0					AA152054	B	1.00-1.00		
Obstruction - Probable Bedrock End of Trial Pit at 1.35m		1.35	77.25						
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
In situ PBT [plate bearing test] undertaken. Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP002**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	701,057.90 E 731,150.85 N
		DATE STARTED	29/09/2021
		DATE COMPLETED	29/09/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	78.59
		EXCAVATION METHOD	Hitachi 8 Tonne
ENGINEER	Mott MacDonald Ireland		

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 Topsoil									
COBBLES and BOULDERS with gravelly slightly sandy clay. Gravel, cobbles and boulders are dark grey fine to coarse Angular to subangular of limestone 0.50m - CBR test not undertaken, ground conditions unsuitable		0.30	78.29						
Very stiff brown gravelly slightly sandy CLAY. Gravel is fine to coarse subrounded to angular of limestone		0.70	77.89		AA152057	D B	0.80-0.80 0.80-0.80		
1.0									
Obstruction - Probable Bedrock End of Trial Pit at 1.10m		1.10	77.49						
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP003**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	701,095.95 E 731,151.12 N
		DATE STARTED	
		DATE COMPLETED	28/09/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	78.75
ENGINEER	Mott MacDonald Ireland	**EXCAVATION METHOD**	Hitachi 8 Tonne

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 Topsoil									
		0.30	78.45			D	0.30-0.30		
Firm to stiff brown slightly gravelly slightly sandy CLAY. Sand is fine to medium, gravel is fine to coarse, subrounded to angular of predominantly limestone					AA152051	B	0.30-0.30		
		0.50	78.25						
Possible Weathered Rock recovered as Angular to Tabular cobbles and boulders with little/ residual gravelly sandy silt/clay. Gravel and Cobbles are subangular to tabular predominantly limestone					AA152052	B	0.70-0.70		
		0.85	77.90						
Obstruction - Probable Bedrock End of Trial Pit at 0.85m									
1.0									
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP004**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	700,976.15 E 731,124.87 N
		DATE STARTED	29/09/2021
		DATE COMPLETED	29/09/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	78.49
ENGINEER	Mott MacDonald Ireland	**EXCAVATION METHOD**	Hitachi 8 Tonne

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 sightly sandy CLAY. Sand is fine to medium.		0.30	78.19						
Stiff brown gravelly slightly sandy CLAY with high cobble content. Gravel is fine to coarse subangular to angular. Cobbles are subangular to tabular of limestone		0.45	78.04			D B	0.50-0.50 0.50-0.50		
					AA157067				
1.0 Stiff brown slightly gravelly slightly sandy CLAY. Gravel is fine to coarse, subrounded to angular predominantly of limestone		1.00	77.49			D B	1.10-1.10 1.10-1.10		
					AA157068				
Obstruction - Probable Bedrock End of Trial Pit at 1.40m		1.40	77.09						
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
In situ CBR [DCP] test undertaken from ground level. Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP005**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	701,164.05 E 731,110.29 N
		DATE STARTED	29/09/2021
		DATE COMPLETED	29/09/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	79.95
ENGINEER	Mott MacDonald Ireland	**EXCAVATION METHOD**	Hitachi 8 Tonne

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 Topsoil		0.20	79.75						
Stiff brown slightly gravelly slightly sandy CLAY with low cobble content. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles are angular tabular of Limestone									
0.50m - Plate bearing test						D	0.50-0.50		
		0.60	79.35		AA152058	B	0.50-0.50		
Possible Weathered Rock recovered as Angular to Tabular cobbles and boulders with a little residual gravelly sandy silt/clay. Gravel and Cobbles are subangular tabular predominantly limestone					AA152059	B	0.80-0.80		
1.0									
Obstruction - Probable Bedrock End of Trial Pit at 1.10m		1.10	78.85						
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
In situ PBT [plate bearing test] undertaken. Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP006**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	701,002.19 E 731,101.92 N
		DATE STARTED	28/09/2021
		DATE COMPLETED	28/09/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	78.60
ENGINEER	Mott MacDonald Ireland	**EXCAVATION METHOD**	Hitachi 8 Tonne

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 Topsoil		0.20	78.40						
Stiff brown slightly gravelly sandy CLAY with occasional rootlets. Gravel is fine to coarse, subrounded to angular predominantly of limestone		0.35	78.25			D	0.30-0.30		
Possible Weathered Rock recovered as Angular to Tabular cobbles and boulders with little residual gravelly sandy silt/clay. Gravel and Cobbles are subangular to tabular predominantly limestone					AA152055	B	0.30-0.30		
					AA152057	B	0.60-0.60		
Obstruction - Probable Bedrock End of Trial Pit at 0.75m		0.75	77.85						
1.0									
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP007**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	701,154.55 E 731,094.54 N
		DATE STARTED	29/09/2021
		DATE COMPLETED	29/09/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	80.06
ENGINEER	Mott MacDonald Ireland	**EXCAVATION METHOD**	Hitachi 8 Tonne

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 Topsoil									
Stiff brown slightly gravelly slightly sandy SILT/CLAY with rare rootlets. Sand is fine to medium. Gravel is fine to coarse angular to subrounded predominantly limestone.		0.30	79.76						
0.50m - Plate bearing test					AA152060	B	0.50-0.50		
Possible weathered rock recovered as COBBLES with gravel and a little brown slightly sandy gravelly SILT/CLAY. Gravel and cobbles are angular to platy of limestone		0.75 0.80	79.31 79.26		AA152061	B	0.75-0.75		
1.0 Possible weathered rock recovered as Gravel and cobble-sized angular tabular dark grey medium strong limestone		1.00	79.06						
Obstruction - Probable Bedrock End of Trial Pit at 1.00m									
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
In situ PBT [plate bearing test] undertaken. Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP008**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	701,054.50 E 731,094.28 N
		DATE STARTED	29/09/2021
		DATE COMPLETED	29/09/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	78.82
		EXCAVATION METHOD	Hitachi 8 Tonne
ENGINEER	Mott MacDonald Ireland		

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 Topsoil					AA152066	B	0.20-1.20		
Possible weathered rock recovered as angular flat Cobbles of dark grey limestone with a little clay / residual slightly gravelly slightly sandy silt/clay		0.30	78.52		AA152065	B	0.50-0.50		
1.0 Stiff dark brown slightly gravelly sandy CLAY with a medium cobble content. Gravel is fine to coarse. Cobbles are subrounded to angular of mudstone.		1.00	77.82			D	1.20-1.20		
Obstruction - Probable Bedrock End of Trial Pit at 1.60m		1.60	77.22						
2.0									

Groundwater Conditions
Dry

Stability
Minor sidewall collapse from 0.20 to 0.70m on eastern wall

General Remarks
Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP009**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	700,950.94 E 731,059.96 N
		DATE STARTED	30/09/2021
		DATE COMPLETED	30/09/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	78.46
ENGINEER	Mott MacDonald Ireland	**EXCAVATION METHOD**	Hitachi 8 Tonne

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 slightly sandy CLAY. Sand is fine to medium.		0.20	78.26						
Firm brown slightly sandy slightly gravelly CLAY 0.50m - Plate bearing test		0.50	77.96		AA152072	D B	0.50-0.50 0.50-0.50	100 92 95	
Stiff grey brown slightly gravelly slightly sandy CLAY with a low cobble content. Gravel is fine to coarse subrounded to angular. Cobbles are subangular to angular of mudstone and limestone, highly weathered		0.75	77.71		AA152073	D B	0.75-0.75 0.75-0.75		
1.0									
Obstruction - Probable Bedrock End of Trial Pit at 1.10m		1.10	77.36						
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
In situ PBT [plate bearing test] undertaken. Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP010**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	701,093.17 E 731,075.06 N
		DATE STARTED	29/09/2021
		DATE COMPLETED	29/09/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	79.49
ENGINEER	Mott MacDonald Ireland	**EXCAVATION METHOD**	Hitachi 8 Tonne

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
		0.25	79.24						
Firm brown slightly sandy slightly gravelly SILT/CLAY with many cobbles. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles are subangular to subrounded of limestone.		0.40	79.09			D	0.40-0.40		
Possible Weathered Rock recovered as Angular tabular gravel, cobble and boulder-sized fragments of limestone with a little residual slightly gravelly slightly sandy silt/clay. Gravel and cobbles are subangular tabular predominantly of limestone.					AA152062	B	0.40-0.40		
					AA152063	B	0.80-0.80		
1.0									
Firm brown slightly gravelly slightly sandy SILT/CLAY with a medium cobble content. Gravel is subangular to angular fine to coarse of limestone. Cobbles are tabular of limestone		1.20	78.29		AA152064	B	1.20-1.20		
Possible bedrock recovered as medium strong Limestone undulating in profile from north to south of pit		1.60	77.89						
Obstruction - Probable Bedrock End of Trial Pit at 1.80m		1.80	77.69						
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP011**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	701,108.85 E 731,044.22 N
		DATE STARTED	01/10/2021
		DATE COMPLETED	01/10/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	80.46
ENGINEER	Mott MacDonald Ireland	**EXCAVATION METHOD**	Hitachi 8 Tonne

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 slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded		0.20	80.26		AA152080	B	0.30-0.30		
Stiff brown gravelly slightly sandy SILT/CLAY with a low to medium cobble content. Gravel is fine to coarse subrounded to angular. Cobbles are angular to tabular of limestone		0.40	80.06			D	0.40-0.50	Refusal	
						D	0.60-0.70		
0.50m - Hand vane refusal 0.50m - Plate bearing test					AA152081	B	0.60-0.60		
Possible Weathered Rockhead recovered as blocky cobble-sized Limestone fragments with a little sandy clay/silt. Cobbles are of medium strong limestone.		0.80	79.66		AA152082	B	0.90-0.90		
1.0									
Obstruction - Probable Bedrock End of Trial Pit at 1.10m		1.10	79.36						
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
In situ PBT [plate bearing test] undertaken. Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP012**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	701,054.14 E 731,017.86 N
		DATE STARTED	30/09/2021
		DATE COMPLETED	30/09/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	79.69
ENGINEER	Mott MacDonald Ireland	**EXCAVATION METHOD**	Hitachi 8 Tonne

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
		0.20	79.49						
Firm brown slightly gravelly slightly sandy CLAY. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse.						D	0.40-0.50		
0.50m - Plate bearing test					AA152078	B	0.40-0.50	120 90 92	
		0.60	79.09						
Possible Weathered Rock recovered as Angular tabular cobbles and boulders with a little residual gravelly slightly sandy silty clay. Gravel and cobbles are subangular tabular predominantly of limestone.						D	0.80-0.90		
					AA152079	B	0.90-0.90		
1.0 Possible bedrock recovered as medium strong Limestone undulating in profile from 1.0m to 1.20m		1.00	78.69						
		1.20	78.49						
Obstruction - Probable Bedrock End of Trial Pit at 1.20m									
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
In situ PBT [plate bearing test] undertaken at both 0.40 and 0.50m bgl (PBT12A). Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP013**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	700,977.16 E 731,016.81 N
		DATE STARTED	30/09/2021
		DATE COMPLETED	30/09/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	78.86
ENGINEER	Mott MacDonald Ireland	**EXCAVATION METHOD**	Hitachi 8 Tonne

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 Topsoil		0.20	78.66						
Stiff brown slightly gravelly slightly sandy CLAY with a low cobble content. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles are angular tabular of limestone		0.45	78.41			D	0.40-0.45	120	
Stiff grey brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of limestone. 0.50m Blocky cobbles and boulders in eastern end of pit					AA152069	B	0.40-0.45	90 95 120	
						D	0.90-1.00		
1.0 Possible Weathered Rock comprising dark grey Limestone. Limestone obstructing excavation at western end of pit, falling to 1.80m in the centre of the excavation		1.00	77.86		AA152070	B	0.90-1.00		
					AA152071	B	1.20-1.80		
Obstruction - Probable Bedrock End of Trial Pit at 1.80m		1.80	77.06						
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
Pit extended 0.50m to East. Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP014**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	700,928.45 E 731,003.75 N
		DATE STARTED	30/09/2021
		DATE COMPLETED	30/09/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	78.55
		EXCAVATION METHOD	Hitachi 8 Tonne
ENGINEER	Mott MacDonald Ireland		

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
		0.20	78.35						
Firm to stiff brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is fine to coarse angular to subangular of limestone									
0.40m - Plate bearing test						D	0.40-0.40	120	
					AA152074	B	0.40-0.40	95	
								84	
		0.60	77.95						
Possible Weathered Rock recovered as Angular tabular cobbles and boulders with a little residual gravelly slightly sandy silty clay. Gravel and cobbles are subangular tabular predominantly of limestone						D	0.70-0.80		
					AA152075	B	0.70-0.80		
		0.90	77.65						
Obstruction - Probable Bedrock End of Trial Pit at 0.90m									
1.0									
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
In situ PBT [plate bearing test] undertaken. Pit backfilled with arisings upon completion

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP015**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	701,090.20 E 730,999.23 N
		DATE STARTED	30/09/2021
		DATE COMPLETED	30/09/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	80.85
ENGINEER	Mott MacDonald Ireland	**EXCAVATION METHOD**	Hitachi 8 Tonne

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL (MADE GROUND)									
MADE GROUND comprised of firm light brown slightly gravelly slightly sandy CLAY with rootlets. Sand is fine to coarse. Gravel is fine to coarse subrounded to subangular		0.20	80.65			D	0.40-0.40		
MADE GROUND comprised of soft to firm dark brown grey very gravelly slightly sandy SILT/CLAY with rare tarmac, steel and plastic. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of limestone.		0.50	80.35		AA152076	B	0.40-0.40	Refusal	
0.50m - Hand vane refusal					AA152077	B	0.70-0.70		
Possible Weathered Rock recovered as Gravel and cobble-sized angular tabular fragments of dark grey medium strong limestone		0.85 0.90	80.00 79.95						
1.0 Obstruction - Probable Bedrock End of Trial Pit at 0.90m									
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP015A**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	701,090.20 E 730,999.23 N
		DATE STARTED	01/10/2021
		DATE COMPLETED	01/10/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	80.85
ENGINEER	Mott MacDonald Ireland	**EXCAVATION METHOD**	Hitachi 8 Tonne

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
MADE GROUND comprised of brown grey gravelly sandy CLAY with a low to medium cobble, boulders, rare tarmac, steel and plastic. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of limestone. 0.50m - Hand vane refusal		0.30	80.55			D	0.50-0.55	Refusal	
Trial pit terminated at Engineers request - ENV sample retrieved End of Trial Pit at 0.60m		0.60	80.25						
1.0									
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP016**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	701,112.90 E 730,985.37 N
		DATE STARTED	01/10/2021
		DATE COMPLETED	01/10/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	81.57
ENGINEER	Mott MacDonald Ireland	**EXCAVATION METHOD**	Hitachi 8 Tonne

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
MADE GROUND comprised dark brown slightly sandy very gravelly CLAY with a medium to high cobble content and low Boulder Content and concrete blocks. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of limestone. 0.45m - Hand vane refusal		0.40	81.17		AA152083	D B D	0.50-0.50 0.50-0.50 0.60-0.60	Refusal	
Stiff brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of limestone.		0.85	80.72						
1.0 Possible Weathered Rockhead recovered as Gravel- and cobble- sized angular tabular fragments of dark grey medium strong to strong limestone End of Trial Pit at 1.00m		1.00	80.57						
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
Pit terminated on possible rockhead obstruction. Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP017**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	701,078.28 E 730,912.34 N
		DATE STARTED	05/10/2021
		DATE COMPLETED	05/10/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	82.16
		EXCAVATION METHOD	Hitachi 8 Tonne
ENGINEER	Mott MacDonald Ireland		

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
		0.30	81.86						
Firm brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of limestone. (MADE GROUND)		0.40	81.76					25	
						D	0.45-0.50	52	
MADE GROUND comprising brown slightly sandy gravelly CLAY with a low cobble content and rare ceramic and plastic fragments. Sand is fine to medium. Gravel is angular to subrounded fine to coarse. Cobbles are angular tabular of limestone.		0.60	81.56		AA152089	B	0.45-0.50	30	
					AA152090	B	0.70-0.70		
MADE GROUND comprising greyish brown very sandy gravelly silty CLAY with a low to medium cobble content and rare tarmacadam, concrete, timber and brick fragments. Sand is medium to coarse. Gravel is angular to subangular fine to coarse of limestone.		0.80	81.36						
1.0 Possible Weathered Rockhead recovered as angular cobble and gravel-sized fragments of medium strong dark grey LIMESTONE and MUDSTONE		0.90	81.26						
Obstruction - Probable Bedrock End of Trial Pit at 0.90m									
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP018**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	700,921.02 E 730,964.97 N
		DATE STARTED	06/10/2021
		DATE COMPLETED	06/10/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	78.59
ENGINEER	Mott MacDonald Ireland	**EXCAVATION METHOD**	Hitachi 8 Tonne

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 slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular of limestone.		0.25	78.34		AA152098	D B	0.30-0.40 0.30-0.40	120	
Possible Weathered Rockhead recovered as Gravel- and cobble- sized angular tabular fragments of dark grey medium strong to strong limestone		0.55	78.04		AA152099	D B	0.50-0.70 0.50-0.70		
Possible Weathered Rockhead recovered as Gravel- and Cobble-sized angular to tabular fragments of dark brown Mudstone		0.85	77.74						
1.0 Possible Weathered Rockhead recovered as Gravel- and cobble- sized Angular tabular fragments of dark grey medium strong to strong limestone		0.95	77.64						
Obstruction - Probable Bedrock End of Trial Pit at 1.20m		1.20	77.39						
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
In situ PBT [plate bearing test] undertaken. Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP019**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	701,113.08 E 730,962.75 N
		DATE STARTED	05/10/2021
		DATE COMPLETED	05/10/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	81.93
ENGINEER	Mott MacDonald Ireland	**EXCAVATION METHOD**	Hitachi 8 Tonne

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
		0.30	81.63						
Firm brown slightly sandy slightly gravelly CLAY with a low cobble content. Sand is fine. Gravel is angular to subrounded fine to coarse of limestone.						D	0.40-0.40		
		0.45	81.48		AA152086	B	0.40-0.40	Refusal	
MADE GROUND comprising brown slightly sandy gravelly CLAY with a medium cobble content and rare timber and plastic fragments (localised at 0.55m). Sand is fine to medium. Gravel is angular to subangular fine to coarse of limestone. Cobbles are angular tabular of limestone. 0.50m - Hand vane refusal						D	0.55-0.60		
		0.65	81.28		AA152087	B	0.55-0.55		
		0.75	81.18		AA152088	B	0.75-0.75		
Possible Rockhead recovered as angular gravel- and cobble-sized blocky fragments of dark grey LIMESTONE with a little brown slightly sandy gravelly silt/clay									
1.0 Obstruction - Probable Bedrock End of Trial Pit at 0.75m									
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
In situ PBT [plate bearing test] undertaken. Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP020**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	700,897.09 E 730,945.98 N
		DATE STARTED	06/10/2021
		DATE COMPLETED	06/10/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	78.36
ENGINEER	Mott MacDonald Ireland	**EXCAVATION METHOD**	Hitachi 8 Tonne

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
		0.30	78.06		AA152100	B	0.25-0.30		
Stiff brown dark brown slightly sandy slightly gravelly SILT/CLAY with a low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles are angular flat of limestone and mudstone.		0.50	77.86			D	0.45-0.50	101	
					AA152101	B	0.45-0.50	90	
Possible Weathered Rockhead recovered as blocky gravel-, cobble- and boulder-sized fragments of angular LIMESTONE with a little brown sandy gravelly clay. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of limestone.		0.80	77.56						
Possible Weathered Rockhead recovered as gravel and blocky cobble-sized fragments of flat angular LIMESTONE with a little slighlty sandy very gravelly silt/clay. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of limestone.					AA152102	B	1.00-1.05		
1.0									
End of Trial Pit at 1.15m		1.15	77.21						
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
Changed orientation of trial pit from North to south to East to West due to refusal with toothed bucket. In situ CBR [DCP] test undertaken from ground level. Pit ended on possible rockhead obstruction. Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP021**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	701,059.04 E 730,923.84 N
		DATE STARTED	05/10/2021
		DATE COMPLETED	05/10/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	81.46
ENGINEER	Mott MacDonald Ireland	**EXCAVATION METHOD**	Hitachi 8 Tonne

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
MADE GROUND comprising brown and grey slightly sandy gravelly CLAY with a low cobble content and rare plastic and tarmacadam fragments. Sand is fine to medium. Gravel is angular to subangular fine to coarse of limestone. Cobbles are angular tabular of limestone. 0.40m - Hand vane refusal		0.30	81.16			D B D D	0.30-0.35 0.30-0.35 0.35-0.40 0.40-0.45	Refusal	
Possible Weathered Rockhead recovered as blocky gravel-, cobble- and boulder-sized fragments of angular LIMESTONE		0.60	80.86		AA152093				
Possible Weathered Rockhead recovered as gravel- and cobble-sized fragments of highly to completely weathered dark brown platy MUDSTONE with some firm dark brown slightly sandy gravelly SILT/CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone.		0.90	80.56			D	0.90-0.95		
1.0 Obstruction - Probable Bedrock End of Trial Pit at 1.00m		1.00	80.46		AA152094 AA152095	B B	0.90-0.95 0.95-1.00		
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP022**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	700,872.20 E 730,886.63 N
		DATE STARTED	06/10/2021
		DATE COMPLETED	06/10/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	78.25
ENGINEER	Mott MacDonald Ireland	**EXCAVATION METHOD**	Hitachi 8 Tonne

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
		0.25	78.00			D	0.25-0.30		
Firm to stiff light brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is subrounded to subangular fine to coarse of limestone.					AA152103	B	0.25-0.30	79	
		0.60	77.65					61	
Firm to stiff grey brown gravelly sandy CLAY with a medium cobble content and low boulder content. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone. Cobbles and boulders are blocky, angular and tubular of limestone. Possible weathered rock profile observed in eastern wall from 1.0 to 1.7m bgl.						D	0.60-0.65	120	
1.0					AA152104	B	0.60-0.65		
					AA152105	B	1.60-1.70		
		1.70	76.55						
Possible Rockhead/Boulder, undulating in profile from 1.20m to 1.70m from east to west across pit End of Trial Pit at 1.70m									
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
In situ PBT [plate bearing test] undertaken. Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP023**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	701,063.85 E 730,894.16 N
		DATE STARTED	05/10/2021
		DATE COMPLETED	05/10/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	82.02
ENGINEER	Mott MacDonald Ireland	**EXCAVATION METHOD**	Hitachi 8 Tonne

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
MADE GROUND comprising firm brown and grey slightly sandy slightly gravelly CLAY with a low to medium cobble content and rare plastic and steel fragments. Sand is fine. Gravel is angular to subangular fine to medium. Cobbles are angular tabular and platy of limestone.		0.30	81.72			D	0.40-0.45		
					AA152091	B	0.40-0.45	33	
		0.55	81.47					69	
Possible Rockhead recovered as angular gravel- and cobble-sized fragments of dark grey LIMESTONE with a little brown slightly sandy gravelly silt/clay						D	0.60-0.65	41	
		0.70	81.32		AA152092	B	0.60-0.65		
Obstruction - Probable Bedrock End of Trial Pit at 0.70m									
1.0									
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
In situ CBR [DCP] test undertaken from ground level. Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP024**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	700,919.09 E 730,860.95 N
		DATE STARTED	06/10/2021
		DATE COMPLETED	06/10/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	79.12
ENGINEER	Mott MacDonald Ireland	**EXCAVATION METHOD**	Hitachi 8 Tonne

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
		0.20	78.92			D	0.20-0.30		
Possible Weathered Rockhead recovered as angular and tabular Gravel and cobble-sized fragments of dark grey medium strong to strong limestone with a little brown slightly sandy slightly gravelly silt/clay 0.30m - Hand vane refusal		0.30	78.82		AA152109	B	0.20-0.30	REF	
Possible Weathered Rockhead recovered as Gravel and cobble sized dark grey medium strong to strong limestone - platy and tabular		0.50	78.62						
		0.60	78.52						
Possible Weathered Rockhead recovered as Gravel and cobble sized dark grey medium strong to strong mudstone- Angular platy to tabular									
Possible Rockhead/Boulder recovered as brown clayey/silty sandy Gravel-sized fragments 0.60-1.05m - Rockhead slopes from 0.60 to 1.05m at ~45 degrees					AA152110	B	0.90-1.00		
1.0									
Obstruction - Probable Bedrock End of Trial Pit at 1.05m		1.05	78.07						
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
In situ CBR [DCP] test undertaken from ground level. Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP025**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	700,882.07 E 730,856.28 N
		DATE STARTED	06/10/2021
		DATE COMPLETED	06/10/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	78.33
ENGINEER	Mott MacDonald Ireland	**EXCAVATION METHOD**	Hitachi 8 Tonne

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
						D	0.25-0.30		
Firm to stiff dark brown slightly sandy slightly gravelly SILT/CLAY with low cobble content. Sand is fine to coarse. Gravel is angular fine to coarse of limestone. Cobbles are tabular of limestone.		0.30	78.03		AA152106	B	0.25-0.30	79 58	
						D	0.55-0.60		
Possible Weathered Rockhead recovered as angular and tabular Gravel and cobble-sized fragments of dark grey medium strong to strong limestone with a little brown slightly sandy slightly gravelly silt/clay		0.60	77.73		AA152107	B	0.55-0.60		
1.0 Obstruction - Probable Bedrock End of Trial Pit at 1.00m		1.00	77.33		AA152108	B	0.95-1.00		
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP026**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	700,970.08 E 730,854.52 N
		DATE STARTED	05/10/2021
		DATE COMPLETED	05/10/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	80.06
ENGINEER	Mott MacDonald Ireland	**EXCAVATION METHOD**	Hitachi 8 Tonne

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	79.96						
Possible Weathered Rockhead recovered as gravel, cobble and boulder-sized flat to tabular fragments of dark grey medium strong to strong limestone with interbedded mudstone at 0.40m and 0.9m bgl and a little clay/silt 0.30m - Hand vane refusal								REF	
					AA152096	B	0.45-0.50		
1.0					AA152097	B	1.00-1.10		
Obstruction - Probable Bedrock End of Trial Pit at 1.10m		1.10	78.96						
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP027**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	701,036.92 E 730,838.80 N
		DATE STARTED	07/10/2021
		DATE COMPLETED	07/10/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	81.56
ENGINEER	Mott MacDonald Ireland	**EXCAVATION METHOD**	Hitachi 8 Tonne

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 comprised of Asphalt		0.10	81.46						
MADE GROUND comprised of light grey and brown clayey/silty sandy Gravel. Sand is fine to medium. Gravel is angular to subrounded fine to coarse of limestone.					AA152122	B	0.15-0.20		
0.30m Geotextile Membrane		0.30	81.26						
Possible Weathered Rockhead recovered as flat / tabular Gravel and cobble-sized fragments of dark grey medium strong to strong limestone with a little brown silt/clay						D	0.35-0.40		
					AA152123	B	0.60-0.70		
Obstruction - Probable Bedrock End of Trial Pit at 0.70m		0.70	80.86						
1.0									
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP028**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	700,918.57 E 730,851.06 N
		DATE STARTED	06/10/2021
		DATE COMPLETED	06/10/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	79.22
ENGINEER	Mott MacDonald Ireland	**EXCAVATION METHOD**	Hitachi 8 Tonne

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL						D	0.30-0.35		
Very stiff dark brown slightly sandy slightly gravelly CLAY with dark brown angular limestone and mudstone cobbles and boulders. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular of limestone. (Possible weathered rockhead)		0.35	78.87		AA152111	B	0.30-0.35		
					AA152112	B	0.35-0.40		
		0.50	78.72		AA152113	B	0.40-0.50		
Possible Weathered Rockhead recovered as Angular tabular Gravel, cobble- and boulder-sized fragments of dark grey medium strong to strong limestone. Horizon of light brown white silty clay in West wall of trial pit.		0.75	78.47		AA152114	B	0.70-0.75	18 32 43	
Obstruction - Probable Bedrock End of Trial Pit at 0.75m									
1.0									
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP029**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	700,944.20 E 730,848.59 N
		DATE STARTED	07/10/2021
		DATE COMPLETED	07/10/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	79.71
ENGINEER	Mott MacDonald Ireland	**EXCAVATION METHOD**	Hitachi 8 Tonne

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 to stiff dark brown very gravelly slightly sandy CLAY with a low cobble content. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of limestone. Gravel and cobbles are angular tabular of limestone		0.25	79.46			D	0.30-0.35		
					AA152115	B	0.30-0.35	74 62	
Possible Weathered Rockhead recovered as Gravel- and cobble-sized flat / tabular fragments of dark grey medium strong to strong limestone		0.50	79.21		AA152116	B	0.50-0.55	58	
					AA152117	B	0.80-0.85		
Obstruction - Probable Bedrock End of Trial Pit at 0.85m		0.85	78.86						
1.0									
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP030**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	700,944.22 E 730,899.57 N
		DATE STARTED	07/10/2021
		DATE COMPLETED	07/10/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	79.20
ENGINEER	Mott MacDonald Ireland	**EXCAVATION METHOD**	Hitachi 8 Tonne

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL						D	0.25-0.30		
		0.30	78.90		AA152118	B	0.25-0.30	101 78 80	
Possible weathered rock recovered as flat angular Limestone with a little brown slightly sandy slightly gravelly silt/clay. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone.					AA152119	B	0.50-0.60		
		0.60	78.60						
Possible weathered rock recovered as flat angular Limestone. Rock subcrop appears vertically fractured.									
		0.80	78.40						
Possible Weathered Rockhead recovered as Angular platy Gravel- and cobble-sized fragments of dark grey medium strong to strong mudstone with a little clay/silt					AA152120	B	0.90-1.00		
1.0 Obstruction - Probable Bedrock End of Trial Pit at 1.00m		1.00	78.20						
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP031**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	700,966.46 E 730,528.55 N
		DATE STARTED	12/10/2021
		DATE COMPLETED	12/10/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	80.76
ENGINEER	Mott MacDonald Ireland	**EXCAVATION METHOD**	Hitachi 8 Tonne

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	80.66						
MADE GROUND comprised of stiff brown gravelly slightly sandy SILT/CLAY with brick, rare wire, plastic, metal and concrete blocks and boulders. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of limestone.						D B	0.30-0.40 0.30-0.40	95 92 >120	
					AA152132				
1.0 Obstruction - Probable Bedrock End of Trial Pit at 1.10m		1.10	79.66						
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP032**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	700,965.35 E 730,508.62 N
		DATE STARTED	12/10/2021
		DATE COMPLETED	12/10/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	80.52
ENGINEER	Mott MacDonald Ireland	**EXCAVATION METHOD**	Hitachi 8 Tonne

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
		0.15	80.37		AA152124	B	0.10-0.15		
Firm brown slightly gravelly slightly sandy CLAY with a low to medium cobble content. Sand is fine to medium. Gravel is fine to coarse. Gravel and cobbles are subrounded to tabular of limestone - Possible MADE GROUND						D	0.20-0.30		
		0.30	80.22		AA152130	B	0.20-0.30		
Stiff dark brown slightly gravelly slightly sandy CLAY. Sand is fine to medium. Gravel is fine to coarse subrounded to subangular of limestone.						D	0.40-0.50	>120	
					AA152131	B	0.40-0.50		
		0.60	79.92						
Possible Weathered Rockhead recovered as flat / tabular Gravel and cobble-sized fragments of dark grey medium strong to strong limestone with a little brown sandy gravelly clay. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone. End of Trial Pit at 0.60m									
1.0									
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
Pit ended on possible rockhead obstruction. Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP033**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	700,985.22 E 730,516.79 N
		DATE STARTED	12/10/2021
		DATE COMPLETED	12/10/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	81.04
ENGINEER	Mott MacDonald Ireland	**EXCAVATION METHOD**	Hitachi 8 Tonne

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 comprised of Loose Asphalt		0.10	80.94						
MADE GROUND comprised of light grey clayey/silty sandy Gravel. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of limestone.					AA152126	B	0.30-0.35		
0.40m Geotextile Membrane		0.40	80.64						
MADE GROUND comprised of firm brown gravelly slightly sandy SILT/CLAY with frequent bricks, rare wire, plastic and metal. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of limestone.						D	0.50-0.55		
					AA152127	B	0.50-0.55		
Obstruction - Probable Bedrock End of Trial Pit at 0.80m		0.80	80.24						
1.0									
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP034**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	700,921.78 E 730,483.40 N
		DATE STARTED	12/10/2021
		DATE COMPLETED	12/10/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	79.77
ENGINEER	Mott MacDonald Ireland	**EXCAVATION METHOD**	Hitachi 8 Tonne

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL		0.15	79.62						
Stiff brown greenish grey slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is fine to coarse subrounded to subangular of limestone.						D	0.20-0.30		
					AA152133	B	0.20-0.30		
0.40m - Hand vane refusal								REF	
Firm brown gravelly slightly sandy CLAY with a low cobble content. Sand is fine to coarse. Gravel is fine to coarse. Gravel and cobbles are subrounded to angular of limestone and mudstone		0.55	79.22						
						D	0.70-0.80		
1.0					AA152134	B	0.70-0.80		
Obstruction - Probable Bedrock End of Trial Pit at 1.40m		1.40	78.37						
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

TRIAL PIT RECORD

REPORT NUMBER 23560

CONTRACT	WSP Ground Investigation Contract Lot 3	**TRIAL PIT NO.**	**TPR-TP035**
		SHEET	Sheet 1 of 1
LOGGED BY	D.Newell	**CO-ORDINATES**	700,846.70 E 730,433.36 N
		DATE STARTED	12/10/2021
		DATE COMPLETED	12/10/2021
CLIENT	Irish Water / Ervia	**GROUND LEVEL (m)**	77.99
ENGINEER	Mott MacDonald Ireland	**EXCAVATION METHOD**	Hitachi 8 Tonne

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
Stiff brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrouded of limestone 0.30m - Hand vane refusal		0.20	77.79			D	0.30-0.40	REF	
					AA152135	B	0.30-0.40		
Firm greyish brown gravelly slighty sandy slightly gravelly CLAY with a low to medium cobble content. Sand is fine to coarse. Gravel is fine to coarse. Gravel and cobbles are subrounded, subangular to flat of limestone		0.50	77.49						
1.0						D	0.80-0.90		
					AA152136	B	0.80-0.90		
Obstruction - Probable Bedrock End of Trial Pit at 1.40m		1.40	76.59						
2.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
Pit backfilled with arisings upon completion. Trial pit length = 3.50m / width = 0.50m.

Appendix 10D

Peat Probe & Russian Core Records

Appendix 10E

Field / In-Situ Test Results

Appendix 10E.1

Borehole Infiltration Tests

Borehole Infiltration Test

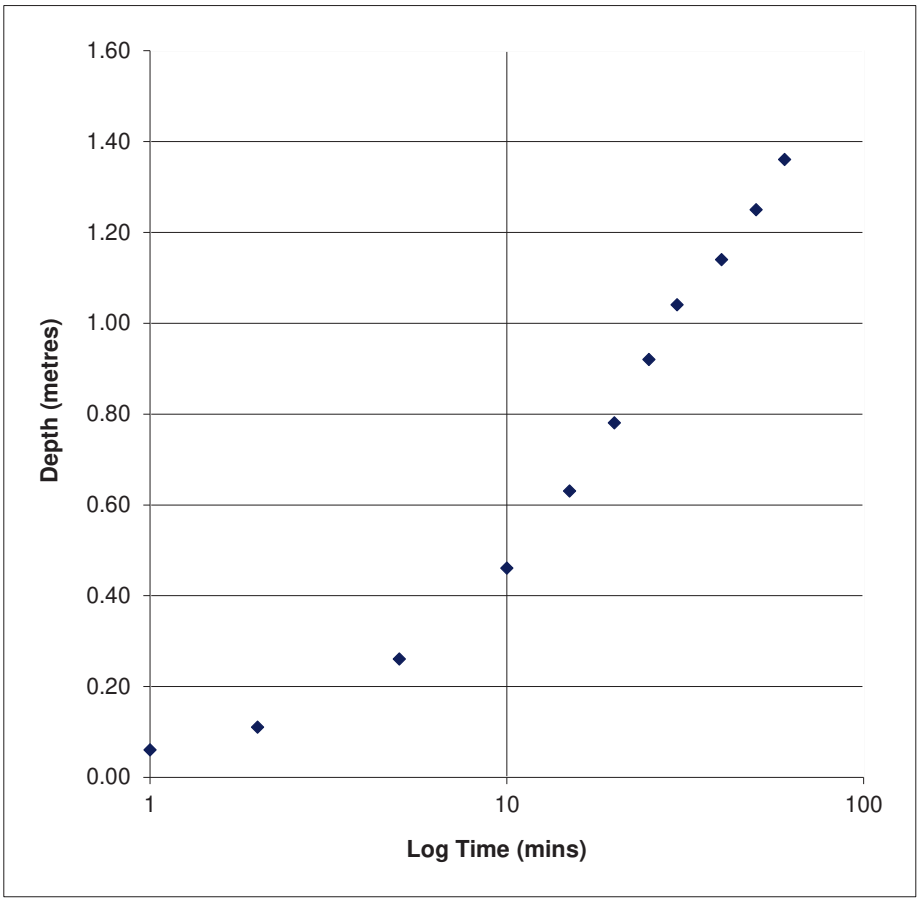
IGSL

CONTRACT:	WSP Lot 3
NUMBER	23560
CLIENT:	Ervia / Irish Water
ENGINEER:	MM
LOCATION:	TPR-BH003
BOREHOLE No.	TPR-BH003
TEST No.	1
Date	16/09/2021

TEST RESPONSE ZONE DETAILS:

Top (mbgl):	1.00
Bottom (mbgl):	1.00
Length (m):	0.00
Diameter (m):	0.200
Initial Standing Water Level (m below top of casing)	None
Height of casing or standpipe : above ground level (m)	0.70
Falling or Rising Head Test?	Falling

Elapsed Time (mins)	Depth to Water* (m)
0.00	0.00
1	0.06
2	0.11
5	0.26
10	0.46
15	0.63
20	0.78
25	0.92
30	1.04
40	1.14
50	1.25
60	1.36



Calculation of steady flow Rate

T1 (mins)	0.00
T2 (mins)	60.00
Flow period (mins)	60.00
Initial depth (m)	0.00
Final depth (m)	1.36
Fall in level (m)	1.36
Vol. Dispersed (m3)	0.0427

Respone Zone

Length (m)	0.000
Diameter (m)	0.200
Exposed Area (m2)	0.031

f-value = Volume dispersed / unit exposed area / unit time

f-value (m/min) = 2.27E-02

* Below Ground level

Borehole Infiltration Test

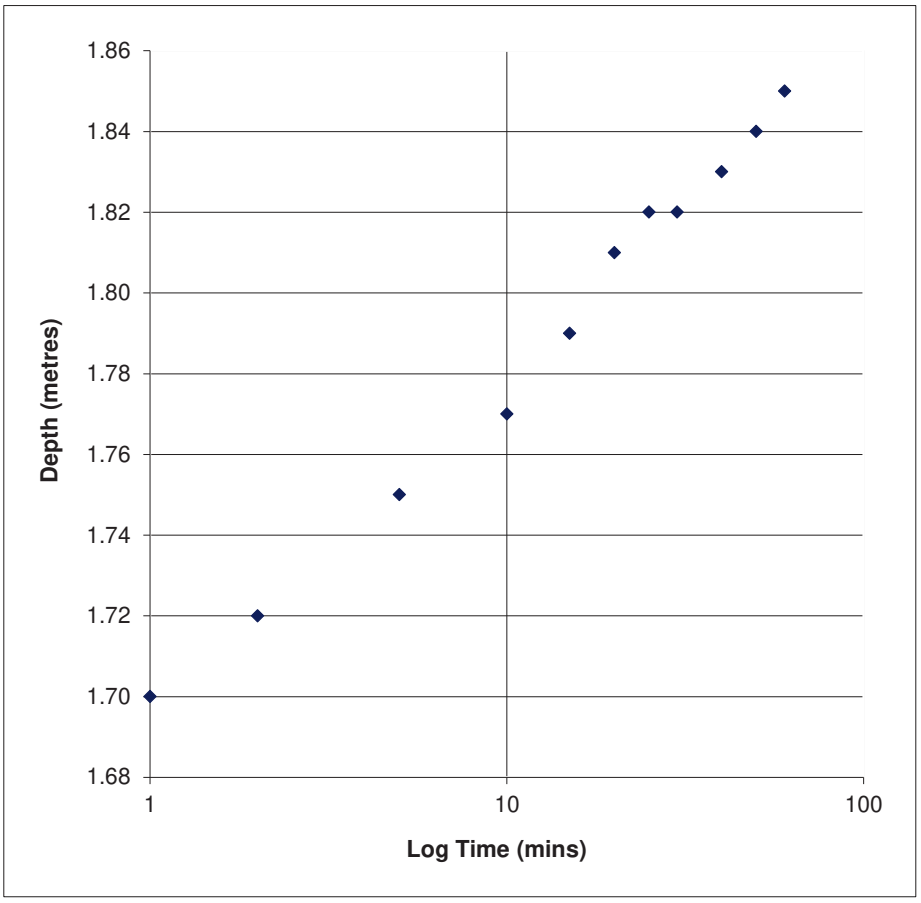
IGSL

CONTRACT:	WSP Lot 3
NUMBER	23560
CLIENT:	Ervia / Irish Water
ENGINEER:	MM
LOCATION:	TPR-BH009
BOREHOLE No.	TPR-BH009
TEST No.	1
Date	20/09/2021

TEST RESPONSE ZONE DETAILS:

Top (mbgl):	1.50
Bottom (mbgl):	1.90
Length (m):	0.40
Diameter (m):	0.200
Initial Standing Water Level (m below top of casing)	None
Height of casing or standpipe : above ground level (m)	0.20
Falling or Rising Head Test?	Falling

Elapsed Time (mins)	Depth to Water* (m)
0.00	1.57
1	1.70
2	1.72
5	1.75
10	1.77
15	1.79
20	1.81
25	1.82
30	1.82
40	1.83
50	1.84
60	1.85



Calculation of steady flow Rate

T1 (mins)	0.00
T2 (mins)	60.00
Flow period (mins)	60.00
Initial depth (m)	1.57
Final depth (m)	1.85
Fall in level (m)	0.28
Vol. Dispersed (m3)	0.0088

Respone Zone

Length (m)	0.400
Diameter (m)	0.200
Exposed Area (m2)	0.283

f-value = Volume dispersed / unit exposed area / unit time

f-value (m/min) = 5.19E-04

* Below Ground level

Borehole Infiltration Test

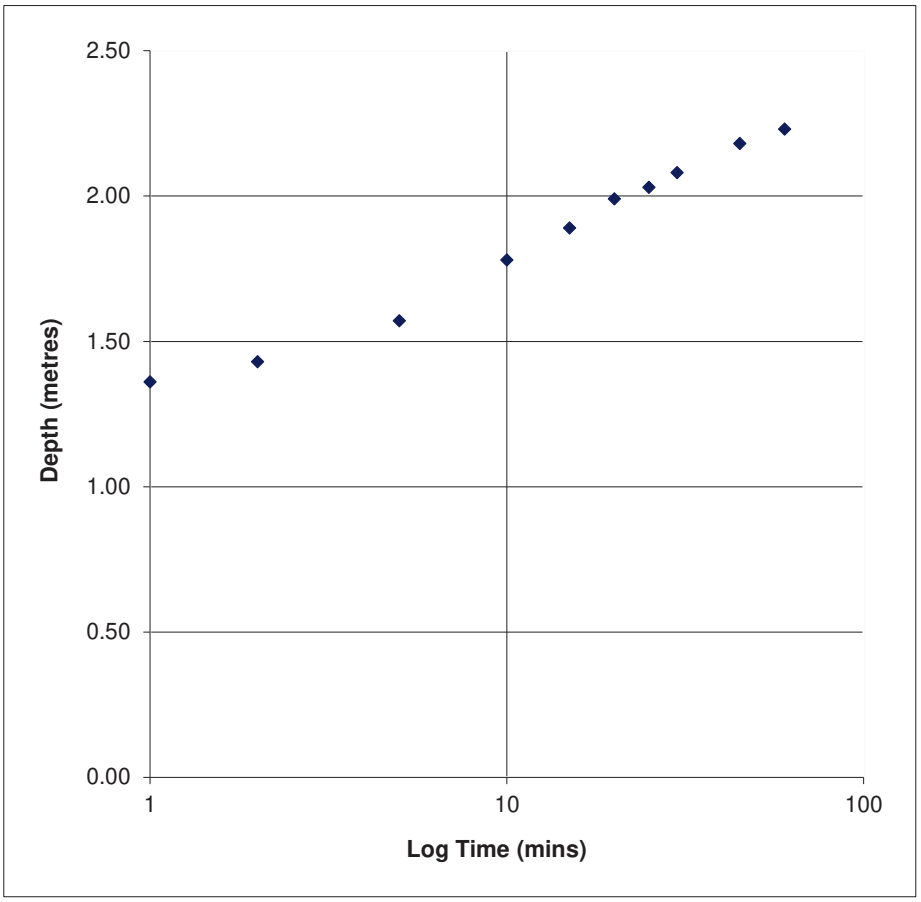
IGSL

CONTRACT:	WSP Lot 3
NUMBER	23560
CLIENT:	Ervia / Irish Water
ENGINEER:	MM
LOCATION:	TPR-BH011
BOREHOLE No.	TPR-BH011
TEST No.	1
Date	11/11/2021

TEST RESPONSE ZONE DETAILS:

Top (mbgl):	1.50
Bottom (mbgl):	1.60
Length (m):	0.10
Diameter (m):	0.150
Initial Standing Water Level (m below top of casing)	None
Height of casing or standpipe : above ground level (m)	1.00
Falling or Rising Head Test?	Falling

Elapsed Time (mins)	Depth to Water* (m)
0.00	0.00
1	1.36
2	1.43
5	1.57
10	1.78
15	1.89
20	1.99
25	2.03
30	2.08
45	2.18
60	2.23



Calculation of steady flow Rate

T1 (mins)	0.00
T2 (mins)	60.00
Flow period (mins)	60.00
Initial depth (m)	0.00
Final depth (m)	2.23
Fall in level (m)	2.23
Vol. Dispersed (m3)	0.0394

Respone Zone

Length (m)	0.100
Diameter (m)	0.150
Exposed Area (m2)	0.065

f-value = Volume dispersed / unit exposed area / unit time

f-value (m/min) = 1.01E-02

* Below Ground level

Borehole Infiltration Test

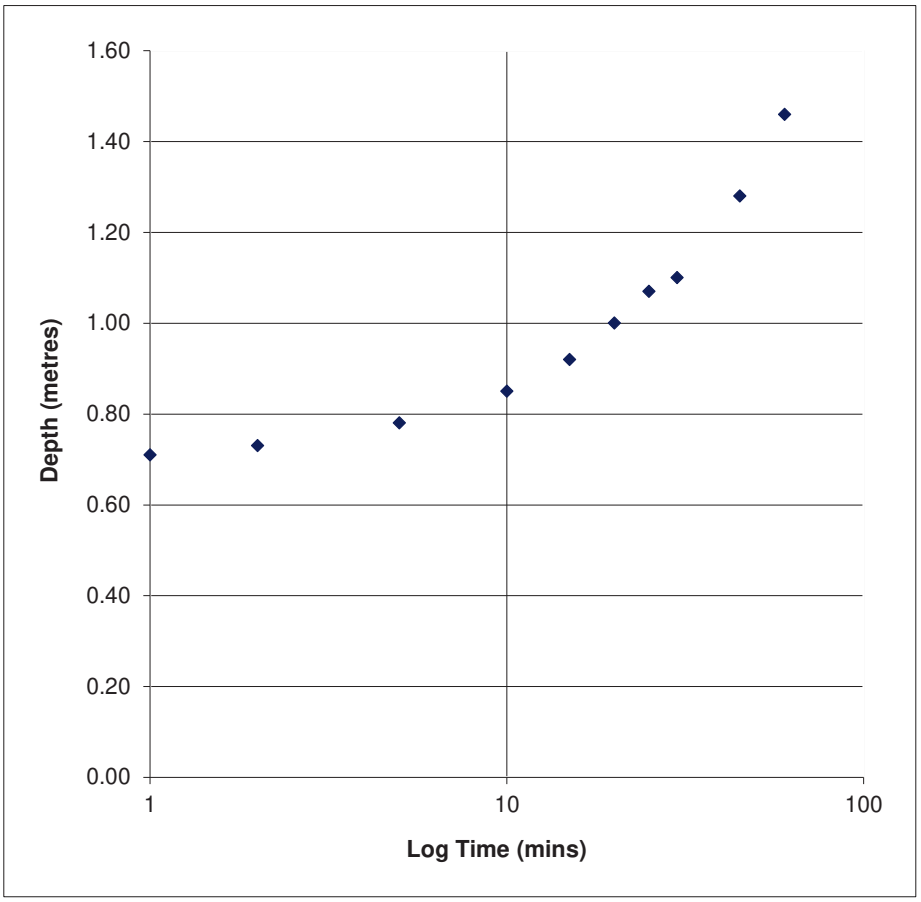
IGSL

CONTRACT:	WSP Lot 3
NUMBER	23560
CLIENT:	Ervia / Irish Water
ENGINEER:	MM
LOCATION:	TPR-BH014
BOREHOLE No.	TPR-BH014
TEST No.	1
Date	15/11/2021

TEST RESPONSE ZONE DETAILS:

Top (mbgl):	2.00
Bottom (mbgl):	2.10
Length (m):	0.10
Diameter (m):	0.150
Initial Standing Water Level (m below top of casing)	None
Height of casing or standpipe : above ground level (m)	0.40
Falling or Rising Head Test?	Falling

Elapsed Time (mins)	Depth to Water* (m)
0.00	0.00
1	0.71
2	0.73
5	0.78
10	0.85
15	0.92
20	1.00
25	1.07
30	1.10
45	1.28
60	1.46



Calculation of steady flow Rate

T1 (mins)	0.00
T2 (mins)	60.00
Flow period (mins)	60.00
Initial depth (m)	0.00
Final depth (m)	1.46
Fall in level (m)	1.46
Vol. Dispersed (m3)	0.0258

Respone Zone

Length (m)	0.100
Diameter (m)	0.150
Exposed Area (m2)	0.065

f-value = Volume dispersed / unit exposed area / unit time

f-value (m/min) = 6.64E-03

* Below Ground level

Appendix 10E.2

Packer Test Records

PACKER TEST RESULT SHEET — IGSL (F13)

JOB NO.	23530	GROUND LEVEL (mOD)	79.76
CONTRACT	WSP Lot 3	BOTTOM OF HOLE (m)	4.40
LOCATION	TPR Site	TOP OF TEST SECTION (m)	3.10
		BOTTOM OF TEST SECTION (m)	4.40
BOREHOLE NO.	TPR-BH006	CENTRE OF TEST SECTION (m)	3.75
TEST NO.	1	GAUGE HEIGHT ABOVE GROUND LEVEL (m)	0.10
DATE OF TEST	09-Nov-21	INITIAL GROUND WATER LEVEL (m)	2.50

FLOW METER READINGS

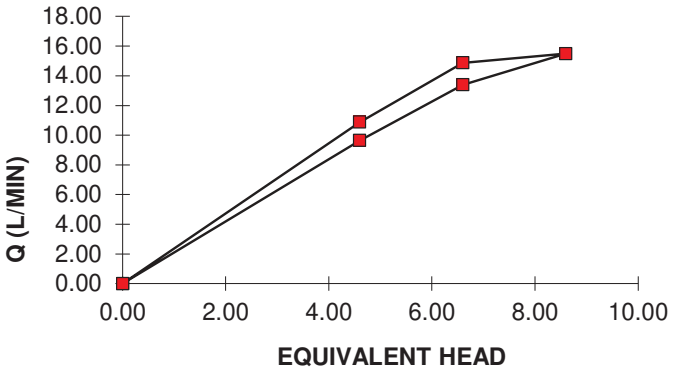
RUN NUMBER	PRESSURE (BAR)	0 MIN (LITRES)	5 MIN (LITRES)	10 MIN (LITRES)	15 MIN (LITRES)
1	0.2	185485	185559	185512	185673
2	0.4	185586	185736	185810	185847
3	0.6	185912	186019	186132	186214
4	0.4	186223	186331	186422	186513
5	0.2	186520	186591	186658	186732

WATER TAKEN

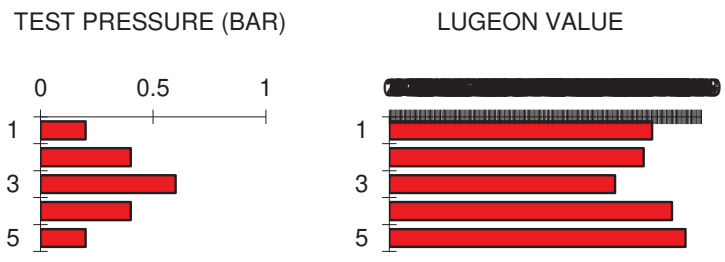
RUN NUMBER	0-5 MIN (LITRES)	5-10 MIN (LITRES)	10-15 MIN (LITRES)	0-15 MIN (LITRES)	Q (L/MIN)
1	74.00	-47.00	161.00	188.00	12.53
2	150.00	74.00	37.00	261.00	17.40
3	107.00	113.00	82.00	302.00	20.13
4	108.00	91.00	91.00	290.00	19.33
5	71.00	67.00	74.00	212.00	14.13

EQUIVALENT HEAD (M)	Q (L/MIN/METRE)
0.00	0.00
4.60	9.64
6.60	13.38
8.60	15.49
6.60	14.87
4.60	10.87
0.00	0.00

AVERAGE LUGEON **211**



Analysis by Houlsby Method (1976)



PACKER TEST RESULT SHEET — IGSL (F13)

JOB NO.	23530	GROUND LEVEL (mOD)	80.85
CONTRACT	WSP Lot 3	BOTTOM OF HOLE (m)	4.40
LOCATION	TPR Site	TOP OF TEST SECTION (m)	3.10
		BOTTOM OF TEST SECTION (m)	4.40
BOREHOLE NO.	TPR-BH010	CENTRE OF TEST SECTION (m)	3.75
TEST NO.	1	GAUGE HEIGHT ABOVE GROUND LEVEL (m)	0.10
DATE OF TEST	10/11/2021	INITIAL GROUND WATER LEVEL (m)	3.00

FLOW METER READINGS

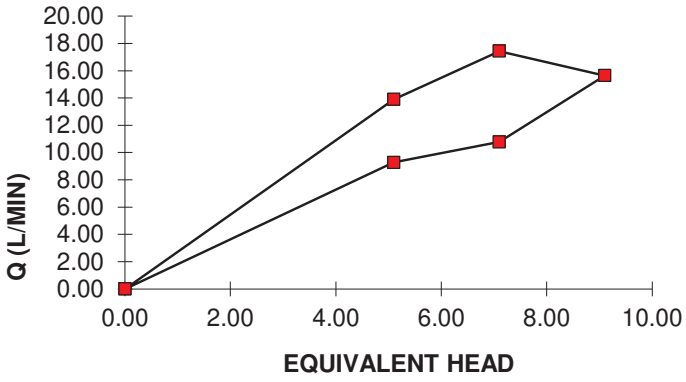
RUN NUMBER	PRESSURE (BAR)	0 MIN (LITRES)	5 MIN (LITRES)	10 MIN (LITRES)	15 MIN (LITRES)
1	0.2	186751	186818	186871	186932
2	0.4	186940	187010	187089	187150
3	0.6	187163	187254	187353	187468
4	0.4	187483	187598	187709	187823
5	0.2	187833	187922	188016	188104

WATER TAKEN

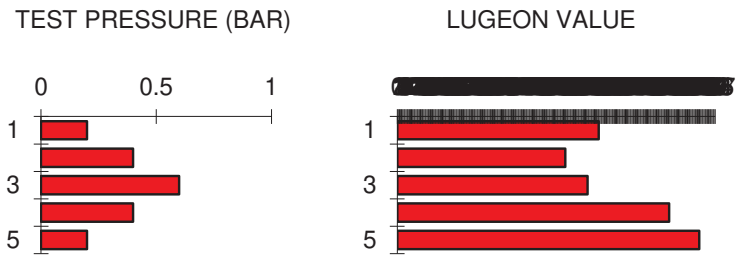
RUN NUMBER	0-5 MIN (LITRES)	5-10 MIN (LITRES)	10-15 MIN (LITRES)	0-15 MIN (LITRES)	Q (L/MIN)
1	67.00	53.00	61.00	181.00	12.07
2	70.00	79.00	61.00	210.00	14.00
3	91.00	99.00	115.00	305.00	20.33
4	115.00	111.00	114.00	340.00	22.67
5	89.00	94.00	88.00	271.00	18.07

EQUIVALENT HEAD (M)	Q (L/MIN/METRE)
0.00	0.00
5.10	9.28
7.10	10.77
9.10	15.64
7.10	17.44
5.10	13.90
0.00	0.00

AVERAGE LUGEON **205**



Analysis by Houlsby Method (1976)



Appendix 10E.3

Plate Bearing Test Records

PLATE TEST REPORT SHEET

Pressure Settlement Calculations

Reference No. R127219
Contract: WSP Lot-3
Test No. TPR-TP001: CBR - Load
Location: See Site Map
Depth 0.50m bgl
Plate Size: 450mm
Date: 28/09/2021
Dial gauge div = 0.01 mm

*INPUT: DIAL GAUGE READINGS

Pressure Reading PSI	Applied Pressure (kN/m2)	Dial gauge Readings			Accumulative Settlement			Average settlement (mm)
		*Gauge 1	*Gauge 2	*Gauge 3	Gauge 1	Gauge 2	Gauge 3	
0	0	**1047**	**1068**	**1125**	0	0	0	0.00
500	50	**994**	**1032**	**1046**	0.53	0.36	0.79	-0.56
1000	99	**750**	**1027**	**800**	2.97	0.41	3.25	-2.21
1500	149	**647**	**977**	**645**	4	0.91	4.8	-3.24
2000	199	**550**	**947**	**490**	4.97	1.21	6.35	-4.18
2500	248	**470**	**913**	**338**	5.77	1.55	7.87	-5.06
1500	149	**470**	**916**	**342**	5.77	1.52	7.83	-5.04
750	74	**494**	**952**	**385**	5.53	1.16	7.4	-4.70
0	0	**577**	**1050**	**494**	4.7	0.18	6.31	-3.73
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

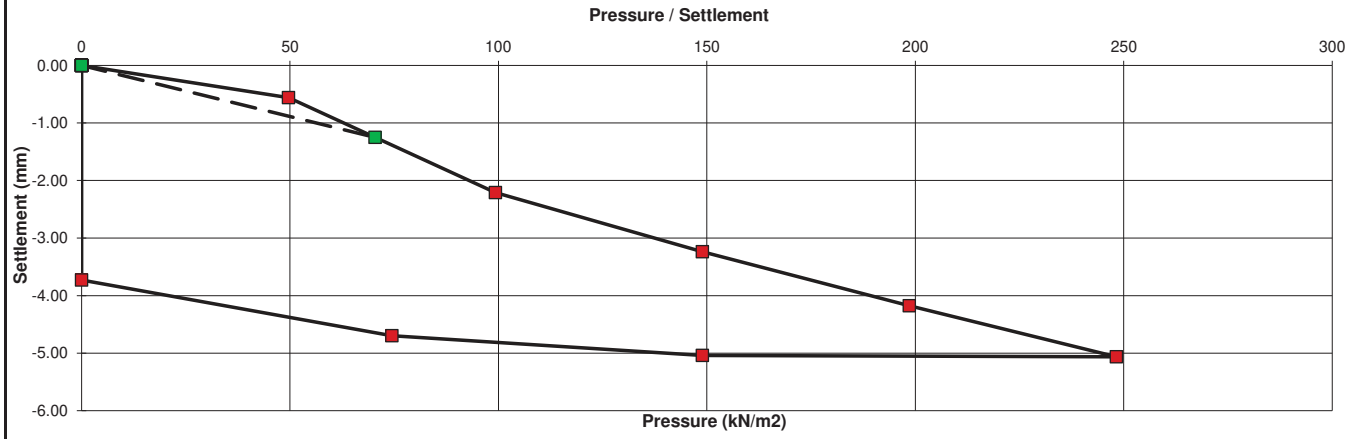
Reference No.	R127219
Contract	WSP Lot-3
Test No.	TPR-TP001: CBR - Load
Location	See Site Map
Depth	0.50m bgl
Client	Irish Water
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	D.Newell
Authorised by	
Date	28/09/2021

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

Brown sandy gravelly CLAY

Sample Ref No. .....

Depth ..... m bgl



Gradient at 1.25 mm settlement intersection = 56
Modulus of subgrade reaction = 36 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 4.8 %

PLATE TEST REPORT SHEET

Pressure Settlement Calculations

Reference No. R127219
Contract: WSP Lot-3
Test No. TPR-TP001: CBR - Reload
Location: See Site Map
Depth 0.50m bgl
Plate Size: 450mm
Date: 28/09/2021
Dial gauge div = 0.01 mm

*INPUT: DIAL GAUGE READINGS

Pressure Reading PSI	Applied Pressure (kN/m2)	Dial gauge Readings			Accumulative Settlement			Average settlement (mm)
		*Gauge 1	*Gauge 2	*Gauge 3	Gauge 1	Gauge 2	Gauge 3	
0	0	**1188**	**1267**	**1052**	0	0	0	0.00
500	50	**1182**	**1259**	**1047**	0.06	0.08	0.05	-0.06
1000	99	**1144**	**1212**	**1001**	0.44	0.55	0.51	-0.50
1500	149	**1114**	**1175**	**959**	0.74	0.92	0.93	-0.86
2000	199	**1085**	**1140**	**918**	1.03	1.27	1.34	-1.21
2500	248	**1057**	**1097**	**854**	1.31	1.7	1.98	-1.66
1500	149	**1059**	**1112**	**859**	1.29	1.55	1.93	-1.59
750	74	**1089**	**1154**	**907**	0.99	1.13	1.45	-1.19
0	0	**1167**	**1248**	**1000**	0.21	0.19	0.52	-0.31
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

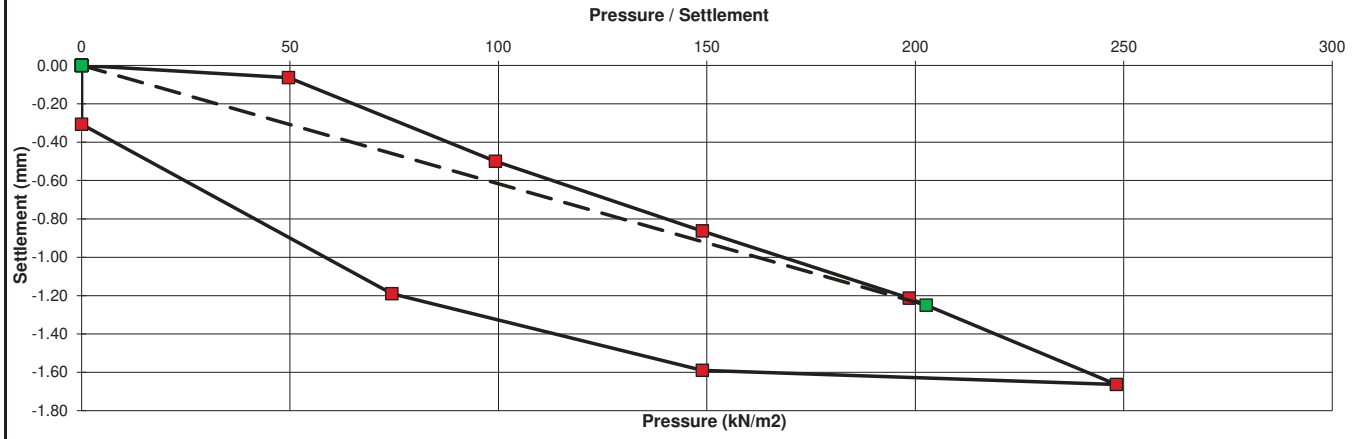
Reference No.	R127219
Contract	WSP Lot-3
Test No.	TPR-TP001: CBR - Reload
Location	See Site Map
Depth	0.50m bgl
Client	Irish Water
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	D.Newell
Authorised by	
Date	28/09/2021

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

Brown sandy gravelly CLAY

Sample Ref No. .....

Depth ..... m bgl



Gradient at 1.25 mm settlement intersection = 162

Modulus of subgrade reaction = 104 MPa/m

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

Equivalent CBR value in accordance with NRA HD25-26/10 30.3 %

PLATE TEST REPORT SHEET

Pressure Settlement Calculations

Reference No. R127220
Contract: WSP Lot-3
Test No. TPR-TP005: CBR - Load
Location: See Site Map
Depth 0.50m bgl
Plate Size: 450mm
Date: 29/09/2021
Dial gauge div = 0.01 mm

*INPUT: DIAL GAUGE READINGS

Pressure Reading PSI	Applied Pressure (kN/m2)	Dial gauge Readings			Accumulative Settlement			Average settlement (mm)
		*Gauge 1	*Gauge 2	*Gauge 3	Gauge 1	Gauge 2	Gauge 3	
0	0	**1203**	**1176**	**1175**	0	0	0	0.00
500	50	**1142**	**1101**	**1080**	0.61	0.75	0.95	-0.77
1000	99	**1012**	**955**	**917**	1.91	2.21	2.58	-2.23
1500	149	**905**	**830**	**802**	2.98	3.46	3.73	-3.39
2000	199	**803**	**708**	**688**	4	4.68	4.87	-4.52
2500	248	**728**	**600**	**566**	4.75	5.76	6.09	-5.53
1500	149	**731**	**610**	**576**	4.72	5.66	5.99	-5.46
750	74	**765**	**654**	**625**	4.38	5.22	5.5	-5.03
0	0	**921**	**802**	**752**	2.82	3.74	4.23	-3.60
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							

PLATE TEST REPORT SHEET (F3.1)

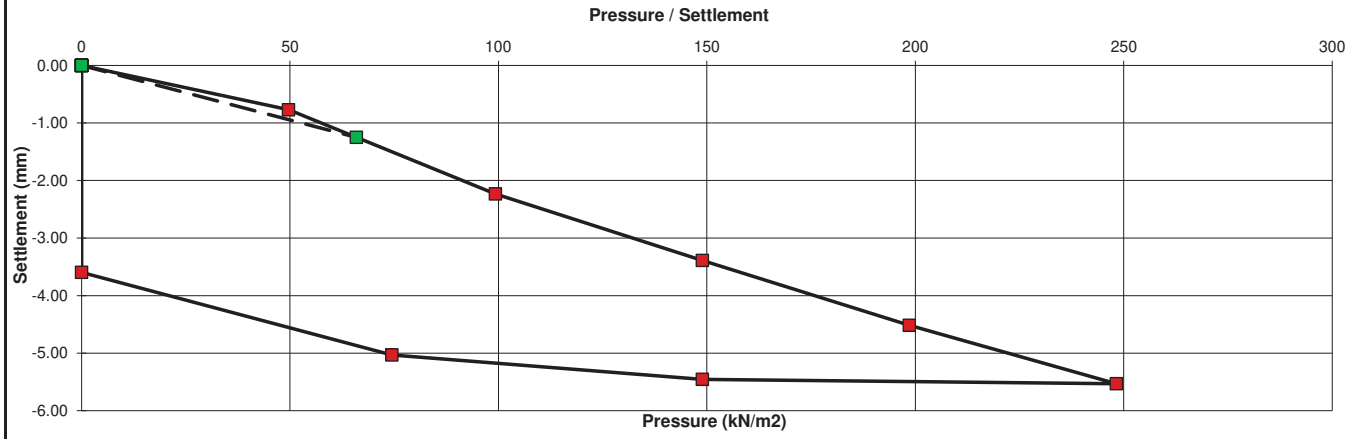
Applied Pressure/Settlement Curve

Reference No.	R127220
Contract	WSP Lot-3
Test No.	TPR-TP005: CBR - Load
Location	See Site Map
Depth	0.50m bgl
Client	Irish Water
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	D.Newell
Authorised by	
Date	29/09/2021

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

Brown slightly sandy slightly gravelly CLAY

Sample Ref No. .....
Depth ..... m bgl



Gradient at 1.25 mm settlement intersection = 53
Modulus of subgrade reaction = 34 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 4.3 %

PLATE TEST REPORT SHEET

Pressure Settlement Calculations

Reference No. R127220
Contract: WSP Lot-3
Test No. TPR-TP005: CBR - Reload
Location: See Site Map
Depth 0.50m bgl
Plate Size: 450mm
Date: 29/09/2021
Dial gauge div = 0.01 mm

*INPUT: DIAL GAUGE READINGS

Pressure Reading PSI	Applied Pressure (kN/m2)	Dial gauge Readings			Accumulative Settlement			Average settlement (mm)
		*Gauge 1	*Gauge 2	*Gauge 3	Gauge 1	Gauge 2	Gauge 3	
0	0	**921**	**799**	**749**	0	0	0	0.00
500	50	**869**	**747**	**697**	0.52	0.52	0.52	-0.52
1000	99	**825**	**702**	**653**	0.96	0.97	0.96	-0.96
1500	149	**784**	**658**	**609**	1.37	1.41	1.4	-1.39
2000	199	**754**	**617**	**568**	1.67	1.82	1.81	-1.77
2500	248	**726**	**567**	**502**	1.95	2.32	2.47	-2.25
1500	149	**732**	**581**	**516**	1.89	2.18	2.33	-2.13
750	74	**765**	**622**	**561**	1.56	1.77	1.88	-1.74
0	0	**893**	**747**	**685**	0.28	0.52	0.64	-0.48
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							

PLATE TEST REPORT SHEET (F3.1)

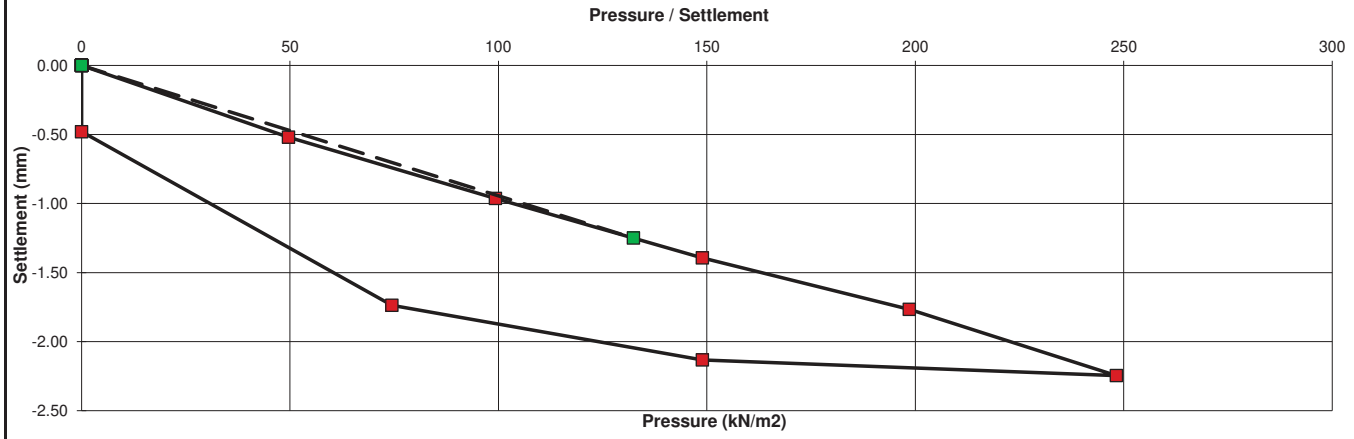
Applied Pressure/Settlement Curve

Reference No.	R127220
Contract	WSP Lot-3
Test No.	TPR-TP005: CBR - Reload
Location	See Site Map
Depth	0.50m bgl
Client	Irish Water
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	D.Newell
Authorised by	
Date	29/09/2021

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

Brown slightly sandy slightly gravelly CLAY

Sample Ref No. .....
Depth ..... m bgl



Gradient at 1.25 mm settlement intersection = 106
Modulus of subgrade reaction = 68 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 14.5 %

PLATE TEST REPORT SHEET

Pressure Settlement Calculations

Reference No. R127221
Contract: WSP Lot-3
Test No. TPR-TP007: PBT - Load (230Kn)
Location: See Site Map
Depth 0.50m bgl
Plate Size: 450mm
Date: 29/09/2021
Dial gauge div = 0.01 mm

*INPUT: DIAL GAUGE READINGS

Pressure Reading PSI	Applied Pressure (kN/m2)	Dial gauge Readings			Accumulative Settlement			Average settlement (mm)
		*Gauge 1	*Gauge 2	*Gauge 3	Gauge 1	Gauge 2	Gauge 3	
0	0	**1228**	**1268**	**1223**	0	0	0	0.00
500	50	**1121**	**1197**	**1143**	1.07	0.71	0.8	-0.86
1000	99	**979**	**1097**	**1018**	2.49	1.71	2.05	-2.08
1500	149	**886**	**1030**	**922**	3.42	2.38	3.01	-2.94
2000	199	**792**	**949**	**812**	4.36	3.19	4.11	-3.89
2750	273	**647**	**814**	**650**	5.81	4.54	5.73	-5.36
1500	149	**654**	**829**	**673**	5.74	4.39	5.5	-5.21
750	74	**685**	**865**	**725**	5.43	4.03	4.98	-4.81
0	0	**814**	**982**	**890**	4.14	2.86	3.33	-3.44
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

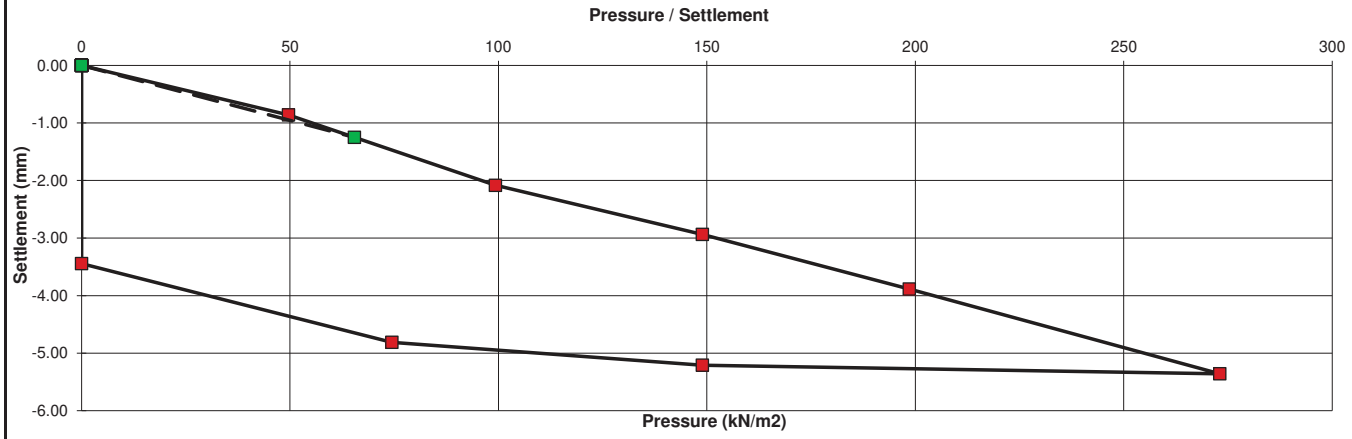
Reference No.	R127221
Contract	WSP Lot-3
Test No.	TPR-TP007: PBT - Load (230Kn)
Location	See Site Map
Depth	0.50m bgl
Client	Irish Water
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	D.Newell
Authorised by	
Date	29/09/2021

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

Brown slightly sandy slightly gravelly CLAY

Sample Ref No.

Depth m bgl



Gradient at 1.25 mm settlement intersection = 52
Modulus of subgrade reaction = 34 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 4.3 %

PLATE TEST REPORT SHEET

Pressure Settlement Calculations

Reference No. R127221
Contract: WSP Lot-3
Test No. TPR-TP007: PBT - Reload (230Kn)
Location: See Site Map
Depth 0.50m bgl
Plate Size: 450mm
Date: 29/09/2021
Dial gauge div = 0.01 mm

*INPUT: DIAL GAUGE READINGS

Pressure Reading PSI	Applied Pressure (kN/m2)	Dial gauge Readings			Accumulative Settlement			Average settlement (mm)
		*Gauge 1	*Gauge 2	*Gauge 3	Gauge 1	Gauge 2	Gauge 3	
0	0	**812**	**981**	**899**	0	0	0	0.00
500	50	**772**	**943**	**852**	0.4	0.38	0.47	-0.42
1000	99	**734**	**909**	**795**	0.78	0.72	1.04	-0.85
1500	149	**697**	**871**	**741**	1.15	1.1	1.58	-1.28
2000	199	**666**	**834**	**693**	1.46	1.47	2.06	-1.66
2750	273	**612**	**791**	**608**	2	1.9	2.91	-2.27
1500	149	**620**	**806**	**627**	1.92	1.75	2.72	-2.13
750	74	**664**	**860**	**702**	1.48	1.21	1.97	-1.55
0	0	**801**	**980**	**875**	0.11	0.01	0.24	-0.12
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

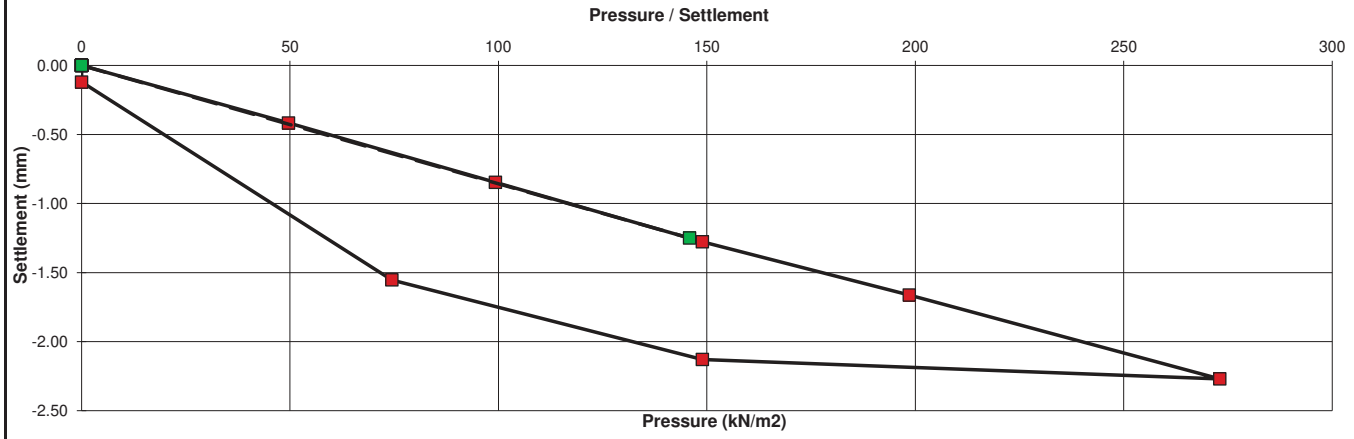
Reference No.	R127221
Contract	WSP Lot-3
Test No.	TPR-TP007: PBT - Reload (230Kn)
Location	See Site Map
Depth	0.50m bgl
Client	Irish Water
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	D.Newell
Authorised by	
Date	29/09/2021

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

Brown slightly sandy slightly gravelly CLAY

Sample Ref No.

Depth m bgl



Gradient at 1.25 mm settlement intersection = 117
Modulus of subgrade reaction = 75 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 17.1 %

PLATE TEST REPORT SHEET

Pressure Settlement Calculations

Reference No. R127222
Contract: WSP Lot-3
Test No. TPR-TP009: CBR - Load
Location: See Site Map
Depth 0.50m bgl
Plate Size: 450mm
Date: 30/09/2021
Dial gauge div = 0.01 mm

*INPUT: DIAL GAUGE READINGS

Pressure Reading PSI	Applied Pressure (kN/m2)	Dial gauge Readings			Accumulative Settlement			Average settlement (mm)
		*Gauge 1	*Gauge 2	*Gauge 3	Gauge 1	Gauge 2	Gauge 3	
0	0	**1217**	**1132**	**1261**	0	0	0	0.00
500	50	**1158**	**1081**	**1200**	0.59	0.51	0.61	-0.57
1000	99	**1047**	**999**	**1084**	1.7	1.33	1.77	-1.60
1500	149	**930**	**907**	**957**	2.87	2.25	3.04	-2.72
2000	199	**804**	**803**	**814**	4.13	3.29	4.47	-3.96
2700	268	**675**	**692**	**625**	5.42	4.4	6.36	-5.39
1500	149	**675**	**708**	**644**	5.42	4.24	6.17	-5.28
750	74	**703**	**751**	**689**	5.14	3.81	5.72	-4.89
0	0	**786**	**842**	**775**	4.31	2.9	4.86	-4.02
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

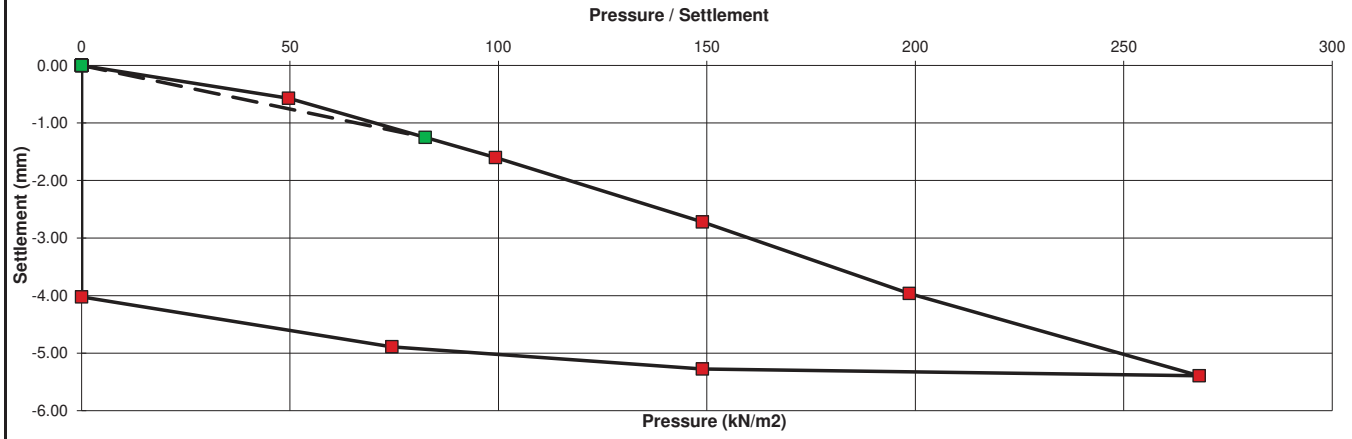
Reference No.	R127222
Contract	WSP Lot-3
Test No.	TPR-TP009: CBR - Load
Location	See Site Map
Depth	0.50m bgl
Client	Irish Water
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	D.Newell
Authorised by	
Date	30/09/2021

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

Light brown slightly sandy slightly gravelly CLAY

Sample Ref No. .....

Depth ..... m bgl



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 6.4 %

PLATE TEST REPORT SHEET

Pressure Settlement Calculations

Reference No. R127222
Contract: WSP Lot-3
Test No. TPR-TP009: CBR - Reload
Location: See Site Map
Depth 0.50m bgl
Plate Size: 450mm
Date: 30/09/2021
Dial gauge div = 0.01 mm

*INPUT: DIAL GAUGE READINGS

Pressure Reading PSI	Applied Pressure (kN/m2)	Dial gauge Readings			Accumulative Settlement			Average settlement (mm)
		*Gauge 1	*Gauge 2	*Gauge 3	Gauge 1	Gauge 2	Gauge 3	
0	0	**786**	**841**	**775**	0	0	0	0.00
500	50	**779**	**834**	**774**	0.07	0.07	0.01	-0.05
1000	99	**744**	**799**	**745**	0.42	0.42	0.3	-0.38
1500	149	**701**	**756**	**704**	0.85	0.85	0.71	-0.80
2000	199	**665**	**720**	**667**	1.21	1.21	1.08	-1.17
2700	268	**630**	**675**	**599**	1.56	1.66	1.76	-1.66
1500	149	**632**	**689**	**612**	1.54	1.52	1.63	-1.56
750	74	**664**	**731**	**657**	1.22	1.1	1.18	-1.17
0	0	**756**	**824**	**744**	0.3	0.17	0.31	-0.26
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

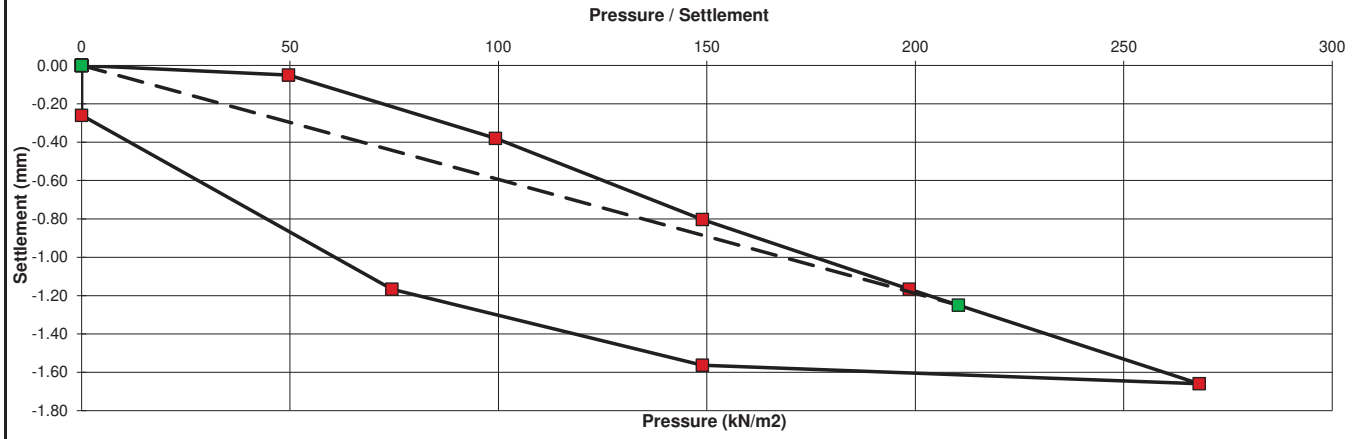
Reference No.	R127222
Contract	WSP Lot-3
Test No.	TPR-TP009: CBR - Reload
Location	See Site Map
Depth	0.50m bgl
Client	Irish Water
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	D.Newell
Authorised by	
Date	30/09/2021

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

Light brown slightly sandy slightly gravelly CLAY

Sample Ref No. .....

Depth ..... m bgl



Gradient at 1.25 mm settlement intersection = 168

Modulus of subgrade reaction = 108 MPa/m

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

Equivalent CBR value in accordance with NRA HD25-26/10 32.3 %

PLATE TEST REPORT SHEET

Pressure Settlement Calculations

Reference No. R127223
Contract: WSP Lot-3
Test No. TPR-TP011: PBT-230 Load
Location: See Site Map
Depth 0.50m bgl
Plate Size: 450mm
Date: 01/10/2021
Dial gauge div = 0.01 mm

*INPUT: DIAL GAUGE READINGS

Pressure Reading PSI	Applied Pressure (kN/m2)	Dial gauge Readings			Accumulative Settlement			Average settlement (mm)
		*Gauge 1	*Gauge 2	*Gauge 3	Gauge 1	Gauge 2	Gauge 3	
0	0	**1209**	**1228**	**1225**	0	0	0	0.00
500	50	**1094**	**1147**	**1134**	1.15	0.81	0.91	-0.96
1000	99	**942**	**994**	**941**	2.67	2.34	2.84	-2.62
1500	149	**787**	**840**	**721**	4.22	3.88	5.04	-4.38
2000	199	**628**	**679**	**516**	5.81	5.49	7.09	-6.13
2700	268	**363**	**425**	**213**	8.46	8.03	10.12	-8.87
1500	149	**377**	**442**	**214**	8.32	7.86	10.11	-8.76
750	74	**430**	**492**	**238**	7.79	7.36	9.87	-8.34
0	0	**521**	**651**	**345**	6.88	5.77	8.8	-7.15
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

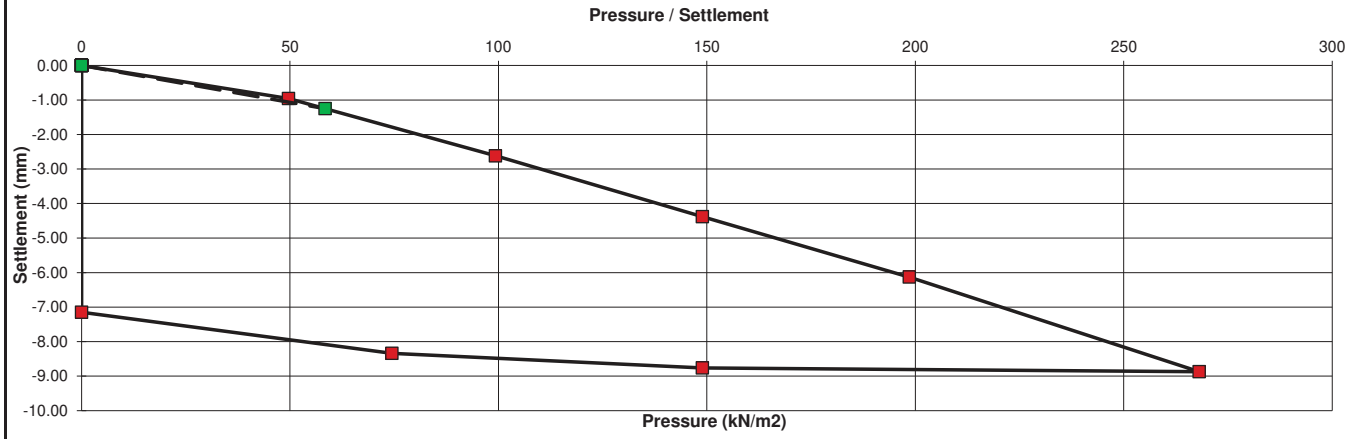
Reference No.	R127223
Contract	WSP Lot-3
Test No.	TPR-TP011: PBT-230 Load
Location	See Site Map
Depth	0.50m bgl
Client	Irish Water
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	D.Newell
Authorised by	
Date	01/10/2021

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

Light brown slightly sandy gravelly CLAY with low cobble content

Sample Ref No. .....

Depth ..... m bgl



Gradient at 1.25 mm settlement intersection = 47

Modulus of subgrade reaction = 30 MPa/m

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

Equivalent CBR value in accordance with NRA HD25-26/10 3.5 %

PLATE TEST REPORT SHEET

Pressure Settlement Calculations

Reference No. R127223
Contract: WSP Lot-3
Test No. TPR-TP011: PBT-230 Reload
Location: See Site Map
Depth 0.50m bgl
Plate Size: 450mm
Date: 01/10/2021
Dial gauge div = 0.01 mm

*INPUT: DIAL GAUGE READINGS

Pressure Reading PSI	Applied Pressure (kN/m2)	Dial gauge Readings			Accumulative Settlement			Average settlement (mm)
		*Gauge 1	*Gauge 2	*Gauge 3	Gauge 1	Gauge 2	Gauge 3	
0	0	**1201**	**855**	**858**	0	0	0	0.00
500	50	**1160**	**813**	**797**	0.41	0.42	0.61	-0.48
1000	99	**1114**	**763**	**742**	0.87	0.92	1.16	-0.98
1500	149	**1070**	**716**	**703**	1.31	1.39	1.55	-1.42
2000	199	**1025**	**675**	**656**	1.76	1.8	2.02	-1.86
2700	268	**931**	**588**	**540**	2.7	2.67	3.18	-2.85
1500	149	**948**	**607**	**540**	2.53	2.48	3.18	-2.73
750	74	**1001**	**658**	**567**	2	1.97	2.91	-2.29
0	0	**1088**	**896**	**685**	1.13	0.41	1.73	-1.09
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

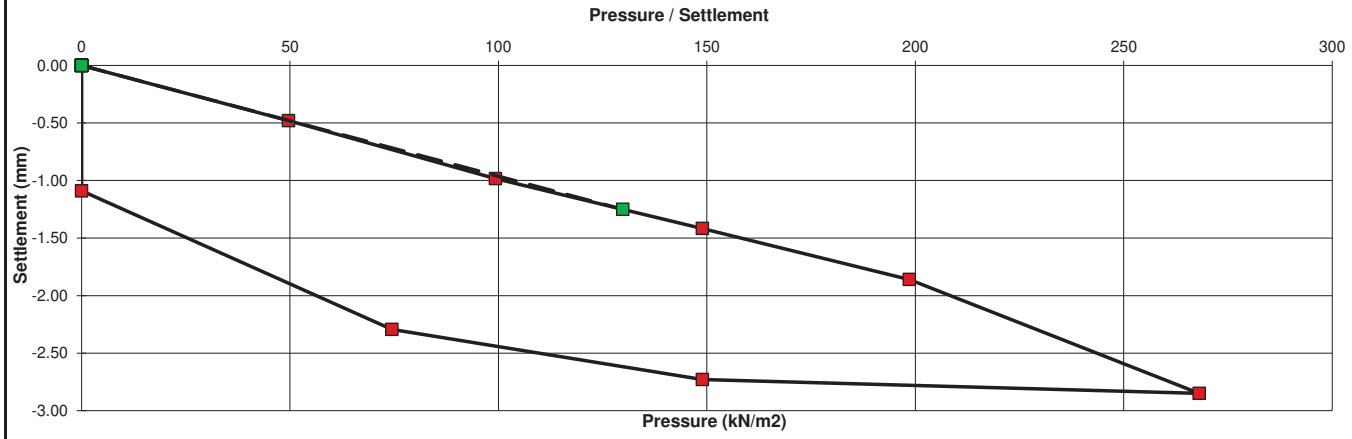
Reference No.	R127223
Contract	WSP Lot-3
Test No.	TPR-TP011: PBT-230 Reload
Location	See Site Map
Depth	0.50m bgl
Client	Irish Water
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	D.Newell
Authorised by	
Date	01/10/2021

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

Light brown slightly sandy gravelly CLAY with low cobble content

Sample Ref No. .....

Depth ..... m bgl



Gradient at 1.25 mm settlement intersection = 104

Modulus of subgrade reaction = 67 MPa/m

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

Equivalent CBR value in accordance with NRA HD25-26/10 14.0 %

PLATE TEST REPORT SHEET

Pressure Settlement Calculations

Reference No. R129324
Contract: WSP Lot 3
Test No. PBT 12 - Load
Location: PBT12
Depth 0.40m bgl
Plate Size: 450mm
Date: 30/09/2021
Dial gauge div = 0.01 mm

*INPUT: DIAL GAUGE READINGS

Pressure Reading PSI	Applied Pressure (kN/m2)	Dial gauge Readings			Accumulative Settlement			Average settlement (mm)
		*Gauge 1	*Gauge 2	*Gauge 3	Gauge 1	Gauge 2	Gauge 3	
0	0	**1134**	**1146**	**1209**	0	0	0	0.00
500	50	**1095**	**1091**	**1163**	0.39	0.55	0.46	-0.47
1000	99	**1021**	**1013**	**1081**	1.13	1.33	1.28	-1.25
1500	149	**932**	**923**	**984**	2.02	2.23	2.25	-2.17
2000	199	**857**	**850**	**898**	2.77	2.96	3.11	-2.95
2750	273	**745**	**745**	**766**	3.89	4.01	4.43	-4.11
1500	149	**749**	**755**	**769**	3.85	3.91	4.4	-4.05
750	74	**771**	**787**	**798**	3.63	3.59	4.11	-3.78
0	0	**823**	**852**	**857**	3.11	2.94	3.52	-3.19
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

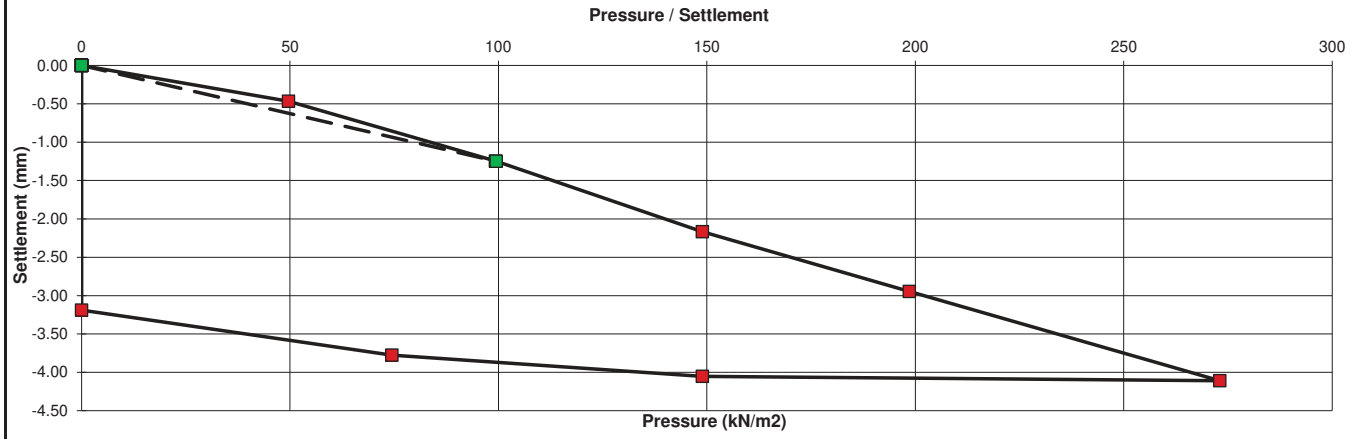
Reference No.	R129324
Contract	WSP Lot 3
Test No.	PBT 12 - Load
Location	PBT12
Depth	0.40m bgl
Client	Irish Water
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	D.Newell
Authorised by	
Date	30/09/2021

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

Firm to stiff brown slightly sandy slightly gravelly CLAY

Sample Ref No. .....

Depth ..... m bgl



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 8.8 %

PLATE TEST REPORT SHEET

Pressure Settlement Calculations

Reference No. R129324
Contract: WSP Lot 3
Test No. PBT 12 - Reload
Location: PBT12
Depth 0.40m bgl
Plate Size: 450mm
Date: 30/09/2021
Dial gauge div = 0.01 mm

*INPUT: DIAL GAUGE READINGS

Pressure Reading PSI	Applied Pressure (kN/m2)	Dial gauge Readings			Accumulative Settlement			Average settlement (mm)
		*Gauge 1	*Gauge 2	*Gauge 3	Gauge 1	Gauge 2	Gauge 3	
0	0	**824**	**852**	**859**	0	0	0	0.00
500	50	**825**	**840**	**859**	0.01	0.12	0	-0.04
1000	99	**801**	**809**	**833**	0.23	0.43	0.26	-0.31
1500	149	**777**	**780**	**805**	0.47	0.72	0.54	-0.58
2000	199	**759**	**759**	**785**	0.65	0.93	0.74	-0.77
2750	273	**708**	**711**	**722**	1.16	1.41	1.37	-1.31
1500	149	**711**	**720**	**726**	1.13	1.32	1.33	-1.26
750	74	**734**	**755**	**756**	0.9	0.97	1.03	-0.97
0	0	**765**	**775**	**775**	0.59	0.77	0.84	-0.73
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

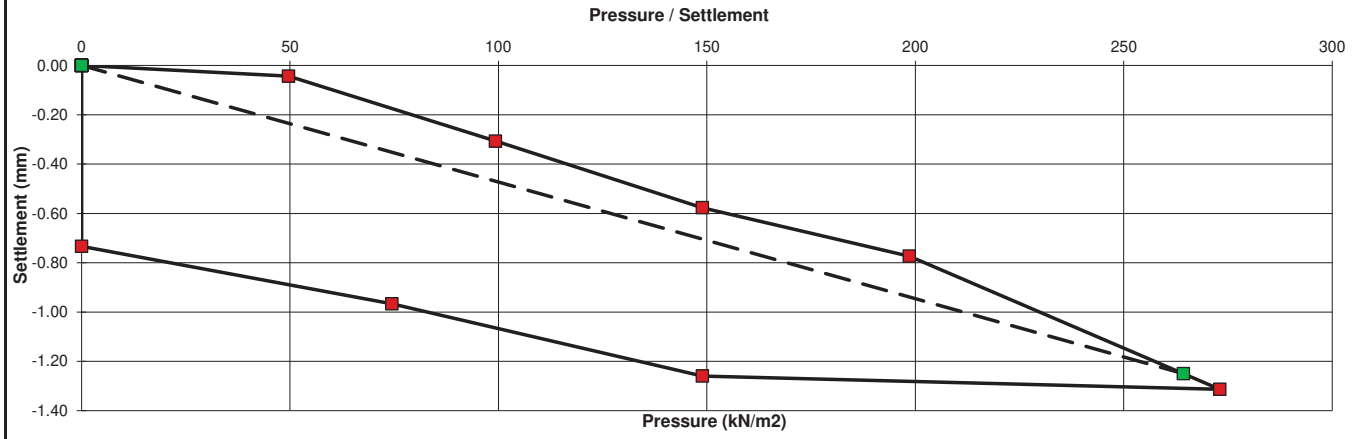
Reference No.	R129324
Contract	WSP Lot 3
Test No.	PBT 12 - Reload
Location	PBT12
Depth	0.40m bgl
Client	Irish Water
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	D.Newell
Authorised by	
Date	30/09/2021

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

Firm to stiff brown slightly sandy slightly gravelly CLAY

Sample Ref No. .....

Depth ..... m bgl



Gradient at 1.25 mm settlement intersection = 211

Modulus of subgrade reaction = 136 MPa/m

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

Equivalent CBR value in accordance with NRA HD25-26/10 48.0 %

PLATE TEST REPORT SHEET

Pressure Settlement Calculations

Reference No. R129325
Contract: WSP Lot 3
Test No. PBT 12A - Load
Location: PBT 12A
Depth 0.50m bgl
Plate Size: 450mm
Date: 30/09/2021
Dial gauge div = 0.01 mm

*INPUT: DIAL GAUGE READINGS

Pressure Reading PSI	Applied Pressure (kN/m2)	Dial gauge Readings			Accumulative Settlement			Average settlement (mm)
		*Gauge 1	*Gauge 2	*Gauge 3	Gauge 1	Gauge 2	Gauge 3	
0	0	**1166**	**1017**	**986**	0	0	0	0.00
500	50	**1094**	**969**	**937**	0.72	0.48	0.49	-0.56
750	74	**1050**	**940**	**909**	1.16	0.77	0.77	-0.90
1000	99	**969**	**885**	**866**	1.97	1.32	1.2	-1.50
1250	124	**910**	**840**	**831**	2.56	1.77	1.55	-1.96
1500	149	**854**	**793**	**785**	3.12	2.24	2.01	-2.46
750	74	**864**	**800**	**787**	3.02	2.17	1.99	-2.39
300	30	**892**	**819**	**809**	2.74	1.98	1.77	-2.16
0	0	**973**	**890**	**890**	1.93	1.27	0.96	-1.39
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

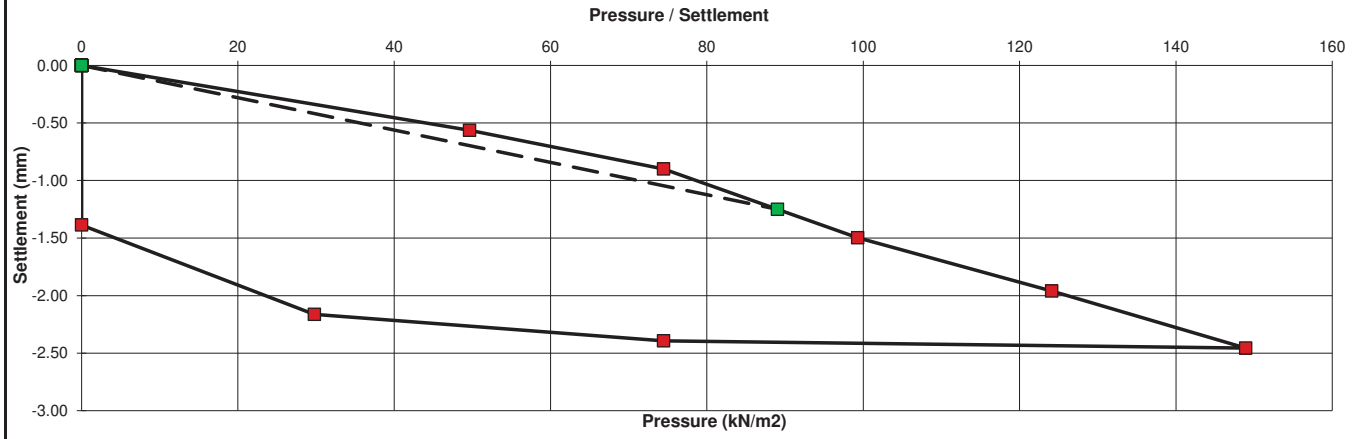
Reference No.	R129325
Contract	WSP Lot 3
Test No.	PBT 12A - Load
Location	PBT 12A
Depth	0.50m bgl
Client	Irish Water
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	D.Newell
Authorised by	
Date	30/09/2021

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

Firm to stiff brown slightly sandy slightly gravelly CLAY

Sample Ref No.

Depth m bgl



Gradient at 1.25 mm settlement intersection = 71

Modulus of subgrade reaction = 46 MPa/m

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

Equivalent CBR value in accordance with NRA HD25-26/10 7.3 %

PLATE TEST REPORT SHEET

Pressure Settlement Calculations

Reference No. R129325
Contract: WSP Lot 3
Test No. PBT 12A - Reload
Location: PBT 12A
Depth 0.50m bgl
Plate Size: 450mm
Date: 30/09/2021
Dial gauge div = 0.01 mm

*INPUT: DIAL GAUGE READINGS

Pressure Reading PSI	Applied Pressure (kN/m2)	Dial gauge Readings			Accumulative Settlement			Average settlement (mm)
		*Gauge 1	*Gauge 2	*Gauge 3	Gauge 1	Gauge 2	Gauge 3	
0	0	**973**	**890**	**890**	0	0	0	0.00
500	50	**894**	**836**	**838**	0.79	0.54	0.52	-0.62
750	74	**876**	**823**	**825**	0.97	0.67	0.65	-0.76
1000	99	**853**	**806**	**806**	1.2	0.84	0.84	-0.96
1250	124	**826**	**787**	**786**	1.47	1.03	1.04	-1.18
1500	149	**791**	**760**	**759**	1.82	1.3	1.31	-1.48
750	74	**803**	**767**	**762**	1.7	1.23	1.28	-1.40
300	30	**836**	**789**	**787**	1.37	1.01	1.03	-1.14
0	0	**901**	**842**	**845**	0.72	0.48	0.45	-0.55
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

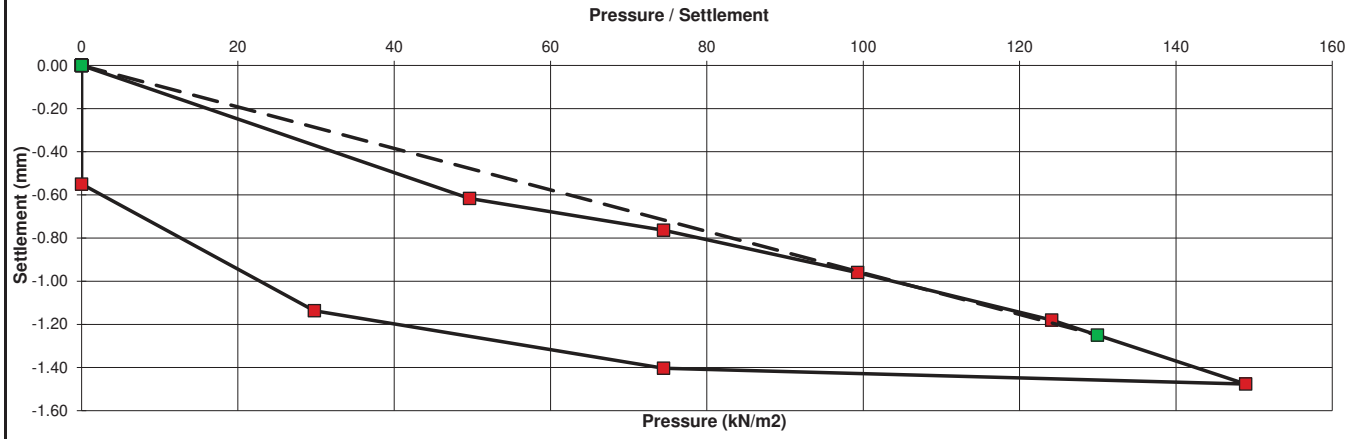
Reference No.	R129325
Contract	WSP Lot 3
Test No.	PBT 12A - Reload
Location	PBT 12A
Depth	0.50m bgl
Client	Irish Water
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	D.Newell
Authorised by	
Date	30/09/2021

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

Firm to stiff brown slightly sandy slightly gravelly CLAY

Sample Ref No. .....

Depth ..... m bgl



Gradient at 1.25 mm settlement intersection = 104

Modulus of subgrade reaction = 67 MPa/m

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

Equivalent CBR value in accordance with NRA HD25-26/10 14.0 %

PLATE TEST REPORT SHEET

Pressure Settlement Calculations

Reference No. R127225
Contract: WSP Lot-3
Test No. TPR-TP014: CBR - Load
Location: See Site Map
Depth 0.50m bgl
Plate Size: 450mm
Date: 30/09/2021
Dial gauge div = 0.01 mm

*INPUT: DIAL GAUGE READINGS

Pressure Reading PSI	Applied Pressure (kN/m2)	Dial gauge Readings			Accumulative Settlement			Average settlement (mm)
		*Gauge 1	*Gauge 2	*Gauge 3	Gauge 1	Gauge 2	Gauge 3	
0	0	**1189**	**1153**	**1138**	0	0	0	0.00
500	50	**1110**	**1095**	**1050**	0.79	0.58	0.88	-0.75
1000	99	**907**	**944**	**811**	2.82	2.09	3.27	-2.73
1500	149	**746**	**816**	**651**	4.43	3.37	4.87	-4.22
2000	199	**607**	**701**	**511**	5.82	4.52	6.27	-5.54
2300	228	**515**	**619**	**386**	6.74	5.34	7.52	-6.53
1500	149	**522**	**629**	**388**	6.67	5.24	7.5	-6.47
750	74	**559**	**662**	**410**	6.3	4.91	7.28	-6.16
0	0	**632**	**735**	**496**	5.57	4.18	6.42	-5.39
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

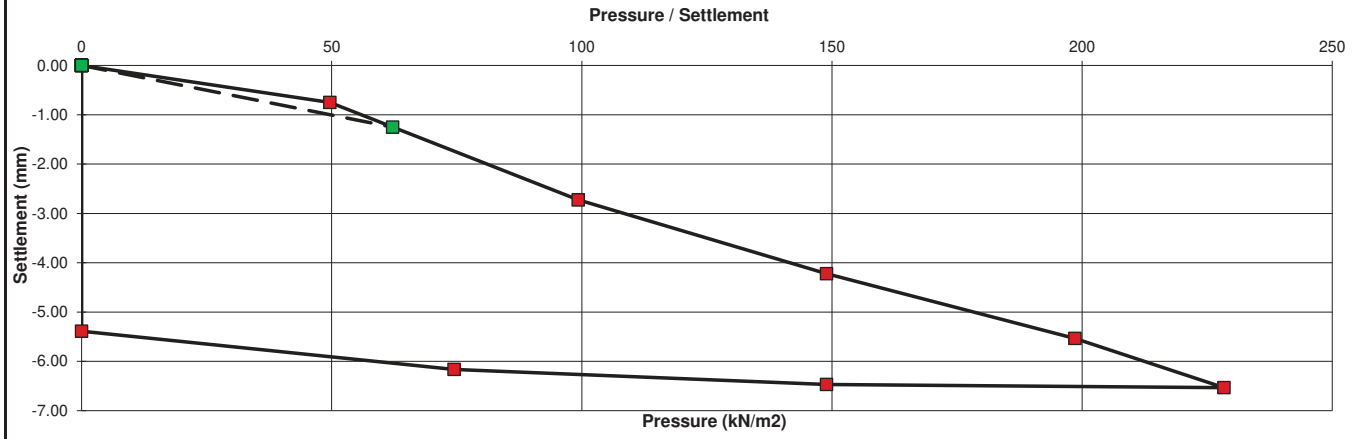
Reference No.	R127225
Contract	WSP Lot-3
Test No.	TPR-TP014: CBR - Load
Location	See Site Map
Depth	0.50m bgl
Client	Irish Water
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	D.Newell
Authorised by	
Date	30/09/2021

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

Light brown slightly sandy very slightly gravelly CLAY

Sample Ref No. .....

Depth ..... m bgl



Gradient at 1.25 mm settlement intersection = 50

Modulus of subgrade reaction = 32 MPa/m

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

Equivalent CBR value in accordance with NRA HD25-26/10 3.9 %

PLATE TEST REPORT SHEET

Pressure Settlement Calculations

Reference No. R127225
Contract: WSP Lot-3
Test No. TPR-TP014: CBR - Reload
Location: See Site Map
Depth 0.50m bgl
Plate Size: 450mm
Date: 30/09/2021
Dial gauge div = 0.01 mm

*INPUT: DIAL GAUGE READINGS

Pressure Reading PSI	Applied Pressure (kN/m2)	Dial gauge Readings			Accumulative Settlement			Average settlement (mm)
		*Gauge 1	*Gauge 2	*Gauge 3	Gauge 1	Gauge 2	Gauge 3	
0	0	**632**	**735**	**495**	0	0	0	0.00
500	50	**629**	**725**	**480**	0.03	0.1	0.15	-0.09
1000	99	**579**	**681**	**441**	0.53	0.54	0.54	-0.54
1500	149	**550**	**655**	**418**	0.82	0.8	0.77	-0.80
2000	199	**523**	**630**	**395**	1.09	1.05	1	-1.05
2300	228	**503**	**614**	**380**	1.29	1.21	1.15	-1.22
1500	149	**510**	**621**	**379**	1.22	1.14	1.16	-1.17
750	74	**541**	**650**	**405**	0.91	0.85	0.9	-0.89
0	0	**614**	**729**	**476**	0.18	0.06	0.19	-0.14
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

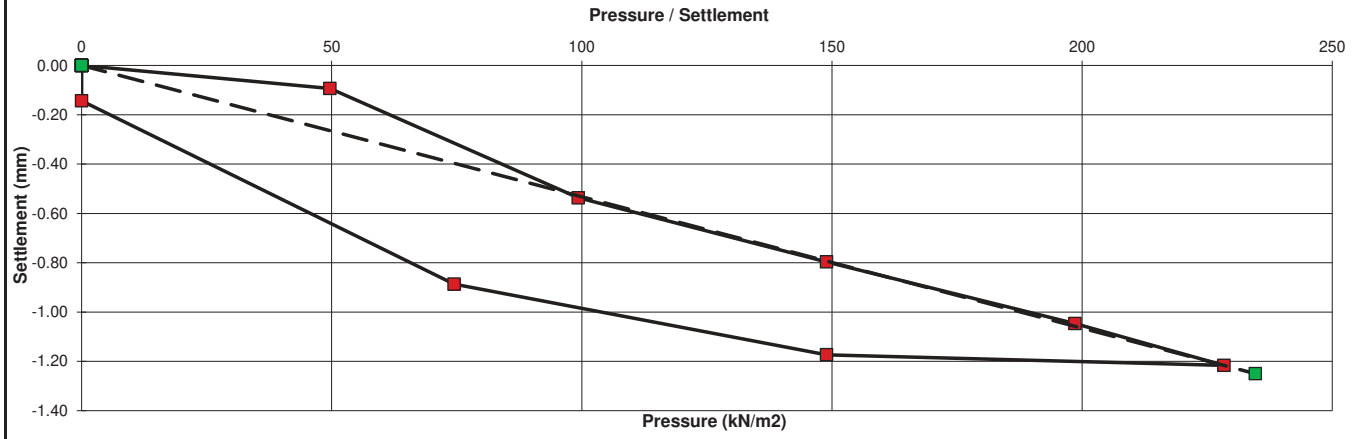
Reference No.	R127225
Contract	WSP Lot-3
Test No.	TPR-TP014: CBR - Reload
Location	See Site Map
Depth	0.50m bgl
Client	Irish Water
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	D.Newell
Authorised by	
Date	30/09/2021

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

Light brown slightly sandy very slightly gravelly CLAY

Sample Ref No. .....

Depth ..... m bgl



Gradient at 1.25 mm settlement intersection = 188

Modulus of subgrade reaction = 121 MPa/m

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

Equivalent CBR value in accordance with NRA HD25-26/10 39.0 %

PLATE TEST REPORT SHEET

Pressure Settlement Calculations

Reference No. R127226
Contract: WSP Lot-3
Test No. TPR-TP018: PBT 210Kn - Load
Location: See Site Map
Depth 0.50m bgl
Plate Size: 450mm
Date: 06/10/2021
Dial gauge div = 0.01 mm

*INPUT: DIAL GAUGE READINGS

Pressure Reading PSI	Applied Pressure (kN/m2)	Dial gauge Readings			Accumulative Settlement			Average settlement (mm)
		*Gauge 1	*Gauge 2	*Gauge 3	Gauge 1	Gauge 2	Gauge 3	
0	0	**1121**	**1103**	**1206**	0	0	0	0.00
500	50	**1089**	**1077**	**1191**	0.32	0.26	0.15	-0.24
1000	99	**913**	**982**	**1107**	2.08	1.21	0.99	-1.43
1500	149	**882**	**832**	**1011**	2.39	2.71	1.95	-2.35
2000	199	**835**	**762**	**936**	2.86	3.41	2.7	-2.99
2500	248	**800**	**679**	**845**	3.21	4.24	3.61	-3.69
1500	149	**797**	**685**	**848**	3.24	4.18	3.58	-3.67
750	74	**824**	**730**	**896**	2.97	3.73	3.1	-3.27
0	0	**930**	**828**	**999**	1.91	2.75	2.07	-2.24
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

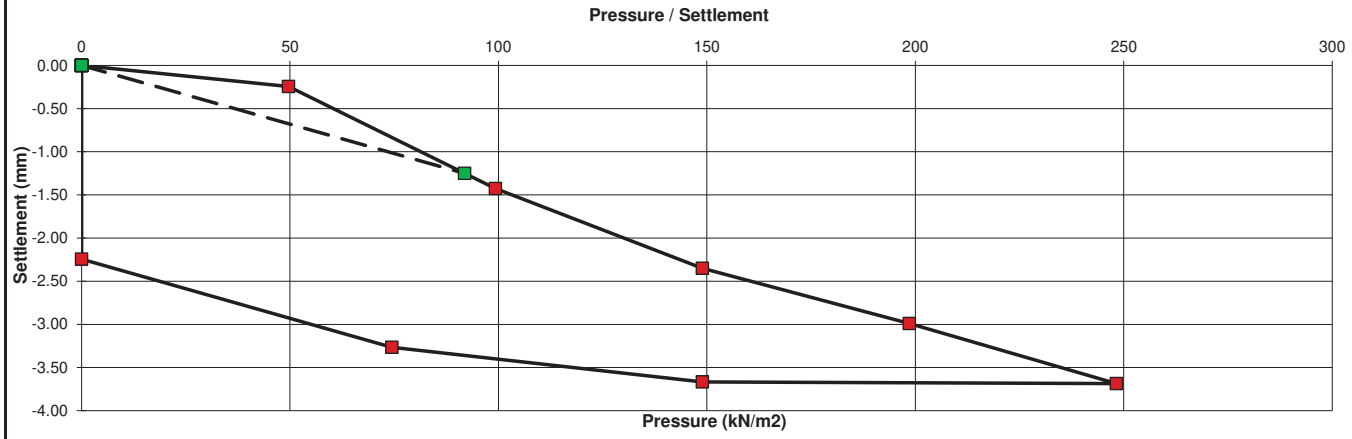
Reference No.	R127226
Contract	WSP Lot-3
Test No.	TPR-TP018: PBT 210Kn - Load
Location	See Site Map
Depth	0.50m bgl
Client	Irish Water
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	D.Newell
Authorised by	
Date	06/10/2021

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

Light brown slightly sandy slightly gravelly CLAY

Sample Ref No.

Depth m bgl



Gradient at 1.25 mm settlement intersection = 74

Modulus of subgrade reaction = 47 MPa/m

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

Equivalent CBR value in accordance with NRA HD25-26/10 7.7 %

PLATE TEST REPORT SHEET

Pressure Settlement Calculations

Reference No. R127226
Contract: WSP Lot-3
Test No. TPR-TP018: PBT 210Kn - Reload
Location: See Site Map
Depth 0.50m bgl
Plate Size: 450mm
Date: 06/10/2021
Dial gauge div = 0.01 mm

*INPUT: DIAL GAUGE READINGS

Pressure Reading PSI	Applied Pressure (kN/m2)	Dial gauge Readings			Accumulative Settlement			Average settlement (mm)
		*Gauge 1	*Gauge 2	*Gauge 3	Gauge 1	Gauge 2	Gauge 3	
0	0	**936**	**828**	**999**	0	0	0	0.00
500	50	**923**	**830**	**998**	0.13	0.02	0.01	-0.05
1000	99	**867**	**778**	**965**	0.69	0.5	0.34	-0.51
1500	149	**830**	**736**	**924**	1.06	0.92	0.75	-0.91
2000	199	**802**	**693**	**882**	1.34	1.35	1.17	-1.29
2500	248	**790**	**646**	**822**	1.46	1.82	1.77	-1.68
1500	149	**785**	**658**	**833**	1.51	1.7	1.66	-1.62
750	74	**804**	**693**	**872**	1.32	1.35	1.27	-1.31
0	0	**903**	**784**	**963**	0.33	0.44	0.36	-0.38
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

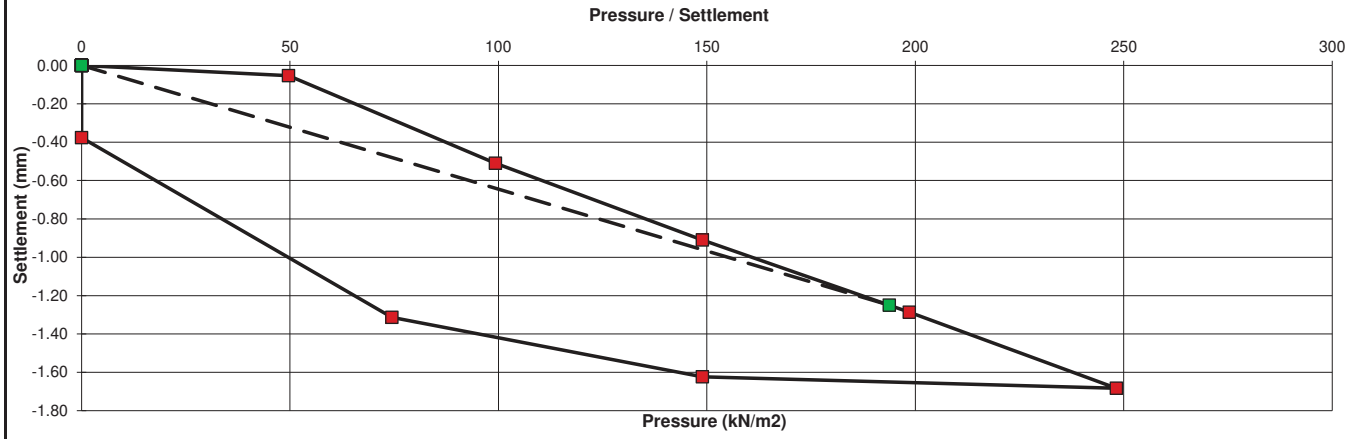
Reference No.	R127226
Contract	WSP Lot-3
Test No.	TPR-TP018: PBT 210Kn - Reload
Location	See Site Map
Depth	0.50m bgl
Client	Irish Water
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	D.Newell
Authorised by	
Date	06/10/2021

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

Light brown slightly sandy slightly gravelly CLAY

Sample Ref No.

Depth m bgl



Gradient at 1.25 mm settlement intersection = 155

Modulus of subgrade reaction = 100 MPa/m

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

Equivalent CBR value in accordance with NRA HD25-26/10 28.0 %

PLATE TEST REPORT SHEET

Pressure Settlement Calculations

Reference No. R127227
Contract: WSP Lot-3
Test No. TPR-TP019: CBR - Load
Location: See Site Map
Depth 0.50m bgl
Plate Size: 450mm
Date: 05/10/2021
Dial gauge div = 0.01 mm

*INPUT: DIAL GAUGE READINGS

Pressure Reading PSI	Applied Pressure (kN/m2)	Dial gauge Readings			Accumulative Settlement			Average settlement (mm)
		*Gauge 1	*Gauge 2	*Gauge 3	Gauge 1	Gauge 2	Gauge 3	
0	0	**975**	**1068**	**1008**	0	0	0	0.00
300	30	**969**	**1057**	**1002**	0.06	0.11	0.06	-0.08
600	60	**890**	**1000**	**936**	0.85	0.68	0.72	-0.75
900	89	**796**	**930**	**859**	1.79	1.38	1.49	-1.55
1200	119	**706**	**864**	**784**	2.69	2.04	2.24	-2.32
1500	149	**639**	**811**	**724**	3.36	2.57	2.84	-2.92
750	74	**640**	**818**	**725**	3.35	2.5	2.83	-2.89
350	35	**654**	**840**	**737**	3.21	2.28	2.71	-2.73
0	0	**683**	**871**	**768**	2.92	1.97	2.4	-2.43
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

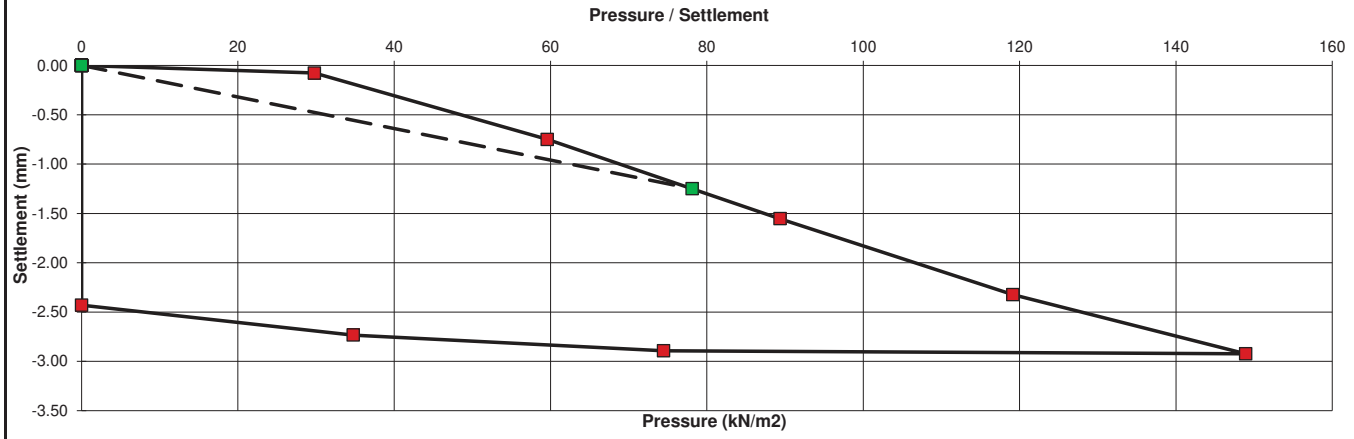
Reference No.	R127227
Contract	WSP Lot-3
Test No.	TPR-TP019: CBR - Load
Location	See Site Map
Depth	0.50m bgl
Client	Irish Water
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	D.Newell
Authorised by	
Date	05/10/2021

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

MADE GROUND -Dark brown slightly sandy gravelly CLAY with low cobble content

Sample Ref No. .....

Depth ..... m bgl



Gradient at 1.25 mm settlement intersection = 62

Modulus of subgrade reaction = 40 MPa/m

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

Equivalent CBR value in accordance with NRA HD25-26/10 5.8 %

PLATE TEST REPORT SHEET

Pressure Settlement Calculations

Reference No. R127227
Contract: WSP Lot-3
Test No. TPR-TP019: CBR - Reload
Location: See Site Map
Depth 0.50m bgl
Plate Size: 450mm
Date: 05/10/2021
Dial gauge div = 0.01 mm

*INPUT: DIAL GAUGE READINGS

Pressure Reading PSI	Applied Pressure (kN/m2)	Dial gauge Readings			Accumulative Settlement			Average settlement (mm)
		*Gauge 1	*Gauge 2	*Gauge 3	Gauge 1	Gauge 2	Gauge 3	
0	0	**683**	**871**	**768**	0	0	0	0.00
300	30	**676**	**862**	**764**	0.07	0.09	0.04	-0.07
600	60	**659**	**844**	**749**	0.24	0.27	0.19	-0.23
900	89	**647**	**832**	**737**	0.36	0.39	0.31	-0.35
1200	119	**626**	**816**	**718**	0.57	0.55	0.5	-0.54
1500	149	**600**	**799**	**694**	0.83	0.72	0.74	-0.76
750	74	**600**	**808**	**695**	0.83	0.63	0.73	-0.73
350	35	**613**	**826**	**708**	0.7	0.45	0.6	-0.58
0	0	**641**	**861**	**742**	0.42	0.1	0.26	-0.26
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							

PLATE TEST REPORT SHEET (F3.1)

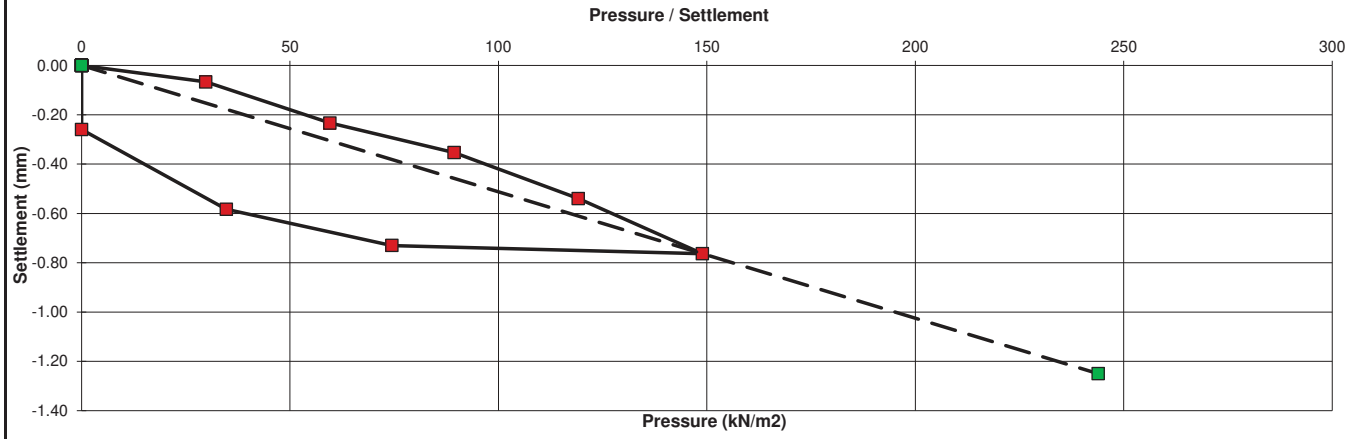
Applied Pressure/Settlement Curve

Reference No.	R127227
Contract	WSP Lot-3
Test No.	TPR-TP019: CBR - Reload
Location	See Site Map
Depth	0.50m bgl
Client	Irish Water
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	D.Newell
Authorised by	
Date	05/10/2021

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

MADE GROUND -Dark brown slightly sandy gravelly CLAY with low cobble content

Sample Ref No. .....
Depth ..... m bgl



Gradient at 1.25 mm settlement intersection = 195
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 41.8 %

PLATE TEST REPORT SHEET

Pressure Settlement Calculations

Reference No. R127228
Contract: WSP Lot-3
Test No. TPR-TP022: PBT 210Kn - Load
Location: See Site Map
Depth 0.50m bgl
Plate Size: 450mm
Date: 06/10/2021
Dial gauge div = 0.01 mm

*INPUT: DIAL GAUGE READINGS

Pressure Reading PSI	Applied Pressure (kN/m2)	Dial gauge Readings			Accumulative Settlement			Average settlement (mm)
		*Gauge 1	*Gauge 2	*Gauge 3	Gauge 1	Gauge 2	Gauge 3	
0	0	**1208**	**1144**	**1258**	0	0	0	0.00
500	50	**1161**	**1100**	**1237**	0.47	0.44	0.21	-0.37
1000	99	**1040**	**961**	**1104**	1.68	1.83	1.54	-1.68
1500	149	**956**	**855**	**996**	2.52	2.89	2.62	-2.68
2000	199	**899**	**864**	**784**	3.09	2.8	4.74	-3.54
2300	228	**880**	**687**	**756**	3.28	4.57	5.02	-4.29
1200	119	**880**	**701**	**778**	3.28	4.43	4.8	-4.17
600	60	**895**	**736**	**823**	3.13	4.08	4.35	-3.85
0	0	**940**	**784**	**895**	2.68	3.6	3.63	-3.30
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

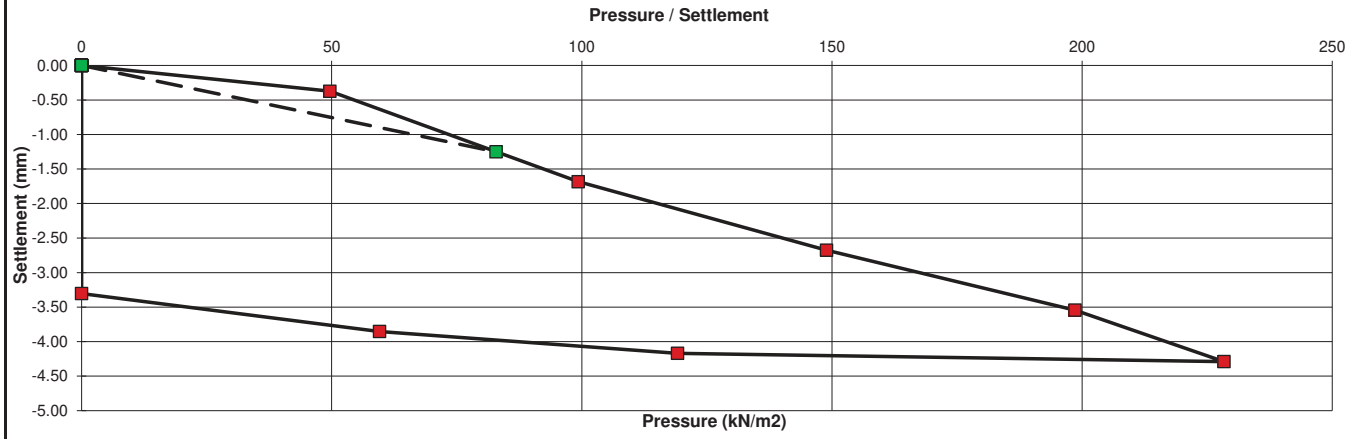
Reference No.	R127228
Contract	WSP Lot-3
Test No.	TPR-TP022: PBT 210Kn - Load
Location	See Site Map
Depth	0.50m bgl
Client	Irish Water
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	D.Newell
Authorised by	
Date	06/10/2021

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

Light brown slightly sandy very slightly gravelly CLAY

Sample Ref No.

Depth m bgl



Gradient at 1.25 mm settlement intersection = 66

Modulus of subgrade reaction = 43 MPa/m

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

Equivalent CBR value in accordance with NRA HD25-26/10 6.4 %

PLATE TEST REPORT SHEET

Pressure Settlement Calculations

Reference No. R127228
Contract: WSP Lot-3
Test No. TPR-TP022: PBT 210Kn - Reload
Location: See Site Map
Depth 0.50m bgl
Plate Size: 450mm
Date: 06/10/2021
Dial gauge div = 0.01 mm

*INPUT: DIAL GAUGE READINGS

Pressure Reading PSI	Applied Pressure (kN/m2)	Dial gauge Readings			Accumulative Settlement			Average settlement (mm)
		*Gauge 1	*Gauge 2	*Gauge 3	Gauge 1	Gauge 2	Gauge 3	
0	0	**940**	**784**	**895**	0	0	0	0.00
500	50	**930**	**780**	**895**	0.1	0.04	0	-0.05
1000	99	**902**	**758**	**858**	0.38	0.26	0.37	-0.34
1500	149	**879**	**729**	**830**	0.61	0.55	0.65	-0.60
2000	199	**861**	**683**	**772**	0.79	1.01	1.23	-1.01
2300	228	**859**	**652**	**722**	0.81	1.32	1.73	-1.29
1200	119	**855**	**673**	**750**	0.85	1.11	1.45	-1.14
600	60	**872**	**704**	**798**	0.68	0.8	0.97	-0.82
0	0	**922**	**758**	**857**	0.18	0.26	0.38	-0.27
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							

PLATE TEST REPORT SHEET (F3.1)

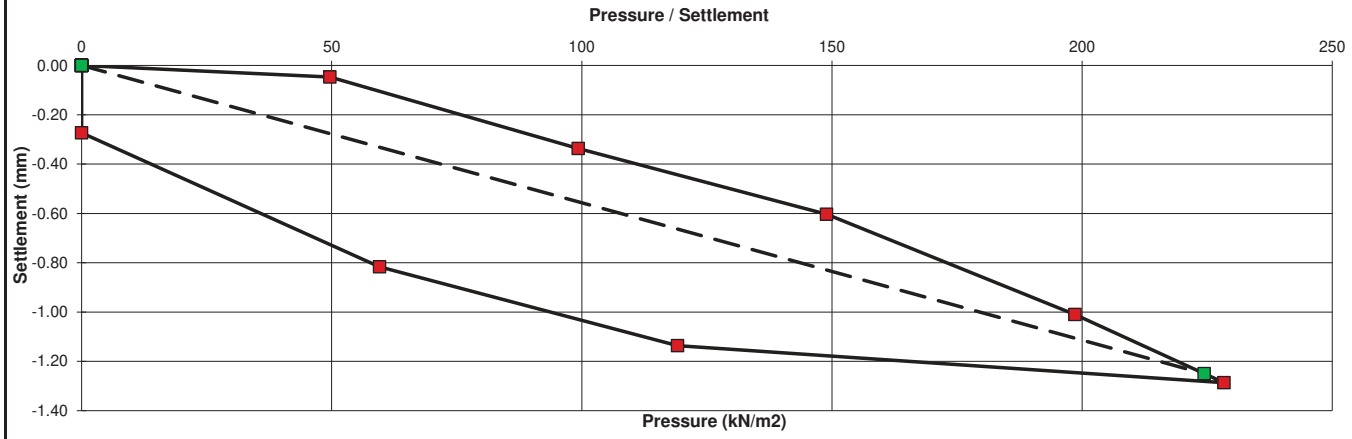
Applied Pressure/Settlement Curve

Reference No.	R127228
Contract	WSP Lot-3
Test No.	TPR-TP022: PBT 210Kn - Reload
Location	See Site Map
Depth	0.50m bgl
Client	Irish Water
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	D.Newell
Authorised by	
Date	06/10/2021

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

Light brown slightly sandy very slightly gravelly CLAY

Sample Ref No. .....
Depth ..... m bgl



Gradient at 1.25 mm settlement intersection = 180
Modulus of subgrade reaction = 115 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 36.2 %

Appendix 10E.4

Dynamic Cone Penetrometer Records

Dynamic Cone Penetrometer

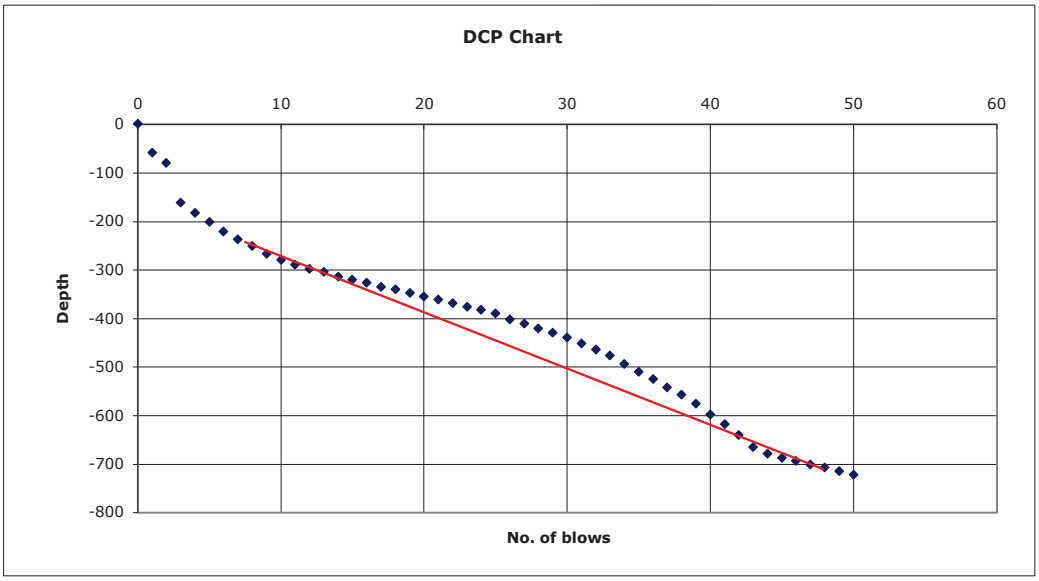
Contract	WSP Lot 3
Ref No.	23560
Client	Irish Water / Ervia
Date:	11/10/2021
Location	TPR-TP004
Test No.	TPR-TP004-CBR

DCP Zero Reading	65	mm
Start of Test at:	Existing GL	

Soil Description (taken from TP Log)

From (m)	To (m)	
0	**0.3**	Topsoil
0.3	**0.45**	Firm brown sightly sandy CLAY
0.45	**1**	Stiff brown gravelly slightly sandy CLAY with high cobble content

No of Blows	*Total Blows*	*Reading mm*	*No of Blows*	*Total Blows*	*Reading mm*	*No of Blows*	*Total Blows*	*Reading mm*
0	0	65	1	21	427	1	42	706
1	1	124	1	22	434	1	43	730
1	2	145	1	23	441	1	44	744
1	3	227	1	24	448	1	45	753
1	4	248	1	25	455	1	46	759
1	5	267	1	26	467	1	47	766
1	6	286	1	27	476	1	48	773
1	7	303	1	28	486	1	49	780
1	8	316	1	29	495	1	50	788
1	9	332	1	30	505	1		
1	10	345	1	31	517	1		
1	11	355	1	32	530	1		
1	12	363	1	33	542	1		
1	13	370	1	34	559	1		
1	14	379	1	35	575	1		
1	15	386	1	36	591	1		
1	16	392	1	37	608	1		
1	17	400	1	38	623	1		
1	18	406	1	39	641	1		
1	19	413	1	40	663	1		
1	20	420	1	41	683	1		



Red line = best fit line over course of test

	From	to	Penetration	mm / blow
Depth range (mm)	238	708	470	11.4634
Blows	7	48	41	

TRRL RN8 Log10 (CBR) = 2.48-1.057*Log10 (mm/blow)

Log10(CBR) = 1.360

CBR = 22.9

Dynamic Cone Penetrometer

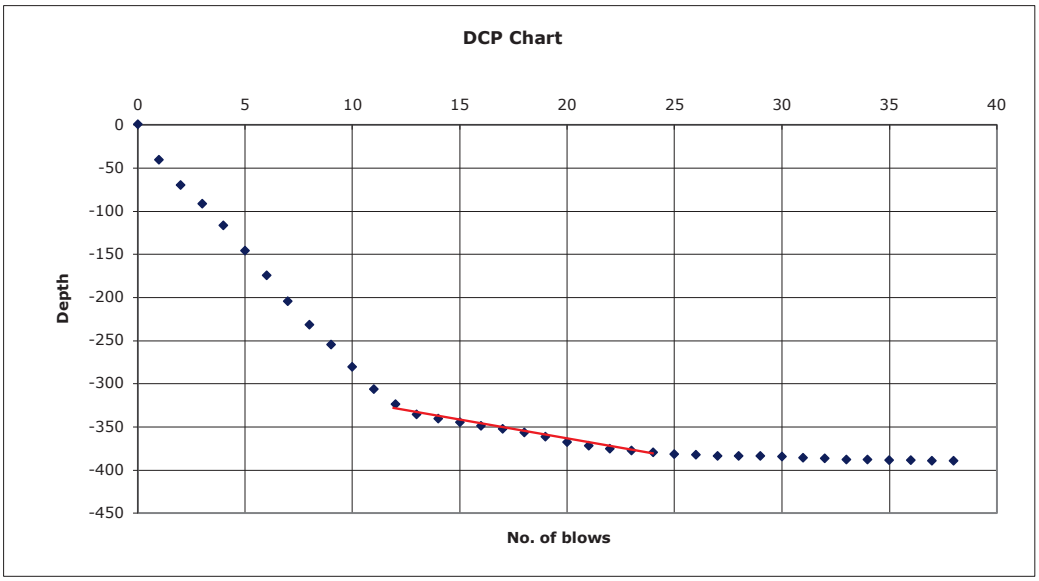
Contract	WSP Lot 3
Ref No.	23560
Client	Irish Water / Ervia
Date:	11/10/2021
Location	TPR-TP020
Test No.	TPR-TP020-CBR

DCP Zero Reading	63	mm
Start of Test at:	Existing GL	

Soil Description (taken from TP Log)

From (m)	To (m)	
0	**0.3**	TOPSOIL
0.3	**0.5**	Stiff brown dark brown slightly sandy slightly gravelly SILT/CLAY with a low cobble content

No of Blows	*Total Blows*	*Reading mm*	*No of Blows*	*Total Blows*	*Reading mm*	*No of Blows*	*Total Blows*	*Reading mm*
0	0	63	1	21	435	1		
1	1	104	1	22	439	1		
1	2	133	1	23	441	1		
1	3	155	1	24	443	1		
1	4	180	1	25	445	1		
1	5	209	1	26	446	1		
1	6	238	1	27	447	1		
1	7	268	1	28	447	1		
1	8	295	1	29	447	1		
1	9	318	1	30	448	1		
1	10	344	1	31	449	1		
1	11	370	1	32	450	1		
1	12	387	1	33	451	1		
1	13	399	1	34	451	1		
1	14	404	1	35	452	1		
1	15	408	1	36	452	1		
1	16	412	1	37	453	1		
1	17	416	1	38	453	1		
1	18	420	1			1		
1	19	425	1			1		
1	20	431	1			1		



Red line = best fit line for subsoil from c.325mm bgl

	From	to	Penetration	mm / blow
Depth range (mm)	336	380	44	4.0000
Blows	13	24	11	

TRRL RN8 Log10 (CBR) = 2.48-1.057*Log10 (mm/blow)

Log10(CBR) = 1.844

CBR = 69.8

Dynamic Cone Penetrometer

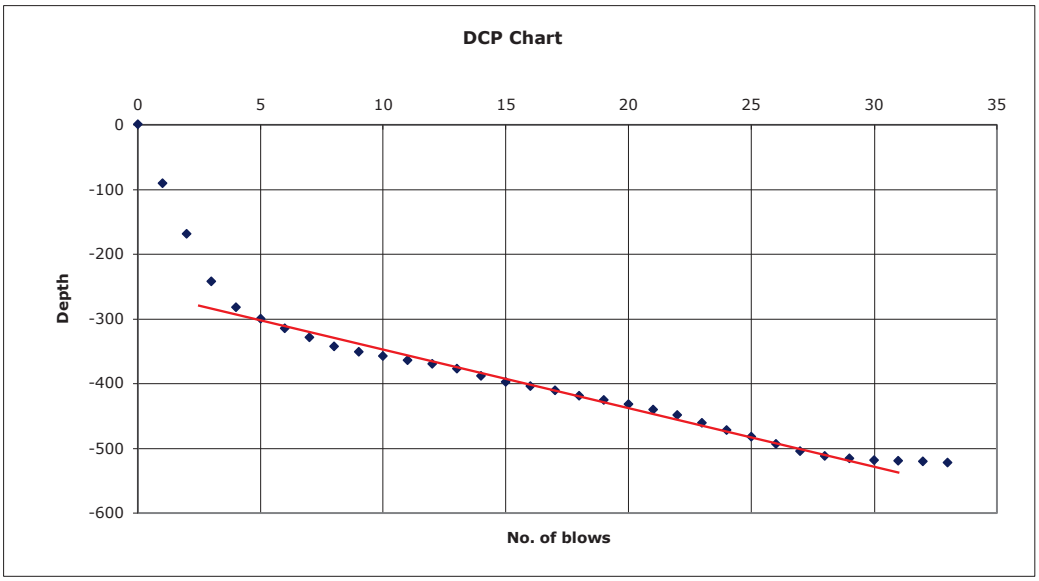
Contract	WSP Lot 3
Ref No.	23560
Client	Irish Water / Ervia
Date:	11/10/2021
Location	TPR-TP023
Test No.	TPR-TP023-CBR

DCP Zero Reading	62	mm
Start of Test at:	Existing GL	

Soil Description (taken from TP Log)

From (m)	To (m)	
0	**0.3**	Topsoil
0.3	**0.55**	MADE GROUND - Firm CLAY w/cobbles, rare plastic and steel
0.55	**0.7**	Possible Rockhead - Ang fragments of LIMESTONE with a little silt/clay

No of Blows	*Total Blows*	*Reading mm*	*No of Blows*	*Total Blows*	*Reading mm*	*No of Blows*	*Total Blows*	*Reading mm*
0	0	62	1	21	503	1		
1	1	153	1	22	511	1		
1	2	231	1	23	523	1		
1	3	304	1	24	534	1		
1	4	344	1	25	544	1		
1	5	362	1	26	556	1		
1	6	377	1	27	567	1		
1	7	391	1	28	574	1		
1	8	405	1	29	578	1		
1	9	413	1	30	581	1		
1	10	420	1	31	582	1		
1	11	426	1	32	583	1		
1	12	432	1	33	584	1		
1	13	439	1			1		
1	14	450	1			1		
1	15	460	1			1		
1	16	466	1			1		
1	17	473	1			1		
1	18	481	1			1		
1	19	488	1			1		
1	20	494	1			1		



Red line = best fit line over course of test

	From	to	Penetration	mm / blow
Depth range (mm)	315	512	197	8.9545
Blows	6	28	22	

TRRL RN8 Log10 (CBR) = 2.48-1.057*Log10 (mm/blow)

Log10(CBR) = 1.474

CBR = 29.8

Dynamic Cone Penetrometer

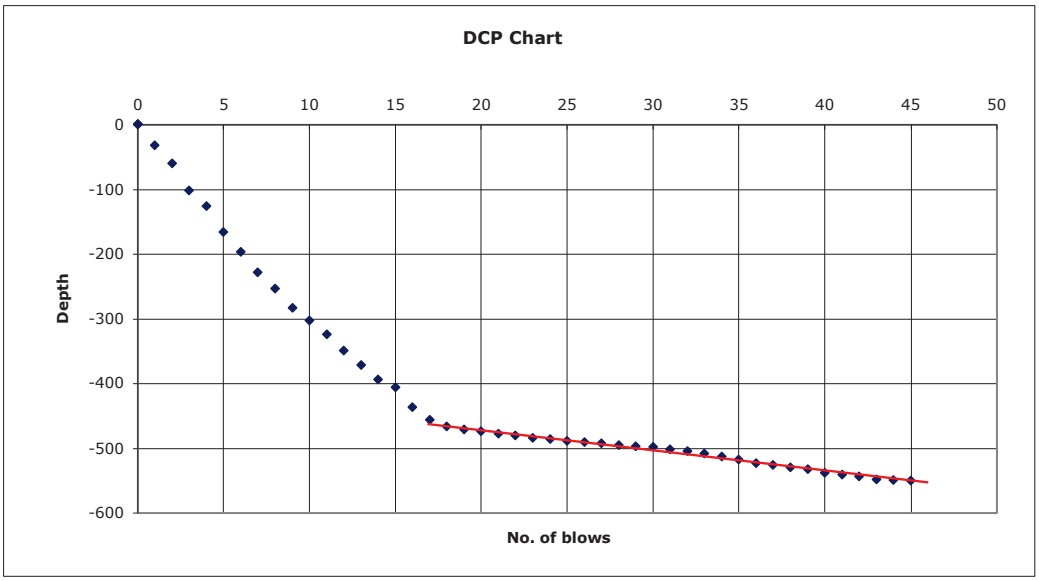
Contract	WSP Lot 3
Ref No.	23560
Client	Irish Water / Ervia
Date:	11/10/2021
Location	TPR-TP024
Test No.	TPR-TP024-CBR

DCP Zero Reading	52	mm
Start of Test at:	Existing GL	

Soil Description (taken from TP Log)

From (m)	To (m)	
0	**0.2**	TOPSOIL
0.2	**0.3**	Possible Weathered Rockhead - angular fragments of limestone with a little silt/clay
0.3	**0.5**	Possible Weathered Rockhead platy and tabular fragments of Limestone

No of Blows	*Total Blows*	*Reading mm*	*No of Blows*	*Total Blows*	*Reading mm*	*No of Blows*	*Total Blows*	*Reading mm*
0	0	52	1	21	530	1	42	596
1	1	84	1	22	533	1	43	600
1	2	112	1	23	536	1	44	601
1	3	154	1	24	538	1	45	602
1	4	178	1	25	541	1		
1	5	218	1	26	543	1		
1	6	249	1	27	545	1		
1	7	280	1	28	547	1		
1	8	306	1	29	549	1		
1	9	335	1	30	550	1		
1	10	355	1	31	554	1		
1	11	376	1	32	557	1		
1	12	401	1	33	560	1		
1	13	424	1	34	565	1		
1	14	446	1	35	570	1		
1	15	458	1	36	575	1		
1	16	489	1	37	578	1		
1	17	508	1	38	582	1		
1	18	519	1	39	585	1		
1	19	523	1	40	590	1		
1	20	526	1	41	593	1		



Red line = best fit line from 450mm

	From	to	Penetration	mm / blow
Depth range (mm)	467	550	83	3.0741
Blows	18	45	27	

TRRL RN8 Log10 (CBR) = 2.48-1.057*Log10 (mm/blow)

Log10(CBR) = 1.964

CBR = 92.1

Appendix 10F

Specialist In-Situ Test Results

Appendix 10F.1

High Pressure Dilatometer

(In Situ Site Investigation Report P1210125)

Project: Water Supply Project Eastern and Midlands Region Ground Investigation Lot 3

Pressuremeter Testing Factual Report

Client: IGSL Limited

Contract No.: P1210125

Issue	Date	Description	Prepared	Checked	Approved
01	26/01/2022	Draft	JH	JH	RC

Date: 26th January 2022
Our Ref: P1210125

Hastings Innovation Centre
Highfield Drive
St Leonards on Sea
East Sussex TN38 9UH

ISGL Limited
M7 Business Park
Naas
Co.Kildare
W91 DY93
Ireland

Attention: Ciarán Killaly

Pressuremeter testing at
Water Supply Project Eastern and Midlands Region Ground Investigation Lot 3

We have pleasure in providing a digital copy of our report for the above project.

We hope that you are satisfied with the performance of our staff, equipment and reporting on this project. If you should have any queries about any aspect of the works carried out, please do not hesitate to contact us. We look forward to being of service to you in the future.

Yours faithfully,
In Situ Site Investigation Limited



Darren Ward
Director

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ABBREVIATIONS

Pressuremeter types	
HPD	High pressure dilatometer
SBP	Self-boring pressuremeter
RPM	Reaming pressuremeter

In situ horizontal stress (σho)	
p_o	Cavity reference pressure
$\sigma ho_{(M\&R)}$	In situ horizonal stress from Marsland & Randolph (1977) analysis (where $P_{yield} = P_L - S_u$)
$\sigma ho_{(LO)}$	In situ horizonal stress from lift-off analysis (SBP)
$\sigma ho_{(H\&W)}$	In situ horizonal stress from unloading curve (Houlsby & Withers, 1988; RPM)
$\sigma ho_{(CM)}$	In situ horizonal stress from curve modelling (Whittle, 1999; SBP)

Undrained shear strength (kPa)	
$s_{u\ (loading)}$	Shear strength from loading curve, via Gibson & Anderson (1961) analysis
$s_{u\ (M\&R)}$	Shear strength from Marsland & Randolph (1977) analysis (where $S_u = P_{yield} - P_L$)
$s_{u\ (unloading)}$	Shear strength from unloading curve, via Jefferies (1988) analysis (RPM & SBP)
$s_{u\ (H\&W)}$	Shear strength from unloading curve, via Houlsby & Withers (1988) analysis (RPM)
P_L	Limit pressure via Gibson & Anderson (1961) analysis
$P_{L\ (H\&W)}$	Limit pressure via Houlsby & Withers (1988) analysis (RPM)

Shear modulus parameters	
G_i	Initial shear modulus (MPa) derived from steep linear section of loading path, prior to yield
G_{ur}	Shear modulus (MPa) derived from unload-reload loop
ε_c	Cavity strain range over the unload-reload loop
β	Exponent of elasticity, after Bolton & Whittle (1999), where 1 is linear elastic
α	Shear stress constant (MPa), after Bolton & Whittle (1999)

Other	
P_{max}	Maximum test pressure reached prior to instrument unloading (MPa)
P_{yield}	Pressure at which material yield is assessed, defined as end of linear loading curve

1.0 INTRODUCTION

1.1 Site Details

At the request of IGSL Ltd, In Situ Site Investigation Limited (In Situ S.I.) carried out pressuremeter testing as part of the Water Supply Project – Eastern and Midlands Region project. The works form part of the proposed scheme to transport water from the Parteen Basin in North Tipperary to Peamount Reservoir in West Dublin.

The project was split into three lots, with this report presenting pressuremeter testing carried out on Lot 3.

The pressuremeter testing was attempted in two boreholes. The fieldwork was carried out on site from 5th to 20th October 2021.

This report presents the factual records of the pressuremeter testing, together with an interpretation of the test results to derive material parameters. Further specific details relating to the ground investigation, i.e., borehole locations and exploratory hole logs, are provided in the IGSL Ltd report.

2.0 FIELDWORK

2.1 General

Four pressuremeter tests were carried out in boreholes constructed using a rotary drilling rig, operated by IGSL Ltd. The tests were carried out using a high-pressure dilatometer (HPD). The testing was carried out in general accordance with BS EN ISO 22476-5 (2012) and BS 5930 (2020). The test depths were scheduled by the Client. A summary table of the tests is presented below.

Table 2.1. *Summary of pressuremeter tests.*

Borehole Reference	Test Reference	Date	Test Depth	Probe	Operator	Remarks
BH005	T01	26/10/2021	3.50	Kylie (HPD06)	D Cooper	Test pocket cored using water flush. Membrane burst.
	T02	27/10/2021	4.00	Kylie (HPD06)	D Cooper	Test pocket cored using water flush. Membrane pulled out clamp.
BH007	T01	28/10/2021	3.60	Kylie (HPD06)	D Cooper	Test pocket cored using water flush. Fracture movement.
	T02	28/10/2021	5.70	Kylie (HPD06)	D Cooper	Test pocket cored using water flush. Fracture movement.

2.2 High Pressure Dilatometer (HPD)

The HPD is a cylindrical 95mm diameter probe which is inserted into a cored 99 diameter test pocket, drilled using a T6-H core barrel. The HPD is therefore termed a pre-bored type instrument. The probe, approximately 1.5m in length, has a central section which is covered by a rubber membrane. Pressure applied to the inside of the instrument, via compressed air, forces the membrane to expand against the test pocket wall. The radial displacement of the inside boundary of the membrane is measured at six points equally distributed around the centre of the expanding section, by free moving arms. This displacement, and the pressure necessary to cause the movement, is continuously monitored by transducers contained within the instrument. The HPD is linked to the ground surface via a combined pressure hose and electrical power/communication umbilical cable which connects the instrument to the pressure source and readout unit.

Analogue to digital conversion of the displacement and pressure transducers is carried out within the pressuremeter electronics package. The pressuremeter output comprises a

multiplexed signal which connects through the pressuremeter interface unit to the USB port of a laptop computer. Software, supplied by Cambridge Insitu Ltd, is used to record the data, convert the received signals to engineering units (using the pressure and displacement transducer calibrations) and display these in real time on the laptop computer during testing to allow control of the test by the operator. Plotting these readings of displacement against pressure produces a loading curve for the material being tested. A number of mathematical analyses are applied to translate this loading curve into material strength and stiffness parameters.

The testing on this project was undertaken using probes manufactured by Cambridge Insitu Ltd. Details of the instruments are provided below. Corrections measured for membrane stiffness (essentially resistance to inflation in air) were carried out during the testing program.

Table 2.2. *Pressuremeter instrument details.*

Instrument	Diameter (mm)	Pressure Capacity (MPa)	Displacement Measurement	ID & Serial No.
HPD	95	20	6 arms at 60° 3 opposite pairs	Kylie (HPD06)

2.3 HPD Testing Procedure

The boreholes were constructed using a rotary drilling rig by conventional rotary coring at nominal 146mm diameter, using water flush, to approximately 1.5m above the scheduled pressuremeter test depth. A 2 to 3m long section was then drilled using a T6-H size core barrel to provide a test pocket of nominal diameter 99.2mm. The HPD was inserted into the test pocket as soon as practicably possible using 2⅜ API drill rods, lowered in via the drilling rig winch.

The pressuremeter tests were carried out in a stress-controlled manner using a manually operated gas control box to pressurise the HPD at an appropriate rate for the ground conditions. During the tests a number of unload-reload loops were performed. Before carrying out the loops, a short holding period was maintained to allow reduction of creep on the ground. The loading was continued until either the ground had failed, maximum arm displacement had occurred, or if at lower pressure, expansion around the probe was uneven, such that in the opinion of the operator, continuation of the loading would result in risk of damage to the probe. Upon unloading and deflation of the membrane, the instrument was withdrawn from the tested section and recovered back to the ground surface. The boreholes were then advanced to the next specified test depth and the sequence repeated, until the testing program was completed.

3.0 TEST INTERPRETATION

3.1 Introduction

The pressure / cavity strain curve has been analysed to determine various material parameters, as appropriate, including:

Cavity reference pressure	p_o
Initial shear modulus	G_i
Yield	P_{yield}
Unload-reload shear modulus	G_{ur}
Undrained shear strength	s_u
Limit Pressure	P_L

The analysis methodologies used have followed the industry accepted practice for interpretation of pressuremeter tests (e.g., Clarke, 1996; Mair & Wood, 1987). The nature of the material tested can result in some limitations in the application and appropriateness of the interpretation methods. Any such limitations, if present, are discussed below and should be considered when selecting material parameters for engineering design purposes.

3.2 Description of Material Tested

An indication of the geology at the depth of each test completed is provided on the plots in Appendix A. The ground conditions encountered in the boreholes typically comprised LIMESTONE. For more detail refer to the IGSL Ltd report.

3.3 Cavity Reference Pressure

The act of drilling into undisturbed ground relieves the in situ horizontal stress, which is then effectively restored as the instrument membrane is initially pressurised. During this initial loading, a linear pressure / displacement response is anticipated as the pressure is increased and then exceeds the cavity reference pressure. With the HPD instrument, the direct correlation between the cavity reference pressure and in situ horizontal stress is problematic and should be treated with caution. This is due to the large potential for disturbance during test pocket formation and probable relaxation or stress relief of the ground following drilling of the open test pocket.

Marsland and Randolph (1977) proposed that in the vicinity of in situ horizontal stress, soil behaves elastically and therefore the initial loading curve is linear. This elastic behaviour will cease when the undrained shear strength of the soil in the cavity wall is reached, and hence the loading curve will then begin to curve away from linearity. The point at which the loading curve becomes non-linear (or the onset of yield, P_{yield}), represents the in situ horizontal stress plus the undrained shear strength at this point:

$$P_{yield} = \sigma_{ho} + s_u.$$

The tests performed at the site were in LIMESTONE rock. However, the analysis method used to determine the undrained shear strength assumes the material is a perfectly elastic prior to failure and perfectly plastic post failure. For a rock this analysis may not be valid as the material may behave as a brittle material and fail in tension, or in triaxial compression, depending on the strength of the material and in situ stress conditions.

3.4 Shear Modulus

A pressuremeter test, in an elastic, perfectly plastic material, imparts a pure shear failure, hence it is normal to report shear modulus in preference to an elastic modulus. Shear modulus is determined from the initial loading curve, and from unload reload loops, performed at intervals during the test progression. The relationship used to determine shear modulus (G) is below, where ε_c is the cavity strain range:

$$G = \frac{1}{2}\frac{dp}{d\varepsilon c}$$

Haberfield and Johnson (1993) have suggested that the unload-reload modulus is the most reliable parameter from a pressuremeter test in rock. It is noted that the nature and spacing of fissures in the rock mass will affect the result. Widely spaced fissures may result in the test giving the intact modulus of the rock, rather than a mass modulus, and / or open fissures may be closed as the test progresses and give a modulus which is higher than the mass modulus.

Note is made that often in clays and sands some hysteresis is generally evident, and it is possible to determine a secant shear modulus from the reloading portion of an unload reload loop. A high degree of consistency is often possible when plotting secant shear modulus results from individual tests. This may be further extended to a series of tests in a geological formation by normalising via undrained shear strength, or in situ stress. The various plots for both initial loading shear modulus (G_i) and the shear modulus derived from unload reload loops (G_{ur}) are presented graphically in the test results.

Individual unload reload loops can also be analysed to determine small strain stiffness parameters. This is achieved by taking a secant modulus from the base of the loop, to the individual points on the reloading curve. Plotting the cavity strain range against modulus, gives an indication of how stiffness varies with strain. Further, a Bolton and Whittle (1999) analysis can be performed to investigate the non-linear elastic / plastic behaviour.

The secant modulus (G) can be converted to an undrained elastic (Youngs) modulus (E_u) by use of the following relationship:

$$E_u = 2.G(1 + \upsilon) \qquad \text{Where } \upsilon = \text{Poisson's ratio}$$

The Poisson's ratio can be either undrained (υ_u) or drained (υ'). For undrained elastic soil (clay) a υ_u value of 0.5 can be taken. For drained conditions in any soil, the value of υ' is typically 0.1 to 0.3. The Poisson's ratio for weak rocks is also generally taken as 0.1 to 0.3, with the difference between drained or undrained behaviour being relatively insignificant (Mair and Wood, 1987).

Plots of calculated secant modulus values at varying shear strain % are provided within the analysis results. It is noted that any user of this analysis should satisfy themselves that it is appropriate to the material tested.

3.5 Strength

Undrained shear strength has been determined using Gibson and Anderson (1961) for the loading portion of the test curve. This is the generally accepted method for the determination of strength and are based on the assumption of an elastic - perfectly plastic material. The analysis of Gibson and Anderson (1961) also provides a Limit Pressure (P_L). This is a limiting pressure defined as the pressure at which the change in volume (ΔV) divided by the current volume (V) is equal to one. While this is not achieved in practice, it can be determined by extrapolation. Note is also made that the definition of P_L is different to that associated with a Ménard Limit Pressure, and the two should not be interchanged.

3.6 Summary of Results

Summary tables of the analysis results for each borehole location are presented in Appendix A, followed by the individual full graphical analyses for the tests completed.

4.0 REFERENCES

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APPENDIX A

Test Data Analysis

Description	Figure No.
Pressuremeter Results Summary	BH005 & BH007
Pressuremeter Shear Modulus Plot & Undrained Shear Strength Plot	Figure 1
Pressuremeter In Situ Horizontal Stress, Yield & Maximum Pressure Plot	Figure 2
Pressuremeter Test Analysis	
BH005	T01 & T02
BH007	T01 & T02

Pressuremeter Results Summary

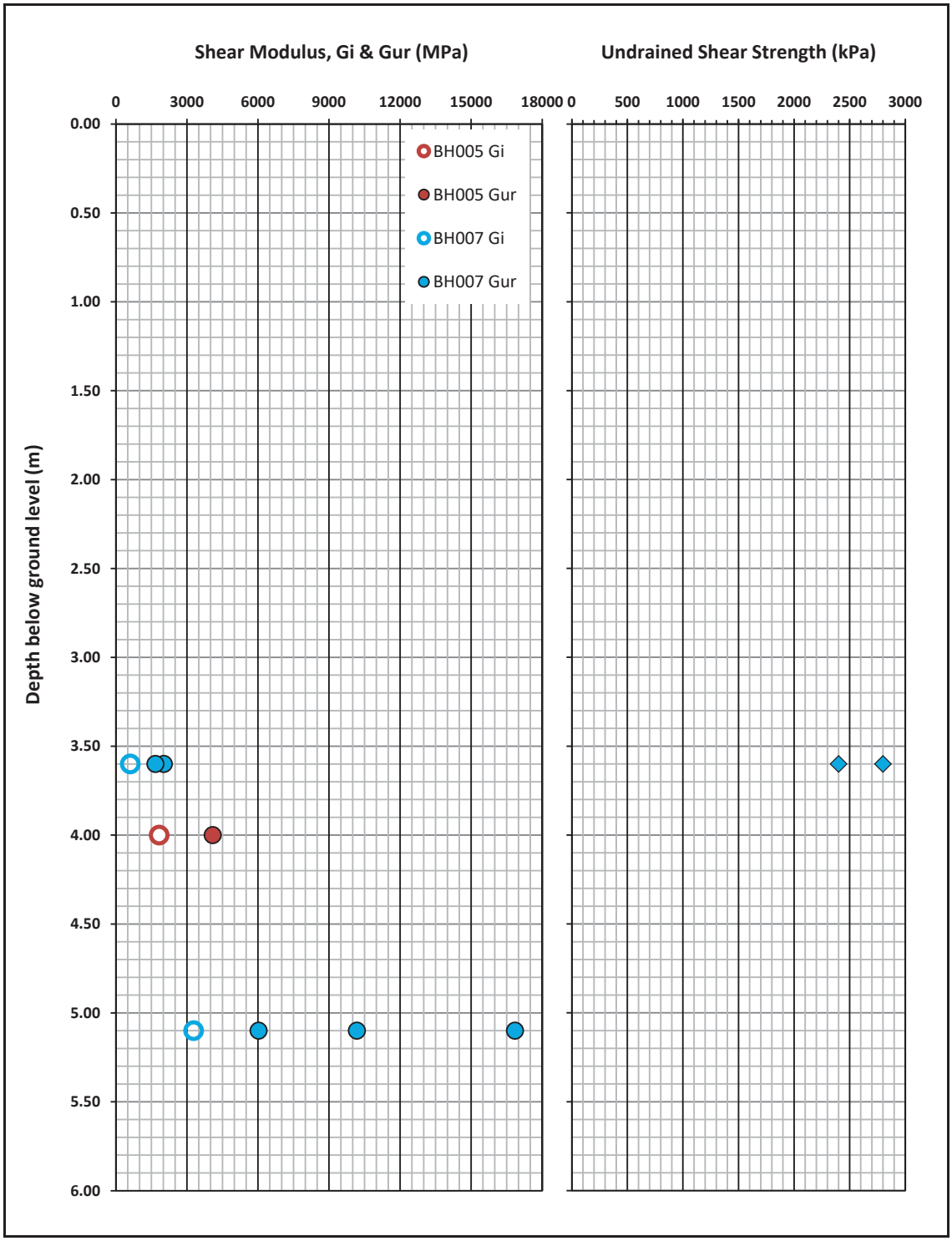
IN SITU
SITE INVESTIGATION

Project	Water Supply Project GI Lot 3
Client	IGSL Ltd
Project No.	P1210125
Table No.	BH005 & BH007

Test ID	Depth (m)	Material description from borehole log	Max. test pressure (kPa)	po (kPa)	Undrained strength $S_{u\ (M\&R)}$ (kPa)	Undrained strength $S_{u\ (loading)}$ (kPa)	Undrained strength P_L (kPa)	G_i (MPa)	Loop No.	G_{ur} (MPa)	e_c (%)	Non linear stiffness α (MPa)	Non linear stiffness β	Secant shear modulus Shear strain 1%	Secant shear modulus Shear strain 0.1%	Secant shear modulus Shear strain 0.01%	Secant shear modulus Shear strain 0.001%
BH005																	
1	3.50	LIMESTONE.	3563	Terminated due to membrane burst.													
2	4.00	LIMESTONE.	5836	2149	No material yield			1827	1	4093	0.018	1927	0.911	2899	3555	4360	5346
BH007																	
1	3.60	LIMESTONE.	7707	1420	2800	2400	16950	610	1	2028	0.028	505	0.828	1117	1661	2469	3671
									2	1670	0.051	242	0.748	773	1380	2463	4397
2	5.10	LIMESTONE.	13076	4125	No material yield			3285	1	6027	0.008	1292	0.849	2593	3674	5205	7374
									2	10178	0.011	5347	0.924	7578	9021	10739	12784
									3	16857	0.008	Poor loop definition, full analysis not possible.					

Pressuremeter Shear Modulus & Undrained Shear Strength Plot

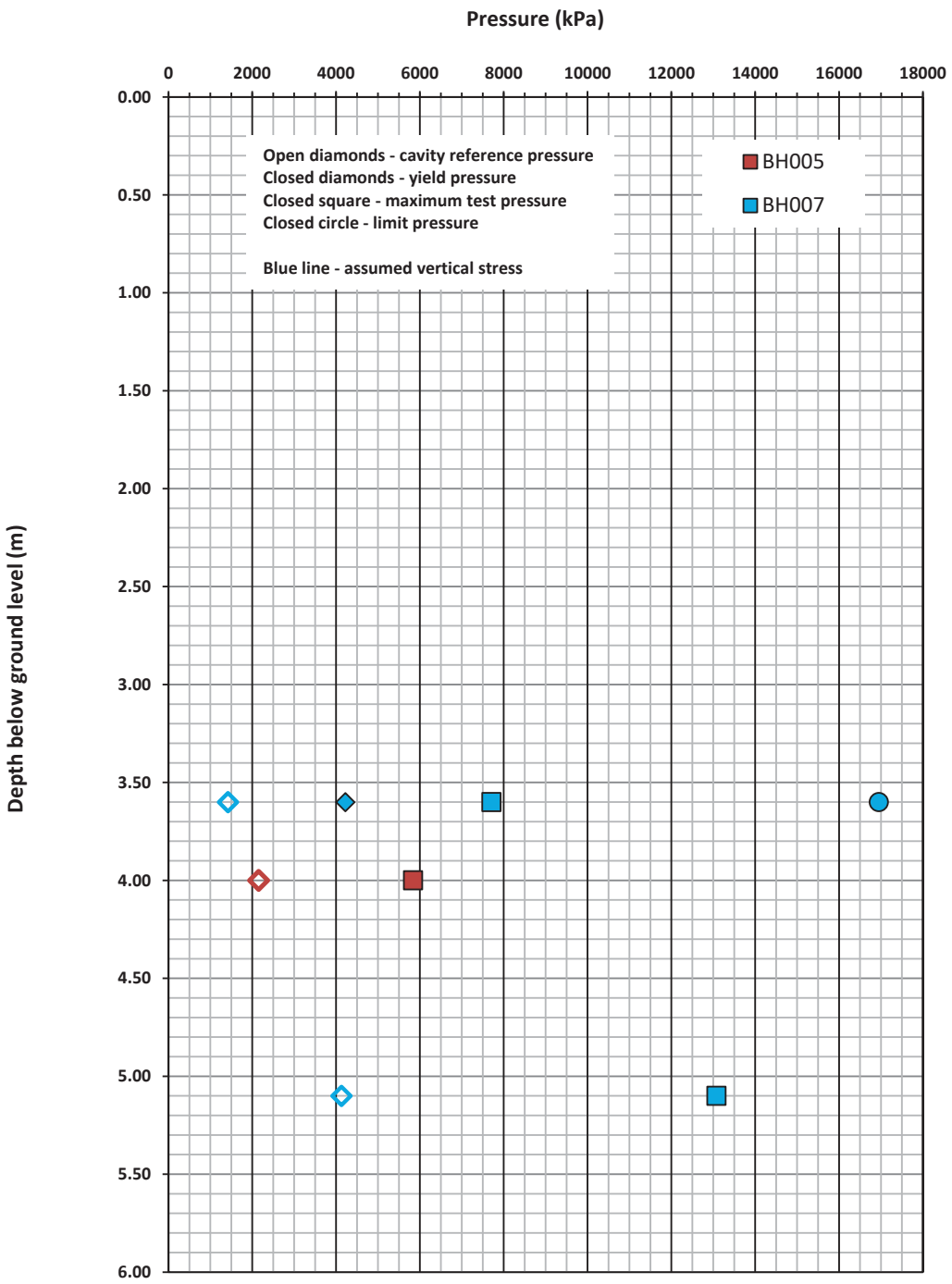
IN SITU
SITE INVESTIGATION



Project	Water Supply Project GI Lot 3	**Figure No.**	**1**
Client	IGSL Ltd		
Project No.	P1210125		

Pressuremeter Cavity Reference Pressure, Yield & Maximum Test Pressure Plot

IN SITU
SITE INVESTIGATION

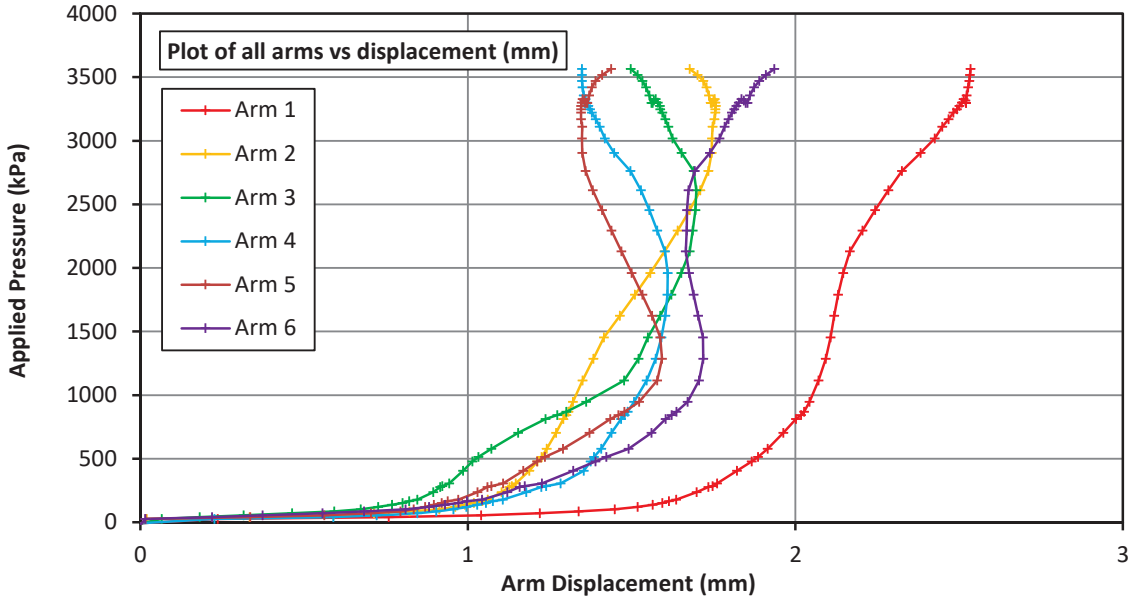


Project	Water Supply Project GI Lot 3	**Figure No.**	**2**
Client	IGSL Ltd		
Project No.	P1210125		

Pressuremeter Test Overview
High Pressure Dilatometer (HPD)

IN SITU SITE INVESTIGATION

Test Date	26/10/2021	**Test No.**	1
Borehole	BH005	**Test Depth (m)**	3.50
Coordinates (m)	- -	**Elevation (m)**	-



Material description from borehole log:

LIMESTONE.

Test pocket conditions:

Total core recovery: - %
Solid core recovery: - %
Rock quality designation: - %

Test pocket depth range:
From: 2.50 m to: 4.00 m
Flush: Air

Test comment:

The test was a good size with initial arm lift off at 1.0 to 1.5m. Some probe re-adjustment, marked by negative movement on arms 3, 4 & 5, occurred during loading indicating some variabilty in the test pocket. The test was terminated due to membrane burst at 3563kPa.

Test details: **Instrument:** Kylie (HPD06)

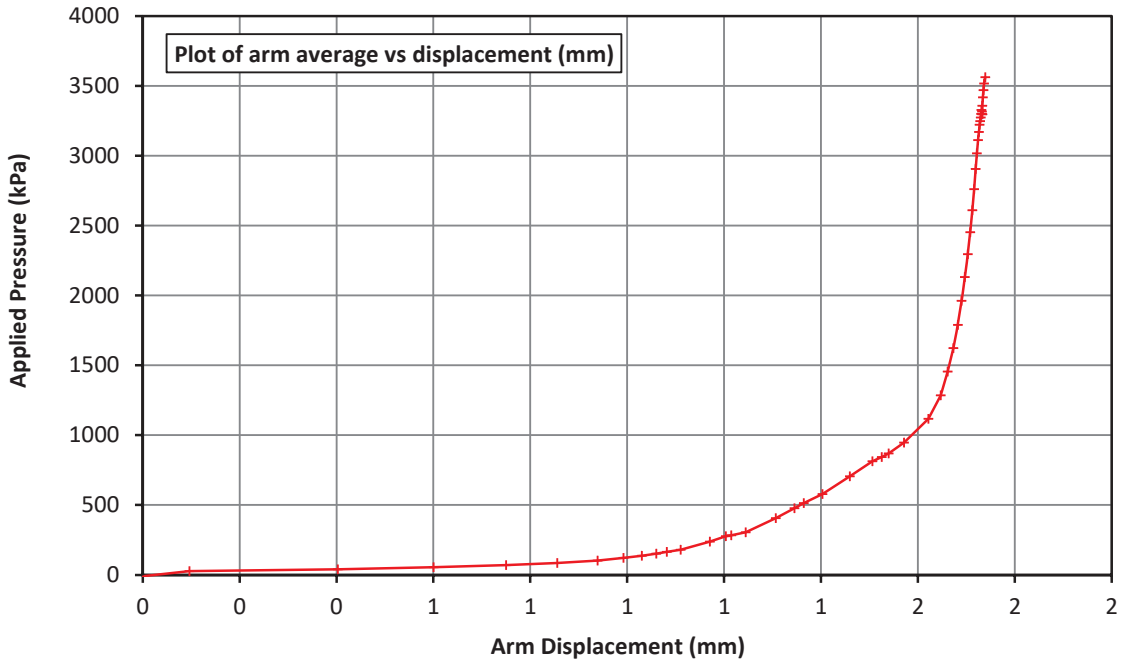
			mV	mV/mm		mV	mV/MPa
Drilling method:	Rotary coring						
Casing depth:	2.50 m	Arm 1:	-2437.2	136.2	TPC A:	-2361.8	114.3
Water level:	0.00 m	Arm 2:	-2349.1	135.5	TPC B:	-2422.6	122.8
		Arm 3:	-2281.4	137.1			
Test time:		Arm 4:	-2452.3	132.3			
Start (probe in):	10:00 hrs	Arm 5:	-2353.8	130.2			
Finish (probe out):	10:15 hrs	Arm 6:	-2305.5	135.8			

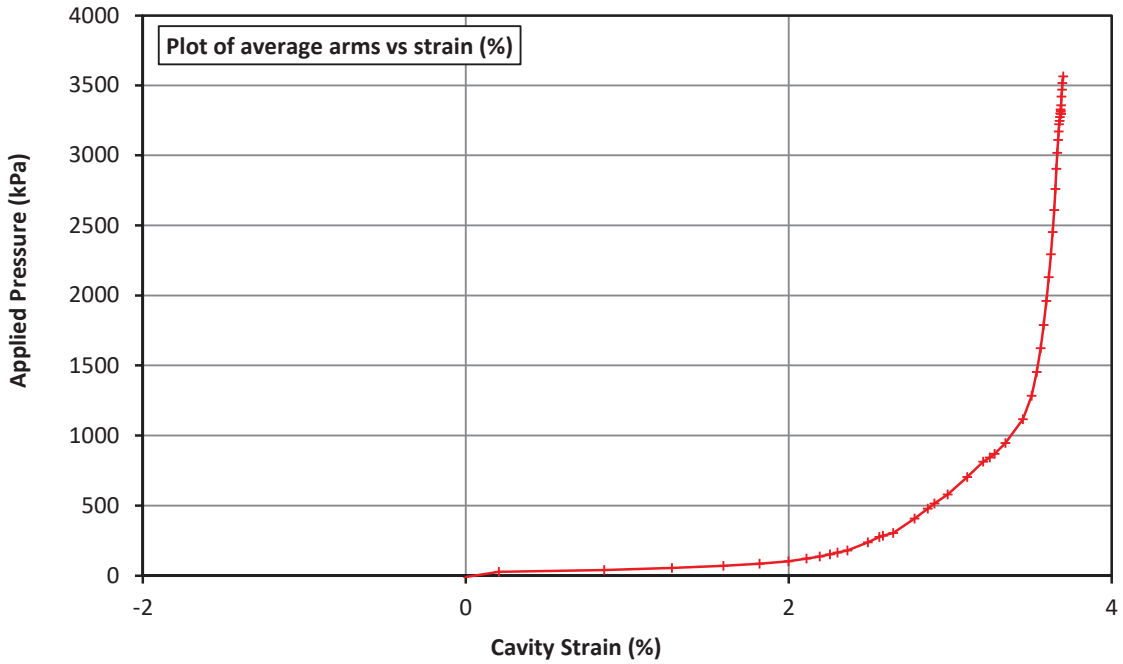
Project	Water Supply Project GI Lot 3	**Figure No.**	**BH005 T01 - 01**
Client	IGSL Ltd		
Project No.	P1200125		

Pressuremeter Test - Average Arm Plots

IN SITU SITE INVESTIGATION

Test Date	26/10/2021	**Test No.**	1
Borehole	BH005	**Test Depth (m)**	3.50



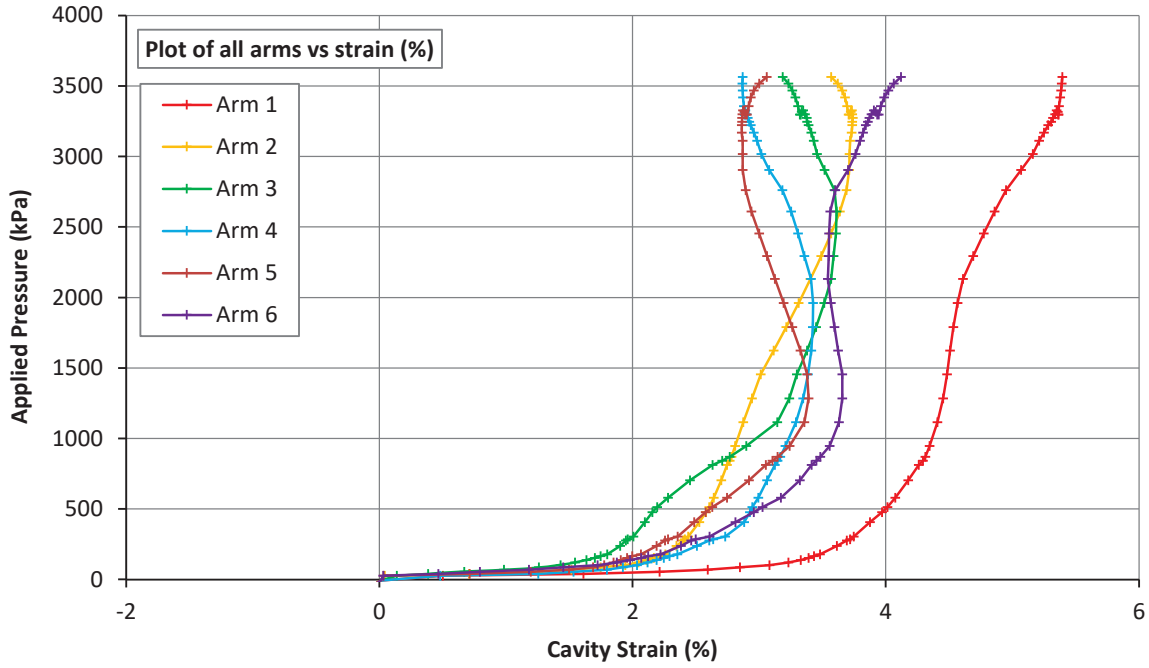


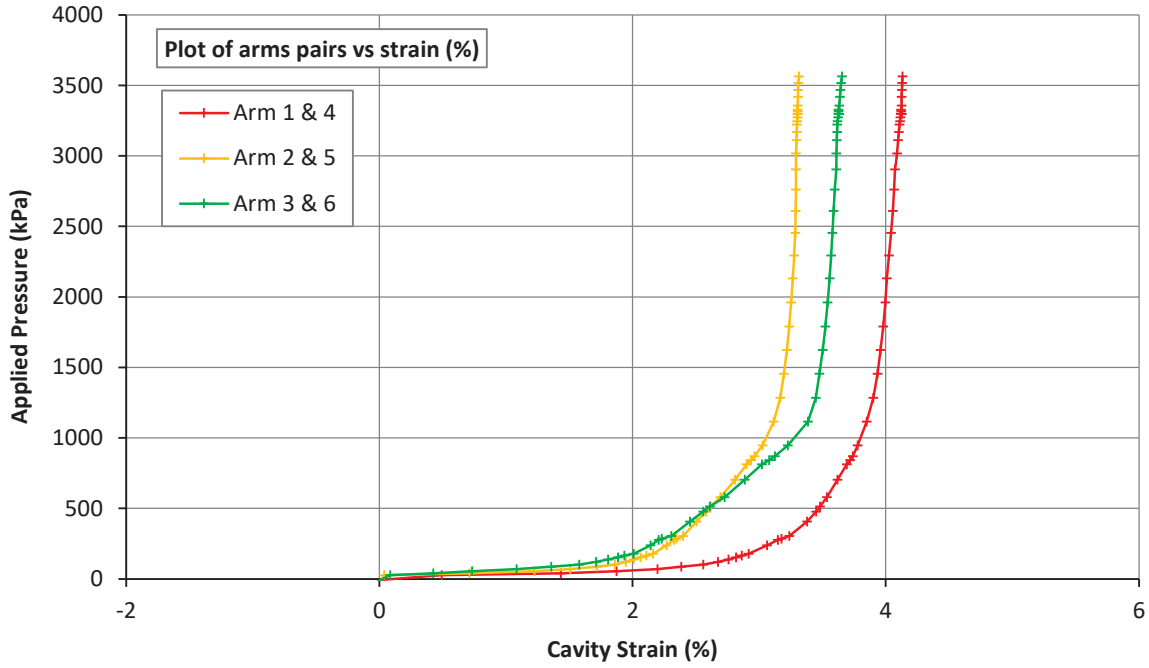
Project	Water Supply Project GI Lot 3	**Figure No.**	**BH005 T01 - 02**
Client	IGSL Ltd		
Project No.	P1200125		

Pressuremeter Test - Arm Displacement vs Strain (%)

IN SITU SITE INVESTIGATION

Test Date	26/10/2021	**Test No.**	1
Borehole	BH005	**Test Depth (m)**	3.50



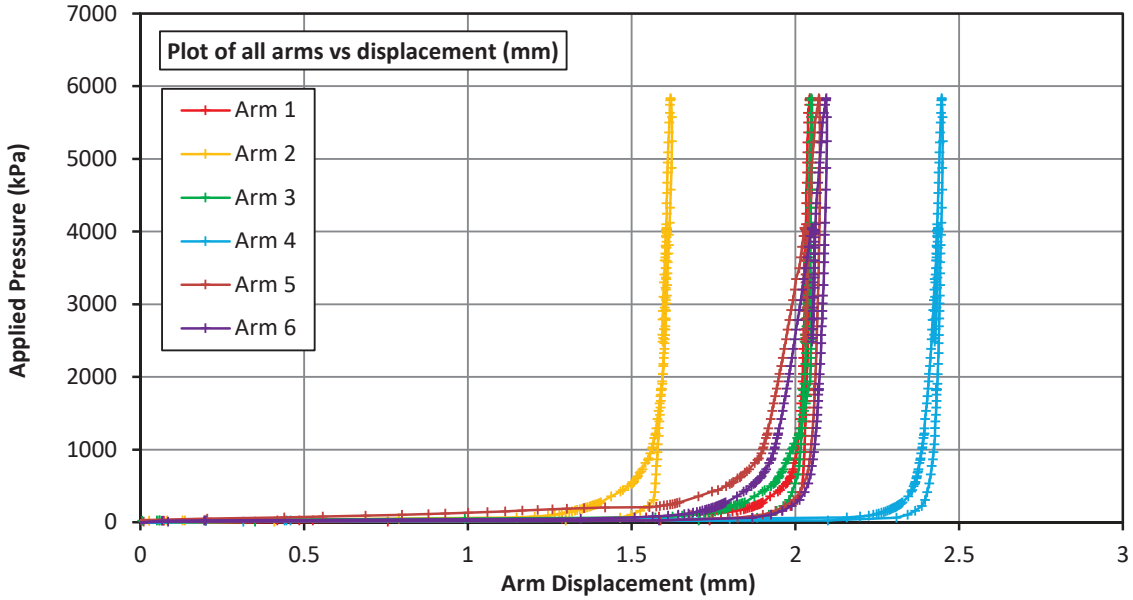


Project	Water Supply Project GI Lot 3	**Figure No.**	**BH005 T01 - 03**
Client	IGSL Ltd		
Project No.	P1200125		

Pressuremeter Test Overview
High Pressure Dilatometer (HPD)

IN SITU SITE INVESTIGATION

Test Date	27/10/2021	**Test No.**	2
Borehole	BH005	**Test Depth (m)**	4.00
Coordinates (m)	- -	**Elevation (m)**	-



Material description from borehole log:

LIMESTONE.

Test pocket conditions:

Total core recovery: - %
Solid core recovery: - %
Rock quality designation: - %

Test pocket depth range:
From: 4.00 m to: 5.00 m
Flush: Air

Test comment:

The test pocket was good with arms lifting off at 1.9 to 2.1mm. The po was estimated to be at 2149kPa, with the following loading section being long and linear. Material yield was not observed and the test was terminated at 5836kPa due to the membrane pulling away from the instrument. Analysis of a single unload reload loop provides a modulus value of 4093MPa.

Test details: **Instrument:** Kylie (HPD06)

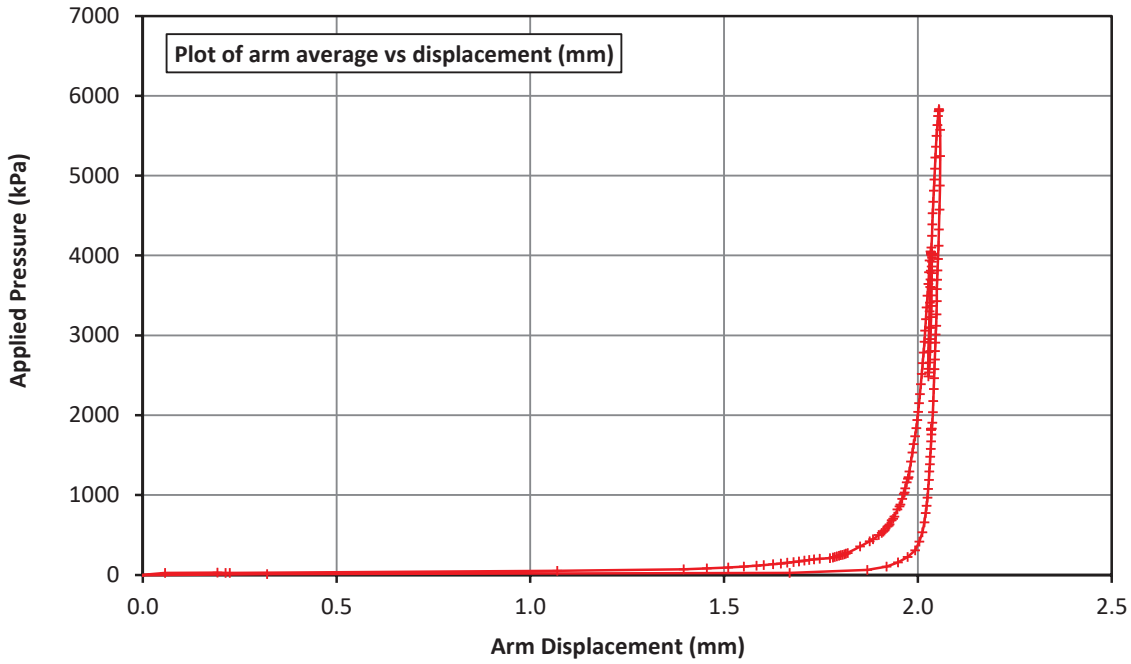
			mV	mV/mm		mV	mV/MPa
Drilling method:	Rotary coring						
Casing depth:	3.50 m	Arm 1:	-2432.6	136.2	TPC A:	-2358.4	114.3
Water level:	0.00 m	Arm 2:	-2345.3	135.5	TPC B:	-2416.5	122.8
		Arm 3:	-2267.9	137.1			
Test time:		Arm 4:	-2439.2	132.3			
Start (probe in):	12:00 hrs	Arm 5:	-2345.1	130.2			
Finish (probe out):	12:40 hrs	Arm 6:	-2302.1	135.8			

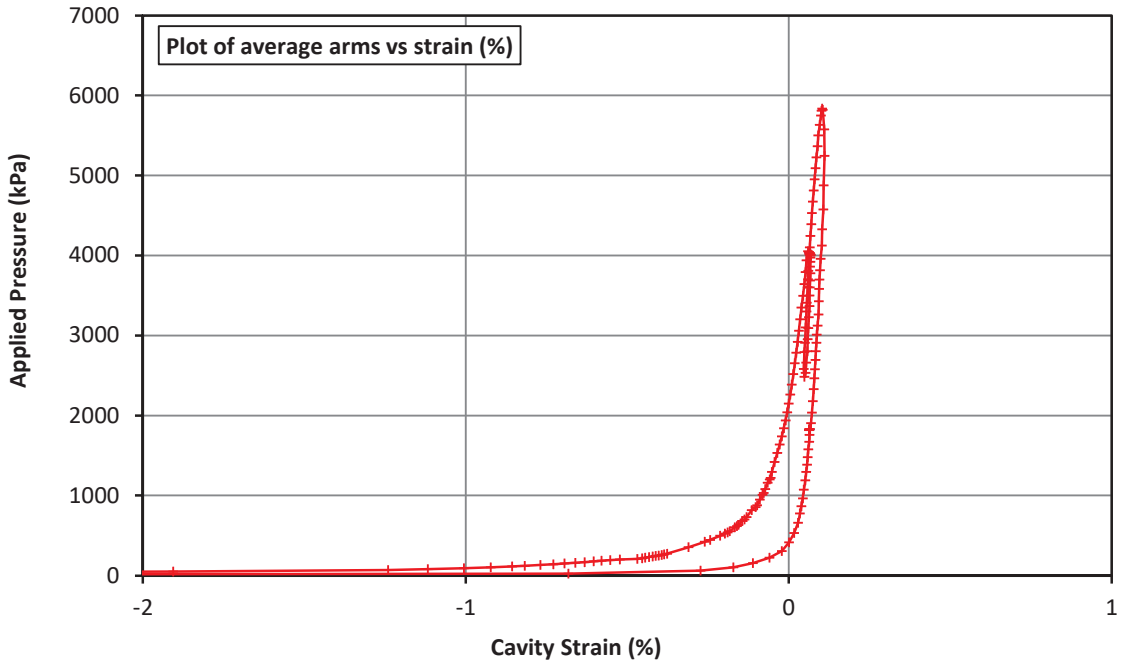
Project	Water Supply Project GI Lot 3	**Figure No.**	**BH005 T02 - 01**
Client	IGSL Ltd		
Project No.	P1200125		

Pressuremeter Test - Average Arm Plots

IN SITU SITE INVESTIGATION

Test Date	27/10/2021	**Test No.**	2
Borehole	BH005	**Test Depth (m)**	4.00



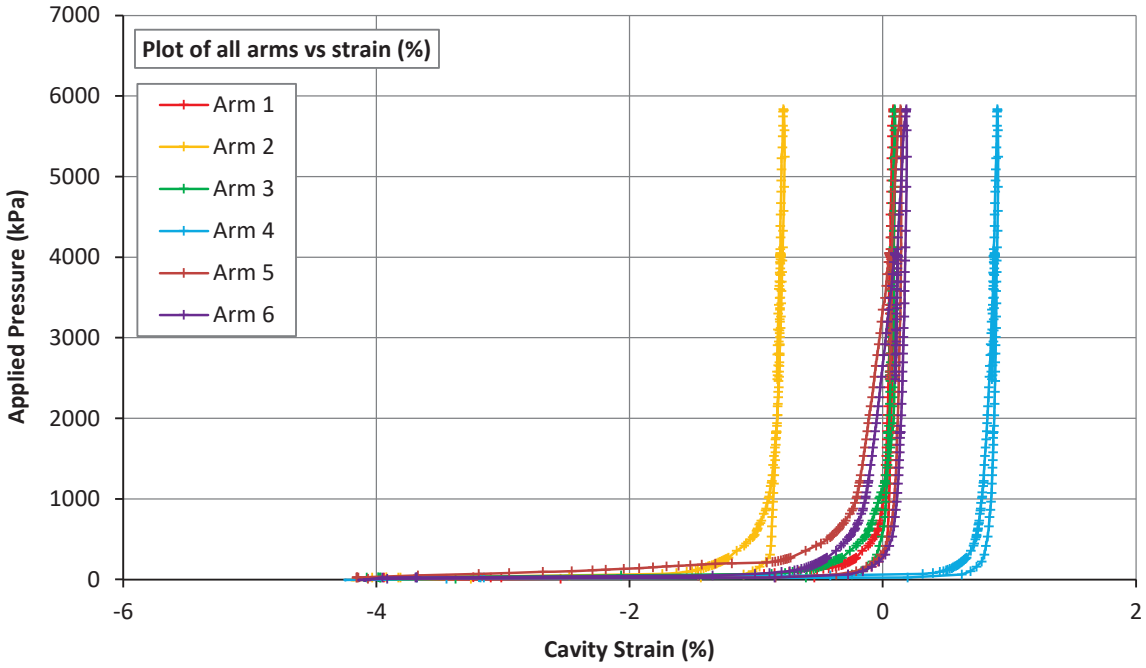


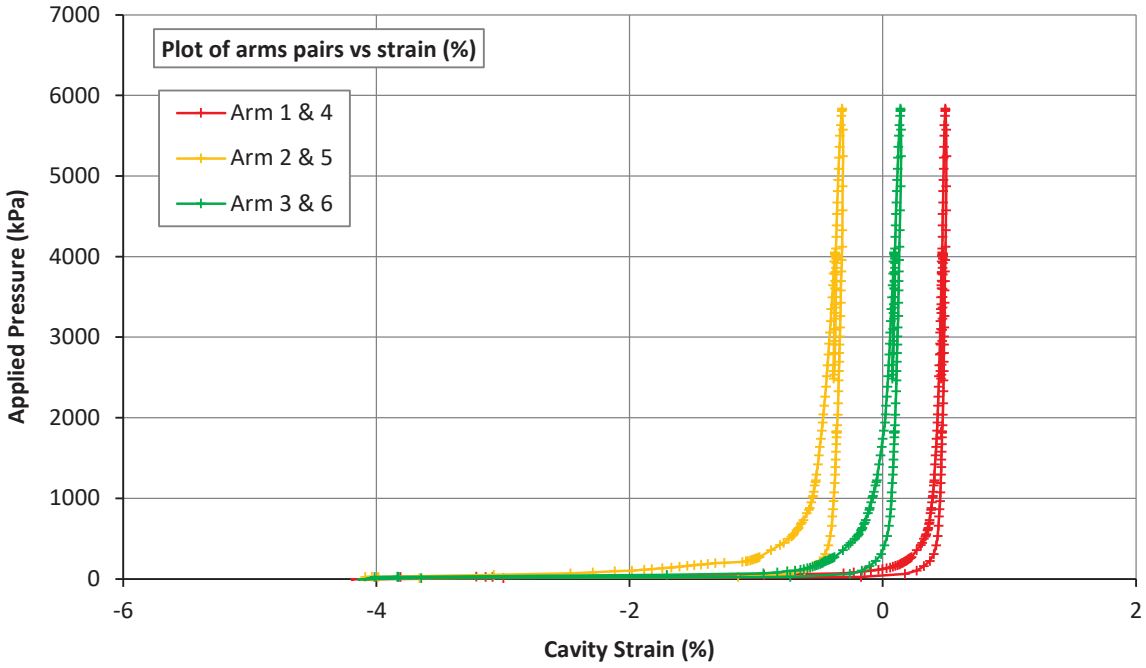
Project	Water Supply Project GI Lot 3	**Figure No.**	**BH005 T02 - 02**
Client	IGSL Ltd		
Project No.	P1200125		

Pressuremeter Test - Arm Displacement vs Strain (%)

IN SITU SITE INVESTIGATION

Test Date	27/10/2021	**Test No.**	2
Borehole	BH005	**Test Depth (m)**	4.00



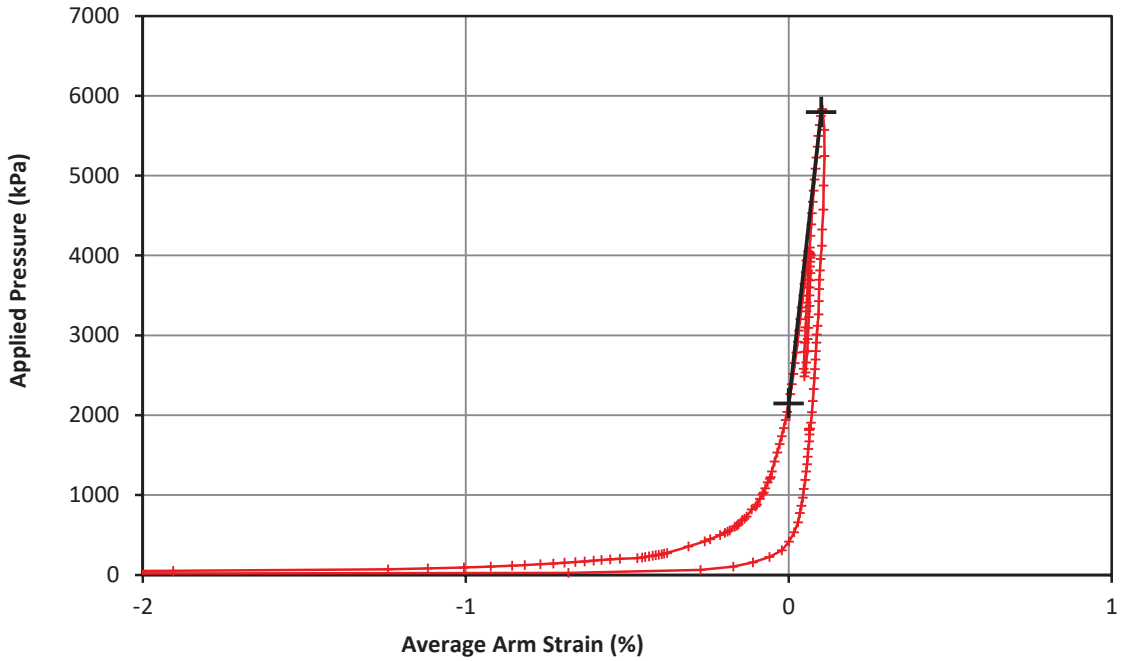


Project	Water Supply Project GI Lot 3	**Figure No.**	**BH005 T02 - 03**
Client	IGSL Ltd		
Project No.	P1200125		

Pressuremeter Analysis - Initial Modulus & In Situ Horizontal Stress

IN SITU SITE INVESTIGATION

Test Date	27/10/2021	**Test No.**	2
Borehole	BH005	**Test Depth (m)**	4.00



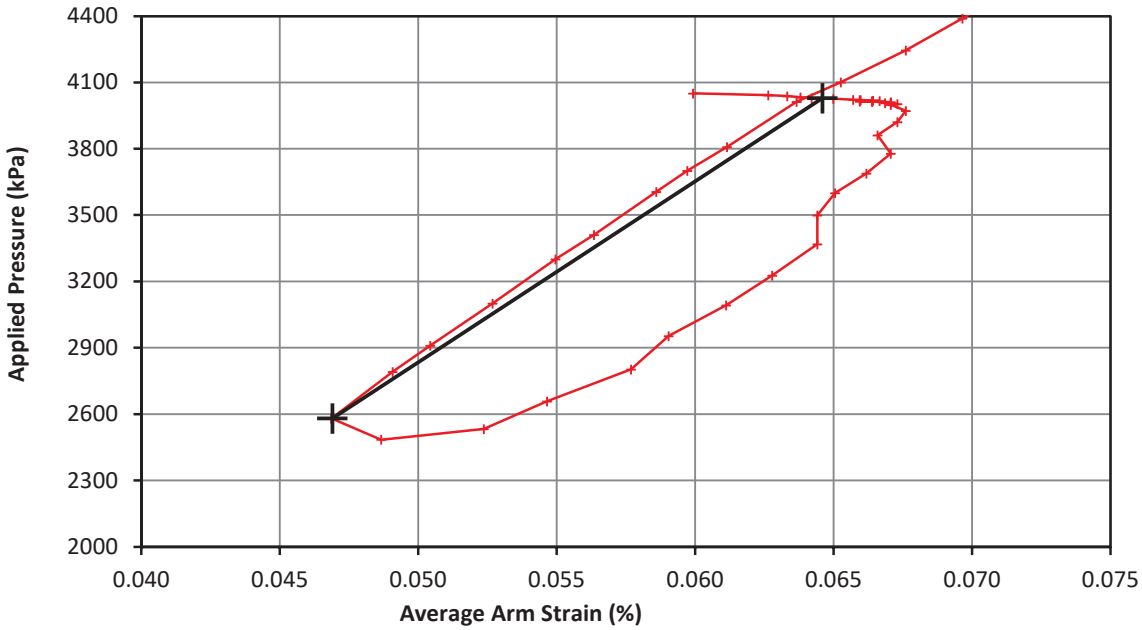
Initial Modulus	Shear Modulus	1827.3 MPa

Project	Water Supply Project GI Lot 3	**Figure No.**	**BH005 T02 - 04**
Client	IGSL Ltd		
Project No.	P1200125		

Pressuremeter Analysis - Unload Reload Loop

IN SITU SITE INVESTIGATION

Test Date	27/10/2021	**Test No.**	2
Borehole	BH005	**Test Depth (m)**	4.00



Loop 1	Shear Modulus	4093.3 MPa
	Cavity Strain Range	0.018 %

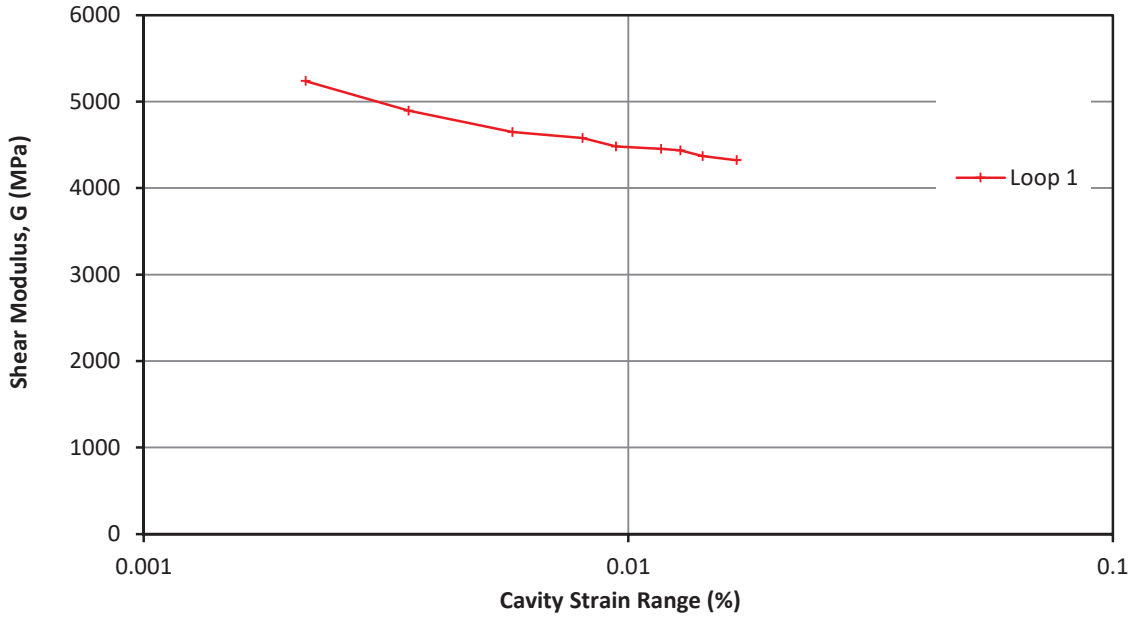
Project	Water Supply Project GI Lot 3	**Figure No.**	**BH005 T02 - 05**
Client	IGSL Ltd		
Project No.	P1200125		

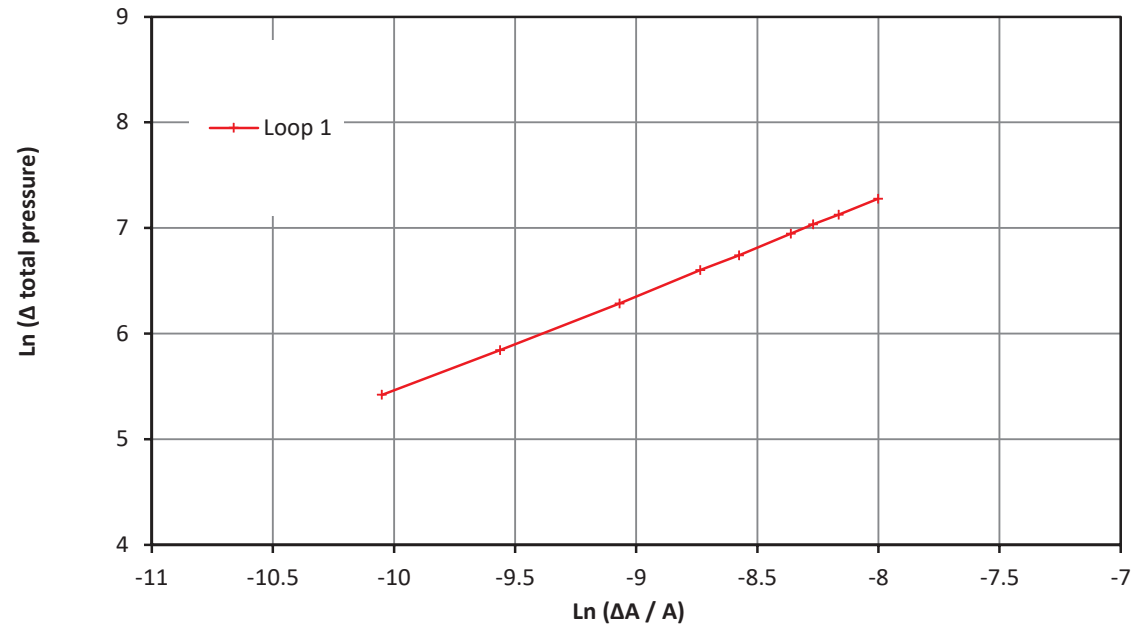
Pressuremeter Analysis

Small Strain Stiffness and Bolton & Whittle (1999)

IN SITU SITE INVESTIGATION

Test Date	27/10/2021	**Test No.**	2
Borehole	BH005	**Test Depth (m)**	4.00





Loop 1	
Gradient(β)	Intercept
0.911	2114.752 (MPa)

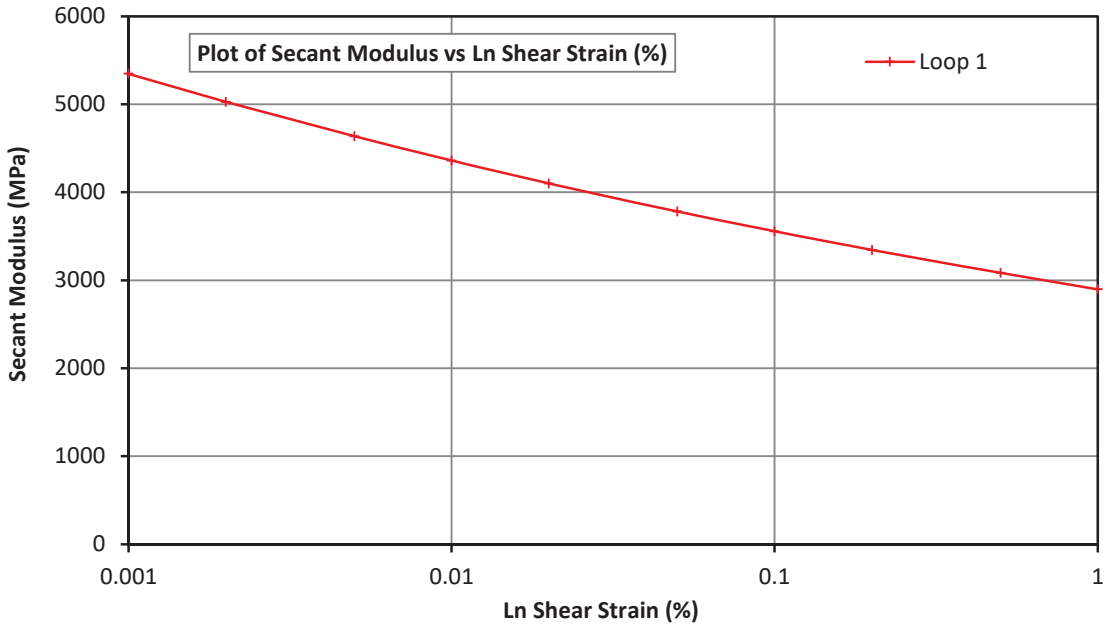
Project	Water Supply Project GI Lot 3	**Figure No.**	**BH005 T02 - 06**
Client	IGSL Ltd		
Project No.	P1200125		

Pressuremeter Analysis

Secant Modulus - Shear Strain (%)

IN SITU SITE INVESTIGATION

Test Date	27/10/2021	**Test No.**	2
Borehole	BH005	**Test Depth (m)**	4.00



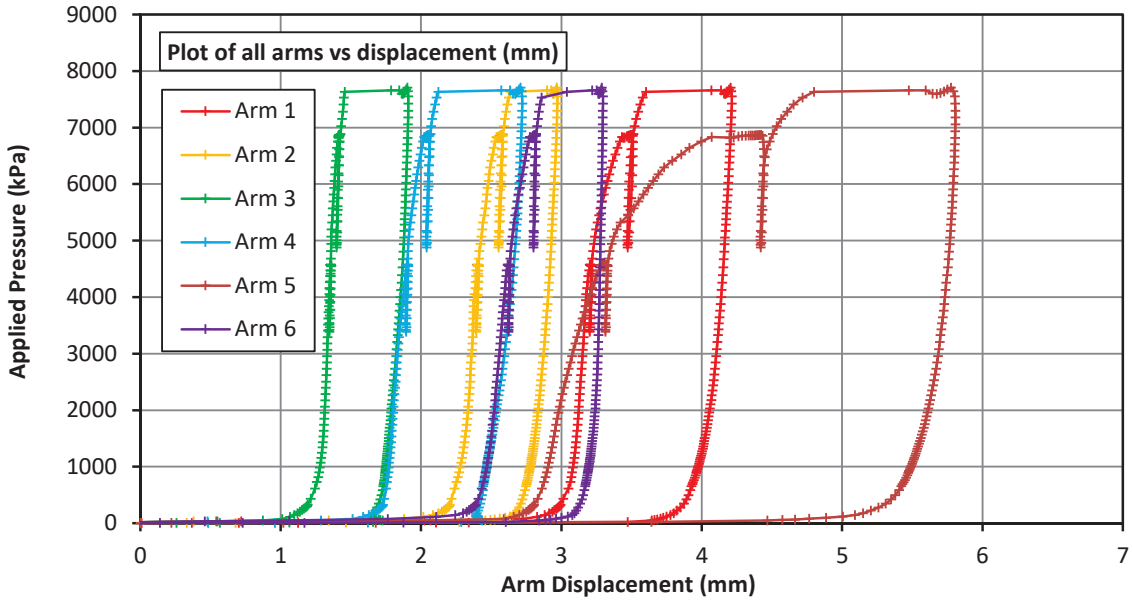
Shear Strain	Loop 1
0.001%	**5346**
0.002%	5028
0.005%	4636
0.010%	**4360**
0.020%	4100
0.050%	3780
0.100%	**3555**
0.200%	3343
0.500%	3082
1.000%	**2899**

Project	Water Supply Project GI Lot 3	**Figure No.**	**BH005 T02 - 07**
Client	IGSL Ltd		
Project No.	P1200125		

Pressuremeter Test Overview
High Pressure Dilatometer (HPD)

IN SITU SITE INVESTIGATION

Test Date	28/10/2021	**Test No.**	1
Borehole	BH007	**Test Depth (m)**	3.60
Coordinates (m)	- -	**Elevation (m)**	-



Material description from borehole log:

LIMESTONE.

Test pocket conditions:

Total core recovery:	100 %	Test pocket depth range:	
Solid core recovery:	- %	From: 2.60 m to: 4.10 m	
Rock quality designation:	- %	Flush: Air	

Test comment:

The test pocket was reasonable with arms lifting off at 1.3 to 3.2mm. The po was estimated to be at 1420kPa, with the following loading section being relatively long. The test was taken to a maximum pressure of 7707kPa, but was terminated due to fracture movement. Material yield was interpreted at 4220kPa, although this should be treated with caution due to the variable displacement-pressure response shown by arm 5. Analysis of two unload reload loops provides modulus values of 1670 to 2028MPa. Derived undrained shear strength analysis provides values of 2400 to 2800kPa, although these should also be treated with caution due to the nature of the tested material.

Test details: **Instrument:** Kylie (HPD06)

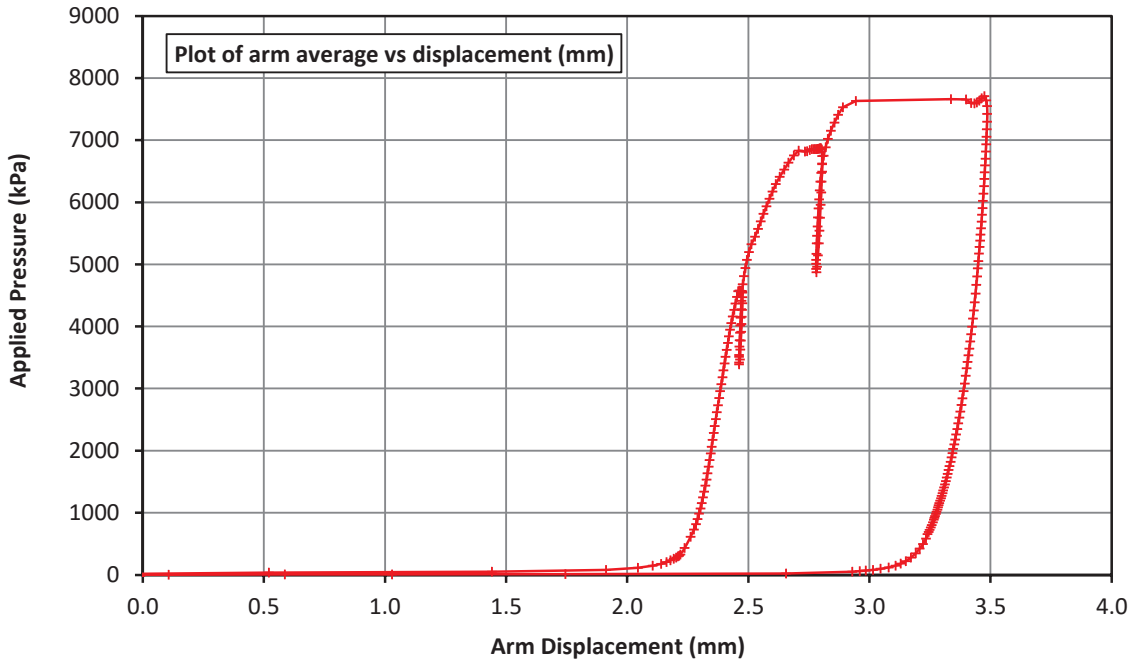
			mV	mV/mm		mV	mV/MPa
Drilling method:	Rotary coring						
Casing depth:	2.00 m	Arm 1:	-2434.2	136.2	TPC A:	-2359.8	114.3
Water level:	0.00 m	Arm 2:	-2338.1	135.5	TPC B:	-2417.5	122.8
		Arm 3:	-2269.9	137.1			
Test time:		Arm 4:	-2448.4	132.3			
Start (probe in):	12:15 hrs	Arm 5:	-2349.3	130.2			
Finish (probe out):	13:15 hrs	Arm 6:	-2303.9	135.8			

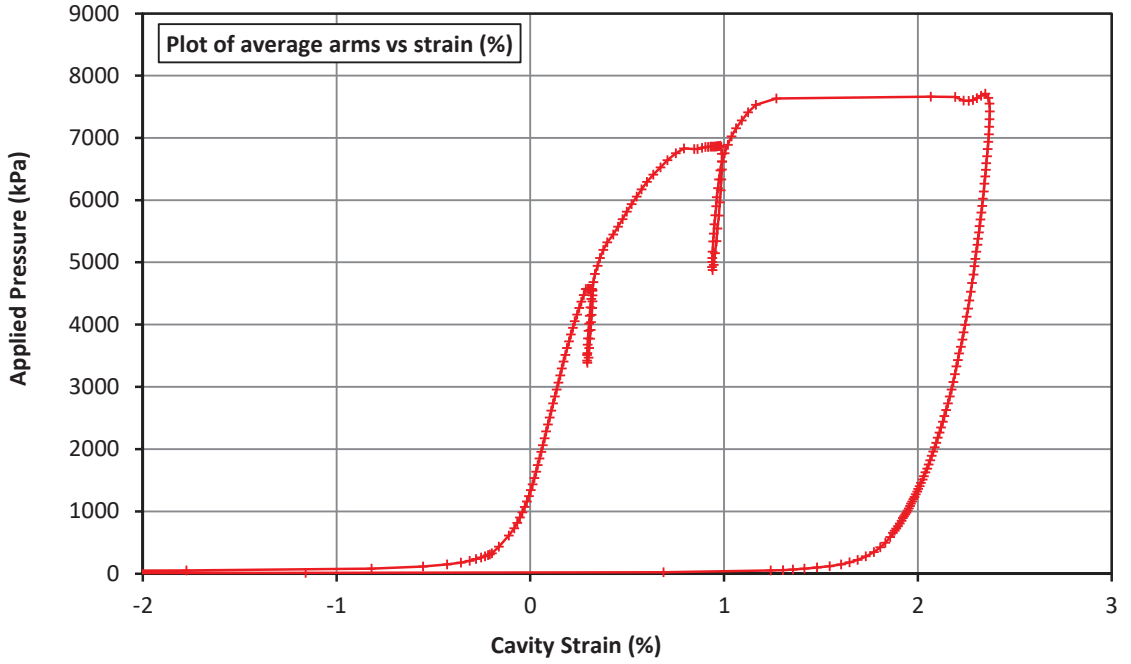
Project	Water Supply Project GI Lot 3	**Figure No.**	**BH007 T01 - 01**
Client	IGSL Ltd		
Project No.	P1200125		

Pressuremeter Test - Average Arm Plots

IN SITU SITE INVESTIGATION

Test Date	28/10/2021	**Test No.**	1
Borehole	BH007	**Test Depth (m)**	3.60



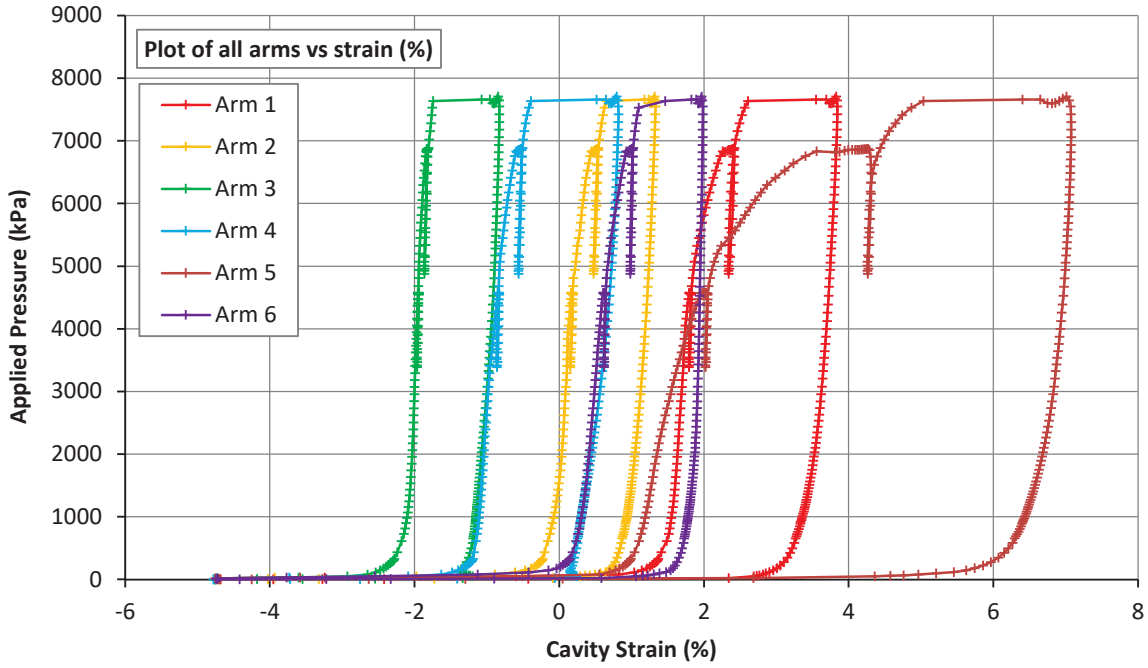


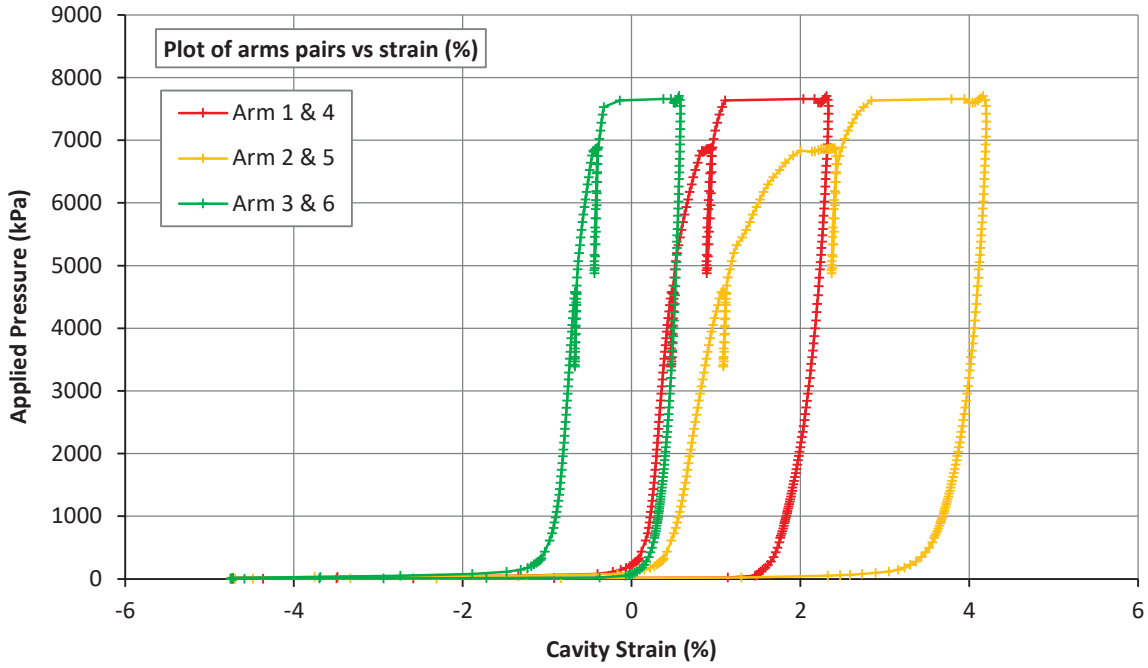
Project	Water Supply Project GI Lot 3	**Figure No.**	**BH007 T01 - 02**
Client	IGSL Ltd		
Project No.	P1200125		

Pressuremeter Test - Arm Displacement vs Strain (%)

IN SITU SITE INVESTIGATION

Test Date	28/10/2021	**Test No.**	1
Borehole	BH007	**Test Depth (m)**	3.60



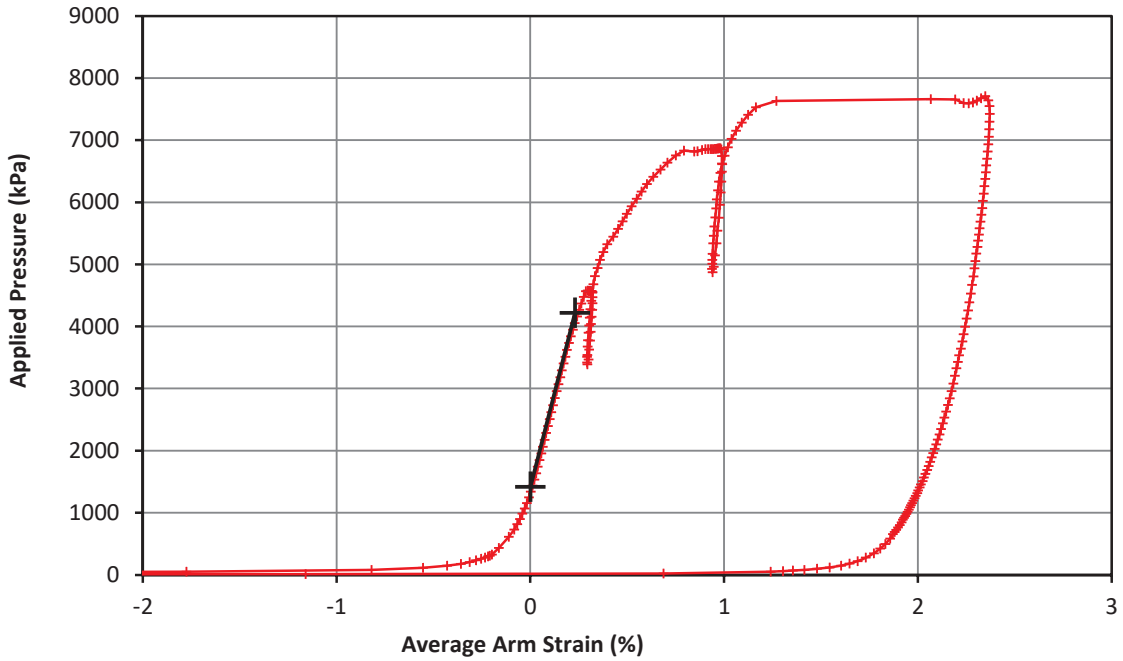


Project	Water Supply Project GI Lot 3	**Figure No.**	**BH007 T01 - 03**
Client	IGSL Ltd		
Project No.	P1200125		

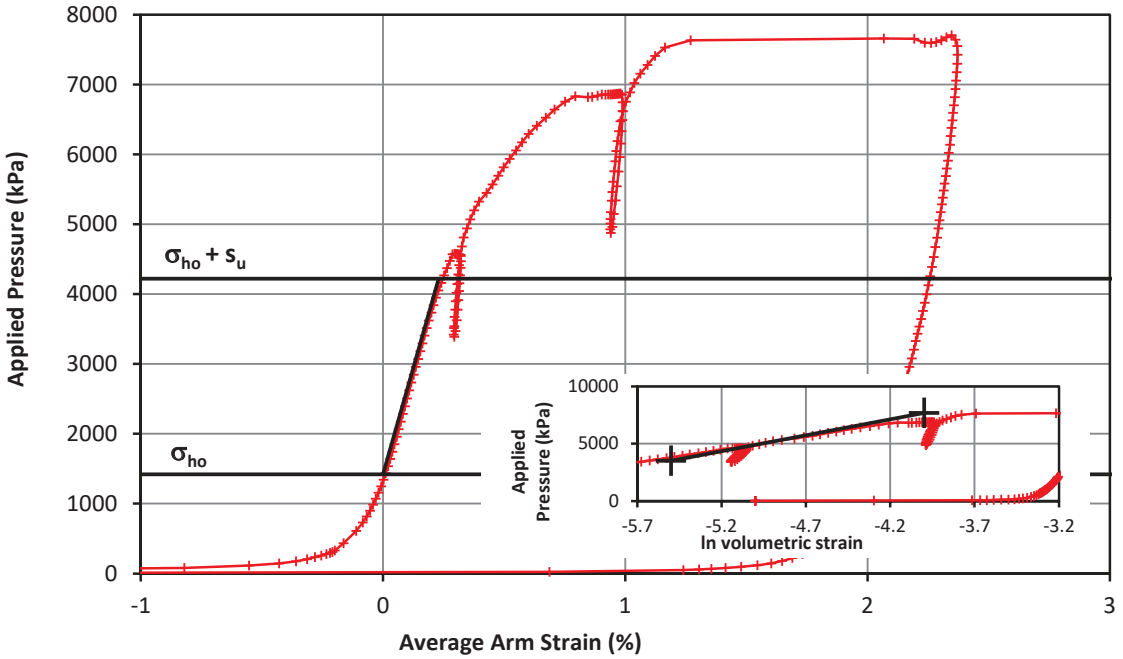
Pressuremeter Analysis - Initial Modulus & In Situ Horizontal Stress

IN SITU SITE INVESTIGATION

Test Date	28/10/2021	**Test No.**	1
Borehole	BH007	**Test Depth (m)**	3.60



Initial Modulus	Shear Modulus	610.1 MPa



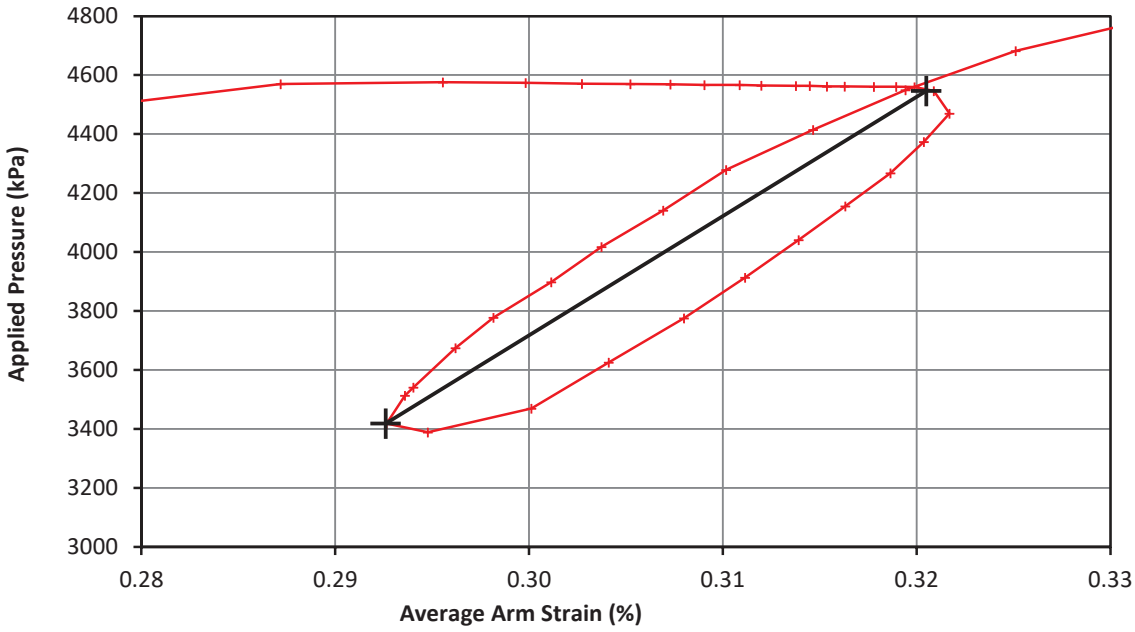
Marsland & Randolph	In situ horizontal stress	1420 kPa
	Undrained Strength	2800 kPa

Project	Water Supply Project GI Lot 3	**Figure No.**	**BH007 T01 - 04**
Client	IGSL Ltd		
Project No.	P1200125		

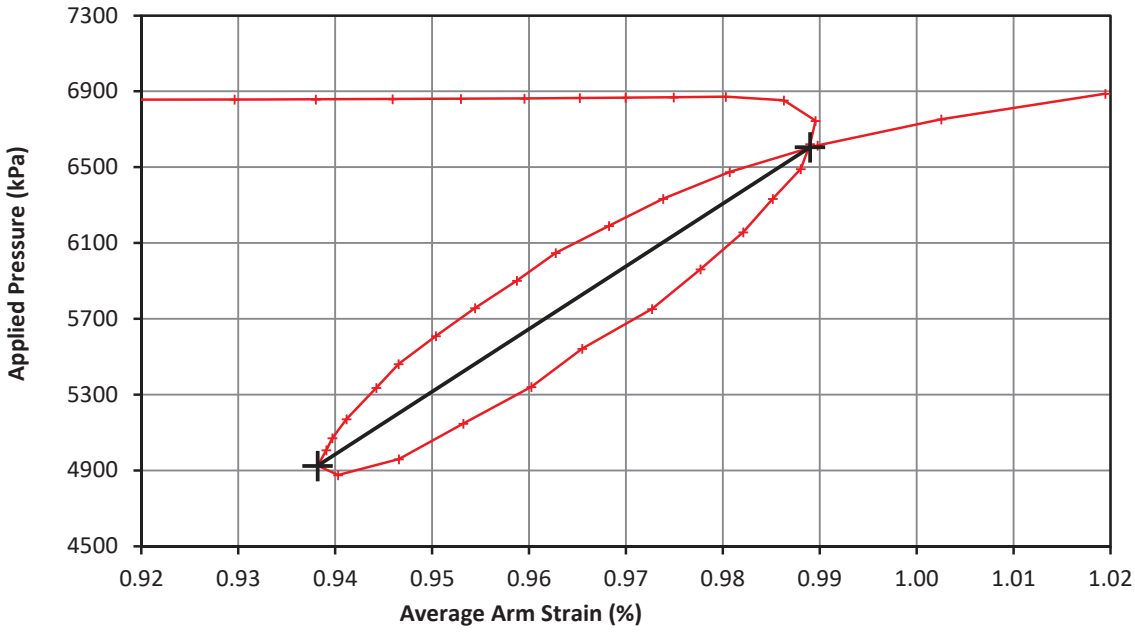
Pressuremeter Analysis - Unload Reload Loop

IN SITU SITE INVESTIGATION

Test Date	28/10/2021	**Test No.**	1
Borehole	BH007	**Test Depth (m)**	3.60



Loop 1	Shear Modulus	2028.3 MPa
	Cavity Strain Range	0.028 %



Loop 2	Shear Modulus	1670.0 MPa
	Cavity Strain Range	0.051 %

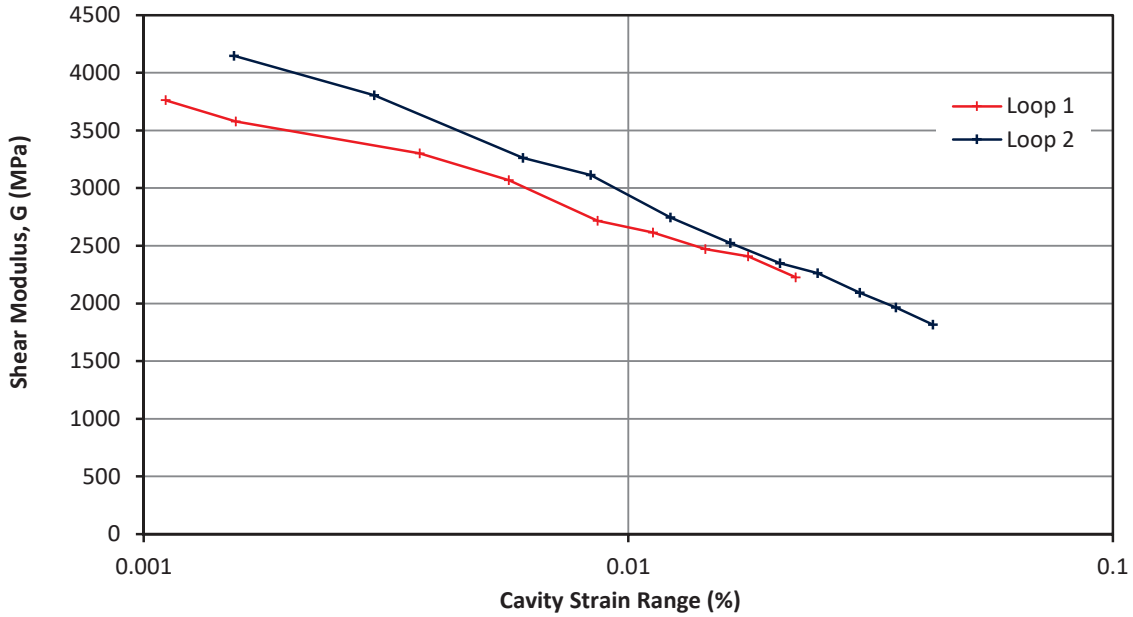
Project	Water Supply Project GI Lot 3	**Figure No.**	**BH007 T01 - 05**
Client	IGSL Ltd		
Project No.	P1200125		

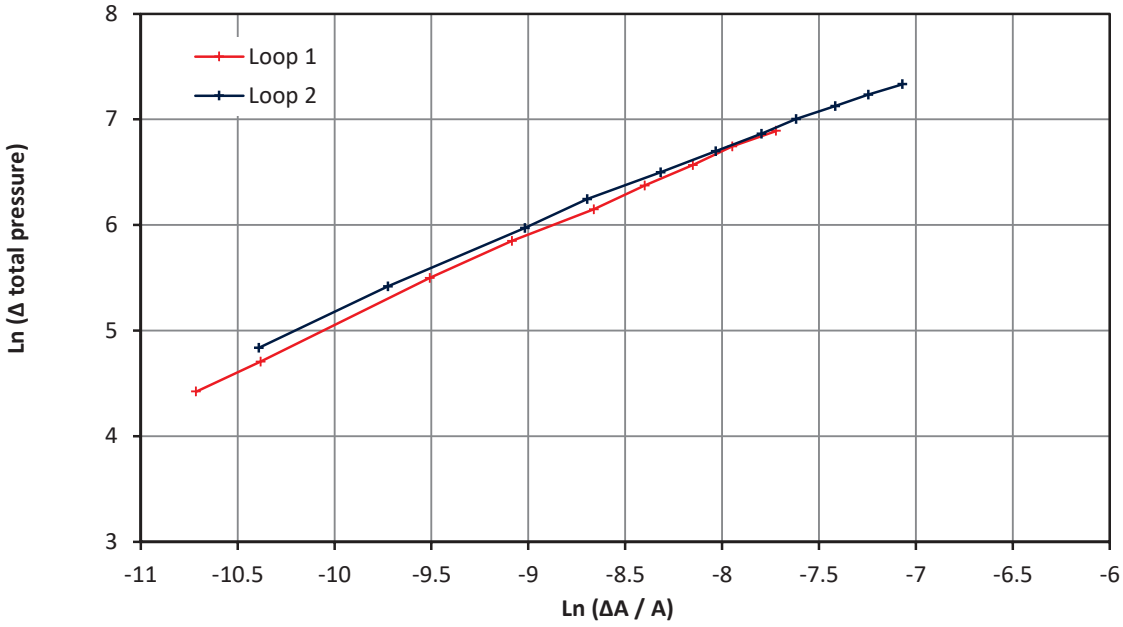
Pressuremeter Analysis

Small Strain Stiffness and Bolton & Whittle (1999)

IN SITU SITE INVESTIGATION

Test Date	28/10/2021	**Test No.**	1
Borehole	BH007	**Test Depth (m)**	3.60





Loop 1		Loop 2	
Gradient(β)	Intercept	Gradient(β)	Intercept
0.828	610.526 (MPa)	0.748	323.979 (MPa)

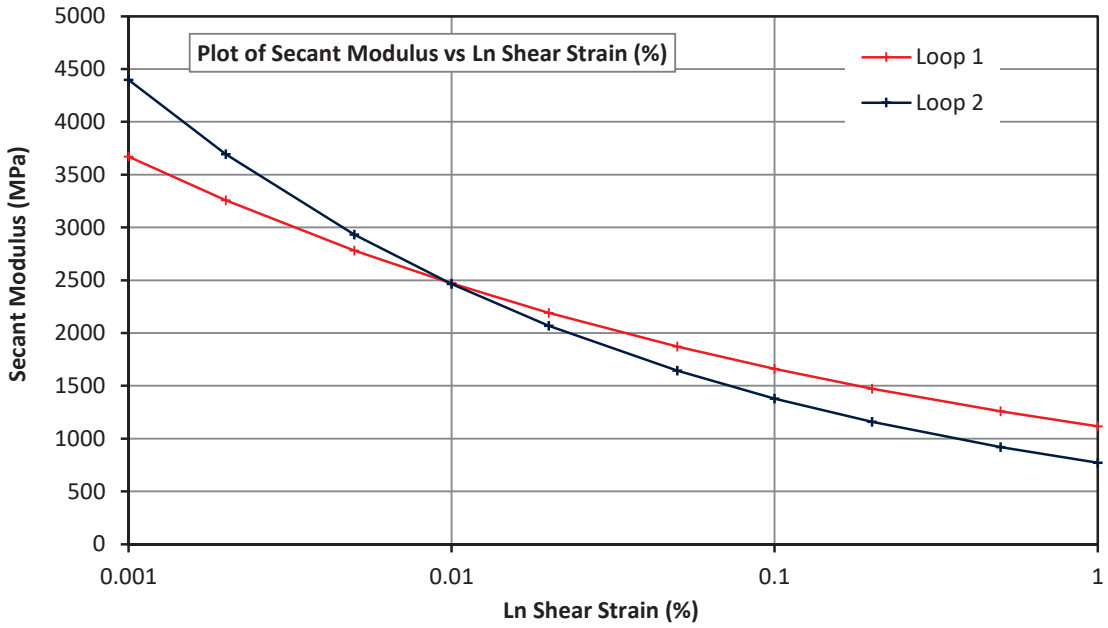
Project	Water Supply Project GI Lot 3	**Figure No.**	**BH007 T01 - 06**
Client	IGSL Ltd		
Project No.	P1200125		

Pressuremeter Analysis

Secant Modulus - Shear Strain (%)

IN SITU SITE INVESTIGATION

Test Date	28/10/2021	**Test No.**	1
Borehole	BH007	**Test Depth (m)**	3.60



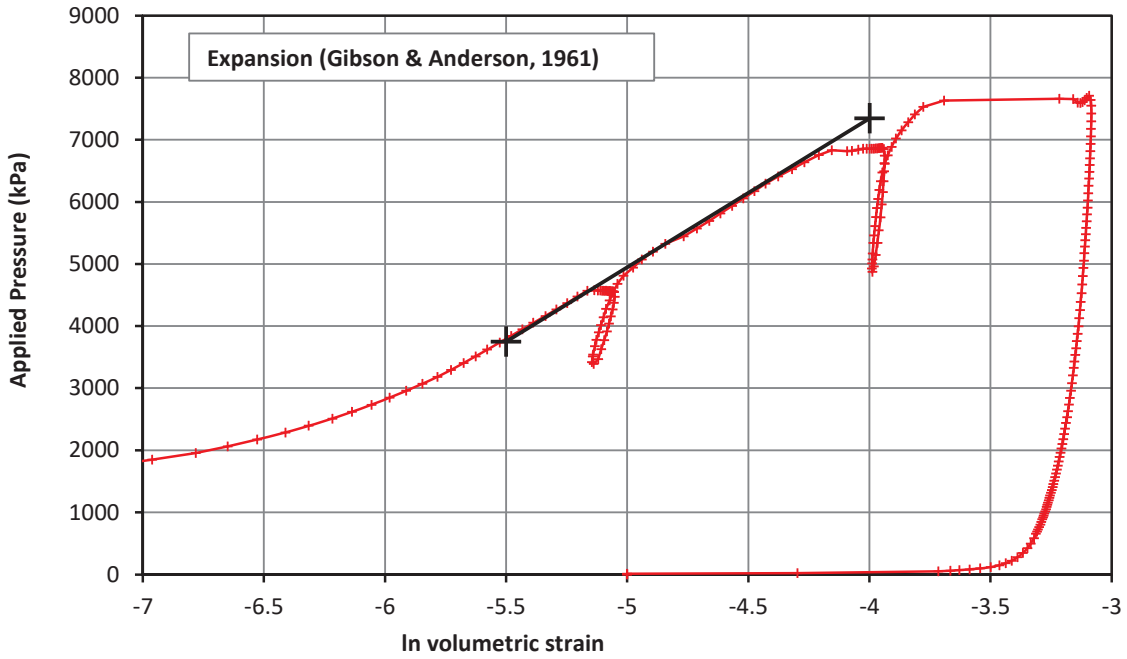
Shear Strain	Loop 1	Loop 2
0.001%	**3671**	**4397**
0.002%	3257	3693
0.005%	2782	2932
0.010%	**2469**	**2463**
0.020%	2191	2069
0.050%	1871	1643
0.100%	**1661**	**1380**
0.200%	1474	1159
0.500%	1259	920
1.000%	**1117**	**773**

Project	Water Supply Project GI Lot 3	**Figure No.**	**BH007 T01 - 07**
Client	IGSL Ltd		
Project No.	P1200125		

Pressuremeter Analysis - Undrained Strength

IN SITU SITE INVESTIGATION

Test Date	28/10/2021	**Test No.**	1
Borehole	BH007	**Test Depth (m)**	3.60



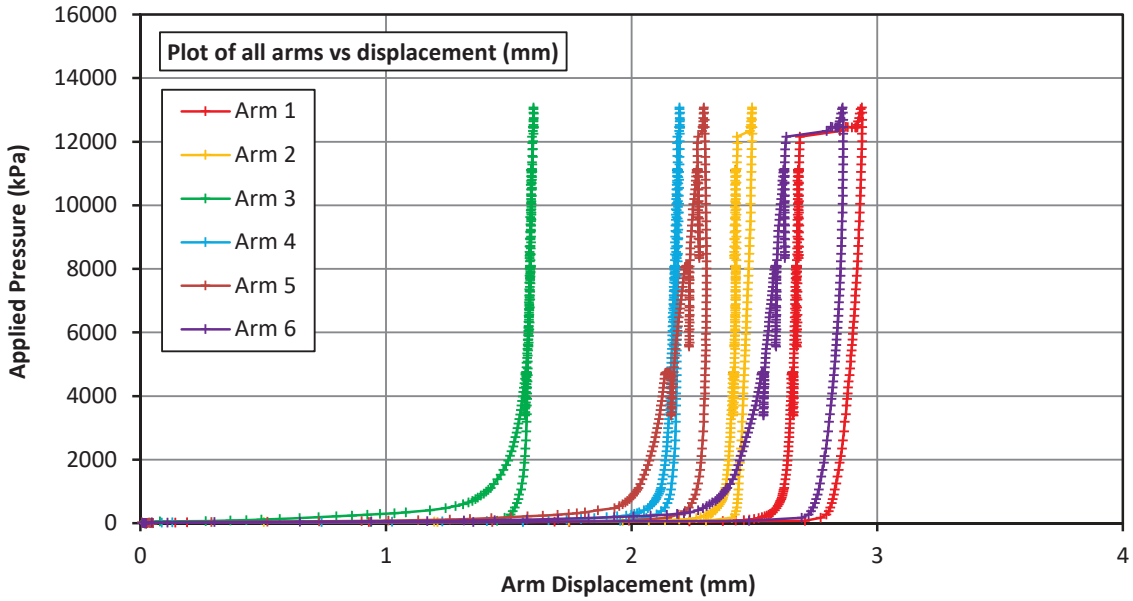
Strength (loading)	Undrained Shear	2400	kPa
	Limit Pressure	16950	kPa

Project	Water Supply Project GI Lot 3	**Figure No.**	**BH007 T01 - 08**
Client	IGSL Ltd		
Project No.	P1200125		

Pressuremeter Test Overview
High Pressure Dilatometer (HPD)

IN SITU SITE INVESTIGATION

Test Date	28/10/2021	**Test No.**	2
Borehole	BH007	**Test Depth (m)**	5.10
Coordinates (m)	- -	**Elevation (m)**	-



Material description from borehole log:

LIMESTONE.

Test pocket conditions:

Total core recovery:	100 %	Test pocket depth range:	
Solid core recovery:	- %	From: 4.10 m to: 5.60 m	
Rock quality designation:	- %	Flush: Air	

Test comment:

The test pocket was good with arms lifting off at 1.6 to 2.7mm. The po was estimated to be at 4125kPa, with the following loading section being long and linear. No material yield was observed and the test was terminated at 13076kPa, due to fracture movement shown by arms 6, 1 & 2. The displacement-pressure response shown by the arms during loading was consistent, with the tested material being high strength. Analysis of three unload reload loops provides very high modulus values, although it must be noted that loop definition was difficult due to the small strain range experienced over the test.

Test details: **Instrument:** Kylie (HPD06)

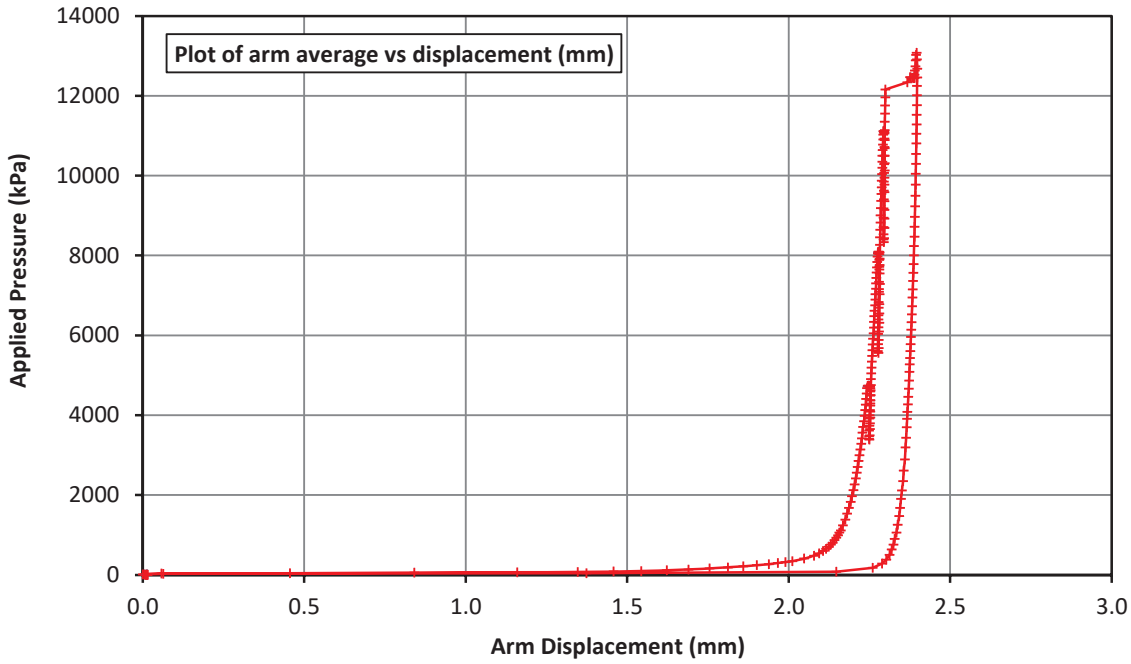
			mV	mV/mm		mV	mV/MPa
Drilling method:	Rotary coring						
Casing depth:	4.10 m	Arm 1:	-2432.6	136.2	TPC A:	-2360.3	114.3
Water level:	0.00 m	Arm 2:	-2338.3	135.5	TPC B:	-2417.4	122.8
		Arm 3:	-2270.3	137.1			
Test time:		Arm 4:	-2447.4	132.3			
Start (probe in):	15:10 hrs	Arm 5:	-2347.3	130.2			
Finish (probe out):	16:15 hrs	Arm 6:	-2303.9	135.8			

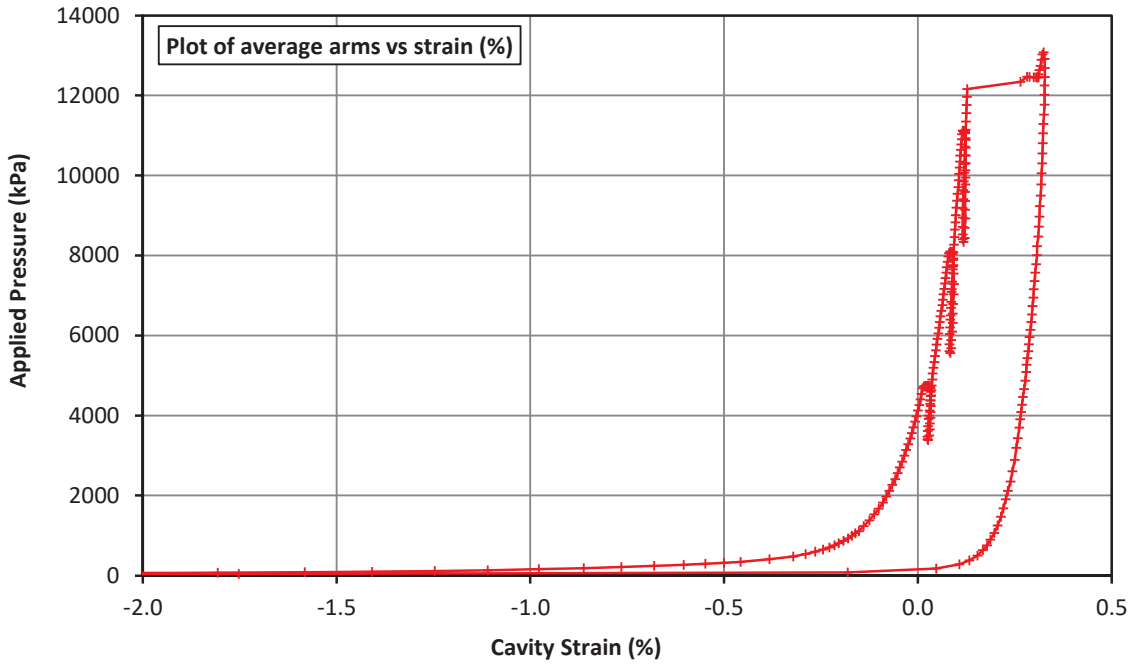
Project	Water Supply Project GI Lot 3	**Figure No.**	**BH007 T02 - 01**
Client	IGSL Ltd		
Project No.	P1200125		

Pressuremeter Test - Average Arm Plots

IN SITU SITE INVESTIGATION

Test Date	28/10/2021	**Test No.**	2
Borehole	BH007	**Test Depth (m)**	5.10



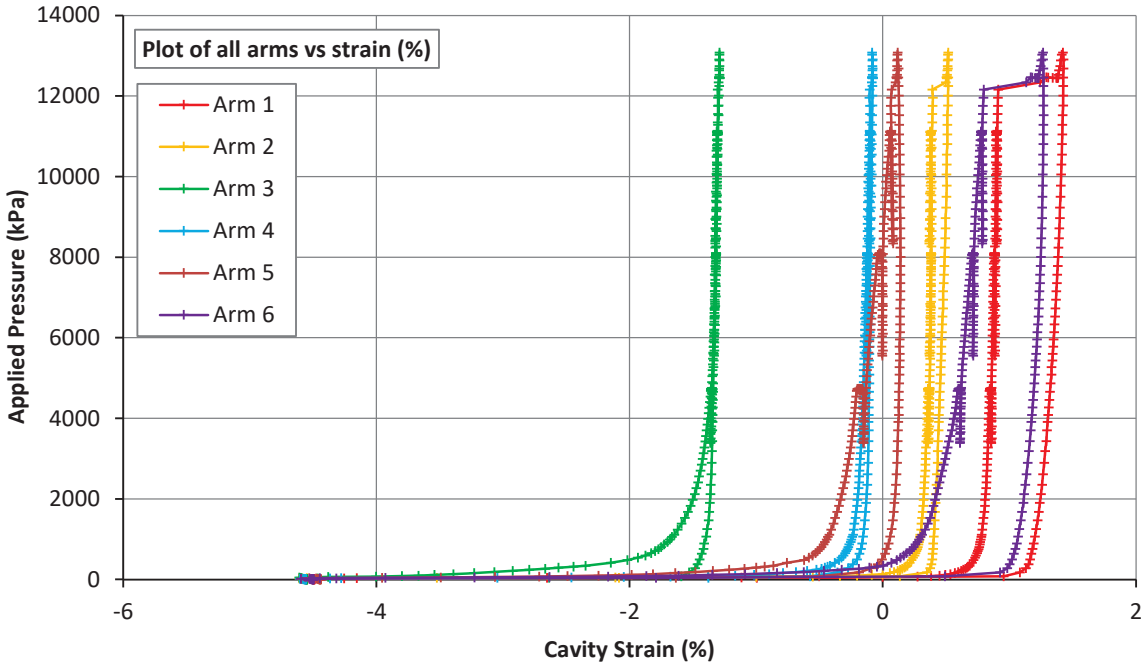


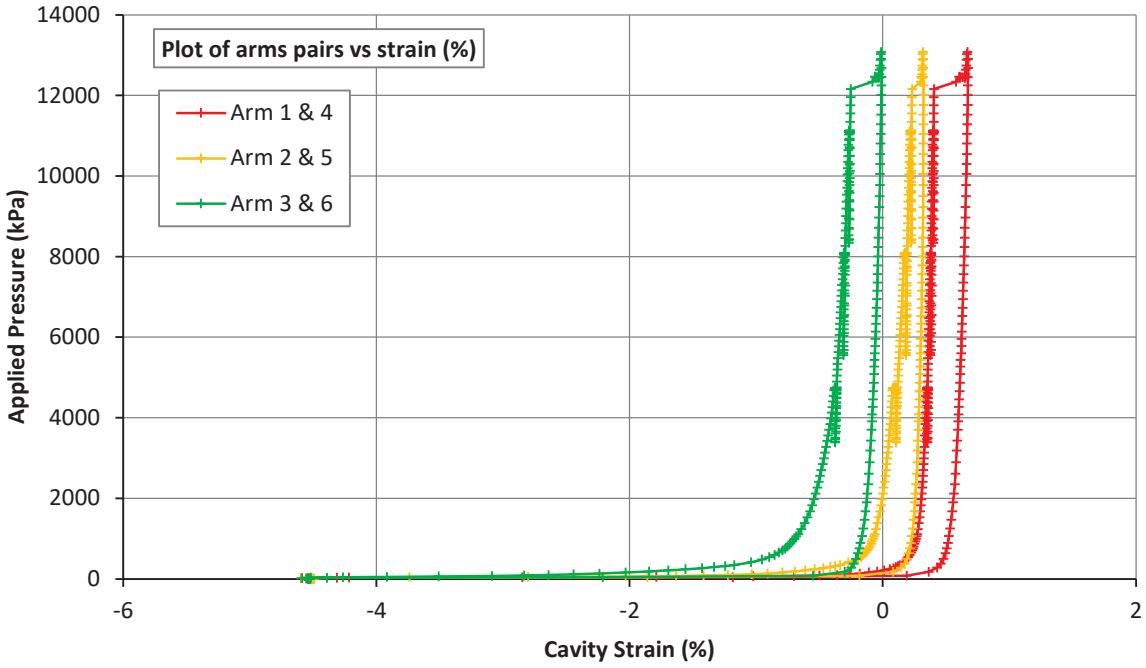
Project	Water Supply Project GI Lot 3	**Figure No.**	**BH007 T02 - 02**
Client	IGSL Ltd		
Project No.	P1200125		

Pressuremeter Test - Arm Displacement vs Strain (%)

IN SITU SITE INVESTIGATION

Test Date	28/10/2021	**Test No.**	2
Borehole	BH007	**Test Depth (m)**	5.10



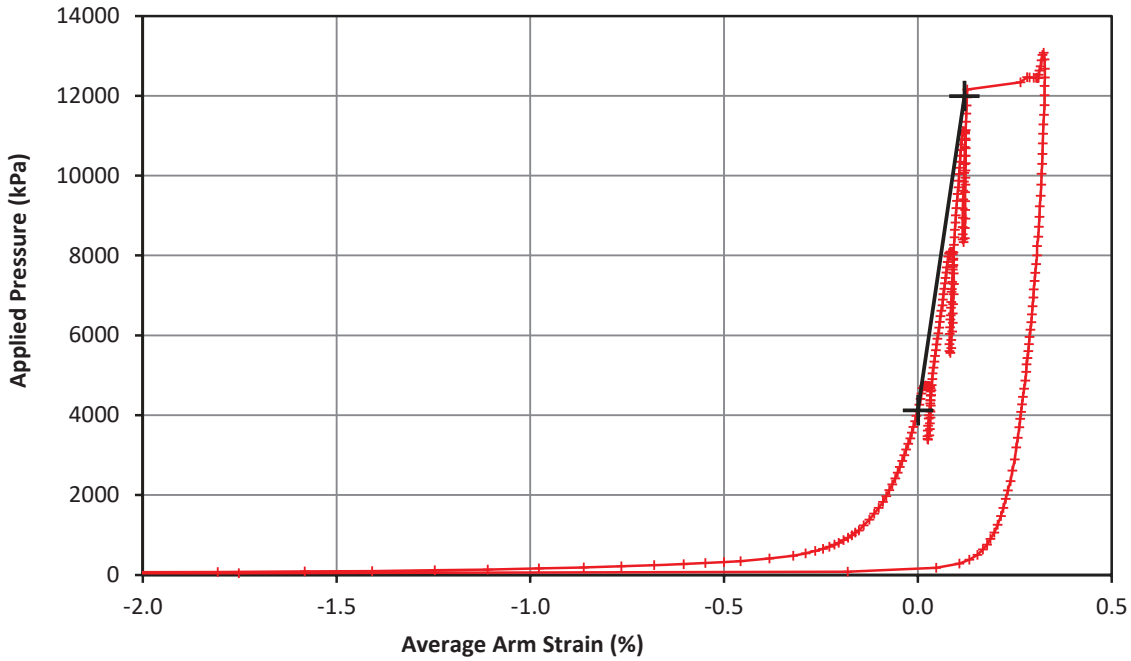


Project	Water Supply Project GI Lot 3	**Figure No.**	**BH007 T02 - 03**
Client	IGSL Ltd		
Project No.	P1200125		

Pressuremeter Analysis - Initial Modulus & In Situ Horizontal Stress

IN SITU SITE INVESTIGATION

Test Date	28/10/2021	**Test No.**	2
Borehole	BH007	**Test Depth (m)**	5.10



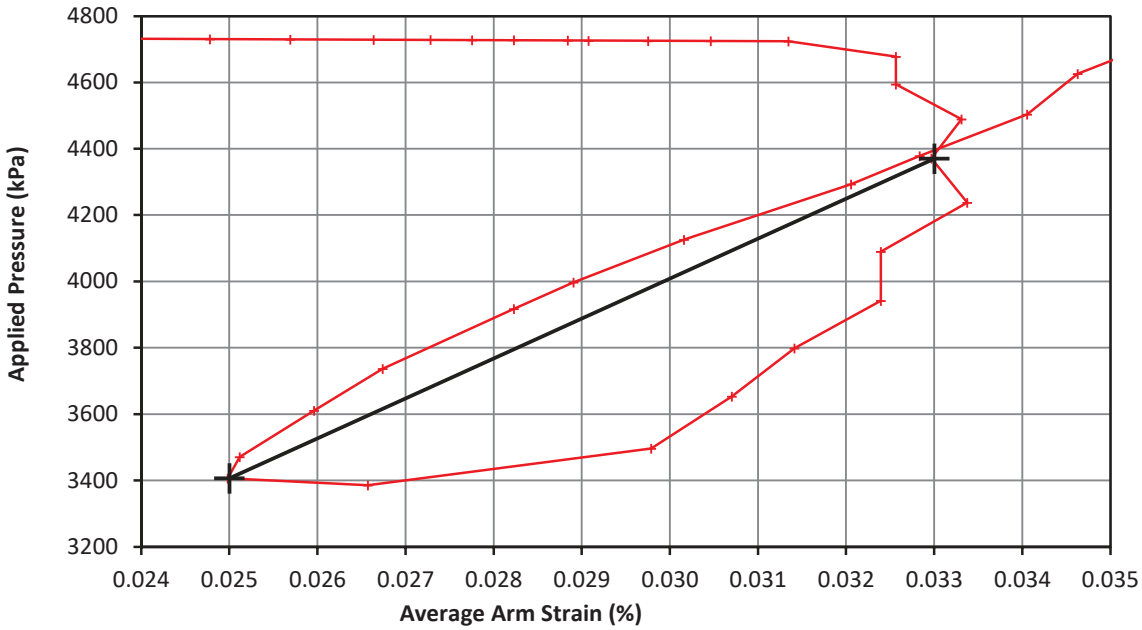
Initial Modulus	Shear Modulus	3285.2 MPa

Project	Water Supply Project GI Lot 3	**Figure No.**	**BH007 T02 - 04**
Client	IGSL Ltd		
Project No.	P1200125		

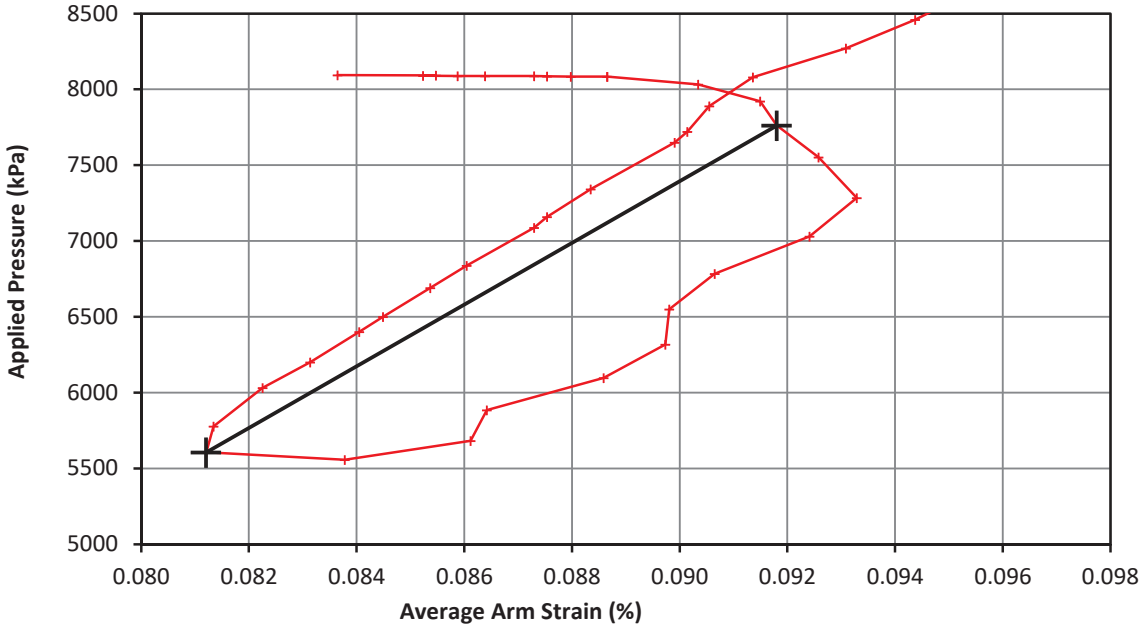
Pressuremeter Analysis - Unload Reload Loop

IN SITU SITE INVESTIGATION

Test Date	28/10/2021	Test No.	2
Borehole	BH007	Test Depth (m)	5.10



Loop 1	Shear Modulus	6027.0 MPa
	Cavity Strain Range	0.008 %



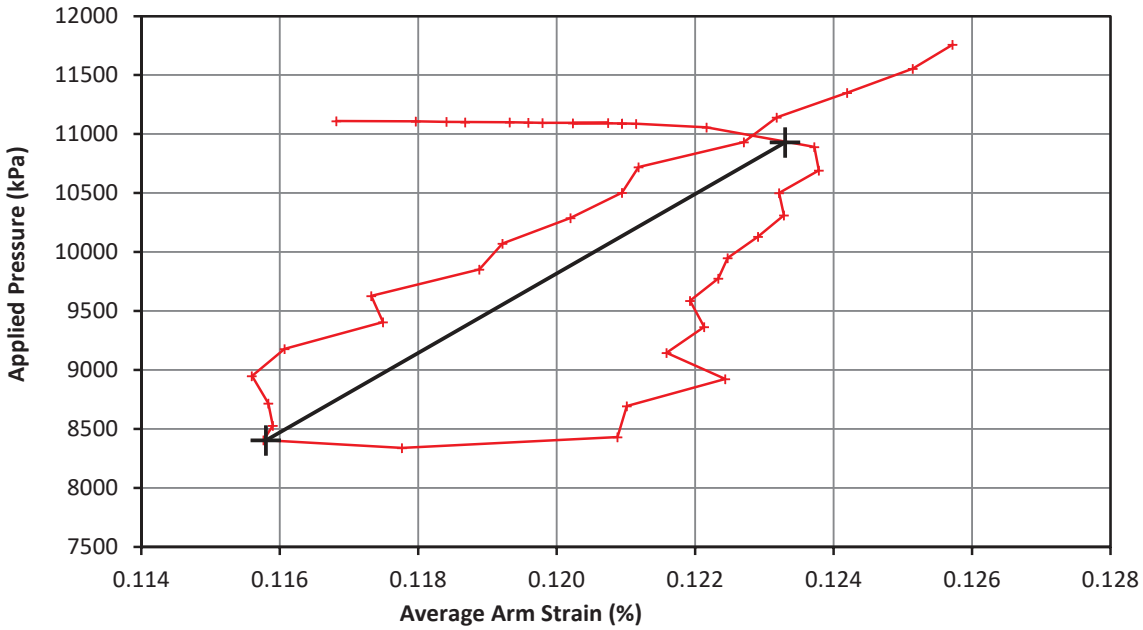
Loop 2	Shear Modulus	10177.7 MPa
	Cavity Strain Range	0.011 %

Project	Water Supply Project GI Lot 3	Figure No.	BH007 T02 - 05
Client	IGSL Ltd		
Project No.	P1200125		

Pressuremeter Analysis - Unload Reload Loop

IN SITU SITE INVESTIGATION

Test Date	28/10/2021	**Test No.**	2
Borehole	BH007	**Test Depth (m)**	5.10



Loop 3	Shear Modulus	16857.4	MPa
	Cavity Strain Range	0.008	%

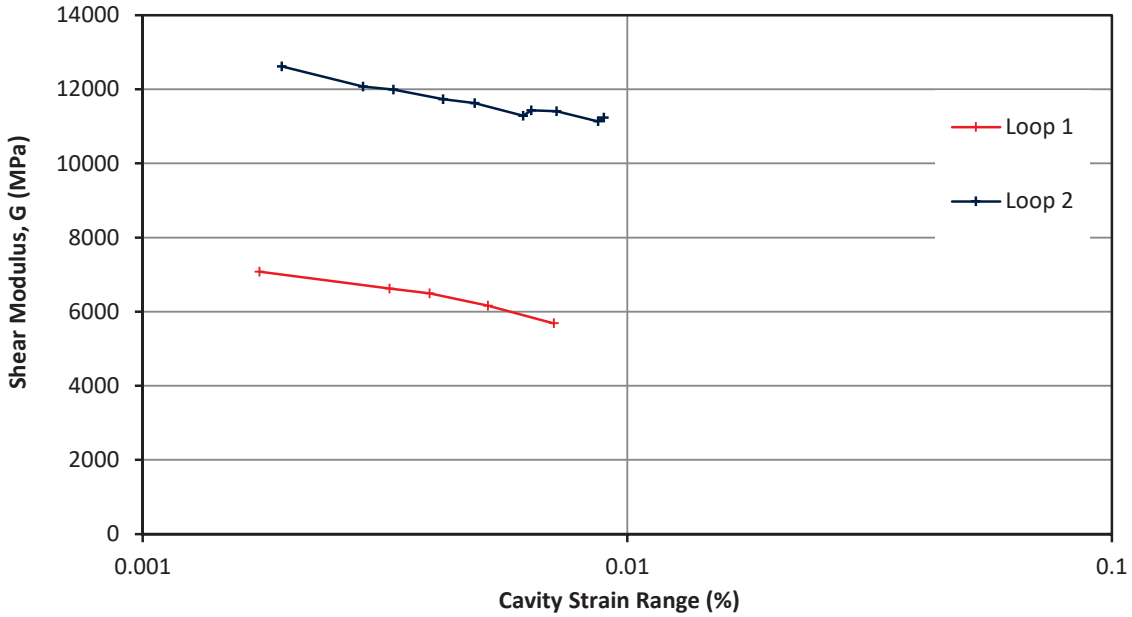
Project	Water Supply Project GI Lot 3	**Figure No.**	**BH007 T02 - 06**
Client	IGSL Ltd		
Project No.	P1200125		

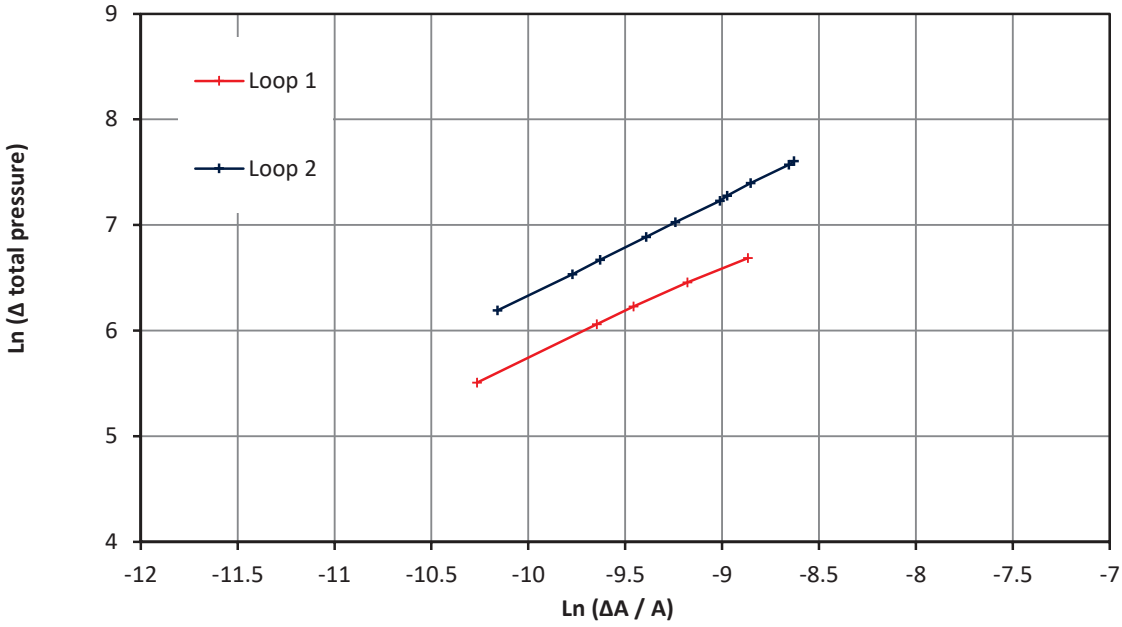
Pressuremeter Analysis

Small Strain Stiffness and Bolton & Whittle (1999)

IN SITU SITE INVESTIGATION

Test Date	28/10/2021	**Test No.**	2
Borehole	BH007	**Test Depth (m)**	5.10





Loop 1		Loop 2	
Gradient(β)	Intercept	Gradient(β)	Intercept
0.849	1522.209 (MPa)	0.924	5785.049 (MPa)

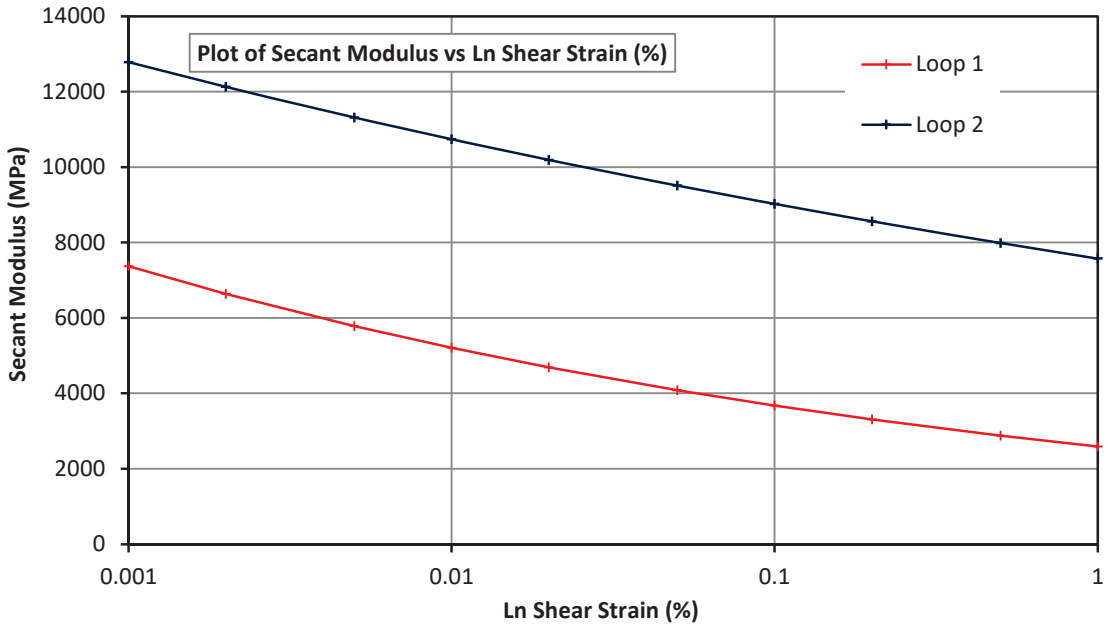
Project	Water Supply Project GI Lot 3	**Figure No.**	**BH007 T02 - 07**
Client	IGSL Ltd		
Project No.	P1200125		

Pressuremeter Analysis

Secant Modulus - Shear Strain (%)

IN SITU SITE INVESTIGATION

Test Date	28/10/2021	**Test No.**	2
Borehole	BH007	**Test Depth (m)**	5.10



Shear Strain	Loop 1	Loop 2
0.001%	**7374**	**12784**
0.002%	6639	12130
0.005%	5780	11317
0.010%	**5205**	**10739**
0.020%	4686	10190
0.050%	4080	9507
0.100%	**3674**	**9021**
0.200%	3308	8560
0.500%	2880	7986
1.000%	**2593**	**7578**

Project	Water Supply Project GI Lot 3	**Figure No.**	**BH007 T02 - 08**
Client	IGSL Ltd		
Project No.	P1200125		

APPENDIX B

Calibrations

Description
Kylie (HPD06)

HPD-95 ISSI

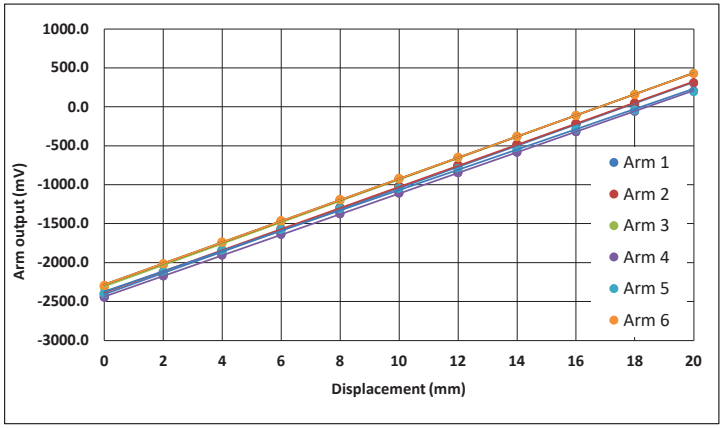
HPD06 - Kylie

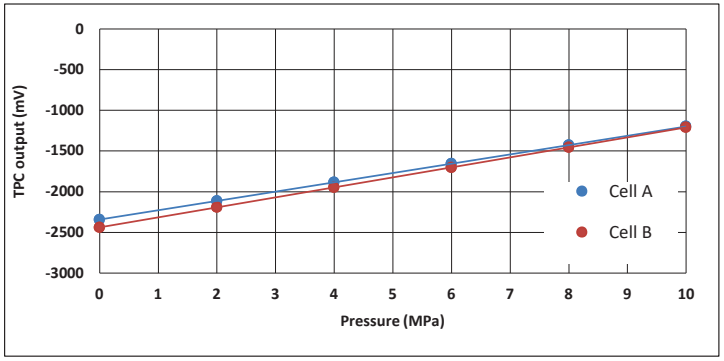
IN SITU
SITE INVESTIGATION

Arms	20/09/2021					
Displacement	Arm 1	Arm 2	Arm 3	Arm 4	Arm 5	Arm 6
mm	mV	mV	mV	mV	mV	mV
0	-2421.3	-2393.9	-2314.4	-2444.5	-2396.7	-2292.2
2	-2136.6	-2116.5	-2030.3	-2171.2	-2118.9	-2013.1
4	-1856.5	-1838.4	-1750.2	-1903.2	-1846.1	-1736.3
6	-1579.8	-1562.7	-1472.0	-1636.4	-1575.7	-1461.6
8	-1307.0	-1288.8	-1196.5	-1371.2	-1308.4	-1188.9
10	-1033.9	-1016.9	-922.9	-1107.6	-1047.1	-917.6
12	-762.4	-746.9	-650.4	-844.5	-790.9	-647.2
14	-493.0	-480.1	-378.5	-582.2	-536.7	-379.5
16	-228.0	-214.4	-110.3	-319.0	-287.8	-110.2
18	38.4	48.9	159.4	-58.0	-42.9	156.7
20	306.9	310.4	427.2	204.7	194.0	425.4
18	29.6	46.8	159.4	-58.1	-43.9	155.8
16	-227.0	-216.7	-111.1	-320.8	-285.6	-112.4
14	-494.5	-483.5	-382.4	-583.4	-536.8	-381.6
12	-764.5	-752.3	-654.7	-846.6	-791.0	-649.6
10	-1036.0	-1022.8	-927.3	-1109.8	-1046.0	-920.1
8	-1309.4	-1294.5	-1201.3	-1373.6	-1307.5	-1191.7
6	-1582.5	-1567.8	-1476.6	-1638.9	-1576.1	-1463.9
4	-1859.1	-1842.3	-1753.6	-1905.2	-1847.5	-1738.2
2	-2137.4	-2119.3	-2032.9	-2172.5	-2121.7	-2015.0
0	-2421.5	-2394.6	-2315.9	-2445.3	-2399.5	-2293.4
Slope (mV/mm)	136.2	135.5	137.1	132.3	130.2	135.8
Zero (mV)	-2405.5	-2383.2	-2302.7	-2435.6	-2369.3	-2282.6

Pressure Cells	20/09/2021			
Pressure	Cell A		Cell B	
MPa	V	mV	V	mV
0.0	-2.34360	-2343.60	-2.44020	-2440.20
2.0	-2.11410	-2114.10	-2.19300	-2193.00
4.0	-1.88580	-1885.80	-1.94840	-1948.40
6.0	-1.65700	-1657.00	-1.70280	-1702.80
8.0	-1.42860	-1428.60	-1.45690	-1456.90
10.0	-1.19880	-1198.80	-1.21120	-1211.20
12.0	-0.97150	-971.50	-0.96550	-965.50
14.0	-0.74240	-742.40	-0.72010	-720.10
16.0	-0.51360	-513.60	-0.47490	-474.90
18.0	-0.28500	-285.00	-0.22920	-229.20
20.0	-0.05590	-55.90	0.01600	16.00
18.0	-0.28410	-284.10	-0.22850	-228.50
16.0	-0.51190	-511.90	-0.47350	-473.50
14.0	-0.74110	-741.10	-0.71880	-718.80
12.0	-0.96940	-969.40	-0.96440	-964.40
10.0	-1.19810	-1198.10	-1.21000	-1210.00
8.0	-1.42750	-1427.50	-1.45520	-1455.20
6.0	-1.65620	-1656.20	-1.70220	-1702.20
4.0	-1.88420	-1884.20	-1.94660	-1946.60
2.0	-2.11300	-2113.00	-2.19150	-2191.50
0.0	-2.34200	-2342.00	-2.43780	-2437.80
Slope (mV/MPa)		114.3		122.8
Zero (mV)		-2342.5		-2438.4

System Complaince	1.5 mm/Gpa





Calibrated by:	Cambridge Insitu
Calibrated at:	Cambridge Insitu
Checked by:	Cambridge Insitu
Date:	20/09/2021

Appendix 10G

Geophysics Report

Appendix 10H

Laboratory Test Results

Appendix 10H.1

Geotechnical Laboratory Test Records – Soil

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**

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

Report No. **R129346** Contract No. 23560 Contract Name: WSP Lot 3

Customer Ervia

Samples Received: 01/12/21 Date Tested: Various

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
TPR-BH004	AA155847	0.5	A21/6224	D	24	36	19	17	86	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-BH004	AA155849	1.0	A21/6225	D	13	43	21	22	37	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-BH012	AA155845	1.2	A21/6233	D	8	32	16	16	17	WS	4.4	C L	Brown sandy clayey GRAVEL
TPR-BH013	AA155841	0.6	A21/6235	D	6.9	22	NP	NP	21	WS	4.4		Brown silty, slightly sandy, GRAVEL with some cobbles

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
H Byrne	23/12/21	1 of 1

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**

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

Report No. **R123497** Contract No. 23560 Contract Name: WSP Lot 3

Customer Ervia

Samples Received: 01/12/21 Date Tested: Various

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
TPR-TP001	N/A	0.4	A21/6134	D	16	44	22	22	72	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-TP002	N/A	0.8	A21/6136	D	8.1	36	20	16	50	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-TP003	N/A	0.3	A21/6137	D	30	38	19	19	86	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-TP004	N/A	0.5	A21/6139	D	11	35	21	14	46	WS	4.4	C L	Brown sandy gravelly CLAY
TPR-TP004	N/A	1.1	A21/6140	D	11	35	17	18	48	WS	4.4	C L	Brown sandy gravelly CLAY
TPR-TP005	N/A	0.5	A21/6141	D	18	35	20	15	81	WS	4.4	C L	Brown sandy gravelly CLAY
TPR-TP006	N/A	0.3	A21/6143	D	26	47	25	22	75	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-TP008	N/A	1.2	A21/6147	D	12	37	19	18	24	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-TP009	N/A	0.5	A21/6148	D	22	44	20	24	75	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-TP009	N/A	0.8	A21/6149	D	12	38	21	17	57	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-TP013	N/A	0.4-0.45	A21/6150	D	12	55	26	29	43	WS	4.4	C H	Brown sandy gravelly CLAY
TPR-TP013	N/A	0.9-1.0	A21/6151	D	13	51	28	23	43	WS	4.4	C H	Brown sandy gravelly CLAY
TPR-TP011	N/A	0.4-0.50	A21/6153	D	15	41	21	20	75	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-TP011	N/A	0.6-0.7	A21/6154	D	11								Brown sandy gravelly SILT/CLAY
TPR-TP012	N/A	0.4-0.50	A21/6156	D	27	48	23	25	77	WS	4.4	C I	Brown 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.
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IGSL Ltd Materials Laboratory

Persons authorized to approve reports
H Byrne (Laboratory Manager)

Approved by: H Byrne

Date: 23/12/21

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**

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

Report No. **R123498** Contract No. 23560 Contract Name: WSP Lot 3

Customer Ervia

Samples Received: 01/12/21 Date Tested: Various

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
TPR-TP012	N/A	0.8-0.9	A21/6157	D	19								Brown sandy gravelly SILT/CLAY
TPR-TP014	N/A	0.4	A21/6158	D	19	45	24	21	67	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-TP014	N/A	0.7-0.8	A21/6159	D	14								Brown sandy gravelly SILT/CLAY
TPR-TP015	N/A	0.4	A21/6158	D	17	45	25	20	65	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-TP016	N/A	0.5	A21/6162	D	8.9	48	24	24	39	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-TP010	N/A	0.4	A21/6163	D	12								Brown sandy gravelly SILT/CLAY
TPR-TP017	N/A	0.45-0.50	A21/6166	D	17	48	26	22	53	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-TP017	AA152090	0.7	A21/6167	D	7.8								Brown sandy gravelly SILT/CLAY
TPR-TP023	N/A	0.4-0.45	A21/6168	D	20	43	24	19	53	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-TP019	N/A	0.4	A21/6170	D	16	41	21	20	56	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-TP021	N/A	0.3-0.35	A21/6172	D	12	41	21	20	61	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-TP018	N/A	0.3-0.40	A21/6174	D	21	41	21	20	83	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-TP028	N/A	0.3-0.35	A21/6176	D	20	45	25	20	67	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-TP025	N/A	0.25-0.3	A21/6178	D	26	44	19	25	75	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-TP025	N/A	0.55-0.6	A21/6179	D	18								Brown sandy gravelly SILT/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.
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IGSL Ltd Materials Laboratory

Persons authorized to approve reports
H Byrne (Laboratory Manager)

Approved by: H Byrne

Date: 23/12/21

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**

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

Report No. **R123499** Contract No. 23560 Contract Name: WSP Lot 3

Customer Ervia

Samples Received: 01/12/21 Date Tested: Various

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
TPR-TP024	N/A	0.2-0.3	A21/6180	D	23								Brown sandy gravelly SILT/CLAY
TPR-TP022	N/A	0.25-0.3	A21/6182	D	23	36	19	17	83	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-TP022	N/A	0.6-0.65	A21/6183	D	16	39	20	19	60	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-TP020	N/A	0.45-0.5	A21/6185	D	23	44	21	23	65	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-TP030	N/A	0.25-0.3	A21/6187	D	20								Brown sandy gravelly SILT/CLAY
TPR-TP029	N/A	0.3-0.35	A21/6189	D	25	49	25	24	46	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-TP027	N/A	0.35-0.4	A21/6193	D	26								Brown sandy gravelly SILT/CLAY
TPR-TP035	N/A	0.3-0.4	A21/6196	D	24	41	23	18	74	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-TP035	N/A	0.8-0.9	A21/6197	D	8.8	34	18	16	52	WS	4.4	C L	Brown sandy gravelly CLAY
TPR-TP034	N/A	0.2-0.30	A21/6198	D	24	46	24	22	79	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-TP034	N/A	0.7-0.80	A21/6199	D	11	32	15	17	47	WS	4.4	C L	Brown sandy gravelly CLAY
TPR-TP032	N/A	0.2-0.30	A21/6201	D	18	47	26	21	45	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-TP032	N/A	0.4-0.5	A21/6202	D	25	47	23	24	76	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-DS001	AA164898	0.00-0.60	A21/6206A	D	17	43	22	21	70	WS	4.4	C I	Brown 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.
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IGSL Ltd Materials Laboratory

Persons authorized to approve reports
H Byrne (Laboratory Manager)

Approved by | Date: 23/12/21 | Page: 1 of 1

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**

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

Report No. **R123350** Contract No. 23560 Contract Name: WSP Lot 3

Customer Ervia

Samples Received: 01/12/21 Date Tested: Various

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
TPR-DS002	AA164898	0.15-0.55	A21/6205A	B	14	39	19	20	82	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-DS003	AA164898	0.15-0.60	A21/6206A	B	16	37	17	20	77	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-DS004	AA151651	0.15-0.45	A21/6207A	B	17	40	22	18	80	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-DS005	AA151652	0.15-0.60	A21/6208A	B	18	44	24	20	67	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-DS006	AA161654	0.0-0.45	A21/6209A	B	19	44	24	20	80	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-DS007	AA151657	0.15-0.40	A21/6210A	B	23	42	21	21	73	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-DS009	AA151655	0.50-1.00	A21/6211A	B	17	48	21	27	68	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-DS011	AA151656	0.15-0.32	A21/6212A	D	21	45	25	20	76	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-DS008	AA151658	0.20-0.50	A21/6213A	D	19	48	21	27	77	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-DS012	AA151663	0.15-0.55	A21/6216A	D	21	45	26	19	73	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-DS013	AA161651	0.15-0.45	A21/6217A	D	15	46	22	24	57	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-DS014	AA151663	0.15-0.50	A21/6218A	D	16	47	26	21	71	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-DS015	AA151660	0.15-0.4	A21/6219A	D	18	49	23	26	78	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-DS016	AA151661	0.15-0.55	A21/6220A	D	19	43	23	20	78	WS	4.4	C I	Brown sandy gravelly CLAY
TPR-DS017	AA151661	0.15-0.40	A21/6221A	D	17	46	25	19	74	WS	4.4	M I	Brown sandy gravelly 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: H Byrne

Date: 23/12/21

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	100	
28	100	
20	98	
14	97	
10	96	
6.3	95	
5	94	
3.35	92	
2	88	
1.18	83	SAND
0.6	78	
0.425	75	
0.3	72	
0.15	66	
0.063	60	SILT/CLAY
0.037	53	
0.027	47	
0.017	42	
0.010	37	
0.007	33	
0.005	30	
0.002	20	

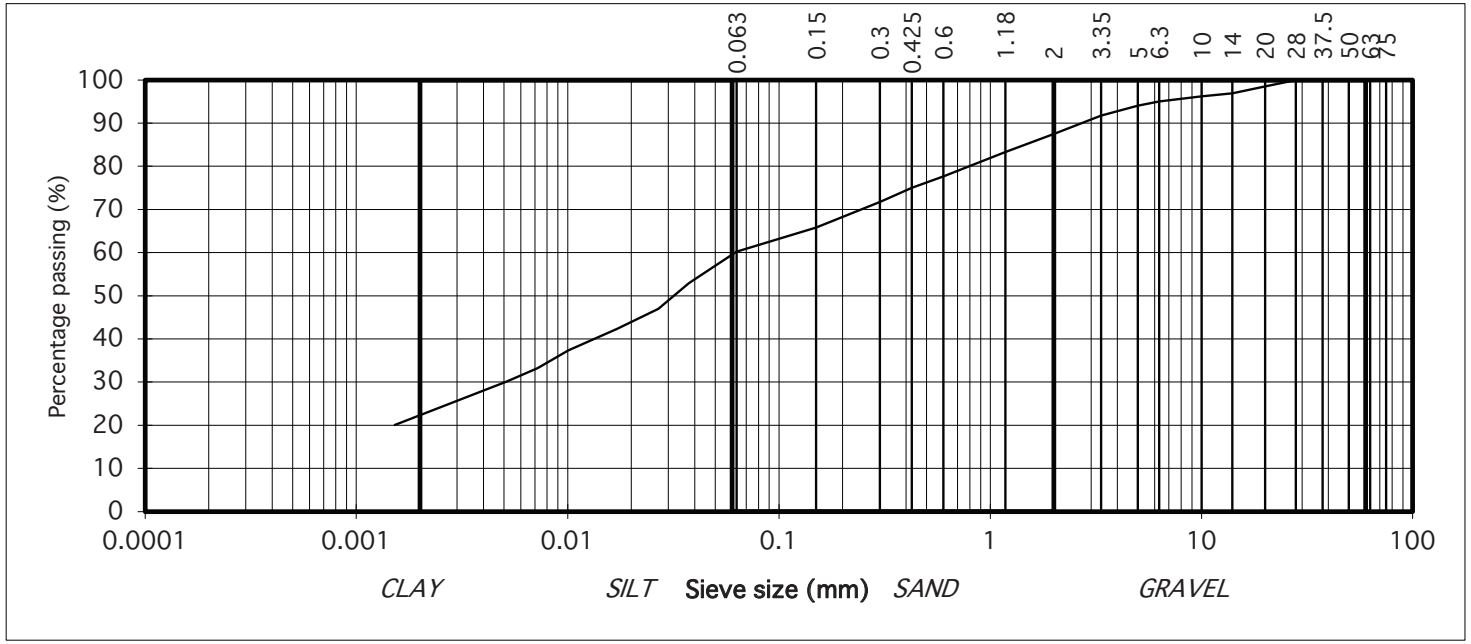
Contract No.	23560	Report No.	R129922
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR DS001		
Sample No.*	AA164898	Lab. Sample No.	A21/6204A
Sample Type:	B		
Depth* (m)	0.0-0.4	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	08/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		

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.

This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks

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



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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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

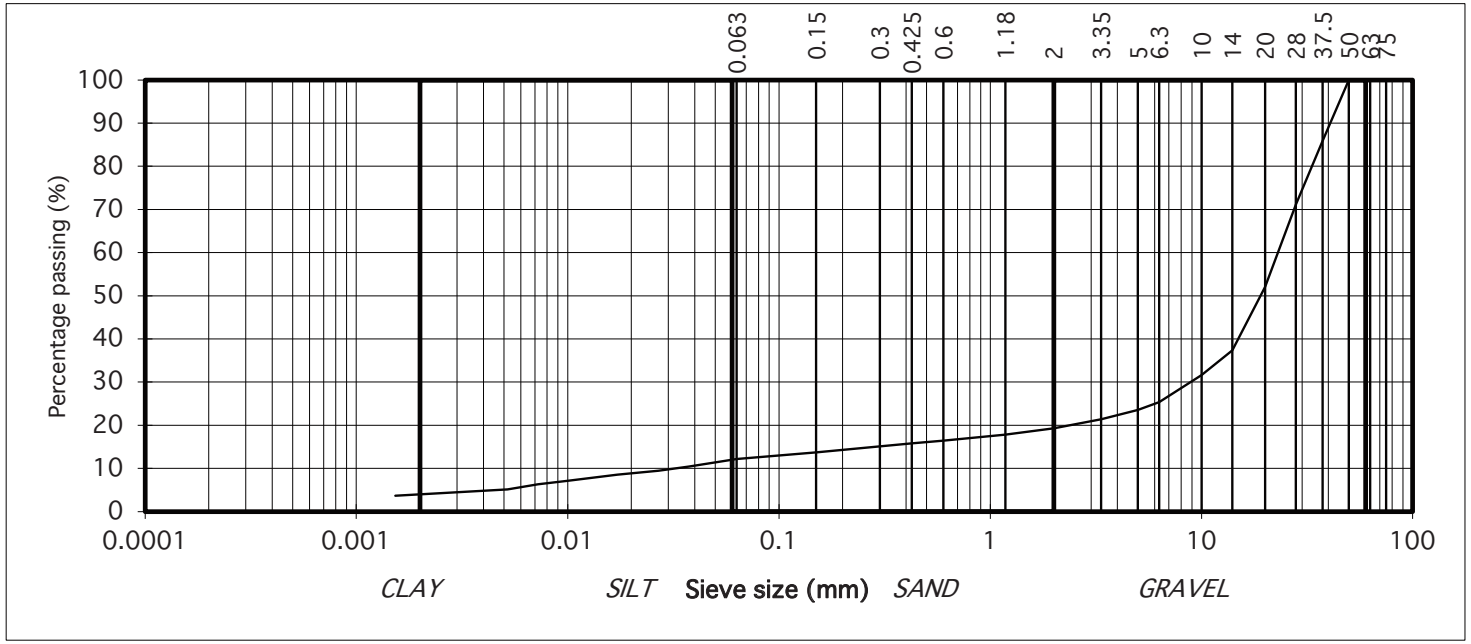
particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	86	
28	71	
20	52	
14	37	
10	32	
6.3	25	
5	24	
3.35	21	
2	19	
1.18	18	SAND
0.6	16	
0.425	16	
0.3	15	
0.15	14	
0.063	12	SILT/CLAY
0.038	10	
0.027	9	
0.017	9	
0.010	7	
0.007	6	
0.005	5	
0.002	4	

Contract No.	23560	Report No.	R129902
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR DS001		
Sample No.*	AA164898	Lab. Sample No.	A21/6204B
Sample Type:	B		
Depth* (m)	0.4-0.60	Customer:	Ervia
Date Received	01/12/2022	Date Testing started	09/12/2021
Description:	Brown clayey/silty, sandy, GRAVEL		

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.
This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	23/12/21	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)

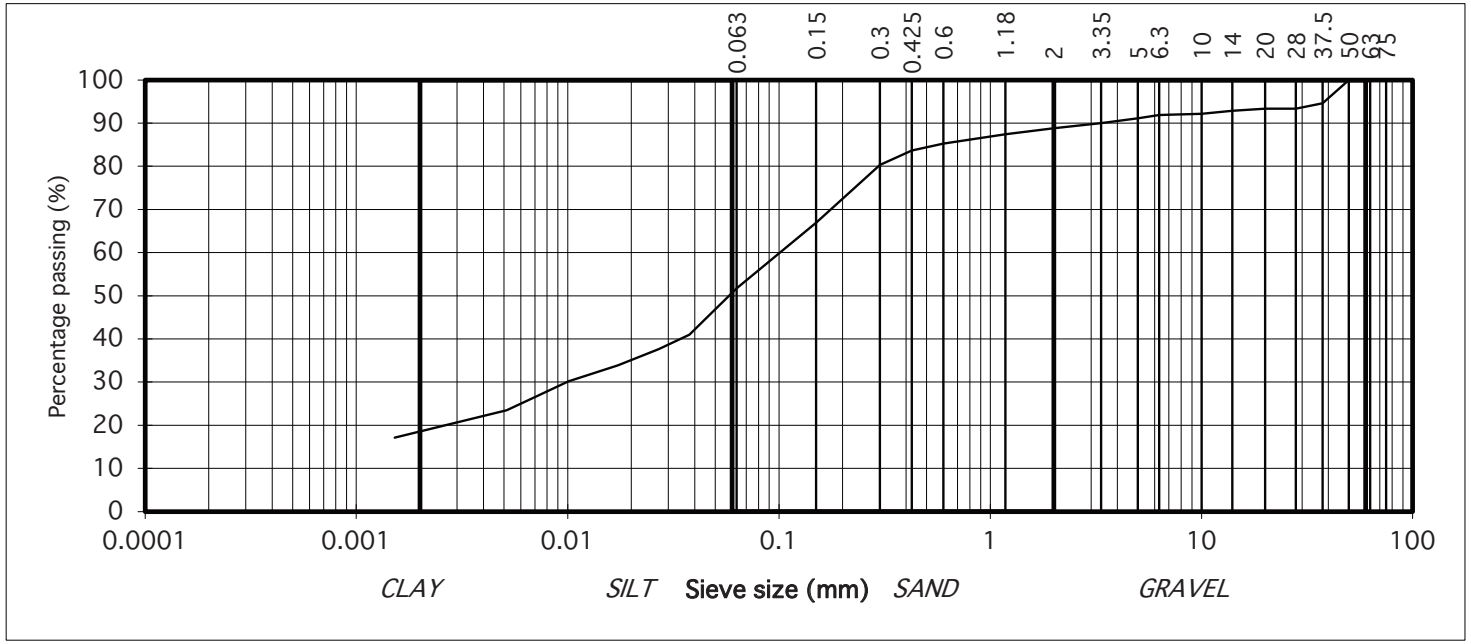
ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	95	
28	93	
20	93	
14	93	
10	92	
6.3	92	
5	91	
3.35	90	
2	89	
1.18	87	SAND
0.6	85	
0.425	84	
0.3	80	
0.15	67	
0.063	52	SILT/CLAY
0.038	41	
0.027	38	
0.017	34	
0.010	30	
0.007	27	
0.005	23	
0.002	17	

Contract No.	23560	Report No.	R129953	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR DS002			
Sample No.*	AA164895	Lab. Sample No.		A21/6205A
Sample Type:	B			
Depth* (m)	0.15-0.55	Customer:	Ervia	
Date Received	01/12/2021	Date Testing started		09/12/2021
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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Approved by:	Date:	Page no:
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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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	92	GRAVEL
37.5	89	
28	80	
20	71	
14	65	
10	58	
6.3	52	
5	50	
3.35	47	
2	45	
1.18	43	SAND
0.6	42	
0.425	41	
0.3	40	
0.15	36	
0.063	30	SILT/CLAY
0.037	26	
0.027	23	
0.017	21	
0.010	18	
0.007	15	
0.005	12	
0.002	9	

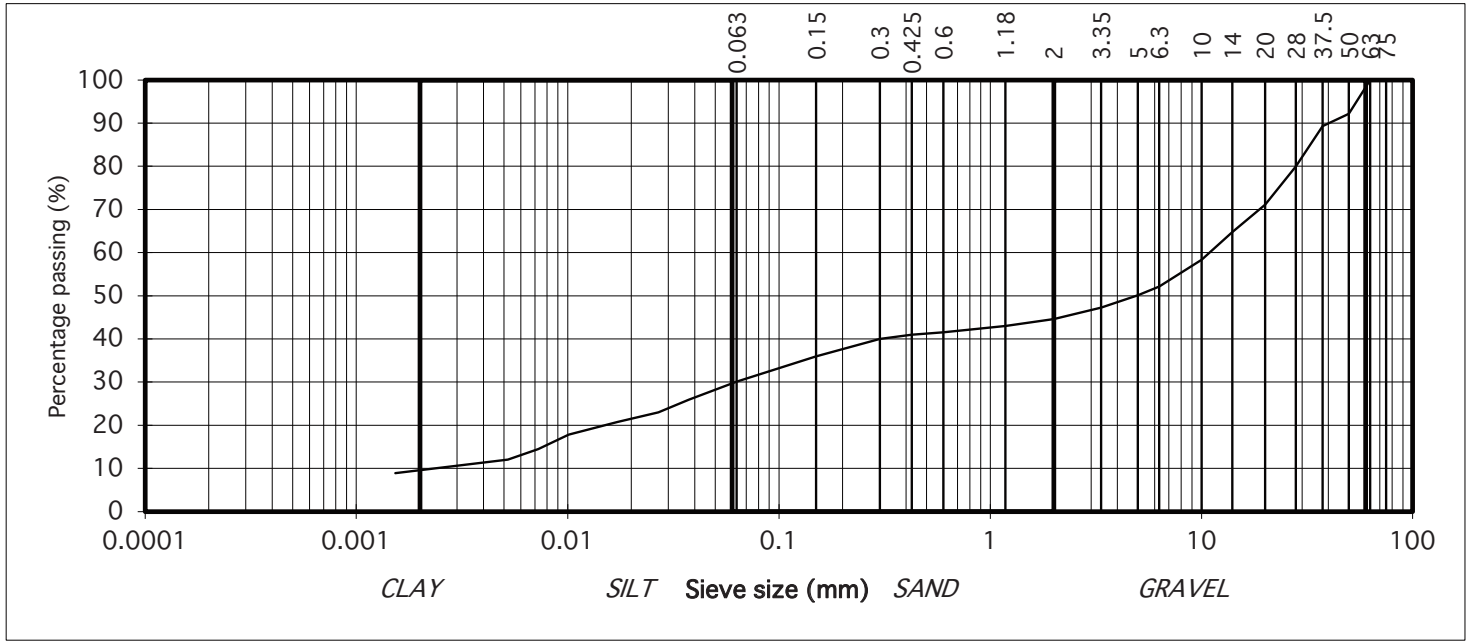
Contract No.	23560	Report No.	R129923
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR DS002		
Sample No.*	AA164895	Lab. Sample No.	A21/6205B
Sample Type:	B		
Depth* (m)	0.55-0.70	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	09/12/2021
Description:	Brown slightly sandy, gravelly, SILT/CLAY		

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.

This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks

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



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Approved by:	Date:	Page no:
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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)

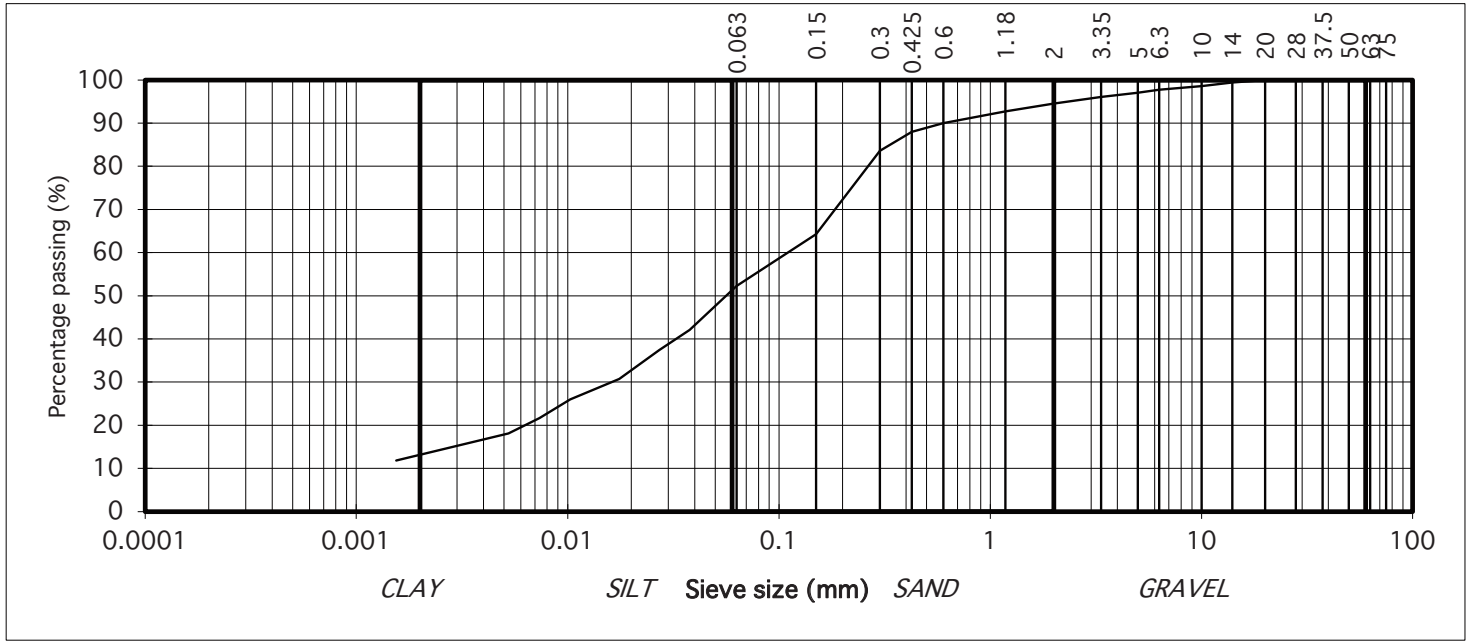
ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	100	
20	100	
14	99	
10	99	
6.3	98	
5	97	
3.35	96	
2	95	
1.18	93	SAND
0.6	90	
0.425	88	
0.3	84	
0.15	64	
0.063	52	SILT/CLAY
0.038	42	
0.027	37	
0.018	31	
0.010	26	
0.007	22	
0.005	18	
0.002	12	

Contract No.	23560	Report No.	R129948	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR DS003			
Sample No.*	AA164898	Lab. Sample No.		A21/6206A
Sample Type:	B			
Depth* (m)	0.15-0.60	Customer:	Ervia	
Date Received	01/12/2021	Date Testing started		09/12/2021
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 ISO17892-4:2 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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Approved by:	Date:	Page no:
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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	88	
28	71	
20	71	
14	70	
10	70	
6.3	69	
5	69	
3.35	68	
2	66	
1.18	65	SAND
0.6	63	
0.425	62	
0.3	61	
0.15	56	
0.063	50	SILT/CLAY
0.038	40	
0.027	36	
0.017	31	
0.010	28	
0.007	25	
0.005	22	
0.002	13	

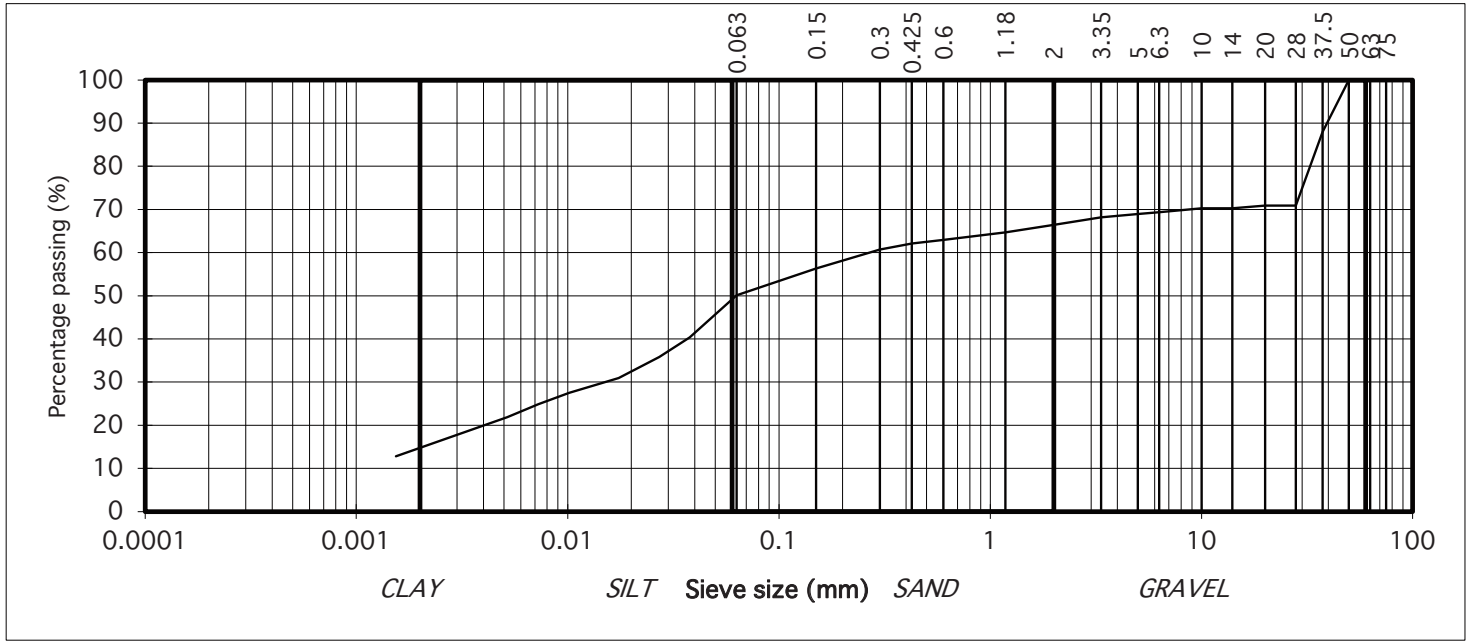
Contract No.	23560	Report No.	R129924
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR DS003		
Sample No.*	AA164898	Lab. Sample No.	A21/6206B
Sample Type:	B		
Depth* (m)	0.60-0.70	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	09/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		

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.

This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



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Approved by:	Date:	Page no:
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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)

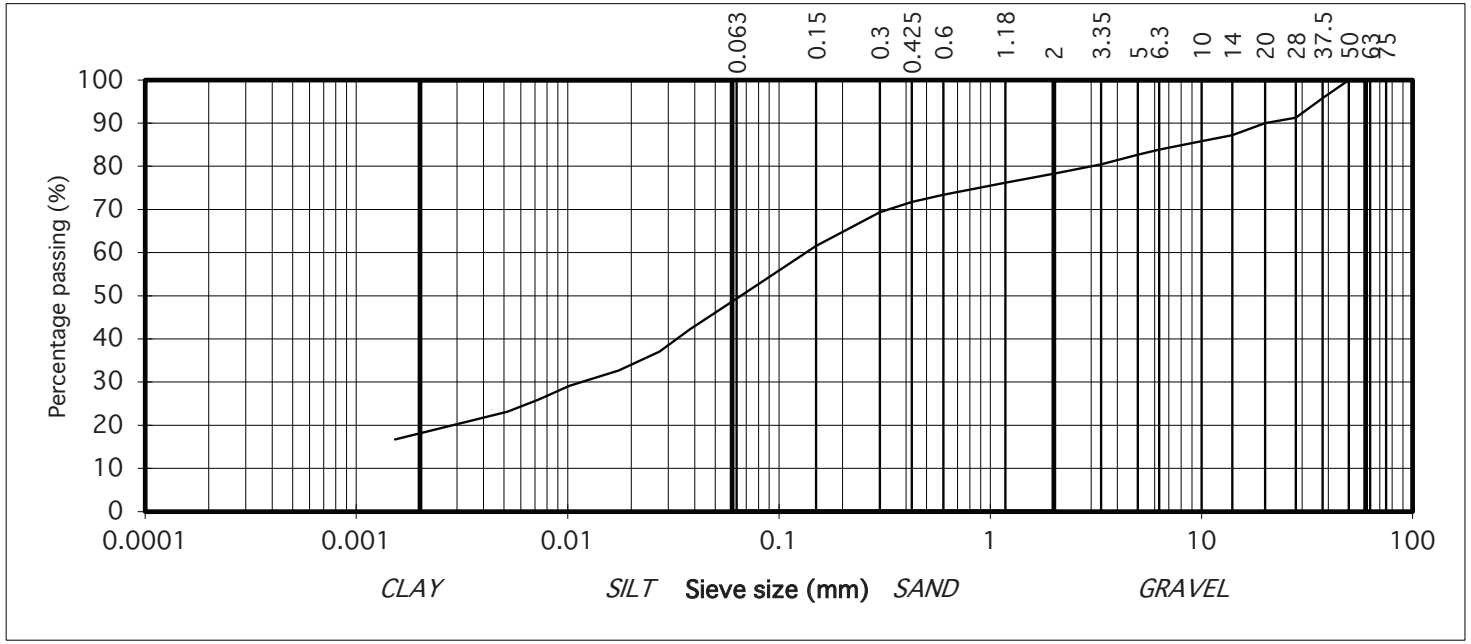
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	96	
28	91	
20	90	
14	87	
10	86	
6.3	84	
5	83	
3.35	80	
2	78	
1.18	76	SAND
0.6	73	
0.425	72	
0.3	69	
0.15	62	
0.063	49	SILT/CLAY
0.038	42	
0.027	37	
0.017	33	
0.010	29	
0.007	26	
0.005	23	
0.002	17	

Contract No.	23560	Report No.	R129925	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR DS004			
Sample No.*	AA151651	Lab. Sample No.		A21/6207A
Sample Type:	B			
Depth* (m)	0.15-0.45	Customer:	Ervia	
Date Received	01/12/2021	Date Testing started		09/12/2021
Description:	Brown slightly 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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IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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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

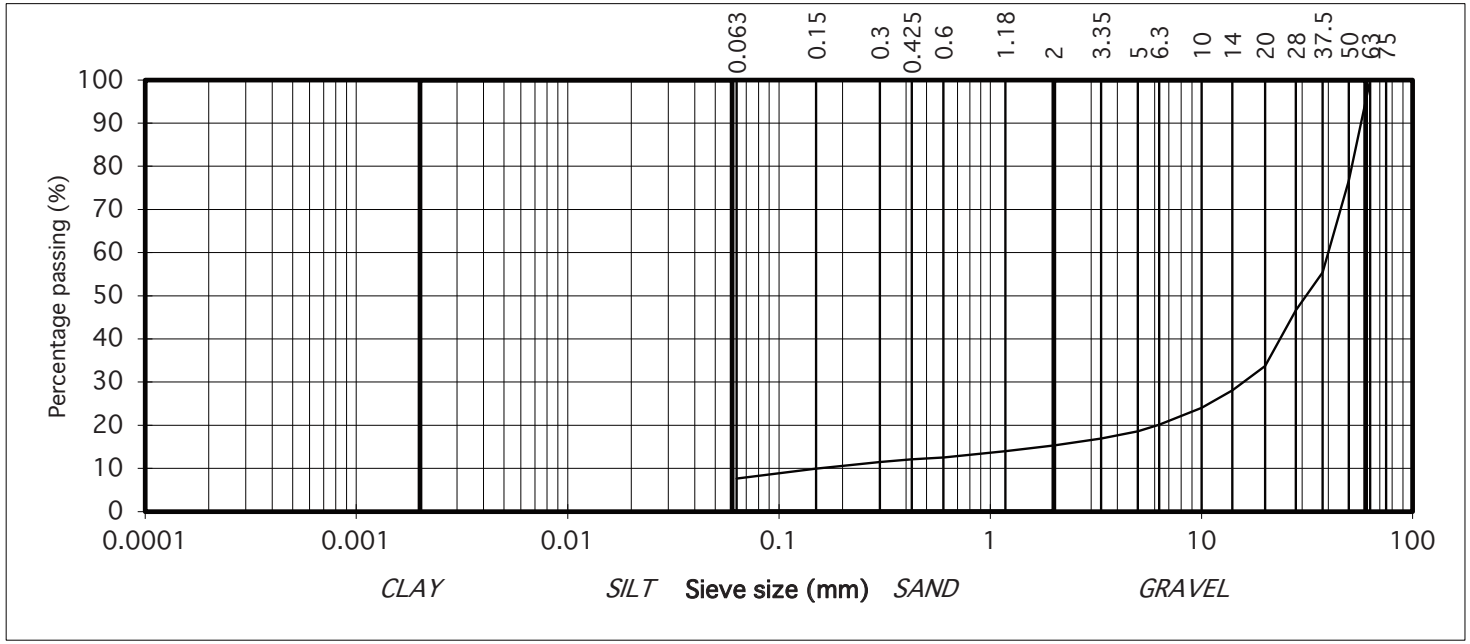
particle size	% passing	
75	100	COBBLES
63	100	
50	77	GRAVEL
37.5	55	
28	47	
20	34	
14	28	
10	24	
6.3	20	
5	19	
3.35	17	
2	15	
1.18	14	SAND
0.6	13	
0.425	12	
0.3	12	
0.15	10	
0.063	8	SILT/CLAY

Contract No.	23560	Report No.	R129949
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR DS004		
Sample No.*	AA151651	Lab. Sample No.	A21/6207B
Sample Type:	B		
Depth* (m)	0.45-0.63	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	09/12/2021
Description:	Brown clayey/silty, sandy, GRAVEL		

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.
This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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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)

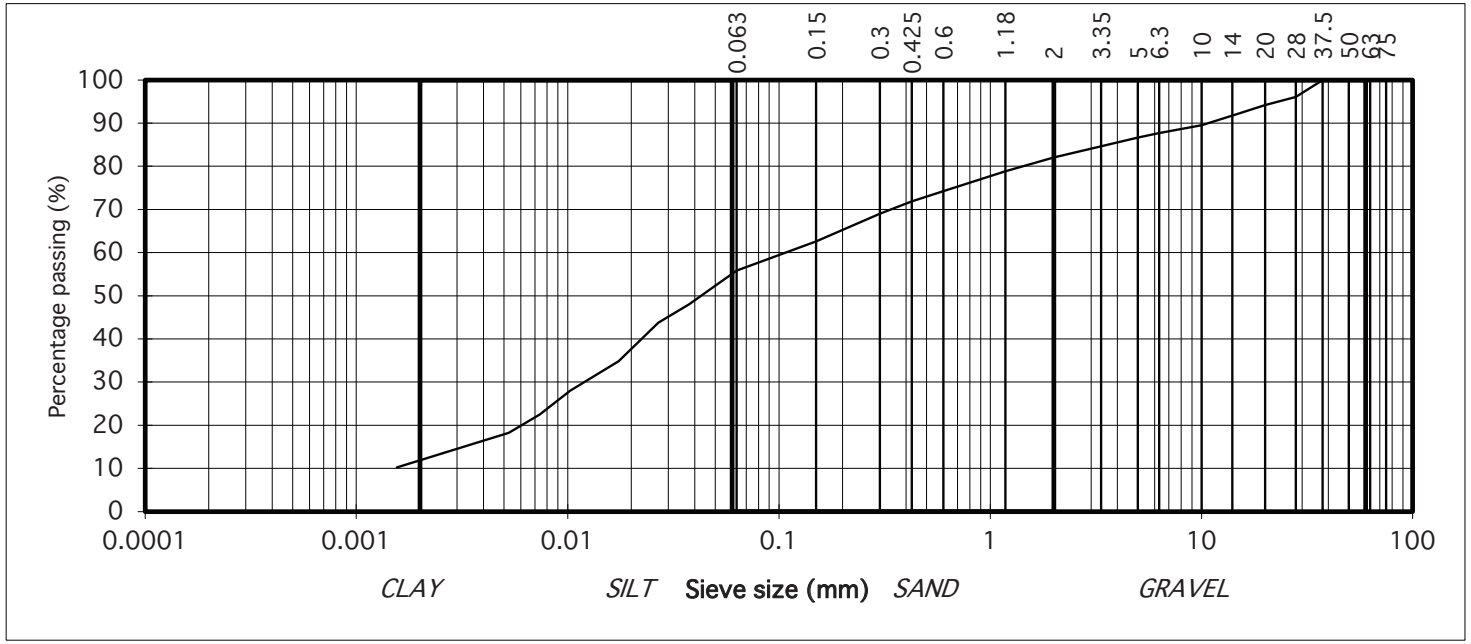
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	96	
20	94	
14	92	
10	90	
6.3	88	
5	87	
3.35	85	
2	82	
1.18	79	SAND
0.6	74	
0.425	72	
0.3	69	
0.15	63	
0.063	56	SILT/CLAY
0.038	48	
0.027	44	
0.017	35	
0.010	28	
0.007	23	
0.005	18	
0.002	10	

Contract No.	23560	Report No.	R129926	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR DS005			
Sample No.*	AA151652	Lab. Sample No.		A21/6208A
Sample Type:	B			
Depth* (m)	0.15-0.60	Customer:	Ervia	
Date Received	01/12/2021	Date Testing started		09/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY			

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.
This report shall not be reproduced except in full without the written approval of the Laboratory.

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



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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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

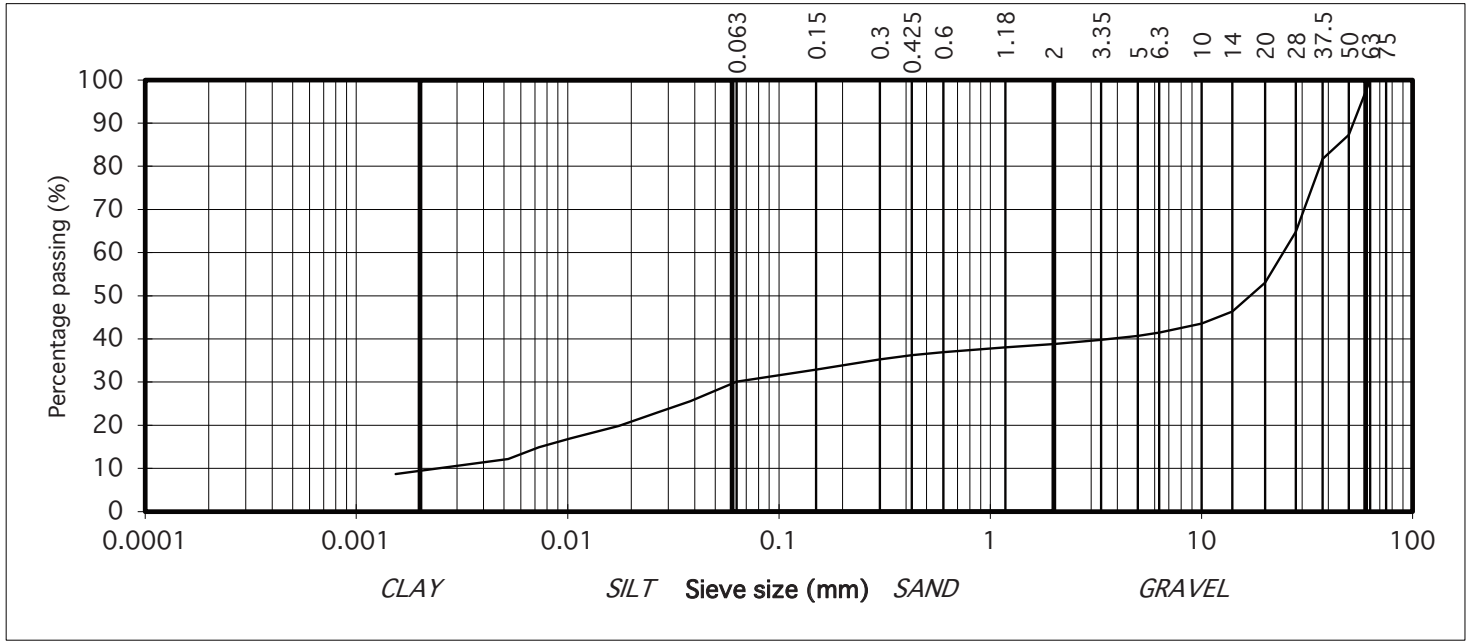
particle size	% passing	
75	100	COBBLES
63	100	
50	87	GRAVEL
37.5	82	
28	65	
20	53	
14	46	
10	44	
6.3	41	
5	41	
3.35	40	
2	39	
1.18	38	SAND
0.6	37	
0.425	36	
0.3	35	
0.15	33	
0.063	30	SILT/CLAY
0.038	26	
0.027	23	
0.018	20	
0.010	17	
0.007	15	
0.005	12	
0.002	9	

Contract No.	23560	Report No.	R129903
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR DS005		
Sample No.*	AA151652	Lab. Sample No.	A21/6208B
Sample Type:	B		
Depth* (m)	0.60-1.0	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	09/12/2021
Description:	Brown slightly sandy, gravelly, SILT/CLAY		

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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Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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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)

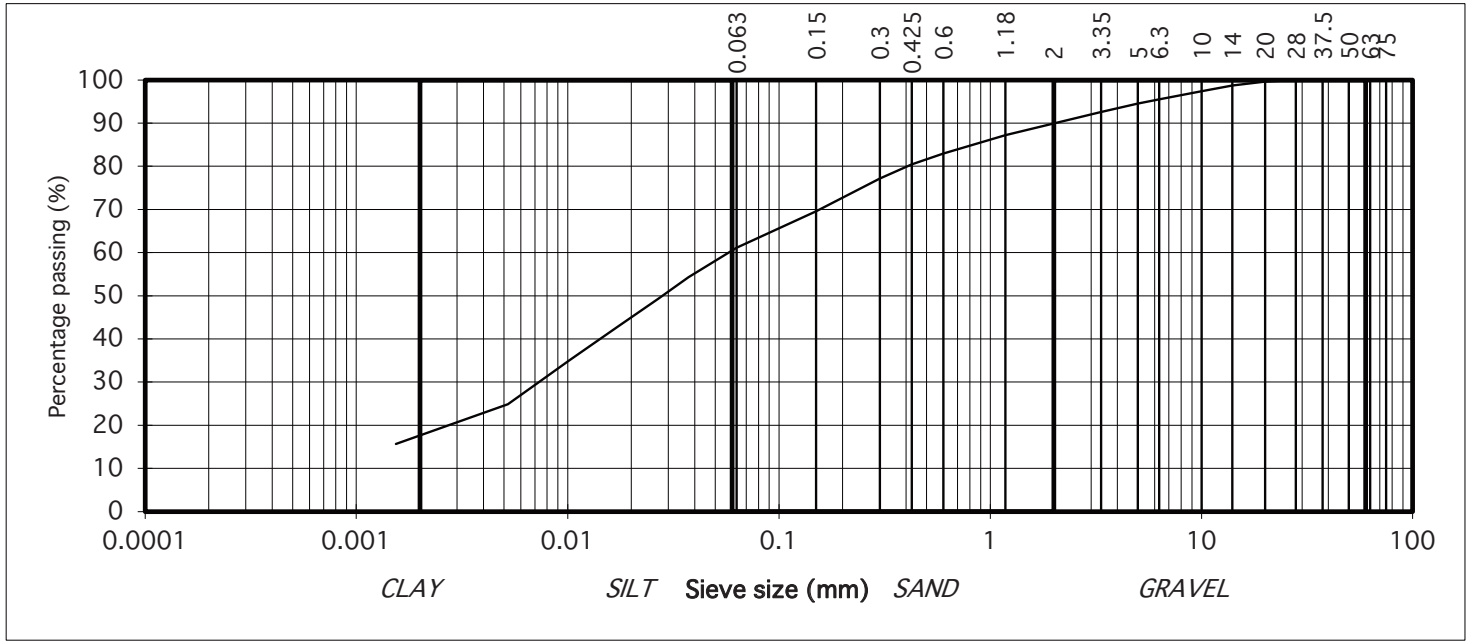
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	100	
20	100	
14	99	
10	97	
6.3	95	
5	94	
3.35	93	
2	90	
1.18	87	SAND
0.6	83	
0.425	80	
0.3	77	
0.15	70	
0.063	61	SILT/CLAY
0.037	54	
0.027	49	
0.017	43	
0.010	35	
0.007	30	
0.005	25	
0.002	16	

Contract No.	23560	Report No.	R129927	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR DS006			
Sample No.*	AA151654	Lab. Sample No.		A21/6209A
Sample Type:	B			
Depth* (m)	0.00-0.45	Customer:	Ervia	
Date Received	01/12/2021	Date Testing started		09/12/2021
Description:	Brown slightly 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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IGSL Ltd Materials Laboratory

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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

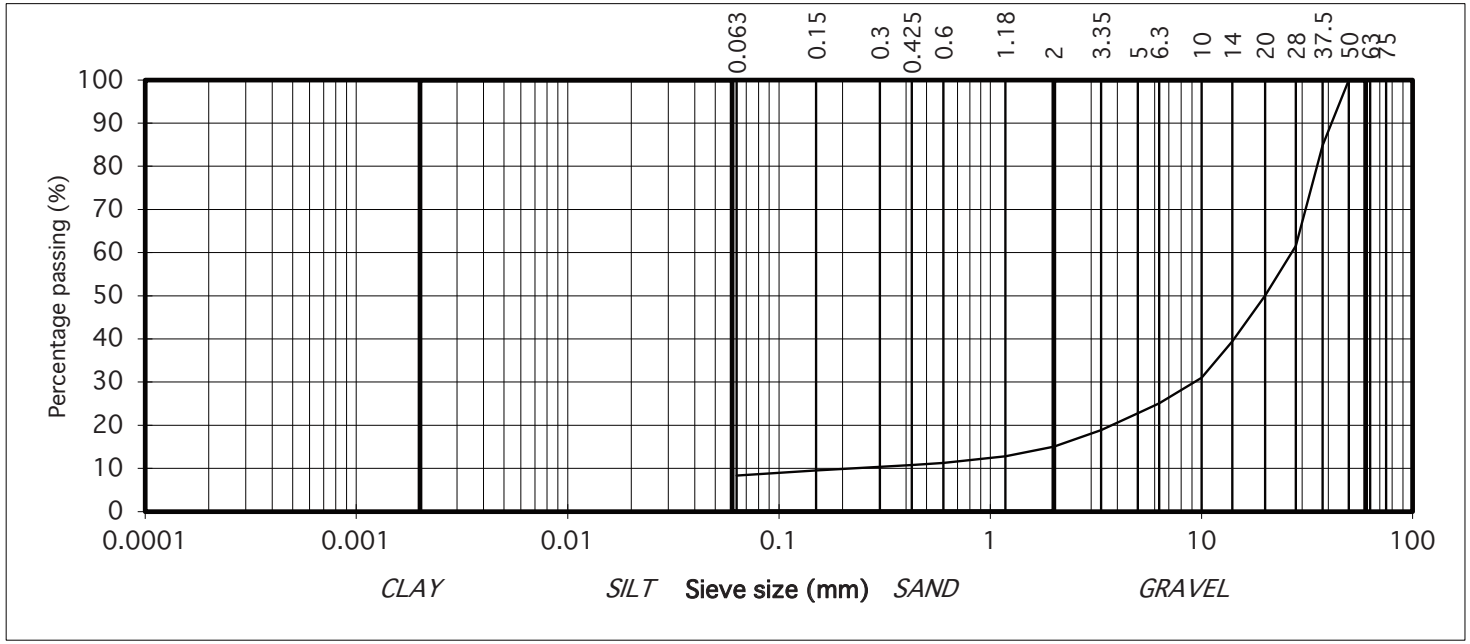
particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	85	
28	62	
20	50	
14	39	
10	31	
6.3	25	
5	23	
3.35	19	
2	15	
1.18	13	SAND
0.6	11	
0.425	11	
0.3	10	
0.15	10	
0.063	8	SILT/CLAY

Contract No.	23560	Report No.	R129928
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR DS006		
Sample No.*	AA151654	Lab. Sample No.	A21/6209B
Sample Type:	B		
Depth* (m)	0.45-0.70	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	09/12/2021
Description:	Brown clayey/silty, sandy, GRAVEL		

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.
This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



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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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	100	
20	94	
14	92	
10	91	
6.3	89	
5	87	
3.35	85	
2	82	
1.18	79	SAND
0.6	73	
0.425	70	
0.3	66	
0.15	62	
0.063	56	SILT/CLAY
0.037	49	
0.027	43	
0.017	38	
0.010	33	
0.007	27	
0.005	23	
0.002	14	

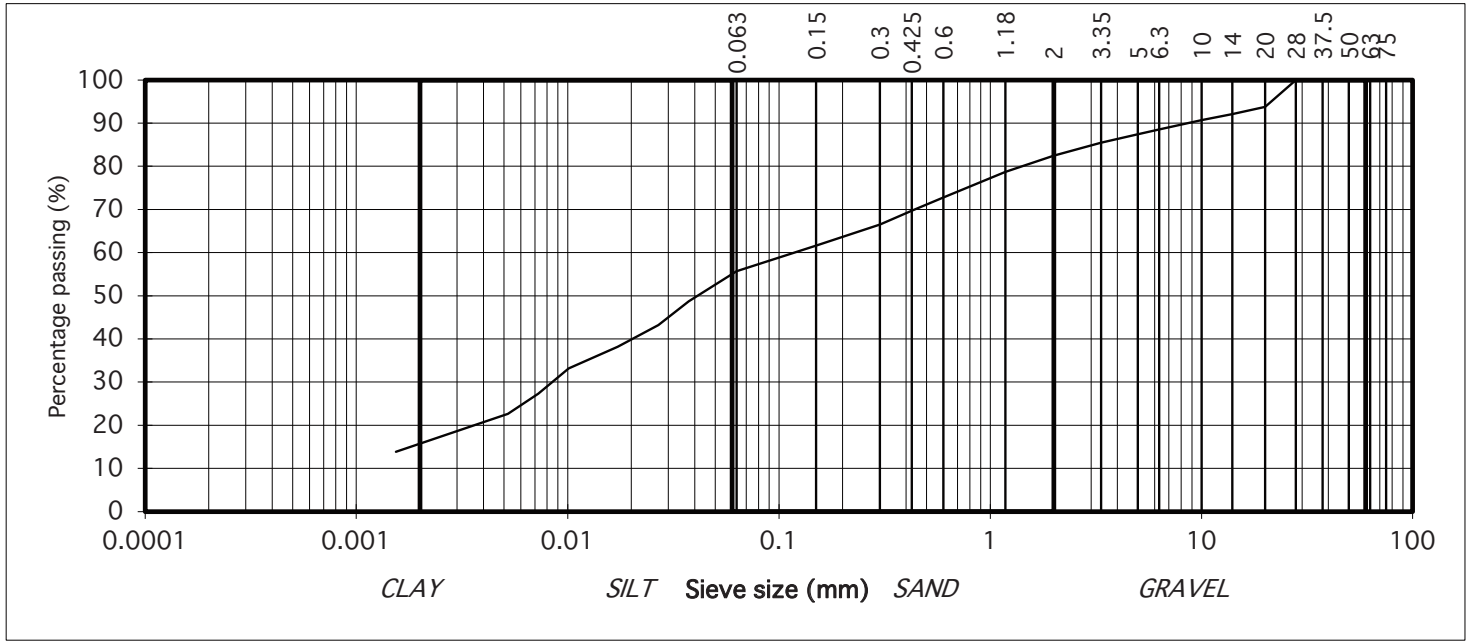
Contract No.	23560	Report No.	R129929
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR DS007		
Sample No.*	AA151697	Lab. Sample No.	A21/6210A
Sample Type:	B		
Depth* (m)	0.15-0.4	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	09/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		

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.

This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks

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



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

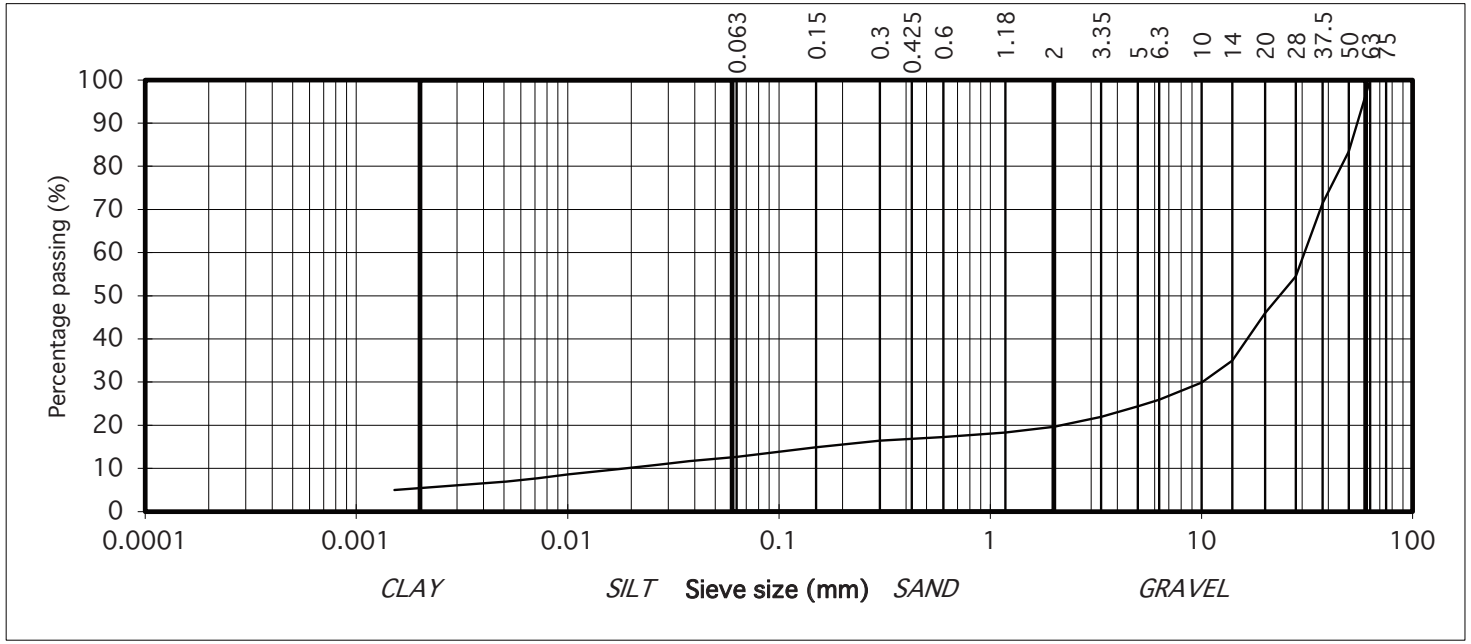
particle size	% passing	
75	100	COBBLES
63	100	
50	83	GRAVEL
37.5	71	
28	55	
20	46	
14	35	
10	30	
6.3	26	
5	24	
3.35	22	
2	20	
1.18	18	SAND
0.6	17	
0.425	17	
0.3	16	
0.15	15	
0.063	13	SILT/CLAY
0.038	12	
0.027	11	
0.017	10	
0.010	9	
0.007	8	
0.005	7	
0.002	5	

Contract No.	23560	Report No.	R129904
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR DS007		
Sample No.*	AA151657	Lab. Sample No.	A21/6210B
Sample Type:	B		
Depth* (m)	0.40-0.60	Customer:	Ervia
Date Received	01/12/2022	Date Testing started	09/12/2021
Description:	Brown clayey/silty, sandy, GRAVEL		

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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Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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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

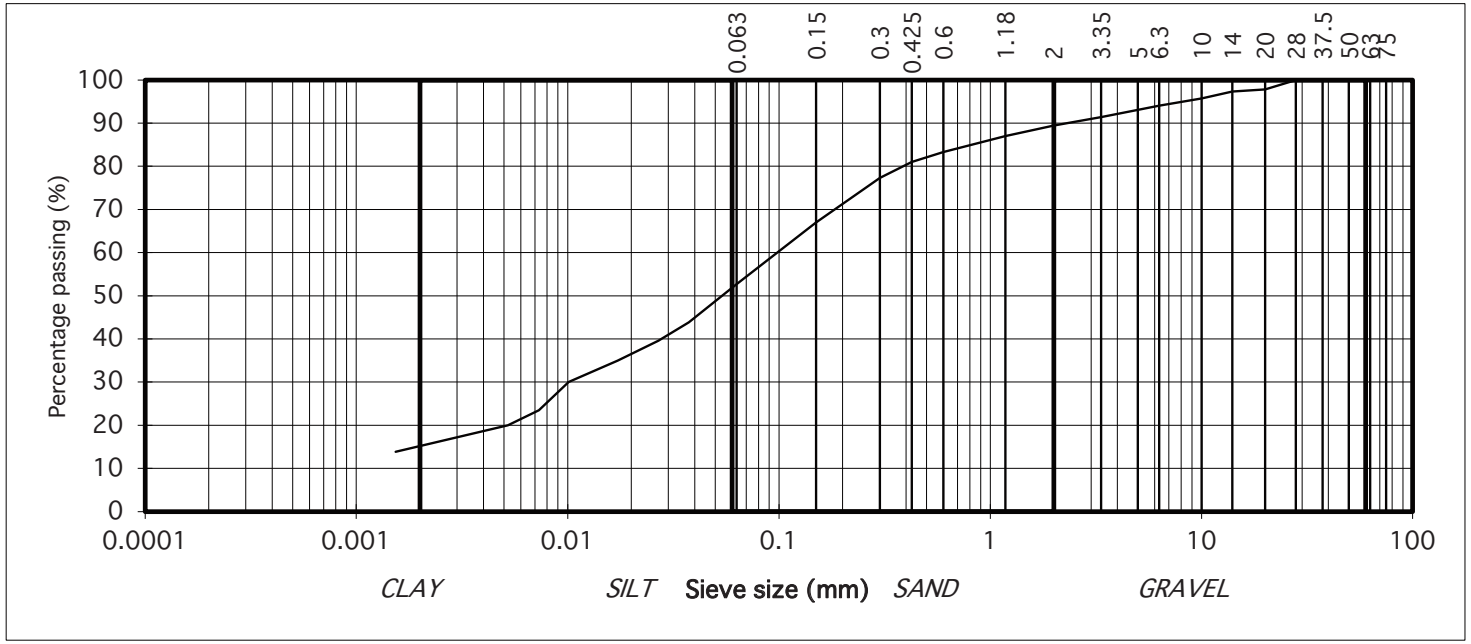
particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	100	
20	98	
14	97	
10	96	
6.3	94	
5	93	
3.35	91	
2	89	
1.18	87	SAND
0.6	83	
0.425	81	
0.3	77	
0.15	67	
0.063	53	SILT/CLAY
0.037	44	
0.027	40	
0.017	35	
0.010	30	
0.007	23	
0.005	20	
0.002	14	

Contract No.	23560	Report No.	R129952
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR DS008		
Sample No.*	AA151658	Lab. Sample No.	A21/6213A
Sample Type:	B		
Depth* (m)	0.20-0.50	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	09/12/2021
Description:	Brown sandy, slightly gravelly, SILT/CLAY		

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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Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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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

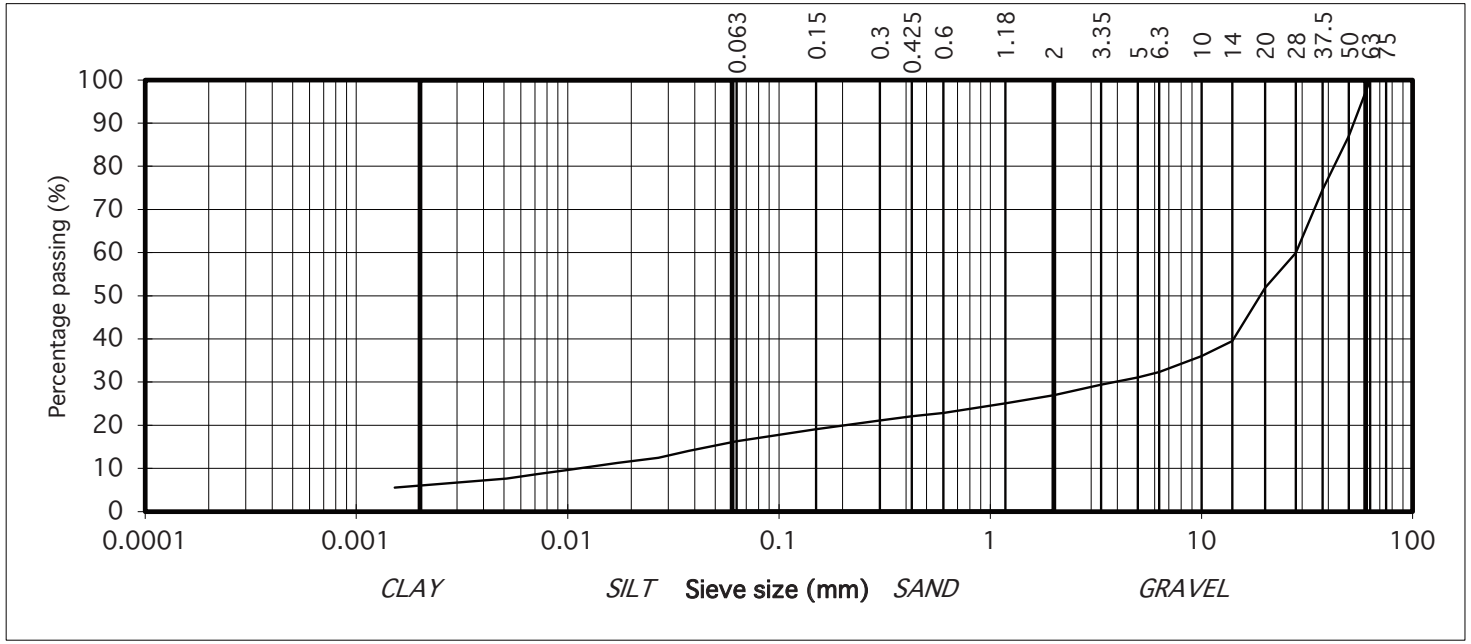
particle size	% passing	
75	100	COBBLES
63	100	
50	87	GRAVEL
37.5	75	
28	60	
20	52	
14	40	
10	36	
6.3	32	
5	31	
3.35	29	
2	27	
1.18	25	SAND
0.6	23	
0.425	22	
0.3	21	
0.15	19	
0.063	16	SILT/CLAY
0.037	14	
0.027	12	
0.017	11	
0.010	10	
0.007	9	
0.005	8	
0.002	6	

Contract No.	23560	Report No.	R129905
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR DS008		
Sample No.*	AA151658	Lab. Sample No.	A21/6213B
Sample Type:	B		
Depth* (m)	0.50-0.70	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	09/12/2021
Description:	Brown clayey/silty, sandy, GRAVEL		

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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Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



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Approved by:	Date:	Page no:
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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)

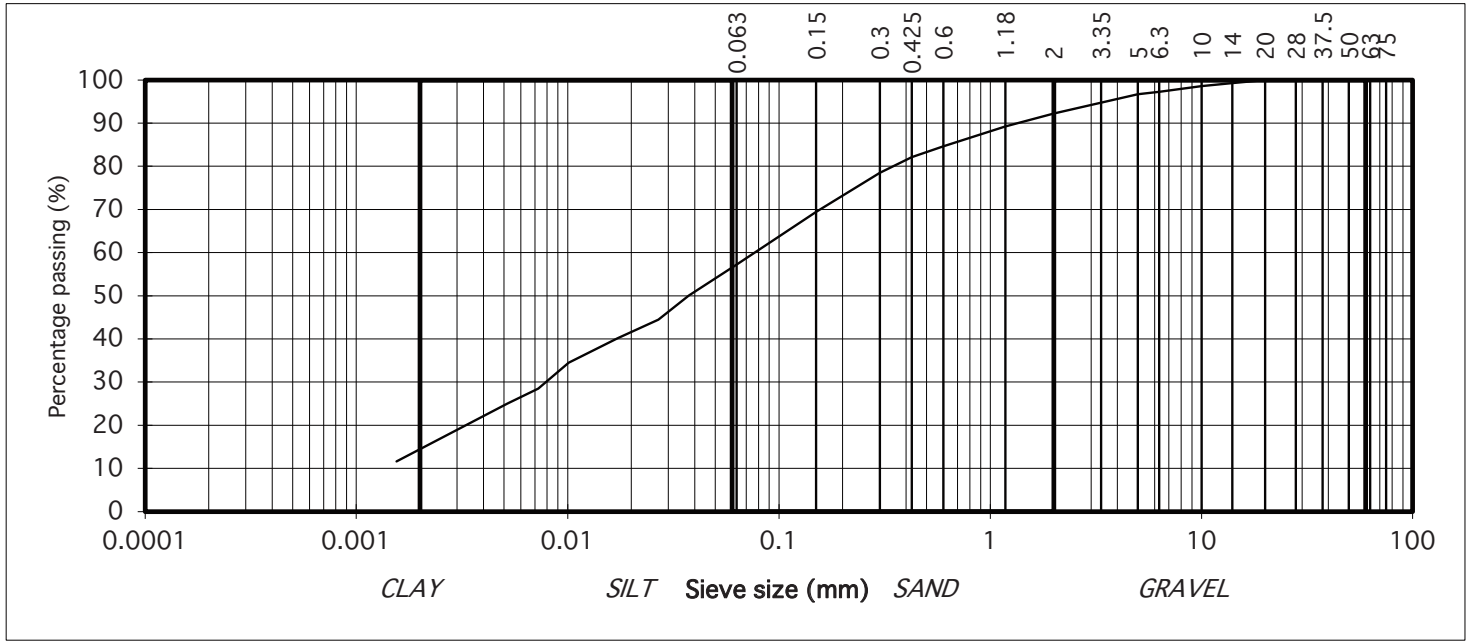
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	100	
20	100	
14	99	
10	99	
6.3	97	
5	97	
3.35	95	
2	92	
1.18	89	SAND
0.6	85	
0.425	82	
0.3	79	
0.15	69	
0.063	57	SILT/CLAY
0.037	50	
0.027	44	
0.017	40	
0.010	35	
0.007	28	
0.005	25	
0.002	12	

Contract No.	23560	Report No.	R129906
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR DS009		
Sample No.*	AA129906	Lab. Sample No.	A21/6211
Sample Type:	B		
Depth* (m)	0.5-1.0	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	09/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		

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



IGSL Ltd Materials Laboratory

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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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

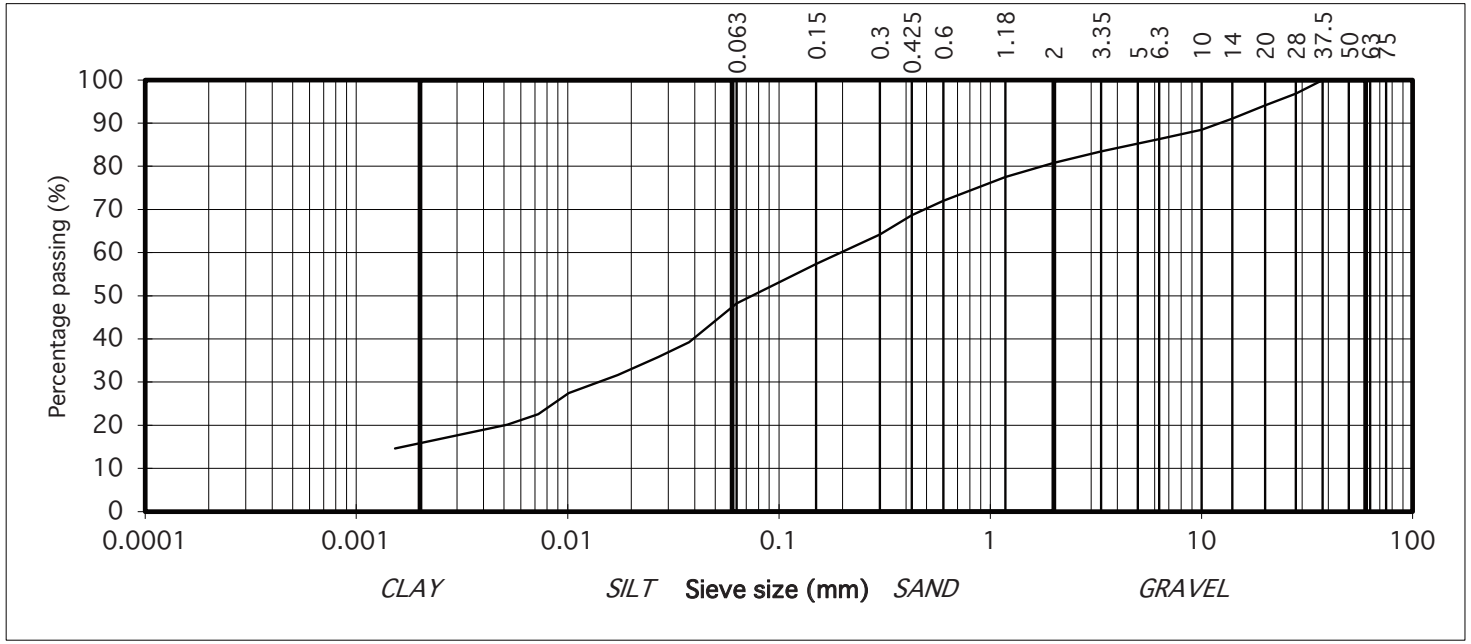
particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	97	
20	94	
14	91	
10	88	
6.3	86	
5	85	
3.35	83	
2	81	
1.18	77	SAND
0.6	72	
0.425	69	
0.3	64	
0.15	57	
0.063	48	SILT/CLAY
0.038	39	
0.027	36	
0.017	32	
0.010	27	
0.007	23	
0.005	20	
0.002	15	

Contract No.	23560	Report No.	R129931
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR DS011		
Sample No.*	AA151656	Lab. Sample No.	A21/6212A
Sample Type:	B		
Depth* (m)	0.15-0.32	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	09/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		

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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Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



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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

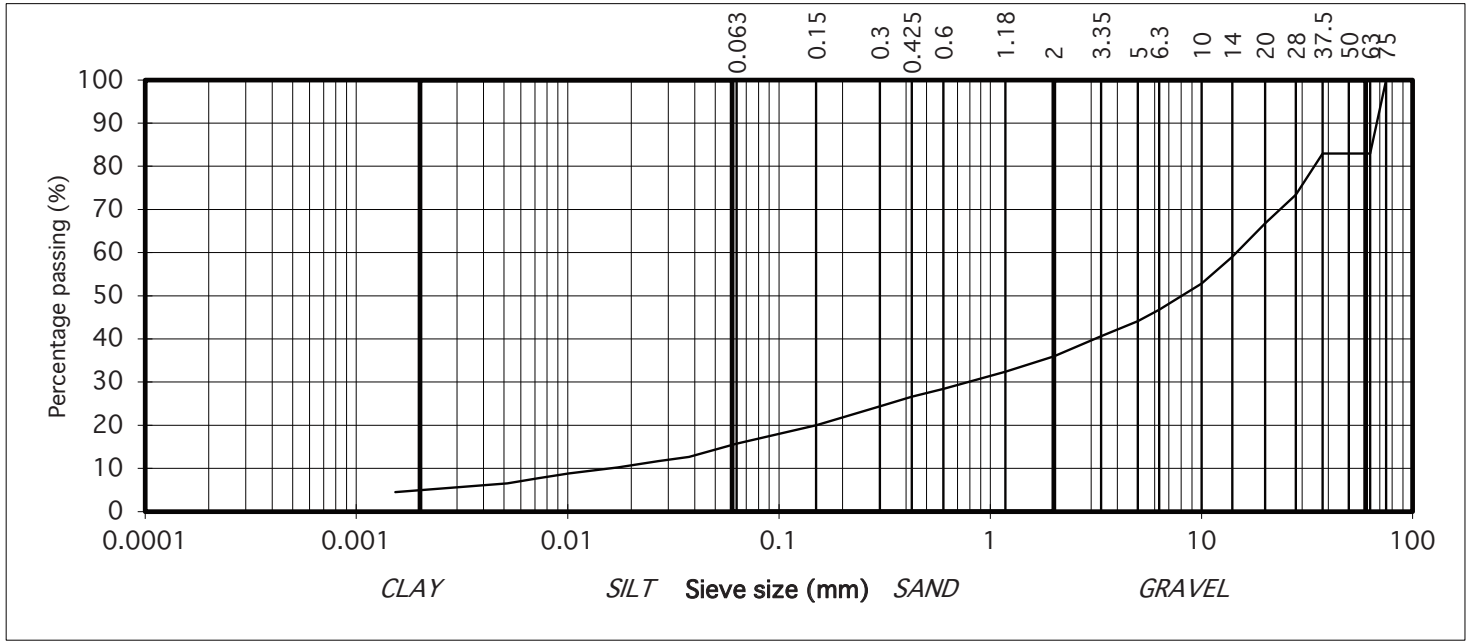
particle size	% passing	
75	100	COBBLES
63	83	
50	83	GRAVEL
37.5	83	
28	73	
20	67	
14	59	
10	53	
6.3	47	
5	44	
3.35	41	
2	36	
1.18	32	SAND
0.6	28	
0.425	27	
0.3	24	
0.15	20	
0.063	16	SILT/CLAY
0.038	13	
0.027	12	
0.017	10	
0.010	9	
0.007	8	
0.005	7	
0.002	4	

Contract No.	23560	Report No.	R129930
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR DS010		
Sample No.*	AA151659	Lab. Sample No.	A21/6215
Sample Type:	B		
Depth* (m)	1.05-1.7	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	09/12/2021
Description:	Brown clayey/silty, very sandy, GRAVEL with some cobbles		

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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Remarks

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IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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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

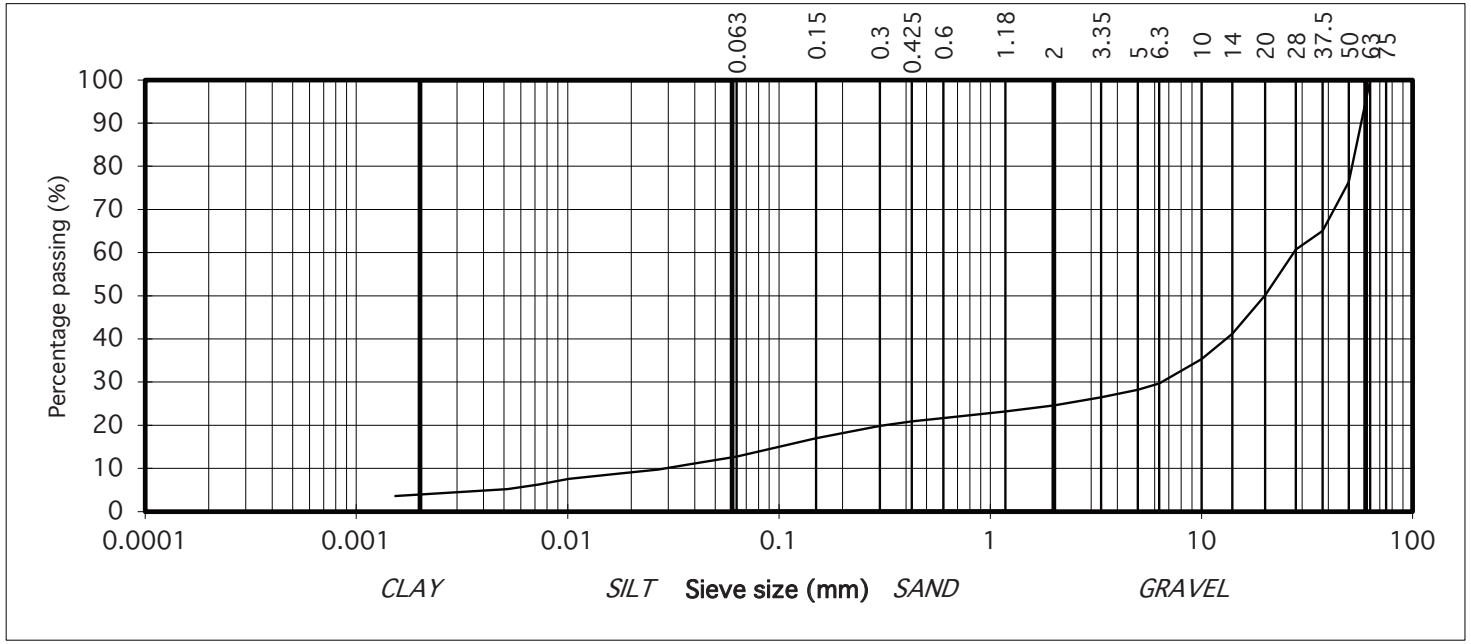
particle size	% passing	
75	100	COBBLES
63	100	
50	76	GRAVEL
37.5	65	
28	61	
20	50	
14	41	
10	35	
6.3	30	
5	28	
3.35	26	
2	25	
1.18	23	SAND
0.6	22	
0.425	21	
0.3	20	
0.15	17	
0.063	13	SILT/CLAY
0.037	11	
0.027	10	
0.017	9	
0.010	8	
0.007	6	
0.005	5	
0.002	4	

Contract No.	23560	Report No.	R129907
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR DS010		
Sample No.*	AA151659	Lab. Sample No.	A21/6214
Sample Type:	B		
Depth* (m)	0.15-0.55	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	09/12/2021
Description:	Brown clayey/silty, sandy, GRAVEL		

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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Remarks

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IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	23/12/21	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

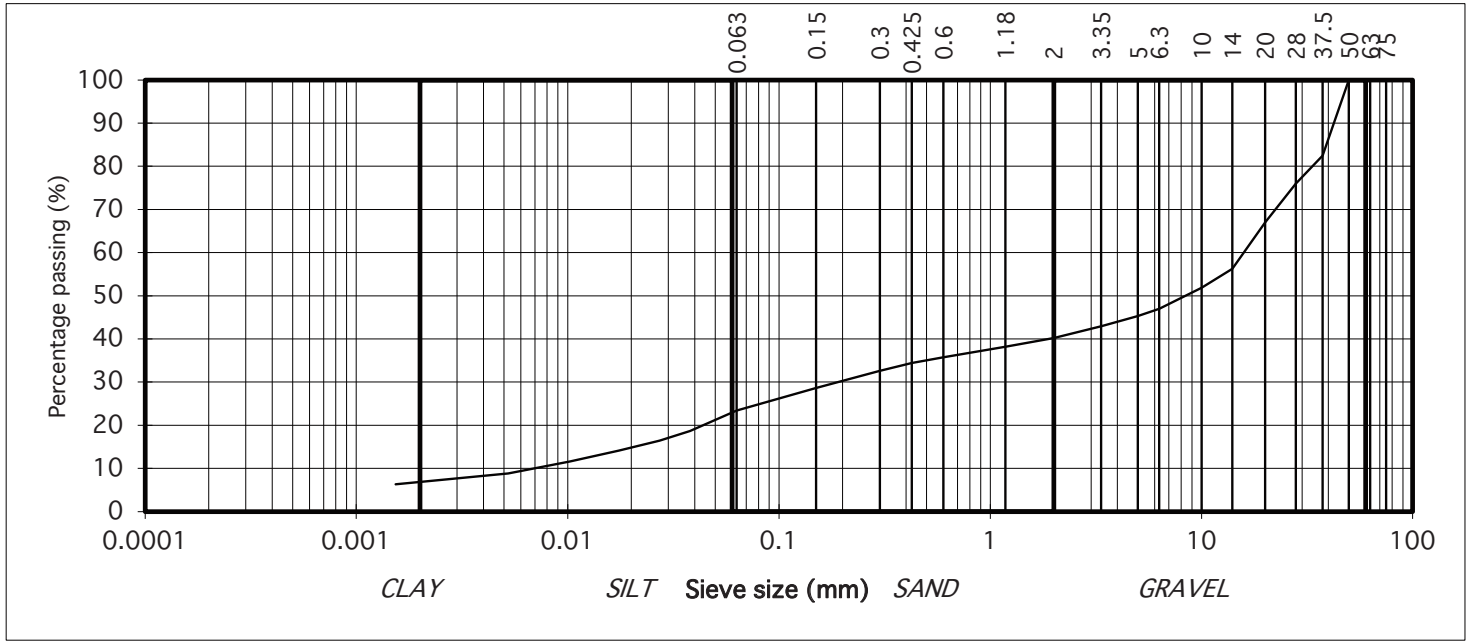
particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	82	
28	76	
20	67	
14	56	
10	52	
6.3	47	
5	45	
3.35	43	
2	40	
1.18	38	SAND
0.6	36	
0.425	34	
0.3	33	
0.15	29	
0.063	23	SILT/CLAY
0.038	19	
0.027	16	
0.018	14	
0.010	12	
0.007	10	
0.005	9	
0.002	6	

Contract No.	23560	Report No.	R129908
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR DS011		
Sample No.*	AA151656	Lab. Sample No.	A21/6212B
Sample Type:	B		
Depth* (m)	0.32-0.60	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	09/12/2021
Description:	Brown slightly sandy, gravelly, SILT/CLAY		

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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Remarks

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IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	88	
20	85	
14	83	
10	81	
6.3	78	
5	77	
3.35	75	
2	73	
1.18	71	SAND
0.6	69	
0.425	67	
0.3	65	
0.15	60	
0.063	53	SILT/CLAY
0.038	44	
0.027	40	
0.017	36	
0.010	30	
0.007	27	
0.005	23	
0.002	16	

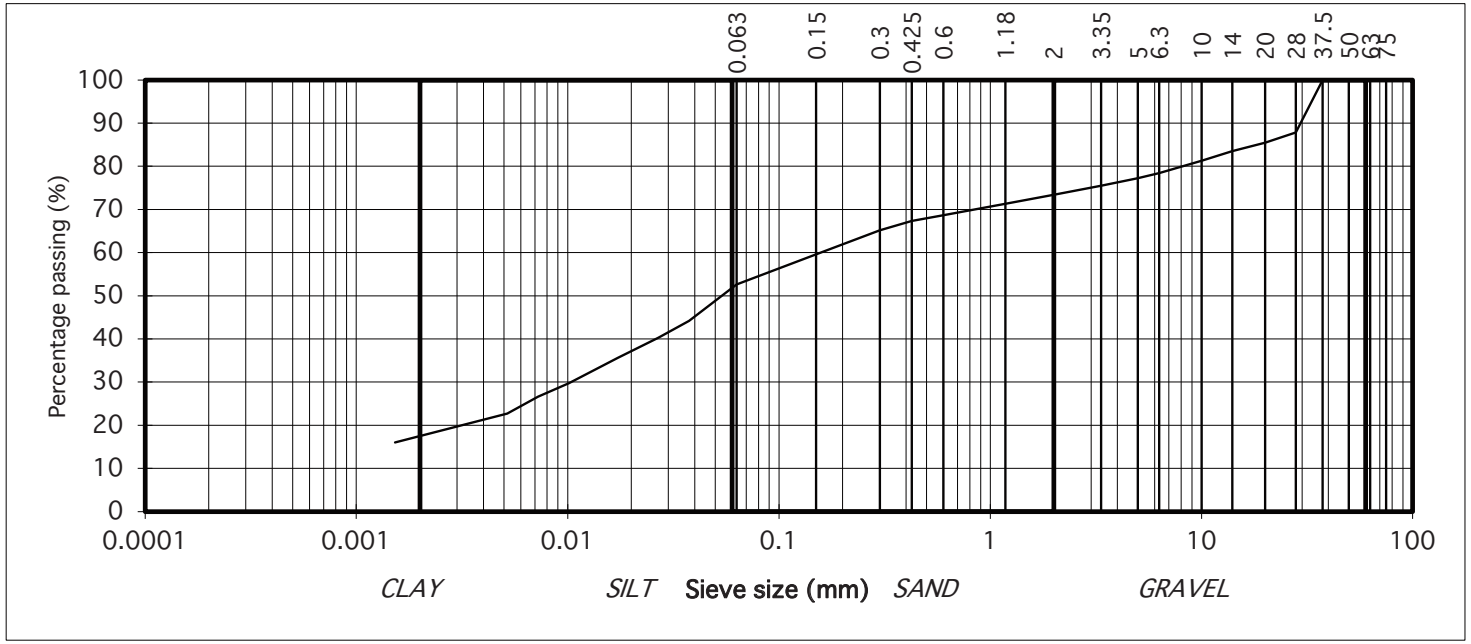
Contract No.	23560	Report No.	R129909
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR DS012		
Sample No.*	AA151663	Lab. Sample No.	A21/6216A
Sample Type:	B		
Depth* (m)	0.15-0.55	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	09/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		

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Remarks

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Approved by:	Date:	Page no:
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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)

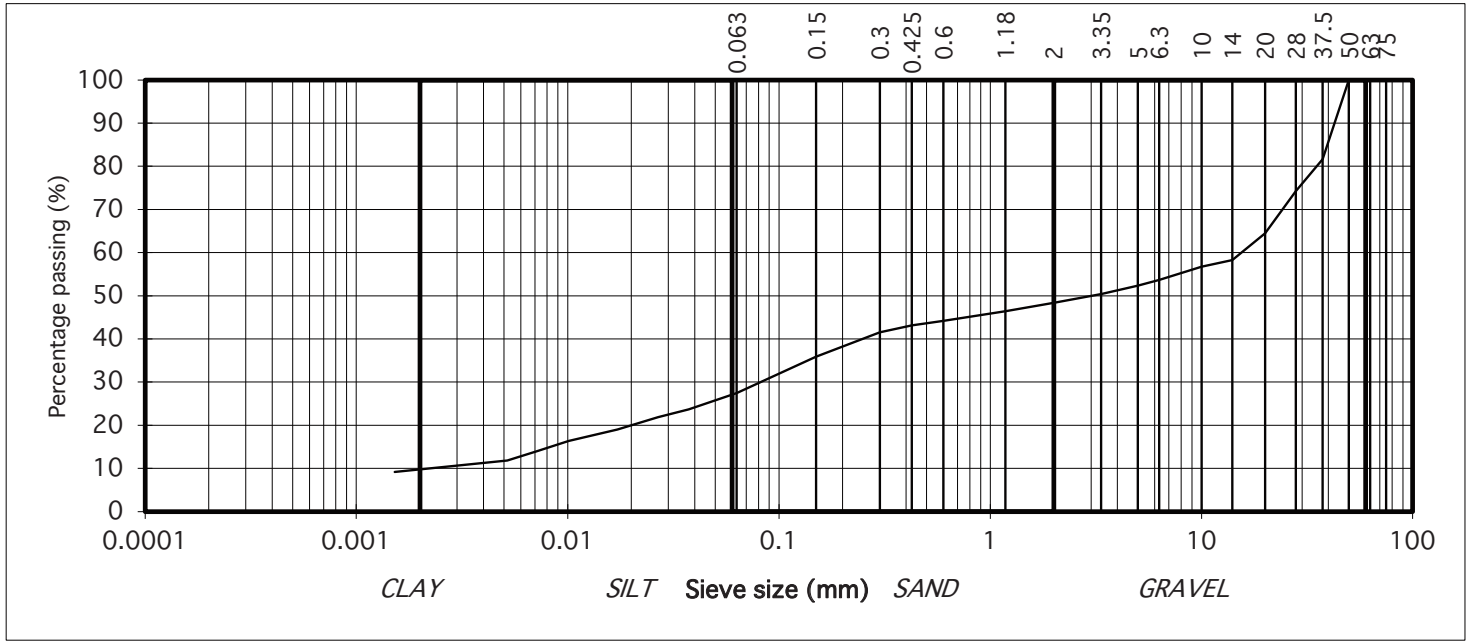
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	82	
28	74	
20	64	
14	58	
10	57	
6.3	54	
5	52	
3.35	50	
2	48	
1.18	46	SAND
0.6	44	
0.425	43	
0.3	42	
0.15	36	
0.063	27	SILT/CLAY
0.037	24	
0.027	22	
0.017	19	
0.010	16	
0.007	14	
0.005	12	
0.002	9	

Contract No.	23560	Report No.	R129955	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR DS012			
Sample No.*	AA151663	Lab. Sample No.		A21/6216B
Sample Type:	B			
Depth* (m)	0.55-0.85	Customer:	Ervia	
Date Received	01/12/2021	Date Testing started		09/12/2021
Description:	Brown slightly sandy, gravelly, SILT/CLAY			

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377

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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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

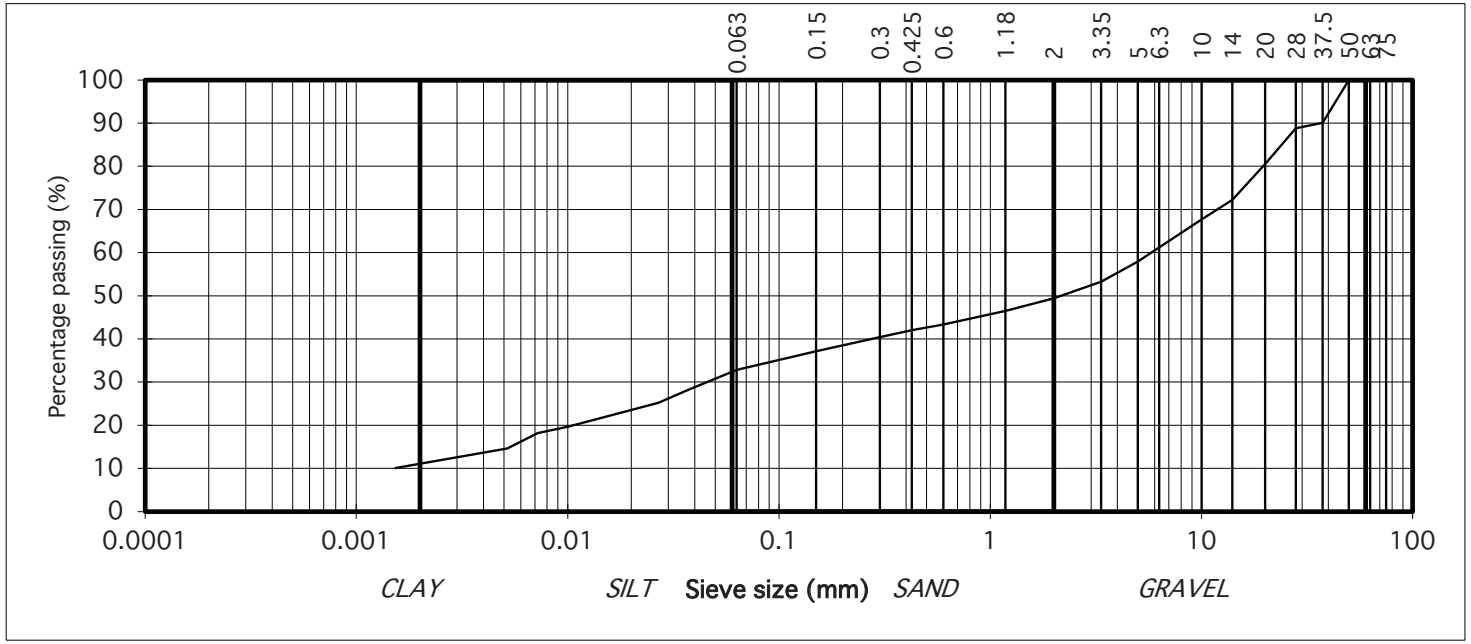
particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	90	
28	89	
20	81	
14	72	
10	68	
6.3	61	
5	58	
3.35	53	
2	49	
1.18	47	SAND
0.6	43	
0.425	42	
0.3	40	
0.15	37	
0.063	33	SILT/CLAY
0.038	28	
0.027	25	
0.017	23	
0.010	20	
0.007	18	
0.005	15	
0.002	10	

Contract No.	23560	Report No.	R129950	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR DS012			
Sample No.*	AA151663	Lab. Sample No.		A21/6216C
Sample Type:	B			
Depth* (m)	0.85-1.0	Customer:	Ervia	
Date Received	01/12/2021	Date Testing started		09/12/2021
Description:	Brown slightly sandy, gravelly, SILT/CLAY			

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.
This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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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)

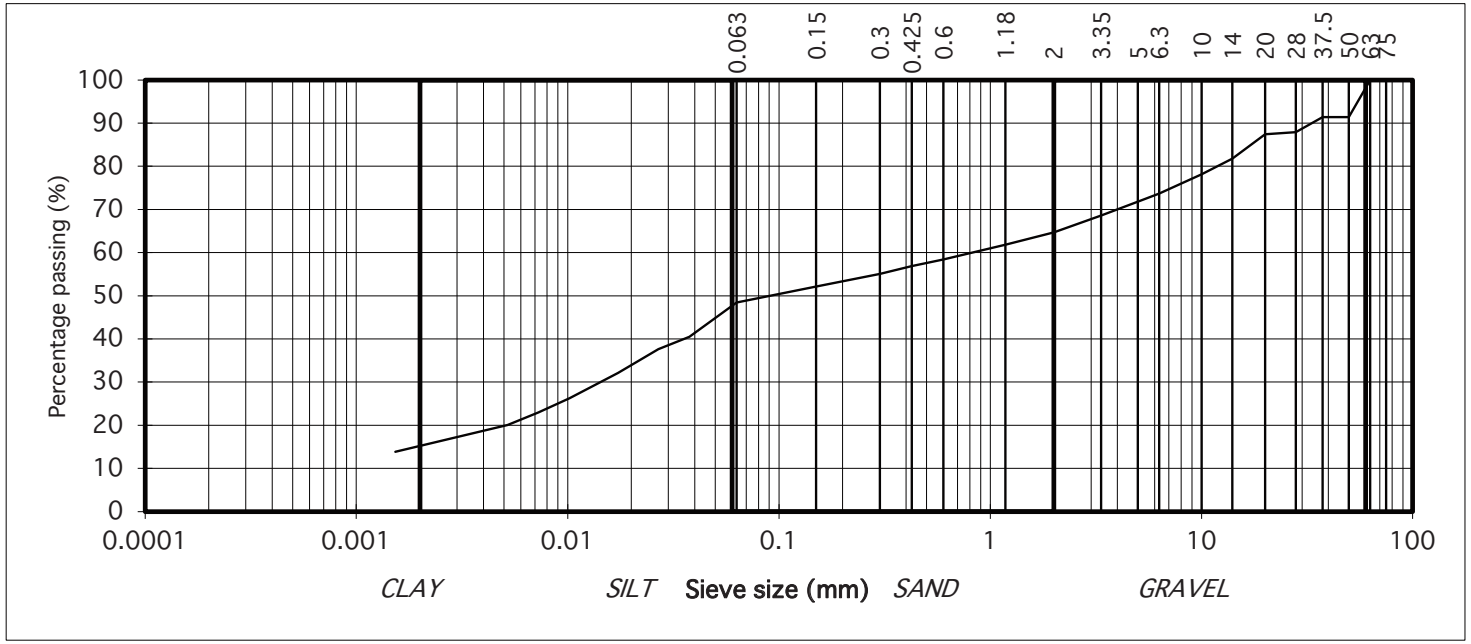
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	91	GRAVEL
37.5	91	
28	88	
20	87	
14	82	
10	78	
6.3	74	
5	72	
3.35	69	
2	65	
1.18	62	SAND
0.6	58	
0.425	57	
0.3	55	
0.15	52	
0.063	48	SILT/CLAY
0.038	41	
0.027	38	
0.017	32	
0.010	26	
0.007	23	
0.005	20	
0.002	14	

Contract No.	23560	Report No.	R129932	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR DS013			
Sample No.*	AA161651	Lab. Sample No.		A21/6217A
Sample Type:	B			
Depth* (m)	0.15-0.45	Customer:	Ervia	
Date Received	01/12/2021	Date Testing started		09/12/2021
Description:	Brown slightly sandy, 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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Approved by:	Date:	Page no:
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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

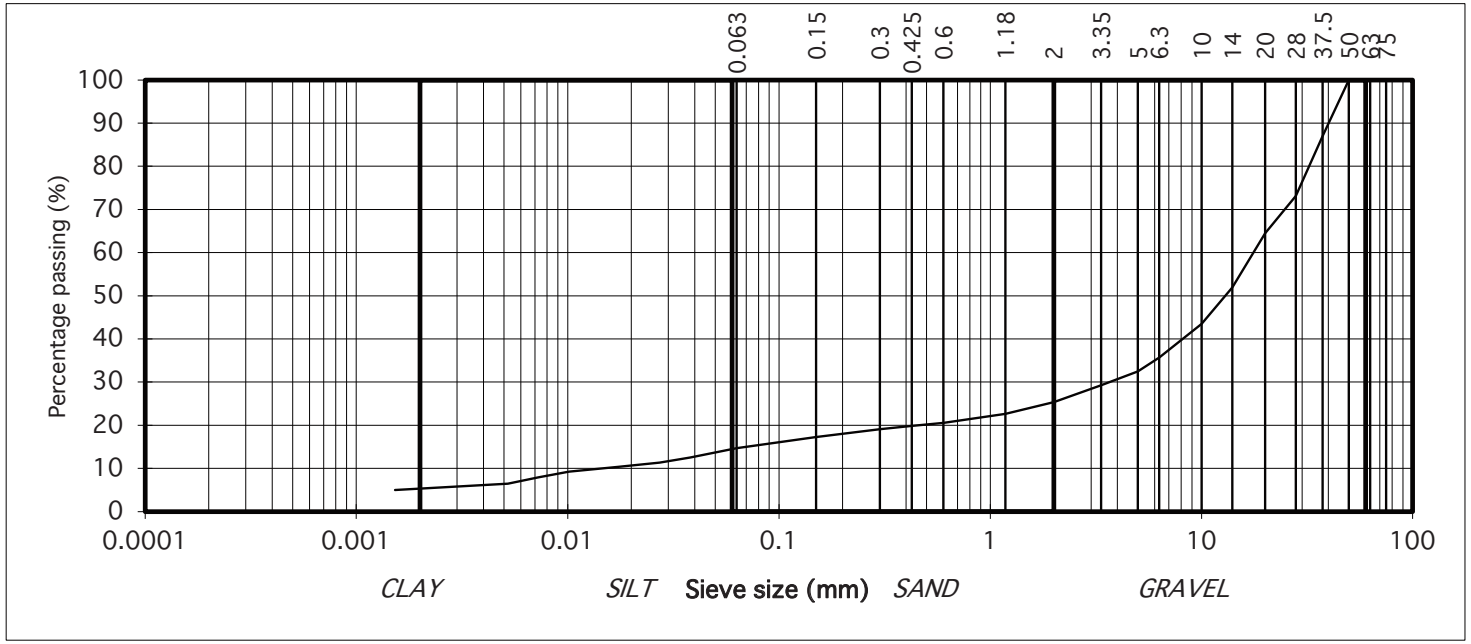
particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	87	
28	73	
20	64	
14	52	
10	43	
6.3	36	
5	32	
3.35	29	
2	25	
1.18	23	SAND
0.6	21	
0.425	20	
0.3	19	
0.15	17	
0.063	15	SILT/CLAY
0.038	13	
0.027	11	
0.017	10	
0.010	9	
0.007	8	
0.005	6	
0.002	5	

Contract No.	23560	Report No.	R129910
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR DS013		
Sample No.*	AA161651	Lab. Sample No.	A21/6217B
Sample Type:	B		
Depth* (m)	0.45-0.6	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	09/12/2021
Description:	Brown clayey/silty, sandy, GRAVEL		

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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Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



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Approved by:	Date:	Page no:
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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

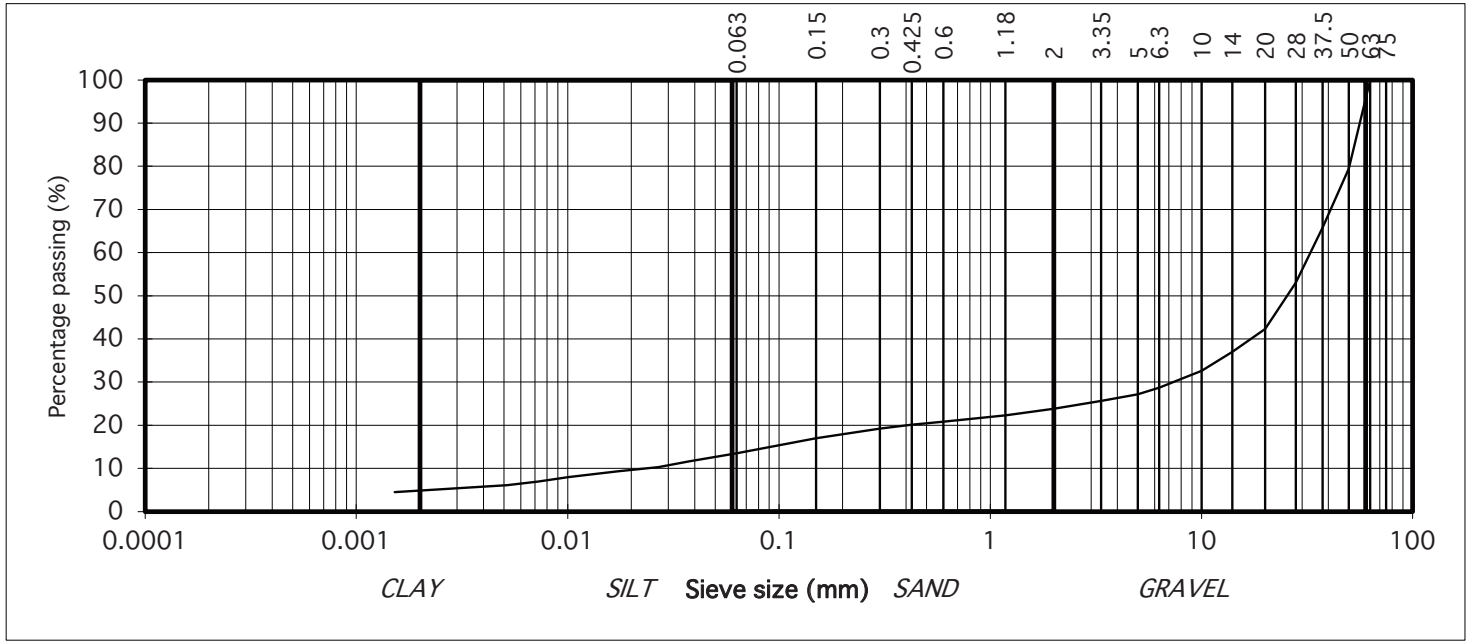
particle size	% passing	
75	100	COBBLES
63	100	
50	79	GRAVEL
37.5	66	
28	53	
20	42	
14	37	
10	33	
6.3	29	
5	27	
3.35	26	
2	24	
1.18	22	SAND
0.6	21	
0.425	20	
0.3	19	
0.15	17	
0.063	14	SILT/CLAY
0.037	12	
0.027	10	
0.017	9	
0.010	8	
0.007	7	
0.005	6	
0.002	5	

Contract No.	23560	Report No.	R129911
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR DS014		
Sample No.*	AA151663	Lab. Sample No.	A21/6218B
Sample Type:	B		
Depth* (m)	0.5-1.0	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	09/12/2021
Description:	Brown clayey/silty, sandy, GRAVEL		

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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Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



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Approved by:	Date:	Page no:
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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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

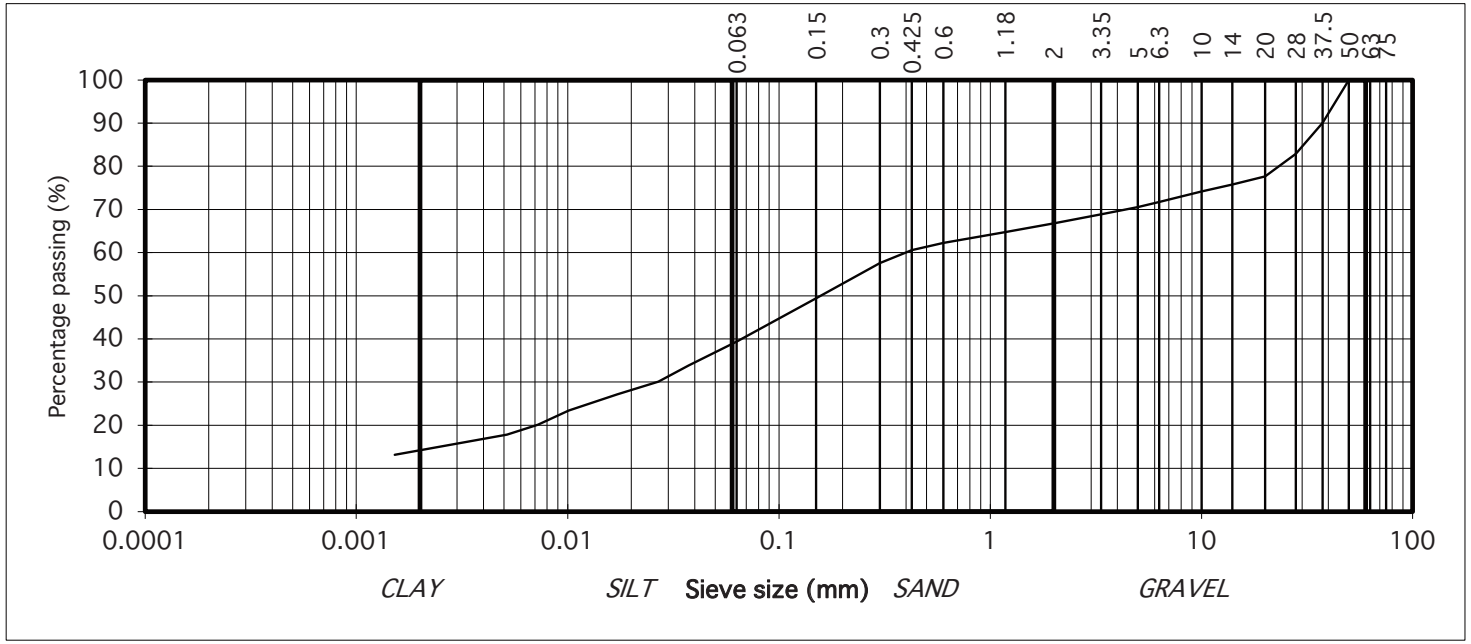
particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	90	
28	83	
20	78	
14	76	
10	74	
6.3	72	
5	71	
3.35	69	
2	67	
1.18	65	SAND
0.6	62	
0.425	61	
0.3	58	
0.15	49	
0.063	39	SILT/CLAY
0.037	34	
0.027	30	
0.017	27	
0.010	23	
0.007	20	
0.005	18	
0.002	13	

Contract No.	23560	Report No.	R129933	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR DS014			
Sample No.*	AA151663	Lab. Sample No.		A21/6218A
Sample Type:	B			
Depth* (m)	0.15-0.50	Customer:	Ervia	
Date Received	01/12/2021	Date Testing started		09/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY			

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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Remarks

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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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

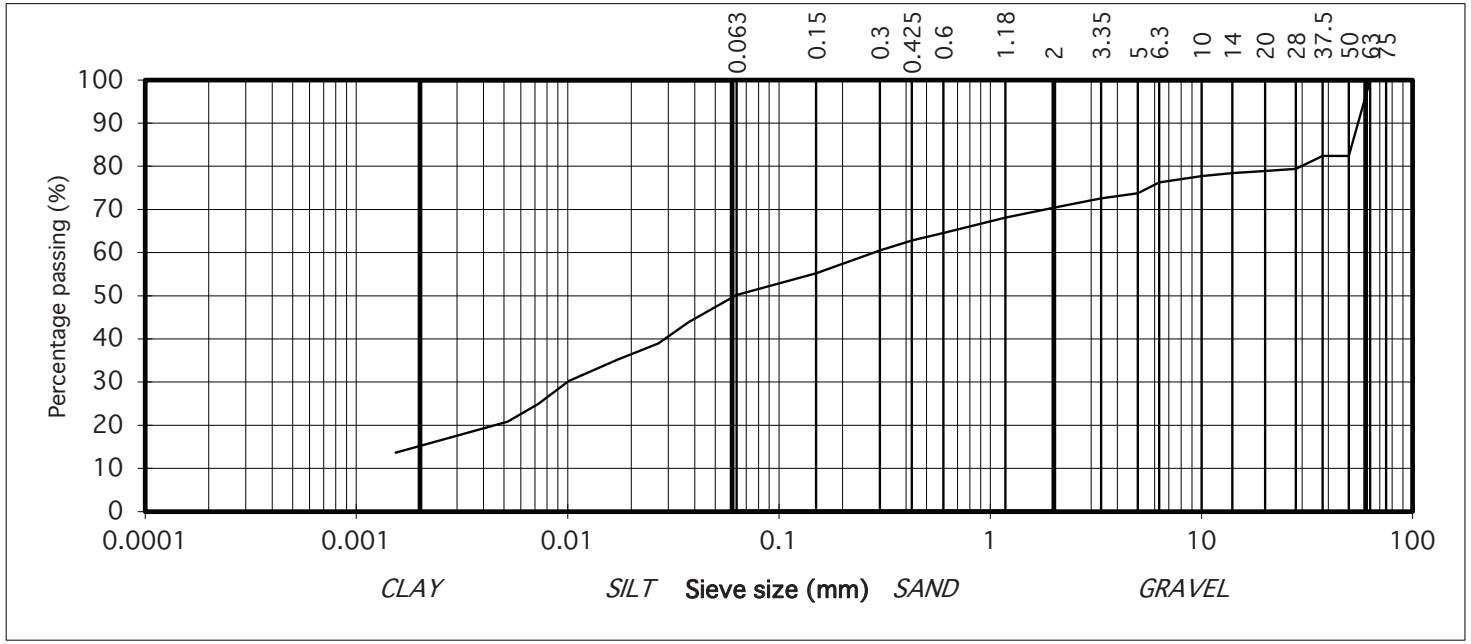
particle size	% passing	
75	100	COBBLES
63	100	
50	82	GRAVEL
37.5	82	
28	79	
20	79	
14	78	
10	78	
6.3	76	
5	74	
3.35	73	
2	70	
1.18	68	SAND
0.6	65	
0.425	63	
0.3	60	
0.15	55	
0.063	50	SILT/CLAY
0.037	44	
0.027	39	
0.017	35	
0.010	30	
0.007	25	
0.005	21	
0.002	14	

Contract No.	23560	Report No.	R129935	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR DS015			
Sample No.*	AA151660	Lab. Sample No.		A21/6219A
Sample Type:	B			
Depth* (m)	0.15-0.40	Customer:	Ervia	
Date Received	01/12/2021	Date Testing started		09/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY			

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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Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



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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

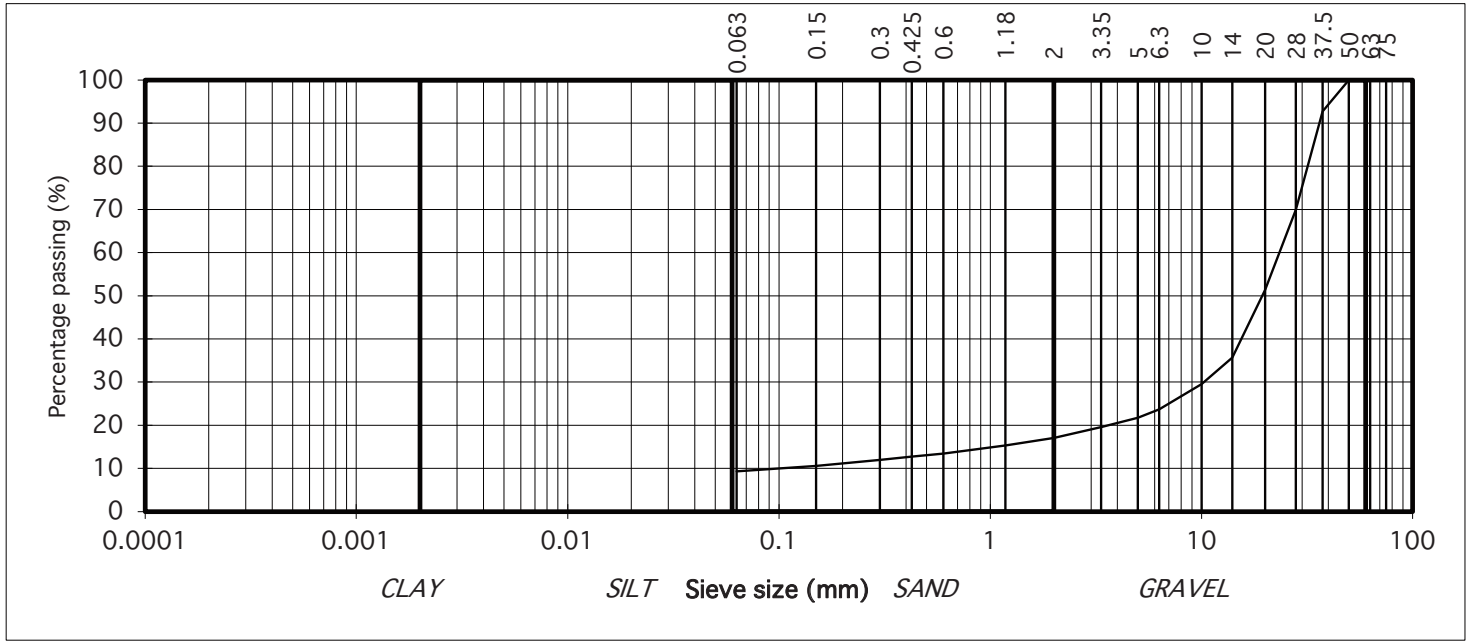
particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	93	
28	70	
20	51	
14	36	
10	30	
6.3	24	
5	22	
3.35	20	
2	17	
1.18	15	SAND
0.6	13	
0.425	13	
0.3	12	
0.15	11	
0.063	9	SILT/CLAY

Contract No.	23560	Report No.	R129934
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR DS015		
Sample No.*	AA151660	Lab. Sample No.	A21/6219B
Sample Type:	B		
Depth* (m)	0.5-0.6	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	09/12/2021
Description:	Brown clayey/silty, sandy, GRAVEL		

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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Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	23/12/21	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	100	
28	100	
20	99	
14	96	
10	95	
6.3	92	
5	91	
3.35	88	
2	83	
1.18	79	SAND
0.6	74	
0.425	72	
0.3	70	
0.15	65	
0.063	60	SILT/CLAY
0.038	53	
0.027	46	
0.017	40	
0.010	35	
0.007	31	
0.005	26	
0.002	16	

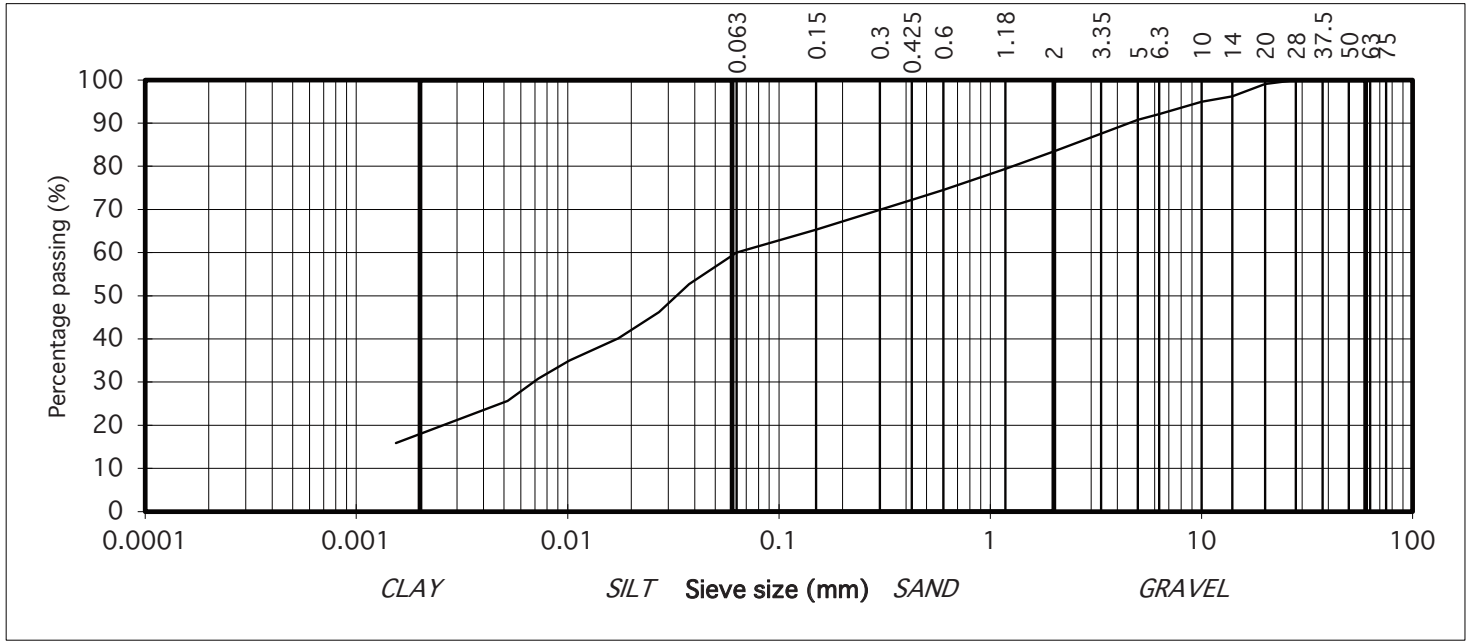
Contract No.	23560	Report No.	R129912
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR DS016		
Sample No.*	AA151661	Lab. Sample No.	A21/6220A
Sample Type:	B		
Depth* (m)	0.15-0.55	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	09/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		

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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Remarks

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IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

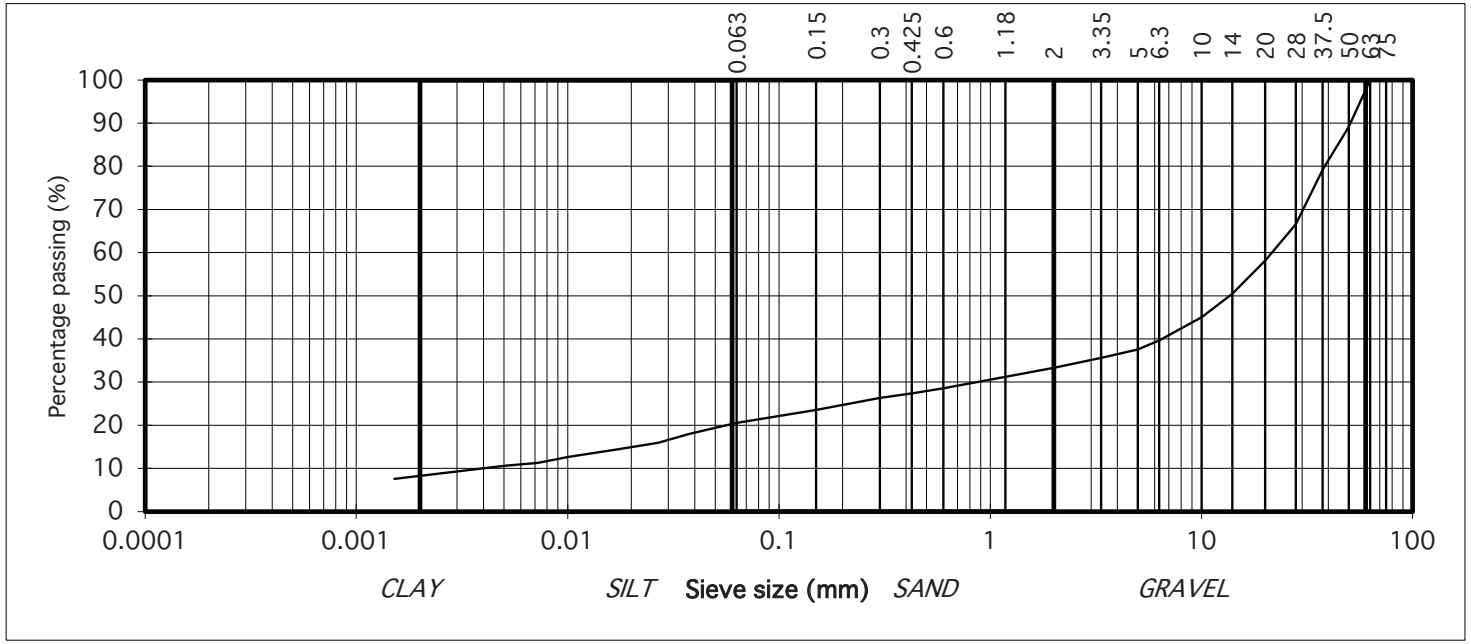
particle size	% passing	
75	100	COBBLES
63	100	
50	89	GRAVEL
37.5	79	
28	67	
20	58	
14	50	
10	45	
6.3	40	
5	38	
3.35	36	
2	33	
1.18	31	SAND
0.6	29	
0.425	27	
0.3	26	
0.15	24	
0.063	21	SILT/CLAY
0.037	18	
0.027	16	
0.017	14	
0.010	13	
0.007	11	
0.005	11	
0.002	8	

Contract No.	23560	Report No.	R129913	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR DS016			
Sample No.*	AA151661	Lab. Sample No.		A21/6220
Sample Type:	B			
Depth* (m)	0.55-0.70	Customer:	Ervia	
Date Received	01/12/2021	Date Testing started		09/12/2021
Description:	Brown slightly sandy, very gravelly, SILT/CLAY			

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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Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



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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	100	
28	96	
20	93	
14	87	
10	85	
6.3	83	
5	82	
3.35	80	
2	78	
1.18	76	SAND
0.6	74	
0.425	72	
0.3	70	
0.15	55	
0.063	43	SILT/CLAY
0.037	36	
0.027	33	
0.017	29	
0.010	25	
0.007	21	
0.005	17	
0.002	11	

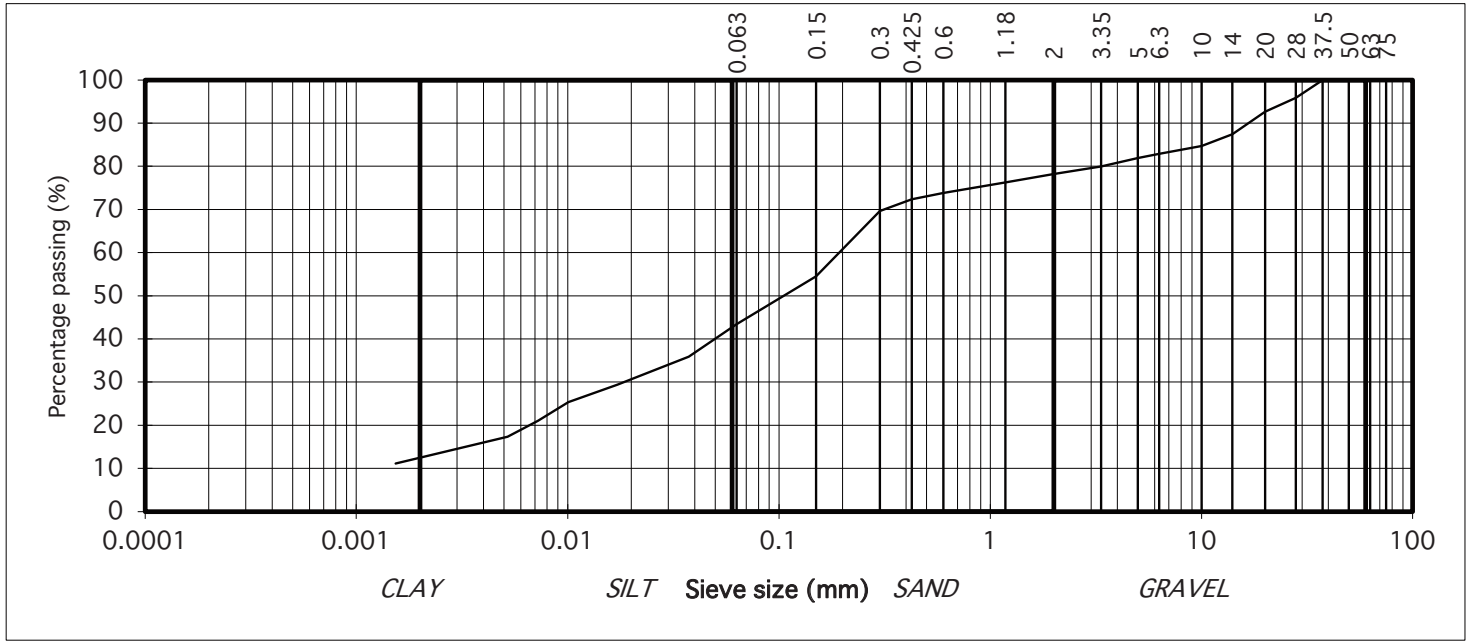
Contract No.	23560	Report No.	R129951
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR DS017		
Sample No.*	AA151661	Lab. Sample No.	A21/6221A
Sample Type:	B		
Depth* (m)	0.15-0.40	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	09/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		

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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Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



IGSL Ltd Materials Laboratory

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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

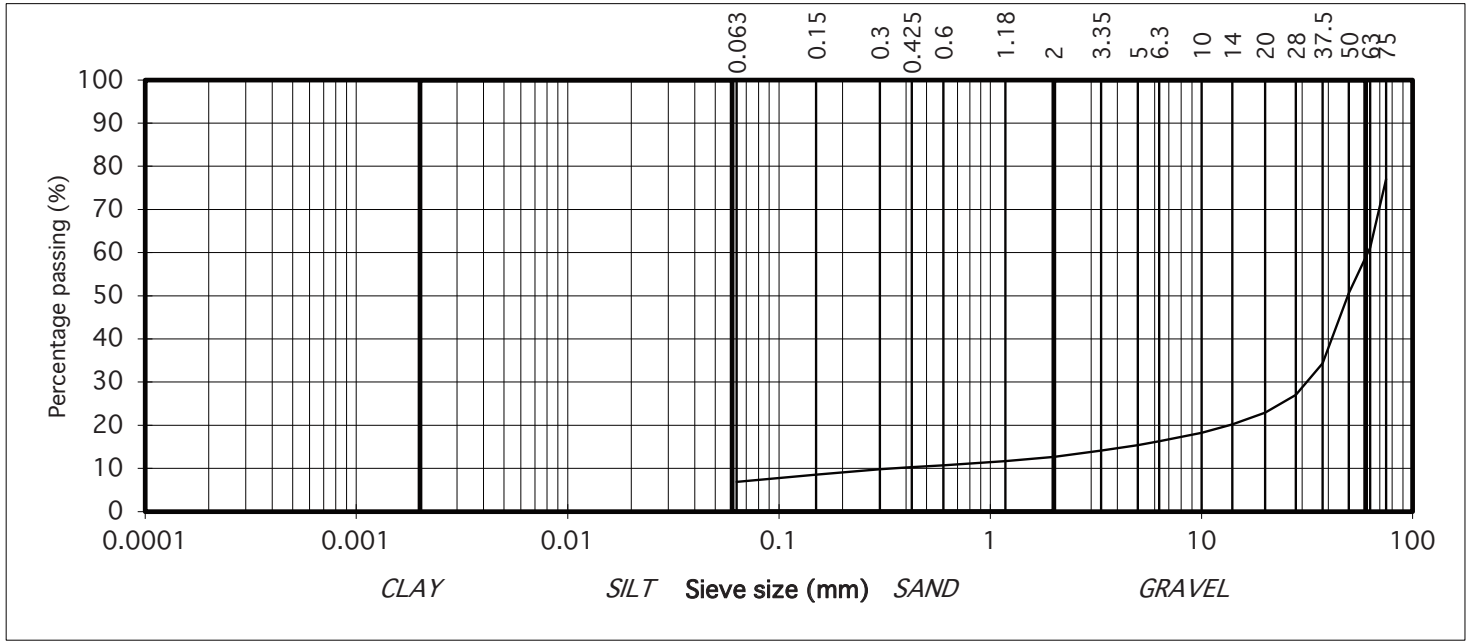
particle size	% passing	
75	77	COBBLES
63	61	
50	51	GRAVEL
37.5	34	
28	27	
20	23	
14	20	
10	18	
6.3	16	
5	15	
3.35	14	
2	13	
1.18	12	SAND
0.6	11	
0.425	10	
0.3	10	
0.15	9	
0.063	7	SILT/CLAY

Contract No.	23560	Report No.	R129936	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR DS017			
Sample No.*	AA151661	Lab. Sample No.		A21/6221B
Sample Type:	B			
Depth* (m)	0.40-60	Customer:	Ervia	
Date Received	01/12/2021	Date Testing started		09/12/2021
Description:	Brown clayey/silty, sandy, GRAVEL with many cobbles			

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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Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



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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)

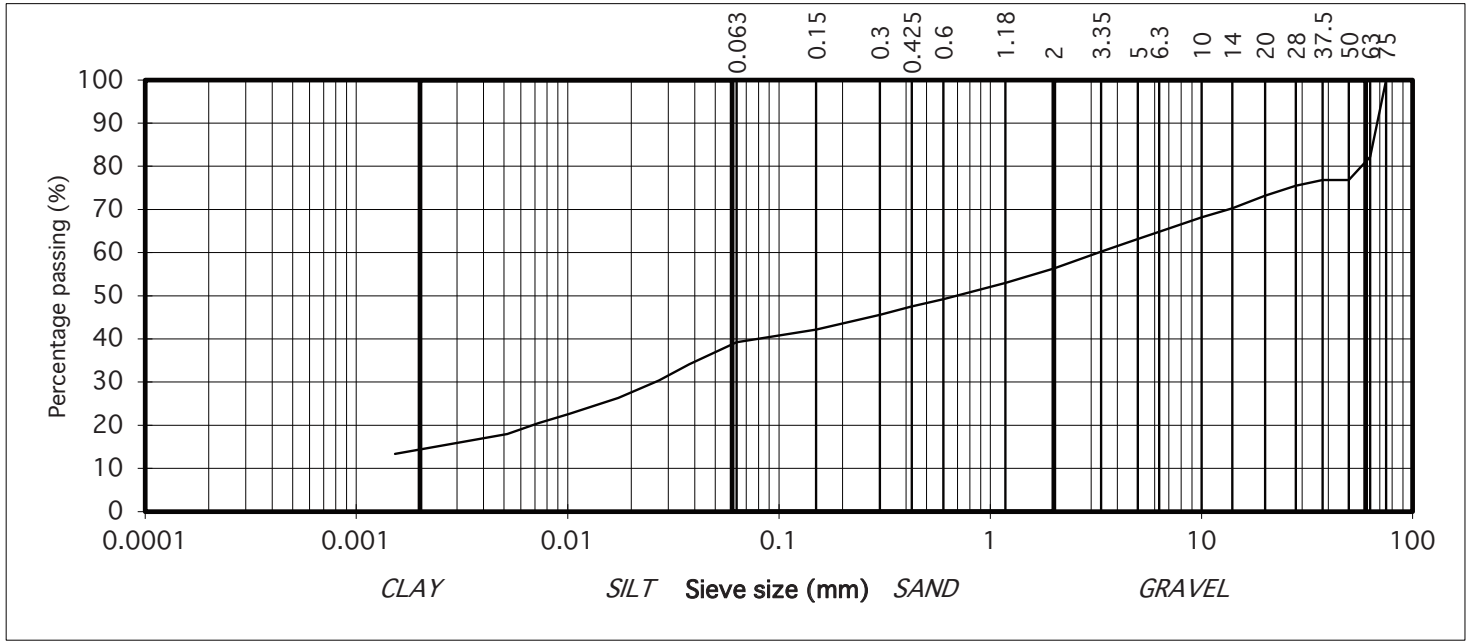
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	82	
50	77	GRAVEL
37.5	77	
28	75	
20	73	
14	70	
10	68	
6.3	65	
5	63	
3.35	60	
2	56	
1.18	53	SAND
0.6	49	
0.425	48	
0.3	46	
0.15	42	
0.063	39	SILT/CLAY
0.038	34	
0.027	30	
0.017	26	
0.010	23	
0.007	20	
0.005	18	
0.002	13	

Contract No. 23560 Report No. R129383
Contract Name: WSP - Lot 3
BH/TP* : TPR-TP168871
Sample No.* AA152124 Lab. Sample No. A21/6191
Sample Type: B
Depth* (m) 0.50-0.60 Customer: Ervia
Date Received 01/12/2021 Date Testing started 01/12/2021
Description: Brown slightly sandy, gravelly, SILT/CLAY with some cobbles

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377

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Approved by:	Date:	Page no:
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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)

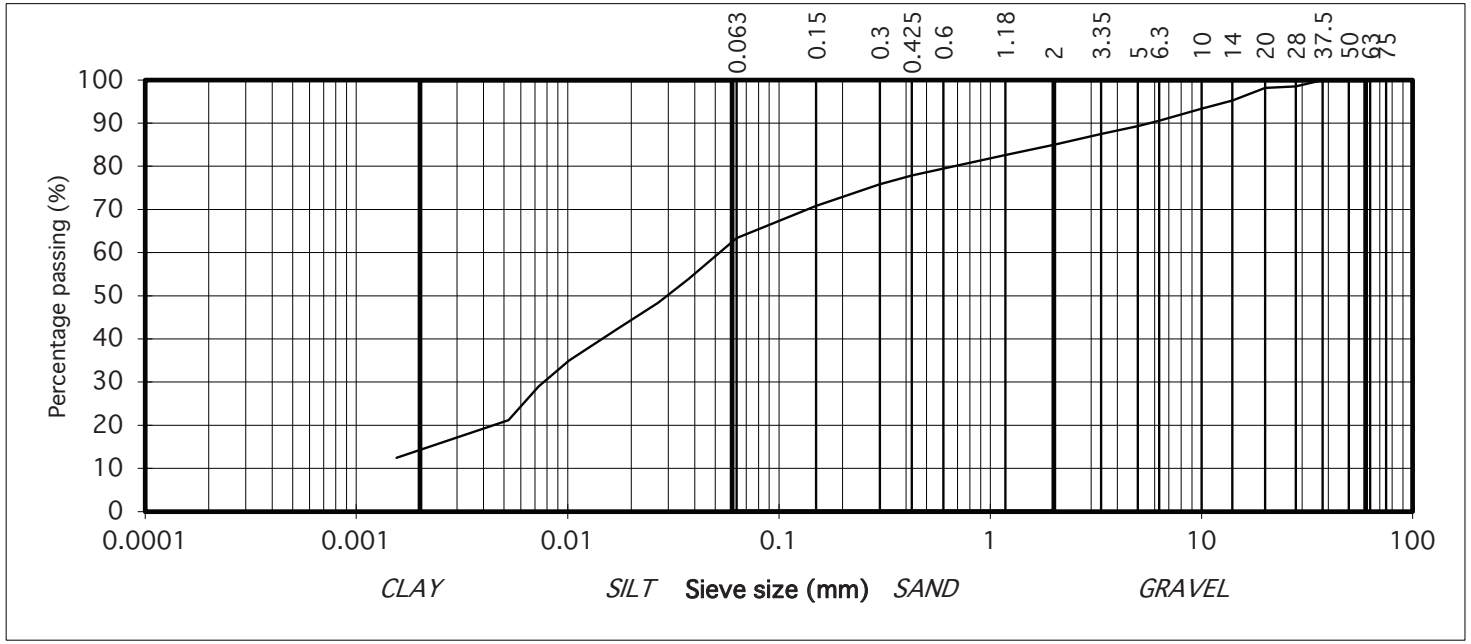
ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	99	
20	98	
14	95	
10	93	
6.3	91	
5	89	
3.35	87	
2	85	
1.18	83	SAND
0.6	79	
0.425	78	
0.3	76	
0.15	71	
0.063	63	SILT/CLAY
0.037	54	
0.027	48	
0.017	42	
0.010	35	
0.007	29	
0.005	21	
0.002	12	

Contract No. 23560 Report No. R129901
Contract Name: WSP - Lot 3
BH/TP* : TPR TP168871
Sample No.* AA152125 Lab. Sample No. A21/6192
Sample Type: B
Depth* (m) 1.10-1.20 Customer: Ervia
Date Received 01/12/2021 Date Testing started 06/12/2021
Description: Brown slightly 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 .

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Approved by:	Date:	Page no:
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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)

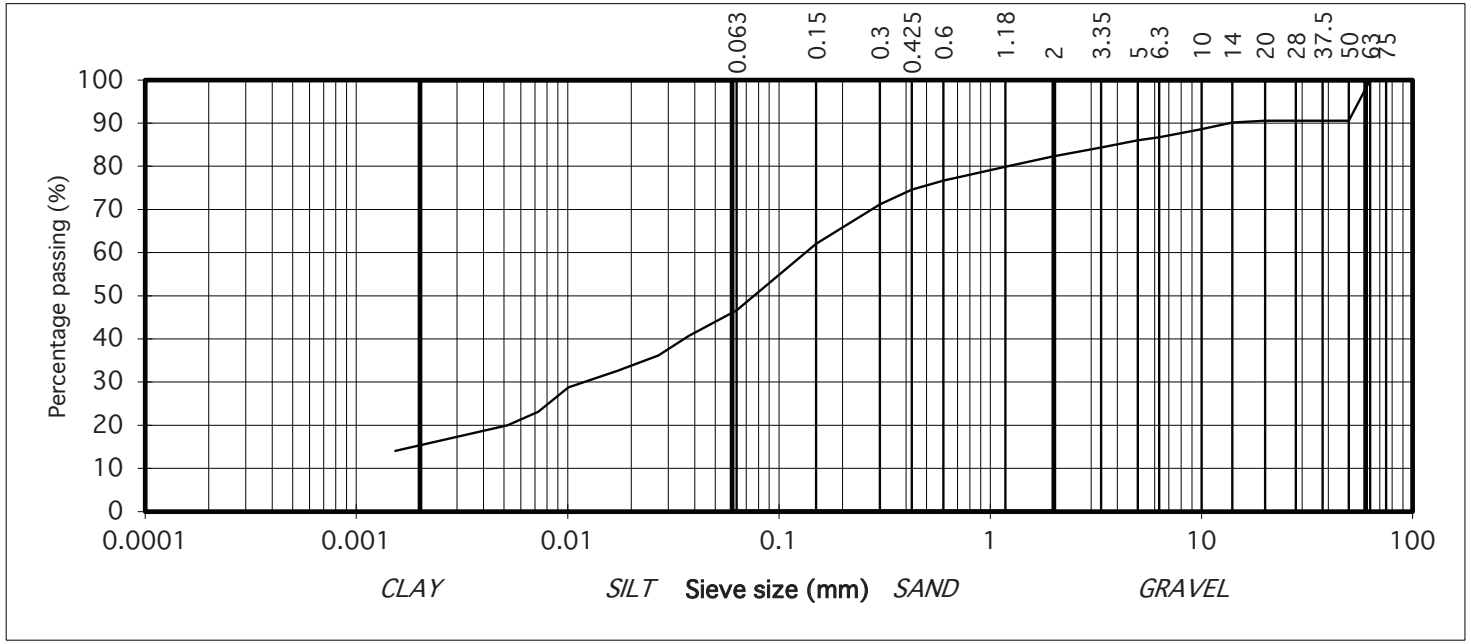
ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	91	GRAVEL
37.5	91	
28	91	
20	91	
14	90	
10	89	
6.3	87	
5	86	
3.35	84	
2	82	
1.18	80	SAND
0.6	77	
0.425	75	
0.3	71	
0.15	62	
0.063	47	SILT/CLAY
0.037	41	
0.027	36	
0.017	33	
0.010	29	
0.007	23	
0.005	20	
0.002	14	

Contract No.	23560	Report No.	R129876	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR TP001			
Sample No.*	AA152053	Lab. Sample No.		A21/6134
Sample Type:	B			
Depth* (m)	0.40	Customer:	Ervia	
Date Received	01/12/2021	Date Testing started		07/12/2021
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 .

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Approved by:	Date:	Page no:
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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

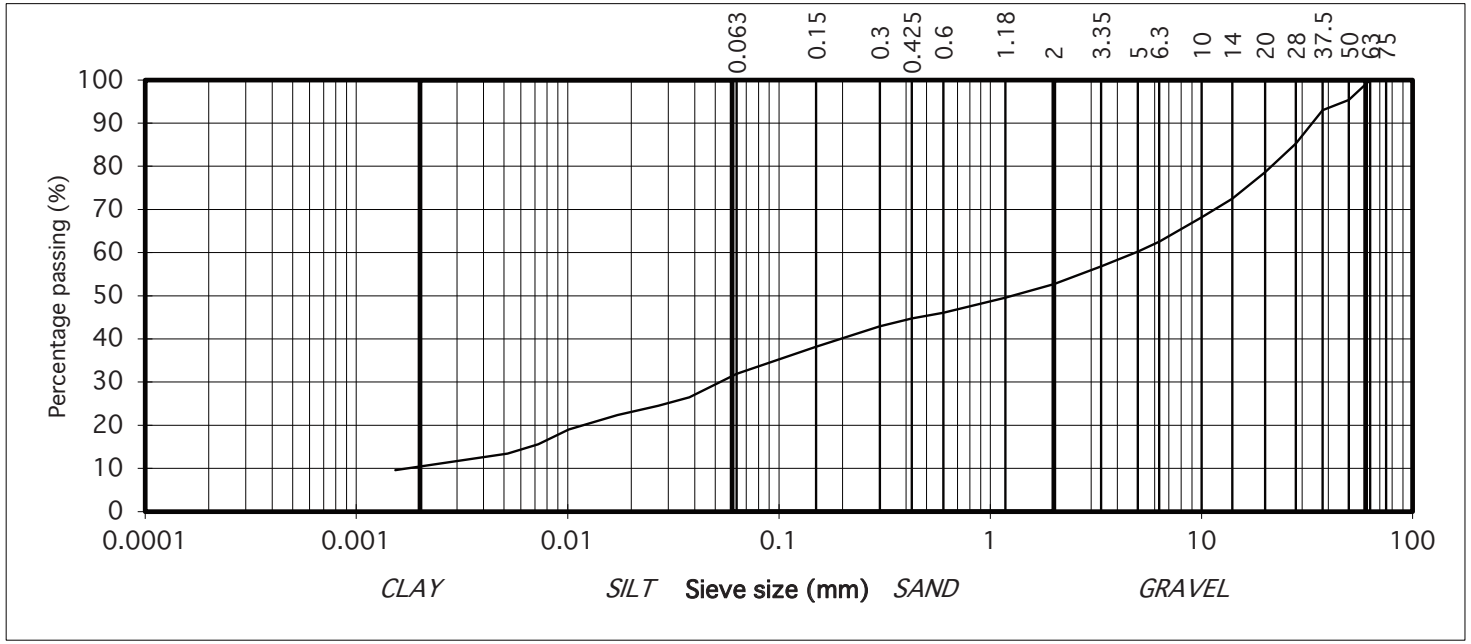
particle size	% passing	
75	100	COBBLES
63	100	
50	95	GRAVEL
37.5	93	
28	85	
20	79	
14	72	
10	68	
6.3	62	
5	60	
3.35	57	
2	53	
1.18	50	SAND
0.6	46	
0.425	45	
0.3	43	
0.15	38	
0.063	32	SILT/CLAY
0.038	26	
0.027	25	
0.017	22	
0.010	19	
0.007	16	
0.005	13	
0.002	10	

Contract No.	23560	Report No.	R129877	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR TP001			
Sample No.*	AA152054	Lab. Sample No.		A21/6135
Sample Type:	B			
Depth* (m)	0.40	Customer:	Ervia	
Date Received	01/12/2021	Date Testing started		06/12/2021
Description:	Brown slightly sandy, gravelly, SILT/CLAY			

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Remarks

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

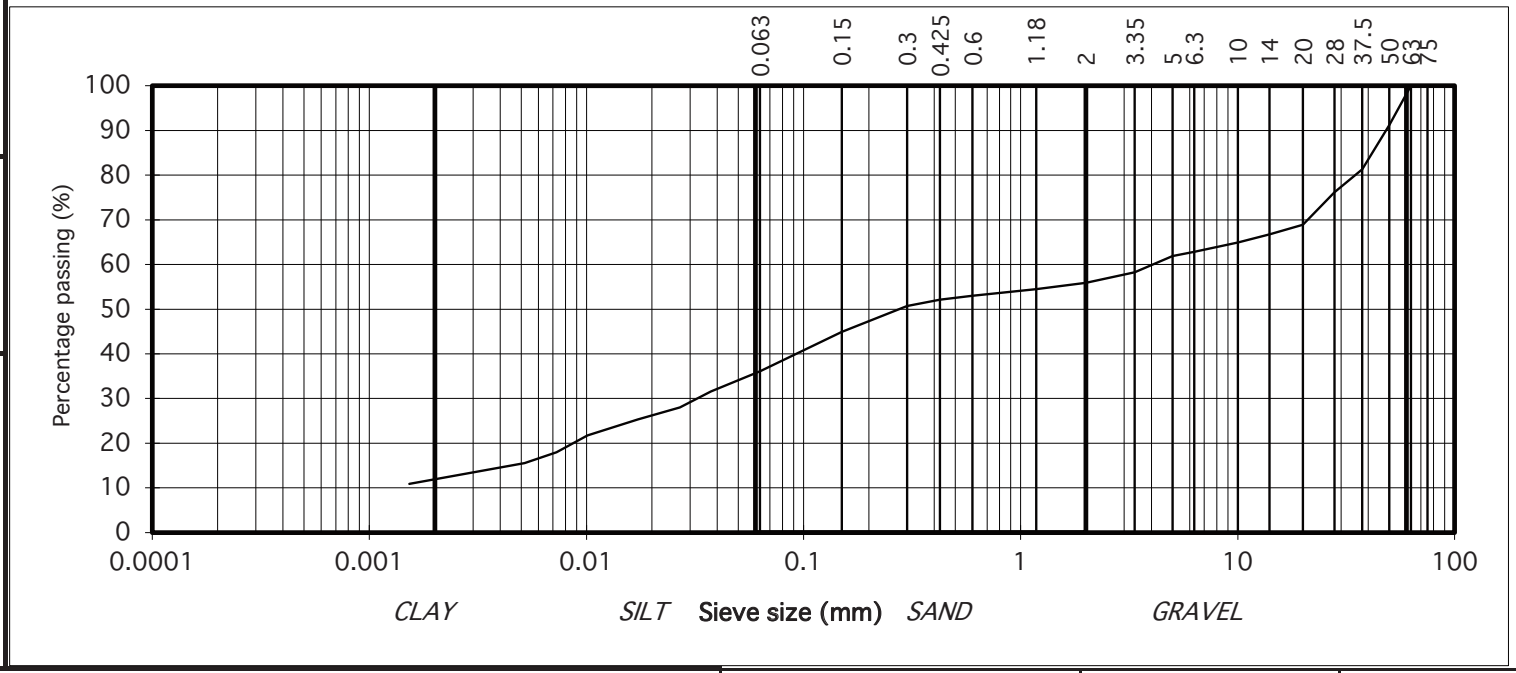
TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**
(note: Sedimentation stage not accredited)

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

particle size	% passing	
75	100	COBBLES
63	100	
50	91	GRAVEL
37.5	81	
28	76	
20	69	
14	67	
10	65	
6.3	63	
5	62	
3.35	58	
2	56	
1.18	54	SAND
0.6	53	
0.425	52	
0.3	51	
0.15	45	
0.063	36	SILT/CLAY
0.037	32	
0.027	28	
0.017	25	
0.010	22	
0.007	18	
0.005	16	
0.002	11	

Contract No.	23560	Report No.	R129351	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR TP002			
Sample No.*	AA152057	Lab. Sample No.		A21/6136
Sample Type:	B			
Depth* (m)	0.80	Customer:	Ervia	
Date Received	01/12/2021	Date Testing started		01/12/2021
Description:	Brown slightly sandy, gravelly, SILT/CLAY			
Remarks	Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .			

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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)

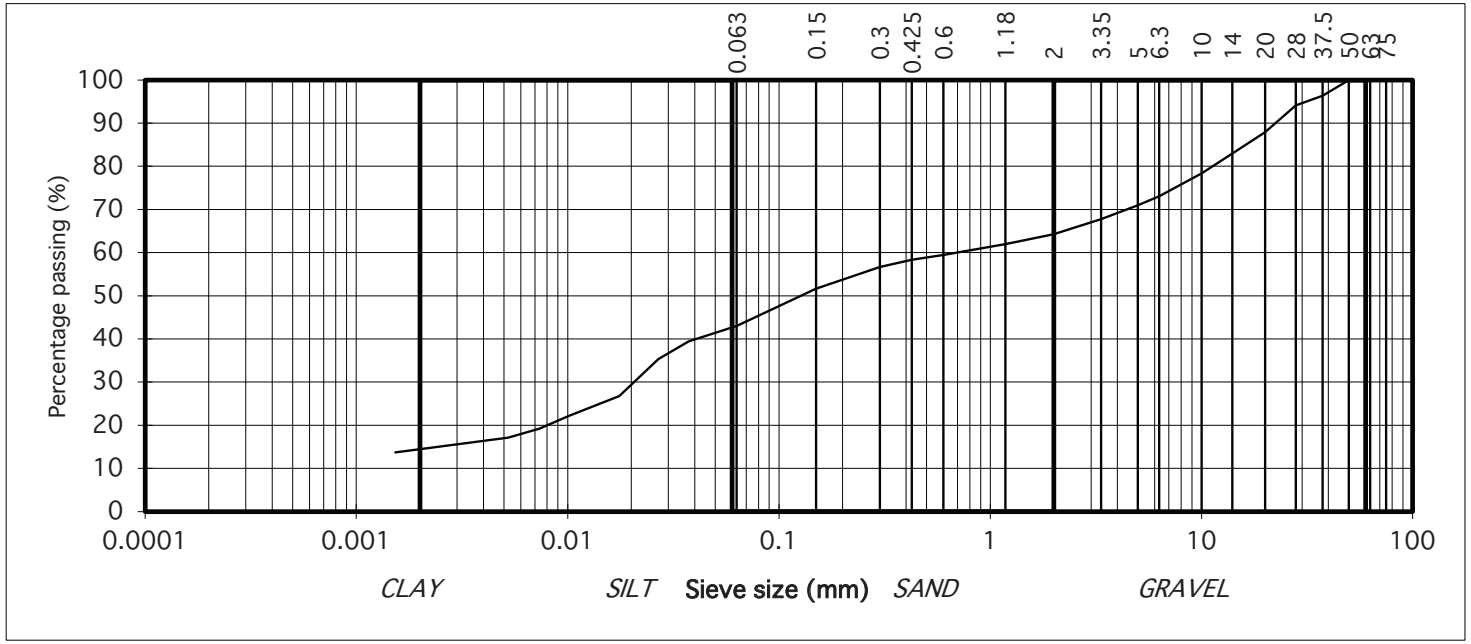
ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	96	
28	94	
20	88	
14	83	
10	78	
6.3	73	
5	71	
3.35	68	
2	64	
1.18	62	SAND
0.6	59	
0.425	58	
0.3	57	
0.15	52	
0.063	43	SILT/CLAY
0.037	39	
0.027	35	
0.018	27	
0.010	22	
0.007	19	
0.005	17	
0.002	14	

Contract No.	23560	Report No.	R129822
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP004		
Sample No.*	AA157067	Lab. Sample No.	A21/6135
Sample Type:	B		
Depth* (m)	0.50	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	07/12/2021
Description:	Brown slightly sandy, gravelly, SILT/CLAY		

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

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Approved by:	Date:	Page no:
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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)

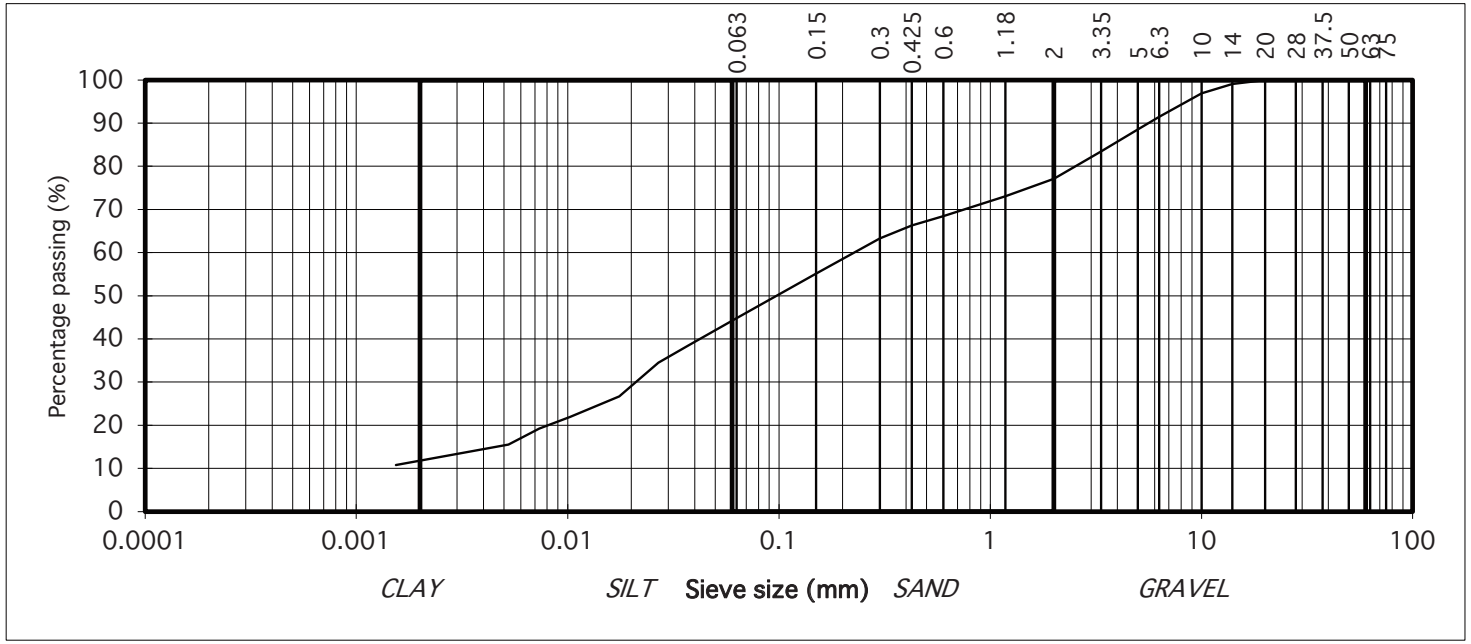
ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	100	
20	100	
14	99	
10	97	
6.3	91	
5	89	
3.35	83	
2	77	
1.18	73	SAND
0.6	68	
0.425	66	
0.3	63	
0.15	55	
0.063	45	SILT/CLAY
0.037	39	
0.027	34	
0.018	27	
0.010	22	
0.007	19	
0.005	16	
0.002	11	

Contract No.	23560	Report No.	R129823
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP004		
Sample No.*	AA157068	Lab. Sample No.	A21/6140
Sample Type:	B		
Depth* (m)	1.10	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	07/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		

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



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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

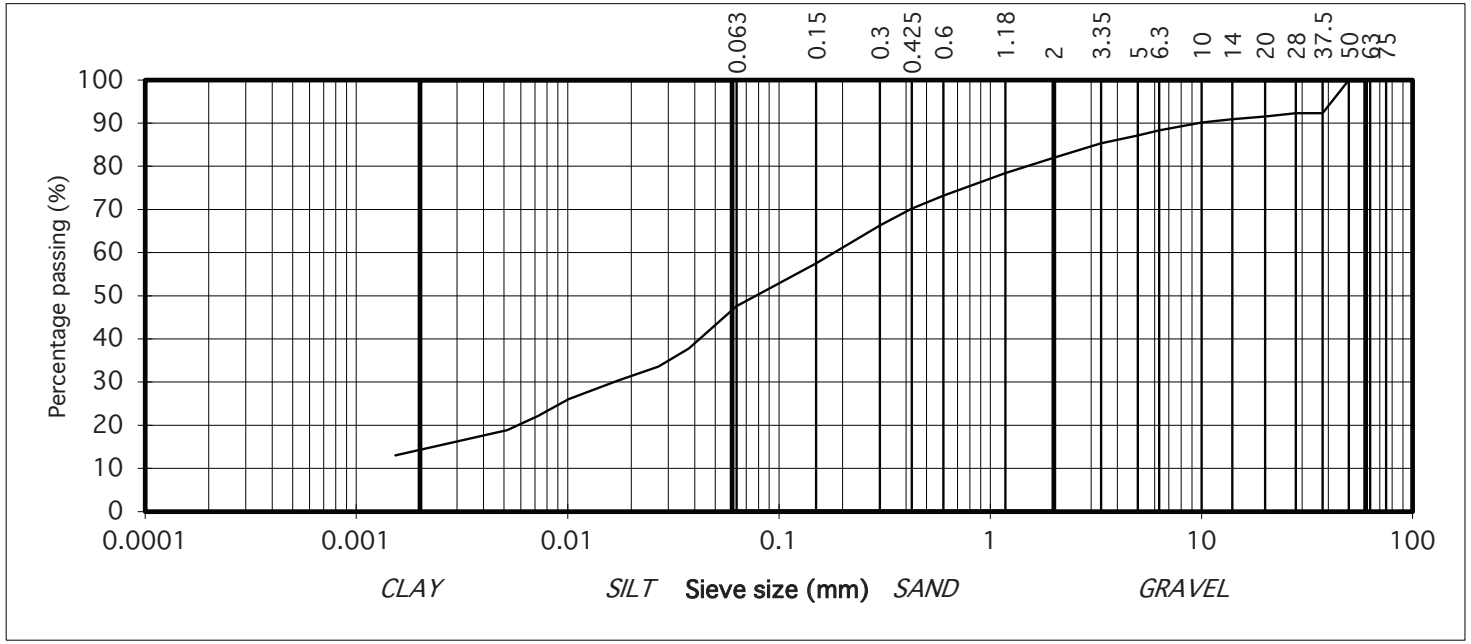
particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	92	
28	92	
20	91	
14	91	
10	90	
6.3	88	
5	87	
3.35	85	
2	82	
1.18	78	SAND
0.6	73	
0.425	70	
0.3	66	
0.15	58	
0.063	48	SILT/CLAY
0.037	38	
0.027	34	
0.017	30	
0.010	26	
0.007	22	
0.005	19	
0.002	13	

Contract No.	23560	Report No.	R129918
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP005		
Sample No.*	AA152058	Lab. Sample No.	A21/6141
Sample Type:	B		
Depth* (m)	0.50	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	07/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		

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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Remarks

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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

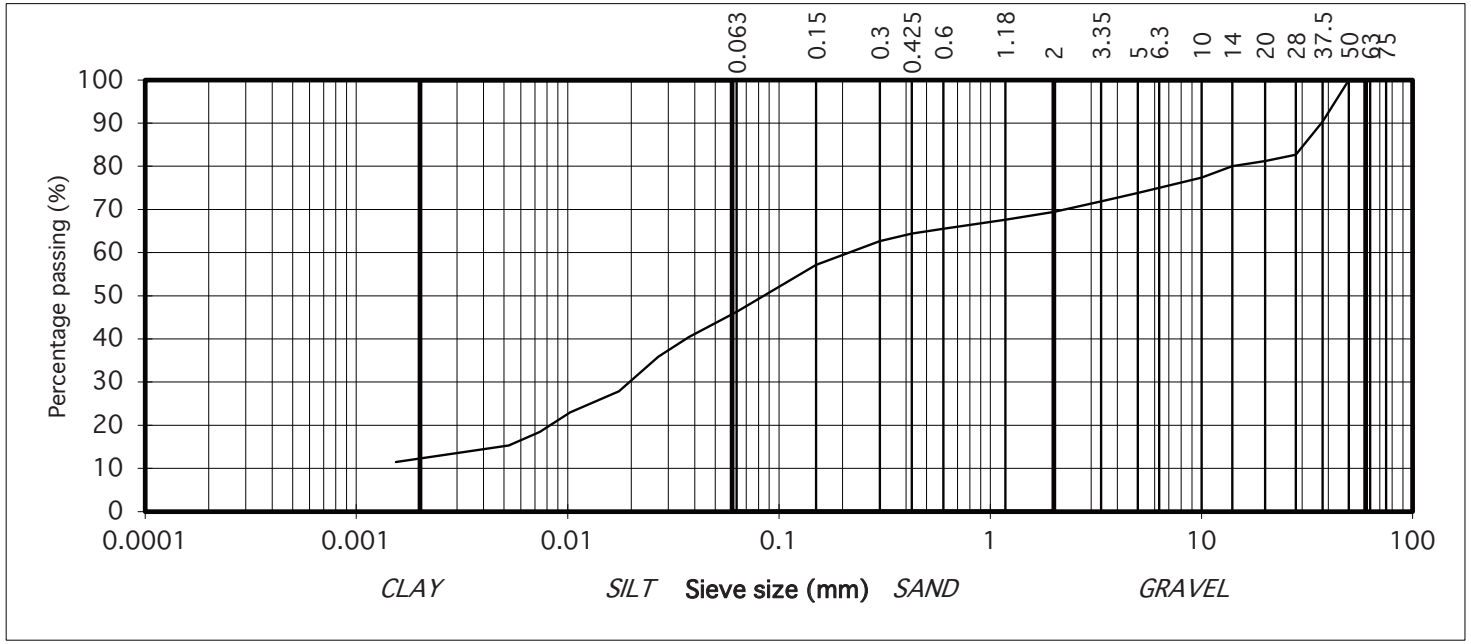
particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	90	
28	83	
20	81	
14	80	
10	77	
6.3	75	
5	74	
3.35	72	
2	69	
1.18	68	SAND
0.6	66	
0.425	64	
0.3	63	
0.15	57	
0.063	46	SILT/CLAY
0.037	40	
0.027	36	
0.018	28	
0.010	23	
0.007	18	
0.005	15	
0.002	12	

Contract No.	23560	Report No.	R129879
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP005		
Sample No.*	AA152059	Lab. Sample No.	A21/6142
Sample Type:	B		
Depth* (m)	0.80	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	06/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		

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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Remarks

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IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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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)

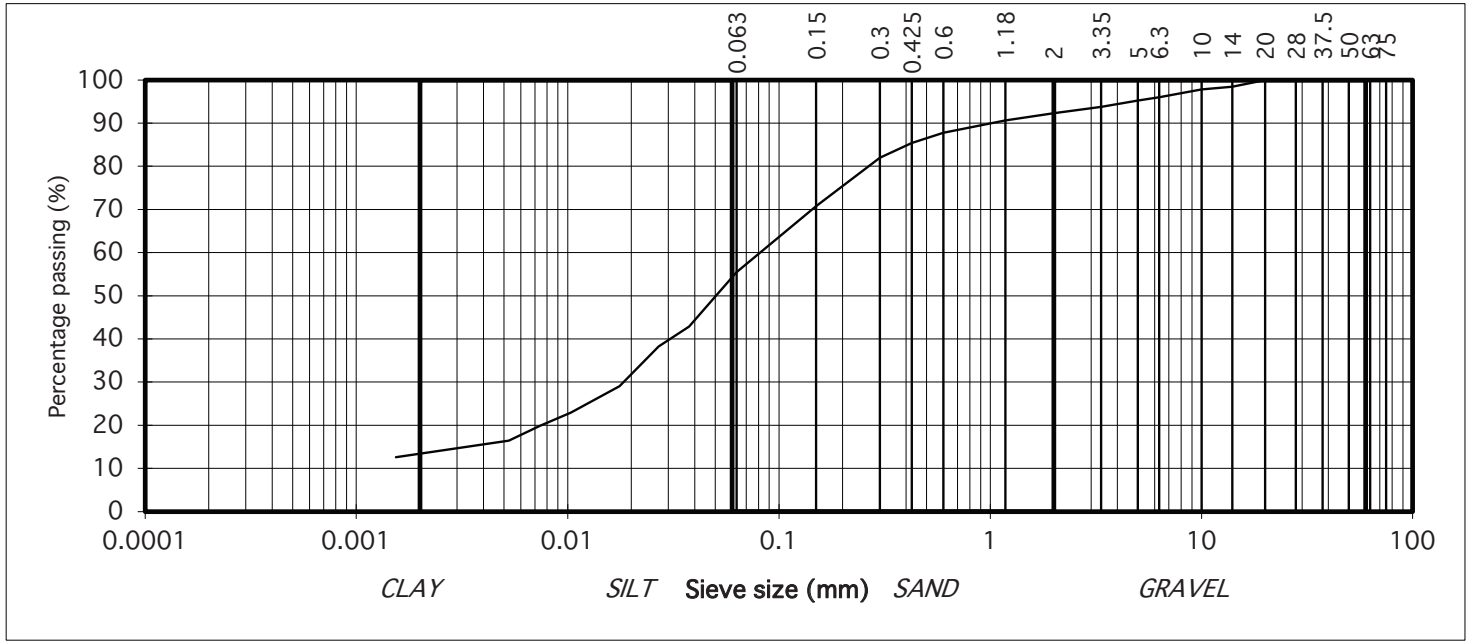
ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	100	
20	100	
14	98	
10	98	
6.3	96	
5	95	
3.35	94	
2	92	
1.18	91	SAND
0.6	88	
0.425	85	
0.3	82	
0.15	71	
0.063	55	SILT/CLAY
0.038	43	
0.027	38	
0.018	29	
0.010	23	
0.007	20	
0.005	16	
0.002	13	

Contract No.	23560	Report No.	R129880
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP006		
Sample No.*	AA152055	Lab. Sample No.	A21/6143
Sample Type:	B		
Depth* (m)	0.30	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	07/12/2021
Description:	Brown sandy, slightly gravelly, SILT/CLAY		

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



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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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	95	
50	90	GRAVEL
37.5	78	
28	66	
20	58	
14	53	
10	50	
6.3	48	
5	48	
3.35	46	
2	45	
1.18	44	SAND
0.6	43	
0.425	42	
0.3	41	
0.15	38	
0.063	34	SILT/CLAY
0.037	27	
0.027	25	
0.017	22	
0.010	19	
0.007	17	
0.005	14	
0.002	11	

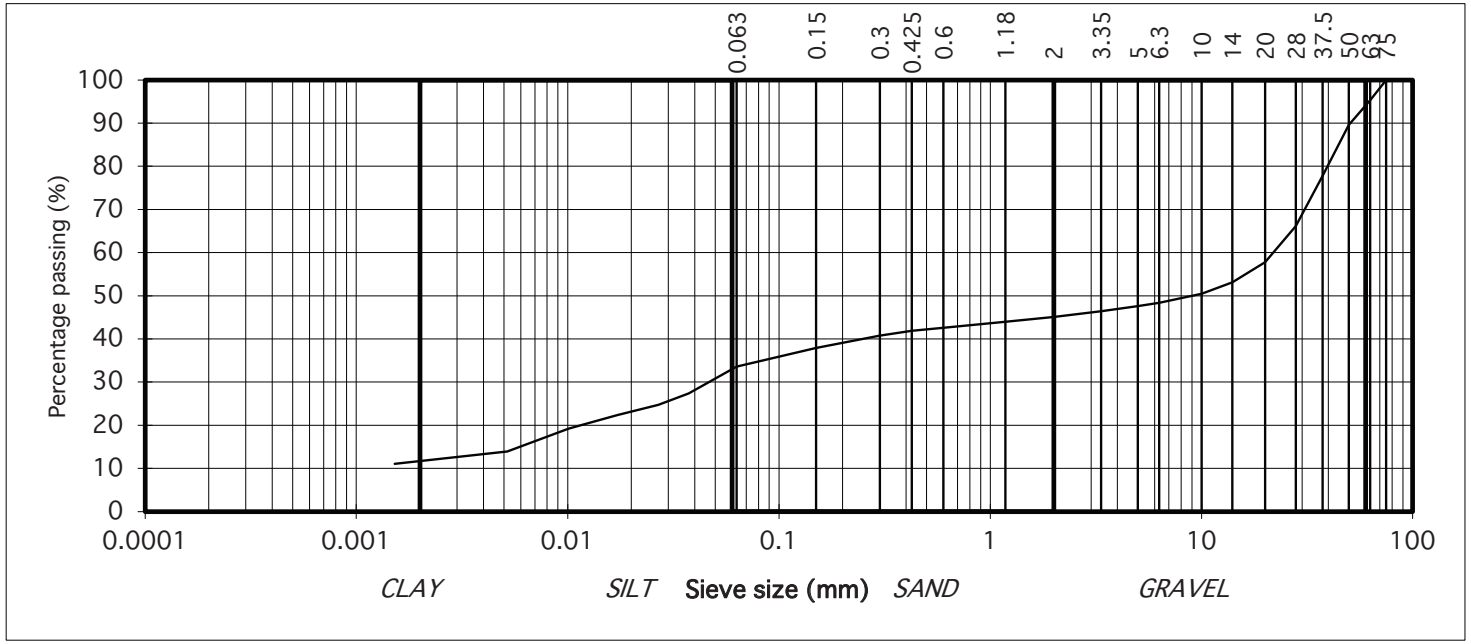
Contract No.	23560	Report No.	R129808
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP006		
Sample No.*	AA152057	Lab. Sample No.	A21/6144
Sample Type:	B		
Depth* (m)	0.60	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	06/12/2021
Description:	Brown slightly sandy, gravelly, SILT/CLAY with occasional cobbles		

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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Remarks

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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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	100	
20	99	
14	99	
10	99	
6.3	98	
5	97	
3.35	97	
2	96	
1.18	94	SAND
0.6	93	
0.425	91	
0.3	88	
0.15	80	
0.063	64	SILT/CLAY
0.038	49	
0.027	45	
0.018	33	
0.010	28	
0.007	21	
0.005	17	
0.002	11	

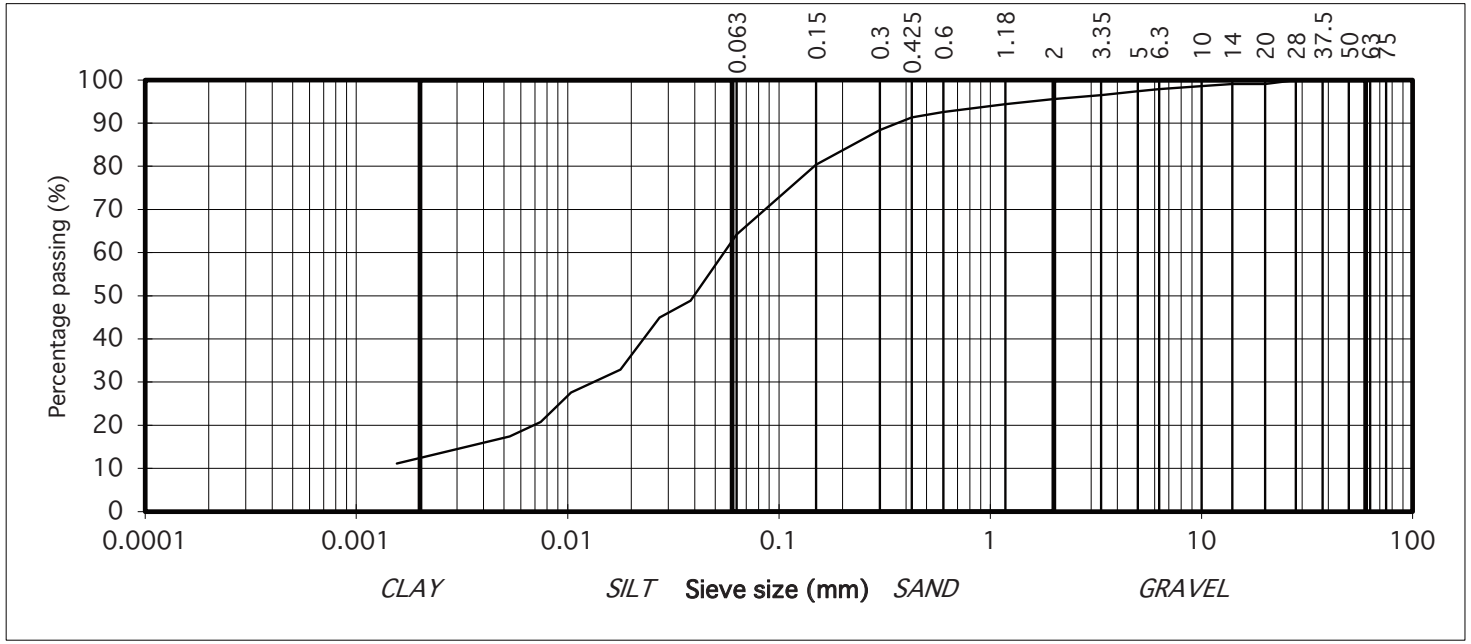
Contract No.	23560	Report No.	R129881
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP007		
Sample No.*	AA152066	Lab. Sample No.	A21/6145
Sample Type:	B		
Depth* (m)	0.50	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	07/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		

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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Remarks

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IGSL Ltd Materials Laboratory

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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)

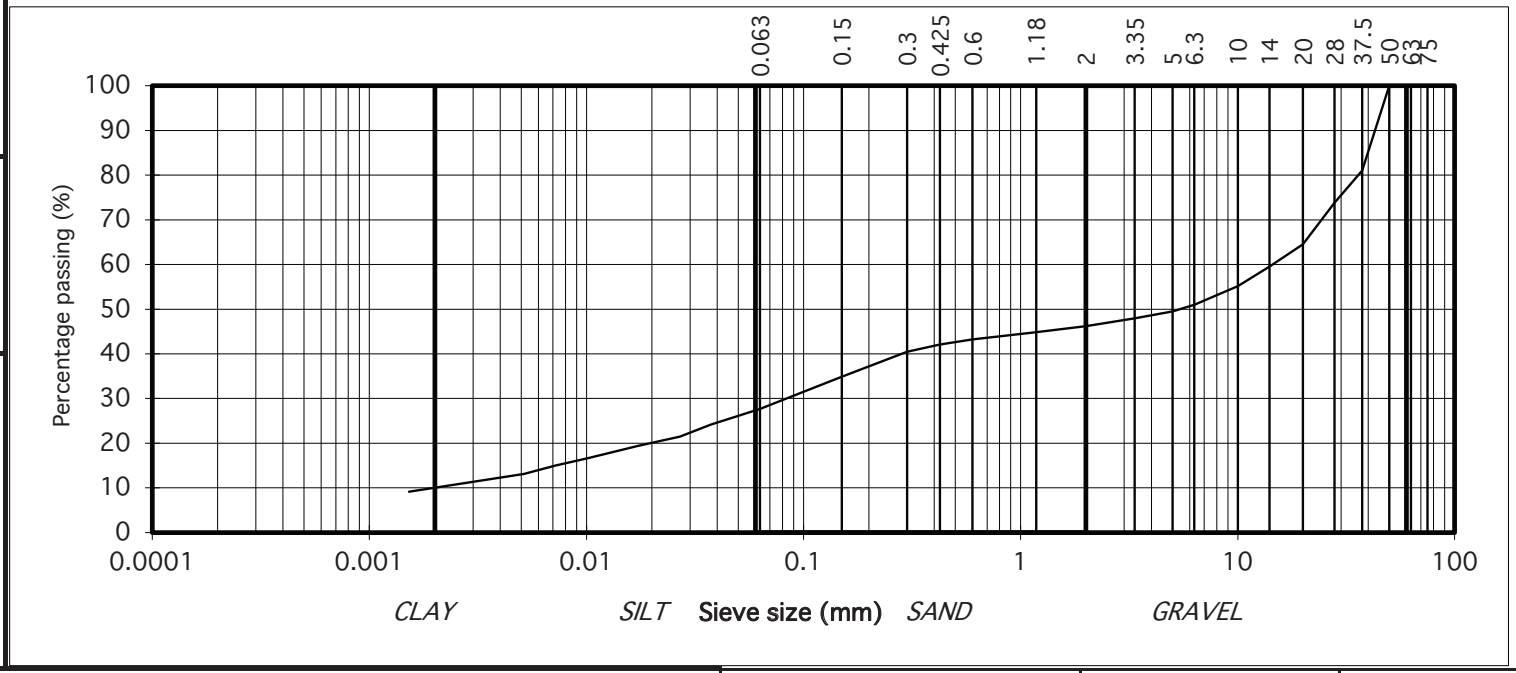
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	81	
28	74	
20	65	
14	60	
10	55	
6.3	51	
5	50	
3.35	48	
2	46	
1.18	45	SAND
0.6	43	
0.425	42	
0.3	40	
0.15	35	
0.063	28	SILT/CLAY
0.037	24	
0.027	21	
0.017	19	
0.010	17	
0.007	15	
0.005	13	
0.002	9	

Contract No.	23560	Report No.	R129352
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP007		
Sample No.*	AA152061	Lab. Sample No.	A21/6146
Sample Type:	B		
Depth* (m)	0.75	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	01/12/2021
Description:	Brown slightly sandy, gravelly, SILT/CLAY		

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.
This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks: Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

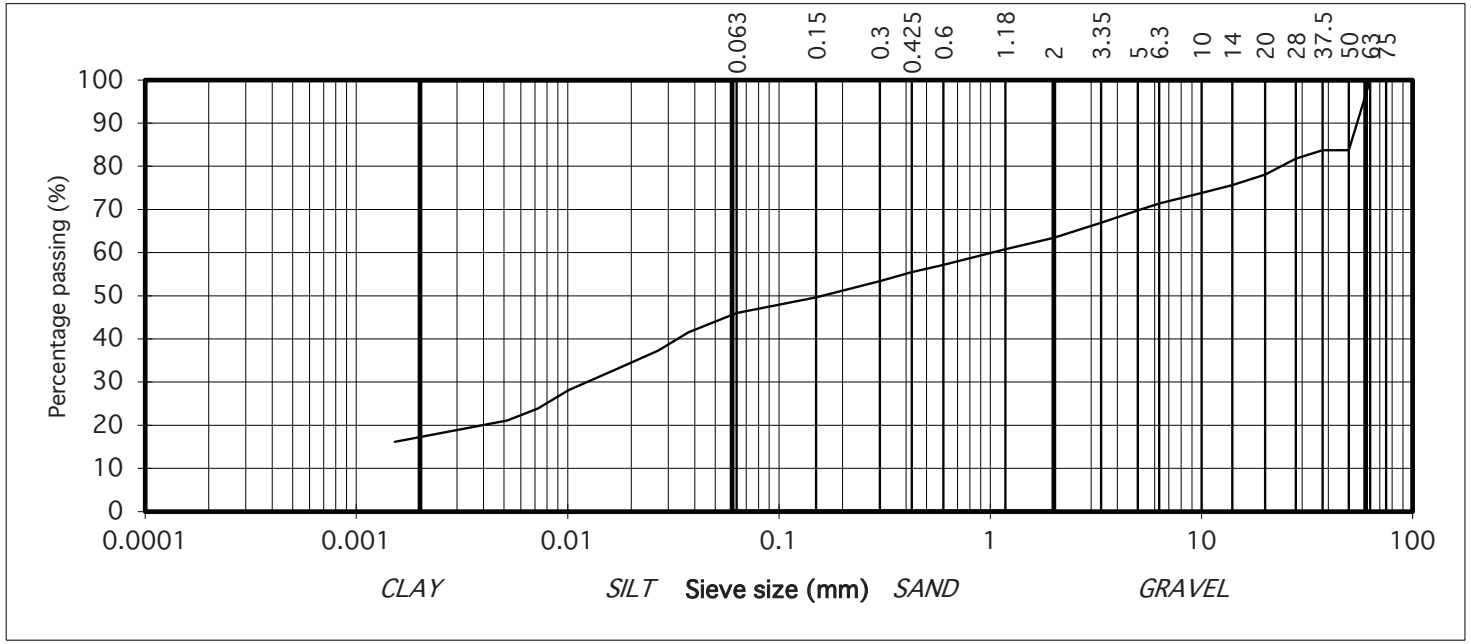
particle size	% passing	
75	100	COBBLES
63	100	
50	84	GRAVEL
37.5	84	
28	82	
20	78	
14	76	
10	74	
6.3	71	
5	70	
3.35	67	
2	63	
1.18	61	SAND
0.6	57	
0.425	56	
0.3	53	
0.15	50	
0.063	46	SILT/CLAY
0.037	42	
0.027	37	
0.017	33	
0.010	28	
0.007	24	
0.005	21	
0.002	16	

Contract No.	23560	Report No.	R129946
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP008		
Sample No.*	AA152065	Lab. Sample No.	A21/6147
Sample Type:	B		
Depth* (m)	0.50	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	07/12/2021
Description:	Brown slightly sandy, gravelly, SILT/CLAY		

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.
This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



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Approved by:	Date:	Page no:
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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

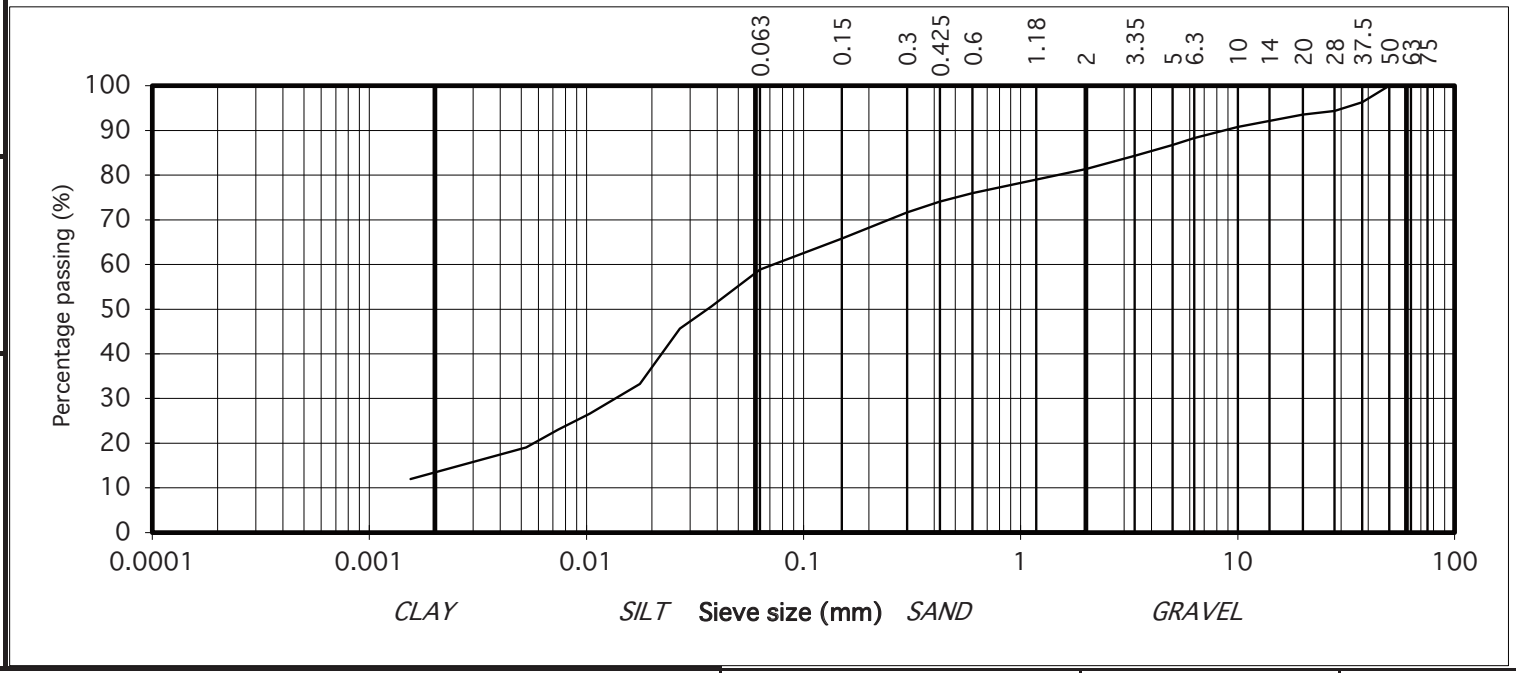
TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**
(note: Sedimentation stage not accredited)

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

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	96	
28	94	
20	94	
14	92	
10	91	
6.3	88	
5	87	
3.35	84	
2	81	
1.18	79	SAND
0.6	76	
0.425	74	
0.3	72	
0.15	66	
0.063	59	SILT/CLAY
0.037	51	
0.027	46	
0.018	33	
0.010	27	
0.007	23	
0.005	19	
0.002	12	

Contract No.	23560	Report No.	R129353	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR TP009			
Sample No.*	AA152072	Lab. Sample No.		A21/6148
Sample Type:	B			
Depth* (m)	0.50	Customer:	Ervia	
Date Received	01/12/2021	Date Testing started		01/12/2021
Description:	Brown slightly 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 .			

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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

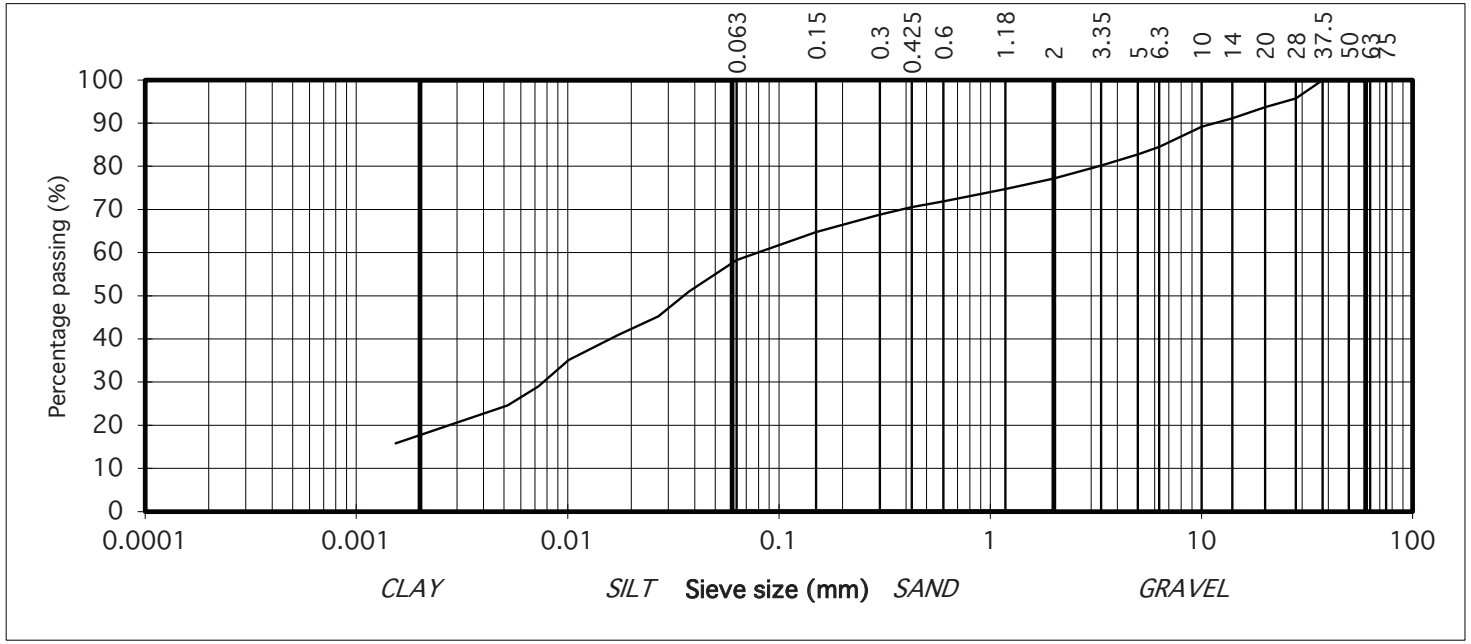
particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	96	
20	94	
14	91	
10	89	
6.3	85	
5	83	
3.35	80	
2	77	
1.18	75	SAND
0.6	72	
0.425	71	
0.3	69	
0.15	65	
0.063	58	SILT/CLAY
0.037	51	
0.027	45	
0.017	41	
0.010	35	
0.007	29	
0.005	25	
0.002	16	

Contract No.	23560	Report No.	R129882
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP009		
Sample No.*	AA152073	Lab. Sample No.	A21/6149
Sample Type:	B		
Depth* (m)	0.75	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	06/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		

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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Remarks

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



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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)

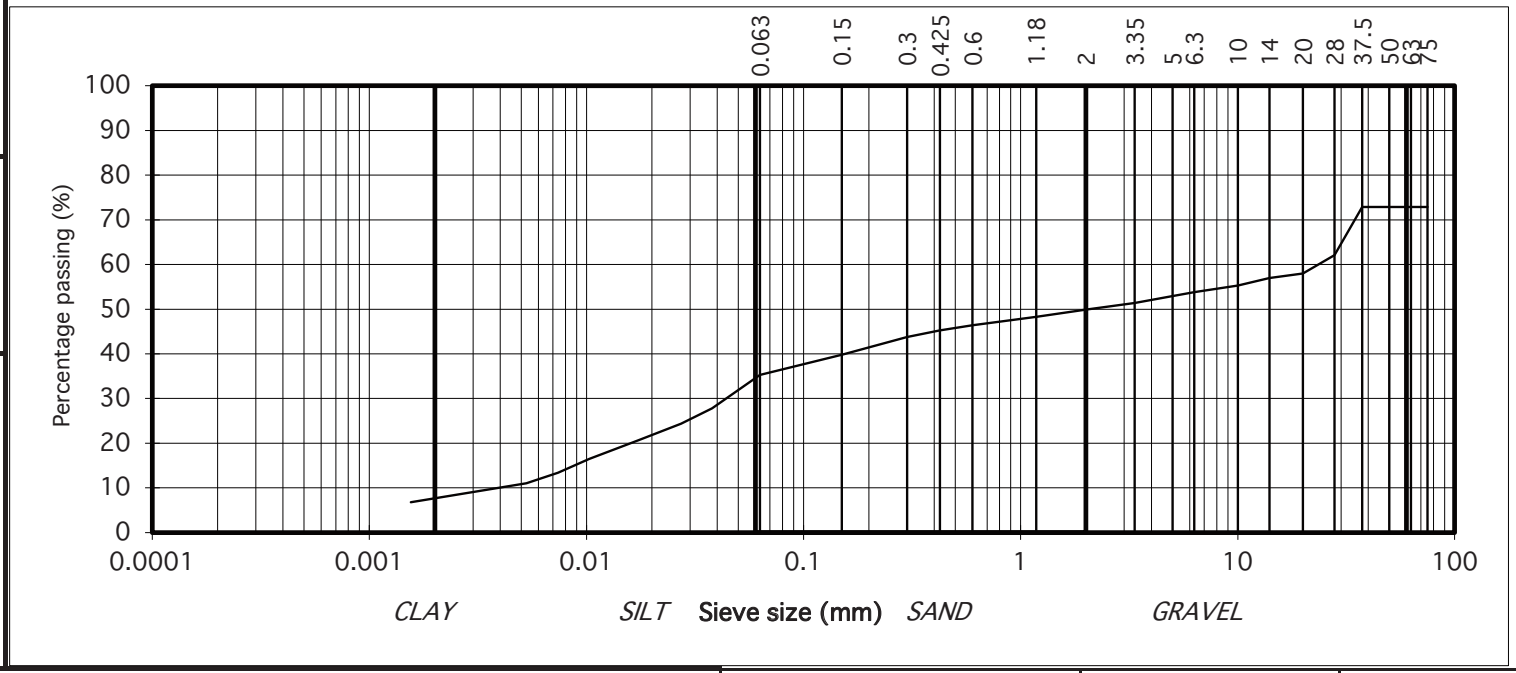
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	73	COBBLES
63	73	
50	73	GRAVEL
37.5	73	
28	62	
20	58	
14	57	
10	55	
6.3	54	
5	53	
3.35	51	
2	50	
1.18	48	SAND
0.6	46	
0.425	45	
0.3	44	
0.15	40	
0.063	35	SILT/CLAY
0.038	28	
0.027	24	
0.018	21	
0.010	17	
0.007	13	
0.005	11	
0.002	7	

Contract No.	23560	Report No.	R129354
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP010		
Sample No.*	AA152062	Lab. Sample No.	A21/6163
Sample Type:	B		
Depth* (m)	0.40	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	01/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY with many cobbles		

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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Remarks: Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



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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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	100	
20	100	
14	100	
10	99	
6.3	99	
5	99	
3.35	98	
2	97	
1.18	97	SAND
0.6	96	
0.425	95	
0.3	94	
0.15	93	
0.063	89	SILT/CLAY
0.037	78	
0.027	64	
0.018	49	
0.010	34	
0.007	26	
0.005	20	
0.002	12	

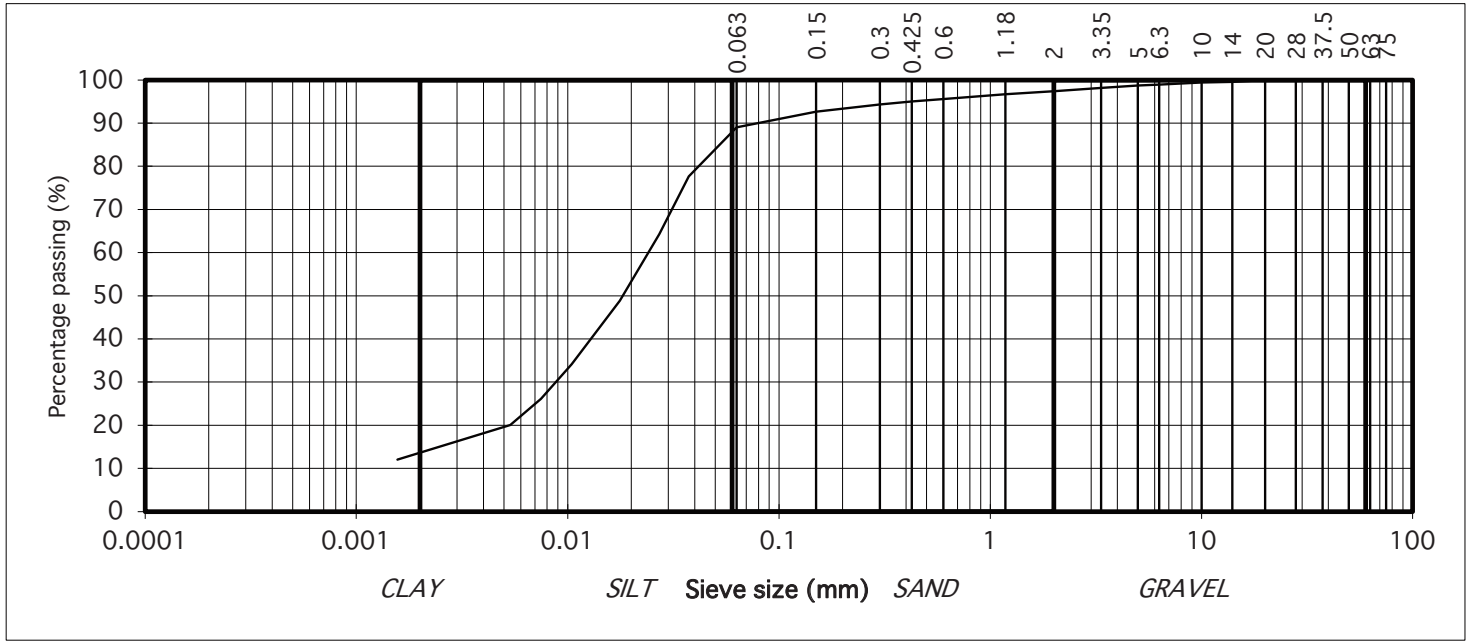
Contract No.	23560	Report No.	R129809
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP010		
Sample No.*	AA152063	Lab. Sample No.	A21/6164
Sample Type:	B		
Depth* (m)	0.80	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	06/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		

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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Remarks

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



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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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

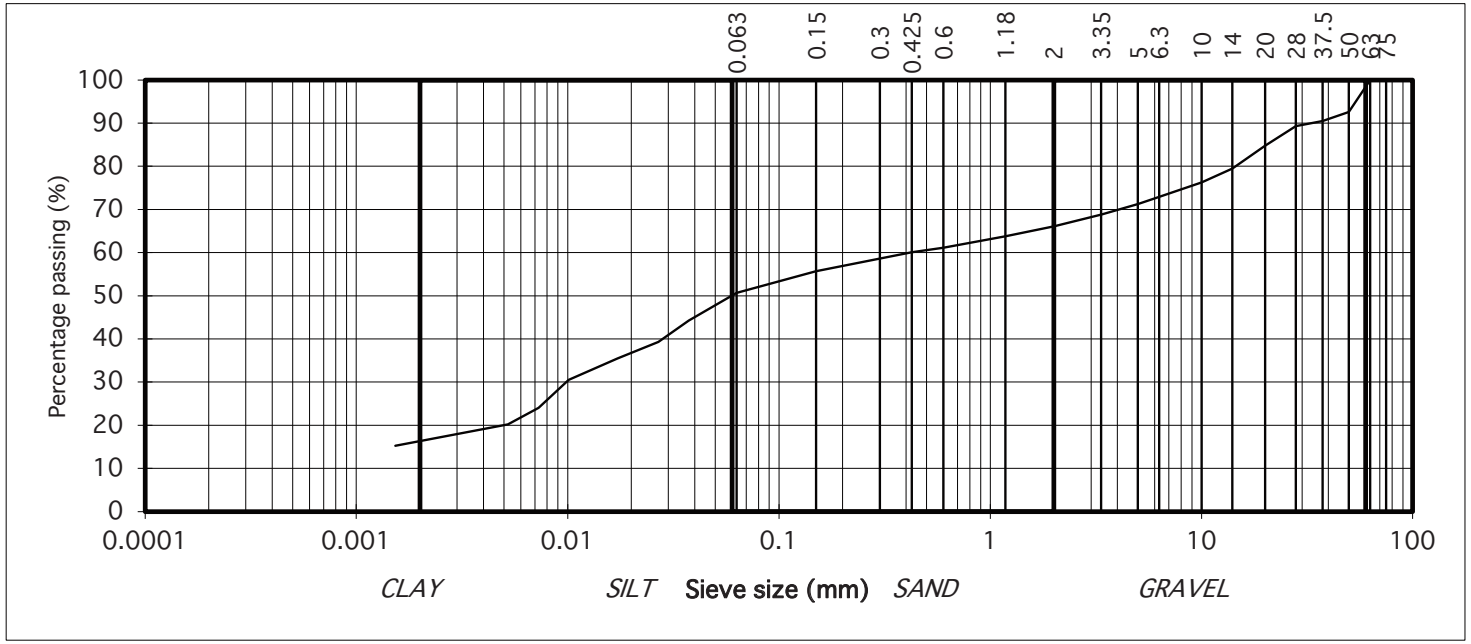
particle size	% passing	
75	100	COBBLES
63	100	
50	93	GRAVEL
37.5	90	
28	89	
20	85	
14	79	
10	76	
6.3	73	
5	71	
3.35	69	
2	66	
1.18	64	SAND
0.6	61	
0.425	60	
0.3	59	
0.15	56	
0.063	51	SILT/CLAY
0.037	44	
0.027	39	
0.017	36	
0.010	31	
0.007	24	
0.005	20	
0.002	15	

Contract No.	23560	Report No.	R129883
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP010		
Sample No.*	AA152064	Lab. Sample No.	A21/6165
Sample Type:	B		
Depth* (m)	1.20	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	07/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		

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Remarks

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



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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)

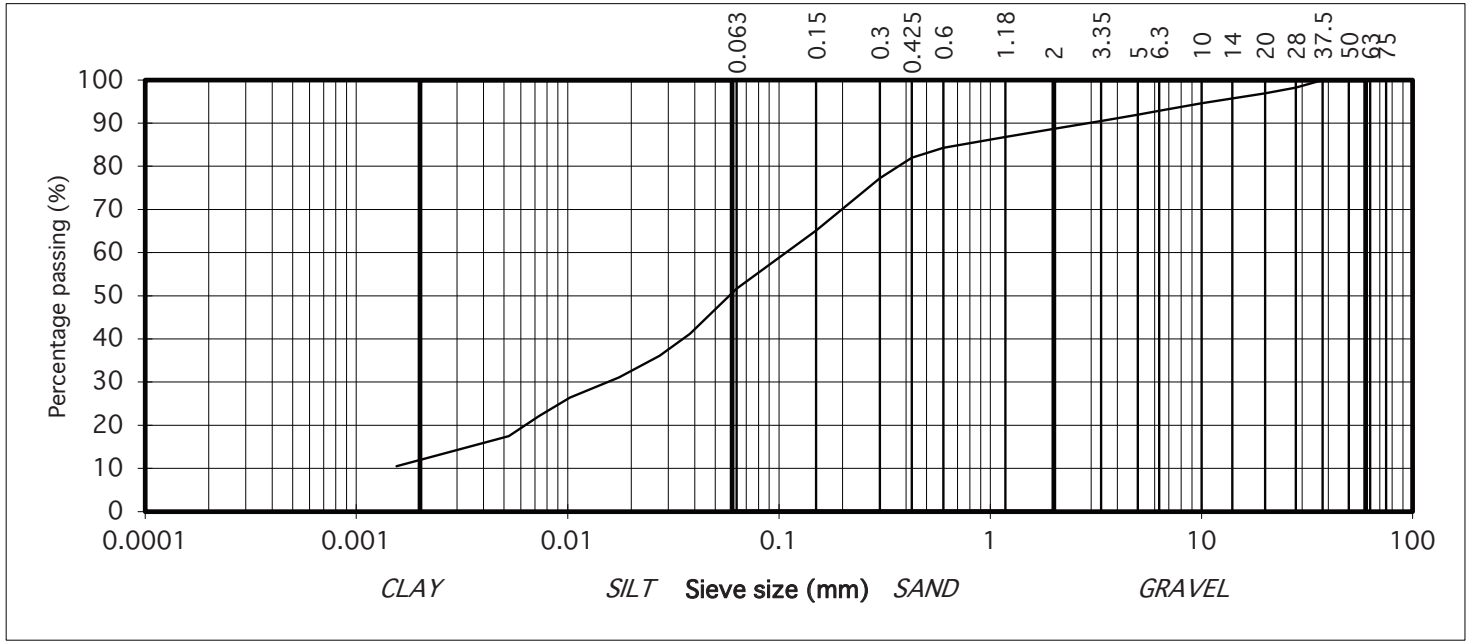
ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	98	
20	97	
14	96	
10	95	
6.3	93	
5	92	
3.35	90	
2	89	
1.18	87	SAND
0.6	84	
0.425	82	
0.3	77	
0.15	65	
0.063	52	SILT/CLAY
0.038	41	
0.027	36	
0.018	31	
0.010	26	
0.007	22	
0.005	17	
0.002	10	

Contract No.	23560	Report No.	R129884
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP011		
Sample No.*	AA152086	Lab. Sample No.	A21/6152
Sample Type:	B		
Depth* (m)	0.30	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	07/12/2021
Description:	Brown sandy, slightly gravelly, SILT/CLAY		

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



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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)

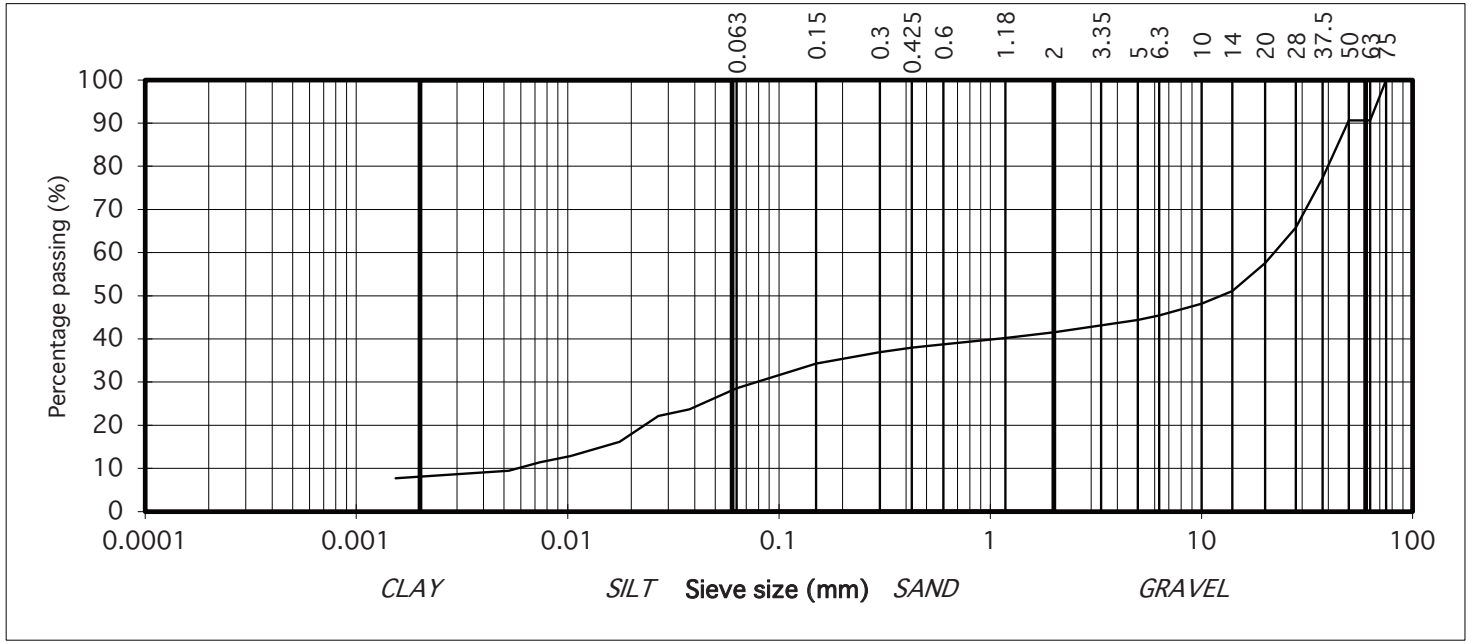
ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	91	
50	91	GRAVEL
37.5	77	
28	66	
20	58	
14	51	
10	48	
6.3	45	
5	44	
3.35	43	
2	42	
1.18	40	SAND
0.6	39	
0.425	38	
0.3	37	
0.15	34	
0.063	29	SILT/CLAY
0.038	24	
0.027	22	
0.018	16	
0.010	13	
0.007	11	
0.005	9	
0.002	8	

Contract No.	23560	Report No.	R129824
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP011		
Sample No.*	AA152081	Lab. Sample No.	A21/6154
Sample Type:	B		
Depth* (m)	0.60	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	07/12/2021
Description:	Brown slightly sandy, gravelly, SILT/CLAY with some cobbles		
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)

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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

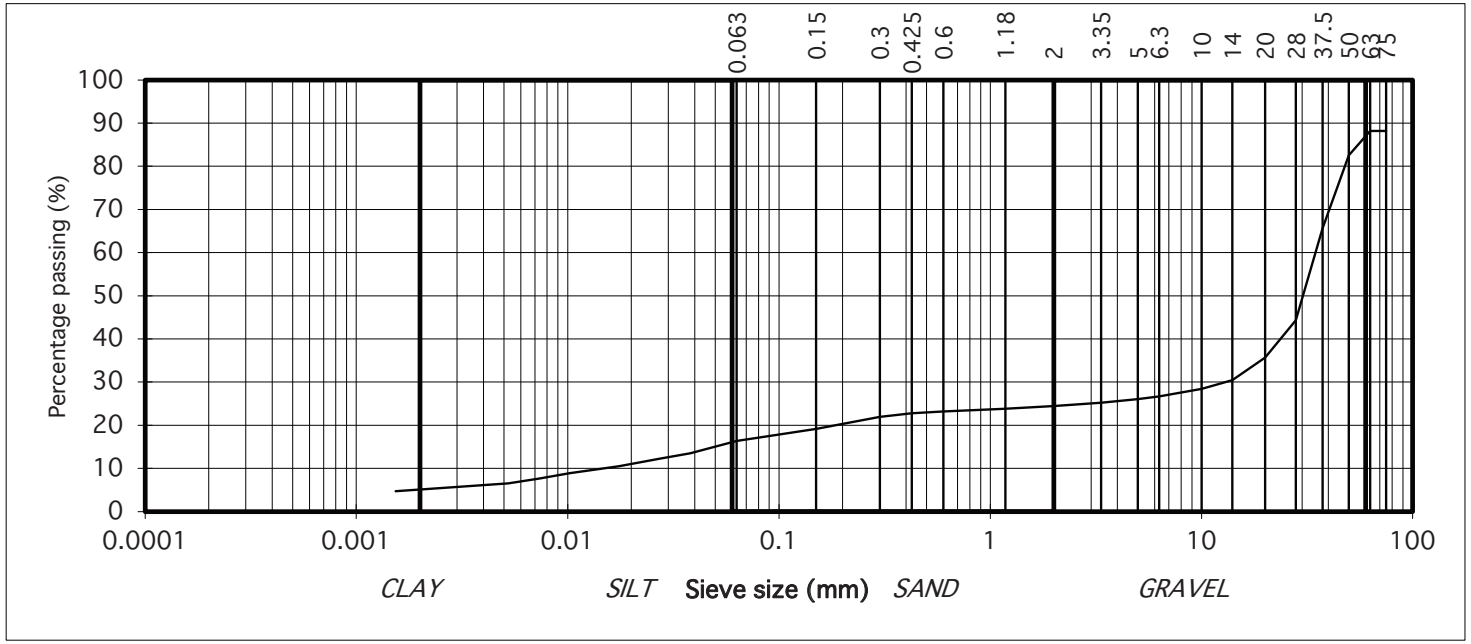
particle size	% passing	
75	88	COBBLES
63	88	
50	83	GRAVEL
37.5	66	
28	44	
20	36	
14	30	
10	28	
6.3	27	
5	26	
3.35	25	
2	24	
1.18	24	SAND
0.6	23	
0.425	23	
0.3	22	
0.15	19	
0.063	16	SILT/CLAY
0.038	14	
0.027	12	
0.018	11	
0.010	9	
0.007	8	
0.005	7	
0.002	5	

Contract No.	23560	Report No.	R129885
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP011		
Sample No.*	AA152082	Lab. Sample No.	A21/6155
Sample Type:	B		
Depth* (m)	0.90	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	07/12/2021
Description:	Brown clayey/silty, sandy, GRAVEL with some cobbles		

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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Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



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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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

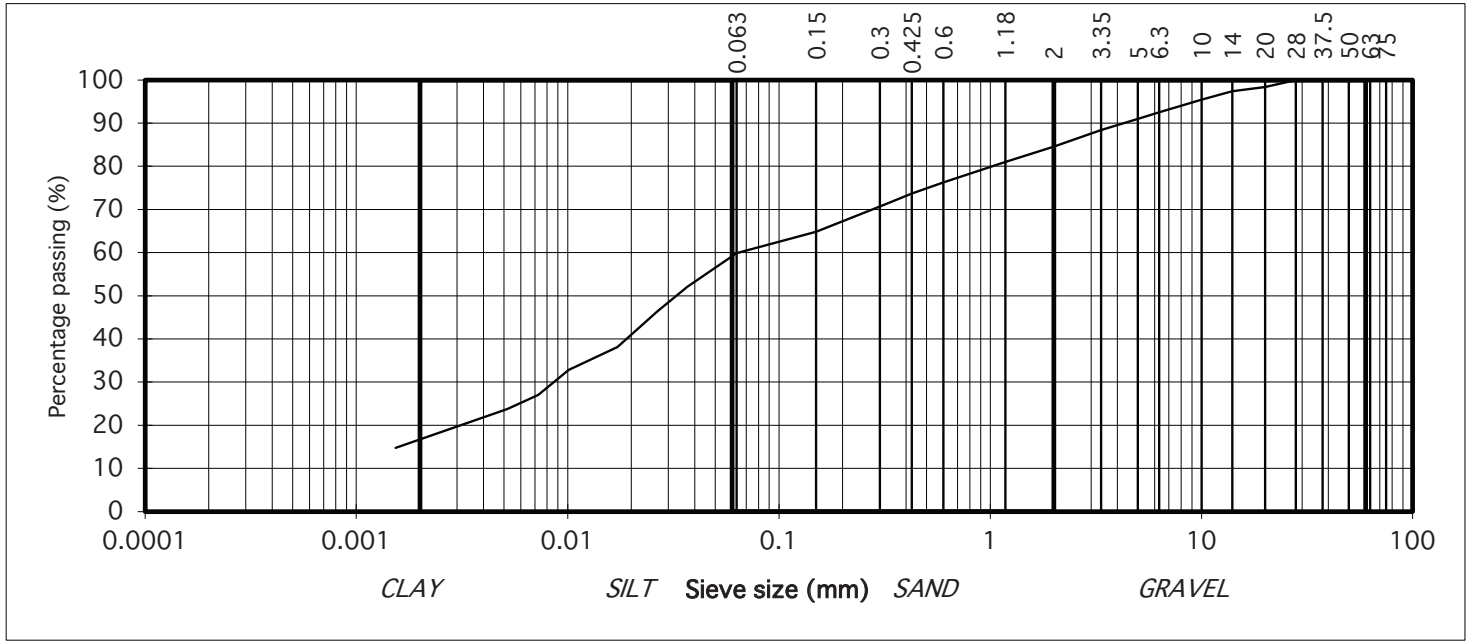
particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	100	
20	98	
14	97	
10	95	
6.3	93	
5	91	
3.35	88	
2	85	
1.18	81	SAND
0.6	76	
0.425	74	
0.3	71	
0.15	65	
0.063	60	SILT/CLAY
0.037	52	
0.027	46	
0.017	38	
0.010	33	
0.007	27	
0.005	24	
0.002	15	

Contract No.	23560	Report No.	R129919
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP012		
Sample No.*	AA152078	Lab. Sample No.	A21/6156
Sample Type:	B		
Depth* (m)	0.4-0.50	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	07/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		

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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Remarks

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



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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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

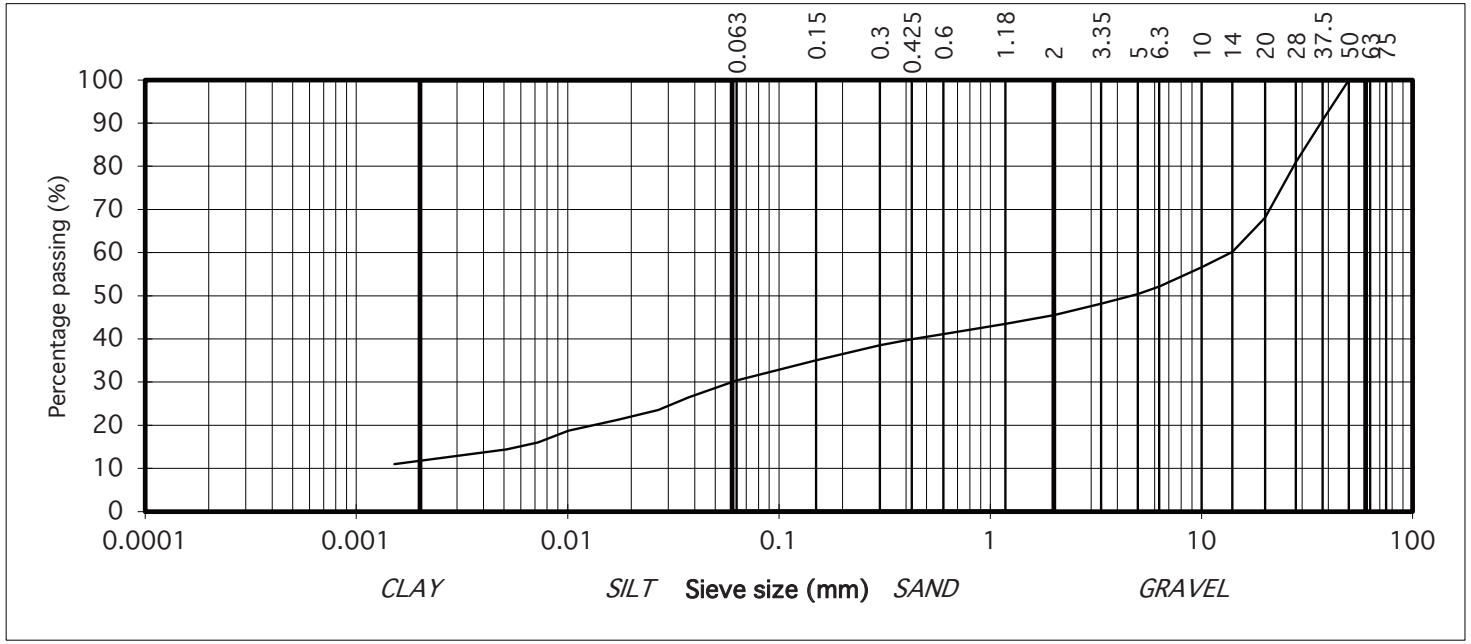
particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	91	
28	81	
20	68	
14	60	
10	57	
6.3	52	
5	50	
3.35	48	
2	45	
1.18	43	SAND
0.6	41	
0.425	40	
0.3	39	
0.15	35	
0.063	30	SILT/CLAY
0.037	27	
0.027	24	
0.017	21	
0.010	19	
0.007	16	
0.005	14	
0.002	11	

Contract No.	23560	Report No.	R129920
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP012		
Sample No.*	AA152079	Lab. Sample No.	A21/6157
Sample Type:	B		
Depth* (m)	0.90	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	07/12/2021
Description:	Brown slightly sandy, gravelly, SILT/CLAY		

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

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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

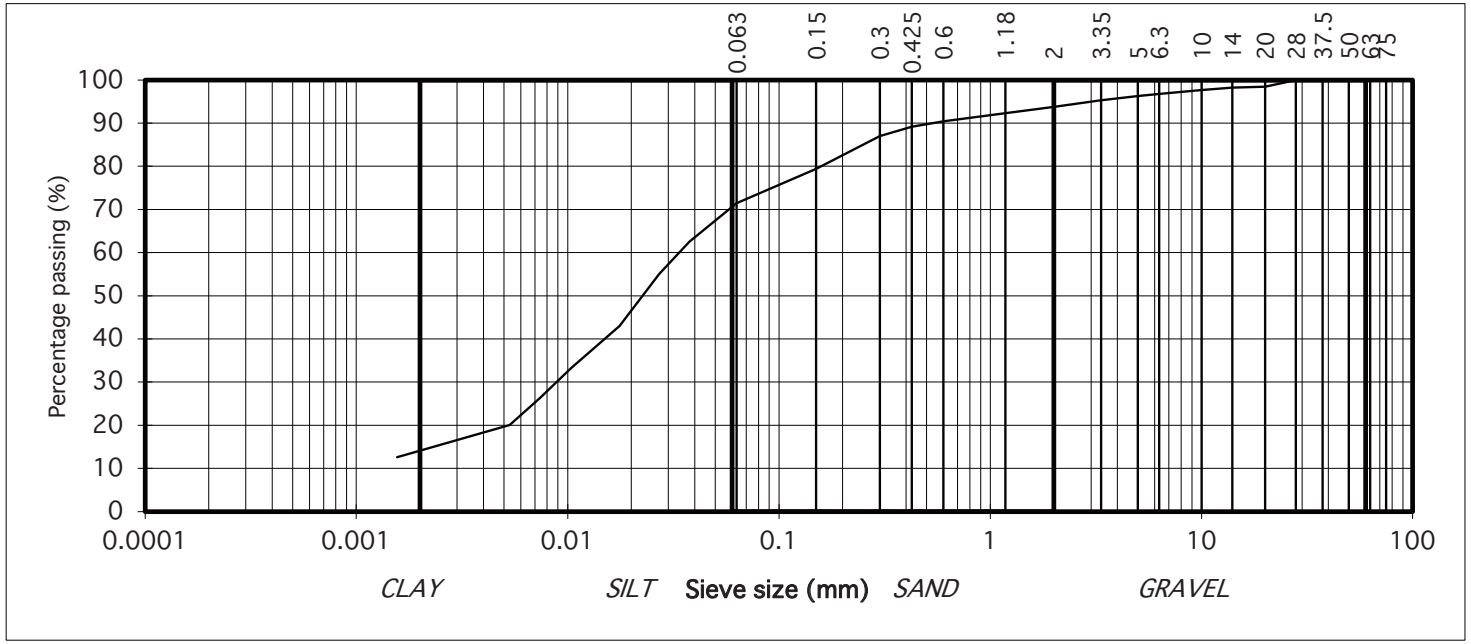
particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	100	
20	98	
14	98	
10	98	
6.3	97	
5	96	
3.35	95	
2	94	
1.18	92	SAND
0.6	90	
0.425	89	
0.3	87	
0.15	79	
0.063	71	SILT/CLAY
0.038	63	
0.027	55	
0.018	43	
0.010	33	
0.007	26	
0.005	20	
0.002	13	

Contract No.	23560	Report No.	R129886
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP013		
Sample No.*	AA152069	Lab. Sample No.	A21/6150
Sample Type:	B		
Depth* (m)	0.40-0.45	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	07/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		

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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Remarks

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



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	23/12/21	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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

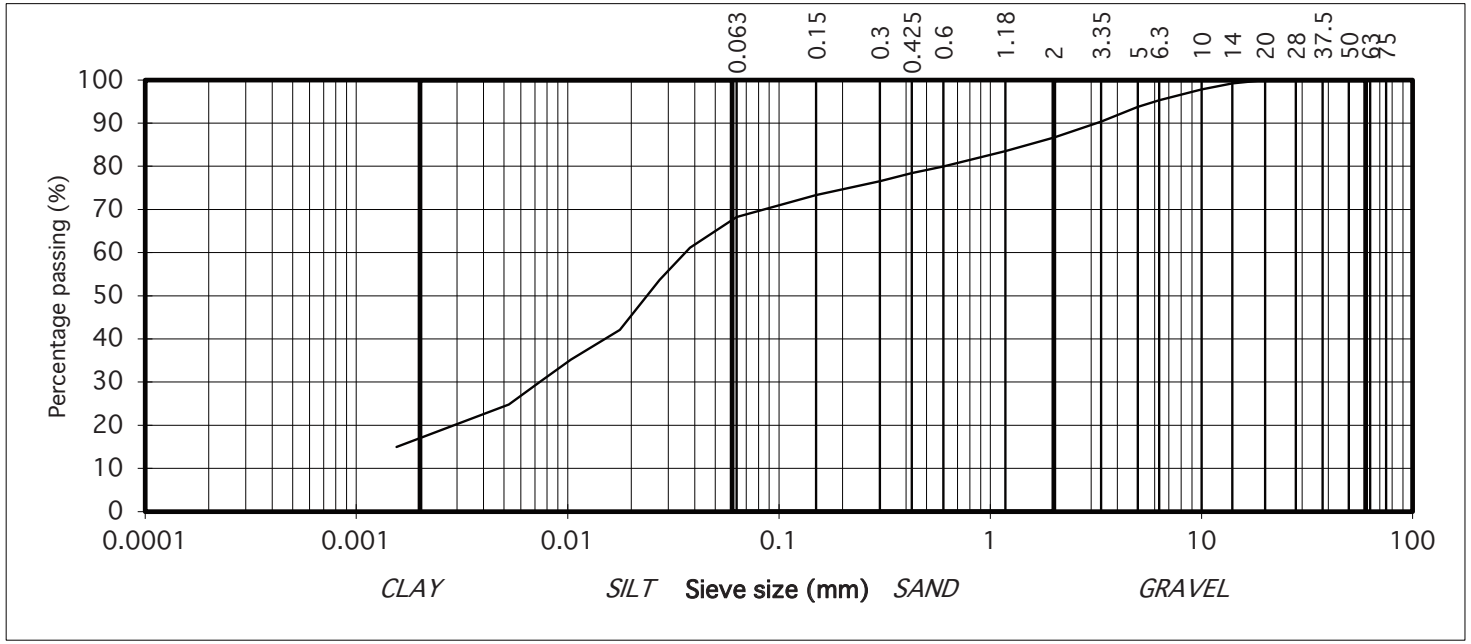
particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	100	
20	100	
14	99	
10	98	
6.3	95	
5	94	
3.35	90	
2	87	
1.18	83	SAND
0.6	80	
0.425	78	
0.3	77	
0.15	73	
0.063	68	SILT/CLAY
0.038	61	
0.027	54	
0.018	42	
0.010	35	
0.007	30	
0.005	25	
0.002	15	

Contract No.	23560	Report No.	R129887
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP013		
Sample No.*	AA152070	Lab. Sample No.	A21/6151
Sample Type:	B		
Depth* (m)	0.90-1.00	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	06/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		

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Remarks

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IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	23/12/21	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)

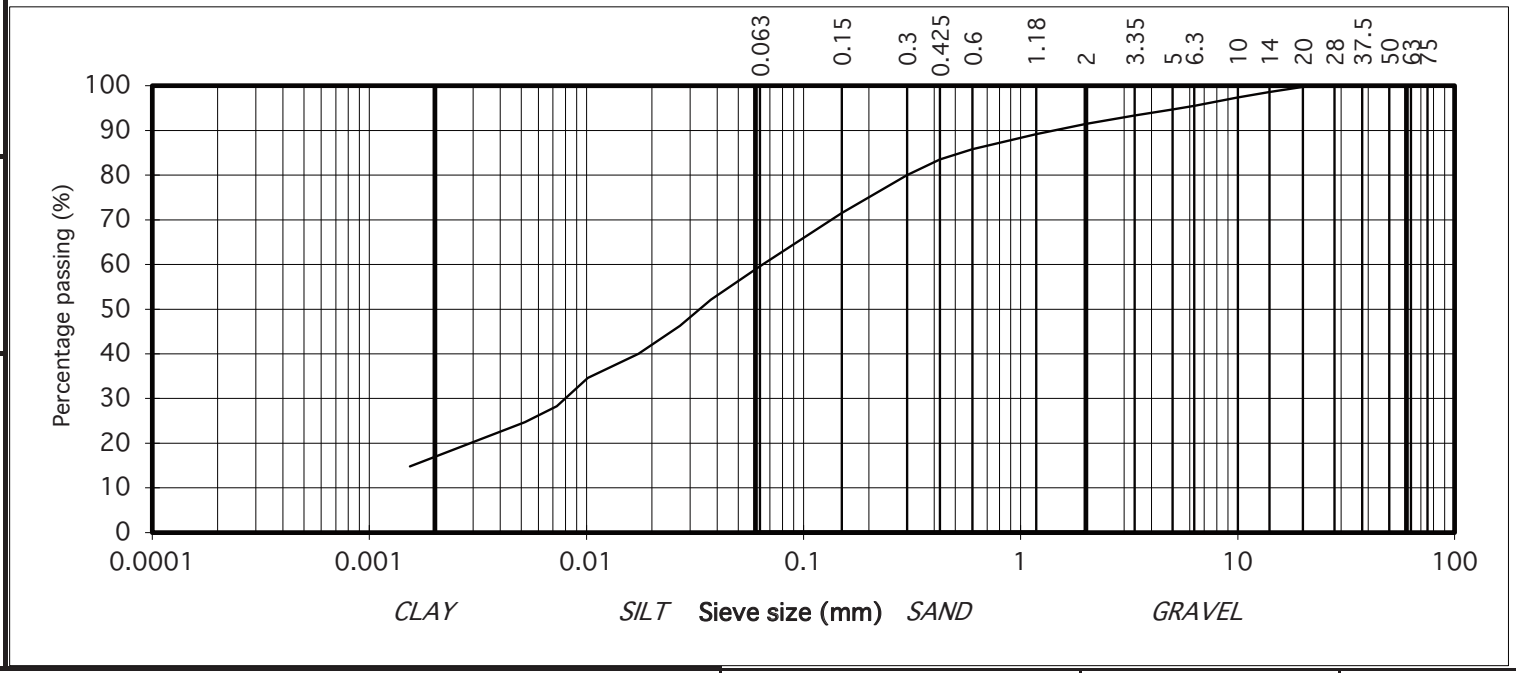
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	100	
20	100	
14	99	
10	97	
6.3	96	
5	95	
3.35	93	
2	91	
1.18	89	SAND
0.6	86	
0.425	84	
0.3	80	
0.15	72	
0.063	60	SILT/CLAY
0.037	52	
0.027	46	
0.017	40	
0.010	35	
0.007	28	
0.005	25	
0.002	15	

Contract No.	23560	Report No.	R129355
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP014		
Sample No.*	AA152074	Lab. Sample No.	A21/6158
Sample Type:	B		
Depth* (m)	0.40	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	01/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		

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



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	23/12/21	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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	94	
50	90	GRAVEL
37.5	84	
28	73	
20	67	
14	60	
10	55	
6.3	51	
5	49	
3.35	46	
2	43	
1.18	42	SAND
0.6	40	
0.425	40	
0.3	39	
0.15	36	
0.063	32	SILT/CLAY
0.037	28	
0.027	25	
0.017	22	
0.010	19	
0.007	16	
0.005	13	
0.002	9	

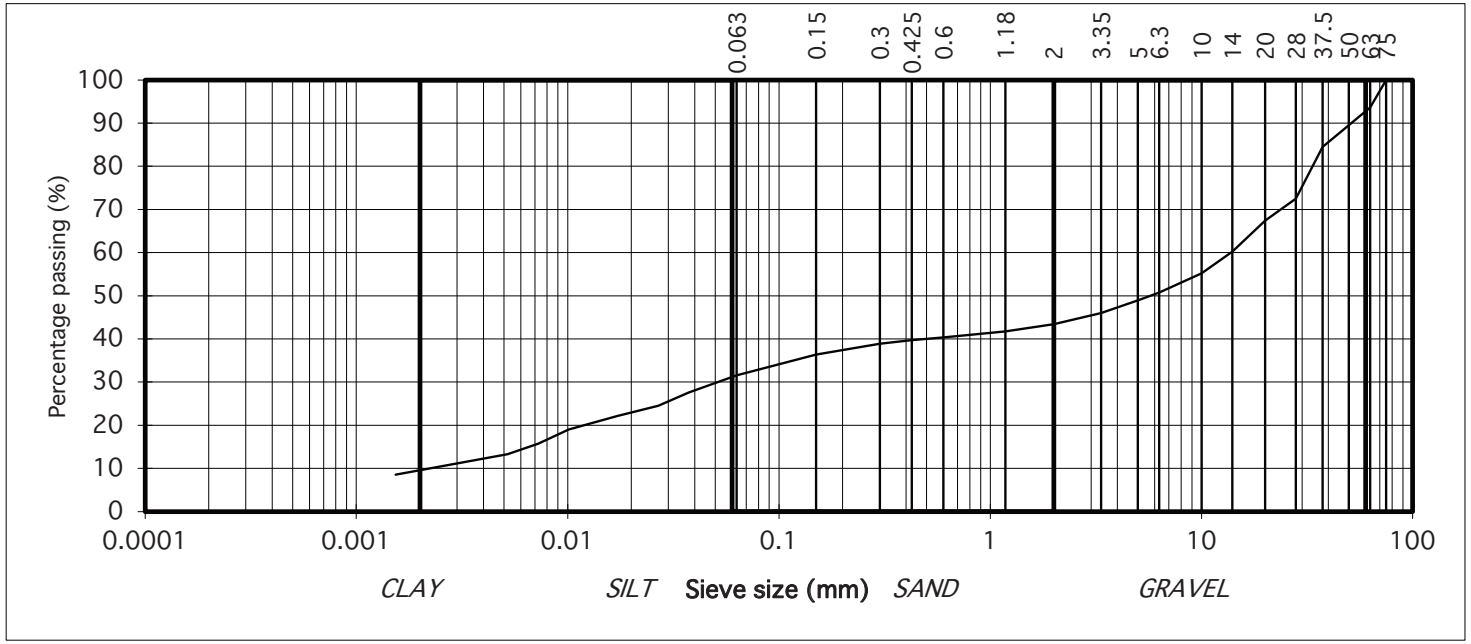
Contract No.	23560	Report No.	R129888
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP014		
Sample No.*	AA152075	Lab. Sample No.	A21/6159
Sample Type:	B		
Depth* (m)	0.7-0.80	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	07/12/2021
Description:	Brown slightly sandy, gravelly, SILT/CLAY with some cobbles		

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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Remarks

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IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	23/12/21	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)

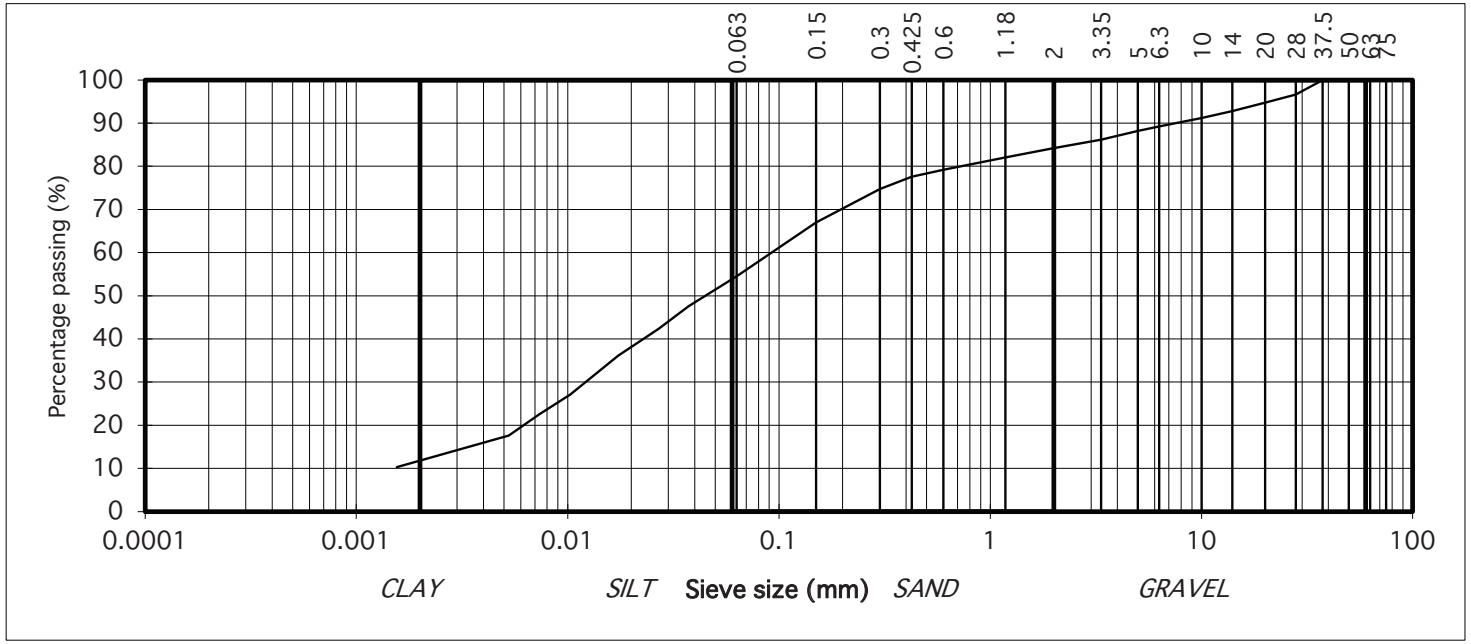
ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	97	
20	95	
14	93	
10	91	
6.3	89	
5	88	
3.35	86	
2	84	
1.18	82	SAND
0.6	79	
0.425	78	
0.3	75	
0.15	67	
0.063	55	SILT/CLAY
0.037	48	
0.027	42	
0.017	36	
0.010	27	
0.007	23	
0.005	18	
0.002	10	

Contract No.	23560	Report No.	R129810	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR TP015			
Sample No.*	AA152076	Lab. Sample No.		A21/6158
Sample Type:	B			
Depth* (m)	0.40	Customer:	Ervia	
Date Received	01/12/2021	Date Testing started		01/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY			

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



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	23/12/21	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

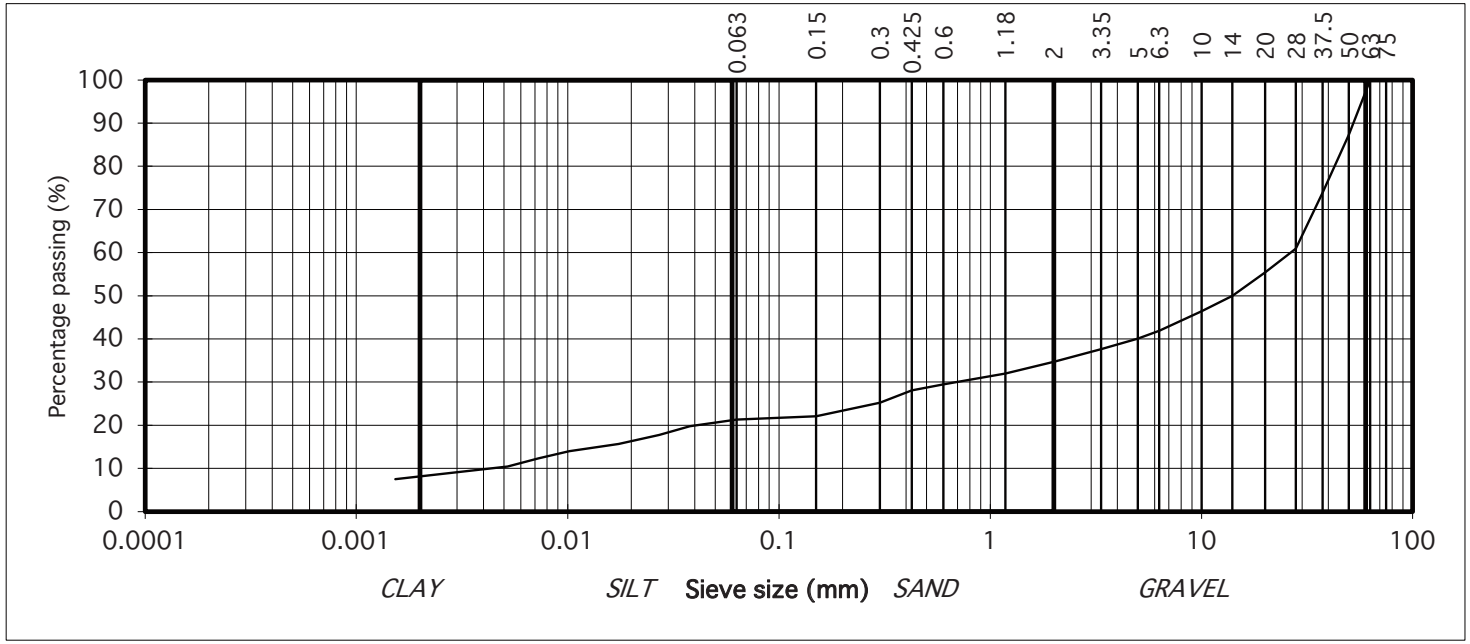
particle size	% passing	
75	100	COBBLES
63	100	
50	87	GRAVEL
37.5	74	
28	61	
20	55	
14	50	
10	46	
6.3	42	
5	40	
3.35	38	
2	35	
1.18	32	SAND
0.6	29	
0.425	28	
0.3	25	
0.15	22	
0.063	21	SILT/CLAY
0.038	20	
0.027	18	
0.017	16	
0.010	14	
0.007	12	
0.005	10	
0.002	7	

Contract No.	23560	Report No.	R129889
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP015		
Sample No.*	AA152077	Lab. Sample No.	A21/6161
Sample Type:	B		
Depth* (m)	0.70	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	07/12/2021
Description:	Brown slightly sandy, very gravelly, SILT/CLAY		

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.
This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	23/12/21	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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

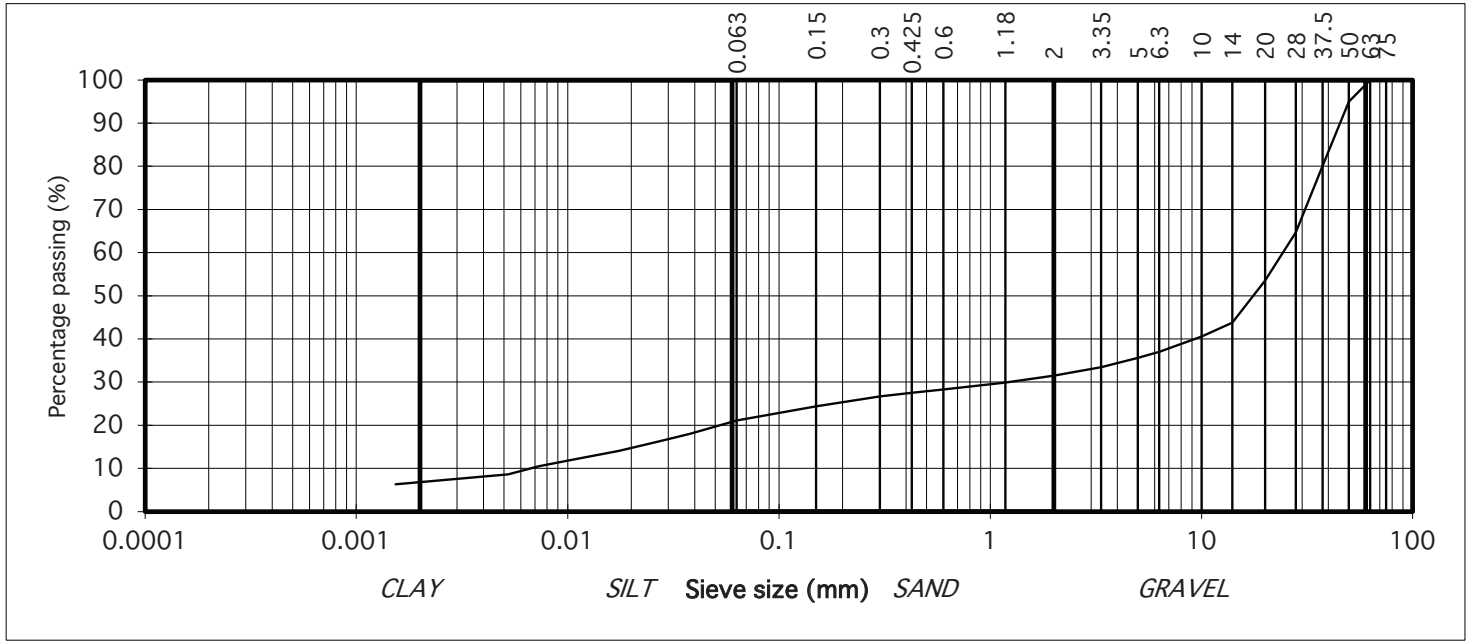
particle size	% passing	
75	100	COBBLES
63	100	
50	95	GRAVEL
37.5	80	
28	65	
20	54	
14	44	
10	41	
6.3	37	
5	36	
3.35	33	
2	31	
1.18	30	SAND
0.6	28	
0.425	28	
0.3	27	
0.15	24	
0.063	21	SILT/CLAY
0.038	18	
0.027	16	
0.018	14	
0.010	12	
0.007	11	
0.005	9	
0.002	6	

Contract No.	23560	Report No.	R129825
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP016		
Sample No.*	AA152083	Lab. Sample No.	A21/6162
Sample Type:	B		
Depth* (m)	0.50	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	07/12/2021
Description:	Brown slightly sandy, very gravelly, SILT/CLAY		

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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Remarks

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IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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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)

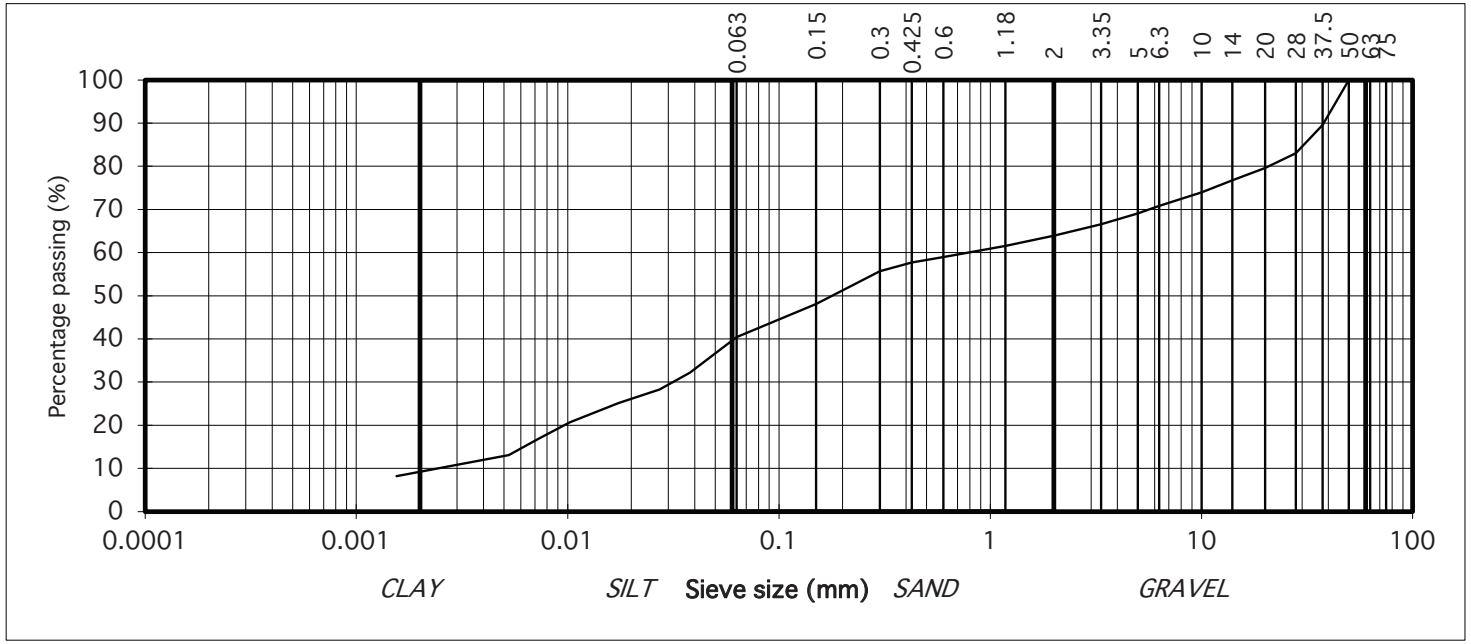
ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	90	
28	83	
20	80	
14	77	
10	74	
6.3	71	
5	69	
3.35	67	
2	64	
1.18	62	SAND
0.6	59	
0.425	58	
0.3	56	
0.15	48	
0.063	40	SILT/CLAY
0.038	32	
0.027	28	
0.017	25	
0.010	21	
0.007	17	
0.005	13	
0.002	8	

Contract No.	23560	Report No.	R129890
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP017		
Sample No.*	AA152089	Lab. Sample No.	A21/6166
Sample Type:	B		
Depth* (m)	0.45-0.50	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	07/12/2021
Description:	Brown slightly sandy, gravelly, SILT/CLAY		

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:
H Byrne	23/12/21	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)

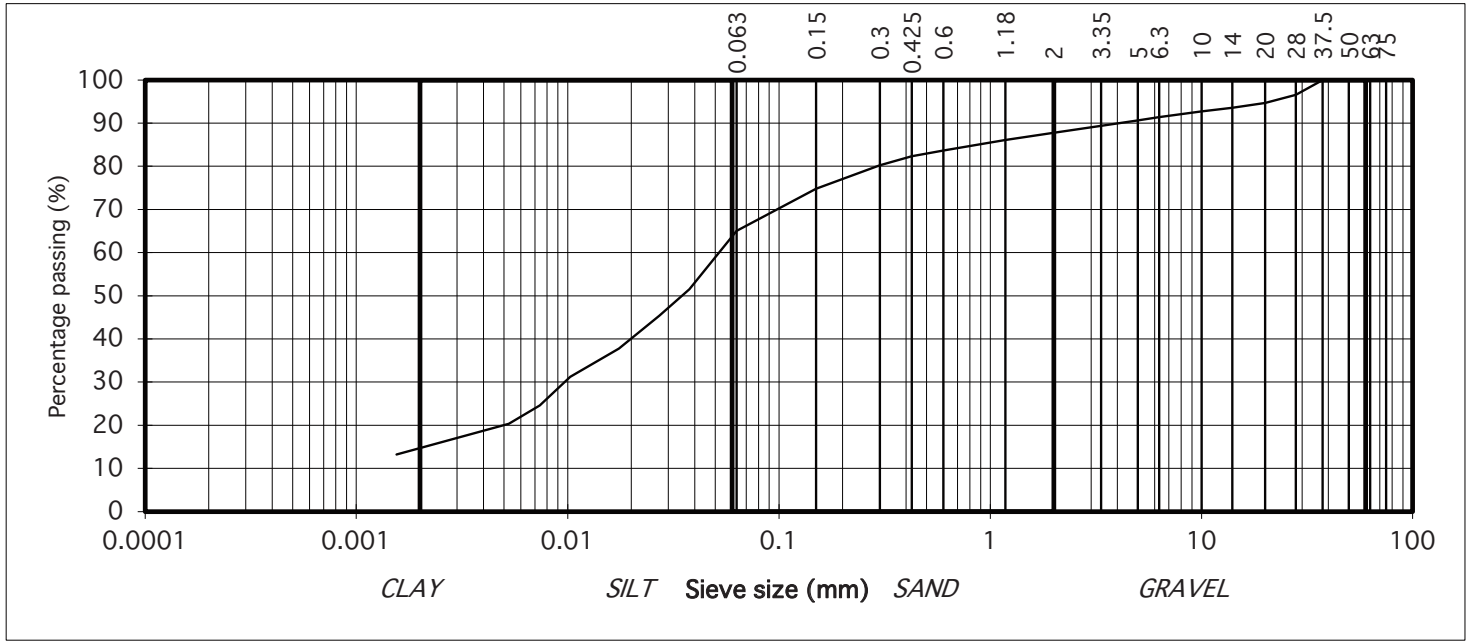
ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	97	
20	95	
14	94	
10	93	
6.3	91	
5	91	
3.35	89	
2	88	
1.18	86	SAND
0.6	84	
0.425	82	
0.3	80	
0.15	75	
0.063	65	SILT/CLAY
0.038	52	
0.027	45	
0.018	38	
0.010	31	
0.007	25	
0.005	20	
0.002	13	

Contract No.	23560	Report No.	R129811
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP018		
Sample No.*	AA152098	Lab. Sample No.	A21/6174
Sample Type:	B		
Depth* (m)	0.30-0.40	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	03/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		

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IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	23/12/21	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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

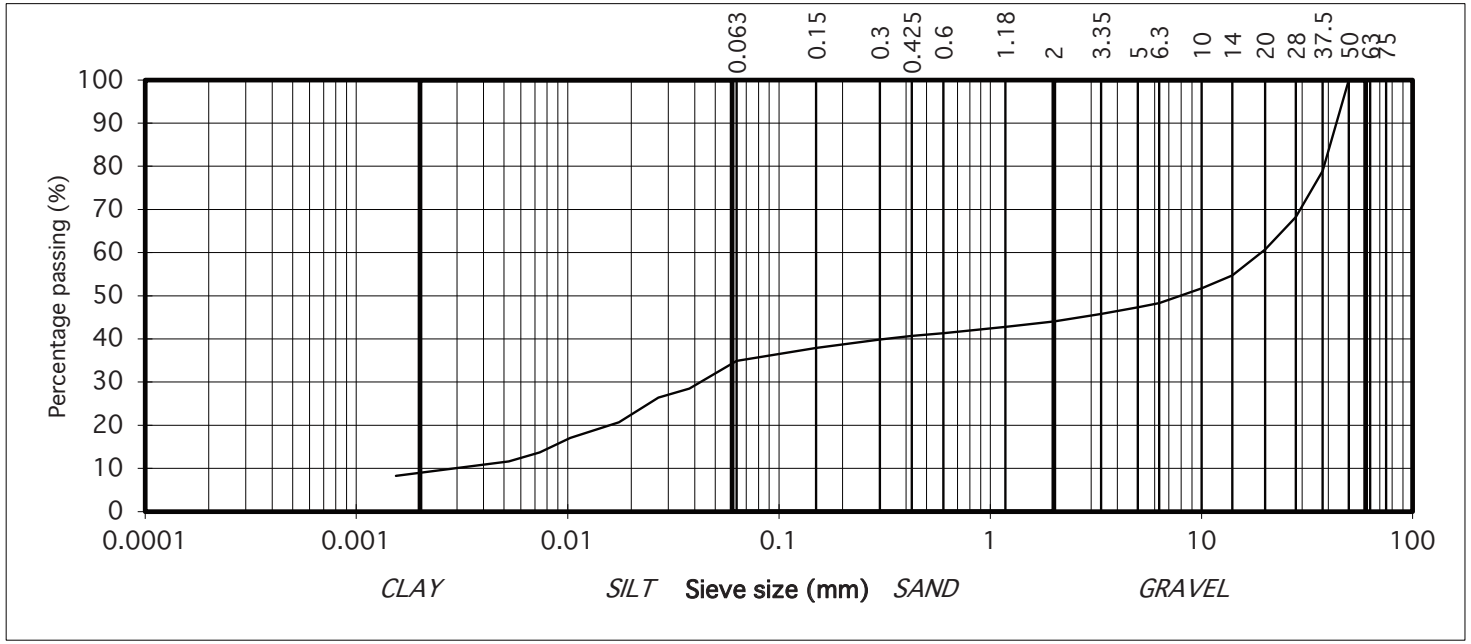
particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	79	
28	68	
20	61	
14	55	
10	52	
6.3	48	
5	47	
3.35	46	
2	44	
1.18	43	SAND
0.6	41	
0.425	41	
0.3	40	
0.15	38	
0.063	35	SILT/CLAY
0.038	28	
0.027	26	
0.018	21	
0.010	17	
0.007	14	
0.005	12	
0.002	8	

Contract No.	23560	Report No.	R129812	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR TP018			
Sample No.*	AA152099	Lab. Sample No.		A21/6175
Sample Type:	B			
Depth* (m)	0.5-0.70	Customer:	Ervia	
Date Received	01/12/2021	Date Testing started		03/12/2021
Description:	Brown slightly sandy, gravelly, SILT/CLAY			

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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Remarks

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IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	23/12/21	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

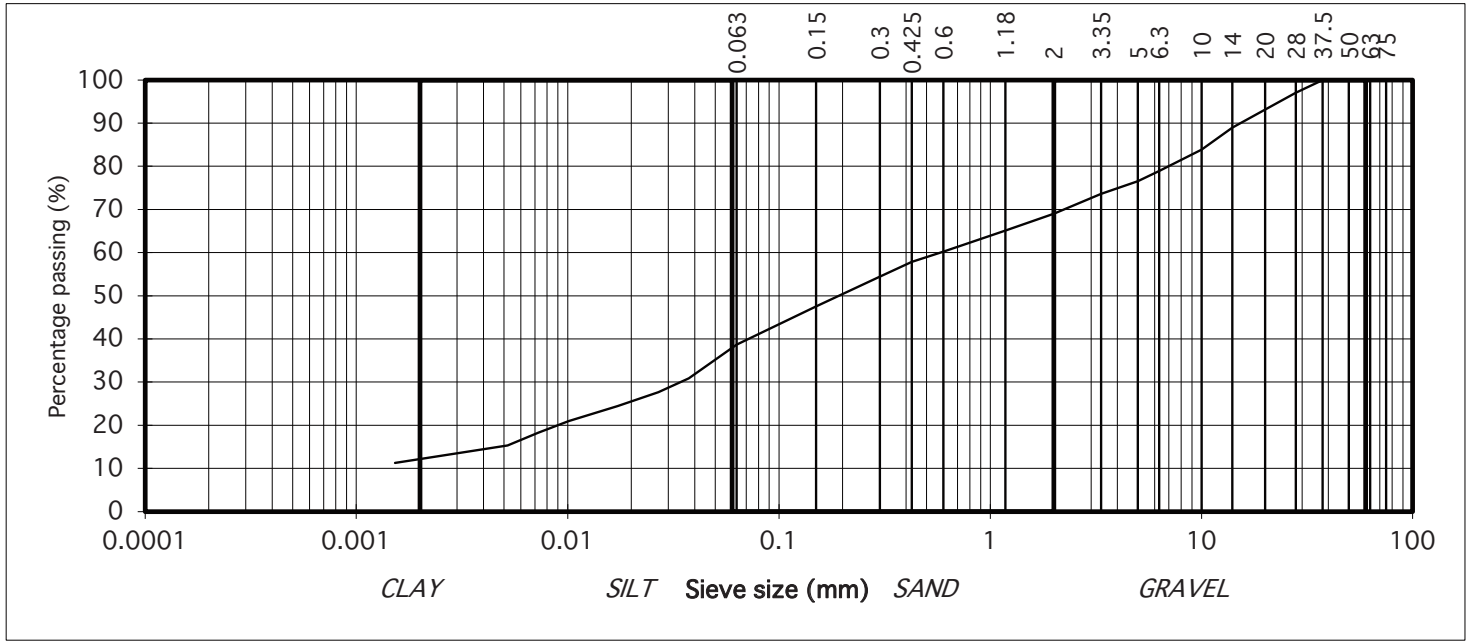
particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	97	
20	93	
14	89	
10	84	
6.3	79	
5	77	
3.35	74	
2	69	
1.18	65	SAND
0.6	60	
0.425	58	
0.3	54	
0.15	48	
0.063	39	SILT/CLAY
0.037	31	
0.027	28	
0.017	24	
0.010	21	
0.007	18	
0.005	15	
0.002	11	

Contract No.	23560	Report No.	R129921
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP019		
Sample No.*	AA152086	Lab. Sample No.	A21/6170
Sample Type:	B		
Depth* (m)	0.40	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	07/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		

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:
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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)

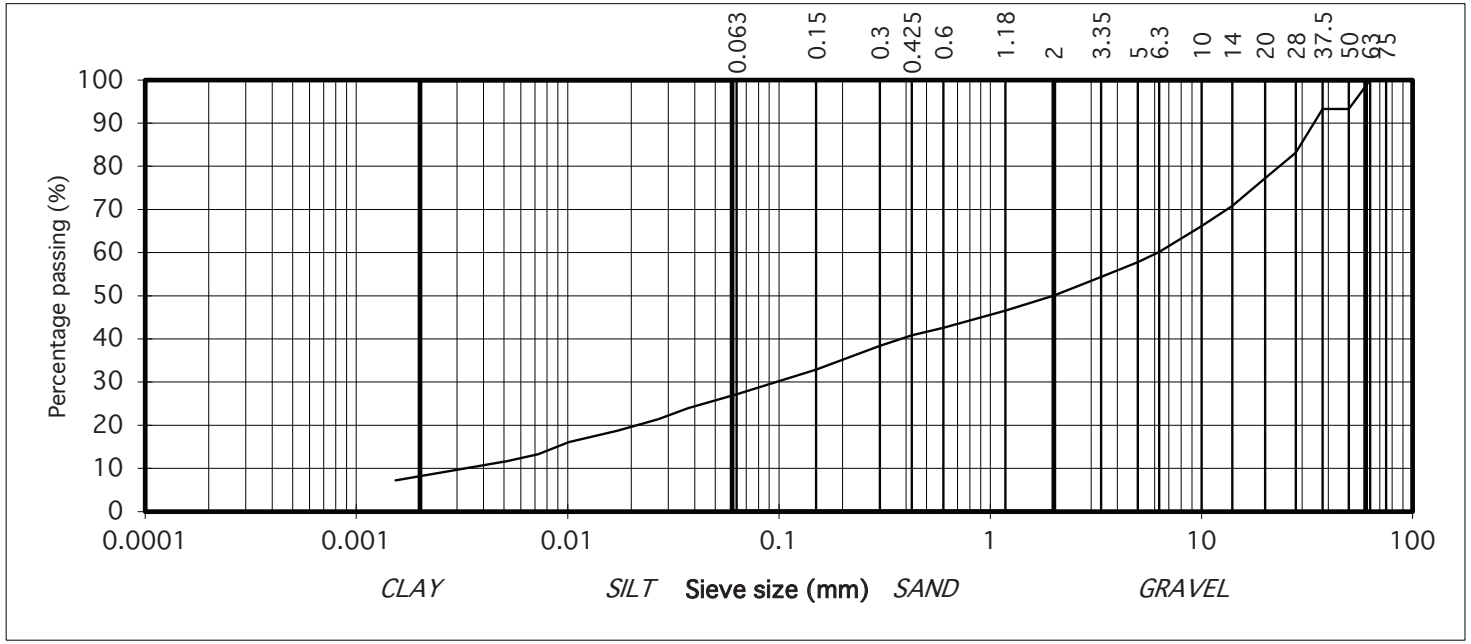
ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	93	GRAVEL
37.5	93	
28	83	
20	77	
14	71	
10	66	
6.3	60	
5	58	
3.35	54	
2	50	
1.18	47	SAND
0.6	43	
0.425	41	
0.3	38	
0.15	33	
0.063	27	SILT/CLAY
0.037	24	
0.027	21	
0.017	19	
0.010	16	
0.007	13	
0.005	12	
0.002	7	

Contract No.	23560	Report No.	R129891
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP019		
Sample No.*	AA152088	Lab. Sample No.	A21/6171
Sample Type:	B		
Depth* (m)	0.75	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	07/12/2021
Description:	Brown slightly sandy, 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.
This report shall not be reproduced except in full without the written approval of the Laboratory.



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	23/12/21	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

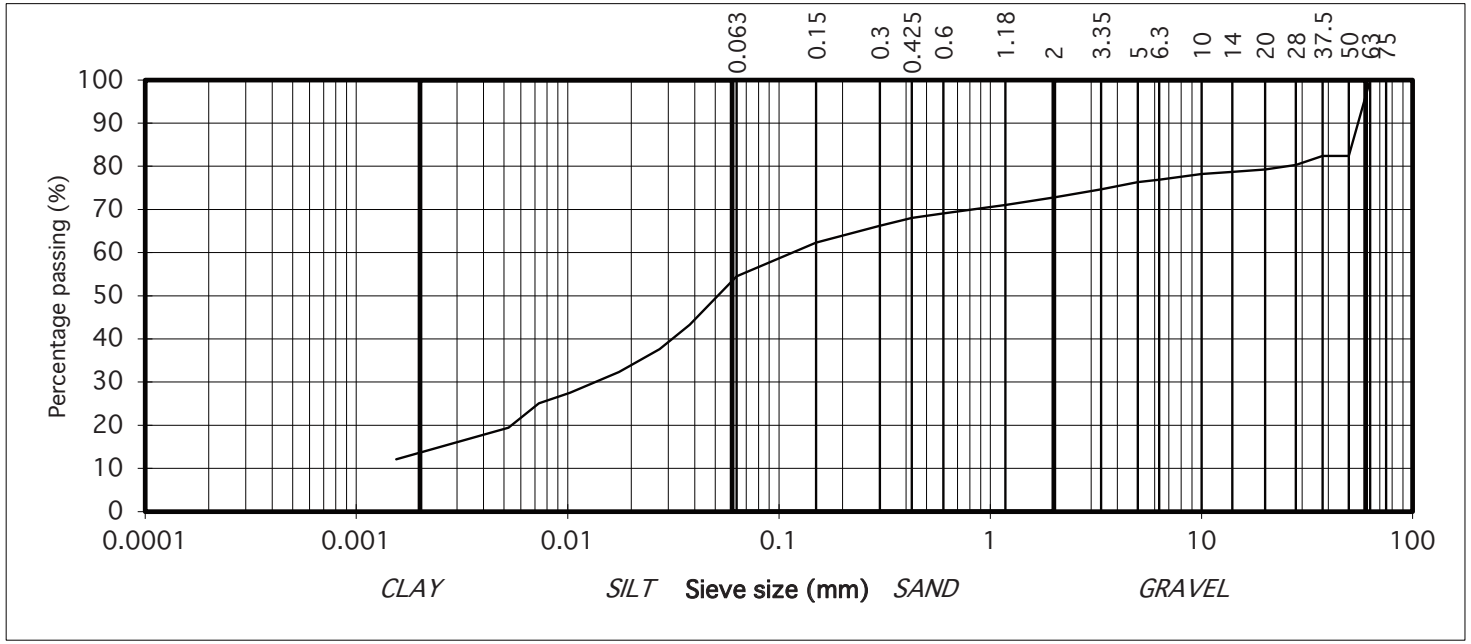
particle size	% passing	
75	100	COBBLES
63	100	
50	82	GRAVEL
37.5	82	
28	80	
20	79	
14	79	
10	78	
6.3	77	
5	76	
3.35	75	
2	73	
1.18	71	SAND
0.6	69	
0.425	68	
0.3	66	
0.15	62	
0.063	55	SILT/CLAY
0.038	43	
0.027	38	
0.018	32	
0.010	28	
0.007	25	
0.005	19	
0.002	12	

Contract No.	23560	Report No.	R129826
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR-TP020		
Sample No.*	AA152100	Lab. Sample No.	A21/6184
Sample Type:	B		
Depth* (m)	0.25-0.30	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	06/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		

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.
This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	23/12/21	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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

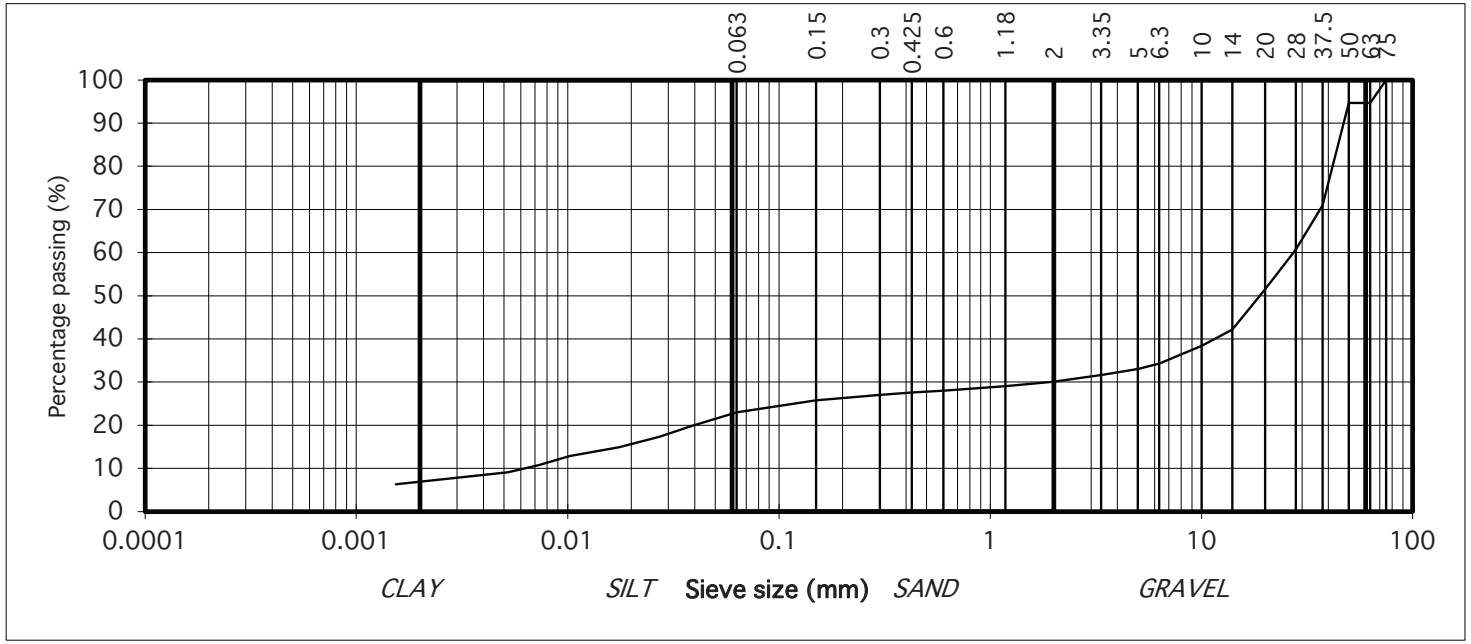
particle size	% passing	
75	100	COBBLES
63	95	
50	95	GRAVEL
37.5	71	
28	61	
20	52	
14	42	
10	38	
6.3	34	
5	33	
3.35	32	
2	30	
1.18	29	SAND
0.6	28	
0.425	28	
0.3	27	
0.15	26	
0.063	23	SILT/CLAY
0.038	20	
0.027	17	
0.018	15	
0.010	13	
0.007	11	
0.005	9	
0.002	6	

Contract No.	23560	Report No.	R129813
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR-TP020		
Sample No.*	AA152102	Lab. Sample No.	A21/6186
Sample Type:	B		
Depth* (m)	1.00-1.05	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	03/12/2021
Description:	Brown slightly sandy, very gravelly, SILT/CLAY with some cobbles		

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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Remarks

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



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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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

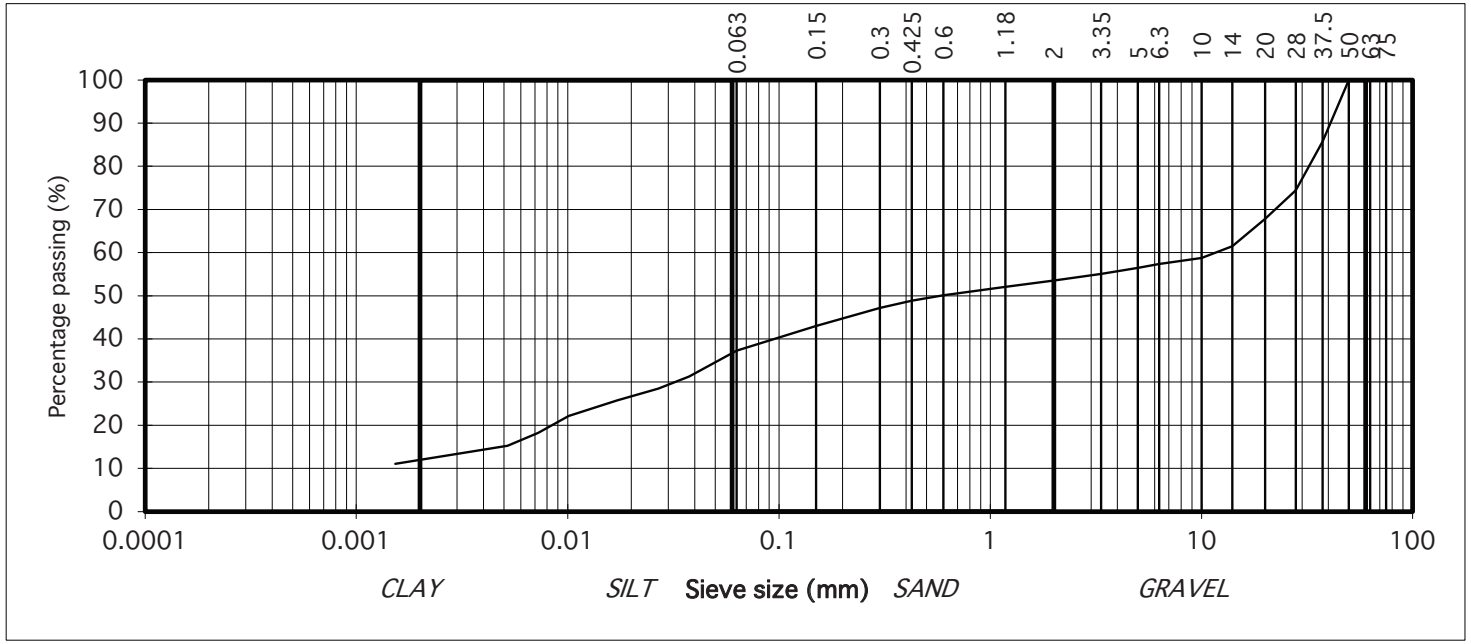
particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	86	
28	74	
20	68	
14	61	
10	59	
6.3	57	
5	56	
3.35	55	
2	54	
1.18	52	SAND
0.6	50	
0.425	49	
0.3	47	
0.15	43	
0.063	37	SILT/CLAY
0.038	31	
0.027	29	
0.017	26	
0.010	22	
0.007	18	
0.005	15	
0.002	11	

Contract No.	23560	Report No.	R129892	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR TP021			
Sample No.*	AA152093	Lab. Sample No.		A21/6172
Sample Type:	B			
Depth* (m)	0.30-0.35	Customer:	Ervia	
Date Received	01/12/2021	Date Testing started		03/12/2021
Description:	Brown slightly sandy, gravelly, SILT/CLAY			

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.
This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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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	95	GRAVEL
37.5	91	
28	82	
20	77	
14	73	
10	70	
6.3	67	
5	66	
3.35	64	
2	61	
1.18	59	SAND
0.6	57	
0.425	56	
0.3	55	
0.15	52	
0.063	47	SILT/CLAY
0.038	38	
0.027	33	
0.017	29	
0.010	24	
0.007	20	
0.005	16	
0.002	11	

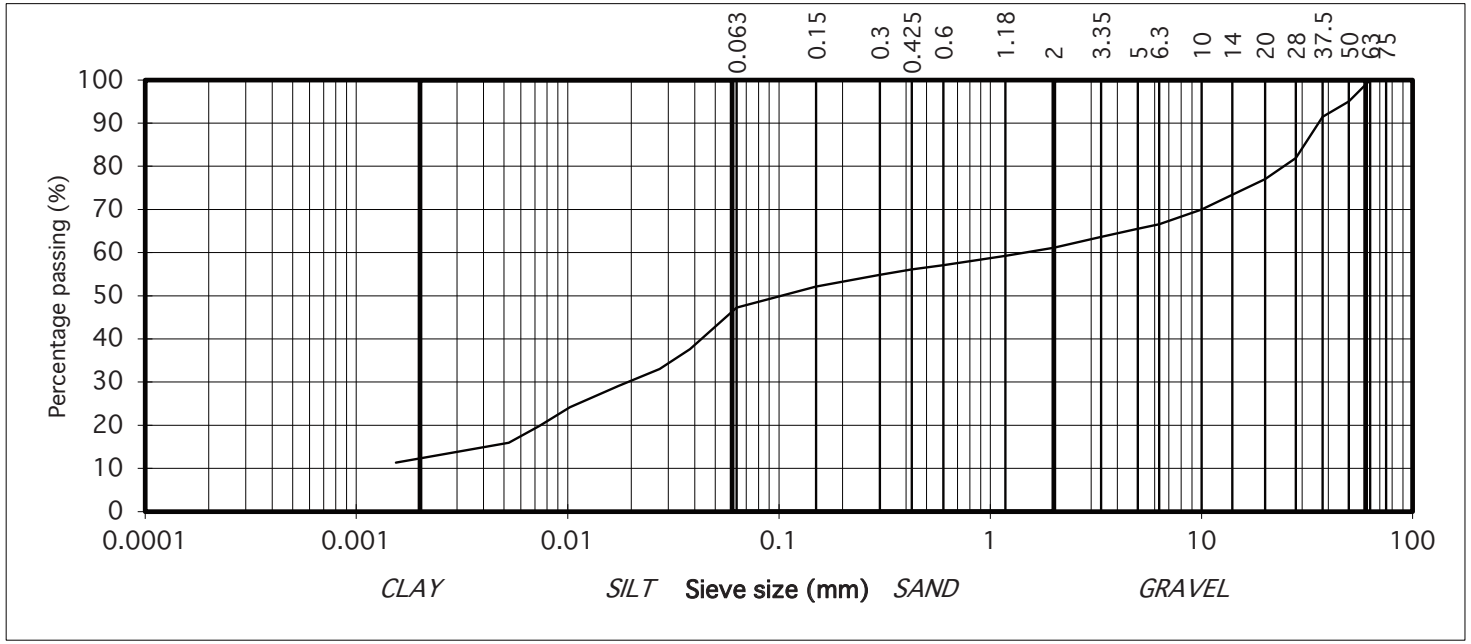
Contract No.	23560	Report No.	R129814
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP021		
Sample No.*	AA152094	Lab. Sample No.	A21/6173
Sample Type:	B		
Depth* (m)	0.90-0.95	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	06/12/2021
Description:	Brown slightly sandy, gravelly, SILT/CLAY		

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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Remarks

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



IGSL Ltd Materials Laboratory

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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

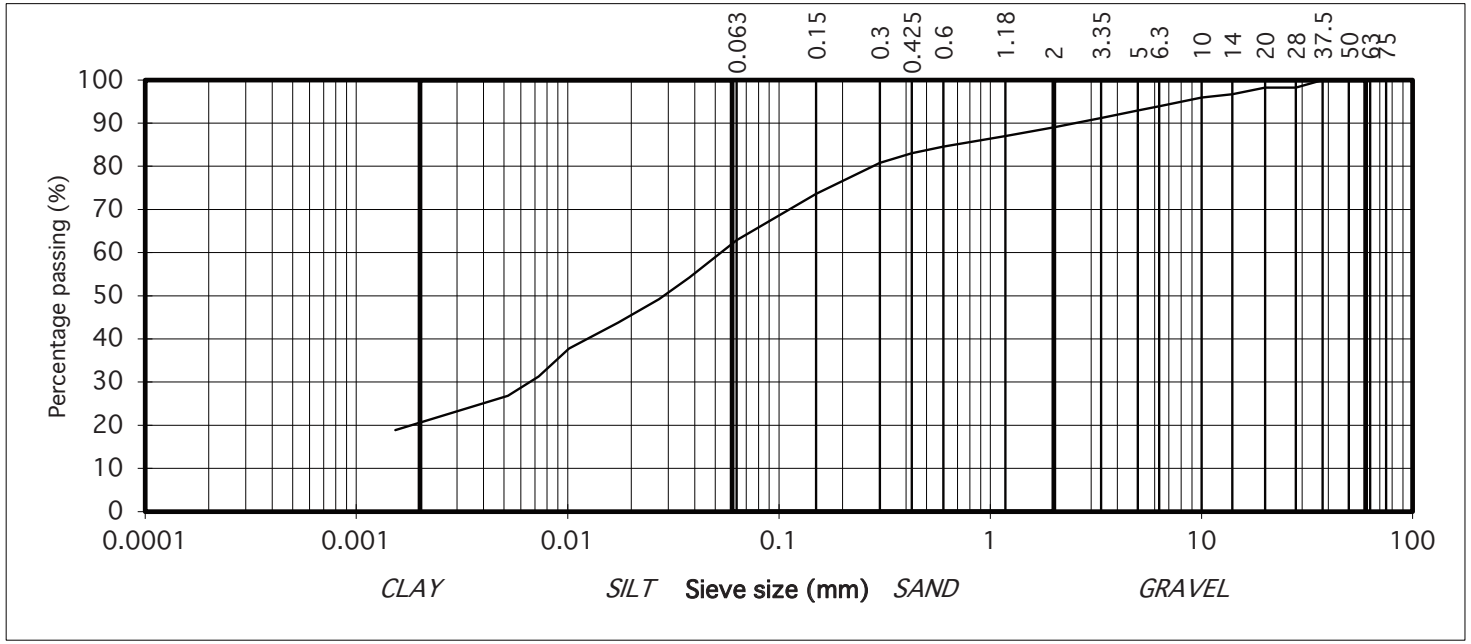
particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	98	
20	98	
14	97	
10	96	
6.3	94	
5	93	
3.35	91	
2	89	
1.18	87	SAND
0.6	85	
0.425	83	
0.3	81	
0.15	74	
0.063	63	SILT/CLAY
0.038	54	
0.027	49	
0.017	44	
0.010	38	
0.007	31	
0.005	27	
0.002	19	

Contract No.	23560	Report No.	R129815
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR-TP022		
Sample No.*	AA152103	Lab. Sample No.	A21/6182
Sample Type:	B		
Depth* (m)	0.25-0.30	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	03/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		

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.
This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks

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



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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	100	
28	92	
20	89	
14	85	
10	82	
6.3	77	
5	76	
3.35	73	
2	69	
1.18	67	SAND
0.6	64	
0.425	62	
0.3	60	
0.15	54	
0.063	46	SILT/CLAY
0.038	36	
0.027	33	
0.017	29	
0.010	25	
0.007	22	
0.005	18	
0.002	11	

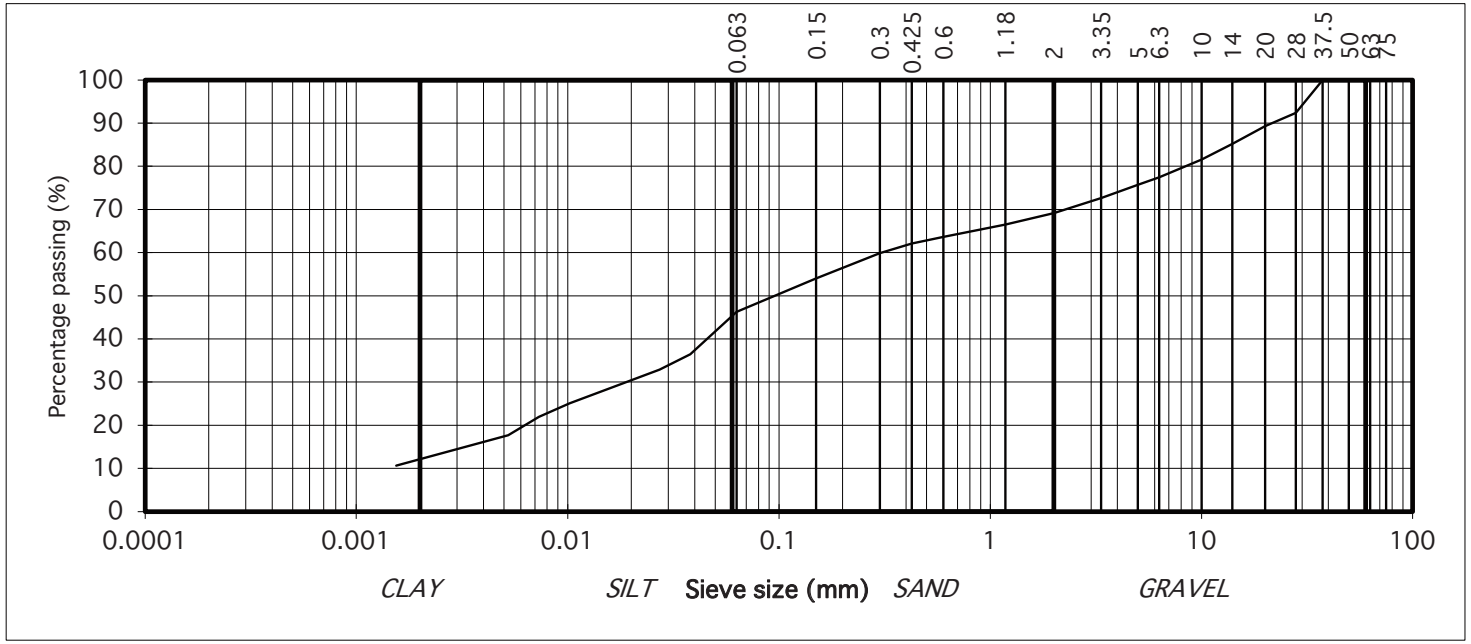
Contract No.	23560	Report No.	R129893
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR-TP022		
Sample No.*	AA152104	Lab. Sample No.	A21/6183
Sample Type:	B		
Depth* (m)	0.60-0.65	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	03/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		

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.

This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks

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



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	23/12/21	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)

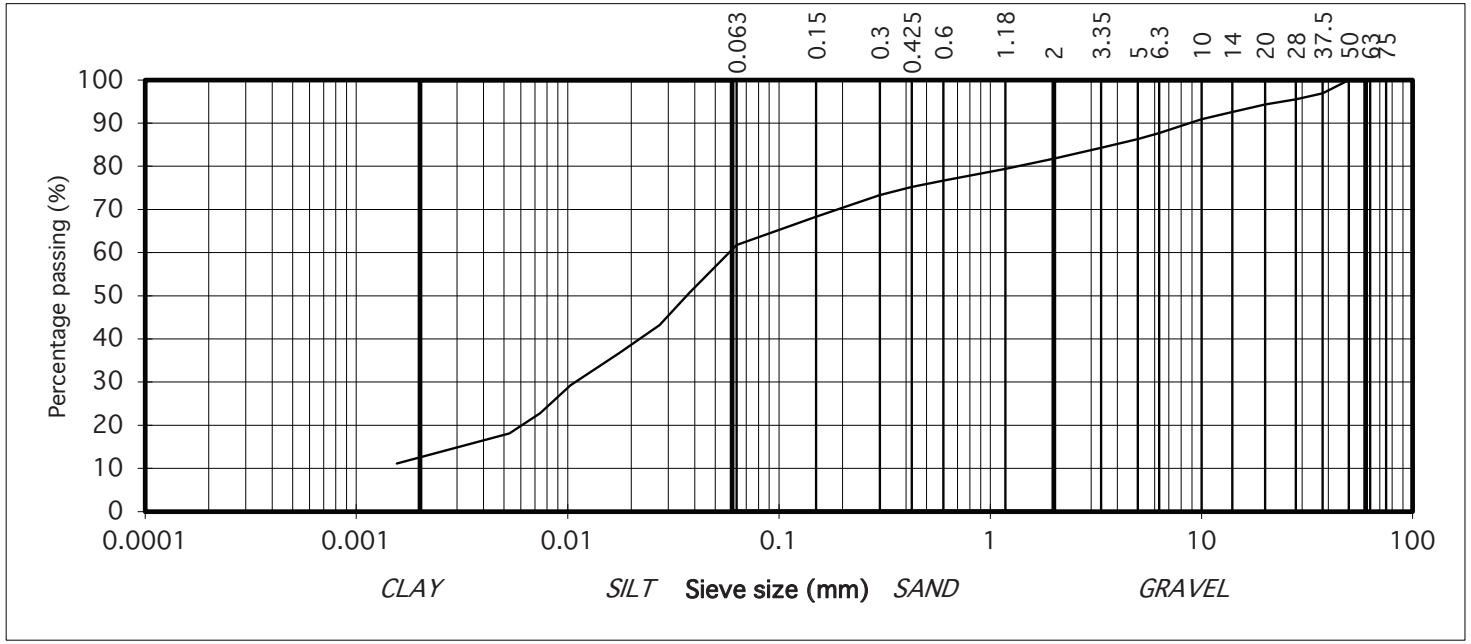
ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	97	
28	96	
20	94	
14	93	
10	91	
6.3	88	
5	86	
3.35	84	
2	82	
1.18	79	SAND
0.6	77	
0.425	75	
0.3	73	
0.15	68	
0.063	62	SILT/CLAY
0.038	51	
0.027	43	
0.018	37	
0.010	29	
0.007	23	
0.005	18	
0.002	11	

Contract No.	23560	Report No.	R129894	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR TP023			
Sample No.*	AA152091	Lab. Sample No.		A21/6168
Sample Type:	B			
Depth* (m)	0.40-0.45	Customer:	Ervia	
Date Received	01/12/2021	Date Testing started		07/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY			

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.
This report shall not be reproduced except in full without the written approval of the Laboratory.

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



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	23/12/21	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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

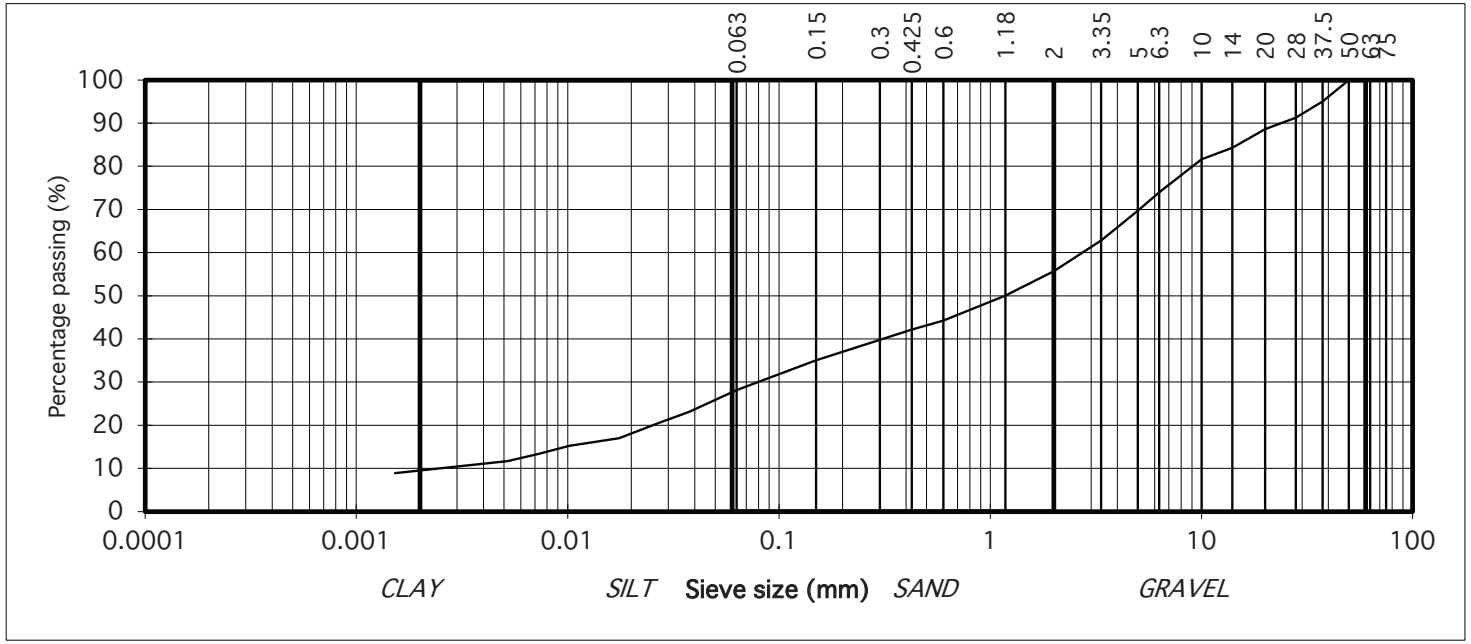
particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	95	
28	91	
20	89	
14	84	
10	82	
6.3	74	
5	70	
3.35	63	
2	56	
1.18	50	SAND
0.6	44	
0.425	42	
0.3	40	
0.15	35	
0.063	28	SILT/CLAY
0.038	23	
0.027	21	
0.018	17	
0.010	15	
0.007	13	
0.005	12	
0.002	9	

Contract No.	23560	Report No.	R129895
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP023		
Sample No.*	AA152092	Lab. Sample No.	A21/6169
Sample Type:	B		
Depth* (m)	0.60-0.65	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	07/12/2021
Description:	Brown slightly sandy, gravelly, SILT/CLAY		

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.
This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks

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



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	23/12/21	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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	99	
20	96	
14	93	
10	91	
6.3	89	
5	88	
3.35	86	
2	84	
1.18	82	SAND
0.6	80	
0.425	78	
0.3	75	
0.15	68	
0.063	59	SILT/CLAY
0.038	46	
0.027	41	
0.018	35	
0.010	30	
0.007	25	
0.005	22	
0.002	15	

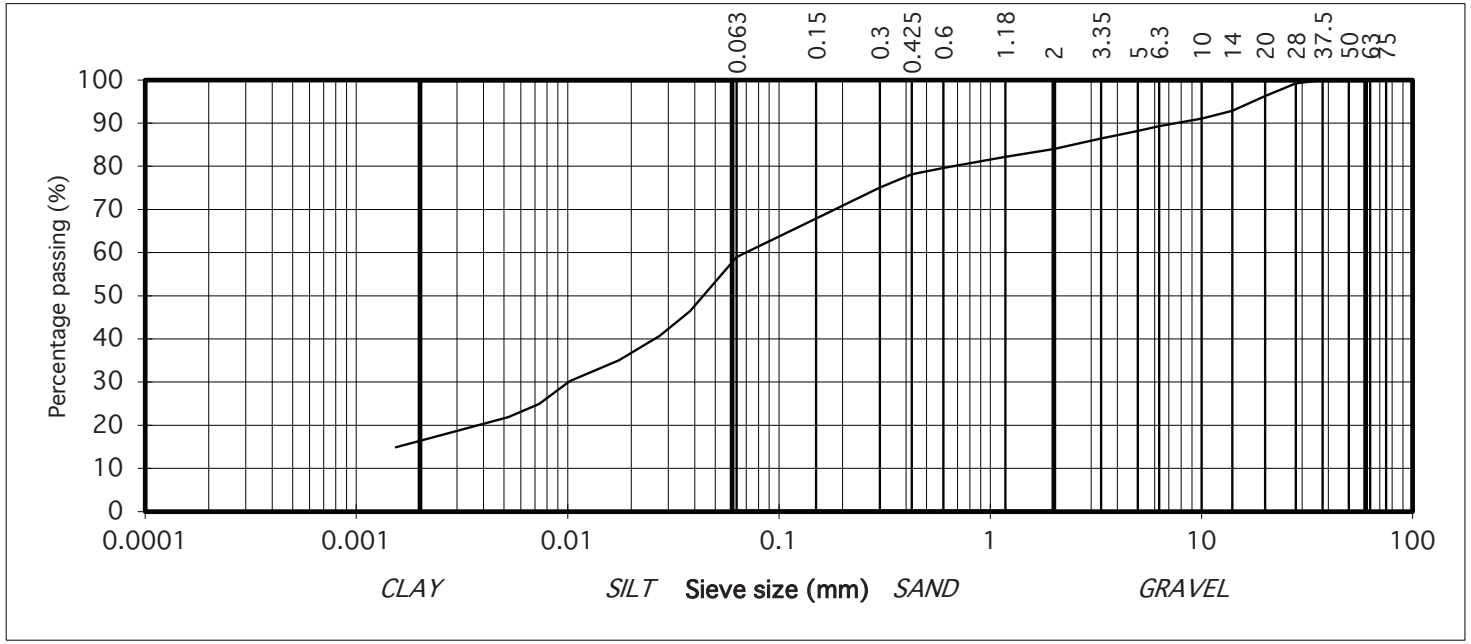
Contract No.	23560	Report No.	R129896
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR-TP024		
Sample No.*	AA152109	Lab. Sample No.	A21/6180
Sample Type:	B		
Depth* (m)	0.20-0.30	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	03/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		

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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Remarks

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



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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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

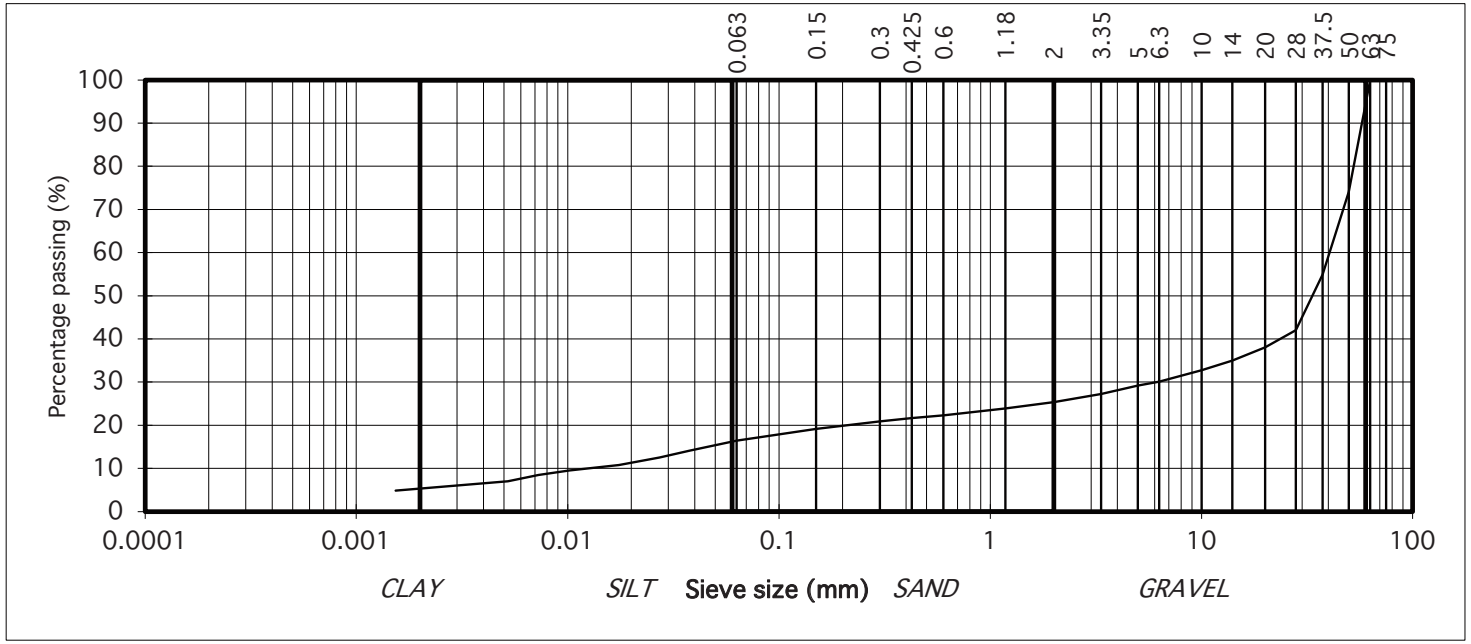
particle size	% passing	
75	100	COBBLES
63	100	
50	74	GRAVEL
37.5	55	
28	42	
20	38	
14	35	
10	33	
6.3	30	
5	29	
3.35	27	
2	25	
1.18	24	SAND
0.6	22	
0.425	22	
0.3	21	
0.15	19	
0.063	16	SILT/CLAY
0.038	14	
0.027	13	
0.018	11	
0.010	10	
0.007	8	
0.005	7	
0.002	5	

Contract No.	23560	Report No.	R129816
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR-TP024		
Sample No.*	AA152110	Lab. Sample No.	A21/6181
Sample Type:	B		
Depth* (m)	0.90-1.0	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	03/12/2021
Description:	Brown clayey/silty, sandy, GRAVEL		

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.
This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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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)

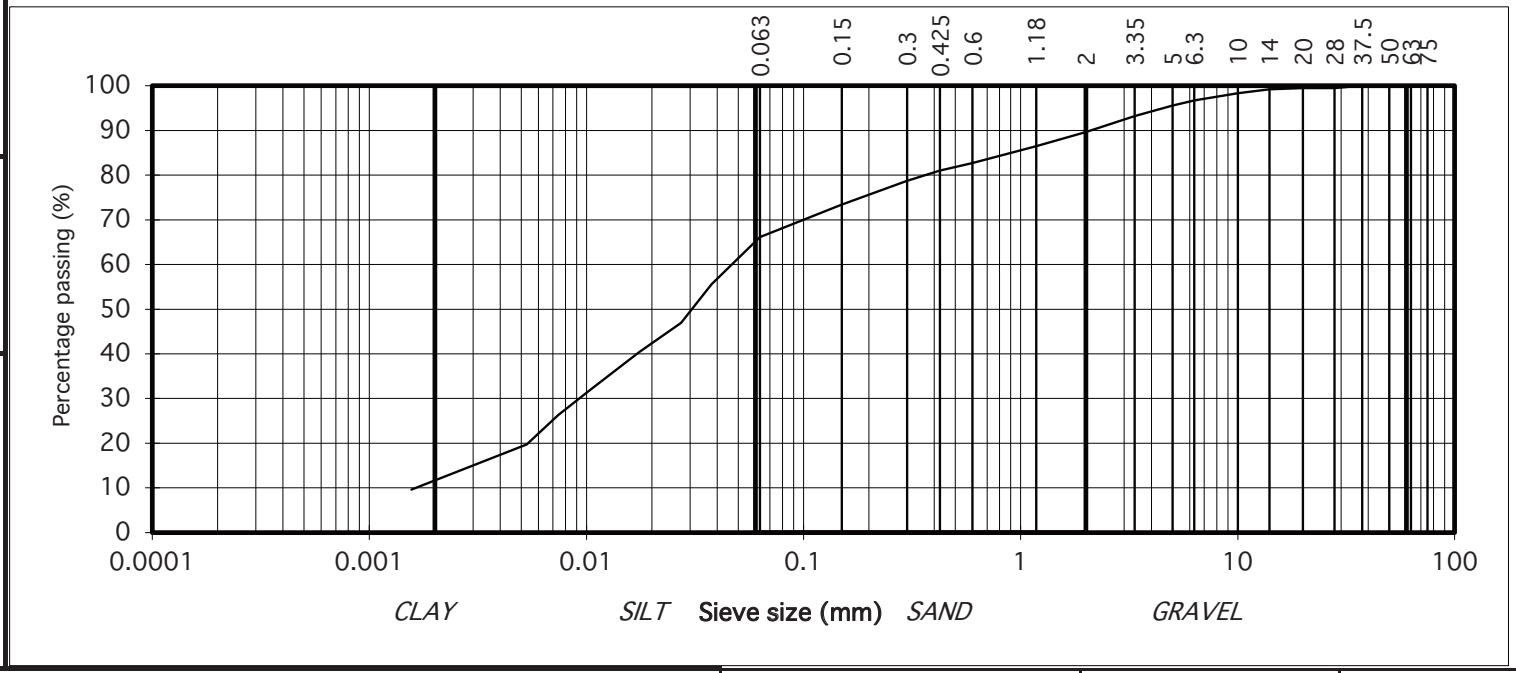
ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	99	
20	99	
14	99	
10	98	
6.3	97	
5	96	
3.35	93	
2	90	
1.18	86	SAND
0.6	83	
0.425	81	
0.3	79	
0.15	73	
0.063	66	SILT/CLAY
0.038	56	
0.027	47	
0.018	40	
0.010	32	
0.007	26	
0.005	20	
0.002	10	

Contract No.	23560	Report No.	R129356	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR TP025			
Sample No.*	AA152106	Lab. Sample No.		A21/6178
Sample Type:	B			
Depth* (m)	0.25-0.30	Customer:	Ervia	
Date Received	01/12/2021	Date Testing started		01/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY			

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



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	23/12/21	1 of 1

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

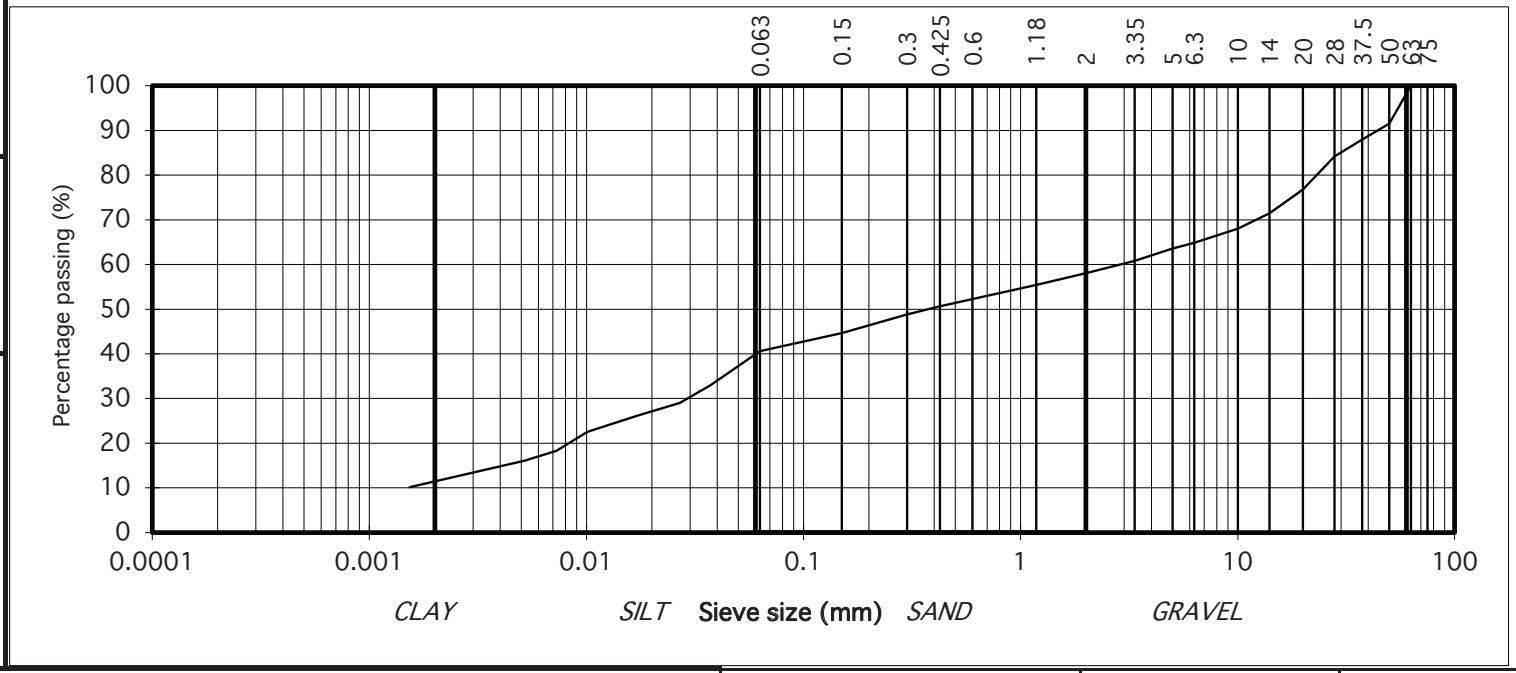
TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**
(note: Sedimentation stage not accredited)

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

particle size	% passing	
75	100	COBBLES
63	100	
50	92	GRAVEL
37.5	88	
28	84	
20	77	
14	71	
10	68	
6.3	65	
5	64	
3.35	61	
2	58	
1.18	55	SAND
0.6	52	
0.425	51	
0.3	49	
0.15	45	
0.063	41	SILT/CLAY
0.037	33	
0.027	29	
0.017	26	
0.010	23	
0.007	18	
0.005	16	
0.002	10	

Contract No.	23560	Report No.	R129357	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR TP025			
Sample No.*	AA152107	Lab. Sample No.		A21/6179
Sample Type:	B			
Depth* (m)	0.55-0.60	Customer:	Ervia	
Date Received	01/12/2021	Date Testing started		01/12/2021
Description:	Brown slightly sandy, 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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IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

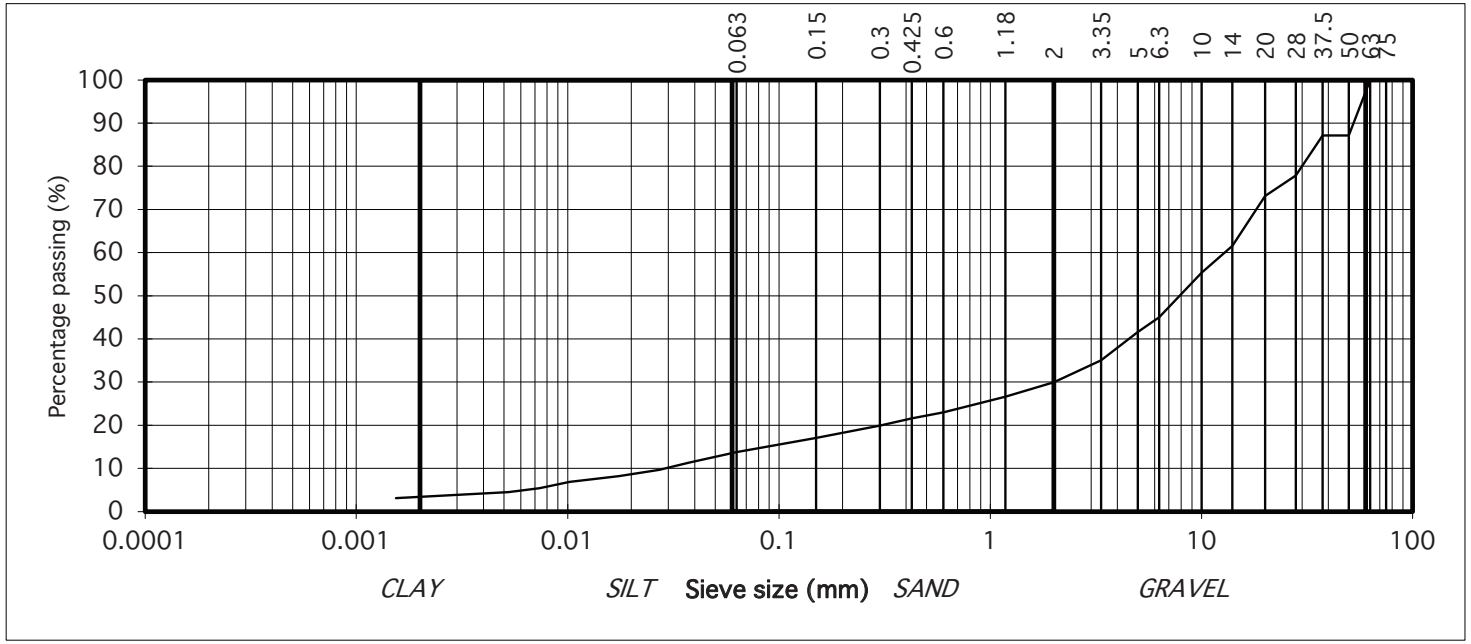
particle size	% passing	
75	100	COBBLES
63	100	
50	87	GRAVEL
37.5	87	
28	78	
20	73	
14	62	
10	55	
6.3	45	
5	42	
3.35	35	
2	30	
1.18	27	SAND
0.6	23	
0.425	22	
0.3	20	
0.15	17	
0.063	14	SILT/CLAY
0.038	11	
0.027	10	
0.017	8	
0.010	7	
0.007	5	
0.005	4	
0.002	3	

Contract No.	23560	Report No.	R129897
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP027		
Sample No.*	AA152122	Lab. Sample No.	A21/6193
Sample Type:	B		
Depth* (m)	0.15-0.20	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	03/12/2021
Description:	Brown clayey/silty, sandy, GRAVEL		

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.
This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	23/12/21	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)

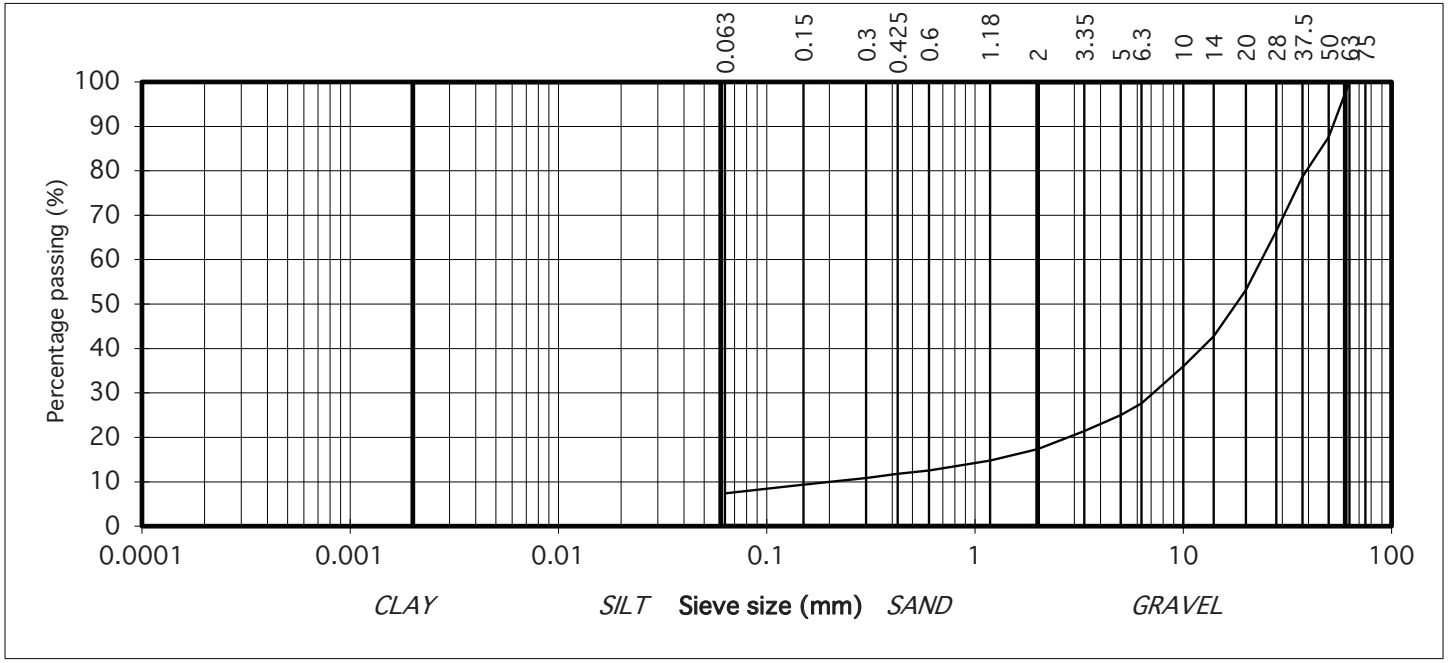
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	88	GRAVEL
37.5	79	
28	66	
20	53	
14	43	
10	36	
6.3	28	
5	25	
3.35	21	
2	17	
1.18	15	SAND
0.6	13	
0.425	12	
0.3	11	
0.15	9	
0.063	7	SILT/CLAY

Contract No.	23560	Report No.	R129358
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP027		
Sample No.*	AA152123	Lab. Sample No.	A21/6195
Sample Type:	B		
Depth* (m)	0.60-0.70	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	01/12/2021
Description:	Grey/brown clayey/silty, sandy, GRAVEL		

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.
This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	23/12/21	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)

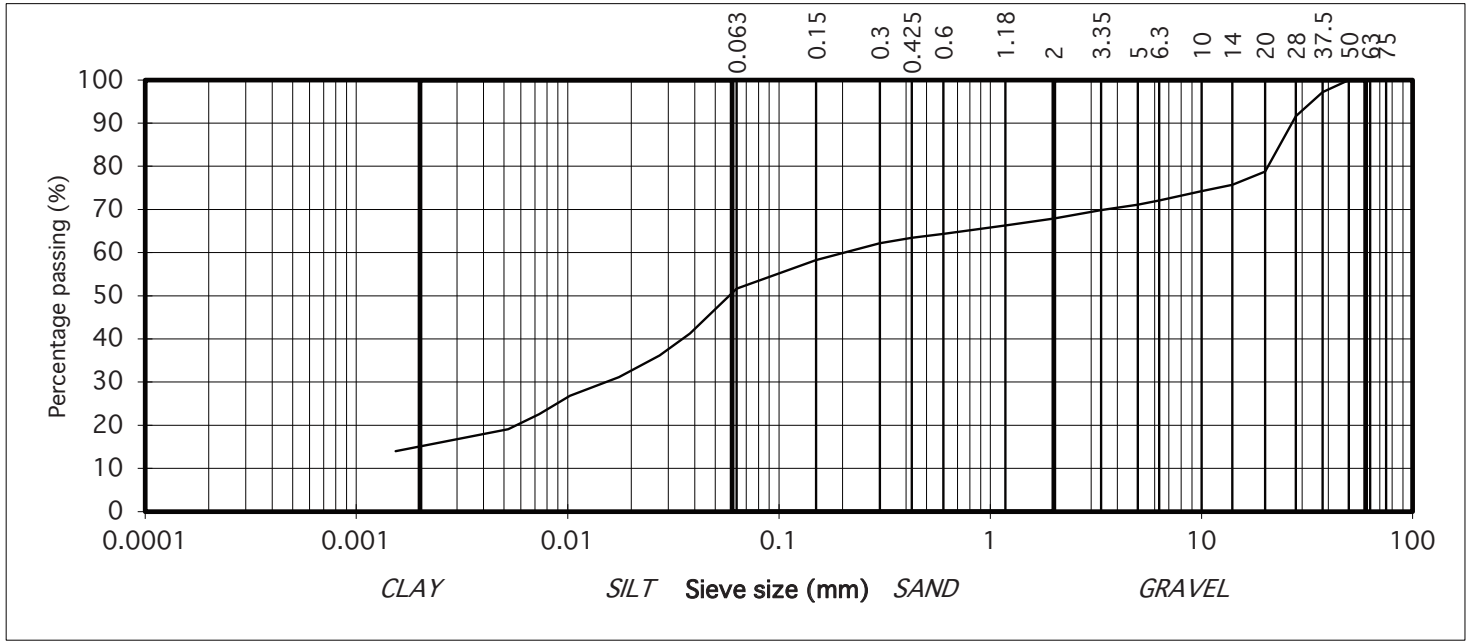
ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	97	
28	92	
20	79	
14	76	
10	74	
6.3	72	
5	71	
3.35	70	
2	68	
1.18	66	SAND
0.6	64	
0.425	63	
0.3	62	
0.15	58	
0.063	52	SILT/CLAY
0.038	41	
0.027	36	
0.018	31	
0.010	27	
0.007	23	
0.005	19	
0.002	14	

Contract No.	23560	Report No.	R129827	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR TP028			
Sample No.*	AA152111	Lab. Sample No.		A21/6176
Sample Type:	B			
Depth* (m)	0.30-0.35	Customer:	Ervia	
Date Received	01/12/2021	Date Testing started		03/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY			

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.
This report shall not be reproduced except in full without the written approval of the Laboratory.

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



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	23/12/21	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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

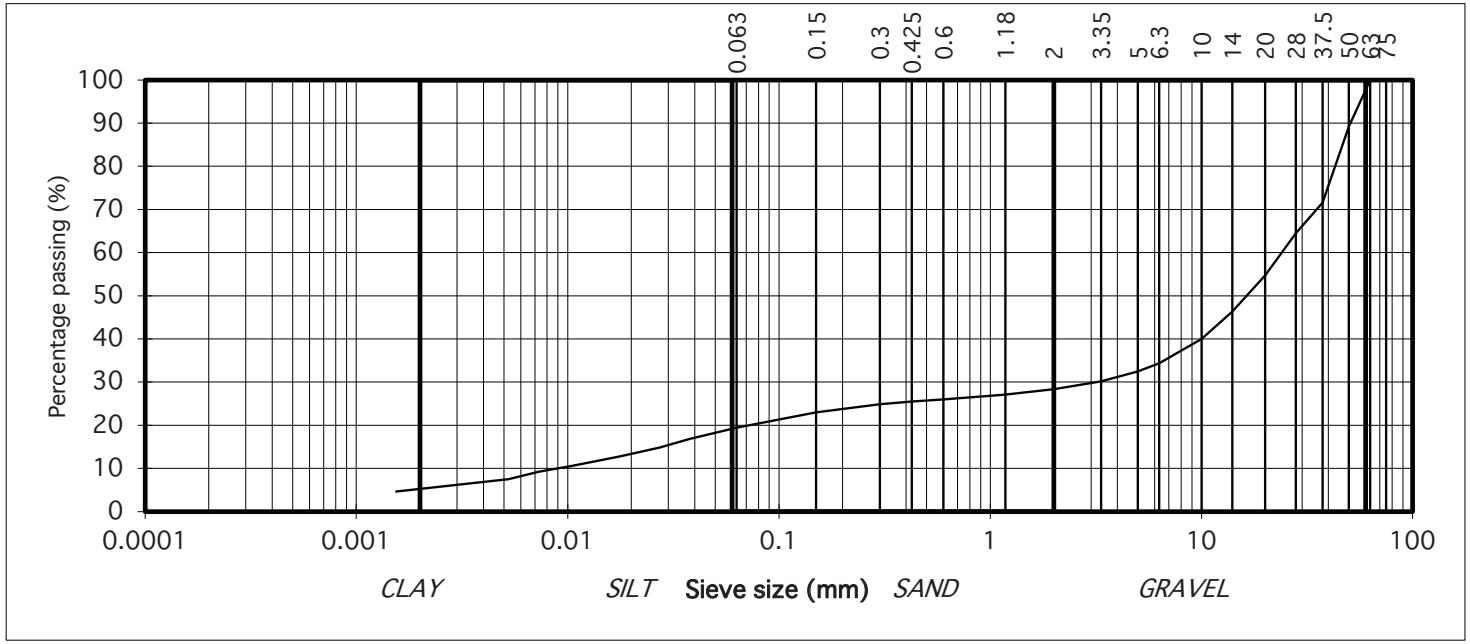
particle size	% passing	
75	100	COBBLES
63	100	
50	89	GRAVEL
37.5	72	
28	64	
20	55	
14	46	
10	40	
6.3	34	
5	32	
3.35	30	
2	28	
1.18	27	SAND
0.6	26	
0.425	26	
0.3	25	
0.15	23	
0.063	19	SILT/CLAY
0.038	17	
0.027	15	
0.018	13	
0.010	11	
0.007	9	
0.005	7	
0.002	5	

Contract No.	23560	Report No.	R129898
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR-TP028		
Sample No.*	AA152114	Lab. Sample No.	A21/6177
Sample Type:	B		
Depth* (m)	0.70-0.75	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	03/12/2021
Description:	Brown clayey/silty, sandy, GRAVEL		

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.
This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Smple size did not meet the requirements of BS1377



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	94	
50	84	GRAVEL
37.5	69	
28	58	
20	44	
14	43	
10	40	
6.3	37	
5	36	
3.35	35	
2	33	
1.18	31	SAND
0.6	30	
0.425	29	
0.3	28	
0.15	24	
0.063	20	SILT/CLAY
0.038	16	
0.027	14	
0.018	12	
0.010	10	
0.007	8	
0.005	7	
0.002	5	

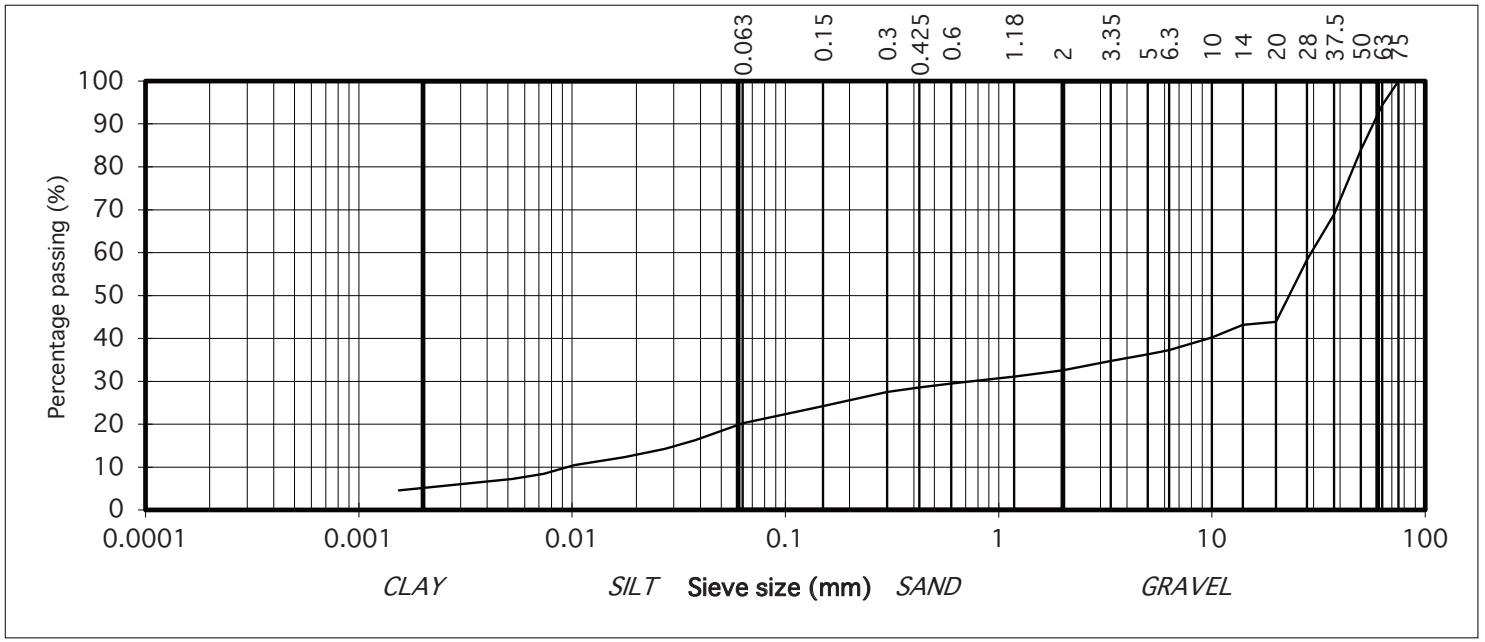
Contract No.	23560	Report No.	R129359
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP029		
Sample No.*	AA152116	Lab. Sample No.	A21/6190
Sample Type:	B		
Depth* (m)	0.50-0.55	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	01/12/2021
Description:	Brown slightly sandy, very gravelly, SILT/CLAY with some cobbles		

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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Remarks

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



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	23/12/21	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

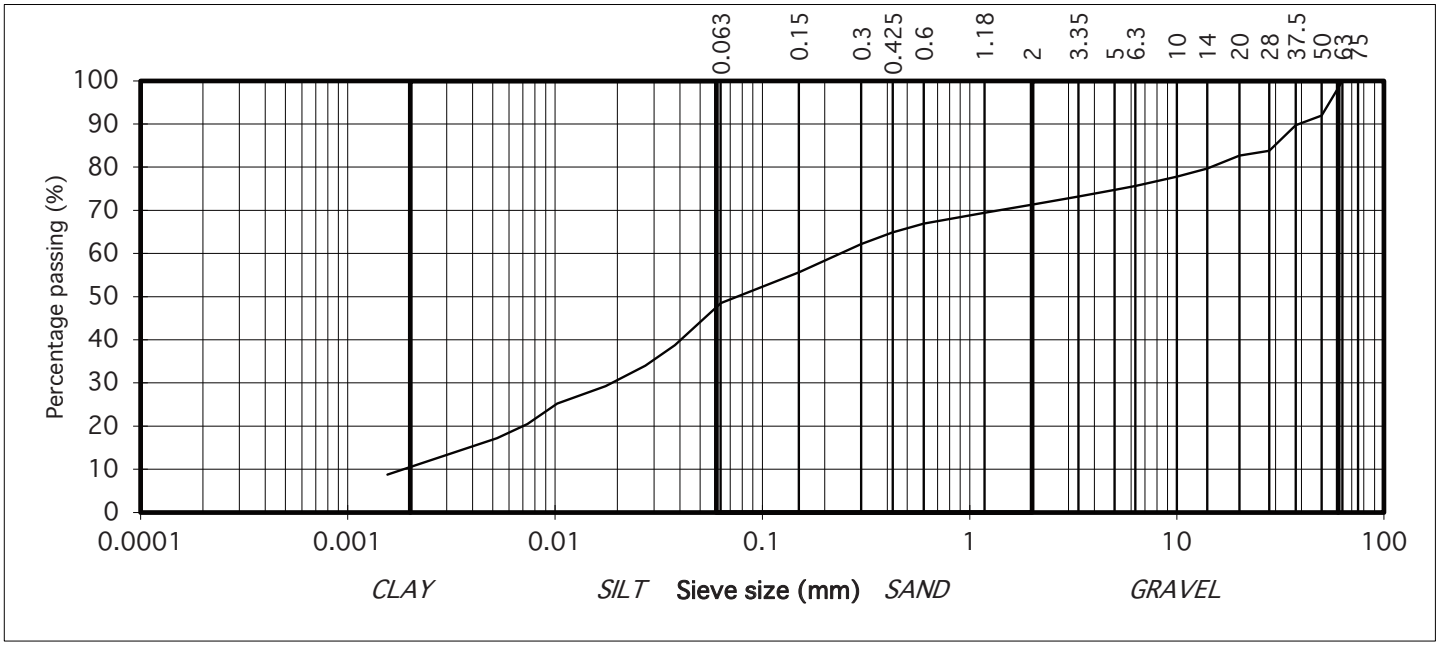
particle size	% passing	
75	100	COBBLES
63	100	
50	92	GRAVEL
37.5	90	
28	84	
20	83	
14	80	
10	78	
6.3	76	
5	75	
3.35	73	
2	71	
1.18	69	SAND
0.6	67	
0.425	65	
0.3	62	
0.15	56	
0.063	48	SILT/CLAY
0.038	39	
0.027	34	
0.018	29	
0.010	25	
0.007	20	
0.005	17	
0.002	9	

Contract No.	23560	Report No.	R129360
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR-TP030		
Sample No.*	AA152118	Lab. Sample No.	A21/6187
Sample Type:	B		
Depth* (m)	0.25-0.30	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	01/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		

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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Remarks

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



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H Byrne	23/12/21	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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

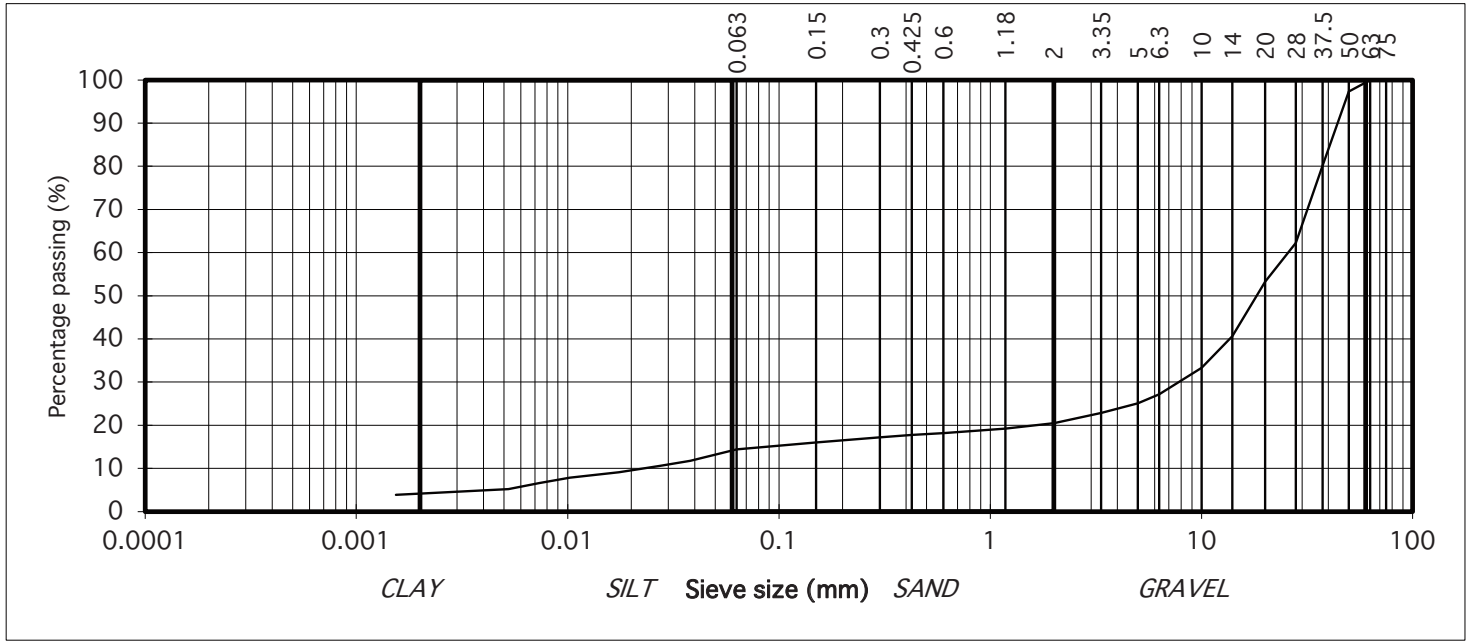
particle size	% passing	
75	100	COBBLES
63	100	
50	97	GRAVEL
37.5	80	
28	62	
20	53	
14	41	
10	33	
6.3	27	
5	25	
3.35	23	
2	20	
1.18	19	SAND
0.6	18	
0.425	18	
0.3	17	
0.15	16	
0.063	14	SILT/CLAY
0.038	12	
0.027	11	
0.018	9	
0.010	8	
0.007	7	
0.005	5	
0.002	4	

Contract No.	23560	Report No.	R129362	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR-TP030			
Sample No.*	AA152120	Lab. Sample No.		A21/6200
Sample Type:	B			
Depth* (m)	0.90-1.00	Customer:	Ervia	
Date Received	01/12/2021	Date Testing started		01/12/2021
Description:	Brown clayey/silty, sandy, GRAVEL			

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.
This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks

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



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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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	92	
20	85	
14	77	
10	74	
6.3	70	
5	68	
3.35	66	
2	63	
1.18	61	SAND
0.6	58	
0.425	56	
0.3	54	
0.15	50	
0.063	43	SILT/CLAY
0.038	38	
0.027	35	
0.018	30	
0.010	27	
0.007	24	
0.005	21	
0.002	14	

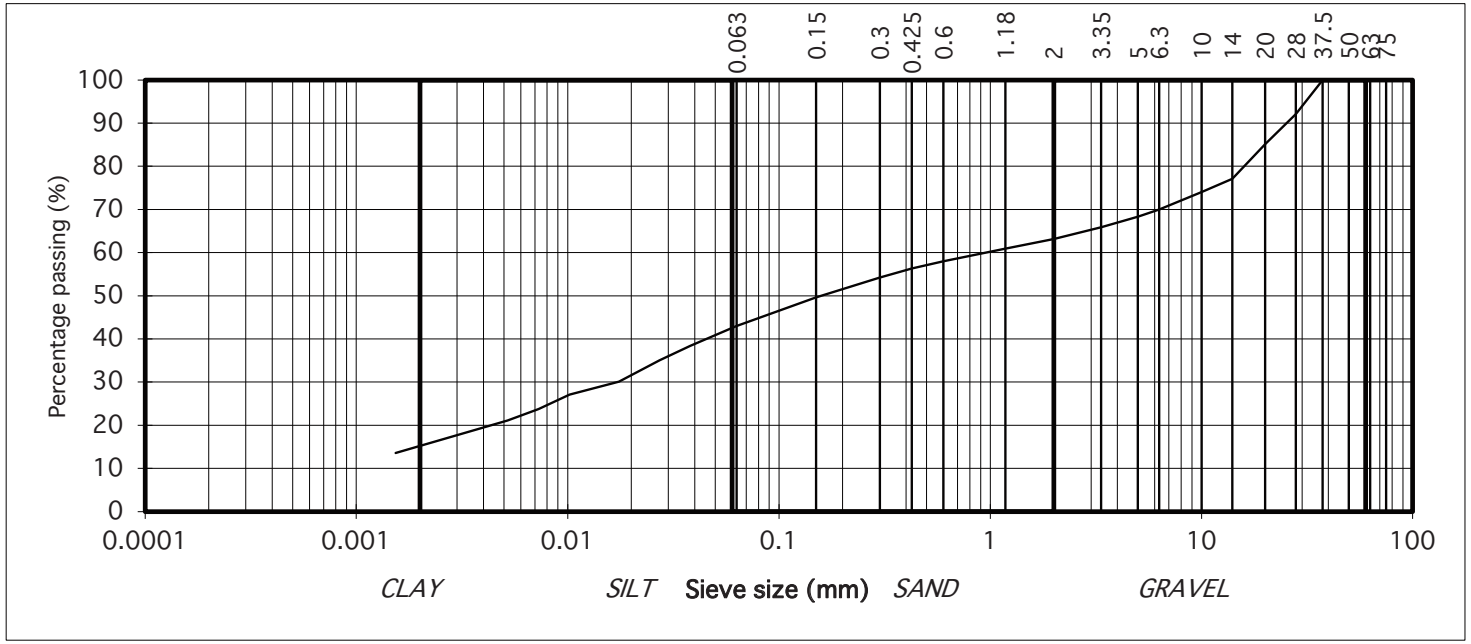
Contract No.	23560	Report No.	R129362
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP031		
Sample No.*	AA152132	Lab. Sample No.	A21/6200
Sample Type:	B		
Depth* (m)	0.30-0.40	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	01/12/2021
Description:	Brown slightly sandy, gravelly, SILT/CLAY		

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.

This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks

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



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	23/12/21	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

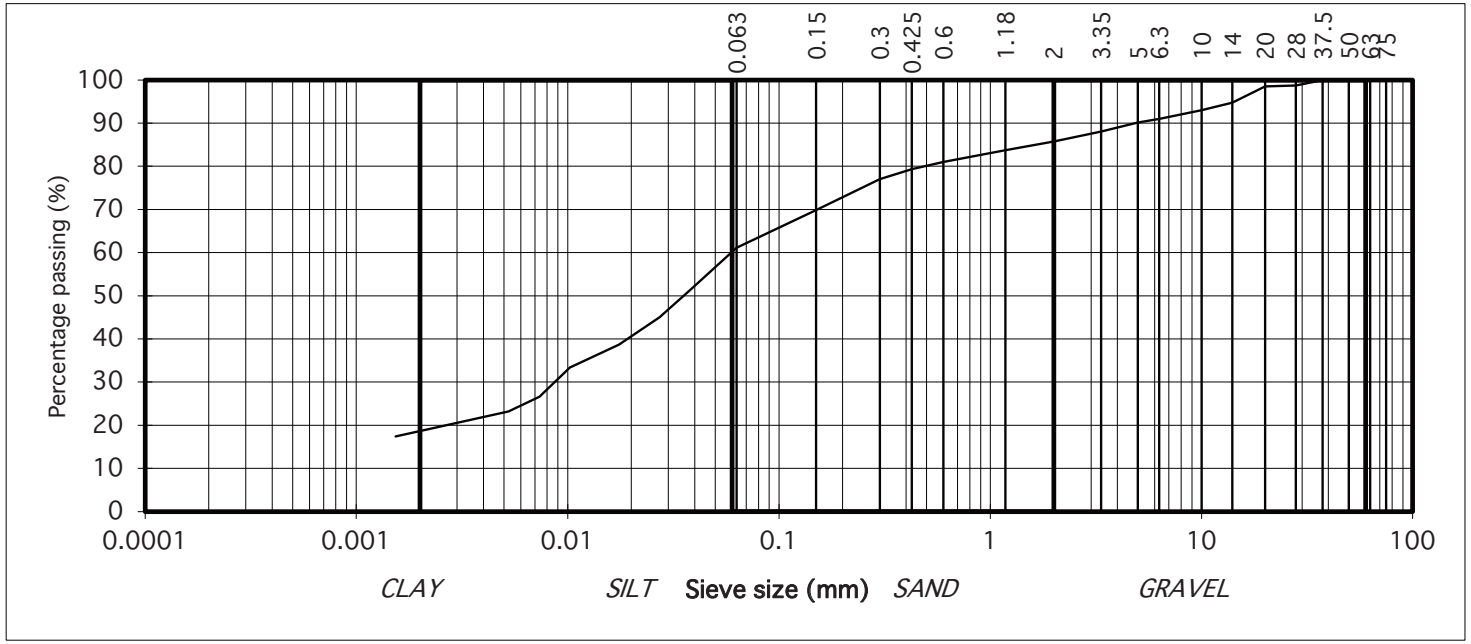
particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	99	
20	98	
14	95	
10	93	
6.3	91	
5	90	
3.35	88	
2	86	
1.18	84	SAND
0.6	81	
0.425	79	
0.3	77	
0.15	70	
0.063	61	SILT/CLAY
0.038	51	
0.027	45	
0.018	39	
0.010	33	
0.007	27	
0.005	23	
0.002	17	

Contract No.	23560	Report No.	R129363
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR-TP032		
Sample No.*	AA152124	Lab. Sample No.	A21/6237
Sample Type:	B		
Depth* (m)	0.10-0.15	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	01/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		

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.
This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks

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



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	23/12/21	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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

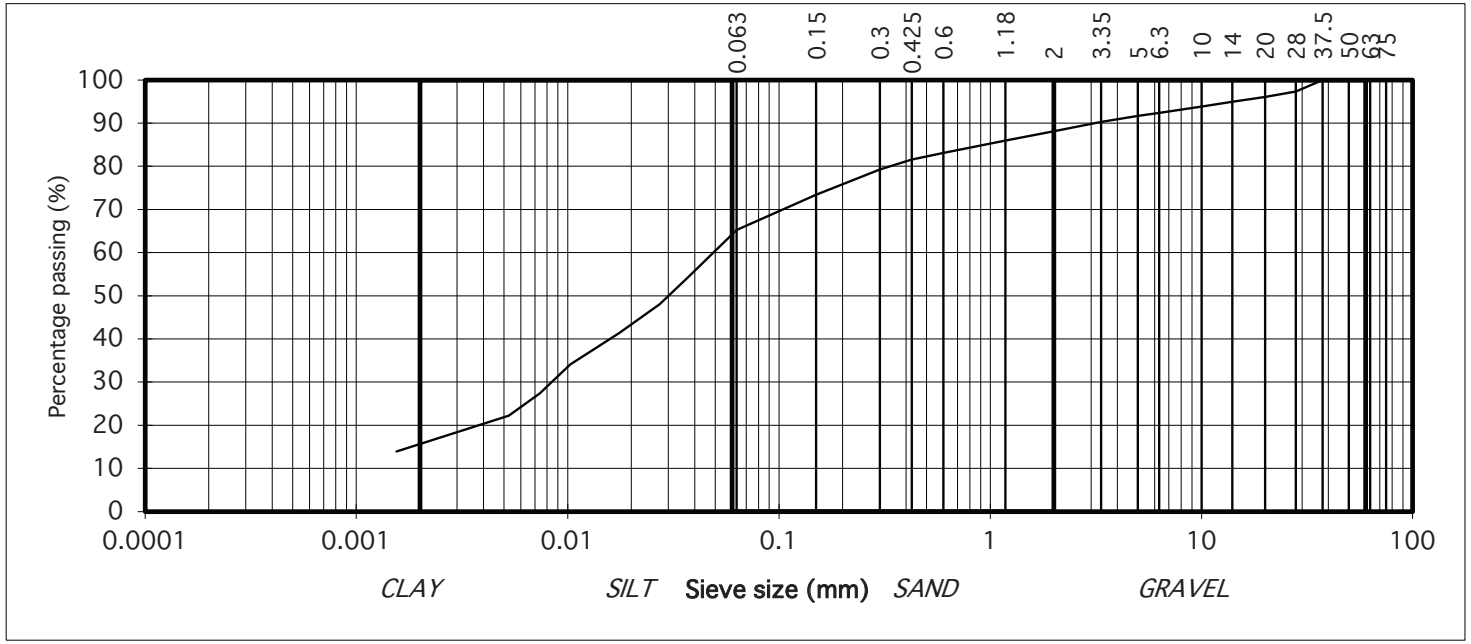
particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	97	
20	96	
14	95	
10	94	
6.3	92	
5	92	
3.35	90	
2	88	
1.18	86	SAND
0.6	83	
0.425	82	
0.3	79	
0.15	73	
0.063	65	SILT/CLAY
0.038	55	
0.027	48	
0.018	41	
0.010	34	
0.007	27	
0.005	22	
0.002	14	

Contract No.	23560	Report No.	R129818
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR-TP032		
Sample No.*	AA152131	Lab. Sample No.	A21/6202
Sample Type:	B		
Depth* (m)	0.40-0.50	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	03/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		

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.
This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks

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



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	23/12/21	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)

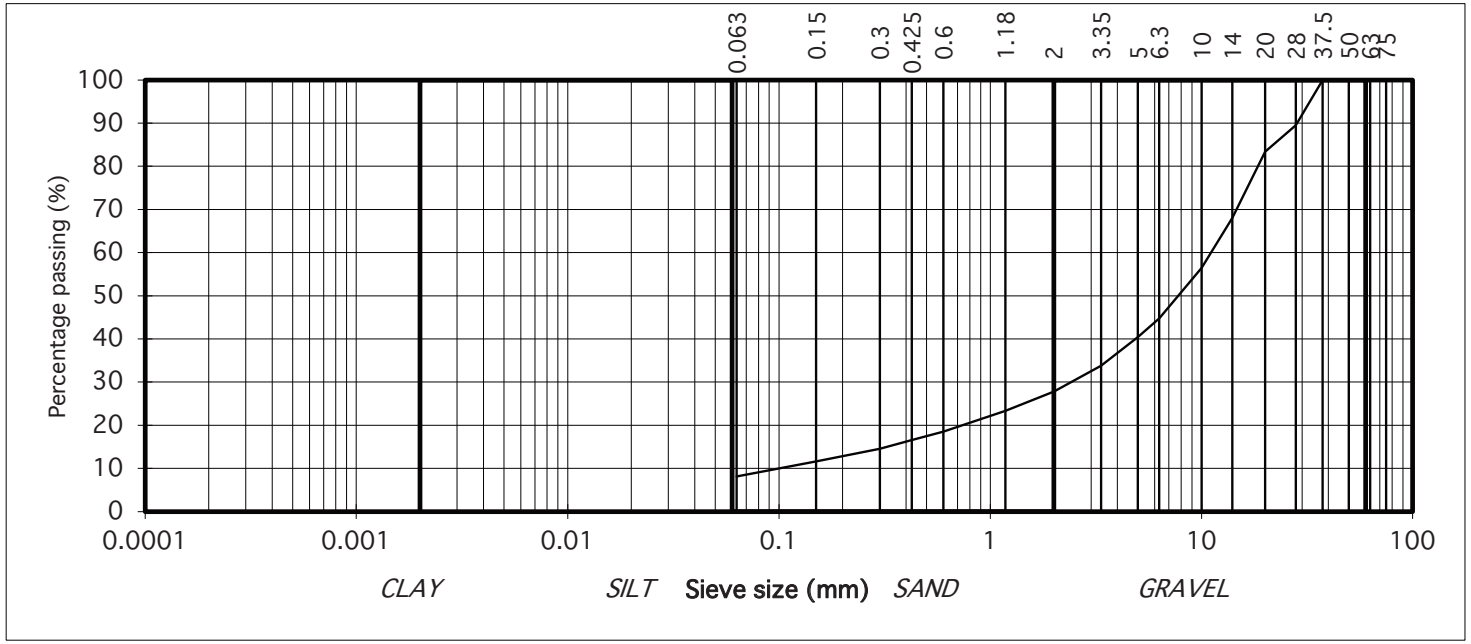
ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	90	
20	83	
14	68	
10	56	
6.3	45	
5	40	
3.35	34	
2	28	
1.18	23	SAND
0.6	19	
0.425	17	
0.3	15	
0.15	12	
0.063	8	SILT/CLAY

Contract No.	23560	Report No.	R129817	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR TP033			
Sample No.*	AA152126	Lab. Sample No.		A21/6203
Sample Type:	B			
Depth* (m)	0.30-0.35	Customer:	Ervia	
Date Received	01/12/2021	Date Testing started		01/12/2021
Description:	Brown clayey/silty, sandy, GRAVEL			

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:
H Byrne	23/12/21	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

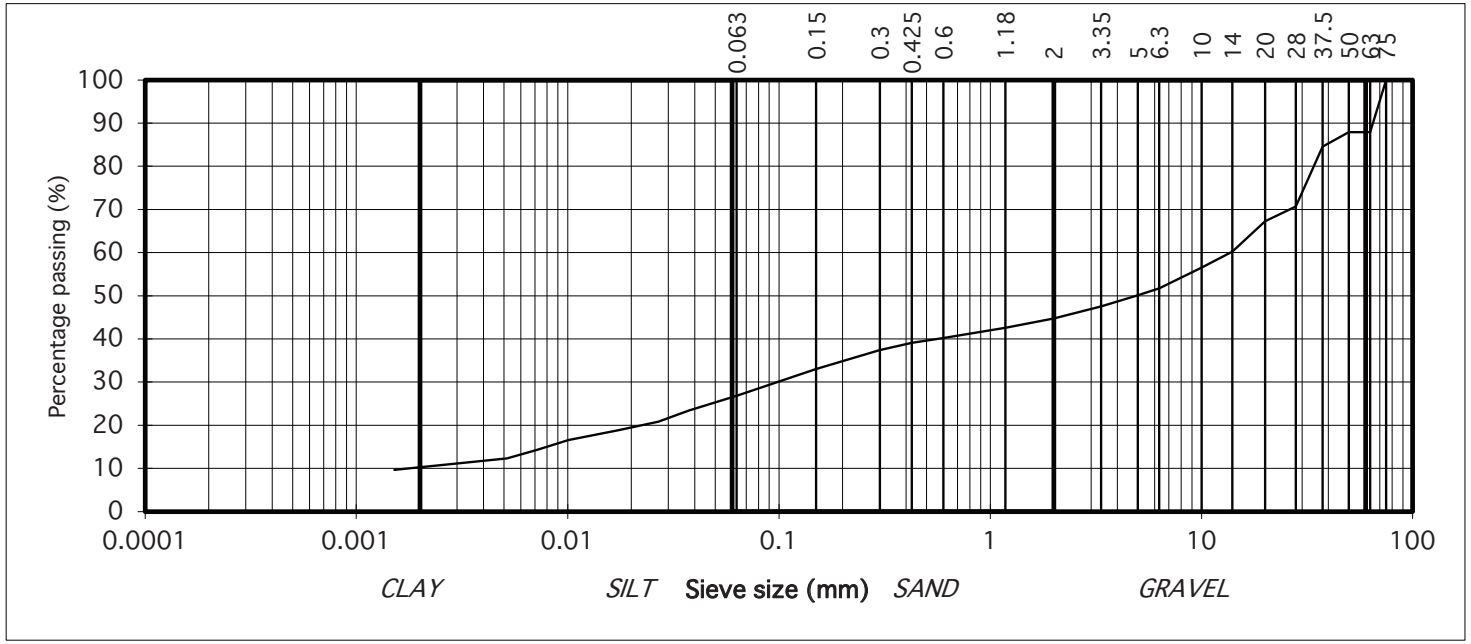
particle size	% passing	
75	100	COBBLES
63	88	
50	88	GRAVEL
37.5	85	
28	71	
20	67	
14	60	
10	57	
6.3	52	
5	50	
3.35	48	
2	45	
1.18	43	SAND
0.6	40	
0.425	39	
0.3	37	
0.15	33	
0.063	27	SILT/CLAY
0.037	23	
0.027	21	
0.017	19	
0.010	17	
0.007	14	
0.005	12	
0.002	10	

Contract No.	23560	Report No.	R129364	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR-TP033			
Sample No.*	AA152127	Lab. Sample No.		A21/6203
Sample Type:	B			
Depth* (m)	0.50-0.55	Customer:	Ervia	
Date Received	01/12/2021	Date Testing started		01/12/2021
Description:	Brown slightly sandy, gravelly, SILT/CLAY with some cobbles			

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.
This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



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Approved by:	Date:	Page no:
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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

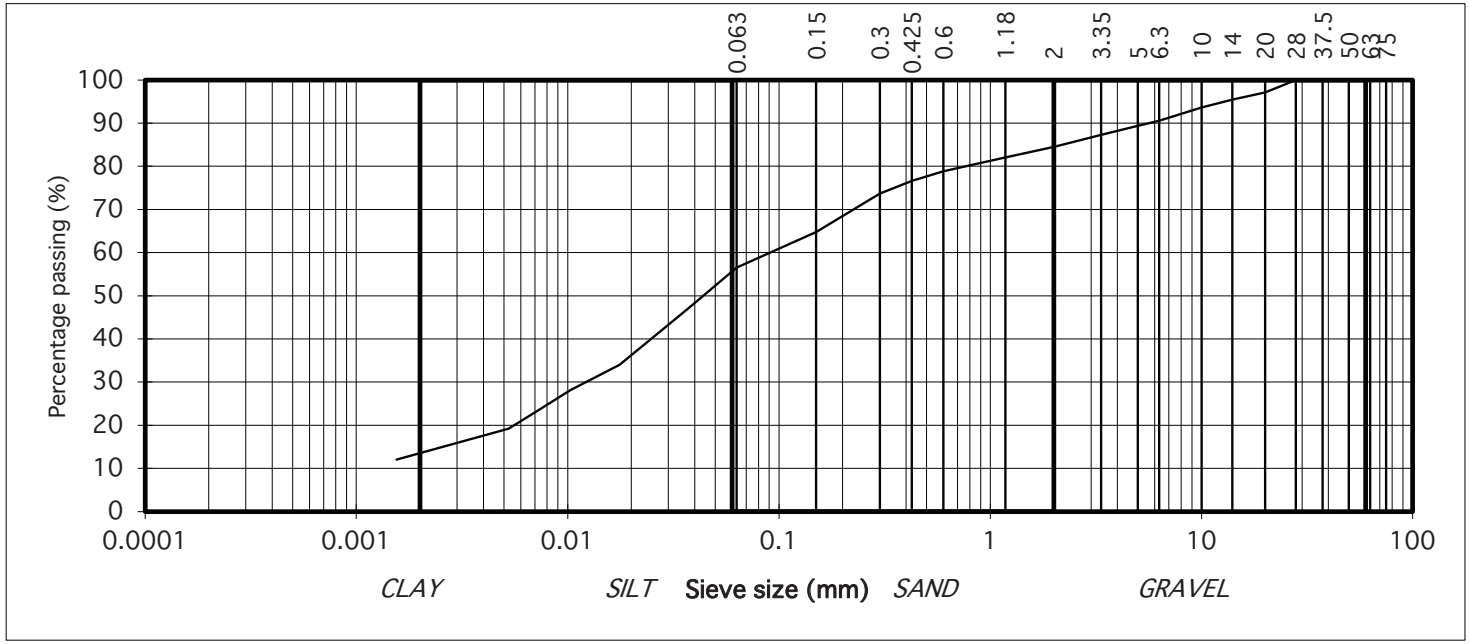
TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**
(note: Sedimentation stage not accredited)

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

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	100	
20	97	
14	95	
10	94	
6.3	91	
5	89	
3.35	87	
2	85	
1.18	82	SAND
0.6	79	
0.425	77	
0.3	74	
0.15	65	
0.063	57	SILT/CLAY
0.038	47	
0.027	42	
0.018	34	
0.010	28	
0.007	24	
0.005	19	
0.002	12	

Contract No.	23560	Report No.	R129381	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR TP034			
Sample No.*	AA152133	Lab. Sample No.		A21/6198
Sample Type:	B			
Depth* (m)	0.20-0.30	Customer:	Ervia	
Date Received	01/12/2021	Date Testing started		01/12/2021
Description:	Brown slightly 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 .			

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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)

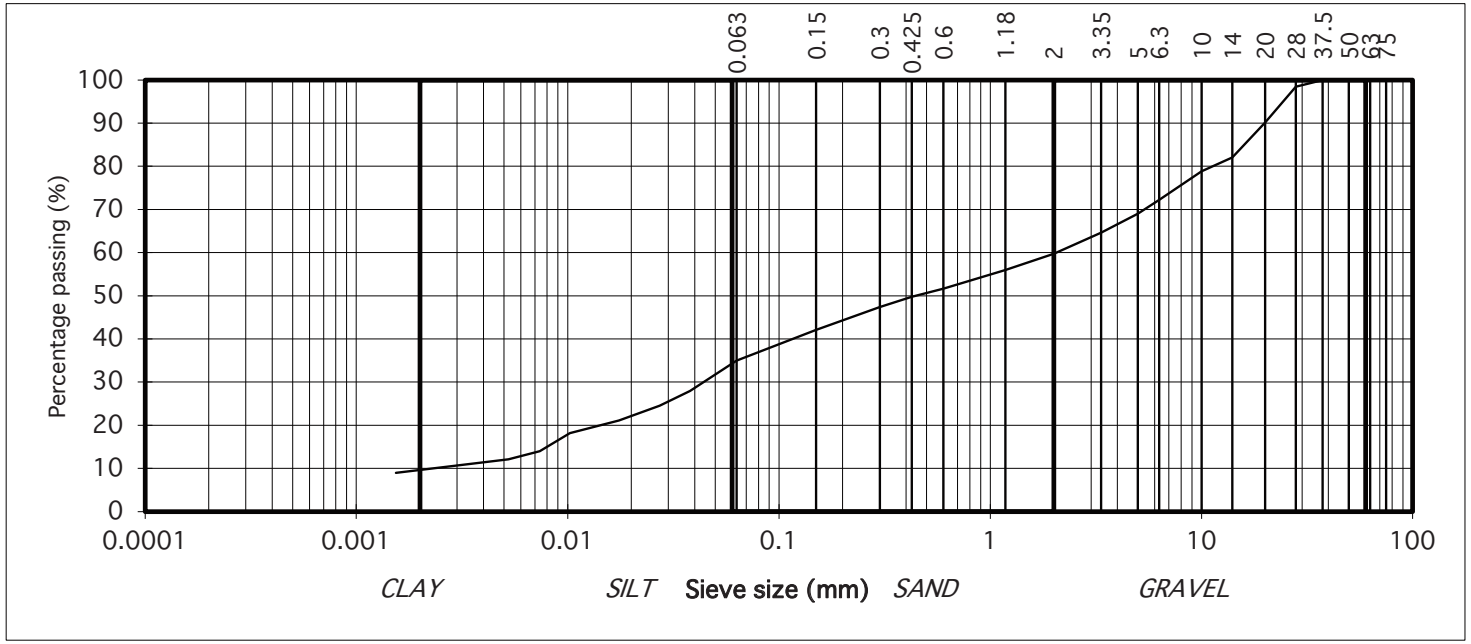
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	98	
20	90	
14	82	
10	79	
6.3	72	
5	69	
3.35	65	
2	60	
1.18	56	SAND
0.6	52	
0.425	50	
0.3	47	
0.15	42	
0.063	35	SILT/CLAY
0.038	28	
0.027	25	
0.018	21	
0.010	18	
0.007	14	
0.005	12	
0.002	9	

Contract No.	23560	Report No.	R129899
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR TP034		
Sample No.*	AA152134	Lab. Sample No.	A21/6199
Sample Type:	B		
Depth* (m)	0.70-0.80	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	03/12/2021
Description:	Brown slightly sandy, gravelly, SILT/CLAY		

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



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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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	98	
20	95	
14	93	
10	90	
6.3	88	
5	87	
3.35	84	
2	82	
1.18	80	SAND
0.6	77	
0.425	75	
0.3	72	
0.15	63	
0.063	52	SILT/CLAY
0.038	41	
0.027	36	
0.018	31	
0.010	26	
0.007	21	
0.005	18	
0.002	11	

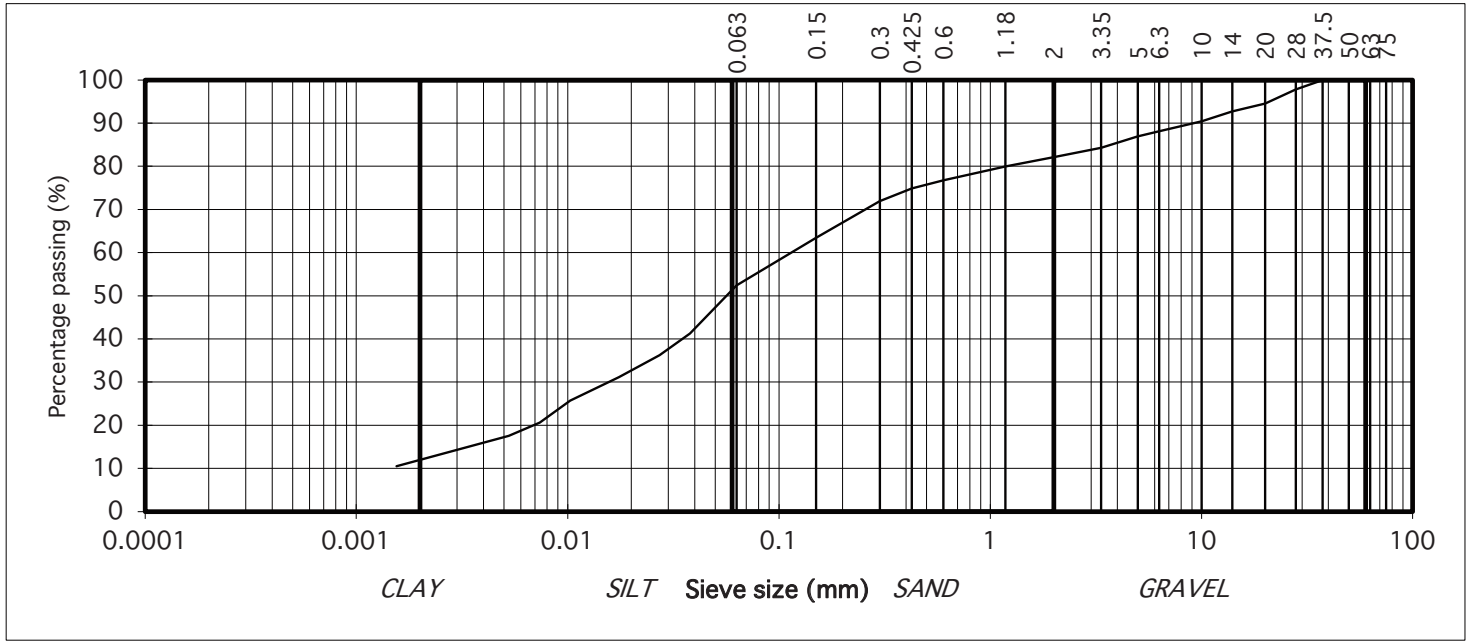
Contract No.	23560	Report No.	R129900	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR TP035			
Sample No.*	AA152135	Lab. Sample No.		A21/6196
Sample Type:	B			
Depth* (m)	0.30-0.40	Customer:	Ervia	
Date Received	24/09/2021	Date Testing started		03/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY			

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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Remarks

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IGSL Ltd Materials Laboratory

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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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	95	
28	89	
20	82	
14	76	
10	72	
6.3	65	
5	63	
3.35	58	
2	52	
1.18	48	SAND
0.6	43	
0.425	42	
0.3	40	
0.15	37	
0.063	34	SILT/CLAY
0.038	30	
0.027	26	
0.018	22	
0.010	19	
0.007	16	
0.005	13	
0.002	8	

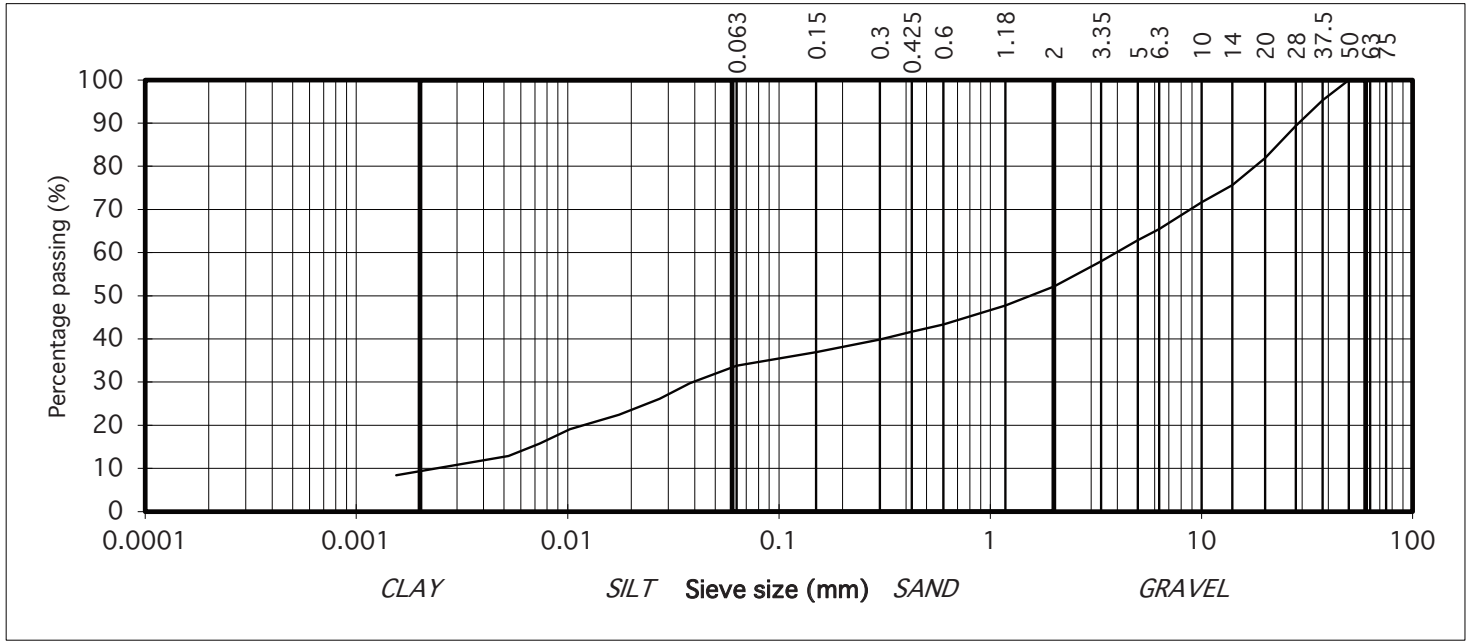
Contract No.	23560	Report No.	R129382
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR-TP035		
Sample No.*	AA152136	Lab. Sample No.	A21/6197
Sample Type:	B		
Depth* (m)	0.80-0.90	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	01/12/2021
Description:	Brown slightly sandy, gravelly, SILT/CLAY		

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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Remarks

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



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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

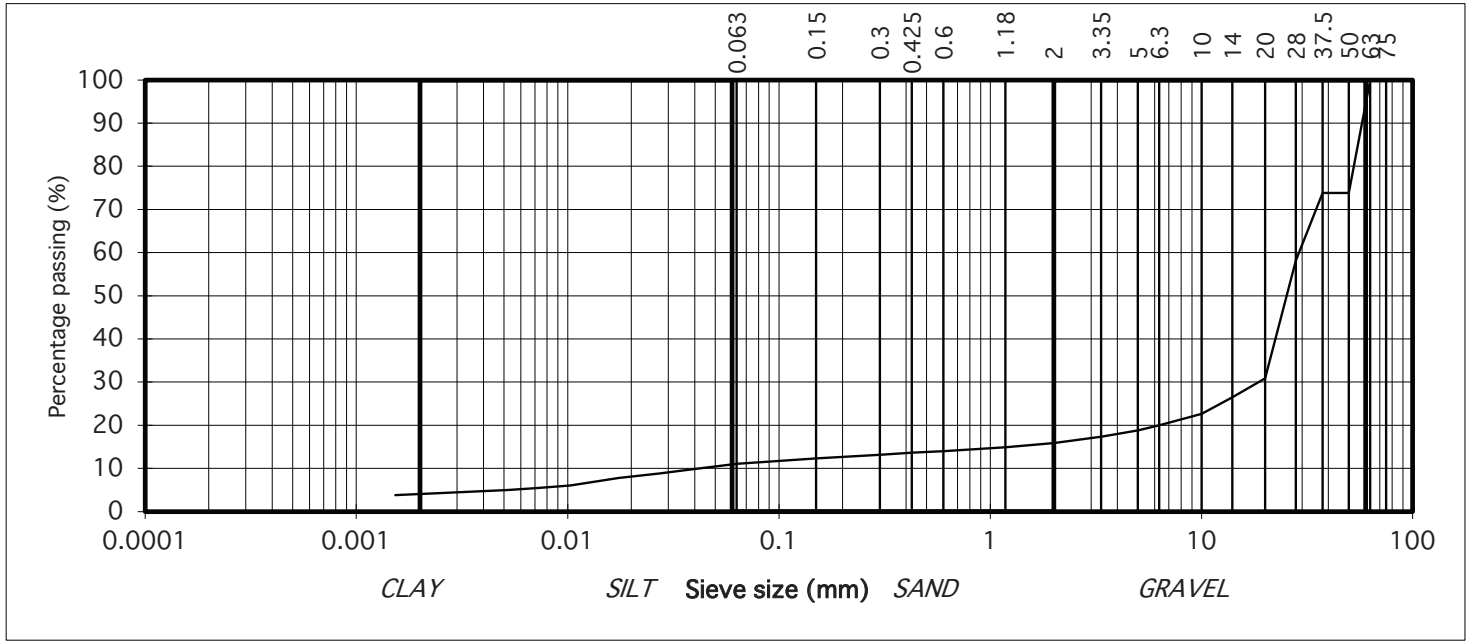
particle size	% passing	
75	100	COBBLES
63	100	
50	74	GRAVEL
37.5	74	
28	58	
20	31	
14	26	
10	23	
6.3	20	
5	19	
3.35	17	
2	16	
1.18	15	SAND
0.6	14	
0.425	14	
0.3	13	
0.15	12	
0.063	11	SILT/CLAY
0.038	10	
0.027	9	
0.017	8	
0.010	6	
0.007	5	
0.005	5	
0.002	4	

Contract No.	23560	Report No.	R129865	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR BH001			
Sample No.*	AA155831	Lab. Sample No.		A21/6222
Sample Type:	B			
Depth* (m)	0.80	Customer:	Ervia	
Date Received	01/12/2021	Date Testing started		06/12/2021
Description:	Brown clayey/silty, slightly sandy, GRAVEL			

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.
This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



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Approved by:	Date:	Page no:
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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

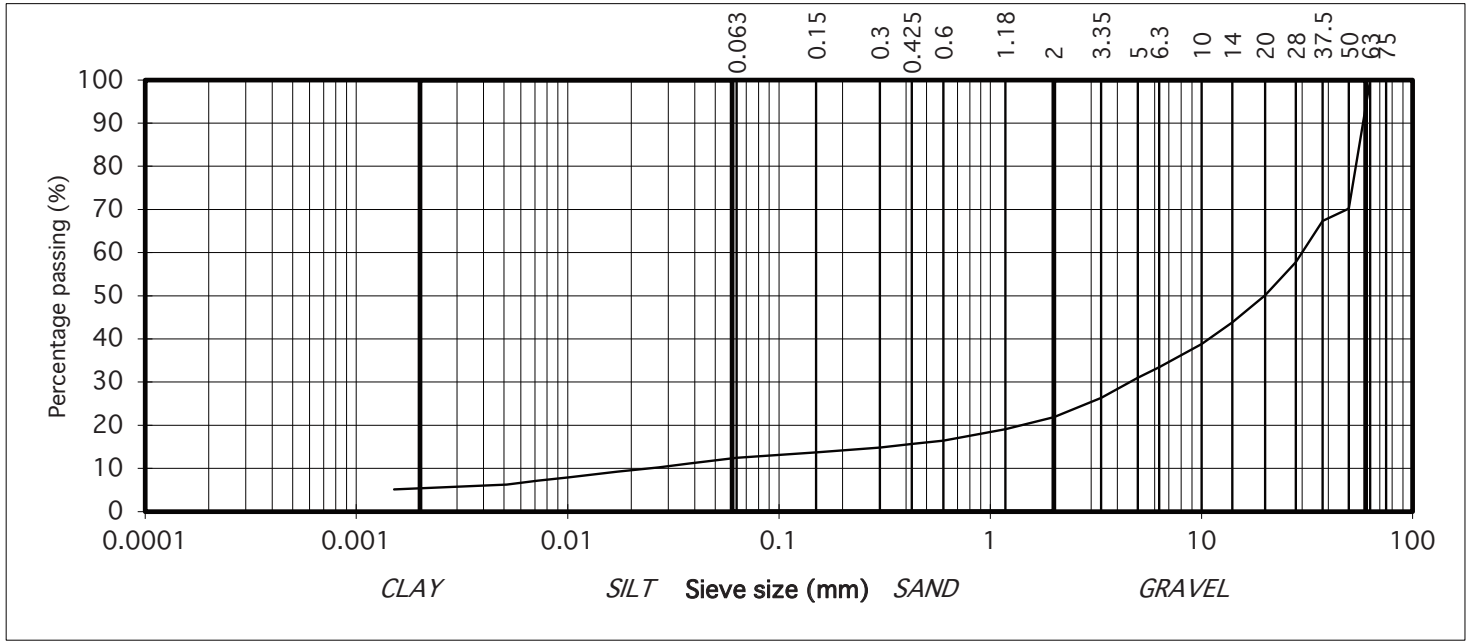
particle size	% passing	
75	100	COBBLES
63	100	
50	70	GRAVEL
37.5	67	
28	58	
20	50	
14	44	
10	39	
6.3	33	
5	31	
3.35	26	
2	22	
1.18	19	SAND
0.6	16	
0.425	16	
0.3	15	
0.15	14	
0.063	12	SILT/CLAY
0.038	11	
0.027	10	
0.017	9	
0.010	8	
0.007	7	
0.005	6	
0.002	5	

Contract No.	23560	Report No.	R129866
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR BH003		
Sample No.*	AA155832	Lab. Sample No.	A21/6223
Sample Type:	B		
Depth* (m)	1.00	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	06/12/2021
Description:	Brown clayey/silty, sandy, GRAVEL		

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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Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requiremets of BS1377



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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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

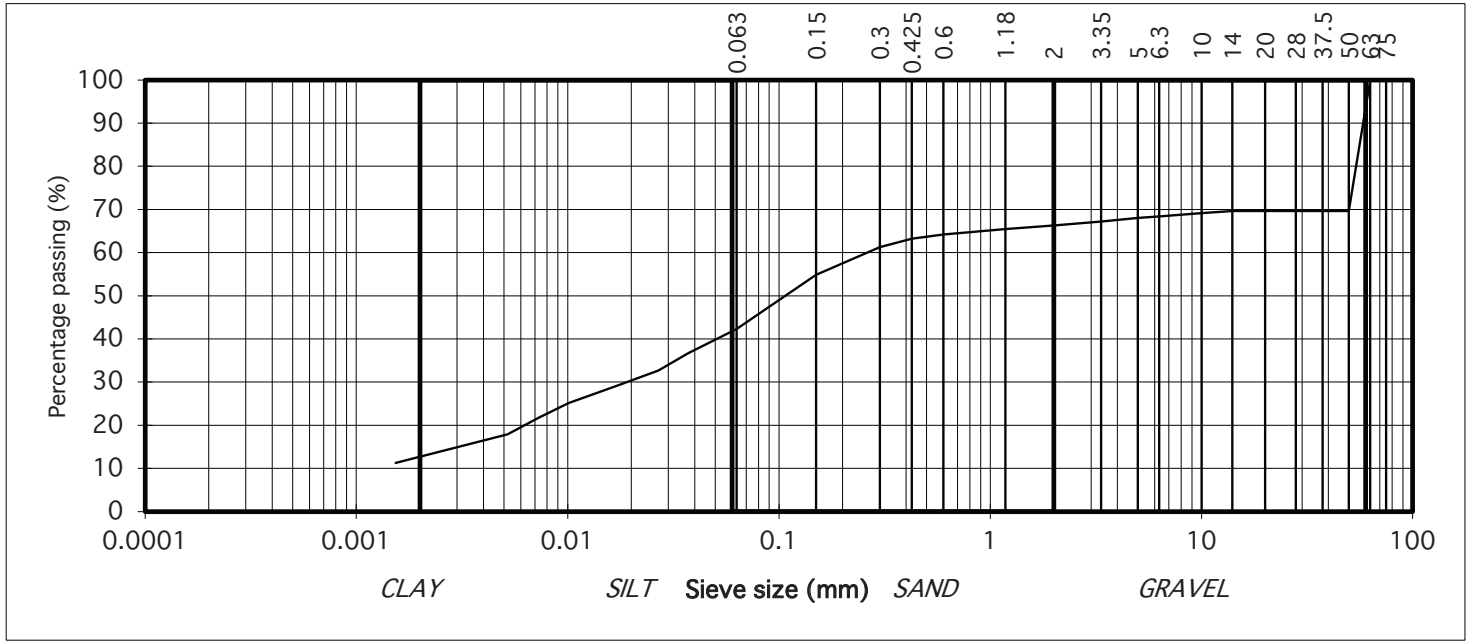
particle size	% passing	
75	100	COBBLES
63	100	
50	70	GRAVEL
37.5	70	
28	70	
20	70	
14	70	
10	69	
6.3	68	
5	68	
3.35	67	
2	66	
1.18	65	SAND
0.6	64	
0.425	63	
0.3	61	
0.15	55	
0.063	42	SILT/CLAY
0.037	37	
0.027	33	
0.017	29	
0.010	25	
0.007	22	
0.005	18	
0.002	11	

Contract No.	23560	Report No.	R129867
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR BH004		
Sample No.*	AA155846	Lab. Sample No.	A21/6224
Sample Type:	B		
Depth* (m)	0.50	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	06/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		

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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Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



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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)

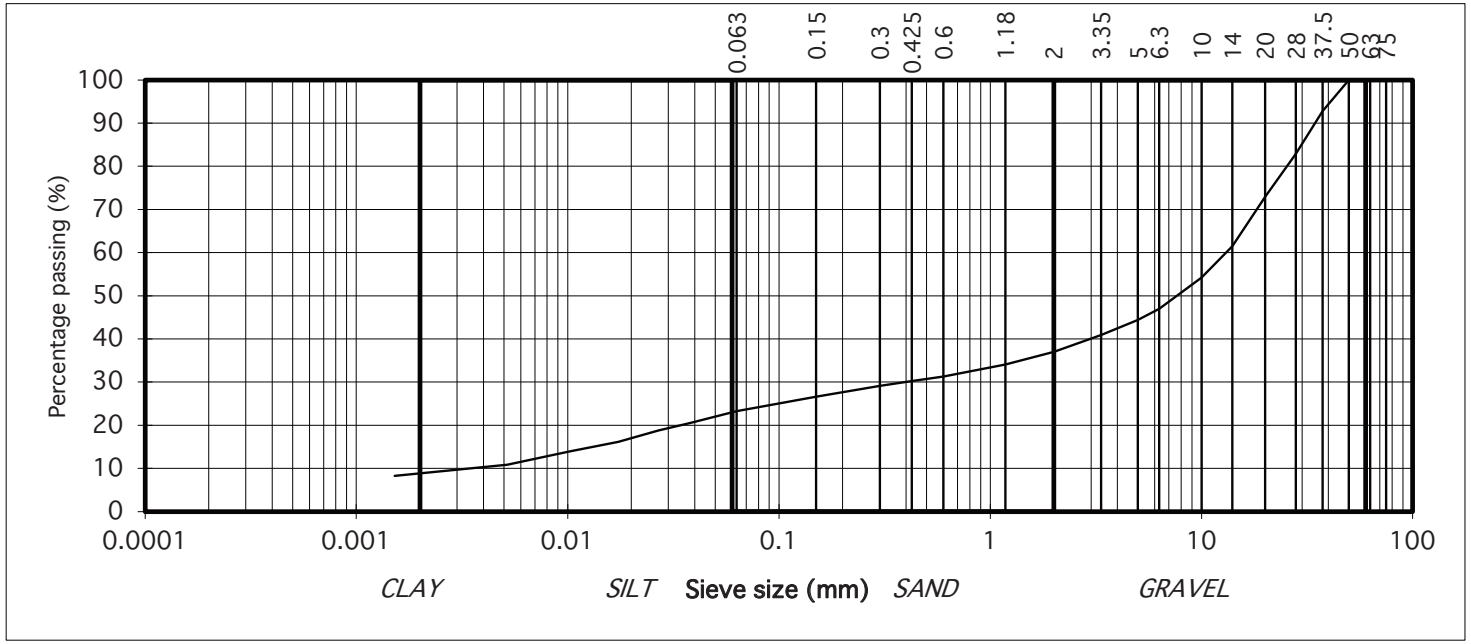
ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	93	
28	83	
20	73	
14	61	
10	54	
6.3	47	
5	44	
3.35	41	
2	37	
1.18	34	SAND
0.6	31	
0.425	30	
0.3	29	
0.15	27	
0.063	23	SILT/CLAY
0.038	20	
0.027	19	
0.017	16	
0.010	14	
0.007	12	
0.005	11	
0.002	8	

Contract No.	23560	Report No.	R129868	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR BH004			
Sample No.*	AA155848	Lab. Sample No.		A21/6225
Sample Type:	B			
Depth* (m)	1.00	Customer:	Ervia	
Date Received	01/12/2021	Date Testing started		06/12/2021
Description:	Brown slightly sandy, gravelly, SILT/CLAY			

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



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

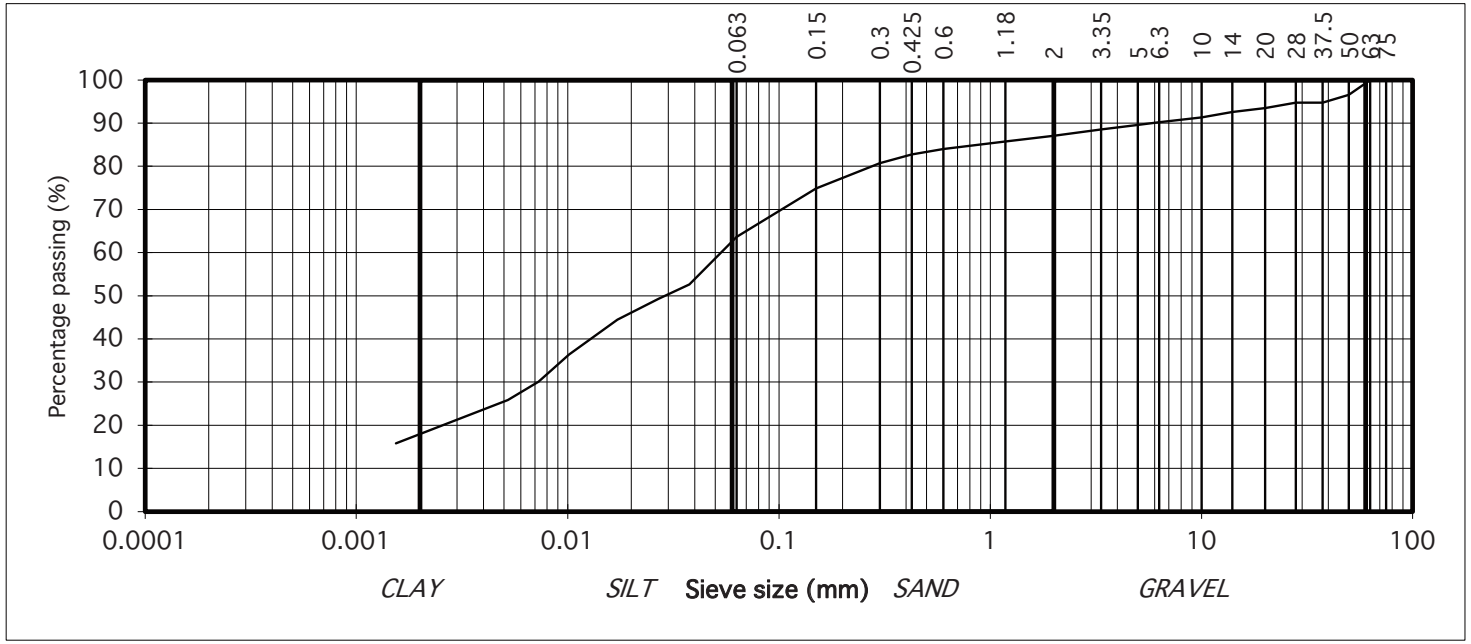
particle size	% passing	
75	100	COBBLES
63	100	
50	97	GRAVEL
37.5	95	
28	95	
20	94	
14	93	
10	91	
6.3	90	
5	90	
3.35	89	
2	87	
1.18	86	SAND
0.6	84	
0.425	83	
0.3	81	
0.15	75	
0.063	64	SILT/CLAY
0.038	53	
0.027	49	
0.017	44	
0.010	36	
0.007	30	
0.005	26	
0.002	16	

Contract No.	23560	Report No.	R129869
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR BH005		
Sample No.*	AA155833	Lab. Sample No.	A21/6226
Sample Type:	B		
Depth* (m)	1.00	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	06/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		

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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Remarks

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



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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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

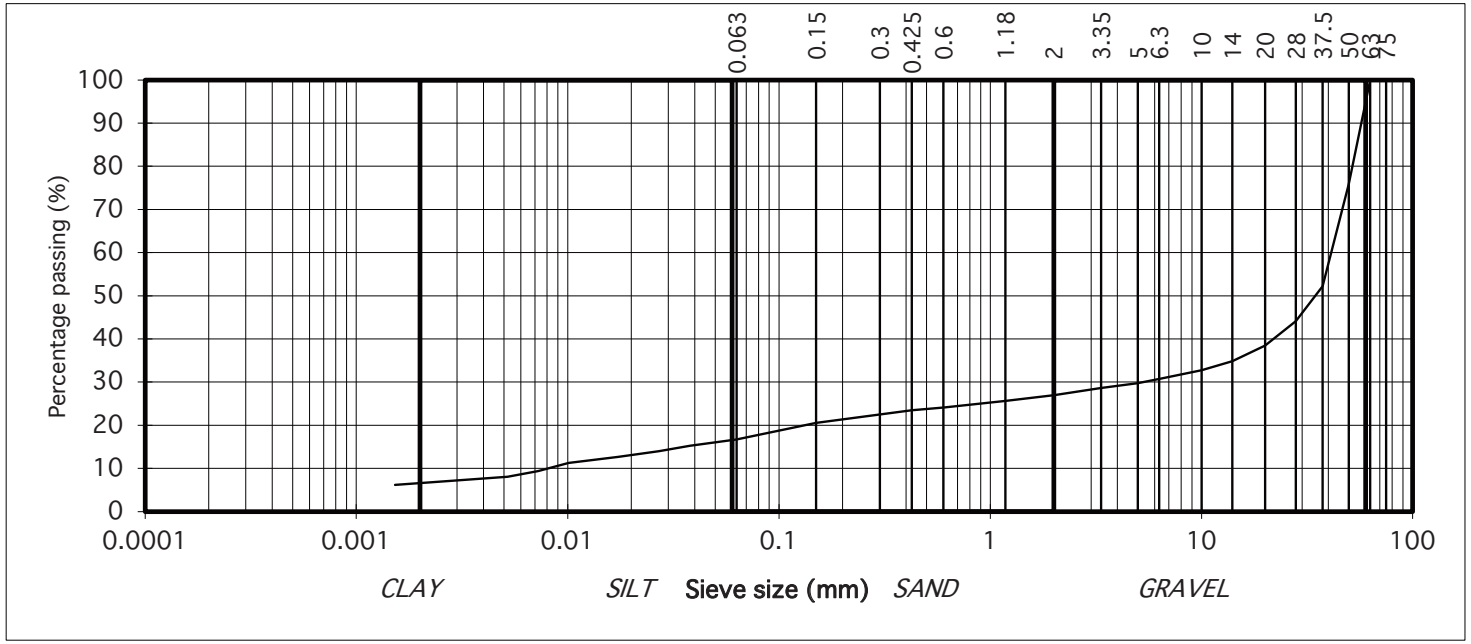
particle size	% passing	
75	100	COBBLES
63	100	
50	76	GRAVEL
37.5	52	
28	44	
20	38	
14	35	
10	33	
6.3	31	
5	30	
3.35	29	
2	27	
1.18	26	SAND
0.6	24	
0.425	23	
0.3	23	
0.15	21	
0.063	17	SILT/CLAY
0.038	15	
0.027	14	
0.017	13	
0.010	11	
0.007	9	
0.005	8	
0.002	6	

Contract No.	23560	Report No.	R129870
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR BH005		
Sample No.*	AA155834	Lab. Sample No.	A21/6227
Sample Type:	B		
Depth* (m)	1.70	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	06/12/2021
Description:	Brown clayey/silty, sandy, GRAVEL		

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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Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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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 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

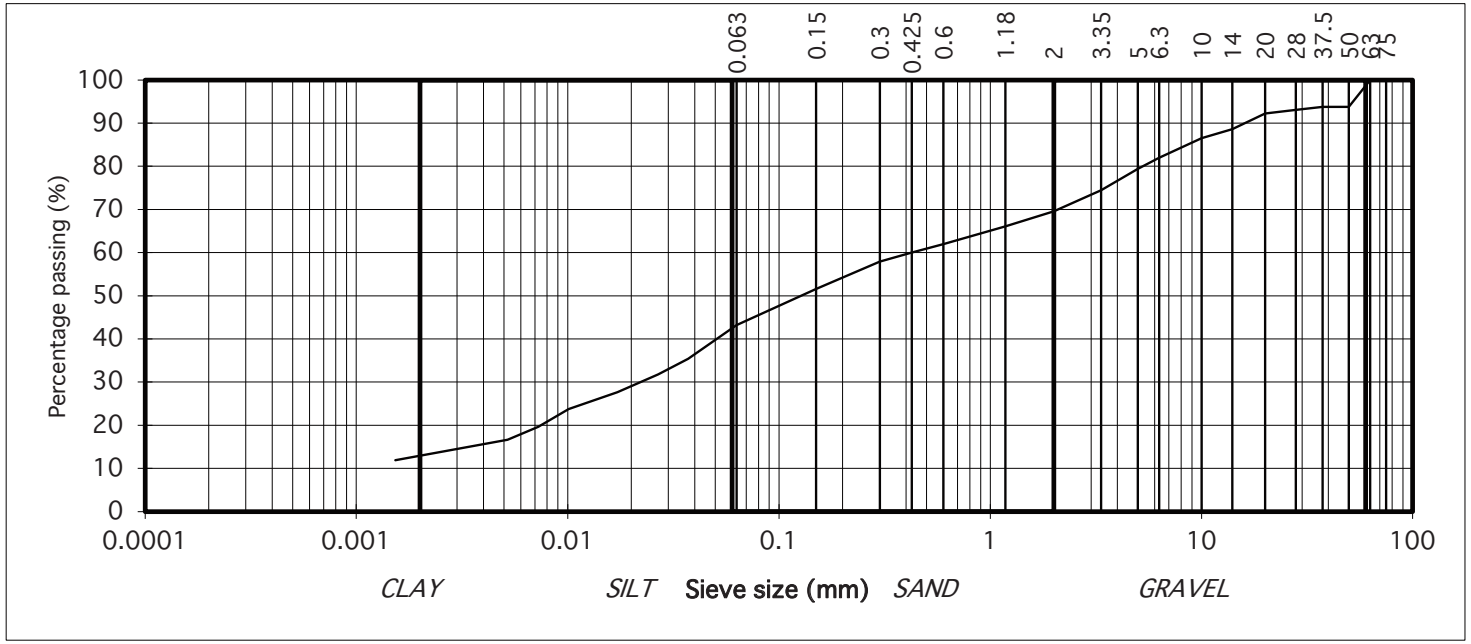
particle size	% passing	
75	100	COBBLES
63	100	
50	94	GRAVEL
37.5	94	
28	93	
20	92	
14	89	
10	86	
6.3	82	
5	79	
3.35	74	
2	70	
1.18	66	SAND
0.6	62	
0.425	60	
0.3	58	
0.15	52	
0.063	43	SILT/CLAY
0.037	35	
0.027	32	
0.017	28	
0.010	24	
0.007	20	
0.005	17	
0.002	12	

Contract No.	23560	Report No.	R129871
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR BH007		
Sample No.*	AA155835	Lab. Sample No.	A21/6228
Sample Type:	B		
Depth* (m)	0.50	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	06/12/2021
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		

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Remarks

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



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Approved by:	Date:	Page no:
H Byrne	23/12/21	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)

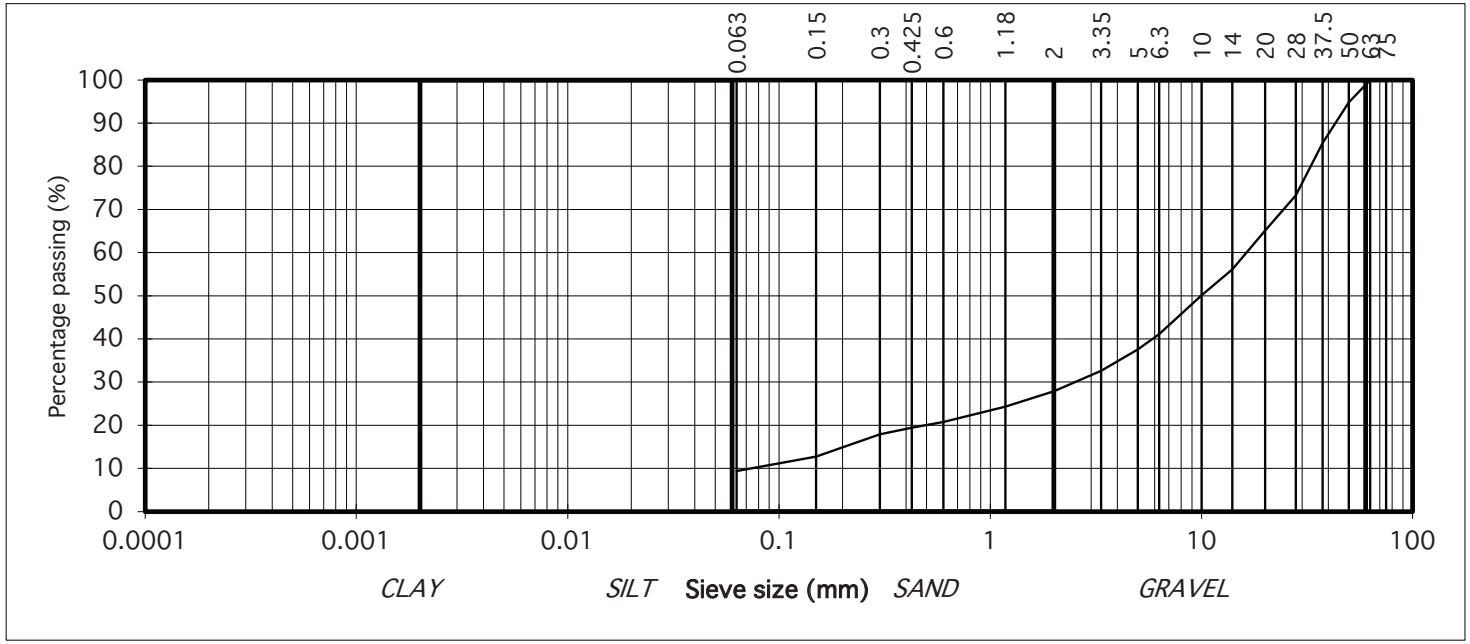
ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	95	GRAVEL
37.5	85	
28	73	
20	65	
14	56	
10	50	
6.3	41	
5	38	
3.35	33	
2	28	
1.18	24	SAND
0.6	21	
0.425	19	
0.3	18	
0.15	13	
0.063	9	SILT/CLAY

Contract No.	23560	Report No.	R129566
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR BH008		
Sample No.*	AA155836	Lab. Sample No.	A21/6229
Sample Type:	B		
Depth* (m)	0.60	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	07/12/2021
Description:	Brown clayey/silty, sandy, GRAVEL		

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



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Approved by:	Date:	Page no:
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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)

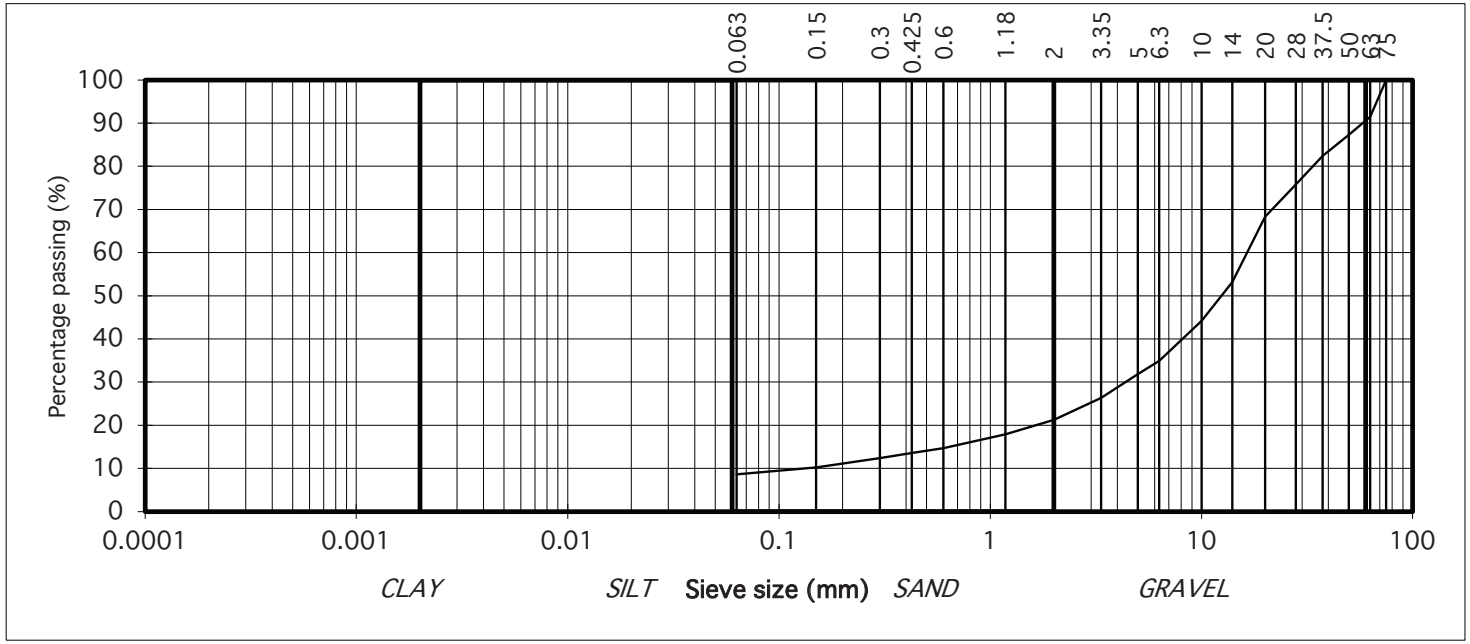
ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	91	
50	87	GRAVEL
37.5	82	
28	76	
20	68	
14	53	
10	44	
6.3	35	
5	32	
3.35	26	
2	21	
1.18	18	SAND
0.6	15	
0.425	14	
0.3	12	
0.15	10	
0.063	9	SILT/CLAY

Contract No.	23560	Report No.	R129872
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR BH009		
Sample No.*	AA155837	Lab. Sample No.	A21/6230
Sample Type:	B		
Depth* (m)	0.50	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	06/12/2021
Description:	Brown clayey/silty, sandy, GRAVEL with some cobbles		

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

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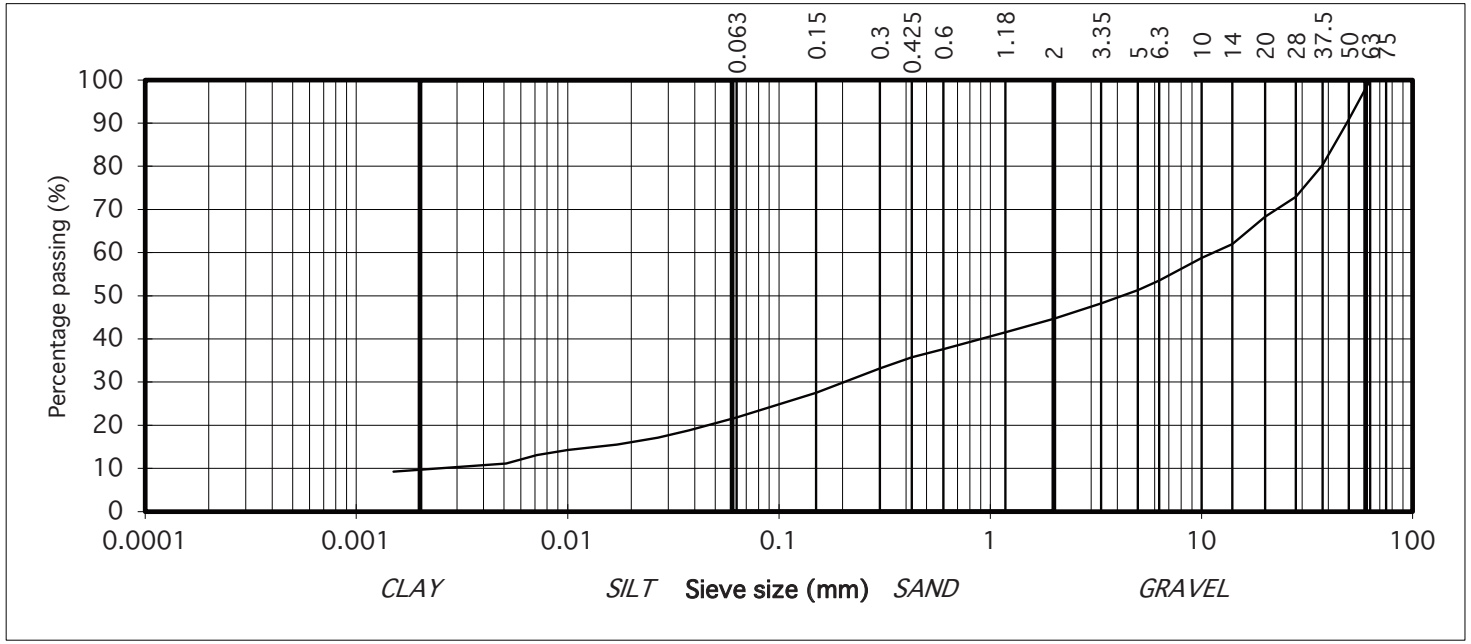
TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**
(note: Sedimentation stage not accredited)

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

particle size	% passing	
75	100	COBBLES
63	100	
50	91	GRAVEL
37.5	80	
28	73	
20	68	
14	62	
10	59	
6.3	54	
5	51	
3.35	48	
2	45	
1.18	42	SAND
0.6	38	
0.425	36	
0.3	33	
0.15	28	
0.063	22	SILT/CLAY
0.037	19	
0.027	17	
0.017	16	
0.010	14	
0.007	13	
0.005	11	
0.001	9	

Contract No.	23560	Report No.	R129873	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR BH009			
Sample No.*	AA155838	Lab. Sample No.		A21/6231
Sample Type:	B			
Depth* (m)	1.00	Customer:	Ervia	
Date Received	01/12/2021	Date Testing started		06/12/2021
Description:	Brown slightly sandy, gravelly, SILT/CLAY			
Remarks	Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .			

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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

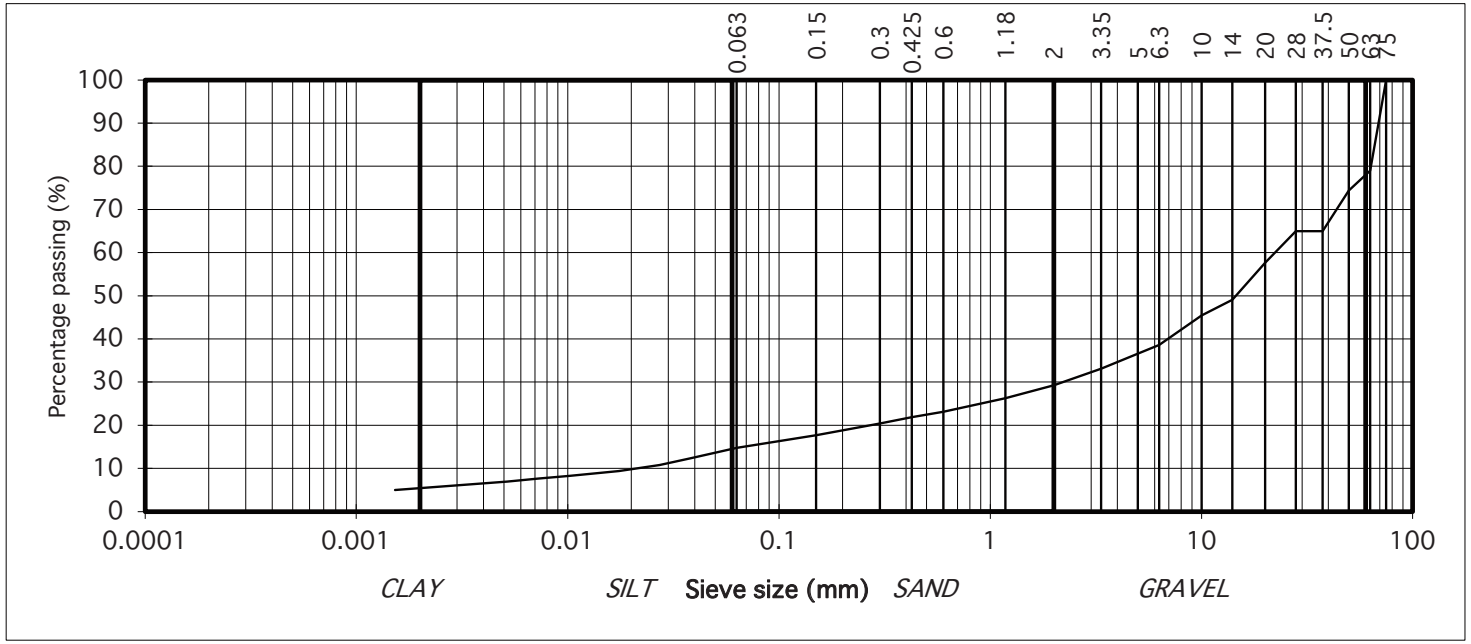
particle size	% passing	
75	100	COBBLES
63	79	
50	74	GRAVEL
37.5	65	
28	65	
20	58	
14	49	
10	45	
6.3	39	
5	37	
3.35	33	
2	29	
1.18	26	SAND
0.6	23	
0.425	22	
0.3	20	
0.15	18	
0.063	15	SILT/CLAY
0.038	12	
0.027	11	
0.017	9	
0.010	8	
0.007	8	
0.005	7	
0.002	5	

Contract No.	23560	Report No.	R129874
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR BH009		
Sample No.*	AA155839	Lab. Sample No.	A21/6232
Sample Type:	B		
Depth* (m)	1.50	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	06/12/2021
Description:	Brown clayey/silty, sandy, GRAVEL with many cobbles		

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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Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



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Approved by:	Date:	Page no:
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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)

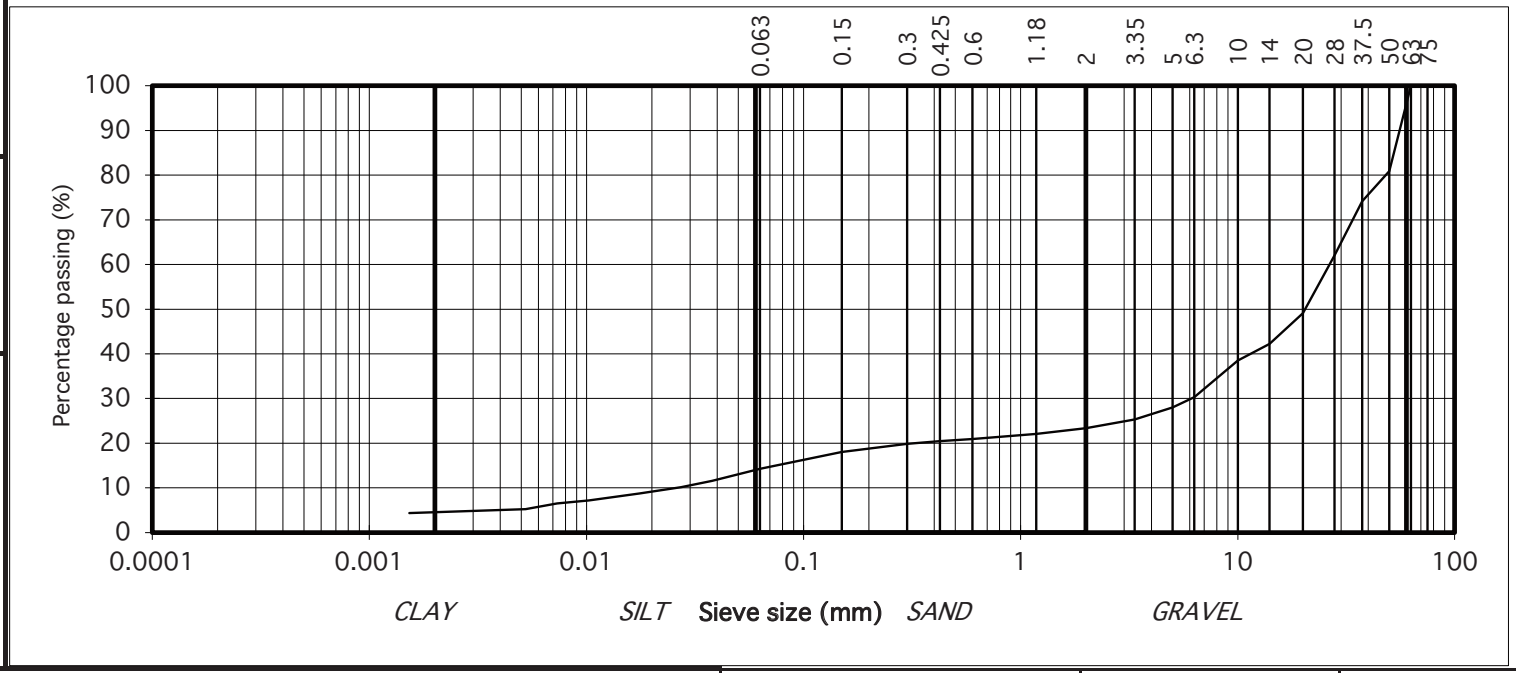
particle size	% passing	
75	100	COBBLES
63	100	
50	81	GRAVEL
37.5	74	
28	62	
20	49	
14	42	
10	39	
6.3	30	
5	28	
3.35	25	
2	23	
1.18	22	SAND
0.6	21	
0.425	20	
0.3	20	
0.15	18	
0.063	14	SILT/CLAY
0.038	12	
0.027	10	
0.018	9	
0.010	7	
0.007	7	
0.005	5	
0.002	4	

Contract No.	23560	Report No.	R129954	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR BH012			
Sample No.*	AA155842	Lab. Sample No.		A21/6233B
Sample Type:	B			
Depth* (m)	0.50	Customer:	Ervia	
Date Received	01/12/2021	Date Testing started		01/12/2021
Description:	Brown clayey/silty, sandy, GRAVEL			

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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Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not emeet the requirements of BS1377



IGSL Ltd Materials Laboratory

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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

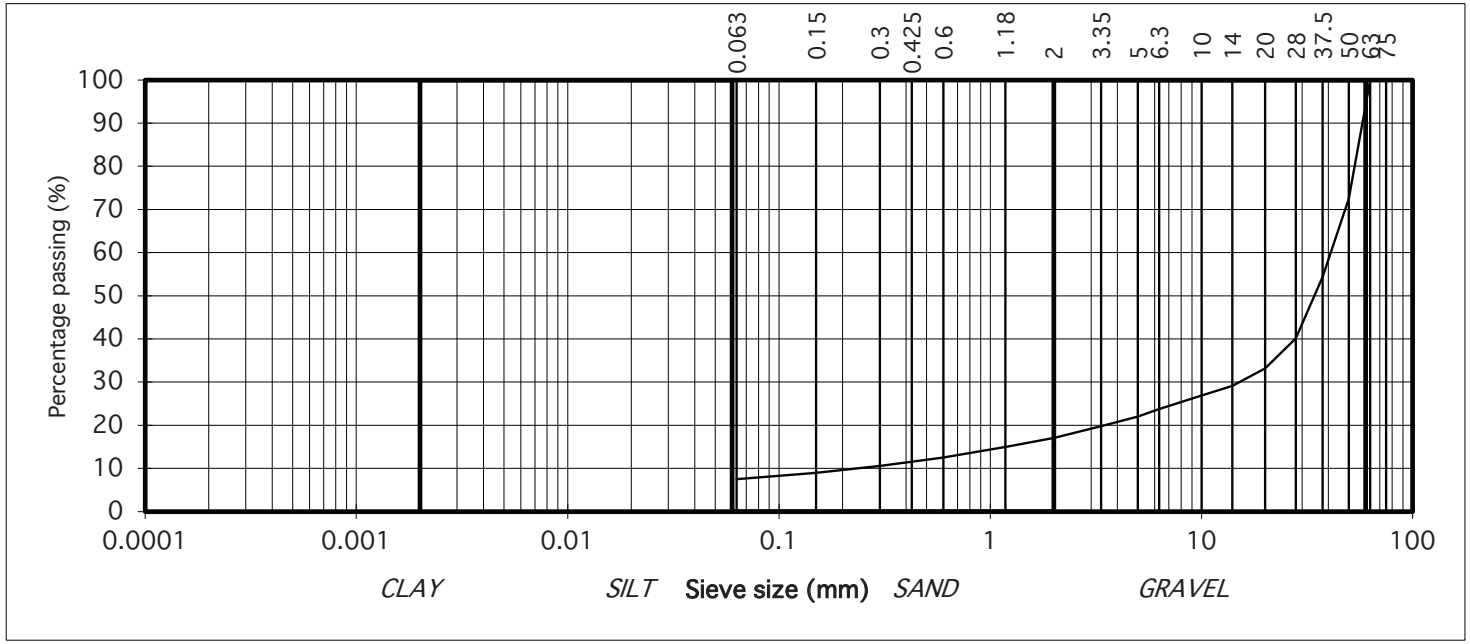
particle size	% passing	
75	100	COBBLES
63	100	
50	73	GRAVEL
37.5	54	
28	40	
20	33	
14	29	
10	27	
6.3	24	
5	22	
3.35	20	
2	17	
1.18	15	SAND
0.6	13	
0.425	12	
0.3	11	
0.15	9	
0.063	8	SILT/CLAY

Contract No.	23560	Report No.	R129875
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR BH012		
Sample No.*	AA155844	Lab. Sample No.	A21/6233
Sample Type:	B		
Depth* (m)	1.20	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	06/12/2021
Description:	Brown clayey/silty, sandy, GRAVEL		

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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Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



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Approved by:	Date:	Page no:
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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)

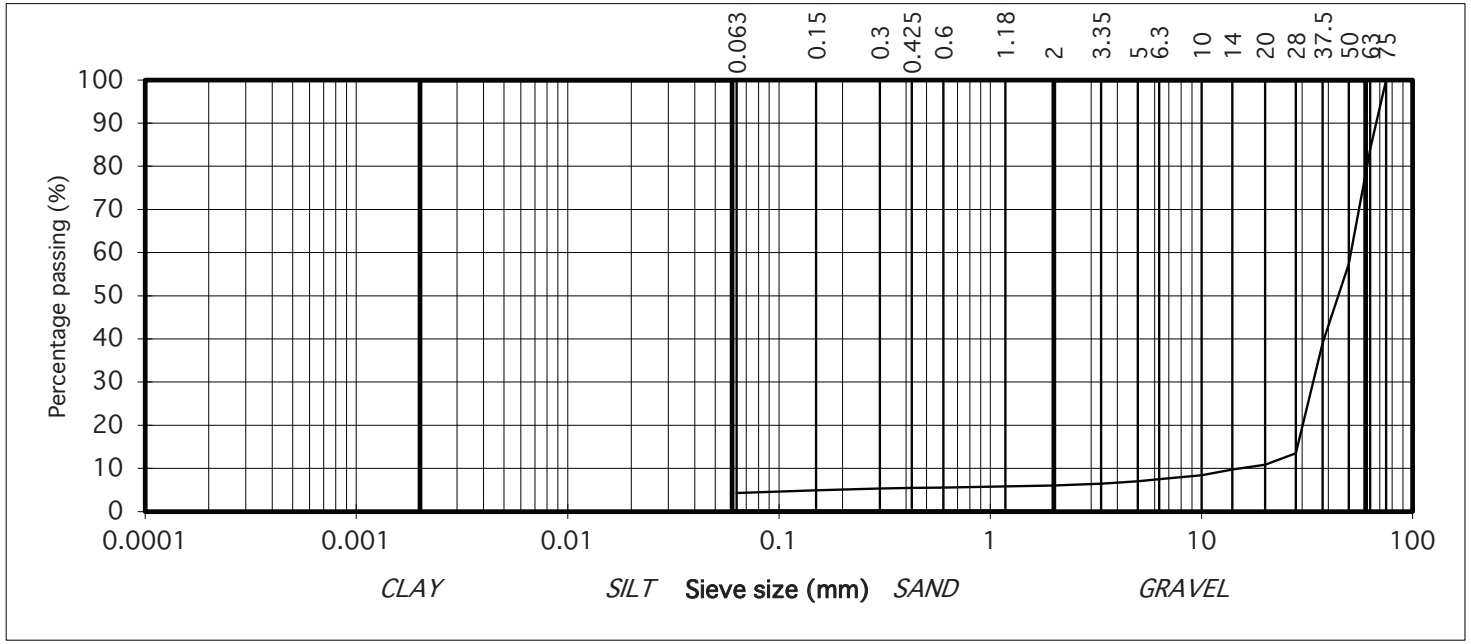
ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	84	
50	57	GRAVEL
37.5	39	
28	14	
20	11	
14	10	
10	8	
6.3	8	
5	7	
3.35	7	
2	6	
1.18	6	SAND
0.6	6	
0.425	5	
0.3	5	
0.15	5	
0.063	4	SILT/CLAY

Contract No.	23560	Report No.	R129807
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR BH013		
Sample No.*	AA155840	Lab. Sample No.	A21/6234
Sample Type:	B		
Depth* (m)	0.50	Customer:	Ervia
Date Received	01/12/2021	Date Testing started	06/12/2021
Description:	Brown slightly clayey/silty, slightly sandy, GRAVEL with some cobbles		

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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Remarks: Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



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Approved by:	Date:	Page no:
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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:Part 4:1990, clause 5.4

Report No.	**R129831**
Contract No.	23560
Contract Name:	WSP Lot3
Customer:	Ervia
BH/TP*	TPR TP002
Sample No.*	AA152057
Depth* (m)	0.80
Sample Type:	B
Lab Sample No.	A21/6136
Source* (if applicable)	N/A
Material Type* (if applicable):	B
Sample Received:	01/12/21
Date Tested:	11/12/21
Sample Cert:	Not Provided
Moisture Content (%):	11
% Particles > 20mm (By dry mass):	30
MCV:	11.4
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown slightly sandy, gravelly, SILT/CLAY

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IGSL Ltd Materials Laboratory M7 Business Park Naas Co.Kildare 045 846176	TEST REPORT Determination of MCV / moisture content Relation of a soil Tested in accordance with BS1377-4:1990, clause 5.5	

Report No. R129565 Contract WSP - Lot 3

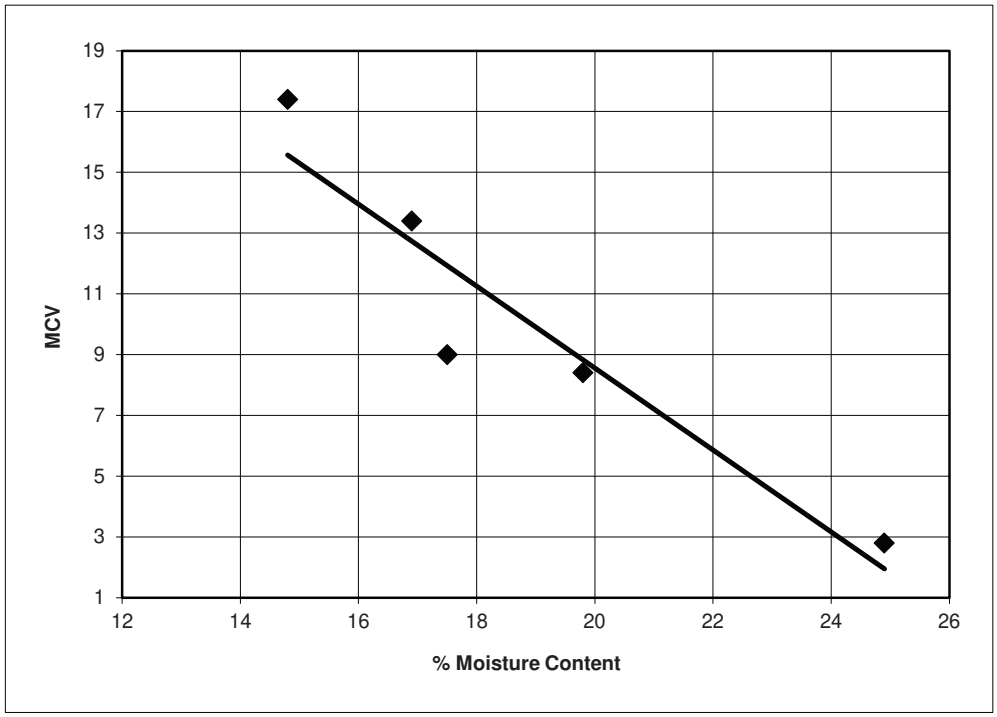
Contract No. 23560 Customer Ervia

Date received 01/12/21 Date Tested 11/12/21

BH/TP No. TPR TP011 Sample No. AA152081 Type: B

Depth (m) 0.60 Lab sample No. A21/6154

MC%	15	18	20	25	16.9
MCV	17.4	9	8.4	2.8	13.4



% material >20mm 78

Persons authorized to approve reports

J Barrett (Quality Manager)

H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory	Approved by	Date	Page No.
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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:Part 4:1990, clause 5.4

Report No.	**R129832**
Contract No.	23560
Contract Name:	WSP Lot3
Customer:	Ervia
BH/TP*	TPR TP013
Sample No.*	AA152069
Depth* (m)	0.4-0.45
Sample Type:	B
Lab Sample No.	A21/6150
Source* (if applicable)	N/A
Material Type* (if applicable):	B
Sample Received:	01/12/21
Date Tested:	11/12/21
Sample Cert:	Not Provided
Moisture Content (%):	24
% Particles > 20mm (By dry mass):	0
MCV:	15
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown slightly sandy, slightly gravelly, SILT/CLAY

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Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

Report No.	**R129838**
Contract No.	23560
Contract Name:	WSP Lot3
Customer:	Ervia
BH/TP*	TPR TP019
Sample No.*	AA152086
Depth* (m)	0.40
Sample Type:	B
Lab Sample No.	A21/6170
Source* (if applicable)	N/A
Material Type* (if applicable):	B
Sample Received:	01/12/21
Date Tested:	11/12/21
Sample Cert:	Not Provided
Moisture Content (%):	16
% Particles > 20mm (By dry mass):	18
MCV:	13.6
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown slightly sandy, slightly gravelly, SILT/CLAY

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Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

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

Report No.	**R129839**
Contract No.	23560
Contract Name:	WSP Lot3
Customer:	Ervia
BH/TP*	TPR TP022
Sample No.*	AA152104
Depth* (m)	0.6-0.65
Sample Type:	B
Lab Sample No.	A21/6183
Source* (if applicable)	N/A
Material Type* (if applicable):	B
Sample Received:	01/12/21
Date Tested:	11/12/21
Sample Cert:	Not Provided
Moisture Content (%):	17
% Particles > 20mm (By dry mass):	24
MCV:	15
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown slightly sandy, slightly 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:Part 4:1990, clause 5.4

Report No.	**R129840**
Contract No.	23560
Contract Name:	WSP Lot3
Customer:	Ervia
BH/TP*	TPR TP029
Sample No.*	AA152115
Depth* (m)	0.3-0.35
Sample Type:	B
Lab Sample No.	A21/6189
Source* (if applicable)	N/A
Material Type* (if applicable):	B
Sample Received:	01/12/21
Date Tested:	11/12/21
Sample Cert:	Not Provided
Moisture Content (%):	24
% Particles > 20mm (By dry mass):	22
MCV:	11
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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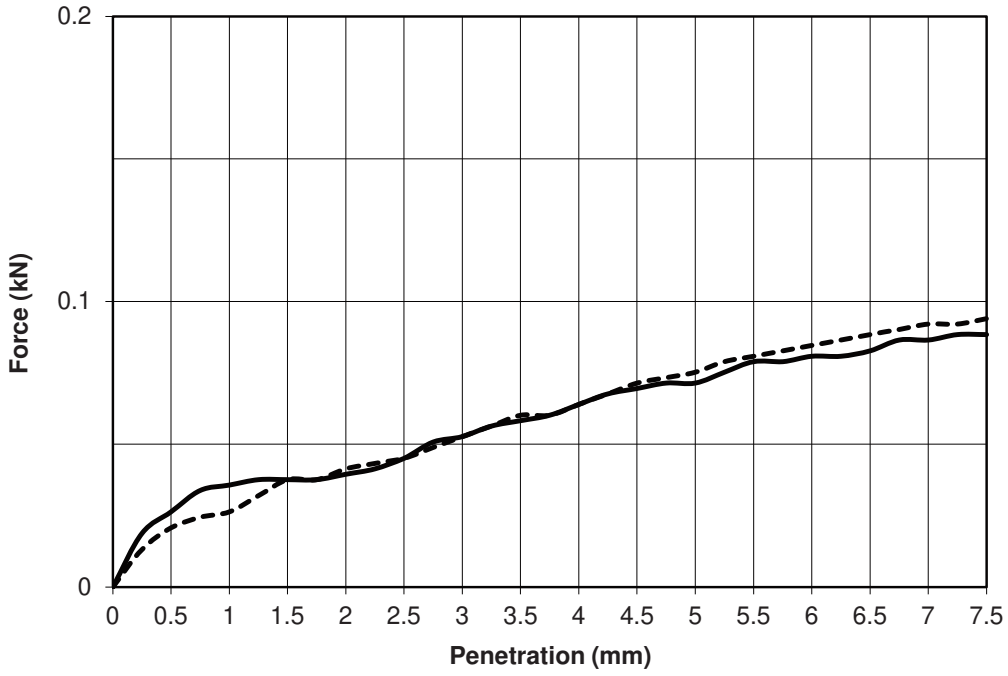
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Naas Co.Kildare
045 899324

TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

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

Report No.	R129819	Contract	WSP Lot 3		
Contract No.	23560	Customer	Ervia		
Date received	01/12/21	Date Tested	09/12/21		
BH/TP No.*	TPR TP003	Sample No.*	AA152051	Type:	B
Depth* (m)	0.30	Lab sample No.	A21/6137		



Key: ———— Top ---------- Base

Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		
Initial Condition:	Unsoaked		
Moisture Content (%):	33	Bulk Density (Mg/m^3):	1.84
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.39
% Material >20mm:	0		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**0.4**	**0.4**
Moisture Content %	33	33

Results relate only to the specimen tested, in as received condition unless otherwise noted

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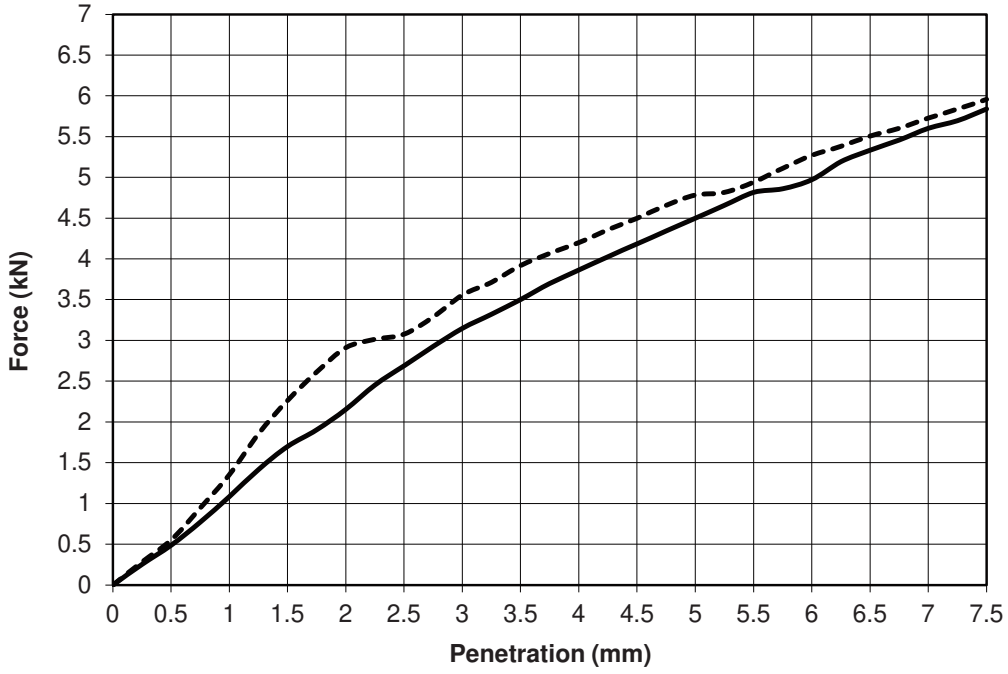
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Unit J5,M7 Business Park
Naas Co.Kildare
045 899324

TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

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

Report No.	R129828	Contract	WSP Lot 3
Contract No.	23560	Customer	Ervia
Date received	01/12/21	Date Tested	10/12/21
BH/TP No.*	TPR TP005	Sample No.*	AA152058 Type: B
Depth* (m)	0.50	Lab sample No.	A21/6141



Key: ———— Top ---------- Base

Description:	Brown slightly sandy slightly gravelly SILT/CLAY		
Initial Condition:	Unsoaked		
Moisture Content (%):	20	Bulk Density (Mg/m^3):	1.93
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.61
% Material >20mm:	2.8		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**23**	**24**
Moisture Content %	19	20

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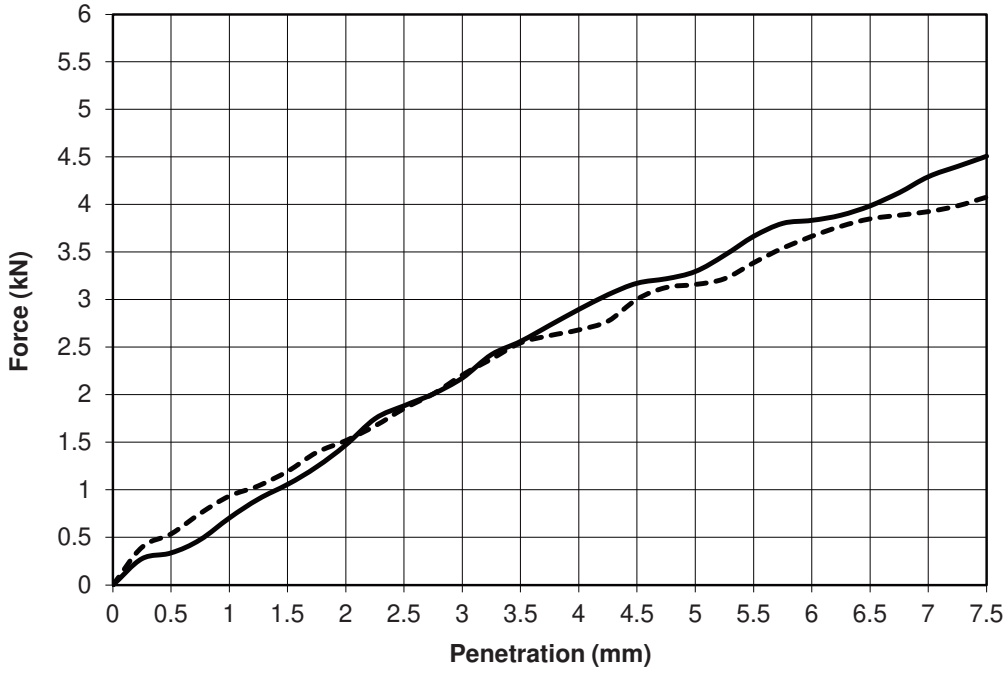
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TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

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

Report No.	R129820	Contract	WSP Lot 3
Contract No.	23560	Customer	Ervia
Date received	01/12/21	Date Tested	09/12/21
BH/TP No.*	TPR TP019	Sample No.*	AA152086 Type: B
Depth* (m)	0.40	Lab sample No.	A21/6170



Key: ———— Top ---------- Base

Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		
Initial Condition:	Unsoaked		
Moisture Content (%):	16	Bulk Density (Mg/m^3):	2.05
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.76
% Material >20mm:	16		
Method of compaction:	Static Compaction Method 2		

Test Result	**Top**	**Base**
CBR %	**17**	**16**
Moisture Content %	17	16

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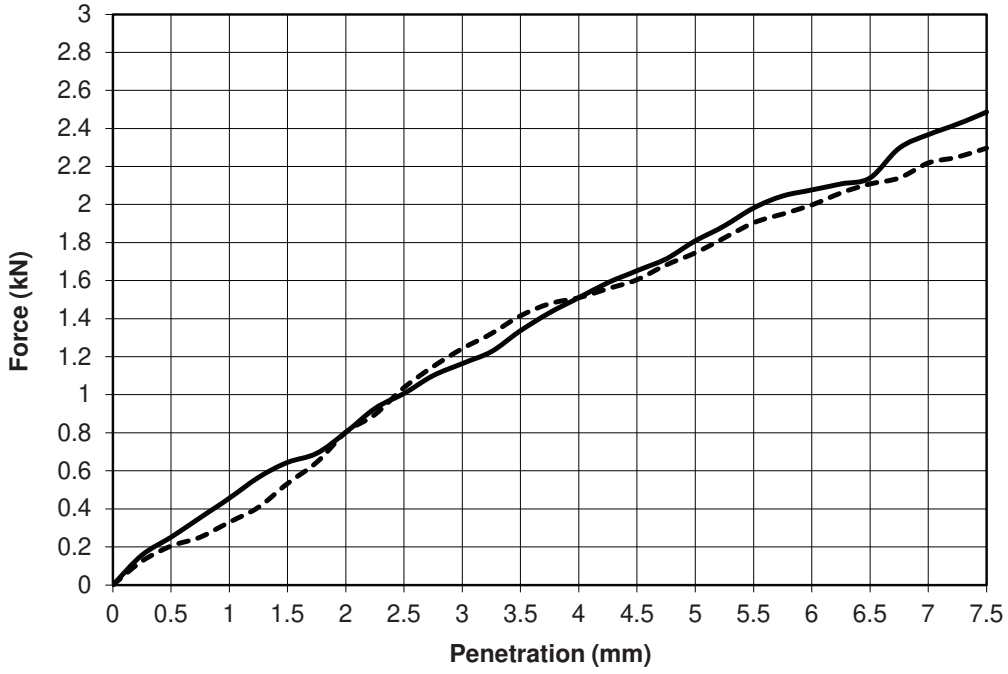
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TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

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

Report No.	R129829	Contract	WSP Lot 3
Contract No.	23560	Customer	Ervia
Date received	01/12/21	Date Tested	09/12/21
BH/TP No.*	TPR TP020	Sample No.*	AA152100 Type: B
Depth* (m)	0.25-0.30	Lab sample No.	A21/6184



Key: ———— Top ---------- Base

Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY		
Initial Condition:	Unsoaked		
Moisture Content (%):	26	Bulk Density (Mg/m^3):	1.90
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.51
% Material >20mm:	2.5		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**9.1**	**8.8**
Moisture Content %	26	26

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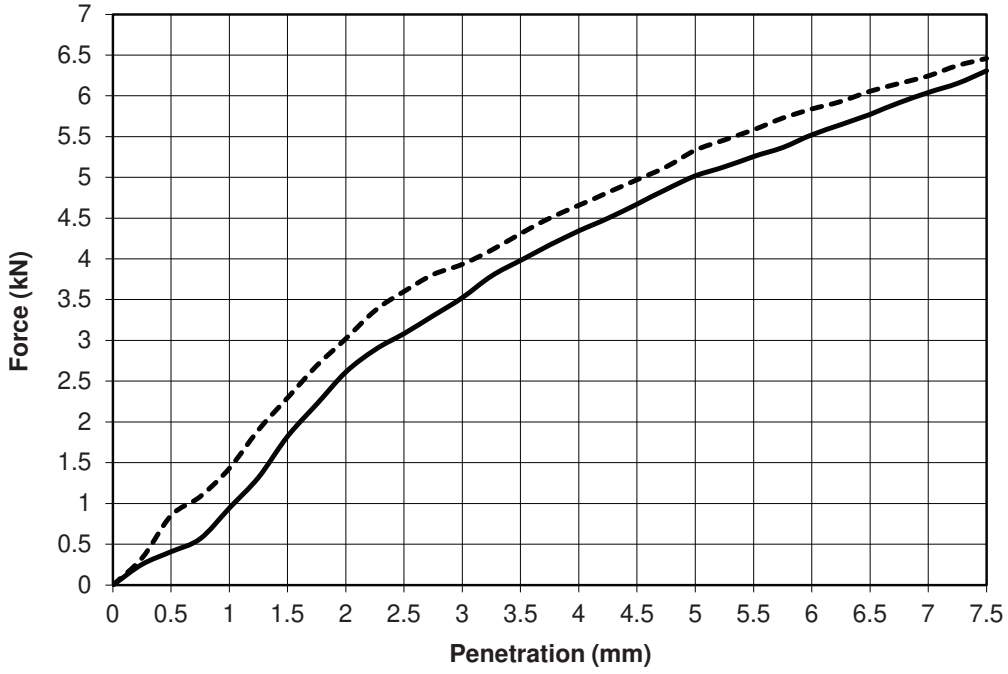
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TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

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

Report No.	R129830	Contract	WSP Lot 3
Contract No.	23560	Customer	Ervia
Date received	01/12/21	Date Tested	10/12/21
BH/TP No.*	TPR TP022	Sample No.*	AA152104 Type: B
Depth* (m)	0.6-0.65	Lab sample No.	A21/6183



Key: ———— Top ---------- Base

Description:	Brown slightly sandy slightly gravelly SILT/CLAY		
Initial Condition:	Unsoaked		
Moisture Content (%):	17	Bulk Density (Mg/m^3):	2.01
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.71
% Material >20mm:	18		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**25**	**27**
Moisture Content %	18	17

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Test Report

Dry Density/Moisture Content Relationship

Tested in accordance with BS1377:Part 4:1990

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1331

Report No. R129563 Contract No. 23560

Contract Name: WSP - Lot 3

Location*: TPR TP001

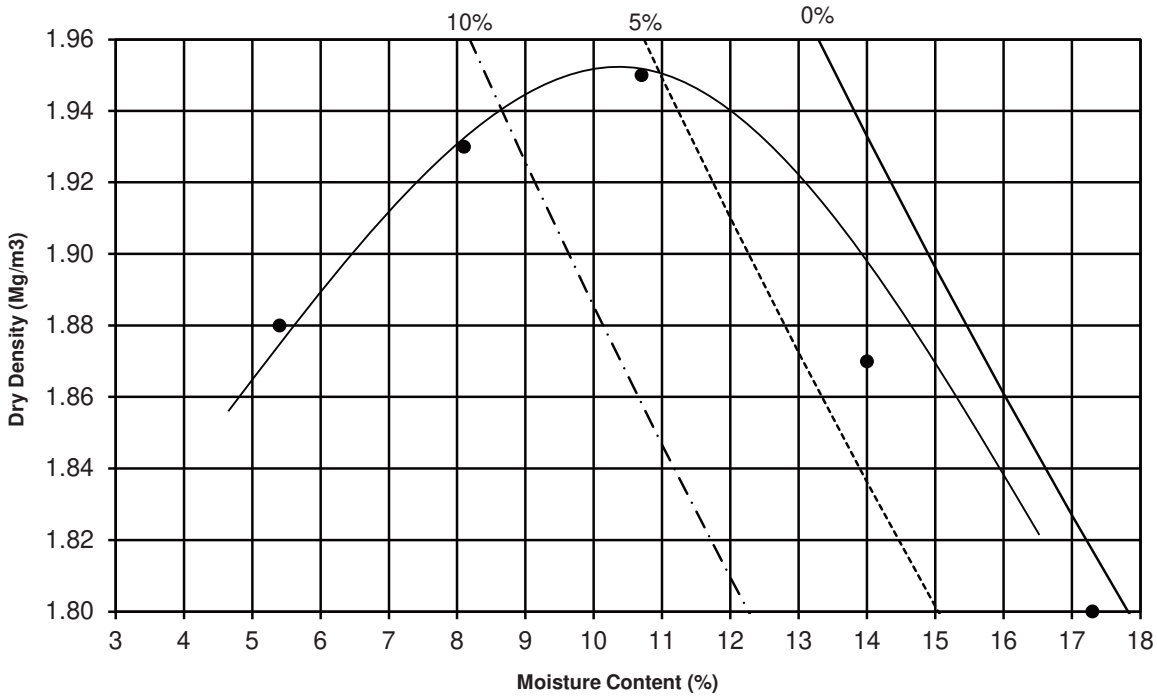
Sample No*. AA152054 Depth* (m) 1 Material Type B

Lab sample no. A21/6135 Customer: Ervia

Date Received: 01/12/2021 Test Method: 4.5Kg Rammer

Date Tested: 10/12/2021 BS1377:Part 4:1990 3.5

Dry Density (Mg/m^3)	1.95	1.93	1.88	1.87	1.80	0.00	
Moisture Content (%)	11	8	5	14	17	0	



Maximum Dry Density (Mg/m^3): 1.95 Optimum Moisture Content (%): 11

Description: Brown slightly sandy, gravelly, SILT/CLAY

Sample Preparation: Material passing 20mm ~~Single~~ / Separate samples used

Particle Density (Mg/m^3): 2.65 Particle Density: Assumed

% retained on 20/37.5mm sieve: 29

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Test Report

Dry Density/Moisture Content Relationship

Tested in accordance with BS1377:Part 4:1990

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

Report No. R129937 Contract No. 23560

Contract Name: WSP - Lot 3

Location*: TPR TP003

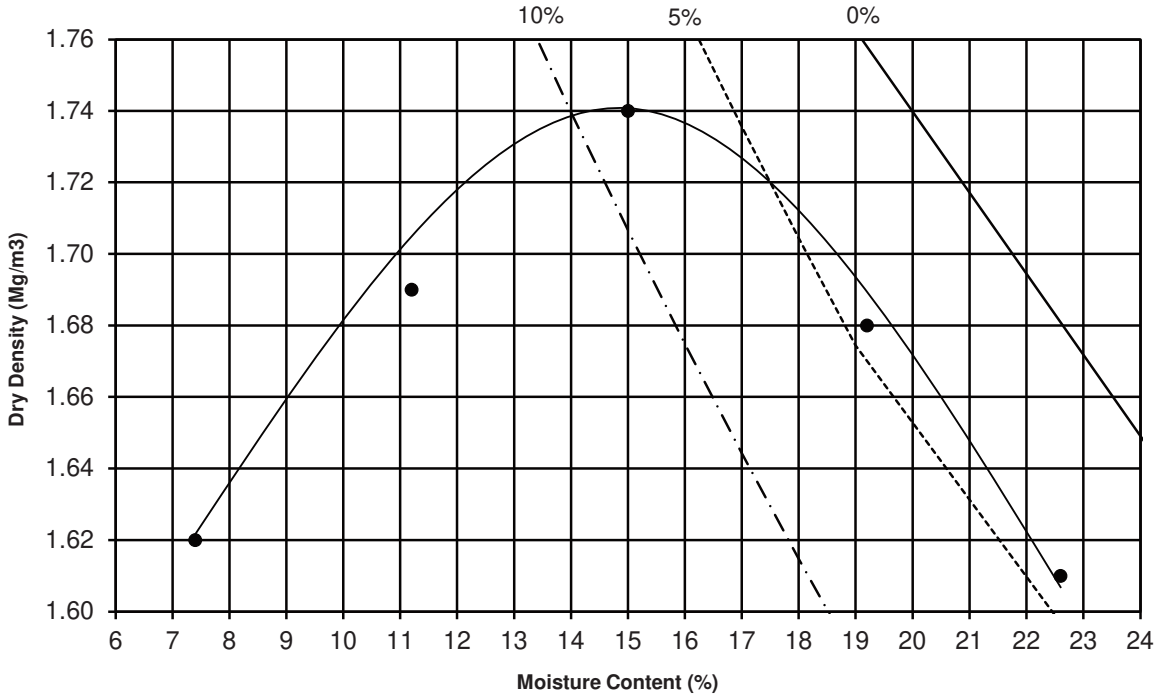
Sample No*. AA152052 Depth* (m) 0.7 Material Type B

Lab sample no. A21/6138 Customer: Ervia

Date Received: 01/12/2021 Test Method: 2.5 KG Rammer

Date Tested: 10/12/2021 BS1377:Part 4:1990 3.3

Dry Density (Mg/m^3)	1.61	1.68	1.74	1.69	1.62	0.00	
Moisture Content (%)	23	19	15	11	7	0	



Maximum Dry Density (Mg/m^3): 1.74 Optimum Moisture Content (%): 15

Description: Brown slightly sandy, gravelly, SILT/CLAY with some cobbles

Sample Preparation: Material passing 20mm ~~Single~~ / Separate samples used

Particle Density (Mg/m^3): 2.65 Particle Density: Assumed

% retained on 20/37.5mm sieve: 26

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Test Report

Dry Density/Moisture Content Relationship

Tested in accordance with BS1377:Part 4:1990

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1331

Report No. R129560 Contract No. 23560

Contract Name: WSP - Lot 3

Location*: TPR TP004

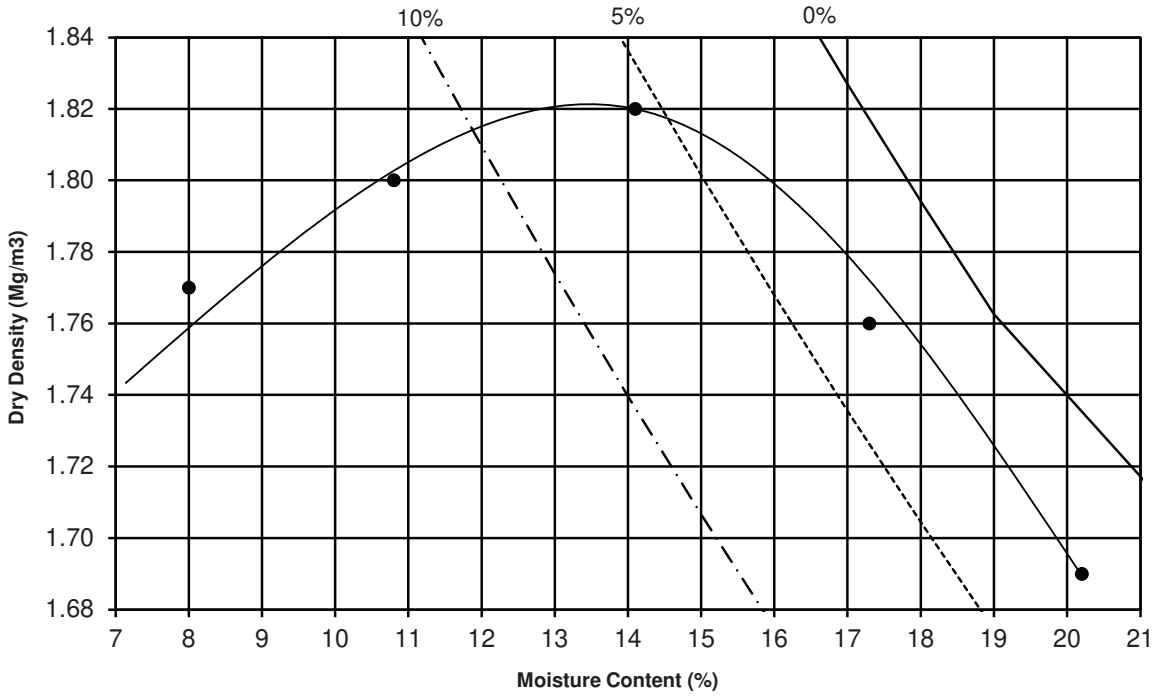
Sample No*. AA157068 Depth* (m) 1.1 Material Type B

Lab sample no. A21/6140 Customer: Ervia

Date Received: 01/12/2021 Test Method: 4.5 KG Rammer

Date Tested: 10/12/2021 BS1377:Part 4:1990 3.5

Dry Density (Mg/m^3)	1.80	1.77	1.82	1.76	1.69	0.00	
Moisture Content (%)	11	8	14	17	20	0	



Maximum Dry Density (Mg/m^3): 1.82 Optimum Moisture Content (%): 14

Description: Brown slightly sandy, slightly gravelly, SILT/CLAY

Sample Preparation: Material passing 20mm ~~Single~~ / Separate samples used

Particle Density (Mg/m^3): 2.65 Particle Density: Assumed

% retained on 20/37.5mm sieve: 6

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Test Report

Dry Density/Moisture Content Relationship

Tested in accordance with BS1377:Part 4:1990

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1331

Report No. R129561 Contract No. 23560

Contract Name: WSP - Lot 3

Location*: TPR TP005

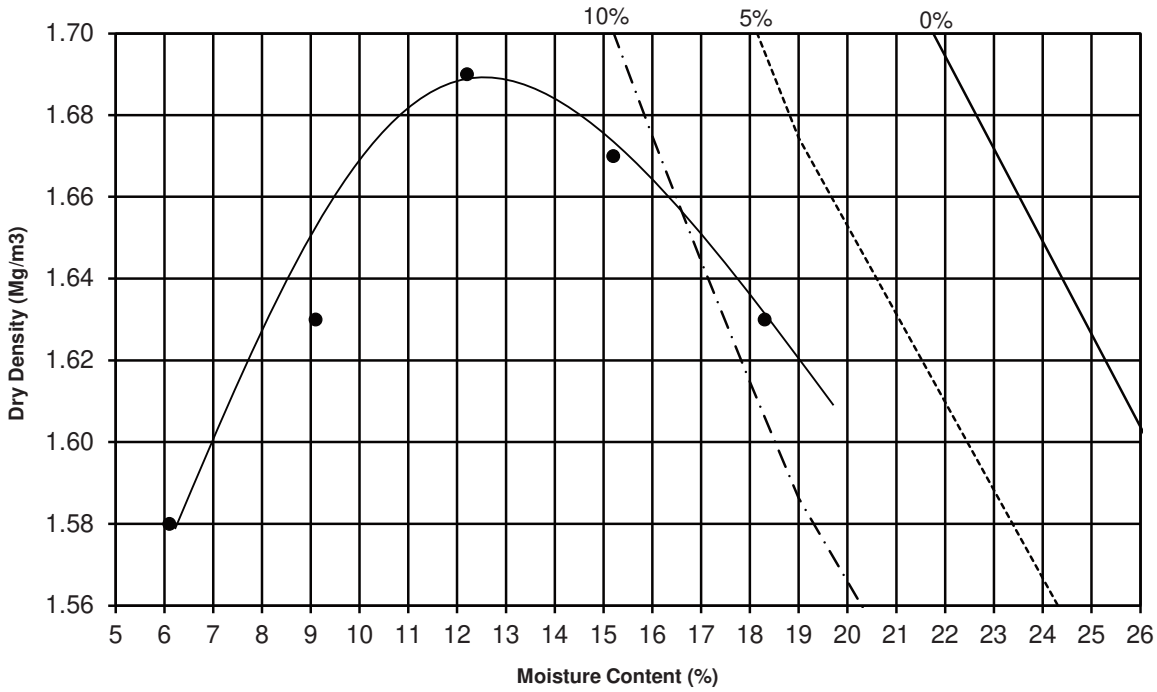
Sample No*. AA152059 Depth* (m) 0.8 Material Type B

Lab sample no. A21/6142 Customer: Ervia

Date Received: 01/12/2021 Test Method: Vibro Hammer

Date Tested: 10/12/2021 BS1377:Part 4:1990 3.7

Dry Density (Mg/m^3)	1.63	1.67	1.69	1.63	1.58	0.00	
Moisture Content (%)	18	15	12	9.1	6.1	0	



Maximum Dry Density (Mg/m^3): 1.79 Optimum Moisture Content (%): 12

Description: Brown slightly sandy, slightly gravelly, SILT/CLAY

Sample Preparation: Material passing 20mm ~~Single~~ / Separate samples used

Particle Density (Mg/m^3): 2.65 Particle Density: Assumed

% retained on 20/37.5mm sieve: 13

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Test Report

Dry Density/Moisture Content Relationship

Tested in accordance with BS1377:Part 4:1990

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1331

Report No. R129562 Contract No. 23560

Contract Name: WSP - Lot 3

Location*: TPR TP009

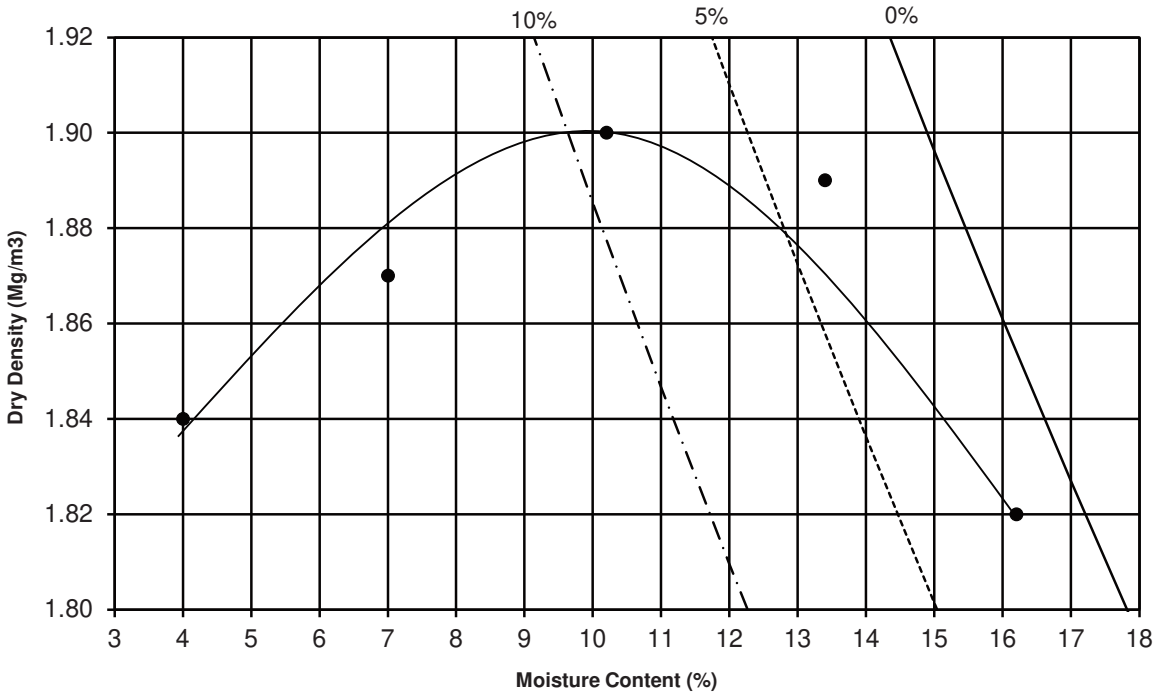
Sample No*. AA152073 Depth* (m) 0.75 Material Type B

Lab sample no. A21/6149 Customer: Ervia

Date Received: 01/12/2021 Test Method: 4.5Kg Rammer

Date Tested: 10/12/2021 BS1377:Part 4:1990 3.5

Dry Density (Mg/m^3)	1.89	1.87	1.90	1.82	1.84	0.00	
Moisture Content (%)	13	7	10	16	4.0	0	



Maximum Dry Density (Mg/m^3): 1.90 Optimum Moisture Content (%): 10

Description: Brown slightly sandy, slightly gravelly, SILT/CLAY

Sample Preparation: Material passing 20mm ~~Single~~ / Separate samples used

Particle Density (Mg/m^3): 2.65 Particle Density: Assumed

% retained on 20/37.5mm sieve: 8

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Test Report

Dry Density/Moisture Content Relationship

Tested in accordance with BS1377:Part 4:1990

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

Report No. R129564 Contract No. 23560

Contract Name: WSP - Lot 3

Location*: TPR TP014

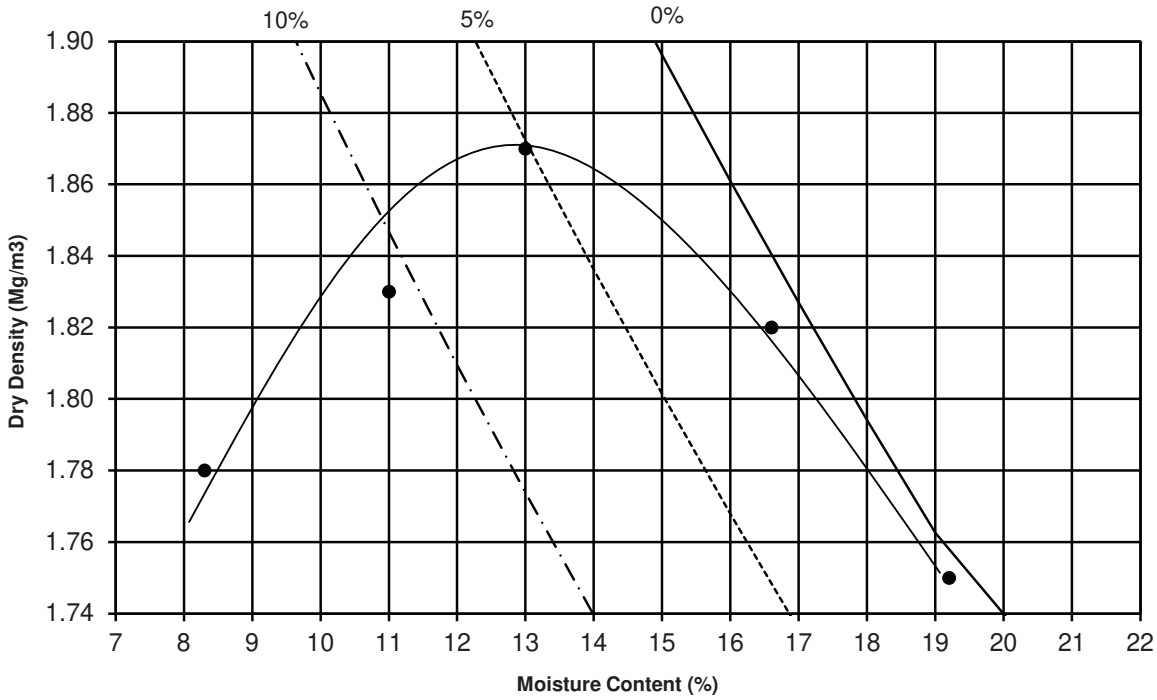
Sample No*. AA152075 Depth* (m) 0.7-0.8 Material Type B

Lab sample no. A21/6159 Customer: Ervia

Date Received: 01/12/2021 Test Method: Virbo Hammer

Date Tested: 10/12/2021 BS1377:Part 4:1990 3.7

Dry Density (Mg/m^3)	1.82	1.75	1.87	1.83	1.78	0.00	
Moisture Content (%)	17	19	13	11	8	0	



Maximum Dry Density (Mg/m^3): 1.87 Optimum Moisture Content (%): 13

Description: Brown slightly sandy, gravelly, SILT/CLAY with some cobbles

Sample Preparation: Material passing 20mm ~~Single~~ / Separate samples used

Particle Density (Mg/m^3): 2.65 Particle Density: Assumed

% retained on 20/37.5mm sieve: 24

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Test Report

Dry Density/Moisture Content Relationship

Tested in accordance with BS1377:Part 4:1990

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1331

Report No. R129988 Contract No. 23560

Contract Name: WSP - Lot 3

Location*: TPR TP022

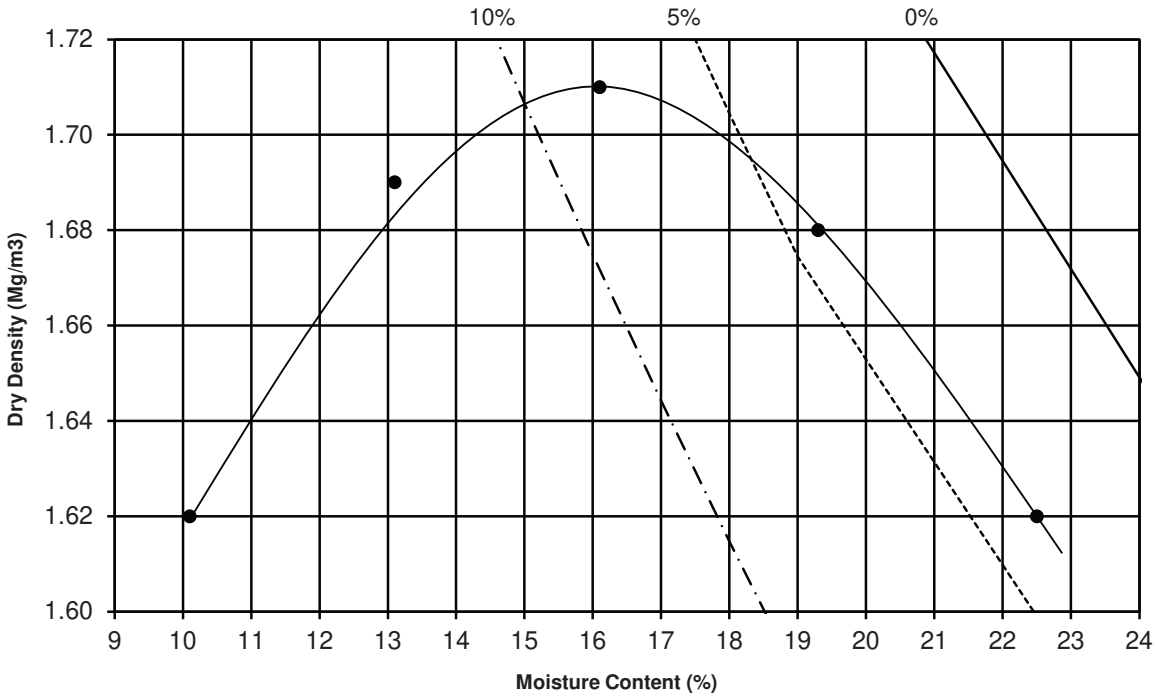
Sample No*. AA152103 Depth* (m) 0.25-0.30 Material Type B

Lab sample no. A21/6182 Customer: Ervia

Date Received: 01/12/2021 Test Method: 2.5 KG Rammer

Date Tested: 10/12/2021 BS1377:Part 4:1990 3.3

Dry Density (Mg/m^3)	1.62	1.68	1.71	1.69	1.62	0.00	
Moisture Content (%)	23	19	16	13	10	0	



Maximum Dry Density (Mg/m^3): 1.71 Optimum Moisture Content (%): 16

Description: Brown slightly sandy, slightly gravelly, SILT/CLAY

Sample Preparation: Material passing 20mm ~~Single~~ / Separate samples used

Particle Density (Mg/m^3): 2.65 Particle Density: Assumed

% retained on 20/37.5mm sieve: 3

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Test Report

Dry Density/Moisture Content Relationship

Tested in accordance with BS1377:Part 4:1990

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1331

Report No. R129915 Contract No. 23560

Contract Name: WSP - Lot 3

Location*: TPR TP024

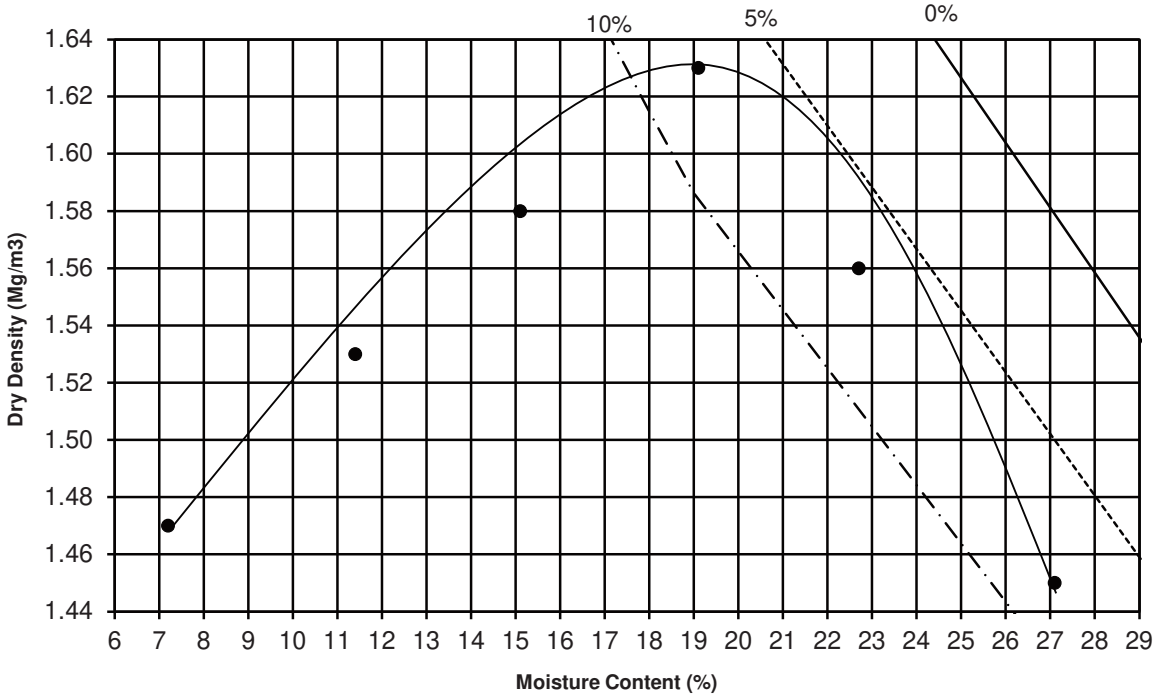
Sample No*. AA152109 Depth* (m) 0.20-0.30 Material Type B

Lab sample no. A21/6180 Customer: Ervia

Date Received: 01/12/2021 Test Method: 2.5 KG Rammer

Date Tested: 10/12/2021 BS1377:Part 4:1990 3.3

Dry Density (Mg/m^3)	1.56	1.63	1.58	1.53	1.47	1.45	
Moisture Content (%)	23	19	15	11	7	27	



Maximum Dry Density (Mg/m^3): 1.63 Optimum Moisture Content (%): 19

Description: Brown slightly sandy, slightly gravelly, SILT/CLAY

Sample Preparation: Material passing 20mm ~~Single~~ / Separate samples used

Particle Density (Mg/m^3): 2.65 Particle Density: Assumed

% retained on 20/37.5mm sieve: 9

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

Report No. **R131910** Contract No. 23560 Contract Name: WSP Lot 3

Customer Ervia

Samples Received: 18/02/22 Date Tested: 18/02/22

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
RPR-BH002	N/A	0.6-0.8	A22/0595	B	10	35	19	16	15	WS	4.4	C L	Brown clayey, sandy, GRAVEL
TPR-BH002	N/A	1.8-2.30	A22/0596	B	14	35	22	13	35	WS	4.4	C L	Brown slightly sandy, gravelly, CLAY
TPR-BH006	N/A	0.7-1.0	A22/0597	B	25	50	28	22	60	WS	4.4	M I	Brown slightly sandy, gravelly, SILT
TPR-BH006	N/A	1.45-2.0	A22/0598	B	9.1	41	19	22	28	WS	4.4	C I	Dark brown clayey, sandy, GRAVEL with many cobbles
TPR-BH010	N/A	0.5-0.70	A22/0599	B	15	33	17	16	31	WS	4.4	C L	Brown slightly sandy, gravelly, CLAY
TPR-BH011	N/A	1-1.20	A22/0600	B	13	31	16	15	63	WS	4.4	C L	Brown slightly sandy, gravelly, CLAY
TPR-BH011	N/A	2.0-2.30	A22/0601	B	6.3	38	21	17	45	WS	4.4	C I	COBBLES with brown clayey, sandy, gravel
TPR-BH011	N/A	2.8-3.20	A22/0602	B	20	41	NP	NP	40	WS	4.4		Dark brown slightly sandy, gravelly, SILT
TPR-BH014	N/A	0.7-1.0	A22/0603	B	8.3	55	25	30	35	WS	4.4	C H	Dark brown clayey, slightly sandy, GRAVEL

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
		H Byrne	04/03/22	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)

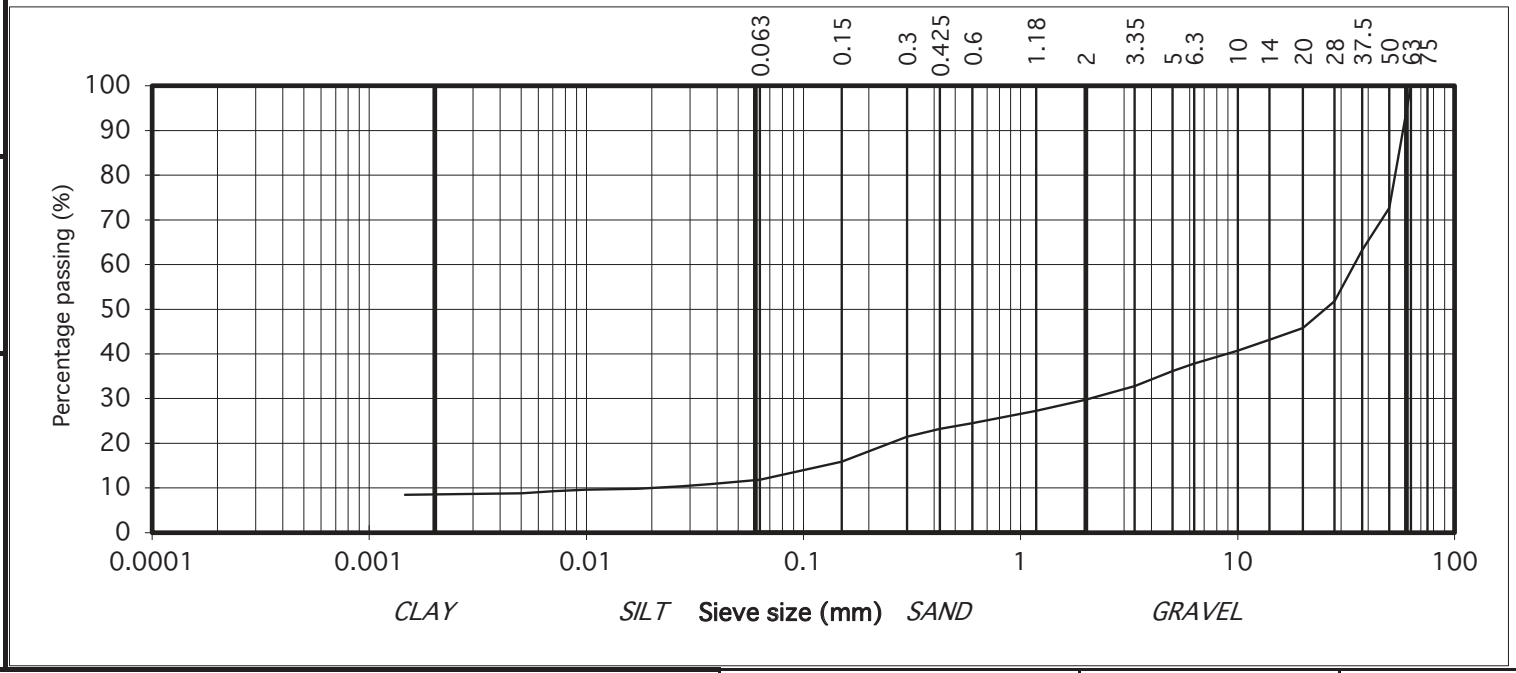
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	73	GRAVEL
37.5	63	
28	52	
20	46	
14	43	
10	41	
6.3	38	
5	36	
3.35	33	
2	30	
1.18	27	SAND
0.6	25	
0.425	23	
0.3	21	
0.15	16	
0.063	12	SILT/CLAY
0.038	11	
0.027	10	
0.017	10	
0.010	10	
0.007	9	
0.005	9	
0.001	8	

Contract No.	23560	Report No.	R132417
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR-TP026		
Sample No.*	N/A	Lab. Sample No.	A22/0593
Sample Type:	B		
Depth* (m)	0.50	Customer:	Ervia
Date Received	18/02/2022	Date Testing started	18/02/2022
Description:	Brown clayey/silty, sandy, GRAVEL		

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.
This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks: Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirement of BS1377



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	04/03/22	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

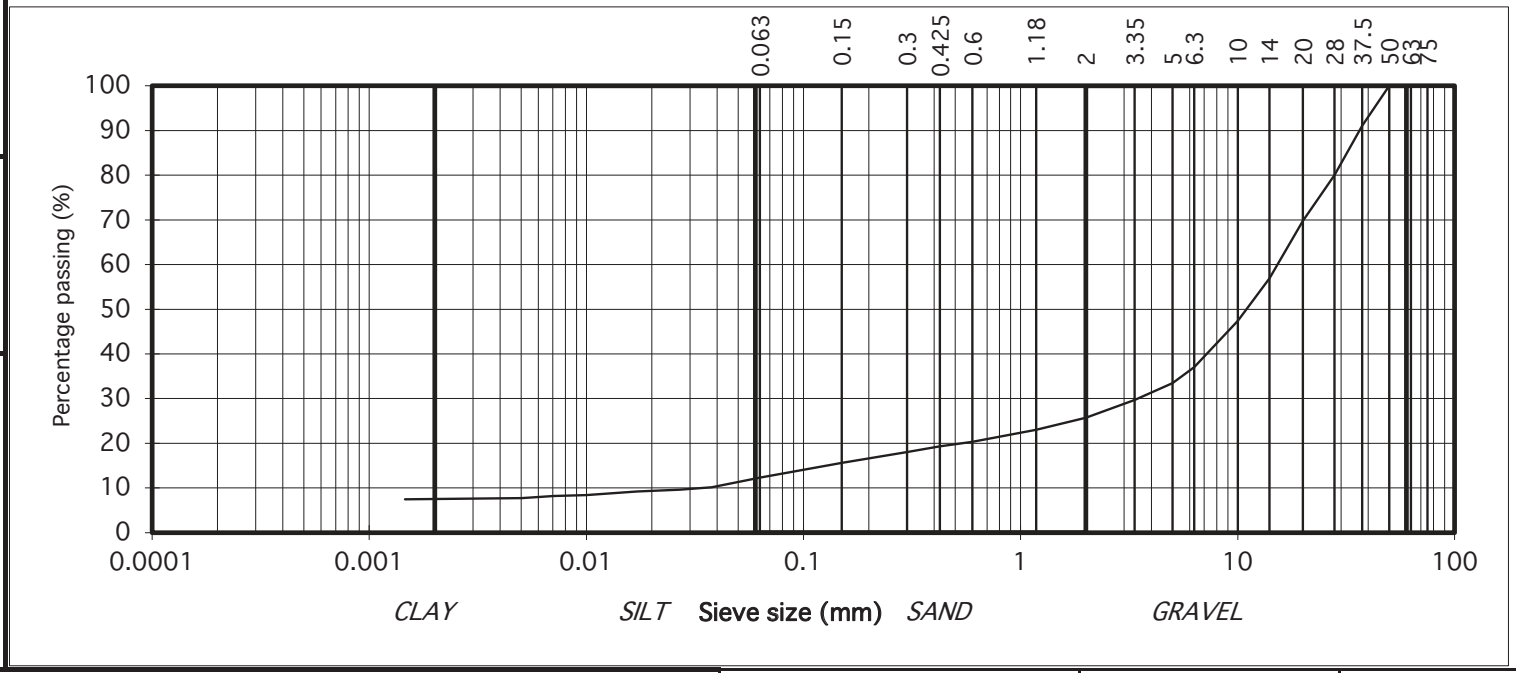
particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	91	
28	80	
20	70	
14	57	
10	47	
6.3	37	
5	33	
3.35	30	
2	26	
1.18	23	SAND
0.6	20	
0.425	19	
0.3	18	
0.15	16	
0.063	12	SILT/CLAY
0.038	10	
0.027	10	
0.017	9	
0.010	8	
0.007	8	
0.005	8	
0.001	7	

Contract No.	23560	Report No.	R131914
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR-BH002		
Sample No.*	N/A	Lab. Sample No.	A22/0595
Sample Type:	B		
Depth* (m)	0.60-0.80	Customer:	Ervia
Date Received	18/02/2022	Date Testing started	22/02/2022
Description:	Brown clayey, sandy, GRAVEL		

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.
This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks

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



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	04/03/22	1 of 1

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

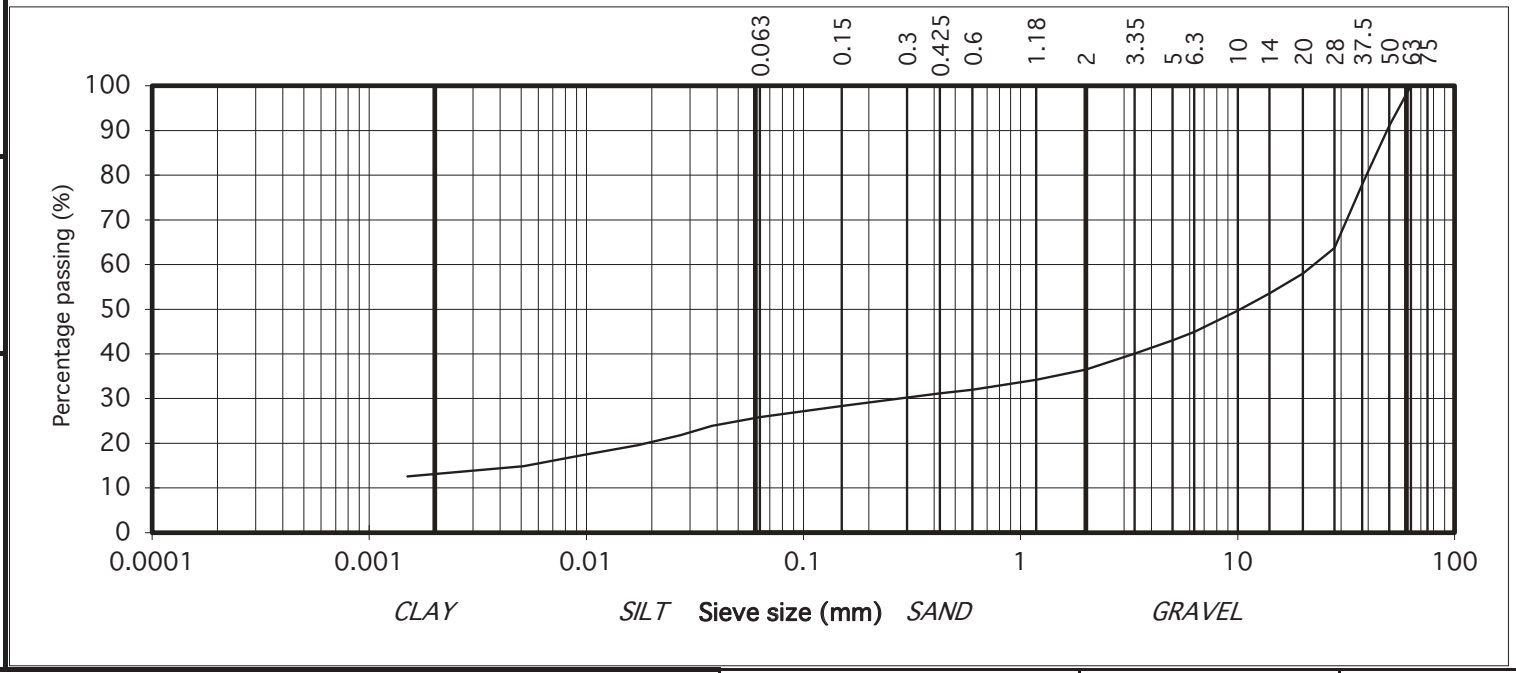
TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**
(note: Sedimentation stage not accredited)

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

particle size	% passing	
75	100	COBBLES
63	100	
50	91	GRAVEL
37.5	78	
28	64	
20	58	
14	54	
10	50	
6.3	45	
5	43	
3.35	40	
2	37	
1.18	34	SAND
0.6	32	
0.425	31	
0.3	30	
0.15	28	
0.063	26	SILT/CLAY
0.038	24	
0.027	22	
0.017	20	
0.010	18	
0.007	16	
0.005	15	
0.002	13	

Contract No.	23560	Report No.	R131915
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR-BH002		
Sample No.*	N/A	Lab. Sample No.	A22/0596
Sample Type:	B		
Depth* (m)	1.80-2.30	Customer:	Ervia
Date Received	18/02/2022	Date Testing started	18/02/2022
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:
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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

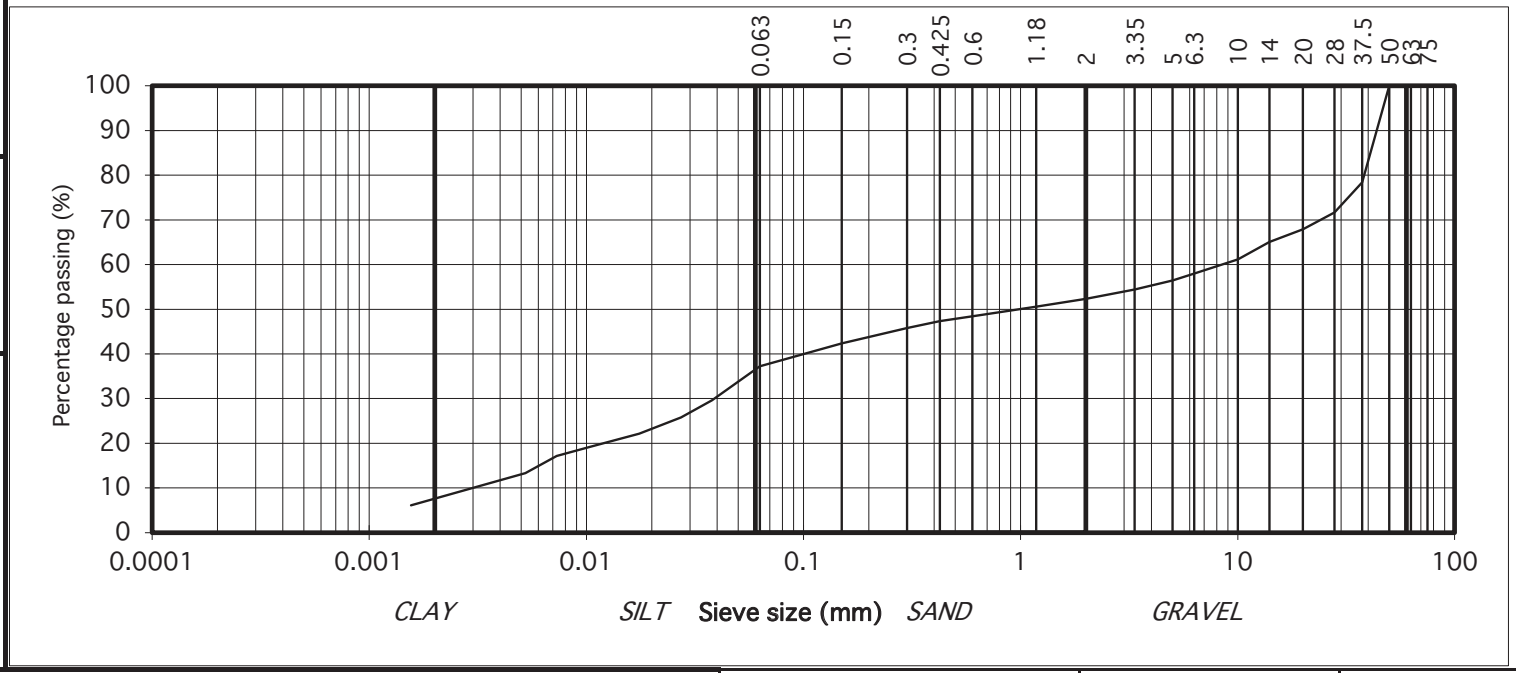
particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	78	
28	72	
20	68	
14	65	
10	61	
6.3	58	
5	56	
3.35	54	
2	52	
1.18	51	SAND
0.6	48	
0.425	47	
0.3	46	
0.15	42	
0.063	37	SILT/CLAY
0.038	30	
0.027	26	
0.018	22	
0.010	19	
0.007	17	
0.005	13	
0.002	6	

Contract No.	23560	Report No.	R131912
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR-BH006		
Sample No.*	N/A	Lab. Sample No.	A22/0597
Sample Type:	B		
Depth* (m)	0.70-1.0	Customer:	Ervia
Date Received	18/02/2022	Date Testing started	18/02/2022
Description:	Brown slightly sandy, gravelly, SILT		

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.
This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks

Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirement of BS1377



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	04/03/22	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)

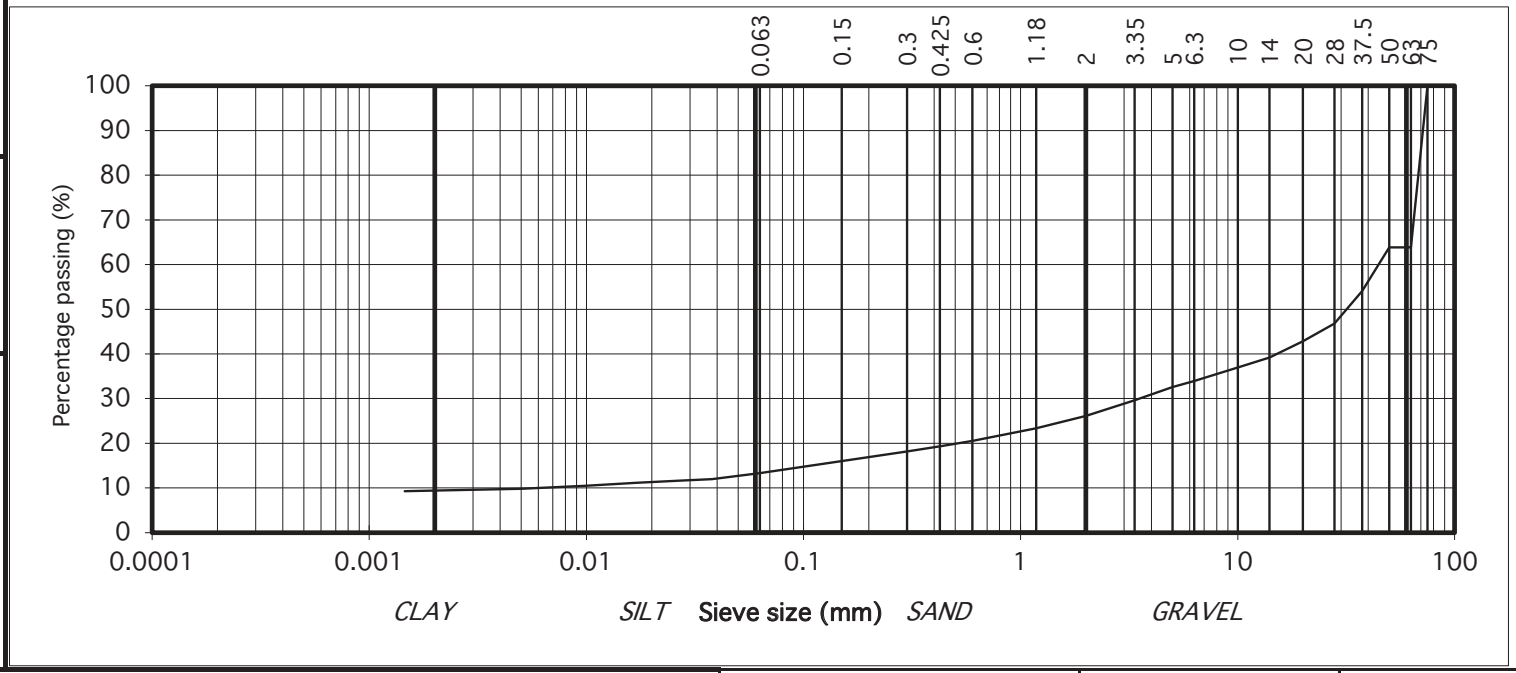
ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	64	
50	64	GRAVEL
37.5	54	
28	47	
20	43	
14	39	
10	37	
6.3	34	
5	33	
3.35	30	
2	26	
1.18	23	SAND
0.6	21	
0.425	19	
0.3	18	
0.15	16	
0.063	13	SILT/CLAY
0.038	12	
0.027	12	
0.017	11	
0.010	11	
0.007	10	
0.005	10	
0.001	9	

Contract No.	23560	Report No.	R131913	
Contract Name:	WSP - Lot 3			
BH/TP* :	TPR-BH006			
Sample No.*	N/A	Lab. Sample No.		A22/0598
Sample Type:	B			
Depth* (m)	1.45-2.0	Customer:	Ervia	
Date Received	18/02/2022	Date Testing started		18/02/2022
Description:	Dark brown clayey, sandy, GRAVEL with many cobbles			

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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Remarks: Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirement of BS1377



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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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)

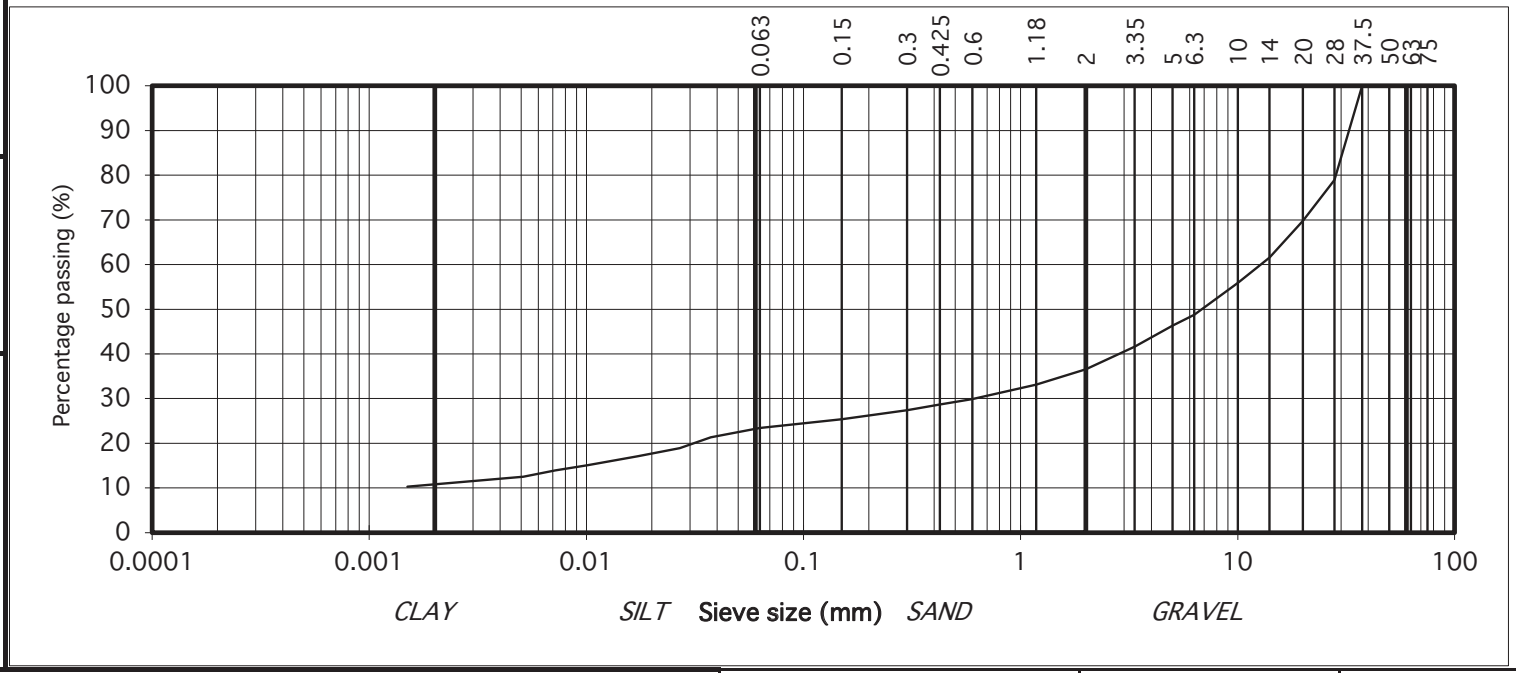
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	79	
20	70	
14	62	
10	56	
6.3	49	
5	46	
3.35	42	
2	37	
1.18	33	SAND
0.6	30	
0.425	29	
0.3	27	
0.15	25	
0.063	23	SILT/CLAY
0.037	21	
0.027	19	
0.017	17	
0.010	15	
0.007	14	
0.005	12	
0.002	10	

Contract No.	23560	Report No.	R131916
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR-BH010		
Sample No.*	N/A	Lab. Sample No.	A22/0599
Sample Type:	B		
Depth* (m)	0.50-0.70	Customer:	Ervia
Date Received	18/02/2022	Date Testing started	22/02/2022
Description:	Brown slightly sandy, gravelly, CLAY		

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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Remarks: Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirement of BS1377



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	04/03/22	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)

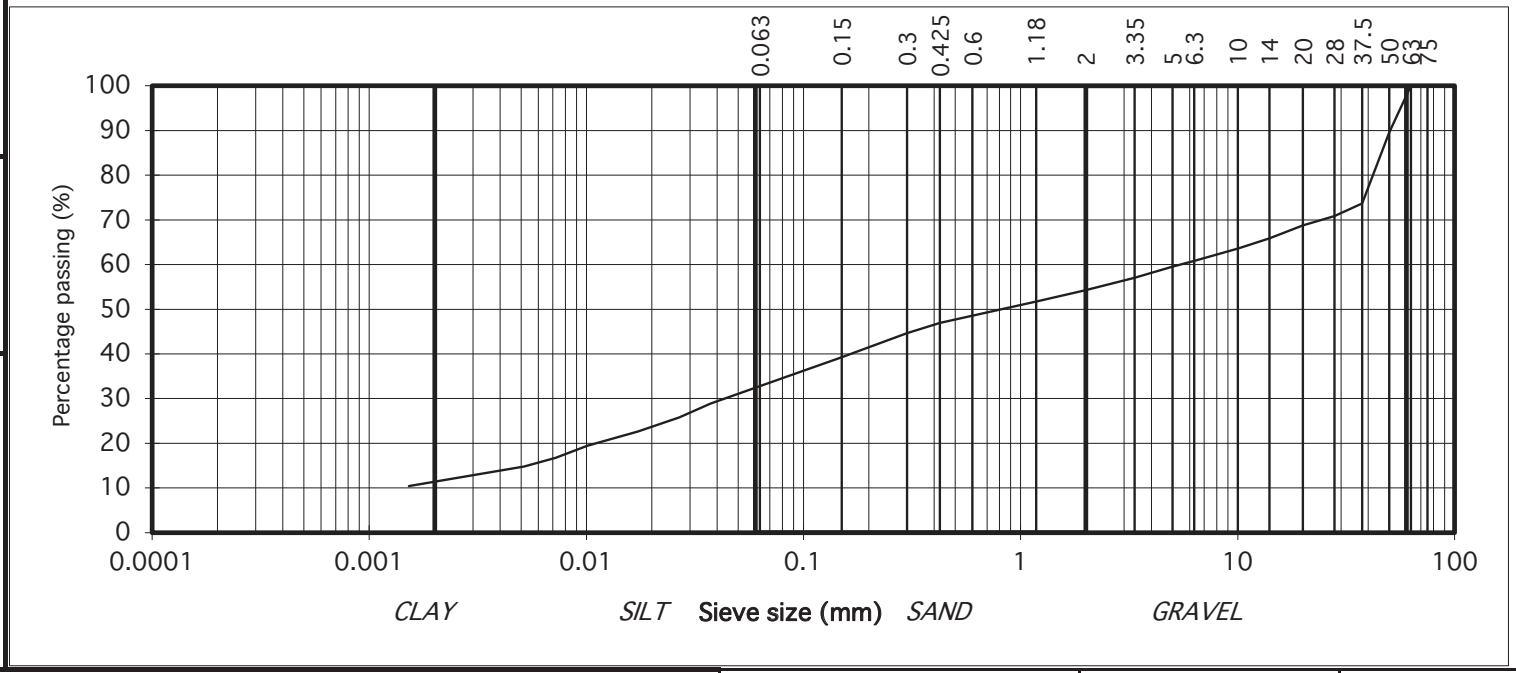
ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	90	GRAVEL
37.5	74	
28	71	
20	69	
14	66	
10	64	
6.3	61	
5	60	
3.35	57	
2	54	
1.18	52	SAND
0.6	49	
0.425	47	
0.3	45	
0.15	39	
0.063	33	SILT/CLAY
0.037	29	
0.027	26	
0.017	23	
0.010	19	
0.007	17	
0.005	15	
0.002	10	

Contract No.	23560	Report No.	R131918
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR-BH011		
Sample No.*	N/A	Lab. Sample No.	A22/0600
Sample Type:	B		
Depth* (m)	1.0-1.2	Customer:	Ervia
Date Received	18/02/2022	Date Testing started	18/02/2022
Description:	Brown slightly sandy, gravelly, CLAY		

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



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	04/03/22	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

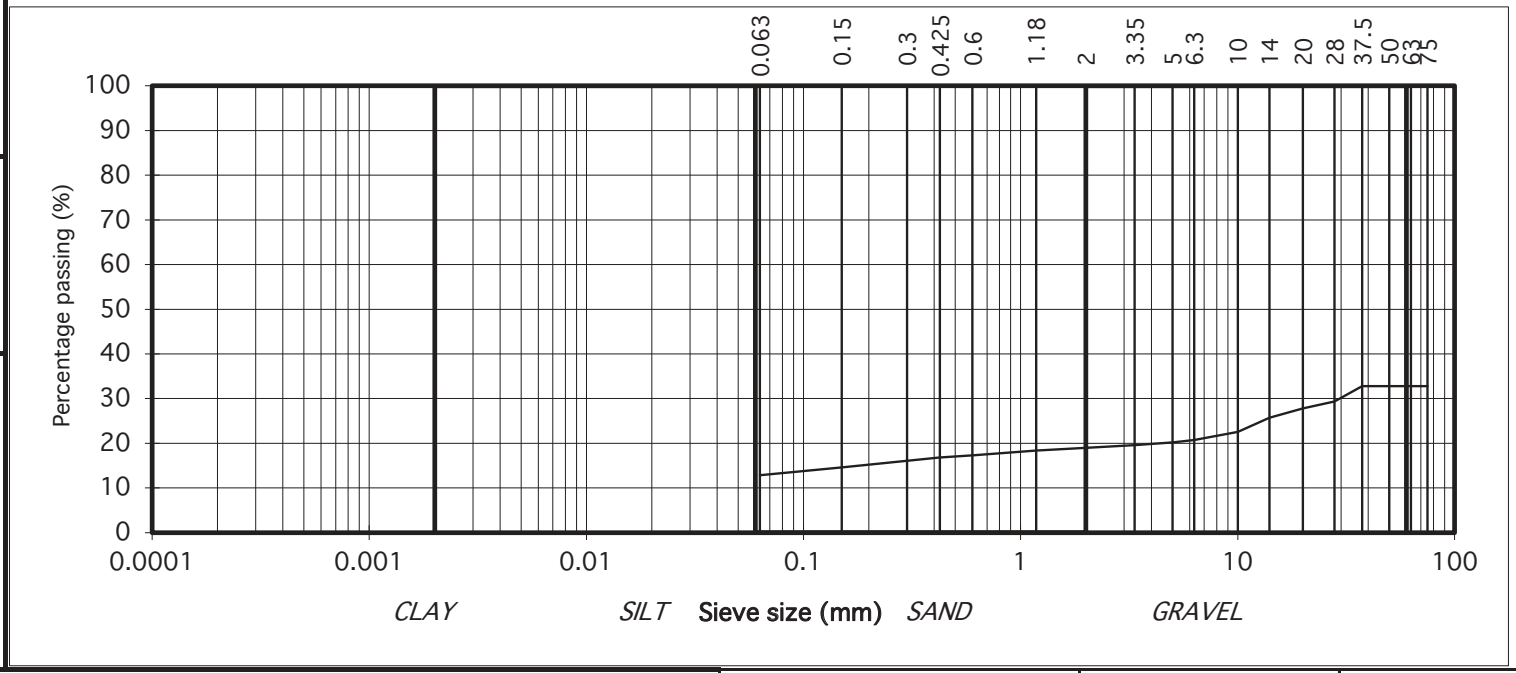
particle size	% passing	
75	33	COBBLES
63	33	
50	33	GRAVEL
37.5	33	
28	29	
20	28	
14	26	
10	23	
6.3	21	
5	20	
3.35	20	
2	19	
1.18	18	SAND
0.6	17	
0.425	17	
0.3	16	
0.15	15	
0.063	13	SILT/CLAY

Contract No.	23560	Report No.	R131917
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR-BH011		
Sample No.*	N/A	Lab. Sample No.	A22/0601
Sample Type:	B		
Depth* (m)	2.00-2.30	Customer:	Ervia
Date Received	18/02/2022	Date Testing started	18/02/2022
Description:	COBBLES with brown clayey, sandy, gravel		

Remarks: Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirement 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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Approved by:	Date:	Page no:
H Byrne	04/03/22	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)

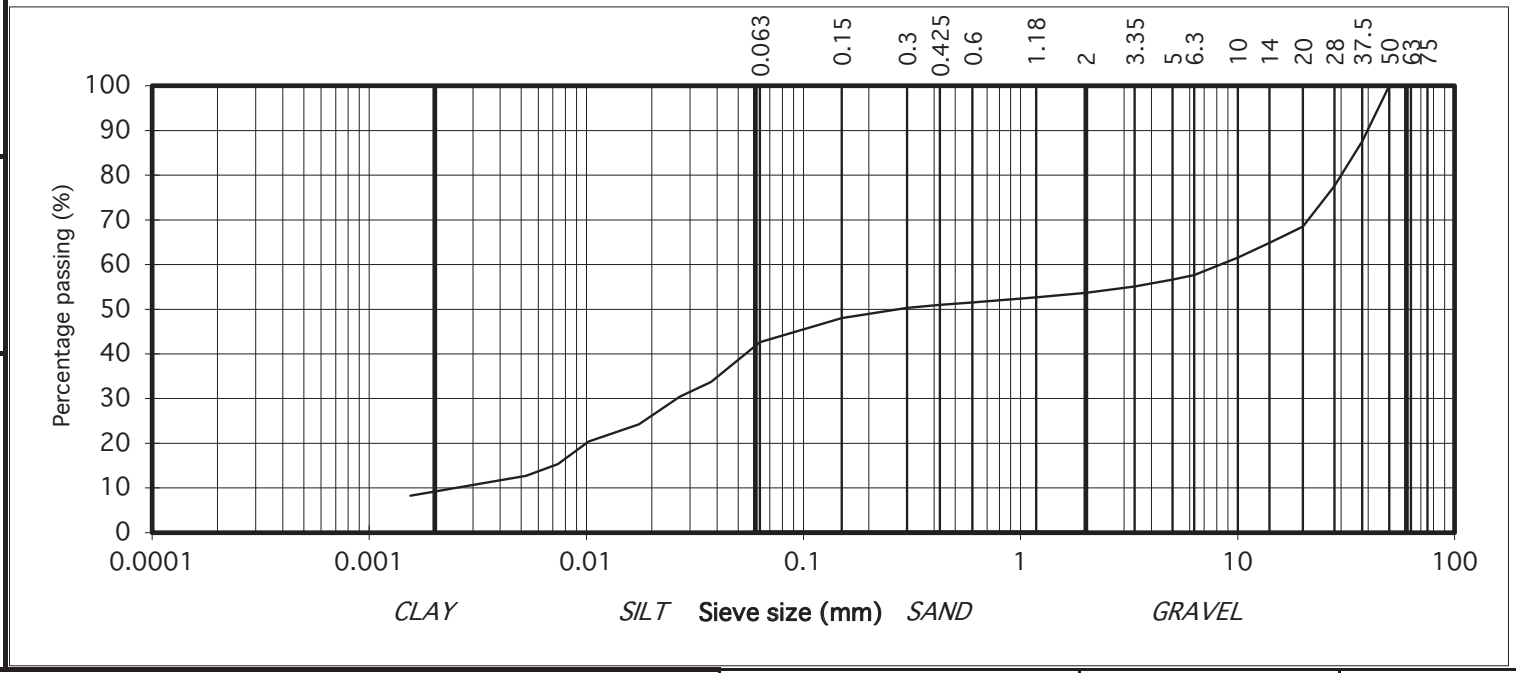
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	88	
28	78	
20	69	
14	65	
10	62	
6.3	58	
5	57	
3.35	55	
2	54	
1.18	53	SAND
0.6	51	
0.425	51	
0.3	50	
0.15	48	
0.063	43	SILT/CLAY
0.037	34	
0.027	30	
0.017	24	
0.010	20	
0.007	15	
0.005	13	
0.002	8	

Contract No.	23560	Report No.	R131919
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR-BH011		
Sample No.*	N/A	Lab. Sample No.	A22/0602
Sample Type:	B		
Depth* (m)	2.8-3.2	Customer:	Ervia
Date Received	18/02/2022	Date Testing started	18/02/2022
Description:	Dark brown slightly sandy, gravelly, SILT		

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.
This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks: Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirement of BS1377



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	04/03/22	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)

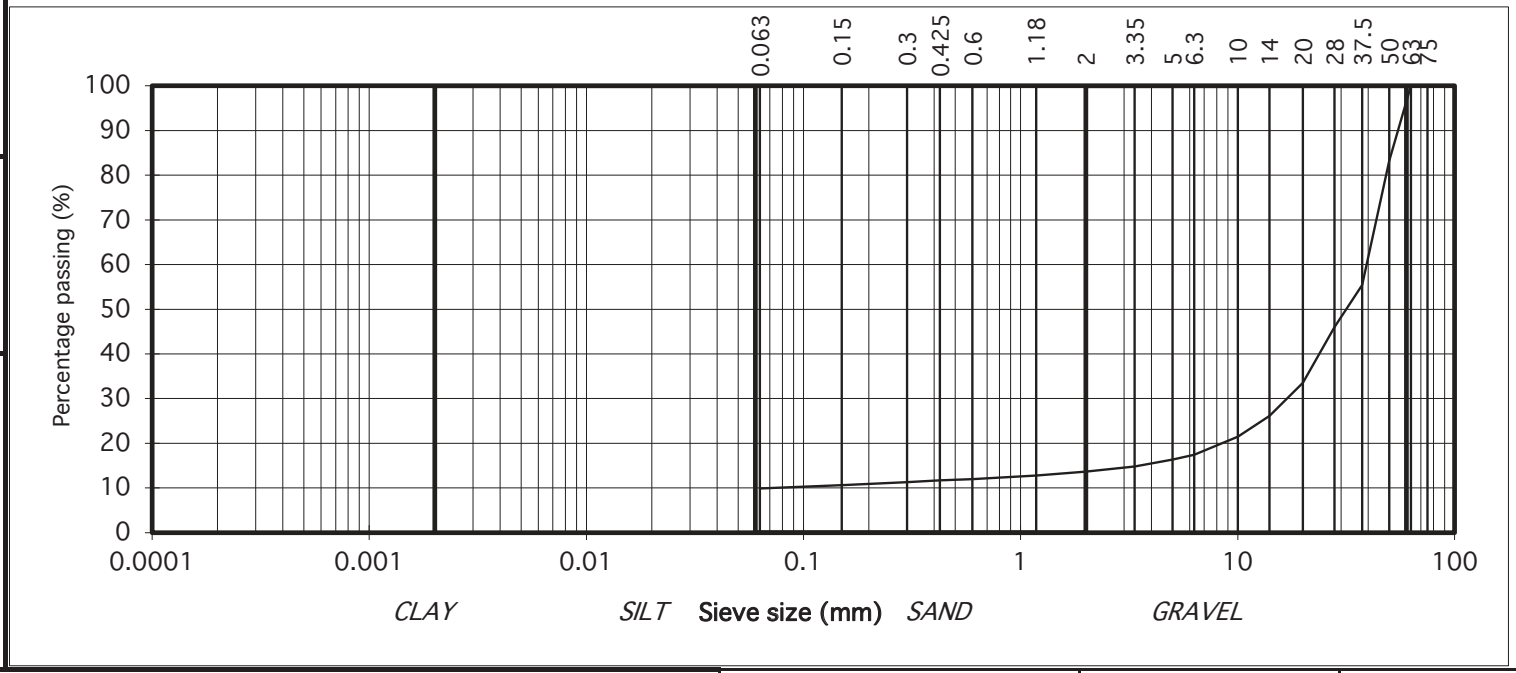
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	83	GRAVEL
37.5	55	
28	46	
20	34	
14	26	
10	21	
6.3	17	
5	16	
3.35	15	
2	14	
1.18	13	SAND
0.6	12	
0.425	12	
0.3	11	
0.15	11	
0.063	10	SILT/CLAY

Contract No.	23560	Report No.	R131920
Contract Name:	WSP - Lot 3		
BH/TP* :	TPR-BH014		
Sample No.*	N/A	Lab. Sample No.	A22/0603
Sample Type:	B		
Depth* (m)	0.70-1.0	Customer:	Ervia
Date Received	18/02/2022	Date Testing started	18/02/2022
Description:	Dark brown clayey, slightly sandy, GRAVEL		

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.
This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks: Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirement of BS1377



IGSL Ltd Materials Laboratory

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

One dimensional Consolidation

BS1377:Part 5:1990

Report No. R130976

Contract: WSP Lot 3 Contract number: 23560

BH: TPR BH002 Sample number: - Depth (m): 1.3

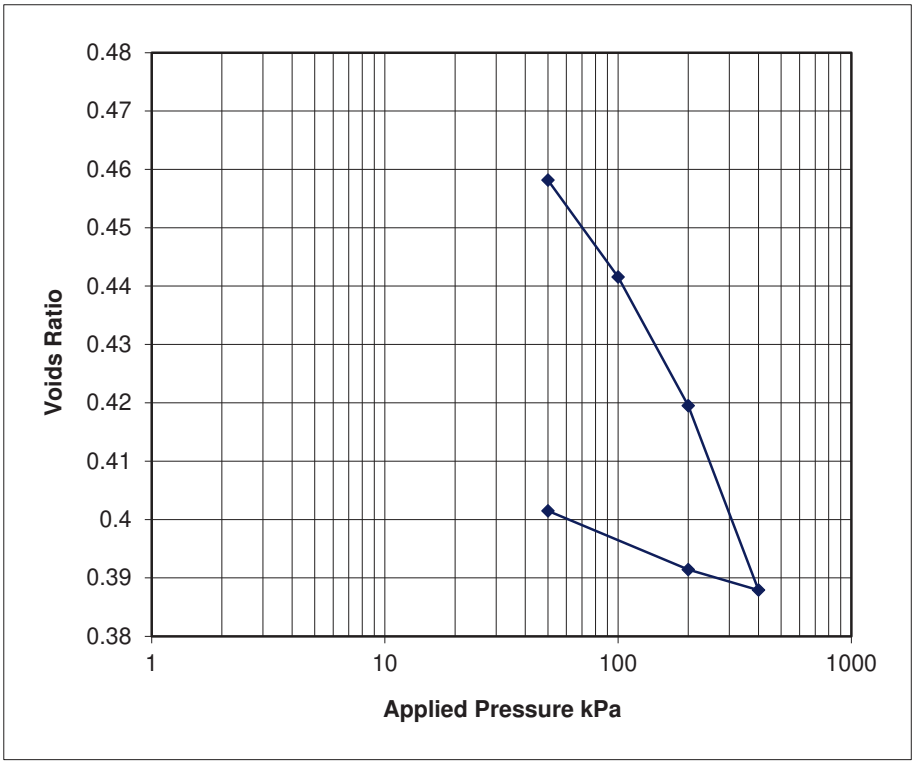
Description Brown slightly sandy clayey MUDSTONE

Specimen Height (mm) 18.6 Specimen diameter (mm) 76.1

	Initial	Final
Moisture content %	13	18
Bulk density Mg/m^3	2.03	2.18
Dry density Mg/m^3	1.79	1.84
Void ratio	0.484	0.401

Assumed Particle density Mg/m^3 2.65

Applied Pressure (kPa)	m_v (m^2/MN)	c_v (m^2/year)	Voids Ratio
0 - 50	0.344	46.547	0.45815
50 - 100	0.228	16.280	0.44155
100 - 200	0.153	6.191	0.41952
200 - 400	0.111	4.710	0.38792
400 - 200	0.013	1.294	0.39143
200 - 50	0.048	0.493	0.40148



Appendix 10H.2

Geo-environmental & Chemical Testing – Soil

Chemtest Report Numbers

21-34719
21-35059
21-36466
21-40059
21-40063
21-40208

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

UKAS TESTING
2183

Final Report

Report No.:	21-34719-1		
Initial Date of Issue:	25-Oct-2021		
Client	IGSL		
Client Address:	M7 Business Park Naas County Kildare Ireland		
Contact(s):	Darren Keogh		
Project	WSP Lot 3 - GI		
Quotation No.:	Q21-25679	**Date Received:**	06-Oct-2021
Order No.:		**Date Instructed:**	15-Oct-2021
No. of Samples:	2		
Turnaround (Wkdays):	7	**Results Due:**	25-Oct-2021
Date Approved:	25-Oct-2021		

Approved By:



Details: Glynn Harvey, Technical Manager

Results - Soil

Project: WSP Lot 3 - GI

Client: IGSL			**Chemtest Job No.:**		21-34719	21-34719
Quotation No.: Q21-25679			**Chemtest Sample ID.:**		1292995	1292996
			Sample Location:		TPR-TP016	TPR-TP015A
			Sample Type:		SOIL	SOIL
			Top Depth (m):		0.60	0.50
			Bottom Depth (m):		0.65	0.55
			Asbestos Lab:		DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
ACM Type	U	2192		N/A	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	8.9	6.8
pH	U	2010		4.0	[A] 8.5	[A] 8.3
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	[A] < 0.40	[A] < 0.40
Magnesium (Water Soluble)	N	2120	g/l	0.010	[A] < 0.010	[A] < 0.010
Sulphate (2:1 Water Soluble) as SO4 mg/l	U	2120	mg/l	10.000	[A] < 10	[A] < 10
Total Sulphur	U	2175	%	0.010	[A] 0.070	[A] 0.039
Cyanide (Free)	U	2300	mg/kg	0.50	[A] < 0.50	[A] < 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	[A] < 0.50	[A] < 0.50
Thiocyanate	U	2300	mg/kg	5.0	[A] < 5.0	[A] < 5.0
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	[A] 8.4	[A] 6.1
Iron (Total)	N	2430	mg/kg	100	[A] 16000	[A] 19000
Arsenic	U	2450	mg/kg	1.0	45	50
Barium	U	2450	mg/kg	10	130	250
Beryllium	U	2450	mg/kg	1.0	< 1.0	2.2
Cadmium	U	2450	mg/kg	0.10	2.0	4.7
Chromium	U	2450	mg/kg	1.0	56	79
Manganese	U	2450	mg/kg	5.0	1800	< 5.0
Molybdenum	U	2450	mg/kg	2.0	6.5	10
Copper	U	2450	mg/kg	0.50	84	110
Mercury	U	2450	mg/kg	0.10	0.16	0.33
Nickel	U	2450	mg/kg	0.50	99	130
Lead	U	2450	mg/kg	0.50	34	100
Selenium	U	2450	mg/kg	0.20	0.81	< 0.20
Vanadium	U	2450	mg/kg	5.0	79	140
Zinc	U	2450	mg/kg	0.50	140	250
Chromium (Trivalent)	N	2490	mg/kg	1.0	56	79
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	[A] 1.9	[A] 2.9
Total Organic Carbon	U	2625	%	0.20	[A] 1.1	[A] 1.7
Aliphatic TPH >C5-C6	N	2680	mg/kg	0.010	[A] < 0.010	[A] < 0.010
Aliphatic TPH >C6-C8	N	2680	mg/kg	0.010	[A] < 0.010	[A] < 0.010
Aliphatic TPH >C8-C10	N	2680	mg/kg	0.10	[A] < 0.10	[A] < 0.10
Aliphatic TPH >C10-C12	N	2680	mg/kg	0.10	[A] < 0.10	[A] < 0.10
Aliphatic TPH >C12-C16	N	2680	mg/kg	0.10	[A] < 0.10	[A] < 0.10
Aliphatic TPH >C16-C21	N	2680	mg/kg	0.10	[A] < 0.10	[A] < 0.10
Aliphatic TPH >C21-C35	N	2680	mg/kg	0.10	[A] < 0.10	[A] < 0.10

Results - Soil

Project: WSP Lot 3 - GI

Client: IGSL				**Chemtest Job No.:**	21-34719	21-34719
Quotation No.: Q21-25679				**Chemtest Sample ID.:**	1292995	1292996
				Sample Location:	TPR-TP016	TPR-TP015A
				Sample Type:	SOIL	SOIL
				Top Depth (m):	0.60	0.50
				Bottom Depth (m):	0.65	0.55
				Asbestos Lab:	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Aliphatic TPH >C35-C44	N	2680	mg/kg	0.10	[A] < 0.10	[A] < 0.10
Total Aliphatic Hydrocarbons	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C5-C7	N	2680	mg/kg	0.010	[A] < 0.010	[A] < 0.010
Aromatic TPH >C7-C8	N	2680	mg/kg	0.010	[A] < 0.010	[A] < 0.010
Aromatic TPH >C8-C10	N	2680	mg/kg	0.10	[A] < 0.10	[A] < 0.10
Aromatic TPH >C10-C12	N	2680	mg/kg	0.10	[A] < 0.10	[A] < 0.10
Aromatic TPH >C12-C16	N	2680	mg/kg	0.10	[A] < 0.10	[A] < 0.10
Aromatic TPH >C16-C21	N	2680	mg/kg	0.10	[A] < 0.10	[A] < 0.10
Aromatic TPH >C21-C35	N	2680	mg/kg	0.10	[A] < 0.10	[A] < 0.10
Aromatic TPH >C35-C44	N	2680	mg/kg	0.10	[A] < 0.10	[A] < 0.10
Total Aromatic Hydrocarbons	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	2.0	[A] < 2.0	[A] < 2.0
Naphthalene	N	2800	mg/kg	0.010	[A] < 0.010	[A] < 0.010
Acenaphthylene	N	2800	mg/kg	0.010	[A] < 0.010	[A] < 0.010
Acenaphthene	N	2800	mg/kg	0.010	[A] < 0.010	[A] < 0.010
Fluorene	N	2800	mg/kg	0.010	[A] < 0.010	[A] < 0.010
Phenanthrene	N	2800	mg/kg	0.010	[A] < 0.010	[A] 0.090
Anthracene	N	2800	mg/kg	0.010	[A] < 0.010	[A] 0.030
Fluoranthene	N	2800	mg/kg	0.010	[A] 0.080	[A] 0.10
Pyrene	N	2800	mg/kg	0.010	[A] 0.060	[A] 0.12
Benzo[a]anthracene	N	2800	mg/kg	0.010	[A] < 0.010	[A] < 0.010
Chrysene	N	2800	mg/kg	0.010	[A] < 0.010	[A] < 0.010
Benzo[b]fluoranthene	N	2800	mg/kg	0.010	[A] < 0.010	[A] < 0.010
Benzo[k]fluoranthene	N	2800	mg/kg	0.010	[A] < 0.010	[A] < 0.010
Benzo[a]pyrene	N	2800	mg/kg	0.010	[A] < 0.010	[A] < 0.010
Indeno(1,2,3-c,d)Pyrene	N	2800	mg/kg	0.010	[A] < 0.010	[A] < 0.010
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.010	[A] < 0.010	[A] < 0.010
Benzo[g,h,i]perylene	N	2800	mg/kg	0.010	[A] < 0.010	[A] < 0.010
Total Of 16 PAH's	N	2800	mg/kg	0.20	[A] < 0.20	[A] 0.34
Resorcinol	U	2920	mg/kg	0.020	< 0.020	< 0.020
Phenol	U	2920	mg/kg	0.020	< 0.020	< 0.020
Cresols	U	2920	mg/kg	0.020	< 0.020	< 0.020
Xylenols	U	2920	mg/kg	0.020	< 0.020	< 0.020
1-Naphthol	N	2920	mg/kg	0.020	< 0.020	< 0.020
Trimethylphenols	U	2920	mg/kg	0.020	< 0.020	< 0.020
Total Phenols	U	2920	mg/kg	0.10	< 0.10	< 0.10

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:
1292995			TPR-TP016		A	Amber Glass 250ml
1292995			TPR-TP016		A	Plastic Tub 500g
1292996			TPR-TP015A		A	Amber Glass 250ml
1292996			TPR-TP015A		A	Plastic Tub 500g

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
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 <37°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.
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline 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.
2450	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.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / 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
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.

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

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
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 TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°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

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

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

Final Report

Report No.:	21-35059-1		
Initial Date of Issue:	25-Oct-2021		
Client	IGSL		
Client Address:	M7 Business Park Naas County Kildare Ireland		
Contact(s):	Darren Keogh		
Project	WSP Lot 3 - GI		
Quotation No.:	Q21-25679	**Date Received:**	08-Oct-2021
Order No.:		**Date Instructed:**	15-Oct-2021
No. of Samples:	5		
Turnaround (Wkdays):	7	**Results Due:**	25-Oct-2021
Date Approved:	25-Oct-2021		

Approved By:



Details: Glynn Harvey, Technical Manager

Results - Leachate

Project: WSP Lot 3 - GI

Client: IGSL				**Chemtest Job No.:**		21-35059	21-35059
Quotation No.: Q21-25679				**Chemtest Sample ID.:**		1294834	1294837
				Sample Location:		TPR017	TPR021
				Sample Type:		SOIL	SOIL
				Top Depth (m):		0.65	0.35
				Bottom Depth (m):		0.70	0.40
				Date Sampled:		05-Oct-2021	05-Oct-2021
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**		
pH	U	1010	2:1		N/A	8.5	8.4
Chloride	U	1220	2:1	mg/l	1.0	1.9	1.6
Ammonia (Free)	N	1220	2:1	mg/l	0.050	< 0.050	< 0.050
Nitrate	U	1220	2:1	mg/l	0.50	1.7	9.9
Sulphate	U	1220	2:1	mg/l	1.0	44	10
Cyanide (Total) Low-Level	N	1300	2:1	mg/l	0.0050	< 0.0050	< 0.0050
Cyanide (Free) Low-Level	N	1300	2:1	mg/l	0.0050	< 0.0050	< 0.0050
Sulphide	U	1325	2:1	mg/l	0.050	< 0.050	< 0.050
Magnesium	U	1455	2:1	mg/l	0.20	3.2	3.1
Hardness	U	1415	2:1	mg/l	15	110	140
Arsenic (Dissolved)	U	1455	2:1	µg/l	0.20	0.65	1.1
Boron (Dissolved)	U	1455	2:1	µg/l	10.0	30	11
Barium (Dissolved)	U	1455	2:1	µg/l	5.00	27	16
Beryllium (Dissolved)	U	1455	2:1	µg/l	1.00	< 1.0	< 1.0
Cadmium (Dissolved)	U	1455	2:1	µg/l	0.11	< 0.11	< 0.11
Copper (Dissolved)	U	1455	2:1	µg/l	0.50	2.2	5.6
Mercury (Dissolved)	U	1455	2:1	µg/l	0.05	< 0.05	< 0.05
Manganese (Dissolved)	U	1455	2:1	µg/l	0.50	1.4	1.4
Molybdenum (Dissolved)	U	1455	2:1	µg/l	0.20	15	4.8
Nickel (Dissolved)	U	1455	2:1	µg/l	0.50	0.50	1.4
Lead (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50	< 0.50
Selenium (Dissolved)	U	1455	2:1	µg/l	0.50	1.2	1.1
Vanadium (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50	0.54
Zinc (Dissolved)	U	1455	2:1	µg/l	2.5	< 2.5	3.2
Iron (Dissolved)	N	1455	2:1	µg/l	5.0	< 5.0	32
Chromium (Trivalent)	N	1490	2:1	µg/l	20	< 20	< 20
Low-Level Chromium (Hexavalent)	N	1495	2:1	µg/l	0.10	0.38	< 0.10
Aliphatic TPH >C5-C6	N	1675	2:1	µg/l	0.010	< 0.010	< 0.010
Aliphatic TPH >C6-C8	N	1675	2:1	µg/l	0.010	< 0.010	< 0.010
Aliphatic TPH >C8-C10	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	2:1	µg/l	1.0	< 1.0	< 1.0
Aromatic TPH >C5-C7	N	1675	2:1	µg/l	0.010	< 0.010	< 0.010
Aromatic TPH >C7-C8	N	1675	2:1	µg/l	0.010	< 0.010	< 0.010
Aromatic TPH >C8-C10	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10

Results - Leachate

Project: WSP Lot 3 - GI

Client: IGSL				**Chemtest Job No.:**		21-35059	21-35059
Quotation No.: Q21-25679				**Chemtest Sample ID.:**		1294834	1294837
				Sample Location:		TPR017	TPR021
				Sample Type:		SOIL	SOIL
				Top Depth (m):		0.65	0.35
				Bottom Depth (m):		0.70	0.40
				Date Sampled:		05-Oct-2021	05-Oct-2021
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**		
Aromatic TPH >C10-C12	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10
Aromatic TPH >C21-C35	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	1675	2:1	µg/l	1.0	< 1.0	< 1.0
Total Petroleum Hydrocarbons	N	1675	2:1	µg/l	2.0	< 2.0	< 2.0
Naphthalene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Acenaphthylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Acenaphthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Fluorene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Phenanthrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Benzo[a]anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Chrysene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Benzo[b]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Benzo[k]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Benzo[a]pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Total Of 16 PAH's	N	1800	2:1	µg/l	0.20	< 0.20	< 0.20
Total Phenols	U	1920	2:1	mg/l	0.030	< 0.030	< 0.030

Results - Soil

Project: WSP Lot 3 - GI

Client: IGSL				**Chemtest Job No.:**	21-35059	21-35059	21-35059	21-35059	21-35059
Quotation No.: Q21-25679				**Chemtest Sample ID.:**	1294833	1294834	1294835	1294836	1294837
				Sample Location:	TPR023	TPR017	TPR019	TPR017	TPR021
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.60	0.65	0.50	0.45	0.35
				Bottom Depth (m):	0.65	0.70	0.55	0.50	0.40
				Date Sampled:	05-Oct-2021	05-Oct-2021	05-Oct-2021	05-Oct-2021	05-Oct-2021
				Asbestos Lab:	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**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
Moisture	N	2030	%	0.020	10	4.3	6.1	7.9	8.4
pH	U	2010		4.0	8.6	8.6	8.3	8.4	8.2
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40
Magnesium (Water Soluble)	N	2120	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Sulphate (2:1 Water Soluble) as SO4 mg/l	U	2120	mg/l	10.000	42	30	19	< 10	< 10
Total Sulphur	U	2175	%	0.010	0.072	0.098	0.028	0.037	0.014
Cyanide (Free)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Thiocyanate	U	2300	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	9.2	11	9.0	5.8	2.6
Iron (Total)	N	2430	mg/kg	100	12000	6600	14000	16000	19000
Arsenic	U	2450	mg/kg	1.0	8.1	7.0	11	9.8	10
Barium	U	2450	mg/kg	10	67	55	87	79	69
Beryllium	U	2450	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cadmium	U	2450	mg/kg	0.10	0.92	0.50	1.2	1.3	1.4
Chromium	U	2450	mg/kg	1.0	14	10	16	17	16
Manganese	U	2450	mg/kg	5.0	790	420	1000	1100	1200
Molybdenum	U	2450	mg/kg	2.0	2.3	< 2.0	2.4	2.8	2.6
Copper	U	2450	mg/kg	0.50	25	22	37	36	30
Mercury	U	2450	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.12	< 0.10
Nickel	U	2450	mg/kg	0.50	30	24	32	37	35
Lead	U	2450	mg/kg	0.50	19	11	22	31	20
Selenium	U	2450	mg/kg	0.20	0.23	< 0.20	< 0.20	0.30	0.66
Vanadium	U	2450	mg/kg	5.0	15	7.1	17	21	20
Zinc	U	2450	mg/kg	0.50	64	43	72	97	85
Chromium (Trivalent)	N	2490	mg/kg	1.0	14	10	16	17	16
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	2.7	1.2	2.1	2.7	2.8
Total Organic Carbon	U	2625	%	0.20	1.6	0.70	1.2	1.6	1.6
Aliphatic TPH >C5-C6	N	2680	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Aliphatic TPH >C6-C8	N	2680	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Aliphatic TPH >C8-C10	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: WSP Lot 3 - GI

Client: IGSL			**Chemtest Job No.:**		21-35059	21-35059	21-35059	21-35059	21-35059
Quotation No.: Q21-25679			**Chemtest Sample ID.:**		1294833	1294834	1294835	1294836	1294837
			Sample Location:		TPR023	TPR017	TPR019	TPR017	TPR021
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.60	0.65	0.50	0.45	0.35
			Bottom Depth (m):		0.65	0.70	0.55	0.50	0.40
			Date Sampled:		05-Oct-2021	05-Oct-2021	05-Oct-2021	05-Oct-2021	05-Oct-2021
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
Aliphatic TPH >C21-C35	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C5-C7	N	2680	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Aromatic TPH >C7-C8	N	2680	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Aromatic TPH >C8-C10	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C21-C35	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Naphthalene	N	2800	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Acenaphthylene	N	2800	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Acenaphthene	N	2800	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Fluorene	N	2800	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Phenanthrene	N	2800	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Anthracene	N	2800	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Fluoranthene	N	2800	mg/kg	0.010	0.13	0.17	< 0.010	0.21	0.15
Pyrene	N	2800	mg/kg	0.010	0.14	0.16	< 0.010	0.15	0.14
Benzo[a]anthracene	N	2800	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Chrysene	N	2800	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[b]fluoranthene	N	2800	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[k]fluoranthene	N	2800	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[a]pyrene	N	2800	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	2800	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	2800	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Total Of 16 PAH's	N	2800	mg/kg	0.20	0.27	0.33	< 0.20	0.36	0.29
Resorcinol	U	2920	mg/kg	0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Phenol	U	2920	mg/kg	0.020	< 0.020	< 0.020	0.021	0.033	0.033
Cresols	U	2920	mg/kg	0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Xylenols	U	2920	mg/kg	0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
1-Naphthol	N	2920	mg/kg	0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Trimethylphenols	U	2920	mg/kg	0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Total Phenols	U	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH 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.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1325	Sulphide in Waters	Sulphides	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using N,N–dimethyl-pphenylenediamine.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
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).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1495	Low Level Hexavalent Chromium in Waters	Chromium [VI]	Colorimetric determination of hexavalent chromium expressed as Cr (VI) µg/l in water, using Ion Chromatography and UV-visible spectrophotometry.
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters 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	Pentane extraction / GCMS detection
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	pH Meter
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 <37°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.
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline 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.

Test Methods

SOP	Title	Parameters included	Method summary
2450	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.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / 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
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
650	Characterisation of Waste (Leaching WAC)	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

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
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 TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°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

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

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

UKAS TESTING
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Final Report

Report No.:	21-36466-1		
Initial Date of Issue:	02-Nov-2021		
Client	IGSL		
Client Address:	M7 Business Park Naas County Kildare Ireland		
Contact(s):	Darren Keogh		
Project	WSP Lot 3 - GI		
Quotation No.:	Q21-25679	**Date Received:**	20-Oct-2021
Order No.:		**Date Instructed:**	22-Oct-2021
No. of Samples:	1		
Turnaround (Wkdays):	7	**Results Due:**	01-Nov-2021
Date Approved:	02-Nov-2021		

Approved By:



Details: Glynn Harvey, Technical Manager

Results - Leachate

Project: WSP Lot 3 - GI

Client: IGSL				**Chemtest Job No.:**		21-36466
Quotation No.: Q21-25679				**Chemtest Sample ID.:**		1301978
Order No.:				Client Sample Ref.:		TPR
				Sample Location:		TP031
				Sample Type:		SOIL
				Top Depth (m):		0.30
				Bottom Depth (m):		0.40
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**	
pH	U	1010	2:1		N/A	10.1
Chloride	U	1220	2:1	mg/l	1.0	22
Ammonia (Free)	N	1220	2:1	mg/l	0.050	2.4
Nitrate	U	1220	2:1	mg/l	0.50	1.5
Sulphate	U	1220	2:1	mg/l	1.0	99
Cyanide (Total) Low-Level	N	1300	2:1	mg/l	0.0050	0.010
Cyanide (Free) Low-Level	N	1300	2:1	mg/l	0.0050	0.0070
Sulphide	U	1325	2:1	mg/l	0.050	< 0.050
Magnesium	U	1455	2:1	mg/l	0.20	0.55
Hardness	U	1415	2:1	mg/l	15	220
Arsenic (Dissolved)	U	1455	2:1	µg/l	0.20	18
Boron (Dissolved)	U	1455	2:1	µg/l	10.0	12
Barium (Dissolved)	U	1455	2:1	µg/l	5.00	16
Beryllium (Dissolved)	U	1455	2:1	µg/l	1.00	< 1.0
Cadmium (Dissolved)	U	1455	2:1	µg/l	0.11	< 0.11
Copper (Dissolved)	U	1455	2:1	µg/l	0.50	160
Mercury (Dissolved)	U	1455	2:1	µg/l	0.05	0.07
Manganese (Dissolved)	U	1455	2:1	µg/l	0.50	1.8
Molybdenum (Dissolved)	U	1455	2:1	µg/l	0.20	47
Nickel (Dissolved)	U	1455	2:1	µg/l	0.50	44
Lead (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50
Selenium (Dissolved)	U	1455	2:1	µg/l	0.50	5.9
Vanadium (Dissolved)	U	1455	2:1	µg/l	0.50	65
Zinc (Dissolved)	U	1455	2:1	µg/l	2.5	2.9
Iron (Dissolved)	N	1455	2:1	µg/l	5.0	41
Chromium (Trivalent)	N	1490	2:1	µg/l	20	[A] < 20
Low-Level Chromium (Hexavalent)	N	1495	2:1	µg/l	0.10	[A] 1.9
Aliphatic TPH >C5-C6	N	1675	2:1	µg/l	0.010	[A] < 0.010
Aliphatic TPH >C6-C8	N	1675	2:1	µg/l	0.010	[A] < 0.010
Aliphatic TPH >C8-C10	N	1675	2:1	µg/l	0.10	[A] < 0.10
Aliphatic TPH >C10-C12	N	1675	2:1	µg/l	0.10	[A] < 0.10
Aliphatic TPH >C12-C16	N	1675	2:1	µg/l	0.10	[A] < 0.10
Aliphatic TPH >C16-C21	N	1675	2:1	µg/l	0.10	[A] < 0.10
Aliphatic TPH >C21-C35	N	1675	2:1	µg/l	0.10	[A] < 0.10
Aliphatic TPH >C35-C44	N	1675	2:1	µg/l	0.10	[A] < 0.10
Total Aliphatic Hydrocarbons	N	1675	2:1	µg/l	1.0	[A] < 1.0
Aromatic TPH >C5-C7	N	1675	2:1	µg/l	0.010	[A] < 0.010
Aromatic TPH >C7-C8	N	1675	2:1	µg/l	0.010	[A] < 0.010
Aromatic TPH >C8-C10	N	1675	2:1	µg/l	0.10	[A] < 0.10

Results - Leachate

Project: WSP Lot 3 - GI

Client: IGSL				**Chemtest Job No.:**		21-36466
Quotation No.: Q21-25679				**Chemtest Sample ID.:**		1301978
Order No.:				Client Sample Ref.:		TPR
				Sample Location:		TP031
				Sample Type:		SOIL
				Top Depth (m):		0.30
				Bottom Depth (m):		0.40
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**	
Aromatic TPH >C10-C12	N	1675	2:1	µg/l	0.10	[A] < 0.10
Aromatic TPH >C12-C16	N	1675	2:1	µg/l	0.10	[A] < 0.10
Aromatic TPH >C16-C21	N	1675	2:1	µg/l	0.10	[A] < 0.10
Aromatic TPH >C21-C35	N	1675	2:1	µg/l	0.10	[A] < 0.10
Aromatic TPH >C35-C44	N	1675	2:1	µg/l	0.10	[A] < 0.10
Total Aromatic Hydrocarbons	N	1675	2:1	µg/l	1.0	[A] < 1.0
Total Petroleum Hydrocarbons	N	1675	2:1	µg/l	2.0	[A] < 2.0
Naphthalene	N	1800	2:1	µg/l	0.010	< 0.010
Acenaphthylene	N	1800	2:1	µg/l	0.010	< 0.010
Acenaphthene	N	1800	2:1	µg/l	0.010	< 0.010
Fluorene	N	1800	2:1	µg/l	0.010	< 0.010
Phenanthrene	N	1800	2:1	µg/l	0.010	< 0.010
Anthracene	N	1800	2:1	µg/l	0.010	< 0.010
Fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010
Pyrene	N	1800	2:1	µg/l	0.010	< 0.010
Benzo[a]anthracene	N	1800	2:1	µg/l	0.010	< 0.010
Chrysene	N	1800	2:1	µg/l	0.010	< 0.010
Benzo[b]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010
Benzo[k]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010
Benzo[a]pyrene	N	1800	2:1	µg/l	0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1800	2:1	µg/l	0.010	< 0.010
Dibenz(a,h)Anthracene	N	1800	2:1	µg/l	0.010	< 0.010
Benzo[g,h,i]perylene	N	1800	2:1	µg/l	0.010	< 0.010
Total Of 16 PAH's	N	1800	2:1	µg/l	0.20	< 0.20
Total Phenols	U	1920	2:1	mg/l	0.030	< 0.030

Results - Soil

Project: WSP Lot 3 - GI

Client: IGSL			**Chemtest Job No.:**		21-36466
Quotation No.: Q21-25679			**Chemtest Sample ID.:**		1301978
Order No.:			Client Sample Ref.:		TPR
			Sample Location:		TP031
			Sample Type:		SOIL
			Top Depth (m):		0.30
			Bottom Depth (m):		0.40
			Asbestos Lab:		DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
ACM Type	U	2192		N/A	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected
Moisture	N	2030	%	0.020	16
pH	U	2010		4.0	[A] 8.5
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	[A] 0.60
Magnesium (Water Soluble)	N	2120	g/l	0.010	[A] < 0.010
Sulphate (2:1 Water Soluble) as SO4 mg/l	U	2120	mg/l	10.000	[A] 39
Total Sulphur	U	2175	%	0.010	[A] 0.084
Cyanide (Free)	U	2300	mg/kg	0.50	[A] < 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	[A] < 0.50
Thiocyanate	U	2300	mg/kg	5.0	[A] < 5.0
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	[A] 4.1
Iron (Total)	N	2430	mg/kg	100	[A] 14000
Arsenic	U	2450	mg/kg	1.0	15
Barium	U	2450	mg/kg	10	80
Beryllium	U	2450	mg/kg	1.0	< 1.0
Cadmium	U	2450	mg/kg	0.10	2.0
Chromium	U	2450	mg/kg	1.0	22
Manganese	U	2450	mg/kg	5.0	< 5.0
Molybdenum	U	2450	mg/kg	2.0	3.7
Copper	U	2450	mg/kg	0.50	49
Mercury	U	2450	mg/kg	0.10	< 0.10
Nickel	U	2450	mg/kg	0.50	46
Lead	U	2450	mg/kg	0.50	28
Selenium	U	2450	mg/kg	0.20	0.85
Vanadium	U	2450	mg/kg	5.0	37
Zinc	U	2450	mg/kg	0.50	96
Chromium (Trivalent)	N	2490	mg/kg	1.0	22
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50
Organic Matter	U	2625	%	0.40	[A] 1.2
Total Organic Carbon	U	2625	%	0.20	[A] 0.70
Aliphatic TPH >C5-C6	N	2680	mg/kg	0.010	[A] < 0.010
Aliphatic TPH >C6-C8	N	2680	mg/kg	0.010	[A] < 0.010
Aliphatic TPH >C8-C10	N	2680	mg/kg	0.10	[A] < 0.10
Aliphatic TPH >C10-C12	N	2680	mg/kg	0.10	[A] < 0.10
Aliphatic TPH >C12-C16	N	2680	mg/kg	0.10	[A] < 0.10
Aliphatic TPH >C16-C21	N	2680	mg/kg	0.10	[A] < 0.10

Results - Soil

Project: WSP Lot 3 - GI

Client: IGSL			**Chemtest Job No.:**		21-36466
Quotation No.: Q21-25679			**Chemtest Sample ID.:**		1301978
Order No.:			Client Sample Ref.:		TPR
			Sample Location:		TP031
			Sample Type:		SOIL
			Top Depth (m):		0.30
			Bottom Depth (m):		0.40
			Asbestos Lab:		DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Aliphatic TPH >C21-C35	N	2680	mg/kg	0.10	[A] < 0.10
Aliphatic TPH >C35-C44	N	2680	mg/kg	0.10	[A] < 0.10
Total Aliphatic Hydrocarbons	N	2680	mg/kg	1.0	[A] < 1.0
Aromatic TPH >C5-C7	N	2680	mg/kg	0.010	[A] < 0.010
Aromatic TPH >C7-C8	N	2680	mg/kg	0.010	[A] < 0.010
Aromatic TPH >C8-C10	N	2680	mg/kg	0.10	[A] < 0.10
Aromatic TPH >C10-C12	N	2680	mg/kg	0.10	[A] < 0.10
Aromatic TPH >C12-C16	N	2680	mg/kg	0.10	[A] < 0.10
Aromatic TPH >C16-C21	N	2680	mg/kg	0.10	[A] < 0.10
Aromatic TPH >C21-C35	N	2680	mg/kg	0.10	[A] 110
Aromatic TPH >C35-C44	N	2680	mg/kg	0.10	[A] < 0.10
Total Aromatic Hydrocarbons	N	2680	mg/kg	1.0	[A] 110
Total Petroleum Hydrocarbons	N	2680	mg/kg	2.0	[A] 110
Naphthalene	N	2800	mg/kg	0.010	[A] < 0.010
Acenaphthylene	N	2800	mg/kg	0.010	[A] < 0.010
Acenaphthene	N	2800	mg/kg	0.010	[A] < 0.010
Fluorene	N	2800	mg/kg	0.010	[A] < 0.010
Phenanthrene	N	2800	mg/kg	0.010	[A] < 0.010
Anthracene	N	2800	mg/kg	0.010	[A] < 0.010
Fluoranthene	N	2800	mg/kg	0.010	[A] < 0.010
Pyrene	N	2800	mg/kg	0.010	[A] < 0.010
Benzo[a]anthracene	N	2800	mg/kg	0.010	[A] < 0.010
Chrysene	N	2800	mg/kg	0.010	[A] < 0.010
Benzo[b]fluoranthene	N	2800	mg/kg	0.010	[A] < 0.010
Benzo[k]fluoranthene	N	2800	mg/kg	0.010	[A] < 0.010
Benzo[a]pyrene	N	2800	mg/kg	0.010	[A] < 0.010
Indeno(1,2,3-c,d)Pyrene	N	2800	mg/kg	0.010	[A] < 0.010
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.010	[A] < 0.010
Benzo[g,h,i]perylene	N	2800	mg/kg	0.010	[A] < 0.010
Total Of 16 PAH's	N	2800	mg/kg	0.20	[A] < 0.20
Resorcinol	U	2920	mg/kg	0.020	< 0.020
Phenol	U	2920	mg/kg	0.020	< 0.020
Cresols	U	2920	mg/kg	0.020	< 0.020
Xylenols	U	2920	mg/kg	0.020	< 0.020
1-Naphthol	N	2920	mg/kg	0.020	< 0.020
Trimethylphenols	U	2920	mg/kg	0.020	< 0.020
Total Phenols	U	2920	mg/kg	0.10	< 0.10

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:
1301978	TPR		TP031		A	Amber Glass 250ml
1301978	TPR		TP031		A	Plastic Tub 500g

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH 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.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1325	Sulphide in Waters	Sulphides	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using N,N–dimethyl-pphenylenediamine.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
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).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1495	Low Level Hexavalent Chromium in Waters	Chromium [VI]	Colorimetric determination of hexavalent chromium expressed as Cr (VI) µg/l in water, using Ion Chromatography and UV-visible spectrophotometry.
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters 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	Pentane extraction / GCMS detection
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	pH Meter
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 <37°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.
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline 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.

Test Methods

SOP	Title	Parameters included	Method summary
2450	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.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / 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
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
650	Characterisation of Waste (Leaching WAC)	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

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
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 TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°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

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

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

UKAS TESTING
2183

Final Report

Report No.:	21-40059-1		
Initial Date of Issue:	24-Nov-2021		
Client	IGSL		
Client Address:	M7 Business Park Naas County Kildare Ireland		
Contact(s):	Darren Keogh		
Project	23560 WSP Lot 3 - GI		
Quotation No.:		**Date Received:**	15-Nov-2021
Order No.:		**Date Instructed:**	16-Nov-2021
No. of Samples:	16		
Turnaround (Wkdays):	7	**Results Due:**	24-Nov-2021
Date Approved:	24-Nov-2021		

Approved By:



Details: Glynn Harvey, Technical Manager

Results - Soil

Project: 23560 WSP Lot 3 - GI

Client: IGSL		**Chemtest Job No.:**			21-40059	21-40059	21-40059	21-40059	21-40059	21-40059	21-40059	21-40059	21-40059	21-40059	21-40059
Quotation No.:		**Chemtest Sample ID.:**			1319916	1319917	1319918	1319919	1319920	1319921	1319922	1319923	1319924	1319925	1319926
Order No.:		Client Sample Ref.:			AA152053	AA152054	AA152051	AA152052	AA157067	AA152059	AA152060	AA152065	AA152073	AA152069	AA152078
		Sample Location:			TPR-TP001	TPR-TP001	TPR-TP003	TPR-TP003	TPR-TP004	TPR-TP005	TPR-TP007	TPR-TP008	TPR-TP009	TPR-TP013	TPR-TP012
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.40	1.00	0.30	0.70	0.50	0.80	0.50	0.50	0.75	0.40	0.40
		Bottom Depth (m):			0.40	1.00	0.30	0.70	0.50	0.80	0.50	0.50	0.75	0.45	0.50
Determinand	**Accred.**	**SOP**	**Units**	**LOD**											
Moisture	N	2030	%	0.020	11	5.9	17	11	21	10	9.6	8.2	8.5	15	14
pH	U	2010		4.0	[A] 7.8	[A] 8.5	[A] 7.3	[A] 8.2	[A] 8.2	[A] 8.1	[A] 8.0	[A] 8.3	[A] 8.3	[A] 8.2	[A] 7.6
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	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	[A] < 0.010	[A] < 0.010	[A] < 0.010

Results - Soil

Project: 23560 WSP Lot 3 - GI

Client: IGSL		**Chemtest Job No.:**			21-40059	21-40059	21-40059	21-40059	21-40059
Quotation No.:		**Chemtest Sample ID.:**			1319927	1319928	1319929	1319930	1319931
Order No.:		Client Sample Ref.:			AA152063	AA152064	AA152091	AA152099	AA152110
		Sample Location:			TPR-TP010	TPR-TP010	TPR-TP023	TPR-TP018	TPR-TP024
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.80	1.20	0.40	0.50	0.90
		Bottom Depth (m):			0.80	1.20	0.45	0.70	1.00
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
Moisture	N	2030	%	0.020	7.4	7.9	4.9	4.5	4.3
pH	U	2010		4.0	[A] 9.9	[A] 9.6	[A] 9.0	[A] 9.1	[A] 8.9
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	[A] 0.077	[A] 0.012	[A] < 0.010	[A] < 0.010	[A] < 0.010

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:
1319916	AA152053		TPR-TP001		A	Amber Glass 250ml
1319916	AA152053		TPR-TP001		A	Plastic Tub 500g
1319917	AA152054		TPR-TP001		A	Amber Glass 250ml
1319917	AA152054		TPR-TP001		A	Plastic Tub 500g
1319918	AA152051		TPR-TP003		A	Amber Glass 250ml
1319918	AA152051		TPR-TP003		A	Plastic Tub 500g
1319919	AA152052		TPR-TP003		A	Amber Glass 250ml
1319919	AA152052		TPR-TP003		A	Plastic Tub 500g
1319920	AA157067		TPR-TP004		A	Amber Glass 250ml
1319921	AA152059		TPR-TP005		A	Amber Glass 250ml
1319921	AA152059		TPR-TP005		A	Plastic Tub 500g
1319922	AA152060		TPR-TP007		A	Plastic Tub 500g
1319923	AA152065		TPR-TP008		A	Amber Glass 250ml
1319923	AA152065		TPR-TP008		A	Plastic Tub 500g
1319924	AA152073		TPR-TP009		A	Amber Glass 250ml
1319924	AA152073		TPR-TP009		A	Plastic Tub 500g
1319925	AA152069		TPR-TP013		A	Amber Glass 250ml
1319925	AA152069		TPR-TP013		A	Plastic Tub 500g
1319926	AA152078		TPR-TP012		A	Amber Glass 250ml
1319926	AA152078		TPR-TP012		A	Plastic Tub 500g
1319927	AA152063		TPR-TP010		A	Amber Glass 250ml
1319927	AA152063		TPR-TP010		A	Plastic Tub 500g
1319928	AA152064		TPR-TP010		A	Amber Glass 250ml
1319929	AA152091		TPR-TP023		A	Amber Glass 250ml
1319929	AA152091		TPR-TP023		A	Plastic Tub 500g
1319930	AA152099		TPR-TP018		A	Plastic Tub 500g
1319931	AA152110		TPR-TP024		A	Plastic Tub 500g

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
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 <37°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

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U/S	Unsuitable Sample
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>	"greater than"
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If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

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eurofins | Chemtest
Eurofins Chemtest Ltd
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Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	21-40063-1
Initial Date of Issue:	22-Nov-2021
Client	IGSL
Client Address:	M7 Business Park Naas County Kildare Ireland
Contact(s):	Darren Keogh
Project	23560 WSP Lot 3 - GI

Quotation No.:		**Date Received:**	15-Nov-2021
Order No.:		**Date Instructed:**	16-Nov-2021
No. of Samples:	6		
Turnaround (Wkdays):	7	**Results Due:**	24-Nov-2021
Date Approved:	22-Nov-2021		

Approved By:



Details: Glynn Harvey, Technical Manager

Results - Soil

Project: 23560 WSP Lot 3 - GI

Client: IGSL		**Chemtest Job No.:**			21-40063	21-40063	21-40063	21-40063	21-40063	21-40063
Quotation No.:		**Chemtest Sample ID.:**			1319953	1319954	1319955	1319956	1319957	1319958
Order No.:		Client Sample Ref.:			155831	155846	155848	155835	155838	155840
		Sample Location:			TPR-BH001	TPR-BH004	TPR-BH004	TPR-BH007	TPR-BH009	TPR-BH013
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.80	0.50	1.00	0.50	1.00	0.50
		Bottom Depth (m):			0.80	0.50	1.00	0.50	1.00	0.50
Determinand	**Accred.**	**SOP**	**Units**	**LOD**						
Moisture	N	2030	%	0.020	18	19	6.6	23	14	32
pH	U	2010		4.0	[A] 9.1	[A] 8.2	[A] 8.6	[A] 8.6	[A] 8.5	[A] 8.4
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] 0.012	[A] < 0.010

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:
1319953	155831		TPR-BH001		A	Amber Glass 250ml
1319953	155831		TPR-BH001		A	Plastic Tub 500g
1319954	155846		TPR-BH004		A	Amber Glass 250ml
1319954	155846		TPR-BH004		A	Plastic Tub 500g
1319955	155848		TPR-BH004		A	Amber Glass 250ml
1319955	155848		TPR-BH004		A	Plastic Tub 500g
1319956	155835		TPR-BH007		A	Amber Glass 250ml
1319956	155835		TPR-BH007		A	Plastic Tub 500g
1319957	155838		TPR-BH009		A	Amber Glass 250ml
1319957	155838		TPR-BH009		A	Plastic Tub 500g
1319958	155840		TPR-BH013		A	Amber Glass 250ml
1319958	155840		TPR-BH013		A	Plastic Tub 500g

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
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 <37°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

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

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
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 TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°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

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

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

UKAS TESTING
2183

Final Report

Report No.:	21-40208-1		
Initial Date of Issue:	22-Nov-2021		
Client	IGSL		
Client Address:	M7 Business Park Naas County Kildare Ireland		
Contact(s):	Darren Keogh		
Project	23560 WSP Lot 3- GI		
Quotation No.:		**Date Received:**	16-Nov-2021
Order No.:		**Date Instructed:**	16-Nov-2021
No. of Samples:	37		
Turnaround (Wkdays):	7	**Results Due:**	24-Nov-2021
Date Approved:	22-Nov-2021		

Approved By:



Details: Glynn Harvey, Technical Manager

Results - Soil

Project: 23560 WSP Lot 3- GI

Client: IGSL		**Chemtest Job No.:**			21-40208	21-40208	21-40208	21-40208	21-40208	21-40208	21-40208	21-40208	21-40208	21-40208	21-40208
Quotation No.:		**Chemtest Sample ID.:**			1320779	1320780	1320781	1320782	1320783	1320784	1320785	1320786	1320787	1320788	1320789
Order No.:		Client Sample Ref.:			AA152053	AA157067	AA152060	AA152065	AA152069	AA152070	AA152081	AA152078	AA152079	AA152075	AA152064
		Sample Location:			TPR-TP001	TPR-TP004	TPR-TP007	TPR-TP008	TPR-TP013	TPR-TP013	TPR-TP011	TPR-TP012	TPR-TP012	TPR-TP014	TPR-TP010
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.40	0.50	0.50	0.50	0.40	0.90	0.60	0.40	0.90	0.70	1.20
		Bottom Depth (m):			0.40	0.50	0.50	0.50	0.45	1.00	0.60	0.50	0.90	0.80	120
Determinand	**Accred.**	**SOP**	**Units**	**LOD**											
Moisture	N	2030	%	0.020	11	7.5	14	14	14	47	8.8	12	11	5.0	11
pH	U	2010		4.0	[A] 8.6	[A] 8.6	[A] 8.4	[A] 8.3	[A] 8.0	[A] 8.5	[A] 8.3	[A] 8.6	[A] 8.1	[A] 8.5	[A] 8.7
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	[A] 0.017	[A] < 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	[A] < 0.010

Results - Soil

Project: 23560 WSP Lot 3- GI

Client: IGSL	**Chemtest Job No.:**				21-40208	21-40208	21-40208	21-40208	21-40208	21-40208	21-40208	21-40208	21-40208	21-40208	21-40208
Quotation No.:	**Chemtest Sample ID.:**				1320790	1320791	1320792	1320793	1320794	1320795	1320796	1320797	1320798	1320799	1320800
Order No.:	Client Sample Ref.:				AA152089	AA152086	AA152094	AA152099	AA152110	AA152102	AA152118	AA152120	AA152125	AA152132	AA152126
	Sample Location:				TPR-TP017	TPR-TP019	TPR-TP021	TPR-TP018	TPR-TP024	TPR-TP020	TPR-TP030	TPR-TP030	TPR-TP168871	TPR-TP031	TPR-TP033
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.45	0.40	0.90	0.50	0.90	1.00	0.25	0.90	1.10	0.30	0.30
	Bottom Depth (m):				0.50	0.40	0.95	0.70	1.00	1.05	0.30	1.00	1.20	0.40	0.35
Determinand	**Accred.**	**SOP**	**Units**	**LOD**											
Moisture	N	2030	%	0.020	9.8	8.7	9.2	15	8.3	5.6	11	2.7	12	14	3.8
pH	U	2010		4.0	[A] 8.5	[A] 8.4	[A] 8.5	[A] 8.4	[A] 8.4	[A] 8.6	[A] 8.2	[A] 8.6	[A] 8.6	[A] 8.4	[A] 8.5
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	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	[A] < 0.010	[A] 0.013	[A] 0.086

Results - Soil

Project: 23560 WSP Lot 3- GI

Client: IGSL		**Chemtest Job No.:**			21-40208	21-40208	21-40208	21-40208	21-40208	21-40208	21-40208	21-40208	21-40208	21-40208	21-40208
Quotation No.:		**Chemtest Sample ID.:**			1320801	1320802	1320803	1320804	1320805	1320806	1320807	1320808	1320809	1320810	1320811
Order No.:		Client Sample Ref.:			164898	164898	151652	151654	151657	151655	151656	151658	151659	151659	151663
		Sample Location:			TPR-DS002	TPR-DS003	TPR-DS005	TPR-DS006	TPR-DS007	TPR-DS009	TPR-DS011	TPR-DS008	TPR-DS010	TPR-DS010	TPR-DS012
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00
		Bottom Depth (m):			0.70	0.70	1.00	0.70	0.60	1.00	0.60	0.70	1.00	1.70	1.00
Determinand	**Accred.**	**SOP**	**Units**	**LOD**											
Moisture	N	2030	%	0.020	9.0	3.0	9.7	4.1	3.0	12	2.7	5.5	7.5	12	2.6
pH	U	2010		4.0	[A] 8.6	[A] 8.7	[A] 8.5	[A] 8.8	[A] 8.7	[A] 8.5	[A] 8.8	[A] 8.7	[A] 9.9	[A] 8.6	[A] 11.0
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	[A] < 0.010	[A] 0.013	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] 0.24	[A] 0.21	[A] 0.045

Results - Soil

Project: 23560 WSP Lot 3- GI

Client: IGSL		**Chemtest Job No.:**			21-40208	21-40208	21-40208	21-40208
Quotation No.:		**Chemtest Sample ID.:**			1320812	1320813	1320814	1320815
Order No.:		Client Sample Ref.:			151651	151663	151661	151661
		Sample Location:			TPR-DS013	TPR-DS014	TPR-DS016	TPR-DS017
		Sample Type:			SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.00	0.00	0.00	0.00
		Bottom Depth (m):			0.60	1.00	0.70	0.60
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
Moisture	N	2030	%	0.020	5.5	1.3	13	92
pH	U	2010		4.0	[A] 9.3	[A] 9.1	[A] 8.2	[A] 8.7
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010

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:
1320779	AA152053		TPR-TP001		A	Amber Glass 250ml
1320780	AA157067		TPR-TP004		A	Amber Glass 250ml
1320780	AA157067		TPR-TP004		A	Plastic Tub 500g
1320781	AA152060		TPR-TP007		A	Amber Glass 250ml
1320782	AA152065		TPR-TP008		A	Amber Glass 250ml
1320783	AA152069		TPR-TP013		A	Amber Glass 250ml
1320784	AA152070		TPR-TP013		A	Amber Glass 250ml
1320784	AA152070		TPR-TP013		A	Plastic Tub 500g
1320785	AA152081		TPR-TP011		A	Amber Glass 250ml
1320785	AA152081		TPR-TP011		A	Plastic Tub 500g
1320786	AA152078		TPR-TP012		A	Amber Glass 250ml
1320787	AA152079		TPR-TP012		A	Amber Glass 250ml
1320787	AA152079		TPR-TP012		A	Plastic Tub 500g
1320788	AA152075		TPR-TP014		A	Amber Glass 250ml
1320788	AA152075		TPR-TP014		A	Plastic Tub 500g
1320789	AA152064		TPR-TP010		A	Amber Glass 250ml
1320789	AA152064		TPR-TP010		A	Plastic Tub 500g
1320790	AA152089		TPR-TP017		A	Amber Glass 250ml
1320790	AA152089		TPR-TP017		A	Plastic Tub 500g
1320791	AA152086		TPR-TP019		A	Amber Glass 250ml
1320791	AA152086		TPR-TP019		A	Plastic Tub 500g
1320792	AA152094		TPR-TP021		A	Amber Glass 250ml
1320792	AA152094		TPR-TP021		A	Plastic Tub 500g
1320793	AA152099		TPR-TP018		A	Amber Glass 250ml
1320794	AA152110		TPR-TP024		A	Amber Glass 250ml
1320795	AA152102		TPR-TP020		A	Amber Glass 250ml
1320795	AA152102		TPR-TP020		A	Plastic Tub 500g
1320796	AA152118		TPR-TP030		A	Amber Glass 250ml
1320796	AA152118		TPR-TP030		A	Plastic Tub 500g

Deviations

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Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1320797	AA152120		TPR-TP030		A	Amber Glass 250ml
1320797	AA152120		TPR-TP030		A	Plastic Tub 500g
1320798	AA152125		TPR-TP168871		A	Amber Glass 250ml
1320798	AA152125		TPR-TP168871		A	Plastic Tub 500g
1320799	AA152132		TPR-TP031		A	Amber Glass 250ml
1320799	AA152132		TPR-TP031		A	Plastic Tub 500g
1320800	AA152126		TPR-TP033		A	Amber Glass 250ml
1320800	AA152126		TPR-TP033		A	Plastic Tub 500g
1320801	164898		TPR-DS002		A	Amber Glass 250ml
1320801	164898		TPR-DS002		A	Plastic Tub 500g
1320802	164898		TPR-DS003		A	Amber Glass 250ml
1320802	164898		TPR-DS003		A	Plastic Tub 500g
1320803	151652		TPR-DS005		A	Amber Glass 250ml
1320803	151652		TPR-DS005		A	Plastic Tub 500g
1320804	151654		TPR-DS006		A	Amber Glass 250ml
1320804	151654		TPR-DS006		A	Plastic Tub 500g
1320805	151657		TPR-DS007		A	Amber Glass 250ml
1320805	151657		TPR-DS007		A	Plastic Tub 500g
1320806	151655		TPR-DS009		A	Amber Glass 250ml
1320806	151655		TPR-DS009		A	Plastic Tub 500g
1320807	151656		TPR-DS011		A	Amber Glass 250ml
1320807	151656		TPR-DS011		A	Plastic Tub 500g
1320808	151658		TPR-DS008		A	Amber Glass 250ml
1320808	151658		TPR-DS008		A	Plastic Tub 500g
1320809	151659		TPR-DS010		A	Amber Glass 250ml
1320809	151659		TPR-DS010		A	Plastic Tub 500g
1320810	151659		TPR-DS010		A	Amber Glass 250ml
1320810	151659		TPR-DS010		A	Plastic Tub 500g
1320811	151663		TPR-DS012		A	Amber Glass 250ml

Deviations

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Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1320811	151663		TPR-DS012		A	Plastic Tub 500g
1320812	151651		TPR-DS013		A	Amber Glass 250ml
1320812	151651		TPR-DS013		A	Plastic Tub 500g
1320813	151663		TPR-DS014		A	Amber Glass 250ml
1320813	151663		TPR-DS014		A	Plastic Tub 500g
1320814	151661		TPR-DS016		A	Amber Glass 250ml
1320814	151661		TPR-DS016		A	Plastic Tub 500g
1320815	151661		TPR-DS017		A	Amber Glass 250ml
1320815	151661		TPR-DS017		A	Plastic Tub 500g

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
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 <37°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

Report Information

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I/S	Insufficient Sample
U/S	Unsuitable Sample
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<	"less than"
>	"greater than"
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LOD	Limit of detection

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Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

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A - Date of sampling not supplied
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customerservices@chemtest.com

Appendix 10H.3

Rock Strength Testing

(Diametrial) POINT LOAD STRENGTH INDEX TEST DATA

Contract: WSP Ground Investigation Contract Lot 3
Date of test: 31/03/2022

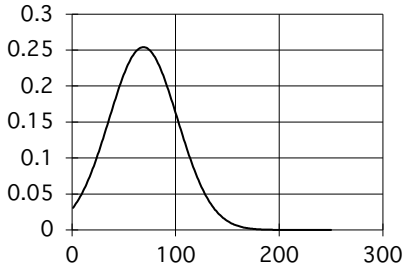
Sample Type: Core
Contract no. 23560

RC No.	Depth m	D (Diameter) mm	P (failure load) kN	F	Is (index strength) Mpa	Is(50) (index strength) Mpa	*UCS MPa	Type	Orienation
TPR-BH/RC001	1.0	78	19.0	1.222	3.12	3.81	76	d	//
	2.0	78	15.0	1.222	2.47	3.01	60	d	//
	3.0	78	15.0	1.222	2.47	3.01	60	d	//
	4.0	78	19.0	1.222	3.12	3.81	76	d	//
TPR-BH/RC002	2.5	102	33.0	1.378	3.17	4.37	87	d	//
	3.5	102	29.0	1.378	2.79	3.84	77	d	//
	6.0	102	28.0	1.378	2.69	3.71	74	d	//
TPR-BH/RC003	1.5	78	10.0	1.222	1.64	2.01	40	d	//
	5.5	78	17.0	1.222	2.79	3.41	68	d	//
	7.5	78	16.0	1.222	2.63	3.21	64	d	//
TPR-BH/RC004	1.9	78	8.0	1.222	1.31	1.61	32	d	//
	4.0	78	7.0	1.222	1.15	1.41	28	d	//
	6.0	78	22.0	1.222	3.62	4.42	88	d	//
TPR-BH/RC005	3.0	78	2.0	1.222	0.33	0.40	8	d	//
	4.5	78	30.0	1.222	4.93	6.02	120	d	//
TPR-BH/RC005A	3.5	78	31.0	1.222	5.10	6.22	124	d	//
	5.0	78	1.0	1.222	0.16	0.20	4	d	//
	6.0	78	30.0	1.222	4.93	6.02	120	d	//
TPR-BH/RC006	2.9	102	28.0	1.378	2.69	3.71	74	d	//
	4.0	102	34.0	1.378	3.27	4.50	90	d	//
	6.0	102	27.0	1.378	2.60	3.58	72	d	//

Statistical Summary Data	Is(50)	UCS*
Number of Samples Tested	21	21
Minimum	0.20	4
Average	3.44	69
Maximum	6.22	124
Standard Dev.	1.65	33
Upper 95% Confidence Limit	6.67	133.48
Lower 95% Confidence Limit	0.21	4.23

Comments:
*UCS taken as k x Point Load Is(50): k= 20

*UCS Normal Distribution Curve



Abbreviations	
i	irregular
a	axial
b	block
d	diametral

approx. orientation to planes of weakness/bedding

U	unknown
P	perpendicular
//	parallel

(Diametrial) POINT LOAD STRENGTH INDEX TEST DATA

Contract: WSP Ground Investigation Contract Lot 3
Date of test: 31/03/2022

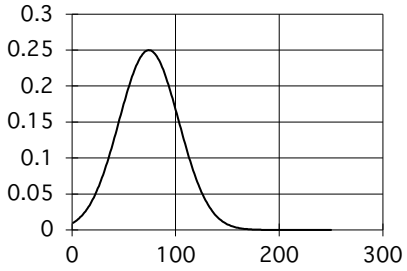
Sample Type: Core
Contract no. 23560

RC No.	Depth m	D (Diameter) mm	P (failure load) kN	F	Is (index strength) Mpa	Is(50) (index strength) Mpa	*UCS MPa	Type	Orienation
TPR-BH/RC007	1.5	78	6.0	1.222	0.99	1.20	24	d	//
	3.0	78	24.0	1.222	3.94	4.82	96	d	//
	4.0	78	17.0	1.222	2.79	3.41	68	d	//
	6.0	78	20.0	1.222	3.29	4.02	80	d	//
TPR-BH/RC008	3.0	78	21.0	1.222	3.45	4.22	84	d	//
	4.0	78	20.0	1.222	3.29	4.02	80	d	//
	6.0	78	13.0	1.222	2.14	2.61	52	d	//
TPR-BH/RC009	2.5	78	19.0	1.222	3.12	3.81	76	d	//
	4.5	78	30.0	1.222	4.93	6.02	120	d	//
	5.5	78	22.0	1.222	3.62	4.42	88	d	//
	6.5	78	31.0	1.222	5.10	6.22	124	d	//
TPR-BH/RC010	6.0	102	22.0	1.378	2.11	2.91	58	d	//
TPR-BH/RC011	3.5	102	21.0	1.378	2.02	2.78	56	d	//
	5.3	102	34.0	1.378	3.27	4.50	90	d	//
TPR-BH/RC012	2.5	78	21.0	1.222	3.45	4.22	84	d	//
	6.0	78	20.0	1.222	3.29	4.02	80	d	//
TPR-BH/RC013	4.5	78	16.0	1.222	2.63	3.21	64	d	//
TPR-BH/RC014	6.9	102	3.0	1.378	0.29	0.40	8	d	//

Statistical Summary Data	Is(50)	UCS*
Number of Samples Tested	18	18
Minimum	0.40	8
Average	3.71	74
Maximum	6.22	124
Standard Dev.	1.44	29
Upper 95% Confidence Limit	6.53	130.59
Lower 95% Confidence Limit	0.89	17.89

Comments:
*UCS taken as k x Point Load Is(50): k= 20

*UCS Normal Distribution Curve



Abbreviations	
i	irregular
a	axial
b	block
d	diametral

approx. orientation to planes of weakness/bedding

U	unknown
P	perpendicular
//	parallel

(Diametrial) POINT LOAD STRENGTH INDEX TEST DATA

Contract: WSP Ground Investigation Contract Lot 3
Date of test: 31/03/2022

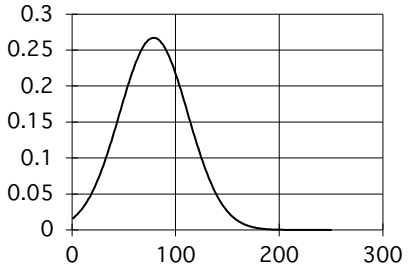
Sample Type: Core
Contract no. 23560

RC No.	Depth m	D (Diameter) mm	P (failure load) kN	F	Is (index strength) Mpa	Is(50) (index strength) Mpa	*UCS MPa	Type	Orienation
TPR-DS/RC001	1.5	78	13.0	1.222	2.14	2.61	52	d	//
	2.2	78	17.0	1.222	2.79	3.41	68	d	//
	4.0	78	19.0	1.222	3.12	3.81	76	d	//
	6.0	78	3.0	1.222	0.49	0.60	12	d	//
TPR-DS/RC002	1.0	78	12.0	1.222	1.97	2.41	48	d	//
	1.6	78	21.0	1.222	3.45	4.22	84	d	//
	2.5	78	20.0	1.222	3.29	4.02	80	d	//
	5.0	78	26.0	1.222	4.27	5.22	104	d	//
TPR-DS/RC003	1.3	78	21.0	1.222	3.45	4.22	84	d	//
	2.4	78	26.0	1.222	4.27	5.22	104	d	//
	3.2	78	18.0	1.222	2.96	3.61	72	d	//
	5.0	78	22.0	1.222	3.62	4.42	88	d	//
TPR-DS/RC004	1.4	78	12.0	1.222	1.97	2.41	48	d	//
	2.0	78	21.0	1.222	3.45	4.22	84	d	//
	4.0	78	32.0	1.222	5.26	6.42	128	d	//
	5.7	78	28.0	1.222	4.60	5.62	112	d	//
TPR-DS/RC005	2.2	78	29.0	1.222	4.77	5.82	116	d	//
	3.1	78	17.0	1.222	2.79	3.41	68	d	//
	5.0	78	32.0	1.222	5.26	6.42	128	d	//
TPR-DS/RC006	2.0	78	14.0	1.222	2.30	2.81	56	d	//
	3.0	78	2.0	1.222	0.33	0.40	8	d	//
	4.0	78	27.0	1.222	4.44	5.42	108	d	//

Statistical Summary Data	Is(50)	UCS*
Number of Samples Tested	22	22
Minimum	0.40	8
Average	3.94	79
Maximum	6.42	128
Standard Dev.	1.64	33
Upper 95% Confidence Limit	7.16	143.28
Lower 95% Confidence Limit	0.72	14.43

Comments:
*UCS taken as k x Point Load Is(50): k= 20

*UCS Normal Distribution Curve



Abbreviations	
i	irregular
a	axial
b	block
d	diametral

approx. orientation to planes of weakness/bedding

U	unknown
P	perpendicular
//	parallel

(Diametrial) POINT LOAD STRENGTH INDEX TEST DATA

Contract: WSP Ground Investigation Contract Lot 3
Date of test: 31/03/2022

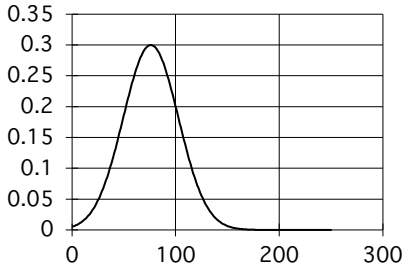
Sample Type: Core
Contract no. 23560

RC No.	Depth m	D (Diameter) mm	P (failure load) kN	F	Is (index strength) Mpa	Is(50) (index strength) Mpa	*UCS MPa	Type	Orienation
TPR-DS/RC007	2.0	78	24.0	1.222	3.94	4.82	96	d	//
	3.0	78	19.0	1.222	3.12	3.81	76	d	//
	5.0	78	21.0	1.222	3.45	4.22	84	d	//
TPR-DS/RC008	4.5	78	15.0	1.222	2.47	3.01	60	d	//
	5.5	78	11.0	1.222	1.81	2.21	44	d	//
TPR-DS/RC009	2.2	78	26.0	1.222	4.27	5.22	104	d	//
	2.7	78	19.0	1.222	3.12	3.81	76	d	//
	4.0	78	20.0	1.222	3.29	4.02	80	d	//
	5.8	78	12.0	1.222	1.97	2.41	48	d	//
TPR-DS/RC010	4.5	78	26.0	1.222	4.27	5.22	104	d	//
TPR-DS/RC011	3.3	78	21.0	1.222	3.45	4.22	84	d	//
	4.5	78	28.0	1.222	4.60	5.62	112	d	//
TPR-DS/RC012	2.9	78	27.0	1.222	4.44	5.42	108	d	//
	4.0	78	26.0	1.222	4.27	5.22	104	d	//
TPR-DS/RC013	3.0	78	15.0	1.222	2.47	3.01	60	d	//
	4.5	78	12.0	1.222	1.97	2.41	48	d	//
TPR-DS/RC014	1.7	78	10.0	1.222	1.64	2.01	40	d	//
	4.5	78	15.0	1.222	2.47	3.01	60	d	//
TPR-DS/RC015	3.8	78	6.0	1.222	0.99	1.20	24	d	//
TPR-DS/RC017	4.0	78	26.0	1.222	4.27	5.22	104	d	//

Statistical Summary Data	Is(50)	UCS*
Number of Samples Tested	20	20
Minimum	1.20	24
Average	3.80	76
Maximum	5.62	112
Standard Dev.	1.33	27
Upper 95% Confidence Limit	6.41	128.27
Lower 95% Confidence Limit	1.20	23.92

Comments:
*UCS taken as k x Point Load Is(50): k= 20

*UCS Normal Distribution Curve



Abbreviations	
i	irregular
a	axial
b	block
d	diametral

approx. orientation to planes of weakness/bedding

U	unknown
P	perpendicular
//	parallel

Point Load Axial - Test Results

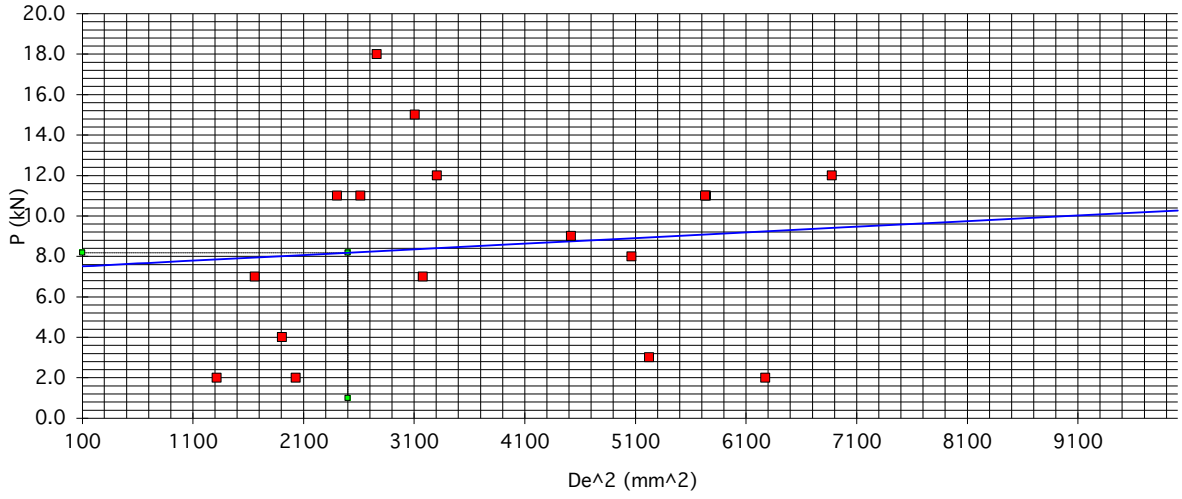
Contract: WSP Ground Investigation Contract Lot 3

Sample Type: Irregular lump sample

Contract No.: 23560

Date of Test: 31/03/2022 Tested by: D.O'S

RC Hole No.	Depth	W1 mm	W2 mm	D mm	P kN	De^2 mm^2	De mm	Is MN/m^2
TPR-BH/RC010	3.4	42.0	36.0	102	8.0	5065	71	1.58
	4.0	60.0	32.0	98	11.0	5740	76	1.92
TPR-BH/RC012	1.5	51.0	60.0	34	11.0	2403	49	4.58
TPR-BH/RC013	1.6	76.0	82.0	26	11.0	2615	51	4.21
	5.0	90.0	65.0	28	18.0	2763	53	6.51
	7.0	62.0	56.0	44	12.0	3305	57	3.63
TPR-BH/RC014	2.0	42.0	48.0	29	7.0	1662	41	4.21
	5.0	60.0	62.0	40	15.0	3107	56	4.83
TPR-DS/RC008	1.5	32.0	36.0	44	4.0	1905	44	2.10
	3.5	130.0	110.0	45	12.0	6876	83	1.75
TPR-DS/RC011	1.5	80.0	76.0	32	7.0	3178	56	2.20
	2.2	140	110	36	11	5730	76	1.92
TPR-DS/RC012	2.5	74	68	50	9	4520	67	1.99
TPR-DS/RC016	1.5	34	60	22	2	1317	36	1.52
	2.5	82	94	56	2	6275	79	0.32
	4.8	82	32	72	3	5226	72	0.57
TPR-DS/RC017	2.0	72	73	22	2	2031	45	0.98



Calculation of Is(50)

Equation of Best Fit P = 0.00028 De^2 + 7.481248566

P(50) at D(50) from graph = 8.18 kN

Is(50) = (P(50)/2500) x 1000 = 3.3 MN/m^2

IS(50) X 20 = UCS approximately = 65.44317 MPa

Uniaxial Compression Test Report Sheet

I.G.S.L.

Sample Identification

Contract Name:	WSP Ground Investigation Contract Lot 3
Job Number:	23560
Hole No:	TPR-BH/RC001
Depth (m):	4.5m

Sample Description

Colour:	Dark grey
Grain size:	Fine-grained
Weathering Grade:	Fresh
Rock Type:	LIMESTONE

Weathering Grade Criteria

I. Fresh: Unchanged from original state
II. Slightly weathered: Slight discolouration, slight weakening
III. Moderately weathered: Considerable weakening, penetrative discolouration
IV. Highly weathered: Considerable weakening, penetrative discolouration, breaks in hand

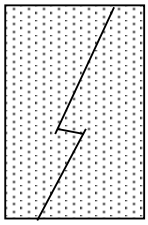
Sample Measurements

Length	208	
Diameter (Ø)	78	mm

Testing

Load Rate	4.3	kN/min
Load at Failure (P)	256	kN

Sketch of Failure Surfaces



Strength Calculations

Uniaxial Compressive Strength = $\frac{256000}{4775.94}$

$= \frac{1000 \times P}{\prod \times (Ø/2)^2}$

= 53.57 (Mpa)

Bulk Density = 2.68 (Mg/m^3)

Notes:

Uniaxial Compression Test Report Sheet

I.G.S.L.

Sample Identification

Contract Name:	WSP Ground Investigation Contract Lot 3
Job Number:	23560
Hole No:	TPR-BH/RC002
Depth (m):	5.00m

Sample Description

Colour:	Grey
Grain size:	Fine-grained
Weathering Grade:	Fresh
Rock Type:	LIMESTONE

Weathering Grade Criteria

I. Fresh:	Unchanged from original state
II. Slightly weathered:	Slight discolouration, slight weakening
III. Moderately weathered:	Considerable weakening, penetrative discolouration
IV. Highly weathered:	Considerable weakening, penetrative discolouration, breaks in hand

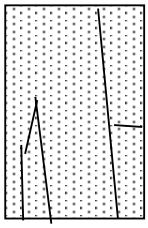
Sample Measurements

Length	261	
Diameter (Ø)	102	mm

Testing

Load Rate	4.3	kN/min
Load at Failure (P)	403	kN

Sketch of Failure Surfaces



Strength Calculations

Uniaxial Compressive Strength $= \dfrac{403000}{8167.14}$

$= \dfrac{1000 \times P}{\prod \times (Ø/2)^2}$

= 49.32 (Mpa)

Bulk Density = 2.63 (Mg/m^3)

Notes:

Uniaxial Compression Test Report Sheet

I.G.S.L.

Sample Identification

Contract Name:	WSP Ground Investigation Contract Lot 3
Job Number:	23560
Hole No:	TPR-BH/RC003
Depth (m):	3.00m

Sample Description

Colour:	Grey
Grain size:	Fine-grained
Weathering Grade:	Fresh
Rock Type:	LIMESTONE

Weathering Grade Criteria

I. Fresh: Unchanged from original state
II. Slightly weathered: Slight discolouration, slight weakening
III. Moderately weathered: Considerable weakening, penetrative discolouration
IV. Highly weathered: Considerable weakening, penetrative discolouration, breaks in hand

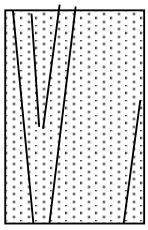
Sample Measurements

Length	277	
Diameter (Ø)	78	mm

Testing

Load Rate	4.3	kN/min
Load at Failure (P)	403	kN

Sketch of Failure Surfaces



Strength Calculations

Uniaxial Compressive Strength = $\frac{403000}{4775.94}$

$= \frac{1000 \times P}{\prod \times (Ø/2)^2}$

= 84.34 (Mpa)

Bulk Density = 2.64 (Mg/m^3)

Notes:

Uniaxial Compression Test Report Sheet

I.G.S.L.

Sample Identification

Contract Name:	WSP Ground Investigation Contract Lot 3
Job Number:	23560
Hole No:	TPR-BH/RC004
Depth (m):	2.00m

Sample Description

Colour:	Grey
Grain size:	Fine-grained
Weathering Grade:	Fresh
Rock Type:	LIMESTONE

Weathering Grade Criteria

I. Fresh:	Unchanged from original state
II. Slightly weathered:	Slight discolouration, slight weakening
III. Moderately weathered:	Considerable weakening, penetrative discolouration
IV. Highly weathered:	Considerable weakening, penetrative discolouration, breaks in hand

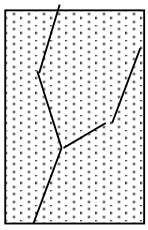
Sample Measurements

Length	204	
Diameter (Ø)	78	mm

Testing

Load Rate	4.3	kN/min
Load at Failure (P)	243	kN

Sketch of Failure Surfaces



Strength Calculations

Uniaxial Compressive Strength $= \dfrac{243000}{4775.94}$

$= \dfrac{1000 \times P}{\prod \times (Ø/2)^2}$

= 50.85 (Mpa)

Bulk Density = 2.64 (Mg/m^3)

Notes:

Uniaxial Compression Test Report Sheet

I.G.S.L.

Sample Identification

Contract Name:	WSP Ground Investigation Contract Lot 3
Job Number:	23560
Hole No:	TPR-BH/RC005
Depth (m):	3.80m

Sample Description

Colour:	Grey
Grain size:	Fine-grained
Weathering Grade:	Fresh
Rock Type:	LIMESTONE

Weathering Grade Criteria

I. Fresh:	Unchanged from original state
II. Slightly weathered:	Slight discolouration, slight weakening
III. Moderately weathered:	Considerable weakening, penetrative discolouration
IV. Highly weathered:	Considerable weakening, penetrative discolouration, breaks in hand

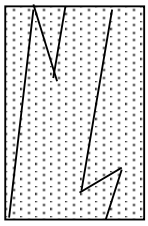
Sample Measurements

Length	200	
Diameter (Ø)	78	mm

Testing

Load Rate	4.3	kN/min
Load at Failure (P)	399	kN

Sketch of Failure Surfaces



Strength Calculations

Uniaxial Compressive Strength $= \dfrac{399000}{4775.94}$

$= \dfrac{1000 \times P}{\prod \times (Ø/2)^2}$

= 83.50 (Mpa)

Bulk Density = 2.61 (Mg/m^3)

Notes:

Uniaxial Compression Test Report Sheet

I.G.S.L.

Sample Identification

Contract Name:	WSP Ground Investigation Contract Lot 3
Job Number:	23560
Hole No:	TPR-BH/RC006
Depth (m):	3.10m

Sample Description

Colour:	Grey
Grain size:	Fine-grained
Weathering Grade:	Fresh
Rock Type:	LIMESTONE

Weathering Grade Criteria

I. Fresh:	Unchanged from original state
II. Slightly weathered:	Slight discolouration, slight weakening
III. Moderately weathered:	Considerable weakening, penetrative discolouration
IV. Highly weathered:	Considerable weakening, penetrative discolouration, breaks in hand

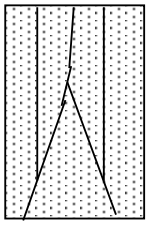
Sample Measurements

Length	238	
Diameter (Ø)	102	mm

Testing

Load Rate	4.3	kN/min
Load at Failure (P)	283	kN

Sketch of Failure Surfaces



Strength Calculations

Uniaxial Compressive Strength $= \dfrac{283000}{8167.14}$

$= \dfrac{1000 \times P}{\prod \times (Ø/2)^2}$

= 34.63 (Mpa)

Bulk Density = 2.67 (Mg/m^3)

Notes:

Uniaxial Compression Test Report Sheet | *I.G.S.L.*

Sample Identification

Contract Name:	WSP Ground Investigation Contract Lot 3
Job Number:	23560
Hole No:	TPR-BH/RC007
Depth (m):	3.40m

Sample Description

Colour:	Grey
Grain size:	Fine-grained
Weathering Grade:	Fresh
Rock Type:	LIMESTONE

Weathering Grade Criteria

I. Fresh:	Unchanged from original state
II. Slightly weathered:	Slight discolouration, slight weakening
III. Moderately weathered:	Considerable weakening, penetrative discolouration
IV. Highly weathered:	Considerable weakening, penetrative discolouration, breaks in hand

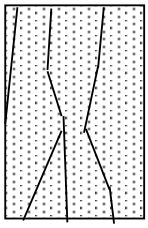
Sample Measurements

Length	202	
Diameter (Ø)	78	mm

Testing

Load Rate	4.3	kN/min
Load at Failure (P)	310	kN

Sketch of Failure Surfaces



Strength Calculations

Uniaxial Compressive Strength = $\frac{310000}{4775.94}$

$= \frac{1000 \times P}{\prod \times (Ø/2)^2}$

= 64.88 (Mpa)

Bulk Density = 2.65 (Mg/m^3)

Notes:

Uniaxial Compression Test Report Sheet

I.G.S.L.

Sample Identification

Contract Name:	WSP Ground Investigation Contract Lot 3
Job Number:	23560
Hole No:	TPR-BH/RC008
Depth (m):	4.80m

Sample Description

Colour:	Grey
Grain size:	Fine-grained
Weathering Grade:	Fresh
Rock Type:	LIMESTONE

Weathering Grade Criteria

I. Fresh: Unchanged from original state
II. Slightly weathered: Slight discolouration, slight weakening
III. Moderately weathered: Considerable weakening, penetrative discolouration
IV. Highly weathered: Considerable weakening, penetrative discolouration, breaks in hand

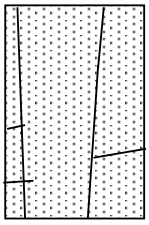
Sample Measurements

Length	201	
Diameter (Ø)	78	mm

Testing

Load Rate	4.3	kN/min
Load at Failure (P)	225	kN

Sketch of Failure Surfaces



Strength Calculations

Uniaxial Compressive Strength = $\frac{225000}{4775.94}$

= $\frac{1000 \times P}{\prod \times (Ø/2)^2}$

= 47.09 (Mpa)

Bulk Density = 2.64 (Mg/m^3)

Notes:

Uniaxial Compression Test Report Sheet | *I.G.S.L.*

Sample Identification

Contract Name:	WSP Ground Investigation Contract Lot 3
Job Number:	23560
Hole No:	TPR-BH/RC009
Depth (m):	3.50m

Sample Description

Colour:	Grey
Grain size:	Fine-grained
Weathering Grade:	Fresh
Rock Type:	LIMESTONE

Weathering Grade Criteria

I. Fresh: Unchanged from original state
II. Slightly weathered: Slight discolouration, slight weakening
III. Moderately weathered: Considerable weakening, penetrative discolouration
IV. Highly weathered: Considerable weakening, penetrative discolouration, breaks in hand

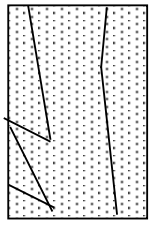
Sample Measurements

Length	202	
Diameter (Ø)	78	mm

Testing

Load Rate	4.3	kN/min
Load at Failure (P)	198	kN

Sketch of Failure Surfaces



Strength Calculations

Uniaxial Compressive Strength = $\frac{198000}{4775.94}$

= $\frac{1000 \times P}{\prod \times (Ø/2)^2}$

= 41.44 (Mpa)

Bulk Density = 2.65 (Mg/m^3)

Notes:

Uniaxial Compression Test Report Sheet

I.G.S.L.

Sample Identification

Contract Name:	WSP Ground Investigation Contract Lot 3
Job Number:	23560
Hole No:	TPR-BH/RC010
Depth (m):	5.00m

Sample Description

Colour:	Grey
Grain size:	Fine-grained
Weathering Grade:	Fresh
Rock Type:	LIMESTONE

Weathering Grade Criteria

I. Fresh:	Unchanged from original state
II. Slightly weathered:	Slight discolouration, slight weakening
III. Moderately weathered:	Considerable weakening, penetrative discolouration
IV. Highly weathered:	Considerable weakening, penetrative discolouration, breaks in hand

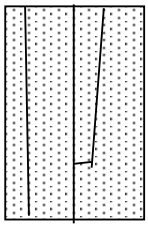
Sample Measurements

Length	198	
Diameter (Ø)	78	mm

Testing

Load Rate	4.3	kN/min
Load at Failure (P)	352	kN

Sketch of Failure Surfaces



Strength Calculations

Uniaxial Compressive Strength $= \dfrac{352000}{4775.94}$

$= \dfrac{1000 \times P}{\prod \times (Ø/2)^2}$

= 73.67 (Mpa)

Bulk Density = 2.66 (Mg/m^3)

Notes:

Uniaxial Compression Test Report Sheet | *I.G.S.L.*

Sample Identification

Contract Name:	WSP Ground Investigation Contract Lot 3
Job Number:	23560
Hole No:	TPR-BH/RC012
Depth (m):	3.60m

Sample Description

Colour:	Grey
Grain size:	Fine-grained
Weathering Grade:	Fresh
Rock Type:	LIMESTONE

Weathering Grade Criteria

I. Fresh:	Unchanged from original state
II. Slightly weathered:	Slight discolouration, slight weakening
III. Moderately weathered:	Considerable weakening, penetrative discolouration
IV. Highly weathered:	Considerable weakening, penetrative discolouration, breaks in hand

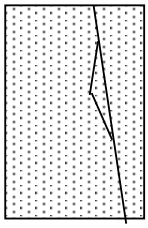
Sample Measurements

Length	200	
Diameter (Ø)	78	mm

Testing

Load Rate	4.3	kN/min
Load at Failure (P)	262	kN

Sketch of Failure Surfaces



Strength Calculations

Uniaxial Compressive Strength $= \dfrac{262000}{4775.94}$

$= \dfrac{1000 \times P}{\prod \times (Ø/2)^2}$

= 54.83 (Mpa)

Bulk Density = 2.65 (Mg/m^3)

Notes:

Uniaxial Compression Test Report Sheet

I.G.S.L.

Sample Identification

Contract Name:	WSP Ground Investigation Contract Lot 3
Job Number:	23560
Hole No:	TPR-BH/RC013
Depth (m):	3.00m

Sample Description

Colour:	Grey
Grain size:	Fine-grained
Weathering Grade:	Fresh
Rock Type:	LIMESTONE

Weathering Grade Criteria

I. Fresh: Unchanged from original state
II. Slightly weathered: Slight discolouration, slight weakening
III. Moderately weathered: Considerable weakening, penetrative discolouration
IV. Highly weathered: Considerable weakening, penetrative discolouration, breaks in hand

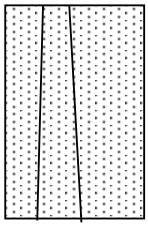
Sample Measurements

Length	198	
Diameter (Ø)	78	mm

Testing

Load Rate	4.3	kN/min
Load at Failure (P)	234	kN

Sketch of Failure Surfaces



Strength Calculations

Uniaxial Compressive Strength = $\frac{234000}{4775.94}$

= $\frac{1000 \times P}{\prod \times (Ø/2)^2}$

= 48.97 (Mpa)

Bulk Density = 2.63 (Mg/m^3)

Notes:

Uniaxial Compression Test Report Sheet

I.G.S.L.

Sample Identification

Contract Name:	WSP Ground Investigation Contract Lot 3
Job Number:	23560
Hole No:	TPR-BH/RC014
Depth (m):	6.30m

Sample Description

Colour:	Grey
Grain size:	Fine-grained
Weathering Grade:	Fresh
Rock Type:	LIMESTONE

Weathering Grade Criteria

I. Fresh: Unchanged from original state
II. Slightly weathered: Slight discolouration, slight weakening
III. Moderately weathered: Considerable weakening, penetrative discolouration
IV. Highly weathered: Considerable weakening, penetrative discolouration, breaks in hand

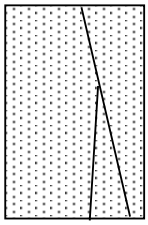
Sample Measurements

Length	212	
Diameter (Ø)	102	mm

Testing

Load Rate	4.3	kN/min
Load at Failure (P)	298	kN

Sketch of Failure Surfaces



Strength Calculations

Uniaxial Compressive Strength $= \dfrac{298000}{8167.14}$

$= \dfrac{1000 \times P}{\prod \times (Ø/2)^2}$

= 36.47 (Mpa)

Bulk Density = 2.64 (Mg/m^3)

Notes:

STRUCTURAL SOILS LTD

TEST REPORT

Report No. 750676R.01(00) 1774

Date 24-March-2022 Contract WSP Lot 3

Client IGSL
Address M7 Business Park
Naas
County Kildare
Ireland

For the Attention of Hugh Byrne

Samples submitted by client	03-March-2022	Client Reference	23560
Testing Started	03-March-2022	Client Order No.	20103
Testing Completed	21-March-2022	Instruction Type	Written

Tests marked 'Not UKAS Accredited' in this report are not included in the UKAS Accreditation Schedule for our Laboratory.

UKAS Accredited Tests

Indirect Tensile Strength by Brazil method in accordance with ISRM suggested methods

* This clause of BS1377 is no longer the most up to date method due to the publication of ISO17892

Please Note: Remaining samples will be retained for a period of one month from today and will then be disposed of .
Test were undertaken on samples 'as received' unless otherwise stated.
Opinions and interpretations expressed in this report are outside the scope of accreditation for this laboratory.

Structural Soils Ltd 1a Princess Street Bedminster Bristol BS3 4AG Tel.0117 9471000. e-mail dimitris.xirouchakis@soils.co.uk

TESTING VERIFICATION CERTIFICATE

1774

The test results included in this report are certified as:-

ISSUE STATUS: **FINAL**

In accordance with the Structural Soils Ltd Laboratory Quality Management System, results sheets and summaries of results issued by the laboratory are checked by an approved signatory. The integrity of the test data and results are ensured by control of the computer system employed by the laboratory as part of the Software Verification Program as detailed in the Laboratory Quality Manual.

This testing verification certificate covers all testing compiled on or before the following datetime: **21/03/2022 10:14:14**.

Testing reported after this date is not covered by this Verification Certificate.



Approved Signatory
Alan Frost (Data Quality Manager)

(Head Office)
Bristol Laboratory
Unit 1A, Princess Street
Bedminster
Bristol
BS3 4AG

Castleford Laboratory
The Potteries, Pottery Street
Castleford
West Yorkshire
WF10 1NJ

Hemel Laboratory
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

Tonbridge Laboratory
Anerley Court, Half Moon Lane
Hildenborough
Tonbridge
TN11 9HU

STRUCTURAL SOILS LTD	Contract: **WSP Lot 3**	Job No: **750676**

GINT_LIBRARY_V10_01.GLB LibVersion: v8_07_001 PrjVersion: v8_07 | GrfcText L - LAB VERIFICATION REPORT - V02 - A4P | 750676.GPJ - v10_01.
Structural Soils Ltd, Branch Office - Bristol Lab: 1a Princess Street, Bedminster, Bristol, BS3 4AG. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.soils.co.uk, Email: ask@soils.co.uk. | 21/03/22 - 10:14 | AF3 |

SUMMARY OF INDIRECT TENSILE STRENGTH BY THE BRAZIL TEST

In accordance with ISRM Suggested Methods

Borehole: **TPR-BH/RC002** Sample Type: **C** Depth (m): **3.00**

Bulk Density (Mg/m^3): **2.68** Dry Density (Mg/m^3): **2.67** Moisture Content (%): **0.47**

Sample Diameter (mm): **54.30** Sample Thickness (mm): **29.93** Thickness/Diameter Ratio: **0.55**

Orientation of loading: **Diametral** Load Rate (kN/s): **0.20** Test duration (secs): **133**

Load at Failure (kN): **30.4** Tensile Strength (MPa): **11.9**

Description: **Grey LIMESTONE**

Loading / Foliation relationship: **Not recorded**

Remarks: **Sample was re-cored**



Post-test photo

STRUCTURAL SOILS 1a Princess Street Bedminster Bristol BS3 4AG	Compiled By		Date
	D. Richards	**DAISY RICHARDS**	**21/03/22**
	Contract **WSP Lot 3**	Job No **750676**	

GINT_LIBRARY_V10_01.GLB LibVersion: v8_07_001 PrjVersion: v8_07 | GrfcText L - BRAZILIAN ROCK TEST - A4P | 750676.GPJ - v10_01
Structural Soils Ltd, Branch Office - Bristol Lab: 1a Princess Street, Bedminster, Bristol, BS3 4AG. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.soils.co.uk, Email: ask@soils.co.uk. | 21/03/22 - 10:09 | AF3 |

SUMMARY OF INDIRECT TENSILE STRENGTH BY THE BRAZIL TEST

In accordance with ISRM Suggested Methods

Borehole: **TPR-BH/RC005** Sample Type: **C** Depth (m): **3.50**

Bulk Density (Mg/m^3): **2.66** Dry Density (Mg/m^3): **2.65** Moisture Content (%): **0.22**

Sample Diameter (mm): **54.19** Sample Thickness (mm): **27.44** Thickness/Diameter Ratio: **0.51**

Orientation of loading: **Diametral** Load Rate (kN/s): **0.20** Test duration (secs): **123**

Load at Failure (kN): **27.1** Tensile Strength (MPa): **11.6**

Description: **Grey LIMESTONE**

Loading / Foliation relationship: **Not recorded**

Remarks: **Sample was re-cored**



Post-test photo

STRUCTURAL SOILS
1a Princess Street
Bedminster
Bristol
BS3 4AG

Compiled By		Date
D. Richards	**DAISY RICHARDS**	**21/03/22**
Contract: **WSP Lot 3**	Job No: **750676**	

GINT_LIBRARY_V10_01.GLB LibVersion: v8_07_001 PrjVersion: v8_07 | GrfcText L - BRAZILIAN ROCK TEST - A4P | 750676.GPJ - v10_01
Structural Soils Ltd, Branch Office - Bristol Lab: 1a Princess Street, Bedminster, Bristol, BS3 4AG. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.soils.co.uk, Email: ask@soils.co.uk. | 21/03/22 - 10:09 | AF3 |

SUMMARY OF INDIRECT TENSILE STRENGTH BY THE BRAZIL TEST

In accordance with ISRM Suggested Methods

Borehole: **TPR-BH/RC008** Sample Type: **C** Depth (m): **1.70**

Bulk Density (Mg/m^3): **2.53** Dry Density (Mg/m^3): **2.50** Moisture Content (%): **0.88**

Sample Diameter (mm): **54.16** Sample Thickness (mm): **29.32** Thickness/Diameter Ratio: **0.54**

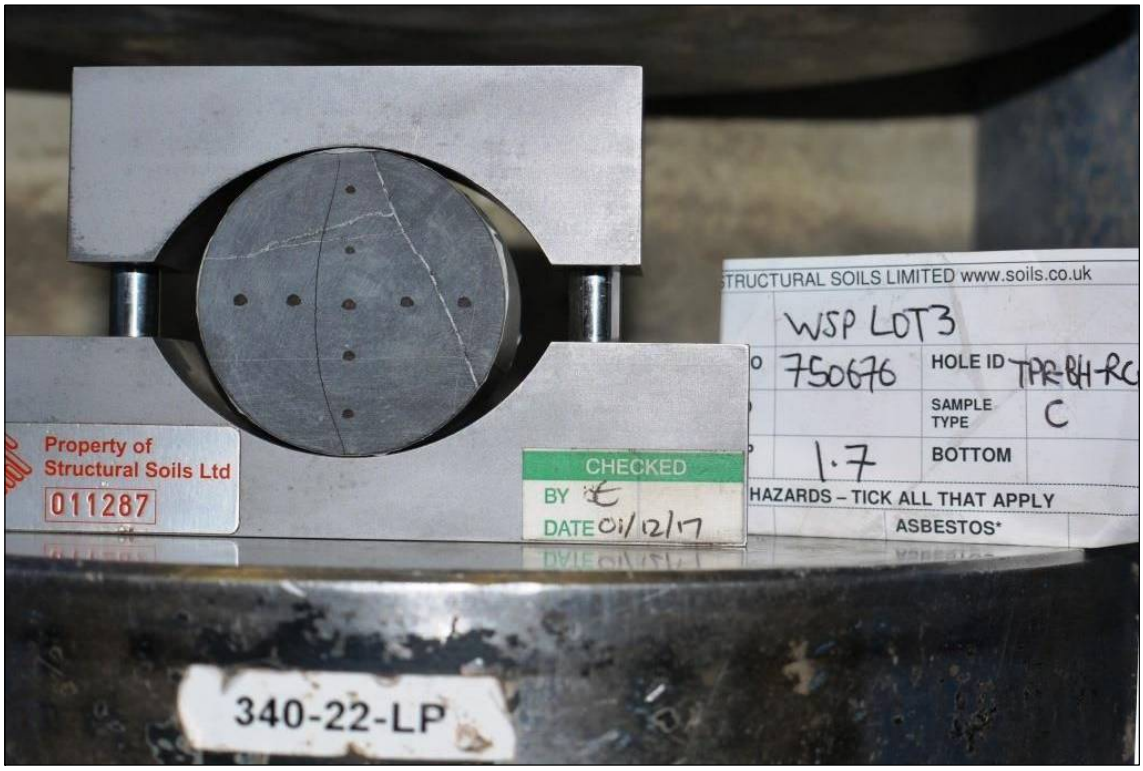
Orientation of loading: **Diametral** Load (kN/s): **0.20** Test duration (secs): **79**

Load at Failure (kN): **21.3** Tensile Strength (MPa): **8.53**

Description: **Grey LIMESTONE**

Loading / Foliation relationship: **Not recorded**

Remarks: **Sample was re-cored**



Post-test photo

STRUCTURAL SOILS 1a Princess Street Bedminster Bristol BS3 4AG	Compiled By		Date
	D. Richards	**DAISY RICHARDS**	**21/03/22**
	Contract **WSP Lot 3**	Job No **750676**	

GINT_LIBRARY_V10_01.GLB LibVersion: v8_07_001 PrjVersion: v8_07 | GrfcText L - BRAZILIAN ROCK TEST - A4P | 750676.GPJ - v10_01
Structural Soils Ltd, Branch Office - Bristol Lab: 1a Princess Street, Bedminster, Bristol, BS3 4AG. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.soils.co.uk, Email: ask@soils.co.uk. | 21/03/22 - 10:09 | AF3 |

SUMMARY OF INDIRECT TENSILE STRENGTH BY THE BRAZIL TEST

In accordance with ISRM Suggested Methods

Borehole: **TPR-BH/RC013** Sample Type: **C** Depth (m): **3.20**

Bulk Density (Mg/m^3): **2.69** Dry Density (Mg/m^3): **2.69** Moisture Content (%): **0.06**

Sample Diameter (mm): **54.09** Sample Thickness (mm): **29.64** Thickness/Diameter Ratio: **0.55**

Orientation of loading: **Diametral** Load Rate (kN/s): **0.20** Test duration (secs): **90**

Load at Failure (kN): **21.6** Tensile Strength (MPa): **8.57**

Description: **Grey LIMESTONE**

Loading / Foliation relationship: **Not recorded**

Remarks: **Sample was re-cored**



Post-test photo

STRUCTURAL SOILS 1a Princess Street Bedminster Bristol BS3 4AG	Compiled By		Date
	D. Richards	DAISY RICHARDS	21/03/22
	Contract: **WSP Lot 3**	Job No: **750676**	

GINT_LIBRARY_V10_01.GLB LibVersion: v8_07_001 PrjVersion: v8_07 | GrfcText L - BRAZILIAN ROCK TEST - A4P | 750676.GPJ - v10_01
Structural Soils Ltd, Branch Office - Bristol Lab: 1a Princess Street, Bedminster, Bristol, BS3 4AG. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.soils.co.uk, Email: ask@soils.co.uk. | 21/03/22 - 10:09 | AF3 |

Appendix 10H.4

Rock Reusability Testing

IGSL Ltd
Materials Laboratory
M7 Business Park.
Newhall, Naas.
Co. Kildare

Test Report

Magnesium Sulfate Test

Tested in accordance with EN1367-2:2009

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1337

Report No.	**R133263**
Client:	Ervia
Contract No.	23560
Contract Name:	WSP Lot 3
Sample No.	A22/0944
Client Ref.	TPR DS006 @ 1.5m
Material Type:	Rock Core
Date Received:	26/02/2022
Date testing started	09/03/2022
Location:	TPR DS006 @ 1.5m
Sample Certificate:	Not Provided
Size Range	10-14mm
Magnesium Sulfate Value (MS_1) Portion 1	3.7
Magnesium Sulfate Value (MS_2) Portion 2	2.8
Mean Magnesium Sulfate Value	3

The result relates to the specimens tested.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

Approved signatories
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL	Approved by	Date	Page
	H Byrne	4/4/22	1 of 1

IGSL Ltd
Materials Laboratory
M7 Business Park.
Newhall, Naas.
Co. Kildare

Test Report

Magnesium Sulfate Test

Tested in accordance with EN1367-2:2009

Report No.	**R133262**
Client:	Ervia
Contract No.	23560
Contract Name:	WSP Lot 3
Sample No.	A22/0945
Client Ref.	TPR DS015 @ 1.5m
Material Type:	Rock Core
Date Received:	26/02/2022
Date testing started	09/03/2022
Location:	TPR DS015 @ 1.5m
Sample Certificate:	Not Provided
Size Range	10-14mm
Magnesium Sulfate Value (MS_1) Portion 1	6.9
Magnesium Sulfate Value (MS_2) Portion 2	4.8
Mean Magnesium Sulfate Value	6

The result relates to the specimens tested.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

Approved signatories
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL	Approved by	Date	Page
	H Byrne	4/4/22	1 of 1

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

Test Report

Resistance to Fragmentation - Los Angeles Test

Tested in accordance with BS EN1097-2:2020

Report No.		**R132422**
Client:		Ervia
Contract:		WSP Lot 3
Contract No:		23560
Sample No.		A22/0945
Client Ref*:		TPR DS015 @1.5m
Location*:		N/A
Source*:		N/A
Material Type*:		Aggerate
Sample Received:		04/03/22
Date tested:		04/03/2022
Sample Cert:		~~Attached~~ /Provided
Size of Material:	1	<14mm >12.5mm
	2	<12.5mm >10mm
Los Angeles Coefficient:		18

Results relate only to the specimen tested, in as received condition unless otherwise noted.
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)

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	H Byrne	11/3/22	1 of 1

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

Test Report

Resistance to Fragmentation - Los Angeles Test

Tested in accordance with BS EN1097-2:2020

Report No.		**R132423**
Client:		Ervia
Contract:		WSP Lot 3
Contract No:		23560
Sample No.		A22/0944
Client Ref*:		TPR DS06 @1.5m
Location*:		N/A
Source*:		N/A
Material Type*:		Aggerate
Sample Received:		04/03/22
Date tested:		04/03/2022
Sample Cert:		~~Attached~~ /Provided
Size of Material:	1	<14mm >12.5mm
	2	<12.5mm >10mm
Los Angeles Coefficient:		15

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

Test Report

Slake Durability

Tested in accordance with ISRM Part 2 (1981)

Report No.	**R132419**
Contract No.	23560
Contract Name:	WSP Lot 3
Client:	Ervia
Sample No.	A22/0944
Client Ref	TPR DS06 @1.5m
Location	N/A
Sample Certificate	~~Approved~~ /Not Provided
Date Received	26/02/22
Date Tested	26/02/22

Slake Durability

Cycle 1	99.6
Cycle 2	99.3

Description of the rock

Pre Test: Grey Rock

Post Test: Grey rock

The slaking fluid is tap water at 20°C unless otherwise stated in this report.

The results relate to the specimens tested.
Any remaining material will be retained for one month.
Opinions and interpretations are outside the scope of accreditation.

Persons authorised to approve report

J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Materials Laboratory	Approved by	Date	Page
	H Byrne	11/3/22	1 of 1

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

Test Report

Slake Durability

Tested in accordance with ISRM Part 2 (1981)

Report No.	**R132418**
Contract No.	23560
Contract Name:	WSP Lot 3
Client:	Ervia
Sample No.	A22/0945
Client Ref	TPR DS015 @1.5m
Location	N/A
Sample Certificate	~~Approved~~ /Not Provided
Date Received	26/02/22
Date Tested	26/02/22

Slake Durability

Cycle 1	99.6
Cycle 2	99.1

Description of the rock

Pre Test: Grey Rock

Post Test: Grey rock

The slaking fluid is tap water at 20°C unless otherwise stated in this report.

The results relate to the specimens tested.
Any remaining material will be retained for one month.
Opinions and interpretations are outside the scope of accreditation.

Persons authorised to approve report

J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Materials Laboratory	Approved by	Date	Page
	H Byrne	11/3/22	1 of 1

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

Test Report

Particle Shape - Flakiness

Tested in accordance with BS EN933-3:2012

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

Report No. **R132420**

Contract No. 23560

Contract Name: WSP Lot 3

Customer: Ervia

Sample No. A22/0945

Customer Ref*: TPR DS015 @ 1.5m

Location*: TPR DS015 @ 1.5m

Material Type*: Rock Core

Sample Received: 26/02/2022

Date tested: 01/03/2022

Sample Cert: ~~Attached~~ / Not Provided

Mass of Test Portion (g): 2740

Flakiness Index: 22

Results relate only to the specimen tested, in as received condition unless otherwise noted.
Opinions and interpretations are outside the scope of accreditation.
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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
	H Byrne	11/03/22	1 of 1

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

Test Report

Particle Shape - Flakiness

Tested in accordance with BS EN933-3:2012

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

Report No. **R132421**

Contract No. 23560

Contract Name: WSP Lot 3

Customer: Ervia

Sample No. A22/0944

Customer Ref*: TPR DS06 @ 1.5m

Location*: TPR DS06 @ 1.5m

Material Type*: Rock Core

Sample Received: 26/02/2022

Date tested: 01/03/2022

Sample Cert: ~~Attached~~ / Not Provided

Mass of Test Portion (g): 2800

Flakiness Index: 23

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)

IGSL Ltd Materials Laboratory	Approved by	Date	Page
	H Byrne	11/03/22	1 of 1

IGSL Ltd
Materials Laboratory
M7 Business Park.
Newhall, Naas.
Co. Kildare

Test Report

Particle Density/Water Absorption

Tested in accordance with EN1097-6:2013

Report No.	**R132425**
Client:	Ervia
Contract No.	23560
Contract Name:	WSP Lot 3
Sample No.	A22/0944
Client Ref.*	TRP DS06 @1.5m
Material Type*:	Aggregate
Date Received:	26/2/22
Date testing started	9/3/22
Location*:	N/A
Sample Certificate:	Not Provided
Test Method:	Pyknometer method,
Condition of material:	As received
Oven dried particle density (Mg/m^3)	2.69
Saturated surface dried particle density (Mg/m^3)	2.69
Apparent particle density (Mg/m^3)	2.70
Water Absorption (%)	0.2

Results relate only to the specimen tested, in as received condition unless otherwise noted.
Opinions and interpretations are outside the scope of accreditation.
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Approved signatories
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory	Approved by	Date	Page
	H Byrne	11/3/22	1 of 1

IGSL Ltd
Materials Laboratory
M7 Business Park.
Newhall, Naas.
Co. Kildare

Test Report

Particle Density/Water Absorption

Tested in accordance with EN1097-6:2013

Report No. **R132424**

Client: Ervia

Contract No.	23560
Contract Name:	WSP Lot 3
Sample No.	A22/0945
Client Ref.*	TRP DS015 @1.5m
Material Type*:	Aggregate
Date Received:	26/2/22
Date testing started	9/3/22
Location*:	N/A
Sample Certificate:	Not Provided
Test Method:	Pyknometer method,
Condition of material:	As received
Oven dried particle density (Mg/m^3)	2.69
Saturated surface dried particle density (Mg/m^3)	2.69
Apparent particle density (Mg/m^3)	2.71
Water Absorption (%)	0.3

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

IGSL Ltd Materials Laboratory	Approved by	Date	Page
	H Byrne	11/3/22	1 of 1

Appendix 10H.5

Rock Chemical Analysis

Chemtest Report Numbers

22-10587

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

Final Report

Report No.:	22-10587-1		
Initial Date of Issue:	29-Mar-2022		
Client	IGSL		
Client Address:	M7 Business Park Naas County Kildare Ireland		
Contact(s):	Darren Keogh		
Project	23560 WSP Lot 3		
Quotation No.:	Q20-21693	**Date Received:**	21-Mar-2022
Order No.:		**Date Instructed:**	21-Mar-2022
No. of Samples:	11		
Turnaround (Wkdays):	7	**Results Due:**	29-Mar-2022
Date Approved:	29-Mar-2022		

Approved By:



Details: Stuart Henderson, Technical Manager

Results - Soil

Project: 23560 WSP Lot 3

Client: IGSL				**Chemtest Job No.:**	22-10587	22-10587	22-10587	22-10587	22-10587	22-10587	22-10587	22-10587	22-10587	22-10587
Quotation No.: Q20-21693				**Chemtest Sample ID.:**	1395349	1395350	1395351	1395352	1395353	1395354	1395355	1395356	1395357	1395358
				Sample Location:	TPR-BH/RC001	TPR-BH/RC002	TPR-BH/RC005	TPR-BH/RC006	TPR-BH/RC007	TPR-BH/RC008	TPR-BH/RC009	TPR-BH/RC010	TPR-BH/RC011	TPR-BH/RC013
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	1.5	2.0	1.5	1.5	1.8	1.4	1.9	0.7	2.0	1.2
Determinand	**Accred.**	**SOP**	**Units**	**LOD**										
Moisture	N	2030	%	0.020	0.30	6.6	0.81	14	3.7	6.1	1.3	3.1	5.7	1.7
pH (2.5:1)	N	2010		4.0	[A] 9.1	[A] 8.9	[A] 9.0	[A] 8.3	[A] 8.9	[A] 8.9	[A] 9.1	[A] 8.9	[A] 9.0	[A] 9.0
Magnesium (Water Soluble)	N	2120	g/l	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] 0.014	[A] 0.011	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	[A] 0.021	[A] 0.011	[A] 0.020	[A] 0.44	[A] 0.22	[A] 0.028	[A] 0.016	[A] 0.019	[A] < 0.010	[A] 0.024
Total Sulphur	U	2175	%	0.010	[A] 0.080	[A] 0.069	[A] 0.075	[A] 0.35	[A] 0.29	[A] 0.067	[A] 0.12	[A] 0.11	[A] 0.11	[A] 0.13
Chloride (Water Soluble)	U	2220	g/l	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] 0.012	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] 0.014
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.016	< 0.010	< 0.010	< 0.010	< 0.010
Ammonium (Water Soluble)	U	2220	g/l	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Sulphate (Acid Soluble)	U	2430	%	0.010	[A] 0.013	[A] < 0.010	[A] 0.017	[A] 0.18	[A] 0.046	[A] 0.017	[A] 0.018	[A] 0.030	[A] 0.030	[A] 0.015

Results - Soil

Project: 23560 WSP Lot 3

Client: IGSL			**Chemtest Job No.:**		22-10587
Quotation No.: Q20-21693			**Chemtest Sample ID.:**		1395359
			Sample Location:		TPR-BH/RC014
			Sample Type:		SOIL
			Top Depth (m):		0.7
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Moisture	N	2030	%	0.020	1.1
pH (2.5:1)	N	2010		4.0	[A] 8.8
Magnesium (Water Soluble)	N	2120	g/l	0.010	[A] < 0.010
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	[A] 0.028
Total Sulphur	U	2175	%	0.010	[A] 0.18
Chloride (Water Soluble)	U	2220	g/l	0.010	[A] < 0.010
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010
Ammonium (Water Soluble)	U	2220	g/l	0.01	< 0.01
Sulphate (Acid Soluble)	U	2430	%	0.010	[A] 0.040

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:
1395349			TPR-BH/RC001		A	Plastic Tub 500g
1395350			TPR-BH/RC002		A	Plastic Tub 500g
1395351			TPR-BH/RC005		A	Plastic Tub 500g
1395352			TPR-BH/RC006		A	Plastic Tub 500g
1395353			TPR-BH/RC007		A	Plastic Tub 500g
1395354			TPR-BH/RC008		A	Plastic Tub 500g
1395355			TPR-BH/RC009		A	Plastic Tub 500g
1395356			TPR-BH/RC010		A	Plastic Tub 500g
1395357			TPR-BH/RC011		A	Plastic Tub 500g
1395358			TPR-BH/RC013		A	Plastic Tub 500g
1395359			TPR-BH/RC014		A	Plastic Tub 500g

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
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 <37°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.
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measuremernt by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.

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

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
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 TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°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

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

Appendix 10H.6

Water Chemical Analysis

Chemtest Report Numbers

21-36947

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

UKAS TESTING
2183

Final Report

Report No.:	21-36947-1		
Initial Date of Issue:	29-Oct-2021		
Client	IGSL		
Client Address:	M7 Business Park Naas County Kildare Ireland		
Contact(s):	Darren Keogh Ciaran Killaly John Clancy John Lawler		
Project	Peamount' - WSP Lot 3		
Quotation No.:	Q21-25679	**Date Received:**	22-Oct-2021
Order No.:		**Date Instructed:**	23-Oct-2021
No. of Samples:	1		
Turnaround (Wkdays):	5	**Results Due:**	28-Oct-2021
Date Approved:	29-Oct-2021		
Approved By:			
Details:	Glynn Harvey, Technical Manager		

Results - Water

Project: Peamount' - WSP Lot 3

Client: IGSL			**Chemtest Job No.:**		21-36947
Quotation No.: Q21-25679			**Chemtest Sample ID.:**		1304609
Order No.:			Client Sample Ref.:		WSP Lot 3
			Sample Location:		TPR-DS004
			Sample Type:		WATER
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
pH	U	1010		N/A	[A] 7.9
Total Dissolved Solids	N	1020	mg/l	1.0	270
Sulphate	U	1220	mg/l	1.0	[A] 35
Cyanide (Total) Low-Level	N	1300	mg/l	0.0050	< 0.0050
Cyanide (Free) Low-Level	N	1300	mg/l	0.0050	< 0.0050
Sulphide	U	1325	mg/l	0.050	[A] < 0.050
Magnesium	U	1455	mg/l	0.20	[A] 4.4
Total Hardness as CaCO3	U	1270	mg/l	15	[A] 160
Arsenic (Dissolved)	U	1455	µg/l	0.20	[A] < 0.20
Boron (Dissolved)	U	1455	µg/l	10.0	[A] 24
Barium (Dissolved)	U	1455	µg/l	5.00	[A] 17
Beryllium (Dissolved)	U	1455	µg/l	1.00	[A] < 1.0
Cadmium (Dissolved)	U	1455	µg/l	0.11	[A] < 0.11
Chromium (Dissolved)	U	1455	µg/l	0.50	[A] 5.0
Copper (Dissolved)	U	1455	µg/l	0.50	[A] < 0.50
Iron (Dissolved)	N	1455	µg/l	5.0	[A] < 5.0
Mercury (Dissolved)	U	1455	µg/l	0.05	[A] < 0.05
Manganese (Dissolved)	U	1455	µg/l	0.50	[A] 22
Molybdenum (Dissolved)	U	1455	µg/l	0.20	[A] 4.0
Nickel (Dissolved)	U	1455	µg/l	0.50	[A] 3.4
Lead (Dissolved)	U	1455	µg/l	0.50	[A] < 0.50
Selenium (Dissolved)	U	1455	µg/l	0.50	[A] 0.88
Vanadium (Dissolved)	U	1455	µg/l	0.50	[A] < 0.50
Zinc (Dissolved)	U	1455	µg/l	2.5	[A] < 2.5
Chromium (Trivalent)	N	1490	µg/l	20	[A] < 20
Low-Level Chromium (Hexavalent)	U	1495	µg/l	0.10	[A] 4.7
Dissolved Organic Carbon	U	1610	mg/l	2.0	2.1
Aliphatic TPH >C5-C6	N	1675	µg/l	0.010	[A] < 0.010
Aliphatic TPH >C6-C8	N	1675	µg/l	0.010	[A] < 0.010
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	[A] < 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	[A] < 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	[A] < 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	[A] < 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	[A] < 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	[A] < 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	1.0	[A] < 1.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.010	[A] < 0.010
Aromatic TPH >C7-C8	N	1675	µg/l	0.010	[A] < 0.010
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	[A] < 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	[A] < 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	[A] < 0.10

Results - Water

Project: Peamount' - WSP Lot 3

Client: IGSL			**Chemtest Job No.:**		21-36947
Quotation No.: Q21-25679			**Chemtest Sample ID.:**		1304609
Order No.:			Client Sample Ref.:		WSP Lot 3
			Sample Location:		TPR-DS004
			Sample Type:		WATER
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	[A] < 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	[A] < 0.10
Aromatic TPH >C35-C44	N	1675	µg/l	0.10	[A] < 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	1.0	[A] < 1.0
Total Petroleum Hydrocarbons	N	1675	µg/l	2.0	[A] < 2.0
Naphthalene	N	1800	µg/l	0.010	[A] < 0.010
Acenaphthylene	N	1800	µg/l	0.010	[A] < 0.010
Acenaphthene	N	1800	µg/l	0.010	[A] < 0.010
Fluorene	N	1800	µg/l	0.010	[A] < 0.010
Phenanthrene	N	1800	µg/l	0.010	[A] < 0.010
Anthracene	N	1800	µg/l	0.010	[A] < 0.010
Fluoranthene	N	1800	µg/l	0.010	[A] < 0.010
Pyrene	N	1800	µg/l	0.010	[A] < 0.010
Benzo[a]anthracene	N	1800	µg/l	0.010	[A] < 0.010
Chrysene	N	1800	µg/l	0.010	[A] < 0.010
Benzo[b]fluoranthene	N	1800	µg/l	0.010	[A] < 0.010
Benzo[k]fluoranthene	N	1800	µg/l	0.010	[A] < 0.010
Benzo[a]pyrene	N	1800	µg/l	0.010	[A] < 0.010
Indeno(1,2,3-c,d)Pyrene	N	1800	µg/l	0.010	[A] < 0.010
Dibenz(a,h)Anthracene	N	1800	µg/l	0.010	[A] < 0.010
Benzo[g,h,i]perylene	N	1800	µg/l	0.010	[A] < 0.010
Total Of 16 PAH's	N	1800	µg/l	0.20	[A] < 0.20
Total Phenols	U	1920	mg/l	0.030	[A] < 0.030

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:
1304609	WSP Lot 3		TPR-DS004		A	Coloured Winchester 1000ml
1304609	WSP Lot 3		TPR-DS004		A	Plastic Bottle 1000ml

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity 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.
1270	Total Hardness of Waters	Total hardness	Calculation applied to calcium and magnesium results, expressed as mg l-1 CaCO3 equivalent.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1325	Sulphide in Waters	Sulphides	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using N,N–dimethyl-pphenylenediamine.
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).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1495	Low Level Hexavalent Chromium in Waters	Chromium [VI]	Colorimetric determination of hexavalent chromium expressed as Cr (VI) µg/l in water, using Ion Chromatography and UV-visible spectrophotometry.
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters 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	Pentane extraction / GCMS detection
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.

Report Information

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SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
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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 TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°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
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Sample Retention and Disposal

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Appendix 10H.7

Geological Classification

GEOLOGICAL CLASSIFICATION / SIMPLIFIED PETROLOGY ©

Project No.	23560	**Sample Ref No.**	TPR-BH-002 - 1.80-2.30m
Project Location:	WSP - Lot 3	**Sample Location:**	TPR-BH-002
Client:	Irish Water	**Date Logged:**	12/07/2022

Notes on sample preparation & examination: Sample reduced (riffled & quartered) in accordance with IS EN 932-2:1999. Sample examined and classified by IGSL Professional Geologist in accordance with IS EN 14689-1:2004, IS EN 932-3:1997 and IS 398;2013 Part 1, Testing & Categorization Protocol. Sample examined with hand lens and bionocular microscope.

Bulk Sample



Sample Description

Aggregate consists of calci-siltite limestone and argillaceous (muddy) limestone with fine grained grey/brown coatings. No evidence of mineralogical changes, encrustations (e.g. gypsum) or deleterious constituents (e.g. calcareous mudstone or shale) in the sample provided. Sample in a dry state.

Riffled & Quartered Sub-Sample



Washed Fragments Sub-Sample Characteristics

Particle Sizes Estimation (mm):

Max	Mean	Min.
40	15	10

Particle Shape:

Angular to subrounded

Nature of Fines:

Grey/brown, silt or clay size

Nature of Coatings:

Grey/brown, fine sand & silt / clay size

Image of Washed Fragments



Assessed Rock Types (lithologies) in Bulk Sample

Rock Types	% Present
Type 1: Calci-Siltite Limestone	65%
Type 2: Argillaceous (Muddy) Limestone	35%

Note: *Rock types and proportions assesed by examining bulk sample and washing the fragments and examining by naked eye, hand lens and binocular microscope.*

Project No. 23560	GEOLOGICAL CLASSIFICATION / SIMPLIFIED PETROLOGY ©	Sheet 2 of 2

ROCK Type 1		Calci-Siltite Limestone			
Dominant Particle size:		10-40mm			
Colour:		Grey to pale grey			
Strength:		Strong			
Apparent Porosity / Water Absorption:		Low			
Reaction to dilute HCL (Dry Sample):		Strong			
Presence of Laminations in hand specimen	YES	☐	NO	☑	If YES, Laminar Spacing
Surface Coatings	YES	☑	NO	☐	Clay/silt
Staining	YES	☑	NO	☐	Local medium iron-oxide
Secondary Mineral Present	YES	☐	NO	☑	
Carbonate Mineralisation	YES	☑	NO	☐	Sparite
Sulphate Mineralisation	YES	☐	NO	☑	

ROCK Type 2		Argillaceous (Muddy) Limestone			
Dominant Particle size:		10-30mm			
Colour:		Dark grey/black			
Strength:		Medium strong			
Apparent Porosity / Water Absorption:		Moderate			
Reaction to dilute HCL (Dry Sample):		Low			
Presence of Laminations in hand specimen	YES	☐	NO	☑	If YES, Laminar Spacing
Surface Coatings	YES	☑	NO	☐	Clay/silt
Staining	YES	☑	NO	☐	Local slight iron-oxide
Secondary Mineral Present	YES	☐	NO	☑	
Carbonate Mineralisation	YES	☑	NO	☐	Sparite
Sulphate Mineralisation	YES	☐	NO	☑	

ROCK Type 3					
Dominant Particle size:					
Colour:					
Strength:					
Apparent Porosity / Water Absorption:					
Reaction to dilute HCL (Dry Sample):					
Presence of Laminations in hand specimen	YES	☐	NO	☐	If YES, Laminar Spacing
Surface Coatings	YES	☐	NO	☐	
Staining	YES	☐	NO	☐	
Secondary Mineral Present	YES	☐	NO	☐	
Carbonate Mineralisation	YES	☐	NO	☐	
Sulphate Mineralisation	YES	☐	NO	☐	

Selected Microscopy Images

GEOLOGICAL CLASSIFICATION / SIMPLIFIED PETROLOGY ©

Project No.	23560	**Sample Ref No.**	TPR-BH-011 - 2.00-2.30m
Project Location:	WSP - Lot 3	**Sample Location:**	TPR-BH-011
Client:	Irish Water	**Date Logged:**	12/07/2022

Notes on sample preparation & examination: Sample reduced (riffled & quartered) in accordance with IS EN 932-2:1999. Sample examined and classified by IGSL Professional Geologist in accordance with IS EN 14689-1:2004, IS EN 932-3:1997 and IS 398;2013 Part 1, Testing & Categorization Protocol. Sample examined with hand lens and bionocular microscope.

Bulk Sample



Sample Description

Aggregate consists of calci-siltite limestone and argillaceous (muddy) limestone with fine grained grey/brown coatings. No evidence of mineralogical changes, encrustations (e.g. gypsum) or deleterious constituents (e.g. calcareous mudstone or shale) in the sample provided. Sample in a dry state.

Riffled & Quartered Sub-Sample



Washed Fragments Sub-Sample Characteristics

Particle Sizes Estimation (mm):

Max	Mean	Min.
40	15	10

Particle Shape:

Angular to subrounded

Nature of Fines:

Grey/brown, silt or clay size

Nature of Coatings:

Grey/brown, fine sand & silt / clay size

Image of Washed Fragments



Assessed Rock Types (lithologies) in Bulk Sample

Rock Types	% Present
Type 1: Calci-Siltite Limestone	70%
Type 2: Argillaceous (Muddy) Limestone	30%

Note: *Rock types and proportions assesed by examining bulk sample and washing the fragments and examining by naked eye, hand lens and binocular microscope.*

Project No. 23560	GEOLOGICAL CLASSIFICATION / SIMPLIFIED PETROLOGY ©	Sheet 2 of 2

ROCK Type 1		Calci-Siltite Limestone			
Dominant Particle size:		10-40mm			
Colour:		Grey to pale grey			
Strength:		Strong			
Apparent Porosity / Water Absorption:		Low			
Reaction to dilute HCL (Dry Sample):		Strong			
Presence of Laminations in hand specimen	YES	☐	NO	☑	If YES, Laminar Spacing
Surface Coatings	YES	☑	NO	☐	Clay/silt
Staining	YES	☑	NO	☐	Local medium iron-oxide
Secondary Mineral Present	YES	☐	NO	☑	
Carbonate Mineralisation	YES	☑	NO	☐	Sparite
Sulphate Mineralisation	YES	☐	NO	☑	

ROCK Type 2		Argillaceous (Muddy) Limestone			
Dominant Particle size:		10-30mm			
Colour:		Dark grey/black			
Strength:		Medium strong			
Apparent Porosity / Water Absorption:		Moderate			
Reaction to dilute HCL (Dry Sample):		Low			
Presence of Laminations in hand specimen	YES	☐	NO	☑	If YES, Laminar Spacing
Surface Coatings	YES	☑	NO	☐	Clay/silt
Staining	YES	☑	NO	☐	Local slight iron-oxide
Secondary Mineral Present	YES	☐	NO	☑	
Carbonate Mineralisation	YES	☑	NO	☐	Sparite
Sulphate Mineralisation	YES	☐	NO	☑	

ROCK Type 3					
Dominant Particle size:					
Colour:					
Strength:					
Apparent Porosity / Water Absorption:					
Reaction to dilute HCL (Dry Sample):					
Presence of Laminations in hand specimen	YES	☐	NO	☐	If YES, Laminar Spacing
Surface Coatings	YES	☐	NO	☐	
Staining	YES	☐	NO	☐	
Secondary Mineral Present	YES	☐	NO	☐	
Carbonate Mineralisation	YES	☐	NO	☐	
Sulphate Mineralisation	YES	☐	NO	☐	

Selected Microscopy Images

Appendix 10I

Photographs

Appendix 10I.1

Trial Pit Photographs

Excavation

TPR-TP001 – 1 of 5



TPR-TP001 – 2 of 5



TPR-TP001 – 3 of 5



TPR-TP001 – 4 of 5



TPR-TP001 – 5 of 5



TPR-TP002 – 1 of 4



TPR-TP002 – 2 of 4



TPR-TP002 – 3 of 4



TPR-TP002 – 4 of 4



TPR-TP003 – 1 of 2



TPR-TP003 – 2 of 2



TPR-TP004 – 1 of 5



TPR-TP004 – 2 of 5



TPR-TP004 – 3 of 5



TPR-TP004 – 4 of 5



TPR-TP004 – 5 of 5



TPR-TP005 – 1 of 3



TPR-TP005 – 2 of 3



TPR-TP005 – 3 of 3



TPR-TP006 – 1 of 6



TPR-TP006 – 2 of 6



TPR-TP006 – 3 of 6



TPR-TP006 – 4 of 6



TPR-TP006 – 5 of 6



TPR-TP006 – 6 of 6



TPR-TP007 – 1 of 5



TPR-TP007 – 2 of 5



TPR-TP007 – 3 of 5



TPR-TP007 – 4 of 5



TPR-TP007 – 5 of 5



TPR-TP008 – 1 of 6



TPR-TP008 – 2 of 6



TPR-TP008 – 3 of 6



TPR-TP008 – 4 of 6



TPR-TP008 – 5 of 6



TPR-TP008 – 6 of 6



TPR-TP009 – 1 of 4



TPR-TP009 – 2 of 4



TPR-TP009 – 3 of 4



TPR-TP009 – 4 of 4



TPR-TP010 – 1 of 4



TPR-TP010 – 2 of 4



TPR-TP010 – 3 of 4



TPR-TP010 – 4 of 4



TPR-TP011 – 1 of 4



TPR-TP011 – 2 of 4



TPR-TP011 – 3 of 4



TPR-TP011 – 4 of 4



TPR-TP012 – 1 of 5



TPR-TP012 – 2 of 5



TPR-TP012 – 3 of 5



TPR-TP012 – 4 of 5



TPR-TP012 – 5 of 5



TPR-TP013 – 1 of 4



TPR-TP013 – 2 of 4



TPR-TP013 – 3 of 4



TPR-TP013 – 4 of 4



TPR-TP014 – 1 of 5



TPR-TP014 – 2 of 5



TPR-TP014 – 3 of 5



TPR-TP014 – 4 of 5



TPR-TP014 – 5 of 5



TPR-TP015 – 1 of 7



TPR-TP015 – 2 of 7



TPR-TP015 – 3 of 7



TPR-TP015 – 4 of 7



TPR-TP015 – 5 of 7



TPR-TP015 – 6 of 7



TPR-TP015 – 7 of 7



TPR-TP015A – 1 of 3



TPR-TP015A – 2 of 3



TPR-TP015A – 3 of 3



TPR-TP016 – 1 of 5



TPR-TP016 – 2 of 5



TPR-TP016 – 3 of 5



TPR-TP016 – 4 of 5



TPR-TP016 – 5 of 5



TPR-TP017 – 1 of 6



TPR-TP017 – 2 of 6



TPR-TP017 – 3 of 6



TPR-TP017 – 4 of 6



TPR-TP017 – 5 of 6



TPR-TP017 – 6 of 6



TPR-TP018 – 1 of 3



TPR-TP018 – 2 of 3



TPR-TP018 – 3 of 3



TPR-TP019 – 1 of 6



TPR-TP019 – 2 of 6



TPR-TP019 – 3 of 6



TPR-TP019 – 4 of 6



TPR-TP019 – 5 of 6



TPR-TP019 – 6 of 6



TPR-TP020 – 1 of 5



TPR-TP020 – 2 of 5



TPR-TP020 – 3 of 5



TPR-TP020 – 4 of 5



TPR-TP020 – 5 of 5



TPR-TP021 – 1 of 4



TPR-TP021 – 2 of 4



TPR-TP021 – 3 of 4



TPR-TP021 – 4 of 4



TPR-TP022 – 1 of 4



TPR-TP022 – 2 of 4



TPR-TP022 – 3 of 4



TPR-TP022 – 4 of 4



TPR-TP023 – 1 of 5



TPR-TP023 – 2 of 5



TPR-TP023 – 3 of 5



TPR-TP023 – 4 of 5



TPR-TP023 – 5 of 5



TPR-TP024 – 1 of 4



TPR-TP024 – 2 of 4



TPR-TP024 – 3 of 4



TPR-TP024 – 4 of 4



TPR-TP025 – 1 of 4



TPR-TP025 – 2 of 4



TPR-TP025 – 3 of 4



TPR-TP025 – 4 of 4



TPR-TP026 – 1 of 3



TPR-TP026 – 2 of 3



TPR-TP026 – 3 of 3



TPR-TP027 – 1 of 5



TPR-TP027 – 2 of 5



TPR-TP027 – 3 of 5



TPR-TP027 – 4 of 5



TPR-TP027 – 5 of 5



TPR-TP028 – 1 of 1



TPR-TP029 – 1 of 4



TPR-TP029 – 2 of 4



TPR-TP029 – 3 of 4



TPR-TP029 – 4 of 4



TPR-TP030 – 1 of 5



TPR-TP030 – 2 of 5



TPR-TP030 – 3 of 5



TPR-TP030 – 4 of 5



TPR-TP030 – 5 of 5



TPR-TP031 – 1 of 4



TPR-TP031 – 2 of 4



TPR-TP031 – 3 of 4



TPR-TP031 – 4 of 4



TPR-TP032 – 1 of 4



TPR-TP032 – 2 of 4



TPR-TP032 – 3 of 4



TPR-TP032 – 4 of 4



TPR-TP033 – 1 of 4



TPR-TP033 – 2 of 4



TPR-TP033 – 3 of 4



TPR-TP033 – 4 of 4



TPR-TP034 – 1 of 4



TPR-TP034 – 2 of 4



TPR-TP034 – 3 of 4



TPR-TP034 – 4 of 4



TPR-TP035 – 1 of 4



TPR-TP035 – 2 of 4



TPR-TP035 – 3 of 4



TPR-TP035 – 4 of 4

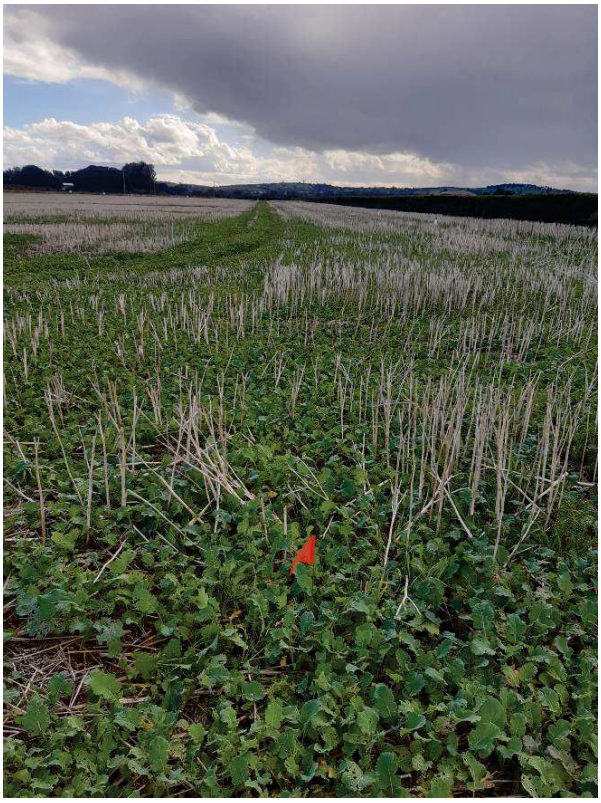


Appendix 10I.2

Trial Pit Photographs

Pre-Condition / Post Condition

TPR-TP001 – 1 of 4 **PRE-**



TPR-TP001 – 2 of 4 **PRE-**



TPR-TP001 – 3 of 4 **PRE-**



TPR-TP001 – 4 of 4 **POST-**



TPR-TP002 – 1 of 3 **PRE-**



TPR-TP002 – 2 of 3 **PRE-**



TPR-TP002 – 3 of 3 **POST-**



TPR-TP003 – 1 of 4 **PRE-**



TPR-TP003 – 2 of 4 **PRE-**



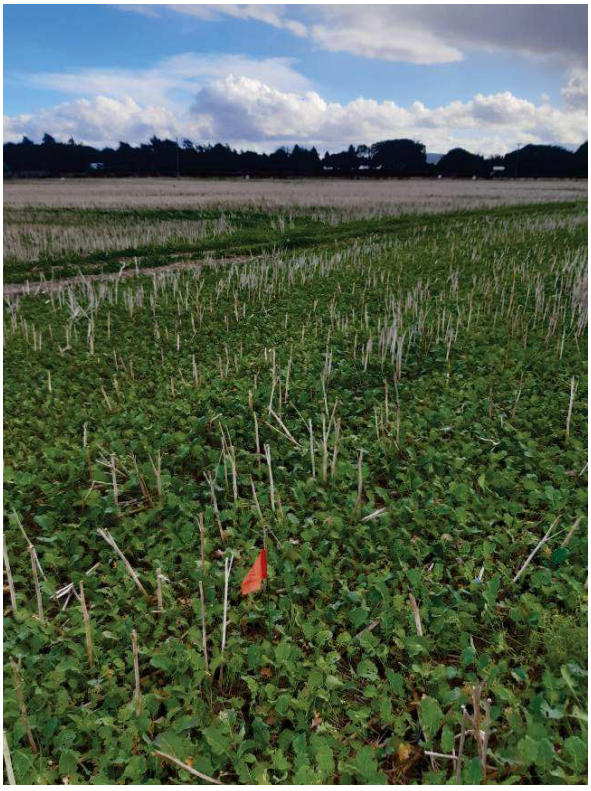
TPR-TP003 – 3 of 4 **POST-**



TPR-TP003 – 4 of 4 **POST-**



TPR-TP004 – 1 of 3 **PRE-**



TPR-TP004 – 2 of 3 **PRE-**



TPR-TP004 – 3 of 3 **POST-**



TPR-TP005 – 1 of 4 **PRE-**



TPR-TP005 – 2 of 4 **PRE-**



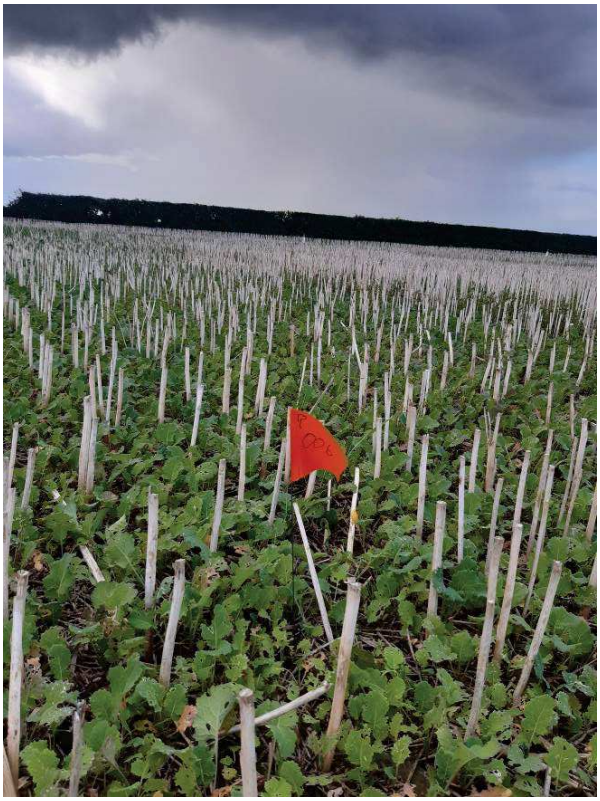
TPR-TP005 – 3 of 4 **PRE-**



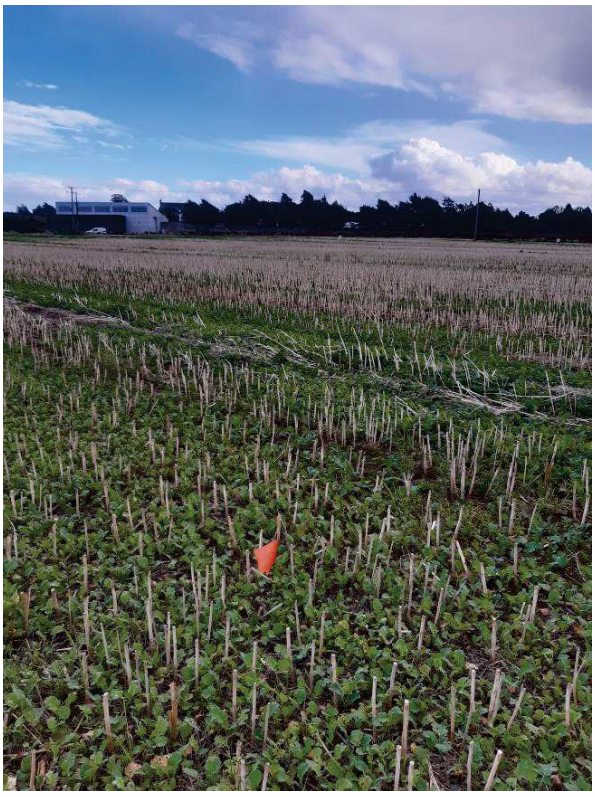
TPR-TP005 – 4 of 4 **POST-**



TPR-TP006 – 1 of 3 **PRE-**



TPR-TP006 – 2 of 3 **PRE-**



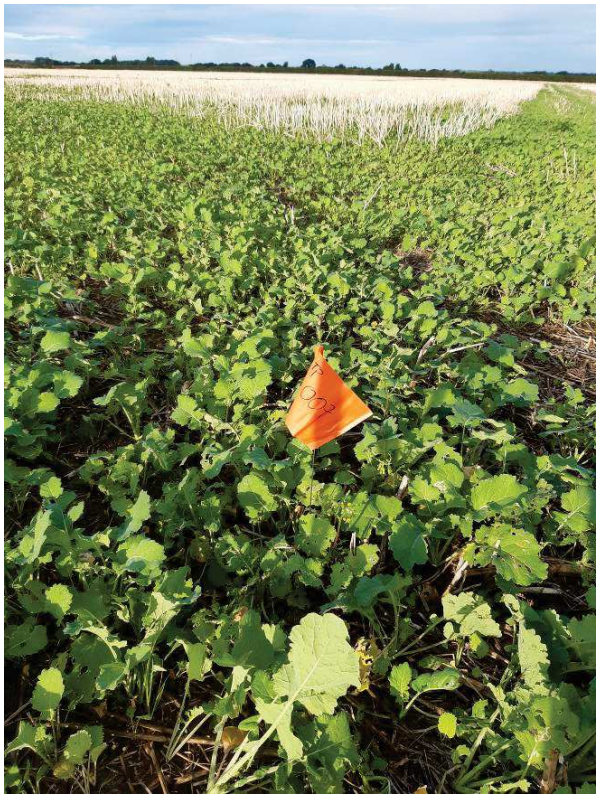
TPR-TP006 – 3 of 3 **POST-**



TPR-TP007 – 1 of 3 **PRE-**



TPR-TP007 – 2 of 3 **PRE-**



TPR-TP007 – 3 of 3 **POST-**



TPR-TP008 – 1 of 3 **PRE-**



TPR-TP008 – 2 of 3 **PRE-**



TPR-TP008 – 3 of 3 **POST-**



TPR-TP009 – 1 of 2 **PRE-**



TPR-TP009 – 2 of 2 **POST-**



TPR-TP010 – 1 of 3 **PRE-**



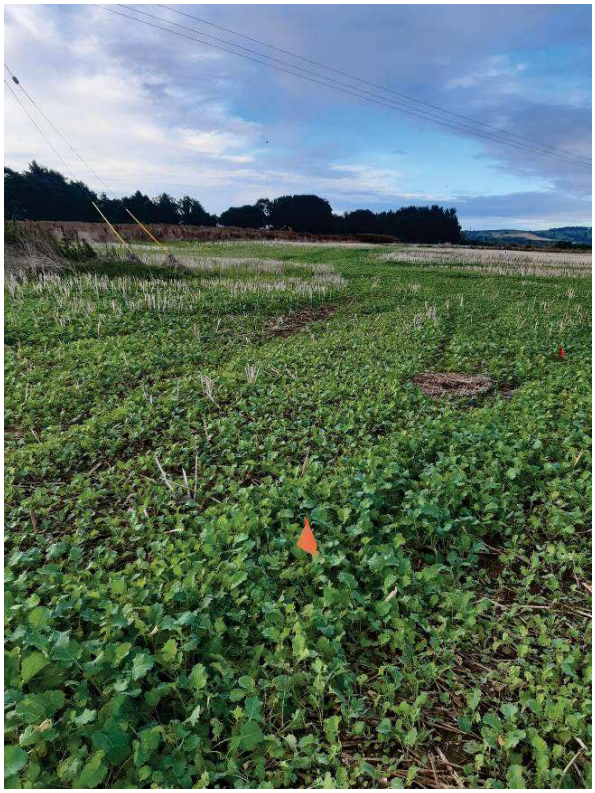
TPR-TP010 – 2 of 3 **PRE-**



TPR-TP010 – 3 of 3 **POST-**



TPR-TP011 – 1 of 3 **PRE-**



TPR-TP011 – 2 of 3 **PRE-**



TPR-TP011 – 3 of 3 **POST-**



TPR-TP012 – 1 of 2 **PRE-**



TPR-TP012 – 2 of 2 **POST-**



TPR-TP013 – 1 of 1 **POST-**



TPR-TP014 – 1 of 2 **PRE-**



TPR-TP014 – 2 of 2 **POST-**



TPR-TP015 – 1 of 2 **PRE-**



TPR-TP015 – 2 of 2 **POST-**



TPR-TP015A – 1 of 1 **POST-**



TPR-TP016 – 1 of 3 **PRE-**



TPR-TP016 – 2 of 3 **POST-**



TPR-TP016 – 3 of 3 **POST-**



TPR-TP017 – 1 of 3 **PRE-**



TPR-TP017 – 2 of 3 **PRE-**



TPR-TP017 – 3 of 3 **POST-**



TPR-TP018 – 1 of 2 **PRE-**



TPR-TP018 – 2 of 2 **POST-**



TPR-TP019 – 1 of 3 **PRE-**



TPR-TP019 – 2 of 3 **PRE-**



TPR-TP019 – 3 of 3 **POST-**



TPR-TP020 – 1 of 2 **PRE-**



TPR-TP020 – 2 of 2 **POST-**



TPR-TP021 – 1 of 4 **PRE-**



TPR-TP021 – 2 of 4 **PRE-**



TPR-TP021 – 3 of 4 **POST-**



TPR-TP021 – 4 of 4 **POST-**



TPR-TP022 – 1 of 1 **PRE-**



TPR-TP023 – 1 of 2 **PRE-**



TPR-TP023 – 2 of 2 **POST-**



TPR-TP024 – 1 of 2 **PRE-**



TPR-TP024 – 2 of 2 **POST-**



TPR-TP025 – 1 of 1 **POST-**



TPR-TP026 – 1 of 3 **PRE-**



TPR-TP026 – 2 of 3 **POST-**



TPR-TP026 – 3 of 3 **POST-**



TPR-TP027 – 1 of 2 **PRE-**



TPR-TP027 – 2 of 2 **POST-**



TPR-TP028 – 1 of 2 **PRE-**



TPR-TP028 – 2 of 2 **POST-**



TPR-TP029 – 1 of 2 **PRE-**



TPR-TP029 – 2 of 2 **POST-**



TPR-TP030 – 1 of 2 **PRE-**



TPR-TP030 – 2 of 2 **POST-**



TPR-TP031 – 1 of 2 **PRE-**



TPR-TP031 – 2 of 2 **POST-**



TPR-TP032 – 1 of 2 **PRE-**



TPR-TP032 – 2 of 2 **POST-**



TPR-TP033 – 1 of 2 **PRE-**



TPR-TP033 – 2 of 2 **POST-**



TPR-TP034 – 1 of 2 **PRE-**



TPR-TP034 – 2 of 2 **POST-**



TPR-TP035 – 1 of 2 **PRE-**



TPR-TP035 – 2 of 2 **POST-**



Appendix 10I.3

Core Photographs

Borehole Core Photographs

TPR-BH001
TPR-BH003
TPR-BH004
TPR-BH005
TPR-BH005A
TPR-BH007
TPR-BH008
TPR-BH009
TPR-BH012
TPR-BH013

TPR-BH001 – Box 1 of 3 – 1.00-3.55m



TPR-BH001 – Box 2 of 3 – 3.55-6.10m



TPR-BH001 – Box 3 of 3 – 6.10-8.15m



TPR-BH003 – Box 1 of 4 – 0.70-3.47m



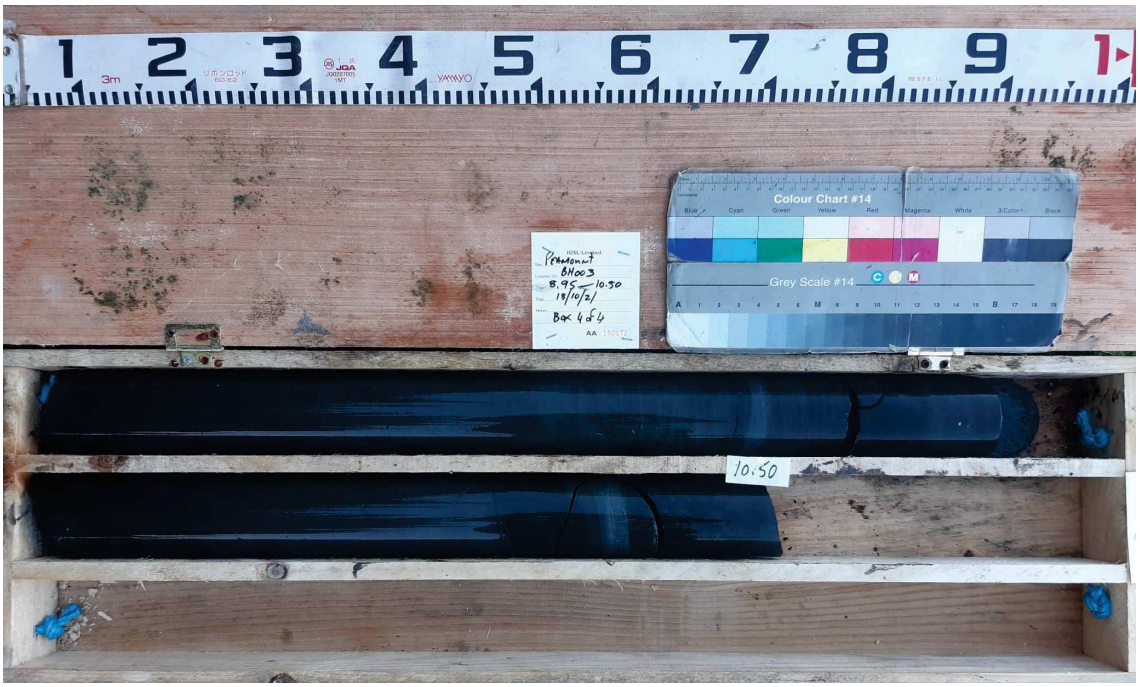
TPR-BH003 – Box 2 of 4 – 3.47-6.35m



TPR-BH003 – Box 3 of 4 – 6.35-8.95m



TPR-BH003 – Box 4 of 4 – 8.95-10.50m



TPR-BH004 – Box 1 of 3 – 1.30-3.85m



TPR-BH004 – Box 2 of 3 – 3.85-6.60m



TPR-BH004 – Box 3 of 3 – 6.60-8.00m



TPR-BH005 – Box 1 of 2 – 1.50-4.10m



TPR-BH005 – Box 2 of 2 – 4.10-4.95m



TPR-BH005A – Box 1 of 2 – 3.00-5.60m



TPR-BH005A – Box 2 of 2 – 5.60-8.00m



TPR-BH007 – Box 1 of 3 – 1.20-3.80m



TPR-BH007 – Box 2 of 3 – 3.80-6.25m



TPR-BH007 – Box 3 of 3 – 6.25-7.95m



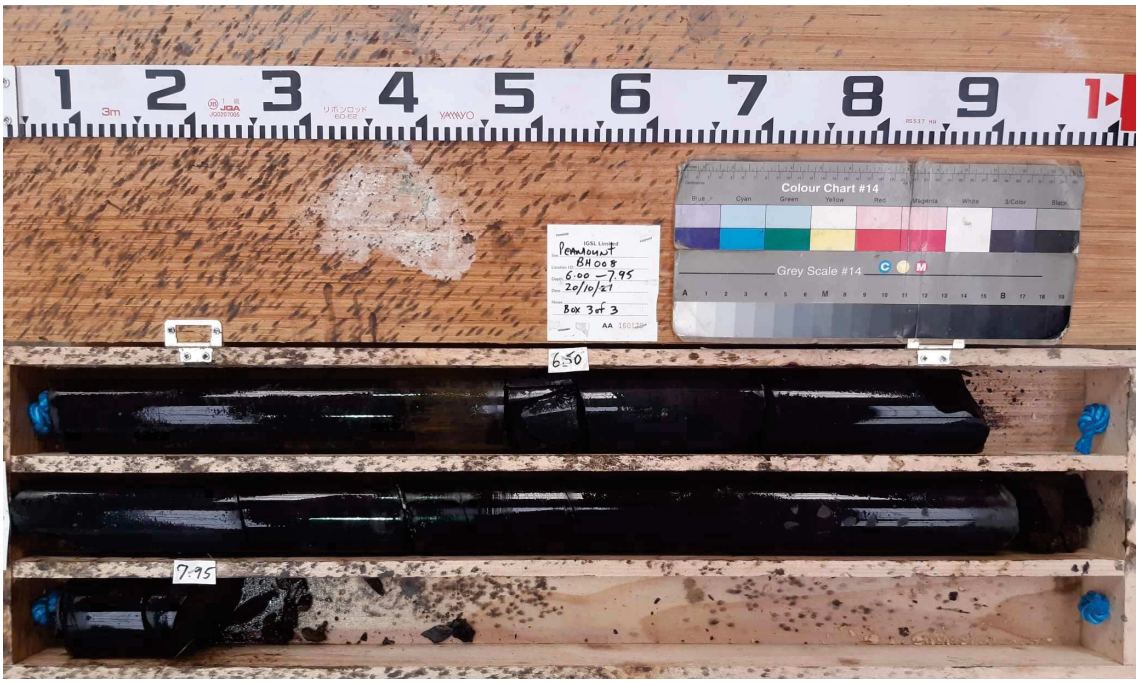
TPR-BH008 – Box 1 of 3 – 0.50-3.30m



TPR-BH008 – Box 2 of 3 – 3.30-6.00m



TPR-BH008 – Box 3 of 3 – 6.00-7.95m



TPR-BH009 – Box 1 of 3 – 1.90-4.60m



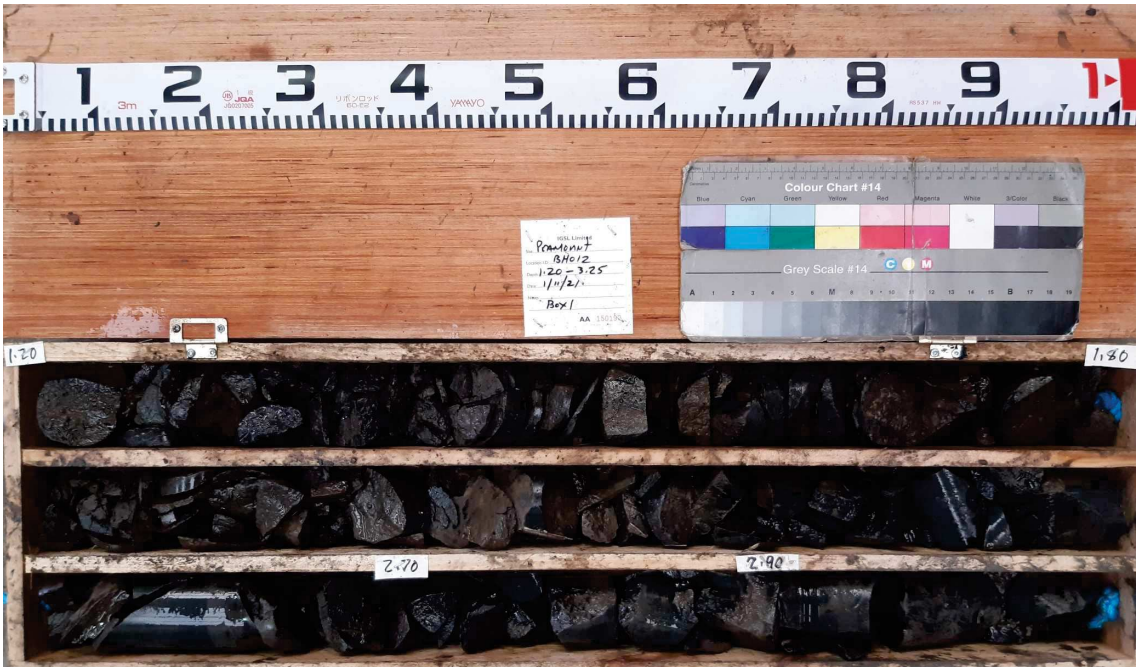
TPR-BH009 – Box 2 of 3 – 4.60-7.15m



TPR-BH009 – Box 3 of 3 – 7.15-7.90m



TPR-BH012 – Box 1 of 3 – 1.20-3.25m



TPR-BH012 – Box 2 of 3 – 3.25-6.10m



TPR-BH012 – Box 3 of 3 – 6.10-8.00m



TPR-BH013 – Box 1 of 3 – 1.20-4.60m



TPR-BH013 – Box 2 of 3 – 4.60-7.15m



TPR-BH013 – Box 3 of 3 – 7.15-8.00m



Appendix 10I.3

Core Photographs

Geobore S Core Photographs

TPR-BH002
TPR-BH006
TPR-BH010
TPR-BH011
TPR-BH014

TPR-BH002 – Box 1 of 5 – 0.00-2.30m – Core Diameter 102mm



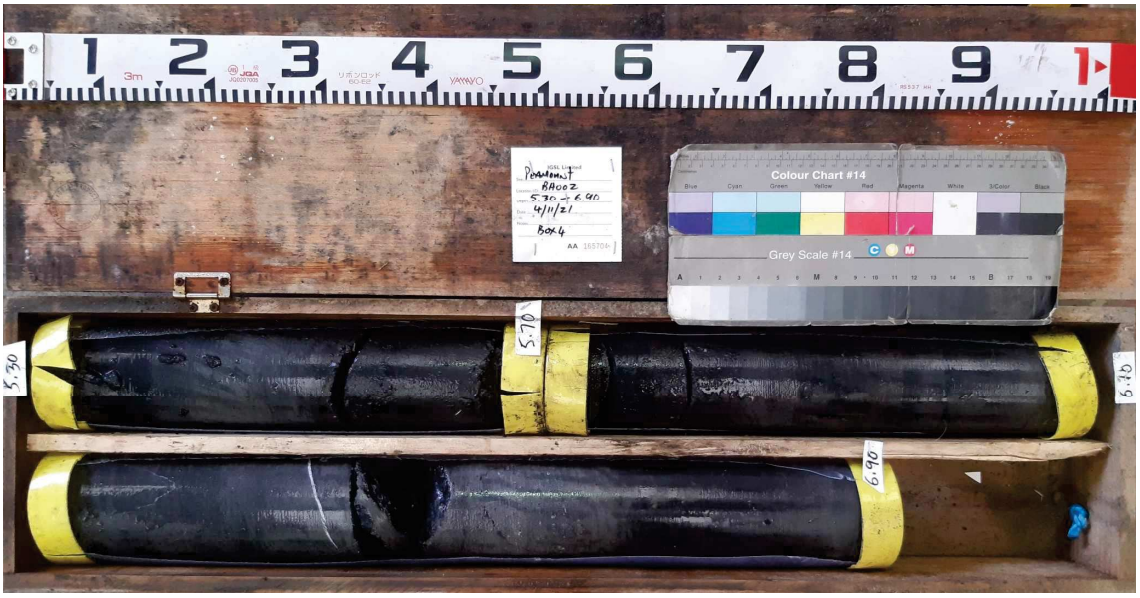
TPR-BH002 – Box 2 of 5 – 2.30-3.75m – Core Diameter 102mm



TPR-BH002 – Box 3 of 5 – 3.75-5.30m – Core Diameter 102mm



TPR-BH002 – Box 4 of 5 – 5.30-6.90m – Core Diameter 102mm



TPR-BH002 – Box 5 of 5 – 6.90-8.75m – Core Diameter 102mm



TPR-BH006 – Box 1 of 5 – 0.00-1.45m – Core Diameter 102mm



TPR-BH006 – Box 2 of 5 – 1.45-3.10m – Core Diameter 102mm



TPR-BH006 – Box 3 of 5 – 3.10-4.40m – Core Diameter 102mm



TPR-BH006 – Box 4 of 5 – 4.40-7.15m – Core Diameter 78mm



TPR-BH006 – Box 5 of 5 – 7.15-7.95m – Core Diameter 78mm



TPR-BH010 – Box 1 of 5 – 0.00-1.90m – Core Diameter 102mm



TPR-BH010 – Box 2 of 5 – 1.90-3.60m – Core Diameter 102mm



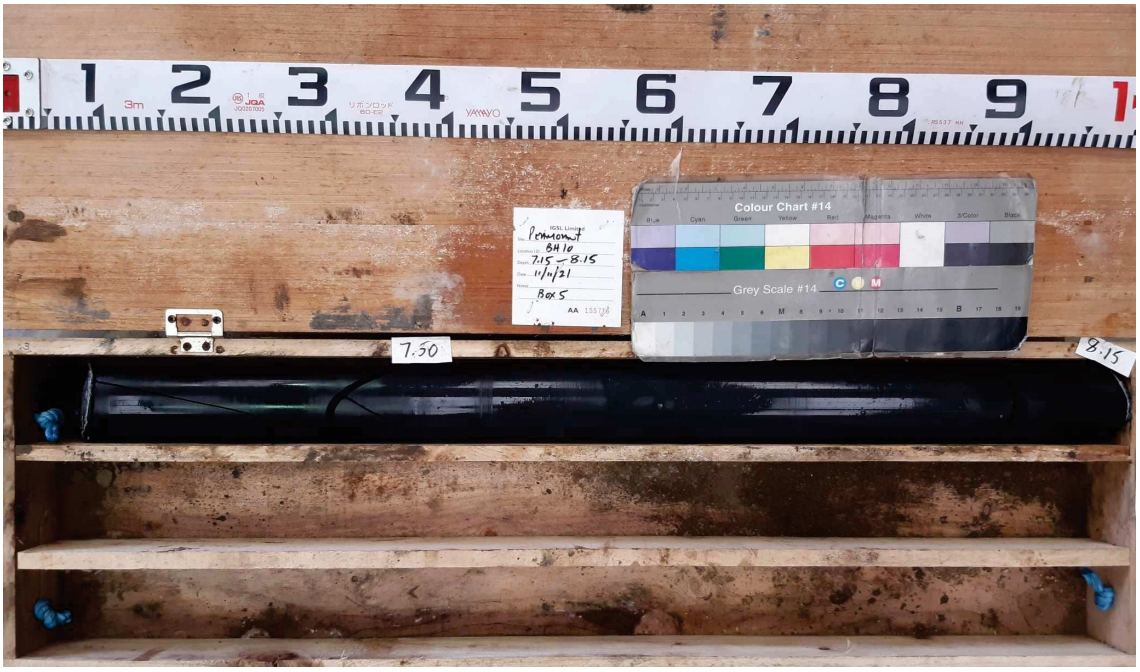
TPR-BH010 – Box 3 of 5 – 3.60-4.60m – Core Diameter 102mm



TPR-BH010 – Box 4 of 5 – 4.60-7.15m – Core Diameter 78mm



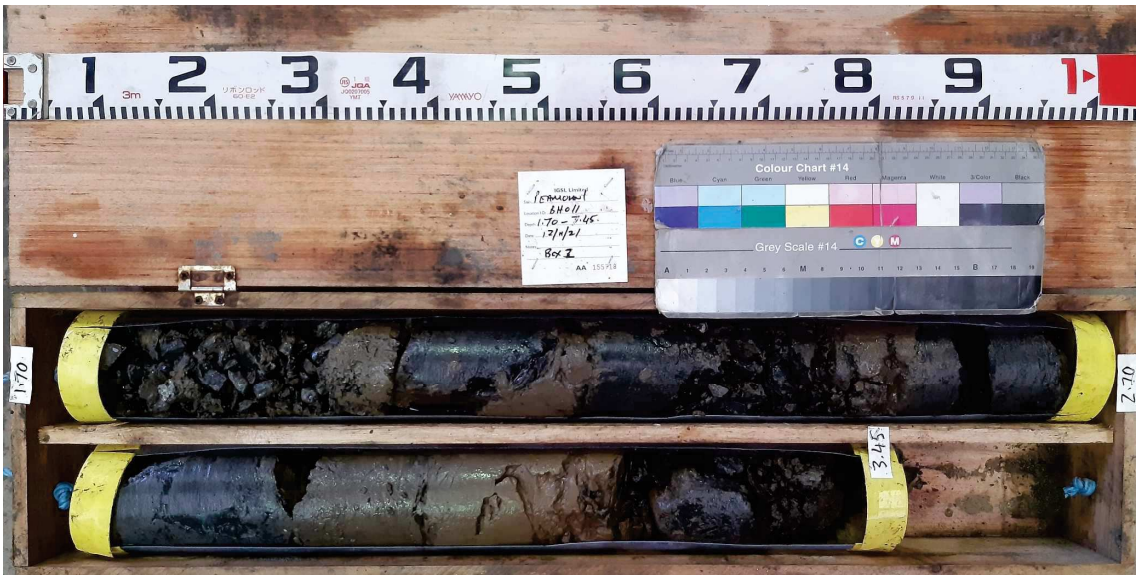
TPR-BH010 – Box 5 of 5 – 7.15-8.15m – Core Diameter 78mm



TPR-BH011 – Box 1 of 5 – 0.00-1.70m



TPR-BH011 – Box 2 of 5 – 1.70-3.45m



TPR-BH011 – Box 3 of 5 – 3.45-5.30m



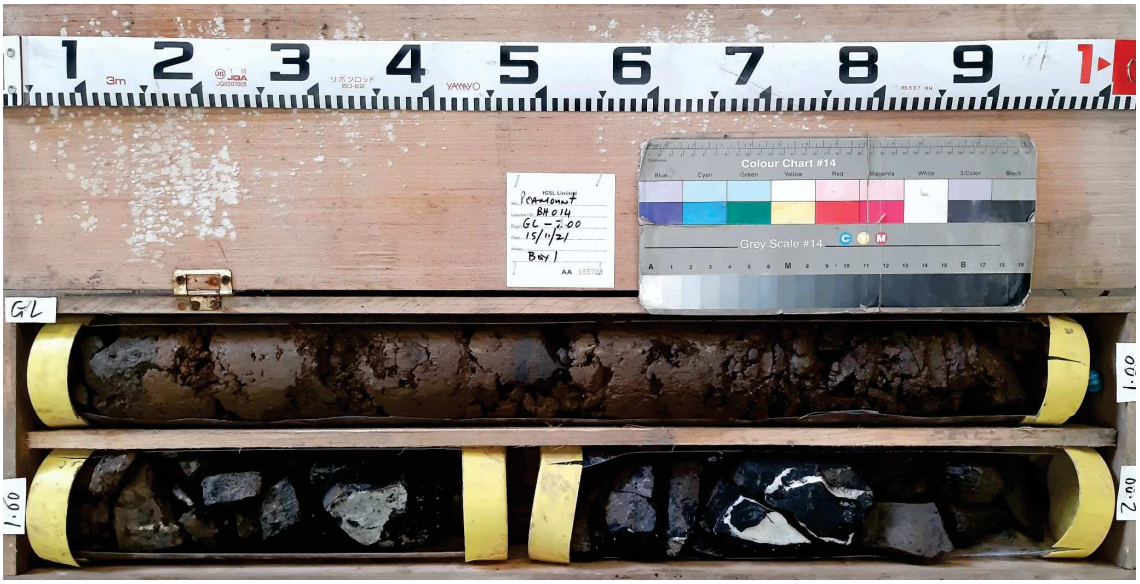
TPR-BH011 – Box 4 of 5 – 5.30-6.80m



TPR-BH011 – Box 5 of 5 – 6.80-8.40m



TPR-BH014 – Box 1 of 6 – 0.00-2.00m



TPR-BH014 – Box 2 of 6 – 2.00-2.80m



TPR-BH014 – Box 3 of 6 – 2.80-3.85m



TPR-BH014 – Box 4 of 6 – 3.85-5.30m



TPR-BH014 – Box 5 of 6 – 5.30-6.95m



TPR-BH014 – Box 6 of 6 – 6.95-8.40m



Appendix 10I.3

Core Photographs

Dynamic Sampling Core Photographs

TPR-DS-001
TPR-DS-002
TPR-DS-003
TPR-DS-004
TPR-DS-005
TPR-DS-006
TPR-DS-007
TPR-DS-008
TPR-DS-009
TPR-DS-010
TPR-DS-011
TPR-DS-012
TPR-DS-013
TPR-DS-014
TPR-DS-015
TPR-DS-016
TPR-DS-017

TPR-DS-001 – Box 1 of 2 – 0.60-3.10m



TPR-DS-001 – Box 2 of 2 – 3.10-6.00m



TPR-DS-002 – Box 1 of 2 – 0.70-3.10m



TPR-DS-002 – Box 2 of 2 – 3.10-6.00m



TPR-DS-003 – Box 1 of 2 – 0.90-3.70m



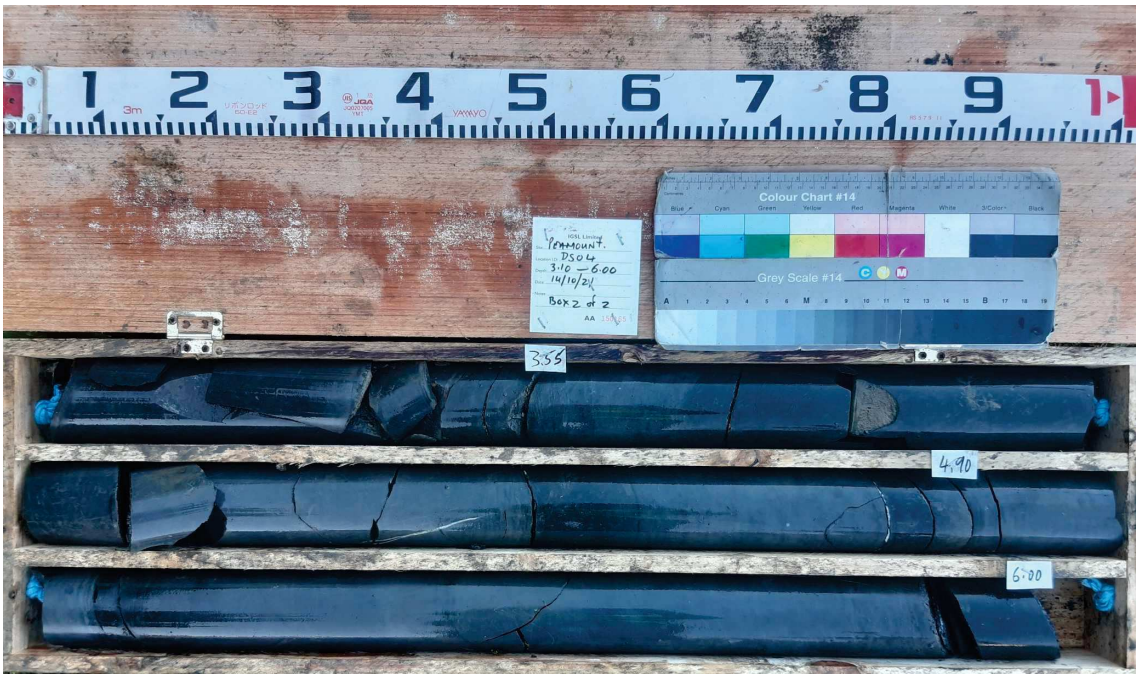
TPR-DS-003 – Box 2 of 2 – 3.70-6.30m



TPR-DS-004 – Box 1 of 2 – 0.65-3.00m



TPR-DS-004 – Box 2 of 2 – 3.00-6.00m



TPR-DS-005 – Box 1 of 2 – 2.00-5.00m



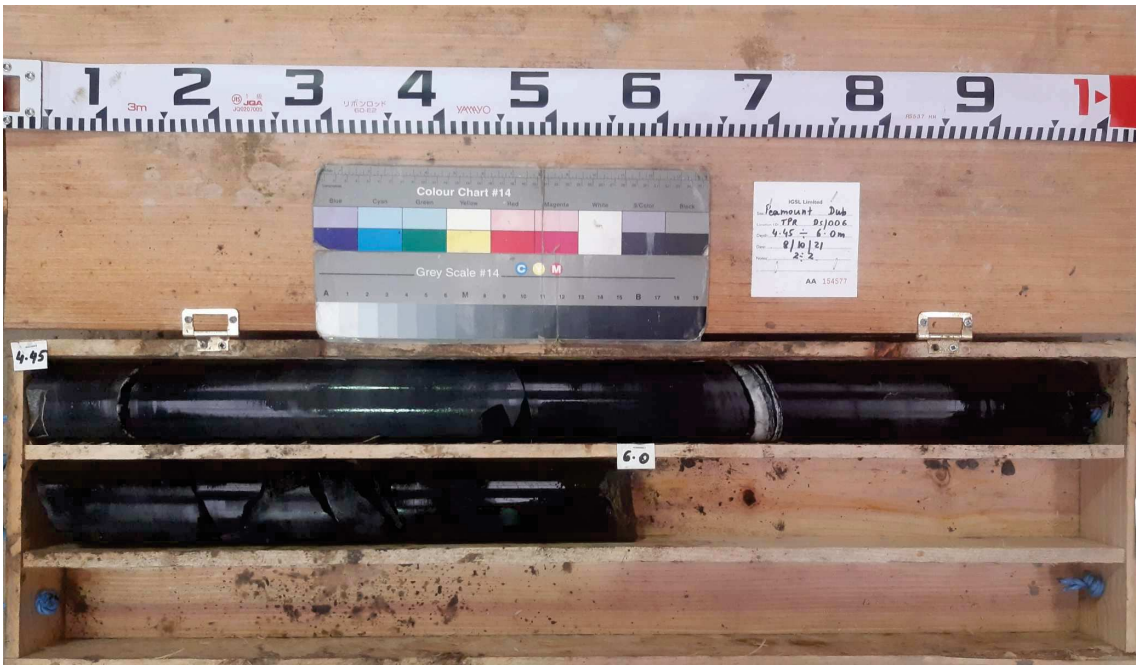
TPR-DS-005 – Box 2 of 2 – 5.00-6.00m



TPR-DS-006 – Box 1 of 2 – 1.50-4.45m



TPR-DS-006 – Box 2 of 2 – 4.45-6.00m



TPR-DS-007 – Box 1 of 2 – 1.50-4.30m



TPR-DS-007 – Box 2 of 2 – 4.30-6.00m



TPR-DS-008 – Box 1 of 2 – 1.50-4.35m



TPR-DS-008 – Box 2 of 2 – 4.35-6.00m



TPR-DS-009 – Box 1 of 2 – 2.00-5.00m



TPR-DS-009 – Box 2 of 2 – 5.00-6.00m



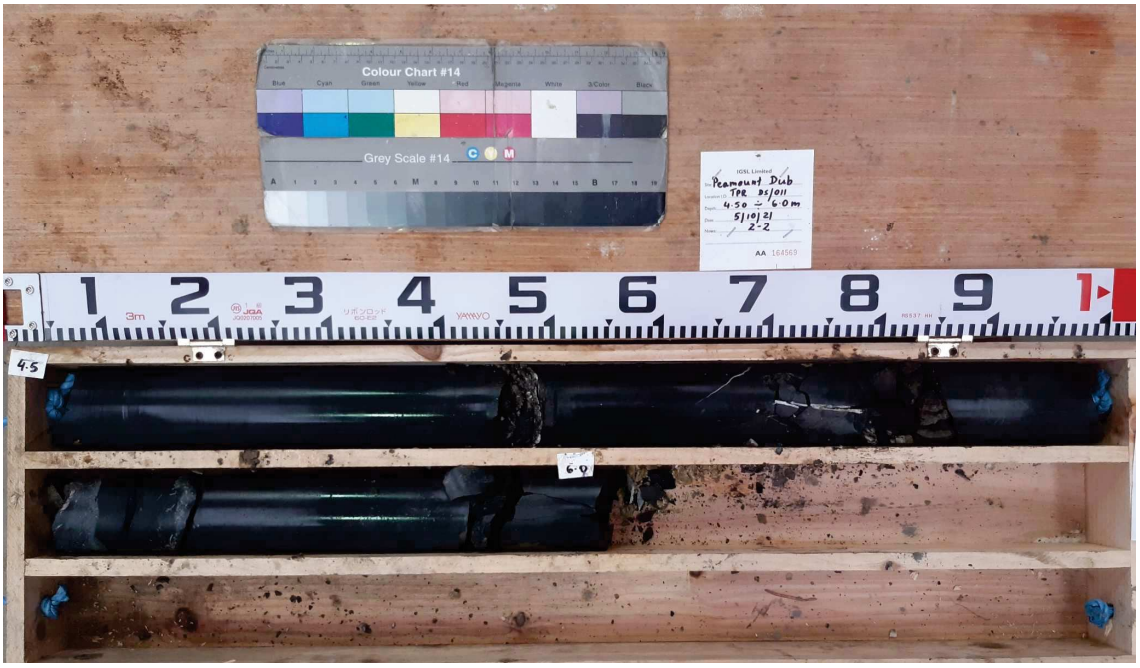
TPR-DS-010 – Box 1 of 1 – 4.10-6.00m



TPR-DS-011 – Box 1 of 2 – 1.50-4.50m



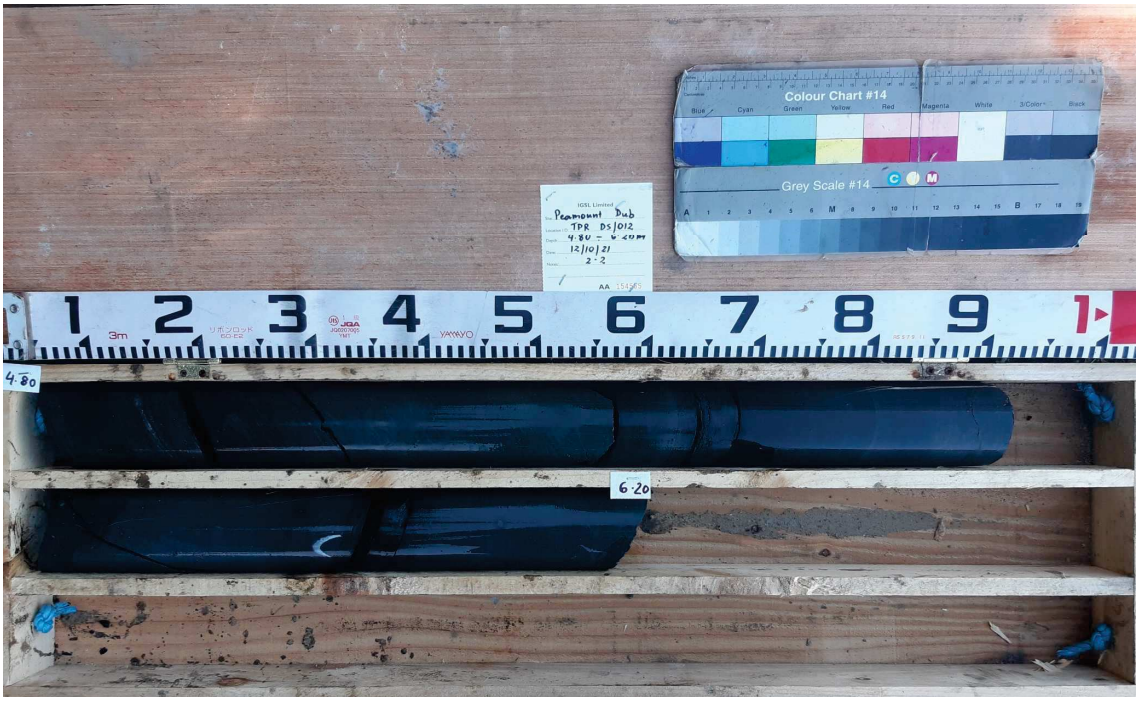
TPR-DS-011 – Box 2 of 2 – 4.50-6.00m



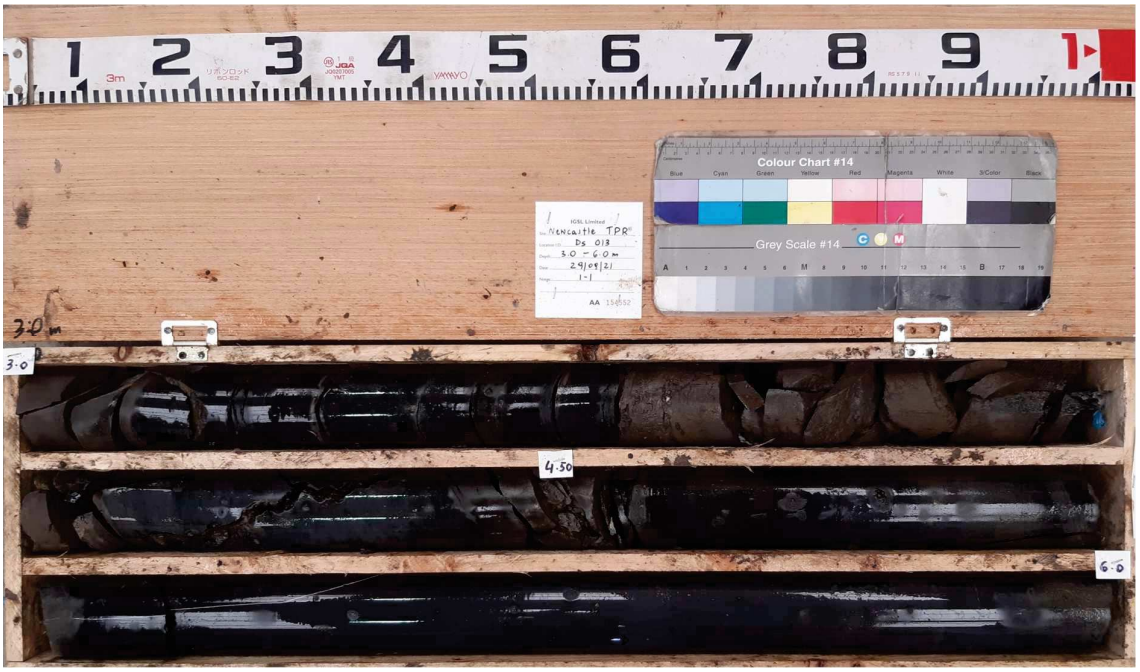
TPR-DS-012 – Box 1 of 2 – 2.00-4.80m



TPR-DS-012 – Box 2 of 2 – 4.80-6.20m



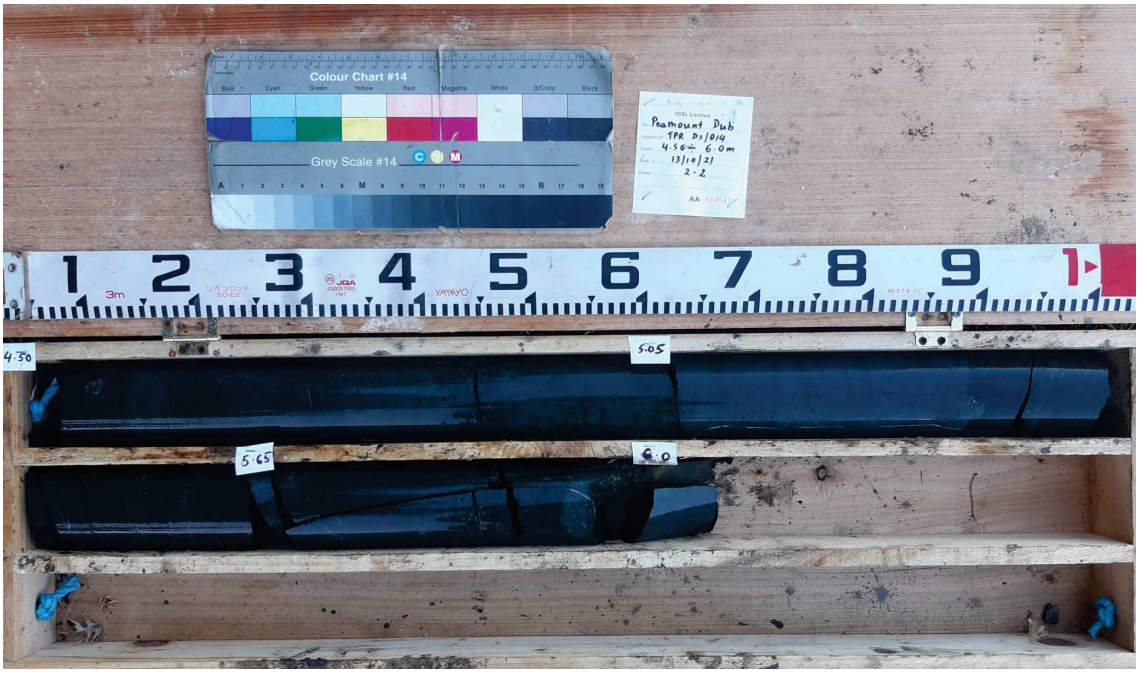
TPR-DS-013 – Box 1 of 1 – 3.00-6.00m



TPR-DS-014 – Box 1 of 2 – 1.50-4.50m



TPR-DS-014 – Box 2 of 2 – 4.50-6.00m



TPR-DS-015 – Box 1 of 2 – 1.50-5.40m



TPR-DS-015 – Box 2 of 2 – 5.40-6.00m



TPR-DS-016 – Box 1 of 2 – 1.50-4.50m



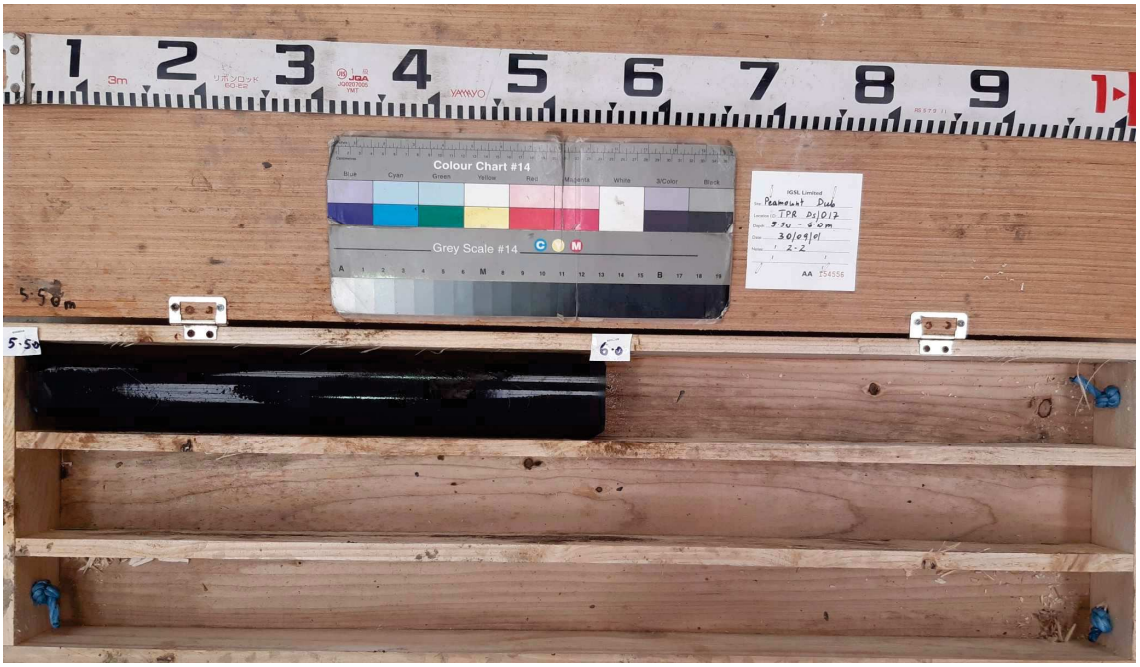
TPR-DS-016 – Box 2 of 2 – 4.50-6.00m



TPR-DS-017 – Box 1 of 2 – 1.50-5.50m



TPR-DS-017 – Box 2 of 2 – 1.50-5.50m



Appendix 10J

Groundwater Level Data

Appendix 10J.1

Field Measurements

Groundwater Monitoring - Rotary GB / RC

Site Location	WSP Lot 3
Project No.	23560
Engineer	Mott MacDonald

		Date of Monitoring						
		20/10/2021	21/10/2021	26/10/2021	09/11/2021	11/11/2021	16/11/2021	
Exploratory Hole No.	SP 50mm	(m bgl)	(m bgl)	(m bgl)	(m bgl)	(m bgl)	(m bgl)	(m bgl)
TPR-BH-002 (Geobore S)	50mm					2.40	2.46	
TPR-BH-006 (Geobore S)	50mm					2.71	2.74	
TPR-BH-014 (Geobore S)	50mm						1.93	
TPR-BH-008	50mm	3.65	3.63	3.63	3.63		3.40	
TPR-BH-009	50mm			2.65	2.96		3.65	
TPR-BH-012	50mm					3.15	3.20	
TPR-BH-013	50mm					4.40	4.39	

Appendix 10J.2

Data Logger Records

Field Measurements

(Taken ahead of logger download)

SUMMARY GRAPHS ONLY

TPR BH002
06-12-21 – 09-02-22
09-02-22 – 16-03-22
16-03-22 – 12-04-22
12-04-22 – 08-08-22

TPR BH006
06-12-21 – 09-02-22
09-02-22 – 16-03-22
16-03-22 – 12-04-22
12-04-22 – 08-08-22

TPR BH008
29-10-21 – 06-12-21
06-12-21 – 09-02-22
09-02-22 – 16-03-22
16-03-22 – 12-04-22
12-04-22 – 08-08-22

TPR BH009
29-10-21 – 06-12-21
06-12-21 – 09-02-22
09-02-22 – 16-03-22
16-03-22 – 12-04-22
12-04-22 – 08-08-22

TPR BH012
06-12-21 – 09-02-22
09-02-22 – 16-03-22
16-03-22 – 12-04-22
12-04-22 – 08-08-22

TPR BH013
06-12-21 – 09-02-22
09-02-22 – 16-03-22
16-03-22 – 12-04-22
12-04-22 – 08-08-22

TPR BH014
06-12-21 – 09-02-22
09-02-22 – 16-03-22
16-03-22 – 12-04-22
12-04-22 – 08-08-22

Field Measurements

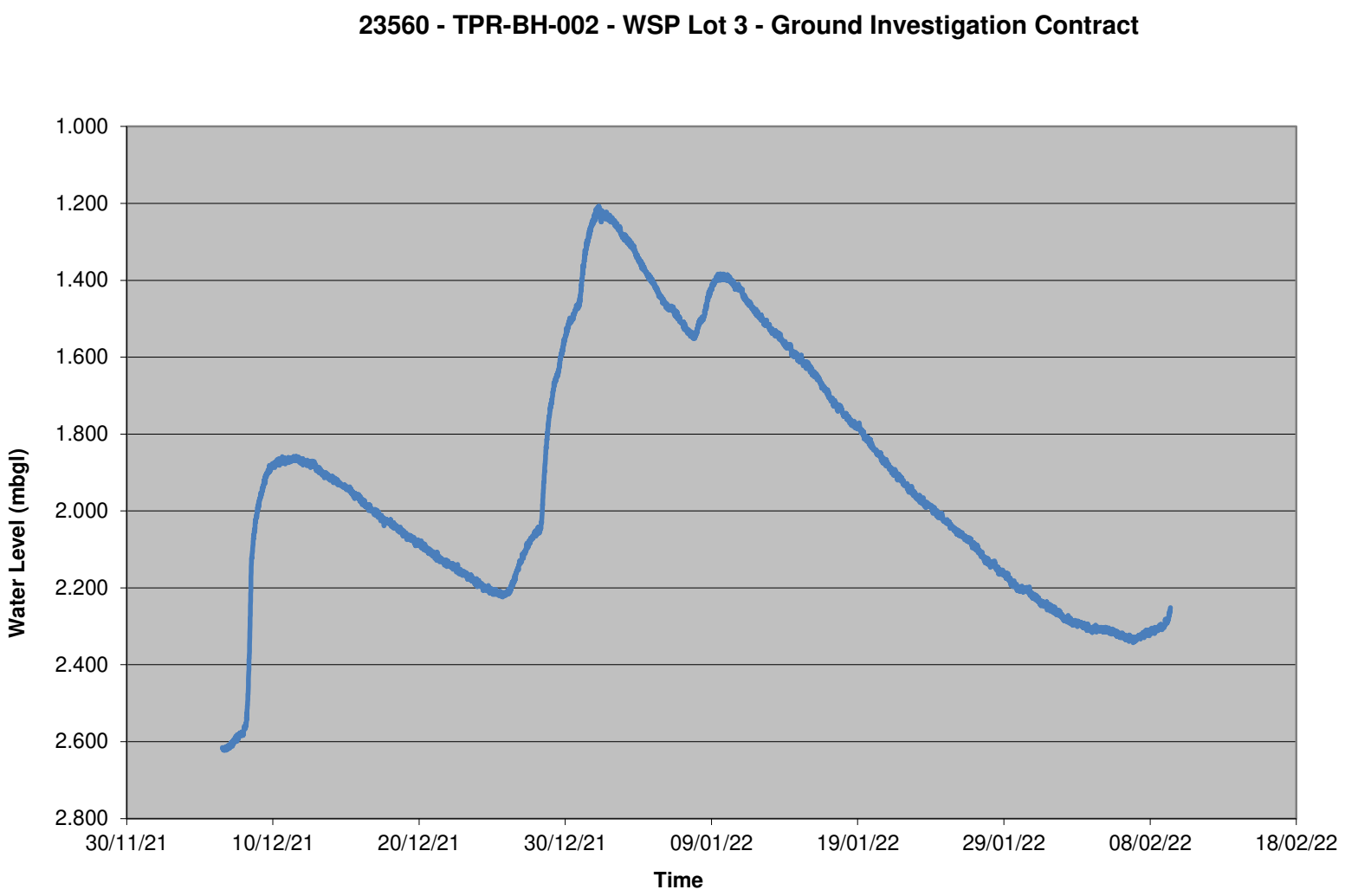
(Taken ahead of logger download)

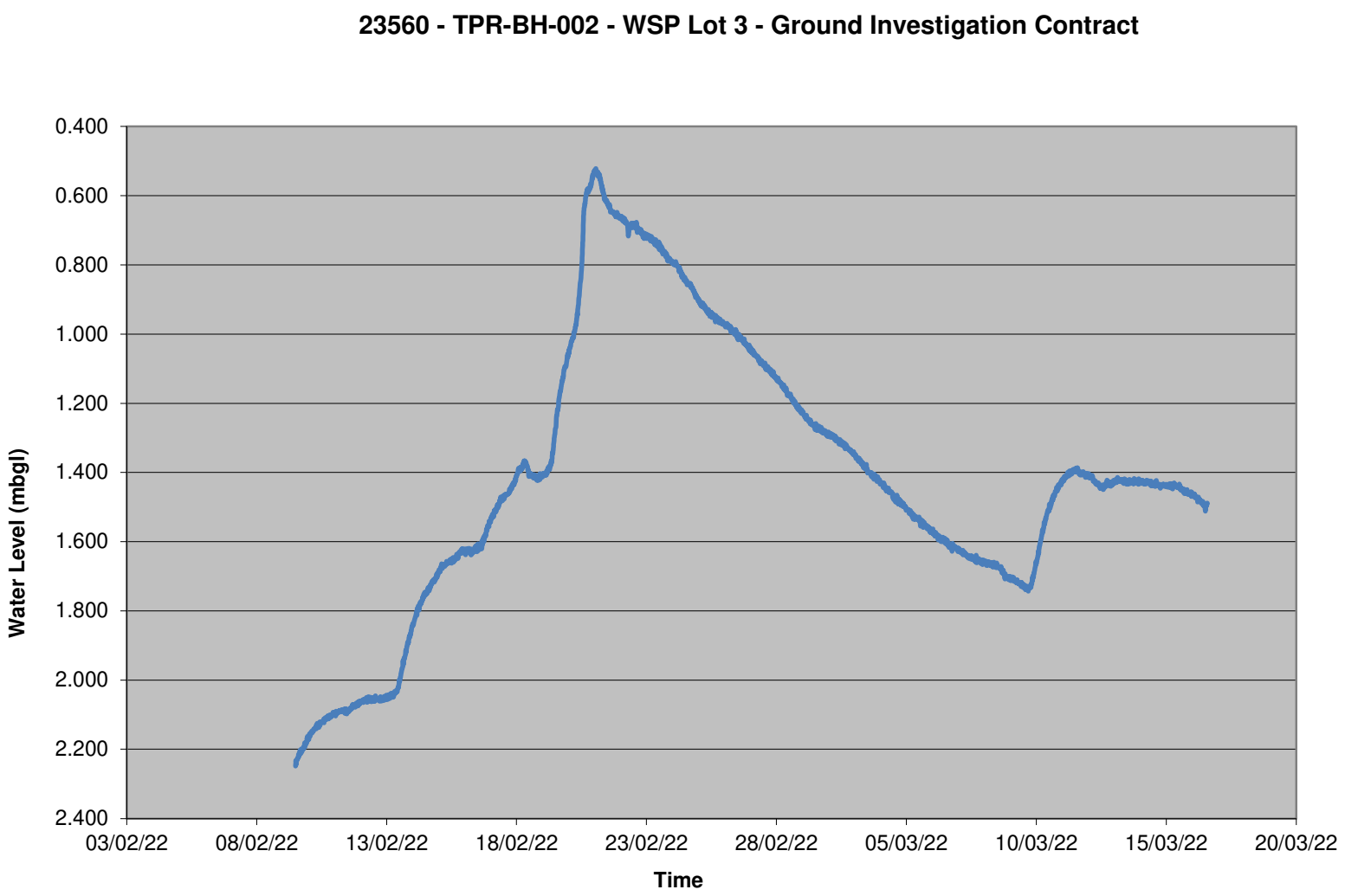
Groundwater Monitoring - Rotary GB / RC

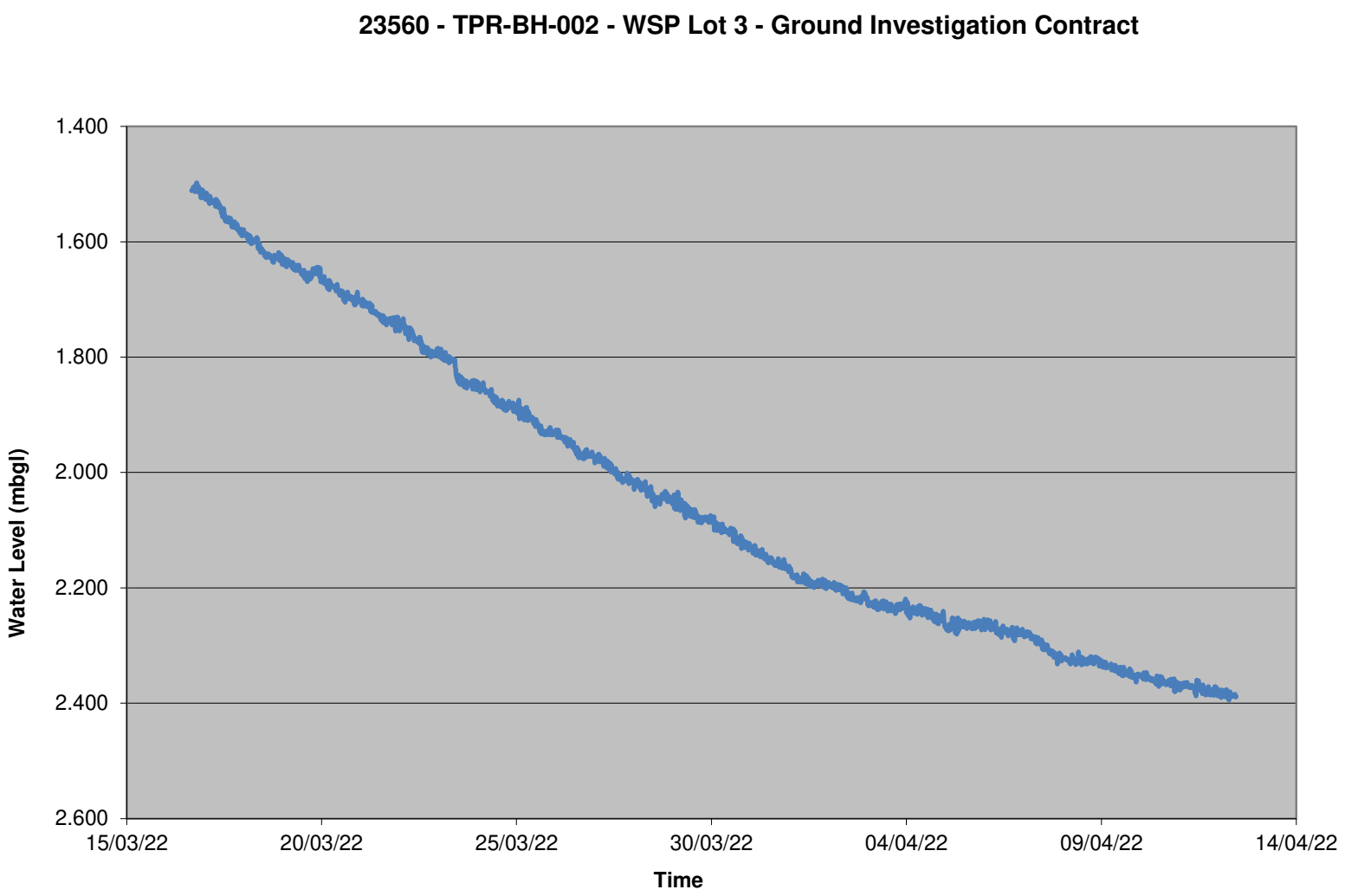
Site Location	WSP Lot 3
Project No.	23560
Engineer	Mott MacDonald

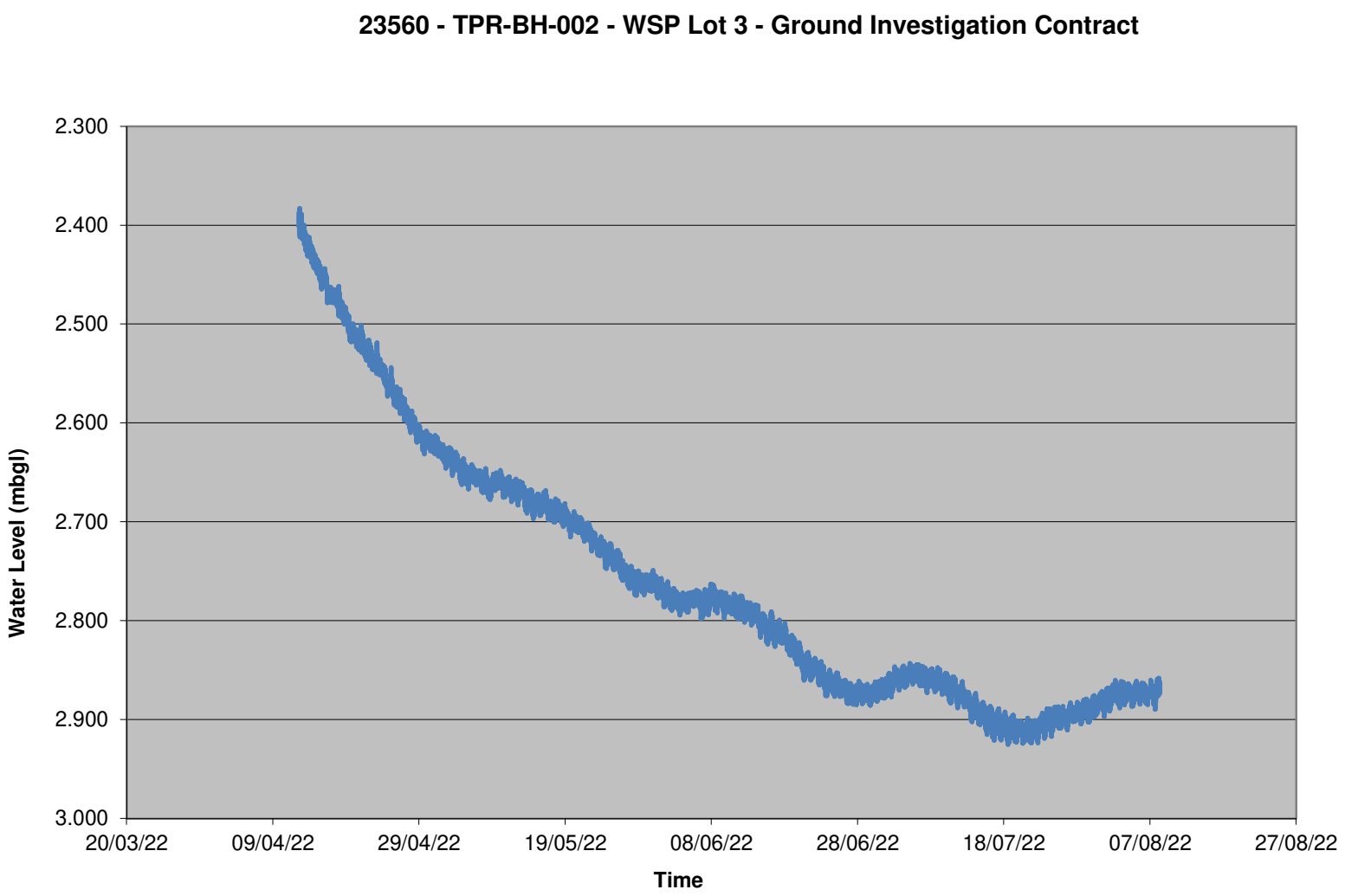
		Date of Monitoring (Data Logger Visits)						
		29/10/2021	06/12/2021	09/02/2022	16/03/2022	12/04/2022	08/08/2022	
Exploratory Hole No.	SP 50mm	(m bgl)	(m bgl)	(m bgl)	(m bgl)	(m bgl)	(m bgl)	(m bgl)
TPR-BH-002 (Geobore S)	50mm		2.62	2.25	1.48	2.38	2.86	
TPR-BH-006 (Geobore S)	50mm		2.73	2.48	1.92	2.40	2.79	
TPR-BH-014 (Geobore S)	50mm		2.98	2.23	2.79	3.19	3.29	
TPR-BH-008	50mm	3.57	3.45	3.09	2.00	3.18	3.64	
TPR-BH-009	50mm	2.45	2.64	2.47	2.42	2.63	2.72	
TPR-BH-012	50mm		3.10	2.90	2.81	3.22	3.27	
TPR-BH-013	50mm		4.35	4.17	3.48	4.26	4.46	

TPR BH002
06-12-21 – 09-02-22
09-02-22 – 16-03-22
16-03-22 – 12-04-22
12-04-22 – 08-08-22

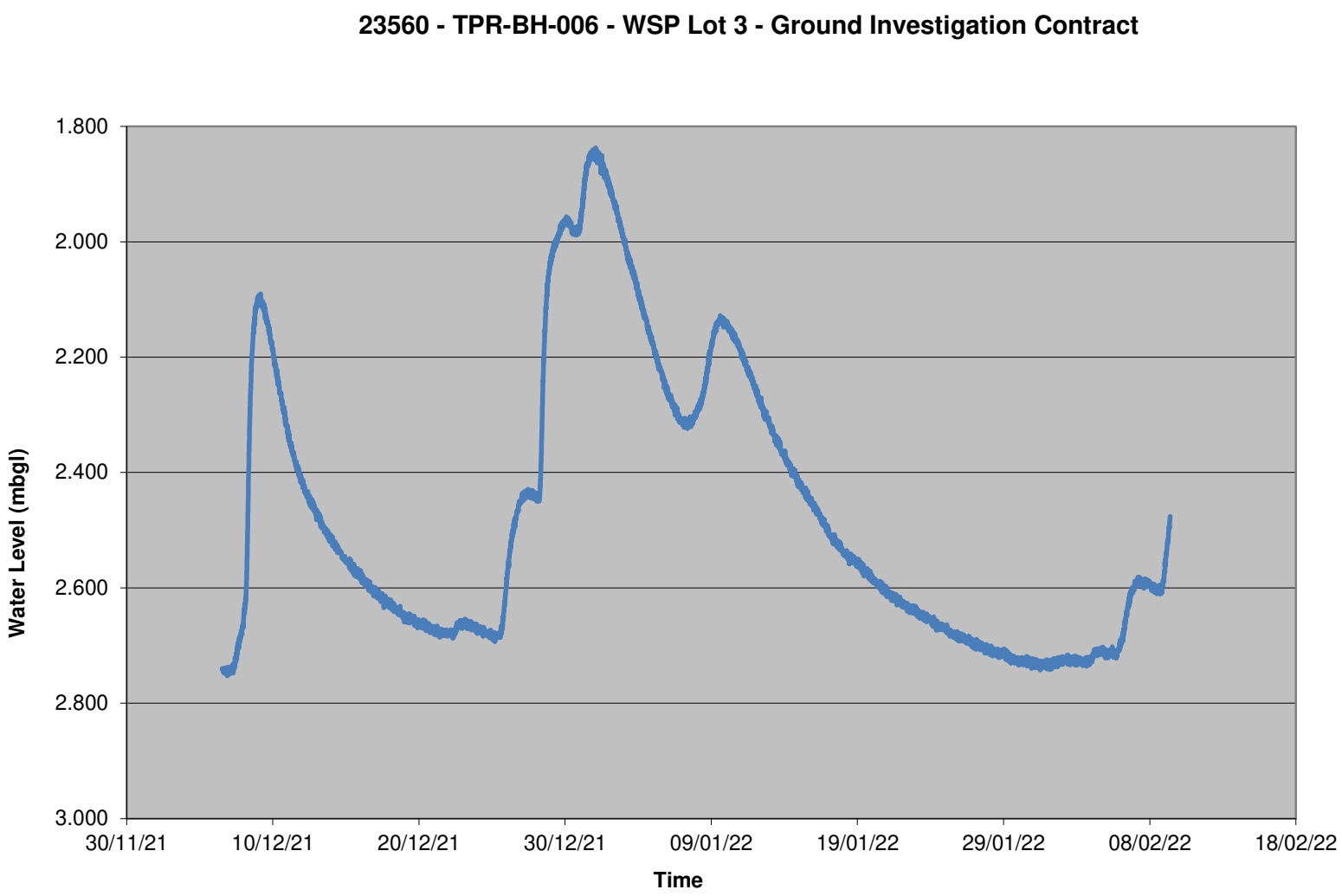

23560 - TPR-BH-002 - WSP Lot 3 - Ground Investigation Contract
1.000
1.200
1.400
1.600
1.800
2.000
2.200
2.400
2.600
2.800
Water Level (mbgl)
30/11/21
10/12/21
20/12/21
30/12/21
09/01/22
19/01/22
29/01/22
08/02/22
18/02/22
Time

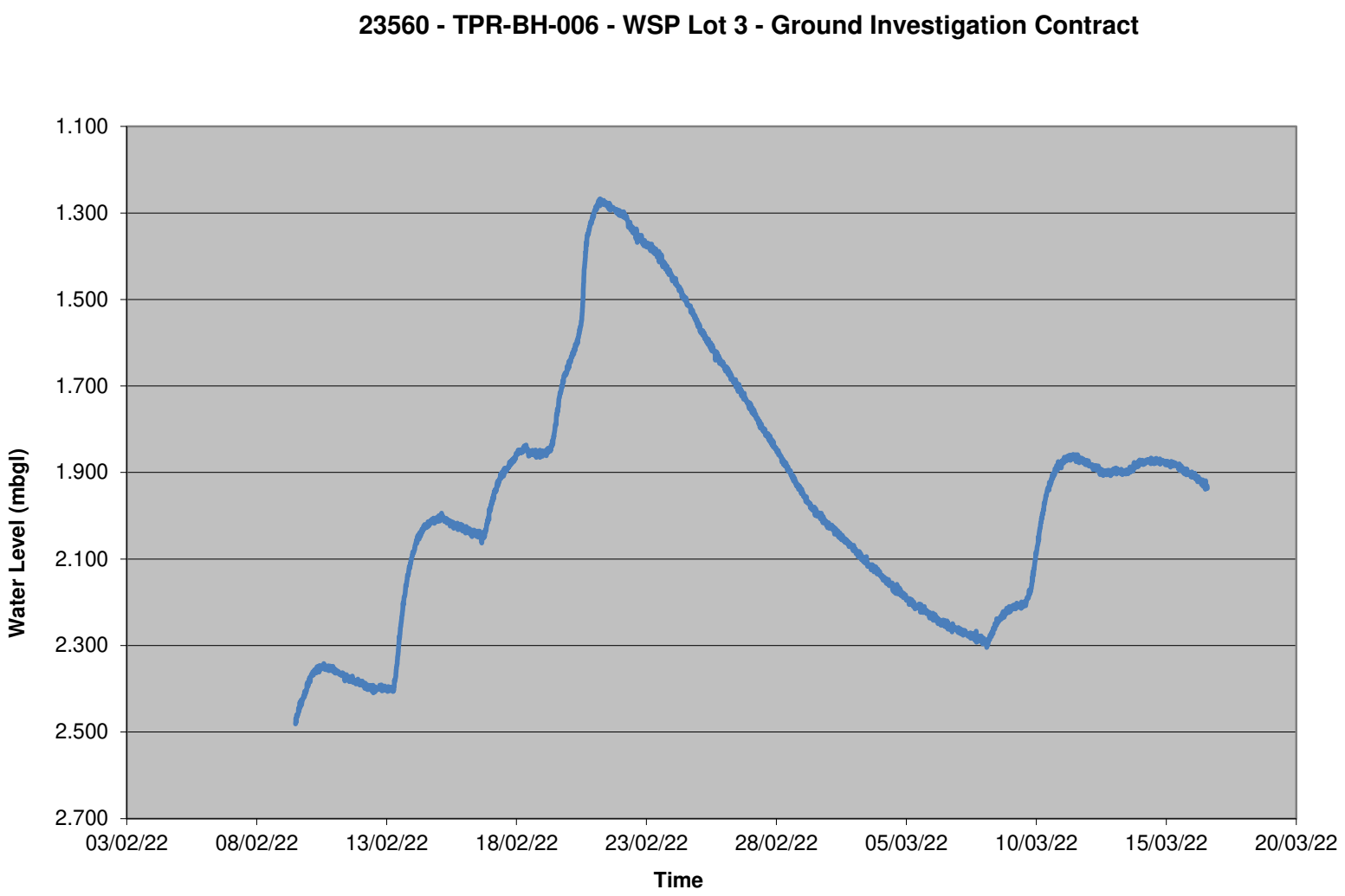

23560 - TPR-BH-002 - WSP Lot 3 - Ground Investigation Contract
Water Level (mbgl)
0.400
0.600
0.800
1.000
1.200
1.400
1.600
1.800
2.000
2.200
2.400
03/02/22
08/02/22
13/02/22
18/02/22
23/02/22
28/02/22
05/03/22
10/03/22
15/03/22
20/03/22
Time

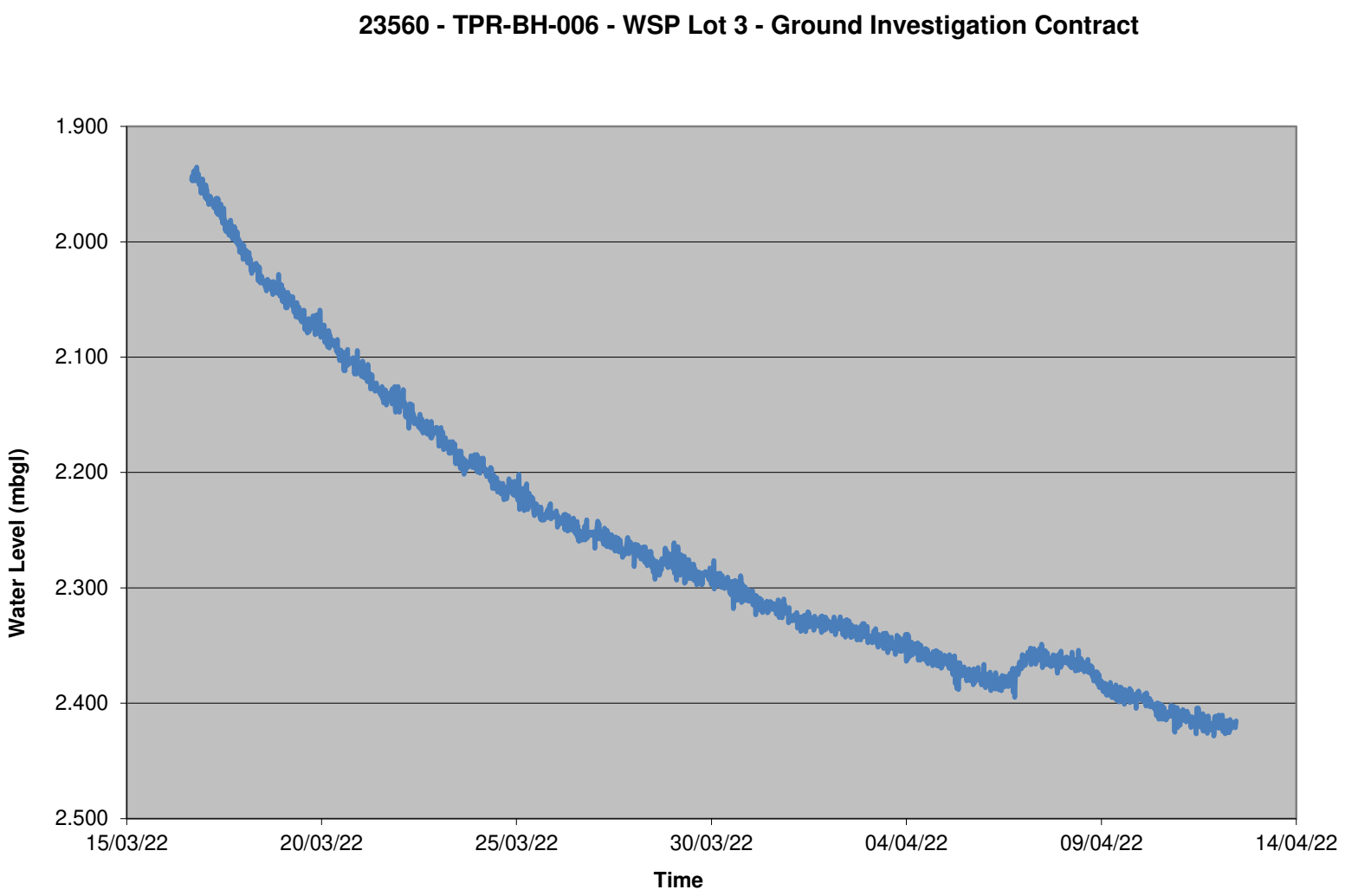

23560 - TPR-BH-002 - WSP Lot 3 - Ground Investigation Contract
1.400
1.600
1.800
2.000
2.200
2.400
2.600
Water Level (mbgl)
15/03/22
20/03/22
25/03/22
30/03/22
04/04/22
09/04/22
14/04/22
Time

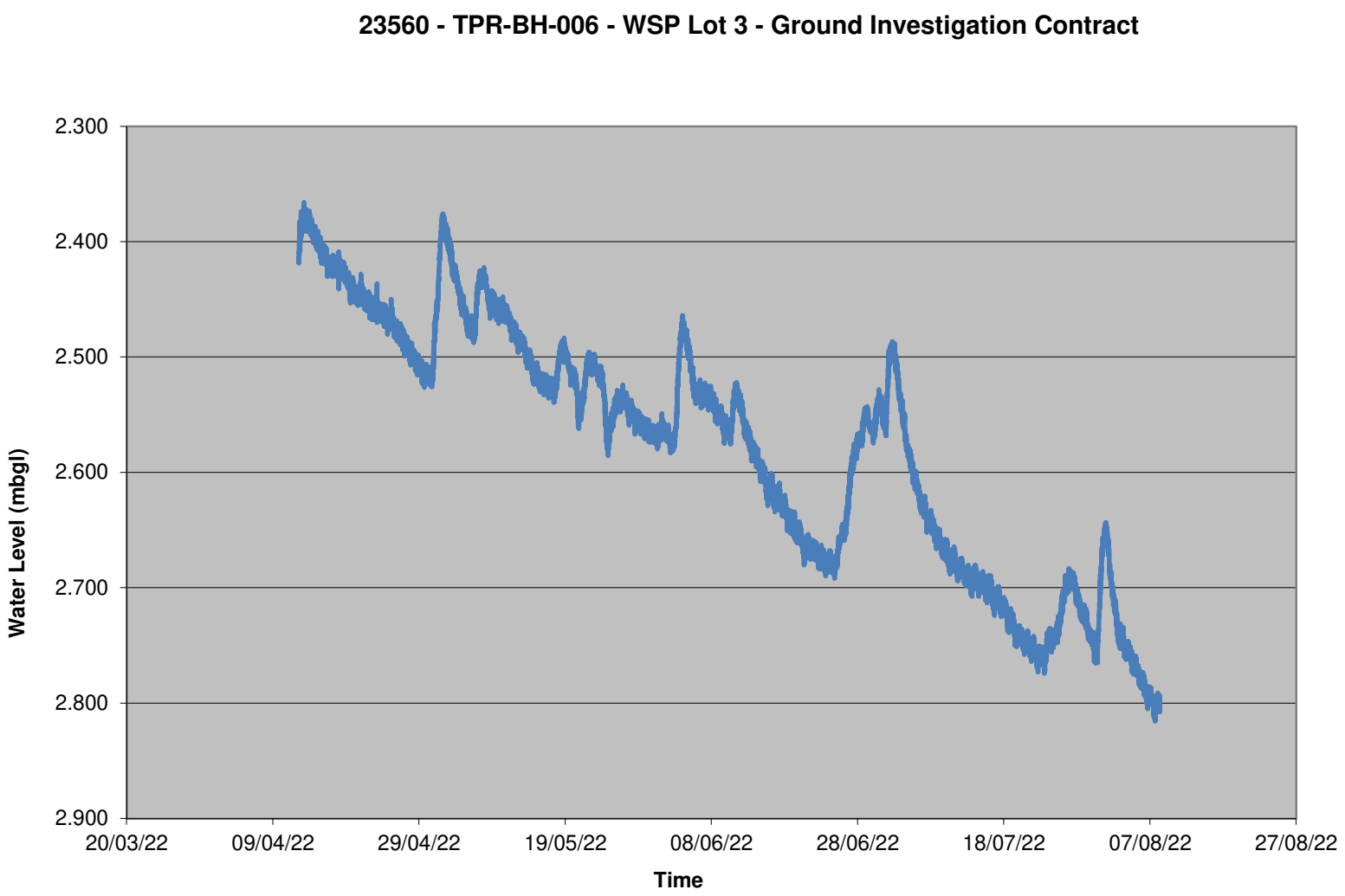

23560 - TPR-BH-002 - WSP Lot 3 - Ground Investigation Contract
2.300
2.400
2.500
2.600
2.700
2.800
2.900
3.000
Water Level (mbgl)
20/03/22
09/04/22
29/04/22
19/05/22
08/06/22
28/06/22
18/07/22
07/08/22
27/08/22
Time

TPR BH006
06-12-21 – 09-02-22
09-02-22 – 16-03-22
16-03-22 – 12-04-22
12-04-22 – 08-08-22

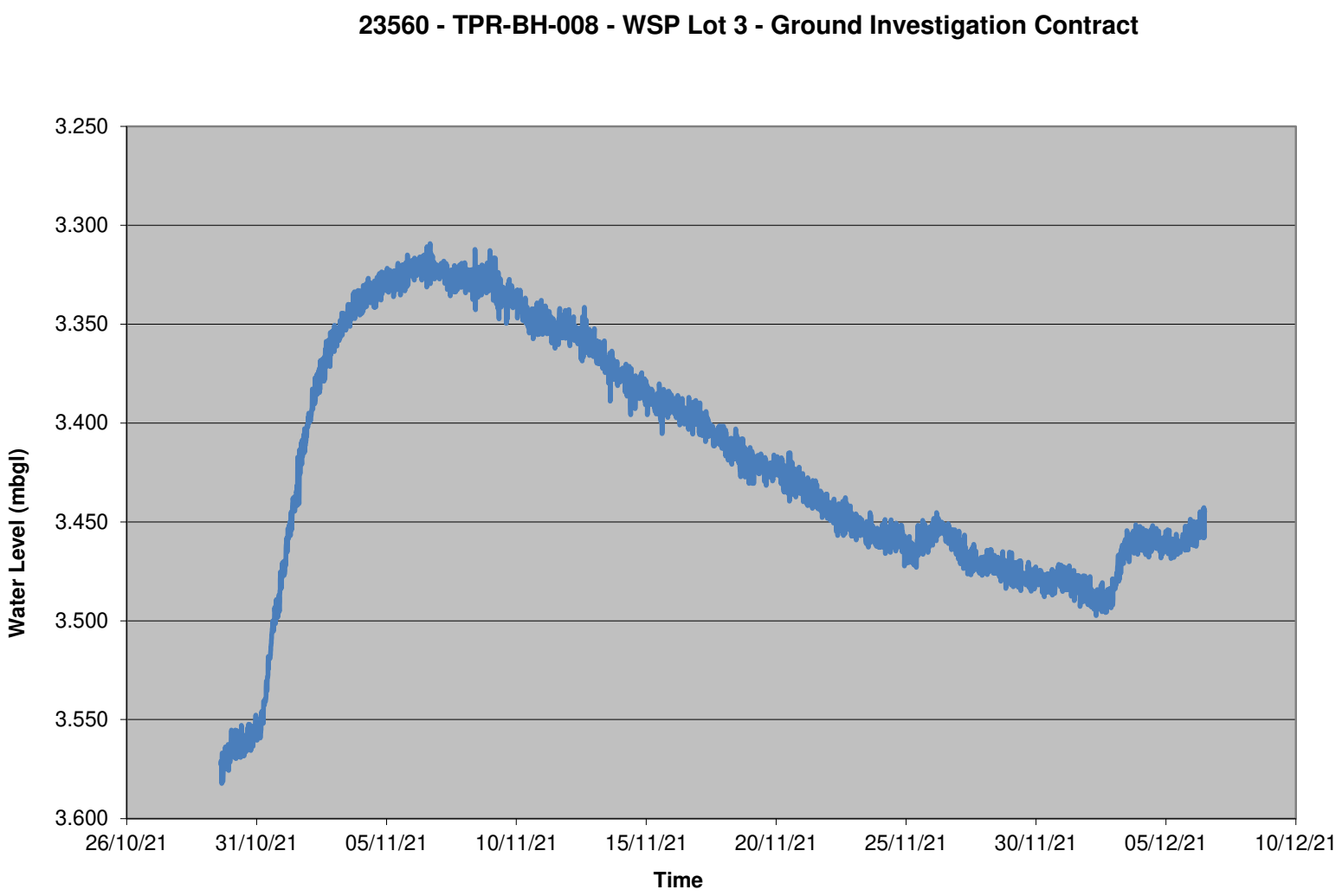

23560 - TPR-BH-006 - WSP Lot 3 - Ground Investigation Contract
1.800
2.000
2.200
2.400
2.600
2.800
3.000
Water Level (mbgl)
30/11/21
10/12/21
20/12/21
30/12/21
09/01/22
19/01/22
29/01/22
08/02/22
18/02/22
Time

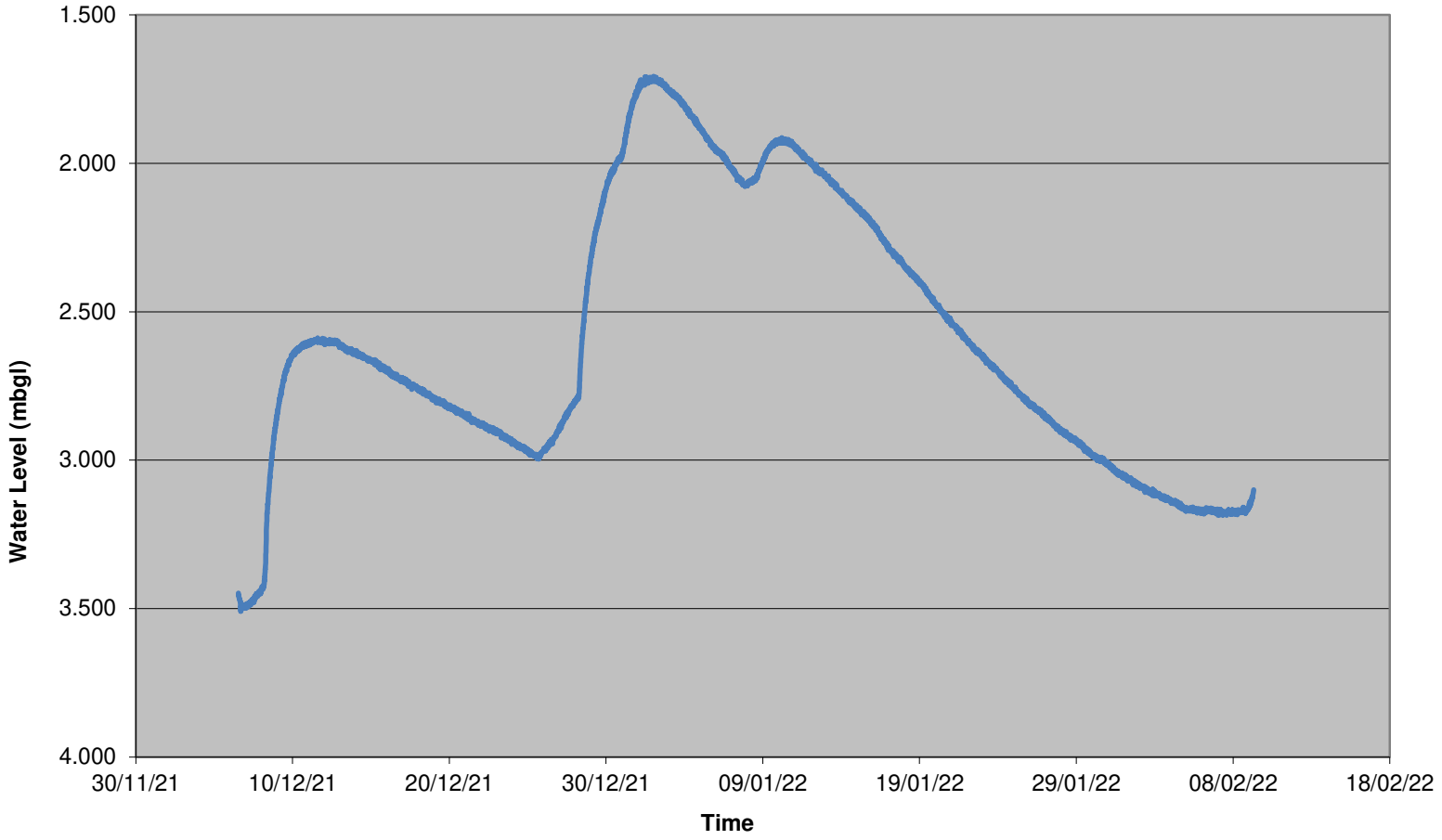

23560 - TPR-BH-006 - WSP Lot 3 - Ground Investigation Contract
Water Level (mbgl)
1.100
1.300
1.500
1.700
1.900
2.100
2.300
2.500
2.700
03/02/22
08/02/22
13/02/22
18/02/22
23/02/22
28/02/22
05/03/22
10/03/22
15/03/22
20/03/22
Time

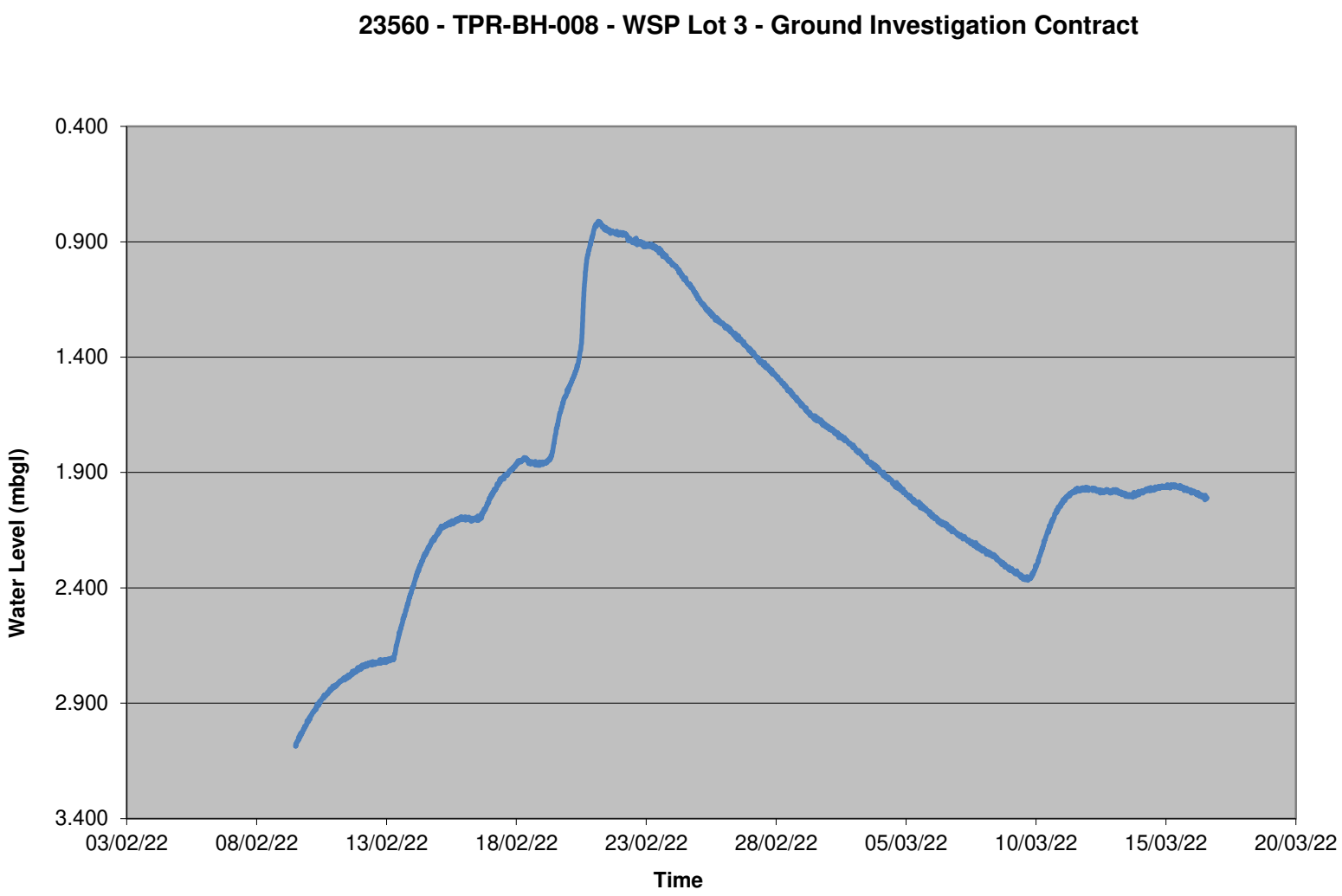

23560 - TPR-BH-006 - WSP Lot 3 - Ground Investigation Contract
1.900
2.000
2.100
2.200
2.300
2.400
2.500
Water Level (mbgl)
15/03/22
20/03/22
25/03/22
30/03/22
04/04/22
09/04/22
14/04/22
Time

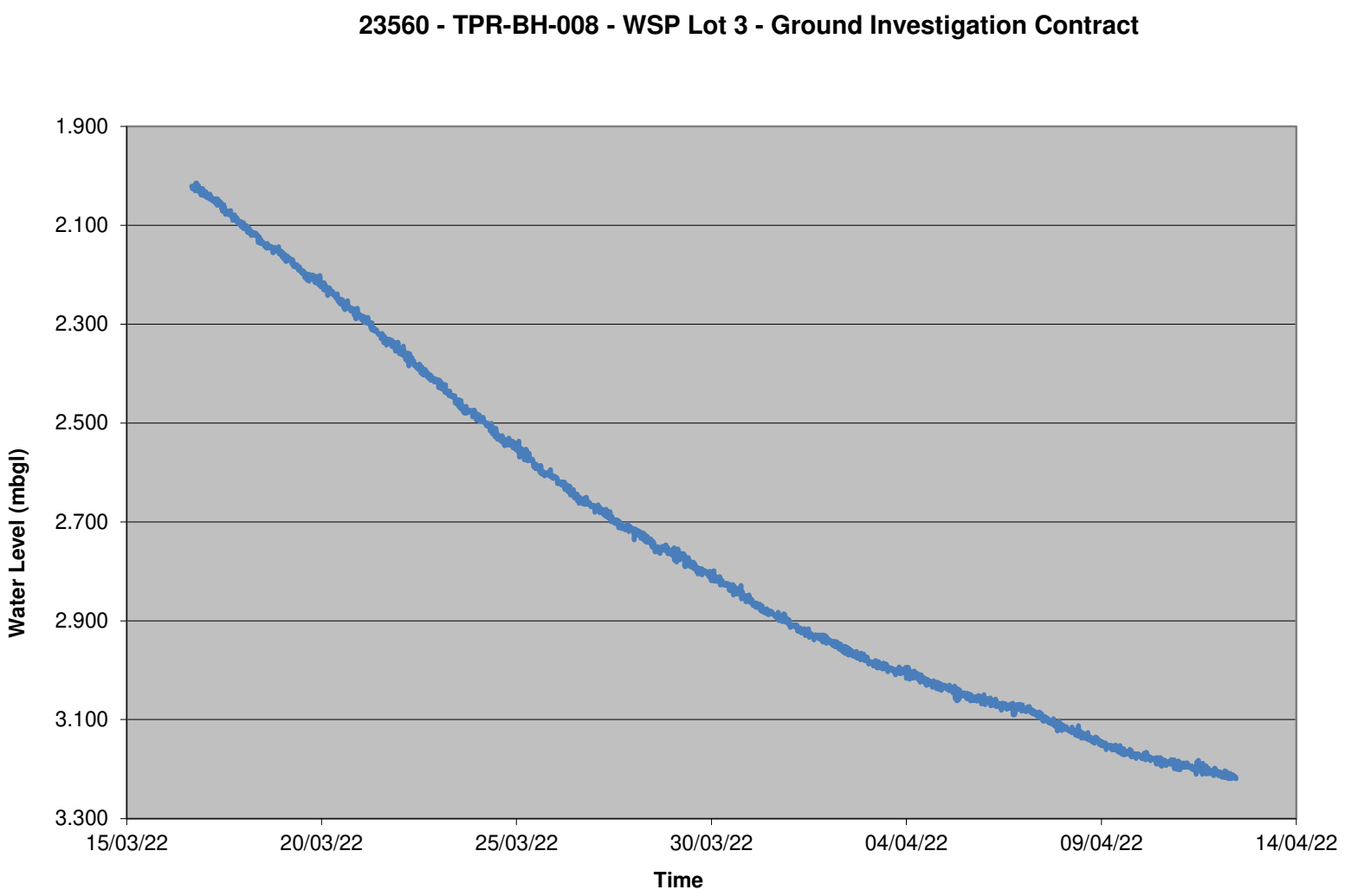

23560 - TPR-BH-006 - WSP Lot 3 - Ground Investigation Contract
2.300
2.400
2.500
2.600
2.700
2.800
2.900
Water Level (mbgl)
20/03/22
09/04/22
29/04/22
19/05/22
08/06/22
28/06/22
18/07/22
07/08/22
27/08/22
Time

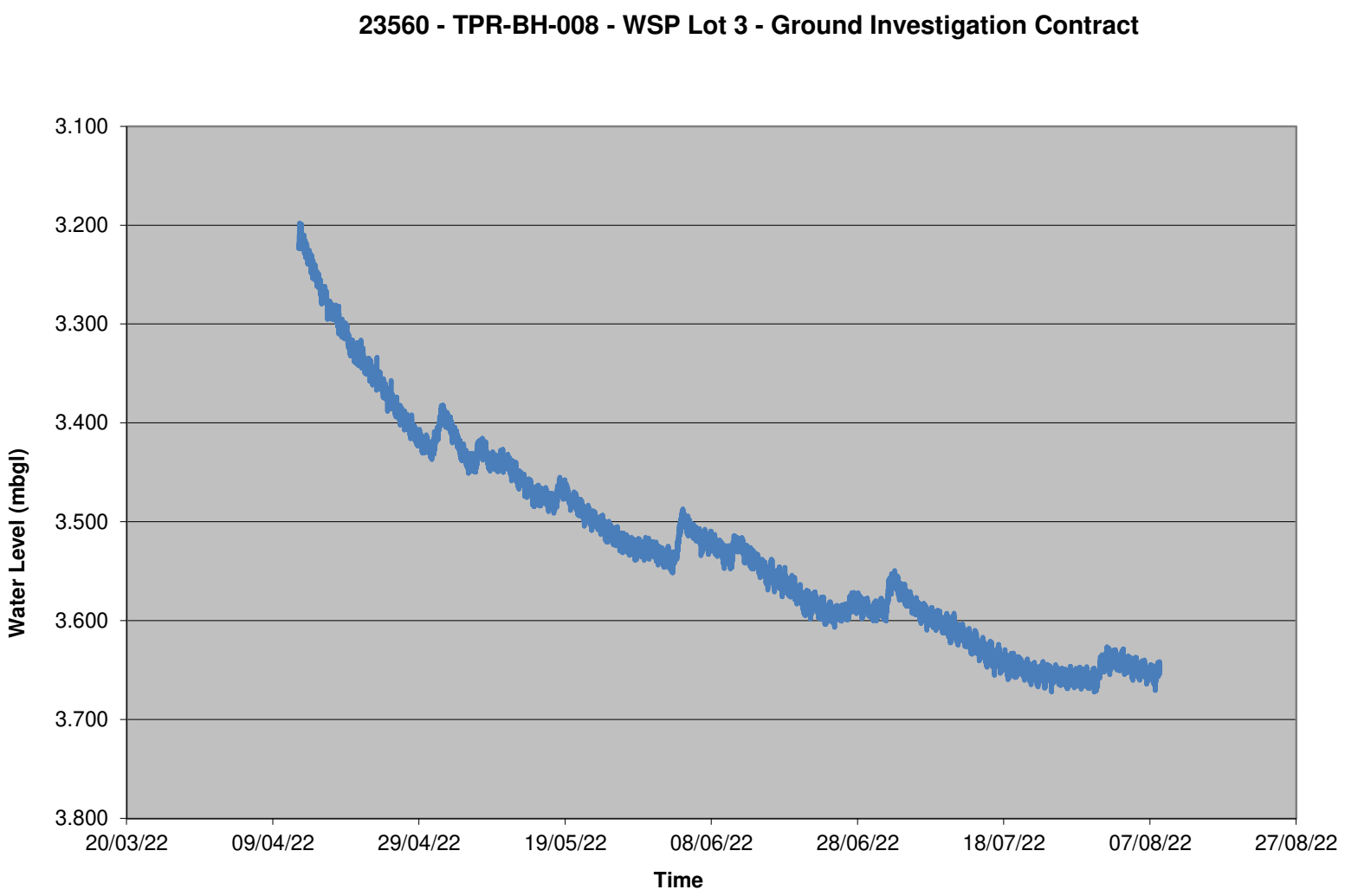
TPR BH008
29-10-21 – 06-12-21
06-12-21 – 09-02-22
09-02-22 – 16-03-22
16-03-22 – 12-04-22
12-04-22 – 08-08-22


23560 - TPR-BH-008 - WSP Lot 3 - Ground Investigation Contract
3.250
3.300
3.350
3.400
3.450
3.500
3.550
3.600
Water Level (mbgl)
26/10/21
31/10/21
05/11/21
10/11/21
15/11/21
20/11/21
25/11/21
30/11/21
05/12/21
10/12/21
Time

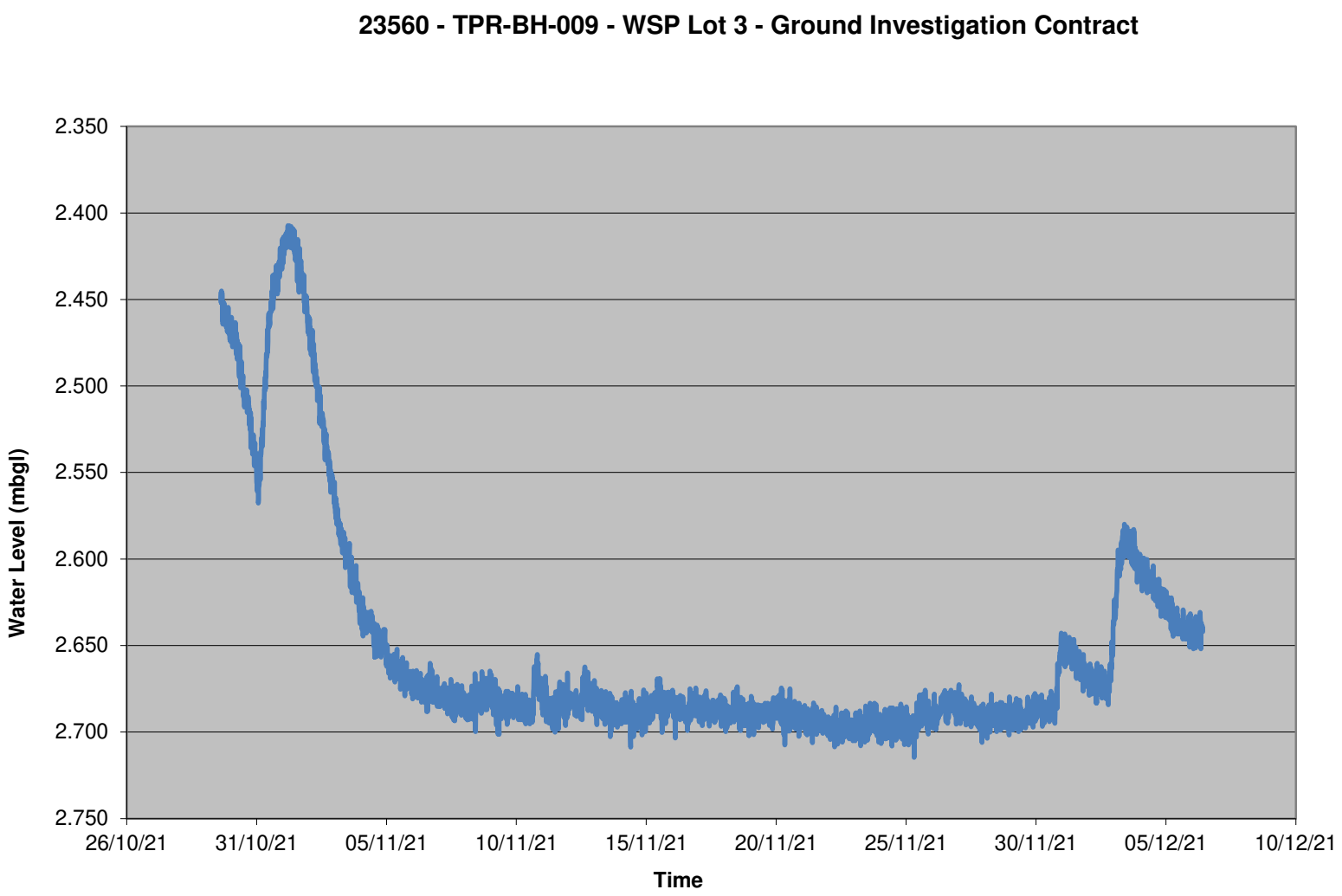

23560 - TPR-BH-008 - WSP Lot 3 - Ground Investigation Contract
1.500
2.000
2.500
3.000
3.500
4.000
Water Level (mbgl)
30/11/21
10/12/21
20/12/21
30/12/21
09/01/22
19/01/22
29/01/22
08/02/22
18/02/22
Time

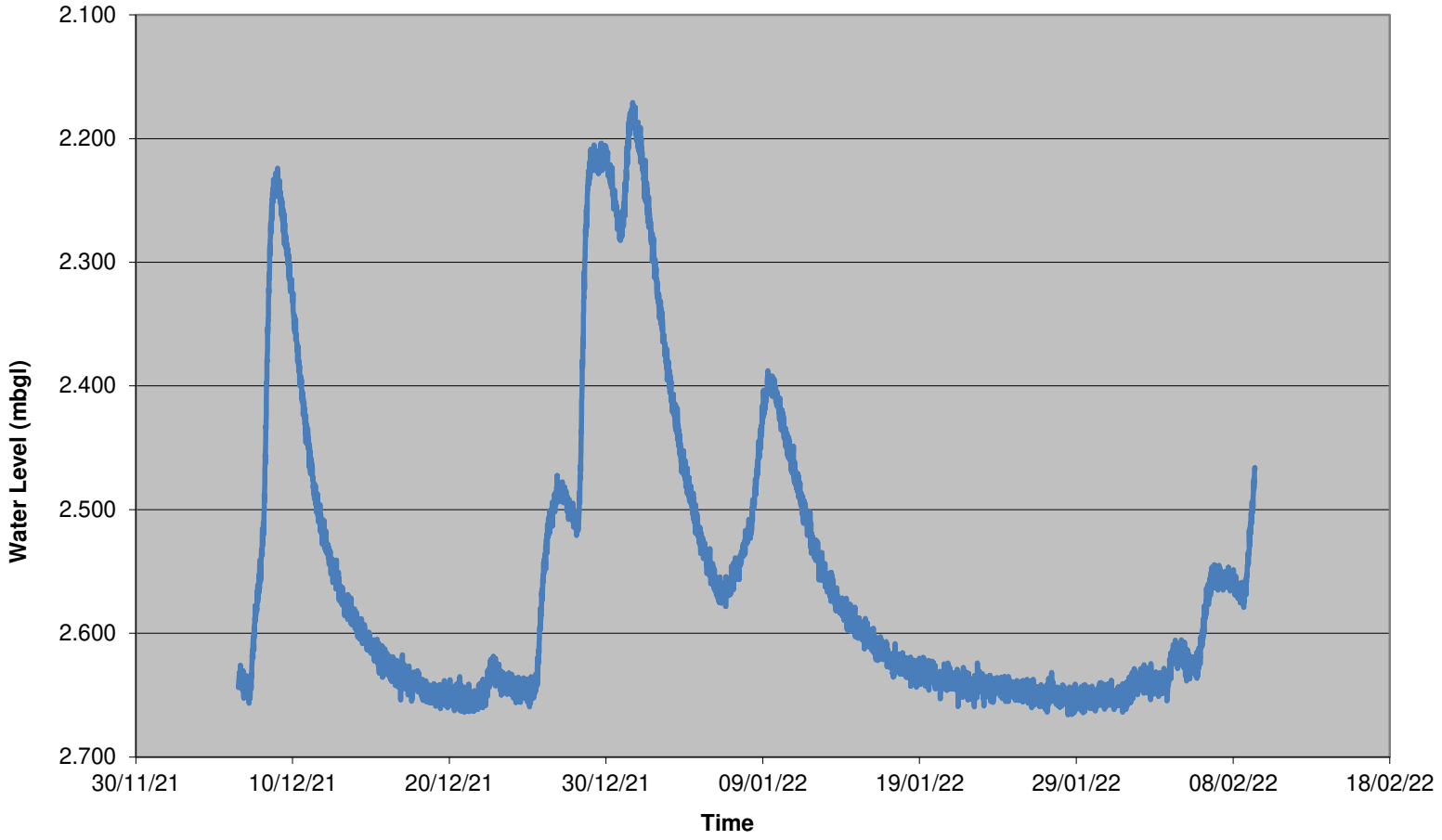

23560 - TPR-BH-008 - WSP Lot 3 - Ground Investigation Contract
0.400
0.900
1.400
1.900
2.400
2.900
3.400
Water Level (mbgl)
03/02/22
08/02/22
13/02/22
18/02/22
23/02/22
28/02/22
05/03/22
10/03/22
15/03/22
20/03/22
Time

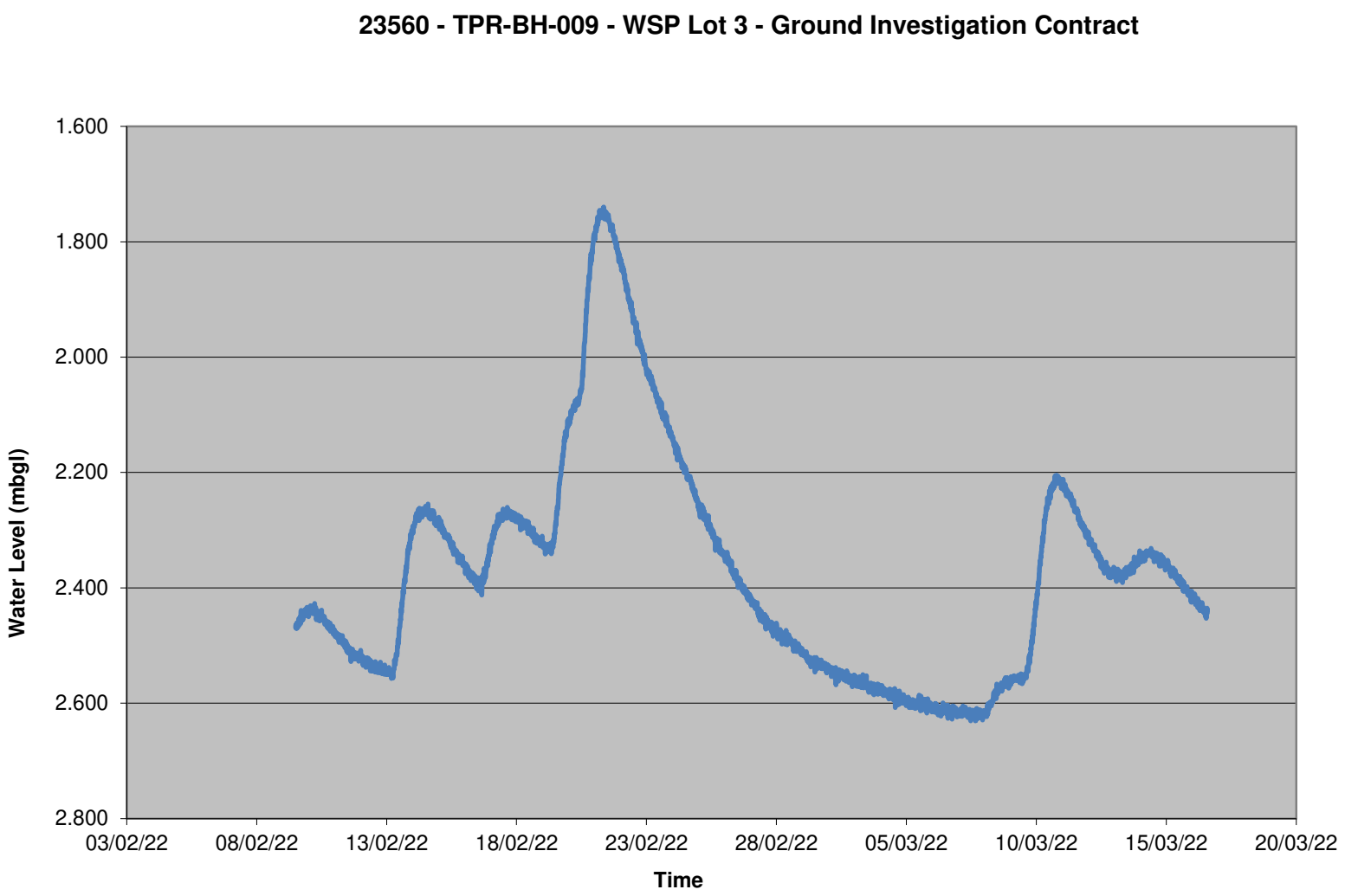

23560 - TPR-BH-008 - WSP Lot 3 - Ground Investigation Contract
1.900
2.100
2.300
2.500
2.700
2.900
3.100
3.300
Water Level (mbgl)
15/03/22
20/03/22
25/03/22
30/03/22
04/04/22
09/04/22
14/04/22
Time

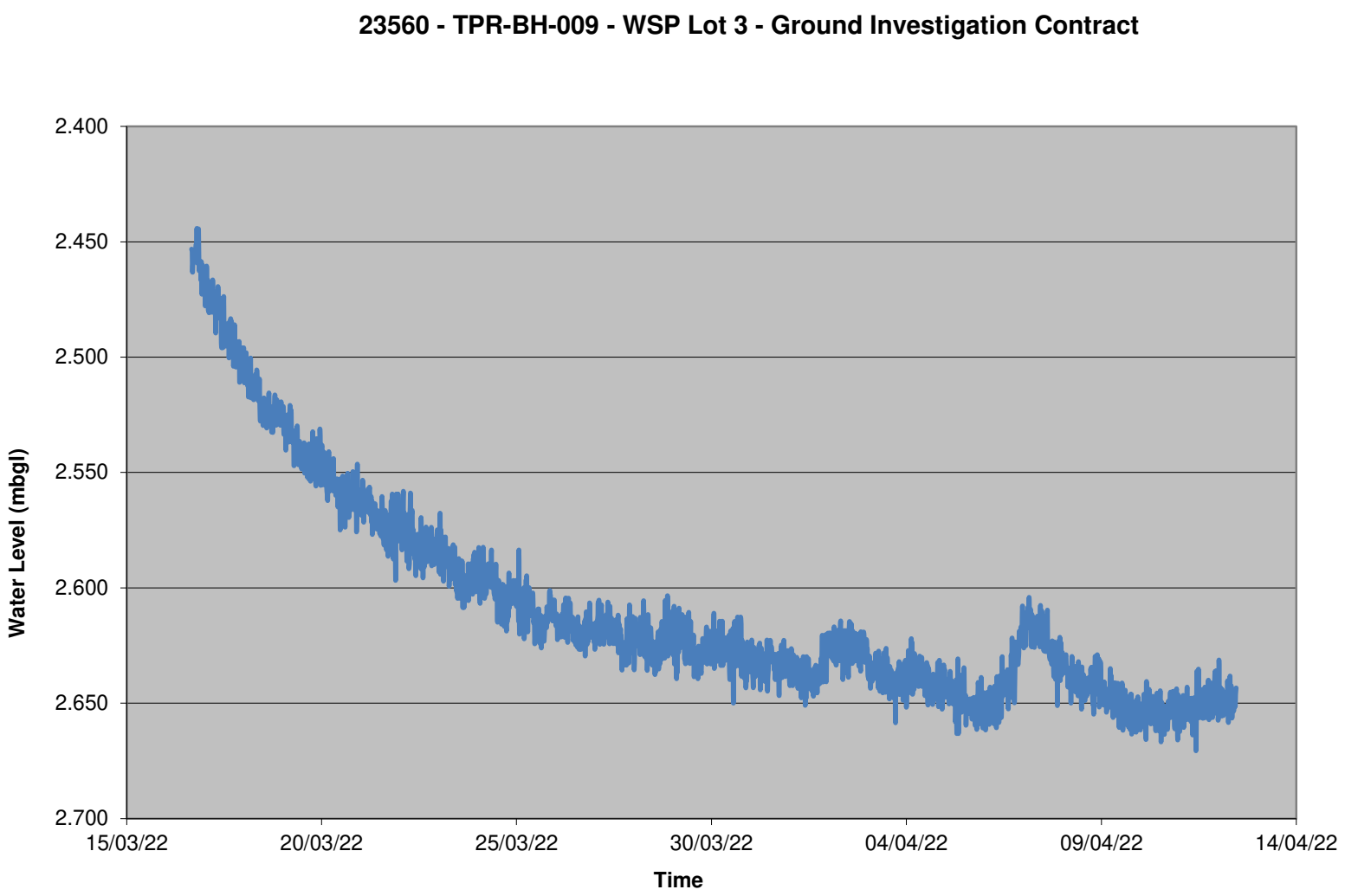

23560 - TPR-BH-008 - WSP Lot 3 - Ground Investigation Contract
3.100
3.200
3.300
3.400
3.500
3.600
3.700
3.800
Water Level (mbgl)
20/03/22
09/04/22
29/04/22
19/05/22
08/06/22
28/06/22
18/07/22
07/08/22
27/08/22
Time

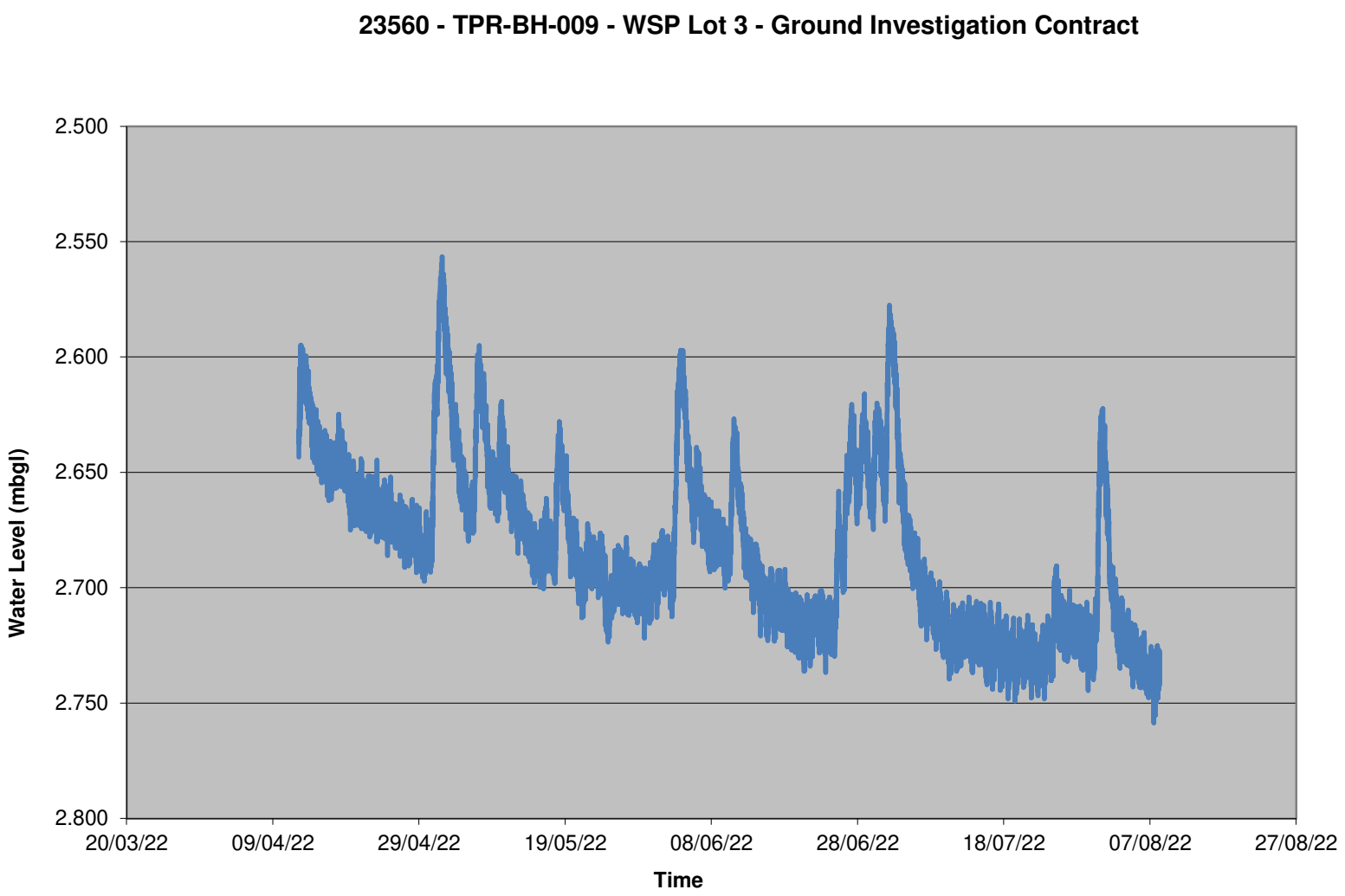
TPR BH009
29-10-21 – 06-12-21
06-12-21 – 09-02-22
09-02-22 – 16-03-22
16-03-22 – 12-04-22
12-04-22 – 08-08-22


23560 - TPR-BH-009 - WSP Lot 3 - Ground Investigation Contract
Water Level (mbgl)
2.350
2.400
2.450
2.500
2.550
2.600
2.650
2.700
2.750
26/10/21
31/10/21
05/11/21
10/11/21
15/11/21
20/11/21
25/11/21
30/11/21
05/12/21
10/12/21
Time

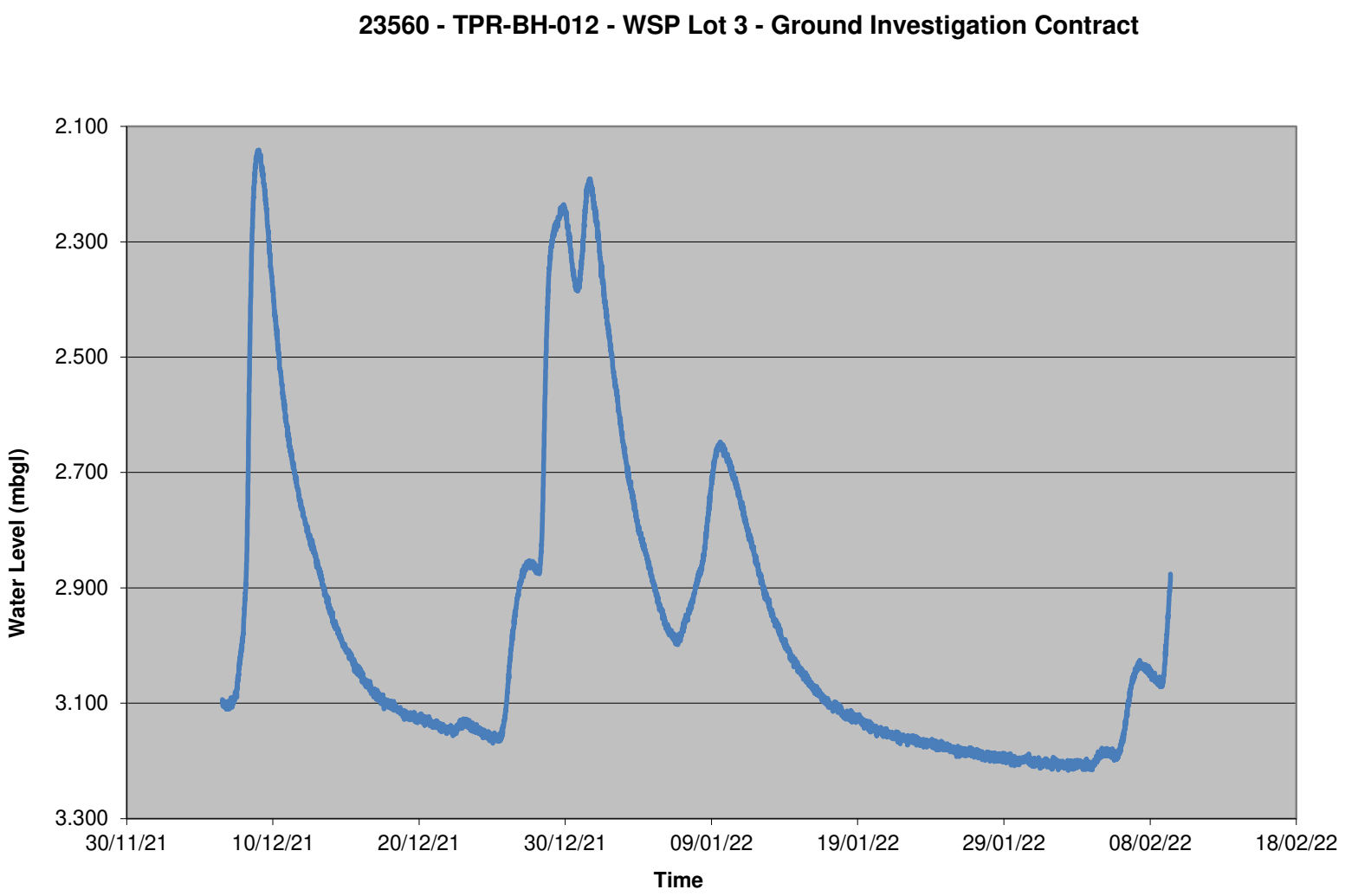

23560 - TPR-BH-009 - WSP Lot 3 - Ground Investigation Contract
2.100
2.200
2.300
2.400
2.500
2.600
2.700
Water Level (mbgl)
30/11/21
10/12/21
20/12/21
30/12/21
09/01/22
19/01/22
29/01/22
08/02/22
18/02/22
Time

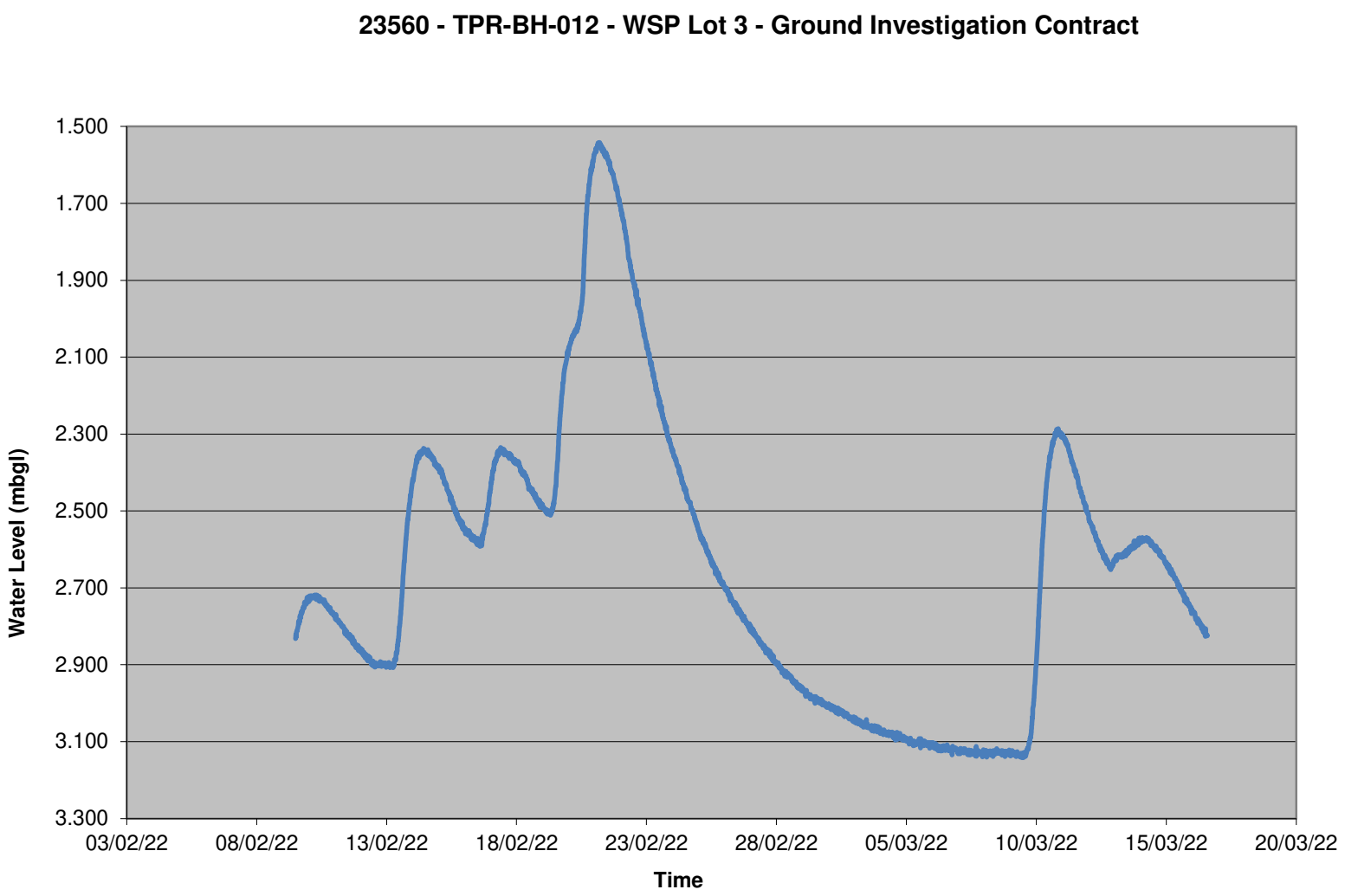

23560 - TPR-BH-009 - WSP Lot 3 - Ground Investigation Contract
1.600
1.800
2.000
2.200
2.400
2.600
2.800
Water Level (mbgl)
03/02/22
08/02/22
13/02/22
18/02/22
23/02/22
28/02/22
05/03/22
10/03/22
15/03/22
20/03/22
Time

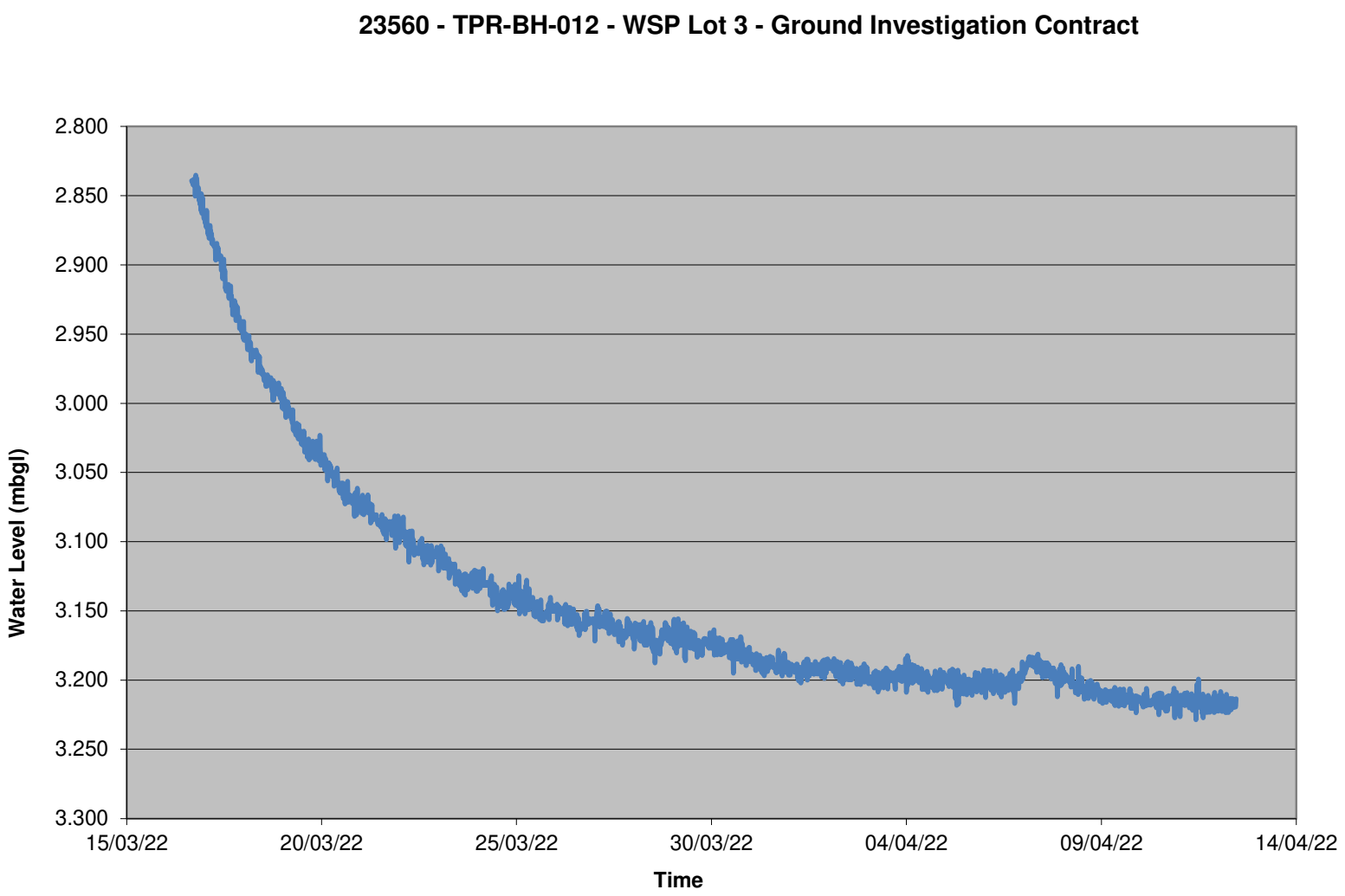

23560 - TPR-BH-009 - WSP Lot 3 - Ground Investigation Contract
2.400
2.450
2.500
2.550
2.600
2.650
2.700
Water Level (mbgl)
15/03/22
20/03/22
25/03/22
30/03/22
04/04/22
09/04/22
14/04/22
Time

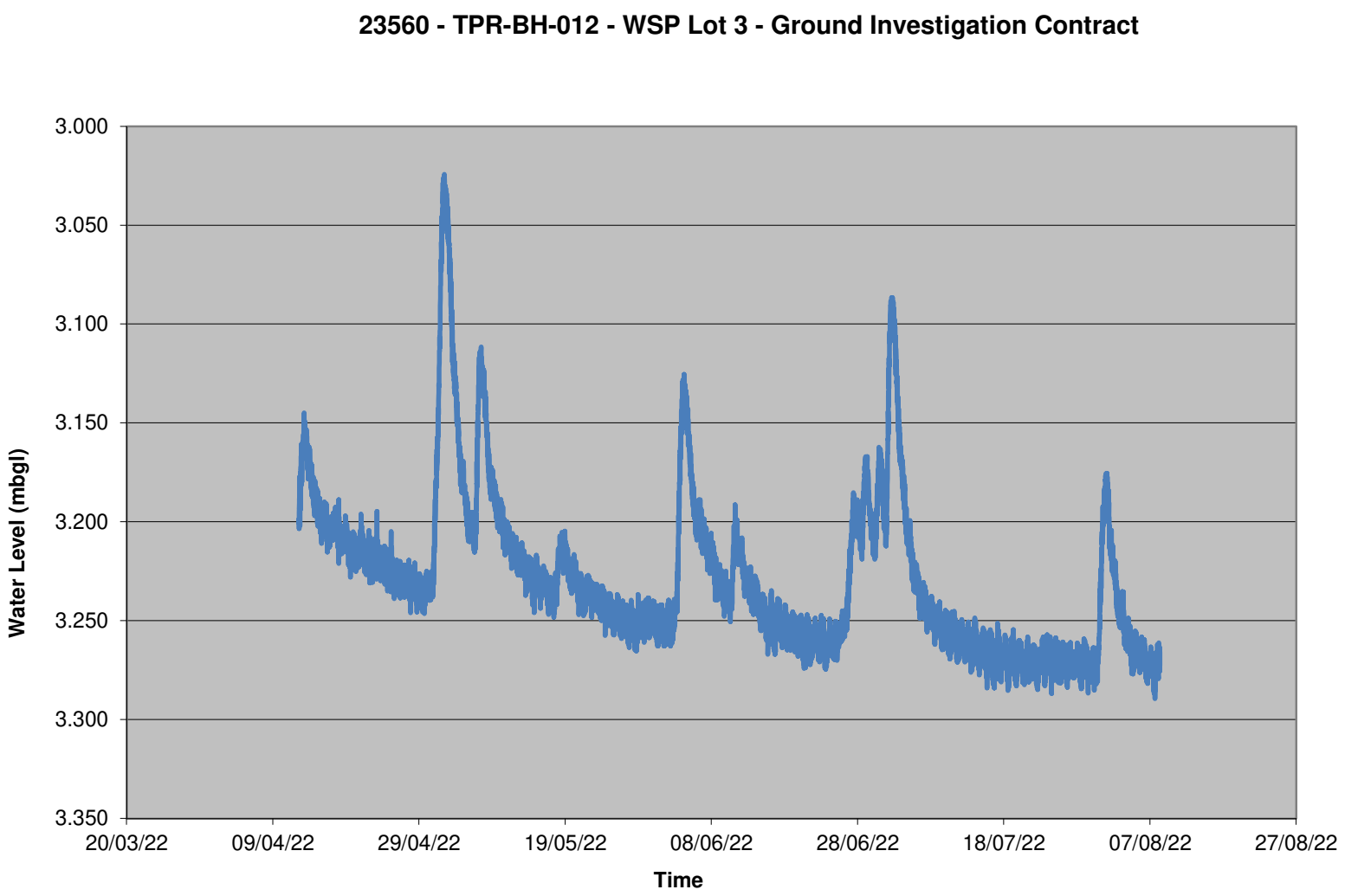

23560 - TPR-BH-009 - WSP Lot 3 - Ground Investigation Contract
2.500
2.550
2.600
2.650
2.700
2.750
2.800
Water Level (mbgl)
20/03/22
09/04/22
29/04/22
19/05/22
08/06/22
28/06/22
18/07/22
07/08/22
27/08/22
Time

TPR BH012
06-12-21 – 09-02-22
09-02-22 – 16-03-22
16-03-22 – 12-04-22
12-04-22 – 08-08-22

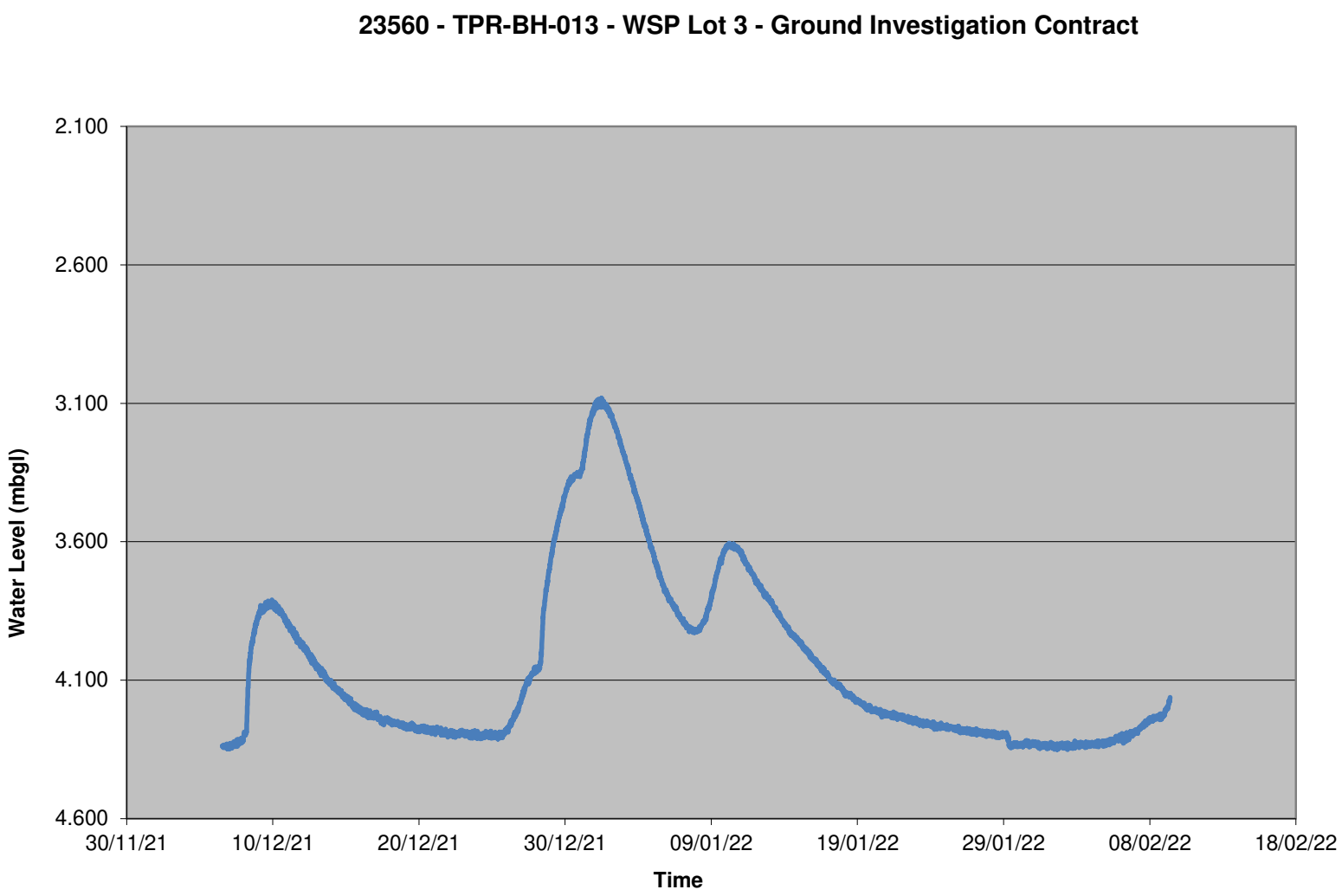

23560 - TPR-BH-012 - WSP Lot 3 - Ground Investigation Contract
2.100
2.300
2.500
2.700
2.900
3.100
3.300
Water Level (mbgl)
30/11/21
10/12/21
20/12/21
30/12/21
09/01/22
19/01/22
29/01/22
08/02/22
18/02/22
Time

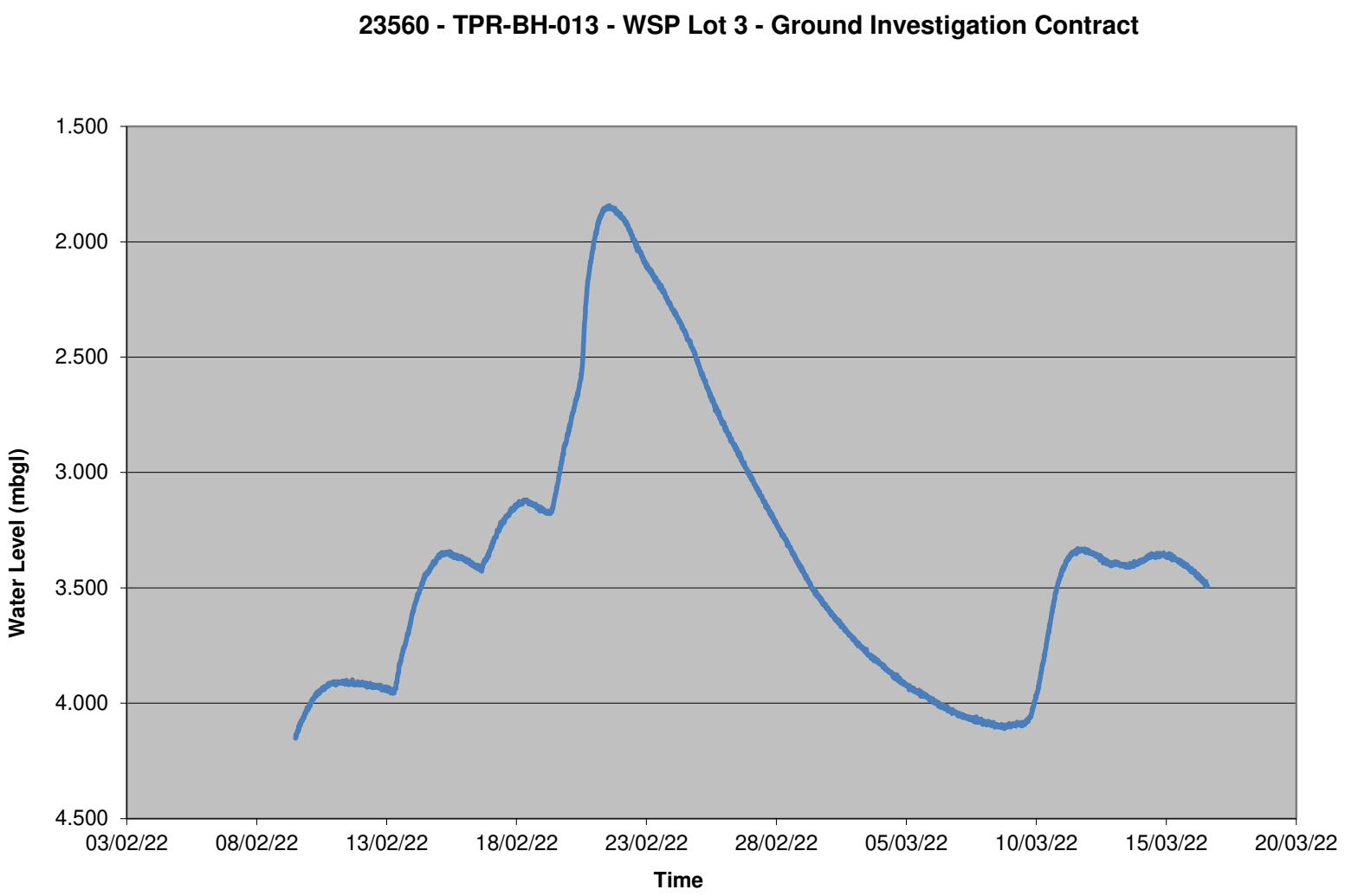

23560 - TPR-BH-012 - WSP Lot 3 - Ground Investigation Contract
Water Level (mbgl)
1.500
1.700
1.900
2.100
2.300
2.500
2.700
2.900
3.100
3.300
03/02/22
08/02/22
13/02/22
18/02/22
23/02/22
28/02/22
05/03/22
10/03/22
15/03/22
20/03/22
Time

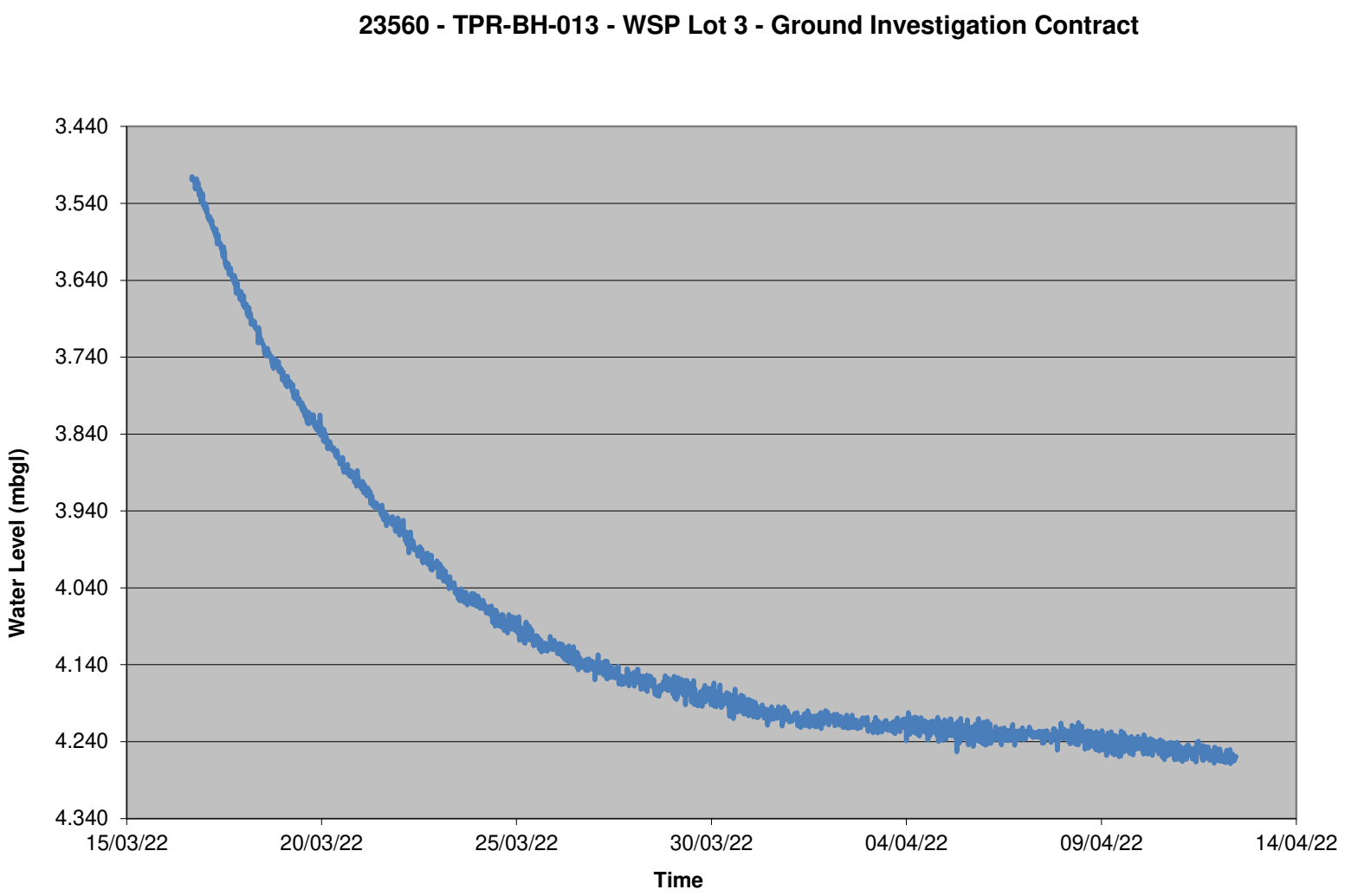

23560 - TPR-BH-012 - WSP Lot 3 - Ground Investigation Contract
Water Level (mbgl)
2.800
2.850
2.900
2.950
3.000
3.050
3.100
3.150
3.200
3.250
3.300
15/03/22
20/03/22
25/03/22
30/03/22
04/04/22
09/04/22
14/04/22
Time

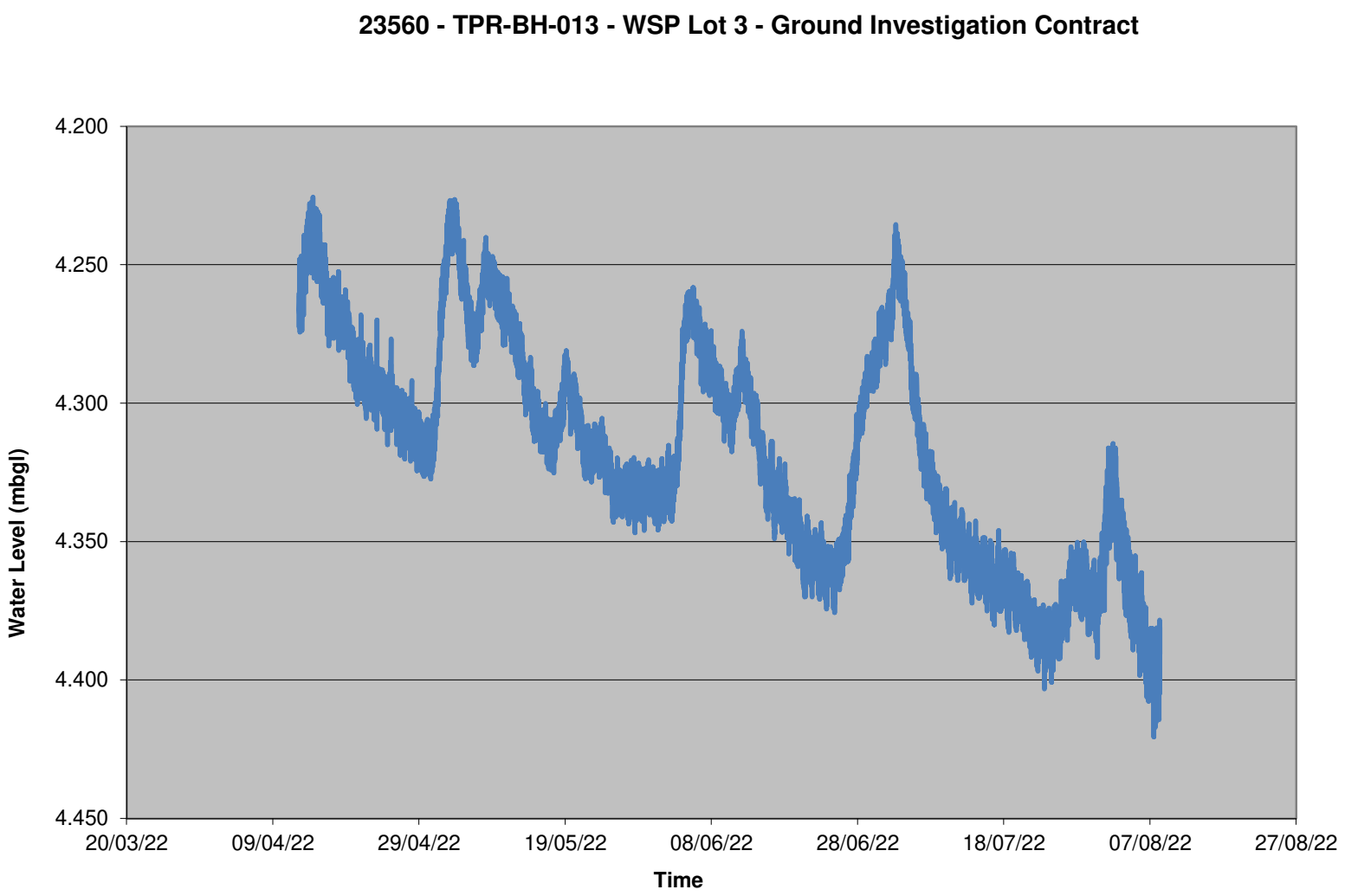

23560 - TPR-BH-012 - WSP Lot 3 - Ground Investigation Contract
3.000
3.050
3.100
3.150
3.200
3.250
3.300
3.350
Water Level (mbgl)
20/03/22
09/04/22
29/04/22
19/05/22
08/06/22
28/06/22
18/07/22
07/08/22
27/08/22
Time

TPR BH013
06-12-21 – 09-02-22
09-02-22 – 16-03-22
16-03-22 – 12-04-22
12-04-22 – 08-08-22

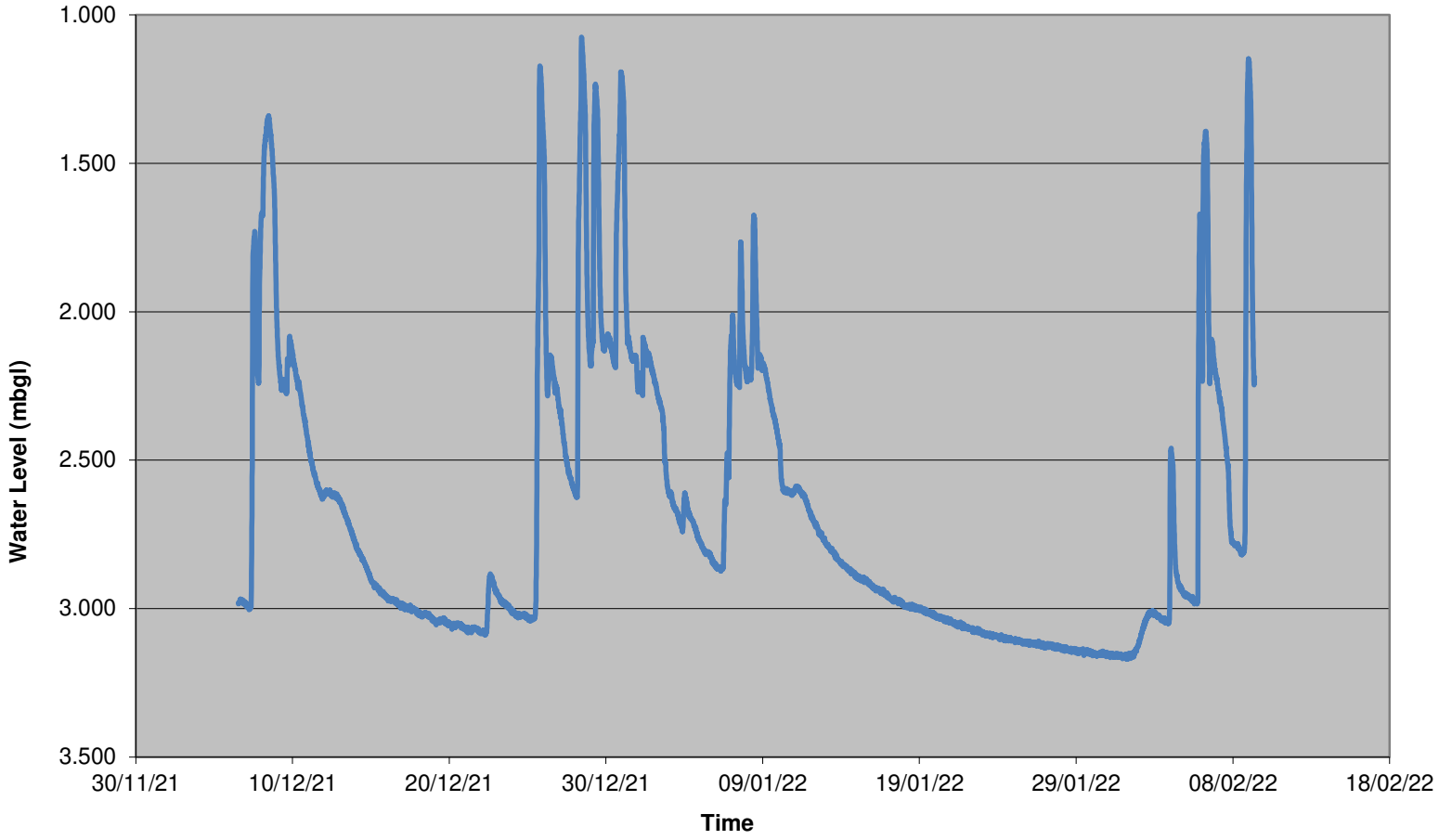

23560 - TPR-BH-013 - WSP Lot 3 - Ground Investigation Contract
2.100
2.600
3.100
3.600
4.100
4.600
Water Level (mbgl)
30/11/21
10/12/21
20/12/21
30/12/21
09/01/22
19/01/22
29/01/22
08/02/22
18/02/22
Time

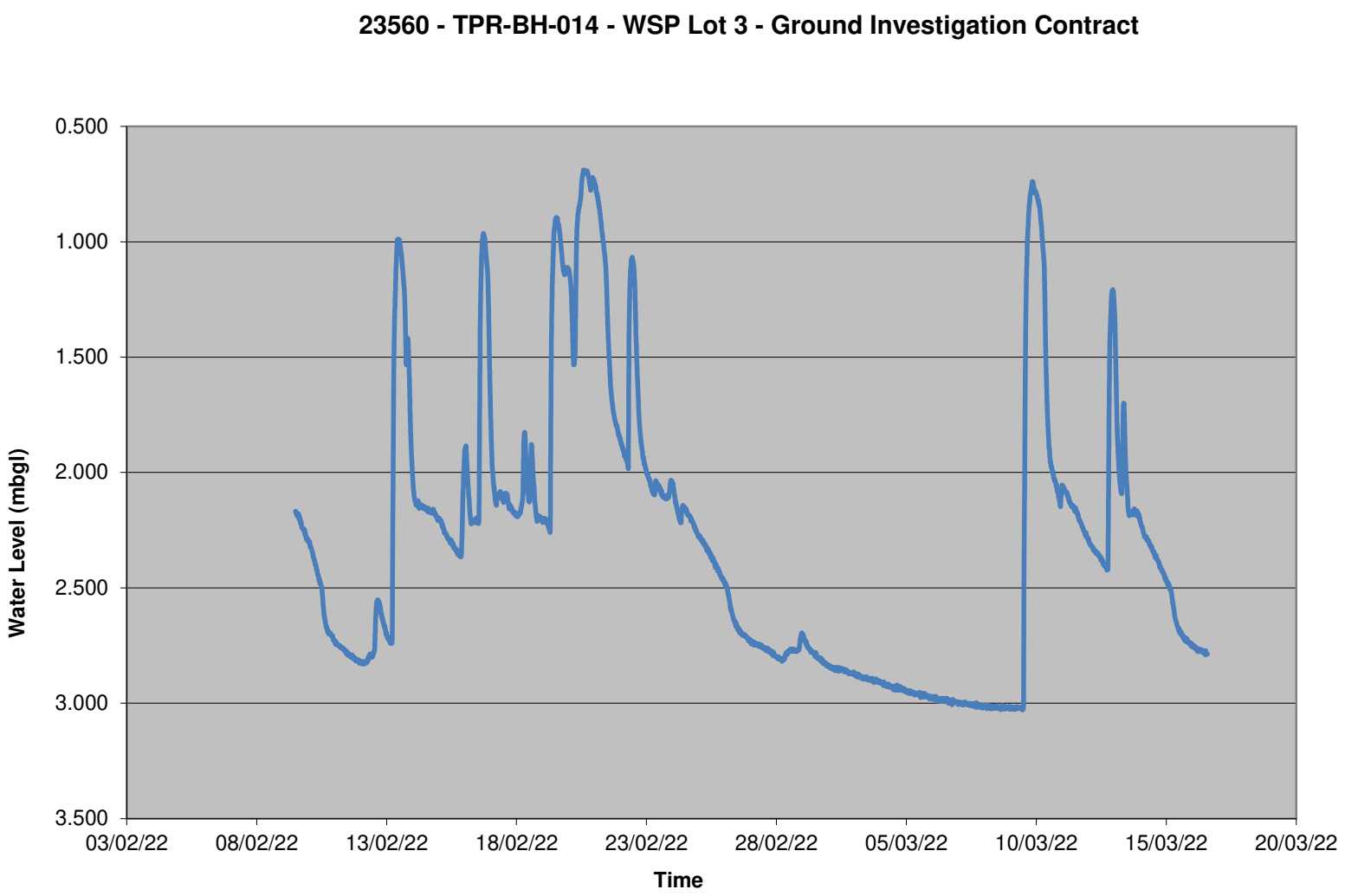

23560 - TPR-BH-013 - WSP Lot 3 - Ground Investigation Contract
1.500
2.000
2.500
3.000
3.500
4.000
4.500
Water Level (mbgl)
03/02/22
08/02/22
13/02/22
18/02/22
23/02/22
28/02/22
05/03/22
10/03/22
15/03/22
20/03/22
Time

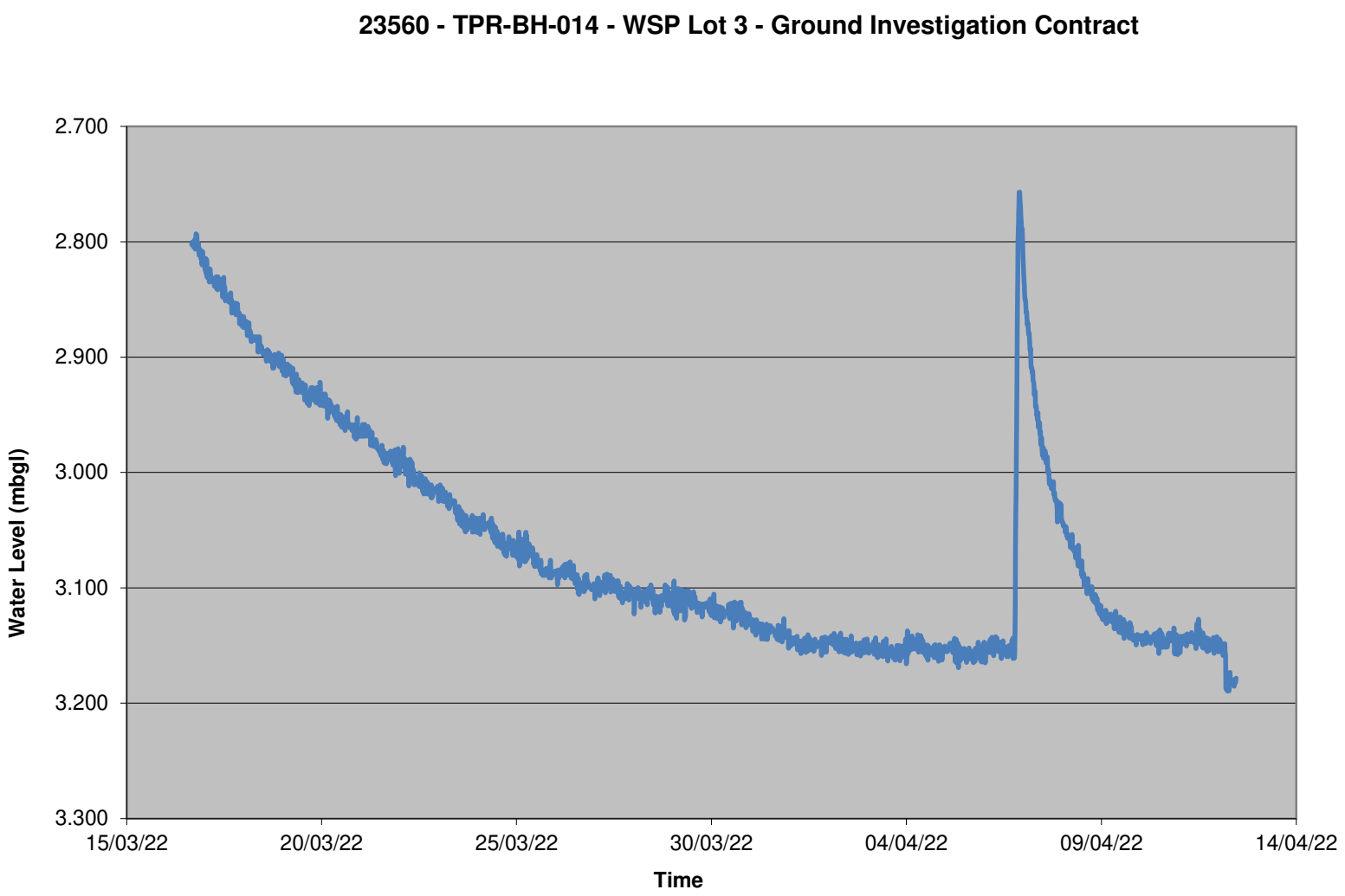

23560 - TPR-BH-013 - WSP Lot 3 - Ground Investigation Contract
Water Level (mbgl)
3.440
3.540
3.640
3.740
3.840
3.940
4.040
4.140
4.240
4.340
15/03/22
20/03/22
25/03/22
30/03/22
04/04/22
09/04/22
14/04/22
Time

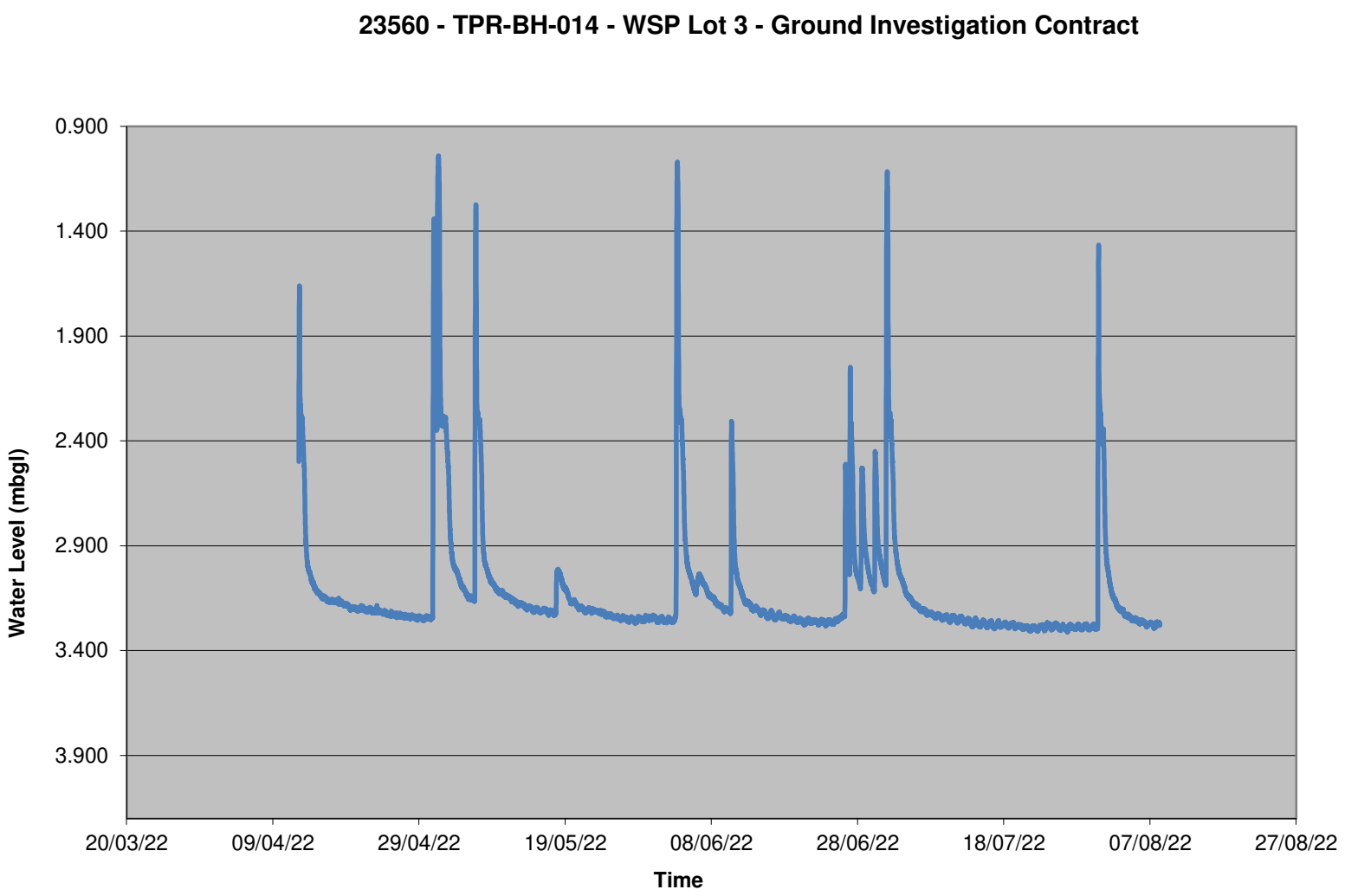

23560 - TPR-BH-013 - WSP Lot 3 - Ground Investigation Contract
4.200
4.250
4.300
4.350
4.400
4.450
Water Level (mbgl)
20/03/22
09/04/22
29/04/22
19/05/22
08/06/22
28/06/22
18/07/22
07/08/22
27/08/22
Time

TPR BH014
06-12-21 – 09-02-22
09-02-22 – 16-03-22
16-03-22 – 12-04-22
12-04-22 – 08-08-22


23560 - TPR-BH-014 - WSP Lot 3 - Ground Investigation Contract
1.000
1.500
2.000
2.500
3.000
3.500
Water Level (mbgl)
30/11/21
10/12/21
20/12/21
30/12/21
09/01/22
19/01/22
29/01/22
08/02/22
18/02/22
Time

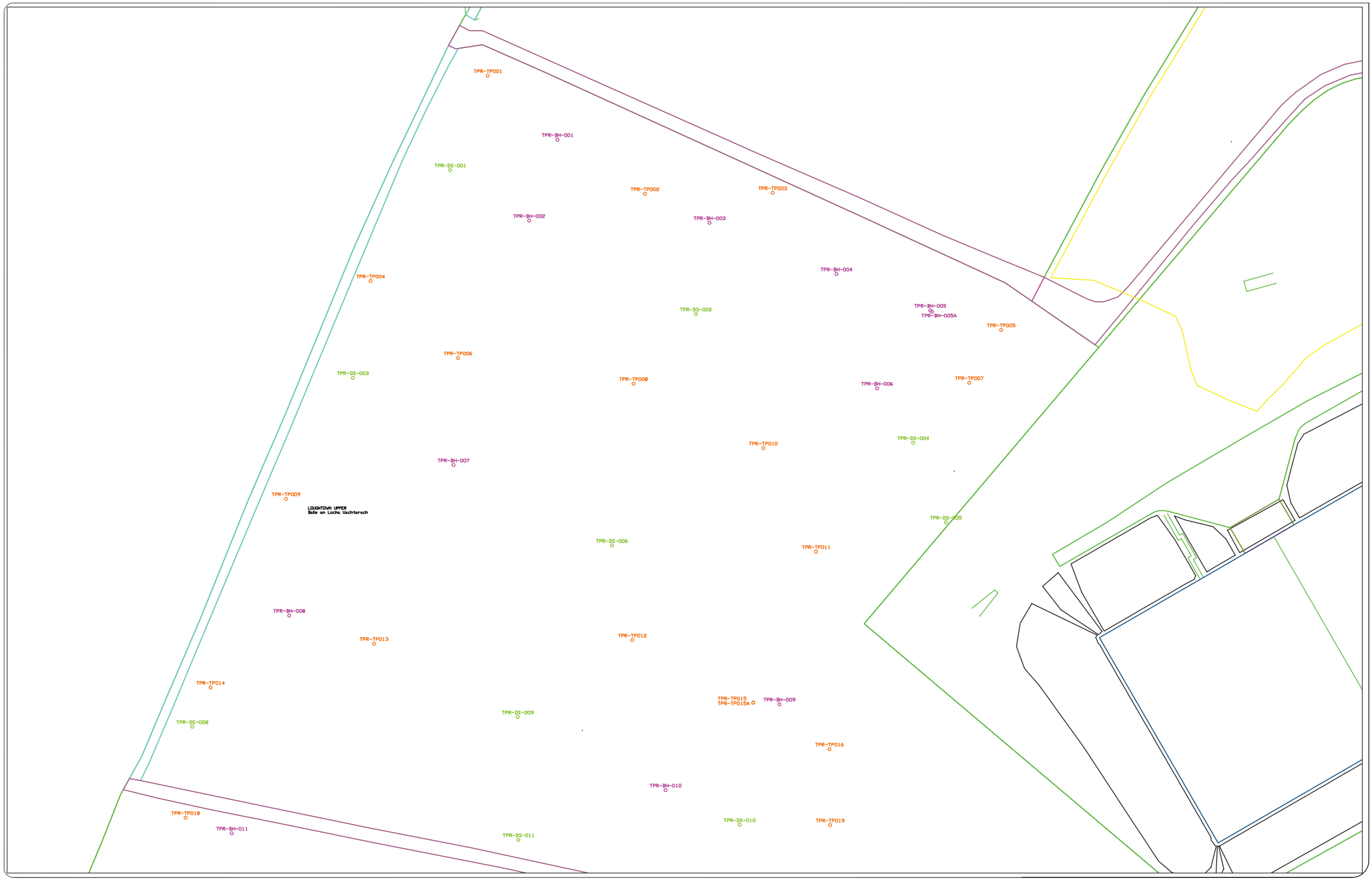

23560 - TPR-BH-014 - WSP Lot 3 - Ground Investigation Contract
0.500
1.000
1.500
2.000
2.500
3.000
3.500
Water Level (mbgl)
03/02/22
08/02/22
13/02/22
18/02/22
23/02/22
28/02/22
05/03/22
10/03/22
15/03/22
20/03/22
Time


23560 - TPR-BH-014 - WSP Lot 3 - Ground Investigation Contract
2.700
2.800
2.900
3.000
3.100
3.200
3.300
Water Level (mbgl)
15/03/22
20/03/22
25/03/22
30/03/22
04/04/22
09/04/22
14/04/22
Time


23560 - TPR-BH-014 - WSP Lot 3 - Ground Investigation Contract
0.900
1.400
1.900
2.400
2.900
3.400
3.900
Water Level (mbgl)
20/03/22
09/04/22
29/04/22
19/05/22
08/06/22
28/06/22
18/07/22
07/08/22
27/08/22
Time

Appendix 10K

Drawings



North

Site Location

Borehole Location

Dynamic Sample Borehole Location

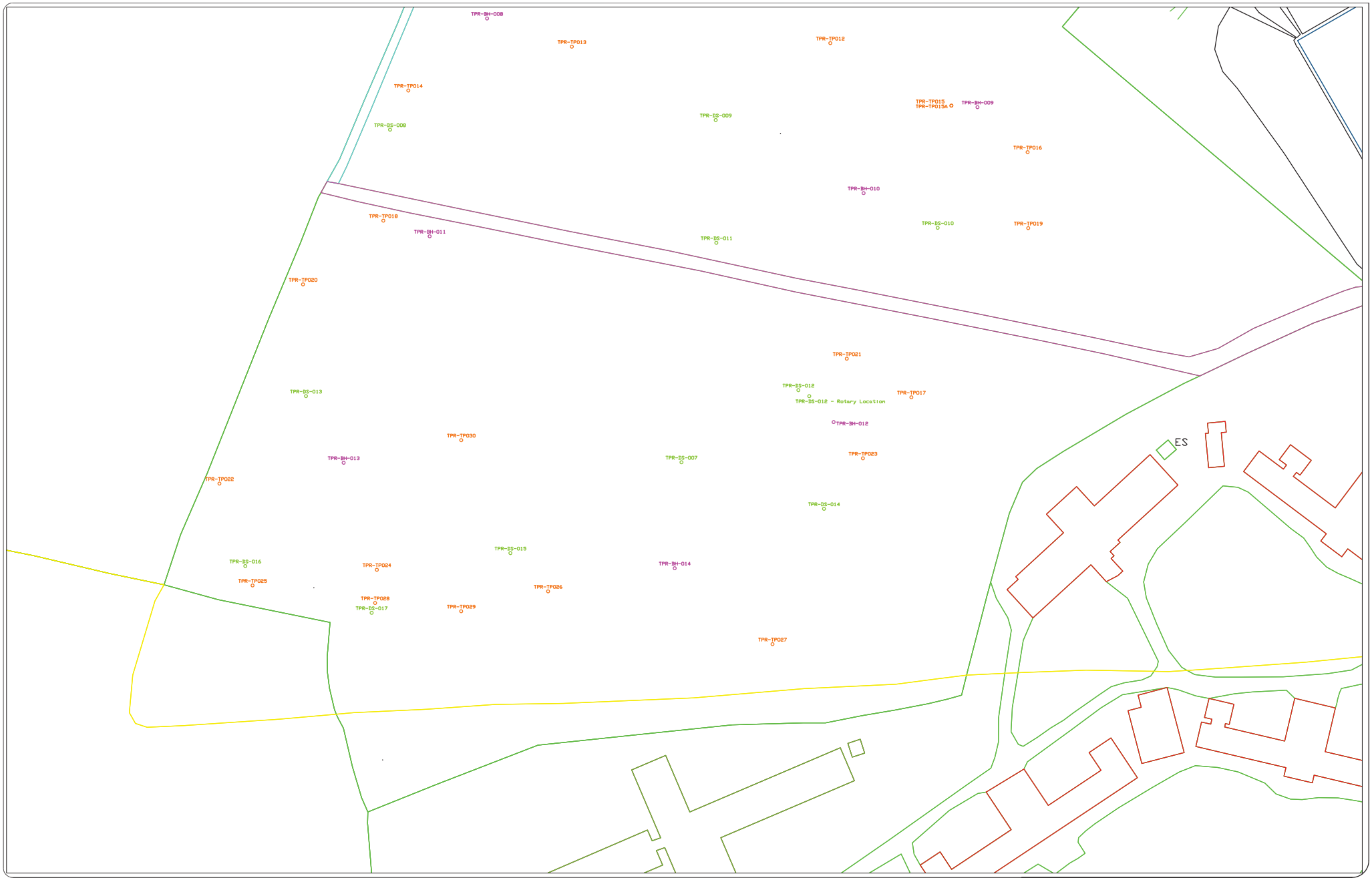
Trial Pit Location

IGSL Limited
Unit 7 M7 Business Park, Naas, Co.Kildare
Tel: 045 846 176 Fax: 045 846 187
E-mail: info@igsl.ie

SITE INVESTIGATION & GEOTECHNICAL SPECIALISTS

Rev	By	Date	Description
0	CK	20/07	Layout Plan

Project:	WSP Lot 3				
Component:	Preliminary Ground Investigation				
Title:	Location Plan				
Designed:	CK	Date: 20/07	File Name: 23560	Drawing No:	
Drawn:	CK	Date: 20/07	Original Scale: 1:1000 @A3	23560-000-101	
Checked:	JL	Date: 20/07	Date: 20/07/2022		



North

Site Location

Borehole Location

Dynamic Sample Borehole Location

Trial Pit Location

IGSL Limited
Unit 7 M7 Business Park, Naas, Co.Kildare
Tel: 045 846 176 Fax: 045 846 187
E-mail: info@igsl.ie

SITE INVESTIGATION
&
GEOTECHNICAL SPECIALISTS

Rev	By	Date	Description
0	CK	20/07	Layout Plan

Project:	WSP Lot 3				
Component:	Preliminary Ground Investigation				
Title:	Location Plan				
Designed:	CK	Date:	20/07	File Name:	23560
Drawn:	CK	Date:	20/07	Original Scale:	1:1000 @A3
Checked:	JL	Date:	20/07	Date:	20/07/2022

Drawing No:
23560-000-102

Appendix 10L

Digital Data (AGS)