Measured and Derived Geotechnical Parameters and Final Results

Golfe du Lion Geotechnical Site Investigation Est (Z4) | Mediterranean Sea

F254727-REP-002 04 | 17 October 2025

IFE

Direction Générale de l'Énergie et du Climat – DGEC

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Client Address	Tour Séquoia 1 place Carpeaux 92055 LA DÉFENSE CEDEX
Client Contact	Jérôme MINVIELLE

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Project Team

Initials	Name	Role
SPO	Stanislas Po	Project Manager
JPI	Julien Pitel	Client Deliverables Manager
KJL	Kah Jun Lee	Senior Geotechnical Engineer
MRI	Mira Richa	Reporting Manager
LTO	Lou Torcq	Geotechnical Engineer
TLG	Tilio Le Guilly	Geotechnical Engineer

FUGRO
Fugro France SAS
Work & Share
3-5 Boulevard des Bouvets
92000 Nanterre
France

Direction Générale de l'Énergie et du Climat – DGEC
Tour Séquoia 1
Place Carpeaux
92055 Paris La Défense Cedex
France

17 October 2025

Attention: Jérôme MINVIELLE

Dear Mr MINVIELLE

Please find below the interim Measured and Derived Geotechnical Parameters and Final Results. It was prepared by Mira Richa and Tilio Le Guilly under the supervision of Kah Jun Lee, in accordance with Call-Off n° 1406589329 between Direction Générale de l'Énergie et du Climat – DGEC and Fugro France SAS.

The final version of this report will be issued when the onshore laboratory testing is completed. If you have any questions in the meantime, please do not hesitate to contact us.

Thank you for the opportunity to participate in this project.

Yours sincerely



Mira Richa
Geotechnical engineer

Reporting Structure

Operational Report

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Executive Summary

Introduction

Direction Générale de l'Énergie et du Climat – DGEC contracted Fugro France to carry out a geotechnical site investigation and provide ground information at the floating windfarm locations of the development area in Golfe du Lion Ouest (Z3), Est (Z4) and Centre (Z5), France. Fieldwork was performed from the MV Fugro Quest from 11 January to 27 January 2025.

This report details the measured and derived geotechnical parameters and final results for the investigated locations in Golfe du Lion Est (Z4). It presents:

1. A description of the geotechnical site investigation;
2. Geotechnical logs and descriptions of the soil strata;
3. Results of the in situ testing, sampling, and laboratory testing;
4. Positioning and water depth measurements.

Fieldwork

Table S.1 shows the number of test locations.

Table S.1: Summary of test locations

Test Type	Total No. of Test Locations	No. of Retest Locations
Downhole Mode		
Composite Borehole (sampling/CPT)	1	0
Sampling Borehole	4	0
Notes CPT = Cone penetration test		

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Abbreviations

BHA	Bottom-hole assembly
BSF	Below seafloor
CID	Consolidated isotropically drained triaxial
CIU	Consolidated isotropically undrained triaxial
LAT	Lowest astronomical tide
MM	Maximum and minimum density
MV	Marine vessel
OCR	Overconsolidation ratio
PD	Particle density
PI	Plasticity index
PP	Pocket penetrometer

PSD	Particle size distribution
SB	Shear box
SRB	Sulphate reducing bacteria
TRT	Thermal resistivity test
TV	Torvane
UU	Unconsolidated undrained triaxial
UUr	Unconsolidated undrained triaxial remoulded
UTM	Universal Transverse Mercator
WIP	Wireline push

1. Project Information

1.1 Introduction

Direction Générale de l'Énergie et du Climat – DGEC contracted Fugro France to carry out a geotechnical site investigation and provide ground information at the floating windfarm locations of the development area in Golfe du Lion Ouest (Z3), Est (Z4) and Centre (Z5), France. Fieldwork was performed from the MV Fugro Quest from 11 January to 27 January 2025.

This report details the measured and derived geotechnical parameters and final results for the investigated locations in Golfe du Lion Est (Z4).

Plate 1.1 is a map showing the general location of the investigated area. Plate 1.2 is the detailed plan of the investigated locations for Golfe du Lion Est (Z4).

1.2 Scope of Report

This report presents:

1. A description of the geotechnical site investigation;
2. Geotechnical logs and descriptions of the soil strata;
3. Results of the in situ testing, sampling, and laboratory testing;
4. Positioning and water depth measurements.

1.3 Summary of Fieldwork

Table 1.1 summarises the fieldwork carried out during the site investigation. For full details, see Operational Report (Fugro,2025).

Table 1.1: Summary of fieldwork

Location	Final Recovery [m BSF]	Sampling and Testing Details
Z4_OWF_BH01-SAMP	20.40	22 WIPs
Z4_OWF_BH05-SAMP	20.45	21 WIPs
Z4_OWF_BH15-COMP	21.07	07 WIPs and 06 CPTs
Z4_OWF_BH16-SAMP	20.60	23 WIPs
Z4_OWF_BH17-SAMP	20.35	21 WIPs

Notes
BSF = Below seafloor
CPT = Cone penetration test
WIP = Wireline push sample

1.4 Data Sources

The data used in the preparation of this report were obtained during the offshore site investigation, which included laboratory testing, and the subsequent onshore laboratory test programme.

1.5 Geodetic Data

Appendix E summarises the borehole coordinates and water depths of the investigated locations. The coordinates presented in these positioning reports are the calculated location coordinates. Coordinates for all boreholes are expressed using the Universal Transverse Mercator (UTM) projection 31 N, World Geodetic System 1984, International Spheroid, with a central meridian of 3° east.

Measured water depths were reduced to the Lowest astronomical tide (LAT) based on chart datum FR Bathyelli.

The user must consider the accuracy of all measurements, particularly where use may differ from original intentions. For example, water depths presented are indicative only and should not be used for design purposes, such as estimating current or wave forces on platforms.

1.6 Guidelines on Use of Report

Appendix A outlines the limitations of this report in terms of a range of considerations including, but not limited to, its purpose, its scope, the data on which it is based, its use by third parties, possible future changes in design procedures and possible changes in the conditions at the site over time. It represents a clear exposition of the constraints which apply to all reports issued by Fugro. It should be noted that these guidelines do not in any way supersede the terms and conditions of the contract between Fugro and DGEC.

2. Geotechnical Description and Profiles

2.1 Introduction

This section presents geotechnical logs for the Golfe du Lion Est (Z4). Based on laboratory test results and in situ test data, the logs indicate measured and inferred:

- Sample and cone penetration test (CPT) depths;
- Soil layering, including classifications of undrained shear strength (s_u) in fine-grained cohesive soils;
- Measured (s_u) values from strength tests;
- Interpreted (s_u) from CPT data;
- Relative density (D_r) interpreted from CPT data;
- Measured water content, unit weight (γ), plasticity index (PI) and particle size distribution (PSD) data;
- Carbonate content and organic matter results.

Plate 2.1 defines the symbols and terms used in the geotechnical logs.

2.2 Interpretation of Undrained Shear Strength from In situ Tests

In fine-grained cohesive (clay) soils, undrained shear strength (s_u) was interpreted from CPT data using Equation 2.1.

$$s_u = q_n / N_{kt}$$

Equation 2.1

Where:

s_u = Inferred undrained shear strength [kPa]
q_n = Net cone resistance [kPa]
N_{kt} = Empirical factor relating cone resistance to undrained shear strength

Cone factor (N_{kt}) values of 15 and 20 were adopted to infer the s_u profiles presented in the geotechnical logs. Appendix B further details the methods used to infer q_n from CPT data.

2.3 Interpretation of Relative Density from Cone Penetration Tests

The relative density of coarse-grained cohesionless soils was estimated using the relationship proposed by Jamiolkowski et al. (2003), and presented in Equations 2.2 and 2.3.

$$D_r(dry) = \frac{1}{0.0296} \cdot ln\left[q_c \Big/ 2.494 \cdot \left[\frac{\sigma'_{v0} \cdot \left[\frac{1 + 2 \cdot K_0}{3} \right]}{100} \right]^{0.46} \right]$$

Equation 2.2

$$D_r(saturated) = \left[\frac{-1.87 + 2.32 \cdot ln\frac{1000 \cdot q_c}{(100 \cdot \sigma'_{v0})^{0.5}}}{100} + 1\right] \cdot D_r(dry)$$

Equation 2.3

Where:

D_r (dry) = Estimated relative density [%]
D_r (saturated) = Estimated saturated relative density [%]
q_c = Measured cone resistance [MPa]
σ'_{v0} = Vertical effective overburden stress [kPa]
K_0 = Coefficient of lateral earth pressure

The sensitivity of inferred relative density to changes in estimated horizontal stress can be evaluated using Jamiolkowski et al.'s (2003) chart, which presents a relationship between relative density, cone resistance and mean effective stress. Values of K_0 of 0.5 and 1.0 were used to estimate the relative density D_r (saturated) presented in the borehole logs.

2.4 Discussion of Results

Plates 2.2 to 2.11 present geotechnical logs for the tested locations. The soil profiles shown are based on analysed CPT data, visual descriptions of recovered samples, and the results of offshore and onshore laboratory testing. Sections 2.2 and 2.3 outline the methods used to interpret the CPT results.

Soil descriptions are based on BS 5930:2015+A1:2020 (BSI, 2015a), ISO 14688-1:2017 (ISO, 2017a) and ISO 14688-2:2017 (ISO, 2017b). The limits of consistency in predominantly cohesive soils follow BSI 5930:2015+A1:2020, and in predominantly coarse-grained soils Lambe and Whitman (1969). Appendix C details the limits of consistency used.

The description of the carbonate content presented on the geotechnical logs was carried out in accordance with ISO 14688-1:2017 (ISO, 2017a) and ISO 14688-2:2017 (ISO, 2017b). A first qualitative determination was done during sample description by the application of droplets of dilute hydrochloric acid (10% HCl). Some specific samples were then selected to perform carbonate content determination during onshore laboratory testing phase. Modifications to the carbonate content description of the soil were carried out according to the results of the tests performed onshore.

The description of the organic matter presented on the geotechnical logs was carried out in accordance with ISO 14688-1:2017 (ISO, 2017a) and ISO 14688-2:2017 (ISO, 2017b) following onshore laboratory testing phase.

Modifications on main soil types and secondary fractions were carried out on the log descriptions based on particle size distribution test and plasticity index results. In case of a discrepancy between these test outcomes, priority is given to the plasticity index results, as it determines the main soil behaviour. In accordance with ISO 14688-1:2017 (ISO, 2017a), the intermediate terms of "silty CLAY" or "clayey SILT" are used for material that is borderline in behaviour between clay and silt.

Soil strength classifications are based on the results of soil strength tests, advanced laboratory strength tests, and interpreted CPT data. Consistency was assessed in the field following ISO 14688-1:2017 (ISO, 2017a) and BS 5930:2015+A1:2020 (BSI, 2015a). Terms of s_u always take precedence when considering the strata described and should not be confused with consistency. Consistency and s_u of the soil are not directly comparable; large differences between the two can be due to several factors, including soil fabric, sample quality and moisture content. Consistency descriptions are not included in the geotechnical logs as they are more applicable to individual samples than to an entire soil layer.

CPT cone resistance may be influenced by the material ahead of and behind the penetrating cone. The cone starts to sense a change in strata type before it reaches the new material and continues to sense a past strata material even after entering a new one. Consequently, the CPT does not always measure accurately the in situ mechanical properties in thin soil beds.

The distance over which the cone senses an interface decreases with material stiffness. Narrow soft strata layer less than 100 mm thick can be fully detected by cone resistance, whereas stiff strata layers may need to be at least 750 mm thick for cone resistance to reach its full value (Lunne et al., 1997). The CPT will detect stiff strata layers, but their strength could be underestimated if the layer under investigation is less than 750 mm thick. This effect scales when using cones of a larger diameter (Lunne et al., 1997).

With reference to the above and using engineering judgement, sublayer behaviour (drained or undrained) was assigned during CPT processing and geotechnical log drafting. Where sublayers were assigned a behaviour different to the main layer behaviour, the thickness and stiffness of the layer and its effect on the CPT cone should be considered when deriving representative engineering profiles.

3. In Situ Test Data

3.1 Introduction

Six (6) successful downhole CPTs were completed in one (1) composite geotechnical borehole using the Fugro WISON® MkIV system.

See Operational Report (Fugro,2025) for details of the testing systems and equipment used.

3.2 Cone Penetration Tests

3.2.1 Downhole Cone Penetration Tests

Cones with a projected area of 10 cm^2 and a 5 tonnes capacity (CP10 cones) were used for the testing, and pore pressure measurements were made on the shoulder of the cone. Corresponding net area ratio of the cone, alpha (α) and net area ratio of the friction sleeve, beta (β) values for the cones used were respectively 0.75 and 0.

The Fugro SEACLAM® seabed reaction frame provided a reaction weight of approximately 10 tonnes for the tests.

Digital signals from the cones transmitted from the seabed unit and stored for subsequent computer processing included:

- Penetration;
- Cone resistance (q_c);
- Sleeve friction (f_s);
- Pore-water pressure (u).

Zero readings were taken on deck before and after each test and monitored to ensure that the cone channels did not drift beyond acceptable limits during the test. The zero readings taken at the start and end of the test were absolute values of pressure expressed as MPa.

Hydrostatic offsets were applied to the cone readings before penetration started and the values presented are relative to seabed.

Tests were terminated at the operator's discretion, taking into account the total thrust applied to the cone, the tip resistance, and the soil conditions.

Cones used in this project were calibrated before mobilisation in Fugro's onshore laboratory in Nootdorp, the Netherlands. Table 3.1 summarises the test numbers, depth ranges, and cones used for the tests; Plates 3.1 to 3.9 present the cone calibration certificates.

Table 3.1: Summary of downhole cone penetration tests

Location	CPT Number	Depth Range [m BSF]	Cones Used
Z4_OWF_BH15-COMP	CPT01 - CPT06	0.0 - 21.07	CP10-1706-2404

Notes
CPT = Cone penetration test
BSF = Below seafloor

3.2.2 Test Results

Plates 3.10 to 3.14 show the results of the CPTs. Two plots and one table are presented:

- The first plot presents the measured (q_c, f_s and u) and derived parameters (q_n, q_t, B_q, f_t, R_f, R_{ft}) obtained during the tests;
- The second plot presents the normalised (Q_{tn}, Q_t and F_r) and classification parameters (I_c, I_{SBT}, γ, S_u, D_r);
- A summary table presents the zero loads of the cone before and after each test, and the subsequent amount of drift as per ISO 19901-8:2014 (ISO, 2014a).

3.2.3 Discussion of Cone Penetration Test Results

The CPT results obtained during the geotechnical site investigation were generally of good quality and characterised the in situ soil conditions when compared with recovered samples and adjacent CPT locations. The hydrostatic offsets measured before the start of each test were monitored to ensure that the measured value was within acceptable limits of the theoretical value.

The zero readings taken on deck before and after each test did not drift beyond acceptable limits during the test. Good results were observed at all tested locations. All tests satisfied the requirements for Class 1 based on the zero drift test classifications outlined by ISO 19901-8:2014 (ISO, 2014a).

3.3 Operational Issues

The in-situ testing operations were completed successfully without any significant challenges.

3.4 Practice for Cone Penetration Testing

Table 3.2 summarises the specifications of the CPT equipment used.

Table 3.2: Practice for cone penetration testing

Test Control	
General Procedure	According to ISO 19901-8:2014 (ISO, 2014a) Refer to document titled Cone Penetration Test (Appendix B)
Metrological Confirmation	According to ISO 10012:2003 (ISO, 2003) (Appendix B)
Target Application Class	Class 1 or Class 2 in accordance with ISO 19901-8:2014 (ISO, 2014a)
Test Termination	Refer to document titled Cone Penetration Test (Appendix B)
Downhole Cone Penetration Testing Apparatus	
Thrust Machine	Fugro WISON® MkV
Mounting of Thrust Machine	Fixed
Reaction Equipment	Fugro SEACLAM® MkII
Push Rods	3.0 m (CP10)
Push Rod Casing	Stainless steel
Penetrometer Type	CP10 (10 cm^2) piezocone
Communication	Fibre optic
Test Results	
Data Processing and Management	Discovery, GeoVisual, Topaz
Depth Reference Level	Seabed
Water Depth Reference	LAT
Notes LAT = Lowest Astronomical Tide	

4. Sampling Data

4.1 Overview

Ninety-four (94) downhole wireline push (WIP) samples were taken from four (4) sampling and one (1) composite geotechnical boreholes.

Plates 4.1 to 4.94 presents the photographs of the acquired samples. Plates 4.95 to 4.102 summarise the samples acquired during the fieldwork, the testing performed offshore and the scheduled onshore testing.

4.2 Downhole Samples

Table 4.1 summarises the downhole sampling and coring equipment used during the fieldwork.

Table 4.1: Sampling equipment

Sampler Type	Inside Diameter D_1 [mm]	Outside Diameter D_2 [mm]	Inside Diameter D_3 [mm]	Wall Thickness [mm]	Tube Length* [mm]	Sample Length* [mm]	Rate of Penetration† [mm/s]
Thin-walled 3″ tube	72.0	76.0	72.0	2.0	1028.0	950.0	20.0
Thick-walled 3″ tube	72.0	80.0	72.0	4.0	1028.0	950.0	20.0
Thick-walled 2″ tube	53.0	60.3	53.1	3.6	1028	950	20.0

Notes
D_1 = Inside diameter of cutting shoe
D_2 = Greatest outside diameter of sample tube and/or cutting shoe
D_3 = Inside diameter of flush portion of sample tube or liner
* = Stated manufactured length. If cutting edge becomes blunted during sampling process, tubes may be trimmed to sharpen it

4.2.1 Downhole Piston and Push Samples

Most of the downhole push samples were taken using Fugro's wireline WIPSAMPLER in combination with seamless 3″ WIP thin-walled tubes. To prevent buckling, 2″ and 3″ WIP thick-walled tubes were used where dense to very dense sand soils (2″ tubes) or very high strength clay soils (3″ tubes) were expected. In cohesionless material, a core catcher was used in conjunction with the 3″ WIP thin-walled and 2″ WIP thick-walled tubes to prevent the sample from slipping out of the tube during recovery to deck.

A core catcher was used with thin-walled 3″ (72 mm) and thick-walled 2″ (53 mm) tubes in cohesionless material, to prevent the sample from slipping out of the tube during recovery to deck. The thick-walled 2″ (53 mm) tube was only used for dense cohesionless material. The

sample tube was pushed into the soil at a constant rate of 20 mm/s using the reaction obtained by clamping the drill pipe at seafloor with the Fugro SEACLAM® system.

4.3 Operational Constraints

The sampling was completed successfully without any major challenges.

Table 4.2 lists the operational issues in chronological order.

Table 4.2: Summary of operational issues: sampling tests

Location	Depth [m BSF]	Test No.	Description
Z4_OWF_BH01-SAMP	6.5	W08	Short recovery and cuttings (gravels) present. Retest at the same depth
Notes BSF = Below seafloor			

4.4 Practice for Sample Handling

Immediately after recovery, the samples were extruded from their tubes and visually described. In clay, some sections were first selected for intact preservation for further testing in onshore laboratory. Some basic index tests were performed based on this visual description, including moisture content determination, bulk and dry density determination, index strength tests (pocket penetrometer, torvane) and thermal resistivity tests in shallow sediments up to 6 m BSF. Additional tests included unconsolidated undrained triaxial and sulphate reducing bacteria tests. Any remaining lengths are preserved in bags.

In coarse grained soil, basic tests included moisture content determination and bulk and dry density determination. Any remaining lengths are preserved in bags.

All soil samples were stored in a reefer container at 7°C.

Full visual descriptions were made of the recovered samples in accordance with BS 5930:2015+A1:2020 (BSI, 2015), ISO 14688-1:2017 (ISO, 2017a) and ISO 14688 2:2017 (ISO, 2017b) and Munsell Color (2009).

Tables 4.3 summarises the procedures for sample handling.

Table 4.3: Practice for handling seabed samples

Stage	Process	Description
Initial sample handling	Initial handling	Detach sample tube from WIPSAMPLER
	Push samples	Transfer to site laboratory
Site geotechnical laboratory	Push samples	■ Extrude sample from sample tube ■ Measure recovery ■ Photograph sample ■ Make visual geotechnical description of sample

Stage	Process	Description
		■ Test soil where appropriate (e.g. water content, unit weight, pocket penetrometer, torvane, fall cone, reaction to 10 % hydrochloric acid) ■ Thermal resistivity tests (TRT) to be conducted at frequency agreed on board according to procedure defined in Fugro document F254727-TN-002 02 (Fugro, 2024a) ■ Sulphate reducing bacteria (SRB) measurement was conducted at frequency agreed on board according to protocol defined in Fugro document F254727-TN-003 02 (Fugro, 2024b)
Sample protection	Packaging of disturbed material (bag subsamples)	■ Pack disturbed material in double bulk bags ■ Label each bag
	Packaging of undisturbed material (wax subsamples)	■ Wrap in cling film (add label) ■ Wrap in aluminium foil ■ Insert in cardboard tube (add label) ■ Add wax to seal sample in tube ■ Insert waxed sample into inflatable packaging (add label)
Onboard sample storage	n/a	■ Samples stored in a reefer container
Sample transport	n/a	■ Pack samples into wooden crates and strap to pallet ■ Wrap pallets in heavy-duty shrink film
Notes n/a = Not applicable		

5. Laboratory Test Data

5.1 Introduction

Laboratory tests were carried out in accordance with the standards listed in Appendix D where it is also noted which tests are accredited. The results relate only to the samples tested and are considered to be representative of those samples.

The summary of laboratory test results sheets (Plates 5.1 to 5.14) present tabulated results from the offshore and onshore laboratory testing.

Table 5.1 summarises the performed tests offshore and onshore according to the soil type and the preservation condition necessary for the tests to be performed.

Table 5.1: Summary of offshore and onshore laboratory tests

Tests	Soil Type	Sample Type	Condition
Offshore			
Index soil strength pocket penetrometer (PP) & torvane (TV)	Cohesive soil	-	Undisturbed
Moisture content & bulk density	Cohesive and cohesionless soil	-	Disturbed
Unconsolidated undrained triaxial (UU)	Cohesive soil	-	Undisturbed
Thermal resistivity test (TRT)	Cohesive and fine cohesionless soil - non gravelly	Performed in Shelby tube immediately after sampling	Undisturbed
Sulphate reducing bacteria (SRB)	Cohesive and cohesionless soil	-	Undisturbed
Onshore			
Plasticity index (PI)	Cohesive soil	Wax/Bag	Undisturbed/Disturbed
Particle size distribution (PSD)	Cohesive and cohesionless soil	Wax/Bag	Disturbed
Particle density (PD)	Cohesive and cohesionless soil	Wax/Bag	Disturbed
Maximum and minimum density (MM)	Cohesionless soil	Bag	Disturbed
Incremental loading oedometer	Cohesive soil	Wax	Undisturbed
Permeability in permeameter (constant head method)	Cohesive and cohesionless soil	Wax/Bag	Disturbed, recompacted

Tests	Soil Type	Sample Type	Condition
Permeability in triaxial cell (constant head method)	Cohesive soil	Wax	Undisturbed
Unconsolidated undrained triaxial (UU)	Cohesive soil	Wax	Undisturbed
Unconsolidated undrained triaxial remoulded (UU_r)	Cohesive soil	Bag (when UU done offshore) / remoulded from Wax (when UU done onshore)	Disturbed
Consolidated isotropically drained triaxial (CID)	Cohesionless soil	Bag	Disturbed, recompacted
Consolidated isotropically undrained triaxial (CIU)	Cohesive soil	Wax	Undisturbed
Shear box (SB)	Cohesionless soil	Bag	Disturbed, recompacted
Chemical tests	Cohesive and cohesionless soil	Wax/Bag	Undisturbed/Disturbed
Notes - = Not applicable			

Refer to the summary of laboratory test results for full sample descriptions. The geotechnical descriptions given in the individual test reports are indicative only of the specimens tested

5.2 Index Laboratory Tests

Basic index laboratory tests completed offshore on soils obtained during the site investigation included soil description, colour identification using Munsell Color (2009) charts, water content (w), unit weight (γ) and dry unit weight (γ_d), pocket penetrometer (PP), torvane (TV), unconsolidated undrained triaxial (UU)..

Decisions to perform PP and TV tests were based on soil type, soil strength, and gravel and shell fragments contents.

Except for Sulphate reducing bacteria (SRB) and Thermal resistivity tests (TRT), the test results are presented in the geotechnical logs (Plates 2.2 to 2.11) and the summary of laboratory test results sheets (Plates 5.1 to 5.14).

Further index tests were performed onshore. These include particle size distribution (PSD), plasticity index (PI), particle density (PD), maximum and minimum density (MM) and further UU triaxial tests.

5.2.1 Water Content and Wet and Dry Density Determination

Water content* (w) (also called moisture content) and unit weight (γ) were measured in representative samples from the investigated locations. Dry unit weight (γ_d) was then inferred from the measured γ and w content values.

The geotechnical logs (Plates 2.2 to 2.11) and the summary of laboratory test results sheets (Plates 5.1 to 5.14) present the individual test results.

5.2.2 Index Soil Strength

Index undrained shear strength (s_u) for cohesive soil samples was measured using PP and TV tests. The summary of laboratory test results sheets (Plates 5.1 to 5.14) present tables showing the individual test results. The geotechnical logs (Plates 2.2 to 2.11) present the individual test results graphically.

The results generally agree well with s_u derived from CPT data using cone factor values (N_{kt}) of 15 and 20.

5.2.3 Plasticity Index

Nine (9) liquid and plastic limit tests were conducted on selected specimens of fine-grained soils to assess plasticity. Plate 5.15 summarises the test results. Plate 5.16 presents the plasticity chart.

Most of the samples were classified as low to medium plasticity. Two (2) samples were non-plastic, as Table 5.2 shows. Non-plastic samples were determined by the possibility of rolling 3 mm threads according to ISO 17892-12:2018.

Table 5.2: Summary of non-plastic samples

Location	Sample	Depth [m]
Z4_OWF_BH01-SAMP	01-1	0.00
Z4_OWF_BH01-SAMP	17-2	15.65

5.2.4 Particle Size Distribution

Twenty-eight (28) sieve and twenty-four (24) sedimentation tests were conducted on selected samples to confirm the geotechnical descriptions made offshore. Plate 5.17 summarises the test results and plates 5.18 to 5.49 present the composite PSD curves.

The PSD results largely confirmed the descriptions made offshore; a few minor adjustments were made regarding the secondary soil constituent.

Variations might be noted between the PSD curves and the sample description, particularly concerning gravel content. In some PSD tests, gravel content is present where shells and shell fragments were visually described, in such cases, no modifications were made to the soil

* The terms 'water content' and 'moisture content' may both be used in this report depending on the terminology of the applicable standard.

description. Similarly, no changes were made where the soil description indicated a heterogeneous (lamination or pockets of clay) constitution, as the PSD test result would not be representative of the soil layer.

Where the fine fraction was <10% the sedimentation by pipette method was cancelled. Conversely where <10% dry mass was retained on a 2 mm sieve during wet sieving, the sieving was cancelled. In accordance with the ISO 17892-4 standard for PSD test, the laboratory has the flexibility to decide the appropriate sieve size according to the type of soil encountered, with the objective of ensuring continuity of the PSD grading curve. In this project, when the soil sample was assessed as containing high fine contents, only three sieve sizes were used for the coarse-grained fraction (sieves corresponding to coarse, medium and fine sand).

In total four (4) wet sieving and eight (8) sedimentation tests were cancelled.

5.2.5 Particle Density

PD tests were performed using the fluid pycnometer method. Twenty-three (23) PD tests were conducted on selected cohesionless and cohesive soil samples. Plate 5.50 summarises the test results.

Three (3) PD tests were repeated due to high values. Re-tests showed results within the expected range. Repeated tests are shown in Table 5.3.

Table 5.3: Repeated PD tests

Location	Sample	Depth BSF (m)
Z4_OWF_BH05-SAMP	02-1	1.00
Z4_OWF_BH15-COMP	04-1	9.50
Z4_OWF_BH16-SAMP	21-1	18.50
Notes BSF = Below Seafloor		

Values of particle density display average values of 2.70 Mg/m^3 for sand samples and 2.73 Mg/m^3 for clay samples. To be noted that clay samples were slightly sandy to sandy.

5.2.6 Maximum and Minimum Density

Six (6) MM tests were conducted on selected cohesionless soil samples. Plate 5.51 summarises the test results.

Tests were performed according to the methods developed by the Norwegian Geotechnical Institute (NGI) and Geolabs (NGI Geolabs, 2019a and 2019b). The method accepts a maximum of 12% fines. As a significant fines content was expected, based on soil descriptions, it was agreed with the Client to extend this maximum value to 20% and to identify test results that were performed on sample with more than 12% fines.

Two (2) MM samples were cancelled due to high fines content, higher than 20%.

One (1) test was performed on a batched sample due to insufficient material in borehole Z4_OWF_BH17-SAMP bags 07-1 + 07-2 at 5.50 m BSF. The batched bag samples were selected based on similar soil description and depth proximity.

5.3 Consolidation Tests

Oedometer tests to provide stress history, drained stiffness and time-dependent behaviour of the soils data under one-dimensional consolidation were carried out to assist engineering design. Undisturbed test specimens were loaded beyond their estimated pre-consolidation pressure (p'_c) to enable measurement of the actual p'_c and other settlement parameters. Casagrande's (1936) construction method were used to estimate p'_c.

5.3.1 Incremental Oedometer Tests

Six (6) undisturbed incremental oedometer tests were conducted on selected cohesive soil samples. Plate 5.52 summarises the results. Plates 5.53 to 5.58 show the individual results.

5.3.2 Sample Quality Assessments

The quality of the samples used in the consolidation tests is evaluated based on the changes in void ratio noted between the start of each test and at the estimated in situ effective overburden pressure (p'_0), as recommended by Lunne et al. (1998) and summarised in Table 5.4. The estimated overconsolidation ratio (OCR) is based on the ratio of the estimated p'_0 and p'_c.

Sample quality is very poor (vp) to poor (p) for all of the samples. The apparent deterioration in estimated sample quality may have been caused by stress relaxation rather than handling. In addition, despite plasticity index results classify the cohesive soil as clay, PSD indicate higher proportion of silt particles compared to clay particles. Also, significant sand content (between 10% and 20%) is noted in PSD tests performed in the vicinity of few oedometer tests (Z4-OWF_BH01-SAMP sample 17-4, Z4-OWF_BH15-SAMP sample 07-2 and Z4-OWF_BH17-SAMP sample 20-3). This could have affected the cohesion of the samples and therefore impacted the initial void ratio.

Table 5.4: Proposed criteria for evaluation of sample disturbance (after Lunne et al., 1998)

Overconsolidation Ratio	$\Delta e/e_0$			
	Very Good to Excellent	Good to Fair	Poor	Very Poor
1–2	< 0.04	0.04–0.07	0.07–0.14	> 0.14
2–4	< 0.03	0.03–0.05	0.05–0.10	> 0.10

5.4 Triaxial Tests

This section describes the following tests:

- Unconsolidated undrained triaxial (UU);
- Consolidated isotropically undrained triaxial (CIU);
- Consolidated isotropically drained triaxial (CID);

5.4.1 Unconsolidated Undrained Triaxial Tests

Six (6) UU tests were conducted offshore and seven (7) were conducted onshore. Six (6) UUr tests were carried out to help determine soil sensitivity. The geotechnical logs (Plates 2.2 to 2.11) present the test results. Plate 5.59 summarises the UU data performed offshore and plates 5.60 to 5.69 present the individual test results offshore. Plate 5.70 summarises the UU data performed onshore and plates 5.71 to 5.77 the individual test results onshore.

The UU results are considered to be representative of the soils tested. They agree well with the full range of index strengths measured, and with the s_u inferred from CPT data using cone factor values (N_{kt}) of 15 and 20.

Failure was taken at 20% axial strain unless the deviator stress peaked at a lower strain.

5.4.2 Consolidated Isotropically Undrained Triaxial Tests

Six (6) CIU triaxial tests were conducted on selected samples. Plates 5.78 summarises the test results and plates 5.79 to 5.138 present the individual results.

Samples were consolidated to a best estimate of their in-situ stress conditions, based on estimates of the overburden and lateral earth pressures. As per standard Fugro practice, CIU test failure is taken at 10% axial strain except where the peak deviator stress occurred at a lower axial strain.

The laboratory test results are considered to be representative of the soils tested and are within the expected range, based on estimates of the overburden and lateral earth pressures which the samples were prepared.

5.4.3 Consolidated Isotropically Drained Triaxial Tests

Seventeen (17) set-of-three CID tests were performed to assess soil behaviour under drained conditions. Plates5.139 to 5.141 5.139 to 5.141 summarises the test results and plates 5.142 to 5.279 present the individual results.

The test specimens were prepared to an initial dry density based on relative density and minimum and maximum dry density test results, if these were not available, dry density was calculated from dry density measured offshore. Alternatively, reconstituted samples are compacted to the maximum achievable density if the sand layer was defined with Dr higher than 80%.

The results include an effective apparent cohesion (c') and effective internal friction (ϕ') value based on best-fit line through the set-of-three test. However, the c' and ϕ' are dependent on the vertical stress and are not therefore constant values for the given soils type.

Four (4) tests showed high c' and ϕ' values as shown in Table 5.5. A contractive behaviour during shearing is observed (negative volumetric strain) in the tests performed to the maximum achievable density.

In Z4_OWF_BH05-SAMP sample 02-2, the sample was recompacted based on MM test results and considering a relative density of 95%. A contractive behaviour during shearing is also observed (negative volumetric strain) for this test.

While CIDs present a dilatant behaviour, this contractive behaviour would tend to confirm that these samples were more compacted than in situ conditions. Therefore, these results are likely not representative of the ground conditions.

Table 5.5: CID test results with high ϕ' and/or c'

Location	Sample	Depth BSF [m]	ϕ' [°]	c' [kPa]	Remarks
Z4_OWF_BH16-SAMP	05-1	3.00	56.5	0	Possibly due to an over-compaction as max achievable density was used.
Z4_OWF_BH16-SAMP	10-2	8.35	41.0	40	Possibly due to an over-compaction as max achievable density was used
Z4_OWF_BH17-SAMP	05-2	3.90	36.5	34	Sample over-compacted as the test was performed with a dry density of 1.78 Mg/m³ instead of the target dry density of 1.53 Mg/m³
Z4_OWF_BH05-SAMP	02-2	1.30	43.0	9	Sample over-compacted, values might be over-estimated
Notes BSF = Below Seafloor					

Five (5) tests were repeated due to high $\phi'$and c'. The re-tests showed values in the expected range. Two (2) tests continue to show a high ϕ' and c'. These repeated tests are shown in Table 5.6.

Table 5.6: Repeated CID tests

Location	Sample	Depth BSF [m]	ϕ' [°]	c' [kPa]
Z4_OWF_BH05-SAMP	08-2	7.30	33.5	3
Z4_OWF_BH05-SAMP	21-2	20.00	32.5	18
Z4_OWF_BH16-SAMP	05-1	3.00	56.5	0
Z4_OWF_BH17-SAMP	05-2	3.90	36.5	34
Z4_OWF_BH17-SAMP	18-1	16.50	33	0
Notes BSF = Below Seafloor				

5.5 Shear Box Tests

Twelve (12) set-of-three shear box (SB) tests were conducted using a soil–soil interface. Plate 5.280 to 5.281 summarises the test results and plates 5.282 to 5. present the individual results.

The test specimens are prepared to an initial dry density based on relative density and minimum and maximum dry density test results, if these were not available, dry density was calculated from dry density measured offshore. Alternatively, reconstituted samples are compacted to the maximum achievable density if the sand layer was defined with Dr higher than 80%.

The results include a c' and ϕ' value based on best-fit line through the set-of-three test. However, the c' and ϕ' are dependent on the vertical stress and are not therefore constant values for the given soils type.

The laboratory test results are considered to be representative of the soils tested and are within the expected range, based on the initial relative density to which the samples were prepared.

Three (3) tests show high effective apparent cohesion (c') and high effective internal friction ϕ' values as shown in Table 5.7. The use of the maximum achievable density may have resulted in an over-compaction, resulting in overestimated ϕ' and c' values. These results are to be considered with caution.

Table 5.7: SB test results with high ϕ' and/or c'

Location	Sample	Depth BSF [m]	ϕ' [°]	c' [kPa]	Remarks
Z4_OWF_BH01-SAMP	04-1	2.50	46.5	0.0	Possibly due to an over-compaction as max achievable density was used
Z4_OWF_BH17-SAMP	16-2	14.90	21.0	63.0	Possibly due to the presence of extremely closely to closely spaced thin to thick laminae of clay within a silty SAND as per offshore description
Z4_OWF_BH05-SAMP	20-1+20-2	18.00	33.0	42.5	Possibly due to an over-compaction as max achievable density was used
Notes BSF = Below Seafloor					

Six (6) tests were repeated due to high $\phi'$and c' values. The re-tests showed values in the expected range. One (1) sample continues to show a high c'. These repeated tests are shown in Table 5.8.

Table 5.8: Repeated SB tests

Location	Sample	Depth BSF [m]	ϕ' [°]	c' [kPa]
Z4_OWF_BH05-SAMP	10-1	9.00	39.0	9
Z4_OWF_BH15-COMP	04-3	10.10	39.0	6
Z4_OWF_BH16-SAMP	19-1	16.50	41.0	0
Z4_OWF_BH17-SAMP	02-1	1.00	34.5	11
Z4_OWF_BH17-SAMP	09-1	7.50	44.0	1
Z4_OWF_BH17-SAMP	16-2	14.90	21.0	63
Notes BSF = Below Seafloor				

One (1) test in borehole Z4_OWF_BH05-SAMP samples 20-1+20-2 at 18.00 m BSF was performed on a batched samples due to insufficient material. The batched bag samples were selected based on similar soil description and depth proximity.

5.6 Permeability Tests

Permeameter permeability tests measure the coefficient of permeability in sand and silty sand soil types and triaxial permeability tests measure the coefficient of permeability in undisturbed clay samples.

Permeability is calculated in accordance with Darcy's equation for laminar flow (ISO 17892-11:2019). Darcy's law applies to laminar (non-turbulent) flow conditions.

Darcy's law (Equation 5.1) states that the volumetric flow rate, *Q*, is proportional to: (1) the difference in hydraulic head along a length interval, l; (2) a coefficient *K* (hydraulic conductivity), which accounts for restriction to flow imposed by the solid medium and for the density and viscosity of the fluid flowing through the porous medium (i.e. water through sand); and (3) the cross-sectional area perpendicular to the flow direction:

$$Q = -K \frac{(h_2 - h_1)}{l} A$$ Equation 5.1

The hydraulic gradient i as shown in Equation 5.2 is the ratio between Δh which is the water elevations in the piezometers and l the distance between the piezometers.

$$i = \frac{(h_2 - h_1)}{l} = \frac{\Delta h}{l}$$ Equation 5.2

Darcy's law can therefore be expressed as Equation 5.3:

$$Q = -K\, i\, A$$ Equation 5.3

Plate 5.342 summarises the test results of all permeability tests.

5.6.1 Permeameter Permeability Tests

Five (5) permeameter tests were scheduled to measure the coefficient of permeability in sand and silty sand soil types. Plates 5.343 to 5.347 present the individual results.

The test specimens are prepared to an initial dry density based on relative density and minimum and maximum dry density test results, if these were not available, dry density was calculated from dry density measured offshore. Alternatively, reconstituted samples are compacted to the maximum achievable density if the sand layer was defined with Dr higher than 80%.

The laboratory test results are considered to be representative of the soils tested and are within the expected range, based on the initial relative density to which the samples were prepared.

In borehole Z4_OWF_BH17-SAMP bags 14-1+14-2 at 12.5 m BSF test was relocated due to high fines content.

5.6.2 Triaxial Permeability Tests

Four (4) triaxial permeability tests were conducted to measure the coefficient of permeability in undisturbed clay samples. Plates 5.348 to 5.359 present the individual results.

Samples were consolidated to a best estimate of their in situ stress conditions, based on estimates of the overburden and lateral earth pressures. The laboratory test results are considered to be representative of the soils tested and are within the expected range.

5.7 Thermal Resistivity Tests

Thermal resistivity tests were conducted to measure the capacity of the ground to conduct or to dissipate heat. A total of ten (10) tests were performed offshore.

TEMPOS Thermal Properties analyser package kit was used for offshore thermal conductivity tests.

Plates 5.360 to 5.364.364 summarise the tests performed offshore. Values of thermal resistivity vary between 0.474 (m.K)/W and 0.715 (m.K)/W.

5.8 Chemical Testing

Chemical testing is carried out at third-party laboratory. The results relate only to the samples tested and are considered to be representative of those samples.

Appendix D lists the laboratory testing standards and statements used for the chemical tests.

5.8.1 Carbonate Content

Twenty (20) tests were conducted on selected soil samples. Plate 5.365 summarises the test results.

The carbonate content of CO_2 measured ranged between 8.3 % and 16.0 %. A conversion is required to get the actual amount of calcium carbonate (% $CaCO_3$) present in the soil and is presented in Table 5.9. The carbonate content of $CaCO_3$ measured ranged between 18.9 % and 36.4 %.

With the $CaCO_3$ carbonate content, corresponding layers descriptions were updated accordingly as mentioned in section 2.4.

Variations might be noted between the carbonate content $CaCO_3$ and the sample description. In some tests, calcareous soil, shells and shell fragments were present in occasional amounts and visually described, in such cases, no modifications were made to the soil description.

Table 5.9: Summary of the $CaCO_3$ carbonate content converted from CO_2

Location	Sample	Depth BSF [m]	CO_2 [%]	$CaCO_3$ [%]
Z4_OWF_BH01-SAMP	05-2	3.90	8.3	18.9
Z4_OWF_BH01-SAMP	11-1	9.50	13.0	29.6
Z4_OWF_BH01-SAMP	16-3	15.05	14.0	31.8
Z4_OWF_BH01-SAMP	20-5	19.30	15.0	34.1
Z4_OWF_BH05-SAMP	01-1	0.00	14.0	31.8
Z4_OWF_BH05-SAMP	06-1	5.00	10.0	22.7
Z4_OWF_BH05-SAMP	12-1	10.50	13.0	29.6
Z4_OWF_BH05-SAMP	17-1	15.00	16.0	36.4
Z4_OWF_BH05-SAMP	19-1	17.00	15.0	34.1
Z4_OWF_BH15-COMP	01-1	1.50	14.0	31.8
Z4_OWF_BH15-COMP	03-1	8.50	13.0	29.6
Z4_OWF_BH15-COMP	06-1	17.00	13.0	29.6
Z4_OWF_BH16-SAMP	04-2	2.80	12.0	27.3
Z4_OWF_BH16-SAMP	09-2	7.35	12.0	27.3
Z4_OWF_BH16-SAMP	16-2	14.25	12.0	27.3
Z4_OWF_BH16-SAMP	23-1	20.00	13.0	29.6
Z4_OWF_BH17-SAMP	03-3	1.90	13.0	29.6
Z4_OWF_BH17-SAMP	07-3	6.10	13.0	29.6
Z4_OWF_BH17-SAMP	15-1	13.50	13.0	29.6
Z4_OWF_BH17-SAMP	19-2	17.75	8.4	19.1
Notes BSF = Below Seafloor				

5.8.2 Organic Content

Twenty (20) loss on ignition tests will be conducted to measure the organic content on selected soil samples. Plate 5.366 summarises the test results.

Eight (8) samples presented organic content higher than 6%, corresponding layers descriptions were updated accordingly as mentioned in section 2.4.

Values of organic content vary between 1.80 % and 11.00 %.

5.8.3 Chloride Content

Twenty (20) water soluble chloride tests were conducted on selected soil samples. Plate 5.367 summarises the test results. The chloride content ranges from 0.42% and 0.63%.

5.8.4 Sulphate Content and pH

Twenty (20) total sulphate content tests were conducted on selected soil samples. Plate 5.368 summarises the test results.

The sulphate content measured as total acid soluble sulphate (SO_4) ranges from 804 mg/l to 2330 mg/l and the pH ranges from 8.50 to 9.10.

5.9 Sulphate Reducing Bacteria test

A total of twenty-two (22) sulphate reducing bacteria tests were conducted offshore on selected soil samples and residual soil of weathered rock to determine the presence of sulphate reducing bacteria at approximately every 5 m and when presence of organic matter, along the borehole. Sig Sulphide ® SRB kits from Echa were used for these tests.

Test results are presented in Plates 5.369 to 5.390. Table 5.10 summarises the SRB tests qualitative interpretation after six days.

Table 5.10: Summary of SRB test results

Location	Sample	Depth BSF [m]	Qualitative interpretation – Day 6	SRB Concentration [SRB/ml]
Z4_OWF_BH01-SAMP	W06	5.00	Light Contamination	10-100
Z4_OWF_BH01-SAMP	W11	10.10	Moderate Contamination	1000-10000
Z4_OWF_BH01-SAMP	W16	15.10	Light Contamination	<10
Z4_OWF_BH05-SAMP	W01	0.30	Light Contamination	<10
Z4_OWF_BH05-SAMP	W06	5.50	Light Contamination	<10
Z4_OWF_BH05-SAMP	W12	11.00	Moderate Contamination	1000-10000
Z4_OWF_BH05-SAMP	W18	16.60	Light Contamination	<10
Z4_OWF_BH15-COMP	W01	2.65	Moderate Contamination	100-1000
Z4_OWF_BH15-COMP	W02	5.50	Light Contamination	<10
Z4_OWF_BH15-COMP	W04	9.50	Light Contamination	10-100
Z4_OWF_BH15-COMP	W05	13.50	Light Contamination	10-100

Location	Sample	Depth BSF [m]	Qualitative interpretation – Day 6	SRB Concentration [SRB/ml]
Z4_OWF_BH15-COMP	W06	17.00	Moderate Contamination	100-1000
Z4_OWF_BH16-SAMP	W01	0.10	Moderate Contamination	100-1000
Z4_OWF_BH16-SAMP	W07	5.00	Light Contamination	10-100
Z4_OWF_BH16-SAMP	W10	8.00	Light Contamination	10-100
Z4_OWF_BH16-SAMP	W13	11.40	Light Contamination	<10
Z4_OWF_BH16-SAMP	W18	15.40	Light Contamination	10-100
Z4_OWF_BH16-SAMP	W22	19.70	Light Contamination	10-100
Z4_OWF_BH17-SAMP	W02	1.10	Light Contamination	<10
Z4_OWF_BH17-SAMP	W07	6.20	Light Contamination	<10
Z4_OWF_BH17-SAMP	W13	12.00	Moderate Contamination	1000-10000
Z4_OWF_BH17-SAMP	W18	17.00	Light Contamination	<10

Notes
BSF = Below seafloor

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7. Symbols and Terms

Every effort is made to avoid duplication or inconsistency in the use of symbols and terms in this report. However, this is not always possible as some different terms are commonly represented by the same symbol; similarly, some terms have multiple representations.

For example, I_p and PI both mean plasticity index, and I_L and LI both mean liquidity index, while a can mean both acceleration and net area ratio of cone penetrometer, depending on the context.

Table 7.1 presents symbols and terms that may be used in this report.

Table 7.1: Symbols and terms

Symbol	Unit	Full Term or Definition
General		
A	m^2	Area
a	m/s^2	Acceleration
B	m	Width
D	m	Diameter
d	m	Depth
g	m/s^2	Acceleration due to gravity [g = 9.81 m/s^2]
h	m	Height or thickness
h_{sf}	m	Height of reference point above seafloor
i	-	Inclination
L	m	Length
ln	-	Natural logarithm
log	-	Logarithm base 10
m	kg	Mass
t	s	Time
V	m^3	Volume
v	m/s	Velocity
W	kN	Weight
w or MC	%	Moisture content
W50	-	WIP sample in sample tube of 50 mm internal diameter
W72		WIP sample in sample tube of 72 mm internal diameter
z	m	Penetration or depth below reference level (usually ground surface) or height above seafloor for drilling mode in situ probe zero reference readings
Stress Strain		
E	MPa	Modulus of linear deformation (Young's modulus)

Symbol	Unit	Full Term or Definition
E_u	MPa	Modulus of linear deformation (Young's modulus for undrained stress change)
E_d	MPa	Modulus of linear deformation (Young's modulus for drained stress change)
G	MPa	Modulus of shear deformation (shear modulus)
G_{max}	MPa	Shear modulus at small strain or initial (small strain) shear modulus
U	MPa	Pore-water pressure
u_0	MPa	Hydrostatic pore pressure relative to seafloor or phreatic surface
u_f	kPa	Pore-water pressure at failure
Δu	kPa	Change in pore-water pressure
$\Delta\sigma_v$	kPa	Change in total vertical stress
$\Delta\sigma'_v$	kPa	Change in effective vertical stress
ε	%	Linear strain
ε_1, ε_2, ε_3,	%	Principal strains
ε_{50}	%	Vertical strain at half the maximum deviator stress
ε_v	%	Vertical strain
ε_{vf}	%	Vertical strain at failure
γ	%	Shear strain
μ	-	Coefficient of friction
ν	-	Poisson's ratio
ν_u	-	Poisson's ratio for undrained stress change
ν_d	-	Poisson's ratio for drained stress change
σ	kPa	Total stress
σ'	kPa	Effective stress
σ_1, σ_2, σ_3	kPa	Principal stresses
σ'_h	kPa	Effective horizontal stress
σ'_{h0}	kPa	In situ horizontal effective stress
σ'_v	kPa	Effective vertical stress
σ_{v0}	kPa	Total vertical stress relative to ground surface or phreatic surface
σ'_{v0} or p'_0	kPa	In situ vertical effective stress
σ'_{vc}	kPa	Vertical effective consolidation stress
σ'_r	kPa	Radial effective stress
τ	kPa	Shear stress
Physical Ground Characteristics		
Density and Unit Weights		
γ	kN/m^3	Unit weight of ground (or bulk unit weight or total unit weight)
γ_d	kN/m^3	Unit weight of dry ground

Symbol	Unit	Full Term or Definition
γ_s	kN/m^3	Unit weight of solid particles
γ_w	kN/m^3	Unit weight of water
γ_{dmin}	kN/m^3	Minimum index (dry) unit weight
γ_{dmax}	kN/m^3	Maximum index (dry) unit weight
γ' or γ_{sub}	kN/m^3	Unit weight of submerged ground or soil
ρ	Mg/m^3 [= t/m^3]	Density of ground/soil or bulk density
ρ_d	Mg/m^3 [= t/m^3]	Density of dry ground/soil or dry density
ρ_s	Mg/m^3 [= t/m^3]	Density of solid particles
σ_ω	Mg/m^3 [= t/m^3]	Density of water
D_r	-, %	Relative density [= γ_{dmax} (γ_d − γ_{dmin})/γ_d(γ_{dmax} − γ_{dmin})]
e	-	Void ratio
e_0	-	Initial void ratio
G_s	-	Specific gravity of solid particle
I_d	-, %	Density index [=(γ_d − γ_{dmin})/γ_d(γ_{dmax} − γ_{dmin})]
n	-, %	Porosity
w	%	Water content
S_r	%	Degree of saturation
Consistency		
w_L	%	Liquid limit
w_P	%	Plastic limit
I_P or PI	%	Plasticity index [= w_L − w_P]
I_L or LI	%	Liquidity index [= (w − w_P)/(w_L − w_P)]
I_C	%	Consistency index [= (w_L − w)/(w_L − w_P)]
Particle Size		
D	mm	Particle diameter
D_n	mm	n% diameter [$n\% < D$]
C_u	-	Uniformity coefficient [= D_{60}/D_{10}]
C_c	-	Curvature coefficient [= $(D_{30})2/D_{10}D_{60}$]
Hydraulic Properties		
k	m/s	Coefficient of permeability
k_v	m/s	Coefficient of vertical permeability
k_h	m/s	Coefficient of horizontal permeability
Mechanical Ground Characteristics		
Cone Penetration Test		
A_c	mm^2	Cross-sectional projected area of the cone
A_n	mm^2	Cross-sectional area of load cell or shaft
A_s	mm^2	Surface area of friction sleeve

Symbol	Unit	Full Term or Definition
a	-	Net area ratio of the cone penetrometer
B_q	-	Pore pressure ratio
Δ_{u1}, Δ_{u2}, Δ_{u3}	MPa	Excess pore pressure at filter locations 1, 2 and 3
F_r	%	Normalised friction ratio [= f_t/q_n]
f_s	MPa	Sleeve friction or measured sleeve friction
f_t	MPa	Measured sleeve friction corrected for pore pressure effects
i	°	Inclination
K	-	Adjustment factor for ratio of pore pressure at u_1 to u_2 location
l	m	Penetration length
N_c	-	Cone factor between q_c and s_u or c_u
N_k	-	Cone factor between q_n and s_u or c_u
Q_t	-	Normalised cone resistance [= q_n/σ'_{v0}]
q_c	MPa	Cone resistance or measured cone resistance
q_n	MPa	Net cone resistance
q_t	MPa	Corrected cone resistance (i.e. total cone resistance) or cone penetration resistance corrected for pore-water pressure effects
R_f	%	Friction ratio
R_{ft}	%	Corrected friction ratio [= f_s/q_t or f_t/q_t]
R_{ftn}	%	Net friction ratio
U	-	Normalised excess pore pressure
u	MPa	Pore pressure
u_0	MPa	In situ pore pressure
u_1, u_2, u_3	MPa	Pore pressure measured at locations 1, 2 and 3
u_i	MPa	Measured pore pressure at the start of the dissipation test
u_t	MPa	Measured pore pressure at time t during a dissipation test
α	-	Ratio of the cone shaft to the area of the cone face
β	-	Pore-water pressure correction factor (CPTu)
Strength of Soil		
$s_u$or c_u	kPa	Undrained shear strength or undrained (undisturbed) shear strength of soil
s_{ufv}	kPa	Shear strength by field vane testing
$s_{ufv,rem}$	kPa	Remoulded shear strength by field vane testing
$s_{ufv,res}$	kPa	Residual shear strength by field vane testing
s_{uu} or $s_{u^{UU}}$	kPa	Undrained shear strength from UU test or static unconsolidated undrained triaxial shear strength
s_u/σ'_{v0} or c_u/σ'_{v0}	-	Undrained strength ratio
φ' or ϕ'	° (degree)	Effective angle of internal friction
ε_{50}	%	Strain at 50% of peak deviator stress (or ε_c)

Symbol	Unit	Full Term or Definition
E_{50}	MPa	Young's modulus at 50% of peak deviator stress
$c_{u;r}$ or $s_u(R)$	kPa	Undrained shear strength of remoulded soil
C_R	kPa	Undrained residual shear strength
S_t	-	Soil sensitivity [=$c_u/c_{u;r}$ or $s_u/s_u(R)$]
tan ϕ	° (degree)	Internal friction
ϕ_u	° (degree)	Undrained friction angle
ϕ_d	° (degree)	Drained friction angle
Consolidation (One-Dimensional)		
C_c	-	Compression index
C_s	-	Swelling index (or recompression)
c_v	m^2/s	Coefficient of consolidation
e	-	Void ratio
m_v	m^2/MN	Coefficient of compressibility
OCR	-	Overconsolidation ratio [=σ'_p/σ'_{vo} or p'_c/p'_0]
p	kPa	Vertical pressure
$p'_c = \sigma'_p$	kPa	Preconsolidation stress
YSR	-	Yield stress ratio [= $\sigma'_{vy}/\sigma'_{v0}$]
Dp	kPa	$p'_c - p'_0$
σ_{vy}	kPa	Effective vertical yield stress in oedometer compression
σ'_{v0}	kPa	Effective in situ vertical stress (or p'_0)
Geotechnical Design		
Earth Pressure		
δ	° (degree)	Angle of interface friction (between ground and foundation)
K	-	Coefficient of lateral earth pressure
K_a	-	Coefficient of active earth pressure
K_p	-	Coefficient of passive earth pressure
K_0	-	Coefficient of earth pressure at rest [= $\sigma'_{h0}/\sigma'_{v0}$]
$K_{0,nc}$	-	K_0 for normally consolidated soil
$K_{0,oc}$	-	K_0 for overconsolidated soil

Notes
Hyphen (-) in Unit column means no unit applies
Single prime (') applies to effective stress

List of Plates

1. Project Information

2. Geotechnical Description and Profiles

3. In Situ Test Data

4. Sampling Data

5. Laboratory Test Data

1. Project Information

Title	Plate No.
Vicinity Map	1.1
General Location Plan	1.2

EMODnet imagery with mean depth full coverage with water depth to Lowest Astronomical Tide (LAT) reference from EMODnet DTM in gridded form over whole of maritime basin on a grid of 1/16 * 1/16 arc minutes (ca. 115 metre grid) complemented by land DTM and GEBCO coverage in traditional atlas style colours

N

520000 540000 560000 580000 600000 620000 640000 660000

4840000 4820000 4800000 4780000 4760000 4740000 4720000 4700000

Fos-sur-Mer

Port-la-Nouvelle

GLC

GLE

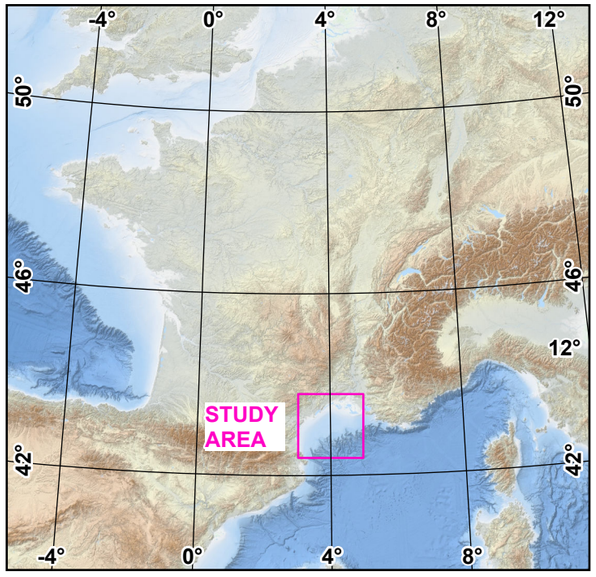
GLO

Spatial Reference
Name: WGS 1984 UTM Zone 31N
Datum: WGS 1984
Projection: Transverse Mercator

Priority areas resulting from the planning exercise:
- Golfe du Lion Centre (GLC)
- Golfe du Lion Est (GLE)
- Golfe du Lion Ouest (GLO)
- Study area for the connection of the priority zone within 10 years

Overhead power lines (RTE)
- 225kV
- 400kV

Electrical substation enclosure (RTE)
- 225kV
- 400kV
- Main ports



SCALE 1: 600 000
at original A3 page size

0 5 10 20 30 40 Kilometers

Golfe du Lion Site Investigation - Vicinity Map

Project name: Golfe du Lion Site Investigation
Project no. F254727
Report no. F254727-REP-002

Contractor: FUGRO

Client: MINISTÈRE DE LA TRANSITION ÉNERGÉTIQUE
Liberté Égalité Fraternité

Plate number: 1.1
Site location: Mediterranean Sea, France

Prepared by	Checked by	Approved by
A. Thiéblemont	B. Q. Mendoza	J. Pitel

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595000 600000 605000 610000 615000 620000 625000 630000

4785000 4780000 4775000 4770000 4765000 4760000 4755000 4750000

EMODnet imagery with mean depth full coverage with water depth to Lowest Astronomical Tide (LAT) reference from EMODnet DTM in gridded form over whole of maritime basin on a grid of 1/16 * 1/16 arc minutes (ca. 115 metre grid) complemented by land DTM and GEBCO coverage in traditional atlas style colours

N

GLE

Z4_OWF_BH05-SAMP

Z4_OWF_BH15-COMP

Z4_OWF_BH17-SAMP

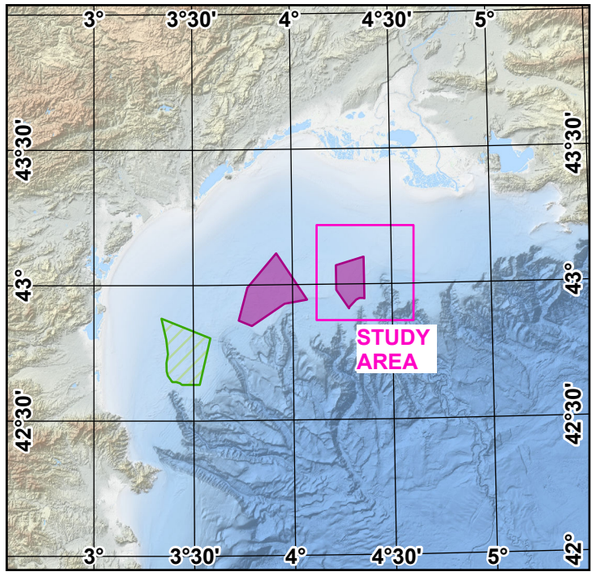
Z4_OWF_BH16-SAMP

Z4_OWF_BH01-SAMP

Spatial Reference
Name: WGS 1984 UTM Zone 31N
Datum: WGS 1984
Projection: Transverse Mercator

Priority areas resulting from the planning exercise:
- Golfe du Lion Centre (GLC)
- Golfe du Lion Est (GLE)
- Golfe du Lion Ouest (GLO)
- Limit of the territorial sea (12 Nq)

Type:
- CPT and Sampling
- Sampling



SCALE 1: 150 000
at original A3 page size

0 1.25 2.5 5 7.5 10
Kilometers

Golfe du Lion Site Investigation - Est (Z4) - Detailed Location Plan

Project name: Golfe du Lion Site Investigation
Project no. F254727
Report no. F254727-REP-002

Contractor: FUGRO

Client: MINISTÈRE DE LA TRANSITION ÉNERGÉTIQUE
Liberté Égalité Fraternité

Plate number: 1.3
Site location: Mediterranean Sea, France

Prepared by	Checked by	Approved by
A. Thiéblemont	B. Q. Mendoza	J. Pitel

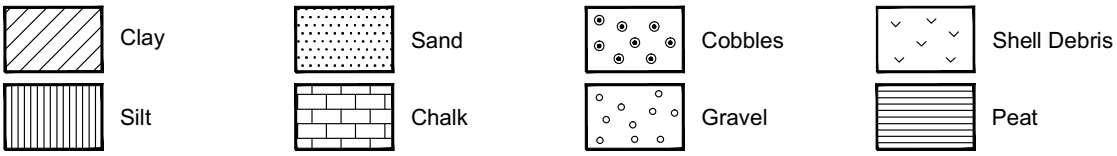
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2. Geotechnical Description and Profiles

Title	Plate No.
List of Symbols and Classification Systems Used	2.1
Geotechnical Logs	2.2 to 2.11

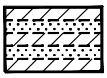
Drawn by : DRF Date : 31/07/2013
Filename: J:\...\CAD\Symbols_and_Terms_Used_on_Geotechnical_Logs_ISO.dwg

SOIL IDENTIFICATION SYMBOLS

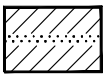


Note:
These soil identification symbols differ from BS 5930 (1999) but they are used to conform with those generally adopted for offshore purposes
Vertical symbols on the log indicate a soil mixture of primary, secondary and tertiary constituents as presented in the soil descriptions

SOIL STRUCTURE SYMBOLS



Interbedded/laminated Soil A and Soil B

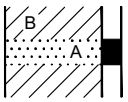


Bed of Soil A in layer of Soil B

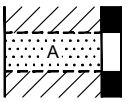
Note:

1. Pockets are not continuous through the sample
2. Partings are 1 to 2 grains thick
3. Thinly laminated is under 6 mm thick
4. Thickly laminated is from 6 mm to 20 mm thick
5. Very thinly bedded is from 20 mm to 60 mm thick
6. Thinly bedded is from 60 mm to 200 mm thick
7. Medium bedded is from 200 mm to 600 mm thick
8. Thickly bedded is from 600 mm to 2000 mm thick
9. Very thickly bedded is over 2000 mm thick

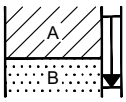
SOIL STRATIFICATION SYMBOLS



Bed of Soil A found in layer of Soil B detected by sampling



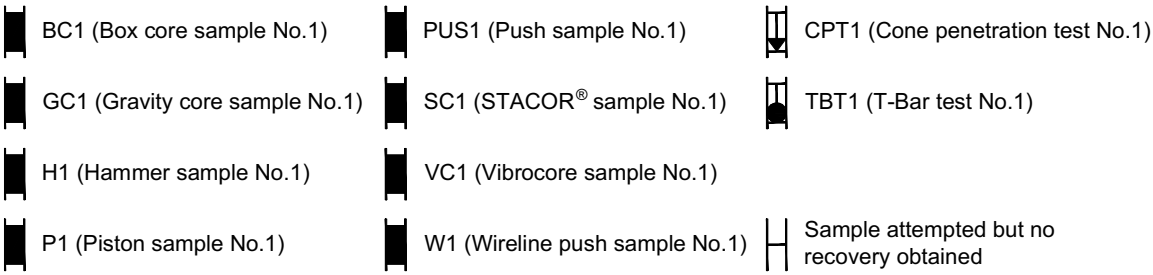
Layer of Soil A detected during drilling



Layer change from Soil A to Soil B detected during cone penetration test

Note:
Depth and thickness of layers detected during drilling are less accurate than those determined by sampling or cone penetration tests

SOIL SAMPLING AND TESTING SYMBOLS



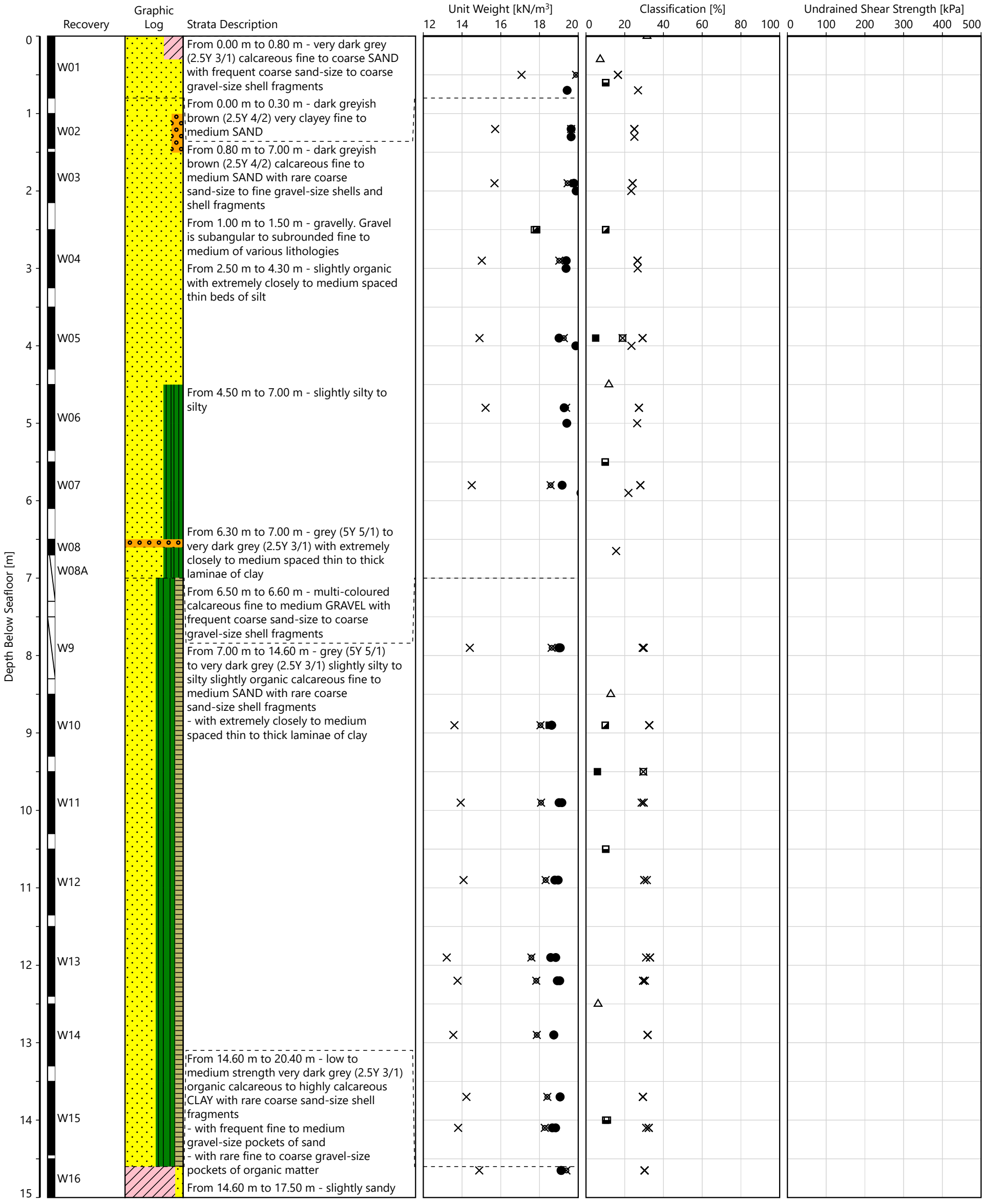
TERMS FOR SOIL STRENGTH AND DENSITY

Fine-grained Soils

Term	Undrained Shear Strength [kPa]
Extremely low	< 10
Very low	10 – 20
Low	20 – 40
Medium	40 – 75
High	75 – 150
Very high	150 – 300
Extremely high	300 – 600
Ultra high	> 600

Coarse-grained Soils

Term	Estimated Relative Density [%]
Very loose	0 – 15
Loose	15 – 35
Medium dense	35 – 65
Dense	65 – 85
Very dense	85 – 100



Start date	: 19-Jan-2025
Deployment method	: Rotary borehole drilling and sampling
Recovery depth	: 20.40 m below Seafloor
Penetration depth	: 20.50 m below Seafloor
Water depth	: LAT +100.00 m
Coordinate	: E 608023.5 m N 4756478.6 m
Coordinate system	: WGS 84 / UTM zone 31N

- Unit weight from volume mass calculation
- Unit weight from water content
- Dry unit weight
- UU-triaxial
- CU-triaxial
- OED
- SB
- Unit weight from CPT

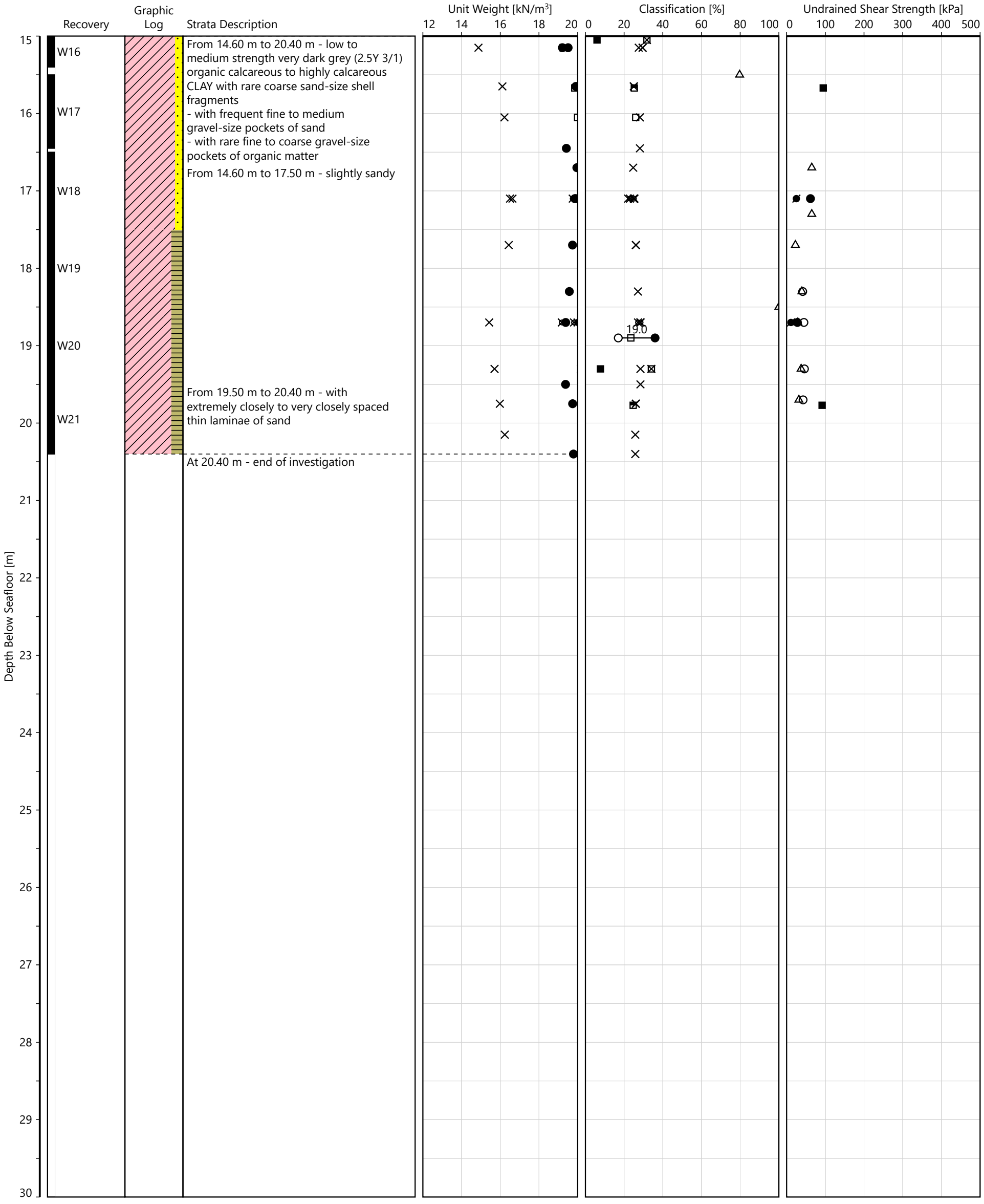
- Water content
- Plasticity index
- Plastic limit
- Liquid limit
- UU-triaxial
- CU-triaxial
- OED
- SB
- CID
- Percentage fines
- Carbonate content
- Organic content
- Relative density from CPT

- Pocket penetrometer
- Torvane
- UU-triaxial
- CU-triaxial
- Undrained shear strength from CPT

Slashed symbols refer to tests on remoulded soil

Geotechnical Log
Z4_OWF_BH01-SAMP

TOPAZ / Geotechnical log (FFSA)_v2 / 2025-08-29 10:07:23 +02:00



Start date	: 19-Jan-2025
Deployment method	: Rotary borehole drilling and sampling
Recovery depth	: 20.40 m below Seafloor
Penetration depth	: 20.50 m below Seafloor
Water depth	: LAT +100.00 m
Coordinate	: E 608023.5 m N 4756478.6 m
Coordinate system	: WGS 84 / UTM zone 31N

- Unit weight from volume mass calculation
- Unit weight from water content
- Dry unit weight
- UU-triaxial
- CU-triaxial
- OED
- SB
- Unit weight from CPT

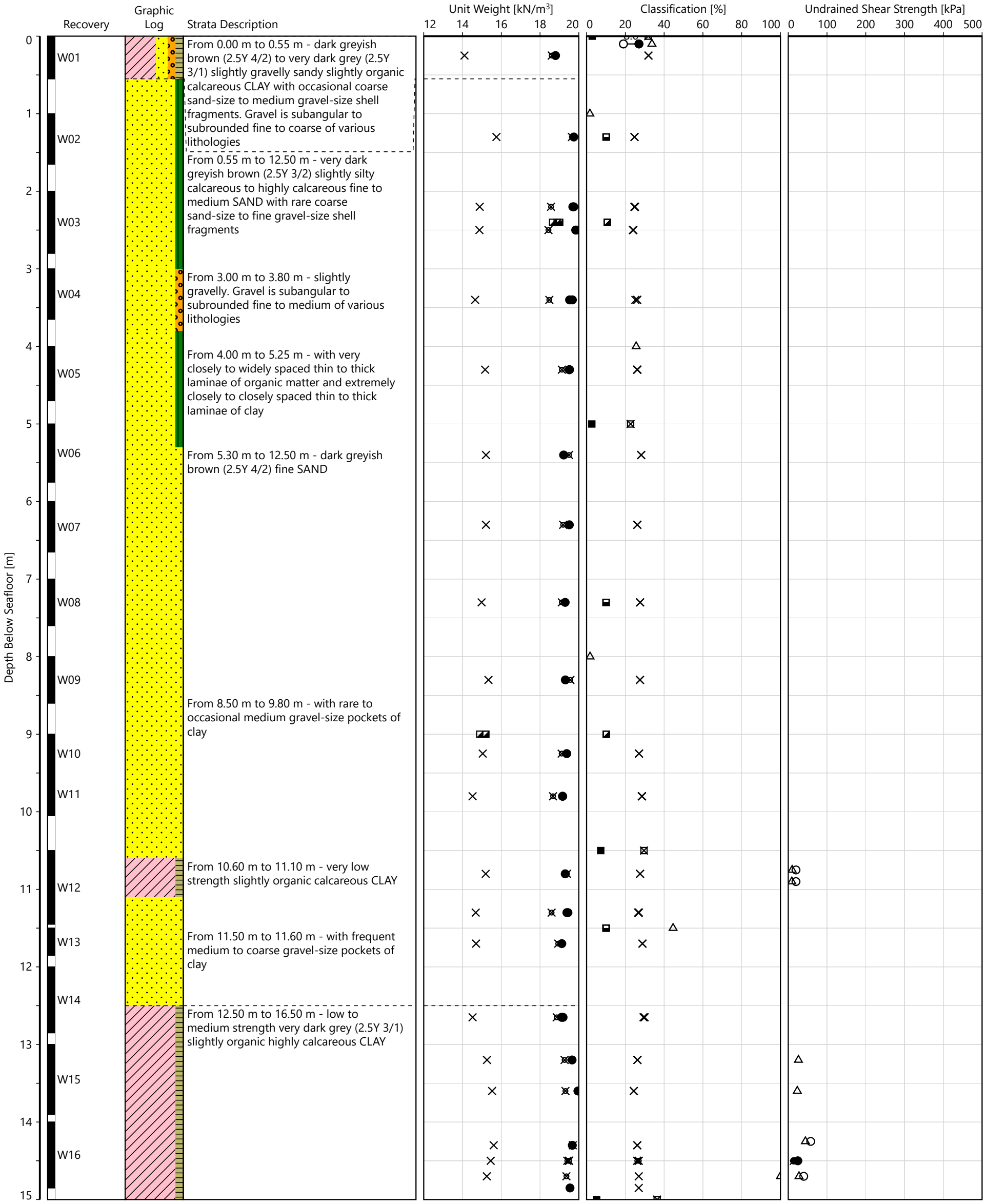
- Water content
- Plasticity index
- Plastic limit
- Liquid limit
- UU-triaxial
- CU-triaxial
- OED
- SB
- CID
- Percentage fines
- Carbonate content
- Organic content
- Relative density from CPT

- Pocket penetrometer
- Torvane
- UU-triaxial
- CU-triaxial
- Undrained shear strength from CPT

Slashed symbols refer to tests on remoulded soil

Geotechnical Log
Z4_OWF_BH01-SAMP

TOPAZ / Geotechnical log (FFSA)_v2 / 2025-08-29 10:07:23 +02:00



Start date	: 19-Jan-2025
Deployment method	: Rotary borehole drilling and sampling
Recovery depth	: 20.45 m below Seafloor
Penetration depth	: 20.50 m below Seafloor
Water depth	: LAT +90.80 m
Coordinate	: E 609362.2 m N 4767064.7 m
Coordinate system	: WGS 84 / UTM zone 31N

- Unit weight from volume mass calculation
- Unit weight from water content
- Dry unit weight
- UU-triaxial
- CU-triaxial
- OED
- SB
- Unit weight from CPT

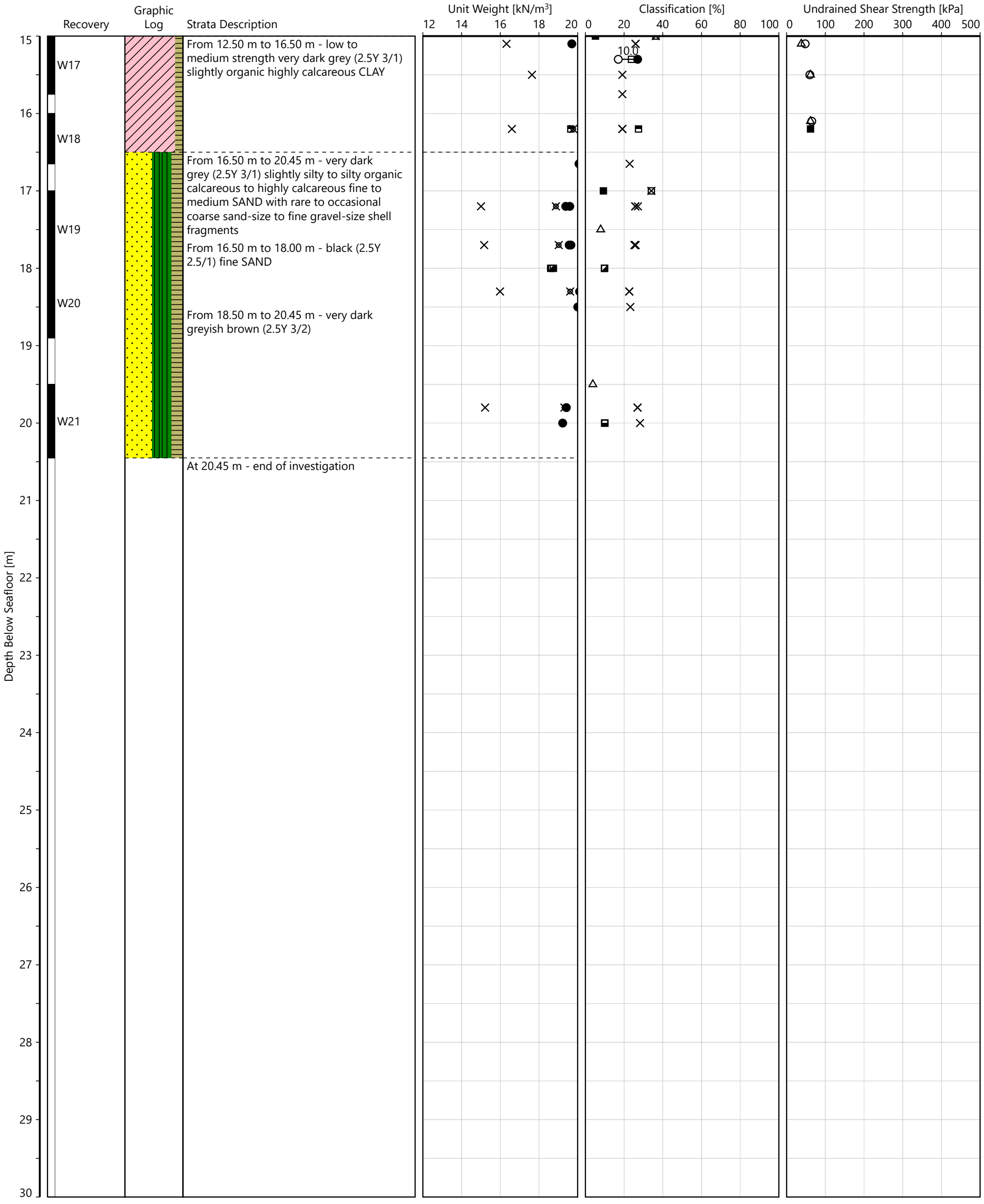
- Water content
- Plasticity index
- Plastic limit
- Liquid limit
- UU-triaxial
- CU-triaxial
- OED
- SB
- CID
- Percentage fines
- Carbonate content
- Organic content
- Relative density from CPT

- Pocket penetrometer
- Torvane
- UU-triaxial
- CU-triaxial
- Undrained shear strength from CPT

Slashed symbols refer to tests on remoulded soil

Geotechnical Log
Z4_OWF_BH05-SAMP

TOPAZ / Geotechnical log (FFSA)_v2 / 2025-08-29 10:07:23 +02:00



Start date	: 19-Jan-2025
Deployment method	: Rotary borehole drilling and sampling
Recovery depth	: 20.45 m below Seafloor
Penetration depth	: 20.50 m below Seafloor
Water depth	: LAT +90.80 m
Coordinate	: E 609362.2 m N 4767064.7 m
Coordinate system	: WGS 84 / UTM zone 31N

- Unit weight from volume mass calculation
- Unit weight from water content
- Dry unit weight
- UU-triaxial
- CU-triaxial
- OED
- SB
- Unit weight from CPT

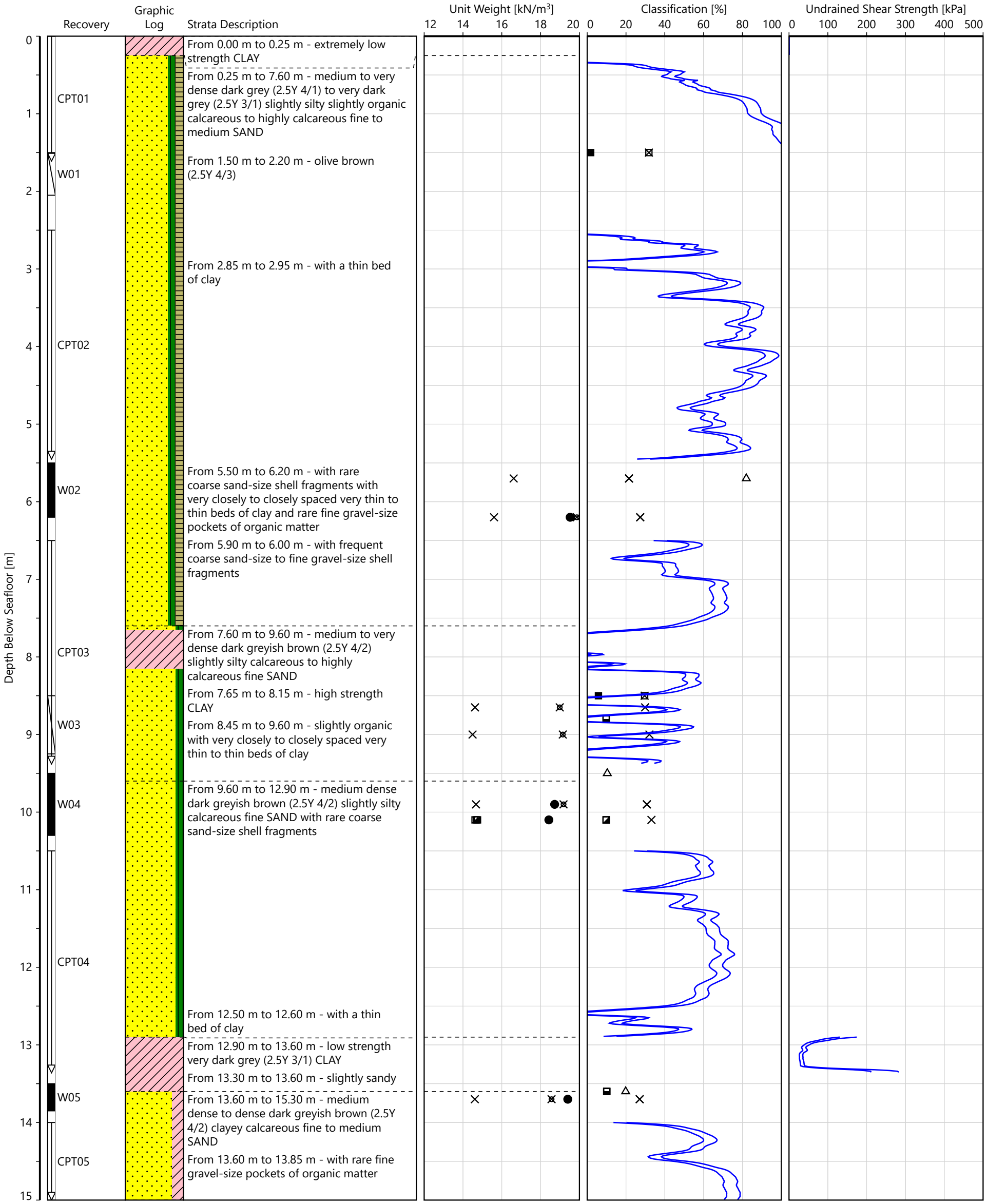
- Water content
- Plasticity index
- Plastic limit
- Liquid limit
- UU-triaxial
- CU-triaxial
- OED
- SB
- CID
- Percentage fines
- Carbonate content
- Organic content
- Relative density from CPT

- Pocket penetrometer
- Torvane
- UU-triaxial
- CU-triaxial
- Undrained shear strength from CPT

Slashed symbols refer to tests on remoulded soil

Geotechnical Log
Z4_OWF_BH05-SAMP

TOPAZ / Geotechnical log (FFSA)_v2 / 2025-08-29 10:07:23 +02:00



Start date	: 17-Jan-2025
Deployment method	: Rotary borehole drilling, sampling and in situ testing
Recovery depth	: 21.07 m below Seafloor
Penetration depth	: 21.07 m below Seafloor
Water depth	: LAT +91.20 m
Coordinate	: E 603348.7 m N 4765382.1 m
Coordinate system	: WGS 84 / UTM zone 31N

- Unit weight from volume mass calculation
- Unit weight from water content
- Dry unit weight
- UU-triaxial
- CU-triaxial
- OED
- SB
- Unit weight from CPT

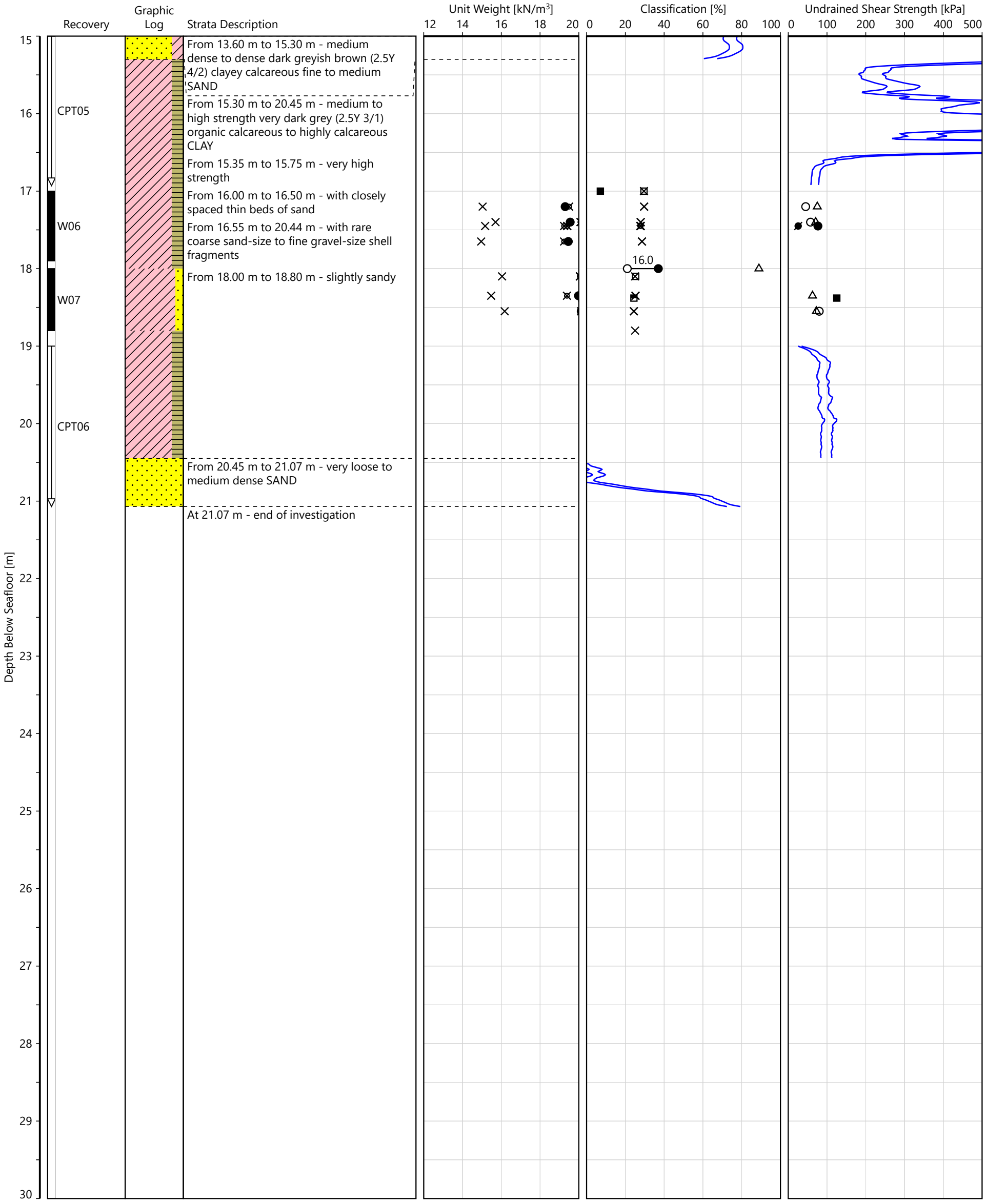
- Water content
- Plasticity index
- Plastic limit
- Liquid limit
- UU-triaxial
- CU-triaxial
- OED
- SB
- CID
- Percentage fines
- Carbonate content
- Organic content
- Relative density from CPT

- Pocket penetrometer
- Torvane
- UU-triaxial
- CU-triaxial
- Undrained shear strength from CPT

Slashed symbols refer to tests on remoulded soil

Geotechnical Log
Z4_OWF_BH15-COMP

TOPAZ / Geotechnical log (FFSA)_v2 / 2025-08-29 10:07:23 +02:00



Start date	: 17-Jan-2025
Deployment method	: Rotary borehole drilling, sampling and in situ testing
Recovery depth	: 21.07 m below Seafloor
Penetration depth	: 21.07 m below Seafloor
Water depth	: LAT +91.20 m
Coordinate	: E 603348.7 m N 4765382.1 m
Coordinate system	: WGS 84 / UTM zone 31N

- Unit weight from volume mass calculation
- Unit weight from water content
- Dry unit weight
- UU-triaxial
- CU-triaxial
- OED
- SB
- Unit weight from CPT

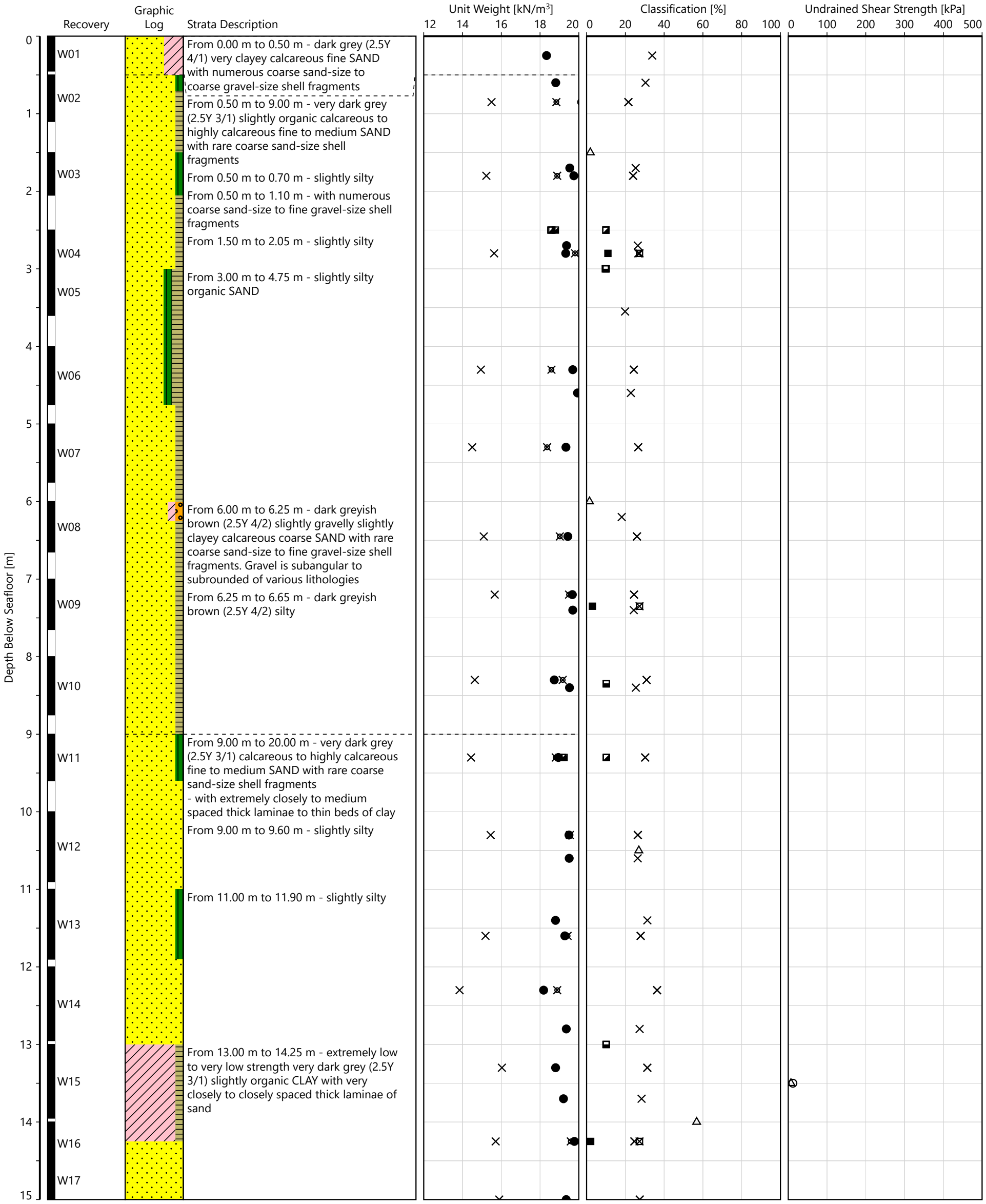
- Water content
- Plasticity index
- Plastic limit
- Liquid limit
- UU-triaxial
- CU-triaxial
- OED
- SB
- CID
- Percentage fines
- Carbonate content
- Organic content
- Relative density from CPT

- Pocket penetrometer
- Torvane
- UU-triaxial
- CU-triaxial
- Undrained shear strength from CPT

Slashed symbols refer to tests on remoulded soil

Geotechnical Log
Z4_OWF_BH15-COMP

TOPAZ / Geotechnical log (FFSA)_v2 / 2025-08-29 10:07:23 +02:00



Start date	: 18-Jan-2025
Deployment method	: Rotary borehole drilling and sampling
Recovery depth	: 20.60 m below Seafloor
Penetration depth	: 21.00 m below Seafloor
Water depth	: LAT +89.90 m
Coordinate	: E 604921.7 m N 4762370.5 m
Coordinate system	: WGS 84 / UTM zone 31N

- Unit weight from volume mass calculation
- Unit weight from water content
- Dry unit weight
- UU-triaxial
- CU-triaxial
- OED
- SB
- Unit weight from CPT

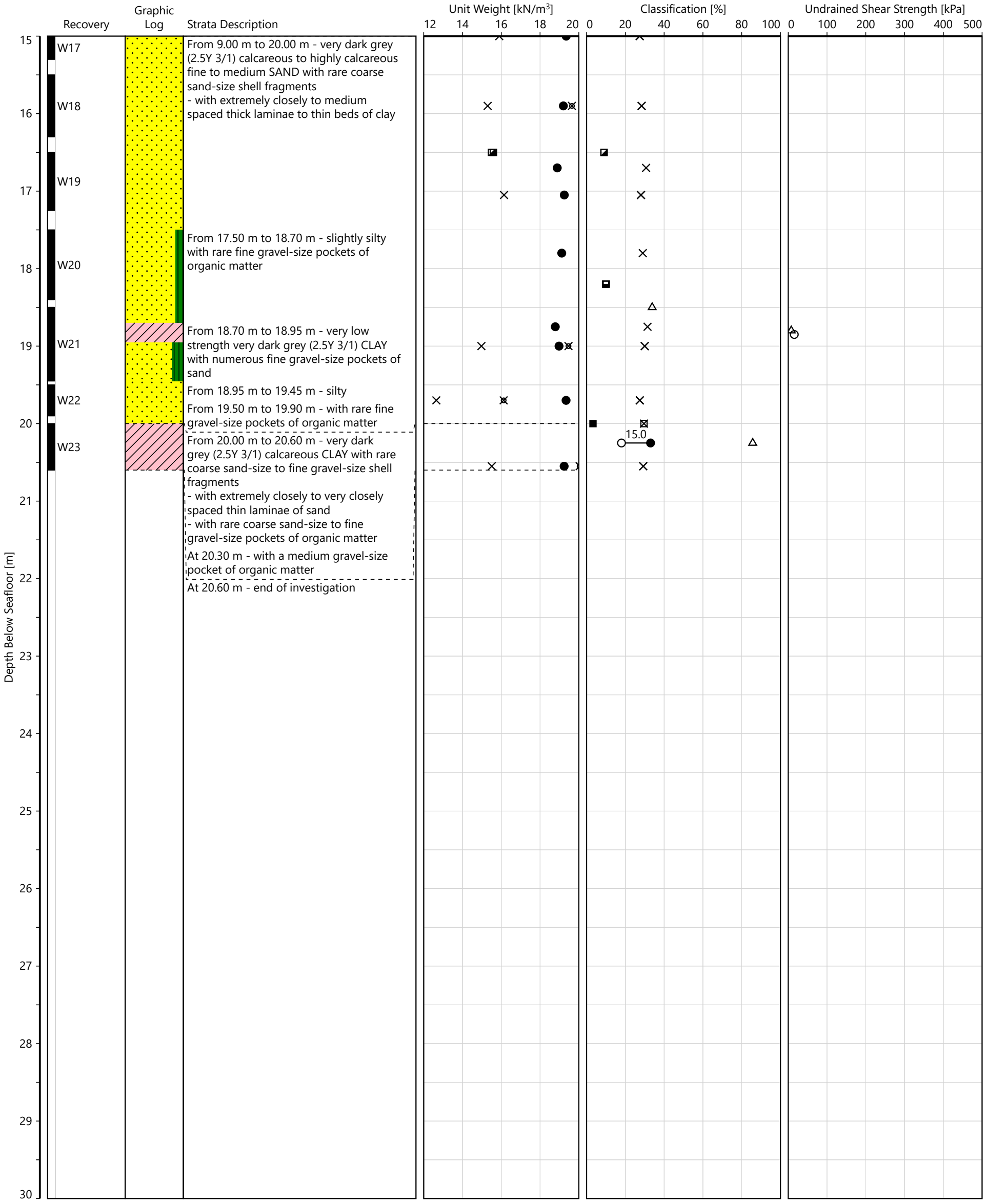
- Water content
- Plasticity index
- Plastic limit
- Liquid limit
- UU-triaxial
- CU-triaxial
- OED
- SB
- CID
- Percentage fines
- Carbonate content
- Organic content
- Relative density from CPT

- Pocket penetrometer
- Torvane
- UU-triaxial
- CU-triaxial
- Undrained shear strength from CPT

Slashed symbols refer to tests on remoulded soil

Geotechnical Log
Z4_OWF_BH16-SAMP

TOPAZ / Geotechnical log (FFSA)_v2 / 2025-08-29 10:07:23 +02:00



Start date	: 18-Jan-2025
Deployment method	: Rotary borehole drilling and sampling
Recovery depth	: 20.60 m below Seafloor
Penetration depth	: 21.00 m below Seafloor
Water depth	: LAT +89.90 m
Coordinate	: E 604921.7 m N 4762370.5 m
Coordinate system	: WGS 84 / UTM zone 31N

- Unit weight from volume mass calculation
- Unit weight from water content
- Dry unit weight
- UU-triaxial
- CU-triaxial
- OED
- SB
- Unit weight from CPT

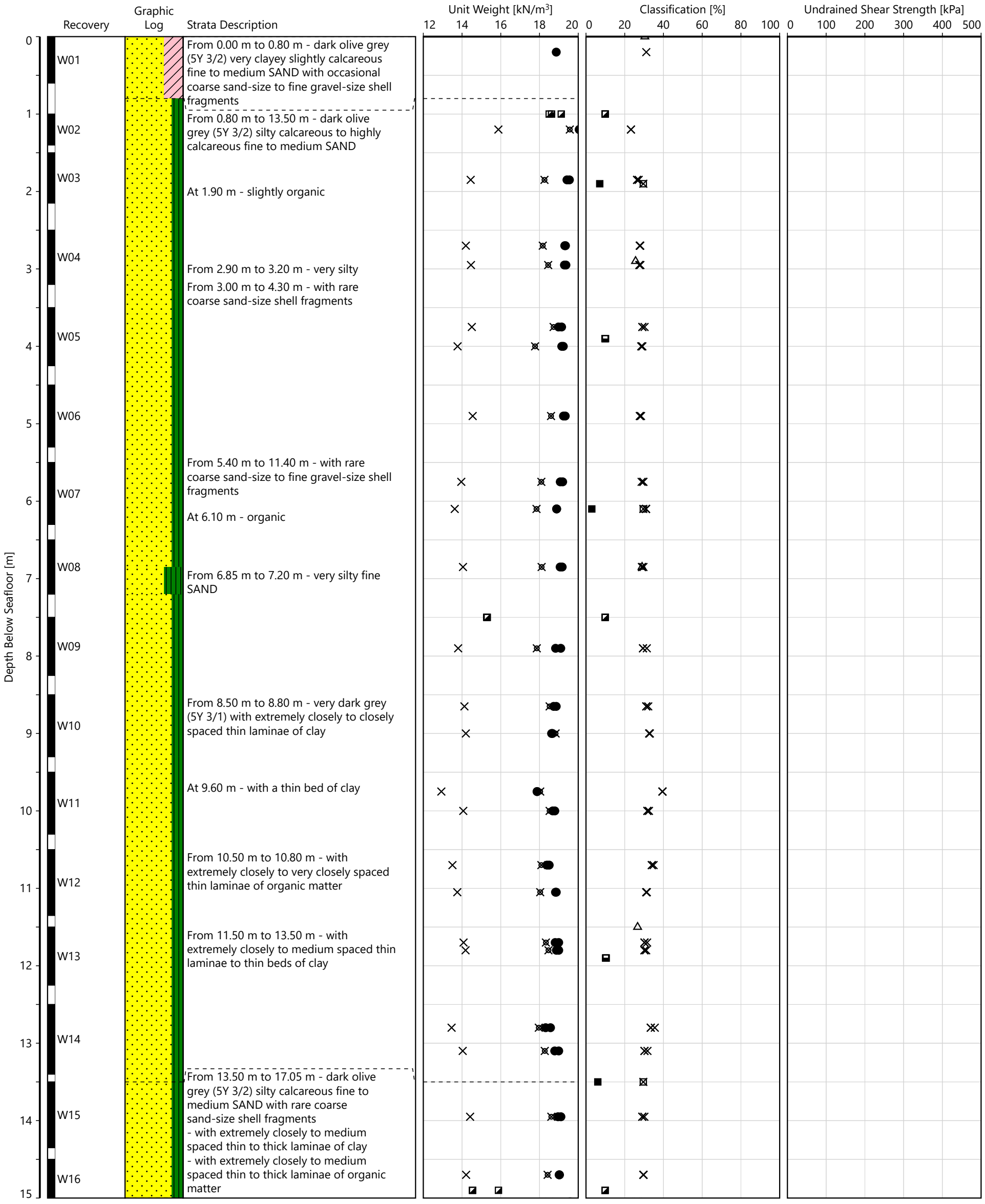
- Water content
- Plasticity index
- Plastic limit
- Liquid limit
- UU-triaxial
- CU-triaxial
- OED
- SB
- CID
- Percentage fines
- Carbonate content
- Organic content
- Relative density from CPT

- Pocket penetrometer
- Torvane
- UU-triaxial
- CU-triaxial
- Undrained shear strength from CPT

Slashed symbols refer to tests on remoulded soil

Geotechnical Log
Z4_OWF_BH16-SAMP

TOPAZ / Geotechnical log (FFSA)_v2 / 2025-08-29 10:07:23 +02:00



Start date	: 18-Jan-2025
Deployment method	: Rotary borehole drilling and sampling
Recovery depth	: 20.35 m below Seafloor
Penetration depth	: 20.50 m below Seafloor
Water depth	: LAT +93.50 m
Coordinate	: E 600422.4 m N 4762323.1 m
Coordinate system	: WGS 84 / UTM zone 31N

- Unit weight from volume mass calculation
- Unit weight from water content
- Dry unit weight
- UU-triaxial
- CU-triaxial
- OED
- SB
- Unit weight from CPT

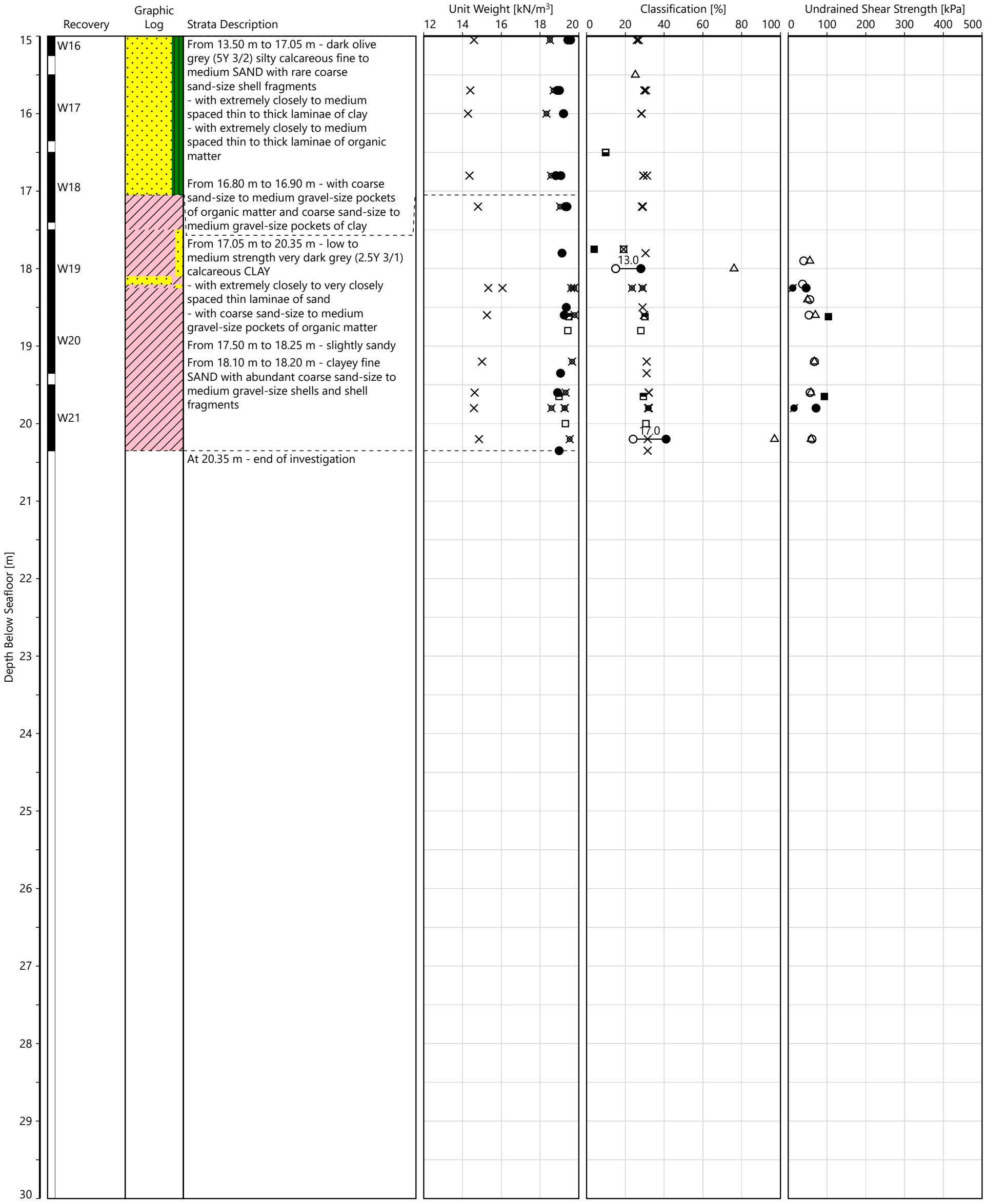
- Water content
- Plasticity index
- Plastic limit
- Liquid limit
- UU-triaxial
- CU-triaxial
- OED
- SB
- CID
- Percentage fines
- Carbonate content
- Organic content
- Relative density from CPT

- Pocket penetrometer
- Torvane
- UU-triaxial
- CU-triaxial
- Undrained shear strength from CPT

Slashed symbols refer to tests on remoulded soil

Geotechnical Log
Z4_OWF_BH17-SAMP

TOPAZ / Geotechnical log (FFSA)_v2 / 2025-08-29 10:07:23 +02:00



Start date	: 18-Jan-2025
Deployment method	: Rotary borehole drilling and sampling
Recovery depth	: 20.35 m below Seafloor
Penetration depth	: 20.50 m below Seafloor
Water depth	: LAT +93.50 m
Coordinate	: E 600422.4 m N 4762323.1 m
Coordinate system	: WGS 84 / UTM zone 31N

- Unit weight from volume mass calculation
- Unit weight from water content
- Dry unit weight
- UU-triaxial
- CU-triaxial
- OED
- SB
- Unit weight from CPT

- Water content
- Plasticity index
- Plastic limit
- Liquid limit
- UU-triaxial
- CU-triaxial
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- Relative density from CPT

- Pocket penetrometer
- Torvane
- UU-triaxial
- CU-triaxial
- Undrained shear strength from CPT

Slashed symbols refer to tests on remoulded soil

Geotechnical Log
Z4_OWF_BH17-SAMP

3. In Situ Test Data

Title	Plate No.
Pre-fieldwork Cone Calibration Certificates	3.1 to 3.9
Cone Penetration Tests	3.10 to 3.14
Measured (q_c, f_s and u) and Derived Parameters (q_n, q_t, B_q, f_t, R_f, R_{ft})	3.10 to 3.11
Normalised (Q_{tn}, Q_t and F_r) and Classification Parameters (I_c, I_{SBT}, γ, S_u, D_r)	3.12 to 3.13
Cone Zero Drift	3.14

Calibration Certificate

Applicant	**Fugro Netherlands Marine B.V.**
	Prismastraat 4
	2631 RT, Nootdorp
	The Netherlands

CALIBRATION RvA K 167

Certificate Number
FCN24035011

Instrument	**Cone Penetrometer**		
Manufacturer	Fugro		
Type	CP10-CF80PB10-P1E1M1-V1		
Serial Number	1706-2404	Electronics	7512
Node Type	7001	Hardware Version	5.01
Software Version	8.01		

Calibration method The instrument was calibrated according to Fugro procedures using a comparison technique against a reference standard.

Environmental Conditions

Ambient air temperature during calibration	20.5 ± 3 °C
Temperature change during calibration	< ±1 °C
Atmospheric pressure during calibration	1000 ± 100 mbar

Result The condition of the cone penetrometer meets the requirements of ISO 22476-1:2012 Section 4.1 through 4.7. The calibration results are reported on the next page(s).

The calibration results indicate that the cone penetrometer meets the requirements for use in Application Class 1 as defined in ISO 22476-1:2012 Section 5.2.

Uncertainty The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, which provides a confidence level of approximately 95%. The standard uncertainty has been determined in accordance with EA-4/02.

Traceability The measurements have been executed using standards for which the traceability to (inter)national standards has been demonstrated towards the RvA (Raad voor Accreditatie).

Calibration date 19-Sep-2024

Calibrate before 19-Mar-2025

Calibrated Sensor	Manufacturer / Type	Calibrated Range	Maximum Rating	Procedure
Cone [Force]	Fugro Loadcell	0 to 80 kN	0 to 100 kN	EUAF-FNLM- CAL-PR-003
Cone+Fric. [Force]	Fugro Loadcell	0 to 80 kN	0 to 100 kN	EUAF-FNLM- CAL-PR-003
Pore 2 [Pressure]	Keller PA-8/100bar (8467.8)	0 to 10 MPa	0 to 15 MPa	EUAF-FNLM- CAL-PR-004

	Before adjustment		After adjustment		Drift	
Calibrated Sensor	Sensitivity	Zero Load	Sensitivity	Zero Load	Sensitivity	Zero Load
Cone [Force]	25.1 µV/V/kN	14.7 µV/V	25.1 µV/V/kN	18.2 µV/V	0.00 %	0.18 %
Cone+Fric. [Force]	25.4 µV/V/kN	72.6 µV/V	25.3 µV/V/kN	184 µV/V	-0.08 %	5.51 %
Pore 2 [Pressure]	3.08 mV/V/MPa	-3.12 mV/V	3.08 mV/V/MPa	-3.06 mV/V	-0.04 %	0.21 %

Nootdorp, 20-Sep-2024

Ruud Schrijvers
Deputy Manager Transducer Workshop

This certificate is issued provided that neither Fugro nor the Raad voor Accreditatie assumes any liability.

The Raad voor Accreditatie is one of the signatories of the Multilateral Agreement of the European Cooperation for Accreditation (EA) for the mutual recognition of calibration certificates.

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Cone Calibration Result [Force]

Instrument	
Manufacturer	Fugro
Type	CP10-CF80PB10-P1E1 M1-V1
Serial Number	1706-2404
Electronics	7512
Node Type	7001
Hardware Version	5.01
Software Version	8.01

Reference	
Manufacturer	Zwick/Roell
Serial Number	6034-0003
Uncertainty	0.0025 · F_r + 0.011 [kN]

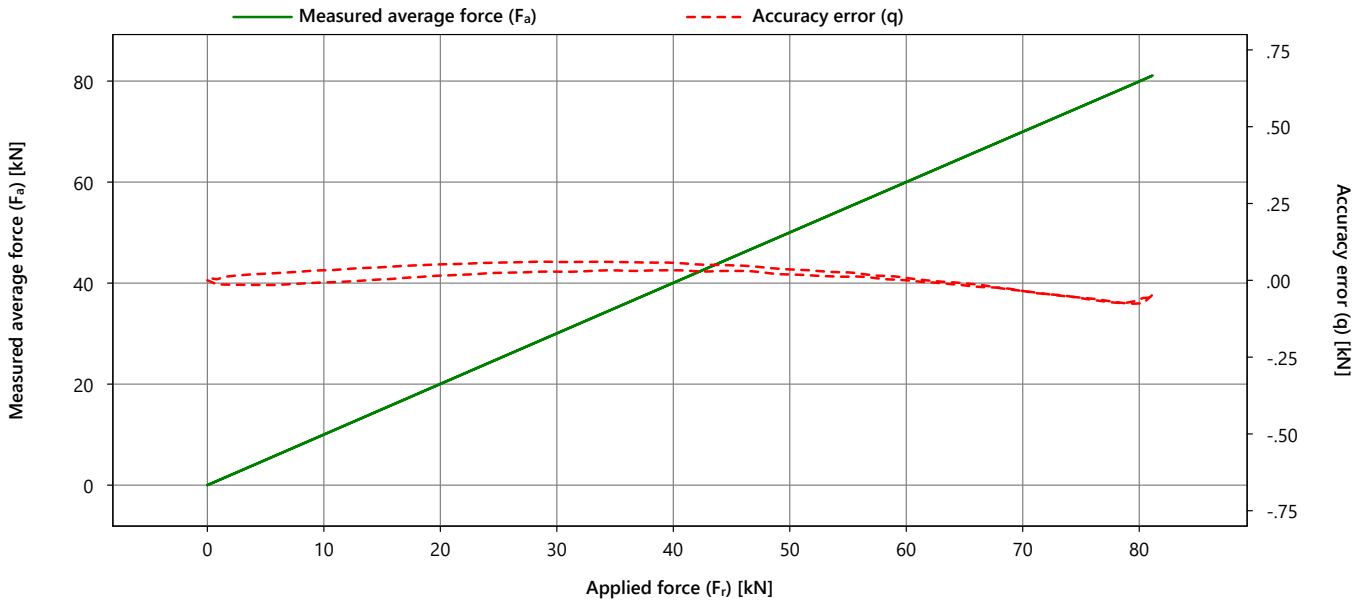
Calibration Details	
Calibration Date	19 Sep 2024 05:31:09
Procedure	EUAF-FNLM- CAL-PR-003
Software Version	4.4.1.56591

CALIBRATION RvA K 167

Certificate Number FCN24035011

Sensor	
Channel	Cone [Force]
Manufacturer	Fugro Loadcell
Calibrated Range	0 to 80 kN
Maximum Rating	0 to 100 kN

Characteristics	Unit	Value
Max accuracy error (q)	[kN]	0.062
Max repeatability error (b)	[kN]	0.029
Max reversibility error (v)	[kN]	0.040
Zero load error (F_{c0})	[kN]	0.008
Zero load offset (F_0)	[kN]	0.001
Resolution	[kN]	$3.71 \cdot 10^{-5}$
Noise RMS	[kN]	0.000



Applied force (F_r)	Measured force 1 ($F_{a,1}$)	Measured force 2 ($F_{a,2}$)	Measured force 3 ($F_{a,3}$)	Measured average force (F_a)	Accuracy error (q)	Repeatability error (b)	Reversibility error (v)	Expanded Uncertainty (U)
[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]
0.000	0.009	-0.004	-0.004	0.000	0.000	0.013		0.027
16.000	15.996	16.009	16.011	16.005	0.005	0.015	0.040	0.081
32.000	32.014	32.036	32.035	32.029	0.029	0.022	0.031	0.104
48.000	48.013	48.029	48.031	48.024	0.024	0.018	0.017	0.138
64.000	63.974	63.994	63.993	63.987	-0.013	0.019	0.006	0.177
80.000	79.920	79.944	79.949	79.938	-0.062	0.029		0.219
64.000	63.982	63.999	63.999	63.993	-0.007	0.017	0.006	0.177
48.000	48.030	48.046	48.048	48.041	0.041	0.018	0.017	0.138
32.000	32.050	32.063	32.066	32.060	0.060	0.016	0.031	0.102
16.000	16.036	16.049	16.051	16.045	0.045	0.016	0.040	0.081
0.000	0.007	0.009	0.008	0.008	0.008	0.002		0.017

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Cone+Fric. Calibration Result [Force]

Instrument	
Manufacturer	Fugro
Type	CP10-CF80PB10-P1E1 M1-V1
Serial Number	1706-2404
Electronics	7512
Node Type	7001
Hardware Version	5.01
Software Version	8.01

Reference	
Manufacturer	Zwick/Roell
Serial Number	6034-0003
Uncertainty	0.0025 · F_r + 0.011 [kN]

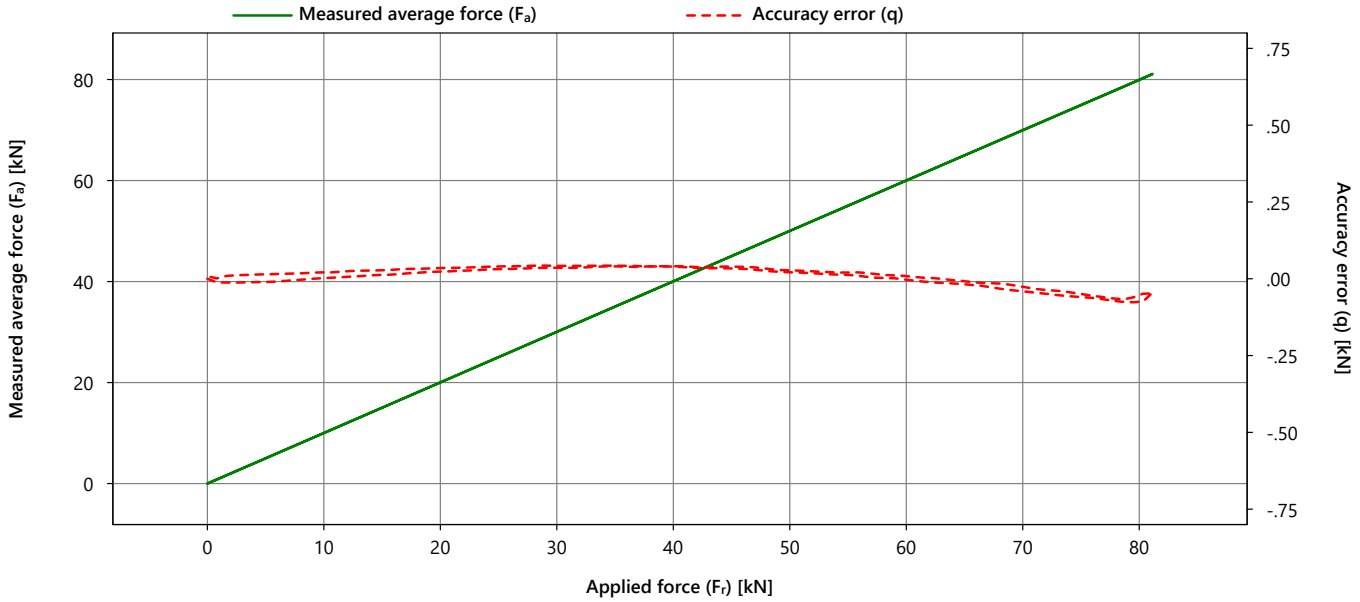
Calibration Details	
Calibration Date	19 Sep 2024 05:31:09
Procedure	EUAF-FNLM- CAL-PR-003
Software Version	4.4.1.56591

CALIBRATION RvA K 167

Certificate Number FCN24035011

Sensor	
Channel	Cone+Fric. [Force]
Manufacturer	Fugro Loadcell
Calibrated Range	0 to 80 kN
Maximum Rating	0 to 100 kN

Characteristics	Unit	Value
Max accuracy error (q)	[kN]	0.054
Max repeatability error (b)	[kN]	0.044
Max reversibility error (v)	[kN]	0.016
Zero load error (F_{c0})	[kN]	0.008
Zero load offset (F_0)	[kN]	0.015
Resolution	[kN]	$3.68 \cdot 10^{-5}$
Noise RMS	[kN]	0.000
Tip-Sleeve Interaction %	[%]	0.030



Applied force (F_r)	Measured force 1 ($F_{a,1}$)	Measured force 2 ($F_{a,2}$)	Measured force 3 ($F_{a,3}$)	Measured average force (F_a)	Accuracy error (q)	Repeatability error (b)	Reversibility error (v)	Expanded Uncertainty (U)
[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]
0.000	0.007	-0.003	-0.005	0.000	0.000	0.012		0.025
16.000	16.000	16.018	16.024	16.014	0.014	0.023	0.016	0.063
32.000	32.017	32.044	32.047	32.036	0.036	0.030	0.006	0.101
48.000	48.015	48.037	48.045	48.033	0.033	0.030	-0.007	0.140
64.000	63.977	64.002	64.008	63.996	-0.004	0.031	-0.011	0.180
80.000	79.921	79.953	79.965	79.946	-0.054	0.044		0.223
64.000	63.966	63.991	63.997	63.985	-0.015	0.031	-0.011	0.180
48.000	48.009	48.031	48.038	48.026	0.026	0.029	-0.007	0.139
32.000	32.028	32.044	32.054	32.042	0.042	0.026	0.006	0.099
16.000	16.018	16.032	16.039	16.030	0.030	0.021	0.016	0.062
0.000	0.010	0.008	0.008	0.008	0.008	0.002		0.017

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Pore 2 Calibration Result [Pressure]

Instrument	
Manufacturer	Fugro
Type	CP10-CF80PB10-P1E1 M1-V1
Serial Number	1706-2404
Electronics	7512
Node Type	7001
Hardware Version	5.01
Software Version	8.01

Sensor	
Channel	Pore 2 [Pressure]
Manufacturer	Keller PA-8/100bar (8467.8)
Calibrated Range	0 to 10 MPa
Maximum Rating	0 to 15 MPa

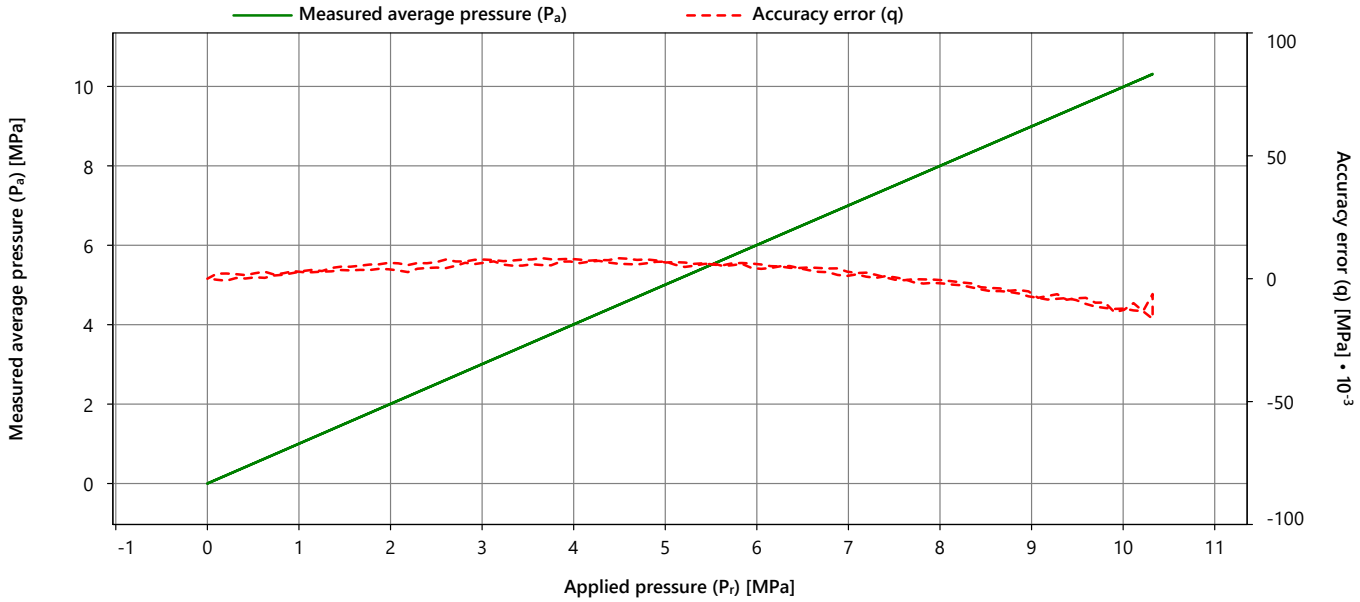
Reference	
Manufacturer	Keller PA-33X
Serial Number	3257-0002
Uncertainty	0.00022 · P_r + 0.0013 [MPa]

Calibration Details	
Calibration Date	19 Sep 2024 07:00:41
Procedure	EUAF-FNLM- CAL-PR-004
Software Version	4.4.1.56591

CALIBRATION RvA K 167

Certificate Number FCN24035011

Characteristics	Unit	Value
Max accuracy error (q)	[MPa]	0.012
Max repeatability error (b)	[MPa]	0.005
Max reversibility error (v)	[MPa]	0.003
Zero load error (P_{c0})	[MPa]	0.000
Zero load offset (P_0)	[MPa]	0.000
Resolution	[MPa]	2.42 · 10^{-6}
Noise RMS	[MPa]	0.000



Applied pressure (P_r)	Measured pressure 1 ($P_{a,1}$)	Measured pressure 2 ($P_{a,2}$)	Measured pressure 3 ($P_{a,3}$)	Measured average pressure (P_a)	Accuracy error (q)	Repeatability error (b)	Reversibility error (v)	Expanded Uncertainty (U)
[MPa]	[MPa]	[MPa]	[MPa]	[MPa]	[MPa]	[MPa]	[MPa]	[MPa]
0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.002
2.000	2.001	2.005	2.006	2.004	0.004	0.005	0.003	0.011
4.000	4.007	4.007	4.006	4.007	0.007	0.002	0.001	0.004
6.000	6.004	6.004	6.003	6.004	0.004	0.002	0.002	0.005
8.000	7.997	7.999	7.999	7.998	-0.002	0.002	0.001	0.005
10.000	9.987	9.988	9.989	9.988	-0.012	0.001		0.005
8.000	8.000	8.000	7.998	7.999	-0.001	0.002	0.001	0.005
6.000	6.006	6.005	6.007	6.006	0.006	0.002	0.002	0.005
4.000	4.007	4.008	4.009	4.008	0.008	0.002	0.001	0.004
2.000	2.006	2.007	2.007	2.007	0.007	0.001	0.003	0.006
0.000	0.000	0.001	-0.001	0.000	0.000	0.001		0.003

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Symbols, Definitions and References

Certificate Number
FCN24035011

Symbols and Definitions (general)

b	Repeatability error, defined as the maximum difference between the measurements of the instrument at the applied value.
Noise RMS	Signal noise, defined as the quadratic mean when the sensor is not subjected to load.
q	Accuracy error, defined as the difference between the average indicated value by the instrument and the applied value.
Resolution	Smallest change in a quantity being measured that causes a perceptible change in the corresponding indication.
U	The stated uncertainty is that of the average indicated quantity, and includes the entire calibration method, including the reference and calibrated sensor, but excludes the difference between average indicated value by the instrument and the applied value.
v	Reversibility error, defined as the difference between the average indicated value by the instrument at a certain applied value when it was increased and when it was decreased.

Symbols and Definitions (quantity specific: Q may be substituted for F or P, as appropriate)

Q_0	Zero load offset, instrument output where the specified measured quantity value is zero.
Q_a	Average indicated quantity value by the instrument.
$Q_{a,x}$	Quantity value indicated by the instrument at measurement x.
Q_{c0}	Zero load error, defined as the difference between the average indicated value by the instrument before and after the load cycle has been applied.
Q_r	Applied reference quantity value.

Quantities

F	Force
P	Pressure

References

International Organization for Standardization, 2012. *ISO 22476-1:2012 Geotechnical investigation and testing, Field testing, Electrical cone and piezocone penetration test.* Geneva: ISO.

European Co-operation For Accreditation, 2013. *Evaluation of the uncertainty of measurement in calibration.* European Co-operation For Accreditation, Publication; EA-4/02 M:2013.

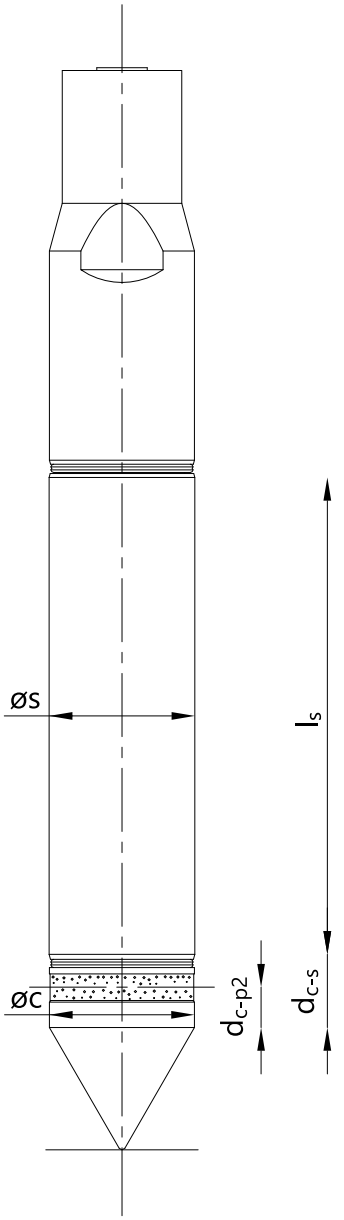
This certificate shall not be reproduced, except in full, without written permission of Fugro

Typical Dimensions

Instrument

Manufacturer	Fugro
Type	CP10-CF80PB10-P1E1M1-V1
Serial Number	1706-2404

Appendix Applicable to Certificate Number FCN24035011



Typical Dimensions

A_c	Cross-sectional projected area of the cone	0.001 m^2
A_s	Surface area of the friction sleeve	0.015 m^2
af	Cone net area ratio	0.75
bf	Friction sleeve net area ratio	0
øc	Diameter of the cylindrical part of the cone	35.8 mm
øs	Diameter of the friction sleeve	36.1 mm
l_s	Length of the friction sleeve	132.7 mm
d_{c-s}	Cone - friction sleeve distance	13.5 mm
d_{c-p2}	Cone - pore 2 distance	5 mm

Diagram is not to scale

Cone Net Area Ratio Result

Instrument	
Manufacturer	Fugro
Type	CP10-CF80PB10-P1E1 M1-V1
Serial Number	1706-2404
Electronics	7512
Node Type	7001
Hardware Version	5.01
Software Version	8.01

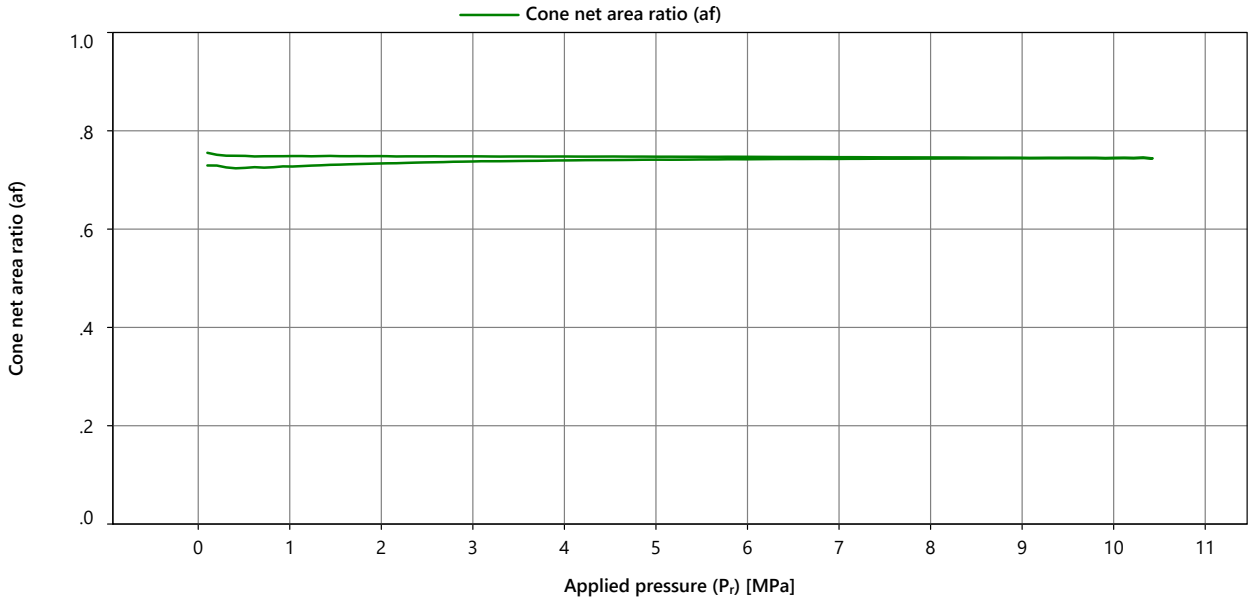
Reference	
Manufacturer	Keller PA-33X
Serial Number	3257-0002
Uncertainty	0.00022 · P_r + 0.0013 [MPa]

Measurement Details	
Measurement Date	19 Sep 2024 07:00:41
Procedure	EUAF-FNLM- CAL-PR-003
Software Version	4.4.1.56591

Appendix Applicable to Certificate Number FCN24035011

Characteristics	Unit	Value
Cone net area ratio (af)	[-]	0.74

The cone net area ratio presented above is determined at the maximum applied pressure during the measurement.



Applied pressure (P_r) [MPa]	Measured cone net area ratio 1 (af,1)	Measured cone net area ratio 2 (af,2)	Measured cone net area ratio 3 (af,3)	Measured average cone net area ratio (af)
2.000	0.733	0.734	0.734	0.734
4.000	0.740	0.740	0.739	0.740
6.000	0.742	0.742	0.742	0.742
8.000	0.744	0.744	0.744	0.744
10.000	0.745	0.745	0.745	0.745
8.000	0.746	0.746	0.746	0.746
6.000	0.747	0.747	0.747	0.747
4.000	0.748	0.748	0.748	0.748
2.000	0.749	0.749	0.748	0.749

Friction Sleeve Net Area Ratio Result

Instrument	
Manufacturer	Fugro
Type	CP10-CF80PB10-P1E1 M1-V1
Serial Number	1706-2404
Electronics	7512
Node Type	7001
Hardware Version	5.01
Software Version	8.01

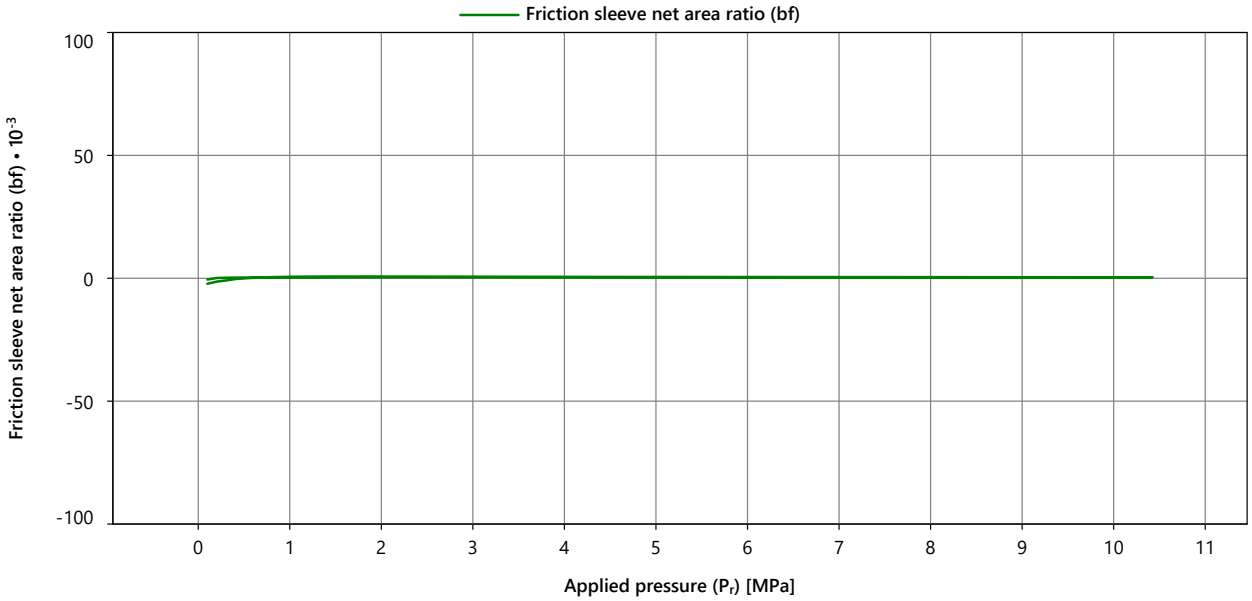
Reference	
Manufacturer	Keller PA-33X
Serial Number	3257-0002
Uncertainty	0.00022 · P_r + 0.0013 [MPa]

Measurement Details	
Measurement Date	19 Sep 2024 07:00:41
Procedure	EUAF-FNLM- CAL-PR-003
Software Version	4.4.1.56591

Appendix Applicable to Certificate Number FCN24035011

Characteristics	Unit	Value
Friction sleeve net area ratio (bf)	[-]	0.00041

The friction sleeve net area ratio presented above is determined at the maximum applied pressure during the measurement.



Applied pressure (P_r) [MPa]	Measured friction sleeve net area ratio (bf) 1 (bf,1)	Measured friction sleeve net area ratio (bf) 2 (bf,2)	Measured friction sleeve net area ratio (bf) 3 (bf,3)	Measured average Friction sleeve net area ratio (bf)
2.000	0.001	0.001	0.001	0.001
4.000	0.001	0.001	0.001	0.001
6.000	0.001	0.001	0.001	0.001
8.000	0.000	0.000	0.000	0.000
10.000	0.000	0.000	0.000	0.000
8.000	0.000	0.000	0.000	0.000
6.000	0.000	0.000	0.000	0.000
4.000	0.000	0.000	0.000	0.000
2.000	0.000	0.000	0.000	0.000

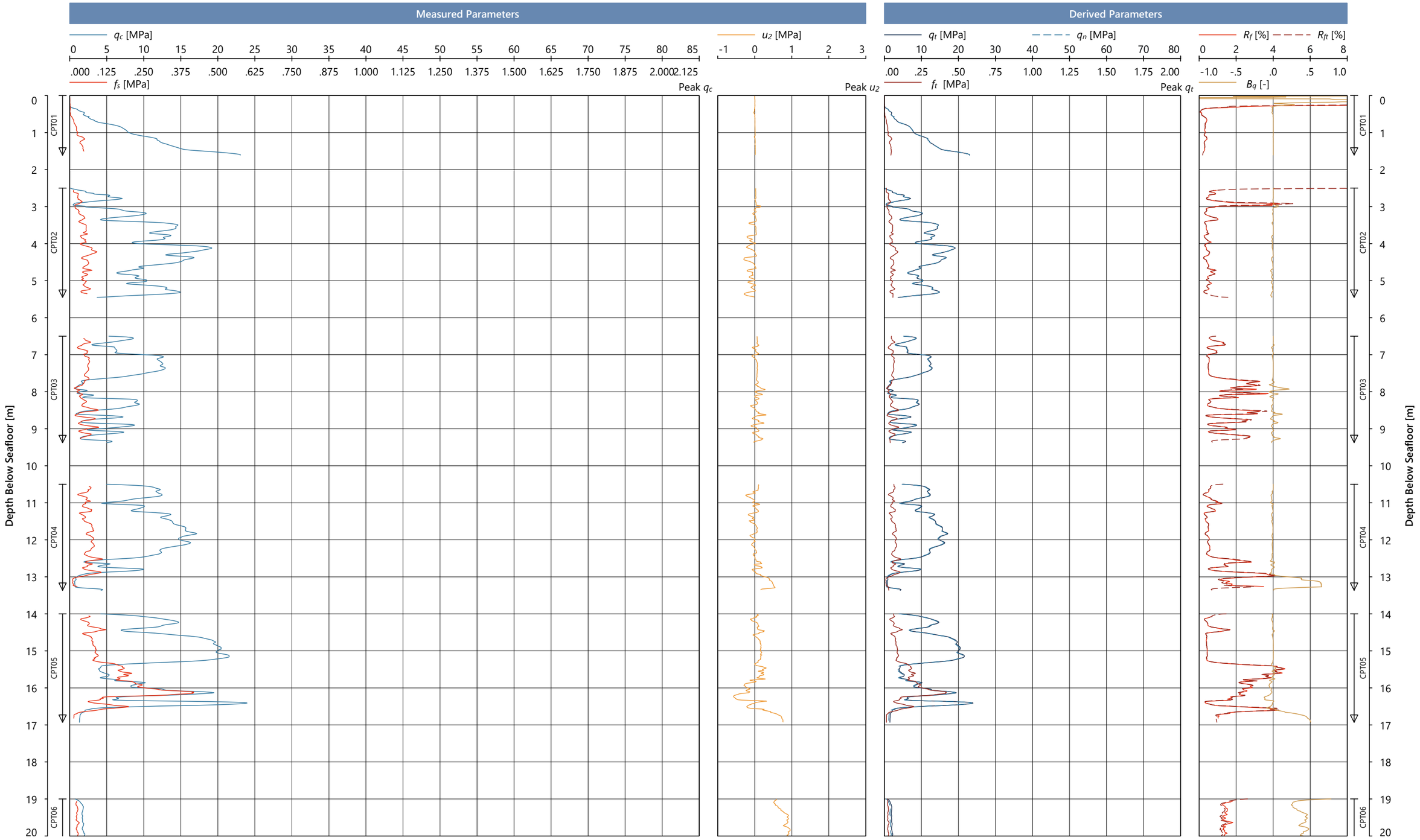
Symbols and Definitions

Appendix Applicable to Certificate Number FCN24035011

Symbols and Definitions (general)	
af	Cone net area ratio, defined as the factor between the applied pressure to the instrument and the indicated cone resistance.
af,x	Measured cone net area ratio at measurement x.
bf	Friction sleeve net area ratio, defined as the factor between the applied pressure to the instrument and the indicated sleeve friction.
bf,x	The measured friction sleeve net area ratio at measurement x.

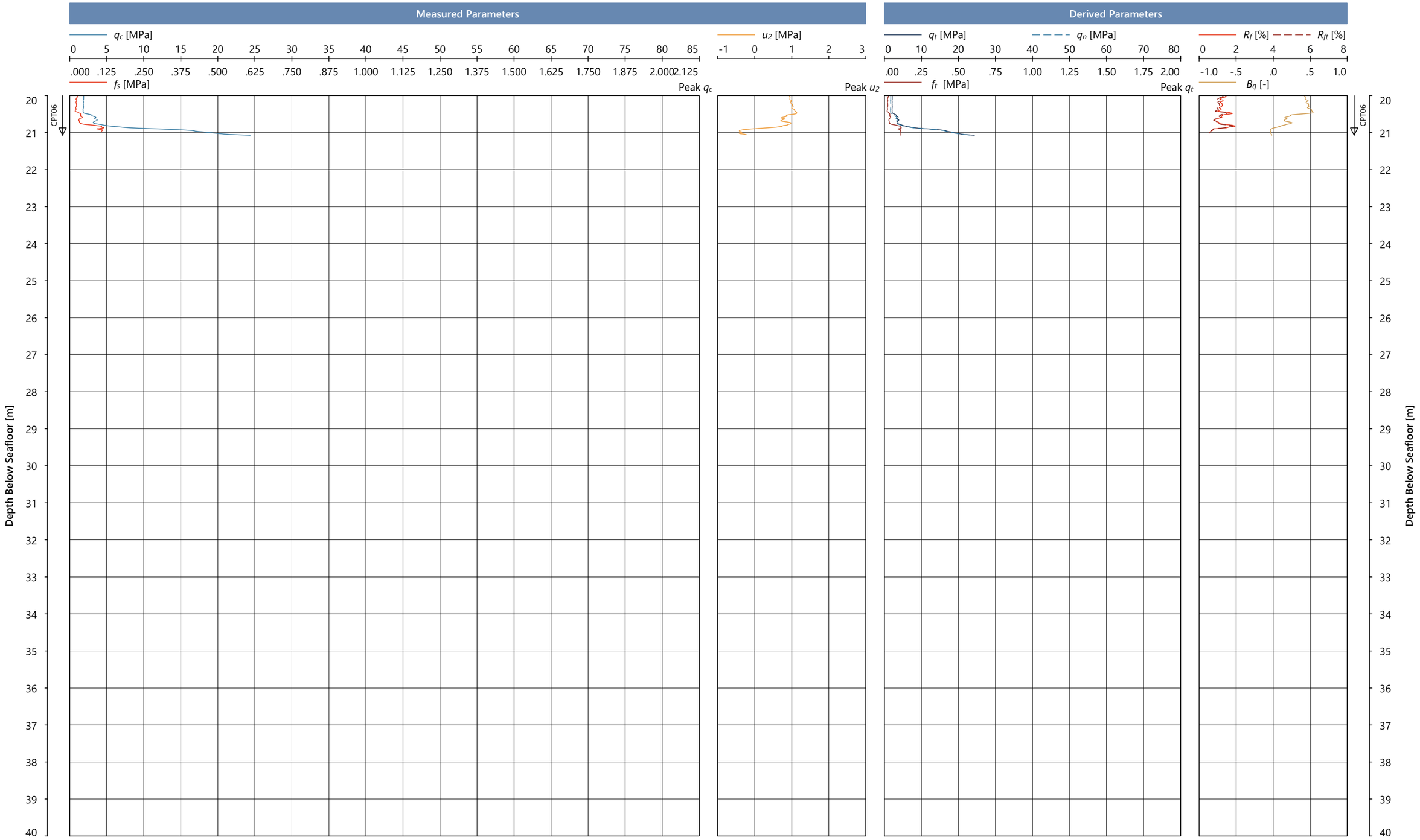
Symbols and Definitions (quantity specific: Q may be substituted for P, as appropriate)	
Qw	Applied reference quantity value.

Quantities	
P	Pressure



Date of Testing : 17 January 2025
Location : Z4_OWF_BH15-COMP
Water Depth [m] : 91.2
Coordinates [m] : E 603348.7 N 4765382.1

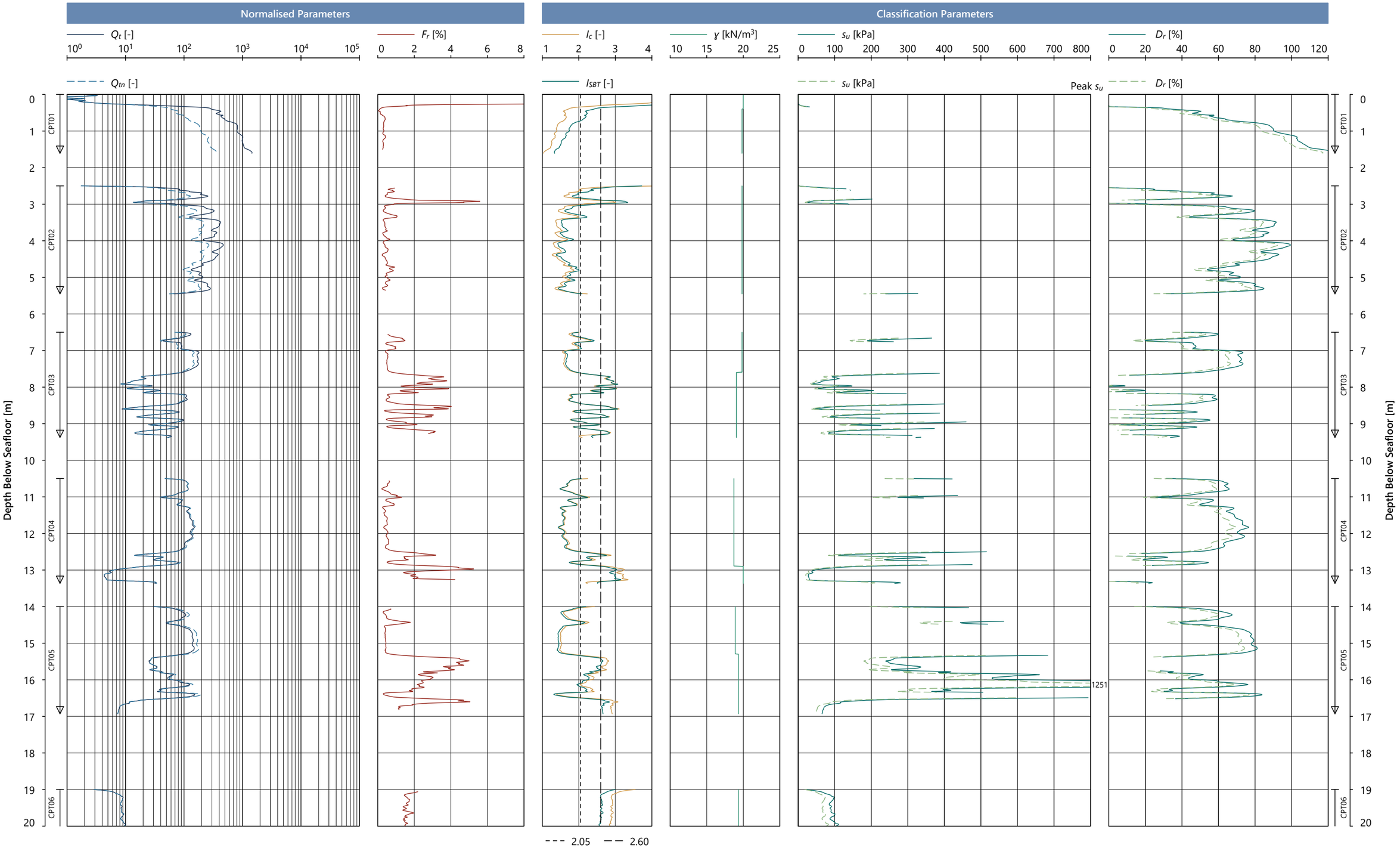
Cone Penetration Test Results: Measured and Derived Parameters



Date of Testing : 17 January 2025
Location : Z4_OWF_BH15-COMP
Water Depth [m] : 91.2
Coordinates [m] : E 603348.7 N 4765382.1

Cone Penetration Test Results: Measured and Derived Parameters

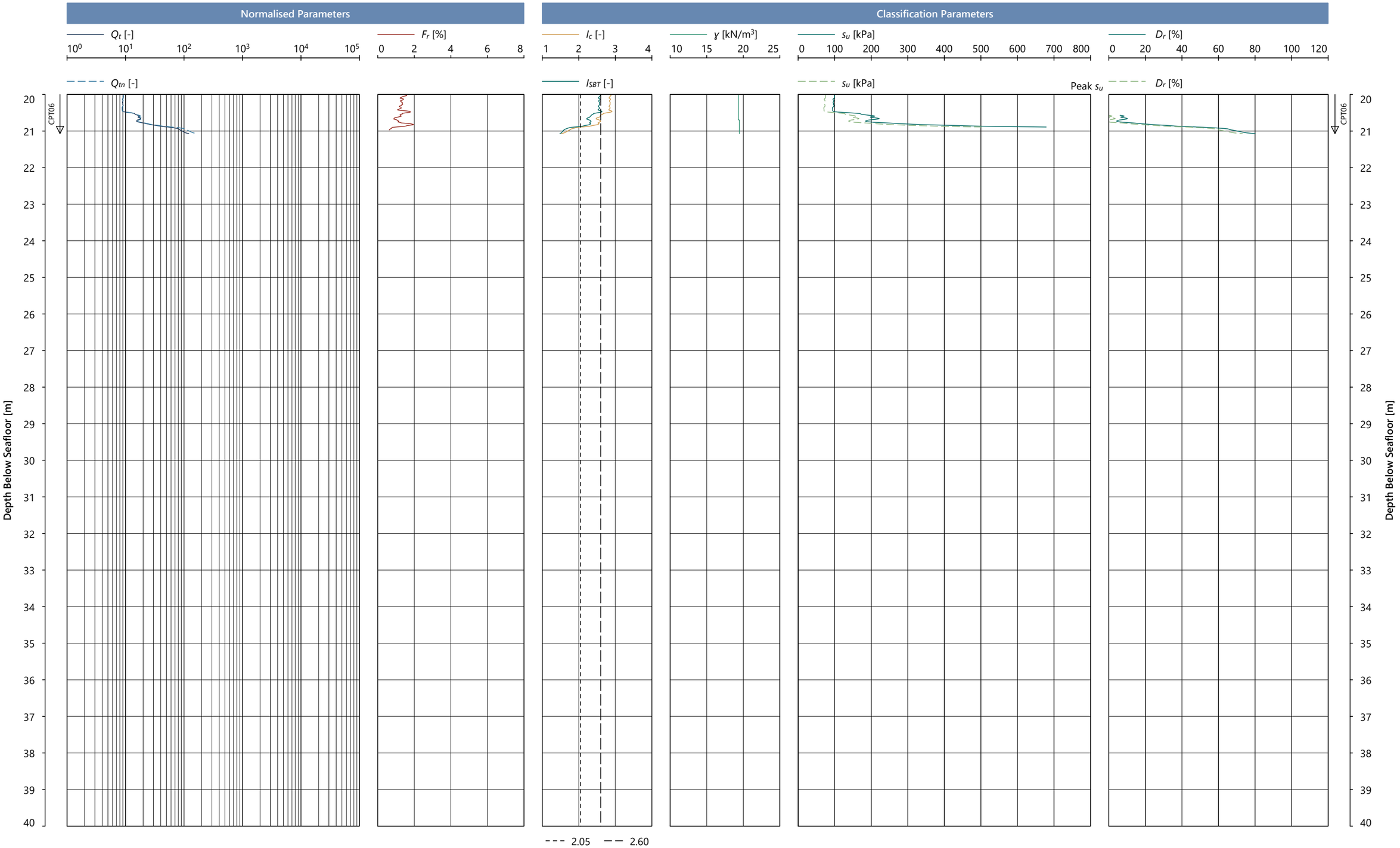
GeoVisual 4.4.3 | DM-MDP | 2025-02-04 12:53:16



Date of Testing : 17 January 2025
Location : Z4_OWF_BH15-COMP
Water Depth [m] : 91.2
Coordinates [m] : E 603348.7 N 4765382.1

GeoVisual 4.4.3 | DM-NCP(multi) | 2025-02-04 12:53:37

Cone Penetration Test Results: Normalised and Classification Parameters



Date of Testing : 17 January 2025
Location : Z4_OWF_BH15-COMP
Water Depth [m] : 91.2
Coordinates [m] : E 603348.7 N 4765382.1

Cone Penetration Test Results: Normalised and Classification Parameters

GeoVisual 4.4.3 | DM-NCP(multi) | 2025-02-04 12:53:37

Location	Test ID	Zero Reading at Start of Test			Zero Drift*			Cone Penetrometer	Serial Number	Net Area Ratio
		q_c [MPa]	f_s [MPa]	u_2 [MPa]	q_c [MPa]	f_s [MPa]	u_2 [MPa]			a [-]
Z4_OWF_BH15-COMP	CPT01	0.018	0.037	0.000	-0.022	0.001	-0.003	CP10-CF80PB10	1706-2404	0.75
Z4_OWF_BH15-COMP	CPT02	0.004	0.040	-0.003	-0.031	0.000	-0.002	CP10-CF80PB10	1706-2404	0.75
Z4_OWF_BH15-COMP	CPT03	0.001	0.040	-0.004	-0.003	0.000	-0.002	CP10-CF80PB10	1706-2404	0.75
Z4_OWF_BH15-COMP	CPT04	0.005	0.040	-0.005	-0.001	0.001	-0.001	CP10-CF80PB10	1706-2404	0.75
Z4_OWF_BH15-COMP	CPT05	0.010	0.041	-0.004	-0.026	0.000	-0.001	CP10-CF80PB10	1706-2404	0.75
Z4_OWF_BH15-COMP	CPT06	0.010	0.041	-0.003	-0.033	0.000	-0.003	CP10-CF80PB10	1706-2404	0.75

Notes

* : Zero drift is the difference between the zero output at the start of the test and the zero output at the end of the test. The zero reading at start of test is a value presented in units of measurement result. The value itself is a conversion from system output, usually in mV or in bits. It has no explicit physical meaning.

\- : Zero drift could not be calculated. Zero drift can be assessed by comparing zero drift values of successive tests.

GeoVisual 4.4.3 / DM-ZD / 2025-02-04 12:53:55

Cone Penetration Test Results: Zero Drift

4. Sampling Data

Title	Plate No.
Sample Photographs	4.1 to 4.94
Sample List and Laboratory Testing Schedule	4.95 to 4.102



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W01
Depth [m BSF]	:	0.00
Note(s)	:	Intact



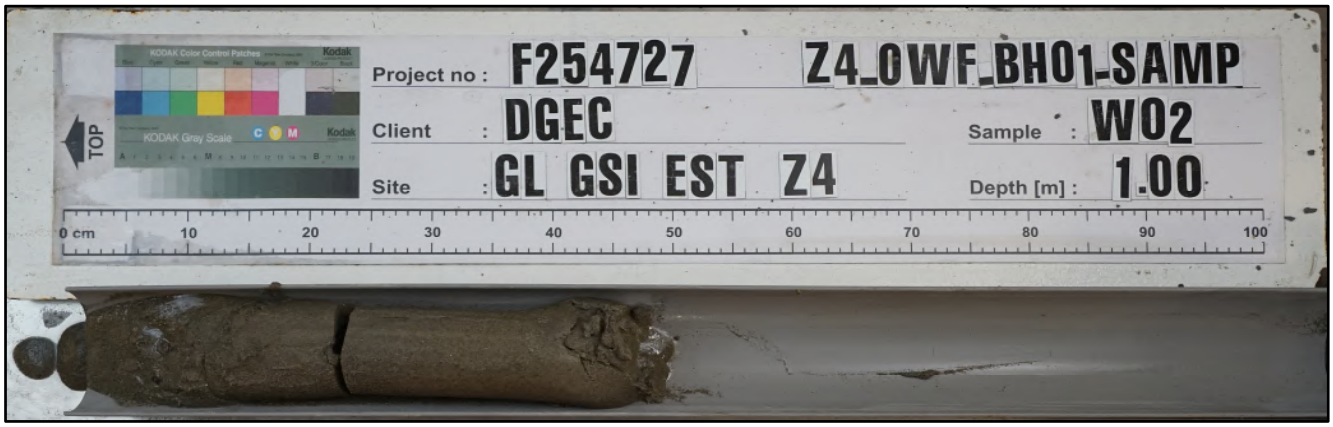
Location	:	Z4_OWF_BH01-SAMP
Sample	:	W01
Depth [m BSF]	:	0.00
Note(s)	:	Split

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH01-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025

SAMPLE PHOTOGRAPHS

Z4_OWF_BH01-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH01-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W02
Depth [m BSF]	:	1.00
Note(s)	:	Intact



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W02
Depth [m BSF]	:	1.00
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH01-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH01-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W03
Depth [m BSF]	:	1.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W03
Depth [m BSF]	:	1.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH01-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH01-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W04
Depth [m BSF]	:	2.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W04
Depth [m BSF]	:	2.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH01-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH01-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W05
Depth [m BSF]	:	3.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W05
Depth [m BSF]	:	3.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH01-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH01-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W06
Depth [m BSF]	:	4.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W06
Depth [m BSF]	:	4.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH01-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH01-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W07
Depth [m BSF]	:	5.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W07
Depth [m BSF]	:	5.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH01-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH01-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W08A
Depth [m BSF]	:	6.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W08A
Depth [m BSF]	:	6.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH01-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH01-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W08
Depth [m BSF]	:	6.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W08
Depth [m BSF]	:	6.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH01-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH01-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W09
Depth [m BSF]	:	7.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W09
Depth [m BSF]	:	7.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH01-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH01-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W10
Depth [m BSF]	:	8.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W10
Depth [m BSF]	:	8.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH01-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH01-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W11
Depth [m BSF]	:	9.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W11
Depth [m BSF]	:	9.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH01-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH01-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W12
Depth [m BSF]	:	10.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W12
Depth [m BSF]	:	10.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH01-SAMP



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W13
Depth [m BSF]	:	11.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W13
Depth [m BSF]	:	11.50
Note(s)	:	Split

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH01-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025

SAMPLE PHOTOGRAPHS

Z4_OWF_BH01-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH01-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W14
Depth [m BSF]	:	12.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W14
Depth [m BSF]	:	12.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH01-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH01-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W15
Depth [m BSF]	:	13.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W15
Depth [m BSF]	:	13.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH01-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH01-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W16
Depth [m BSF]	:	14.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W16
Depth [m BSF]	:	14.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH01-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH01-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W17
Depth [m BSF]	:	15.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W17
Depth [m BSF]	:	15.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH01-SAMP



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W18
Depth [m BSF]	:	16.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W18
Depth [m BSF]	:	16.50
Note(s)	:	Split

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH01-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025

SAMPLE PHOTOGRAPHS

Z4_OWF_BH01-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH01-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W19
Depth [m BSF]	:	17.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W19
Depth [m BSF]	:	17.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH01-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH01-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W20
Depth [m BSF]	:	18.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W20
Depth [m BSF]	:	18.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH01-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH01-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W21
Depth [m BSF]	:	19.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH01-SAMP
Sample	:	W21
Depth [m BSF]	:	19.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH01-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH05-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH05_SAMP
Sample	:	W01
Depth [m BSF]	:	0.00
Note(s)	:	Intact



Location	:	Z4_OWF_BH05_SAMP
Sample	:	W01
Depth [m BSF]	:	0.00
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH05-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH05-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH05_SAMP
Sample	:	W02
Depth [m BSF]	:	1.00
Note(s)	:	Intact

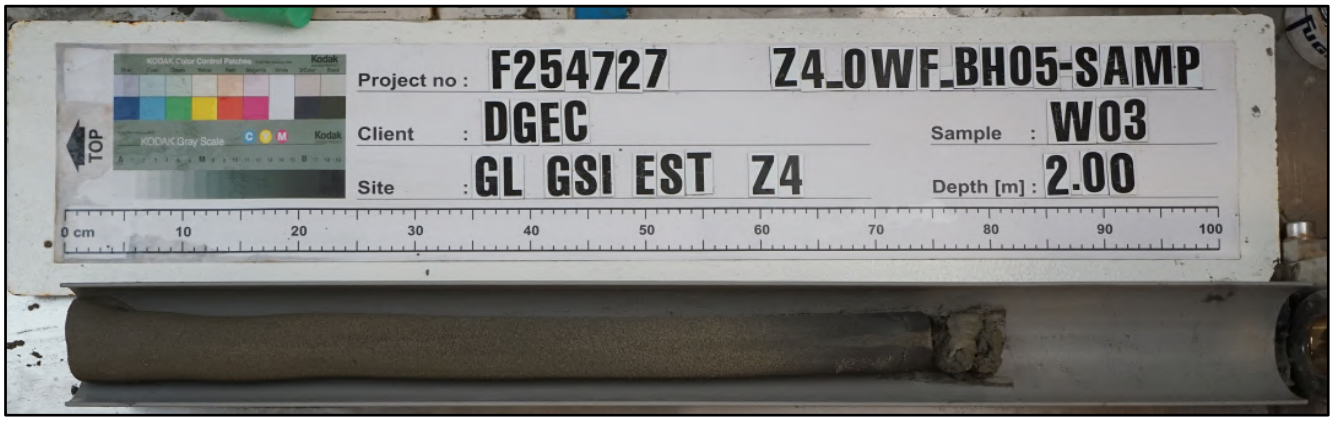


Location	:	Z4_OWF_BH05_SAMP
Sample	:	W02
Depth [m BSF]	:	1.00
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH05-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH05-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH05_SAMP
Sample	:	W03
Depth [m BSF]	:	2.00
Note(s)	:	Intact



Location	:	Z4_OWF_BH05_SAMP
Sample	:	W03
Depth [m BSF]	:	2.00
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH05-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH05-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH05_SAMP
Sample	:	W04
Depth [m BSF]	:	3.00
Note(s)	:	Intact



Location	:	Z4_OWF_BH05_SAMP
Sample	:	W04
Depth [m BSF]	:	3.00
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH05-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH05-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH05_SAMP
Sample	:	W05
Depth [m BSF]	:	4.00
Note(s)	:	Intact

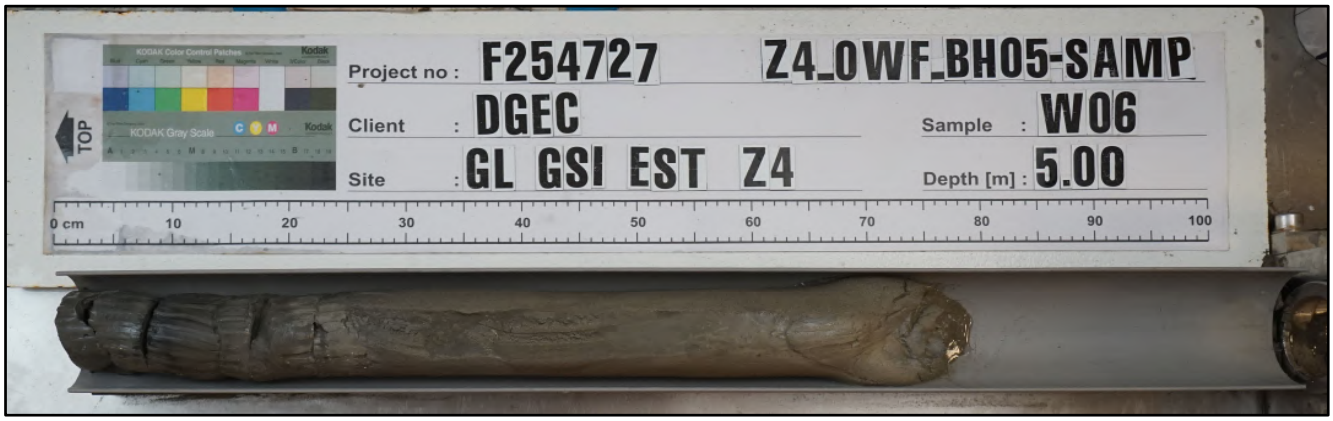


Location	:	Z4_OWF_BH05_SAMP
Sample	:	W05
Depth [m BSF]	:	4.00
Note(s)	:	Split

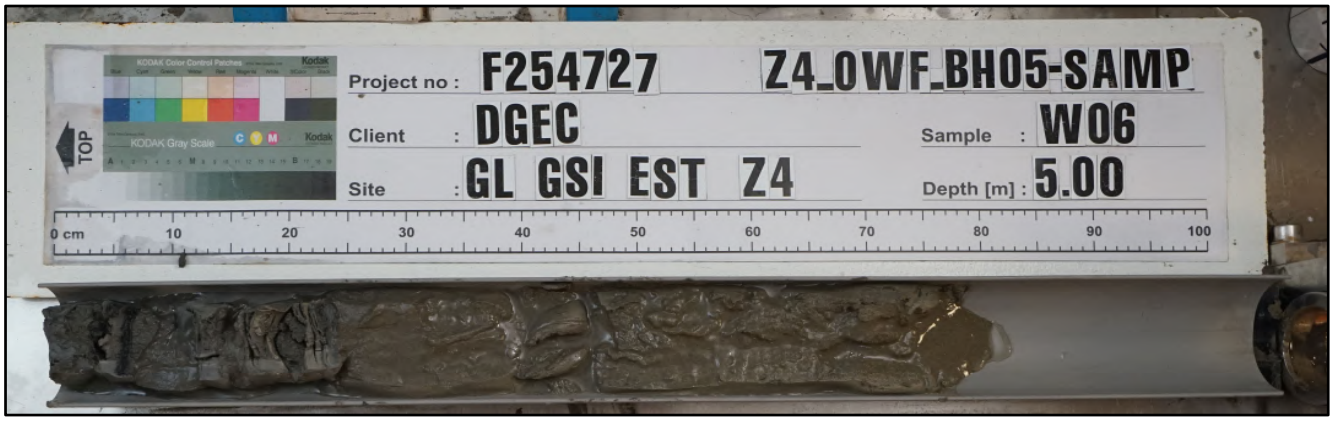
SAMPLE PHOTOGRAPHS

Z4_OWF_BH05-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH05-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH05_SAMP
Sample	:	W06
Depth [m BSF]	:	5.00
Note(s)	:	Intact

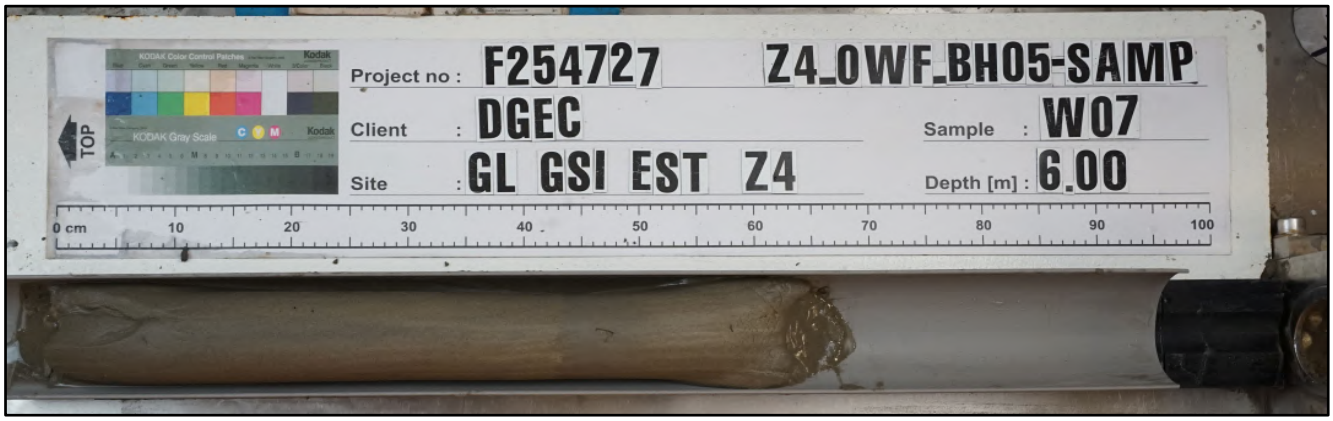


Location	:	Z4_OWF_BH05_SAMP
Sample	:	W06
Depth [m BSF]	:	5.00
Note(s)	:	Split

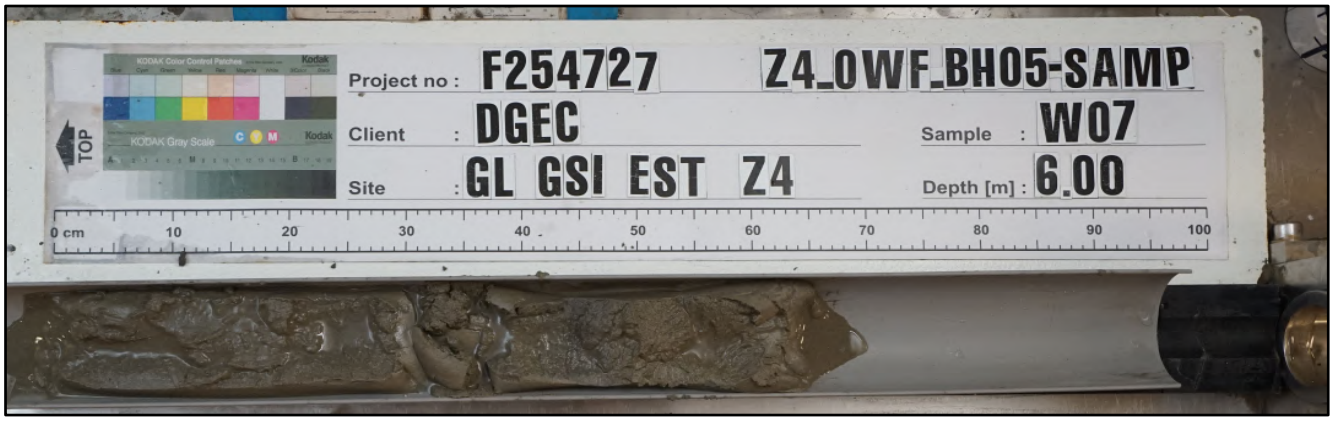
SAMPLE PHOTOGRAPHS

Z4_OWF_BH05-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH05-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



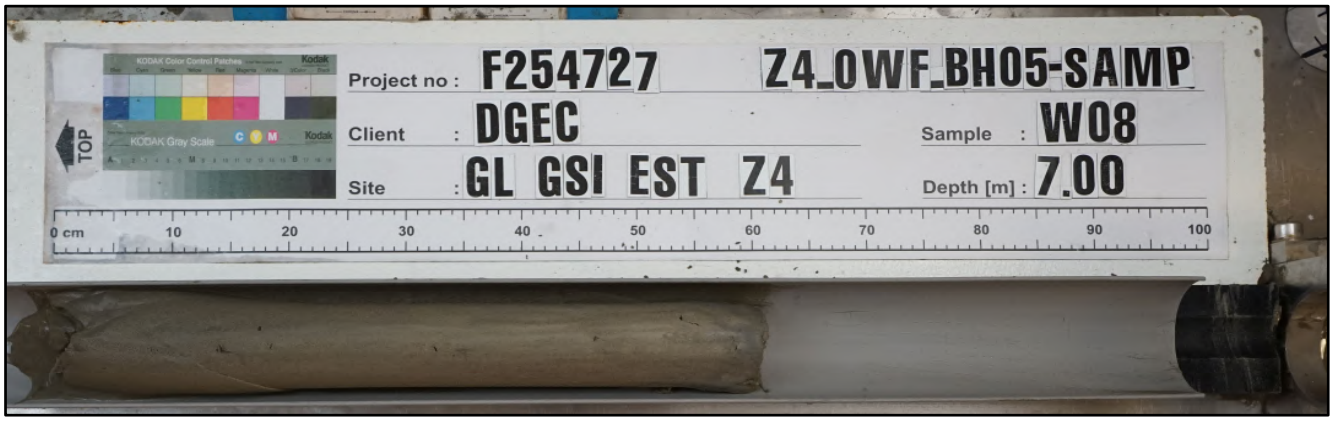
Location	:	Z4_OWF_BH05_SAMP
Sample	:	W07
Depth [m BSF]	:	6.00
Note(s)	:	Intact



Location	:	Z4_OWF_BH05_SAMP
Sample	:	W07
Depth [m BSF]	:	6.00
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH05-SAMP



Location	:	Z4_OWF_BH05_SAMP
Sample	:	W08
Depth [m BSF]	:	7.00
Note(s)	:	Intact



Location	:	Z4_OWF_BH05_SAMP
Sample	:	W08
Depth [m BSF]	:	7.00
Note(s)	:	Split

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH05-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025

SAMPLE PHOTOGRAPHS

Z4_OWF_BH05-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH05-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH05_SAMP
Sample	:	W09
Depth [m BSF]	:	8.00
Note(s)	:	Intact



Location	:	Z4_OWF_BH05_SAMP
Sample	:	W09
Depth [m BSF]	:	8.00
Note(s)	:	Split

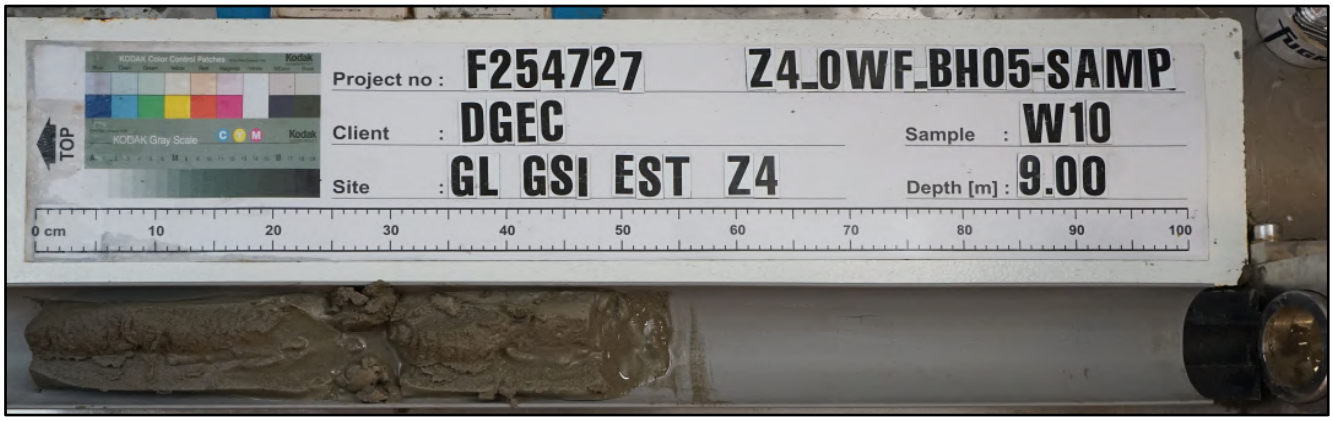
SAMPLE PHOTOGRAPHS

Z4_OWF_BH05-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH05-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH05_SAMP
Sample	:	W10
Depth [m BSF]	:	9.00
Note(s)	:	Intact

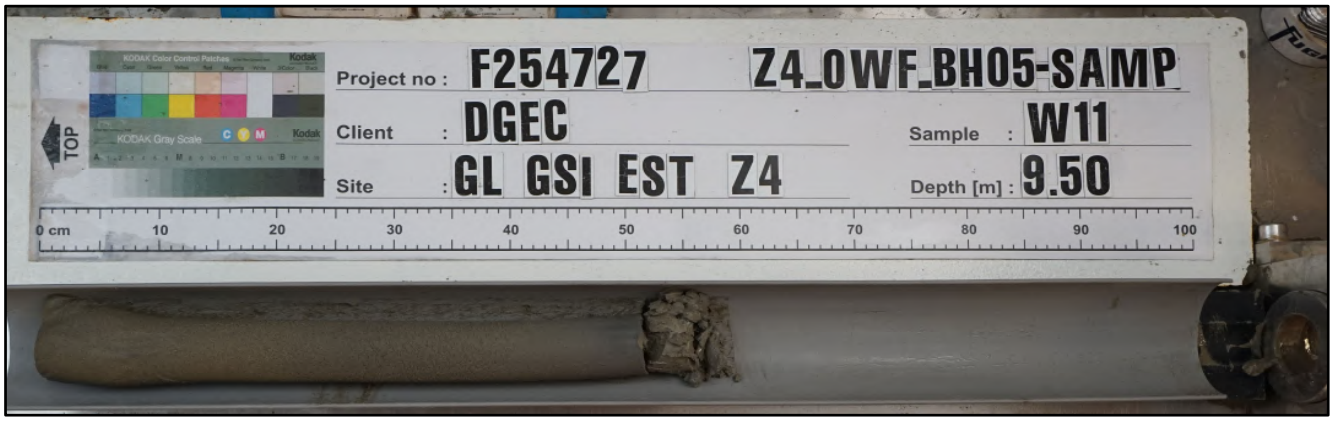


Location	:	Z4_OWF_BH05_SAMP
Sample	:	W10
Depth [m BSF]	:	9.00
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH05-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH05-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH05_SAMP
Sample	:	W11
Depth [m BSF]	:	9.50
Note(s)	:	Intact

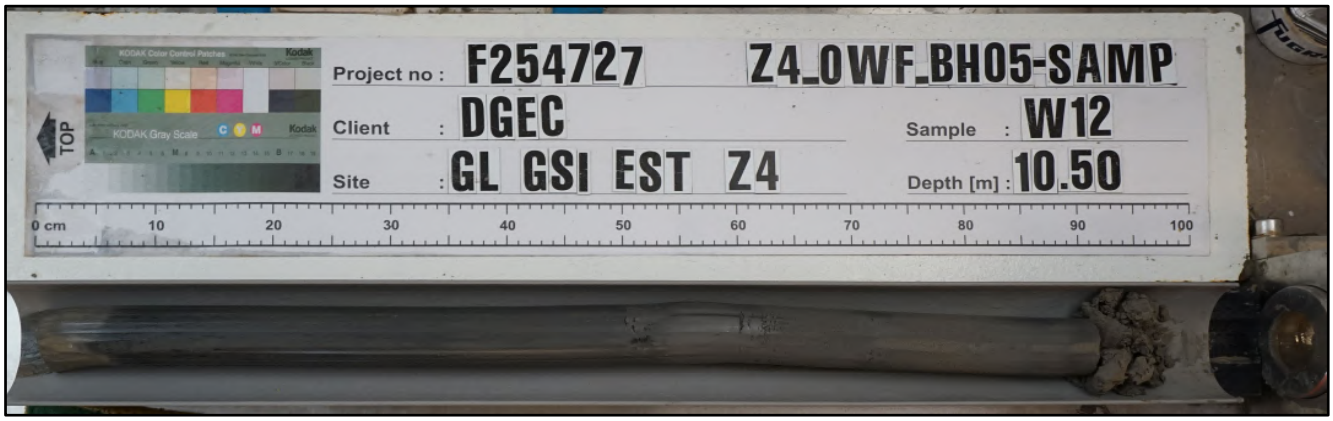


Location	:	Z4_OWF_BH05_SAMP
Sample	:	W11
Depth [m BSF]	:	9.50
Note(s)	:	Split

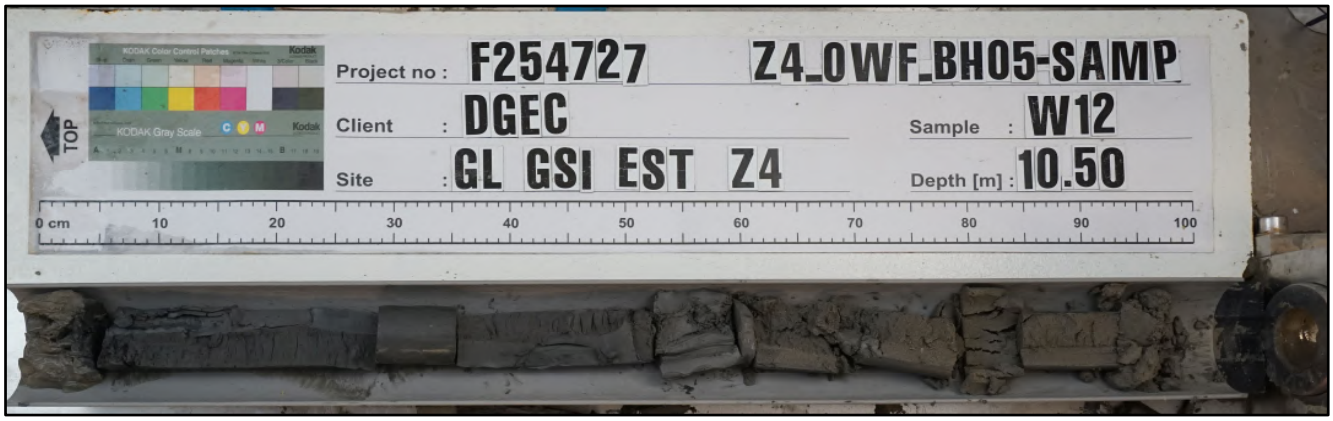
SAMPLE PHOTOGRAPHS

Z4_OWF_BH05-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH05-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



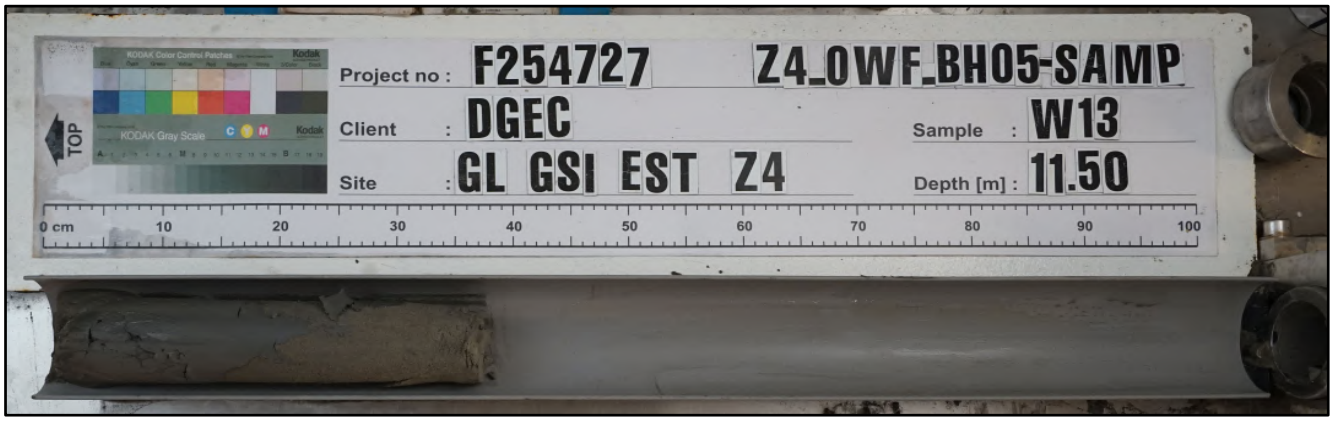
Location	:	Z4_OWF_BH05_SAMP
Sample	:	W12
Depth [m BSF]	:	10.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH05_SAMP
Sample	:	W12
Depth [m BSF]	:	10.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH05-SAMP



Location	:	Z4_OWF_BH05_SAMP
Sample	:	W13
Depth [m BSF]	:	11.50
Note(s)	:	Intact

No photograph available

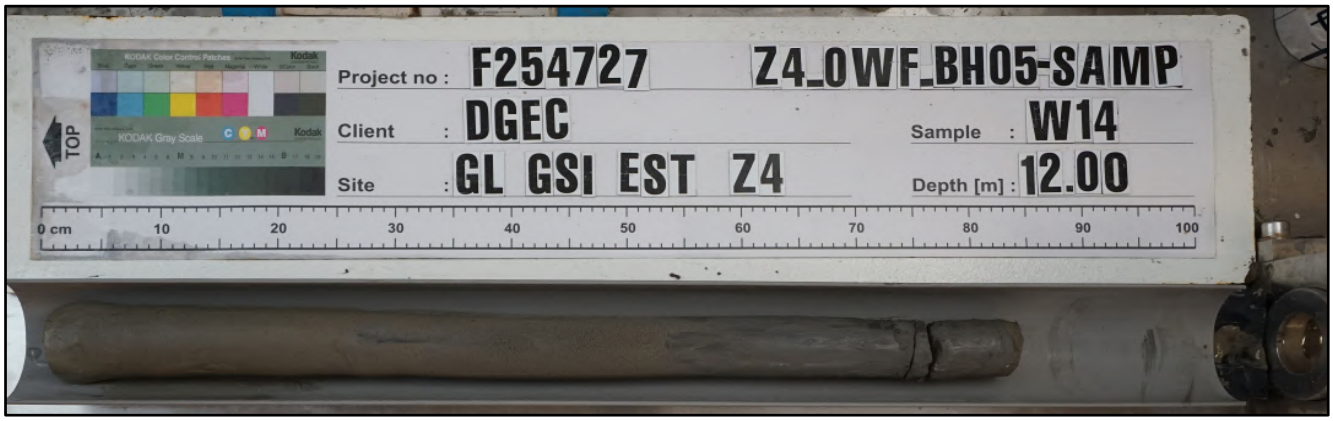
Location	:	Z4_OWF_BH05_SAMP
Sample	:	W13
Depth [m BSF]	:	11.50

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH05-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025

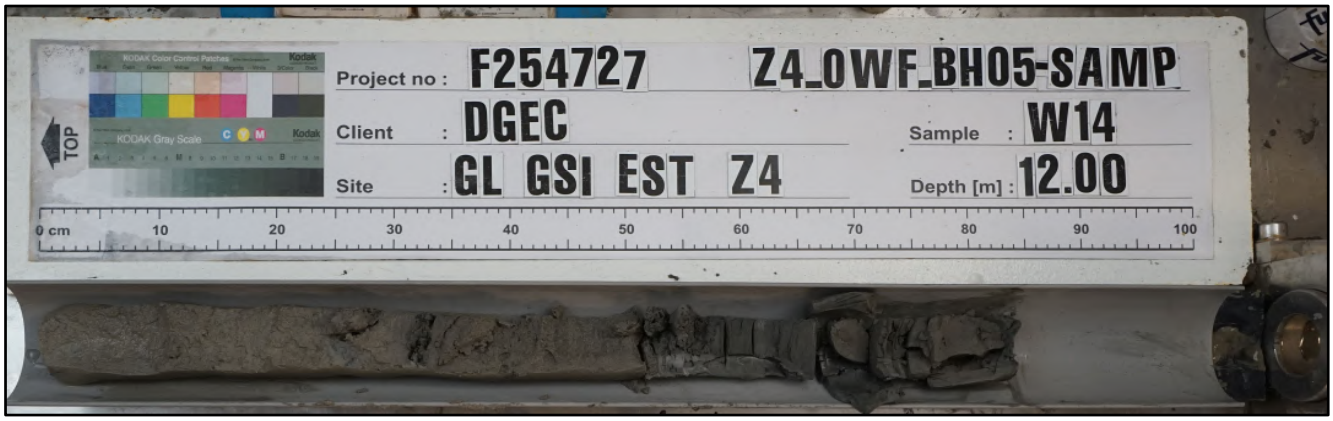
SAMPLE PHOTOGRAPHS

Z4_OWF_BH05-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH05-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH05_SAMP
Sample	:	W14
Depth [m BSF]	:	12.00
Note(s)	:	Intact

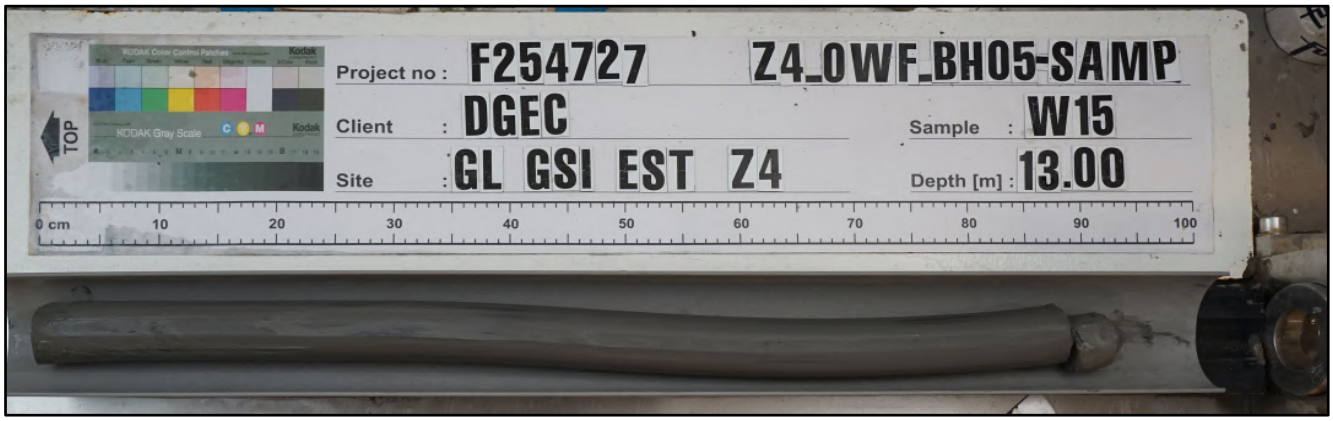


Location	:	Z4_OWF_BH05_SAMP
Sample	:	W14
Depth [m BSF]	:	12.00
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH05-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH05-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH05_SAMP
Sample	:	W15
Depth [m BSF]	:	13.00
Note(s)	:	Intact



Location	:	Z4_OWF_BH05_SAMP
Sample	:	W15
Depth [m BSF]	:	13.00
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH05-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH05-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH05_SAMP
Sample	:	W16
Depth [m BSF]	:	14.00
Note(s)	:	Intact



Location	:	Z4_OWF_BH05_SAMP
Sample	:	W16
Depth [m BSF]	:	14.00
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH05-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH05-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH05_SAMP
Sample	:	W17
Depth [m BSF]	:	15.00
Note(s)	:	Intact



Location	:	Z4_OWF_BH05_SAMP
Sample	:	W17
Depth [m BSF]	:	15.00
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH05-SAMP



Location	:	Z4_OWF_BH05_SAMP
Sample	:	W18
Depth [m BSF]	:	16.00
Note(s)	:	Intact



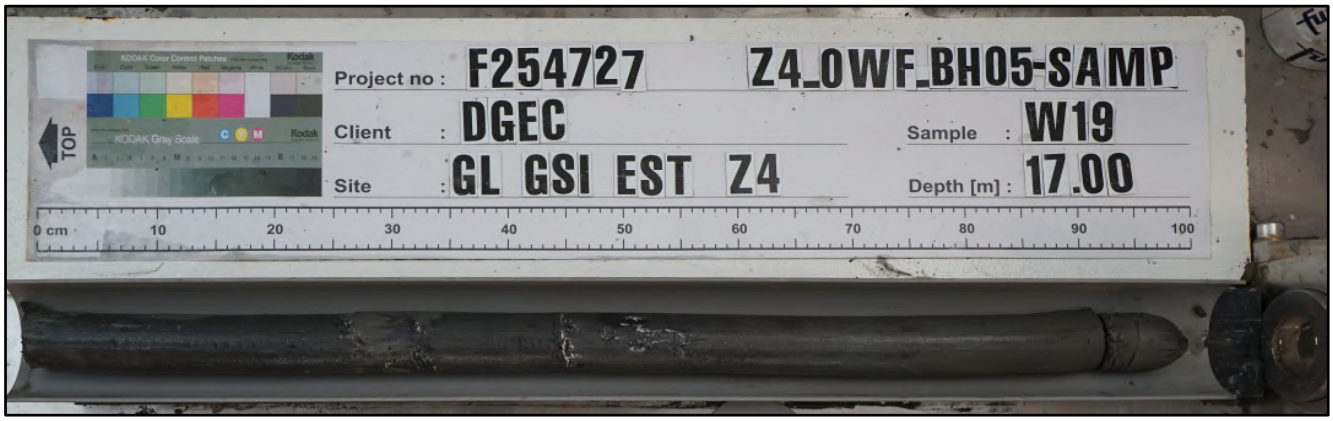
Location	:	Z4_OWF_BH05_SAMP
Sample	:	W18
Depth [m BSF]	:	16.00
Note(s)	:	Split

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH05-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025

SAMPLE PHOTOGRAPHS

Z4_OWF_BH05-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH05-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH05_SAMP
Sample	:	W19
Depth [m BSF]	:	17.00
Note(s)	:	Intact



Location	:	Z4_OWF_BH05_SAMP
Sample	:	W19
Depth [m BSF]	:	17.00
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH05-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH05-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH05_SAMP
Sample	:	W20
Depth [m BSF]	:	18.00
Note(s)	:	Intact



Location	:	Z4_OWF_BH05_SAMP
Sample	:	W20
Depth [m BSF]	:	18.00
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH05-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH05-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH05_SAMP
Sample	:	W21
Depth [m BSF]	:	19.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH05_SAMP
Sample	:	W21
Depth [m BSF]	:	19.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH05-SAMP

Release Date: 21-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH15-COMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 21-1-2025



Location	:	Z4_OWF_BH15-COMP
Sample	:	W01
Depth [m BSF]	:	1.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH15-COMP
Sample	:	W01
Depth [m BSF]	:	1.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH15_COMP

Release Date: 21-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH15-COMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 21-1-2025



Location	:	Z4_OWF_BH15-COMP
Sample	:	W02
Depth [m BSF]	:	5.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH15-COMP
Sample	:	W02
Depth [m BSF]	:	5.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH15_COMP

Release Date: 21-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH15-COMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 21-1-2025



Location	:	Z4_OWF_BH15-COMP
Sample	:	W03
Depth [m BSF]	:	8.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH15-COMP
Sample	:	W03
Depth [m BSF]	:	8.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH15_COMP

Release Date: 21-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH15-COMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 21-1-2025



Location	:	Z4_OWF_BH15-COMP
Sample	:	W04
Depth [m BSF]	:	9.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH15-COMP
Sample	:	W04
Depth [m BSF]	:	9.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH15_COMP

Release Date: 21-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH15-COMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 21-1-2025



Location	:	Z4_OWF_BH15-COMP
Sample	:	W05
Depth [m BSF]	:	13.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH15-COMP
Sample	:	W05
Depth [m BSF]	:	13.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH15_COMP

Release Date: 21-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH15-COMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 21-1-2025



Location	:	Z4_OWF_BH15-COMP
Sample	:	W06
Depth [m BSF]	:	17.00
Note(s)	:	Intact



Location	:	Z4_OWF_BH15-COMP
Sample	:	W06
Depth [m BSF]	:	17.00
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH15_COMP

Release Date: 21-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH15-COMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 21-1-2025



Location	:	Z4_OWF_BH15-COMP
Sample	:	W07
Depth [m BSF]	:	18.00
Note(s)	:	Intact

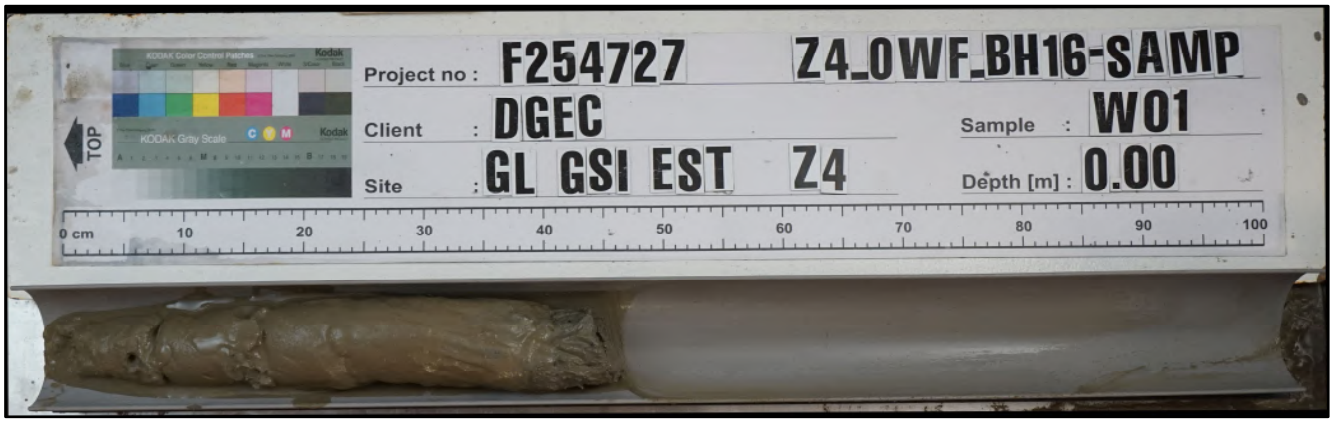


Location	:	Z4_OWF_BH15-COMP
Sample	:	W07
Depth [m BSF]	:	18.00
Note(s)	:	Split

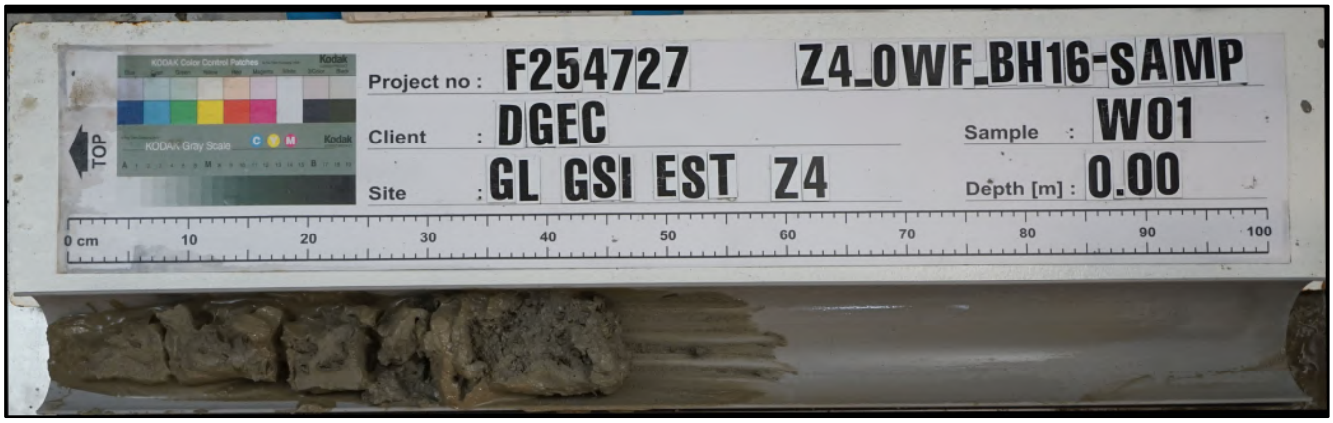
SAMPLE PHOTOGRAPHS

Z4_OWF_BH15_COMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH16-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W01
Depth [m BSF]	:	0.00
Note(s)	:	Intact



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W01
Depth [m BSF]	:	0.00
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH16-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH16-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W02
Depth [m BSF]	:	0.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W02
Depth [m BSF]	:	0.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH16-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH16-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W03
Depth [m BSF]	:	1.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W03
Depth [m BSF]	:	1.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH16-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH16-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W04
Depth [m BSF]	:	2.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W04
Depth [m BSF]	:	2.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH16-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH16-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W05
Depth [m BSF]	:	3.00
Note(s)	:	Intact



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W05
Depth [m BSF]	:	3.00
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH16-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH16-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W06
Depth [m BSF]	:	4.00
Note(s)	:	Intact



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W06
Depth [m BSF]	:	4.00
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH16-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH16-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W07
Depth [m BSF]	:	5.00
Note(s)	:	Intact



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W07
Depth [m BSF]	:	5.00
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH16-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH16-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W08
Depth [m BSF]	:	6.00
Note(s)	:	Intact



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W08
Depth [m BSF]	:	6.00
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH16-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH16-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W09
Depth [m BSF]	:	7.00
Note(s)	:	Intact



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W09
Depth [m BSF]	:	7.00
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH16-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH16-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W10
Depth [m BSF]	:	8.00
Note(s)	:	Intact



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W10
Depth [m BSF]	:	8.00
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH16-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH16-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W11
Depth [m BSF]	:	9.00
Note(s)	:	Intact



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W11
Depth [m BSF]	:	9.00
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH16-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH16-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W12
Depth [m BSF]	:	10.00
Note(s)	:	Intact



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W12
Depth [m BSF]	:	10.00
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH16-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH16-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W13
Depth [m BSF]	:	11.00
Note(s)	:	Intact



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W13
Depth [m BSF]	:	11.00
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH16-SAMP



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W14
Depth [m BSF]	:	12.00
Note(s)	:	Intact



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W14
Depth [m BSF]	:	12.00
Note(s)	:	Split

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH16-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025

SAMPLE PHOTOGRAPHS

Z4_OWF_BH16-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH16-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W15
Depth [m BSF]	:	13.00
Note(s)	:	Intact



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W15
Depth [m BSF]	:	13.00
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH16-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH16-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W16
Depth [m BSF]	:	14.00
Note(s)	:	Intact



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W16
Depth [m BSF]	:	14.00
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH16-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH16-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W17
Depth [m BSF]	:	14.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W17
Depth [m BSF]	:	14.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH16-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH16-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W18
Depth [m BSF]	:	15.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W18
Depth [m BSF]	:	15.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH16-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH16-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W19
Depth [m BSF]	:	16.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W19
Depth [m BSF]	:	16.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH16-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH16-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W20
Depth [m BSF]	:	17.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W20
Depth [m BSF]	:	17.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH16-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH16-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W21
Depth [m BSF]	:	18.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W21
Depth [m BSF]	:	18.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH16-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH16-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W22
Depth [m BSF]	:	19.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W22
Depth [m BSF]	:	19.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH16-SAMP

Release Date: 27-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH16-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 27-1-2025



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W23
Depth [m BSF]	:	20.00
Note(s)	:	Intact



Location	:	Z4_OWF_BH16-SAMP
Sample	:	W23
Depth [m BSF]	:	20.00
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH16-SAMP

Release Date: 21-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH17-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 21-1-2025



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W01
Depth [m BSF]	:	0.00
Note(s)	:	Intact



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W01
Depth [m BSF]	:	0.00
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH17_SAMP

Release Date: 21-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH17-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 21-1-2025



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W02
Depth [m BSF]	:	1.00
Note(s)	:	Intact



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W02
Depth [m BSF]	:	1.00
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH17_SAMP

Release Date: 21-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH17-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 21-1-2025



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W03
Depth [m BSF]	:	1.50
Note(s)	:	Intact

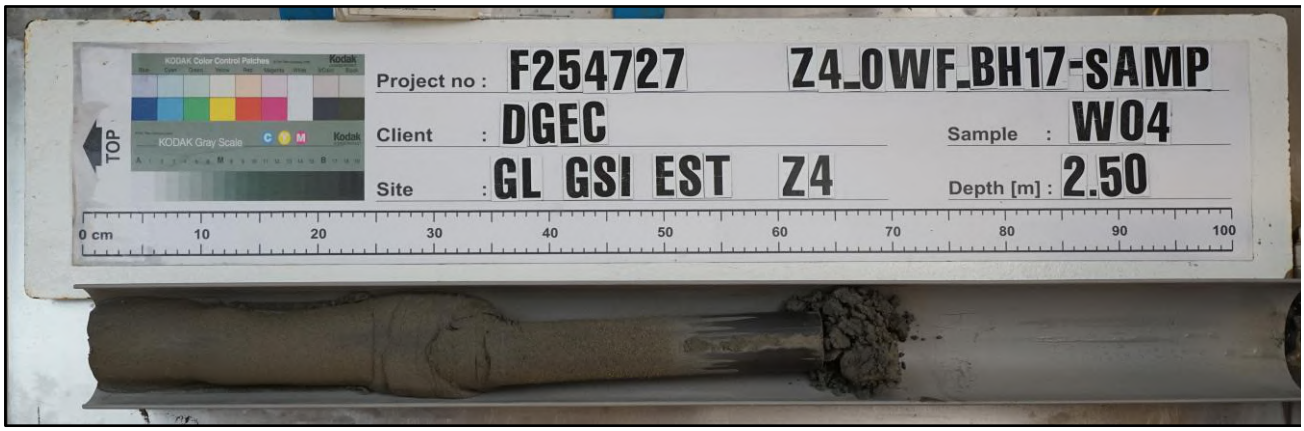


Location	:	Z4_OWF_BH17-SAMP
Sample	:	W03
Depth [m BSF]	:	1.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH17_SAMP

Release Date: 21-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH17-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 21-1-2025



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W04
Depth [m BSF]	:	2.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W04
Depth [m BSF]	:	2.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH17_SAMP

Release Date: 21-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH17-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 21-1-2025



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W05
Depth [m BSF]	:	3.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W05
Depth [m BSF]	:	3.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH17_SAMP

Release Date: 21-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH17-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 21-1-2025



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W06
Depth [m BSF]	:	4.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W06
Depth [m BSF]	:	4.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH17_SAMP

Release Date: 21-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH17-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 21-1-2025



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W07
Depth [m BSF]	:	5.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W07
Depth [m BSF]	:	5.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH17_SAMP

Release Date: 21-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH17-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 21-1-2025



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W08
Depth [m BSF]	:	6.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W08
Depth [m BSF]	:	6.50
Note(s)	:	Split

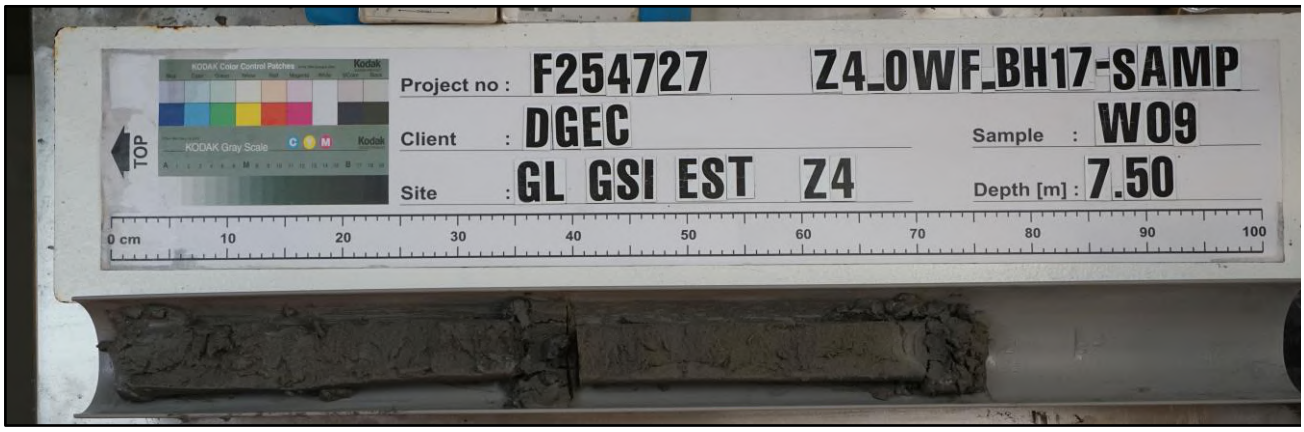
SAMPLE PHOTOGRAPHS

Z4_OWF_BH17_SAMP

Release Date: 21-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH17-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 21-1-2025



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W09
Depth [m BSF]	:	7.50
Note(s)	:	Intact

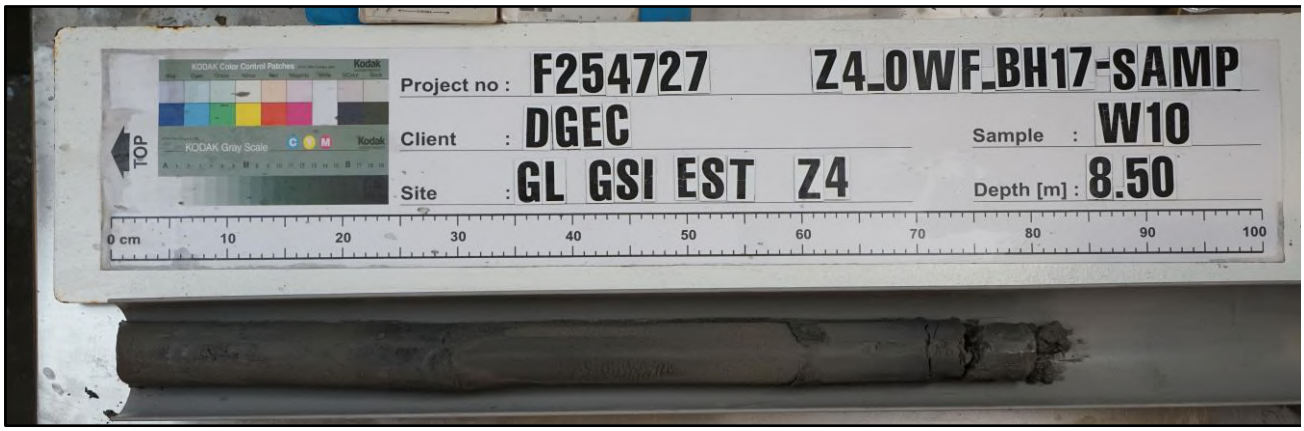


Location	:	Z4_OWF_BH17-SAMP
Sample	:	W09
Depth [m BSF]	:	7.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH17_SAMP

Release Date: 21-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH17-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 21-1-2025



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W10
Depth [m BSF]	:	8.50
Note(s)	:	Intact

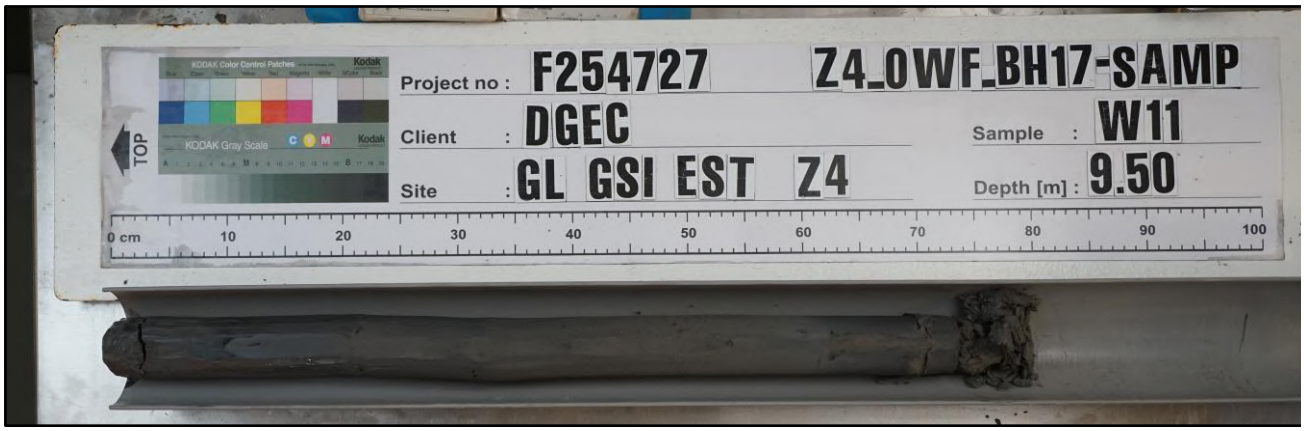


Location	:	Z4_OWF_BH17-SAMP
Sample	:	W10
Depth [m BSF]	:	8.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH17_SAMP

Release Date: 21-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH17-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 21-1-2025



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W11
Depth [m BSF]	:	9.50
Note(s)	:	Intact

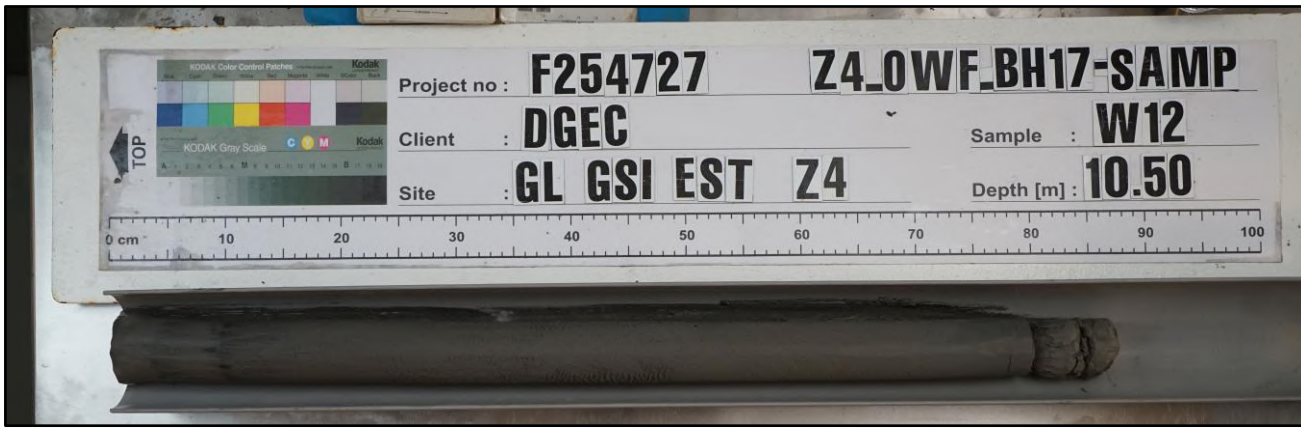


Location	:	Z4_OWF_BH17-SAMP
Sample	:	W11
Depth [m BSF]	:	9.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH17_SAMP

Release Date: 21-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH17-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 21-1-2025



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W12
Depth [m BSF]	:	10.50
Note(s)	:	Intact

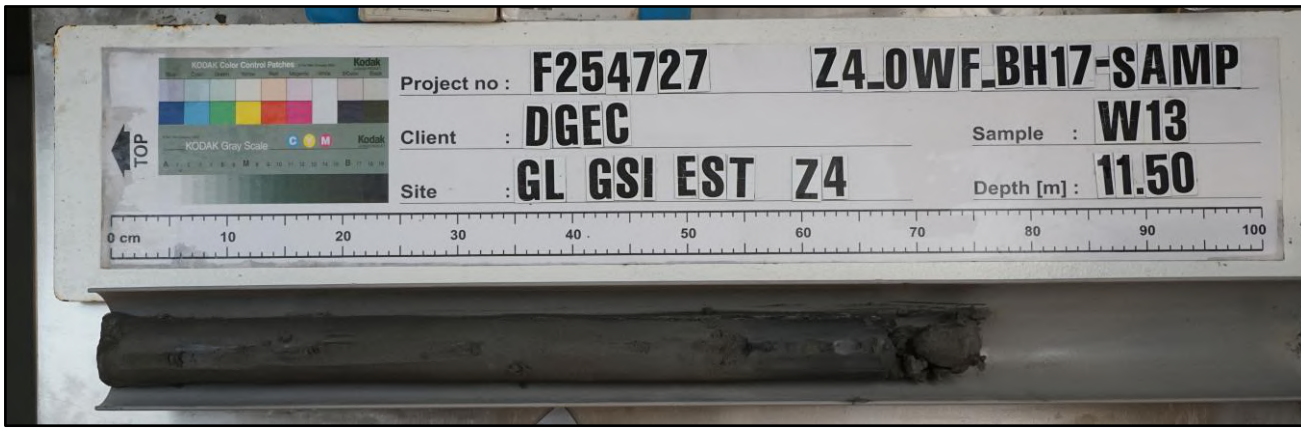


Location	:	Z4_OWF_BH17-SAMP
Sample	:	W12
Depth [m BSF]	:	10.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH17_SAMP

Release Date: 21-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH17-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 21-1-2025



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W13
Depth [m BSF]	:	11.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W13
Depth [m BSF]	:	11.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH17_SAMP

Release Date: 21-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH17-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 21-1-2025



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W14
Depth [m BSF]	:	12.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W14
Depth [m BSF]	:	12.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH17_SAMP

Release Date: 21-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH17-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 21-1-2025



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W15
Depth [m BSF]	:	13.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W15
Depth [m BSF]	:	13.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH17_SAMP

Release Date: 21-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH17-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 21-1-2025



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W16
Depth [m BSF]	:	14.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W16
Depth [m BSF]	:	14.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH17_SAMP

Release Date: 21-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH17-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 21-1-2025



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W17
Depth [m BSF]	:	15.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W17
Depth [m BSF]	:	15.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH17_SAMP

Release Date: 21-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH17-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 21-1-2025



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W18
Depth [m BSF]	:	16.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W18
Depth [m BSF]	:	16.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH17_SAMP

Release Date: 21-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH17-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 21-1-2025



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W19
Depth [m BSF]	:	17.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W19
Depth [m BSF]	:	17.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH17_SAMP

Release Date: 21-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH17-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 21-1-2025



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W20
Depth [m BSF]	:	18.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W20
Depth [m BSF]	:	18.50
Note(s)	:	Split

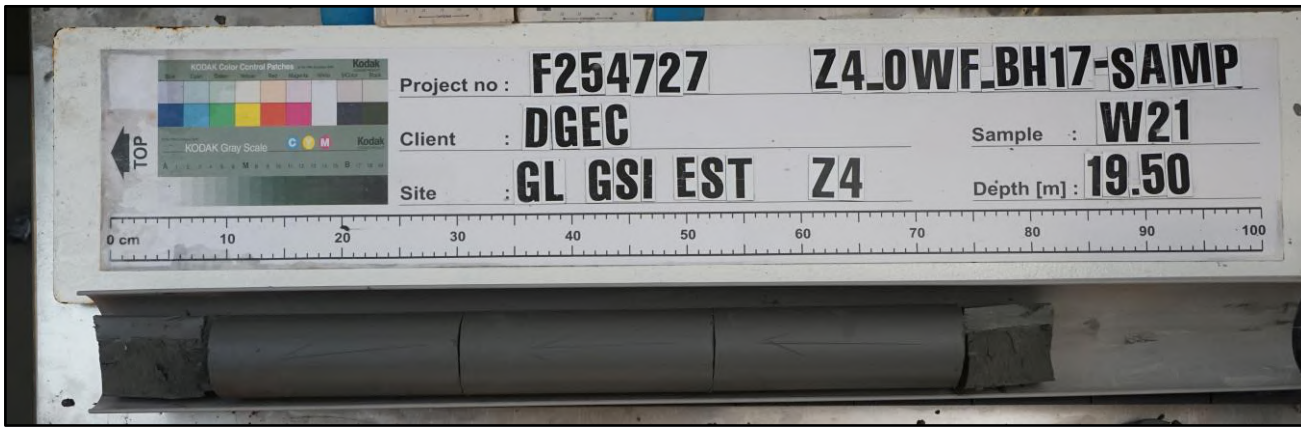
SAMPLE PHOTOGRAPHS

Z4_OWF_BH17_SAMP

Release Date: 21-1-2025
Drawn with: Photo_Plate_Maker v 6.0
Photo Folder: ield\Golfe du Lion Est (Z4)\Z4_OWF_BH17-SAMP
Presented Plate: Downhole_Portrait
Processed by:
Date: 21-1-2025



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W21
Depth [m BSF]	:	19.50
Note(s)	:	Intact



Location	:	Z4_OWF_BH17-SAMP
Sample	:	W21
Depth [m BSF]	:	19.50
Note(s)	:	Split

SAMPLE PHOTOGRAPHS

Z4_OWF_BH17_SAMP

Lab Testing Schedule

CLIENT: DGEC
SITE: Golfe de Lion Geotechnical Site Investigation Est (Z4)
JOB NO: F254727

Drawn by: MRI/BQM
Date: 10/2/2025

Total number of offshore tests (#)											268	246	55	46	21	10	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0		
Total number of onshore tests (/)											0	0	0	0	0	0	0	9	32	32	23	8	5	6	12	1	7	4	17	6	20	20	20	20	20		
Borehole Number	Sample	Depth from (m)	Sample Type	Sample Length (cm)	Sample Diameter (mm)	Mass (g)	Wallingford / LLN	Sample received	Sample location	Sample used up	Moisture Content	Bulk Density	PP	TV	Sulphate Reducing Bacteria	Thermal Conductivity/Resistivity	Thermal Conductivity Reconstituted	Plasticity Index	Sieve	Sedimentation	PD	Min/Max Density	Permeameter Permeability [Constant	OED	Shear Box	UU	UU remould	TXL Permeability [Constant Head]	CIDc (set of 3 tests)	CIUc	Loss on Ignition	Total Sulphate Content	Water Soluble Chloride	Carbonate Content of Soil	pH Value of Soil and Water	Soil Type	Remarks
Z4_OWF_BH01-SAMP	01-1	0	Bag	30	68.7	1673			Box 17									/	/	/																CLAY	
Z4_OWF_BH01-SAMP	01-2	0.3	Bag	30	68.7	1705			Box 17		#	#							/	/	/															SAND	
Z4_OWF_BH01-SAMP	01-3	0.6	Bag	20	68.7	1122			Box 17		#																		/							SAND	
Z4_OWF_BH01-SAMP	02-1	1	Bag	50	68.7	2521			Box 17		#	#																								SAND	
Z4_OWF_BH01-SAMP	03-1	1.5	Bag	65	68.7	2856			Box 17		#	#										/														SAND	
Z4_OWF_BH01-SAMP	04-1	2.5	Bag	40	53	2015			Box 17		#	#													/											SAND	
Z4_OWF_BH01-SAMP	04-2	2.9	Bag	35	53	1115			Box 17		#	#																								SAND	
Z4_OWF_BH01-SAMP	05-1	3.5	Bag	40	53	1766			Box 17		#	#																								SAND	
Z4_OWF_BH01-SAMP	05-2	3.9	Bag	40	53	1652			Box 17		#	#																			/	/	/	/	/	SAND	
Z4_OWF_BH01-SAMP	06-1	4.5	Bag	40	53	1798			Box 17		#	#							/	/	/															SAND	
Z4_OWF_BH01-SAMP	06-2	4.9	Bag	45	53	1643			Box 17		#																									SAND	
Z4_OWF_BH01-SAMP	07-1	5.5	Bag	60	53	2288			Box 17		#	#											/						/							SAND	
Z4_OWF_BH01-SAMP	08-1	6.5	Bag	10	53	304			Box 17																											GRAVEL	
Z4_OWF_BH01-SAMP	08-2	6.6	Bag	10	53	254			Box 17		#																									SAND	
Z4_OWF_BH01-SAMP	08A-1	6.5	Bag	40	53	1736			Box 17																											SAND	
Z4_OWF_BH01-SAMP	08A-2	6.9	Bag	40	53	1552			Box 17																											SAND	
Z4_OWF_BH01-SAMP	9-1	7.5	Bag	40	53	1488			Box 18		#	#																								SAND	
Z4_OWF_BH01-SAMP	9-2	7.9	Bag	40	53	1620			Box 18		#	#																								SAND	
Z4_OWF_BH01-SAMP	10-1	8.5	Bag	40	53	1456			Box 18		#	#							/	/																SAND	
Z4_OWF_BH01-SAMP	10-2	8.9	Bag	40	53	1514			Box 18		#	#													/											SAND	
Z4_OWF_BH01-SAMP	11-1	9.5	Bag	40	53	1485			Box 18		#	#																			/	/	/	/	/	SAND	
Z4_OWF_BH01-SAMP	11-2	9.9	Bag	40	53	1488			Box 18		#	#																								SAND	
Z4_OWF_BH01-SAMP	12-1	10.5	Bag	40	53	1414			Box 18		#	#																	/							SAND	
Z4_OWF_BH01-SAMP	12-2	10.9	Bag	45	53	1789			Box 18		#	#										/														SAND	
Z4_OWF_BH01-SAMP	13-1	11.5	Bag	45	53	1687			Box 18		#	#																								SAND	
Z4_OWF_BH01-SAMP	13-2	11.95	Bag	45	53	1492			Box 18		#	#																								SAND	
Z4_OWF_BH01-SAMP	14-1	12.5	Bag	40	53	1560			Box 18		#	#							/	/	/															SAND	
Z4_OWF_BH01-SAMP	14-2	12.9	Bag	40	53	1434			Box 18		#	#																								SAND	
Z4_OWF_BH01-SAMP	15-1	13.5	Bag	50	53	1775			Box 18		#	#																								SAND	
Z4_OWF_BH01-SAMP	15-2	14	Bag	45	53	1573			Box 18		#	#																	/							SAND	

Lab Testing Schedule

CLIENT: DGEC
SITE: Golfe de Lion Geotechnical Site Investigation Est (Z4)
JOB NO: F254727

Drawn by: MRI/BQM
Date: 10/2/2025

Total number of offshore tests (#)											268	246	55	46	21	10	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0		
Total number of onshore tests (/)											0	0	0	0	0	0	0	9	32	32	23	8	5	6	12	1	7	4	17	6	20	20	20	20	20		
Borehole Number	Sample	Depth from (m)	Sample Type	Sample Length (cm)	Sample Diameter (mm)	Mass (g)	Wallingford / LLN	Sample received	Sample location	Sample used up	Moisture Content	Bulk Density	PP	TV	Sulphate Reducing Bacteria	Thermal Conductivity/Resistivity	Thermal Conductivity Reconstituted	Plasticity Index	Sieve	Sedimentation	PD	Min/Max Density	Permeameter Permeability [Constant	OED	Shear Box	UU	UU remould	TXL Permeability [Constant Head]	CIDc (set of 3 tests)	CIUc	Loss on Ignition	Total Sulphate Content	Water Soluble Chloride	Carbonate Content of Soil	pH Value of Soil and Water	Soil Type	Remarks
Z4_OWF_BH01-SAMP	16-1	14.5	Bag	10	53	354			Box 18																											SAND	
Z4_OWF_BH01-SAMP	16-2	14.6	Bag	45	53	1771			Box 18		#	#																								CLAY	
Z4_OWF_BH01-SAMP	16-3	15.05	Bag	35	53	1392			Box 18		#	#																			/	/	/	/	/	CLAY	
Z4_OWF_BH01-SAMP	17-1	15.5	Bag	15	72	834			Box 19		#	#							/	/	/															CLAY	
Z4_OWF_BH01-SAMP	17-2	15.65	**Wax**	20	72	1667			Box 12 WAX		#	#						/												/						CLAY	
Z4_OWF_BH01-SAMP	17-3	15.85	**Wax**	20	72	1711			Box 12 WAX			#																								CLAY	
Z4_OWF_BH01-SAMP	17-4	16.05	**Wax**	20	72	1680			Box 12 WAX			#												/				/								CLAY	
Z4_OWF_BH01-SAMP	17-5	16.25	Bag	20	72	1542			Box 19		#																									CLAY	
Z4_OWF_BH01-SAMP	18-1	16.5	Bag	20	72	1183			Box 19		#		#																							CLAY	
Z4_OWF_BH01-SAMP	18-2	16.7	Bag	20	72	1487			Box 19		#		#																							CLAY	
Z4_OWF_BH01-SAMP	18-3	16.9	Bag	20	72	1402			Box 19		#	#																								CLAY	
Z4_OWF_BH01-SAMP	18-4	17.1	Bag	20	72	1717			Box 19		#	#	#														#	/								CLAY	UU
Z4_OWF_BH01-SAMP	18-5	17.3	Bag	20	72	1217			Box 19				#																							CLAY	
Z4_OWF_BH01-SAMP	19-1	17.5	Bag	20	72	1185			Box 19		#	#	#																							CLAY	
Z4_OWF_BH01-SAMP	19-2	17.7	**Wax**	20	72	1641			Box 12 WAX		#	#	#																							CLAY	
Z4_OWF_BH01-SAMP	19-3	17.9	Bag	20	72	1652			Box 19																											CLAY	
Z4_OWF_BH01-SAMP	19-4	18.1	Bag	20	72	1670			Box 19		#		#	#																						CLAY	
Z4_OWF_BH01-SAMP	19-5	18.3	Bag	20	72	1191			Box 19		#		#	#																						CLAY	
Z4_OWF_BH01-SAMP	20-1	18.5	Bag	20	72	1140			Box 19		#	#	#	#					/	/	/															CLAY	
Z4_OWF_BH01-SAMP	20-2	18.7	**Wax**	20	72	1645			Box 12 WAX		#	#	#	#												/	/									CLAY	
Z4_OWF_BH01-SAMP	20-3	18.9	**Wax**	20	72	1675			Box 12 WAX									/						/												CLAY	
Z4_OWF_BH01-SAMP	20-4	19.1	**Wax**	20	72	1636			Box 12 WAX			#	#	#																						CLAY	
Z4_OWF_BH01-SAMP	20-5	19.3	Bag	20	72	1166			Box 19		#	#	#	#																		/	/	/	/	/	CLAY	
Z4_OWF_BH01-SAMP	21-1	19.5	Bag	25	72	1715			Box 19		#	#	#	#																						CLAY	
Z4_OWF_BH01-SAMP	21-2	19.75	**Wax**	20	72	1695			Box 12 WAX		#	#																			/					CLAY	
Z4_OWF_BH01-SAMP	21-3	19.95	**Wax**	20	72	1560			Box 12 WAX			#																								CLAY	
Z4_OWF_BH01-SAMP	21-4	20.15	Bag	25	72	1325			Box 19		#	#																								CLAY	
Z4_OWF_BH05-SAMP	01-1	0	Bag	10	68.7	679			Box 14																						/	/	/	/	/	CLAY	
Z4_OWF_BH05-SAMP	01-2	0.1	Bag	20	68.7	950			Box 14		#	#						/	/	/	/															CLAY	
Z4_OWF_BH05-SAMP	01-3	0.3	Bag	25	68.7	1820			Box 14																											CLAY	

Lab Testing Schedule

CLIENT: DGEC
SITE: Golfe de Lion Geotechnical Site Investigation Est (Z4)
JOB NO: F254727

Drawn by: MRI/BQM
Date: 10/2/2025

Total number of offshore tests (#)											268	246	55	46	21	10	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0		
Total number of onshore tests (/)											0	0	0	0	0	0	0	9	32	32	23	8	5	6	12	1	7	4	17	6	20	20	20	20	20		
Borehole Number	Sample	Depth from (m)	Sample Type	Sample Length (cm)	Sample Diameter (mm)	Mass (g)	Wallingford / LLN	Sample received	Sample location	Sample used up	Moisture Content	Bulk Density	PP	TV	Sulphate Reducing Bacteria	Thermal Conductivity/Resistivity	Thermal Conductivity Reconstituted	Plasticity Index	Sieve	Sedimentation	PD	Min/Max Density	Permeameter Permeability [Constant	OED	Shear Box	UU	UU remould	TXL Permeability [Constant Head]	CIDc (set of 3 tests)	CIUc	Loss on Ignition	Total Sulphate Content	Water Soluble Chloride	Carbonate Content of Soil	pH Value of Soil and Water	Soil Type	Remarks
Z4_OWF_BH05-SAMP	02-1	1	Bag	30	68.7	1873			Box 14		#	#							/	/	/															SAND	
Z4_OWF_BH05-SAMP	02-2	1.3	Bag	35	68.7	2563			Box 14		#	#																	/							SAND	
Z4_OWF_BH05-SAMP	03-1	2	Bag	40	53	2009			Box 14		#	#													/											SAND	
Z4_OWF_BH05-SAMP	03-2	2.4	Bag	40	53	1019			Box 14		#	#											/													SAND	
Z4_OWF_BH05-SAMP	04-1	3	Bag	35	53	1459			Box 14																											SAND	
Z4_OWF_BH05-SAMP	04-2	3.35	Bag	30	53	990			Box 14		#	#																								SAND	
Z4_OWF_BH05-SAMP	05-1	4	Bag	35	53	1140			Box 14		#	#							/	/																SAND	
Z4_OWF_BH05-SAMP	05-2	4.35	Bag	35	53	1603			Box 14																											SAND	
Z4_OWF_BH05-SAMP	06-1	5	Bag	25	68.7	1561			Box 14																						/	/	/	/	/	SAND	
Z4_OWF_BH05-SAMP	06-2	5.25	Bag	25	68.7	1335			Box 14		#	#																								SAND	
Z4_OWF_BH05-SAMP	06-3	5.5	Bag	25	68.7	1847			Box 14																											SAND	
Z4_OWF_BH05-SAMP	07-1	6	Bag	35	68.7	2170			Box 14		#	#																								SAND	
Z4_OWF_BH05-SAMP	07-2	6.35	Bag	30	68.7	1840			Box 14																											SAND	
Z4_OWF_BH05-SAMP	08-1	7	Bag	30	68.7	1795			Box 15		#	#										/														SAND	
Z4_OWF_BH05-SAMP	08-2	7.3	Bag	30	68.7	2293			Box 15		#	#																	/							SAND	
Z4_OWF_BH05-SAMP	09-1	8	Bag	30	68.7	1930			Box 15		#	#							/	/	/															SAND	
Z4_OWF_BH05-SAMP	09-2	8.3	Bag	30	68.7	2202			Box 15		#	#																								SAND	
Z4_OWF_BH05-SAMP	10-1	9	Bag	25	68.7	1410			Box 15		#	#													/											SAND	
Z4_OWF_BH05-SAMP	10-2	9.25	Bag	25	68.7	1746			Box 15		#	#																								SAND	
Z4_OWF_BH05-SAMP	11-1	9.5	Bag	25	53	1142			Box 15																											SAND	
Z4_OWF_BH05-SAMP	11-2	9.75	Bag	30	53	1102			Box 15		#	#																								SAND	
Z4_OWF_BH05-SAMP	12-1	10.5	Bag	5	53	153			Box 15																						/	/	/	/	/	SAND	
Z4_OWF_BH05-SAMP	12-2	10.55	Bag	25	53	847			Box 15		#	#																								CLAY	
Z4_OWF_BH05-SAMP	12-3	10.8	Bag	30	53	1240			Box 15		#	#																								CLAY	
Z4_OWF_BH05-SAMP	12-4	11.1	Bag	35	53	1258			Box 15		#	#																								SAND	
Z4_OWF_BH05-SAMP	13-1	11.5	Bag	35	72	2173			Box 15		#	#							/	/									/							SAND	
Z4_OWF_BH05-SAMP	14-1	12	Bag	50	53	2024			Box 15																											SAND	Disturbed
Z4_OWF_BH05-SAMP	14-2	12.5	Bag	35	53	1098			Box 15		#	#																								CLAY	
Z4_OWF_BH05-SAMP	15-1	13	Bag	45	53	1734			Box 15		#	#	#																							CLAY	
Z4_OWF_BH05-SAMP	15-2	13.45	Bag	45	53	1957			Box 15		#	#	#																							CLAY	

Lab Testing Schedule

CLIENT: DGEC
SITE: Golfe de Lion Geotechnical Site Investigation Est (Z4)
JOB NO: F254727

Drawn by: MRI/BQM
Date: 10/2/2025

Total number of offshore tests (#)											268	246	55	46	21	10	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0		
Total number of onshore tests (/)											0	0	0	0	0	0	0	9	32	32	23	8	5	6	12	1	7	4	17	6	20	20	20	20	20		
Borehole Number	Sample	Depth from (m)	Sample Type	Sample Length (cm)	Sample Diameter (mm)	Mass (g)	Wallingford / LLN	Sample received	Sample location	Sample used up	Moisture Content	Bulk Density	PP	TV	Sulphate Reducing Bacteria	Thermal Conductivity/Resistivity	Thermal Conductivity Reconstituted	Plasticity Index	Sieve	Sedimentation	PD	Min/Max Density	Permeameter Permeability [Constant	OED	Shear Box	UU	UU remould	TXL Permeability [Constant Head]	CIDc (set of 3 tests)	CIUc	Loss on Ignition	Total Sulphate Content	Water Soluble Chloride	Carbonate Content of Soil	pH Value of Soil and Water	Soil Type	Remarks
Z4_OWF_BH05-SAMP	16-1	14	Bag	30	72	1879			Box 16		#	#	#	#																						CLAY	
Z4_OWF_BH05-SAMP	16-2	14.3	**Wax**	20	72	1417			Box 08 WAX		#	#																/							CLAY	
Z4_OWF_BH05-SAMP	16-3	14.5	Bag	20	72	1404			Box 16			#	#	#												#	/								CLAY	UU
Z4_OWF_BH05-SAMP	16-4	14.7	Bag	15	72	1126			Box 16		#	#	#	#					/	/	/														CLAY	
Z4_OWF_BH05-SAMP	17-1	15	Bag	10	72	803			Box 16		#	#	#	#																	/	/	/	/	/	CLAY	
Z4_OWF_BH05-SAMP	17-2	15.1	**Wax**	20	72	1721			Box 08 WAX		#	#	#	#																						CLAY	
Z4_OWF_BH05-SAMP	17-3	15.3	**Wax**	20	72	1768			Box 08 WAX			#	#	#				/						/												CLAY	
Z4_OWF_BH05-SAMP	17-4	15.5	Bag	25	72	1611			Box 16		#	#	#	#																						CLAY	
Z4_OWF_BH05-SAMP	18-1	16	Bag	20	72	1124			Box 16		#	#																								CLAY	
Z4_OWF_BH05-SAMP	18-2	16.2	**Wax**	20	72	1680			Box 08 WAX		#	#																		/						CLAY	
Z4_OWF_BH05-SAMP	18-3	16.4	Bag	10	72	579			Box 16																											CLAY	
Z4_OWF_BH05-SAMP	18-4	16.5	Bag	5	72	496			Box 16																											CLAY	
Z4_OWF_BH05-SAMP	19-1	17	Bag	50	53	1553			Box 16		#	#																			/	/	/	/	/	SAND	
Z4_OWF_BH05-SAMP	19-2	17.5	Bag	50	53	1876			Box 16		#	#							/	/	/														SAND	
Z4_OWF_BH05-SAMP	20-1	18	Bag	50	53	1962			Box 16		#	#													/										SAND	
Z4_OWF_BH05-SAMP	20-2	18.5	Bag	40	53	1493			Box 16		#												/												SAND	
Z4_OWF_BH05-SAMP	21-1	19.5	Bag	50	53	1992			Box 16		#	#							/	/		/													SAND	
Z4_OWF_BH05-SAMP	21-2	20	Bag	45	53	1800			Box 16		#																		/						SAND	
Z4_OWF_BH15-COMP	01-1	1.5	Bag	55	53	1989			Box 06																						/	/	/	/	/	SAND	
Z4_OWF_BH15-COMP	02-1	5.5	Bag	20	53	738.5			Box 06		#	#																								SAND	
Z4_OWF_BH15-COMP	02-2	5.7	Bag	20	53	762			Box 06		#	#							/	/	/															SAND	
Z4_OWF_BH15-COMP	02-3	5.9	Bag	10	53	477			Box 06																											SAND	
Z4_OWF_BH15-COMP	02-4	6	Bag	20	53	867.5			Box 06		#	#																								SAND	
Z4_OWF_BH15-COMP	03-1	8.5	Bag	30	72	1643			Box 06		#	#																			/	/	/	/	/	SAND	
Z4_OWF_BH15-COMP	03-2	8.8	Bag	30	72	2006			Box 06		#	#																	/							SAND	
Z4_OWF_BH15-COMP	03-3	9.1	Bag	15	72	1601			Box 06																											SAND	
Z4_OWF_BH15-COMP	04-1	9.5	Bag	30	72	2226			Box 06										/	/	/															SAND	
Z4_OWF_BH15-COMP	04-2	9.8	Bag	30	72	1629			Box 06		#	#										/														SAND	
Z4_OWF_BH15-COMP	04-3	10.1	Bag	20	72	1016			Box 06		#														/											SAND	
Z4_OWF_BH15-COMP	05-1	13.5	Bag	10	72	496			Box 07																											CLAY	

Lab Testing Schedule

CLIENT: DGEC
SITE: Golfe de Lion Geotechnical Site Investigation Est (Z4)
JOB NO: F254727

Drawn by: MRI/BQM
Date: 10/2/2025

Total number of offshore tests (#)											268	246	55	46	21	10	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0		
Total number of onshore tests (/)											0	0	0	0	0	0	0	9	32	32	23	8	5	6	12	1	7	4	17	6	20	20	20	20	20		
Borehole Number	Sample	Depth from (m)	Sample Type	Sample Length (cm)	Sample Diameter (mm)	Mass (g)	Wallingford / LLN	Sample received	Sample location	Sample used up	Moisture Content	Bulk Density	PP	TV	Sulphate Reducing Bacteria	Thermal Conductivity/Resistivity	Thermal Conductivity Reconstituted	Plasticity Index	Sieve	Sedimentation	PD	Min/Max Density	Permeameter Permeability [Constant	OED	Shear Box	UU	UU remould	TXL Permeability [Constant Head]	CIDc (set of 3 tests)	CIUc	Loss on Ignition	Total Sulphate Content	Water Soluble Chloride	Carbonate Content of Soil	pH Value of Soil and Water	Soil Type	Remarks
Z4_OWF_BH15-COMP	05-2	13.6	Bag	25	72	2029			Box 07		#	#							/	/	/								/							SAND	
Z4_OWF_BH15-COMP	06-1	17	Bag	20	72	1397			Box 07		#	#	#	#																	/	/	/	/	/	CLAY	
Z4_OWF_BH15-COMP	06-2	17.2	**Wax**	25	72	1514			Box 02 WAX		#	#	#	#																							CLAY	
Z4_OWF_BH15-COMP	06-3	17.45	Bag	20	72	1722			Box 07		#	#														#	/								CLAY	UU
Z4_OWF_BH15-COMP	06-4	17.65	**Wax**	25	72	1784			Box 02 WAX		#	#																							CLAY	
Z4_OWF_BH15-COMP	07-1	18	Bag	10	72	970			Box 07			#						/	/	/	/														CLAY	
Z4_OWF_BH15-COMP	07-2	18.1	**Wax**	25	72	1521			Box 08 WAX		#	#	#	#										/					/							CLAY	
Z4_OWF_BH15-COMP	07-3	18.35	**Wax**	20	72	1548			Box 08 WAX		#	#	#	#																/						CLAY	
Z4_OWF_BH15-COMP	07-4	18.55	**Wax**	25	72	1665			Box 08 WAX		#	#	#	#																						CLAY	
Z4_OWF_BH16-SAMP	01-1	0	Bag	45	68.7	2094			Box 10		#																								SAND	
Z4_OWF_BH16-SAMP	02-1	0.5	Bag	20	53	591			Box 10		#																								SAND	
Z4_OWF_BH16-SAMP	02-2	0.7	Bag	40	53	1919			Box 10		#	#																							SAND	
Z4_OWF_BH16-SAMP	03-1	1.5	Bag	50	53	1936			Box 11		#	#																							SAND	
Z4_OWF_BH16-SAMP	03-2	2	Bag	5	53	341.5			Box 11										/	/	/														SAND	
Z4_OWF_BH16-SAMP	04-1	2.5	Bag	30	52.3	1232			Box 11		#	#													/										SAND	
Z4_OWF_BH16-SAMP	04-2	2.8	Bag	30	52.3	1254			Box 11		#	#																			/	/	/	/	/	SAND	
Z4_OWF_BH16-SAMP	05-1	3	Bag	30	52.3	1618			Box 11																				/						SAND	
Z4_OWF_BH16-SAMP	05-2	3.3	Bag	30	52.3	905			Box 11		#																								SAND	
Z4_OWF_BH16-SAMP	06-1	4	Bag	40	52.3	1707			Box 11		#	#																							SAND	
Z4_OWF_BH16-SAMP	06-2	4.4	Bag	35	52.3	1445			Box 11		#																								SAND	
Z4_OWF_BH16-SAMP	07-1	5	Bag	40	52.3	1669			Box 11		#	#																							SAND	
Z4_OWF_BH16-SAMP	07-2	5.4	Bag	35	52.3	1381			Box 11																										SAND	
Z4_OWF_BH16-SAMP	08-1	6	Bag	25	53	1257			Box 11		#								/	/															SAND	
Z4_OWF_BH16-SAMP	08-2	6.25	Bag	40	53	1561			Box 11		#	#																							SAND	
Z4_OWF_BH16-SAMP	09-1	7	Bag	35	53	1077			Box 11		#	#																							SAND	
Z4_OWF_BH16-SAMP	09-2	7.35	Bag	30	53	1484			Box 11		#																				/	/	/	/	/	SAND	
Z4_OWF_BH16-SAMP	10-1	8	Bag	35	53	1639			Box 11		#	#																							SAND	
Z4_OWF_BH16-SAMP	10-2	8.35	Bag	40	53	1467			Box 11		#																			/						SAND	
Z4_OWF_BH16-SAMP	11-1	9	Bag	30	53	987			Box 11		#	#											/												SAND	
Z4_OWF_BH16-SAMP	11-2	9.3	Bag	30	53	1262			Box 11		#	#													/										SAND	

Lab Testing Schedule

CLIENT: DGEC
SITE: Golfe de Lion Geotechnical Site Investigation Est (Z4)
JOB NO: F254727

Drawn by: MRI/BQM
Date: 10/2/2025

Total number of offshore tests (#)											268	246	55	46	21	10	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0		
Total number of onshore tests (/)											0	0	0	0	0	0	0	9	32	32	23	8	5	6	12	1	7	4	17	6	20	20	20	20	20		
Borehole Number	Sample	Depth from (m)	Sample Type	Sample Length (cm)	Sample Diameter (mm)	Mass (g)	Wallingford / LLN	Sample received	Sample location	Sample used up	Moisture Content	Bulk Density	PP	TV	Sulphate Reducing Bacteria	Thermal Conductivity/Resistivity	Thermal Conductivity Reconstituted	Plasticity Index	Sieve	Sedimentation	PD	Min/Max Density	Permeameter Permeability [Constant	OED	Shear Box	UU	UU remould	TXL Permeability [Constant Head]	CIDc (set of 3 tests)	CIUc	Loss on Ignition	Total Sulphate Content	Water Soluble Chloride	Carbonate Content of Soil	pH Value of Soil and Water	Soil Type	Remarks
Z4_OWF_BH16-SAMP	12-1	10	Bag	50	53	2119			Box 11		#	#																								SAND	
Z4_OWF_BH16-SAMP	12-2	10.5	Bag	40	53	1394			Box 11		#								/	/	/															SAND	
Z4_OWF_BH16-SAMP	13-1	11	Bag	50	53	1993			Box 13		#																									SAND	
Z4_OWF_BH16-SAMP	13-2	11.5	Bag	40	53	1348			Box 13		#	#																								SAND	
Z4_OWF_BH16-SAMP	14-1	12	Bag	50	53	1876			Box 13		#	#																								SAND	
Z4_OWF_BH16-SAMP	14-2	12.5	Bag	45	53	1880			Box 13		#																									SAND	
Z4_OWF_BH16-SAMP	15-1	13	Bag	50	53	1832			Box 13		#	#	#	#															/							SAND	
Z4_OWF_BH16-SAMP	15-2	13.5	Bag	45	53	1859			Box 13		#		#	#																						SAND	
Z4_OWF_BH16-SAMP	16-1	14	Bag	25	72	1540			Box 13		#	#							/	/																SAND	
Z4_OWF_BH16-SAMP	16-2	14.25	Bag	30	72	2365			Box 13		#	#																			/	/	/	/	/	SAND	
Z4_OWF_BH16-SAMP	17-1	14.5	Bag	40	72	3000			Box 13																											SAND	
Z4_OWF_BH16-SAMP	17-2	14.9	Bag	40	72	2743			Box 13		#	#																								SAND	
Z4_OWF_BH16-SAMP	18-1	15.5	Bag	40	68.7	2377			Box 13		#	#																								SAND	
Z4_OWF_BH16-SAMP	18-2	15.9	Bag	40	68.7	2930			Box 13		#	#										/														SAND	
Z4_OWF_BH16-SAMP	19-1	16.5	Bag	40	68.7	2623			Box 13		#														/											SAND	
Z4_OWF_BH16-SAMP	19-2	16.9	Bag	35	68.7	2529			Box 13		#	#																								SAND	
Z4_OWF_BH16-SAMP	20-1	17.5	Bag	40	68.7	2078			Box 13		#																									SAND	
Z4_OWF_BH16-SAMP	20-2	17.9	Bag	30	68.7	1511			Box 13																											SAND	
Z4_OWF_BH16-SAMP	20-3	18.2	Bag	20	68.7	1424			Box 13																				/							SAND	
Z4_OWF_BH16-SAMP	21-1	18.5	Bag	20	68.7	1301			Box 13										/	/	/															SAND	
Z4_OWF_BH16-SAMP	21-2	18.7	Bag	25	68.7	1853			Box 13		#		#	#																						CLAY	
Z4_OWF_BH16-SAMP	21-3	18.95	Bag	50	68.7	2936			Box 13		#	#																								SAND	
Z4_OWF_BH16-SAMP	22-1	19.5	Bag	40	68.7	2100			Box 13		#	#																								SAND	
Z4_OWF_BH16-SAMP	23-1	20	Bag	25	72	1910			Box 14																						/	/	/	/	/	CLAY	Disturbed
Z4_OWF_BH16-SAMP	23-2	20.25	Bag	25	72	1696			Box 14									/	/	/	/															CLAY	Disturbed
Z4_OWF_BH16-SAMP	23-3	20.5	Bag	10	72	997			Box 14		#	#																								CLAY	
Z4_OWF_BH17-SAMP	01-1	0	Bag	30	68.7	1794			Box 07		#								/	/	/															SAND	
Z4_OWF_BH17-SAMP	01-2	0.3	Bag	30	68.7	1754			Box 07																											SAND	
Z4_OWF_BH17-SAMP	02-1	1	Bag	20	68.7	1258			Box 07		#	#			#										/											SAND	SRB
Z4_OWF_BH17-SAMP	02-2	1.2	Bag	20	68.7	1236			Box 07		#	#																								SAND	

Lab Testing Schedule

CLIENT: DGEC
SITE: Golfe de Lion Geotechnical Site Investigation Est (Z4)
JOB NO: F254727

Drawn by: MRI/BQM
Date: 10/2/2025

Total number of offshore tests (#)											268	246	55	46	21	10	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0		
Total number of onshore tests (/)											0	0	0	0	0	0	0	9	32	32	23	8	5	6	12	1	7	4	17	6	20	20	20	20	20		
Borehole Number	Sample	Depth from (m)	Sample Type	Sample Length (cm)	Sample Diameter (mm)	Mass (g)	Wallingford / LLN	Sample received	Sample location	Sample used up	Moisture Content	Bulk Density	PP	TV	Sulphate Reducing Bacteria	Thermal Conductivity/Resistivity	Thermal Conductivity Reconstituted	Plasticity Index	Sieve	Sedimentation	PD	Min/Max Density	Permeameter Permeability [Constant	OED	Shear Box	UU	UU remould	TXL Permeability [Constant Head]	CIDc (set of 3 tests)	CIUc	Loss on Ignition	Total Sulphate Content	Water Soluble Chloride	Carbonate Content of Soil	pH Value of Soil and Water	Soil Type	Remarks
Z4_OWF_BH17-SAMP	03-1	1.5	Bag	15	68.7	706			Box 07																										SAND	Disturbed
Z4_OWF_BH17-SAMP	03-2	1.65	Bag	25	68.7	919			Box 07		#	#																								SAND	
Z4_OWF_BH17-SAMP	03-3	1.9	Bag	25	68.7	1047			Box 07																					/	/	/	/	/	SAND	
Z4_OWF_BH17-SAMP	04-1	2.5	Bag	40	68.7	1650			Box 07		#	#																								SAND	
Z4_OWF_BH17-SAMP	04-2	2.9	Bag	30	68.7	1109			Box 07		#	#							/	/																SAND	
Z4_OWF_BH17-SAMP	05-1	3.5	Bag	40	53	1413			Box 07		#	#																								SAND	
Z4_OWF_BH17-SAMP	05-2	3.9	Bag	35	53	1496			Box 07		#	#																	/							SAND	
Z4_OWF_BH17-SAMP	06-1	4.5	Bag	40	53	1615			Box 07		#	#																								SAND	
Z4_OWF_BH17-SAMP	06-2	4.9	Bag	40	53	1250			Box 07		#	#																								SAND	
Z4_OWF_BH17-SAMP	07-1	5.5	Bag	30	53	1205			Box 09		#	#										/														SAND	
Z4_OWF_BH17-SAMP	07-2	5.8	Bag	30	53	1123			Box 09		#	#																								SAND	
Z4_OWF_BH17-SAMP	07-3	6.1	Bag	20	53	843			Box 09		#	#			#																/	/	/	/	/	SAND	SRB
Z4_OWF_BH17-SAMP	08-1	6.5	Bag	35	53	1494			Box 09		#	#																								SAND	
Z4_OWF_BH17-SAMP	08-2	6.85	Bag	35	53	1155			Box 09		#	#							/	/	/															SAND	
Z4_OWF_BH17-SAMP	09-1	7.5	Bag	35	53	1399			Box 09																/											SAND	
Z4_OWF_BH17-SAMP	09-2	7.85	Bag	40	53	1342			Box 09		#	#																								SAND	
Z4_OWF_BH17-SAMP	10-1	8.5	Bag	30	53	1023			Box 09		#	#																								SAND	
Z4_OWF_BH17-SAMP	10-2	8.8	Bag	25	53	839			Box 09		#	#																								SAND	
Z4_OWF_BH17-SAMP	10-3	9.05	Bag	25	53	949			Box 09																											SAND	
Z4_OWF_BH17-SAMP	11-1	9.5	Bag	40	53	1413			Box 09		#	#																								SAND	
Z4_OWF_BH17-SAMP	11-2	9.9	Bag	40	53	1167			Box 09		#	#																								SAND	
Z4_OWF_BH17-SAMP	12-1	10.5	Bag	40	53	1321			Box 09		#	#																								SAND	
Z4_OWF_BH17-SAMP	12-2	10.9	Bag	45	53	1611			Box 09		#	#																								SAND	
Z4_OWF_BH17-SAMP	13-1	11.5	Bag	40	53	1122			Box 09		#	#							/	/																SAND	
Z4_OWF_BH17-SAMP	13-2	11.9	Bag	35	53	1332			Box 09						#														/							SAND	SRB
Z4_OWF_BH17-SAMP	14-1	12.5	Bag	40	53	1384			Box 09		#	#																								SAND	
Z4_OWF_BH17-SAMP	14-2	12.9	Bag	30	53	951			Box 09		#	#																								SAND	
Z4_OWF_BH17-SAMP	14-3	13.2	Bag	20	53	852			Box 09															/												SAND	
Z4_OWF_BH17-SAMP	15-1	13.5	Bag	40	53	1791			Box 09																						/	/	/	/	/	SAND	
Z4_OWF_BH17-SAMP	15-2	13.9	Bag	45	53	1481			Box 09		#	#																								SAND	

Lab Testing Schedule

CLIENT: DGEC
SITE: Golfe de Lion Geotechnical Site Investigation Est (Z4)
JOB NO: F254727

Drawn by: MRI/BQM
Date: 10/2/2025

Total number of offshore tests (#)											268	246	55	46	21	10	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0		
Total number of onshore tests (/)											0	0	0	0	0	0	0	9	32	32	23	8	5	6	12	1	7	4	17	6	20	20	20	20	20		
Borehole Number	Sample	Depth from (m)	Sample Type	Sample Length (cm)	Sample Diameter (mm)	Mass (g)	Wallingford / LLN	Sample received	Sample location	Sample used up	Moisture Content	Bulk Density	PP	TV	Sulphate Reducing Bacteria	Thermal Conductivity/Resistivity	Thermal Conductivity Reconstituted	Plasticity Index	Sieve	Sedimentation	PD	Min/Max Density	Permeameter Permeability [Constant	OED	Shear Box	UU	UU remould	TXL Permeability [Constant Head]	CIDc (set of 3 tests)	CIUc	Loss on Ignition	Total Sulphate Content	Water Soluble Chloride	Carbonate Content of Soil	pH Value of Soil and Water	Soil Type	Remarks
Z4_OWF_BH17-SAMP	16-1	14.5	Bag	40	53	1430			Box 10		#	#																								SAND	
Z4_OWF_BH17-SAMP	16-2	14.9	Bag	35	53	1331			Box 10		#	#													/											SAND	
Z4_OWF_BH17-SAMP	17-1	15.5	Bag	40	53	1315			Box 10		#	#							/	/	/															SAND	
Z4_OWF_BH17-SAMP	17-2	15.9	Bag	45	53	1566			Box 10		#	#										/														SAND	
Z4_OWF_BH17-SAMP	18-1	16.5	Bag	55	53	1956			Box 10		#	#																	/							SAND	
Z4_OWF_BH17-SAMP	18-2	17.05	Bag	35	53	1065			Box 10		#	#																								CLAY	
Z4_OWF_BH17-SAMP	19-1	17.5	Bag	25	72	1660			Box 10																											CLAY	
Z4_OWF_BH17-SAMP	19-2	17.75	Bag	25	72	1765			Box 10		#		#	#																	/	/	/	/	/	CLAY	
Z4_OWF_BH17-SAMP	19-3	18	Bag	25	72	2129			Box 10			#		#				/	/	/	/															CLAY	
Z4_OWF_BH17-SAMP	19-4	18.25	Bag	15	72	1101			Box 10			#	#	#												#	/								CLAY	UU
Z4_OWF_BH17-SAMP	19-5	18.4	Bag	10	72	220			Box 10		#		#	#																						CLAY	
Z4_OWF_BH17-SAMP	20-1	18.5	Bag	10	72	723			Box 10		#	#	#	#																						CLAY	
Z4_OWF_BH17-SAMP	20-2	18.6	**Wax**	20	72	1607			Box 08 WAX		#	#	#	#																			/				CLAY	
Z4_OWF_BH17-SAMP	20-3	18.8	**Wax**	20	72	1665			Box 08 WAX															/				/							CLAY	
Z4_OWF_BH17-SAMP	20-4	19	**Wax**	20	72	1613			Box 08 WAX			#	#	#																						CLAY	
Z4_OWF_BH17-SAMP	20-5	19.2	Bag	15	72	795			Box 10		#	#	#	#																						CLAY	
Z4_OWF_BH17-SAMP	21-1	19.5	Bag	10	72	681			Box 10		#	#	#	#																						CLAY	
Z4_OWF_BH17-SAMP	21-2	19.6	**Wax**	20	72	1588			Box 08 WAX		#	#	#	#																			/				CLAY	
Z4_OWF_BH17-SAMP	21-3	19.8	Bag	20	72	1350			Box 10			#														#	/								CLAY	UU
Z4_OWF_BH17-SAMP	21-4	20	**Wax**	20	72	1600			Box 08 WAX			#	#	#											/											CLAY	
Z4_OWF_BH17-SAMP	21-5	20.2	Bag	15	72	608			Box 10		#	#	#	#				/	/	/	/															CLAY	

5. Laboratory Test Data

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Plasticity Chart	5.16
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Particle Size Distribution Test Results	5.18 to 5.49
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Summary of Minimum and Maximum Density Test Results	5.51
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Summary of Unconsolidated Undrained Triaxial Test Results – Onshore	5.70
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Summary of Consolidated Isotropically Undrained Triaxial in Compression Test Results	5.78
Consolidated Isotropically Undrained Triaxial in Compression Test Results	5.79 to 5.138
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Consolidated Isotropically Drained Triaxial in Compression Test Results	5.142 to 5.279
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Shear Box Test Results	5.282 to 5.341
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Sulphate Reducing Bacteria Test Results	5.369 to 5.390

Laboratory Classification Test Results
Z4_OWF_BH01-SAMP

Sample		Depth		Unit Weight [kN/m³]							Atterberg Limits				Undrained Shear Strength				
No	Ground Description	BSF [m]	w [%]	γ-w	γ	$\gamma_{d,min}$	$\gamma_{d,max}$	ρ_s [Mg/m³]	CC [%]	OC [%]	w_P [%]	w_L [%]	I_P [%]	Fines [%]	PP [kPa]	TV [kPa]	FC [kPa]	LV [kPa]	UU [kPa]
01	From 0.00 m to 0.30 m - very soft dark greyish brown (2.5Y 4/2) sandy calcareous CLAY with frequent coarse sand-size shell fragments From 0.30 m to 0.60 m - very dark grey (2.5Y 3/1) calcareous fine to coarse SAND with frequent coarse sand-size to coarse gravel-size shell fragments From 0.60 m to 0.80 m - very dark grey (2.5Y 3/1) calcareous fine to medium SAND	0.00 0.00 0.30 0.50 0.70	 16.5 26.9	 21.3 19.4	 19.9			2.69			NP NP	NP NP	NP NP	31.5 7.3					
02	From 1.00 m to 1.45 m - greyish brown (2.5Y 5/2) gravelly slightly calcareous medium to coarse SAND with rare coarse sand-size shell fragments. Gravel is flat subangular to subrounded of various lithologies	1.00 1.20 1.30	 25.0 25.0	 19.6 19.6	 19.6														
03	From 1.50 m to 2.15 m - dark greyish brown (2.5Y 4/2) calcareous fine to coarse SAND with rare coarse sand-size to fine gravel-size shell fragments From 2.05 m to 2.10 m - gravelly. Gravel is subangular to subrounded of various lithologies	1.50 1.90 2.00	 24.1 23.4	 19.8 19.9	 19.4	13.4	17.2												
04	From 2.50 m to 3.25 m - dark greyish brown (2.5Y 4/2) calcareous fine to medium SAND - with a thin bed of silt	2.50 2.90 3.00	 26.6 26.7	 19.4 19.4	 19.0														
05	From 3.50 m to 4.30 m - dark greyish brown (2.5Y 4/2) calcareous fine to medium SAND with rare coarse sand-size to fine gravel-size shell fragments - with closely to medium spaced thin beds of silt	3.50 3.90 4.00	 29.2 23.5	 19.0 19.9	 19.3				18.9	5.0									
06	From 4.50 m to 5.35 m - dark greyish brown (2.5Y 4/2) calcareous fine to medium SAND with rare coarse sand-size shell fragments	4.50 4.80 5.00	 27.3 26.4	 19.3 19.4	 19.4			2.67						11.8					
07	From 5.50 m to 6.10 m - grey (5Y 5/1) slightly silty calcareous fine to medium SAND	5.50 5.80 5.90	 28.1 21.9	 19.2 20.1	 18.6														
08	From 6.50 m to 6.60 m - multi-coloured calcareous fine to medium GRAVEL with frequent coarse sand-size to coarse gravel-size shell fragments From 6.60 m to 6.70 m - grey (5Y 5/1) clayey calcareous fine to medium SAND - with extremely closely spaced thin laminae of silt	6.50 6.65	 15.6	 21.4															
08A	From 6.50 m to 7.30 m - grey (5Y 5/1) clayey calcareous fine to medium SAND with rare coarse sand-size to fine gravel-size shells and shell fragments	6.50																	

Notes

w : Water content
γ-w : Unit weight derived from water content
γ : Unit weight from volume mass calculation
$\gamma_{d,min}$: Minimum index dry unit weight
$\gamma_{d,max}$: Maximum index dry unit weight
ρ_s : Particle density
CC : $CaCO_3$ content
OC : Organic content
w_P : Plastic limit
w_L : Liquid limit
I_P : Plasticity index
PP : Pocket penetrometer
TV : Torvane
FC : Fall cone
LV : Laboratory vane
UU : Unconsolidated undrained triaxial
Fines : Mass percentage of material passing 63 µm or 75 µm sieve
10^r : r refers to test on remoulded soil
10^d : d refers to test on disturbed soil
10^s : Residual undrained shear strength
BSF : Below seafloor
W : WIP
RC : Rock Core

Note that both Rock Core (RC) and WIPS (W) were used for this location and the numbering is a reflection of switching between the different sampling method

Laboratory Classification Test Results

Z4_OWF_BH01-SAMP

Sample		Depth		Unit Weight [kN/m³]							Atterberg Limits				Undrained Shear Strength				
No	Ground Description	BSF [m]	w [%]	γ-w	γ	$\gamma_{d,min}$	$\gamma_{d,max}$	ρ_s [Mg/m³]	CC [%]	OC [%]	w_P [%]	w_L [%]	I_P [%]	Fines [%]	PP [kPa]	TV [kPa]	FC [kPa]	LV [kPa]	UU [kPa]
9	From 7.50 m to 8.30 m - very dark grey (2.5Y 3/1) calcareous fine to medium SAND with rare coarse sand-size to fine gravel-size shells and shell fragments From 7.90 m to 8.05 m - with very closely to closely spaced thin to thick laminae of clay	7.50 7.90 7.90	29.9 29.3	19.0 19.1	18.6														
10	From 8.50 m to 9.30 m - very dark grey (2.5Y 3/1) calcareous fine to medium SAND with rare coarse sand-size to fine gravel-size shells and shell fragments From 8.55 m to 8.65 m - with extremely closely spaced thin to thick laminae of clay From 9.10 m to 9.30 m - very dark greyish brown (2.5Y 3/2)	8.50 8.90 8.90	32.7 32.6	18.6 18.6	18.1									12.8					
11	From 9.50 m to 10.30 m - very dark grey (2.5Y 3/1) slightly silty calcareous fine to medium SAND with rare coarse sand-size shells and shell fragments At 9.80 m - with a thick lamina of clay	9.50 9.90 9.90	28.7 29.8	19.2 19.0	18.1				29.6	5.9									
12	From 10.50 m to 11.35 m - very dark greyish brown (2.5Y 3/2) slightly silty calcareous fine to medium SAND with rare coarse sand-size shells and shell fragments - with very closely to closely spaced thin to thick laminae of clay From 11.30 m to 11.35 m - with extremely closely spaced thin laminae of organic matter	10.50 10.90 10.90	31.4 30.1	18.8 19.0	18.3	11.7	15.7												
13	From 11.50 m to 12.40 m - very dark greyish brown (2.5Y 3/2) slightly silty calcareous fine to medium SAND with rare coarse sand-size shells and shell fragments - with extremely closely to closely spaced thin laminae to very thin beds of clay	11.50 11.90 11.90 12.20 12.20	31.0 33.1 30.4 29.5	18.8 18.6 18.9 19.0	17.6 17.8														
14	From 12.50 m to 13.30 m - very dark greyish brown (2.5Y 3/2) slightly silty calcareous fine to medium SAND with rare coarse sand-size shells and shell fragments - with extremely closely to closely spaced thin laminae to very thin beds of clay	12.50 12.90 12.90	31.8 31.8	18.7 18.7	17.9			2.69						6.2					
15	From 13.50 m to 14.45 m - very dark greyish brown (2.5Y 3/2) slightly silty calcareous fine to medium SAND with rare coarse sand-size shells and shell fragments - with extremely closely to closely spaced thick laminae to thin beds of clay	13.50 13.70 13.70 14.10 14.10	29.4 29.4 31.1 32.4	19.1 19.1 18.8 18.7	18.4 18.3														

Notes

w : Water content
γ-w : Unit weight derived from water content
γ : Unit weight from volume mass calculation
$\gamma_{d,min}$: Minimum index dry unit weight
$\gamma_{d,max}$: Maximum index dry unit weight
ρ_s : Particle density
CC : $CaCO_3$ content
OC : Organic content
w_P : Plastic limit
w_L : Liquid limit
I_P : Plasticity index
Fines : Mass percentage of material passing 63 µm or 75 µm sieve
PP : Pocket penetrometer
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10^s : Residual undrained shear strength
BSF : Below seafloor
W : WIP
RC : Rock Core

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Laboratory Classification Test Results
Z4_OWF_BH01-SAMP

Sample		Depth		Unit Weight [kN/m³]							Atterberg Limits				Undrained Shear Strength				
No	Ground Description	BSF [m]	w [%]	γ-w	γ	$\gamma_{d,min}$	$\gamma_{d,max}$	ρ_s [Mg/m³]	CC [%]	OC [%]	w_P [%]	w_L [%]	I_P [%]	Fines [%]	PP [kPa]	TV [kPa]	FC [kPa]	LV [kPa]	UU [kPa]
16	From 14.50 m to 14.60 m - very dark greyish brown (2.5Y 3/2) slightly silty calcareous fine to medium SAND From 14.60 m to 15.40 m - firm very dark grey (2.5Y 3/1) sandy slightly calcareous CLAY with rare coarse sand-size to fine gravel-size shell fragments - with frequent fine to medium gravel-size pockets of sand	14.50 14.65 14.65 15.05 15.15 15.15	30.3 30.2 27.6 29.6	19.1 19.1 19.5 19.2	19.4 19.3				31.8	6.0									
17	From 15.50 m to 16.45 m - firm very dark grey (2.5Y 3/1) sandy slightly calcareous CLAY with rare coarse sand-size shell fragments - with rare fine to medium gravel-size pockets of organic matter - with frequent fine to medium gravel-size pockets of sand	15.50 15.65 16.05 16.45	25.0 28.2	19.9 19.4	20.1 20.8			2.73			NP	NP	NP	79.7					
18	From 16.50 m to 17.50 m - stiff very dark grey (2.5Y 3/1) sandy slightly calcareous CLAY with rare coarse sand-size shell fragments - with frequent fine to medium gravel-size pockets of sand - with rare fine to coarse gravel-size pockets of organic matter	16.50 16.70 17.10 17.10 17.10 17.30	24.7 25.1 25.4 22.1	20.0 19.9 19.9 20.4	20.6 20.8										65 65				62
19	From 17.50 m to 18.50 m - firm low to medium strength very dark grey (2.5Y 3/1) slightly calcareous CLAY with rare coarse sand-size shell fragments - with frequent fine to medium gravel-size pockets of sand - with rare fine to coarse gravel-size pockets of organic matter	17.50 17.70 18.30	26.1 27.2	19.7 19.6	20.7										23 39	42			
20	From 18.50 m to 19.50 m - firm low to medium strength very dark grey (2.5Y 3/1) slightly calcareous CLAY with rare coarse sand-size shell fragments - with rare fine to medium gravel-size pockets of organic matter - with rare fine to medium gravel-size pockets of sand From 18.50 m to 18.55 m - greyish brown (2.5Y 5/2)	18.50 18.70 18.90 19.30 19.50	28.4 28.5	19.4 19.4	19.8 20.2			2.74	34.1	7.8	17.0	36.0	19.0	100.0	29 38	45 46			
21	From 19.50 m to 20.40 m - firm low strength very dark grey (2.5Y 3/1) slightly calcareous CLAY with rare coarse sand-size shell fragments - with extremely closely to very closely spaced thin laminae of sand - with rare fine to medium gravel-size pockets of organic matter	19.50 19.70 19.75 20.15 20.40	26.1 25.8	19.7 19.8	20.1 20.4										32	43			

Notes

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$\gamma_{d,max}$: Maximum index dry unit weight
ρ_s : Particle density
CC : $CaCO_3$ content
OC : Organic content
w_P : Plastic limit
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BSF : Below seafloor
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Laboratory Classification Test Results

Z4_OWF_BH05-SAMP

Sample		Depth		Unit Weight [kN/m³]							Atterberg Limits				Undrained Shear Strength				
No	Ground Description	BSF [m]	w [%]	γ-w	γ	$\gamma_{d,min}$	$\gamma_{d,max}$	ρ_s [Mg/m³]	CC [%]	OC [%]	w_P [%]	w_L [%]	I_P [%]	Fines [%]	PP [kPa]	TV [kPa]	FC [kPa]	LV [kPa]	UU [kPa]
01	From 0.00 m to 0.10 m - very soft dark greyish brown (2.5Y 4/2) slightly sandy slightly calcareous CLAY From 0.10 m to 0.55 m - soft very dark grey (2.5Y 3/1) slightly gravelly sandy slightly calcareous CLAY with occasional coarse sand-size to medium gravel-size shell fragments. Gravel is subangular to subrounded fine to coarse of various lithologies	0.00 0.10 0.25	31.9	18.8	18.6			2.71	31.8	2.9	19.0	27.0	8.0	33.7					
02	From 1.00 m to 1.65 m - very dark greyish brown (2.5Y 3/2) calcareous fine to medium SAND with rare coarse sand-size to fine gravel-size shell fragments	1.00 1.30	24.7	19.7	19.6			2.68						1.7					
03	From 2.00 m to 2.80 m - very dark greyish brown (2.5Y 3/2) slightly silty calcareous fine to medium SAND with rare coarse sand-size to fine gravel-size shell fragments	2.00 2.20 2.20 2.50 2.50	25.0 24.7 24.1 23.9	19.7 19.7 19.8 19.9	18.6 18.4														
04	From 3.00 m to 3.65 m - very dark greyish brown (2.5Y 3/2) slightly gravelly slightly silty calcareous fine to medium SAND with rare coarse sand-size to medium gravel-size shell fragments. Gravel is subangular to subrounded fine to medium of various lithologies	3.00 3.40 3.40	25.2 26.1	19.7 19.5	18.5														
05	From 4.00 m to 4.70 m - very dark greyish brown (2.5Y 3/2) slightly silty calcareous fine to medium SAND with rare coarse sand-size to fine gravel-size shell fragments - with extremely closely to closely spaced thin to thick laminae of clay At 4.25 m - with a thick lamina of organic matter	4.00 4.30 4.30	26.1 26.2	19.5 19.5	19.1									25.6					
06	From 5.00 m to 5.25 m - very dark greyish brown (2.5Y 3/2) slightly silty calcareous fine to medium SAND with rare coarse sand-size to fine gravel-size shell fragments - with extremely closely to closely spaced thin to thick laminae of clay From 5.00 m to 5.10 m - with very closely spaced thick laminae of organic matter From 5.25 m to 5.75 m - dark greyish brown (2.5Y 4/2) slightly silty calcareous fine SAND with rare coarse sand-size shell fragments	5.00 5.40	28.2	19.2	19.5				22.7	2.7									
07	From 6.00 m to 6.65 m - dark greyish brown (2.5Y 4/2) slightly silty calcareous fine SAND	6.00 6.30	26.2	19.5	19.2														
08	From 7.00 m to 7.60 m - dark greyish brown (2.5Y 4/2) slightly silty calcareous fine SAND with rare coarse sand-size shell fragments	7.00 7.30	27.6	19.3	19.1	12.1	16.1												

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Laboratory Classification Test Results

Z4_OWF_BH05-SAMP

Sample		Depth		Unit Weight [kN/m³]							Atterberg Limits				Undrained Shear Strength				
No	Ground Description	BSF [m]	w [%]	γ-w	γ	$\gamma_{d,min}$	$\gamma_{d,max}$	ρ_s [Mg/m³]	CC [%]	OC [%]	w_P [%]	w_L [%]	I_P [%]	Fines [%]	PP [kPa]	TV [kPa]	FC [kPa]	LV [kPa]	UU [kPa]
09	From 8.00 m to 8.60 m - dark greyish brown (2.5Y 4/2) slightly silty calcareous fine SAND From 8.50 m to 8.60 m - with occasional fine to medium gravel-size pockets of clay	8.00 8.30	27.6	19.3	19.6			2.69						1.8					
10	From 9.00 m to 9.50 m - dark greyish brown (2.5Y 4/2) slightly silty calcareous fine SAND with rare coarse sand-size shell fragments	9.00 9.25	27.1	19.4	19.1														
11	From 9.50 m to 10.05 m - dark greyish brown (2.5Y 4/2) slightly silty calcareous fine SAND From 9.75 m to 9.80 m - with rare coarse sand-size to fine gravel-size shell fragments with rare medium gravel-size pockets of clay	9.50 9.80 9.80	28.5 28.6	19.2 19.2	18.7														
12	From 10.50 m to 10.55 m - dark greyish brown (2.5Y 4/2) slightly silty calcareous fine SAND with rare coarse sand-size to fine gravel-size shell fragments From 10.55 m to 11.10 m - firm very dark grey (2.5Y 3/1) slightly calcareous CLAY At 10.60 m - with a medium gravel-size pocket of organic matter At 11.00 m - with a thick lamina of sand From 11.10 m to 11.45 m - dark greyish brown (2.5Y 4/2) slightly silty calcareous fine SAND with rare coarse sand-size to fine gravel-size shell fragments	10.50 10.75 10.80 10.90 11.30 11.30	27.6 27.0 26.7	19.3 19.4 19.4	19.4 18.6				29.6	7.3					10 9	20 20			
13	From 11.50 m to 11.85 m - dark greyish brown (2.5Y 4/2) slightly silty calcareous fine SAND with rare coarse sand-size to fine gravel-size shell fragments From 11.50 m to 11.60 m - with frequent medium to coarse gravel-size pockets of clay	11.50 11.70	28.8	19.1	18.9									44.6					
14	From 12.00 m to 12.50 m - dark greyish brown (2.5Y 4/2) slightly silty calcareous fine SAND with rare coarse sand-size to fine gravel-size shell fragments At 12.25 m - with a medium gravel-size pocket of clay At 12.30 m - with a thick lamina of clay From 12.50 m to 12.85 m - firm very dark grey (2.5Y 3/1) sandy slightly calcareous CLAY	12.00 12.65 12.65	29.3 29.9	19.2 19.1	18.9														
15	From 13.00 m to 13.90 m - firm low strength very dark grey (2.5Y 3/1) slightly calcareous CLAY	13.00 13.20 13.60	26.2 24.4	19.7 20.0	19.3 19.3										26 23				

Notes

w : Water content
γ-w : Unit weight derived from water content
γ : Unit weight from volume mass calculation
$\gamma_{d,min}$: Minimum index dry unit weight
$\gamma_{d,max}$: Maximum index dry unit weight
ρ_s : Particle density
CC : $CaCO_3$ content
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w_P : Plastic limit
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BSF: Below seafloor
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Note that both Rock Core (RC) and WIPS (W) were used for this location and the numbering is a reflection of switching between the different sampling method

Laboratory Classification Test Results

Z4_OWF_BH05-SAMP

Sample		Depth		Unit Weight [kN/m³]							Atterberg Limits				Undrained Shear Strength				
No	Ground Description	BSF [m]	w [%]	γ-w	γ	$\gamma_{d,min}$	$\gamma_{d,max}$	ρ_s [Mg/m³]	CC [%]	OC [%]	w_P [%]	w_L [%]	I_P [%]	Fines [%]	PP [kPa]	TV [kPa]	FC [kPa]	LV [kPa]	UU [kPa]
16	From 14.00 m to 14.85 m - firm low to medium strength very dark grey (2.5Y 3/1) slightly calcareous CLAY At 14.30 m - with a thin lamina of sand	14.00 14.25 14.30 14.50 14.70 14.85	 26.1 26.9	 19.7 19.5	 19.7 19.5 19.4 			2.72						100.0	 44 28 	 58 40 			25
17	From 15.00 m to 15.75 m - firm to stiff low to medium strength very dark grey (2.5Y 3/1) slightly calcareous CLAY At 15.60 m - with a coarse gravel-size pocket of sand	15.00 15.10 15.30 15.50 15.75	 25.9 19.1	 19.7 20.9	 20.6 21.0 				36.4	5.2	 17.0 	 27.0 	 10.0 		 38 62 	 48 60 			
18	From 16.00 m to 16.63 m - stiff very dark grey (2.5Y 3/1) silty slightly calcareous CLAY From 16.40 m to 16.50 m - with extremely closely spaced thick laminae of sand From 16.63 m to 16.64 m - very dark grey (2.5Y 3/1) gravelly calcareous fine to medium SAND with abundant fine to medium gravel-size shells and shell fragments. Gravel is subangular to subrounded medium of various lithologies From 16.64 m to 16.65 m - black (2.5Y 2.5/1) silty calcareous fine SAND with rare coarse sand-size shell fragments	16.00 16.10 16.20 16.65	 19.1 22.9	 20.9 20.1	 19.8 										 62 	 65 			
19	From 17.00 m to 18.00 m - black (2.5Y 2.5/1) silty calcareous fine SAND with occasional coarse sand-size to medium gravel-size shells and shell fragments	17.00 17.20 17.20 17.50 17.70 17.70	 27.2 25.8 26.0 25.4	 19.4 19.6 19.6 19.7	 18.9 19.0 			2.69	34.1	9.3				7.9					
20	From 18.00 m to 18.90 m - very dark grey (2.5Y 3/1) calcareous fine to medium SAND with rare coarse sand-size shell fragments From 18.50 m to 18.90 m - dark olive grey (5Y 3/2)	18.00 18.30 18.50	 22.7 23.2	 20.1 20.0	 19.6 														
21	From 19.50 m to 20.45 m - dark olive grey (5Y 3/2) calcareous fine to medium SAND with rare coarse sand-size shell fragments	19.50 19.80 20.00	 27.0 28.2	 19.4 19.2	 19.3 	12.6	16.6							3.8					

Notes

w : Water content
γ-w : Unit weight derived from water content
γ : Unit weight from volume mass calculation
$\gamma_{d,min}$: Minimum index dry unit weight
$\gamma_{d,max}$: Maximum index dry unit weight
ρ_s : Particle density
CC : $CaCO_3$ content
OC : Organic content
w_P : Plastic limit
w_L : Liquid limit
I_P : Plasticity index
Fines : Mass percentage of material passing 63 µm or 75 µm sieve
PP : Pocket penetrometer
TV : Torvane
FC : Fall cone
LV : Laboratory vane
UU : Unconsolidated undrained triaxial
10^r : r refers to test on remoulded soil
10^d : d refers to test on disturbed soil
10^s : Residual undrained shear strength
BSF: Below seafloor
W : WIP
RC : Rock Core

Note that both Rock Core (RC) and WIPS (W) were used for this location and the numbering is a reflection of switching between the different sampling method

Laboratory Classification Test Results

Z4_OWF_BH15-COMP

Sample		Depth		Unit Weight [kN/m³]							Atterberg Limits				Undrained Shear Strength				
No	Ground Description	BSF [m]	w [%]	γ-w	γ	$\gamma_{d,min}$	$\gamma_{d,max}$	ρ_s [Mg/m³]	CC [%]	OC [%]	w_P [%]	w_L [%]	I_P [%]	Fines [%]	PP [kPa]	TV [kPa]	FC [kPa]	LV [kPa]	UU [kPa]
01	From 1.50 m to 2.05 m - olive brown (2.5Y 4/3) slightly silty fine to medium SAND	1.50							31.8	1.8									
02	From 5.50 m to 5.70 m - dark grey (2.5Y 4/1) slightly silty calcareous fine to medium SAND with rare coarse sand-size shell fragments From 5.70 m to 6.20 m - very dark grey (2.5Y 3/1) silty fine to medium SAND with rare coarse sand-size shell fragments - with very closely to closely spaced very thin to thin beds of clay - with rare fine gravel-size pockets of organic matter From 5.90 m to 6.00 m - with frequent coarse sand-size to fine gravel-size shell fragments	5.50 5.70 6.20	 21.6 27.3	 20.5 19.5	 20.2 19.9			2.73						82.0					
03	From 8.50 m to 9.25 m - dark greyish brown (2.5Y 4/2) slightly silty highly calcareous fine SAND - with very closely to closely spaced very thin to medium beds of clay	8.50 8.65 9.00			 19.0 19.1				29.6	5.8									
04	From 9.50 m to 10.30 m - dark greyish brown (2.5Y 4/2) slightly silty calcareous fine SAND with rare coarse sand-size shell fragments	9.50 9.80 9.90 10.10	 30.7 33.1	 18.7 18.4	 19.2	 11.8	 15.5	2.69						10.4					
05	From 13.50 m to 13.60 m - very dark grey (2.5Y 3/1) slightly sandy CLAY From 13.60 m to 13.85 m - dark greyish brown (2.5Y 4/2) slightly silty calcareous fine to medium SAND - with rare fine gravel-size pockets of organic matter	13.50 13.60 13.70	 27.0	 19.4	 18.6			2.69						19.8					
06	From 17.00 m to 17.90 m - firm medium strength very dark grey (2.5Y 3/1) CLAY with rare coarse sand-size shell fragments	17.00 17.20 17.40 17.45 17.65	 29.7 27.9 28.6	 19.3 19.6 19.5	 19.5 20.1 19.4 19.2				29.6	7.1					75 71	45 58			 77
07	From 18.00 m to 18.80 m - firm medium strength very dark grey (2.5Y 3/1) slightly sandy CLAY with rare coarse sand-size to fine gravel-size shell fragments	18.00 18.10 18.35 18.55 18.80	 25.2 24.4 25.0	 20.0 20.1 20.0	 20.1 19.4 20.1			2.76			21.0	37.0	16.0	88.9	 63 73	 80			

Notes

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γ-w : Unit weight derived from water content
γ : Unit weight from volume mass calculation
$\gamma_{d,min}$: Minimum index dry unit weight
$\gamma_{d,max}$: Maximum index dry unit weight
ρ_s : Particle density
CC : $CaCO_3$ content
OC : Organic content
w_P : Plastic limit
w_L : Liquid limit
I_P : Plasticity index
PP : Pocket penetrometer
TV : Torvane
FC : Fall cone
LV : Laboratory vane
UU : Unconsolidated undrained triaxial
Fines : Mass percentage of material passing 63 µm or 75 µm sieve
10^r : r refers to test on remoulded soil
10^d : d refers to test on disturbed soil
10^s : Residual undrained shear strength
BSF: Below seafloor
W : WIP
RC : Rock Core

Note that both Rock Core (RC) and WIPS (W) were used for this location and the numbering is a reflection of switching between the different sampling method

Laboratory Classification Test Results
Z4_OWF_BH16-SAMP

Sample		Depth		Unit Weight [kN/m³]							Atterberg Limits				Undrained Shear Strength				
No	Ground Description	BSF [m]	w [%]	γ-w	γ	$\gamma_{d,min}$	$\gamma_{d,max}$	ρ_s [Mg/m³]	CC [%]	OC [%]	w_P [%]	w_L [%]	I_P [%]	Fines [%]	PP [kPa]	TV [kPa]	FC [kPa]	LV [kPa]	UU [kPa]
01	From 0.00 m to 0.45 m - dark grey (2.5Y 4/1) very clayey calcareous fine SAND with numerous coarse sand-size to coarse gravel-size shell fragments	0.00 0.25	33.9	18.3															
02	From 0.50 m to 0.70 m - very dark grey (2.5Y 3/1) slightly silty calcareous fine to medium SAND with numerous coarse sand-size shell fragments From 0.70 m to 1.10 m - very dark grey (2.5Y 3/1) fine to medium SAND with numerous coarse sand-size to fine gravel-size shell fragments	0.50 0.60 0.85	30.4 21.6	18.8 20.2	18.8														
03	From 1.50 m to 2.05 m - very dark grey (2.5Y 3/1) slightly silty fine to medium SAND with rare coarse sand-size shell fragments From 2.00 m to 2.05 m - very dark greyish brown (2.5Y 3/2)	1.50 1.70 1.80 2.00	25.3 24.0	19.5 19.7	18.9			2.66						1.9					
04	From 2.50 m to 3.10 m - very dark grey (2.5Y 3/1) fine to medium SAND	2.50 2.70 2.80	26.4 26.7	19.4 19.3	19.8				27.3	11.0									
05	From 3.00 m to 3.60 m - very dark grey (2.5Y 3/1) slightly silty fine to medium SAND with rare coarse sand-size shell fragments	3.00 3.55	19.9	20.5															
06	From 4.00 m to 4.75 m - dark grey (2.5Y 4/1) slightly silty calcareous fine to medium SAND with rare coarse sand-size shell fragments	4.00 4.30 4.60	24.4 22.9	19.7 19.9	18.6														
07	From 5.00 m to 5.75 m - very dark grey (2.5Y 3/1) calcareous fine to medium SAND with rare coarse sand-size shell fragments	5.00 5.30	26.6	19.3	18.4														
08	From 6.00 m to 6.25 m - dark greyish brown (2.5Y 4/2) slightly gravelly highly calcareous coarse SAND with rare coarse sand-size to fine gravel-size shell fragments. Gravel is subangular to subrounded of various lithologies From 6.25 m to 6.65 m - dark greyish brown (2.5Y 4/2) silty calcareous fine to medium SAND with rare coarse sand-size shell fragments	6.00 6.20 6.45	18.1 26.0	20.8 19.4	19.0									1.5					
09	From 7.00 m to 7.65 m - very dark grey (2.5Y 3/1) fine to medium SAND with rare coarse sand-size shell fragments	7.00 7.20 7.35 7.40	24.5 24.3	19.7 19.7	19.5				27.3	3.0									
10	From 8.00 m to 8.75 m - very dark grey (2.5Y 3/1) calcareous fine to medium SAND with rare coarse sand-size to fine gravel-size shell fragments	8.00 8.30 8.40	31.0 25.4	18.7 19.5	19.2														

Notes

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$\gamma_{d,max}$: Maximum index dry unit weight
ρ_s : Particle density
CC : $CaCO_3$ content
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w_L : Liquid limit
I_P : Plasticity index
PP : Pocket penetrometer
TV : Torvane
FC : Fall cone
LV : Laboratory vane
UU : Unconsolidated undrained triaxial
Fines : Mass percentage of material passing 63 µm or 75 µm sieve
10^r : r refers to test on remoulded soil
10^d : d refers to test on disturbed soil
10^s : Residual undrained shear strength
BSF : Below seafloor
W : WIP
RC : Rock Core

Note that both Rock Core (RC) and WIPS (W) were used for this location and the numbering is a reflection of switching between the different sampling method

Laboratory Classification Test Results
Z4_OWF_BH16-SAMP

Sample		Depth		Unit Weight [kN/m³]							Atterberg Limits				Undrained Shear Strength				
No	Ground Description	BSF [m]	w [%]	γ-w	γ	$\gamma_{d,min}$	$\gamma_{d,max}$	ρ_s [Mg/m³]	CC [%]	OC [%]	w_P [%]	w_L [%]	I_P [%]	Fines [%]	PP [kPa]	TV [kPa]	FC [kPa]	LV [kPa]	UU [kPa]
11	From 9.00 m to 9.60 m - very dark grey (2.5Y 3/1) slightly silty fine to medium SAND with rare coarse sand-size shell fragments - with extremely closely to medium spaced thin beds of clay	9.00 9.30	30.2	18.9	18.8														
12	From 10.00 m to 10.90 m - very dark greyish brown (2.5Y 3/2) calcareous fine to medium SAND with rare coarse sand-size shell fragments - with very closely spaced very thin to thin beds of clay	10.00 10.30 10.50 10.60	26.4 26.4	19.5 19.5	19.5			2.68						27.0					
13	From 11.00 m to 11.90 m - very dark grey (2.5Y 3/1) slightly silty calcareous fine to medium SAND - with thin laminae of organic matter - with extremely closely to very closely spaced thick laminae to thin beds of clay	11.00 11.40 11.60	31.4 27.9	18.8 19.3	19.4														
14	From 12.00 m to 12.95 m - very dark grey (2.5Y 3/1) calcareous fine to medium SAND - with closely spaced medium beds of clay	12.00 12.30 12.80	36.4 27.4	18.2 19.4	18.9														
15	From 13.00 m to 13.95 m - extremely low to very low strength CLAY - with extremely closely to closely spaced thick laminae of sand	13.00 13.30 13.50 13.70	31.3 28.4	18.8 19.2	21.1										7	12			
16	From 14.00 m to 14.55 m - very dark grey (2.5Y 3/1) calcareous SAND - with very closely spaced thick laminae to very thin beds of clay	14.00 14.25	24.7	19.8	19.6				27.3	2.1				56.8					
17	From 14.50 m to 15.30 m - very dark grey (2.5Y 3/1) calcareous fine to medium SAND with rare coarse sand-size shell fragments - with closely to medium spaced thin to medium beds of clay	14.50 15.00	27.4	19.3	20.3														
18	From 15.50 m to 16.30 m - very dark grey (2.5Y 3/1) calcareous fine to medium SAND - with very closely to closely spaced very thin to thin beds of clay	15.50 15.90	28.4	19.2	19.6														
19	From 16.50 m to 17.25 m - calcareous fine to medium SAND - with very closely to closely spaced thin to medium beds of clay	16.50 16.70 17.05	30.7 28.1	18.9 19.2	20.7														
20	From 17.50 m to 18.40 m - very dark grey (2.5Y 3/1) slightly silty calcareous fine to medium SAND with rare coarse sand-size shell fragments - with rare fine gravel-size pockets of organic matter	17.50 17.80	29.0	19.1															

Notes

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Fines : Mass percentage of material passing 63 µm or 75 µm sieve
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10^s : Residual undrained shear strength
BSF : Below seafloor
W : WIP
RC : Rock Core

Note that both Rock Core (RC) and WIPS (W) were used for this location and the numbering is a reflection of switching between the different sampling method

Laboratory Classification Test Results

Z4_OWF_BH16-SAMP

Sample		Depth		Unit Weight [kN/m³]							Atterberg Limits				Undrained Shear Strength				
No	Ground Description	BSF [m]	w [%]	γ-w	γ	$\gamma_{d,min}$	$\gamma_{d,max}$	ρ_s [Mg/m³]	CC [%]	OC [%]	w_P [%]	w_L [%]	I_P [%]	Fines [%]	PP [kPa]	TV [kPa]	FC [kPa]	LV [kPa]	UU [kPa]
21	From 18.50 m to 18.70 m - very dark grey (2.5Y 3/1) silty calcareous fine SAND From 18.70 m to 18.95 m - soft very low strength slightly silty calcareous CLAY - with numerous fine gravel-size pockets of sand From 18.95 m to 19.45 m - very dark grey (2.5Y 3/1) silty calcareous fine SAND - with very closely to closely spaced thick laminae to thin beds of clay	18.50 18.75 18.80 18.85 19.00	31.4 30.0	18.8 19.0	19.5			2.70						33.8	8	16			
22	From 19.50 m to 19.90 m - very dark grey (2.5Y 3/1) calcareous fine to medium SAND - with closely spaced thin to medium beds of clay - with rare fine gravel-size pockets of organic matter	19.50 19.70	27.4	19.3	16.1														
23	From 20.00 m to 20.60 m - firm very dark grey (2.5Y 3/1) slightly calcareous CLAY with rare coarse sand-size to fine gravel-size shell fragments - with extremely closely to very closely spaced thin laminae of sand - with rare coarse sand-size to fine gravel-size pockets of organic matter At 20.30 m - with a medium gravel-size pocket of organic matter	20.00 20.25 20.55	29.2	19.2	20.0			2.73	29.6	3.3	18.0	33.0	15.0	85.7					

Notes

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γ : Unit weight from volume mass calculation
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$\gamma_{d,max}$: Maximum index dry unit weight
ρ_s : Particle density
CC : $CaCO_3$ content
OC : Organic content
w_P : Plastic limit
w_L : Liquid limit
I_P : Plasticity index
Fines : Mass percentage of material passing 63 µm or 75 µm sieve
PP : Pocket penetrometer
TV : Torvane
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UU : Unconsolidated undrained triaxial
10^r : r refers to test on remoulded soil
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10^s : Residual undrained shear strength
BSF : Below seafloor
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Laboratory Classification Test Results
Z4_OWF_BH17-SAMP

Sample		Depth		Unit Weight [kN/m³]							Atterberg Limits				Undrained Shear Strength				
No	Ground Description	BSF [m]	w [%]	γ-w	γ	$\gamma_{d,min}$	$\gamma_{d,max}$	ρ_s [Mg/m³]	CC [%]	OC [%]	w_P [%]	w_L [%]	I_P [%]	Fines [%]	PP [kPa]	TV [kPa]	FC [kPa]	LV [kPa]	UU [kPa]
01	From 0.00 m to 0.60 m - dark olive grey (5Y 3/2) clayey slightly calcareous fine SAND with occasional coarse sand-size to coarse gravel-size shells and shell fragments	0.00 0.20	31.1	18.9				2.70						30.4					
02	From 1.00 m to 1.40 m - dark olive grey (5Y 3/2) slightly calcareous fine to medium SAND with rare coarse sand-size to fine gravel-size shell fragments At 1.40 m - with a very thin bed of gravelly coarse sand	1.00 1.20	23.2	20.1	19.6														
03	From 1.50 m to 2.15 m - dark olive grey (5Y 3/2) slightly silty calcareous fine to medium SAND with rare coarse sand-size shell fragments	1.50 1.85 1.85 1.90	27.2 26.4	19.4 19.5	18.3				29.6	7.1									
04	From 2.50 m to 2.90 m - dark olive grey (5Y 3/2) slightly silty calcareous fine to medium SAND with rare coarse sand-size shell fragments From 2.90 m to 3.20 m - dark olive grey (5Y 3/2) silty calcareous fine to medium SAND with rare coarse sand-size shell fragments	2.50 2.70 2.70 2.90 2.95 2.95	27.7 28.0 28.1 27.6	19.3 19.3 19.3 19.4	18.2 18.4									25.6					
05	From 3.50 m to 4.25 m - dark olive grey (5Y 3/2) slightly silty calcareous fine to medium SAND with rare coarse sand-size shell fragments	3.50 3.75 3.75 4.00 4.00	29.1 30.2 28.5 29.1	19.1 19.0 19.2 19.1	18.7 17.8														
06	From 4.50 m to 5.30 m - dark olive grey (5Y 3/2) slightly silty calcareous fine to medium SAND	4.50 4.90 4.90	28.4 27.8	19.2 19.3	18.6														
07	From 5.50 m to 6.30 m - dark olive grey (5Y 3/2) slightly silty calcareous fine to medium SAND with rare coarse sand-size to fine gravel-size shell fragments	5.50 5.75 5.75 6.10 6.10	28.7 29.6 31.0 31.0	19.2 19.1 18.9 18.9	18.1 17.8	11.8	15.8		29.6	3.0									
08	From 6.50 m to 7.20 m - dark olive grey (5Y 3/2) slightly silty calcareous fine to medium SAND with rare coarse sand-size to fine gravel-size shell fragments At 6.95 m - with a thin lamina of clay	6.50 6.85 6.85	29.7 28.9	19.1 19.2	18.1			2.70						29.0					
09	From 7.50 m to 8.25 m - dark olive grey (5Y 3/2) slightly silty calcareous fine to medium SAND with rare coarse sand-size to fine gravel-size shell fragments	7.50 7.90 7.90	31.4 29.4	18.8 19.1	17.9														

Notes

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$\gamma_{d,max}$: Maximum index dry unit weight
ρ_s : Particle density
CC : $CaCO_3$ content
OC : Organic content
w_P : Plastic limit
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Fines : Mass percentage of material passing 63 µm or 75 µm sieve
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10^r : r refers to test on remoulded soil
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10^s : Residual undrained shear strength
BSF: Below seafloor
W : WIP
RC : Rock Core

Note that both Rock Core (RC) and WIPS (W) were used for this location and the numbering is a reflection of switching between the different sampling method

Laboratory Classification Test Results
Z4_OWF_BH17-SAMP

Sample		Depth		Unit Weight [kN/m³]							Atterberg Limits				Undrained Shear Strength				
No	Ground Description	BSF [m]	w [%]	γ-w	γ	$\gamma_{d,min}$	$\gamma_{d,max}$	ρ_s [Mg/m³]	CC [%]	OC [%]	w_P [%]	w_L [%]	I_P [%]	Fines [%]	PP [kPa]	TV [kPa]	FC [kPa]	LV [kPa]	UU [kPa]
10	From 8.50 m to 8.80 m - very dark grey (5Y 3/1) slightly silty calcareous fine to medium SAND with rare coarse sand-size to fine gravel-size shell fragments - with extremely closely to closely spaced thin laminae of clay From 8.80 m to 9.30 m - dark olive grey (5Y 3/2) slightly silty calcareous fine to medium SAND with rare coarse sand-size to fine gravel-size shell fragments	8.50 8.65 8.65 9.00 9.00	 32.1 31.1 33.0 32.6	 18.7 18.9 18.6 18.7	 18.5 18.8 														
11	From 9.50 m to 10.30 m - dark olive grey (5Y 3/2) slightly silty calcareous fine to medium SAND with rare coarse sand-size to fine gravel-size shell fragments At 9.60 m - with a thin bed of clay	9.50 9.75 9.75 10.00 10.00	 39.5 39.5 32.5 31.7	 17.9 17.9 18.7 18.8	 18.0 18.5 														
12	From 10.50 m to 11.35 m - dark olive grey (5Y 3/2) slightly silty calcareous fine to medium SAND with rare coarse sand-size to fine gravel-size shell fragments From 10.50 m to 10.80 m - with extremely closely to very closely spaced thin laminae of organic matter	10.50 10.70 10.70 11.05 11.05	 34.9 34.0 31.4 31.1	 18.4 18.5 18.8 18.9	 18.1 18.0 														
13	From 11.50 m to 12.25 m - dark olive grey (5Y 3/2) slightly silty calcareous fine to medium SAND with rare coarse sand-size shell fragments - with extremely closely to closely spaced thin to thick laminae of clay	11.50 11.70 11.70 11.80 11.80	 31.6 30.2 31.1 30.2	 18.8 19.0 18.9 19.0	 18.3 18.5 									26.7					
14	From 12.50 m to 13.40 m - dark olive grey (5Y 3/2) slightly silty calcareous fine to medium SAND with rare coarse sand-size shell fragments - with extremely closely to very closely spaced thick laminae to thin beds of clay	12.50 12.80 12.80 13.10 13.10	 35.5 33.4 31.7 30.2	 18.3 18.6 18.8 19.0	 18.0 18.3 														
15	From 13.50 m to 14.35 m - dark olive grey (5Y 3/2) silty calcareous fine to medium SAND with rare coarse sand-size shell fragments - with closely to medium spaced thick laminae to very thin beds of clay - with medium spaced thick laminae to very thin beds of organic matter At 13.60 m - with rare medium to coarse gravel-size shell fragments	13.50 13.95 13.95	 30.2 29.1	 19.0 19.1	 18.6 				29.6	6.1									

Notes

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γ : Unit weight from volume mass calculation
$\gamma_{d,min}$: Minimum index dry unit weight
$\gamma_{d,max}$: Maximum index dry unit weight
ρ_s : Particle density
CC : $CaCO_3$ content
OC : Organic content
w_P : Plastic limit
w_L : Liquid limit
I_P : Plasticity index
Fines : Mass percentage of material passing 63 µm or 75 µm sieve
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TV : Torvane
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10^r : r refers to test on remoulded soil
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10^s : Residual undrained shear strength
BSF: Below seafloor
W : WIP
RC : Rock Core

Note that both Rock Core (RC) and WIPS (W) were used for this location and the numbering is a reflection of switching between the different sampling method

Laboratory Classification Test Results
Z4_OWF_BH17-SAMP

Sample		Depth		Unit Weight [kN/m³]							Atterberg Limits				Undrained Shear Strength				
No	Ground Description	BSF [m]	w [%]	γ-w	γ	$\gamma_{d,min}$	$\gamma_{d,max}$	ρ_s [Mg/m³]	CC [%]	OC [%]	w_P [%]	w_L [%]	I_P [%]	Fines [%]	PP [kPa]	TV [kPa]	FC [kPa]	LV [kPa]	UU [kPa]
16	From 14.50 m to 15.25 m - dark olive grey (5Y 3/2) silty calcareous fine to medium SAND with rare coarse sand-size shell fragments - with extremely closely to closely spaced thin to thick laminae of clay	14.50																	
		14.70	29.7	19.0	18.4														
		14.70	29.6	19.0															
		15.05	25.9	19.6	18.5														
		15.05	26.8	19.4															
17	From 15.50 m to 16.35 m - dark olive grey (5Y 3/2) silty calcareous fine to medium SAND with rare coarse sand-size shell fragments - with extremely closely to closely spaced thin to thick laminae of clay - with extremely closely to closely spaced thin to thick laminae of organic matter	15.50						2.69						25.2					
		15.70	30.7	18.9	18.7														
		15.70	29.8	19.0															
		16.00	28.4	19.2	18.3														
		16.00	28.3	19.2															
18	From 16.50 m to 17.05 m - dark olive grey (5Y 3/2) silty calcareous fine to medium SAND with rare coarse sand-size to medium gravel-size shell fragments From 16.80 m to 16.90 m - with coarse sand-size to medium gravel-size pockets of clay and coarse sand-size to medium gravel-size pockets of organic matter At 16.90 m - with a very thin bed of clay From 17.05 m to 17.40 m - slightly sandy CLAY - with fine gravel-size pockets of organic matter	16.50																	
		16.80	31.2	18.8	18.6														
		16.80	29.3	19.1															
		17.20	29.0	19.3	19.0														
		17.20	28.6	19.4															
19	From 17.50 m to 18.25 m - low to medium strength very dark grey (2.5Y 3/1) slightly sandy calcareous CLAY with rare coarse sand-size to medium gravel-size shells and shell fragments - with extremely closely to very closely spaced thin laminae of sand - with coarse sand-size to medium gravel-size pockets of organic matter From 18.10 m to 18.20 m - with abundant coarse sand-size to medium gravel-size shells and shell fragments with a thin bed of sandy clay From 18.25 m to 18.50 m - firm medium strength very dark grey (2.5Y 3/1) calcareous CLAY	17.50																	
		17.75							19.1	3.9									
		17.80	30.4	19.1															
		17.90													56	40			
		18.00						2.74			15.0	28.0	13.0	76.1					
		18.20														37			
		18.25			20.7														46
		18.25			19.8														
		18.40													50	56			
		18.50	28.9	19.4															
20	From 18.50 m to 19.35 m - stiff medium strength very dark grey (2.5Y 3/1) calcareous CLAY	18.50																	
		18.60	29.6	19.2	19.8										70	54			
		19.20			19.7										68	68			
		19.35	31.0	19.1															

Notes

w : Water content
γ-w : Unit weight derived from water content
γ : Unit weight from volume mass calculation
$\gamma_{d,min}$: Minimum index dry unit weight
$\gamma_{d,max}$: Maximum index dry unit weight
ρ_s : Particle density
CC : $CaCO_3$ content
OC : Organic content
w_P : Plastic limit
w_L : Liquid limit
I_P : Plasticity index
PP : Pocket penetrometer
TV : Torvane
FC : Fall cone
LV : Laboratory vane
UU : Unconsolidated undrained triaxial
Fines : Mass percentage of material passing 63 µm or 75 µm sieve
10^r : r refers to test on remoulded soil
10^d : d refers to test on disturbed soil
10^s : Residual undrained shear strength
BSF: Below seafloor
W : WIP
RC : Rock Core

Note that both Rock Core (RC) and WIPS (W) were used for this location and the numbering is a reflection of switching between the different sampling method

Laboratory Classification Test Results

Z4_OWF_BH17-SAMP

Sample		Depth		Unit Weight [kN/m³]							Atterberg Limits				Undrained Shear Strength				
No	Ground Description	BSF [m]	w [%]	γ-w	γ	$\gamma_{d,min}$	$\gamma_{d,max}$	ρ_s [Mg/m³]	CC [%]	OC [%]	w_P [%]	w_L [%]	I_P [%]	Fines [%]	PP [kPa]	TV [kPa]	FC [kPa]	LV [kPa]	UU [kPa]
21	From 19.50 m to 20.35 m - stiff medium strength very dark grey (2.5Y 3/1) calcareous CLAY	19.50																	
		19.60	32.1	18.9	19.3										59	56			
		19.80			19.3														72
		20.20			19.5			2.75			24.0	41.0	17.0	96.9	59	61			
		20.35	31.5	19.0															

Notes

w : Water content
γ-w : Unit weight derived from water content
γ : Unit weight from volume mass calculation
$\gamma_{d,min}$: Minimum index dry unit weight
$\gamma_{d,max}$: Maximum index dry unit weight
ρ_s : Particle density
CC : $CaCO_3$ content
OC : Organic content
w_P : Plastic limit
w_L : Liquid limit
I_P : Plasticity index
Fines : Mass percentage of material passing 63 µm or 75 µm sieve
PP : Pocket penetrometer
TV : Torvane
FC : Fall cone
LV : Laboratory vane
UU : Unconsolidated undrained triaxial
10^r : r refers to test on remoulded soil
10^d : d refers to test on disturbed soil
10^s : Residual undrained shear strength
BSF: Below seafloor
W : WIP
RC : Rock Core

Note that both Rock Core (RC) and WIPS (W) were used for this location and the numbering is a reflection of switching between the different sampling method

Test Report

Liquid Limit, Plastic Limit and Plasticity Index

ISO 17892-12:2018

UKAS TESTING 0919

No.	Test Date	Location	Sample	Depth [m]	Preparation Method (% passing 0.425 mm)	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	Laboratory
1	28/03/2025	Z4_OWF_BH01-SAMP	01-1	0.00	Natural soil	-	NP	-	F
2	13/06/2025	Z4_OWF_BH01-SAMP	17-2	15.65	Natural soil	-	NP	-	A
3	13/06/2025	Z4_OWF_BH01-SAMP	20-3	18.90	Natural soil	36	17	19	A
4	20/03/2025	Z4_OWF_BH05-SAMP	01-2	0.10	Sieved (80)	27	19	8	F
5	13/06/2025	Z4_OWF_BH05-SAMP	17-3	15.30	Natural soil	27	17	10	A
6	19/03/2025	Z4_OWF_BH15-COMP	07-1	18.00	Natural soil	37	21	16	F
7	20/03/2025	Z4_OWF_BH16-SAMP	23-2	20.25	Natural soil	33	18	15	F
8	25/03/2025	Z4_OWF_BH17-SAMP	19-3	18.00	Sieved (91)	28	15	13	F
9	20/03/2025	Z4_OWF_BH17-SAMP	21-5	20.20	Natural soil	41	24	17	F

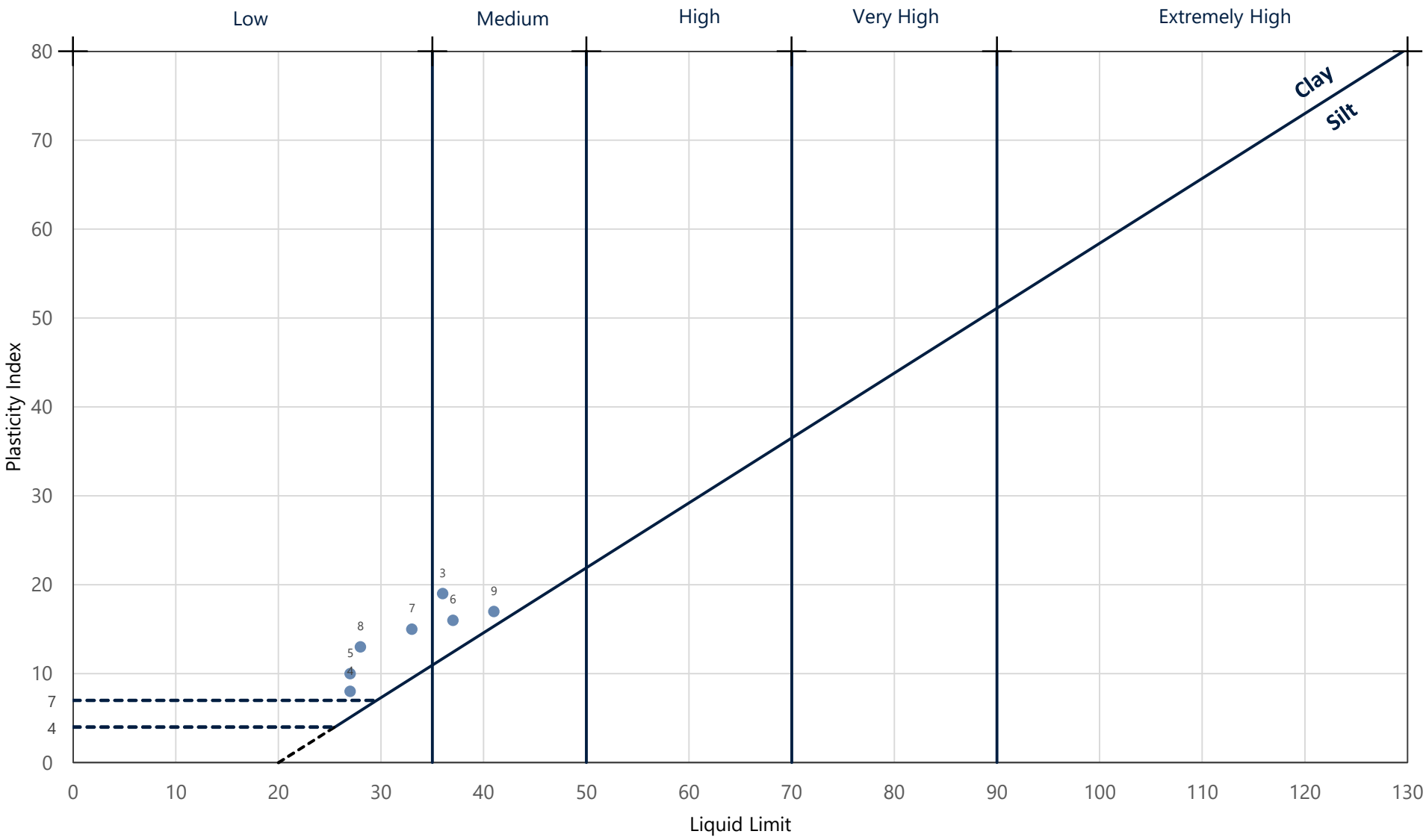
Fall cone method with 4 points, 80 gr/30° cone used and increasing water content
NP=Non-plastic sample
Note: For sample descriptions, please refer to the report section presenting laboratory test results.

A: Wallingford, UK
F: Louvain-la-Neuve, Belgium

Approved by ET - 18/07/2025

FUGRO

Plasticity Chart



A: Wallingford, UK
F: Louvain-la-Neuve, Belgium

Location ID	Sample ID	Depth [m]	Percentage Soil Types					D10 [mm]	D30 [mm]	D50 [mm]	D60 [mm]	Cc [-]	Cu [-]
			Fines	Clay	Silt	Sand	Gravel						
Z4_OWF_BH01-SAMP	01-1	0.00	32	14	18	62	6	-	0.045	0.164	0.199	-	-
Z4_OWF_BH01-SAMP	01-2	0.30	7	-	-	70	23	0.109	0.246	0.451	0.693	0.8	6.4
Z4_OWF_BH01-SAMP	06-1	4.50	12	3	8	88	0	0.045	0.087	0.125	0.149	1.1	3.3
Z4_OWF_BH01-SAMP	10-1	8.50	13	4	9	87	0	0.034	0.08	0.105	0.12	1.6	3.5
Z4_OWF_BH01-SAMP	14-1	12.50	6	-	-	94	0	0.065	0.08	0.099	0.109	0.9	1.7
Z4_OWF_BH01-SAMP	17-1	15.50	80	20	60	20	0	-	0.006	0.027	0.036	-	-
Z4_OWF_BH01-SAMP	20-1	18.50	100	40	60	0	0	-	-	0.004	0.008	-	-
Z4_OWF_BH05-SAMP	01-2	0.10	34	14	20	54	12	-	0.035	0.142	0.191	-	-
Z4_OWF_BH05-SAMP	02-1	1.00	2	-	-	98	0	0.078	0.133	0.167	0.179	1.3	2.3
Z4_OWF_BH05-SAMP	05-1	4.00	26	7	19	71	3	0.007	0.07	0.111	0.139	5.2	20.8
Z4_OWF_BH05-SAMP	09-1	8.00	2	-	-	98	0	0.07	0.089	0.115	0.13	0.9	1.9
Z4_OWF_BH05-SAMP	13-1	11.50	45	10	34	55	0	-	0.025	0.07	0.084	-	-
Z4_OWF_BH05-SAMP	16-4	14.70	100	39	61	0	0	-	-	0.004	0.006	-	-
Z4_OWF_BH05-SAMP	19-2	17.50	8	-	-	92	0	0.065	0.083	0.106	0.12	0.9	1.9
Z4_OWF_BH05-SAMP	21-1	19.50	4	-	-	95	1	0.069	0.093	0.126	0.147	0.9	2.1
Z4_OWF_BH15-COMP	02-2	5.70	82	39	43	18	0	-	-	0.006	0.01	-	-
Z4_OWF_BH15-COMP	04-1	9.50	10	3	7	90	0	0.059	0.077	0.095	0.105	1.0	1.8
Z4_OWF_BH15-COMP	05-2	13.60	20	5	15	80	0	0.011	0.071	0.089	0.1	4.4	8.8
Z4_OWF_BH15-COMP	07-1	18.00	89	24	65	10	-	-	0.003	0.009	0.014	-	-
Z4_OWF_BH16-SAMP	Batch_10	1.50	2	-	-	98	0	0.172	0.23	0.264	0.282	1.1	1.6
Z4_OWF_BH16-SAMP	08-1	6.00	2	-	-	96	2	0.152	0.232	0.307	0.409	0.9	2.7
Z4_OWF_BH16-SAMP	12-2	10.50	27	7	20	73	0	0.005	0.068	0.111	0.141	7.2	31.2
Z4_OWF_BH16-SAMP	16-1	14.00	57	17	39	43	0	-	0.008	0.044	0.069	-	-
Z4_OWF_BH16-SAMP	21-1	18.50	34	7	27	66	0	0.009	0.051	0.079	0.091	3.1	9.8
Z4_OWF_BH16-SAMP	23-2	20.25	86	26	60	14	0	-	0.003	0.009	0.017	-	-
Z4_OWF_BH17-SAMP	01-1	0.00	30	13	18	66	4	-	0.059	0.153	0.174	-	-
Z4_OWF_BH17-SAMP	04-2	2.90	26	7	19	74	0	0.008	0.067	0.091	0.106	5.2	12.9
Z4_OWF_BH17-SAMP	08-2	6.85	29	6	23	71	0	0.008	0.064	0.083	0.094	5.4	11.8
Z4_OWF_BH17-SAMP	13-1	11.50	27	9	17	73	0	0.002	0.066	0.084	0.095	18.9	39.7
Z4_OWF_BH17-SAMP	17-1	15.50	25	7	18	75	0	0.005	0.067	0.085	0.097	8.7	18.2
Z4_OWF_BH17-SAMP	19-3	18.00	76	22	54	20	4	-	0.004	0.014	0.025	-	-
Z4_OWF_BH17-SAMP	21-5	20.20	97	24	73	3	0	-	0.003	0.007	0.011	-	-

Test method : ISO 17892-4 (2016)

TOPAZ / PSD Summary of particle size distribution test results with %Fines (FFSA) / 2025-08-28 13:52:52 +02:00

Summary of Particle Size Distribution Test Results

Test Report

Particle Size Distribution

ISO 17892-4: 2016 - 5.2 & 5.4 - Sieving & Sedimentation by Pipette Method

UKAS TESTING 0919

Test Identification			
Location	Z4_OWF_BH01-SAMP	Depth [m]	0.00
Sample	01-1	Test start date	14/03/2025

Sieving

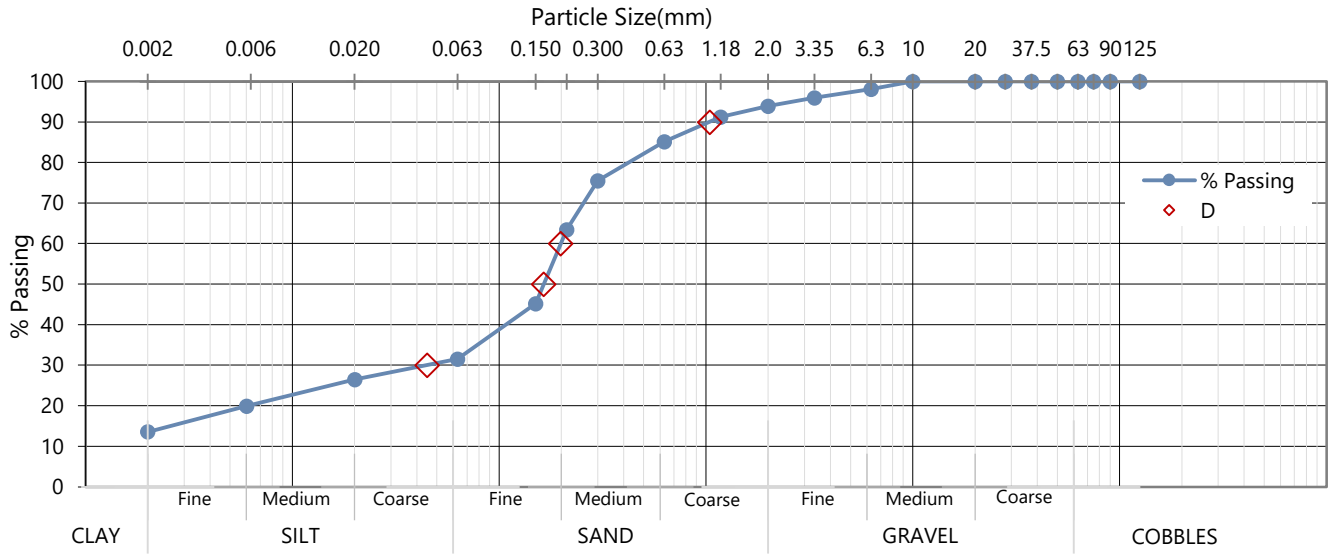
Particle Size [mm]	Passing [%]
125.0	100
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
10.0	100
6.3	98
3.35	96
2.00	94
1.18	91
0.630	85
0.300	76
0.212	63
0.150	45
0.063	32

Sedimentation

Particle Size [mm]	Passing [%]
0.0200	26
0.0060	20
0.0020	14

Curve Characteristics			
D_{90}	1.043 mm	Uniformity Coefficient	
D_{60}	0.199 mm	C_U	-
D_{50}	0.164 mm	Coefficient of Curvature	
D_{30}	0.045 mm	C_C	-
D_{10}	-		

Soil fractions [%]	
Cobbles	0
Gravel	6
Sand	62
Silt*	18
Clay	14



Note 1: For sample descriptions, please refer to the report section presenting laboratory test results.

Note 2: Particle density for sedimentation is assumed to be 2.70 Mg/m^3.

*** Where a sedimentation test was not carried out, this represents total fines, particles less than 0.063 mm.**

Project: 503387 - F254727 Laboratory: Louvain-la-Neuve Approved by: ET - 15/04/2025

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Test Report

Particle Size Distribution

ISO 17892-4: 2016 - 5.2 - Sieving Method

UKAS TESTING 0919

Test Identification			
Location	Z4_OWF_BH01-SAMP	Depth [m]	0.30
Sample	01-2	Test start date	21/03/2025

Sieving

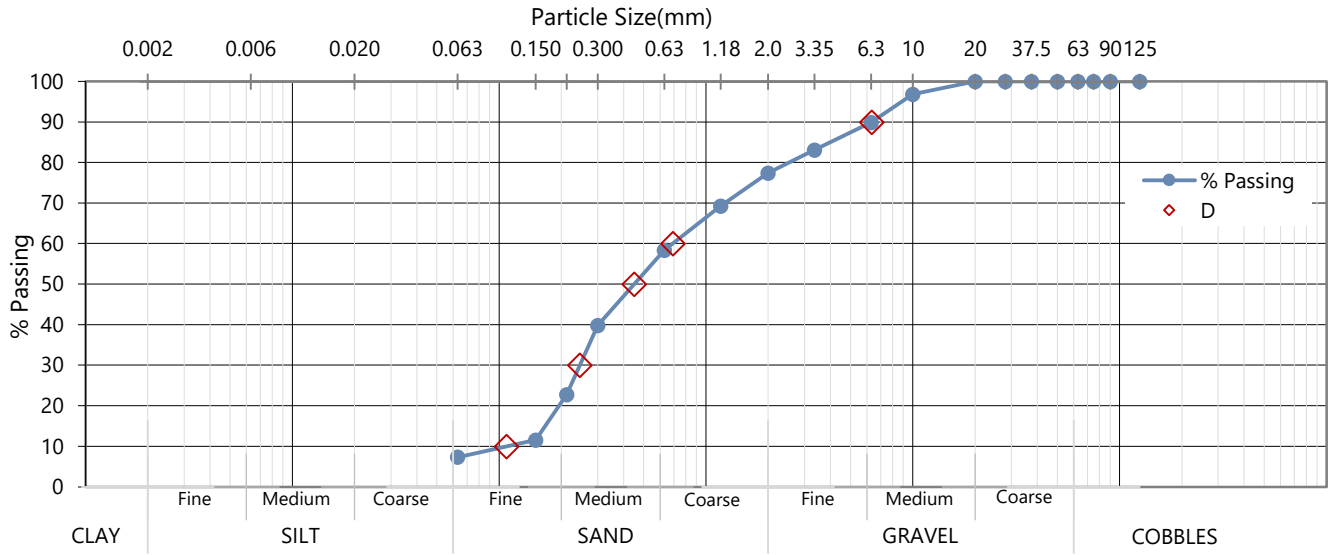
Particle Size [mm]	Passing [%]
125.0	100
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
10.0	97
6.3	90
3.35	83
2.00	77
1.18	69
0.630	58
0.300	40
0.212	23
0.150	12
0.063	7

Sedimentation

Particle Size [mm]	Passing [%]

Curve Characteristics			
D_{90}	6.330 mm	Uniformity Coefficient	
D_{60}	0.693 mm	C_U	6.37
D_{50}	0.451 mm	Coefficient of Curvature	
D_{30}	0.246 mm	C_C	0.80
D_{10}	0.109 mm		

Soil fractions [%]	
Cobbles	0
Gravel	23
Sand	70
Silt*	7
Clay	0



Note 1: For sample descriptions, please refer to the report section presenting laboratory test results.

Note 2: Particle density for sedimentation is assumed to be 2.70 Mg/m^3.

*** Where a sedimentation test was not carried out, this represents total fines, particles less than 0.063 mm.**

Project: 503387 - F254727 Laboratory: Louvain-la-Neuve Approved by: ET - 15/04/2025

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Test Report

Particle Size Distribution

ISO 17892-4: 2016 - 5.2 & 5.4 - Sieving & Sedimentation by Pipette Method

Test Identification			
Location	Z4_OWF_BH01-SAMP	Depth [m]	4.50
Sample	06-1	Test start date	21/03/2025

Sieving

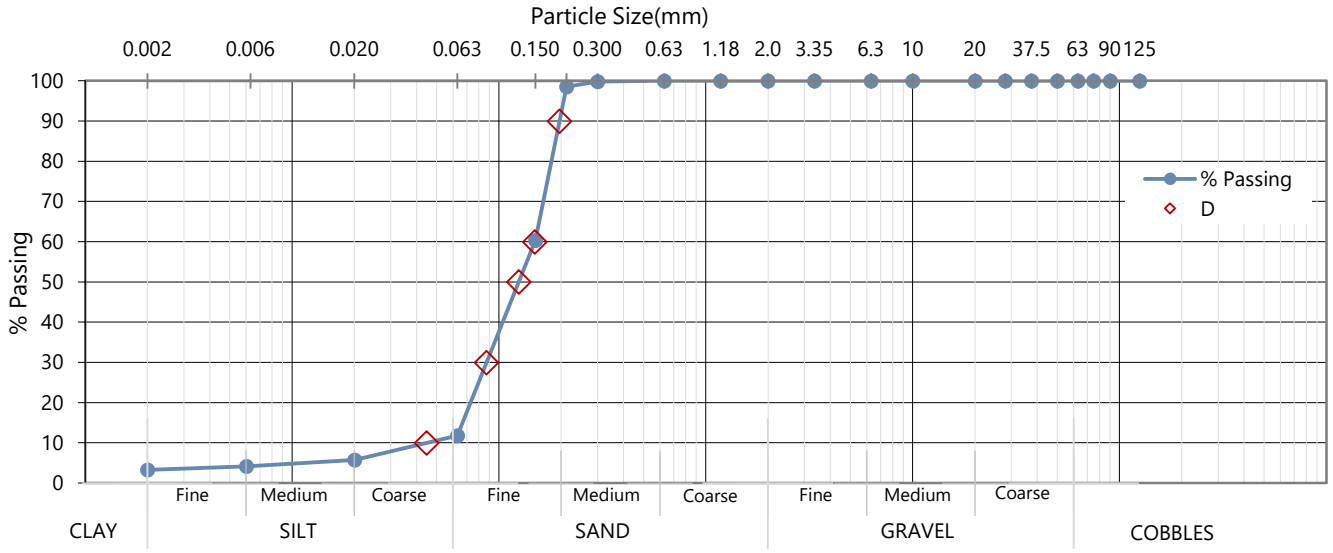
Particle Size [mm]	Passing [%]
125.0	100
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
10.0	100
6.3	100
3.35	100
2.00	100
1.18	100
0.630	100
0.300	100
0.212	99
0.150	60
0.063	12

Sedimentation

Particle Size [mm]	Passing [%]
0.0200	6
0.0060	4
0.0020	3

Curve Characteristics			
D_{90}	0.196 mm	Uniformity Coefficient	
D_{60}	0.149 mm	C_U	3.33
D_{50}	0.125 mm	Coefficient of Curvature	
D_{30}	0.087 mm	C_C	1.14
D_{10}	0.045 mm		

Soil fractions [%]	
Cobbles	0
Gravel	0
Sand	88
Silt*	9
Clay	3



Note 1: For sample descriptions, please refer to the report section presenting laboratory test results.

Note 2: Particle density for sedimentation is assumed to be 2.70 Mg/m^3.

*** Where a sedimentation test was not carried out, this represents total fines, particles less than 0.063 mm.**

Project: 503387 - F254727 Laboratory: Louvain-la-Neuve Approved by: TG - 22/04/2025

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Test Report

Particle Size Distribution

ISO 17892-4: 2016 - 5.2 & 5.4 - Sieving & Sedimentation by Pipette Method

Test Identification			
Location	Z4_OWF_BH01-SAMP	Depth [m]	8.50
Sample	10-1	Test start date	21/03/2025

Sieving

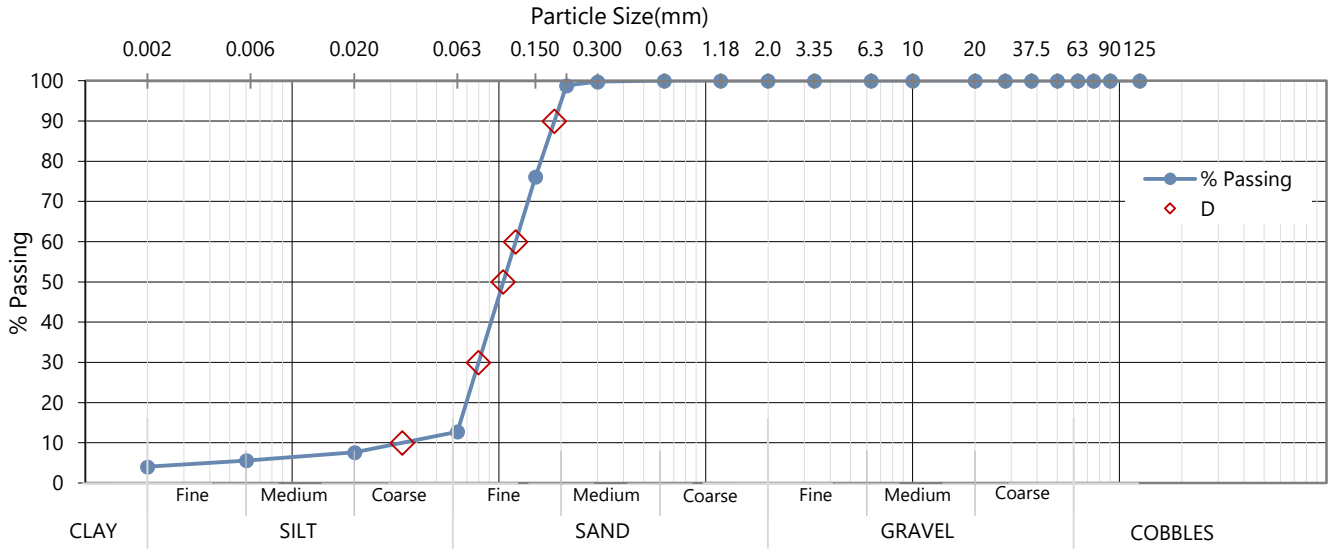
Particle Size [mm]	Passing [%]
125.0	100
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
10.0	100
6.3	100
3.35	100
2.00	100
1.18	100
0.630	100
0.300	100
0.212	99
0.150	76
0.063	13

Sedimentation

Particle Size [mm]	Passing [%]
0.0200	8
0.0060	6
0.0020	4

Curve Characteristics			
D_{90}	0.185 mm	Uniformity Coefficient	
D_{60}	0.120 mm	C_U	3.53
D_{50}	0.105 mm	Coefficient of Curvature	
D_{30}	0.080 mm	C_C	1.55
D_{10}	0.034 mm		

Soil fractions [%]	
Cobbles	0
Gravel	0
Sand	87
Silt*	9
Clay	4



Note 1: For sample descriptions, please refer to the report section presenting laboratory test results.

Note 2: Particle density for sedimentation is assumed to be 2.70 Mg/m^3.

*** Where a sedimentation test was not carried out, this represents total fines, particles less than 0.063 mm.**

Project: 503387 - F254727 Laboratory: Louvain-la-Neuve Approved by: TG - 31/05/2025

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Test Report

Particle Size Distribution

ISO 17892-4: 2016 - 5.2 - Sieving Method

Test Identification			
Location	Z4_OWF_BH01-SAMP	Depth [m]	12.50
Sample	14-1	Test start date	21/03/2025

Sieving

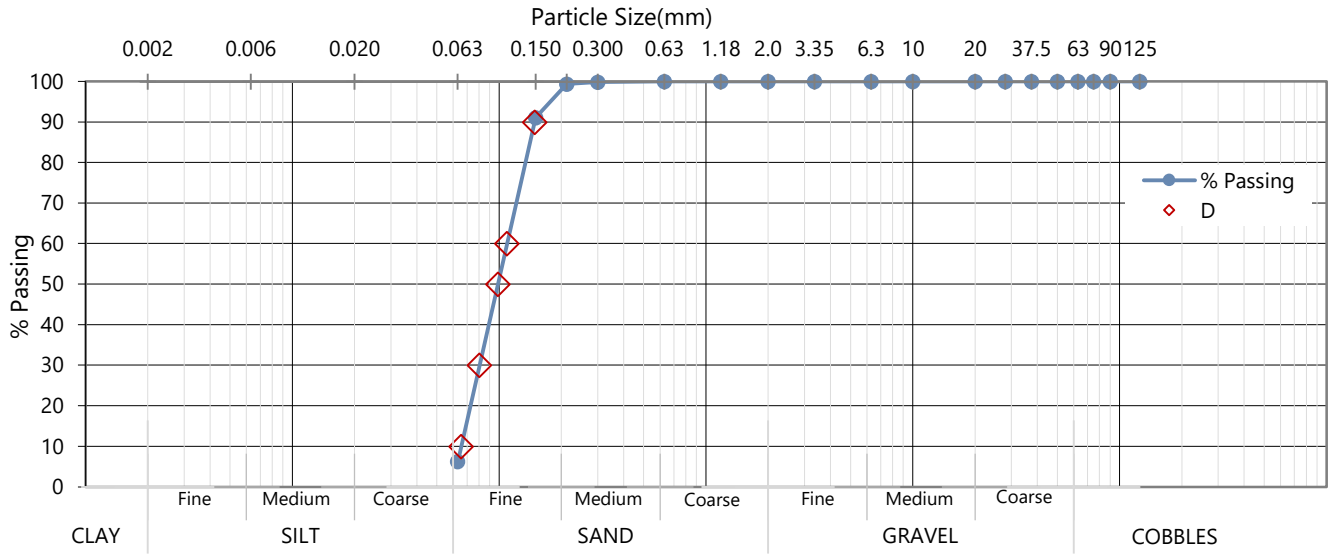
Particle Size [mm]	Passing [%]
125.0	100
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
10.0	100
6.3	100
3.35	100
2.00	100
1.18	100
0.630	100
0.300	100
0.212	99
0.150	91
0.063	6

Sedimentation

Particle Size [mm]	Passing [%]

Curve Characteristics			
D_{90}	0.148 mm	Uniformity Coefficient	
D_{60}	0.109 mm	C_U	1.67
D_{50}	0.099 mm	Coefficient of Curvature	
D_{30}	0.080 mm	C_C	0.90
D_{10}	0.065 mm		

Soil fractions [%]	
Cobbles	0
Gravel	0
Sand	94
Silt*	6
Clay	0



Note 1: For sample descriptions, please refer to the report section presenting laboratory test results.

Note 2: Particle density for sedimentation is assumed to be 2.70 Mg/m^3.

*** Where a sedimentation test was not carried out, this represents total fines, particles less than 0.063 mm.**

Project: 503387 - F254727 Laboratory: Louvain-la-Neuve Approved by: ET - 15/04/2025

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Test Report

Particle Size Distribution

ISO 17892-4: 2016 - 5.2 & 5.4 - Sieving & Sedimentation by Pipette Method

Test Identification			
Location	Z4_OWF_BH01-SAMP	Depth [m]	15.50
Sample	17-1	Test start date	21/03/2025

Sieving

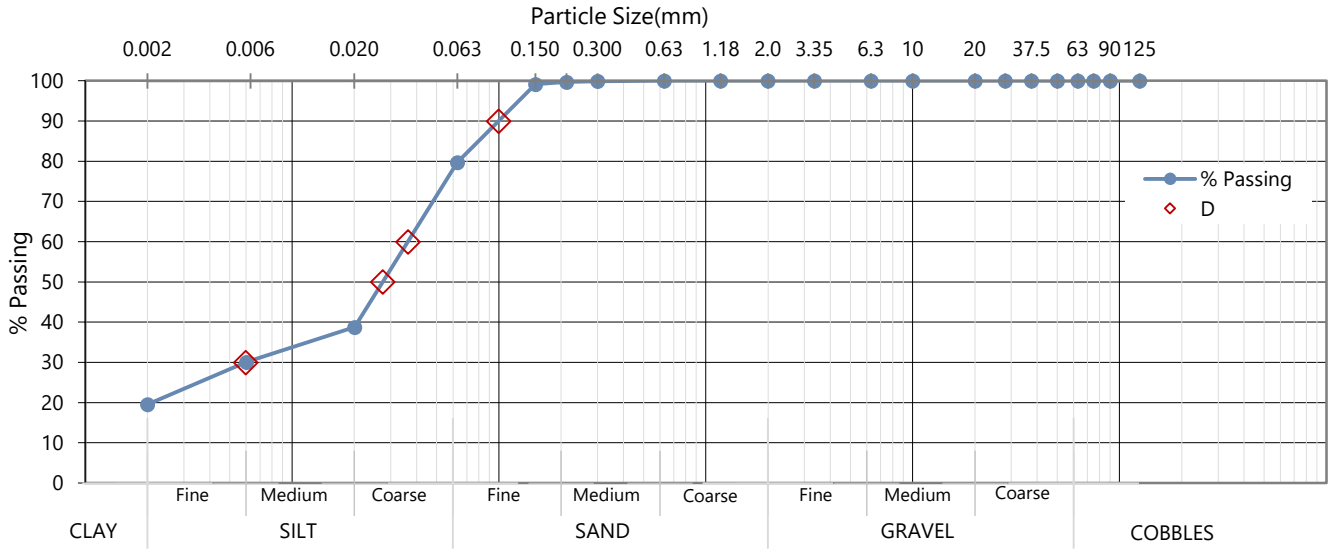
Particle Size [mm]	Passing [%]
125.0	100
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
10.0	100
6.3	100
3.35	100
2.00	100
1.18	100
0.630	100
0.300	100
0.212	100
0.150	99
0.063	80

Sedimentation

Particle Size [mm]	Passing [%]
0.0200	39
0.0060	30
0.0020	20

Curve Characteristics			
D_{90}	0.100 mm	Uniformity Coefficient	
D_{60}	0.036 mm	C_U	-
D_{50}	0.027 mm	Coefficient of Curvature	
D_{30}	0.006 mm	C_C	-
D_{10}	-		

Soil fractions [%]	
Cobbles	0
Gravel	0
Sand	20
Silt*	60
Clay	20



Note 1: For sample descriptions, please refer to the report section presenting laboratory test results.

Note 2: Particle density for sedimentation is assumed to be 2.70 Mg/m^3.

*** Where a sedimentation test was not carried out, this represents total fines, particles less than 0.063 mm.**

Project: 503387 - F254727 Laboratory: Louvain-la-Neuve Approved by: TG - 22/04/2025

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Test Report

Particle Size Distribution

ISO 17892-4: 2016 - 5.2 & 5.4 - Sieving & Sedimentation by Pipette Method

Test Identification			
Location	Z4_OWF_BH01-SAMP	Depth [m]	18.50
Sample	20-1	Test start date	21/03/2025

Sieving

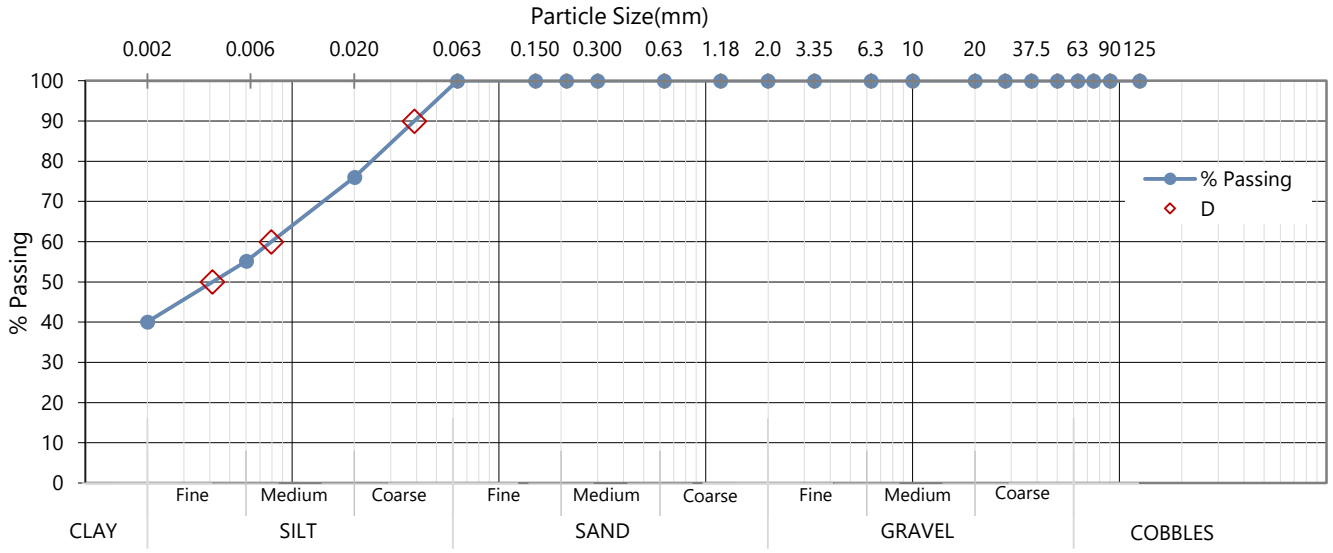
Particle Size [mm]	Passing [%]
125.0	100
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
10.0	100
6.3	100
3.35	100
2.00	100
1.18	100
0.630	100
0.300	100
0.212	100
0.150	100
0.063	100

Sedimentation

Particle Size [mm]	Passing [%]
0.0200	76
0.0060	55
0.0020	40

Curve Characteristics			
D_{90}	0.039 mm	Uniformity Coefficient	
D_{60}	0.008 mm	C_U	-
D_{50}	0.004 mm	Coefficient of Curvature	
D_{30}	-	C_C	-
D_{10}	-		

Soil fractions [%]	
Cobbles	0
Gravel	0
Sand	0
Silt*	60
Clay	40



Note 1: For sample descriptions, please refer to the report section presenting laboratory test results.

Note 2: Particle density for sedimentation is assumed to be 2.70 Mg/m^3.

*** Where a sedimentation test was not carried out, this represents total fines, particles less than 0.063 mm.**

Project: 503387 - F254727 Laboratory: Louvain-la-Neuve Approved by: TG - 22/04/2025

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Test Report

Particle Size Distribution

ISO 17892-4: 2016 - 5.2 & 5.4 - Sieving & Sedimentation by Pipette Method

UKAS TESTING 0919

Test Identification			
Location	Z4_OWF_BH05-SAMP	Depth [m]	0.10
Sample	01-2	Test start date	14/03/2025

Sieving

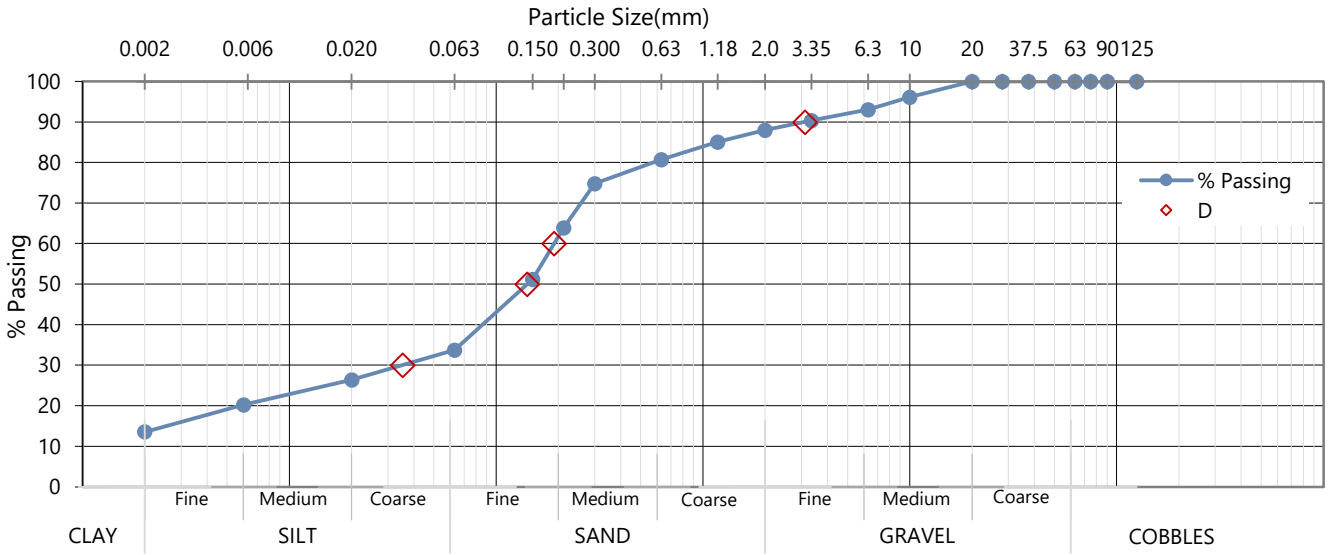
Particle Size [mm]	Passing [%]
125.0	100
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
10.0	96
6.3	93
3.35	90
2.00	88
1.18	85
0.630	81
0.300	75
0.212	64
0.150	51
0.063	34

Sedimentation

Particle Size [mm]	Passing [%]
0.0200	26
0.0060	20
0.0020	14

Curve Characteristics			
D_{90}	3.118 mm	Uniformity Coefficient	
D_{60}	0.191 mm	C_U	-
D_{50}	0.142 mm	Coefficient of Curvature	
D_{30}	0.035 mm	C_C	-
D_{10}	-		

Soil fractions [%]	
Cobbles	0
Gravel	12
Sand	54
Silt*	20
Clay	14



Note 1: For sample descriptions, please refer to the report section presenting laboratory test results.

Note 2: Particle density for sedimentation is assumed to be 2.70 Mg/m^3.

*** Where a sedimentation test was not carried out, this represents total fines, particles less than 0.063 mm.**

Project: 503387 - F254727 Laboratory: Louvain-la-Neuve Approved by: ET - 15/04/2025

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Test Report

Particle Size Distribution

ISO 17892-4: 2016 - 5.2 - Sieving Method

Test Identification			
Location	Z4_OWF_BH05-SAMP	Depth [m]	1.00
Sample	02-1	Test start date	21/03/2025

Sieving

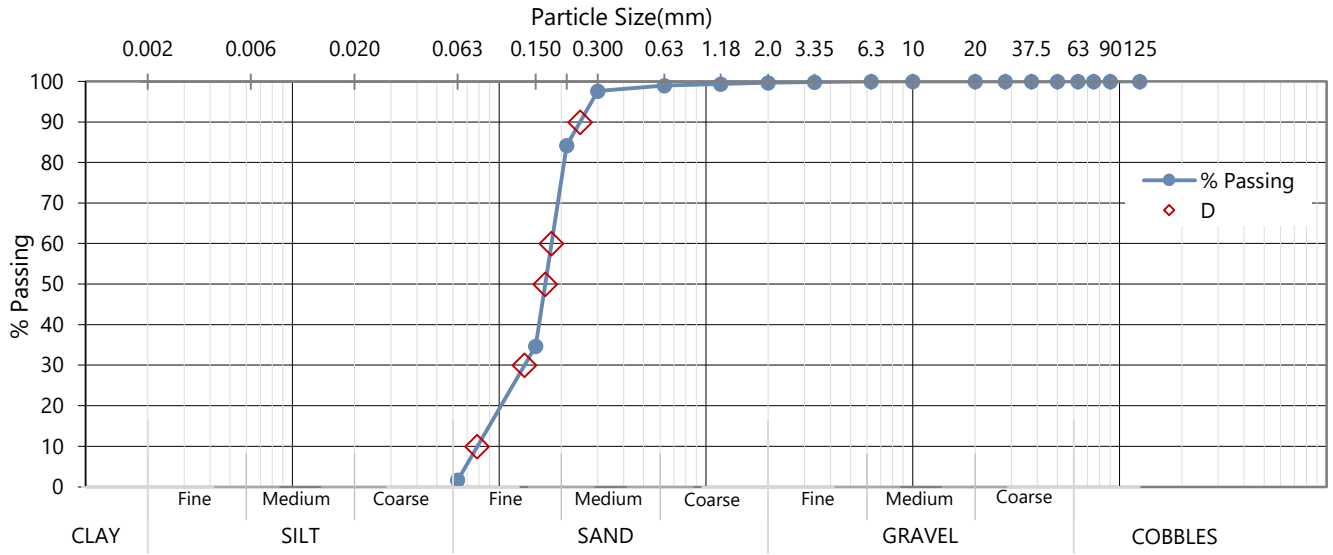
Particle Size [mm]	Passing [%]
125.0	100
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
10.0	100
6.3	100
3.35	100
2.00	100
1.18	99
0.630	99
0.300	98
0.212	84
0.150	35
0.063	2

Sedimentation

Particle Size [mm]	Passing [%]

Curve Characteristics			
D_{90}	0.246 mm	Uniformity Coefficient	
D_{60}	0.179 mm	C_U	2.28
D_{50}	0.167 mm	Coefficient of Curvature	
D_{30}	0.133 mm	C_C	1.25
D_{10}	0.078 mm		

Soil fractions [%]	
Cobbles	0
Gravel	0
Sand	98
Silt*	2
Clay	0



Note 1: For sample descriptions, please refer to the report section presenting laboratory test results.

Note 2: Particle density for sedimentation is assumed to be 2.70 Mg/m^3.

*** Where a sedimentation test was not carried out, this represents total fines, particles less than 0.063 mm.**

Project: 503387 - F254727 Laboratory: Louvain-la-Neuve Approved by: ET - 15/04/2025

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Test Report

Particle Size Distribution

ISO 17892-4: 2016 - 5.2 & 5.4 - Sieving & Sedimentation by Pipette Method

Test Identification			
Location	Z4_OWF_BH05-SAMP	Depth [m]	4.00
Sample	05-1	Test start date	21/03/2025

Sieving

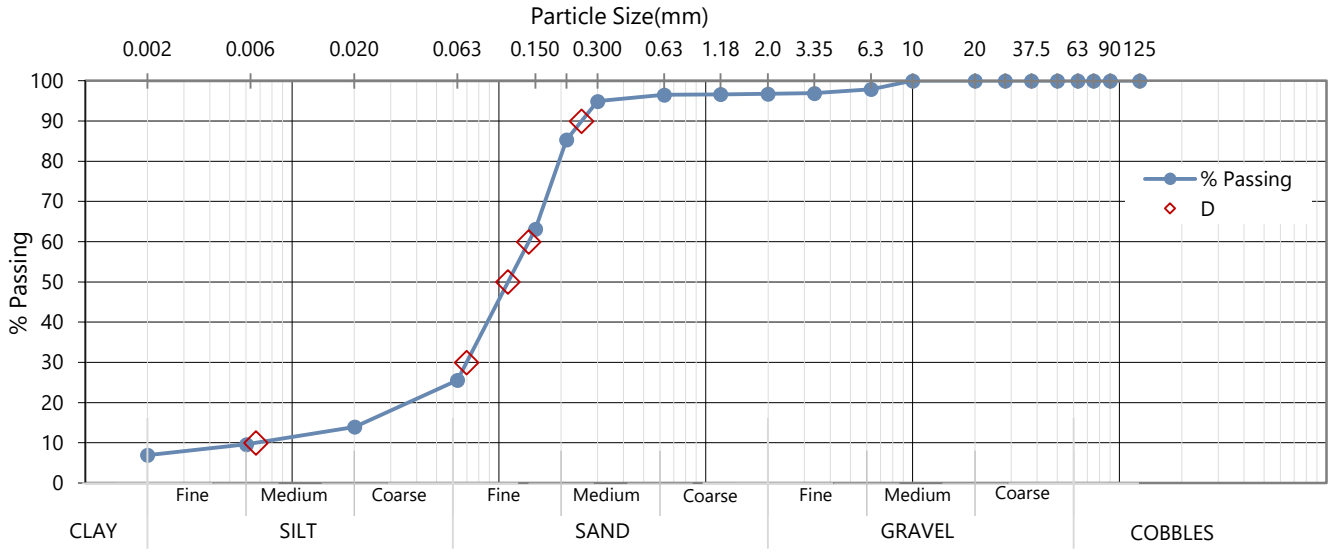
Particle Size [mm]	Passing [%]
125.0	100
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
10.0	100
6.3	98
3.35	97
2.00	97
1.18	97
0.630	97
0.300	95
0.212	85
0.150	63
0.063	26

Sedimentation

Particle Size [mm]	Passing [%]
0.0200	14
0.0060	10
0.0020	7

Curve Characteristics			
D_{90}	0.251 mm	Uniformity Coefficient	
D_{60}	0.139 mm	C_U	20.84
D_{50}	0.111 mm	Coefficient of Curvature	
D_{30}	0.070 mm	C_C	5.22
D_{10}	0.007 mm		

Soil fractions [%]	
Cobbles	0
Gravel	3
Sand	71
Silt*	19
Clay	7



Note 1: For sample descriptions, please refer to the report section presenting laboratory test results.

Note 2: Particle density for sedimentation is assumed to be 2.70 Mg/m^3.

*** Where a sedimentation test was not carried out, this represents total fines, particles less than 0.063 mm.**

Project: 503387 - F254727 Laboratory: Louvain-la-Neuve Approved by: TG - 31/05/2025

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Test Report

Particle Size Distribution

ISO 17892-4: 2016 - 5.2 - Sieving Method

Test Identification			
Location	Z4_OWF_BH05-SAMP	Depth [m]	8.00
Sample	09-1	Test start date	21/03/2025

Sieving

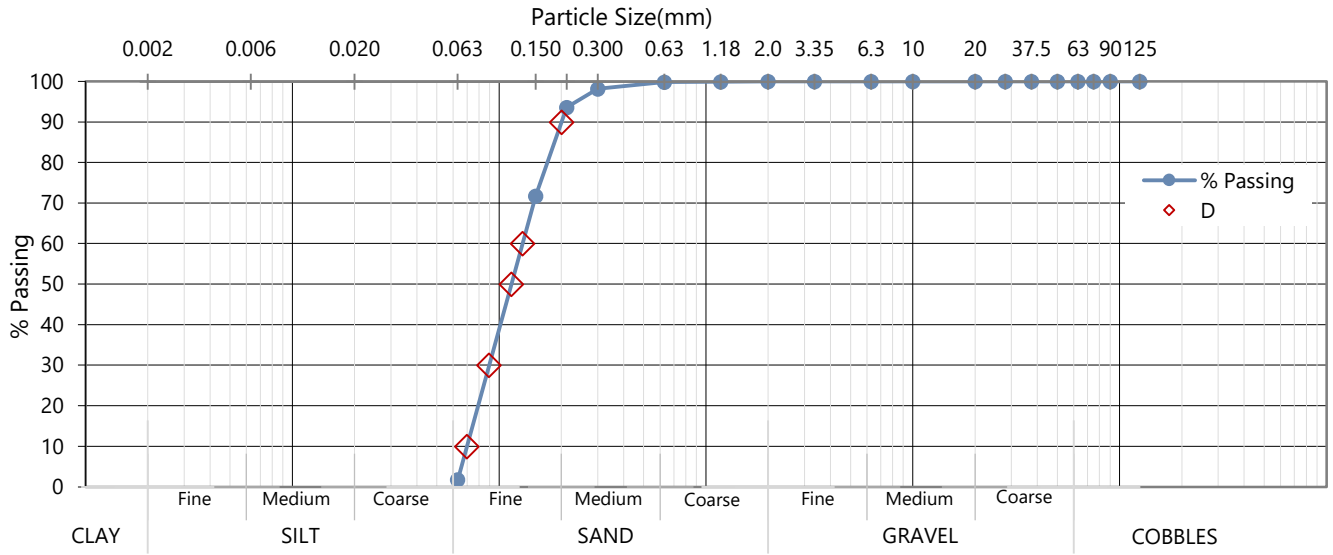
Particle Size [mm]	Passing [%]
125.0	100
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
10.0	100
6.3	100
3.35	100
2.00	100
1.18	100
0.630	100
0.300	98
0.212	94
0.150	72
0.063	2

Sedimentation

Particle Size [mm]	Passing [%]

Curve Characteristics			
D_{90}	0.200 mm	Uniformity Coefficient	
D_{60}	0.130 mm	C_U	1.86
D_{50}	0.115 mm	Coefficient of Curvature	
D_{30}	0.089 mm	C_C	0.88
D_{10}	0.070 mm		

Soil fractions [%]	
Cobbles	0
Gravel	0
Sand	98
Silt*	2
Clay	0



Note 1: For sample descriptions, please refer to the report section presenting laboratory test results.

Note 2: Particle density for sedimentation is assumed to be 2.70 Mg/m^3.

*** Where a sedimentation test was not carried out, this represents total fines, particles less than 0.063 mm.**

Project: 503387 - F254727 Laboratory: Louvain-la-Neuve Approved by: ET - 15/04/2025

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Test Report

Particle Size Distribution

ISO 17892-4: 2016 - 5.2 & 5.4 - Sieving & Sedimentation by Pipette Method

UKAS TESTING 0919

Test Identification			
Location	Z4_OWF_BH05-SAMP	Depth [m]	11.50
Sample	13-1	Test start date	30/04/2025

Sieving

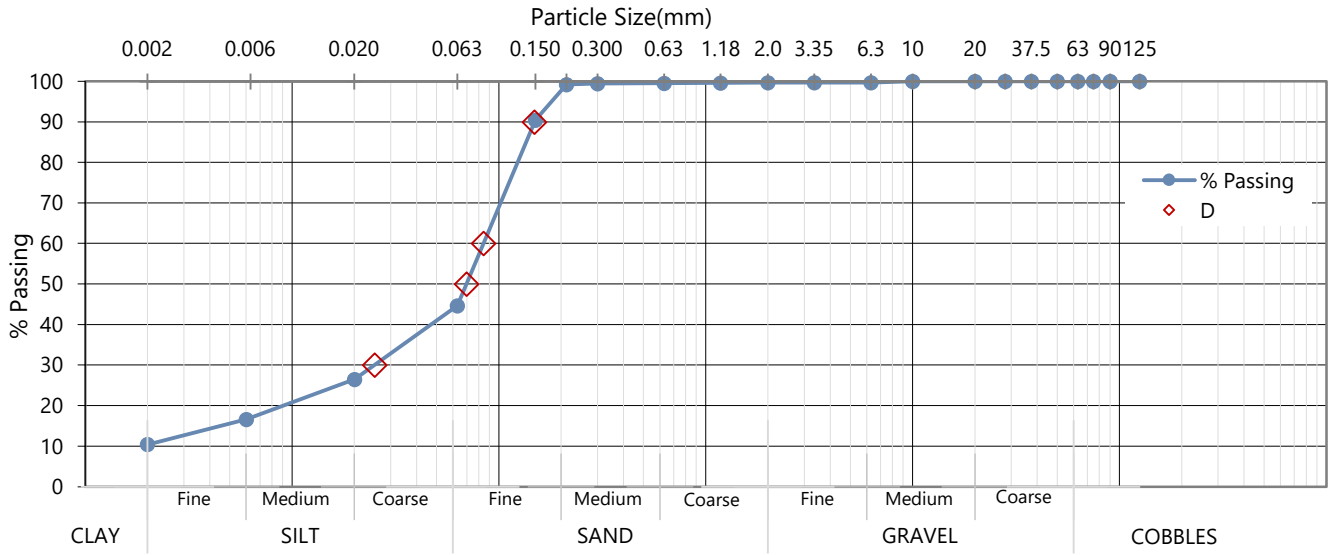
Particle Size [mm]	Passing [%]
125.0	100
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
10.0	100
6.3	100
3.35	100
2.00	100
1.18	100
0.630	100
0.300	99
0.212	99
0.150	90
0.063	45

Sedimentation

Particle Size [mm]	Passing [%]
0.0200	26
0.0060	17
0.0020	10

Curve Characteristics			
D_{90}	0.149 mm	Uniformity Coefficient	
D_{60}	0.084 mm	C_U	-
D_{50}	0.070 mm	Coefficient of Curvature	
D_{30}	0.025 mm	C_C	-
D_{10}	-		

Soil fractions [%]	
Cobbles	0
Gravel	0
Sand	55
Silt*	35
Clay	10



Note 1: For sample descriptions, please refer to the report section presenting laboratory test results.

Note 2: Particle density for sedimentation is assumed to be 2.70 Mg/m^3.

*** Where a sedimentation test was not carried out, this represents total fines, particles less than 0.063 mm.**

Project: 503387 - F254727 Laboratory: Wallingford Approved by: SW - 24/06/2025

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Test Report

Particle Size Distribution

ISO 17892-4: 2016 - 5.2 & 5.4 - Sieving & Sedimentation by Pipette Method

Test Identification			
Location	Z4_OWF_BH05-SAMP	Depth [m]	14.70
Sample	16-4	Test start date	21/03/2025

Sieving

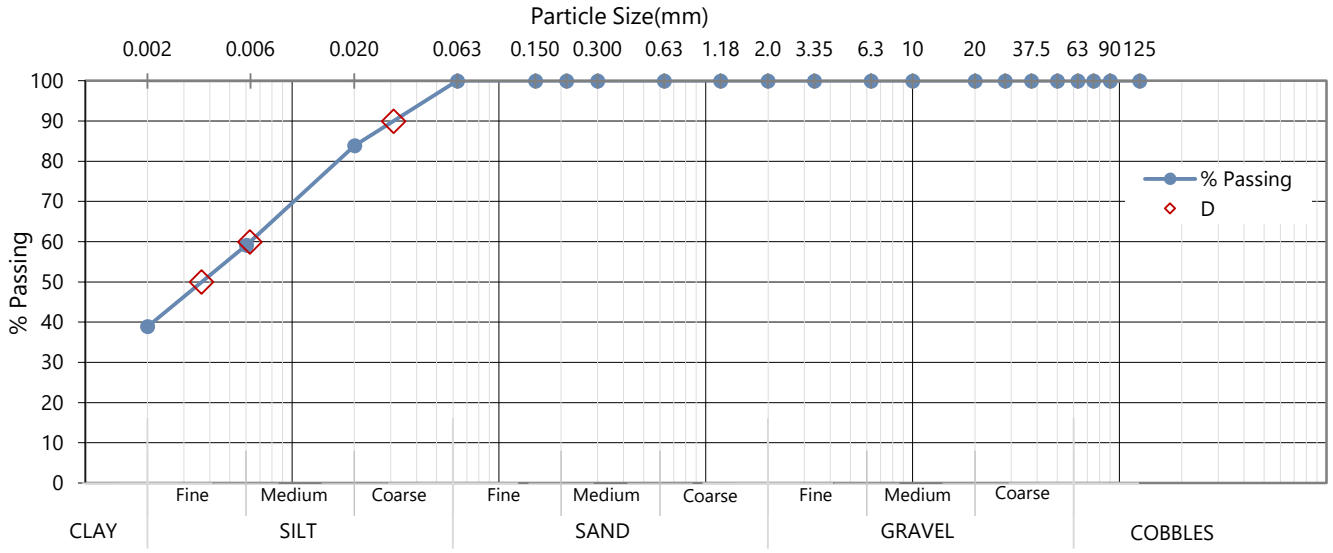
Particle Size [mm]	Passing [%]
125.0	100
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
10.0	100
6.3	100
3.35	100
2.00	100
1.18	100
0.630	100
0.300	100
0.212	100
0.150	100
0.063	100

Sedimentation

Particle Size [mm]	Passing [%]
0.0200	84
0.0060	59
0.0020	39

Curve Characteristics			
D_{90}	0.031 mm	Uniformity Coefficient	
D_{60}	0.006 mm	C_U	-
D_{50}	0.004 mm	Coefficient of Curvature	
D_{30}	-	C_C	-
D_{10}	-		

Soil fractions [%]	
Cobbles	0
Gravel	0
Sand	0
Silt*	61
Clay	39



Note 1: For sample descriptions, please refer to the report section presenting laboratory test results.

Note 2: Particle density for sedimentation is assumed to be 2.70 Mg/m^3.

*** Where a sedimentation test was not carried out, this represents total fines, particles less than 0.063 mm.**

Project: 503387 - F254727 Laboratory: Louvain-la-Neuve Approved by: TG - 22/04/2025

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Test Report

Particle Size Distribution

ISO 17892-4: 2016 - 5.2 - Sieving Method

Test Identification			
Location	Z4_OWF_BH05-SAMP	Depth [m]	17.50
Sample	19-2	Test start date	21/03/2025

Sieving

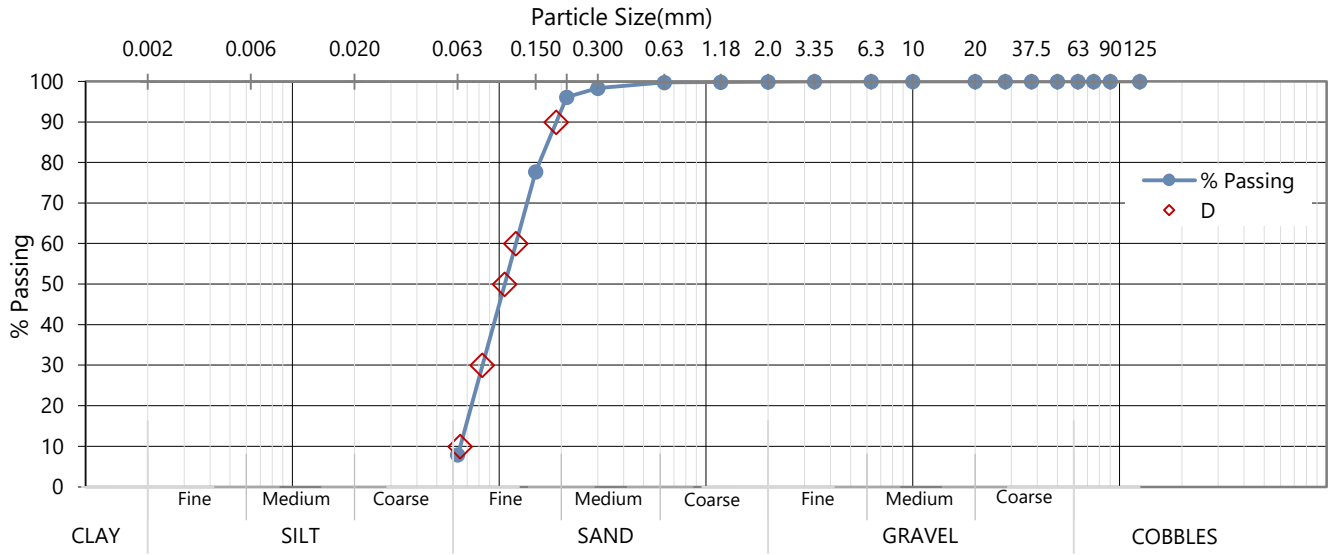
Particle Size [mm]	Passing [%]
125.0	100
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
10.0	100
6.3	100
3.35	100
2.00	100
1.18	100
0.630	100
0.300	98
0.212	96
0.150	78
0.063	8

Sedimentation

Particle Size [mm]	Passing [%]

Curve Characteristics			
D_{90}	0.189 mm	Uniformity Coefficient	
D_{60}	0.120 mm	C_U	1.86
D_{50}	0.106 mm	Coefficient of Curvature	
D_{30}	0.083 mm	C_C	0.88
D_{10}	0.065 mm		

Soil fractions [%]	
Cobbles	0
Gravel	0
Sand	92
Silt*	8
Clay	0



Note 1: For sample descriptions, please refer to the report section presenting laboratory test results.

Note 2: Particle density for sedimentation is assumed to be 2.70 Mg/m^3.

*** Where a sedimentation test was not carried out, this represents total fines, particles less than 0.063 mm.**

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Test Report

Particle Size Distribution

ISO 17892-4: 2016 - 5.2 - Sieving Method

Test Identification			
Location	Z4_OWF_BH05-SAMP	Depth [m]	19.50
Sample	21-1	Test start date	03/03/2025

Sieving

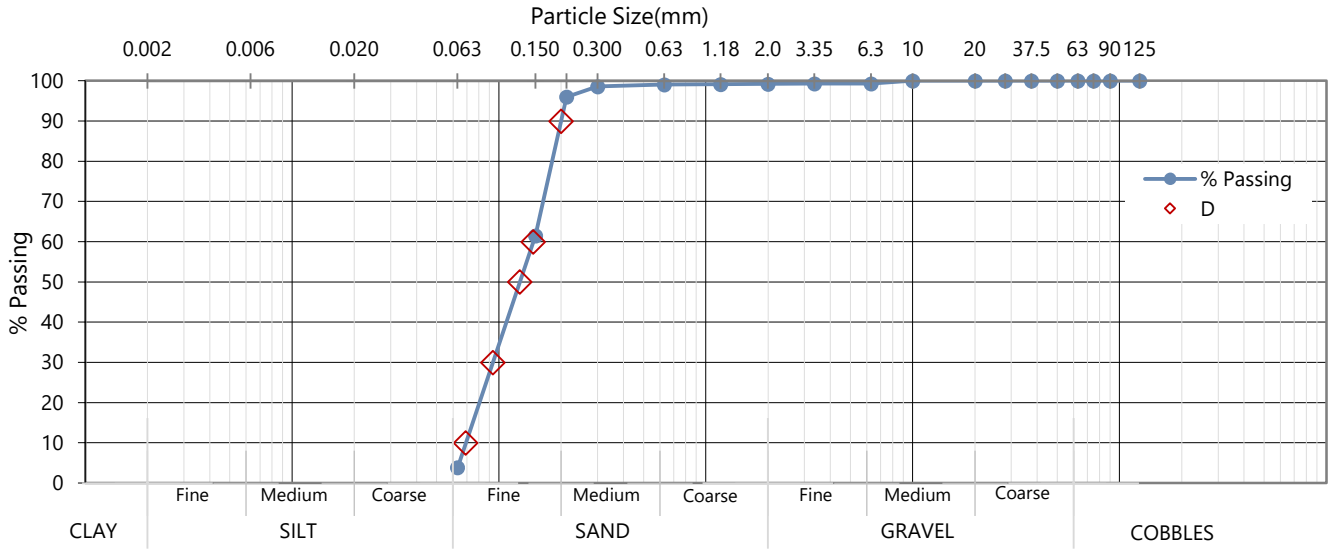
Particle Size [mm]	Passing [%]
125.0	100
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
10.0	100
6.3	99
3.35	99
2.00	99
1.18	99
0.630	99
0.300	99
0.212	96
0.150	62
0.063	4

Sedimentation

Particle Size [mm]	Passing [%]

Curve Characteristics			
D_{90}	0.200 mm	Uniformity Coefficient	
D_{60}	0.147 mm	C_U	2.12
D_{50}	0.126 mm	Coefficient of Curvature	
D_{30}	0.093 mm	C_C	0.86
D_{10}	0.069 mm		

Soil fractions [%]	
Cobbles	0
Gravel	1
Sand	95
Silt*	4
Clay	0



Note 1: For sample descriptions, please refer to the report section presenting laboratory test results.

Note 2: Particle density for sedimentation is assumed to be 2.70 Mg/m^3.

*** Where a sedimentation test was not carried out, this represents total fines, particles less than 0.063 mm.**

Project: 503387 - F254727 Laboratory: Wallingford Approved by: TG - 28/04/2025

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Test Report

Particle Size Distribution

ISO 17892-4: 2016 - 5.2 & 5.4 - Sieving & Sedimentation by Pipette Method

Test Identification			
Location	Z4_OWF_BH15-COMP	Depth [m]	5.70
Sample	02-2	Test start date	21/03/2025

Sieving

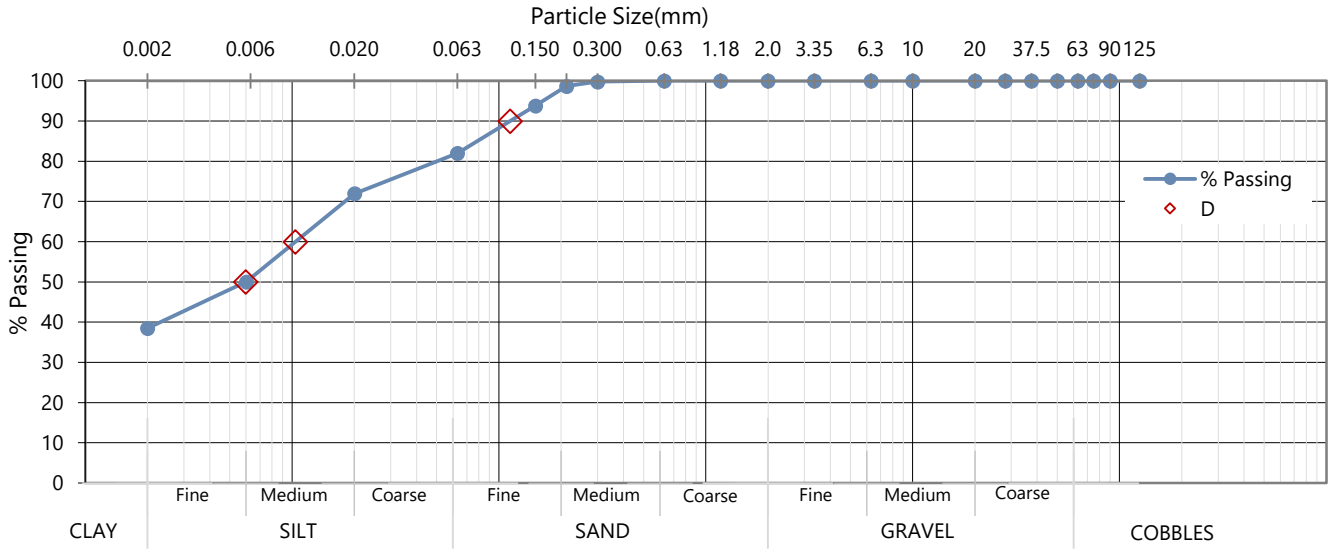
Particle Size [mm]	Passing [%]
125.0	100
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
10.0	100
6.3	100
3.35	100
2.00	100
1.18	100
0.630	100
0.300	100
0.212	99
0.150	94
0.063	82

Sedimentation

Particle Size [mm]	Passing [%]
0.0200	72
0.0060	50
0.0020	39

Curve Characteristics			
D_{90}	0.113 mm	Uniformity Coefficient	
D_{60}	0.010 mm	C_U	-
D_{50}	0.006 mm	Coefficient of Curvature	
D_{30}	-	C_C	-
D_{10}	-		

Soil fractions [%]	
Cobbles	0
Gravel	0
Sand	18
Silt*	43
Clay	39



Note 1: For sample descriptions, please refer to the report section presenting laboratory test results.

Note 2: Particle density for sedimentation is assumed to be 2.70 Mg/m^3.

*** Where a sedimentation test was not carried out, this represents total fines, particles less than 0.063 mm.**

Project: 503387 - F254727 Laboratory: Louvain-la-Neuve Approved by: TG - 22/04/2025

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Test Report

Particle Size Distribution

ISO 17892-4: 2016 - 5.2 & 5.4 - Sieving & Sedimentation by Pipette Method

Test Identification			
Location	Z4_OWF_BH15-COMP	Depth [m]	9.50
Sample	04-1	Test start date	21/03/2025

Sieving

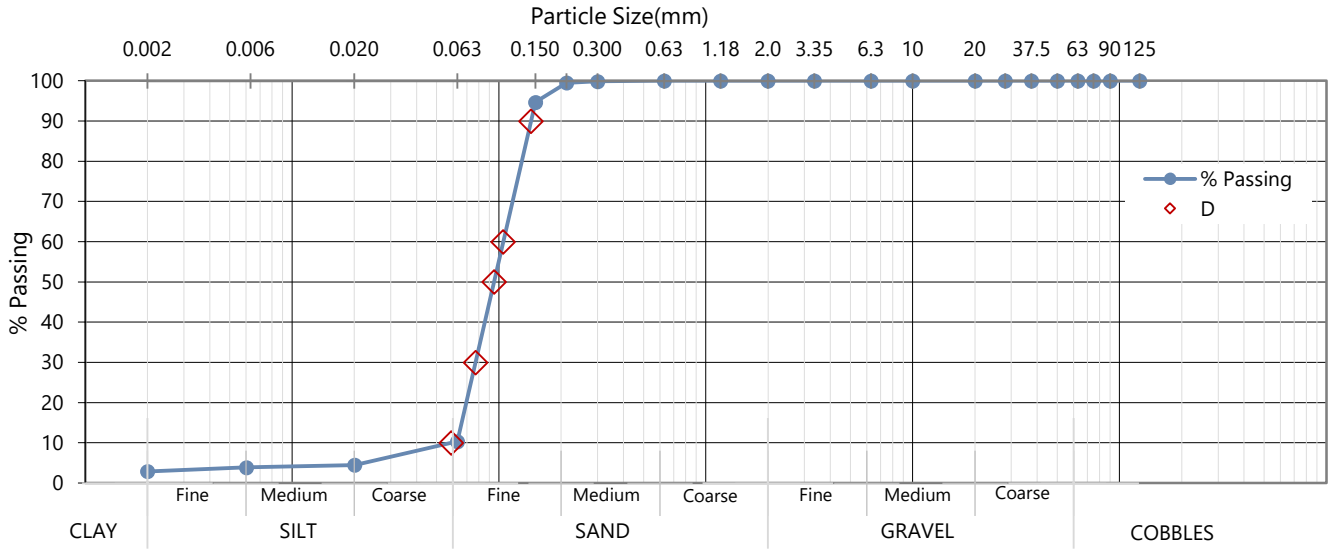
Particle Size [mm]	Passing [%]
125.0	100
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
10.0	100
6.3	100
3.35	100
2.00	100
1.18	100
0.630	100
0.300	100
0.212	99
0.150	95
0.063	10

Sedimentation

Particle Size [mm]	Passing [%]
0.0200	4
0.0060	4
0.0020	3

Curve Characteristics			
D_{90}	0.143 mm	Uniformity Coefficient	
D_{60}	0.105 mm	C_U	1.79
D_{50}	0.095 mm	Coefficient of Curvature	
D_{30}	0.077 mm	C_C	0.96
D_{10}	0.059 mm		

Soil fractions [%]	
Cobbles	0
Gravel	0
Sand	90
Silt*	7
Clay	3



Note 1: For sample descriptions, please refer to the report section presenting laboratory test results.

Note 2: Particle density for sedimentation is assumed to be 2.70 Mg/m^3.

*** Where a sedimentation test was not carried out, this represents total fines, particles less than 0.063 mm.**

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Test Report

Particle Size Distribution

ISO 17892-4: 2016 - 5.2 & 5.4 - Sieving & Sedimentation by Pipette Method

Test Identification			
Location	Z4_OWF_BH15-COMP	Depth [m]	13.60
Sample	05-2	Test start date	30/04/2025

Sieving

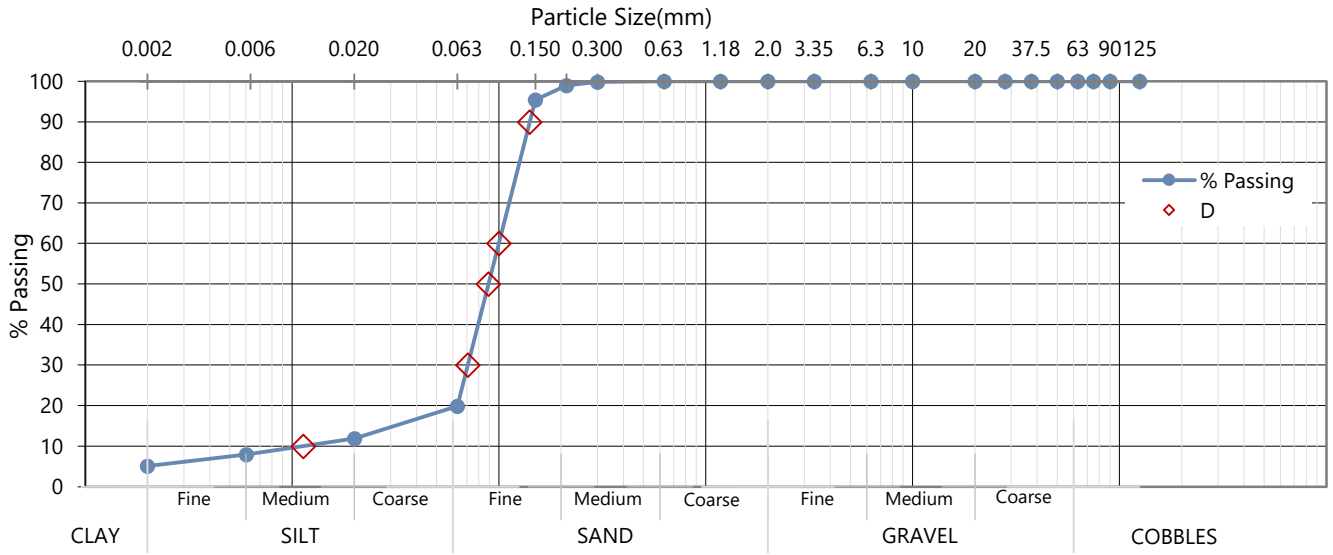
Particle Size [mm]	Passing [%]
125.0	100
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
10.0	100
6.3	100
3.35	100
2.00	100
1.18	100
0.630	100
0.300	100
0.212	99
0.150	95
0.063	20

Sedimentation

Particle Size [mm]	Passing [%]
0.0200	12
0.0060	8
0.0020	5

Curve Characteristics			
D_{90}	0.141 mm	Uniformity Coefficient	
D_{60}	0.100 mm	C_U	8.80
D_{50}	0.089 mm	Coefficient of Curvature	
D_{30}	0.071 mm	C_C	4.42
D_{10}	0.011 mm		

Soil fractions [%]	
Cobbles	0
Gravel	0
Sand	80
Silt*	15
Clay	5



Note 1: For sample descriptions, please refer to the report section presenting laboratory test results.

Note 2: Particle density for sedimentation is assumed to be 2.70 Mg/m^3.

*** Where a sedimentation test was not carried out, this represents total fines, particles less than 0.063 mm.**

Project: 503387 - F254727 Laboratory: Wallingford Approved by: SW - 24/06/2025

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Test Report

Particle Size Distribution

ISO 17892-4: 2016 - 5.4 - Sedimentation by Pipette Method

UKAS TESTING 0919

Test Identification			
Location	Z4_OWF_BH15-COMP	Depth [m]	18.00
Sample	07-1	Test start date	14/03/2025

Sieving

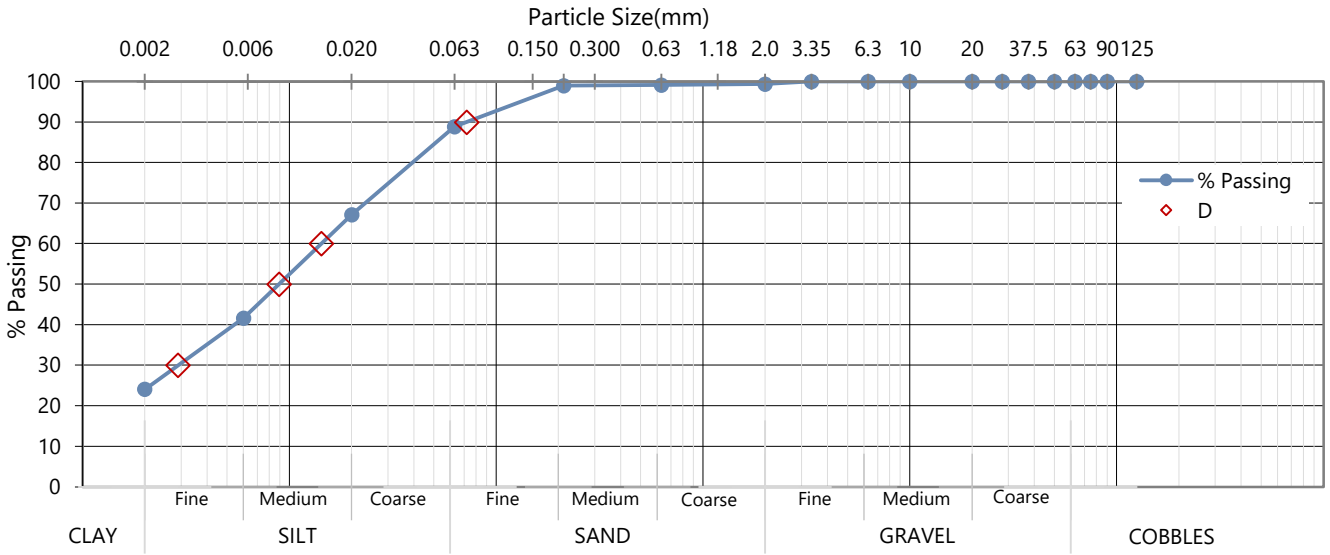
Particle Size [mm]	Passing [%]
125.0	100
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
10.0	100
6.3	100
3.35	100
2.00	99
0.630	99
0.212	99
0.063	89

Sedimentation

Particle Size [mm]	Passing [%]
0.0200	67
0.0060	42
0.0020	24

Curve Characteristics			
D_{90}	0.072 mm	Uniformity Coefficient	
D_{60}	0.014 mm	C_U	-
D_{50}	0.009 mm	Coefficient of Curvature	
D_{30}	0.003 mm	C_C	-
D_{10}	-		

Soil fractions [%]	
Cobbles	0
Gravel	1
Sand	10
Silt*	65
Clay	24



Note 1: For sample descriptions, please refer to the report section presenting laboratory test results.

Note 2: Particle density for sedimentation is assumed to be 2.70 Mg/m^3.

*** Where a sedimentation test was not carried out, this represents total fines, particles less than 0.063 mm.**

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Test Report

Particle Size Distribution

ISO 17892-4: 2016 - 5.2 - Sieving Method

Test Identification			
Location	Z4_OWF_BH16-SAMP	Depth [m]	6.00
Sample	08-1	Test start date	21/03/2025

Sieving

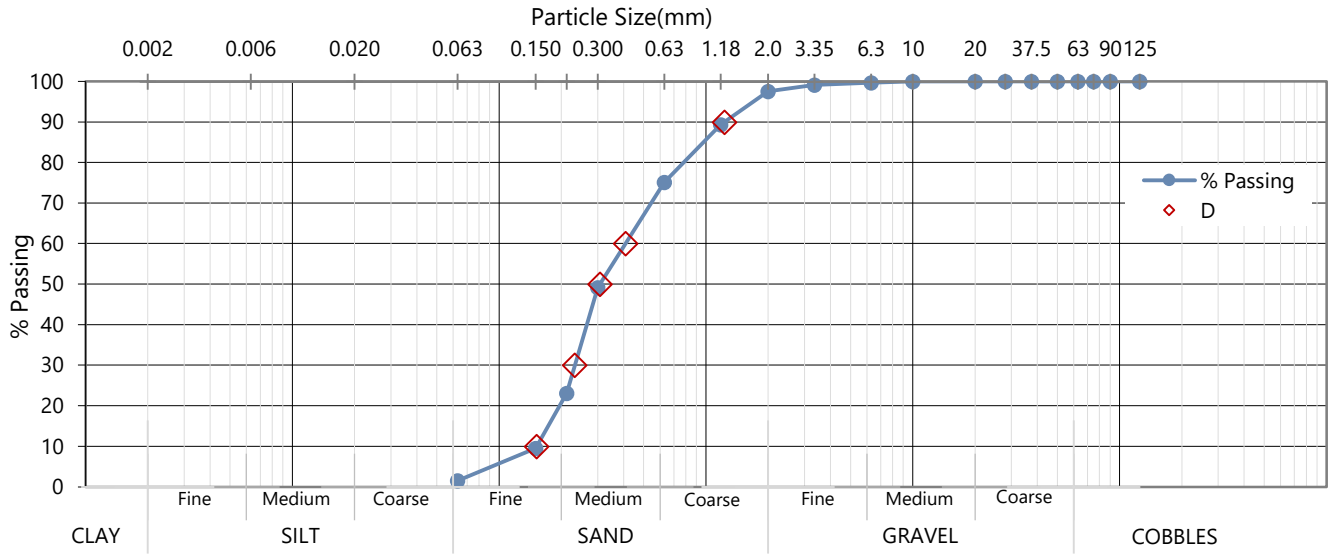
Particle Size [mm]	Passing [%]
125.0	100
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
10.0	100
6.3	100
3.35	99
2.00	98
1.18	89
0.630	75
0.300	49
0.212	23
0.150	10
0.063	2

Sedimentation

Particle Size [mm]	Passing [%]

Curve Characteristics			
D_{90}	1.229 mm	Uniformity Coefficient	
D_{60}	0.409 mm	C_U	2.69
D_{50}	0.307 mm	Coefficient of Curvature	
D_{30}	0.232 mm	C_C	0.87
D_{10}	0.152 mm		

Soil fractions [%]	
Cobbles	0
Gravel	2
Sand	96
Silt*	2
Clay	0



Note 1: For sample descriptions, please refer to the report section presenting laboratory test results.

Note 2: Particle density for sedimentation is assumed to be 2.70 Mg/m^3.

*** Where a sedimentation test was not carried out, this represents total fines, particles less than 0.063 mm.**

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Test Report

Particle Size Distribution

ISO 17892-4: 2016 - 5.2 & 5.4 - Sieving & Sedimentation by Pipette Method

Test Identification			
Location	Z4_OWF_BH16-SAMP	Depth [m]	10.50
Sample	12-2	Test start date	21/03/2025

Sieving

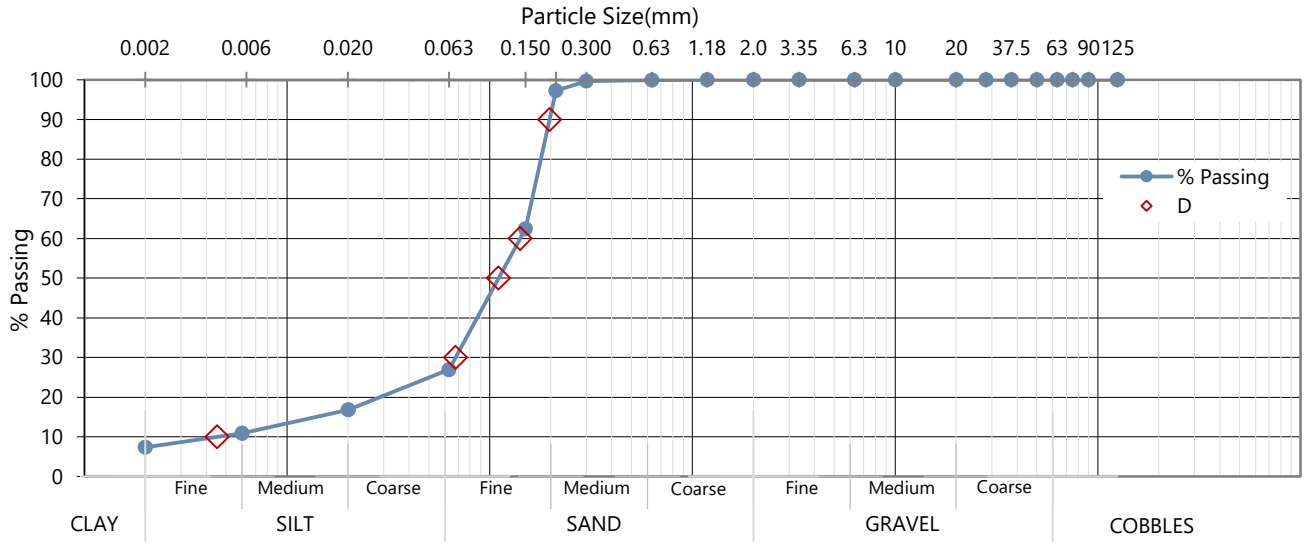
Particle Size [mm]	Passing [%]
125.0	100
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
10.0	100
6.3	100
3.35	100
2.00	100
1.18	100
0.630	100
0.300	100
0.212	97
0.150	62
0.063	27

Sedimentation

Particle Size [mm]	Passing [%]
0.0200	17
0.0060	11
0.0020	7

Curve Characteristics			
D_{90}	0.197 mm	Uniformity Coefficient	
D_{60}	0.141 mm	C_U	31.19
D_{50}	0.111 mm	Coefficient of Curvature	
D_{30}	0.068 mm	C_C	7.21
D_{10}	0.005 mm		

Soil fractions [%]	
Cobbles	0
Gravel	0
Sand	73
Silt*	20
Clay	7



Note 1: For sample descriptions, please refer to the report section presenting laboratory test results.

Note 2: Particle density for sedimentation is assumed to be 2.70 Mg/m^3.

*** Where a sedimentation test was not carried out, this represents total fines, particles less than 0.063 mm.**

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Test Report

Particle Size Distribution

ISO 17892-4: 2016 - 5.2 & 5.4 - Sieving & Sedimentation by Pipette Method

Test Identification			
Location	Z4_OWF_BH16-SAMP	Depth [m]	14.00
Sample	16-1	Test start date	21/03/2025

Sieving

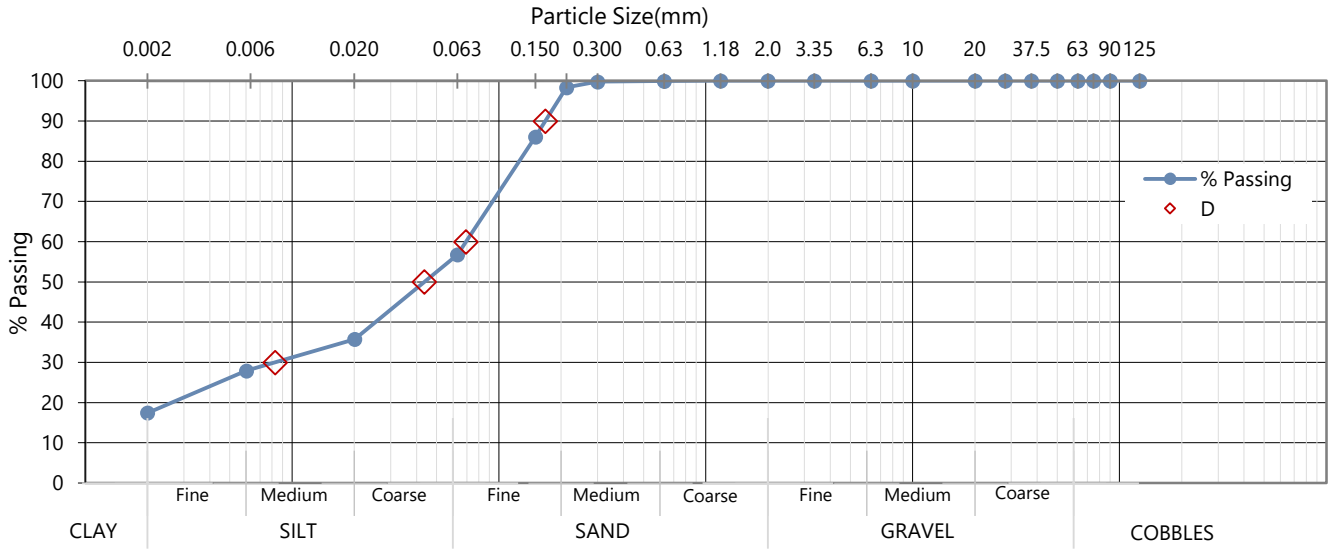
Particle Size [mm]	Passing [%]
125.0	100
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
10.0	100
6.3	100
3.35	100
2.00	100
1.18	100
0.630	100
0.300	100
0.212	98
0.150	86
0.063	57

Sedimentation

Particle Size [mm]	Passing [%]
0.0200	36
0.0060	28
0.0020	17

Curve Characteristics			
D_{90}	0.168 mm	Uniformity Coefficient	
D_{60}	0.069 mm	C_U	-
D_{50}	0.044 mm	Coefficient of Curvature	
D_{30}	0.008 mm	C_C	-
D_{10}	-		

Soil fractions [%]	
Cobbles	0
Gravel	0
Sand	43
Silt*	40
Clay	17



Note 1: For sample descriptions, please refer to the report section presenting laboratory test results.

Note 2: Particle density for sedimentation is assumed to be 2.70 Mg/m^3.

*** Where a sedimentation test was not carried out, this represents total fines, particles less than 0.063 mm.**

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Test Report

Particle Size Distribution

ISO 17892-4: 2016 - 5.2 & 5.4 - Sieving & Sedimentation by Pipette Method

Test Identification			
Location	Z4_OWF_BH16-SAMP	Depth [m]	18.50
Sample	21-1	Test start date	21/03/2025

Sieving

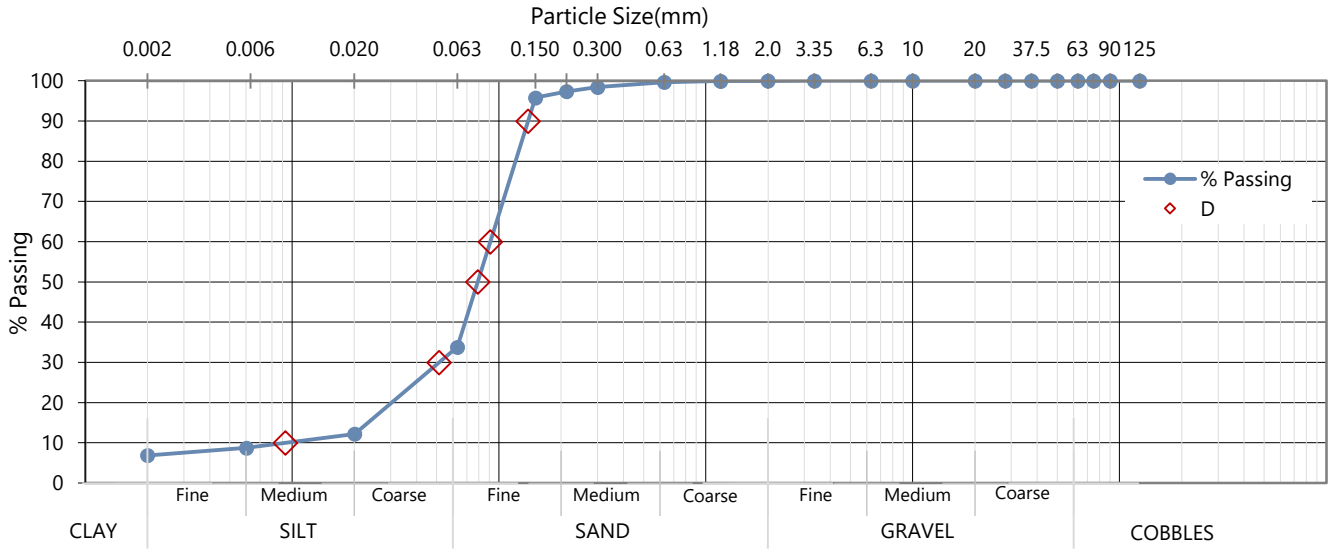
Particle Size [mm]	Passing [%]
125.0	100
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
10.0	100
6.3	100
3.35	100
2.00	100
1.18	100
0.630	100
0.300	98
0.212	97
0.150	96
0.063	34

Sedimentation

Particle Size [mm]	Passing [%]
0.0200	12
0.0060	9
0.0020	7

Curve Characteristics			
D_{90}	0.138 mm	Uniformity Coefficient	
D_{60}	0.091 mm	C_U	9.80
D_{50}	0.079 mm	Coefficient of Curvature	
D_{30}	0.051 mm	C_C	3.14
D_{10}	0.009 mm		

Soil fractions [%]	
Cobbles	0
Gravel	0
Sand	66
Silt*	27
Clay	7



Note 1: For sample descriptions, please refer to the report section presenting laboratory test results.

Note 2: Particle density for sedimentation is assumed to be 2.70 Mg/m^3.

*** Where a sedimentation test was not carried out, this represents total fines, particles less than 0.063 mm.**

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Particle Size Distribution

ISO 17892-4: 2016 - 5.2 & 5.4 - Sieving & Sedimentation by Pipette Method

UKAS TESTING 0919

Test Identification			
Location	Z4_OWF_BH16-SAMP	Depth [m]	20.25
Sample	23-2	Test start date	18/03/2025

Sieving

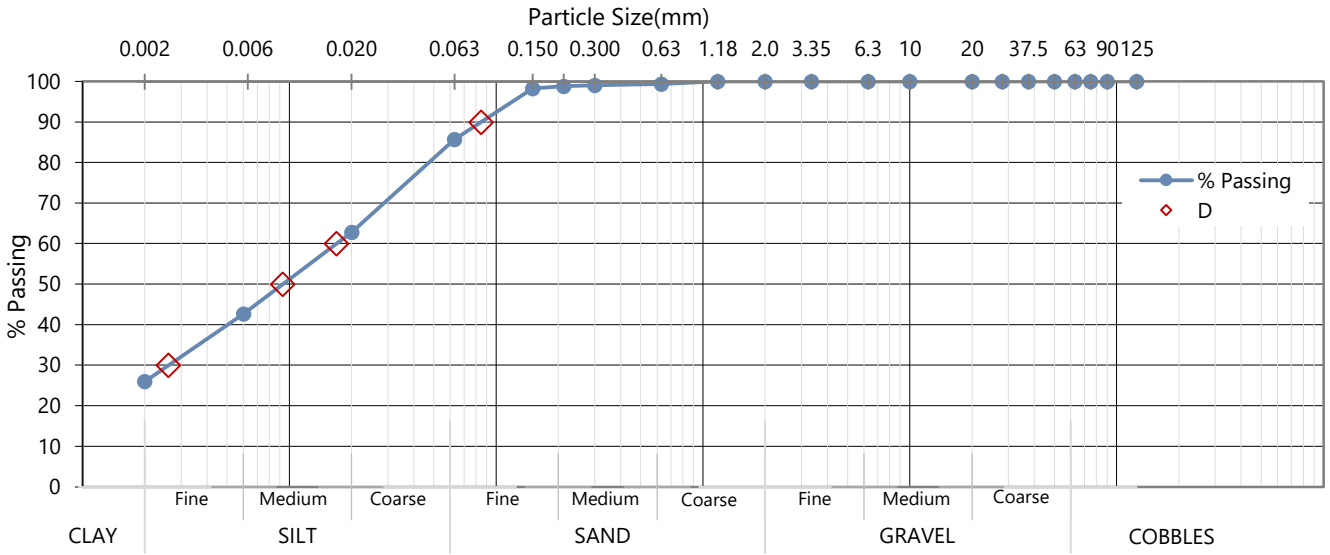
Particle Size [mm]	Passing [%]
125.0	100
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
10.0	100
6.3	100
3.35	100
2.00	100
1.18	100
0.630	99
0.300	99
0.212	99
0.150	98
0.063	86

Sedimentation

Particle Size [mm]	Passing [%]
0.0200	63
0.0060	43
0.0020	26

Curve Characteristics			
D_{90}	0.085 mm	Uniformity Coefficient	
D_{60}	0.017 mm	C_U	-
D_{50}	0.009 mm	Coefficient of Curvature	
D_{30}	0.003 mm	C_C	-
D_{10}	-		

Soil fractions [%]	
Cobbles	0
Gravel	0
Sand	14
Silt*	60
Clay	26



Note 1: For sample descriptions, please refer to the report section presenting laboratory test results.

Note 2: Particle density for sedimentation is assumed to be 2.70 Mg/m^3.

*** Where a sedimentation test was not carried out, this represents total fines, particles less than 0.063 mm.**

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Test Report

Particle Size Distribution

ISO 17892-4: 2016 - 5.2 - Sieving Method

Test Identification			
Location	Z4_OWF_BH16_SAMP	Depth [m]	1.50 - 2.05
Sample	Batch_10	Test start date	05/06/2025

Sieving

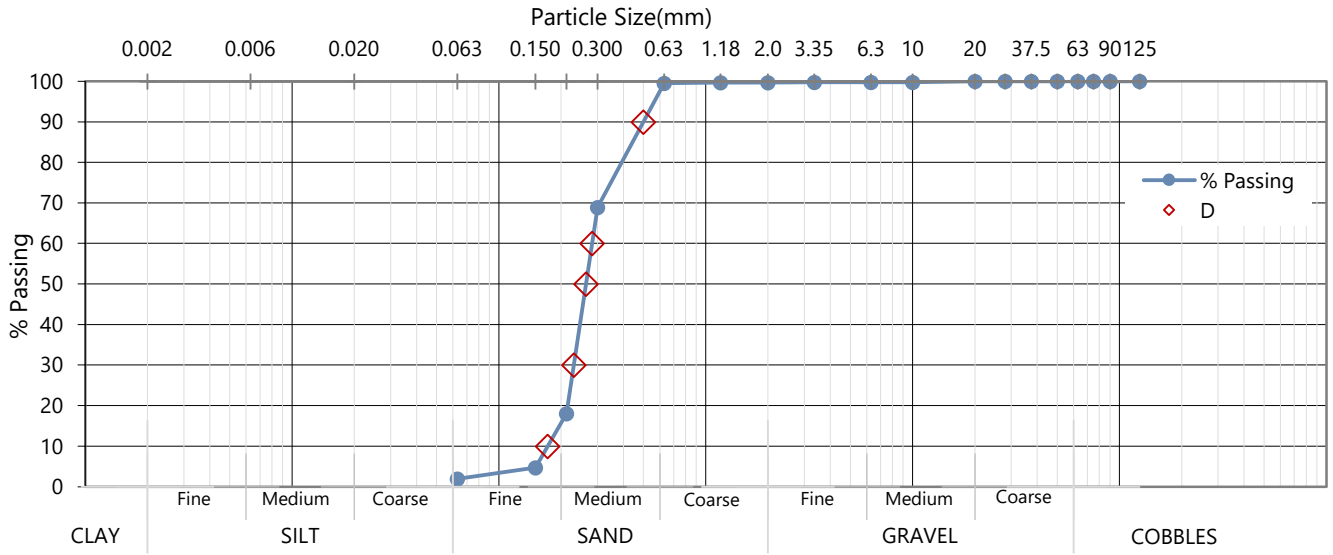
Particle Size [mm]	Passing [%]
125.0	100
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
10.0	100
6.3	100
3.35	100
2.00	100
1.18	100
0.630	100
0.300	69
0.212	18
0.150	5
0.063	2

Sedimentation

Particle Size [mm]	Passing [%]

Curve Characteristics			
D_{90}	0.500 mm	Uniformity Coefficient	
D_{60}	0.282 mm	C_U	1.64
D_{50}	0.264 mm	Coefficient of Curvature	
D_{30}	0.230 mm	C_C	1.09
D_{10}	0.172 mm		

Soil fractions [%]	
Cobbles	0
Gravel	0
Sand	98
Silt*	2
Clay	0



Note 1: For sample descriptions, please refer to the report section presenting laboratory test results.

Note 2: Particle density for sedimentation is assumed to be 2.70 Mg/m^3.

*** Where a sedimentation test was not carried out, this represents total fines, particles less than 0.063 mm.**

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Particle Size Distribution

ISO 17892-4: 2016 - 5.2 & 5.4 - Sieving & Sedimentation by Pipette Method

UKAS TESTING 0919

Test Identification			
Location	Z4_OWF_BH17-SAMP	Depth [m]	0.00
Sample	01-1	Test start date	21/03/2025

Sieving

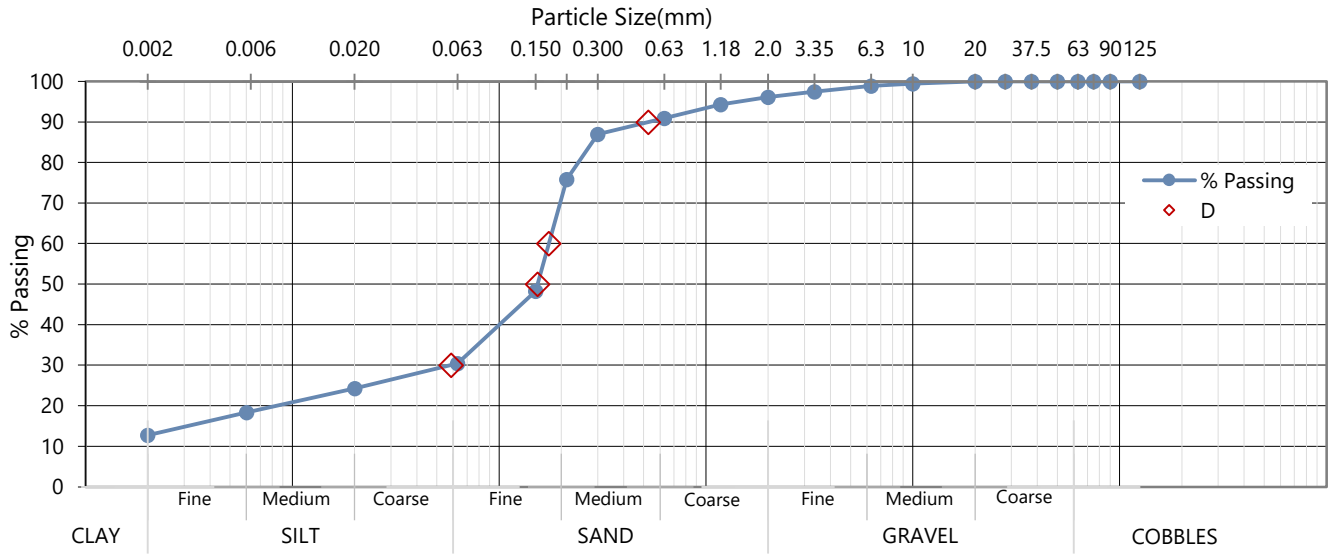
Particle Size [mm]	Passing [%]
125.0	100
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
10.0	99
6.3	99
3.35	97
2.00	96
1.18	94
0.630	91
0.300	87
0.212	76
0.150	48
0.063	30

Sedimentation

Particle Size [mm]	Passing [%]
0.0200	24
0.0060	18
0.0020	13

Curve Characteristics			
D_{90}	0.527 mm	Uniformity Coefficient	
D_{60}	0.174 mm	C_U	-
D_{50}	0.153 mm	Coefficient of Curvature	
D_{30}	0.059 mm	C_C	-
D_{10}	-		

Soil fractions [%]	
Cobbles	0
Gravel	4
Sand	66
Silt*	17
Clay	13



Note 1: For sample descriptions, please refer to the report section presenting laboratory test results.

Note 2: Particle density for sedimentation is assumed to be 2.70 Mg/m^3.

*** Where a sedimentation test was not carried out, this represents total fines, particles less than 0.063 mm.**

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Particle Size Distribution

ISO 17892-4: 2016 - 5.2 & 5.4 - Sieving & Sedimentation by Pipette Method

Test Identification			
Location	Z4_OWF_BH17-SAMP	Depth [m]	2.90
Sample	04-2	Test start date	21/03/2025

Sieving

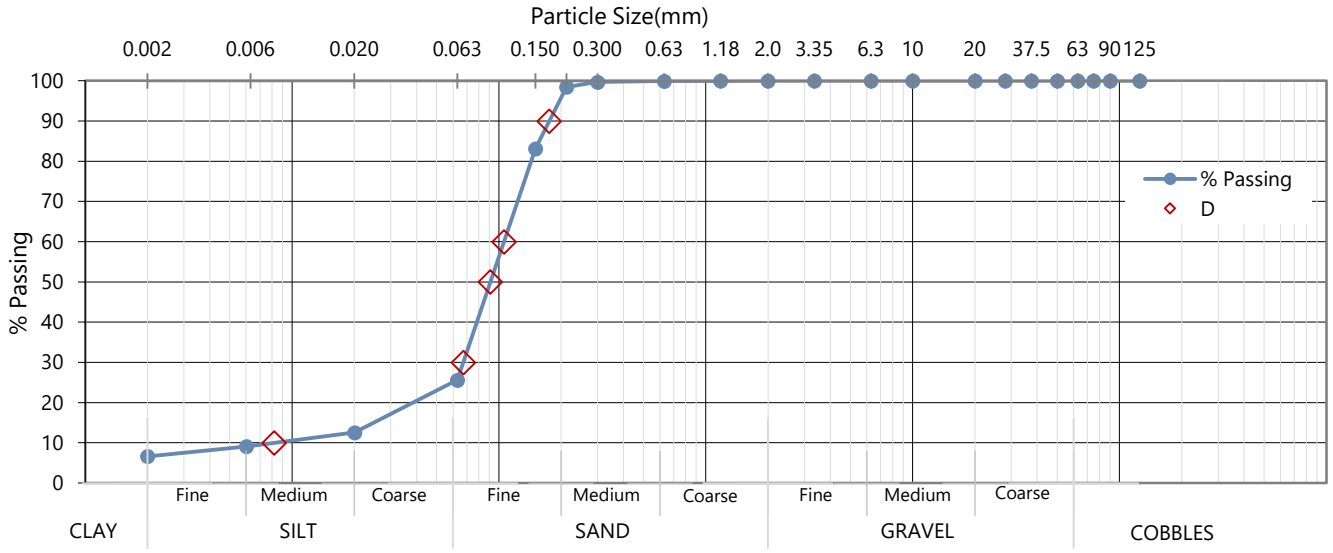
Particle Size [mm]	Passing [%]
125.0	100
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
10.0	100
6.3	100
3.35	100
2.00	100
1.18	100
0.630	100
0.300	100
0.212	98
0.150	83
0.063	26

Sedimentation

Particle Size [mm]	Passing [%]
0.0200	13
0.0060	9
0.0020	7

Curve Characteristics			
D_{90}	0.175 mm	Uniformity Coefficient	
D_{60}	0.106 mm	C_U	12.91
D_{50}	0.091 mm	Coefficient of Curvature	
D_{30}	0.067 mm	C_C	5.23
D_{10}	0.008 mm		

Soil fractions [%]	
Cobbles	0
Gravel	0
Sand	74
Silt*	19
Clay	7



Note 1: For sample descriptions, please refer to the report section presenting laboratory test results.

Note 2: Particle density for sedimentation is assumed to be 2.70 Mg/m^3.

*** Where a sedimentation test was not carried out, this represents total fines, particles less than 0.063 mm.**

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Particle Size Distribution

ISO 17892-4: 2016 - 5.2 & 5.4 - Sieving & Sedimentation by Pipette Method

Test Identification			
Location	Z4_OWF_BH17-SAMP	Depth [m]	6.85
Sample	08-2	Test start date	21/03/2025

Sieving

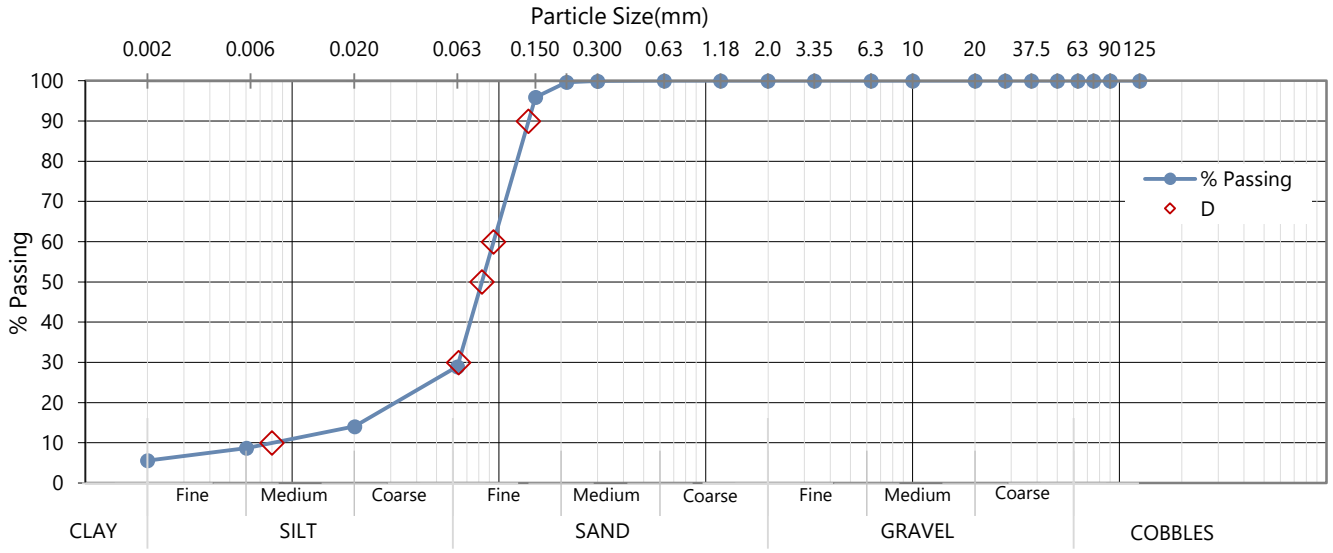
Particle Size [mm]	Passing [%]
125.0	100
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
10.0	100
6.3	100
3.35	100
2.00	100
1.18	100
0.630	100
0.300	100
0.212	100
0.150	96
0.063	29

Sedimentation

Particle Size [mm]	Passing [%]
0.0200	14
0.0060	9
0.0020	6

Curve Characteristics			
D_{90}	0.139 mm	Uniformity Coefficient	
D_{60}	0.094 mm	C_U	11.76
D_{50}	0.083 mm	Coefficient of Curvature	
D_{30}	0.064 mm	C_C	5.40
D_{10}	0.008 mm		

Soil fractions [%]	
Cobbles	0
Gravel	0
Sand	71
Silt*	23
Clay	6



Note 1: For sample descriptions, please refer to the report section presenting laboratory test results.

Note 2: Particle density for sedimentation is assumed to be 2.70 Mg/m^3.

*** Where a sedimentation test was not carried out, this represents total fines, particles less than 0.063 mm.**

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Particle Size Distribution

ISO 17892-4: 2016 - 5.2 & 5.4 - Sieving & Sedimentation by Pipette Method

Test Identification			
Location	Z4_OWF_BH17-SAMP	Depth [m]	11.50
Sample	13-1	Test start date	21/03/2025

Sieving

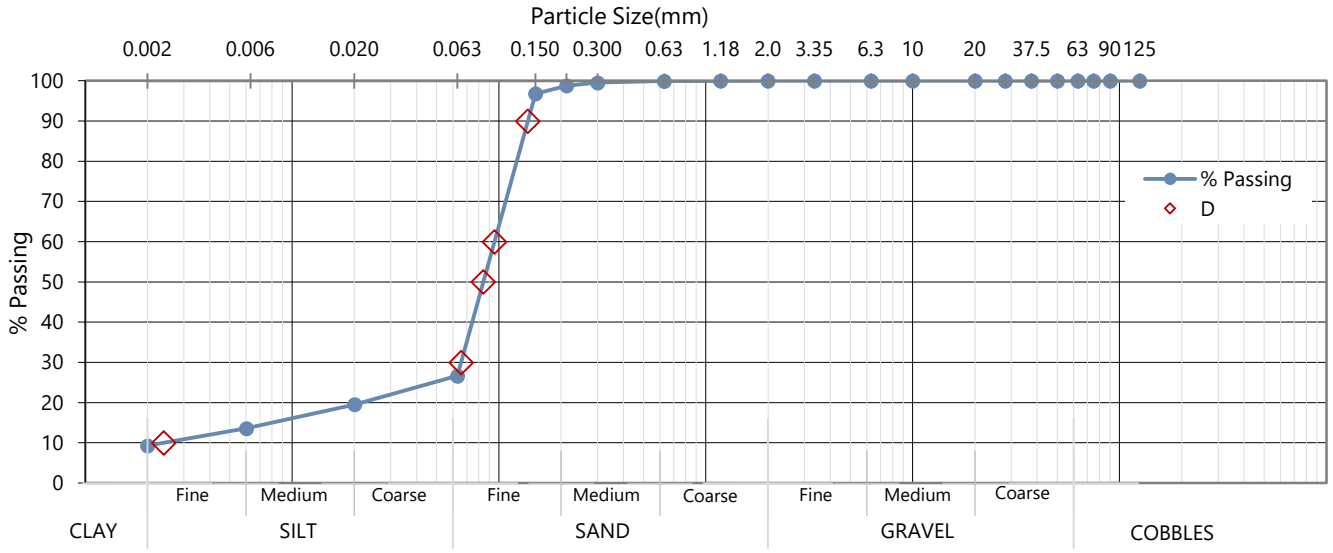
Particle Size [mm]	Passing [%]
125.0	100
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
10.0	100
6.3	100
3.35	100
2.00	100
1.18	100
0.630	100
0.300	100
0.212	99
0.150	97
0.063	27

Sedimentation

Particle Size [mm]	Passing [%]
0.0200	20
0.0060	14
0.0020	9

Curve Characteristics			
D_{90}	0.138 mm	Uniformity Coefficient	
D_{60}	0.095 mm	C_U	39.70
D_{50}	0.084 mm	Coefficient of Curvature	
D_{30}	0.066 mm	C_C	18.90
D_{10}	0.002 mm		

Soil fractions [%]	
Cobbles	0
Gravel	0
Sand	73
Silt*	18
Clay	9



Note 1: For sample descriptions, please refer to the report section presenting laboratory test results.

Note 2: Particle density for sedimentation is assumed to be 2.70 Mg/m^3.

*** Where a sedimentation test was not carried out, this represents total fines, particles less than 0.063 mm.**

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Test Report

Particle Size Distribution

ISO 17892-4: 2016 - 5.2 & 5.4 - Sieving & Sedimentation by Pipette Method

UKAS TESTING 0919

Test Identification			
Location	Z4_OWF_BH17-SAMP	Depth [m]	15.50
Sample	17-1	Test start date	21/03/2025

Sieving

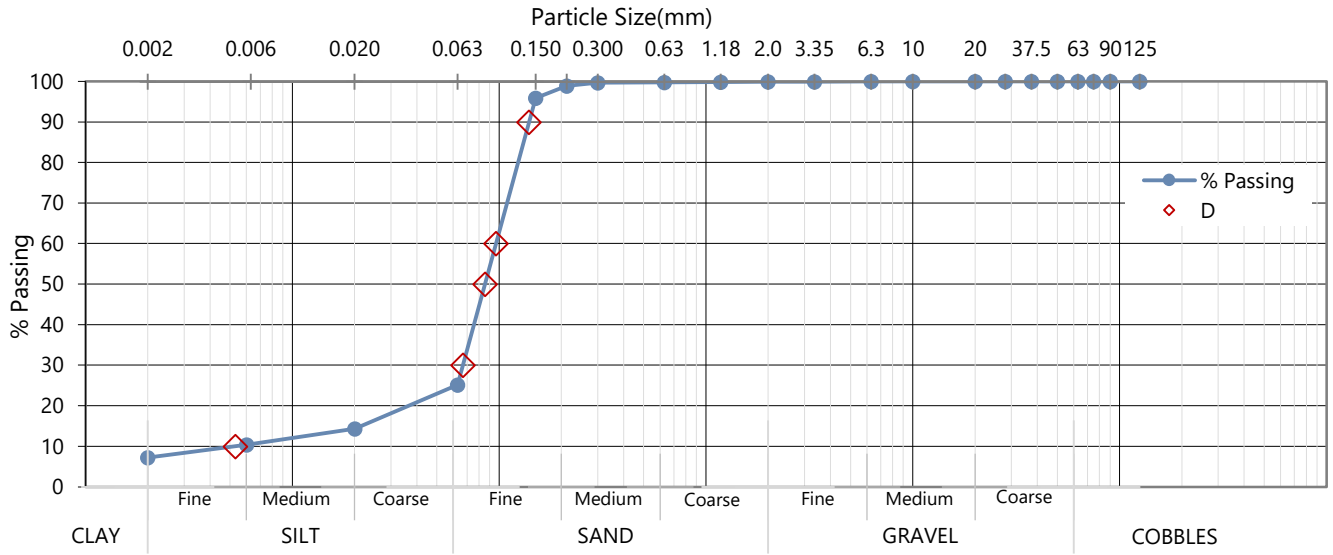
Particle Size [mm]	Passing [%]
125.0	100
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
10.0	100
6.3	100
3.35	100
2.00	100
1.18	100
0.630	100
0.300	100
0.212	99
0.150	96
0.063	25

Sedimentation

Particle Size [mm]	Passing [%]
0.0200	14
0.0060	10
0.0020	7

Curve Characteristics			
D_{90}	0.140 mm	Uniformity Coefficient	
D_{60}	0.097 mm	C_U	18.19
D_{50}	0.085 mm	Coefficient of Curvature	
D_{30}	0.067 mm	C_C	8.72
D_{10}	0.005 mm		

Soil fractions [%]	
Cobbles	0
Gravel	0
Sand	75
Silt*	18
Clay	7



Note 1: For sample descriptions, please refer to the report section presenting laboratory test results.

Note 2: Particle density for sedimentation is assumed to be 2.70 Mg/m^3.

*** Where a sedimentation test was not carried out, this represents total fines, particles less than 0.063 mm.**

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Test Report

Particle Size Distribution

ISO 17892-4: 2016 - 5.2 & 5.4 - Sieving & Sedimentation by Pipette Method

Test Identification			
Location	Z4_OWF_BH17-SAMP	Depth [m]	18.00
Sample	19-3	Test start date	14/03/2025

Sieving

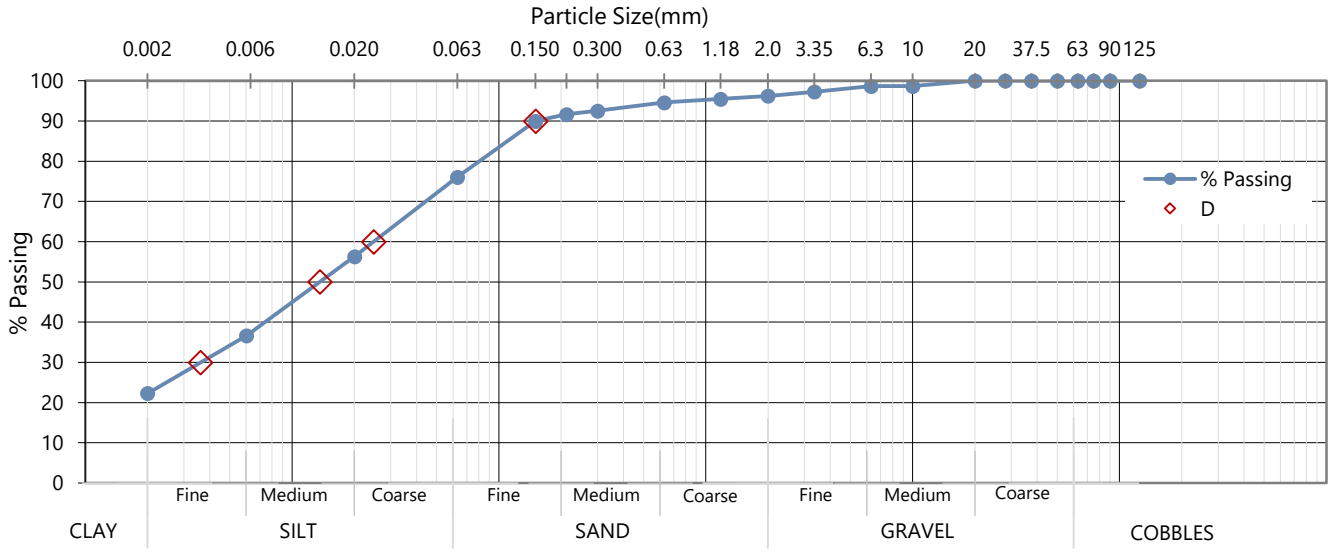
Particle Size [mm]	Passing [%]
125.0	100
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
10.0	99
6.3	99
3.35	97
2.00	96
1.18	95
0.630	95
0.300	93
0.212	92
0.150	90
0.063	76

Sedimentation

Particle Size [mm]	Passing [%]
0.0200	56
0.0060	37
0.0020	22

Curve Characteristics			
D_{90}	0.151 mm	Uniformity Coefficient	
D_{60}	0.025 mm	C_U	-
D_{50}	0.014 mm	Coefficient of Curvature	
D_{30}	0.004 mm	C_C	-
D_{10}	-		

Soil fractions [%]	
Cobbles	0
Gravel	4
Sand	20
Silt*	54
Clay	22



Note 1: For sample descriptions, please refer to the report section presenting laboratory test results.

Note 2: Particle density for sedimentation is assumed to be 2.70 Mg/m^3.

*** Where a sedimentation test was not carried out, this represents total fines, particles less than 0.063 mm.**

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Test Report

Particle Size Distribution

ISO 17892-4: 2016 - 5.4 - Sedimentation by Pipette Method

Test Identification			
Location	Z4_OWF_BH17-SAMP	Depth [m]	20.20
Sample	21-5	Test start date	14/03/2025

Sieving

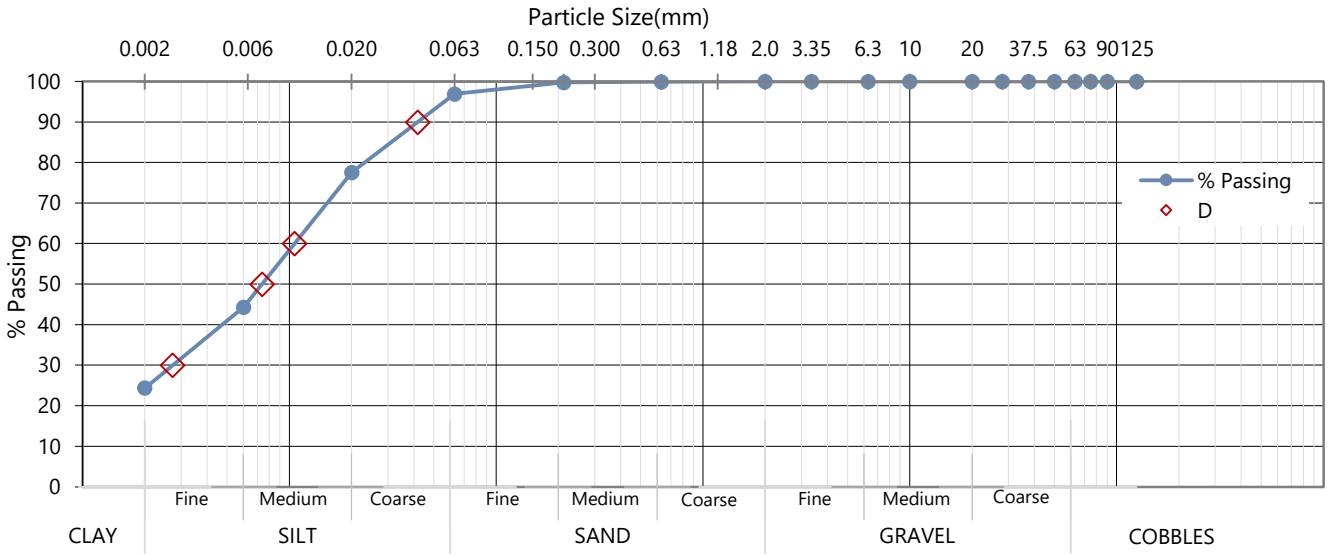
Particle Size [mm]	Passing [%]
125.0	100
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
10.0	100
6.3	100
3.35	100
2.00	100
0.630	100
0.212	100
0.063	97

Sedimentation

Particle Size [mm]	Passing [%]
0.0200	78
0.0060	44
0.0020	24

Curve Characteristics			
D_{90}	0.042 mm	Uniformity Coefficient	
D_{60}	0.011 mm	C_U	-
D_{50}	0.007 mm	Coefficient of Curvature	
D_{30}	0.003 mm	C_C	-
D_{10}	-		

Soil fractions [%]	
Cobbles	0
Gravel	0
Sand	3
Silt*	73
Clay	24



Note 1: For sample descriptions, please refer to the report section presenting laboratory test results.

Note 2: Particle density for sedimentation is assumed to be 2.70 Mg/m^3.

*** Where a sedimentation test was not carried out, this represents total fines, particles less than 0.063 mm.**

Project: 503387 - F254727 Laboratory: Louvain-la-Neuve Approved by: ET - 22/04/2025

Test Page - 1/1

Test Report
Particle Density
Fluid Pycnometer Method
ISO 17892-3:2015

UKAS TESTING 0919

No.	Test Date	Location	Sample	Depth [m]	Particle Density [Mg/m^3]	Laboratory
1	03/04/2025	Z4_OWF_BH01-SAMP	01-2	0.30	2.69	F
2	09/04/2025	Z4_OWF_BH01-SAMP	06-1	4.50	2.67	F
3	25/03/2025	Z4_OWF_BH01-SAMP	14-1	12.50	2.69	F
4	24/03/2025	Z4_OWF_BH01-SAMP	17-1	15.50	2.73	F
5	25/03/2025	Z4_OWF_BH01-SAMP	20-1	18.50	2.74	F
6	20/03/2025	Z4_OWF_BH05-SAMP	01-2	0.10	2.71	F
7	09/04/2025	Z4_OWF_BH05-SAMP	02-1	1.00	2.68	F
8	21/02/2025	Z4_OWF_BH05-SAMP	09-1	8.00	2.69	A
9	24/03/2025	Z4_OWF_BH05-SAMP	16-4	14.70	2.72	F
10	26/03/2025	Z4_OWF_BH05-SAMP	19-2	17.50	2.69	F
11	26/03/2025	Z4_OWF_BH15-COMP	02-2	5.70	2.73	F
12	09/04/2025	Z4_OWF_BH15-COMP	04-1	9.50	2.69	F
13	02/04/2025	Z4_OWF_BH15-COMP	05-2	13.60	2.69	A
14	21/03/2025	Z4_OWF_BH15-COMP	07-1	18.00	2.76	F
15	24/03/2025	Z4_OWF_BH16-SAMP	03-2	2.00	2.66	F
16	03/04/2025	Z4_OWF_BH16-SAMP	12-2	10.50	2.68	F
17	09/04/2025	Z4_OWF_BH16-SAMP	21-1	18.50	2.70	F
18	21/03/2025	Z4_OWF_BH16-SAMP	23-2	20.25	2.73	F
19	24/03/2025	Z4_OWF_BH17-SAMP	01-1	0.00	2.70	F
20	25/03/2025	Z4_OWF_BH17-SAMP	08-2	6.85	2.70	F
21	24/03/2025	Z4_OWF_BH17-SAMP	17-1	15.50	2.69	F
22	21/03/2025	Z4_OWF_BH17-SAMP	19-3	18.00	2.74	F
23	20/03/2025	Z4_OWF_BH17-SAMP	21-5	20.20	2.75	F

Note: For sample descriptions, please refer to the report section presenting laboratory test results.

Project: 503387 - F254727
Test Page 1 / 1

A: Wallingford, UK
F: Louvain-la-Neuve, Belgium

Approuved by ET - 15/07/2025

Test Report

Maximum and Minimum Dry Densities

Norwegian Geotechnical Institute (NGI) and Geolabs Method

No.	Test Date	Borehole	Sample	Depth [m]	Maximum Dry Density [Mg/m^3]				Maximum Dry Density [Mg/m^3]	Minimum Dry Density [Mg/m^3]	Location
					Before Surcharge		After Surcharge				
					Specimen 1	Specimen 2	Specimen 1	Specimen 2			
1	20/02/2025	Z4_OWF_BH01-SAMP	03-1	1.50	1.71	1.71	1.75	1.76	1.75	1.37	A
2	25/02/2025	Z4_OWF_BH01-SAMP	12-2	10.90	1.56	1.57	1.61	1.60	1.60	1.19	A
3	07/03/2025	Z4_OWF_BH05-SAMP	08-1	7.00	1.57	1.58	1.63	1.64	1.64	1.23	A
4	27/02/2025	Z4_OWF_BH05-SAMP	21-1	19.50	1.62	1.62	1.69	1.71	1.70	1.28	A
5	06/03/2025	Z4_OWF_BH15-COMP	04-2	9.80	1.58	1.57	1.59	1.58	1.58	1.20	A
6	27/02/2025	Z4_OWF_BH17-SAMP	Batch_01	5.50-6.10	1.58	1.58	1.61	1.61	1.61	1.20	A

*** Indicative results as test was performed on a sample ouf of specification with more than 12 % fines**

Note: For sample descriptions, please refer to the report section presenting laboratory test results.

Project: 503387 - F254727

Test page no. 1 / 1

A: Wallingford, UK

F: Louvain-la-Neuve, Belgium

Approved by ET 15/07/2025

Location	Sample ID	Depth BSF [m]	Test Type	Sample Quality*	Index Property						Consolidation Parameters								
					ρ [Mg/m^3]	U_W [kN/m^3]	W_i [%]	e_0 [-]	S_r [%]	PD [Mg/m^3]	P'_0 [kPa]	P'_c [kPa]	OCR [-]	Cc [-]	Cs [-]	CR [-]	Cv At Est. P'_0 [m^2/year]	M At Est. P'_0 [Mn/m^2]	Kv At Est. P'_0 [m/year]
Z4_OWF_BH01-SAMP	17-4	16.05	il	vp	2.04	20.0	26.0	0.669	100	2.70	147	425	2.90	0.166	0.012	0.099	37.905	4.520	0.083
Z4_OWF_BH01-SAMP	20-3	18.90	il	vp	2.13	20.9	23.5	0.565	100	2.70	174	357	2.05	0.126	0.009	0.080	17.951	5.854	0.030
Z4_OWF_BH05-SAMP	17-3	15.30	il	vp	2.09	20.5	23.8	0.600	100	2.70	143	271	1.89	0.146	0.012	0.091	4.694	5.243	0.009
Z4_OWF_BH15-COMP	07-2	18.10	il	vp	2.14	20.9	25.3	0.585	100	2.70	169	462	2.73	0.138	0.021	0.087	18.008	4.806	0.037
Z4_OWF_BH17-SAMP	20-3	18.80	il	vp	1.98	19.4	28.0	0.744	100	2.70	167	440	2.63	0.180	0.014	0.103	35.930	7.685	0.046
Z4_OWF_BH17-SAMP	21-4	20.00	il	p	1.97	19.3	30.6	0.792	100	2.70	178	615	3.45	0.258	0.015	0.144	6.485	11.288	0.006

Notes

* : Estimated sample quality based on Lune et al. (2006)

BSF : Below seafloor
ρ : Bulk density
U_w : Unit weight
w : Water content
e_0 : Initial void ratio
S_r : Degree of saturation
PD : Particle density
P'_0 : In-situ pressure
P'_c : Pre-consolidatio pressure
OCR : Over consolidation ratio
Cc : Compression index
Cs : Swelling index
Cv : Coefficient of consolidation
M : Coefficient of volume compressibility
Kv : Permeability
CRS : Constant rate of strain
IL : Incremental loading
CR : primary compression ratio

TOPAZ / OED Summary of OED tests with OCR (Tabular data) (FFSA) Final_v2 / 2025-08-25 15:24:09 +02:00

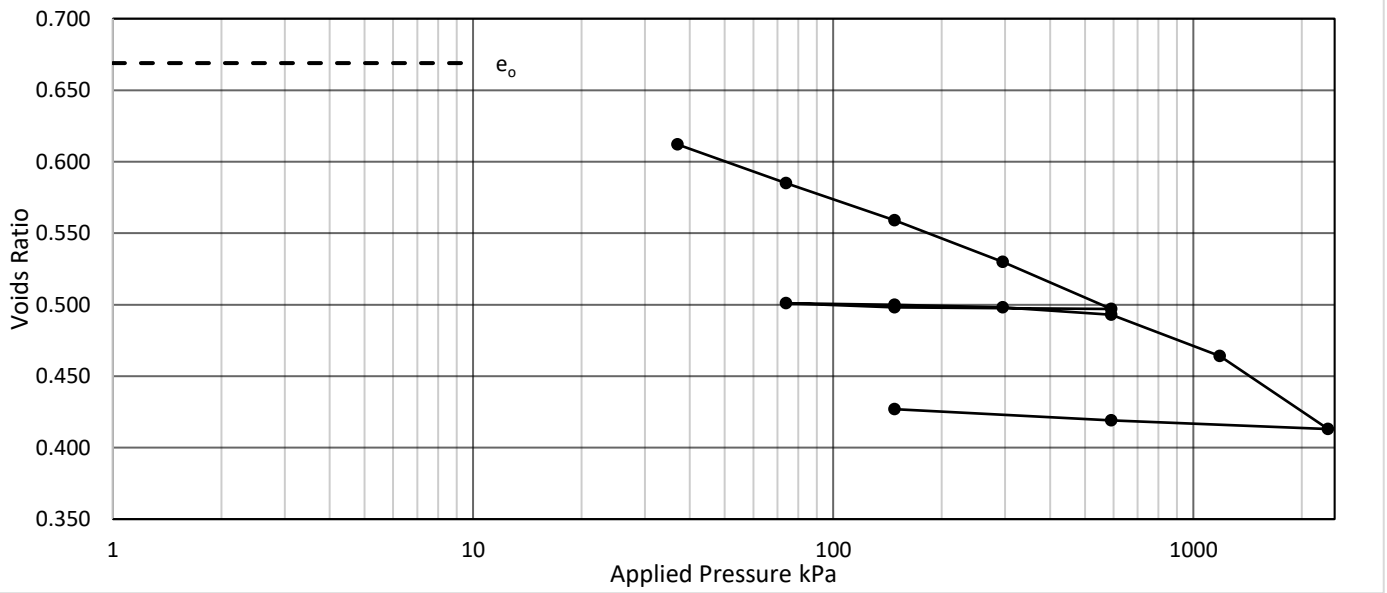
Summary of One-Dimensional Consolidation Test Results

LABORATORY TEST CERTIFICATE
Incremental Loading Oedometer Test

BS EN ISO 17892-5:2017

1483

Project Reference	F254727			Location ID	Z4_OWF_BH01-SAMP
Project Name	Golfe du Lion			Depth Top [m]	16.05
Specimen Description	Brown slightly sandy SILT			Sample Type	Wax
Specimen Reference		Specimen Depth [m]	16.16	Sample Reference	17-4



Applied Pressure kPa	Voids ratio	m_v m²/MN	C_v [$t_{50,log}$] m²/yr	C_v [$t_{90,root}$] m²/yr	C_{sec}
2.5	0.669	-	-	-	-
37	0.612	0.99	17	18	0.00420
74	0.585	0.46	22	29	0.00170
148	0.559	0.22	33	38	0.00210
296	0.530	0.13	46	52	0.00230
592	0.497	0.071	67	92	0.00270
148	0.498				
74	0.501				
148	0.500	0.0082	170	330	0.00010
296	0.498	0.0098	170	410	0.00018
592	0.493	0.012	140	330	0.00042
1,184	0.464	0.033	120	120	0.00290
2,368	0.413	0.029	130	150	0.00360
592	0.419				
148	0.427				

Date of Test	17/04/2025	
Preparation	Hand Trimming	
Particle density	2.70	Mg/m³
Average temperature for test	21	°C
Swelling Pressure		kPa
Settlement on saturation		%
Degree of Saturation	100	%

	Initial	Final	
Diameter	49.95	-	mm
Height	20.00	17.10	mm
Water Content	26.0	19.9	%
Bulk density	2.04	2.27	Mg/m³
Dry density	1.62	1.89	Mg/m³
Voids Ratio	0.669	0.427	

Frame correction applied to height changes

Cv corrected to 20°C

* Negative Csec determination

Issue Date	12/05/2025	Certificate Reference	Issue 1	Authorised By	huntc
Client	DGEC			Authorised Date	12/05/2025 11:41
Remarks					

Fugro GB Limited. Unit 43, Number One Industrial Estate, Medomsley Road, Consett, DH8 6TW

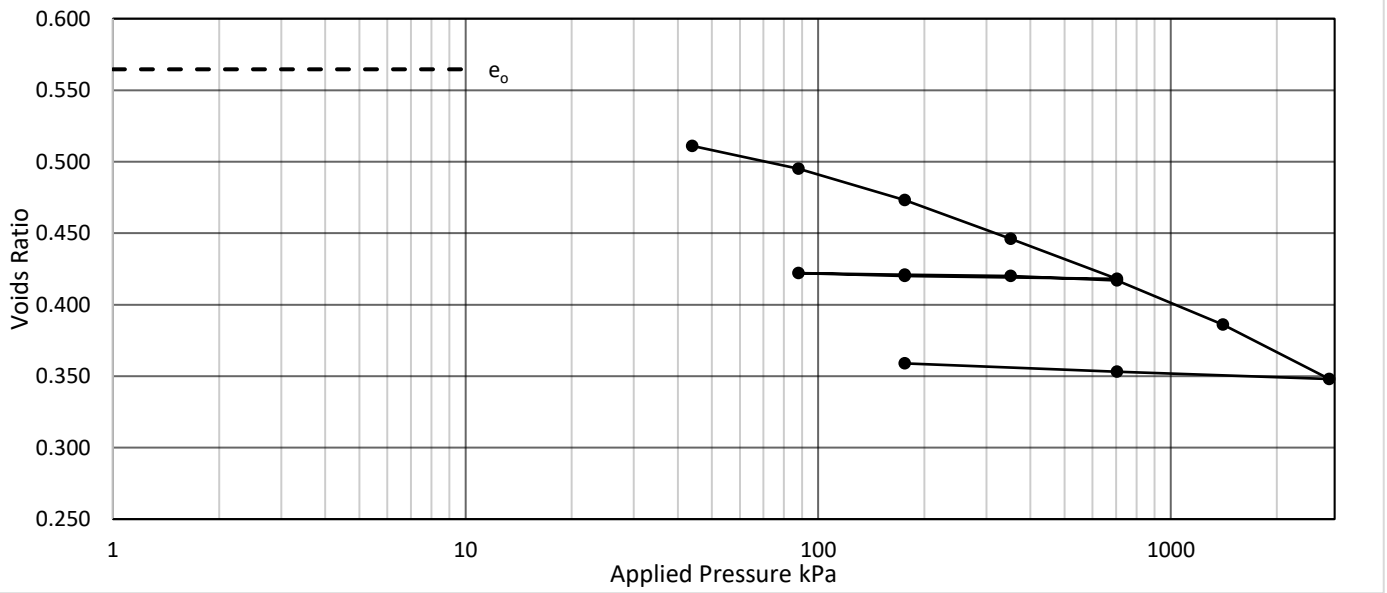
Testing was performed at the Fugro GB Limited laboratory at the address shown above. Results relate only to the sample tested, having been authorised by persons qualified to do so. Opinions and interpretations are outside the scope of accreditation. Unless stated otherwise the sample was tested in the condition it was received at the laboratory.

LABORATORY TEST CERTIFICATE
Incremental Loading Oedometer Test

BS EN ISO 17892-5:2017

1483

Project Reference	F254727			Location ID	Z4_OWF_BH01-SAMP
Project Name	Golfe du Lion			Depth Top [m]	18.90
Specimen Description	Grey slightly sandy CLAY			Sample Type	Wax
Specimen Reference		Specimen Depth [m]	18.98	Sample Reference	20-3



Applied Pressure kPa	Voids ratio	m_v m²/MN	C_v [$t_{50,log}$] m²/yr	C_v [$t_{90,root}$] m²/yr	C_{sec}
2.5	0.565	-	-	-	-
44	0.511	0.82	10	12	0.00160
88	0.495	0.24	15	15	0.00093
176	0.473	0.17	21	18	0.00180
352	0.446	0.10	32	34	0.00230
704	0.418	0.055	40	39	0.00250
176	0.420				
88	0.422				
176	0.421	0.0048	85	120	0.00012
352	0.420	0.0041	230	160	0.00021
704	0.417	0.0069	200	190	0.00047
1,408	0.386	0.031	61	62	0.00250
2,816	0.348	0.020	86	91	0.00320
704	0.353				
176	0.359				

Date of Test	26/03/2025	
Preparation	Hand Trimming	
Particle density	2.70	Mg/m³
Average temperature for test	21	°C
Swelling Pressure		kPa
Settlement on saturation		%
Degree of Saturation	100	%

	Initial	Final	
Diameter	50.01	-	mm
Height	19.93	17.31	mm
Water Content	23.5	16.1	%
Bulk density	2.13	2.31	Mg/m³
Dry density	1.73	1.99	Mg/m³
Voids Ratio	0.565	0.359	

Frame correction applied to height changes

Cv corrected to 20°C

* Negative Csec determination

Issue Date	09/05/2025	Certificate Reference	Issue 1	Authorised By	huntc
Client	DGEC			Authorised Date	17/04/2025 10:44
Remarks					

Fugro GB Limited. Unit 43, Number One Industrial Estate, Medomsley Road, Consett, DH8 6TW

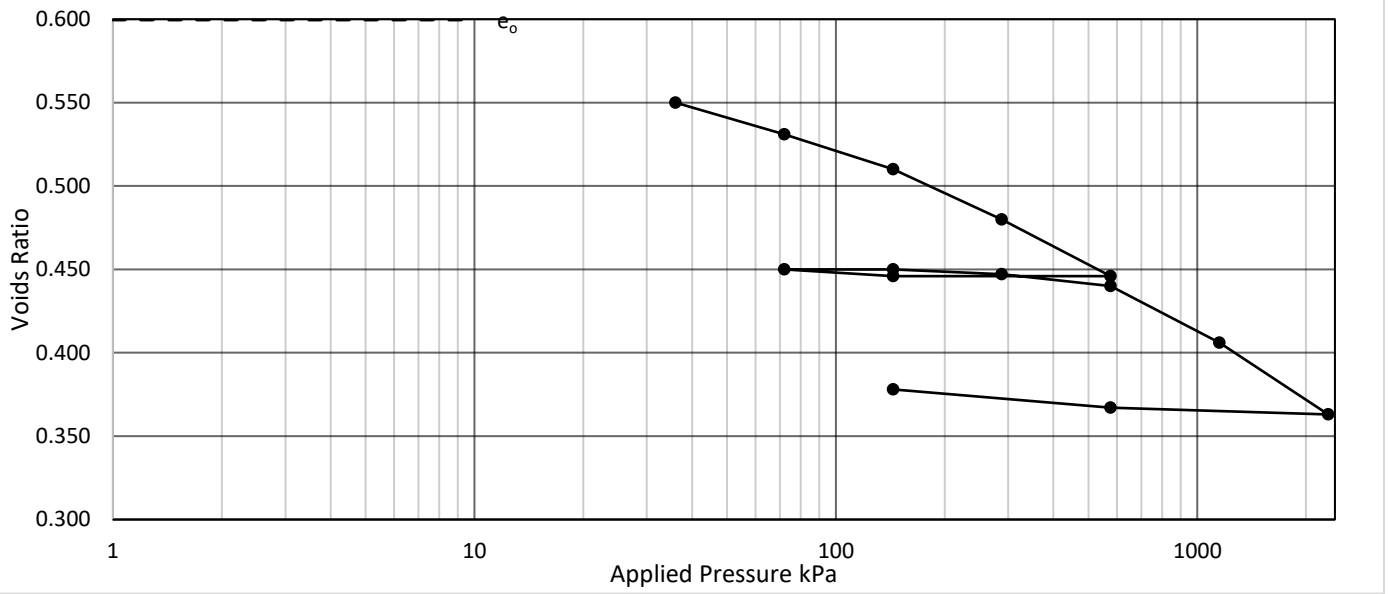
Testing was performed at the Fugro GB Limited laboratory at the address shown above. Results relate only to the sample tested, having been authorised by persons qualified to do so. Opinions and interpretations are outside the scope of accreditation. Unless stated otherwise the sample was tested in the condition it was received at the laboratory.

LABORATORY TEST CERTIFICATE
Incremental Loading Oedometer Test

BS EN ISO 17892-5:2017

1483

Project Reference	F254727			Location ID	Z4_OWF_BH05-SAMP
Project Name	Golfe du Lion			Depth Top [m]	15.30
Specimen Description	Grey slightly sandy CLAY			Sample Type	Wax
Specimen Reference		Specimen Depth [m]	15.35	Sample Reference	17-3



Applied Pressure kPa	Voids ratio	m_v m^2/MN	C_v $[t_{50,log}]$ m^2/yr	C_v $[t_{90,root}]$ m^2/yr	C_{sec}
2.5	0.600	-	-	-	-
36	0.550	0.92	1.9	2.3	0.00052
72	0.531	0.35	3.0	4.0	0.00085
144	0.510	0.19	4.9	4.7	0.00140
288	0.480	0.14	6.2	5.0	0.00200
576	0.446	0.080	8.9	5.0	0.00270
144	0.446				
72	0.450				
144	0.450	0.0037	21	23	0.00014
288	0.447	0.012	24	24	0.00028
576	0.440	0.018	29	22	0.00072
1,152	0.406	0.040	12	18	0.00280
2,304	0.363	0.027	12	20	0.00310
576	0.367				
144	0.378				

Date of Test	25/03/2025	
Preparation	Hand Trimming	
Particle density	2.70	Mg/m^3
Average temperature for test	21	°C
Swelling Pressure		kPa
Settlement on saturation		%
Degree of Saturation	100	%

	Initial	Final	
Diameter	50.01	-	mm
Height	19.84	17.09	mm
Water Content	23.8	17.8	%
Bulk density	2.09	2.31	Mg/m^3
Dry density	1.69	1.96	Mg/m^3
Voids Ratio	0.600	0.378	

Frame correction applied to height changes

Cv corrected to 20°C

* Negative Csec determination

Issue Date	14/04/2025	Certificate Reference	Issue 1	Authorised By	huntc
Client	DGEC			Authorised Date	09/04/2025 15:56
Remarks					

Fugro GB Limited. Unit 43, Number One Industrial Estate, Medomsley Road, Consett, DH8 6TW

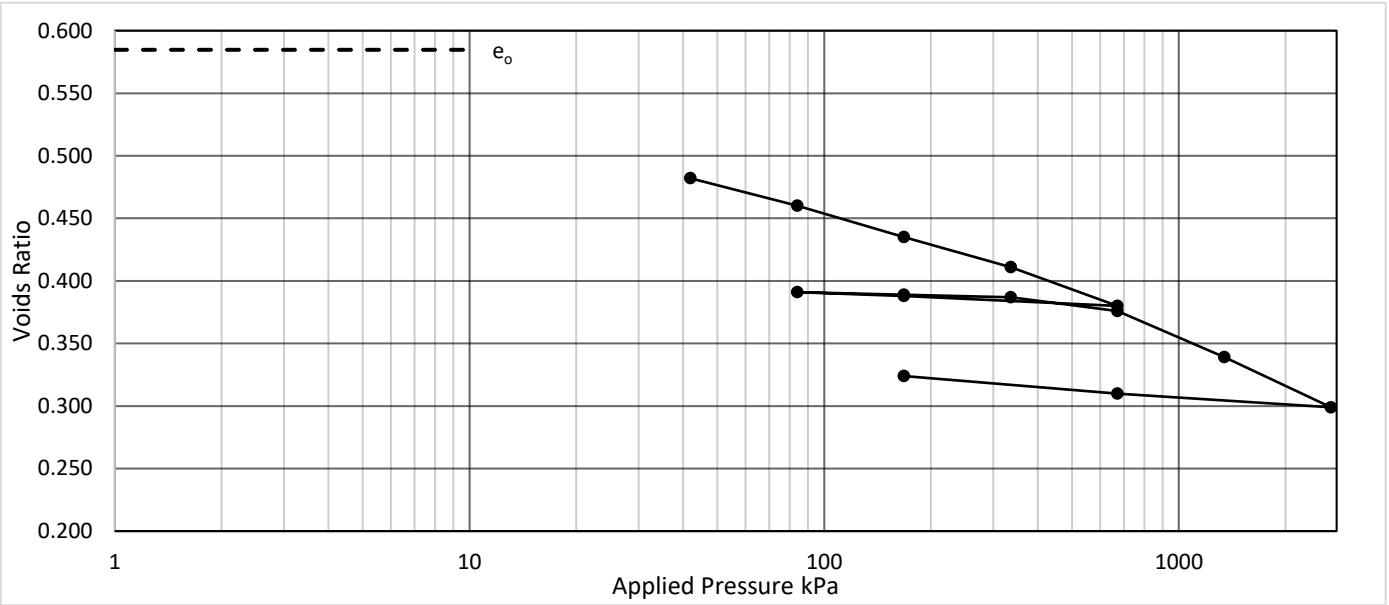
Testing was performed at the Fugro GB Limited laboratory at the address shown above. Results relate only to the sample tested, having been authorised by persons qualified to do so. Opinions and interpretations are outside the scope of accreditation. Unless stated otherwise the sample was tested in the condition it was received at the laboratory.

LABORATORY TEST CERTIFICATE
Incremental Loading Oedometer Test

BS EN ISO 17892-5:2017

1483

Project Reference	F254727			Location ID	Z4_OWF_BH15-COMP
Project Name	Golfe du Lion			Depth Top [m]	18.10
Specimen Description	Brown slightly sandy CLAY			Sample Type	Wax
Specimen Reference		Specimen Depth [m]	18.25	Sample Reference	07-2



Applied Pressure kPa	Voids ratio	m_v m²/MN	C_v [$t_{50,log}$] m²/yr	C_v [$t_{90,root}$] m²/yr	C_{sec}
2.5	0.585	-	-	-	-
42	0.482	1.6	7.2	4.2	0.00260
84	0.460	0.36	6.6	16	0.00170
168	0.435	0.21	7.8	18	0.00190
336	0.411	0.097	11	19	0.00230
672	0.380	0.066	16	19	0.00260
168	0.388				
84	0.391				
168	0.389	0.016	29	74	0.00020
336	0.387	0.0080	33	40	0.00031
672	0.376	0.024		92	0.00086
1,344	0.339	0.040	21	28	0.00300
2,688	0.299	0.022	15	28	0.00110
672	0.310				
168	0.324				

Date of Test	17/04/2025	
Preparation	Hand Trimming	
Particle density	2.70	Mg/m³
Average temperature for test	21	°C
Swelling Pressure		kPa
Settlement on saturation		%
Degree of Saturation	100	%

	Initial	Final	
Diameter	49.92	-	mm
Height	20.01	16.72	mm
Water Content	25.3	18.7	%
Bulk density	2.14	2.42	Mg/m³
Dry density	1.70	2.04	Mg/m³
Voids Ratio	0.585	0.324	

Frame correction applied to height changes

Cv corrected to 20°C

* Negative Csec determination

Issue Date	12/05/2025	Certificate Reference	Issue 1	Authorised By	huntc
Client	DGEC			Authorised Date	12/05/2025 11:41
Remarks					

Fugro GB Limited. Unit 43, Number One Industrial Estate, Medomsley Road, Consett, DH8 6TW

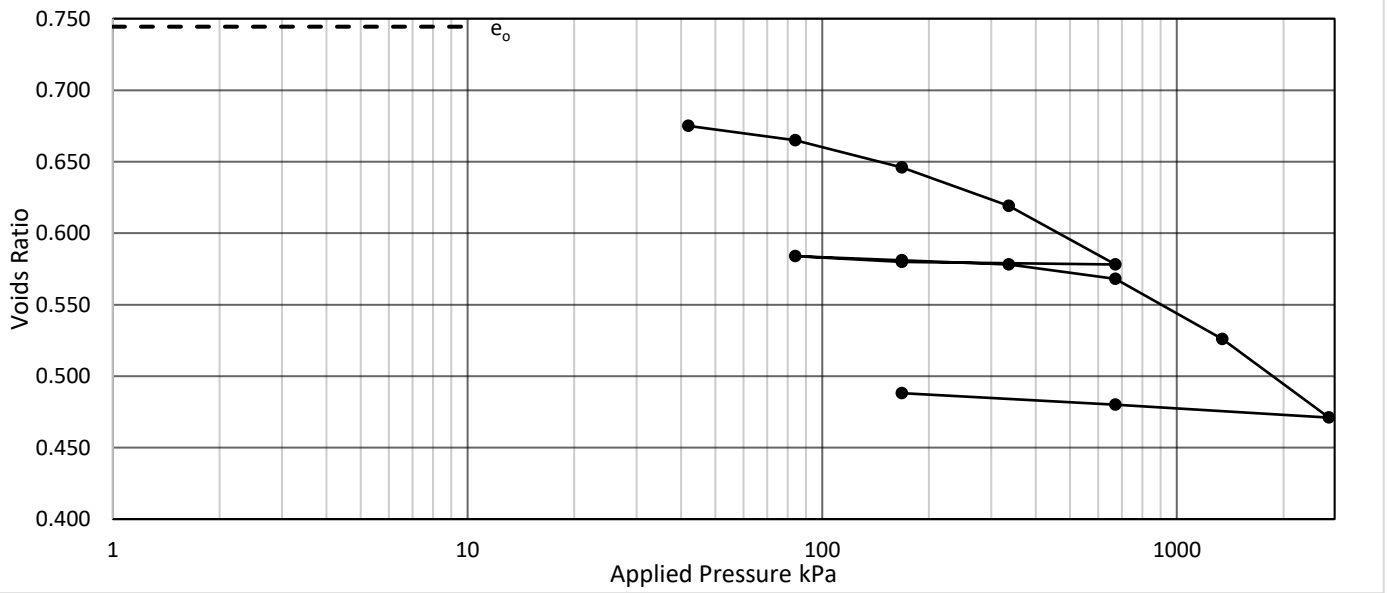
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LABORATORY TEST CERTIFICATE
Incremental Loading Oedometer Test

BS EN ISO 17892-5:2017

1483

Project Reference	F254727			Location ID	Z4_OWF_BH17-SAMP
Project Name	Golfe du Lion			Depth Top [m]	18.80
Specimen Description	Brown slightly sandy SILT			Sample Type	Wax
Specimen Reference		Specimen Depth [m]	18.90	Sample Reference	20-3



Applied Pressure kPa	Voids ratio	m_v m²/MN	C_v [$t_{50,log}$] m²/yr	C_v [$t_{90,root}$] m²/yr	C_{sec}
2.0	0.744	-	-	-	-
42	0.675	1.0	45	83	0.00040
84	0.665	0.15	24	26	0.00058
168	0.646	0.13	40	36	0.00096
336	0.619	0.10	69	59	0.00170
672	0.578	0.075	26	33	0.00210
168	0.580				
84	0.584				
168	0.581	0.022	79	190	0.00011
336	0.578	0.011	210	190	0.00027
672	0.568	0.018	210	190	0.00071
1,344	0.526	0.040	71	58	0.00290
2,688	0.471	0.027	82	94	0.00400
672	0.480				
168	0.488				

Date of Test	17/04/2025	
Preparation	Hand Trimming	
Particle density	2.70	Mg/m³
Average temperature for test	21	°C
Swelling Pressure		kPa
Settlement on saturation		%
Degree of Saturation	100	%

	Initial	Final	
Diameter	49.94	-	mm
Height	20.02	17.08	mm
Water Content	28.0	23.3	%
Bulk density	1.98	2.24	Mg/m³
Dry density	1.55	1.81	Mg/m³
Voids Ratio	0.744	0.488	

Frame correction applied to height changes

Cv corrected to 20°C

* Negative Csec determination

Issue Date	12/05/2025	Certificate Reference	Issue 1	Authorised By	huntc
Client	DGEC			Authorised Date	12/05/2025 11:41
Remarks					

Fugro GB Limited. Unit 43, Number One Industrial Estate, Medomsley Road, Consett, DH8 6TW

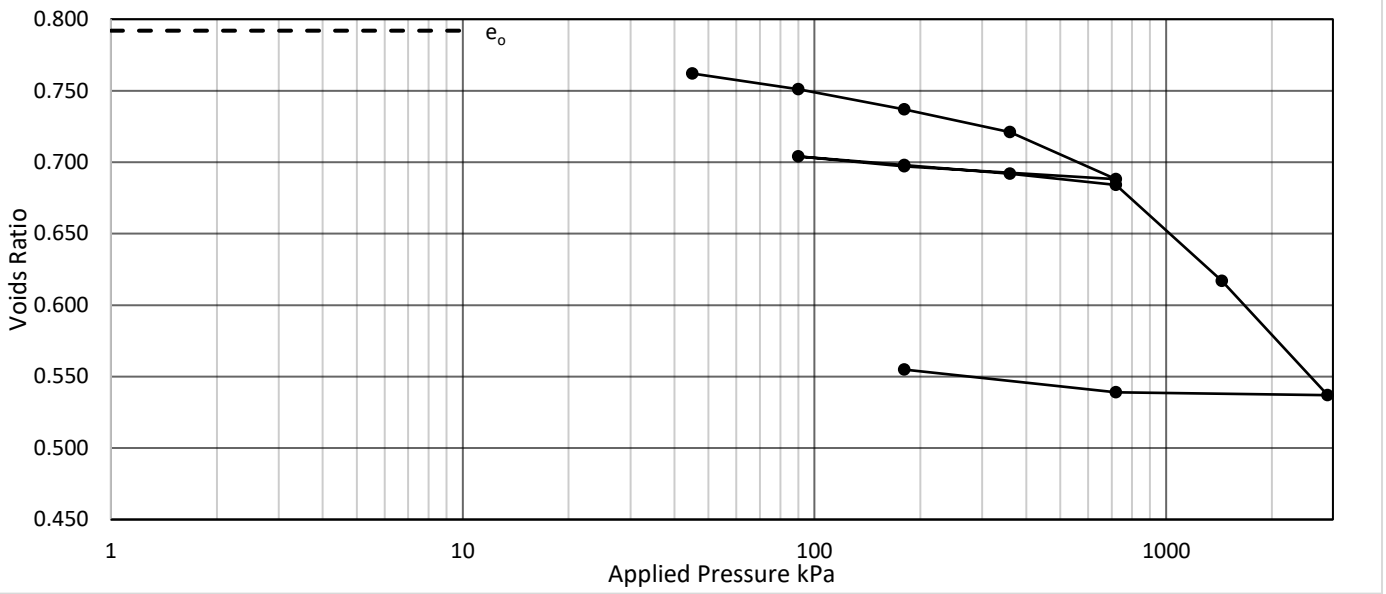
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LABORATORY TEST CERTIFICATE
Incremental Loading Oedometer Test

BS EN ISO 17892-5:2017

1483

Project Reference	F254727			Location ID	Z4_OWF_BH17-SAMP
Project Name	Golfe du Lion			Depth Top [m]	20.00
Specimen Description	Grey slightly sandy CLAY			Sample Type	Wax
Specimen Reference		Specimen Depth [m]	20.03	Sample Reference	21-4



Applied Pressure kPa	Voids ratio	m_v m²/MN	C_v [$t_{50,log}$] m²/yr	C_v [$t_{90,root}$] m²/yr	C_{sec}
2.5	0.792	-	-	-	-
45	0.762	0.39	11	24	0.00054
90	0.751	0.15	17	30	0.00060
180	0.737	0.088	13	6.1	0.00013
360	0.721	0.050	28	27	0.00081
720	0.688	0.053	28	25	0.00200
180	0.697				
90	0.704				
180	0.698	0.037		170	0.00010
360	0.692	0.021	0.93	52	0.00024
720	0.684	0.012	22	19	0.00061
1,440	0.617	0.056	9.8	4.8	0.00013
2,880	0.537	0.034	29	22	0.00520
720	0.539				
180	0.555				

Date of Test	25/03/2025	
Preparation	Hand Trimming	
Particle density	2.70	Mg/m³
Average temperature for test	21	°C
Swelling Pressure		kPa
Settlement on saturation		%
Degree of Saturation	100	%

	Initial	Final	
Diameter	50.06	-	mm
Height	19.94	17.30	mm
Water Content	30.6	26.1	%
Bulk density	1.97	2.19	Mg/m³
Dry density	1.51	1.74	Mg/m³
Voids Ratio	0.792	0.555	

Frame correction applied to height changes

Cv corrected to 20°C

* Negative Csec determination

Issue Date	14/04/2025	Certificate Reference	Issue 1	Authorised By	huntc
Client	DGEC			Authorised Date	09/04/2025 15:22
Remarks					

Fugro GB Limited. Unit 43, Number One Industrial Estate, Medomsley Road, Consett, DH8 6TW

Testing was performed at the Fugro GB Limited laboratory at the address shown above. Results relate only to the sample tested, having been authorised by persons qualified to do so. Opinions and interpretations are outside the scope of accreditation. Unless stated otherwise the sample was tested in the condition it was received at the laboratory.

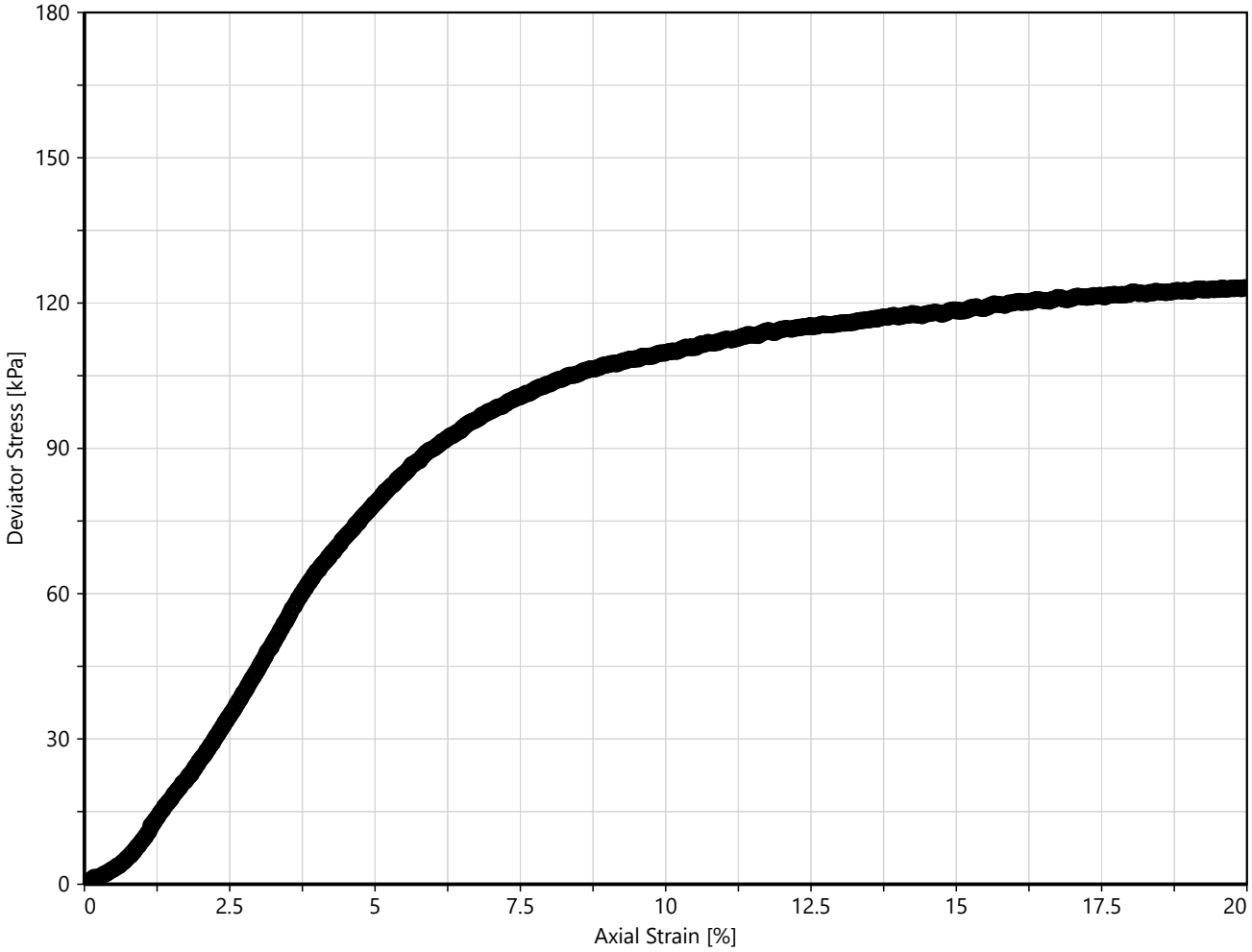
Location	Sample ID	Depth BSF [m]	Specimen Condition	w [%]	ρ [Mg/m^3]	ρ_d [Mg/m^3]	S_r [%]	P_c [kPa]	s_u [kPa]	ε_{50} [%]	ε_f [%]
Z4_OWF_BH01-SAMP	18-4	17.10	Undisturbed	25.1	2.12	1.70	100	1325	62	3.82	20.00
Z4_OWF_BH05-SAMP	16-3	14.50	Undisturbed	26.1	1.99	1.58	98	1184	25	3.75	20.00
Z4_OWF_BH15-COMP	06-3	17.45	Undisturbed	27.9	1.98	1.55	98	1244	77	2.63	20.00
Z4_OWF_BH17-SAMP	19-4	18.25	Undisturbed	28.9	2.01	1.56	100	1282	46	2.89	20.00
Z4_OWF_BH17-SAMP	21-3	19.80	Undisturbed	32.1	1.96	1.49	100	1312	72	3.28	20.00

Notes

BSF : Below seafloor
w : Water content
S_r : Degree of saturation
ρ : Bulk density
ρ_d : Dry density
s_u : Undrained shear strength
ε_{50} : Axial strain at 50 % of maximum deviator stress
P_c : Cell pressure
ε_f : Axial strain at failure

TOPAZ / UU Summary of UU triaxial test results (FFSA) / 2025-08-28 13:52:50 +02:00

Summary of Unconsolidated Undrained Triaxial Test Results



Curve	⊖—⊖
INITIAL CONDITIONS	
Specimen condition	Undisturbed
Laboratory	Field laboratory
Specimen diameter [mm]	72.0
Specimen length [mm]	140.0
Unit weight [kN/m^3]	20.8
Water content [%]	25
Membrane thickness [mm]	0.3
Membrane correction [kPa]	3.0
Strain Rate [%/h]	59.8
FAILURE CONDITIONS	
Cell pressure [kPa]	1325
Undrained shear strength, s_u [kPa]	62
Axial strain at 50% of max deviator stress, ε_{50} [%]	3.8
Young's modulus at 50% of max deviator stress, E_{50} [MPa]	1.6
Axial strain at failure, ε_f [%]	20.0
Failure type	Vertical fracture

Sample : 18-4 Test method : ISO 17892-8 (2018)
Test depth : 17.1 m
Visual identification : stiff very dark grey (2.5Y 3/1) sandy slightly calcareous CLAY with rare coarse sand-size shell fragments - with frequent fine to medium gravel-size pockets of sand - with rare fine to coarse gravel-size pockets of organic matter

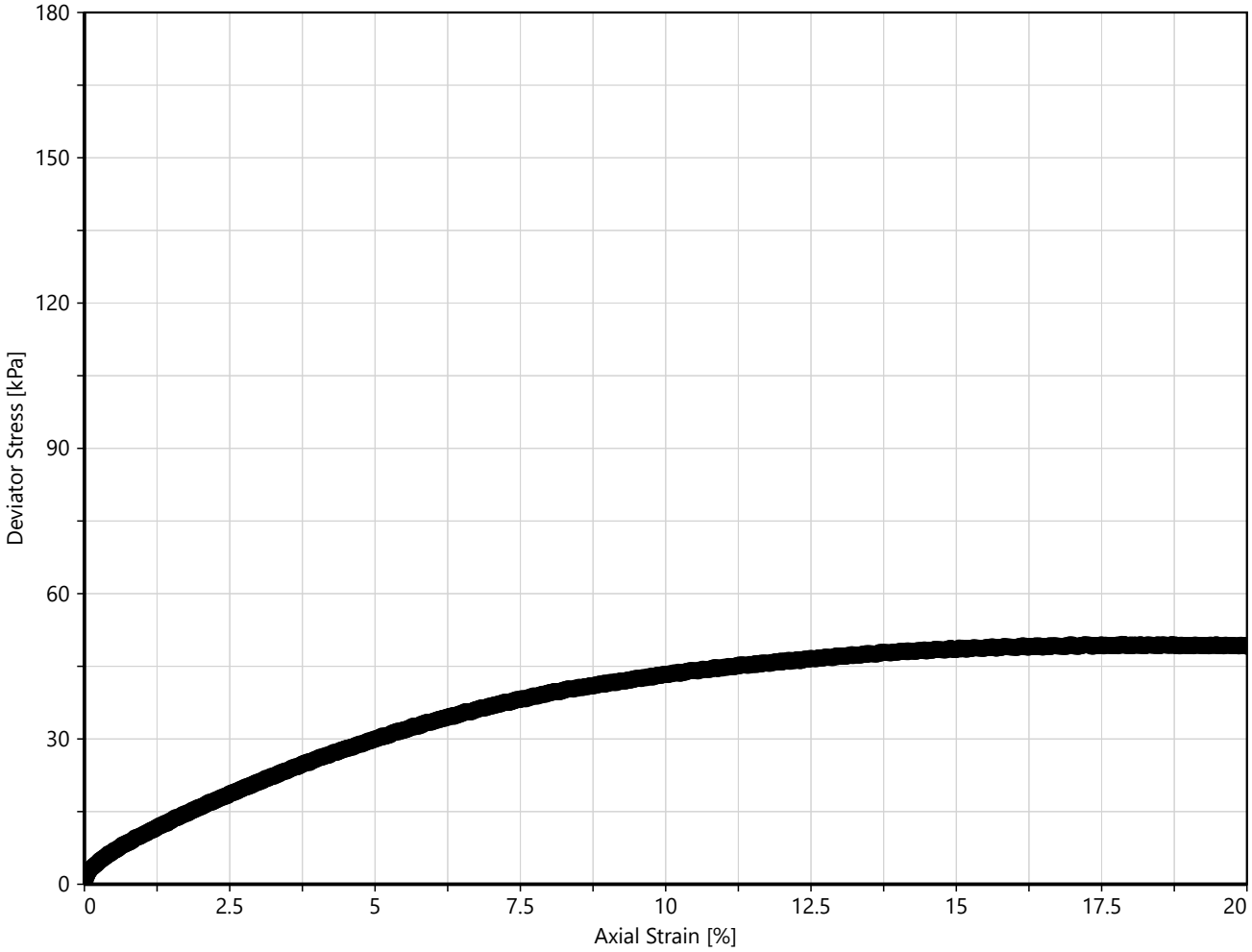
Uu-Triaxial Test Results

Z4_OWF_BH01-SAMP

TOPAZ / UU-triaxial test results / 2025-08-28 13:36:02 +02:00


PROJECT NO. : F254727 DGEC
PROJECT TITLE: Golf du Lion GSI
DATE : 20-01-2025
BOREHOLE : Z4_OWF_BH01
SAMPLE : 18-4
DEPTH (m) : 17,10 m
FUGRO
BOTTOM


PROJECT NO. : F254727 DGEC
PROJECT TITLE: Golf du Lion GSI
DATE : 20-01-2025
BOREHOLE : Z4_OWF_BH01
SAMPLE : 18-4
DEPTH (m) : 17,10 m
FUGRO
BOTTOM



Curve	
INITIAL CONDITIONS	
Specimen condition	Undisturbed
Laboratory	Field laboratory
Specimen diameter [mm]	72.0
Specimen length [mm]	144.0
Unit weight [kN/m^3]	19.5
Water content [%]	26
Membrane thickness [mm]	0.3
Membrane correction [kPa]	2.7
Strain Rate [%/h]	59.2
FAILURE CONDITIONS	
Cell pressure [kPa]	1184
Undrained shear strength, s_u [kPa]	25
Axial strain at 50% of max deviator stress, ε_{50} [%]	3.7
Young's modulus at 50% of max deviator stress, E_{50} [MPa]	0.7
Axial strain at failure, ε_f [%]	20.0
Failure type	Bulge failure

Sample : 16-3
Test depth : 14.5 m
Visual identification : soft low strength very dark grey calcareous CLAY
Test method : ISO 17892-8 (2018)

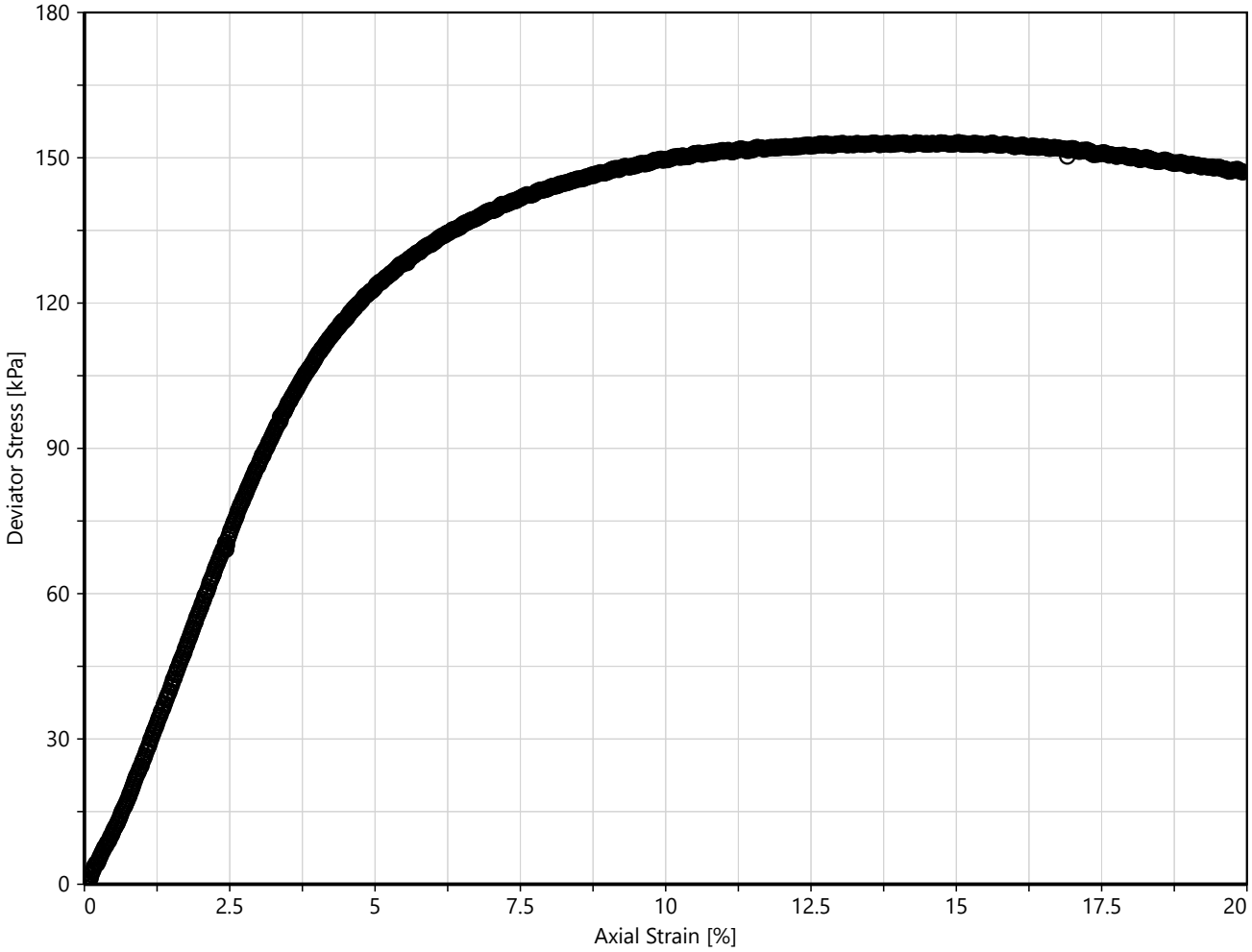
TOPAZ / UU-triaxial test results / 2025-08-28 13:36:02 +02:00

Uu-Triaxial Test Results

Z4_OWF_BH05-SAMP


PROJECT NO. : F254727 DGEC
PROJECT TITLE: Golf du Lion GSI
DATE : 19-01-2025
BOREHOLE : Z4_OWF_BH05
SAMPLE : 16_3
DEPTH (m) : 14,50
FUGRO
BOTTOM


PROJECT NO. : F254727 DGEC
PROJECT TITLE: Golf du Lion GSI
DATE : 19-01-2025
BOREHOLE : Z4_OWF_BH05
SAMPLE : 16_3
DEPTH (m) : 14,50
FUGRO
BOTTOM



Curve	⊖—⊖
INITIAL CONDITIONS	
Specimen condition	Undisturbed
Laboratory	Field laboratory
Specimen diameter [mm]	72.0
Specimen length [mm]	144.0
Unit weight [kN/m^3]	19.4
Water content [%]	28
Membrane thickness [mm]	0.3
Membrane correction [kPa]	2.3
Strain Rate [%/h]	59.5
FAILURE CONDITIONS	
Cell pressure [kPa]	1244
Undrained shear strength, s_u [kPa]	77
Axial strain at 50% of max deviator stress, ε_{50} [%]	2.6
Young's modulus at 50% of max deviator stress, E_{50} [MPa]	2.9
Axial strain at failure, ε_f [%]	20.0
Failure type	Bulge failure

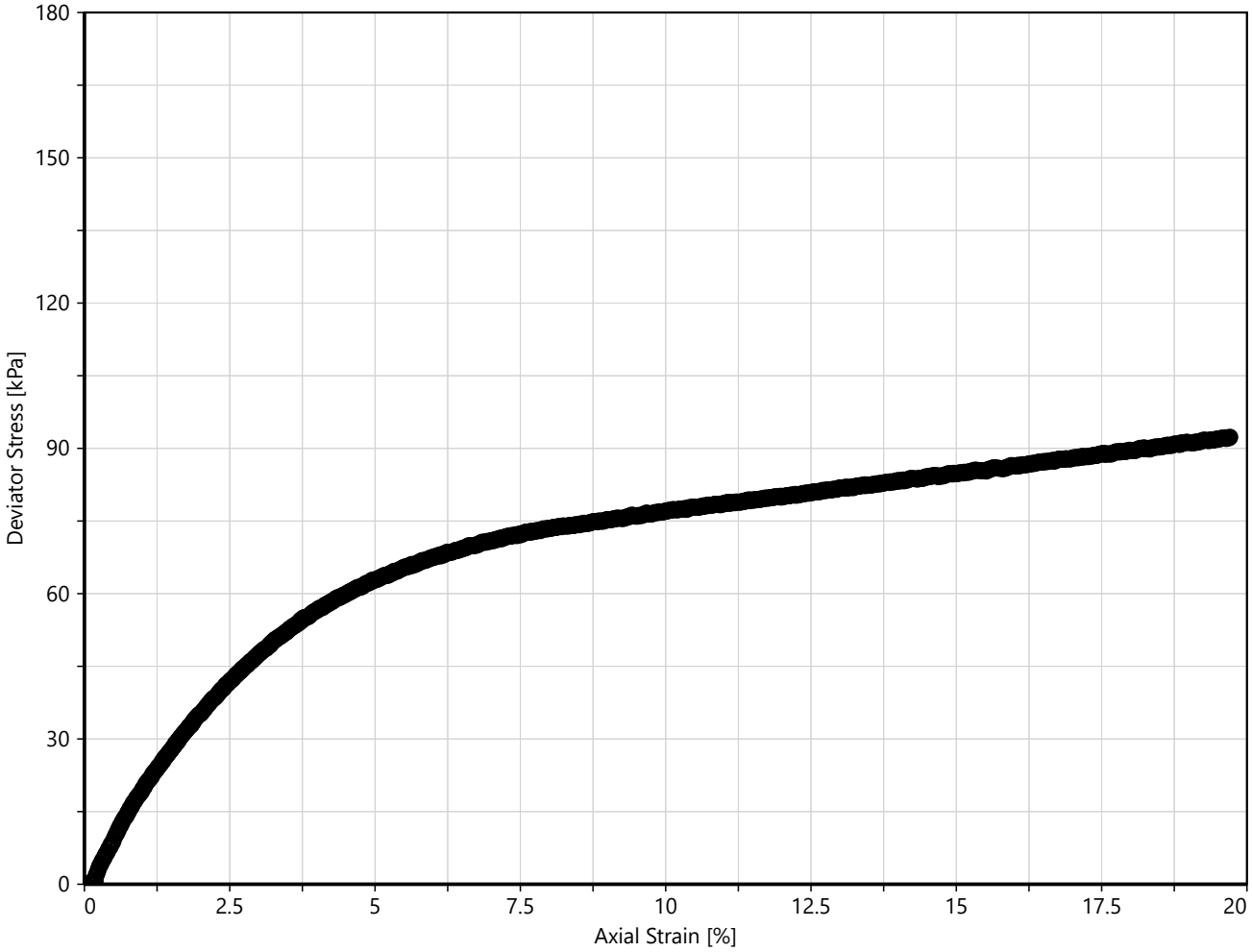
Sample : 06-3 Test method : ISO 17892-8 (2018)
Test depth : 17.5 m
Visual identification : firm medium strength very dark grey (2.5Y 3/1) CLAY with rare coarse sand-size shell fragments

TOPAZ / UU-triaxial test results / 2025-08-28 13:36:02 +02:00

Uu-Triaxial Test Results
Z4_OWF_BH15-COMP


PROJECT NO.: F254727 DGEC
BOREHOLE: Z4_OWF_BH05_COMP
PROJECT TITLE: Golf du Lion GSI
SAMPLE: WIP 06
DATE: 17-01-2025
DEPTH (m): 17.45
FUGRO
BOTTOM


PROJECT NO.: F254727 DGEC
BOREHOLE: Z4_OWF_BH05_COMP
PROJECT TITLE: Golf du Lion GSI
SAMPLE: WIP 06
DATE: 17-01-2025
DEPTH (m): 17.45
FUGRO
BOTTOM



Curve	
INITIAL CONDITIONS	
Specimen condition	Undisturbed
Laboratory	Field laboratory
Specimen diameter [mm]	71.0
Specimen length [mm]	143.3
Unit weight [kN/m^3]	19.8
Water content [%]	29
Membrane thickness [mm]	0.3
Membrane correction [kPa]	3.0
Strain Rate [%/h]	58.9
FAILURE CONDITIONS	
Cell pressure [kPa]	1282
Undrained shear strength, s_u [kPa]	46
Axial strain at 50% of max deviator stress, ε_{50} [%]	2.9
Young's modulus at 50% of max deviator stress, E_{50} [MPa]	1.6
Axial strain at failure, ε_f [%]	20.0
Failure type	Bulge failure

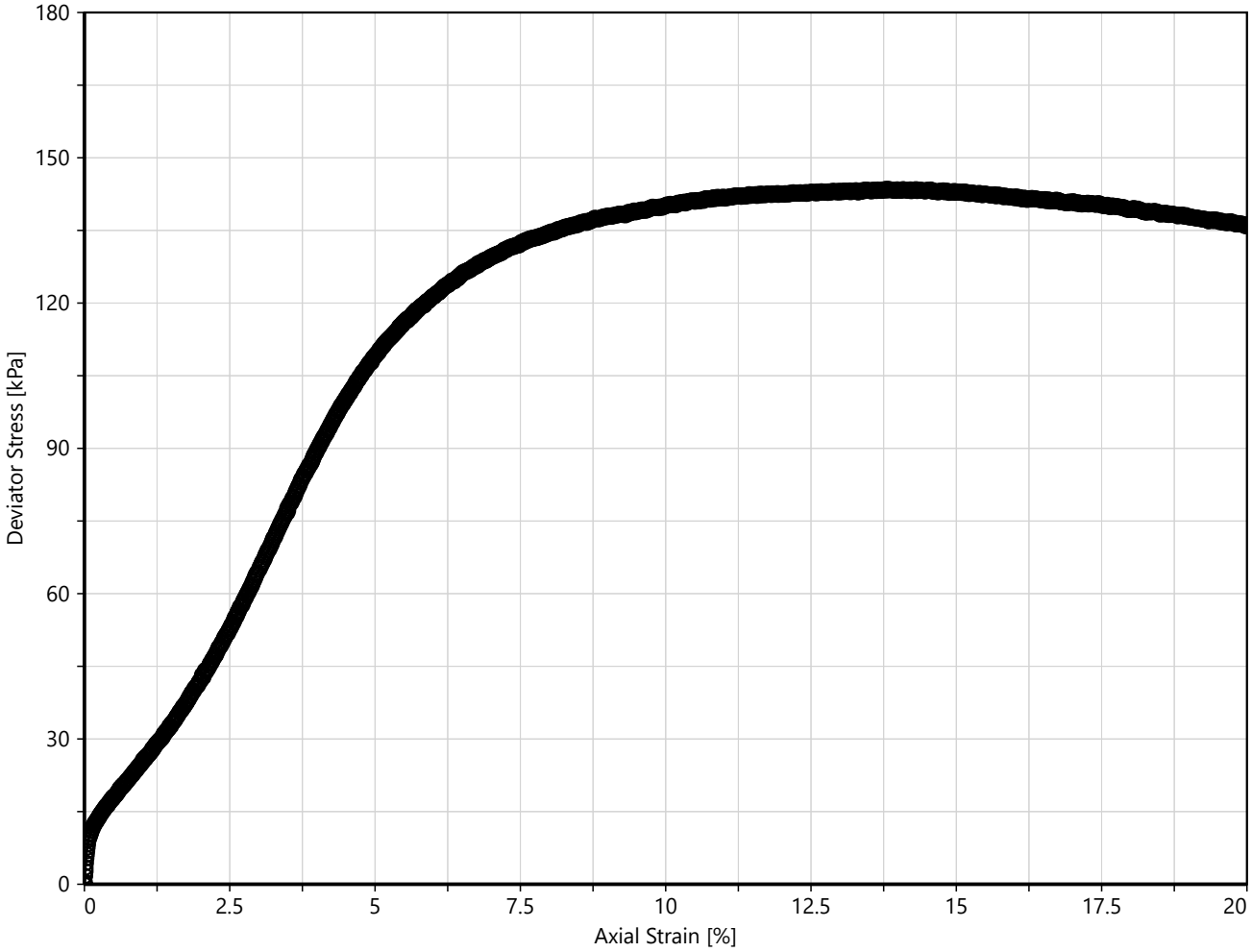
Sample : 19-4
Test depth : 18.3 m
Visual identification : firm medium strength very dark grey (2.5Y 3/1) calcareous CLAY
Test method : ISO 17892-8 (2018)

TOPAZ / UU-triaxial test results / 2025-08-28 13:36:02 +02:00

Uu-Triaxial Test Results
Z4_OWF_BH17-SAMP


PROJECT NO. : F254727 DGEC
PROJECT TITLE: Golf du Lion GSI
DATE : 18-01-2025
BOREHOLE : Z4_OWF_BH17-SAMP
SAMPLE : WIP 19
DEPTH (m) : 18.25
FUGRO
BOTTOM


PROJECT NO. : F254727 DGEC
PROJECT TITLE: Golf du Lion GSI
DATE : 18-01-2025
BOREHOLE : Z4_OWF_BH17-SAMP
SAMPLE : WIP 19
DEPTH (m) : 18.25
FUGRO
BOTTOM



Curve	
INITIAL CONDITIONS	
Specimen condition	Undisturbed
Laboratory	Field laboratory
Specimen diameter [mm]	72.0
Specimen length [mm]	142.0
Unit weight [kN/m^3]	19.3
Water content [%]	32
Membrane thickness [mm]	0.3
Membrane correction [kPa]	2.1
Strain Rate [%/h]	58.8
FAILURE CONDITIONS	
Cell pressure [kPa]	1312
Undrained shear strength, s_u [kPa]	72
Axial strain at 50% of max deviator stress, ε_{50} [%]	3.3
Young's modulus at 50% of max deviator stress, E_{50} [MPa]	2.2
Axial strain at failure, ε_f [%]	20.0
Failure type	Bulge failure

Sample : 21-3
Test depth : 19.8 m
Visual identification : stiff medium strength very dark grey (2.5Y 3/1) calcareous CLAY
Test method : ISO 17892-8 (2018)

TOPAZ / UU-triaxial test results / 2025-08-28 13:36:02 +02:00

Uu-Triaxial Test Results
Z4_OWF_BH17-SAMP


PROJECT NO. : F254727 DGEC
PROJECT TITLE: Golf du Lion GSI
DATE : 18-01-2025
BOREHOLE : Z4_OWF_BH17_SAMP
SAMPLE : WIP 21
DEPTH (m) : 19.80
FUGRO
BOTTOM


PROJECT NO. : F254727 DGEC
PROJECT TITLE: Golf du Lion GSI
DATE : 18-01-2025
BOREHOLE : Z4_OWF_BH17_SAMP
SAMPLE : WIP 21
DEPTH (m) : 19.80
FUGRO
BOTTOM

Location	Sample ID	Depth BSF [m]	Specimen Condition	w [%]	ρ [Mg/m^3]	ρ_d [Mg/m^3]	S_r [%]	P_c [kPa]	s_u [kPa]	ε_{50} [%]	ε_f [%]
Z4_OWF_BH01-SAMP	18-4	17.10	REMOULDED	23.0	2.01	1.64	96	1342	25	8.02	20.03
Z4_OWF_BH01-SAMP	20-2	18.70	UNDISTURBED	28.5	2.04	1.59	100	1374	28	4.50	16.21
Z4_OWF_BH01-SAMP	20-2	18.70	REMOULDED	27.2	1.96	1.54	97	1374	11	6.67	20.01
Z4_OWF_BH05-SAMP	16-3	14.50	REMOULDED	26.9	1.98	1.56	99	1198	14	5.98	20.02
Z4_OWF_BH15-COMP	06-3	17.45	REMOULDED	27.7	1.96	1.54	99	1261	26	6.50	20.02
Z4_OWF_BH17-SAMP	19-4	18.25	REMOULDED	23.4	2.00	1.62	95	1300	12	8.86	20.03
Z4_OWF_BH17-SAMP	21-3	19.80	REMOULDED	31.7	1.89	1.44	98	1331	15	7.50	20.03

Notes

BSF : Below seafloor
w : Water content
S_r : Degree of saturation
ρ : Bulk density
ρ_d : Dry density
s_u : Undrained shear strength
ε_{50} : Axial strain at 50 % of maximum deviator stress
P_c : Cell pressure
ε_f : Axial strain at failure

TOPAZ / UU Summary of UU triaxial tests (From Tabular data) (FFSA) / 2025-08-28 10:30:11 +02:00

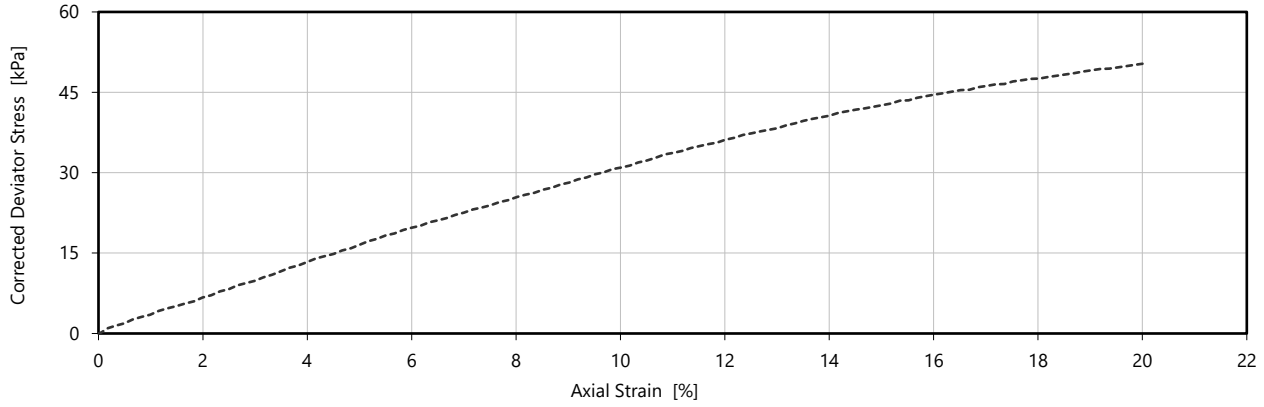
Summary of Unconsolidated Undrained Triaxial Test Results

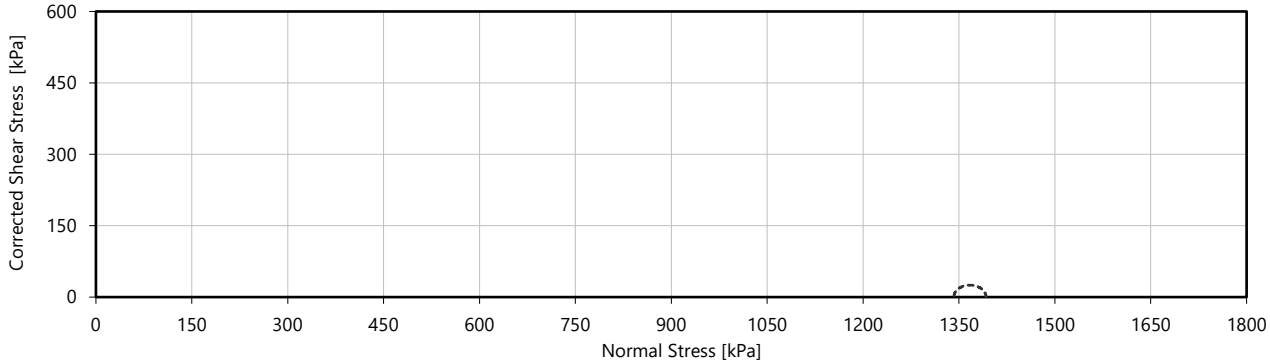
LABORATORY TEST CERTIFICATE
Unconsolidated Undrained Triaxial Test

BS EN ISO 17892-8:2018

1483

Project Reference	F254727			Location ID	Z4_OWF_BH01-SAMP
Project Name	Golfe du Lion			Depth Top [m]	17.10
Specimen Description	Grey slightly sandy CLAY			Sample Type	B
Specimen Reference		Specimen Depth [m]		Sample Reference	18-4





Test number	1		
Specimen Preparation	REMOULDED		
Length [mm]	144.53		
Diameter [mm]	70.20		
Bulk Density [Mg/m³]	2.013		
Specimen Water Content [%]	23.0		
Failure Surface Water Content [%]			
Dry Density [Mg/m³]	1.636		
Initial Voids Ratio	0.650		
Degree of Saturation [%]	96		
Application of Deviator Stress			
Cell Pressure [kPa]	1342		
Specimen Height [mm]	142.76		
Mean Rate of Shear [mm/min]	2.89		
Peak Values			
Undrained Shear Strength [kPa]	25		
Strain at Failure [%]	20.0		
Failure Mode	Plastic		

Issue Date	14/04/2025	Certificate Reference	Issue 1	Authorised By	huntc
Client	DGEC			Authorised Date	14/04/2025 10:58
Remarks	Prepared to maximum achievable density				

Fugro GB Limited. Unit 43, Number One Industrial Estate, Medomsley Road, Consett, DH8 6TW

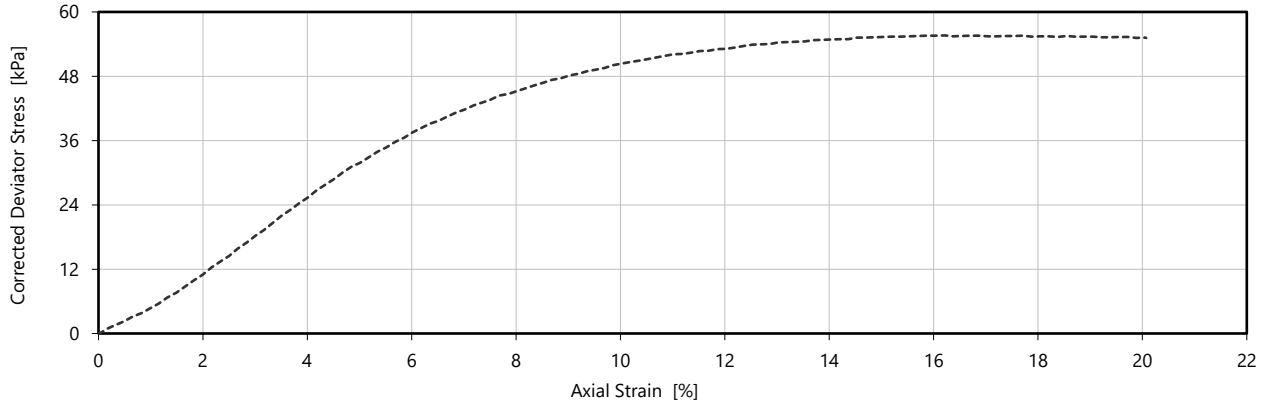
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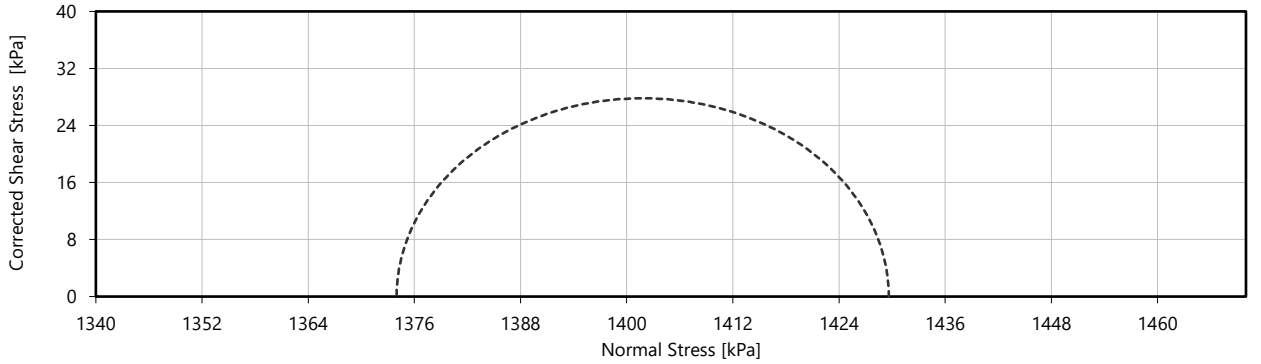
LABORATORY TEST CERTIFICATE
Unconsolidated Undrained Triaxial Test

BS EN ISO 17892-8:2018

1483

Project Reference	F254727			Location ID	Z4_OWF_BH01-SAMP
Project Name	Golfe du Lion			Depth Top [m]	18.70
Specimen Description	Soft grey slightly sandy CLAY			Sample Type	Wax
Specimen Reference	1	Specimen Depth [m]	18.72	Sample Reference	20-2





Test number	1		
Specimen Preparation	UNDISTURBED		
Length [mm]	139.84		
Diameter [mm]	73.32		
Bulk Density [Mg/m³]	2.038		
Specimen Water Content [%]	28.5		
Failure Surface Water Content [%]			
Dry Density [Mg/m³]	1.586		
Initial Voids Ratio	0.702		
Degree of Saturation [%]	100		
Application of Deviator Stress			
Cell Pressure [kPa]	1374		
Specimen Height [mm]	137.78		
Mean Rate of Shear [mm/min]	2.80		
Peak Values			
Undrained Shear Strength [kPa]	28		
Strain at Failure [%]	16.2		
Failure Mode	Plastic		

Issue Date	28/08/2025	Certificate Reference	Issue 2	Authorised By	lindsayc
Client	DGEC			Authorised Date	28/08/2025 09:35
Remarks					

Fugro GB Limited. Unit 43, Number One Industrial Estate, Medomsley Road, Consett, DH8 6TW

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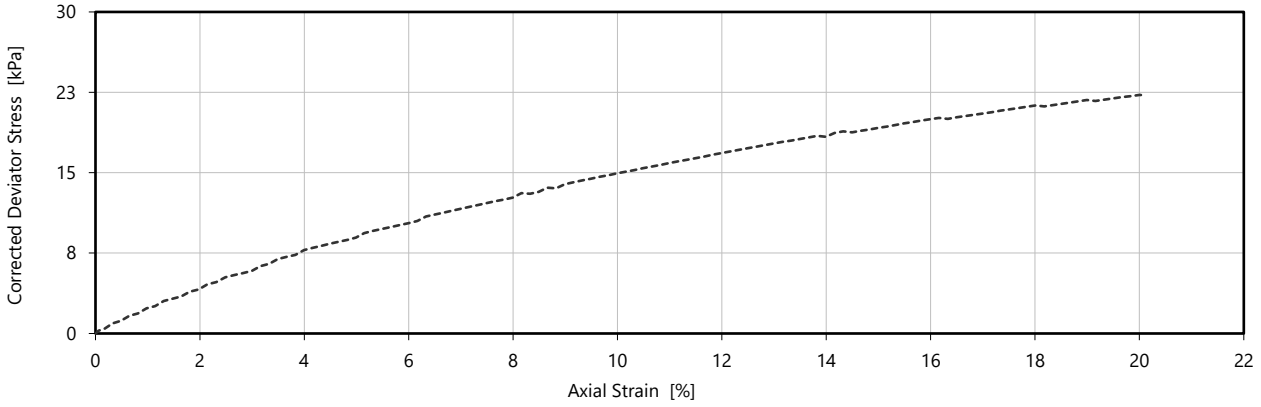
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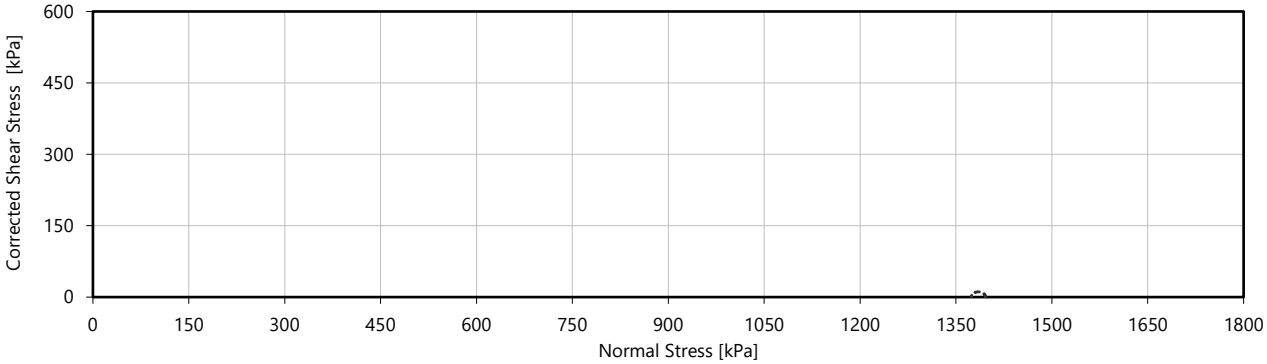
LABORATORY TEST CERTIFICATE
Unconsolidated Undrained Triaxial Test

BS EN ISO 17892-8:2018

1483

Project Reference	F254727			Location ID	Z4_OWF_BH01-SAMP
Project Name	Golfe du Lion			Depth Top [m]	18.70
Specimen Description	Grey slightly sandy CLAY			Sample Type	Wax
Specimen Reference	2	Specimen Depth [m]		Sample Reference	20-2





Test number	1		
Specimen Preparation	REMOULDED		
Length [mm]	144.53		
Diameter [mm]	70.20		
Bulk Density [Mg/m³]	1.955		
Specimen Water Content [%]	27.2		
Failure Surface Water Content [%]			
Dry Density [Mg/m³]	1.537		
Initial Voids Ratio	0.756		
Degree of Saturation [%]	97		
Application of Deviator Stress			
Cell Pressure [kPa]	1374		
Specimen Height [mm]	139.91		
Mean Rate of Shear [mm/min]	2.89		
Peak Values			
Undrained Shear Strength [kPa]	11		
Strain at Failure [%]	20.0		
Failure Mode	Plastic		

Issue Date	14/04/2025	Certificate Reference	Issue 1	Authorised By	huntc
Client	DGEC			Authorised Date	14/04/2025 10:59
Remarks	Prepared to maximum achievable density				

Fugro GB Limited. Unit 43, Number One Industrial Estate, Medomsley Road, Consett, DH8 6TW

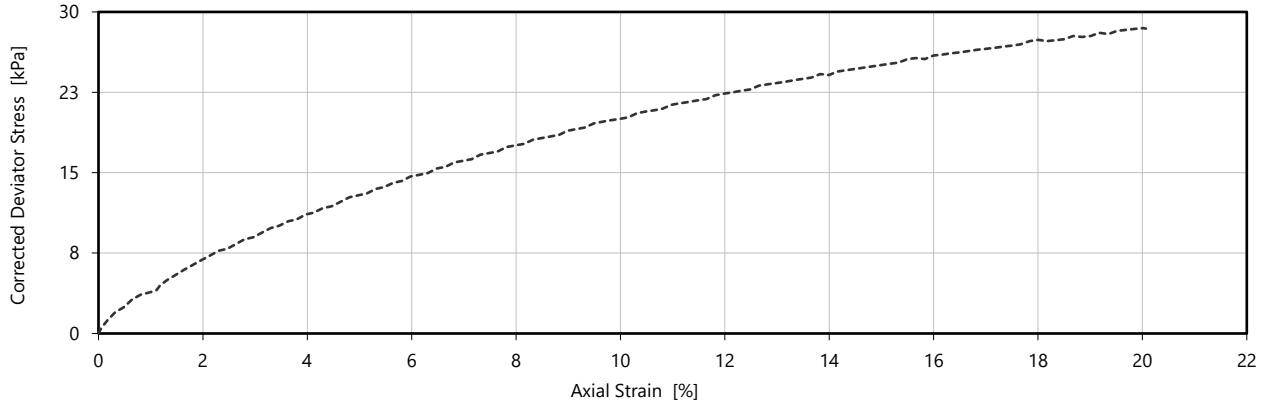
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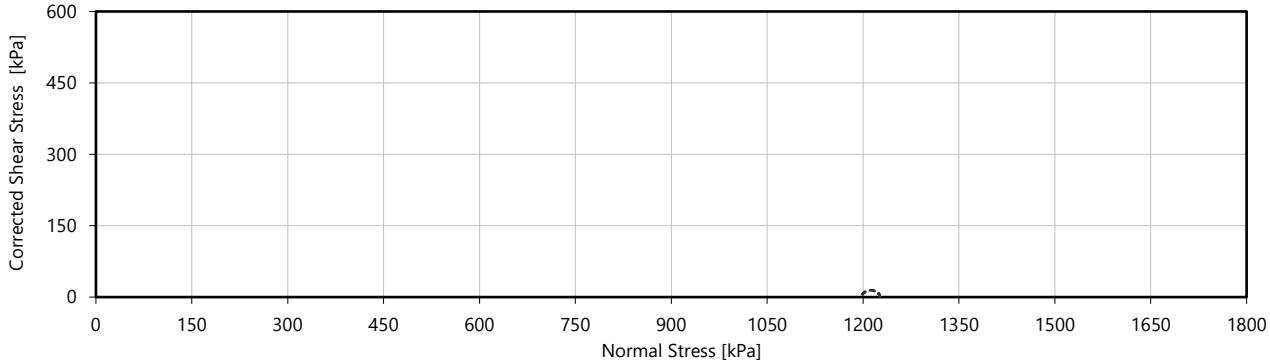
LABORATORY TEST CERTIFICATE
Unconsolidated Undrained Triaxial Test

BS EN ISO 17892-8:2018

1483

Project Reference	F254727			Location ID	Z4_OWF_BH05-SAMP
Project Name	Golfe du Lion			Depth Top [m]	14.50
Specimen Description	Grey slightly sandy CLAY			Sample Type	B
Specimen Reference		Specimen Depth [m]		Sample Reference	16-3





Test number	1		
Specimen Preparation	REMOULDED		
Length [mm]	144.53		
Diameter [mm]	70.20		
Bulk Density [Mg/m³]	1.978		
Specimen Water Content [%]	26.9		
Failure Surface Water Content [%]			
Dry Density [Mg/m³]	1.559		
Initial Voids Ratio	0.732		
Degree of Saturation [%]	99		
Application of Deviator Stress			
Cell Pressure [kPa]	1198		
Specimen Height [mm]	141.12		
Mean Rate of Shear [mm/min]	2.89		
Peak Values			
Undrained Shear Strength [kPa]	14		
Strain at Failure [%]	20.0		
Failure Mode	Plastic		

Issue Date	14/04/2025	Certificate Reference	Issue 1	Authorised By	huntc
Client	DGEC			Authorised Date	09/04/2025 16:09
Remarks					

Fugro GB Limited. Unit 43, Number One Industrial Estate, Medomsley Road, Consett, DH8 6TW

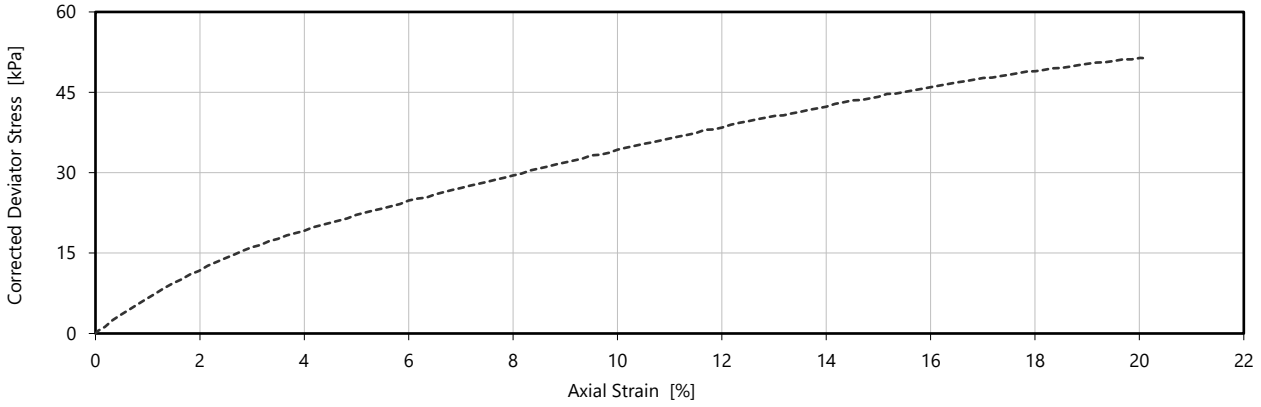
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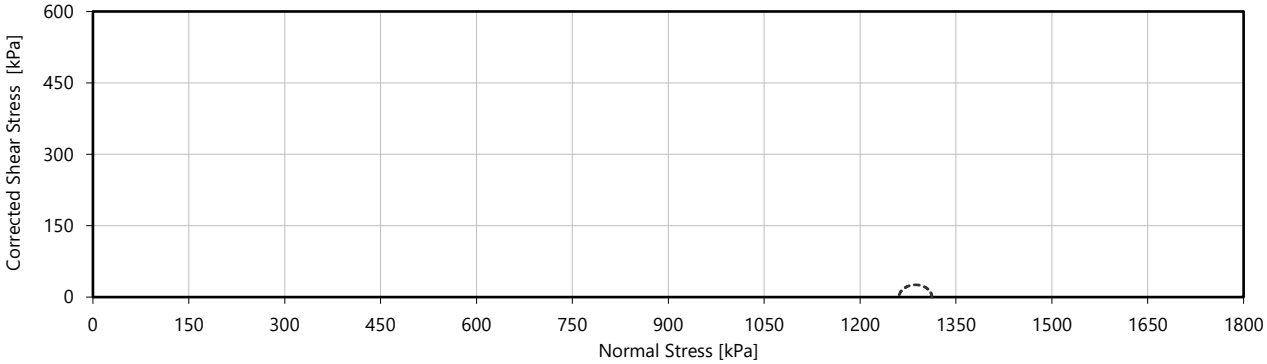
LABORATORY TEST CERTIFICATE
Unconsolidated Undrained Triaxial Test

BS EN ISO 17892-8:2018

1483

Project Reference	F254727			Location ID	Z4_OWF_BH15-COMP
Project Name	Golfe du Lion			Depth Top [m]	17.45
Specimen Description	Grey slightly sandy CLAY with occasional shell fragments			Sample Type	B
Specimen Reference		Specimen Depth [m]		Sample Reference	06-3





Test number	1		
Specimen Preparation	REMOULDED		
Length [mm]	144.53		
Diameter [mm]	70.20		
Bulk Density [Mg/m³]	1.961		
Specimen Water Content [%]	27.7		
Failure Surface Water Content [%]			
Dry Density [Mg/m³]	1.536		
Initial Voids Ratio	0.758		
Degree of Saturation [%]	99		
Application of Deviator Stress			
Cell Pressure [kPa]	1261		
Specimen Height [mm]	136.62		
Mean Rate of Shear [mm/min]	2.89		
Peak Values			
Undrained Shear Strength [kPa]	26		
Strain at Failure [%]	20.0		
Failure Mode	Plastic		

Issue Date	14/04/2025	Certificate Reference	Issue 1	Authorised By	huntc
Client	DGEC			Authorised Date	09/04/2025 16:13
Remarks					

Fugro GB Limited. Unit 43, Number One Industrial Estate, Medomsley Road, Consett, DH8 6TW

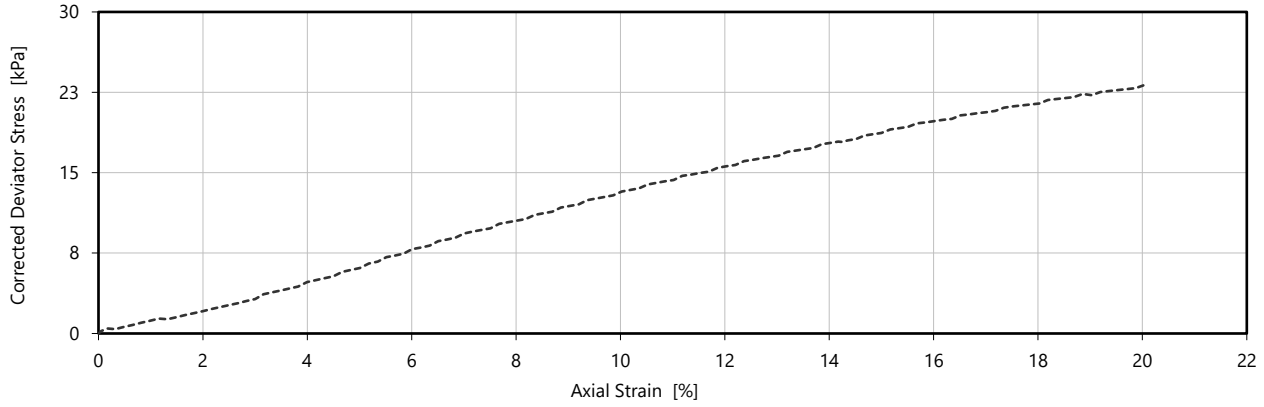
Testing was performed at the Fugro GB Limited laboratory at the address shown above. Results relate only to the sample tested, having been authorised by persons qualified to do so. Opinions and interpretations are outside the scope of accreditation. Unless stated otherwise the sample was tested in the condition it was received at the laboratory.

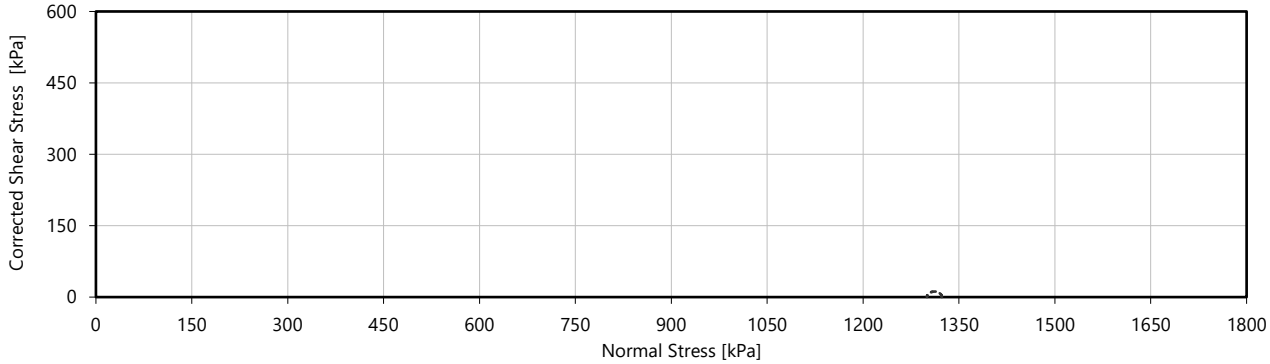
LABORATORY TEST CERTIFICATE
Unconsolidated Undrained Triaxial Test

BS EN ISO 17892-8:2018

1483

Project Reference	F254727			Location ID	Z4_OWF_BH17-SAMP
Project Name	Golfe du Lion			Depth Top [m]	18.25
Specimen Description	Grey slightly sandy CLAY with occasional shell fragments			Sample Type	B
Specimen Reference		Specimen Depth [m]		Sample Reference	19-4





Test number	1		
Specimen Preparation	REMOULDED		
Length [mm]	137.00		
Diameter [mm]	70.20		
Bulk Density [Mg/m³]	1.999		
Specimen Water Content [%]	23.4		
Failure Surface Water Content [%]			
Dry Density [Mg/m³]	1.619		
Initial Voids Ratio	0.667		
Degree of Saturation [%]	95		
Application of Deviator Stress			
Cell Pressure [kPa]	1300		
Specimen Height [mm]	134.98		
Mean Rate of Shear [mm/min]	2.74		
Peak Values			
Undrained Shear Strength [kPa]	12		
Strain at Failure [%]	20.0		
Failure Mode	Plastic		

Issue Date	14/04/2025	Certificate Reference	Issue 1	Authorised By	huntc
Client	DGEC			Authorised Date	10/04/2025 16:46
Remarks					

Fugro GB Limited. Unit 43, Number One Industrial Estate, Medomsley Road, Consett, DH8 6TW

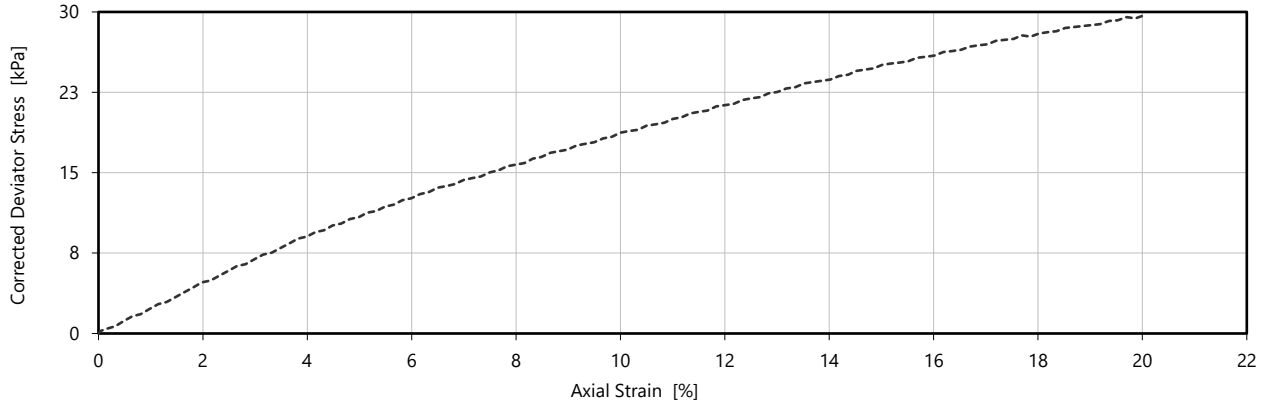
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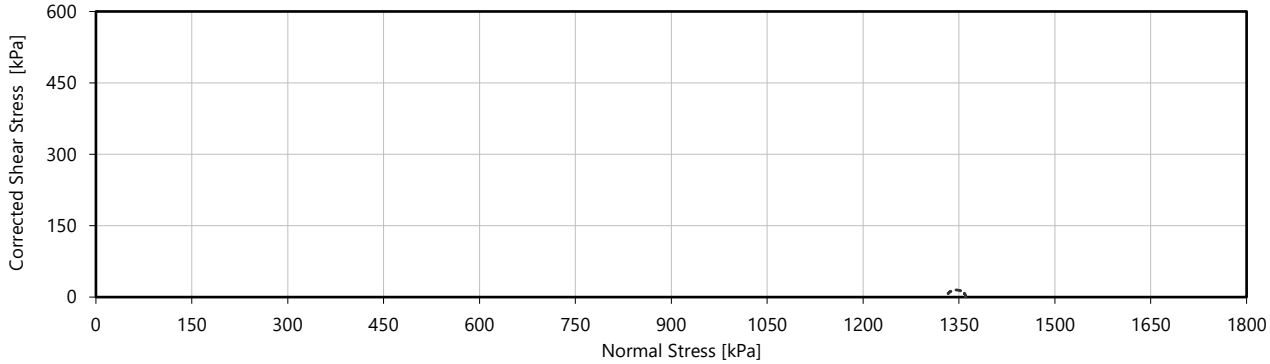
LABORATORY TEST CERTIFICATE
Unconsolidated Undrained Triaxial Test

BS EN ISO 17892-8:2018

1483

Project Reference	F254727			Location ID	Z4_OWF_BH17-SAMP
Project Name	Golfe du Lion			Depth Top [m]	19.80
Specimen Description	Grey slightly sandy CLAY			Sample Type	B
Specimen Reference		Specimen Depth [m]		Sample Reference	21-3





Test number	1		
Specimen Preparation	REMOULDED		
Length [mm]	144.53		
Diameter [mm]	70.20		
Bulk Density [Mg/m³]	1.895		
Specimen Water Content [%]	31.7		
Failure Surface Water Content [%]			
Dry Density [Mg/m³]	1.439		
Initial Voids Ratio	0.876		
Degree of Saturation [%]	98		
Application of Deviator Stress			
Cell Pressure [kPa]	1331		
Specimen Height [mm]	137.54		
Mean Rate of Shear [mm/min]	2.89		
Peak Values			
Undrained Shear Strength [kPa]	15		
Strain at Failure [%]	20.0		
Failure Mode	Plastic		

Issue Date	14/04/2025	Certificate Reference	Issue 1	Authorised By	huntc
Client	DGEC			Authorised Date	14/04/2025 10:59
Remarks	Prepared to maximum achievable density				

Fugro GB Limited. Unit 43, Number One Industrial Estate, Medomsley Road, Consett, DH8 6TW

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Location	Sample ID	Depth BSF [m]	Test Type	Specimen Condition	Initial Conditions*							Consolidation Stage†							
					D [mm]	h [mm]	w [%]	ρ [Mg/m^3]	ρ_d [Mg/m^3]	e_0 [-]	S_r [%]	w [%]	ρ [Mg/m^3]	ρ_d [Mg/m^3]	e [-]	σ'_{rc} [kPa]	σ'_{vc} [kPa]	ε_{vol} [%]	ε_v [%]
Z4_OWF_BH01-SAMP	17-2	15.67	CIU08	Undisturbed	73.3	133.9	25.3	2.02	1.62	0.672	100	21.9	2.08	1.71	0.581	101	101	5.43	2.35
Z4_OWF_BH01-SAMP	21-2	19.77	CIU09	Undisturbed	72.0	137.5	24.7	2.08	1.67	0.619	100	22.7	2.12	1.72	0.566	116	116	3.25	1.00
Z4_OWF_BH05-SAMP	18-2	16.20	CIU10	Undisturbed	72.2	135.7	27.5	2.00	1.57	0.718	100	23.7	2.07	1.67	0.617	109	109	5.91	1.94
Z4_OWF_BH15-COMP	07-3	18.38	CIU11	Undisturbed	71.5	138.3	24.4	2.05	1.65	0.635	100	22.5	2.09	1.70	0.584	127	127	3.12	1.13
Z4_OWF_BH17-SAMP	20-2	18.62	CIU12	Undisturbed	72.4	138.8	30.1	1.99	1.53	0.768	100	27.0	1.98	1.56	0.729	115	115	2.22	0.69
Z4_OWF_BH17-SAMP	21-2	19.65	CIU13	Undisturbed	69.0	140.2	29.3	1.93	1.50	0.804	98	26.9	1.97	1.55	0.741	123	122	3.51	1.03

Location	Sample ID	Depth BSF [m]	Test Type	Specimen Condition	Shear Stage				Final Conditions‡				Bender Element	
					q [kPa]	ε_{50} [%]	E_{50} [kPa]	ε_f [%]	w [%]	ρ [Mg/m^3]	ρ_d [Mg/m^3]	e [-]	v_s [m/s]	G_{max} [MPa]
Z4_OWF_BH01-SAMP	17-2	15.67	CIU08	Undisturbed	189	2.46	3841	10.00	21.9	2.08	1.71	0.581	-	-
Z4_OWF_BH01-SAMP	21-2	19.77	CIU09	Undisturbed	183	1.04	8795	10.00	22.7	2.12	1.72	0.566	-	-
Z4_OWF_BH05-SAMP	18-2	16.20	CIU10	Undisturbed	124	0.52	11813	10.00	23.7	2.07	1.67	0.617	-	-
Z4_OWF_BH15-COMP	07-3	18.38	CIU11	Undisturbed	251	1.41	8912	10.00	22.5	2.09	1.70	0.584	-	-
Z4_OWF_BH17-SAMP	20-2	18.62	CIU12	Undisturbed	207	1.99	5215	10.00	27.0	1.98	1.56	0.729	-	-
Z4_OWF_BH17-SAMP	21-2	19.65	CIU13	Undisturbed	186	0.92	10118	10.00	26.9	1.97	1.55	0.741	-	-

Notes

BSF : Below seafloor
* : Specimen conditions after preparation and before saturation
† : Specimen conditions after last consolidation and before shearing
‡ : Specimen conditions after testing
CIU : Isotropically consolidated undrained
CAU : Anisotropically consolidated undrained
c/e : In compression/extension
BE : Bender element measurements

D : Diameter
h : Height
w : Water content
ρ : Bulk density
ρ_d : Dry density
e_0 : Initial void ratio
S_r : Degree of saturation
\- : not recorded/assigned

e : Void ratio
σ'_{rc} : Radial effective consolidation stress
σ'_{vc} : Vertical effective consolidation stress
ε_{vol} : Volumetric strain
ε_v : Vertical strain
q : Deviator stress at failure
ε_{50} : Axial strain at 50 % of q_{max}

E_{50} : Secant modulus at ε_{50}
ε_f : Axial strain at failure
v_s : Shear wave velocity after last consolidation
G_{max} : Small strain shear modulus after last consolidation

TOPAZ / CU Summary Table(Tabular data)(FF5A)_v3 / 2025-08-21 16:46:36 +02:00

Summary of Consolidated Undrained Triaxial Test Results

Test Report
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

UKAS TESTING 0919

Test Identification	
Location	Z4_OWF_BH01-SAMP
Sample	17-2
Depth [m]	15.67
Test number	CIU08

Specimen Visual Description
Firm high strength dark grey sandy CLAY

Initial Specimen Conditions	
Test start date	30/05/2025
Type of sample	Undisturbed
Diameter [mm]	73.3
Height [mm]	133.9
Water content [%]	25.3
Bulk density [Mg/m^3]	2.02
Dry density [Mg/m^3]	1.62
Void ratio [-]	0.672
Degree of saturation [%]	100
Particle density - Assumed [Mg/m^3]	2.70
Torvane [kPa]	-
Pocket penetrometer [kPa]	71
Type of drains	Radial (spiral) & one end only

Test Report
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

0919

Saturation	
Pressure increments applied [kPa]	100
Differential pressure used [kPa]	N/A
Cell pressure [kPa]	1513
Base PWP [kPa]	1511
Mid height PWP [kPa]	-
B value achieved [-]	1.00

Anisotropic Consolidation	
Cell pressure [kPa]	1612
Back pressure [kPa]	1511
Base PWP [kPa]	1511
Mid height PWP [kPa]	-
Effective radial pressure [kPa]	101
Effective axial pressure [kPa]	101
Deviator stress [kPa]	0
Volumetric strain [%]	5.43
Volumetric strain rate - end of stage [%/hr]	0.02
External axial strain [%]	2.35
Local axial strain [%]	-
Local radial strain [%]	-
Water content [%]	21.9
Bulk density [Mg/m^3]	2.08
Dry density [Mg/m^3]	1.71
Void ratio [-]	0.581
Degree of saturation [%]	100

Test Report
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

Shearing Stage	
Initial effective radial pressure [kPa]	101
Initial effective axial pressure [kPa]	101
Rate of strain [%/hour]	0.29
At peak deviator stress	
Corrected deviator stress [kPa]	226
Membrane correction applied [kPa]	5
Drain correction applied [kPa]	0
External axial strain [%]	19.02
Local axial strain [%]	-
Local radial strain [%]	-
Excess base PWP [kPa]	9
Excess mid height PWP [kPa]	-
Effective radial pressure [kPa]	91
Effective axial pressure [kPa]	317
Principal effective stress ratio [-]	3.47
ε_{50} [%]	3.49
Secant modulus (E_{50}) at ε_{50} [kPa]	3232
At peak principal effective stress ratio	
Corrected deviator stress [kPa]	142
Membrane correction applied [kPa]	1
Drain correction applied [kPa]	0
External axial strain [%]	5.37
Local axial strain [%]	-
Local radial strain [%]	-
Excess base PWP [kPa]	53
Excess mid height PWP [kPa]	-
Effective radial pressure [kPa]	48
Effective axial pressure [kPa]	190
Principal effective stress ratio [-]	3.94
At 10% external axial strain	
Corrected deviator stress [kPa]	189
Membrane correction applied [kPa]	2
Drain correction applied [kPa]	0
External axial strain [%]	10.00
Excess base PWP [kPa]	31
Excess mid height PWP [kPa]	-
Effective radial pressure [kPa]	70
Effective axial pressure [kPa]	259
Principal effective stress ratio [-]	3.71
ε_{50} [%]	2.46
Secant modulus (E_{50}) at ε_{50} [kPa]	3841

Project: 503387 Laboratory: Wallingford, UK Approved by: ET - 18/06/2025

UK-MLB-TCH-TP-706 Advanced Triaxial Testing

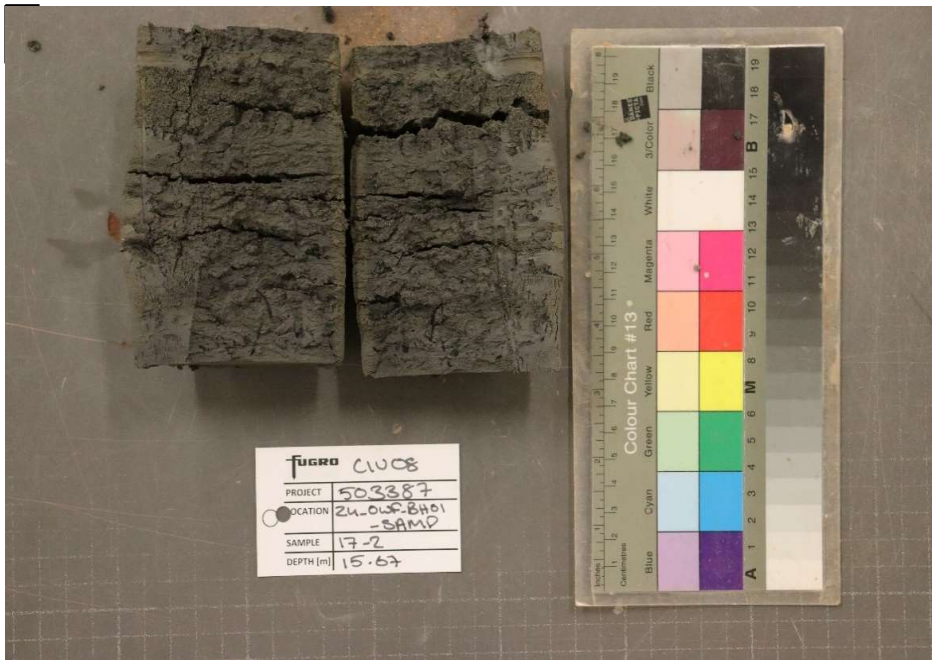
Test Report
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

UKAS TESTING 0919

Specimen Photographs





FINAL CONDITIONS

Water content [%]	21.9
Bulk density [Mg/m^3]	2.08
Dry density [Mg/m^3]	1.71
Void ratio [-]	0.581

Project: 503387 | Laboratory: Wallingford, UK | Approved by: ET - 18/06/2025

UK-MLB-TCH-TP-706 Advanced Triaxial Testing

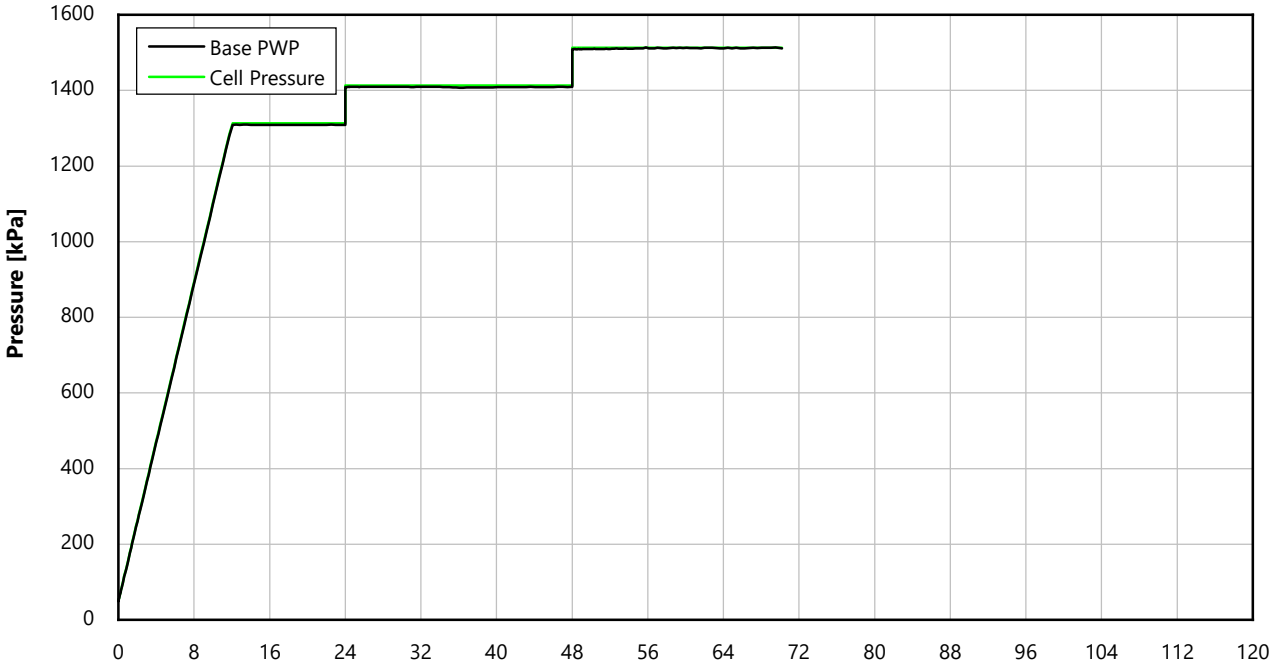
Test Report

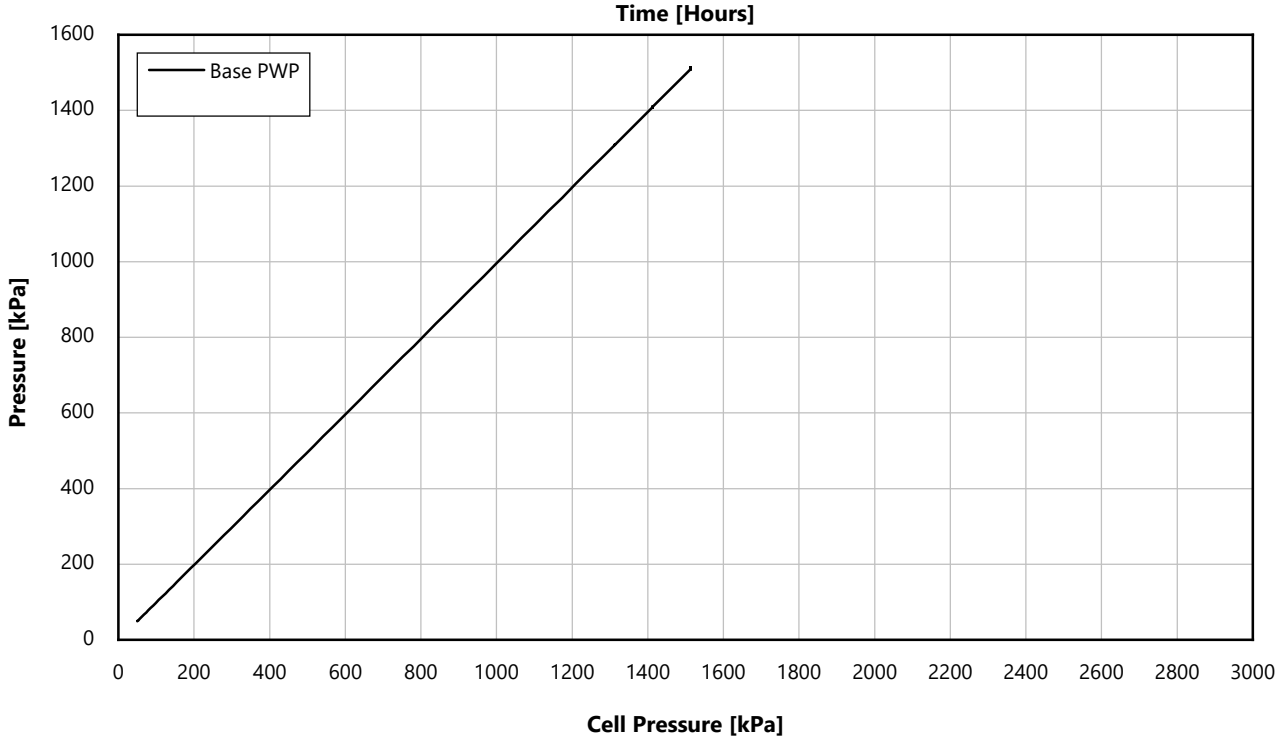
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

UKAS TESTING 0919

Saturation





SATURATION	
B value : 1.00	Initial σ'_a : 0 kPa
	Final σ'_a : 2 kPa

Project: 503387

Laboratory: Wallingford, UK
UK-MLB-TCH-TP-706 Advanced Triaxial Testing

Approved by: ET 18/06/2025

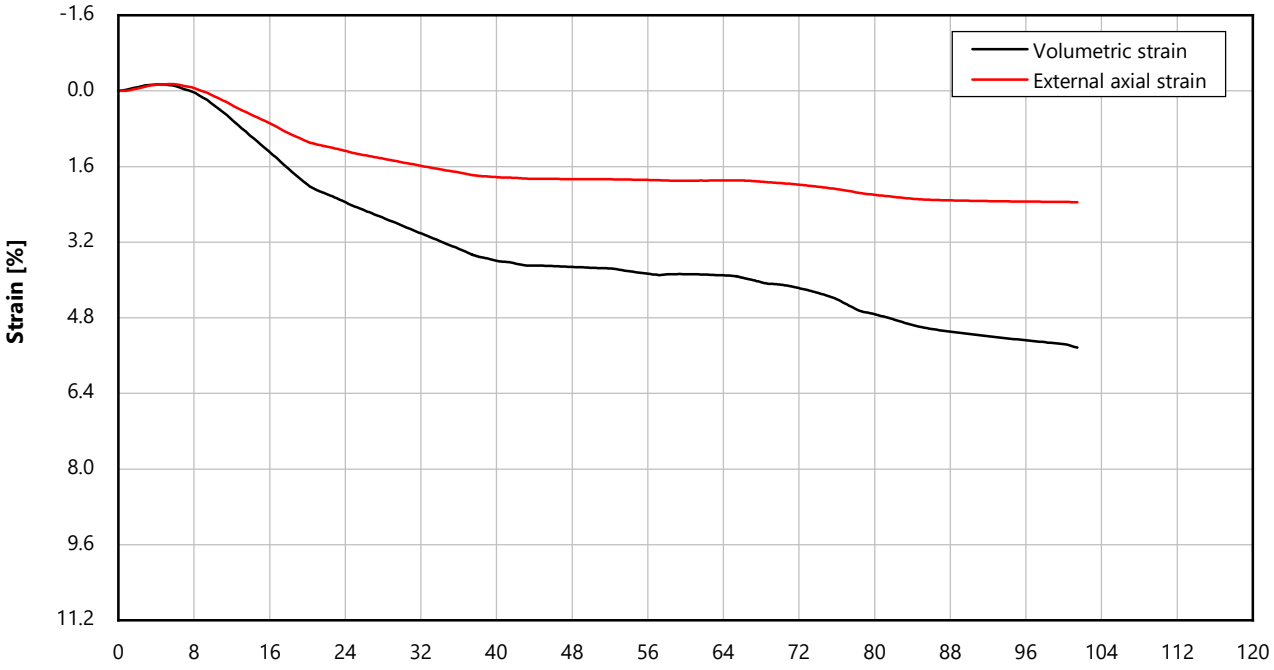
Test Report

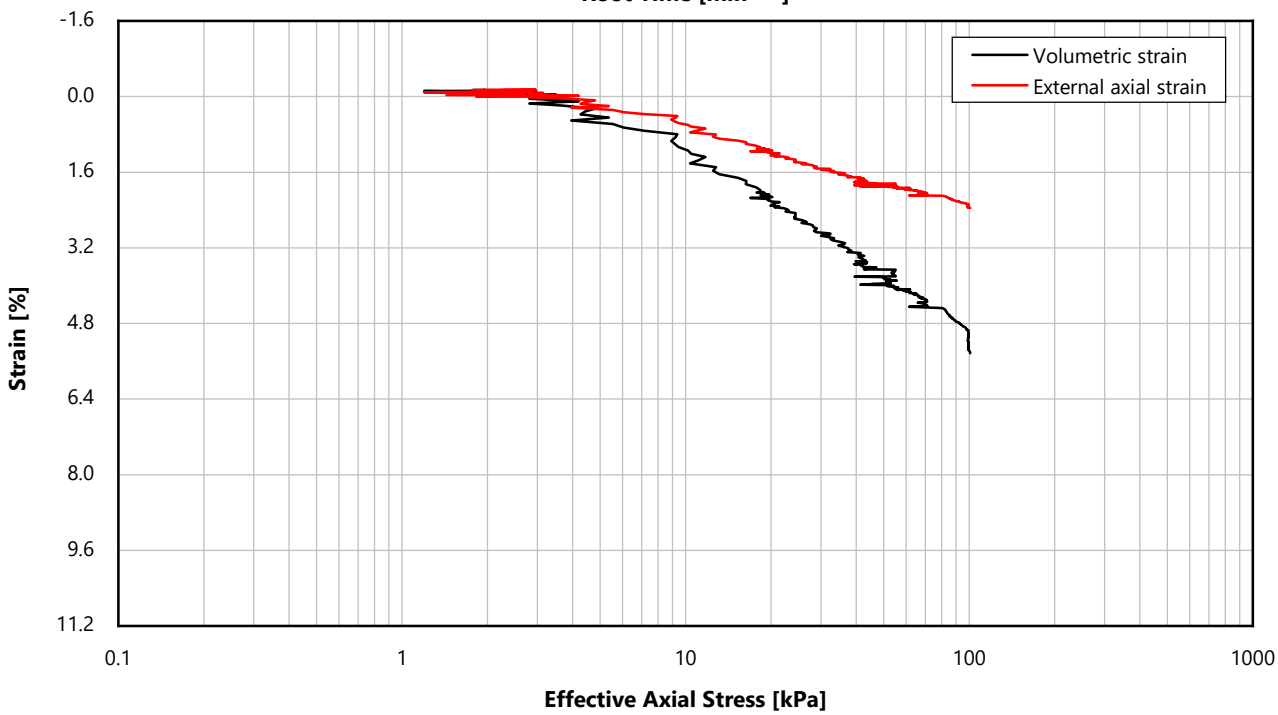
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

0919

Consolidation





CONSOLIDATION
Stage 1 σ'_{rc} : 101 kPa
Stage 1 σ'_{ac} : 101 kPa

Project: 503387

Laboratory: Wallingford, UK
UK-MLB-TCH-TP-706 Advanced Triaxial Testing

Approved by: ET 18/06/2025

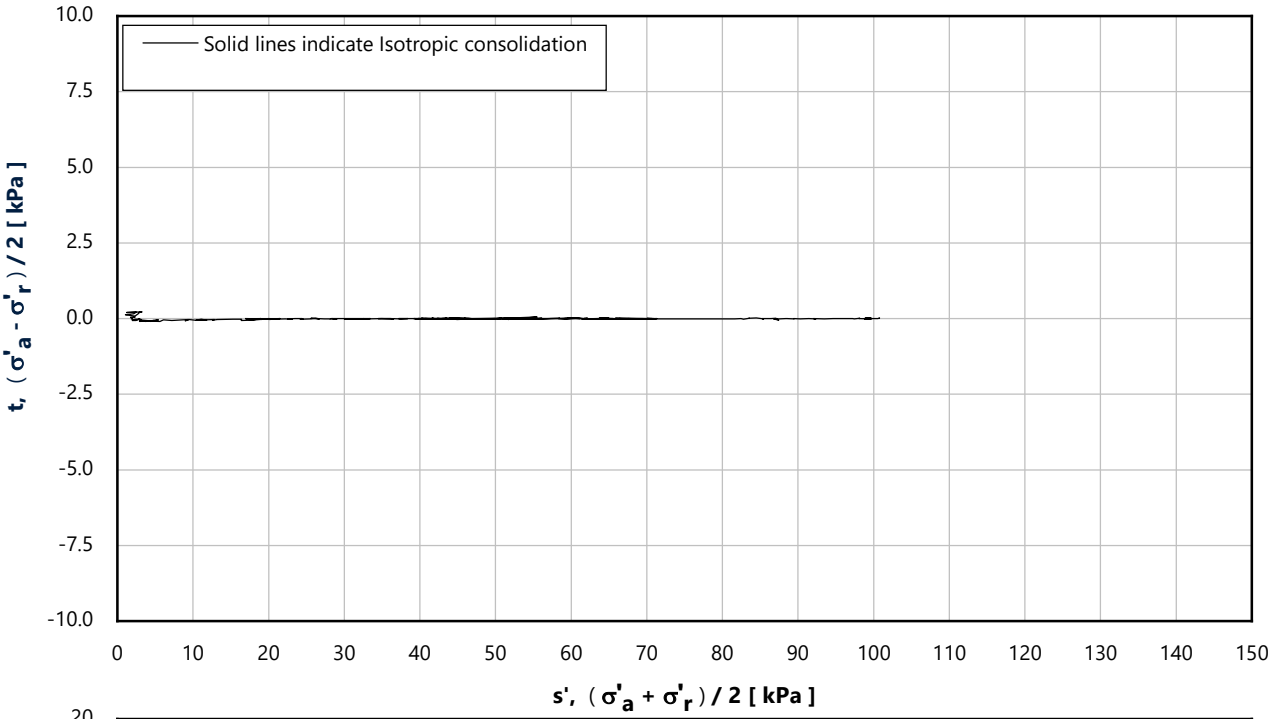
Test Report

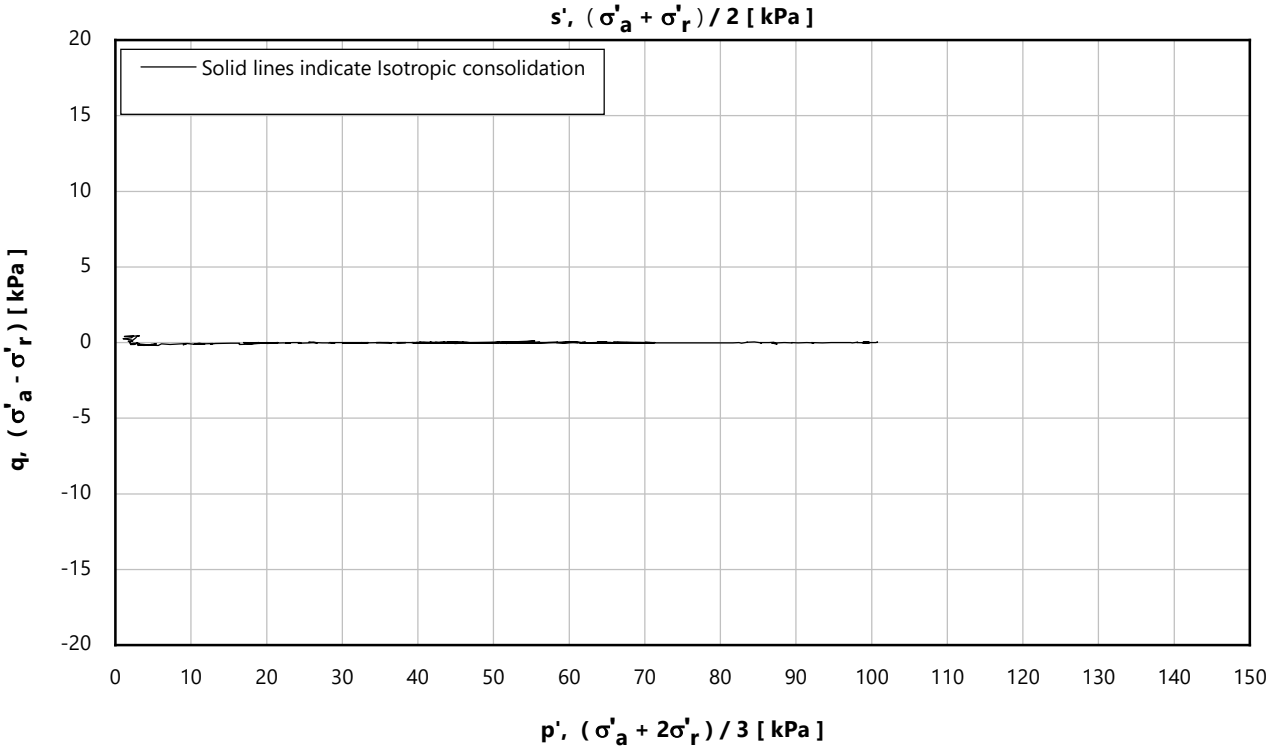
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

0919

Consolidation





CONSOLIDATION	
Stage 1 σ'_{rc}	: 101 kPa
Stage 1 σ'_{ac}	: 101 kPa

Project: 503387

Laboratory: Wallingford, UK
UK-MLB-TCH-TP-706 Advanced Triaxial Testing

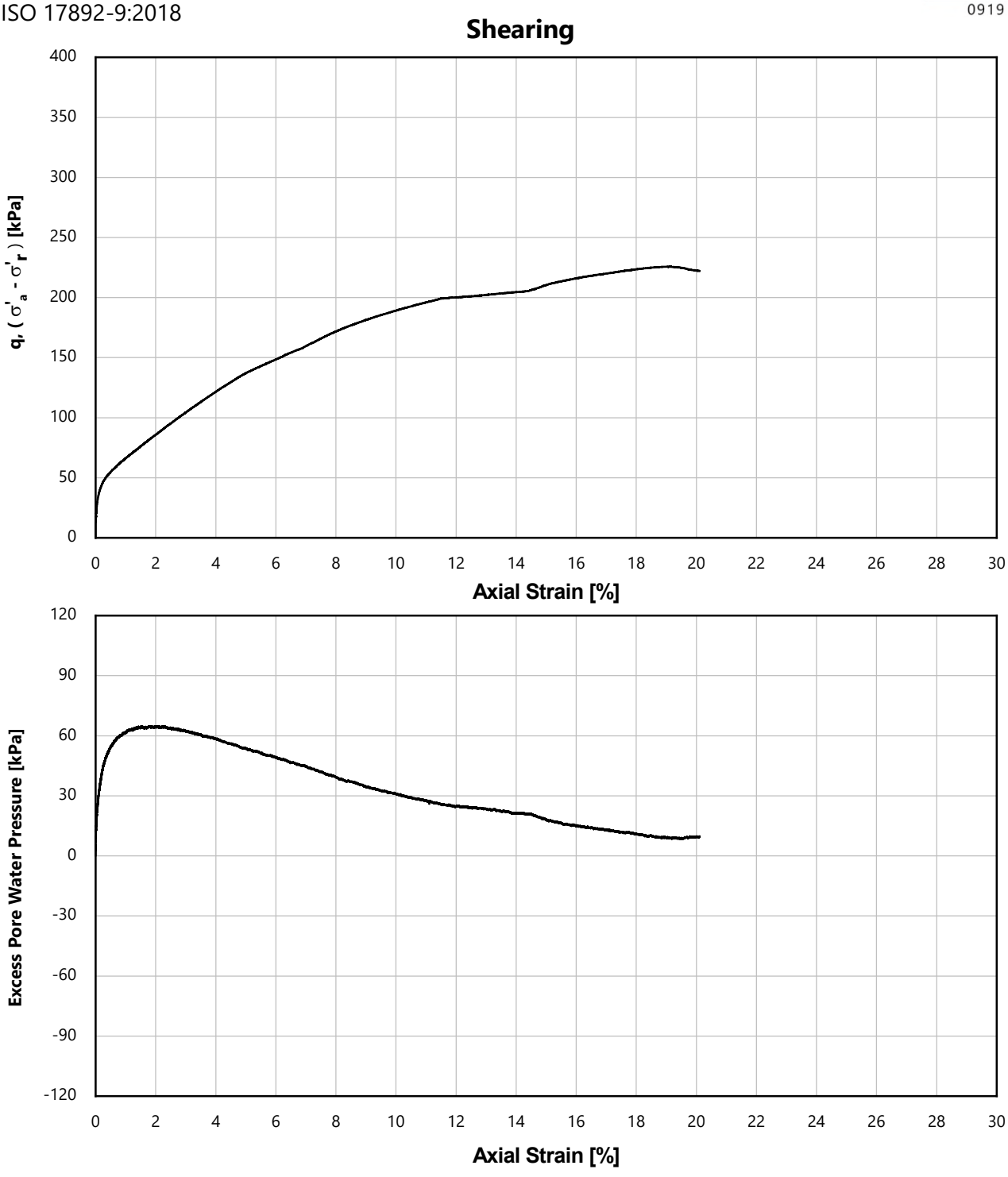
Approved by: ET 18/06/2025

Test Report

Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

UKAS TESTING 0919



SHEAR		
Initial σ'_r : 101 kPa	Rate of strain : 0.29 %/hour	q_{peak} : 226 kPa
Initial σ'_a : 101 kPa	Ext. ε at q_{peak} : 19.02 %	

Project: 503387

Laboratory: Wallingford, UK
UK-MLB-TCH-TP-706 Advanced Triaxial Testing

Approved by: ET 18/06/2025

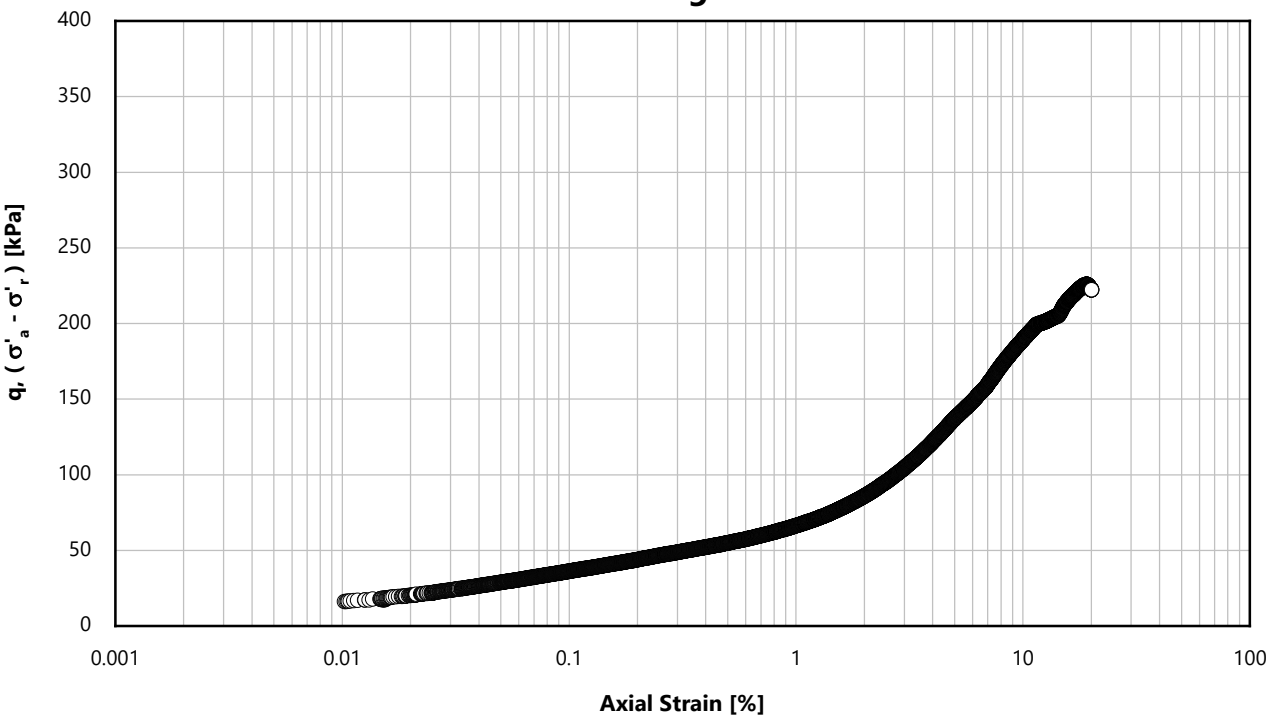
Test Report

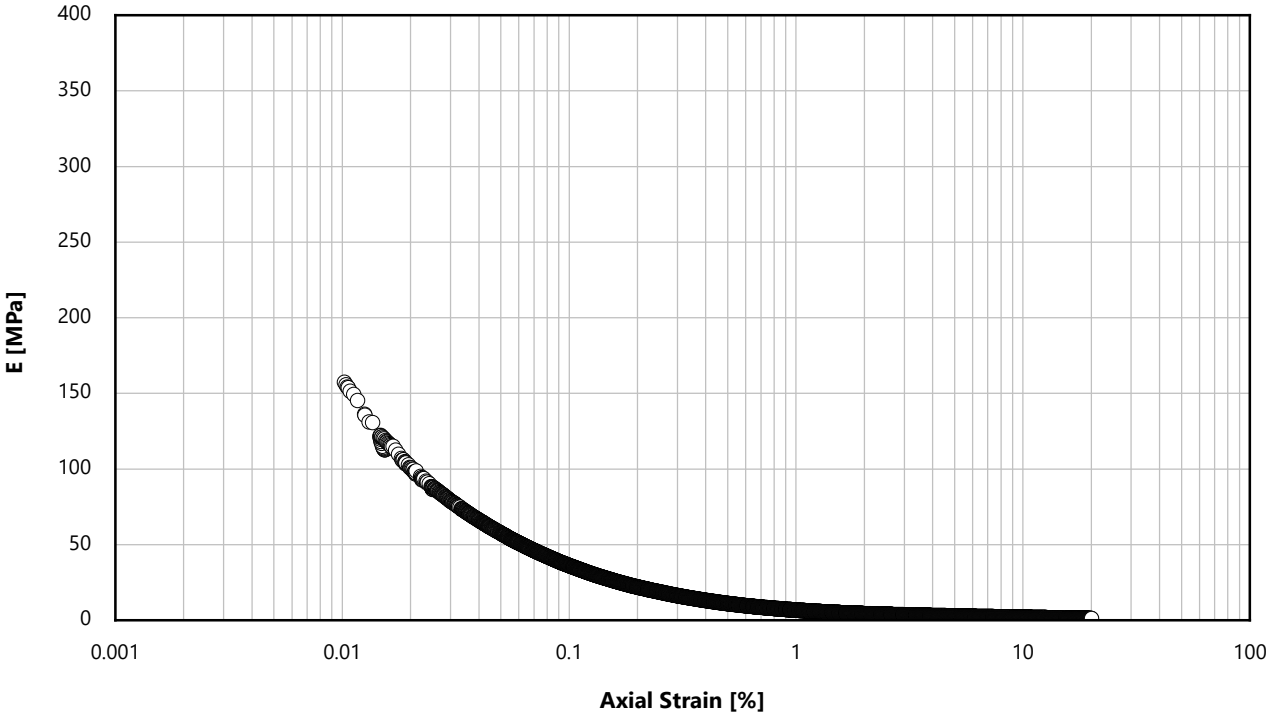
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

UKAS TESTING 0919

Shearing





SHEAR		
Initial σ'_r : 101 kPa	Rate of strain : 0.29 %/hour	q_{peak} : 226 kPa
Initial σ'_a : 101 kPa	Ext. ε at q_{peak} : 19.02 %	

Project: 503387

Laboratory: Wallingford, UK
UK-MLB-TCH-TP-706 Advanced Triaxial Testing

Approved by: ET 18/06/2025

Test Report

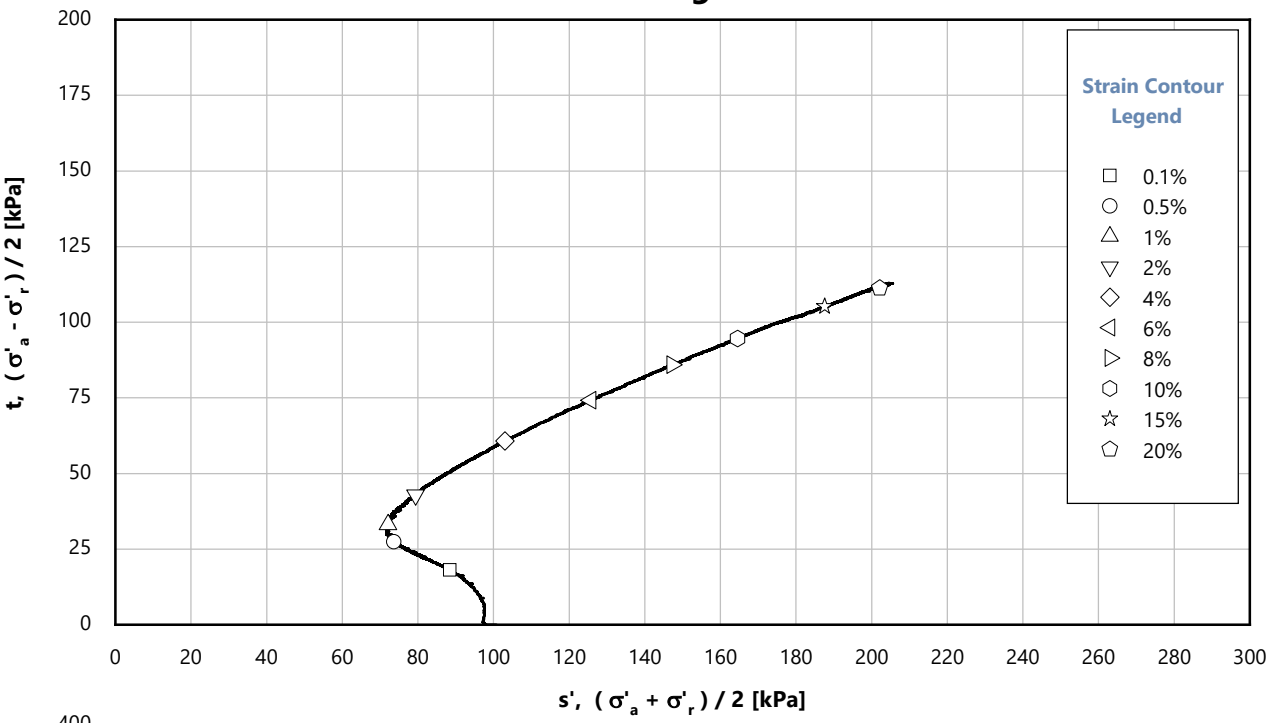
Consolidated Triaxial Compression Test On Water Saturated Soils

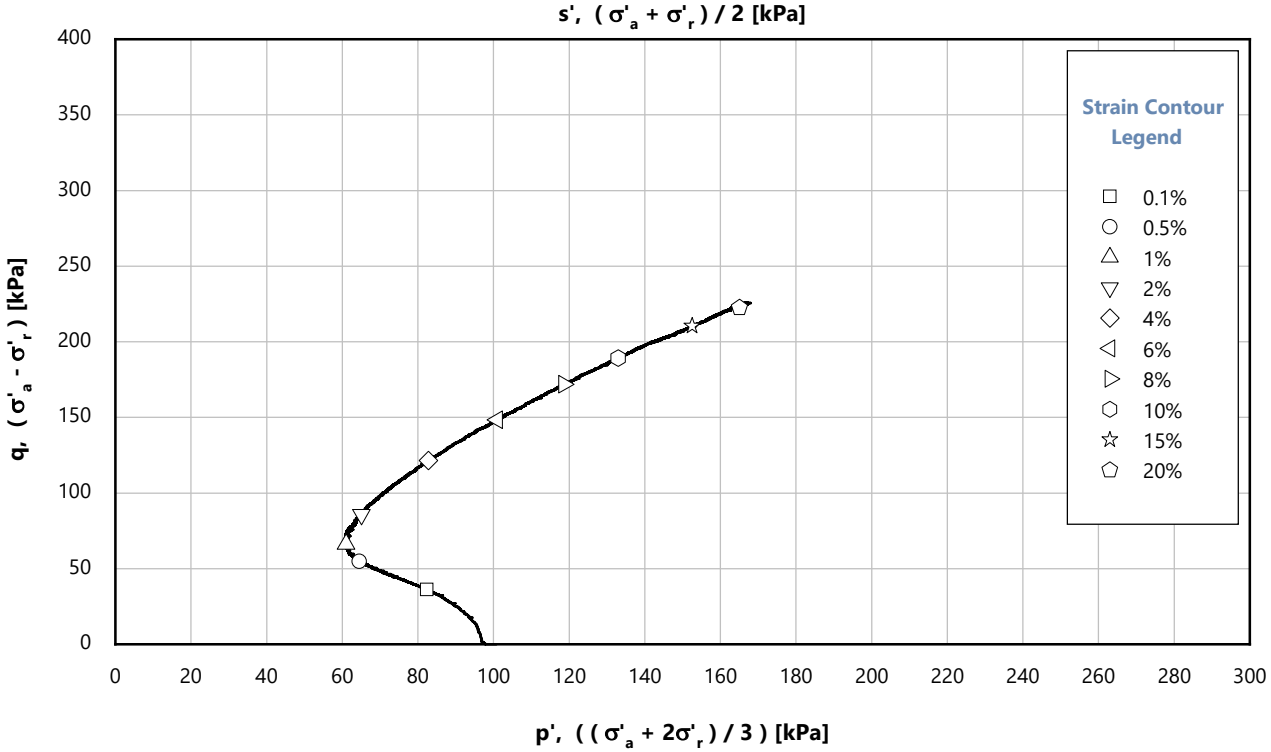
Isotropic, Undrained (CIUc)

ISO 17892-9:2018

UKAS TESTING 0919

Shearing





SHEAR		
Initial σ'_r : 101 kPa	Rate of strain : 0.29 %/hour	q_{peak} : 226 kPa
Initial σ'_a : 101 kPa	Ext. ε at q_{peak} : 19.02 %	

Project: 503387

Laboratory: Wallingford, UK
UK-MLB-TCH-TP-706 Advanced Triaxial Testing

Approved by: ET 18/06/2025

Test Report
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

UKAS TESTING 0919

Test Identification	
Location	Z4_OWF_BH01-SAMP
Sample	21-2
Depth [m]	19.77
Test number	CIU09

Specimen Visual Description
Low strength dark grey slightly sandy CLAY

Initial Specimen Conditions	
Test start date	20/05/2025
Type of sample	Undisturbed
Diameter [mm]	72.0
Height [mm]	137.5
Water content [%]	24.7
Bulk density [Mg/m^3]	2.08
Dry density [Mg/m^3]	1.67
Void ratio [-]	0.619
Degree of saturation [%]	100
Particle density - Assumed [Mg/m^3]	2.70
Torvane [kPa]	37
Pocket penetrometer [kPa]	42
Type of drains	Radial (spiral) & one end only

Project: 503387

Laboratory: Wallingford, UK
UK-MLB-TCH-TP-706 Advanced Triaxial Testing

Approved by: ET - 20/06/2025

Test Report
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

0919

Saturation	
Pressure increments applied [kPa]	100
Differential pressure used [kPa]	N/A
Cell pressure [kPa]	1495
Base PWP [kPa]	1481
Mid height PWP [kPa]	-
B value achieved [-]	1.00

Isotropic Consolidation	
Cell pressure [kPa]	1597
Back pressure [kPa]	1481
Base PWP [kPa]	1481
Mid height PWP [kPa]	-
Effective radial pressure [kPa]	116
Effective axial pressure [kPa]	116
Deviator stress [kPa]	0
Volumetric strain [%]	3.25
Volumetric strain rate - end of stage [%/hr]	0.01
External axial strain [%]	1.00
Local axial strain [%]	-
Local radial strain [%]	-
Water content [%]	22.7
Bulk density [Mg/m^3]	2.12
Dry density [Mg/m^3]	1.72
Void ratio [-]	0.566
Degree of saturation [%]	100

Test Report
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

UKAS TESTING 0919

Shearing Stage	
Initial effective radial pressure [kPa]	116
Initial effective axial pressure [kPa]	116
Rate of strain [%/hour]	0.30
At peak deviator stress	
Corrected deviator stress [kPa]	186
Membrane correction applied [kPa]	3
Drain correction applied [kPa]	0
External axial strain [%]	12.27
Local axial strain [%]	-
Local radial strain [%]	-
Excess base PWP [kPa]	32
Excess mid height PWP [kPa]	-
Effective radial pressure [kPa]	84
Effective axial pressure [kPa]	269
Principal effective stress ratio [-]	3.22
ε_{50} [%]	1.09
Secant modulus (E_{50}) at ε_{50} [kPa]	8485
At peak principal effective stress ratio	
Corrected deviator stress [kPa]	167
Membrane correction applied [kPa]	1
Drain correction applied [kPa]	0
External axial strain [%]	5.22
Local axial strain [%]	-
Local radial strain [%]	-
Excess base PWP [kPa]	45
Excess mid height PWP [kPa]	-
Effective radial pressure [kPa]	71
Effective axial pressure [kPa]	237
Principal effective stress ratio [-]	3.35
At 10% external axial strain	
Corrected deviator stress [kPa]	183
Membrane correction applied [kPa]	2
Drain correction applied [kPa]	0
External axial strain [%]	10.00
Excess base PWP [kPa]	34
Excess mid height PWP [kPa]	-
Effective radial pressure [kPa]	82
Effective axial pressure [kPa]	265
Principal effective stress ratio [-]	3.25
ε_{50} [%]	1.04
Secant modulus (E_{50}) at ε_{50} [kPa]	8795

Project: 503387 Laboratory: Wallingford, UK Approved by: ET - 20/06/2025

UK-MLB-TCH-TP-706 Advanced Triaxial Testing

Test Report

Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

UKAS TESTING 0919

Specimen Photographs

Photograph unavailable

FINAL CONDITIONS

Water content [%]	22.7
Bulk density [Mg/m^3]	2.12
Dry density [Mg/m^3]	1.72
Void ratio [-]	0.566

Project: 503387

Laboratory: Wallingford, UK
UK-MLB-TCH-TP-706 Advanced Triaxial Testing

Approved by: ET - 20/06/2025

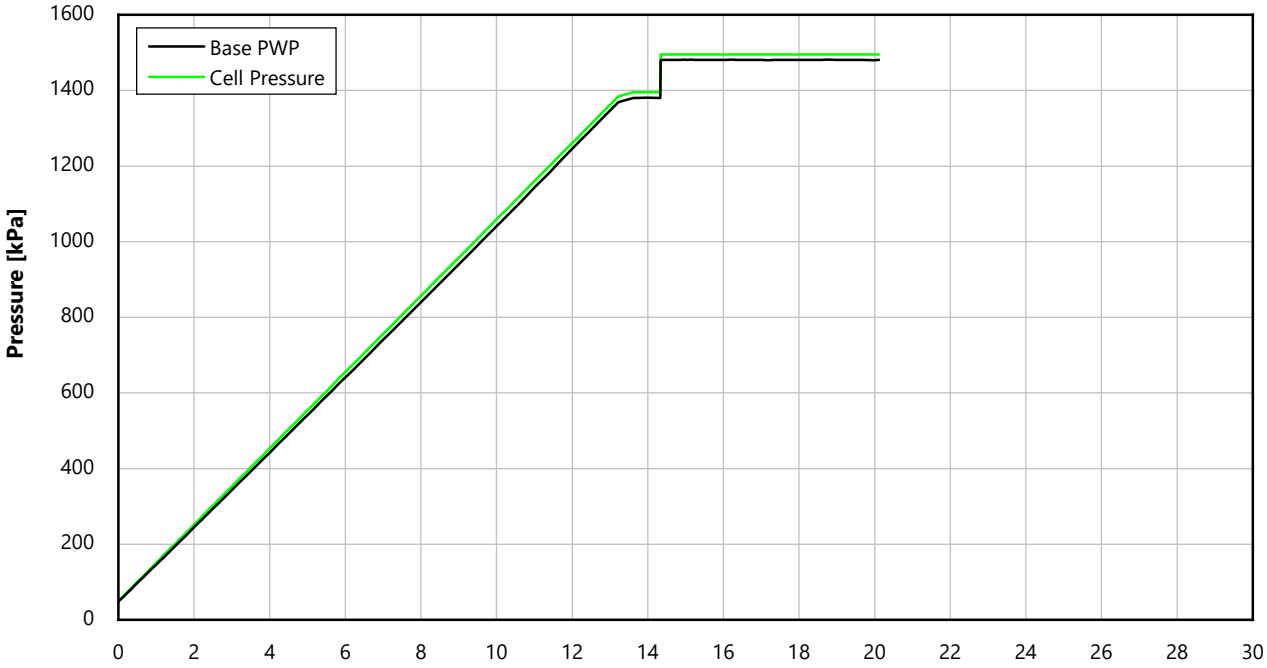
Test Report

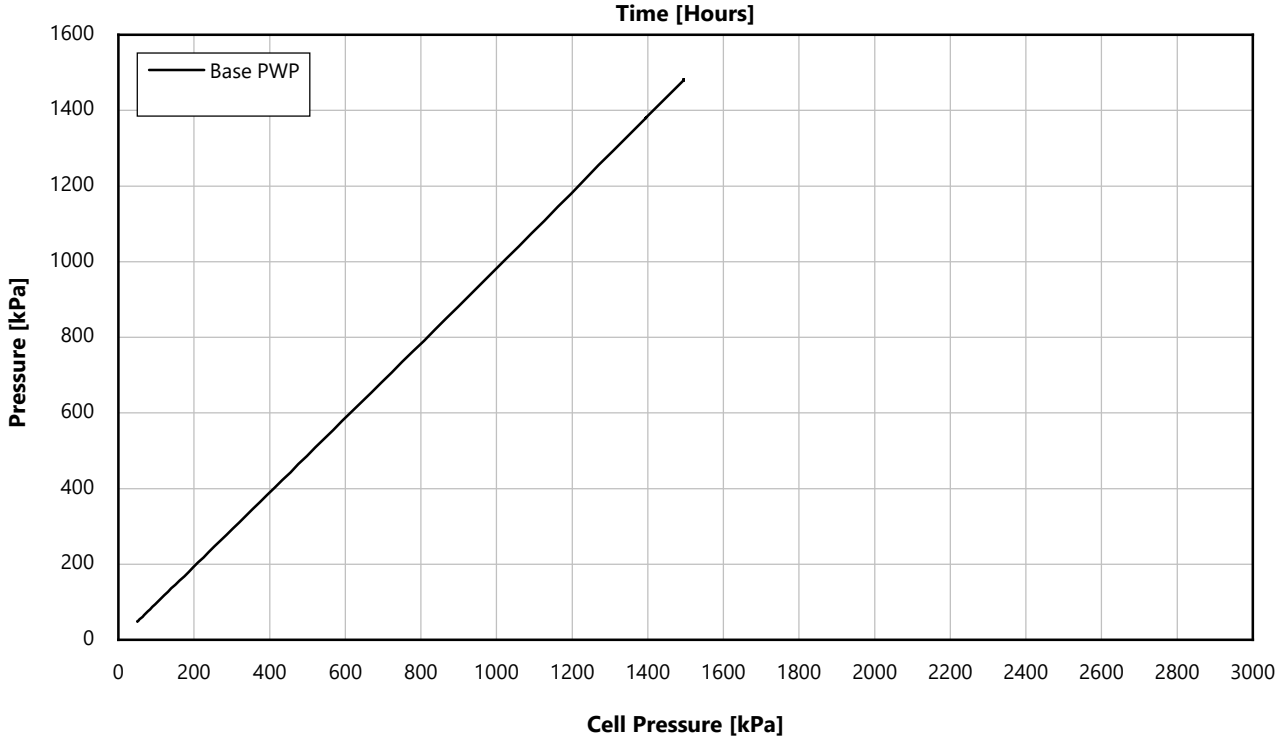
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

UKAS TESTING 0919

Saturation





SATURATION	
B value : 1.00	Initial σ'_a : 1 kPa
	Final σ'_a : 14 kPa

Project: 503387

Laboratory: Wallingford, UK
UK-MLB-TCH-TP-706 Advanced Triaxial Testing

Approved by: ET 20/06/2025

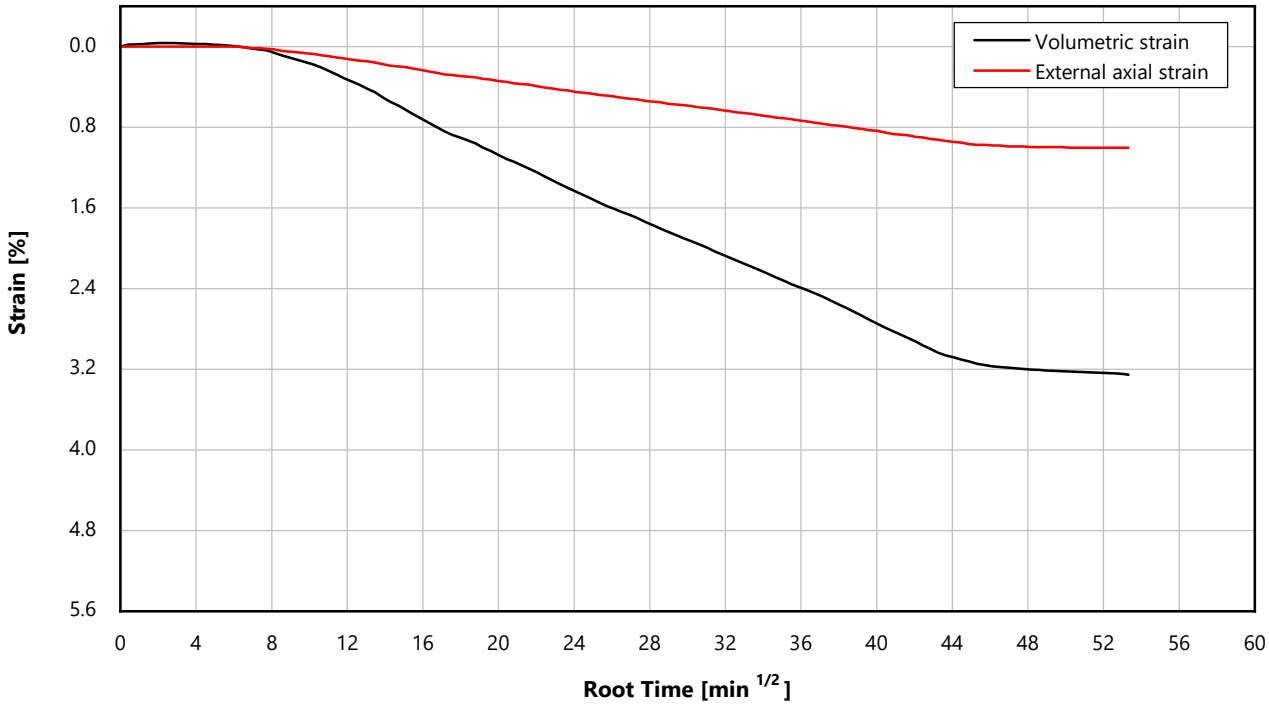
Test Report

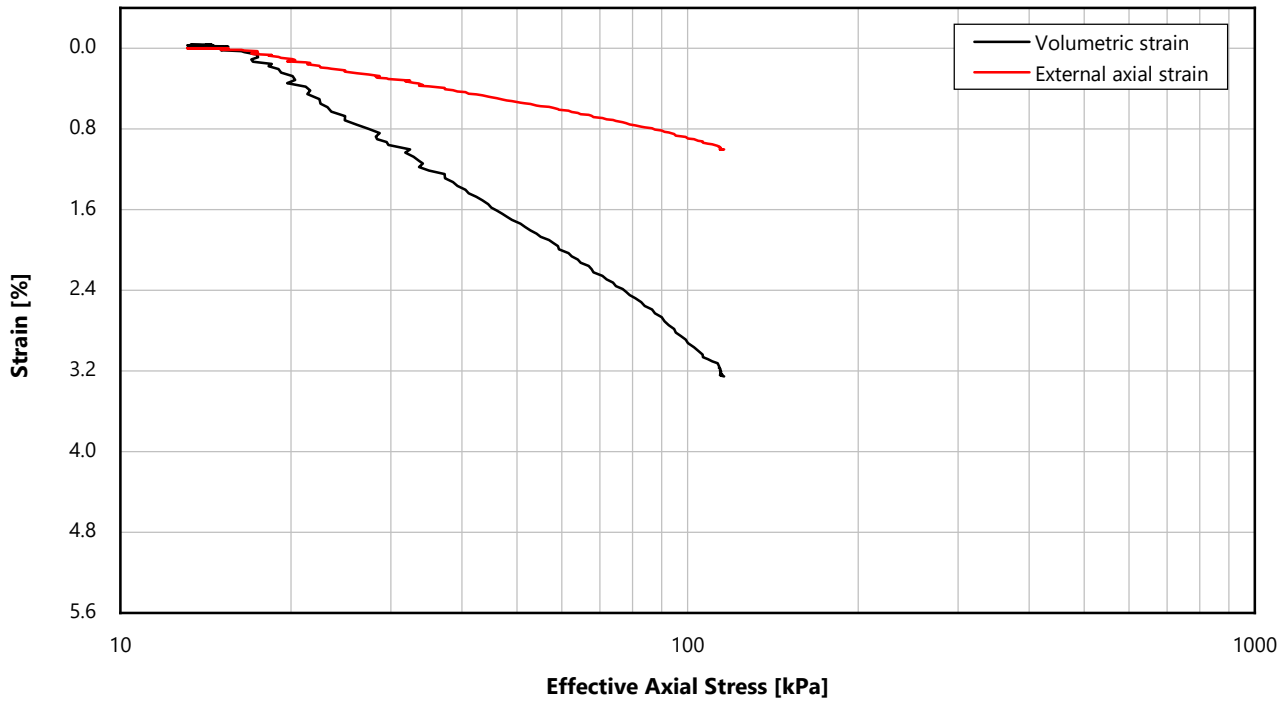
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

0919

Consolidation





CONSOLIDATION
Stage 1 σ'_{rc} : 116 kPa
Stage 1 σ'_{ac} : 116 kPa

Project: 503387

Laboratory: Wallingford, UK
UK-MLB-TCH-TP-706 Advanced Triaxial Testing

Approved by: ET 20/06/2025

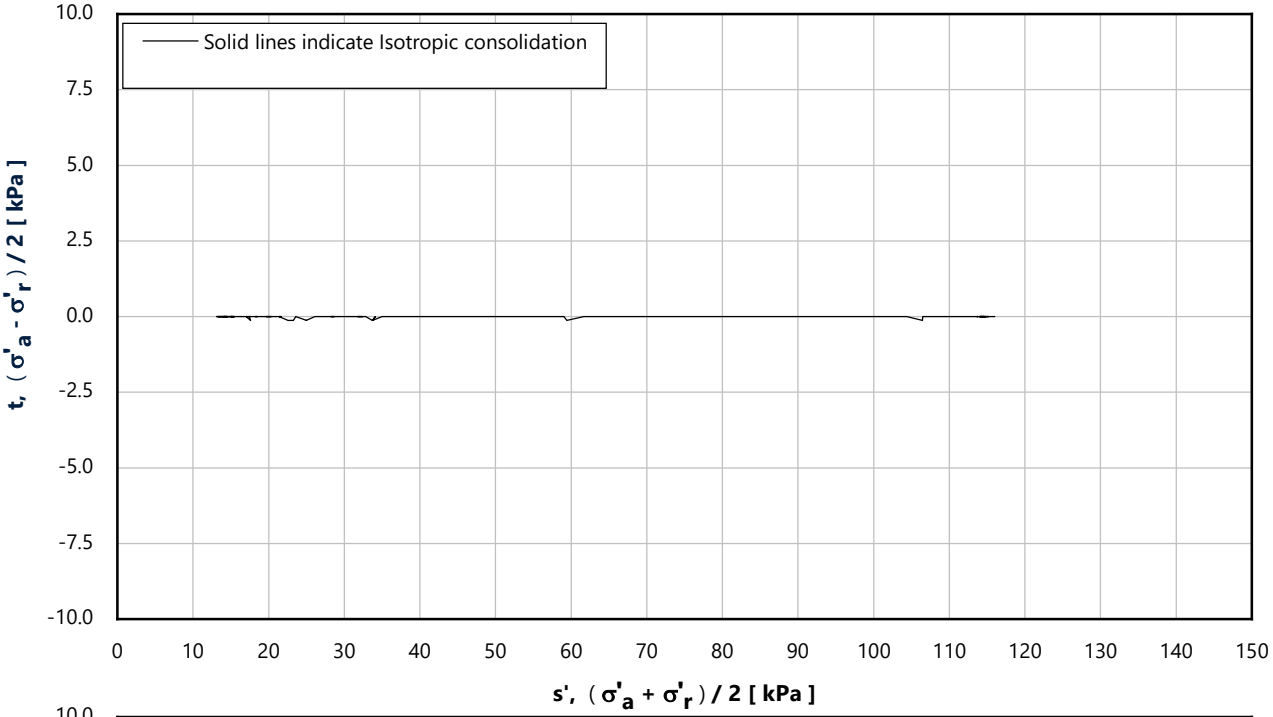
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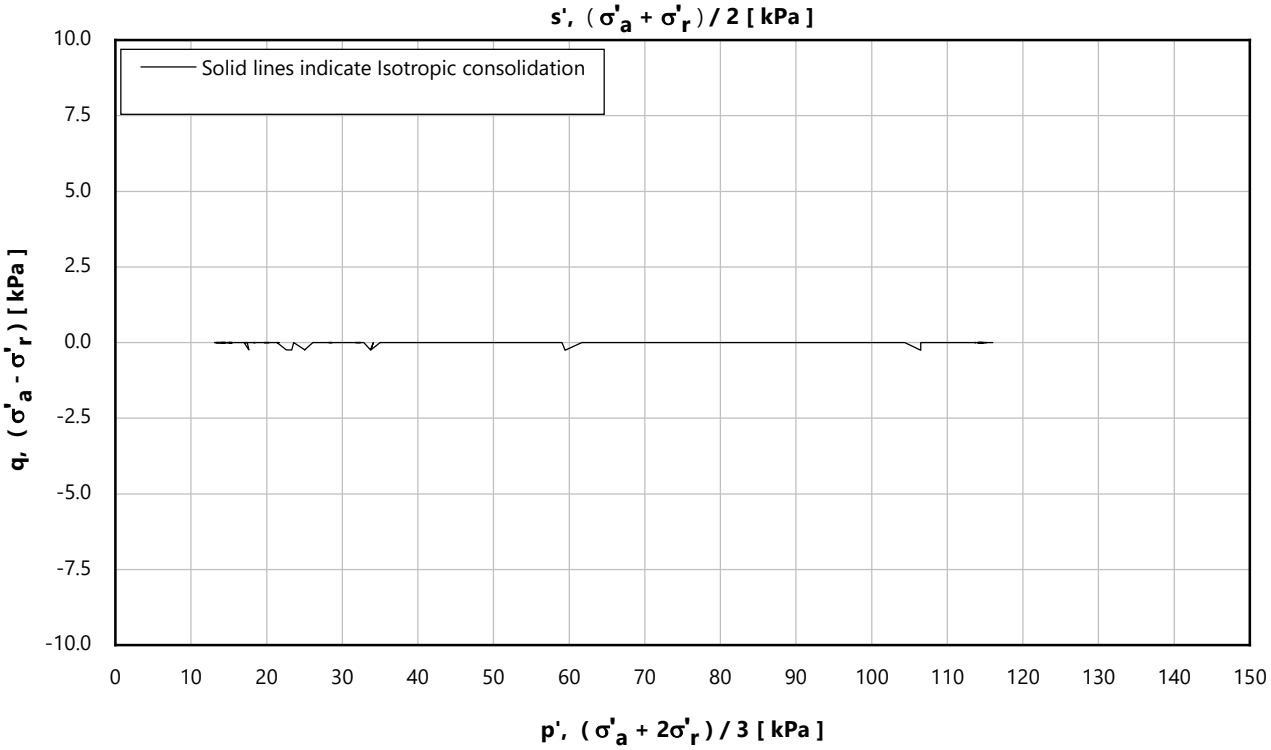
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

UKAS TESTING 0919

Consolidation





CONSOLIDATION
Stage 1 σ'_{rc} : 116 kPa
Stage 1 σ'_{ac} : 116 kPa

Project: 503387

Laboratory: Wallingford, UK
UK-MLB-TCH-TP-706 Advanced Triaxial Testing

Approved by: ET 20/06/2025

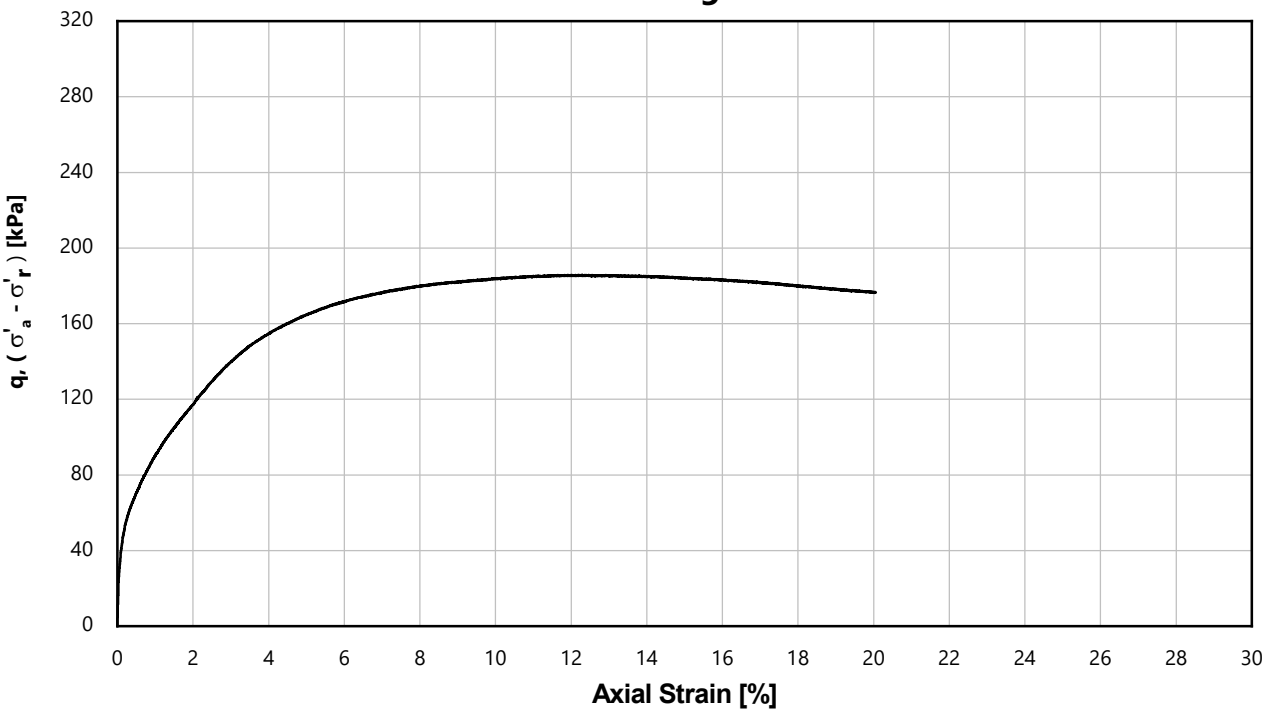
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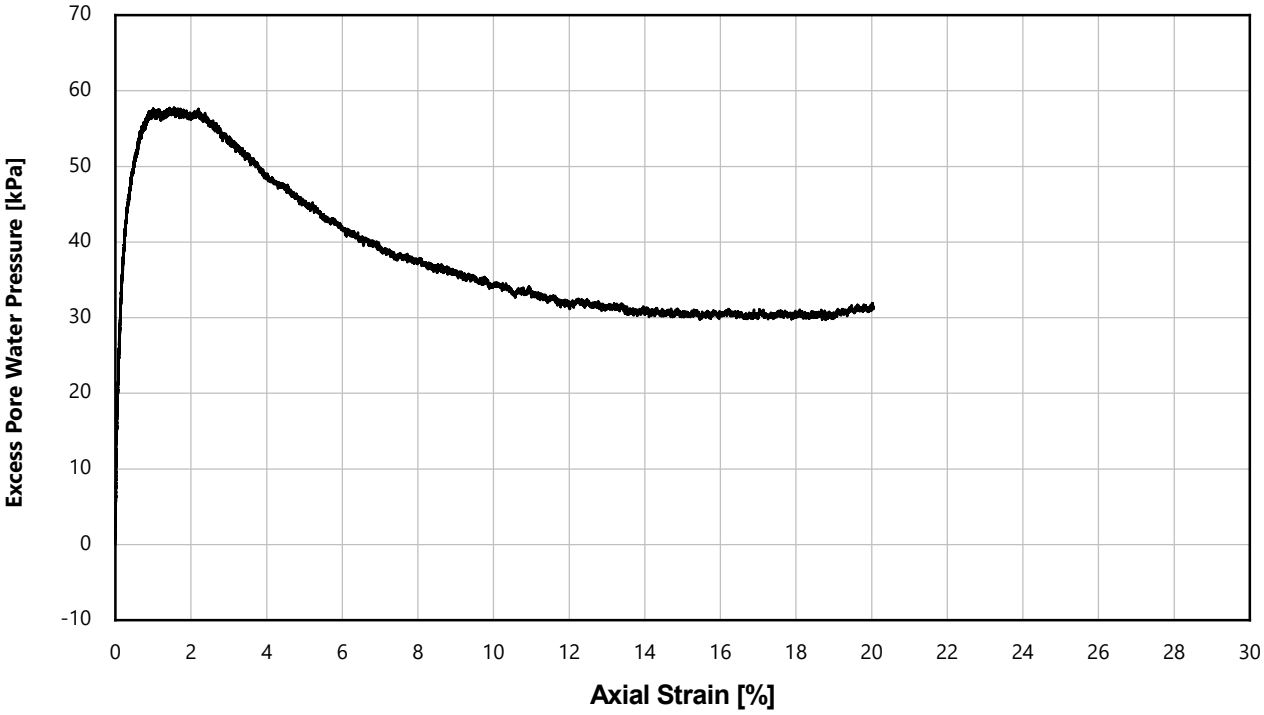
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

UKAS TESTING 0919

Shearing





SHEAR		
Initial σ'_r : 116 kPa	Rate of strain : 0.30 %/hour	q_{peak} : 186 kPa
Initial σ'_a : 116 kPa	Ext. ε at q_{peak} : 12.27 %	

Project: 503387

Laboratory: Wallingford, UK
UK-MLB-TCH-TP-706 Advanced Triaxial Testing

Approved by: ET 20/06/2025

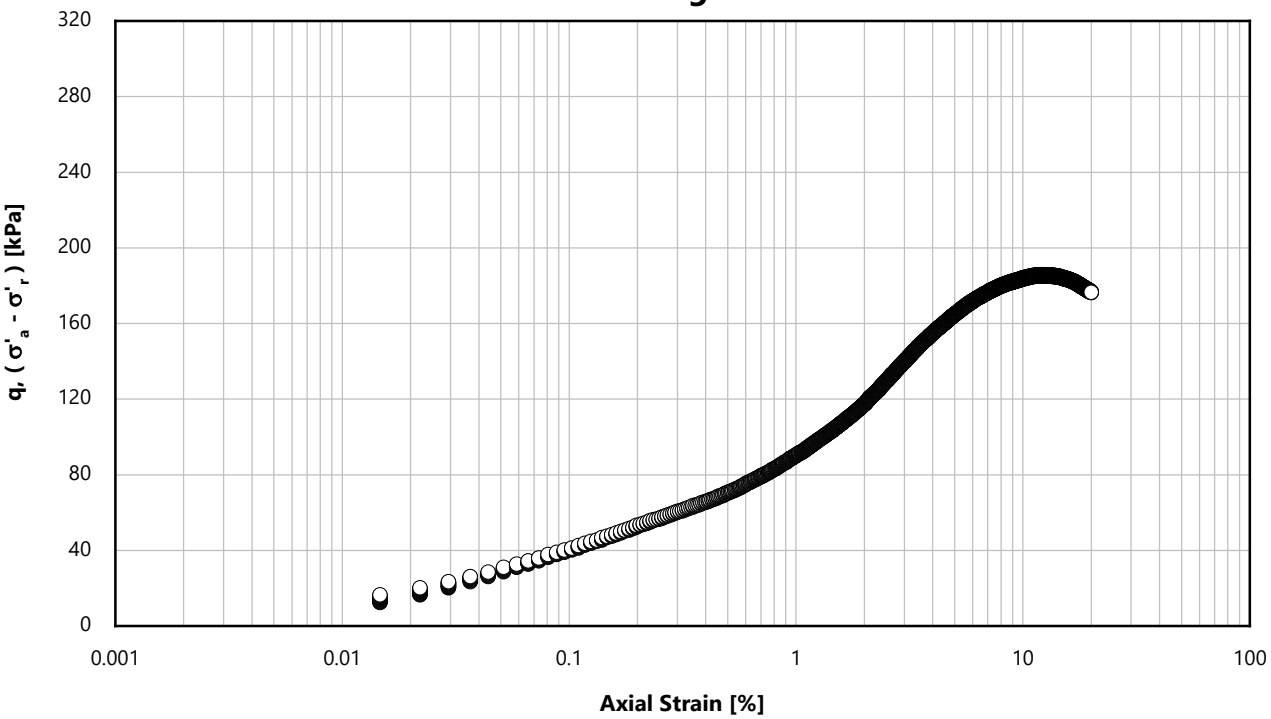
Test Report

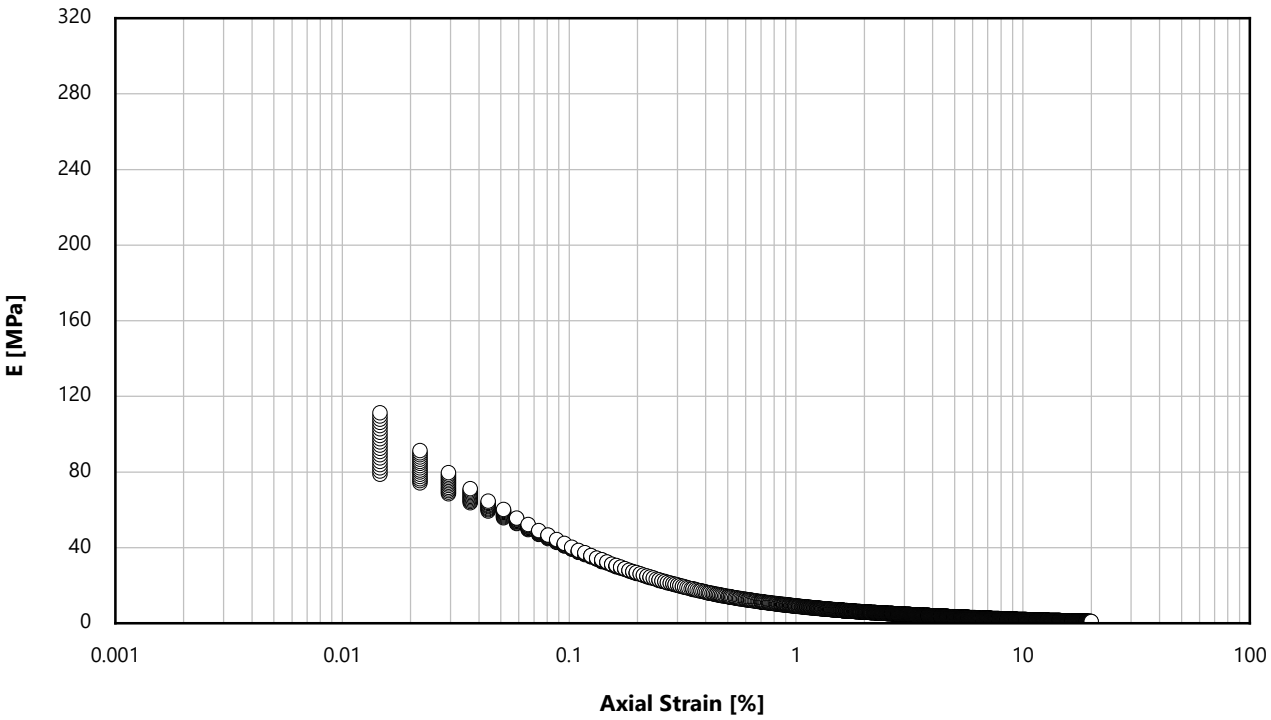
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

0919

Shearing





SHEAR		
Initial σ'_r : 116 kPa	Rate of strain : 0.30 %/hour	q_{peak} : 186 kPa
Initial σ'_a : 116 kPa	Ext. ε at q_{peak} : 12.27 %	

Project: 503387

Laboratory: Wallingford, UK
UK-MLB-TCH-TP-706 Advanced Triaxial Testing

Approved by: ET 20/06/2025

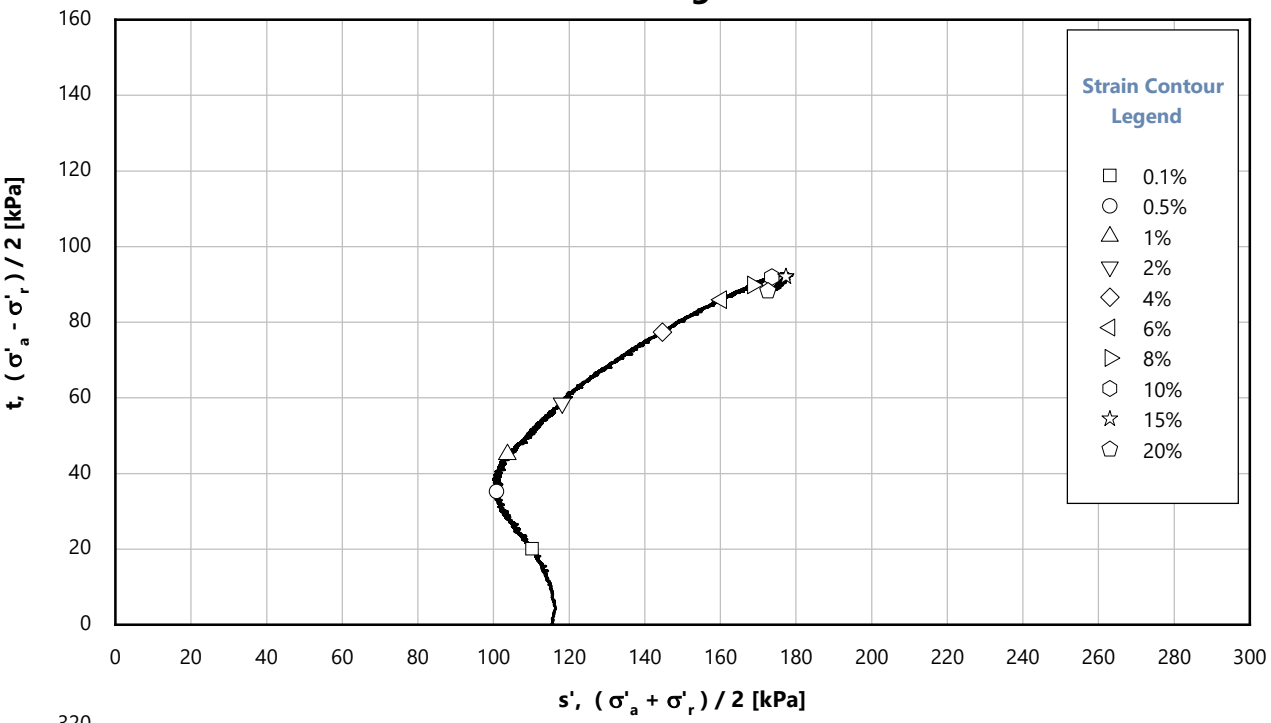
Test Report

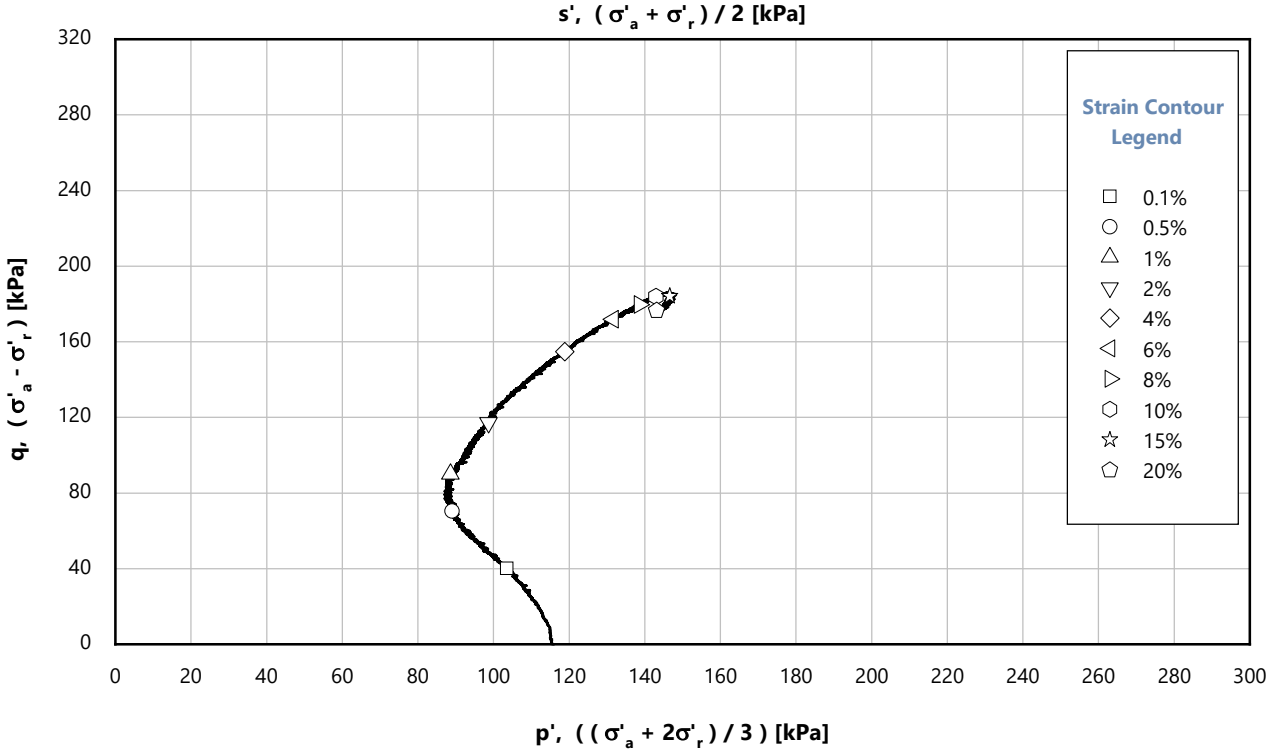
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

0919

Shearing





SHEAR		
Initial σ'_r : 116 kPa	Rate of strain : 0.30 %/hour	q_{peak} : 186 kPa
Initial σ'_a : 116 kPa	Ext. ε at q_{peak} : 12.27 %	

Project: 503387

Laboratory: Wallingford, UK
UK-MLB-TCH-TP-706 Advanced Triaxial Testing

Approved by: ET 20/06/2025

Test Report
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

UKAS TESTING 0919

Test Identification	
Location	Z4_OWF_BH05-SAMP
Sample	18-2
Depth [m]	16.20
Test number	CIU10

Specimen Visual Description
Very soft extremely low strength dark grey silty CLAY

Initial Specimen Conditions	
Test start date	02/06/2025
Type of sample	Undisturbed
Diameter [mm]	72.2
Height [mm]	135.7
Water content [%]	27.5
Bulk density [Mg/m^3]	2.00
Dry density [Mg/m^3]	1.57
Void ratio [-]	0.718
Degree of saturation [%]	100
Particle density - Assumed [Mg/m^3]	2.70
Torvane [kPa]	7
Pocket penetrometer [kPa]	-
Type of drains	Radial (spiral) & one end only

Test Report
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

UKAS TESTING 0919

Saturation	
Pressure increments applied [kPa]	100
Differential pressure used [kPa]	N/A
Cell pressure [kPa]	700
Base PWP [kPa]	695
Mid height PWP [kPa]	-
B value achieved [-]	0.99

Isotropic Consolidation	
Cell pressure [kPa]	807
Back pressure [kPa]	696
Base PWP [kPa]	698
Mid height PWP [kPa]	-
Effective radial pressure [kPa]	109
Effective axial pressure [kPa]	109
Deviator stress [kPa]	0
Volumetric strain [%]	5.91
Volumetric strain rate - end of stage [%/hr]	0.00
External axial strain [%]	1.94
Local axial strain [%]	-
Local radial strain [%]	-
Water content [%]	23.7
Bulk density [Mg/m^3]	2.07
Dry density [Mg/m^3]	1.67
Void ratio [-]	0.617
Degree of saturation [%]	100

Project: 503387 - F254727

Laboratory: Wallingford, UK

Z4_OWF_BH05-SAMP_18-2_CIU10

Approved by: - 00/01/1900

Test Report
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

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Shearing Stage	
Initial effective radial pressure [kPa]	109
Initial effective axial pressure [kPa]	109
Rate of strain [%/hour]	0.30
At peak deviator stress	
Corrected deviator stress [kPa]	126
Membrane correction applied [kPa]	4
Drain correction applied [kPa]	0
External axial strain [%]	15.47
Local axial strain [%]	-
Local radial strain [%]	-
Excess base PWP [kPa]	50
Excess mid height PWP [kPa]	-
Effective radial pressure [kPa]	59
Effective axial pressure [kPa]	185
Principal effective stress ratio [-]	3.14
ε_{50} [%]	0.57
Secant modulus (E_{50}) at ε_{50} [kPa]	11082
At peak principal effective stress ratio	
Corrected deviator stress [kPa]	117
Membrane correction applied [kPa]	2
Drain correction applied [kPa]	0
External axial strain [%]	6.50
Local axial strain [%]	-
Local radial strain [%]	-
Excess base PWP [kPa]	60
Excess mid height PWP [kPa]	-
Effective radial pressure [kPa]	49
Effective axial pressure [kPa]	166
Principal effective stress ratio [-]	3.40
At 10% external axial strain	
Corrected deviator stress [kPa]	124
Membrane correction applied [kPa]	2
Drain correction applied [kPa]	0
External axial strain [%]	10.00
Excess base PWP [kPa]	56
Excess mid height PWP [kPa]	-
Effective radial pressure [kPa]	53
Effective axial pressure [kPa]	177
Principal effective stress ratio [-]	3.31
ε_{50} [%]	0.52
Secant modulus (E_{50}) at ε_{50} [kPa]	11813

Project: 503387 - F254727

Laboratory: Wallingford, UK

Z4_OWF_BH05-SAMP_18-2_CIU10

Approved by: - 00/01/1900

Test Report
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

UKAS TESTING 0919

Specimen Photographs



FINAL CONDITIONS

Water content [%]	23.7
Bulk density [Mg/m³]	2.07
Dry density [Mg/m³]	1.67
Void ratio [-]	0.617

Project: 503387 - F254727

Laboratory: Wallingford, UK
Z4_OWF_BH05-SAMP_18-2_CIU10

Approved by: - 00/01/1900

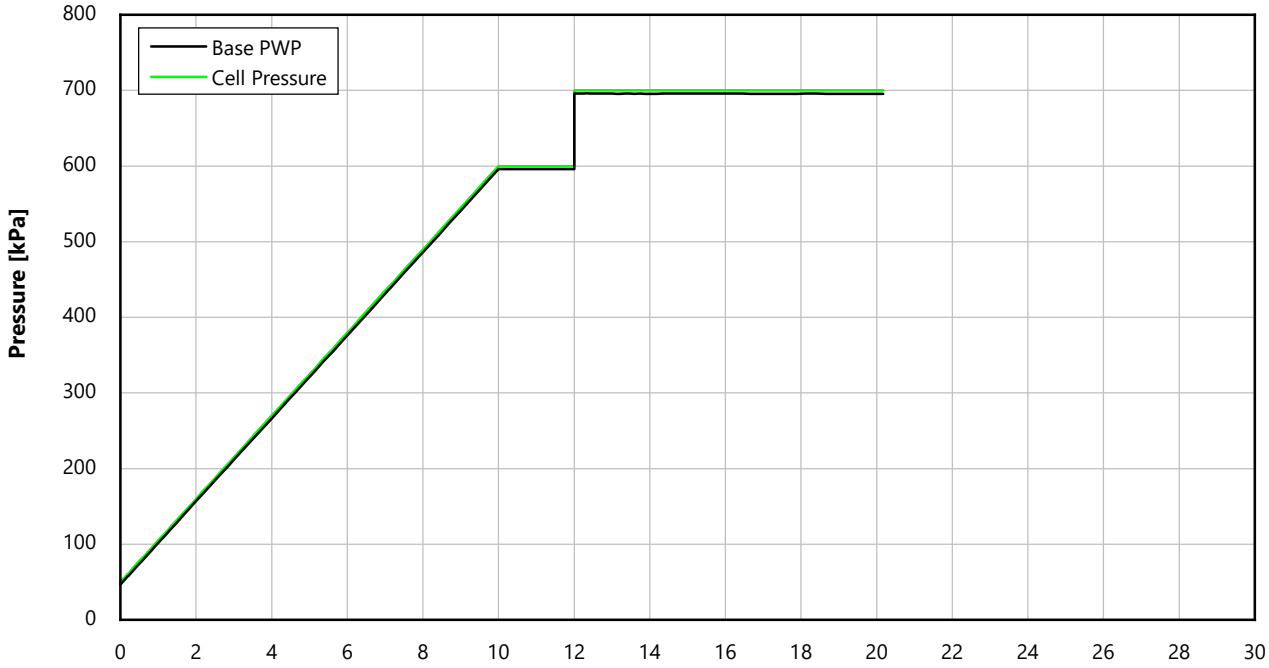
Test Report

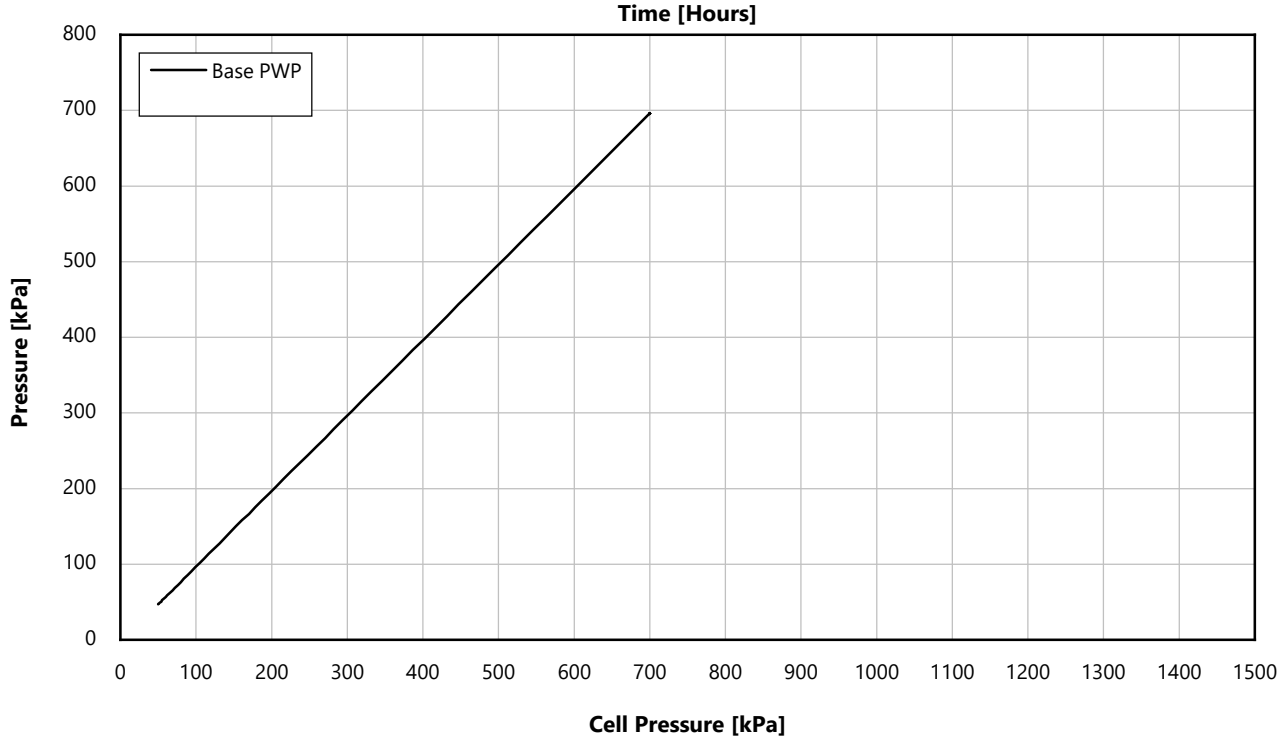
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

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Saturation





SATURATION	
B value : 0.99	Initial σ'_a : 3 kPa
	Final σ'_a : 5 kPa

Project: 503387 - F254727

Laboratory: Wallingford, UK
Z4_OWF_BH05-SAMP_18-2_CIU10

Approved by: ET 20/06/2025

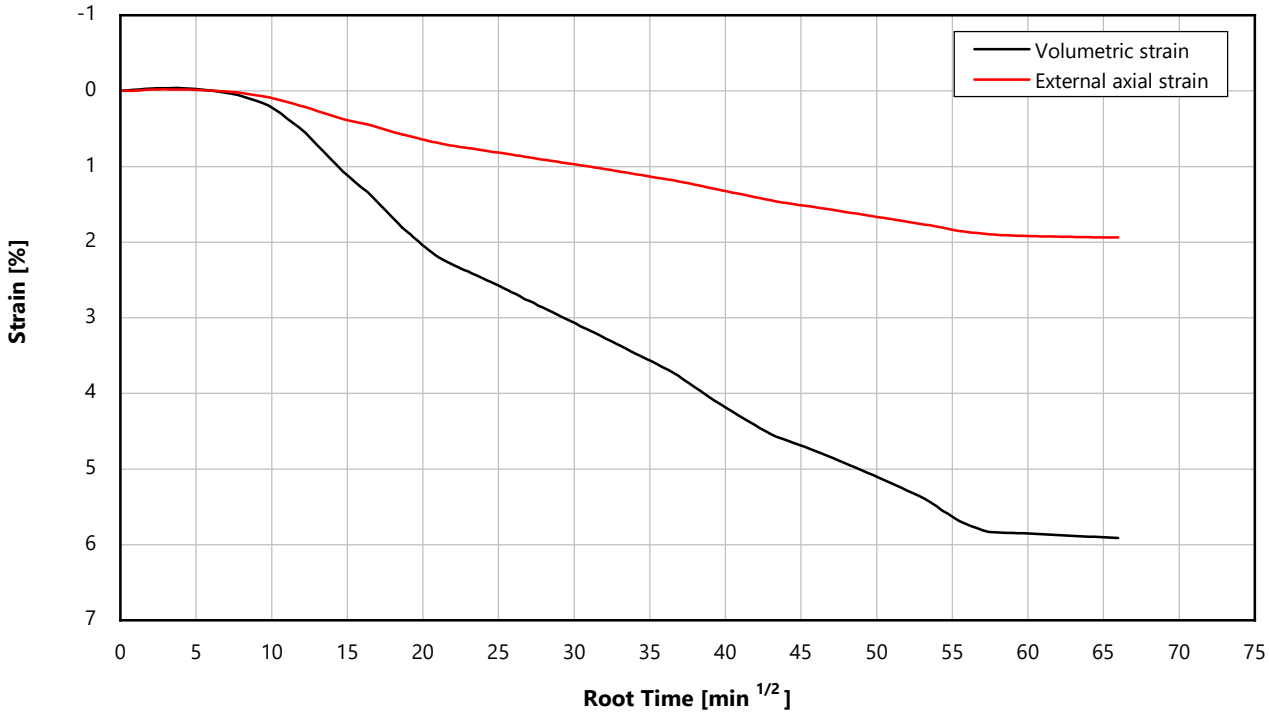
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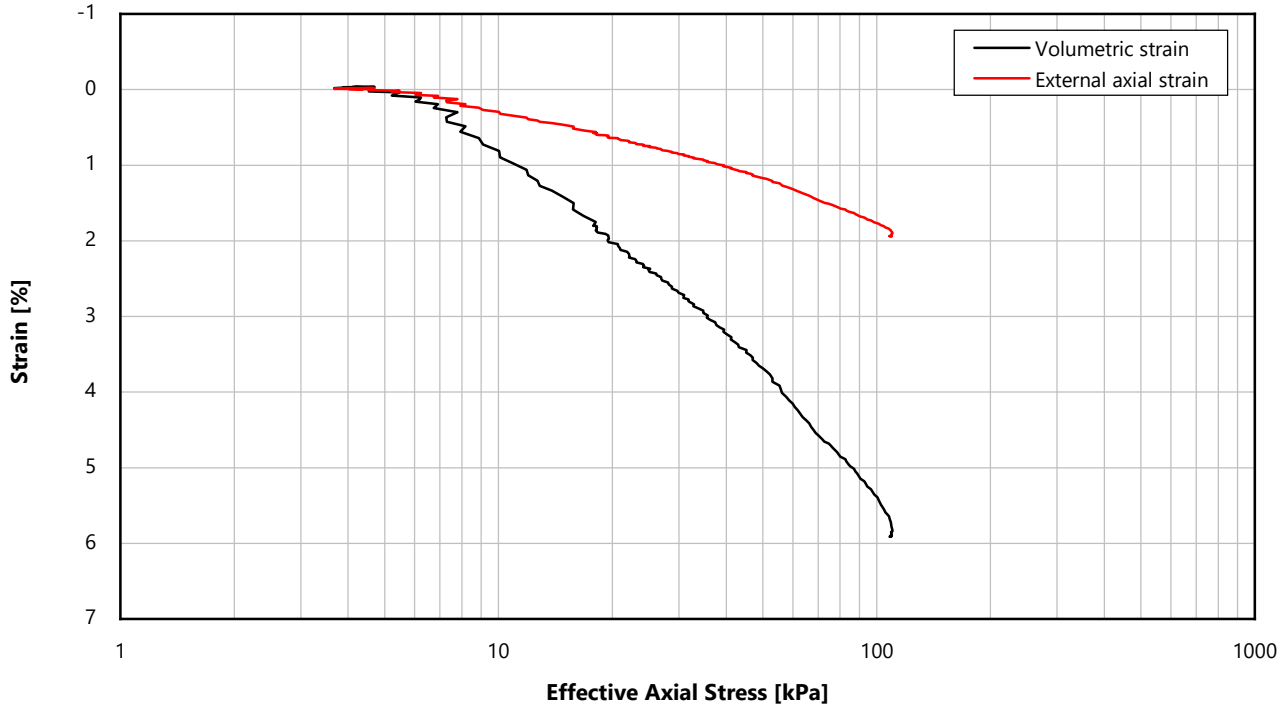
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

0919

Consolidation





CONSOLIDATION	
Stage 1 σ'_{rc}	: 109 kPa
Stage 1 σ'_{ac}	: 109 kPa

Project: 503387 - F254727

Laboratory: Wallingford, UK
Z4_OWF_BH05-SAMP_18-2_CIU10

Approved by: ET 20/06/2025

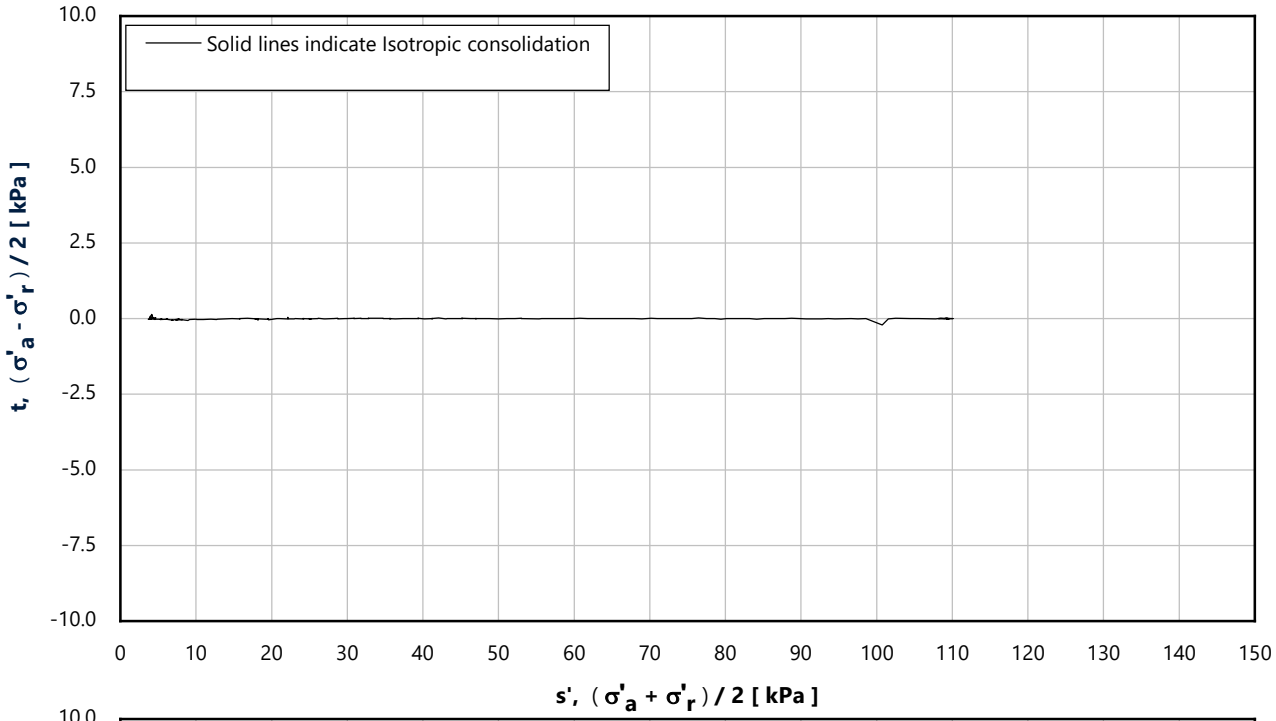
Test Report

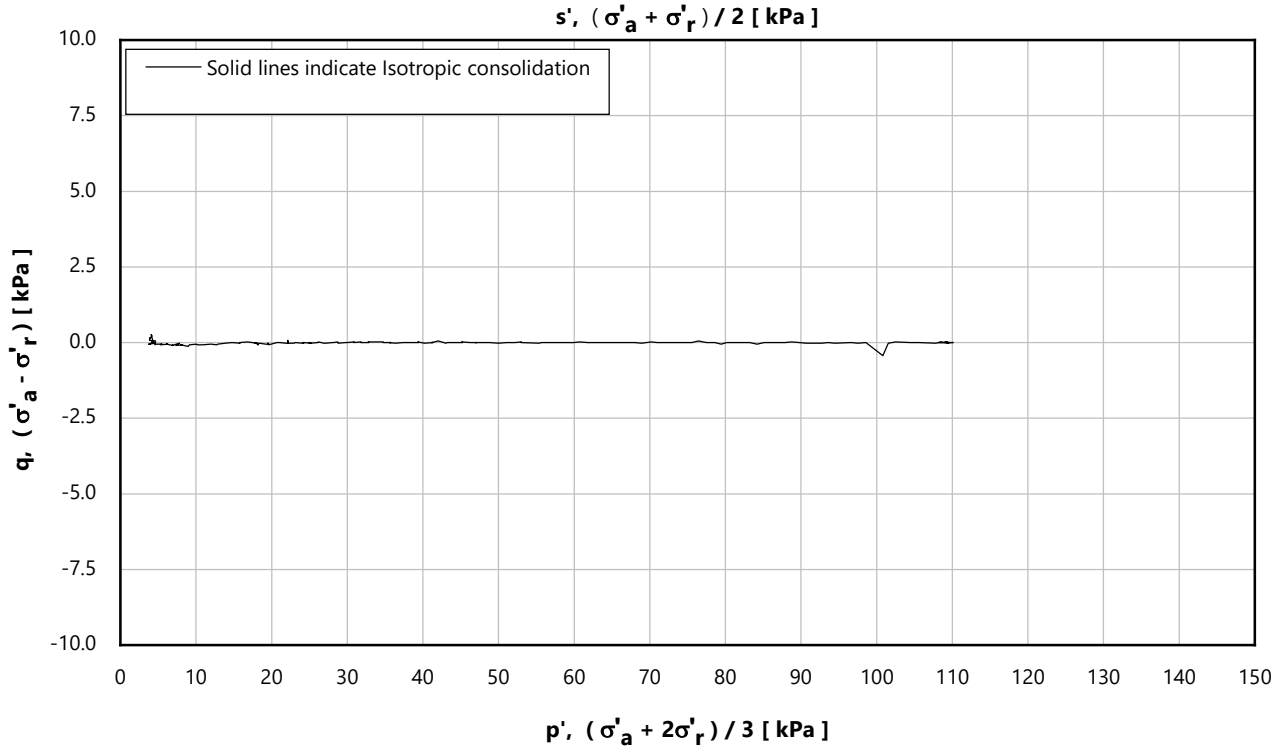
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

0919

Consolidation





CONSOLIDATION	
Stage 1 σ'_{rc}	: 109 kPa
Stage 1 σ'_{ac}	: 109 kPa

Project: 503387 - F254727

Laboratory: Wallingford, UK
Z4_OWF_BH05-SAMP_18-2_CIU10

Approved by: ET 20/06/2025

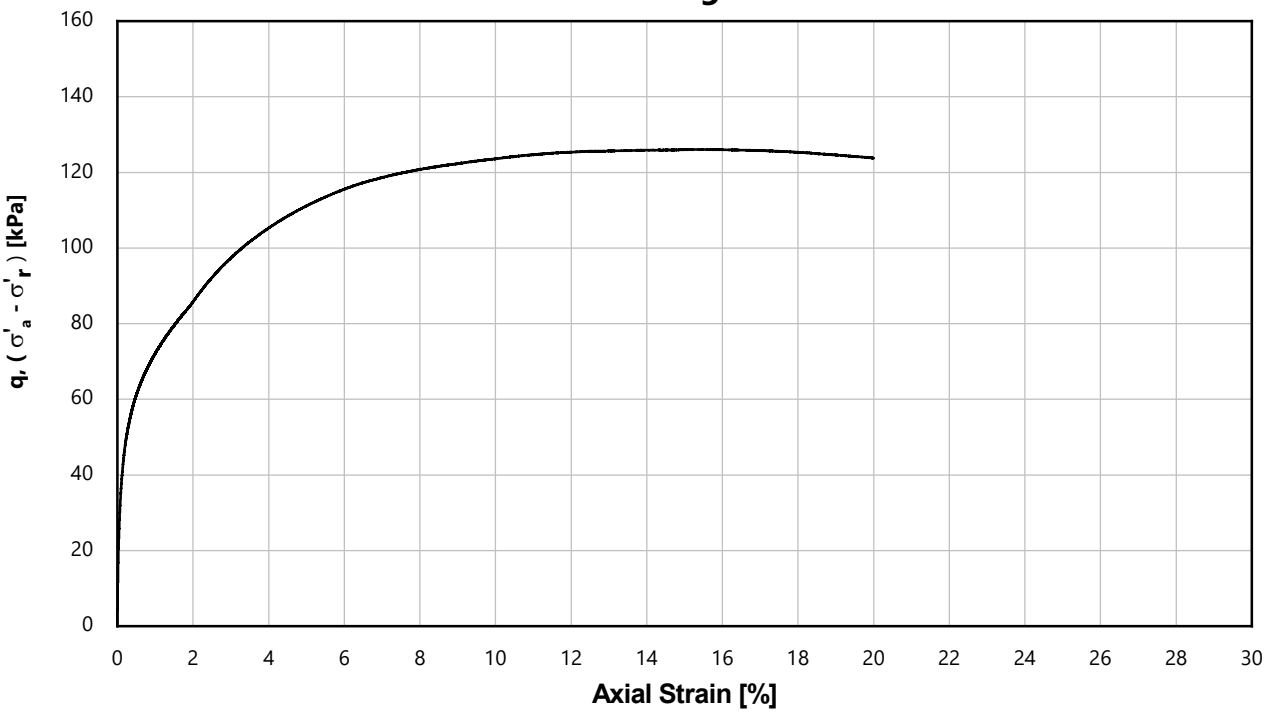
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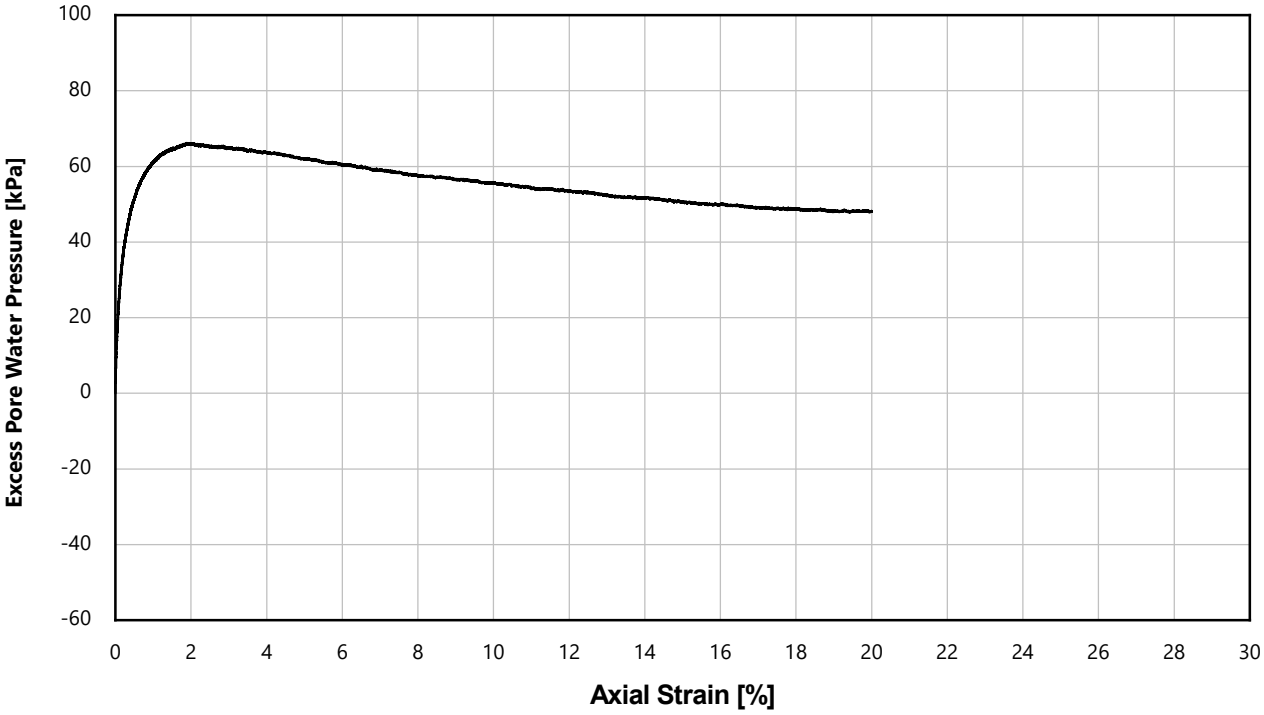
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

UKAS TESTING 0919

Shearing





SHEAR		
Initial σ'_r : 109 kPa	Rate of strain : 0.30 %/hour	q_{peak} : 126 kPa
Initial σ'_a : 109 kPa	Ext. ε at q_{peak} : 15.47 %	

Project: 503387 - F254727

Laboratory: Wallingford, UK
Z4_OWF_BH05-SAMP_18-2_CIU10

Approved by: ET 20/06/2025

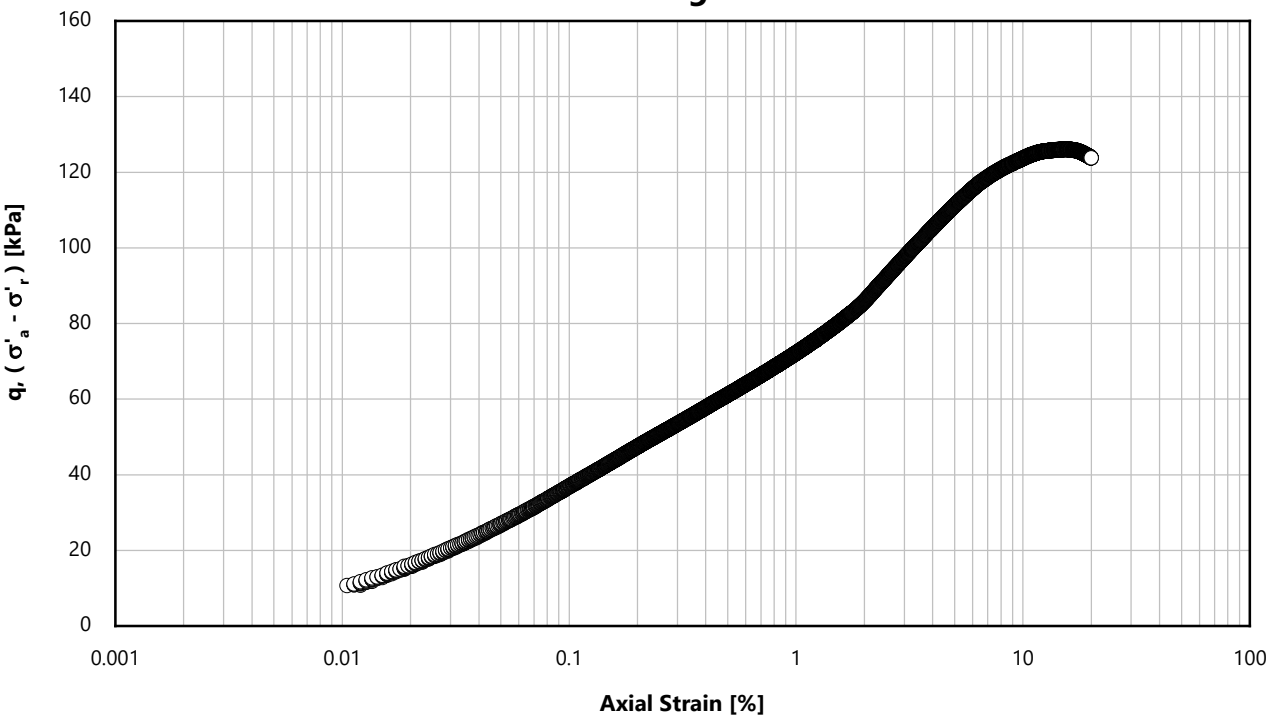
Test Report

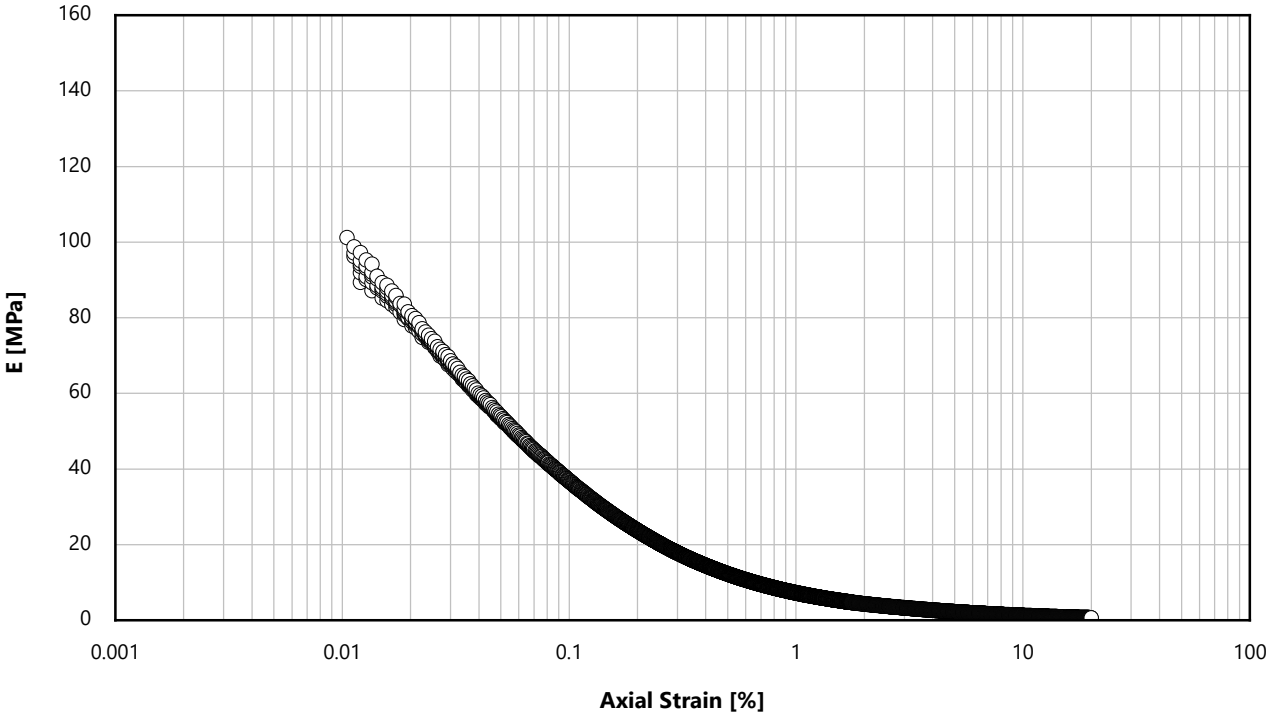
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

0919

Shearing





SHEAR		
Initial σ'_r : 109 kPa	Rate of strain : 0.30 %/hour	q_{peak} : 126 kPa
Initial σ'_a : 109 kPa	Ext. ε at q_{peak} : 15.47 %	

Project: 503387 - F254727

Laboratory: Wallingford, UK
Z4_OWF_BH05-SAMP_18-2_CIU10

Approved by: ET 20/06/2025

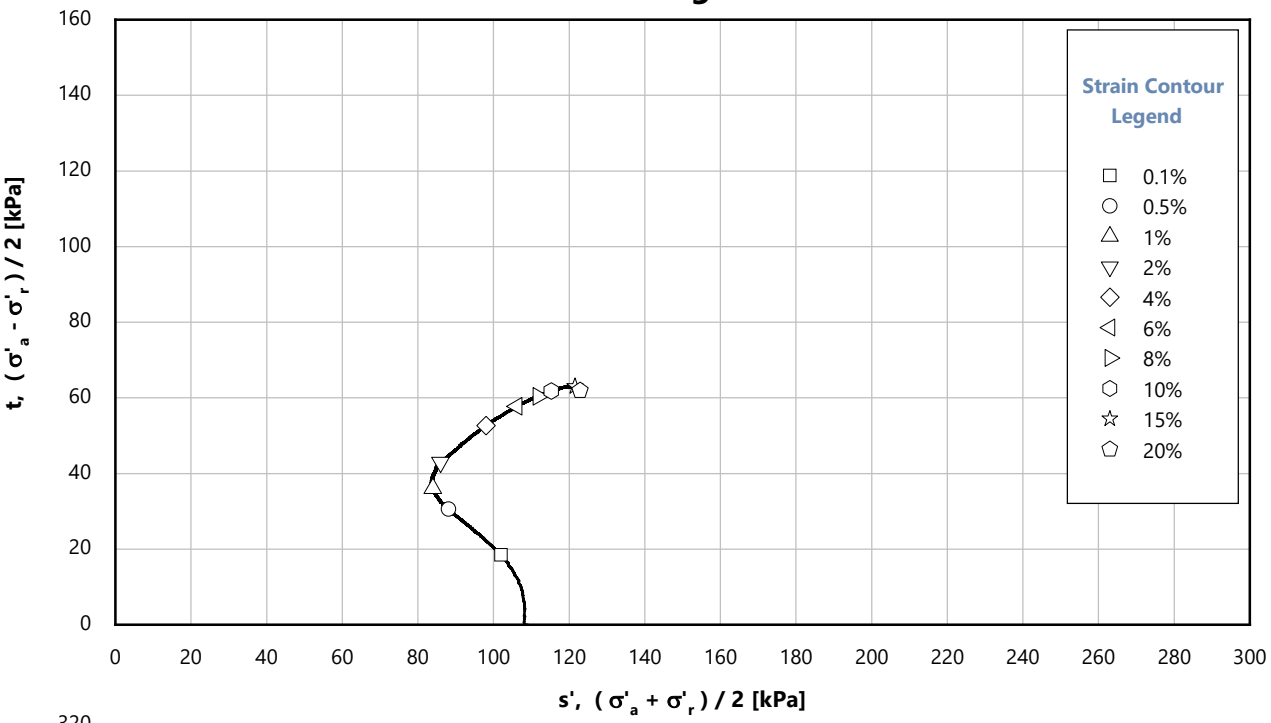
Test Report

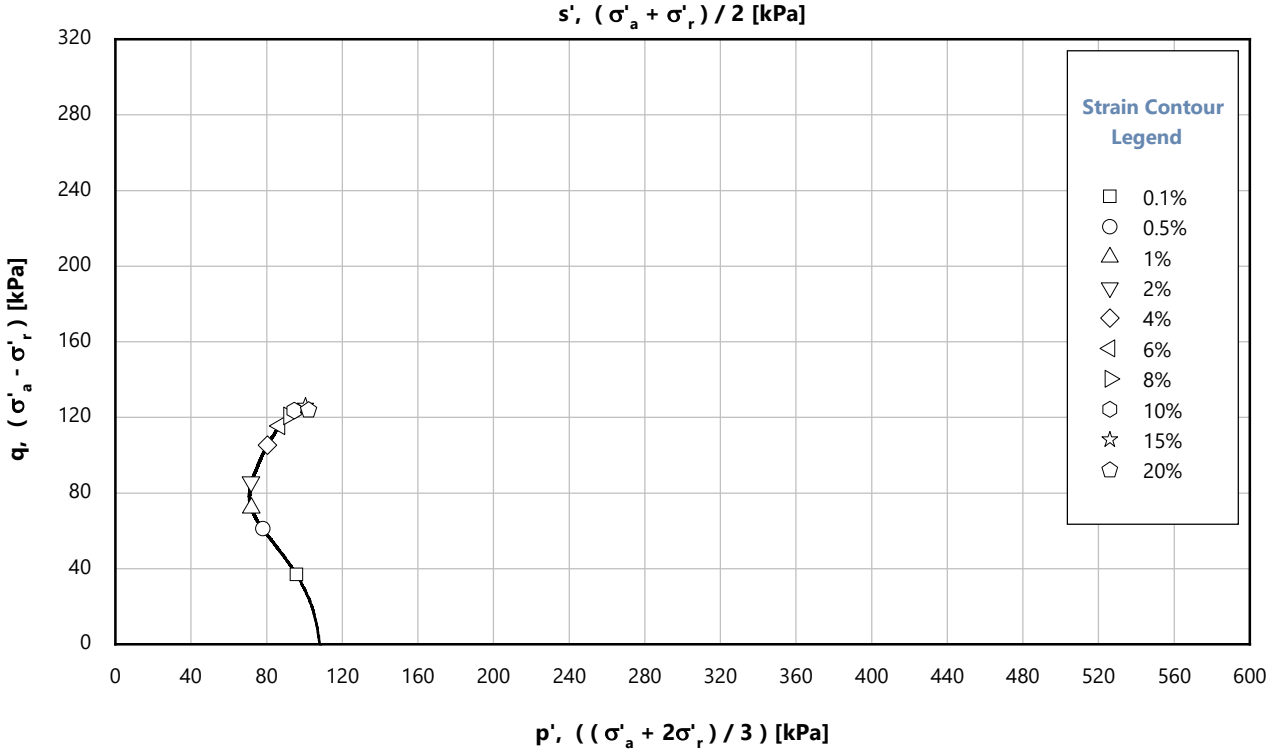
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

0919

Shearing





SHEAR		
Initial σ'_r : 109 kPa	Rate of strain : 0.30 %/hour	q_{peak} : 126 kPa
Initial σ'_a : 109 kPa	Ext. ε at q_{peak} : 15.47 %	

Project: 503387 - F254727

Laboratory: Wallingford, UK
Z4_OWF_BH05-SAMP_18-2_CIU10

Approved by: ET 20/06/2025

Test Report
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

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Test Identification	
Location	Z4_OWF_BH15-COMP
Sample	07-3
Depth [m]	18.38
Test number	CIU11

Specimen Visual Description
Firm medium strength dark grey slightly sandy CLAY

Initial Specimen Conditions	
Test start date	23/05/2025
Type of sample	Undisturbed
Diameter [mm]	71.5
Height [mm]	138.3
Water content [%]	24.4
Bulk density [Mg/m^3]	2.05
Dry density [Mg/m^3]	1.65
Void ratio [-]	0.635
Degree of saturation [%]	100
Particle density - Assumed [Mg/m^3]	2.70
Torvane [kPa]	69
Pocket penetrometer [kPa]	67
Type of drains	Radial (spiral) & one end only

Test Report
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

0919

Saturation	
Pressure increments applied [kPa]	100
Differential pressure used [kPa]	N/A
Cell pressure [kPa]	1379
Base PWP [kPa]	1375
Mid height PWP [kPa]	-
B value achieved [-]	1.00

Isotropic Consolidation	
Cell pressure [kPa]	1502
Back pressure [kPa]	1375
Base PWP [kPa]	1375
Mid height PWP [kPa]	-
Effective radial pressure [kPa]	127
Effective axial pressure [kPa]	127
Deviator stress [kPa]	0
Volumetric strain [%]	3.12
Volumetric strain rate - end of stage [%/hr]	0.00
External axial strain [%]	1.13
Local axial strain [%]	-
Local radial strain [%]	-
Water content [%]	22.5
Bulk density [Mg/m^3]	2.09
Dry density [Mg/m^3]	1.70
Void ratio [-]	0.584
Degree of saturation [%]	100

Project: 503387 - F254727

Laboratory: Wallingford, UK
Z4_OWF_BH15-COMP_07-3_CIU11

Approved by: ET - 23/06/2025

Test Report
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

UKAS TESTING 0919

Shearing Stage	
Initial effective radial pressure [kPa]	127
Initial effective axial pressure [kPa]	127
Rate of strain [%/hour]	0.30
At peak deviator stress	
Corrected deviator stress [kPa]	253
Membrane correction applied [kPa]	4
Drain correction applied [kPa]	0
External axial strain [%]	13.30
Local axial strain [%]	-
Local radial strain [%]	-
Excess base PWP [kPa]	23
Excess mid height PWP [kPa]	-
Effective radial pressure [kPa]	104
Effective axial pressure [kPa]	357
Principal effective stress ratio [-]	3.45
ε_{50} [%]	1.44
Secant modulus (E_{50}) at ε_{50} [kPa]	8811
At peak principal effective stress ratio	
Corrected deviator stress [kPa]	188
Membrane correction applied [kPa]	1
Drain correction applied [kPa]	0
External axial strain [%]	3.30
Local axial strain [%]	-
Local radial strain [%]	-
Excess base PWP [kPa]	58
Excess mid height PWP [kPa]	-
Effective radial pressure [kPa]	69
Effective axial pressure [kPa]	258
Principal effective stress ratio [-]	3.72
At 10% external axial strain	
Corrected deviator stress [kPa]	251
Membrane correction applied [kPa]	3
Drain correction applied [kPa]	0
External axial strain [%]	10.00
Excess base PWP [kPa]	29
Excess mid height PWP [kPa]	-
Effective radial pressure [kPa]	98
Effective axial pressure [kPa]	349
Principal effective stress ratio [-]	3.55
ε_{50} [%]	1.41
Secant modulus (E_{50}) at ε_{50} [kPa]	8912

Project: 503387 - F254727

Laboratory: Wallingford, UK

Z4_OWF_BH15-COMP_07-3_CIU11

Approved by: ET - 23/06/2025

Test Report
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

UKAS TESTING 0919

Specimen Photographs

Photograph unavailable

FINAL CONDITIONS

Water content [%]	22.5
Bulk density [Mg/m^3]	2.09
Dry density [Mg/m^3]	1.70
Void ratio [-]	0.584

Project: 503387 - F254727

Laboratory: Wallingford, UK

Z4_OWF_BH15-COMP_07-3_CIU11

Approved by: ET - 23/06/2025

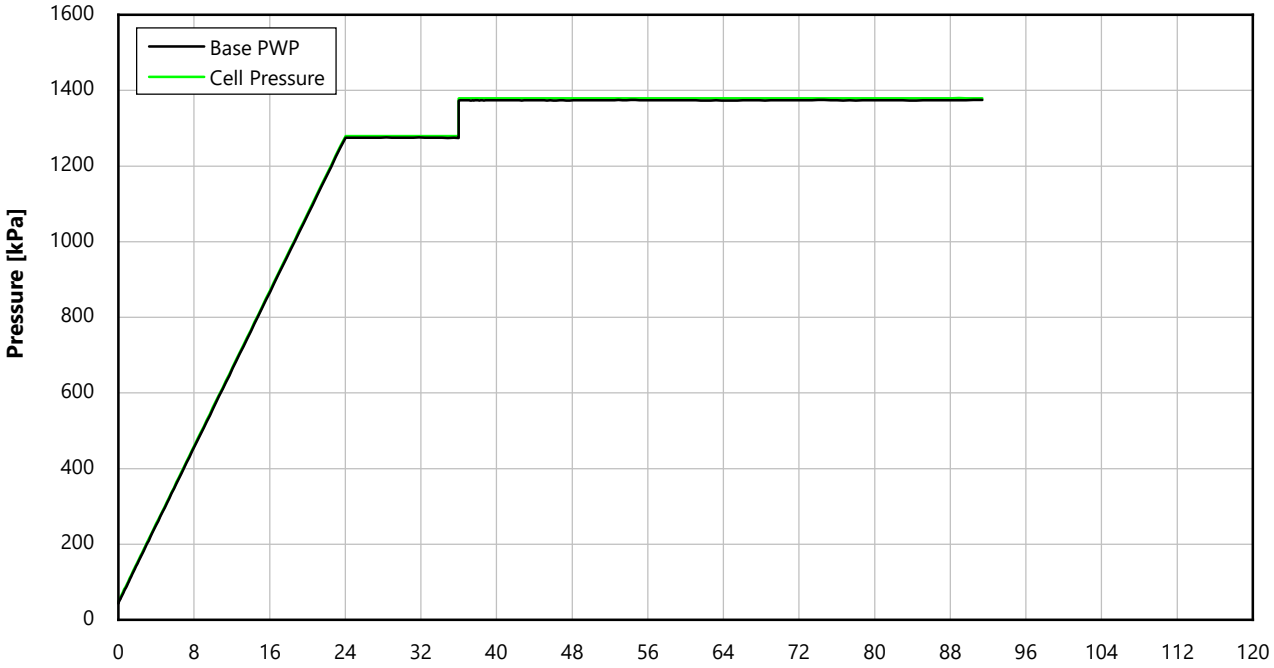
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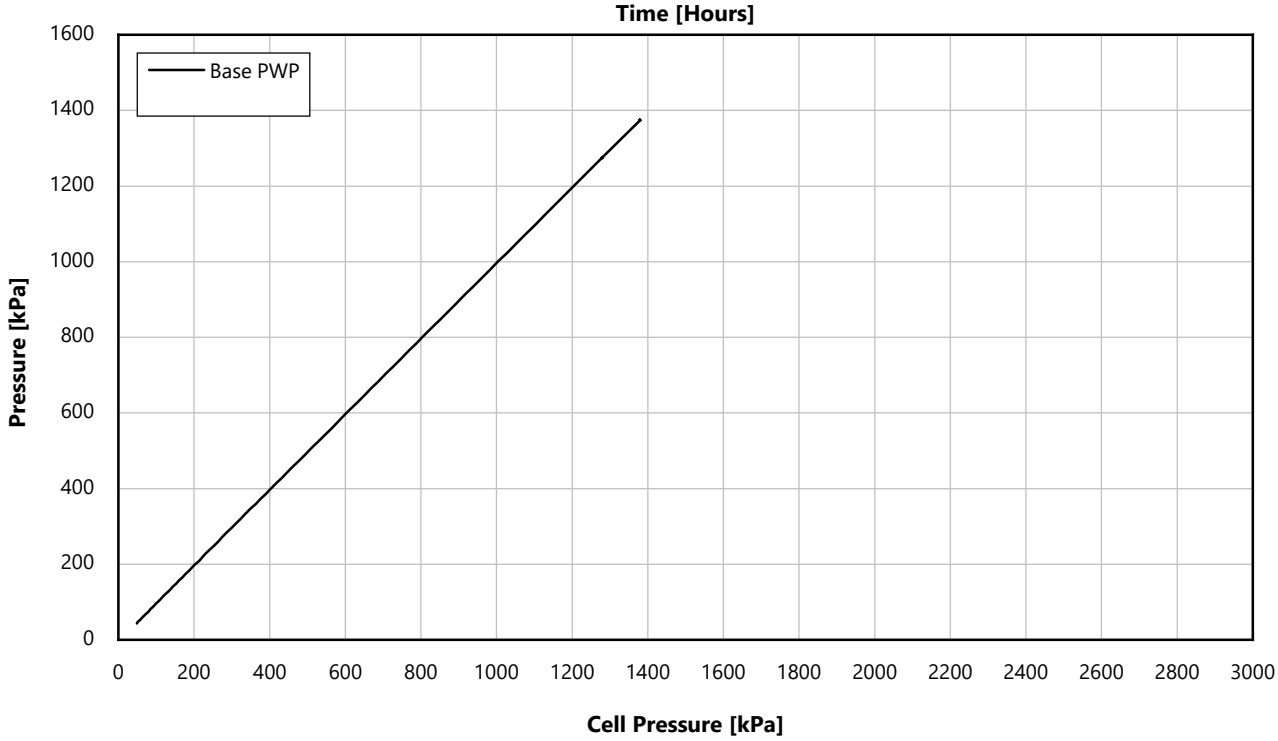
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

UKAS TESTING 0919

Saturation





SATURATION	
B value : 1.00	Initial σ'_a : 6 kPa
	Final σ'_a : 4 kPa

Project: 503387 - F254727

Laboratory: Wallingford, UK
Z4_OWF_BH15-COMP_07-3_CIU11

Approved by: ET 23/06/2025

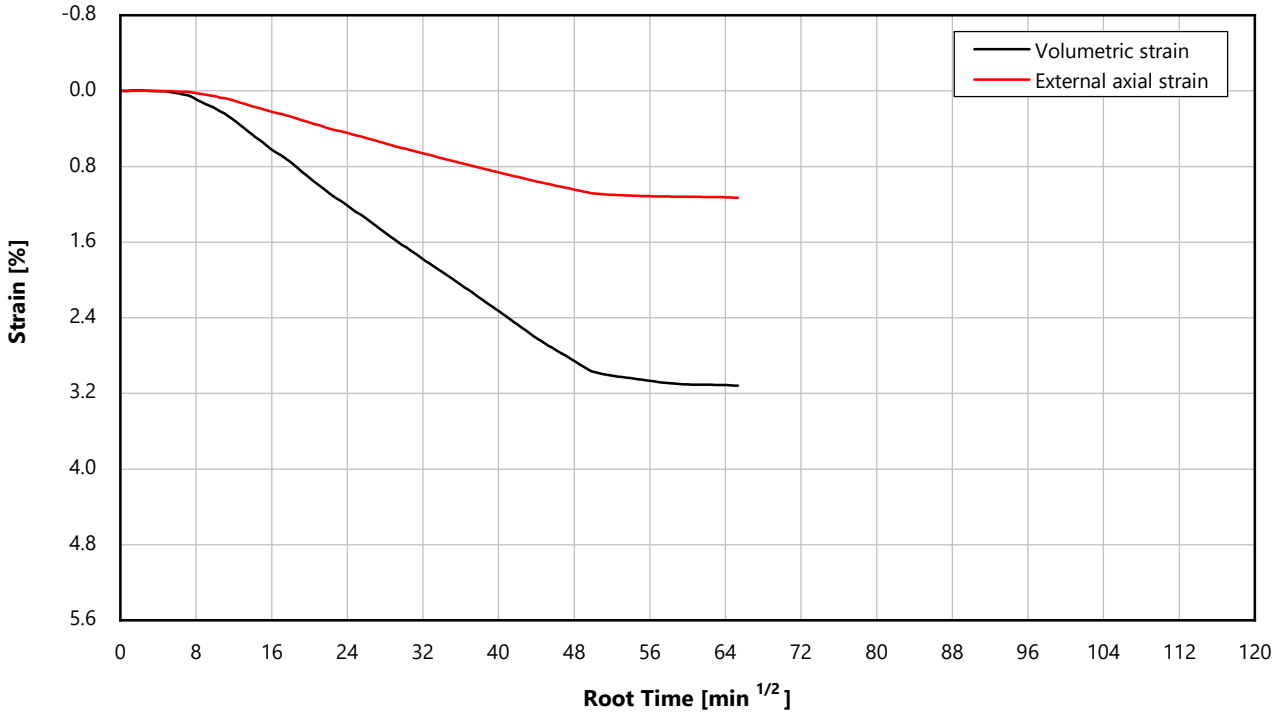
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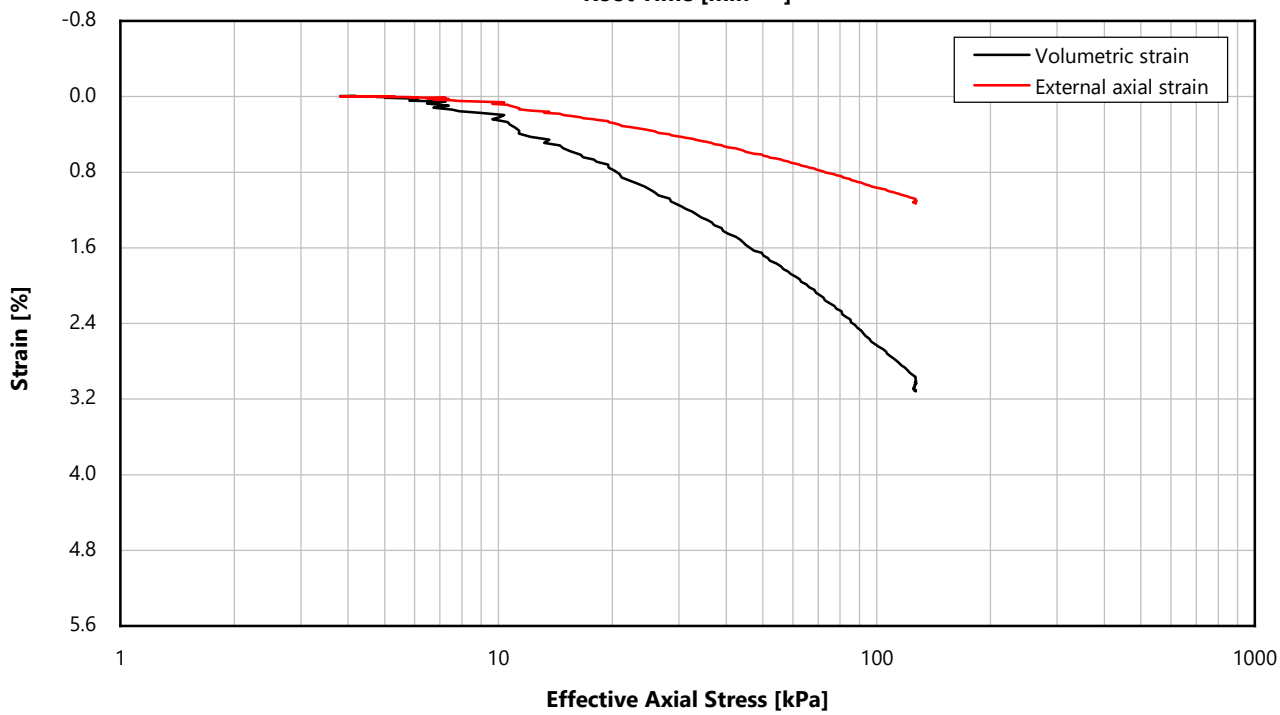
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

0919

Consolidation





CONSOLIDATION
Stage 1 σ'_{rc} : 127 kPa
Stage 1 σ'_{ac} : 127 kPa

Project: 503387 - F254727

Laboratory: Wallingford, UK
Z4_OWF_BH15-COMP_07-3_CIU11

Approved by: ET 23/06/2025

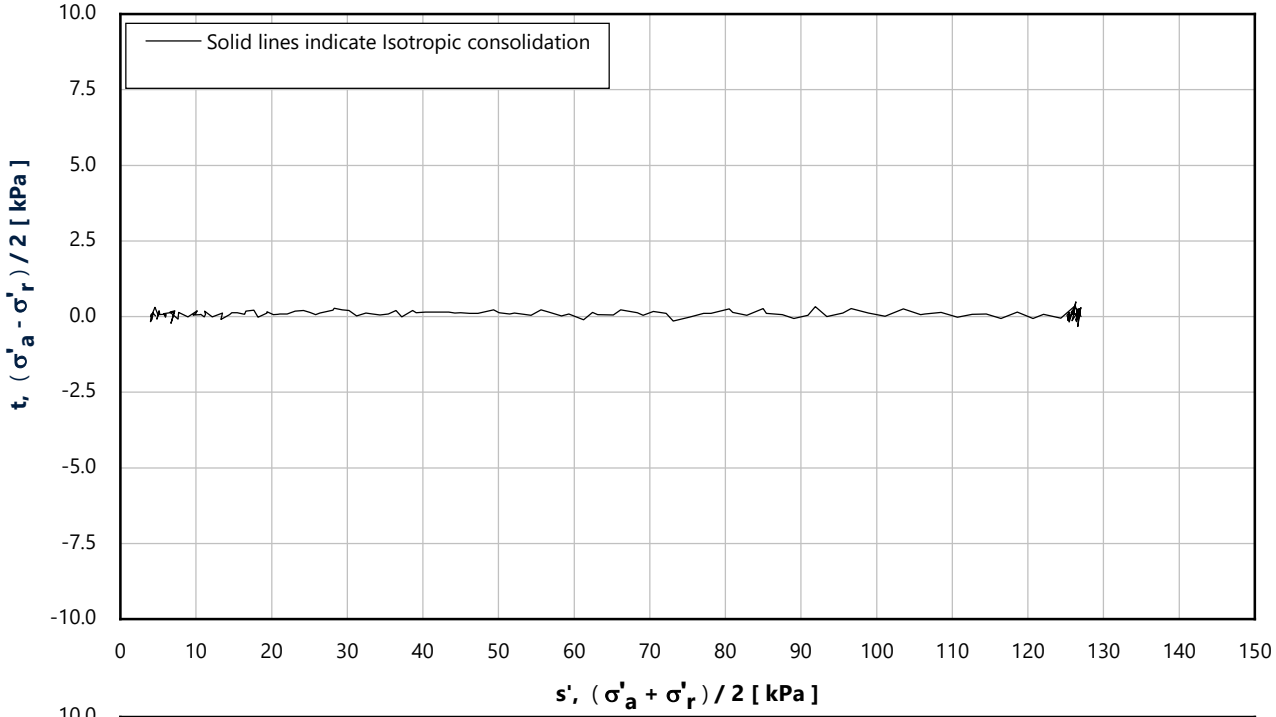
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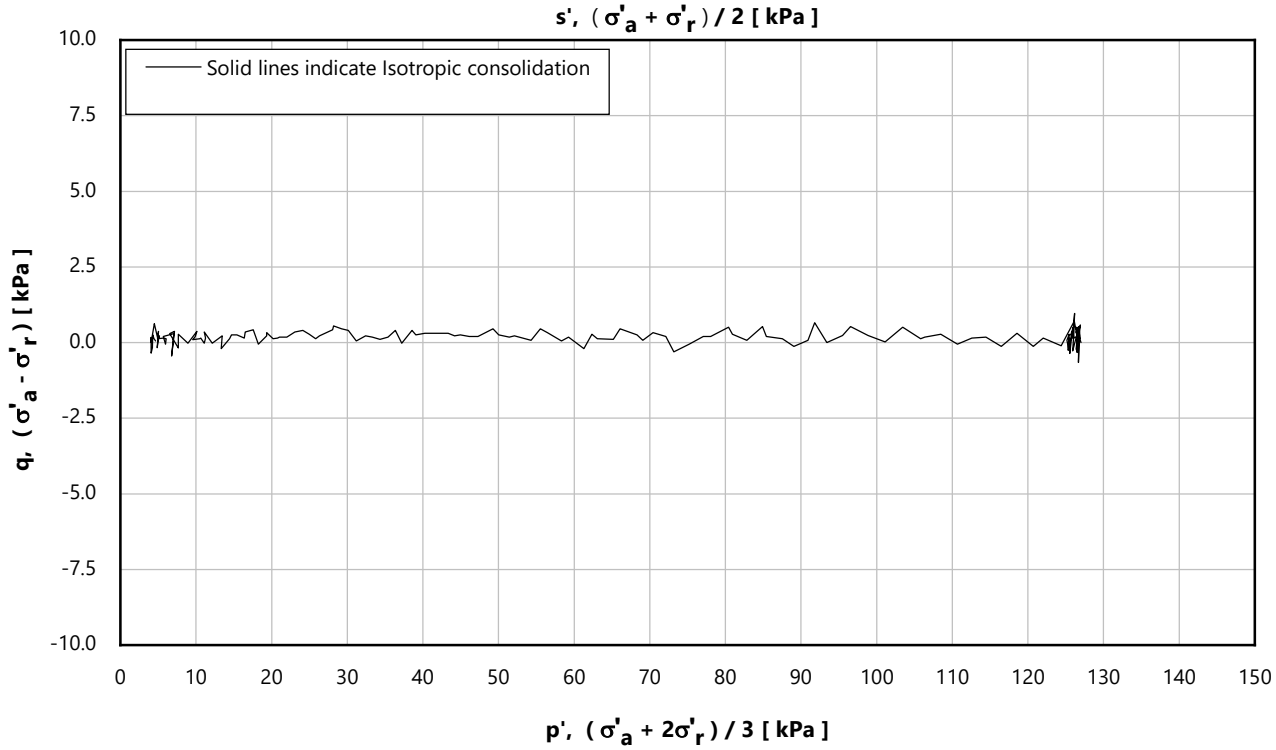
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

0919

Consolidation





CONSOLIDATION	
Stage 1 σ'_{rc}	: 127 kPa
Stage 1 σ'_{ac}	: 127 kPa

Project: 503387 - F254727

Laboratory: Wallingford, UK
Z4_OWF_BH15-COMP_07-3_CIU11

Approved by: ET 23/06/2025

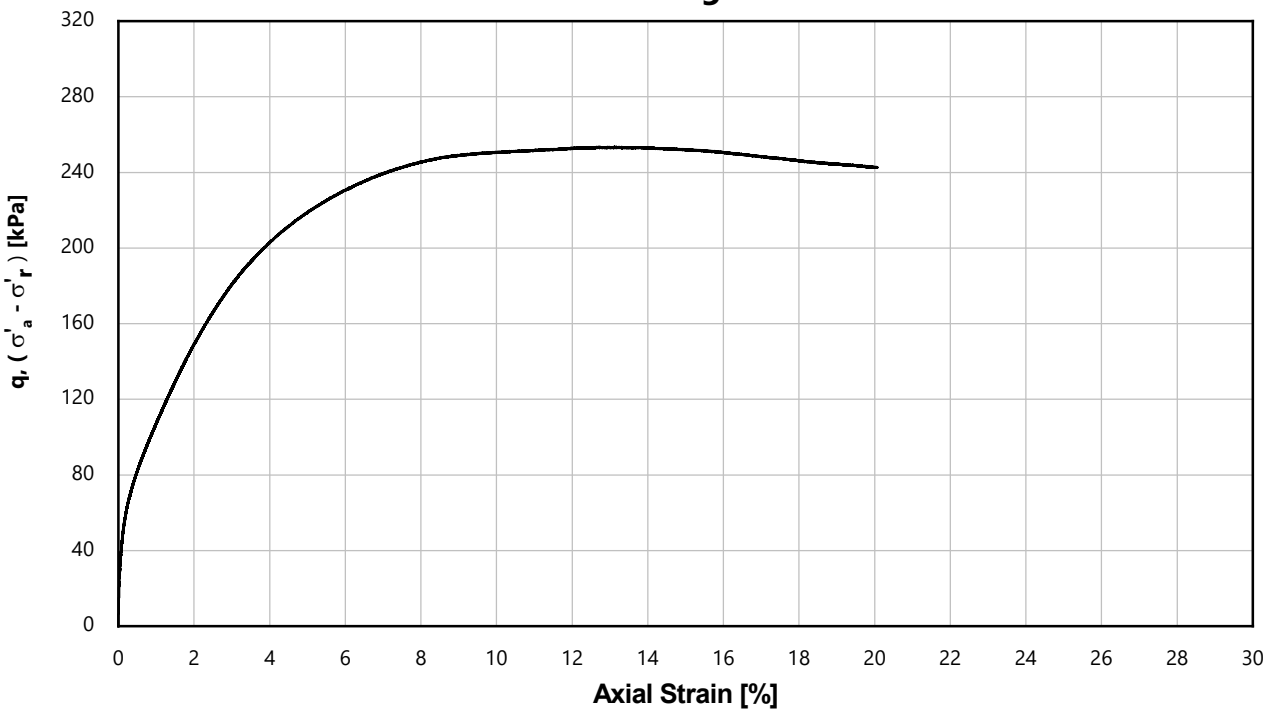
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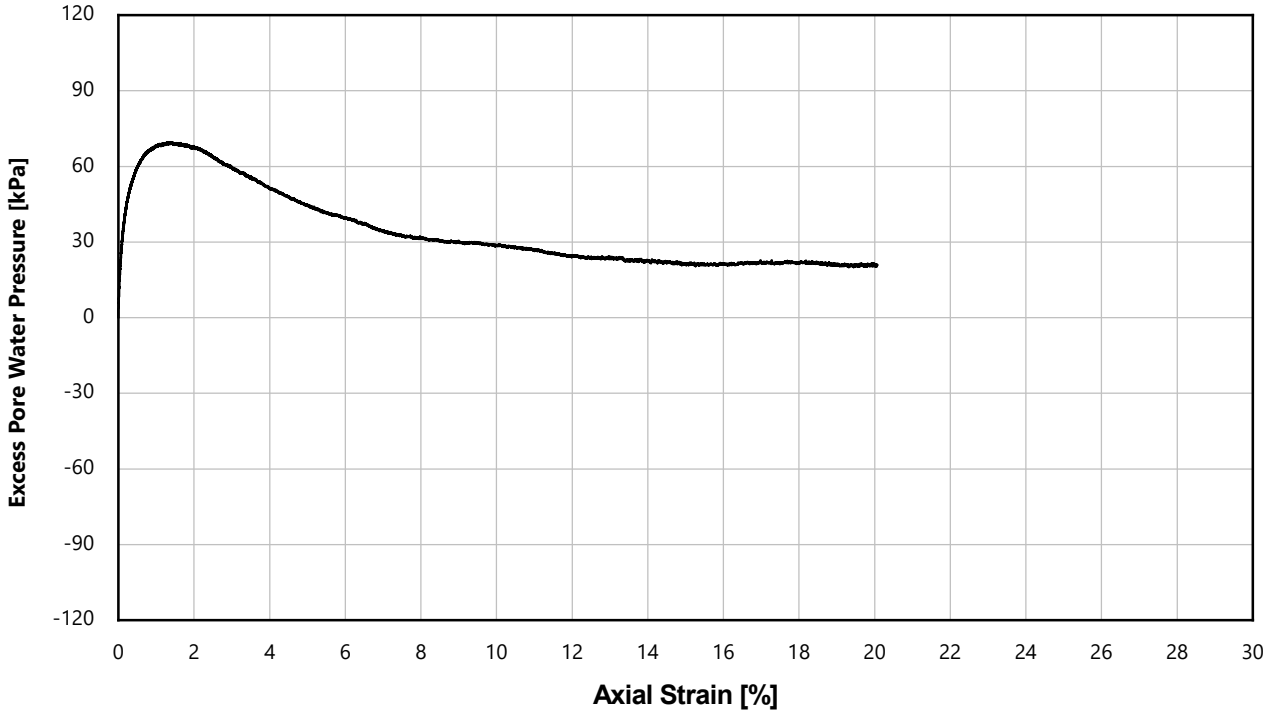
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

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Shearing





SHEAR		
Initial σ'_r : 127 kPa	Rate of strain : 0.30 %/hour	q_{peak} : 253 kPa
Initial σ'_a : 127 kPa	Ext. ε at q_{peak} : 13.30 %	

Project: 503387 - F254727

Laboratory: Wallingford, UK
Z4_OWF_BH15-COMP_07-3_CIU11

Approved by: ET 23/06/2025

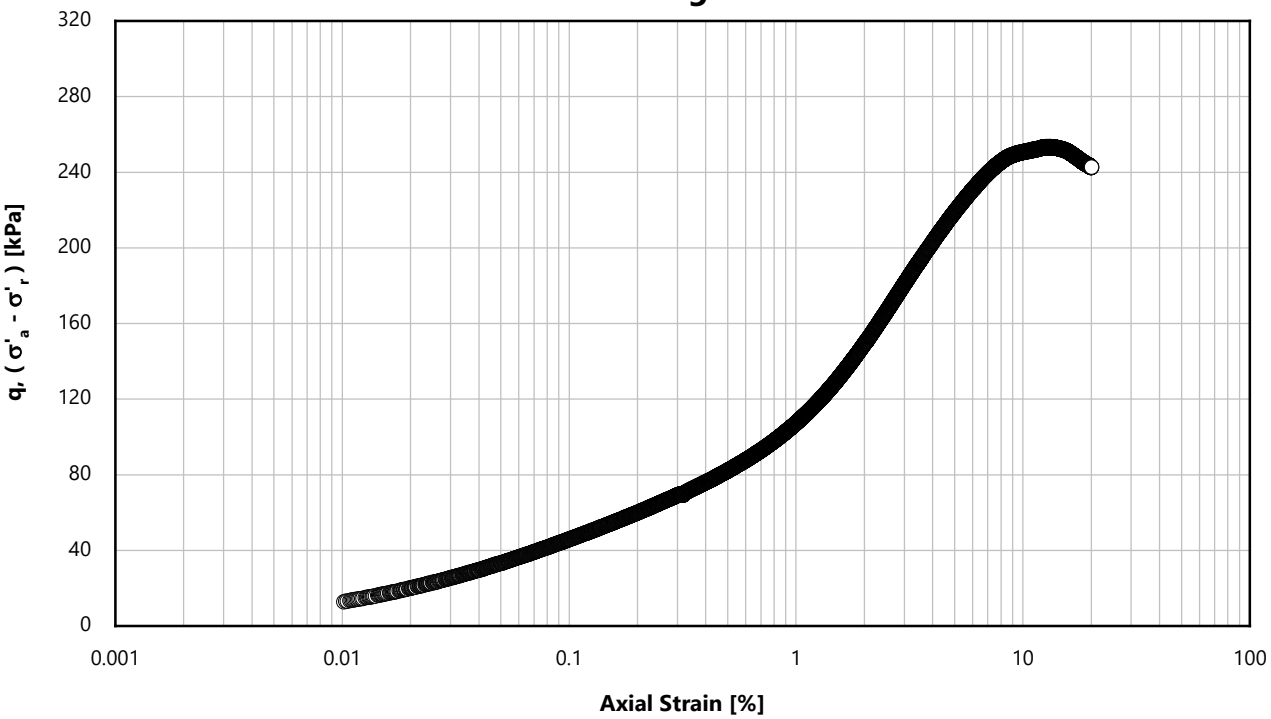
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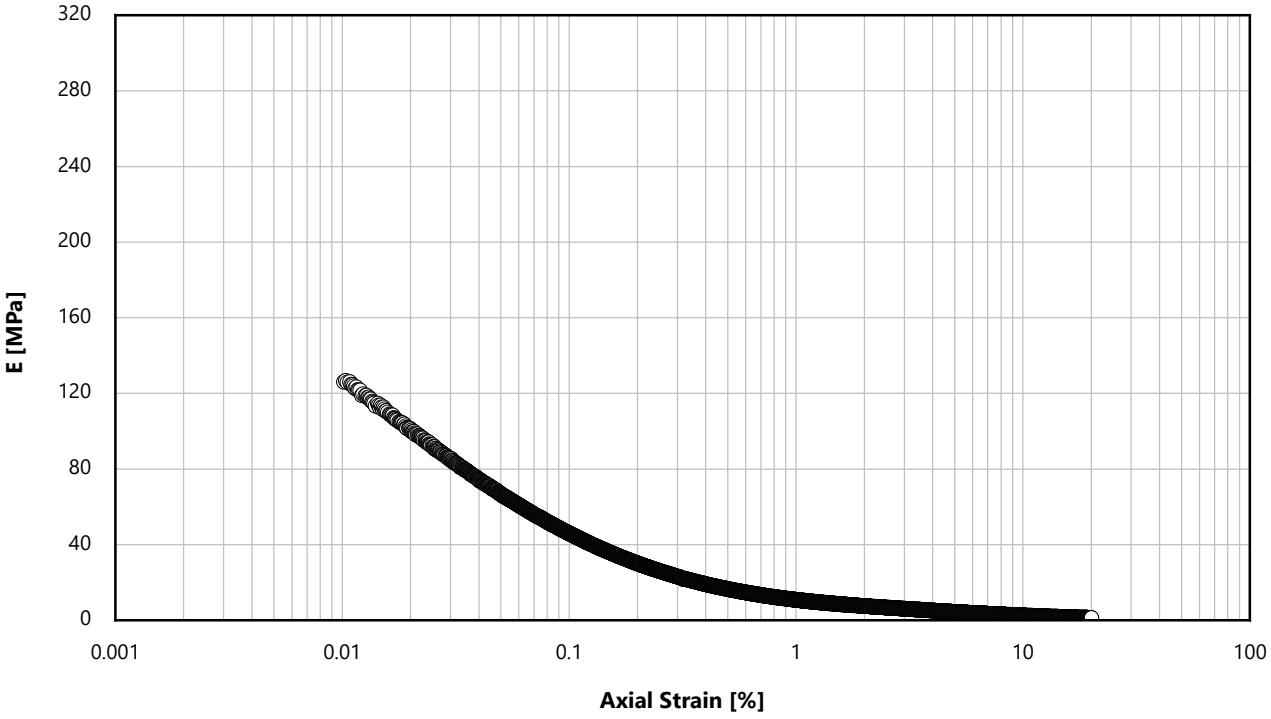
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

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Shearing





SHEAR		
Initial σ'_r : 127 kPa	Rate of strain : 0.30 %/hour	q_{peak} : 253 kPa
Initial σ'_a : 127 kPa	Ext. ε at q_{peak} : 13.30 %	

Project: 503387 - F254727

Laboratory: Wallingford, UK
Z4_OWF_BH15-COMP_07-3_CIU11

Approved by: ET 23/06/2025

Test Report

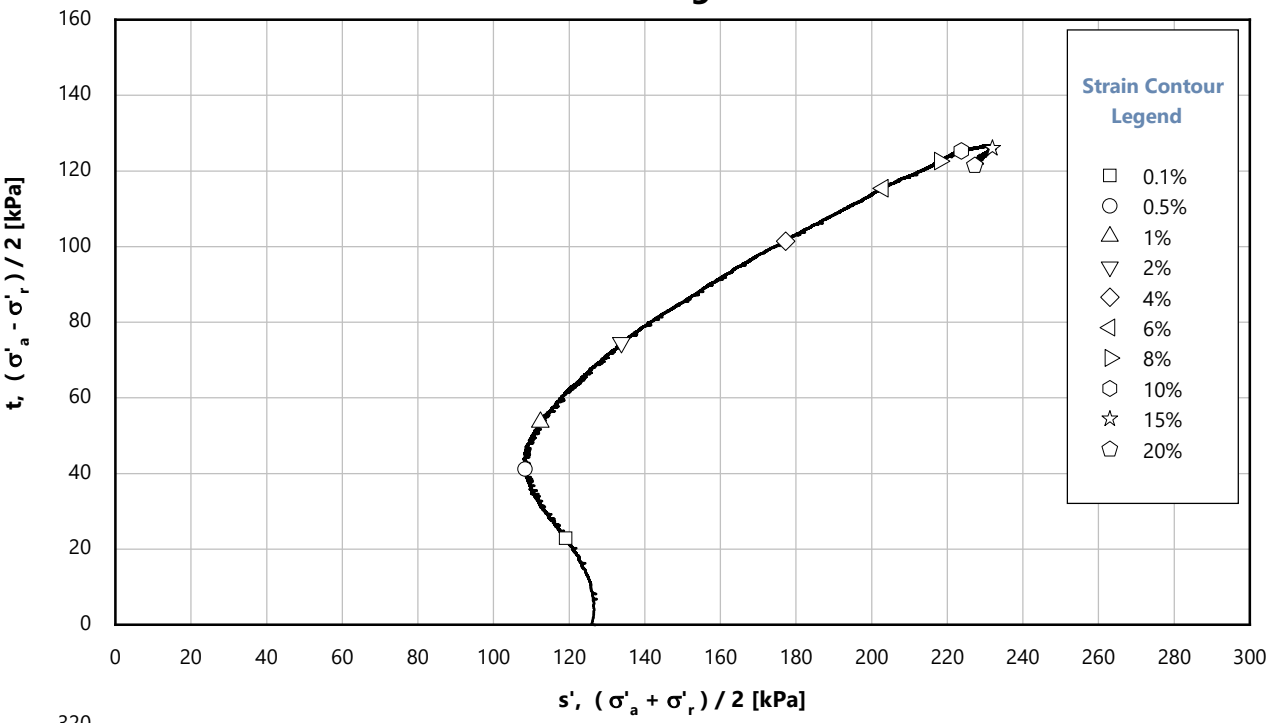
Consolidated Triaxial Compression Test On Water Saturated Soils

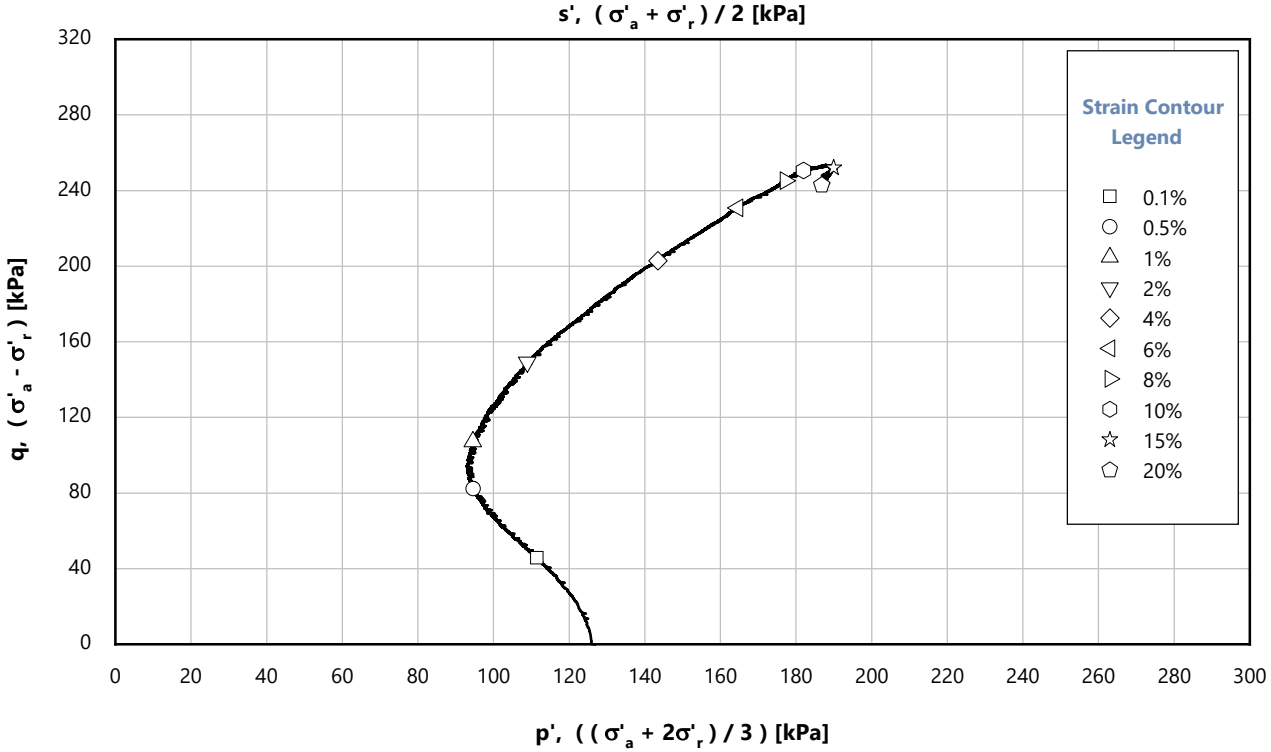
Isotropic, Undrained (CIUc)

ISO 17892-9:2018

0919

Shearing





SHEAR		
Initial σ'_r : 127 kPa	Rate of strain : 0.30 %/hour	q_{peak} : 253 kPa
Initial σ'_a : 127 kPa	Ext. ε at q_{peak} : 13.30 %	

Project: 503387 - F254727

Laboratory: Wallingford, UK
Z4_OWF_BH15-COMP_07-3_CIU11

Approved by: ET 23/06/2025

Test Report
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

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Test Identification	
Location	Z4_OWF_BH17-SAMP
Sample	20-2
Depth [m]	18.62
Test number	CIU12

Specimen Visual Description
Firm medium strength dark grey silty CLAY

Initial Specimen Conditions	
Test start date	30/05/2025
Type of sample	Undisturbed
Diameter [mm]	72.4
Height [mm]	138.8
Water content [%]	30.1
Bulk density [Mg/m^3]	1.99
Dry density [Mg/m^3]	1.53
Void ratio [-]	0.768
Degree of saturation [%]	100
Particle density - Assumed [Mg/m^3]	2.70
Torvane [kPa]	48
Pocket penetrometer [kPa]	67
Type of drains	Radial (spiral) & one end only

Test Report
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

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Saturation	
Pressure increments applied [kPa]	100
Differential pressure used [kPa]	N/A
Cell pressure [kPa]	1412
Base PWP [kPa]	1384
Mid height PWP [kPa]	-
B value achieved [-]	1.00

Isotropic Consolidation	
Cell pressure [kPa]	1499
Back pressure [kPa]	1384
Base PWP [kPa]	1384
Mid height PWP [kPa]	-
Effective radial pressure [kPa]	115
Effective axial pressure [kPa]	115
Deviator stress [kPa]	0
Volumetric strain [%]	2.22
Volumetric strain rate - end of stage [%/hr]	0.01
External axial strain [%]	0.69
Local axial strain [%]	-
Local radial strain [%]	-
Water content [%]	27.0
Bulk density [Mg/m³]	1.98
Dry density [Mg/m³]	1.56
Void ratio [-]	0.729
Degree of saturation [%]	100

Project: 503387 - F254727

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP_20-2_CIU12

Approved by: ET - 23/06/2025

Test Report
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

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Shearing Stage	
Initial effective radial pressure [kPa]	115
Initial effective axial pressure [kPa]	115
Rate of strain [%/hour]	0.30
At peak deviator stress	
Corrected deviator stress [kPa]	216
Membrane correction applied [kPa]	4
Drain correction applied [kPa]	0
External axial strain [%]	14.10
Local axial strain [%]	-
Local radial strain [%]	-
Excess base PWP [kPa]	11
Excess mid height PWP [kPa]	-
Effective radial pressure [kPa]	103
Effective axial pressure [kPa]	319
Principal effective stress ratio [-]	3.09
ε_{50} [%]	2.13
Secant modulus (E_{50}) at ε_{50} [kPa]	5079
At peak principal effective stress ratio	
Corrected deviator stress [kPa]	183
Membrane correction applied [kPa]	2
Drain correction applied [kPa]	0
External axial strain [%]	5.70
Local axial strain [%]	-
Local radial strain [%]	-
Excess base PWP [kPa]	33
Excess mid height PWP [kPa]	-
Effective radial pressure [kPa]	82
Effective axial pressure [kPa]	265
Principal effective stress ratio [-]	3.24
At 10% external axial strain	
Corrected deviator stress [kPa]	207
Membrane correction applied [kPa]	3
Drain correction applied [kPa]	0
External axial strain [%]	10.00
Excess base PWP [kPa]	18
Excess mid height PWP [kPa]	-
Effective radial pressure [kPa]	97
Effective axial pressure [kPa]	304
Principal effective stress ratio [-]	3.14
ε_{50} [%]	1.99
Secant modulus (E_{50}) at ε_{50} [kPa]	5215

Project: 503387 - F254727

Laboratory: Wallingford, UK

Z4_OWF_BH17-SAMP_20-2_CIU12

Approved by: ET - 23/06/2025

Test Report
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

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Specimen Photographs





FINAL CONDITIONS

Water content [%]	27.0
Bulk density [Mg/m³]	1.98
Dry density [Mg/m³]	1.56
Void ratio [-]	0.729

Project: 503387 - F254727

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP_20-2_CIU12

Approved by: ET - 23/06/2025

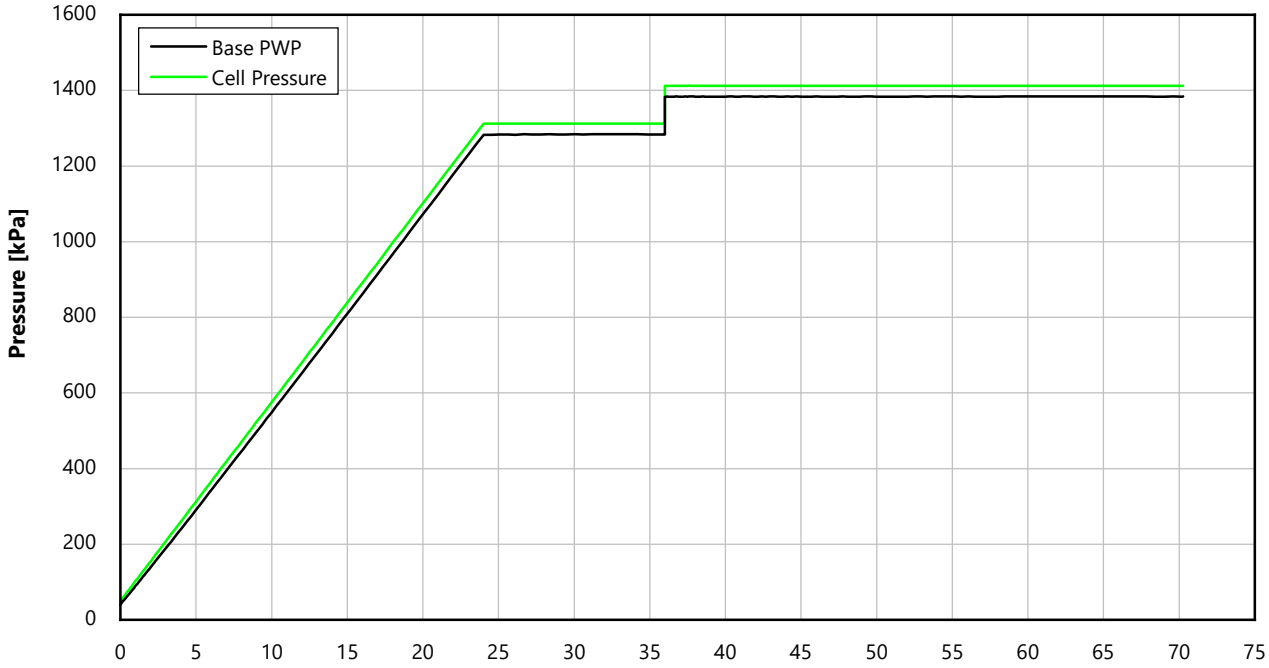
Test Report

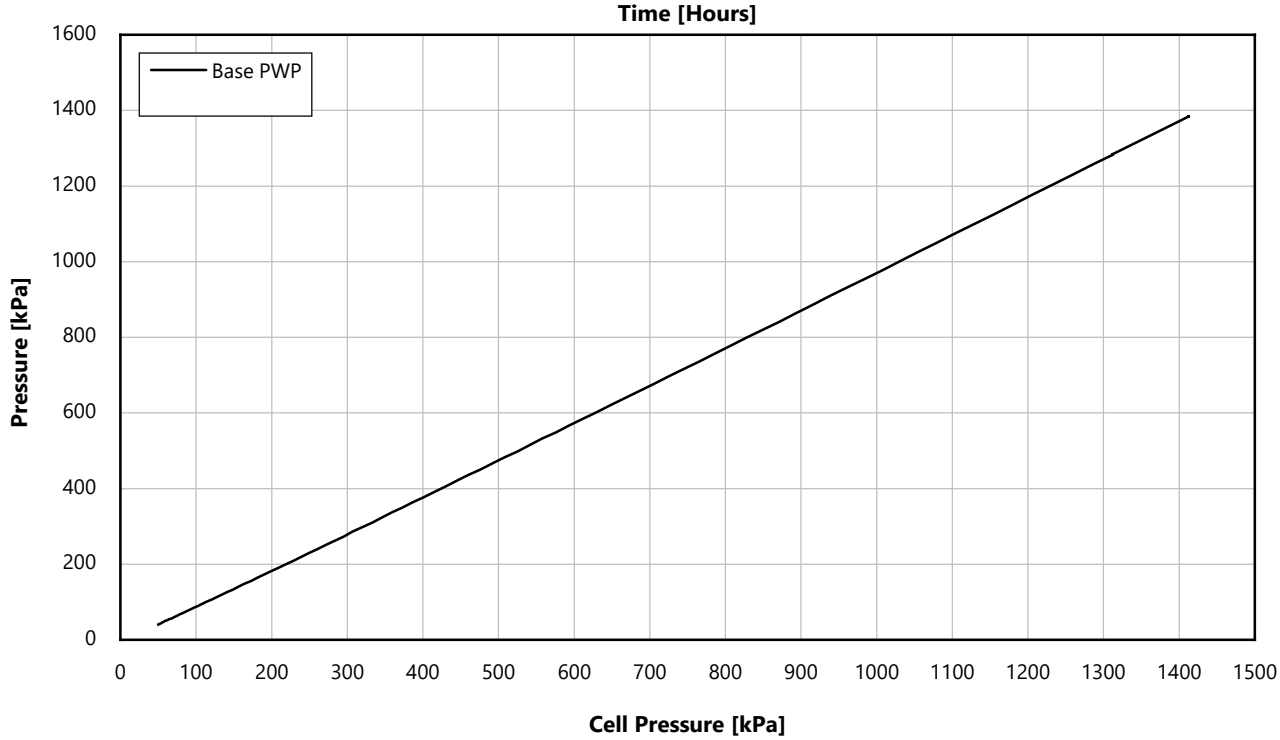
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

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Saturation





SATURATION	
B value : 1.00	Initial σ'_a : 10 kPa
	Final σ'_a : 28 kPa

Project: 503387 - F254727

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP_20-2_CIU12

Approved by: ET 23/06/2025

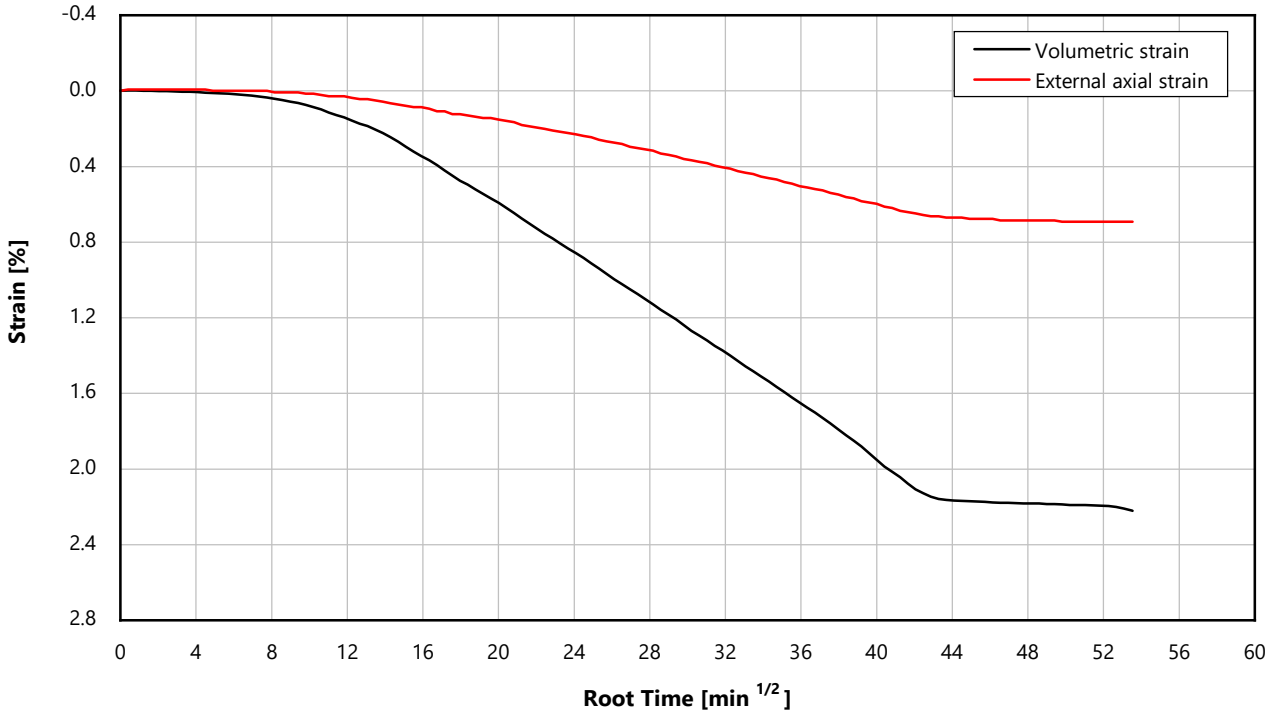
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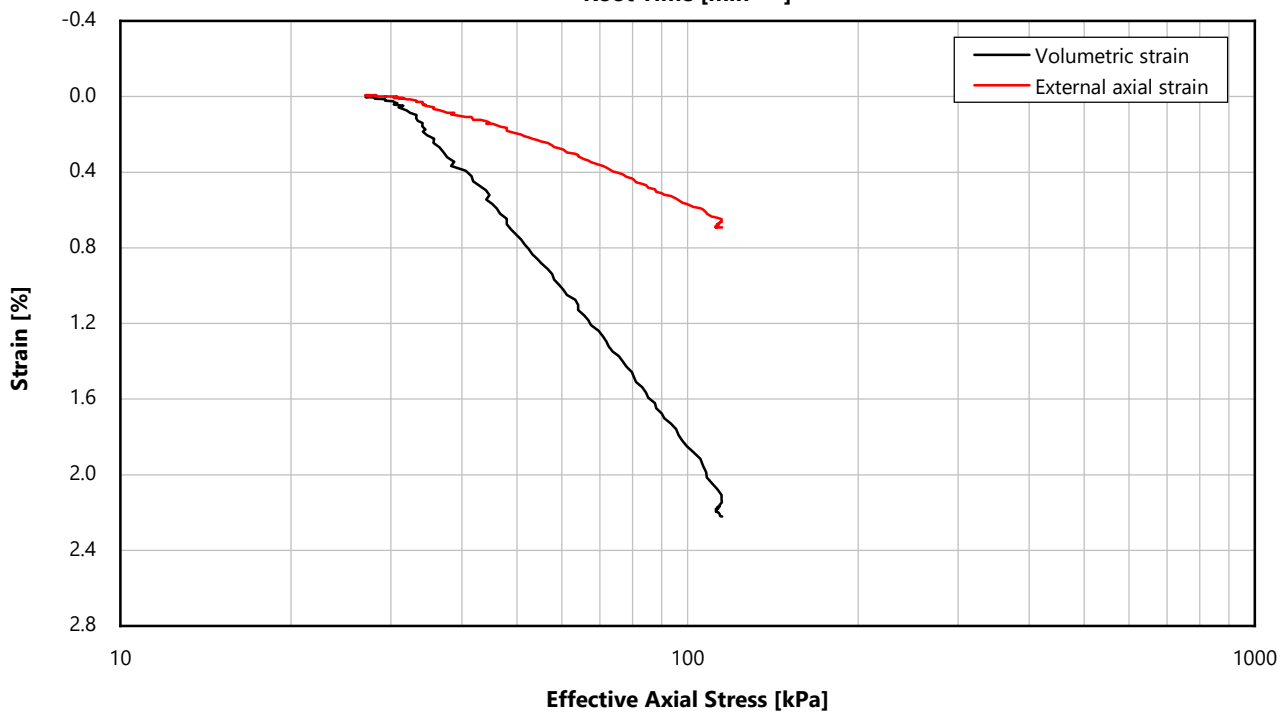
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

0919

Consolidation





CONSOLIDATION
Stage 1 σ'_{rc} : 115 kPa
Stage 1 σ'_{ac} : 115 kPa

Project: 503387 - F254727

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP_20-2_CIU12

Approved by: ET 23/06/2025

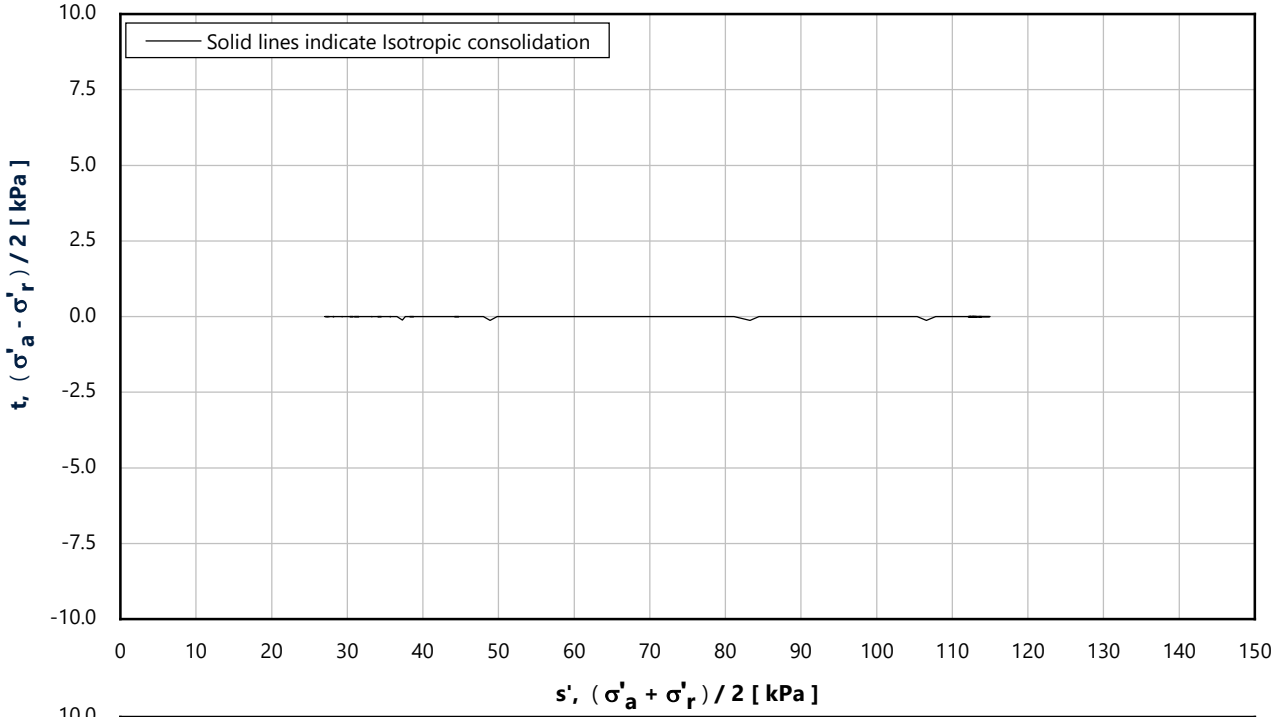
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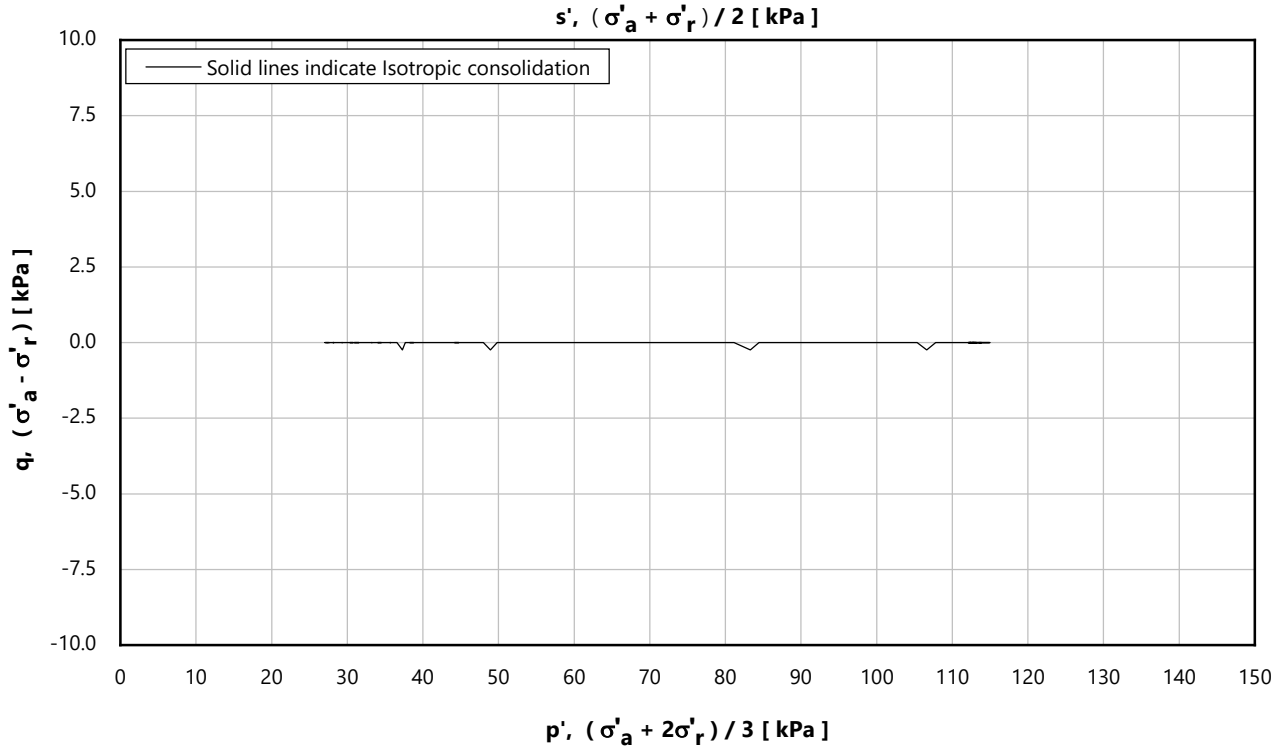
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

0919

Consolidation





CONSOLIDATION	
Stage 1 σ'_{rc}	: 115 kPa
Stage 1 σ'_{ac}	: 115 kPa

Project: 503387 - F254727

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP_20-2_CIU12

Approved by: ET 23/06/2025

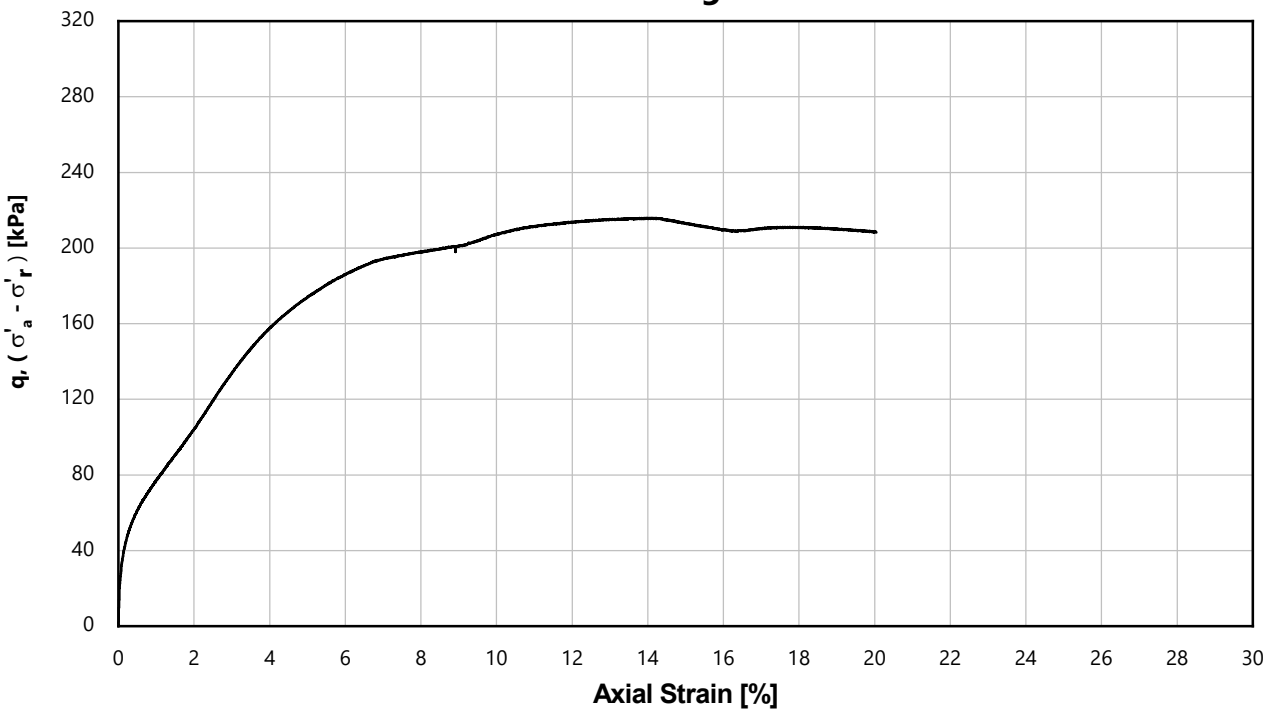
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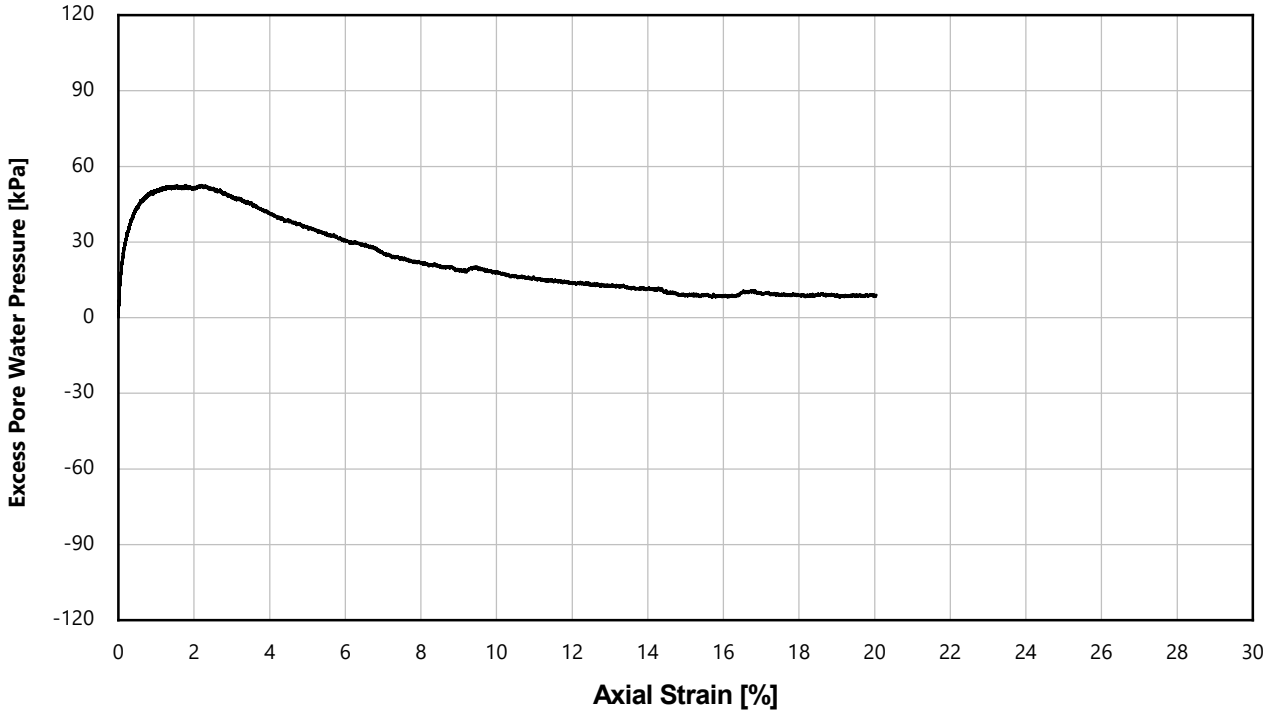
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

UKAS TESTING 0919

Shearing





SHEAR		
Initial σ'_r : 115 kPa	Rate of strain : 0.30 %/hour	q_{peak} : 216 kPa
Initial σ'_a : 115 kPa	Ext. ε at q_{peak} : 14.10 %	

Project: 503387 - F254727

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP_20-2_CIU12

Approved by: ET 23/06/2025

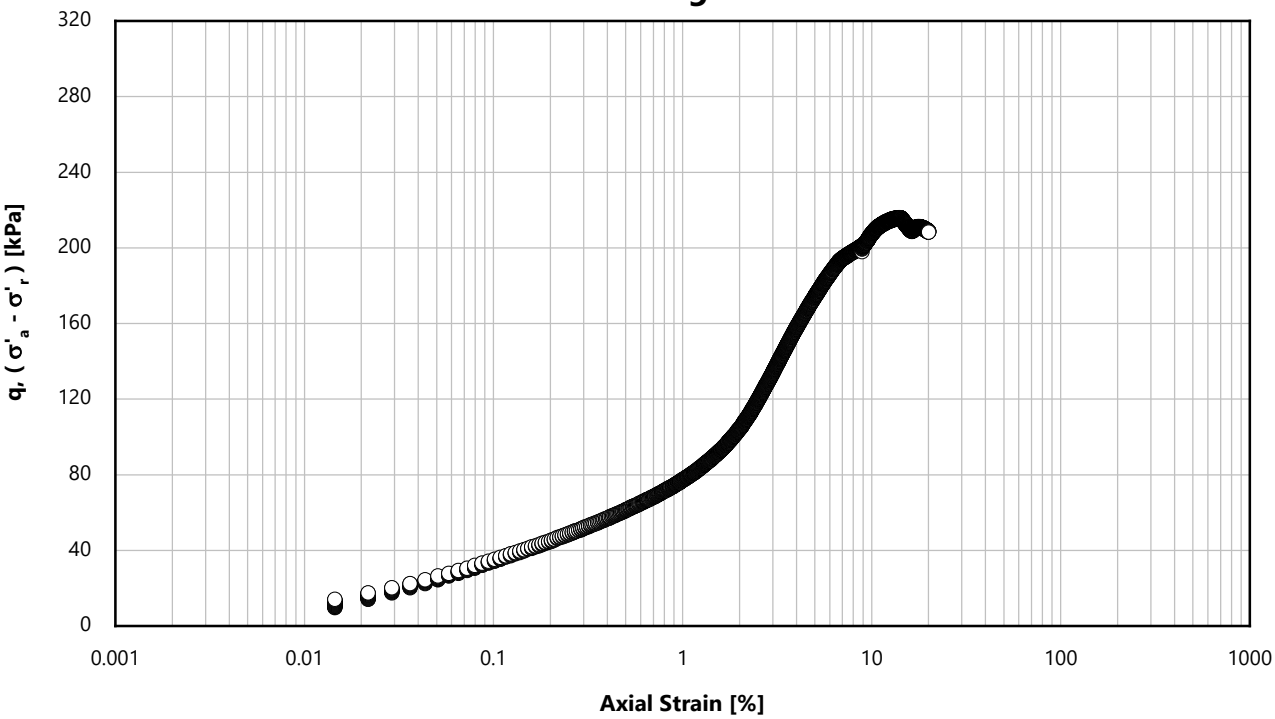
Test Report

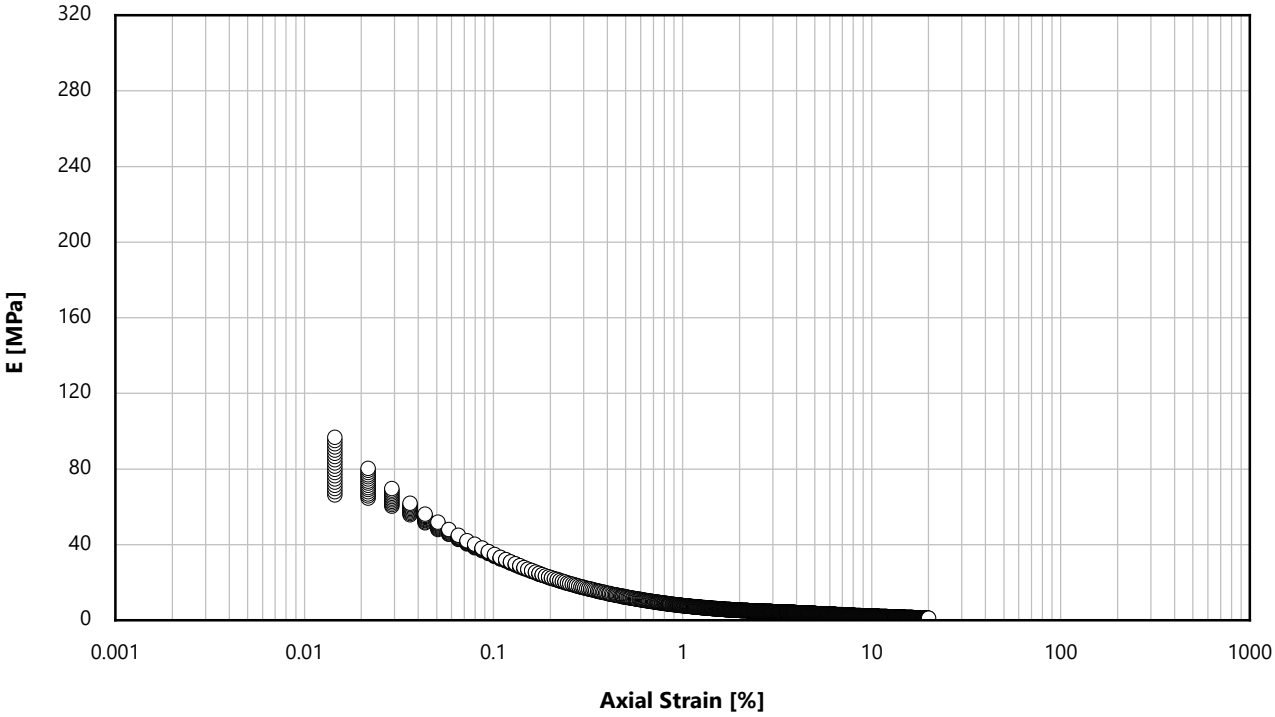
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

0919

Shearing





SHEAR		
Initial σ'_r : 115 kPa	Rate of strain : 0.30 %/hour	q_{peak} : 216 kPa
Initial σ'_a : 115 kPa	Ext. ε at q_{peak} : 14.10 %	

Project: 503387 - F254727

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP_20-2_CIU12

Approved by: ET 23/06/2025

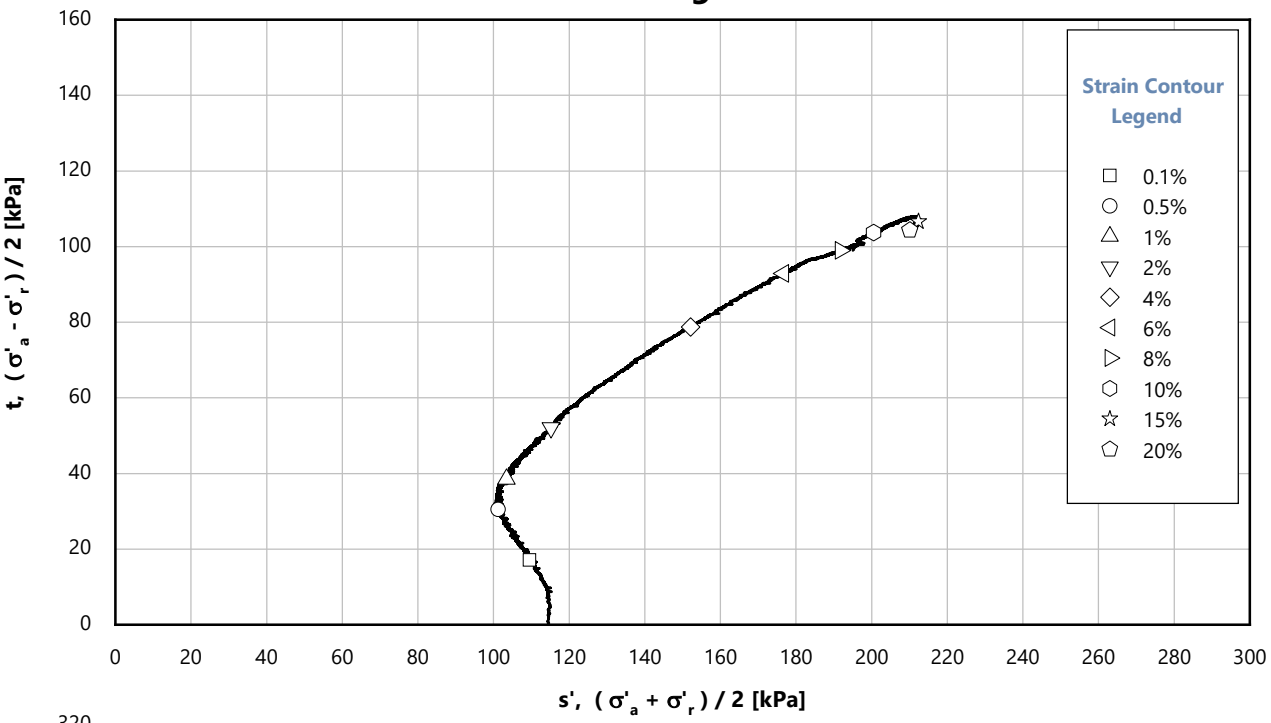
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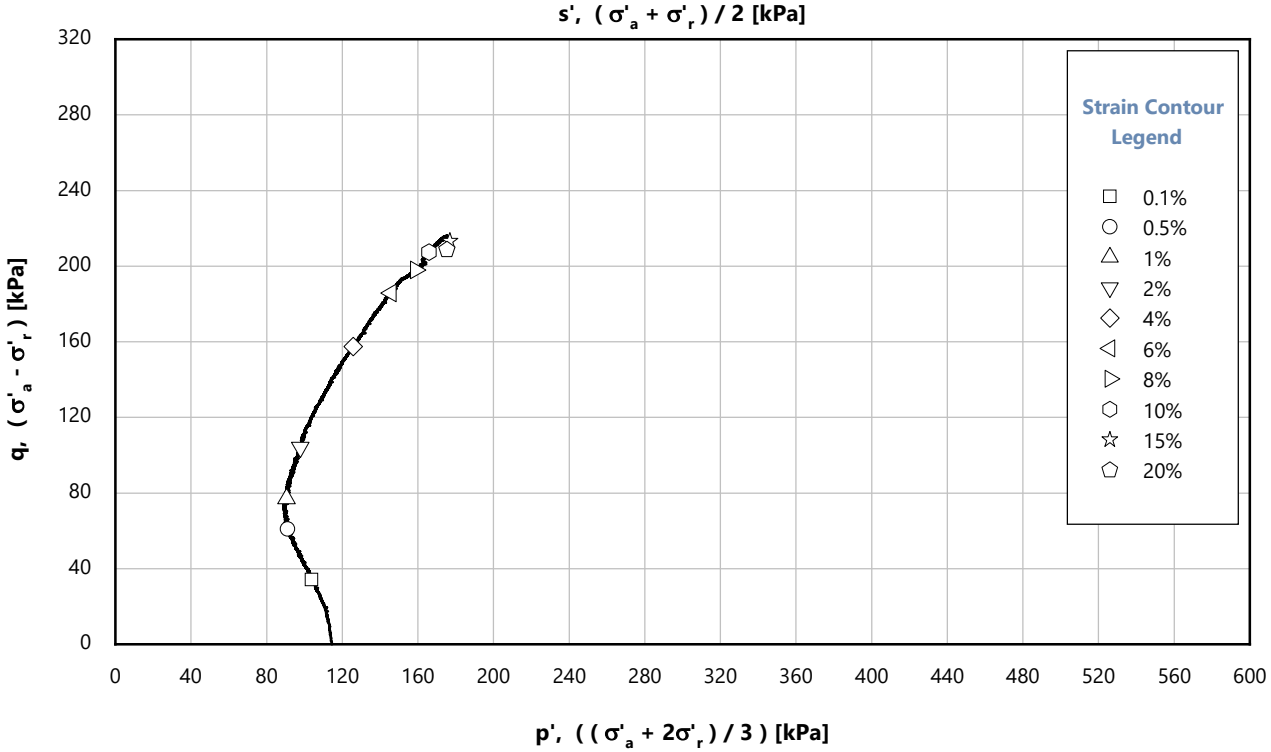
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

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Shearing





SHEAR		
Initial σ'_r : 115 kPa	Rate of strain : 0.30 %/hour	q_{peak} : 216 kPa
Initial σ'_a : 115 kPa	Ext. ε at q_{peak} : 14.10 %	

Project: 503387 - F254727

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP_20-2_CIU12

Approved by: ET 23/06/2025

Test Report
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

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Test Identification	
Location	Z4_OWF_BH17-SAMP
Sample	21-2
Depth [m]	19.65
Test number	CIU13

Specimen Visual Description
Firm medium strength dark grey silty CLAY

Initial Specimen Conditions	
Test start date	30/05/2025
Type of sample	Undisturbed
Diameter [mm]	69.0
Height [mm]	140.2
Water content [%]	29.3
Bulk density [Mg/m^3]	1.93
Dry density [Mg/m^3]	1.50
Void ratio [-]	0.804
Degree of saturation [%]	98
Particle density - Assumed [Mg/m^3]	2.70
Torvane [kPa]	48
Pocket penetrometer [kPa]	59
Type of drains	Radial (spiral) & one end only

Test Report
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

0919

Saturation	
Pressure increments applied [kPa]	100
Differential pressure used [kPa]	N/A
Cell pressure [kPa]	1528
Base PWP [kPa]	1525
Mid height PWP [kPa]	-
B value achieved [-]	0.98

Isotropic Consolidation	
Cell pressure [kPa]	1650
Back pressure [kPa]	1524
Base PWP [kPa]	1527
Mid height PWP [kPa]	-
Effective radial pressure [kPa]	123
Effective axial pressure [kPa]	122
Deviator stress [kPa]	0
Volumetric strain [%]	3.51
Volumetric strain rate - end of stage [%/hr]	0.00
External axial strain [%]	1.03
Local axial strain [%]	-
Local radial strain [%]	-
Water content [%]	26.9
Bulk density [Mg/m³]	1.97
Dry density [Mg/m³]	1.55
Void ratio [-]	0.741
Degree of saturation [%]	98

Project: 503387 - F254727

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP_21-2_CIU13

Approved by: ET - 23/06/2025

Test Report
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

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Shearing Stage	
Initial effective radial pressure [kPa]	123
Initial effective axial pressure [kPa]	123
Rate of strain [%/hour]	0.30
At peak deviator stress	
Corrected deviator stress [kPa]	188
Membrane correction applied [kPa]	3
Drain correction applied [kPa]	0
External axial strain [%]	11.94
Local axial strain [%]	-
Local radial strain [%]	-
Excess base PWP [kPa]	48
Excess mid height PWP [kPa]	-
Effective radial pressure [kPa]	75
Effective axial pressure [kPa]	263
Principal effective stress ratio [-]	3.53
ε_{50} [%]	0.95
Secant modulus (E_{50}) at ε_{50} [kPa]	9911
At peak principal effective stress ratio	
Corrected deviator stress [kPa]	178
Membrane correction applied [kPa]	5
Drain correction applied [kPa]	0
External axial strain [%]	19.52
Local axial strain [%]	-
Local radial strain [%]	-
Excess base PWP [kPa]	61
Excess mid height PWP [kPa]	-
Effective radial pressure [kPa]	62
Effective axial pressure [kPa]	240
Principal effective stress ratio [-]	3.89
At 10% external axial strain	
Corrected deviator stress [kPa]	186
Membrane correction applied [kPa]	2
Drain correction applied [kPa]	0
External axial strain [%]	10.00
Excess base PWP [kPa]	50
Excess mid height PWP [kPa]	-
Effective radial pressure [kPa]	73
Effective axial pressure [kPa]	260
Principal effective stress ratio [-]	3.54
ε_{50} [%]	0.92
Secant modulus (E_{50}) at ε_{50} [kPa]	10118

Project: 503387 - F254727

Laboratory: Wallingford, UK

Z4_OWF_BH17-SAMP_21-2_CIU13

Approved by: ET - 23/06/2025

Test Report
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

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Specimen Photographs





FINAL CONDITIONS

Water content [%]	26.9
Bulk density [Mg/m^3]	1.97
Dry density [Mg/m^3]	1.55
Void ratio [-]	0.741

Project: 503387 - F254727

Laboratory: Wallingford, UK

Z4_OWF_BH17-SAMP_21-2_CIU13

Approved by: ET - 23/06/2025

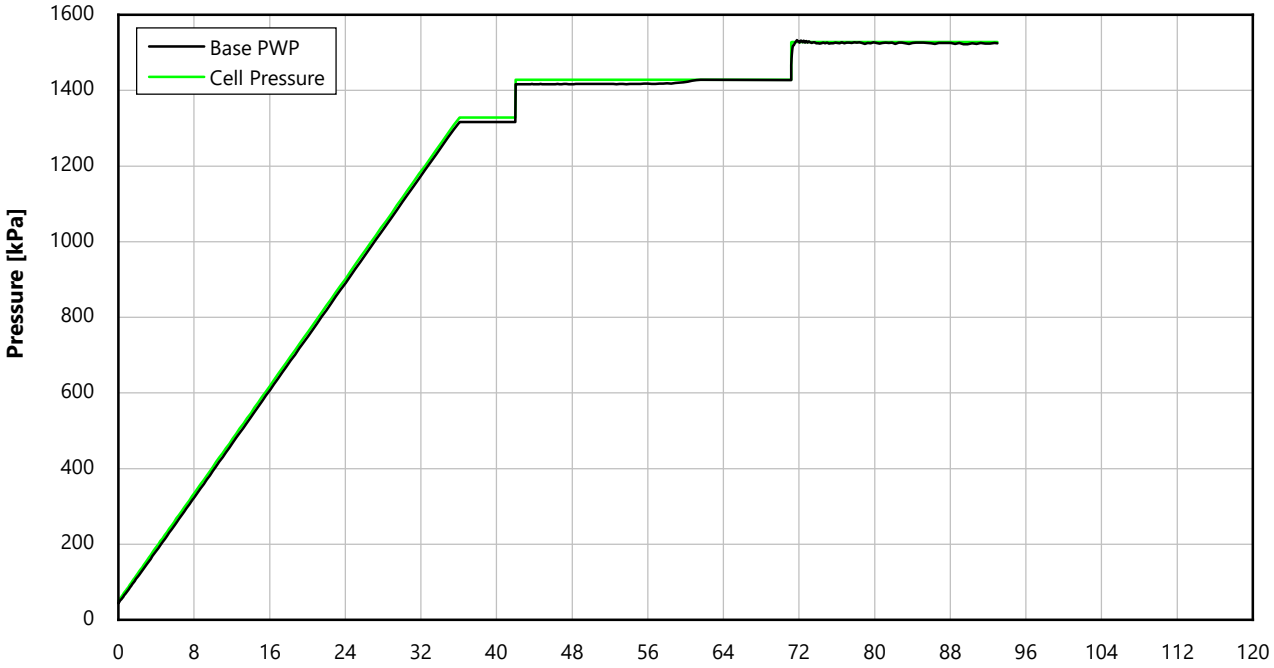
Test Report

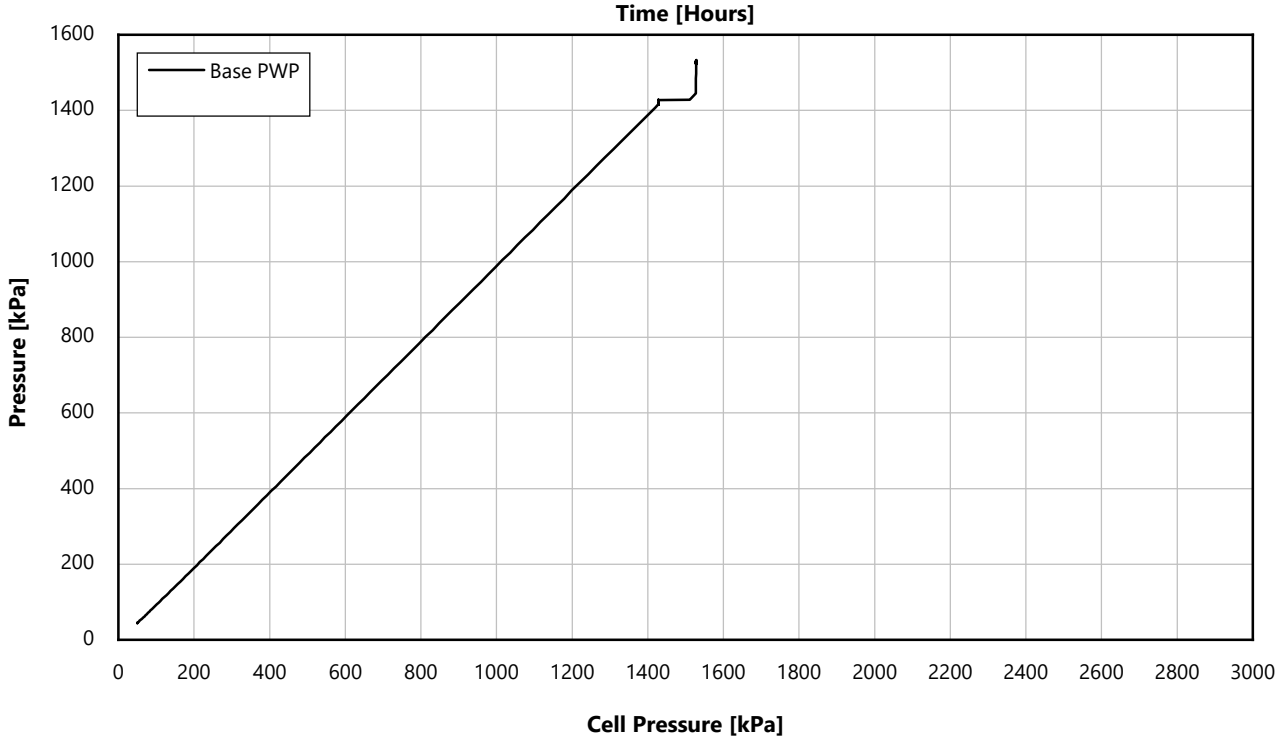
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

UKAS TESTING 0919

Saturation





SATURATION	
B value : 0.98	Initial σ'_a : 5 kPa
	Final σ'_a : 3 kPa

Project: 503387 - F254727

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP_21-2_CIU13

Approved by: ET 23/06/2025

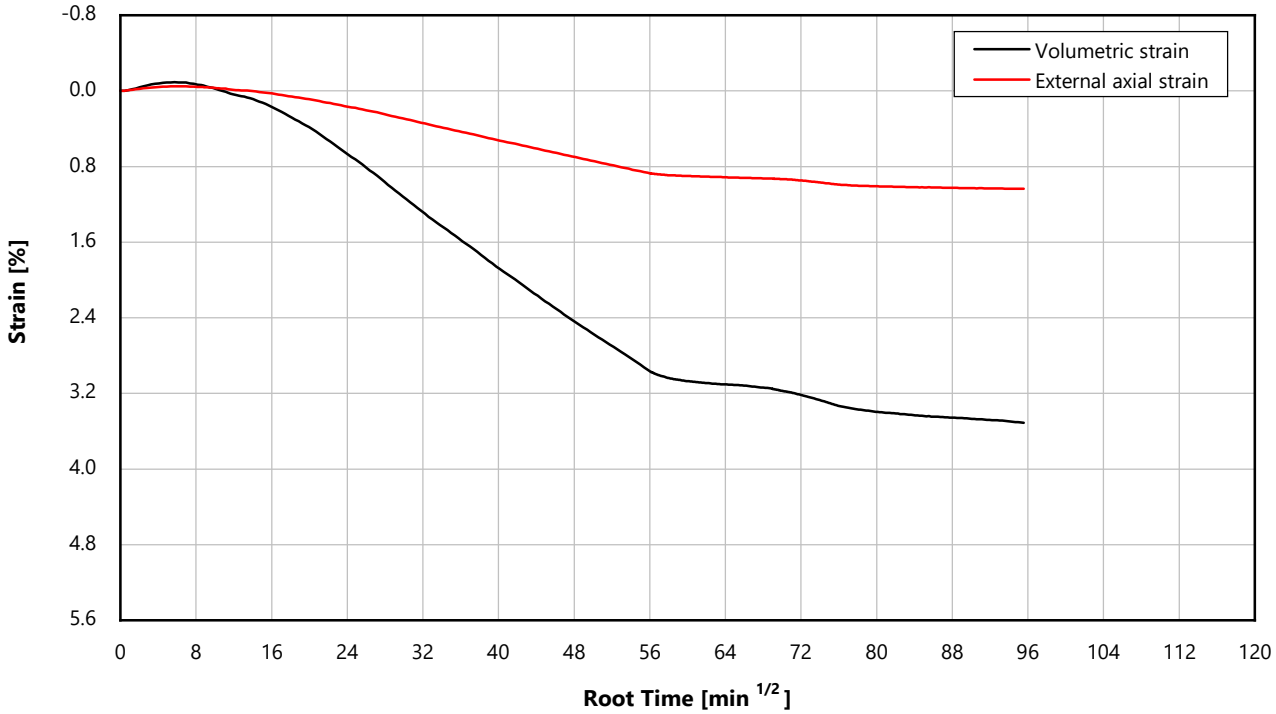
Test Report

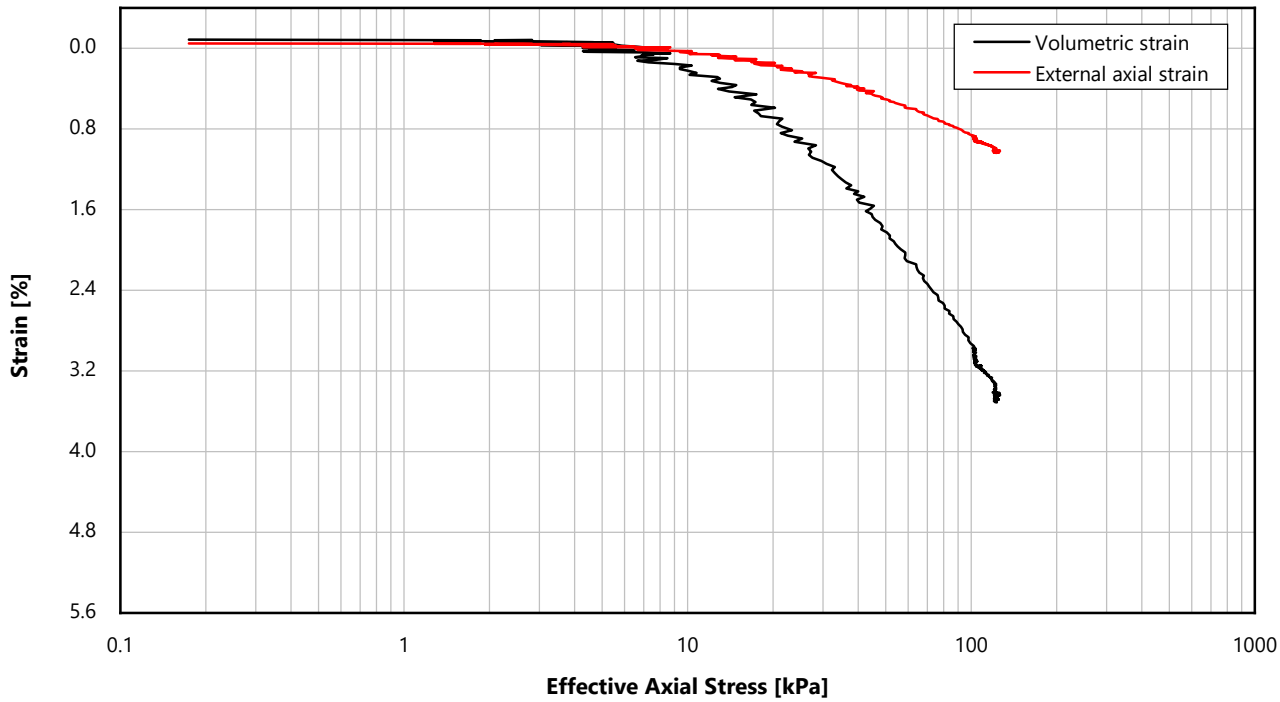
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

0919

Consolidation





CONSOLIDATION
Stage 1 σ'_{rc} : 123 kPa
Stage 1 σ'_{ac} : 122 kPa

Project: 503387 - F254727

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP_21-2_CIU13

Approved by: ET 23/06/2025

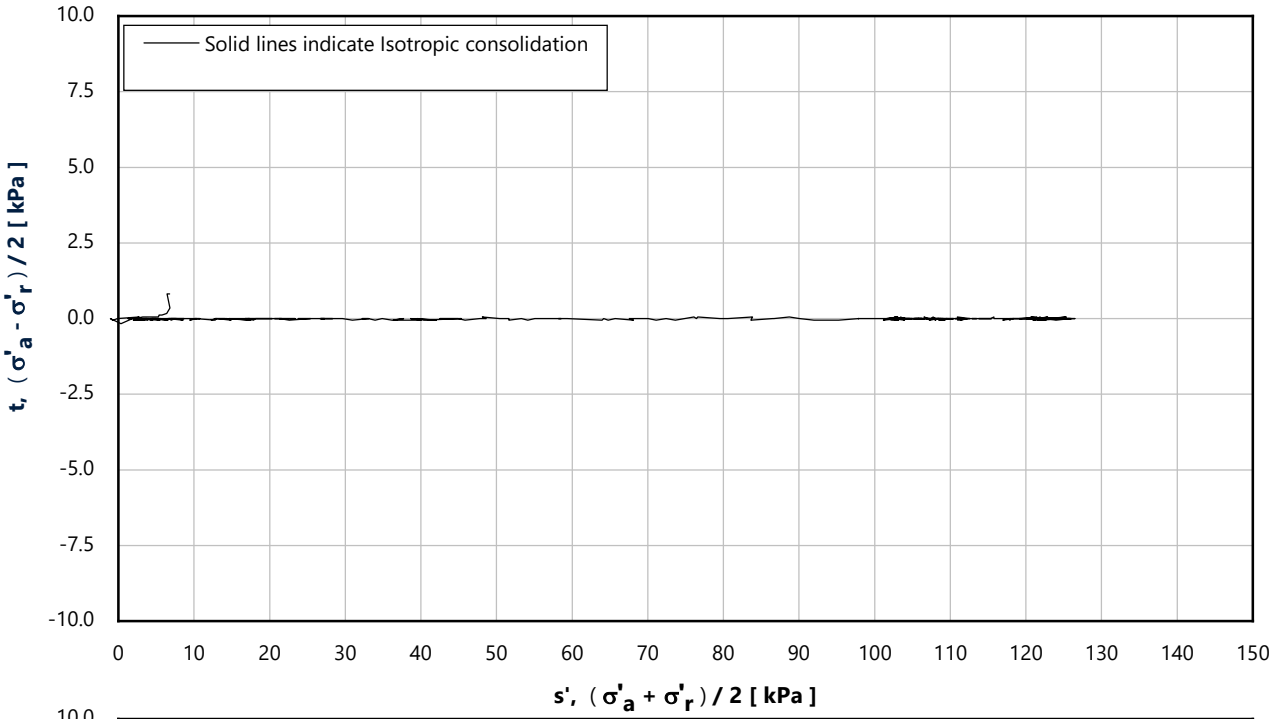
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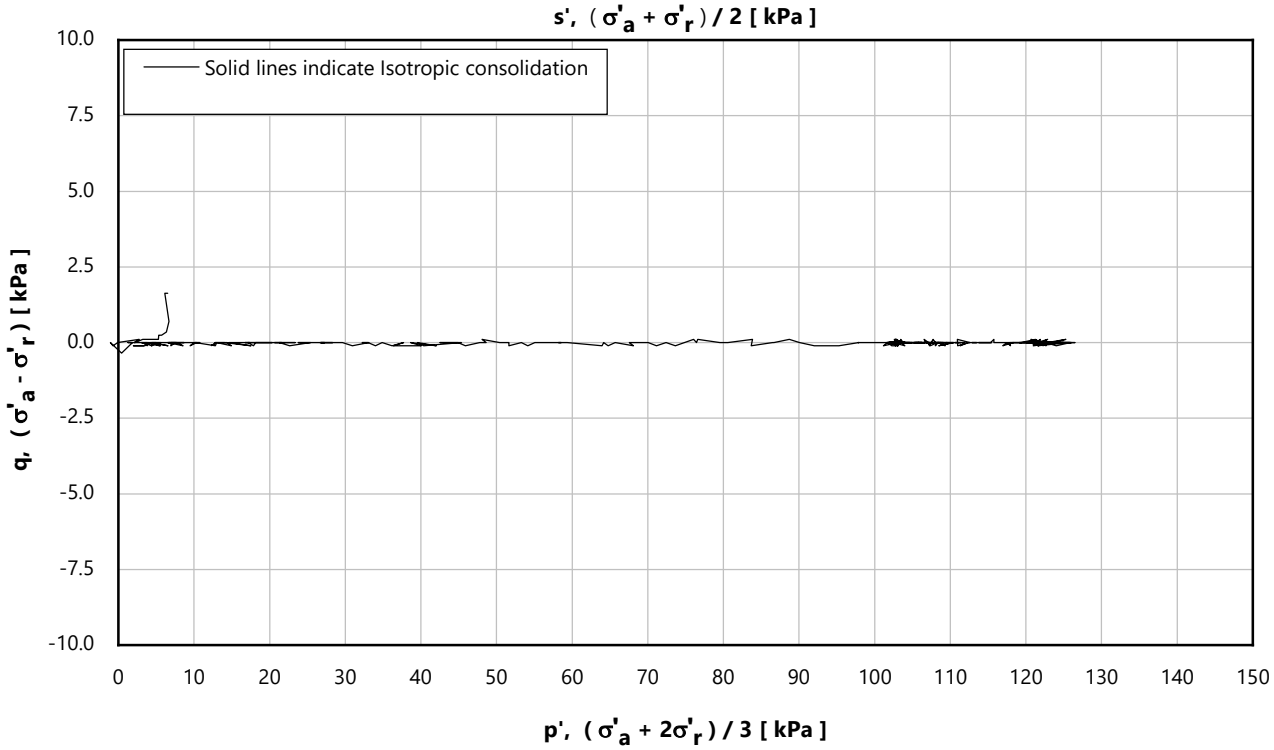
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

0919

Consolidation





CONSOLIDATION	
Stage 1 σ'_{rc}	: 123 kPa
Stage 1 σ'_{ac}	: 122 kPa

Project: 503387 - F254727

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP_21-2_CIU13

Approved by: ET 23/06/2025

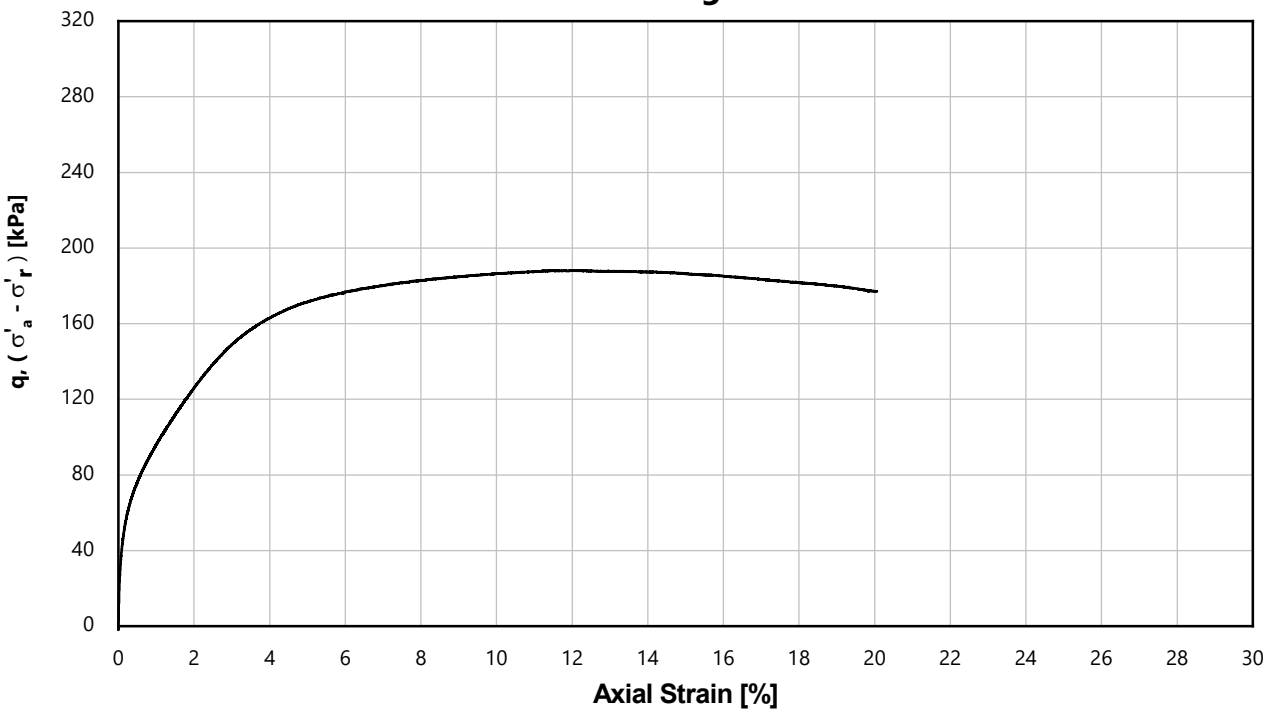
Test Report

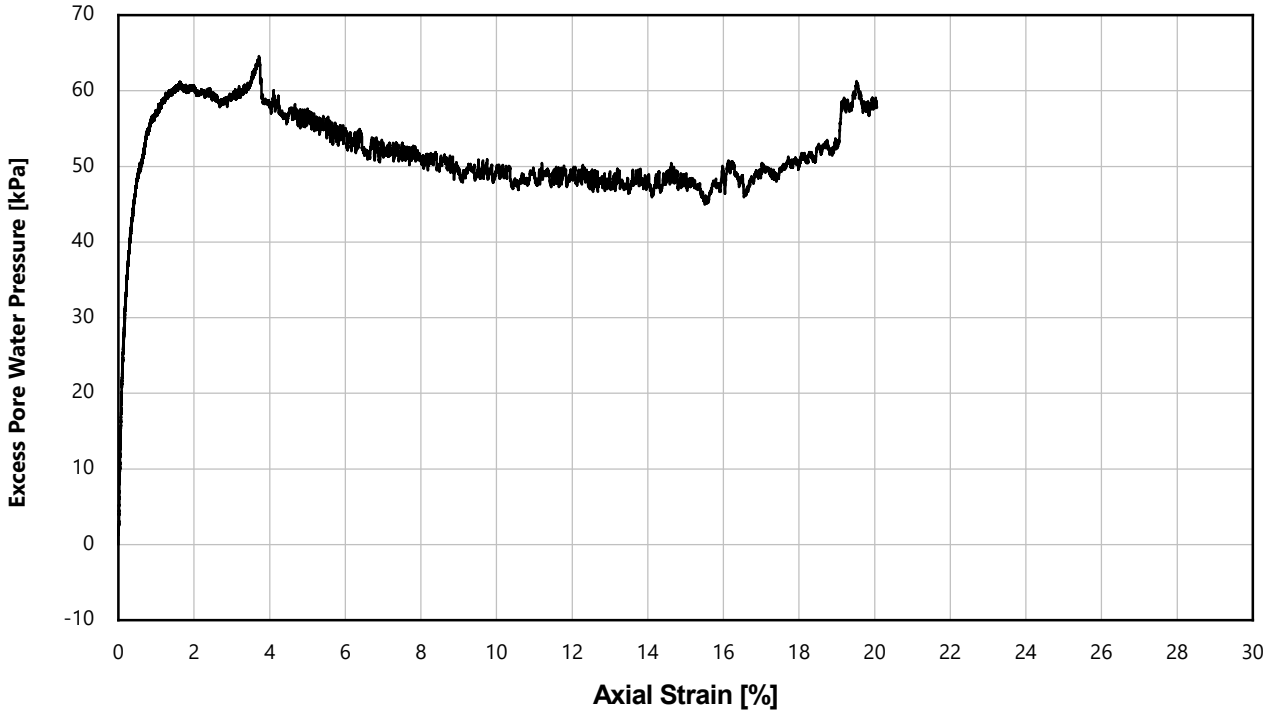
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

0919

Shearing





SHEAR		
Initial σ'_r : 123 kPa	Rate of strain : 0.30 %/hour	q_{peak} : 188 kPa
Initial σ'_a : 123 kPa	Ext. ε at q_{peak} : 11.94 %	

Project: 503387 - F254727

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP_21-2_CIU13

Approved by: ET 23/06/2025

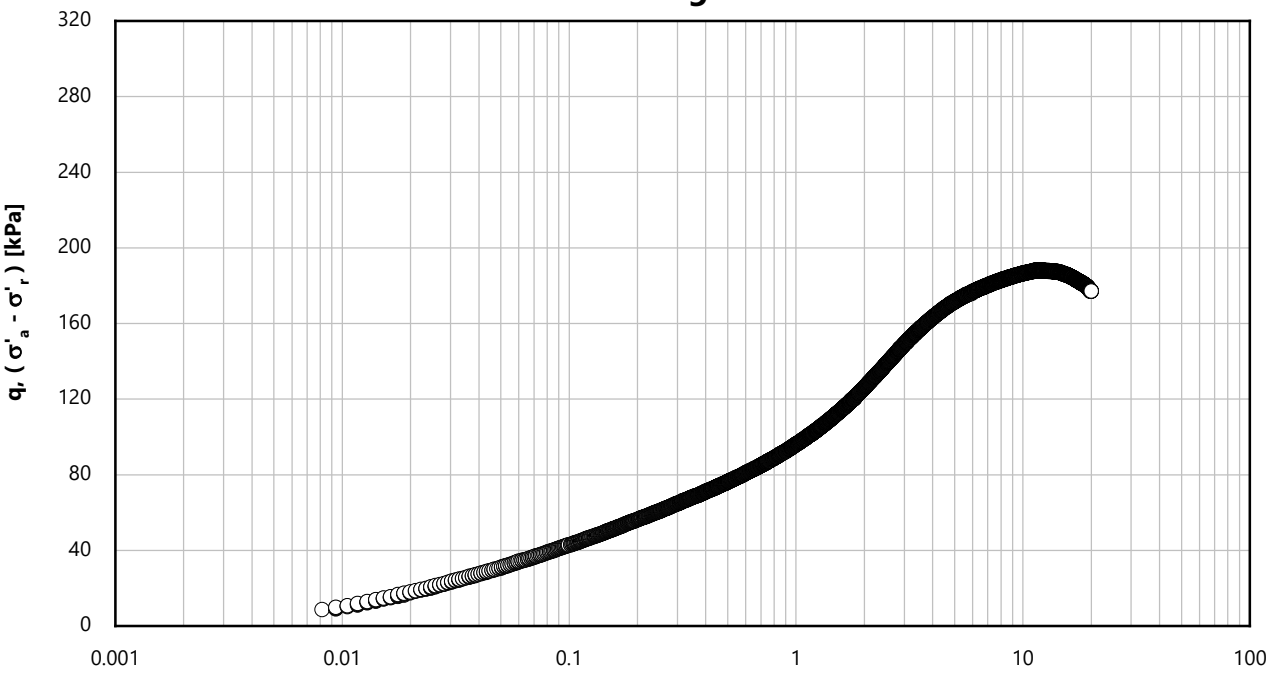
Test Report

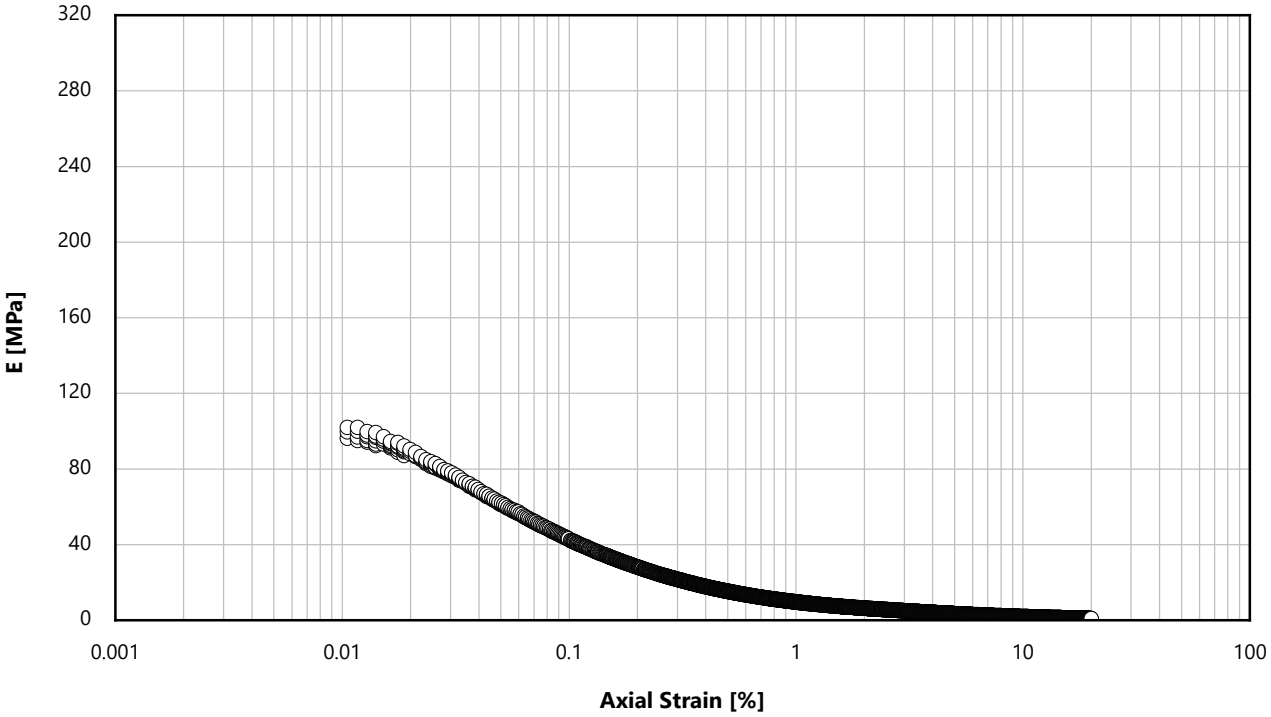
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

0919

Shearing





SHEAR		
Initial σ'_r : 123 kPa	Rate of strain : 0.30 %/hour	q_{peak} : 188 kPa
Initial σ'_a : 123 kPa	Ext. ε at q_{peak} : 11.94 %	

Project: 503387 - F254727

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP_21-2_CIU13

Approved by: ET 23/06/2025

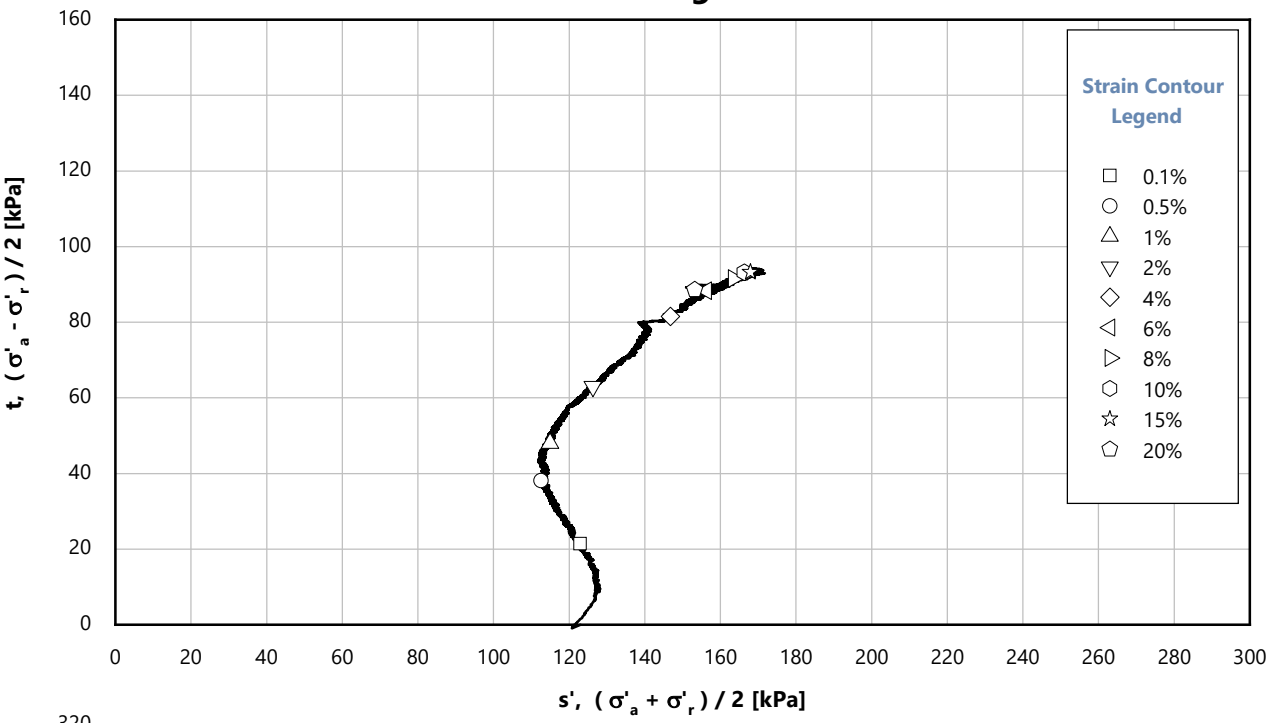
Test Report

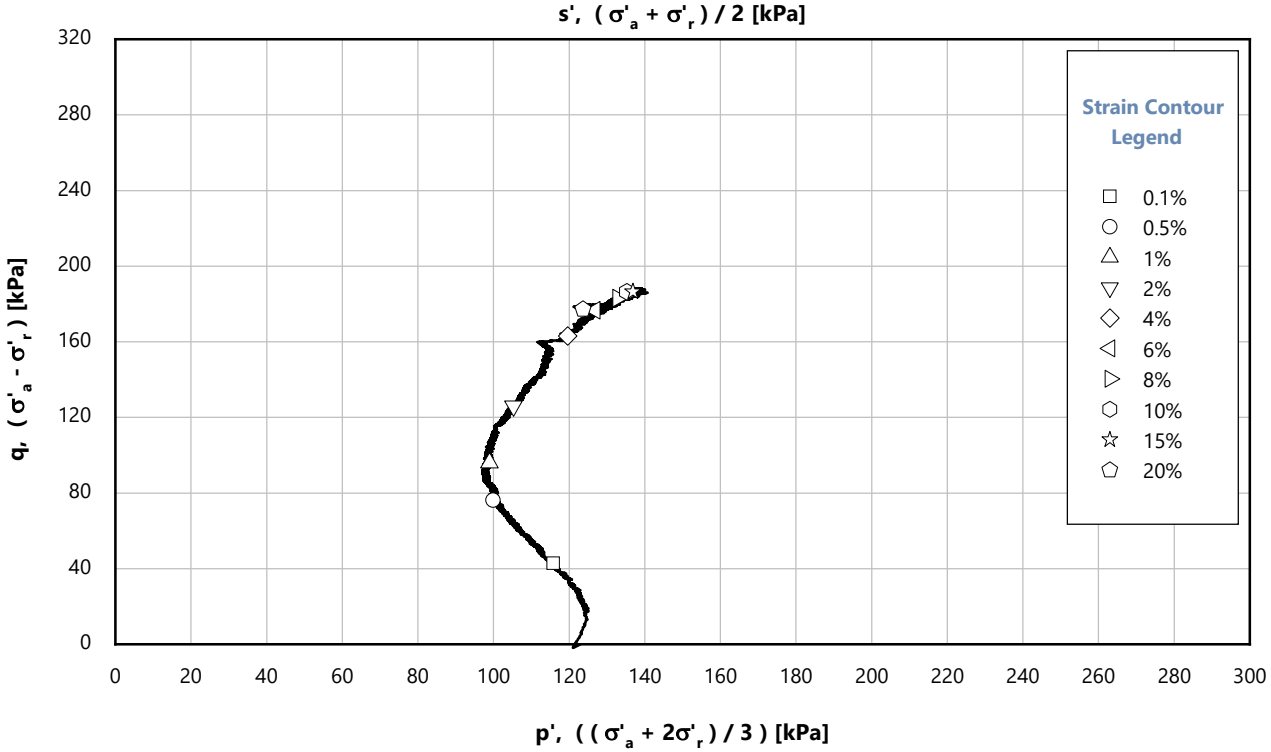
Consolidated Triaxial Compression Test On Water Saturated Soils Isotropic, Undrained (CIUc)

ISO 17892-9:2018

0919

Shearing





SHEAR		
Initial σ'_r : 123 kPa	Rate of strain : 0.30 %/hour	q_{peak} : 188 kPa
Initial σ'_a : 123 kPa	Ext. ε at q_{peak} : 11.94 %	

Project: 503387 - F254727

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP_21-2_CIU13

Approved by: ET 23/06/2025

Location	Sample ID	Depth BSF [m]	Specimen Condition	Specimen ID	Initial Conditions*							B [-]	Consolidation Stage†				
					D [mm]	h [mm]	w [%]	ρ [Mg/m^3]	ρ_d [Mg/m^3]	e_0 [-]	S_r [%]		e [-]	σ'_{rc} [kPa]	σ'_{vc} [kPa]	ε_{vol} [%]	ε_v [%]
Z4_OWF_BH01-SAMP	01-3	0.60	Recompacted	CID09a	50.8	95.0	10.3	1.56	1.41	0.877	31	0.93	0.874	15	15	0.17	0.06
Z4_OWF_BH01-SAMP	01-3	0.60	Recompacted	CID09b	50.8	95.0	10.1	1.56	1.42	0.872	31	0.95	0.870	23	23	0.12	0.04
Z4_OWF_BH01-SAMP	01-3	0.60	Recompacted	CID09c	50.8	95.0	10.2	1.56	1.41	0.873	31	0.93	0.867	38	38	0.36	0.12
Z4_OWF_BH01-SAMP	07-1	5.50	Recompacted	CID10a	51.2	100.0	10.0	1.70	1.54	0.718	37	1.00	0.712	34	34	0.32	0.11
Z4_OWF_BH01-SAMP	07-1	5.50	Recompacted	CID10b	51.2	100.0	9.9	1.70	1.54	0.718	37	1.00	0.705	51	51	0.74	0.11
Z4_OWF_BH01-SAMP	07-1	5.50	Recompacted	CID10c	51.2	100.0	9.9	1.70	1.54	0.717	37	1.00	0.698	84	84	1.16	0.13
Z4_OWF_BH01-SAMP	12-1	10.50	Recompacted	CID11a	50.5	95.0	10.2	1.59	1.45	0.833	33	0.92	0.827	63	63	0.37	0.12
Z4_OWF_BH01-SAMP	12-1	10.50	Recompacted	CID11b	50.5	95.0	10.2	1.60	1.45	0.826	33	0.92	0.814	95	95	0.68	0.23
Z4_OWF_BH01-SAMP	12-1	10.50	Recompacted	CID11c	50.5	95.0	10.2	1.60	1.45	0.826	33	0.96	0.808	158	158	1.00	0.33
Z4_OWF_BH01-SAMP	15-2	14.00	Recompacted	CID12a	50.5	95.0	10.2	1.46	1.33	0.994	27	0.96	0.949	85	85	2.27	0.76
Z4_OWF_BH01-SAMP	15-2	14.00	Recompacted	CID12b	50.5	95.0	11.1	1.46	1.32	1.010	29	0.96	0.911	127	127	4.91	1.64
Z4_OWF_BH01-SAMP	15-2	14.00	Recompacted	CID12c	50.5	95.0	10.2	1.47	1.33	0.989	27	0.96	0.849	212	212	7.06	2.35
Z4_OWF_BH05-SAMP	02-2	1.30	Recompacted	CID13A	50.8	95.0	10.1	1.89	1.72	0.541	49	0.93	0.540	15	15	0.04	0.01
Z4_OWF_BH05-SAMP	02-2	1.30	Recompacted	CID13B	50.8	95.0	10.1	1.89	1.72	0.542	49	0.95	0.538	23	23	0.21	0.07
Z4_OWF_BH05-SAMP	02-2	1.30	Recompacted	CID13C	50.8	95.0	10.2	1.90	1.73	0.535	51	0.93	0.531	38	38	0.23	0.08
Z4_OWF_BH05-SAMP	08-2	7.30	Recompacted	CID14A	50.8	95.0	10.0	1.56	1.41	0.874	30	1.00	0.869	45	45	0.25	0.08
Z4_OWF_BH05-SAMP	08-2	7.30	Recompacted	CID14B	50.8	95.0	10.0	1.55	1.41	0.877	30	0.98	0.868	68	68	0.47	0.16
Z4_OWF_BH05-SAMP	08-2	7.30	Recompacted	CID14Cr	50.8	95.0	10.2	1.55	1.41	0.878	31	0.96	0.861	113	113	0.90	0.30

Location	Sample ID	Depth BSF [m]	Specimen ID	Shear Stage					Mohr Envelope		Bender Element	
				q_{max} [kPa]	ε_{vol} [%]	ε_v [%]	σ'_v / σ'_h [-]	Rate of Strain [%/hour]	φ' [°]	c' [kPa]	v_s [m/s]	G_{max} [MPa]
Z4_OWF_BH01-SAMP	01-3	0.60	CID09a	43	-0.06	2.13	3.86	1.30	33.0	1.0	-	-
Z4_OWF_BH01-SAMP	01-3	0.60	CID09b	57	0.00	2.50	3.39	1.30			-	-
Z4_OWF_BH01-SAMP	01-3	0.60	CID09c	91	0.80	14.01	3.57	1.30			-	-
Z4_OWF_BH01-SAMP	07-1	5.50	CID10a	120	-0.18	2.92	4.48	1.28	36.0	3.0	-	-
Z4_OWF_BH01-SAMP	07-1	5.50	CID10b	155	-0.02	3.25	4.03	1.30			-	-
Z4_OWF_BH01-SAMP	07-1	5.50	CID10c	261	0.00	3.79	4.12	1.30			-	-
Z4_OWF_BH01-SAMP	12-1	10.50	CID11a	224	-0.28	2.37	4.53	1.30	39.5	3.0	-	-
Z4_OWF_BH01-SAMP	12-1	10.50	CID11b	374	-0.32	2.56	4.89	1.30			-	-
Z4_OWF_BH01-SAMP	12-1	10.50	CID11c	564	-0.15	3.39	4.56	1.30			-	-
Z4_OWF_BH01-SAMP	15-2	14.00	CID12a	192	2.77	20.20	3.26	1.30	31.5	2.0	-	-
Z4_OWF_BH01-SAMP	15-2	14.00	CID12b	290	3.30	20.16	3.30	1.30			-	-
Z4_OWF_BH01-SAMP	15-2	14.00	CID12c	473	4.69	20.16	3.23	1.30			-	-
Z4_OWF_BH05-SAMP	02-2	1.30	CID13A	130	-1.63	2.14	7.59	1.30	43.0	9.0	-	-
Z4_OWF_BH05-SAMP	02-2	1.30	CID13B	179	-1.40	1.84	8.43	1.30			-	-
Z4_OWF_BH05-SAMP	02-2	1.30	CID13C	212	-1.99	2.44	6.37	1.30			-	-
Z4_OWF_BH05-SAMP	08-2	7.30	CID14A	116	0.07	2.05	3.59	1.30	33.5	3.0	-	-
Z4_OWF_BH05-SAMP	08-2	7.30	CID14B	186	0.12	2.00	3.76	1.30			-	-
Z4_OWF_BH05-SAMP	08-2	7.30	CID14Cr	290	0.36	4.00	3.54	1.30			-	-

Notes

BSF : Below seafloor
* : Specimen conditions after preparation and before saturation
† : Specimen conditions after consolidation and before shearing
CID : Isotropically consolidated drained
c/e : In compression/extension
BE : Bender element measurements
D : Diameter
h : Height
w : Water content
ρ : Bulk density
ρ_d : Dry density
e_0 : Initial void ratio
S_r : Degree of saturation
B : Skempton parameter
e : Void ratio
σ'_{rc} : Radial effective consolidation stress
σ'_{vc} : Vertical effective consolidation stress
ε_{vol} : Volumetric strain
ε_v : Vertical strain
q_{max} Maximum deviator stress
σ'_v / σ'_h : Effective stress ratio
φ' : Effective angle of internal friction
c' : Effective cohesion
v_s : Shear wave velocity
G_{max} : Small strain shear modulus

TOPAZ / CD Summary of CD-nps triaxial test (from Tabular data)(FFSA)_v4 / 2025-08-29 15:50:07 +02:00

Summary of Consolidated Drained Triaxial Test Results

Location	Sample ID	Depth BSF [m]	Specimen Condition	Specimen ID	Initial Conditions*							B	Consolidation Stage†				
					D [mm]	h [mm]	w [%]	ρ [Mg/m^3]	ρ_d [Mg/m^3]	e_0 [-]	S_r [%]	[-]	e [-]	σ'_{rc} [kPa]	σ'_{vc} [kPa]	ε_{vol} [%]	ε_v [%]
Z4_OWF_BH05-SAMP	13-1	11.50	Recompacted	CID15A	50.5	95.0	10.2	1.59	1.44	0.841	32	0.96	0.823	71	71	0.98	0.33
Z4_OWF_BH05-SAMP	13-1	11.50	Recompacted	CID15B	50.8	95.0	9.9	1.56	1.42	0.867	30	0.96	0.839	107	107	1.52	0.51
Z4_OWF_BH05-SAMP	13-1	11.50	Recompacted	CID15C	50.5	95.0	10.2	1.58	1.43	0.848	32	0.96	0.797	179	179	2.75	0.92
Z4_OWF_BH05-SAMP	21-2	20.00	Recompacted	CID16Ar	50.5	95.0	10.1	1.76	1.60	0.654	41	0.96	0.641	125	125	0.76	0.25
Z4_OWF_BH05-SAMP	21-2	20.00	Recompacted	CID16Br	50.5	95.0	10.0	1.76	1.60	0.656	40	0.94	0.628	188	188	1.69	0.56
Z4_OWF_BH05-SAMP	21-2	20.00	Recompacted	CID16Cr	50.5	95.0	10.0	1.76	1.60	0.652	41	0.90	0.604	313	313	2.88	0.96
Z4_OWF_BH15-COMP	03-2	8.80	Recompacted	CID17a	50.5	95.0	9.8	1.50	1.36	0.946	27	1.00	0.920	55	55	1.35	0.45
Z4_OWF_BH15-COMP	03-2	8.80	Recompacted	CID17b	50.5	95.0	9.8	1.49	1.36	0.948	27	0.96	0.902	83	83	2.36	0.79
Z4_OWF_BH15-COMP	03-2	8.80	Recompacted	CID17c	50.5	95.0	9.8	1.49	1.36	0.947	27	0.96	0.886	138	138	3.14	1.05
Z4_OWF_BH15-COMP	05-2	13.60	Recompacted	CID18a	50.5	95.0	10.1	1.47	1.33	0.990	27	0.92	0.960	85	85	1.50	0.50
Z4_OWF_BH15-COMP	05-2	13.60	Recompacted	CID18b	50.5	95.0	10.1	1.46	1.33	0.998	27	0.92	0.961	127	127	1.81	0.61
Z4_OWF_BH15-COMP	05-2	13.60	Recompacted	CID18c	50.5	95.0	10.1	1.47	1.33	0.990	27	0.92	0.928	212	212	3.12	1.04
Z4_OWF_BH16-SAMP	05-1	3.00	Recompacted	CID19A	50.8	95.0	10.1	2.30	2.09	0.271	99	0.90	0.268	19	19	0.22	0.07
Z4_OWF_BH16-SAMP	05-1	3.00	Recompacted	CID19B	50.7	95.0	10.0	2.31	2.10	0.260	102	0.95	0.256	28	28	0.37	0.12
Z4_OWF_BH16-SAMP	05-1	3.00	Recompacted	CID19C	50.8	95.0	9.6	2.29	2.09	0.266	96	0.95	0.262	47	47	0.37	0.12
Z4_OWF_BH16-SAMP	10-2	8.35	Recompacted	CID20A	50.5	95.0	10.2	1.86	1.68	0.574	47	0.96	0.568	52	52	0.34	0.11
Z4_OWF_BH16-SAMP	10-2	8.35	Recompacted	CID20B	50.5	95.0	10.2	1.85	1.68	0.582	46	0.96	0.570	77	77	0.73	0.25
Z4_OWF_BH16-SAMP	10-2	8.35	Recompacted	CID20C	50.5	95.0	10.2	1.85	1.68	0.578	47	0.96	0.562	129	129	1.02	0.34

Location	Sample ID	Depth BSF [m]	Specimen ID	Shear Stage					Mohr Envelope		Bender Element	
				q_{max} [kPa]	ε_{vol} [%]	ε_v [%]	σ'_v / σ'_h [-]	Rate of Strain [%/hour]	φ' [°]	c' [kPa]	v_s [m/s]	G_{max} [MPa]
Z4_OWF_BH05-SAMP	13-1	11.50	CID15A	139	2.98	14.00	2.96	1.30	32.0	0.0	-	-
Z4_OWF_BH05-SAMP	13-1	11.50	CID15B	229	2.76	12.51	3.17	1.30			-	-
Z4_OWF_BH05-SAMP	13-1	11.50	CID15C	407	4.74	17.31	3.28	1.30			-	-
Z4_OWF_BH05-SAMP	21-2	20.00	CID16Ar	369	0.39	4.64	3.89	1.30	32.5	18.0	-	-
Z4_OWF_BH05-SAMP	21-2	20.00	CID16Br	488	1.30	10.13	3.60	1.30			-	-
Z4_OWF_BH05-SAMP	21-2	20.00	CID16Cr	801	1.91	9.91	3.53	1.30			-	-
Z4_OWF_BH15-COMP	03-2	8.80	CID17a	114	4.87	20.00	3.22	1.30	31.0	2.0	-	-
Z4_OWF_BH15-COMP	03-2	8.80	CID17b	185	4.12	20.00	3.22	1.30			-	-
Z4_OWF_BH15-COMP	03-2	8.80	CID17c	292	4.30	14.66	3.15	1.30			-	-
Z4_OWF_BH15-COMP	05-2	13.60	CID18a	186	4.85	20.19	3.30	1.30	33.0	0.0	-	-
Z4_OWF_BH15-COMP	05-2	13.60	CID18b	283	4.14	18.91	3.30	1.30			-	-
Z4_OWF_BH15-COMP	05-2	13.60	CID18c	504	5.54	20.15	3.40	1.30			-	-
Z4_OWF_BH16-SAMP	05-1	3.00	CID19A	213	-2.49	3.36	11.07	1.30	56.5	0.0	-	-
Z4_OWF_BH16-SAMP	05-1	3.00	CID19B	252	-2.59	3.25	9.24	1.30			-	-
Z4_OWF_BH16-SAMP	05-1	3.00	CID19C	509	-2.51	2.59	11.71	1.30			-	-
Z4_OWF_BH16-SAMP	10-2	8.35	CID20A	397	-1.13	3.09	8.65	1.30	41.0	40.0	-	-
Z4_OWF_BH16-SAMP	10-2	8.35	CID20B	458	-1.44	2.87	6.78	1.30			-	-
Z4_OWF_BH16-SAMP	10-2	8.35	CID20C	655	-1.03	3.72	6.04	1.30			-	-

Notes

BSF : Below seafloor
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CID : Isotropically consolidated drained
c/e : In compression/extension
BE : Bender element measurements
D : Diameter
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ρ_d : Dry density
e_0 : Initial void ratio
S_r : Degree of saturation
B : Skempton parameter
e : Void ratio
σ'_{rc} : Radial effective consolidation stress
σ'_{vc} : Vertical effective consolidation stress
ε_{vol} : Volumetric strain
ε_v : Vertical strain
q_{max} Maximum deviator stress
σ'_v / σ'_h : Effective stress ratio
φ' : Effective angle of internal friction
c' : Effective cohesion
v_s : Shear wave velocity
G_{max} : Small strain shear modulus

TOPAZ / CD Summary of CD-nps triaxial test (from Tabular data)(FFSA)_v4 / 2025-08-29 15:50:07 +02:00

Summary of Consolidated Drained Triaxial Test Results

Location	Sample ID	Depth BSF [m]	Specimen Condition	Specimen ID	Initial Conditions*							B [-]	Consolidation Stage†				
					D [mm]	h [mm]	w [%]	ρ [Mg/m^3]	ρ_d [Mg/m^3]	e_0 [-]	S_r [%]		e [-]	σ'_{rc} [kPa]	σ'_{vc} [kPa]	ε_{vol} [%]	ε_v [%]
Z4_OWF_BH16-SAMP	15-1	13.00	Recompacted	CID21a	50.5	95.0	10.0	1.62	1.47	0.803	33	0.96	0.756	80	80	2.61	0.87
Z4_OWF_BH16-SAMP	15-1	13.00	Recompacted	CID21b	50.5	95.0	10.2	1.62	1.47	0.802	34	0.96	0.752	120	120	2.81	0.94
Z4_OWF_BH16-SAMP	15-1	13.00	Recompacted	CID21c	50.5	95.0	10.2	1.61	1.47	0.808	33	0.92	0.729	200	200	4.39	1.46
Z4_OWF_BH16-SAMP	20-3	18.20	Recompacted	CID22A	50.5	95.0	10.1	1.49	1.35	0.963	28	0.96	0.937	112	112	1.34	0.45
Z4_OWF_BH16-SAMP	20-3	18.20	Recompacted	CID22B	50.5	95.0	9.8	1.49	1.35	0.958	27	0.96	0.904	168	168	2.74	0.91
Z4_OWF_BH16-SAMP	20-3	18.20	Recompacted	CID22C	50.5	95.0	10.1	1.48	1.35	0.966	28	0.92	0.907	281	281	2.99	1.00
Z4_OWF_BH17-SAMP	05-2	3.90	Recompacted	CID23a	50.8	95.0	9.9	1.96	1.78	0.488	54	0.90	0.484	23	23	0.26	0.09
Z4_OWF_BH17-SAMP	05-2	3.90	Recompacted	CID23b	50.8	95.0	10.1	1.94	1.77	0.500	54	1.00	0.496	34	34	0.30	0.10
Z4_OWF_BH17-SAMP	05-2	3.90	Recompacted	CID23c	50.8	95.0	9.8	1.94	1.77	0.496	52	0.90	0.492	57	57	0.28	0.09
Z4_OWF_BH17-SAMP	13-2	11.90	Recompacted	CID24a	50.5	95.0	10.1	1.41	1.28	1.066	25	0.96	1.026	70	70	1.90	0.63
Z4_OWF_BH17-SAMP	13-2	11.90	Recompacted	CID24b	50.5	95.0	10.4	1.41	1.28	1.072	26	0.90	1.016	105	105	2.70	0.90
Z4_OWF_BH17-SAMP	13-2	11.90	Recompacted	CID24c	50.5	95.0	10.4	1.41	1.28	1.072	26	0.98	0.996	175	175	3.66	1.22
Z4_OWF_BH17-SAMP	18-1	16.50	Recompacted	CID25a	50.5	95.0	9.8	1.50	1.36	0.944	28	0.98	0.895	98	98	2.53	0.84
Z4_OWF_BH17-SAMP	18-1	16.50	Recompacted	CID25b	50.5	95.0	9.8	1.50	1.36	0.942	28	0.98	0.879	146	146	3.20	1.07
Z4_OWF_BH17-SAMP	18-1	16.50	Recompacted	CID25c	50.5	95.0	9.8	1.49	1.36	0.948	27	0.98	0.853	244	244	4.86	1.62

Location	Sample ID	Depth BSF [m]	Specimen ID	Shear Stage					Mohr Envelope		Bender Element	
				q_{max} [kPa]	ε_{vol} [%]	ε_v [%]	σ'_v / σ'_h [-]	Rate of Strain [%/hour]	φ' [°]	c' [kPa]	v_s [m/s]	G_{max} [MPa]
Z4_OWF_BH16-SAMP	15-1	13.00	CID21a	189	4.45	20.07	3.40	1.30	32.5	4.0	-	-
Z4_OWF_BH16-SAMP	15-1	13.00	CID21b	293	2.82	18.75	3.50	1.30			-	-
Z4_OWF_BH16-SAMP	15-1	13.00	CID21c	473	5.59	20.03	3.36	1.30			-	-
Z4_OWF_BH16-SAMP	20-3	18.20	CID22A	279	2.38	15.25	3.55	1.30	32.0	10.0	-	-
Z4_OWF_BH16-SAMP	20-3	18.20	CID22B	412	3.23	19.75	3.50	1.30			-	-
Z4_OWF_BH16-SAMP	20-3	18.20	CID22C	663	5.08	19.99	3.37	1.30			-	-
Z4_OWF_BH17-SAMP	05-2	3.90	CID23a	252	-1.65	2.25	11.16	1.30	36.5	34.0	-	-
Z4_OWF_BH17-SAMP	05-2	3.90	CID23b	261	-1.36	2.25	7.98	1.30			-	-
Z4_OWF_BH17-SAMP	05-2	3.90	CID23c	333	-1.35	1.75	6.44	1.30			-	-
Z4_OWF_BH17-SAMP	13-2	11.90	CID24a	136	3.90	17.25	2.95	1.30	32.0	0.0	-	-
Z4_OWF_BH17-SAMP	13-2	11.90	CID24b	226	4.58	19.48	3.20	1.30			-	-
Z4_OWF_BH17-SAMP	13-2	11.90	CID24c	395	5.03	20.09	3.29	1.30			-	-
Z4_OWF_BH17-SAMP	18-1	16.50	CID25a	216	4.84	19.57	3.27	1.30	32.5	0.0	-	-
Z4_OWF_BH17-SAMP	18-1	16.50	CID25b	332	5.18	19.75	3.33	1.30			-	-
Z4_OWF_BH17-SAMP	18-1	16.50	CID25c	570	5.52	19.72	3.36	1.30			-	-

Notes

BSF : Below seafloor
* : Specimen conditions after preparation and before saturation
† : Specimen conditions after consolidation and before shearing
CID : Isotropically consolidated drained
c/e : In compression/extension
BE : Bender element measurements
D : Diameter
h : Height
w : Water content
ρ : Bulk density
ρ_d : Dry density
e_0 : Initial void ratio
S_r : Degree of saturation
B : Skempton parameter
e : Void ratio
σ'_{rc} : Radial effective consolidation stress
σ'_{vc} : Vertical effective consolidation stress
ε_{vol} : Volumetric strain
ε_v : Vertical strain
q_{max} Maximum deviator stress
σ'_v / σ'_h : Effective stress ratio
φ' : Effective angle of internal friction
c' : Effective cohesion
v_s : Shear wave velocity
G_{max} : Small strain shear modulus

TOPAZ / CD Summary of CD-nps triaxial test (From Tabular data)(FFSA)_v4 / 2025-08-29 15:50:07 +02:00

Summary of Consolidated Drained Triaxial Test Results

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Test Identification	Specimen 1	Specimen 2	Specimen 3
Location	Z4_OWF_BH01-SAMP	Z4_OWF_BH01-SAMP	Z4_OWF_BH01-SAMP
Sample	01-3	01-3	01-3
Depth [m]	0.60	0.60	0.60
Test number	CID09a	CID09b	CID09c

Specimen Visual Description
Greyish brown fine SAND

Initial Specimen Conditions	Specimen 1	Specimen 2	Specimen 3
Test start date	14/05/2025	03/06/2025	22/05/2025
Type of sample	Recompacted	Recompacted	Recompacted
Diameter [mm]	50.8	50.8	50.8
Length [mm]	95.0	95.0	95.0
Water content [%]	10.3	10.1	10.2
Bulk density [Mg/m^3]	1.56	1.56	1.56
Dry density [Mg/m^3]	1.41	1.42	1.41
Void ratio [-]	0.877	0.872	0.873
Degree of saturation [%]	31	31	31
Type of drains fitted	One end	One end	One end

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

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Saturation	Specimen 1	Specimen 2	Specimen 3
Pressure increments applied [kPa]	15	20	30
Differential pressure used [kPa]	5	5	10
Pore pressure on completion [kPa]	345	355	380
Cell pressure on completion [kPa]	350	360	390
B value achieved	0.93	0.95	0.93

Consolidation: Isotropic	Specimen 1	Specimen 2	Specimen 3
Cell pressure [kPa]	365	383	428
Back pressure [kPa]	350	360	390
Effective cell pressure [kPa]	15	23	38
Pore pressure on completion [kPa]	350	360	390
Pore pressure dissipation [%]	100	100	100
Water content [%]	33.0	32.8	32.7
Bulk density [Mg/m^3]	1.88	1.88	1.88
Dry density [Mg/m^3]	1.41	1.42	1.42
Void ratio [-]	0.874	0.870	0.867
Degree of saturation [%]	100	100	100
Axial strain [%]	0.06	0.04	0.12
Volumetric strain [%]	0.17	0.12	0.35
Volumetric strain rate-end of stage [%/hr]	0.00	0.01	0.04

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

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Shearing	Specimen 1	Specimen 2	Specimen 3
Initial pore pressure [kPa]	350	360	390
Initial effective cell pressure [kPa]	15	23	38
Rate of strain [%/hour]	1.30	1.30	1.30
At peak deviator stress			
Corrected deviator stress [kPa]	43	57	91
Membrane correction applied [kPa]	0.6	0.7	3.3
Drain correction applied [kPa]	0	0	0
Axial strain [%]	2.13	2.50	14.01
Volumetric strain [%]	-0.06	0.00	0.80
Major principal effective stress [kPa]	58	81	126
Minor principal effective stress [kPa]	15	24	35
Principal effective stress ratio	3.86	3.39	3.57
ε_{50} [%]	0.37	0.33	0.38
Secant modulus (E_{50}) at ε_{50} [kPa]	5849	8657	11847
At peak principal effective stress ratio			
Corrected deviator stress [kPa]	43	57	90
Membrane correction applied [kPa]	0.6	0.5	3.7
Drain correction applied [kPa]	0	0	0
Axial strain [%]	2.13	1.88	16.76
Volumetric strain [%]	-0.06	0.04	0.86
Major principal effective stress [kPa]	58	80	125
Minor principal effective stress [kPa]	15	23	35
Principal effective stress ratio	3.86	3.43	3.57
At 10% axial strain			
Corrected deviator stress [kPa]	40	54	90
Membrane correction applied [kPa]	2.5	2.5	2.5
Drain correction applied [kPa]	0	0	0
Axial strain [%]	10.00	10.00	10.00
Volumetric strain [%]	0.20	0.11	0.65
Major principal effective stress [kPa]	55	78	126
Minor principal effective stress [kPa]	14	23	36
Principal effective stress ratio	3.79	3.34	3.52

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

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Photographs		
Specimen 1	**Specimen 2**	**Specimen 3**
Photograph Unavailable	Photograph Unavailable	Photograph Unavailable

Final Conditions	Specimen 1	Specimen 2	Specimen 3
Water content [%]	32.8	32.7	32.7
Bulk density [Mg/m³]	1.88	1.88	1.88
Dry density [Mg/m³]	1.42	1.42	1.42
Mode of failure	Barrel	Barrel	Barrel

Project: 503387 - F254727
Test page CID09-4/8

Laboratory: Wallingford, UK
Z4_OWF_BH01-SAMP / 01-3 / 0.6

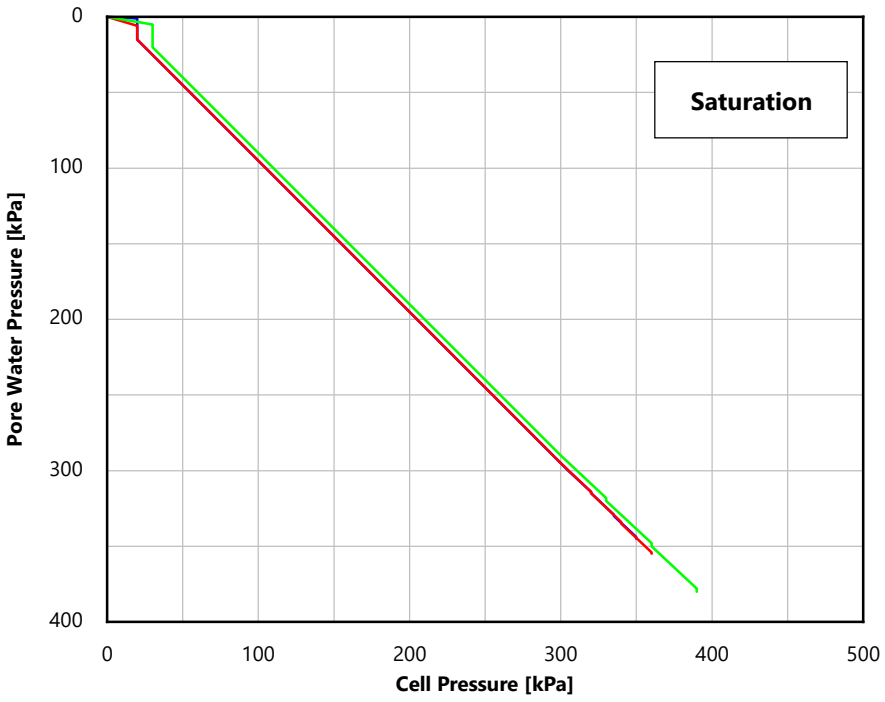
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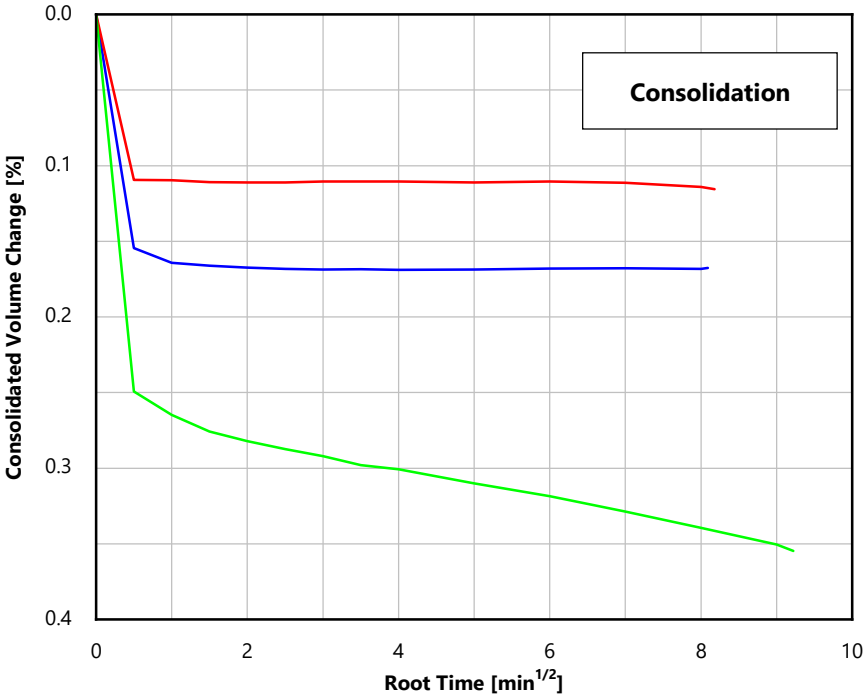
Test Report

Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018





Consolidation			
Stage 1 σ'_{rc} : 15 kPa	Stage 2 σ'_{rc} : 23 kPa	Stage 3 σ'_{rc} : 38 kPa	1
Stage 1 σ'_{vc} : 15 kPa	Stage 2 σ'_{vc} : 23 kPa	Stage 3 σ'_{vc} : 38 kPa	2
			3

Project: 503387 - F254727
CID09

Laboratory: Wallingford, UK
Z4_OWF_BH01-SAMP / 01-3 / 0.6

Approved by: ET 12/08/2025

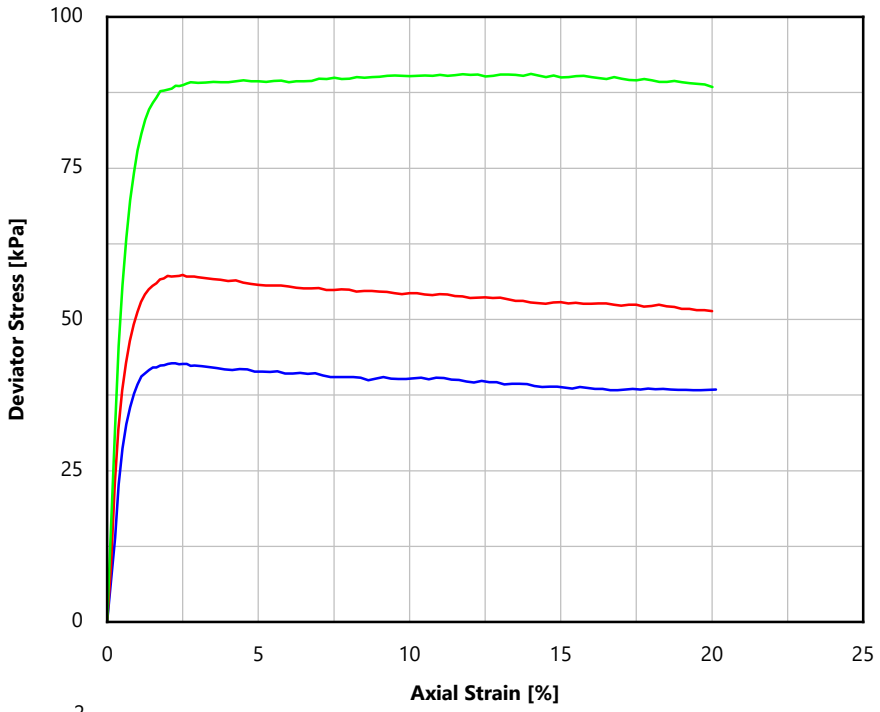
Test Report

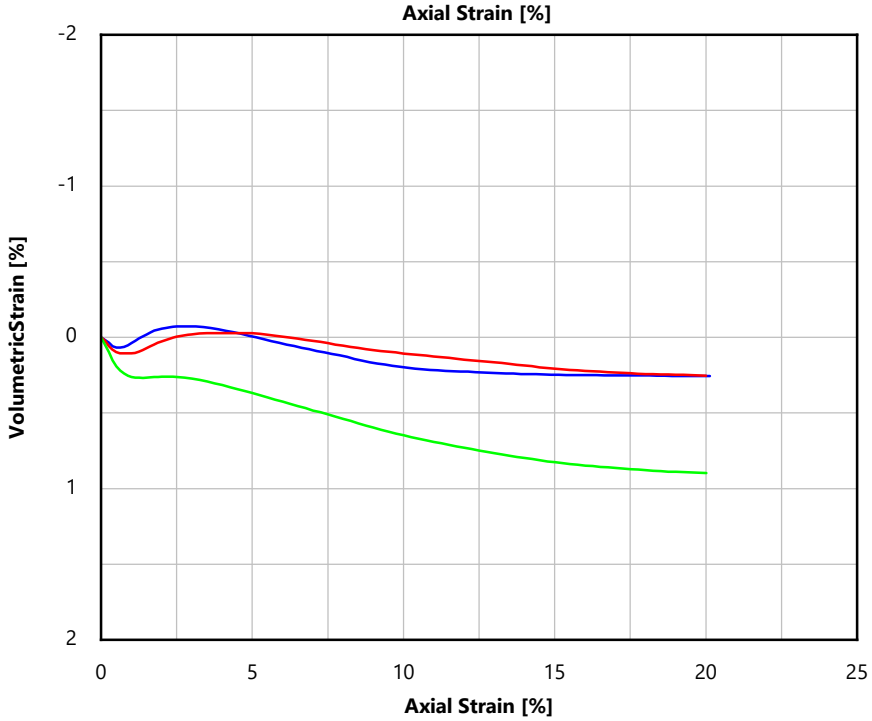
Consolidated Triaxial Compression Test On Water Saturated Soils
Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Shearing





Consolidation			
Stage 1 σ'_{rc} : 15 kPa	Stage 2 σ'_{rc} : 23 kPa	Stage 3 σ'_{rc} : 38 kPa	1
Stage 1 σ'_{vc} : 15 kPa	Stage 2 σ'_{vc} : 23 kPa	Stage 3 σ'_{vc} : 38 kPa	2
			3

Project: 503387 - F254727
CID09

Laboratory: Wallingford, UK
Z4_OWF_BH01-SAMP / 01-3 / 0.6

Approved by: ET 12/08/2025

Test Report

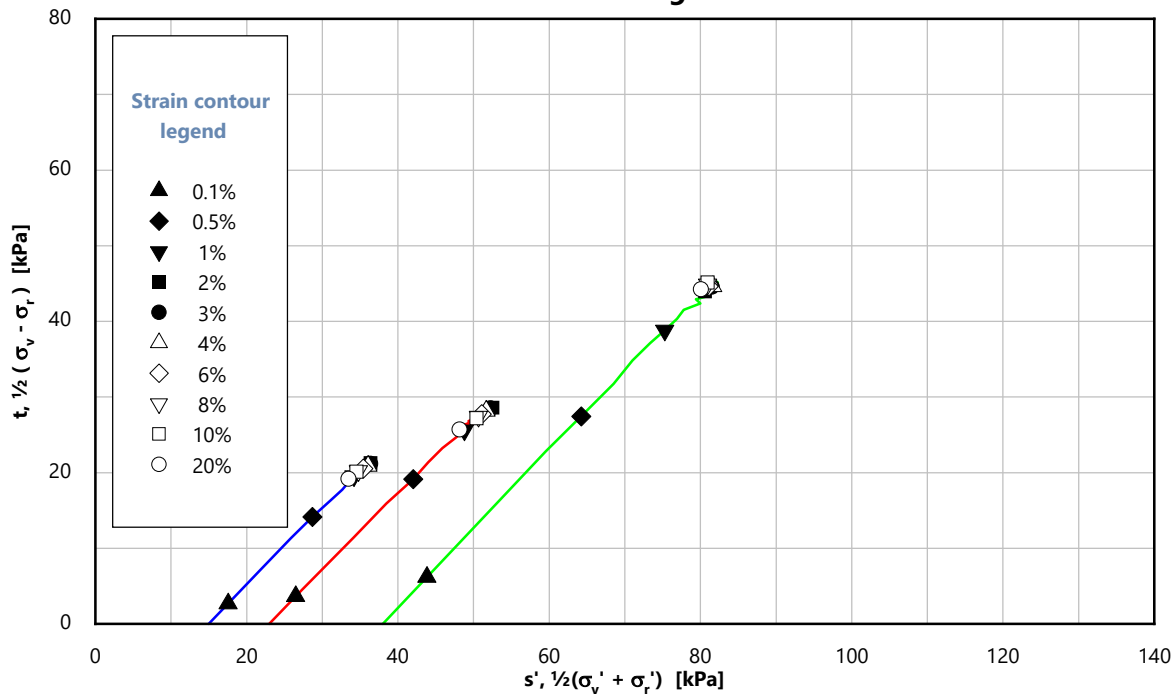
Consolidated Triaxial Compression Test On Water Saturated Soils

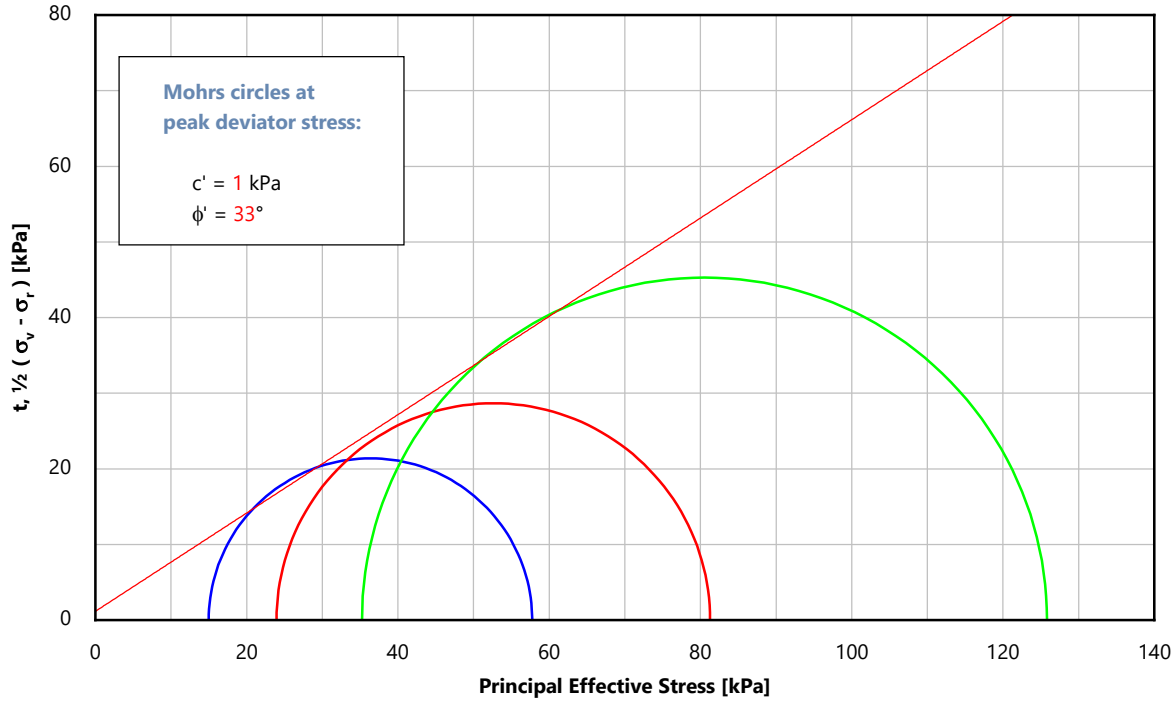
Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Shearing





Consolidation			
Stage 1 σ'_{rc} : 15 kPa	Stage 2 σ'_{rc} : 23 kPa	Stage 3 σ'_{rc} : 38 kPa	1
Stage 1 σ'_{vc} : 15 kPa	Stage 2 σ'_{vc} : 23 kPa	Stage 3 σ'_{vc} : 38 kPa	2
			3

Project: 503387 - F254727
CID09

Laboratory: Wallingford, UK
Z4_OWF_BH01-SAMP / 01-3 / 0.6

Approved by: ET 12/08/2025

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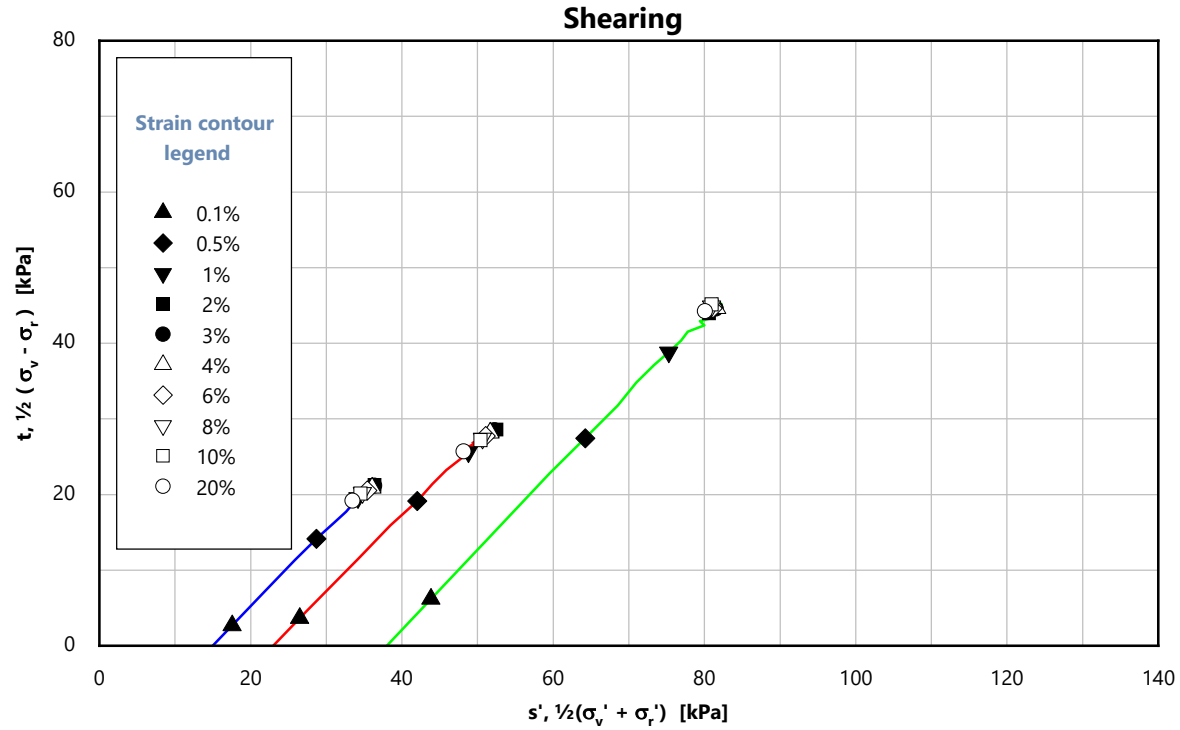
Test Report

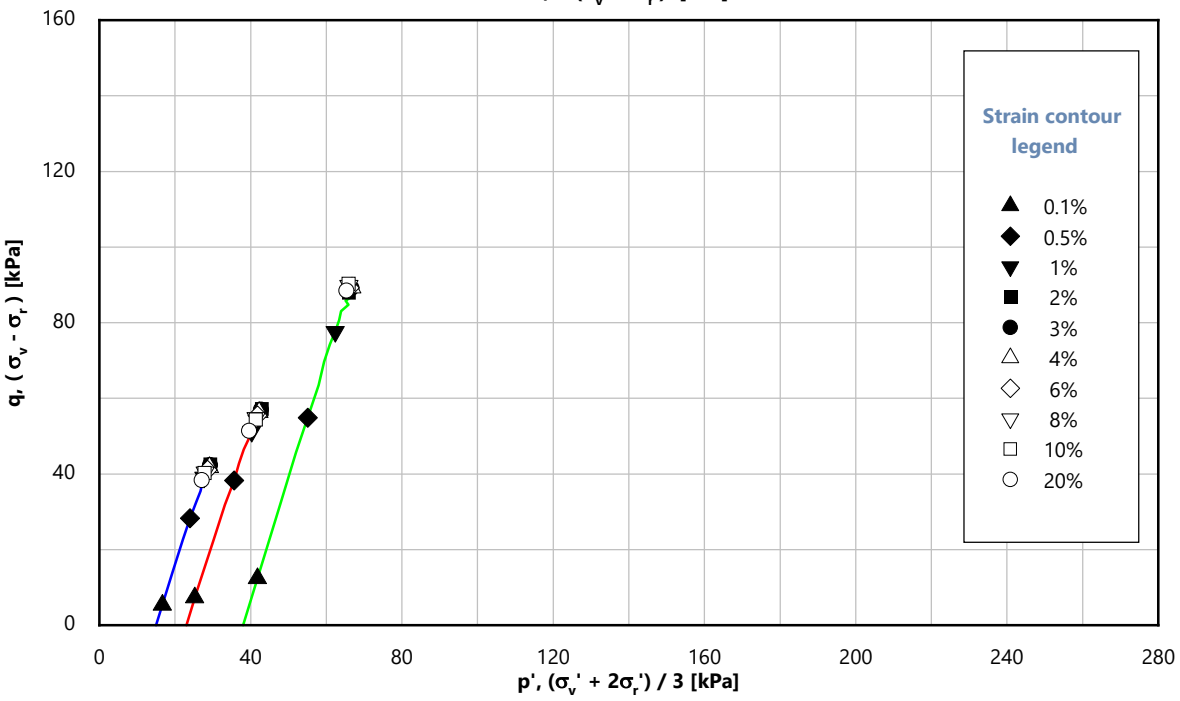
Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

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Consolidation			
Stage 1 σ'_{rc} : 15 kPa	Stage 2 σ'_{rc} : 23 kPa	Stage 3 σ'_{rc} : 38 kPa	1
Stage 1 σ'_{vc} : 15 kPa	Stage 2 σ'_{vc} : 23 kPa	Stage 3 σ'_{vc} : 38 kPa	2 3

Project: 503387 - F254727
CID09

Laboratory: Wallingford, UK
Z4_OWF_BH01-SAMP / 01-3 / 0.6

Approved by: ET 12/08/2025

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Test Report

Consolidated Triaxial Compression Test on Water Saturated Isotropic, Drained - Set of three (3) tests

UKAS TESTING 0919

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Test Identification	Specimen 1	Specimen 2	Specimen 3
Location	Z4_OWF_BH01-SAMP	Z4_OWF_BH01-SAMP	Z4_OWF_BH01-SAMP
Sample	07-1	07-1	07-1
Depth [m]	5.50	5.50	5.50
Test number	CID10a	CID10b	CID10c

Specimen Visual Description
Dark brownish grey fine to medium SAND

Initial Specimen Conditions	Specimen 1	Specimen 2	Specimen 3
Test start date	05/06/2025	04/06/2025	04/06/2025
Type of sample	Re-compacted	Re-compacted	Re-compacted
Diameter [mm]	51.2	51.2	51.2
Height [mm]	100.0	100.0	100.0
Water content [%]	10.0	9.9	9.9
Bulk density [Mg/m^3]	1.70	1.70	1.70
Dry density [Mg/m^3]	1.54	1.54	1.54
Void ratio [-]	0.718	0.718	0.717
Degree of saturation [%]	37	37	37
Type of drains	One end only	One end only	One end only

Test Report

Consolidated Triaxial Compression Test on Water Saturated Isotropic, Drained - Set of three (3) tests

UKAS TESTING 0919

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Saturation	Specimen 1	Specimen 2	Specimen 3
Pressure increments applied [kPa]	100	100	100
Differential pressure used [kPa]	10	10	10
Pore presure on completion [kPa]	688	687	687
Cell pressure on completion [kPa]	700	700	700
B value achieved [-]	1.00	1.00	1.00

Consolidation: Isotropic	Specimen 1	Specimen 2	Specimen 3
Cell pressure [kPa]	722	738	771
Back pressure [kPa]	689	688	687
Effective axial pressure [kPa]	34	51	84
Pore presure on completion [kPa]	689	688	687
Pore presure dissipation [kPa]	-	-	-
Water content [%]	26.9	26.6	26.3
Bulk density [Mg/m^3]	1.96	1.97	1.97
Dry density [Mg/m^3]	1.55	1.55	1.56
Void ratio [-]	0.712	0.705	0.698
Degree of saturation [%]	100	100	100
Axial strain [%]	0.11	0.11	0.13
Volumetric strain [%]	0.32	0.74	1.16
Volumetric strain rate-end of stage [%/hr]	0.00	0.00	0.00

Test Report

Consolidated Triaxial Compression Test on Water Saturated Isotropic, Drained - Set of three (3) tests

UKAS TESTING 0919

ISO 17892-9:2018

Shearing	Specimen 1	Specimen 2	Specimen 3
Initial pore pressure [kPa]	689	688	687
Initial effective cell pressure [kPa]	34	51	84
Rate of strain [%/hour]	1.28	1.30	1.30
At peak deviator stress			
Corrected deviator stress [kPa]	120	155	261
Membrane correction applied [kPa]	1.3	1.5	1.7
Drain correction applied [kPa]	0	0	0
Axial strain [%]	2.92	3.25	3.79
Volumetric strain [%]	-0.18	-0.02	0.00
Major principal effective stress [kPa]	154	206	344
Minor principal effective stress [kPa]	34	51	84
Principal effective stress ratio [-]	4.48	4.03	4.12
ε_{50} [%]	0.43	0.40	0.54
Secant modulus (E50) at ε_{50} [kPa]	13974	19456	24291
At peak principal effective stress ratio			
Corrected deviator stress [kPa]	119	154	260
Membrane correction applied [kPa]	1.1	1.4	1.7
Drain correction applied [kPa]	0	0	0
Axial strain [%]	2.56	3.08	3.85
Volumetric strain [%]	-0.11	0.01	-0.02
Major principal effective stress [kPa]	151	204	343
Minor principal effective stress [kPa]	33	50	83
Principal effective stress ratio [-]	4.62	4.07	4.13
At 10% axial strain			
Corrected deviator stress [kPa]	102	143	235
Membrane correction applied [kPa]	4.3	4.4	4.4
Drain correction applied [kPa]	0	0	0
Axial strain [%]	10.00	10.00	9.99
Volumetric strain [%]	-0.98	-0.64	-0.74
Major principal effective stress [kPa]	136	194	319
Minor principal effective stress [kPa]	34	51	84
Principal effective stress ratio [-]	4.05	3.83	3.81

Project: 503387 - F254727 Laboratory: Wallingford, UK Approved by: LB - 02/07/2025

Z4_OWF_BH01-SAMP / 07-1 / 5.5

Test Report

Consolidated Triaxial Compression Test on Water Saturated Isotropic, Drained - Set of three (3) tests

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Specimen Photographs - 1





Final Conditions - Specimen 1

Water content [%]	27.9
Bulk density [Mg/m³]	1.95
Dry density [Mg/m³]	1.52
Mode of failure	Compound failure

Project: 503387 - F254727 Laboratory: Wallingford, UK Approved by: LB - 02/07/2025

Z4_OWF_BH01-SAMP / 07-1 / 5.5

Test Report

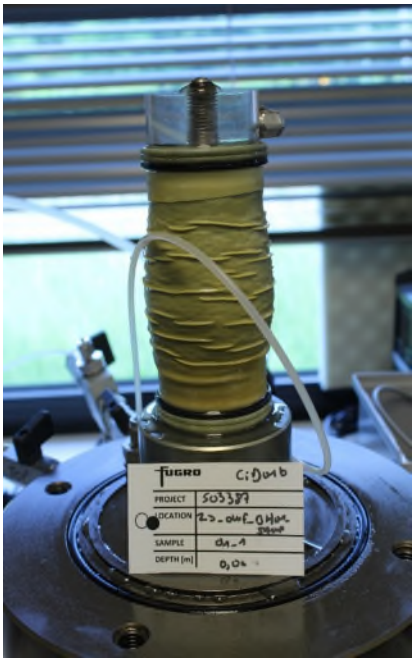
Consolidated Triaxial Compression Test on Water Saturated Isotropic, Drained - Set of three (3) tests

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Specimen Photographs - 2





Final Conditions - Specimen 2

Water content [%]	27.4
Bulk density [Mg/m³]	1.96
Dry density [Mg/m³]	1.54
Mode of failure	Compound failure

Project: 503387 - F254727 Laboratory: Wallingford, UK Approved by: LB - 02/07/2025

Z4_OWF_BH01-SAMP / 07-1 / 5.5

Test Report

Consolidated Triaxial Compression Test on Water Saturated Isotropic, Drained - Set of three (3) tests

UKAS TESTING 0919

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Specimen Photographs - 3





Final Conditions - Specimen 3

Water content [%]	27.2
Bulk density [Mg/m^3]	1.96
Dry density [Mg/m^3]	1.54
Mode of failure	Compound failure

Project: 503387 - F254727 Laboratory: Wallingford, UK Approved by: LB - 02/07/2025

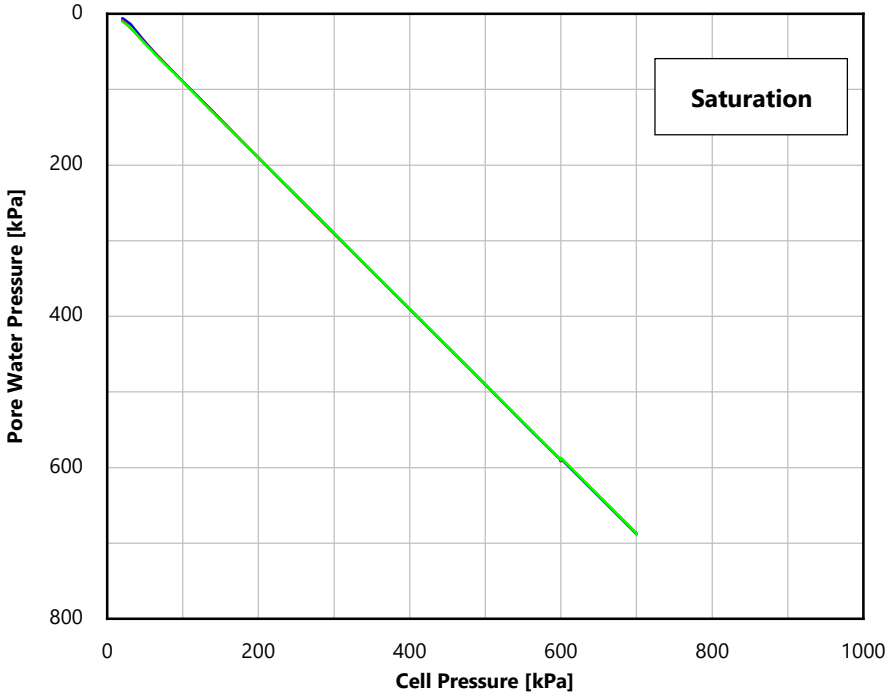
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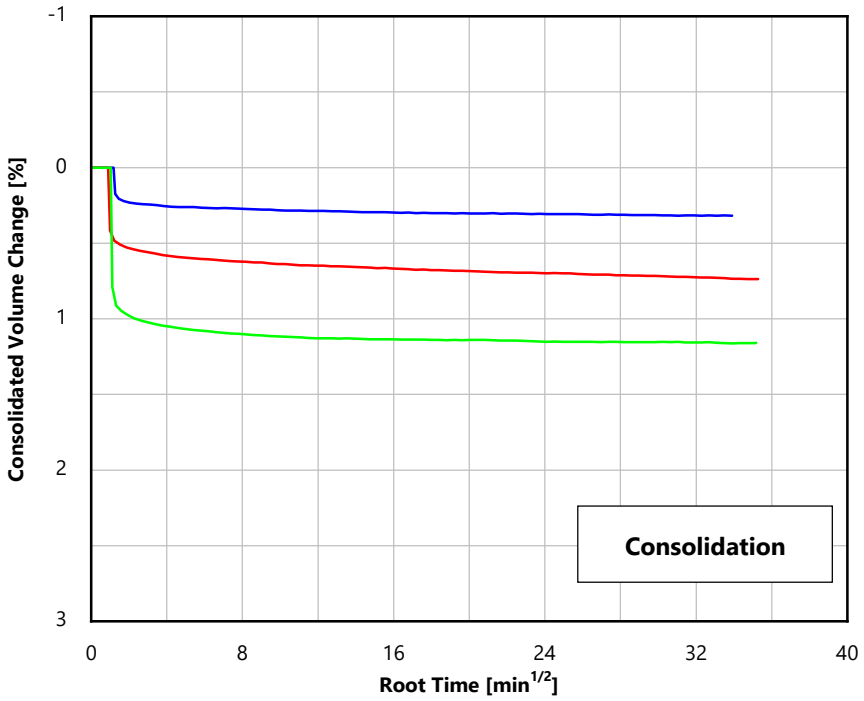
Test Report

Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018





Consolidation			
Stage 1 σ'_{rc} : 34 kPa	Stage 2 σ'_{rc} : 51 kPa	Stage 3 σ'_{rc} : 84 kPa	1
Stage 1 σ'_{vc} : 34 kPa	Stage 2 σ'_{vc} : 51 kPa	Stage 3 σ'_{vc} : 84 kPa	2
			3

Project: 503387 - F254727
CID10

Laboratory: Wallingford, UK
Z4_OWF_BH01-SAMP / 07-1 / 5.5

Approved by: LB 02/07/2025

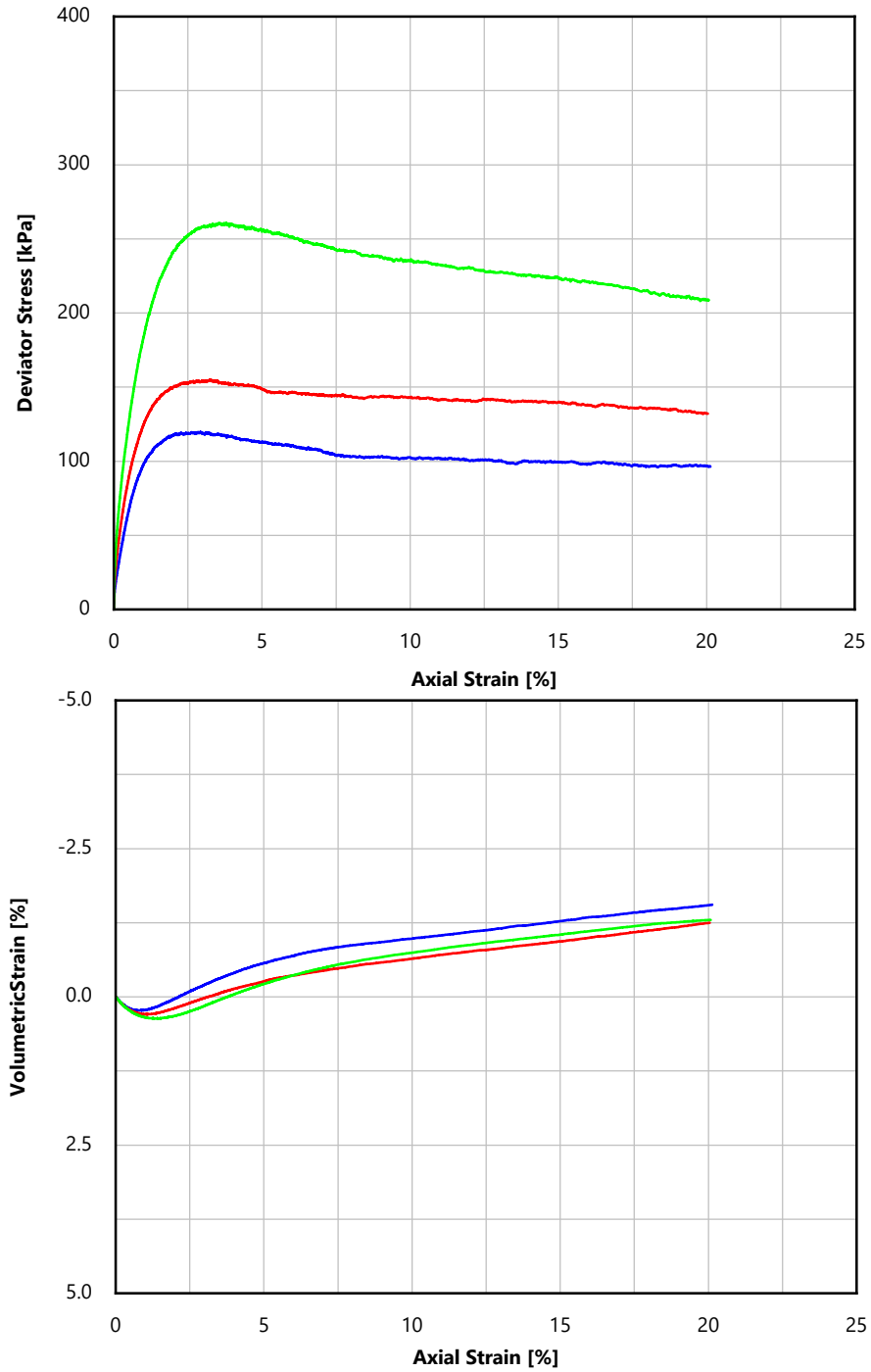
Test Report

Consolidated Triaxial Compression Test On Water Saturated Soils
Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Shearing



Consolidation			
Stage 1 σ'_{rc} : 34 kPa	Stage 2 σ'_{rc} : 51 kPa	Stage 3 σ'_{rc} : 84 kPa	1
Stage 1 σ'_{vc} : 34 kPa	Stage 2 σ'_{vc} : 51 kPa	Stage 3 σ'_{vc} : 84 kPa	2
			3

Project: 503387 - F254727
CID10

Laboratory: Wallingford, UK
Z4_OWF_BH01-SAMP / 07-1 / 5.5

Approved by: LB 02/07/2025

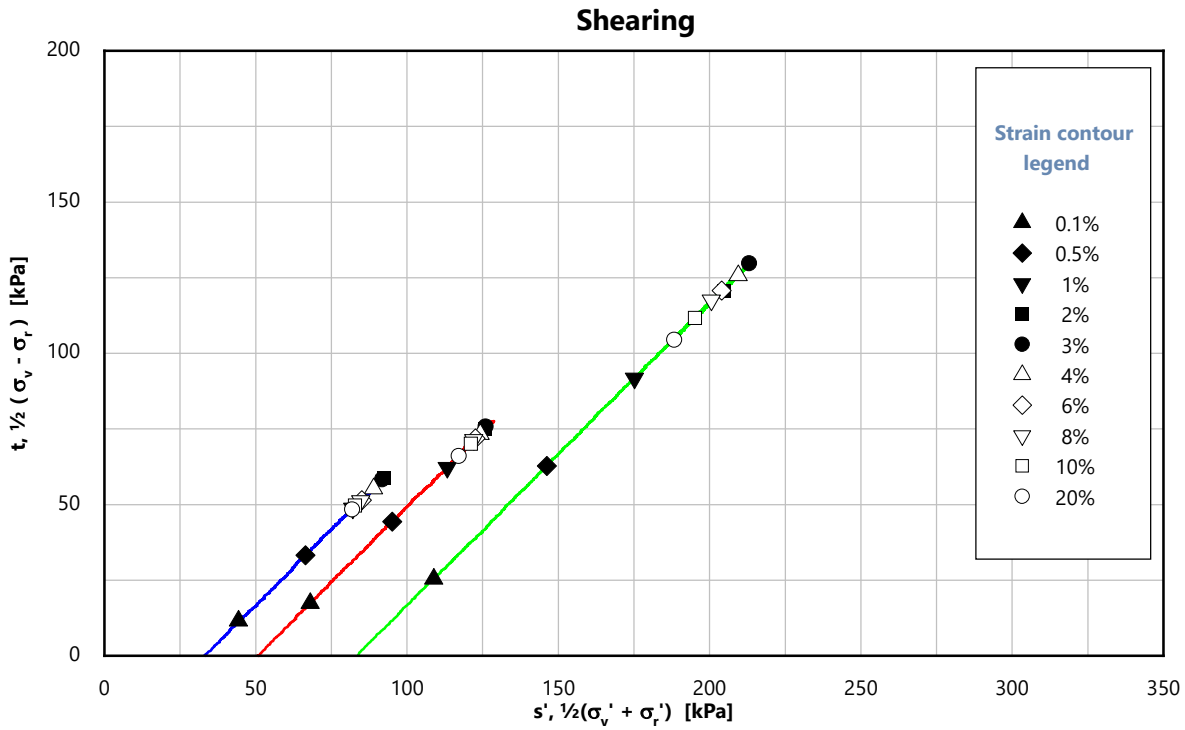
Test Report

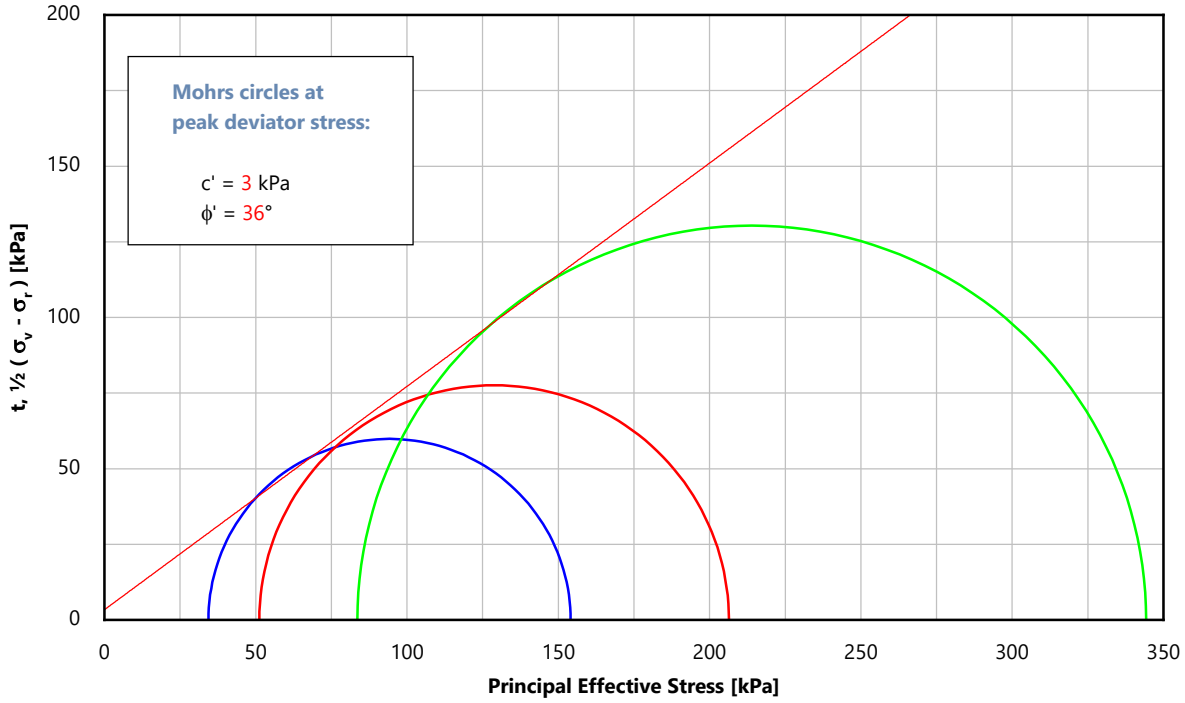
Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919





Consolidation			
Stage 1 σ'_{rc} : 34 kPa	Stage 2 σ'_{rc} : 51 kPa	Stage 3 σ'_{rc} : 84 kPa	1
Stage 1 σ'_{vc} : 34 kPa	Stage 2 σ'_{vc} : 51 kPa	Stage 3 σ'_{vc} : 84 kPa	2
			3

Project: 503387 - F254727
CID10

Laboratory: Wallingford, UK
Z4_OWF_BH01-SAMP / 07-1 / 5.5

Approved by: LB 02/07/2025

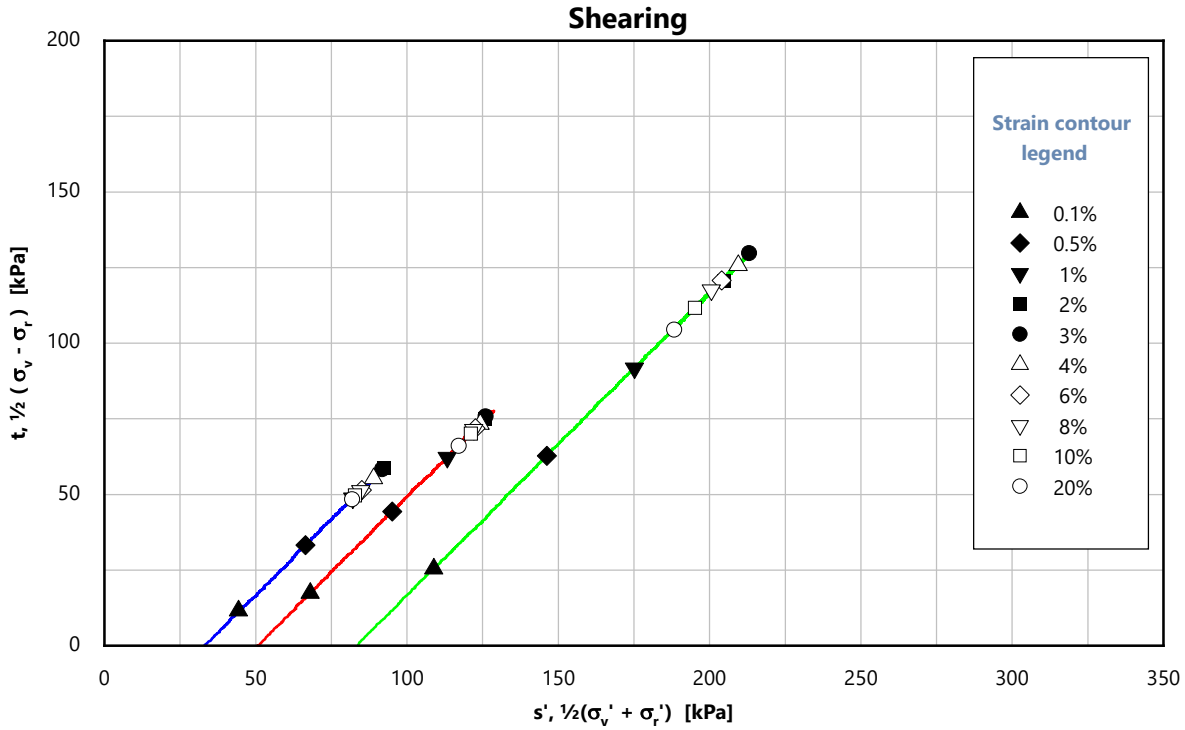
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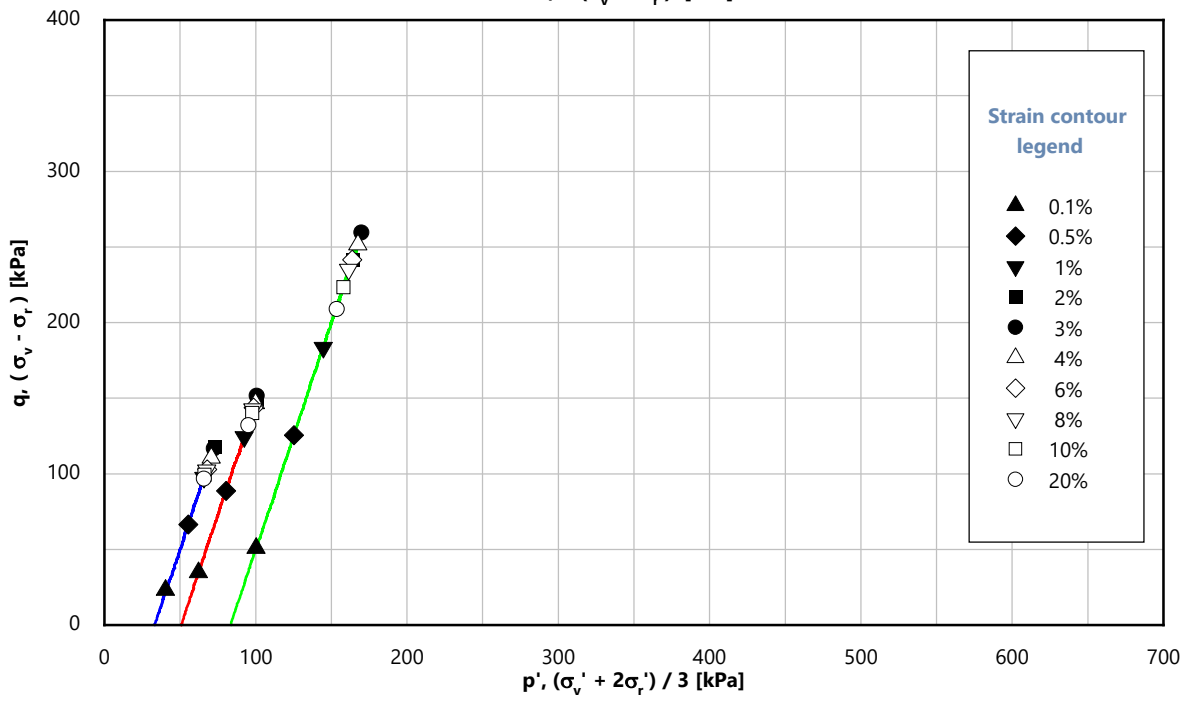
Test Report

Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018





Consolidation			
Stage 1 σ'_{rc} : 34 kPa	Stage 2 σ'_{rc} : 51 kPa	Stage 3 σ'_{rc} : 84 kPa	1
Stage 1 σ'_{vc} : 34 kPa	Stage 2 σ'_{vc} : 51 kPa	Stage 3 σ'_{vc} : 84 kPa	2 3

Project: 503387 - F254727
CID10

Laboratory: Wallingford, UK
Z4_OWF_BH01-SAMP / 07-1 / 5.5

Approved by: LB 02/07/2025

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

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Test Identification	Specimen 1	Specimen 2	Specimen 3
Location	Z4_OWF_BH01-SAMP	Z4_OWF_BH01-SAMP	Z4_OWF_BH01-SAMP
Sample	12-1	12-1	12-1
Depth [m]	10.50	10.50	10.50
Test number	CID11a	CID11b	CID11c

Specimen Visual Description
Olive fine SAND

Initial Specimen Conditions	Specimen 1	Specimen 2	Specimen 3
Test start date	01/05/2025	01/05/2025	01/05/2025
Type of sample	Recompacted	Recompacted	Recompacted
Diameter [mm]	50.5	50.5	50.5
Length [mm]	95.0	95.0	95.0
Water content [%]	10.2	10.2	10.2
Bulk density [Mg/m^3]	1.59	1.60	1.60
Dry density [Mg/m^3]	1.45	1.45	1.45
Void ratio [-]	0.833	0.826	0.826
Degree of saturation [%]	33	33	33
Type of drains fitted	One end	One end	One end

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

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Saturation	Specimen 1	Specimen 2	Specimen 3
Pressure increments applied [kPa]	50	50	50
Differential pressure used [kPa]	10	10	10
Pore pressure on completion [kPa]	540	390	390
Cell pressure on completion [kPa]	550	400	400
B value achieved	0.92	0.92	0.96

Consolidation: Isotropic	Specimen 1	Specimen 2	Specimen 3
Cell pressure [kPa]	613	495	558
Back pressure [kPa]	550	400	400
Effective cell pressure [kPa]	63	95	158
Pore pressure on completion [kPa]	550	400	400
Pore pressure dissipation [%]	100	100	100
Water content [%]	31.2	30.7	30.5
Bulk density [Mg/m^3]	1.90	1.91	1.91
Dry density [Mg/m^3]	1.45	1.46	1.47
Void ratio [-]	0.827	0.814	0.808
Degree of saturation [%]	100	100	100
Axial strain [%]	0.12	0.23	0.33
Volumetric strain [%]	0.37	0.68	1.00
Volumetric strain rate-end of stage [%/hr]	0.02	0.02	0.03

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Shearing	Specimen 1	Specimen 2	Specimen 3
Initial pore pressure [kPa]	550	400	400
Initial effective cell pressure [kPa]	63	95	158
Rate of strain [%/hour]	1.30	1.30	1.30
At peak deviator stress			
Corrected deviator stress [kPa]	224	374	564
Membrane correction applied [kPa]	0.6	0.6	0.8
Drain correction applied [kPa]	0	0	0
Axial strain [%]	2.37	2.56	3.39
Volumetric strain [%]	-0.28	-0.32	-0.15
Major principal effective stress [kPa]	288	470	723
Minor principal effective stress [kPa]	64	96	158
Principal effective stress ratio	4.53	4.89	4.56
ε_{50} [%]	0.44	0.60	0.73
Secant modulus (E_{50}) at ε_{50} [kPa]	25380	31314	38758
At peak principal effective stress ratio			
Corrected deviator stress [kPa]	224	373	564
Membrane correction applied [kPa]	0.6	0.6	0.8
Drain correction applied [kPa]	0	0	0
Axial strain [%]	2.37	2.45	3.39
Volumetric strain [%]	-0.28	-0.27	-0.15
Major principal effective stress [kPa]	288	469	723
Minor principal effective stress [kPa]	64	95	158
Principal effective stress ratio	4.53	4.91	4.56
At 10% axial strain			
Corrected deviator stress [kPa]	207	285	472
Membrane correction applied [kPa]	2.0	2.0	2.0
Drain correction applied [kPa]	0	0	0
Axial strain [%]	10.00	10.00	10.00
Volumetric strain [%]	-1.50	-1.89	-1.19
Major principal effective stress [kPa]	271	381	631
Minor principal effective stress [kPa]	65	96	160
Principal effective stress ratio	4.20	3.97	3.96

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Photographs		
Specimen 1	**Specimen 2**	**Specimen 3**
Photograph unavailable	Photograph unavailable	Photograph unavailable

Final Conditions	Specimen 1	Specimen 2	Specimen 3
Water content [%]	32.5	30.7	30.5
Bulk density [Mg/m³]	1.89	1.91	1.91
Dry density [Mg/m³]	1.42	1.46	1.47
Mode of failure	Compound failure	Compound failure	Compound failure

Project: 503387 - F254727
Test page CID11-4/8

Laboratory: Wallingford, UK
Z4_OWF_BH01-SAMP / 12-1 / 10.5

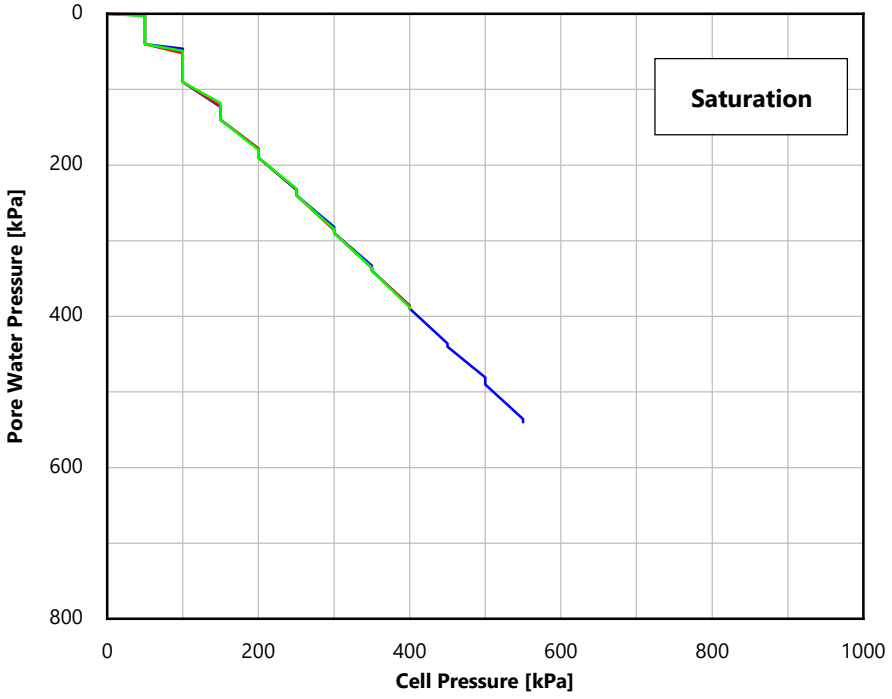
Approved by: ET - 22/05/2025

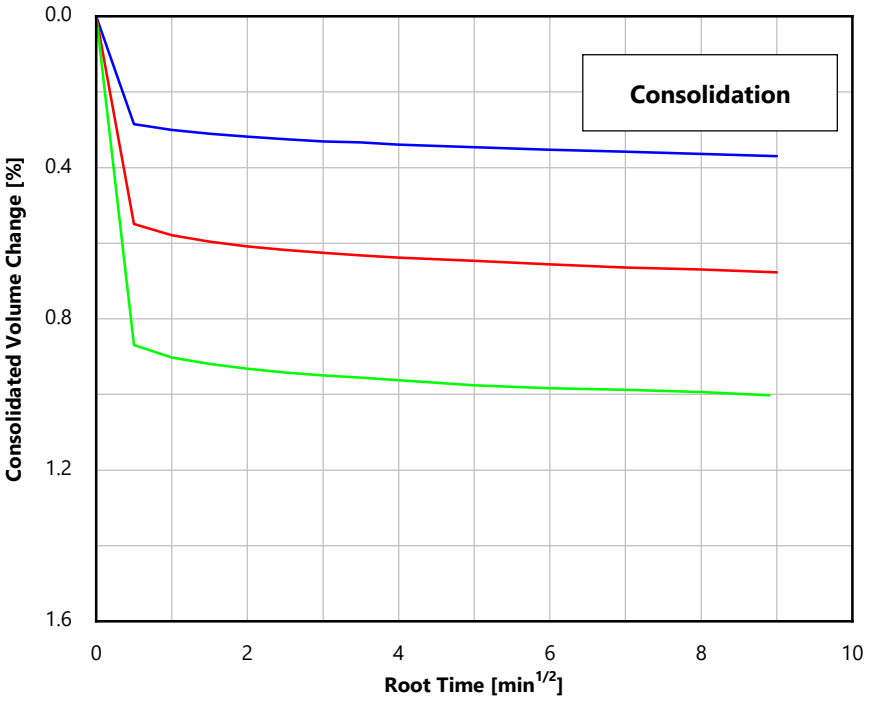
Test Report

Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018





Consolidation			
Stage 1 σ'_{rc} : 63 kPa	Stage 2 σ'_{rc} : 95 kPa	Stage 3 σ'_{rc} : 158 kPa	1
Stage 1 σ'_{vc} : 63 kPa	Stage 2 σ'_{vc} : 95 kPa	Stage 3 σ'_{vc} : 158 kPa	2
			3

Project: 503387 - F254727
CID11

Laboratory: Wallingford, UK
Z4_OWF_BH01-SAMP / 12-1 / 10.5

Approved by: ET 22/05/2025

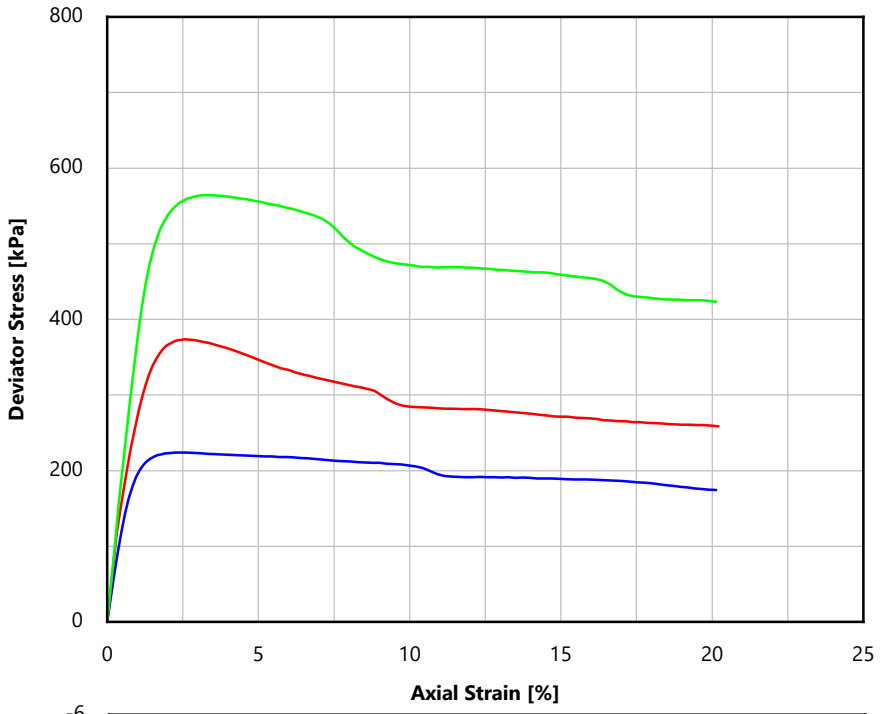
Test Report

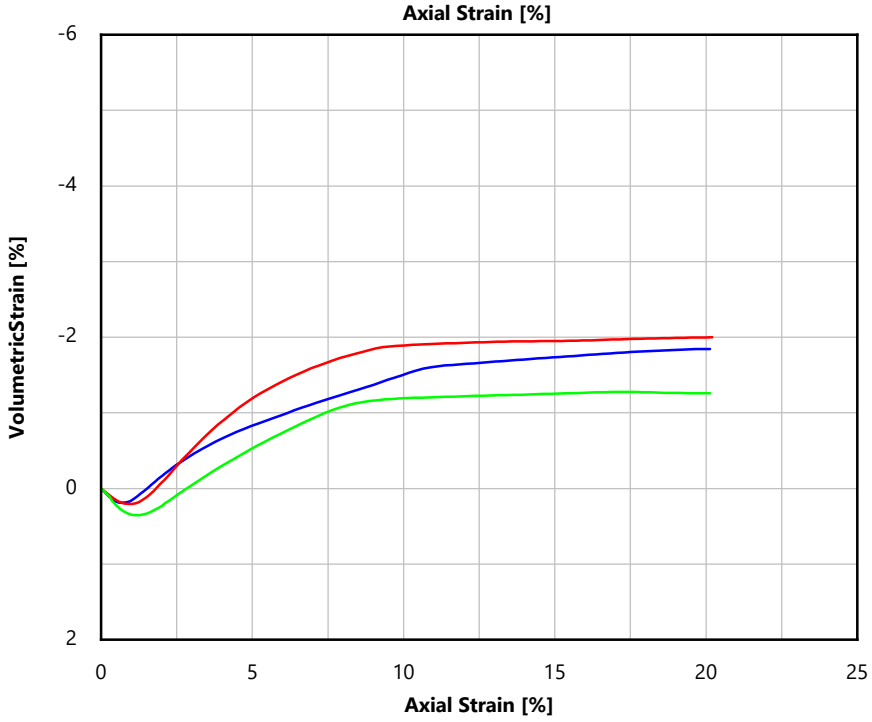
Consolidated Triaxial Compression Test On Water Saturated Soils
Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Shearing





Consolidation			
Stage 1 σ'_{rc} : 63 kPa	Stage 2 σ'_{rc} : 95 kPa	Stage 3 σ'_{rc} : 158 kPa	1
Stage 1 σ'_{vc} : 63 kPa	Stage 2 σ'_{vc} : 95 kPa	Stage 3 σ'_{vc} : 158 kPa	2
			3

Project: 503387 - F254727
CID11

Laboratory: Wallingford, UK
Z4_OWF_BH01-SAMP / 12-1 / 10.5

Approved by: ET 22/05/2025

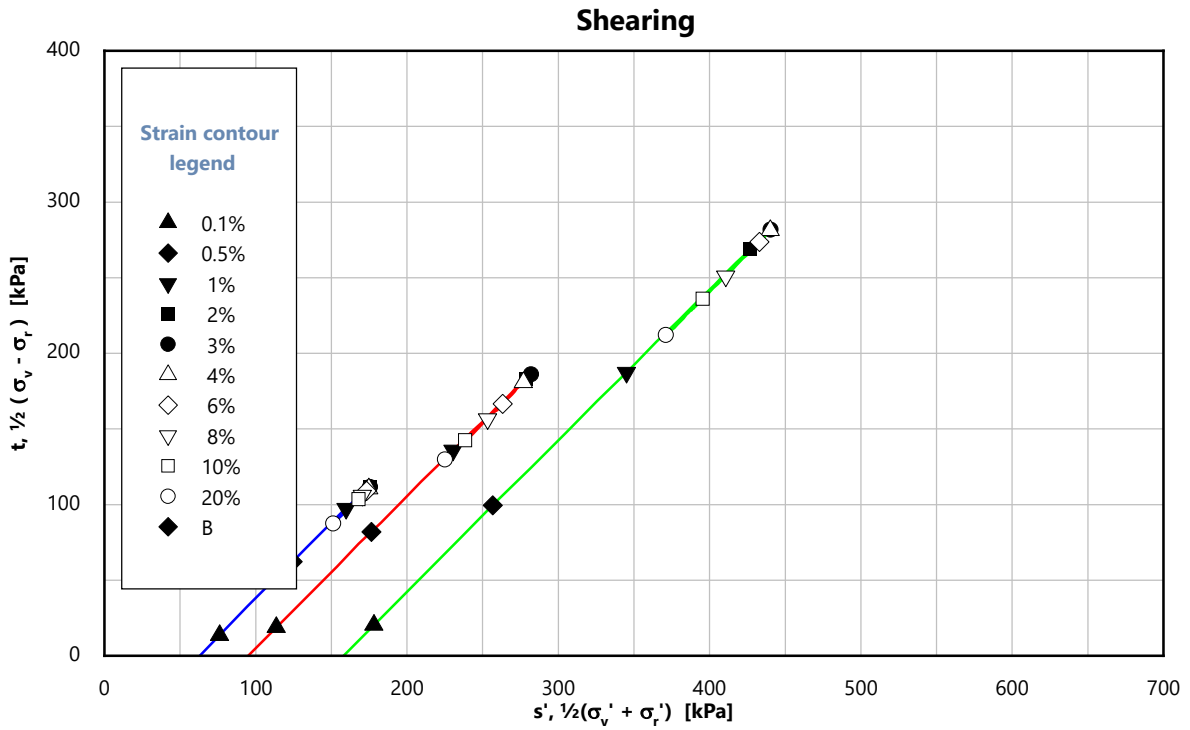
Test Report

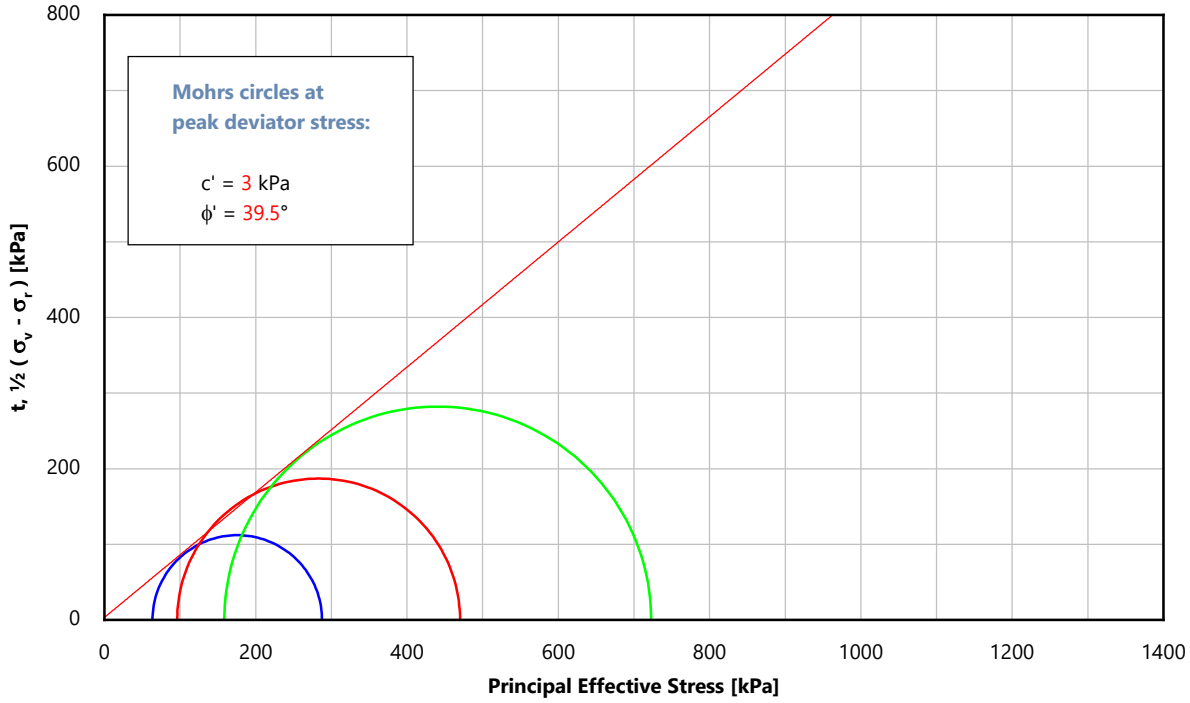
Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919





Consolidation			
Stage 1 σ'_{rc} : 63 kPa	Stage 2 σ'_{rc} : 95 kPa	Stage 3 σ'_{rc} : 158 kPa	1
Stage 1 σ'_{vc} : 63 kPa	Stage 2 σ'_{vc} : 95 kPa	Stage 3 σ'_{vc} : 158 kPa	2
			3

Project: 503387 - F254727
CID11

Laboratory: Wallingford, UK
Z4_OWF_BH01-SAMP / 12-1 / 10.5

Approved by: ET 22/05/2025

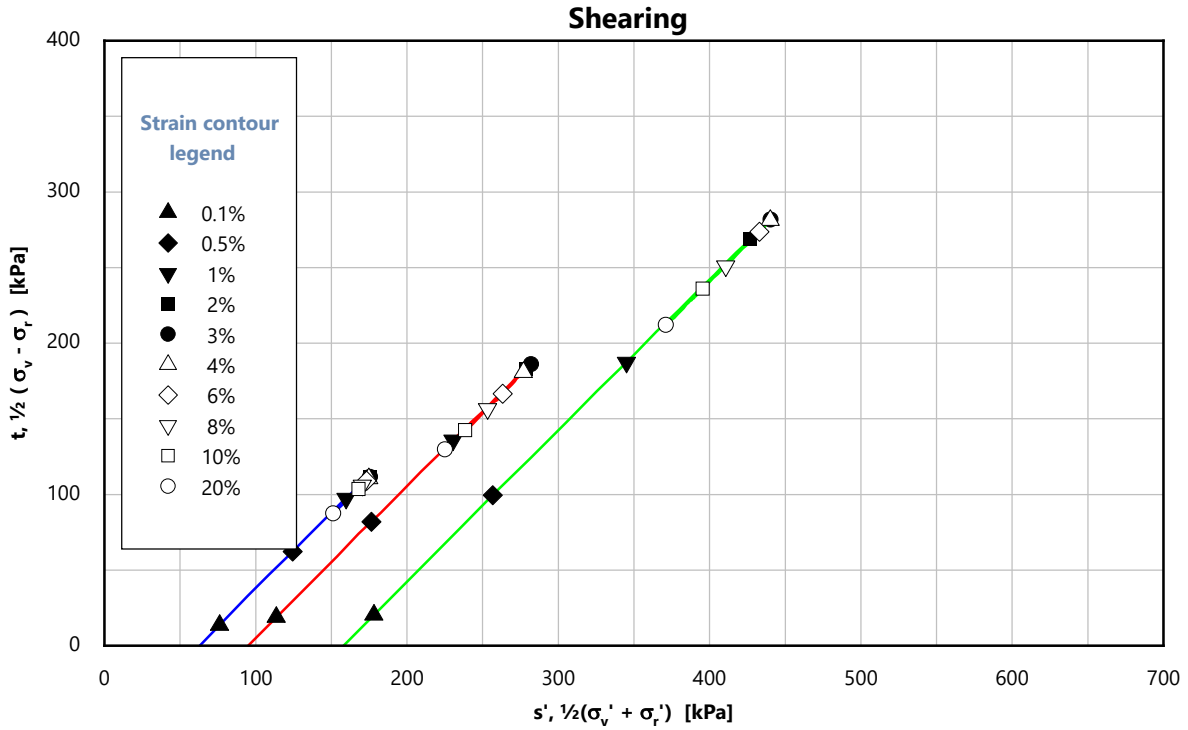
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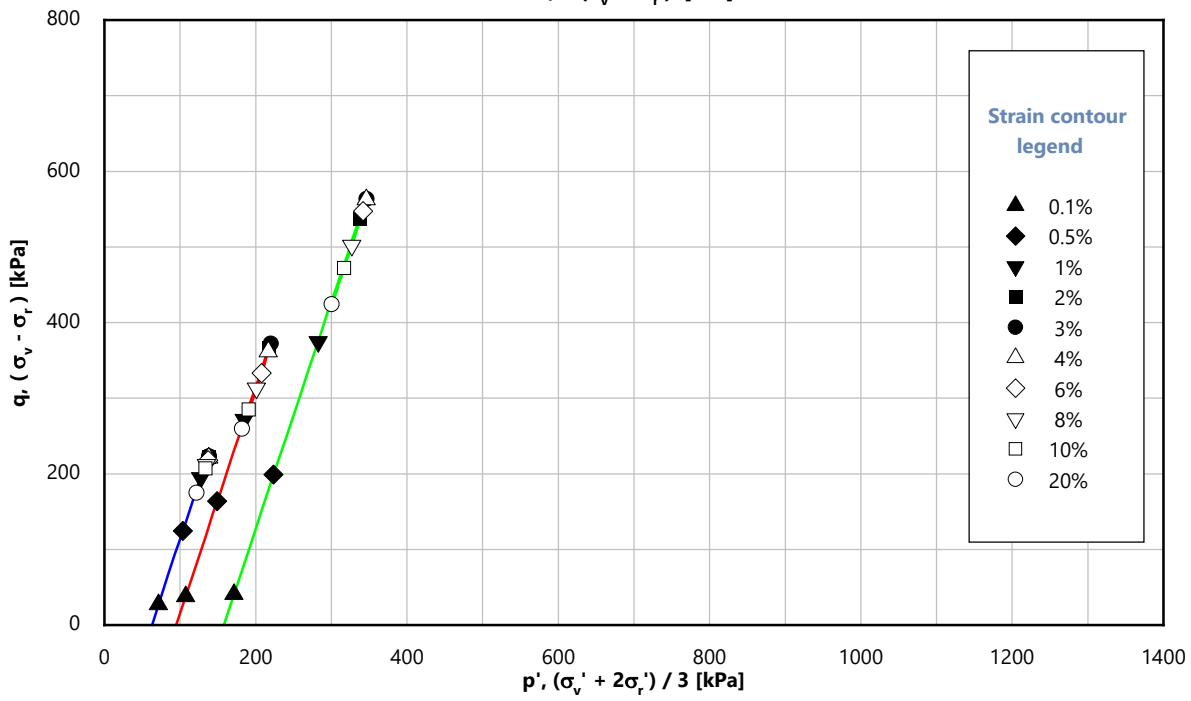
Test Report

Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018





Consolidation			
Stage 1 σ'_{rc} : 63 kPa	Stage 2 σ'_{rc} : 95 kPa	Stage 3 σ'_{rc} : 158 kPa	1
Stage 1 σ'_{vc} : 63 kPa	Stage 2 σ'_{vc} : 95 kPa	Stage 3 σ'_{vc} : 158 kPa	2 3

Project: 503387 - F254727
CID11

Laboratory: Wallingford, UK
Z4_OWF_BH01-SAMP / 12-1 / 10.5

Approved by: ET 22/05/2025

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

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Test Identification	Specimen 1	Specimen 2	Specimen 3
Location	Z4_OWF_BH01-SAMP	Z4_OWF_BH01-SAMP	Z4_OWF_BH01-SAMP
Sample	15-2	15-2	15-2
Depth [m]	14.00	14.00	14.00
Test number	CID12a	CID12b	CID12c

Specimen Visual Description
Olive brown fine SAND

Initial Specimen Conditions	Specimen 1	Specimen 2	Specimen 3
Test start date	04/06/2025	21/05/2025	30/04/2025
Type of sample	Recompacted	Recompacted	Recompacted
Diameter [mm]	50.5	50.5	50.5
Length [mm]	95.0	95.0	95.0
Water content [%]	10.2	11.1	10.2
Bulk density [Mg/m^3]	1.46	1.46	1.47
Dry density [Mg/m^3]	1.33	1.32	1.33
Void ratio [-]	0.994	1.010	0.989
Degree of saturation [%]	27	29	27
Type of drains fitted	One end	One end	One end

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

Saturation	Specimen 1	Specimen 2	Specimen 3
Pressure increments applied [kPa]	50	50	50
Differential pressure used [kPa]	10	10	10
Pore pressure on completion [kPa]	390	290	290
Cell pressure on completion [kPa]	400	300	300
B value achieved	0.96	0.96	0.96

Consolidation: Isotropic	Specimen 1	Specimen 2	Specimen 3
Cell pressure [kPa]	485	427	512
Back pressure [kPa]	400	300	300
Effective cell pressure [kPa]	85	127	212
Pore pressure on completion [kPa]	400	302	300
Pore pressure dissipation [%]	100	98	100
Water content [%]	35.8	34.4	32.0
Bulk density [Mg/m^3]	1.85	1.86	1.89
Dry density [Mg/m^3]	1.36	1.39	1.43
Void ratio [-]	0.949	0.911	0.849
Degree of saturation [%]	100	100	100
Axial strain [%]	0.76	1.64	2.35
Volumetric strain [%]	2.27	4.91	7.06
Volumetric strain rate-end of stage [%/hr]	0.03	0.04	0.05

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Shearing	Specimen 1	Specimen 2	Specimen 3
Initial pore pressure [kPa]	400	300	300
Initial effective cell pressure [kPa]	85	127	212
Rate of strain [%/hour]	1.30	1.30	1.30
At peak deviator stress			
Corrected deviator stress [kPa]	192	290	473
Membrane correction applied [kPa]	4.6	4.6	4.6
Drain correction applied [kPa]	0	0	0
Axial strain [%]	20.20	20.16	20.16
Volumetric strain [%]	2.77	3.30	4.69
Major principal effective stress [kPa]	277	416	685
Minor principal effective stress [kPa]	85	126	212
Principal effective stress ratio	3.26	3.30	3.23
ε_{50} [%]	3.90	3.72	3.84
Secant modulus (E_{50}) at ε_{50} [kPa]	2465	3898	6161
At peak principal effective stress ratio			
Corrected deviator stress [kPa]	192	290	473
Membrane correction applied [kPa]	4.6	4.6	4.6
Drain correction applied [kPa]	0	0	0
Axial strain [%]	19.95	20.16	20.16
Volumetric strain [%]	2.78	3.30	4.69
Major principal effective stress [kPa]	277	416	685
Minor principal effective stress [kPa]	85	126	212
Principal effective stress ratio	3.26	3.30	3.23
At 10% axial strain			
Corrected deviator stress [kPa]	161	247	399
Membrane correction applied [kPa]	2.8	2.8	2.8
Drain correction applied [kPa]	0	0	0
Axial strain [%]	10.00	10.00	10.00
Volumetric strain [%]	2.70	3.10	4.02
Major principal effective stress [kPa]	245	371	612
Minor principal effective stress [kPa]	84	124	212
Principal effective stress ratio	2.91	2.99	2.88

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Photographs		
Specimen 1	**Specimen 2**	**Specimen 3**
Photograph Unavailable	Photograph Unavailable	Photograph Unavailable

Final Conditions	Specimen 1	Specimen 2	Specimen 3
Water content [%]	35.8	34.4	32.0
Bulk density [Mg/m^3]	1.85	1.86	1.89
Dry density [Mg/m^3]	1.36	1.39	1.43
Mode of failure	Barrel	Barrel	Barrel

Project: 503387 - F254727
Test page CID12-4/8

Laboratory: Wallingford, UK
Z4_OWF_BH01-SAMP / 15-2 / 14

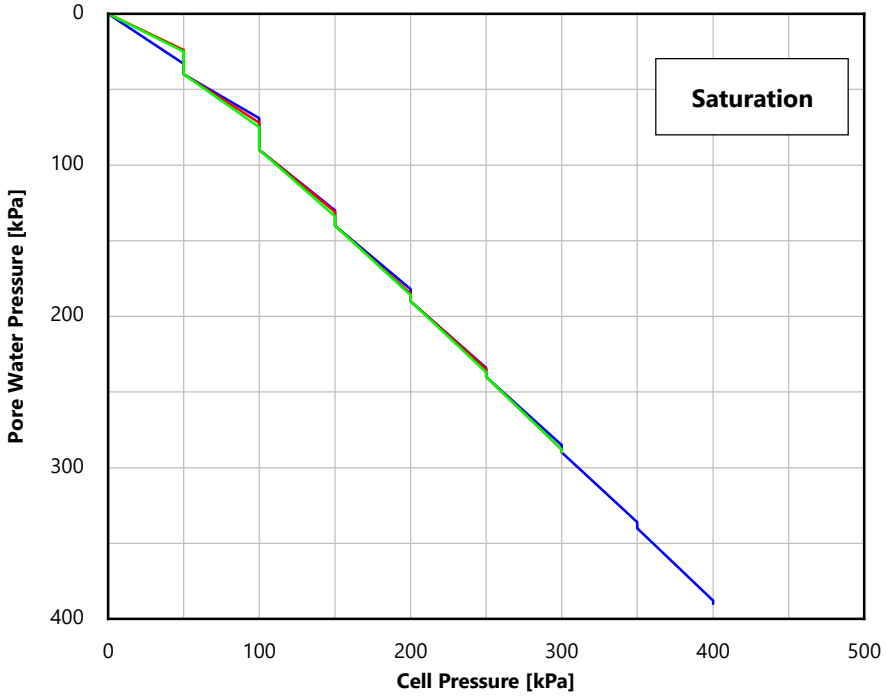
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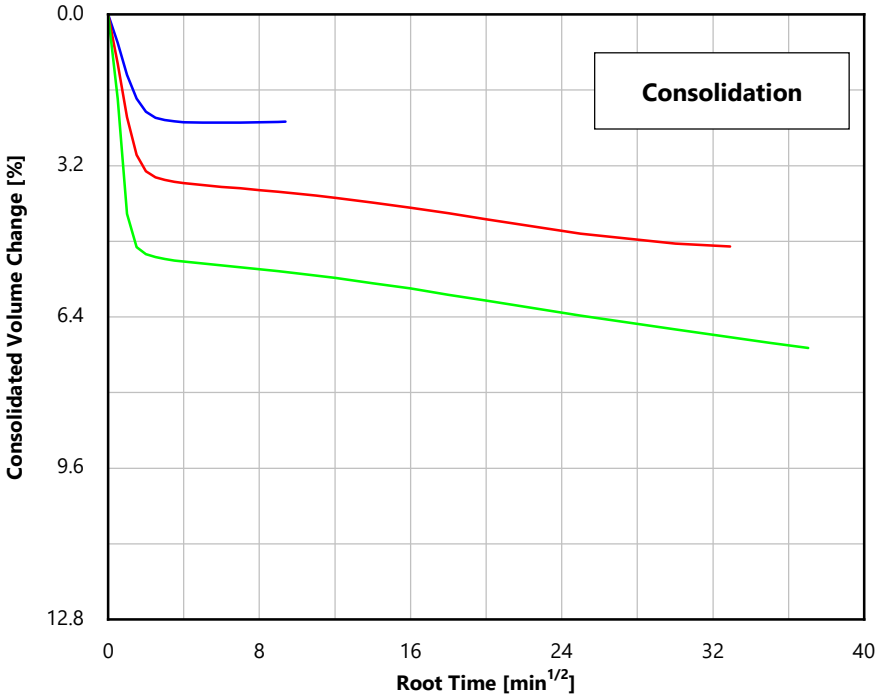
Test Report

Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018





Consolidation			
Stage 1 σ'_{rc} : 85 kPa	Stage 2 σ'_{rc} : 127 kPa	Stage 3 σ'_{rc} : 212 kPa	1
Stage 1 σ'_{vc} : 85 kPa	Stage 2 σ'_{vc} : 127 kPa	Stage 3 σ'_{vc} : 212 kPa	2
			3

Project: 503387 - F254727
CID12

Laboratory: Wallingford, UK
Z4_OWF_BH01-SAMP / 15-2 / 14

Approved by: ET 24/06/2025

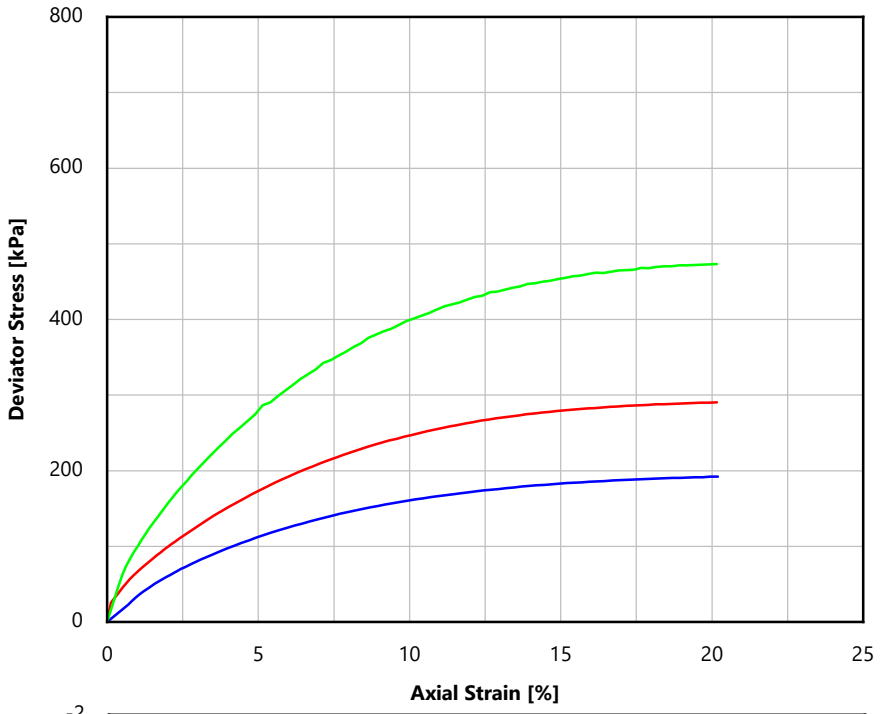
Test Report

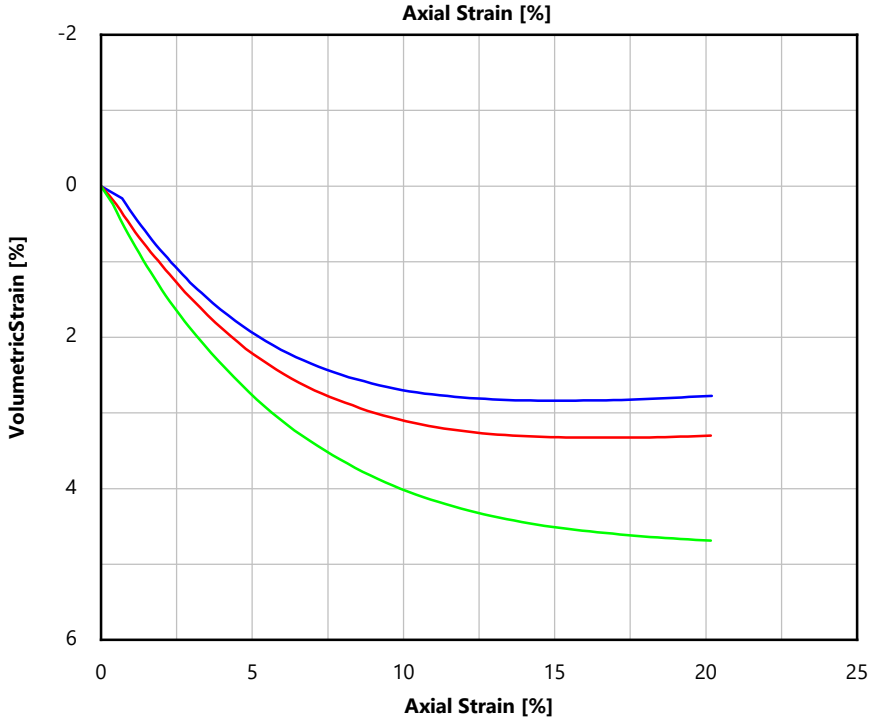
Consolidated Triaxial Compression Test On Water Saturated Soils
Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Shearing





Consolidation			
Stage 1 σ'_{rc} : 85 kPa	Stage 2 σ'_{rc} : 127 kPa	Stage 3 σ'_{rc} : 212 kPa	1
Stage 1 σ'_{vc} : 85 kPa	Stage 2 σ'_{vc} : 127 kPa	Stage 3 σ'_{vc} : 212 kPa	2
			3

Project: 503387 - F254727
CID12

Laboratory: Wallingford, UK
Z4_OWF_BH01-SAMP / 15-2 / 14

Approved by: ET 24/06/2025

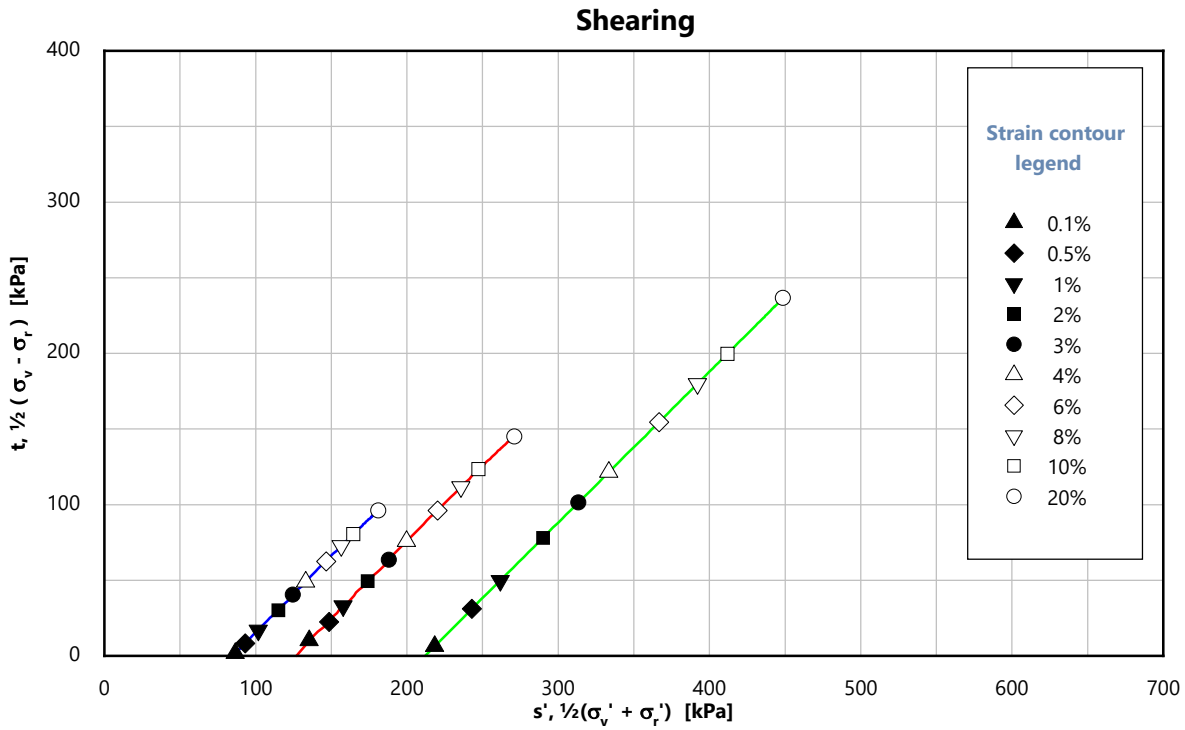
Test Report

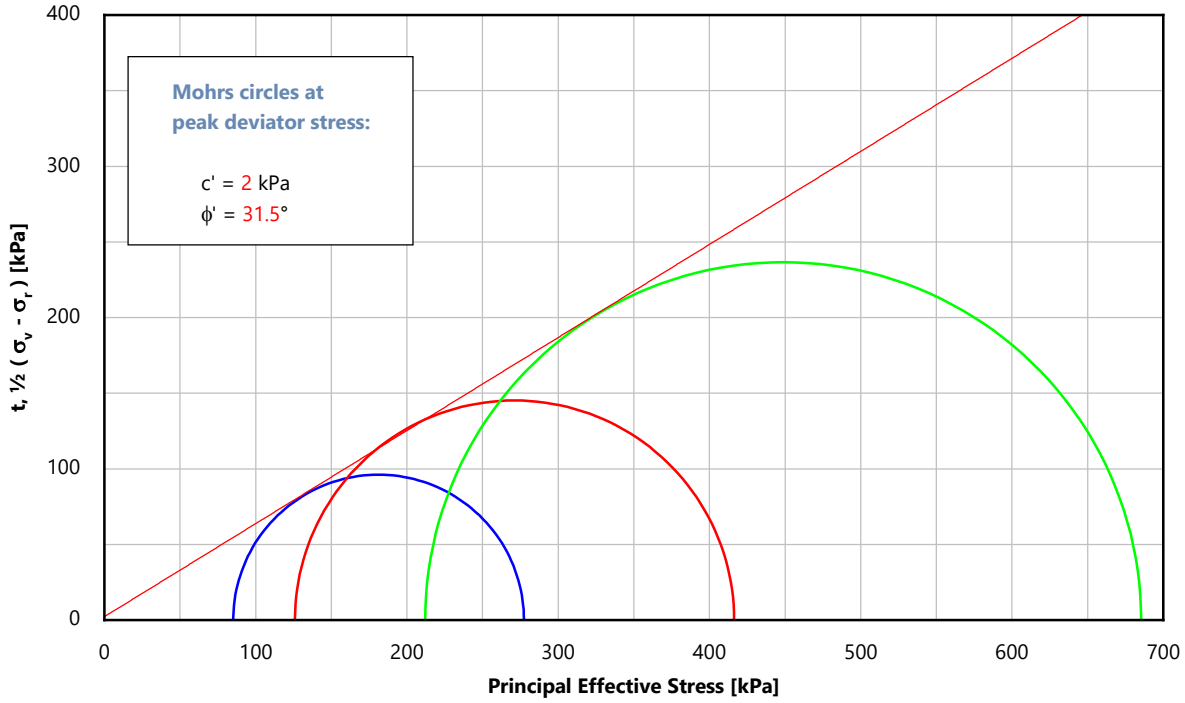
Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919





Consolidation			
Stage 1 σ'_{rc} : 85 kPa	Stage 2 σ'_{rc} : 127 kPa	Stage 3 σ'_{rc} : 212 kPa	1
Stage 1 σ'_{vc} : 85 kPa	Stage 2 σ'_{vc} : 127 kPa	Stage 3 σ'_{vc} : 212 kPa	2
			3

Project: 503387 - F254727
CID12

Laboratory: Wallingford, UK
Z4_OWF_BH01-SAMP / 15-2 / 14

Approved by: ET 24/06/2025

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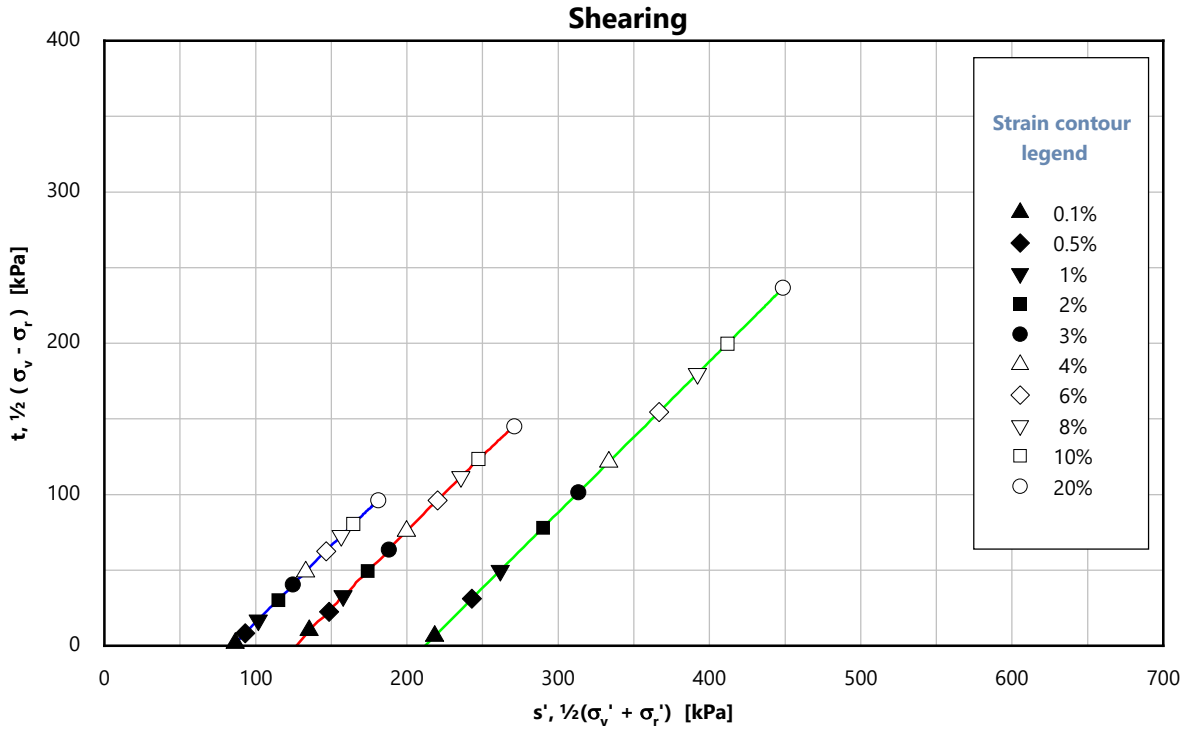
Test Report

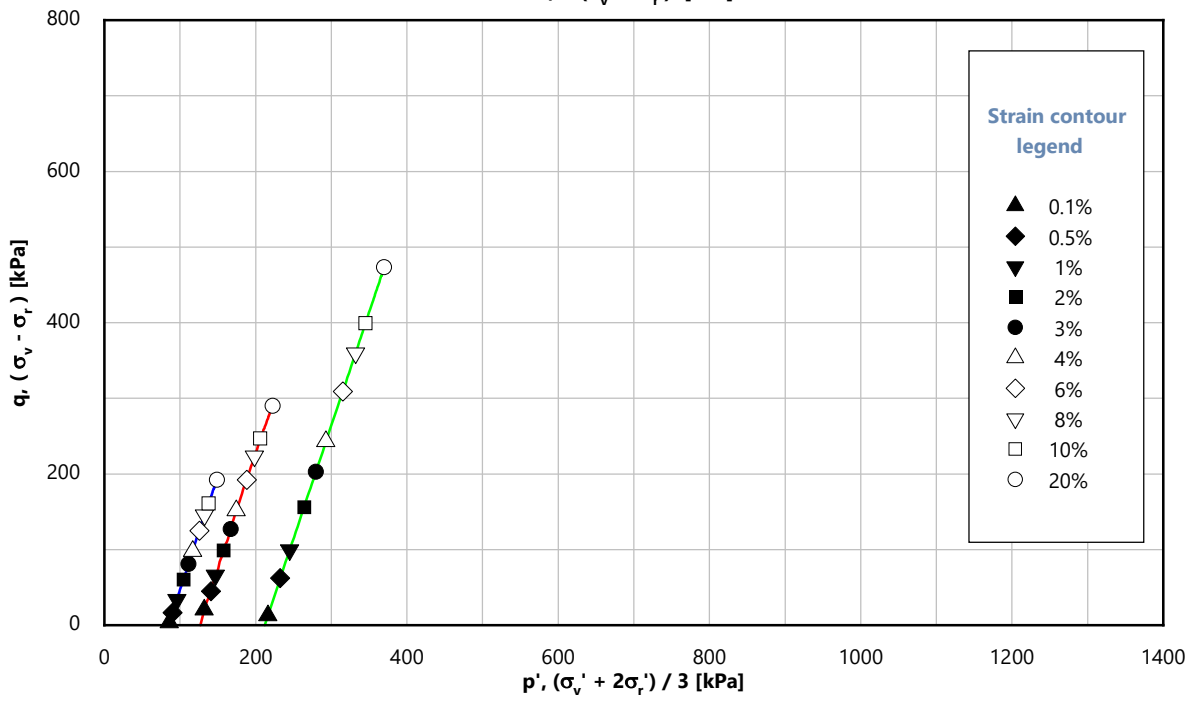
Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919





Consolidation			
Stage 1 σ'_{rc} : 85 kPa	Stage 2 σ'_{rc} : 127 kPa	Stage 3 σ'_{rc} : 212 kPa	1
Stage 1 σ'_{vc} : 85 kPa	Stage 2 σ'_{vc} : 127 kPa	Stage 3 σ'_{vc} : 212 kPa	2
			3

Project: 503387 - F254727
CID12

Laboratory: Wallingford, UK
Z4_OWF_BH01-SAMP / 15-2 / 14

Approved by: ET 24/06/2025

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Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

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Test Identification	Specimen 1	Specimen 2	Specimen 3
Location	Z4_OWF_BH05-SAMP	Z4_OWF_BH05-SAMP	Z4_OWF_BH05-SAMP
Sample	02-2	02-2	02-2
Depth [m]	1.30	1.30	1.30
Test number	CID13A	CID13B	CID13C

Specimen Visual Description
Greyish brown fine to medium SAND

Initial Specimen Conditions	Specimen 1	Specimen 2	Specimen 3
Test start date	01/01/1900	06/06/2025	14/05/2025
Type of sample	Recompacted	Recompacted	Recompacted
Diameter [mm]	50.8	50.8	50.8
Length [mm]	95.0	95.0	95.0
Water content [%]	10.0	10.0	10.2
Bulk density [Mg/m^3]	1.89	1.89	1.90
Dry density [Mg/m^3]	1.72	1.72	1.73
Void ratio [-]	0.541	0.542	0.535
Degree of saturation [%]	49	49	51
Type of drains fitted	One end	One end	One end

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

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Saturation	Specimen 1	Specimen 2	Specimen 3
Pressure increments applied [kPa]	15	20	30
Differential pressure used [kPa]	5	5	10
Pore pressure on completion [kPa]	345	335	380
Cell pressure on completion [kPa]	350	340	390
B value achieved	0.93	0.95	0.93

Consolidation: Isotropic	Specimen 1	Specimen 2	Specimen 3
Cell pressure [kPa]	365	363	428
Back pressure [kPa]	350	340	390
Effective cell pressure [kPa]	15	23	38
Pore pressure on completion [kPa]	346	340	390
Pore pressure dissipation [%]	173	100	100
Water content [%]	20.4	20.3	20.1
Bulk density [Mg/m^3]	2.07	2.07	2.08
Dry density [Mg/m^3]	1.72	1.72	1.73
Void ratio [-]	0.540	0.538	0.531
Degree of saturation [%]	100	100	100
Axial strain [%]	0.01	0.07	0.08
Volumetric strain [%]	0.04	0.21	0.23
Volumetric strain rate-end of stage [%/hr]	0.06	0.01	0.00

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

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Shearing	Specimen 1	Specimen 2	Specimen 3
Initial pore pressure [kPa]	350	340	390
Initial effective cell pressure [kPa]	15	23	38
Rate of strain [%/hour]	1.30	1.30	1.30
At peak deviator stress			
Corrected deviator stress [kPa]	130	179	212
Membrane correction applied [kPa]	0.6	0.5	0.6
Drain correction applied [kPa]	0	0	0
Axial strain [%]	2.14	1.84	2.44
Volumetric strain [%]	-1.63	-1.40	-1.99
Major principal effective stress [kPa]	150	203	252
Minor principal effective stress [kPa]	20	24	40
Principal effective stress ratio	7.59	8.43	6.37
ε_{50} [%]	0.83	0.62	0.54
Secant modulus (E_{50}) at ε_{50} [kPa]	7838	14411	19629
At peak principal effective stress ratio			
Corrected deviator stress [kPa]	130	175	212
Membrane correction applied [kPa]	0.6	0.4	0.5
Drain correction applied [kPa]	0	0	0
Axial strain [%]	2.14	1.64	2.06
Volumetric strain [%]	-1.63	-1.08	-1.51
Major principal effective stress [kPa]	150	198	251
Minor principal effective stress [kPa]	20	23	39
Principal effective stress ratio	7.59	8.66	6.46
At 10% axial strain			
Corrected deviator stress [kPa]	49	363	103
Membrane correction applied [kPa]	2.4	2.5	2.3
Drain correction applied [kPa]	0	0	0
Axial strain [%]	10.00	10.00	10.00
Volumetric strain [%]	-4.77	-14.35	-5.26
Major principal effective stress [kPa]	53	249	143
Minor principal effective stress [kPa]	5	-114	40
Principal effective stress ratio	5.92	58.85	3.57

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

0919

Photographs		
Specimen 1	**Specimen 2**	**Specimen 3**
Photograph unavailable	Photograph unavailable	

Final Conditions	Specimen 1	Specimen 2	Specimen 3
Water content [%]	23.8	24.0	20.1
Bulk density [Mg/m³]	2.01	2.01	2.08
Dry density [Mg/m³]	1.63	1.62	1.73
Mode of failure	Compound failure	Compound failure	Compound failure

Project: 503387 - F254727
Test page CID13-4/8

Laboratory: Wallingford, UK
Z4_OWF_BH05-SAMP / 02-2 / 1.3

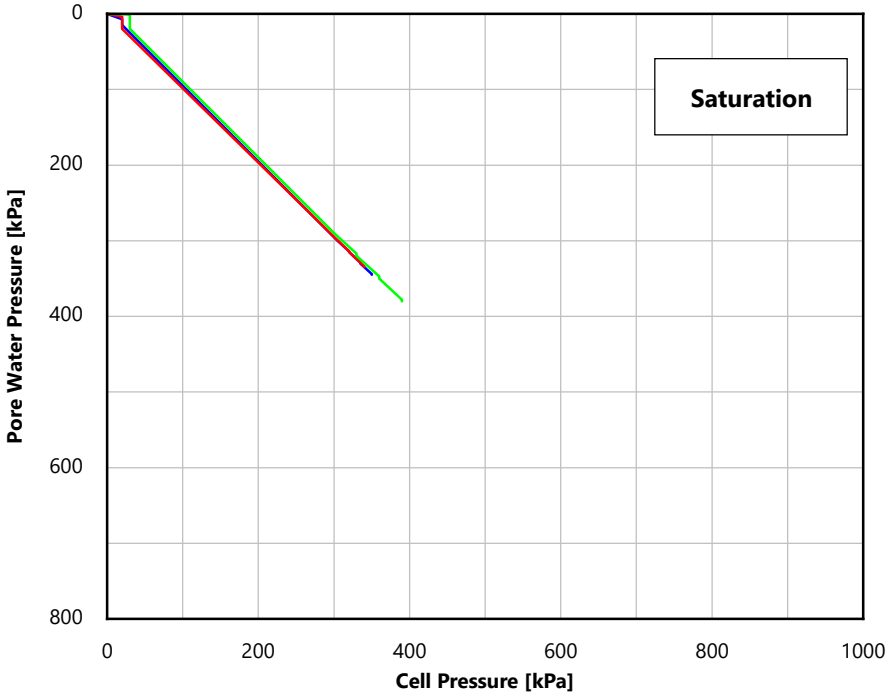
Approved by: ET - 26/06/2025

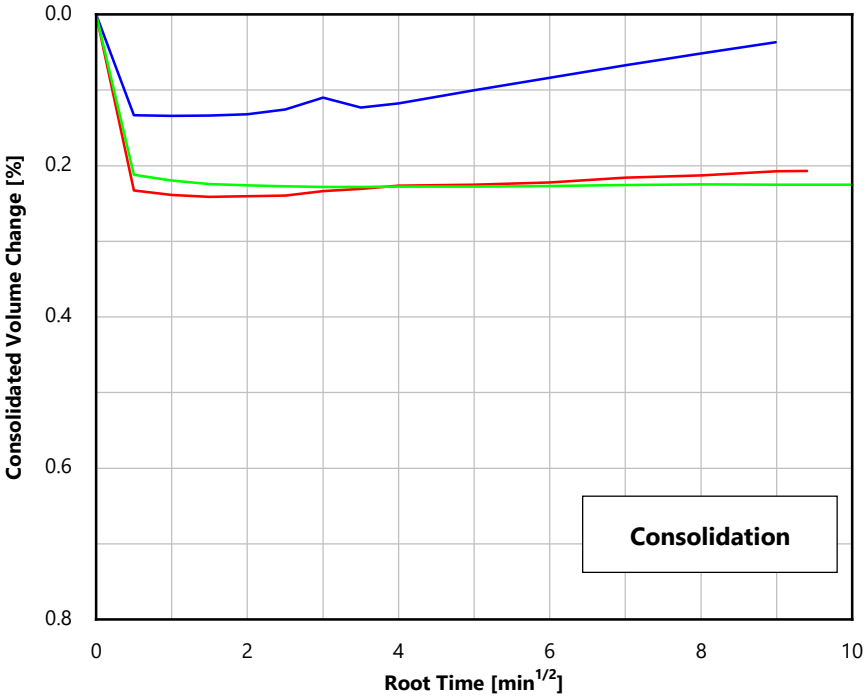
Test Report

Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018





Consolidation			
Stage 1 σ'_{rc} : 15 kPa	Stage 2 σ'_{rc} : 23 kPa	Stage 3 σ'_{rc} : 38 kPa	1
Stage 1 σ'_{vc} : 15 kPa	Stage 2 σ'_{vc} : 23 kPa	Stage 3 σ'_{vc} : 38 kPa	2 3

Project: 503387 - F254727
CID13

Laboratory: Wallingford, UK
Z4_OWF_BH05-SAMP / 02-2 / 1.3

Approved by: ET 26/06/2025

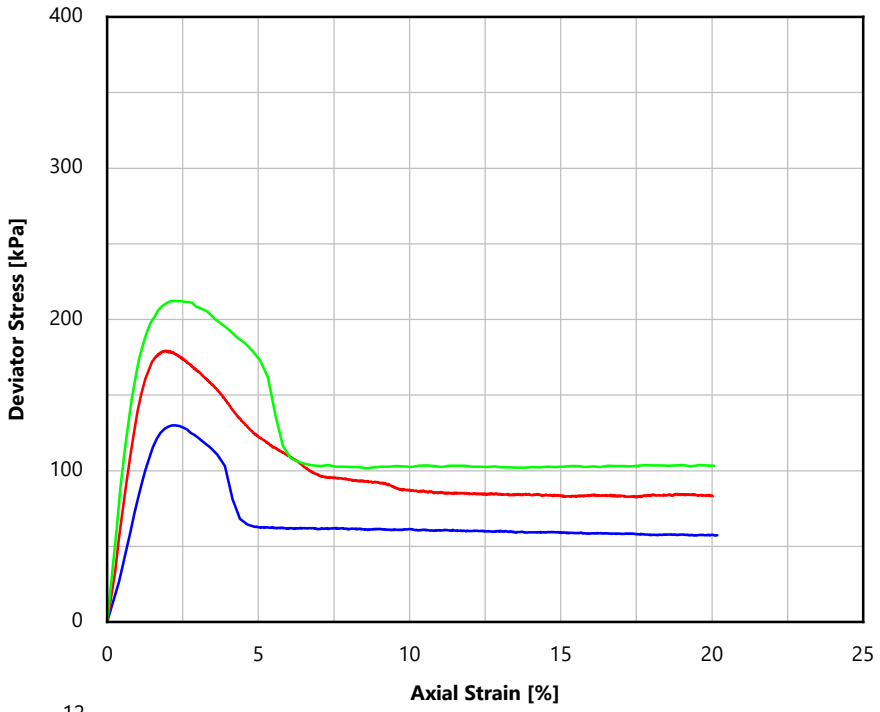
Test Report

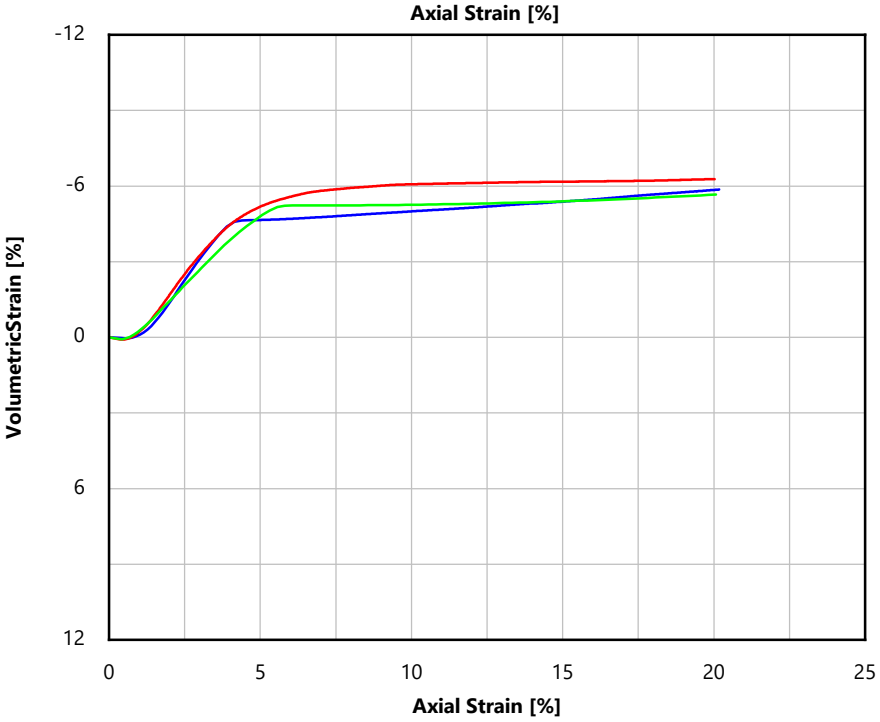
Consolidated Triaxial Compression Test On Water Saturated Soils
Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Shearing





Consolidation			
Stage 1 σ'_{rc} : 15 kPa	Stage 2 σ'_{rc} : 23 kPa	Stage 3 σ'_{rc} : 38 kPa	1
Stage 1 σ'_{vc} : 15 kPa	Stage 2 σ'_{vc} : 23 kPa	Stage 3 σ'_{vc} : 38 kPa	2
			3

Project: 503387 - F254727
CID13

Laboratory: Wallingford, UK
Z4_OWF_BH05-SAMP / 02-2 / 1.3

Approved by: ET 26/06/2025

Test Report

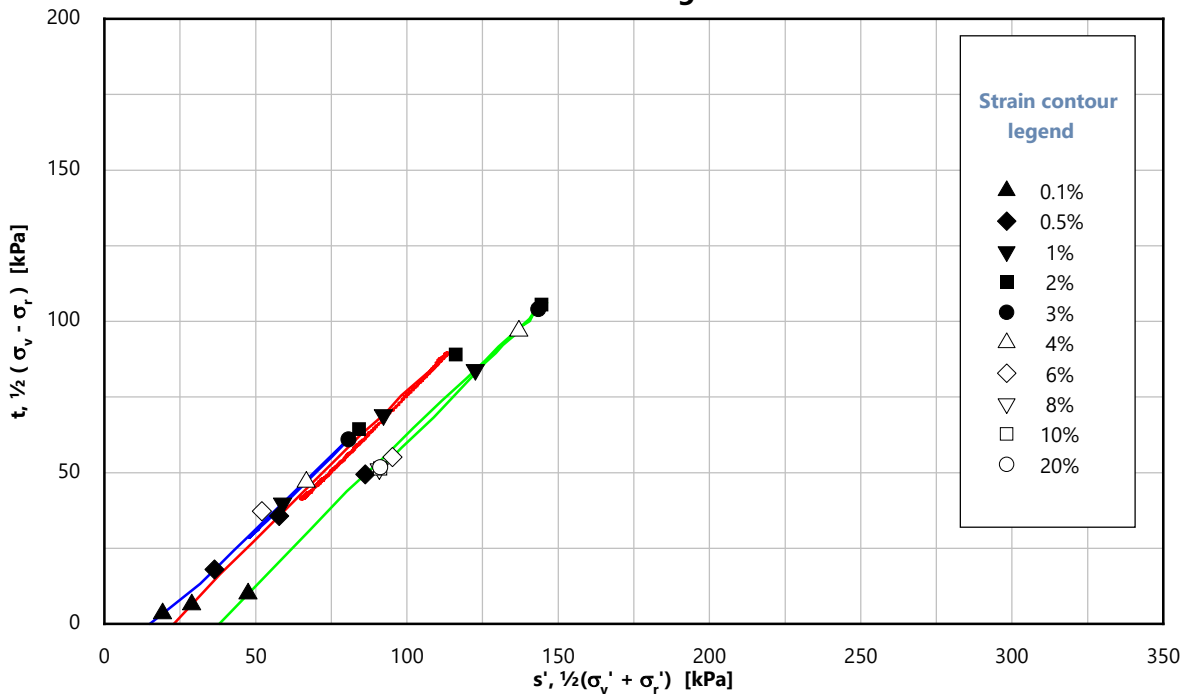
Consolidated Triaxial Compression Test On Water Saturated Soils

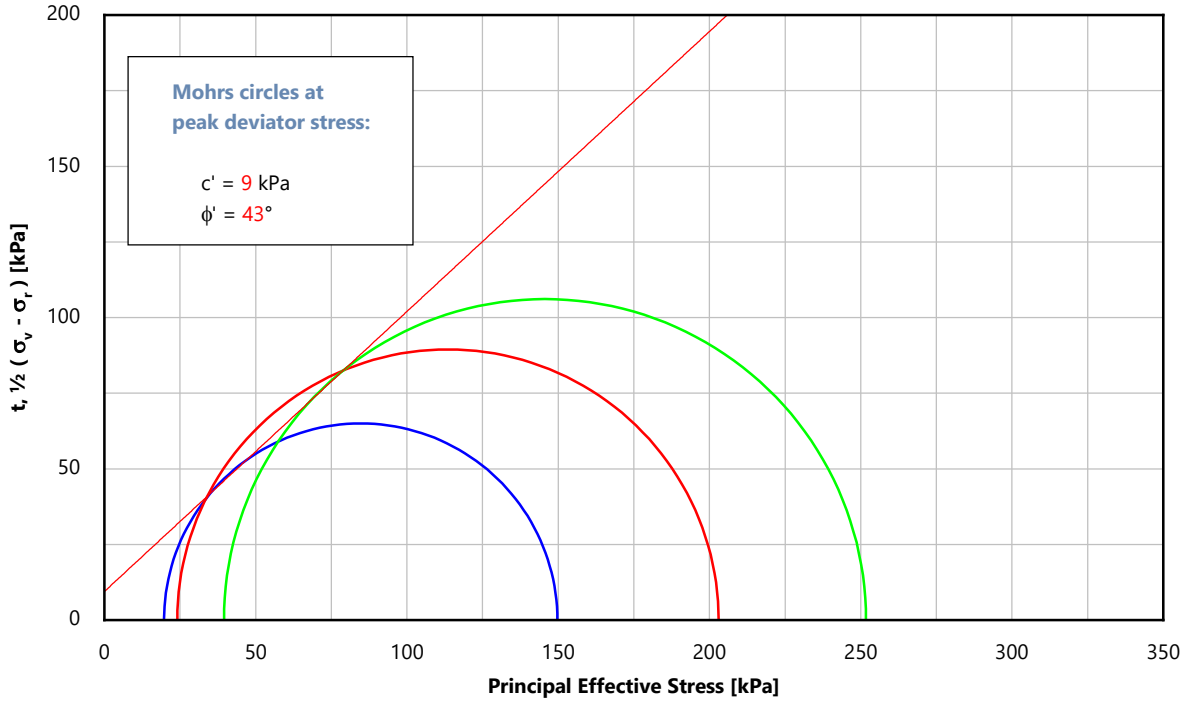
Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Shearing





Consolidation			
Stage 1 σ'_{rc} : 15 kPa	Stage 2 σ'_{rc} : 23 kPa	Stage 3 σ'_{rc} : 38 kPa	1
Stage 1 σ'_{vc} : 15 kPa	Stage 2 σ'_{vc} : 23 kPa	Stage 3 σ'_{vc} : 38 kPa	2
			3

Project: 503387 - F254727
CID13

Laboratory: Wallingford, UK
Z4_OWF_BH05-SAMP / 02-2 / 1.3

Approved by: ET 26/06/2025

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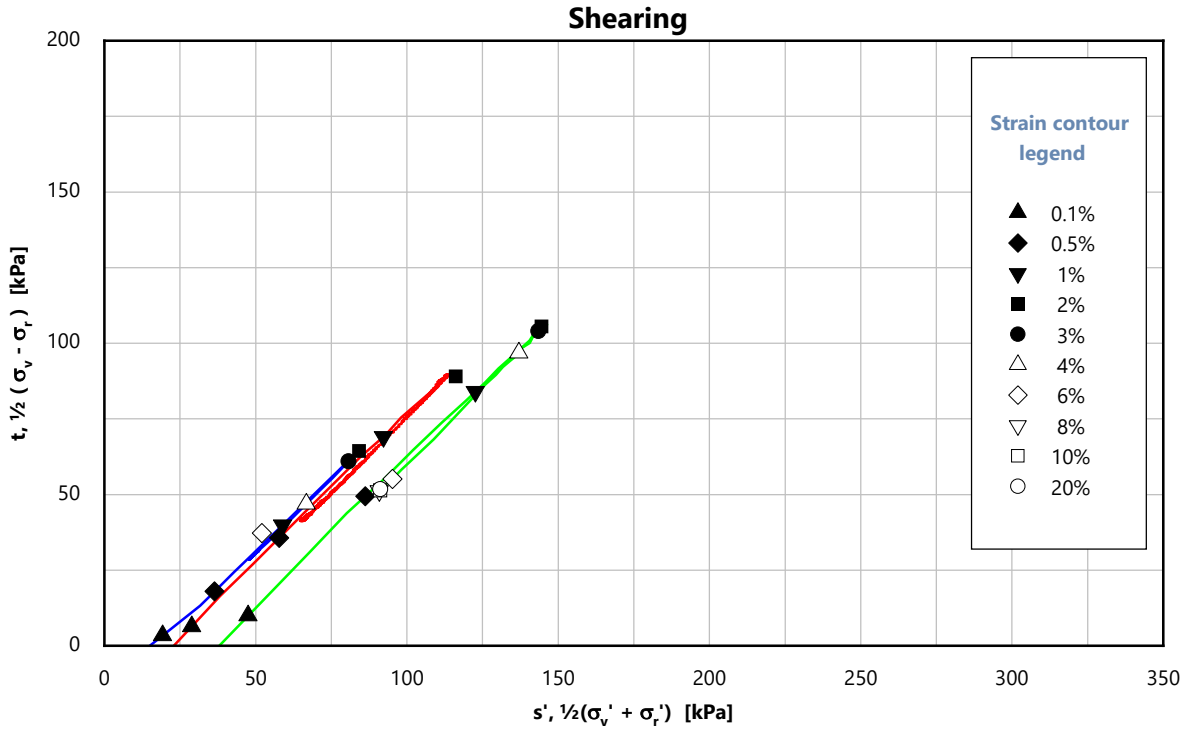
Test Report

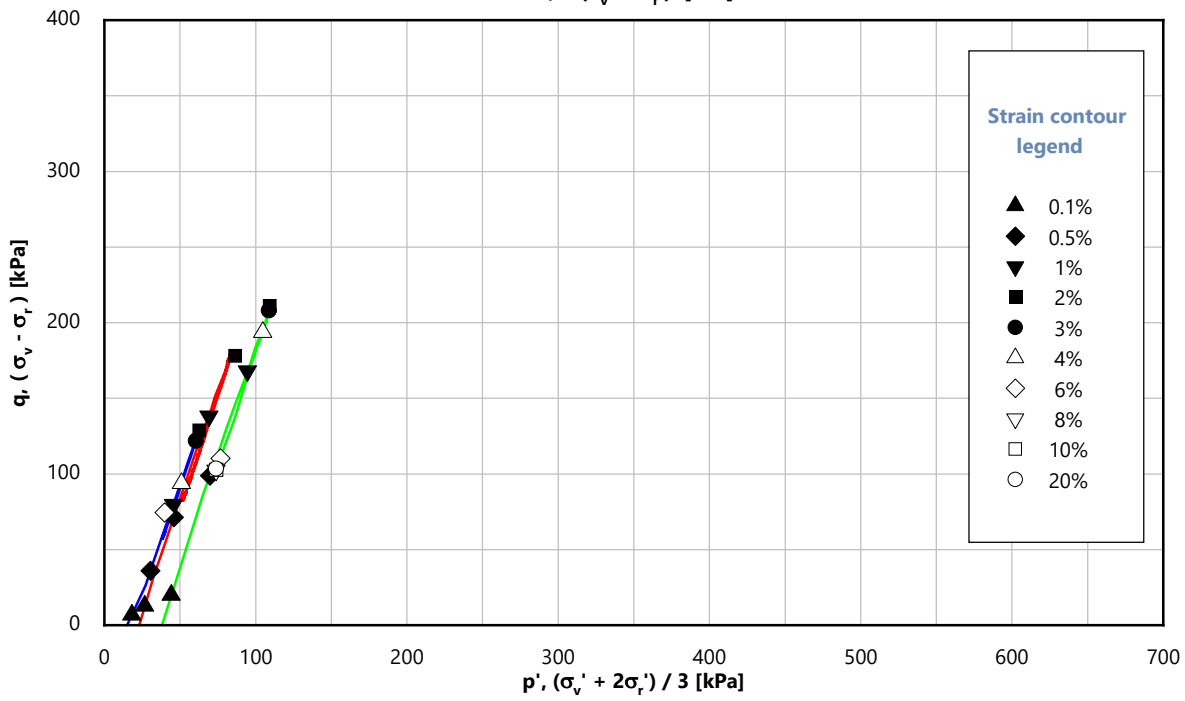
Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

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Consolidation			
Stage 1 σ'_{rc} : 15 kPa	Stage 2 σ'_{rc} : 23 kPa	Stage 3 σ'_{rc} : 38 kPa	1
Stage 1 σ'_{vc} : 15 kPa	Stage 2 σ'_{vc} : 23 kPa	Stage 3 σ'_{vc} : 38 kPa	2 3

Project: 503387 - F254727
CID13

Laboratory: Wallingford, UK
Z4_OWF_BH05-SAMP / 02-2 / 1.3

Approved by: ET 26/06/2025

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

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Test Identification	Specimen 1	Specimen 2	Specimen 3
Location	Z4_OWF_BH05-SAMP	Z4_OWF_BH05-SAMP	Z4_OWF_BH05-SAMP
Sample	08-2	08-2	08-2
Depth [m]	7.30	7.30	7.30
Test number	CID14A	CID14B	CID14Cr

Specimen Visual Description
Olive brown fine SAND

Initial Specimen Conditions	Specimen 1	Specimen 2	Specimen 3
Test start date	14/05/2025	14/05/2025	01/07/2025
Type of sample	Recompacted	Recompacted	Recompacted
Diameter [mm]	50.8	50.8	50.8
Length [mm]	95.0	95.0	95.0
Water content [%]	10.0	10.0	10.2
Bulk density [Mg/m^3]	1.56	1.55	1.55
Dry density [Mg/m^3]	1.41	1.41	1.41
Void ratio [-]	0.874	0.877	0.878
Degree of saturation [%]	30	30	31
Type of drains fitted	One end	One end	One end

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

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Saturation	Specimen 1	Specimen 2	Specimen 3
Pressure increments applied [kPa]	40	50	50
Differential pressure used [kPa]	10	10	10
Pore pressure on completion [kPa]	350	390	390
Cell pressure on completion [kPa]	360	400	400
B value achieved	1.00	0.98	0.96

Consolidation: Isotropic	Specimen 1	Specimen 2	Specimen 3
Cell pressure [kPa]	405	468	513
Back pressure [kPa]	360	400	400
Effective cell pressure [kPa]	45	68	113
Pore pressure on completion [kPa]	360	400	400
Pore pressure dissipation [%]	100	100	100
Water content [%]	32.8	32.8	32.5
Bulk density [Mg/m^3]	1.88	1.88	1.89
Dry density [Mg/m^3]	1.42	1.42	1.42
Void ratio [-]	0.869	0.868	0.861
Degree of saturation [%]	100	100	100
Axial strain [%]	0.08	0.16	0.30
Volumetric strain [%]	0.25	0.47	0.90
Volumetric strain rate-end of stage [%/hr]	0.03	0.08	0.08

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

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Shearing	Specimen 1	Specimen 2	Specimen 3
Initial pore pressure [kPa]	360	400	400
Initial effective cell pressure [kPa]	45	68	113
Rate of strain [%/hour]	1.30	1.30	1.30
At peak deviator stress			
Corrected deviator stress [kPa]	116	186	290
Membrane correction applied [kPa]	0.5	0.5	0.9
Drain correction applied [kPa]	0	0	0
Axial strain [%]	2.05	2.00	4.00
Volumetric strain [%]	0.07	0.12	0.36
Major principal effective stress [kPa]	161	253	404
Minor principal effective stress [kPa]	45	67	114
Principal effective stress ratio	3.59	3.76	3.54
ε_{50} [%]	0.25	0.30	0.41
Secant modulus (E_{50}) at ε_{50} [kPa]	23099	30456	35314
At peak principal effective stress ratio			
Corrected deviator stress [kPa]	114	186	290
Membrane correction applied [kPa]	2.6	0.5	1.2
Drain correction applied [kPa]	0	0	0
Axial strain [%]	12.67	1.87	5.00
Volumetric strain [%]	0.44	0.13	0.39
Major principal effective stress [kPa]	158	252	403
Minor principal effective stress [kPa]	44	67	113
Principal effective stress ratio	3.60	3.78	3.56
At 10% axial strain			
Corrected deviator stress [kPa]	114	170	285
Membrane correction applied [kPa]	2.1	2.1	2.1
Drain correction applied [kPa]	0	0	0
Axial strain [%]	10.00	10.00	10.00
Volumetric strain [%]	0.36	0.43	0.50
Major principal effective stress [kPa]	158	237	399
Minor principal effective stress [kPa]	44	67	114
Principal effective stress ratio	3.58	3.56	3.50

Project: 503387 - F254727
Test page CID14-3/8

Laboratory: Wallingford, UK
Z4_OWF_BH05-SAMP / 08-2 / 7.3

Approved by: ET - 15/07/2025

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

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Photographs		
Specimen 1	**Specimen 2**	**Specimen 3**
Photograph unavailable	Photograph unavailable	Photograph unavailable

Final Conditions	Specimen 1	Specimen 2	Specimen 3
Water content [%]	32.5	32.8	32.1
Bulk density [Mg/m³]	1.89	1.88	1.89
Dry density [Mg/m³]	1.42	1.42	1.43
Mode of failure	Barrel	Compound failure	Barrel

Project: 503387 - F254727
Test page CID14-4/8

Laboratory: Wallingford, UK
Z4_OWF_BH05-SAMP / 08-2 / 7.3

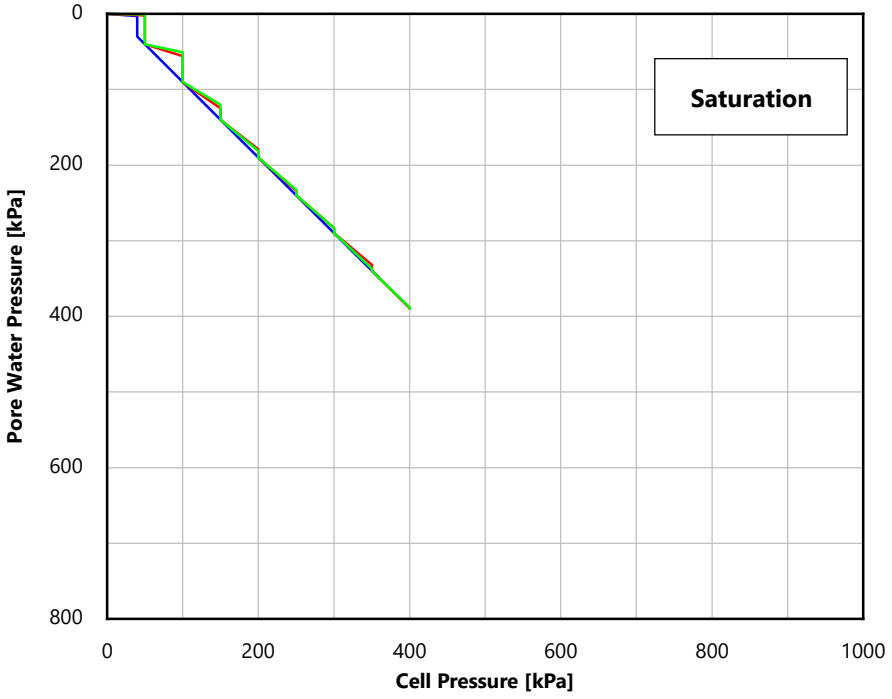
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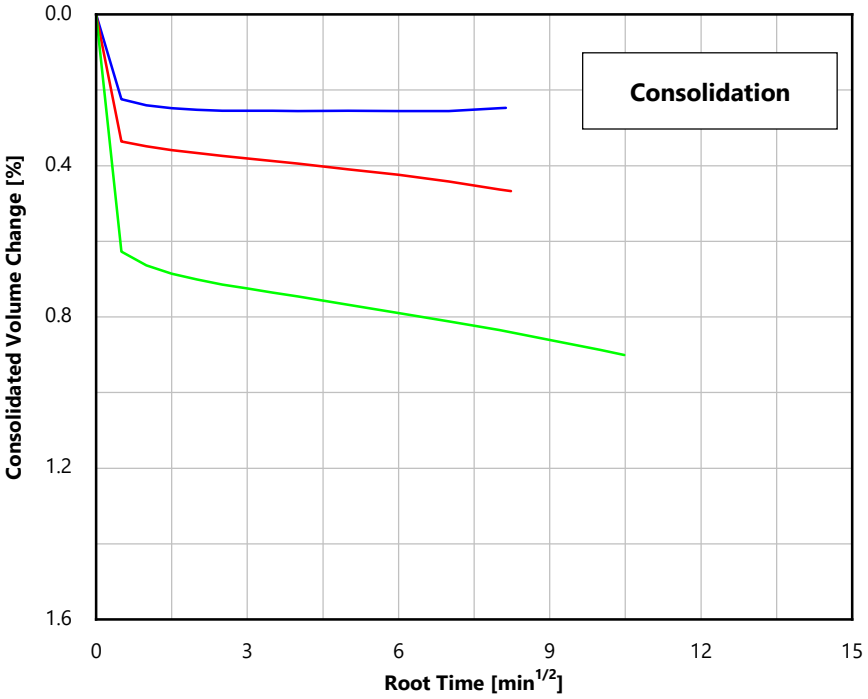
Test Report

Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

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Consolidation			
Stage 1 σ'_{rc} : 45 kPa	Stage 2 σ'_{rc} : 68 kPa	Stage 3 σ'_{rc} : 113 kPa	1
Stage 1 σ'_{vc} : 45 kPa	Stage 2 σ'_{vc} : 68 kPa	Stage 3 σ'_{vc} : 113 kPa	2 3

Project: 503387 - F254727
CID14

Laboratory: Wallingford, UK
Z4_OWF_BH05-SAMP / 08-2 / 7.3

Approved by: ET 15/07/2025

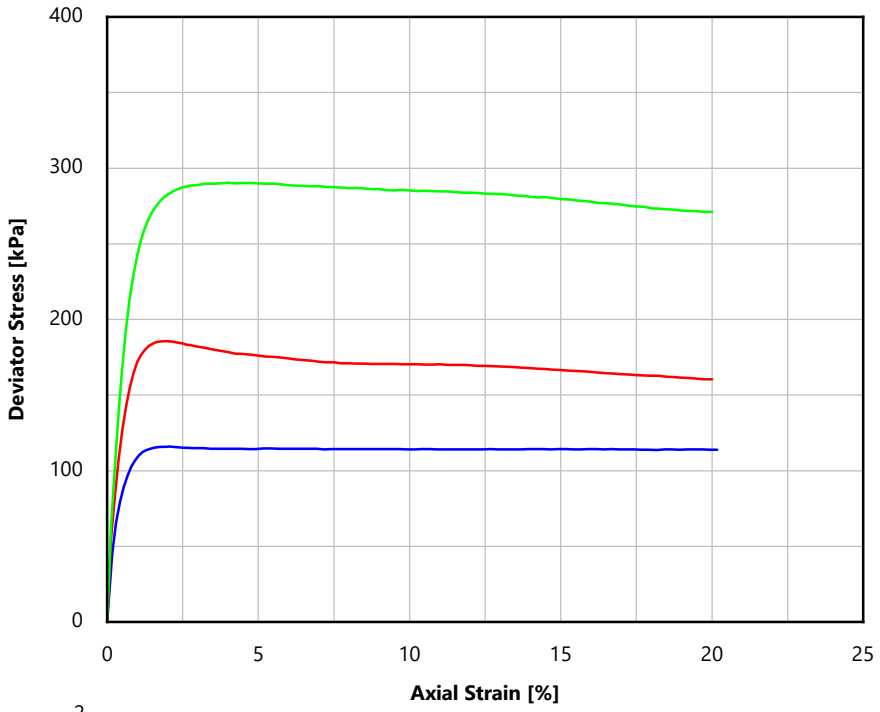
Test Report

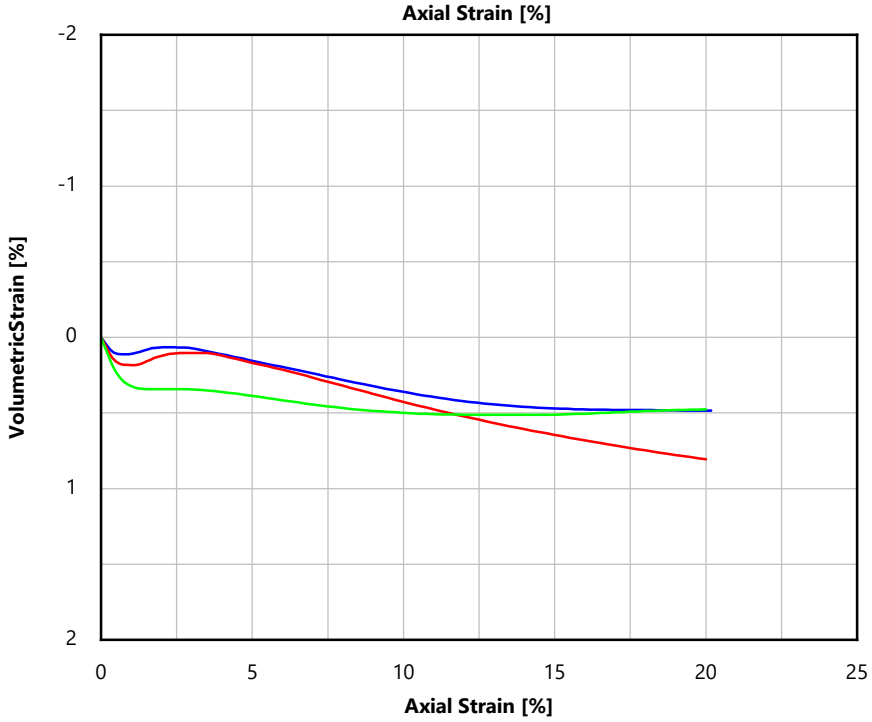
Consolidated Triaxial Compression Test On Water Saturated Soils
Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Shearing





Consolidation			
Stage 1 σ'_{rc} : 45 kPa	Stage 2 σ'_{rc} : 68 kPa	Stage 3 σ'_{rc} : 113 kPa	1
Stage 1 σ'_{vc} : 45 kPa	Stage 2 σ'_{vc} : 68 kPa	Stage 3 σ'_{vc} : 113 kPa	2
			3

Project: 503387 - F254727
CID14

Laboratory: Wallingford, UK
Z4_OWF_BH05-SAMP / 08-2 / 7.3

Approved by: ET 15/07/2025

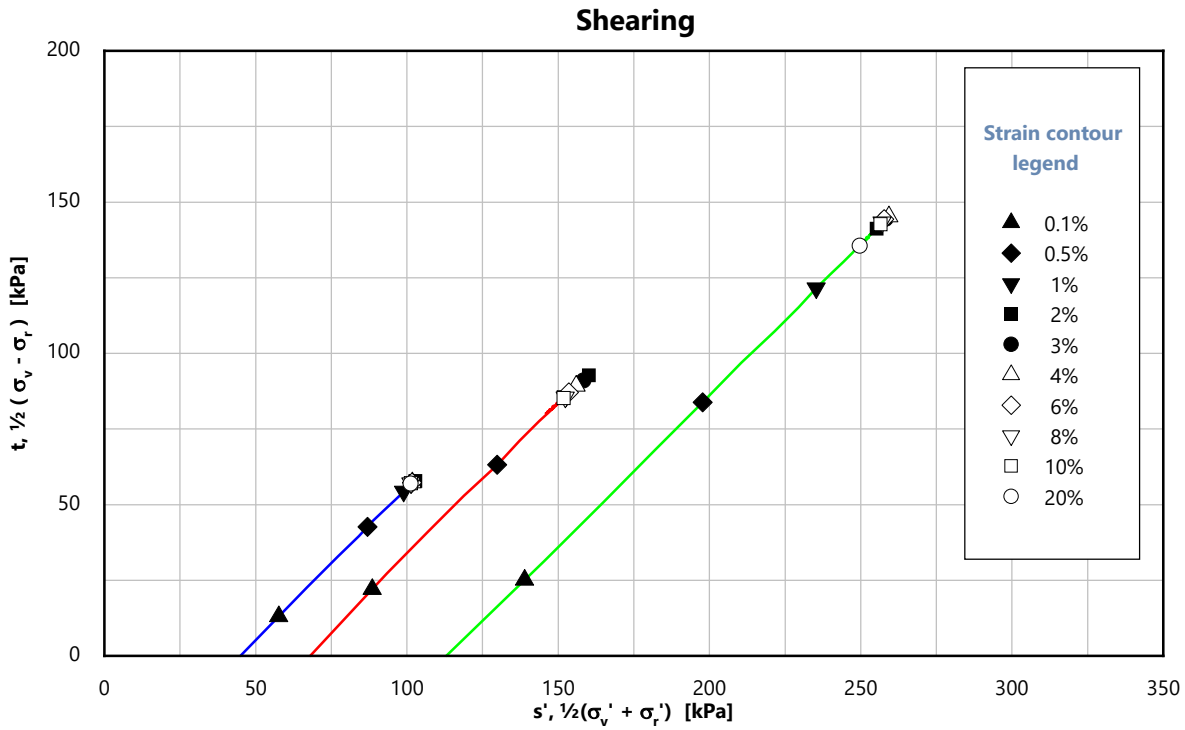
Test Report

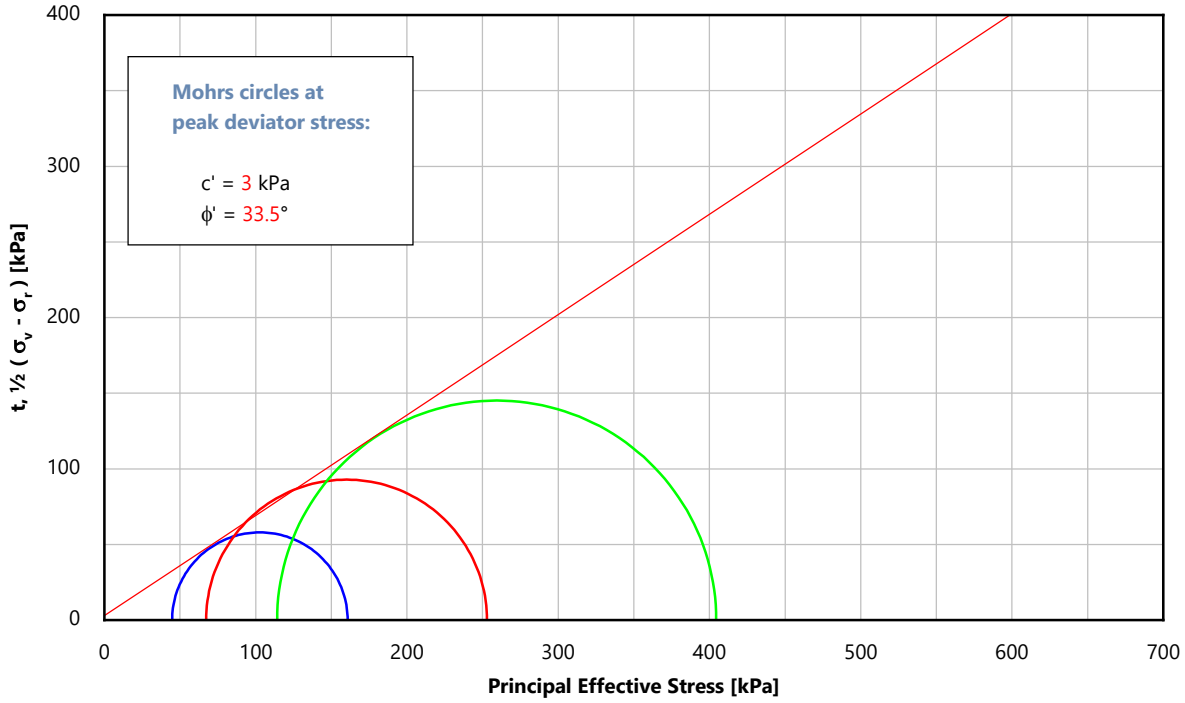
Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919





Consolidation			
Stage 1 σ'_{rc} : 45 kPa	Stage 2 σ'_{rc} : 68 kPa	Stage 3 σ'_{rc} : 113 kPa	1
Stage 1 σ'_{vc} : 45 kPa	Stage 2 σ'_{vc} : 68 kPa	Stage 3 σ'_{vc} : 113 kPa	2
			3

Project: 503387 - F254727
CID14

Laboratory: Wallingford, UK
Z4_OWF_BH05-SAMP / 08-2 / 7.3

Approved by: ET 15/07/2025

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Test Report

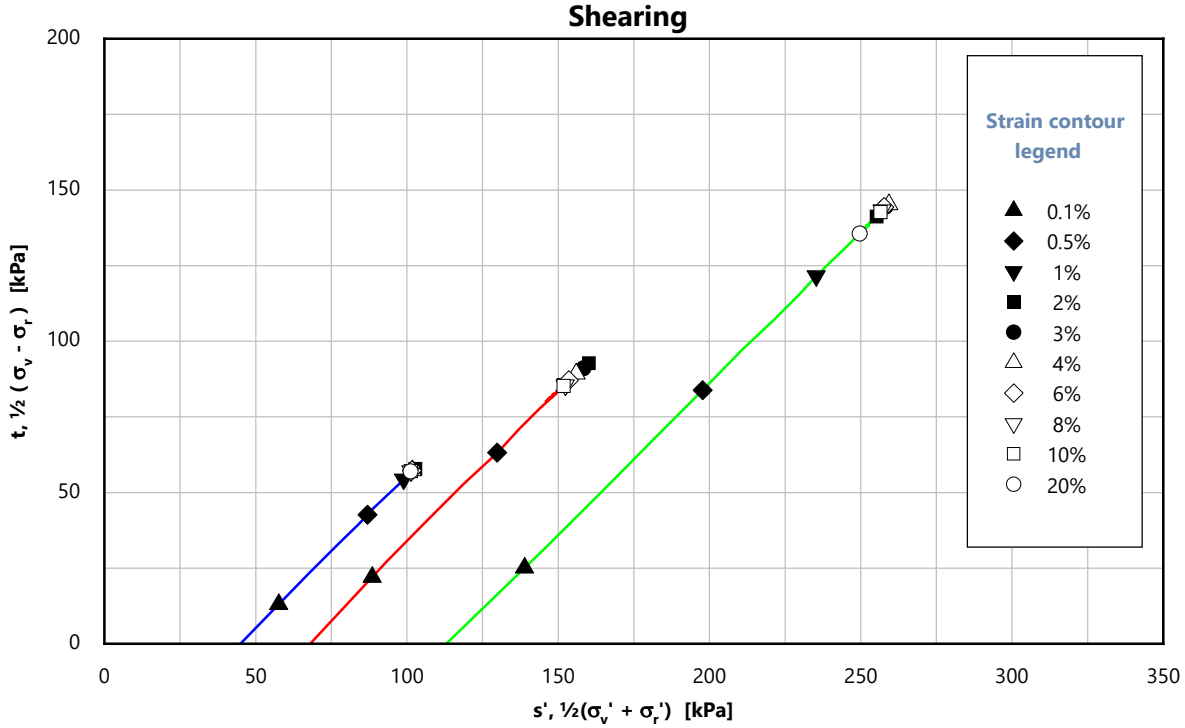
Consolidated Triaxial Compression Test On Water Saturated Soils

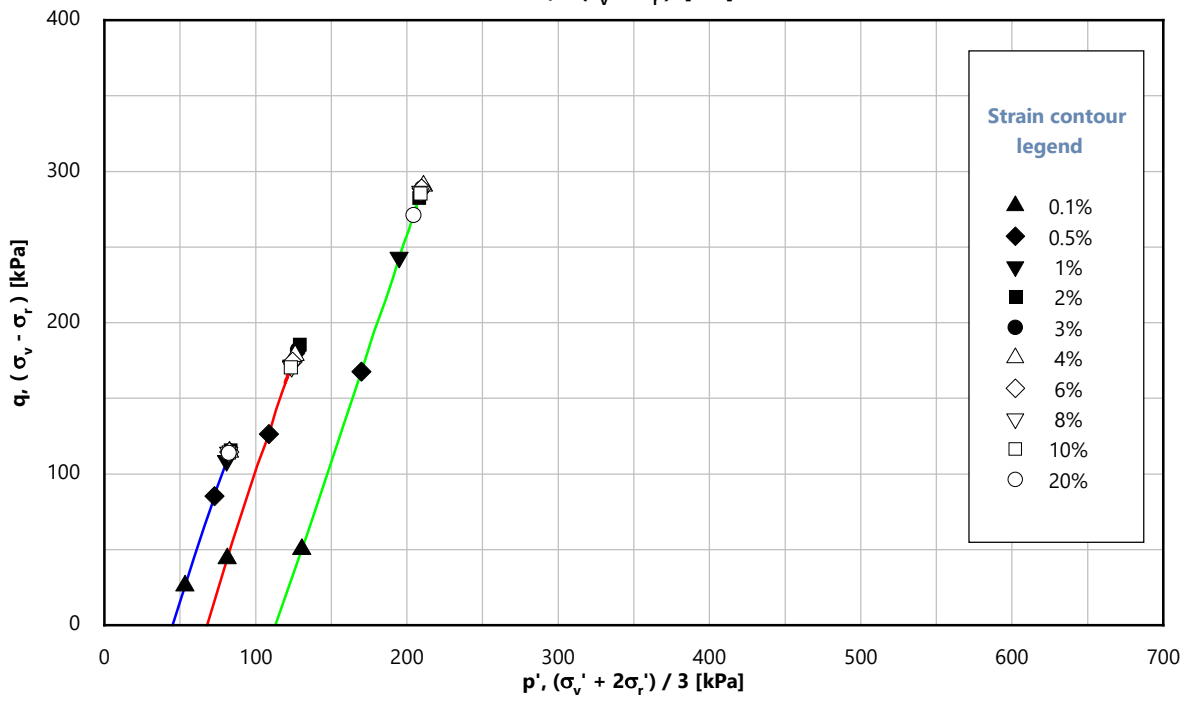
Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Shearing





Consolidation			
Stage 1 σ'_{rc} : 45 kPa	Stage 2 σ'_{rc} : 68 kPa	Stage 3 σ'_{rc} : 113 kPa	1
Stage 1 σ'_{vc} : 45 kPa	Stage 2 σ'_{vc} : 68 kPa	Stage 3 σ'_{vc} : 113 kPa	2 3

Project: 503387 - F254727
CID14

Laboratory: Wallingford, UK
Z4_OWF_BH05-SAMP / 08-2 / 7.3

Approved by: ET 15/07/2025

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Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Test Identification	Specimen 1	Specimen 2	Specimen 3
Location	Z4_OWF_BH05-SAMP	Z4_OWF_BH05-SAMP	Z4_OWF_BH05-SAMP
Sample	13-1	13-1	13-1
Depth [m]	11.50	11.50	11.50
Test number	CID15A	CID15B	CID15C

Specimen Visual Description
Greyish brown fine SAND

Initial Specimen Conditions	Specimen 1	Specimen 2	Specimen 3
Test start date	12/05/2025	28/04/2025	12/05/2025
Type of sample	Recompacted	Recompacted	Recompacted
Diameter [mm]	50.5	50.8	50.5
Length [mm]	95.0	95.0	95.0
Water content [%]	10.2	9.9	10.2
Bulk density [Mg/m^3]	1.59	1.56	1.58
Dry density [Mg/m^3]	1.44	1.42	1.43
Void ratio [-]	0.841	0.867	0.848
Degree of saturation [%]	32	30	32
Type of drains fitted	One end	One end	One end

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Saturation	Specimen 1	Specimen 2	Specimen 3
Pressure increments applied [kPa]	50	50	50
Differential pressure used [kPa]	10	10	10
Pore pressure on completion [kPa]	390	340	490
Cell pressure on completion [kPa]	400	350	500
B value achieved	0.96	0.96	0.96

Consolidation: Isotropic	Specimen 1	Specimen 2	Specimen 3
Cell pressure [kPa]	471	457	679
Back pressure [kPa]	400	350	500
Effective cell pressure [kPa]	71	107	179
Pore pressure on completion [kPa]	400	350	500
Pore pressure dissipation [%]	100	100	100
Water content [%]	31.1	31.7	30.1
Bulk density [Mg/m^3]	1.90	1.90	1.92
Dry density [Mg/m^3]	1.45	1.44	1.47
Void ratio [-]	0.823	0.839	0.797
Degree of saturation [%]	100	100	100
Axial strain [%]	0.33	0.50	0.91
Volumetric strain [%]	0.98	1.51	2.74
Volumetric strain rate-end of stage [%/hr]	0.00	0.01	0.01

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Shearing	Specimen 1	Specimen 2	Specimen 3
Initial pore pressure [kPa]	400	350	500
Initial effective cell pressure [kPa]	71	107	179
Rate of strain [%/hour]	1.30	1.30	1.30
At peak deviator stress			
Corrected deviator stress [kPa]	139	229	407
Membrane correction applied [kPa]	2.5	2.3	2.9
Drain correction applied [kPa]	0	0	0
Axial strain [%]	14.00	12.51	17.31
Volumetric strain [%]	2.98	2.76	4.74
Major principal effective stress [kPa]	209	335	585
Minor principal effective stress [kPa]	71	105	178
Principal effective stress ratio	2.96	3.17	3.28
ε_{50} [%]	1.50	1.74	2.57
Secant modulus (E_{50}) at ε_{50} [kPa]	4636	6592	7914
At peak principal effective stress ratio			
Corrected deviator stress [kPa]	139	229	406
Membrane correction applied [kPa]	2.6	2.3	2.9
Drain correction applied [kPa]	0	0	0
Axial strain [%]	14.75	12.51	16.81
Volumetric strain [%]	3.02	2.76	4.70
Major principal effective stress [kPa]	209	335	582
Minor principal effective stress [kPa]	70	105	176
Principal effective stress ratio	2.98	3.17	3.30
At 10% axial strain			
Corrected deviator stress [kPa]	134	224	363
Membrane correction applied [kPa]	2.0	1.9	2.0
Drain correction applied [kPa]	0	0	0
Axial strain [%]	10.00	10.00	10.00
Volumetric strain [%]	2.63	2.64	3.78
Major principal effective stress [kPa]	205	330	539
Minor principal effective stress [kPa]	71	106	176
Principal effective stress ratio	2.90	3.12	3.06

Project: 503387 - F254727
Test page CID15-3/8

Laboratory: Wallingford, UK
Z4_OWF_BH05-SAMP / 13-1 / 11.5

Approved by: ET - 24/06/2025

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Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

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Photographs		
Specimen 1	**Specimen 2**	**Specimen 3**
Photograph unavailable	Photograph unavailable	Photograph unavailable

Final Conditions	Specimen 1	Specimen 2	Specimen 3
Water content [%]	31.1	29.7	30.1
Bulk density [Mg/m^3]	1.90	1.92	1.92
Dry density [Mg/m^3]	1.45	1.48	1.47
Mode of failure	Barrel	Compound failure	Barrel

Project: 503387 - F254727
Test page CID15-4/8

Laboratory: Wallingford, UK
Z4_OWF_BH05-SAMP / 13-1 / 11.5

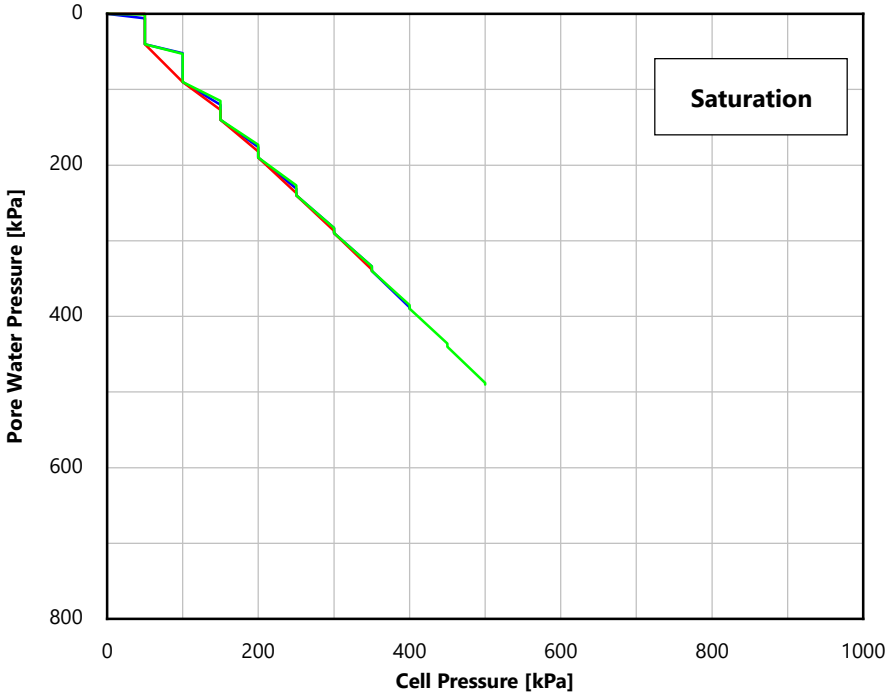
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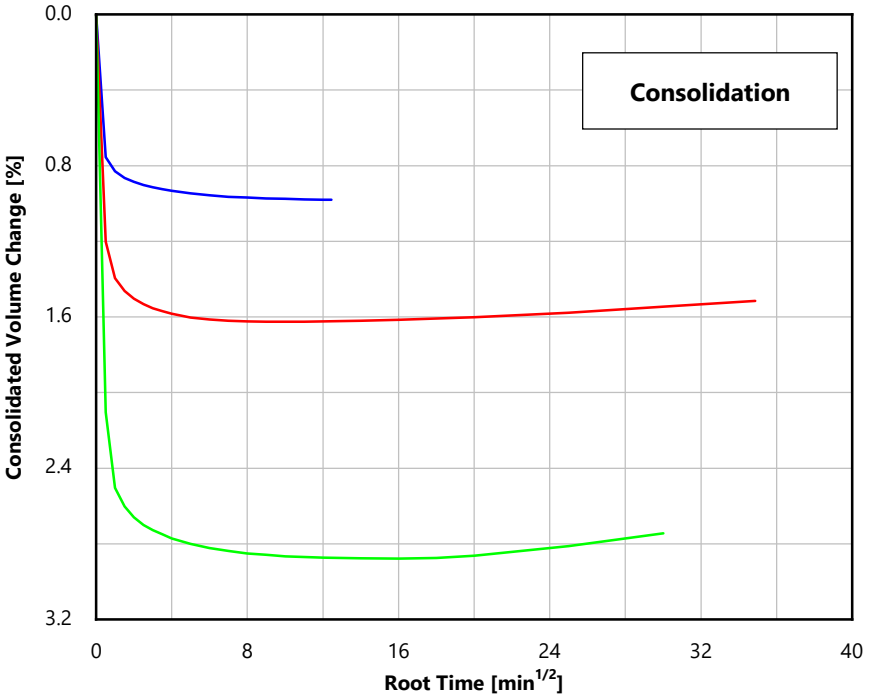
Test Report

Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

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Consolidation			
Stage 1 σ'_{rc} : 71 kPa	Stage 2 σ'_{rc} : 107 kPa	Stage 3 σ'_{rc} : 179 kPa	1
Stage 1 σ'_{vc} : 71 kPa	Stage 2 σ'_{vc} : 107 kPa	Stage 3 σ'_{vc} : 179 kPa	2
			3

Project: 503387 - F254727
CID15

Laboratory: Wallingford, UK
Z4_OWF_BH05-SAMP / 13-1 / 11.5

Approved by: ET 24/06/2025

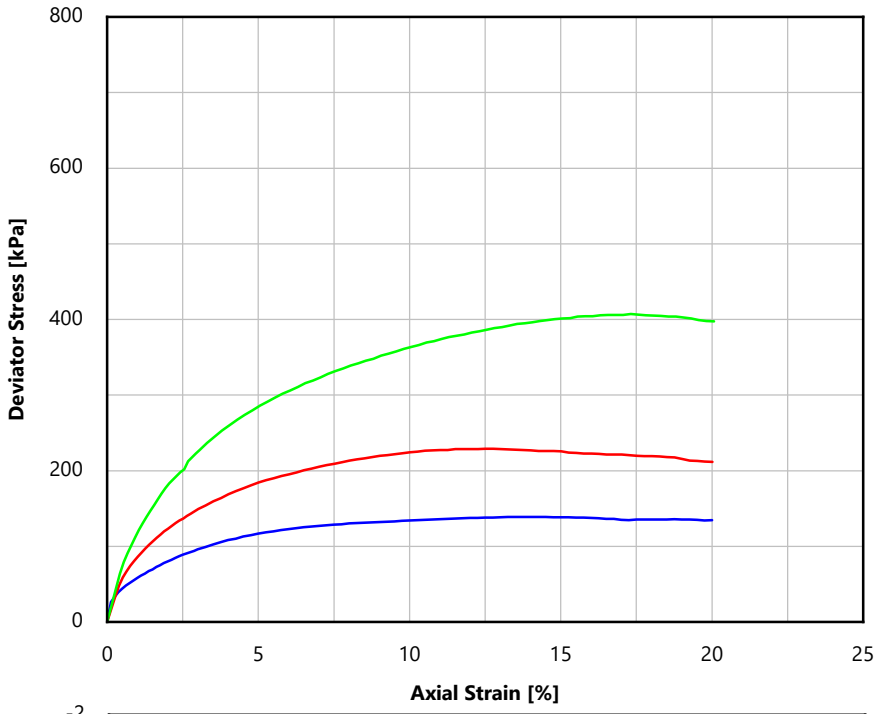
Test Report

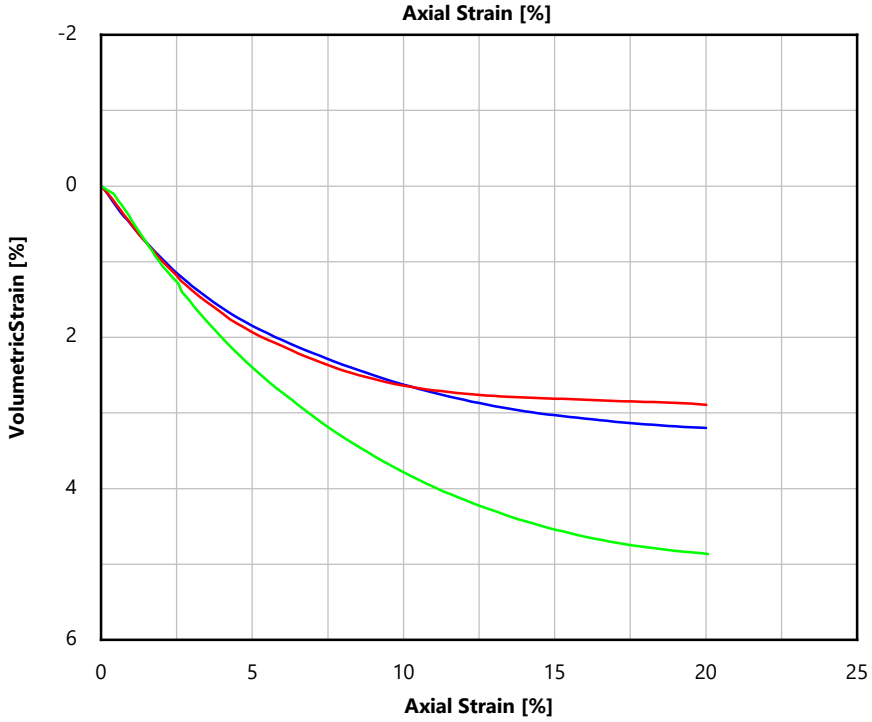
Consolidated Triaxial Compression Test On Water Saturated Soils
Isotropic, Drained - Set of three (3) tests

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UKAS TESTING 0919

Shearing





Consolidation			
Stage 1 σ'_{rc} : 71 kPa	Stage 2 σ'_{rc} : 107 kPa	Stage 3 σ'_{rc} : 179 kPa	1
Stage 1 σ'_{vc} : 71 kPa	Stage 2 σ'_{vc} : 107 kPa	Stage 3 σ'_{vc} : 179 kPa	2
			3

Project: 503387 - F254727
CID15

Laboratory: Wallingford, UK
Z4_OWF_BH05-SAMP / 13-1 / 11.5

Approved by: ET 24/06/2025

Test Report

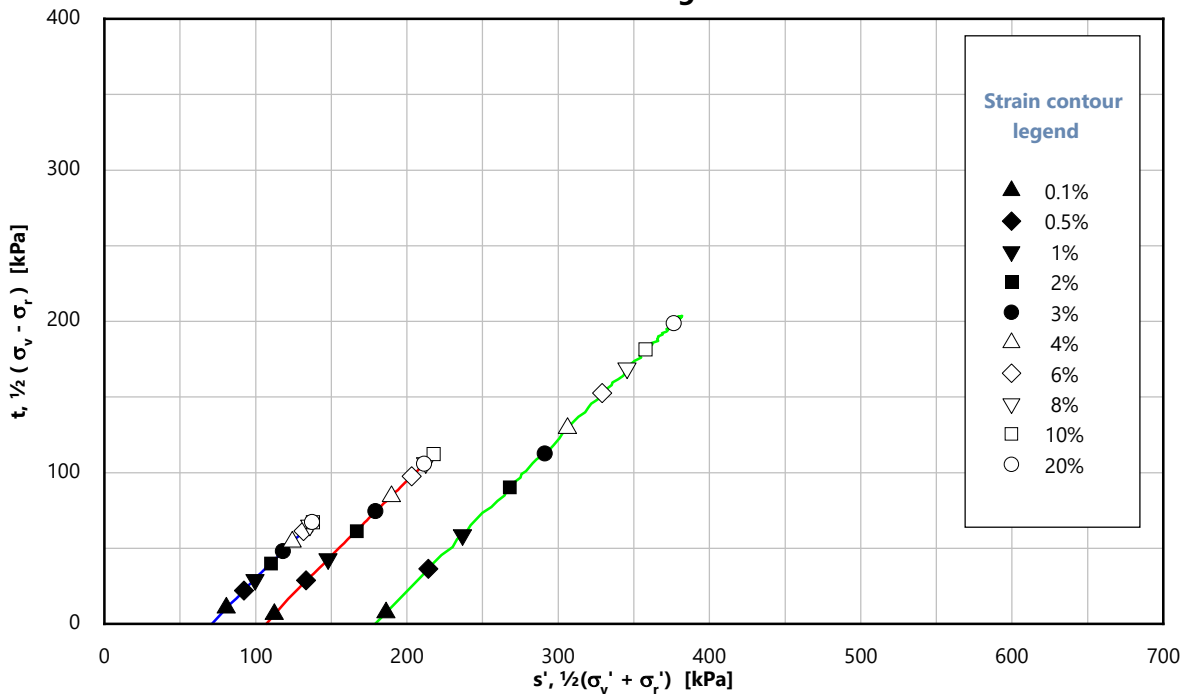
Consolidated Triaxial Compression Test On Water Saturated Soils

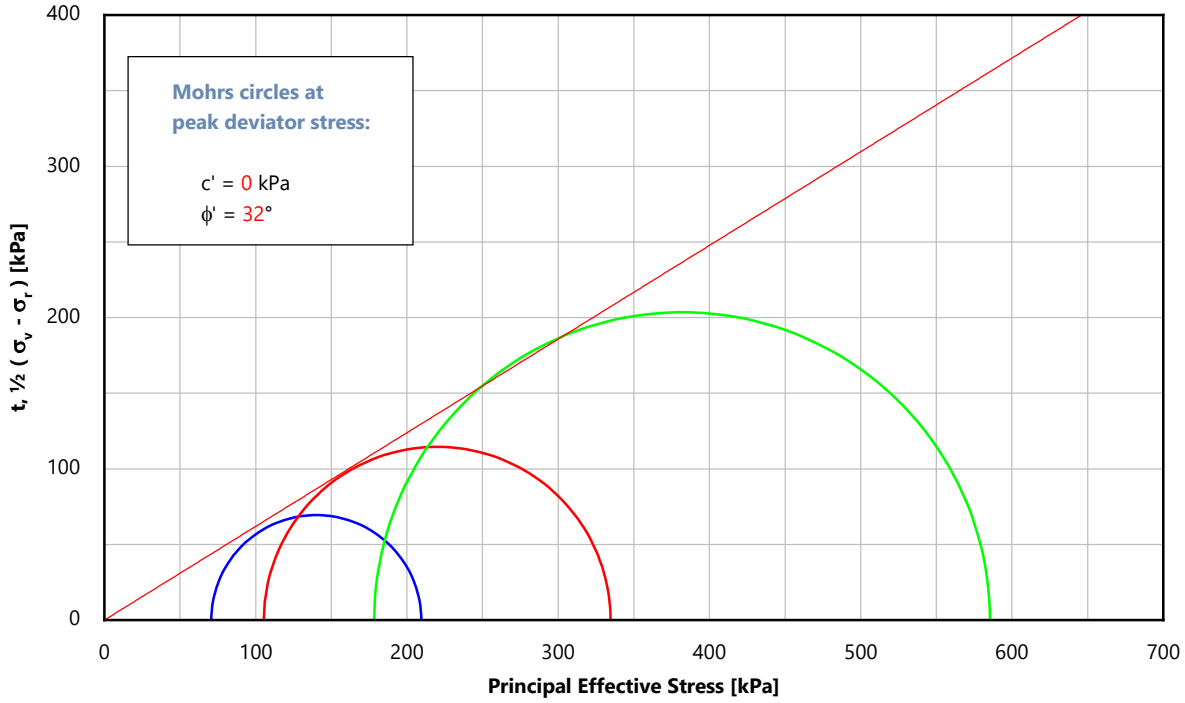
Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Shearing





Consolidation			
Stage 1 σ'_{rc} : 71 kPa	Stage 2 σ'_{rc} : 107 kPa	Stage 3 σ'_{rc} : 179 kPa	1
Stage 1 σ'_{vc} : 71 kPa	Stage 2 σ'_{vc} : 107 kPa	Stage 3 σ'_{vc} : 179 kPa	2
			3

Project: 503387 - F254727
CID15

Laboratory: Wallingford, UK
Z4_OWF_BH05-SAMP / 13-1 / 11.5

Approved by: ET 24/06/2025

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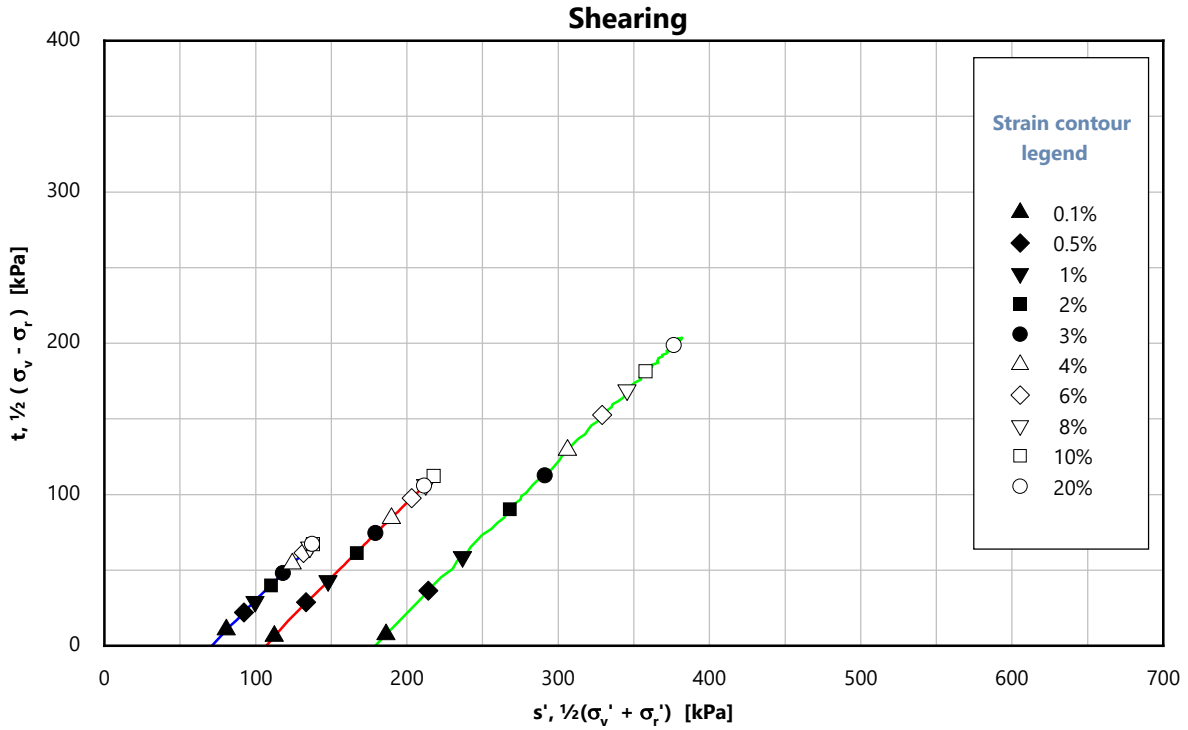
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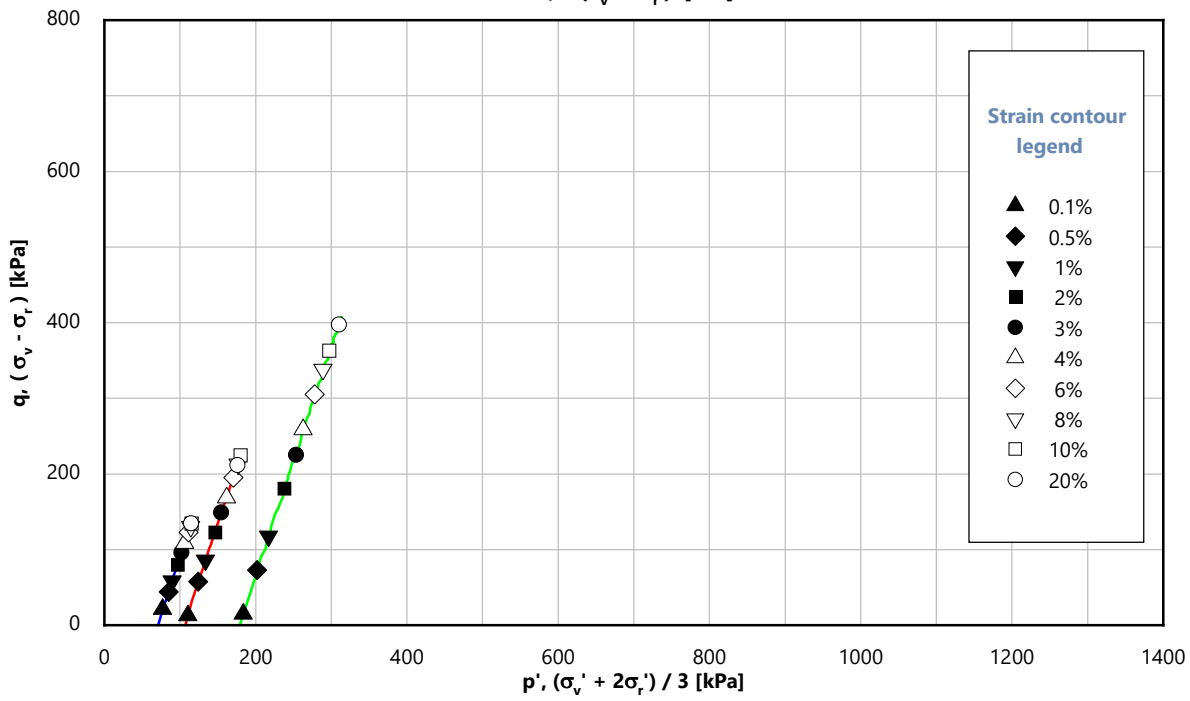
Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

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Consolidation			
Stage 1 σ'_{rc} : 71 kPa	Stage 2 σ'_{rc} : 107 kPa	Stage 3 σ'_{rc} : 179 kPa	1
Stage 1 σ'_{vc} : 71 kPa	Stage 2 σ'_{vc} : 107 kPa	Stage 3 σ'_{vc} : 179 kPa	2
			3

Project: 503387 - F254727
CID15

Laboratory: Wallingford, UK
Z4_OWF_BH05-SAMP / 13-1 / 11.5

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Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

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Test Identification	Specimen 1	Specimen 2	Specimen 3
Location	Z4_OWF_BH05-SAMP	Z4_OWF_BH05-SAMP	Z4_OWF_BH05-SAMP
Sample	21-2	21-2	21-2
Depth [m]	20.00	20.00	20.00
Test number	CID16Ar	CID16Br	CID16Cr

Specimen Visual Description
Olive brown fine SAND

Initial Specimen Conditions	Specimen 1	Specimen 2	Specimen 3
Test start date	24/06/2025	16/06/2025	12/06/2025
Type of sample	Recompacted	Recompacted	Recompacted
Diameter [mm]	50.5	50.5	50.5
Length [mm]	95.0	95.0	95.0
Water content [%]	10.1	10.0	10.0
Bulk density [Mg/m^3]	1.76	1.76	1.76
Dry density [Mg/m^3]	1.60	1.60	1.60
Void ratio [-]	0.654	0.656	0.652
Degree of saturation [%]	41	40	41
Type of drains fitted	One end	One end	One end

Test Report

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Saturation	Specimen 1	Specimen 2	Specimen 3
Pressure increments applied [kPa]	50	50	50
Differential pressure used [kPa]	10	10	10
Pore pressure on completion [kPa]	590	437	540
Cell pressure on completion [kPa]	600	450	550
B value achieved	0.96	0.94	0.90

Consolidation: Isotropic	Specimen 1	Specimen 2	Specimen 3
Cell pressure [kPa]	725	638	863
Back pressure [kPa]	600	450	550
Effective cell pressure [kPa]	125	188	313
Pore pressure on completion [kPa]	600	450	546
Pore pressure dissipation [%]	100	100	101
Water content [%]	24.2	23.7	22.8
Bulk density [Mg/m^3]	2.01	2.01	2.03
Dry density [Mg/m^3]	1.61	1.63	1.65
Void ratio [-]	0.641	0.628	0.604
Degree of saturation [%]	100	100	100
Axial strain [%]	0.25	0.56	0.96
Volumetric strain [%]	0.76	1.68	2.88
Volumetric strain rate-end of stage [%/hr]	0.01	0.02	0.01

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Shearing	Specimen 1	Specimen 2	Specimen 3
Initial pore pressure [kPa]	600	450	550
Initial effective cell pressure [kPa]	125	188	313
Rate of strain [%/hour]	1.30	1.30	1.30
At peak deviator stress			
Corrected deviator stress [kPa]	369	488	801
Membrane correction applied [kPa]	1.1	2.1	2.1
Drain correction applied [kPa]	0	0	0
Axial strain [%]	4.64	10.13	9.91
Volumetric strain [%]	0.39	1.30	1.91
Major principal effective stress [kPa]	497	675	1118
Minor principal effective stress [kPa]	128	188	317
Principal effective stress ratio	3.89	3.60	3.53
ε_{50} [%]	0.60	0.86	0.78
Secant modulus (E_{50}) at ε_{50} [kPa]	30884	28276	51121
At peak principal effective stress ratio			
Corrected deviator stress [kPa]	368	487	800
Membrane correction applied [kPa]	1.0	1.9	2.1
Drain correction applied [kPa]	0	0	0
Axial strain [%]	4.39	9.13	10.16
Volumetric strain [%]	0.40	1.31	1.92
Major principal effective stress [kPa]	495	675	1117
Minor principal effective stress [kPa]	127	187	317
Principal effective stress ratio	3.90	3.60	3.53
At 10% axial strain			
Corrected deviator stress [kPa]	359	487	801
Membrane correction applied [kPa]	2.1	2.1	2.1
Drain correction applied [kPa]	0	0	0
Axial strain [%]	10.00	10.00	10.00
Volumetric strain [%]	0.18	1.30	1.91
Major principal effective stress [kPa]	486	675	1118
Minor principal effective stress [kPa]	127	188	317
Principal effective stress ratio	3.81	3.60	3.53

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Photographs		
Specimen 1	**Specimen 2**	**Specimen 3**
Photograph Unavailable	Photograph Unavailable	Photograph Unavailable

Final Conditions	Specimen 1	Specimen 2	Specimen 3
Water content [%]	24.2	23.0	21.4
Bulk density [Mg/m^3]	2.01	2.03	2.05
Dry density [Mg/m^3]	1.61	1.65	1.69
Mode of failure	Compound failure	Barrel	Compound failure

Project: 503387 - F254727
Test page CID16r-4/8

Laboratory: Wallingford, UK
Z4_OWF_BH05-SAMP / 21-2 / 20

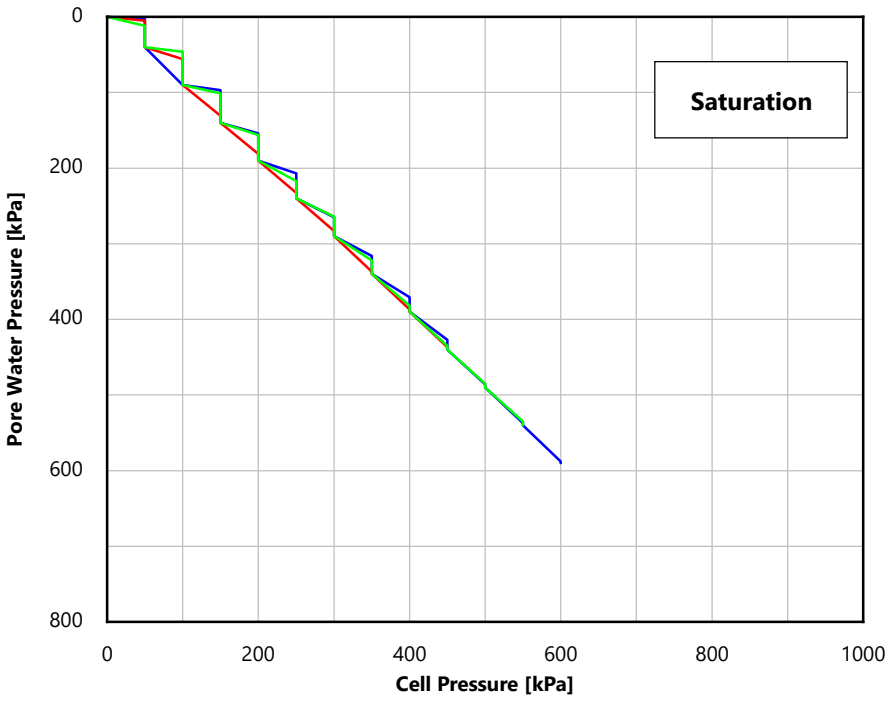
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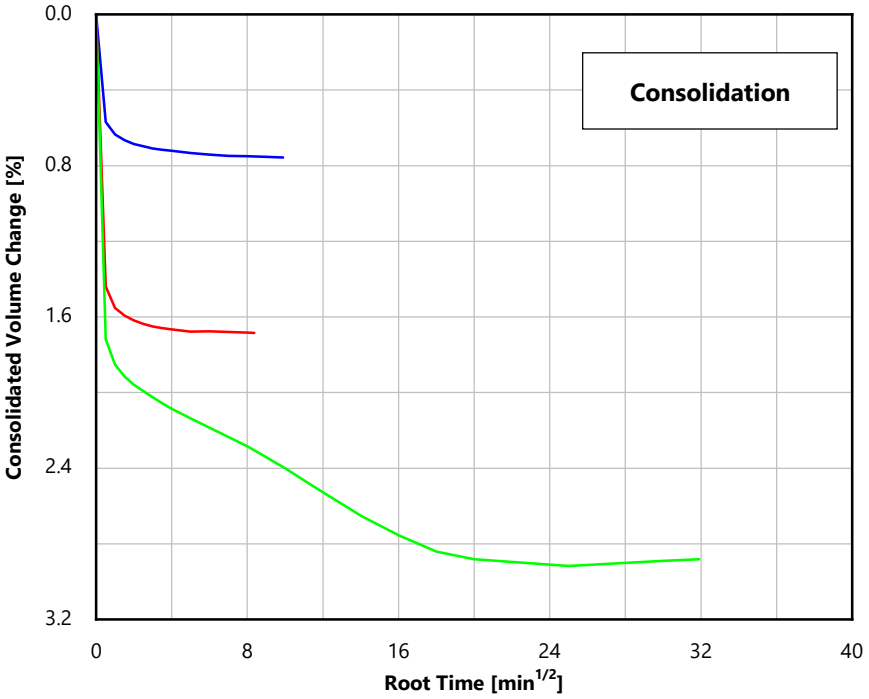
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Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

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Consolidation			
Stage 1 σ'_{rc} : 125 kPa	Stage 2 σ'_{rc} : 188 kPa	Stage 3 σ'_{rc} : 313 kPa	1
Stage 1 σ'_{vc} : 125 kPa	Stage 2 σ'_{vc} : 188 kPa	Stage 3 σ'_{vc} : 313 kPa	2 3

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CID16r

Laboratory: Wallingford, UK
Z4_OWF_BH05-SAMP / 21-2 / 20

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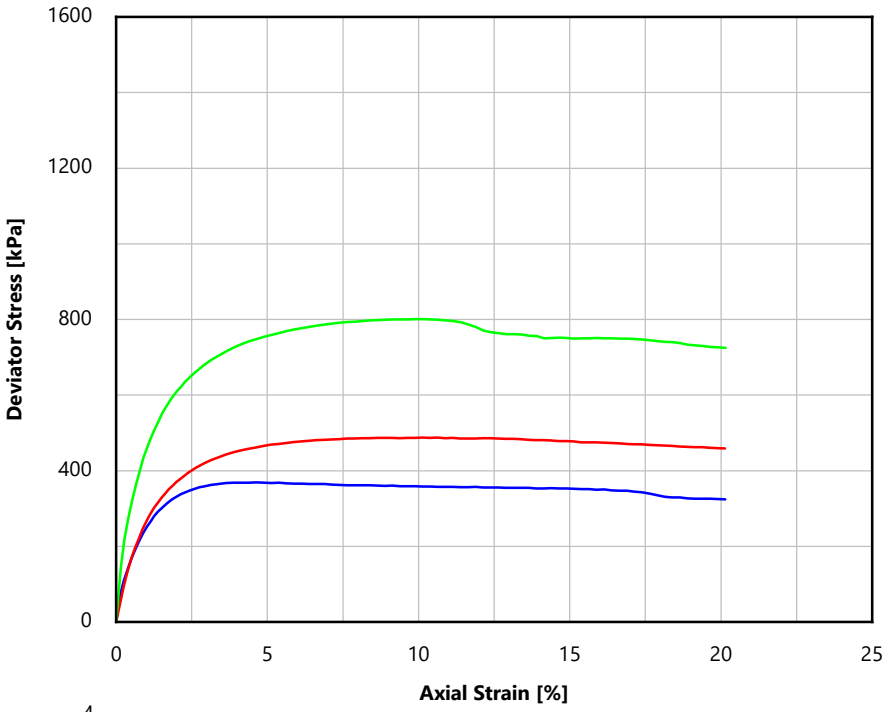
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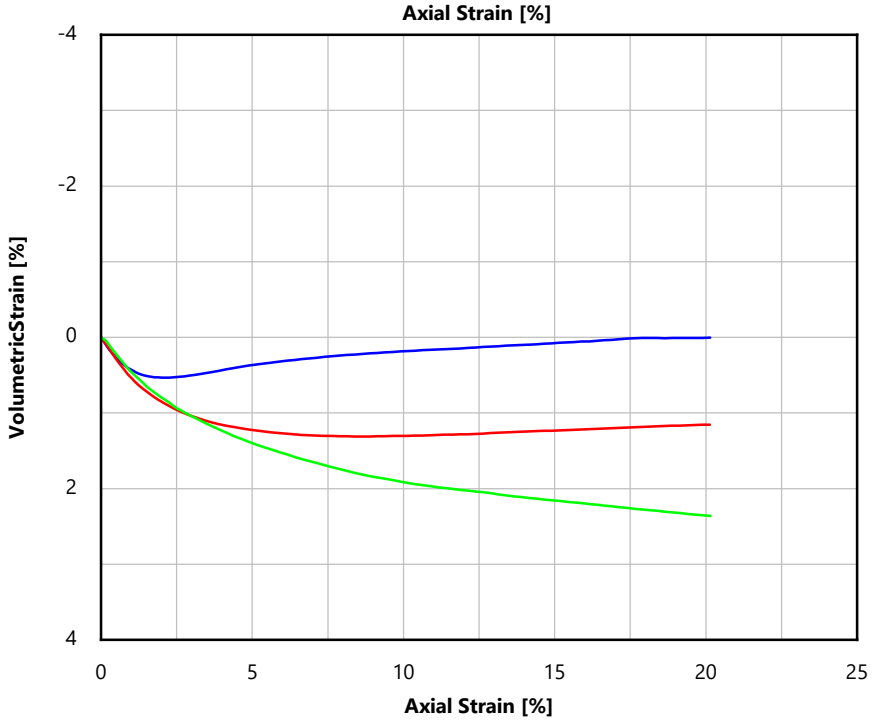
Consolidated Triaxial Compression Test On Water Saturated Soils
Isotropic, Drained - Set of three (3) tests

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UKAS TESTING 0919

Shearing





Consolidation			
Stage 1 σ'_{rc} : 125 kPa	Stage 2 σ'_{rc} : 188 kPa	Stage 3 σ'_{rc} : 313 kPa	1
Stage 1 σ'_{vc} : 125 kPa	Stage 2 σ'_{vc} : 188 kPa	Stage 3 σ'_{vc} : 313 kPa	2
			3

Project: 503387 - F254727
CID16r

Laboratory: Wallingford, UK
Z4_OWF_BH05-SAMP / 21-2 / 20

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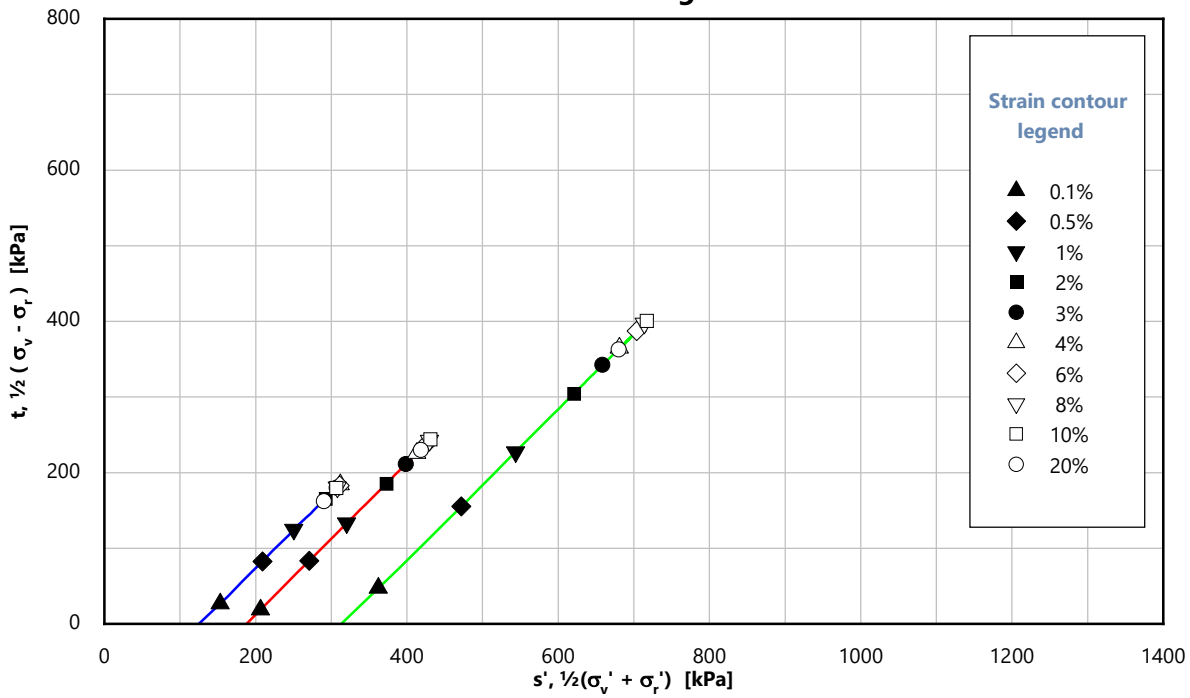
Consolidated Triaxial Compression Test On Water Saturated Soils

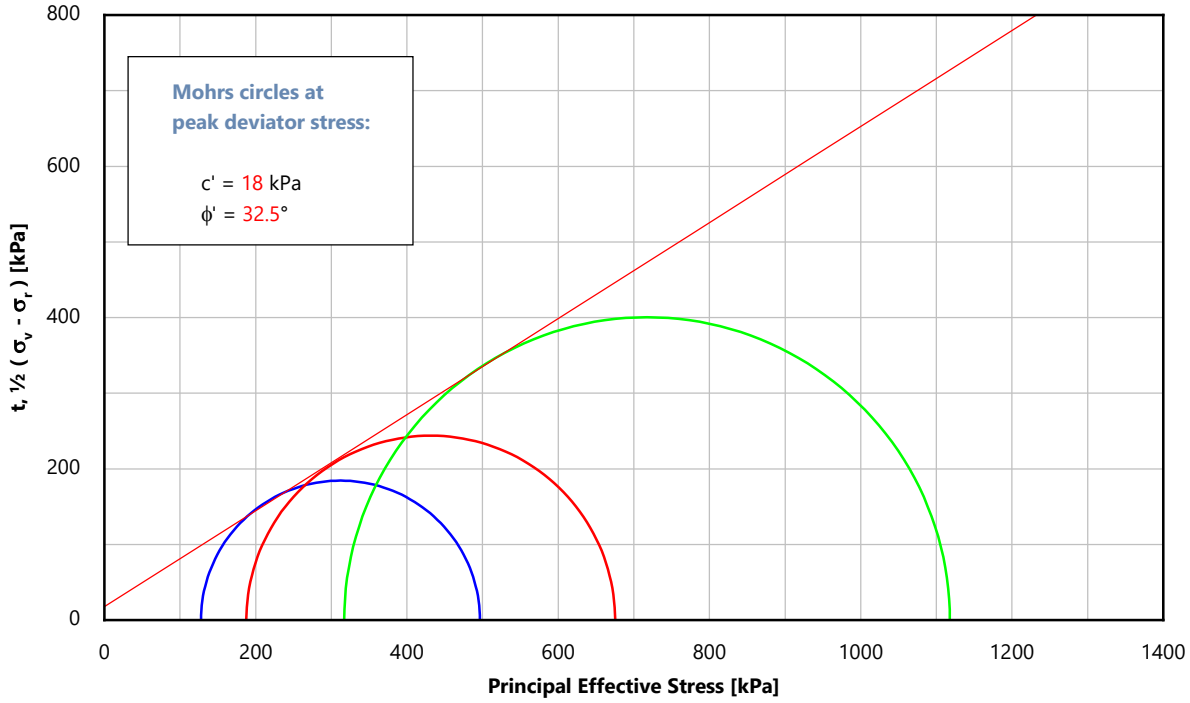
Isotropic, Drained - Set of three (3) tests

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UKAS TESTING 0919

Shearing





Consolidation			
Stage 1 σ'_{rc} : 125 kPa	Stage 2 σ'_{rc} : 188 kPa	Stage 3 σ'_{rc} : 313 kPa	1
Stage 1 σ'_{vc} : 125 kPa	Stage 2 σ'_{vc} : 188 kPa	Stage 3 σ'_{vc} : 313 kPa	2
			3

Project: 503387 - F254727
CID16r

Laboratory: Wallingford, UK
Z4_OWF_BH05-SAMP / 21-2 / 20

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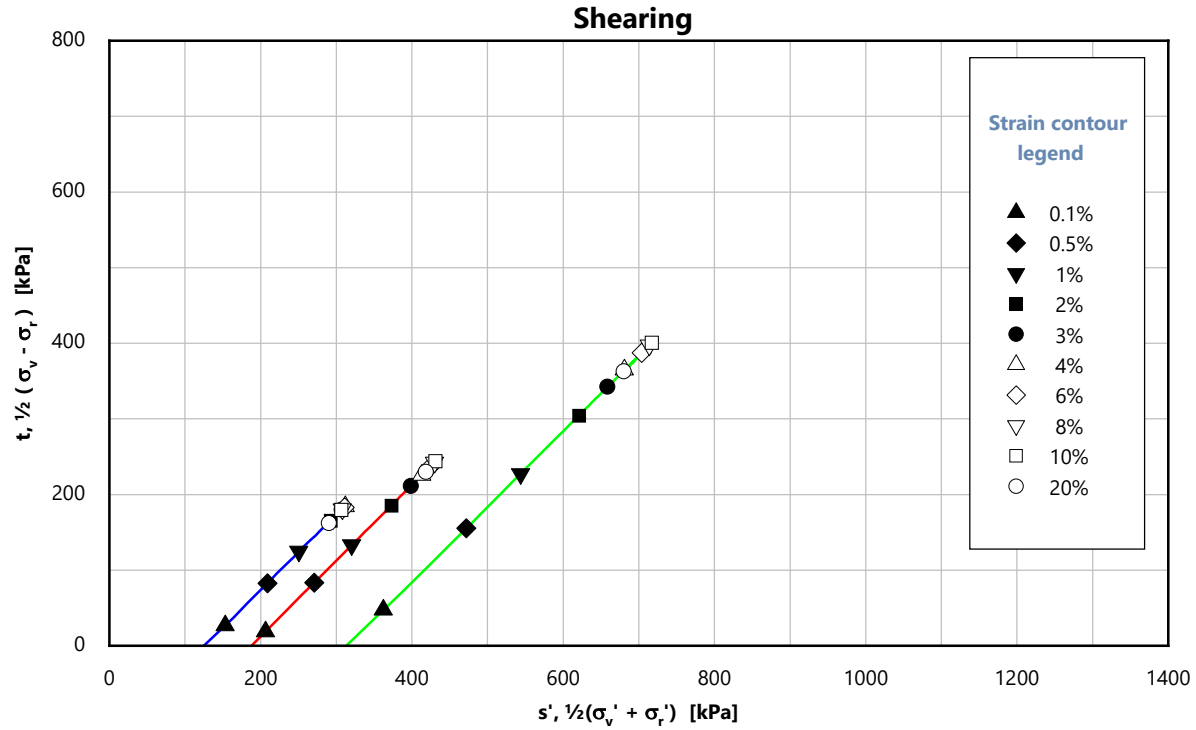
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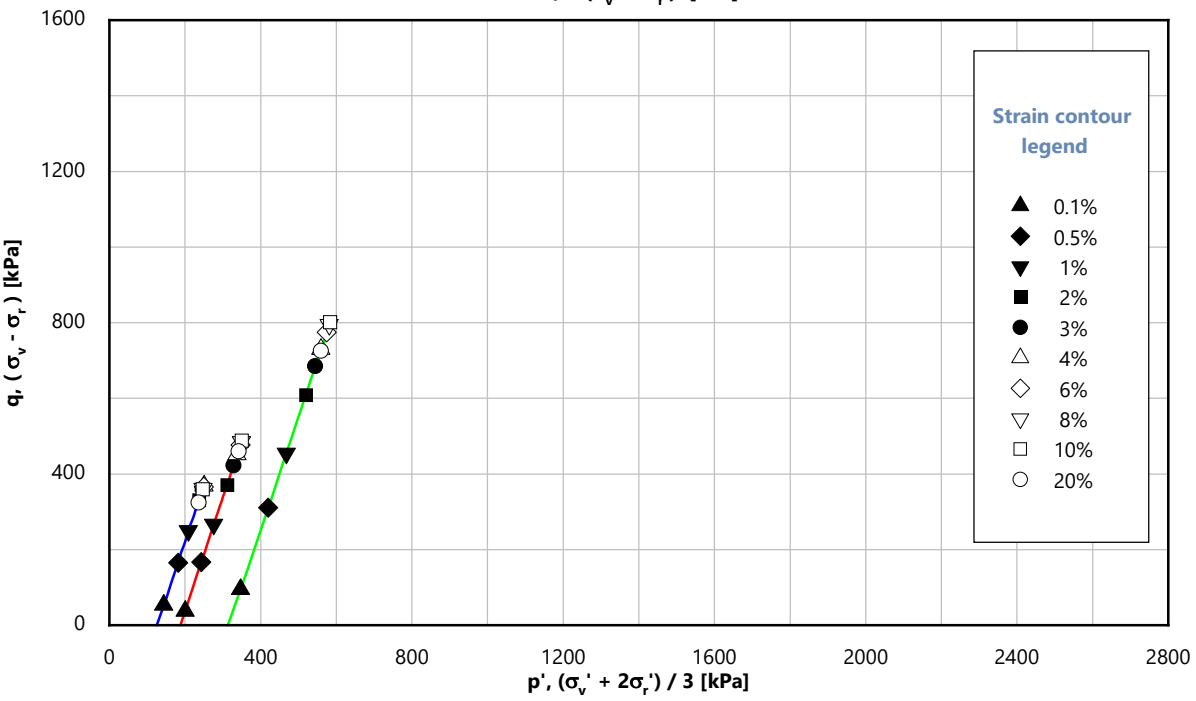
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Isotropic, Drained - Set of three (3) tests

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Consolidation			
Stage 1 σ'_{rc} : 125 kPa	Stage 2 σ'_{rc} : 188 kPa	Stage 3 σ'_{rc} : 313 kPa	1
Stage 1 σ'_{vc} : 125 kPa	Stage 2 σ'_{vc} : 188 kPa	Stage 3 σ'_{vc} : 313 kPa	2
			3

Project: 503387 - F254727
CID16r

Laboratory: Wallingford, UK
Z4_OWF_BH05-SAMP / 21-2 / 20

Approved by: ET 15/07/2025

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Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

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Test Identification	Specimen 1	Specimen 2	Specimen 3
Location	Z4_OWF_BH15-COMP	Z4_OWF_BH15-COMP	Z4_OWF_BH15-COMP
Sample	03-2	03-2	03-2
Depth [m]	8.80	8.80	8.80
Test number	CID17a	CID17b	CID17c

Specimen Visual Description
Dark greyish brown silty SAND

Initial Specimen Conditions	Specimen 1	Specimen 2	Specimen 3
Test start date	25/04/2025	25/04/2025	25/04/2025
Type of sample	Recompacted	Recompacted	Recompacted
Diameter [mm]	50.5	50.5	50.5
Length [mm]	95.0	95.0	95.0
Water content [%]	9.8	9.8	9.8
Bulk density [Mg/m^3]	1.50	1.49	1.49
Dry density [Mg/m^3]	1.36	1.36	1.36
Void ratio [-]	0.946	0.948	0.947
Degree of saturation [%]	27	27	27
Type of drains fitted	One end	One end	One end

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Saturation	Specimen 1	Specimen 2	Specimen 3
Pressure increments applied [kPa]	50	50	50
Differential pressure used [kPa]	10	10	10
Pore pressure on completion [kPa]	340	390	540
Cell pressure on completion [kPa]	350	400	550
B value achieved	1.00	0.96	0.96

Consolidation: Isotropic	Specimen 1	Specimen 2	Specimen 3
Cell pressure [kPa]	405	483	688
Back pressure [kPa]	350	400	550
Effective cell pressure [kPa]	55	83	138
Pore pressure on completion [kPa]	350	400	550
Pore pressure dissipation [%]	100	100	100
Water content [%]	34.7	34.0	33.4
Bulk density [Mg/m^3]	1.86	1.87	1.88
Dry density [Mg/m^3]	1.38	1.39	1.41
Void ratio [-]	0.920	0.902	0.886
Degree of saturation [%]	100	100	100
Axial strain [%]	0.45	0.79	1.05
Volumetric strain [%]	1.35	2.36	3.14
Volumetric strain rate-end of stage [%/hr]	0.09	0.04	0.01

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Shearing	Specimen 1	Specimen 2	Specimen 3
Initial pore pressure [kPa]	350	400	550
Initial effective cell pressure [kPa]	55	83	138
Rate of strain [%/hour]	1.30	1.30	1.30
At peak deviator stress			
Corrected deviator stress [kPa]	114	185	292
Membrane correction applied [kPa]	3.6	3.6	3.0
Drain correction applied [kPa]	0	0	0
Axial strain [%]	20.00	20.00	14.66
Volumetric strain [%]	4.87	4.12	4.30
Major principal effective stress [kPa]	165	269	428
Minor principal effective stress [kPa]	51	84	136
Principal effective stress ratio	3.22	3.22	3.15
ε_{50} [%]	3.14	2.58	3.04
Secant modulus (E_{50}) at ε_{50} [kPa]	1816	3587	4803
At peak principal effective stress ratio			
Corrected deviator stress [kPa]	114	185	291
Membrane correction applied [kPa]	3.6	3.4	3.1
Drain correction applied [kPa]	0	0	0
Axial strain [%]	20.00	18.25	15.66
Volumetric strain [%]	4.87	4.06	4.34
Major principal effective stress [kPa]	165	268	426
Minor principal effective stress [kPa]	51	83	135
Principal effective stress ratio	3.22	3.22	3.16
At 10% axial strain			
Corrected deviator stress [kPa]	98	168	266
Membrane correction applied [kPa]	2.2	2.2	2.2
Drain correction applied [kPa]	0	0	0
Axial strain [%]	10.00	10.00	10.00
Volumetric strain [%]	3.93	3.50	3.87
Major principal effective stress [kPa]	150	252	402
Minor principal effective stress [kPa]	52	83	136
Principal effective stress ratio	2.90	3.02	2.96

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Photographs		
Specimen 1	**Specimen 2**	**Specimen 3**
Photograph unavailable	Photograph unavailable	Photograph unavailable

Final Conditions	Specimen 1	Specimen 2	Specimen 3
Water content [%]	34.7	34.0	33.4
Bulk density [Mg/m^3]	1.86	1.87	1.88
Dry density [Mg/m^3]	1.38	1.39	1.41
Mode of failure	Barrel	Barrel	Compound failure

Project: 503387 - F254727
Test page CID17-4/8

Laboratory: Wallingford, UK
Z4_OWF_BH15-COMP / 03-2 / 8.8

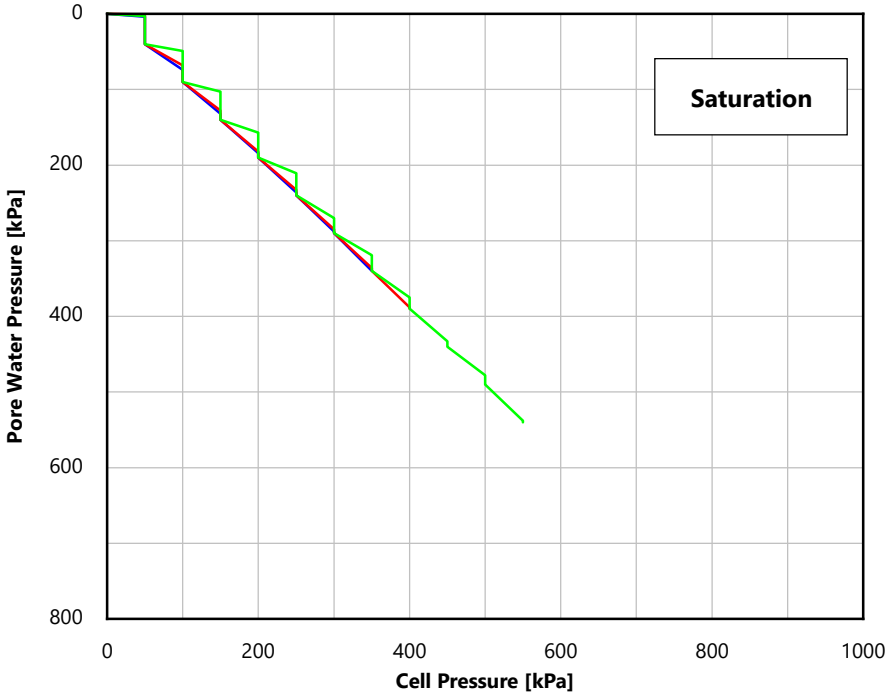
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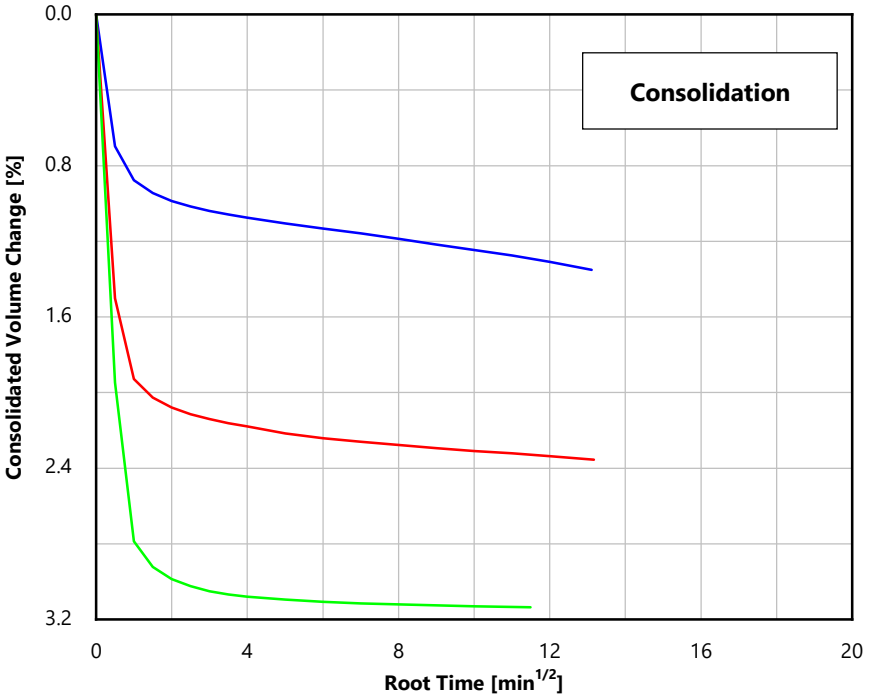
Test Report

Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018





Consolidation			
Stage 1 σ'_{rc} : 55 kPa	Stage 2 σ'_{rc} : 83 kPa	Stage 3 σ'_{rc} : 138 kPa	1
Stage 1 σ'_{vc} : 55 kPa	Stage 2 σ'_{vc} : 83 kPa	Stage 3 σ'_{vc} : 138 kPa	2
			3

Project: 503387 - F254727
CID17

Laboratory: Wallingford, UK
Z4_OWF_BH15-COMP / 03-2 / 8.8

Approved by: ET 30/05/2025

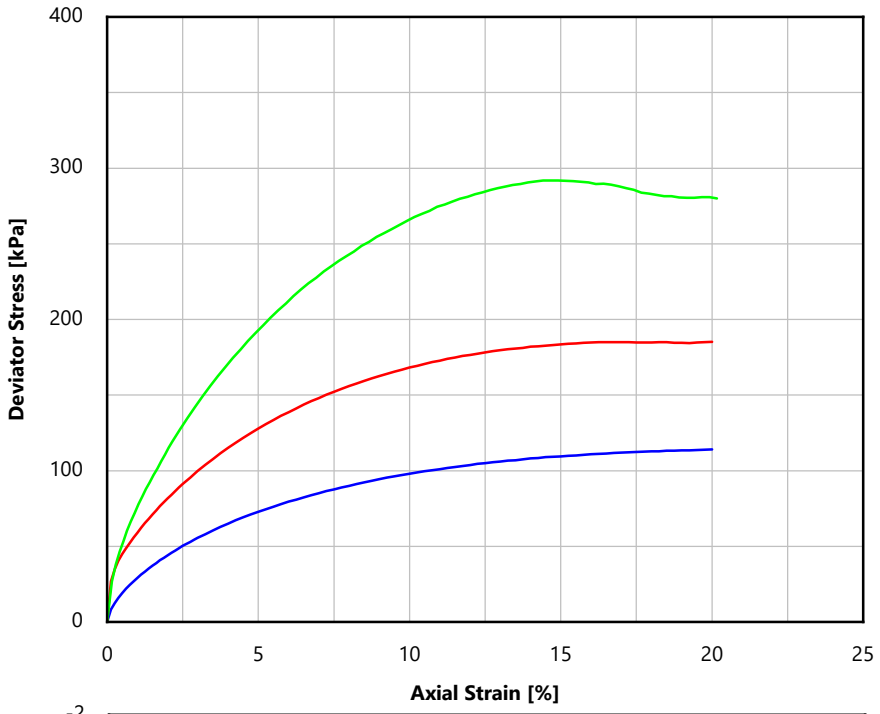
Test Report

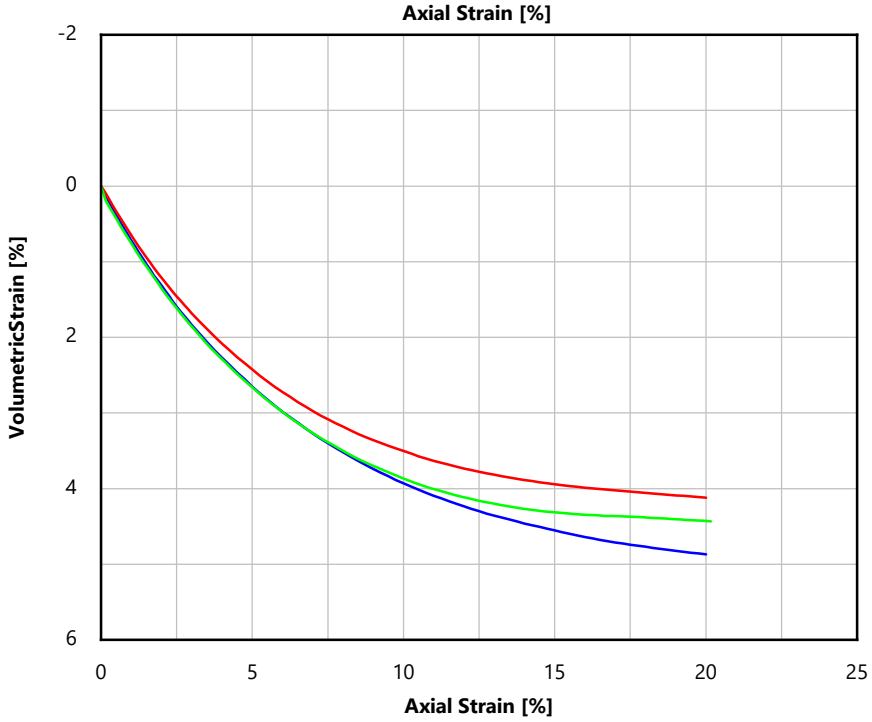
Consolidated Triaxial Compression Test On Water Saturated Soils
Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Shearing





Consolidation			
Stage 1 σ'_{rc} : 55 kPa	Stage 2 σ'_{rc} : 83 kPa	Stage 3 σ'_{rc} : 138 kPa	1
Stage 1 σ'_{vc} : 55 kPa	Stage 2 σ'_{vc} : 83 kPa	Stage 3 σ'_{vc} : 138 kPa	2
			3

Project: 503387 - F254727
CID17

Laboratory: Wallingford, UK
Z4_OWF_BH15-COMP / 03-2 / 8.8

Approved by: ET 30/05/2025

Test Report

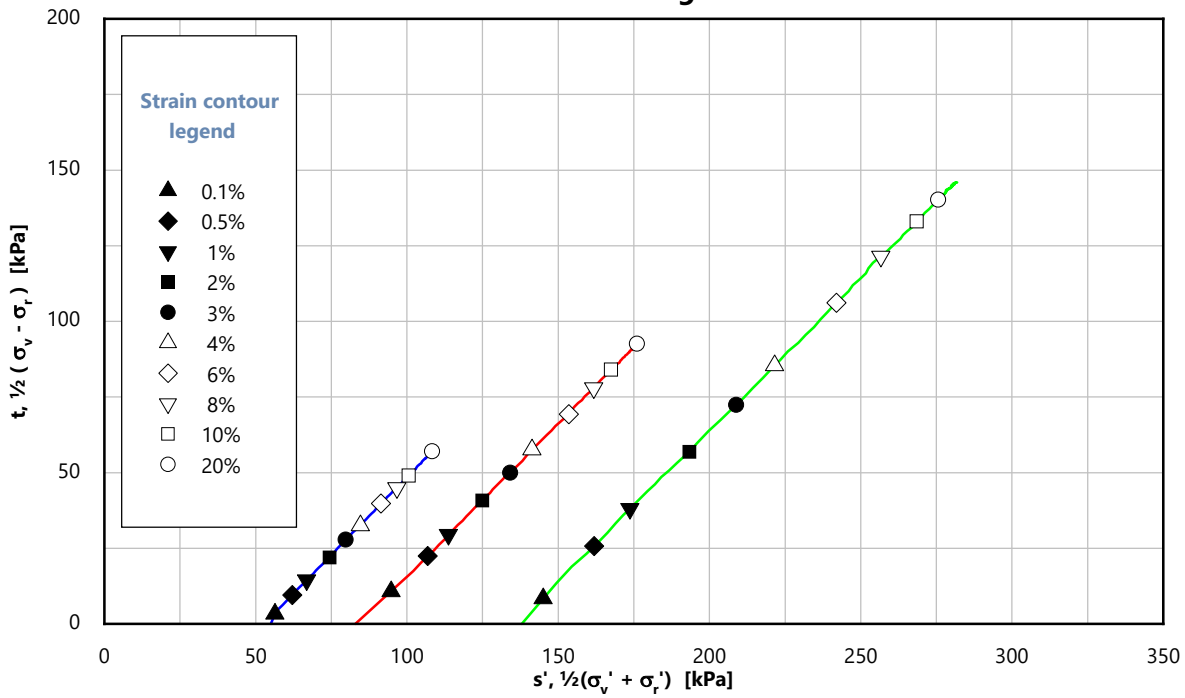
Consolidated Triaxial Compression Test On Water Saturated Soils

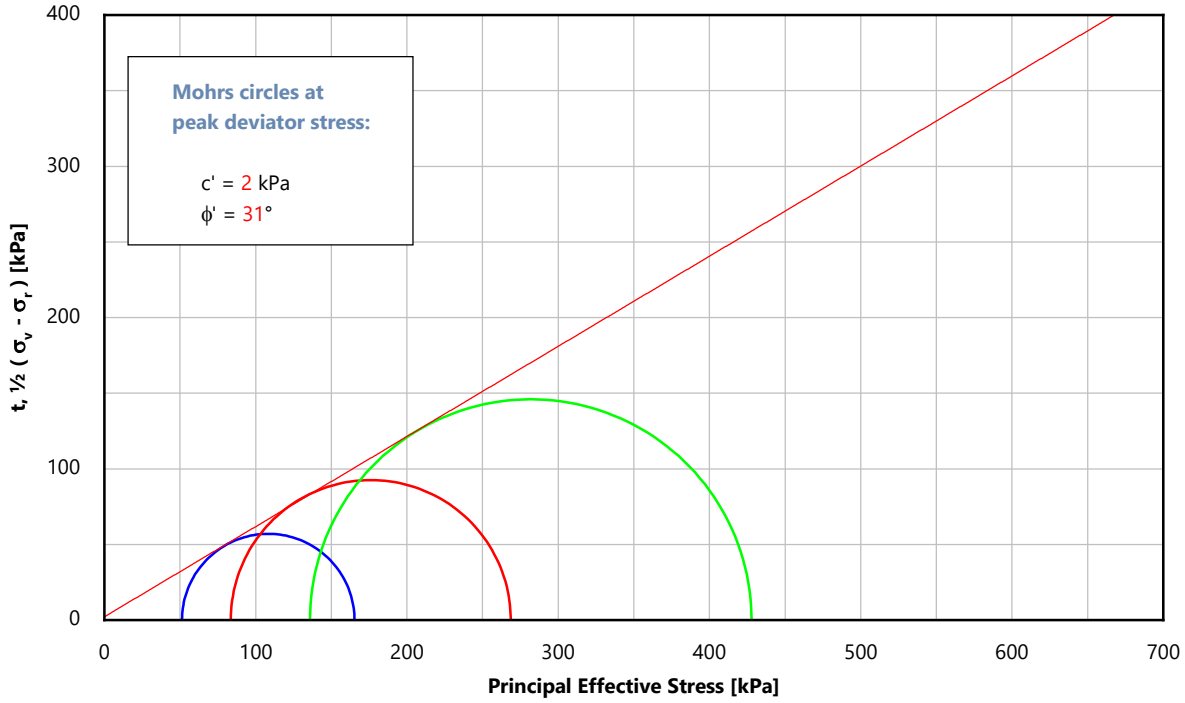
Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Shearing





Consolidation			
Stage 1 σ'_{rc} : 55 kPa	Stage 2 σ'_{rc} : 83 kPa	Stage 3 σ'_{rc} : 138 kPa	1
Stage 1 σ'_{vc} : 55 kPa	Stage 2 σ'_{vc} : 83 kPa	Stage 3 σ'_{vc} : 138 kPa	2
			3

Project: 503387 - F254727
CID17

Laboratory: Wallingford, UK
Z4_OWF_BH15-COMP / 03-2 / 8.8

Approved by: ET 30/05/2025

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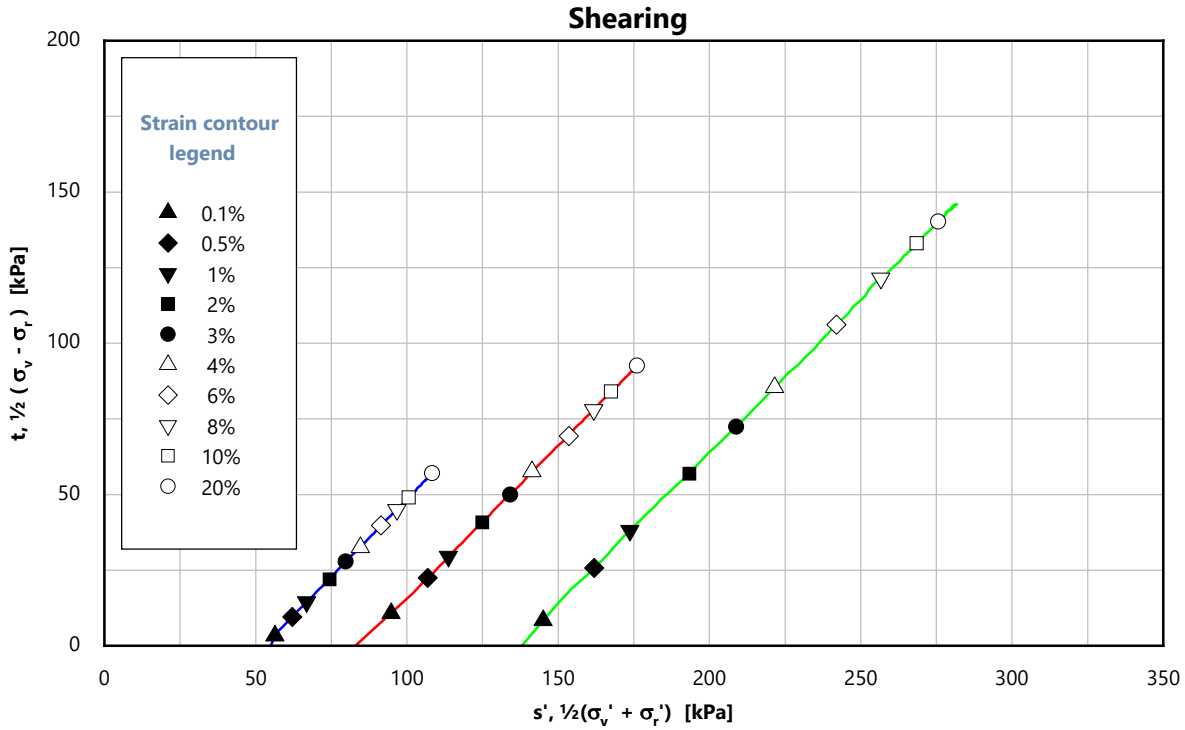
Test Report

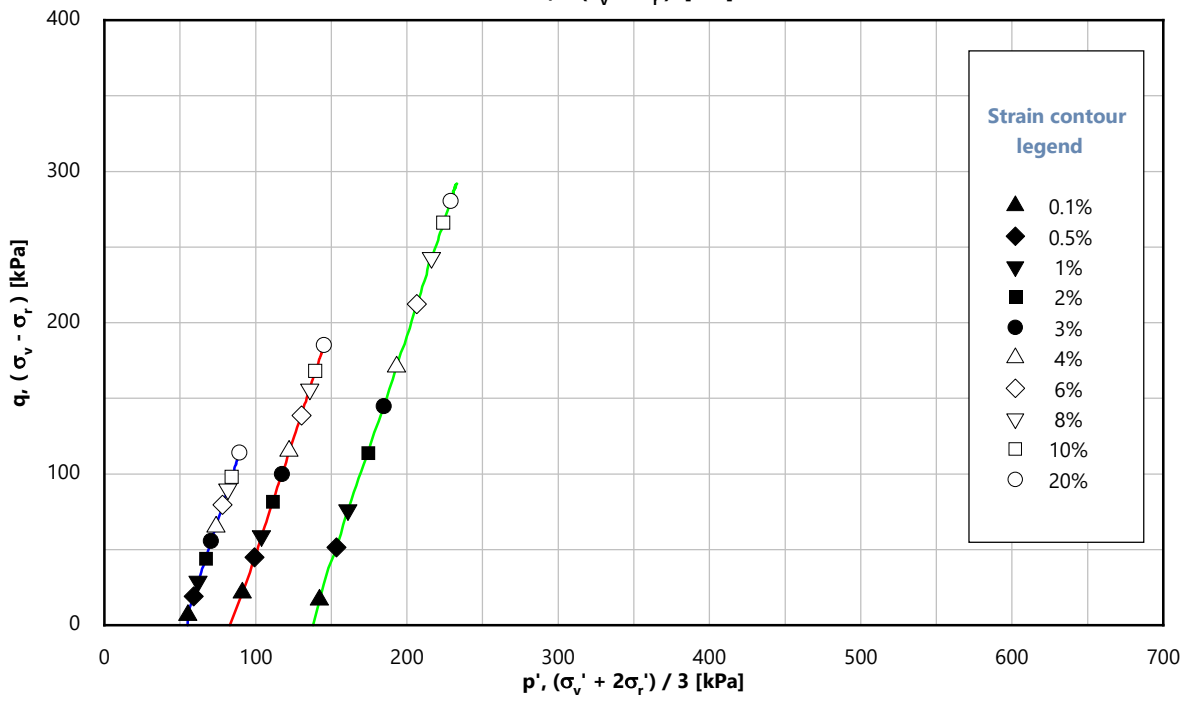
Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

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Consolidation			
Stage 1 σ'_{rc} : 55 kPa	Stage 2 σ'_{rc} : 83 kPa	Stage 3 σ'_{rc} : 138 kPa	1
Stage 1 σ'_{vc} : 55 kPa	Stage 2 σ'_{vc} : 83 kPa	Stage 3 σ'_{vc} : 138 kPa	2 3

Project: 503387 - F254727
CID17

Laboratory: Wallingford, UK
Z4_OWF_BH15-COMP / 03-2 / 8.8

Approved by: ET 30/05/2025

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Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

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Test Identification	Specimen 1	Specimen 2	Specimen 3
Location	Z4_OWF_BH15-COMP	Z4_OWF_BH15-COMP	Z4_OWF_BH15-COMP
Sample	05-2	05-2	05-2
Depth [m]	13.60	13.60	13.60
Test number	CID18a	CID18b	CID18c

Specimen Visual Description
Greyish brown fine SAND

Initial Specimen Conditions	Specimen 1	Specimen 2	Specimen 3
Test start date	30/04/2025	25/04/2025	25/04/2025
Type of sample	Recompacted	Recompacted	Recompacted
Diameter [mm]	50.5	50.5	50.5
Length [mm]	95.0	95.0	95.0
Water content [%]	10.1	10.1	10.1
Bulk density [Mg/m^3]	1.47	1.46	1.47
Dry density [Mg/m^3]	1.33	1.33	1.33
Void ratio [-]	0.990	0.998	0.990
Degree of saturation [%]	27	27	27
Type of drains fitted	One end	One end	One end

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

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Saturation	Specimen 1	Specimen 2	Specimen 3
Pressure increments applied [kPa]	50	50	50
Differential pressure used [kPa]	10	10	10
Pore pressure on completion [kPa]	440	440	540
Cell pressure on completion [kPa]	450	450	550
B value achieved	0.92	0.92	0.92

Consolidation: Isotropic	Specimen 1	Specimen 2	Specimen 3
Cell pressure [kPa]	535	577	762
Back pressure [kPa]	450	450	550
Effective cell pressure [kPa]	85	127	212
Pore pressure on completion [kPa]	450	450	550
Pore pressure dissipation [%]	100	100	100
Water content [%]	36.2	36.3	35.0
Bulk density [Mg/m^3]	1.84	1.84	1.86
Dry density [Mg/m^3]	1.35	1.35	1.37
Void ratio [-]	0.960	0.961	0.928
Degree of saturation [%]	100	100	100
Axial strain [%]	0.50	0.60	1.04
Volumetric strain [%]	1.50	1.81	3.12
Volumetric strain rate-end of stage [%/hr]	0.01	0.01	0.02

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Shearing	Specimen 1	Specimen 2	Specimen 3
Initial pore pressure [kPa]	450	450	550
Initial effective cell pressure [kPa]	85	127	212
Rate of strain [%/hour]	1.30	1.30	1.30
At peak deviator stress			
Corrected deviator stress [kPa]	186	283	504
Membrane correction applied [kPa]	5.4	5.2	5.4
Drain correction applied [kPa]	0	0	0
Axial strain [%]	20.19	18.91	20.15
Volumetric strain [%]	4.85	4.14	5.54
Major principal effective stress [kPa]	267	407	714
Minor principal effective stress [kPa]	81	123	210
Principal effective stress ratio	3.30	3.30	3.40
ε_{50} [%]	2.20	1.92	2.76
Secant modulus (E_{50}) at ε_{50} [kPa]	4225	7393	9149
At peak principal effective stress ratio			
Corrected deviator stress [kPa]	186	283	504
Membrane correction applied [kPa]	5.4	5.2	5.4
Drain correction applied [kPa]	0	0	0
Axial strain [%]	20.19	19.16	20.15
Volumetric strain [%]	4.85	4.15	5.54
Major principal effective stress [kPa]	267	406	714
Minor principal effective stress [kPa]	81	122	210
Principal effective stress ratio	3.30	3.31	3.40
At 10% axial strain			
Corrected deviator stress [kPa]	162	256	429
Membrane correction applied [kPa]	3.3	3.3	3.3
Drain correction applied [kPa]	0	0	0
Axial strain [%]	10.00	10.00	10.00
Volumetric strain [%]	3.62	3.27	4.20
Major principal effective stress [kPa]	245	379	639
Minor principal effective stress [kPa]	83	123	210
Principal effective stress ratio	2.96	3.08	3.04

Project: 503387 - F254727
Test page CID18-3/8

Laboratory: Wallingford, UK
Z4_OWF_BH15-COMP / 05-2 / 13.6

Approved by: ET - 30/05/2025

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Photographs		
Specimen 1	**Specimen 2**	**Specimen 3**
Photograph Unavailable	Photograph Unavailable	Photograph Unavailable

Final Conditions	Specimen 1	Specimen 2	Specimen 3
Water content [%]	36.2	36.3	35.0
Bulk density [Mg/m^3]	1.84	1.84	1.86
Dry density [Mg/m^3]	1.35	1.35	1.37
Mode of failure	Barrel	Barrel	Barrel

Project: 503387 - F254727
Test page CID18-4/8

Laboratory: Wallingford, UK
Z4_OWF_BH15-COMP / 05-2 / 13.6

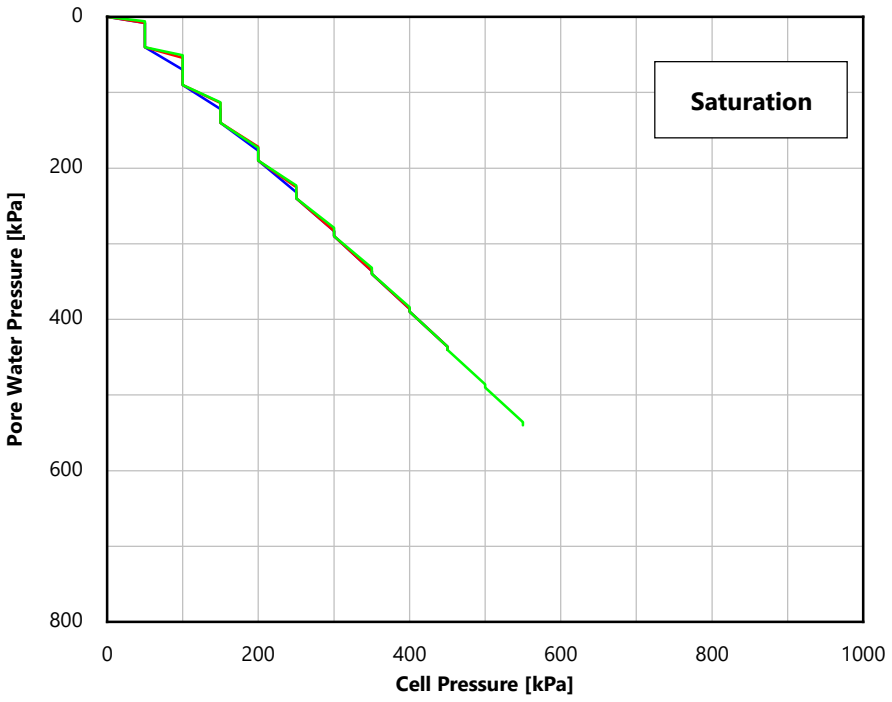
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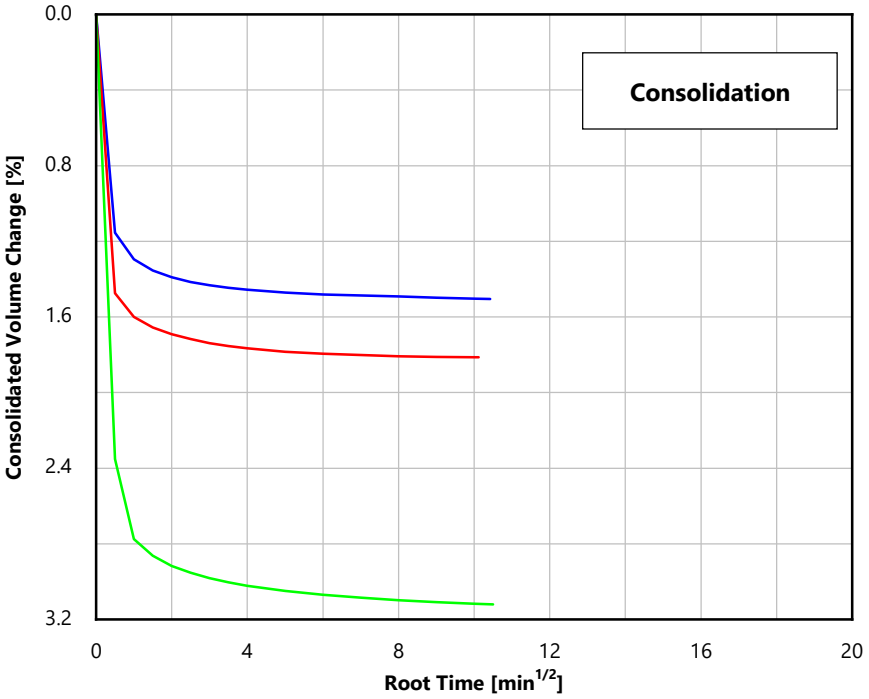
Test Report

Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018





Consolidation			
Stage 1 σ'_{rc} : 85 kPa	Stage 2 σ'_{rc} : 127 kPa	Stage 3 σ'_{rc} : 212 kPa	1
Stage 1 σ'_{vc} : 85 kPa	Stage 2 σ'_{vc} : 127 kPa	Stage 3 σ'_{vc} : 212 kPa	2
			3

Project: 503387 - F254727
CID18

Laboratory: Wallingford, UK
Z4_OWF_BH15-COMP / 05-2 / 13.6

Approved by: ET 30/05/2025

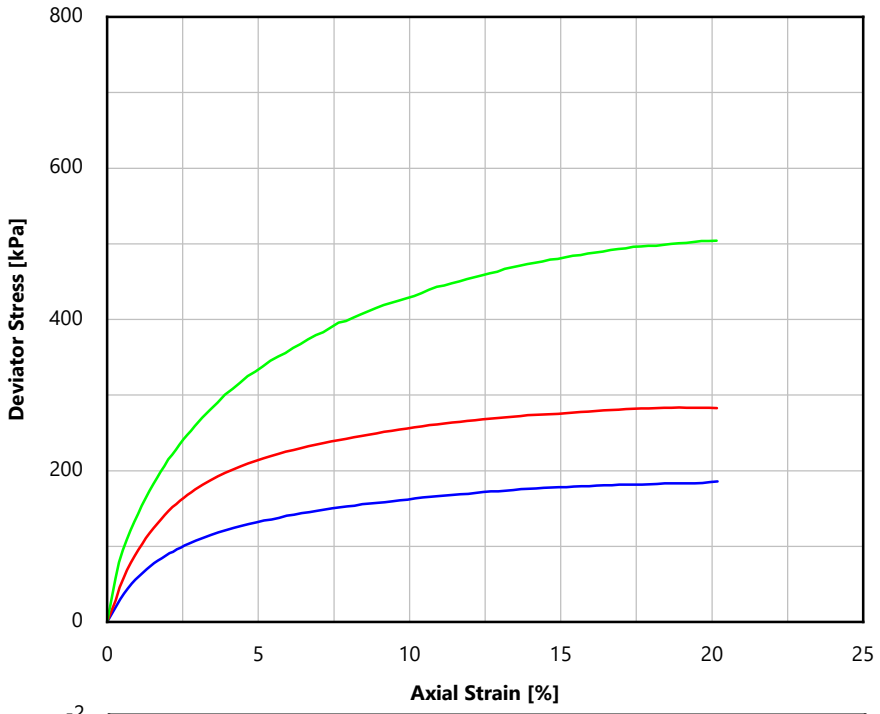
Test Report

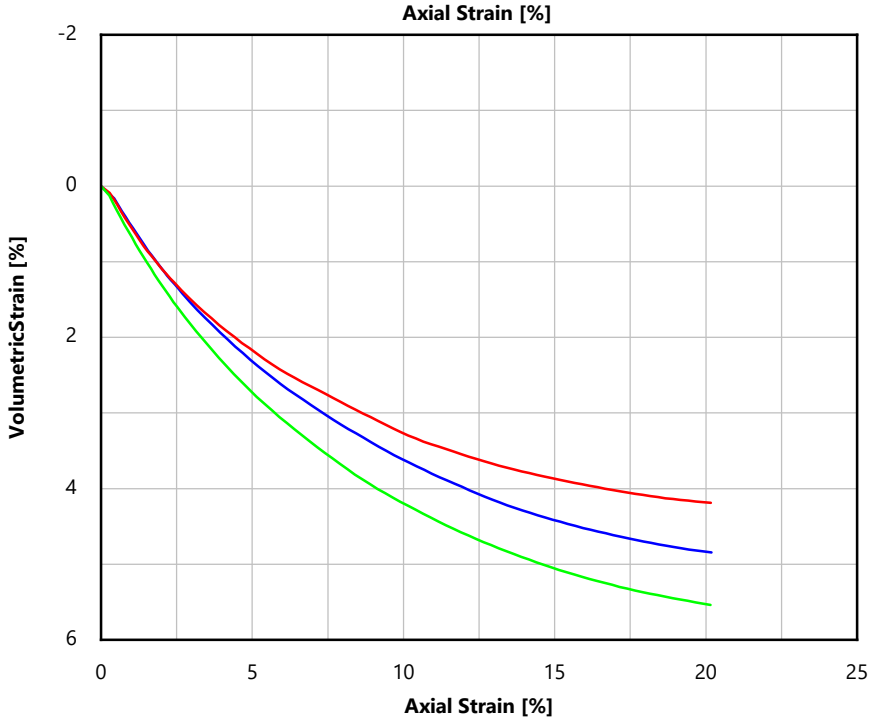
Consolidated Triaxial Compression Test On Water Saturated Soils
Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Shearing





Consolidation			
Stage 1 σ'_{rc} : 85 kPa	Stage 2 σ'_{rc} : 127 kPa	Stage 3 σ'_{rc} : 212 kPa	1
Stage 1 σ'_{vc} : 85 kPa	Stage 2 σ'_{vc} : 127 kPa	Stage 3 σ'_{vc} : 212 kPa	2
			3

Project: 503387 - F254727
CID18

Laboratory: Wallingford, UK
Z4_OWF_BH15-COMP / 05-2 / 13.6

Approved by: ET 30/05/2025

Test Report

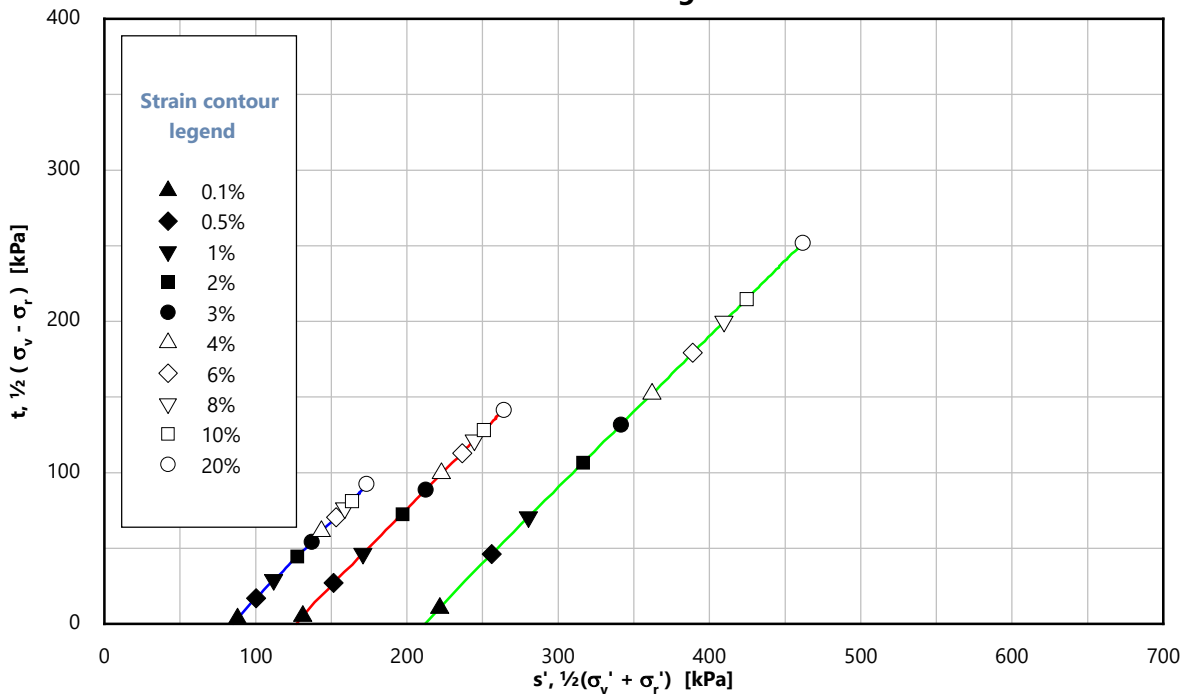
Consolidated Triaxial Compression Test On Water Saturated Soils

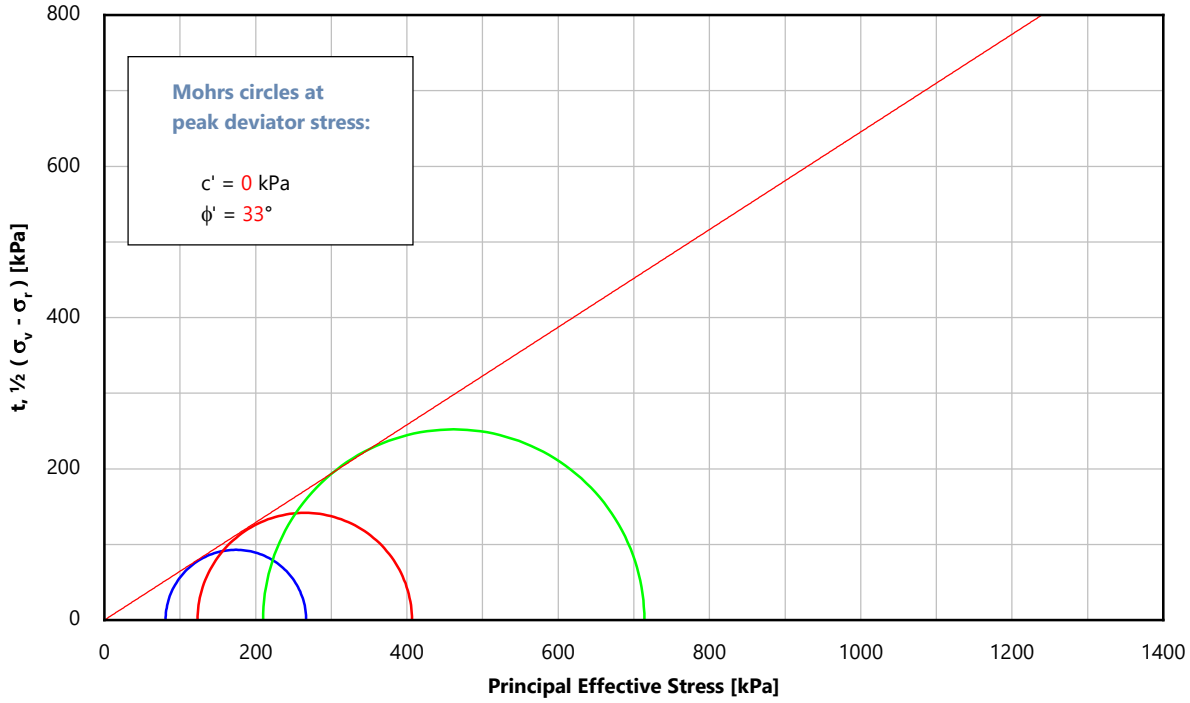
Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Shearing





Consolidation			
Stage 1 σ'_{rc} : 85 kPa	Stage 2 σ'_{rc} : 127 kPa	Stage 3 σ'_{rc} : 212 kPa	1
Stage 1 σ'_{vc} : 85 kPa	Stage 2 σ'_{vc} : 127 kPa	Stage 3 σ'_{vc} : 212 kPa	2
			3

Project: 503387 - F254727
CID18

Laboratory: Wallingford, UK
Z4_OWF_BH15-COMP / 05-2 / 13.6

Approved by: ET 30/05/2025

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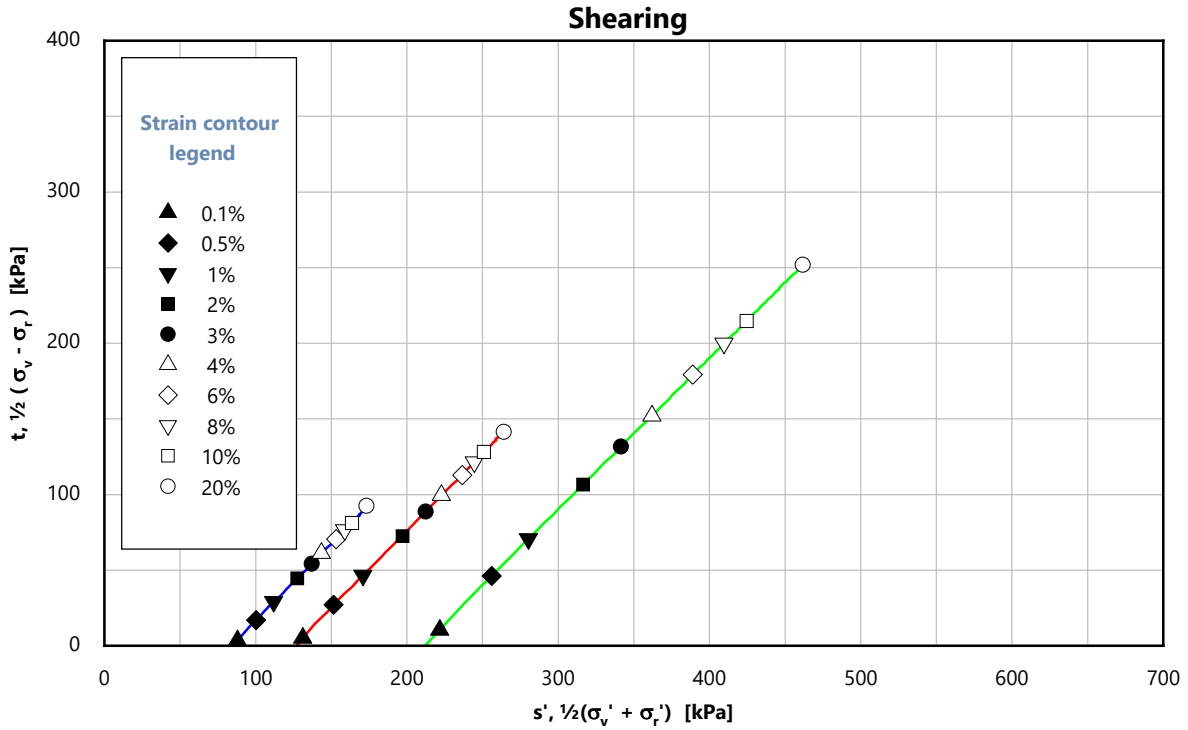
Test Report

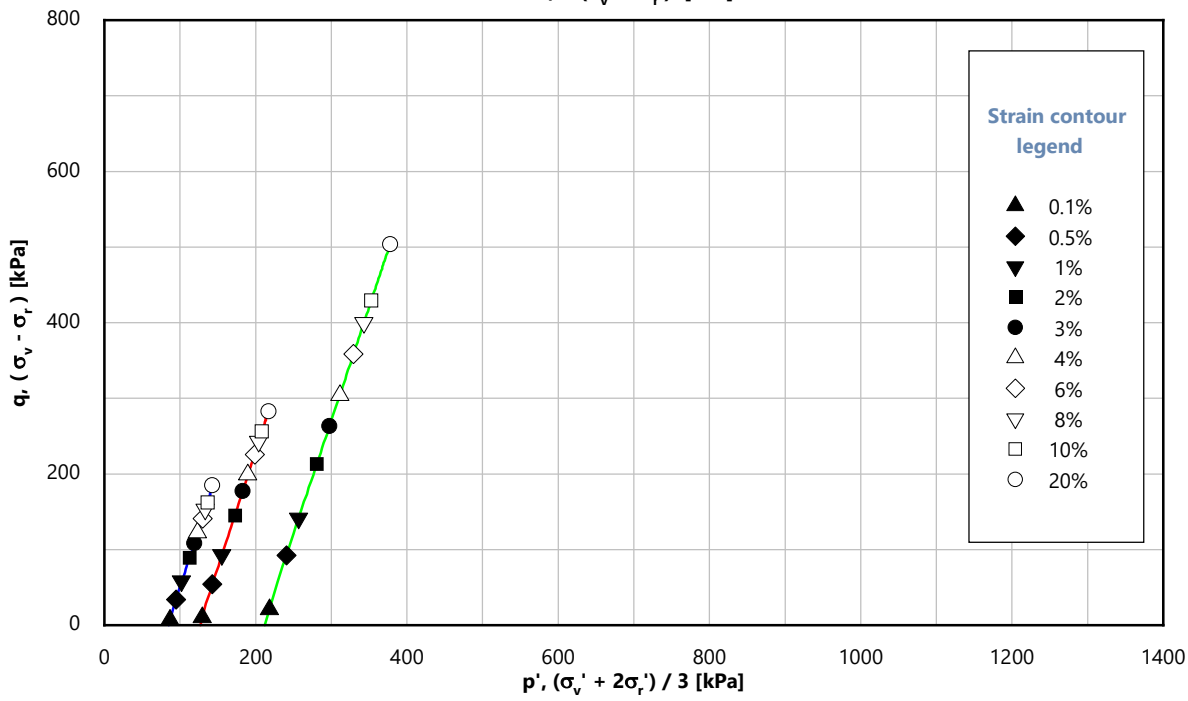
Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

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Consolidation			
Stage 1 σ'_{rc} : 85 kPa	Stage 2 σ'_{rc} : 127 kPa	Stage 3 σ'_{rc} : 212 kPa	1
Stage 1 σ'_{vc} : 85 kPa	Stage 2 σ'_{vc} : 127 kPa	Stage 3 σ'_{vc} : 212 kPa	2 3

Project: 503387 - F254727
CID18

Laboratory: Wallingford, UK
Z4_OWF_BH15-COMP / 05-2 / 13.6

Approved by: ET 30/05/2025

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Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

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Test Identification	Specimen 1	Specimen 2	Specimen 3
Location	Z4_OWF_BH16-SAM	Z4_OWF_BH16-SAM	Z4_OWF_BH16-SAM
Sample	05-1	05-1	05-1
Depth [m]	3.00	3.00	3.00
Test number	CID19A	CID19B	CID19C

Specimen Visual Description
Greyish brown fine to medium SAND

Initial Specimen Conditions	Specimen 1	Specimen 2	Specimen 3
Test start date	31/07/2025	04/08/2025	05/08/2025
Type of sample	Recompacted	Recompacted	Recompacted
Diameter [mm]	50.8	50.7	50.8
Length [mm]	95.0	95.0	95.0
Water content [%]	10.1	10.0	9.6
Bulk density [Mg/m^3]	2.30	2.31	2.29
Dry density [Mg/m^3]	2.09	2.10	2.09
Void ratio [-]	0.271	0.260	0.266
Degree of saturation [%]	99	102	96
Type of drains fitted	One end	One end	One end

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

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Saturation	Specimen 1	Specimen 2	Specimen 3
Pressure increments applied [kPa]	50	50	50
Differential pressure used [kPa]	10	10	10
Pore pressure on completion [kPa]	555	455	590
Cell pressure on completion [kPa]	560	460	600
B value achieved	0.90	0.95	0.95

Consolidation: Isotropic	Specimen 1	Specimen 2	Specimen 3
Cell pressure [kPa]	579	488	647
Back pressure [kPa]	560	460	600
Effective cell pressure [kPa]	19	28	47
Pore pressure on completion [kPa]	560	460	600
Pore pressure dissipation [%]	100	100	100
Water content [%]	10.1	9.7	9.9
Bulk density [Mg/m^3]	2.30	2.31	2.31
Dry density [Mg/m^3]	2.09	2.11	2.10
Void ratio [-]	0.268	0.256	0.262
Degree of saturation [%]	100	100	100
Axial strain [%]	0.07	0.12	0.12
Volumetric strain [%]	0.22	0.37	0.37
Volumetric strain rate-end of stage [%/hr]	0.01	0.05	0.02

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Shearing	Specimen 1	Specimen 2	Specimen 3
Initial pore pressure [kPa]	560	460	600
Initial effective cell pressure [kPa]	19	28	47
Rate of strain [%/hour]	1.30	1.30	1.30
At peak deviator stress			
Corrected deviator stress [kPa]	212	252	509
Membrane correction applied [kPa]	0.7	0.7	0.6
Drain correction applied [kPa]	0	0	0
Axial strain [%]	3.36	3.25	2.59
Volumetric strain [%]	-2.49	-2.59	-2.51
Major principal effective stress [kPa]	234	283	557
Minor principal effective stress [kPa]	21	31	48
Principal effective stress ratio	11.07	9.24	11.71
ε_{50} [%]	1.62	1.18	1.02
Secant modulus (E_{50}) at ε_{50} [kPa]	6562	10703	25032
At peak principal effective stress ratio			
Corrected deviator stress [kPa]	212	252	509
Membrane correction applied [kPa]	0.8	0.7	0.6
Drain correction applied [kPa]	0	0	0
Axial strain [%]	3.61	3.25	2.59
Volumetric strain [%]	-3.01	-2.59	-2.51
Major principal effective stress [kPa]	233	283	557
Minor principal effective stress [kPa]	21	31	48
Principal effective stress ratio	11.07	9.24	11.71
At 10% axial strain			
Corrected deviator stress [kPa]	93	109	184
Membrane correction applied [kPa]	1.9	2.0	1.9
Drain correction applied [kPa]	0	0	0
Axial strain [%]	10.00	10.00	10.00
Volumetric strain [%]	-5.06	-5.70	-6.41
Major principal effective stress [kPa]	114	139	231
Minor principal effective stress [kPa]	21	30	47
Principal effective stress ratio	5.35	4.61	4.89

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Photographs		
Specimen 1	**Specimen 2**	**Specimen 3**
Photograph unavailable	Photograph unavailable	Photograph unavailable

Final Conditions	Specimen 1	Specimen 2	Specimen 3
Water content [%]	10.1	12.8	13.5
Bulk density [Mg/m³]	2.30	2.23	2.22
Dry density [Mg/m³]	2.09	1.98	1.95
Mode of failure	Compound failure	Compound failure	Compound failure

Project: 503387 - F254727
Test page CID19r-4/8

Laboratory: Wallingford, UK
Z4_OWF_BH16-SAMP / 05-1 / 3

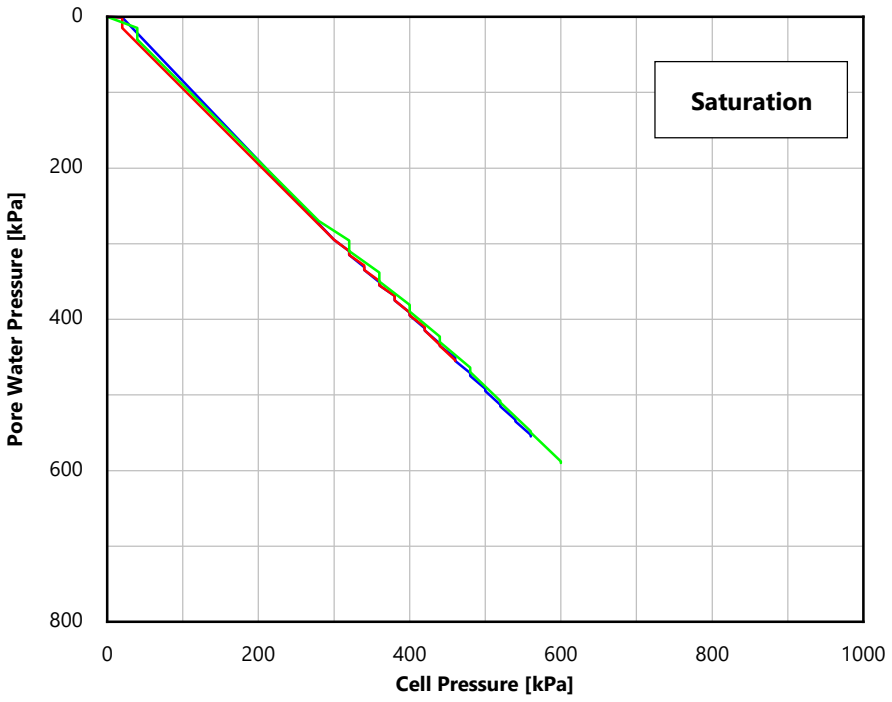
Approved by: ET - 18/08/2025

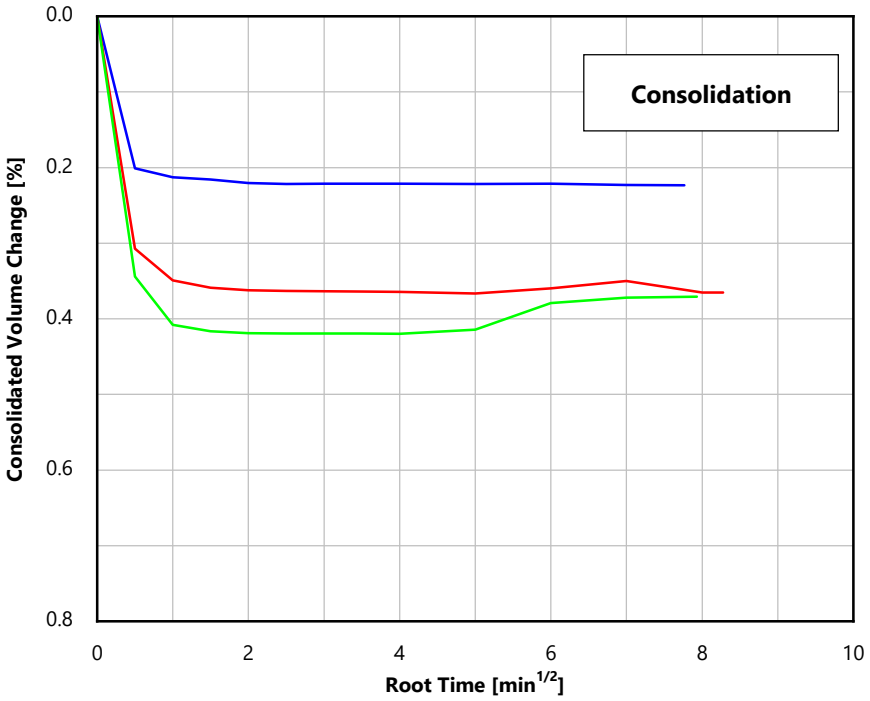
Test Report

Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018





Consolidation			
Stage 1 σ'_{rc} : 19 kPa	Stage 2 σ'_{rc} : 28 kPa	Stage 3 σ'_{rc} : 47 kPa	1
Stage 1 σ'_{vc} : 19 kPa	Stage 2 σ'_{vc} : 28 kPa	Stage 3 σ'_{vc} : 47 kPa	2
			3

Project: 503387 - F254727
CID19r

Laboratory: Wallingford, UK
Z4_OWF_BH16-SAMP / 05-1 / 3

Approved by: ET 18/08/2025

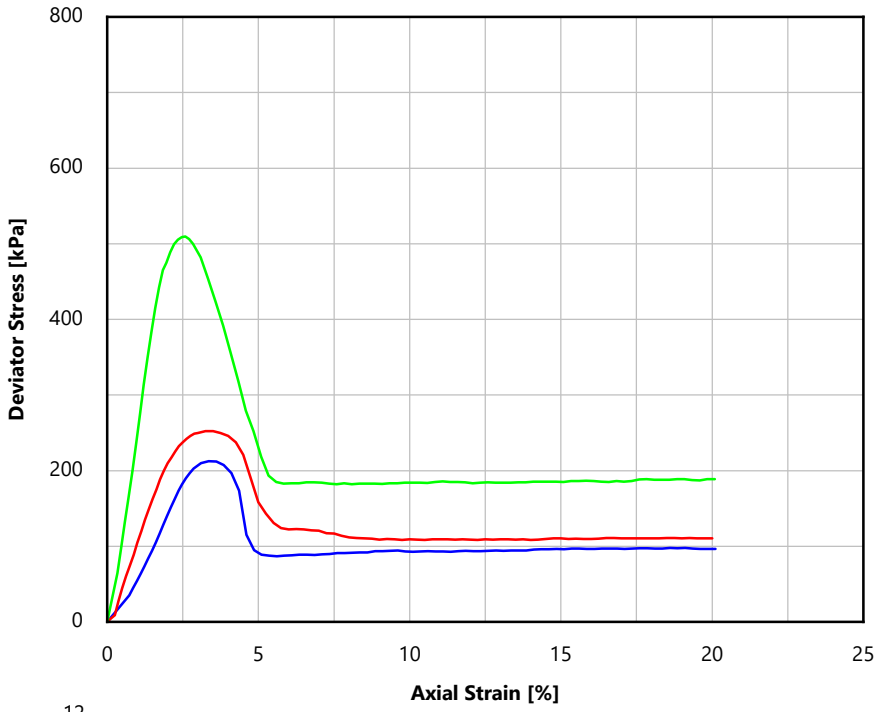
Test Report

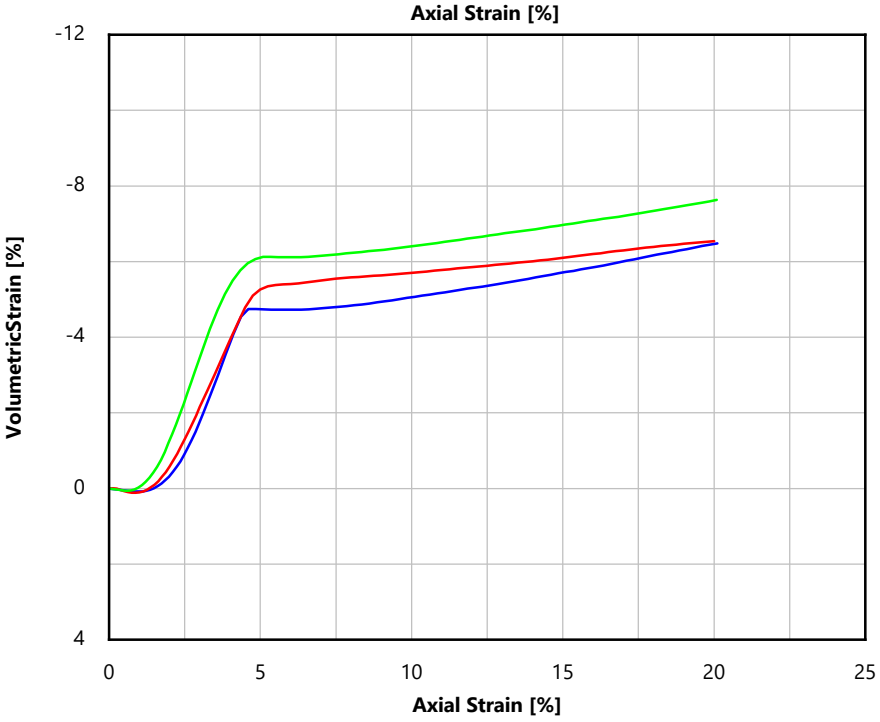
Consolidated Triaxial Compression Test On Water Saturated Soils
Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Shearing





Consolidation			
Stage 1 σ'_{rc} : 19 kPa	Stage 2 σ'_{rc} : 28 kPa	Stage 3 σ'_{rc} : 47 kPa	1
Stage 1 σ'_{vc} : 19 kPa	Stage 2 σ'_{vc} : 28 kPa	Stage 3 σ'_{vc} : 47 kPa	2
			3

Project: 503387 - F254727
CID19r

Laboratory: Wallingford, UK
Z4_OWF_BH16-SAMP / 05-1 / 3

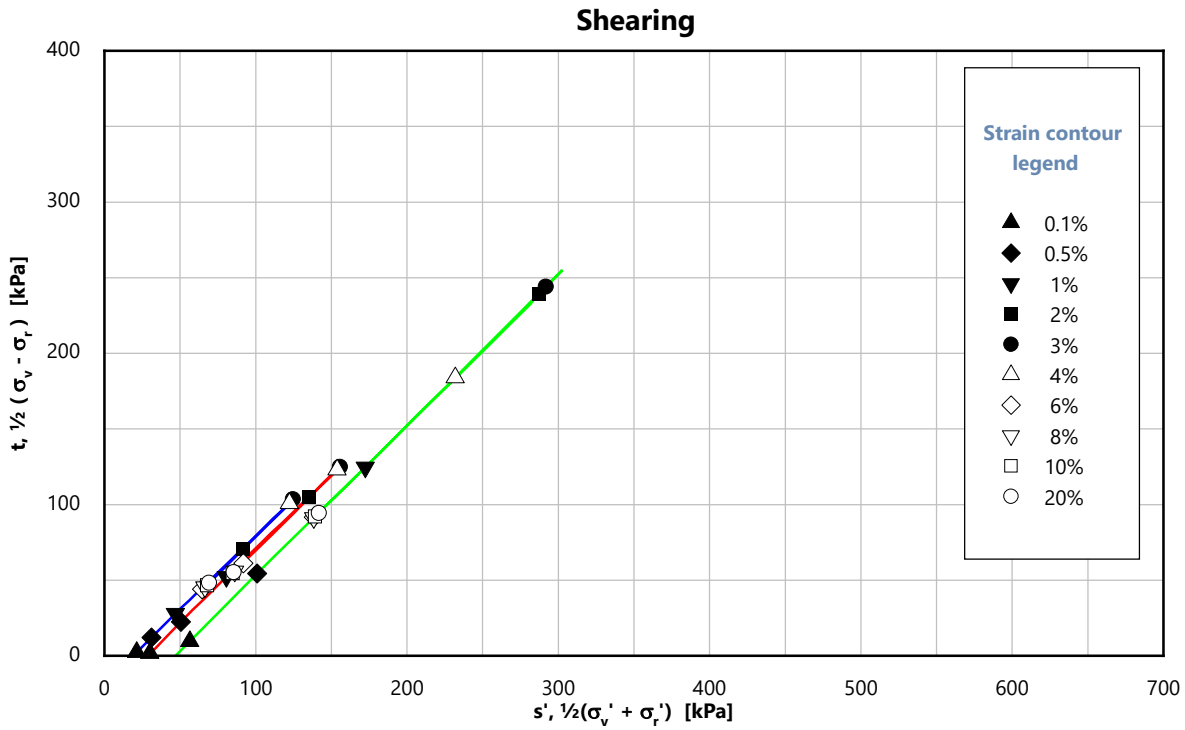
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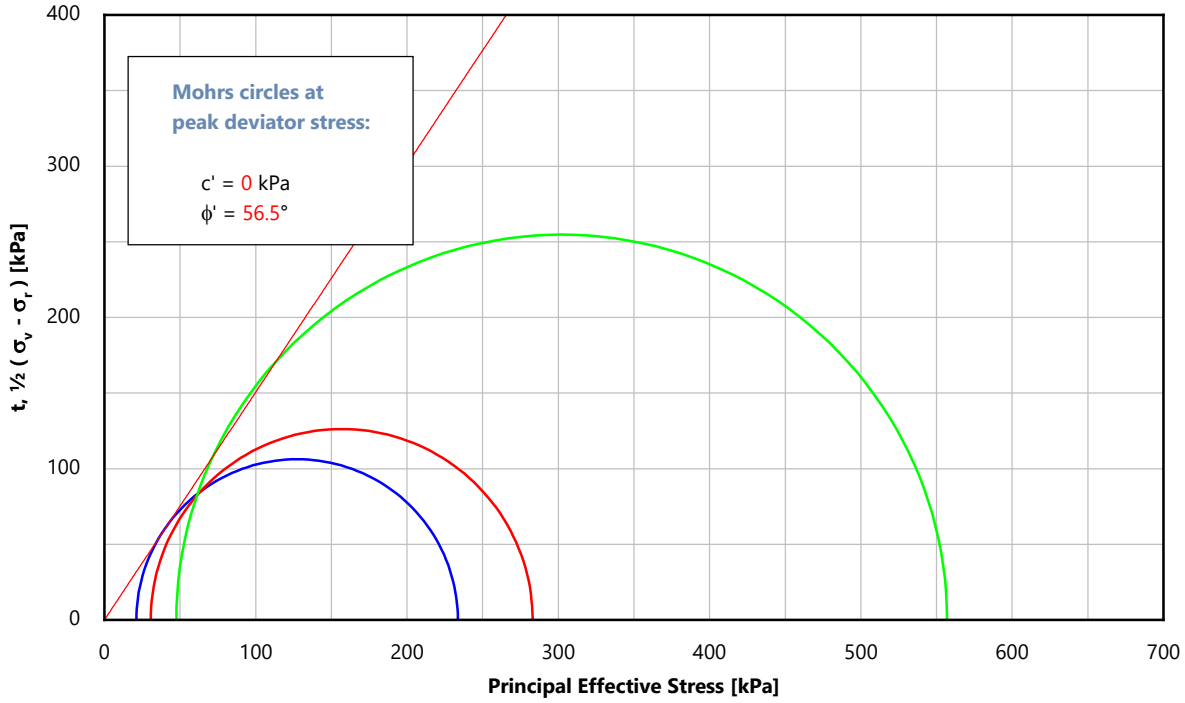
Test Report

Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018





Consolidation			
Stage 1 σ'_{rc} : 19 kPa	Stage 2 σ'_{rc} : 28 kPa	Stage 3 σ'_{rc} : 47 kPa	1
Stage 1 σ'_{vc} : 19 kPa	Stage 2 σ'_{vc} : 28 kPa	Stage 3 σ'_{vc} : 47 kPa	2
			3

Project: 503387 - F254727
CID19r

Laboratory: Wallingford, UK
Z4_OWF_BH16-SAMP / 05-1 / 3

Approved by: ET 18/08/2025

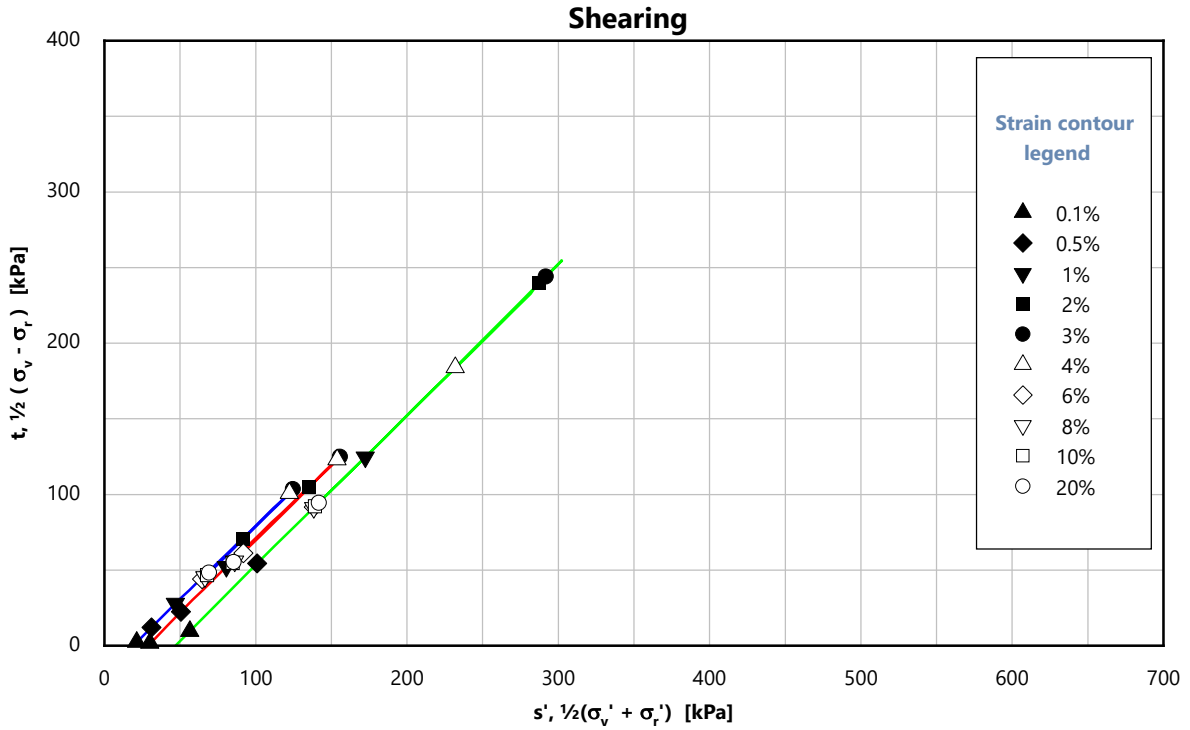
Test Report

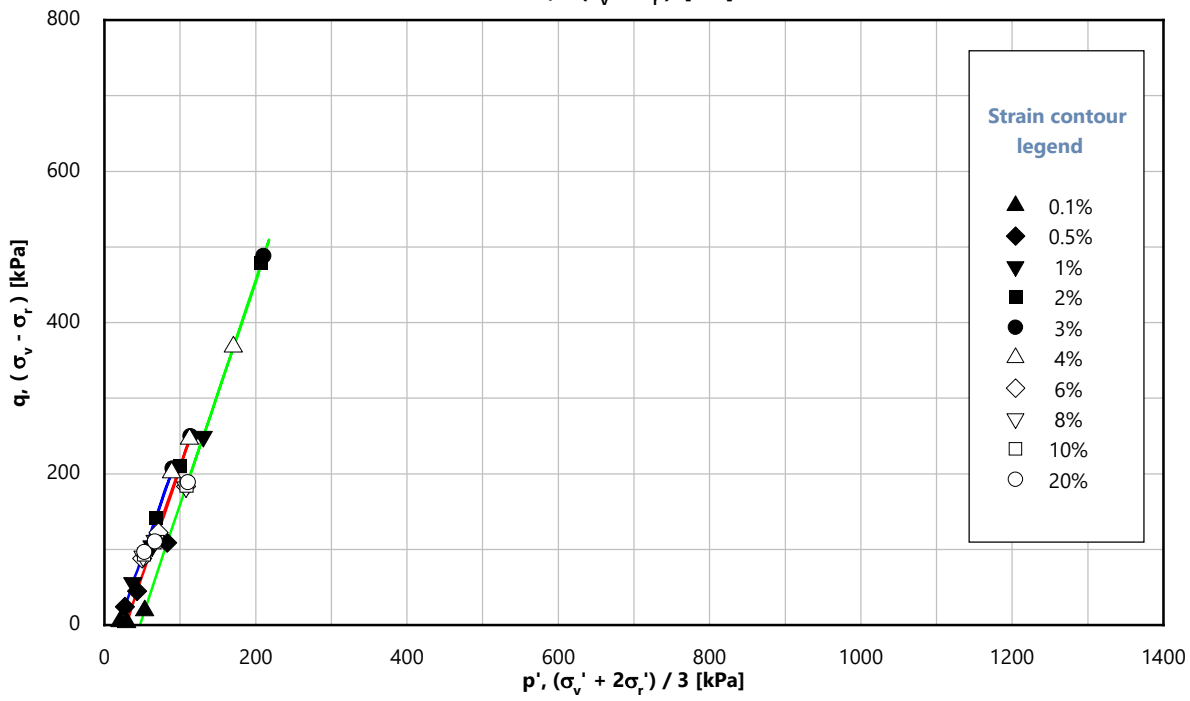
Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

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Consolidation			
Stage 1 σ'_{rc} : 19 kPa	Stage 2 σ'_{rc} : 28 kPa	Stage 3 σ'_{rc} : 47 kPa	1
Stage 1 σ'_{vc} : 19 kPa	Stage 2 σ'_{vc} : 28 kPa	Stage 3 σ'_{vc} : 47 kPa	2
			3

Project: 503387 - F254727
CID19r

Laboratory: Wallingford, UK
Z4_OWF_BH16-SAMP / 05-1 / 3

Approved by: ET 18/08/2025

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Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Test Identification	Specimen 1	Specimen 2	Specimen 3
Location	Z4_OWF_BH16-SAMP	Z4_OWF_BH16-SAMP	Z4_OWF_BH16-SAMP
Sample	10-2	10-2	10-2
Depth [m]	8.35	8.35	8.35
Test number	CID20A	CID20B	CID20C

Specimen Visual Description
Grey fine to medium SAND

Initial Specimen Conditions	Specimen 1	Specimen 2	Specimen 3
Test start date	06/05/2025	28/05/2025	28/05/2025
Type of sample	Recompacted	Recompacted	Recompacted
Diameter [mm]	50.5	50.5	50.5
Length [mm]	95.0	95.0	95.0
Water content [%]	10.2	10.2	10.2
Bulk density [Mg/m^3]	1.86	1.85	1.85
Dry density [Mg/m^3]	1.68	1.68	1.68
Void ratio [-]	0.574	0.582	0.578
Degree of saturation [%]	47	46	47
Type of drains fitted	One end	One end	One end

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

Saturation	Specimen 1	Specimen 2	Specimen 3
Pressure increments applied [kPa]	50	50	50
Differential pressure used [kPa]	10	10	10
Pore pressure on completion [kPa]	690	440	440
Cell pressure on completion [kPa]	700	450	450
B value achieved	0.96	0.96	0.96

Consolidation: Isotropic	Specimen 1	Specimen 2	Specimen 3
Cell pressure [kPa]	752	527	579
Back pressure [kPa]	700	450	450
Effective cell pressure [kPa]	52	77	129
Pore pressure on completion [kPa]	700	451	450
Pore pressure dissipation [%]	100	98	100
Water content [%]	21.5	21.5	21.2
Bulk density [Mg/m^3]	2.05	2.05	2.06
Dry density [Mg/m^3]	1.69	1.69	1.70
Void ratio [-]	0.568	0.570	0.562
Degree of saturation [%]	100	100	100
Axial strain [%]	0.11	0.24	0.34
Volumetric strain [%]	0.34	0.73	1.02
Volumetric strain rate-end of stage [%/hr]	0.03	0.04	0.08

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

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Shearing	Specimen 1	Specimen 2	Specimen 3
Initial pore pressure [kPa]	700	450	450
Initial effective cell pressure [kPa]	52	77	129
Rate of strain [%/hour]	1.30	1.30	1.30
At peak deviator stress			
Corrected deviator stress [kPa]	397	458	655
Membrane correction applied [kPa]	0.6	0.6	0.8
Drain correction applied [kPa]	0	0	0
Axial strain [%]	3.09	2.87	3.72
Volumetric strain [%]	-1.13	-1.44	-1.03
Major principal effective stress [kPa]	449	537	785
Minor principal effective stress [kPa]	52	79	130
Principal effective stress ratio	8.65	6.78	6.04
ε_{50} [%]	1.37	0.87	1.07
Secant modulus (E_{50}) at ε_{50} [kPa]	14477	26247	30638
At peak principal effective stress ratio			
Corrected deviator stress [kPa]	397	458	655
Membrane correction applied [kPa]	0.6	0.6	0.8
Drain correction applied [kPa]	0	0	0
Axial strain [%]	3.09	2.87	3.72
Volumetric strain [%]	-1.13	-1.44	-1.03
Major principal effective stress [kPa]	449	537	785
Minor principal effective stress [kPa]	52	79	130
Principal effective stress ratio	8.65	6.78	6.04
At 10% axial strain			
Corrected deviator stress [kPa]	193	231	408
Membrane correction applied [kPa]	1.8	1.8	1.8
Drain correction applied [kPa]	0	0	0
Axial strain [%]	10.00	10.00	10.00
Volumetric strain [%]	-2.97	-3.17	-3.40
Major principal effective stress [kPa]	245	310	539
Minor principal effective stress [kPa]	52	79	132
Principal effective stress ratio	4.71	3.94	4.10

Project: 503387 - F254727
Test page CID20-3/8

Laboratory: Wallingford, UK
Z4_OWF_BH16-SAMP / 10-2 / 8.35

Approved by: ET - 12/08/2025

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Photographs		
Specimen 1	**Specimen 2**	**Specimen 3**
Photograph unavailable	Photograph unavailable	Photograph unavailable

Final Conditions	Specimen 1	Specimen 2	Specimen 3
Water content [%]	23.7	23.6	23.3
Bulk density [Mg/m^3]	2.01	2.01	2.02
Dry density [Mg/m^3]	1.63	1.63	1.64
Mode of failure	Compound failure	Compound failure	Compound failure

Project: 503387 - F254727
Test page CID20-4/8

Laboratory: Wallingford, UK
Z4_OWF_BH16-SAMP / 10-2 / 8.35

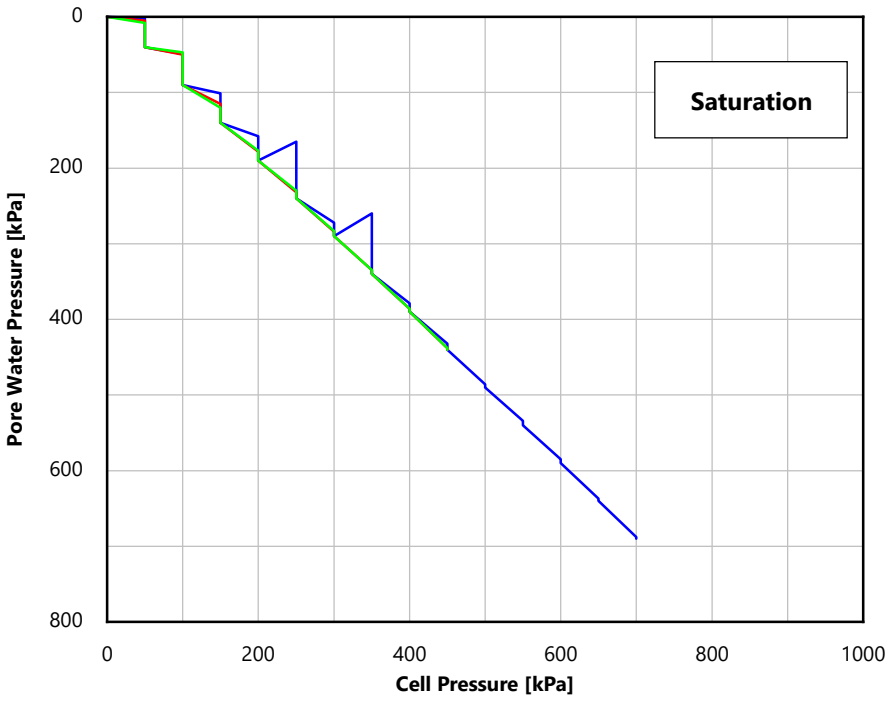
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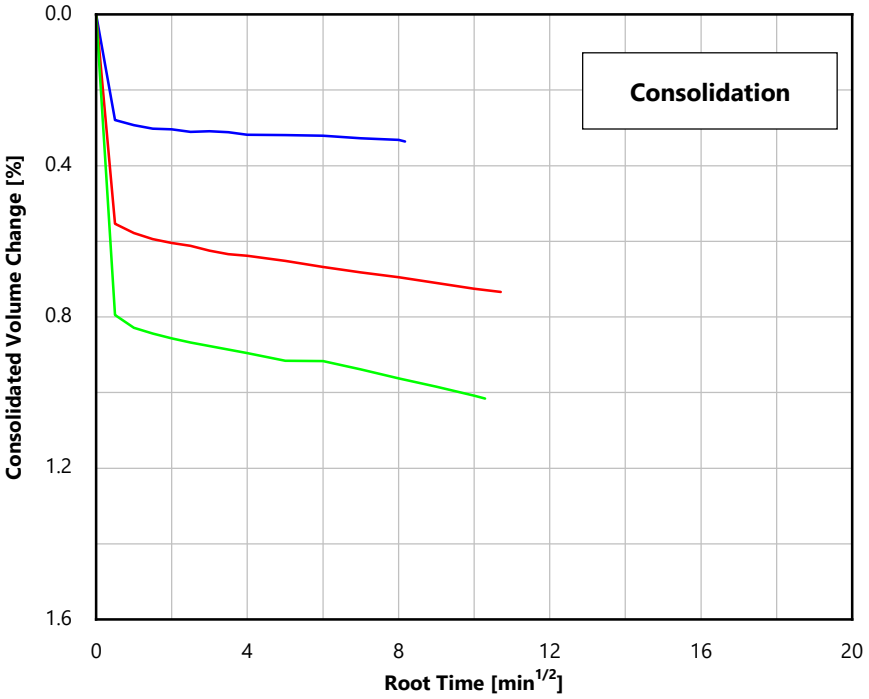
Test Report

Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018





Consolidation			
Stage 1 σ'_{rc} : 52 kPa	Stage 2 σ'_{rc} : 77 kPa	Stage 3 σ'_{rc} : 129 kPa	1
Stage 1 σ'_{vc} : 52 kPa	Stage 2 σ'_{vc} : 77 kPa	Stage 3 σ'_{vc} : 129 kPa	2 3

Project: 503387 - F254727
CID20

Laboratory: Wallingford, UK
Z4_OWF_BH16-SAMP / 10-2 / 8.35

Approved by: ET 12/08/2025

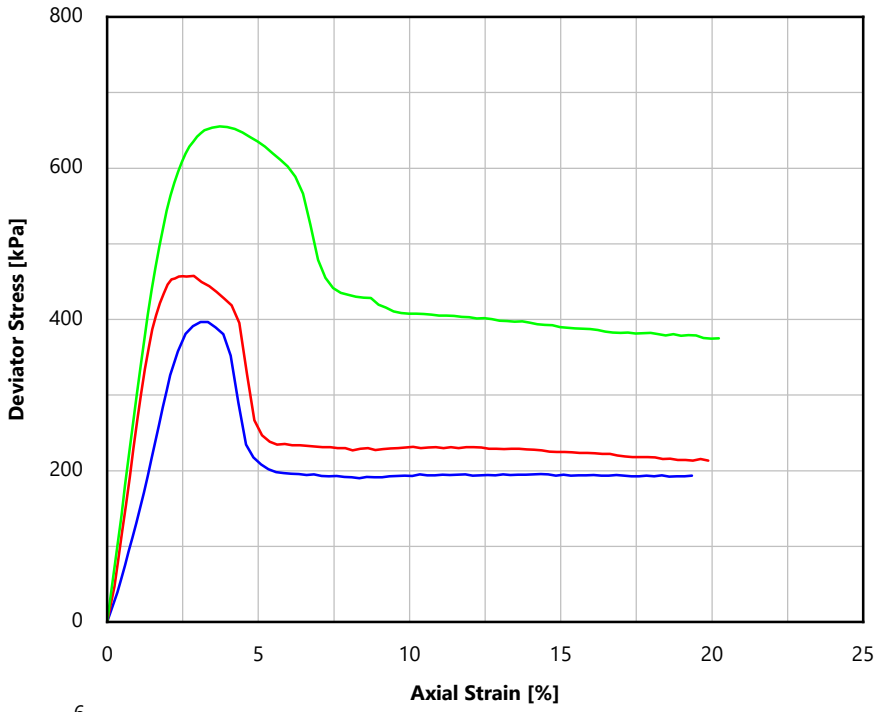
Test Report

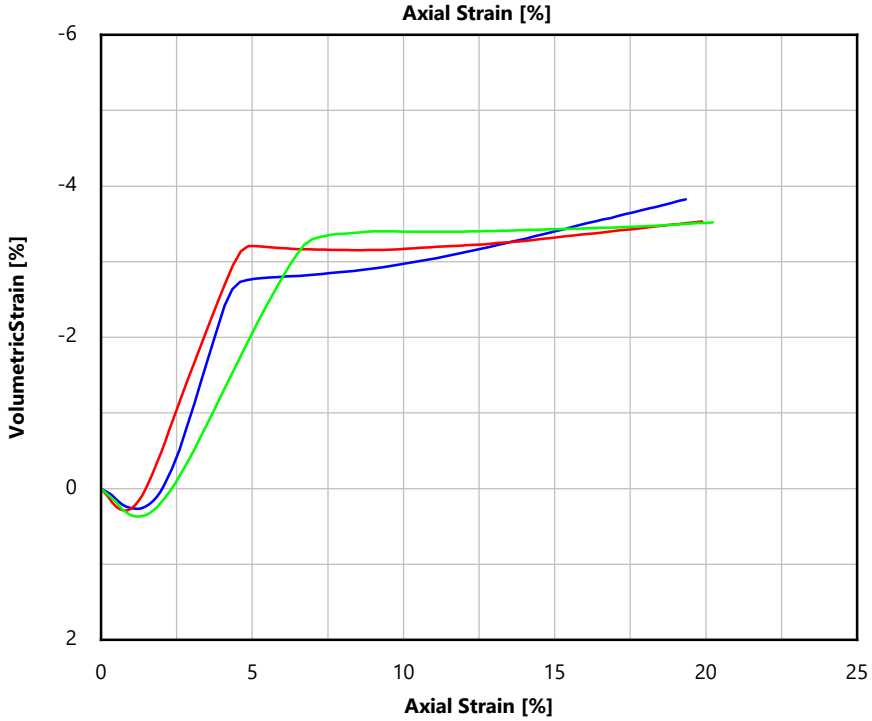
Consolidated Triaxial Compression Test On Water Saturated Soils
Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Shearing





Consolidation			
Stage 1 σ'_{rc} : 52 kPa	Stage 2 σ'_{rc} : 77 kPa	Stage 3 σ'_{rc} : 129 kPa	1
Stage 1 σ'_{vc} : 52 kPa	Stage 2 σ'_{vc} : 77 kPa	Stage 3 σ'_{vc} : 129 kPa	2
			3

Project: 503387 - F254727
CID20

Laboratory: Wallingford, UK
Z4_OWF_BH16-SAMP / 10-2 / 8.35

Approved by: ET 12/08/2025

Test Report

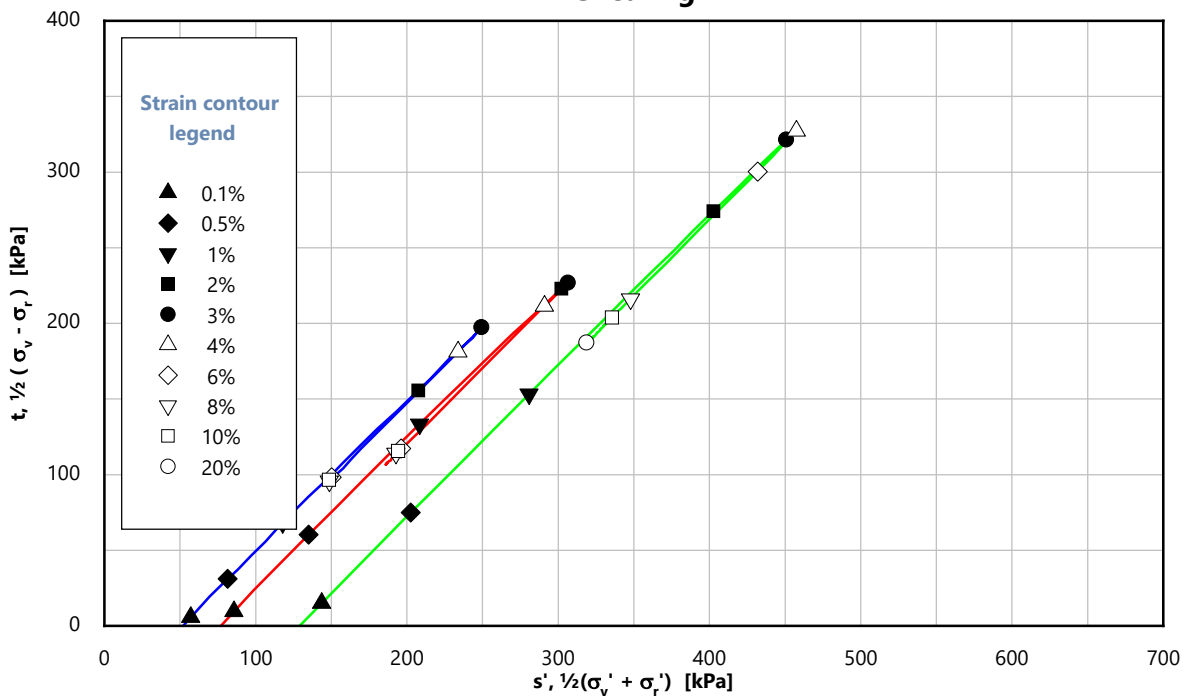
Consolidated Triaxial Compression Test On Water Saturated Soils

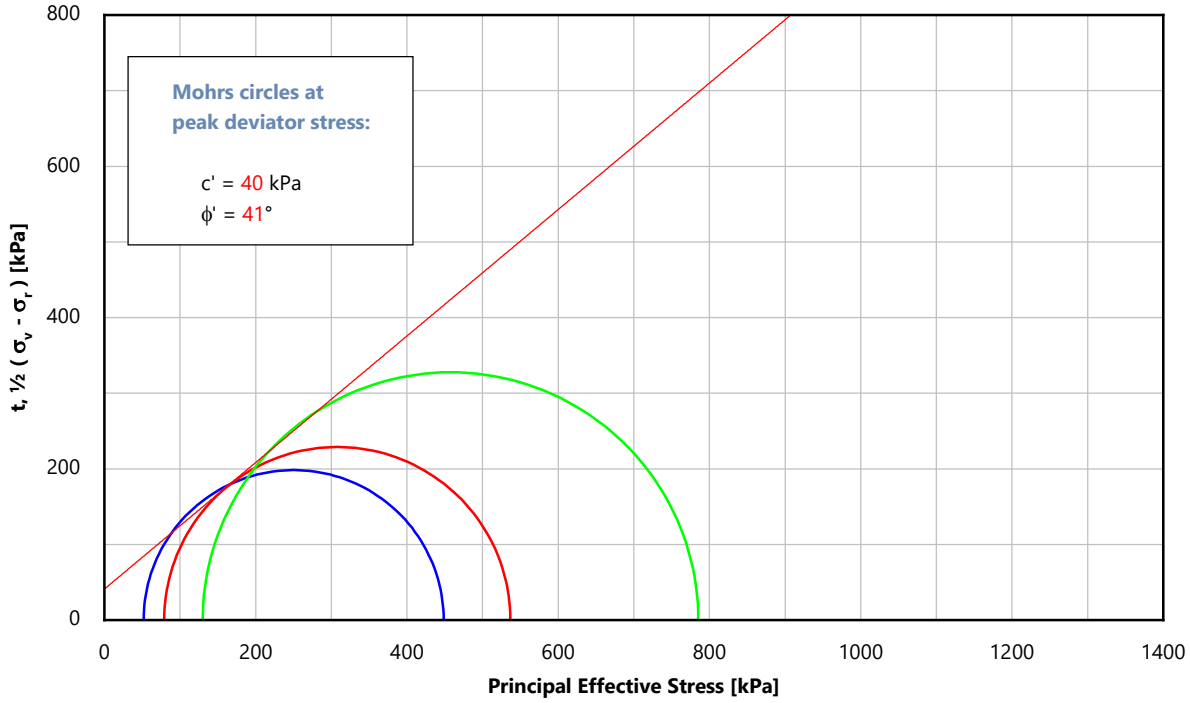
Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Shearing





Consolidation			
Stage 1 σ'_{rc} : 52 kPa	Stage 2 σ'_{rc} : 77 kPa	Stage 3 σ'_{rc} : 129 kPa	1
Stage 1 σ'_{vc} : 52 kPa	Stage 2 σ'_{vc} : 77 kPa	Stage 3 σ'_{vc} : 129 kPa	2
			3

Project: 503387 - F254727
CID20

Laboratory: Wallingford, UK
Z4_OWF_BH16-SAMP / 10-2 / 8.35

Approved by: ET 12/08/2025

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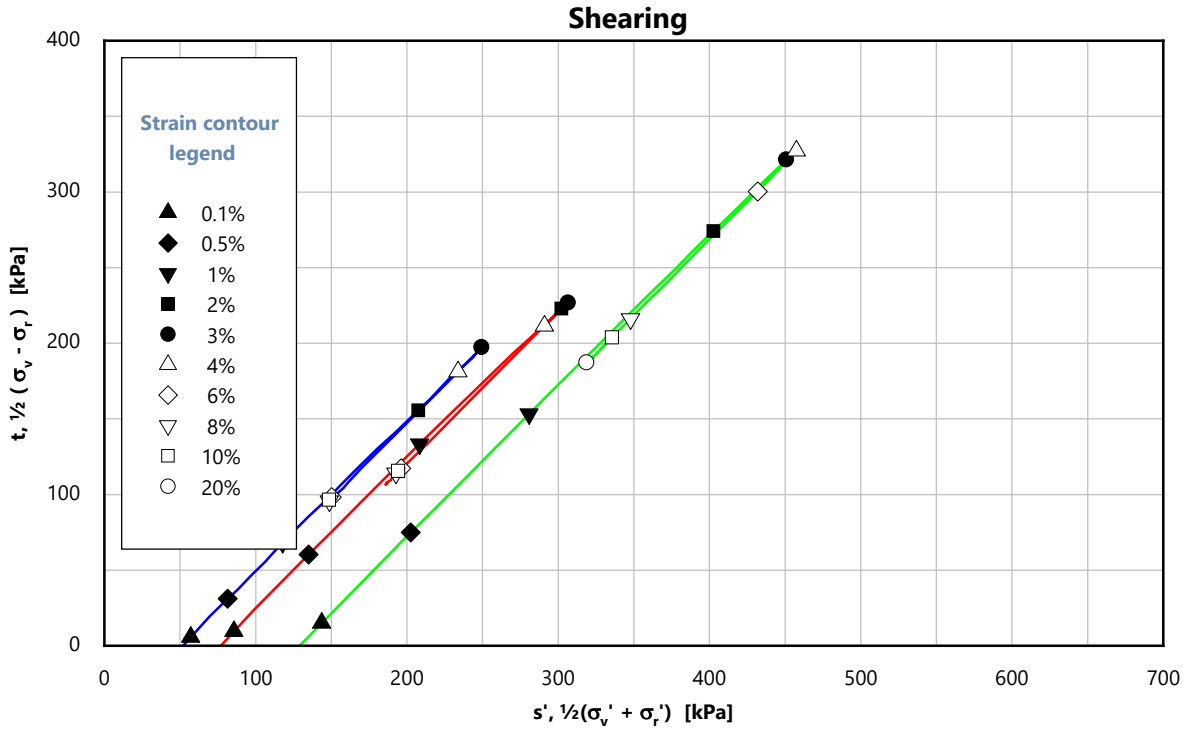
Test Report

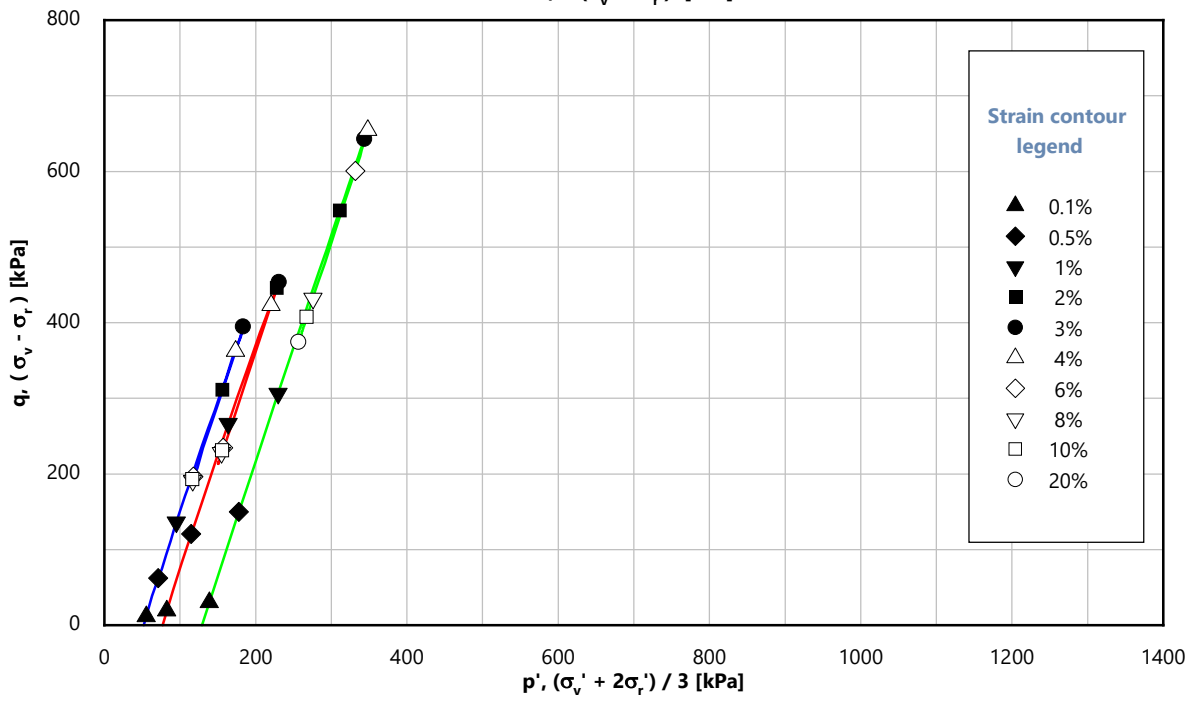
Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919





Consolidation			
Stage 1 σ'_{rc} : 52 kPa	Stage 2 σ'_{rc} : 77 kPa	Stage 3 σ'_{rc} : 129 kPa	1
Stage 1 σ'_{vc} : 52 kPa	Stage 2 σ'_{vc} : 77 kPa	Stage 3 σ'_{vc} : 129 kPa	2 3

Project: 503387 - F254727
CID20

Laboratory: Wallingford, UK
Z4_OWF_BH16-SAMP / 10-2 / 8.35

Approved by: ET 12/08/2025

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Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Test Identification	Specimen 1	Specimen 2	Specimen 3
Location	Z4_OWF_BH16-SAMP	Z4_OWF_BH16-SAMP	Z4_OWF_BH16-SAMP
Sample	15-1	15-1	15-1
Depth [m]	13.00	13.00	13.00
Test number	CID21a	CID21b	CID21c

Specimen Visual Description
Grey fine SAND

Initial Specimen Conditions	Specimen 1	Specimen 2	Specimen 3
Test start date	07/05/2025	06/05/2025	30/04/2025
Type of sample	Recompacted	Recompacted	Recompacted
Diameter [mm]	50.5	50.5	50.5
Length [mm]	95.0	95.0	95.0
Water content [%]	10.0	10.2	10.2
Bulk density [Mg/m^3]	1.62	1.62	1.61
Dry density [Mg/m^3]	1.47	1.47	1.47
Void ratio [-]	0.803	0.802	0.808
Degree of saturation [%]	33	34	33
Type of drains fitted	One end	One end	One end

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

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Saturation	Specimen 1	Specimen 2	Specimen 3
Pressure increments applied [kPa]	50	50	50
Differential pressure used [kPa]	10	10	10
Pore pressure on completion [kPa]	440	640	390
Cell pressure on completion [kPa]	450	650	400
B value achieved	0.96	0.96	0.92

Consolidation: Isotropic	Specimen 1	Specimen 2	Specimen 3
Cell pressure [kPa]	530	770	600
Back pressure [kPa]	450	650	400
Effective cell pressure [kPa]	80	120	200
Pore pressure on completion [kPa]	450	654	400
Pore pressure dissipation [%]	100	97	100
Water content [%]	28.5	28.4	27.5
Bulk density [Mg/m^3]	1.94	1.94	1.95
Dry density [Mg/m^3]	1.51	1.51	1.53
Void ratio [-]	0.756	0.752	0.729
Degree of saturation [%]	100	100	100
Axial strain [%]	0.87	0.94	1.46
Volumetric strain [%]	2.61	2.81	4.39
Volumetric strain rate-end of stage [%/hr]	0.07	0.01	0.05

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

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Shearing	Specimen 1	Specimen 2	Specimen 3
Initial pore pressure [kPa]	450	650	400
Initial effective cell pressure [kPa]	80	120	200
Rate of strain [%/hour]	1.30	1.30	1.30
At peak deviator stress			
Corrected deviator stress [kPa]	189	293	473
Membrane correction applied [kPa]	4.6	4.4	4.6
Drain correction applied [kPa]	0	0	0
Axial strain [%]	20.07	18.75	20.03
Volumetric strain [%]	4.45	2.82	5.59
Major principal effective stress [kPa]	267	410	673
Minor principal effective stress [kPa]	79	117	200
Principal effective stress ratio	3.40	3.50	3.36
ε_{50} [%]	3.19	3.34	3.75
Secant modulus (E_{50}) at ε_{50} [kPa]	2954	4380	6308
At peak principal effective stress ratio			
Corrected deviator stress [kPa]	188	293	472
Membrane correction applied [kPa]	4.3	4.3	4.5
Drain correction applied [kPa]	0	0	0
Axial strain [%]	18.32	18.25	19.55
Volumetric strain [%]	4.41	2.83	5.56
Major principal effective stress [kPa]	266	409	671
Minor principal effective stress [kPa]	78	117	199
Principal effective stress ratio	3.42	3.51	3.37
At 10% axial strain			
Corrected deviator stress [kPa]	167	264	398
Membrane correction applied [kPa]	2.8	2.8	2.8
Drain correction applied [kPa]	0	0	0
Axial strain [%]	10.00	10.00	10.00
Volumetric strain [%]	3.84	2.89	4.50
Major principal effective stress [kPa]	245	381	598
Minor principal effective stress [kPa]	78	116	200
Principal effective stress ratio	3.14	3.28	2.99

Project: 503387 - F254727
Test page CID21-3/8

Laboratory: Wallingford, UK
Z4_OWF_BH16-SAMP / 15-1 / 13

Approved by: ET - 09/06/2025

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

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Photographs		
Specimen 1	**Specimen 2**	**Specimen 3**
Photograph Unavailable	Photograph Unavailable	Photograph Unavailable

Final Conditions	Specimen 1	Specimen 2	Specimen 3
Water content [%]	25.6	26.5	23.9
Bulk density [Mg/m^3]	1.98	1.97	2.01
Dry density [Mg/m^3]	1.58	1.56	1.62
Mode of failure	Compound failure	Compound failure	Compound failure

Project: 503387 - F254727
Test page CID21-4/8

Laboratory: Wallingford, UK
Z4_OWF_BH16-SAMP / 15-1 / 13

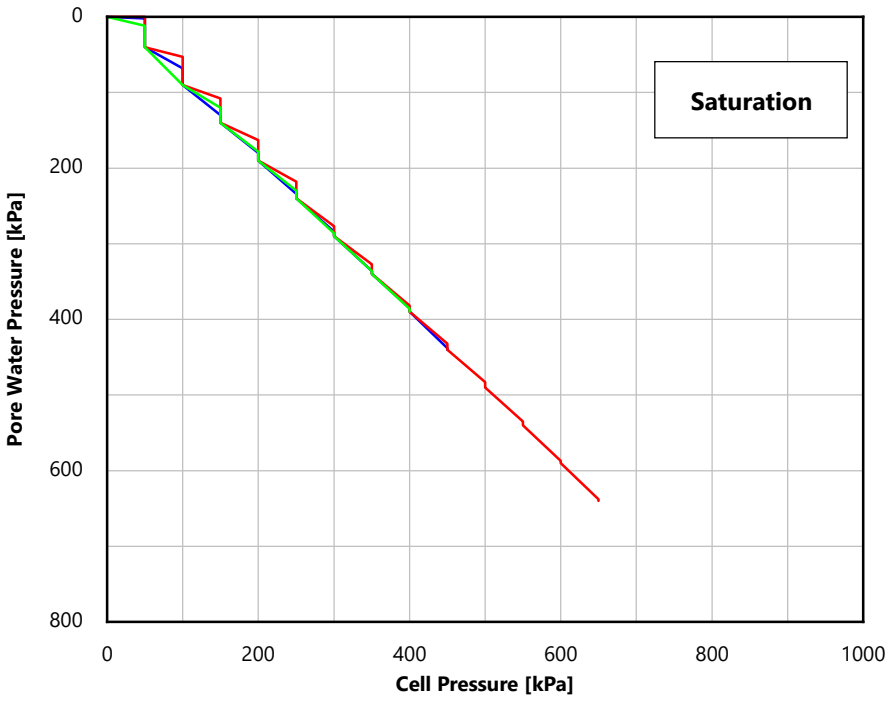
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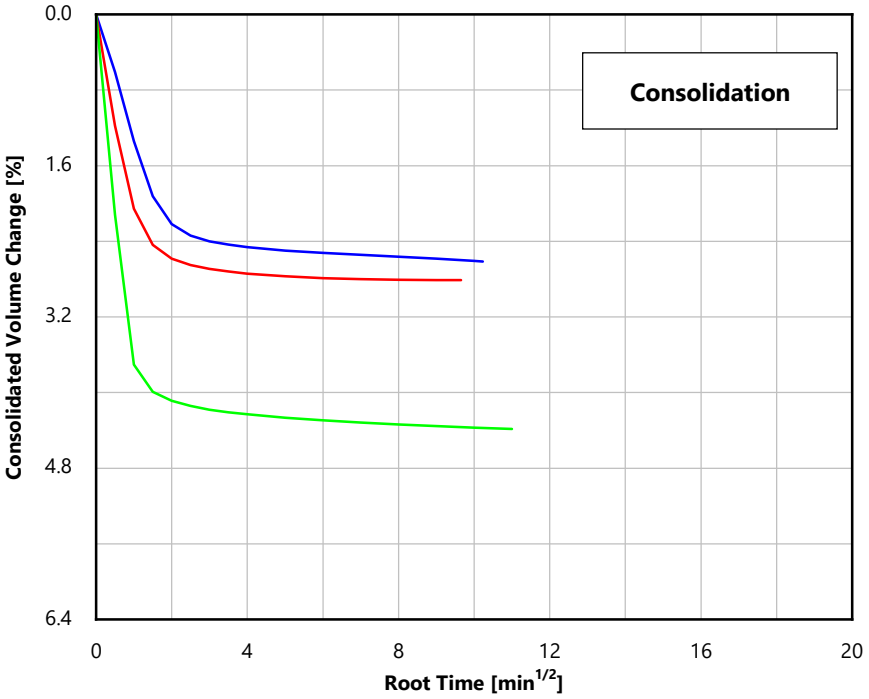
Test Report

Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018





Consolidation			
Stage 1 σ'_{rc} : 80 kPa	Stage 2 σ'_{rc} : 120 kPa	Stage 3 σ'_{rc} : 200 kPa	1
Stage 1 σ'_{vc} : 80 kPa	Stage 2 σ'_{vc} : 120 kPa	Stage 3 σ'_{vc} : 200 kPa	2
			3

Project: 503387 - F254727
CID21

Laboratory: Wallingford, UK
Z4_OWF_BH16-SAMP / 15-1 / 13

Approved by: ET 09/06/2025

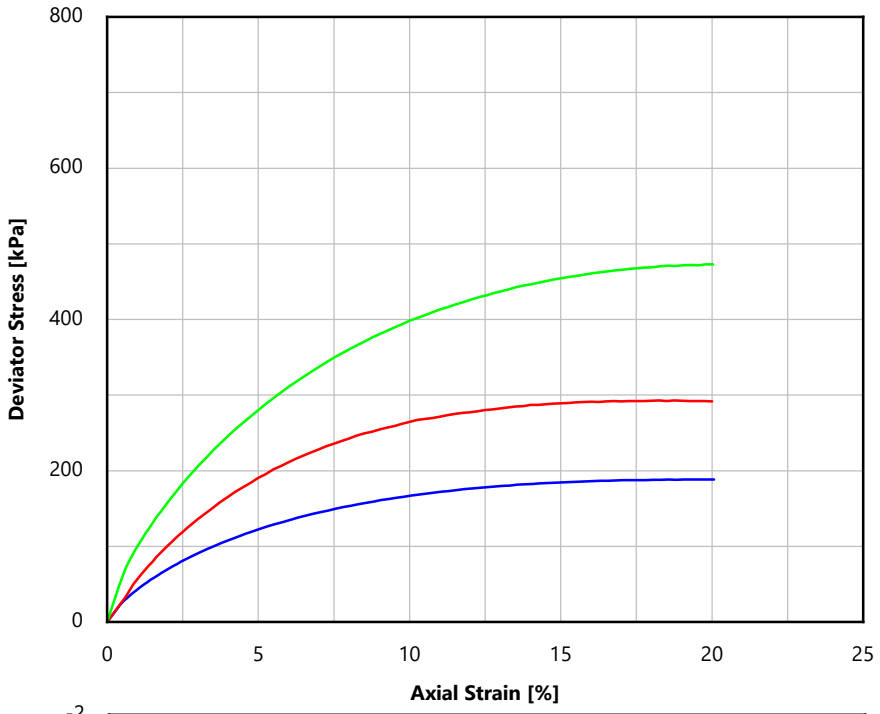
Test Report

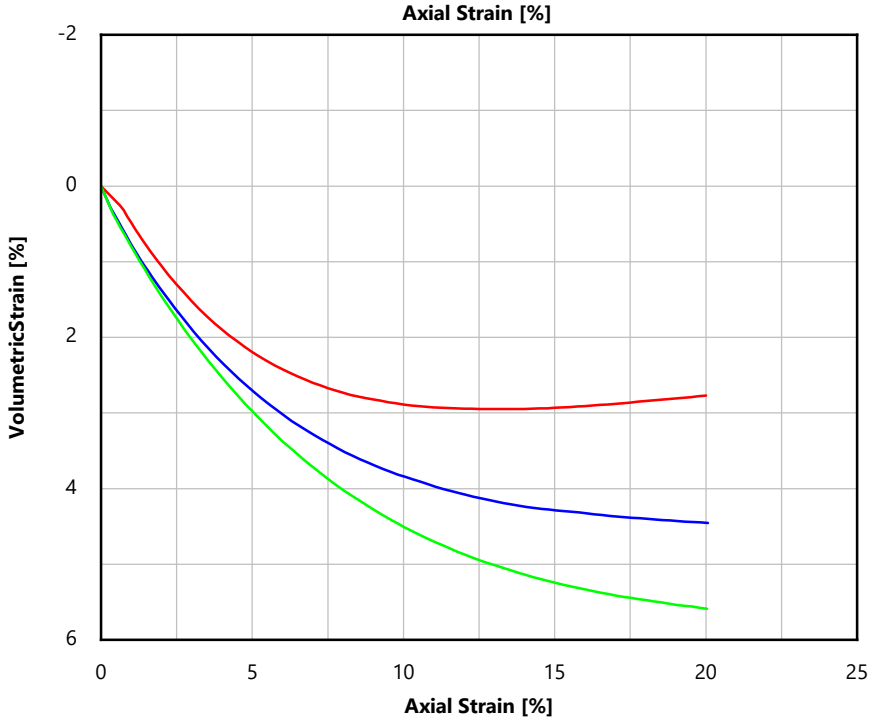
Consolidated Triaxial Compression Test On Water Saturated Soils
Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Shearing





Consolidation			
Stage 1 σ'_{rc} : 80 kPa	Stage 2 σ'_{rc} : 120 kPa	Stage 3 σ'_{rc} : 200 kPa	1
Stage 1 σ'_{vc} : 80 kPa	Stage 2 σ'_{vc} : 120 kPa	Stage 3 σ'_{vc} : 200 kPa	2
			3

Project: 503387 - F254727
CID21

Laboratory: Wallingford, UK
Z4_OWF_BH16-SAMP / 15-1 / 13

Approved by: ET 09/06/2025

Test Report

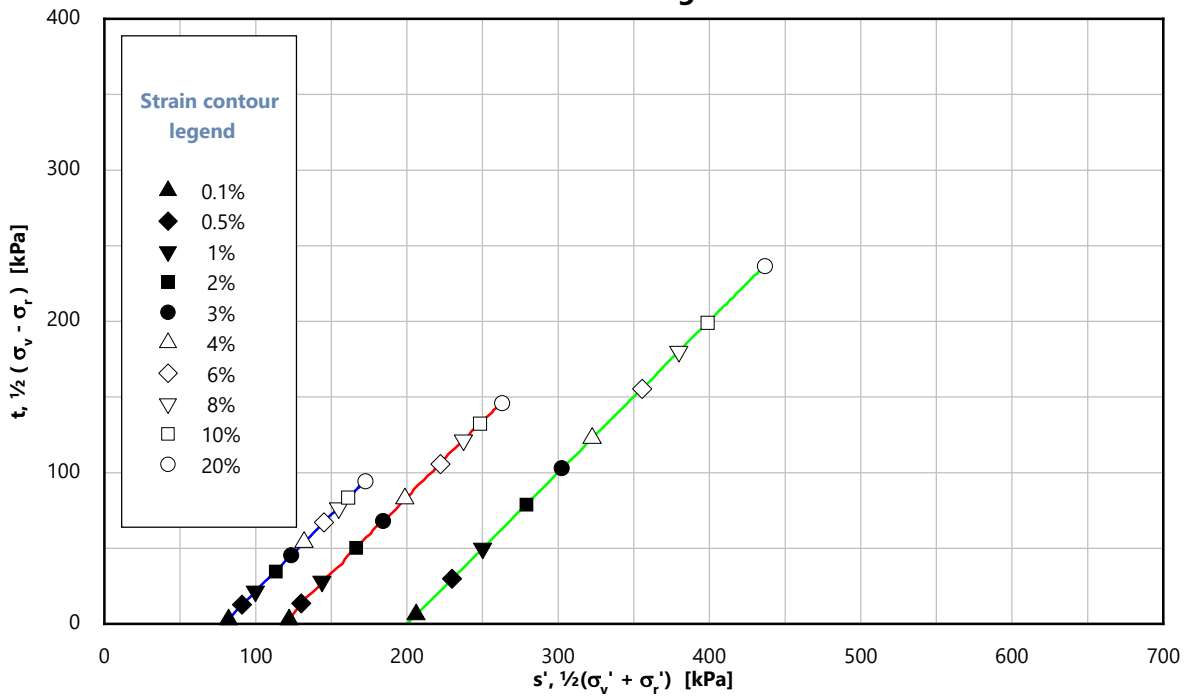
Consolidated Triaxial Compression Test On Water Saturated Soils

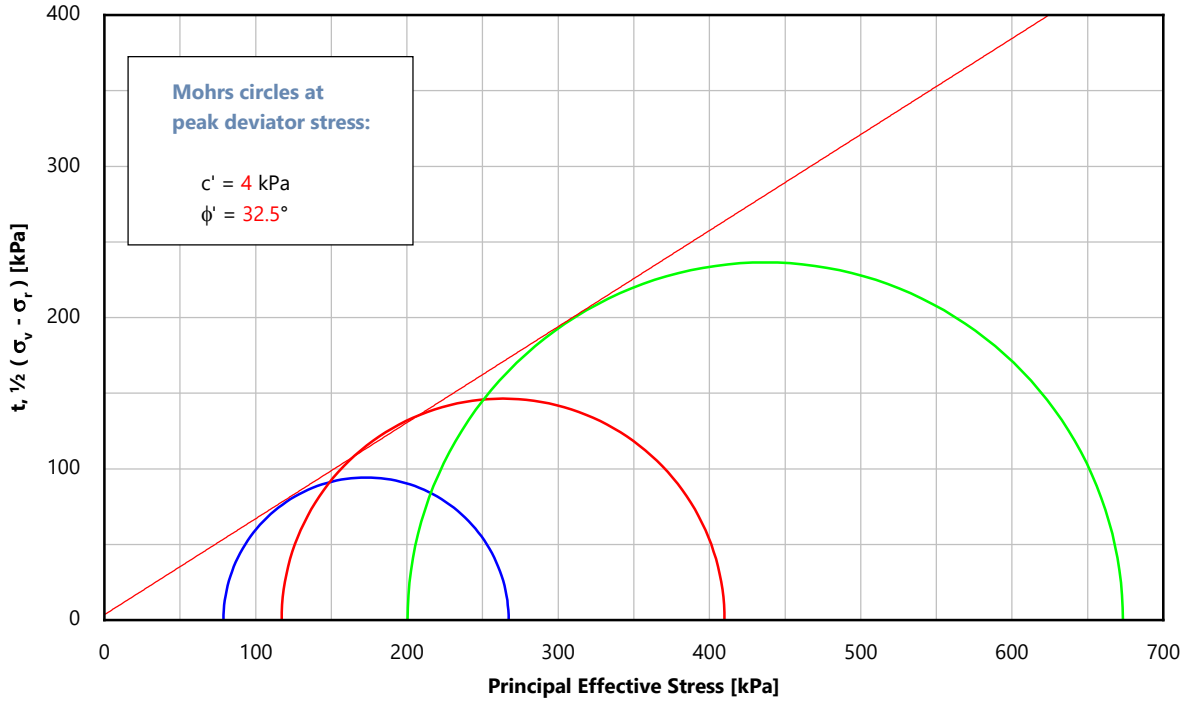
Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Shearing





Consolidation			
Stage 1 σ'_{rc} : 80 kPa	Stage 2 σ'_{rc} : 120 kPa	Stage 3 σ'_{rc} : 200 kPa	1
Stage 1 σ'_{vc} : 80 kPa	Stage 2 σ'_{vc} : 120 kPa	Stage 3 σ'_{vc} : 200 kPa	2
			3

Project: 503387 - F254727
CID21

Laboratory: Wallingford, UK
Z4_OWF_BH16-SAMP / 15-1 / 13

Approved by: ET 09/06/2025

FUGRO

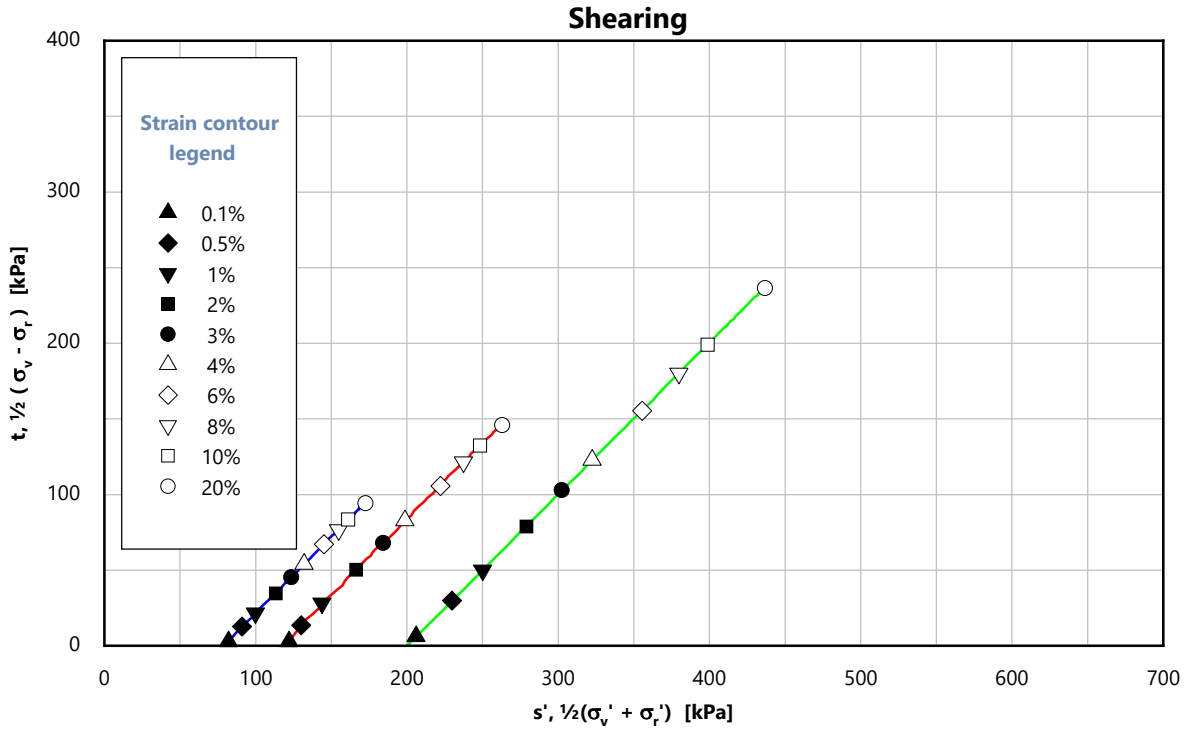
Test Report

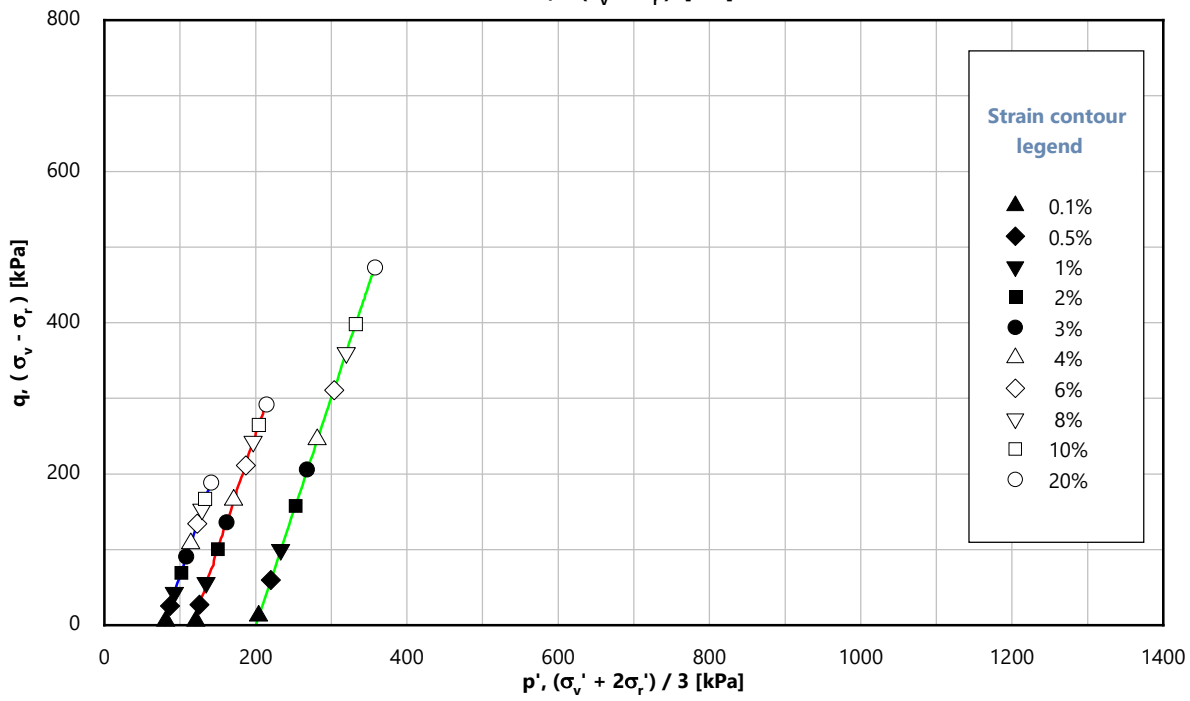
Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919





Consolidation			
Stage 1 σ'_{rc} : 80 kPa	Stage 2 σ'_{rc} : 120 kPa	Stage 3 σ'_{rc} : 200 kPa	1
Stage 1 σ'_{vc} : 80 kPa	Stage 2 σ'_{vc} : 120 kPa	Stage 3 σ'_{vc} : 200 kPa	2
			3

Project: 503387 - F254727
CID21

Laboratory: Wallingford, UK
Z4_OWF_BH16-SAMP / 15-1 / 13

Approved by: ET 09/06/2025

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

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Test Identification	Specimen 1	Specimen 2	Specimen 3
Location	Z4_OWF_BH16-SAMP	Z4_OWF_BH16-SAMP	Z4_OWF_BH16-SAMP
Sample	20-3	20-3	20-3
Depth [m]	18.20	18.20	18.20
Test number	CID22A	CID22B	CID22C

Specimen Visual Description
Dark grey fine SAND

Initial Specimen Conditions	Specimen 1	Specimen 2	Specimen 3
Test start date	28/04/2025	08/05/2025	28/04/2025
Type of sample	Recompacted	Recompacted	Recompacted
Diameter [mm]	50.5	50.5	50.5
Length [mm]	95.0	95.0	95.0
Water content [%]	10.1	9.8	10.1
Bulk density [Mg/m^3]	1.49	1.49	1.48
Dry density [Mg/m^3]	1.35	1.35	1.35
Void ratio [-]	0.963	0.958	0.966
Degree of saturation [%]	28	27	28
Type of drains fitted	One end	One end	One end

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

Saturation	Specimen 1	Specimen 2	Specimen 3
Pressure increments applied [kPa]	50	50	50
Differential pressure used [kPa]	10	10	10
Pore pressure on completion [kPa]	440	640	440
Cell pressure on completion [kPa]	450	650	450
B value achieved	0.96	0.96	0.92

Consolidation: Isotropic	Specimen 1	Specimen 2	Specimen 3
Cell pressure [kPa]	562	818	731
Back pressure [kPa]	450	650	450
Effective cell pressure [kPa]	112	168	281
Pore pressure on completion [kPa]	450	650	450
Pore pressure dissipation [%]	100	100	100
Water content [%]	35.4	34.1	34.2
Bulk density [Mg/m^3]	1.85	1.87	1.87
Dry density [Mg/m^3]	1.37	1.39	1.39
Void ratio [-]	0.937	0.904	0.907
Degree of saturation [%]	100	100	100
Axial strain [%]	0.45	0.91	1.00
Volumetric strain [%]	1.34	2.74	2.99
Volumetric strain rate-end of stage [%/hr]	0.00	0.00	0.01

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

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Shearing	Specimen 1	Specimen 2	Specimen 3
Initial pore pressure [kPa]	450	650	450
Initial effective cell pressure [kPa]	112	168	281
Rate of strain [%/hour]	1.30	1.30	1.30
At peak deviator stress			
Corrected deviator stress [kPa]	278	412	663
Membrane correction applied [kPa]	3.3	3.9	3.9
Drain correction applied [kPa]	0	0	0
Axial strain [%]	15.25	19.75	19.99
Volumetric strain [%]	2.38	3.23	5.08
Major principal effective stress [kPa]	388	577	943
Minor principal effective stress [kPa]	109	165	280
Principal effective stress ratio	3.55	3.50	3.37
ε_{50} [%]	1.79	1.38	2.04
Secant modulus (E_{50}) at ε_{50} [kPa]	7798	14947	16284
At peak principal effective stress ratio			
Corrected deviator stress [kPa]	278	412	663
Membrane correction applied [kPa]	3.3	3.9	3.9
Drain correction applied [kPa]	0	0	0
Axial strain [%]	15.25	19.75	19.74
Volumetric strain [%]	2.38	3.23	5.07
Major principal effective stress [kPa]	388	577	943
Minor principal effective stress [kPa]	109	165	280
Principal effective stress ratio	3.55	3.50	3.37
At 10% axial strain			
Corrected deviator stress [kPa]	262	389	592
Membrane correction applied [kPa]	2.4	2.4	2.4
Drain correction applied [kPa]	0	0	0
Axial strain [%]	10.00	10.00	10.00
Volumetric strain [%]	2.30	2.60	3.81
Major principal effective stress [kPa]	371	555	872
Minor principal effective stress [kPa]	109	165	280
Principal effective stress ratio	3.41	3.36	3.11

Project: 503387 - F254727
Test page CID22-3/8

Laboratory: Wallingford, UK
Z4_OWF_BH16-SAMP / 20-3 / 18.2

Approved by: ET - 25/06/2025

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Photographs		
Specimen 1	**Specimen 2**	**Specimen 3**
Photograph unavailable	Photograph unavailable	Photograph unavailable

Final Conditions	Specimen 1	Specimen 2	Specimen 3
Water content [%]	33.7	31.8	30.6
Bulk density [Mg/m^3]	1.87	1.90	1.91
Dry density [Mg/m^3]	1.40	1.44	1.46
Mode of failure	Barrel	Barrel	Barrel

Project: 503387 - F254727
Test page CID22-4/8

Laboratory: Wallingford, UK
Z4_OWF_BH16-SAMP / 20-3 / 18.2

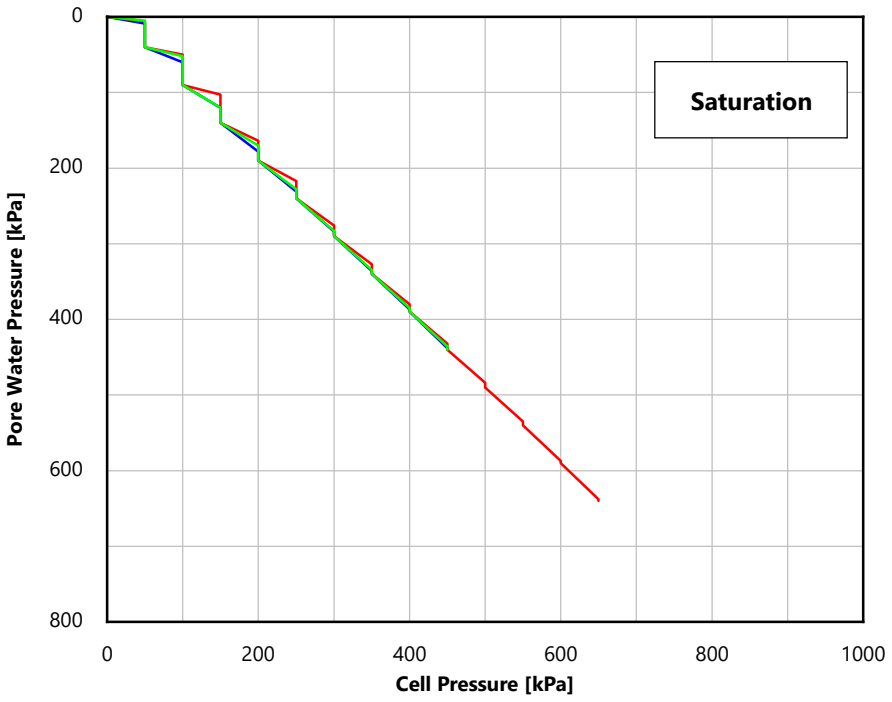
Approved by: ET - 25/06/2025

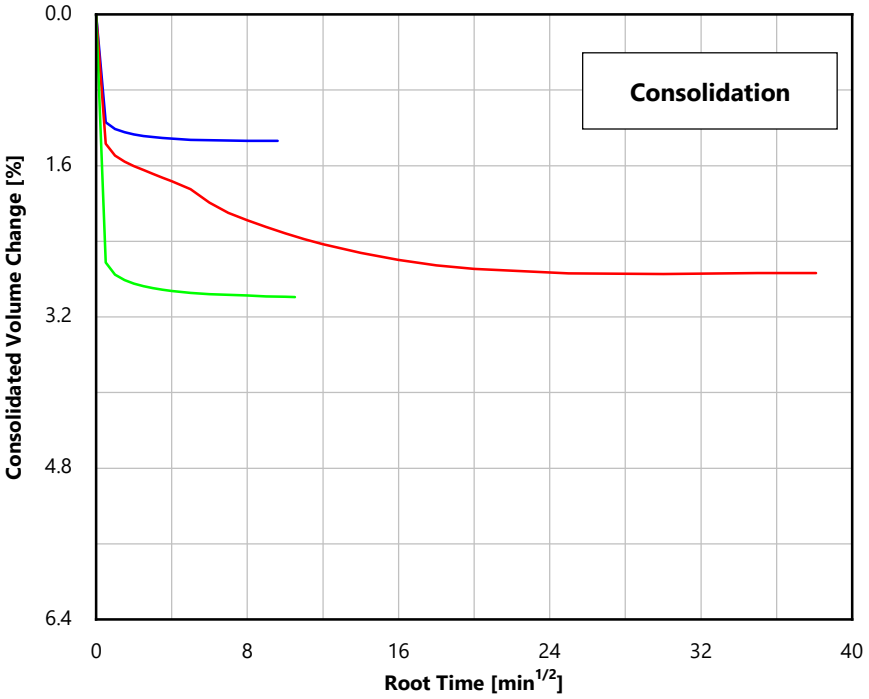
Test Report

Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018





Consolidation			
Stage 1 σ'_{rc} : 112 kPa	Stage 2 σ'_{rc} : 168 kPa	Stage 3 σ'_{rc} : 281 kPa	1
Stage 1 σ'_{vc} : 112 kPa	Stage 2 σ'_{vc} : 168 kPa	Stage 3 σ'_{vc} : 281 kPa	2 3

Project: 503387 - F254727
CID22

Laboratory: Wallingford, UK
Z4_OWF_BH16-SAMP / 20-3 / 18.2

Approved by: ET 25/06/2025

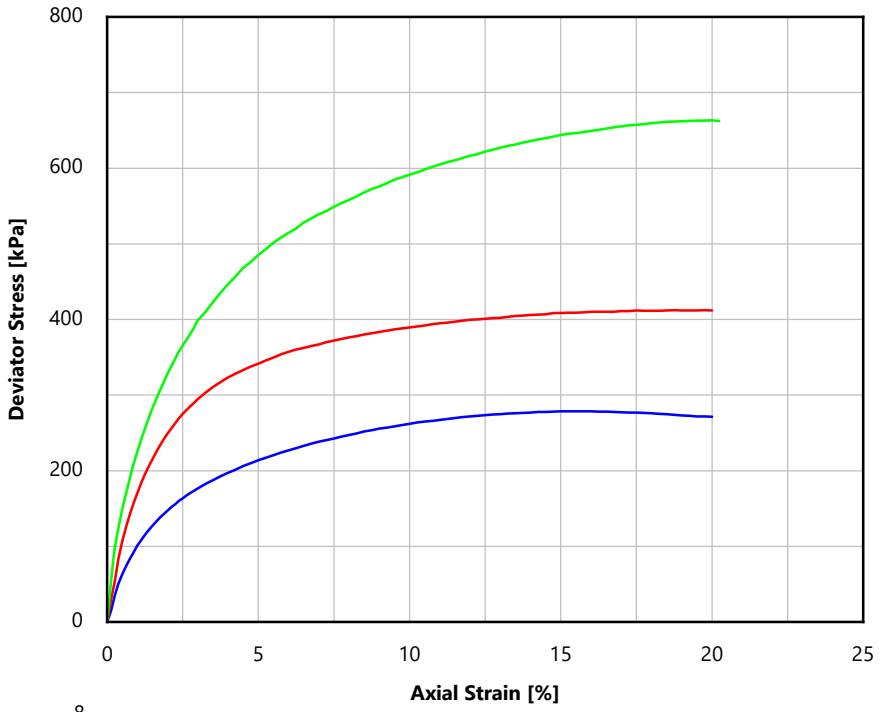
Test Report

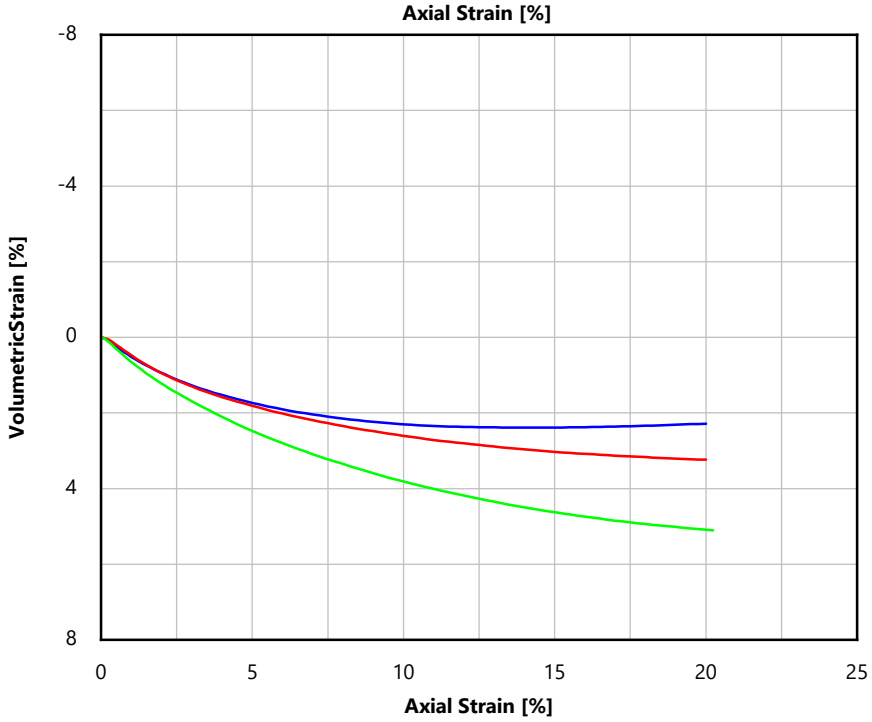
Consolidated Triaxial Compression Test On Water Saturated Soils
Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Shearing





Consolidation			
Stage 1 σ'_{rc} : 112 kPa	Stage 2 σ'_{rc} : 168 kPa	Stage 3 σ'_{rc} : 281 kPa	1
Stage 1 σ'_{vc} : 112 kPa	Stage 2 σ'_{vc} : 168 kPa	Stage 3 σ'_{vc} : 281 kPa	2
			3

Project: 503387 - F254727
CID22

Laboratory: Wallingford, UK
Z4_OWF_BH16-SAMP / 20-3 / 18.2

Approved by: ET 25/06/2025

Test Report

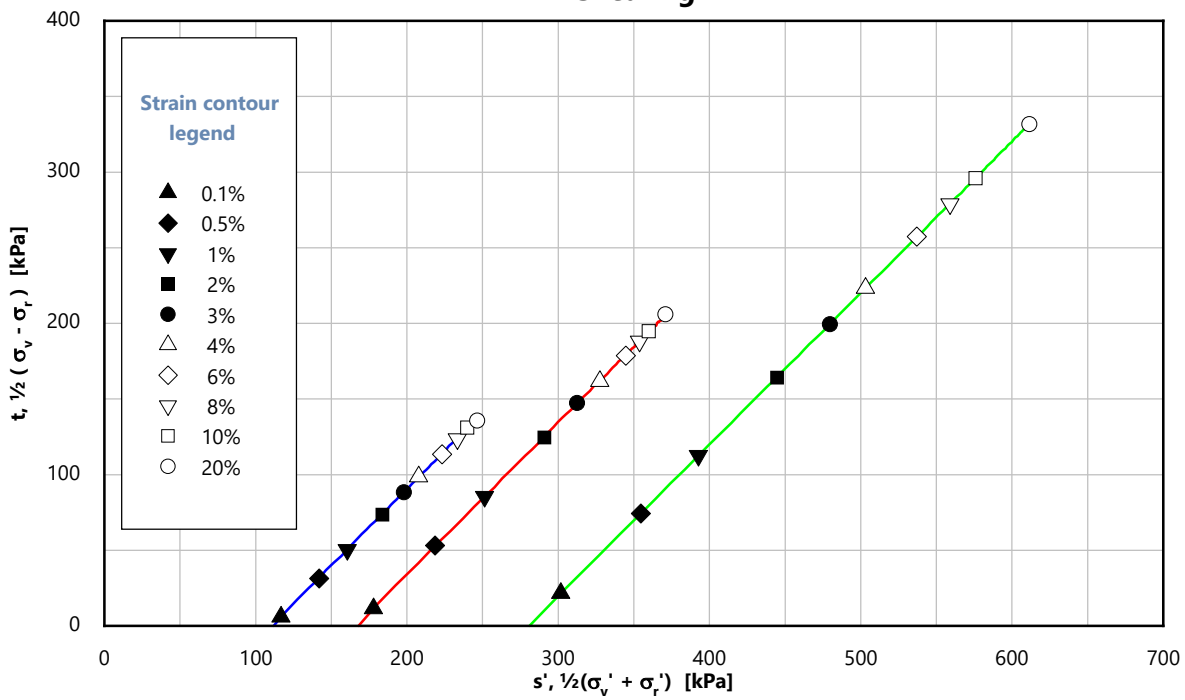
Consolidated Triaxial Compression Test On Water Saturated Soils

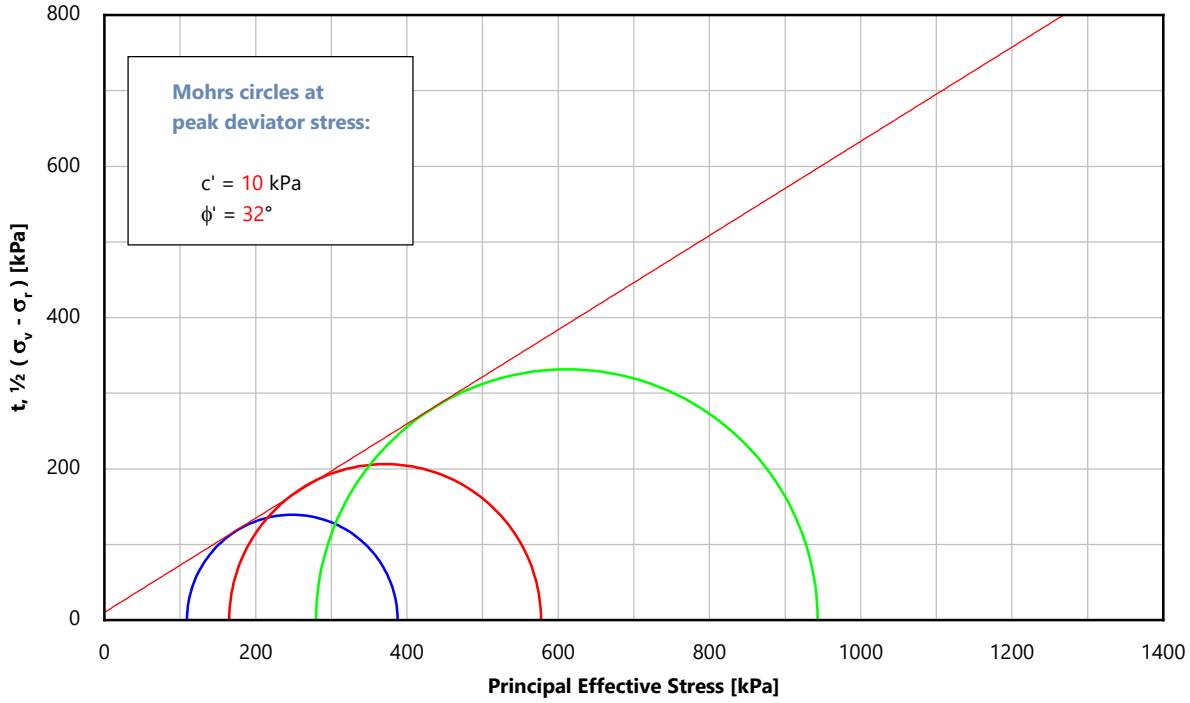
Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Shearing





Consolidation			
Stage 1 σ'_{rc} : 112 kPa	Stage 2 σ'_{rc} : 168 kPa	Stage 3 σ'_{rc} : 281 kPa	1
Stage 1 σ'_{vc} : 112 kPa	Stage 2 σ'_{vc} : 168 kPa	Stage 3 σ'_{vc} : 281 kPa	2
			3

Project: 503387 - F254727
CID22

Laboratory: Wallingford, UK
Z4_OWF_BH16-SAMP / 20-3 / 18.2

Approved by: ET 25/06/2025

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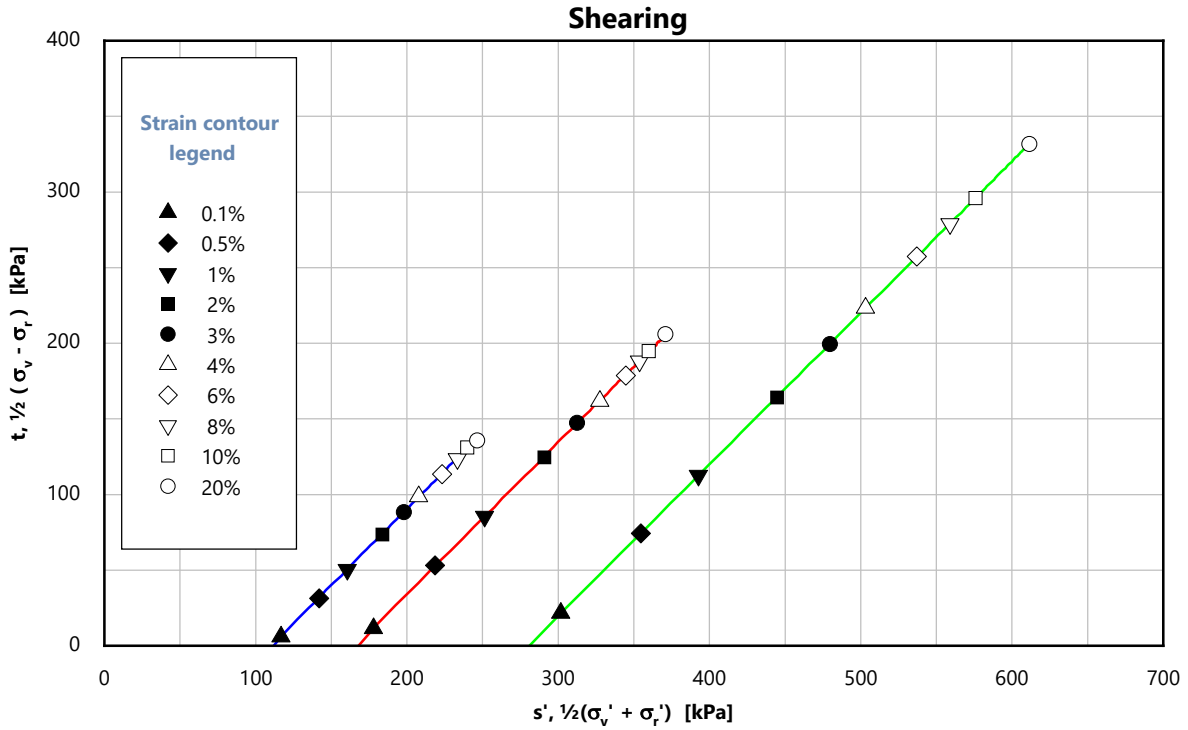
Test Report

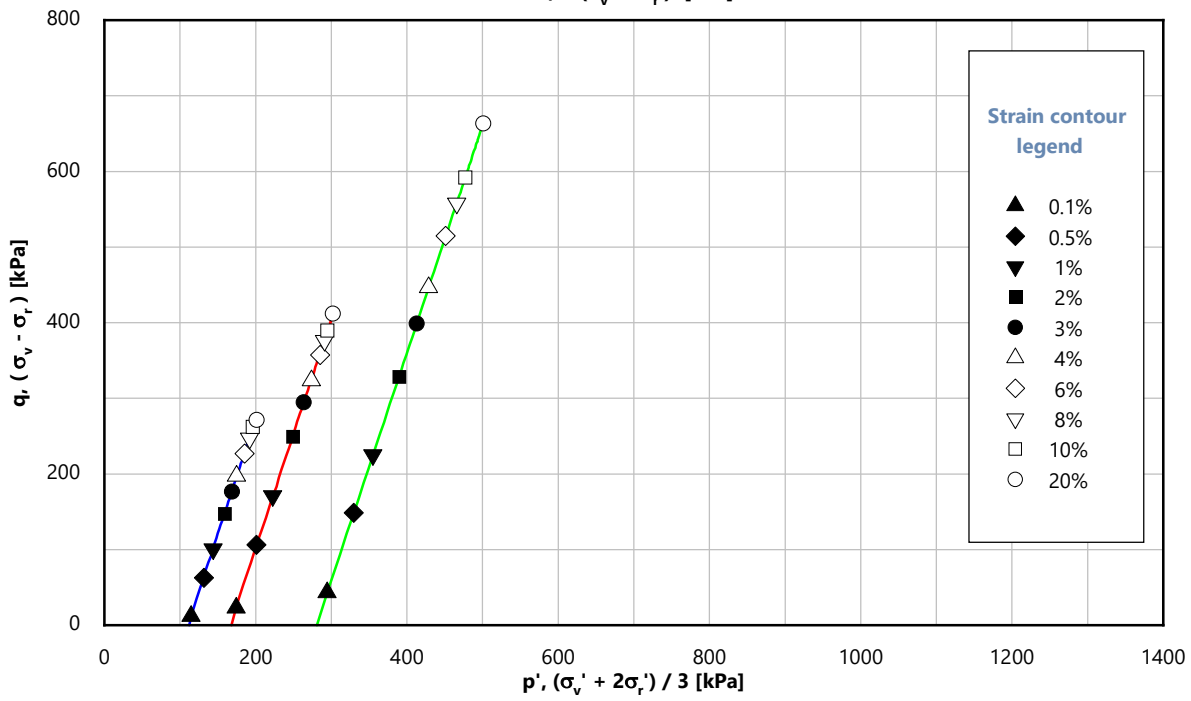
Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

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Consolidation			
Stage 1 σ'_{rc} : 112 kPa	Stage 2 σ'_{rc} : 168 kPa	Stage 3 σ'_{rc} : 281 kPa	1
Stage 1 σ'_{vc} : 112 kPa	Stage 2 σ'_{vc} : 168 kPa	Stage 3 σ'_{vc} : 281 kPa	2
			3

Project: 503387 - F254727
CID22

Laboratory: Wallingford, UK
Z4_OWF_BH16-SAMP / 20-3 / 18.2

Approved by: ET 25/06/2025

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

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Test Identification	Specimen 1	Specimen 2	Specimen 3
Location	Z4_OWF_BH17-SAM	Z4_OWF_BH17-SAM	Z4_OWF_BH17-SAM
Sample	05-2	05-2	05-2
Depth [m]	3.90	3.90	3.90
Test number	CID23a	CID23b	CID23c

Specimen Visual Description
Olive brown fine SAND

Initial Specimen Conditions	Specimen 1	Specimen 2	Specimen 3
Test start date	06/05/2025	23/06/2025	16/07/2025
Type of sample	Recompacted	Recompacted	Recompacted
Diameter [mm]	50.8	50.8	50.8
Length [mm]	95.0	95.0	95.0
Water content [%]	9.9	10.1	9.8
Bulk density [Mg/m^3]	1.96	1.94	1.94
Dry density [Mg/m^3]	1.78	1.77	1.77
Void ratio [-]	0.488	0.500	0.496
Degree of saturation [%]	54	54	52
Type of drains fitted	One end	One end	One end

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

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Saturation	Specimen 1	Specimen 2	Specimen 3
Pressure increments applied [kPa]	50	50	50
Differential pressure used [kPa]	10	10	10
Pore pressure on completion [kPa]	435	380	340
Cell pressure on completion [kPa]	440	390	350
B value achieved	0.90	1.00	0.90

Consolidation: Isotropic	Specimen 1	Specimen 2	Specimen 3
Cell pressure [kPa]	463	424	407
Back pressure [kPa]	440	390	350
Effective cell pressure [kPa]	23	34	57
Pore pressure on completion [kPa]	440	390	350
Pore pressure dissipation [%]	100	100	100
Water content [%]	18.3	18.7	18.6
Bulk density [Mg/m^3]	2.11	2.10	2.11
Dry density [Mg/m^3]	1.79	1.77	1.78
Void ratio [-]	0.484	0.496	0.492
Degree of saturation [%]	100	100	100
Axial strain [%]	0.09	0.10	0.09
Volumetric strain [%]	0.26	0.30	0.28
Volumetric strain rate-end of stage [%/hr]	0.00	0.08	0.00

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

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Shearing	Specimen 1	Specimen 2	Specimen 3
Initial pore pressure [kPa]	440	390	350
Initial effective cell pressure [kPa]	23	34	57
Rate of strain [%/hour]	1.30	1.30	1.30
At peak deviator stress			
Corrected deviator stress [kPa]	252	261	333
Membrane correction applied [kPa]	0.6	0.6	0.5
Drain correction applied [kPa]	0	0	0
Axial strain [%]	2.25	2.25	1.75
Volumetric strain [%]	-1.65	-1.36	-1.35
Major principal effective stress [kPa]	277	298	394
Minor principal effective stress [kPa]	25	37	61
Principal effective stress ratio	11.16	7.98	6.44
ε_{50} [%]	1.00	0.85	0.33
Secant modulus (E_{50}) at ε_{50} [kPa]	12626	15315	50730
At peak principal effective stress ratio			
Corrected deviator stress [kPa]	252	260	332
Membrane correction applied [kPa]	0.6	0.6	0.4
Drain correction applied [kPa]	0	0	0
Axial strain [%]	2.25	2.13	1.50
Volumetric strain [%]	-1.65	-1.19	-1.02
Major principal effective stress [kPa]	277	297	393
Minor principal effective stress [kPa]	25	37	61
Principal effective stress ratio	11.16	8.00	6.45
At 10% axial strain			
Corrected deviator stress [kPa]	98	128	178
Membrane correction applied [kPa]	2.3	2.3	2.3
Drain correction applied [kPa]	0	0	0
Axial strain [%]	10.00	10.00	10.00
Volumetric strain [%]	-3.96	-3.38	-2.90
Major principal effective stress [kPa]	123	166	239
Minor principal effective stress [kPa]	25	38	62
Principal effective stress ratio	4.93	4.36	3.88

Project: 503387 - F254727
Test page CID23-3/8

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP / 05-2 / 3.9

Approved by: ET - 14/08/2025

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

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Photographs		
Specimen 1	**Specimen 2**	**Specimen 3**
Photograph unavailable	Photograph unavailable	Photograph unavailable

Final Conditions	Specimen 1	Specimen 2	Specimen 3
Water content [%]	21.2	20.9	20.6
Bulk density [Mg/m^3]	2.06	2.06	2.07
Dry density [Mg/m^3]	1.70	1.70	1.71
Mode of failure	Compound failure	Compound failure	Compound failure

Project: 503387 - F254727
Test page CID23-4/8

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP / 05-2 / 3.9

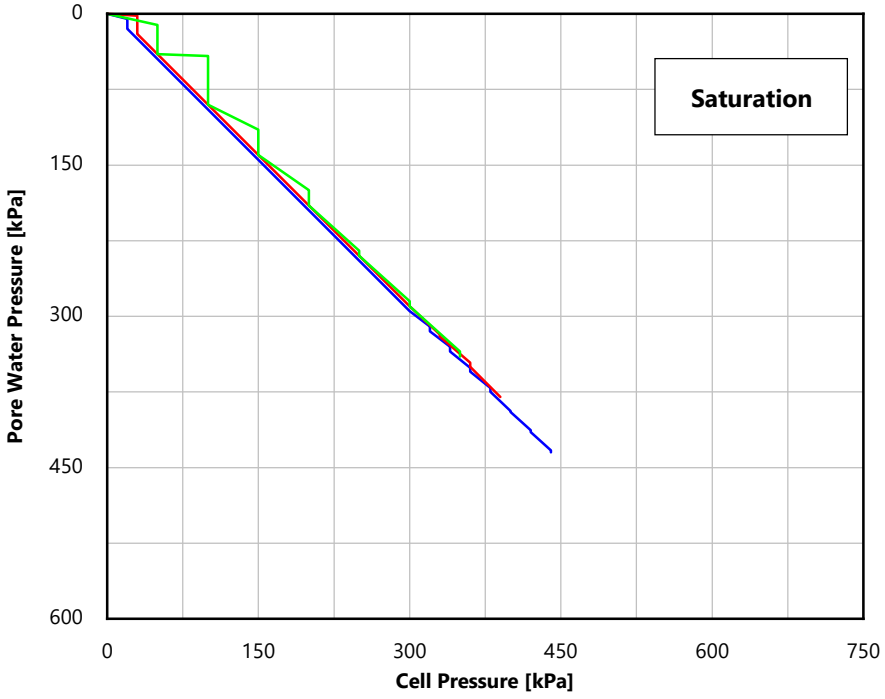
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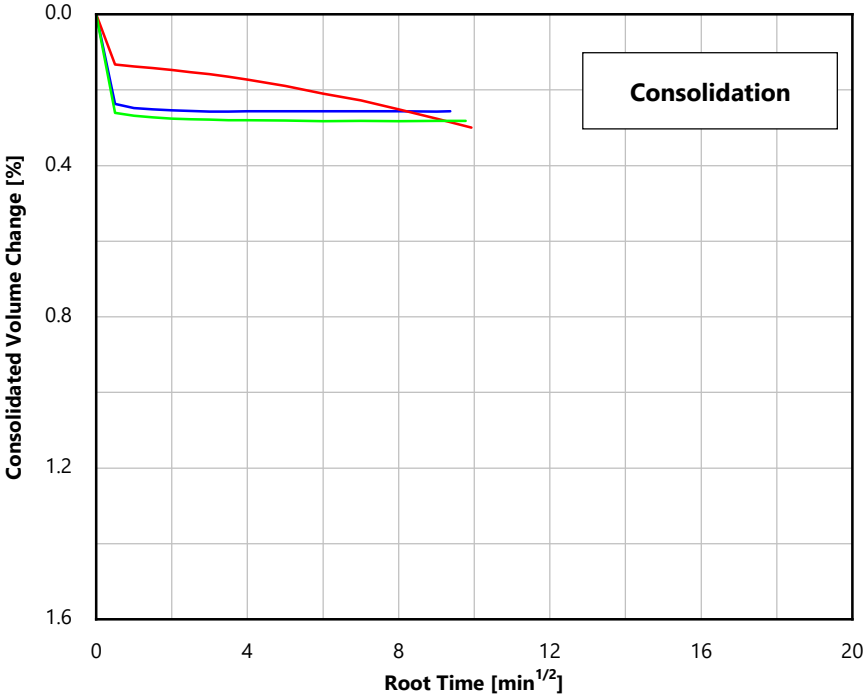
Test Report

Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

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Consolidation			
Stage 1 σ'_{rc} : 23 kPa	Stage 2 σ'_{rc} : 34 kPa	Stage 3 σ'_{rc} : 57 kPa	1
Stage 1 σ'_{vc} : 23 kPa	Stage 2 σ'_{vc} : 34 kPa	Stage 3 σ'_{vc} : 57 kPa	2
			3

Project: 503387 - F254727
CID23

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP / 05-2 / 3.9

Approved by: ET 14/08/2025

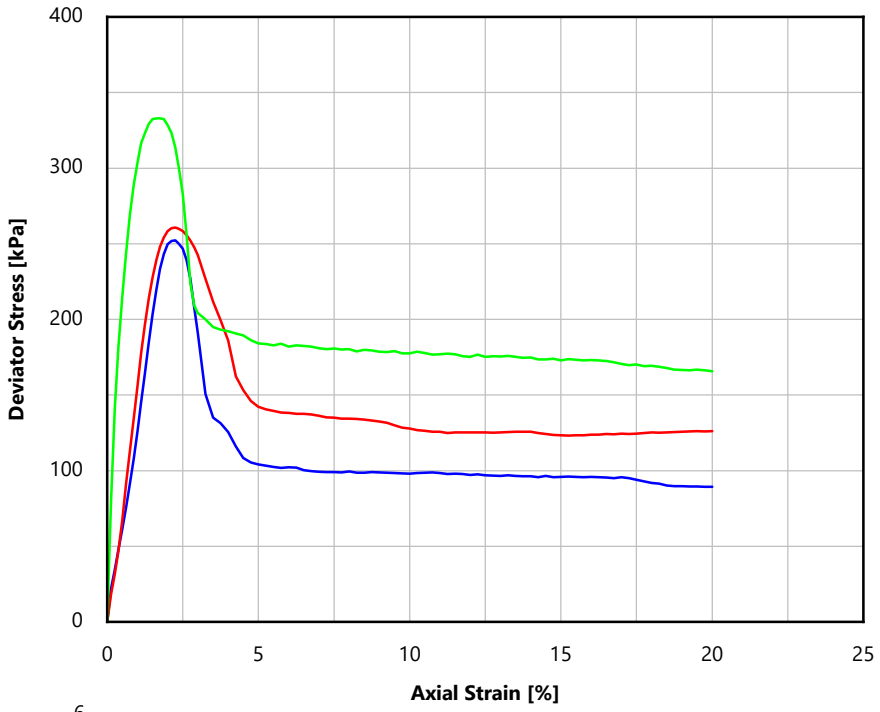
Test Report

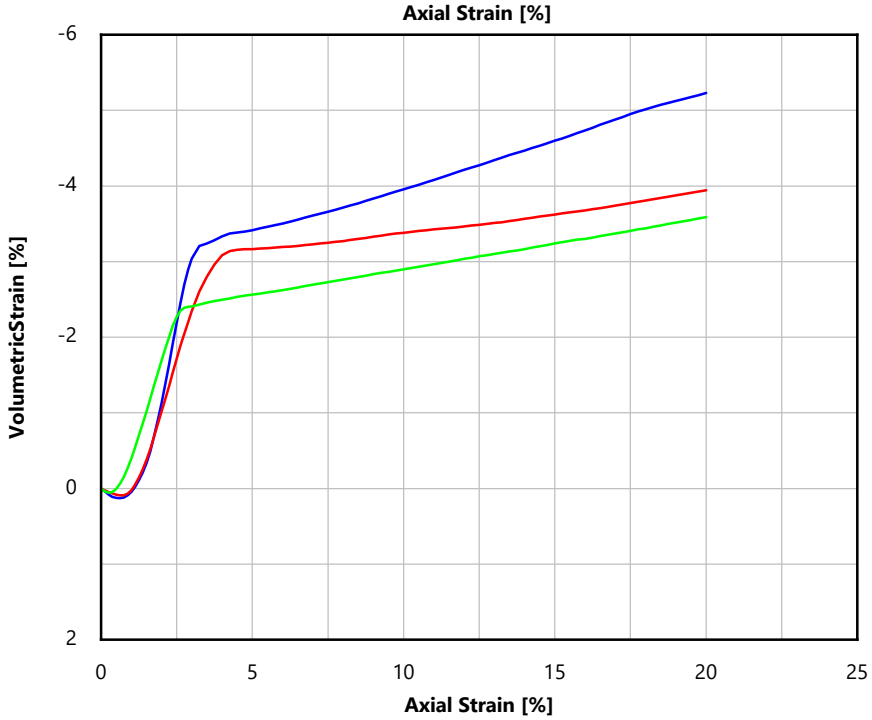
Consolidated Triaxial Compression Test On Water Saturated Soils
Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Shearing





Consolidation			
Stage 1 σ'_{rc} : 23 kPa	Stage 2 σ'_{rc} : 34 kPa	Stage 3 σ'_{rc} : 57 kPa	1
Stage 1 σ'_{vc} : 23 kPa	Stage 2 σ'_{vc} : 34 kPa	Stage 3 σ'_{vc} : 57 kPa	2
			3

Project: 503387 - F254727
CID23

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP / 05-2 / 3.9

Approved by: ET 14/08/2025

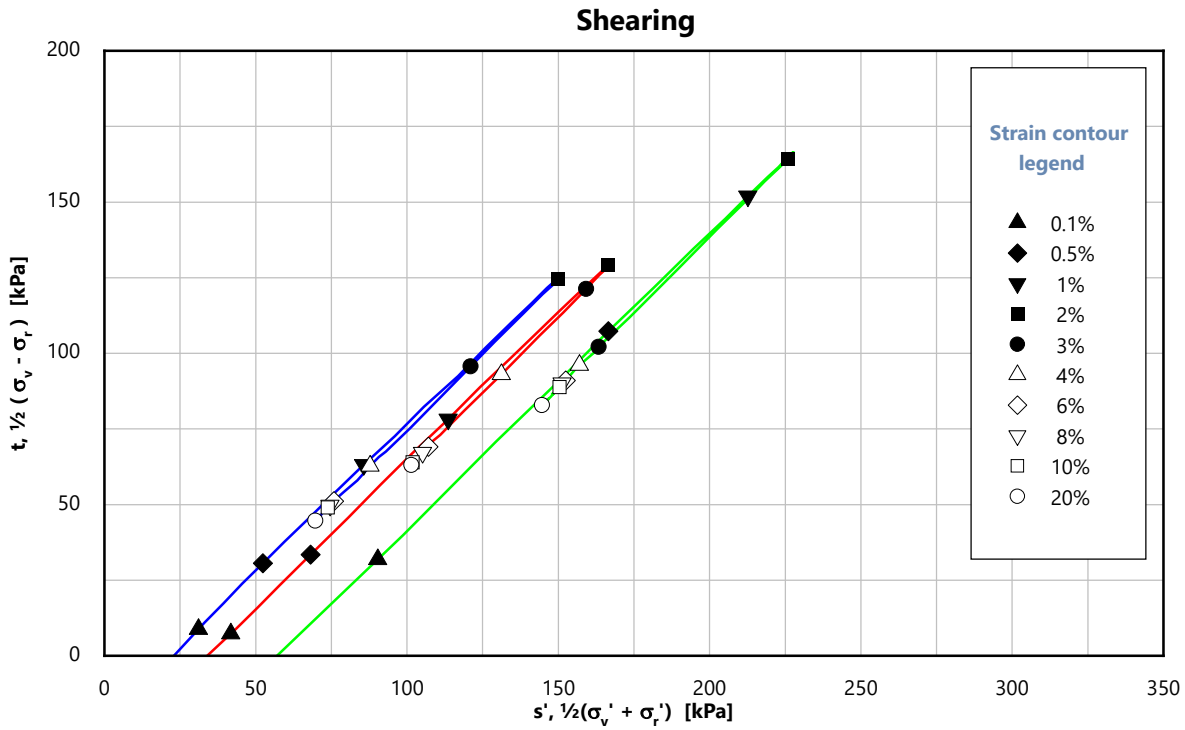
Test Report

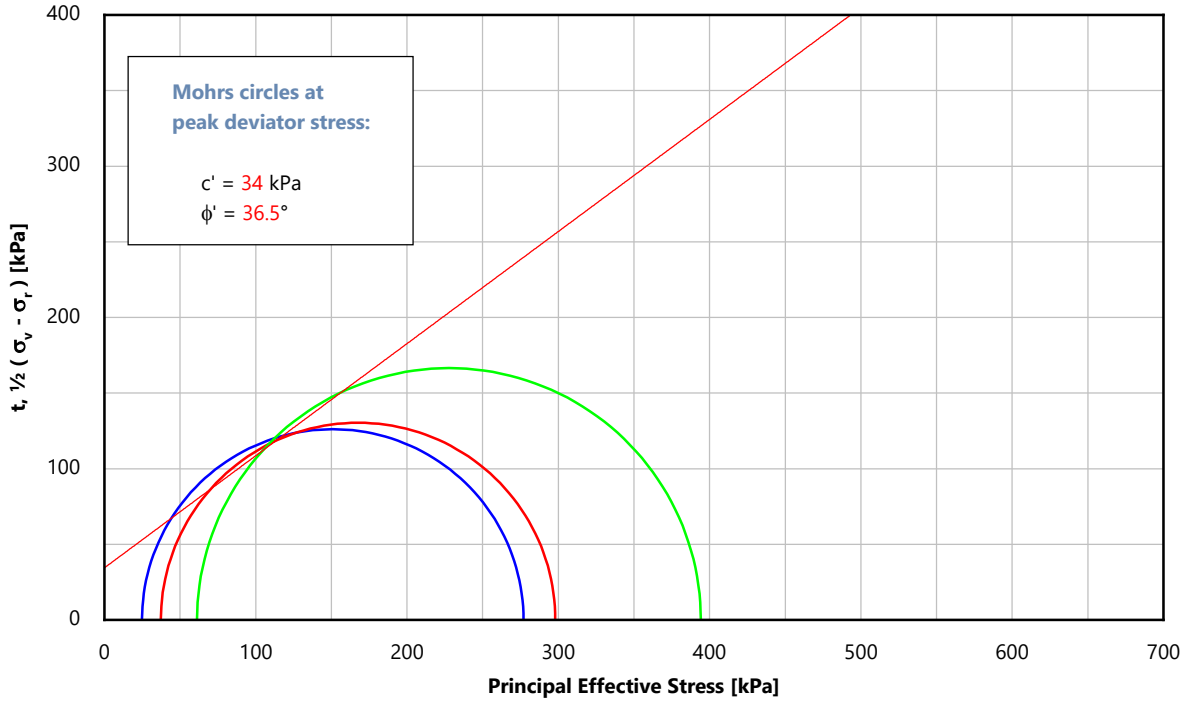
Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

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Consolidation			
Stage 1 σ'_{rc} : 23 kPa	Stage 2 σ'_{rc} : 34 kPa	Stage 3 σ'_{rc} : 57 kPa	1
Stage 1 σ'_{vc} : 23 kPa	Stage 2 σ'_{vc} : 34 kPa	Stage 3 σ'_{vc} : 57 kPa	2
			3

Project: 503387 - F254727
CID23

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP / 05-2 / 3.9

Approved by: ET 14/08/2025

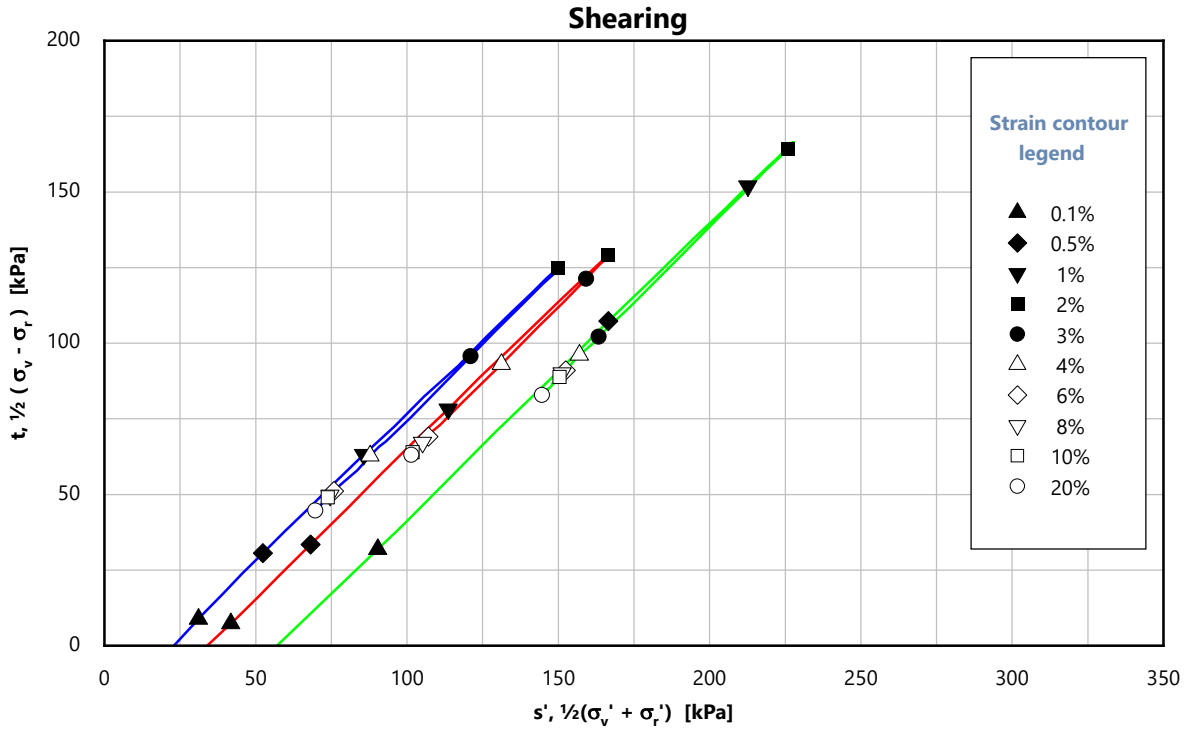
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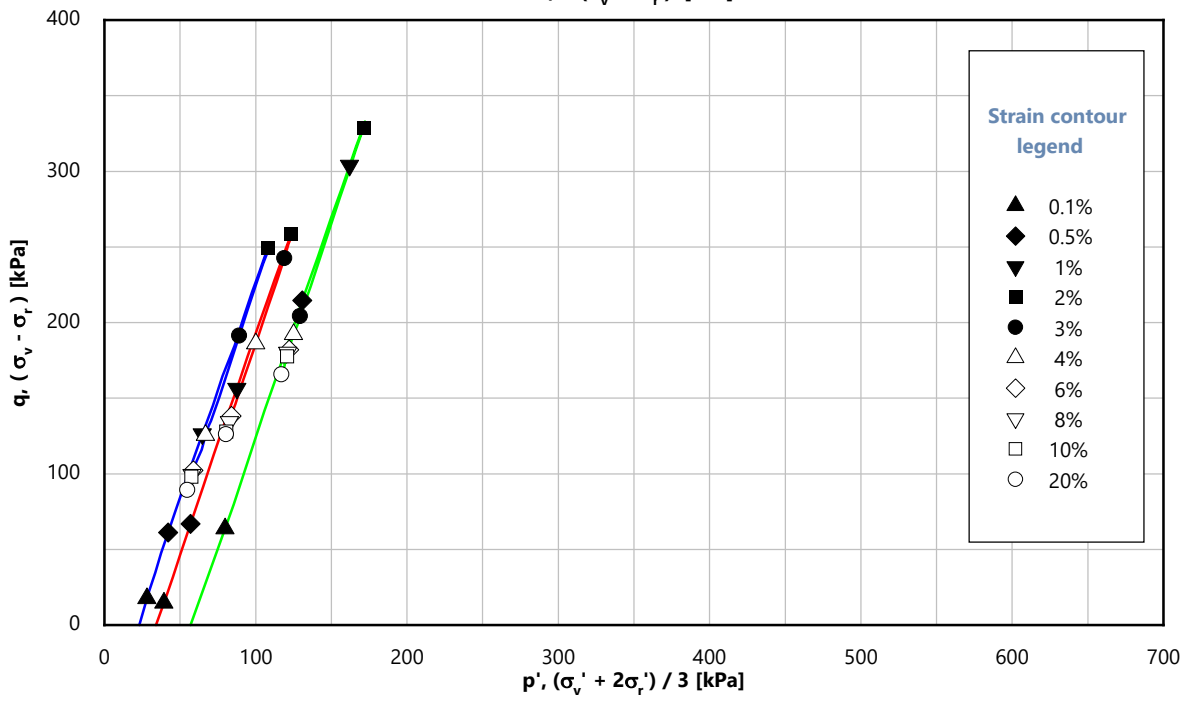
Test Report

Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018





Consolidation			
Stage 1 σ'_{rc} : 23 kPa	Stage 2 σ'_{rc} : 34 kPa	Stage 3 σ'_{rc} : 57 kPa	1
Stage 1 σ'_{vc} : 23 kPa	Stage 2 σ'_{vc} : 34 kPa	Stage 3 σ'_{vc} : 57 kPa	2 3

Project: 503387 - F254727
CID23

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP / 05-2 / 3.9

Approved by: ET 14/08/2025

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Test Identification	Specimen 1	Specimen 2	Specimen 3
Location	Z4_OWF_BH17-SAMP	Z4_OWF_BH17-SAMP	Z4_OWF_BH17-SAMP
Sample	13-2	13-2	13-2
Depth [m]	11.90	11.90	11.90
Test number	CID24a	CID24b	CID24c

Specimen Visual Description
Greyish brown fine SAND

Initial Specimen Conditions	Specimen 1	Specimen 2	Specimen 3
Test start date	08/05/2025	01/05/2025	01/05/2025
Type of sample	Recompacted	Recompacted	Recompacted
Diameter [mm]	50.5	50.5	50.5
Length [mm]	95.0	95.0	95.0
Water content [%]	10.1	10.4	10.4
Bulk density [Mg/m^3]	1.41	1.41	1.41
Dry density [Mg/m^3]	1.28	1.28	1.28
Void ratio [-]	1.066	1.072	1.072
Degree of saturation [%]	25	26	26
Type of drains fitted	One end	One end	One end

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

Saturation	Specimen 1	Specimen 2	Specimen 3
Pressure increments applied [kPa]	50	50	50
Differential pressure used [kPa]	10	10	10
Pore pressure on completion [kPa]	290	540	290
Cell pressure on completion [kPa]	300	550	300
B value achieved	0.96	0.90	0.98

Consolidation: Isotropic	Specimen 1	Specimen 2	Specimen 3
Cell pressure [kPa]	370	655	475
Back pressure [kPa]	300	550	300
Effective cell pressure [kPa]	70	105	175
Pore pressure on completion [kPa]	300	550	300
Pore pressure dissipation [%]	100	100	100
Water content [%]	38.7	38.3	37.6
Bulk density [Mg/m^3]	1.81	1.82	1.83
Dry density [Mg/m^3]	1.31	1.31	1.33
Void ratio [-]	1.026	1.016	0.996
Degree of saturation [%]	100	100	100
Axial strain [%]	0.63	0.90	1.22
Volumetric strain [%]	1.90	2.70	3.66
Volumetric strain rate-end of stage [%/hr]	0.02	0.05	0.02

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Shearing	Specimen 1	Specimen 2	Specimen 3
Initial pore pressure [kPa]	300	550	300
Initial effective cell pressure [kPa]	70	105	175
Rate of strain [%/hour]	1.30	1.30	1.30
At peak deviator stress			
Corrected deviator stress [kPa]	136	226	395
Membrane correction applied [kPa]	3.5	3.8	3.9
Drain correction applied [kPa]	0	0	0
Axial strain [%]	17.25	19.48	20.09
Volumetric strain [%]	3.90	4.58	5.03
Major principal effective stress [kPa]	205	329	567
Minor principal effective stress [kPa]	70	103	172
Principal effective stress ratio	2.95	3.20	3.29
ε_{50} [%]	3.19	3.29	3.43
Secant modulus (E_{50}) at ε_{50} [kPa]	2131	3444	5754
At peak principal effective stress ratio			
Corrected deviator stress [kPa]	136	226	395
Membrane correction applied [kPa]	3.4	3.8	3.9
Drain correction applied [kPa]	0	0	0
Axial strain [%]	16.50	19.73	20.09
Volumetric strain [%]	3.88	4.59	5.03
Major principal effective stress [kPa]	205	329	567
Minor principal effective stress [kPa]	69	103	172
Principal effective stress ratio	2.96	3.20	3.29
At 10% axial strain			
Corrected deviator stress [kPa]	120	191	327
Membrane correction applied [kPa]	2.4	2.4	2.4
Drain correction applied [kPa]	0	0	0
Axial strain [%]	10.00	10.00	10.00
Volumetric strain [%]	3.44	3.76	3.99
Major principal effective stress [kPa]	188	295	500
Minor principal effective stress [kPa]	68	104	173
Principal effective stress ratio	2.75	2.84	2.89

Project: 503387 - F254727
Test page CID24-3/8

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP / 13-2 / 11.9

Approved by: ET - 09/06/2025

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Photographs		
Specimen 1	**Specimen 2**	**Specimen 3**
Photograph Unavailable	Photograph Unavailable	Photograph Unavailable

Final Conditions	Specimen 1	Specimen 2	Specimen 3
Water content [%]	38.7	38.3	33.8
Bulk density [Mg/m^3]	1.81	1.82	1.87
Dry density [Mg/m^3]	1.31	1.31	1.40
Mode of failure	Barrel	Barrel	Barrel

Project: 503387 - F254727
Test page CID24-4/8

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP / 13-2 / 11.9

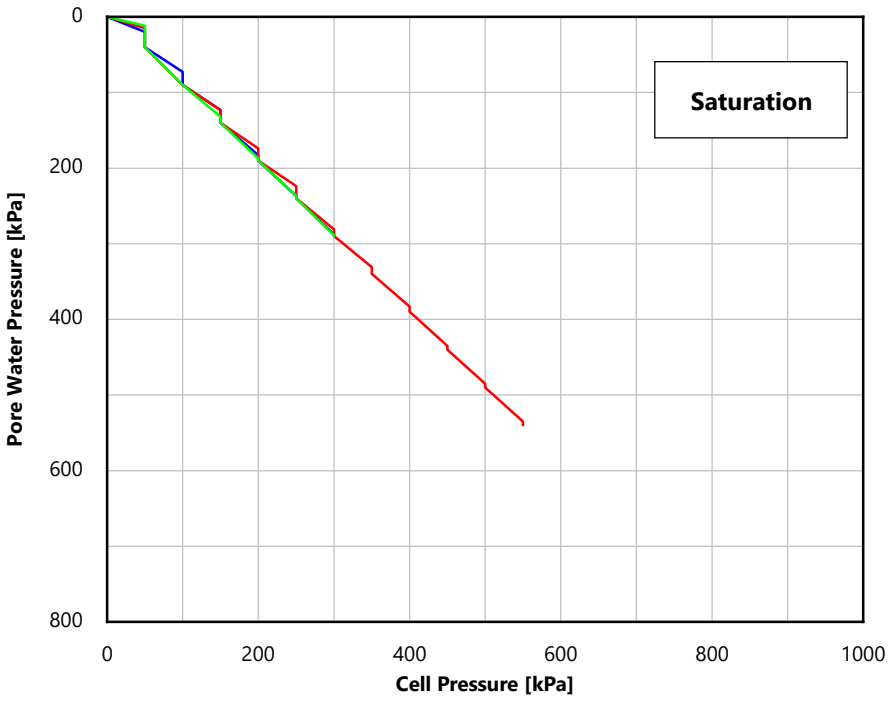
Approved by: ET - 09/06/2025

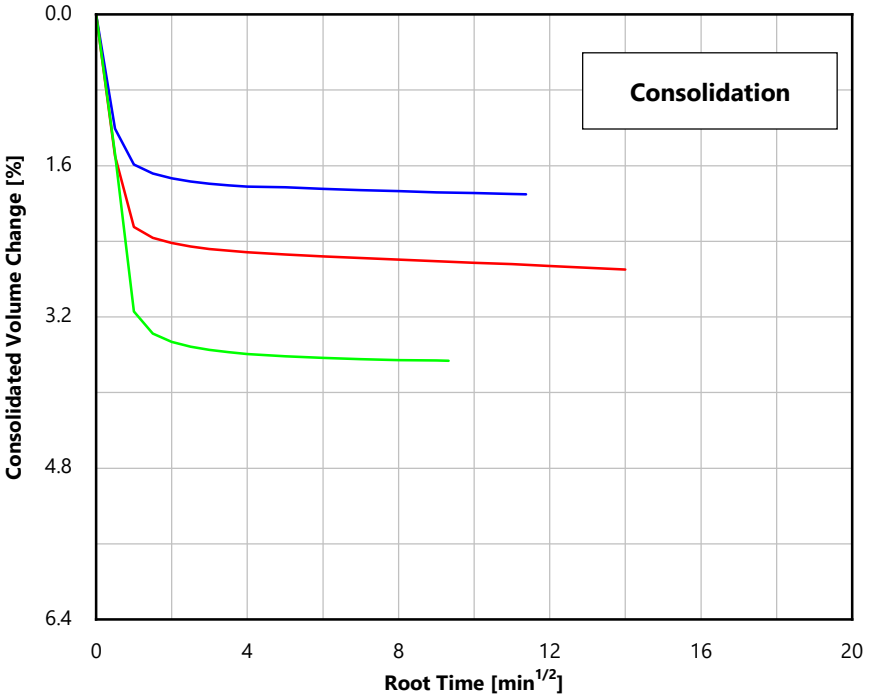
Test Report

Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018





Consolidation			
Stage 1 σ'_{rc} : 70 kPa	Stage 2 σ'_{rc} : 105 kPa	Stage 3 σ'_{rc} : 175 kPa	1
Stage 1 σ'_{vc} : 70 kPa	Stage 2 σ'_{vc} : 105 kPa	Stage 3 σ'_{vc} : 175 kPa	2
			3

Project: 503387 - F254727
CID24

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP / 13-2 / 11.9

Approved by: ET 09/06/2025

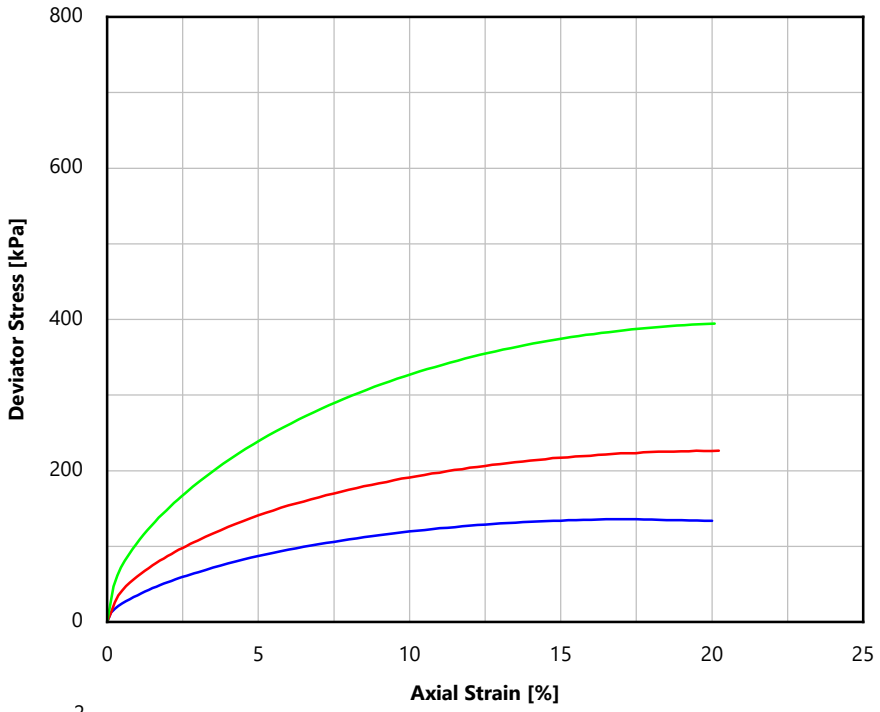
Test Report

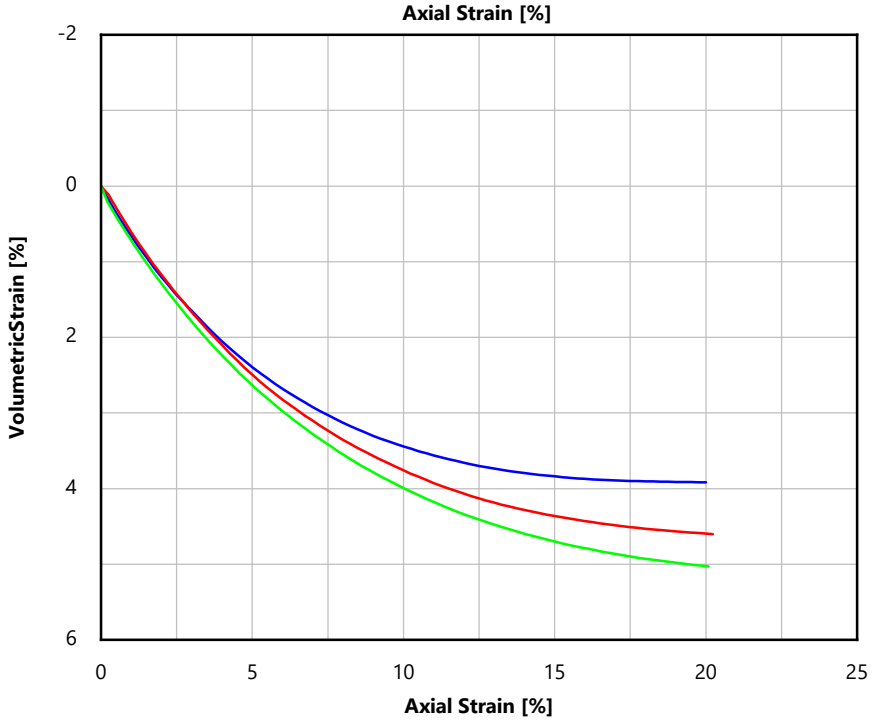
Consolidated Triaxial Compression Test On Water Saturated Soils
Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Shearing





Consolidation			
Stage 1 σ'_{rc} : 70 kPa	Stage 2 σ'_{rc} : 105 kPa	Stage 3 σ'_{rc} : 175 kPa	1
Stage 1 σ'_{vc} : 70 kPa	Stage 2 σ'_{vc} : 105 kPa	Stage 3 σ'_{vc} : 175 kPa	2
			3

Project: 503387 - F254727
CID24

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP / 13-2 / 11.9

Approved by: ET 09/06/2025

Test Report

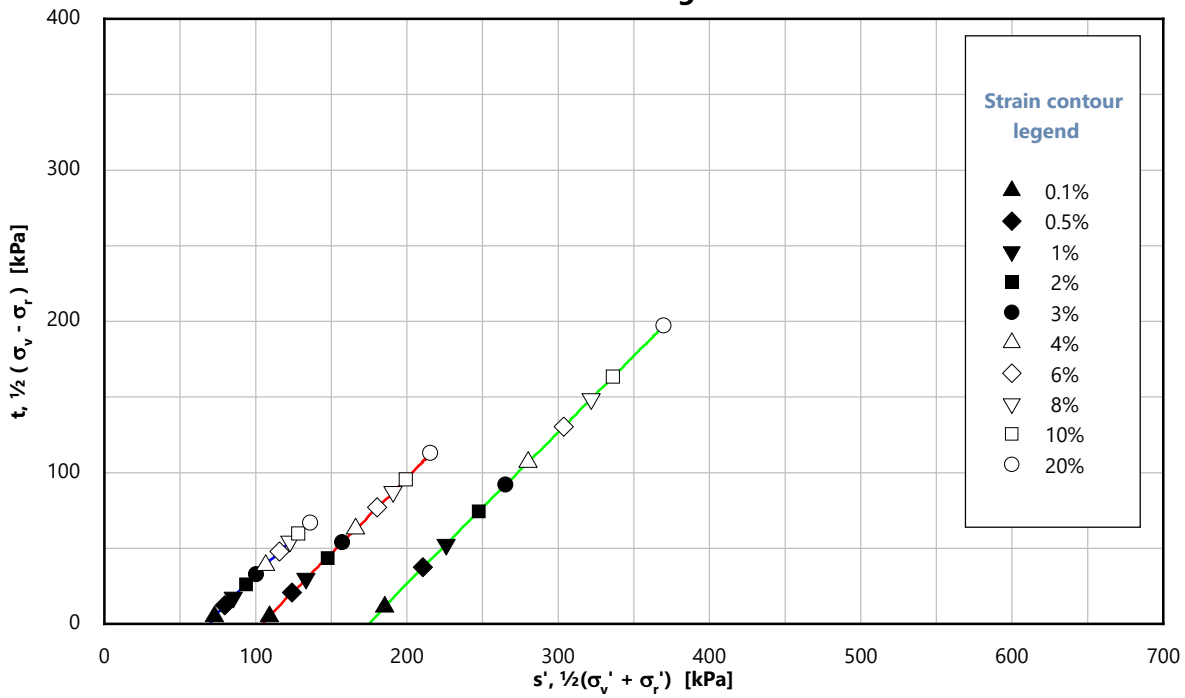
Consolidated Triaxial Compression Test On Water Saturated Soils

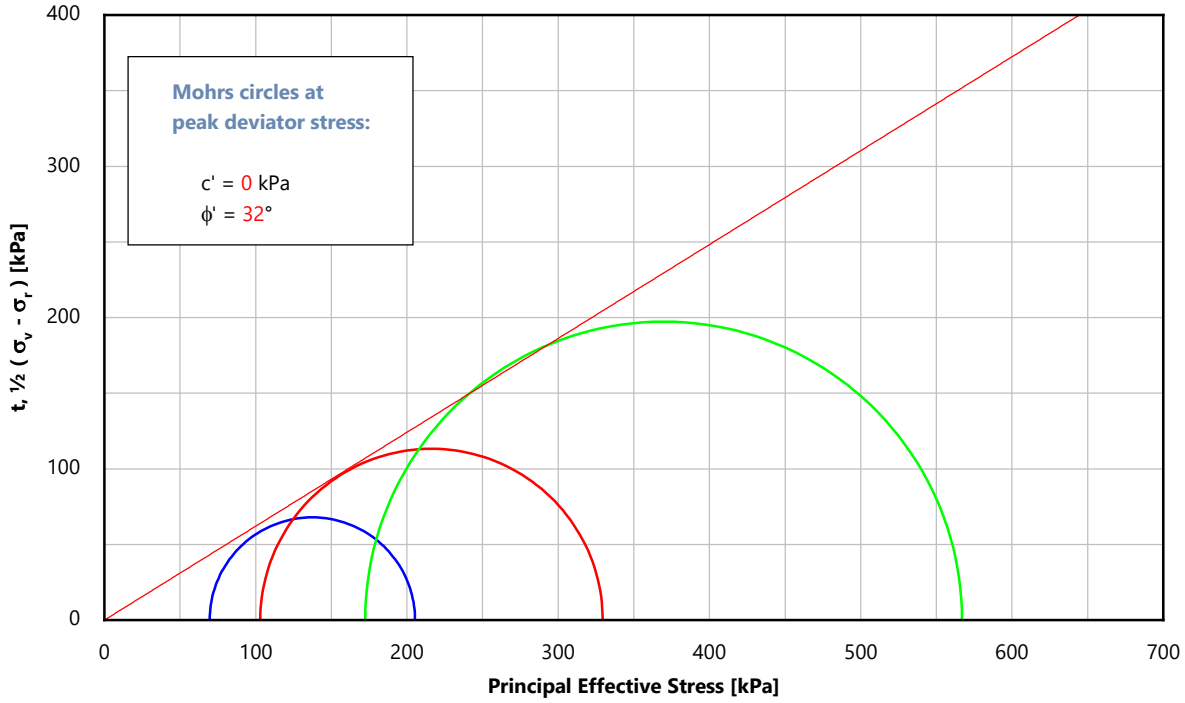
Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Shearing





Consolidation			
Stage 1 σ'_{rc} : 70 kPa	Stage 2 σ'_{rc} : 105 kPa	Stage 3 σ'_{rc} : 175 kPa	1
Stage 1 σ'_{vc} : 70 kPa	Stage 2 σ'_{vc} : 105 kPa	Stage 3 σ'_{vc} : 175 kPa	2
			3

Project: 503387 - F254727
CID24

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP / 13-2 / 11.9

Approved by: ET 09/06/2025

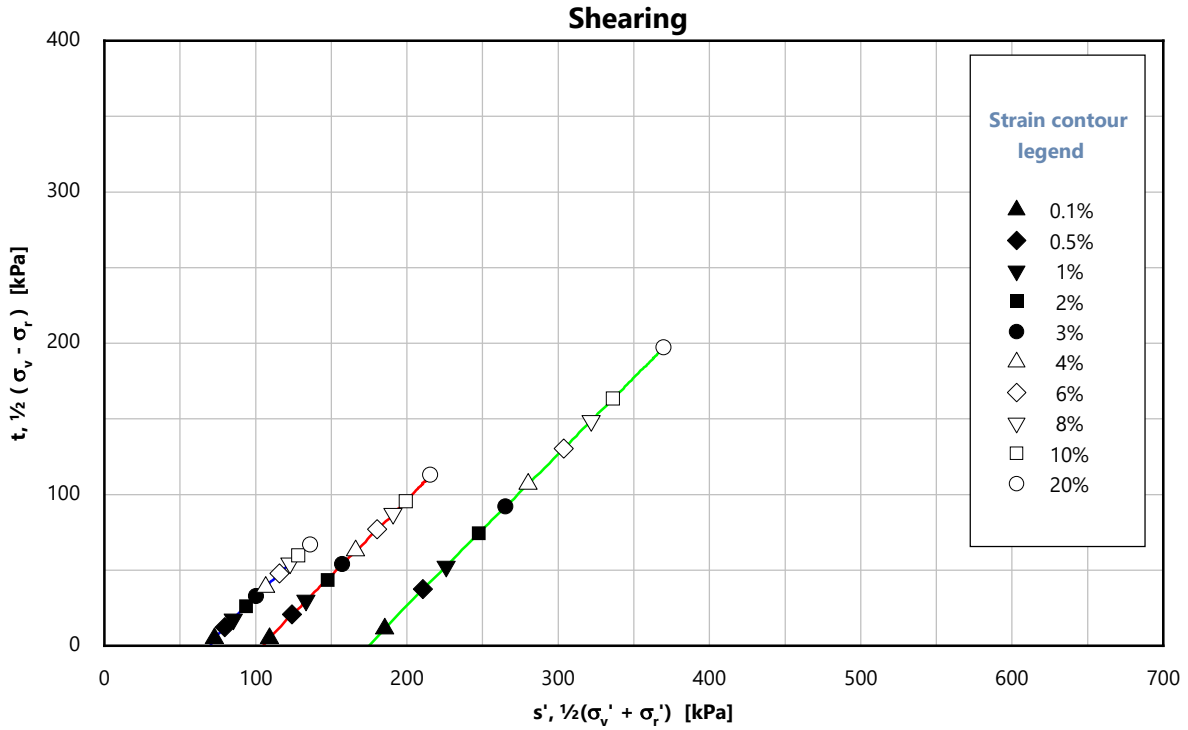
Test Report

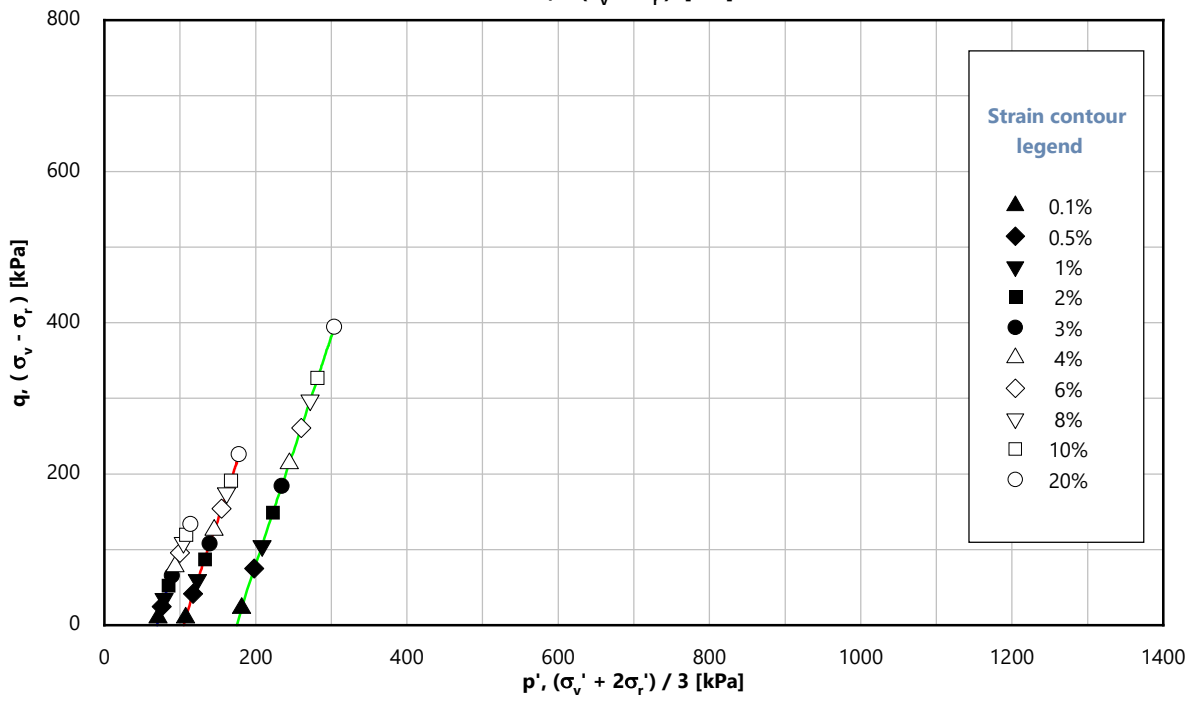
Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919





Consolidation			
Stage 1 σ'_{rc} : 70 kPa	Stage 2 σ'_{rc} : 105 kPa	Stage 3 σ'_{rc} : 175 kPa	1
Stage 1 σ'_{vc} : 70 kPa	Stage 2 σ'_{vc} : 105 kPa	Stage 3 σ'_{vc} : 175 kPa	2 3

Project: 503387 - F254727
CID24

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP / 13-2 / 11.9

Approved by: ET 09/06/2025

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Test Identification	Specimen 1	Specimen 2	Specimen 3
Location	Z4_OWF_BH17-SAMP	Z4_OWF_BH17-SAMP	Z4_OWF_BH17-SAMP
Sample	18-1	18-1	18-1
Depth [m]	16.50	16.50	16.50
Test number	CID25a	CID25b	CID25c

Specimen Visual Description
Very dark greyish brown silty SAND

Initial Specimen Conditions	Specimen 1	Specimen 2	Specimen 3
Test start date	07/05/2025	07/05/2025	07/05/2025
Type of sample	Recompacted	Recompacted	Recompacted
Diameter [mm]	50.5	50.5	50.5
Length [mm]	95.0	95.0	95.0
Water content [%]	9.8	9.8	9.8
Bulk density [Mg/m^3]	1.50	1.50	1.49
Dry density [Mg/m^3]	1.36	1.36	1.36
Void ratio [-]	0.944	0.942	0.948
Degree of saturation [%]	28	28	27
Type of drains fitted	One end	One end	One end

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

Saturation	Specimen 1	Specimen 2	Specimen 3
Pressure increments applied [kPa]	50	50	50
Differential pressure used [kPa]	10	10	10
Pore pressure on completion [kPa]	440	490	340
Cell pressure on completion [kPa]	450	500	350
B value achieved	0.98	0.98	0.98

Consolidation: Isotropic	Specimen 1	Specimen 2	Specimen 3
Cell pressure [kPa]	548	646	594
Back pressure [kPa]	450	500	350
Effective cell pressure [kPa]	98	146	244
Pore pressure on completion [kPa]	450	500	350
Pore pressure dissipation [%]	100	100	100
Water content [%]	33.8	33.2	32.2
Bulk density [Mg/m^3]	1.87	1.88	1.89
Dry density [Mg/m^3]	1.40	1.41	1.43
Void ratio [-]	0.895	0.879	0.853
Degree of saturation [%]	100	100	100
Axial strain [%]	0.84	1.07	1.62
Volumetric strain [%]	2.53	3.20	4.86
Volumetric strain rate-end of stage [%/hr]	0.03	0.02	0.03

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Shearing	Specimen 1	Specimen 2	Specimen 3
Initial pore pressure [kPa]	450	500	350
Initial effective cell pressure [kPa]	98	146	244
Rate of strain [%/hour]	1.30	1.30	1.30
At peak deviator stress			
Corrected deviator stress [kPa]	216	332	570
Membrane correction applied [kPa]	3.9	3.9	3.9
Drain correction applied [kPa]	0	0	0
Axial strain [%]	19.57	19.75	19.72
Volumetric strain [%]	4.84	5.18	5.52
Major principal effective stress [kPa]	311	475	812
Minor principal effective stress [kPa]	95	143	241
Principal effective stress ratio	3.27	3.33	3.36
ε_{50} [%]	2.93	3.28	3.46
Secant modulus (E_{50}) at ε_{50} [kPa]	3676	5069	8234
At peak principal effective stress ratio			
Corrected deviator stress [kPa]	215	332	570
Membrane correction applied [kPa]	3.9	3.9	3.9
Drain correction applied [kPa]	0	0	0
Axial strain [%]	19.82	19.75	19.72
Volumetric strain [%]	4.85	5.18	5.52
Major principal effective stress [kPa]	310	475	812
Minor principal effective stress [kPa]	95	143	241
Principal effective stress ratio	3.27	3.33	3.36
At 10% axial strain			
Corrected deviator stress [kPa]	185	280	484
Membrane correction applied [kPa]	2.4	2.4	2.4
Drain correction applied [kPa]	0	0	0
Axial strain [%]	10.00	10.00	10.00
Volumetric strain [%]	3.96	4.16	4.37
Major principal effective stress [kPa]	280	424	727
Minor principal effective stress [kPa]	95	144	242
Principal effective stress ratio	2.94	2.95	3.00

Project: 503387 - F254727
Test page CID25-3/8

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP / 18-1 / 16.5

Approved by: ET - 24/06/2025

Test Report

Consolidated Triaxial Compression Test on Water Saturated Soils Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

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Photographs		
Specimen 1	**Specimen 2**	**Specimen 3**
Photograph Unavailable	Photograph Unavailable	Photograph Unavailable

Final Conditions	Specimen 1	Specimen 2	Specimen 3
Water content [%]	30.3	33.2	28.3
Bulk density [Mg/m^3]	1.92	1.88	1.94
Dry density [Mg/m^3]	1.47	1.41	1.51
Mode of failure	Barrel	Barrel	Barrel

Project: 503387 - F254727
Test page CID25-4/8

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP / 18-1 / 16.5

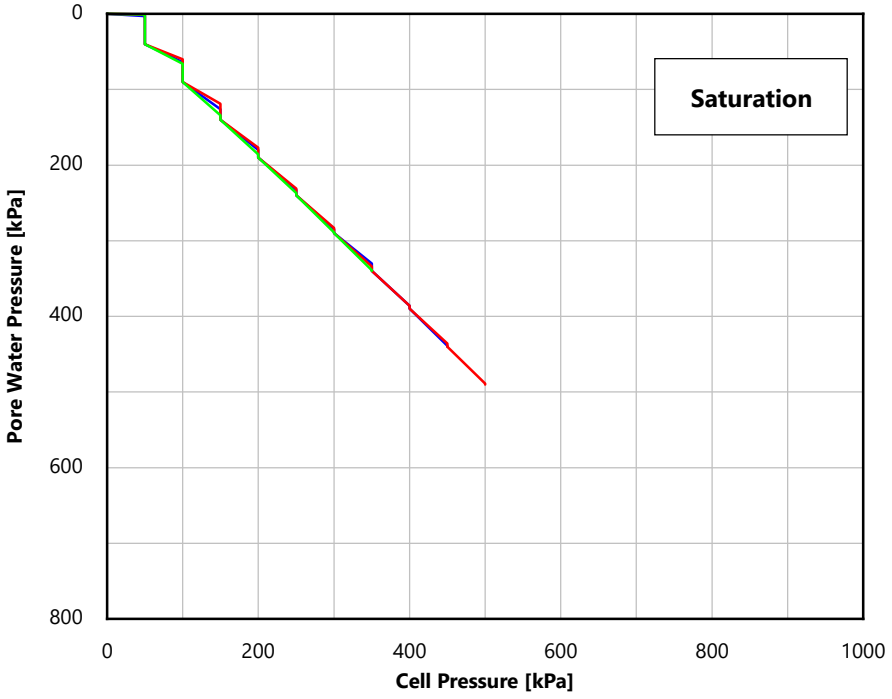
Approved by: ET - 24/06/2025

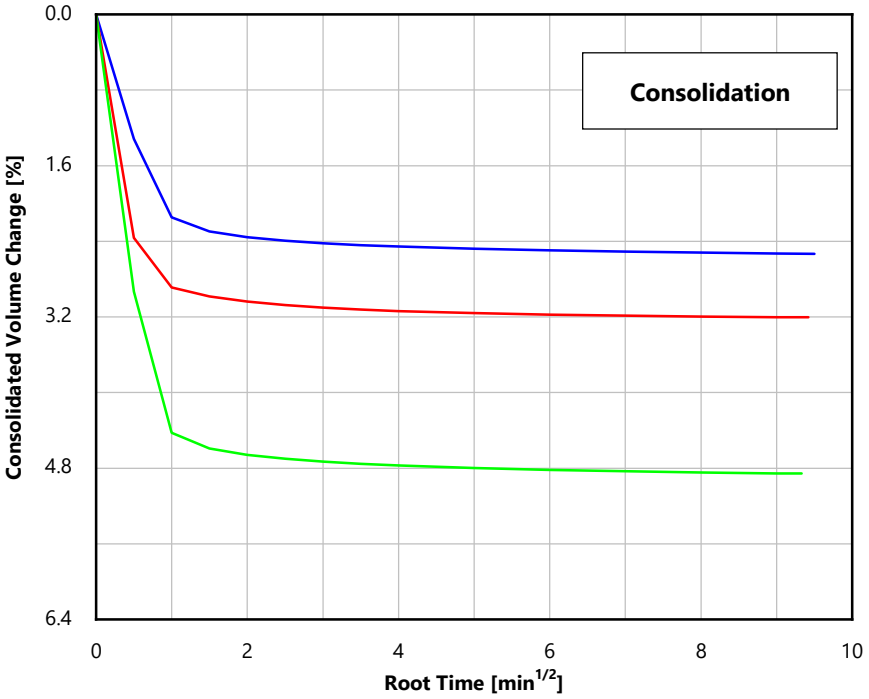
Test Report

Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018





Consolidation			
Stage 1 σ'_{rc} : 98 kPa	Stage 2 σ'_{rc} : 146 kPa	Stage 3 σ'_{rc} : 244 kPa	1
Stage 1 σ'_{vc} : 98 kPa	Stage 2 σ'_{vc} : 146 kPa	Stage 3 σ'_{vc} : 244 kPa	2
			3

Project: 503387 - F254727
CID25

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP / 18-1 / 16.5

Approved by: ET 24/06/2025

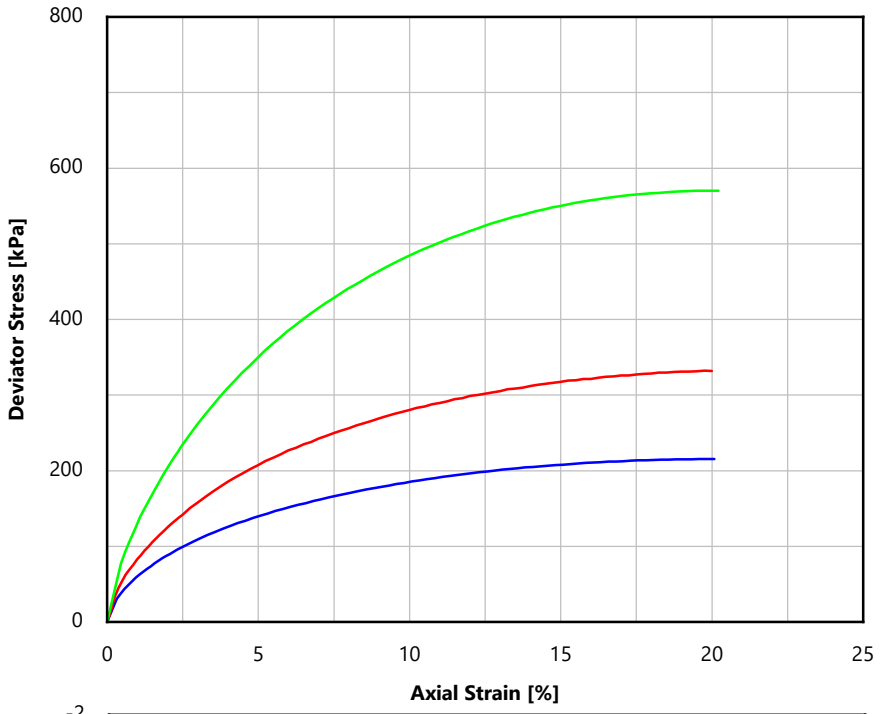
Test Report

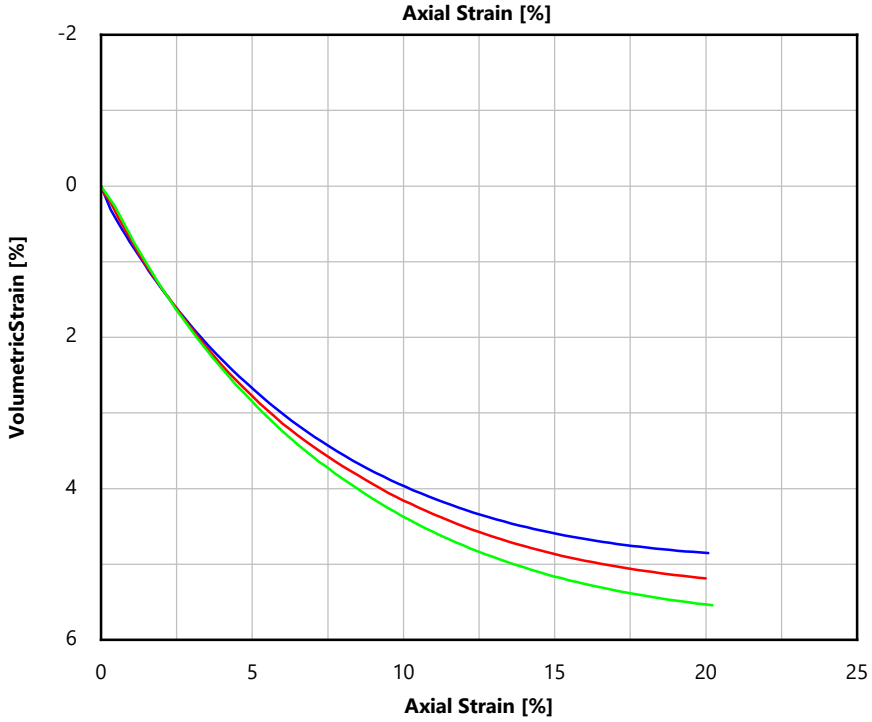
Consolidated Triaxial Compression Test On Water Saturated Soils
Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919

Shearing





Consolidation			
Stage 1 σ'_{rc} : 98 kPa	Stage 2 σ'_{rc} : 146 kPa	Stage 3 σ'_{rc} : 244 kPa	1
Stage 1 σ'_{vc} : 98 kPa	Stage 2 σ'_{vc} : 146 kPa	Stage 3 σ'_{vc} : 244 kPa	2
			3

Project: 503387 - F254727
CID25

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP / 18-1 / 16.5

Approved by: ET 24/06/2025

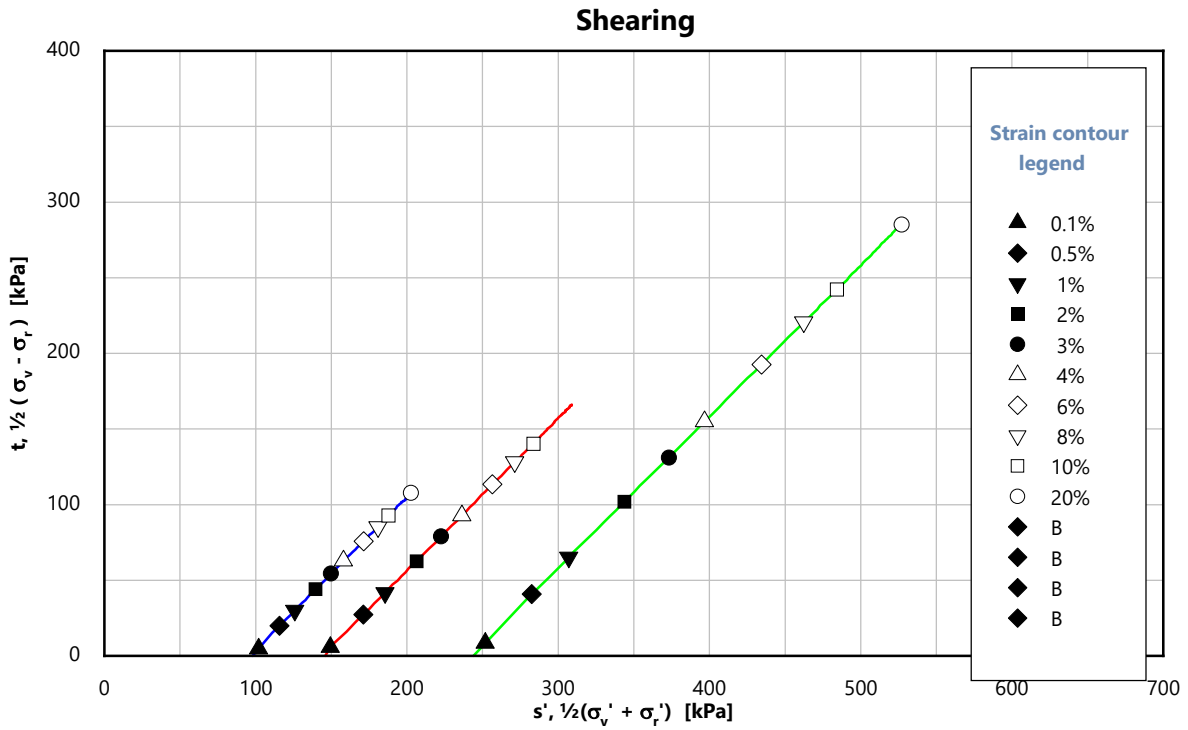
Test Report

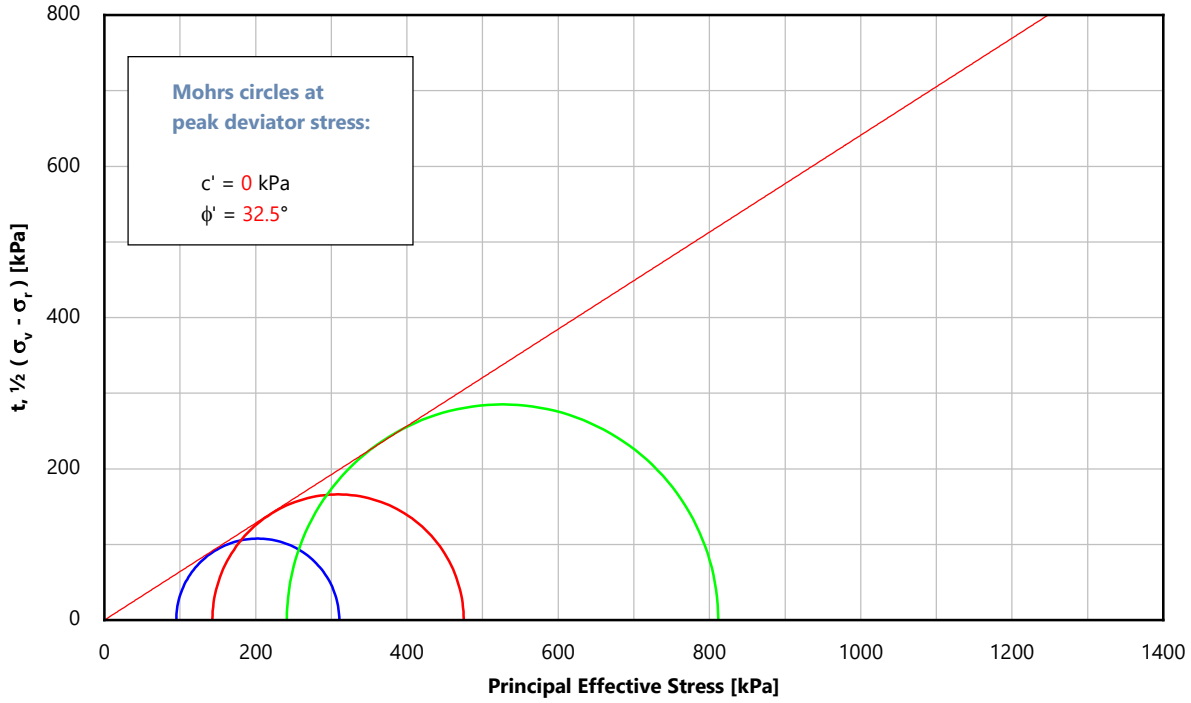
Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919





Consolidation			
Stage 1 σ'_{rc} : 98 kPa	Stage 2 σ'_{rc} : 146 kPa	Stage 3 σ'_{rc} : 244 kPa	1
Stage 1 σ'_{vc} : 98 kPa	Stage 2 σ'_{vc} : 146 kPa	Stage 3 σ'_{vc} : 244 kPa	2
			3

Project: 503387 - F254727
CID25

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP / 18-1 / 16.5

Approved by: ET 24/06/2025

FUGRO

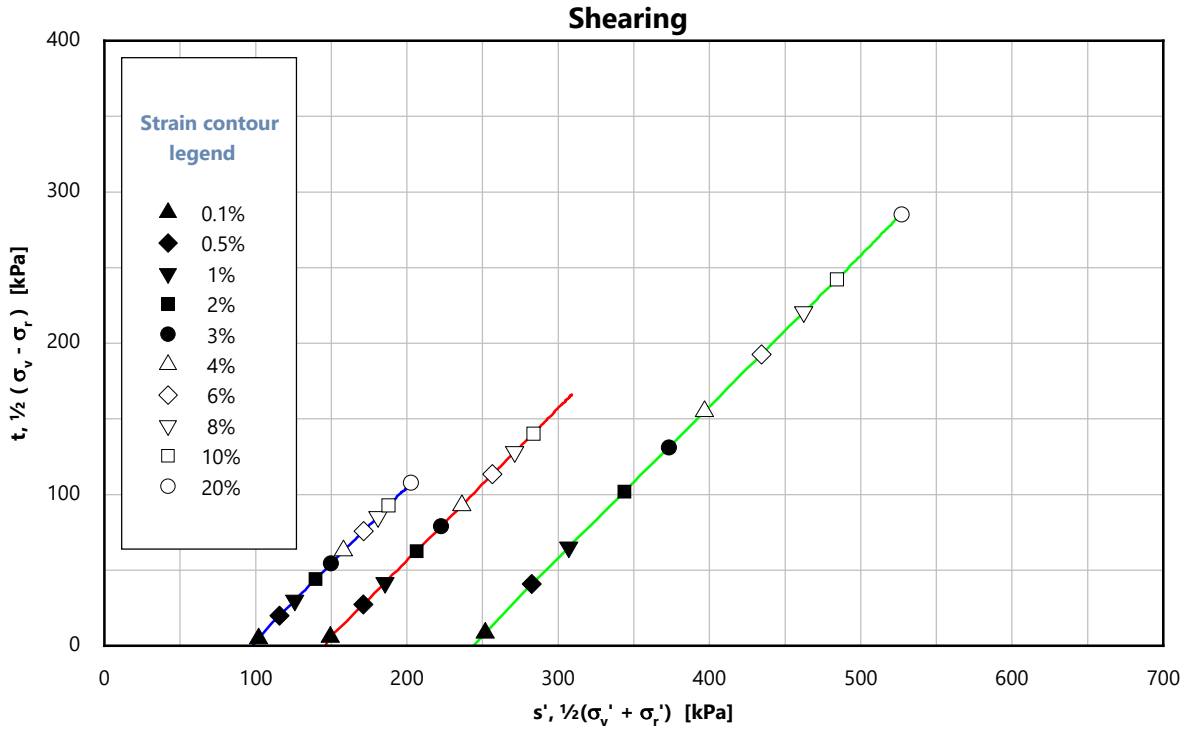
Test Report

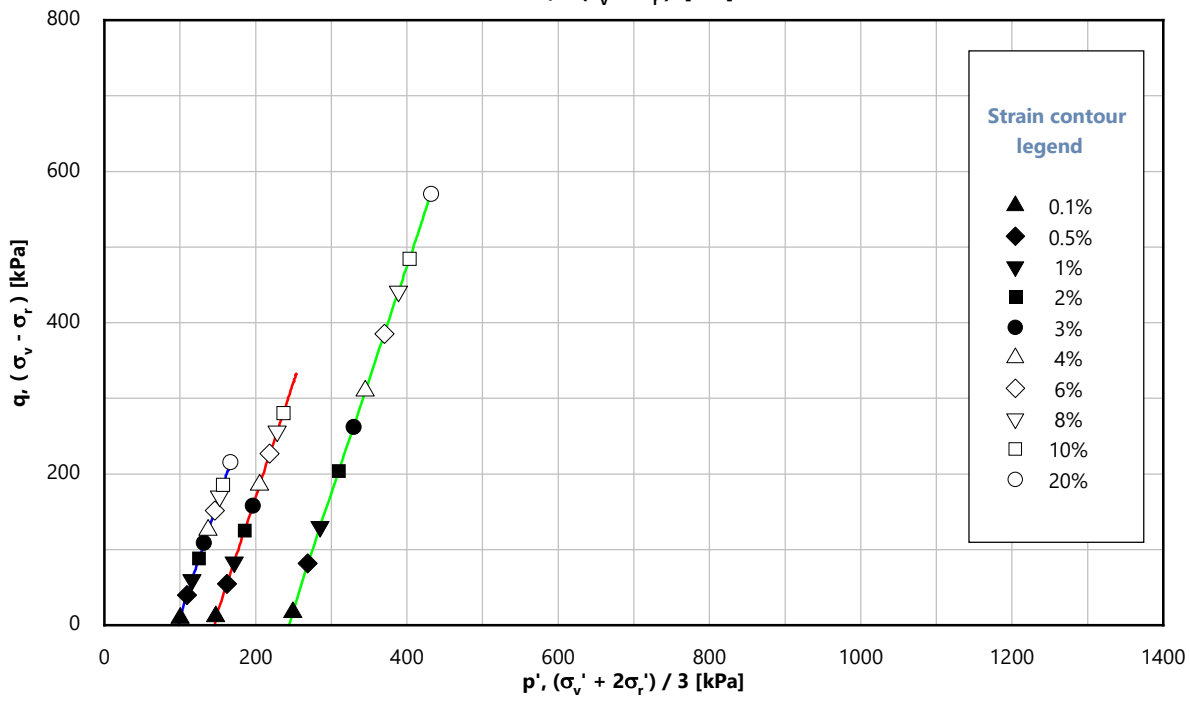
Consolidated Triaxial Compression Test On Water Saturated Soils

Isotropic, Drained - Set of three (3) tests

ISO 17892-9:2018

UKAS TESTING 0919





Consolidation			
Stage 1 σ'_{rc} : 98 kPa	Stage 2 σ'_{rc} : 146 kPa	Stage 3 σ'_{rc} : 244 kPa	1
Stage 1 σ'_{vc} : 98 kPa	Stage 2 σ'_{vc} : 146 kPa	Stage 3 σ'_{vc} : 244 kPa	2
			3

Project: 503387 - F254727
CID25

Laboratory: Wallingford, UK
Z4_OWF_BH17-SAMP / 18-1 / 16.5

Approved by: ET 24/06/2025

FUGRO

Location	Sample ID	Depth BSF [m]	Initial Conditions*					Shear Stage		φ' [°]	c' [kPa]
			w [%]	ρ [Mg/m^3]	ρ_d [Mg/m^3]	e_0 [-]	S_r [%]	σ_v [kPa]	τ_{peak} [kPa]		
Z4_OWF_BH01-SAMP	04-1	2.50	10.1	1.82	1.65	0.605	44	25	27	46.5	0.0
			10.1	1.82	1.65	0.604	45	50	46		
			10.1	1.81	1.64	0.615	44	100	108		
Z4_OWF_BH01-SAMP	10-2	8.90	10.0	1.89	1.71	0.545	49	40	38	38.0	13.0
			10.0	1.89	1.71	0.546	48	81	74		
			10.0	1.89	1.72	0.541	49	161	140		
Z4_OWF_BH05-SAMP	03-2	2.40	10.7	1.90	1.72	0.543	52	23	30	38.0	9.0
			10.7	1.92	1.74	0.524	54	49	46		
			10.7	1.94	1.75	0.513	55	98	89		
Z4_OWF_BH05-SAMP	10-1	9.00	10.2	1.52	1.38	0.923	29	42	33	39.0	9.0
			10.2	1.55	1.41	0.884	30	84	76		
			10.2	1.55	1.41	0.885	30	167	143		
Z4_OWF_BH05-SAMP	20-1	18.00	9.8	1.91	1.74	0.523	50	84	72	33.0	42.5
			9.8	1.90	1.73	0.535	49	169	134		
			9.8	1.90	1.73	0.530	49	337	271		
Z4_OWF_BH15-COMP	04-3	10.10	9.8	1.50	1.37	0.935	28	47	42	39.0	6.0
			9.8	1.49	1.36	0.952	27	94	66		
			9.8	1.50	1.37	0.941	28	188	168		
Z4_OWF_BH16-SAMP	11-2	9.30	10.2	1.93	1.76	0.510	53	43	60	36.5	23.0
			10.2	1.96	1.78	0.489	55	86	79		
			10.2	1.95	1.77	0.495	55	172	153		

Notes

BSF : Below seafloor
* : Specimen conditions after preparation and before consolidation
† : Specimen conditions after consolidation and before shearing
w : Water content
ρ : Bulk density
ρ_d : Dry density
e_0 : Initial void ratio
S_r : Degree of saturation
e : Void ratio
σ_v : Total vertical stress
τ_{peak} : Peak shear stress
φ' : Effective angle of internal friction
c' : Effective cohesion intercept

Summary of Direct Shear - Shear Box Test Results

Soil-Soil Interface

TOPAZ / DS Direct Shear Summary (SO-SO) (FFSA) V2 / 2025-09-01 13:59:39 +02:00

Location	Sample ID	Depth BSF [m]	Initial Conditions*					Shear Stage		φ' [°]	c' [kPa]
			w [%]	ρ [Mg/m^3]	ρ_d [Mg/m^3]	e_0 [-]	S_r [%]	σ_v [kPa]	τ_{peak} [kPa]		
Z4_OWF_BH16-SAMP	04-1	2.50	10.0	1.92	1.74	0.522	51	25	23	37.5	1.0
			10.0	1.89	1.72	0.541	49	50	40		
			10.0	1.90	1.72	0.536	49	100	78		
Z4_OWF_BH16-SAMP	19-1	16.50	9.0	1.59	1.46	0.817	29	76	76	41.0	0.0
			9.0	1.58	1.45	0.829	29	152	117		
			9.0	1.59	1.46	0.818	29	305	271		
Z4_OWF_BH17-SAMP	16-2	14.90	9.9	1.62	1.47	0.798	33	66	69	21.0	63.0
			9.9	1.48	1.35	0.965	27	132	123		
			9.9	1.48	1.35	0.963	27	264	159		
Z4_OWF_BH17-SAMP	02-1	1.00	9.9	1.95	1.77	0.494	53	25	33	34.5	11.0
			9.9	1.90	1.73	0.534	49	50	45		
			9.9	1.89	1.72	0.544	48	100	81		
Z4_OWF_BH17-SAMP	09-1	7.50	9.9	1.56	1.42	0.868	30	33	26	44.0	1.0
			9.9	1.56	1.42	0.870	30	66	52		
			9.9	1.56	1.42	0.867	30	132	132		

Notes

BSF : Below seafloor
* : Specimen conditions after preparation and before consolidation
† : Specimen conditions after consolidation and before shearing
w : Water content
ρ : Bulk density
ρ_d : Dry density
e_0 : Initial void ratio
S_r : Degree of saturation
e : Void ratio
σ_v : Total vertical stress
τ_{peak} : Peak shear stress
φ' : Effective angle of internal friction
c' : Effective cohesion intercept

Summary of Direct Shear - Shear Box Test Results

Soil-Soil Interface

TOPAZ / DS Direct Shear Summary (SO-SO) (FFSA) V2 / 2025-09-01 13:59:39 +02:00

Test Report

Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Test Identification	
Location	Z4_OWF_BH01-SAMP
Sample	04-1
Depth [m]	2.50

Specimen Visual Description
Dark grey SAND

Initial Specimen Conditions	1	2	3
Test start date	14/04/2025	14/04/2025	14/04/2025
Length [mm]	60.0	60.1	60.1
Width [mm]	60.1	60.0	60.1
Water content [%]	10.1	10.1	10.1
Bulk density [Mg/m^3]	1.82	1.82	1.81
Dry density [Mg/m^3]	1.65	1.65	1.64
Void ratio [-]	0.605	0.604	0.615
Degree of saturation [%]	44	45	44
Assumed particle density [Mg/m^3]	2.65	2.65	2.65

End of Consolidation	1	2	3
Normal stress [kPa]	25	50	100
Void ratio [-]	0.592	0.577	0.554
Vertical displacement [mm]	0.21	0.41	0.93
Degree of saturation [%]	100	100	100

Shear Stage	1	2	3
Rate of displacement [mm/min]	0.45	0.45	0.45
Normal stress [kPa]	25	50	100
Shear stress at failure [kPa]	27	46	108
Horizontal displacement at failure [mm]	0.72	0.96	1.14
Vertical displacement at failure [mm]	-0.03	-0.04	-0.01
Void ratio at the end of the test [-]	0.593	0.579	0.554

Notes
Sample tested submerged
Square sample

Project: 503387 - F254727 Laboratory: Wallingford, UK Approved by: SW - 10/06/2025

Test page SB07-1/4

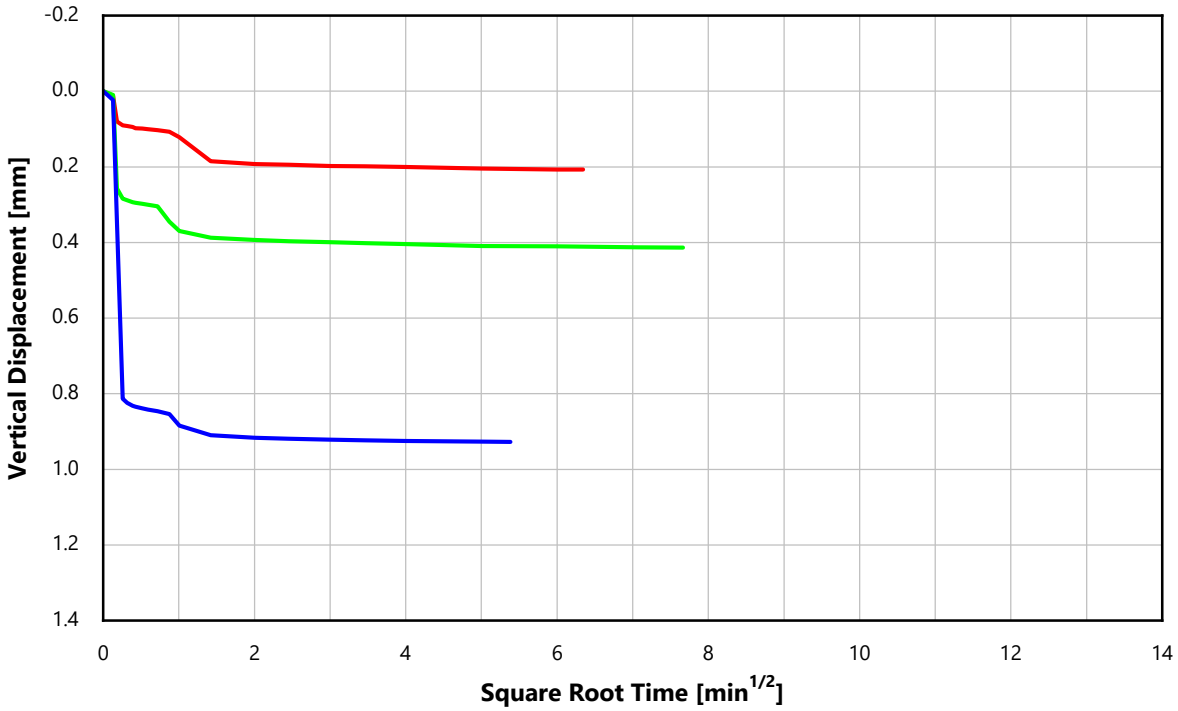
Test Report

Direct Shear Test
Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Consolidation Stage



Specimen 1: Normal stress 25 kPa Specimen 2: Normal stress 50 kPa Specimen 3: Normal stress 100 kPa

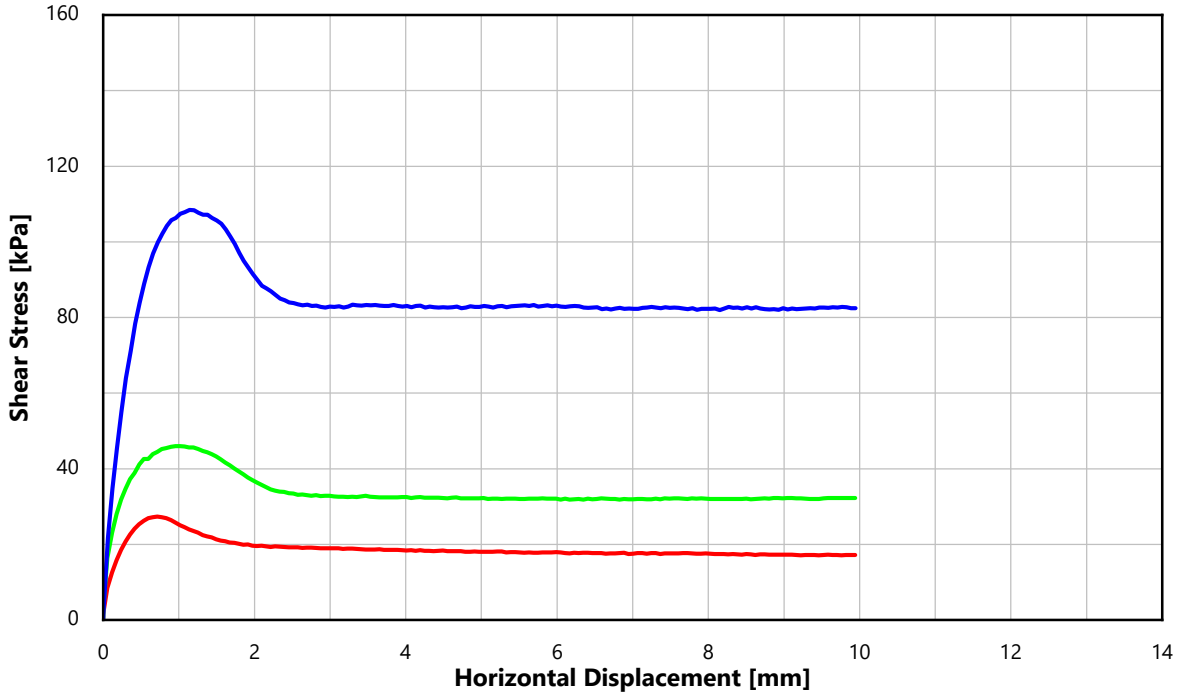
Test Report

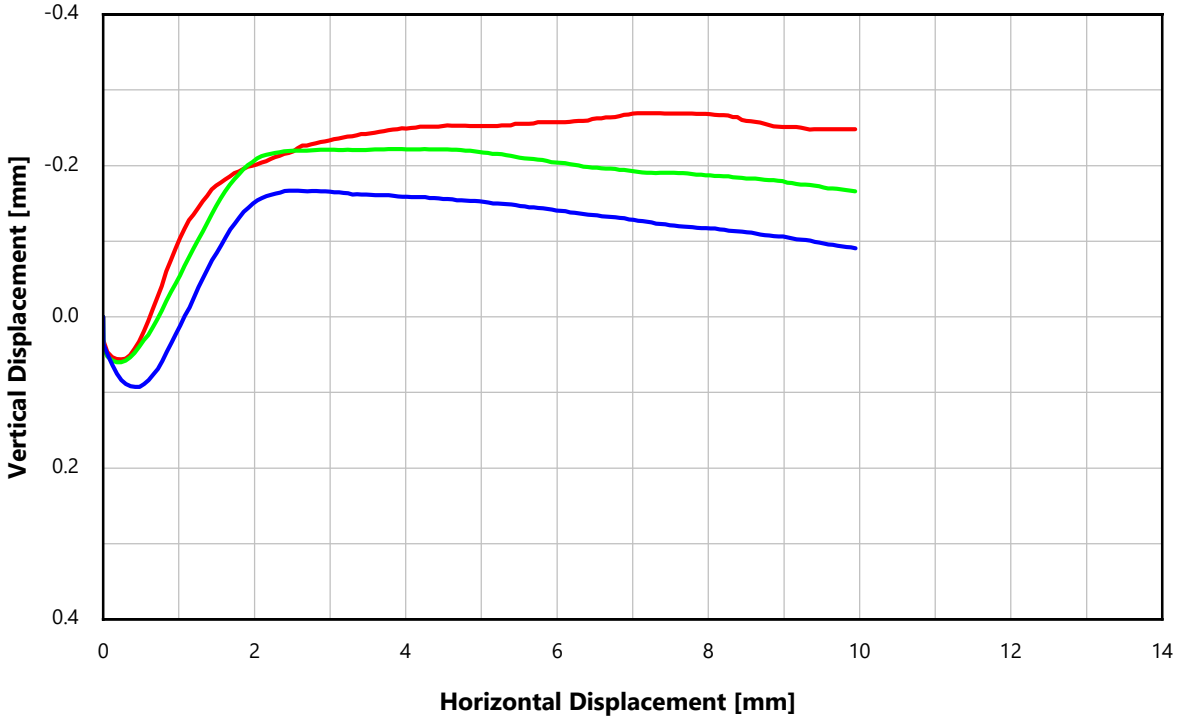
Direct Shear Test
Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Shear Stage





Specimen 1: Normal stress 25 kPa — Specimen 2: Normal stress 50 kPa — Specimen 3: Normal stress 100 kPa

Project: 503387 - F254727
Test Page No.: SB07 - 3/4

Laboratory: Wallingford, UK

Approved by: SW - 10/06/2025

Test Report

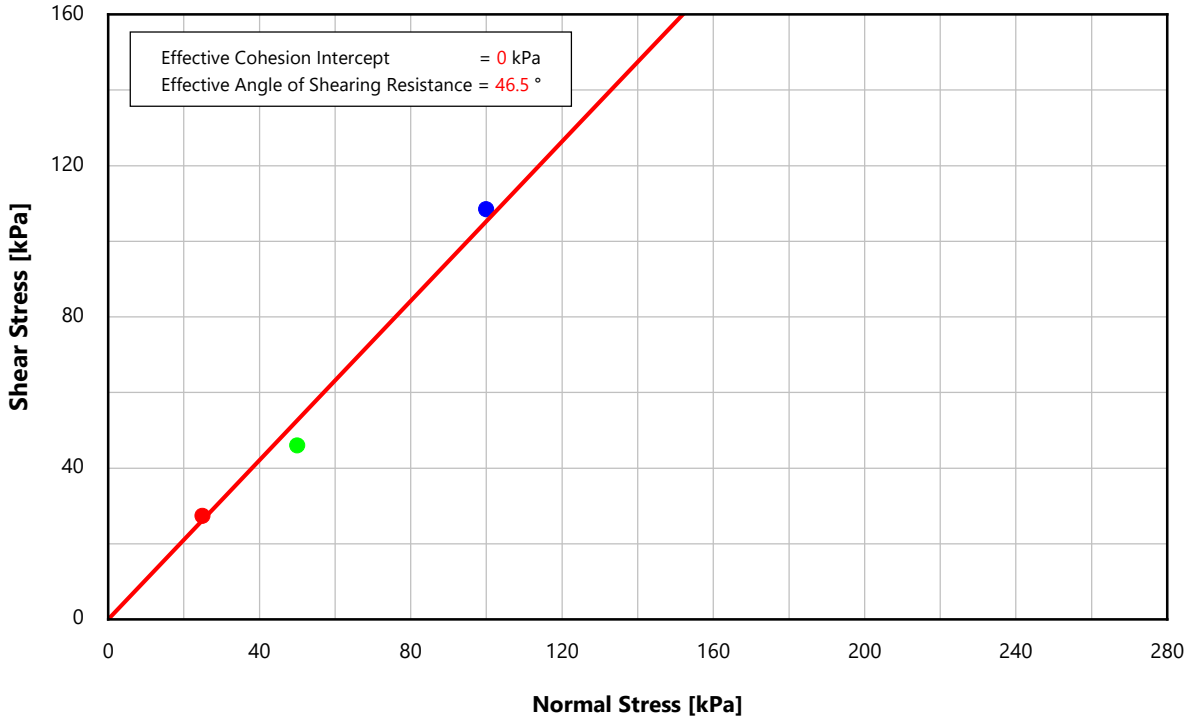
Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Friction Angle



Specimen 1: Normal stress 25 kPa | Specimen 2: Normal stress 50 kPa | Specimen 3: Normal stress 100 kPa

Project: 503387 - F254727
Test Page No.: SB07 - 4/4

Laboratory: Wallingford, UK

Approved by: SW - 10/06/2025

Test Report

Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Test Identification	
Location	Z4_OWF_BH01-SAMP
Sample	10-2
Depth [m]	8.90

Specimen Visual Description
Dark grey fine to medium SAND

Initial Specimen Conditions	1	2	3
Test start date	18/03/2025	18/03/2025	18/03/2025
Length [mm]	60.0	60.0	60.1
Width [mm]	60.0	60.0	60.1
Water content [%]	10.0	10.0	10.0
Bulk density [Mg/m^3]	1.89	1.89	1.89
Dry density [Mg/m^3]	1.71	1.71	1.72
Void ratio [-]	0.545	0.546	0.541
Degree of saturation [%]	49	48	49
Assumed particle density [Mg/m^3]	2.65	2.65	2.65

End of Consolidation	1	2	3
Normal stress [kPa]	40	81	161
Void ratio [-]	0.513	0.512	0.492
Vertical displacement [mm]	0.49	0.51	0.75
Degree of saturation [%]	100	100	100

Shear Stage	1	2	3
Rate of displacement [mm/min]	0.45	0.45	0.45
Normal stress [kPa]	40	81	161
Shear stress at failure [kPa]	38	74	140
Horizontal displacement at failure [mm]	1.13	0.96	1.43
Vertical displacement at failure [mm]	-0.06	-0.05	-0.05
Void ratio at the end of the test [-]	0.517	0.515	0.495

Notes
Sample tested submerged
Square sample

Project: 503387 - F254727 Laboratory: Wallingford, UK Approved by: SW - 03/06/2025

Test page SB08-1/4

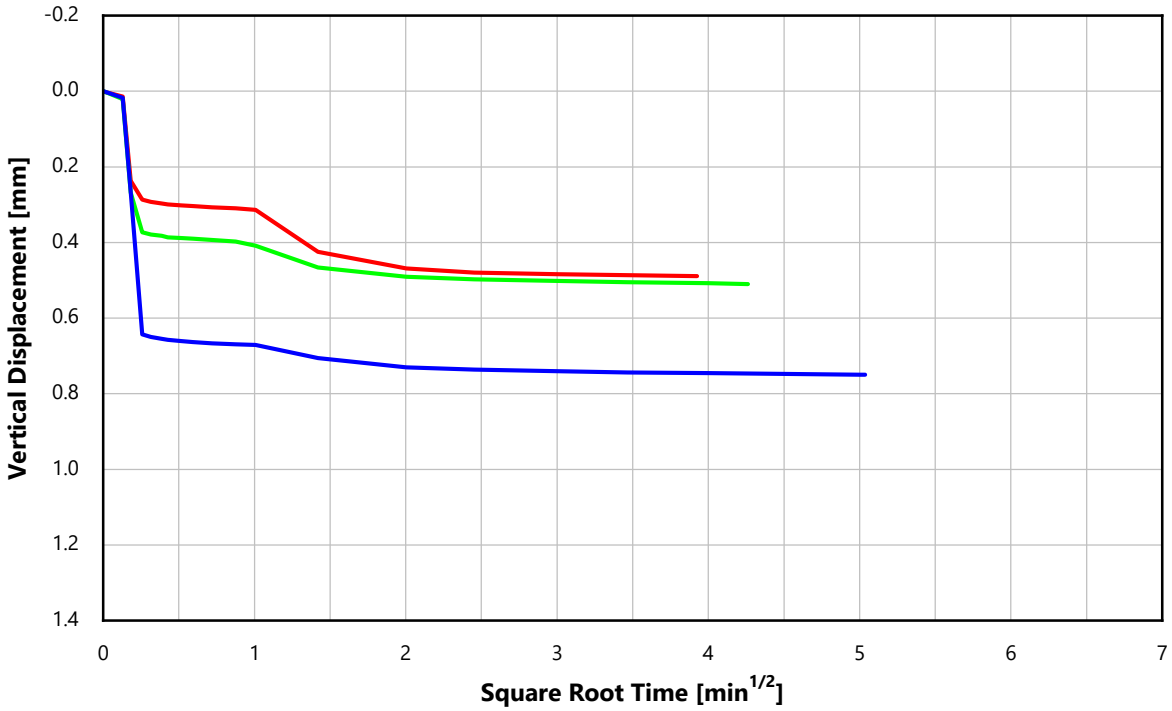
Test Report

Direct Shear Test
Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Consolidation Stage



Specimen 1: Normal stress 30 kPa Specimen 2: Normal stress 81 kPa Specimen 3: Normal stress 161 kPa

Project: 503387 - F254727
Test Page No.: SB08 - 2/4

Laboratory: Wallingford, UK

Approved by: SW - 03/06/2025

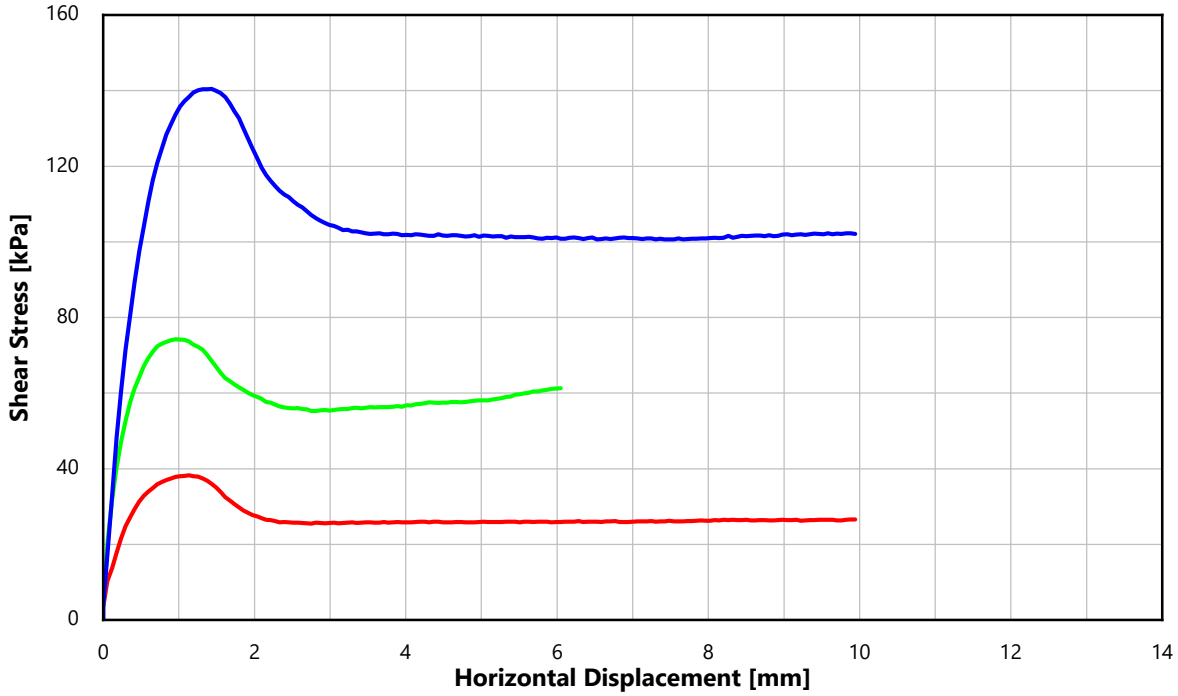
Test Report

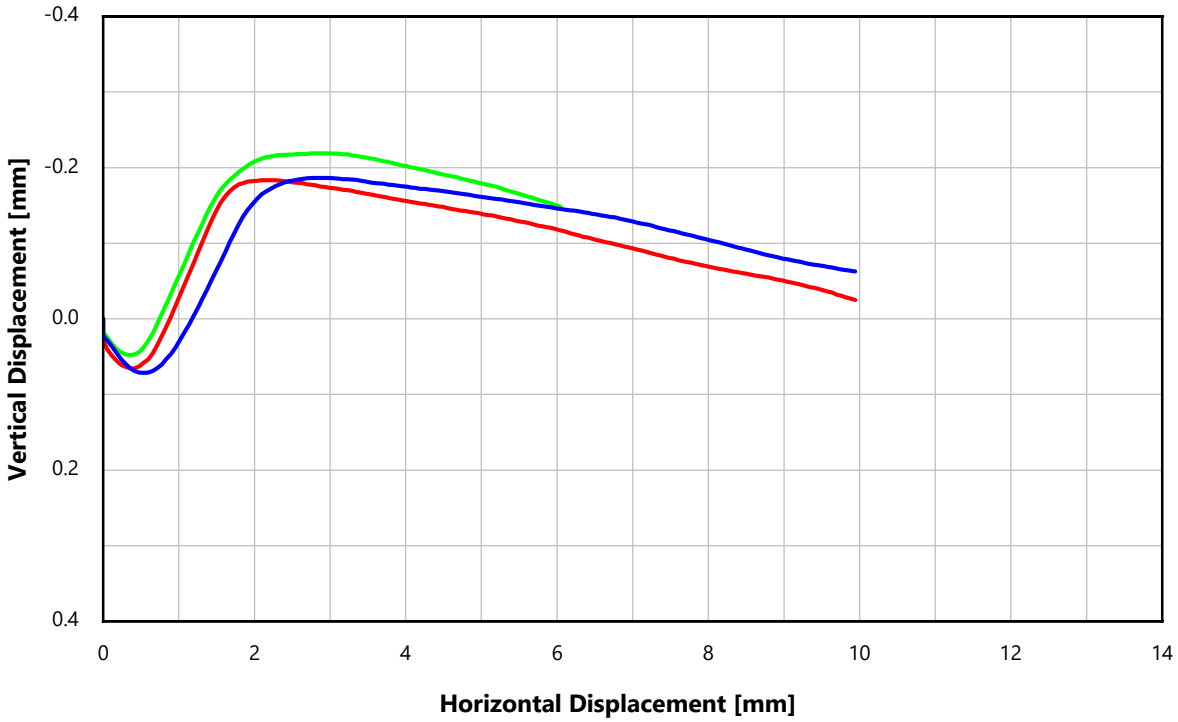
Direct Shear Test
Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Shear Stage





Specimen 1: Normal stress 30 kPa — Specimen 2: Normal stress 81 kPa — Specimen 3: Normal stress 161 kPa

Project: 503387 - F254727
Test Page No.: SB08 - 3/4

Laboratory: Wallingford, UK

Approved by: SW - 03/06/2025

Test Report

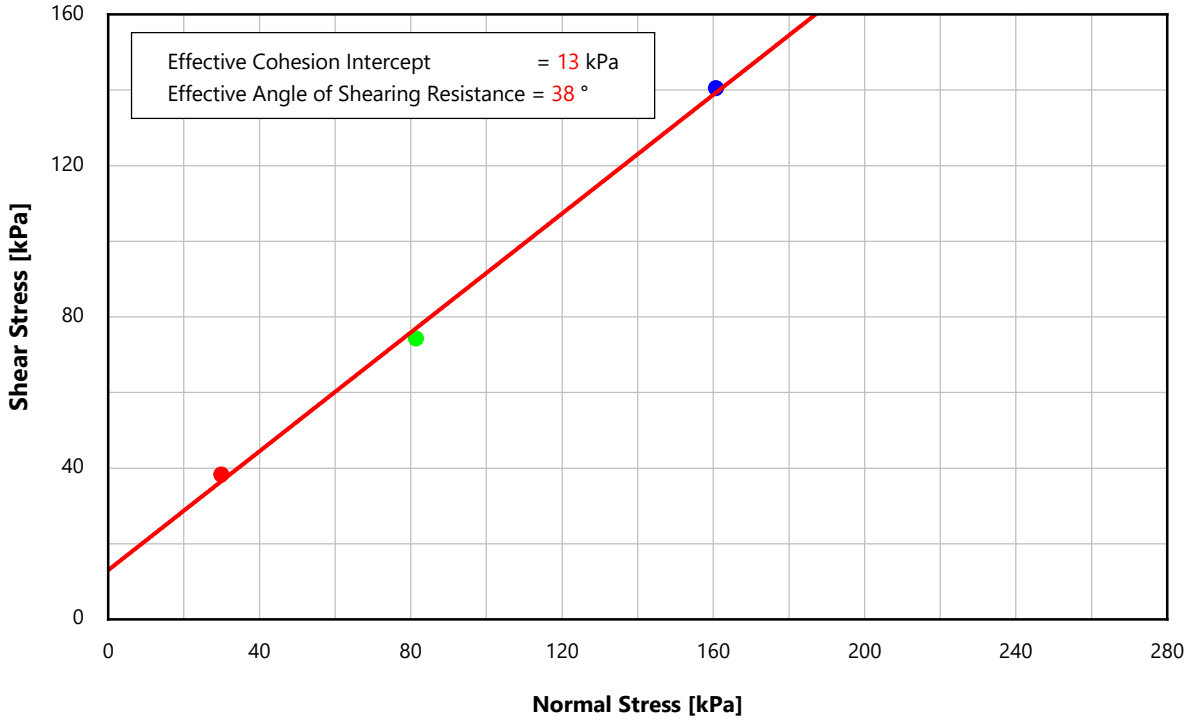
Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Friction Angle



Specimen 1: Normal stress 30 kPa | Specimen 2: Normal stress 81 kPa | Specimen 3: Normal stress 161 kPa

Project: 503387 - F254727
Test Page No.: SB08 - 4/4

Laboratory: Wallingford, UK

Approved by: SW - 03/06/2025

Test Report

Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Test Identification	
Location	Z4_OWF_BH05-SAMP
Sample	03-2
Depth [m]	2.40

Specimen Visual Description
Greenish grey CLAY

Initial Specimen Conditions	1	2	3
Test start date	20/05/2025	23/05/2025	20/05/2025
Diameter [mm]	60.0	60.0	60.0
Water content [%]	10.7	10.7	10.7
Bulk density [Mg/m^3]	1.90	1.92	1.94
Dry density [Mg/m^3]	1.72	1.74	1.75
Void ratio [-]	0.543	0.524	0.513
Degree of saturation [%]	52	54	55
Assumed particle density [Mg/m^3]	2.65	2.65	2.65

End of Consolidation	1	2	3
Normal stress [kPa]	23	49	98
Void ratio [-]	0.526	0.477	0.478
Vertical displacement [mm]	0.24	0.68	0.50
Degree of saturation [%]	100	100	98

Shear Stage	1	2	3
Rate of displacement [mm/min]	0.45	0.45	0.45
Normal stress [kPa]	23	49	99
Shear stress at failure [kPa]	30	46	89
Horizontal displacement at failure [mm]	0.44	1.72	0.76
Vertical displacement at failure [mm]	-0.08	0.02	-0.01
Void ratio at the end of the test [-]	0.531	0.475	0.479

Notes
Sample tested submerged
Round sample

Project: 503387 - F254727 Laboratory: Wallingford, UK Approved by: SW - 10/06/2025

Test page SB09-1/4

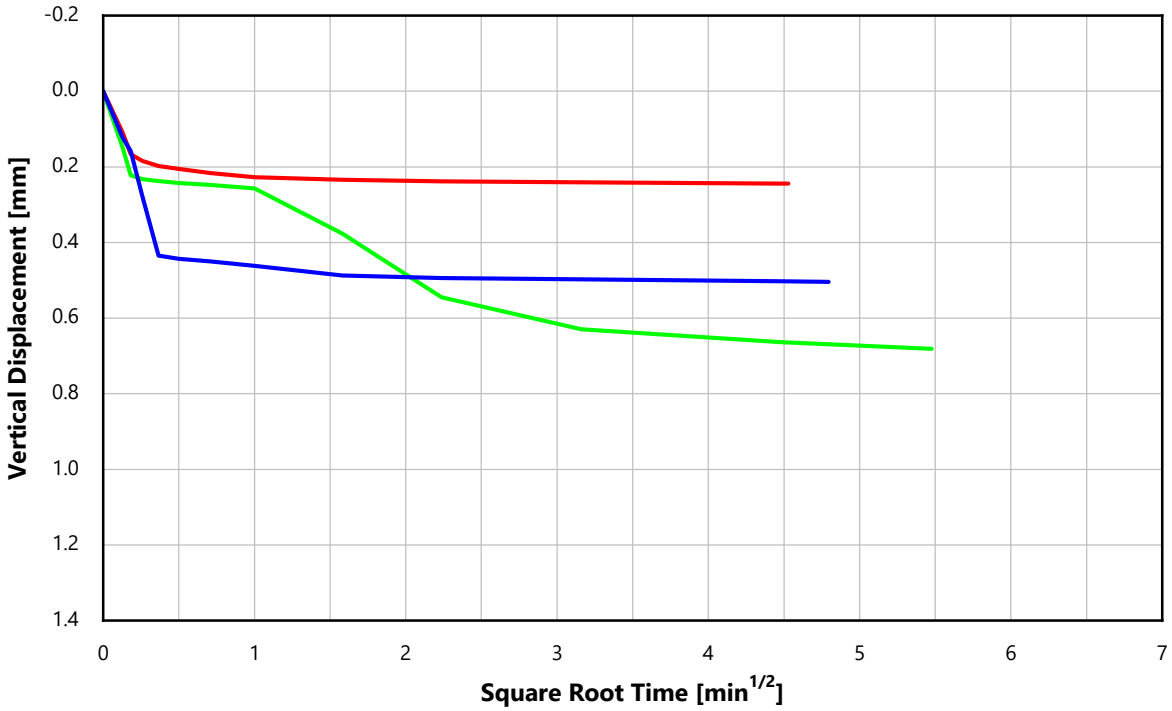
Test Report

Direct Shear Test
Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Consolidation Stage



Specimen 1: Normal stress 25 kPa Specimen 2: Normal stress 50 kPa Specimen 3: Normal stress 100 kPa

Test Report

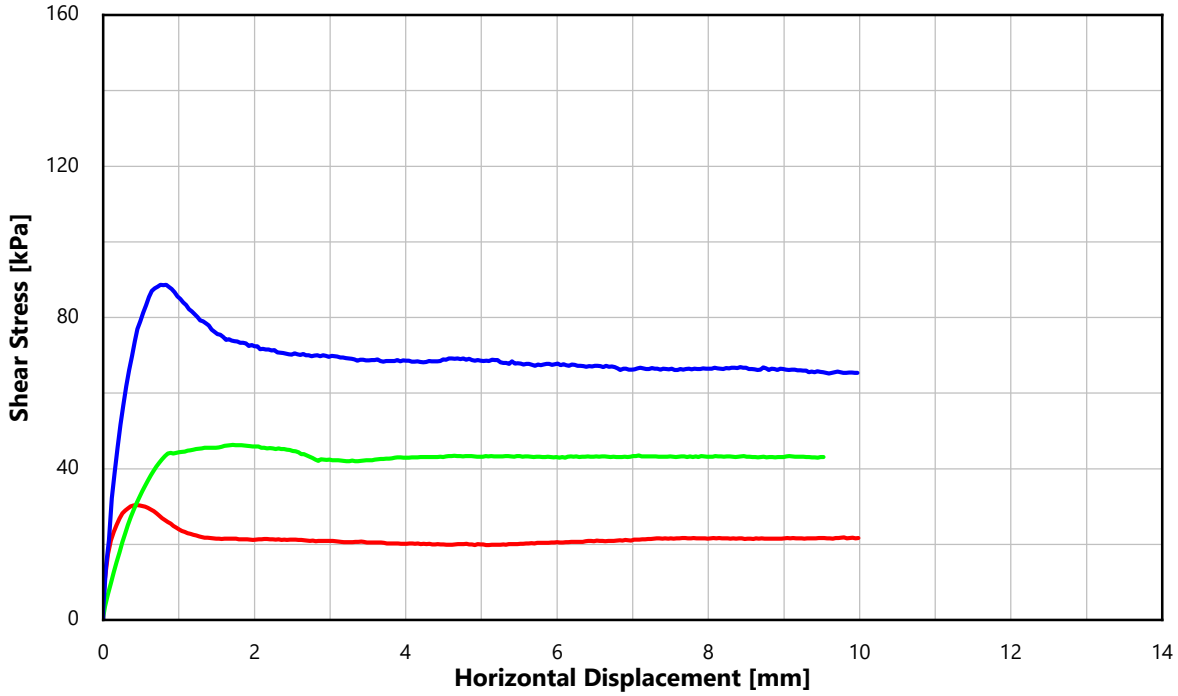
Direct Shear Test

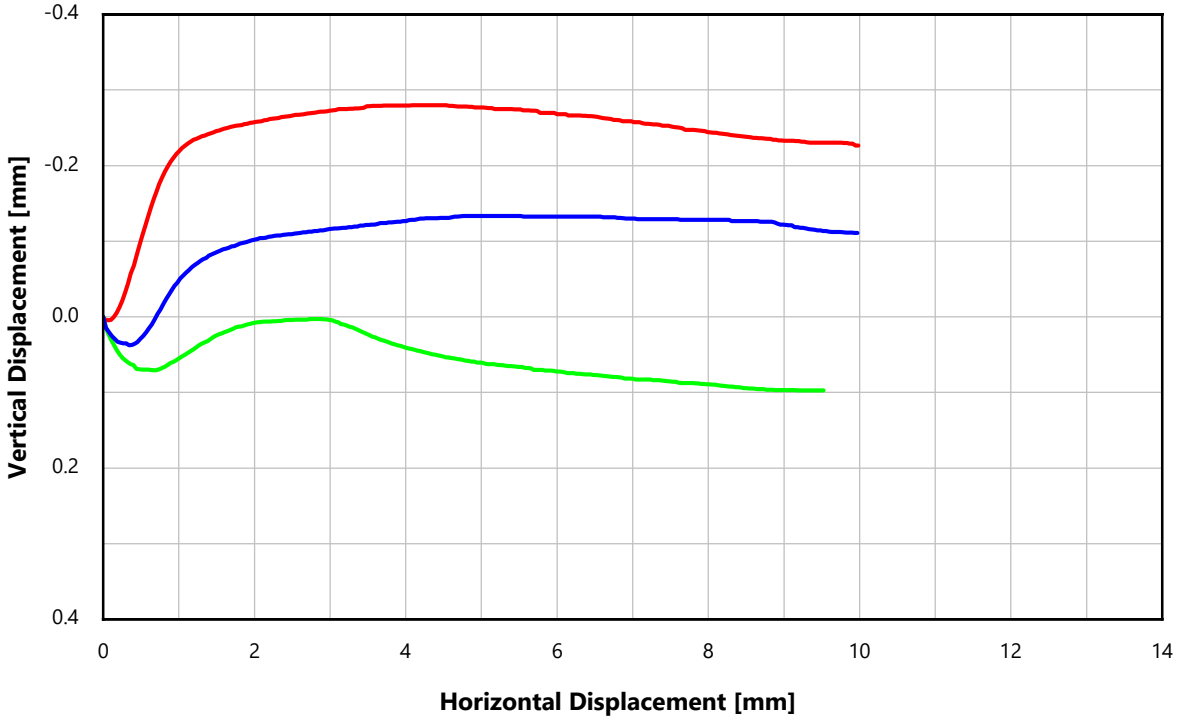
Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Shear Stage





Specimen 1: Normal stress 25 kPa — Specimen 2: Normal stress 50 kPa — Specimen 3: Normal stress 100 kPa

Project: 503387 - F254727
Test Page No.: SB09 - 3/4

Laboratory: Wallingford, UK

Approved by: SW - 10/06/2025

Test Report

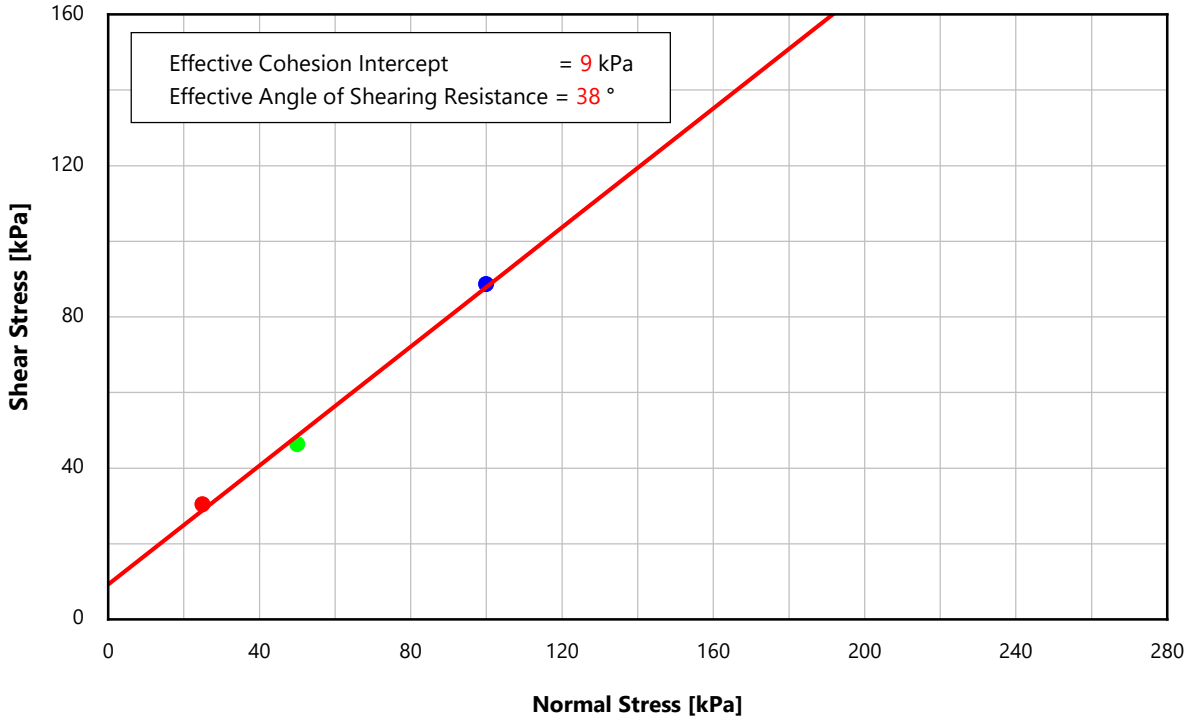
Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Friction Angle



Specimen 1: Normal stress 25 kPa | Specimen 2: Normal stress 50 kPa | Specimen 3: Normal stress 100 kPa

Project: 503387 - F254727
Test Page No.: SB09 - 4/4

Laboratory: Wallingford, UK

Approved by: SW - 10/06/2025

Test Report

Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Test Identification	
Location	Z4_OWF_BH05-SAMP
Sample	10-1
Depth [m]	9.00

Specimen Visual Description
Grey fine to medium SAND

Initial Specimen Conditions	1	2	3
Test start date	23/04/2025	01/05/2025	08/07/2025
Length [mm]	60.0	60.0	60.0
Width [mm]	60.0	60.0	60.0
Water content [%]	10.2	10.2	10.2
Bulk density [Mg/m^3]	1.52	1.55	1.55
Dry density [Mg/m^3]	1.38	1.41	1.41
Void ratio [-]	0.923	0.884	0.885
Degree of saturation [%]	29	30	30
Assumed particle density [Mg/m^3]	2.65	2.65	2.65

End of Consolidation	1	2	3
Normal stress [kPa]	42	84	167
Void ratio [-]	0.850	0.816	0.819
Vertical displacement [mm]	0.93	0.87	0.84
Degree of saturation [%]	85	92	96

Shear Stage	1	2	3
Rate of displacement [mm/min]	0.45	0.45	0.45
Normal stress [kPa]	42	84	167
Shear stress at failure [kPa]	33	76	143
Horizontal displacement at failure [mm]	9.10	10.00	9.40
Vertical displacement at failure [mm]	-0.09	0.04	0.39
Void ratio at the end of the test [-]	0.857	0.813	0.789

Notes
Sample tested submerged
Square sample

Project: 503387 - F254727 Laboratory: Wallingford, UK Approved by: SW - 14/07/2025

Test page SB10r3-1/4

Test Report

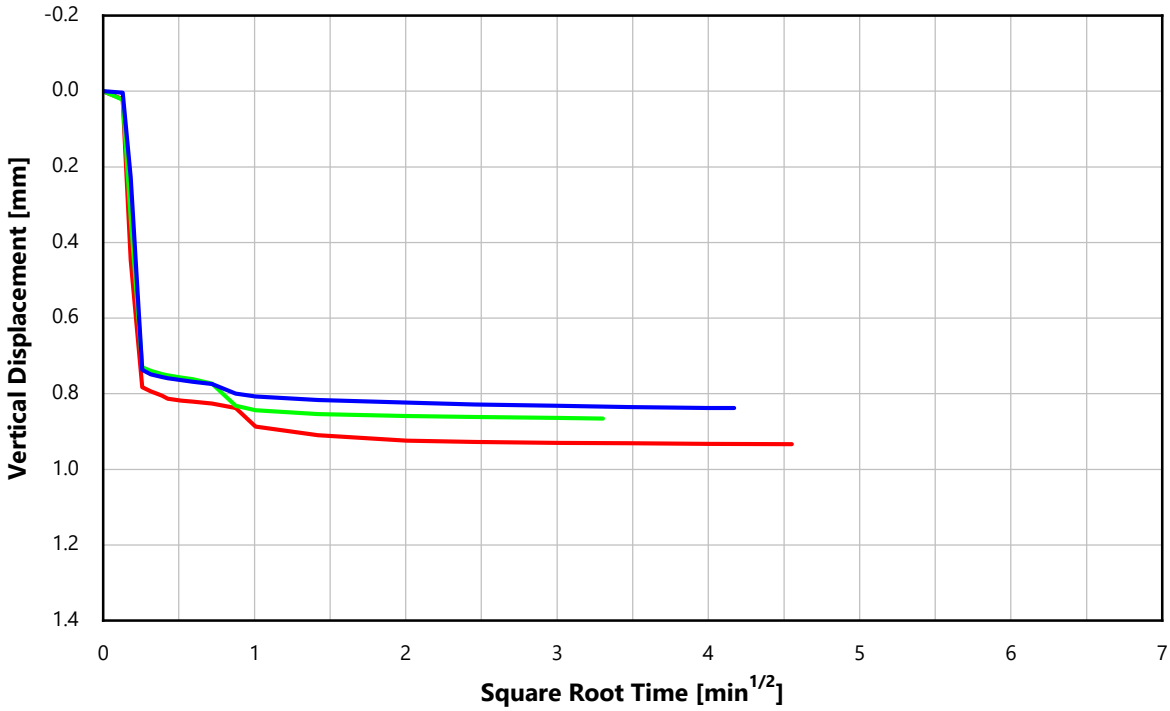
Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Consolidation Stage



Specimen 1: Normal stress 30 kPa Specimen 2: Normal stress 84 kPa Specimen 3: Normal stress 167 kPa

Test Report

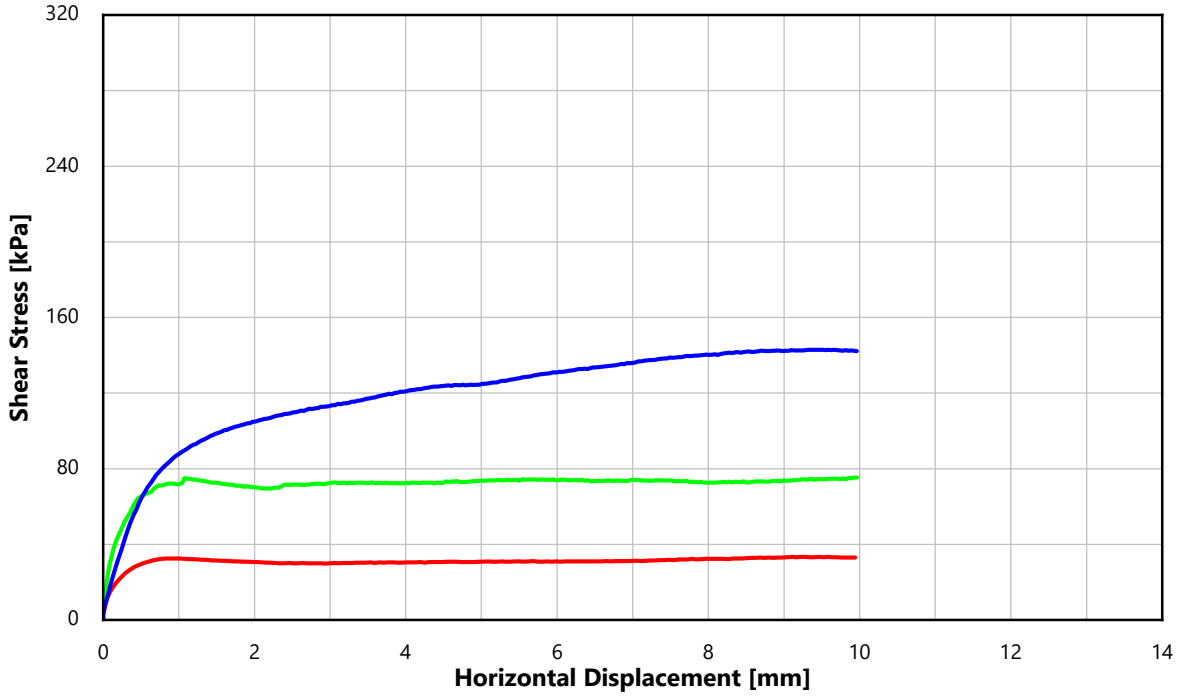
Direct Shear Test

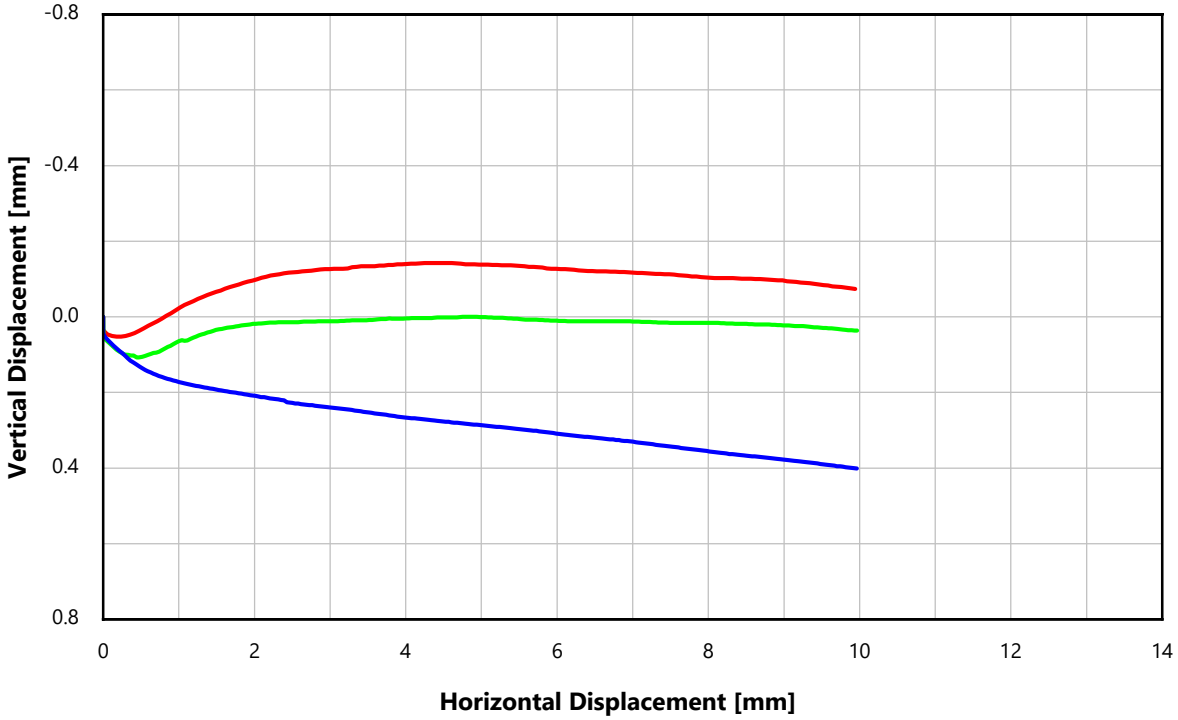
Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Shear Stage





Specimen 1: Normal stress 30 kPa — Specimen 2: Normal stress 84 kPa — Specimen 3: Normal stress 167 kPa

Project: 503387 - F254727
Test Page No.: SB10r3 - 3/4

Laboratory: Wallingford, UK

Approved by: SW - 14/07/2025

Test Report

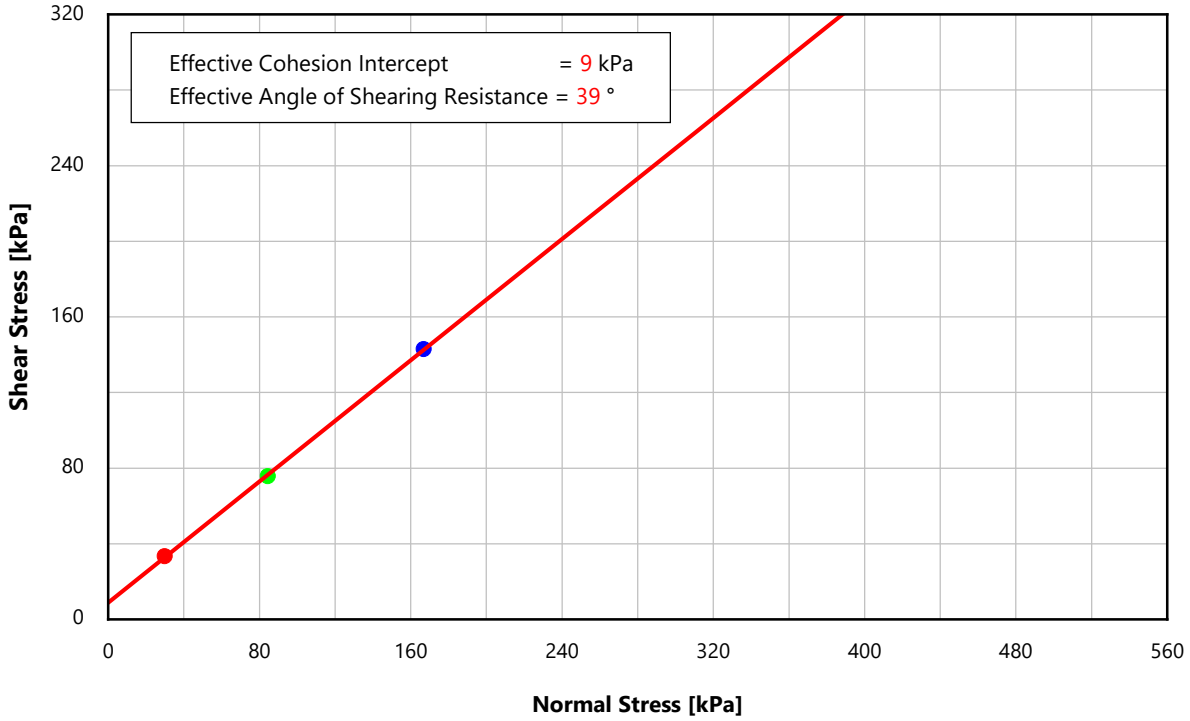
Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Friction Angle



Specimen 1: Normal stress 30 kPa | Specimen 2: Normal stress 84 kPa | Specimen 3: Normal stress 167 kPa

Project: 503387 - F254727
Test Page No.: SB10r3 - 4/4

Laboratory: Wallingford, UK

Approved by: SW - 14/07/2025

Test Report

Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Test Identification	
Location	Z4_OWF_BH05-SAMP
Sample	10-1
Depth [m]	9.00

Specimen Visual Description
Grey fine to medium SAND

Initial Specimen Conditions	1	2	3
Test start date	23/04/2025	01/05/2025	08/07/2025
Length [mm]	60.0	60.0	60.0
Width [mm]	60.0	60.0	60.0
Water content [%]	10.2	10.2	10.2
Bulk density [Mg/m^3]	1.52	1.55	1.55
Dry density [Mg/m^3]	1.38	1.41	1.41
Void ratio [-]	0.923	0.884	0.885
Degree of saturation [%]	29	30	30
Assumed particle density [Mg/m^3]	2.65	2.65	2.65

End of Consolidation	1	2	3
Normal stress [kPa]	42	84	167
Void ratio [-]	0.850	0.816	0.819
Vertical displacement [mm]	0.93	0.87	0.84
Degree of saturation [%]	85	92	96

Shear Stage	1	2	3
Rate of displacement [mm/min]	0.45	0.45	0.45
Normal stress [kPa]	42	84	167
Shear stress at failure [kPa]	33	76	143
Horizontal displacement at failure [mm]	9.10	10.00	9.40
Vertical displacement at failure [mm]	-0.09	0.04	0.39
Void ratio at the end of the test [-]	0.857	0.813	0.789

Notes
Sample tested submerged
Square sample

Project: 503387 - F254727 Laboratory: Wallingford, UK Approved by: SW - 14/07/2025

Test page SB10r3-1/4

Test Report

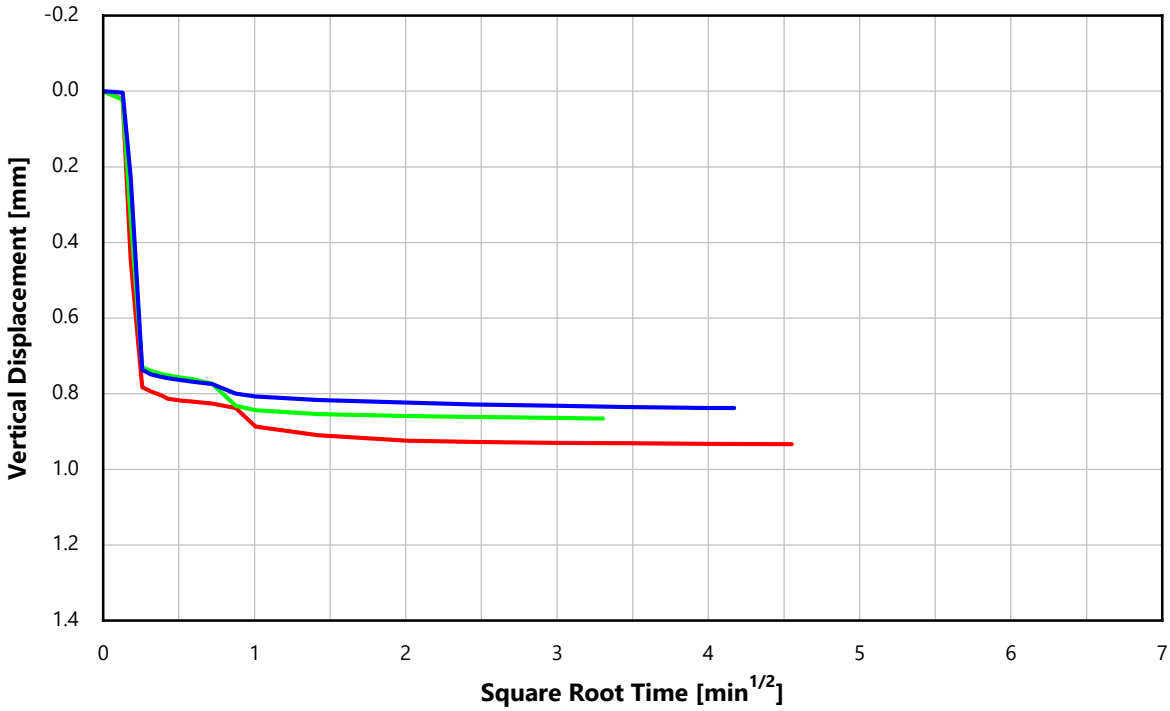
Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Consolidation Stage



Specimen 1: Normal stress 30 kPa Specimen 2: Normal stress 84 kPa Specimen 3: Normal stress 167 kPa

Project: 503387 - F254727
Test Page No.: SB10r3 - 2/4

Laboratory: Wallingford, UK

Approved by: SW - 14/07/2025

Test Report

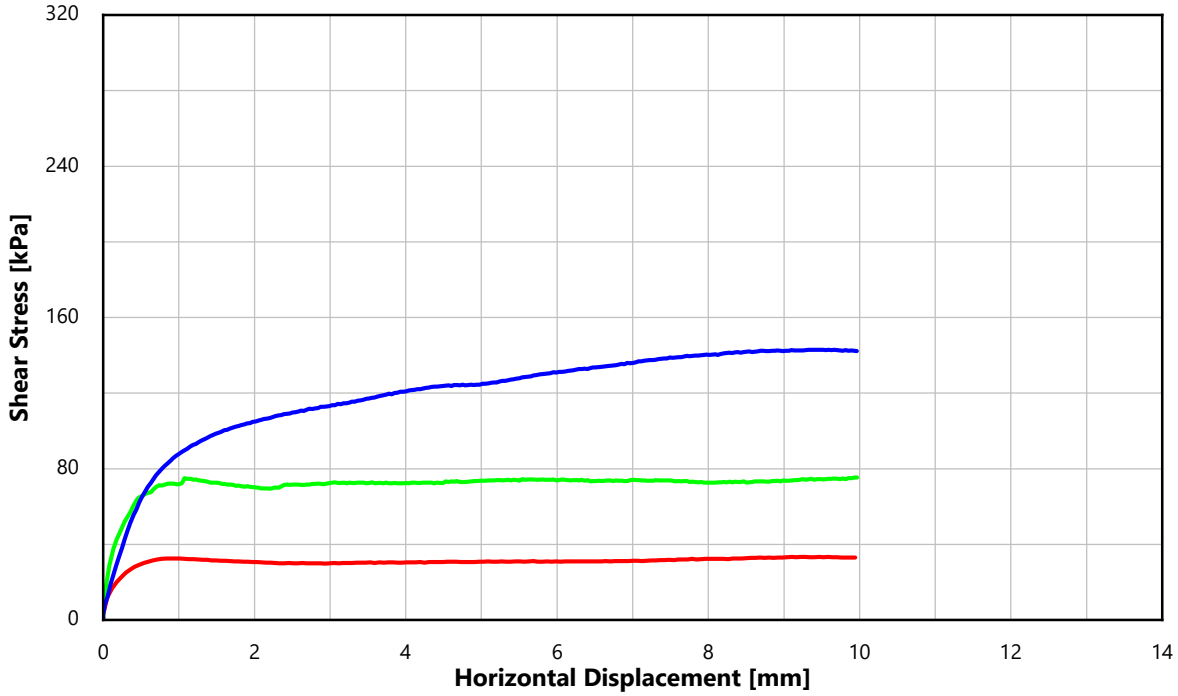
Direct Shear Test

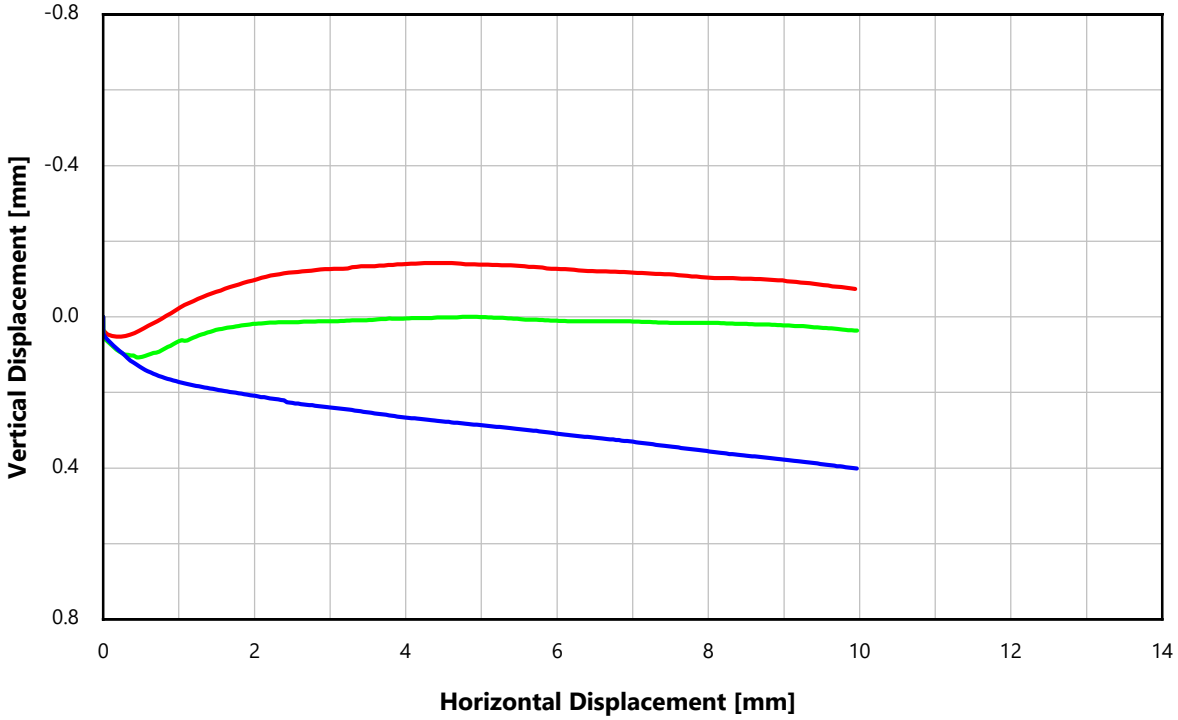
Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Shear Stage





Specimen 1: Normal stress 30 kPa — Specimen 2: Normal stress 84 kPa — Specimen 3: Normal stress 167 kPa

Project: 503387 - F254727
Test Page No.: SB10r3 - 3/4

Laboratory: Wallingford, UK

Approved by: SW - 14/07/2025

Test Report

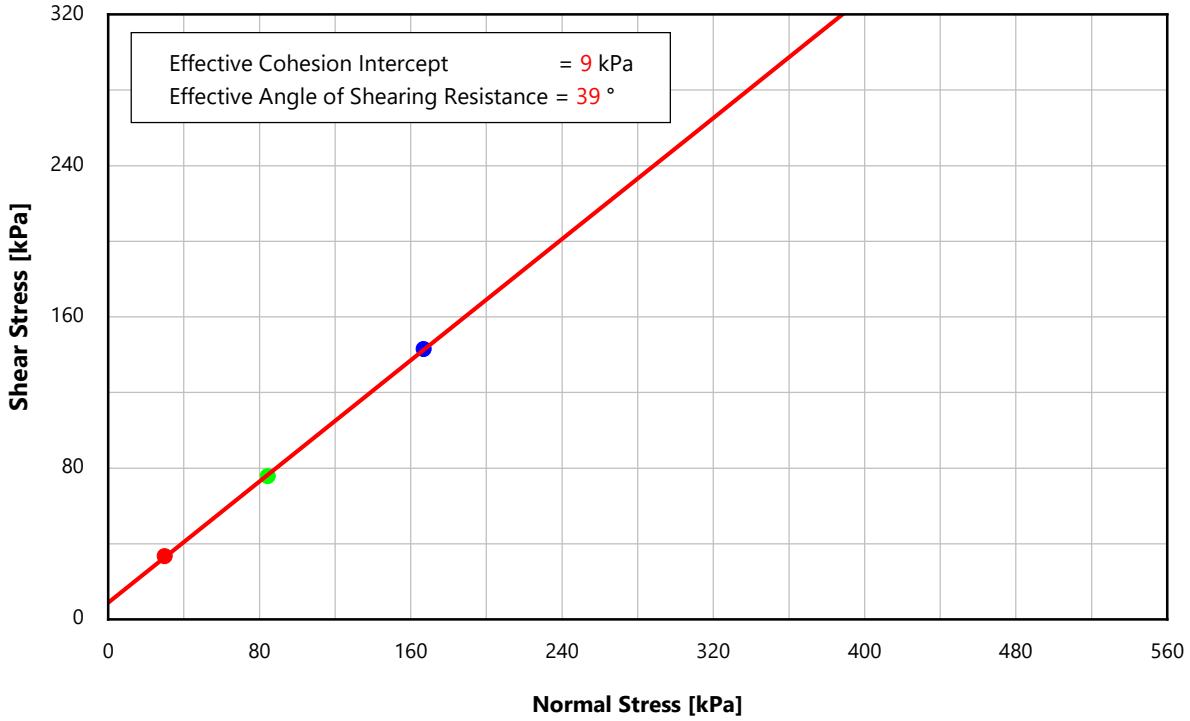
Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Friction Angle



Specimen 1: Normal stress 30 kPa | Specimen 2: Normal stress 84 kPa | Specimen 3: Normal stress 167 kPa

Project: 503387 - F254727
Test Page No.: SB10r3 - 4/4

Laboratory: Wallingford, UK

Approved by: SW - 14/07/2025

Test Report

Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Test Identification	
Location	Z4_OWF_BH05-SAMP
Sample	20-1
Depth [m]	18.00

Specimen Visual Description
Dark grey fine to medium SAND

Initial Specimen Conditions	1	2	3
Test start date	14/04/2025	14/04/2025	14/04/2025
Length [mm]	60.0	60.0	60.0
Width [mm]	60.0	60.1	60.0
Water content [%]	9.8	9.8	9.8
Bulk density [Mg/m^3]	1.91	1.90	1.90
Dry density [Mg/m^3]	1.74	1.73	1.73
Void ratio [-]	0.523	0.535	0.530
Degree of saturation [%]	50	49	49
Assumed particle density [Mg/m^3]	2.65	2.65	2.65

End of Consolidation	1	2	3
Normal stress [kPa]	84	169	337
Void ratio [-]	0.481	0.475	0.469
Vertical displacement [mm]	0.65	0.92	0.93
Degree of saturation [%]	100	100	100

Shear Stage	1	2	3
Rate of displacement [mm/min]	0.45	0.45	0.45
Normal stress [kPa]	84	169	337
Shear stress at failure [kPa]	72	134	271
Horizontal displacement at failure [mm]	1.08	1.43	1.55
Vertical displacement at failure [mm]	-0.07	-0.01	-0.02
Void ratio at the end of the test [-]	0.485	0.476	0.470

Notes
Sample tested submerged
Square sample

Project: 503387 - F254727 Laboratory: Wallingford, UK Approved by: AF - 13/05/2025

Test page SB11-1/4

Test Report

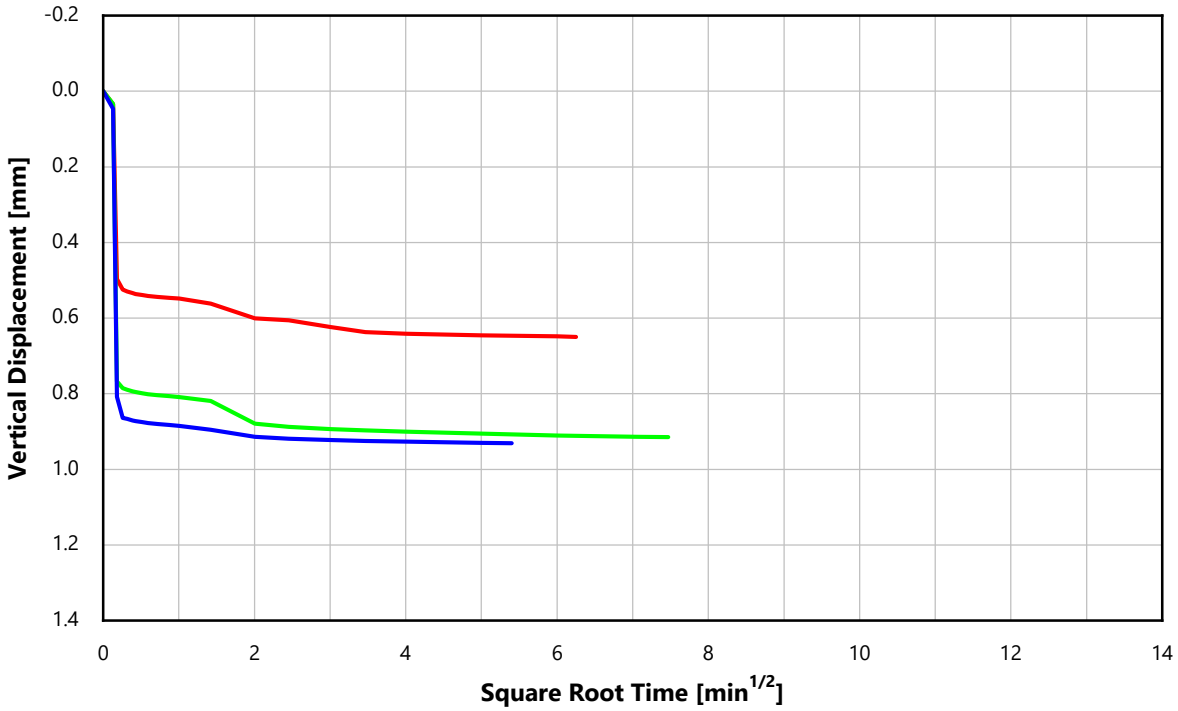
Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Consolidation Stage



Specimen 1: Normal stress 30 kPa Specimen 2: Normal stress 169 kPa Specimen 3: Normal stress 337 kPa

Project: 503387 - F254727
Test Page No.: SB11 - 2/4

Laboratory: Wallingford, UK

Approved by: AF - 13/05/2025

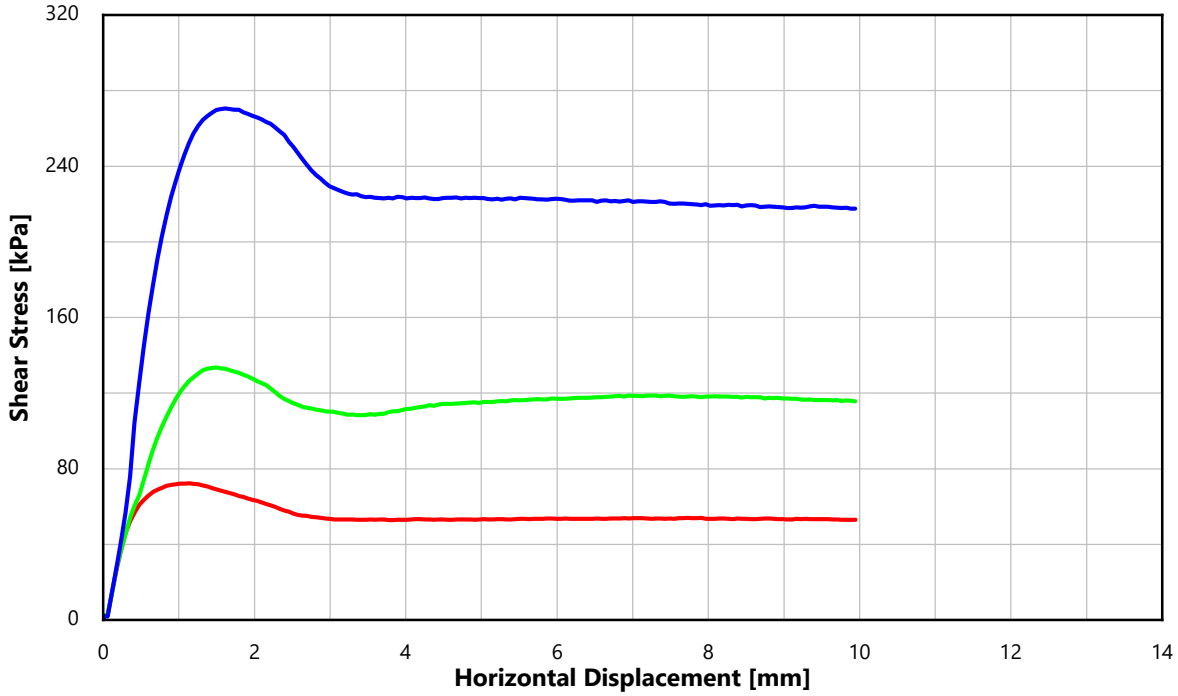
Test Report

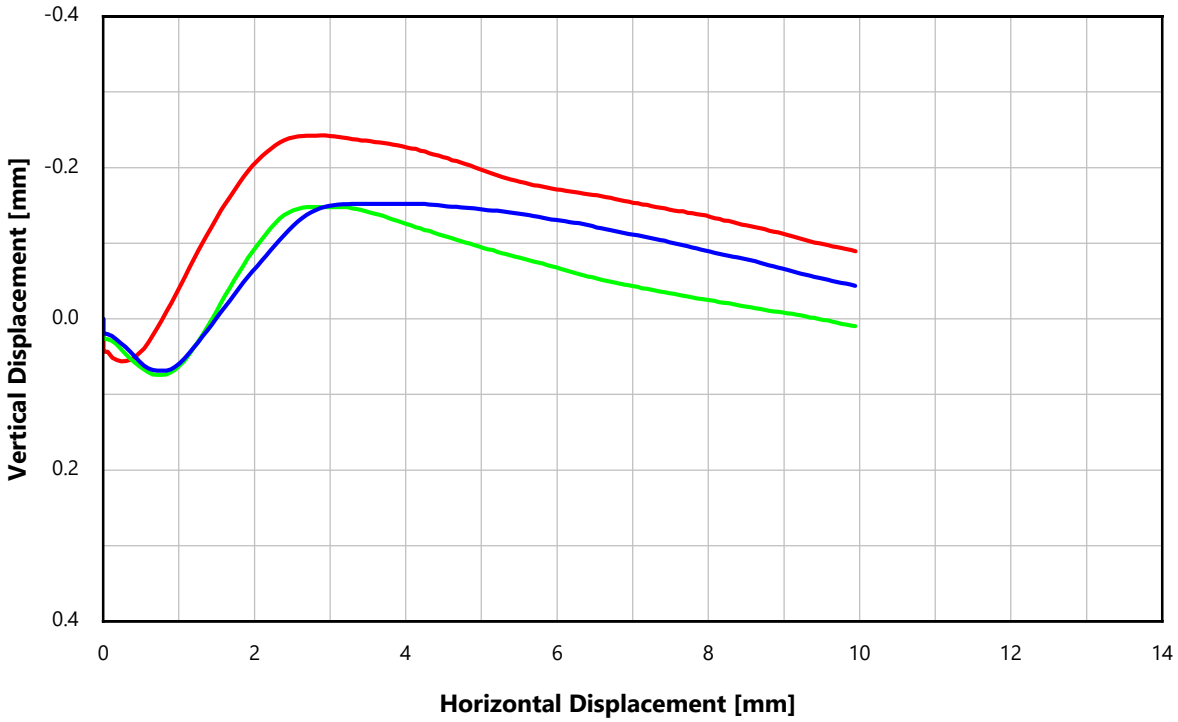
Direct Shear Test
Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Shear Stage





Specimen 1: Normal stress 30 kPa — Specimen 2: Normal stress 169 kPa — Specimen 3: Normal stress 337 kPa

Project: 503387 - F254727
Test Page No.: SB11 - 3/4

Laboratory: Wallingford, UK

Approved by: AF - 13/05/2025

Test Report

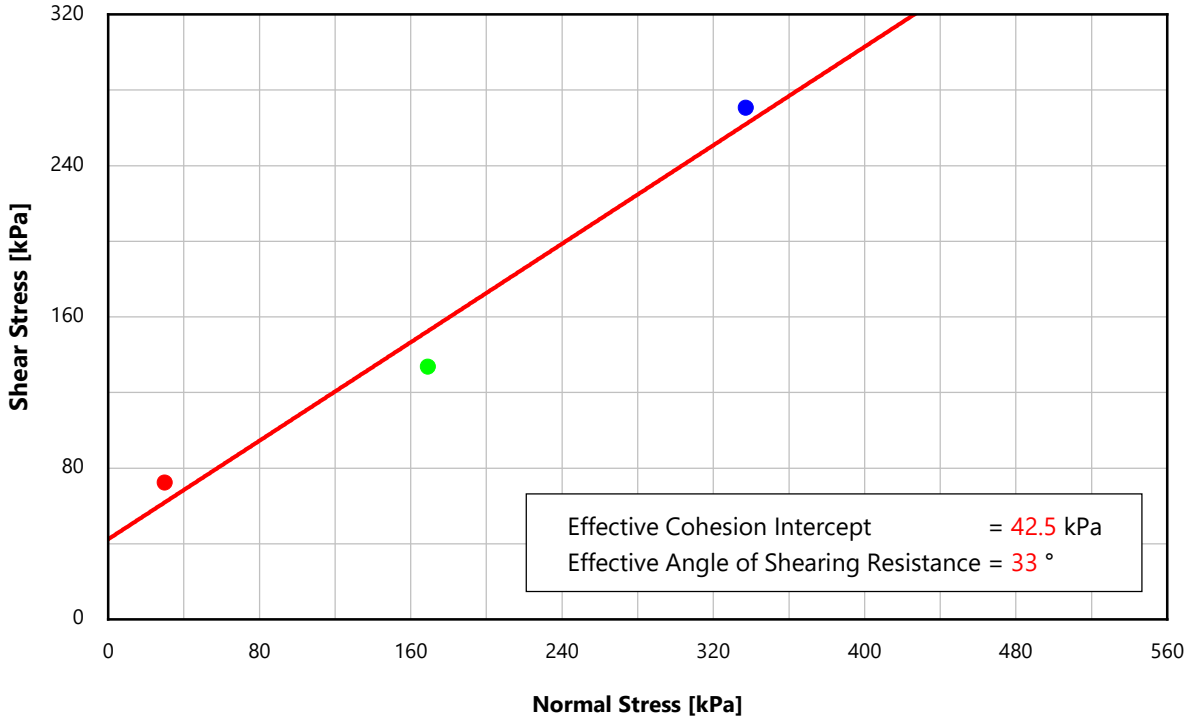
Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Friction Angle



Specimen 1: Normal stress 30 kPa | Specimen 2: Normal stress 169 kPa | Specimen 3: Normal stress 337 kPa

Project: 503387 - F254727
Test Page No.: SB11 - 4/4

Laboratory: Wallingford, UK

Approved by: AF - 13/05/2025

Test Report

Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Test Identification	
Location	Z4_OWF_BH15-COMP
Sample	04-3
Depth [m]	10.10

Specimen Visual Description
Dark grey fine to medium SAND

Initial Specimen Conditions	1	2	3
Test start date	22/04/2025	09/06/2025	07/07/2025
Length [mm]	60.0	60.0	60.0
Width [mm]	60.0	60.0	60.0
Water content [%]	9.8	9.8	9.8
Bulk density [Mg/m^3]	1.50	1.49	1.50
Dry density [Mg/m^3]	1.37	1.36	1.37
Void ratio [-]	0.935	0.952	0.941
Degree of saturation [%]	28	27	28
Assumed particle density [Mg/m^3]	2.65	2.65	2.65

End of Consolidation	1	2	3
Normal stress [kPa]	47	94	188
Void ratio [-]	0.918	0.915	0.871
Vertical displacement [mm]	0.21	0.46	0.87
Degree of saturation [%]	86	85	87

Shear Stage	1	2	3
Rate of displacement [mm/min]	0.45	0.45	0.45
Normal stress [kPa]	47	94	188
Shear stress at failure [kPa]	42	66	168
Horizontal displacement at failure [mm]	9.10	9.70	10.00
Vertical displacement at failure [mm]	-0.01	0.22	0.18
Void ratio at the end of the test [-]	0.919	0.897	0.856

Notes
Sample tested submerged
Square sample

Project: 503387 - F254727 Laboratory: Wallingford, UK Approved by: ET - 29/07/2025

Test page SB12r-1/4

Test Report

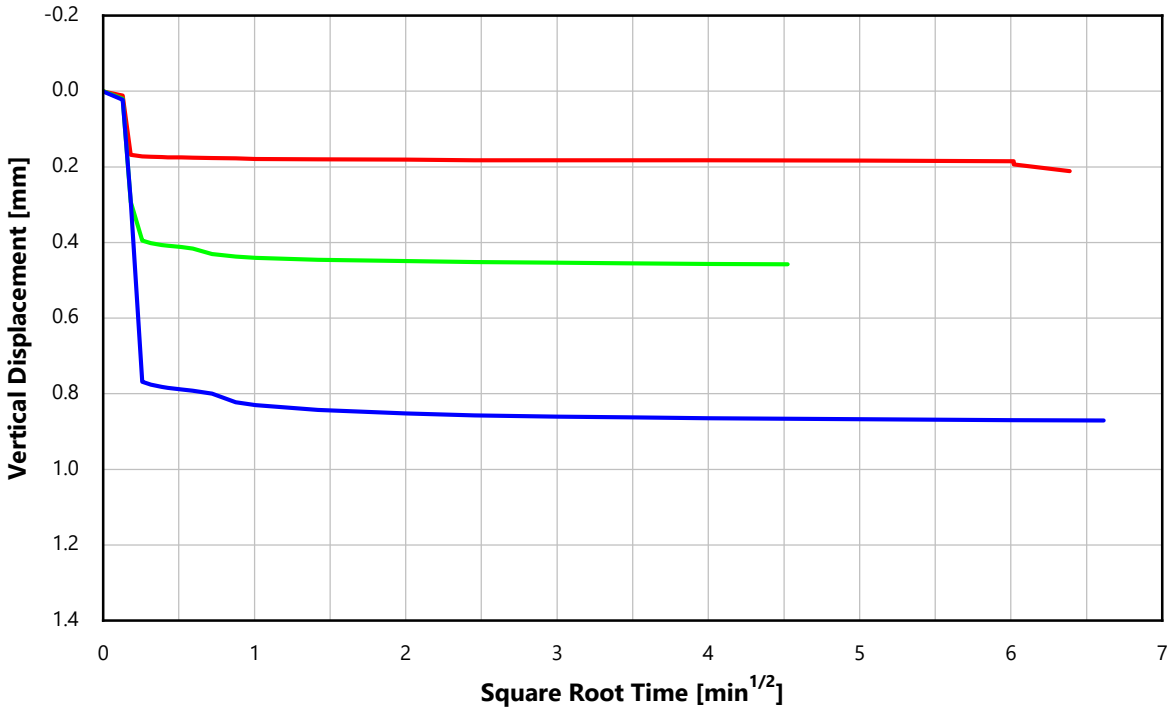
Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Consolidation Stage



Specimen 1: Normal stress 30 kPa Specimen 2: Normal stress 94 kPa Specimen 3: Normal stress 188 kPa

Test Report

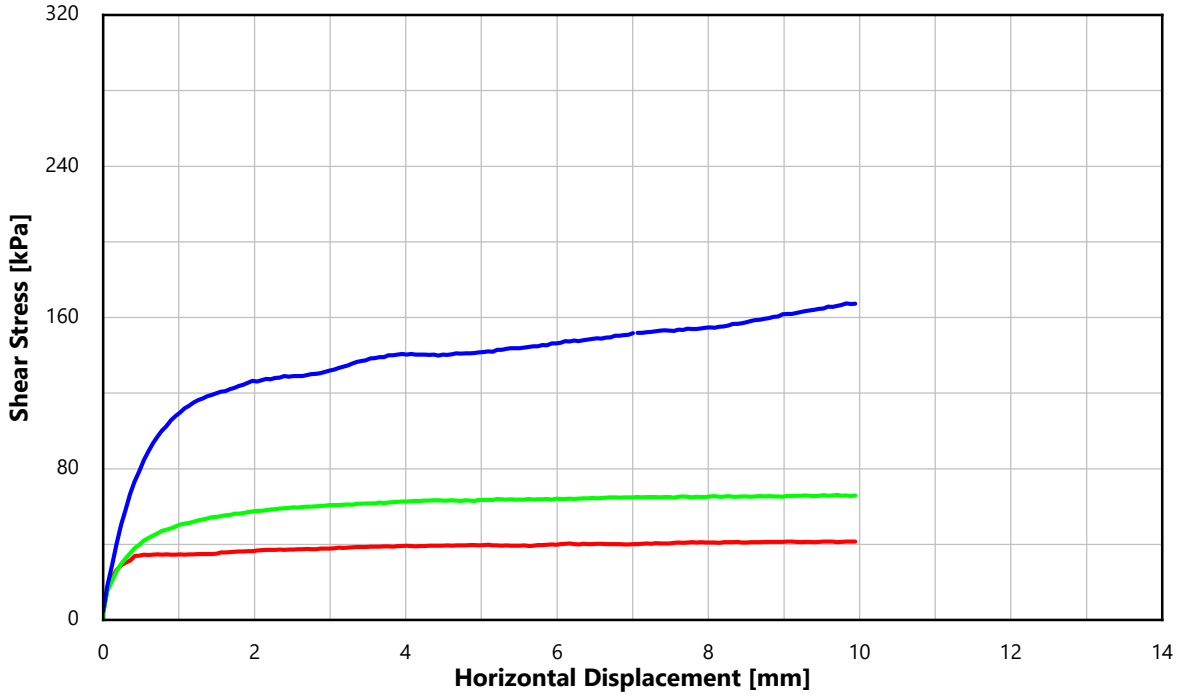
Direct Shear Test

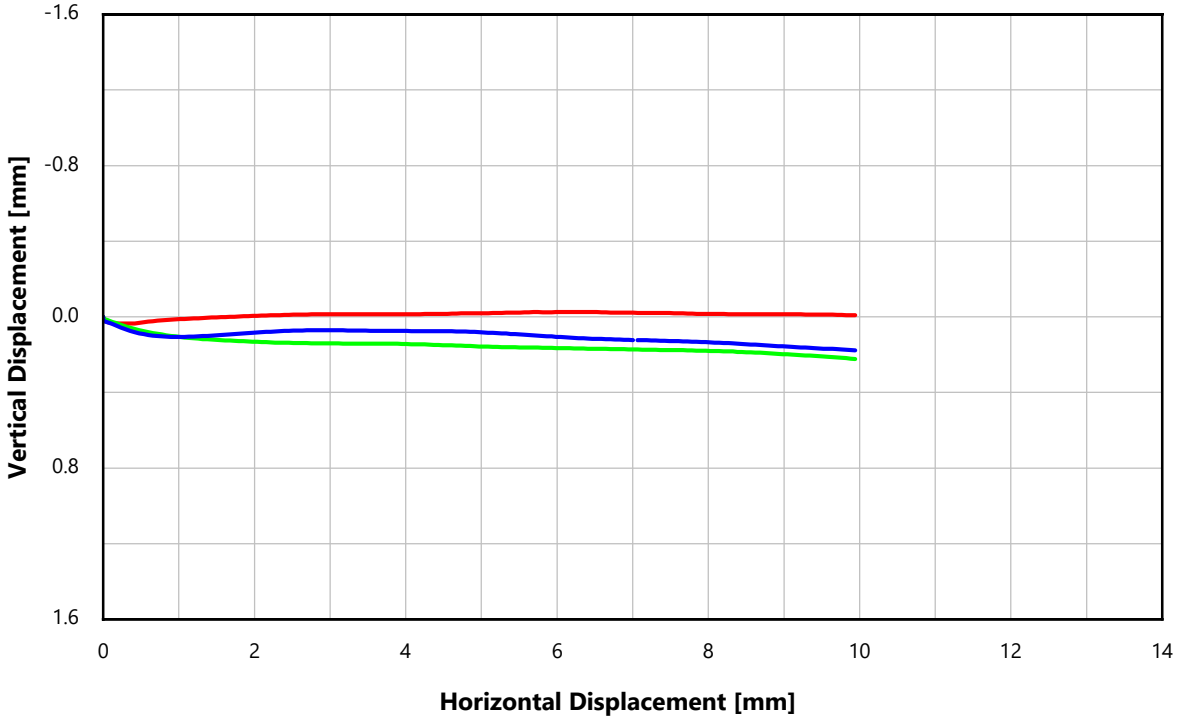
Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Shear Stage





Specimen 1: Normal stress 30 kPa — Specimen 2: Normal stress 94 kPa — Specimen 3: Normal stress 188 kPa

Project: 503387 - F254727
Test Page No.: SB12r - 3/4

Laboratory: Wallingford, UK

Approved by: -

Test Report

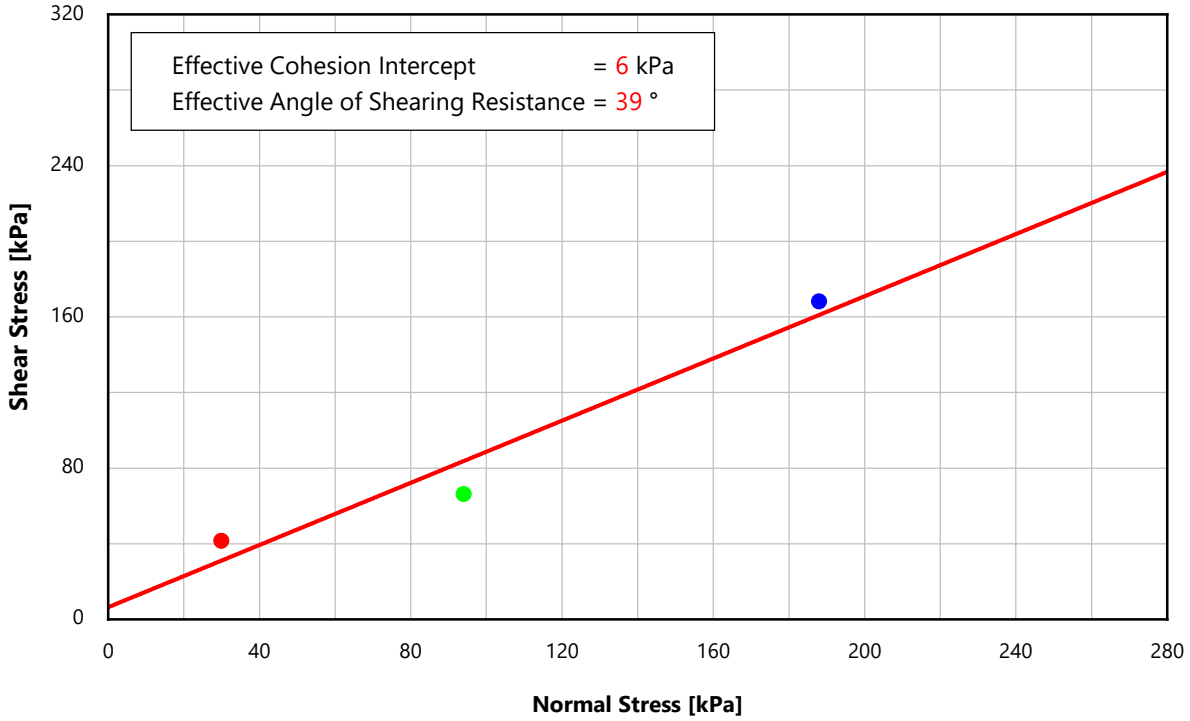
Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Friction Angle



Specimen 1: Normal stress 30 kPa — Specimen 2: Normal stress 94 kPa — Specimen 3: Normal stress 188 kPa

Project: 503387 - F254727
Test Page No.: SB12r - 4/4

Laboratory: Wallingford, UK

Approved by: -

Test Report

Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Test Identification	
Location	Z4_OWF_BH15-COMP
Sample	04-3
Depth [m]	10.10

Specimen Visual Description
Dark grey fine to medium SAND

Initial Specimen Conditions	1	2	3
Test start date	22/04/2025	09/06/2025	07/07/2025
Length [mm]	60.0	60.0	60.0
Width [mm]	60.0	60.0	60.0
Water content [%]	9.8	9.8	9.8
Bulk density [Mg/m^3]	1.50	1.49	1.50
Dry density [Mg/m^3]	1.37	1.36	1.37
Void ratio [-]	0.935	0.952	0.941
Degree of saturation [%]	28	27	28
Assumed particle density [Mg/m^3]	2.65	2.65	2.65

End of Consolidation	1	2	3
Normal stress [kPa]	47	94	188
Void ratio [-]	0.918	0.915	0.871
Vertical displacement [mm]	0.21	0.46	0.87
Degree of saturation [%]	86	85	87

Shear Stage	1	2	3
Rate of displacement [mm/min]	0.45	0.45	0.45
Normal stress [kPa]	47	94	188
Shear stress at failure [kPa]	42	66	168
Horizontal displacement at failure [mm]	9.10	9.70	10.00
Vertical displacement at failure [mm]	-0.01	0.22	0.18
Void ratio at the end of the test [-]	0.919	0.897	0.856

Notes
Sample tested submerged
Square sample

Project: 503387 - F254727 Laboratory: Wallingford, UK Approved by: ET - 29/07/2025

Test page SB12r-1/4

Test Report

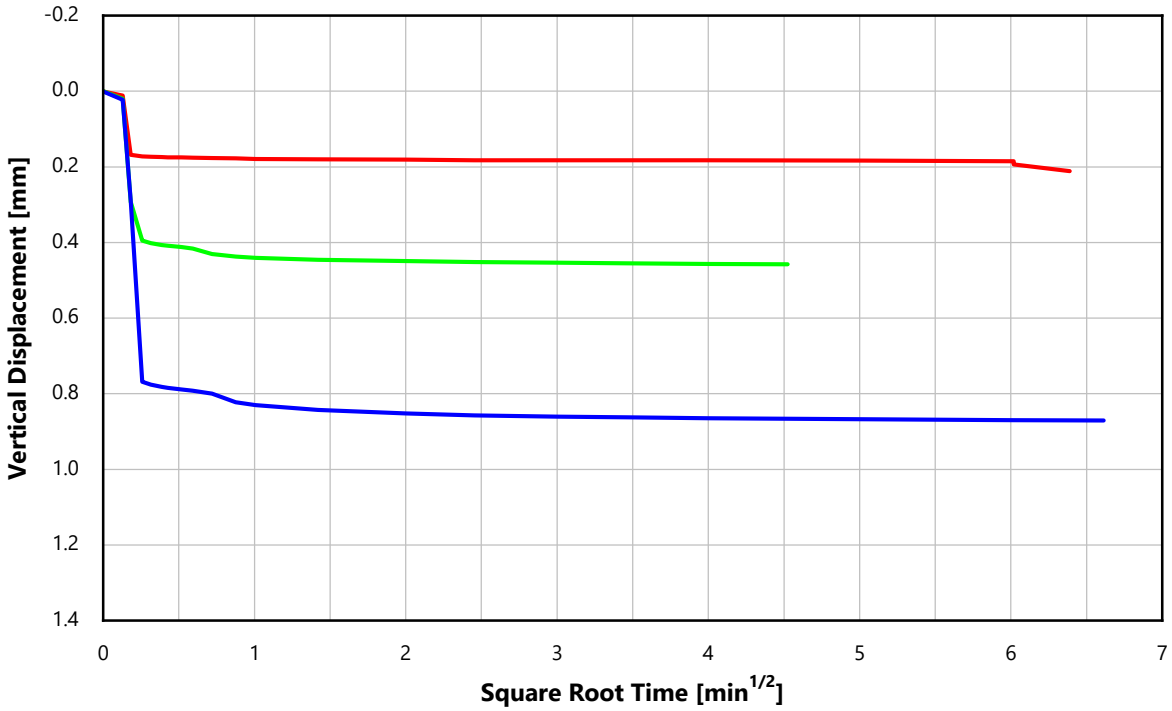
Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Consolidation Stage



Specimen 1: Normal stress 30 kPa Specimen 2: Normal stress 94 kPa Specimen 3: Normal stress 188 kPa

Project: 503387 - F254727
Test Page No.: SB12r - 2/4

Laboratory: Wallingford, UK

Approved by: -

Test Report

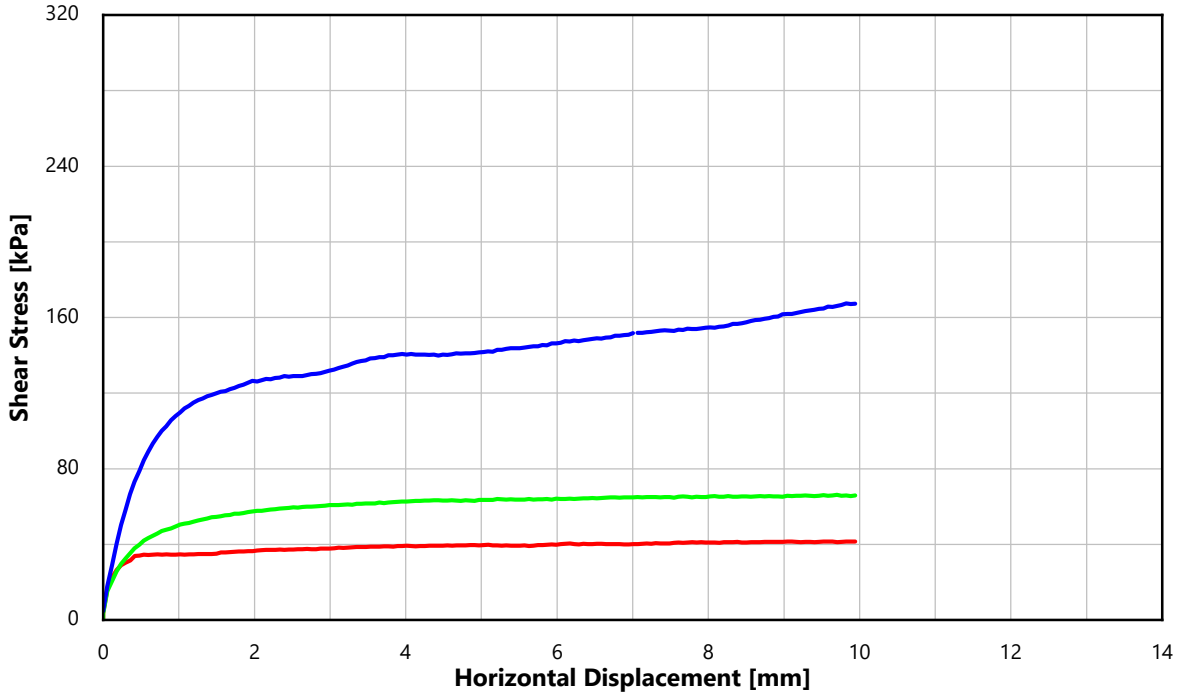
Direct Shear Test

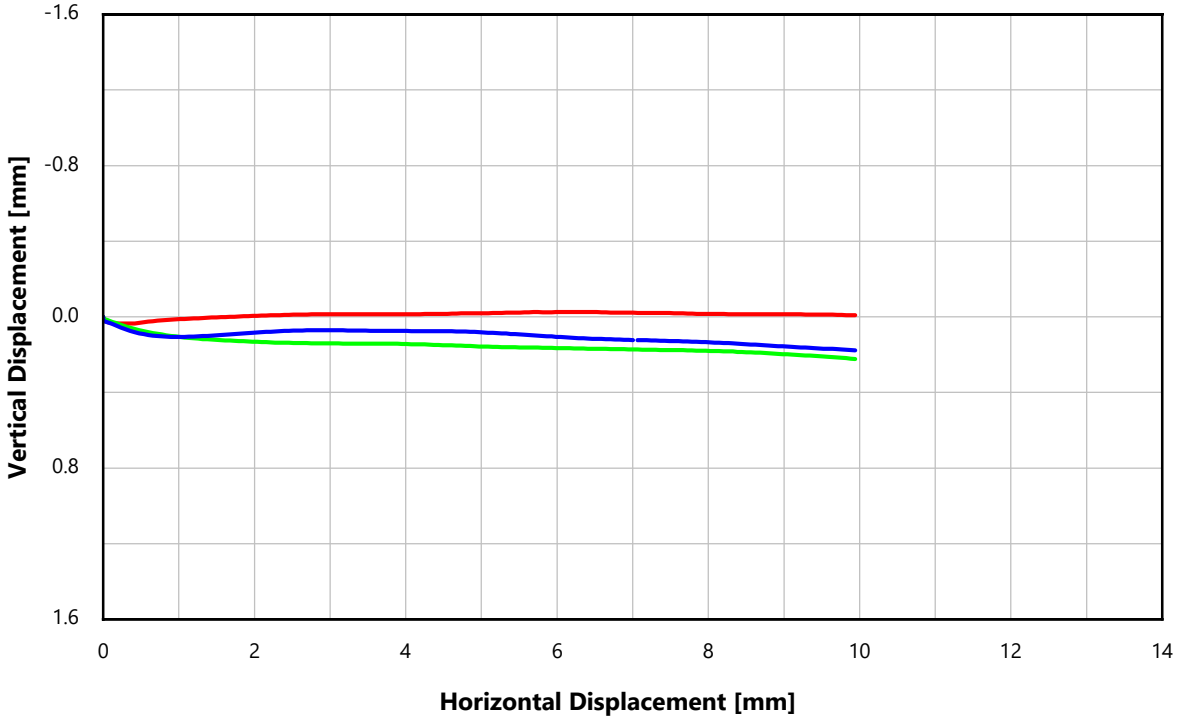
Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Shear Stage





Specimen 1: Normal stress 30 kPa — Specimen 2: Normal stress 94 kPa — Specimen 3: Normal stress 188 kPa

Project: 503387 - F254727
Test Page No.: SB12r - 3/4

Laboratory: Wallingford, UK

Approved by: -

Test Report

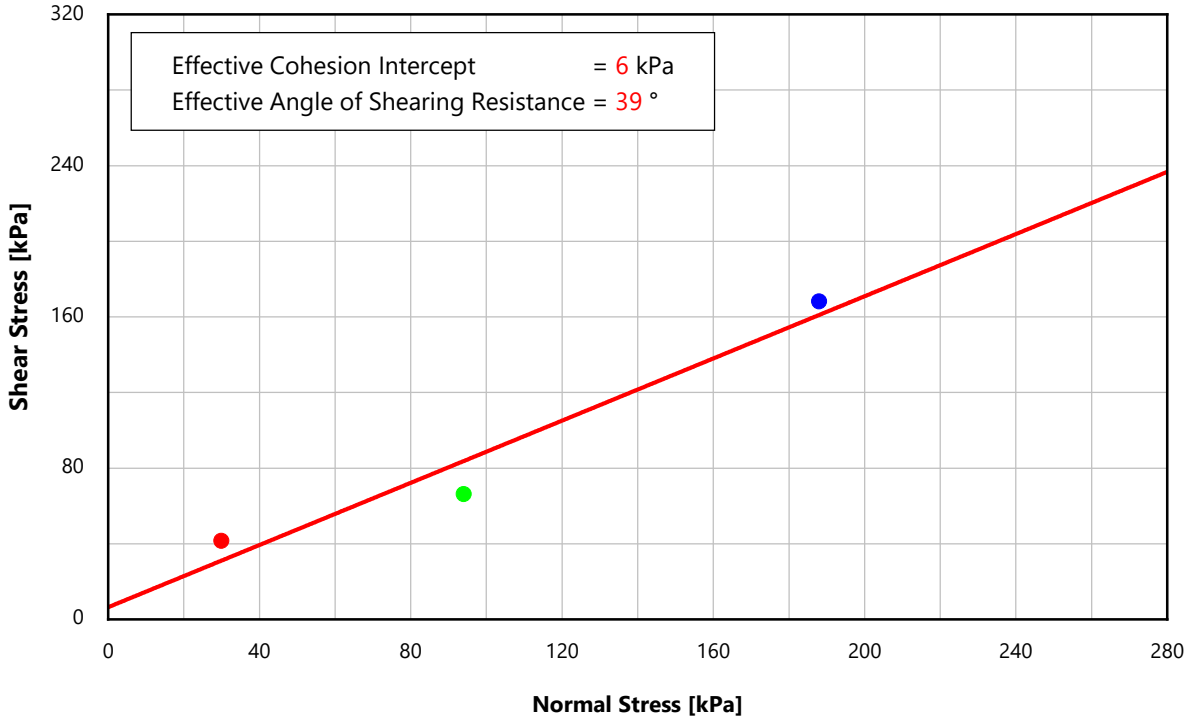
Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Friction Angle



Specimen 1: Normal stress 30 kPa — Specimen 2: Normal stress 94 kPa — Specimen 3: Normal stress 188 kPa

Project: 503387 - F254727
Test Page No.: SB12r - 4/4

Laboratory: Wallingford, UK

Approved by: -

Test Report

Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Test Identification	
Location	Z4_OWF_BH16-SAMP
Sample	04-1
Depth [m]	2.50

Specimen Visual Description
Dark grey medium SAND

Initial Specimen Conditions	1	2	3
Test start date	15/04/2025	15/04/2025	15/04/2025
Length [mm]	60.0	60.1	60.0
Width [mm]	60.0	60.0	60.0
Water content [%]	10.0	10.0	10.0
Bulk density [Mg/m^3]	1.92	1.89	1.90
Dry density [Mg/m^3]	1.74	1.72	1.72
Void ratio [-]	0.522	0.541	0.536
Degree of saturation [%]	51	49	49
Assumed particle density [Mg/m^3]	2.65	2.65	2.65

End of Consolidation	1	2	3
Normal stress [kPa]	25	50	100
Void ratio [-]	0.513	0.519	0.507
Vertical displacement [mm]	0.13	0.34	0.45
Degree of saturation [%]	100	100	100

Shear Stage	1	2	3
Rate of displacement [mm/min]	0.45	0.45	0.45
Normal stress [kPa]	26	50	100
Shear stress at failure [kPa]	23	40	78
Horizontal displacement at failure [mm]	0.90	0.90	1.38
Vertical displacement at failure [mm]	-0.04	-0.04	-0.04
Void ratio at the end of the test [-]	0.515	0.521	0.509

Notes
Sample tested submerged
Square sample

Project: 503387 - F254727 Laboratory: Wallingford, UK Approved by: SW - 03/06/2025

Test page SB13-1/4

Test Report

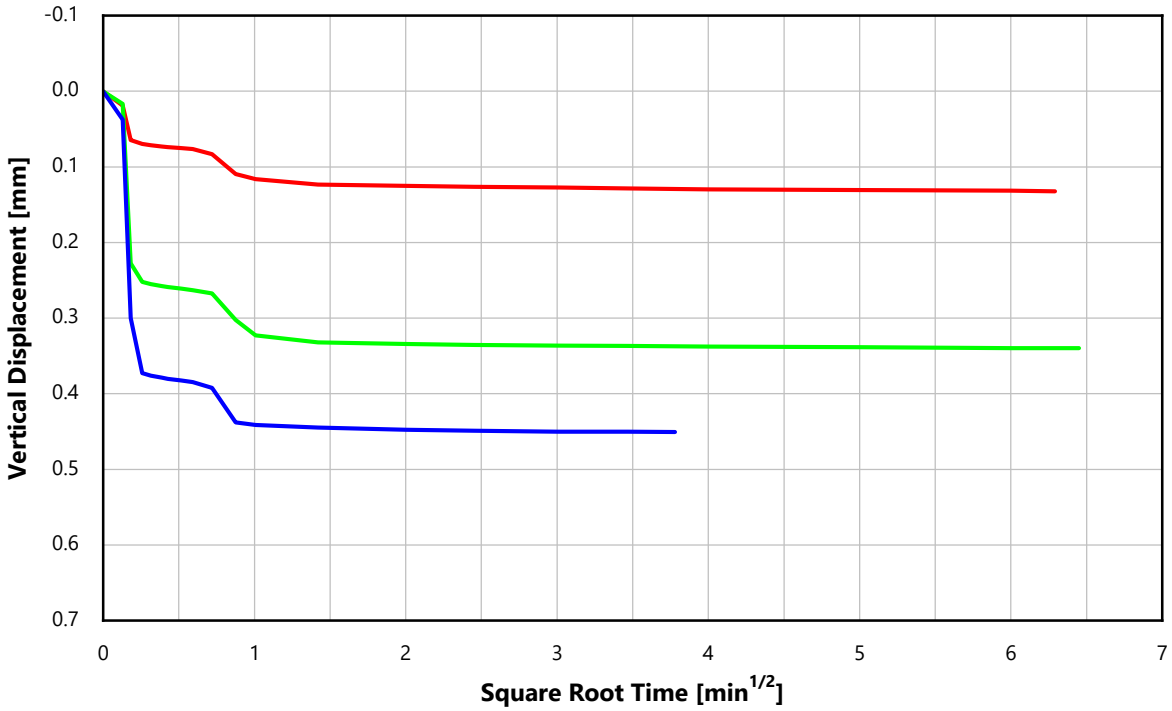
Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Consolidation Stage



Specimen 1: Normal stress 30 kPa
Specimen 2: Normal stress 50 kPa
Specimen 3: Normal stress 100 kPa

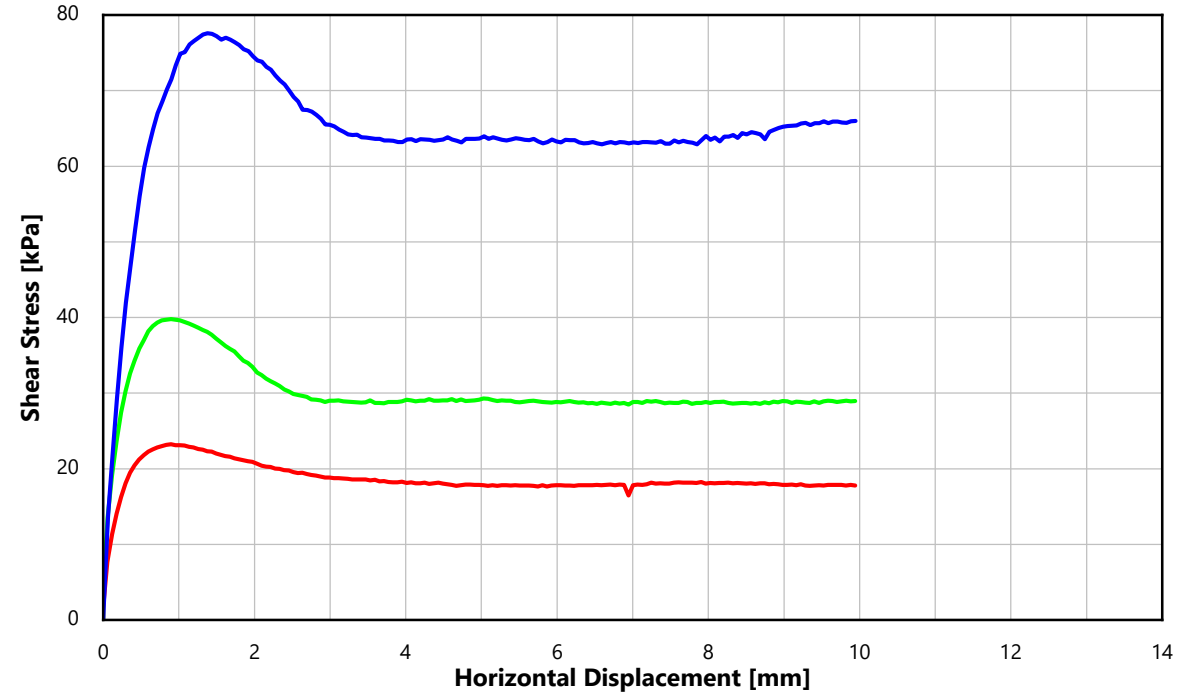
Test Report

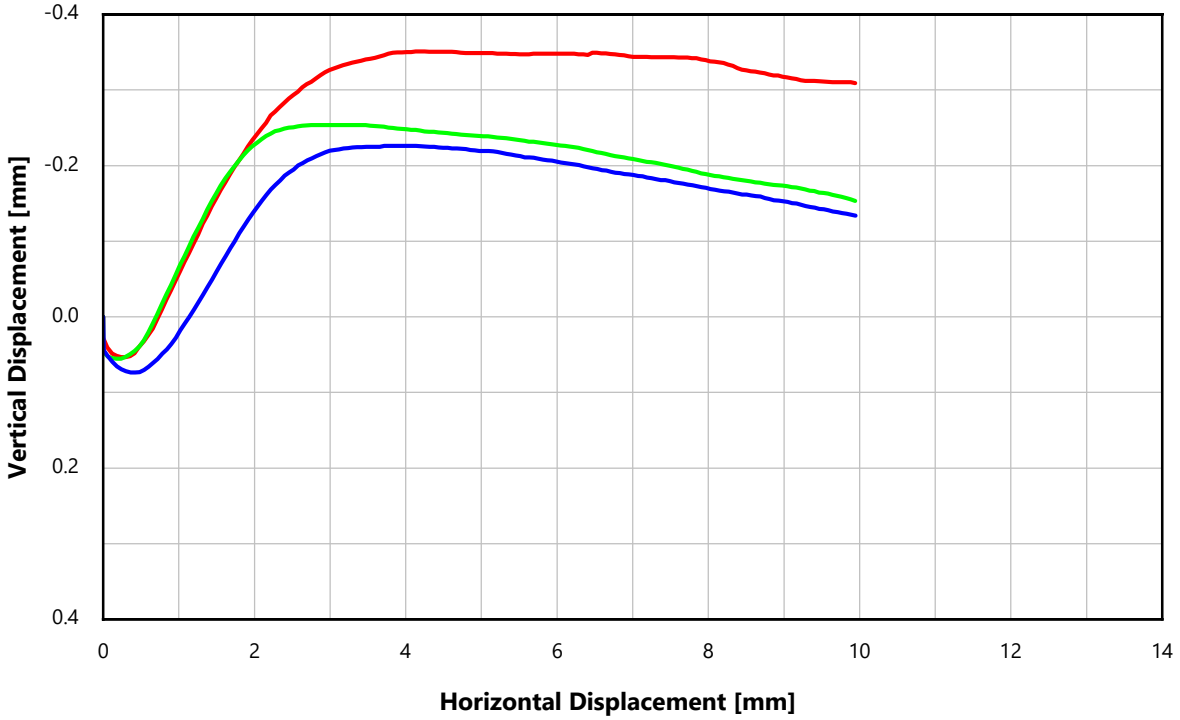
Direct Shear Test
Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Shear Stage





Specimen 1: Normal stress 30 kPa — Specimen 2: Normal stress 50 kPa — Specimen 3: Normal stress 100 kPa

Project: 503387 - F254727
Test Page No.: SB13 - 3/4

Laboratory: Wallingford, UK

Approved by: SW - 03/06/2025

Test Report

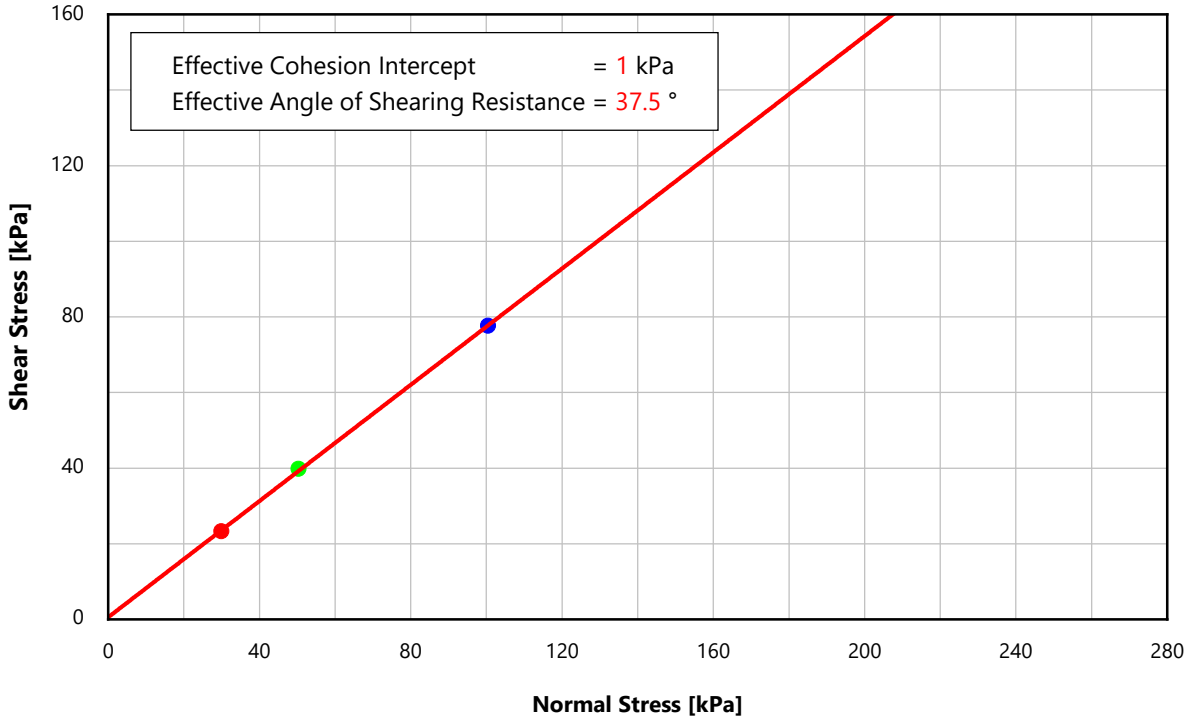
Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Friction Angle



Specimen 1: Normal stress 30 kPa | Specimen 2: Normal stress 50 kPa | Specimen 3: Normal stress 100 kPa

Project: 503387 - F254727
Test Page No.: SB13 - 4/4

Laboratory: Wallingford, UK

Approved by: SW - 03/06/2025

Test Report

Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Test Identification	
Location	Z4_OWF_BH16-SAMP
Sample	11-2
Depth [m]	9.30

Specimen Visual Description
Dark grey SAND

Initial Specimen Conditions	1	2	3
Test start date	16/04/2025	16/04/2025	16/04/2025
Length [mm]	60.0	60.0	60.0
Width [mm]	60.0	60.0	60.0
Water content [%]	10.2	10.2	10.2
Bulk density [Mg/m^3]	1.93	1.96	1.95
Dry density [Mg/m^3]	1.76	1.78	1.77
Void ratio [-]	0.510	0.489	0.495
Degree of saturation [%]	53	55	55
Assumed particle density [Mg/m^3]	2.65	2.65	2.65

End of Consolidation	1	2	3
Normal stress [kPa]	43	86	172
Void ratio [-]	0.462	0.430	0.440
Vertical displacement [mm]	0.73	0.90	0.84
Degree of saturation [%]	100	100	100

Shear Stage	1	2	3
Rate of displacement [mm/min]	0.45	0.45	0.45
Normal stress [kPa]	43	86	172
Shear stress at failure [kPa]	60	79	153
Horizontal displacement at failure [mm]	1.38	1.50	1.55
Vertical displacement at failure [mm]	-0.04	-0.10	-0.11
Void ratio at the end of the test [-]	0.464	0.436	0.448

Notes
Sample tested submerged
Square sample

Project: 503387 - F254727 Laboratory: Wallingford, UK Approved by: SW - 03/07/2025

Test page SB14r-1/4

Test Report

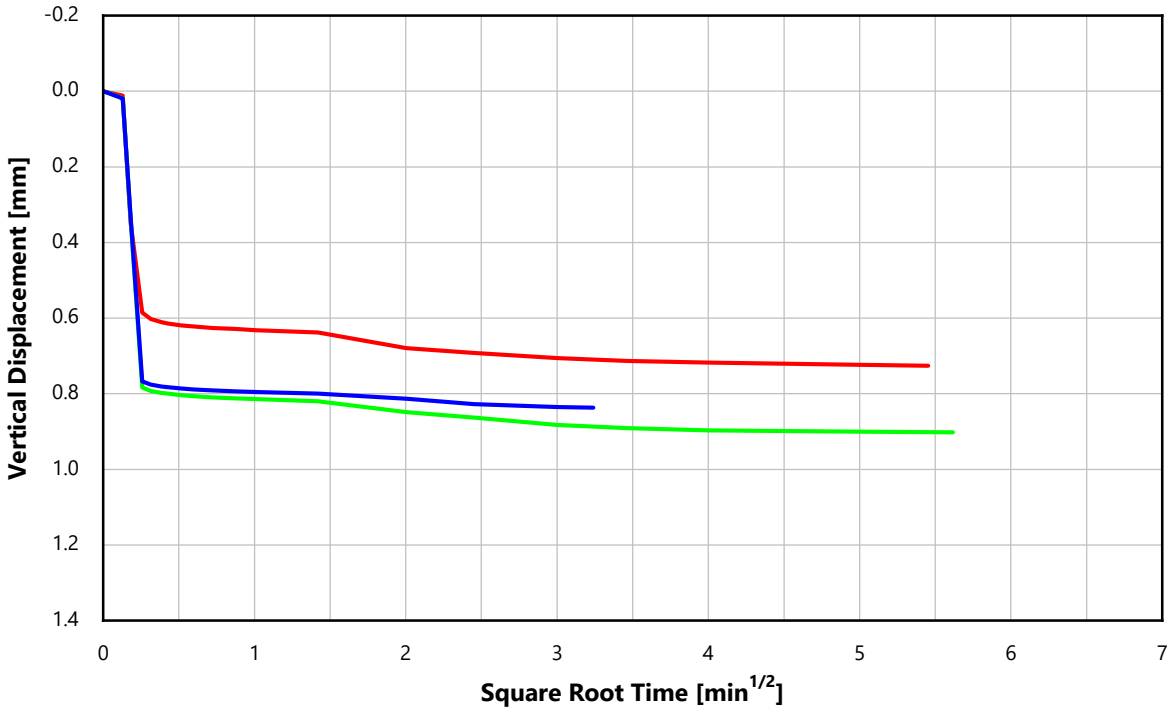
Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Consolidation Stage



Specimen 1: Normal stress 43 kPa Specimen 2: Normal stress 86 kPa Specimen 3: Normal stress 172 kPa

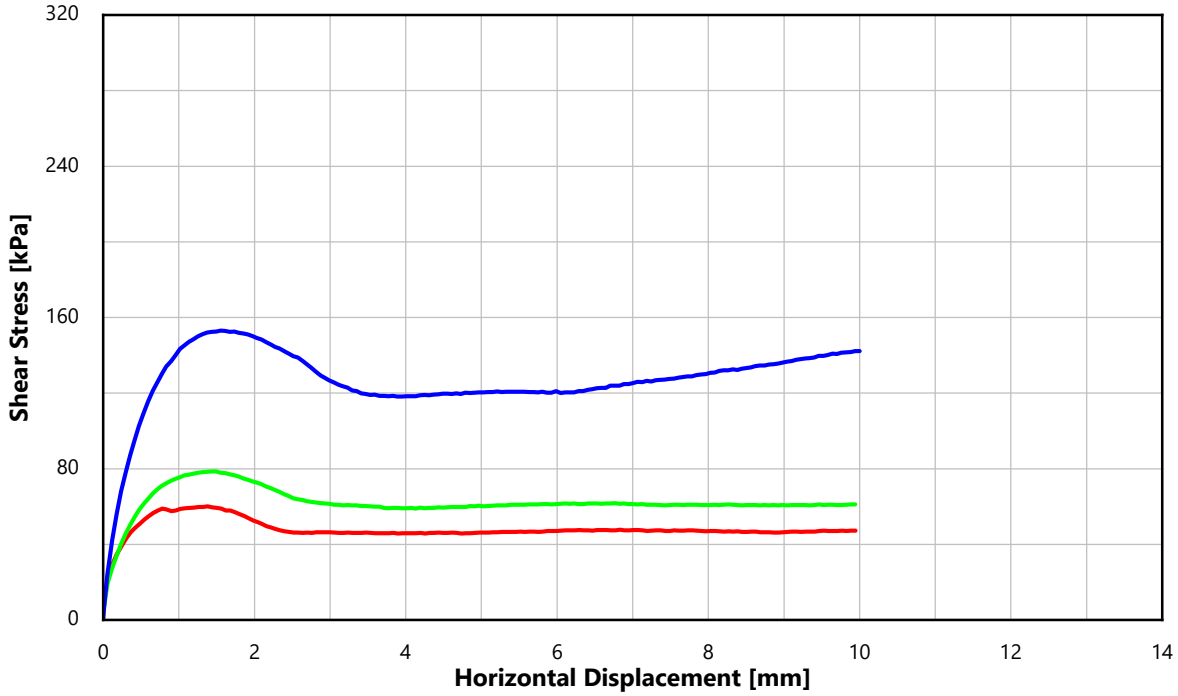
Test Report

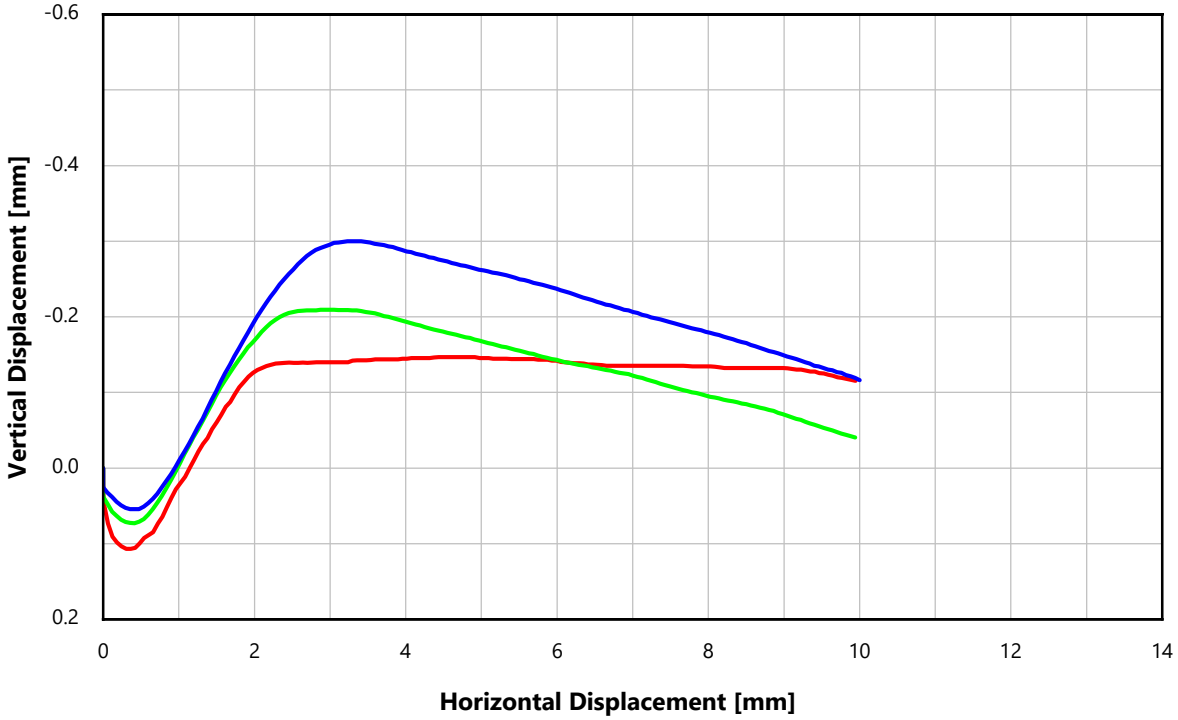
Direct Shear Test
Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Shear Stage





Specimen 1: Normal stress 43 kPa — Specimen 2: Normal stress 86 kPa — Specimen 3: Normal stress 172 kPa

Project: 503387 - F254727
Test Page No.: SB14r - 3/4

Laboratory: Wallingford, UK

Approved by: SW - 03/07/2025

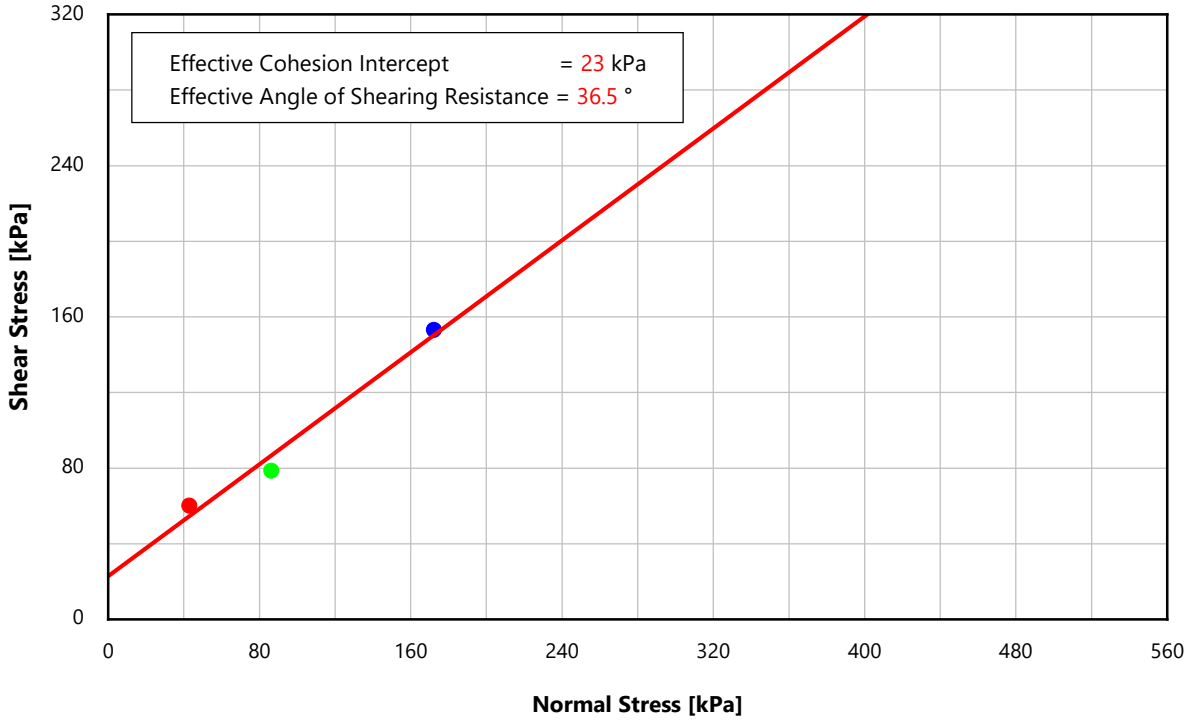
Test Report

Direct Shear Test
Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Friction Angle



Specimen 1: Normal stress 43 kPa | Specimen 2: Normal stress 86 kPa | Specimen 3: Normal stress 172 kPa

Project: 503387 - F254727
Test Page No.: SB14r - 4/4

Laboratory: Wallingford, UK

Approved by: SW - 03/07/2025

Test Report

Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Test Identification	
Location	Z4_OWF_BH16-SAMP
Sample	19-1
Depth [m]	16.50

Specimen Visual Description
Dark grey fine to medium SAND

Initial Specimen Conditions	1	2	3
Test start date	20/06/2025	20/06/2025	20/06/2025
Length [mm]	60.0	60.0	60.0
Width [mm]	60.0	60.0	60.0
Water content [%]	9.0	9.0	9.0
Bulk density [Mg/m^3]	1.59	1.58	1.59
Dry density [Mg/m^3]	1.46	1.45	1.46
Void ratio [-]	0.817	0.829	0.818
Degree of saturation [%]	29	29	29
Assumed particle density [Mg/m^3]	2.65	2.65	2.65

End of Consolidation	1	2	3
Normal stress [kPa]	76	152	305
Void ratio [-]	0.729	0.778	0.635
Vertical displacement [mm]	1.16	0.67	2.41
Degree of saturation [%]	82	82	91

Shear Stage	1	2	3
Rate of displacement [mm/min]	0.45	0.45	0.45
Normal stress [kPa]	76	0	305
Shear stress at failure [kPa]	76	117	271
Horizontal displacement at failure [mm]	9.88	10.00	9.82
Vertical displacement at failure [mm]	0.31	0.49	0.79
Void ratio at the end of the test [-]	0.706	0.740	0.575

Notes
Sample tested submerged
Square sample

Project: 503387 - F254727 Laboratory: Wallingford, UK Approved by: ET - 15/08/2025

Test page SB15r-1/4

Test Report

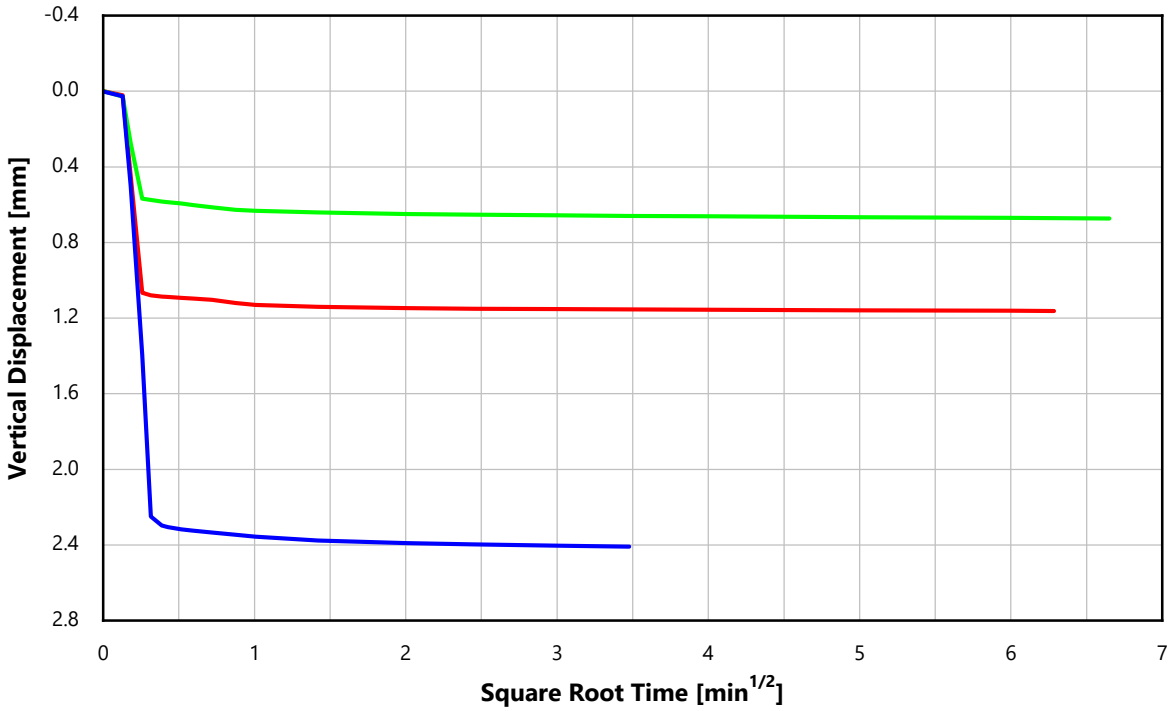
Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Consolidation Stage



Specimen 1: Normal stress 76 kPa
Specimen 2: Normal stress 152 kPa
Specimen 3: Normal stress 305 kPa

Test Report

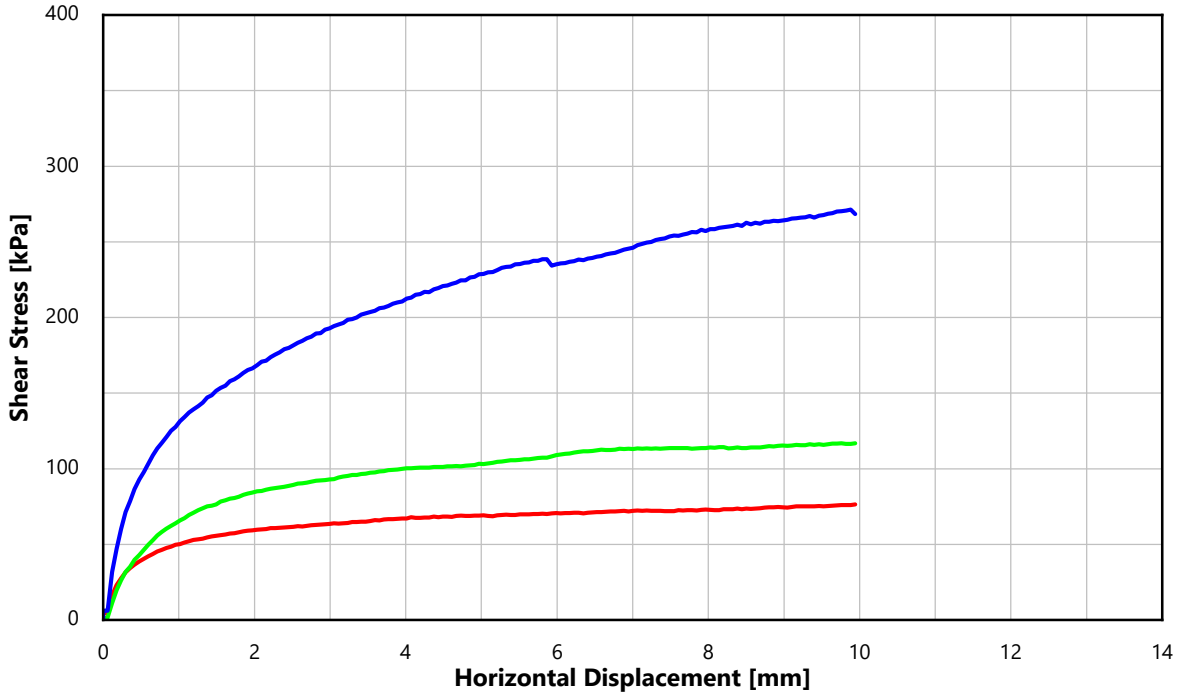
Direct Shear Test

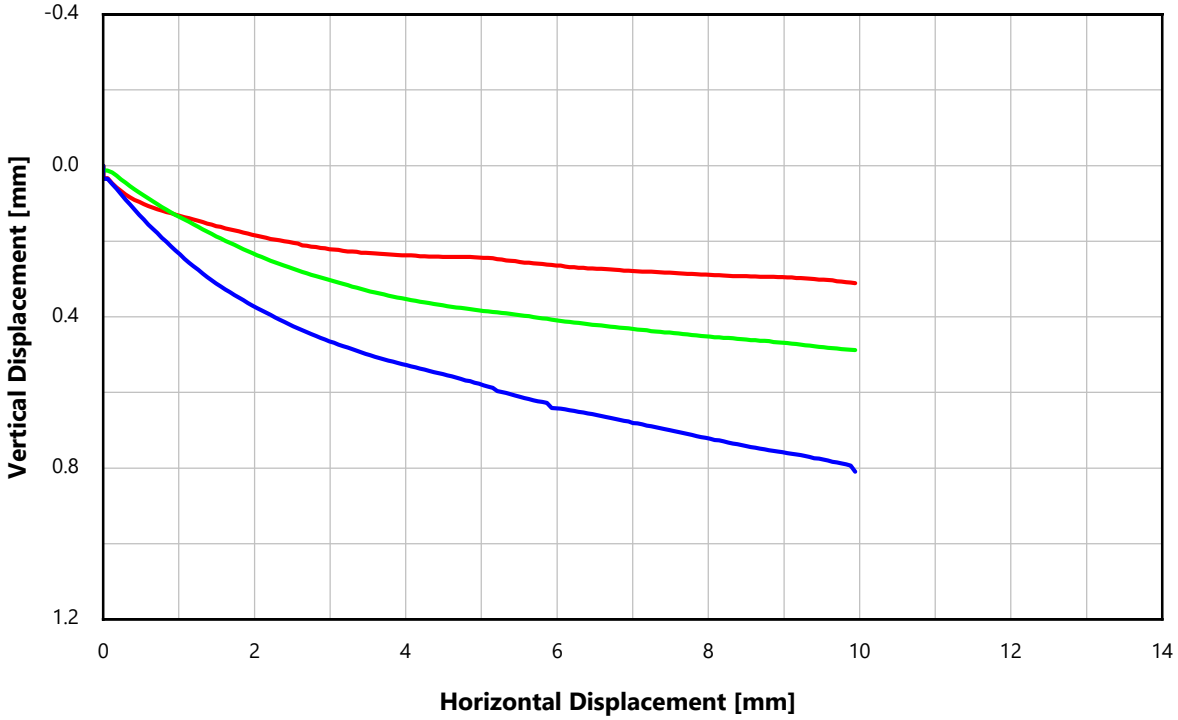
Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Shear Stage





Specimen 1: Normal stress 76 kPa — Specimen 2: Normal stress 152 kPa — Specimen 3: Normal stress 305 kPa

Project: 503387 - F254727
Test Page No.: SB15r - 3/4

Laboratory: Wallingford, UK

Approved by: ET - 15/08/2025

Test Report

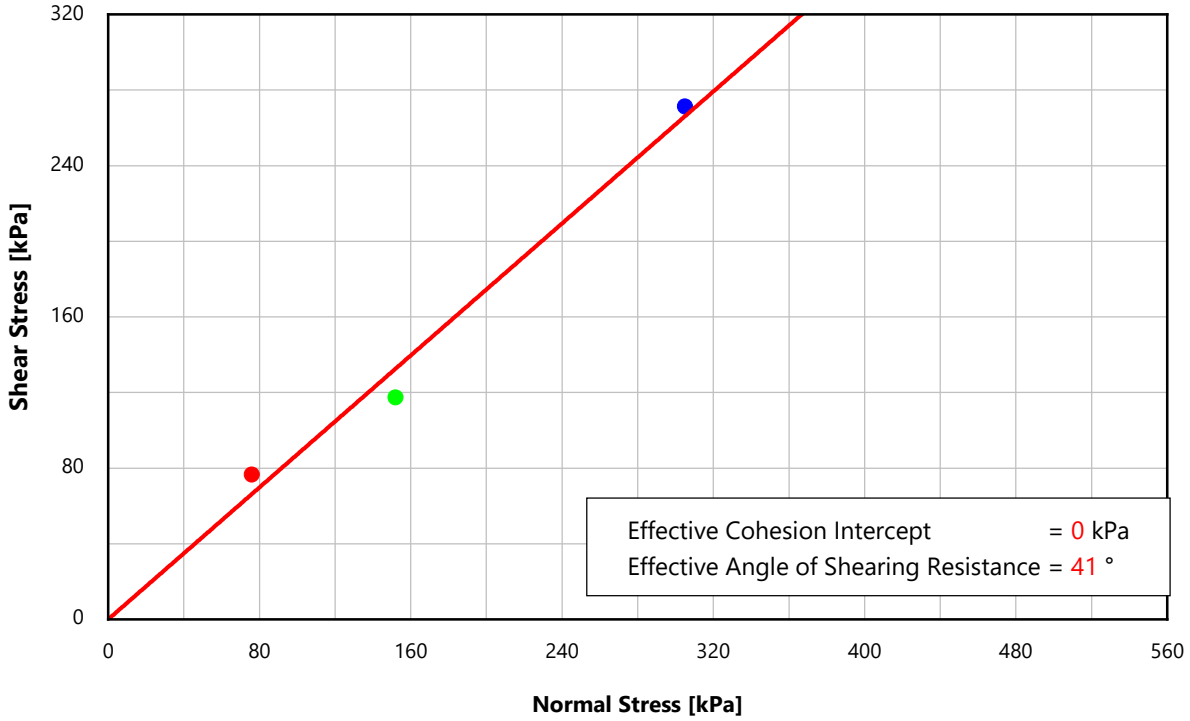
Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Friction Angle



Specimen 1: Normal stress 76 kPa | Specimen 2: Normal stress 152 kPa | Specimen 3: Normal stress 305 kPa

Project: 503387 - F254727
Test Page No.: SB15r - 4/4

Laboratory: Wallingford, UK

Approved by: ET - 15/08/2025

Test Report

Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Test Identification	
Location	Z4_OWF_BH16-SAMP
Sample	19-1
Depth [m]	16.50

Specimen Visual Description
Dark grey fine to medium SAND

Initial Specimen Conditions	1	2	3
Test start date	20/06/2025	20/06/2025	20/06/2025
Length [mm]	60.0	60.0	60.0
Width [mm]	60.0	60.0	60.0
Water content [%]	9.0	9.0	9.0
Bulk density [Mg/m^3]	1.59	1.58	1.59
Dry density [Mg/m^3]	1.46	1.45	1.46
Void ratio [-]	0.817	0.829	0.818
Degree of saturation [%]	29	29	29
Assumed particle density [Mg/m^3]	2.65	2.65	2.65

End of Consolidation	1	2	3
Normal stress [kPa]	76	152	305
Void ratio [-]	0.729	0.778	0.635
Vertical displacement [mm]	1.16	0.67	2.41
Degree of saturation [%]	82	82	91

Shear Stage	1	2	3
Rate of displacement [mm/min]	0.45	0.45	0.45
Normal stress [kPa]	76	0	305
Shear stress at failure [kPa]	76	117	271
Horizontal displacement at failure [mm]	9.88	10.00	9.82
Vertical displacement at failure [mm]	0.31	0.49	0.79
Void ratio at the end of the test [-]	0.706	0.740	0.575

Notes
Sample tested submerged
Square sample

Project: 503387 - F254727 Laboratory: Wallingford, UK Approved by: ET - 15/08/2025

Test page SB15r-1/4

Test Report

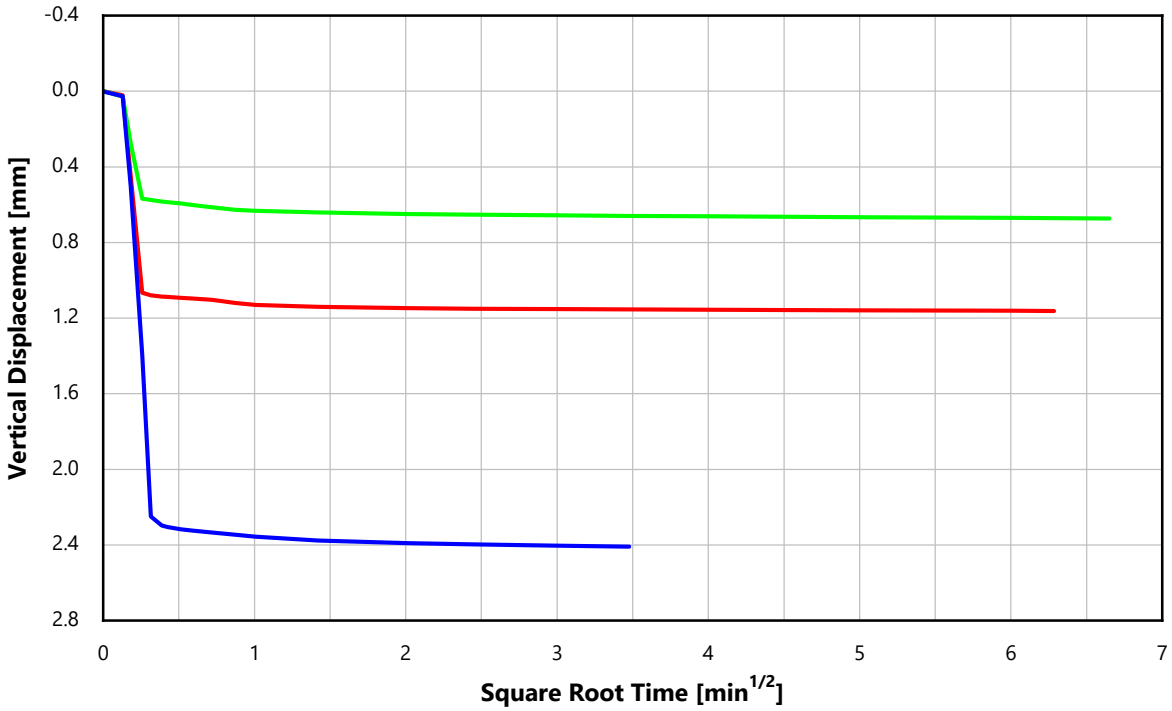
Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Consolidation Stage



Specimen 1: Normal stress 76 kPa
Specimen 2: Normal stress 152 kPa
Specimen 3: Normal stress 305 kPa

Test Report

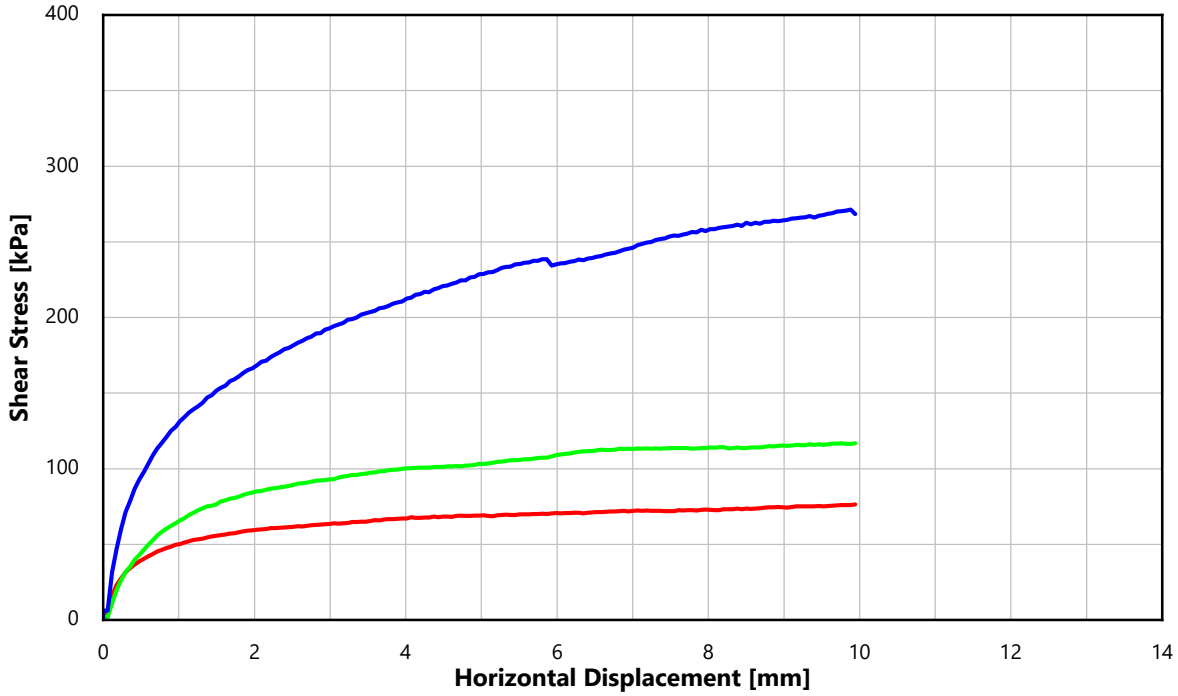
Direct Shear Test

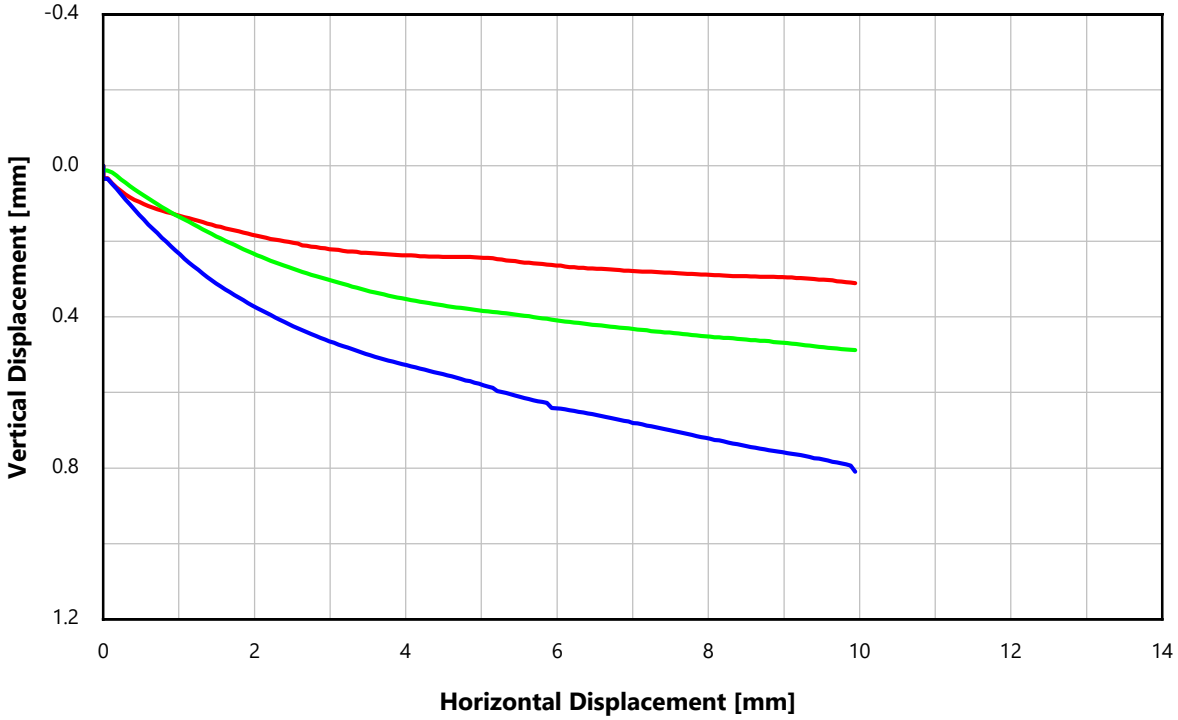
Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Shear Stage





Specimen 1: Normal stress 76 kPa — Specimen 2: Normal stress 152 kPa — Specimen 3: Normal stress 305 kPa

Project: 503387 - F254727
Test Page No.: SB15r - 3/4

Laboratory: Wallingford, UK

Approved by: ET - 15/08/2025

Test Report

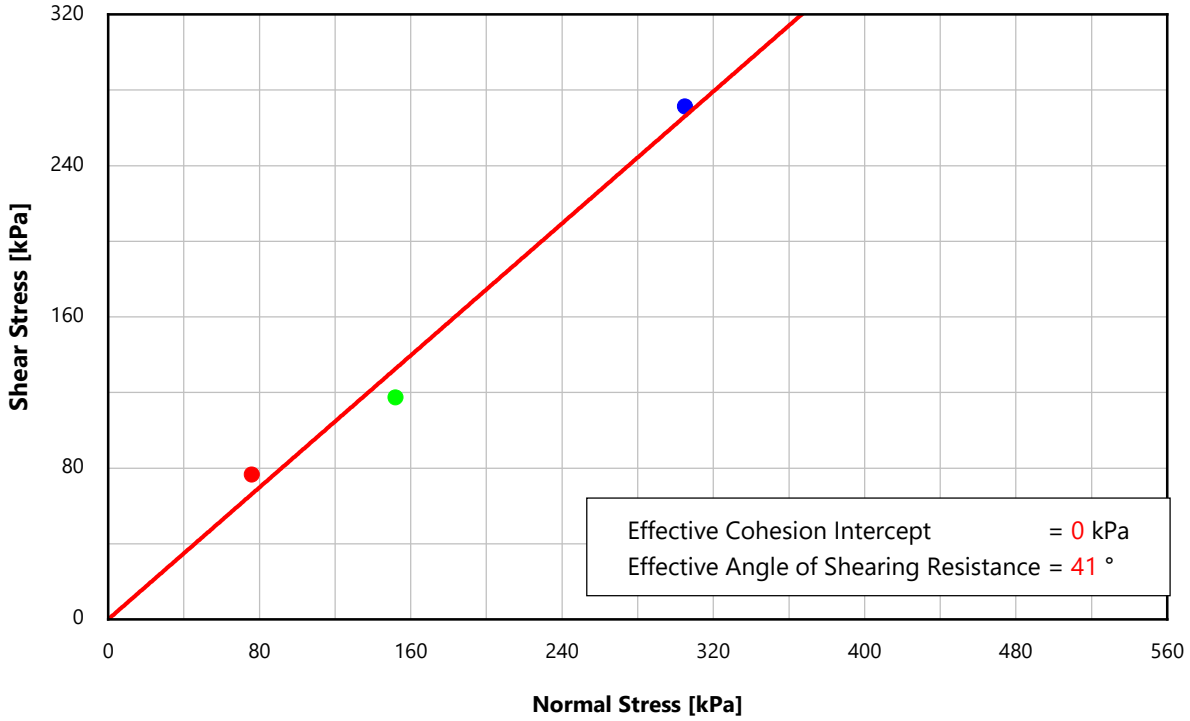
Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Friction Angle



Specimen 1: Normal stress 76 kPa | Specimen 2: Normal stress 152 kPa | Specimen 3: Normal stress 305 kPa

Project: 503387 - F254727
Test Page No.: SB15r - 4/4

Laboratory: Wallingford, UK

Approved by: ET - 15/08/2025

Test Report

Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Test Identification	
Location	Z4_OWF_BH17-SAMP
Sample	02-1
Depth [m]	1.00

Specimen Visual Description
Dark grey slightly gravelly SAND

Initial Specimen Conditions	1	2	3
Test start date	16/04/2025	01/05/2025	01/05/2025
Length [mm]	60.0	60.0	60.0
Width [mm]	60.0	60.0	60.0
Water content [%]	9.9	9.9	9.9
Bulk density [Mg/m^3]	1.95	1.90	1.89
Dry density [Mg/m^3]	1.77	1.73	1.72
Void ratio [-]	0.494	0.534	0.544
Degree of saturation [%]	53	49	48
Assumed particle density [Mg/m^3]	2.65	2.65	2.65

End of Consolidation	1	2	3
Normal stress [kPa]	25	50	100
Void ratio [-]	0.465	0.514	0.504
Vertical displacement [mm]	0.45	0.30	0.61
Degree of saturation [%]	100	100	100

Shear Stage	1	2	3
Rate of displacement [mm/min]	0.45	0.45	0.45
Normal stress [kPa]	25	51	100
Shear stress at failure [kPa]	33	45	81
Horizontal displacement at failure [mm]	0.72	0.96	1.11
Vertical displacement at failure [mm]	0.04	-0.09	-0.07
Void ratio at the end of the test [-]	0.462	0.520	0.509

Notes
Sample tested submerged
Square sample

Project: 503387 - F254727 Laboratory: Wallingford, UK Approved by: SW - 19/06/2025

Test page SB16-1/4

Test Report

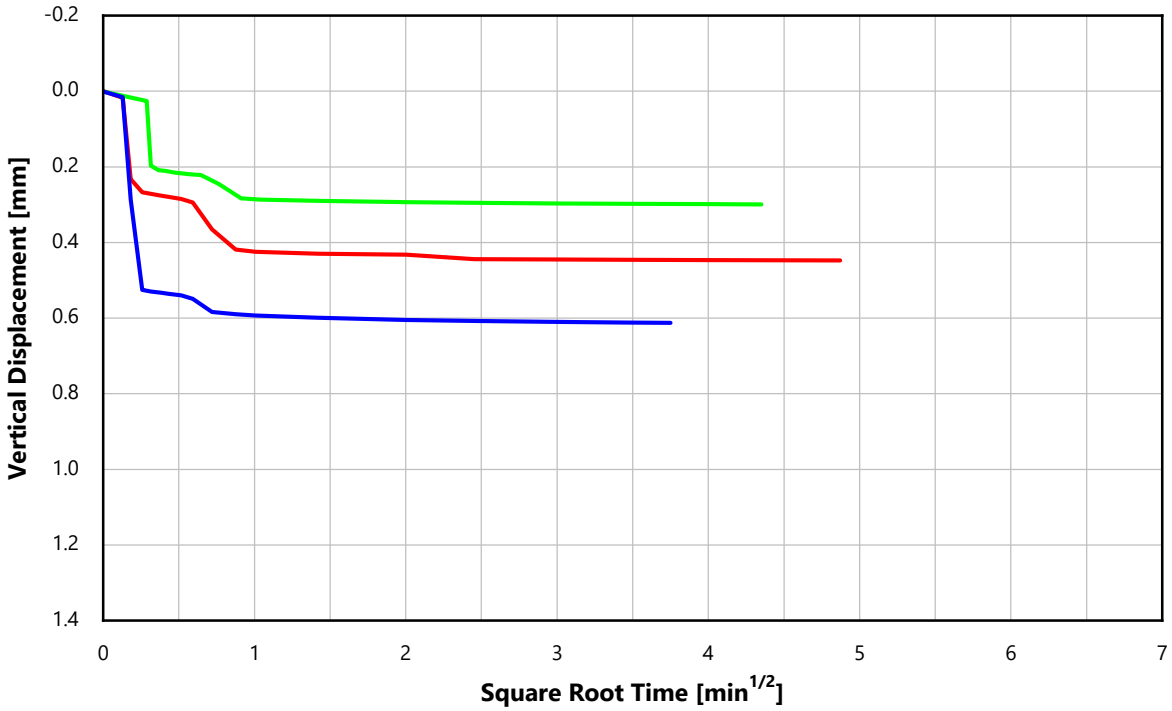
Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Consolidation Stage



Specimen 1: Normal stress 30 kPa | Specimen 2: Normal stress 51 kPa | Specimen 3: Normal stress 100 kPa

Test Report

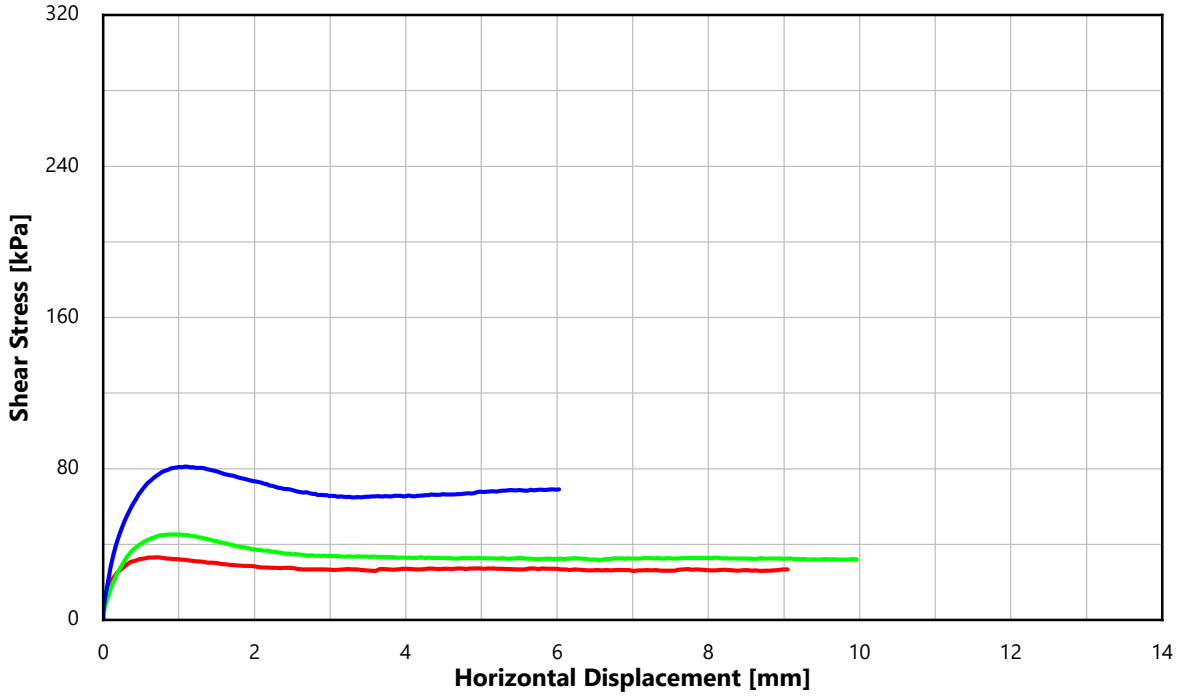
Direct Shear Test

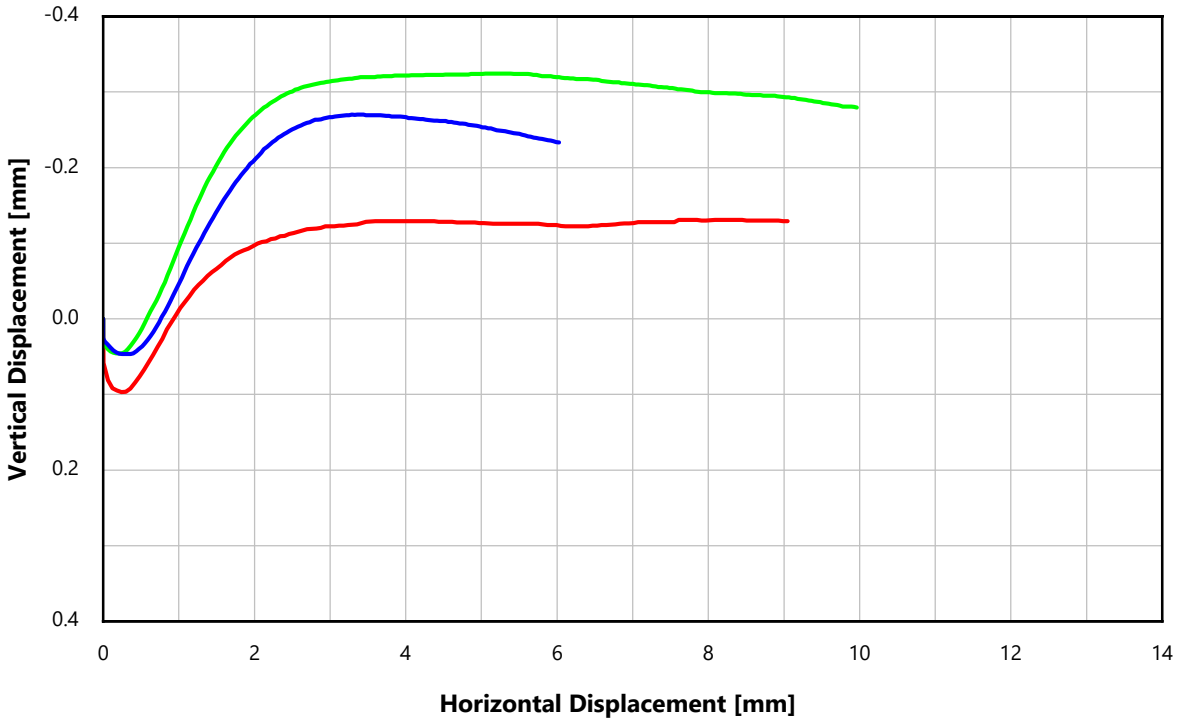
Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Shear Stage





Specimen 1: Normal stress 30 kPa — Specimen 2: Normal stress 51 kPa — Specimen 3: Normal stress 100 kPa

Test Report

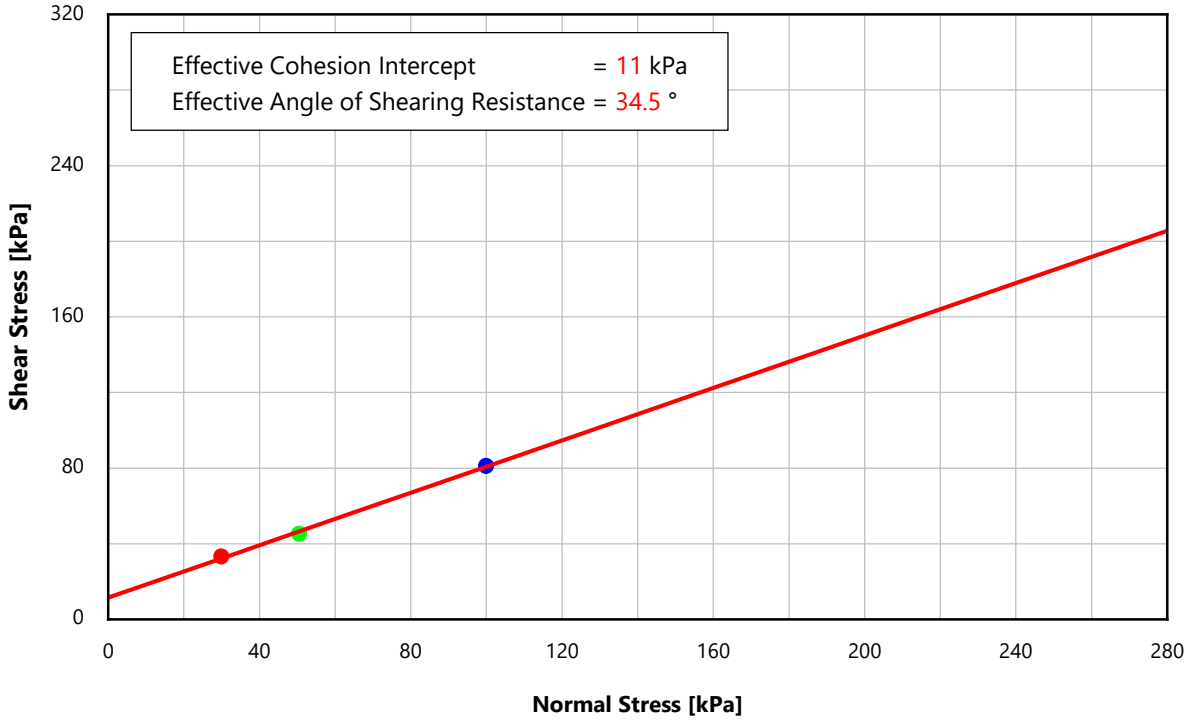
Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Friction Angle



Specimen 1: Normal stress 30 kPa | Specimen 2: Normal stress 51 kPa | Specimen 3: Normal stress 100 kPa

Project: 503387 - F254727
Test Page No.: SB16 - 4/4

Laboratory: Wallingford, UK

Approved by: SW - 19/06/2025

Test Report

Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Test Identification	
Location	Z4_OWF_BH17-SAMP
Sample	09-1
Depth [m]	7.50

Specimen Visual Description
Dark grey fine SAND

Initial Specimen Conditions	1	2	3
Test start date	28/04/2025	28/04/2025	08/07/2025
Length [mm]	60.0	60.1	60.0
Width [mm]	60.0	60.0	60.0
Water content [%]	9.9	9.9	9.9
Bulk density [Mg/m^3]	1.56	1.56	1.56
Dry density [Mg/m^3]	1.42	1.42	1.42
Void ratio [-]	0.868	0.870	0.867
Degree of saturation [%]	30	30	30
Assumed particle density [Mg/m^3]	2.65	2.65	2.65

End of Consolidation	1	2	3
Normal stress [kPa]	33	66	132
Void ratio [-]	0.826	0.793	0.771
Vertical displacement [mm]	0.54	0.99	1.23
Degree of saturation [%]	90	97	94

Shear Stage	1	2	3
Rate of displacement [mm/min]	0.45	0.47	0.45
Normal stress [kPa]	33	66	132
Shear stress at failure [kPa]	26	52	132
Horizontal displacement at failure [mm]	0.90	7.02	9.90
Vertical displacement at failure [mm]	0.03	-0.06	0.28
Void ratio at the end of the test [-]	0.824	0.798	0.749

Notes
Sample tested submerged
Square sample

Project: 503387 - F254727 Laboratory: Wallingford, UK Approved by: SW - 14/07/2025

Test page SB17-1/4

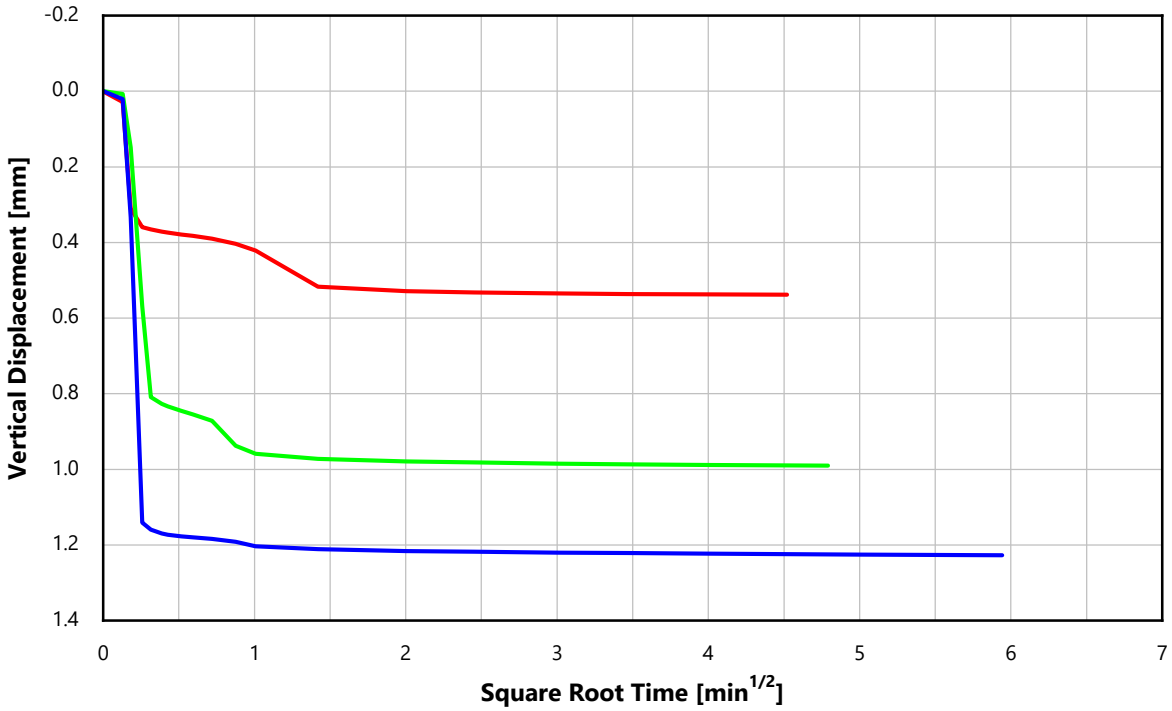
Test Report

Direct Shear Test
Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Consolidation Stage



Specimen 1: Normal stress 33 kPa
Specimen 2: Normal stress 66 kPa
Specimen 3: Normal stress 132 kPa

Test Report

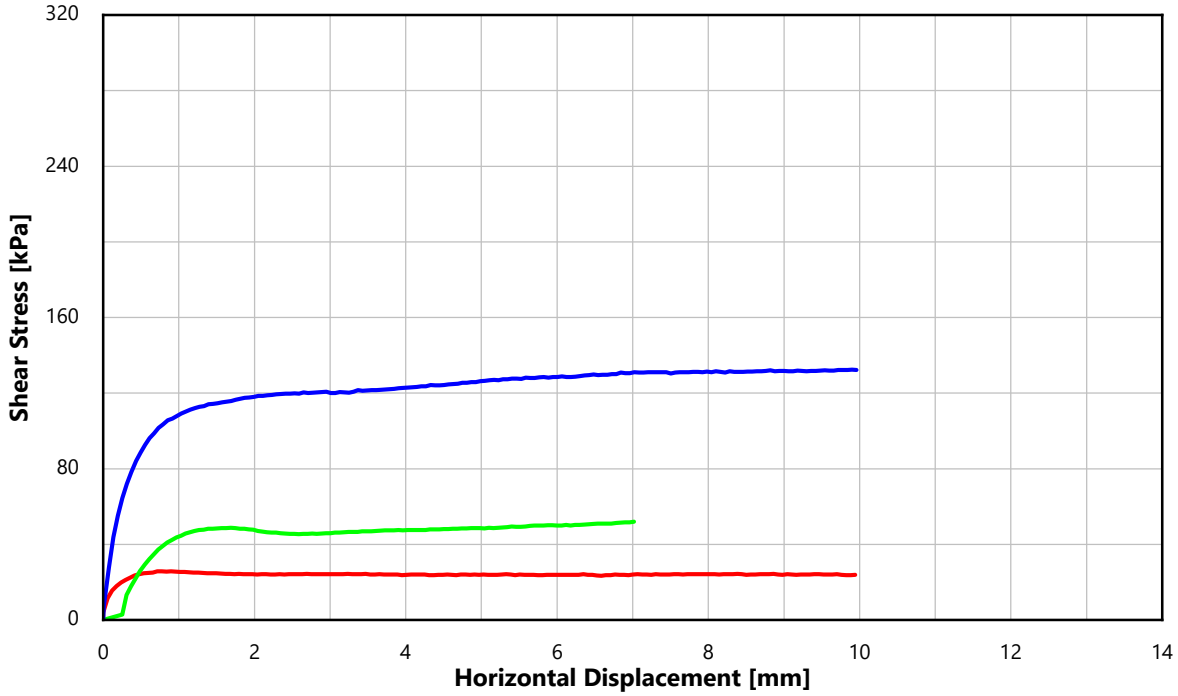
Direct Shear Test

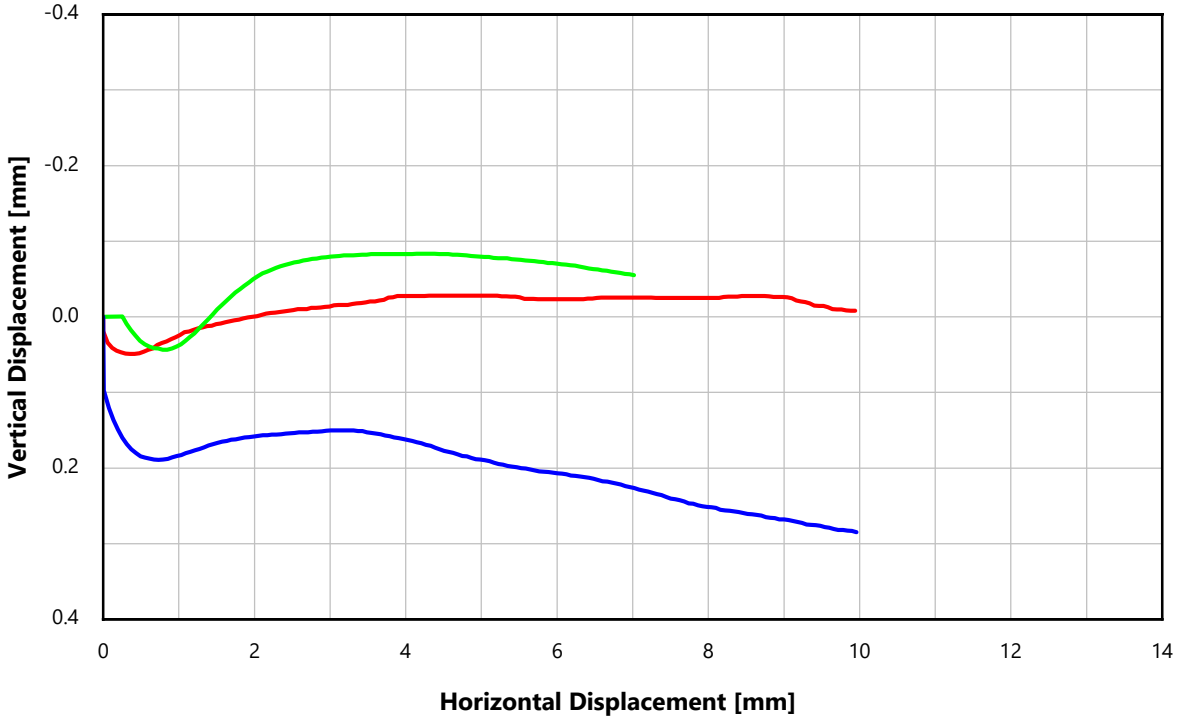
Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Shear Stage





Specimen 1: Normal stress 33 kPa — Specimen 2: Normal stress 66 kPa — Specimen 3: Normal stress 132 kPa

Project: 503387 - F254727
Test Page No.: SB17 - 3/4

Laboratory: Wallingford, UK

Approved by: SW - 14/07/2025

Test Report

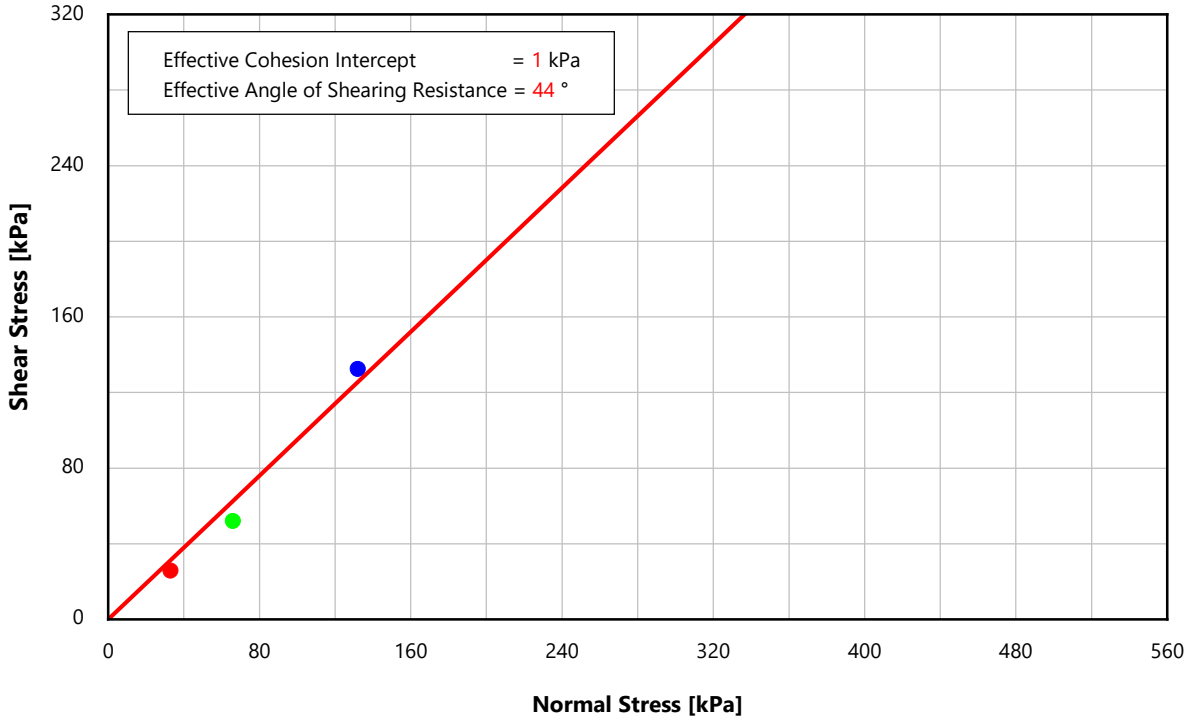
Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Friction Angle



Specimen 1: Normal stress 33 kPa | Specimen 2: Normal stress 66 kPa | Specimen 3: Normal stress 132 kPa

Project: 503387 - F254727
Test Page No.: SB17 - 4/4

Laboratory: Wallingford, UK

Approved by: SW - 14/07/2025

Test Report

Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Test Identification	
Location	Z4_OWF_BH17-SAMP
Sample	16-2
Depth [m]	14.90

Specimen Visual Description
Dark grey fine to medium SAND

Initial Specimen Conditions	1	2	3
Test start date	22/04/2025	09/06/2025	09/06/2025
Length [mm]	60.0	60.0	60.0
Width [mm]	60.0	60.0	60.1
Water content [%]	9.9	9.9	9.9
Bulk density [Mg/m^3]	1.62	1.48	1.48
Dry density [Mg/m^3]	1.47	1.35	1.35
Void ratio [-]	0.798	0.965	0.963
Degree of saturation [%]	33	27	27
Assumed particle density [Mg/m^3]	2.65	2.65	2.65

End of Consolidation	1	2	3
Normal stress [kPa]	66	132	264
Void ratio [-]	0.729	0.793	0.758
Vertical displacement [mm]	0.93	2.11	2.51
Degree of saturation [%]	89	77	82

Shear Stage	1	2	3
Rate of displacement [mm/min]	0.45	0.45	0.45
Normal stress [kPa]	66	132	264
Shear stress at failure [kPa]	69	123	159
Horizontal displacement at failure [mm]	9.95	10.00	9.34
Vertical displacement at failure [mm]	0.33	1.03	1.38
Void ratio at the end of the test [-]	0.704	0.708	0.645

Notes
Sample tested submerged
Square sample

Project: 503387 - F254727 Laboratory: Wallingford, UK Approved by: SW - 19/06/2025

Test page SB18rr-1/4

Test Report

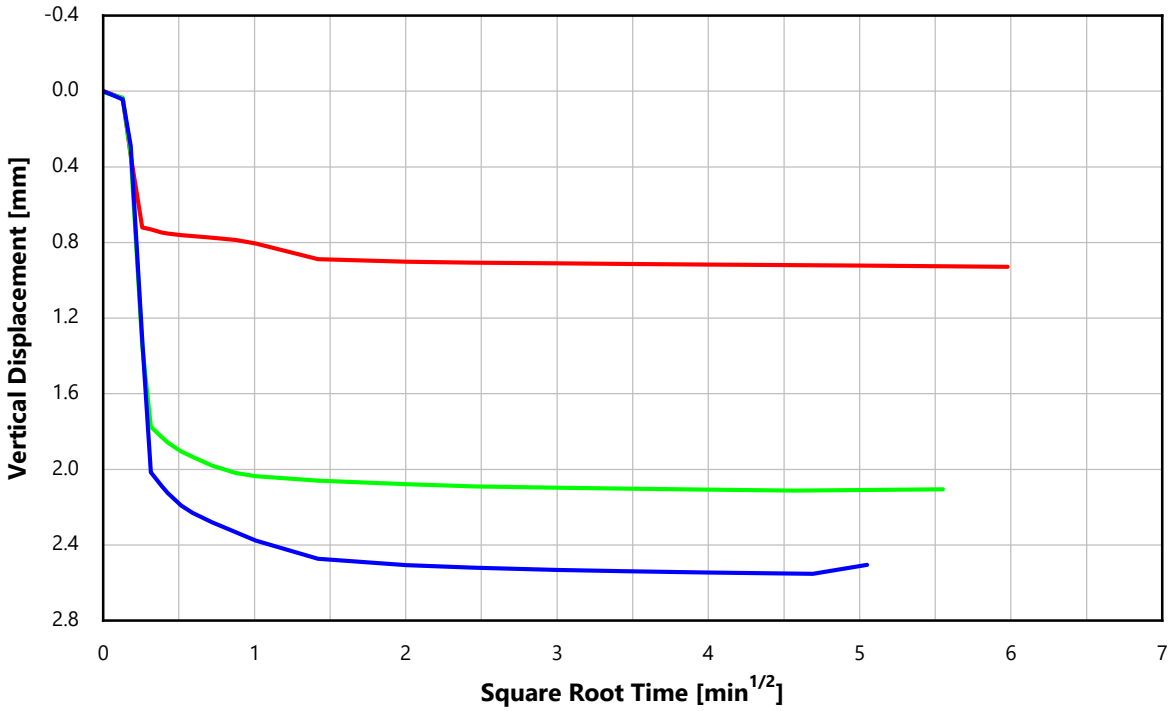
Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Consolidation Stage



Specimen 1: Normal stress 30 kPa
Specimen 2: Normal stress 132 kPa
Specimen 3: Normal stress 264 kPa

Test Report

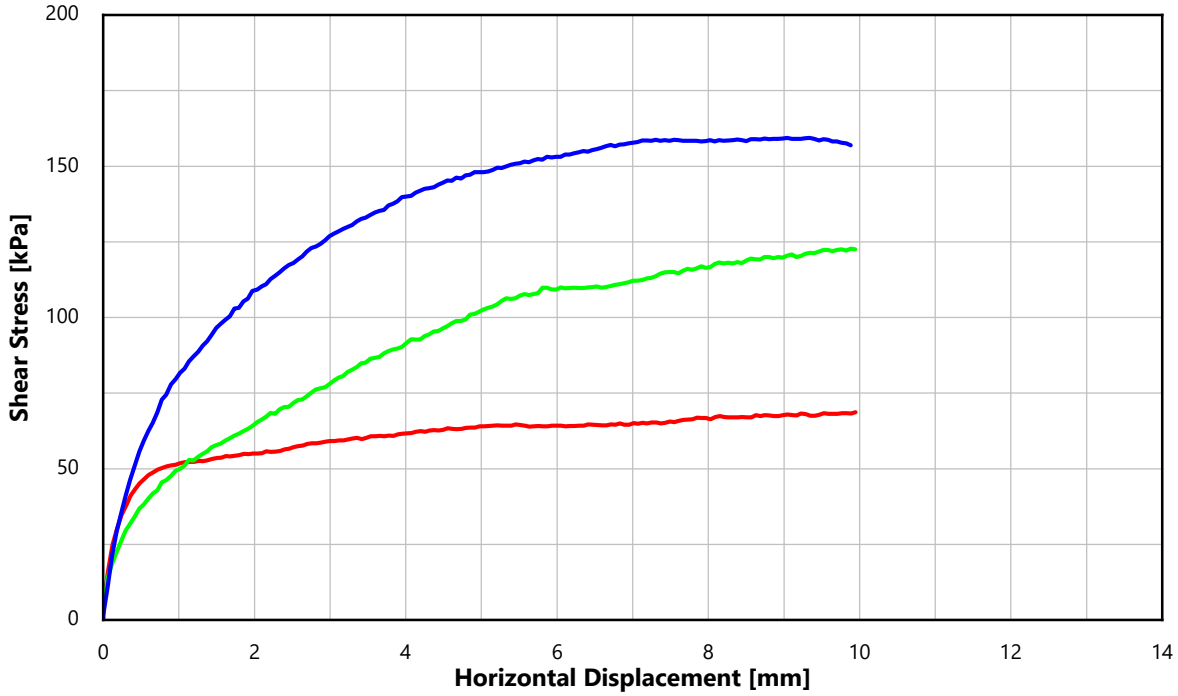
Direct Shear Test

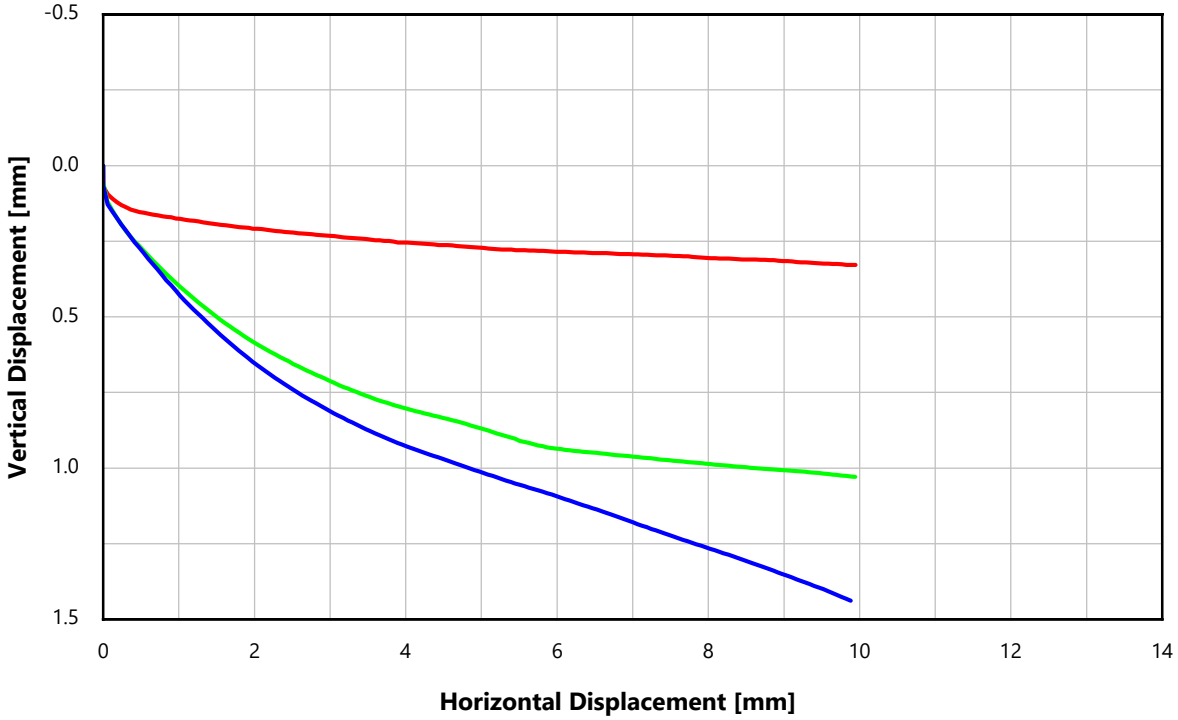
Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Shear Stage





Specimen 1: Normal stress 30 kPa — Specimen 2: Normal stress 132 kPa — Specimen 3: Normal stress 264 kPa

Project: 503387 - F254727
Test Page No.: SB18rr - 3/4

Laboratory: Wallingford, UK

Approved by: SW - 19/06/2025

Test Report

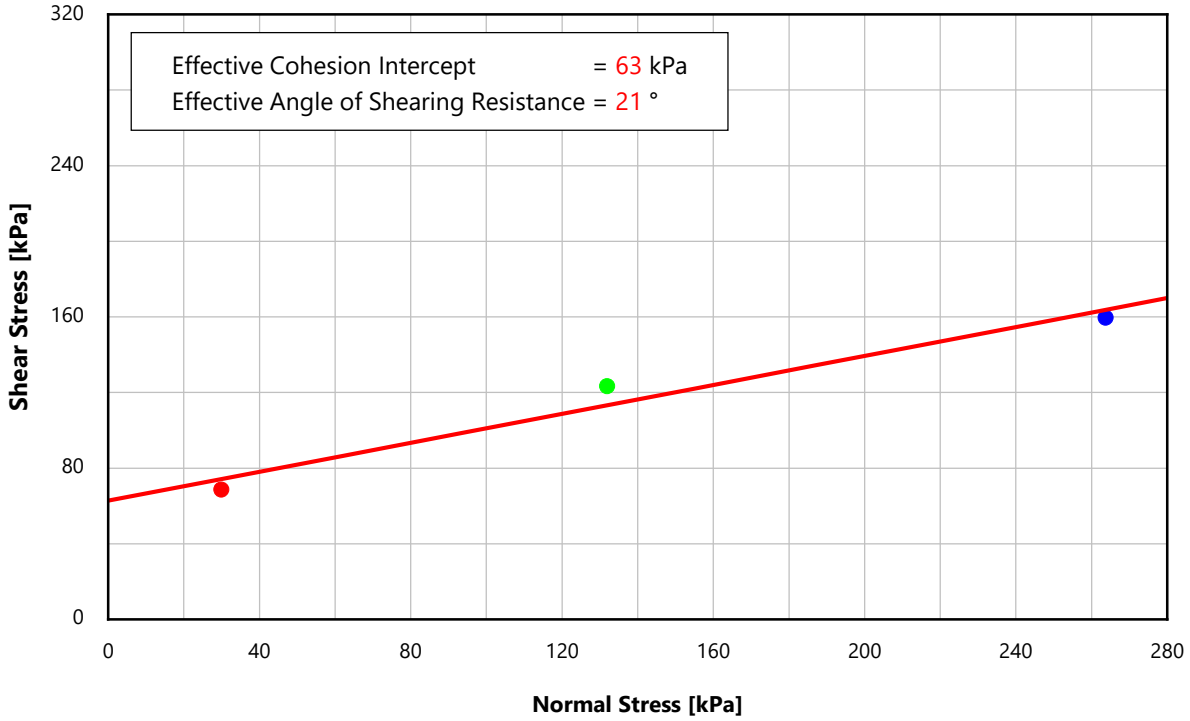
Direct Shear Test

Shear Box, Soil:Soil Interface

ISO 17892-10:2018

UKAS TESTING 0919

Friction Angle



Specimen 1: Normal stress 30 kPa — Specimen 2: Normal stress 132 kPa — Specimen 3: Normal stress 264 kPa

Project: 503387 - F254727
Test Page No.: SB18rr - 4/4

Laboratory: Wallingford, UK

Approved by: SW - 19/06/2025

Location	Sample No.	Depth	Test Type	Index Properties					Effective Pressure	k
				ρ_{bulk}	ρ_{dry}	w_i	w_f	S_{ri}		
[-]	[-]	[m]	[-]	[Mg/m^3]	[Mg/m^3]	[%]	[%]	[%]	[kPa]	[m/s]
Z4_OWF_BH01-SAMP	07-1	5.50	Constant head Permeameter	1.80	1.63	9.9	-	55	-	2.39E-06
Z4_OWF_BH01-SAMP	17-4	18.20	Constant head Triaxial	2.01	1.59	26.0	24.2	100	109	2.20E-08
Z4_OWF_BH05-SAMP	03-1	2 ,00	Constant head Permeameter	1.63	1.48	10.0	-	43	-	3.10E-05
Z4_OWF_BH05-SAMP	16-2	14.30	Constant head Triaxial	2.03	1.61	25.7	22.9	100	90	3.00E-10
Z4_OWF_BH05-SAMP	Batch_07	18.00 - 18.50	Constant head Permeameter	1.84	1.67	9.9	-	59	-	4.69E-06
Z4_OWF_BH15-COMP	07-2	18.10	Constant head Triaxial	1.98	1.56	26.6	23.5	99	126	7.20E-10
Z4_OWF_BH16-SAMP	12-1	10.00	Constant head Permeameter	1.69	1.54	9.9	-	46	-	1.86E-05
Z4_OWF_BH17-SAMP	20-3	18.80	Constant head Triaxial	1.94	1.50	29.3	28.7	99	116	2.40E-09
Z4_OWF_BH17-SAMP	06-1	4.50	Constant head Permeameter	1.53	1.39	10.45	-	38	-	2.05E-04

Notes:
- = Data not available

SUMMARY OF PERMEABILITY TEST RESULTS

Test Report

Permeability tests - Rigid Wall Permeameter

ISO 17892-11:2019, clause 6.3.1.

UKAS TESTING 0919

Test Identification	
Location	Z4_OWF_BH01-SAMP
Sample	07-1
Depth [m]	5.50
Specimen condition	Disturbed - Recompacted

Specimen Visual Description
Greyish brown SAND with few shell fragments and gravel

Initial Specimen Conditions	
Test start date	18/06/2025
Diameter [mm]	101.21
Height [mm]	116.36
Water content [%]	9.94
Bulk density [Mg/m^3]	1.796
Dry density [Mg/m^3]	1.633
Void ratio [-]	0.476
Degree of saturation [%]	55
Particle density - assumed [Mg/m^3]	2.65
Preparation method	Blow compaction to target density

Test Conditions	
Apparatus	Rigid wall (cylindrical) permeameter
Test type	Constant head permeability
Average temperature [°C]	25
Hydraulic gradient	8.6
Water used	Deaired water

Test Results	
Hydraulic gradient applied [-]	8.59E+00
Coefficient of permeability corrected at 20°C [m/s]	2.39E-06

Project: 503387 - F254727 ######### Approved by: SW 25/06/2025

Test Page PERM05-1 of 1

Test Report

Permeability tests - Rigid Wall Permeameter

ISO 17892-11:2019, clause 6.3.1.

UKAS TESTING 0919

Test Identification	
Location	Z4_OWF_BH05-SAMP
Sample	03-1
Depth [m]	2.00 - 2.40
Specimen condition	Disturbed - Recompacted

Specimen Visual Description
Greyish brown SAND

Initial Specimen Conditions	
Test start date	05/12/2025
Diameter [mm]	101.45
Height [mm]	116.27
Water content [%]	10.08
Bulk density [Mg/m^3]	1.634
Dry density [Mg/m^3]	1.485
Void ratio [-]	0.621
Degree of saturation [%]	43
Particle density - assumed [Mg/m^3]	2.65
Preparation method	Blow compaction to target density

Test Conditions	
Apparatus	Rigid wall (cylindrical) permeameter
Test type	Constant head permeability
Average temperature [°C]	25
Hydraulic gradient	5.2
Water used	Deaired water

Test Results	
Hydraulic gradient applied [-]	5.16E+00
Coefficient of permeability corrected at 20°C [m/s]	3.10E-05

Project: 503387 - F254727 ######### Approved by: SW 24/06/2025

Test Page PERM06-1 of 1

Test Report

Permeability tests - Rigid Wall Permeameter

ISO 17892-11:2019, clause 6.3.1.

UKAS TESTING 0919

Test Identification	
Location	Z4_OWF_BH05-SAMP
Sample	Batch_07
Depth [m]	18.00 - 18.50
Specimen condition	Disturbed - Recompacted

Specimen Visual Description
Greyish brown SAND

Initial Specimen Conditions	
Test start date	13/06/2025
Diameter [mm]	101.37
Height [mm]	116.22
Water content [%]	9.88
Bulk density [Mg/m^3]	1.839
Dry density [Mg/m^3]	1.674
Void ratio [-]	0.441
Degree of saturation [%]	59
Particle density - assumed [Mg/m^3]	2.65
Preparation method	Blow compaction to target density

Test Conditions	
Apparatus	Rigid wall (cylindrical) permeameter
Test type	Constant head permeability
Average temperature [°C]	26
Hydraulic gradient	8.6
Water used	Deaired water

Test Results	
Hydraulic gradient applied [-]	8.60E+00
Coefficient of permeability corrected at 20°C [m/s]	4.69E-06

Project: 503387 - F254727 ######### Approved by: SW 24/06/2025

Test Page PERM07-1 of 1

Test Report

Permeability tests - Rigid Wall Permeameter

ISO 17892-11:2019, clause 6.3.1.

UKAS TESTING 0919

Test Identification	
Location	Z4_OWF_BH16-SAMP
Sample	12-1
Depth [m]	10.00 - 10.50
Specimen condition	Disturbed - Recompacted

Specimen Visual Description
Greyish brown clayey SAND

Initial Specimen Conditions	
Test start date	14/05/2025
Diameter [mm]	101.35
Height [mm]	116.50
Water content [%]	9.85
Bulk density [Mg/m^3]	1.692
Dry density [Mg/m^3]	1.540
Void ratio [-]	0.567
Degree of saturation [%]	46
Particle density - assumed [Mg/m^3]	2.65
Preparation method	Blow compaction to target density

Test Conditions	
Apparatus	Rigid wall (cylindrical) permeameter
Test type	Constant head permeability
Average temperature [°C]	26
Hydraulic gradient	8.6
Water used	Deaired water

Test Results	
Hydraulic gradient applied [-]	8.58E+00
Coefficient of permeability corrected at 20°C [m/s]	1.86E-05

Project: 503387 - F254727 ######### Approved by: SW 24/06/2025

Test Page PERM08-1 of 1

Test Report

Permeability tests - Rigid Wall Permeameter

ISO 17892-11:2019, clause 6.3.1.

UKAS TESTING 0919

Test Identification	
Location	Z4_OWF_BH17-SAMP
Sample	06-1
Depth [m]	4.50
Specimen condition	Disturbed - Recompacted

Specimen Visual Description
Greyish brown SAND

Initial Specimen Conditions	
Test start date	28/05/2025
Diameter [mm]	72.16
Height [mm]	70.81
Water content [%]	10.45
Bulk density [Mg/m^3]	1.532
Dry density [Mg/m^3]	1.387
Void ratio [-]	0.729
Degree of saturation [%]	38
Particle density - assumed [Mg/m^3]	2.65
Preparation method	Blow compaction to target density

Test Conditions	
Apparatus	Rigid wall (cylindrical) permeameter
Test type	Constant head permeability
Average temperature [°C]	21
Hydraulic gradient	14.1
Water used	Deaired water

Test Results	
Hydraulic gradient applied [-]	1.41E+01
Coefficient of permeability corrected at 20°C [m/s]	2.05E-04

Project: 503387 - F254727
Test Page PERM17-1 of 1

Approved by: SW 01/07/2025

FUGRO	SUMMARY OF TRIAXIAL PERMEABILITY TEST SINGLESTAGE TEST Constant Head Conditions		Project Reference	F254727
			Location ID	Z4_OWF_BH01-SAMP
			Depth Top [m]	16.05
Project Name	DGEC		Sample Reference	17-4
Specimen Description	Firm grey slightly sandy CLAY thinly interbedded with fine sand		Sample Type	Wax
Test Method	Specimen set-up	BS EN ISO 17892-11:2019 Clause 6.2	Date started	08/04/2025
	Saturation	BS EN ISO 17892-11:2019 Clause 6.3		
	Consolidation-Iso.	BS EN ISO 17892-11:2019 Clause 6.3	Medium	Tap water
	Permeability	BS EN ISO 17892-11:2019 Clause 6.4		

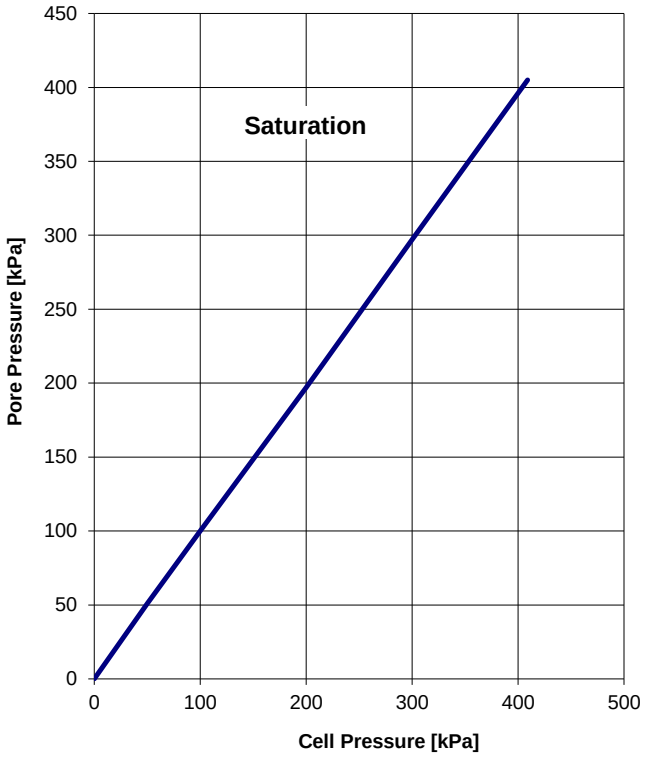
Initial Conditions

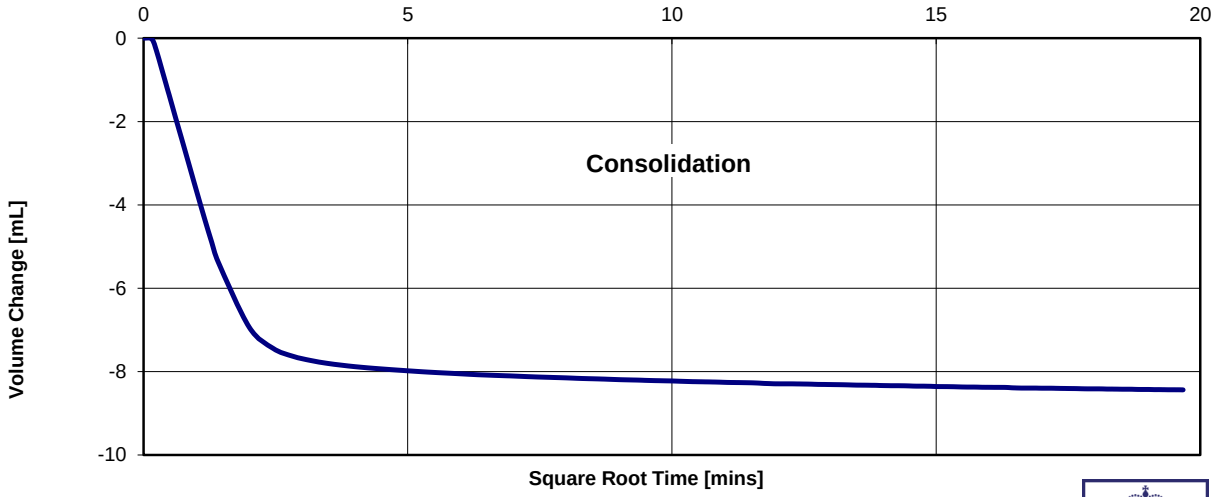
Sample orientation		Vertical
Specimen preparation		Undisturbed
Specimen depth	[m]	16.08
Diameter	[mm]	70.10
Length	[mm]	70.70
Water content (trimmings)	[%]	26.0
Bulk density	[Mg/m^3]	2.01
Dry density	[Mg/m^3]	1.59
Particle density[1]	[Mg/m^3]	#2.7
Voids ratio e	-	0.696
Degree of saturation	[%]	100
Drainage conditions		Both ends

[1] # denotes assumed

Saturation Stage

Saturation method -		Const. Moist. Content
Final cell pressure	[kPa]	409
Final pore pressure	[kPa]	405
Press. Increm./ Diff. press.	[kPa]	50-100 / -
B value achieved	[%]	100
Duration	[days]	1





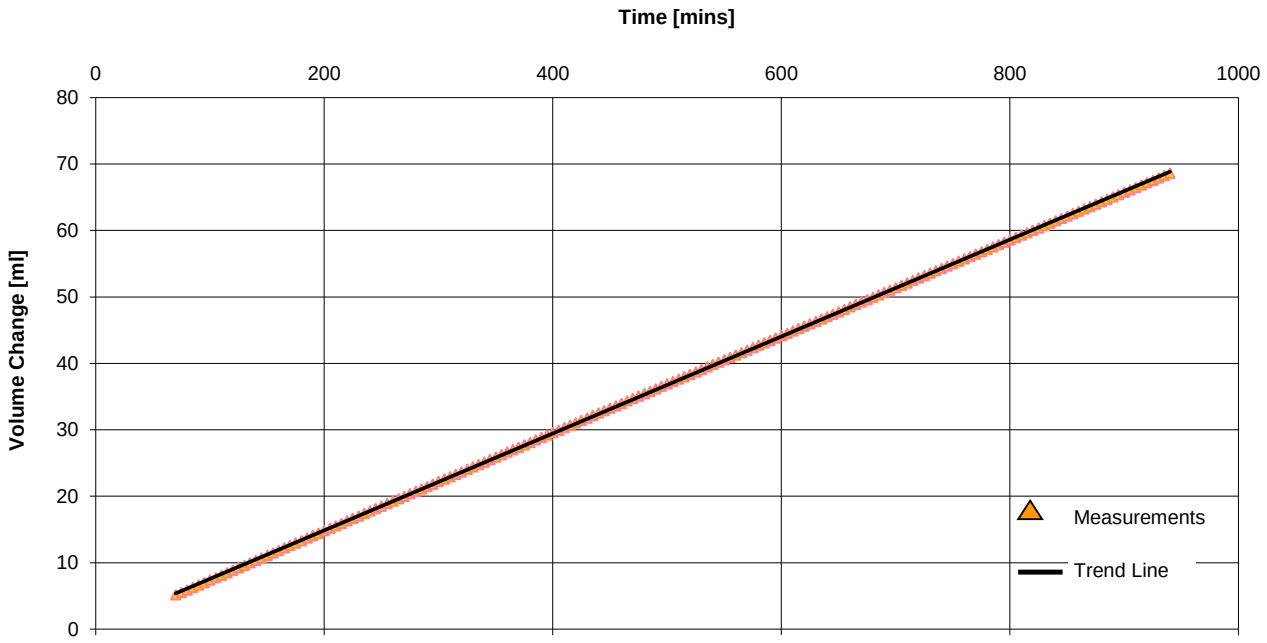
Remarks

UKAS TESTING
1483

FUGRO	SUMMARY OF TRIAXIAL PERMEABILITY TEST SINGLESTAGE TEST Constant Head Conditions	Project Reference	F254727
		Location ID	Z4_OWF_BH01-SAMP
		Depth Top [m]	16.05
Project Name	DGEC	Sample Reference	17-4

Consolidation Stage		
Cell pressure	[kPa]	409
Back pressure	[kPa]	300
Effective pressure	[kPa]	109
Final pore pressure	[kPa]	301
Final pore pressure dissipation	[%]	100
Duration	[days]	1

Permeability Stage		
Pressure difference across specimen	[kPa]	10
Mean effective stress	[kPa]	109
Rate of flow	[ml/min]	0.073
Hydraulic gradient		14.58
Duration	[kPa]	1



COEFFICIENT OF PERMEABILITY AT 20 ^{0}C, **2.2E-08 [m/s]**

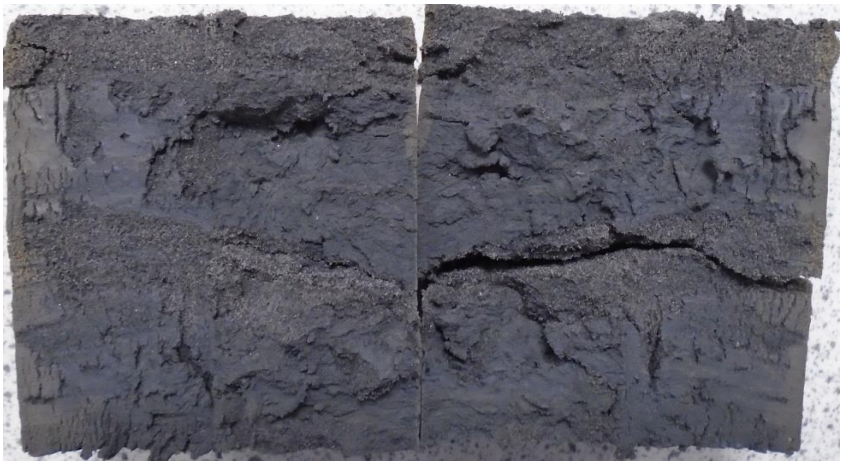
FUGRO	**SUMMARY OF TRIAXIAL PERMEABILITY TEST SINGLESTAGE TEST Constant Head Conditions**	Project Reference	F254727
		Location ID	Z4_OWF_BH01-SAMP
		Depth Top [m]	16.05
Project Name	DGEC	Sample Reference	17-4

Final Conditions

Moisture content	[%]	24.2
Bulk density	[Mg/m^3]	2.03
Total duration	[days]	3

Specimen Photographs





FUGRO	SUMMARY OF TRIAXIAL PERMEABILITY TEST SINGLESTAGE TEST Constant Head Conditions		Project Reference	F254727
			Location ID	Z4_OWF_BH05-SAMP
			Depth Top [m]	14.30
Project Name	Golfe du Lion		Sample Reference	16-2
Specimen Description	Firm grey slightly sandy CLAY		Sample Type	Wax
Test Method	Specimen set-up	BS EN ISO 17892-11:2019 Clause 6.2	Date started	22/04/2025
	Saturation	BS EN ISO 17892-11:2019 Clause 6.3		
	Consolidation-Iso.	BS EN ISO 17892-11:2019 Clause 6.3	Medium	Tap water
	Permeability	BS EN ISO 17892-11:2019 Clause 6.4		

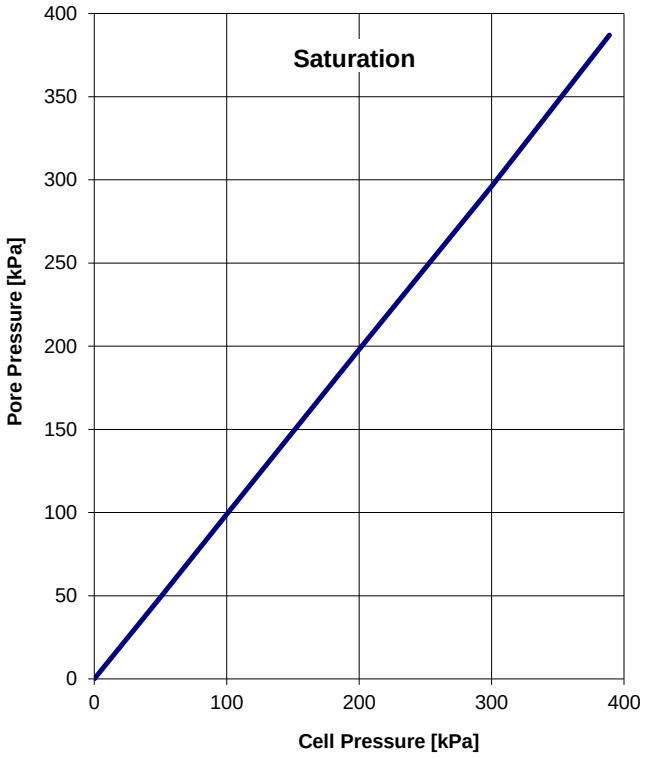
Initial Conditions

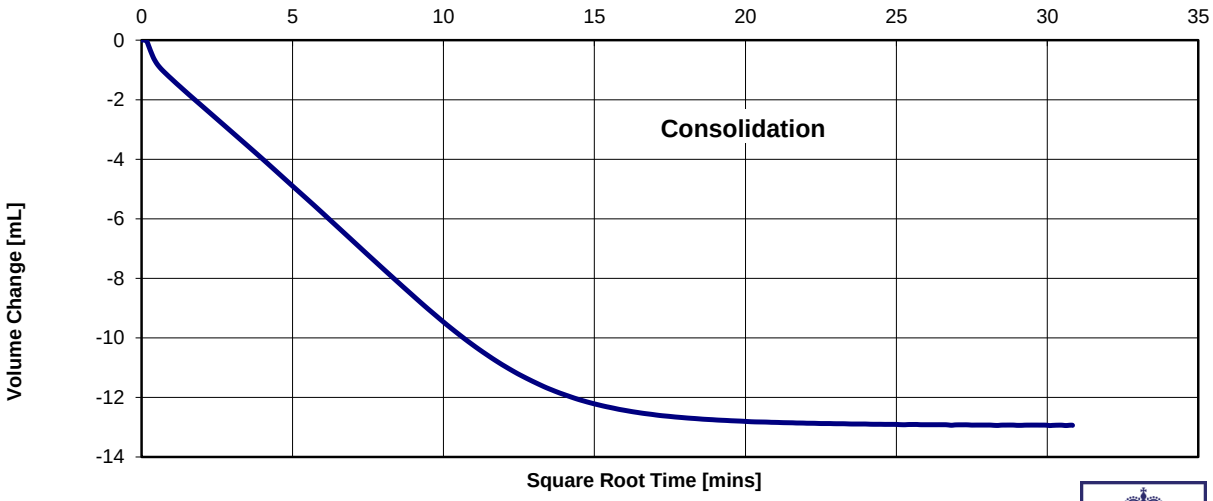
Sample orientation		Vertical
Specimen preparation		Undisturbed
Specimen depth	[m]	14.31
Diameter	[mm]	69.96
Length	[mm]	72.70
Water content (trimmings)	[%]	25.7
Bulk density	[Mg/m^3]	2.03
Dry density	[Mg/m^3]	1.61
Particle density[1]	[Mg/m^3]	#2.7
Voids ratio e	-	0.674
Degree of saturation	[%]	100
Drainage conditions		Both ends

[1] # denotes assumed

Saturation Stage

Saturation method -		Const. Moist. Content
Final cell pressure	[kPa]	389
Final pore pressure	[kPa]	387
Press. Increm./ Diff. press.	[kPa]	50-100 / -
B value achieved	[%]	100
Duration	[days]	1





Remarks

UKAS TESTING
1483

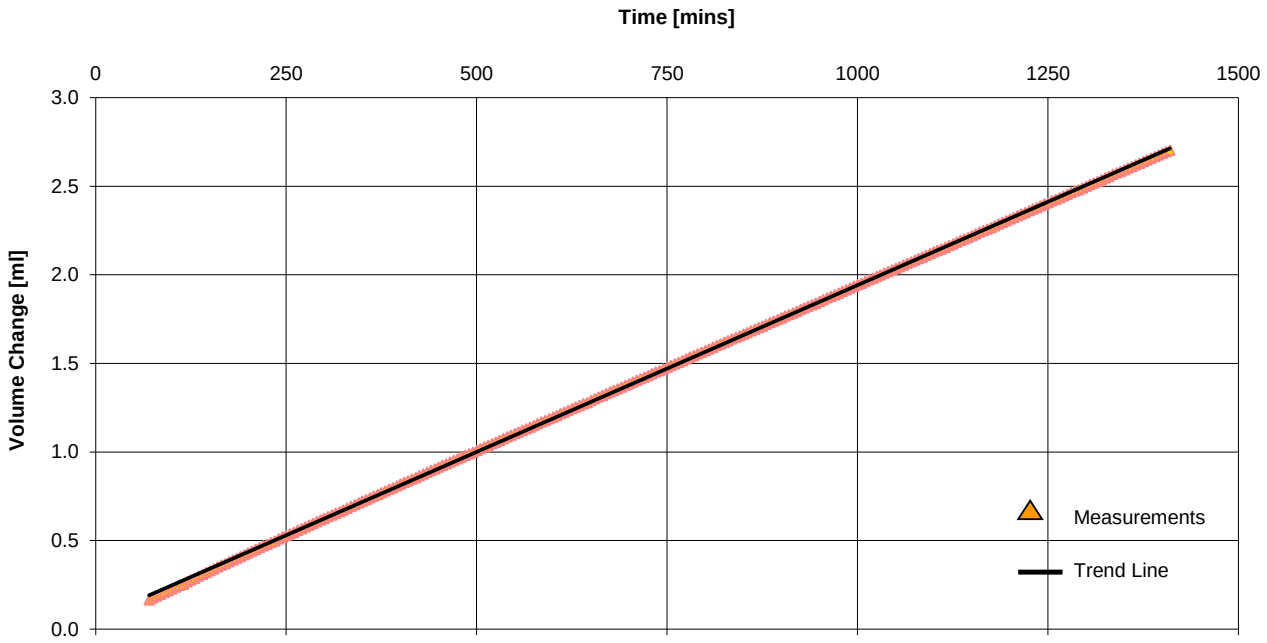
FUGRO	SUMMARY OF TRIAXIAL PERMEABILITY TEST SINGLESTAGE TEST Constant Head Conditions	Project Reference	F254727
		Location ID	Z4_OWF_BH05-SAMP
		Depth Top [m]	14.30
Project Name	Golfe du Lion	Sample Reference	16-2

Consolidation Stage

Cell pressure	[kPa]	390
Back pressure	[kPa]	300
Effective pressure	[kPa]	90
Final pore pressure	[kPa]	301
Final pore pressure dissipation	[%]	100
Duration	[days]	1

Permeability Stage

Pressure difference across specimen	[kPa]	20
Mean effective stress	[kPa]	90
Rate of flow	[ml/min]	0.002
Hydraulic gradient		28.50
Duration	[kPa]	1



COEFFICIENT OF PERMEABILITY AT 20 ^{0}C, **3.0E-10 [m/s]**

FUGRO	**SUMMARY OF TRIAXIAL PERMEABILITY TEST SINGLESTAGE TEST Constant Head Conditions**	Project Reference	F254727
		Location ID	Z4_OWF_BH05-SAMP
		Depth Top [m]	14.30
Project Name	Golfe du Lion	Sample Reference	16-2

Final Conditions

Moisture content	[%]	22.9
Bulk density	[Mg/m^3]	2.07
Total duration	[days]	3

Specimen Photographs





FUGRO	SUMMARY OF TRIAXIAL PERMEABILITY TEST SINGLESTAGE TEST Constant Head Conditions		Project Reference	F254727
			Location ID	Z4_OWF_BH15-COMP
			Depth Top [m]	18.10
Project Name	DGEC		Sample Reference	07-02
Specimen Description	Firm grey slightly sandy CLAY		Sample Type	Wax
Test Method	Specimen set-up	BS EN ISO 17892-11:2019 Clause 6.2	Date started	10/04/2025
	Saturation	BS EN ISO 17892-11:2019 Clause 6.3		
	Consolidation-Iso.	BS EN ISO 17892-11:2019 Clause 6.3	Medium	Tap water
	Permeability	BS EN ISO 17892-11:2019 Clause 6.4		

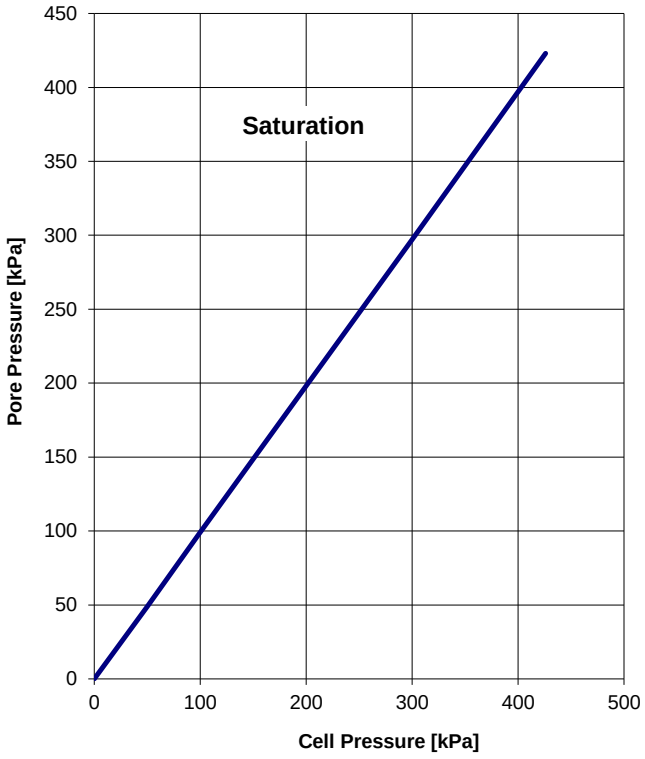
Initial Conditions

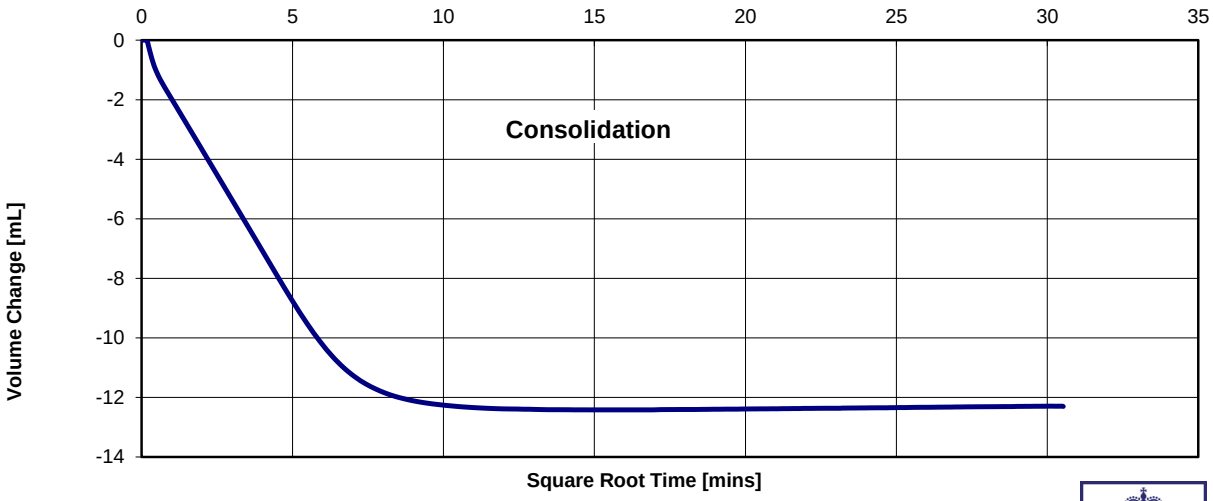
Sample orientation		Vertical
Specimen preparation		Undisturbed
Specimen depth	[m]	18.13
Diameter	[mm]	70.48
Length	[mm]	70.60
Water content (trimmings)	[%]	26.6
Bulk density	[Mg/m^3]	1.98
Dry density	[Mg/m^3]	1.56
Particle density[1]	[Mg/m^3]	#2.7
Voids ratio e	-	0.728
Degree of saturation	[%]	99
Drainage conditions		Both ends

[1] # denotes assumed

Saturation Stage

Saturation method -		Const. Moist. Content
Final cell pressure	[kPa]	426
Final pore pressure	[kPa]	423
Press. Increm./ Diff. press.	[kPa]	50-100 / 0
B value achieved	[%]	100
Duration	[days]	1





Remarks

UKAS TESTING
1483

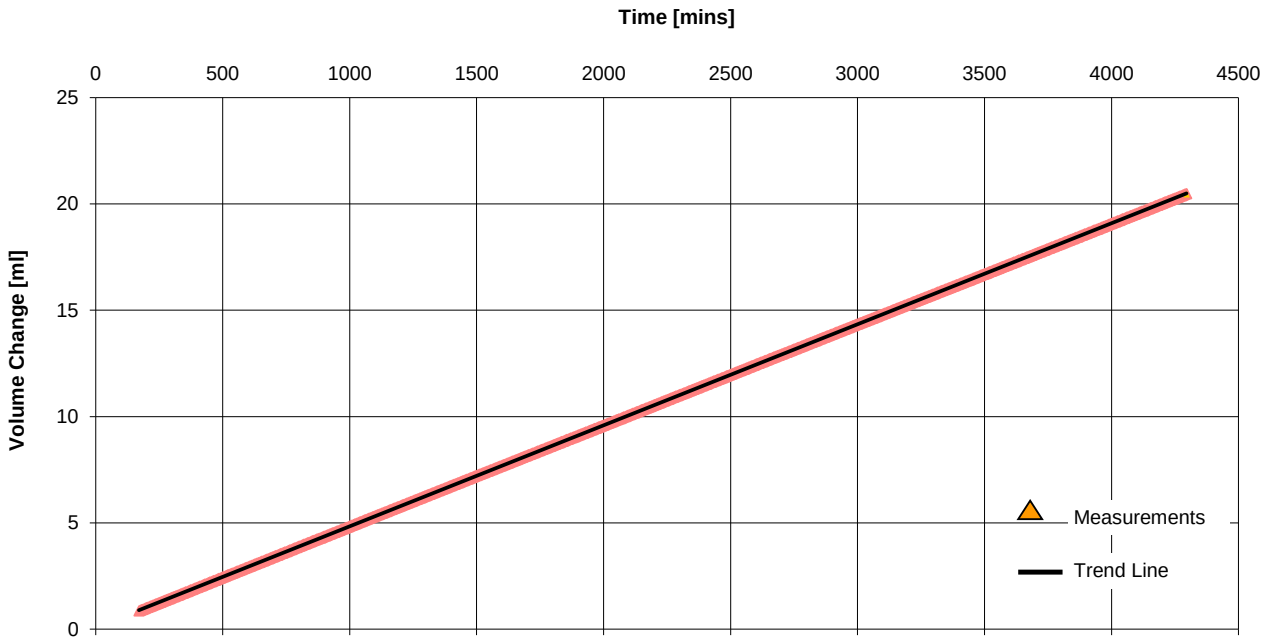
FUGRO	SUMMARY OF TRIAXIAL PERMEABILITY TEST SINGLESTAGE TEST Constant Head Conditions	Project Reference	F254727
		Location ID	Z4_OWF_BH15-COMP
		Depth Top [m]	18.10
Project Name	DGEC	Sample Reference	07-02

Consolidation Stage

Cell pressure	[kPa]	426
Back pressure	[kPa]	300
Effective pressure	[kPa]	126
Final pore pressure	[kPa]	301
Final pore pressure dissipation	[%]	100
Duration	[days]	1

Permeability Stage

Pressure difference across specimen	[kPa]	20
Mean effective stress	[kPa]	126
Rate of flow	[ml/min]	0.005
Hydraulic gradient		29.33
Duration	[kPa]	3



COEFFICIENT OF PERMEABILITY AT 20 ^{0}C, **7.2E-10 [m/s]**

FUGRO	**SUMMARY OF TRIAXIAL PERMEABILITY TEST SINGLESTAGE TEST Constant Head Conditions**	Project Reference	F254727
		Location ID	Z4_OWF_BH15-COMP
		Depth Top [m]	18.10
Project Name	DGEC	Sample Reference	07-02

Final Conditions

Moisture content	[%]	23.5
Bulk density	[Mg/m^3]	2.01
Total duration	[days]	5

Specimen Photographs

FUGRO	SUMMARY OF TRIAXIAL PERMEABILITY TEST SINGLESTAGE TEST Constant Head Conditions		Project Reference	F254727
			Location ID	Z4_OWF_BH17-SAMP
			Depth Top [m]	18.80
Project Name	DGEC		Sample Reference	20-3
Specimen Description	Firm grey slightly sandy CLAY		Sample Type	Wax
Test Method	Specimen set-up	BS EN ISO 17892-11:2019 Clause 6.2	Date started	10/04/2025
	Saturation	BS EN ISO 17892-11:2019 Clause 6.3		
	Consolidation-Iso.	BS EN ISO 17892-11:2019 Clause 6.3	Medium	Tap water
	Permeability	BS EN ISO 17892-11:2019 Clause 6.4		

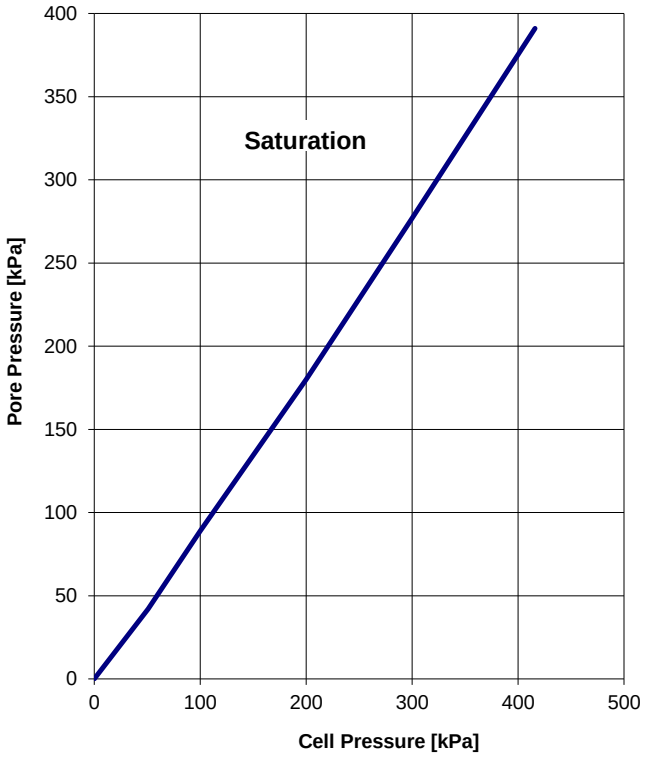
Initial Conditions

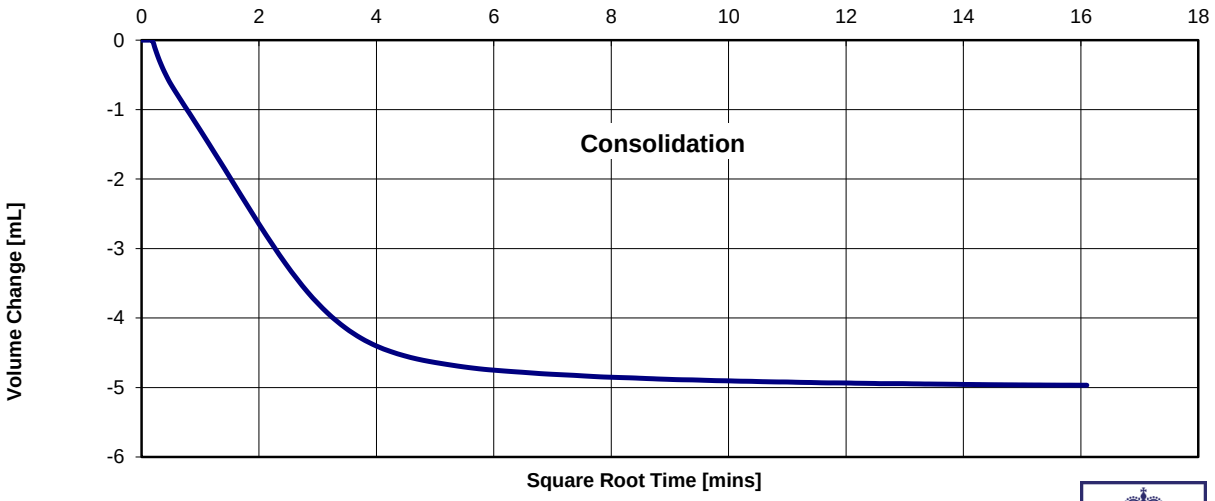
Sample orientation		Vertical
Specimen preparation		Undisturbed
Specimen depth	[m]	18.82
Diameter	[mm]	69.94
Length	[mm]	69.96
Water content (trimmings)	[%]	29.3
Bulk density	[Mg/m^3]	1.94
Dry density	[Mg/m^3]	1.50
Particle density[1]	[Mg/m^3]	#2.7
Voids ratio e	-	0.799
Degree of saturation	[%]	99
Drainage conditions		Both ends

[1] # denotes assumed

Saturation Stage

Saturation method -		Const. Moist. Content
Final cell pressure	[kPa]	416
Final pore pressure	[kPa]	391
Press. Increm./ Diff. press.	[kPa]	50-100 / 0
B value achieved	[%]	98
Duration	[days]	1





Remarks

UKAS TESTING
1483

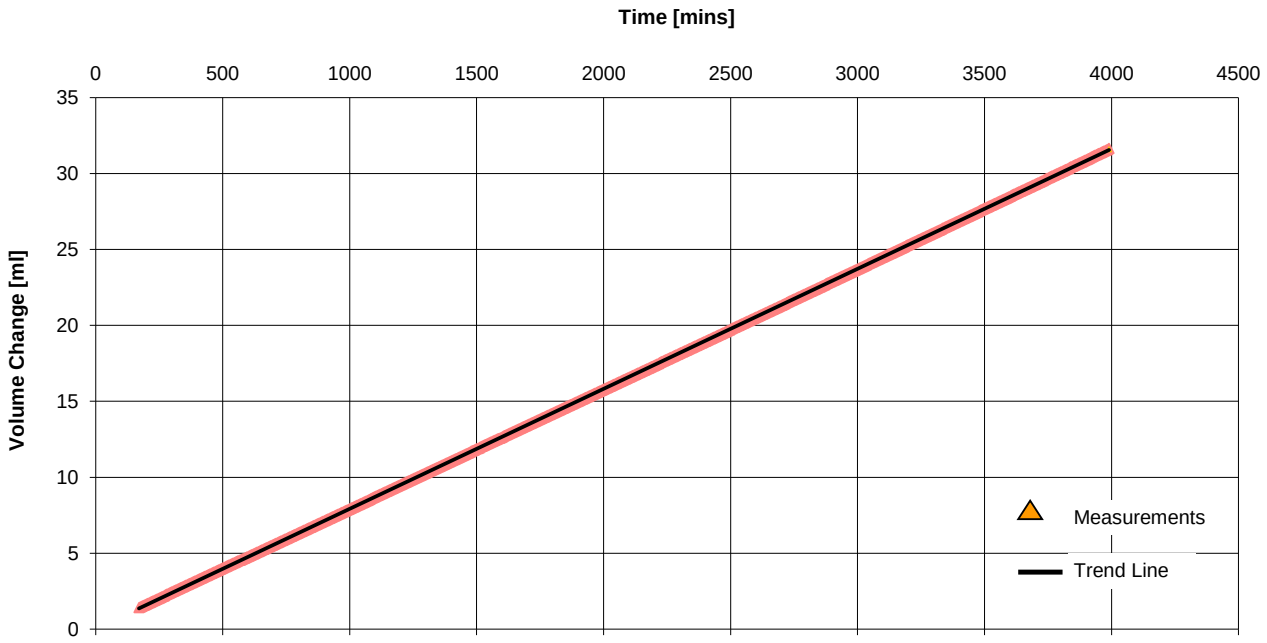
FUGRO	SUMMARY OF TRIAXIAL PERMEABILITY TEST SINGLESTAGE TEST Constant Head Conditions	Project Reference	F254727
		Location ID	Z4_OWF_BH17-SAMP
		Depth Top [m]	18.80
Project Name	DGEC	Sample Reference	20-3

Consolidation Stage

Cell pressure	[kPa]	416
Back pressure	[kPa]	300
Effective pressure	[kPa]	116
Final pore pressure	[kPa]	301
Final pore pressure dissipation	[%]	100
Duration	[days]	1

Permeability Stage

Pressure difference across specimen	[kPa]	10
Mean effective stress	[kPa]	116
Rate of flow	[ml/min]	0.008
Hydraulic gradient		14.67
Duration	[kPa]	3



COEFFICIENT OF PERMEABILITY AT 20 ^{0}C, **2.4E-09 [m/s]**

FUGRO	**SUMMARY OF TRIAXIAL PERMEABILITY TEST SINGLESTAGE TEST Constant Head Conditions**	Project Reference	F254727
		Location ID	Z4_OWF_BH17-SAMP
		Depth Top [m]	18.80
Project Name	DGEC	Sample Reference	20-3

Final Conditions

Moisture content	[%]	28.7
Bulk density	[Mg/m^3]	1.95
Total duration	[days]	5

Specimen Photographs





PROJECT No.	: F254727	
PROJECT TITLE	: Golfe du Lion Geotechnical Site Investigation	
CLIENT	: DGEC	
Location	: GL GSI EST Z4	
Easting	: 608024 m	WGS84 UTM31N
Northing	: 4756479 m	
Water depth	: 100.00 m	LAT FR Bathyelli

SAMPLE IDENTIFICATION			AT SAMPLE COLLECTION			SAMPLE CHARACTERISTICS					MEASUREMENT CONDITIONS							THERMAL RESULTS					SAMPLE TEMPERATURE		
BH name	Sample iD	Test depth [m BSB]	Date	Time	Ambient Temp. [°C]	Description	Condition	Moisture content [%]	Wet Unit Weight [kN/m^3]	Dry Unit Weight [kN/m^3]	Test No.	Date	Time	Kit Serial No.	Probe used	Probe Serial No.	Ambient Temp. [°C]	TC [W/(m.k)]	TR [(m.K)/W]	TR Mean value	Deviation	Error rate (r^2)	Temp	Mean value	Remarks
Z4_OWF_BH01-SAMP	W02	1.2	19/01/2025	19:00	22.0	greyish brown (2.5Y 5/2) gravelly slightly calcareous medium to coarse SAND with rare coarse sand-size shell fragments. Gravel is flat subangular to subrounded of various lithologies	Undisturbed	25	19	16	1	19/01/2025	19:05	8905-0011	TR-3	01583	22.1	1.930	0.518	0.474	14.0%	0.0034	16.1	16.8	-
											2	19/01/2025	19:20	8905-0011	TR-3	01583	22.1	2.179	0.459			0.0021	16.9		-
											3	19/01/2025	19:35	8905-0011	TR-3	01583	22.1	2.244	0.446			0.0015	17.5		-
Z4_OWF_BH01-SAMP	W05	4.6	19/01/2025	21:35	22.0	dark greyish brown (2.5Y 4/2) calcareous fine to medium SAND with rare coarse sand-size to fine gravel-size shell fragments - with closely to medium spaced thin beds of silt	Undisturbed	29	19	15	1	19/01/2025	21:35	8905-0011	TR-3	01583	22.0	1.681	0.595	0.544	14.2%	0.0048	16.1	16.8	-
											2	19/01/2025	21:50	8905-0011	TR-3	01583	22.0	1.899	0.527			0.0018	16.9		-
											3	19/01/2025	22:01	8905-0011	TR-3	01583	22.0	1.960	0.510			0.0025	17.4		-

PROJECT No.	: F254727	
PROJECT TITLE	: Golfe du Lion Geotechnical Site Investigation	
CLIENT	: DGEC	
Location	: GL GSI EST Z4	
Easting	: 609362 m	WGS84 UTM31N
Northing	: 4767065 m	
Water depth	: 90.80 m	LAT FR Bathyelli

SAMPLE IDENTIFICATION			AT SAMPLE COLLECTION			SAMPLE CHARACTERISTICS					MEASUREMENT CONDITIONS							THERMAL RESULTS					SAMPLE TEMPERATURE		
BH name	Sample iD	Test depth [m BSB]	Date	Time	Ambient Temp. [°C]	Description	Condition	Moisture content [%]	Wet Unit Weight [kN/m^3]	Dry Unit Weight [kN/m^3]	Test No.	Date	Time	Kit Serial No.	Probe used	Probe Serial No.	Ambient Temp. [°C]	TC [W/(m.k)]	TR [(m.K)/W]	TR Mean value	Deviation	Error rate (r^2)	Temp	Mean value	Remarks
Z4_OWF_BH05-SAMP	W01	0.35	19/01/25	4:20	28.0	very soft dark greyish brown (2.5Y 4/2) slightly sandy slightly calcareous CLAY; soft very dark grey (2.5Y 3/1) sandy gravelly slightly calcareous CLAY with occasional coarse sand-size to medium gravel-size shell	Undisturbed	32	19	14	1	19/01/25	4:36	8905-0011	TR-3	01075	28.0	1.455	0.687	0.645	11.1%	0.0034	28.0	28.0	-
											2	19/01/25	4:52	8905-0011	TR-3	01075	28.0	1.573	0.636			0.0047	28.0		-
												19/01/2025	5:09	8905-0011	TR-3	01075	28.0	1.636	0.611			0.0021	28.0		-
Z4_OWF_BH05-SAMP	W03	3.15	19/01/25	6:25	28.0	very dark greyish brown (2.5Y 3/2) slightly silty calcareous fine to medium SAND with rare coarse sand-size to fine gravel-size shell fragments	Undisturbed	25	19	15	1	19/01/25	6:40	8905-0011	TR-3	01075	28.0	1.943	0.515	0.481	12.9%	0.0039	28.0	28.0	-
											2	19/01/25	6:56	8905-0011	TR-3	01075	28.0	2.231	0.448			0.0035	28.0		-
											-	-	-	-	-	-	-	-	-			-	-		-

PROJECT No.	: F254727
PROJECT TITLE	: Golfe du Lion Geotechnical Site Investigation
CLIENT	: DGEC
Location	: GL GSI WEST EST Z4
Easting	: 603 348.73 WGS84 UTM31N
Northing	: 4 765 382.07
Water depth	: 91.20 m LAT FR Bathyelli

SAMPLE IDENTIFICATION			AT SAMPLE COLLECTION			SAMPLE CHARACTERISTICS					MEASUREMENT CONDITIONS							THERMAL RESULTS					SAMPLE TEMPERATURE		
BH name	Sample iD	Test depth [m BSB]	Date	Time	Ambient Temp. [°C]	Description	Condition	Moisture content [%]	Wet Unit Weight [kN/m^3]	Dry Unit Weight [kN/m^3]	Test No.	Date	Time	Kit Serial No.	Probe used	Probe Serial No.	Ambient Temp. [°C]	TC [W/(m.k)]	TR [(m.K)/W]	TR Mean value	Deviation	Error rate (r^2)	Temp	Mean value	Remarks
Z4_OWF_BH15-COMP	W01	2.10	17/01/25	16:00	22.0	dark grey (10YR 4/1) slightly silty fine to medium SAND	Undisturbed	22	20	17	1	17/01/25	16:10	8905-0011	TR-3	01075	22.0	1.736	0.576	0.503	20.9%	0.0074	15.6	16.5	-
											2	17/01/25	16:25	8905-0011	TR-3	01075	22.0	2.101	0.476			0.0053	16.6		-
											3	17/01/25	16:40	8905-0011	TR-3	01075	22.0	2.195	0.456			0.0068	17.3		-
Z4_OWF_BH15-COMP	W02	5.60	17/01/25	18:15	22.2	dark grey (2.5Y 4/1) slightly silty calcareous fine to medium SAND with rare coarse sand-size shell fragments	Undisturbed	22	20	17	1	17/01/25	18:15	8905-0011	TR-3	01075	22.2	1.722	0.581	0.529	17.9%	0.0063	15.7	16.4	-
											2	17/01/25	18:37	8905-0011	TR-3	01075	22.2	2.097	0.477			0.0061	17.0		-
											-	-	-	-	-	-	-	-	-			-	-		-

PROJECT No.	: F254727	
PROJECT TITLE	: Golfe du Lion Geotechnical Site Investigation	
CLIENT	: DGEC	
Location	: GL GSI EST Z4	
Easting	: 604922 m	WGS84 UTM31N
Northing	: 4762370 m	
Water depth	: 98.90 m	LAT FR Bathyelli

SAMPLE IDENTIFICATION			AT SAMPLE COLLECTION			SAMPLE CHARACTERISTICS					MEASUREMENT CONDITIONS							THERMAL RESULTS					SAMPLE TEMPERATURE		
BH name	Sample iD	Test depth [m BSB]	Date	Time	Ambient Temp. [°C]	Description	Condition	Moisture content [%]	Wet Unit Weight [kN/m^3]	Dry Unit Weight [kN/m^3]	Test No.	Date	Time	Kit Serial No.	Probe used	Probe Serial No.	Ambient Temp. [°C]	TC [W/(m.k)]	TR [(m.K)/W]	TR Mean value	Deviation	Error rate (r^2)	Temp	Mean value	Remarks
Z4_OWF_BH16-SAMP	W01	0.25	18/01/25	14:35	27.0	dark grey (2.5Y 4/1) very clayey calcareous fine SAND with numerous coarse sand-size to coarse gravel-size shell fragments	Undisturbed	22	19	16	1	18/01/25	14:35	8905-0011	TR-3	01075	27.0	1.326	0.754	0.715	8.6%	0.0027	15.1	15.7	-
											2	18/01/25	14:50	8905-0011	TR-3	01075	27.0	1.427	0.701			0.0009	15.8		-
											3	18/01/25	15:05	8905-0011	TR-3	01075	27.0	1.451	0.689			0.0047	16.2		-
Z4_OWF_BH16-SAMP	W07	5.40	18/01/25	17:38	27.0	very dark grey (2.5Y 3/1) calcareous fine to medium SAND with rare coarse sand-size shell fragments	Undisturbed	27	18	15	1	18/01/25	17:35	8905-0011	TR-3	01075	27.2	1.832	0.546	0.502	13.3%	0.0036	15.5	16.1	-
											2	18/01/25	17:50	8905-0011	TR-3	01075	27.1	2.061	0.485			0.0014	16.2		-
											3	18/01/25	18:10	8905-0011	TR-3	01075	27.1	2.112	0.473			0.0053	16.6		-

PROJECT No.	: F254727	
PROJECT TITLE	: Golfe du Lion Geotechnical Site Investigation	
CLIENT	: DGEC	
Location	: GL GSI EST Z4	
Easting	: 600422 m	WGS84 UTM31N
Northing	: 4762323 m	
Water depth	: 93.50 m	LAT FR Bathyelli

SAMPLE IDENTIFICATION			AT SAMPLE COLLECTION			SAMPLE CHARACTERISTICS					MEASUREMENT CONDITIONS							THERMAL RESULTS					SAMPLE TEMPERATURE		
BH name	Sample iD	Test depth [m BSB]	Date	Time	Ambient Temp. [°C]	Description	Condition	Moisture content [%]	Wet Unit Weight [kN/m^3]	Dry Unit Weight [kN/m^3]	Test No.	Date	Time	Kit Serial No.	Probe used	Probe Serial No.	Ambient Temp. [°C]	TC [W/(m.k)]	TR [(m.K)/W]	TR Mean value	Deviation	Error rate (r^2)	Temp	Mean value	Remarks
Z4_OWF_BH17-SAMP	W02	1.15	18/01/25	3:05	25.0	dark olive grey (5Y 3/2) slightly calcareous fine to coarse SAND with rare coarse sand-size to fine gravel-size shell fragments	Undisturbed	23	20	16	1	18/01/25	3:21	8905-0011	TR-3	01075	25.0	1.850	0.541			0.0027	14.7		-
											2	18/01/25	3:37	8905-0011	TR-3	01075	25.0	2.037	0.491	0.504	11.1%	0.0009	15.4	15.3	-
											3	18/01/25	3:55	8905-0011	TR-3	01075	25.0	2.082	0.480			0.0017	15.9		-
Z4_OWF_BH17-SAMP	W06	4.60	18/01/25	5:22	27.0	dark olive grey (5Y 3/2) slightly silty calcareous fine to medium SAND	Undisturbed	28	19	15	1	18/01/25	5:37	8905-0011	TR-3	01075	25.0	1.590	0.629			0.0044	14.1		-
											2	18/01/25	5:53	8905-0011	TR-3	01075	25.0	1.775	0.563	0.579	13.4%	0.0011	14.9	14.8	-
											3	18/01/25	6:10	8905-0011	TR-3	01075	25.0	1.836	0.545			0.0020	15.4		-

Test Report

Carbonate Content of Soil by Rapid Titration

BS1377-3 : 2018, Section 8.3

No.	Location	Sample	Depth [m]	Carbonate Content 1 [% as CO_2]	Carbonate Content 2 [% as CO_3]	Carbonate Content 3 [% as $CaCO_3$]
1	Z4_OWF_BH01-SAMP	05-2	3.90	8.30		
2	Z4_OWF_BH01-SAMP	11-1	9.50	13.00		
3	Z4_OWF_BH01-SAMP	16-3	15.05	14.00		
4	Z4_OWF_BH01-SAMP	20-5	19.30	15.00		
5	Z4_OWF_BH05-SAMP	01-1	0.00	14.00		
6	Z4_OWF_BH05-SAMP	06-1	5.00	10.00		
7	Z4_OWF_BH05-SAMP	12-1	10.50	13.00		
8	Z4_OWF_BH05-SAMP	17-1	15.00	16.00		
9	Z4_OWF_BH05-SAMP	19-1	17.00	15.00		
10	Z4_OWF_BH15-COMP	01-1	1.50	14.00		
11	Z4_OWF_BH15-COMP	03-1	8.50	13.00		
12	Z4_OWF_BH15-COMP	06-1	17.00	13.00		
13	Z4_OWF_BH16-SAMP	04-2	2.80	12.00		
14	Z4_OWF_BH16-SAMP	09-2	7.35	12.00		
15	Z4_OWF_BH16-SAMP	16-2	14.25	12.00		
16	Z4_OWF_BH16-SAMP	23-1	20.00	13.00		
17	Z4_OWF_BH17-SAMP	03-3	1.90	13.00		
18	Z4_OWF_BH17-SAMP	07-3	6.10	13.00		
19	Z4_OWF_BH17-SAMP	15-1	13.50	13.00		
20	Z4_OWF_BH17-SAMP	19-2	17.75	8.40		

Note: This test was not performed by Fugro and was subcontracted.

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Test Report

Organic Matter of Soil

BS1377-3 : 2018, Section 4 and 6

No.	Location	Sample	Depth [m]	Organic Matter [%]	Organic Matter - Loss On Ignition [%]
1	Z4_OWF_BH01-SAMP	05-2	3.90		5.00
2	Z4_OWF_BH01-SAMP	11-1	9.50		5.90
3	Z4_OWF_BH01-SAMP	16-3	15.05		6.00
4	Z4_OWF_BH01-SAMP	20-5	19.30		7.80
5	Z4_OWF_BH05-SAMP	01-1	0.00		2.90
6	Z4_OWF_BH05-SAMP	06-1	5.00		2.70
7	Z4_OWF_BH05-SAMP	12-1	10.50		7.30
8	Z4_OWF_BH05-SAMP	17-1	15.00		5.20
9	Z4_OWF_BH05-SAMP	19-1	17.00		9.30
10	Z4_OWF_BH15-COMP	01-1	1.50		1.80
11	Z4_OWF_BH15-COMP	03-1	8.50		5.80
12	Z4_OWF_BH15-COMP	06-1	17.00		7.10
13	Z4_OWF_BH16-SAMP	04-2	2.80		11.00
14	Z4_OWF_BH16-SAMP	09-2	7.35		3.00
15	Z4_OWF_BH16-SAMP	16-2	14.25		2.10
16	Z4_OWF_BH16-SAMP	23-1	20.00		3.30
17	Z4_OWF_BH17-SAMP	03-3	1.90		7.10
18	Z4_OWF_BH17-SAMP	07-3	6.10		3.00
19	Z4_OWF_BH17-SAMP	15-1	13.50		6.10
20	Z4_OWF_BH17-SAMP	19-2	17.75		3.90

Note: This test was not performed by Fugro and was subcontracted.

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Test Report

Chloride Content of Soil

BS1377-3 : 2018, Section 9.2 and 9.3

No.	Location	Sample	Depth [m]	Water Soluble Chloride [%]	Acid Soluble Chloride [%]
1	Z4_OWF_BH01-SAMP	05-2	3.90	0.50	
2	Z4_OWF_BH01-SAMP	11-1	9.50	0.57	
3	Z4_OWF_BH01-SAMP	16-3	15.05	0.58	
4	Z4_OWF_BH01-SAMP	20-5	19.30	0.48	
5	Z4_OWF_BH05-SAMP	01-1	0.00	0.86	
6	Z4_OWF_BH05-SAMP	06-1	5.00	0.42	
7	Z4_OWF_BH05-SAMP	12-1	10.50	0.57	
8	Z4_OWF_BH05-SAMP	17-1	15.00	0.50	
9	Z4_OWF_BH05-SAMP	19-1	17.00	0.57	
10	Z4_OWF_BH15-COMP	01-1	1.50	0.50	
11	Z4_OWF_BH15-COMP	03-1	8.50	0.52	
12	Z4_OWF_BH15-COMP	06-1	17.00	0.54	
13	Z4_OWF_BH16-SAMP	04-2	2.80	0.59	
14	Z4_OWF_BH16-SAMP	09-2	7.35	0.46	
15	Z4_OWF_BH16-SAMP	16-2	14.25	0.48	
16	Z4_OWF_BH16-SAMP	23-1	20.00	0.43	
17	Z4_OWF_BH17-SAMP	03-3	1.90	0.63	
18	Z4_OWF_BH17-SAMP	07-3	6.10	0.48	
19	Z4_OWF_BH17-SAMP	15-1	13.50	0.58	
20	Z4_OWF_BH17-SAMP	19-2	17.75	0.58	

Note: This test was not performed by Fugro and was subcontracted.

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Test Report

Total Acid Soluble Sulphate and pH

BS1377-3 : 2018, Section 7.5 and 12

No.	Location	Sample	Depth [m]	Total Acid Soluble Sulphate [mg/l as SO_4]	pH
1	Z4_OWF_BH01-SAMP	05-2	3.90	1090.00	8.80
2	Z4_OWF_BH01-SAMP	11-1	9.50	1050.00	8.70
3	Z4_OWF_BH01-SAMP	16-3	15.05	1200.00	8.80
4	Z4_OWF_BH01-SAMP	20-5	19.30	814.00	8.80
5	Z4_OWF_BH05-SAMP	01-1	0.00	2210.00	8.80
6	Z4_OWF_BH05-SAMP	06-1	5.00	804.00	9.10
7	Z4_OWF_BH05-SAMP	12-1	10.50	1480.00	8.60
8	Z4_OWF_BH05-SAMP	17-1	15.00	1230.00	8.60
9	Z4_OWF_BH05-SAMP	19-1	17.00	1450.00	8.50
10	Z4_OWF_BH15-COMP	01-1	1.50	2330.00	8.50
11	Z4_OWF_BH15-COMP	03-1	8.50	1420.00	8.50
12	Z4_OWF_BH15-COMP	06-1	17.00	1500.00	8.80
13	Z4_OWF_BH16-SAMP	04-2	2.80	1230.00	9.00
14	Z4_OWF_BH16-SAMP	09-2	7.35	970.00	8.90
15	Z4_OWF_BH16-SAMP	16-2	14.25	867.00	9.00
16	Z4_OWF_BH16-SAMP	23-1	20.00	1120.00	8.80
17	Z4_OWF_BH17-SAMP	03-3	1.90	1040.00	8.90
18	Z4_OWF_BH17-SAMP	07-3	6.10	1220.00	8.90
19	Z4_OWF_BH17-SAMP	15-1	13.50	1230.00	8.80
20	Z4_OWF_BH17-SAMP	19-2	17.75	1250.00	8.90

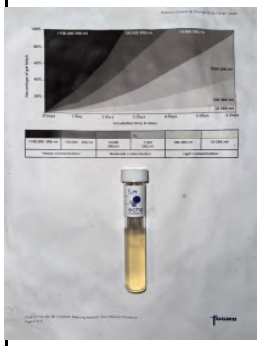
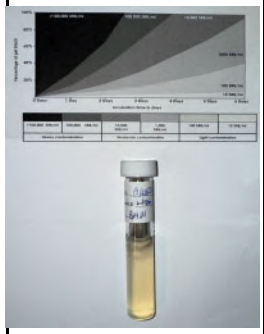
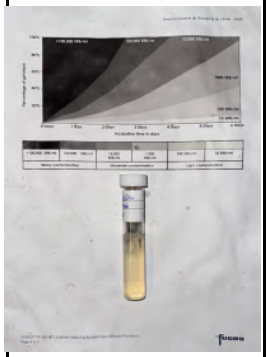
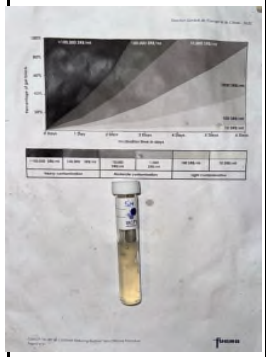
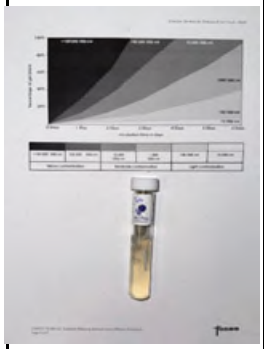
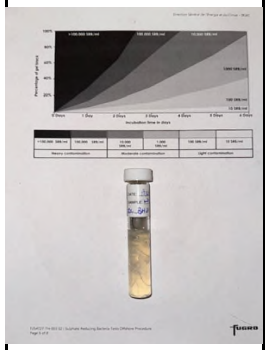
Note: This test was not performed by Fugro and was subcontracted.

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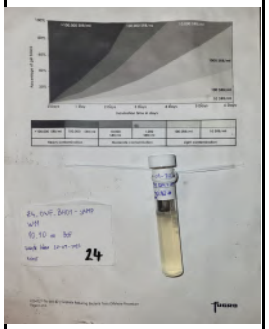
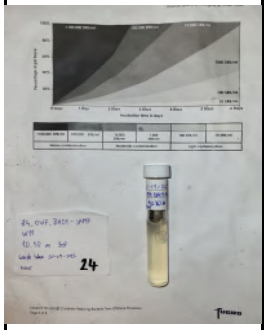
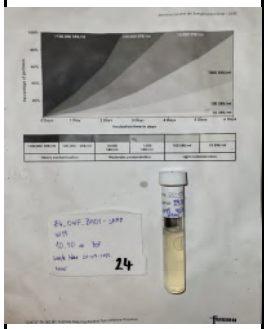
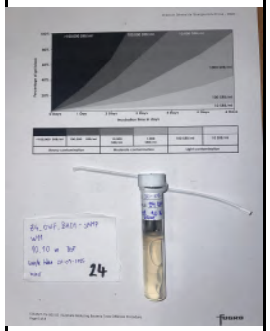
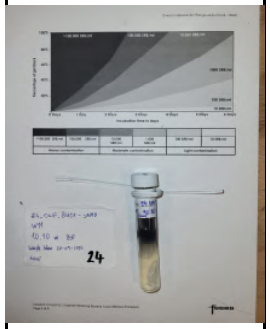
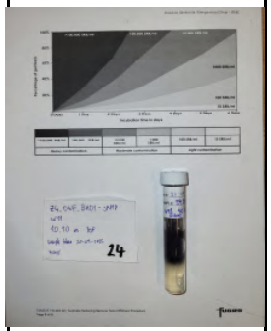
Sulphate-Reducing Bacteria (SRB) Test

Project No.	:	F254727			
Location	:	Z4_OWF_BH01-SAMP	Depth	:	5 m BSF
Sample No.	:	W06	Date of test	:	19/01/2025
SRB Test Kit	:	Sig Sulphide®			

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube
					
Tube Appearance:	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**
No Visible Reaction	Light Grey	Light Grey	Light Grey	Light Grey	Light Grey
SRB Concentration	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**
< 10 SRB/ml	10 - 100 SRB/ml	10 - 100 SRB/ml	10 - 100 SRB/ml	10 - 100 SRB/ml	10 - 100 SRB/ml
Qualitative Interpretation	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**
Light Contamination	Light Contamination	Light Contamination	Light Contamination	Light Contamination	Light Contamination

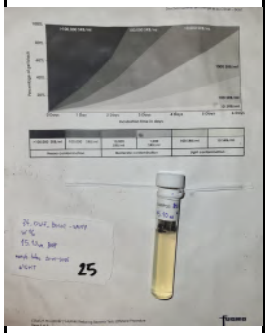
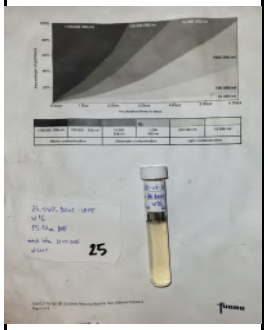
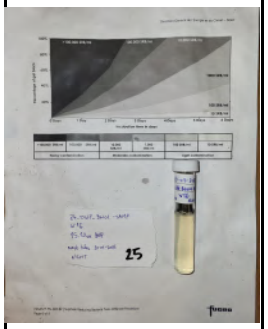
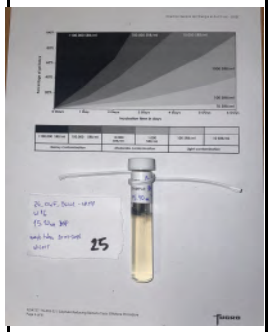
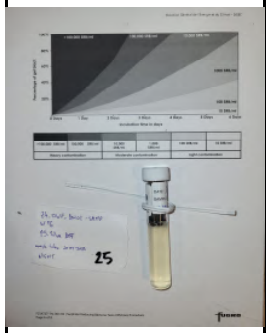
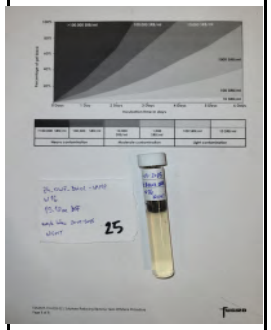
Sulphate-Reducing Bacteria (SRB) Test

Project No.	:	F254727			
Location	:	Z4_OWF_BH01-SAMP	Depth	:	10.1 m BSF
Sample No.	:	W11	Date of test	:	20/01/2025
SRB Test Kit	:	Sig Sulphide®			

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube
					
Tube Appearance:	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**
No Visible Reaction	No Visible Reaction	No Visible Reaction	No Visible Reaction	Dark Grey	Dark Grey
SRB Concentration	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**
< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	1000 -10000 SRB/ml	1000 -10000 SRB/ml
Qualitative Interpretation	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**
Light Contamination	Light Contamination	Light Contamination	Light Contamination	Moderate Contamination	Moderate Contamination

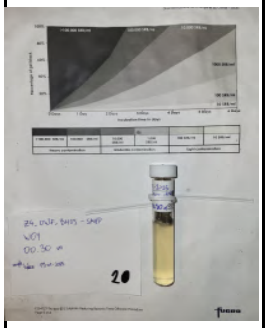
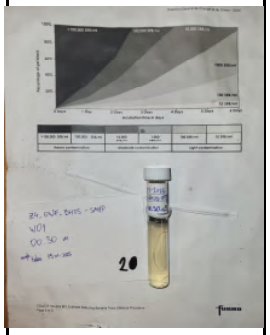
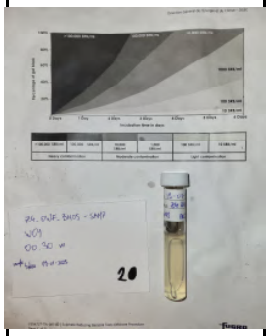
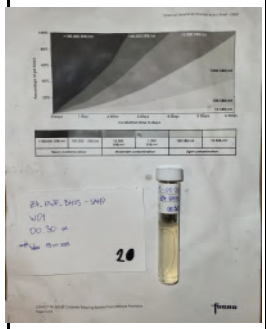
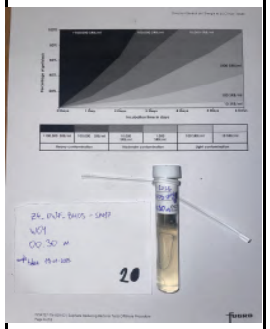
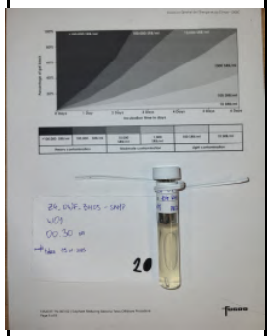
Sulphate-Reducing Bacteria (SRB) Test

Project No.	:	F254727			
Location	:	Z4_OWF_BH01-SAMP	Depth	:	15.1 m BSF
Sample No.	:	W16	Date of test	:	20/01/2025
SRB Test Kit	:	Sig Sulphide®			

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube
					
Tube Appearance:	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**
No Visible Reaction	No Visible Reaction	No Visible Reaction	No Visible Reaction	No Visible Reaction	No Visible Reaction
SRB Concentration	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**
< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml
Qualitative Interpretation	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**
Light Contamination	Light Contamination	Light Contamination	Light Contamination	Light Contamination	Light Contamination

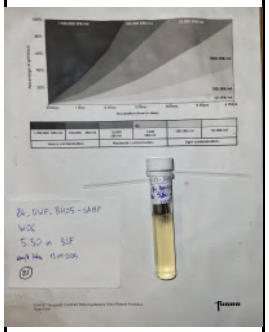
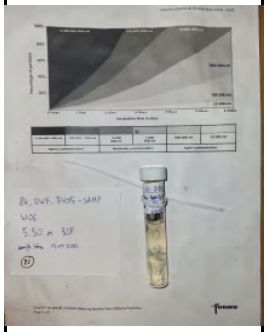
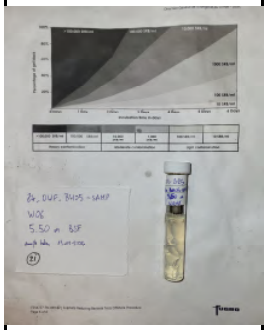
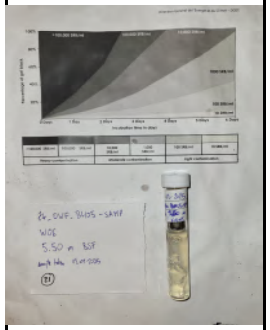
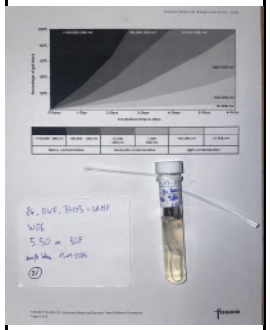
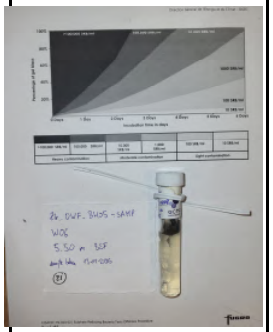
Sulphate-Reducing Bacteria (SRB) Test

Project No.	:	F254727			
Location	:	Z4_OWF_BH05-SAMP	Depth	:	0.3 m BSF
Sample No.	:	W01	Date of test	:	19/01/2025
SRB Test Kit	:	Sig Sulphide®			

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube
					
Tube Appearance:	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**
No Visible Reaction	No Visible Reaction	No Visible Reaction	No Visible Reaction	No Visible Reaction	No Visible Reaction
SRB Concentration	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**
< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml
Qualitative Interpretation	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**
Light Contamination	Light Contamination	Light Contamination	Light Contamination	Light Contamination	Light Contamination

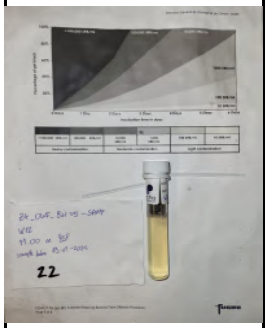
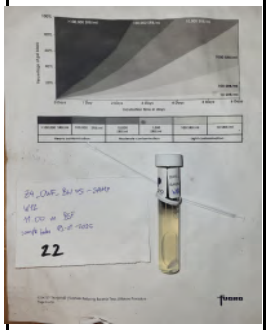
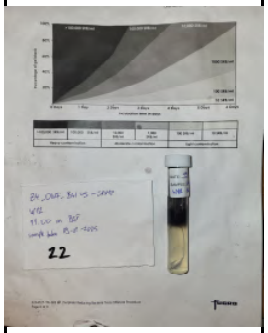
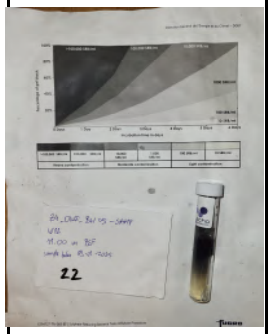
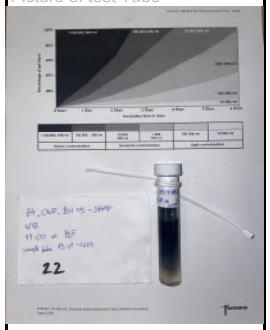
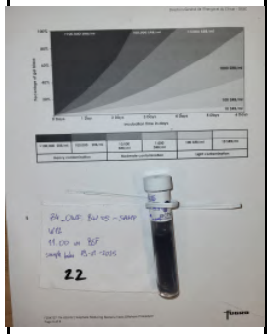
Sulphate-Reducing Bacteria (SRB) Test

Project No.	:	F254727			
Location	:	Z4_OWF_BH05-SAMP	Depth	:	5.5 m BSF
Sample No.	:	W06	Date of test	:	19/01/2025
SRB Test Kit	:	Sig Sulphide®			

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube
					
Tube Appearance:	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**
No Visible Reaction	No Visible Reaction	No Visible Reaction	No Visible Reaction	No Visible Reaction	No Visible Reaction
SRB Concentration	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**
< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml
Qualitative Interpretation	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**
Light Contamination	Light Contamination	Light Contamination	Light Contamination	Light Contamination	Light Contamination

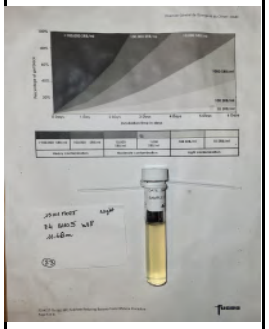
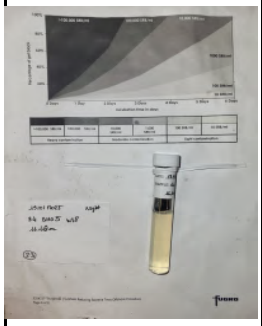
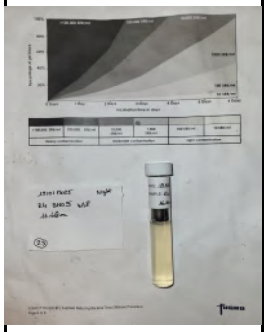
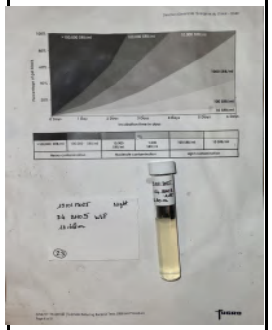
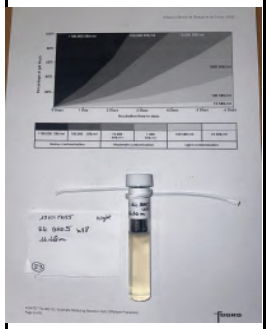
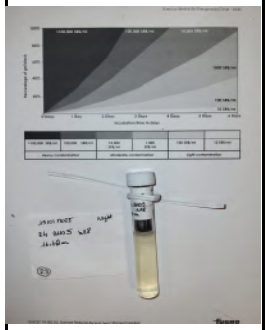
Sulphate-Reducing Bacteria (SRB) Test

Project No.	:	F254727			
Location	:	Z4_OWF_BH05-SAMP	Depth	:	11 m BSF
Sample No.	:	W12	Date of test	:	19/01/205
SRB Test Kit	:	Sig Sulphide®			

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube
					
Tube Appearance:	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**
No Visible Reaction	No Visible Reaction	Dark Grey	Dark Grey	Dark Grey	Dark Grey
SRB Concentration	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**
< 10 SRB/ml	< 10 SRB/ml	1000 -10000 SRB/ml	1000 -10000 SRB/ml	1000 -10000 SRB/ml	1000 -10000 SRB/ml
Qualitative Interpretation	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**
Light Contamination	Light Contamination	Moderate Contamination	Moderate Contamination	Moderate Contamination	Moderate Contamination

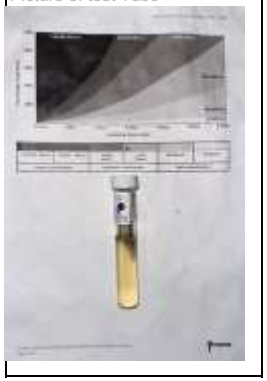
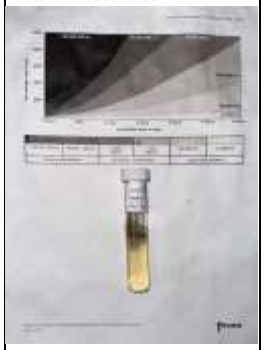
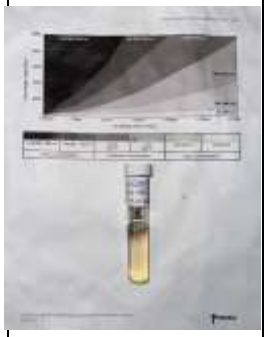
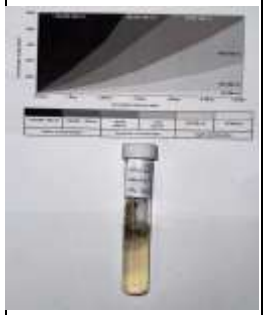
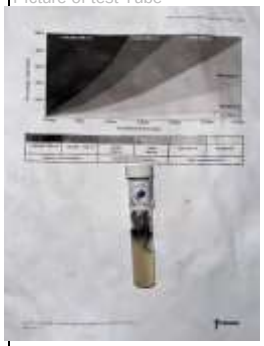
Sulphate-Reducing Bacteria (SRB) Test

Project No.	:	F254727			
Location	:	Z4_OWF_BH05-SAMP	Depth	:	16.6 m BSF
Sample No.	:	W18	Date of test	:	19/01/2025
SRB Test Kit	:	Sig Sulphide®			

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube
					
Tube Appearance:	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**
No Visible Reaction	No Visible Reaction	No Visible Reaction	No Visible Reaction	No Visible Reaction	No Visible Reaction
SRB Concentration	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**
< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml
Qualitative Interpretation	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**
Light Contamination	Light Contamination	Light Contamination	Light Contamination	Light Contamination	Light Contamination

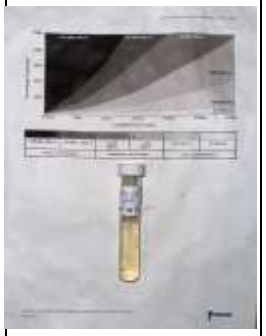
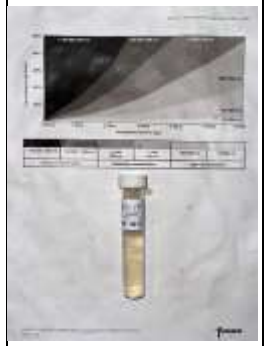
Sulphate-Reducing Bacteria (SRB) Test

Project No.	:	F254727			
Location	:	Z4_OWF_BH15-COMP	Depth	:	2.65 m BSF
Sample No.	:	W01	Date of test	:	17/01/2025
SRB Test Kit	:	Sig Sulphide®			

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube
					
Tube Appearance:	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**
No Visible Reaction	Light Grey	Light Grey	Light Grey	Grey	Grey
SRB Concentration	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**
< 10 SRB/ml	10 - 100 SRB/ml	10 - 100 SRB/ml	10 - 100 SRB/ml	100 - 1000 SRB/ml	100 - 1000 SRB/ml
Qualitative Interpretation	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**
Light Contamination	Light Contamination	Light Contamination	Light Contamination	Moderate Contamination	Moderate Contamination

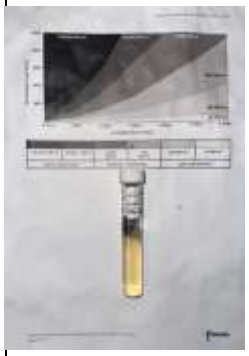
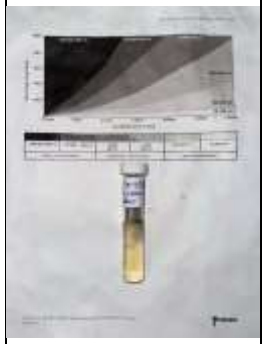
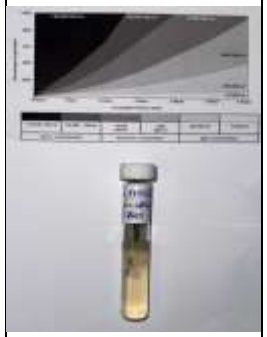
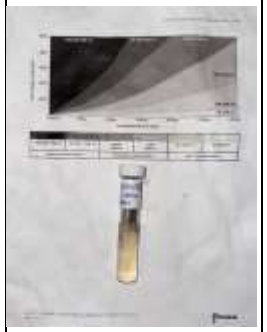
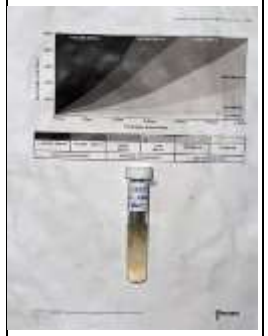
Sulphate-Reducing Bacteria (SRB) Test

Project No.	:	F254727			
Location	:	Z4_OWF_BH15-COMP	Depth	:	5.5 m BSF
Sample No.	:	W02	Date of test	:	17/01/2025
SRB Test Kit	:	Sig Sulphide®			

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube
					
Tube Appearance:	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**
No Visible Reaction	No Visible Reaction	No Visible Reaction	No Visible Reaction	No Visible Reaction	No Visible Reaction
SRB Concentration	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**
< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml
Qualitative Interpretation	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**
Light Contamination	Light Contamination	Light Contamination	Light Contamination	Light Contamination	Light Contamination

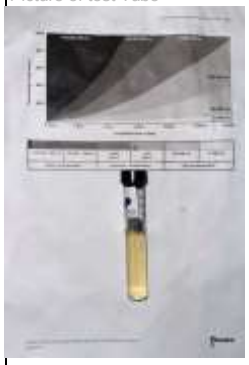
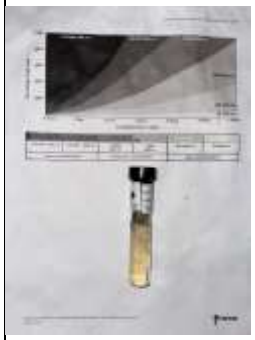
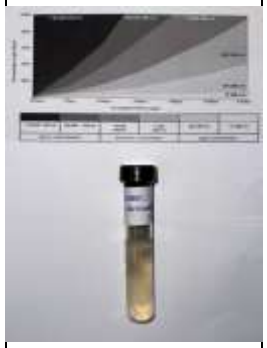
Sulphate-Reducing Bacteria (SRB) Test

Project No.	:	F254727			
Location	:	Z4_OWF_BH15-COMP	Depth	:	9.5 m BSF
Sample No.	:	W04	Date of test	:	17/01/2025
SRB Test Kit	:	Sig Sulphide®			

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube
					
Tube Appearance:	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**
No Visible Reaction	Light Grey	Light Grey	Light Grey	Light Grey	Light Grey
SRB Concentration	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**
< 10 SRB/ml	10 - 100 SRB/ml	10 - 100 SRB/ml	10 - 100 SRB/ml	10 - 100 SRB/ml	10 - 100 SRB/ml
Qualitative Interpretation	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**
Light Contamination	Light Contamination	Light Contamination	Light Contamination	Light Contamination	Light Contamination

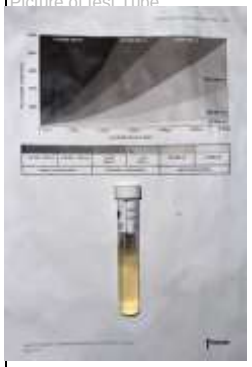
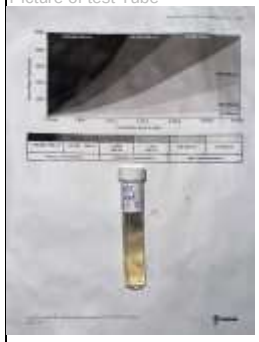
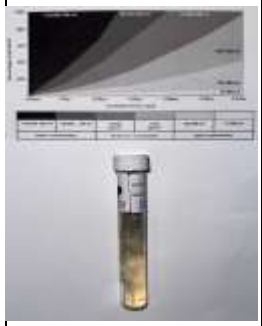
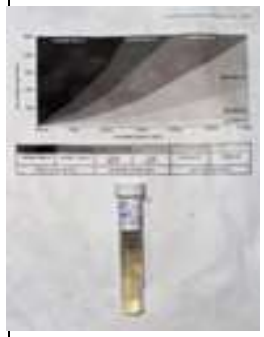
Sulphate-Reducing Bacteria (SRB) Test

Project No.	:	F254727			
Location	:	Z4_OWF_BH15-COMP	Depth	:	13.5 m BSF
Sample No.	:	W05	Date of test	:	17/01/2025
SRB Test Kit	:	Sig Sulphide®			

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube
					
Tube Appearance:	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**
No Visible Reaction	Light Grey	Light Grey	Light Grey	Light Grey	Light Grey
SRB Concentration	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**
< 10 SRB/ml	10 - 100 SRB/ml	10 - 100 SRB/ml	10 - 100 SRB/ml	10 - 100 SRB/ml	10 - 100 SRB/ml
Qualitative Interpretation	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**
Light Contamination	Light Contamination	Light Contamination	Light Contamination	Light Contamination	Light Contamination

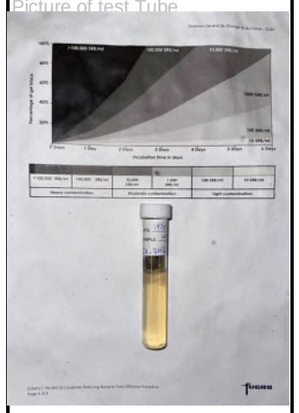
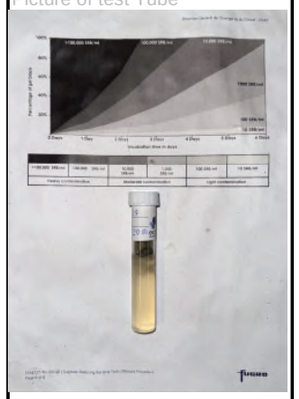
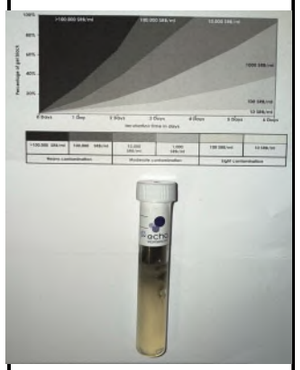
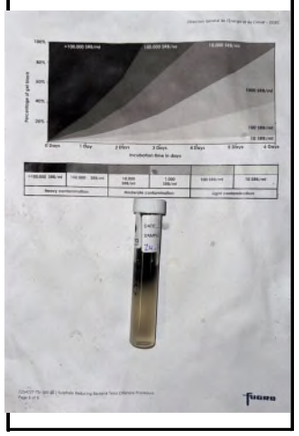
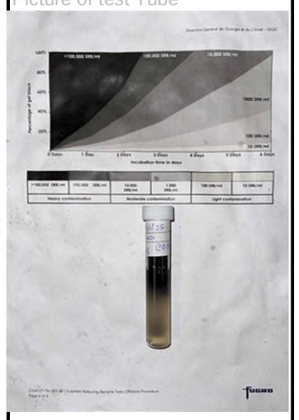
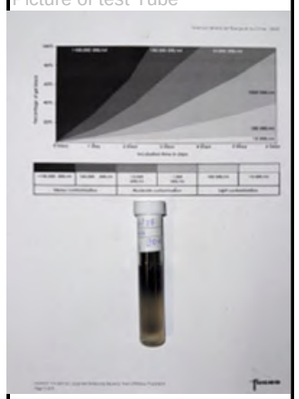
Sulphate-Reducing Bacteria (SRB) Test

Project No.	:	F254727			
Location	:	Z4_OWF_BH15-COMP	Depth	:	17 m BSF
Sample No.	:	W06	Date of test	:	17/01/2025
SRB Test Kit	:	Sig Sulphide®			

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube
					
Tube Appearance:	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**
No Visible Reaction	No Visible Reaction	Light Grey	Grey	Grey	Grey
SRB Concentration	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**
< 10 SRB/ml	< 10 SRB/ml	10 - 100 SRB/ml	100 - 1000 SRB/ml	100 - 1000 SRB/ml	100 - 1000 SRB/ml
Qualitative Interpretation	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**
Light Contamination	Light Contamination	Light Contamination	Moderate Contamination	Moderate Contamination	Moderate Contamination

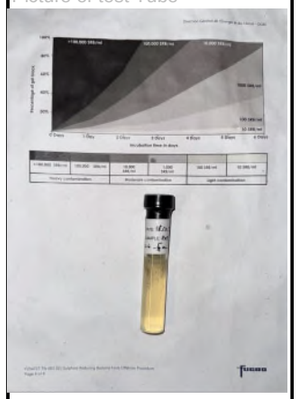
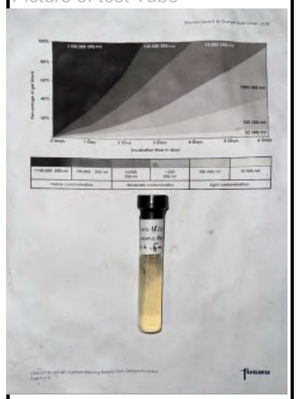
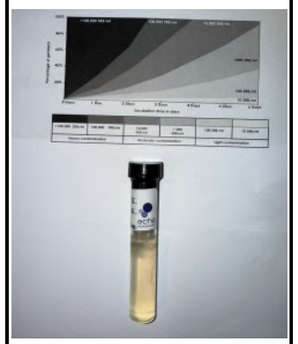
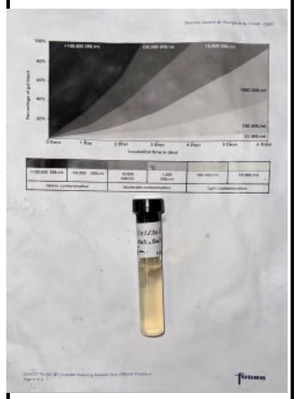
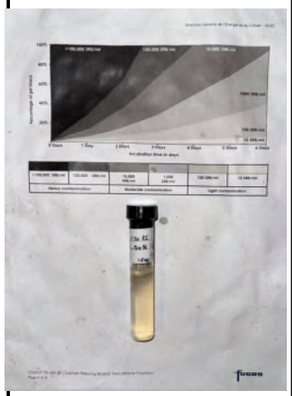
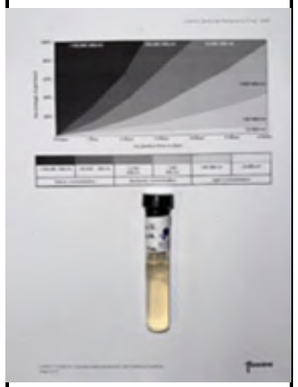
Sulphate-Reducing Bacteria (SRB) Test

Project No.	:	F254727			
Location	:	Z5_OWF_BH16-SAMP	Depth	:	0.1 m BSF
Sample No.	:	W01	Date of test	:	18/01/2025
SRB Test Kit	:	Sig Sulphide®			

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube
					
Tube Appearance:	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**
No Visible Reaction	Light Grey	Grey	Dark Grey	Dark Grey	Dark Grey
SRB Concentration	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**
< 10 SRB/ml	10 - 100 SRB/ml	100 - 1000 SRB/ml	1000 -10000 SRB/ml	1000 -10000 SRB/ml	1000 -10000 SRB/ml
Qualitative Interpretation	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**
Light Contamination	Light Contamination	Moderate Contamination	Moderate Contamination	Moderate Contamination	Moderate Contamination

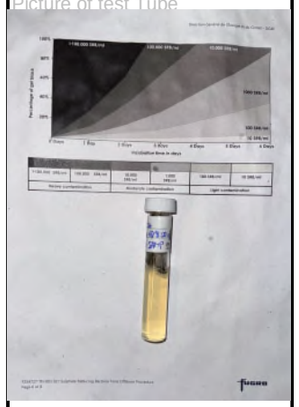
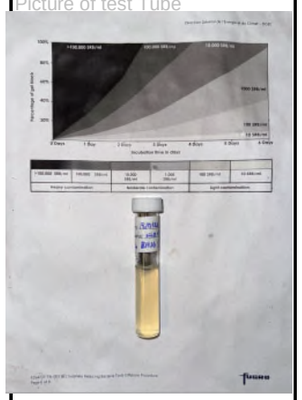
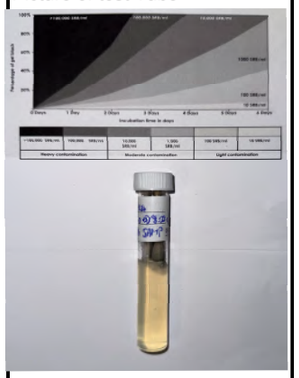
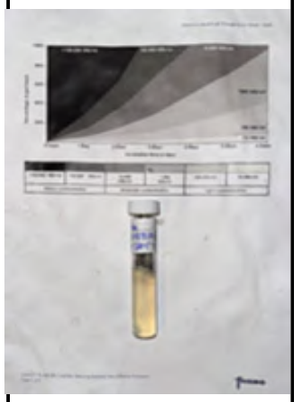
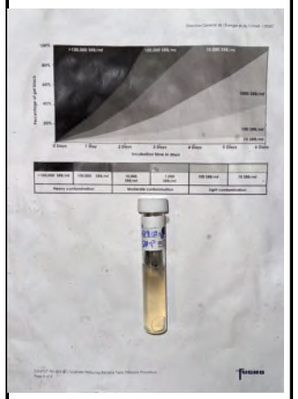
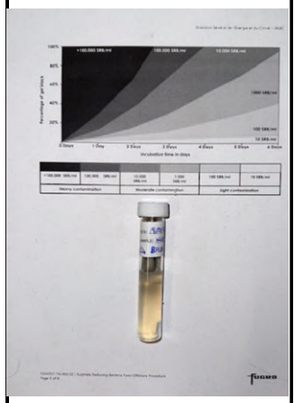
Sulphate-Reducing Bacteria (SRB) Test

Project No.	:	F254727			
Location	:	Z4_OWF_BH16-SAMP	Depth	:	5 m BSF
Sample No.	:	W07	Date of test	:	18/01/2025
SRB Test Kit	:	Sig Sulphide®			

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube
					
Tube Appearance:	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**
No Visible Reaction	No Visible Reaction	No Visible Reaction	No Visible Reaction	Light Grey	Light Grey
SRB Concentration	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**
< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	10 - 100 SRB/ml	10 - 100 SRB/ml
Qualitative Interpretation	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**
Light Contamination	Light Contamination	Light Contamination	Light Contamination	Light Contamination	Light Contamination

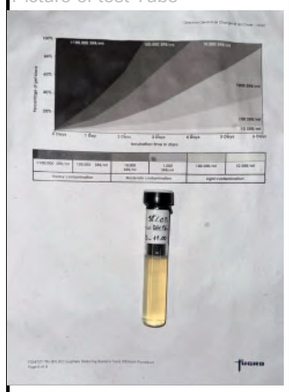
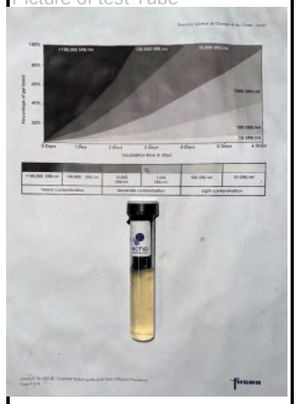
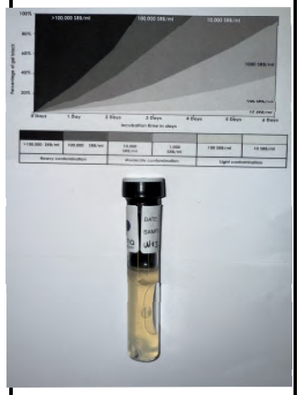
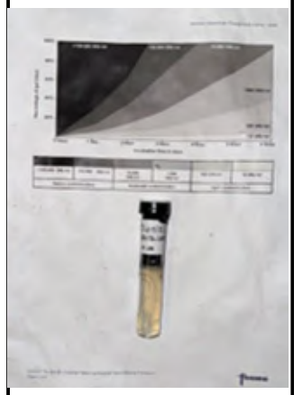
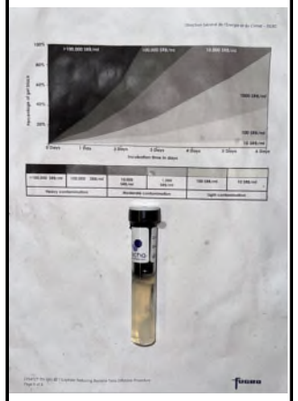
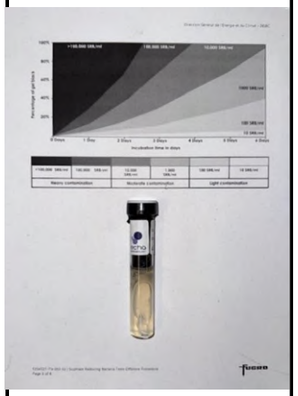
Sulphate-Reducing Bacteria (SRB) Test

Project No.	:	F254727			
Location	:	Z4_OWF_BH16-SAMP	Depth	:	8 m BSF
Sample No.	:	W10	Date of test	:	18/01/2025
SRB Test Kit	:	Sig Sulphide®			

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube
					
Tube Appearance:	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**
No Visible Reaction	No Visible Reaction	No Visible Reaction	No Visible Reaction	Light Grey	Light Grey
SRB Concentration	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**
< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	10 - 100 SRB/ml	10 - 100 SRB/ml
Qualitative Interpretation	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**
Light Contamination	Light Contamination	Light Contamination	Light Contamination	Light Contamination	Light Contamination

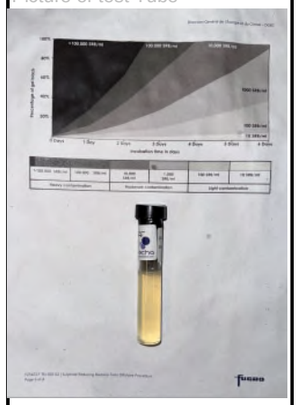
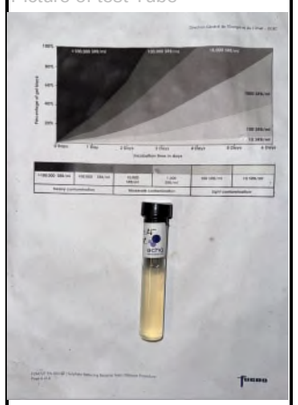
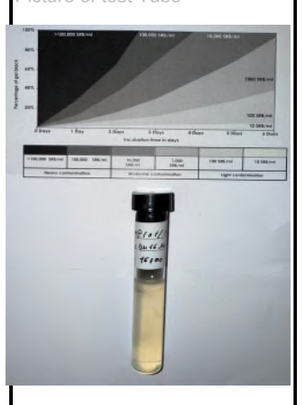
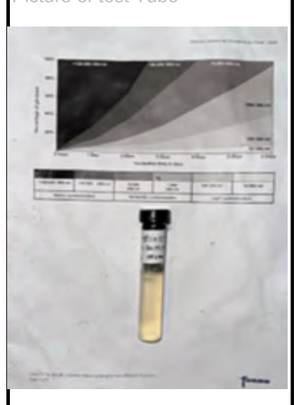
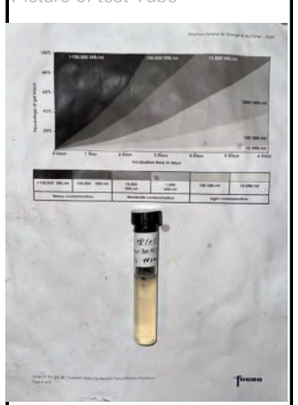
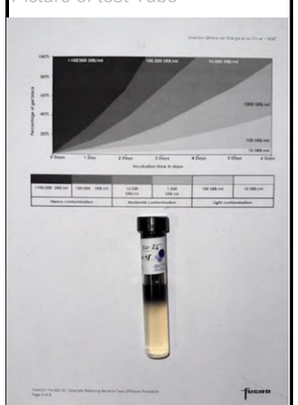
Sulphate-Reducing Bacteria (SRB) Test

Project No.	:	F254727			
Location	:	Z4_OWF_BH16-SAMP	Depth	:	11.4 m BSF
Sample No.	:	W13	Date of test	:	18/01/2025
SRB Test Kit	:	Sig Sulphide®			

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube
					
Tube Appearance:	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**
No Visible Reaction	No Visible Reaction	No Visible Reaction	No Visible Reaction	No Visible Reaction	No Visible Reaction
SRB Concentration	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**
< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml
Qualitative Interpretation	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**
Light Contamination	Light Contamination	Light Contamination	Light Contamination	Light Contamination	Light Contamination

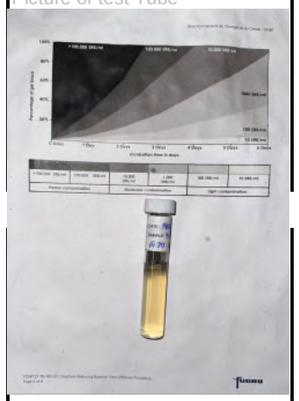
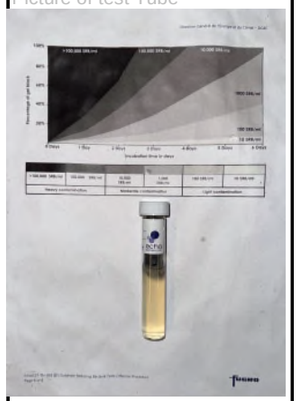
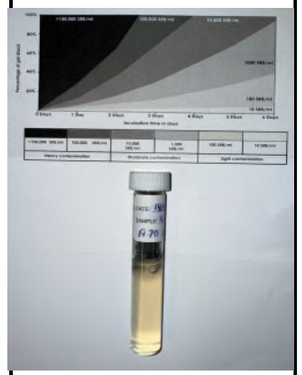
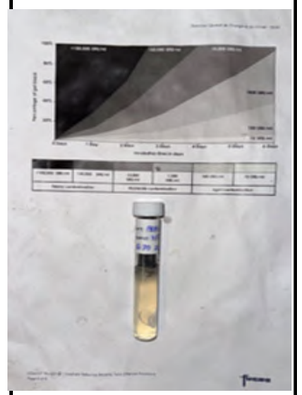
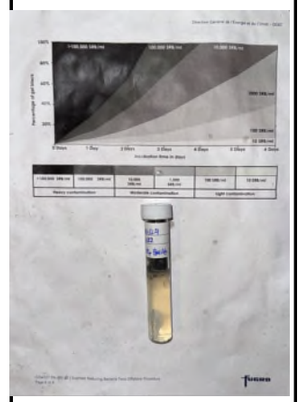
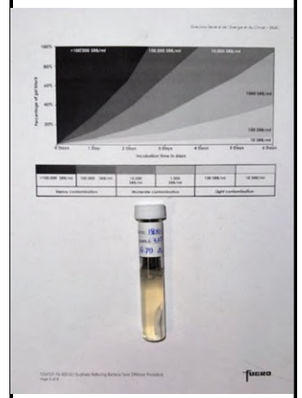
Sulphate-Reducing Bacteria (SRB) Test

Project No.	:	F254727			
Location	:	Z4_OWF_BH16-SAMP	Depth	:	15.4 m BSF
Sample No.	:	W18	Date of test	:	18/01/2025
SRB Test Kit	:	Sig Sulphide®			

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube
					
Tube Appearance:	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**
No Visible Reaction	No Visible Reaction	No Visible Reaction	No Visible Reaction	No Visible Reaction	Light Grey
SRB Concentration	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**
< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	10 - 100 SRB/ml
Qualitative Interpretation	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**
Light Contamination	Light Contamination	Light Contamination	Light Contamination	Light Contamination	Light Contamination

Sulphate-Reducing Bacteria (SRB) Test

Project No.	:	F254727			
Location	:	Z4_OWF_BH16-SAMP	Depth	:	19.7 m BSF
Sample No.	:	W22	Date of test	:	18/01/2025
SRB Test Kit	:	Sig Sulphide®			

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube
					
Tube Appearance:	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**
No Visible Reaction	No Visible Reaction	Light Grey	Light Grey	Light Grey	Light Grey
SRB Concentration	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**
< 10 SRB/ml	< 10 SRB/ml	10 - 100 SRB/ml	10 - 100 SRB/ml	10 - 100 SRB/ml	10 -100 SRB/ml
Qualitative Interpretation	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**
Light Contamination	Light Contamination	Light Contamination	Light Contamination	Light Contamination	Light Contamination

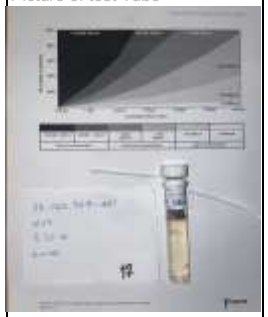
Sulphate-Reducing Bacteria (SRB) Test

Project No.	:	F254727			
Location	:	Z4_OWF_BH17-SAMP	Depth	:	1.1 m BSF
Sample No.	:	W02	Date of test	:	18/01/2025
SRB Test Kit	:	Sig Sulphide®			

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube
					
Tube Appearance:	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**
No Visible Reaction	No Visible Reaction	No Visible Reaction	No Visible Reaction	No Visible Reaction	No Visible Reaction
SRB Concentration	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**
< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml
Qualitative Interpretation	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**
Light Contamination	Light Contamination	Light Contamination	Light Contamination	Light Contamination	Light Contamination

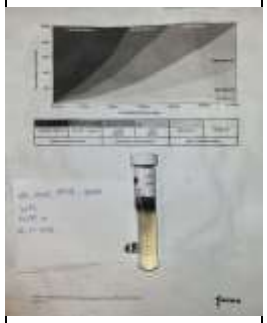
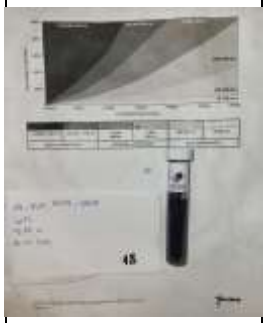
Sulphate-Reducing Bacteria (SRB) Test

Project No.	:	F254727			
Location	:	Z4_OWF_BH17-SAMP	Depth	:	6.2 m BSF
Sample No.	:	W07	Date of test	:	18/01/2025
SRB Test Kit	:	Sig Sulphide®			

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube
					
Tube Appearance:	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**
No Visible Reaction	No Visible Reaction	No Visible Reaction	No Visible Reaction	No Visible Reaction	No Visible Reaction
SRB Concentration	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**
< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml
Qualitative Interpretation	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**
Light Contamination	Light Contamination	Light Contamination	Light Contamination	Light Contamination	Light Contamination

Sulphate-Reducing Bacteria (SRB) Test

Project No.	:	F254727			
Location	:	Z4_OWF_BH17-SAMP	Depth	:	12 m BSF
Sample No.	:	W13	Date of test	:	18/01/2025
SRB Test Kit	:	Sig Sulphide®			

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube
					
Tube Appearance:	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**
No Visible Reaction	No Visible Reaction	No Visible Reaction	Grey	Dark Grey	Dark Grey
SRB Concentration	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**
< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	100 - 1000 SRB/ml	1000 -10000 SRB/ml	1000 -10000 SRB/ml
Qualitative Interpretation	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**
Light Contamination	Light Contamination	Light Contamination	Moderate Contamination	Moderate Contamination	Moderate Contamination

Sulphate-Reducing Bacteria (SRB) Test

Project No.	:	F254727			
Location	:	Z4_OWF_BH17-SAMP	Depth	:	17 m BSF
Sample No.	:	W18	Date of test	:	18/01/2025
SRB Test Kit	:	Sig Sulphide®			

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube	Picture of test Tube
					
Tube Appearance:	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**	**Tube Appearance:**
No Visible Reaction	No Visible Reaction	No Visible Reaction	No Visible Reaction	No Visible Reaction	No Visible Reaction
SRB Concentration	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**	**SRB Concentration**
< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml	< 10 SRB/ml
Qualitative Interpretation	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**	**Qualitative Interpretation**
Light Contamination	Light Contamination	Light Contamination	Light Contamination	Light Contamination	Light Contamination

Appendices

Appendix A Guidelines on Use of Report

A.1 Guidelines on Use of Report

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B.1 Cone Penetration Test Definitions

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E.1 Positioning and Water Depth Data

Appendix F Digital Data

F.1 Digital Data

Appendix A

Guidelines on Use of Report

A.1 Guidelines on Use of Report

This report (the 'Report') was prepared as part of the services (the 'Services') provided by Fugro France SAS ('Fugro') for its client (the 'Client') under the terms of the relevant contract between the two parties (the 'Contract'). The Services were performed by Fugro based on the requirements of the Client set out in the Contract or otherwise made known by the Client to Fugro at the time.

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Appendix B

Cone Penetration Tests

B.1 Cone Penetration Test Definitions

This section details the cone penetration test equipment, procedures and applicable equations.

Description	Document Number
Cone Penetration Test	FNLM-GEO-APP-001

Cone Penetration Test

Scope

This document summarises cone penetration test (CPT) methods.

A CPT involves the measurement of the resistance of ground to steady and continuous penetration of a cone penetrometer equipped with internal sensors. The measurements comprise penetration depth, cone resistance, sleeve friction and, optionally, pore pressure and inclination from vertical. These measurements permit interpretation of ground conditions.

CPT apparatus and procedures adopted by Fugro are in general accordance with ISSMGE (1999), ASTM D5778-20, ISO 22476-1:2022, and ISO 19901-8:2014. General agreement also applies to Eurocode 7 (CEN, 2007).

Some of the test activities allow optional sensor add-ons and procedures, including data processing. These options are not applicable, unless specifically agreed.

This document excludes geotechnical advice, for example advice on a test programme and advice on CPT-based correlations.

CPT Apparatus

General

Fugro offers CPT systems operated from (1) ground surface and seafloor (non-drilling deployment mode) and (2) downhole in a borehole (drilling deployment mode).

CPT apparatus includes various parts as described below:

- Thrust machine: apparatus providing thrust to the push rods so that the recommended rate of penetration (20 mm/s) is controlled;
- Reaction equipment: reaction for the thrust machine;
- Push rod: thick-walled cylindrical tube used for advancing the penetrometer to the required test depth. Push rods may also consist of drill pipe;
- Friction-cone penetrometer (CPT): cylindrical terminal body mounted on the lower end of the push rods, including a cone, a friction sleeve and internal sensing devices for the measurement of cone resistance, sleeve friction and, optionally, inclination;
- Piezocone penetrometer (CPTU or PCPT): cylindrical terminal body mounted on the lower end of the push rods, including a cone, a friction sleeve, a filter and internal sensing devices for the measurement of cone resistance, sleeve friction, pressure and, optionally, inclination and temperature;
- Measuring system: apparatus and software, including sensors, data transmission apparatus, recording apparatus and data processing apparatus.

Deployment from Ground Surface or Seafloor

Specific additional apparatus for CPT deployment from ground surface and seafloor (non-drilling deployment) can include:

- Push rod casing: guide for the part of the push rods protruding above the soil, and for the push rod length exposed in water or soil, to prevent buckling when the required penetration pressure increases beyond the safe limit for the exposed upstanding length of push rods;
- Friction reducer to reduce soil friction acting on the push rods: (1) ring or special projections fixed on the outside of the push rods, with an outside diameter larger than the base of the cone and/or (2) injection of low-friction fluid from the push rod at a fixed distance above the cone penetrometer.

Downhole Borehole Deployment

Downhole CPT systems latch into a bottom hole assembly at the lower end of a drill pipe. System options are:

1. Operation of a downhole thrust machine by applying mud pressure in the borehole;
2. Remote control of a downhole thrust machine by hydraulic pressure transmitted through an umbilical cable connected to a surface-based pump unit, together with;
3. Application of thrust to drill rods where CPT apparatus and a short push rod are latched in the bottom hole assembly; the thrust machine is at ground surface or seafloor.

Downhole CPTs require drilling apparatus for advancing the borehole. The maximum CPT stroke is generally 1.5 m or 3 m.

Data recording can be surface-based and/or downhole.

Cone Penetrometer

Typical features of Fugro penetrometers (Figure 1) include:

- Cone base areas of 500 mm^2, 1000 mm^2 or 1500 mm^2;
- Cone and friction sleeve sensors placed in series, i.e. subtraction-type penetrometers;
- Pore pressure measurements either at the face of the cone (u_1 location) or at the cylindrical extension of the cone (u_2 location). Multiple-sensor penetrometers (u_1, u_2 and u_3 locations) are also available. The u_3 location is immediately above the friction sleeve;
- Inclinometer;
- Temperature sensor, e.g. for cone penetrometer class 0 specified in ISO 22476-1:2022;
- Storage of signals from the penetrometer in digital form for subsequent computer-based processing and presentation.

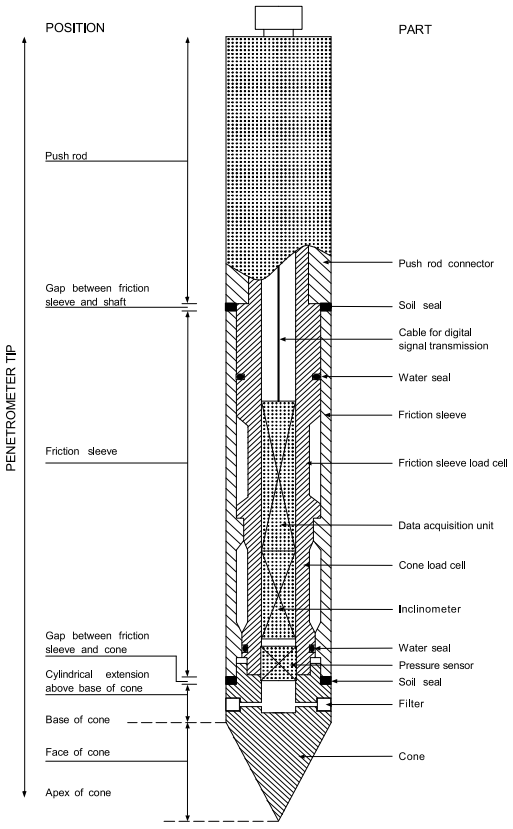


Figure 1: Piezocone penetrometer

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Apparatus for Additional Measurements

Add-on apparatus (and procedures) can apply to specific additional measurements, refer to section 'Additional Measurements' below.

Procedure

General

Figure 2 summarises the test procedure. The procedure includes several stages. The stage of Additional Measurements is optional.

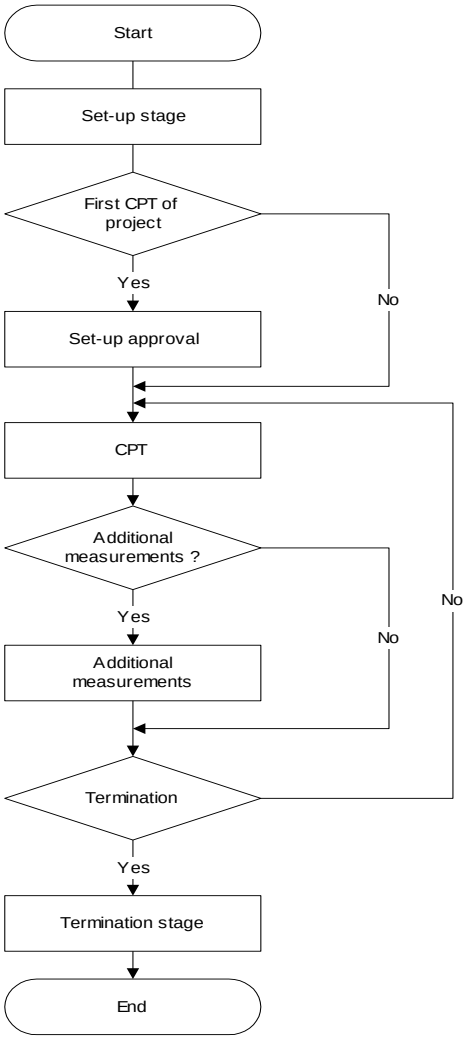


Figure 2: Flow chart

Set-up Stage and Termination Stage

The set-up stage is at discretion of the equipment operator, particularly considering suitability of expected ground type(s), accessibility, risk of damage to equipment and safety of persons.

Set-up requires a reasonably flat, accessible, ground surface with a slope of 5° or less. Most onshore thrust machines have levelling facilities allowing a vertical start of penetration. Seabed frames used for offshore CPT activities have no levelling facilities, i.e. start of penetration may not be vertical.

For over-water (marine/offshore activities), additional accessibility considerations include:

- Minimum water depth for the selected pontoon, jack-up or vessel and the selected test equipment;
- Maximum water depth for the selected pontoon, jack-up or vessel;
- Maximum depth below water (sea) level of selected test equipment;
- Metocean conditions, particularly wind, waves, currents.

The set-up stage typically includes selection of equipment and procedures according to a required type of cone penetrometer, application class, cone penetrometer class, test category and data processing/submission.

The set-up stage or the termination stage includes the location survey, i.e. the determination of the coordinates and the ground surface elevation (or the water depth).

The set-up stage and the termination stage for a downhole CPT include lowering of the CPT apparatus into the borehole and lifting respectively. Most projects require multiple downhole tests in a single borehole.

For piezocone testing, the set-up stage also includes the following steps:

- Office-based or site-based: de-airing of the filter in glycerine by application of 24-hour vacuum and storage in a glycerine-filled container;
- On-site: glycerine filling of hollow space in the cone penetrometer and subsequent mounting of the filter;
- On-site: application of a flexible membrane around the filter to prevent loss of saturating fluid prior to the start of a test.

Land-based tests may include specific measures to help retention of filter saturation during penetration of partially saturated zones. Relaxation of requirements typically applies to offshore tests where water pressures will force entrapped air into solution.

Criteria for test termination are as follows, unless specifically agreed otherwise:

- As instructed by client;
- Reaching target penetration;
- Reaching maximum capacity of the thrust machine, reaction equipment, push rods and/or measuring sensors;
- Sudden increase in penetrometer inclination;
- Risk of damage to apparatus or safety of persons, at discretion of equipment operator or as determined by software algorithms;

whichever occurs first and as applicable. Note that ASTM and ISO standards provide no specific requirements for maximum penetrometer inclination from vertical. A value of 15° is commonly considered.

Application Classes – ISO 19901-8:2014

Table 1 summarises application classes specified in ISO 19901-8:2014 for offshore and nearshore CPTs. The allowable minimum accuracy of a measured parameter is the larger value of the two quoted. A percentage value applies to the measured value and not to the measuring range.

The concept of application classes considers intended soil conditions for selection of an application class. For example, Application Class 1 of ISO 19901-8:2014 can be selected for 'very soft to soft soil deposits', which is approximately equivalent to $q_c < 0.5$ to $q_c < 1$ MPa. In other words, Application Class 1 should not apply to 'mixed bedded soil profiles with weak to strong layers'.

The accuracy values apply to seafloor as reference. They are uncoupled from uncertainty of spatial position below ground surface or seafloor.

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Table 1: Application classes (ISO 19901-8:2014)

Application Class	Parameter	Allowable Minimum Accuracy
1	Cone resistance	35 kPa or 5 %
	Sleeve friction	5 kPa or 10 %
	Pore pressure	25 kPa or 5 %
2	Cone resistance	100 kPa or 5 %
	Sleeve friction	15 kPa or 15 %
	Pore pressure	50 kPa or 5 %
3	Cone Resistance	200 kPa or 5 %
	Sleeve friction	25 kPa or 15 %
	Pore pressure	100 kPa or 5 %

Historically, the concept of application classes was based on an international reference test procedure (ISSMGE, 1999), which specifies 'performance' criteria for cone penetration test measurements. The test results should meet the requirements of one of the application classes.

The following comments apply:

- Accuracy is the 'closeness of a measurement to the true value of the quantity being measured'. It is the accuracy as a whole that is ultimately important not the individual parts. Precision is the 'closeness of each set of measurements to each other'. The resolution of a measuring system is the 'minimum size of the change in the value of a quantity that it can detect'. It will influence the accuracy and precision of a measurement.
- Application Class 3 typically represents industry practice. They are approximately equivalent to the more implicit requirements of ASTM International. Class 3 applies, unless specifically agreed otherwise.

Differences in interpretation about compliance with the ISO box values for accuracy became apparent after publication of a predecessor of ISO 22476-1:2022 and, subsequently, publication of ISO 19901-8:2014. Unfortunately, the interpretational challenges emerged from contractual disputes, unnecessary re-work and CPT results assigned higher confidence than actual (e.g. Peuchen and Parasie, 2019).

The zero drift of a measured parameter can be compared with the allowable minimum accuracy according to the selected application class, per test. This comparison considers the maximum range of values of q_c, f_s and, where applicable, u_1 or u_2 for calculation of the percentage box values (Table 1). Zero drift of a measured parameter is an approximate performance indicator for the measuring system (Peuchen and Terwindt, 2014). Zero drift is the absolute difference of the zero readings, reference readings or zero reference reading of a measuring system between the start and completion of the cone penetration test. The reference readings can be taken at (1) atmospheric pressure at ground surface or above water level or (2) under hydrostatic water pressure close to seafloor.

Cone Penetrometer Classes and Test Categories – ISO 19901-8:2023

ISO 19901-8:2023 includes cone penetrometer classes and test categories that are similar to those of ISO 22476-1:2022. Fugro's implementation of ISO 19901-8:2023 is in progress (*for future update of this document*).

Cone Penetrometer Classes and Test Categories – ISO 22476-1:2022

The applicability of ISO 22476-1:2022 is onshore and nearshore. The standard allows selection of cone penetrometer classes and test categories, i.e. method-based criteria. Compliance with a particular cone penetrometer class and test category then provides some indication for uncertainty of CPT results.

Cone penetrometer classes rely on results of detailed laboratory calibration and verification of cone penetrometers. The results determine compliance of a cone penetrometer with one of four cone penetrometer classes (Table 2). A cone penetrometer can conform to more than one cone penetrometer class, for the case of multiple intervals for calibration.

Input criteria for the cone penetrometer classes include:

- Minimum measurands per cone penetrometer class (Table 2);
- Laboratory cone resistance and sleeve friction: (1) selected uncertainty components for axial force, (2) resolution and output stability, (3) verification values of ambient temperature stability, transient temperature stability and bending influence;
- Laboratory pore pressure: (1) selected uncertainty components for water (or gas) pressure, (2) resolution and output stability, (3) verification values of ambient temperature stability, transient temperature stability and bending influence;
- Inclination: expanded measurement uncertainty for inclination values determined in a calibration laboratory.

Table 2: Required measurands per cone penetrometer class (ISO 22476-1:2022)

Cone Penetrometer Class	q_c	f_s	u_2	T
0	√	√	√	√
1	√	√	√	
2	√	√		
3	√	√		

Notes
q_c = cone resistance
f_s = sleeve friction
u_2 = pore pressure (and/or u_1)
T = temperature

Test categories consider requirements for (1) cone penetrometer class and (2) reference readings and output stability of a cone penetrometer recorded just before the cone penetrometer penetrates the ground and just after the cone penetrometer leaves the ground (Table 3). The requirements for pore pressure u_2 (or u_1) apply according to cone penetrometer class (Table 2).

The difference in reference readings (e.g. $\Delta q_{c;0}$) of a sensor is calculated from sensor output recorded at a frequency of ≥1 Hz, as follows:

- Subtracting the mean value of reference readings of a particular sensor (e.g. sensor for q_c), for a period of one minute shortly before the penetration phase from the mean value of reference readings for a period of one minute shortly after the extraction phase, expressed as an absolute value;
- Cone penetrometer is vertical and under no load, atmospheric or selected ambient water pressure;
- Cone penetrometer is under temperature conditions close to ground temperature.

Calculation of output stability (peak-to-peak) of a sensor (e.g. $2\hat{u}_{qc}$) makes use of reference readings as described above. The calculation considers the larger value of subtracting the maximum and minimum sensor values for a period of one minute shortly before the penetration phase and for a period of one minute shortly after the extraction phase.

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Table 3: Requirements for test categories (ISO 22476-1:2022)

Test Category	Reference Readings [kPa]	Output Stability [kPa]	Cone Penetrometer Class
A	$\Delta q_{c;0} \leq 15$	$2\hat{u}_{qc} \leq 1$	0
	$\Delta f_{s;0} \leq 5$	$2\hat{u}_{fs} \leq 0.5$	
	$\Delta u_{2;0} \leq 3$	$2\hat{u}_{u2} \leq 0.5$	
B	$\Delta q_{c;0} \leq 35$	$2\hat{u}_{qc} \leq 5$	0 or 1
	$\Delta f_{s;0} \leq 5$	$2\hat{u}_{fs} \leq 1.5$	
	$\Delta u_{2;0} \leq 10$	$2\hat{u}_{u2} \leq 3$	
C	$\Delta q_{c;0} \leq 100$	$2\hat{u}_{qc} \leq 11$	0, 1, or 2
	$\Delta f_{s;0} \leq 15$	$2\hat{u}_{fs} \leq 3$	
	$\Delta u_{2;0} \leq 25$	$2\hat{u}_{u2} \leq 8$	
D	$\Delta q_{c;0} \leq 200$	$2\hat{u}_{qc} \leq 33$	0, 1, 2, or 3
	$\Delta f_{s;0} \leq 25$	$2\hat{u}_{fs} \leq 5$	
	$\Delta u_{2;0} \leq 50$	$2\hat{u}_{u2} \leq 16$	

Notes
$\Delta q_{c;0}$ = difference in reference readings for cone resistance q_c
$\Delta f_{s;0}$ = difference in reference readings for sleeve friction f_s
$\Delta u_{2;0}$ = difference in reference readings for pore pressure u_2 (or u_1)
$2\hat{u}_{qc}$ = output stability for q_c
$2\hat{u}_{fs}$ = output stability for f_s
$2\hat{u}_{u2}$ = output stability for u_2 (or u_1)

Results

CPT Parameters

Presentation of results from cone penetration tests typically includes:

- CPT parameters q_c, f_s and R_f versus depth below ground surface or versus elevation;
- Additional CPTU parameters u_1 or u_2 and, optionally, q_t, q_n, f_t, R_{ft}, B_q, Q_t, Q_{tn}, F_r, I_c, I_B and CD for tests with pore pressure measurements;
- Additional (optional) CPT parameter T, temperature;
- Inclination i for tests with inclination measurements;
- Standard graphical format and digital (tabular) ASCII or AGS formats.

Presentation of temperature T versus depth only applies to test results meeting the requirements of both cone penetrometer class 0 of Table 2 and test category A of Table 4.

Most standards specify scales for graphical presentation as follows:

- Axis for penetration depth z: 1 scale unit = 1 m;
- Axis for cone resistance q_c, corrected cone resistance q_t and net cone resistance q_n: 1 scale unit = 2 MPa or 0.5 MPa;
- Axis for sleeve friction f_s: 1 scale unit = 50 kPa;
- Axis for friction ratio R_f: 1 scale unit = 2 %;
- Axis for pore pressure u: 1 scale unit = 0.2 MPa or 0.02 MPa;
- Axis for pore pressure ratio B_q: 1 scale unit = 0.5.

Graphical presentation aims for these scale units and scale ratios, where suitable and practicable.

The reference level of a test is (1) the ground surface for onshore tests, (2) the seafloor for nearshore and offshore tests. Data processing presumes a hydrostatic pore pressure profile relative to seafloor, unless specifically indicated otherwise. The definition of CPT parameters is as follows:

z = penetration depth relative to ground surface or seafloor, corrected for inclination from vertical (i) where a test includes inclination measurements, as follows:

$$z = \int_0^l \cos i \cdot \mathrm{d}l$$

where:

z = penetration depth for the conical base of the cone penetrometer
l = recorded penetration length
i = recorded inclination from vertical

q_c = cone resistance relative to the reference level of the test.

f_s = sleeve friction relative to the reference level of the test. A calculated depth correction applies so that the presented sleeve friction corresponds with the cone depth.

f_t = corrected sleeve friction relative to the reference level of the test. Sleeve friction is corrected for pore pressures acting on the end areas of the friction sleeve

$$f_t = f_s - \frac{(u_2 * A_{sb} - u_3 * A_{st})}{A_s}$$

or simplified to:

$$f_t = f_s - u_2 \frac{(A_{sb} - A_{st})}{A_s} \quad \text{or}$$

$$f_t = f_s - (u_2 * a_{fs})$$

where:

A_{sb} = cross sectional area in the gap between the friction sleeve and the cone
A_{st} = cross sectional area in the gap above the friction sleeve
A_s = surface area of the friction sleeve
a_{fs} = net area ratio of the friction sleeve $(A_{sb} - A_{st})/A_s$

R_f = ratio of sleeve friction to cone resistance (f_s/ q_c). This calculated ratio is for the cone depth.

R_{ft} = corrected friction ratio (f_s/ q_t). The ratio f_t/q_t applies if f_t is known.

u_1 = pore pressure at the face of the cone, relative to the reference level of the test.

u_2 = pore pressure at the cylindrical extension above the base of the cone or in the gap between the friction sleeve and the cone, relative to the reference level of the test.

u_3 = pore pressure immediately above the friction sleeve or in the gap above the friction sleeve, relative to the reference level of the test.

Commonly, no measurement of u_3 applies. An estimate can be obtained using $u_3 = 0.7\,(u_2 - u_0) + u_0$ according to SGI (1991). This estimate is independent of positive or negative values of $u_2 - u_0$.

u_0 = hydrostatic pore pressure at the cone, relative to the phreatic surface or the seafloor. This is a calculated value.

q_t = corrected cone resistance (also called total cone resistance). This includes corrections for hydrostatic and transient pore pressures, and cone construction. The corrected cone resistance is relative to ground surface or seafloor:

$$q_t = q_c + (1\text{-}a)u_2 \text{ or}$$

$$q_t = q_c + (1\text{-}a)[K(u_1 - u_0) + u_0]$$

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Historically, equations for downhole tests were:

$q_t = q_c + (1\text{-}a)u_2 + u_{0i}$ or

$q_t = q_c + (1\text{-}a)[K(u_1 + u_{0i} - u_0) + u_0] + a * u_{0i}$

where:

a = net area ratio of the cross-sectional steel area at the gap between cone and friction sleeve to the cone base area. This ratio is penetrometer-type dependent. The a-factor indicates the effect of pore pressure on unequal cross-sectional areas of the cone.

u_{0i} = hydrostatic pore pressure at the bottom of the borehole, relative to seafloor. This is a calculated value.

K = adjustment factor for the ratio of pore pressure at the cylindrical extension above the base of the cone to pore pressure on the cone face $K = (u_2 - u_0)/(u_1 - u_0)$

The term $u_2 - u_0$ refers to excess pore pressure (with respect to hydrostatic pore pressure). Common symbols for excess pore pressure are du_2 and Δu_2. Similarly, du_1 and Δu_1 can represent the term $u_1 - u_0$.

The K-factor is only of interest for processing of CPTU results with pore pressure measurement at the cone face (u_1). The factor depends on soil characteristics such as fabric, overconsolidation ratio, compressibility and crushability. The K-factor (Peuchen et al., 2010) can be estimated from:

$$K = 0.91 e^{-0.09 Q_t^{0.47}} \left(\frac{1}{1 + F_r(0.17 + 0.061(Q_t - 21.6)^{1/3})} - e^{-2F_r} \right)$$

q_n = $q_t - \sigma_{vo}$ = net cone resistance. This includes corrections for hydrostatic and transient pore pressures, in situ stress, and cone construction. The symbol for q_n may also be q_{net}.

where:

σ_{vo} = total in situ vertical stress at the cone base, relative to ground surface or seafloor. This is a calculated value.

B_q = pore pressure ratio $B_q = (u_2 - u_0)/q_n$ or

$B_q = K(u_1 - u_0)/q_n$

Q_t = q_n/σ'_{v0} = normalized cone resistance

where:

σ'_{v0} = effective in situ vertical stress at the cone base, relative to ground surface or seafloor. This is a calculated value.

Q_{tn} = normalized cone resistance with variable stress exponent n, where:

$$Q_{tn} = [(q_t - \sigma_{v0})/P_a](P_a/\sigma'_{v0})^n$$

$$n = 0.381\,(I_c) + 0.05\,(\sigma'_{vo} / P_a) - 0.15 \text{ and } n \leq 1$$

(Zhang et al., 2002)

where:

P_a = atmospheric pressure

F_r = f_t/q_n = normalized friction ratio

U_2 = normalized excess pore pressure $(u_2 - u_0)/\sigma'_{v0}$

I_B = soil behaviour type index (Robertson, 2016)

$I_B = 100(Q_{tn} + 10)/(70 + Q_{tn}F_r)$

I_c = soil behaviour type index (Robertson and Wride,1998)

$I_c = [(3.47 - \log Q_{tn})^2 + (\log F_r + 1.22)^2]^{0.5}$

I_{SBT} = soil behaviour type index (Robertson, 2010)

$I_{SBT} = [(3.47 - \log (q_c/P_a))^2 + (\log R_f + 1.22)^2]^{0.5}$

CD = contractive-dilative boundary (Robertson, 2016)

$CD = (Q_{tn} - 11)(1 + 0.06F_r)^{17}$

Presented values for u_2, q_t, q_n, f_t, R_{ft}, Q_t and B_q may be annotated with an asterisk, e.g. u_2^*, q_t^* or q_n^*, if u_2 is derived rather than measured, for example if derived by applying a K-factor.

Pore pressure u_2 at the cylindrical extension is commonly assumed equal to u_{2g} in the gap. The assumption $u_2 = u_{2g}$ is probably reasonable for deepwater CPTs and associated high values of ambient pressure that promote saturated conditions in the gap. A similar comment applies to u_3. Note that CPTU saturation procedures apply to the pore pressure measuring system only. These procedures exclude the gaps below and above the friction sleeve.

Some deployment systems allow monitoring of CPT parameters in reverse mode, i.e. upon retraction of the cone penetrometer. This optional feature presents additional information that can improve interpretation of ground behaviour, for example strength sensitivity of fine-grained soil.

Metrological Confirmation

CPT results include information on metrological confirmation. Examples covered by CPT standards include reporting of application class, cone penetrometer class, test category and reference readings.

The ISO standard on metrological confirmation (ISO 10012:2003) provides the general framework for assessment of performance compliance.

Cone penetration test standards can follow a 'prescriptive' approach, whereby specific detailed measures provided a 'deemed to comply' practice. ASTM D5778-20 and ISO 22476-1:2022 provide examples of this approach.

The level of detail required by standards can be high. For example, ISO 22476-1:2022 includes detailed procedures for calibration and verification of CPT systems, with normative references to ISO/IEC 17025:2017. Fugro's calibration laboratory holds formal accreditation for cone penetrometer calibration and verification according to ISO/IEC 17025:2017. Results provided by Fugro's calibration laboratory meet the requirements of ISO 22476-1:2012, ISO 19901-8:2014 and ASTM D5778-20. Fugro is implementing updates to meet the requirements of ISO 22476-1:2022 and ISO 19901-8:2023.

Peuchen and Terwindt (2014, 2015) provide guidance on uncertainty estimation for cone penetration test results. The calculation model for uncertainty estimates for q_c, f_s and u considers the following uncertainty contributions, where applicable: (1) force and pressure sensors, (2) geometry of the cone penetrometer, (3) effects from ambient and transient temperature, (4) non-axial force on cone penetrometer (bending moment), (5) ambient fluid pressure in soil and (6) zero offsets for q_c, f_s and u relative to seafloor.

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Temperature Stability of Cone Penetrometer

Uncertainty considerations for strongly layered soils should allow for heat flux phenomena. Heat flux gives an apparent shift in cone resistance. For example, friction in dense sand causes a cone to heat by about 1°C/MPa cone resistance. Resulting heat flux changes cone resistance by an apparent shift in the order of 100 kPa to 200 kPa for a penetrating probe going from dense sand into clay. This is a temporary change lasting about 5 minutes. Penetration interruption can serve as mitigation measure for transient temperature effects. The incorporation of one or more add-on temperature sensors in a cone penetrometer, and associated data algorithms, can reduce the effects from ambient and transient temperature fluctuations (Peuchen et al., 2020).

Sleeve Friction

Sleeve friction values will show some dependence on details of cone penetrometers, each of which meeting the requirements outlined in ISO (2022, 2023) and ASTM (2020). Peuchen and Terwindt (2014, 2015) list factors which can contribute to variation in f_s values, including:

- Geometry and surface area tolerances: ISO (2022, 2023) and ASTM (2020) standards allow for variations (tolerances) in geometry of a cone penetrometer, including diameter of the cone, diameter of the friction sleeve and the surface area (length) of the friction sleeve. Particularly, presented values of sleeve friction cover 'friction' and 'end bearing' components. Furthermore, the friction component can depend on cavity expansion causing soil to move from space defined by the diameter of the cone to space defined by the diameter of the friction sleeve. This effect can be important for dense sands.
- Surface roughness: The surface roughness of the friction sleeve can change upon use of the cone penetrometer, affecting f_s values. Variations in roughness affect how soil particles interact with the sleeve surface.
- Gaps between components: Gaps between the friction sleeve and other components of the cone penetrometer (e.g., the cone and the shaft) affect f_s values. Contributors include (1) soil-soil shear forces and (2) water or gas pressures in these gaps and (3) changes in gap volume due to pressure and displacement. Some dependencies on the net area ratio of the friction sleeve a_{fs} also apply. Effects on f_s can be particularly significant in soils with varying penetration-induced pore pressures.

Pore Pressures

A CPTU pore pressure measuring system is intended for use in water-saturated uncemented fine-grained soil. Pore pressure measurements (u) are commonly assumed to represent pore water pressures. This assumption is reasonable for soils saturated under in situ stress conditions and remaining saturated during penetration of the cone penetrometer.

Pore pressure results obtained for ground conditions such as partially saturated soils, very dense sands and cemented soils may not be representative and/or repeatable. For example, stiffness differences between the steel components of the cone penetrometer and the piezocone filter can affect results for very dense sands.

Loss of saturation of the pore pressure measuring system can occur during a test (Peuchen et al. 2020). Loss of saturation usually causes a sluggish pore pressure response during penetration of ground below the zone causing desaturation of the pore pressure measuring system. Reasons for loss of saturation include:

- Penetration of partially saturated ground, for example ground containing significant amounts of gas;
- Reduction of pore pressure to below in situ pore pressure, causing gas in solution to become free gas;
- Penetration interruption for a stationary in situ test or for add-on of a push rod, that will cause:
  - Abrupt cone penetrometer deceleration and acceleration, with a possibility of upward movement of the cone penetrometer
  - Change of stress conditions around the cone penetrometer, including pore pressure and gas migration where applicable
  - Small volume change of the gaps below and above the friction sleeve of the cone penetrometer
- For u_2 filter position: proximity of gap between cone tip and friction sleeve, i.e. net area ratio $a < 1$. This gap may not be water-saturated, which in turn can lead to (1) substantial, local (undesired) pore pressure gradients and (2) loss of saturation of the u_2 filter itself;
- Measurement of negative pore pressures such that cavitation occurs; for example, this is not uncommon for a piezocone filter located at the cylindrical extension above the base of the cone (u_2 location), at the time of penetration of dense sand or overconsolidated clay layers.

Re-saturation of a pore pressure measurement system can take place upon further penetration into soil. Particularly, re-saturation may take place in saturated low-permeability soils (clays) that are normally consolidated or lightly overconsolidated and where the gap can become saturated by adequate supply of water and/or water pressure.

Measured pore pressures affected by desaturation of the pore pressure measurement system may not be representative of soil behaviour. Consequently, derived parameter values that use pore pressure may also not be representative.

Shallow Penetration

Shallow penetration will affect CPT measurements. Values of q_c, f_s and u for initial penetration of a cone penetrometer below ground surface, seafloor or bottom of a borehole will differ from a fully embedded cone penetrometer. As a general guide, initial penetration effects can be expected for a distance of about 8 times the diameter of the cone penetrometer for q_c, u_1 and u_2, and for a distance of about 15 times the diameter of the cone penetrometer for f_s. Initial penetration effects can be deeper for downhole borehole deployment. This is because of (1) complex ground stress conditions immediately below the required borehole and (2) borehole-induced ground disturbance that cannot be avoided.

Use of reaction equipment will affect stress conditions for shallow penetration. Particularly, offshore conditions may include extremely soft ground at seafloor. Soil disturbance, pore pressure build-up and consolidation of near-surface soft soil may take place.

Penetration Rate

CPT standards typically provide limits of ± 5 mm/s for a nominal penetration rate of 20 mm/s. Considerations include:

- A typical thrust machine provides a push speed with an uncertainty within ± 5 mm/s under favourable conditions. Under adverse conditions, penetration rates may be outside

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these limits, for example with strongly varying thrust and towards the thrust limit of a thrust machine;
- The penetration rate is not necessarily equal to the push speed because of inevitable vertical movements of the thrust machine and length variation and bending of the push-rod string.

Penetration Interruption

A penetration interruption may be unavoidable, for example to add a push rod or to perform a pore pressure dissipation test. This will affect test results.

Consolidation of low-permeability soil around a cone tip is of particular interest. A stationary cone penetrometer can apply local stresses that approach failure conditions, i.e. about 9 times the undrained shear strength or about 2 times the in situ mean effective stress. Pore pressure re-distribution and dissipation occur, resulting in a local increase in undrained shear strength and hence cone (bearing) resistance. A doubling of cone resistance may not be unreasonable for 100 % consolidation. Supplementary considerations include:

- Small downward movement of a penetrometer (order of millimetres) during a test can contribute to maintaining local stresses approaching failure conditions;
- Soil consolidation around a cone penetrometer may lead to soil/penetrometer adhesion that is sufficient to give an increase in 'cone' diameter. Resumption of penetration will lead to loss of adhered soil, usually within an equivalent distance of a few times the cone diameter;
- A low B_q value may imply partially drained penetration conditions. It is likely that any steady-state penetration conditions will not apply instantaneously upon resumption of penetration;
- Measuring sensors in a probe generate heat, but this is probably not significant for any stationary measurement. Fugro's strain-gauge load sensors are compensated for ambient temperature fluctuations.

Depth Measurement for Offshore Conditions

Table 4 presents depth accuracy classes according to ISO 19901-8:2014. The type of uncertainty is undefined (e.g. combined standard uncertainty or expanded measurement uncertainty with a coverage factor $k = 2$).

Peuchen and Wemmenhove (2020) present a probabilistic approach to depth uncertainty assessment for in situ testing data points, with reference to these accuracy classes.

Offshore definition of the seafloor (ground surface) is difficult for extremely soft ground at seafloor (ISO 19901-8:2014). Penetration of the reaction equipment into a near-fluid zone of the seabed may take place unnoticed. Such settlement affects the start of penetration depth z. Also, settlement may continue at the time of testing.

Downhole CPT systems rely on depth control applicable to borehole drilling. Depth control according to Z2 of Table 4 is typically feasible for drilling systems deployed from a fixed platform, for example a jack-up. This value excludes uncertainty associated with determination of seafloor level. Drilling control from floating equipment, for example a geotechnical survey vessel, may be subject to the additional influence of waves and tides. Z2 is typically feasible for favourable conditions. Z3 or Z4 may apply for adverse conditions.

Table 4: Depth accuracy classes (ISO 19901-8:2014)

Depth Accuracy Class	Maximum Data Point Depth Uncertainty [m]
Z1	0.1
Z2	0.5
Z3	1.0
Z4	2.0
Z5	> 2.0

Zero-Correction for Offshore Conditions

Water pressures generate significant values of cone resistance and pore pressure. The standardised practice is to correct these reference readings to zero at seafloor. CPT systems for non-drilling mode and for seafloor drilling mode allow zero-correction to hydrostatic conditions prior to the start of a test, typically with a zero-correction uncertainty approaching the resolution of the CPT system. Downhole borehole CPT systems latch into the lower end of a drill pipe. The pressure conditions in the drill pipe may not be in full equilibrium with the surrounding ground water pressure and zero-correction will be subject to increased uncertainty, i.e. uncertainty for pore pressure in the order of 100 kPa for deepwater tests (Peuchen, 2000). This uncertainty depends on factors such as the free-flow and viscosity of drill fluid between the drill bit and the seafloor. The uncertainty typically decreases with decreasing depth of the drill bit below sea level and below seafloor. Uncertainty for the zero-correction of cone resistance is approximately equivalent, but by a factor representing the net area ratio effect.

Deepwater Tests

A deepwater environment presents some favourable conditions for cone penetration tests, notably temperature. Ambient temperature conditions are practically constant and the measuring system has ample time to adjust to these temperatures. In addition, transient heat flow phenomena in a cone penetrometer are usually not applicable. This is because a cone penetrometer accumulates negligible (frictional) heat when penetrating the generally prevalent soils of very soft consistency.

Deepwater (piezocone) pore pressure measurements are essentially similar to shallow-water measurements, with the exception of an increased measuring range for pore pressure leading to some reduction in sensor accuracy. Saturation of a pore pressure measuring system is excellent for a deepwater environment, as the high pressures will force any gas bubbles into solution.

Currently available evidence indicates that a high-quality subtraction-type cone penetrometer is adequate for very soft soil characterisation to a water depth of 3000 metres and probably beyond.

Additional Measurements

Friction-cone and piezocone penetrometers allow specific additional measurements, such as friction set-up tests, pore pressure dissipation tests and measurements of ground water pressure. These optional measurements require a penetration interruption or may be feasible at the end of a test. It is also common to add other (optional) in situ test devices to a cone penetrometer. Table 5 presents the more common types.

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Table 5: Probes for additional in situ tests

Type of Probe	Properties	Units
Electrical Conductivity Penetrometer (ECPT)	Electrical conductivity, K	S/m
Temperature Cone Penetrometer (T-CPT)	Temperature T, thermal conductivity k, volumetric heat capacity C	K, W/(m·K), MJ/m^{3}K
Cone penetrometer with heatflow module (HF-CPTU or HF-T-CPT)	Temperature T, thermal conductivity k	K, W/(m·K)
Seismic Cone Penetrometer (SCPT)	S-wave velocity v_s	m/s
Cone Pressuremeter (CPMT)	Stress-strain-time response σ, ε, t	MPa, -, s
Natural Gamma Penetrometer (GCPT)	Natural gamma ray γ	CPS
Cone Magnetometer (CMMT)	Magnetic flux density B, magnetic field horizontal angle θ, vertical angle ϕ	µT, °, °
Hydraulic Profiling Tool (HPT)	Permeability k	m/s
Notes S = Siemens m = metre K = Kelvin (or °C)	W = Watt J = Joule s = second	Pa = Pascal CPS = counts per second T = Tesla

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Appendix C

Geotechnical Classification Systems

C.1 Soil Classification Systems

Soil description and classification during the site investigation followed two standards:

- ISO 14688-1:2017 Geotechnical investigation and testing. Identification and classification of soil. Identification and description (ISO, 2017a);
- ISO 14688-2:2017 Geotechnical investigation and testing. Identification and classification of soil. Principles for a classification (ISO, 2017b).

Based on these two standards, the consistency of cohesive soils was determined offshore as outlined in Table C.1.

Table C.1: Definitions of consistency used in soil descriptions

Consistency Term	Field Assessment
Very soft	Exudes between the fingers when squeezed in the hand
Soft	Can be moulded by light finger pressure
Firm	Cannot be moulded by the fingers but can be rolled in the hand to 3 mm thick threads without breaking or crumbling
Stiff	Crumbles and breaks when rolled to 3 mm thick threads but is still sufficiently moist to be moulded to a lump again
Very stiff	Soil has dried out and is mostly light coloured. Cannot be moulded but crumbles under pressure. Can be indented by the thumbnail

Undrained shear strength of fine soils is defined using the results of basic laboratory and field tests. Table C.2 explains the terms for characterising undrained shear strength. An additional range for ultra high strength soils is included to cover the full range of soil strengths.

Table C.2: Definitions of undrained shear strength of fine soils used in soil descriptions

Strength Term	Undrained Shear Strength [kPa]
Extremely low	< 10
Very low	10–20
Low	20–40
Medium	40–75
High	75–150
Very high	150–300
Extremely high	300–600
Ultra high	> 600

Table C.3 presents the ranges of relative density (Lambe & Whitman, 1969) on which the limits of consistency adopted in sand soils are based.

Table C.3: Definitions of relative density used in soil descriptions

Relative Density Term	Relative Density [%]
Very loose	0–15
Loose	15–35
Medium dense	35–65
Dense	65–85
Very dense	85–100

Fugro has a standard code of practice that aims to standardise soil descriptions in accordance with BS 5930:2015+A1:2020 (BSI, 2015a), and has adopted equivalent qualitative terms for tertiary constituents. These are listed in Table C.4.

Table C.4: Standard terms used in soil descriptions for tertiary constituents

BS 5930:2015 Suggested Term	Fugro Standard Term	% by Volume*
Rare	With trace	< 1
Occasional	With a few	1–5
n/a	With	> 5–15
Frequent	With many	> 15

Notes
n/a = Not applicable: the BSI does not have a suggested term that equates to 'with'
* = Estimated visually

Appendix D

Laboratory Standards

D.1 Laboratory Testing Methods: Standards and Statements

Table D.1 lists the standards and procedures for laboratory tests performed by Fugro during this project. Non-standard laboratory test procedures (i.e. Fugro in-house testing procedures) are included; where tests were performed according to national or international standards, only the applicable standard number is referenced. Accredited tests are noted in the tables below. Tests performed offshore do not fall under the accreditation.

Table D.1: Laboratory method standards and statements

Laboratory Tests	Standard Reference or Fugro Document Number
Classification Tests	
Moisture content*	ISO 17892-1:2014 (ISO, 2014b)
Bulk and dry density*	ISO 17892-2:2014 (ISO, 2014c)
Torvane	L-M-011
Pocket penetrometer	L-M-015
Plastic and liquid limits*	ISO 17892-12:2018 (ISO, 2018c)
Particle density*	ISO 17892-3:2015 (ISO, 2015)
Maximum and minimum density	NGI GEOLABS (2019a, 2019b)
Particle size distribution*	ISO 17892-4:2016 (ISO, 2016)
Conductivity Tests	
Thermal conductivity*	ASTM D5334-22 (ASTM International, 2022)
Consolidation Tests	
Incremental loading oedometer*	ISO 17892-5:2017 (ISO, 2017)
Permeability Tests	
Permeability*	ISO 17892-11:2019 (ISO, 2019)
Permeability in triaxial cell*	ISO 17892-11:2019 (ISO, 2019)
Shear Strength Tests – Total Stress	
Unconsolidated undrained triaxial*	ISO 17892-8:2018 (ISO, 2018)
Direct shear, shear box*	ISO 17892-10:2018 (ISO, 2018b)
Shear Strength Tests – Effective Stress	
Consolidated triaxial compression on water saturated soils*	ISO 17892-9:2018 (ISO, 2018a)
Notes * = Accredited test	

Table D.2 lists additional tests that were subcontracted to a third-party laboratory and not performed by Fugro.

Table D.2: Subcontracted tests: method standards and statements

Laboratory Tests	Standard or Method Statement
Carbonate content of soil by rapid titration *	BS 1377-3:2018 (BSI, 2018)
Chloride content *	BS 1377-3:2018 (BSI, 2018)

Laboratory Tests	Standard or Method Statement
Organic matter by loss on ignition *	BS 1377-3:2018 (BSI, 2018)
pH value *	BS 1377-3:2018 (BSI, 2018)
Sulphate content *	BS 1377-3:2018 (BSI, 2018)
Notes * = Accredited test	

D.2 Laboratory Accreditations

Laboratory accreditations are provided in the below section for the following laboratories:

- Fugro GB Marine Limited (Wallingford and Louvain-la-Neuve laboratory);
- Fugro GeoServices Limited (Consett laboratory);
- Derwentside Environmental Testing Services Ltd.

Schedule of Accreditation

issued by

United Kingdom Accreditation Service

2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

0919

Accredited to ISO/IEC 17025:2017

Fugro GB Limited

Issue No: 051 **Issue date:** 05 June 2025

Fugro House **Hithercroft Road** **Wallingford** **Oxon** **OX10 9RB**	**Contact: Ms S Burns** **Tel: +44 (0)131 4495030** **E-Mail: s.burns@fugro.com** **Website: www.fugro.com**

Testing performed by the Organisation at the locations specified

Locations covered by the organisation and their relevant activities

Laboratory locations:

Location details		Activity	Location code
Address Fugro House Hithercroft Road Wallingford Oxon OX10 9RB	**Local contact:** Ms A Miliopoulou Tel: +44 (0)1491 820443 Email: a.miliopoulou@fugro.com Website: www.fugro.com	**Support Functions:** Quality System Quality Audit Administration **Construction:** Soils – Physical and Mechanical Testing	A
Address Victory House Unit 16 Trafalgar Wharf Hamilton Road Portchester Hampshire PO6 4PX	**Local contact:** Mr A Addleton Tel: +44 (0)23 92205577 Email: a.addleton@fugro.com Website: www.fugro.com	**Support Functions:** Quality System Quality Audit Administration **Sampling and Testing:** Sediment Physical Testing Water Testing	B
Address 1-9 The Curve 32 Research Avenue North Heriot-Watt Research Park Edinburgh EH14 4AP	**Local contact** Mr A Matkin Tel: +44 (0)131 4495030 Email: a.matkin@fugro.com Website: www.fugro.com	**Support Functions:** Quality System Quality Audit Administration **Chemical Testing:** Sediment Testing Soils Testing Water Testing	C
Address Fugro Belgium SRL, Rue du Bosquet 9 1348 Louvain-La-Neuve, Belgium	**Local contact** Ms A Miliopoulou Tel: +44 (0)1491 820443 Email: a.miliopoulou@fugro.com Website: www.fugro.com	**Support Functions:** Quality System Quality Audit Administration **Construction:** Soils – Physical and Mechanical Testing	F

Site activities performed away from location B listed above:

0919

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Fugro GB Limited

Issue No: 051 **Issue date:** 05 June 2025

Testing performed by the Organisation at the locations specified

Location details	Activity	Location code
Premises including domestic, commercial and industrial	Sampling for Microbiological Testing	D
Customer Locations - Marine and transitional water environments	Sampling for macrofaunal taxonomy and Physio-chemical analysis of sediments and water	E

DETAIL OF ACCREDITATION

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
SOILS for civil engineering purposes	Moisture content - oven drying method	BS 1377:Part 2:1990	A
	Electrical Resistivity – Cylindrical Samples	BS 1377-3: 2018 Clause 13.3	A
	One-dimensional consolidation properties of saturated cohesive soils using controlled-strain loading	ASTM D4186-12: 2020	A, F
SOIL and SOFT ROCK	Determination of Thermal Conductivity of Soil and Soft Rock by Thermal Needle Probe	ASTM D5334-22	A
ROCK	Water Content	ASTM D2216-19 The Complete ISRM Suggested Methods – Rock Characterization Testing and Monitoring 1974 – 2006, Editors: R Ulusay & J A Hudson	A A
	Determination of the Point Load Strength Index of Rock	ASTM D5731-16	A
		The Complete ISRM Suggested Methods – Rock Characterization Testing and Monitoring 1974 – 2006, Editors: R Ulusay & J A Hudson	A
GEOTECHNICAL INVESTIGATION and TESTING - Laboratory testing of soil	Water content	BS EN ISO 17892-1:2014 DIN EN ISO 17892-1:2014	A, F
	Bulk density - linear measurement method	BS EN ISO 17892-2:2014 DIN EN ISO 17892-2:2014	A, F
	Particle density - fluid pycnometer method	BS EN ISO 17892-3:2015 DIN EN ISO 17892-3:2015	A, F
	Particle size distribution - sieving method	BS EN ISO 17892-4:2016 DIN EN ISO 17892-4:2016	A, F
	Particle size distribution - pipette method	BS EN ISO 17892-4:2016 DIN EN ISO 17892-4:2016	A, F

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
GEOTECHNICAL INVESTIGATION and TESTING - Laboratory testing of soil (cont'd)	Particle size distribution - hydrometer method	BS EN ISO 17892-4:2016 DIN EN ISO 17892-4:2016	F
	Incremental loading oedometer test	BS EN ISO 17892-5:2017 DIN EN ISO 17892-5:2017	A, F
	Unconsolidated undrained triaxial test	BS EN ISO 17892-8:2018 DIN EN ISO 17892-8:2018	A, F
	Consolidated triaxial compression tests on water saturated soils: Isotropic consolidation (CIU and CID)	BS EN ISO 17892-9:2018 Clause 6.4 DIN EN ISO 17892-9:2018 Clause 6.4	A, F
	Consolidated triaxial compression tests on water saturated soils: Anisotropic consolidation (CAU and CAD)	BS EN ISO 17892-9:2018 Clause 6.5 DIN EN ISO 17892-9:2018 Clause 6.5	A, F
	Triaxial Extension Tests – Consolidated triaxial extension tests on water saturated soils: Isotropic tests	Documented in-house method UK-MLB-TCH-PR-711 Triaxial Extension Tests Issue 1.0 01/01/2023	A, F
	Triaxial Extension Tests – Consolidated triaxial extension tests on water saturated soils: Anisotropic tests	Documented in-house method UK-MLB-TCH-PR-711 Triaxial Extension Tests Issue 1.0 01/01/2023	A, F
	Direct shear – shear box test	BS EN ISO 17892-10:2018 DIN EN ISO 17892-10:2018	A, F
	Direct shear – ring shear test	BS EN ISO 17892-10:2018 DIN EN ISO 17892-10:2018	A, F
	Soil-steel interface (ICP) ring shear test	ICP design methods for driven piles in sands and clays' –Jardine et al 2005 (Appendix A)	A, F
	Permeability tests - Rigid wall permeameter	BS EN ISO 17892-11:2019 DIN EN ISO 17892-11:2019	A, F

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
GEOTECHNICAL INVESTIGATION and TESTING - Laboratory testing of soil (cont'd)	Permeability tests - Flexible wall permeameter	BS EN ISO 17892-11:2019 DIN EN ISO 17892-11:2019	A, F
	Liquid limit by fall cone method: four-point test	BS EN ISO 17892-12:2018 DIN EN ISO 17892-12:2018	A, F
	Plastic limit	BS EN ISO 17892-12:2018 DIN EN ISO 17892-12:2018	A, F
	Plasticity index	BS EN ISO 17892-12:2018 DIN EN ISO 17892-12:2018	A, F
	<u>Physical Tests</u>	Documented In-House Methods	
SEDIMENTS - Marine and freshwater sediments	Particle size distribution	UK-SED-TCH-WI-001 Particle Size Distribution based on NMBAQC's best practice guidance – Particle Size Analysis (PSA) for Supporting Biological Analysis 2022 using a dry sieving method	B
		UK-SED-TCH-WI-002 Particle Size Distribution based on BS 1377 Parts 1: 2016 and 2: 1990 using a dry sieving method	
	Particle size distribution	UK-SED-TCH-WI-006 Particle Size Distribution by Laser Diffraction / 0.02um to 2000um by Laser Diffraction based on NMBAQC'S Best Practice Guidance – Particle Size Analysis (PSA) for Supporting Biological Analysis 2022 and BS ISO 13320:2020	B
WATERS - Saline and Freshwaters	Suspended solids (Glass fibre paper (1.2 µm) filtration method)	UK-SED-TCH-WI-010 – Total Suspended Solids based on HMSO Methods 1980 and BS 872:2005 using gravimetric weighing	B

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
SEDIMENTS - Sediments from Marine and Transitional Waters	Ecological Tests Marine soft-bottom sediment macrofaunal taxonomy	UK-BEN-TCH-WI-001 - Macrobenthic Sample Analysis	B
MARINE SEDIMENTS SOILS	Chemical Tests Total Petroleum Hydrocarbons C_{10} to C_{40}	UK-CHM-TCH-WI-003 - Extraction and Clean-up of Aliphatic and Aromatic Hydrocarbons from Sediments and Soils UK-CHM-TCH-WI-005 - Analysis of Total and Aliphatic Hydrocarbons from Sediments, Soils and Waters	C
WATERS - Saline and Freshwaters	Total Petroleum Hydrocarbons C_{10} to C_{40}	UK-CHM-TCH-WI-004 - Extraction and Clean-up of Aliphatic and Aromatic Hydrocarbons from Water UK-CHM-TCH-WI-005 - Analysis of Total and Aliphatic Hydrocarbons from Sediments, Soils and Waters	C
SEDIMENTS (marine, estuarine etc.)	Metals: Aluminium; Barium; Iron Manganese; Phosphorus Titanium; Vanadium	UK-CHM-TCH-WI-032 Aqua Regia Microwave Digestion of Sediments and Soils UK-CHM-TCH-WI-033 ICP-OES Analysis of Major and Trace Elements in Sediments Soils after an Aqua Regia Digest	C
	Metals: Antimony; Arsenic; Cadmium Chromium; Cobalt; Copper; Lead; Lithium Mercury; Molybdenum Nickel; Silver; Strontium; Zinc	UK-CHM-TCH-WI-032 Aqua Regia Microwave Digestion of Sediments and Soils UK-CHM-TCH-WI-034 ICP-MS Analysis of Trace Elements in Sediments and Soils after an Aqua Regia Digest	C

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
WATERS	Sampling and subsequent analysis by an ISO/IEC 17025 accredited laboratory for	Documented In-House Methods	
RECREATIONAL - Swimming Pools/SPA's	Microbiological Testing	UK-WQS-TCH-WI-001 - Bacteriological Sampling	D
POTABLE - Non-Regulatory sampling (Hot and cold water supply)	Microbiological Testing	UK-WQS-TCH-WI-001 - Bacteriological Sampling	D
SEDIMENTS	Sampling and subsequent analysis by an ISO/IEC 17025 accredited laboratory for	Documented In-House Methods	
Sediments from Marine and Transitional Waters	Macrofaunal taxonomy and to determine physio-chemical properties of the marine sediment collected by means of grab sampler or corer	UK-ESR-OPL-PR-001 - Ecology Group Survey Methods and Procedures (based on ISO 5667-19:2004 and BS EN ISO 16665:2013).	E
END			

Schedule of Accreditation

issued by

United Kingdom Accreditation Service

2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

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Accredited to ISO/IEC 17025:2017

Fugro GB Limited

Issue No: 038 **Issue date:** 01 August 2025

Armstrong House
Unit 43
Number One Industrial Estate
Medomsley Road
Consett
Co Durham
DH8 6TW

Contact: Ms Shona Burns
Tel: +44 (0)1207-581120
Fax: +44 (0)1207-581609
E-Mail: s.burns@fugro.com
Website: www.fugro.com

Testing performed at the above address only

DETAIL OF ACCREDITATION

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
ROCK	End preparation of rock specimens for compressive strength	ASTM D 4543-19
	Point load strength and anisotropy indices	The Complete ISRM Suggested Methods for Rock Characterisation, Testing and Monitoring:1974-2006. Editors: R Ulusay & J A Hudson
	Water content	
	Porosity and density - by saturation and calliper techniques	
	Porosity and density - by saturation and buoyancy techniques	
	Slake-durability index	
	Uniaxial compressive strength	
	Deformability of rock materials in uniaxial compression (Young's modulus & Poisson's ratio)	
	Shore hardness	
	Dynamic Indirect Tensile Strength - by Brazilian Test	ISRM Suggested Methods for Rock Characterization Testing and Monitoring2007-2014. Editors R. Ulusay
	Sound velocity	
	Abrasiveness of Rock using the CERCHAR Method	ASTM D7625-10
	Direct Shear Strength Tests of Rock Specimens Under Constant Normal Force	ASTM D5607-16

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
SOILS for civil engineering purposes	Particle density - gas jar method	BS 1377-2:1990
	Determination of Linear Shrinkage	BS1377-2 :2022
	Dry density/moisture content relationship (2.5 kg rammer) (4.5 kg rammer) (vibrating hammer	BS 1377-4:1990
	Determination of maximum and minimum dry densities for granular soils	BS 1377-4:1990
	Moisture condition value (MCV)	BS 1377-4:1990
	Determination of MCV / moisture content relation of a soil	BS 1377-4:1990
	Chalk crushing value	BS 1377-4:1990
	California Bearing Ratio (CBR)	BS 1377-4:1990 BS 1377-4:1990
	Shear strength by laboratory vane	BS 1377-7:1990
	Undrained shear strength - triaxial compression with multistage loading and without measurement of pore pressure	BS 1377-7:1990
	Consolidated undrained triaxial compression test with the measurement of pore water pressure using multistage loading	Documented In-House Method LTPMS 41: Feb 2016
	Consolidated drained triaxial compression test with measurement of volume change using multistage loading	Documented In-House Method LTPMS 42: Feb 2016
	Hand held shear vane	New Zealand Geotechnical Society Guidelines for Hand Held Shear Vane Test, August 2001
	Thermal Conductivity of Soil and Soft Rock by Thermal Needle Probe	ASTM D5334-14
	Calculating Thermal Diffusivity of Rock and Soil	ASTM D5334-14 / ASTM D4612-16
	Measurement of settlement on saturation	BS1377-2:2022

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
SOILS for civil engineering purposes – cont'd	Measurement of swelling pressure	BS1377-2:2022
	Measurement of swelling	BS1377-2:2022
	Determination of electrical resistivity Undisturbed cylindrical samples	BS1377-3:2018+A1:2021
GEOTECHNICAL INVESTIGATION and TESTING - Laboratory testing of soil	Water content	BS EN ISO 17892-1:2014 DIN EN ISO 17892-1:2014
	Bulk density - linear measurement method - immersion in fluid method - fluid displacement method	BS EN ISO 17892-2:2014 DIN EN ISO 17892-2:2014
	Determination of particle density - fluid pycnometer method	BS EN ISO 17892-3:2015 DIN EN ISO 17892-3:2015
	Determination of particle size distribution - sieving method - pipette method	BS EN ISO 17892-4:2016 DIN EN ISO 17892-4:2016
	Incremental loading oedometer test	BS EN ISO 17892-5:2017 DIN EN ISO 17892-5:2017
	Unconfined compression test	BS EN ISO 17892-7:2018 DIN EN ISO 17892-7:2018
	Unconsolidated undrained triaxial test	BS EN ISO 17892-8:2018 DIN EN ISO 17892-8:2018
	Isotropically consolidated undrained triaxial compression test	BS EN ISO 17892-9:2018 DIN EN ISO 17892-9:2018
	Isotropically consolidated drained triaxial compression test	BS EN ISO 17892-9:2018 DIN EN ISO 17892-9:2018
	Determination of direct shear - small shearbox - large shearbox	BS EN ISO 17892-10:2018 DIN EN ISO 17892-10:2018
	Permeability in a triaxial cell	BS EN ISO 17892-11:2019 DIN EN ISO 17892-11:2019

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
GEOTECHNICAL INVESTIGATION and TESTING - Laboratory testing of soil – cont'd	Determination of plastic limit	BS EN ISO 17892-12:2018 +A2:2022 DIN EN ISO 17892-12:2018 +A2:2022
	Determination of plasticity index	BS EN ISO 17892-12:2018 +A2:2022 DIN EN ISO 17892-12:2018 +A2:2022
	Determination of liquid limit - fall cone method	BS EN ISO 17892-12:2018 +A2:2022 DIN EN ISO 17892-12:2018 +A2:2022
END		

Schedule of Accreditation

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United Kingdom Accreditation Service

2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

2139

Accredited to ISO/IEC 17025:2017

Derwentside Environmental Testing Services Ltd

Issue No: 066 **Issue date:** 22 August 2023

Unit 2
Park Road Industrial Estate
Consett
Co Durham
DH8 5PY

Contact: Mr J Coffer
Tel: +44 (0)1207 582333
E-Mail: info@dets.co.uk
Website: www.dets.co.uk

Testing performed by the Organisation at the locations specified below

Locations covered by the organisation and their relevant activities

Laboratory locations:

Location details	Activity	Location code
Address Unit 2 Park Road Industrial Estate Consett Co Durham DH8 5PY **Local contact** Mr J Coffer	Environmental Analysis Health and Hygiene Asbestos – All Support Functions	A

Site activities performed away from the locations listed above:

Location details	Activity	Location code
Client Premises	Sampling	B

DETAIL OF ACCREDITATION

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
LEACHATES WATER, PROCESS WATER, SALINE/SEA WATER, WASTE WATER, NATURAL	<u>Analysis</u> pH value	Documented In-House Method No DETCS 2008 based on BS 1377:Part 3:1990	A
	Electrical Conductivity	Documented In-House Method No DETCS 2009	A
	Alkalinity	Documented In-House Method No DETSC 2030 based on Standing Committee of Analysts Methods (HMSO) ISBN 011 751 6015	A
	Chemical Oxygen Demand	Documented In-House Method No DETSC 2032 based on Standing Committee of Analysts Method (HMSO) ISBN 011 751 9154, 1986, by colorimetry	A
	Suspended Solids	Documented In-House Method No DETSC 2034 based on Standing Committee of Analysts Method (HMSO) ISBN 011 751 957 X, 1980	A
	Total Dissolved Solids	Documented In-House Method No DETSC 2035 based on Standing Committee of Analysts Method (HMSO) ISBN 011 751 957 X, 1980	A
	Chloride content	Documented In-House Method No DETSC 2006 based on BS 1377:Part 3:1990	A
LEACHATES, WATER, PROCESS, WATER, SALINE/SEA, WATER, WASTE, WATER, NATURAL, TRADE EFFLUENTS	Biochemical Oxygen Demand	Documented In-House Method No DETSC 2031 based on Standing Committee of Analysts Method (HMSO) ISBN 011 752 2120, 1988, by meter	A

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
LEACHATES WATER, PROCESS WATER, SALINE/SEA WATER, WASTE WATER, NATURAL	<u>Analysis</u> (cont'd)		
	Boron (soluble)	Documented In-House Method No DETSC 2123 by colorimetry	A
	Anions, comprising: Chloride Nitrate Nitrite Phosphate Sulphate	Documented In-House Method No DETSC 2055 by ion chromatography based on EPA 9056A (Rev 1 November 2000)	A
Clean water (non-regulatory) Surface (River) water, Sewage Influent and Sewage effluent	Mercury (Total and Dissolved)	Documented in house Method No DETSC 2324 by AFS	A
	Low level Total and Dissolved Metals Aluminium Phosphorous Chromium Iron Nickel Copper Zinc Cadmium Lead	Documented in house Method No DETSC 2306 by ICPMS	A

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
	Analysis (cont'd)		
Clean water (non-regulatory) River water, Groundwater, Trade effluent, prepared and Landfill leachate	Metals: Dissolved only: Aluminium Antimony Arsenic Barium Calcium Cadmium Cobalt Chromium Copper Iron Lead Mercury Potassium Magnesium Manganese Nickel Phosphorus Selenium Sodium Vanadium Zinc	Documented in house method No DETSC 2306 by ICP-MS	A
Clean water (non-regulatory) River water, Groundwater, prepared and Landfill leachate	Molybdenum		
Clean water (non-regulatory) River water, Groundwater, Trade effluent, prepared and Landfill leachate	Hardness by Calculation Calcium Hardness by Calculation	Documented in-House method DETSC 2303	A
	Elemental Sulphur	Documented In-House Method No DETSC 3049 by HPLC based on standing committee of Analysts Method (HMSO) ISBN 011 751 726 7	A
	Oil and Grease (Hexane extractable material) Cyclohexane Extractable Material Toluene Extractable Material	Documented In-House Method No DETSC 3002 by extraction/ gravimetry	A
	Thiocyanate	Documented In-House Method No DETSC 2130 by Skalar	A

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
	Analysis (cont'd)		
Clean water (non-regulatory) River water, Groundwater, Trade effluent, prepared and Landfill leachate (cont'd)	Cyanide (total)	Documented In-House Method No DETSC 2130 by Skalar	A
	Cyanide (free)	Documented In-House Method No DETSC 2130 by Skalar	A
	Phenol (monohydric)	Documented In-House Method No DETSC 2130 by Skalar	A
	Low Level Cyanide (total)	Documented In-House Method No DETSC 2131 by Skalar	A
	Low Level Cyanide (free)	Documented In-House Method No DETSC 2131 by Skalar	A
	Low level Cyanide (Complex by Calculation)	Documented In-House Method No DETSC 2131 by Skalar	A
	Low Level Phenol (monohydric)	Documented In-House Method No DETSC 2131 by Skalar	A
	Volatile Organic Compounds (VOCs), specifically: Benzene Ethylbenzene Methyl-tert-butyl-ether (MTBE) Toluene o-Xylene (m+p)-Xylenes	Documented In-House Method No DETSC 3322 by GC-FID	A
	Extractable Petroleum Hydrocarbons (EPH) (C_{10}-C_{40})	Documented In-House Method No DETSC 3311 by GC-FID	
LEACHATES, TAP WATER (non-regulatory), RIVER WATER AND GROUNDWATER	Nitrite	Documented In-House Method No DETSC 2201 by KONELAB 60i	A
	TON	Documented In-House Method No DETSC 2202 by KONELAB 60i	A
	Hexavalent Chromium	Documented In-House Method No DETSC 2203 by KONELAB 60i	A
	Phosphorous (Soluble reactive)	Documented In-House Method No DETSC 2205 by KONELAB 60i	A

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
	Analysis (cont'd)		
LEACHATES, TAP WATER (non-regulatory), RIVER WATER AND GROUNDWATER (cont'd)	High level Ammonia	Documented In-House Method No DETSC 2206 by KONELAB 60i	A
	Low Level Ammonia	Documented In-House Method No DETSC 2207 by KONELAB 60i	A
	Sulphide	Documented In-House Method No DETSC 2208 by KONELAB 60i	A
LEACHATES (from soils), TAP WATER (non-regulatory), RIVER WATER AND GROUNDWATER	Petroleum range hydrocarbons (PRO) including banding: Total PRO C_5-C_{10} PRO C_5-C_6 PRO C_6-C_8 PRO C_8-C_{10} Total Aliphatic C_5-C_{10} Aliphatic C_5-C_6 Aliphatic >C_6-C_8 Aliphatic >C_8-C_{10} Total Aromatic C_5-C_{10} Aromatic C_5-C_7 Aromatic >C_7-C_8 Aromatic >C_8-C_{10}	Documented in house method No DETSC 3322 using GC-FID	A
LEACHATES (from soils), TAP WATER (non-regulatory), EFFLUENT, RIVER WATER AND GROUNDWATER	Polycyclic Aromatic Hydrocarbons (PAH's) specifically: Naphthalene Acenaphthylene Acenaphthene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene Benz[a]anthracene Chrysene Benzo[b]fluoranthene Benzo[k]fluoranthene Benzo[a]pyrene Dibenz[a,h]anthracene Indeno(123,cd) pyrene Benzo(ghi) perylene Total PAH (sum of EPA 16)	Documented in house method No DETSC 3304 using GC-MS	A

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
	Analysis (cont'd)		
LEACHATES (from soils), TAP WATER (non-regulatory), EFFLUENT, RIVER WATER AND GROUNDWATER (cont'd)	Polychlorinated Biphenyls (PCB's) specifically: PCB 28 / 31 PCB 52 PCB 101 PCB 118 + PCB 123 PCB 153 PCB 138 PCB 180 PCB 105 PCB 114 PCB 126 PCB 156 PCB 157 PCB 167 PCB 169 PCB 189 PCB 77 PCB 81	Documented in house method No DETSC 3402 using GC-MS	A
TAP WATER (non-regulatory), RIVER WATER, GROUNDWATER AND LEACHATE	Total Organic Carbon (TOC) Range - 3 - 30mg/l Range - 30 - 300mg/l	Documented In-House Method No DETSC 2033 by spectrophotometry	A
Surface Water, Groundwater, Effluent, Landfill Leachates and Leachates from Soils	Total Organic Carbon Dissolved Organic Carbon	Documented in house method DETSC 2085 by Infra-red TOC Analyser	A

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
TAP WATER (non-regulatory) SURFACE (river) WATER, GROUNDWATER, TRADE EFFLUENT and PREPARED LEACHATE	Analysis (cont'd) Volatile Organic Compounds: Dichlorodifluoromethane Chloromethane vinyl chloride Bromomethane Chloroethane 1,1-dichloroethylene trans-1,2-dichloroethylene 1,1-dichloroethane cis 1,2-dichloroethylene Chloroform Bromochloromethane 1,1,1-trichloroethane 1,1-dichloropropene Carbon tetrachloride 1,2-dichloroethane Benzene 1,2-dichloropropane Dibromomethane Bromodichloromethane cis-1,3-dichloropropene Toluene trans-1,3-dichloropropene 1,1,2-trichloroethane Tetrachloroethylene 1,3-dichloropropane Dibromochloromethane 1,2-dibromoethane Chlorobenzene 1,1,1,2-tetrachloroethane Ethylbenzene m+p-Xylene o-Xylene Styrene Bromoform Isopropylbenzene 1,1,2,2-tetrachloroethane Bromobenzene 1,2,3-trichloropropane n-propylbenzene 2-chlorotoluene 1,3,5-trimethylbenzene 4-chlorotoluene Tert-butylbenzene	Documented in house method No DETSC 3432 by headspace GC-MS	A

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
	Analysis (cont'd)		
TAP WATER (non-regulatory) SURFACE (river) WATER, GROUNDWATER, TRADE EFFLUENT and PREPARED LEACHATE (cont'd)	Volatile Organic Compounds: (cont'd) 1,2,4-trimethylbenzene sec-butylbenzene p-isopropyltoluene 1,3-dichlorobenzene 1,4-dichlorobenzene n-butylbenzene 1,2-dichlorobenzene 1,2-dibromo-3-chloropropane 1,2,4-trichlorobenzene Hexachlorobutadiene Naphthalene 1,2,3-trichlorobenzene		A
TAP WATER (non-regulatory) SURFACE WATER, GROUNDWATER, TRADE EFFLUENT and PREPARED LEACHATE LANDFILL LEACHATE	Acid Herbicides: Mecoprop Bentazone MCPA Clopyralid Dicamba 2,3,6-trichlorobenzoic acid Dichloprop Bromoxynil Fenoprop MCPB 2,4,5-T Fluroxypyr 2,4-DB Ioxynil	Documented In-House Method No DETSC 3448 by LC-MS-MS	A
LEACHATES, RIVER WATER AND GROUNDWATER	pH	Documented In-House Method No DETSC 2008 by voltammetry	A
	Conductivity	Documented In-House Method No DETSC 2009 by **v**oltammetry	A
	Alkalinity	Documented In-House Method No DETSC 2030 by voltammetry	A

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
SOILS SEDIMENTS	<u>Chemical Analysis</u>		
	pH value	Documented In-House Method No DETSC 2008 based on BS 1377:Part 3:1990	A
	Electrical Conductivity	Documented In-House Method No DETSC 2009	A
	Organic Matter Content	Documented In-House Method No DETSC 2002 based on BS 1377:Part 3:1990	A
	Loss on Ignition	Documented In-House Method No DETSC 2003 based on BS 1377:Part 3:1990	A
	Sulphate content	Documented In-House Method No DETSC 2004 based on BS 1377:Part 3:1990	A
	Water Soluble Chloride content	Documented In-House Method No DETSC 2006 based on BS 1377:Part 3:1990	A
	Acid Soluble Chloride content	Documented In-House Method No DETSC 2007 based on BS 1377:Part 3:1990	A
	Anions, comprising: Chloride Fluoride Nitrate Nitrite Phosphate Sulphate	Method No DETSC 2055 by ion chromatography based on EPA 9056A (Rev 1 November 2000)	A
SOILS only	<u>Boron (water soluble)</u>	Documented In-House Method No DETSC 2311 by ICP-OES	A

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
SOILS SEDIMENTS (cont'd)	Chemical Analysis (cont'd)		
	Mercury	Documented In-House Method No DETSC 2325 by atomic fluorescence	A
SOILS only	Metals: Arsenic Barium Beryllium Cadmium Chromium Cobalt Copper Iron Lead Manganese Molybdenum Nickel Selenium Tin Vanadium Zinc	Documented In-House Method No DETSC 2301 by hotblock digestion and ICP-OES based on Standing Committee of Analysts Method (HMSO) ISBN 011 753 2444	A
	Sulphur (total)	Documented In-House Method No DETSC 2320 by hotblock digestion and ICP-OES	A
	Elemental Sulphur	Documented In-House Method No DETSC 3049 by HPLC based on standing committee of Analysts Method (HMSO) ISBN 011 751 726 7	A
	Volatile Organic Compounds (VOCs), specifically: Benzene Ethylbenzene Methyl-tert-butyl-ether (MTBE) Toluene o-Xylene (m+p)-Xylenes	Documented In-House Method No DETSC 3321 by GC-FID	A

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
SOILS SEDIMENTS (cont'd)	<u>Chemical Analysis</u> (cont'd)		
	Extractable Petroleum Hydrocarbons (EPH) (C_{10}-C_{40}) Diesel Range (C_{10}-C_{24}) Lube Oil range / Mineral Oil Range (C_{24}-C_{40})	Documented In-House Method No DETSC 3311 by GC-FID	A
	Polycyclic Aromatic Hydrocarbons (PAH's) specifically: Naphthalene Acenaphthylene Acenaphthene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene Benz[a]anthracene Chrysene Benzo[b]fluoranthene Benzo[k]fluoranthene Benzo[a]pyrene Dibenz(a,h)anthracene Indeno(1,2,3-cd)pyrene Dibenz[a,h]anthracene Total PAH (sum of EPA 16)	Documented In-House Method No DETSC 3301 by GC based on EPA 8100 and BG Soil Analysis 1999	A
	Polychlorinated Biphenyls (total)	Documented In-House Method No DETSC 3401 by GC-MS	A
SOILS	<u>Analysis</u>		
	Sulphate (acid soluble)	Documented In-House Method No DETSC 2321 by ICP-OES	A
	Sulphate (water soluble)	Documented In-House Method No DETSC 2076 (ICP-OES)	A
	Ammonia	Documented In-House Method No DETSC 2119 by spectrophotometry	A
	Thiocyanate	Documented In-House Method No DETSC 2130 by Skalar	A

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
SOILS (cont'd)	Analysis (cont'd)		
	Cyanide (total) Cyanide (free) Phenol (monohydric)	Documented In-House Method No DETSC 2130 by Skalar	A
	Total Organic Carbon (TOC)	Documented In-House Method No DETSC 2084 by combustion and infra-red detection	A
	Loss on Drying at <30°C Moisture Content at 105°C	Documented In-House Method No DETSC 1004 by Gravimetry	A
	Fraction Organic Carbon by Calculation (Expressed as fraction of TOC)	Documented In-House Method No DETSC 2084	A
	Extractable Petroleum Hydrocarbons (EPH), C_{10}-C_{35}, specifically: Total EPH (C_{10}-C_{35}) Total Extractable Aliphatic Hydrocarbons (C_{10}-C_{35}) C_{10}-C_{12} (aliphatic) C_{12}-C_{16} (aliphatic) C_{16}-C_{21} (aliphatic) C_{21}-C_{35} (aliphatic) Total Extractable Aromatic Hydrocarbons (C_{10}-C_{35}) C_{10}-C_{12} (aromatic) C_{12}-C_{16} (aromatic) C_{16}-C_{21} (aromatic) C_{21}-C_{35} (aromatic)	Documented In-House Method DETSC 3072 by GC-FID	A
	Polychlorinated Biphenyls (total), comprising: PCB 28 / 31 PCB 52 PCB 101 PCB 118 PCB 138 PCB 153 PCB 180	Documented In-House Method No DETSC 3401 by GC-MS	A

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
SOILS (cont'd)	Analysis (cont'd)		
	Polyaromatic Hydrocarbons, comprising: Naphthalene Acenaphthylene Acenaphthene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene Benzo(a)anthracene Chrysene Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Dibenzo(a.h)anthracene Indeno(1,2,3-cd)pyrene Benzo(ghi)perylene Total PAH's (Sum of EPA 16)	Documented in house method No DETSC 3303 by GC-MS	A
	Gross Calorific value	Documented In-House Method No DETSC 5008 using Bomb calorimetry	A
	Net Calorific value	Documented in house calculation	A
Soils	Carbonate as Equivalent Carbon Dioxide	Documented in house method DETSC 2005 using titrimetry	A
Soils	Semi Volatile Organic Compounds: Phenol 2-Chlorophenol 1,3-Dichlorobenzene 1,4-Dichlorobenzene 1,2-Dichlorobenzene Bis(2-chloroisopropyl)ether Benzyl alcohol 2-Methyl phenol N-Nitrosodi-n-propylamine Hexachloroethane 4-Methyl phenol & 3-Methylphenol Nitrobenzene Isophorone	Documented in house method DETSC 3433 using GCMS	A

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
SOILS (cont'd)	Analysis (cont'd) Semi Volatile Organic Compounds: (cont'd) 2-Nitrophenol 2,4-Dimethyl phenol Bis (2-chloroethoxy) methane 2,4-Dichlorophenol 1,2,4-Trichlorobenzene Naphthalene Hexachlorobutadiene 4-Chloro-3-methyl phenol 2-Methylnaphthalene 1-Methylnaphthalene 2,4,6-Trichlorophenol 2-Chloronaphthalene Dimethylphthalate Acenaphthylene 2,6-Dinitrotoluene Acenaphthene Dibenzofuran Diethylphthalate Fluorene Diphenylamine Azobenzene 4-Bromophenyl-1-phenylether Hexachlorobenzene Phenanthrene Anthracene Di-n-butylphthalate Fluoranthene Pyrene Benzo(a)anthracene Chrysene Bis(2-ethylhexyl)phthalate Di-n-octylphthalate Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(g,h,i)perylene	Documented in house method DETSC 3433 using GCMS	A

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
SOILS (cont'd)	Analysis (cont'd) Volatile Organic Compounds: Vinyl Chloride 1,1 Dichloroethylene Trans-1,2-dichloroethylene 1,1-dichloroethane Cis-1,2-dichloroethylene 2,2-dichloropropane Bromochloromethane Chloroform 1,1,1-trichloroethane 1,1-dichloropropene Carbon tetrachloride Benzene 1,2-dichloroethane Trichloroethylene 1,2-dichloropropane Dibromomethane Bromodichloromethane cis-1,3-dichloropropene Toluene trans-1,3-dichloropropene 1,1,2-trichloroethane Tetrachloroethylene 1,3-dichloropropane Dibromochloromethane 1,2-dibromoethane Chlorobenzene 1,1,1,2-tetrachloroethane Ethylbenzene m+p-Xylene o-Xylene Bromoform Isopropylbenzene Bromobenzene 1,2,3-trichloropropane n-propylbenzene 2-chlorotoluene 1,3,5-trimethylbenzene 4-chlorotoluene Tert-butylbenzene 1,2,4-trimethylbenzene sec-butylbenzene p-isopropyltoluene 1,3-dichlorobenzene 1,4-dichlorobenzene n-butylbenzene	Documented in house method DETSC 3431 using Headspace GCMS	A

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
SOILS (cont'd)	Analysis (cont'd)		
	Volatile Organic Compounds: (Cont'd) 1,2-dichlorobenzene 1,2-dibromo-3-chloropropane 1,2,4-trichlorobenzene Hexachlorobutadiene Naphthalene 1,2,3-trichlorobenzene	Documented in house method DETSC 3431 using Headspace GCMS	A
	Acid Herbicides, specifically: 2,4,5-TP (Fenoprop) Clopyralid Picloram 2,3,6-TBA Dicamba Benazolin Fluroxypyr Bentazone 2,4-D Bromoxynil MCPA Triclopyr Dichloprop Ioxynil Mecoprop 2,4,5-T 2,4-DB	Documented in house method DETSC 3447 ising LC-MS-MS	A

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
	Analysis (cont'd)		
BIOMASS and SOLID RECOVERED FUELS	Total Moisture	Documented In-House Method No DETSC 5004 using gravimetric techniques	A
	Analysis Moisture	Documented In-House Method No DETSC 5005 using gravimetric techniques	A
	Volatile matter	Documented In-House Method No DETSC 5003 using gravimetric techniques	A
	Gross Calorific value	Documented In-House Method No DETSC 5007 using Bomb calorimetry	A
	Net Calorific value	Documented in house calculation	A
	Ash Content	Documented In-House Method No DETSC 5002 using gravimetric techniques	A
	Mercury	Documented In-House Method No DETSC 5015 using hot block digestion and Cold Vapour Atomic Fluorescence	A

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
	Analysis (cont'd)		
BIOMASS and SOLID RECOVERED FUELS (cont'd)	Metals Aluminium Arsenic Antimony Barium Beryllium Cadmium Calcium Cobalt Chromium Copper Iron Lead Magnesium Manganese Molybdenum Nickel Phosphorous Potassium Selenium Sodium Thallium Tin Titanium Vanadium Zinc	Documented In-House Method No DETSC 5014 using hot block digestion and ICP-OES	A
	Sulphur	Documented In-House Method No DETSC 5016 using hot block digestion and ICP-OES	A
	Chlorine Fluorine	Documented In-House Method No DETSC 5017 using Ion Chromatography	A
	Biomass Content	Documented In-House Method No DETSC 5012 based on BS EN ISO 21644:2021 using Gravimetry	A
	Carbon, Hydrogen, Nitrogen	Documented In-House Method No DETSC 5013 using CHN analyser	A

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
	Analysis (cont'd)		
BIOMASS and SOLID RECOVERED FUELS (cont'd)	Oxygen (by calculation)	Documented In-House Method No DETSC 5013 by calculation	A
RECYCLED WASTE Trommel Fines	Loss on Ignition at 440°C	Documented in house method ref DETSC 5022 – using Gravimetric Analysis in accordance with HMRC Excise Notice LFT1 27 March 2015	A
	Health and Hygiene	Health and Safety Executive - Asbestos: The Analysts' Guide (HSG 248) – 2021	
ASBESTOS IN BULK MATERIALS including materials and products suspected of containing asbestos	Identification of: Amosite Chrysotile Crocidolite Fibrous Actinolite Fibrous Anthophyllite Fibrous Tremolite	Documented In-House Method DETSC 1101 using stereo-microscopy, polarised light optical microscopy and dispersion staining based on HSG 248.	A
ASBESTOS IN SOILS – The Identification of Asbestos fibres in bulk samples of Soil, *specifically*: *Soil* Aggregate Ballast	Identification of: Amosite Chrysotile Crocidolite Fibrous Actinolite Fibrous Anthophyllite Fibrous Tremolite	Documented In-House Method DETSC 1102 for identification using stereo-microscopy, polarised light optical microscopy and dispersion staining based on HSG 248.	A
ASBESTOS IN SOILS – The Identification and Quantification of Asbestos fibres in bulk samples of Soil, *specifically:* *Soil* *Ballast* *Aggregate*,	Identification and Quantification of Asbestos content of: Amosite Chrysotile Crocidolite Fibrous Actinolite Fibrous Anthophyllite Fibrous Tremolite	Documented In-House Method DETSC 1102 for identification using stereo-microscopy, polarised light optical microscopy and dispersion staining based on HSG 248 Documented In-House Method DETSC 1102 for quantification of asbestos using gravimetry and phase contrast microscopy	A
ASBESTOS CONTAINING MATERIALS	Water Absorption	Documented In-House Method DETSC 1103	A

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
SOILS	Analysis	Documented In-House Method to meet the requirements of the Environment Agency MCERTS Performance Standard - Chemical Testing of Soil	
	pH value	Documented In-House Method No DETSC 2008 by **v**oltammetry	A
	Loss on Ignition	Documented In-House Method No DETSC 2003 based on BS 1377:Part 3:1990	A
	Organic Matter Content	Documented In-House Method No DETSC 2002 based on BS 1377:Part 3:1990	A
	Total Organic Carbon (TOC)	Documented In-House Method No DETSC 2084 by combustion and infra-red detection	A
	Fraction Organic Carbon by Calculation (Expressed as fraction of TOC)	Documented In-House Method No DETSC 2084	A
	Sulphate (acid soluble)	Documented In-House Method No DETSC 2321 by ICP-OES	A
	Sulphate (water soluble)	Documented In-House Method No DETSC 2076 (ICP-OES)	A
	Sulphate (acid soluble)	Documented In-House Method No DETSC 2004	A
	Ammonia	Documented In-House Method No DETSC 2119	A
	Thiocyanate	Documented In-House Method No DETSC 2130	A
	Cyanide (total)	Documented In-House Method No DETSC 2130 by Skalar	A
	Cyanide (free)	Documented In-House Method No DETSC 2130 by Skalar	A

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
SOILS (cont'd)	Analysis (cont'd)	Documented In-House Method to meet the requirements of the Environment Agency MCERTS Performance Standard - Chemical Testing of Soil (cont'd)	
	Boron (water soluble)	Documented In-House Method No DETSC 2311 by ICP-OES	A
	Mercury	Documented In-House Method No DETSC 2325 by hotblock digestion and atomic fluorescence	A
	Sulphur (elemental)	Documented In-House Method No DETSC 3049 by HPLC based on Standing Committee of Analysts Method (HMSO) ISBN 011 751 726 7	A
	Metals: Arsenic Barium Beryllium Cadmium Chromium Cobalt Copper Lead Manganese Molybdenum Nickel Selenium Vanadium Zinc	Documented In-House Method No DETSC 2301 by hotblock digestion and ICP-OES based on Standing Committee of Analysts Method (HMSO) ISBN 011 753 2444	A
	Phenol (monohydric)	Documented In-House Method No DETSC 2130	A
	Volatile Organic Compounds (VOCs), specifically: Benzene Ethylbenzene Toluene o-Xylene (m+p)-Xylenes	Documented In-House Method No DETSC 3321	A

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
SOILS (cont'd)	Analysis (cont'd)	Documented In-House Method to meet the requirements of the Environment Agency MCERTS Performance Standard - Chemical Testing of Soil (cont'd)	
	Extractable Petroleum Hydrocarbons (EPH) (C_{10}-C_{40}) Diesel Range (C_{10}-C_{24}) Lube Oil Range / Mineral Oil Range (C_{24}-C_{40})	Documented In-House Method No DETSC 3311 by GC-FID	A
	Extractable Petroleum Hydrocarbons (EPH), C_{10}-C_{35}, specifically: Total EPH (C_{10}-C_{35}) Total Extractable Aliphatic Hydrocarbons (C_{10}-C_{35}) C_{10}-C_{12} (aliphatic) C_{12}-C_{16} (aliphatic) C_{16}-C_{21} (aliphatic) C_{21}-C_{35} (aliphatic)	Documented In-House Method DETSC 3072 by GC-FID	A
	Extractable Petroleum Hydrocarbons (EPH), C_{10}-C_{35}, specifically: Total Extractable Aromatic Hydrocarbons (C_{10}-C_{35}) C_{10}-C_{12} (aromatic) C_{12}-C_{16} (aromatic) C_{16}-C_{21} (aromatic) C_{21}-C_{35} (aromatic)	Documented In-House Method DETSC 3072 by GC-FID	A

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
SOILS (cont'd)	Analysis (cont'd)	Documented In-House Method to meet the requirements of the Environment Agency MCERTS Performance Standard - Chemical Testing of Soil (cont'd)	
	Extractable Petroleum Hydrocarbons (EPH) specifically: >EC10-EC12 >EC12-EC16 >EC16-EC21 >EC21-EC35 >EC35-EC40 >EC10-C35 >EC10-C40 >EC10-C24 >EC24-C40 Total Extractable Aliphatic Hydrocarbons specifically: >EC10-EC12 >EC12-EC16 >EC16-EC21 >EC21-EC35 >EC35-EC40 >EC10-C35 >EC10-C40 Total Extractable Aromatic Hydrocarbons specifically: >EC10-EC12 >EC12-EC16 >EC16-EC21 >EC21-EC35 >EC10-C35	Documented In-House Method DETSC 3521 by GC/GC-FID	A

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
SOILS (cont'd)	Analysis (cont'd)	Documented In-House Method to meet the requirements of the Environment Agency MCERTS Performance Standard - Chemical Testing of Soil (cont'd)	
	Polychlorinated Biphenyls (total), comprising: PCB 28 / 31 PCB 52 PCB 101 PCB 118 PCB 138 PCB 153 PCB 180	Documented In-House Method No DETSC 3401 by GC-MS	A
	Polyaromatic Hydrocarbons, comprising: Naphthalene Fluoranthene Acenaphthylene Acenaphthene Phenanthrene Pyrene Benzo(a)anthracene Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Dibenzo(a.h)anthracene Indeno(1,2,3-cd)pyrene Benzo(ghi)perylene	Documented in house method No DETSC 3303 by GC-MS	A
WASTEWATERS	Analysis	Documented In-House Method to meet the requirements of the Environment Agency MCERTS Performance Standard - sampling and chemical testing of untreated sewage, sewage effluent and trade effluent	
	Chemical Oxygen Demand	Method DETSC 2032 by Colorimetry	A
END			

Appendix E

Positioning and Water Depth Data

E.1 Positioning and Water Depth Data

Fugro report PE1088-GEOT-02 issue 2 summarises the borehole location coordinates and water depth measurements.

Target coordinates for all borehole locations were specified by Direction Générale de l'Énergie et du Climat – DGEC /Client Consultant and the actual coordinates were approved before borehole and cone penetration test operations. The coordinates presented in this positioning and data report are the calculated location coordinates. Coordinates for all boreholes are expressed using the Universal Transverse Mercator (UTM) projection 31 N, World Geodetic System 1984, International Spheroid, with a central meridian of 3° east

Measured water depths were reduced to the Lowest Astronomical Tide (LAT) based on chart datum CD FR Bathyelli. It should be noted that all water depth measurements made during this investigation are considered sufficiently accurate for geotechnical use but should not be used in isolation for design purposes.

Positioning Data for Fugro Quest

Final Report | DGEC France Golfe du Lion Offshore Windfarm Zone 4 | South Coast of France, Mediterranean Sea

PE1088-GEOT-02 Issue 2 | 23 January 2025

Issue for Approval

DGEC

MINISTÈRE
DE LA TRANSITION
ÉNERGÉTIQUE

Liberté
Égalité
Fraternité

Document Control

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Location Map



Location of DGEC France Golfe du Lion Offshore Windfarm Zone 4, South Coast of France, Mediterranean Sea.

Executive Summary

Fugro was contracted by DGEC to supply navigation and positioning services for the geotechnical drilling vessel MV Fugro Quest at five sampling and/or in situ testing locations at DGEC France Golfe du Lion Offshore Windfarm Zone 4, South Coast of France, Mediterranean Sea.

The sampling and/or in situ testing was carried out between 17 and 20 January 2025.

Fugro navigated and positioned the geotechnical drill ship MV Fugro Quest to the intended positions given by the Client.

Two StarPack GNSS receivers for the surface positioning were used during the project. Underwater positioning was via the vessel's Kongsberg HiPAP 501 USBL system. All depths measurements were reduced to LAT (CD FR BATHYELLI). The real-time GNSS tides were used throughout the project.

Depths at each sample location were measured using the following techniques: USBL depth, pressure sensor and drill string.

During the operations speed of sound measurements were taken and the results were entered into the HiPAP 501 USBL system.

All positions and peripheral (gyrocompass, USBL, etc.) data were sent to the navigation computer which calculated offsets positions in the local geodesy and projection, WGS84/UTM Zone 31 N.

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Glossary

Accuracy	The accuracy of a measurement is its degree of closeness to its actual (true) value. Accuracy is the combination of the precision and reliability of an observation.
Augmentation Data	Additional information e.g. from a reference or tracking station, applied at a user receiver to improve the positioning solution. See also differential GNSS.
Azimuth	A horizontal angle measured from the spheroidal meridian clockwise from north through 360°. See also bearing and heading.
Bearing	Refers to a direction from one point to another on a chart right rotated from grid north (bearing = azimuth + convergence + arc to chord correction). See also azimuth and heading.
C-O Correction	Calculated minus observed correction. The difference found in a calibration procedure between a fixed value and an observation. The C O correction must always be added to the observation.
Chart Datum	Vertical Datum used in charting. Chart data e.g. Mean Sea Level (MSL), Lowest Astronomical Tide (LAT), Lowest Low Water Springs (LLWS), Normaal Amsterdams Peil (Amsterdam Ordnance Datum) (NAP), Normal Null (NN). See also Vertical Datum.
CM	Central meridian, the meridian that defines the central line of longitude of the chart projection. It is a zone constant used in chart projections.
Convergence	Clockwise angle in a point between true north and grid north.
CRP	Common Reference Point is the origin of all vessel coordinates. It is also referred to as the vessel datum. It often corresponds to the drill string on drilling vessels.
Datum (Geodetic)	A mathematical model designed to best-fit part or all of the geoid. It is defined by an ellipsoid and the relationship between the ellipsoid and a point on the topographic surface established as the origin of datum. This relationship can be defined by six quantities, generally (but not necessarily) the geodetic latitude, longitude and the height of the origin, the two components of the deflection of the vertical at the origin, and the geodetic azimuth of a line, from the origin to some other point.
Datum Rotation (Geodetic)	Defined as the anti-clockwise rotation around the X-axis, Y-axis and Z-axis (Rx, Ry, and Rz) in the origin of two spheroids in terms of the Cartesian or geocentric coordinates. See also datum shift and scale.
Datum Shift (Geodetic)	Defined as the difference (ΔX, ΔY, ΔZ) in the origin of two spheroids in terms of the Cartesian or geocentric coordinates. See also datum rotation and scale.
Datum (Vessel)	The vessel datum is the origin of all vessel coordinates. It is referred to as the common reference point or CRP.
DGNSS	Augmentation technique requiring a GNSS receiver(s) to be placed at one or multiple known points from which GNSS observable (pseudo-range) corrections can be deduced. These corrections can then be applied to the offshore mobile receiver.
Differential Positioning	Determination of relative coordinates between two or more satellite receivers that are simultaneously tracking the same satellite signal.
DP	Dynamic positioning, mainly referring to a system keeping the vessel in one position compensating for current, wind and other natural influences, using a variety of positioning systems as reference.
Dynamic Calibration	A technique of calibration on the heading and motion sensors that can be undertaken whilst in port, in transit or during production. GNSS data from three GNSS antennas, placed in large separation along or athwart the vessel, are acquired while the sensor data are also logged. As a result, C-Os for heading, pitch and roll can be determined.

Ellipsoid/Spheroid	In geodesy, unless otherwise specified, a mathematical figure formed by revolving an ellipse about its minor axis. It is often used interchangeably with spheroid. Two quantities define an ellipsoid: these are usually given as the length of the semi-major axis, a, and the inverse flattening, 1/f = a / (a-b), where b is the length of the semi-minor axis. Prolate and triaxial ellipsoids are invariably described as such.
False Easting/False Northing	Defined projection coordinate offsets to the origin point of the projection.
Geoid	The particular equipotential surface with coincides with mean sea level, and which may be imagined to extend through the continents. This surface is perpendicular to the force of gravity everywhere.
GLONASS	Russian global navigation satellite system.
GPS	Global positioning system.
GNSS	Global navigation satellite system. A combination solution of GPS and GLONASS with provision for the future European Galileo space system.
HDOP	Horizontal dilution of precision. A measure of the magnitude of DOP errors in latitude and longitude.
Heading	Course of a vessel measured with a heading system, i.e. a gyrocompass, or a GPS vector heading system. If the heading is magnetic this will be stated. See also azimuth and bearing.
HiPAP	High precision acoustic positioning. A USBL system developed by Simrad - Kongsberg. See USBL definition.
HPR	Hydro acoustic positioning reference. See USBL definition.
Line Scale Factor	The ratio of a distance from point A to point B on the grid to the corresponding distance on the spheroid. K = plane distance/spheroidal distance 1/k=1/6(1/kA + 4/kM +1/kB). (kA, kB, kM being point scale factors at A, B, M. See also point scale factor)
Multifix	Multi reference differential global positioning system based on simultaneous calculated single DGPS positions for each reference station which solutions are then applied to a least squares calculation by which a new solution is created by weighting the single solutions on distance of the used reference station used in the single computations.
NTRIP	Networked Transport of RTCM via Internet Protocol. NTRIP is a protocol of streaming DGPS corrections over the internet.
Offset	A station offset from the main survey station. Must be defined by an azimuth and distance or ΔX, ΔY, ΔZ, or starboard/port, forward/aft, above/below.
OWF	Offshore Wind Farm.
PDOP	Position dilution of precision. A unit-less figure of merit expressing the relationship between the error in user position and the error in satellite position.
PPP	Precise Point Positioning. A global GNSS augmentation technique that corrects for GNSS satellite clock and orbit errors and employs additional modelling techniques to further correct and improve the point positioning accuracy.
Precision	A measure of the random errors in observations and estimated parameters.
Reference Station	A GNSS receiver located at a precisely known location and used to determine the differential corrections employed for DGNSS augmentation techniques.
Satellite Configuration	State of the satellite configuration at a specific time, relative to a specific user or set of users.
Satellite Constellation	The arrangement in space of the complete set of satellites of a system such as GPS.

Scale	Reduction/expansion used in datum-datum transformations. Unit: ppm (parts per million). See also datum shift and datum rotation.
Scale Factor (Point)	Ratio of an infinitesimal distance at a point on the grid to the corresponding distance on the spheroid. K = Δ (plane distance) / Δ (spheroidal distance).
S/CTD (probe)	Salinity or conductivity, temperature and depth probe. Used to determine speed of sound through the water column. Pressure to depth conversions may be applied to provide true depth values.
SD	Standard deviation. Measure of the dispersion of random errors about the mean value. If a large number of measurements or observations of the same quantity are made, the standard deviation is the square root of the sum of the squares of deviations from the mean value divided by the number of observations less one.
Starfix.G2	A decimetre accuracy integrated GNSS service which utilises Fugro's own global network of reference stations to measure carrier phase observations. This data is then processed, producing a corrections solution for each navigation satellite. These corrections are applied to the satellite time reference clock and ephemeris ("orbit") information, hence "clock and orbit corrections". This service utilises both GPS and GLONASS L1 and L2 frequencies, thereby providing an accurate measurement of variations in Ionospheric thickness. This enables signal delay to be calculated more precisely, resulting in a more accurate satellite to antenna range, and hence a more accurate position solution. Starfix.G2 provides a high availability, high integrity, global solution to an accuracy of 10 cm (95 % confidence level) both horizontally and vertically.
Starfix.G2+/G4+	Ultra-precise (3 cm) GPS and GLONASS Global Positioning Service, using Clock and Orbit Corrections enhanced with carrier-phase corrections from the Fugro G4 Network. Starfix.G2+/G4+ is an enhancement of Starfix.G2 service (based on GPS and GLONASS) and utilises advanced GNSS augmentation algorithms developed in-house by Fugro. The code and carrier-phase signals transmitted by GPS and GLONASS satellites are monitored globally by Fugro's worldwide network of reference stations. These observations are processed centrally in real-time using the company's proprietary algorithms to generate precise corrections which are used to augment the standard signals broadcast by GPS and GLONASS satellites. Corrections are received via communications satellites, providing at least two independent G2+/G4+ data sources.
Starfix.G4	A GPS, GLONASS, Galileo and BeiDou positioning system that is based on orbit and clock corrections generated from Fugro's own expanded network of multiple system reference stations. Starfix.G4 utilises Precise Point Positioning (PPP) technology, which distinguishes itself from the traditional differential approach as satellite errors are not lumped together but estimated at source on a per satellite basis. The GPS, GLONASS, Galileo and BeiDou orbit and clock corrections are computed separately, free of ionospheric and tropospheric effects.
Starfix.HP	This service utilises the Fugro international network of approximately 100 land-based reference stations. Unlike standard L1, which uses code based measurements, Starfix.HP is based upon carrier phase measurements which provide a much higher resolution. This service utilises the GPS L1 and L2 frequencies, thereby providing an accurate measurement of Ionospheric thickness. This results in a more accurate satellite to antenna range, and hence a more accurate position solution. At a distance of 1000 km from the nearest reference station Starfix.HP accuracies are typically 10 cm and 15 cm (95 % confidence level) in the horizontal and vertical planes respectively.

Starfix.XP2	This service utilises a third party global network of reference stations to measure carrier phase observations. This data is then processed, producing a corrections solution for each navigation satellite. These corrections are applied to the satellite time reference clock and ephemeris ("orbit") information, hence "clock and orbit corrections". This service utilises the GPS L1 and L2 frequencies, thereby providing an accurate measurement of variations in Ionospheric thickness. This enables signal delay to be calculated more precisely, resulting in a more accurate satellite to antenna range, and hence a more accurate position solution. Starfix.XP2 provides a high performance global solution to an accuracy of 10 cm and 20 cm (95 % confidence level) in the horizontal and vertical planes respectively.
Starfix.L1	This service is a GPS positioning correction system using single frequency code correction data from the Fugro network of reference stations, delivered via both Inmarsat and SpotBeam satellites. These corrections, combined with a single frequency GPS receiver, can provide a positional accuracy of better than 1.5 m (95 %) horizontally at a distance of 500 km from the closest reference station.
Starfix.NG	Fugro's in-house advanced vessel and ROV positioning software system.
StarPack	A StarPack unit consists of a survey grade GNSS receiver and powerful processor, running Linux multi-tasking operating system. The receiver is capable of tracking all current (GPS, GLONASS) and future (Galileo) systems. A StarPack can be extended with a second receiver (in the same unit), to provide accurate, GNSS derived heading.
Transceiver	A device that can transmit and receive signals.
Transducer	A device that converts electrical energy to acoustic energy and vice-versa.
Transponder	A device that can detect a signal on a particular frequency and in response transmits signal on another frequency.
UTM	Universal Transverse Mercator. A special case of the transverse Mercator projection whereby the projection parameters are specified by worldwide agreement, abbreviated as the UTM grid. It consists of 60 north south zones, each 6 degrees of longitude wide with a unique central meridian.
USBL	Ultra-Short BaseLine acoustic positioning method involving the measurement of range and bearing from a vessel-based transceiver to subsea transponders. It generally operates through phase discrimination of an acoustic signal as it passes over three transducers placed at right angles to each other within the Transducer head. Using this method, a three dimensional position of the beacon(s) can be determined.
Vertical Datum	An arbitrarily assumed value for a particular benchmark or a measured value at sea level at a tide station, or a fixed adjustment of many such measurements in a common adjustment. See also chart datum.
WGS 84	World Geodetic System 1984. A rotational ellipsoid having the following dimensions: semi-major axis 6378137.000 m, semi-minor axis (derived) 6356752.314 m, flattening (derived) 1/298.257224. This ellipsoid reference model / datum is the surface from which GPS coordinates are computed.

1. Introduction

Fugro was contracted by DGEC to supply navigation and positioning services for the geotechnical drilling vessel MV Fugro Quest at five sampling and/or in situ testing locations at DGEC France Golfe du Lion Offshore Windfarm Zone 4, South Coast of France, Mediterranean Sea.

The positions and depths reported here were checked by Fugro offshore staff. Full quality control will be carried out by the Fugro office staff prior to the issues of the final report and, as such, some of the values reported in the final report may vary from the field issued report.

The sampling and/or in situ testing was carried out between 17 and 20 January 2025. The positioning results are given in Table 2.1 and Table 2.2.

System positioning performance parameters are outlined in Section 4.3.

2. Results

2.1 Field Locations

Table 2.1: Actual coordinates and water depths in local datum

Datum: WGS84/UTM Zone 31N, EPSG code: 32631					Depth LAT (CD FR BATHYELLI)*		
Location	Easting [m]	Northing [m]	Latitude [North]	Longitude [East]	Pressure Sensor [m]	USBL [m]	Drill String [m]
Z4_OWF_BH01-SAMP	608 023.54	4 756 478.56	42° 57′ 11.8462″	004° 19′ 27.4622″	100.0	100.2	100.1
Z4_OWF_BH05-SAMP	609 362.24	4 767 064.70	43° 02′ 54.2494″	004° 20′ 33.9951″	90.8	90.3	90.6
Z4_OWF_BH15-COMP	603 348.73	4 765 382.07	43° 02′ 02.7479″	004° 16′ 07.1293″	91.2	90.8	91.4
Z4_OWF_BH16-SAMP	604 921.70	4 762 370.45	43° 00′ 24.3648″	004° 17′ 14.5844″	89.9	89.4	89.8
Z4_OWF_BH17-SAMP	600 422.38	4 762 323.10	43° 00′ 25.0174″	004° 13′ 55.8563″	93.5	93.0	93.4

Notes:
*: Refer to Section 5 (Methodology) for details on the different water depth measurement

Table 2.2: Actual location details

Datum: WGS84/UTM Zone 31N, EPSG code: 32631				Standard Deviation		Proposed to Actual	
Location	Easting [m]	Northing [m]	Fixes	Easting [m]	Northing [m]	Distance [m]	Bearing [°G]
Z4_OWF_BH01-SAMP	608 023.54	4 756 478.56	120	0.08	0.09	4.59	006.74
Z4_OWF_BH05-SAMP	609 362.24	4 767 064.70	120	0.06	0.09	4.30	080.61
Z4_OWF_BH15-COMP	603 348.73	4 765 382.07	120	0.06	0.07	0.28	284.67
Z4_OWF_BH16-SAMP	604 921.70	4 762 370.45	120	0.05	0.06	4.46	356.20
Z4_OWF_BH17-SAMP	600 422.38	4 762 323.10	120	0.08	0.09	4.11	005.33

3. Operations

3.1 Scope of Work

Fugro was contracted to provide positioning support for navigation between the sampling and/or in situ testing locations and determination of the drill string position at each location. Sampling and/or in situ testing was planned to be carried out at five locations.

Table 3.1: Proposed coordinates in local datum

Datum: WGS84/UTM Zone 31N, EPSG code: 32631				
Location	Easting [m]	Nothing [m]	Latitude [North]	Longitude [East]
Z4_OWF_BH01-SAMP	608 023.00	4 756 474.00	42° 57' 11.6989"	004° 19' 27.4353"
Z4_OWF_BH05-SAMP	609 358.00	4 767 064.00	43° 02' 54.2288"	004° 20' 33.8071"
Z4_OWF_BH15-COMP	603 349.00	4 765 382.00	43° 02' 02.7454"	004° 16' 07.1413"
Z4_OWF_BH16-SAMP	604 922.00	4 762 366.00	43° 00' 24.2205"	004° 17' 14.5944"
Z4_OWF_BH17-SAMP	600 422.00	4 762 319.00	43° 00' 24.8849"	004° 13' 55.8368"

3.2 Resources

Personnel	Name	From	To
Surveyor	ROC	17 January 2025	20 January 2025

Only equipment used is listed below; refer to Section 5 (Methodology) for procedural explanations.

Positioning Equipment	
Navigation software	Starfix.NG 2024.1 R6 online navigation suite
Primary positioning	Port StarPack 334 with Starfix.G2+/G4+ solution, corrections via SASAT
Secondary positioning	Stbd StarPack 24 with Starfix.G2+/G4+ solution, corrections via ERSAT
Tertiary positioning	Port StarPack 334 with Starfix.XP2 solution, corrections via SASAT
Quaternary positioning	Stbd StarPack 24 with Starfix.XP2 solution, corrections via ERSAT
Quinary positioning	Port StarPack 334 with Starfix.HP solution, corrections via SASAT
Senary positioning	Stbd StarPack 24 with Starfix.HP solution, corrections via ERSAT
Acoustic positioning	Kongsberg HiPAP 501 USBL system (vessel)
Primary heading system	StarPack Starboard ProTrack
Secondary heading system	Raytheon Anschütz heading system – Gyro 1 (vessel)
Tertiary heading system	Raytheon Anschütz heading system – Gyro 2 (vessel)
Quinary heading system	Raytheon Anschütz heading system – Gyro 3 (vessel)
Reference stations	Leidschendam, Aberdeen, Jacou, Bergen, Brønnøysund
Spare correction source	NTRIP

Bathymetry Equipment	
Primary System	Sensordata SD204 Pressure Sensor
Secondary System	Kongsberg HiPAP 501 USBL system
Tertiary System	Drill string
Echo Sounder	Kongsberg EA640
Vertical Motion Compensator	Kongsberg Seatex MRU5 (2x) (vessel)
Atmospheric Pressure	Vaisala PTB210 Barometer
CTD sensor	Valeport Midas SVX2 (2x)
Sector Scan Sonar	Sonavision SV4040
Data Recording	Starfix.2024 online navigation suite

3.3 Offsets

3.3.1 MV Fugro Quest Vessel Offsets

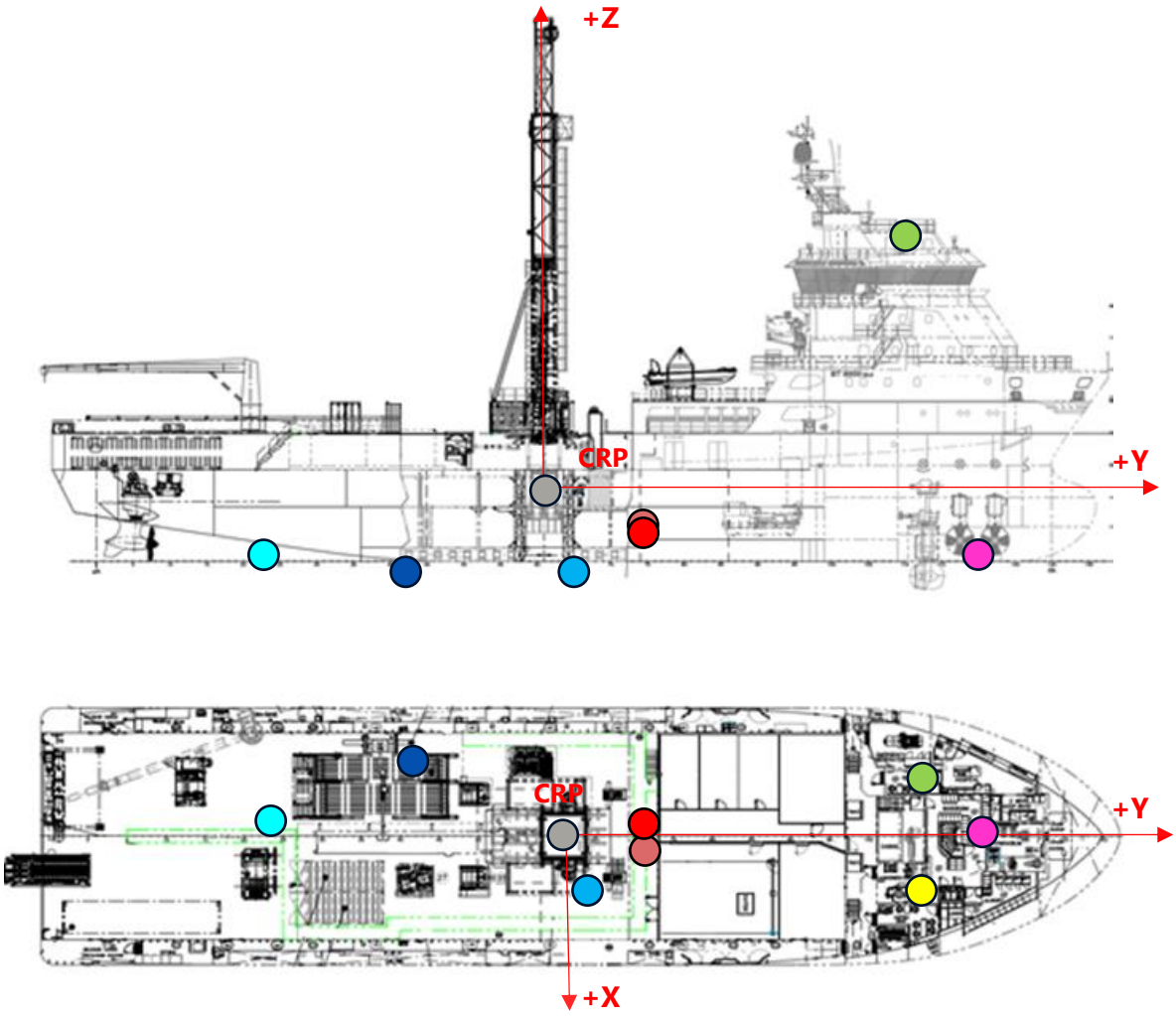


Figure 3.1: MV Fugro Quest offset diagram

Table 3.2: MV Fugro Quest vessel offsets

Offsets		Athwart (X) [m]	Along (Y) [m]	Height (Z) [m]
CRP (Drill String)		0.00	0.00	0.00
GNSS antenna Port		-4.64	31.11	20.22
GNSS antenna Starboard		4.65	31.10	20.22
Echo sounder transducer		-0.36	38.66	-7.41
HiPAP pole starboard		3.50	1.21	-9.83
HiPAP pole port		-6.38	-11.38	-9.16
ADCP		-1.84	-18.93	-7.44
MRU 3		-0.17	5.59	-3.88
MRU 2		0.10	5.59	-3.79

3.3.2 Seabed Frame Offsets

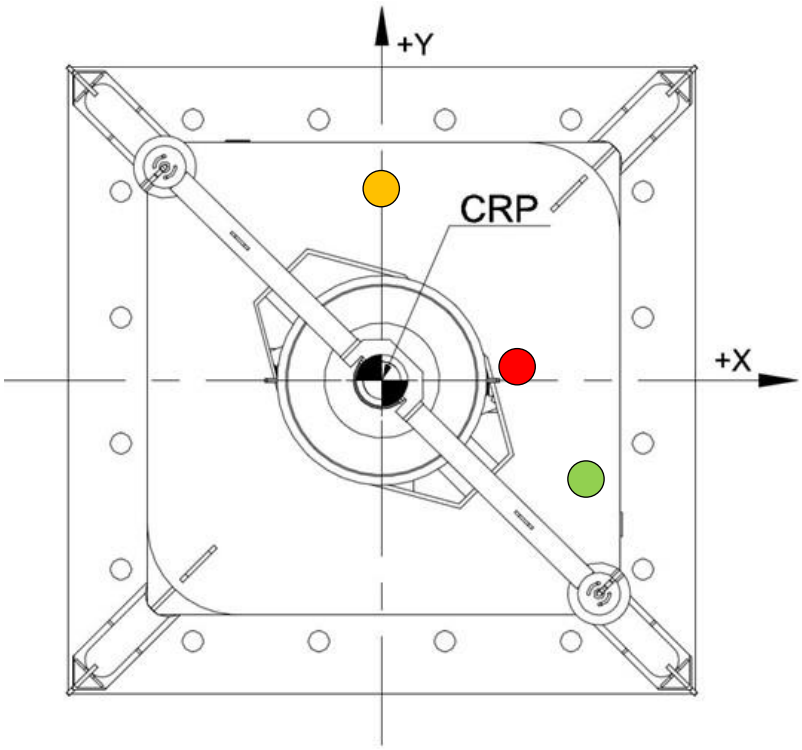


Figure 3.2: Seabed frame offset diagram

Table 3.3: Seabed frame offsets

Offsets		Athwart (X) [m]	Along (Y) [m]	Height (Z) [m]
CRP (Drill string centre)		0.00	0.00	0.00
USBL Beacon (M49)		1.22	-0.56	3.71
Pressure Sensor (Midas SVX2)		0.73	0.10	2.58
Sector Scan Sonar		0.00	1.02	2.27

3.4 Calibration Results

This section details the results of the system calibrations that were carried out prior to positioning operations. Refer to Section 5 (Methodology), for a detailed description of the calibration procedures. Detailed results of the calibrations are available on request.

3.4.1 Positioning Systems

A DGNSS positioning system verification was carried out on 9 January 2025, whilst the vessel was alongside Marseille-Fos, France, by means of Kinematic GNSS processing.

The results of the verification are presented in Table 3.4.

Table 3.4: Positioning system verification

Date	Location	Positioning System	ΔE [m]	S.D. [m]	ΔN [m]	S.D. [m]
9 January 2025	Marseille-Fos	SP Port Starfix.G4+	0.00	0.02	-0.01	0.02
9 January 2025	Marseille-Fos	SP Starboard Starfix.G4+	0.01	0.02	0.00	0.02

To check the integrity of the positioning systems, a positioning system comparison was performed whilst the vessel was alongside Marseille-Fos, France, between 11:32 and 13:32 on 9 January 2025. The positioning system comparison was performed between the primary positioning system (SP port antenna, Starfix.G4+ solution) and the other positioning system solutions (Starfix.G4+ and Starfix.XP2) of the two StarPacks (SP Port and SP Starboard). From the antenna locations, with respect to the vessel primary heading source, positions of the vessel's datum point (CRP) were calculated and compared. The differences between the positioning systems were within the expected system accuracy. The results of the comparisons are presented in Table 3.5.

Table 3.5: Positioning system comparison

Date	Positioning systems	ΔE [m]	S.D. [m]	ΔN [m]	S.D. [m]
9 January 2025	SP Port G4+ vs SP Stbd G4+	0.01	0.02	-0.03	0.02
9 January 2025	SP Port G4+ vs SP Port XP2	0.00	0.01	-0.01	0.01
9 January 2025	SP Port G4+ vs SP Stbd XP2	0.04	0.02	-0.05	0.03

3.4.2 Heading Systems Alignment Check

The heading and motion systems alignments were checked by dynamic calibration in Bergen, Norway, on 4 September 2024. After completion of the checks, the corrections were entered into the online navigation software. The results of the heading checks are presented in Table 3.6.

Table 3.6: Heading systems alignment check

Date	Location	Heading system	Method	C-O [°]	S.D. [°]
4 September 2024	Bergen	SP Stbd ProTrack	Dynamic Calibration	89.95	0.03
4 September 2024	Bergen	SP Port ProTrack	Dynamic Calibration	-90.05	0.03
4 September 2024	Bergen	Gyro 1	Dynamic Calibration	-0.33	0.08
4 September 2024	Bergen	Gyro 2	Dynamic Calibration	-0.85	0.03
4 September 2024	Bergen	Gyro 3	Dynamic Calibration	-0.41	0.23

3.4.3 Speed of Sound and Water Density Measurements

Before the start of project data acquisition and at regular intervals during the project, conductivity, temperature and pressure measurements were taken to establish the local speed of sound profile and average water density. The speed of sound profile was entered into the Kongsberg HiPAP Ultra Short Baseline (USBL) system. The average water density was used for depth determination in conjunction with the pressure sensor. The results of these measurements are presented in Table 3.7.

Table 3.7: Speed of sound and water density measurements

Date	Location	Mean [m/s]	Transducer [m/s]	Seabed [m/s]	Density [kg/m^3]
17 January 2025	Z4_OWF_BH15-COMP	1505.15	1499.28	1509.68	1028.86
19 January 2025	Z4_OWF_BH01-COMP	1508.21	1505.12	1510.09	1029.12

3.4.4 Kongsberg HiPAP USBL System

The Kongsberg HiPAP system, installed on board the MV Fugro Quest, was interfaced to Starfix.NG as the subsea positioning system. A USBL Calibration was performed on 3 September 2024. The calibration was undertaken at Byfjorden, Norway, in a water depth of 228 m. The results of the calibration are presented in Table 3.8.

Table 3.8: Port USBL calibration results in Starfix.NG

System	Date	X Offset [m]	Y Offset [m]	Z Offset [m]	Orientation [°]	Scale	Pitch [°]	Roll [°]
USBL Port	3 September 2024	-	-	-	0.72	1.00	-0.25	0.04
USBL Stbd	3 September 2024	-	-	-	-0.43	1.00	-0.58	-0.20

4. Datum and Tolerances

4.1 Geodetic and Projection Parameters

Table 4.1: Project geodetic and projection parameters

Name: WGS 84/UTM zone 31N,CD FR(BATHYELLI) [Med v1.1 + Vertical Offset -0.27]		
EPSG Code:	32631	
Global Navigation Satellite System (GNSS) Geodetic Parameters*		
Datum:	World Geodetic System 1984	EPSG Code: 6326
Ellipsoid:	WGS 84	
Semi major axis:	a = 6 378 137.00 m	
Inverse Flattening:	1/f = 298.257 223 563	
Local Datum Geodetic Parameters†		
Datum:	European Terrestrial Reference System 1989	EPSG Code: 6326
Ellipsoid:	WGS 84	
Semi major axis:	a = 6 378 137.00 m	
Inverse Flattening:	1/f = 298.257 223 563	
Project Projection Parameters		
Map Projection:	Universal Transverse Mercator	
Grid system:	UTM Zone 31 North (UTM 31N)	EPSG Code: 16031
Latitude of Origin:	00° 00′ 00″ North	
Central Meridian:	003° 00′ 00″ East	
False Easting:	500 000 m	
False Northing:	0 m	
Scale factor on Central Meridian:	0.9996	
Units:	Metre	
Project Vertical Parameters		
Vertical coordinate reference system:	CD FR (BATHYELLI)	FUGRO Code: 41068
Datum:	CD FR (BATHYELLI)	FUGRO Code: 40935
Transformation:	RGF93 v1 to CD FR (BATHYELLI) to Vertical Offset	

Notes:
* = Fugro Starfix navigation software always uses WGS 84 geodetic parameters as a primary datum for any geodetic calculations.
† = Source: Client

4.2 Vertical Control

Chart Datum	LAT - CD FR (BATHYELLI)
Tidal Data	Real time GNSS tides reduced to LAT based on the RGF93 v1 to CD FR (BATHYELLI) model
Barometric pressure variation	Factored in pressure to depth calculation
Effect of wind	Factored in GNSS elevation measurements

4.3 System Performance Parameters

Surface positioning	± 0.1 m
USBL positioning	1 % slant range
Bathymetry (absolute)	± 0.5 m absolute using predicted tides
Bathymetry (relative)	Pressure sensor ± 0.01 % of range
	Drill string - variable
GNSS 3D mode	5 satellites minimum, PDOP < 6, Elevation > 10°
GNSS 2D mode	4 satellites minimum, HDOP < 4, Elevation > 10°
Heading system	1°

5. Methodology

5.1 Introduction

Sections 5.2 to 5.4 inclusive describe the procedures for determining the coordinates and water depths of geotechnical sample and/or in situ testing locations. Section 5.5 describes the calibration procedures carried out for the heading system, surface and subsurface positioning systems, and the echo sounder. The use of subsurface positioning systems, primarily USBL, depends on the type of geotechnical sampling and/or in situ testing methods used, hence some descriptions in the sections below may not be applicable to this report.

5.2 Position Determination

The actual location may be determined by surface positioning alone or with additional use of USBL. The USBL determines the position of the centre of the seabed frame on the seafloor. Particularly in deeper water, use of USBL provides a more accurate position of the sample and/or in situ testing location since the seabed frame may be offset from the surface position of the drill string due to currents.

The position is determined as soon as the seabed frame makes contact with the seafloor. A minimum of 100 position fixes are logged at two-second intervals. Data outliers are then discarded in accordance with standard statistical procedures. To determine the final seabed position of a sample and/or in situ testing location the following general sequence applies:

- From the global navigation satellite system (GNSS) receiver, the antenna's latitude and longitude in WGS 84 are transmitted to the navigation computer and converted to Easting and Northing on the local projection by the navigation software;
- The grid heading and X and Y offsets from the antenna to the common reference point (CRP) are applied to the antenna Easting and Northing in order to compute the position of the CRP on the local projection. If the USBL system is not used then this corresponds to the sample and/or in situ testing location since the CRP has been defined as the centre of the drill string;
- The grid heading and X and Y offsets from the CRP to the USBL transducer, mounted on the vessel's hull, are applied to the CRP Easting and Northing to determine the transducer position on the local projection;
- The USBL system measures the slant range and relative bearing (measured clockwise from the vessel centreline) from the USBL transducer to the beacon, mounted on the seabed frame, and also the depth of the beacon relative to the transducer. These values are converted to ΔX, ΔY in the horizontal plane and ΔZ in the vertical plane by the USBL processor;
- The ΔX, ΔY and ΔZ values are transmitted to the navigation computer where the Z offset of the USBL transducer is applied;

- The position of the beacon is computed in the local projection Easting and Northing and the beacon depth is computed relative to the water surface. The centre of the seabed frame, which corresponds to the seabed sample and/or in situ testing position, is derived from the USBL beacon position by applying the USBL beacons horizontal offsets. The heading of the frame is assumed to be the same as the vessel heading. When heading changes are implemented to the vessel after the location of the frame on the seafloor, the frame will be locked in its original heading by the use of a manual heading, derived from the position fix, in which heading information was logged.

5.3 System Configuration

5.3.1 DP Position System

The MV Fugro Quest is configured according to the classification "Offshore Supply DP Support Vessel, DP Class II". The vessel's DP system is fed with two independent DGPS positions. The system consists of two StarPack receivers. The position solutions are generated using different correction sources and calculation methods.

Position and correction data from the DP system are sent to the survey system by means of galvanic isolators. This enables survey personnel to monitor and compare the positional data from the DP system. All equipment is installed in 19" rack mount housings.

For safety reasons, changes to the DP positioning solution were restricted to changing the selection of the corrections satellite (i.e. SASAT & ERSAT) and shore reference stations when entering a new work area. The system was under the full control and responsibility of the DP Operator. Position details from the DP system were sent to the survey software. Quality control (QC) checks cannot be performed for this system and its performance was fully outside Fugro's responsibility.

5.3.1.1 DP1 Position

The DP1 position is a Starfix.G2+/G4+ calculated positions by using clock and orbit corrections from the Fugro G2 network for both GPS and the Russian Global Navigation Satellite System (GLONASS) space vehicles. These corrections were received by the StarPack via ERSAT transmissions.

5.3.1.2 DP2 Position

The DP2 position is also a Starfix.G2+/G4+ calculated positions by using clock and orbit corrections from the Fugro G2 network for both GPS and the Russian Global Navigation Satellite System (GLONASS) space vehicles. These corrections were received by the StarPack via EASAT transmissions.

5.3.2 Survey Position and Navigation Systems

The survey team used two StarPack GNSS Precise Point Positioning (PPP) receivers for the surface positioning during the project. The three single modus calculation position solutions

(Starfix.G2+/G4+, Starfix.XP2, and Starfix.HP) from the two StarPack receivers were interfaced to the survey computer by means of a galvanic isolated network connection and were made available for comparison and QC. Differential correction signal redundancy was achieved by cross-linking the two StarPack receivers to provide corrections from different satellite transmissions, if required. Both Starfix.G2+/G4+ solutions were fed into Starfix.NG by means of a UDP Broadcast (serial backup). All six position solutions, three per receiver, were fed into StarPack QC suite for QC purposes.

All positions and peripheral (heading system, USBL, etc.) data were sent to the navigation computer where all data transformations, offset and survey calculations, and data integration and logging were performed. All data can be graphically and numerically presented on the navigation computer or any other computer connected to the survey network. An off-line computer is available for the survey crew to post-process and report survey data.

The geodetic and the datum transformation parameters used are presented in Section 4.1.

5.3.2.1 Primary Positioning System

The primary survey positioning service used by the survey team was Starfix.G4+ solution generated from Port StarPack Receiver 334. Positions were calculated by using clock and orbit corrections enhanced with carrier-phase corrections from the Fugro Starfix.G4 Network. These corrections were received by the StarPack via SASAT transmissions and positions were output to the Starfix.NG software package.

5.3.2.2 Secondary Positioning System

The secondary survey positioning service used by the survey team was Starfix.G4+ solution generated from Starboard StarPack Receiver 24. Positions were calculated by using clock and orbit corrections enhanced with carrier-phase corrections from the Fugro Starfix.G4 Network. These corrections were received by the StarPack via ERSAT transmissions and positions were output to the Starfix.NG software package.

5.3.2.3 Tertiary Positioning System

The tertiary positioning service used by the survey team was Starfix.XP2 solution generated from Port StarPack Receiver 334. Positions were calculated using carrier phase corrections from the Fugro Starfix network. The corrections are received by the StarPack via SASAT satellite transmissions and positions are output to the Starfix.NG software package.

5.3.2.4 Quaternary Positioning System

The quaternary positioning service used by the survey team was Starfix.XP2 solution generated from Starboard StarPack Receiver 24. Positions were calculated by using carrier phase corrections from the Fugro Starfix network. The corrections were received by the StarPack via ERSAT satellite transmissions and positions were output to the Starfix.NG software package.

5.3.3 Quality Control

The DGNSS and GNSS PPP data were quality controlled using StarPackQC quality control monitoring application. Real-time QC information was displayed as Time Series graphs, tabulated data and graphical displays such as Sky Plots, Error Ellipses and Lock Time graphs depicting satellite lock status. The quality of DGNSS and GNSS PPP derived position fixing data was monitored whilst logging position data for individual locations and also throughout the entire project period.

An assessment of quality was made based on Position Time Series View with the following time series graphs available to display:

- Standard Deviations (Latitude, Longitude and Height);
- HDOP and VDOP;
- Number of SVs;
- Number of Stations;
- Deltas (Easting, Northing and Height);
- Correction Age;
- F-Test.

An assessment of quality was also made by:

- Data Table Views;
- Satellite Lock Time View;
- Error Ellipses View;
- Satellite Constellation Views.

Within the area of operations the accuracy and repeatability of the Starfix.G2+/G4+ system was designed to be 0.03 m in the horizontal plane and 0.06 m in the vertical plane with 95 % confidence level.

5.4 Depth Determination

The depth at each location was measured using a combination of the following techniques:

- Pressure sensor;
- Drill string reading;
- USBL depth reading.

5.4.1 Conductivity, Temperature, and Depth (CTD) probe

A CTD probe or pressure sensor is secured to the seabed frame to measure water pressure using a Digiquartz sensor. The output from this unit is absolute pressure, i.e. atmospheric pressure plus water pressure. The atmospheric pressure is recorded on deployment and not updated until the probe returns to the surface. Adjustments are therefore necessary to take into account the actual atmospheric pressure changes that occur during the measurement cycle. Barometric pressure is recorded manually at four hourly intervals using the vessel's

barometer. An UNESCO-recognised formula is then used to convert the raw pressure values to depth values. The CTD was mounted on the seabed frame.

5.4.2 Drill String Reading

This is a physical measurement made by the drilling personnel and is the total length of drill pipe used to reach the seabed. The measurement is corrected for the distance between the drill floor and the water surface (air gap) and corrected for local tidal variations. When operating in deep water, errors due to the effects of current may be induced in the drill string depth measurement.

5.4.3 USBL Reading

This is a measurement made by taking the Kongsberg HiPAP system USBL beacon Z-values (depth) and applying the vertical offset of the frame-mounted beacon above the seabed frame base.

5.5 System Calibration Procedures

Calibrations of all position and depth measuring equipment are carried out prior to sampling and/or in situ testing. This checks that all equipment is operating within acceptable limits and that the accuracy of the logged data is not compromised. Most equipment is permanently installed on the geotechnical drilling vessel and therefore not all calibrations are performed before the start of every sampling and/or in situ testing programme. The most recent calibrations of the equipment are assessed and new calibrations are carried out if deemed necessary.

5.5.1 Offset Measurements

At the start of the mobilisation, offsets from the vessel's datum (normally the centre of the drill string) to the various DGNSS antennas and other relevant offset points are measured. These measurements are compared with measurements taken from a scaled vessel plan or a previous vessel offset diagram. Seabed frame offsets from the frame's CRP to its transponder and the Z offset for the CTD probe are also measured. Offsets are entered into the navigation software. The USBL transducer offset is already corrected to the vessel's CRP by the vessel's APOS programme.

5.5.2 Heading System Alignment Check

Four methods are possible when performing a heading system alignment check alongside. The resulting differences between computed and observed headings are entered into the navigation software as the heading system's computed minus observed C-O correction.

5.5.2.1 Total Station

These methods of performing a heading system alignment check uses land survey techniques. Reflectors are placed at or near the bow and stern of the vessel on the centreline and their positions fixed at regular intervals. Simultaneous heading system readings and

heading observations are taken. The true bearing between the reflectors is calculated and compared to the observed heading system reading.

5.5.2.2 Sun Azimuth

Sun azimuth observations are performed with a total station and a sun filter when the sun is at a maximum elevation of approximately 30°. The vessel's heading is determined by measuring the angle between the vessel's centreline and the sun azimuth and applying this angle to the computed sun azimuth. The logged heading subtracted from the heading derived from the azimuth of the sun will give the heading system's C-O correction.

5.5.2.3 Taped Offsets

This method requires the known heading of the quay and two measurements are taken simultaneously from the quay to the vessel's centreline. The distance between the two measurements provides a baseline for calculating the angle of the vessel's centreline relative to the quay, which is then applied to the quay heading to derive the computed grid vessel heading. The convergence is applied to the computed grid heading to obtain the true heading which is compared with the observed heading system's reading in order to obtain the C-O correction.

5.5.2.4 Dynamic Calibration

For this method three GNSS antennas are installed on the vessel, one at the bow, one at starboard and one at vessel port side. The antennas are installed preferably at the same height and with minimum baselines of 15 m. GNSS antenna data are logged for a minimum of six hours, while simultaneously raw heading systems data are logged. All data are logged at a rate of 1 Hz.

The logged GNSS data are converted to RINEX format and processed using the Natural Resources Canada website, applying the CSRS (Canadian Spatial Reference System) PPP (Precise Point Positioning) method. Novatel GrafNav software is used for quality control of the resulting PPP data and calculates accurate 3D antenna positions. Finally the GrafNav results are combined with the logged raw vessel heading systems data in Fugro software to calculate the C-O values for the heading systems.

5.5.3 Positioning System

In order to determine the integrity and reliability of the surface positioning systems, two main procedures are followed:

5.5.3.1 Positioning Verification

The position of the primary DGNSS antenna, in local projection coordinates, is verified using two independent methods.

The first method involves comparing the DGNSS antenna position to that derived through land survey techniques. A total station measures directly to the DGNSS antenna from a

known point on the quay. The DGNSS antenna position and the position derived from the total station are logged simultaneously and should agree to better than 0.25 m. This method also validates the geodetic parameters entered into the online survey software.

The second method verifies the DGNSS antenna position by comparing logged SPK positions to results derived from kinematic GNSS processing. Raw GNSS data logged during operations is processed using the Natural Resources Canada website, applying the CSRS (Canadian Spatial Reference System) PPP (Precise Point Positioning) kinematic mode. The processed results are then compared to the SPK positions logged by Starfix.NG, ensuring agreement within 0.25 m and confirming the accuracy of the DGNSS antenna positioning.

Both methods provide independent verification to ensure precise and reliable positioning for geotechnical operations.

5.5.3.2 System Comparison

Once the position verification results are acceptable, a position comparison against all position computations is conducted. The antenna positions for all systems are logged and using the heading system and the measured antenna offsets are reduced to the vessel's CRP. The difference in the positions should agree to within 1 m and they are represented as Delta Easting (ΔE) and Delta Northing (ΔN).

5.5.4 Ultra-Short Baseline System

A USBL allows the measurement of range and bearing from a vessel-based transceiver to one or more subsea transponders. It generally operates through the phase discrimination of an acoustic signal recorded by three orthogonal transducers combined in one head. A USBL calibration is executed whenever work is carried out on the transducer and at least once a year. Calibrations are carried out in water depths slightly deeper than those in which the operations will occur.

5.5.4.1 Preparation

During the USBL calibration sequence, the vessel must be free to manoeuvre around a stationary transponder. Before starting the actual USBL calibration, it is assumed that:

- The vessel's positioning system has been verified;
- The vessel's heading system alignment has been checked;
- All relevant offsets, including the height of the transponder's transducer above the seabed, have been measured.

The actual water depth, measured by the echo sounder, and not corrected for tide, should also be known at the calibration site.

A speed of sound profile, determined at the calibration site, is entered into the USBL system before calibration data are collected.

For the USBL calibration a transponder, equipped with a remote controlled release mechanism or a surface buoy, is deployed, clear of all structures and pipelines, in an area with an approximate water depth slightly deeper than the proposed survey area. The surface positioning system is used to navigate the vessel during the calibration.

5.5.4.2 Range Scale, Orientation, Pitch and Roll

This phase of the calibration is carried out with the vessel positioned on the circumference of a circle of radius 1.5 to 2 times the water depth, centred on the beacon. The following describes a calibration with the vessel lying to the north, east, south, and west of the beacon with the vessel maintaining the same north heading. In the case of bad weather, this pattern may be rotated so that the vessel is heading into the current. The surface position of the vessel and the USBL position of the beacon are logged at each cardinal point. Generally a minimum of 100 fixes, at 5 second intervals, are logged at each cardinal point.

When the vessel is due north or south of the beacon and heading due north, roll errors are minimised and pitch errors are observed. Transducer alignment errors will plot the beacon offset to the east or west of its actual position. Range scaling errors will plot the beacon to the north or south of the actual position.

When the vessel moves to a position due east or west of the beacon, while still maintaining a heading of due north, roll errors are observed and pitch errors are minimised. Transducer alignment error will plot the beacon offset from its actual position. Range scaling errors will plot the beacon to the east or west of the actual position.

Any resultant errors will show the beacon plotted in four quadrants. If there are no errors, the beacon position will be shown as a circular scatter plot around the actual position.

The range error consists of a fixed error and the scalar multiplier. Overall it accounts for errors in ray path and speed of sound. The USBL module in Starfix.NG derives a range error value that contains and accounts for the range fixed error.

Starfix.NG computes the errors and displays the results as four parameters:

- Pitch error;
- Roll error;
- Transceiver misalignment;
- Range error.

5.5.4.3 Offset (Spin) Test

The first part of the calibration is carried out to verify the offsets between the USBL system and the navigation system. This is normally done by manoeuvring the vessel directly over a beacon deployed on the seabed and then rotating the vessel through 360° while logging the surface and USBL position. Any offset errors are displayed as a ‘snail trail’ showing the beacon position describing a circle around the intended beacon position. Alternatively, the

vessel is positioned directly over the beacon, and an equal number of fixes are logged while the vessel is heading in each of the four cardinal directions.

The Z-offset is checked by comparing the Z component of the USBL observation and the value from the echo sounder, allowing for beacon height above the seafloor. As the vessel is directly over the seafloor beacon, this minimises any errors due to Range Scale and USBL transducer misalignment.

5.5.4.4 Verification of Results

The calibration results are checked using one of two methods:

1. Two lines are run at right angles and in opposite directions over the top of the beacon;
2. A static spin test at a location in a distance of 10 % of water depth from the calibrated beacon position.

In both cases the beacon's position is continuously logged and should not deviate, within operational parameters, from its calibrated position. A reasonably tight, circular scatter plot a few metres across, depending on the navigation system performance, the USBL system performance, and the depth of water, is an indication of a good calibration result.

Appendix F

Digital Data

F.1 Digital Data

This section details the digital data deliverables associated with the investigated locations.

Description	Document/File Name
AGS4 CPT data	F254727_GLE (Z4)_AGS4_CPT Data_i02
AGS4 Field data	F254727_GLE (Z4)_AGS4_Field Data_i02
AGS4 Onshore Laboratory data – FGBL	F254727_GLE (Z4)_AGS4_FGBL_i01
AGS4 Onshore Laboratory data – FGSL	F254727_GLE (Z4)_AGS4_FGSL_i01
ASCII Processed CPT data	F254727_GLE (Z4)_ASCII CPT data_i02.zip
Processed Photos	F254727-REP-002 GLE (Z4)_Photos_i02.zip
Excel Digital Laboratory Test Results	F254727_GLE (Z4)_Laboratory Digital Data_i01
GIS database	GDL_Z4_GTC_FEATURES_2025.gdb