



SMEAHEIA

Smeaheia Site Preparation - Study Geotechnical field report - Nearshore

REPORT

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Equinor Energy AS

► Smeaheia Site Preparation - Study

Geotechnical field investigations - Nearshore

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Key-info	Explanation
Key words	Site investigation report
County	Vestland
Municipality	Øygarden
Location	Austrevågen, Sture
Coordinate system	Euref89 UTM zone 32
Elevation system	NN2000
Project coordinates	North: 6726980 East: 273080

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► Summary

Norconsult Norge AS has carried out geotechnical field investigations in relations to ongoing work with the site preparation study as part of the "Civil 1" part of the Smeaheia project. The area consists of a rockfill in the Austrevågen bay, south of the Sture terminal in Øygarden municipality.

Previously, 63 total soundings have been carried out onshore. This report describes 44 supplementary soundings conducted nearshore by a geotechnical drill rig from a barge.

The soundings generally show firm conditions close to the existing rockfill. In large areas bedrock is found at shallow depth. In some areas soil deposits with very low drilling resistance is registered with thicknesses of up to 5 meters.

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List of drawings

Contents	Format	Scale	Drawing nr.
Boring plan – Conducted investigations – General layout	A1	1:1000	002
Total Sounding	A4/A3	1:250	201-244

List of appendixes

Contents	Appendix Nr.
Laboratory report	A
Explanations – Geotechnical plan- and profile drawings	B
Explanations – Total soundings	C

1 Introduction

Norconsult Norge AS has been contracted by Equinor Energy AS to conduct geotechnical field investigations in relations to ongoing work with the site preparation study as part of the “Civil 1” part of the Smeaheia project. The Smeaheia project aims to build a CO₂ terminal to receive CO₂ from ships for storage under the North Sea. The project site is located in Austrvågen, south of the existing Sture-terminal, in Øygarden municipality, see Figure 1.

Norconsult has previously conducted a geotechnical survey on the existing fill, the results of which are described in the geotechnical data report E316-NL-Q-RY-00001.

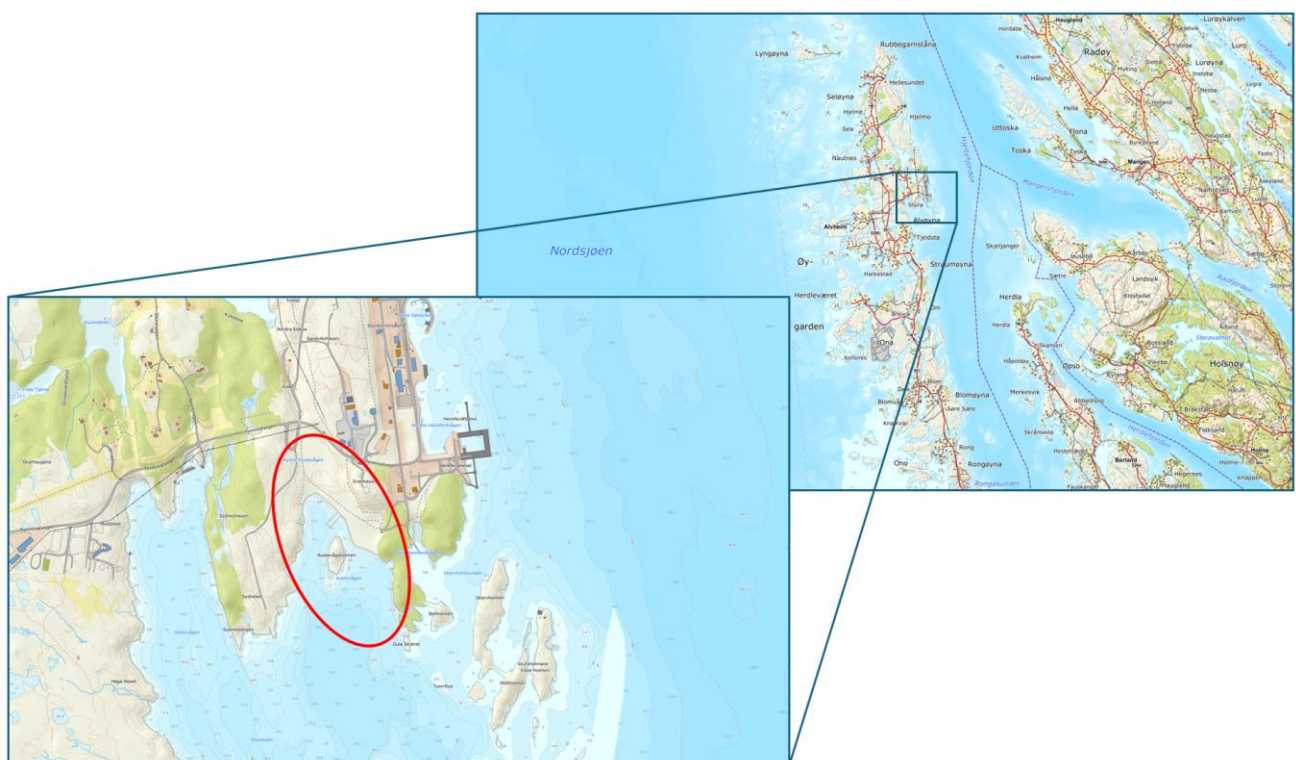


Figure 1: Project location.

2 Purpose

This report is a site investigation report summarising results from the nearshore geotechnical survey. Geotechnical parameter-interpretation, consulting and design are not treated in this report.

The field results, in combination with the laboratory-analysis, should be a design-basis for geotechnical design and assessments further on in the project.

3 Historical aerial photographs

The surveyed area was originally a part of the Austrevågen bay. The bay was filled in with blasted rock from the construction of caverns during the construction of the Sture terminal in the 80s and 90s. Before the bay was filled in, bedrock was visible along the shoreline. Aerial photos showing the situation before and after the filling of the bay is shown on Figure 2.

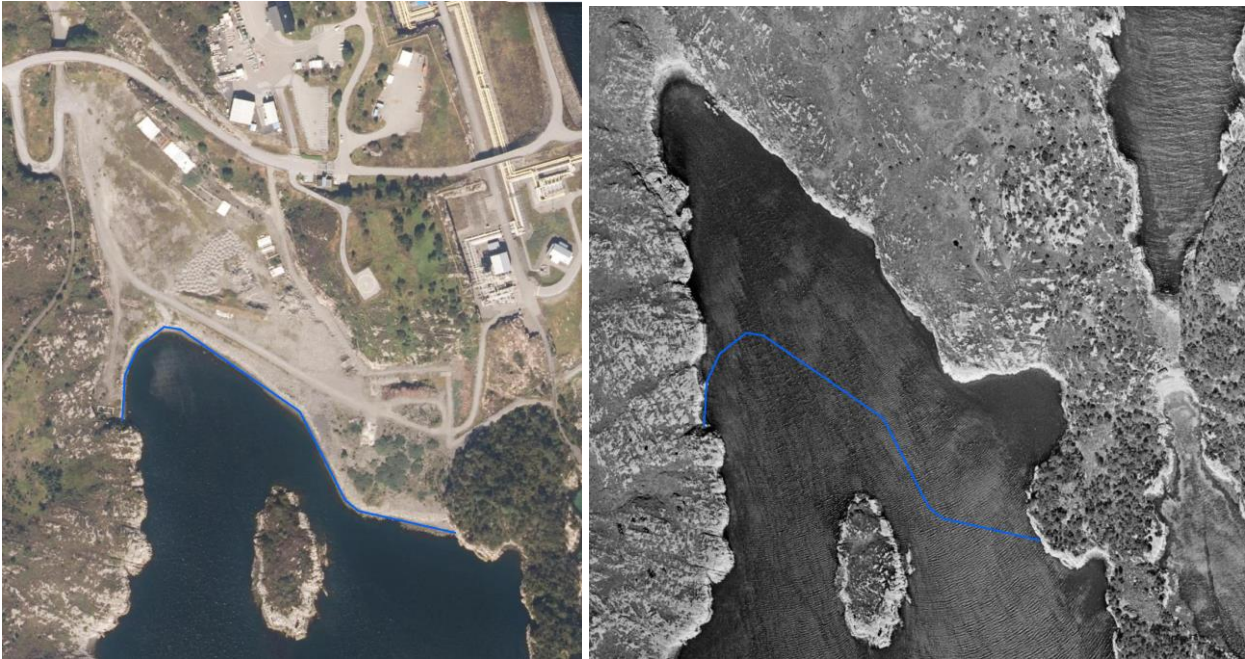


Figure 2: Aerial photos from 1978 and 2020. Today's fill front shown with blue line (Finn.no).

4 Field work

During the field investigations, the following results were produced:

- 44 total soundings to bedrock or firm ground
- 1 cone penetration test (CPTu)
- Collections of 3 undisturbed samples in 1 position by piston sampler

During the total soundings onshore the field crew encountered problems with the penetration of the soil and in particular the bedrock, leading to a substantial amount of drill string breakages and loss of drilling equipment. Similar challenges were encountered in the northern part of the bay while drilling through the rockfill. For the rest of the nearshore soundings, bedrock was successfully registered.

The positions of each borehole and associated height are measured using CPOS-corrected GPS. The table below sums up information from the field work regarding to positions, investigation methods and drilling depths from total soundings. The bore plan of executed ground investigations number 002 gives the same overview. Because of an error in the coordinate table in revision 01, the table has been corrected in version 02.

Table 1: List of boreholes

Borehole	Euref89 UTM zone 32, NN2000			Method	Drill depth (TOT)	
	X (North)	Y (East)	Z (Height)		Soil deposit [m]	Rock [m]
201	6726945,3	272979,6	-15,8	TOT	16,3	
202	6726927,4	273007,5	-15,5	TOT	13,3	
203	6726911,0	273028,9	-20,9	TOT	1,0	3,2
204	6726889,1	273055,8	-18,5	TOT	0,6	3,1
205	6726870,1	273076,7	-20,2	TOT	0,8	3,2
206	6726851,9	273100,1	-9,7	TOT	2,0	3,1
207	6726812,8	273111,3	-8,2	TOT	0,3	3,3
208	6726792,2	273129,3	-13,9	TOT	0,6	3,1
209	6726781,2	273172,4	-11,2	TOT	4,9	3,1
210	6726771,8	273212,5	-4,0	TOT	17,7	3,1
211	6726759,6	273199,7	-13,3	TOT	6,1	
212	6726757,6	273224,3	-14,3	TOT	9,9	1,6
213	6726889,2	273000,0	-23,4	TOT, CPTU, Sample	8,9	3,3
214	6726766,4	273149,9	-17,3	TOT	4,7	4,1
215	6726749,4	273170,5	-15,2	TOT	1,0	3,3
216	6726754,5	273139,3	-17,5	TOT	3,9	3,0
217	6726734,9	273158,9	-18,7	TOT	2,8	3,1
218	6726736,4	273128,5	-13,6	TOT	0,5	3,2

Borehole	Euref89 UTM zone 32, NN2000			Method	Drill depth (TOT)	
	X (North)	Y (East)	Z (Hight)		Soil deposit [m]	Rock [m]
219	6726722,3	273147,4	-19,0	TOT	2,9	3,2
220	6726722,9	273115,9	-4,9	TOT	0,3	3,2
221	6726704,4	273134,9	-19,7	TOT	0,6	3,1
222	6726694,8	273110,1	-4,5	TOT	0,6	3,1
223	6726676,7	273129,8	-18,8	TOT	0,1	3,2
224	6726681,2	273099,2	-8,0	TOT	0,1	3,1
225	6726663,2	273117,9	-17,6	TOT	1,0	3,3
226	6726664,7	273086,1	-7,0	TOT	1,4	3,0
227	6726647,4	273104,2	-16,3	TOT	0,1	3,1
228	6726649,4	273072,7	-5,6	TOT	0,2	3,2
229	6726633,6	273091,4	-19,6	TOT	0,1	3,0
230	6726654,8	273009,8	-32,0	TOT	6,6	3,1
231	6726635,0	273032,9	-28,7	TOT	14,8	3,2
232	6726612,2	273053,4	-34,4	TOT	1,7	3,6
233	6726629,7	272988,7	-32,3	TOT	9,6	3,2
234	6726609,5	273011,1	-36,0	TOT	8,5	3,4
235	6726590,5	273034,2	-41,4	TOT	3,4	3,1
236	6726572,1	273056,0	-47,7	TOT	3,3	3,1
237	6726547,3	273074,2	-55,1	TOT	5,0	3,0
238	6726588,2	272990,5	-33,4	TOT	8,4	3,2
239	6726569,6	273013,0	-41,3	TOT	7,3	3,3
240	6726548,9	273035,9	-51,2	TOT	6,6	3,1
241	6726528,1	273057,6	-57,9	TOT	6,2	3,2
242	6726522,8	273076,3	-59,6	TOT	4,1	1,7
243	6726523,9	273014,3	-49,0	TOT	6,5	3,0
244	6726506,0	273037,2	-58,0	TOT	3,0	3,2

TOT: Total sounding, CPTU: Cone penetration test

4.1 General information regarding the field investigations

The field investigations were conducted by Norconsult Boretteknikk AS. General information regarding the completed field work is summed up in Table 2.

Table 2: General information field work

Field work	
Date of execution	Weeks 25 – 27 and 33 – 34, 2024
Crew leader	Oscar Henning, Maria Theresia Jensen
Type of drilling rig	Geomachine 85
Relevant standards	Ref. [1], [2], [3], [4], and [5]
Results	Drawings 001, 201-244

4.2 General information regarding the laboratory investigations

The field investigations were conducted at Norconsult Norge AS's lab i Molde. General information regarding the completed laboratory work is summed up in Table 3.

Table 3: General information laboratory work

Laboratory work	
Date of execution	Week 45 2024
Lab technician	Hilde Risung and Vibeke Silseth Aspen
Relevant standards	Ref. [10]
Results	Appendix A, drawing 213

5 Ground conditions

The results from the field investigations are shown in boring location plan 002, and on sounding profiles on drawings 201-244.

Appendix B gives an explanation to the geotechnical plan- and profile drawings. Appendix C gives an explanation to the profiles from total soundings.

Note! The information from the field and laboratory investigations are strictly only valid in the investigated positions. Deviations in the ground conditions may occur locally, and the results must therefore not be used uncritically.

5.1 Investigation results

Total soundings 201-213 are placed along the existing fill. The soundings generally show very firm conditions when drilling through the existing rockfill. At position 201 and 202 in the north of the bay the soundings failed to reach bedrock due to similar challenges as during the onshore investigations where approximately half the soundings failed to reach bedrock because of high resistance. In the area north and northeast of Austevågsholmen the sounding show bedrock at shallow depth 0 – 1 m. Sounding 213 placed a bit further from the fill show a top layer of about 5 meters with very low drilling resistance. Samples show that this material consists of sand. The cone penetration test shows very low skin friction, and no increase in pore pressure, indication a drained but very loosely packed material.

Total soundings 214-229 are located in the area east of Austevågsholmen. Bedrock is located at shallow depth in the area. In the northern part there is up to about 3 meters of loose soils, while in the area south of Austrevågsholmen bedrock is generally found 0-1 meter below the seabed surface.

Total soundings 230-244 are located in the deepest part of the surveyed area, with water depths of up to 60 meters. The soundings show similar conditions as in location 213 further in with a loose top layer of up to 5 meters over firm material. Depth to bedrock is up to 15 meters.

Bedrock is visible on the surface in the areas round the site, indicating that the rock surface is steep and uneven.

5.2 Field notes

The considerations of the field crew are described in Table 1. Generally, the sounding deviate slightly from standard due to the soundings being performed on water. The drilling rig is unable to apply force of 3 tons because the barge will lift and the rods bend causing a high risk of drill string breakage.

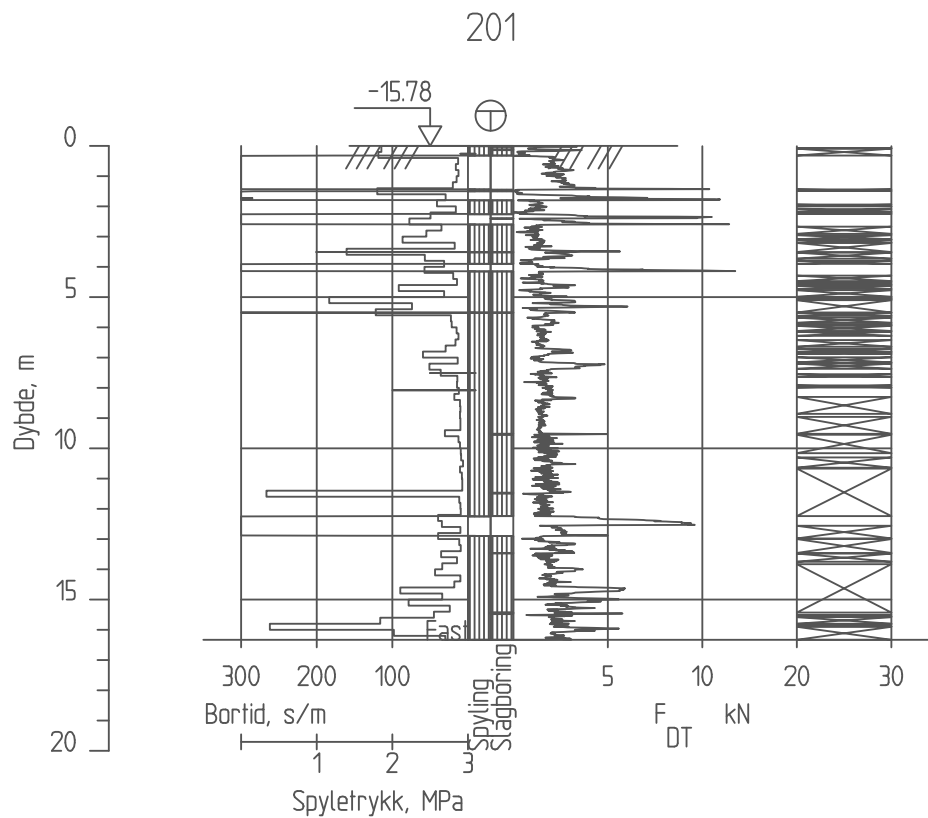
Table 4: Comments from the bore log and comments given by field team (translated from Norwegian).

Borehole	Field comments
201	Unable to penetrate. Drilling stopped due to risk of breakage caused by high torque.
202	Drill string breakage. Loss of 10 drilling rods and drilling head.
203	
204	
205	
206	
207	
208	
209	

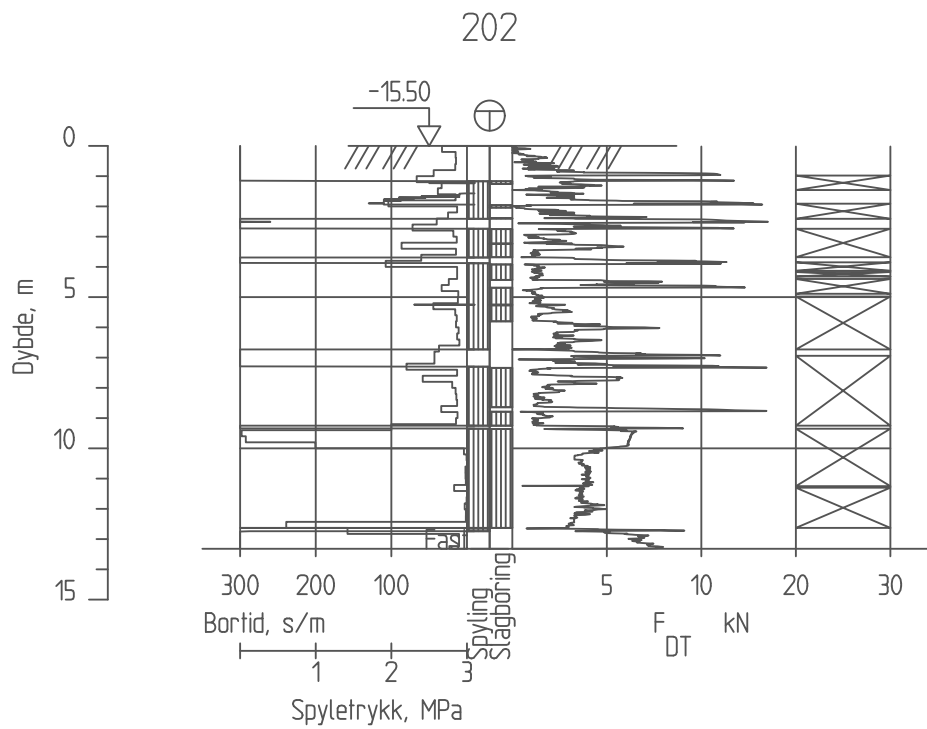
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211	Drill string breakage after 3,7 meters drilling in rockfill. Breakage in casing about 4 – 4,5 meters under water surface. Managed to retrieve 16 meters of drilling rods. Bottom rod damaged, splicing sleeve destroyed due to high torque. Loss of 4 drilling rods and drilling head.
212	Drilling stopped after 1,6 meters drilling in bedrock due to high torque and high risk of drill string breakage.
213	Had to redo CPT sounding due to error in friction logging. Used backup CPT probe, calibration out of date by 7 days.
214	Drilled 1 meter extra in bedrock due to low bedrock quality.
215	
216	
217	
218	Hit bedrock at shallow depth. Drilling bit sliding og steep rock surface caused drill string breakage. Loss of 1 drilling rod and drilling head.
219	
220	
221	
222	
223	
224	
225	Hard to interpret rock surface due to steep bedrock surface.
226	Likely bedrock at surface, but due to steep bedrock surface bedrock interpreted after 1,4 meters.
227	
228	
229	
230	
231	
232	
233	
234	
235	
236	
237	
238	
239	
240	Uneven drilling due to wind and waves.
241	
242	Drill string breakage. Loss of 3 drilling rods and drilling head.
243	
244	

6 References

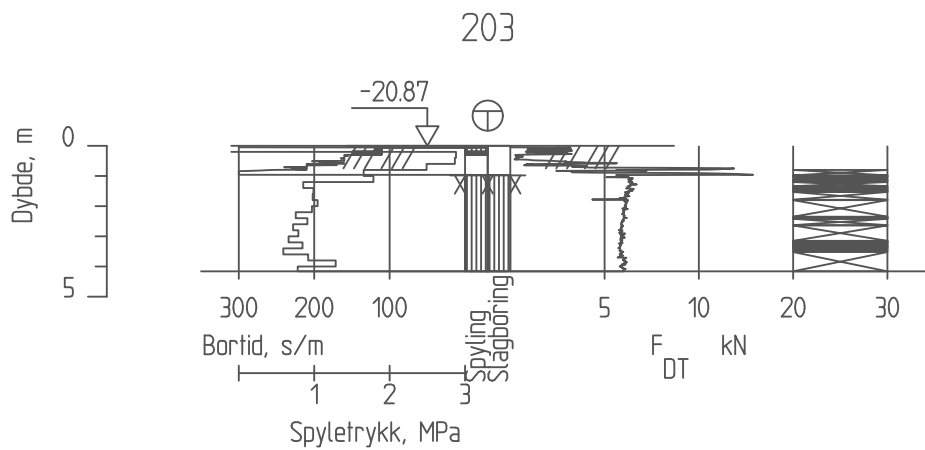
- [1] Statens vegvesen, Håndbok R211 Feltundersøkelser, Statens vegvesen, 1997.
- [2] Norsk geoteknisk forening, Melding nr. 9 - Veiledning for utførelse av totalsondering. Revisjon 1, 2018., Norsk geoteknisk forening, 1994.
- [3] Norsk geoteknisk forening, Melding nr. 5 - Veiledning for utførelse av trykksondering. Revisjon 3, 2010, Norsk geoteknisk forening, 1982.
- [4] Norsk geoteknisk forening, Melding nr. 6 - Veiledning for måling av grunnvannstand og poretrykk. Revisjon 2, 2017., Norsk geoteknisk forening, 1989.
- [5] Norsk geoteknisk forening, Melding nr. 11 - Veiledning for utførelse av prøvetaking, Norsk geoteknisk forening, 2013.



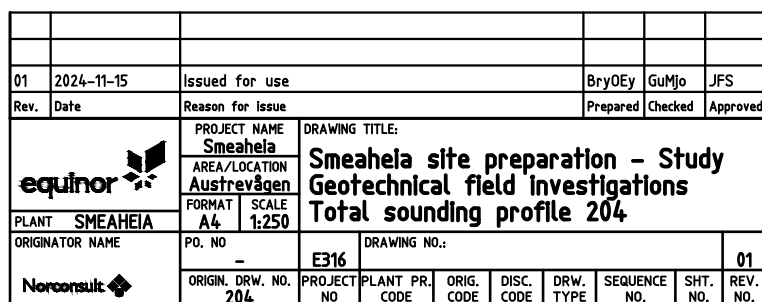
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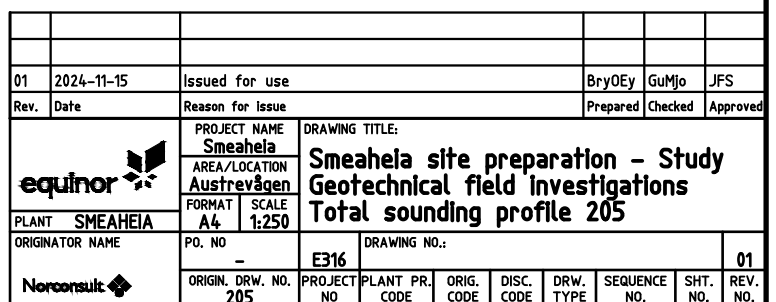


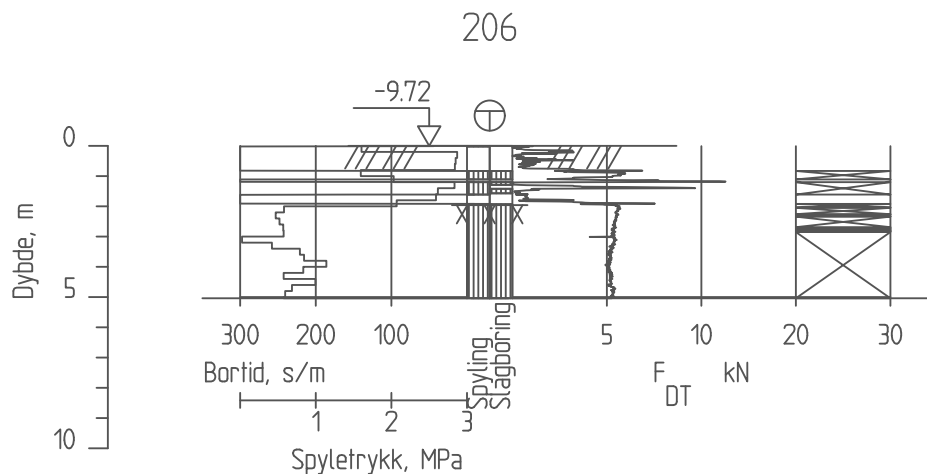
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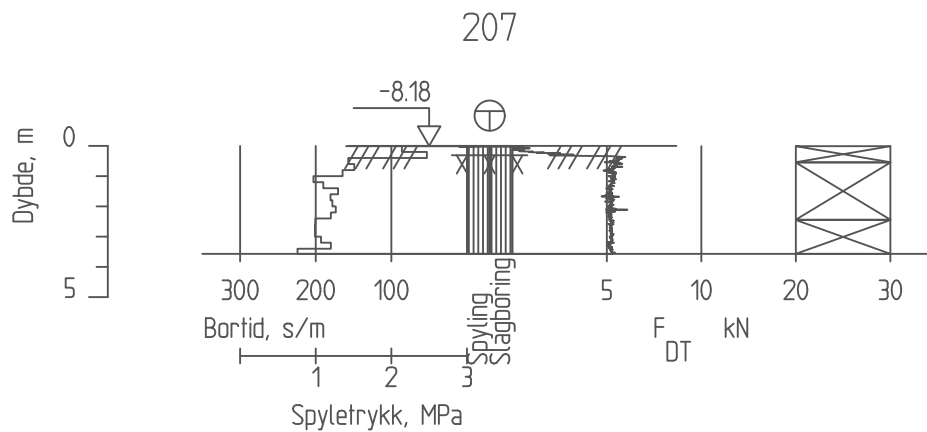
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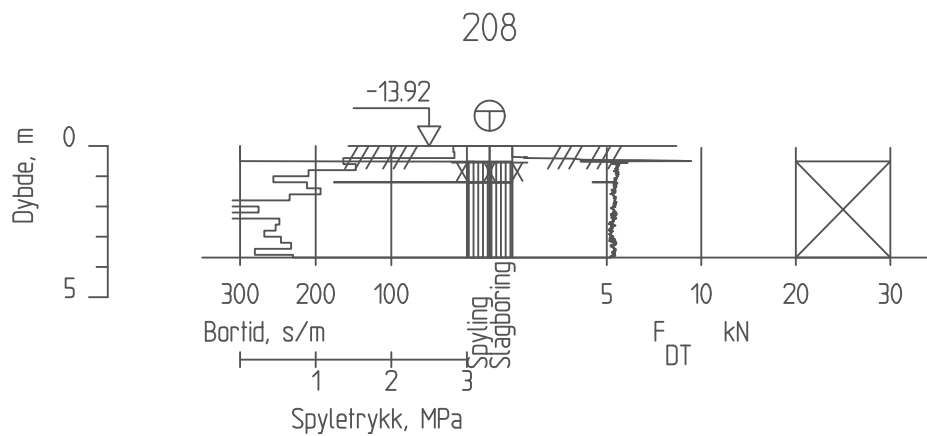




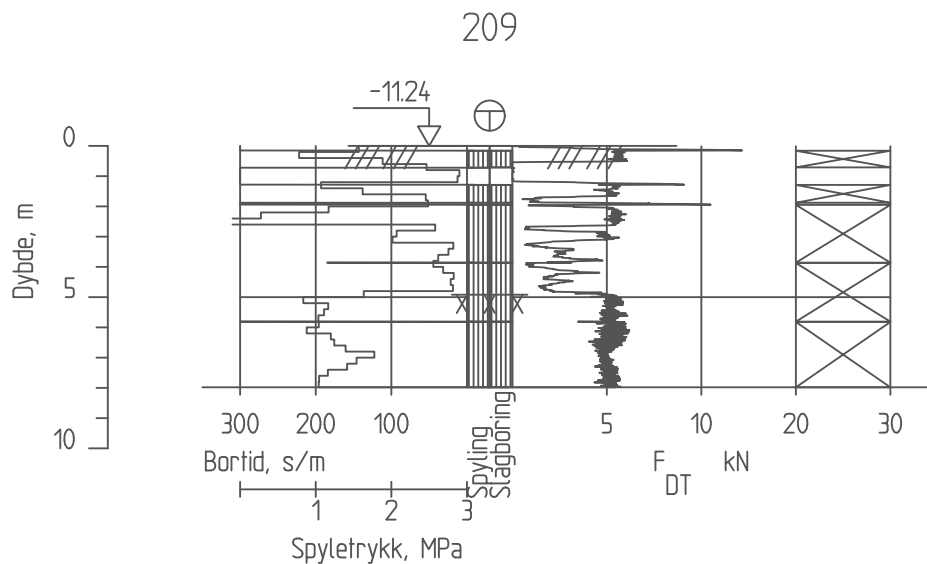
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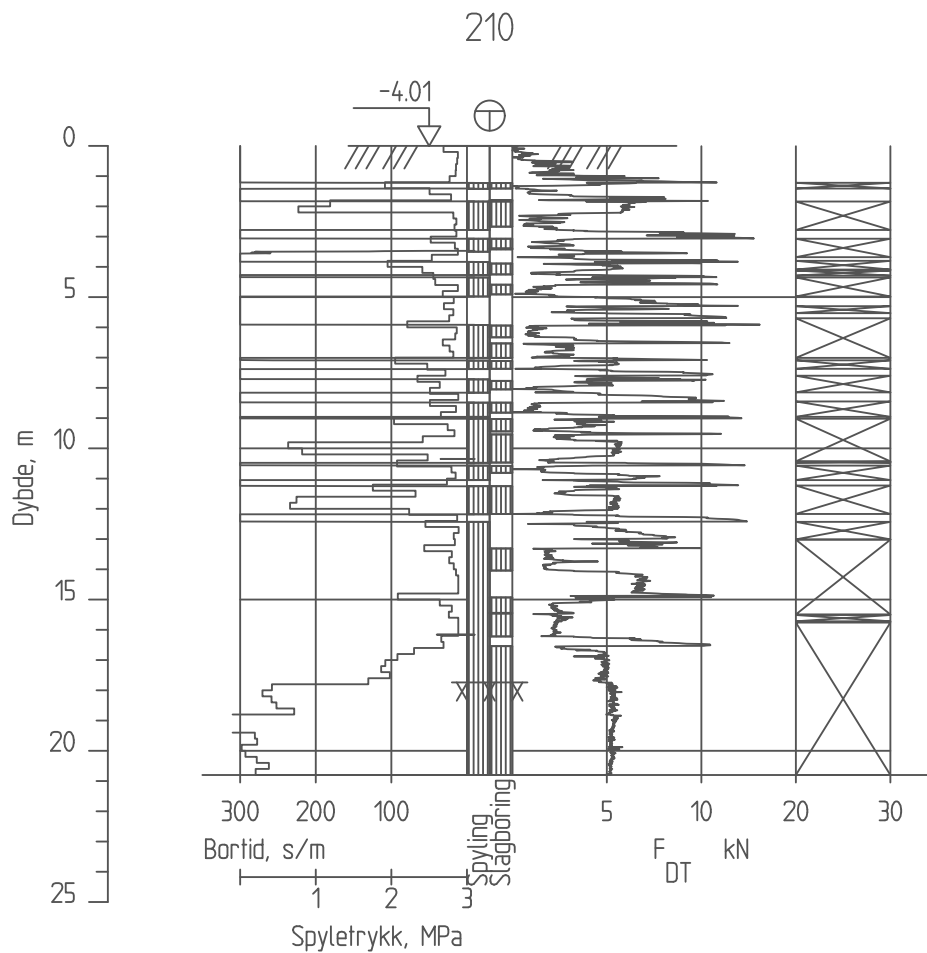
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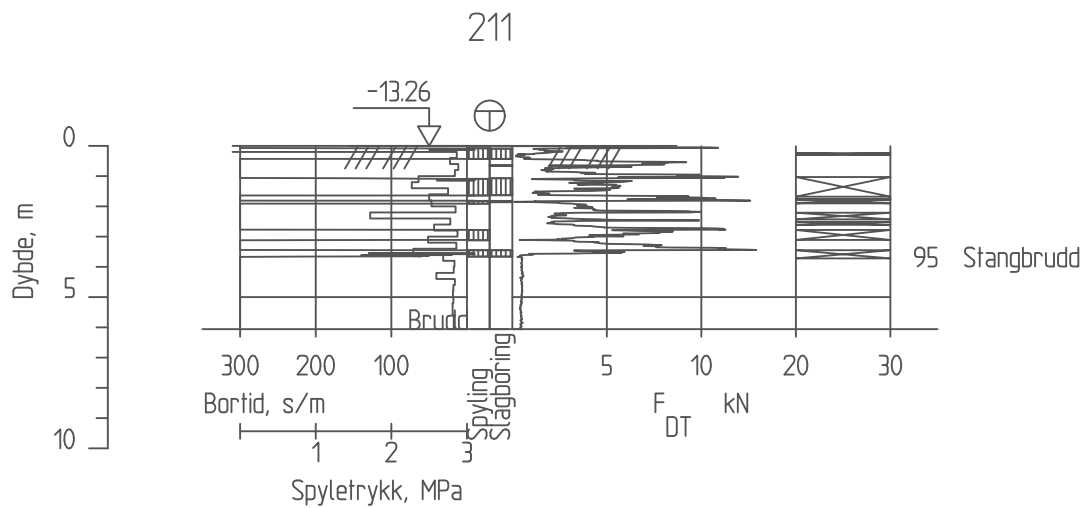
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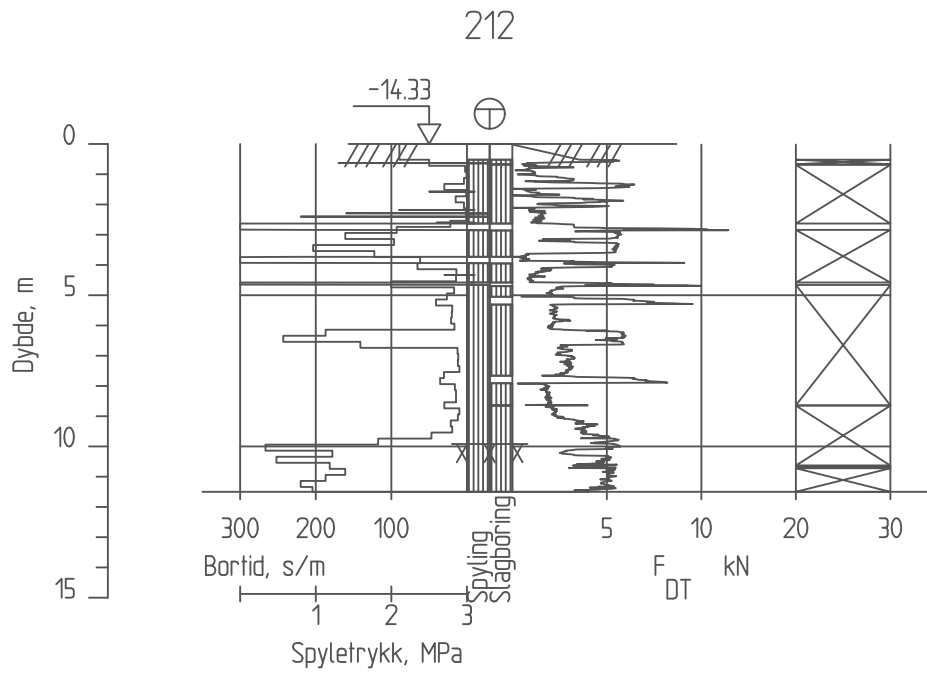
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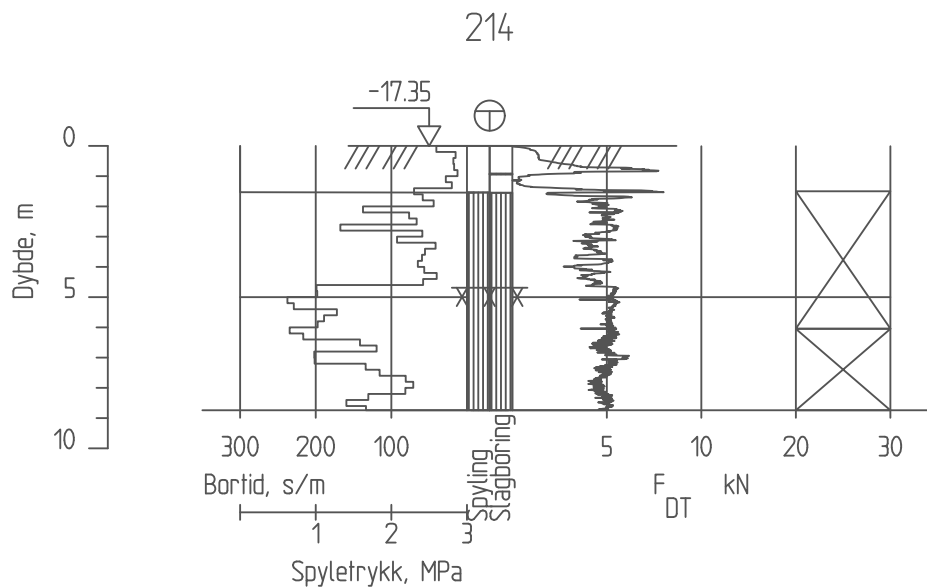
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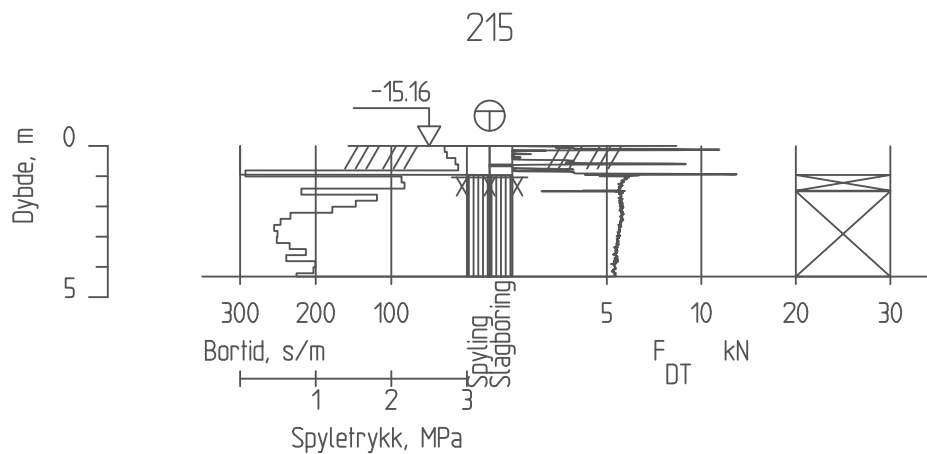
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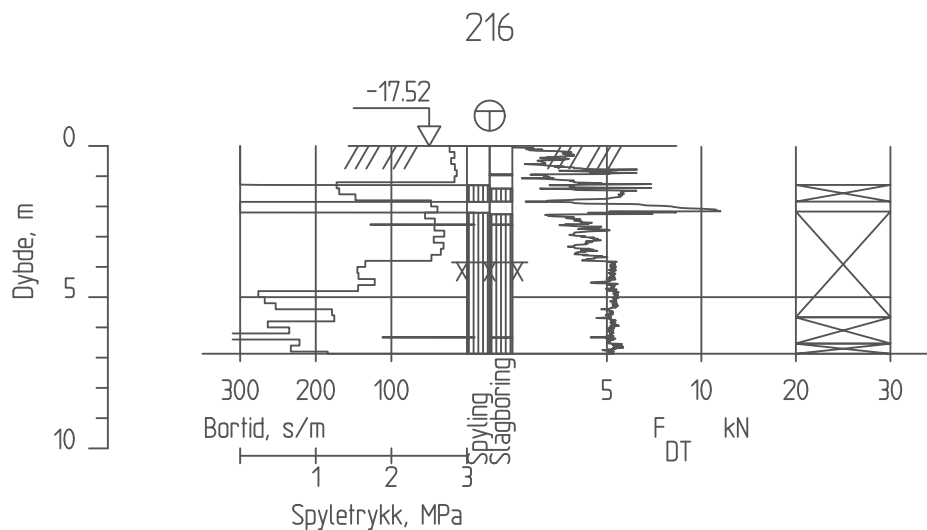
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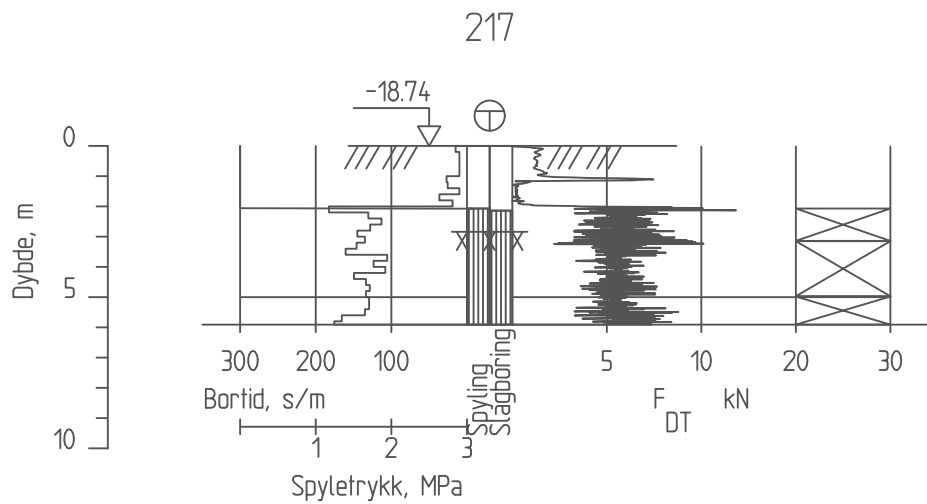
01	2024-11-15	Issued for use	BryOEy	GuMjo	JFS
Rev.	Date	Reason for Issue	Prepared	Checked	Approved
		PROJECT NAME Smeahela AREA/LOCATION Austrevågen FORMAT A4 SCALE 1:250	DRAWING TITLE: Smeahela site preparation - Study Geotechnical field investigations Total sounding profile 214		
PLANT	SMEAHEIA	PO. NO	DRAWING NO.:		
ORIGINATOR NAME					
		ORIGIN. DRW. NO. 214	PROJECT NO E316	PLANT PR. CODE 	ORIG. CODE
			DISC. CODE 	DRW. TYPE 	SEQUENCE NO.
			SHT. NO. 	REV. NO. 	01



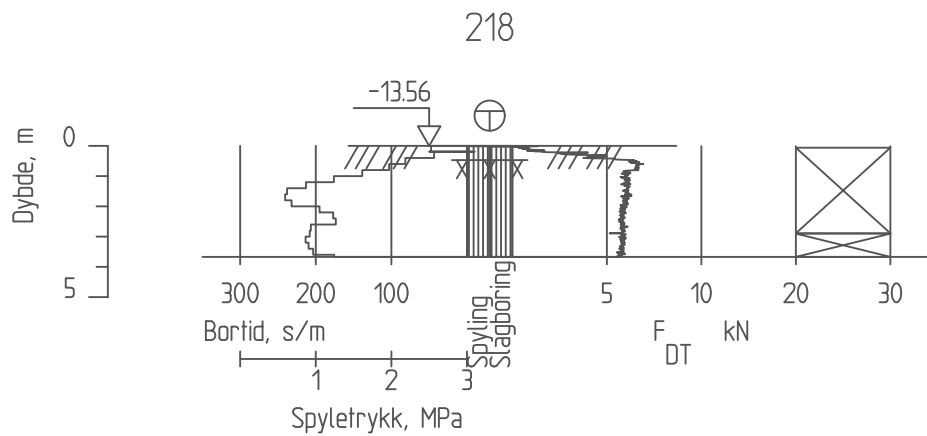
01	2024-11-15	Issued for use			Bry0Ey	GuMJo	JFS			
Rev.	Date	Reason for Issue			Prepared	Checked	Approved			
		PROJECT NAME	DRAWING TITLE:							
		Smeaheia	Smeaheia site preparation – Study Geotechnical field investigations Total sounding profile 215							
		AREA/LOCATION								
		Austrevågen								
		FORMAT	SCALE							
PLANT SMEAHEIA		A4	1:250							
ORIGINATOR NAME		PO. NO	DRAWING NO.:					01		
		–	E316							
		ORIGIN. DRW. NO.	PROJECT NO	PLANT PR. CODE	ORIG. CODE	DISC. CODE	DRW. TYPE	SEQUENCE NO.	SHT. NO.	REV. NO.
		215								



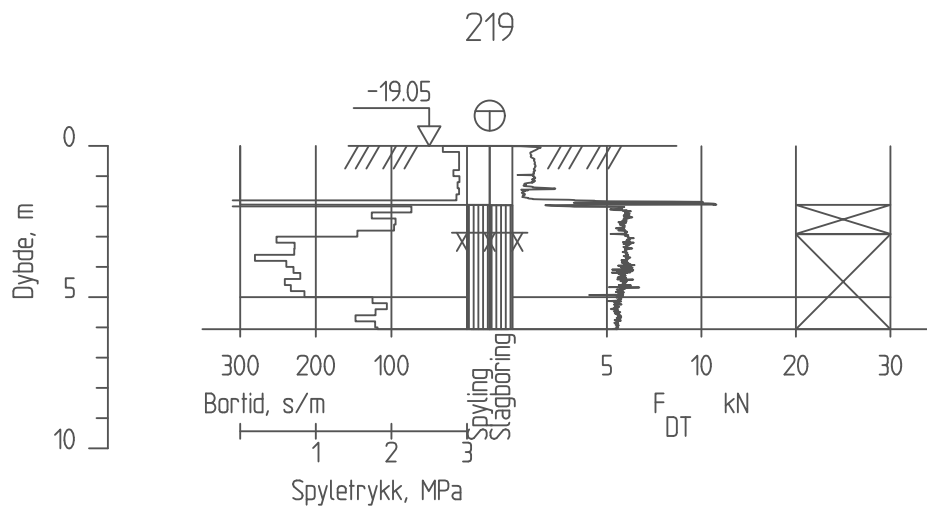
01	2024-11-15	Issued for use			BryOEy	GuMJo	JFS					
Rev.	Date	Reason for Issue			Prepared	Checked	Approved					
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		Smeaheia										
		AREA/LOCATION										
		Austrevågen										
		FORMAT	SCALE									
PLANT SMEAHEIA		A4	1:250									
		ORIGINATOR NAME		PO. NO		DRAWING NO.:		01				
				-		E316						
		ORIGIN. DRW. NO.		PROJECT NO	PLANT PR. CODE	ORIG. CODE	DISC. CODE		DRW. TYPE	SEQUENCE NO.	SHT. NO.	REV. NO.
		216										



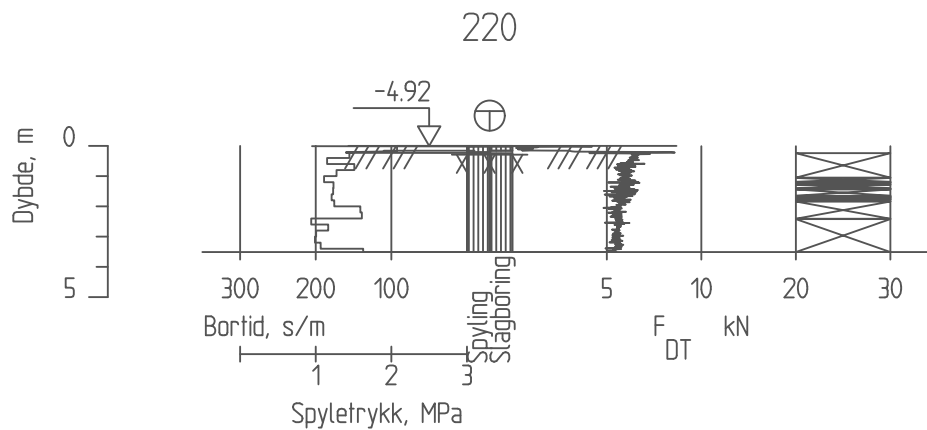
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Rev.	Date	Reason for Issue				Prepared	Checked	Approved			
		PROJECT NAME Smeahela		DRAWING TITLE: Smeahela site preparation – Study Geotechnical field investigations Total sounding profile 217							
		AREA/LOCATION Austrevågen									
		FORMAT A4	SCALE 1:250								
PLANT SMEAHEIA											
ORIGINATOR NAME		PO. NO –		DRAWING NO.:					01		
		ORIGIN. DRW. NO. 217		PROJECT NO	PLANT PR. CODE	ORIG. CODE	DISC. CODE	DRW. TYPE	SEQUENCE NO.	SHT. NO.	REV. NO.



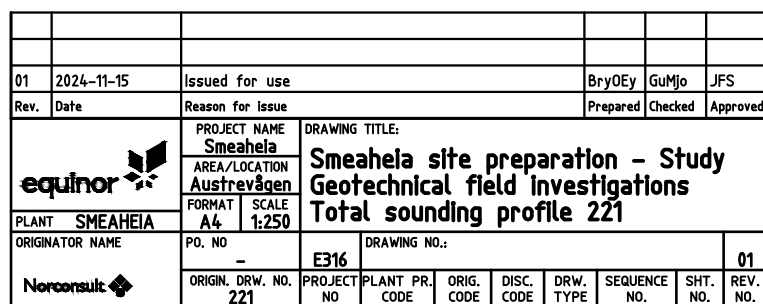
01	2024-11-15	Issued for use				Bry0Ey	GuMJo	JFS				
Rev.	Date	Reason for Issue				Prepared	Checked	Approved				
		PROJECT NAME Smeahela		DRAWING TITLE: Smeahela site preparation – Study Geotechnical field investigations Total sounding profile 218								
		AREA/LOCATION Austrevågen										
		FORMAT A4	SCALE 1:250									
PLANT SMEAHEIA												
ORIGINATOR NAME		PO. NO –		DRAWING NO.:					01			
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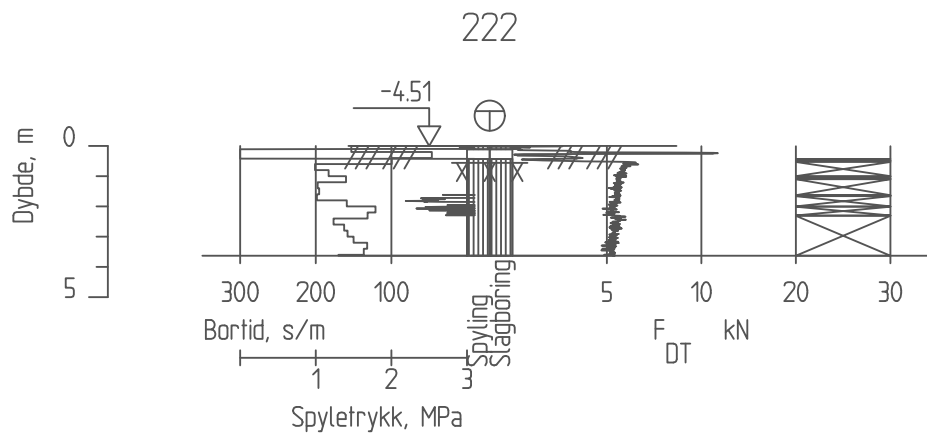


01	2024-11-15	Issued for use			Bry0Ey
Rev.	Date	Reason for Issue			GuMJo
					JFS
				Prepared	Checked
					Approved
		PROJECT NAME	DRAWING TITLE: Smeaheia site preparation – Study Geotechnical field investigations Total sounding profile 219		
		Smeaheia			
		AREA/LOCATION			
PLANT		Austrevågen			
		FORMAT	SCALE		
SMEAHEIA		A4	1:250		
ORIGINATOR NAME		PO. NO.	DRAWING NO.:		
		–	E316		
		ORIGIN. DRW. NO.	PROJECT NO.	PLANT PR. CODE	ORIG. CODE
		219			
			DISC. CODE	DRW. TYPE	SEQUENCE NO.
					SHT. NO.
					REV. NO.
					01

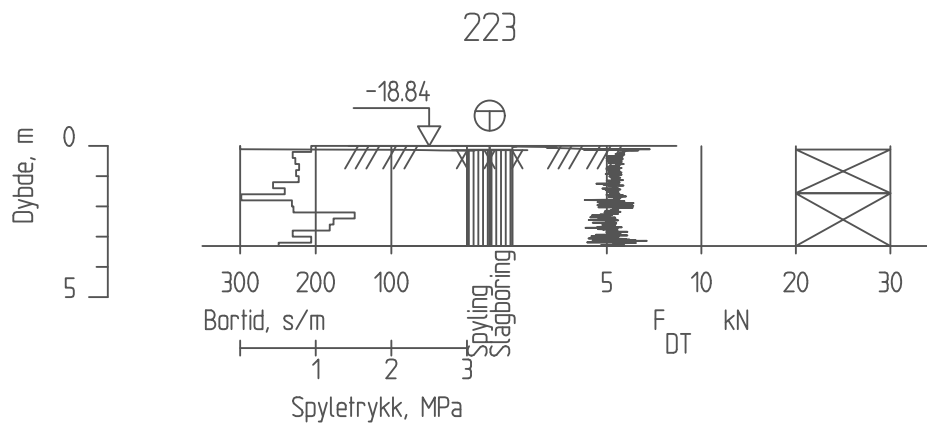


01	2024-11-15	Issued for use				Bry0Ey	GuMJo	JFS		
Rev.	Date	Reason for Issue				Prepared	Checked	Approved		
		PROJECT NAME	DRAWING TITLE:							
		Smeaheia	Smeaheia site preparation – Study Geotechnical field investigations Total sounding profile 220							
		AREA/LOCATION								
		Austrevågen								
PLANT	SMEAHEIA	FORMAT	SCALE							
		A4	1:250							
		PO. NO.	DRAWING NO.:						01	
		–	E316							
		ORIGIN. DRW. NO.	PROJECT NO	PLANT PR. CODE	ORIG. CODE	DISC. CODE	DRW. TYPE	SEQUENCE NO.	SHT. NO.	REV. NO.
		220								

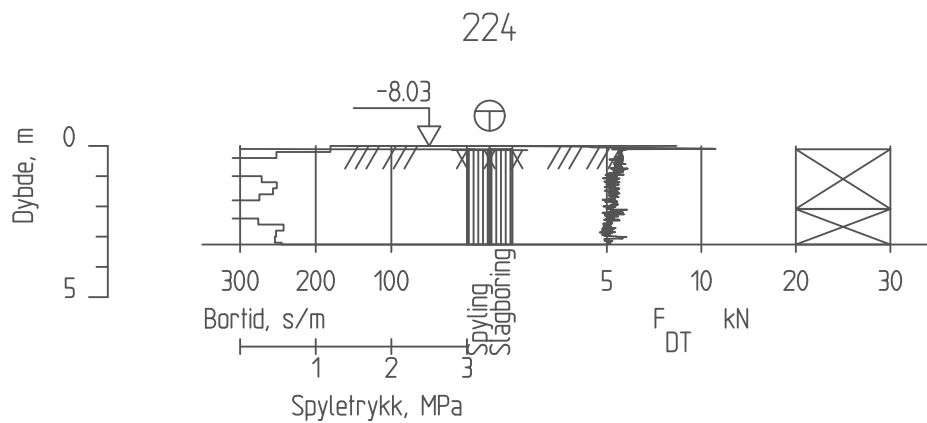




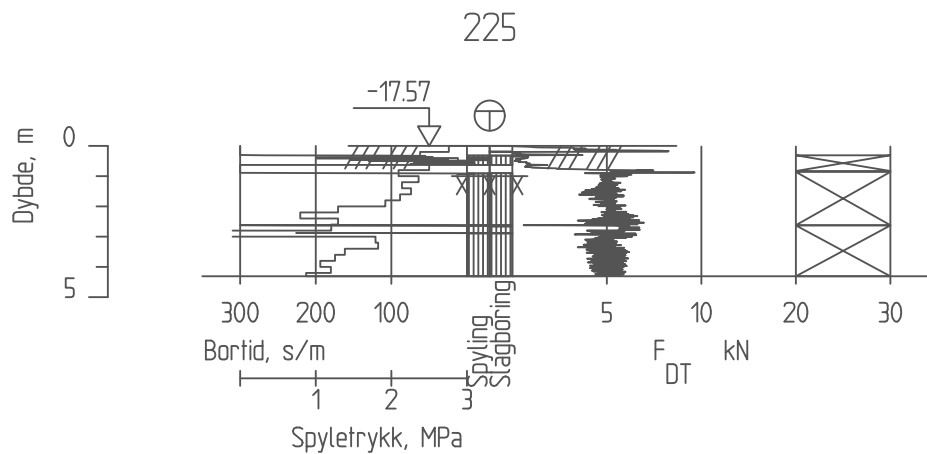
01	2024-11-15	Issued for use	Bry0Ey	GuMJo	JFS
Rev.	Date	Reason for Issue	Prepared	Checked	Approved
		PROJECT NAME Smeahela AREA/LOCATION Austrevågen FORMAT A4	DRAWING TITLE: Smeahela site preparation - Study Geotechnical field investigations Total sounding profile 222		
PLANT	SMEAHEIA	SCALE 1:250			
ORIGINATOR NAME	PO. NO.	E316	DRAWING NO.:		
	ORIGIN. DRW. NO. 222	PROJECT NO.	PLANT PR. CODE	ORIG. CODE	DISC. CODE
		DRW. TYPE	SEQUENCE NO.	SHT. NO.	REV. NO.
					01



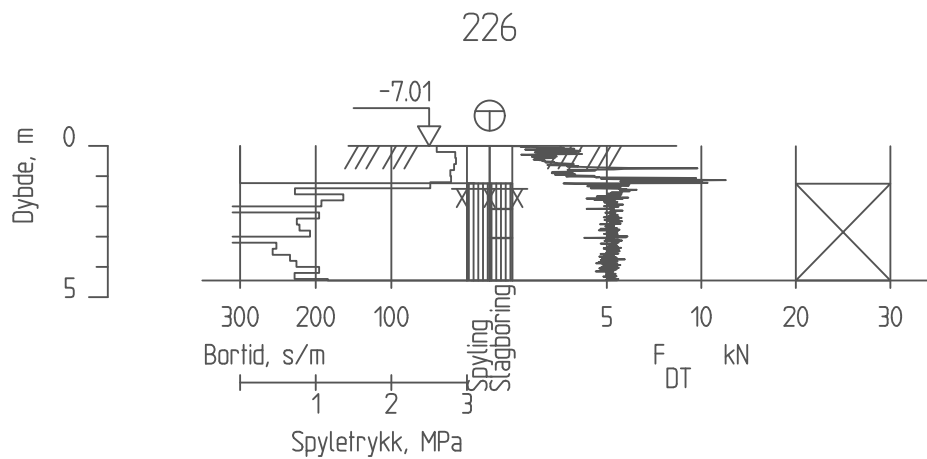
01	2024-11-15	Issued for use				BryOEy	GuMJo	JFS	
Rev.	Date	Reason for Issue				Prepared	Checked	Approved	
		PROJECT NAME Smeahela		DRAWING TITLE: Smeahela site preparation – Study Geotechnical field investigations Total sounding profile 223					
		AREA/LOCATION Austrevågen							
		FORMAT A4	SCALE 1:250						
PLANT SMEAHEIA									
		PO. NO –		DRAWING NO.:				01	
		E316							
		ORIGIN. DRW. NO. 223	PROJECT NO	PLANT PR. CODE	ORIG. CODE	DISC. CODE	DRW. TYPE	SEQUENCE NO.	SHT. NO.



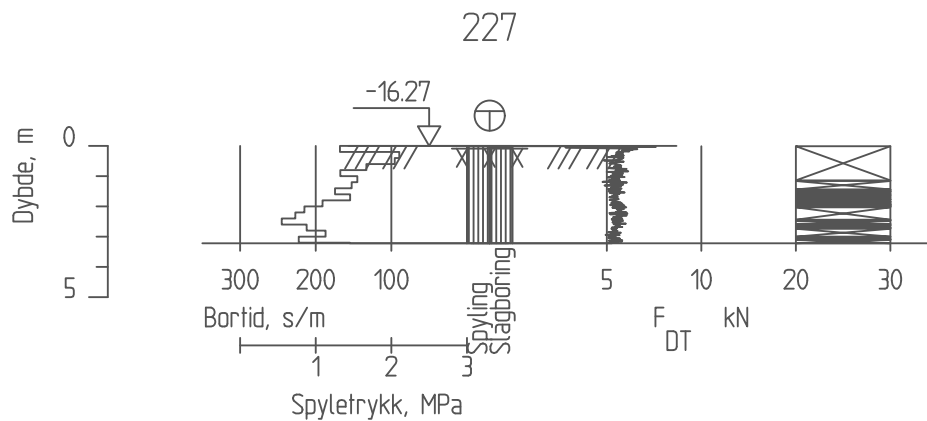
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Rev.	Date	Reason for Issue			Prepared	Checked	Approved			
		PROJECT NAME	DRAWING TITLE:							
		Smeaheia	Smeaheia site preparation – Study Geotechnical field investigations Total sounding profile 224							
		AREA/LOCATION								
PLANT	SMEAHEIA	FORMAT	SCALE							
		A4	1:250							
		ORIGINATOR NAME	PO. NO.	DRAWING NO.:			01			
			–	E316						
		ORIGIN. DRW. NO.	PROJECT NO	PLANT PR. CODE	ORIG. CODE	DISC. CODE	DRW. TYPE	SEQUENCE NO.	SHT. NO.	REV. NO.
		224								



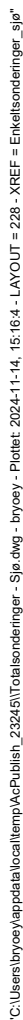
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Rev.	Date	Reason for Issue			Prepared	Checked	Approved			
		PROJECT NAME Smeahela		DRAWING TITLE: Smeahela site preparation – Study Geotechnical field investigations Total sounding profile 225						
		AREA/LOCATION Austrevågen								
		FORMAT A4	SCALE 1:250							
		PLANT SMEAHEIA								
ORIGINATOR NAME		PO. NO. –	E316		DRAWING NO.:			01		
		ORIGIN. DRW. NO. 225	PROJECT NO	PLANT PR. CODE	ORIG. CODE	DISC. CODE	DRW. TYPE	SEQUENCE NO.	SHT. NO.	REV. NO.



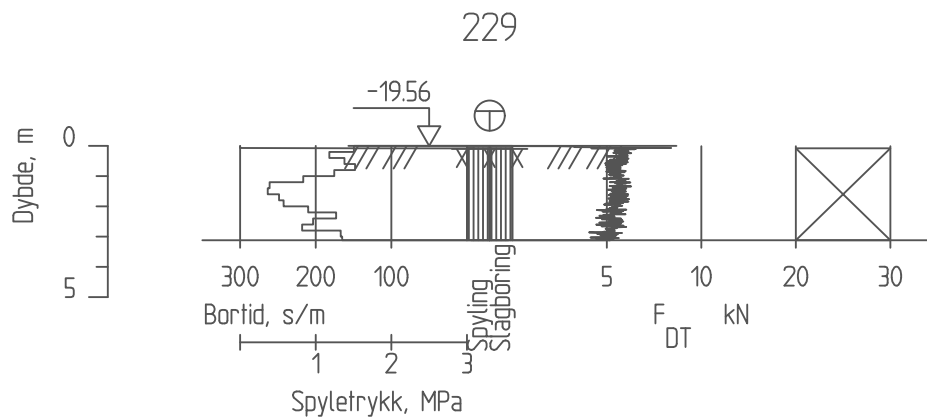
01	2024-11-15	Issued for use			Bry0Ey	GuMJo
Rev.	Date	Reason for Issue			Prepared	Checked
					Approved	JFS
		PROJECT NAME	DRAWING TITLE:			
		Smeahela	Smeahela site preparation - Study Geotechnical field investigations Total sounding profile 226			
		AREA/LOCATION				
		Austrevågen				
		FORMAT	SCALE			
		A4	1:250			
PLANT SMEAHEIA						
ORIGINATOR NAME		PO. NO.	DRAWING NO.:			
		-	E316			01
Norconsult		ORIGIN. DRW. NO.	PROJECT NO.	PLANT PR. CODE	ORIG. CODE	DISC. CODE
		226				
			DRW. TYPE	SEQUENCE NO.	SHT. NO.	REV. NO.



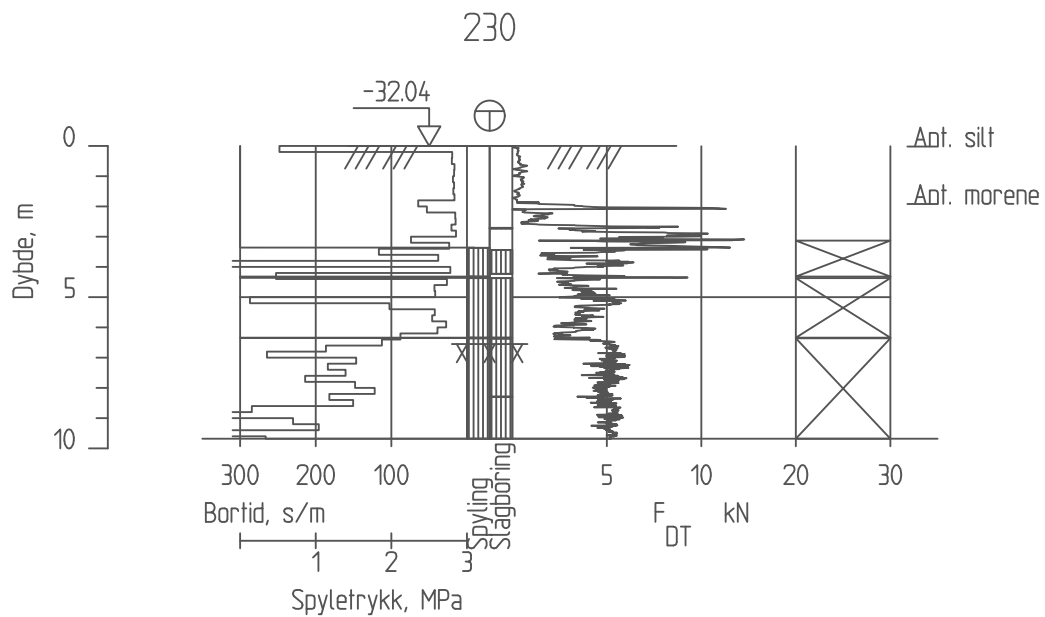
01	2024-11-15	Issued for use		BryOEy	GuMJo
Rev.	Date	Reason for Issue		Prepared	Checked
				Approved	JFS
		PROJECT NAME	DRAWING TITLE:		
		Smeahela	Smeahela site preparation - Study Geotechnical field investigations Total sounding profile 227		
PLANT		AREA/LOCATION			
SMEAHEIA		Austrevågen			
ORIGINATOR NAME		FORMAT	SCALE		
Norconsult		A4	1:250		
		PO. NO.	DRAWING NO.:		
		-	E316		01
		ORIGIN. DRW. NO.	PROJECT NO.	PLANT PR. CODE	REV. NO.
		227			
		ORIG. CODE	DISC. CODE	DRW. TYPE	SEQUENCE NO.
		SHT. NO.			



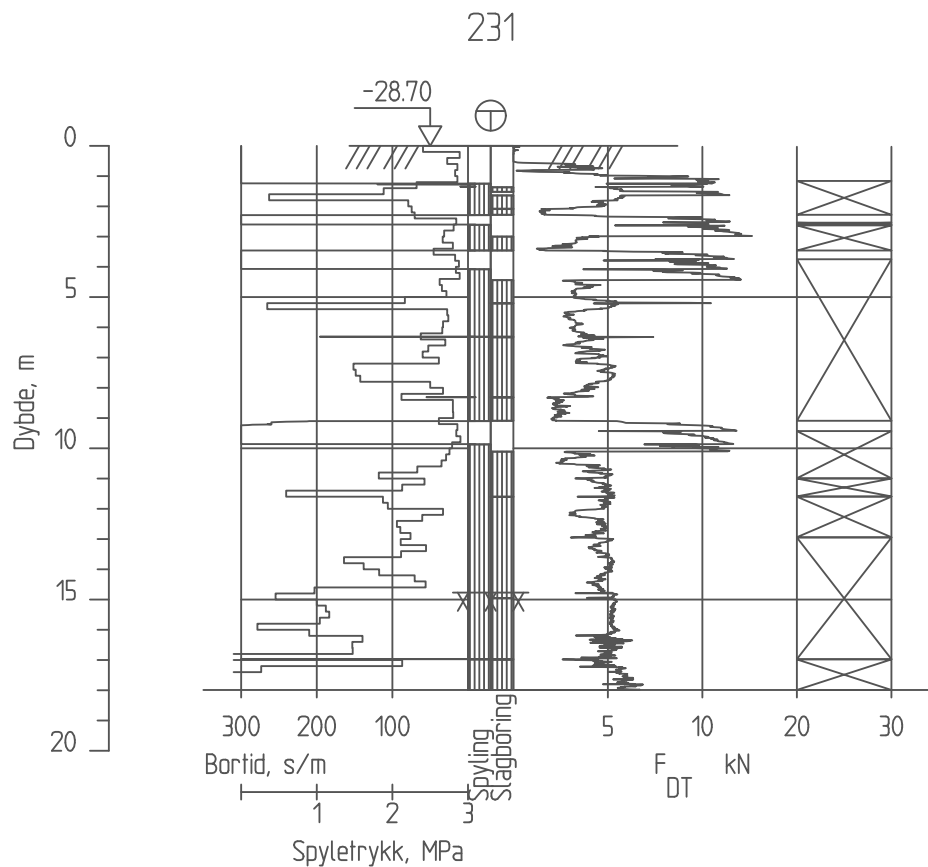
01	2024-11-15	Issued for use					BryOEy	GuMJo	JFS	
Rev.	Date	Reason for Issue					Prepared	Checked	Approved	
		PROJECT NAME Smeahela	DRAWING TITLE: Smeahela site preparation – Study Geotechnical field investigations Total sounding profile 228							
		AREA/LOCATION Austrevågen								
PLANT	SMEAHEIA	FORMAT A4	SCALE 1:250							
		ORIGINATOR NAME	PO. NO. -	E316	DRAWING NO.:					01
			ORIGIN. DRW. NO. 228	PROJECT NO	PLANT PR. CODE	ORIG. CODE	DISC. CODE	DRW. TYPE	SEQUENCE NO.	SHT. NO.



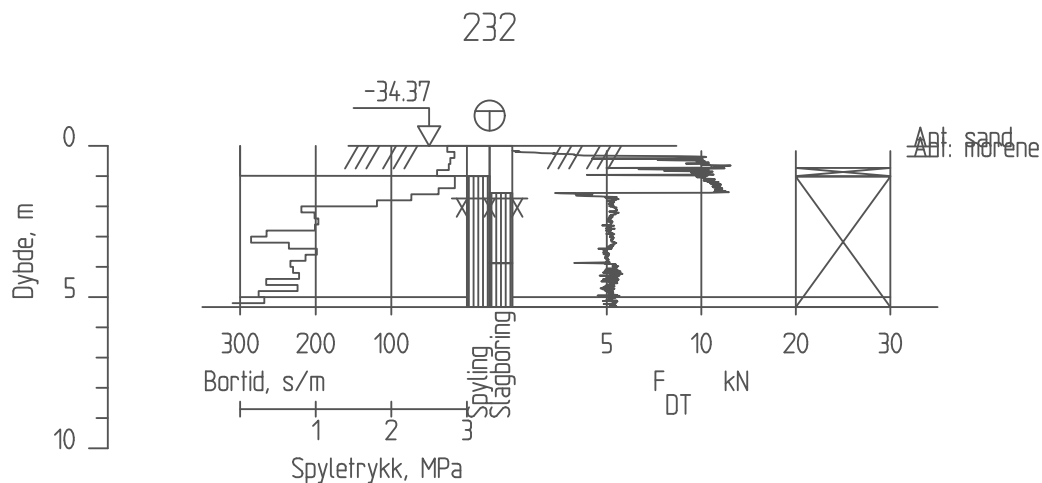
01	2024-11-15	Issued for use			BryOEy	GuMJo	JFS	
Rev.	Date	Reason for Issue			Prepared	Checked	Approved	
		PROJECT NAME	DRAWING TITLE:					
		Smeaheia	Smeaheia site preparation – Study Geotechnical field investigations Total sounding profile 229					
		AREA/LOCATION						
		Austrevågen						
PLANT	SMEAHEIA	FORMAT	SCALE					
		A4	1:250					
		PO. NO	DRAWING NO.:					01
		–	E316					
ORIGIN. DRW. NO.	PROJECT NO	PLANT PR. CODE	ORIG. CODE	DISC. CODE	DRW. TYPE	SEQUENCE NO.	SHT. NO.	REV. NO.
229								



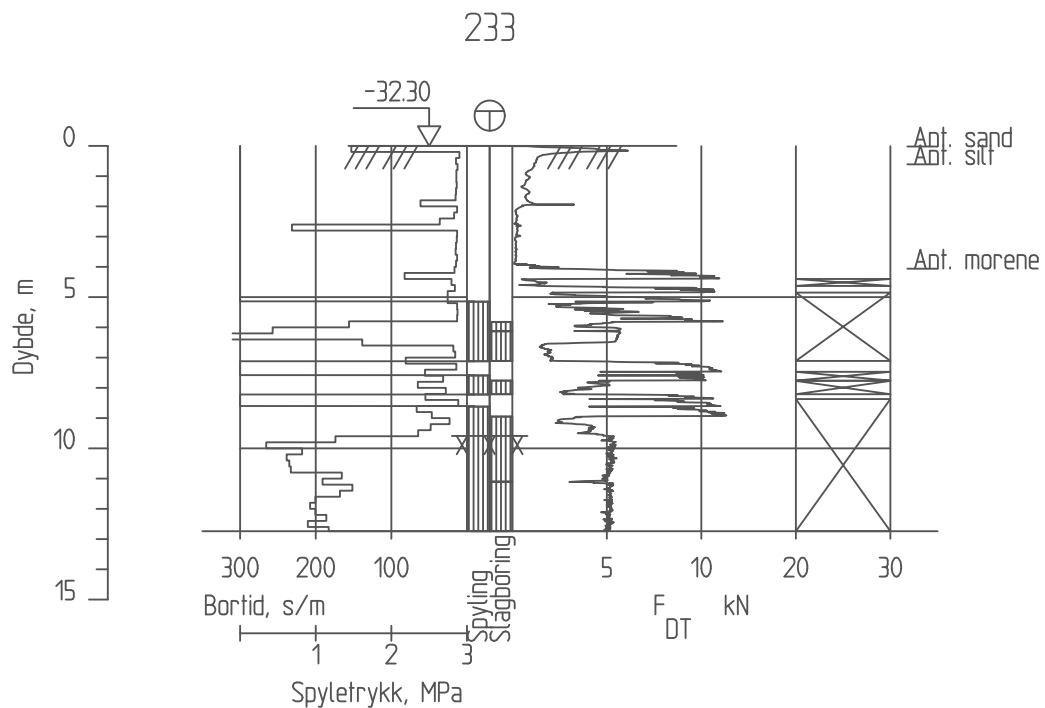
01	2024-11-15	Issued for use			BryOEy GuMJo JFS
Rev.	Date	Reason for Issue			Prepared Checked Approved
		PROJECT NAME	DRAWING TITLE:		
		AREA/LOCATION	Smeahela site preparation - Study Geotechnical field investigations Total sounding profile 230		
		FORMAT			
PLANT	SMEAHEIA	A4	SCALE		
ORIGINATOR NAME	PO. NO	E316		DRAWING NO.:	
	ORIGIN. DRW. NO.	230		PLANT PR. CODE	01
		ORIG. CODE	DISC. CODE	DRW. TYPE	SEQUENCE NO.
					SHT. NO.
					REV. NO.



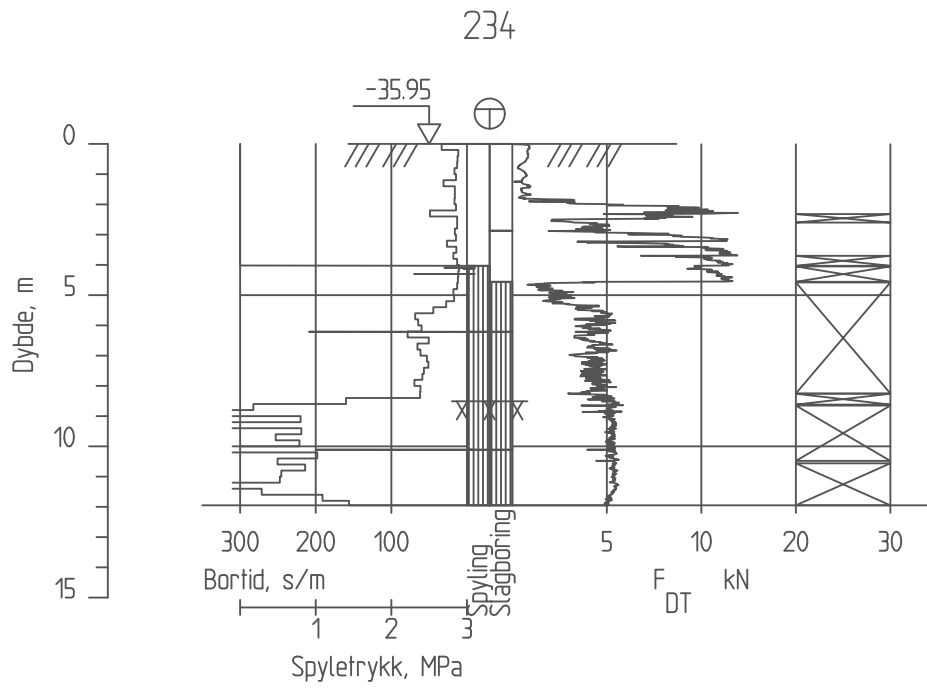
01	2024-11-15	Issued for use				BryOEy	GuMjo	JFS
Rev.	Date	Reason for Issue				Prepared	Checked	Approved
		PROJECT NAME		DRAWING TITLE: Smeahela site preparation – Study Geotechnical field investigations Total sounding profile 231				
		Smeahela						
		AREA/LOCATION						
Austrevågen		FORMAT						
PLANT		SMEAHEIA		A4		SCALE		
				1:250				
		ORIGINATOR NAME		PO. NO		DRAWING NO.:		
				-		E316		
		ORIGIN. DRW. NO.		PROJECT NO		PLANT PR. CODE		01
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						DISC. CODE		
						DRW. TYPE		
						SEQUENCE NO.		
						SHT. NO.		
						REV. NO.		



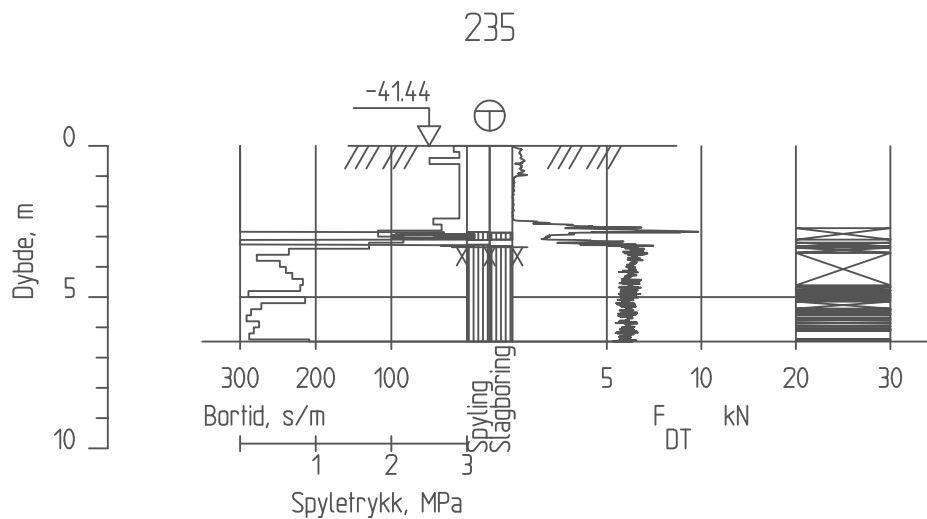
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Rev.	Date	Reason for Issue	Prepared	Checked	Approved
		PROJECT NAME Smeahela AREA/LOCATION Austrevågen FORMAT A4	DRAWING TITLE: Smeahela site preparation - Study Geotechnical field investigations Total sounding profile 232		
PLANT SMEAHEIA ORIGINATOR NAME Norconsult		PO. NO. - ORIGIN. DRW. NO. 232	E316 PROJECT NO.	DRAWING NO.:	
					01



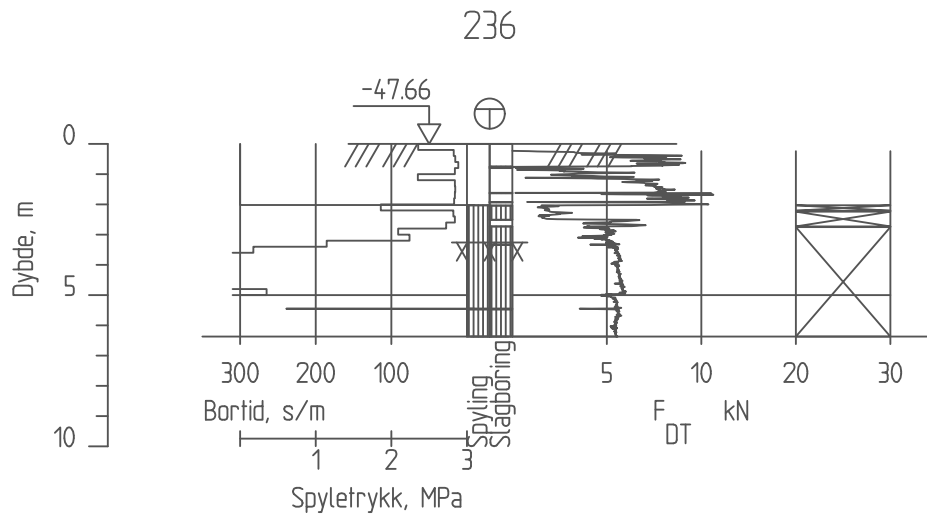
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Rev.	Date	Reason for Issue	Prepared	Checked	Approved
		PROJECT NAME Smeahela AREA/LOCATION Austrevågen FORMAT A4	DRAWING TITLE: Smeahela site preparation - Study Geotechnical field investigations Total sounding profile 233		
PLANT SMEAHEIA ORIGINATOR NAME Norconsult		PO. NO. - ORIGIN. DRW. NO. 233	E316 PROJECT NO.	DRAWING NO.:	01 REV. NO.



01	2024-11-15	Issued for use	BryOEy	GuMJo	JFS
Rev.	Date	Reason for Issue	Prepared	Checked	Approved
		PROJECT NAME Smeahela	DRAWING TITLE:		
PLANT SMEAHEIA		AREA/LOCATION Austrevågen	Smeahela site preparation - Study		
ORIGINATOR NAME		FORMAT A4	SCALE 1:250	Total sounding profile 234	
PO. NO		E316	DRAWING NO.:		01
ORIGIN. DRW. NO. 234		PROJECT NO	PLANT PR. CODE	ORIG. CODE	DISC. CODE
Norconsult		DRW. TYPE	SEQUENCE NO.	SHT. NO.	REV. NO.

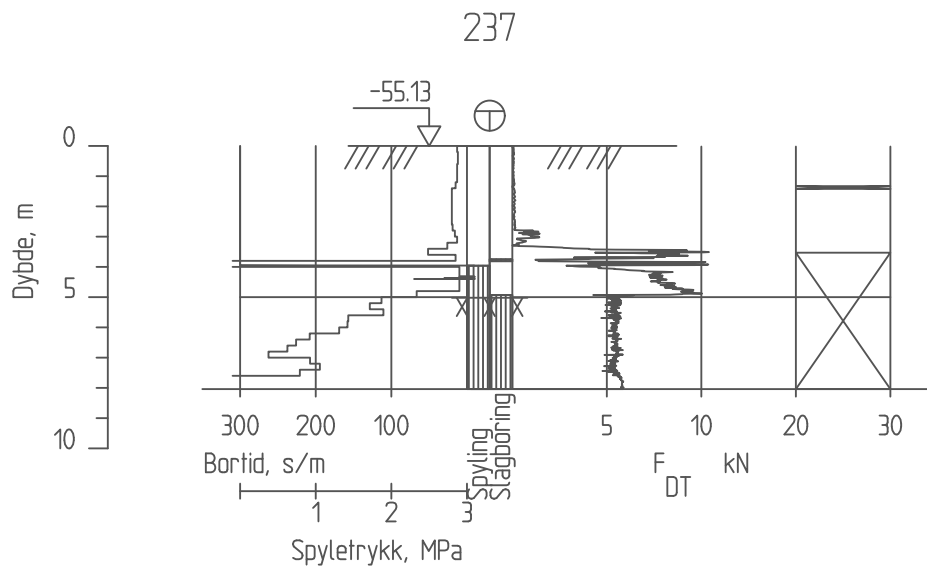


01	2024-11-15	Issued for use				BryOEy	GuMjo	JFS			
Rev.	Date	Reason for Issue				Prepared	Checked	Approved			
		PROJECT NAME		DRAWING TITLE:							
		Smeahela									
		AREA/LOCATION		Smeahela site preparation – Study Geotechnical field investigations Total sounding profile 235							
		Austrevågen									
PLANT		FORMAT	SCALE								
SMEAHEIA		A4	1:250								
ORIGINATOR NAME		PO. NO.		DRAWING NO.:				01			
		–		E316							
		ORIGIN. DRW. NO.		PROJECT NO	PLANT PR. CODE	ORIG. CODE	DISC. CODE	DRW. TYPE	SEQUENCE NO.	SHT. NO.	REV. NO.
		235									

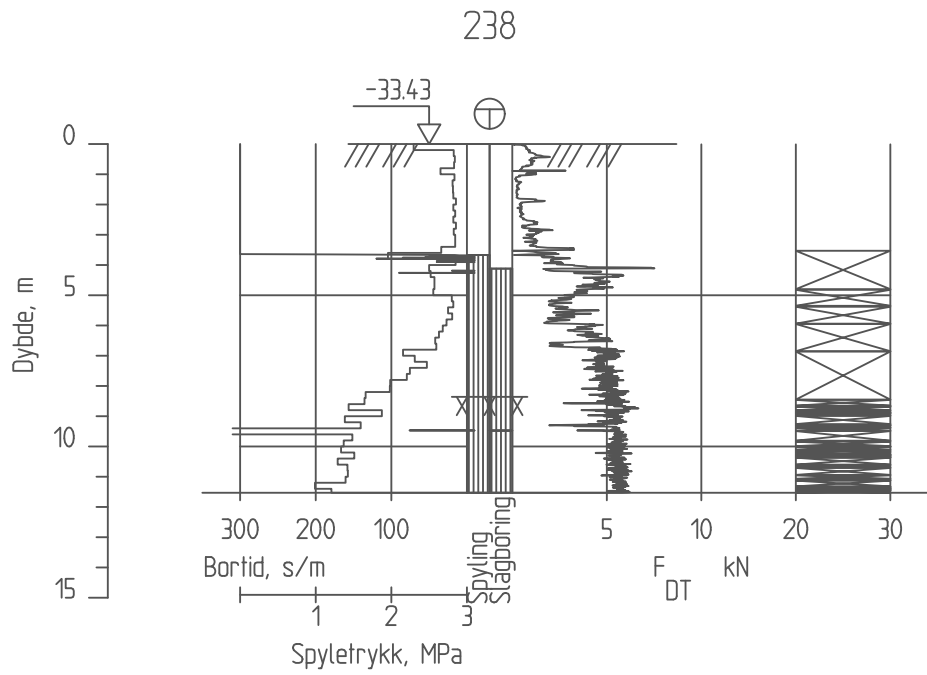


01	2024-11-15	Issued for use			BryOEy GuMJo JFS
Rev.	Date	Reason for Issue			Prepared Checked Approved
		PROJECT NAME	DRAWING TITLE:		
		Smeahela	Smeahela site preparation - Study Geotechnical field investigations Total sounding profile 236		
PLANT		AREA/LOCATION			
SMEAHEIA		Austrevågen			
ORIGINATOR NAME		FORMAT	SCALE	DRAWING NO.:	
Norconsult		A4	1:250	01	
		PO. NO.	E316		
		ORIGIN. DRW. NO.	PROJECT NO.	PLANT PR. CODE	REV. NO.
		236			
		ORIG. CODE	DISC. CODE	DRW. TYPE	SEQUENCE NO.
		SHT. NO.			

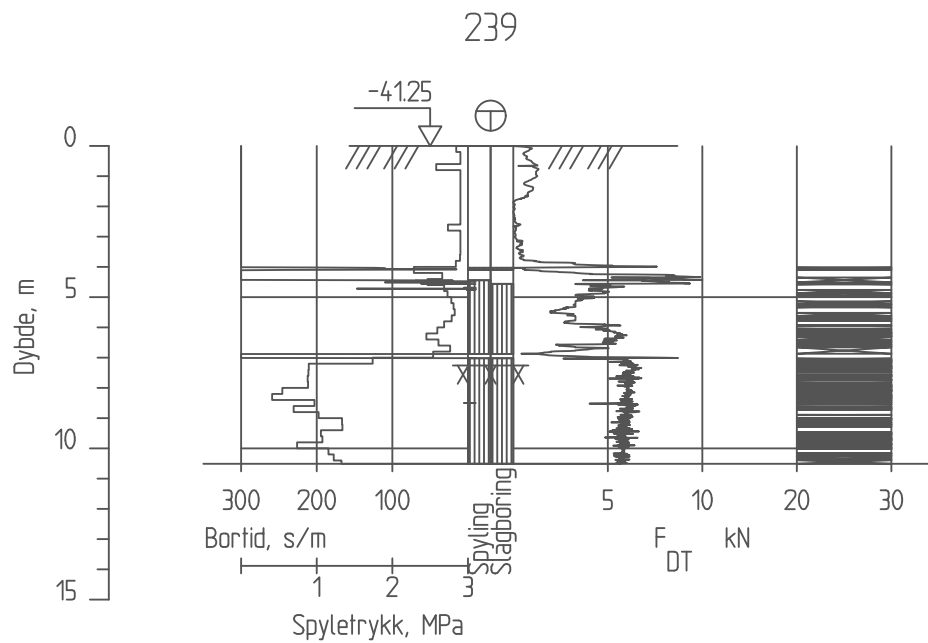
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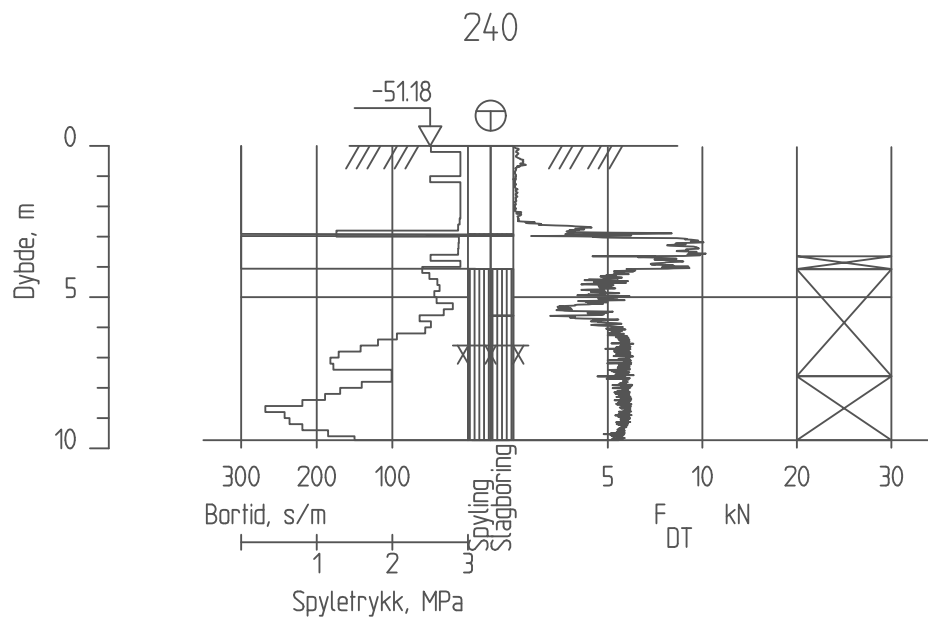
01	2024-11-15	Issued for use			BryOEy	GuMJo	JFS		
Rev.	Date	Reason for Issue			Prepared	Checked	Approved		
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		PROJECT NAME Smeahela		Smeahela site preparation – Study Geotechnical field investigations Total sounding profile 237					
		AREA/LOCATION Austrevågen							
		FORMAT SCALE A4 1:250							
PLANT SMEAHEIA									
ORIGINATOR NAME		PO. NO -		DRAWING NO.: E316			01		
		ORIGIN. DRW. NO. 237		PROJECT NO	PLANT PR. CODE	ORIG. CODE	DISC. CODE	DRW. TYPE	SEQUENCE NO.
									



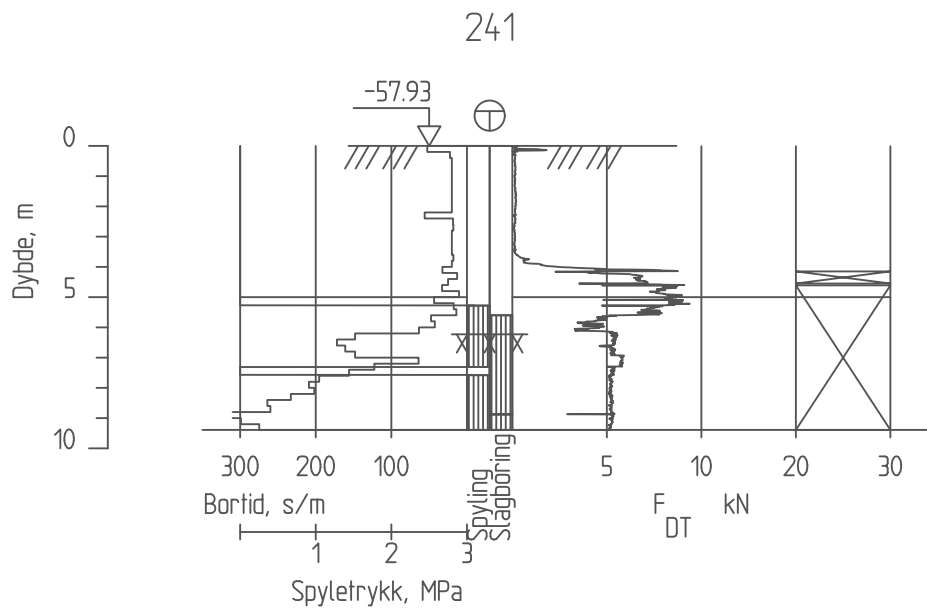
01	2024-11-15	Issued for use			BryOEy GuMJo JFS
Rev.	Date	Reason for Issue			Prepared Checked Approved
		PROJECT NAME	DRAWING TITLE:		
		Smeahela	Smeahela site preparation - Study Geotechnical field investigations Total sounding profile 238		
		AREA/LOCATION Austrevågen			
PLANT	SMEAHEIA	FORMAT	SCALE		
ORIGINATOR NAME		PO. NO		DRAWING NO.:	
		ORIGIN. DRW. NO.	PROJECT	PLANT PR.	ORIG. DISC. DRW. SEQUENCE SHT. REV.
		238	NO	CODE CODE CODE TYPE NO. NO.	01



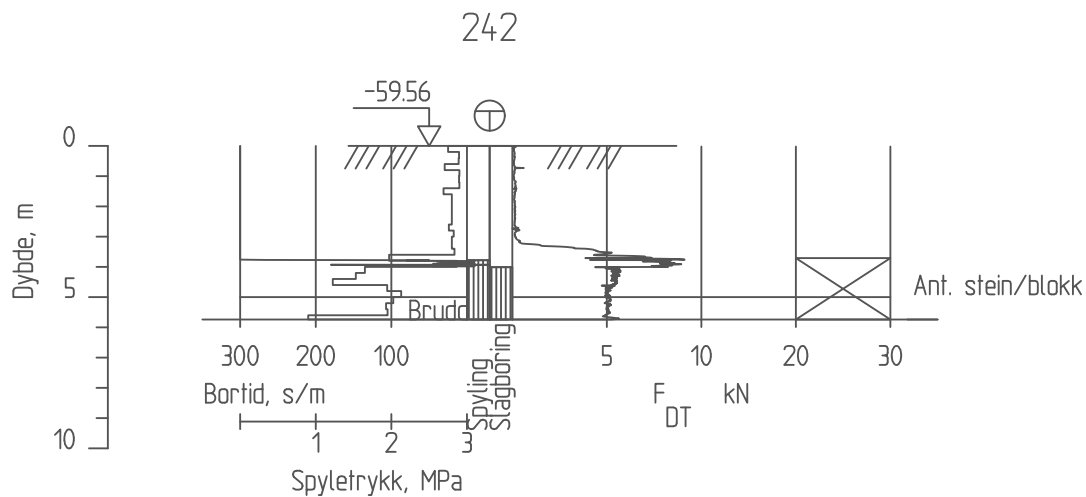
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Rev.	Date	Reason for Issue					Prepared	Checked	Approved		
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		AREA/LOCATION Austrevågen									
		FORMAT A4	SCALE 1:250								
PLANT SMEAHEIA											
		PO. NO –		DRAWING NO.: E316					01		
		ORIGIN. DRW. NO. 239		PROJECT NO	PLANT PR. CODE	ORIG. CODE	DISC. CODE	DRW. TYPE	SEQUENCE NO.	SHT. NO.	REV. NO.



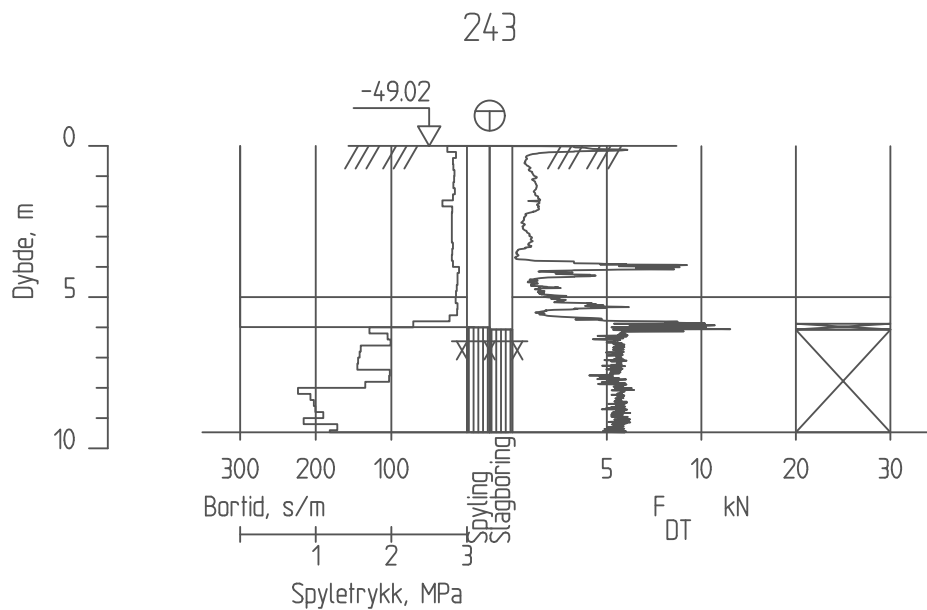
01	2024-11-15	Issued for use	BryOEy	GuMJo	JFS
Rev.	Date	Reason for Issue	Prepared	Checked	Approved
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PO. NO -		SCALE 1:250	DRAWING NO.: E316		
ORIGIN. DRW. NO. 240		PROJECT NO	PLANT PR. CODE	ORIG. CODE	DISC. CODE
		DRW. TYPE	SEQUENCE NO.	SHT. NO.	REV. NO.
					01



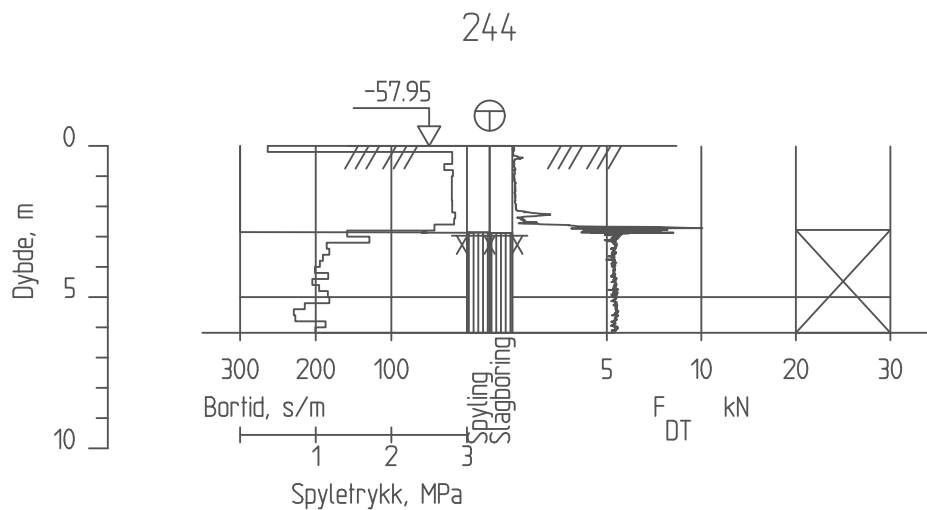
01	2024-11-15	Issued for use			BryOEy GuMJo JFS			
Rev.	Date	Reason for Issue			Prepared Checked Approved			
		PROJECT NAME Smeahela	DRAWING TITLE: Smeahela site preparation – Study Geotechnical field investigations Total sounding profile 241					
		AREA/LOCATION Austrevågen						
		FORMAT A4				SCALE 1:250		
PLANT SMEAHEIA								
		ORIGINATOR NAME	PO. NO. –	DRAWING NO.:		01		
		ORIGIN. DRW. NO. 241	PROJECT NO.	PLANT PR. CODE	ORIG. CODE	DISC. CODE	DRW. TYPE	SEQUENCE NO.



01	2024-11-15	Issued for use			BryOEy GuMJo JFS					
Rev.	Date	Reason for Issue			Prepared Checked Approved					
		PROJECT NAME Smeahela	DRAWING TITLE: Smeahela site preparation – Study Geotechnical field investigations Total sounding profile 242							
		AREA/LOCATION Austrevågen								
		FORMAT A4				SCALE 1:250				
PLANT SMEAHEIA										
		ORIGINATOR NAME	PO. NO. –	DRAWING NO.:			01			
			E316							
		ORIGIN. DRW. NO. 242	PROJECT NO	PLANT PR. CODE	ORIG. CODE	DISC. CODE	DRW. TYPE	SEQUENCE NO.	SHT. NO.	REV. NO.



01	2024-11-15	Issued for use	BryOEy	GuMJo	JFS
Rev.	Date	Reason for Issue	Prepared	Checked	Approved
		PROJECT NAME Smeahela AREA/LOCATION Austrevågen FORMAT A4 SCALE 1:250	DRAWING TITLE: Smeahela site preparation - Study Geotechnical field investigations Total sounding profile 243		
PLANT SMEAHEIA ORIGINATOR NAME Norconsult		PO. NO. - ORIGIN. DRW. NO. 243	PROJECT E316 NO	PLANT PR. CODE	ORIG. CODE
		DISC. CODE	DRW. TYPE	SEQUENCE NO.	SHT. NO.
		REV. NO.	01		



01	2024-11-15	Issued for use				BryOEy	GuMJo	JFS			
Rev.	Date	Reason for Issue				Prepared	Checked	Approved			
		PROJECT NAME Smeahela		DRAWING TITLE: Smeahela site preparation – Study Geotechnical field investigations Total sounding profile 244							
		AREA/LOCATION Austrevågen									
		FORMAT A4	SCALE 1:250								
		PLANT SMEAHEIA									
ORIGINATOR NAME		PO. NO. –	E316		DRAWING NO.:				01		
		ORIGIN. DRW. NO. 244		PROJECT NO	PLANT PR. CODE	ORIG. CODE	DISC. CODE	DRW. TYPE	SEQUENCE NO.	SHT. NO.	REV. NO.

Equinor ASA

► Smeaheia grunnundersøkelser Nearshore

Geotechnical Laboratory Report

Assignment no.: 52407009 Document no.: RIG-LAB01 Version: J01 Date: 2024-11-08



Illustration photo

Assignment name Smeaheia grunnundersøkelser Nearshore
Client: Equinor ASA
Consultant: Norconsult AS, Grandfjæra 24, NO-6415 Molde
Subject manager, laboratory: Hilde Risung
Responsible Geotechnician: Brynjar Øye
Other Key Personnel: Vibeke Silseth Aspen

Samples received 28.10.2024
Start date for testing 30.10.2024
54 mm-samples 3 pieces

Assignment no. GRU: 4010933

J01	2024-11-08	For use	VibAsp	HiRis	VibAsp
Version	Date	Description	Prepared by	Checked by	Approved by

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Appendix

Lab-profile

G600-01	Position 213
---------	--------------

1 Results from standard lab routine

Table 1: Completed tests and laboratory work

Pos. /ID	Type [-]	Depth [m]	Classification	W [%]	TG [-]	GI [%]	Y [kN/m³]
213	54	0,0-1,0	Sand with pieces of shell and gravel				16,5
		0,1-0,2		51,7			
		0,2-0,3					
		0,3-0,4	Humic Silty Sand	69,4	T2	3,3	
		0,4-0,5					
		0,5-0,6					
		0,6-0,7					
213	54	1,0-2,0	Sand with pieces of shell and gravel				18,7
		1,1-1,2		34,4			
		1,2-1,3					
		1,3-1,4	Sand	34,9	T2	1,6	
		1,4-1,5					
		1,5-1,6					
		1,6-1,7					
213	54	2,0-3,0	Silty clay-ey sand with pieces of shell and gravel				21,6
		2,1-2,2		18,0			
		2,2-2,3					
		2,3-2,4	Sandy Clay-ey Silty Gravely Material	17,2	T3	1,2	
		2,4-2,5		16,1			
		2,5-2,6					
		2,6-2,7					

Soil classification based on grain size distribution is marked with **bold type**, the others are visually classified.

Symbols:

54	Undisturbed 54 mm cylinder piston sample
P	Bag (representative)
W	Natural in-situ water content
TG	Frost heave classification (T1-T4)
GI	Organic content
γ	Density

2 Particle size distribution

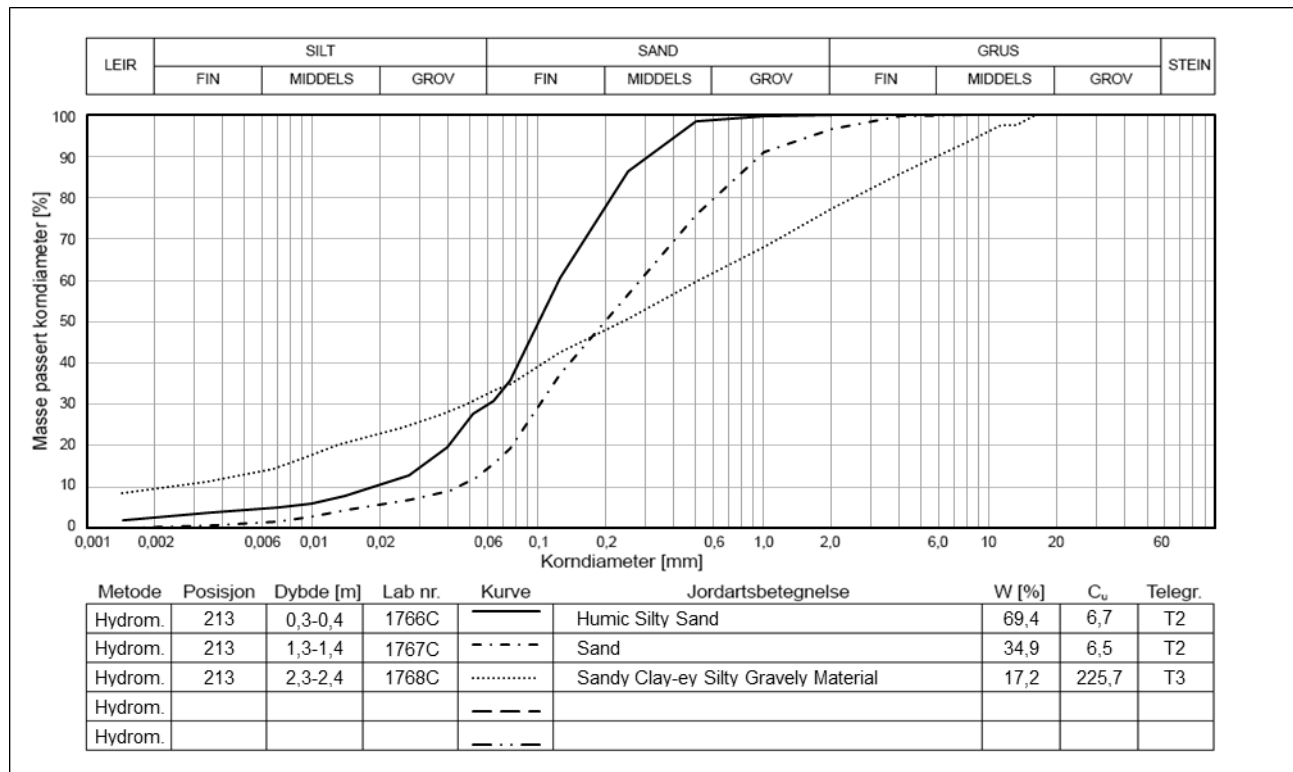


Figure 1 Particle size distribution for position 213

3 Pictures

3.1 Piston samples

Borehole 213

Depth 0,0-1,0 m



Depth 1,0-2,0 m



Depth 2,0-3,0 m



4 References

- Ref. 1 The Norwegian Public Roads Administration (NPRA), Manual R210 2024 Laboratory investigations.*
- Ref. 2 Norwegian Geotechnical Society (2011), Notification no. 2 – Guidance for symbols and definitions in geotechnics, identification and classification of soil*
- Ref. 3 NS-EN 17892-1:2014 Geotechnical investigation and testing -- Laboratory testing of soil -- Part 1: Determination of water content.*
- Ref. 4 NS-EN 17892-2:2014 Geotechnical investigation and testing -- Laboratory testing of soil -- Part 2: Determination of bulk density.*
- Ref. 5 NS-EN 17892-4:2016 Geotechnical investigation and testing -- Laboratory testing of soil -- Part 4: Determination of particle size distribution.*

5 Reporting

❖ Vanninnhold

Vanninnhold regnes som forhold mellom masse vann og masse tørrstoff i prøven. Vanninnhold kan bestemmes både for representative- og uforstyrrede prøver.

$$w = \frac{\text{masse fuktig} - \text{masse tørr}}{\text{masse tørr prøve}}$$

Vanninnhold bestemmes ved veiing før og etter tørking av materialet til konstant vekt.

Vanninnholdene i

Table 1 og kornfordelingskurvene, som er fra samme prøvedybde, kan variere. Ved avvik benyttes vanninnholdet fra Table 1.

❖ Kornfordeling, klassifisering, telefarlighet og gradering

Kornfordeling defineres som masseandel av standardiserte kornstørrelsesgrupper i prøven.

Kornfordeling av prøvemateriale bestemmes ved bruk av sikter og vekter, samt hydrometer hvis materialet har høyt innhold av finstoff. Materialet kan enten vaskes og tørkes i forkant av siktingen, eller siktes fuktig. Våtsikting evt. kombinert med slemmeanalyse brukes når materialets telefarlighet skal bestemmes (*kombianalyse*).

Resultatene presenteres som kornfordelingskurver der akkumulert %-vekt oppgis mot kornstørrelse. I tilfelle kombianalyse kombineres resultatene fra sikting og hydrometeranalysen til én kurve.

For klassifisering benyttes gruppene oppgitt i Tabell 2.

Tabell 2 Kornstørrelsesgrupper

Fraksjon	Kornstørrelse (mm)
Leire	<0,002
Silt	0,002-0,063
Sand	0,063-2
Grus	2-63
Stein	63-630
Blokk	>630

Primære bestanddeler angis i substantivform, mens de sekundære bestanddelene evt. gis som ett eller flere adjektiver (f.eks. *siltig sandig leire*).

Telefarlighet kan bedømmes ut fra materialets kornkornfordeling etter Tabell 3.

Tabell 3 Regler for inndeling i telegrupper

Telegruppe		Masseprosent av matr. <20mm		
		<0,002mm	<0,02mm	<0,2mm
Ikke telefarlig	T1	< 3		
Litt telefarlig	T2	3 - 12		
Middels telef.	T3	1)	> 12	< 50
Meget telef.	T4	< 40	> 12	> 50

1) *jordarter med mer enn 40% < 0,002 mm regnes som middels telefarlige*

Materialets gradering kan bestemmes fra kornfordelingskurvens helning i området der 10% og 60% av materialet passerer ved sikting.

$$c_u = \frac{d_{60}}{d_{10}}$$

Hvis dette av praktiske grunner ikke lar seg utføre brukes d_{75} og d_{25} . Materialets gradering kan beskrives etter retningslinjer gitt i Tabell 4.

Tabell 4 Betegnelser basert på graderingstallet

C_u	Betegnelse
< 5	Ensgradert
5 - 15	Middels gradert
> 15	Velgradert

❖ Humusinnhold

Humusinnhold i mineraljordarter bestemmes med glødetapsmåling og regnes som masse organisk materiale dividert med masse tørrstoff i prøven.

$$GL = \frac{\text{masse tørket} - \text{masse glødet}}{\text{masse glødet prøve}}$$

Humusinnhold kan bestemmes både for representative- og uforstyrrede prøver, og presenteres etter retningslinjer gitt i Tabell 75.

Tabell 5 Betegnelser basert på humusinnhold

%	Betegnelse
2 - 6	Humusholdig
6 - 20	...torv
>20	Torv

❖ Korndensitet

Korndensitet (eller relativ densitet) for finkornede jordarter som leire, silt og sand kan bestemmes ved bruk av pyknometer Korndensiteten regnes som

$$\rho_s = \frac{\text{partiklenes tørrmasse}}{\text{partiklenes reelle volum}}$$

❖ Konsistensgrenser og plasititet

Konsistensgrenser defineres som vanninnholdsområdet der prøven oppfører seg plastisk (formbar). Nedre grensen (plastisitetsgrense, w_p) defineres som vanninnholdet der materialet ikke lenger kan formes uten å sprekke opp. Øvre grensen (flytegrense, w_L) defineres som vanninnholdet der materialet går over til flytende tilstand. Plastisitetsindeks defineres som

$$I_P = w_L - w_p$$

og brukes for å angi det plastiske området for jordarten samt for klassifisering.

❖ Tyngdetetthet

Tyngdetetthet av prøver regnes som masse per volum ganget med jordens grunnakselerasjon. Den kan bestemmes for uforstyrrede prøver, enten for en hel sylinder eller for en mindre prøvebit.

❖ Deformasjons- og konsolideringsegenskaper

Deformasjons- og konsolideringsegenskaper benyttes ved evaluering av forventet setning og tidsforløp ved endring i spenningstilstand. Modellparametere for setningsberegning kan evalueres ved hjelp av belastningsforsøk i laboratoriet. Forsøkene utføres i såkalt ødometerapparat, der prøver belastes vertikalt samtidig som vertikal deformasjon måles. Sideveis deformasjon er hindret av en stiv ring.

Aksiell last, aksiell tøyning og poretrykksforhold under prøven registreres gjennom forsøket. Forsøkene kan utføres med kontinuerlig belastning (CRS/CRP) eller evt. ved en simulert trinnvis belastning.

En generell modell for spenningsmodul kan defineres som

$$M = m\sigma_a \left(\frac{\sigma' - \sigma_r'}{\sigma_a} \right)^{1-n}$$

Formuleringen beskriver konstant-, lineært økende- og parabolisk økende modell, som gjerne benyttes for å beskrive OC leire (konstant med $n=1$), NC leire og fin silt (lineært økende med $n=0$) eller sand og grov silt (parabolisk økende med $n=0,5$).

Tolkning av ødometerforsøk gir verdier på M , m og n .

❖ Skjærfasthet

Drenert skjærfasthet

På effektivspenningsbasis er skjærfastheten avhengig av effektivspenning normalt på bruddplanet.

$$\tau_f = (a + \sigma') \cdot \tan(\phi)$$

Modellparameterne kan bestemmes ved treaksialforsøk i laboratoriet. Spenningsforholdene for slike forsøk bør presiseres av prosjekterende på forhånd slik at resultatene blir mest mulig representative for det aktuelle tilfellet.

Udrenert skjærfasthet

På totalspenningsbasis beskrives skjærfastheten som skjær-belastningen materialet tåler før det bryter sammen. Totalspenningsanalyse analyser benyttes for å beskrive materialoppførsel av finkornige jordarter, ved plutselige eller raske spenningsendringer. Udrenert skjærfasthet defineres som

$$c_u = \frac{(\sigma_1 - \sigma_3)}{2}$$

Skjærfastheten bestemmes ved en rekke forsøk i laboratorium og i felt, og målemetoden oppgis derfor i parameternavnet etter retningslinjer gitt i Tabell 6.

Tabell 6 Betegnelse for udrenert skjærfasthet basert på målemetode

Udrenert skjærfasthet	Målemetode
C_{uc}	Aktivt treaksialforsøk (compression test)
C_{uE}	Passivt treaksialforsøk (extension test)
C_{uD}	Direkte skjærforsøk
C_{ufc} (uomrørt), C_{urfc} (omrørt)	Konusforsøk
C_{uuc}	Enaksialt trykkforsøk

Residual skjærfasthet etter brudd/omrøring kalles omrørt skjærfasthet, c_{ur} . Omrørt skjærfasthet kan være vesentlig lavere enn uforstyrret skjærfasthet.

Forholdet mellom uforstyrret og omrørt skjærfasthet kalles sensitivitet og defineres som

$$S_t = \frac{c_u}{c_{ur}}$$

Sensitivitet kan presenteres etter retningslinjer gitt i Tabell 7.

Tabell 7 Betegnelse basert på sensitivitet

Betegnelse av sensitivitet	Betegnelse av leire	St (-)
Lav	Lite sensitiv	< 8
Middels	Middels sensitiv	8 - 30
Høy	Meget sensitiv	> 30

Variasjoner i skjærfasthet og presentasjon av måledata

Udrenert skjærfasthet er avhengig av bruddflatens retning ift. hovedspenningenes retning in-situ. Udrenert skjærfasthet fra alle spenningsområder (aktivt-, direkte- og passivt spenningsområde) kan evalueres med forsøk listet opp i Tabell 6.

I tillegg til å måle varierte materialegenskaper vil bestemmelser av den samme parameteren ha en viss spredning på grunn av de ulike forsøktypene.

Resultater fra enkelte forsøk kan være påvirket av flere faktorer (som f.eks. steininhold eller interne sprekker i prøvebiten).

Ved visuell presentasjon av måleresultater plottes alle typer forsøk på samme figur, med én målestokk for skjærfastheten C_u . Forsøktypen oppgis med symbol på figuren.

Ved sammenstilling av laboratoriedata utføres ingen korrigering for anisotropi.

❖ Prøvelagring

Hvis laboratorieforsøk ikke utføres umiddelbart etter ankomst til laboratoriet, blir prøvene lagret i et eget kjølerom.

Kjølerommet har lufttemperatur på ca. 5°C.

"\\dmolded01\geovev\loggdatalab\52308179 Smeaheia\52308179 Smeaheia.dwg - VibAsp - Plotter: 2024-11-08, 08:26:05 - LAYOUT = G600-01"

Depth (m)	Description	Sample	Type	Water content (%)					Density (kN/m³)					Grain dens. (g/cm³)	Humic (%)	Shear strength (kN/m²)										S _t Conus
				10	20	30	40	50	17	18	19	20	21			2	4	6	8	10	12	14	16	18		
2	Sand with pieces of shell and gravel <u>Humic Silty Sand (T2)</u>	1	54					52 69	x						3,3											
	Sand with pieces of shell and gravel <u>Sand (T2)</u>	2									x				1,6											
	Silty clay-ey sand with pieces of shell and gravel <u>Sandy Clay-ey Silty Gravely Material (T3)</u>	3											x		1,2											
4																										
6																										
8																										
10																										
12																										
14																										

TEGNFORKLARING:

- Plasticity limit / Water content / Liquid limit
- 15-○-5

Intact shear strain (unconfined compression test)
- 10

Intact shear strength (Conus)
- ▽

Disturbed shear strength (Conus)
- ▼

Sensitivity

J0108.11.2024For use

VibAspHirIsVibAsp

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Equinor ASA

Scale (applies to A1 size)

Smeaheia grunnundersøkelser Nearshore

Lab-profile
Position 213

Norconsult

Project number52407009

Document numberG600-01

RevisionJ01

○ Simple Sounding	● Weight Sounding	▼ Rotary Pressure Sounding
⊗ Rock Surface Determination	⊕ Total Sounding	▽ Cone Penetration Testing
+ Vane Boring	▼ Ram Sounding	⊖ Standard Penetration Test
□ Test Pit	⊙ Tube/Auger Sampling	⊠ Test Pit and Sampling
☪ Water Sampling	☪ Ground Water Level	⊕ Pore Pressure Measurement
⊗ Permeability Measurement	⊠ Test Loading	■ Settlement Testing
⌒ Electric Sounding	^^ Exposed Rock	

$$\bullet \frac{-18.2}{-35.4} 17.2 + 2.9$$

Above line : Ground, sea bed or river bottom level.
Outside line : Depth drilled in soil + depth drilled in rock.
Below line : Assumed rock level, ~ if rock is not found.

Water content	(w)	●	Porosity	(n)
Fall cone liquid limit	(w _F)	▼	Void ratio	(e)
Plasticity limit	(w _p)	├	Sensitivity	(S _t)
Liquid limit	(w _L)	└	Undrained shear strength (s _u)	
Unit weight	(γ)		Fall cone	▽
Dry unit weight	(γ _d)		1- axial compression test	(15) (5) (10) = axial deformation at failure
Unit weight of solid particles	(γ _s)		Torvane	*
			Penetrometer	□

 Clay	 Silt	 Fill	 Rock
 Block	 Stones	 Gravel	 Sand
 Top-soil	 Mud	 Peat/plant fibers	 Shell
 Till	 Wood fibers/saw dust		

Smeaheia Site Preparation - Study

Equinor ASA

Geotechnical Symbols

Norconsult 

Scale

Date

2024-11-18

Prepared by
BryOEy

Approved by
GuMjo

Appendix No.
B

Project No.
52308179

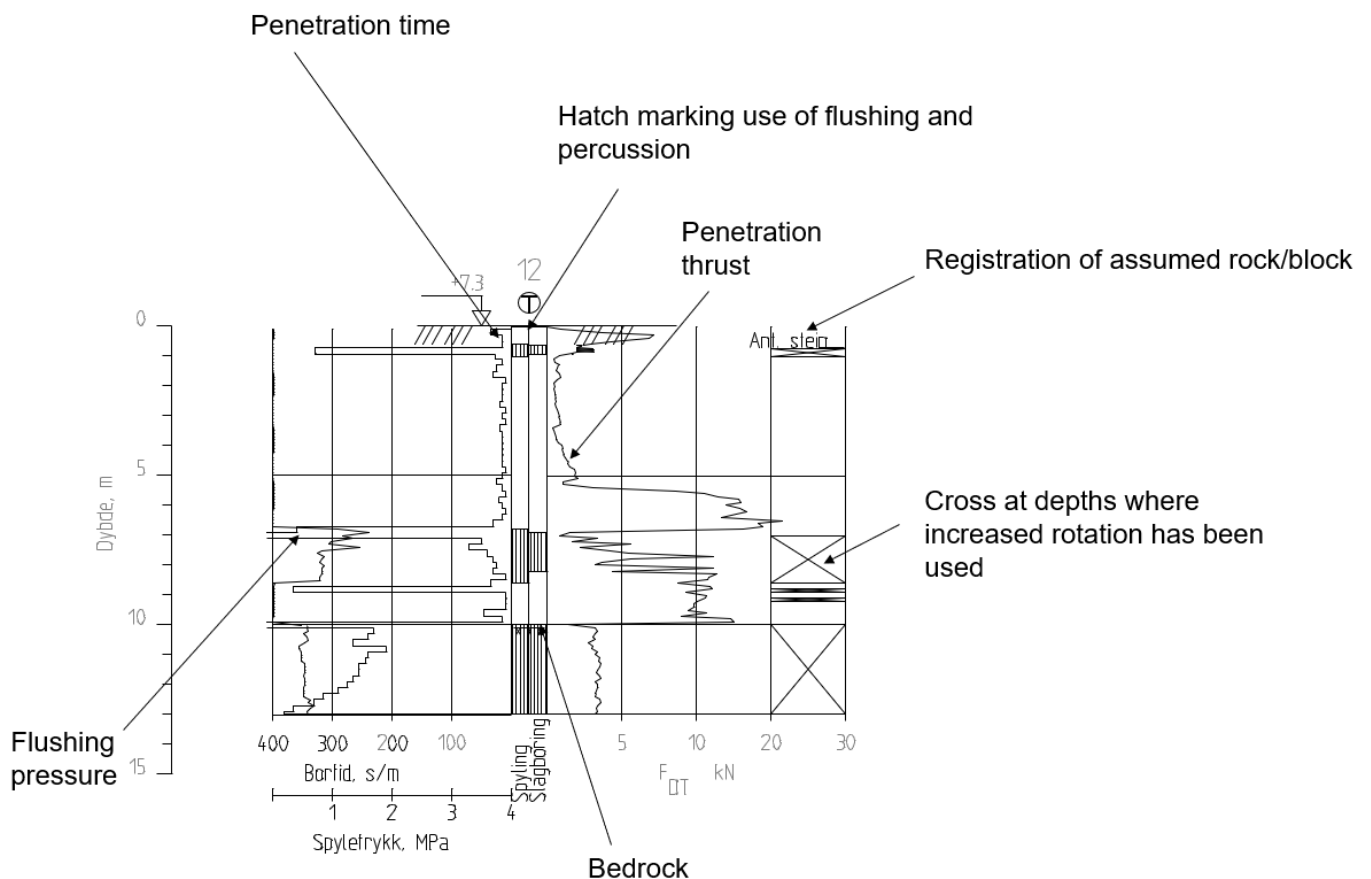
Total sounding

Equipment: Ø 57 mm drill bit with non-return valve.
Ø 44 mm drill rods.

Without hydraulic hammer: Constant rotation 25 revs/min.
Penetration 3 m/min.
If possible, drilling is performed without flushing water.
If further penetration is not possible, flushing with water is used.
If penetration again is stopped, the rotation speed may be increased before hydraulic percussion hammer is used.

With hydraulic hammer: Constant rotation 75 revs/min.
With water flushing and percussion.

Presentation: Hatched areas in separate columns indicate depth intervals where water flushing and percussion drilling is used.
Graphs for penetration thrust, penetration time and flushing pressure.
X in separate column indicates increased rotation speed.
Bedrock level indicated with separate symbol.



Smeaheia Site Preparation - Study

Equinor ASA

Total sounding Definitions – Procedures and Presentation

Prepared by
BryOEy

Approved by
GuMjo

Norconsult 

Scale

Date

2024-11-18

Appendix No.

Project No.

C

52308179