Intended for
Energinet Eltransmission A/S

Document type
Report

Date
June 2022

HDD project
Hesselø Offshore Wind Farm

Subject
Site Investigations For Horizontal Directional Drillings

HESSELØ OFFSHORE WIND FARM

SITE INVESTIGATIONS FOR HDD

GILBJERG HOVED

Bright ideas. Sustainable change.

HESSELØ OFFSHORE WIND FARM
SITE INVESTIGATIONS FOR HDD GILBJERG HOVED

Project name	Gilbjerg Hoved HDD
Project no.	1100051481
Recipient	Energinet Eltransmission A/S
Document type	Report
Version	0.0B
Date	06-07-2022
Prepared by	MSHE, CRTA, LAF
Checked by	RMH
Approved	RMH
Description	Site Investigation Report

Rambøll
Hannemanns Allé 53
DK-2300 København S

T +45 5161 1000
https://ramboll.com

Rambøll Gruppen A/S
CVR NR. 10160669

CONTENT

APPENDICES

1. EXECUTIVE SUMMARY

This report has been prepared to provide geotechnical, geological, and geophysical data in order to disclose the basic soil conditions for the horizontal directional drilling (HDD) location of Gilbjerg Hoved. A risk assessment has been part of the process whereas potential risks has been identified and evaluated for the HDD.

In order to disclose the basic soil conditions, a site investigation campaign was carried out involving a total of 5 geotechnical boreholes performed on the expected HDD location to the depths from 25 to 50 meters below ground level. Furthermore, approximately 1310 meter of Multi Electrode profiling was carried out.

The HDD crossing will be performed in glacial deposits with a known risk of encountering obstructions such a boulders, cobbles and firm sand deposits. Additionally, the HDD crossing will be performed in saturated and unsaturated sand- and gravel deposits where sufficient pressure can be challenging to maintain during drilling. Furthermore, the HDD crossing should be expected to drill below- and above water table which can require adaptation to maintain sufficient pressure and set-up.

In connection with the design and planning of the HDD, calculations to evaluate the factor of safety against blow up of drilling fluid should be performed for the HDD crossing during the final design process. These calculations should be used to determine the maximum fluid pressure limitations and modify the alignment of the HDD, if necessary, to maintain appropriate factors of safety against blow up.

Furthermore, additional factors must be implemented to reduce the potential for blow up of drilling fluids, including the following:

- Preparing spill prevention, control, and countermeasure for the HDD crossing
- Establishing minimum requirements for HDD contractors
- Requiring HDD contractors to develop and follow fluid monitoring programs and blow up prevention plans.

2. INTRODUCTION

2.1 General

Rambøll has been appointed to perform the geophysical and geotechnical site investigation for a planned HDD at the location of Gilbjerg Hoved in the northern part of Zealand.

This report summarizes the results of the performed geophysical and geotechnical investigation.

This report provides recommendations and a risk assessment for tackling problems in the subsurface when using the horizontal directional drilling (HDD) technique for the crossing. HDDs will typically be considered where obstacles at the ground surface, such as sand dunes, protected areas, roads, railway, and water channel, make traditional cut and cover pipeline installation problematic, or where natural amenities such as the wet area are crossed.

This report contains a description of the proposed project, information on the HDD installation technique, a summary of the location where this technique is being considered and discussions concerning surface, geological, and geotechnical conditions at the location. An assessment of the risks for the successfully completing an HDD installation at the locations is provided based on all available information.

All boring locations and depths and sites for geophysical investigations have been selected and defined by Energinet.

2.2 Project description

2.2.1 Background

In June 2020 the Danish Parliament decided to commence the development of the offshore wind farm (OWF) project, Hesselø aiming for a capacity of ca. 1000 MW. It is planned to build and connect the OWF to the Danish onshore electrical grid.

The OWF site is located in the inner Danish Sea, Kattegat, and has been subject to screening studies. The area of investigation subject to the OWF spans an area of ca. 247km^2.

Following the political decision, the Danish Energy Agency has instructed Energinet to initiate site investigations, environmental and metocean studies and analysis for grid connection for the area of investigation.

On the basis of the instruction from the Danish Energy Agency, Energinet requests Rambøll to carry out a geotechnical and geophysical site investigation at the landing site of the export cable from the OWF prior to the planning and execution of an HDD (Horizontal Directional Drilling).

2.2.2 The project

The HDD process involves boring under a feature and pulling the pipeline into place through the borehole that has been reamed to accommodate the diameter of the pipeline.

This process has three main phases: pilot-hole drilling, subsequent reaming passes, and pipe pullback. These phases will not be described in further details since the techniques are assumed to be familiar to the contractors.

Figure 2-1 presents an overview map of the location. Figure 2-2 presents an overview map of the planned HDD position at Gilbjerghoved.

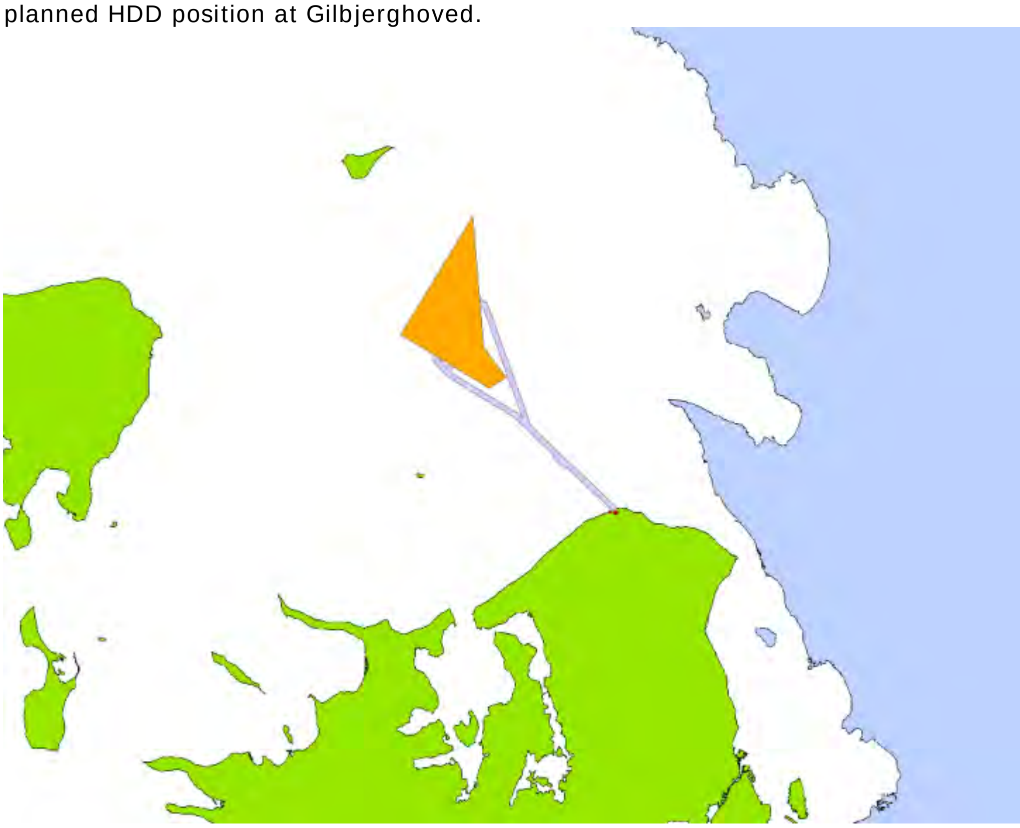


Figure 2-1: Overview map of the location. Orange polygon: OWF area. Pink polygon: cable routes ending at the landing site at Gilbjerg Hoved west of Gilleleje.

Figure 2-2: Black dotted line: Planned HDD position, Gilbjerg Hoved.

2.3 Regional geological background

2.3.1 General geology

The landscape in the northern part of Zealand was created by a series of glaciations.

The surface soils in the northern Zealand are dominated by Clay Till, meltwater sand and gravel.

The Quaternary landscape of the northern Zealand is the result of a series of events in Late Weichsel glaciation. The period extends about 25.000 to 11.000 years back. During this period, three major glaciers formed the landscape present today. First The Kattegat Isstrøm (Kattegat Iceflow) from South Norway, followed by a mid-Sweden glacial advancement called NØ-isen (NE-ice) ending with a progression from East, The Østjyske Isstrøm. Several locations show how the ice has folded, stacked and pressed up the Kattegat Isstrøm and NØ-isen, forming elongated slightly twisted N-S directed moraines. Between these elongated moraines are valleys with meltwater deposits. These meltwater rivers flowed from south to north, draining large dead-ice areas around Esrum Sø. The imprints of these meltwater rivers are still seen today and are now known as Esrum Ådal and Pandehave Ådal.

A cross-section of Esrum Ådal is shown in Figure 2-3 where the Kattegat Isstrøm was responsible for the lowermost Till deposits and the NØ-isen, the upper most Till-deposits, the section is separated by meltwater and lake- deposits.

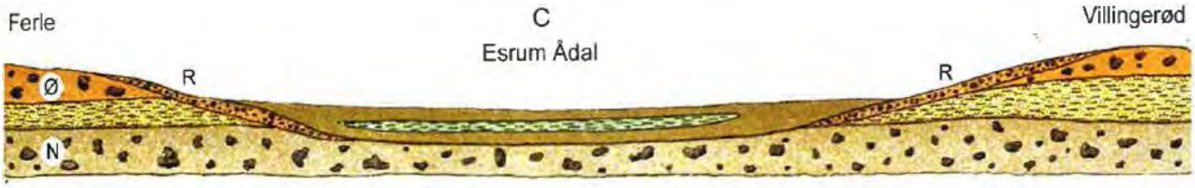


Figure 2-3: From Houmark-Nilsen, 2021 [4]. Terrain model of an area between Gilleleje and Esrum. Ø = Upper Till deposited by the NØ-isen/NE-ice. N = the Lower most Till deposited by the Kattegat Isstrøm/ Kattegat Iceflow. R = Pebble Gravel. N and Ø are separated by meltwater deposits.

2.3.2 Local geology

The survey area is located in an area dominated by meltwater deposits. The nearest archive boreholes in the area are >200 meters away from the current area of study. Due to the large distance, it won't be relevant to take this material into consideration.

The geological map, Figure 2-4, is a representation of the present geology in 1,0 m depth. As seen on Figure 2-4, the boreholes are all positioned in the meltwater deposit-zone, except for BH05 which is located near the coastline and therefore in a marine environment. As described above, the geological map is a representation only of the uppermost 1,0 m soil, and it can be expected, that the meltwater deposits that characterize the four other boreholes will define BH05 as well.

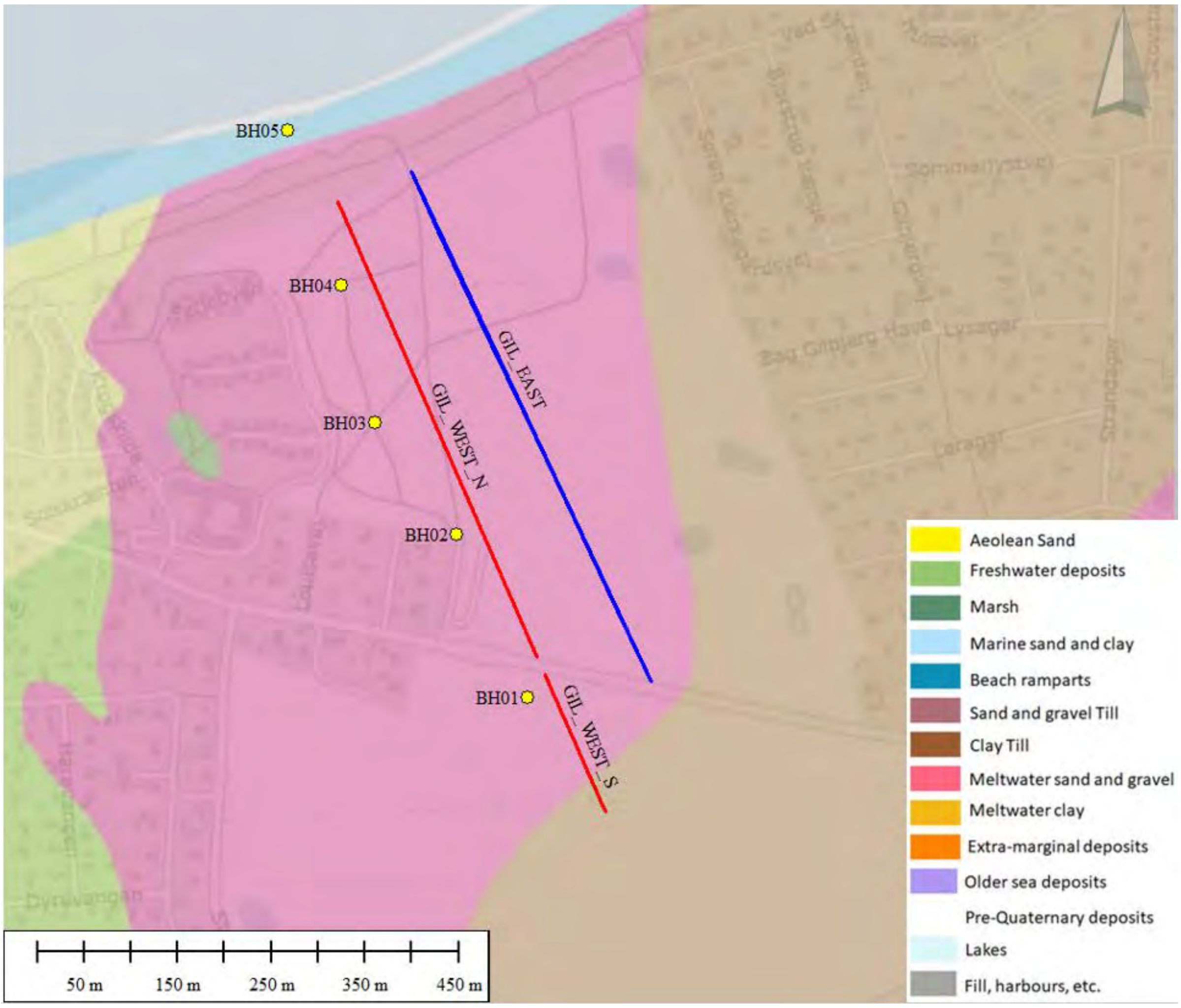


Figure 2-4: Geological map of the survey area including legend, borehole positions and (blue and red) MEP-interpretation lines

3. PURPOSE OF THE INVESTIGATION

The purpose of the site investigations is to investigate and document the geotechnical and geological conditions along with the possible lines for the HDD, so that:

- Informing the client and HDD suppliers about the ground conditions
- Decreasing the soil-related risks for performing HDDs
- Selection of HDD equipment feasible for performing the planned HDDs
- Design of the HDD underground trajectory

The work has been carried out in accordance with Eurocode EC7, Part 1, Part 2, with its associated Danish Annex, DS/CEN ISO/TS 17892 and the Danish Geotechnical Association's Bulletins.

4. EXTEND OF FIELD INVESTIGATIONS

4.1 General

In accordance with the program of the site investigation campaign, a total of 5 boreholes have been performed on site to depths from 25 to 50 meters below ground level (bgl). For this, a total of 160 borehole meters was completed. Furthermore approximately 1310 m Multi Electrode Profiling (MEP) was carried out on site.

Table 4-1 provides details about the five geotechnical boreholes.

Table 4-1: Boreholes drilled at the HDD-site

Borehole	Depth	Date	Projection	X	Y	LSYS	Z
[-]	[m]	[YYYYMMDD]	[-]	[-]	[-]	[-]	[m. DVR90]
HESS.HDD.BH01	25,00	2022-05-17	UTM32E89 ETRS89	703431	6224376	DVR90	+17,80
HESS.HDD.BH02	25,00	2022-05-03	UTM32E89 ETRS89	703355	6224550	DVR90	+20,39
HESS.HDD.BH03	35,00	2022-05-31	UTM32E89 ETRS89	703268	6224669	DVR90	+20,64
HESS.HDD.BH04	50,00	2022-05-23	UTM32E89 ETRS89	703233	6224815	DVR90	+30,64
HESS.HDD.BH05	25,00	2022-04-25	UTM32E89 ETRS89	703176	6224980	DVR90	+3,13

Per Aarsleff has carried out setting out of borehole positions in the field with GPS and with reference to the coordinate system ETRS89 UTM32N and DVR90.

Boreholes were performed by Per Aarsleff with the shell and auger method as 6″ to 8" drillings with casing. The geotechnical field exploration program was performed in the April and May 2022.

The geophysical measurement was carried out by Rambøll in April 2022.

An overview of legend and definitions are provided in Appendix 1.1.

Borehole location plans- and MEP location plans are provided in Appendix 2.1.

Geotechnical- and geophysical longitudinal profiles for respectively the western and eastern site investigation lines, are provided in Appendix 3.1-3.4.

4.2 Extend of geotechnical investigations

During drilling strata boundaries were recorded and soil samples were taken as bag samples (disturbed samples) and A-tubes for geological assessment, classification tests and thermal resistivity tests. Disturbed soil samples were collected at depths of 0.2 and 0.5 m and then generally every 0.5 m, and at least one sample per strata. If assessed possible A-tubes were extracted at an interval of 5 meter. In case of a soil stratum consisting of sand or gravel big bags have been collected instead of the A-tubes.

Field vane tests have been performed in cohesive soils (clay and silt) in accordance with Reference sheet no. 1 from Danish Geotechnical Society in order to evaluate the undrained shear strength (c_u, c_{ur}). Standard Penetration Tests have been performed in cohesionless layers in accordance with Reference sheet no. 3 from Danish Geotechnical Society in order to evaluate the relative density and the angle of internal friction (φ') in the sand.

A total of 4 standpipe piezometers (Ø25mm) have been installed in borehole BH01-BH04 for registration of the groundwater table. In borehole BH05, no standpipe piezometers have been installed as the borehole is located near the coastline and therefore sealed upon termination of the drilling.

A total of 5 attempts of extracting A-tubes were done, however, failed due to the tube being damaged in all the attempts.

The recovered samples have been geologically described in the laboratory. On all samples, the water content has been determined.

Boreholes were sealed with bentonite pellets after completion and just after the final round of ground water soundings were collected.

4.2.1 Laboratory tests

The laboratory works have included geological description of the soil samples in accordance with Danish Geotechnical Society Bulletin, denoted DGS, ref. [1].

Based on the site investigation results Ramboll prepared laboratory testing proposals for each borehole, which were approved by Energinet before commencement.

The program included classification tests as well as advanced laboratory tests:

- Determination of the moisture content in accordance with Danish Geotechnical Society Bulletin 15, section 3.1, approximately per meter.
- Particle size distribution including hydrometer testing in accordance with CEN ISO/TS 17892-4 performed on selected samples.

A limited amount of laboratory tests was performed due to the relatively homogenous soil conditions that were found in the geotechnical boreholes.

The borehole logs are provided in Appendix 4.1-4.5.

Laboratory test results from the particle size distribution are provided in Appendix 5.1-5.5.

4.2.2 Comments to geotechnical drilling works

Comments provided by the driller during the performed drilling works, concerning general drilling and complications such as milling and presence of stones or boulders, are presented in Table 4-2 below. For further detailed, refer to the field logs in Appendix 6.1-6.5.

Table 4-2: Overview of the comments to the geotechnical drilling works

Borehole	Depth	Comment
[-]	[m]	[-]
HESS.HDD.BH01	25,00	• Presence of very sandy Clay Till layers at the top of the strata. • Presence of silty and gravelly sand layers embedded below the Clay Till layers, to the bottom of the strata. • Vane test (V5) in Sand Till. measured maximum strength at 3,40 meters bgl. • Vane test (V4) in Clay Till measured maximum strength at 4,40 meters bgl
HESS.HDD.BH02	25,00	• Presence of sand layers with gravel and stones throughout the strata. • Milling from 13,00-13,25 meters bgl. Approximate milling duration, 3,5 hours. • Milling from 14,00-14,25 meters bgl. Approximate milling duration, 2,0 hours. • Milling from 16,10-16,36 meters bgl. Approximate milling duration, 1,0 hour. • Milling from 17,30-17,50 depth bgl. Approximate milling duration, 1,0 hour.
HESS.HDD.BH03	35,00	• Presence of stony, gravelly, and silty sand layers throughout the strata has slowed the borehole drilling.
HESS.HDD.BH04	50,00	• Presence of stony, gravelly, and silty sand layers throughout the strata has slowed the borehole drilling.
HESS.HDD.BH05	25,00	• Presence of stony, gravelly, and silty sand layers throughout the strata has slowed the borehole drilling.

Furthermore, all attempts of extracting A-tubes have resulted in the tube being damaged.

4.2.3 Ground water conditions

Standpipe piezometers have been installed in four out of five boreholes. The measured water levels are listed in the Table 4-3 below. The measured levels and standpipe piezometers can be seen in the borehole logs in Appendix 4.1-4.5.

Table 4-3: Measured water levels

Borehole	Pipe	Terrain	Date	Water depth	Water level
[-]	[mm]	[m. DVR90]	[YYYYMMDD]	[bgl]	[m. DVR90]
HESS.HDD.BH01	Ø25	+17,80	2022-05-17	15,60	+2,20
			Lost due to plowing	-	-
HESS.HDD.BH02	Ø25	+20,39	2022-05-03	18,62	+1,77
			2022-05-27	18,64	+1,75
HESS.HDD.BH03	Ø25	+20,64	-	-	-
			2022-06-10	18,97	+1,67
HESS.HDD.BH04	Ø25	+30,36	-	-	-
			2022-05-27	29,84	+0,52
HESS.HDD.BH05	-	+3,13	Sealed after termination of borehole	-	-

The water level was measured for BH01 on May 17th, 2022, and was observed at a level of +2,20m DVR90. No 2nd observation was made due to the loss of borehole and standpipe piezometer from plowing.

The water level was measured for BH02 on May 3rd, 2022, and was observed at a level of +1,77m DVR90. The 2nd observation on May 27th, 2022, showed a water level at +1,75m DVR90.

The water level was measured for BH03 on June 10th, 2022, ten days after completion of the borehole, and was observed at a level of +1,67m DVR90.

The water level was measured for BH04 on May 27th, 2022, fourteen days after completion of the borehole, and was observed at level +0,52m DVR90.

The water level was not measured for BH05 due to no standpipe piezometer installation as the borehole is located near the coastline and therefore sealed upon the termination of the drilling.

The observation of the measured water levels shows a steady decrease towards the coastline.

4.3 Extend of geophysical investigations

In the geotechnical realm, geophysical methods are valuable in mapping the subsurface, such as including the ability to collect data over large areas in a relatively short period of time. This survey includes the MEP method (Multi electrode profiling) - a geoelectrical geophysical method, whereby it is possible to determine the resistivity of the subsurface.

The method is also called ERT (electrical resistivity tomography) and CVES (continuous vertical electrical sounding) but will be called MEP in this report.

4.3.1 MEP

The resistivity measurements were acquired as MEP with a roll-along technique. The survey lines were acquired with cables with an electrode spacing of 2 m south of Tinkerup Strandvej and with an electrode spacing of 5 m north of Tinkerup Strandvej. Steel electrodes fastened to the ground were attached to the electrodes on the cables. For each measurement 4 electrodes are actively used, 2 electrodes emit the direct current, and 2 receiving electrodes measure the potential difference between the electrodes in the subsurface. The electrode configuration was set to GradientXL and was measured using a GuidelineGeo Terrameter LS2 instrument. Resistivities are measured in ohm.m.

This method results in a 2D resistivity profile along the measured line. Resistivity is a measure of a materials ability to conduct an electrical current. It is therefore possible to differentiate between materials with low resistivity such as clays, medium resistivity such as saturated sediments, medium-high resistivity such as unsaturated sediments and materials with high resistivity such as very dry coarse-grained sediments or bedrock.

The results from the measurements are presented in section 6 and the technical drawings are presented in Appendix 3.1-3.4

4.4 Results

The siteplan and the longitudinal profiles for the HDD site are provided in Appendix 3.1-3.4

Geotechnical borehole logs are provided in Appendix 4.1-4.5, including site investigation results and laboratory results from moisture content and bulk density/unit weight.

Laboratory test results from particle size distributions are provided in Appendix 5.1-5.5.

Field logs are provided in Appendix 6.1-6.5.

The risk analyses are provided in appendix 7.1.

5. HDD CROSSING CONDITIONS

Surface and subsurface conditions at the proposed HDD crossing location are provided in this section. Discussions of subsurface conditions include information from published geological mapping, groundwater observations, and conditions observed in geotechnical boreholes. Based on this information, an interpretation of the geological and geotechnical conditions at the HDD location is provided.

5.1 Ground properties

For the HDD construction both lower and upper values of strength parameters are required. The low characteristic values of strength parameters will mainly be needed for design of possible temporary constructions like sheet pile walls, containment dams or possible foundations etc. The high values of the strength parameters are mainly needed for the HDD contractor to assess the method and suitability of the drilling equipment, to assess the time for drilling and estimate the abrasion of the bit and drill rods for the job and to estimate pullback forces.

Proper selection of reamer and the number of passes needed depends on soil conditions, the hole size and pump capacity.

For installation in quaternary deposit (till and sand) as described in the boreholes a substantial wear (the borehole drilling works has been challenged by the ground conditions) on machinery should be expected. Enlarging the hole size to much in one pass will wear on the machinery. A reamer that is too large will result in excessive torque and pullback loads.

For the site, the intervals (minimum value and maximum value) for the measured (or derived) strength- and deformation parameters for each soil type have been provided in a table with ground properties.

In the tables below the following symbols apply:

γ	:	Soil unit weight – utilized above water level
γ'	:	Submerged soil unit weight – utilized below water level
c_u	:	Undrained shear strength (short term situation)
φ'	:	Effective angle of internal friction (long term situation)
c'	:	Effective cohesion (long term situation)

5.1.1 Geotechnical investigations

The geotechnical investigations include several tests performed in the encountered soil types in borehole BH01-BH05. Table 5-1 below, presents an overview of the field- and laboratory tests performed.

Table 5-1: Overview of tests performed in the encountered soil types in borehole BH01-05

Soil Type		No. Of Shear Vane tests	No. Of MC tests	No. Of SPT tests	No. Of particle size distribution
[-]	[Env., Age]	[No]	[No]	[No]	[No]
FILL	Fi, Re	0	7	0	0
SAND	Mw, Lg	0	12	2	1
GRAVEL	Mw, Gc	0	12	3	1
SAND	Mw, Gc	5	191	75	25
GRAVEL TILL	Gl, Gc	0	11	4	1
SAND TILL	Gl, Gc	0	57	14	3
CLAY TILL	Gl, Gc	6	9	1	0
Total		11	299	99	31

The sections below, present a general description of the encountered soil types and present the interpreted results for each soil type encountered.

5.1.1.1 FILL, Fi, Re

In borehole BH01, BH02 and BH03, fill has been observed in the top of the strata as sandfill, fine – medium, mully, slightly gravelly, slightly silty dark yellowish brown, and not calcareous. In some samples, plant remains have been observed. Laboratory tests have been performed in the fill layers and below are the results summarized and depicted as a range and average value in Table 5-2. No field tests have been performed in the fill layers.

Table 5-2: Laboratory test results of FILL, Fi, Re

Test	Minimum measured value	Maximum measured value	Average value	Number of tests
Moisture content [%]	5,91	10,11	8,18	7
Particle size distribution [No]	-	-	-	0

5.1.1.2 SAND, Mw, Lg

In borehole, BH02 and BH05, lateglacial meltwater sand has been observed in the upper layers near the surface as fine – coarse, slightly silty, a few grains of gravel, dark yellowish brown and slightly calcareous. Laboratory and field tests have been performed in the lateglacial meltwater sand layers and below are the results summarized and depicted as a range and average in Table 5-3. Figure 5-1 presents an overview of the particle size distribution based on 1 test from lateglacial meltwater sand in borehole BH05.

Table 5-3: Laboratory and field test results of sand SAND, Mw, Lg

Test	Minimum measured value	Maximum measured value	Average value	Number of tests
Moisture content [%]	6,10	15,88	12,84	12
SPT [No.]	11	12	11,5	2
Particle size distribution [No]	-	-	-	1

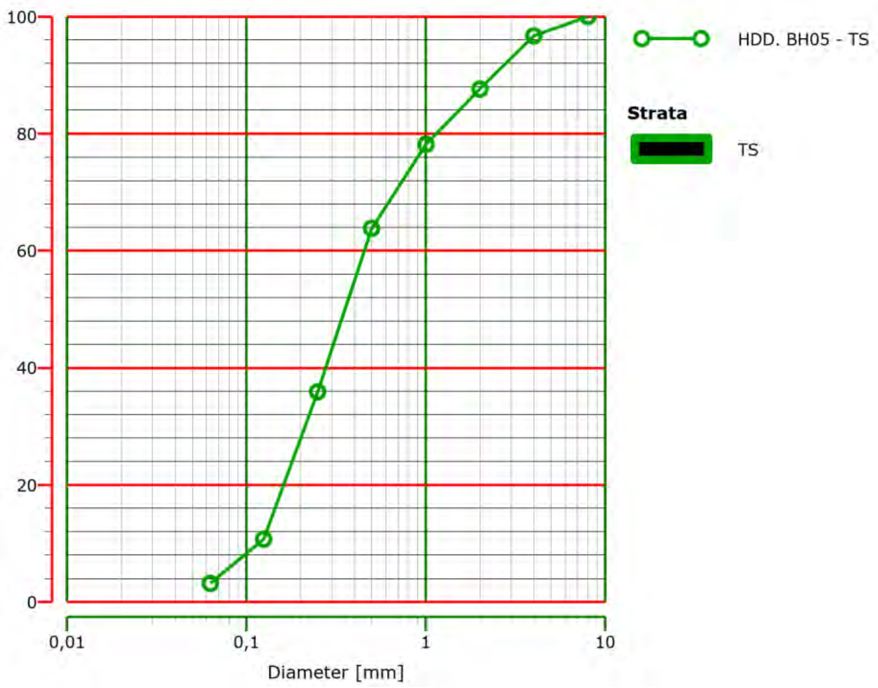


Figure 5-1: Particle size distribution of lateglacial meltwater sand in borehole BH05

5.1.1.3 GRAVEL, Mw, Gc

In borehole BH02 and BH04, glacial meltwater gravel, has been observed in the deeper layers as coarse, sandy, poorly graded, grey, and calcareous. Laboratory and field tests have been performed in the glacial meltwater gravel layers and below are the results summarized and depicted as a range and average in Table 5-4. Figure 5-2 presents an overview of the particle size distribution based on 3 tests from glacial meltwater gravel in borehole BH02 and BH04.

Table 5-4: Laboratory and field test results of GRAVEL, Mw, Gc

Test	Minimum measured value	Maximum measured value	Average value	Number of tests
Moisture content [%]	2,51	12,60	7,20	12
SPT [No.]	12	52	35	3
Particle size distribution [No]	-	-	-	3

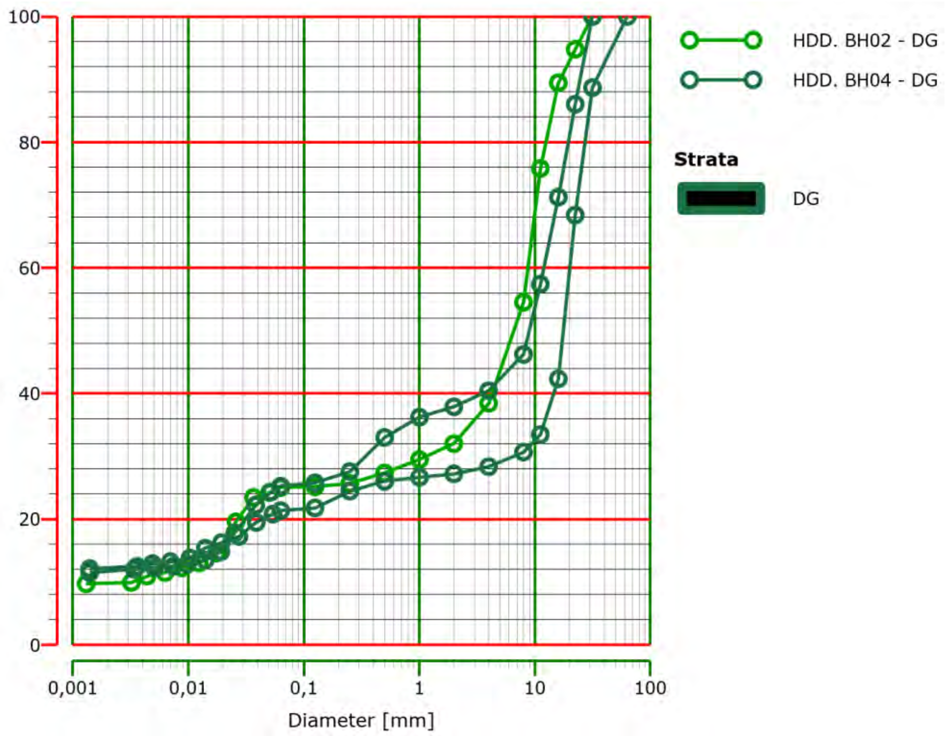


Figure 5-2: Particle size distribution of glacial meltwater gravel in borehole BH02 and BH04

5.1.1.4 SAND, Mw, Gc

In borehole BH01 and BH02, glacial meltwater sand has been observed in the deeper layers as fine – coarse, slightly gravelly, slightly silty, grey, and calcareous. In borehole BH03, BH04 and BH05, glacial meltwater sand has been observed in the upper layers close to the surface, as well as the deeper layers, as fine – medium, sorted, poorly graded, well graded, slightly silty, slightly clayey, dark yellowish brown, brownish grey, calcareous, and slightly calcareous. Laboratory and field tests have been performed in the glacial meltwater sand layers and below are the results summarized and depicted as a range and average in Table 5-5. To be noted, 5 shear vane tests has been performed in layers of glacial meltwater sand. Due to shear vane testing in frictional material, the results are not included to determine the strength or deformation of glacial meltwater sand.

Table 5-5: Laboratory and field test results of SAND, Mw, Gc

Test	Minimum measured value	Maximum measured value	Average value	Number of tests
Moisture content [%]	0	21,63	9,33	191
N_{SPT} [No.]	6	100	39	75
Shear Vane [kPa]	-	-	-	5
Particle size distribution [No]	-	-	-	23

Due to the relatively large number of performed SPT tests in glacial meltwater sand, a statistical approach is used to analyze the plane friction angle, whereby the N_{SPT} values from field tests in borehole BH01-BH05 are derived into plane friction angles in accordance with DS415 and DS/EN [3]. The friction angles represent a conservative estimate of the mean (which is hereafter referred to as the lower average), which represents the average of the values that fall within a 95% confidence interval.

The data population for glacial meltwater sand, can best be approximated by a log-normal distribution. To calculate a conservative estimate of the lower average value, a log-normal distribution is used.

As presented in Figure 5-3, the lower average value of the plane friction angle of glacial meltwater sand is derived to be φ_{pl} = 39°.

To be noted, the glacial meltwater sand layers have generally been observed with no significant quantities of silt. Therefore, in accordance with DS415 and DS/EN, no deduction of the derived plane friction angle of glacial meltwater sand has been done.

Figure 5-4 presents an overview of the particle size distribution based on 23 tests from glacial meltwater sand layers in borehole BH01-BH05. As presented, BH01-BH05 has silt in its glacial meltwater sand deposits.

To examine the possible relation between depth and silt content in the layers of glacial meltwater sand, the data has been processed whereas particles from the 23 tests passing through 0,063 mm sieve are defined as silt (or clay).

Figure 5-5 presents an overview of the relation between depth and silt content of glacial meltwater sand in borehole BH01-BH05. As presented, the majority of the tests show a small content of silt, whereas no relative relation between depth and silt content were found. However, it should be noted that large amounts of silt were found in borehole BH04, as presented in Figure 5-5. Thus, in accordance with DS415 and DS/EN, it should be considered to deduct the derived plane friction angle in glacial meltwater sand according to the design purpose.

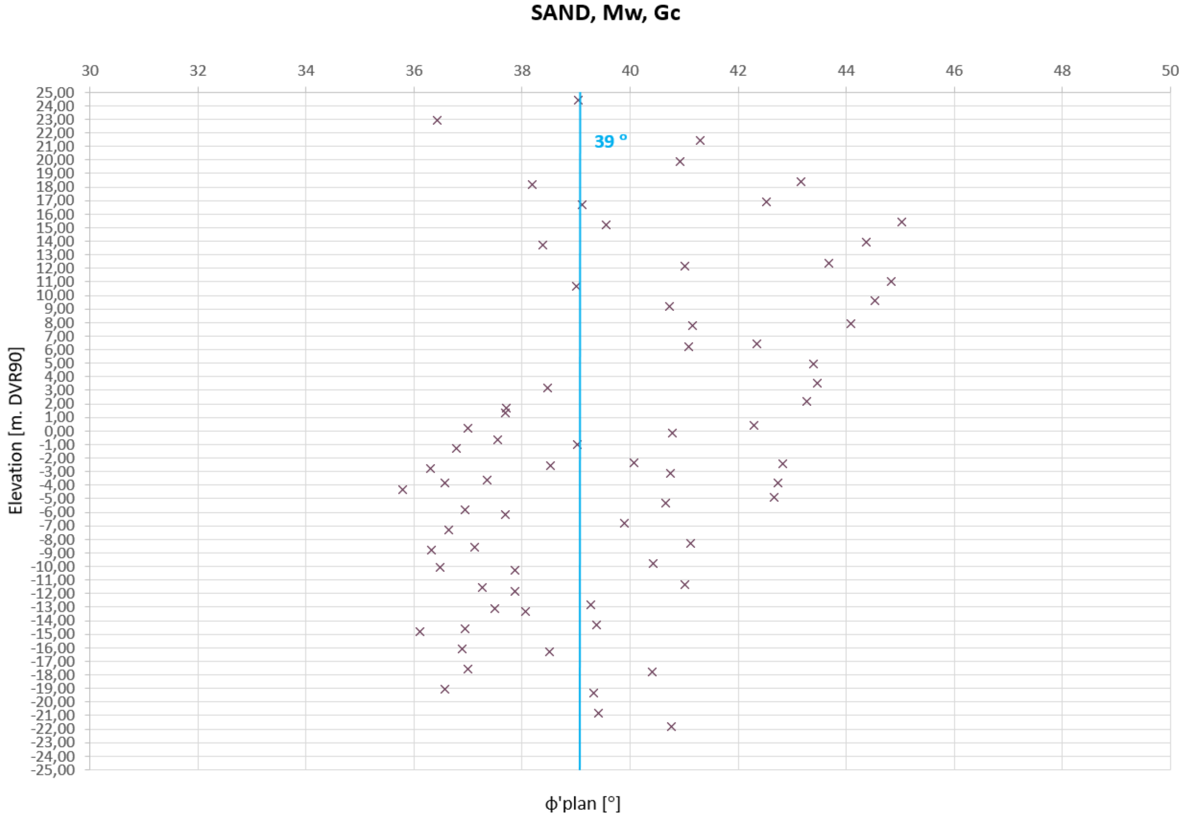


Figure 5-3: The lower average value of the plane friction angle of glacial meltwater sand

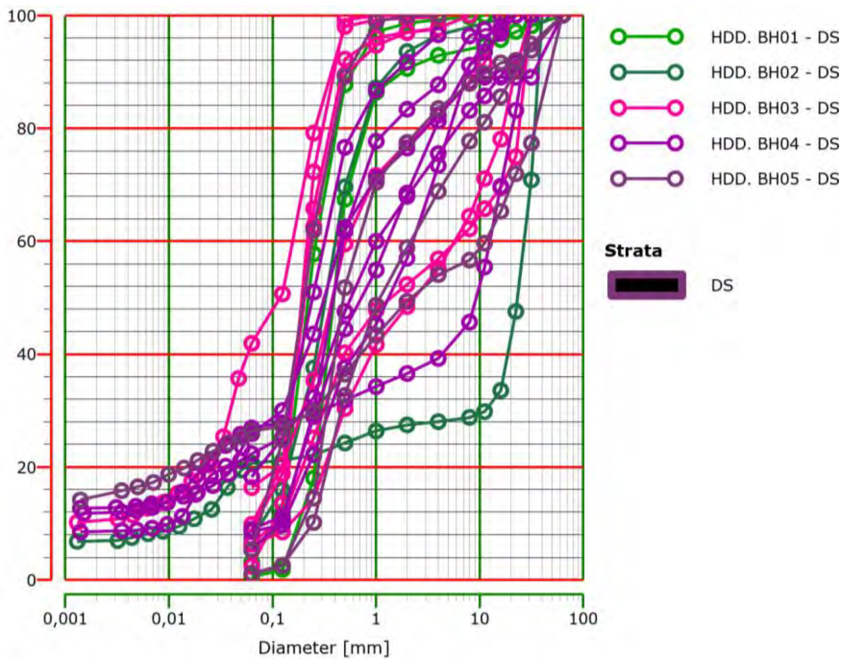


Figure 5-4: Particle size distribution of glacial meltwater sand in borehole BH01-BH05

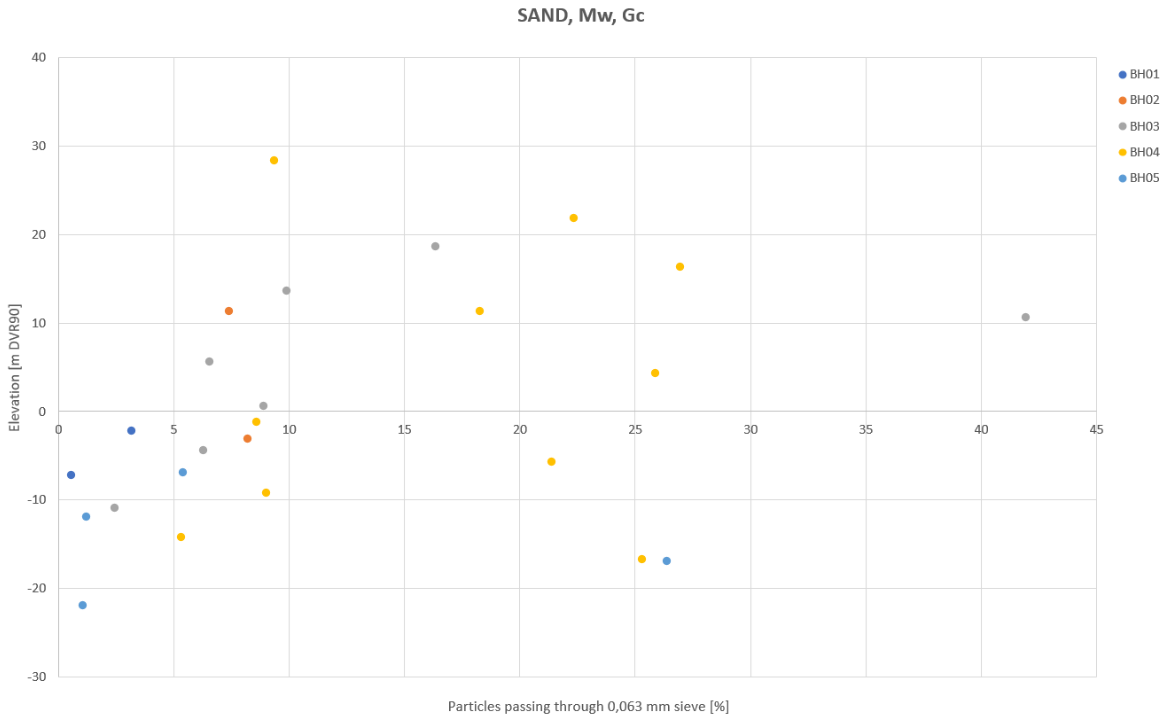


Figure 5-5: Particle size distribution of particles passing through 0,063 mm sieve of glacial meltwater sand in borehole BH01-BH05

5.1.1.5 GRAVEL TILL, Gl, Gc

In borehole, BH02, glacial gravel till has been observed in the upper layer as well as the deeper layer as sandy, silty, grayish brown and calcareous. Laboratory and field tests have been performed in the glacial gravel till, layers and below are the results summarized and depicted as a range and average in Table 5-6. Figure 5-6 presents an overview of the particle size distribution based on 1 test from glacial gravel till in borehole BH02.

Table 5-6: Laboratory and field test results of GRAVEL TILL, Gl, Gc

Test	Minimum measured value	Maximum measured value	Average value	Number of tests
Moisture content [%]	5,74	17,64	10,16	11
SPT [No.]	27	100	62	4
Particle size distribution [No]	-	-	-	1

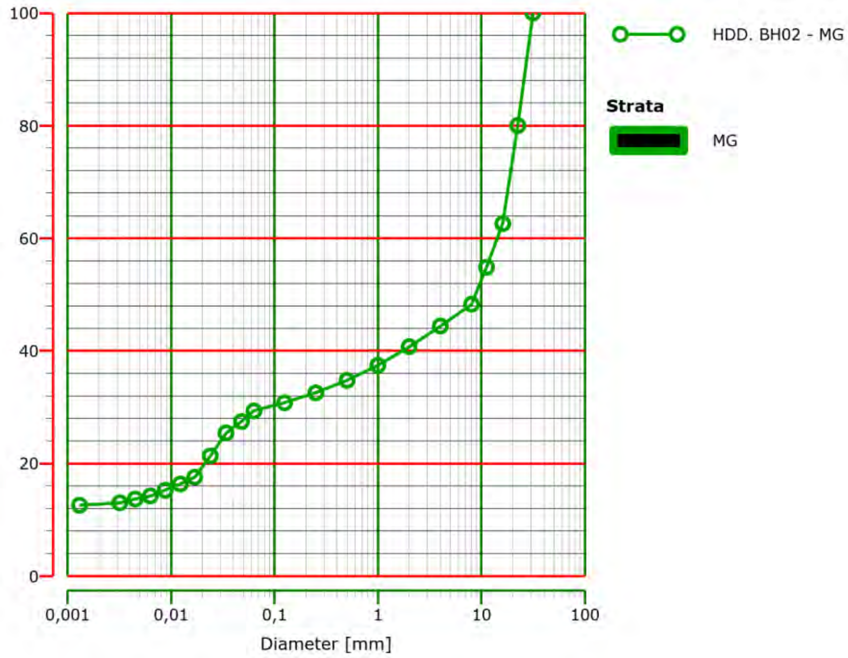


Figure 5-6: Particle size distribution of glacial gravel till in borehole BH02

5.1.1.6 SAND TILL, Gl, Gc

In borehole BH01 and BH02, glacial sand till has been observed in the upper layers as well as the deeper layers as silty, gravelly, slightly clayey light yellowish brown, olive grey, not calcareous in the upper layers, however calcareous in the deeper layers. Laboratory and field tests have been performed in the glacial sand till layers and below are the results summarized and depicted as a range and average in Table 5-7.

Table 5-7: Laboratory and field test results of SAND TILL, Gl, Gc

Test	Minimum measured value	Maximum measured value	Average value	Number of tests
Moisture content [%]	2,11	17,64	7,22	57
SPT [No.]	37	100	62	14
Particle size distribution [No]	-	-	-	3

Due to the relatively large number of performed SPT tests in glacial sand till, a statistical approach is used to analyze the plane friction angle, whereby the N_{SPT} values from field tests in borehole BH01-BH05 are derived into plane friction angles in accordance with DS415 and DS/EN [3]. The friction angles represent a conservative estimate of the mean (which is hereafter referred to as the lower average), which represents the average of the values that fall within a 95% confidence interval.

The data population for glacial sand till can best be approximated by a log-normal distribution. To calculate a conservative estimate of the lower average value, a log-normal distribution is used.

To be noted, glacial sand till, layers have been observed with smaller quantities of silt, and therefore it is assumed that the glacial sand till contains approximately 10% silt. Thus, in accordance with DS415 and DS/EN, 2 degrees is deducted from the derived plane friction angle of glacial sand till.

As presented in Figure 5-7, the lower average value of the plane friction angle of glacial sand till, is found to be φ_{pl} = 40°.

Figure 5-8 presents an overview of the particle size distribution based on 3 tests from glacial sand till in borehole BH01 and BH02.

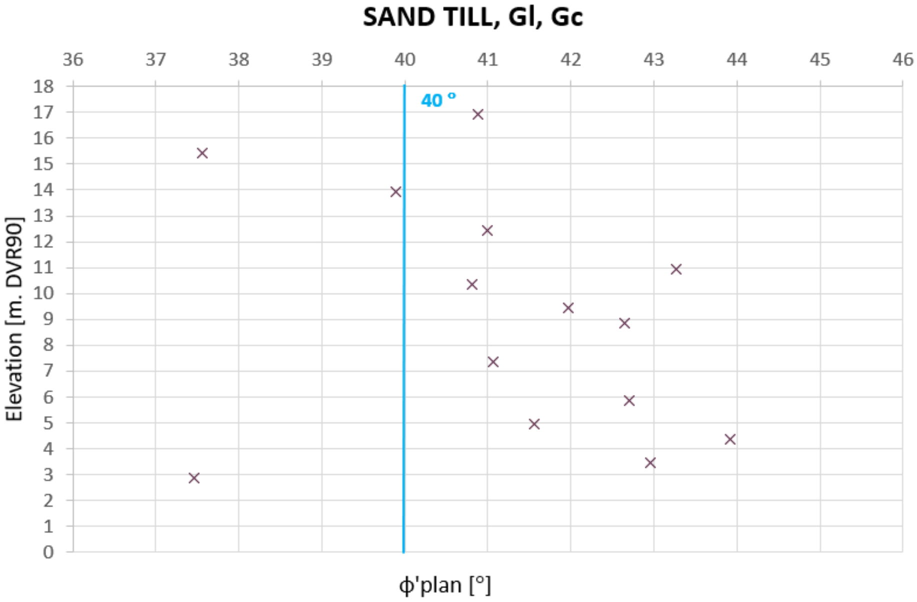


Figure 5-7: The lower average value of the plane friction angle of glacial sand till

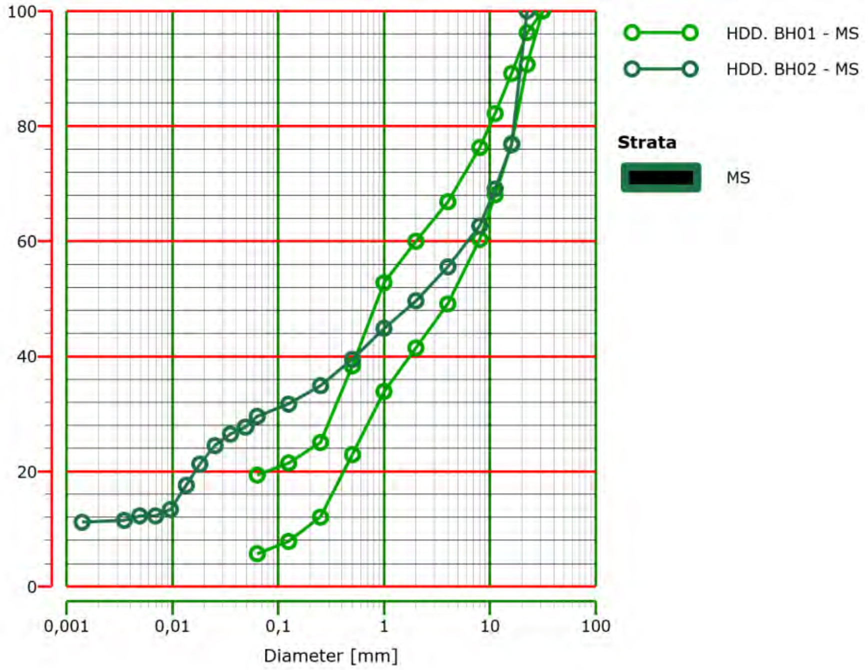


Figure 5-8: Particle size distribution of glacial sand till in borehole BH01 and BH02

5.1.1.7 CLAY TILL, Gl, Gc

In borehole BH01, BH02 and BH03 glacial clay till has been observed in the upper layers as silty, very sandy, gravelly, with sand layers, grayish brown, not calcareous in the upper layers, however calcareous in the deeper layers. Laboratory and field tests have been performed in the glacial clay till, layers and below are the results summarized and depicted as a range and average in Table 5-8.

Table 5-8: Laboratory and field test results of CLAY TILL, Gl, Gc

Test	Minimum measured value	Maximum measured value	Average value	Number of tests
Moisture content [%]	11,01	21,95	13,66	9
SPT [No.]	48	48	48	1
Shear Vane [kPa]	72	702	392	5
Particle size distribution [No]	-	-	-	0

Due to the relatively low number of performed shear vane tests, the strength- and deformation parameters in glacial clay till, must be determined on the basis of empirical knowledge and reference values.

To be noted, the five shear vane tests performed in glacial clay till, have been observed with a generous amount of sand in its deposit which can have an influence the shear vane test results.

The undrained shear strength is determined to match the average strength value, c_u = 392 kPa.

The effective cohesion, c', is determined by the following expression: $c' = \frac{c_u}{10}$, whereas c' is limited to a maximum strength of 20 kPa. Hereby the effective cohesion, c' = 20 kPa.

The consolidation module is determined by the following expression that is based on the relation between the undrained shear strength, c_u, and the water content: $K = \frac{40}{w} \cdot c_u$. Hereby the consolidation module, K = 115 MPa.

5.1.1.8 Summary

Table 5-9 below summarizes the strength- and deformations parameters in the encountered soil types in borehole BH01-05. These parameters are determined on the basis of derived field-, and laboratory tests and on the basis of empirical knowledge and reference values.

Table 5-9: Summary of strength and deformation parameters of the encountered soil types in borehole BH01-05

Soil Type		γ/γ'	φ_k[1]	$\mathbf{c'}$	c_u	K
[-]	[Env., Age]	[kN/m^3]	[°]	[kPa]	[kPa]	[MPa]
FILL	Fi, Re	17/10	37	-	-	3-10
SAND	Mw, Lg	20/10	37	0	-	30
GRAVEL	Mw, Gc	21/10	37	0	-	40
SAND	Mw, Gc	20/10	39	0	-	40
GRAVEL TILL	Gl, Gc	21/10	38	0	-	40
SAND TILL	Gl, Gc	21/10	40	0	-	40
CLAY TILL	Gl, Gc	21/10	30	20	392	115

1) In friction material the friction angle is plane, and I cohesive material the friction angle is triaxle

6. GEOPHYSICAL INVESTIGATIONS – MEP

The survey lines are called GIL-WEST and GIL-EAST are presented in Figure 6-1 below. Furthermore, details about the geophysical investigation and its survey lines are presented in Table 6-1.

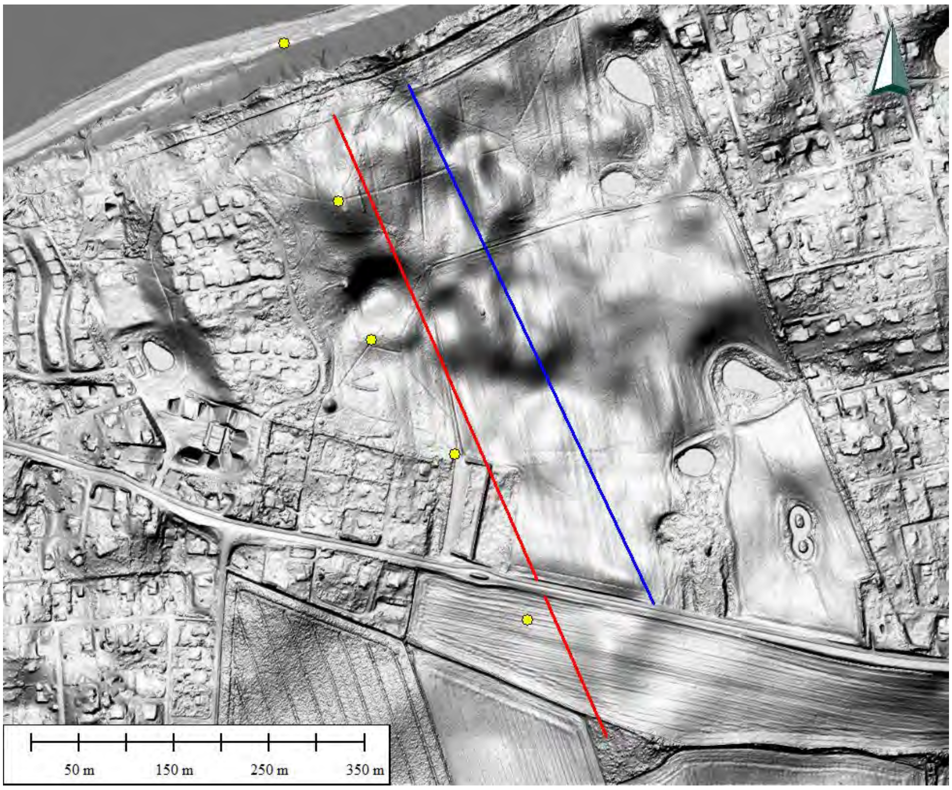


Figure 6-1. Overview of the survey site at Gilbjerghoved. Survey lines are presented in red (GIL-WEST) and blue (GIL-EAST). Boreholes are presented in yellow.

Table 6-1: Details of the geotechnical investigations and its survey lines

Survey Line	Colour	Surface Distance	Acquisition date	X	Y
[-]	[-]	[m]	[YYYYMMDD]	[UTM32 ETRS89]	[UTM32 ETRS89]
GIL-WEST_N	Red	530	2022-04-12	North 703228.478	North 6224903.984
				South 703440.338	South 6224419.421
GIL-WEST_S	Red	160	2022-04-12	North 703448.694	North 6224401.101
				South 703513.215	South 6224254.842

GIL-EAST	Blue	600	2022-04-11	North 703306.329	North 6224936.127
				South 703562.323	South 6224394.279

The MEP data has been processed in the software RES2DINV and Aarhus Workbench. The resistivity measurements have been cleaned for unusually low and high resistivities and afterwards inverted with topography included. The topography has been extracted from the Danish Digital Terrain Model (0,4 m grid) from SDFE. During the data processing both single- and multi-layered 1D interpretations are made as well as 2D interpretations.

The results from the geoelectrical mapping have been correlated with the boreholes extracted from GeoGIS to investigate the soil condition between the boreholes. In the technical drawings the boreholes are orthogonally placed on the profiles labeled with an offset distance.

The MEP profiles are shown in colours representing resistivities in ohm.m according to the logarithmic colour scale presented in Figure 6-2 below.

The MEP Profiles are presented in Figure 6-3 and Figure 6-4 and in Appendix 2.1 and Appendix 2.2 and are oriented north to south.

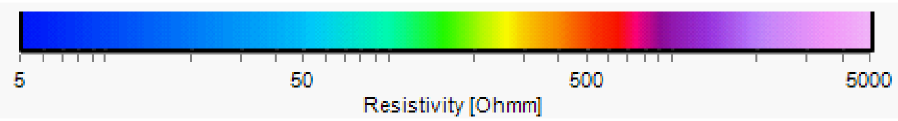


Figure 6-2. Logarithmic colour scale representing resistivities in ohm.m.

GIL-WEST

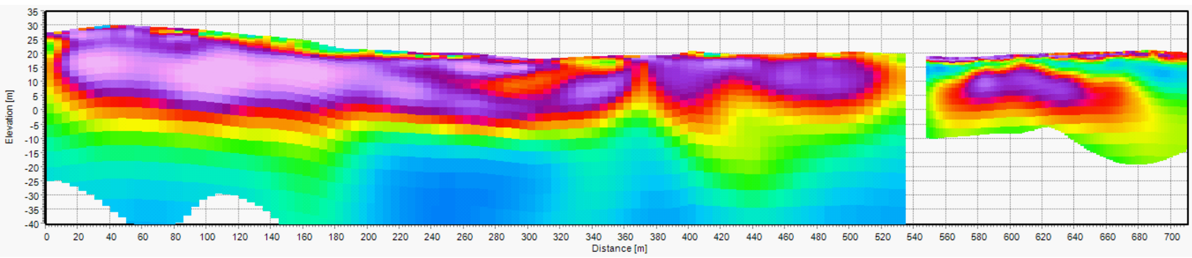


Figure 6-3. MEP profile GIL-WEST oriented north to south.

The profile is divided at the road crossing at 540 meters along the profile. The electrode spacing is 5 m north of the road and 2 m spacing south of the road. The difference is evident with a shallower penetration but with a higher resolution when 2 m spacing is used.

The sharp transition from high resistivities to low resistivities are related to the water table, thus it marks the boundary between unsatured and saturated sediments. The very low resistivities (dark blue) will normally be associated with clays, however this cannot be confirmed from the boreholes. It would not be surprising to find clays at the deepest part of the profile (-40 m), however it has not been interpreted.

According to the LER-database the profile is crossing a cable at approximately 370 meters along the profile. Undulating resistivity data correlate with position of 3rd party power cable.

From the boreholes the geology is mainly composed of sand and gravel throughout the profile but with mixed-in clay particles in the southern part. The resistivities are correlating with the lab-interpreted geology, however a distinction between sand a gravel with or without mixed-in clay particles cannot be made from the resistivities.

North of Tinkerup Strandvej there are areas with clay till as seen in the low resistivities (greenish blue). This correlates with the boreholes. South of Tinkerup Strandvej the profile is situated in an agricultural field. The upper high resistivities are related to the agricultural soil. Below is a layer of clay till varying in thickness from approximately 1-10 m.

GIL-EAST

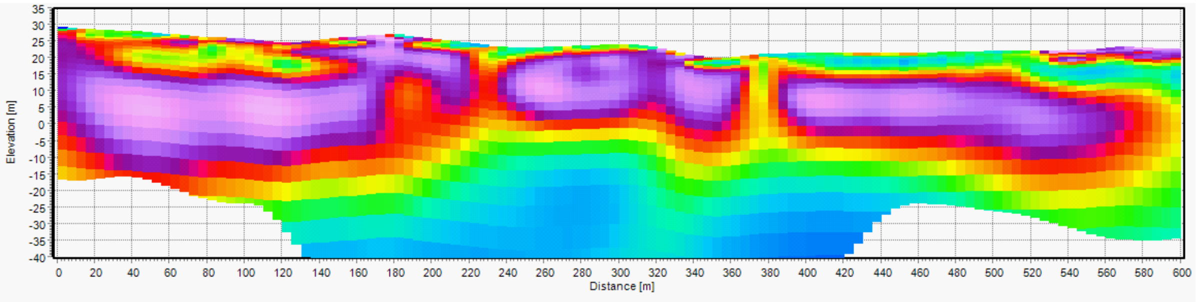


Figure 6-4. MEP profile GIL-EAST oriented north to south.

The profile is only acquired north of the road with an electrode spacing of 5 m.

The same sharp transition from high resistivities to low resistivities is present marking the boundary between unsaturated and saturated sediments. There are also very low resistivities in the deepest part of the profile normally associated with clays, however, as with the previous profile, it has not been interpreted as it could not be confirmed from the boreholes.

In the northern part of the profile there are areas of clay till as seen in the low resistivities (greenish blue). In the southern part of the profile a layer of clay till is interpreted with low resistivities and sharp boundaries to the unsaturated sediment below. In the southernmost part of the profile an unsaturated sediment is interpreted with high resistivities overlying the interpreted clay till.

The boreholes are further away and correlation becomes more uncertain with distance, however the resistivities correlate well with the lab-interpreted geology and there is a high correlation between the two profiles. It is however evident that the eastern profile has lower resistivities in the upper part which indicate a greater presence of clay till. This correlates well with the geological map (jordartskort 1:25000) from GEUS as presented in Figure 2-4. The brown colour is glacial clay till and the purple colour is glacial meltwater sand and gravel.

According to the LER-database the profile is crossing a cable at approximately 380 meters along the profile. Undulating resistivity data correlate with position of 3rd party power cable.

7. RISK ASSESMENT

The scope of this section is to establish a risk profile for the horizontal directional drillings. The purpose is to identify risks towards the contractor's successful completion of the project on time. Focus is on soil related risks.

Risks have been identified and evaluated in advance by geotechnical engineers as well as geologists and discussed and clarified in a workshop with Energinet. Although all efforts have been made to identify all relevant risk and evaluate them, no guarantees are given that all risk scenarios are covered and that risks are correctly assessed.

Risks are evaluated on the impact they will have on the project objective - time. The probability of occurrence is evaluated on a six-point scale ranging from Theoretical (<1%) to Often (>50%). Consequence on time is also evaluated on a six-point scale calibrated to a project with a relatively short duration, see Figure 7-1.

	Very low	Low	Moderate	High	Very high	Cata-strophic
Time	<1 day	1-7 days	7-14 days	14-30 days	1-3 months	>3 months

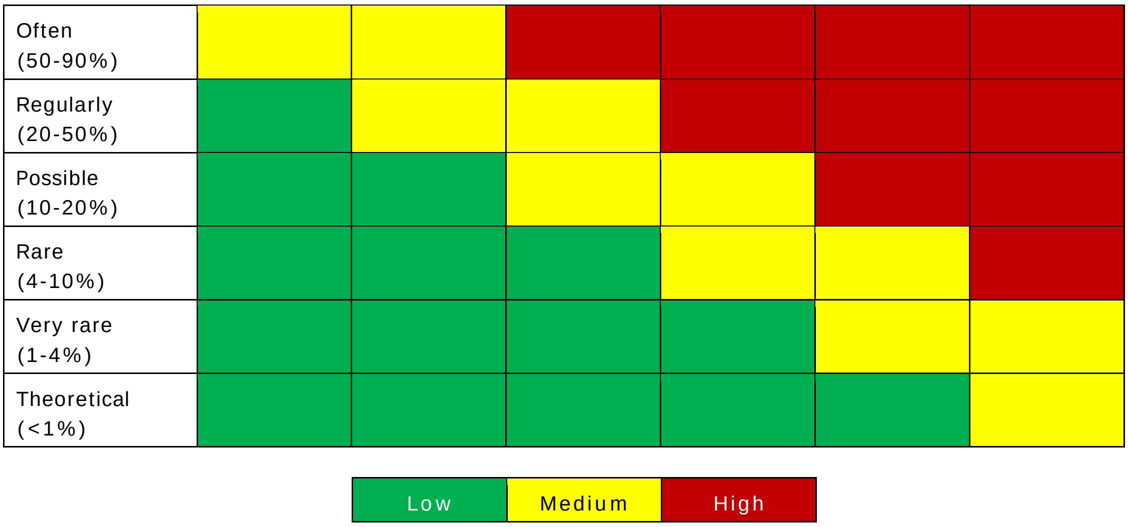


Figure 7-1. Risk matrices for evaluating impact on project time.

In Figure 7-2, the results are plotted in the risk matrix above.

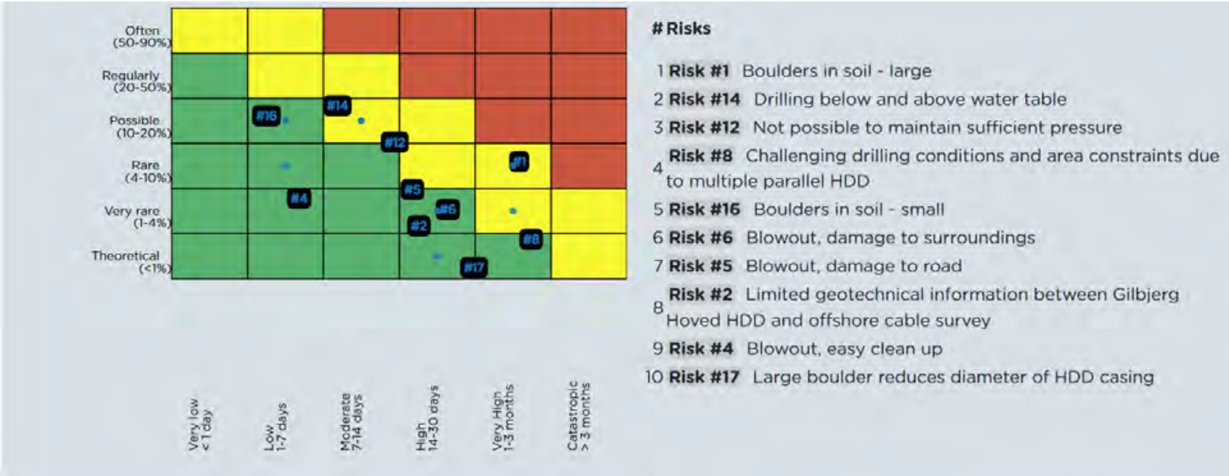
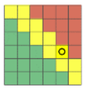
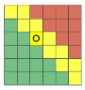
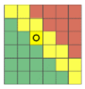
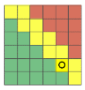
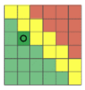
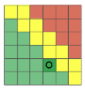
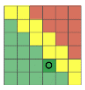
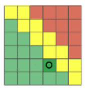
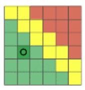
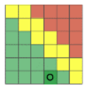
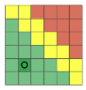
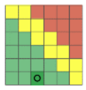
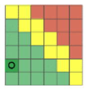


Figure 7-2. Risks plotted in risk matrix.

Below is an overview of the identified risks and the risk level. The risks are ranked with the highest risk first.

In Appendix 7.1 the risks, the effects and possible mitigation measures are described in more details.

No.	Description	Risk level
1	Boulders in soil - large	
12	Not possible to maintain sufficient pressure	
14	Drilling below and above water table	
8	Challenging drilling conditions and area constraints due to multiple parallel HDD	
16	Boulders in soil - small	
2	Limited geotechnical information between Gilbjerg Hoved HDD and offshore cable survey	
5	Blowout, damage to road	
6	Blowout, damage to surroundings	
4	Blowout, easy clean up	

17	Large boulder reduces diameter of HDD casing	
11	Risk of friction during drilling	
15	Crossing of high voltage cable.	
10	Interference with roots	

8. REFERENCES

[1] Danish Geotechnical Society Bulletin 1, revision 2, A guide to engineering geological description. 2021.

[2] DS/EN 1997-1 DK NA:2021, Eurocode 7: Geotechnical design, Part 1.

[3] Fundering, Dansk Standard, DS415, 3. Edition. 1984.

[4] Geologi og Landskaber i Nationalpark Kongernes Nordsjælland, M. Houmark-Nielsen. 2019.

[5] DS/EN 1997-2 DK NA:2013, Eurocode 7: Geotechnical design, Part 2.

APPENDIX 1.1 – LEGEND AND DEFINITIONS

Test Results

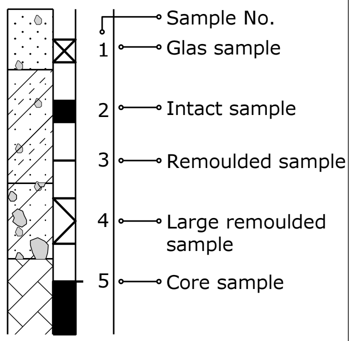
Geology

- FILL
- MULL
- MULL, sandy
- SAND, org. content
- SAND, lumps of organic material
- STONE
- GRAVEL
- SAND
- SILT
- CLAY
- SAND TILL
- SILT TILL
- CLAY TILL
- LIMESTONE (CHALK)
- ROCK
- GYTTJA
- SHELLS
- PEAT
- PEATY MUD
- PLANT REMNANTS

Plan

- LB 10
- Pumping well
- Monitoring well
- Simple borehole
- Borehole with sampling
- Geotech. borehole incl. insitu tests
- Penetration tests

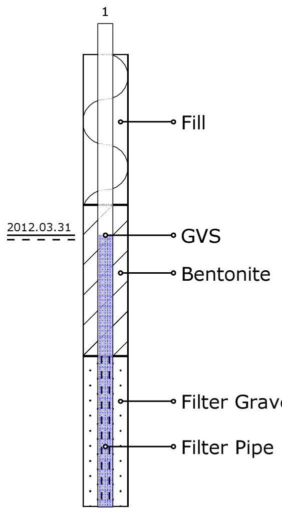
Borehole Log



Geological Abbreviations

Environment		Age	
Br	Brackish Water	Pg	Post Glacial
Fw	Freshwater	Lg	Late Glacial
Ss	Solifluction Soil	Al	Allerød
Gl	Gletscher	Gc	Glacial
Ma	Marine	Ig	Interglacial
Wd	Wash Down	Is	Interstadial
Ts	Top Soil	Pl	Pliocene
Ls	Land Slide	Mi	Miocene
Mw	Meltwater	Ol	Oligocene
Ae	Aeolian	Eo	Eocene
Vu	Vulcanic	Pl	Palæocene
		Se	Selandien
		Da	Danien
		Ct	Cretaceous
		Se	Senon

Stand Pipe



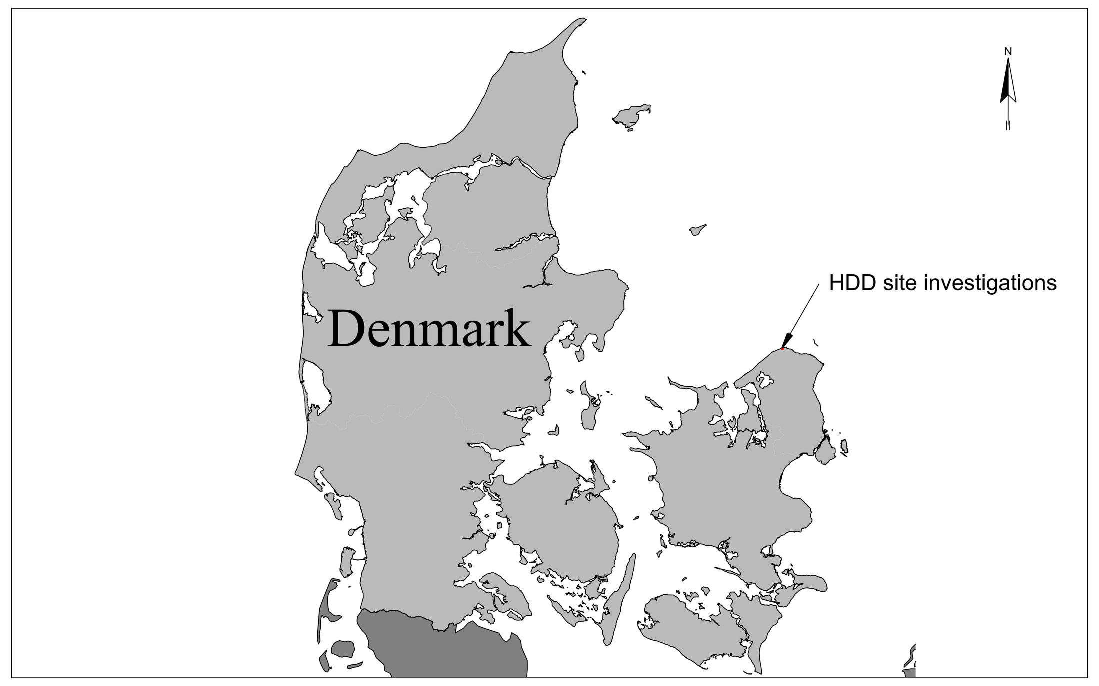
Definitions

Legend	Topic	Abbr.	Unit	Definition
○	Moisture Content	W	%	Water as % of dry weight
⊣	Liquid limit	WL	%	Water content at liquid limit
⊢	Plasticity limit	WP	%	Water content at plastic limit
⊢⊣	Plasticity index	IP	%	WL - WP
▽	Bulk Weight	g	kN/m³	Total weight of total volume
×	Loss of Ignition	gl	%	Loss of ignition as % of dry weight
×	Loss of Ignition, reduced	glr	%	gl - ka
⊕	Carbonate content	ka	%	Weight of CaCo3 as % of dry weight
-/(+)/+/++	Chalk Sample	kp	-	HCl Reaction: - not calcareous, (+) slightly calcareous, + calcareous, ++ very calcareous
++/+/(+) -/--/?/-?/+?	Frost			++ Freezing hazard under all conditions + Freezing problems, even during short periods of frost (+) Freezing problems, during long periods of frost - No Freezing problems -- Absolutly no freezing hazard ? Freezing hazard cannot be evaluated -?/+? Freezing hazard is difficult to evaluate
●	Vane shear strength, intact	cvf	kN/m²	Undrained shear strength - Vane test in intact soil
○	Vane shear strength, remoulded	cvr	kN/m²	Undrained shear strength - Vane test in remoulded soil
	Penetration Test:			
	- Weight Sounding Test	WST	N200	Number of half rotations per. 200 mm penetration
	- Light Sounding Test	LST	N200	Number of blows per 200 mm penetration
	- Light Dynamic Penetrometer	LDP	N200	Number of blows per 200 mm penetration
▼	- SPT, closed/open	SPT	N300	Number of blows per 300 mm penetration

RAMBØLL

Appendix 1.1

APPENDIX 2.1 – LOCATION MAP



Legend:

Geotechnical borehole

Resistivity line (ERT) GIL - East

Resistivity line (ERT) Gil - West

Contains data from "© Styrelsen for Dataforsyning og Infrastruktur - sdfekort.dk"

Notes:

Coordinate system: ETRS89 UTM32N, Elevation DVR90
Original sheet size: A1, 594x840

Rev.	Date	Signature	Checked	Approved
	2022-06-09	JMN	CRTA	RMH

Project no. 1100051481 Scale 1:2000

HESSELØ OFFSHORE WINDFARM
Onshore DK. HDD site investigations

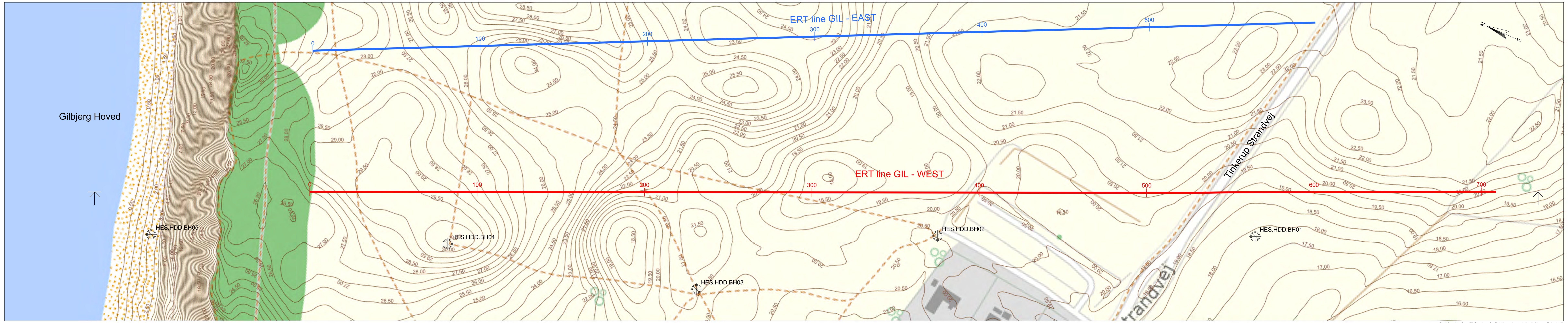
Gilbjerg Hoved
Location Map

Drawing no. 1.1 Rev. 0

RAMBOLL
Hannemanns Allé 53
DK-2300 København S
Tlf. +45 5161 1000
Fax +45 5161 1001
www.ramboll.com

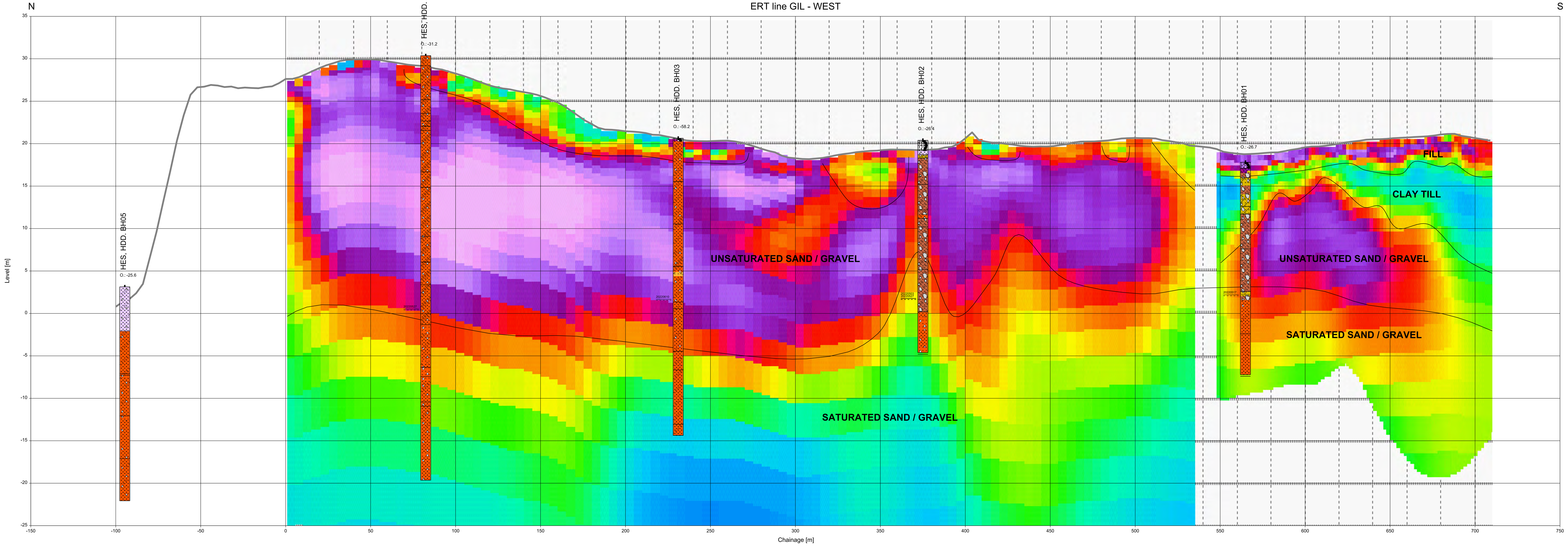
ENERGINET
www.energinet.dk

APPENDIX 3.1-3.4 – GEOTECHNICAL AND GEOPHYSICAL LONGITUDINAL PROFILES



Site plan

Scale: 1:1000



Longitudinal profile

Horz. scale: 1:1000
Vert. scale: 1:200

Legend:

- Geotechnical borehole
- Resistivity line (ERT) GIL - East
- Resistivity line (ERT) GIL - West
- Ground level (Ground level is created by topographic map, DHM/Terræn 0.5m grid. "Styrelsen for Dataforsyning og Infrastruktur - SDFI")

Resistivity [ohmm]: 5 – 50 – 500 – 5000

Clay, Silt, Sand, Gravel, Stone, Fill, Mull/topsoil, Lumps of mull, Limestone, Flint

Clay Till, Silt Till, Sand Till, Gravel Till, Rock, Peat, Gyttja, Plant remnants, Shell, Water level (20190604)

Meltwater Clay, Freshwater Sand/Gravel, Clay Till, Sand/Gravel Till, Meltwater Sand/Gravel

Coordinate system: ETRS89 UTM32N, Elevation DVR90

Format: 594x1260

Rev.	Date	Signature	Checked	Approved
	2022-06-17	JMN	CRTA	RMH

Project no. 1100051481 Scale 1:1000; 1:200

RAMBOLL
Hannemanns Allé 53
DK-2300 København S
Tlf. +45 5161 1000
Fax +45 5161 1001
www.ramboll.com

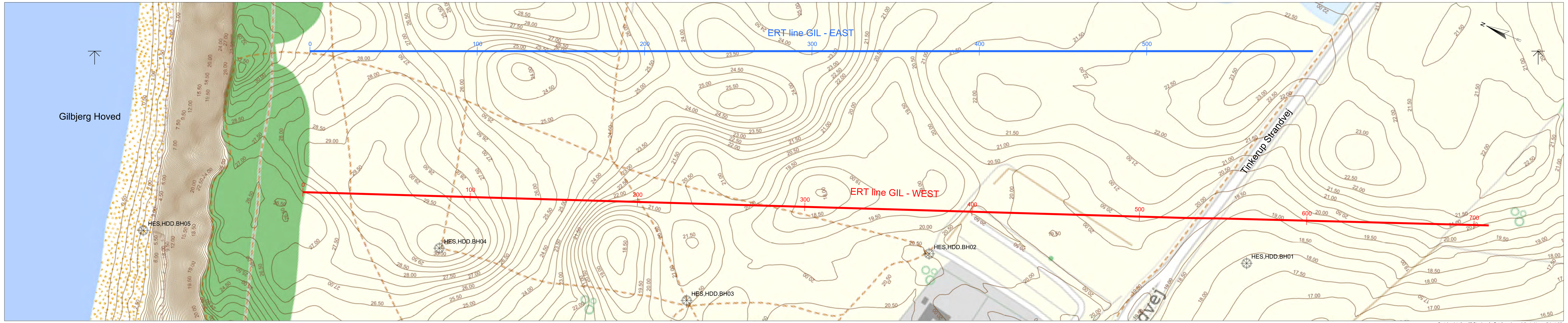
ENERGINET
www.energinet.dk

HESSELØ OFFSHORE WINDFARM
Onshore DK. HDD site investigations

Gilbjerg Hoved. HDD GIL - West. Resistivity (ERT)
Geotechnical and geophysical longitudinal profile

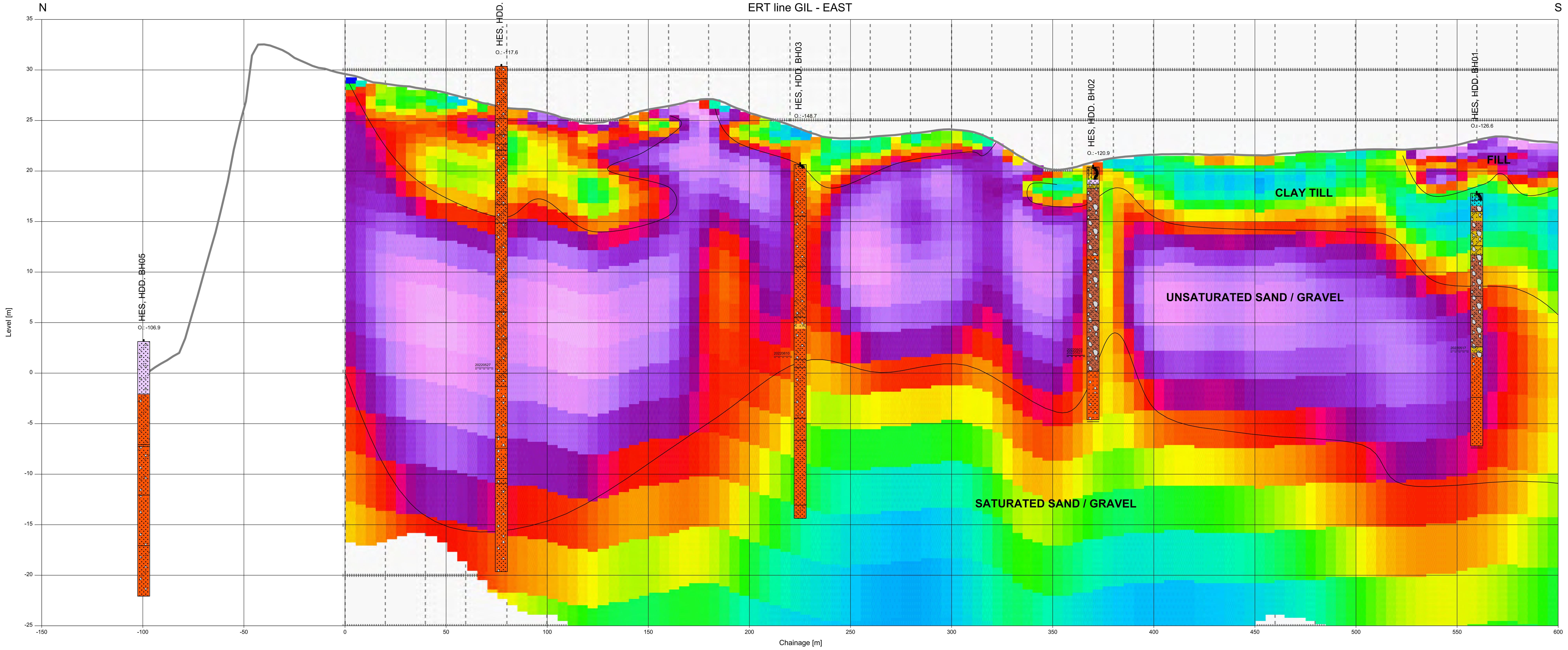
Drawing no. 2.1 Rev. 1

JMN



Site plan

Scale: 1:1000



Longitudinal profile

Horz. scale: 1:1000
Vert. scale: 1:200

Legend:

- Geotechnical borehole
- Resistivity line (ERT) GIL - East
- Resistivity line (ERT) GIL - West
- Ground level (Ground level is created by topographic map, DHM/Terræn 0.5m grid. "Styrelsen for Dataforsyning og Infrastruktur - SDFI")

Resistivity [ohmm]: 5 – 50 – 500 – 5000

Clay, Silt, Sand, Gravel, Stone, Fill, Mull/ topsoil, Lumps of mull, Limestone, Flint

Clay Till, Silt Till, Sand Till, Gravel Till, Rock, Peat, Gyttja, Plant remnants, Shell, Water level (20190604)

Meltwater Clay, Freshwater Sand/ Gravel, Clay Till, Sand/ Gravel Till, Meltwater Sand/ Gravel

Coordinate system: ETRS89 UTM32N, Elevation DVR90

Format: 594x1260

Rev.	Date	Signature	Checked	Approved
	2022-06-17	JMN	CRTA	RMH

Project no. 1100051481 Scale 1:1000; 1:200

HESSELØ OFFSHORE WINDFARM
Onshore DK. HDD site investigations

Gilbjerg Hoved. HDD GIL - East. Resistivity (ERT)
Geotechnical and geophysical longitudinal profile

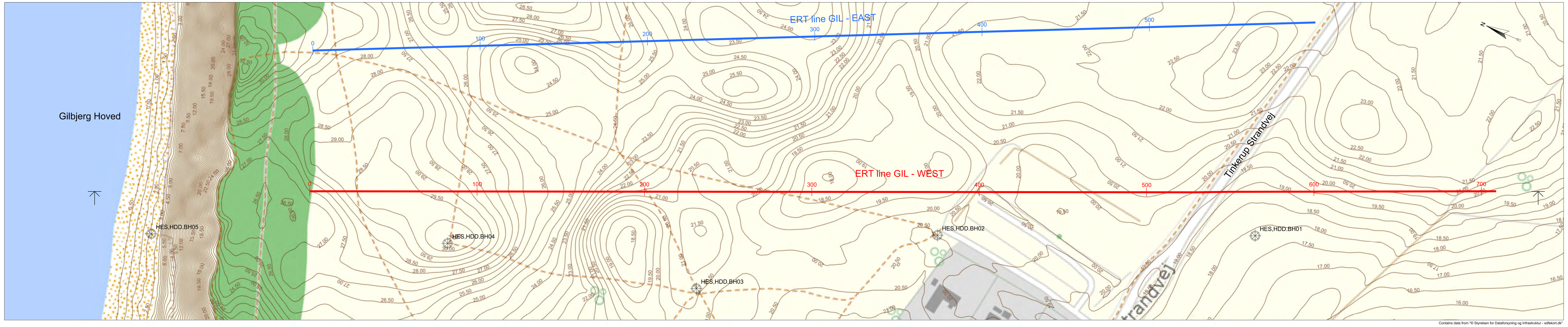
RAMBOLL
Hannemanns Allé 53
DK-2300 København S
Tlf. +45 5161 1000
Fax +45 5161 1001
www.ramboll.com

ENERGINET
www.energinet.dk

Drawing no. 2.2 Rev. 1

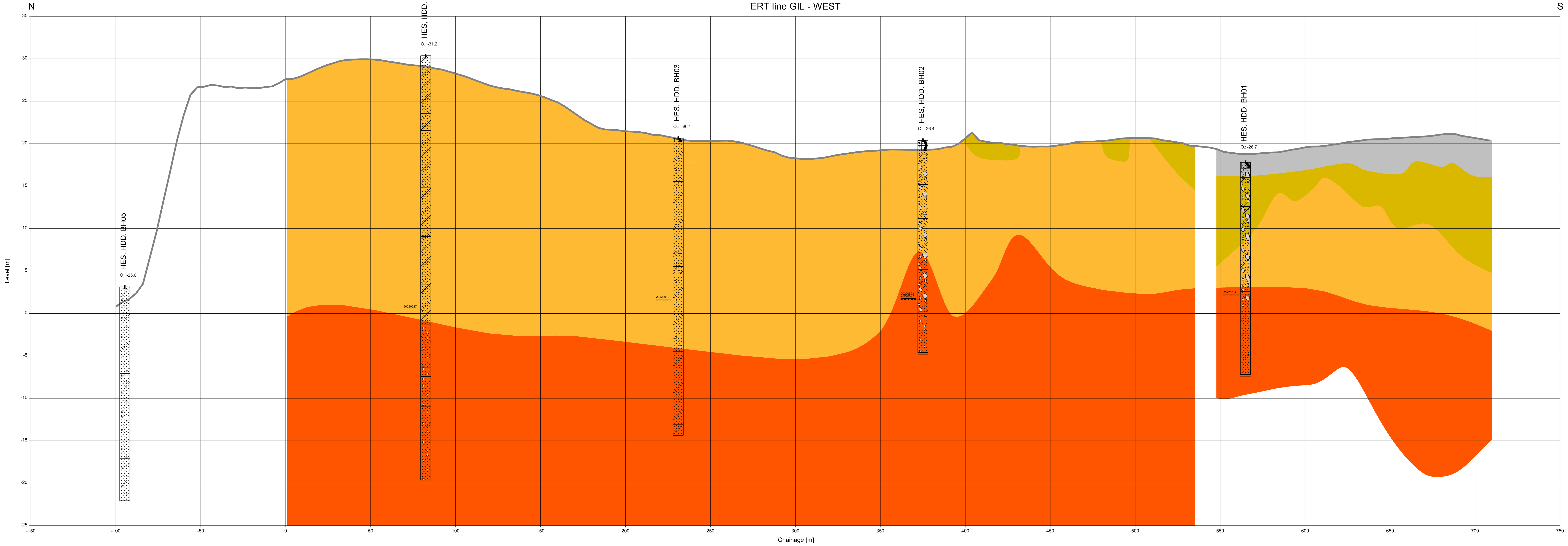
JMN

17-JUN-2022 14:48 P:\geo\2022\1100051481_HDD_Hesselø_Gilbjerg_Hoved\Drawing\2_2_HDD_East_ERT.dgn



Site plan

Scale: 1:1000



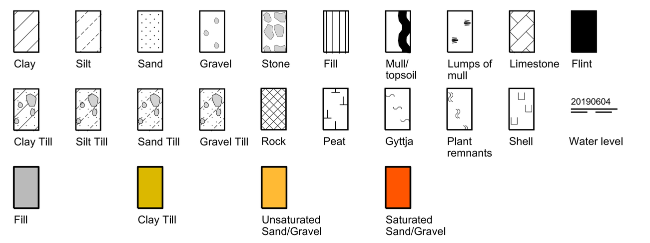
Longitudinal profile

Horz. scale: 1:1000
Vert. scale: 1:200

Contains data from "© Styrelsen for Dataforsyning og Infrastruktur - sdfekort.dk"

Legend:

- Geotechnical borehole
- Resistivity line (ERT) GIL - East
- Resistivity line (ERT) GIL - West
- Ground level (Ground level is created by topographic map, DHM/Terræn 0.5m grid. "Styrelsen for Dataforsyning og Infrastruktur - SDFI")



Coordinate system: ETRS89 UTM32N, Elevation DVR90

Format: 594x1260

Rev.	Date	Signature	Checked	Approved
	2022-07-06	JMN	MSHE	RMH

Project no. 1100051481 Scale 1:1000; 1:200

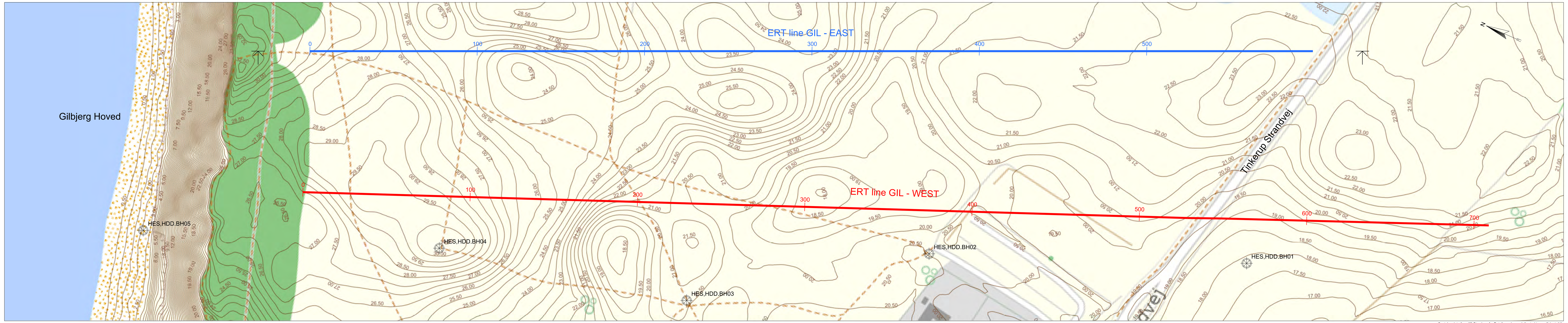
HESSELØ OFFSHORE WINDFARM
Onshore DK. HDD site investigations

Gilbjerg Hoved. HDD GIL - West.
Geotechnical and geophysical longitudinal profile

RAMBOLL
Hannemanns Allé 53
DK-2300 København S
Tlf. +45 5161 1000
Fax +45 5161 1001
www.ramboll.com
ENERGINET
www.energinet.dk

Drawing no. 3.1 Rev. 0

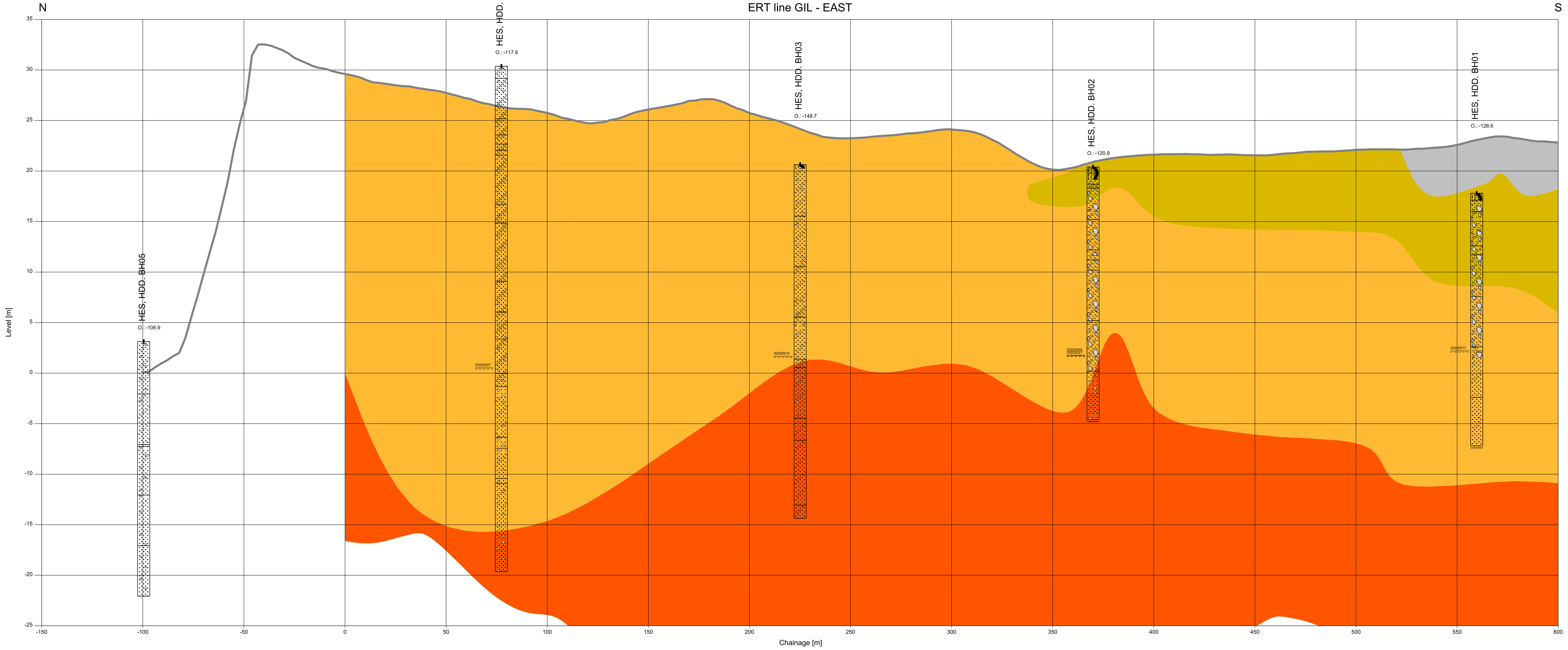
JMN



Contains data from "© Styrelsen for Dataforsyning og Infrastruktur - sdfekort.dk"

Site plan

Scale: 1:1000

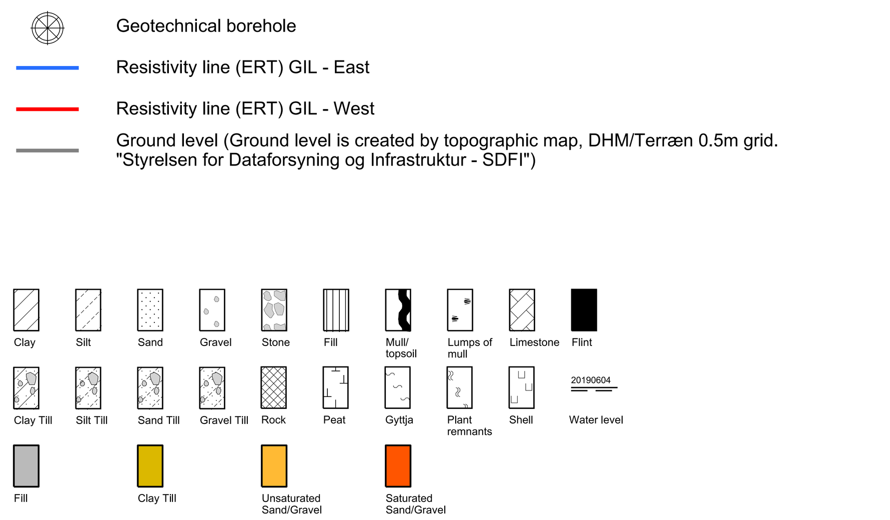


Longitudinal profile

Horz. scale: 1:1000
Vert. scale: 1:200

Contains data from "© Styrelsen for Dataforsyning og Infrastruktur - sdfekort.dk"

Legend:



Coordinate system: ETRS89 UTM32N, Elevation DVR90

Format: 594x1260

Rev.	Date	Signature	Checked	Approved
	2022-07-06	JMN	MSHE	RMH

Project no. 1100051481 Scale 1:1000; 1:200

HESSELØ OFFSHORE WINDFARM
Onshore DK. HDD site investigations

Gilbjerg Hoved. HDD GIL - East.
Geotechnical and geophysical longitudinal profile

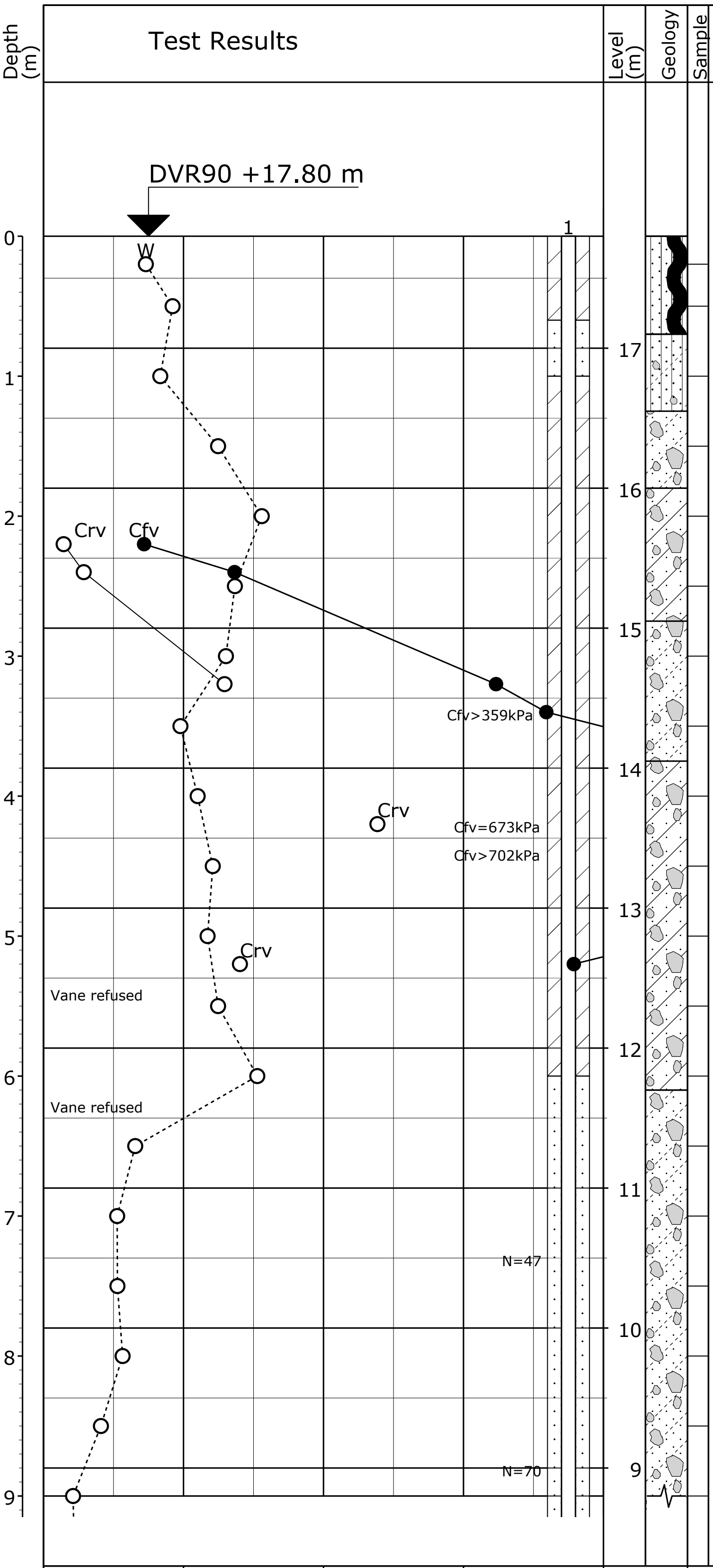
RAMBOLL
Hannemanns Allé 53
DK-2300 København S
Tlf. +45 5161 1000
Fax +45 5161 1001
www.ramboll.com

ENERGINET
www.energinet.dk

Drawing no. 3.2 Rev. 0

JMN

APPENDIX 4.1-4.5 – BOREHOLE LOGS



Sample No.	Geological Description	Env.	Age
1	FILL, TOP SOIL: SAND, dark brown, not calcareous	Fi	Re
2	FILL - " -	Fi	Re
3	FILL: SAND, medium, poorly graded, slightly silty, slightly gravelly, dark yellowish brown, not calcareous	Fi	Re
4	SAND TILL, slightly clayey, silty, gravelly, dark yellowish brown, not calcareous	Gl	Gc
5	CLAY TILL, silty, sandy, gravelly, olive brown, not calcareous	Gl	Gc
6	CLAY TILL, silty, very sandy, gravelly, grayish brown, not calcareous	Gl	Gc
7	SAND TILL, very clayey, silty, gravelly, grayish brown, not calcareous	Gl	Gc
8	SAND TILL - " -	Gl	Gc
9	CLAY TILL, silty, very sandy, gravelly, grayish brown, calcareous	Gl	Gc
10	CLAY TILL - " -	Gl	Gc
11	CLAY TILL - " - Large sample bag	Gl	Gc
12	CLAY TILL, silty, very sandy, gravelly, grayish brown, calcareous	Gl	Gc
13	CLAY TILL, silty, with sand layers, very sandy, gravelly, grayish brown, calcareous	Gl	Gc
14	SAND TILL, silty, gravelly, brownish grey, calcareous	Gl	Gc
15	SAND TILL - " -	Gl	Gc
16	SAND TILL, silty, gravelly, grayish brown, calcareous	Gl	Gc
17	SAND TILL - " -	Gl	Gc
18	SAND TILL - " -	Gl	Gc
19	SAND TILL, silty, gravelly, olive gray, calcareous	Gl	Gc

Continue

Symbol				
○	10	20	30	W (%)
○ ●	100	200	300	Crv,Cfv (kPa)
▼	10	20	30	N (Blows/30 cm)

Glacial deposits may contain cobbles and boulders

Stand Pipe: 1: ø25 - Top Level: 17.80 m

Method: Cased Shell & Auger 6'
Projection: UTM32E89
X: 703431 (m) Y: 6224376 (m) Plan: 2.101

Project: 1100051481 Gilbjerg Hoved, HDD

Drilled by: PAA RJ/PB Date: 2022.05.17 Geologist: LSCH Public No.: Borehole: HDD. BH01

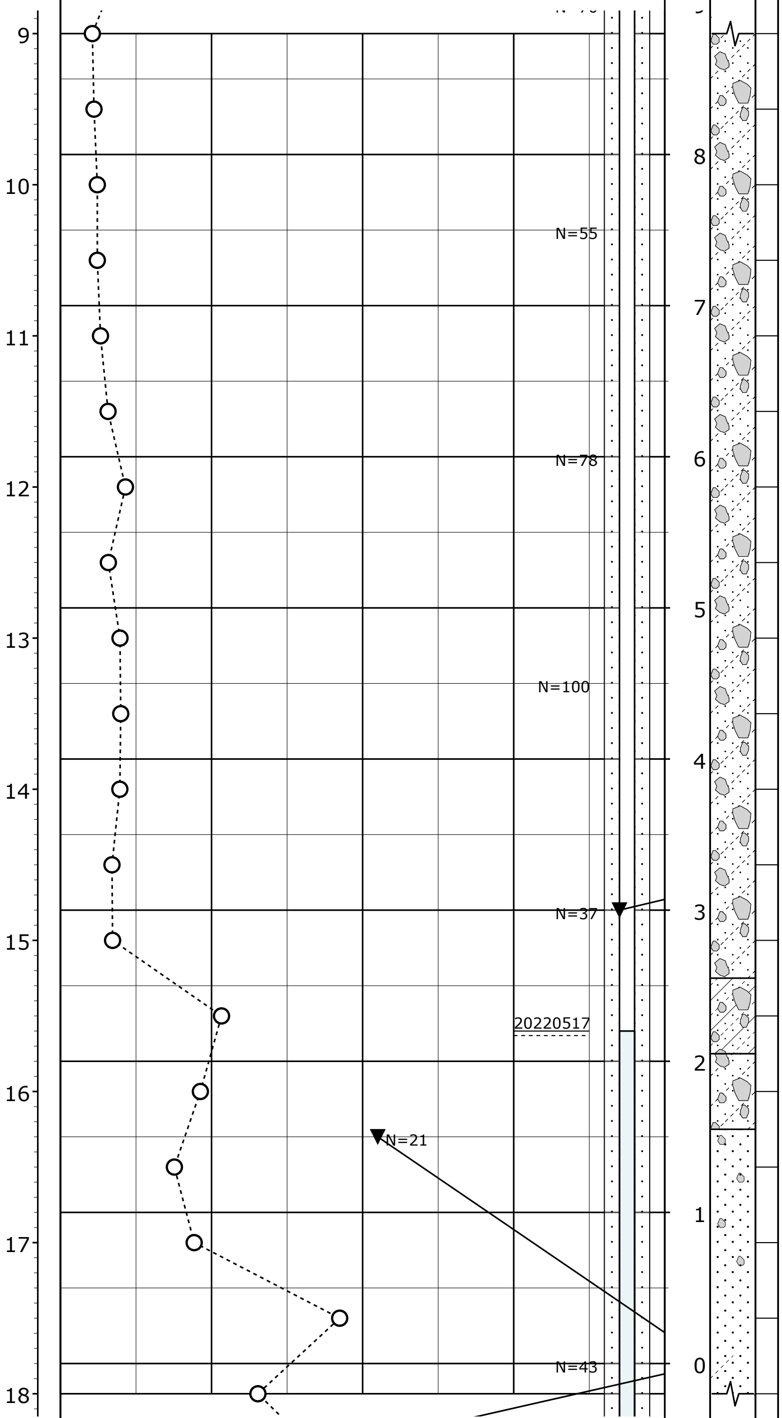
Prepared by: LSCH Checked by: RMH Approved by: RMH Date: 2022.06.10 Encl. No.: P. 1/3

RAMBOLL

Borehole Log

Depth (m)	Test Results	Level (m)	Geology	Sample	Sample No.	Geological Description	Env.	Age

Continued



Sample No.	Geological Description	Env.	Age
19	SAND TILL, silty, gravelly, olive gray, calcareous	Gl	Gc
20	SAND TILL - " -	Gl	Gc
21	SAND TILL - " - Large sample bag	Gl	Gc
22	SAND TILL, silty, gravelly, olive gray, calcareous	Gl	Gc
23	SAND TILL - " -	Gl	Gc
24	SAND TILL, silty, very gravelly, olive gray, calcareous	Gl	Gc
25	SAND TILL, silty, gravelly, olive gray, calcareous	Gl	Gc
26	SAND TILL, silty, very gravelly, dark grayish brown, calcareous	Gl	Gc
27	SAND TILL - " -	Gl	Gc
28	SAND TILL - " -	Gl	Gc
29	SAND TILL - " -	Gl	Gc
30	SAND TILL - " -	Gl	Gc
31	SAND TILL, slightly clayey, silty, gravelly, grey, calcareous Large sample bag	Gl	Gc
32	SAND TILL, silty, gravelly, grey, calcareous	Gl	Gc
33	SAND TILL, silty, very gravelly, grey, calcareous	Gl	Gc
34	SAND, medium - coarse, poorly graded, gravelly, grey, calcareous	Mw	Gc
35	SAND - " -	Mw	Gc
36	SAND, fine - medium, sorted, grey, calcareous	Mw	Gc
37	SAND, medium - coarse, poorly graded, slightly silty, grey, calcareous	Mw	Gc

Continue

Symbol				
○	10	20	30	W (%)
○ ●	100	200	300	Crv,Cfv (kPa)
▼	10	20	30	N (Blows/30 cm)

Glacial deposits may contain cobbles and boulders

Stand Pipe: 1: ø25 - Top Level: 17.80 m

Method: Cased Shell & Auger 6'
Projection: UTM32E89
X: 703431 (m) Y: 6224376 (m) Plan: 2.101

Project: 1100051481 Gilbjerg Hoved, HDD

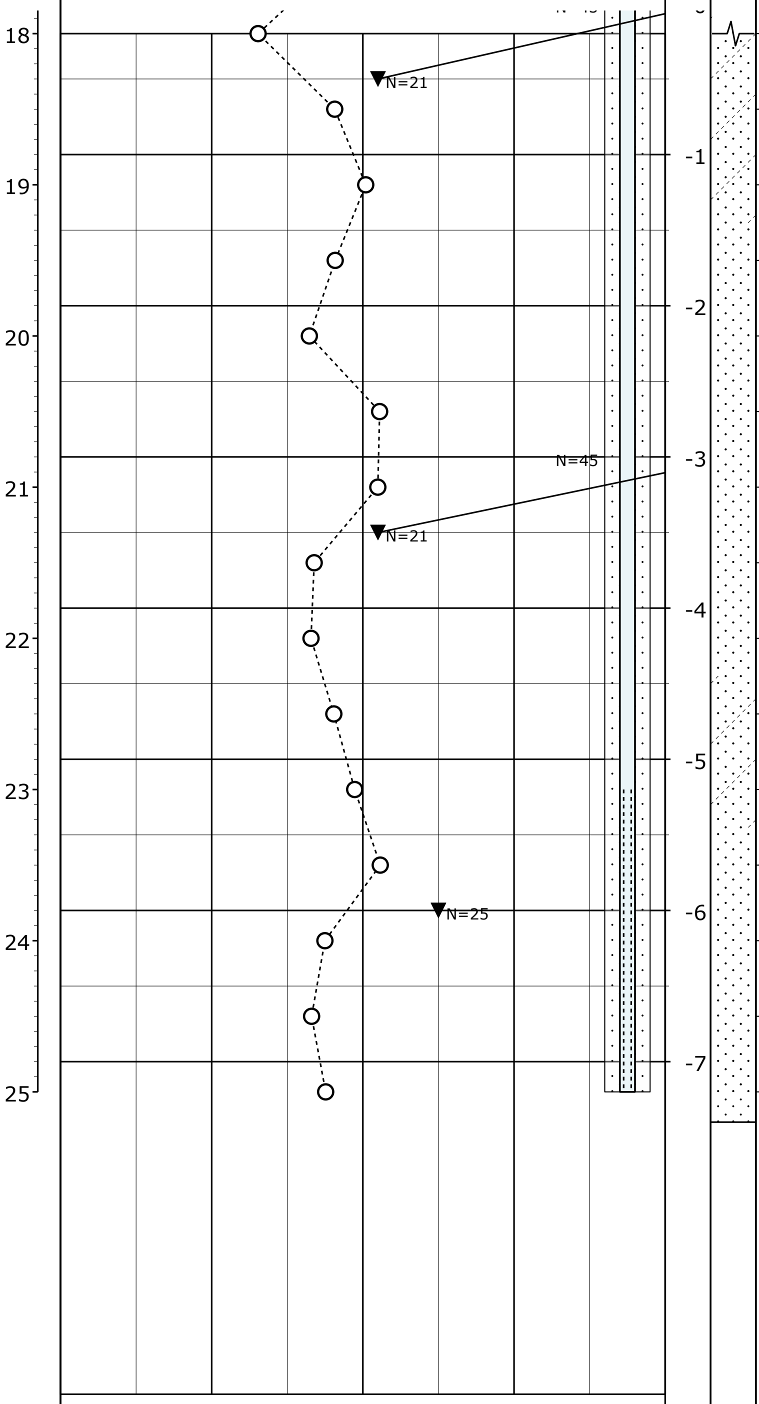
Drilled by: PAA RJ/PB Date: 2022.05.17 Geologist: LSCH Public No.: Borehole: HDD. BH01

Prepared by: LSCH Checked by: RMH Approved by: RMH Date: 2022.06.10 Encl. No.: P. 2/3

RAMBOLL

Borehole Log

Continued



Sample No.	Geological Description	Env.	Age
37	SAND, medium - coarse, poorly graded, slightly silty, grey, calcareous	Mw	Gc
38	SAND, fine - medium, sorted, slightly silty, grey, calcareous	Mw	Gc
39	SAND - " -	Mw	Gc
40	SAND, medium, poorly graded, grey, calcareous	Mw	Gc
41	SAND - " - Large sample bag	Mw	Gc
42	SAND, fine - medium, sorted, grey, calcareous	Mw	Gc
43	SAND - " -	Mw	Gc
44	SAND, fine - medium, poorly graded, grey, calcareous	Mw	Gc
45	SAND, fine - medium, poorly graded, a few grains of gravel, grey, calcareous	Mw	Gc
46	SAND, fine - medium, poorly graded, slightly silty, grey, calcareous	Mw	Gc
47	SAND - " -	Mw	Gc
48	SAND, medium, sorted, grey, calcareous	Mw	Gc
49	SAND - " -	Mw	Gc
50	SAND - " -	Mw	Gc
51	SAND, medium, sorted, a few grains of gravel, grey, calcareous Large sample bag	Mw	Gc

Symbol				
○	10	20	30	W (%)
○ ●	100	200	300	Crv,Cfv (kPa)
▼	10	20	30	N (Blows/30 cm)

Glacial deposits may contain cobbles and boulders

Stand Pipe: 1: ø25 - Top Level: 17.80 m

Method: Cased Shell & Auger 6'
Projection: UTM32E89
X: 703431 (m) Y: 6224376 (m) Plan: 2.101

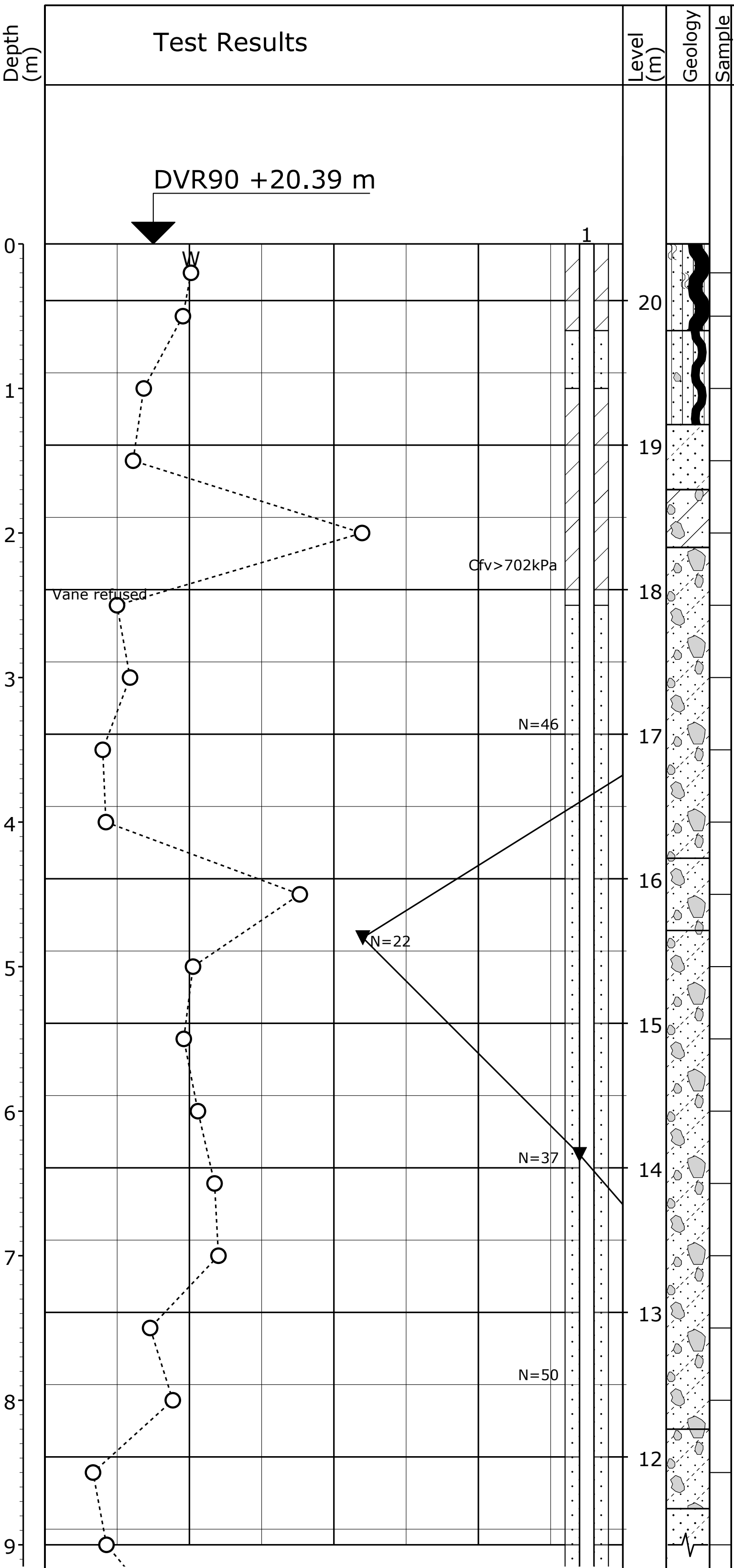
Project: 1100051481 Gilbjerg Hoved, HDD

Drilled by: PAA RJ/PB Date: 2022.05.17 Geologist: LSCH Public No.: Borehole: HDD. BH01

Prepared by: LSCH Checked by: RMH Approved by: RMH Date: 2022.06.10 Encl. No.: P. 3/3

RAMBOLL

Borehole Log



Sample No.	Geological Description	Env.	Age
1	FILL, TOP SOIL: SAND, with some plant remains, dark brown, not calcareous	Fi	Re
2	FILL, TOP SOIL: SAND, dark brown, not calcareous	Fi	Re
3	FILL: SAND, slightly gravelly, with mull, dark yellowish brown, not calcareous	Fi	Re
4	SAND, medium, poorly graded, slightly silty, a few grains of gravel, not calcareous, yellowish brown	Mw	Lg
5	CLAY TILL, silty, sandy, with sand layers, slightly gravelly, grayish brown, not calcareous	Gl	Gc
6	SAND TILL, silty, gravelly, grayish brown, calcareous	Gl	Gc
7	SAND TILL, silty, very gravelly, grayish brown, calcareous	Gl	Gc
8	SAND TILL, silty, gravelly, light grayish brown, calcareous	Gl	Gc
9	SAND TILL, silty, gravelly, grayish brown, calcareous	Gl	Gc
10	GRAVEL TILL, clayey, silty, sandy, light yellowish brown, calcareous	Gl	Gc
11	SAND TILL, silty, gravelly, light yellowish brown, very calcareous Large sample bag	Gl	Gc
12	SAND TILL, silty, very gravelly, light yellowish brown, very calcareous	Gl	Gc
13	SAND TILL - " -	Gl	Gc
14	SAND TILL - " -	Gl	Gc
15	SAND TILL - " -	Gl	Gc
16	SAND TILL - " -	Gl	Gc
17	SAND TILL, silty, gravelly, light yellowish brown, very calcareous	Gl	Gc
18	SAND TILL, slightly clayey, silty, gravelly, light yellowish brown, very calcareous	Gl	Gc
19	SAND, medium - coarse, poorly graded, slightly	Mw	Gc

Continue

Symbol				
○	10	20	30	W (%)
○ ●	100	200	300	Crv,Cfv (kPa)
▼	10	20	30	N (Blows/30 cm)

Glacial deposits may contain cobbles and boulders
Excavated by hand to 1, 5 m b.g.
Stand Pipe: 1: ø25 - Top Level: 20.39 m

Method: Cased Shell & Auger 6'
Projection: UTM32E89
X: 703355 (m) Y: 6224550 (m) Plan: 2.101

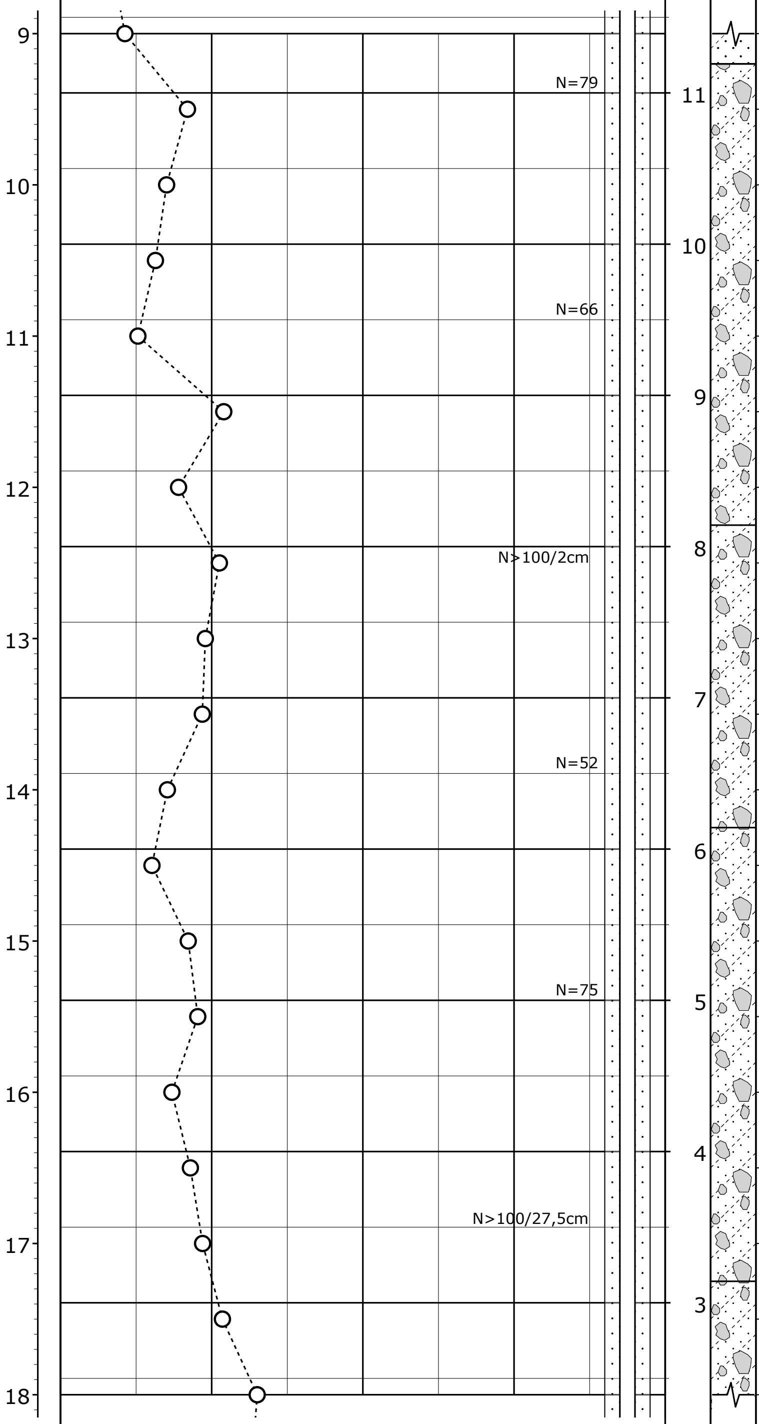
Project: 1100051481 Gilbjerg Hoved, HDD
Drilled by: PAA VLJ/PB Date: 2022.05.03 Geologist: LSCH Public No.: Borehole: HDD. BH02
Prepared by: LSCH Checked by: RMH Approved by: RMH Date: 2022.06.10 Encl. No.: P. 1/3

RAMBOLL

Borehole Log

GeoGIS2020 20.03.81 PSTGUK 04-07-2022 12:29:22

Continued



Depth (m)	Sample No.	Geological Description	Env.	Age
9	19	SAND, medium - coarse, poorly graded, slightly silty, a few grains of gravel, light yellowish brown, calcareous	Mw	Gc
	20	SAND TILL, silty, very gravelly, light yellowish brown, calcareous	Gl	Gc
10	21	SAND TILL - " - Large sample bag	Gl	Gc
	22	SAND TILL, silty, slightly gravelly, light yellowish brown, calcareous	Gl	Gc
11	23	SAND TILL, silty, gravelly, light yellowish brown	Gl	Gc
	24	SAND TILL, silty, slightly gravelly, light yellowish brown	Gl	Gc
12	25	SAND TILL - " -	Gl	Gc
	26	GRAVEL TILL, silty, very sandy, grayish brown, calcareous	Gl	Gc
13	27	GRAVEL TILL - " -	Gl	Gc
	28	GRAVEL TILL - " -	Gl	Gc
14	29	GRAVEL TILL - " -	Gl	Gc
	30	SAND TILL, silty, gravelly, light yellowish brown, calcareous	Gl	Gc
15	31	SAND TILL - " - Large sample bag	Gl	Gc
	32	SAND TILL, silty, gravelly, grayish brown, calcareous	Gl	Gc
16	33	SAND TILL - " -	Gl	Gc
	34	SAND TILL - " -	Gl	Gc
17	35	SAND TILL - " -	Gl	Gc
	36	GRAVEL TILL, silty, very sandy, grayish brown, calcareous	Gl	Gc
18	37	GRAVEL TILL, silty, sandy, grayish brown, calcareous	Gl	Gc

Continue

Symbol				
○	10	20	30	W (%)
○ ●	100	200	300	Crv,Cfv (kPa)
▼	10	20	30	N (Blows/30 cm)

Glacial deposits may contain cobbles and boulders
Excavated by hand to 1, 5 m b.g.
Stand Pipe: 1: ø25 - Top Level: 20.39 m

Method: Cased Shell & Auger 6'
Projection: UTM32E89
X: 703355 (m) Y: 6224550 (m) Plan: 2.101

Project: 1100051481 Gilbjerg Hoved, HDD

Drilled by: PAA VLJ/PB Date: 2022.05.03 Geologist: LSCH Public No.: Borehole: HDD. BH02

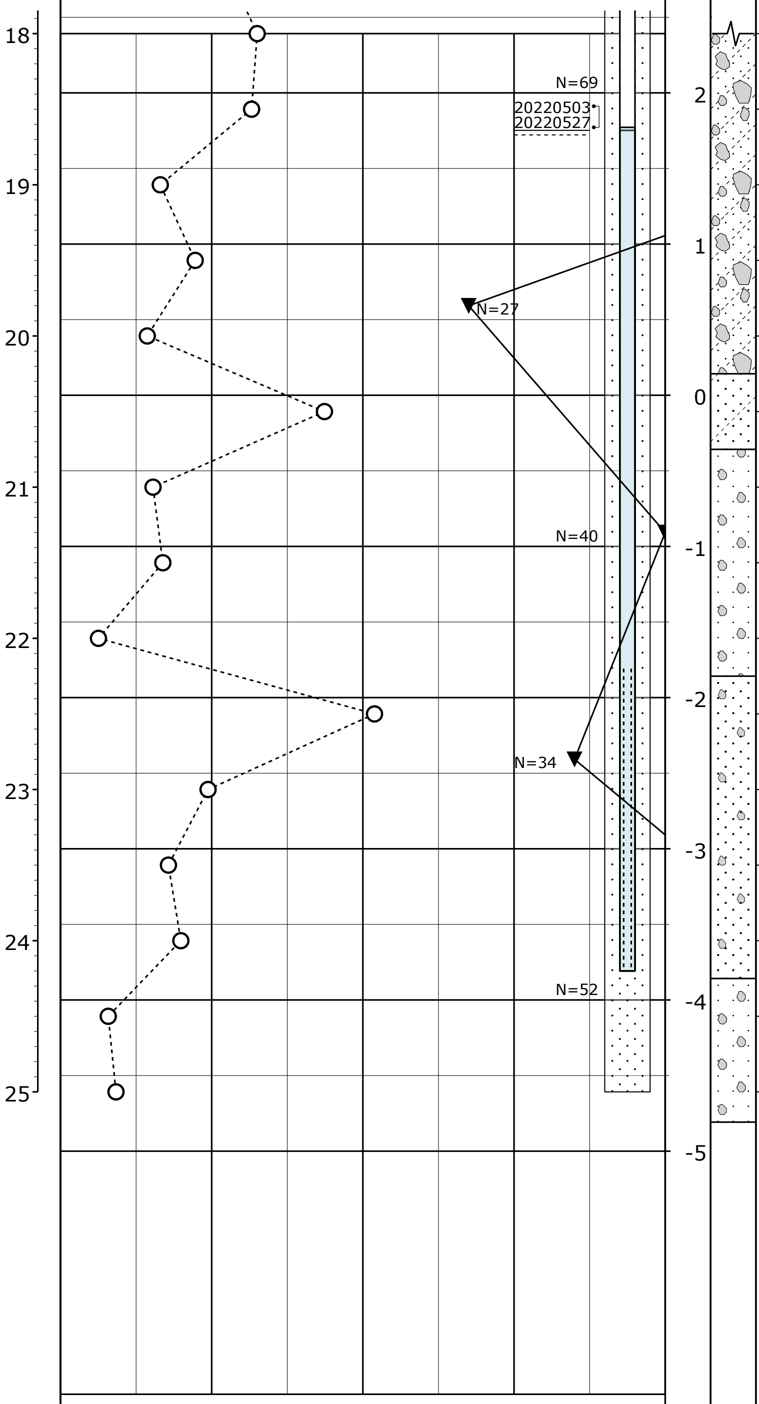
Prepared by: LSCH Checked by: RMH Approved by: RMH Date: 2022.06.10 Encl. No.: P. 2/3

RAMBOLL

Borehole Log

Depth (m)	Test Results	Level (m)	Geology	Sample	Sample No.	Geological Description	Env.	Age

Continued



Sample No.	Geological Description	Env.	Age
37	GRAVEL TILL, silty, sandy, grayish brown, calcareous	Gl	Gc
38	GRAVEL TILL - " -	Gl	Gc
39	GRAVEL TILL - " -	Gl	Gc
40	GRAVEL TILL - " -	Gl	Gc
41	GRAVEL TILL - " - Large sample bag	Gl	Gc
42	SAND, medium - coarse, poorly graded, slightly silty, grey, calcareous	Mw	Gc
43	GRAVEL, very sandy, grey, calcareous	Mw	Gc
44	GRAVEL, sandy, grey, calcareous	Mw	Gc
45	GRAVEL, coarse, slightly sandy, grey, calcareous	Mw	Gc
46	SAND, medium - coarse, poorly graded, slightly gravelly, calcareous	Mw	Gc
47	SAND, medium - coarse, poorly graded, gravelly, calcareous	Mw	Gc
48	SAND, medium - coarse, poorly graded, very gravelly, calcareous	Mw	Gc
49	SAND - " -	Mw	Gc
50	GRAVEL, coarse, slightly sandy, grey, calcareous	Mw	Gc
51	GRAVEL - " - Large sample bag	Mw	Gc

Symbol				
○	10	20	30	W (%)
○ ●	100	200	300	Crv,Cfv (kPa)
▼	10	20	30	N (Blows/30 cm)

Glacial deposits may contain cobbles and boulders
Excavated by hand to 1, 5 m b.g.
Stand Pipe: 1: ø25 - Top Level: 20.39 m

Method: Cased Shell & Auger 6'
Projection: UTM32E89
X: 703355 (m) Y: 6224550 (m) Plan: 2.101

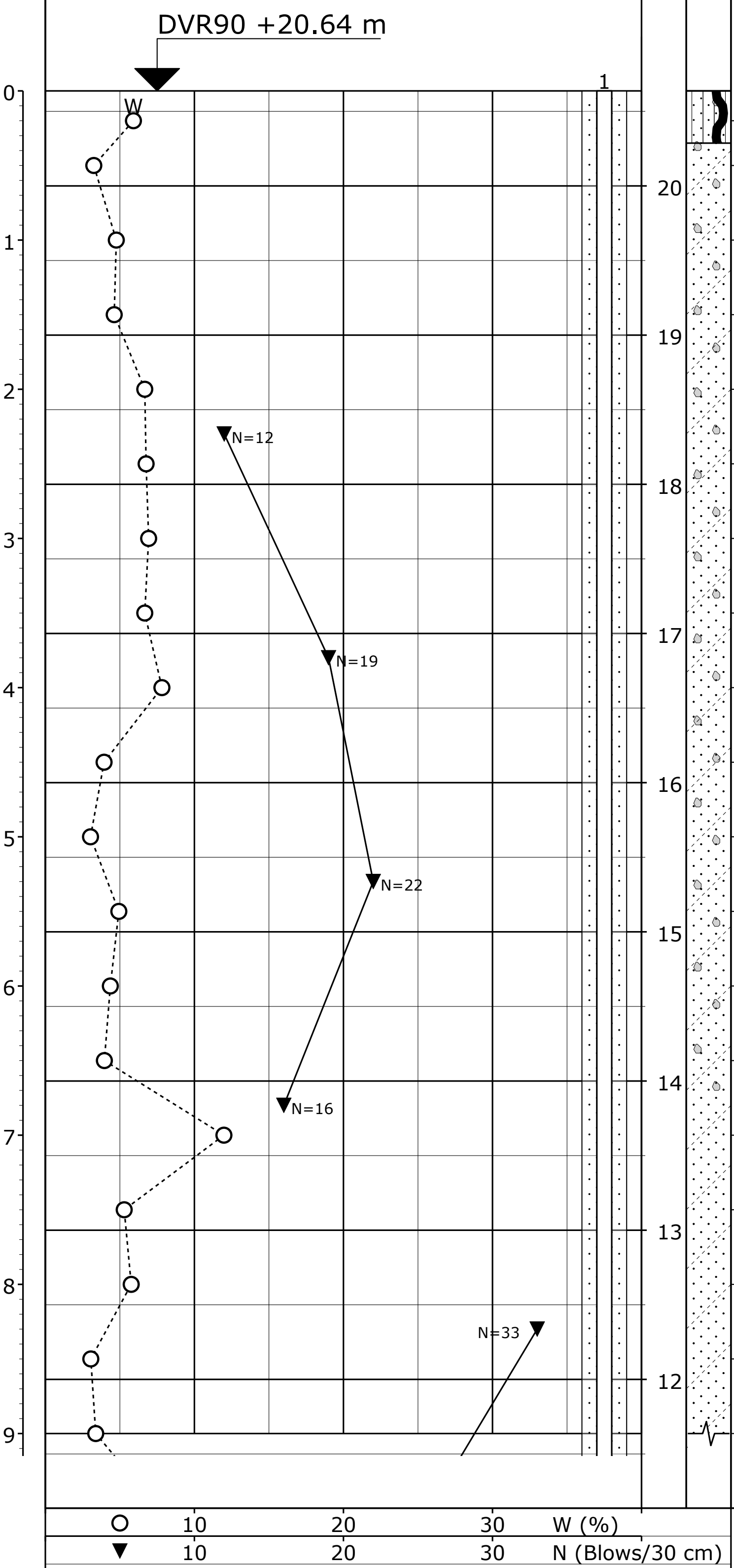
Project: 1100051481 Gilbjerg Hoved, HDD

Drilled by: PAA VLJ/PB Date: 2022.05.03 Geologist: LSCH Public No.: Borehole: HDD. BH02

Prepared by: LSCH Checked by: RMH Approved by: RMH Date: 2022.06.10 Encl. No.: P. 3/3

RAMBOLL

Borehole Log



Sample No.	Geological Description	Env.	Age
1	FILL: SAND, fine - medium, slightly gravelly, with mull, dark brown, not calcareous	Fi	Re
2	SAND, fine - medium, graded, silty, gravelly, not calcareous, dark yellowish brown	Mw/ Gl	Gc
3	SAND - " -	Mw/ Gl	Gc
4	SAND - " -	Mw/ Gl	Gc
5	SAND - " -	Mw/ Gl	Gc
6	SAND - " -	Mw/ Gl	Gc
7	SAND - " -	Mw/ Gl	Gc
8	SAND, fine - medium, graded, silty, gravelly, calcareous, dark yellowish brown	Mw/ Gl	Gc
9	SAND - " -	Mw/ Gl	Gc
10	SAND, fine - medium, graded, silty, very gravelly, calcareous, grayish brown	Mw/ Gl	Gc
11	Large sample bag SAND, fine - medium, graded, silty, very gravelly, calcareous, grayish brown	Mw/ Gl	Gc
12	SAND - " -	Mw/ Gl	Gc
13	SAND - " -	Mw/ Gl	Gc
14	SAND, fine - medium, graded, silty, slightly gravelly, calcareous, grayish brown	Mw/ Gl	Gc
15	SAND, fine - medium, graded, silty, calcareous, grayish brown	Mw	Gc
16	SAND, fine - medium, graded, silty, a few grains of gravel, calcareous, grayish brown	Mw	Gc
17	SAND, fine - medium, graded, a few lumps of clay, silty, a few grains of gravel, calcareous, light grayish brown	Mw/ Gl	Gc
18	SAND, fine - medium, graded, silty, a few grains of gravel, calcareous, grayish brown	Mw/ Gl	Gc
19	SAND, fine - medium, graded, a few lumps of clay, silty, a few grains of gravel, calcareous, light	Mw/ Gl	Gc

Continue

Glacial deposits may contain cobbles and boulders

Stand Pipe: 1: ø25 - Top Level: 20.64 m

Method: Cased Shell & Auger 8'
Projection: UTM32E89
X: 703268 (m) Y: 6224669 (m) Plan: 2.101

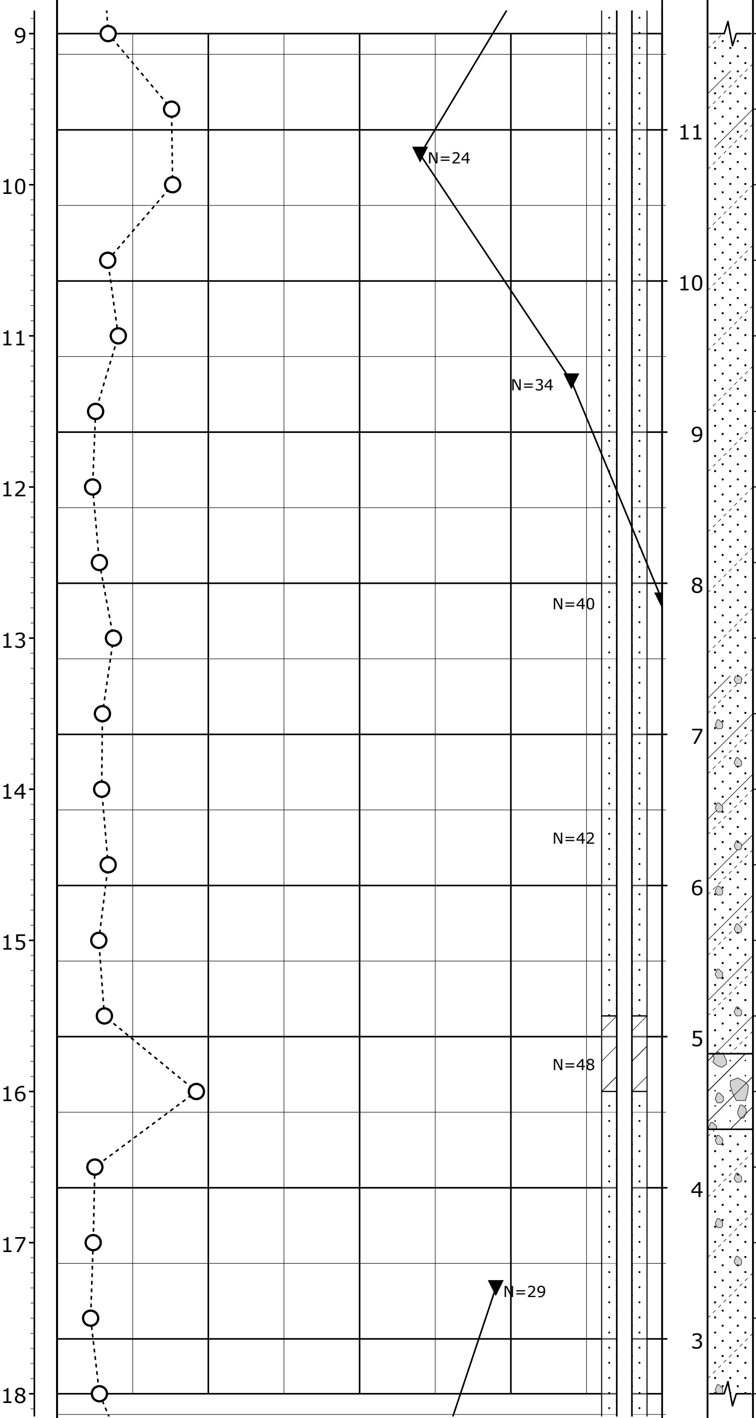
Project: 1100051481 Gilbjerg Hoved, HDD

Drilled by: PAA RJ/PB	Date: 2022.05.31 Geologist: LSCH	Public No.:	Borehole: HDD. BH03
Prepared by: LSCH	Checked by: RMH Approved by: RMH	Date: 2022.06.10	Encl. No.: P. 1/4

Borehole Log

Depth (m)	Test Results	Level (m)	Geology	Sample	Sample No.	Geological Description	Env.	Age

Continued



Sample No.	Geological Description	Env.	Age
19	SAND, fine - medium, graded, a few lumps of clay, silty, a few grains of gravel, calcareous, light grayish brown	Mw/ Gl	Gc
20	SAND, fine, poorly graded, slightly clayey, silty, calcareous, grayish brown	Mw/ Gl	Gc
21	Large sample bag SAND, fine - medium, graded, silty, a few grains of gravel, small decomposed fragments of wood, calcareous, grayish brown	Mw/ Gl	Gc
22	SAND, fine - medium, poorly graded, silty, calcareous, light grayish brown	Mw	Gc
23	SAND - " -	Mw	Gc
24	SAND - " -	Mw	Gc
25	SAND - " -	Mw	Gc
26	SAND - " -	Mw	Gc
27	SAND, fine - medium, poorly graded, små lerklumper, silty, calcareous, grayish brown	Mw	Gc
28	SAND, fine - medium, graded, slightly clayey, silty, gravelly, calcareous, grayish brown	Mw/ Gl	Gc
29	SAND - " -	Mw/ Gl	Gc
30	SAND, medium, graded, slightly clayey, silty, gravelly, calcareous, grayish brown	Mw/ Gl	Gc
31	Large sample bag SAND, medium, graded, slightly clayey, silty, gravelly, calcareous, grayish brown	Mw/ Gl	Gc
32	SAND - " -	Mw/ Gl	Gc
33	CLAY TILL, silty, sandy, slightly gravelly, tykke sandstriber, calcareous, grayish brown	Gl	Gc
34	SAND, fine - medium, graded, silty, slightly gravelly, calcareous, grayish brown	Mw/ Gl	Gc
35	SAND - " -	Mw/ Gl	Gc
36	SAND, fine - medium, graded, silty, enk. gruskorn, calcareous, grayish brown	Mw/ Gl	Gc
37	SAND, fine - medium, graded, silty, slightly gravelly, calcareous, grayish brown	Mw/ Gl	Gc

Continue

	10	20	30	
○	10	20	30	W (%)
▼	10	20	30	N (Blows/30 cm)

Glacial deposits may contain cobbles and boulders

Stand Pipe: 1: ø25 - Top Level: 20.64 m

Method: Cased Shell & Auger 8'
Projection: UTM32E89
X: 703268 (m) Y: 6224669 (m) Plan: 2.101

Project: 1100051481 Gilbjerg Hoved, HDD

Drilled by: PAA RJ/PB Date: 2022.05.31 Geologist: LSCH Public No.: **Borehole: HDD. BH03**

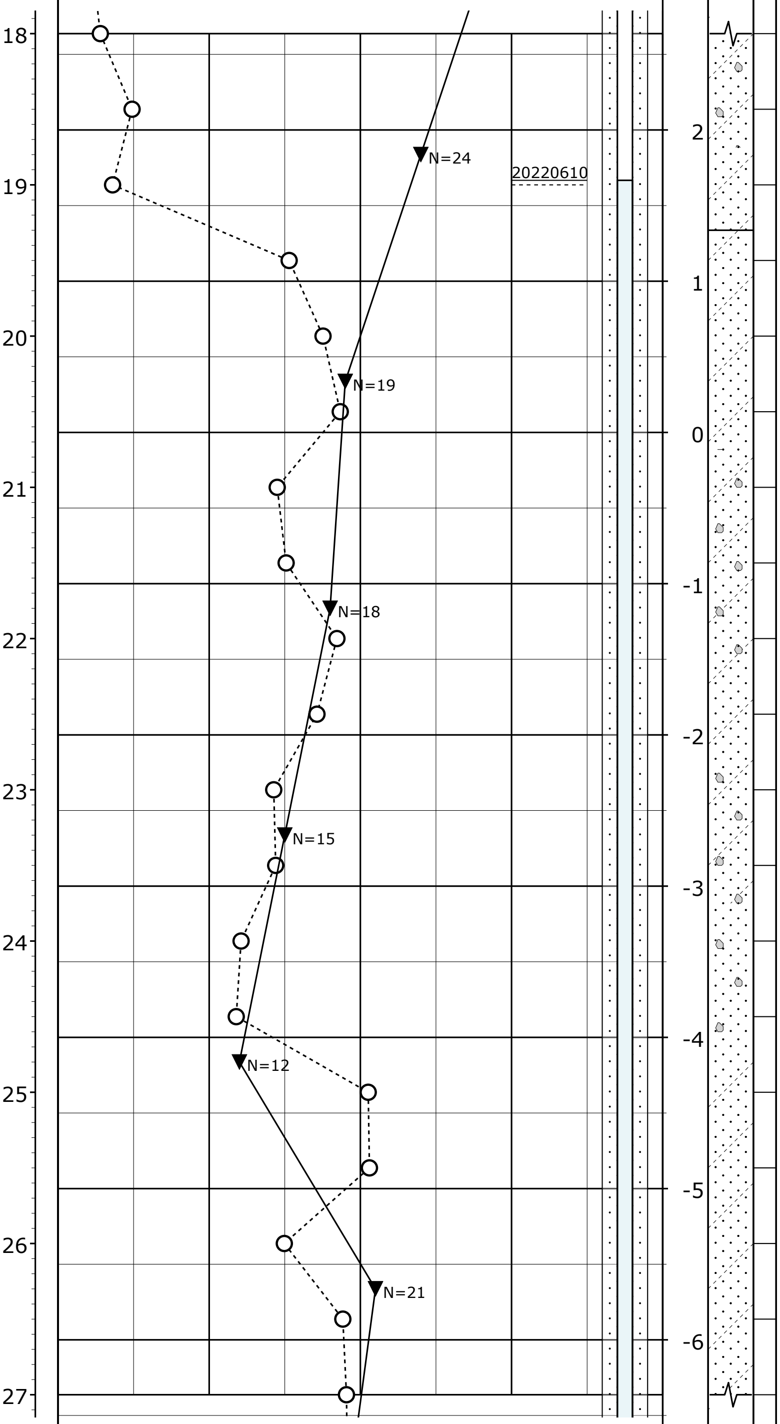
Prepared by: LSCH Checked by: RMH Approved by: RMH Date: 2022.06.10 Encl. No.: P. 2/4

RAMBOLL

Borehole Log

Depth (m)	Test Results	Level (m)	Geology	Sample	Sample No.	Geological Description	Env.	Age

Continued



Sample No.	Geological Description	Env.	Age
37	SAND, fine - medium, graded, silty, slightly gravelly, calcareous, grayish brown	Mw/ Gl	Gc
38	SAND - " -	Mw/ Gl	Gc
39	SAND, fine - medium, graded, small lumps of clay, silty, a few grains of gravel, calcareous, brownish grey	Mw/ Gl	Gc
40	SAND, fine - medium, poorly graded, silty, calcareous, brownish grey	Mw	Gc
41	Large sample bag SAND, fine - medium, poorly graded, silty, calcareous, brownish grey	Mw	Gc
42	SAND - " -	Mw	Gc
43	SAND, medium - coarse, poorly graded, slightly silty, gravelly, calcareous, brownish grey	Mw	Gc
44	SAND - " -	Mw	Gc
45	SAND, medium, poorly graded, slightly silty, gravelly, calcareous, brownish grey	Mw	Gc
46	SAND, fine - medium, poorly graded, silty, calcareous, brownish grey	Mw	Gc
47	SAND, medium, poorly graded, slightly silty, gravelly, calcareous, brownish grey	Mw	Gc
48	SAND, fine - medium, poorly graded, slightly silty, gravelly, calcareous, brownish grey	Mw	Gc
49	SAND, medium - coarse, poorly graded, gravelly, calcareous, brownish grey	Mw	Gc
50	SAND - " -	Mw	Gc
51	Large sample bag SAND, fine - medium, poorly graded, slightly silty, calcareous, brownish grey	Mw	Gc
52	SAND - " -	Mw	Gc
53	SAND - " -	Mw	Gc
54	SAND - " -	Mw	Gc
55	SAND, fine - medium, poorly graded, slightly silty, a few grains of gravel, calcareous, brownish grey	Mw	Gc

Continue

○ 10 20 30 W (%)
▼ 10 20 30 N (Blows/30 cm)

Glacial deposits may contain cobbles and boulders

Stand Pipe: 1: ø25 - Top Level: 20.64 m

Method: Cased Shell & Auger 8'
Projection: UTM32E89
X: 703268 (m) Y: 6224669 (m) Plan: 2.101

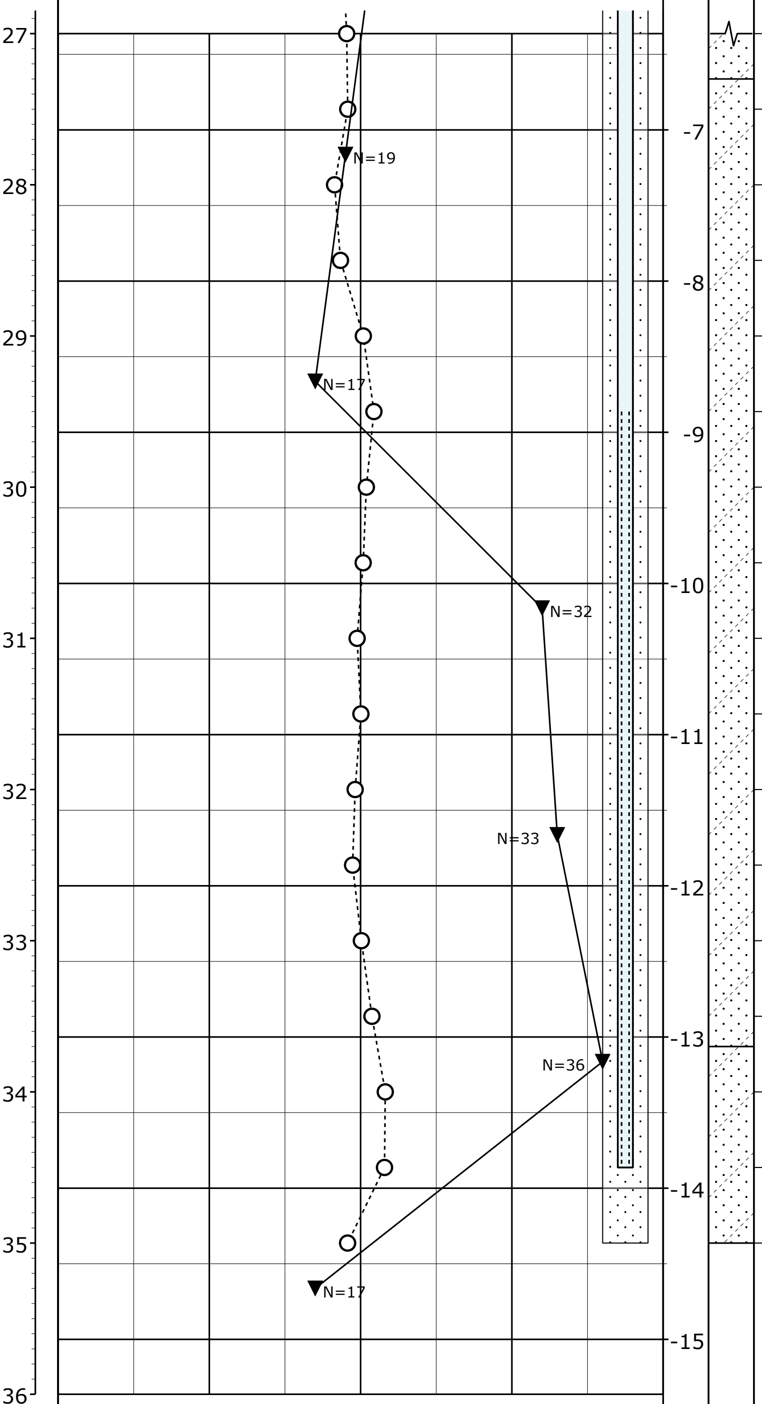
Project: 1100051481	Gilbjerg Hoved, HDD		
Drilled by: PAA RJ/PB	Date: 2022.05.31 Geologist: LSCH	Public No.:	Borehole: HDD. BH03
Prepared by: LSCH	Checked by: RMH Approved by: RMH	Date: 2022.06.10	Encl. No.: P. 3/4

RAMBOLL

Borehole Log

Depth (m)	Test Results	Level (m)	Geology	Sample	Sample No.	Geological Description	Env.	Age

Continued



Sample No.	Geological Description	Env.	Age
55	SAND, fine - medium, poorly graded, slightly silty, a few grains of gravel, calcareous, brownish grey	Mw	Gc
56	SAND, fine - medium, poorly graded, slightly silty, calcareous, brownish grey	Mw	Gc
57	SAND, fine - medium, poorly graded, silty, calcareous, brownish grey	Mw	Gc
58	SAND - " -	Mw	Gc
59	SAND - " -	Mw	Gc
60	SAND - " -	Mw	Gc
61	SAND - " -	Mw	Gc
62	SAND - " -	Mw	Gc
63	SAND - " -	Mw	Gc
64	SAND - " -	Mw	Gc
65	SAND - " -	Mw	Gc
66	SAND - " -	Mw	Gc
67	SAND - " -	Mw	Gc
68	SAND - " -	Mw	Gc
69	SAND - " -	Mw	Gc
70	SAND - " -	Mw	Gc
71	SAND - " -	Mw	Gc

○ 10 20 30 W (%)
▼ 10 20 30 N (Blows/30 cm)

Glacial deposits may contain cobbles and boulders

Stand Pipe: 1: ø25 - Top Level: 20.64 m

Method: Cased Shell & Auger 8'
Projection: UTM32E89
X: 703268 (m) Y: 6224669 (m) Plan: 2.101

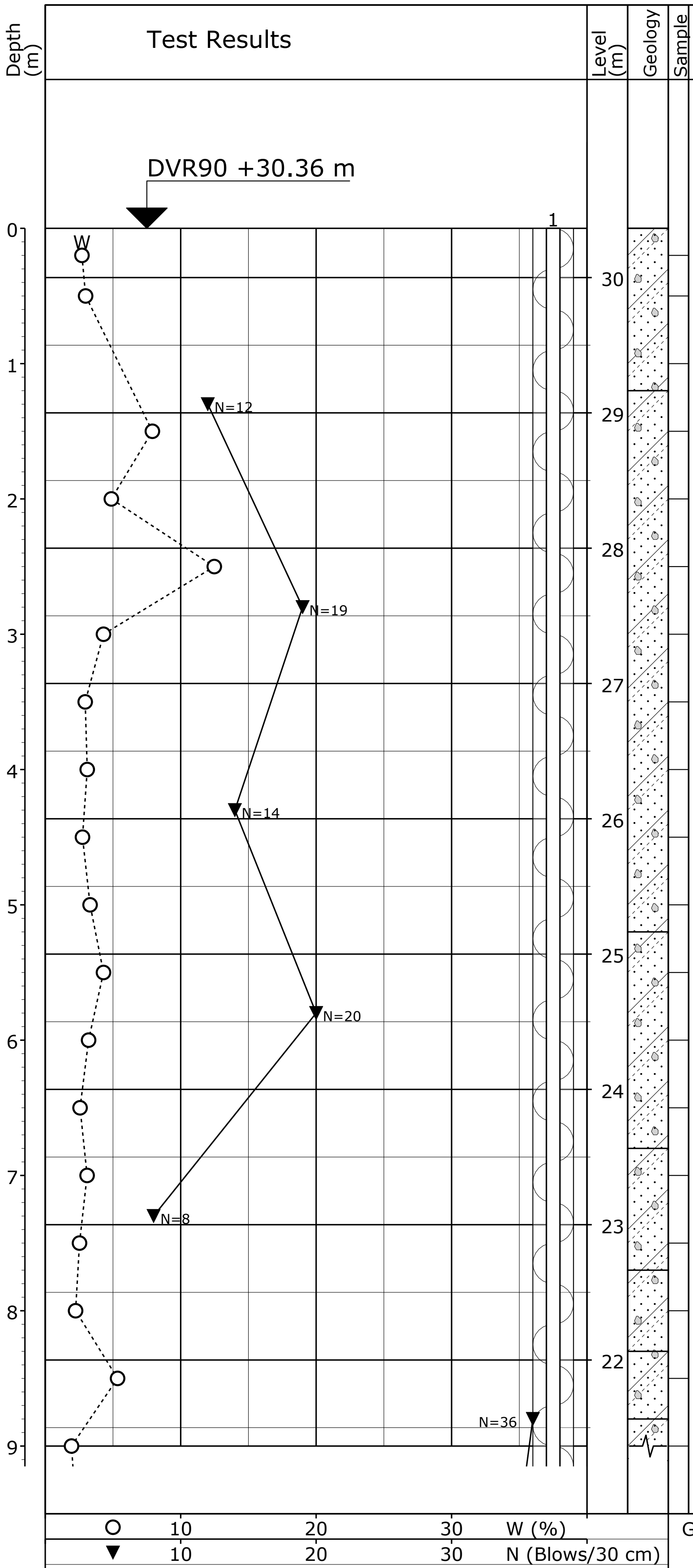
Project: 1100051481 Gilbjerg Hoved, HDD

Drilled by: PAA RJ/PB Date: 2022.05.31 Geologist: LSCH Public No.: Borehole: HDD. BH03

Prepared by: LSCH Checked by: RMH Approved by: RMH Date: 2022.06.10 Encl. No.: P. 4/4

RAMBOLL

Borehole Log



Sample No.	Geological Description	Env.	Age
1	SAND, fine - medium, well graded, slightly clayey, silty, gravelly, dark yellowish brown, not calcareous	Gl/ Mw	Gc
2	SAND - " -	Gl/ Mw	Gc
3	SAND - " -	Gl/ Mw	Gc
4	SAND, fine - medium, well graded, slightly clayey, silty, gravelly, dark yellowish brown, calcareous	Gl/ Mw	Gc
5	SAND - " -	Gl/ Mw	Gc
6	SAND - " -	Gl/ Mw	Gc
7	SAND - " -	Gl/ Mw	Gc
8	SAND, fine - medium, well graded, slightly clayey, silty, slightly gravelly, dark yellowish brown, calcareous	Gl/ Mw	Gc
9	SAND - " -	Gl/ Mw	Gc
10	SAND, fine - medium, well graded, slightly clayey, silty, gravelly, dark yellowish brown, calcareous	Gl/ Mw	Gc
11	SAND - " -	Gl/ Mw	Gc
12	SAND, fine - medium, well graded, slightly clayey, silty, very gravelly, dark yellowish brown, calcareous	Gl/ Mw	Gc
13	SAND, fine - medium, well graded, slightly clayey, silty, gravelly, dark yellowish brown, calcareous	Gl/ Mw	Gc
14	SAND - " -	Gl/ Mw	Gc
15	SAND - " -	Gl/ Mw	Gc
16	SAND - " -	Gl/ Mw	Gc
17	SAND, fine - medium, well graded, slightly clayey, silty, very gravelly, dark yellowish brown, calcareous	Gl/ Mw	Gc
18	SAND, medium, well graded, slightly clayey, silty, gravelly, dark yellowish brown, calcareous	Gl/ Mw	Gc
19	SAND, fine - medium, well graded, slightly clayey, silty, gravelly, dark yellowish brown, calcareous	Gl/ Mw	Gc

Continue

Glacial deposits may contain cobbles and boulders

Stand Pipe: 1: ø25 - Top Level: 30.36 m

Method: Cased Shell & Auger 8'
Projection: UTM32E89
X: 703233 (m) Y: 6224816 (m) Plan: 2.101

Project: 1100051481 Gilbjerg Hoved, HDD

Drilled by: PAA SS/KG Date: 2022.05.23 Geologist: LSCH Public No.: Borehole: HDD. BH04

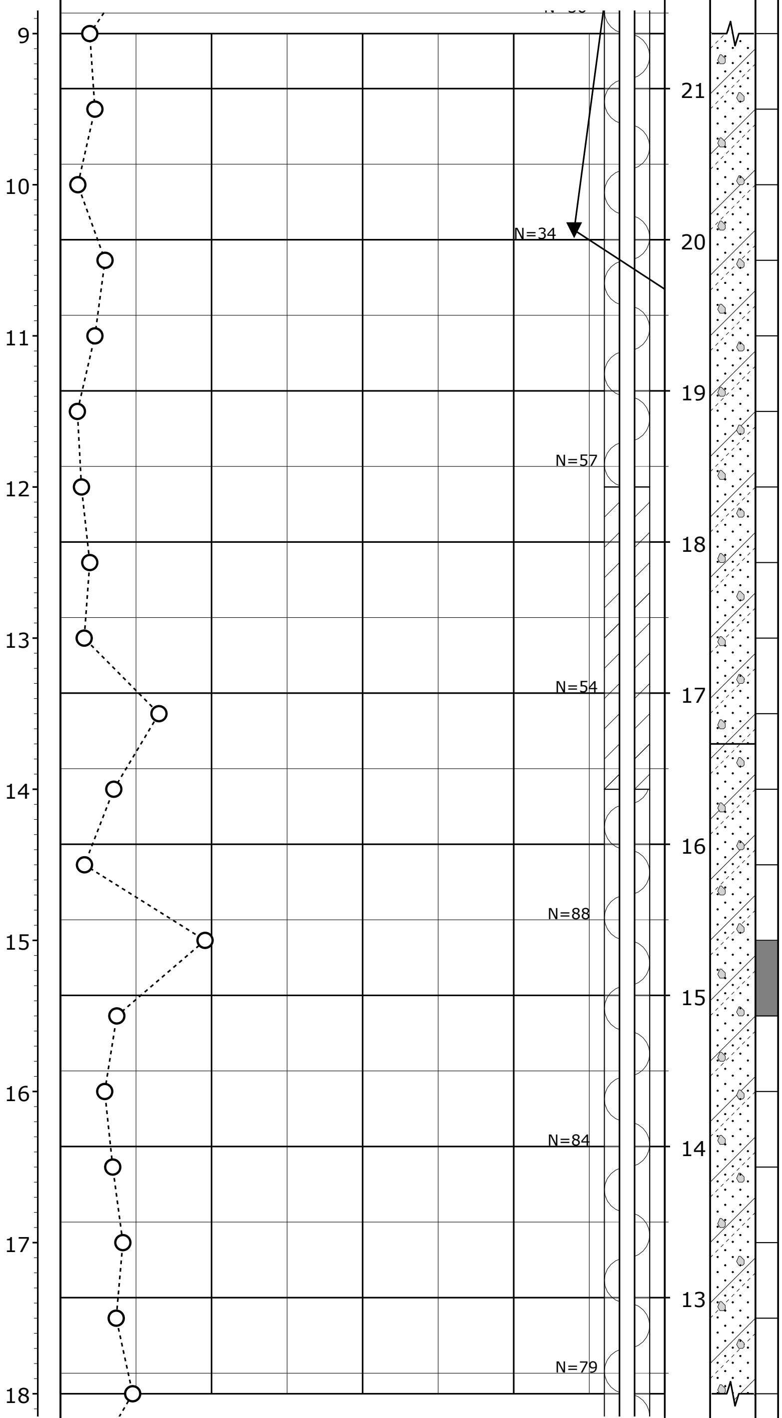
Prepared by: LSCH Checked by: RMH Approved by: RMH Date: 2022.06.10 Encl. No.: P. 1/6

RAMBOLL

Borehole Log

Depth (m)	Test Results	Level (m)	Geology	Sample	Sample No.	Geological Description	Env.	Age

Continued



Sample No.	Geological Description	Env.	Age
19	SAND, fine - medium, well graded, slightly clayey, silty, gravelly, dark yellowish brown, calcareous	Gl/ Mw	Gc
20	SAND, fine - medium, well graded, slightly clayey, silty, gravelly, reddish brown, calcareous	Gl/ Mw	Gc
21	SAND, fine - medium, well graded, slightly clayey, silty, gravelly, grayish brown, calcareous	Gl/ Mw	Gc
22	SAND - " -	Gl/ Mw	Gc
23	SAND - " -	Gl/ Mw	Gc
24	SAND - " -	Gl/ Mw	Gc
25	SAND, fine - medium, well graded, slightly clayey, silty, slightly gravelly, grayish brown, calcareous	Gl/ Mw	Gc
26	SAND - " -	Gl/ Mw	Gc
27	SAND - " -	Gl/ Mw	Gc
28	SAND - " -	Gl/ Mw	Gc
29	SAND, medium - coarse, well graded, slightly clayey, silty, very gravelly, brownish grey, calcareous	Gl/ Mw	Gc
30	SAND, fine - medium, well graded, slightly clayey, silty, very gravelly, brownish grey, calcareous	Gl/ Mw	Gc
31	SAND, medium - coarse, well graded, slightly clayey, silty, very gravelly, brownish grey, calcareous	Gl/ Mw	Gc
A31	A - tube damaged		
32	SAND, fine - medium, well graded, slightly clayey, silty, gravelly, brownish grey, calcareous	Gl/ Mw	Gc
33	SAND - " -	Gl/ Mw	Gc
34	SAND, fine - medium, well graded, slightly clayey, silty, very gravelly, brownish grey, calcareous	Gl/ Mw	Gc
35	SAND, fine - medium, well graded, slightly clayey, silty, gravelly, brownish grey, calcareous	Gl/ Mw	Gc
36	SAND - " -	Gl/ Mw	Gc
37	SAND, fine - medium, well graded, slightly clayey, silty, gravelly, dark brownish grey, calcareous	Gl/ Mw	Gc

Continue

Legend	10	20	30	
O	10	20	30	W (%)
▼	10	20	30	N (Blows/30 cm)

Glacial deposits may contain cobbles and boulders

Stand Pipe: 1: ø25 - Top Level: 30.36 m

Method: Cased Shell & Auger 8'
Projection: UTM32E89
X: 703233 (m) Y: 6224816 (m) Plan: 2.101

Project: 1100051481 Gilbjerg Hoved, HDD

Drilled by: PAA SS/KG Date: 2022.05.23 Geologist: LSCH Public No.: Borehole: HDD. BH04

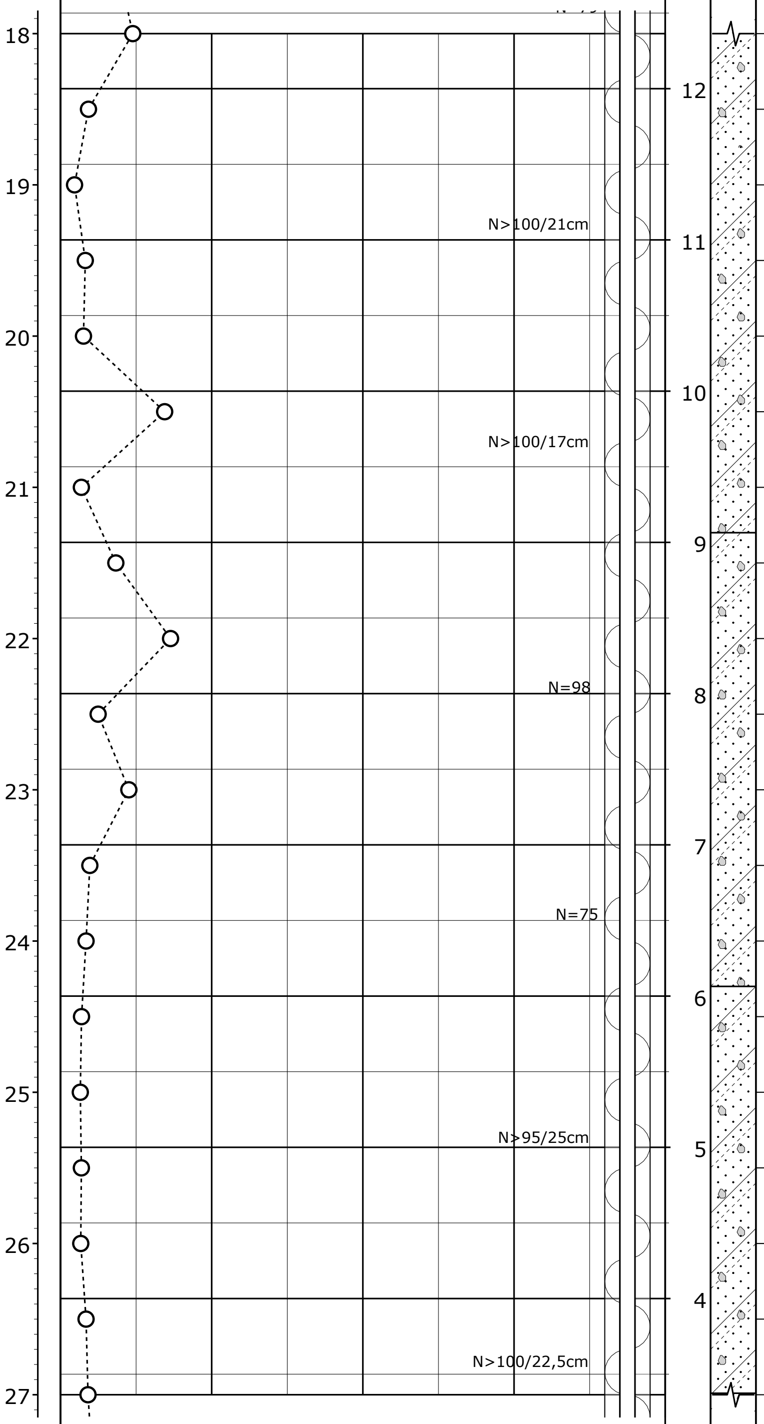
Prepared by: LSCH Checked by: RMH Approved by: RMH Date: 2022.06.10 Encl. No.: P. 2/6

RAMBOLL

Borehole Log

GeoGIS2020 20.03.81 PSTGUK 04-07-2022 12:26:40

Depth (m)	Test Results	Level (m)	Geology	Sample	Sample No.	Geological Description	Env.	Age



Continued

Sample No.	Geological Description	Env.	Age
37	SAND, fine - medium, well graded, slightly clayey, silty, gravelly, dark brownish grey, calcareous	Gl/ Mw	Gc
38	SAND, fine - medium, well graded, slightly clayey, silty, slightly gravelly, brownish grey, calcareous	Gl/ Mw	Gc
39	SAND, fine - medium, well graded, slightly clayey, silty, enk. gruskorn, brownish grey, calcareous	Gl/ Mw	Gc
40	SAND, fine - medium, well graded, slightly clayey, silty, gravelly, brownish grey, calcareous	Gl/ Mw	Gc
41	SAND, fine - medium, well graded, slightly clayey, silty, very gravelly, brownish grey, calcareous	Gl/ Mw	Gc
42	SAND, medium - coarse, well graded, slightly clayey, silty, very gravelly, brownish grey, calcareous	Gl/ Mw	Gc
43	SAND, fine - medium, well graded, slightly clayey, silty, gravelly, brownish grey, calcareous	Gl/ Mw	Gc
44	SAND, medium - coarse, well graded, slightly clayey, silty, very gravelly, brownish grey, calcareous	Gl/ Mw	Gc
45	SAND - " -	Gl/ Mw	Gc
46	SAND, fine - medium, well graded, slightly clayey, silty, gravelly, reddish brown, calcareous	Gl/ Mw	Gc
47	SAND - " -	Gl/ Mw	Gc
48	SAND, fine - medium, well graded, slightly clayey, silty, gravelly, brownish grey, calcareous	Gl/ Mw	Gc
49	SAND - " -	Gl/ Mw	Gc
50	SAND, fine - medium, well graded, slightly clayey, silty, slightly gravelly, brownish grey, calcareous	Gl/ Mw	Gc
51	SAND - " -	Gl/ Mw	Gc
52	SAND - " -	Gl/ Mw	Gc
53	SAND, fine - medium, well graded, slightly clayey, silty, gravelly, brownish grey, calcareous	Gl/ Mw	Gc
54	SAND - " -	Gl/ Mw	Gc
55	SAND - " -	Gl/ Mw	Gc

Continue

○ 10 20 30 W (%)
▼ 10 20 30 N (Blows/30 cm)

Glacial deposits may contain cobbles and boulders

Stand Pipe: 1: ø25 - Top Level: 30.36 m

Method: Cased Shell & Auger 8'
Projection: UTM32E89
X: 703233 (m) Y: 6224816 (m) Plan: 2.101

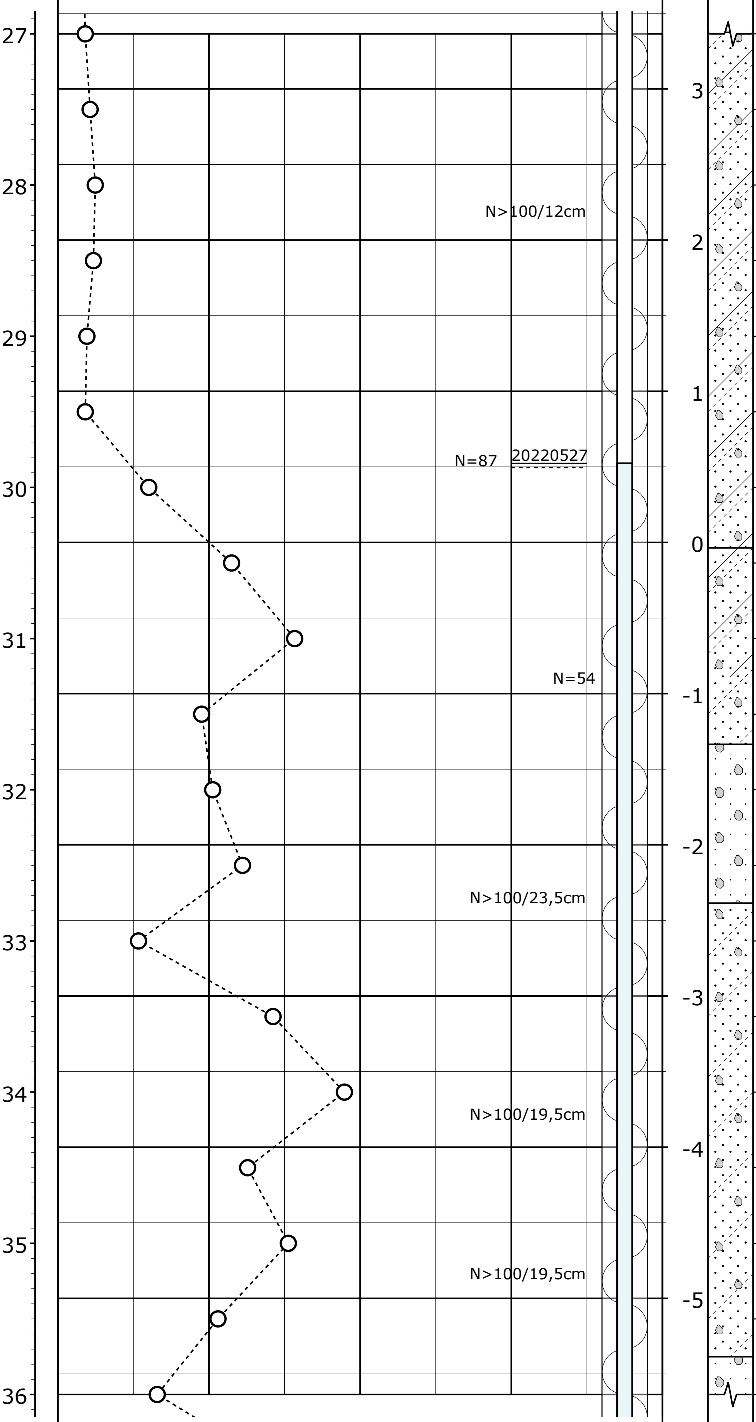
Project: 1100051481	Gilbjerg Hoved, HDD		
Drilled by: PAA SS/KG	Date: 2022.05.23 Geologist: LSCH	Public No.:	Borehole: HDD. BH04
Prepared by: LSCH	Checked by: RMH Approved by: RMH	Date: 2022.06.10	Encl. No.: P. 3/6

RAMBOLL

Borehole Log

Depth (m)	Test Results	Level (m)	Geology	Sample	Sample No.	Geological Description	Env.	Age

Continued



Sample No.	Geological Description	Env.	Age
55	SAND - " -	Gl/ Mw	Gc
56	SAND - " -	Gl/ Mw	Gc
57	SAND - " -	Gl/ Mw	Gc
58	SAND, fine - medium, well graded, slightly clayey, silty, very gravelly, brownish grey, calcareous	Gl/ Mw	Gc
59	SAND, fine - medium, well graded, slightly clayey, silty, gravelly, brownish grey, calcareous	Gl/ Mw	Gc
60	SAND - " -	Gl/ Mw	Gc
61	SAND - " -	Gl/ Mw	Gc
62	SAND - " -	Gl/ Mw	Gc
63	SAND, medium, well graded, slightly clayey, silty, gravelly, brownish grey, slightly calcareous	Gl/ Mw	Gc
64	SAND, medium - coarse, graded, slightly silty, gravelly, slightly calcareous, brownish grey	Mw	Gc
65	GRAVEL, poorly graded, sandy, slightly calcareous, brownish grey	Mw	Gc
66	GRAVEL, graded, sandy, slightly calcareous, grey	Mw	Gc
67	SAND, medium - coarse, poorly graded, slightly silty, gravelly, slightly calcareous, brownish grey	Mw	Gc
68	SAND, fine - medium, well graded, silty, gravelly, slightly calcareous, brownish grey	Mw/ Gl	Gc
69	SAND, medium - coarse, graded, slightly silty, gravelly, slightly calcareous, brownish grey	Mw/ Gl	Gc
70	SAND - " -	Mw/ Gl	Gc
71	SAND, fine - medium, well graded, silty, gravelly, slightly calcareous, brownish grey	Mw/ Gl	Gc
72	SAND - " -	Mw/ Gl	Gc
73	GRAVEL, graded, very sandy, slightly calcareous, brownish grey	Mw	Gc

Continue

○ 10 20 30 W (%)
▼ 10 20 30 N (Blows/30 cm)

Glacial deposits may contain cobbles and boulders

Stand Pipe: 1: ø25 - Top Level: 30.36 m

Method: Cased Shell & Auger 8'
Projection: UTM32E89
X: 703233 (m) Y: 6224816 (m) Plan: 2.101

Project: 1100051481 Gilbjerg Hoved, HDD

Drilled by: PAA SS/KG Date: 2022.05.23 Geologist: LSCH Public No.: Borehole: HDD. BH04

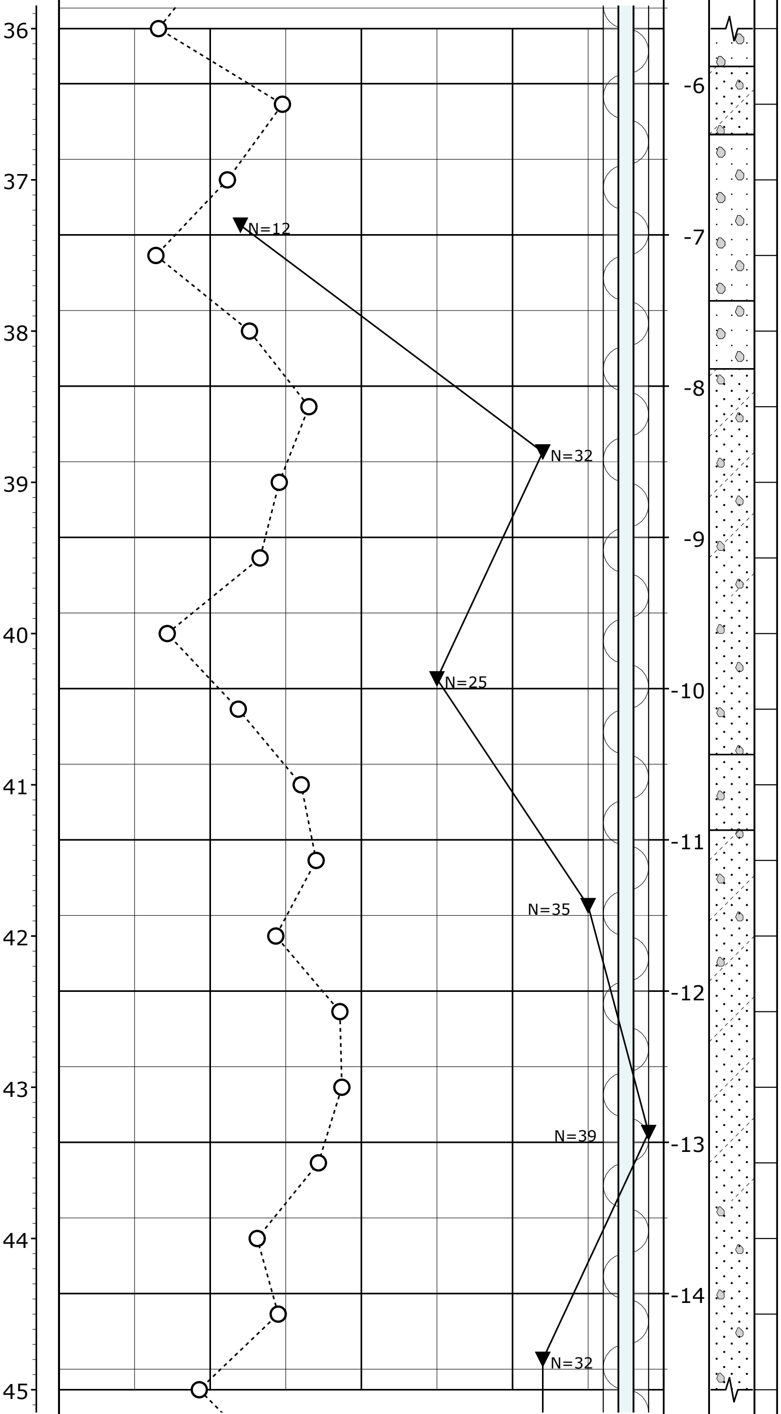
Prepared by: LSCH Checked by: RMH Approved by: RMH Date: 2022.06.10 Encl. No.: P. 4/6

RAMBOLL

Borehole Log

Depth (m)	Test Results	Level (m)	Geology	Sample	Sample No.	Geological Description	Env.	Age

Continued



Sample No.	Geological Description	Env.	Age
73	GRAVEL, graded, very sandy, slightly calcareous, brownish grey	Mw	Gc
74	SAND, medium - coarse, graded, slightly silty, gravelly, slightly calcareous, brownish grey	Mw	Gc
75	GRAVEL, poorly graded, sandy, slightly calcareous, grey	Mw	Gc
76	GRAVEL - " -	Mw	Gc
77	GRAVEL - " -	Mw	Gc
78	SAND, medium - coarse, poorly graded, slightly silty, slightly gravelly, slightly calcareous, grey	Mw	Gc
79	SAND - " -	Mw	Gc
80	SAND, medium - coarse, graded, slightly silty, gravelly, slightly calcareous, grey	Mw	Gc
81	SAND, coarse, poorly graded, gravelly, slightly calcareous, grey	Mw	Gc
82	SAND, medium - coarse, graded, gravelly, slightly calcareous, grey	Mw	Gc
83	SAND - " -	Mw	Gc
84	SAND, fine - medium, poorly graded, slightly silty, slightly gravelly, slightly calcareous, grey	Mw	Gc
85	SAND, fine - medium, graded, slightly silty, gravelly, slightly calcareous, grey	Mw	Gc
86	SAND, fine - medium, poorly graded, slightly silty, a few grains of gravel, slightly calcareous, grey	Mw	Gc
87	SAND - " -	Mw	Gc
88	SAND - " -	Mw	Gc
89	SAND, medium - coarse, poorly graded, very gravelly, slightly calcareous, grey	Mw	Gc
90	SAND, fine - medium, poorly graded, slightly gravelly, slightly calcareous, grey	Mw	Gc
91	SAND, medium - coarse, poorly graded, very gravelly, slightly calcareous, grey	Mw	Gc

Continue

	10	20	30	
○	10	20	30	W (%)
▼	10	20	30	N (Blows/30 cm)

Glacial deposits may contain cobbles and boulders

Stand Pipe: 1: ø25 - Top Level: 30.36 m

Method: Cased Shell & Auger 8'
Projection: UTM32E89
X: 703233 (m) Y: 6224816 (m) Plan: 2.101

Project: 1100051481 Gilbjerg Hoved, HDD

Drilled by: PAA SS/KG Date: 2022.05.23 Geologist: LSCH Public No.: Borehole: HDD. BH04

Prepared by: LSCH Checked by: RMH Approved by: RMH Date: 2022.06.10 Encl. No.: P. 5/6

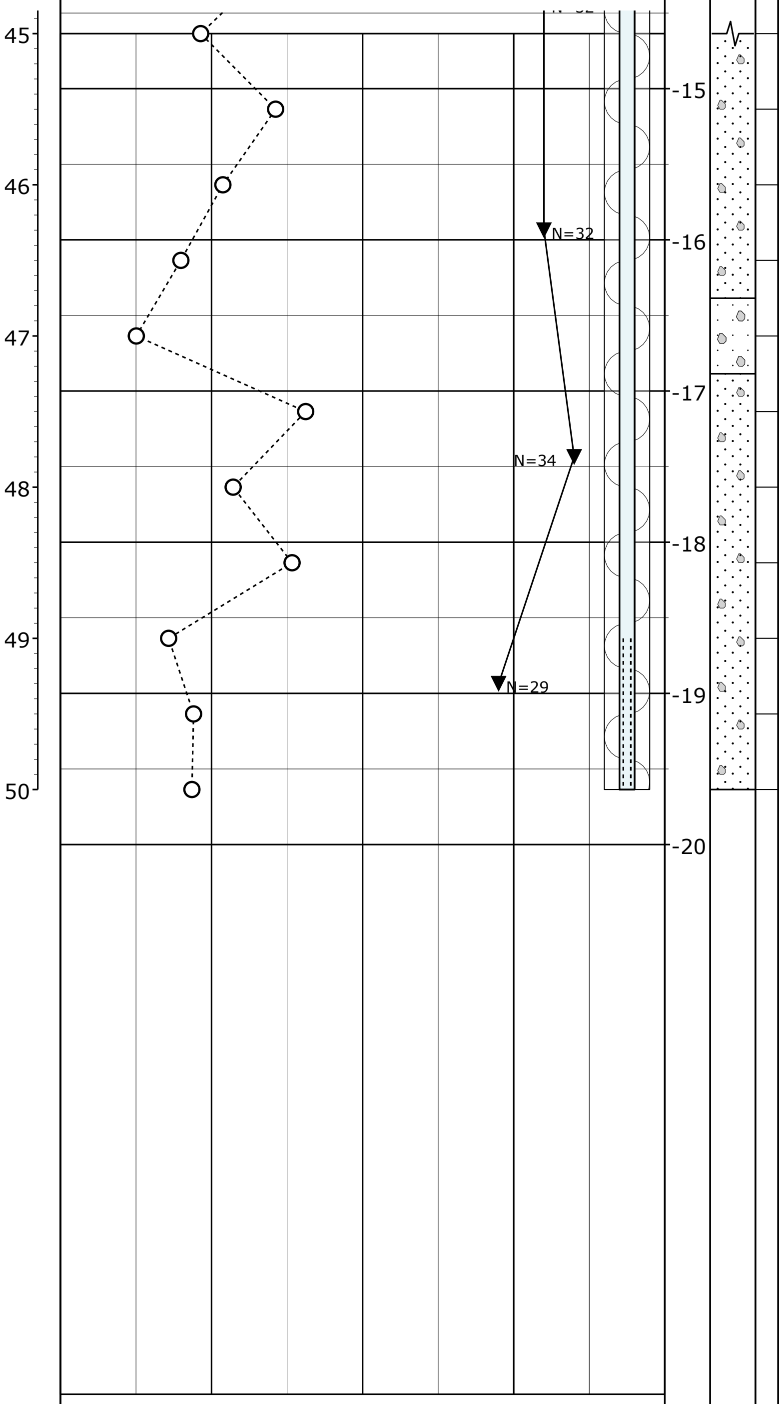
RAMBOLL

Borehole Log

GeoGIS2020 20.03.81 PSTGUK 04-07-2022 12:26:40

Depth (m)	Test Results	Level (m)	Geology	Sample	Sample No.	Geological Description	Env.	Age

Continued



Sample No.	Geological Description	Env.	Age
91	SAND, medium - coarse, poorly graded, very gravelly, slightly calcareous, grey	Mw	Gc
92	SAND, medium - coarse, poorly graded, gravelly, slightly calcareous, grey	Mw	Gc
93	SAND, medium - coarse, graded, gravelly, slightly calcareous, grey	Mw	Gc
94	SAND, medium - coarse, graded, very gravelly, slightly calcareous, grey	Mw	Gc
95	GRAVEL, poorly graded, sandy, slightly calcareous, grey	Mw	Gc
96	SAND, medium - coarse, poorly graded, very gravelly, slightly calcareous, grey	Mw	Gc
97	SAND, coarse, poorly graded, very gravelly, slightly calcareous, grey	Mw	Gc
98	SAND, medium - coarse, poorly graded, gravelly, slightly calcareous, grey	Mw	Gc
99	SAND, fine - medium, graded, gravelly, slightly calcareous, grey	Mw	Gc
100	SAND, medium - coarse, poorly graded, gravelly, slightly calcareous, grey	Mw	Gc
101	SAND - " -	Mw	Gc

○ 10 20 30 W (%)
▼ 10 20 30 N (Blows/30 cm)

Glacial deposits may contain cobbles and boulders

Stand Pipe: 1: ø25 - Top Level: 30.36 m

Method: Cased Shell & Auger 8'
Projection: UTM32E89
X: 703233 (m) Y: 6224816 (m) Plan: 2.101

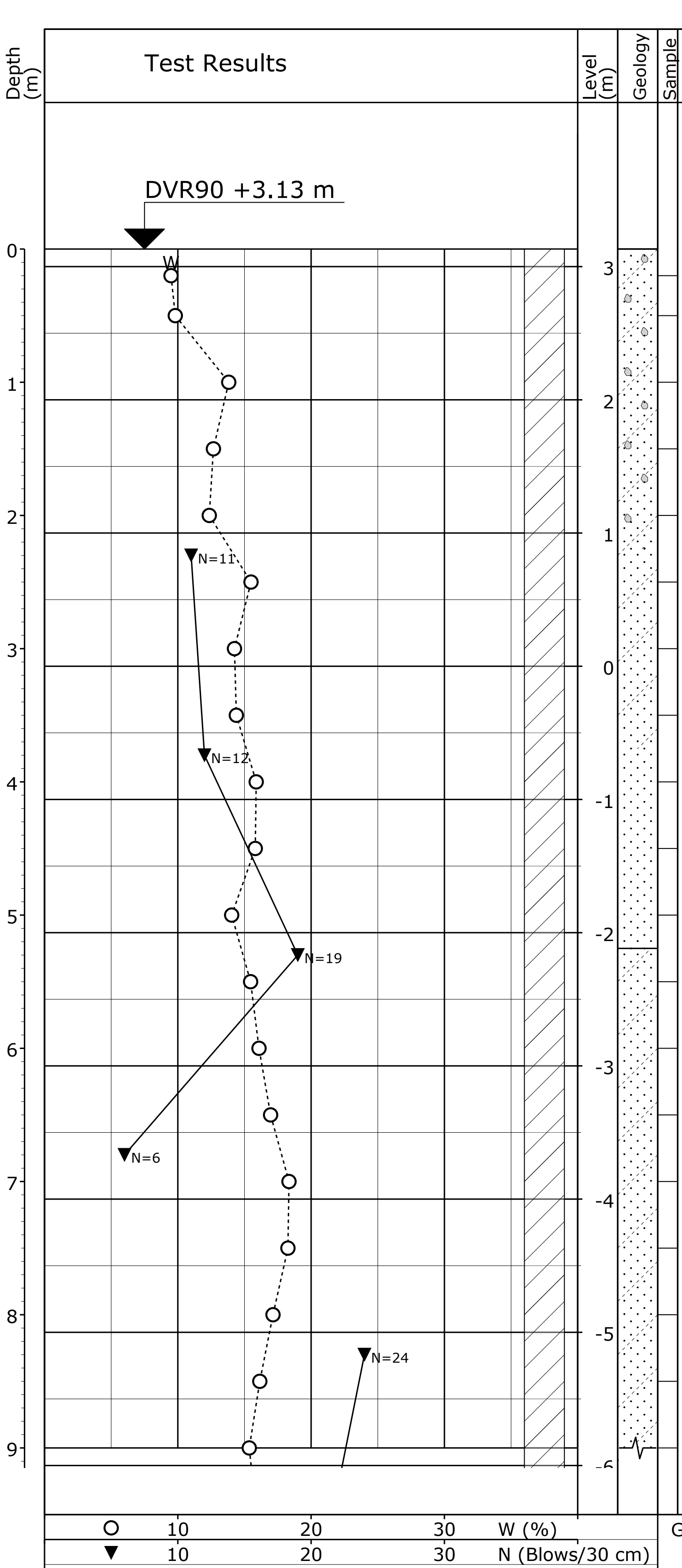
Project: 1100051481 Gilbjerg Hoved, HDD

Drilled by: PAA SS/KG Date: 2022.05.23 Geologist: LSCH Public No.: Borehole: HDD. BH04

Prepared by: LSCH Checked by: RMH Approved by: RMH Date: 2022.06.10 Encl. No.: P. 6/6

RAMBOLL

Borehole Log



Sample No.	Geological Description	Env.	Age
1	SAND, medium - coarse, graded, slightly silty, gravelly, dark yellowish brown, calcareous	Mw	Lg
2	SAND, medium, graded, slightly silty, gravelly, dark yellowish brown, calcareous	Mw	Lg
3	SAND, fine - medium, graded, slightly silty, slightly gravelly, dark yellowish brown, calcareous	Mw	Lg
4	SAND, medium - coarse, poorly graded, slightly silty, slightly gravelly, dark yellowish brown, calcareous	Mw	Lg
5	SAND - " -	Mw	Lg
6	SAND, fine - medium, graded, slightly silty, a few grains of gravel, dark yellowish brown, slightly calcareous	Mw	Lg
7	SAND, medium, graded, slightly silty, a few grains of gravel, dark yellowish brown, calcareous	Mw	Lg
8	SAND, medium - coarse, graded, slightly silty, a few grains of gravel, dark yellowish brown, calcareous	Mw	Lg
9	SAND, medium - coarse, poorly graded, a few grains of gravel, dark yellowish brown, slightly calcareous	Mw	Lg
10	SAND - " -	Mw	Lg
11	SAND, medium - coarse, poorly graded, a few grains of gravel, light olive grey, slightly calcareous	Mw	Lg
	Large sample bag		
12	SAND, medium, graded, slightly silty, light olive grey, slightly calcareous	Mw	Gc
13	SAND, medium, graded, slightly silty, a few grains of gravel, light olive grey, slightly calcareous	Mw	Gc
14	SAND, fine - medium, sorted, slightly silty, brownish grey, slightly calcareous	Mw	Gc
15	SAND - " -	Mw	Gc
16	SAND, fine - medium, poorly graded, slightly silty, brownish grey, slightly calcareous	Mw	Gc
17	SAND - " -	Mw	Gc
18	SAND, fine - medium, poorly graded, slightly silty, grey, slightly calcareous	Mw	Gc
19	SAND - " -	Mw	Gc

Continue

Glacial deposits may contain cobbles and boulders

Method: Cased Shell & Auger 6'
Projection: UTM32E89
X: 703167 (m) Y: 6224980 (m) Plan: 2.101

Project: 1100051481 Gilbjerg Hoved, HDD

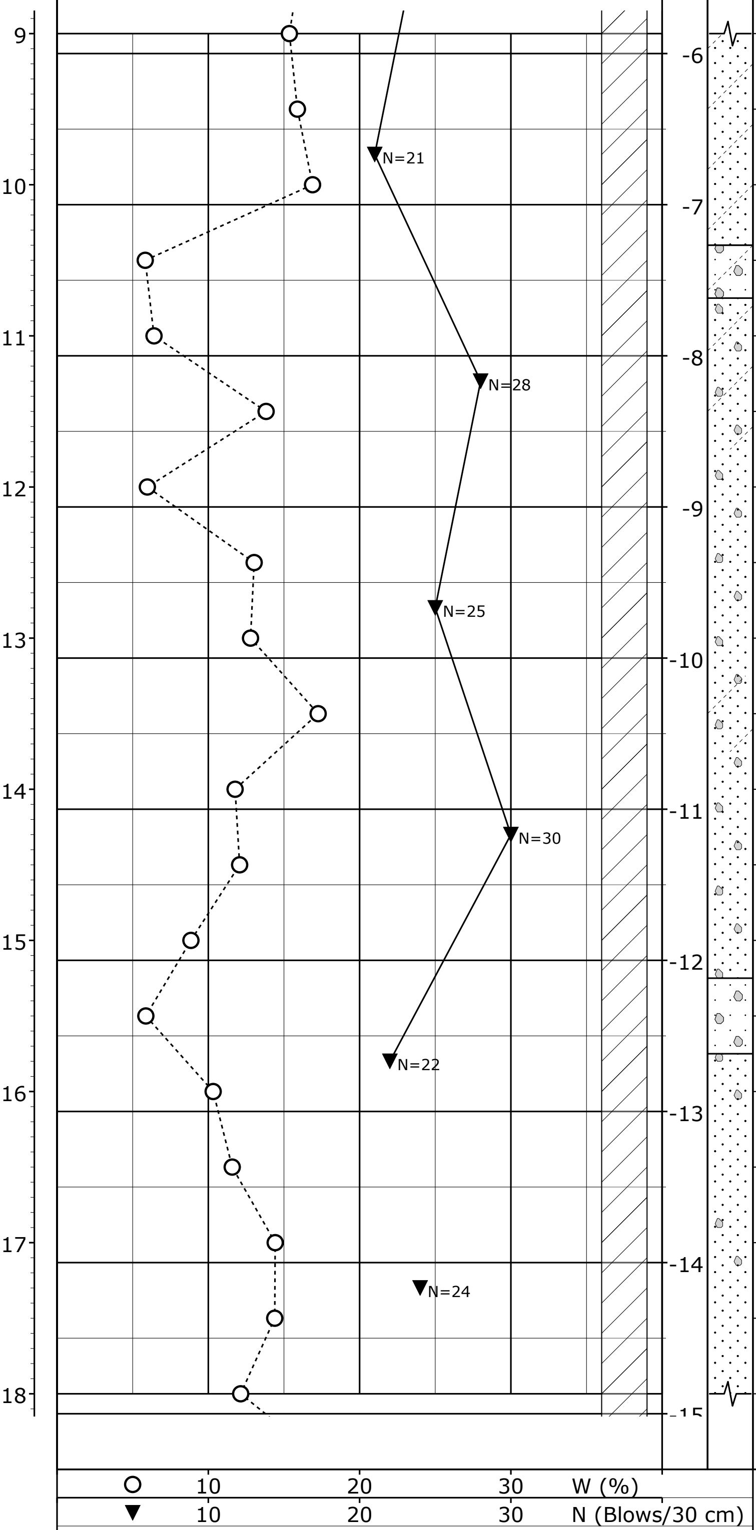
Drilled by: PAA VLJ/PB Date: 2022.04.25 Geologist: LSCH Public No.: Borehole: HDD. BH05

Prepared by: LSCH Checked by: RMH Approved by: RMH Date: 2022.06.10 Encl. No.: P. 1/3

RAMBOLL

Borehole Log

Depth (m)	Test Results	Level (m)	Geology	Sample	Sample No.	Geological Description	Env.	Age



Continued

Sample No.	Geological Description	Env.	Age
19	SAND - " -	Mw	Gc
20	SAND, fine - medium, graded, silty, grey, slightly calcareous	Mw	Gc
21	SAND, medium, graded, silty, grey, slightly calcareous Large sample bag	Mw	Gc
22	GRAVEL, fine, graded, slightly silty, sandy, grey, calcareous	Mw	Gc
23	SAND, fine - coarse, well graded, silty, gravelly, grey, calcareous	Mw	Gc
24	SAND, coarse, graded, slightly silty, very gravelly, grey, calcareous	Mw	Gc
25	SAND, medium - coarse, graded, very gravelly, grey, calcareous	Mw	Gc
26	SAND, medium - coarse, graded, gravelly, grey, calcareous	Mw	Gc
27	SAND - " -	Mw	Gc
28	SAND, medium, poorly graded, slightly silty, gravelly, grey, calcareous	Mw	Gc
29	SAND, coarse, poorly graded, gravelly, grey, calcareous	Mw	Gc
30	SAND - " -	Mw	Gc
31	SAND - " - Large sample bag	Mw	Gc
32	GRAVEL, medium, graded, very sandy, grey, calcareous	Mw	Gc
33	SAND, coarse, graded, slightly gravelly, grey, calcareous	Mw	Gc
34	SAND, medium - coarse, poorly graded, grey, calcareous	Mw	Gc
35	SAND, medium - coarse, poorly graded, gravelly, grey, calcareous	Mw	Gc
36	SAND, medium - coarse, poorly graded, grey, calcareous	Mw	Gc
37	SAND - " -	Mw	Gc

Continue

Glacial deposits may contain cobbles and boulders

Method: Cased Shell & Auger 6'
Projection: UTM32E89
X: 703167 (m) Y: 6224980 (m) Plan: 2.101

Project: 1100051481 Gilbjerg Hoved, HDD

Drilled by: PAA VLJ/PB Date: 2022.04.25 Geologist: LSCH Public No.: Borehole: HDD. BH05

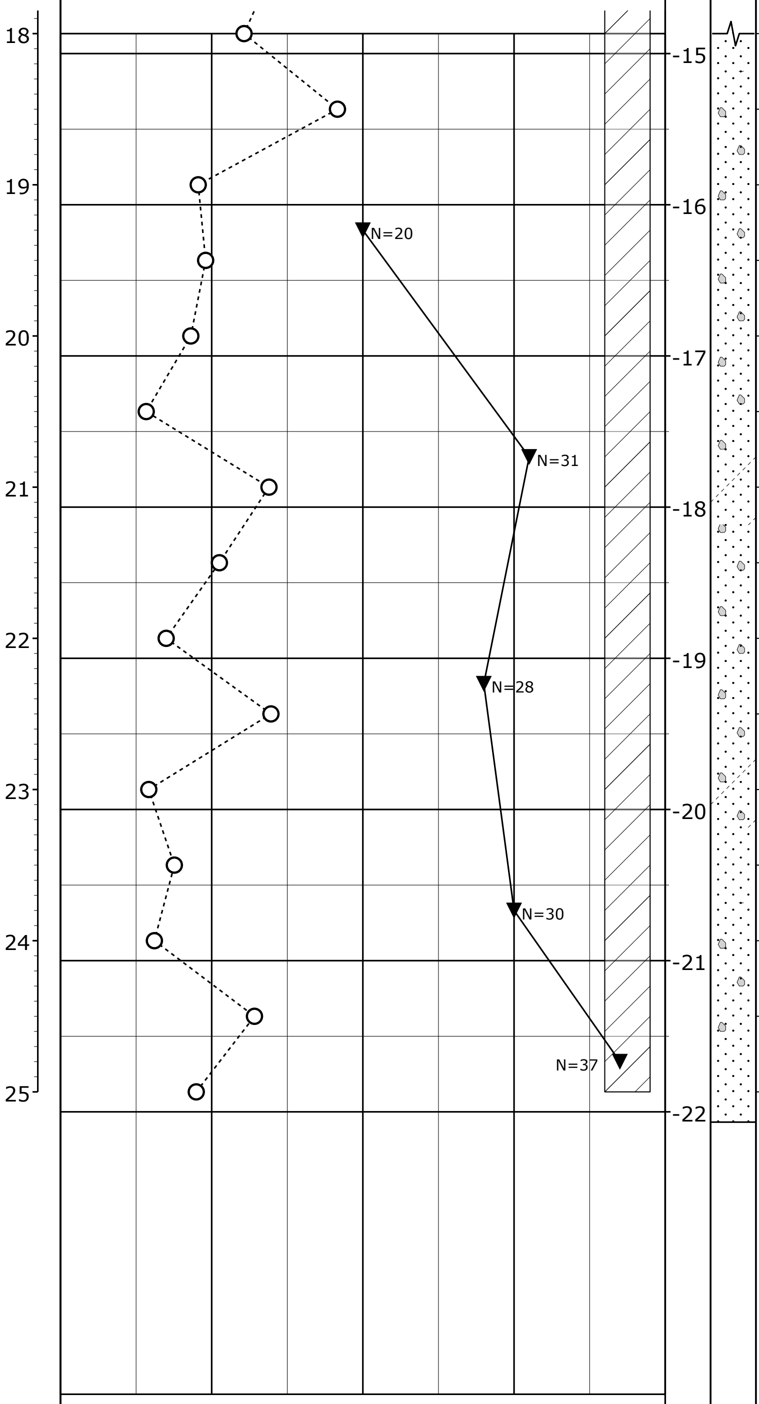
Prepared by: LSCH Checked by: RMH Approved by: RMH Date: 2022.06.10 Encl. No.: P. 2/3

RAMBOLL

Borehole Log

Depth (m)	Test Results	Level (m)	Geology	Sample	Sample No.	Geological Description	Env.	Age

Continued



Sample No.	Geological Description	Env.	Age
37	SAND - " -	Mw	Gc
38	SAND, medium - coarse, graded, gravelly, grey, calcareous	Mw	Gc
39	SAND, medium - coarse, graded, slightly gravelly, grey, calcareous	Mw	Gc
40	SAND - " -	Mw	Gc
41	SAND - " - Large sample bag	Mw	Gc
42	SAND, medium - coarse, graded, slightly gravelly, grey, calcareous	Mw	Gc
43	SAND, medium, poorly graded, slightly silty, grey, calcareous	Mw	Gc
44	SAND, medium - coarse, poorly graded, slightly gravelly, grey, calcareous	Mw	Gc
45	SAND, medium - coarse, sorted, slightly gravelly, grey, calcareous	Mw	Gc
46	SAND, medium - coarse, poorly graded, lumps of clay, slightly gravelly, grey, calcareous	Mw	Gc
47	SAND, fine - medium, poorly graded, slightly silty, slightly gravelly, grey, calcareous	Mw	Gc
48	SAND, medium - coarse, poorly graded, a few grains of gravel, grey, calcareous	Mw	Gc
49	SAND, fine - medium, poorly graded, slightly gravelly, grey, calcareous	Mw	Gc
50	SAND, medium - coarse, poorly graded, slightly gravelly, grey, calcareous	Mw	Gc
51	SAND, fine - medium, poorly graded, a few grains of gravel, grey, calcareous Large sample bag	Mw	Gc

Symbol				
○	10	20	30	W (%)
▼	10	20	30	N (Blows/30 cm)

Glacial deposits may contain cobbles and boulders

Method: Cased Shell & Auger 6'
Projection: UTM32E89
X: 703167 (m) Y: 6224980 (m) Plan: 2.101

Project: 1100051481 Gilbjerg Hoved, HDD

Drilled by: PAA VLJ/PB Date: 2022.04.25 Geologist: LSCH Public No.: Borehole: HDD. BH05

Prepared by: LSCH Checked by: RMH Approved by: RMH Date: 2022.06.10 Encl. No.: P. 3/3

RAMBOLL

Borehole Log

APPENDIX 5.1-5.5 – PARTICLE SIZE DISTRIBUTION

PER AARSLEFF A/S Laboratorium

TEST METHODS: DS/EN 933-1, DS/EN 933-9, DS/EN 1744-1, prVI 99-11

Inspection Section	BH01-S17-8,0
Sample Description	Sand, fine-medium
Location	Gilbjerg Hoved

Lab Number	
Job Number	908091-1100051481
Date Sampled	16. jun 2022

Sieving

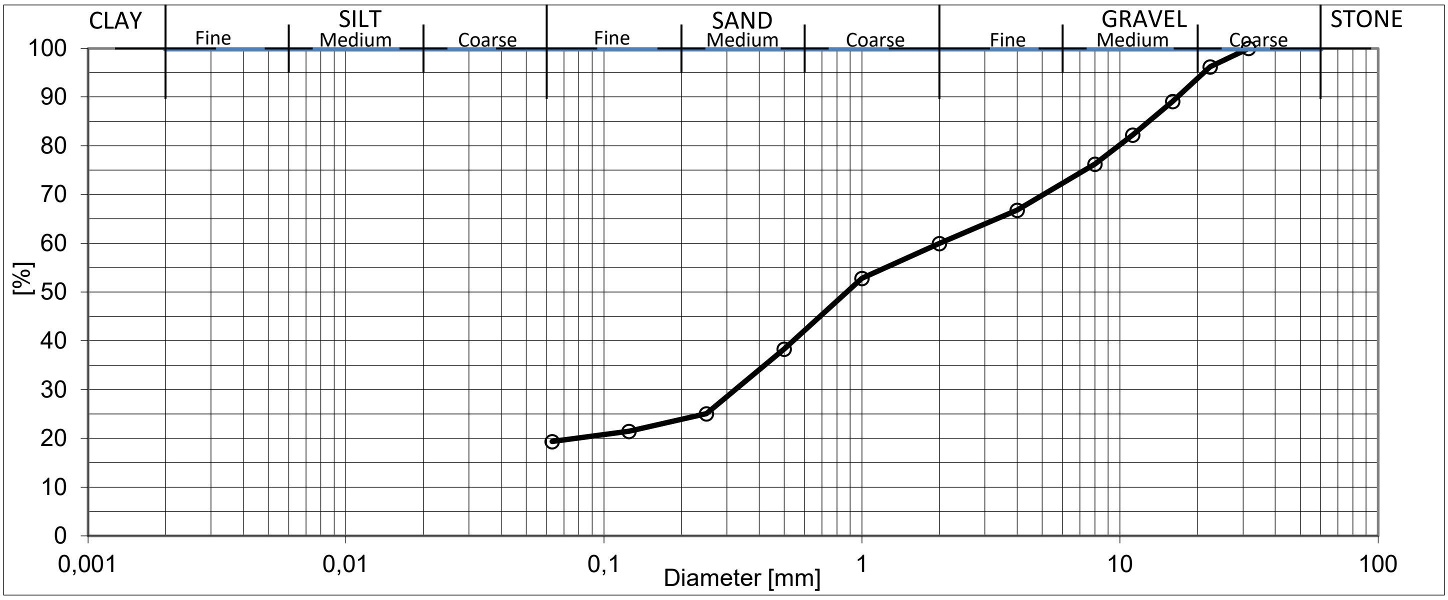
Sieve size [mm]	Passing %
31,5	100,0
22,4	96,2
16	89,1
11,2	82,2
8	76,3
4	66,8
2	60,0
1	52,8
0,5	38,3
0,25	25,0
0,125	21,4
0,063	19,4

Results

D_{85}	12,93
D_{60}	2,00
D_{50}	0,87
D_{15}	
D_{10}	

Coefficient of uniformity

D_{60}/D_{10}	



Made By: THAND

Checked By: CVZ

Date: 17. jun 2022

Date: 17. jun 2022

PER AARSLEFF A/S Laboratorium

TEST METHODS: DS/EN 933-1, DS/EN 933-9, DS/EN 1744-1, prVI 99-11

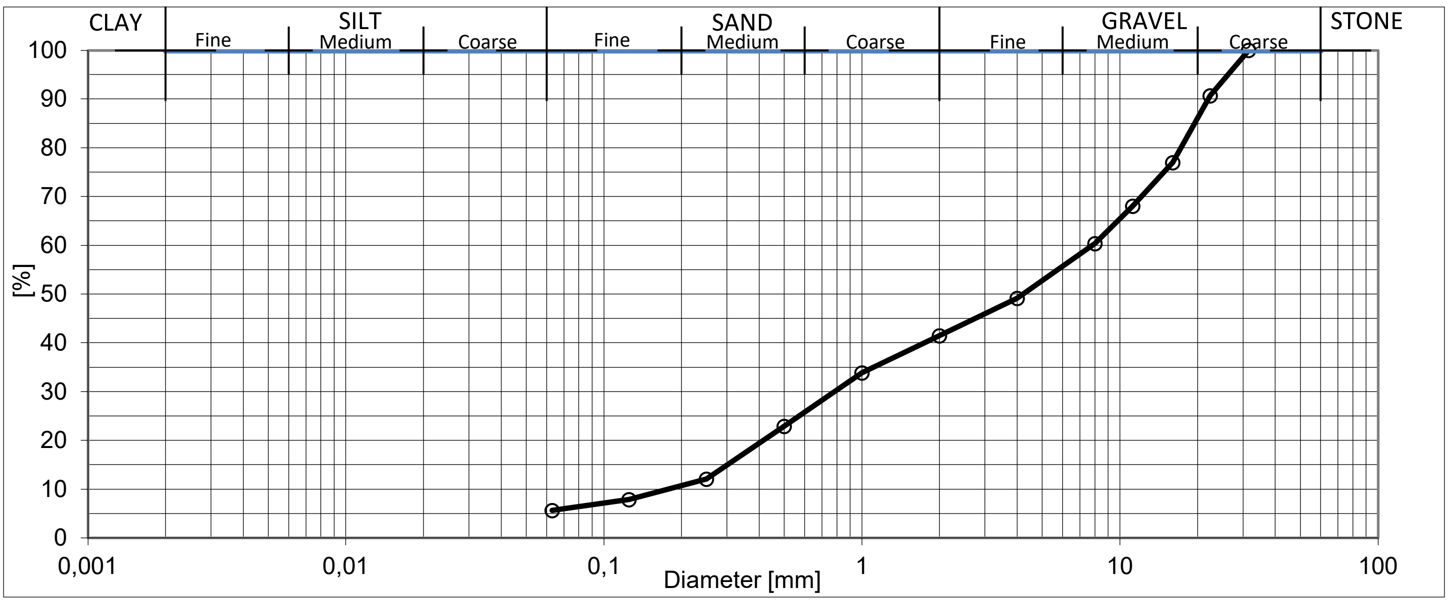
Inspection Section	BH01-S28-13,5
Sample Description	Sand, fine - medium
Location	Gilbjerg Hoved

Lab Number	
Job Number	908091-1100051481
Date Sampled	14. jun 2022

Sieving	
Sieve size [mm]	Passing %
31,5	100,0
22,4	90,7
16	76,9
11,2	68,0
8	60,3
4	49,1
2	41,5
1	33,9
0,5	22,9
0,25	12,1
0,125	7,9
0,063	5,7

Results	
D_{85}	19,49
D_{60}	7,83
D_{50}	4,22
D_{15}	0,30
D_{10}	0,18

Coefficient of uniformity	
D_{60}/D_{10}	44,12



Made By: MALT / THAND

Date: 14-06 / 16-06-2022

Checked By: CVZ

Date: 17. jun 2022

PER AARSLEFF A/S Laboratorium

TEST METHODS: DS/EN 933-1, DS/EN 933-9, DS/EN 1744-1, prVI 99-11

AARSLEFF

Inspection Section	BH01-S41-20
Sample Description	Sand, medium
Location	Gilbjerg Hoved

Lab Number	
Job Number	908091-1100051481
Date Sampled	20. jun 2022

Sieving

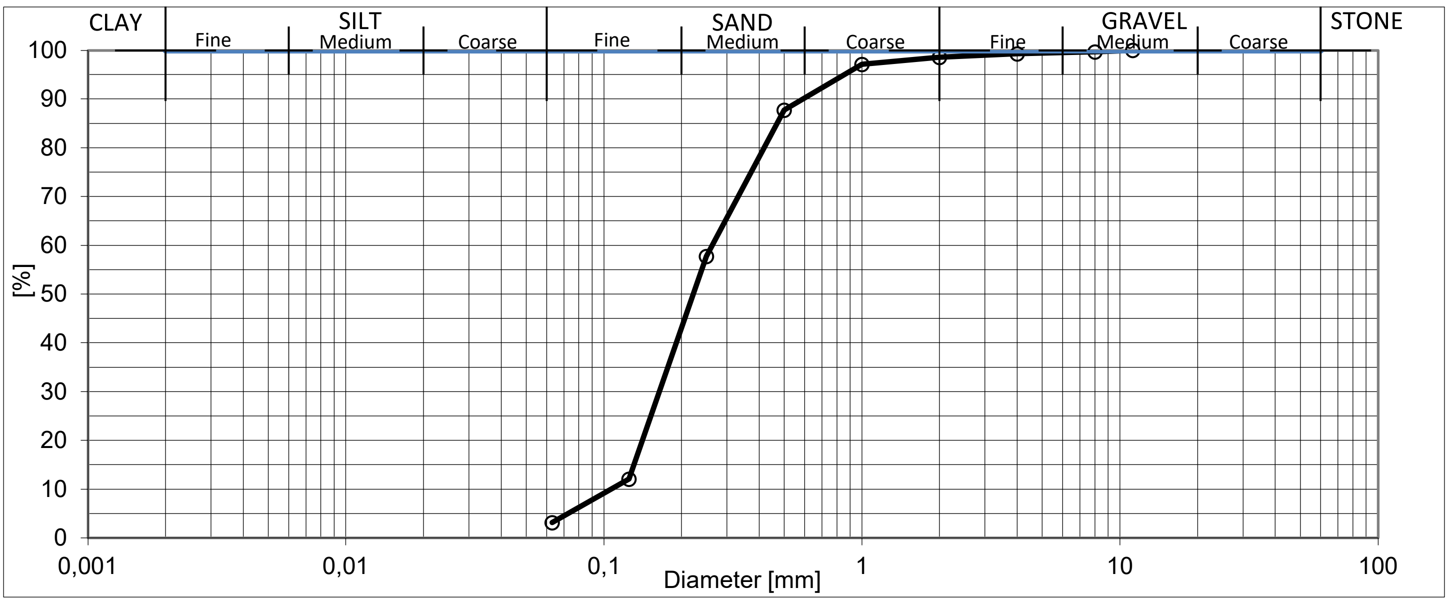
Sieve size [mm]	Passing %
11,2	100,0
8	99,7
4	99,3
2	98,6
1	97,1
0,5	87,8
0,25	57,7
0,125	12,1
0,063	3,2

Results

D_{85}	0,47
D_{60}	0,26
D_{50}	0,22
D_{15}	0,13
D_{10}	0,11

Coefficient of uniformity

D_{60}/D_{10}	2,48



Made By: THAND

Date: 20. jun 2022

Checked By: CVZ

Date: 20. jun 2022

PER AARSLEFF A/S Laboratorium

TEST METHODS: DS/EN 933-1, DS/EN 933-9, DS/EN 1744-1, prVI 99-11

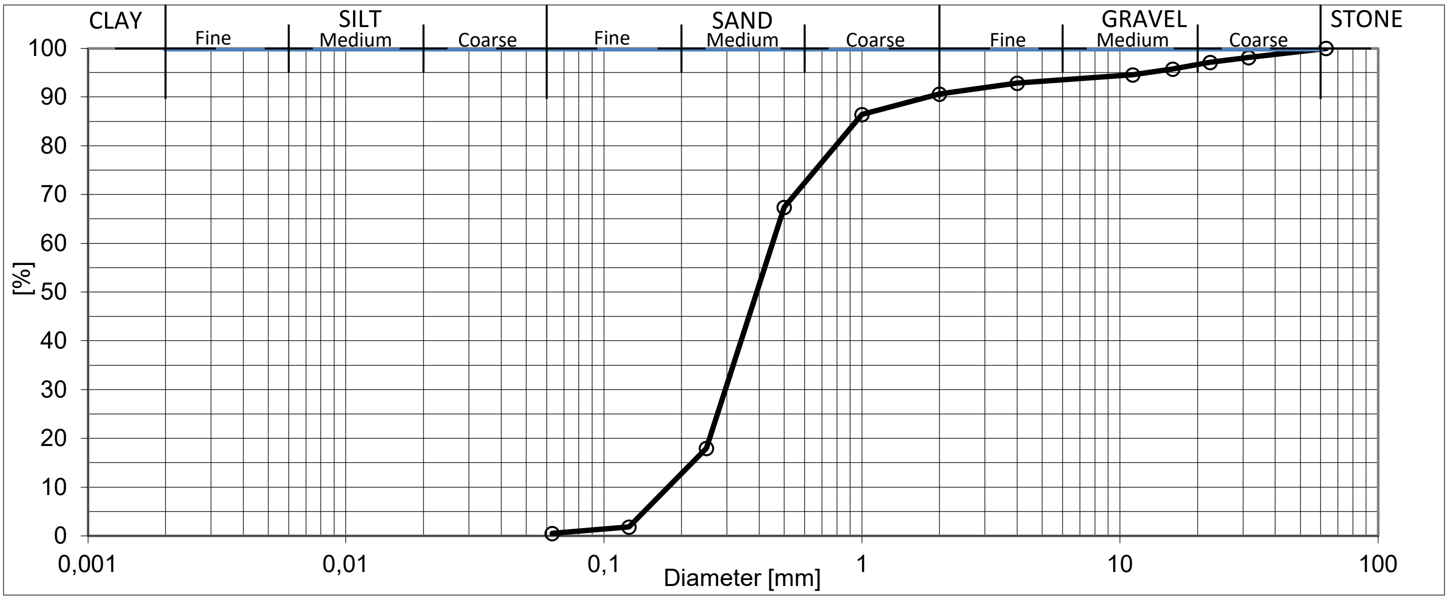
Inspection Section	BH01-S51-25
Sample Description	Sand, medium
Location	Gilbjerg Hoved

Lab Number	
Job Number	908091-1100051481
Date Sampled	20. jun 2022

Sieving	
Sieve size [mm]	Passing %
63	100,0
31,5	98,1
22,4	97,1
16	95,7
11,2	94,6
4	92,9
2	90,6
1	86,4
0,5	67,4
0,25	18,0
0,125	1,8
0,063	0,5

Results	
D_{85}	0,95
D_{60}	0,45
D_{50}	0,39
D_{15}	0,22
D_{10}	0,18

Coefficient of uniformity	
D_{60}/D_{10}	2,54



Made By: THAND

Date: 20. jun 2022

Checked By: CVZ

Date: 20. jun 2022

PER AARSLEFF A/S Laboratorium

TEST METHODS: DS/EN 933-1, DS/EN 933-9, DS/EN 1744-1, prVI 99-11

Inspection Section	BH02-S11-5
Sample Description	Sand, fine - medium
Location	Gilbjerg Hoved

Lab Number	
Job Number	908091-1100051481
Date Sampled	17. jun 2022

Sieving

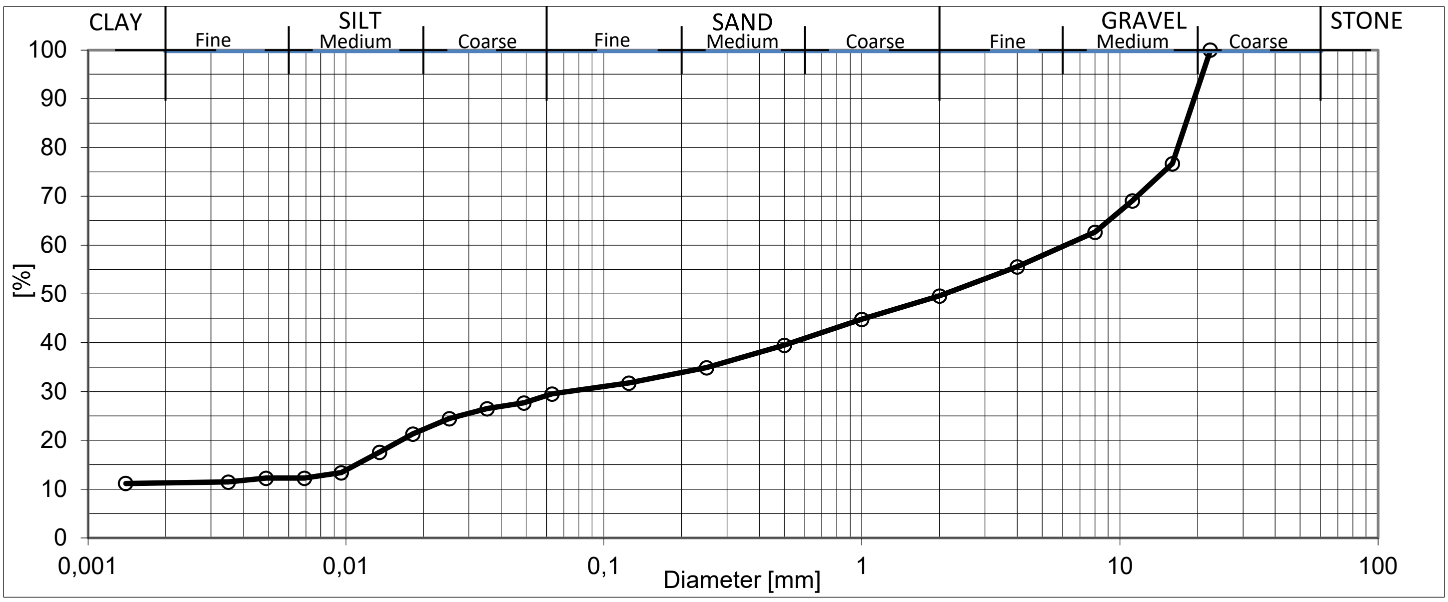
Sieve size [mm]	Passing %
22,4	100,0
16	76,7
11,2	69,1
8	62,7
4	55,6
2	49,6
1	44,8
0,5	39,5
0,25	34,9
0,125	31,7
0,063	29,6
0,049	27,7
0,0353	26,5
0,0252	24,5
0,0182	21,3
0,0135	17,6
0,0096	13,4
0,0069	12,3
0,0049	12,3
0,0035	11,5
0,0014	11,2

Results

D_{85}	18,03
D_{60}	6,16
D_{50}	2,09
D_{15}	0,012
D_{10}	

Coefficient of uniformity

D_{60}/D_{10}	



Made By: THME

Date: 17. jun 2022

Checked By: CVZ

Date: 21. jun 2022

PER AARSLEFF A/S Laboratorium

TEST METHODS: DS/EN 933-1, DS/EN 933-9, DS/EN 1744-1, prVI 99-11

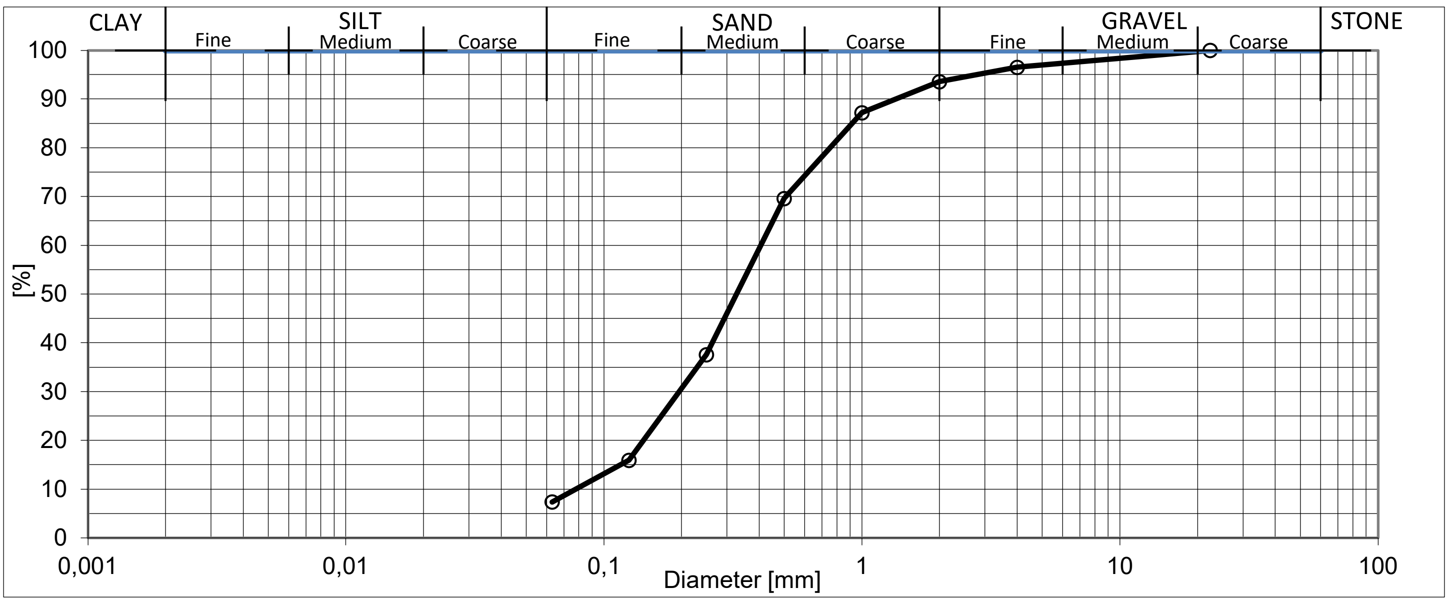
Inspection Section	BH02-S19-9
Sample Description	Sand, medium -coarse
Location	Gilbjerg Hoved

Lab Number	
Job Number	908091-1100051481
Date Sampled	16. jun 2022

Sieving	
Sieve size [mm]	Passing %
22,4	100,0
4	96,5
2	93,6
1	87,2
0,5	69,6
0,25	37,6
0,125	15,9
0,063	7,4

Results	
D_{85}	0,92
D_{60}	0,41
D_{50}	0,33
D_{15}	0,12
D_{10}	0,08

Coefficient of uniformity	
D_{60}/D_{10}	5,23



Made By: THME

Date: 17. jun 2022

Checked By: CVZ

Date: 17. jun 2022

PER AARSLEFF A/S Laboratorium

TEST METHODS: DS/EN 933-1, DS/EN 933-9, DS/EN 1744-1, prVI 99-11

AARSLEFF

Inspection Section	BH02-S29-14
Sample Description	Gravel
Location	Gilbjerg Hoved

Lab Number	
Job Number	908091-1100051481
Date Sampled	17. jun 2022

Sieving

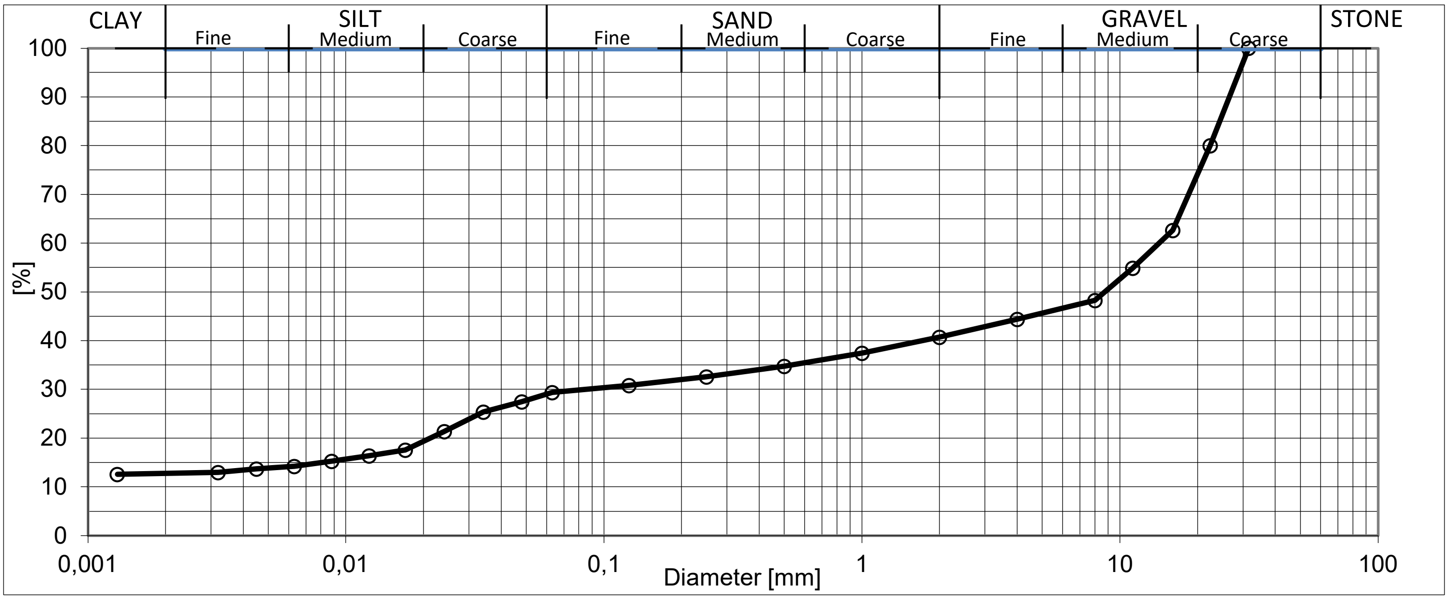
Sieve size [mm]	Passing %
31,5	100,0
22,4	80,0
16	62,6
11,2	54,9
8	48,3
4	44,4
2	40,7
1	37,4
0,5	34,8
0,25	32,6
0,125	30,8
0,063	29,4
0,0481	27,5
0,0341	25,4
0,0241	21,4
0,017	17,6
0,0123	16,4
0,0088	15,3
0,0063	14,2
0,0045	13,7
0,0032	13,0
0,0013	12,6

Results

D_{85}	24,39
D_{60}	14,19
D_{50}	8,74
D_{15}	0,008
D_{10}	

Coefficient of uniformity

D_{60}/D_{10}	



Made By: THME

Date: 17. jun 2022

Checked By: CVZ

Date: 21. jun 2022

PER AARSLEFF A/S Laboratorium

TEST METHODS: DS/EN 933-1, DS/EN 933-9, DS/EN 1744-1, prVI 99-11

Inspection Section	BH02-S43-21
Sample Description	Gravel, sandy
Location	Gilbjerg Hoved

Lab Number	
Job Number	908091-1100051481
Date Sampled	16. jun 2022

Sieving

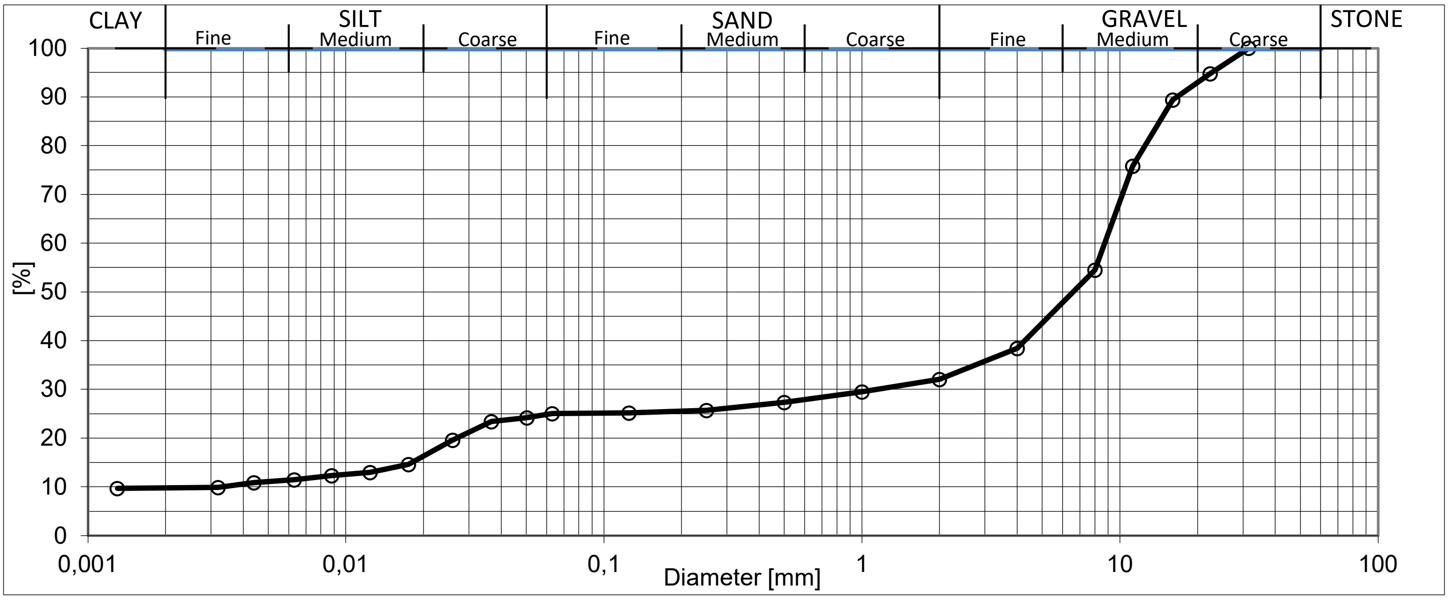
Sieve size [mm]	Passing %
31,5	100,0
22,4	94,8
16	89,4
11,2	75,8
8	54,5
4	38,4
2	32,0
1	29,5
0,5	27,4
0,25	25,7
0,125	25,2
0,063	25,0
0,0503	24,2
0,0366	23,4
0,0259	19,6
0,0175	14,6
0,0124	13,0
0,0088	12,3
0,0063	11,5
0,0044	10,9
0,0032	9,9
0,0013	9,7

Results

D_{85}	14,25
D_{60}	8,72
D_{50}	6,58
D_{15}	0,02
D_{10}	0,003

Coefficient of uniformity

D_{60}/D_{10}	



Made By: THME

Date: 17. jun 2022

Checked By: CVZ

Date: 21. jun 2022

PER AARSLEFF A/S Laboratorium

TEST METHODS: DS/EN 933-1, DS/EN 933-9, DS/EN 1744-1, prVI 99-11

AARSLEFF

Inspection Section	BH02-S48-23,5
Sample Description	Sand, medium - coarse
Location	Gilbjerg Hoved

Lab Number	
Job Number	908091-1100051481
Date Sampled	16. jun 2022

Sieving

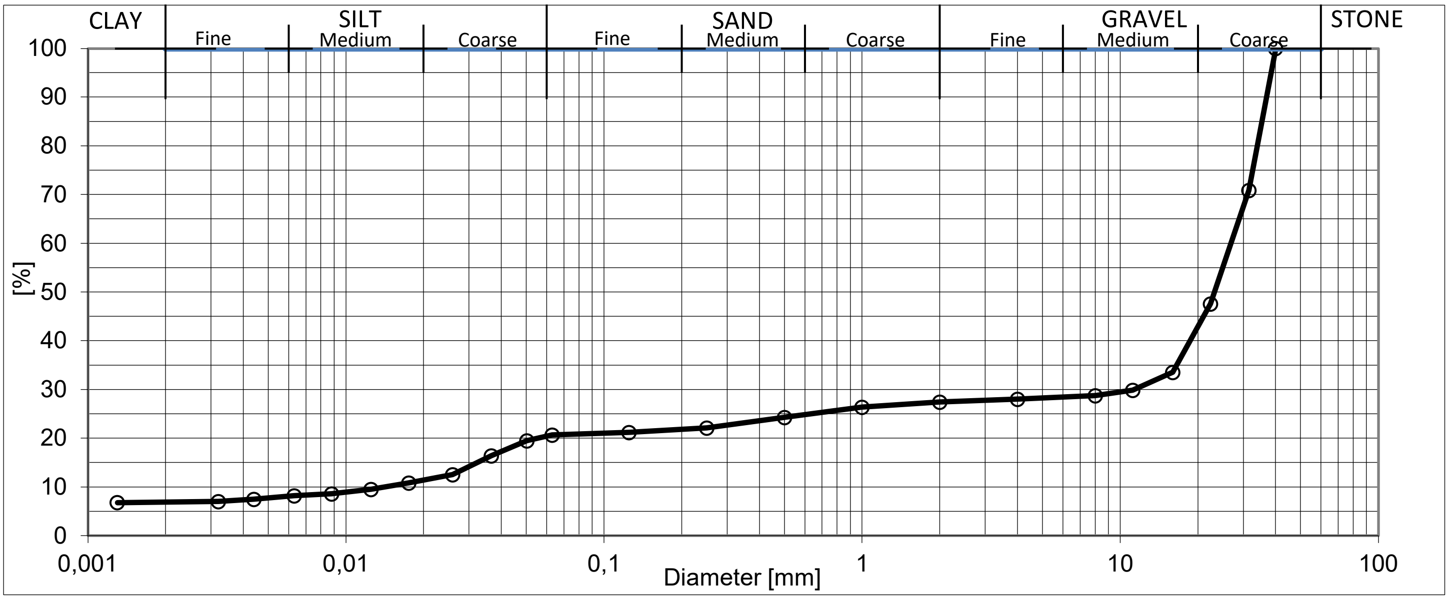
Sieve size [mm]	Passing %
40	100,0
31,5	70,8
22,4	47,6
16	33,6
11,2	29,8
8	28,7
4	28,0
2	27,4
1	26,4
0,5	24,3
0,25	22,1
0,125	21,2
0,063	20,7
0,0503	19,5
0,0366	16,4
0,0259	12,5
0,0175	10,8
0,0125	9,5
0,0088	8,6
0,0063	8,2
0,0044	7,5
0,0032	7,0
0,0013	6,8

Results

D_{85}	35,37
D_{60}	26,88
D_{50}	23,22
D_{15}	0,028
D_{10}	0,017

Coefficient of uniformity

D_{60}/D_{10}	



Made By: THAND

Checked By: CVZ

Date: 17. jun 2022

Date: 21. jun 2022

PER AARSLEFF A/S Laboratorium

TEST METHODS: DS/EN 933-1, DS/EN 933-9, DS/EN 1744-1, prVI 99-11

AARSLEFF

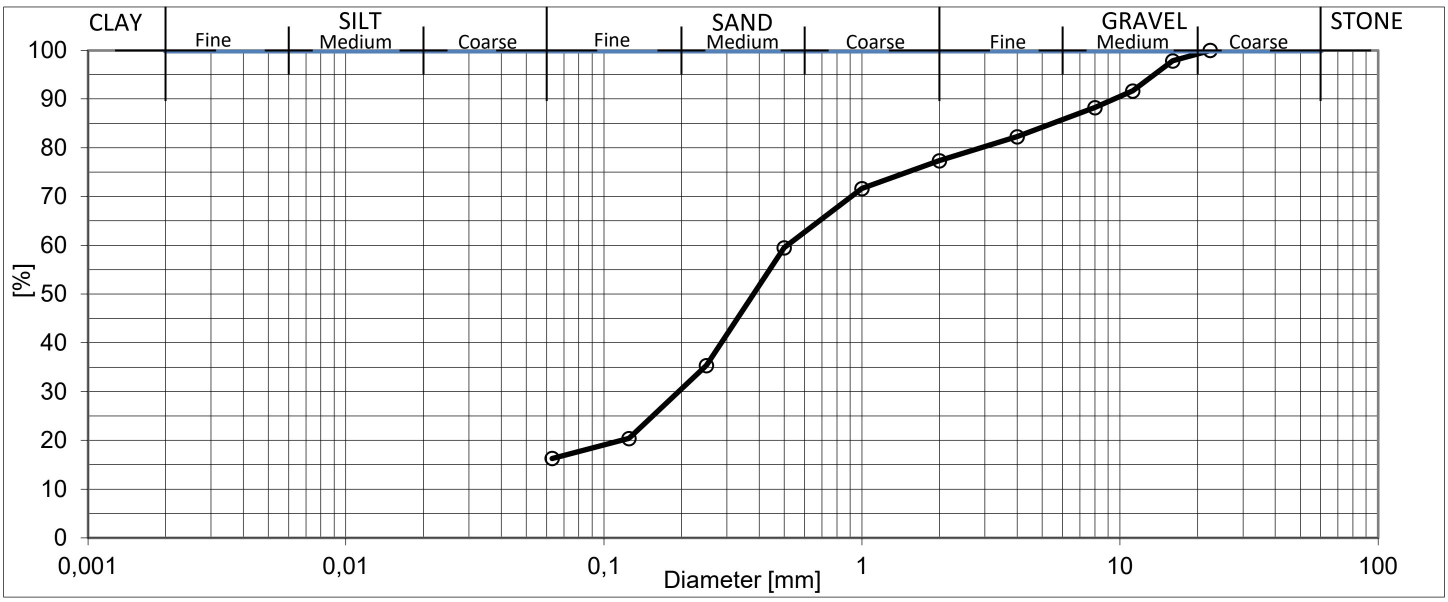
Inspection Section	BH03-S5-2
Sample Description	Sand, fine - medium
Location	Gilbjerg Hoved

Lab Number	
Job Number	908091-1100051481
Date Sampled	15. jun 2022

Sieving	
Sieve size [mm]	Passing %
22,4	100,0
16	97,9
11,2	91,7
8	88,3
4	82,3
2	77,3
1	71,7
0,5	59,5
0,25	35,3
0,125	20,4
0,063	16,3

Results	
D_{85}	5,49
D_{60}	0,51
D_{50}	0,38
D_{15}	
D_{10}	

Coefficient of uniformity	
D_{60}/D_{10}	



Made By: THAND

Date: 16. jun 2022

Checked By: CVZ

Date: 16. jun 2022

PER AARSLEFF A/S Laboratorium

TEST METHODS: DS/EN 933-1, DS/EN 933-9, DS/EN 1744-1, prVI 99-11

Inspection Section	BH03-S15-7
Sample Description	Sand, fine - medium
Location	Gilbjerg Hoved

Lab Number	
Job Number	908091-1100051481
Date Sampled	15. jun 2022

Sieving

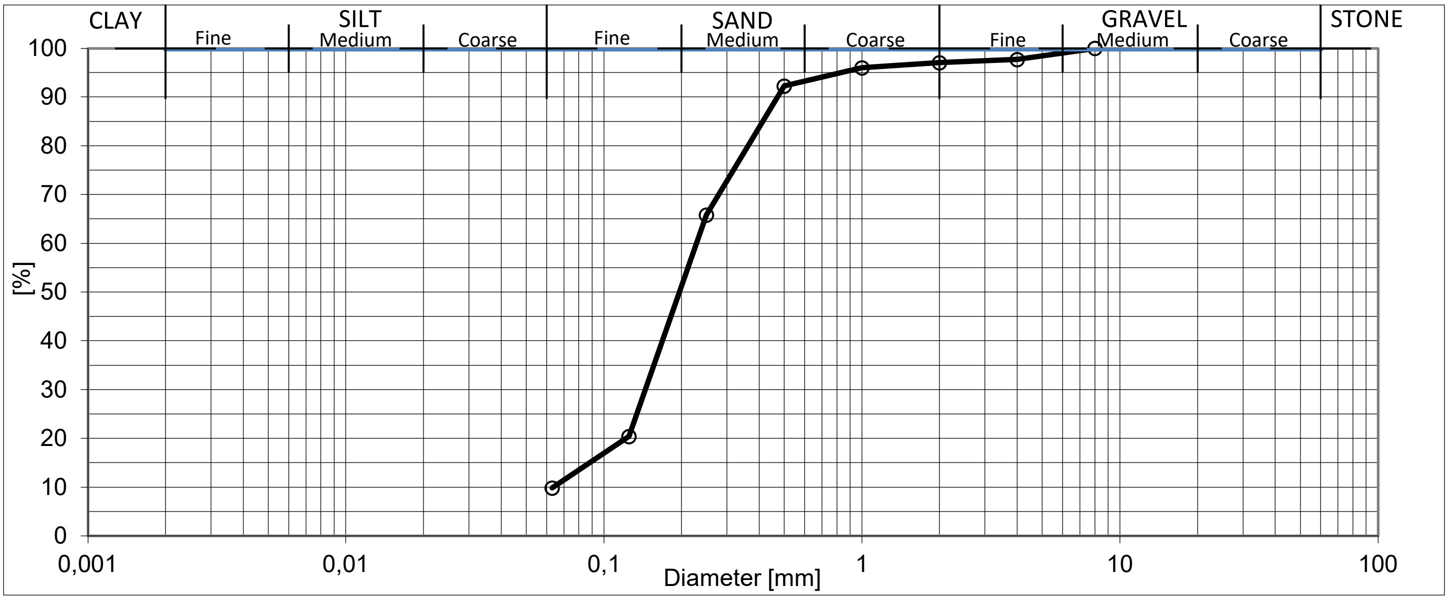
Sieve size [mm]	Passing %
8	100,0
4	97,7
2	97,1
1	96,0
0,5	92,2
0,25	65,8
0,125	20,4
0,063	9,9

Results

D_{85}	0,41
D_{60}	0,23
D_{50}	0,20
D_{15}	0,09
D_{10}	0,06

Coefficient of uniformity

D_{60}/D_{10}	3,60



Made By: THAND

Date: 15. jun 2022

Checked By: CVZ

Date: 17. jun 2022

PER AARSLEFF A/S Laboratorium

TEST METHODS: DS/EN 933-1, DS/EN 933-9, DS/EN 1744-1, prVI 99-11

AARSLEFF

Inspection Section	BH03-S21-10m
Sample Description	Sand, Fine medium
Location	Gilbjerg Hoved

Lab Number	
Job Number	908091-1100051481
Date Sampled	15. jun 2022

Sieving

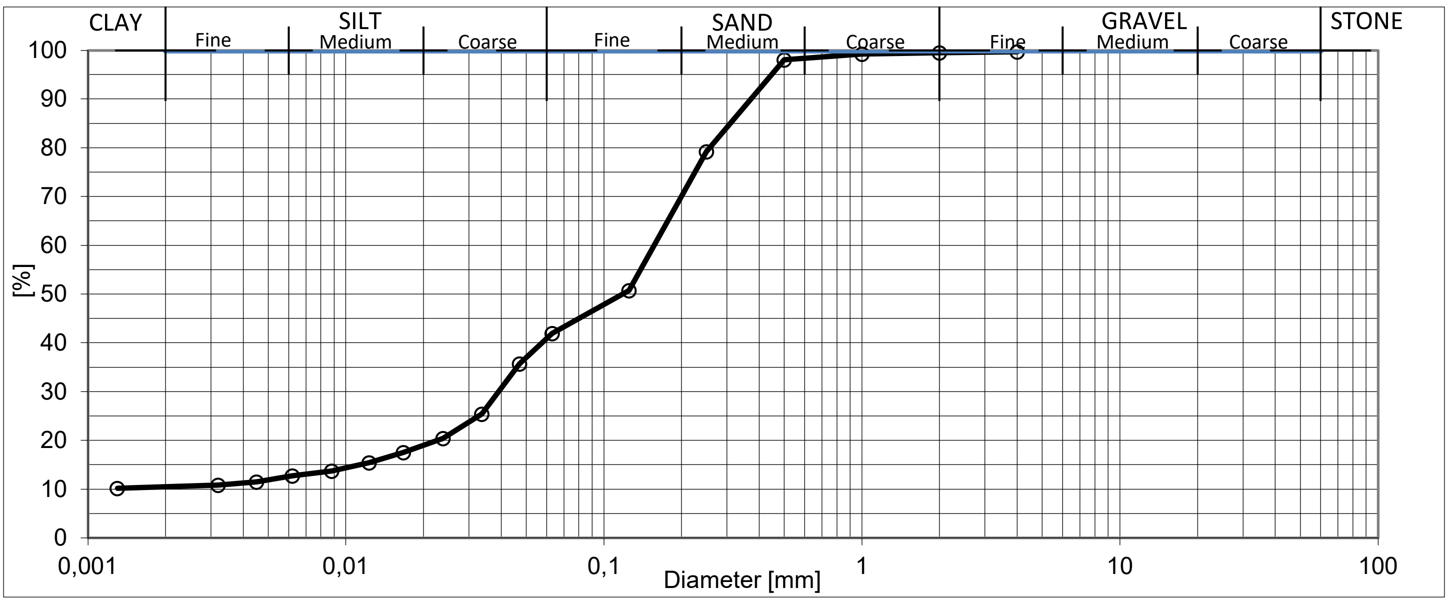
Sieve size [mm]	Passing %
4	99,7
2	99,5
1	99,2
0,5	98,0
0,25	79,2
0,125	50,7
0,063	41,9
0,0471	35,7
0,0336	25,4
0,0238	20,4
0,0167	17,5
0,0123	15,4
0,0088	13,7
0,0062	12,7
0,0045	11,5
0,0032	10,8
0,0013	10,2

Results

D_{85}	0,31
D_{60}	0,16
D_{50}	0,12
D_{15}	0,012
D_{10}	

Coefficient of uniformity

D_{60}/D_{10}	



Made By: THAND

Checked By: CVZ

Date: 15. jun 2022

Date: 21. jun 2022

PER AARSLEFF A/S Laboratorium

TEST METHODS: DS/EN 933-1, DS/EN 933-9, DS/EN 1744-1, prVI 99-11

AARSLEFF

Inspection Section	BH03-S30-15
Sample Description	Sand, medium
Location	Gilbjerg Hoved

Lab Number	
Job Number	908091-1100051481
Date Sampled	16. jun 2022

Sieving

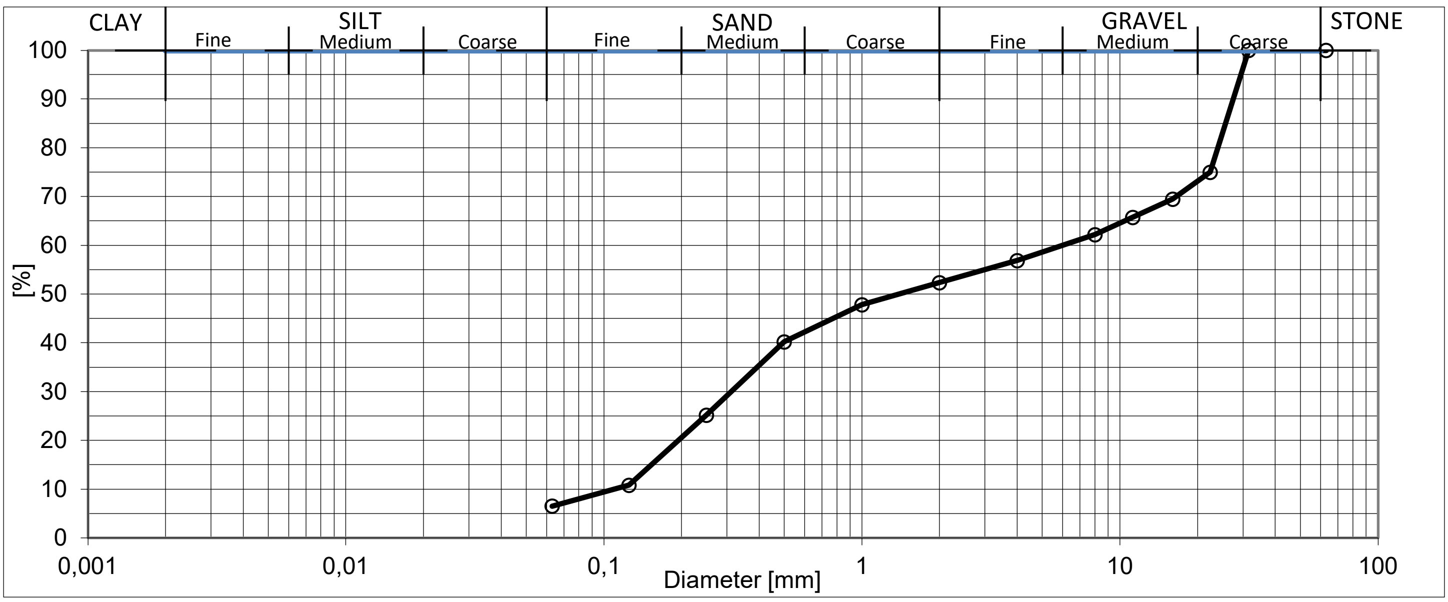
Sieve size [mm]	Passing %
63	100,0
31,5	100,0
22,4	75,0
16	69,5
11,2	65,8
8	62,2
4	56,9
2	52,4
1	47,8
0,5	40,2
0,25	25,2
0,125	10,8
0,063	6,5

Results

D_{85}	25,67
D_{60}	5,98
D_{50}	1,40
D_{15}	0,15
D_{10}	0,11

Coefficient of uniformity

D_{60}/D_{10}	54,63



Made By: THAND

Date: / 15-06-2022

Checked By: CVZ

Date: 16. jun 2022

PER AARSLEFF A/S Laboratorium

TEST METHODS: DS/EN 933-1, DS/EN 933-9, DS/EN 1744-1, prVI 99-11

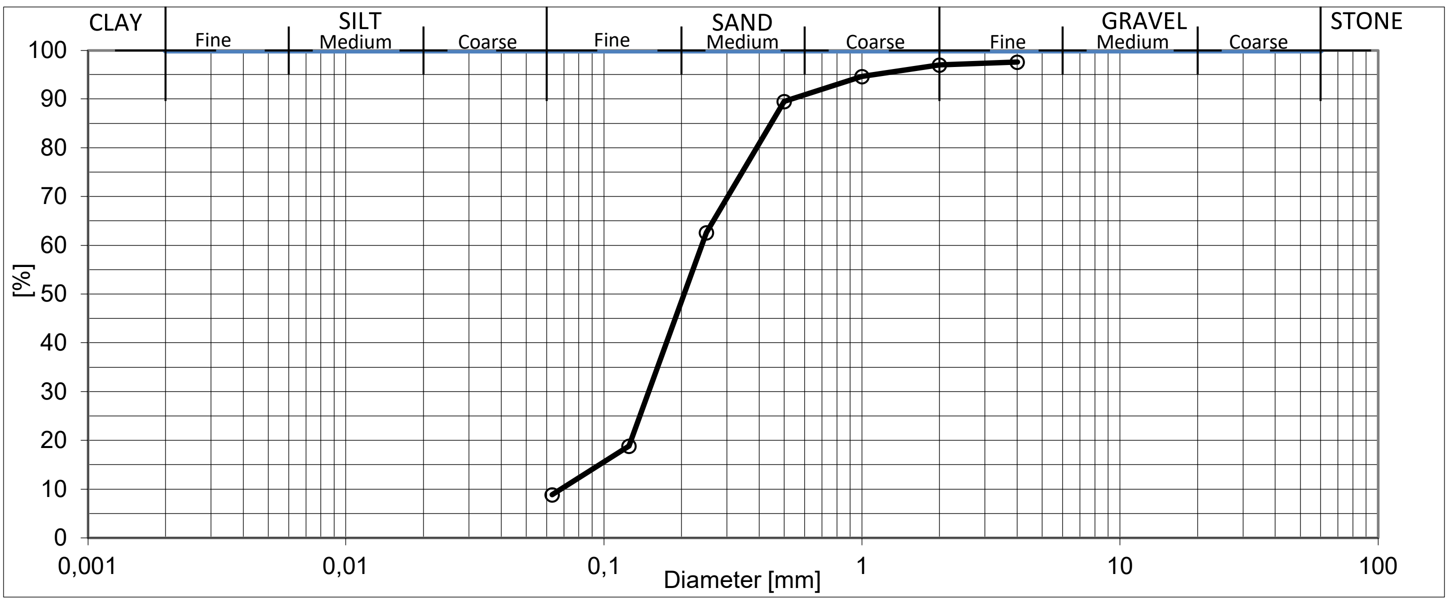
Inspection Section	BH03-S41-20
Sample Description	Sand, fine - medium
Location	Gilbjerg Hoved

Lab Number	
Job Number	908091-1100051481
Date Sampled	17. jun 2022

Sieving	
Sieve size [mm]	Passing %
4	97,6
2	97,0
1	94,7
0,5	89,5
0,25	62,6
0,125	18,8
0,063	8,9

Results	
D_{85}	0,45
D_{60}	0,24
D_{50}	0,20
D_{15}	0,10
D_{10}	0,07

Coefficient of uniformity	
D_{60}/D_{10}	3,53



Made By: THAND

Date: 17. jun 2022

Checked By: CVZ

Date: 17. jun 2022

PER AARSLEFF A/S Laboratorium

TEST METHODS: DS/EN 933-1, DS/EN 933-9, DS/EN 1744-1, prVI 99-11

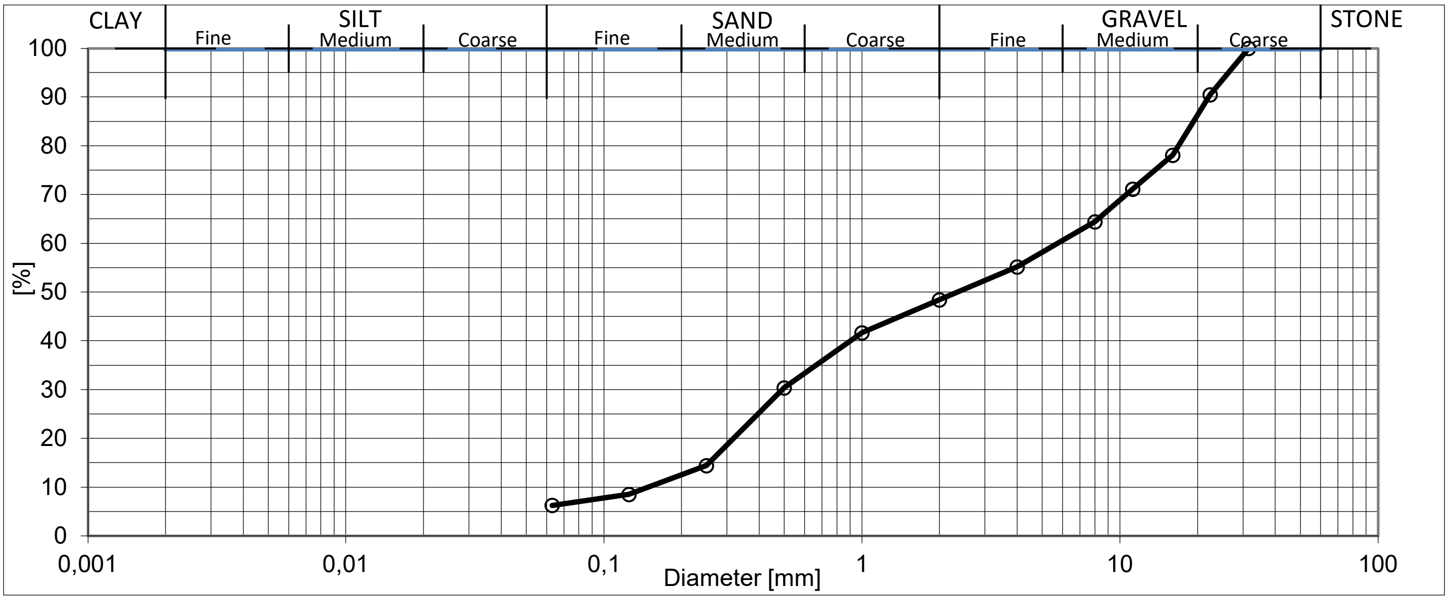
Inspection Section	BH03-S51-25
Sample Description	Sand, medium - coarse
Location	Gilbjerg Hoved

Lab Number	
Job Number	908091-1100051481
Date Sampled	14. jun 2022

Sieving	
Sieve size [mm]	Passing %
31,5	100,0
22,4	90,5
16	78,1
11,2	71,1
8	64,4
4	55,2
2	48,4
1	41,7
0,5	30,4
0,25	14,4
0,125	8,5
0,063	6,3

Results	
D_{85}	19,30
D_{60}	5,74
D_{50}	2,35
D_{15}	0,26
D_{10}	0,15

Coefficient of uniformity	
D_{60}/D_{10}	38,59



Made By: MALT / THAND

Date: 14-06 / 16-06-2022

Checked By: CVZ

Date: 17. jun 2022

PER AARSLEFF A/S Laboratorium

TEST METHODS: DS/EN 933-1, DS/EN 933-9, DS/EN 1744-1, prVI 99-11

AARSLEFF

Inspection Section	BH03-S63-31,5
Sample Description	Sand, Fine medium
Location	Gilbjerg Hoved

Lab Number	
Job Number	908091-1100051481
Date Sampled	15. jun 2022

Sieving

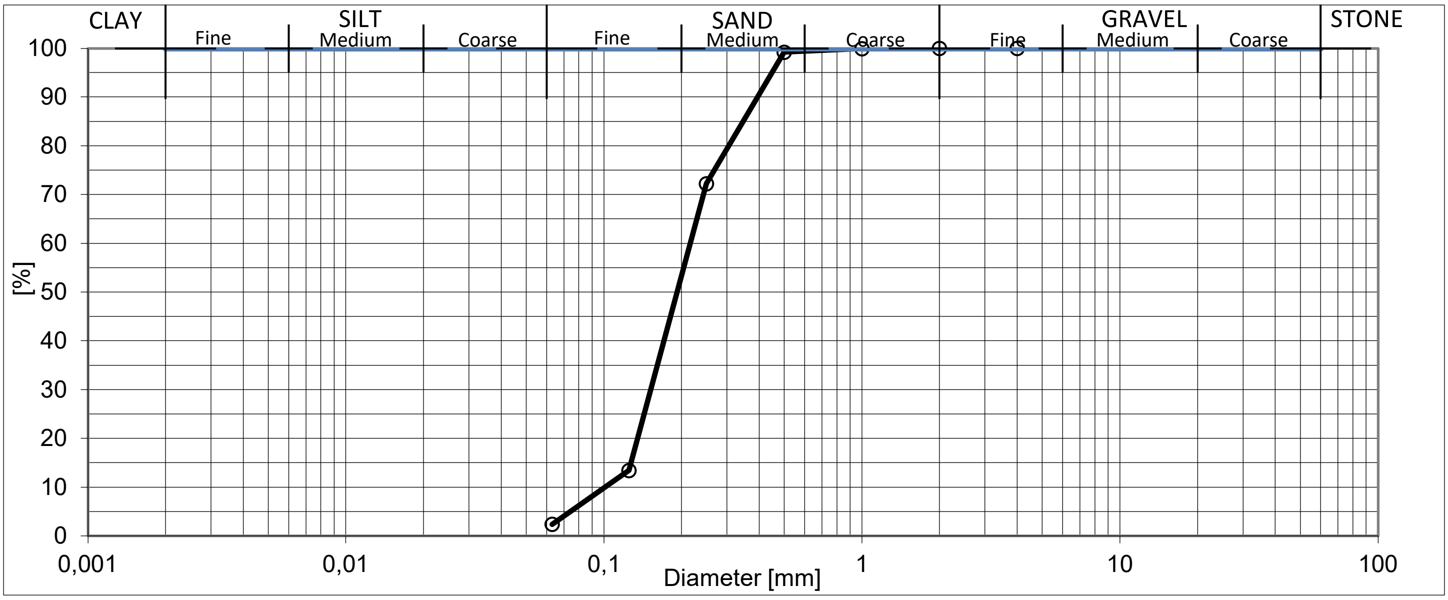
Sieve size [mm]	Passing %
4	100,0
2	100,0
1	99,9
0,5	99,2
0,25	72,2
0,125	13,5
0,063	2,4

Results

D_{85}	0,35
D_{60}	0,22
D_{50}	0,19
D_{15}	0,13
D_{10}	0,10

Coefficient of uniformity

D_{60}/D_{10}	2,15



Made By: THAND

Date: 15. jun 2022

Checked By: CVZ

Date: 16. jun 2022

PER AARSLEFF A/S Laboratorium

TEST METHODS: DS/EN 933-1, DS/EN 933-9, DS/EN 1744-1, prVI 99-11

Inspection Section	BH04-S5-2
Sample Description	Sand, fine - medium
Location	Gilbjerg Hoved

Lab Number	
Job Number	908091-1100051481
Date Sampled	15. jun 2022

Sieving

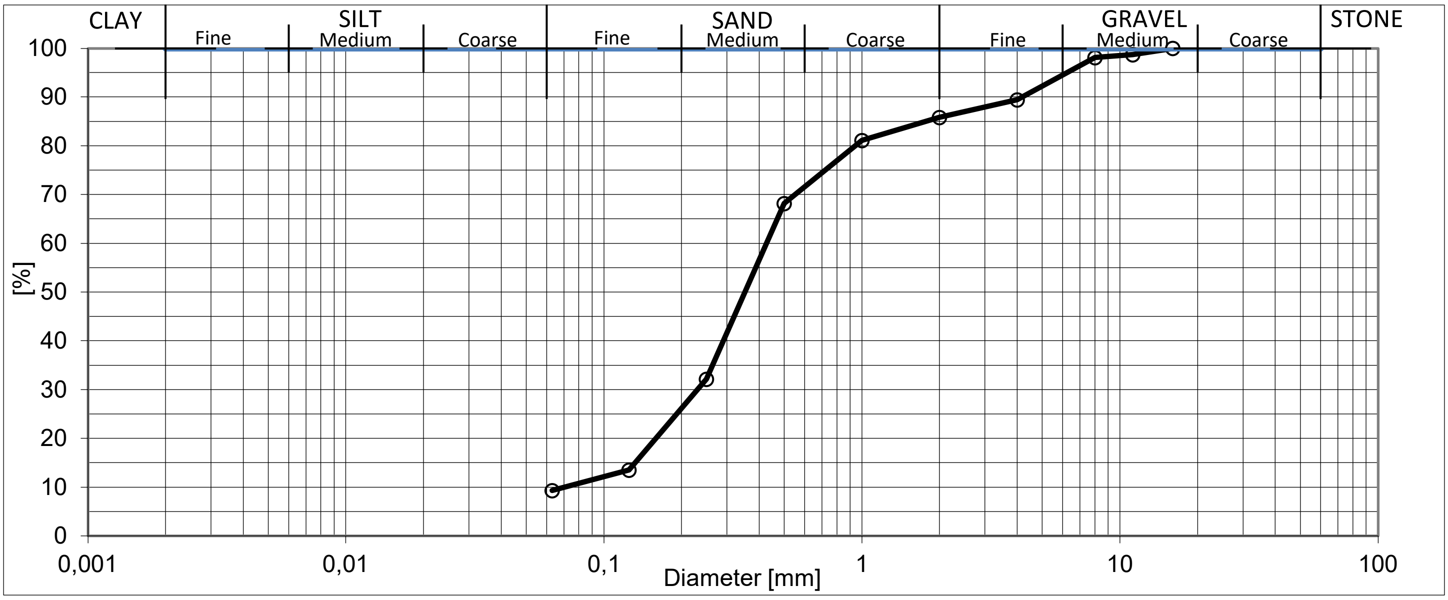
Sieve size [mm]	Passing %
16	100,0
11,2	98,7
8	98,1
4	89,5
2	85,8
1	81,1
0,5	68,2
0,25	32,1
0,125	13,5
0,063	9,3

Results

D_{85}	1,77
D_{60}	0,43
D_{50}	0,35
D_{15}	0,13
D_{10}	0,07

Coefficient of uniformity

D_{60}/D_{10}	6,10



Made By: THAND

Date: 15. jun 2022

Checked By: CVZ

Date: 17. jun 2022

PER AARSLEFF A/S Laboratorium

TEST METHODS: DS/EN 933-1, DS/EN 933-9, DS/EN 1744-1, prVI 99-11

AARSLEFF

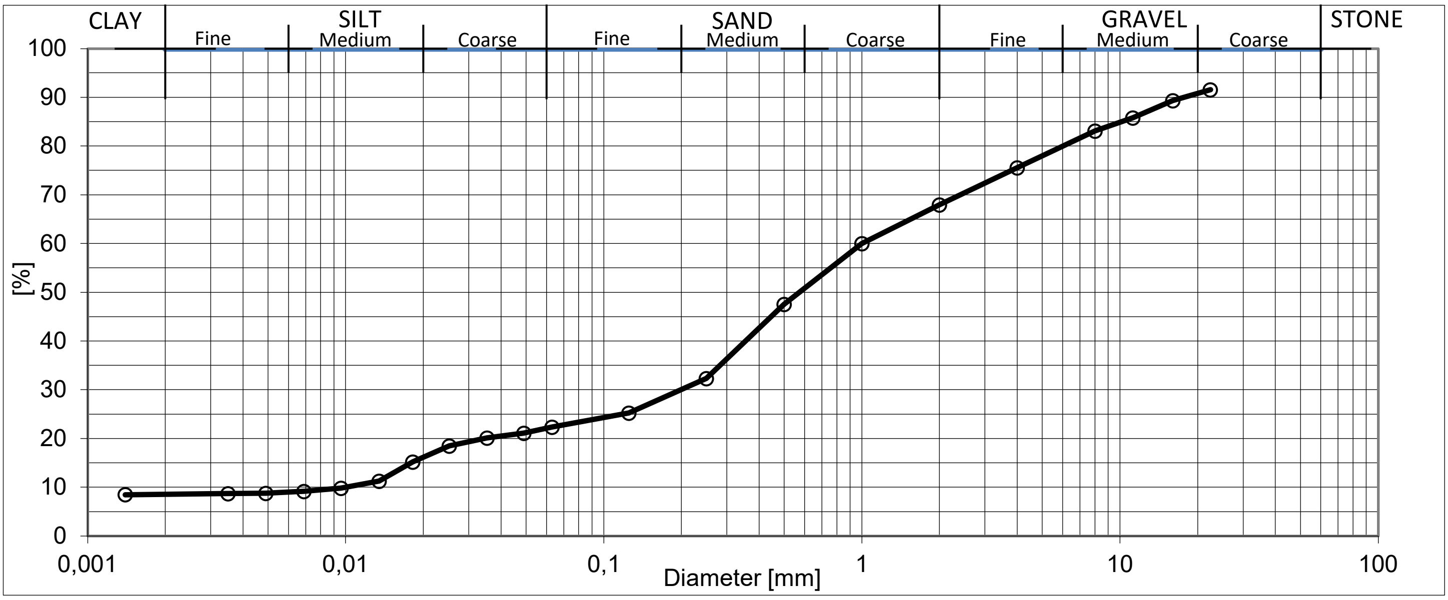
Inspection Section	BH04-S18-8,5
Sample Description	Sand, medium
Location	Gilbjerg Hoved

Lab Number	
Job Number	908091-1100051481
Date Sampled	15. jun 2022

Sieving	
Sieve size [mm]	Passing %
22,4	91,6
16	89,3
11,2	85,8
8	83,1
4	75,5
2	68,0
1	60,0
0,5	47,6
0,25	32,3
0,125	25,3
0,063	22,3
0,049	21,1
0,0353	20,1
0,0252	18,5
0,0182	15,2
0,0135	11,3
0,0096	9,8
0,0069	9,2
0,0049	8,8
0,0035	8,7
0,0014	8,5

Results	
D_{85}	10,17
D_{60}	1,00
D_{50}	0,57
D_{15}	0,018
D_{10}	0,010

Coefficient of uniformity	
D_{60}/D_{10}	99,96



Made By: THAND

Date: 15. jun 2022

Checked By: CVZ

Date: 22. jun 2022

PER AARSLEFF A/S Laboratorium

TEST METHODS: DS/EN 933-1, DS/EN 933-9, DS/EN 1744-1, prVI 99-11

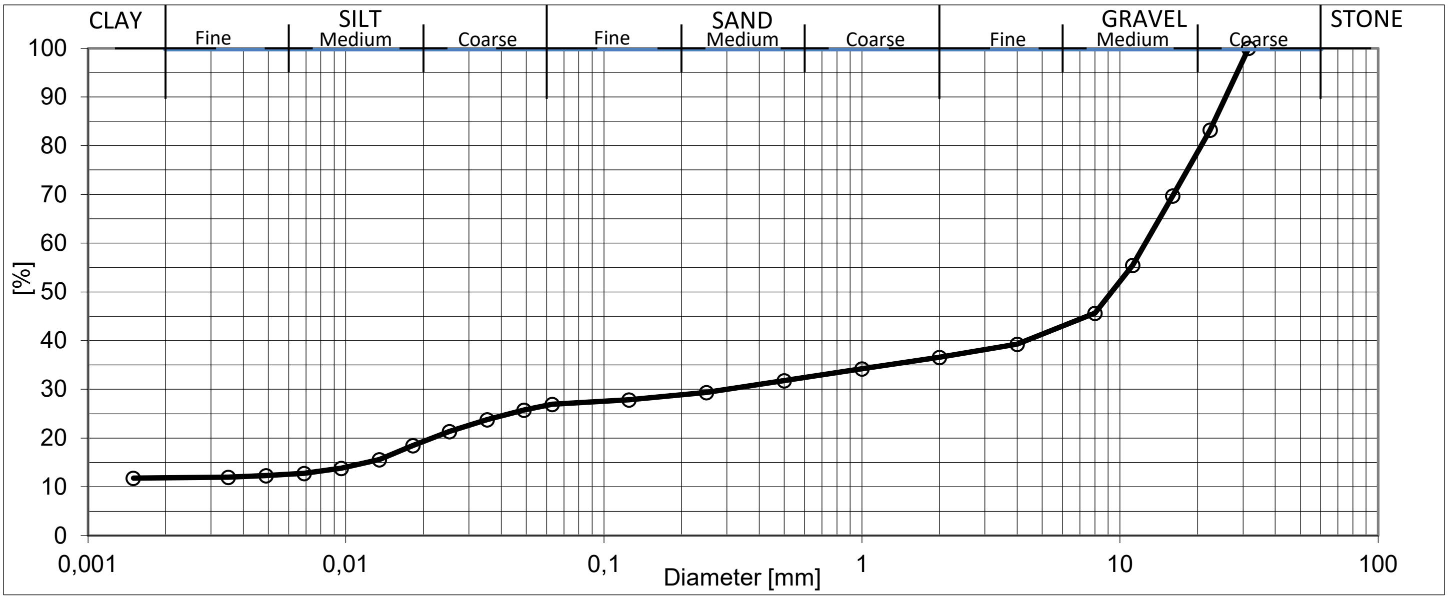
Inspection Section	BH04-S29-14
Sample Description	Sand, medium - coarse
Location	Gilbjerg Hoved

Lab Number	
Job Number	908091-1100051481
Date Sampled	15. jun 2022

Sieving	
Sieve size [mm]	Passing %
31,5	100,0
22,4	83,2
16	69,7
11,2	55,5
8	45,7
4	39,3
2	36,6
1	34,3
0,5	31,8
0,25	29,4
0,125	27,8
0,063	26,9
0,049	25,8
0,0353	23,8
0,0252	21,4
0,0182	18,5
0,0135	15,6
0,0096	13,8
0,0069	12,8
0,0049	12,3
0,0035	12,0
0,0015	11,8

Results	
D_{85}	23,24
D_{60}	12,54
D_{50}	9,28
D_{15}	0,013
D_{10}	

Coefficient of uniformity	
D_{60}/D_{10}	



Made By: THAND

Date: 15. jun 2022

Checked By: CVZ

Date: 21. jun 2022

PER AARSLEFF A/S Laboratorium

TEST METHODS: DS/EN 933-1, DS/EN 933-9, DS/EN 1744-1, prVI 99-11

AARSLEFF

Inspection Section	BH04-S90-44,5
Sample Description	Sand, Fine medium
Location	Gilbjerg Hoved

Lab Number	
Job Number	908091-1100051481
Date Sampled	15. jun 2022

Sieving

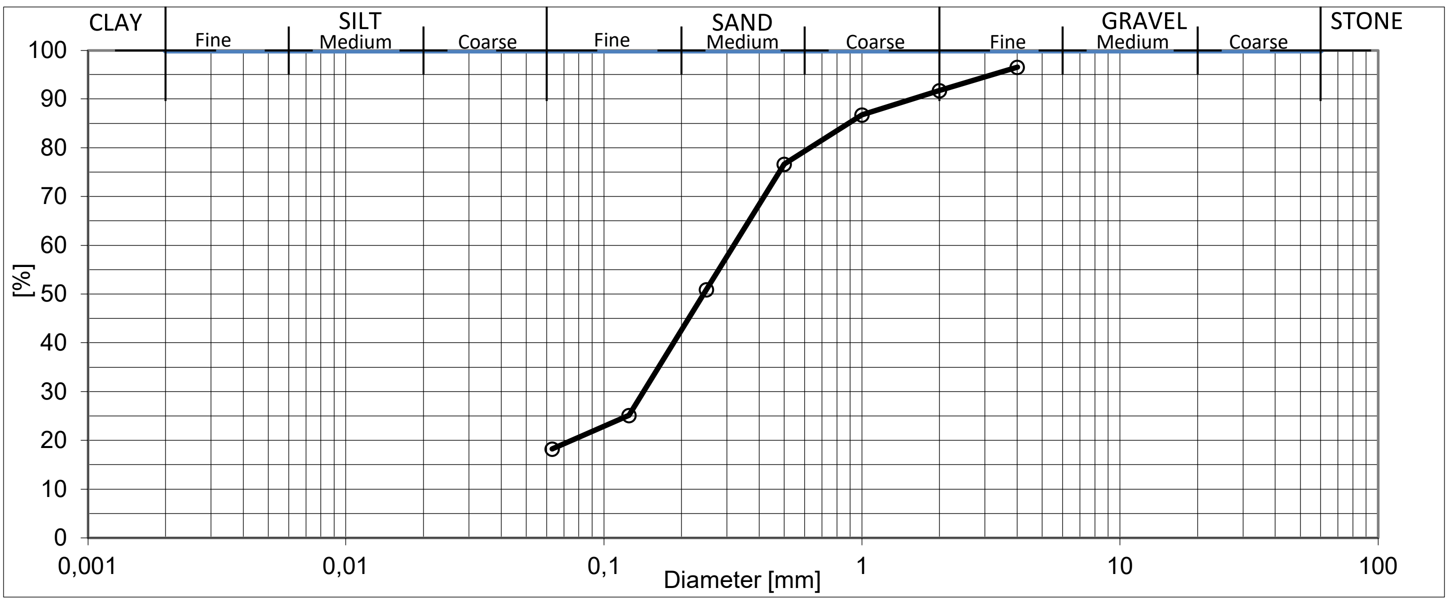
Sieve size [mm]	Passing %
4	96,5
2	91,7
1	86,7
0,5	76,7
0,25	50,9
0,125	25,1
0,063	18,2

Results

D_{85}	0,89
D_{60}	0,32
D_{50}	0,24
D_{15}	
D_{10}	

Coefficient of uniformity

D_{60}/D_{10}	



Made By: THAND

Date: 15. jun 2022

Checked By: CVZ

Date: 16. jun 2022

PER AARSLEFF A/S Laboratorium

TEST METHODS: DS/EN 933-1, DS/EN 933-9, DS/EN 1744-1, prVI 99-11

AARSLEFF

Inspection Section	BH04-S53-26
Sample Description	Sand, Fine medium
Location	Gilbjerg Hoved

Lab Number	
Job Number	908091-1100051481
Date Sampled	15. jun 2022

Sieving

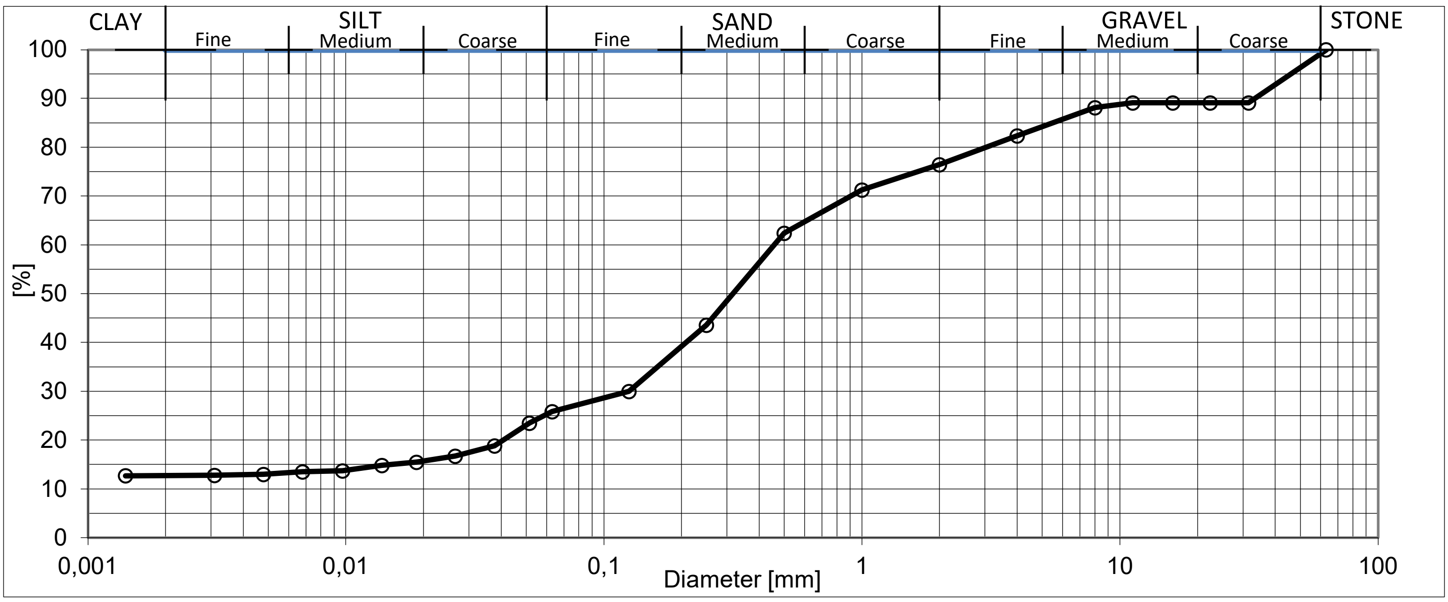
Sieve size [mm]	Passing %
63	100,0
31,5	89,1
22,4	89,1
16	89,1
11,2	89,1
8	88,1
4	82,4
2	76,5
1	71,2
0,5	62,4
0,25	43,6
0,125	30,0
0,063	25,9
0,0514	23,5
0,0377	18,8
0,0265	16,7
0,0188	15,5
0,0138	14,8
0,0097	13,7
0,0068	13,5
0,0048	13,0
0,0031	12,8
0,0014	12,7

Results

D_{85}	5,49
D_{60}	0,46
D_{50}	0,32
D_{15}	0,018
D_{10}	

Coefficient of uniformity

D_{60}/D_{10}	



Made By: THAND

Date: 15. jun 2022

Checked By: CVZ

Date: 22. jun 2022

PER AARSLEFF A/S Laboratorium

TEST METHODS: DS/EN 933-1, DS/EN 933-9, DS/EN 1744-1, prVI 99-11

AARSLEFF

Inspection Section	BH04-S64-31,5
Sample Description	Sand, medium - coarse
Location	Gilbjerg Hoved

Lab Number	
Job Number	908091-1100051481
Date Sampled	15. jun 2022

Sieving

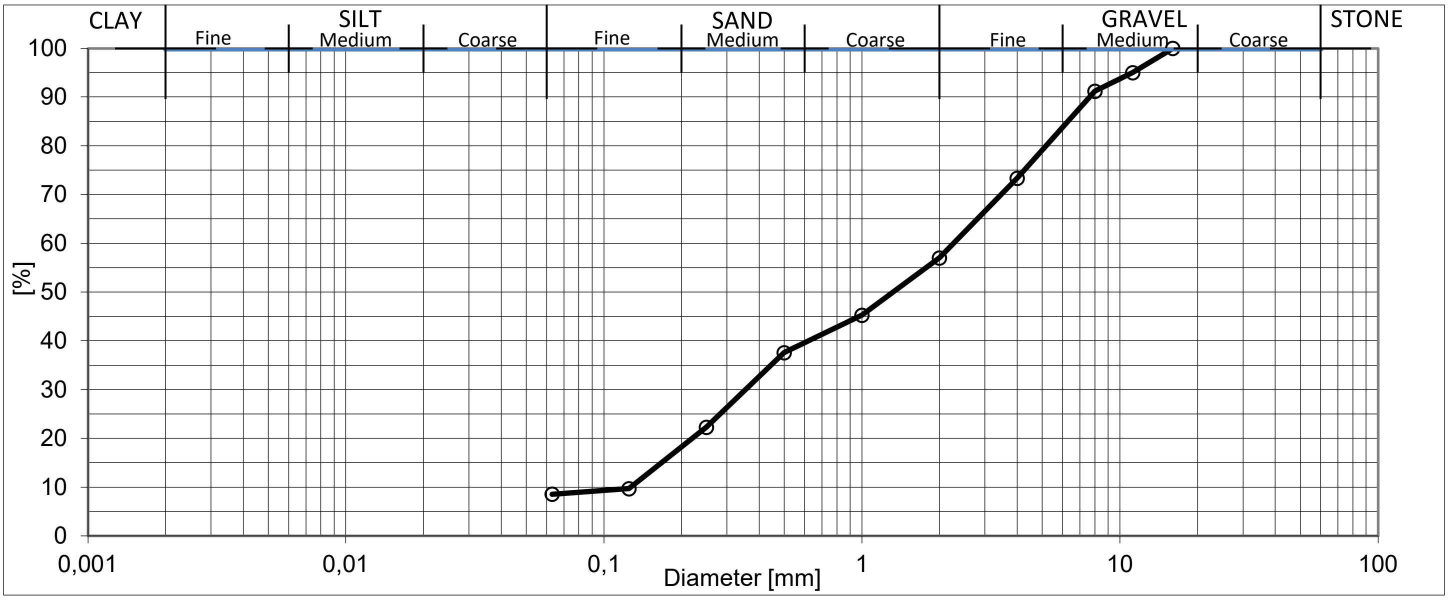
Sieve size [mm]	Passing %
16	100,0
11,2	95,0
8	91,2
4	73,4
2	57,0
1	45,2
0,5	37,6
0,25	22,3
0,125	9,7
0,063	8,6

Results

D_{85}	6,29
D_{60}	2,27
D_{50}	1,32
D_{15}	0,17
D_{10}	0,13

Coefficient of uniformity

D_{60}/D_{10}	17,87



Made By: THAND

Date: 15. jun 2022

Checked By: CVZ

Date: 16. jun 2022

PER AARSLEFF A/S Laboratorium

TEST METHODS: DS/EN 933-1, DS/EN 933-9, DS/EN 1744-1, prVI 99-11

AARSLEFF

Inspection Section	BH04-S73-36
Sample Description	Gravel, sandy
Location	Gilbjerg Hoved

Lab Number	
Job Number	908091-1100051481
Date Sampled	16. jun 2022

Sieving

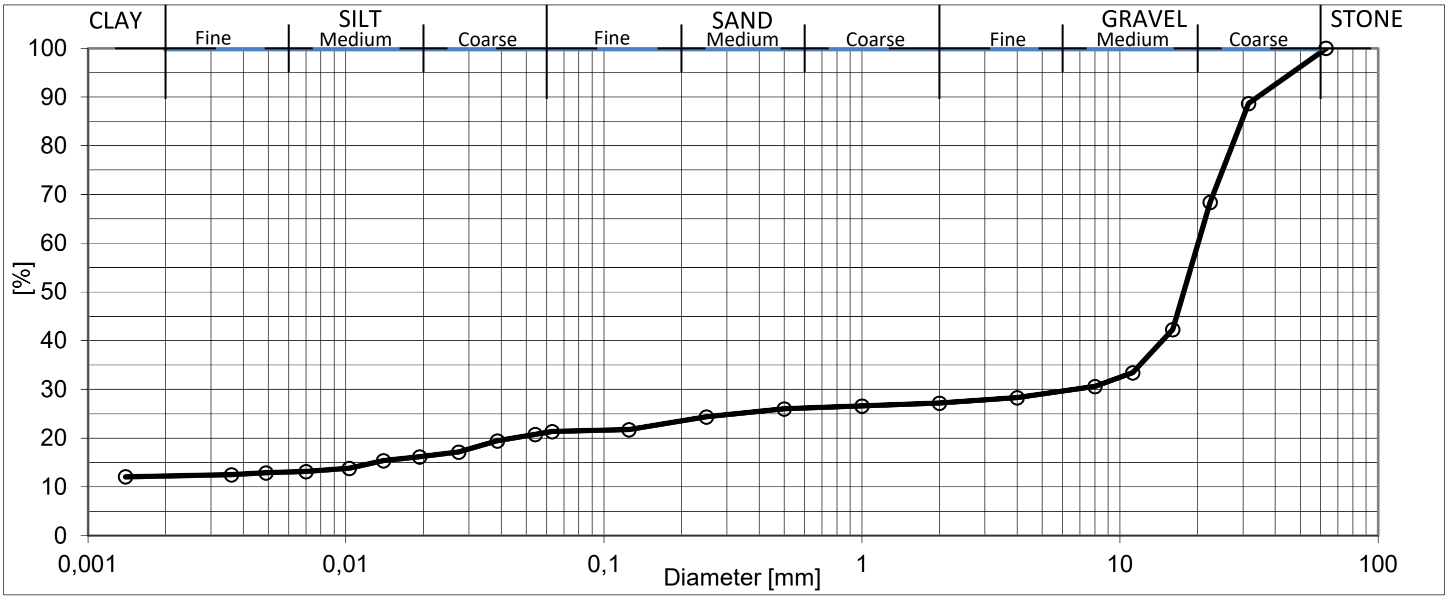
Sieve size [mm]	Passing %
63	100,0
31,5	88,7
22,4	68,4
16	42,3
11,2	33,5
8	30,6
4	28,4
2	27,2
1	26,6
0,5	26,1
0,25	24,4
0,125	21,8
0,063	21,4
0,0541	20,8
0,0387	19,5
0,0274	17,2
0,0193	16,2
0,014	15,4
0,0103	13,8
0,007	13,2
0,0049	12,9
0,0036	12,5
0,0014	12,1

Results

D_{85}	29,61
D_{60}	20,10
D_{50}	17,67
D_{15}	0,013
D_{10}	

Coefficient of uniformity

D_{60}/D_{10}	



Made By: THAND

Checked By: CVZ

Date: 16. jun 2022

Date: 22. jun 2022

PER AARSLEFF A/S Laboratorium

TEST METHODS: DS/EN 933-1, DS/EN 933-9, DS/EN 1744-1, prVI 99-11

AARSLEFF

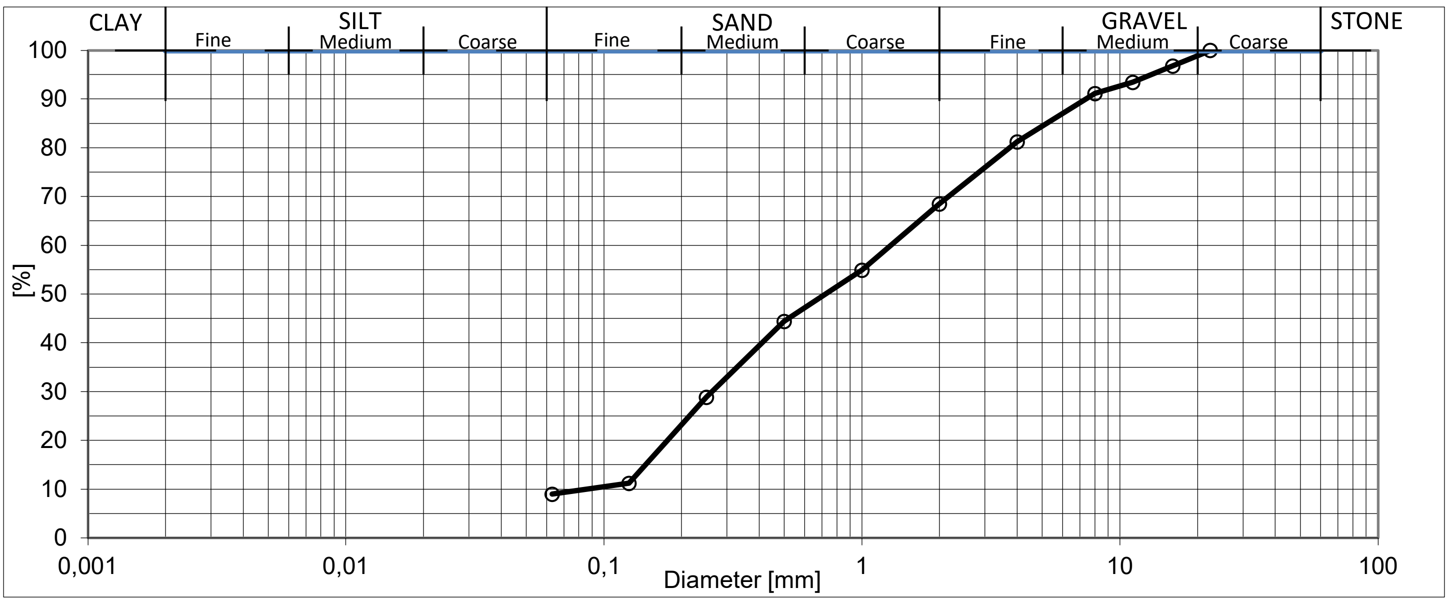
Inspection Section	BH04-S80-39,5
Sample Description	Sand, medium - coarse
Location	Gilbjerg Hoved

Lab Number	
Job Number	908091-1100051481
Date Sampled	15. jun 2022

Sieving	
Sieve size [mm]	Passing %
22,4	100,0
16	96,8
11,2	93,5
8	91,2
4	81,2
2	68,5
1	54,9
0,5	44,4
0,25	28,9
0,125	11,2
0,063	9,0

Results	
D_{85}	5,20
D_{60}	1,30
D_{50}	0,72
D_{15}	0,14
D_{10}	0,09

Coefficient of uniformity	
D_{60}/D_{10}	15,14



Made By: THAND

Checked By: CVZ

Date: 15. jun 2022

Date: 17. jun 2022

PER AARSLEFF A/S Laboratorium

TEST METHODS: DS/EN 933-1, DS/EN 933-9, DS/EN 1744-1, prVI 99-11

AARSLEFF

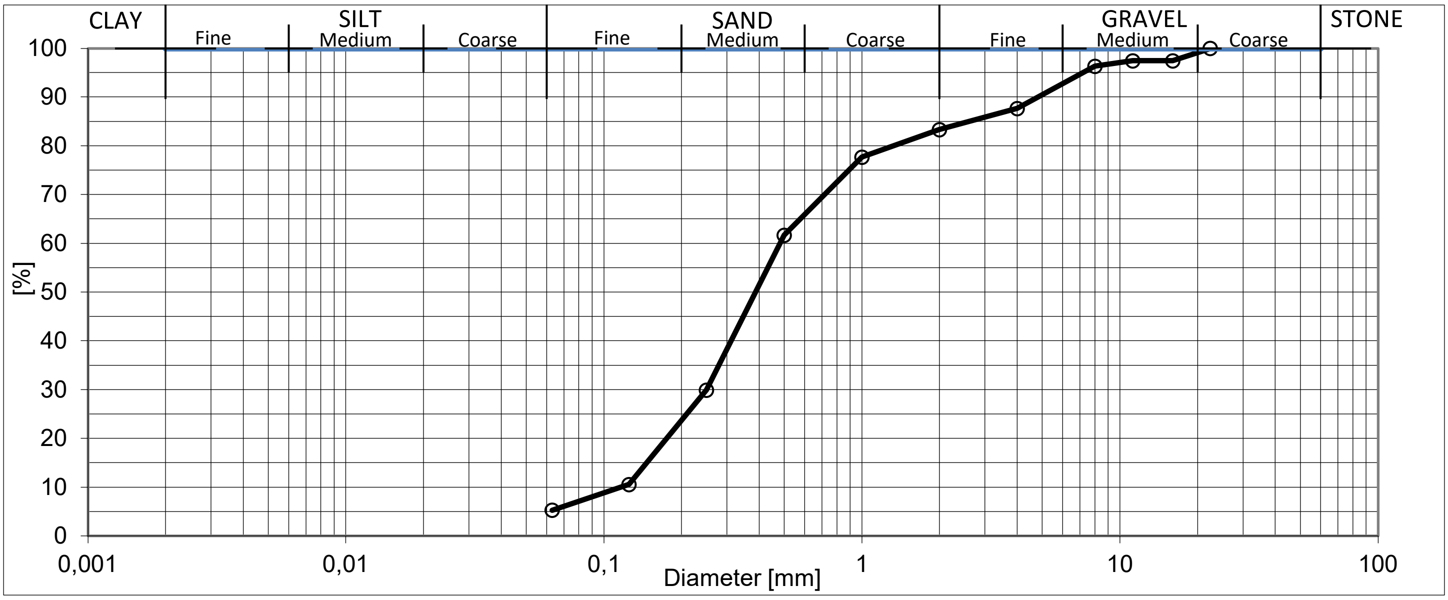
Inspection Section	BH04-S90-44,5
Sample Description	Sand, Fine medium
Location	Gilbjerg Hoved

Lab Number	
Job Number	908091-1100051481
Date Sampled	15. jun 2022

Sieving	
Sieve size [mm]	Passing %
22,4	100,0
16	97,4
11,2	97,4
8	96,3
4	87,7
2	83,3
1	77,7
0,5	61,7
0,25	29,9
0,125	10,5
0,063	5,3

Results	
D_{85}	2,61
D_{60}	0,48
D_{50}	0,39
D_{15}	0,15
D_{10}	0,12

Coefficient of uniformity	
D_{60}/D_{10}	4,13



Made By: THAND

Date: 15. jun 2022

Checked By: CVZ

Date: 16. jun 2022

PER AARSLEFF A/S Laboratorium

TEST METHODS: DS/EN 933-1, DS/EN 933-9, DS/EN 1744-1, prVI 99-11

AARSLEFF

Inspection Section	BH04-S95-47
Sample Description	Gravel
Location	Gilbjerg Hoved

Lab Number	
Job Number	908091-1100051481
Date Sampled	15. jun 2022

Sieving

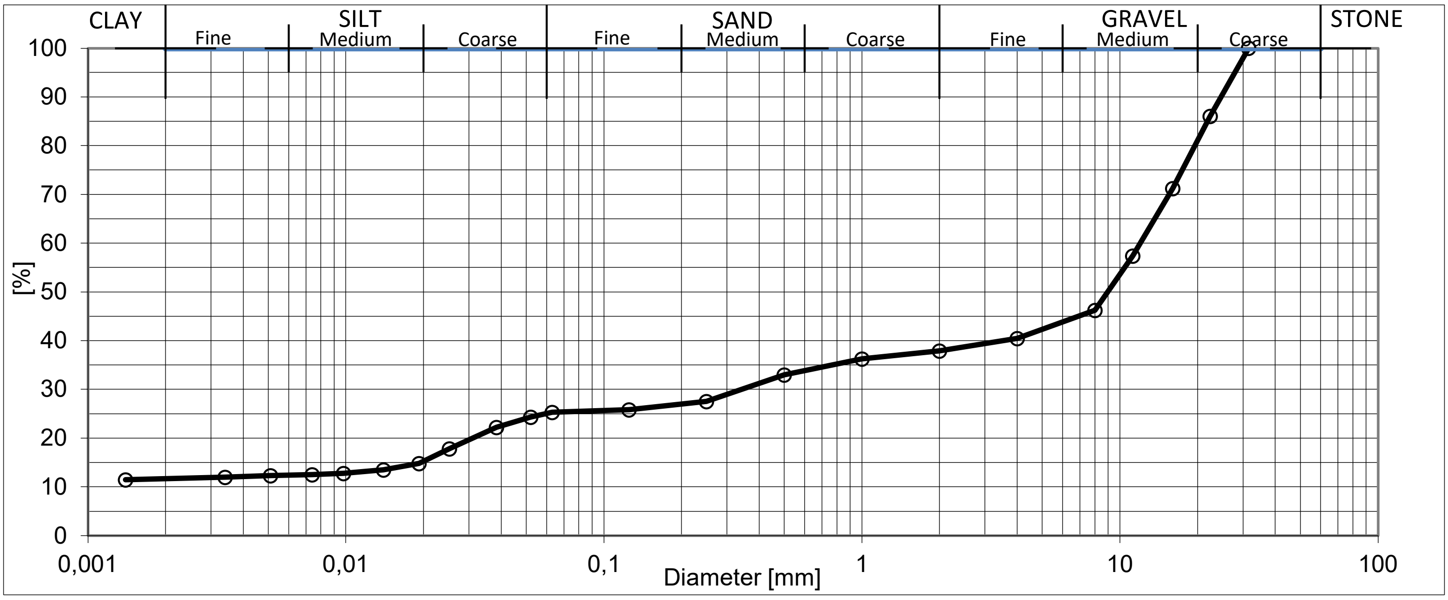
Sieve size [mm]	Passing %
31,5	100,0
22,4	86,0
16	71,2
11,2	57,4
8	46,2
4	40,5
2	37,9
1	36,2
0,5	33,0
0,25	27,5
0,125	25,8
0,063	25,3
0,052	24,3
0,0383	22,2
0,0252	17,8
0,0192	14,8
0,014	13,5
0,0098	12,8
0,0074	12,5
0,0051	12,3
0,0034	12,0
0,0014	11,5

Results

D_{85}	21,88
D_{60}	11,98
D_{50}	8,96
D_{15}	0,02
D_{10}	

Coefficient of uniformity

D_{60}/D_{10}	



Made By: THAND

Date: 15. jun 2022

Checked By: CVZ

Date: 22. jun 2022

PER AARSLEFF A/S Laboratorium

TEST METHODS: DS/EN 933-1, DS/EN 933-9, DS/EN 1744-1, prVI 99-11

AARSLEFF

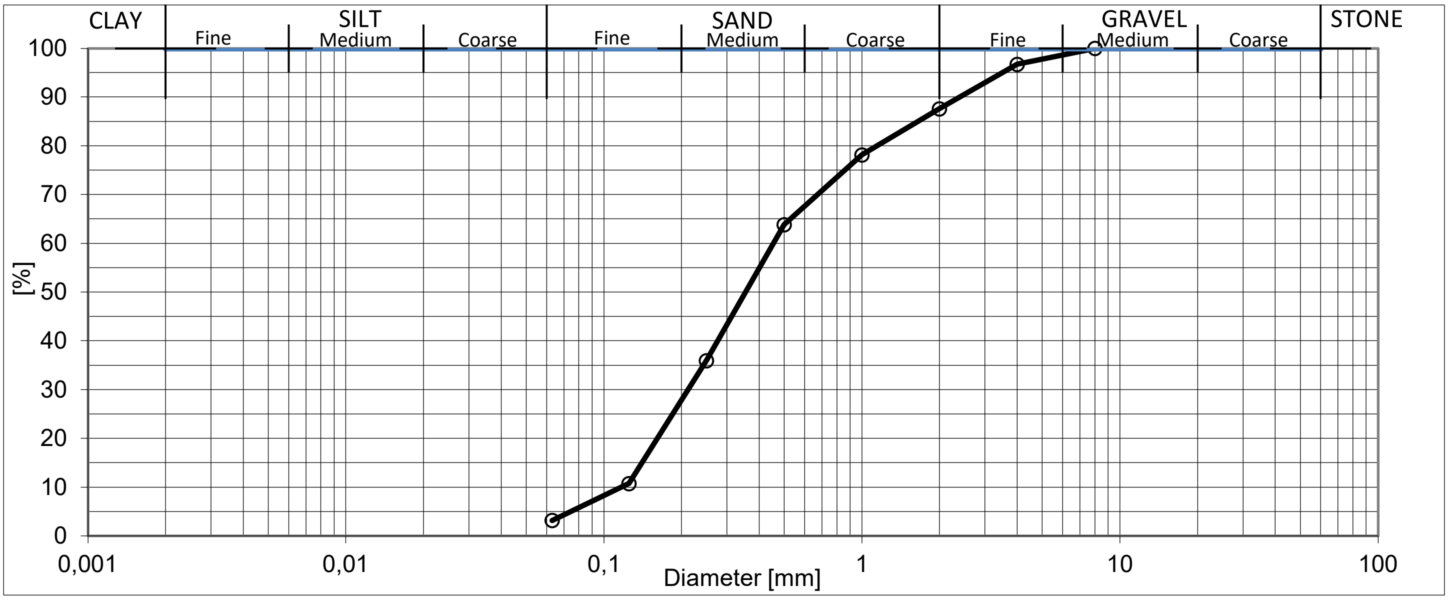
Inspection Section	BH05-S11-5
Sample Description	Sand, medium - coarse
Location	Gilbjerg Hoved

Lab Number	
Job Number	908091-1100051481
Date Sampled	17. jun 2022

Sieving	
Sieve size [mm]	Passing %
8	100,0
4	96,7
2	87,6
1	78,1
0,5	63,8
0,25	35,9
0,125	10,8
0,063	3,2

Results	
D_{85}	1,65
D_{60}	0,45
D_{50}	0,35
D_{15}	0,14
D_{10}	0,12

Coefficient of uniformity	
D_{60}/D_{10}	3,90



Made By: THAND

Date: 17. jun 2022

Checked By: CVZ

Date: 17. jun 2022

PER AARSLEFF A/S Laboratorium

TEST METHODS: DS/EN 933-1, DS/EN 933-9, DS/EN 1744-1, prVI 99-11

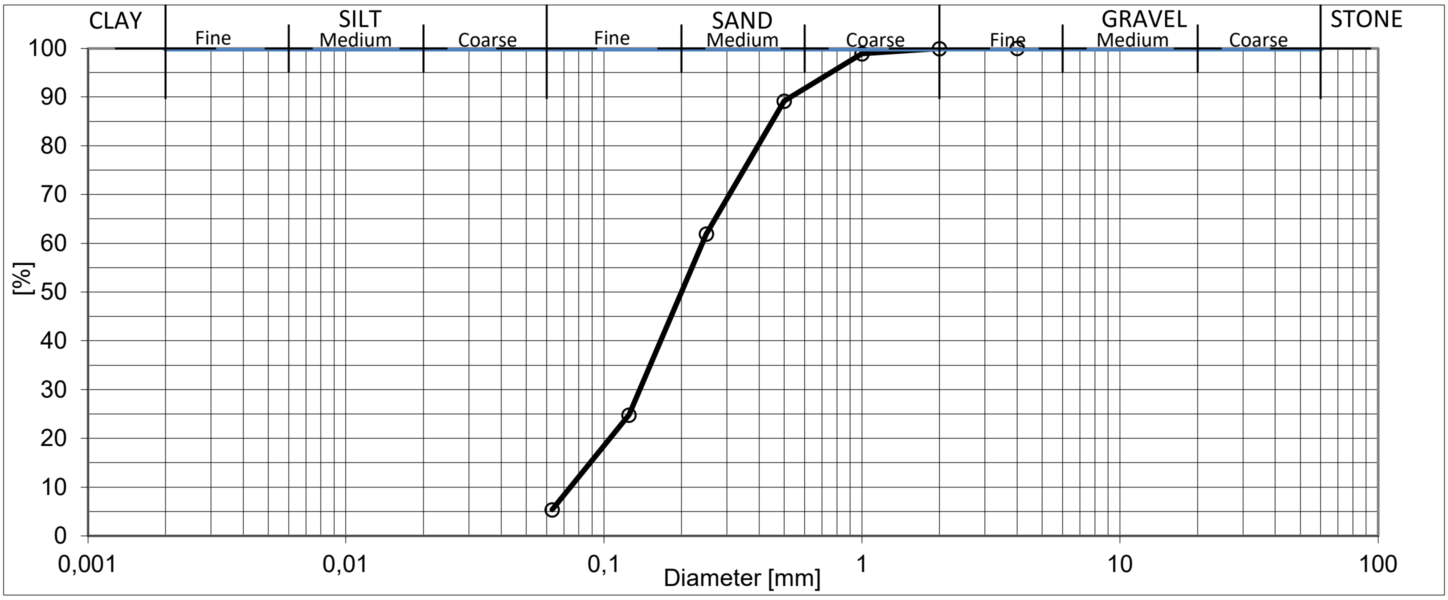
Inspection Section	BH05-S21-10
Sample Description	Sand, medium
Location	Gilbjerg Hoved

Lab Number	
Job Number	908091-1100051481
Date Sampled	17. jun 2022

Sieving	
Sieve size [mm]	Passing %
4	100,0
2	99,9
1	98,9
0,5	89,2
0,25	61,9
0,125	24,8
0,063	5,4

Results	
D_{85}	0,45
D_{60}	0,24
D_{50}	0,20
D_{15}	0,09
D_{10}	0,07

Coefficient of uniformity	
D_{60}/D_{10}	3,25



Made By: THAND

Date: 17. jun 2022

Checked By: CVZ

Date: 17. jun 2022

PER AARSLEFF A/S Laboratorium

TEST METHODS: DS/EN 933-1, DS/EN 933-9, DS/EN 1744-1, prVI 99-11

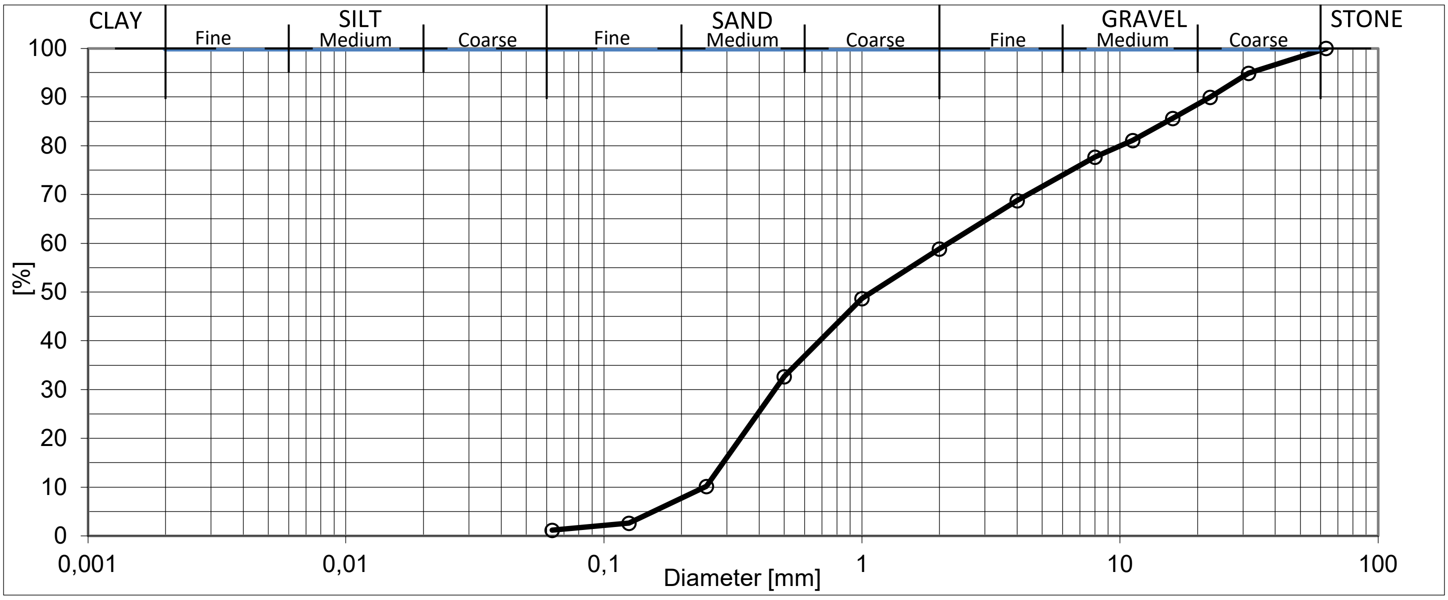
Inspection Section	BH05-S31-15
Sample Description	Sand, coarse
Location	Gilbjerg Hoved

Lab Number	
Job Number	908091-1100051481
Date Sampled	20. jun 2022

Sieving	
Sieve size [mm]	Passing %
63	100,0
31,5	94,9
22,4	90,0
16	85,6
11,2	81,1
8	77,7
4	68,8
2	58,9
1	48,7
0,5	32,7
0,25	10,2
0,125	2,6
0,063	1,2

Results	
D_{85}	15,24
D_{60}	2,16
D_{50}	1,09
D_{15}	0,29
D_{10}	0,25

Coefficient of uniformity	
D_{60}/D_{10}	8,80



Made By: THAND

Date: 20. jun 2022

Checked By: CVZ

Date: 20. jun 2022

PER AARSLEFF A/S Laboratorium

TEST METHODS: DS/EN 933-1, DS/EN 933-9, DS/EN 1744-1, prVI 99-11

AARSLEFF

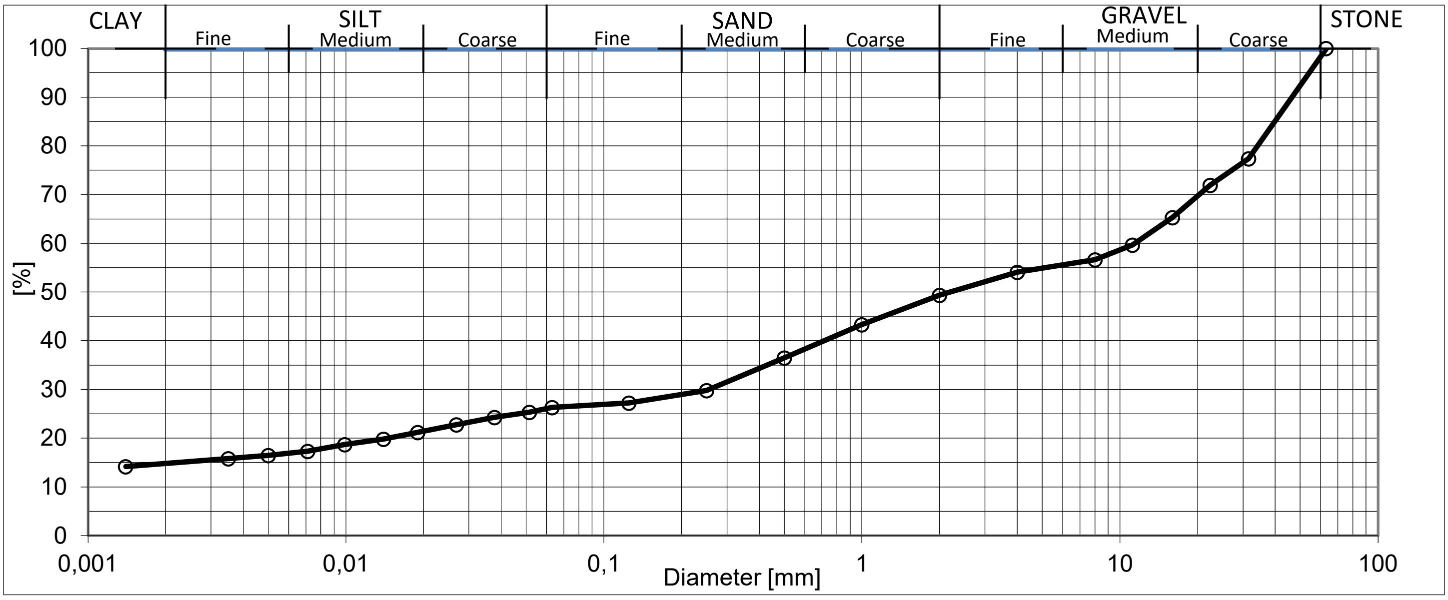
Inspection Section	BH05-S41-20
Sample Description	Sand, medium - coarse
Location	Gilbjerg Hoved

Lab Number	
Job Number	908091-1100051481
Date Sampled	17. jun 2022

Sieving	
Sieve size [mm]	Passing %
63	100,0
31,5	77,4
22,4	71,9
16	65,3
11,2	59,7
8	56,6
4	54,1
2	49,4
1	43,3
0,5	36,5
0,25	29,8
0,125	27,2
0,063	26,3
0,0514	25,3
0,0377	24,3
0,0268	22,8
0,019	21,2
0,014	19,8
0,0099	18,7
0,0071	17,3
0,005	16,5
0,0035	15,8
0,0014	14,2

Results	
D_{85}	39,81
D_{60}	11,44
D_{50}	2,19
D_{15}	0,03
D_{10}	

Coefficient of uniformity	
D_{60}/D_{10}	



Made By: THME

Date: 17. jun 2022

Checked By: CVZ

Date: 21. jun 2022

PER AARSLEFF A/S Laboratorium

TEST METHODS: DS/EN 933-1, DS/EN 933-9, DS/EN 1744-1, prVI 99-11

AARSLEFF

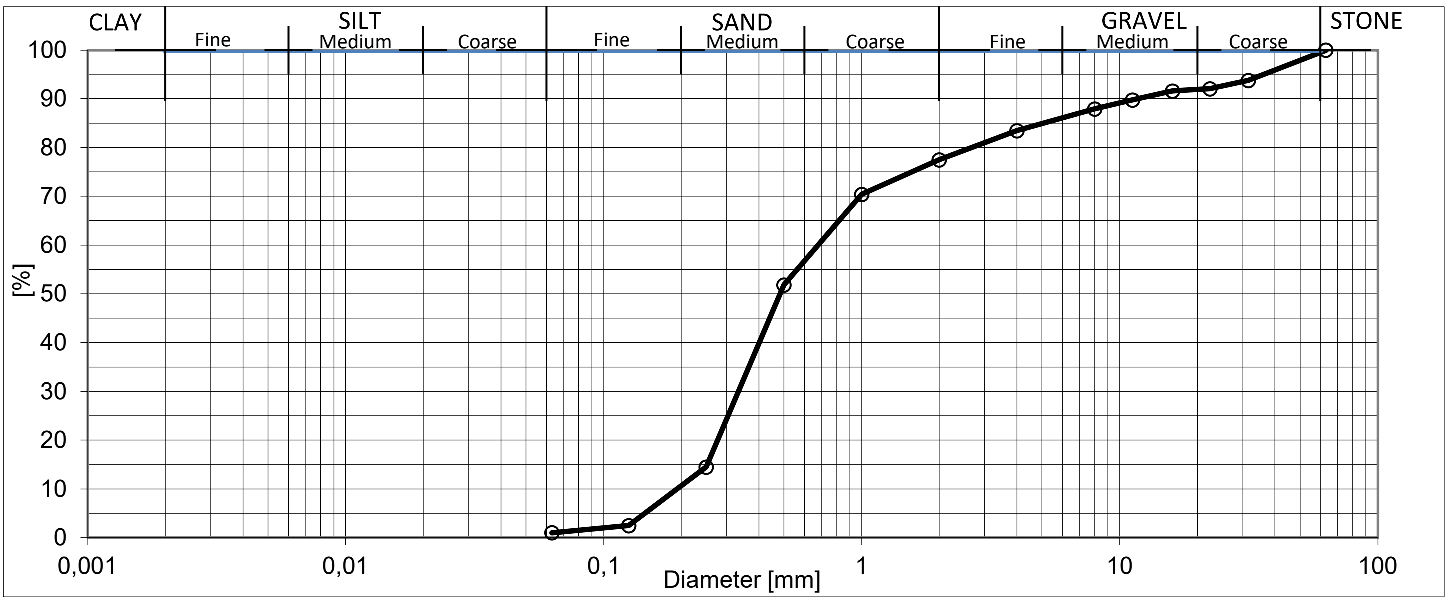
Inspection Section	BH05-S51-25
Sample Description	Sand, fine-medium
Location	Gilbjerg Hoved

Lab Number	
Job Number	908091-1100051481
Date Sampled	20. jun 2022

Sieving	
Sieve size [mm]	Passing %
63	100,0
31,5	93,8
22,4	92,1
16	91,6
11,2	89,7
8	87,9
4	83,5
2	77,5
1	70,4
0,5	51,8
0,25	14,5
0,125	2,5
0,063	1,0

Results	
D_{85}	5,08
D_{60}	0,68
D_{50}	0,48
D_{15}	0,25
D_{10}	0,19

Coefficient of uniformity	
D_{60}/D_{10}	3,52



Made By: THAND

Checked By: CVZ

Date: 20. jun 2022

Date: 20. jun 2022

APPENDIX 6.1-6.5 – FIELD LOGS

Geoteknisk Borejournal

AARSLEFF

Sag: 232193-281	DGU-nr:	Kote: Terræn	Init.: Ud - PB	Dato: 17 / 5 / 22
Boring: BH01	Lok.: gilleleje	Bundpejl: 25,om	Vandspejl: 15,60	Side: 1 a 5
Foringsrør: [x] Ja [ ] Nej — Boringsdim.: 6"		Filterdim.: ø25	Slidsestr.:	Sandstr.: 3

Pejlerør over terræn	Dybde m.	Prøver: Prøve	Prøve-nr.:	Lag-grænse	Jordartsbeskrivelse	Vingeforsøg: Dybde m.	vinge	intakt kg	omrørt kg	SPT: dybde m	antal slag pr. 7,5 cm	Fore rør	Notater: Dybde af: forgravning/ udtagne miljøprøver/ fræsning (fra/til)/ omrigning til DTH
	20		1		muld Sand Sort	20							
	40					40							
	60		2			60							
	80			0,70	Sand	80							
	1 00		3			1 00							
	20					20							
	40					40							
	60		4			60							
	80			1,80		80							
	2 00		5		Lerfuld ik ogger Sandet Fugtig	2 00							
	20					20	5	10	2				
	40					40	5	19	4				
	60		6			60							
	80					80							
	3 00		7			3 00							
	20				ML Sandet Brun Tør	20	5	45	18				
	40					40	5	max	½				
	60		8			60							
	80					80							
	4 00		9			4 00							
	20					20	4	48	17				
	40					40	4	½	½				Kan ikke Trykkes
	60		10			60							
	80					80							
	5 00		11	5,0	Stor Pose Prøve	5 00							
	20					20	4	27	10				
	40					40	4	max	½				
	60		12			60							
	80					80							
	6 00		13			00							

Geoteknisk Borejournal

AARSLEFF

Sag: 232193-281	DGU-nr:	Kote: Terræn	Init.: RJ · PB	Dato: 17 / 5 / 22
Boring: BH01	Lok.: Gilleleje	Bundpejl:	Vandspejl:	Side: 2 a 5
Foringsrør: ☒ Ja ☐ Nej	Boringsdim.: 6"	Filterdim.:	Slidsestr.:	Sandstr.: 3

Pejlerør over terræn	Dybde m.	Prøve	Prøve-nr.:	Lag-grænse	Jordartsbeskrivelse	Vingeforsøg Dybde m.	vinge	intakt kg	omrørt kg	SPT dybde m	antal slag pr. 7,5 cm	Fore rør	Notater: Dybde af: forgravning/ udtagne miljøprøver/ fræsning (fra/til)/ omrigning til DTH
	20				Grus sten [illegible]	20	4	1/	1/				Vær [illegible] Trykket
	40					40							
	60		14			60							
	80					80							
	7 00		15		Do	7 00							
	20					20					7 10		Udtaget [illegible]
	40					40					10 11		[illegible]
	60		16			60					14 13		
	80					80							
	8 00		17		Do	8 00							
	20					20							
	40					40							
	60		18			60					19 11		Udtaget [illegible]
	80				Do	80					18 21		[illegible]
	9 00		19			9 00					17 14		
	20					20							
	40					40							
	60		20			60							
	80					80							
	10 00		21	10,0	stor pose prøve	10 00							Udtaget [illegible]
	20					20					5 9		[illegible]
	40					40					11 12		
	60		22			60					8 17		
	80					80							
	11 00		23		Tb blandet [illegible]	11 00							
	20					20							
	40					40							Udtaget [illegible]
	60		24			60							[illegible]
	80					80							
	12 00		25		[illegible]	00							

Geoteknisk Borejournal

AARSLEFF

Sag: 22193-281	DGU-nr:	Kote: Terræn	Init.: RJ · PB	Dato: 17 / 5 / 22
Boring: BH01	Lok.: Gilleleje	Bundpejl:	Vandspejl:	Side: 3 a 5
Foringsrør: [x] Ja [ ] Nej	Boringsdim.: 6"	Filterdim.:	Slidsestr.:	Sandstr.: 3

Pejlerør over terræn	Dybde m.	Prøve	Prøve-nr.:	Lag-grænse	Jordartsbeskrivelse	Vingeforsøg Dybde m.	vinge	intakt kg	omrørt kg	SPT dybde m	SPT antal slag pr. 7,5 cm	Fore rør	Notater: Dybde af: forgravning/ udtagne miljøprøver/ fræsning (fra/til)/ omrigning til DTH
	20				Sand · Sten Tyft	20							
	40					40							
	60		26			60							
	80				Do	80							
	13 00		27			13 00					17 6		lukket sonde Ingen mm. mangler 6 cm
	20					20					19 32		
	40					40					31 8		mangler 8 cm
	60		28			60							
	80					80							
	14 00		29			14 00							
	20				Kørt ud af marken Kl 16³⁰ skal sæes	20							
	40					40							
	60		30			60				8	9		lukket sonde forvarmning
	80					80				9	9		
	15 00		31		stor pose prøve - VF	15 00				9	10		
	20					20							
	40					40							
	60		32			60							
	80					80							
	16 00		33		Do	16 00							lukket sonde [illegible]
	20					20					4 4		
	40					40					6 11 8		
	60		34			60							
	80				Do	80							
	17 00		35			17 00							
	20					20							
	40					40							
	60		36			60					10		lukket sonde [illegible]
	80				Do	80							
	18 00		37			00							

Sand

Geoteknisk Borejournal

AARSLEFF

Sag: 232193-281	DGU-nr:	Kote: Terræn	Init.: RJ · PB	Dato: 17 / 5 / 22
Boring: BH01	Lok.: Gilleleje	Bundpejl:	Vandspejl:	Side: 4 a 5
Foringsrør: ☑ Ja ☐ Nej	Boringsdim.: 6"	Filterdim.:	Slidsestr.:	Sandstr.: 3

Pejlerør over terræn	Dybde m.	Prøver: Prøve	Prøver: Prøve-nr.:	Prøver: Lag-grænse	Jordartsbeskrivelse	Vingeforsøg: Dybde m.	Vingeforsøg: vinge	Vingeforsøg: intakt kg	Vingeforsøg: omrørt kg	SPT: dybde m	SPT: antal slag pr. 7,5 cm	Fore rør	Notater: Dybde af: forgravning/ udtagne miljøprøver/ fræsning (fra/til)/ omrigning til DTH
	20				Sand - sten - grå VF	20							
	40					40							
	60		38		- Sten	60							
	80					80							
	19 00		39			19 00							Lukket sand
	20					20				6 5			indramning
	40					40				6 5 / 5 5			
	60		40			60							
	80					80							
	20 00		41	200	stor pose prøve	20 00							
	20					20							
	40					40							
	60		42			60					5 6		Lukket sand / Indramning
	80					80					8 9		
	21 00		43		sand grå	21 00					14 14		
	20					20							
	40					40							
	60		44			60							
	80				Do	80							
	22 00		45			22 00							Lukket sand
	20					20					4 4		Indramning
	40					40					5 5 / 6 6		
	60		46		Do	60							
	80					80							
	23 00		47			23 00							
	20					20							
	40					40							
	60		48		Do	60							Lukket sand / Indramning
	80					80							
	24 00		49			24 00							

Geoteknisk Borejournal

AARSLEFF

Sag: 232193-291	DGU-nr:	Kote: Terræn	Init.: RJ · RB	Dato: 17 / 5 / 22
Boring: BH01	Lok.: Gilleleje	Bundpejl:	Vandspejl:	Side: 5 a 5
Foringsrør: ☒ Ja ☐ Nej	Boringsdim.: 6"	Filterdim.:	Slidsestr.:	Sandstr.: 3

Pejlerør over terræn	Dybde m.	Prøver: Prøve	Prøve-nr.:	Lag-grænse	Jordartsbeskrivelse	Vingeforsøg: Dybde m.	vinge	intakt kg	omrørt kg	SPT: dybde m	antal slag pr. 7,5 cm	Fore rør	Notater: Dybde af: forgravning/ udtagne miljøprøver/ fræsning (fra/til)/ omrigning til DTH
	20				Sand - Sten grå	20							
	40					40							
	60		50			60							
	80					80							
	25 00		51		Stor pose prøve 25,0m	25 00							
	20					20							
	40					40							
	60					60							
	80					80							
	00					00							
	20					20							
	40					40							
	60					60							
	80					80							
	00					00							
	20					20							
	40					40							
	60					60							
	80					80							
	00					00							
	20					20							
	40					40							
	60					60							
	80					80							
	00					00							
	20					20							
	40					40							
	60					60							
	80					80							
	00					00							

Geoteknisk Borejournal

AARSLEFF

232/193 281

Sag: [illegible]	DGU-nr:	Kote: Terræn	Init.: VIJ · PB	Dato: 3 / 5 / 22
Boring: BH02	Lok.: Gilleleje	Bundpejl: 24,20	Vandspejl: 18,62	Side: 1 a 5
Foringsrør: ☑ Ja ☐ Nej	Boringsdim.: 6"	Filterdim.: Ø25	Slidsestr.:	Sandstr.: 3

Pejlerør over terræn	Dybde m.	Prøve	Prøve-nr.:	Lag-grænse	Jordartsbeskrivelse	Vingeforsøg Dybde m.	vinge	intakt kg	omrørt kg	SPT dybde m	antal slag pr. 7,5 cm	Fore rør	Notater: Dybde af: forgravning/ udtagne miljøprøver/ fræsning (fra/til)/ omrigning til DTH
	20		1		muld Sand Sort	20							Forgravet 1,5
	40					40							
	60		2	0,60		60							
	80				Sand Ler gul	80							
	1.00		3			1.00							
	20					20							
	40					40							
	60		4			60							
	80			1,70	Ler Fyld	80							
	2.00		5			2.00							
	20				Sten Sand Grus	20	4	max	½				
	40					40	4	½	½				Kan ikke Trykke
	60		6			60							
	80					80							
	3.00		7		Do	3.00							
	20					20						5 7	
	40					40						11 11	
	60		8			60						11 10	
	80					80							
	4.00		9			4.00							
	20				Do	20							
	40					40							
	60		10			60						4 4	
	80					80						6 5 / 6 5	
	5.00		11		Stor pose	5.00							
	20					20							
	40					40							
	60		12			60							
	80				Do	80							
	6.00		13			6.00							

Geoteknisk Borejournal

AARSLEFF

Sag: 195-281 232[illegible]	DGU-nr.:	Kote: Terræn	Init.: [illegible] - RB
Boring: BH02	Lok.: Gilleleje	Bundpejl:	Vandspejl:
Dato: 3 / 5 / 22	Side: 2 a 5		
Foringsrør: ☒ Ja ☐ Nej	Boringsdim.: 6"	Filterdim.:	Slidsestr.:
Sandstr.:			

Pejlerør over terræn	Dybde m.	Prøver: Prøve	Prøver: Prøve-nr.	Prøver: Lag-grænse	Jordartsbeskrivelse	Vingeforsøg: Dybde m.	Vingeforsøg: vinge	Vingeforsøg: intakt kg	Vingeforsøg: omrør kg	SPT: dybde	SPT: antal slag pr. 7,5 cm	Notater: Fore rør	Notater: Dybde af: forgravning/ udtagne miljøprøver/ fræsning (fra/til)/ omrigning til DTH
	20				Sten Sand grus	20						14 11	[illegible]
	40					40						11 10	
	60		14			60						9 7	
	80					80							
	7 00		15		Do	7 00							
	20					20							
	40					40							
	60		16			60							[illegible]
	80					80						10 15	[illegible]
	8 00		17			8 00						12 12 12 14	
	20					20							
	40				SAND GRG	40							
	60		18			60							
	80					80							
	9 00		19			9 00							
	20					20						10 14	[illegible]
	40				SAND STEN GRUS	40						19 26	
	60		20			60						14 20	
	80					80							
	10 00		21		Sten [illegible]	10 00							
	20					20							
	40					40							
	60		22			60							
	80				Do	80						9 12	
	11 00		23			11 00						15 16 17 16	
	20					20							
	40					40							
	60		24			60							
	80				Do	80							
	12 00		25			12 00							

Geoteknisk Borejournal

AARSLEFF

Sag: 193-281 232 [illegible]	DGU-nr:	Kote: Terræn	Init.: [illegible] - RB	Dato: 3 / 5 / 22
Boring: BH02	Lok.: Gilleleje	Bundpejl:	Vandspejl:	Side: 3 a [illegible]
Foringsrør: [X] Ja [ ] Nej	Boringsdim.: 6"	Filterdim.:	Slidsestr.:	Sandstr.:

Pejlerør		Prøver				Vingeforsøg				SPT		Notater	
over terræn	Dybde m.	Prøve	Prøve-nr.:	Lag-grænse	**Jordartsbeskrivelse**	Dybde m.	vinge	intakt kg	omrørt kg	dybde m	antal slag pr. 7,5 cm	Fore rør	Dybde af: forgravning/ udtagne miljøprøver/ fræsning (fra/til)/ omrigning til DTH
	20				[illegible]	20					8 15		[illegible] 28 cm
	40					40					100		
	60		26		D [illegible]	60							
	80					80							
	00		27			00							
	20				D [illegible]	20							Frost fra 13,0 m - 13,25
	40					40							
	60		28			60					11		
	80					80					[illegible]		
	00		29			00					[illegible]		
	20				Frost fra 14,[illegible] - 14,[illegible]	20							
	40				Sand [illegible]	40							
	60		30			60							
	80					80							
	00		31		[illegible]	00							[illegible]
	20					20					[illegible]		
	40					40					[illegible]		
	60		32			60							
	80					80							
	00		33		Frost fra 16,16 - 16,3[illegible] [illegible]	00							
	20					20							
	40					40							
	60		34			60							
	80					80							
	00		35			00							
	20				Frost fra 17,[illegible]	20							
	40					40							
	60		36			60							
	80					80							
	00		37			00							

Geoteknisk Borejournal

AARSLEFF

Sag: 193-281	DGU-nr:	Kote: Terræn	Init.: VH-PB	Dato: 3 / 5 / 22
Boring: BH02	Lok.: Gilleleje	Bundpejl:	Vandspejl:	Side: 4 a 5
Foringsrør: ☒ Ja ☐ Nej	Boringsdim.: 6"	Filterdim.:	Slidsestr.:	Sandstr.:

Pejlerør over terræn	Dybde m.	Prøver: Prøve	Prøver: Prøve-nr.:	Prøver: Lag-grænse	Jordartsbeskrivelse	Vingeforsøg: Dybde m.	Vingeforsøg: vinge	Vingeforsøg: intakt kg	Vingeforsøg: omrørt kg	SPT: dybde m	SPT: antal slag pr. 7,5 cm	Fore rør	Notater: Dybde af: forgravning/ udtagne miljøprøver/ fræsning (fra/til)/ omrigning til DTH
	20				Sten - grus - Tør	20					5 9		
	40		38			40					12 14		
	60					60					19 22		
	80					80							
	19 00		39			19 00							
	20					20							
	40					40							
	60		40		Sten - grus - grå Vf	60					4 6		
	80					80					6 6		
	20 00		41		Stor Pose	20 00					7 8		
	20					20							
	40					40							
	60		42			60							
	80					80							
	21 00		43		D0	21 00							
	20					20							
	40					40							
	60		44			60							
	80					80							
	22 00		45		Da	22 00							
	20					20							
	40				Sand - grå	40							
	60		46			60							
	80					80							
	23 00		47			23 00							
	20					20							
	40					40							
	60		48		Sten ...	60							
	80					80							
	24 00		49			00							

Geoteknisk Borejournal

AARSLEFF

Sag: 193-281 / 232[illegible]	DGU-nr:	Kote: Terræn	Init.: vH · PB	Dato: 3 / 5 / 22
Boring: BH02	Lok.: Gilleleje	Bundpejl:	Vandspejl:	Side: 5 a 5
Foringsrør: [x] Ja [ ] Nej	Boringsdim.: 6"	Filterdim.:	Slidsestr.:	Sandstr.:

Pejlerør		Prøver				Vingeforsøg				SPT			Notater
over terræn	Dybde m.	Prøve	Prøve-nr.:	Lag-grænse	**Jordartsbeskrivelse**	Dybde m.	vinge	intakt kg	omrørt kg	dybde m	antal slag pr. 7,5 cm	Fore rør	Dybde af: forgravning/ udtagne miljøprøver/ fræsning (fra/til)/ omrigning til DTH
	20				Sten + grus	20					6 7		[illegible]
	40					40					9 14		
	60		50			60					12 17		
	80					80							
	25 00		51		Stop [illegible]	25 00							
	20					20							
	40					40							
	60					60							
	80					80							
	00					00							
	20					20							
	40					40							
	60					60							
	80					80							
	00					00							
	20					20							
	40					40							
	60					60							
	80					80							
	00					00							
	20					20							
	40					40							
	60					60							
	80					80							
	00					00							
	20					20							
	40					40							
	60					60							
	80					80							
	00					00							

Geoteknisk Borejournal

AARSLEFF

Sag: 32193-281	DGU-nr:	Kote: Terræn	Init.: RJ - RB	Dato: 17 / 5 / 22
Boring: BH03	Lok.: Gilleleje	Bundpejl:	Vandspejl:	Side: 1 a 5
Foringsrør: ☒ Ja ☐ Nej	Boringsdim.: 8"	Filterdim.:	Slidsestr.:	Sandstr.:

Pejlerør over terræn	Dybde m.	Prøve	Prøve-nr.	Lag-grænse	Jordartsbeskrivelse	Vingeforsøg Dybde m.	vinge	intakt kg	omrørt kg	SPT dybde m	SPT antal slag pr. 7,5 cm	Fore rør	Notater: Dybde af: forgravning/ udtagne miljøprøver/ fræsning (fra/til)/ omrigning til DTH
	20		1		Muldjord	20							
	40				Sand	40							
	60		2			60							
	80					80							
	1 00		3			1 00							
	20					20							
	40					40							
	60		4			60							
	80					80							
	2 00		5			2 00					3		lukket sonde [illegible]
	20					20					3 3		
	40					40					3		
	60		6			60							
	80					80							
	3 00		7			3 00							
	20				Sand - grus - gul - sten	20							
	40					40							
	60		8			60					4 4		lukket sonde [illegible]
	80					80					3 4		
	4 00		9			4 00					6 6		
	20					20							
	40					40							
	60		10			60							
	80		10			80							
	5 00	P	11	5,0	Stor pose prøve	5 00							lukket sonde [illegible]
	20					20					6 8		
	40					40					[illegible]		
	60		12			60							
	80					80							
	6 00		13			6 00							

Geoteknisk Borejournal

AARSLEFF

Sag: 232193-281	DGU-nr:	Kote: Terræn	Init.: RJ - PB	Dato: 19 / 5 / 22
Boring: BH03	Lok.: Gilleleje	Bundpejl:	Vandspejl:	Side: 2 a 6
Foringsrør: ☐ Ja ☐ Nej	Boringsdim.: 8"	Filterdim.:	Slidsestr.:	Sandstr.:

Pejlerør over terræn	Dybde m.	Prøve	Prøve-nr.:	Lag-grænse	Jordartsbeskrivelse	Vingeforsøg Dybde m.	vinge	intakt kg	omrørt kg	SPT dybde m	SPT antal slag pr. 7,5 cm	Fore rør	Notater: Dybde af: forgravning/ udtagne miljøprøver/ fræsning (fra/til)/ omrigning til DTH
	20				Sand fyr gul	20							
	40					40							
	60		14			60					5 3		Lukket Sand [illegible]
	80				Do	80					4 4 / 4 4		
	7 00		15			7 00							
	20					20							
	40				Do	40							
	60		16			60							
	80					80							
	8 00		17			8 00							Lukket Sand [illegible]
	20					20				6	7		
	40					40				8 / 8	8 8 / 9		
	60		18		Do	60							
	80					80							
	9 00		19			9 00							
	20					20							
	40				Do	40							
	60		20			60					5 6		Lukket Sand [illegible]
	80		20			80				9,95	6 / 6 5 7		
	10 00	P	21		Stor pose prøve	10 00							
	20					20							
	40					40							
	60		22			60							
	80					80							
	11 00		23			11 00				11,0			Lukket Sand
	20					20					4 6		ink RAM
	40					40				11,45	7 8 / 9 10		
	60		24			60							
	80					80							
	12 00		25			12 00							

Geoteknisk Borejournal

AARSLEFF

Sag: 23219328	DGU-nr:	Kote: TR	Init.: SS – KG	Dato: 25 / 5 / 22
Boring: BH03	Lok.: Gilleleje	Bundpejl:	Vandspejl:	Side: 3 a 6
Foringsrør: [X] Ja [ ] Nej	Boringsdim.: 8"	Filterdim.:	Slidsestr.:	Sandstr.:

Pejlerør over terræn	Dybde m.	Prøver: Prøve	Prøve-nr.	Lag-grænse	Jordartsbeskrivelse	Vingeforsøg: Dybde m.	vinge	intakt kg	omrørt kg	SPT: dybde m	antal slag pr. 7,5 cm	Fore rør	Notater: Dybde af: forgravning/ udtagne miljøprøver/ fræsning (fra/til)/ omrigning til DTH
	20				Sand, tør, gulbrun	20							
	40					40				12,45			Lukket Sonde
	60		26			60					4 6		IND RAM
	80					80					7 9		
	13 00		27		— || —	13 00				12,9	11 13		Tør
	20					20							
	40					40							
	60		28			60							
	80			13,8		80							
	14 00		29		ibl. Sten	14 00				14,0			Lukket Sonde
	20			14,3		20					6 6		Ind Ram
	40				St. Stenet	40				14,45	8 10 / 12 18		Tør
	60		30			60							
	80		P 30			80							
	15 00	P	31			15 00							Stor pose Prøve 15m
	20					20							
	40					40				15,5			Lukket Sonde
	60		32	15,6		60					4 6		Ind Ram
	80			15,9	Ler Stribe, Sv. Siltet, grå brun	80					4/ 11		
	16 00		33		Ï. Sten	16 00				15,95	11 12		Tør
	20					20							
	40					40							
	60		34			60							
	80					80							
	17 00		35		— || —	17 00				17,0			Lukket Sonde
	20					20					4 6		Ind Ram
	40					40				17,45	7 8 / 9 9		Tør
	60		36			60							
	80					80							
	18 00		37			18 00							

Geoteknisk Borejournal

AARSLEFF

Sag: 232193-281	DGU-nr:	Kote: TR	Init.: SS - KG	Dato: 30 / 5 / 22
Boring: BH03	Lok.: Gilleleje	Bundpejl:	Vandspejl:	Side: 4 a 6
Foringsrør: [x] Ja [ ] Nej	Boringsdim.: 8"	Filterdim.:	Slidsestr.:	Sandstr.:

Pejlerør over terræn	Dybde m.	Prøver: Prøve	Prøver: Prøve-nr.	Prøver: Lag-grænse	Jordartsbeskrivelse	Vingeforsøg: Dybde m.	Vingeforsøg: vinge	Vingeforsøg: intakt kg	Vingeforsøg: omrørt kg	SPT: dybde m	SPT: antal slag pr. 7,5 cm	Notater: Fore rør	Notater: Dybde af: forgravning/ udtagne miljøprøver/ fræsning (fra/til)/ omrigning til DTH
	20				Sand, tør, gulbrun,	20							
	40					40				18,50			Lukket Sonde
	60		38			60					5 5		ind Ram
	80					80					5 6		
	19,00		39			19,00				18,95	6		
	20			19,30		20							
	40				Sand, Grå, VF.	40							
	60		40			60							Stor Pose Prøve 20 m
	80		P40			80							
	20,00	P	41			20,00				20,0	4 6		Lukket Sonde ind Ram.
	20					20					6 4		VS. 15,6 mut
	40			20,4		40				20,45	5 4		
	60		42		Svagt, Gruset.	60							
	80			20,8	Mere Gruset, 1BL. Sten	80							
	21,00		43			21,00							
	20			21,20		20							
	40				% Sten, Sv. Siltet	40				21,5			Lukket Sonde
	60		44			60					3 [illegible]		ind Ram
	80					80					4 4		VS. 14,9 mut
	22,00		45			22,00				21,95	5 5		
	20					20							
	40					40							
	60		46		— || —	60							
	80					80							
	23,00		47			23,00				23,0	2 3		Lukket Sonde ind Ram
	20					20					3 3		VS. 12,1 mut
	40					40				23,45	4 5		
	60		48			60							
	80					80							
	24,00		49			24,00							

Geoteknisk Borejournal

AARSLEFF

Sag: 232193-281	DGU-nr:	Kote: TR	Init.: SS, KG	Dato: 31 / 3 / 22
Boring: BH 03	Lok.: Gilleleje	Bundpejl:	Vandspejl:	Side: 5 a 6
Foringsrør: [X] Ja [ ] Nej	Boringsdim.: 8''	Filterdim.:	Slidsestr.:	Sandstr.:

Pejlerør over terræn	Dybde m.	Prøver: Prøve	Prøver: Prøve-nr.:	Prøver: Lag-grænse	Jordartsbeskrivelse	Vingeforsøg: Dybde m.	Vingeforsøg: vinge	Vingeforsøg: intakt kg	Vingeforsøg: omrørt kg	SPT: dybde m	SPT: antal slag pr. 7,5 cm	Notater: Fore rør	Notater: Dybde af: forgravning/ udtagne miljøprøver/ fræsning (fra/til)/ omrigning til DTH
	20				Sand, St. gruset, grå, VF	20							
	40					40				24,5			Lukket Sand
	60		50			60					1 2		ind Ram.
	80		P50			80					2 3		
	25.00	P	51			25.00				24,95	3 4		VS. 13,8 mut
	20					20							Stor Pose Prøve 25,0m
	40					40							
	60		52		― ‖ ―	60							
	80					80							
	26.00		53			26.00				26,0			Lukket Sand
	20			26,30		20					4 3		ind Ram
	40				mindre Gruset mere Siltet	40					4 5		VS. 12,40 mut
	60		54			60				26,45	5 7		
	80			26,85	Sten	80							
	27.00		55		% Grus	27.00							
	20			27,30		20							
	40				SAND, Silt, VF. GrÅ	40				27,5			Lukket Sand
	60		56			60					4 4		ind Ram
	80					80					4 5		
	28.00		57			28.00				27,95	5 5		VS. 13,8 mut
	20					20							
	40					40							
	60		58		― ‖ ―	60							
	80					80							
	29.00		59			29.00				29,0			Lukket Sand
	20					20					3 4		ind Ram
	40					40					4 4		
	60		60			60				29,5	4 5		VS. 14,1 mut
	80					80							
	30.00		61			30.00							

Geoteknisk Borejournal

AARSLEFF

Sag: 232193-281	DGU-nr:	Kote: TR	Init.: SS, KG	Dato: 31 / 5 / 22
Boring: BH03	Lok.: Gilleleje	Bundpejl:	Vandspejl:	Side: 6 a 6
Foringsrør: [X] Ja [ ] Nej	Boringsdim.: 8"	Filterdim.:	Slidsestr.:	Sandstr.:

Pejlerør over terræn	Dybde m.	Prøve	Prøve-nr.:	Lag-grænse	Jordartsbeskrivelse	Vingeforsøg Dybde m.	vinge	intakt kg	omrørt kg	SPT dybde m	SPT antal slag pr. 7,5 cm	Fore rør	Notater: Dybde af: forgravning/ udtagne miljøprøver/ fræsning (fra/til)/ omrigning til DTH
	20				Sand, grå, VF.	20							
	40					40				30,5			Lukket Sonde
	60		-62			60					5 7		ind Rm
	80					80					7 8		
	31 00		-63			31 00				30,95	8 9		VS 13,8
	20					20							
	40				— || —	40							
	60		-64			60							
	80					80							
	32 00		-65			32 00				32,0			Lukket Sonde
	20					20					8 8		ind Rm
	40					40				32,45	9 9 / 9 8		VS 15,6 [illegible]
	60		-66			60							
	80				— || —	80							
	33 00		-67			33 00							
	20					20							
	40		-68			40				33,5			Lukket Sonde
	60			33,7		60					6 8		ind Rm
	80				ibl. organisk Mat., sv. grus kul	80					8 9		
	34 00		-69			34 00				33,95	9 10		VS 11,6 [illegible]
	20					20							
	40					40							
	60		-70			60							
	80					80							
	35 00		-71			35 00				35,0			Lukket Sonde
	20				V	20					6 4		ind Rm
	40					40				35,4	4 4 / 5 4		VS 8, [illegible]
	60					60							
	80					80							
	00					00							

Lagfølge Borejournal

AARSLEFF

Sag: 232193-28	DGU-nr.:	Kote: STOL	Init.: SS - KG	Dato: 3 / 5 / 22
Boring: BH03	Lok: Gilleleje	Bundpejl.:	Vandspejl:	Side: 1 a 1
Foringsrør: [/] Ja [ ] Nej	Boringsdim.: 8"	Filterdim.: 25 mm	Slidsestr.:	Sandstr.: 3

Dybde m.	Prøver: Prøve	Prøve-nr.:	Lag-grænse	Jordartsbeskrivelse	Dybde m.	Filtersætning
					Bentonit	15,5 m
						Bentonit
						16,0 m
					29,5	
					31,5	
						35,0 m

Geoteknisk Borejournal

AARSLEFF

Sag: 232193-281	DGU-nr:	Kote: TR.	Init.: SS-KG	Dato: 4 / 5 / 22
Boring: BH04	Lok.: Gilleleje	Bundpejl: 3,000	Vandspejl:	Side: 1 a 9
Foringsrør: ☒ Ja ☐ Nej	Boringsdim.: 8"	Filterdim.: 0,25	Slidsestr.:	Sandstr.: TILBAGEFYLD

Pejlerør over terræn	Dybde m.	Prøver: Prøve	Prøve-nr.	Lag-grænse	Jordartsbeskrivelse	Vingeforsøg: Dybde m.	vinge	intakt kg	omrørt kg	SPT: dybde m	antal slag pr. 7,5 cm	Fore rør	Notater: Dybde af: forgravning/ udtagne miljøprøver/ fræsning (fra/til)/ omrigning til DTH
	20		1		Sand, grus, sten, tør, Brun	20							
	40					40							
	60		2			60							
	80					80							
	1 00		3			1 00				1,00			Lukket Sonde
	20			1,2		20					4 3		ind RAMNING
	40				Sv. Stenet, ibl. grå Sand	40				1,45	5 2 / 2 3		Tør
	60		4			60							
	80					80							
	2 00		5			2 00				2,00			Lukket Sonde
	20					20					3 5		ind RAM
	40					40				2,45	5 5 / 4 5		Tør
	60		6			60							
	80					80							
	3 00		7			3 00				[illegible]			
	20					20							
	40					40							
	60		8			60							
	80					80							
	4 00		9			4 00				4,0			Lukket Sonde
	20					20					2 2		ind Ram
	40					40					2 3		
	60		10			60				4,45	4 5		Tør
	80					80							
	5 00		11			5 00							
	20			5,2		20							
	40				St. Stenet	40				5,5			Lukket Sonde
	60		12			60					5 4		ind Ram
	80					80					5 5		
	6 00		13			6 00					5 6		Tør

TILBAGEFYLD

Geoteknisk Borejournal

AARSLEFF

Sag: 232193-281	DGU-nr:	Kote: JOT.	Init.: SS-KG	Dato: / /
Boring: BH04	Lok.: Gilleleje	Bundpejl: 50,00	Vandspejl:	Side: 2 a 9
Foringsrør: ☒ Ja ☐ Nej	Boringsdim.: 8"	Filterdim.: 0,25	Slidsestr.:	Sandstr.: TILBAGEFYLD

Pejlerør over terræn	Dybde m.	Prøve	Prøve-nr.	Lag-grænse	Jordartsbeskrivelse	Vingeforsøg Dybde m.	vinge	intakt kg	omrørt kg	SPT dybde m	SPT antal slag pr. 7,5 cm	Fore rør	Notater: Dybde af: forgravning/ udtagne miljøprøver/ fræsning (fra/til)/ omrigning til DTH
TILBAGEFYLD	20				Sand, grus, stenet, tør, brun/grå	20							
	40					40							
	60		14			60							
	80			6,8		80							
	7 00		15		Sv. leret, mere fint	7 00				7,0			Lukket Sand
	20					20					2 2		ind Ram.
	40					40				7,45	2 2		Tør
	60		16	7,7		60							
	80				Mere Lys/Grå	80							
	8 00		17			8 00							
	20			8,3		20							
	40				St. Stenet	40				8,5			Lukket Sand
	60		18			60					5 8		ind Ram.
	80			8,8		80					8 9		
	9 00		19		Stenet	9 00				8,95	8 11		Tør
	20					20							
	40					40							
	60		20			60							
	80					80							
	10 00		21			10 00				10,0			Lukket Sand
	20					20					2 4		ind Ram
	40					40				10,45	9 9 / 11 10		Tør
	60		22			60							
	80					80							
	11 00		23			11 00							
	20					20							
	40					40				11,5			Lukket Sand
	60		24			60					8 9		ind Ram
	80					80					7 16		
	12 00		25			12 00				11,95	17 19		Tør

Geoteknisk Borejournal

AARSLEFF

Sag: 232193-2X1	DGU-nr:	Kote: JO	Init.: SSKO	Dato: 9/5/22
Boring: BH01	Lok.: Tilleleje	Bundpejl: 50,00	Vandspejl:	Side: 3 a 9
Foringsrør: [x] Ja [ ] Nej — Boringsdim.: 8"		Filterdim.: 0,25	Slidsestr.:	Sandstr.:

Pejlerør over terræn	Dybde m.	Prøve	Prøve-nr.:	Lag-grænse	Jordartsbeskrivelse	Vingeforsøg Dybde m.	vinge	intakt kg	omrørt kg	SPT dybde m	SPT antal slag pr. 7,5 cm	Fore rør	Notater: Dybde af: forgravning/ udtagne miljøprøver/ fræsning (fra/til)/ omrigning til DTH
BENTONIT	20				Sand, grus, sten, tør, SV. leret	20							1YS Blu
	40					40							
	60		26			60							
	80					80							
	13 00		27			13 00				13,0			Lukket Sonde
	20					20					5 10		med Ram.
	40		28			40				13,45	10 13 / 13 18		Tør
	60			13,7		60							
	80				St. Sten	80							
	14 00		29			14 00							
TILBAGEFYLD	20					20							
	40					40				14,5			Lukket Sonde
	60		30			60					8 12		med Ram.
	80					80					20 21		
	15 00		31			15 00				14,95	24 23		Tør
	20	A				20							A-RØR MIS. A-RØR OFF AF Sten
	40					40							
	60		32			60							
	80					80							
	16 00		33			16 00				16,0			Lukket Sonde
	20					20					6 14		med Ram.
	40		34			40				16,45	18 20 / 24 24		Tør
	60					60							
	80					80							
	17 00		35			17 00							
	20					20							
	40					40				17,5			Lukket Sonde
	60		36			60					6 8		med Ram
	80					80					14 17		
	18 00		37			18 00					23 21		Tør

Geoteknisk Borejournal

AARSLEFF

Sag: 232193-281	DGU-nr:	Kote: TR	Init.: SS-KG	Dato: 10 / 5 / 22
Boring: BH04	Lok.: Gilleleje	Bundpejl: 50,00	Vandspejl:	Side: 4 a 9
Foringsrør: [X] Ja [ ] Nej	Boringsdim.: 8"	Filterdim.: 0,25	Slidsestr.:	Sandstr.: TILBAGEFYLD

Pejlerør over terræn	Dybde m.	Prøve	Prøve-nr.	Lag-grænse	Jordartsbeskrivelse	Vingeforsøg Dybde m.	vinge	intakt kg	omrørt kg	SPT dybde m	SPT antal slag pr. 7,5 cm	Fore rør	Notater: Dybde af: forgravning/ udtagne miljøprøver/ fræsning (fra/til)/ omrigning til DTH
TILBAGE FYLD	20				Sand, sv. leret, grus, stenet, 1/5 Brun, tør.	20							
	40					40							
	60		38			60							
	80					80							
	19 00		39			19 00				19,0			Lukket Sand
	20					20					18 6		ind Ram. Mangler 2 cm
	40					40				19,34	32 34 34		Mangler 9 cm. Tør
	60		40			60							
	80					80							
	20 00		41			20 00							
	20					20							
	40					40				20,5			Lukket Sand
	60		42			60					22 13		ind Ram. Mangler 6 cm
	80					80				20,84	43 46 11		Mangler 13 cm. Tør
	21 00		43			21 00							
	20			21,3		20							
	40				Stenet	40							
	60		44			60							
	80					80							
	22 00		45			22 00				22,0			Lukket Sand
	20					20					6 14		ind Ram
	40					40				22,45	16 21 28 33		Tør
	60		46			60							
	80					80							
	23 00		47			23 00							
	20					20							
	40		48			40				23,5			Lukket Sand
	60					60					2 3		ind Ram
	80					80					12 17		
	24 00		49			24 00				23,95	21 26		Tør

Geoteknisk Borejournal

AARSLEFF

Sag: 232193-??	DGU-nr:	Kote: TR	Init.: SS KG	Dato: 11 / 5 / 22
Boring: BH04	Lok.: Gilleleje	Bundpejl: 60,00	Vandspejl:	Side: 5 a 9
Foringsrør: [x] Ja [ ] Nej	Boringsdim.: 8"	Filterdim.: 0,25	Slidsestr.:	Sandstr.: TILBAGE FYLD

Pejlerør over terræn	Dybde m.	Prøve	Prøve-nr.	Lag-grænse	Jordartsbeskrivelse	Vingeforsøg Dybde m.	vinge	intakt kg	omrørt kg	SPT dybde m	SPT antal slag pr. 7,5 cm	Fore rør	Notater: Dybde af: forgravning/ udtagne miljøprøver/ fræsning (fra/til)/ omrigning til DTH
TILBAGE FYLD	20				SAND, SV. Leret, gruset, Stenet, VS. Brun, Tør	20							
	40					40							
	60		50			60							
	80					80							
	25 00		51			25 00				25,0			Lukket Sonde
	20					20					5 9		ind Rør
	40		52			40				25,44	18 29 30 for 20		mangler 5 cm Tør
	60					60							
	80					80							
	26 00		53			26 00							
	20					20							
	40					40				26,5			Lukket Sonde
	60		54			60					4 11		ind Rør
	80					80					20 31		mangler 9,5 cm
	27 00		55	27,0	St. Stenet	27 00				26,95	48		Tør
	20					20							
	40					40							
	60		56			60							
	80					80							
	28 00		57			28 00				28,0			Lukket Sonde
	20					20					18 9		mangler ind Rør 6 cm
	40					40				28,2	24 16		mangler 18 cm Tør
	60		58			60							
	80					80							
	29 00		59			29 00				29			
	20			29,3	Stenet	20							
	40					40				29,5			Lukket Sonde
	60		60			60					7 14		ind Rør
	80					80					16 20		
	30 00		61			30 00				29,95	22 29		Tør

Geoteknisk Borejournal

AARSLEFF

Sag: 232193-281	DGU-nr:	Kote: TR	Init.: SS KG	Dato: 12 / 5 / 22
Boring: BH04	Lok.: Gilleleje	Bundpejl: 50,00	Vandspejl:	Side: 6 a 9
Foringsrør: ☒ Ja ☐ Nej	Boringsdim.: 8"	Filterdim.: 0,25	Slidsestr.:	Sandstr.: TILBAGEFYLD

Pejlerør (over terræn): TILBAGE FYLD

Dybde m.	Prøve	Prøve-nr.	Lag-grænse	Jordartsbeskrivelse	Vingeforsøg Dybde m.	vinge	intakt kg	omrørt kg	SPT dybde m	SPT antal slag pr. 7,5 cm	Fore rør	Notater (Dybde af: forgravning/udtagne miljøprøver/fræsning (fra/til)/omrigning til DTH)
20				Sand, grus, sv.leret, Stenet, [illegible] Brun, Tør	20							
40			30,4		40							
60		62		Sand, grus, VF., Sten, grå	60							Sand/Stand fra 30,4 m.u.t ↓
80					80							
31.00		63			31.00				31,0			Lukket Sonde
20					20					20 5		ind Ram mangler 6,5 cm
40					40					16 4		VS. 1[illegible] m.u.t
60		64	31,7		60				31,39	14 10		
80				St. Stenet	80							
32.00		65			32.00							
20					20							
40		66			40				32,5			Lukket Sonde
60					60					22		ind Ram mangler 7 cm
80					80					21 30		Mangler 6,3 cm?
33.00		67			33.00					34 [illegible]		VS. 16,0 m.u.t
20					20							
40					40							
60		68			60							
80					80							
34.00		69			34.00				34,0			Lukket Sonde
20					20					25		ind Ram mangler 7,5 cm?
40					40				34,21	32, 24 1/11		Mangler 11,5 cm; VS. 15,5 m.u.t
60		70			60							
80					80							
35.00		71			35.00							
20					20							
40		72			40				35,5			Lukket Sonde
60					60					21 4		ind Ram mangler 4,5 cm
80					80					32 36, 30		Mangler 10,5 cm; VS. 21,2 m.u.t
36.00		73			36.00							

Geoteknisk Borejournal

AARSLEFF

Sag: 232193-281	DGU-nr:	Kote: TR	Init.: SS KG	Dato: 16 / 5 / 22
Boring: BH04	Lok.: Gilleleje	Bundpejl: 50,00	Vandspejl:	Side: 7 a 9
Foringsrør: [x] Ja [ ] Nej	Boringsdim.: 8"	Filterdim.: 0,25	Slidsestr.:	Sandstr.: TILBAGE FYLD

Pejlerør over terræn	Dybde m.	Prøve	Prøve-nr.	Lag-grænse	Jordartsbeskrivelse	Vingeforsøg Dybde m.	vinge	intakt kg	omrørt kg	SPT dybde m	SPT antal slag pr. 7,5 cm	Fore rør	Notater (Dybde af: forgravning/ udtagne miljøprøver/ fræsning (fra/til)/ omrigning til DTH)
TILBAGE FYLD	20				Sand, Grus, St. Stenet VF. grå	20							
	40					40							
	60		74	36,7		60							
	80				÷ st. Stenet + st. gruset	80							
	37 00		75			37 00				37,0			Lukket Sonde
	20					20					2 2 / 2 3		ind RAM
	40					40				37,45	3 4		VS. 18,3 Mot
	60		76			60							
	80			37,70	Stenet	80							
	38 00		77			38 00							
	20					20							
	40					40				38,5			Lukket Sonde
	60		78			60					6 6		ind RAM
	80					80					7 8		
	39 00		79			39 00				38,95	8 9		VS. 19,6 mot
	20					20							
	40					40							
	60		80			60							
	80					80							
	40 00		81			40 00				40,6			Lukket Sonde
	20					20					8 4 / 6 6		ind RAM
	40					40				40,95	6 7		VS 19,6 Mot
	60		82			60							
	80			40,8	Mere SANDet	80							
	41 00		83			41 00							
	20			41,30		20							
	40				SAND, Grå, SV. Gruset, VF.	40				41,5			Lukket Sonde
	60		84			60					6 8		ind Ram
	80					80					8 8		
	42 00		85			42 00					9 10		VS 12,9 mot

Vissenbjerg Tryk A/S

Geoteknisk Borejournal

AARSLEFF

Sag: 232193-28	DGU-nr:	Kote: TR.	Init.: SS. kG	Dato: 17 / 5 / 22
Boring: BH04	Lok.: Gillelejle	Bundpejl: 50,00	Vandspejl:	Side: 8 a 9
Foringsrør: ☐ Ja ☐ Nej	Boringsdim.: 8"	Filterdim.: 0,25	Slidsestr.:	Sandstr.: TILBAGEFYLD

Pejlerør over terræn	Dybde m.	Prøve	Prøve-nr.:	Lag-grænse	Jordartsbeskrivelse	Vingeforsøg Dybde m.	vinge	intakt kg	omrørt kg	SPT dybde m	SPT antal slag pr. 7,5 cm	Fore rør	Notater: Dybde af: forgravning/ udtagne miljøprøver/ fræsning (fra/til)/ omrigning til DTH
TILBAGE FYLD	20				Sand, grå, sv. gruset, VF.	20							
	40					40							
	60		86			60							
	80					80							
	43 00		87			43 00				43,0	10 9		Lukket sonde ind RAM
	20					20					10 11		
	40					40				43,45	10 8		V.S. 17,8 mt
	60		88			60							
	80					80							
	44 00		89		—||—	44 00							
	20					20							
	40					40				44,5			Lukket Sonde
	60		90			60					10 5		ind RAM
	80					80					8 8		
	45 00		91			45 00				44,95	8 8		VS. 19,7 mt
	20					20							
	40					40							
	60		92			60							
	80					80							
	46 00		93			46 00				46,0			LUKKET SONDE
	20					20					10 6		IND RAM
	40					40				46,45	9 8 / 8 7		VS 24,10
	60		94			60							
	80					80							
	47 00		95			47 00							
	20					20				47,45			
	40					40							LUKKET SONDE
	60		96			60					10 8		IND RAM
	80					80				47,90	8 8 / 8 6		VS 27,00
	48 00		97			48 00							

Geoteknisk Borejournal

AARSLEFF

Sag: 232193	DGU-nr:	Kote: TR	Init.: PKN/HANSE	Dato: 23 / 5 / 22
Boring: BH04	Lok.: Gilleleje	Bundpejl: 50,00	Vandspejl:	Side: 9 a 9
Foringsrør: ☒ Ja ☐ Nej	Boringsdim.: 8"	Filterdim.: 0,25	Slidsestr.:	Sandstr.: SAND 3 OMKRING FILTER

Pejlerør over terræn	Dybde m.	Prøver: Prøve	Prøve-nr.	Lag-grænse	Jordartsbeskrivelse	Vingeforsøg: Dybde m.	vinge	intakt kg	omrørt kg	SPT: dybde m	antal slag pr. 7,5 cm	Fore rør	Notater: Dybde af: forgravning/ udtagne miljøprøver/ fræsning (fra/til)/ omrigning til DTH
TILBAGEFYLD	20				Sand grå, gruset, iBl. kalksten-sten	20							Stor Blanckprøve fra 45-49
	40		98			40							
	60					60							
	80					80							
	49 00		99		– ll –	49 00				49		49	Indramning
SAND 3	20					20					3 4		
	40		100			40					5 6		V.S 29,5
	60					60					8 10		
	80					80							
	50 00		101			50 00							
	20				STOP DYBDE 50,00 MUT	20							
	40					40							
	60					60							
	80					80							
	00					00							
	20					20							
	40					40							
	60					60							
	80					80							
	00					00							
	20					20							
	40					40							
	60					60							
	80					80							
	00					00							
	20					20							
	40					40							
	60					60							
	80					80							
	00					00							

Geoteknisk Borejournal

AARSLEFF

Sag: [illegible]	DGU-nr:	Kote: Terræn	Init.: VJ · PB	Dato: 25 / 4 / 22
Boring: [illegible]	Lok.: Gilleje	Bundpejl:	Vandspejl: 3,25	Side: 1 a 5
Foringsrør: ☐ Ja ☐ Nej	Boringsdim.: 6"	Filterdim.:	Slidsestr.:	Sandstr.:

Pejlerør	Dybde	Prøver			Jordartsbeskrivelse	Vingeforsøg				SPT		Fore rør	Notater
over terræn	m.	Prøve	Prøve-nr.	Lag-grænse		Dybde m.	vinge	intakt kg	omrørt kg	dybde m	antal slag pr. 7,5 cm		Dybde af: forgravning/ udtagne miljøprøver/ fræsning (fra/til)/ omrigning til DTH
					SAND GUL TØRT								
	20					20							
	40					40							
	60					60							
	80					80							
	1 00				Do	1 00							
	20					20							
	40					40							
	60					60							
	80				Do	80							
	2 00					2 00							
	20					20							
	40					40							
	60				Do	60							
	80					80							
	3 00					3 00							
	20					20							
	40				— VF gul	40							
	60					60							
	80					80							
	4 00				Do	4 00							
	20					20							
	40					40							
	60				Do	60							
	80					80							
	5 00					5 00							
	20					20							
	40				Do	40							
	60					60							
	80				Do	80							
	6 00					6 00							

Geoteknisk Borejournal

AARSLEFF

Sag: 152193-291	DGU-nr:	Kote: Terræn	Init.: UH-PB	Dato: 25 / 4 / 22
Boring: BH 05	Lok.: Gilleleje	Bundpejl:	Vandspejl:	Side: 2 a 5
Foringsrør: ☑ Ja ☐ Nej	Boringsdim.:	Filterdim.:	Slidsestr.:	Sandstr.:

Pejlerør over terræn	Dybde m.	Prøver: Prøve	Prøve-nr.:	Lag-grænse	Jordartsbeskrivelse	Vingeforsøg: Dybde m.	vinge	intakt kg	omrørt kg	SPT: dybde m	antal slag pr. 7,5 cm	Fore rør	Notater: Dybde af: forgravning/ udtagne miljøprøver/ fræsning (fra/til)/ omrigning til DTH
	20				Sand gul VF	20							
	40					40							
	60		14			60						5 4	[illegible]
	80				Do	80						2 2 / 1 1	
	7 00		15			7 00							
	20					20							
	40					40							
	60		16			60							
	80				Do	80							
	8 00		17			8 00						11/12	[illegible]
	20					20						8 6 / 5 5	
	40		18	8/40	m sand grå	40							
	60					60							
	80					80							
	9 00		19			9 00							
	20				Do	20							
	40					40							
	60		20			60						8 9	[illegible]
	80					80						5 5 / 6 5	
	10 00		21		Do	10 00							
	20					20							
	40					40							
	60		22		SAND STEN GRUS	60							
	80					80							
	11 00		23			11 00							
	20					20						5 6	[illegible]
	40					40						7 8 / 7 8	
	60		24		Do	60							
	80					80							
	12 00		25			12 00							

Geoteknisk Borejournal

AARSLEFF®

Sag: 232193-281	DGU-nr:	Kote: Terræn	Init.: [illegible] BB	Dato: 25 / 4 / 22
Boring: BH05	Lok.: Gilleleje	Bundpejl:	Vandspejl:	Side: 3 a 5
Foringsrør: ☒ Ja ☐ Nej	Boringsdim.: 6"	Filterdim.:	Slidsestr.:	Sandstr.:

Pejlerør over terræn	Dybde m.	Prøve	Prøve-nr.:	Lag-grænse	Jordartsbeskrivelse	Vingeforsøg Dybde m.	vinge	intakt kg	omrørt kg	SPT dybde m	SPT antal slag pr. 7,5 cm	Fore rør	Notater: Dybde af: forgravning/ udtagne miljøprøver/ fræsning (fra/til)/ omrigning til DTH
	20				Sand - Silt.	20							
	40					40							
	60		26			60							Udført SPT-forsøg [illegible]
	80					80					8 / 6 / 6		
	13.00		27			13.00							
	20				Sten - grus - sand.	20							
	40					40							
	60		28			60							
	80					80							
	14.00		29		Do	14.00							Udført SPT-forsøg [illegible]
	20					20					21 / 7 / 8		
	40					40							
	60		30			60							
	80				Do	80							
	15.00		31			15.00							
	20					20							
	40					40							
	60		32		Do	60					[illegible]		[illegible]
	80					80							
	16.00		33			16.00							
	20					20							
	40					40							
	60		34		Do.	60							
	80					80							
	17.00		35			17.00							
	20				Do	20							
	40					40							
	60		36			60							
	80				Do	80							
	18.00		37			18.00							

Geoteknisk Borejournal

AARSLEFF

Sag: 232193-281	DGU-nr:	Kote: Terræn	Init.: VT-PB	Dato: 25/4/22
Boring: BH05	Lok.: gillekjr	Bundpejl:	Vandspejl:	Side: 14 a
Foringsrør: [x] Ja [ ] Nej	Boringsdim.: 6"	Filterdim.:	Slidsestr.:	Sandstr.:

Pejlerør over terræn	Dybde m.	Prøve	Prøve-nr.	Lag-grænse	Jordartsbeskrivelse	Vingeforsøg Dybde m.	vinge	intakt kg	omrørt kg	SPT dybde m	SPT antal slag pr. 7,5 cm	Fore rør	Notater: Dybde af: forgravning/ udtagne miljøprøver/ fræsning (fra/til)/ omrigning til DTH
	20				Sand - Sten grus	20							
	40					40							
	60		38			60							
	80				Do	80							
	19 00		39			19 00							[illegible]
	20					20					6 6		
	40					40					5 4 6 5		
	60		40			60							
	80					80							
	20 00		41		Sten grus	20 00							
	20					20							
	40					40							[illegible]
	60		42			60					3 4		
	80					80					5 7 9 10		
	21 00		43			21 00							
	20				Sand - grus grå	20							
	40					40							
	60		44			60							
	80					80							
	22 00		45		Do	22 00							[illegible]
	20					20							
	40					40							
	60		46			60							
	80				Do	80							
	23 00		47			23 00							
	20					20							
	40					40							[illegible]
	60		48		Do	60							
	80					80							
	24 00		49			24 00							

Geoteknisk Borejournal

AARSLEFF

Sag: 232193-291	DGU-nr:	Kote: Terræn	Init.: VJ-PB	Dato: 25 / 4 / 22
Boring: BH05	Lok.: gillelejo	Bundpejl:	Vandspejl:	Side: 5 a 5
Foringsrør: ☑ Ja ☐ Nej	Boringsdim.: 6"	Filterdim.:	Slidsestr.:	Sandstr.:

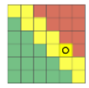
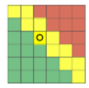
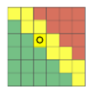
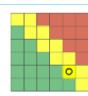
Pejlerør		Prøver				Vingeforsøg				SPT		Notater	
over terræn	Dybde m.	Prøve	Prøve-nr.	Lag-grænse	Jordartsbeskrivelse	Dybde m.	vinge	intakt kg	omrørt kg	dybde m	antal slag pr. 7,5 cm	Fore rør	Dybde af: forgravning/ udtagne miljøprøver/ fræsning (fra/til)/ omrigning til DTH
	20				Sand - grus - sten, gnr	20							
	40					40							Lukket-sand
	60		50			60						6 7	Tragsand? v
	80					80						7 9	
	25 00		51		stor pose	00						11 K	
	20				25,0 m	20							
	40					40							
	60					60							
	80					80							
	00					00							
	20					20							
	40					40							
	60					60							
	80					80							
	00					00							
	20					20							
	40					40							
	60					60							
	80					80							
	00					00							
	20					20							
	40					40							
	60					60							
	80					80							
	00					00							
	20					20							
	40					40							
	60					60							
	80					80							
	00					00							

APPENDIX 7.1 – RISK LOG

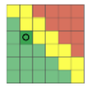
Energinet-Gildbjerg Hoved HDD

Risk Log

2022-06-30

No.	Description	Risk level	
1	Risk description: Boulders in soil - large Cause description: Cause #1: Primarily boulders in clay till, gravel and dense gravel in the glacier layer. Cause #15: Several boulders resulted in delays of Geotechnical boreholes. Cause #19: Encountering one or several large boulders during HDD can cause delay in operations. Effect description: Effect #1: Can lead to withdrawal and new HDD pilot hole. Control-4: *Minimize drilling distance in clay till and gravel layers.* Possible - No deadline	Time	
12	Risk description: Not possible to maintain sufficient pressure Cause description: Cause #12: Relevant for sand deposits. In dry sand drilling fluid can flow into the soil. Drilling is expected in the late glacial and glacial sand layer. Effect description: Effect #10: New start up can be required or change of drilling procedure. Control-11: *Minimize drilling in dry sand or coarse material.* Possible - No deadline Control-12: *Design of drilling mud according to conditions - saturated and non-saturated.* Possible - No deadline	Time	
14	Risk description: Drilling below and above water table Cause description: Cause #14: When there is a change going from saturated to unsaturated conditions this can cause loss of pressure. Effect description: Effect #12: Can require more pressure and require adaptation of set-up. Control-12: *Design of drilling mud according to conditions - saturated and non-saturated.* Possible - No deadline	Time	
8	Risk description: Challenging drilling conditions and area constraints due to multiple parallel HDD Cause description: Cause #8: Blow out can lead to a situation with no feasible drilling route. Challenging due to long length of app. 1 km and sand deposits. Cause #16: Up to three parallel HDD routes. Effect description: Effect #7: In worst case new alignment or new contractor is required.	Time	

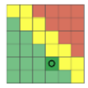
16 Risk description:
Boulders in soil - small
Cause description:
Cause #1: Primarily boulders in clay till, gravel and dense gravel in the glacier layer.
Effect description:
Effect #14: Withdraw and minor rerouting of HDD

Time 

---

2 Risk description:
Limited geotechnical information between Gilbjerg Hoved HDD and offshore cable survey
Cause description:
Cause #2: Uncertain geology towards sea at marine exit point. Nearest geotechnical borehole is on 10m water depth.
Effect description:
Effect #13: Uncertain to contractor how plan the work at sea.

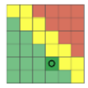
Control-6:
Contractor shall familiarize himself with the cable route survey reports.
Possible - No deadline

Time 

---

5 Risk description:
Blowout, damage to road
Cause description:
Cause #5: HDD crossing of road at Gildbjerg Hoved. Start point is close to surface of the road.
Effect description:
Effect #4: Settlements of road leading to potential closure of road.

Control-7:
Safe distance from HDD starting point to road and amount of overburden between HDD and road.
Possible - No deadline

Time 

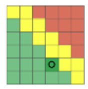
---

6 Risk description:
Blowout, damage to surroundings
Cause description:
Cause #6: Gildbjerg Hoved is nature 2000 area. Probability dependent of depth of drilling which is expected in the post glacial layer.
Effect description:
Effect #5: Blow out can results in drilling mud at surface in Natura 2000 area, this can cause a delay require cleaning up and informing authorities.

Control-2:
Response plan shall handle this to minimize impact on area.
Possible - No deadline

Control-8:
Increase overburden.
Possible - No deadline

Control-9:
Manage use of drilling mud additives
Possible - No deadline

Time 

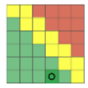
---

4 Risk description:
Blowout, easy clean up
Cause description:
Cause #4: Probability is highest when drilling through sand deposits.
Effect description:
Effect #3: New drilling is required

Time 

17 Risk description:
Large boulder reduces diameter of HDD casing
Cause description:
Cause #18: Encountering boulders when pulling pilot pipe may cause damage to pipe.
Effect description:
Effect #15: Damage to pilot pipe and increased friction and risk when pulling cable through pipe.

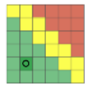
Control-15:
Design pilot pipe according to high voltage cable and HDD according to pilot pipe.
Possible - No deadline

Time 

---

11 Risk description:
Risk of friction during drilling
Cause description:
Cause #11: Probability is in general largest in clay till.
Effect description:
Effect #9: Can lead to new reaming up several times leading to delays. Pipes can get stocked due to friction.

Control-10:
Additives to drilling mud.
Possible - No deadline

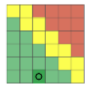
Time 

---

15 Risk description:
Crossing of high voltage cable.
Cause description:
Cause #17: Depth of high voltage cable is not known.

Control-13:
Awareness of cable when planning HDD route.
Possible - No deadline

Control-14:
LER investigation and contact to cable owner
Possible - No deadline

Time 

---

10 Risk description:
Interference with roots
Cause description:
Cause #10: There can be roots from vegetation.

Time