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Keywords: Hydrogeology, Aquifer, Soil, Stratigraphy, Slug test, Soil samples, Groundwater, Monitoring, Groundwater level, Hydraulic conductivity, Transmissivity.

Abstract

The field work comprised geological probing, soil sampling, installation of groundwater monitoring wells and slug testing, and was undertaken by Ramböll Sverige AB in the Laxemar area, north of Oskarshamn, during October and November 2006. In all test locations, an initial soil-rock sounding with constant sink- and rotation rate was undertaken in order to determine suitable depths and locations for subsequent soil sampling and groundwater monitoring well installations. In total, 20 soil-rock soundings, 9 soil samplings and five soil samplings with auger drilling were undertaken, and 12 groundwater monitoring wells were installed in the area.

Slug tests were conducted in all installed wells, as well as in nine other wells which were installed in 2004 by another company. The hydraulic response was generally quick and only few wells indicated response periods that lasted longer than a few minutes. Therefore, most tests were repeated two or three times, in accordance with the method description for slug tests. The results from the slug tests indicate that the transition between the soil and rock is generally very permeable.

The main purpose of the investigation was to improve the geological understanding of deep valley stratigraphy and aquifers as well as the soil-rock contact zone, and in particular to obtain hydrogeological information about the transition from soil to rock.

Geological and hydrogeological investigations were undertaken in seven different areas, Mederhult, Ekerumsån, Laxemarån, Horvan Syd, Lerängarna, Dämmen and Långekärr. The geological conditions vary from area to area, but the subsurface profile typically comprises peat or sand, overlying sand or clay, underlain by till, in turn underlain by bedrock, which generally is fractured. The groundwater table was generally encountered approximately one metre below the ground surface, but in places observed at up to three metres depth below the ground surface. Although in the valley the water level often reaches the ground surface.

Sammanfattning

Sonderingarna, jordprovtagningarna, installation av grundvattenrör och slugtesterna i Laxemarområdet, norr om Oskarshamn, utfördes under oktober och november 2006 av Ramböll Sverige AB. I samtliga punkter utfördes först totalsondering, för att utifrån sonderingsresultaten sedan ta ställning till var jordprovtagningar skulle utföras och var grundvattenrör skulle installeras. Totalt utfördes 20 sonderingar, 9 moränprovtagningar, 5 skruvprovtagningar och 12 grundvattenrör installerades.

Slug tester utfördes i samtliga grundvattenrör samt i ytterligare nio grundvattenrör som installerades under 2004 av annan konsult. Återhämtningen var generellt sett snabb och endast ett fåtal brunnar visade återhämtningsförlopp med längre varaktighet än ett par minuter. På grund av detta repeterades de flesta testen två eller tre gånger i enlighet med metodbeskrivningen för slug tester i öppna grundvattenrör. Resultaten från slugtesterna visar att övergången mellan morän och berg generellt sett är mycket genomsläpplig.

Huvudsyftet med undersökningarna är att få en bättre förståelse över kvartärgeologin i de djupare dalgångrna i området, och de hydrogeologiska egenskaperna i övergången mellan jord och berg.

Undersökningarna utfördes i åtta delområden, Mederhult, Ekerumsån, Laxemarån, Horvan Syd, Lerängarna, Dämmen och Långekärr. De geologiska förhållandena varierar i de olika områdena, men lagerföljden är mycket generellt torv eller sand följt av sand eller lera på friktionsjord ovan berg, som till stor del är sprickig. Grundvattennivån ligger ungefär en meter under markytan, men på sina håll ner till tre meter under markyta. I dalgångarna når dock grundvattennivån ofta markytan.

Contents

1 Introduction

The Swedish Nuclear Fuel and Waste Management Co, in this report referred to as SKB, has a general program for investigations, described in /1/ and a more site specific program for the Oskarshamn area in /2/.

The field work was carried out in October–November 2006 by Ramböll Sverige AB, following the object specific activity plan, where method descriptions for soil probing, with soil sampling, and slug tests in open groundwater monitoring wells were the main documents.

This report details the results obtained from drilling, sampling of soil, installation of groundwater monitoring wells and slug tests. The work was carried out in accordance with activity plan AP PS 400-06-078. In Table 1-1 controlling documents for performing these activities are listed. Both activity plan and method descriptions are SKB's internal controlling documents.

The focus of the geological and hydrogeological investigations has been in areas northwest of Simpevarp. Figure 1-1 show a map with the locations of the field investigations. These investigation were undertaken in different sites Mederhult, Ekerumsån, Laxemarån, Horvan Syd, Lerängarna, Dämmen and Långekärr. In the report reference is often made to these localities. For properly navigating and finding the sites discussed the map in Figure 1-1 should be utilised in conjunction with Table 2-1 which specifes the type of fieldwork undertaken at each site.

Results from the investigation are stored in the primary data base, SICADA and are traceable by the activity plan number.

Table 1-1. Controlling documents for the performance of the activity.

Activity plan	**Number**	**Version**
Kompletterande jordborrningar och installation av grundvattenrör i kontakten jord-berg.	AP PS 400-06-078	1.0
Karakterisering av jordprover från tre dalgångar i Laxemar.	AP PS 400-07-12	1.0
Kärnborrning av KLX21B.	AP PS 400-06-108	1.0
Karaktärisering av jordlager med geotekniska metoder – jordborrning, jordprovtagning och installation av grundvattenrör, Laxemar 2004.	AP PS 400-04-19	1.0
Kärnborrning KLX07.	AP PS 400-04-96	1.0
Kärnborrning KLX19A.	AP PS 400-06-54	1.0
Method descriptions	**Number**	**Version**
Jordborrning.	SKB MD 630.003	1.0
Slugtester i öppna grundvattenrör.	SKB MD 325.001	1.0

Figure 1-1. *General overview of the investigated site. The type of works undertaken at each site is specified in Table 2-1. Results, detailed locations of probing points and soil wells are shown for each site in section 5.1 through 5.8 as follows:*

5.1 – Site 1 Mederhult,
5.2 – Site 2 Ekerumsån,
5.3 – Site 3 Laxemarån,
5.4 – Site 4 Horvan syd,
5.5 – Site 5 Lerängarna,
5.6 – Site 6 Dämmen,
5.6 – Site 7 and 8 Långekärr,
5.7 – Site 9 Gäster,
5.7 – Site 10 Rågängarna,
5.8 – Site 11 Tyremosse.

Map published with permission © Lantmäteriverket Gävle 2007. Medgivande I 2007/1092.

2 Objective and scope

2.1 Objective

The objective of this study was to obtain information from the boreholes pertaining to soil thickness (i.e. depth to rock), stratigraphy, soil composition, transmissivities and groundwater levels. Particular focus is placed on characterizing

a) the soil in the deepest valleys of the area and,

b) the transition zone between soil and rock.

The information is primarily intended to support the hydrogeological modelling of the soil aquifer.

The purpose with this report is to compile and describes the work done and results obtained from these investigations.

2.2 Scope

The above is achieved at the different sites according to Table 2-1. The work comprised six main activites,

- soil probing and stratigraphical interpretation,
- soil sampling and classification,
- grain size analysis,
- well construction,
- slug testing and analysis to obtain transmissivity of the aquifers,
- installation and initiation of equipment in the wells for the long term monitoring of groundwater levels.

Groundwater monitoring wells are constructed to allow groundwater sampling and monitoring, and also be utilised for characterisation of the hydraulic properties of the soil deposits by slug tests.

Also included in this report are results from work undertaken in other activity plans.

- The installation of four wells for the purpose of environmental control of groundwater while drilling investigation boreholes in the bedrock.
  - SSM000256 and SSM000257 for borehole KLX21B, AP PS 400-06-108.
  - SSM000268 for borehole KLX15A, AP PS 400-06-78.
  - SSM000269 and SSM000271 for borehole KLX16A, AP PS 400-06-78.
  - SSM000270 for borehole HLX42, AP PS 400-06-78.
  - SSM000252 and SSM000253 for borehole KLX17A, AP PS 400-06-54.
- The slug testing and analysis of some previously drilled soil wells SSM000028 and SSM000216, drilled in activity AP PS 400-04-19.

A summary of the scope of works is given in Table 2-1. Holes for soil probing have PSM-prefix in their identity code, while soil wells have an SSM-prefix. At some of the probing sites a soil well was constructed, as indicated in the table. Soil-rock probing was also made prior to construction of soils wells SM000268–SSM000271 but no separate probing hole identification codes were assigned.

Table 2-1. Summary of field works undertaken. The location of the sites is shown in Figure 1-1.

Site	Probing	Soil sampling	Soil well construction	Slug testing	Main objective
1 Mederhult	PSM001472 PSM001473 PSM001474 PSM001475	PSM001472 PSM001473	SSM000260 at PSM001473 SSM000261 at PSM001474	SSM000260 SSM000261	Characterization of soil at rock contact in the deep valley
2 Ekerumsån	PSM001476 PSM001477 PSM001478 PSM001479	PSM001477 PSM001479	SSM000262 at PSM001479	SSM000262	Characterization of soil at rock contact in the deep valley
3 Laxemarån	PSM001480 PSM001481 PSM001482 PSM001483	PSM001480	SSM000263 at PSM001482	SSM000263	Characterization of soil at rock contact in the deep valley
4 Horvan syd	PSM001484 PSM001485 PSM001486	PSM001484 PSM001485	SSM000264 at PSM001484 SSM000265 at PSM001485 SSM000266 at PSM001486	SSM000264 SSM000265 SSM000266	Characterization of soil – rock contact zone
5 Lerängarna	PSM001487	PSM001487	SSM000267 at PSM001487 SSM000256[1)] SSM000257	SSM000267 SSM000256 SSM000257	Characterization of soil – rock contact zone
6 Dämmen	SSM000268[2]		SSM000268	SSM000268	Environmental monitoring when drilling KLX15A
7 Långekärr	SSM000269[2] SSM000271[2]		SSM000269 SSM000271	SSM000269 SSM000271	Environmental monitoring when drilling KLX16A
8 Långekärr	SSM000270[2]		SSM000270	SSM000270	Environmental monitoring when drilling HLX42
9 Gäster				SSM000028	Slug testing of older soil wells
10 Rågängarna				SSM000216	Slug testing of older soil wells
11 Tyremosse				SSM000252 SSM000253	Environmental monitoring when drilling KLX17A

[1] Soil wells SSM000256 and SSM000257 were drilled and slug tested by WSP as monitoring wells for drilling of KLX21B, AP PS 400-06-54. Their siting coincided with the planned siting of two soil wells for the present activity with the specific purpose to characterize the transition zone between soil and rock. Hence,stratigraphy and slug test results are included in the present report.

[2] Soil probing was done and well constructed at that place. However, no separate soil probe identification was assigned.

A further scope was also to characterise the collected soil samples with respect to their mineralogy, physical and chemical properties. However, this samplesanalysis was undertaken as a separate activity (AP PS 400-07-12) and is reported in its own site investigation report /20/ except for grain size, organic and carbon content which is included here. The samples analysis comprised the following.

- Grain size distribution, organic content, carbonate content.
- Compact density and water content.
- Soil chemical analyses.
- Analysis of elements.
- Analysis of leachings.
- Mineralogical characterisation.
- BET measurements.
- Water sampling and hydrochemical analysis.

3 Equipment

3.3 Description of equipment

3.3.1 Drilling

Drilling rigs

The geological drillings was preformed by crawler mounted drill rigs, GeoTech 604, see Figure 3-1, and HAFO 1500, see Figure 3-2.

The drilling rig GeoTech 604D is a multi-purpose drilling-, sounding- and sampling rig, designed for geological and environmental site investigations. It is designed especially for Scandinavian sounding.

The cylinder fed HAFO 1500 drilling rig can carry out all the commonly required probing methods, soil sampling methods and can also be used for installation of groundwater inspection wells.

Drill bits used for soil-rock sounding were 57 mm button bits (stiftborrkrona) with GeoTech 604 and HAFO 1500. For installation of groundwater monitoring wells a casing drilling system was used (NO-X 90).

Field computer

For the field work, geological probing and soil sampling, a wireless computer was used to be able to quickly view the results from the probing, see Figure 3-3.

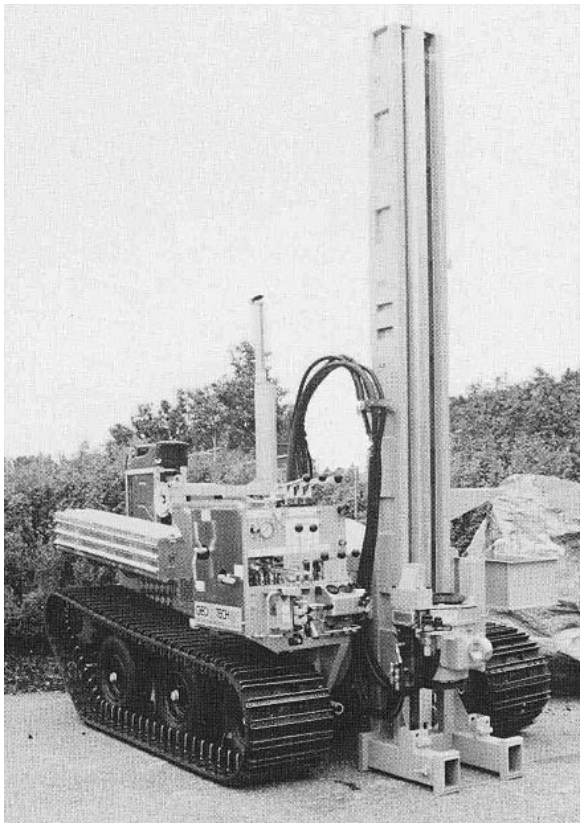


Figure 3-1. *Drilling rig GeoTech 604D was here used mainly for soil-rock probing.*

Figure 3-2. *Drilling rig HAFO 1500 was mainly used for soil-rock probing, soil sampling and installation of groundwater wells.*

Figure 3-3. *Wireless computer GoBook III was used in the field.*

The computer used was a GoBook III, which is robust and suitable for outdoor work. It has Microsoft XP Pro as operative system, Intel Pentium M 1.8 GHz processing unit and an 80 GB shock resistive hard drive.

3.3.2 Soil sampling

Soil sampling was undertaken with a crawler mounted drilling rig, HAFO 1500, see Figure 3-2. The equipment used for soil sampling included bottom soil sampler (Mullvad), with inner diameter 45 mm and outer diameter 72 mm, see Figure 3-4. The typical sample length is approx 600 mm (sand and/or gravel). The bottom soil sampler is able to extract soil samples at depths up to 12–15 m.

For depths less than 5 m soil sampling was carried out by auger sampling, Ø = 90 mm, see Figure 3-5.

Figure 3-4. *Bottom soil sampler was used.*

Figure 3-5. *Soil sampling by auger drilling.*

3.3.3 Slug tests

For the slug tests the following equipment was used:

- Pressure transducer and temperature meter, type DIVER from Van Essen Instruments.
- Portable PC.
- Slugs made from HDPE-pipe (40 mm in diameter and ranging in lengths from 0.398 metres to 1.5 metres), with stainless steel wire (diameter 2.15 mm) and wire stopper.
- Water level meter type ELWA 50A and tape measure with a weight designed for measuring the water level.
- Folding rule.
- Cleaning equipment (70% de-naturated alcohol and cotton cloth).

3.3.4 Surveying

All probing holes (with PSM-prefix) and soil wells (with SSM-prefix) are surveyed with a totalstation Geodimeter GDM640 with 0.010 m accuracy in x, y and z coordinates. Reference point is centre point of top of casing, ie top of the PEH pipe. Planar coordinates (x, y) are given in RT90 2.5g V system and elevation coordinates (z) are given in RHB70 system.

3.3.5 Hydraulic head monitoring

Upon completion of the testing the wells were installed with a pressure transducer for the purpose of longterm monitoring the hydraulic head. An integrated logger-transducer device was installed in each well. The installation was done by SKB with LevelTroll 30PSIA in wells SSM000260–SSM000267 and MiniTroll 30PSIA in wells SSM000268 to SSM000271, both from In-Situ Co.

3.3.6 Laboratory analysis of soil samples

A total of 45 soil samples were submitted to the laboratory for analysis of grain size, $CaCO_3$ content and organic carbon. These are tests were carried out at SWECO Geolab, Stockholm. Soil samples were collected in the framework of activity plan AP PS 400-06-78 while the analysis for grain size distribution were undertaken with activity plan AP PS 400-07-12.

The grain size distribution was determined by sieving and sedimentation. Coarse material (> 0.063 mm) was separated into grain size classes, using a sieving machine and a set of test sieves with apertures ranging from 20 mm to 0.063 mm. For finer material (< 0.063 mm), a hydrometer was used for measuring the sedimentation process.

The organic carbon content was determined by the ignition loss method. Results are presented in Appendix I.

The carbonate content ($CaCO_3$) was determined using the so-called Passon apparatus. A 10% solution of hydrochloric acid, added to a small soil sample containing carbonate, generates carbon dioxide which can be measured.

Table 3-1. The dimensions for the different parts of the slug test equipment.

	Slug 0.5 m	Slug 1.0 m	Slug 1.5 m
Total slug length (m)	0.54	1.08	1.53
Slug diameter (mm)	41.5	41.5	41.5
Total volume (lit)	0.70	1.43	2.04
Wire thickness (mm)	2.15	2.15	2.15

4 Execution

4.1 General

The field work was carried out in accordance with SKB's method descriptions for soil drilling and slug tests, and in line with the activity plan AP PS 400-06-078. This plan included among other things execution programme, environmental programme and data handling.

The works were undertaken jointly by different companies with main responsibitilies as follow,

- Svensk Kärnbränslehantering AB (SKB) – client, overall management, surveying and monitoring.
- Ramböll Sverige AB – contractor, drilling, well construction and execution of slug tests.
- Geological Survey of Sweden (SGU) – contractor, soil sample classification, geological and stratigraphical intepretation.
- SWECO – contractor, grain size analysis, organic content and carbonate content, analysis of slug tests.

4.2 Preparations

4.2.1 Drilling

Prior to the establishment at the site in Oskarshamn drilling rigs and equipment were calibrated and checked, all in line with SKB's instruction in reference literature to the activity plan. Calibration documents etc were delivered to SKB before the field work started.

The field work at the various sites commenced after permission had been obtained from SKB, who handles the contact with the landowners.

Before the drilling started service and function control of all equipment to be utilised was undertaken.

4.2.2 Slug tests

The equipment used for logging of water pressure and temperature during the slug tests was calibrated before the testing commenced.

To ensure the accuracy of the data logger the groundwater pressure for the undisturbed groundwater level was logged at two known reference depths and the groundwater level was also measured manually. This data was used for evaluation of the function checks and a good agreement was achieved for all tests.

4.3 Execution of field work

The field works was performed according to SKB's method description for soil drilling, slug tests in open groundwater monitoring wells and to activity plan AP PS 400-06-078.

Soil wells SSM000256 and SSM000257 were drilled and slug tested by WSP Sverige. These are installed as monitoring wells while drilling of KLX21B, AP PS 400-06-54. Their siting coincided with the planned siting of two soil wells for the present activity with the specific purpose to characterize the transition zone between soil and rock.

4.3.1 Drilling

In the preparation stage service and function control of the equipment to be used was undertaken. When the work at the site had been completed the equipment was cleaned. This was all done in compliance with SKB's instructions referred to in the activity plan.

Prior to soil sampling and/or groundwater monitoring well installations soil-rock sounding first was performed to be able to do field interpretations of soil and register the depth to rock. To assure that bedrock was reached, the drilling continued approximately three metres into the bedrock. Probing, soil sampling and groundwater monitoring wells were installed in line with SKB's method descriptions for these activities. Soil samples were delivered to the client in plastic bags.

The geological drilling followed the standard of /19/ with continous recording and logging of several parameters. Primary parameters are depth, penetration time, feeding power, rotational speed, bit pressure and penetration rate.

When the probing at an area was completed the equipment was cleaned, and the surface restored.

4.3.2 Soil sampling

Soil sampling was performed after the soil-rock probing, and after consultation with either geologist or activity leader. Three sampling methods were employed

a) when flushing during drilling,

b) with a soil sampler when drilling,

c) with Auger during drilling.

The procedure for preparations and function control of equipment prior to soil sampling is identical with the procedure described in section 4.3.1 Drilling.

A total of 45 samples were collected as specified in Appendix J, along with sampling method and volume for each sample. These were packed in plastic transparent bags, labelled and delivered to SKB for control, sorting and recording.

SKB splitted the original sample into two subsamples (a- and b-sample) of approximately equal volumes, of which one (the b-sample) was submitted to the Geological Survey of Sweden for geological interpretation and subsequently also to SWECO GEOLAB for analysis of grain size, $CaCO_3$ and ignition loss estimation of the content of organic carbon and organic material. The a-sample was stored in a refrigerator to be utilised for other analysis (mineralogical, chemical etc).

4.3.3 Soil well construction

Groundwater monitoring wells were installed inside drilling casings with machine HAFO 1500, see section 3.1.1 Drilling. Installation was undertaken with NO-X casing system with a centric ring bit NO-X 90 (inner diameter 90 mm, outer diameter 120 mm). In the soil wells HDPE-filters (Ø 63/50 mm, of varying length, and slot 0.3 mm) and casings (Ø 63/50 mm) were used. Filter sand (1.2–2.0 mm) and bentonite was filled outside the groundwater monitoring wells, while the casing was pulled out. Caps were installed at the top to protect the HDPE standpipes. After installation a function control was performed. Figure 4-1 show the principle of the soil well construction while Appendix D presents the construction for each well.

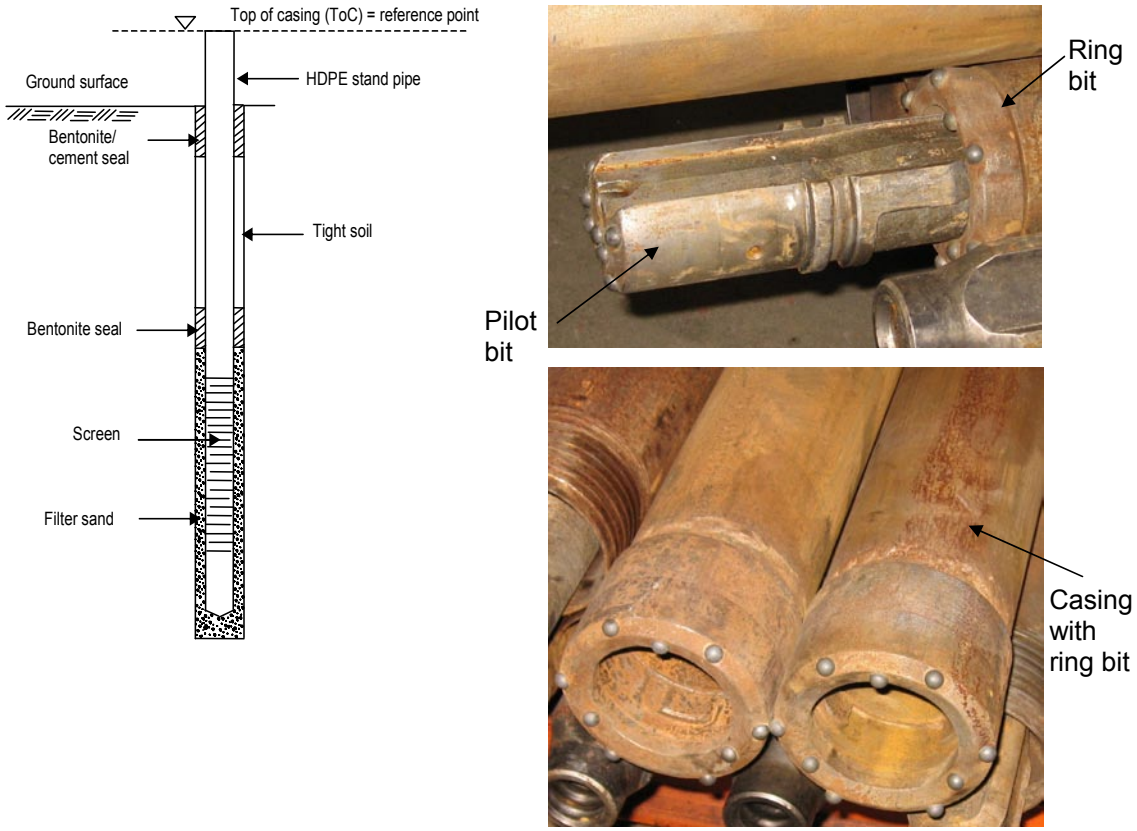


Figure 4-1. *Schematics of soil well construction (left) and centric ring bit 90 mm (bottom right) with pilot bit (topright) was used for soil well installation.*

4.3.4 Slug tests

The total depth of the well was measured, from the top of standpipe to bottom of the well, as well as the depth to the undisturbed groundwater level. Thereafter the slug and wire lengths as well as the logger installation depth were determined.

The equipment was cleaned in accordance with the cleaning instructions described in SKB MD 600.004 (SKB internal controlling document) prior to installation in the well.

After installation of the logger the water level was left to stabilise for a period prior to the slug being rapidly submerged in the well to initiate the falling head test. The logger sampling frequency was one measurement per second for the full duration of the test. When possible the water level was also measured manually during the test period.

When the original water level was obtained the slug was withdrawn from the well and the rising head test was conducted in compliance with the procedures described above.

The falling and rising head tests were carried out according to the document SKB MD 325.001 (SKB internal controlling document), which is referred to for detailed information on the test procedures. Table 4-1 presents a summary of the well details and the main observations during the slug tests.

4.3.5 Groundwater levels (from drilling and slug tests)

Table 4-2 presents the measured depth to water level prior to slug testing, the installation depth of the logger and the wire and slug lengths for all conducted slug tests.

Table 4-1. Summary of well details and main observations during slug tests.

ID code	Slug test no.	Secup screen (m.b.ToC.)	Seclow screen (m.b.ToC.)	Start (YYMMDD hh:mm)	Stop (YYMMDD hh:mm)	tp (s)	h_0 (m.b.ToC.)	dh_0 (m)	dh_0*/ dh_{0p} (–)	test type
Purpose: Characterisation of soil and soil-rock transition										
SSM000260	1	7.45	9.45	061113 13:00	061113 15:00	646	0.99	0.29	1.23	fh
SSM000260	1	7.45	9.45	061113 13:00	061113 15:00	571	0.99	–0.33	1.08	rh
SSM000261	1	9.20	10.20	061114 08:10	061114 10:06	626	0.81	0.42	0.85	fh
SSM000261	1	9.20	10.20	061114 08:10	061114 10:06	422	0.81	–0.35	1.02	rh
SSM000256	1	3.00	5.00	060711	060711		2.77	–0.14		rh
SSM000257	2	3.00	4.00	060711	060711		2.68	–0.34		rh
SSM000267	1	4.00	6.00	061114 10:45	061114 12:05	587	3.48	0.38	0.94	fh
SSM000267	2	4.00	6.00	061114 10:45	061114 12:05	360	3.48	–0.54	0.66	rh
SSM000263	1	6.30	8.30	061114 17:11	061114 17:40	532	1.80	0.12	2.98	fh
SSM000263	1	6.30	8.30	061114 17:11	061114 17:40	241	1.79	–0.14	2.56	rh
SSM000266	1	3.01	4.01	061115 08:54	061115 10:27	1,485	1.38	0.40	0.90	fh
SSM000266	1	3.01	4.01	061115 08:54	061115 10:27	2,394	1.38	–0.32	1.12	rh
SSM000262	6	11.70	14.70	061114 14:59	061114 15:00	61	0.75	0.15	6.93	rh
SSM000264	2	3.00	5.00	061219 11:40	061219 11:41	60	?	0.13	1.96	rh
SSM000265	6	3.58	5.58	061115	061115	226	1.02	0.23	4.52	rh
Purpose: Environmental monitoring during drilling										
SSM000252		5.00	7.00	060714 10:30	060714 13:00			–0.24		rh
SSM000253		3.00	4.00	060714 10:30	060714 13:00			0.43		fh
SSM000269	1	1.00	1.80	061116 11:20	061116 13:30	5,654	1.05	0.29	1.23	fh
SSM000269	1	1.00	1.80	061116 11:20	061116 13:30	2,068	1.05	–0.21	1.70	rh
SSM000268	1	3.03	4.03	061116 14:15	061116 15:00	297	1.48	0.38	0.94	fh
SSM000268	3	3.03	4.03	061116 14:15	061116 15:00	363	1.48	–0.36	0.99	rh
SSM000270	1	2.00	3.00	061116 15:20	061116 16:30	475	1.96	0.46	0.78	fh
SSM000270	1	2.00	3.00	061116 15:20	061116 16:30	362	1.95	–0.29	1.23	rh
Purpose: Previously drilled and not tested										
SSM000028	1	2.00	3.00	061117 11:25	061117 15:30	598	1.23	0.44	2.36	fh
SSM000216	2	1.00	2.00	061130 09:20	061130 10:20	415	0.54	0.39	0.92	fh
SSM000216	1	1.00	2.00	061130 09:20	061130 10:20	237	0.54	–0.31	1.15	rh

id	borehole name
secup (m.b.ToC.)	depth to top of filter
seclow (m.b.ToC.)	depth to base of filter
start	start date and time for test series
stop	stop date and time for test series
tp (sec)	total measuring time after start of displacement
h_0 (m.b.ToC.)	rest water level at the measuring point prior to initiation of slug test
dh_0 (m)	initial displacement
dh_0*/dh_0	inverse of normalised head
dh_0*	expected initial displacement
dh_0	actual initial displacement)
h_f (m)	height of water column at the end of the recovery period
test type	fh for falling head test and rh for rising head test.

Table 4-2. Depth to water level, installation depth of logger and wire and slug lengths for the slug tests. All depths are in metres below top of casing (m.b.ToC.)

Observation Well	Test run no.	Area	Ground-water level (m.b.ToC.)	DIVER depth (m.b.ToC.)	Wire length (m)	Slug length (m)
Purpose: Characterisation of soil and soil-rock transition						
SSM000260	1	Mederhult	0.99	2.25	1.50	0.5
SSM000261	1	Mederhult	0.81	2.05	1.31	0.5
SSM000262	1	Ekerumsån	0.75	2.00	1.25	0.5
SSM000262	2	Ekerumsån	0.75	3.00	1.25	1.5
SSM000263	1	Laxemarån	1.80	3.10	2.30	0.5
SSM000263	2	Laxemarån	1.76	4.10	2.26	1.5
SSM000264		Horvan Syd				0.398, diam = 40 mm
SSM000265	1	Horvan Syd	1.02	2.30	1.55	0.5
SSM000265	2	Horvan Syd	1.02	3.35	1.52	1.5
SSM000266	1	Horvan Syd	1.38	2.80	1.90	0.5
SSM000266	2	Horvan Syd	1.40	2.63	1.90	0.5
SSM000256	1	Lerängarna	1.46			1
SSM000257	2	Lerängarna	1.00			1
SSM000267	1	Lerängarna	3.48	4.75	4.00	0.5
Purpose: Environmental monitoring during drilling						
SSM000252		Tyremosse	1.2			1.0, diam = 40 mm
SSM000253		Tyremosse	0.9			1.0, diam = 40 mm
SSM000268	1	Laxemarån	1.48	2.78	2.00	0.5
SSM000268	2	Laxemar	1.68	3.00	2.20	0.5
SSM000268	3	Laxemar	1.68	4.00	2.20	1.5
SSM000269	1	Laxemar	1.05	1.70	0.87	0.5
SSM000270	1	Laxemar	1.96	3.00	2.27	0.5
SSM000271	–	Laxemar	0.84	–	–	–
Purpose: Previously drilled and not tested						
SSM000028	1	Gäster	1.23	3.54	1.76	1.5
SSM000212	–	Other areas	dry			
SSM000214	–	Other areas	dry			
SSM000216	1	Rågängarna	0.54	1.80	1.04	0.5
SSM000217	–	Other areas	dry			

4.3.6 Surveying

Surveying was performed in two stages. An initial campaign for the soil-rock sounding point and a final for the constructed soil wells.

4.3.7 Hydraulic head monitoring

Installation for hydraulic head monitoring is presented in Table 4-3. The pressure transducer were generally installed about 0.1m above the bottom of the well and collecting data every 5 minute.

Time series from the initiation of each soil well are presented in chapter 5.

Table 4-3. Soil wells which have been included in the monitoring programme, installation of equipment and initiation of measurements was done within this activity.

Well	Purpose	Equipment	Start date	Measuring frequency
SSM000260	Longterm monitoring	Logger LevelTroll	2006-12-07	5 min
SSM000261	Longterm monitoring	Logger LevelTroll	2006-12-07	5 min
SSM000262	Longterm monitoring	Logger LevelTroll	2007-01-15	5 min
SSM000263	Longterm monitoring	Logger LevelTroll	2007-01-15	5 min
SSM000264	Longterm monitoring	Logger LevelTroll	2007-01-15	5 min
SSM000265	Longterm monitoring	Logger LevelTroll	2006-12-07	5 min
SSM000266	Longterm monitoring	Logger LevelTroll	2006-12-07	5 min
SSM000267	Longterm monitoring	Logger LevelTroll	2007-01-15	5 min
SSM000268	Environmental monitoring while drilling KLX15A	Logger MiniTroll	2006-11-22	30 min
SSM000269	Environmental monitoring while drilling KLX16A	Logger MiniTroll	2006-11-22	30 min
SSM000270	Environmental monitoring while drilling HLX42	Logger MiniTroll	2006-11-22	30 min
SSM000271	Environmental monitoring while drilling KLX16A	Logger MiniTroll	2006-11-22	30 min

4.4 Methods for soil sample assessment and classification

4.4.1 Soil sample assessment and classification

Soil classification follows the nomenclature of /14/ http://www.sgf.net/. Classification of soils and stratigraphical interpretation was performed stepwise as follows

1) preliminary interpretation on site performed mainly by the drilling crew through ocular inspection of soil samples and outcome of the soil-rock sounding (penetration rate etc). The results of this exercise is guiding the well construction i.e. how to screen the well,
2) ocular inspection of soil samples by experienced geologist,
3) final interpretation by field crew after consulting the assessment of the expert geologist – i.e. harmonisation of step 1 and 2 above,
4) grain size analysis of soil samples, this was performed in AP PS 400-07-12 and reported here.

This study was based on applicable parts of the method description for soil mapping (SKB MD 131.001, SKB internal controlling document).

The main parameters to be evaluated for organic soils are colour, humification index, as well as size and kind of plant remains. Minerogenic soils are classified after their grain size and grain size distribution, sorting and clast roundness. A complete list of soil samples taken with stratigraphical interpretations is compiled in Appendix J.

4.4.2 Analysis of grain size, organic and carbonate content

A total of 45 soil samples were analysed by SWECO GEOLAB. The varying samples consist of organic soils, clay, sand, gravel and till. Peat and gyttja samples were analysed for organic content, while inorganic samples were subject to grain size distribution analyses. The carbonate content, however, was determined on every sample (with one exception due to lack of material), but the values are generally very low.

Grain size analyses were conducted on minerogenic soils (clay, sand, diamicton). During the drilling activities, the grain size distribution and sorting of these soils was tentatively assessed by:

- an expert geologist (PSM0001472, PSM0001473, PSM0001474 and PSM0001475) or,
- the drill operators (PSM001477, PSM0001479, PSM0001480, PSM0001484, PSM0001485 and PSM0001487).

Samples from the latter locations were additionally assessed by a geologist at the Geological Survey of Sweden.

Laboratory analyses (sieving and hydrometer analyses) of the samples from all locations (except PSM0001474 and PSM0001475, from which no samples have been obtained) were finally carried out at SWECO GEOLAB.

The grain size distribution analyses were carried out according to Swedish geological standards SIS /16/ (sieving) and SIS /17/ (sedimentation, hydrometer method), and the organic content according to SIS /15/ (ignition loss method). The procedure to determine the carbonate content with Passon apparatus has been described by Talme, O. and Almén, K-E. /11/.

Soil samples were oven-dried at 105°C, with the exception of samples with high clay content, which were prepared in wet condition prior to sedimentation. Other samples with high organic content (peat and gyttja) were classified by ocular inspection only. Furthermore, the small quantities of several samples, made it important to perform the tests in a proper order – first, the carbonate and organic content tests were carried out, and last, sieving. The test sieves were visually checked before use.

Laboratory data obtained from tests were checked continuously and stored in the SWECO GEOLAB database. The results of grain size distribution analyses are presented both in test reports and digitally in pdf-file format. These and other results are also listed in a SICADA/Data Import Template and delivered to SKB as an Excel file.

4.4.3 Geology and stratigraphical interpretation

Based upon the above-mentioned ocular and manual assessment, the soils were classified into organic soils and minerogenic soils. In this report the following general guidelines for interpretation of soil in the Laxemar area have been used.

Organic soils: Black to dark brown colours and plant remnants (more or less humified) indicate peat, which is exclusively found at the surface. A distinction between different peat types was not feasible and has therefore not been made. Greenish, brownish and reddish colours paired with a certain elasticity is typical for gyttja. A gyttja with a considerable amount of minerogenic components (clay) is characterised by a lighter colour (often greyish brown) and is classified as clayey gyttja. Other organic soils have not been encountered.

Minerogenic soils: Poorly sorted sediments (diamicton) indicate glacial till. Freshly cut edges indicate rock cuttings (either from boulders or bedrock). Glacial till usually contains angular, sub-rounded and rounded clasts. Many different rock types are usually found in glacial sediments, whereas uniformity is typical for rock cuttings. However, the glacial till in the Oskarshamn area usually contains short-transported material /7, 8, 9/ and is therefore characterised by a relatively homogeneous rock composition. Glacial lake sediments are often fine-grained as they are deposited in an environment without considerable flow energy. Glacial clay is usually varved (i.e. laminated: silty summer varve and clayey winter varve). The glacial clay in the Oskarshamn area, however, is characterised by very indistinct or even lacking lamination /8/. Coarse-grained glacial lake sediments (sand and gravel) are usually well sorted, but due to their short transport angular clasts can occur.

Due to the nature of some sampling techniques, secondary sorting may occur and mixing of different sediment types can not be excluded.

4.5 Data handling

4.5.1 Slug test data handling

Raw data from the DIVER was obtained in a **.mon* format. This was exported from the Software EnviroMon via a comma separated value format and onto Excel where each file was saved as a **.xls* file.

All raw data files (**.mon*) as well as the Excel (**.xls*) files were delivered digitally on a CD to the activity leader.

4.5.2 Methods for slug test analysis

For most wells the falling and rising head tests were repeated three times to minimise the risk of disturbances due to the very rapid response (as outlined in the method description for slug tests). Generally data from the first set of tests was used for the analyses, providing that it showed good consistency with the subsequent test results. If any disturbances were observed in the data another set of test data was used for the analyses.

Due to the very rapid response in some wells it can sometimes be difficult to estimate H_0 and t_0 as discussed in Butler /1/. In those cases the translation method approach has been adopted.

Slug tests in high conductivity formations offer a quite fast and easy way of estimating the formation transmissivity. Due to limitations in the method such as the problem of causing an "instantaneous slug introduction" without disturbing the logger etc, especially in very high permeability formations, the results should be used with care. Alternative methods with longer duration could be used to support the results.

The slug test data has been analysed using the programme Aqtesolv 4.5 /6/. In the following section a brief presentation of the methods used for analysis is given. For further information of the methods please see /1, 4/ and User's guide for Aquifer Test /5/.

The following analysis methods are developed for wells that fully penetrate the aquifer. All wells tested during this programme are only partially penetrating wells. For the analyses the aquifer thickness has been substituted by the effective well screen length which is set equal to the nominal screen length. A sand filter was installed in all wells and so the effective diameter of the well screen was set equal to the outer diameter of the drill casing, 110 mm.

Cooper et al. method

The Cooper et al. method was originally developed to estimate the transmissivity in a confined aquifer and for fully penetrating wells. The Cooper analysis is recommended as the primary analysis method in SKB MD 325.001 (internall controlling document).

Hvorslev method

The Hvorslev method is designed to estimate the hydraulic conductivity in a confined aquifer /18/. The method is based on the assumption that the plot of normalised response data versus time will be linear. Due to the effects of elastic storage in the aquifer the data often shows a concave upward curvature. For the analyses the emphasis for the curve fitting has been on the early time data.

Bouwer and Rice method

The Bouwer Rice analysis method /12/ is based on the Thiem equation and is valid for steady-state flow in unconfined or leaky aquifers of infinite extent. Wells are assumed to be fully or partially penetrating.

McElwee and Zenner method

At some locations oscillating responses were observed, indicative for very high hydraulic conductivites. These are analysed through the theories and methodology described by /10/ and implemented in Aqtesolv 4.5. The solution is applicable for fully or partially penetrating wells in confined or unconfined aquifers. In the database (SICADA) this method is classified as the KGS method since it was originally developed at the Kansas Geological Survey.

4.5.3 Data handling of soil sampling and geological results

Interpretations 2) through 4) above were submitted to the site characterisation database (SICADA) as follows.

2) GE510 Quaternary deposit mapping, stratigraphic observations.

3) EG071 Geological drilling soil observations.

4) GE514 Sampling, sieve analysis – quaternary deposits.

Results of the soil sample classification is presented in Appendix J while the complete stratigraphical interpretation is given in Appendix H and simplified stratigraphical interpretations are given for each site in chapter 5.

4.6 Nonconformities

Due to the conditions noted on site, the method of soil sampling changed from the method described in the activity plan, the use of a Coarse Grain Barrel Sampler (Genomströmmare), to soil sampling with the Bottom soil sampler (Mullvad).

Furthermore, other deviations from the activity plan were that in Mederhult soil sampling with the Bottom soil sampler was carried out in two locations instead of one, and additional five soil samplings with auger drilling was performed, sampling in every drilling hole.

In groundwater monitoring well SSM000264 the bottomplug of the HPDE casing was mistakenly removed. This was remediated but apparently an obstacle appeared in the pipe or bending of the pipe caused the dummy for slug testing jammed above the water table. Hence, it was not possible to perform a slug test with the original dummy and a test was done later on with a smaller dummy

5 Results

A full account of the geological results and stratigraphical interpretations is given in this chapter and Appendix H. This chapter also presents results on topography, geological conditions, groundwater levels and the results from slug tests. The results are reported separately for the different investigation sites in sections 5.1–5.8. These sections also show the location of the soil-rock sounding (probing?) point and the soil wells. Geographical coordinates are listed in Table 5-1.

Table 5-1. Coordinates and type for probing holes and soil wells.

Borehole Id	Northing (m)	Easting (m)	Ground elevation (m.a.s.l.)	Top of casing elevation (m.a.s.l.)	Type
PSM001472	6367964.82	1546974.22	9.87		Geological drilling (Jb-total), soil sample
PSM001473	6367973.58	1546831.91	9.90		Geological drilling (Jb-total), soil sample
PSM001474	6367941.69	1546906.30	9.84		Geological drilling (Jb-total), soil sample
PSM001475	6367882.58	1547072.24	9.74		Geological drilling (Jb-total), soil sample
PSM001476	6366810.41	1547879.38	11.78		Geological drilling (Jb-total),
PSM001477	6366757.99	1548015.83	11.51		Geological drilling (Jb-total), soil sample
PSM001478	6366680.23	1548169.05	11.00		Geological drilling (Jb-total),
PSM001479	6366555.22	1548354.12	10.65		Geological drilling (Jb-total), soil sample
PSM001480	6365386.69	1548411.33	3.81		Geological drilling (Jb-total), soil sample
PSM001481	6365342.13	1548623.84	3.66		Geological drilling (Jb-total),
PSM001482	6365297.72	1548714.43	3.75		Geological drilling (Jb-total),
PSM001483	6365334.49	1548654.52	3.52		Geological drilling (Jb-total),
PSM001484	6366069.50	1549020.12	14.64		Geological drilling (Jb-total), soil sample
PSM001485	6365925.37	1549307.23	5.72		Geological drilling (Jb-total), soil sample
PSM001486	6365918.78	1549293.55	5.75		Geological drilling (Jb-total),
PSM001487	6366240.24	1549599.11	13.15		Geological drilling (Jb-total), soil sample
SSM000252	6366981.26	1546881.09	17.99	18.39	Groundwater monitoring well
SSM000253	6366969.20	1546901.68	17.46	17.96	Groundwater monitoring well
SSM000256	6366048.02	1549705.34	3.20	3.60	Groundwater monitoring well
SSM000257	6366047.49	1549756.90	2.96	3.36	Groundwater monitoring well
SSM000260	6367973.74	1546833.36	9.73	10.80	Groundwater monitoring well
SSM000261	6367940.80	1546909.46	9.65	10.65	Groundwater monitoring well
SSM000262	6366555.22	1548354.24	10.56	11.46	Groundwater monitoring well
SSM000263	6365296.13	1548714.87	3.61	4.63	Groundwater monitoring well
SSM000264	6366069.50	1549020.12	14.69	15.89	Groundwater monitoring well
SSM000265	6365924.32	1549305.93	5.68	6.73	Groundwater monitoring well
SSM000266	6365917.70	1549291.68	5.31	6.78	Groundwater monitoring well
SSM000267	6366240.26	1549599.14	13.13	13.78	Groundwater monitoring well
SSM000268	6365628.31	1547941.42	9.95	11.21	Groundwater monitoring well
SSM000269	6364873.39	1547500.17	14.36	15.16	Groundwater monitoring well
SSM000270	6364834.14	1547444.10	12.83	14.15	Groundwater monitoring well
SSM000271	6364818.02	1547557.90	15.08	15.82	Groundwater monitoring well

Borehole elevations are included in Appendix C, and can make it easier to understand the geological conditions described below.

Slug tests were also conducted in 2 soil wells, SSM000252 and SSM000253, that were not drilled as part of the present activity. Geological information from the drilling of these wells is presented in the drilling report for KLX17A /21/. The slug test results from these wells are presented in section 5.8.

A substantial amount of data have been collected during this activity, which is largely contained in the following appendices:

Appendix A	Linear history plots of slug tests
Appendix B	Normalised slug test plots
Appendix C	Geological results in schematic vertical cross sections
Appendix D	Sounding hole and soil well profiles
Appendix E	Site photos prior and post works
Appendix F	Schematic soil well construction plots
Appendix G	Grain size analysis
Appendix H	Stratigraphical interpretation
Appendix I	Organic carbon and carbonate soil contents
Appendix J	Soil samples classification

Stratigraphy

Most of the drilling locations are situated in valleys, where the thickness of the Quaternary deposits is larger than in the area in general. Maximum soil thickness encountered in the present investigation is 16.2 m. The following Quaternary stratigraphy is typical for the Oskarshamn area /9/:

- Peat
- Gyttja
- Clayey gyttja
- Gravel/sand
- Glacial clay
- Glacial till
- Bedrock

Bedrock: The bedrock in the area consists of granite (Ävrö granite /9/). Weathered and fractured bedrock occurs frequently, which can be difficult to distinguish from till /9/.

The difference between bedrock and till is neither easily interpreted from drilling samples. Fractured bedrock and till with boulders show a very similar signature in boring logs. Since the valleys, where the present study has been conducted, probably follow bedrock lineaments (deformation zones), it can be assumed that the bedrock in the valleys is possibly characterised by sediment-filled fractures (Mederhult, e.g. PSM001472).

Till: Till is encountered at all sites investigated in this study. Its thickness ranges from 1.0 to 4.8 m, except for PSM001472, where the contact between till and bedrock could not be defined. Usually, this till contain some sand and is classified as sandy till, although gravelly diamicton occurs (PSM001472), which, however, may not be interpreted as till but as heavily fractured bedrock. At some locations (e.g. PSM001479), the lower part of the till is depleted in fines. It remains uncertain whether or not this sediment is a different till bed from another ice advance. The gravel fraction consists of sub-rounded to angular clasts of local bedrock, which indicates short transportation. In some cases, the angular clasts are interpreted as bedrock/boulder cuttings.

Most notably, at some boreholes, the grain size analysis shows relatively well sorted soils in contact with the rock to such extent that it can be classified as till. This is the case for PSM001473, PSM001477, PSM001479 and PSM001480. From a geological and genetical point of view, these are classified as till. Based on the grain size distribution, these would rather be classified as sand and gravel. It is also possible that the field classification is wrong and the samples represent a deposit formed by other processes than till. Appendix J presents both interpretations, geological genesis and grain size. The difference in interpretation between the two is marked with boldface fonts in the the grain size column. In the forthcoming text the classification according to the grain size analyses is used. Generally, when in conflict we have adopted the grain size interpretation in Chapter 5. Complete stratigraphical interpretations are presented in Appendix H.In the reporting to the site characterisation database (sicada GE510) both minterpretations are specified in separate columns for grains size and geneses respectivelly.

Glacial clay: The glacial clay reaches a maximum thickness of 2.5 m (PSM00142) and is usually very weakly laminated. Single laminae can barely be distinguished visually.

Gravel/sand: The occurrence of gravel and/or sand on top of the glacial clay seems to be typical for the Laxemar area (Rudmark et al. 2005). This sediment is up to 6.3 m thick (PSM001479). It can appear more or less sorted, and it is interpreted as washout due to wave action from nearby shores.

Clayey gyttja and gyttja: The postglacial lake sediments in the area (7.4 m thick at PSM001474) consist of different types of gyttja. Often the lower parts contain a varying proportion of clay and are easily distinguished from the exclusively organic gyttja. Most of the organic gyttja is interpreted as fine-detritus gyttja, although other types occasionally occur. Due to the sampling method, a detailed distinction between different types was not feasible.

Peat: Peat, which is the uppermost unit in the stratigraphy, is regularly altered by weathering as well as land use and therefore not investigated further.

On purely geological grounds, the stratigraphy at locations PSM001472, PSM001473, PSM001474, PSM001477 and PSM001479 correspond entirely to the above-mentioned typical stratigraphy. At PSM001480, the peat is replaced by clay, which is, based upon its stratigraphical position, interpreted as postglacial lake sediment. PSM001475 lacks glacial lake sediments, instead, the gyttja layer is correspondingly thicker. The locations Horvan syd and Lerängarna (PSM001484, PSM001485 and PSM001487) are situated in shallower valleys and are therefore characterised by thin or absent glacial and postglacial sediments.

Slug tests

Section 5.1–5.8 presents results for each site. A summary of all slug test results is given in section 5.9.

Aquifers in the valleys are generally confined and the screens fully penetrating, with groundwater close to the ground, often less than 0.5 m and always within 3 m below ground. The screened intervals are mostly in friable materials such as till, sand and gravel.

The amount of confinement for the soil wells drilled in this activity is compiled the table below. Confinement in this respect is defined as the length of water column in the well above the top of the aquifer unit. The confining unit is defined as the soil type overlaying the aquifer unit. Often this confining unit constitute an aquiclude or an aquitard, particularly in valleys. When the amount of confinement is positive we have a confined situation and when the value is negative it is an unconfined aquifer. It is evident from this that all valley well aquifers are confined and often slightly artesian while the those situated on a slope and on a crest are unconfined.

Compilation of data pertaining to the amount of confinement for the soils wells drilled as part of this activity. Confinement in this respect is defined as the length of water column in the well above the top of the aquifer unit.

Well	Area	Groundwater level		Screen		Aquifer					
		(m.b.ToC.)	(m.b.g.l.)	Top (m.b.g.l.)	Bottom (m.b.g.l.)	Top (m.b.g.l.)	Bottom (m.b.g.l.)	Aquifer unit	Confining unit	Amount of confine-ment (m)	Topo-graphic enviroment
SSM000260	Mederhult	0.99	–0.08	6.38	8.38	5.80	7.60	Sand	Clay	5.88	Valley
SSM000261	Mederhult	0.81	–0.19	8.20	9.20	8.30	9.10	Sand	Gyttja	8.49	Valley
SSM000262	Ekerumsån	0.75	–0.15	10.80	13.80	11.30	14.75	Gravel	Gyttja	11.45	Valley
SSM000263	Laxemarån	1.80	0.78	5.28	7.28	4.50	6.30	Till	Clay	3.72	Valley
SSM000264	Horvan Syd	3.74	2.54	1.80	3.80	2.00	2.80	Till/rock	Till	–0.54	Slope
SSM000265	Horvan Syd	1.02	–0.03	2.53	4.53	2.50	3.50	Till/rock	Clay	2.53	Valley
SSM000266	Horvan Syd	1.38	–0.09	1.54	2.54	1.20	1.70	Till	Clay	1.29	Valley
SSM000256	Lerängarna	1.46	1.06	2.60	4.60	1.80	4.60	Till/rock	Clay	0.74	Valley
SSM000257	Lerängarna	1.00	0.96	2.60	3.60	2.80	3.40	Till/rock	Clay	1.84	Valley
SSM000267	Lerängarna	3.48	2.83	3.35	5.35	0.00	4.80	Till/rock	Till	–2.83	Crest

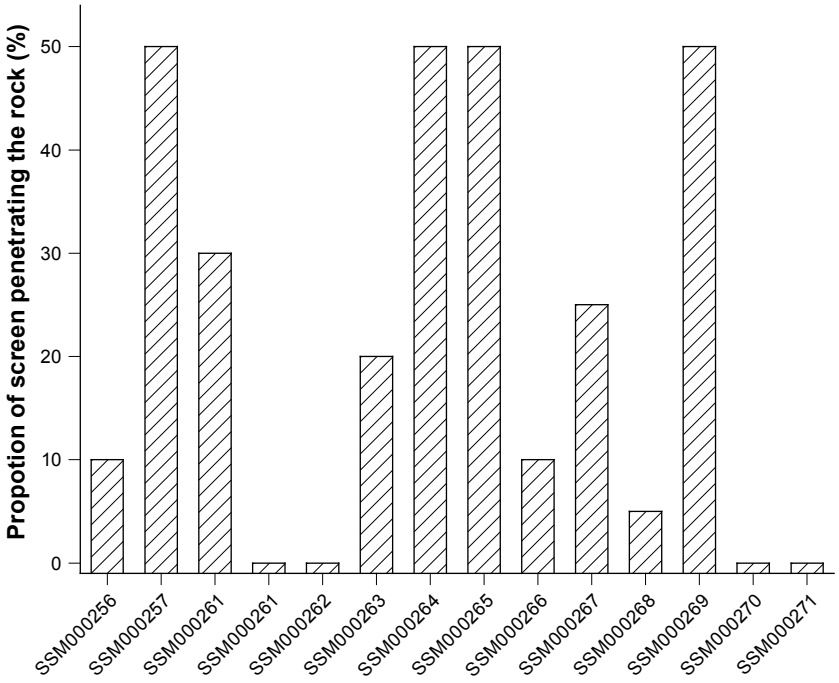
m.b.ToC.: metre below top of casing.
m.b.g.l.: metre below ground level.

In many cases the screen also penetrates the underlying rock, which implies that the estimated transmissivites represent the soil-bedrock contact zone. The approximate proportion of the screen that penetrates the bedrock surface is shown below.

Notably some very high transmissivities ($T \approx 10^{-3}$ m^2/s) were encountered. These may seem high, but they are consistent with oscillating water levels during the slug tests. The transmissivities of the tested soils at the well screens are in the range $5 \cdot 10^{-6}$ to $9 \cdot 10^{-3}$ m^2/s. The slug test results are summarised in Table 5-17.

In the following we present results from each site in terms of stratigraphy, topography, hydraulic head and transmissivity. A map showing the location of drilling/soil wells and simplified stratigraphic logs are also presented.

The simplification done in the stratigraphic logs is due to the lumping of various adjoining fractions for a soil type, e g two adjoining layers, one of fine sand and the other coarse sand are lumped together into one layer of sand. For a detailed stratigraphic account see Appendix H.



5.1 Mederhult

At Mederhult, boreholes PSM001472–PSM001475 were probed and groundwater monitoring wells SSM000260 and SSM000261 were installed. Locations are shown in Figure 5-1 and some basic site conditions are shown in Table 5-2.

5.1.1 Topography

The existing ground surface in the area is relatively flat, and varies between level +9.7 and +9.9 m above sea level.

Table 5-2. Summary of geological conditions and groundwater levels given as intervals encountered at the site.

	Depth (m.b.g.l.)	Level (m.a.s.l.)
Ground surface	–	+9.7 to 9.9
Groundwater	–	+9.7
Base of peat layer	0.5–0.9	+9.2 to +9.0
Base of clay layer	4.8–10	–1 to +4.5
Base of non-cohesice soil layer	1.7– 5.5	–6.2 to +2.5
Rock surface	–	–6.2 to +2.5

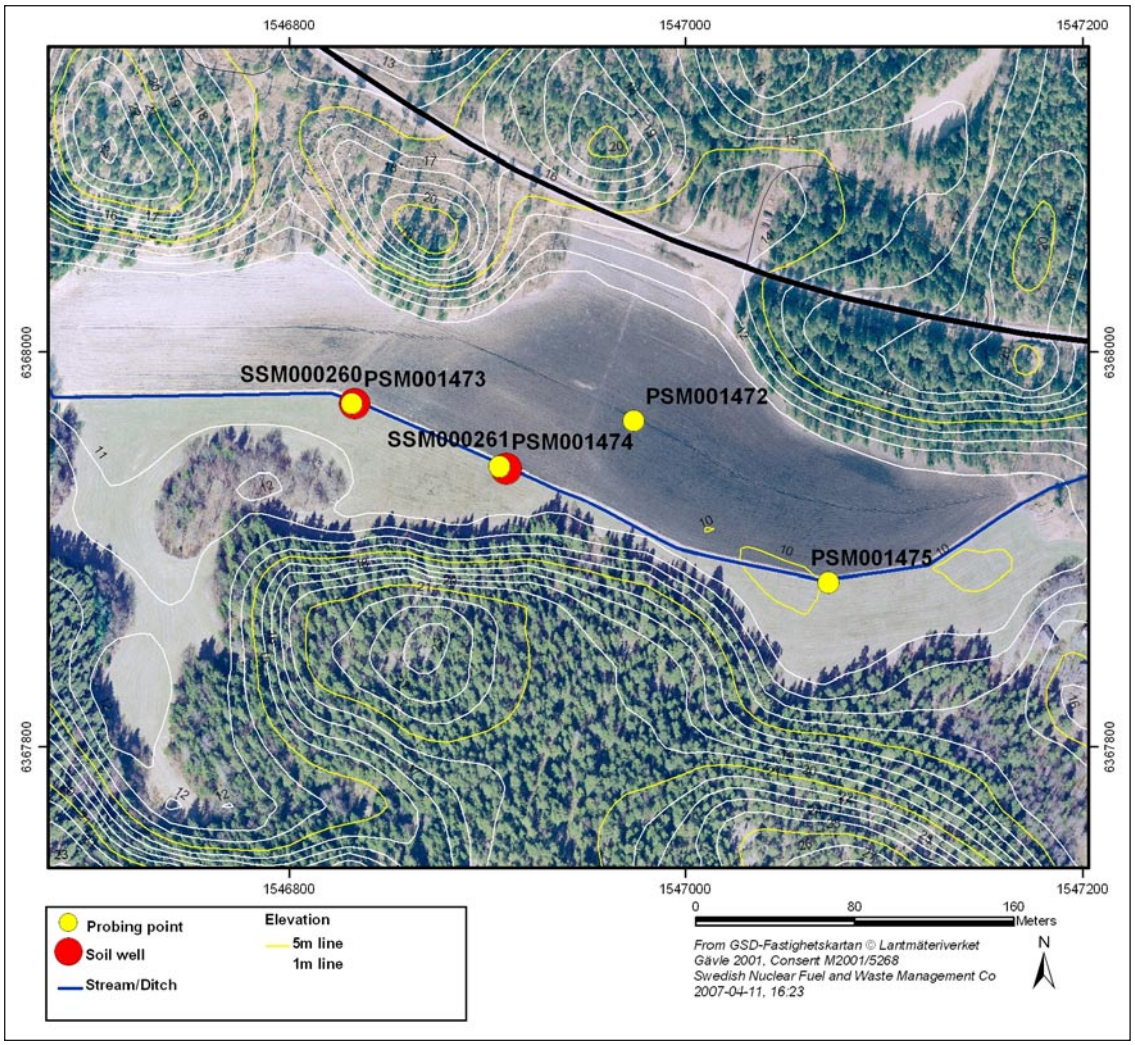


Figure 5-1. *Location of probing point and soil wells at site 1 Mederhult.*

5.1.2 Stratigraphy

The probing encountered an upper layer of peat, around 0.5–0.9 m thick, overlaying clay with some sand and silt. The thickness of this clay layer is between 4.8–10 m, extending down to a level of –1 to +4.5 m above sea level. The layer falls slightly towards the northeast. Below the layer of clay there is a layer of non-cohesive soil, mainly sandy till with some boulders. The till is underlain by rock, encountered at a level between +2.5 and –6.2 m above sea level. The rock quality varies at the site. In the central and deepest part of the site, the rock quality is good, but in the eastern and western parts the rock is fractured. The stratigraphic profile is shown in Figure 5-2.

5.1.3 Hydraulic head

The groundwater table is located at +9.7 m above sea level approximately 1 m below ground surface. Monitored hydraulic head is shown in Figure 5-3.

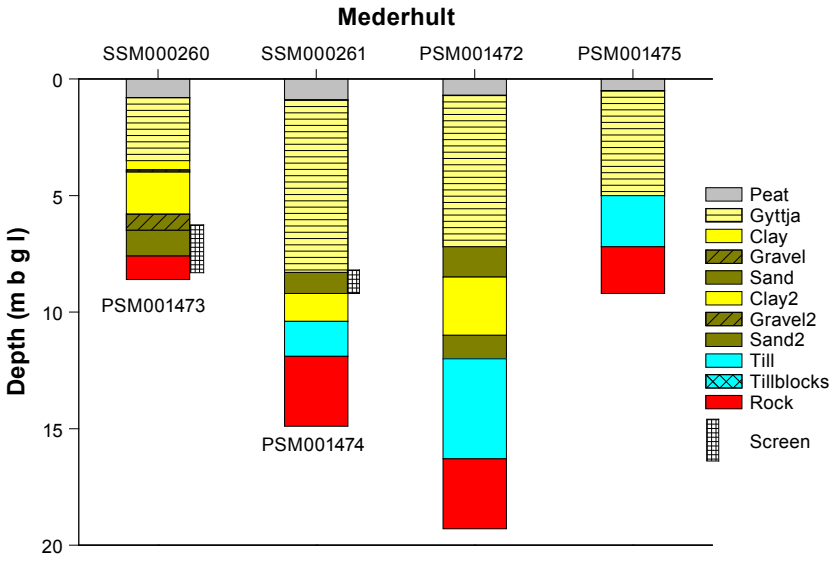


Figure 5-2. *Simplified stratigraphic interpretation at Mederhult. Ground elevations for each hole are given in Table 5-1.*

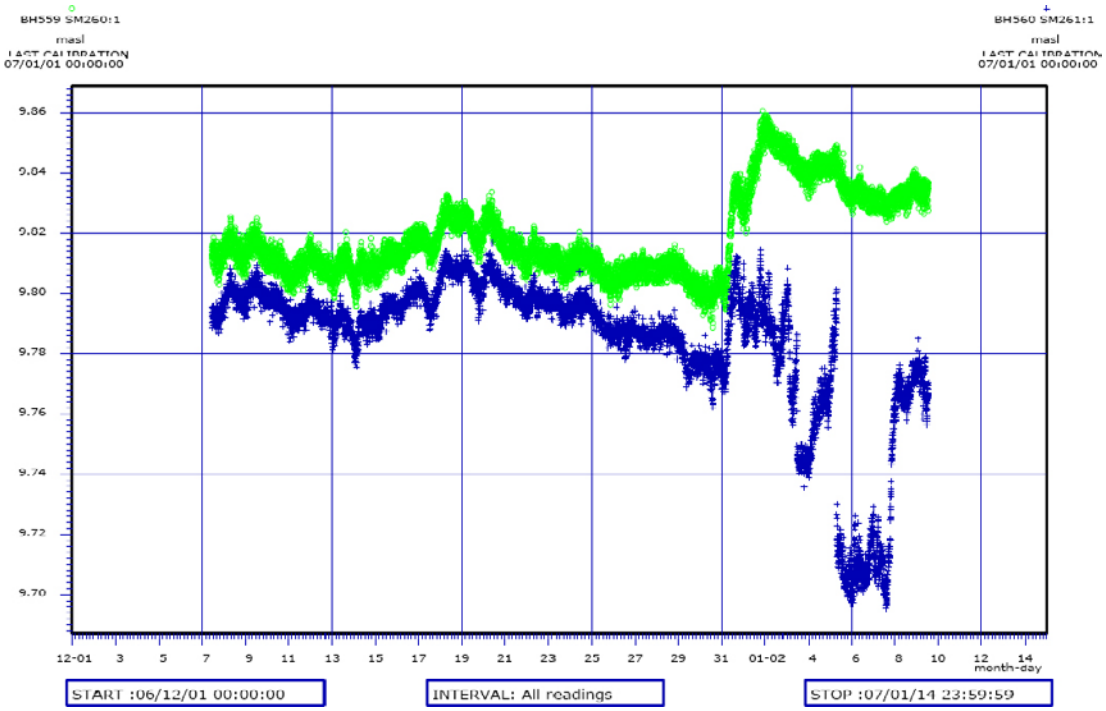


Figure 5-3. *Hydraulic head at SSM000260 and SSM000261.*

5.1.4 Slug tests

Well SSM000260 is screened across a layer of gravelly sandy till and the response in the well was very quick. Only 60 seconds after initiating the test, the water level was back in its original position. The screen in observation well SSM000261 was installed in a layer of medium to coarse sand and the groundwater level was a little slower to recover after the slug tests, however, after only 80 seconds the original groundwater level was reached. Estimated T-values for SSM000260 are 10 times higher than in SSM000261. Table 5-3 presents the evaluated parameters for the slug tests in Mederhult.

Table 5-3. Evaluated parameters for slug tests at Mederhult. Boldfaced values are considered most representative.

METHOD: Cooper et al.	Falling head test		Rising head test	
Observation well	Test no.	T (m^2/s)	Test no.	T (m^2/s)
SSM000260	1	2.3×10^{-4}	1	**4.4×10^{-4}**
SSM000261	1	7.4×10^{-5}	1	7.3×10^{-5}
METHOD: Hvorslev	**Falling head test**		**Rising head test**	
Observation well	**Test no.**	**T (m^2/s)**	**Test no.**	**T (m^2/s)**
SSM000260	1	2.3×10^{-4}	1	3.0×10^{-4}
SSM000261	1	8.1×10^{-5}	1	**4.2×10^{-5}**
METHOD: Bouwer Rice	**Falling head test**		**Rising head test**	
Observation well	**Test no.**	**T (m^2/s)**	**Test no.**	**T (m^2/s)**
SSM000260	1	1.4×10^{-4}	1	1.9×10^{-4}
SSM000261	1	4.3×10^{-5}	1	2.3×10^{-5}

5.2 Ekerumsån

At Ekerumsån, probing holes PSM001476–PSM001479 were drilled. One groundwater monitoring well was also installed, SSM000262. Locations are shown in Figure 5-4 and some basic site conditions in Table 5-4.

5.2.1 Topography

The ground surface at the site is relatively flat, and rises from +10.7 in the east to +11.8 in the west.

5.2.2 Stratigraphy

The geological conditions in Ekerumsån are complicated, Appendix C is recommended as a complement for comprehension of this chapter.

Below the ground surface, a 0.7–1.0 thick layer of peat is found, and this layer is thickest in the western part of the transect. Beneath the peat there is a layer of clay. The thickness of the clay layer varies between 1.7–4.4 m, and is thickest in the eastern part of the transect. The following layer is sand, which in the west is 2.4–2.5 m thick and in the east around 6.2 m thick. In the central part of the site the sand layer is absent. Under the sand layer clay is located, which in

Table 5-4. Summary of geological conditions and groundwater levels given as intervals encountered at the site.

	Depth (m.b.g.l.)	Level (m.a.s.l.)
Ground surface	–	+ 10.7 to +11.8
Groundwater	–	+10.7
Base of peat layer	0.7–1.0	+10 to +10.7
Base of clay layer	1.7–4.4	+5.5 to +8.9
Base of sand layer	(0–)2.4–6.2	–0.7 to +6.3
Base of clay layer	0–1.4	+4.4 to +8.6
Base of non-cohesice soil layer	3.1–5.4	–4 to +3.2
Rock surface	–	–4 to +3.2

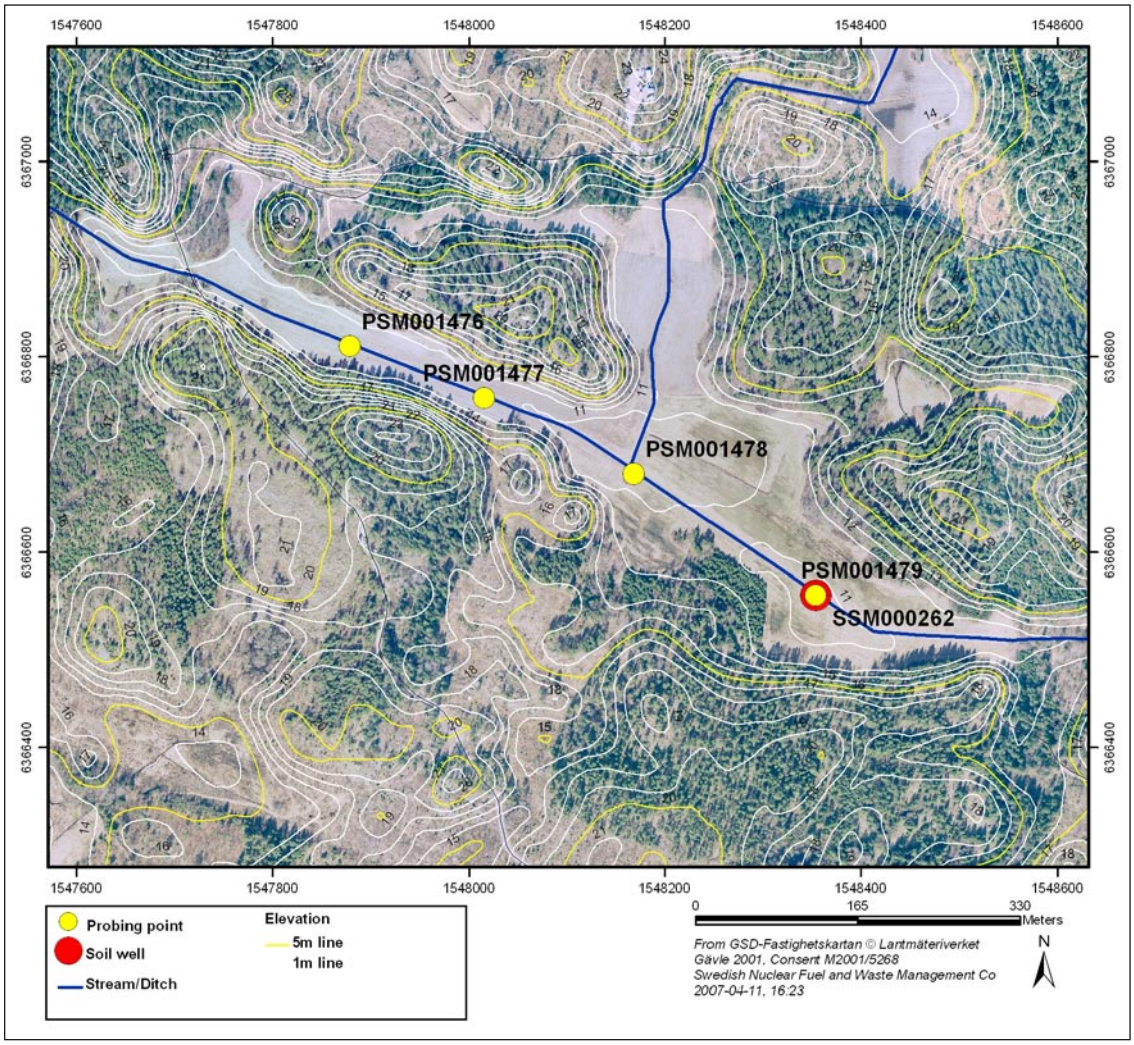


Figure 5-4. *Location of probing points and soil wells at site 2 Ekerumsån.*

the west is 1.4–1.7 m thick, and is missing in the central and eastern parts. Beneath the clay non-cohesive soil on rock is located, which consists of sandy till and sand/gravel, respectively. The layers thickness is, in the west 3.1–3.3 m, in the central part 5.4 m and in the east 3.4 m. The non-cohesive soil contains of both smaller and larger boulders. The rock surface is encountered at about 1–2 m above ground level in the west, level 3 m above sea level in the central part, and while at –4 m above sea level in the east. The rock quality in the area is considered to be poor, since it is fractured in both the eastern and western parts of Ekerumsån, with minor sections of good quality rock. A simplified stratigraphic profile is shown in Figure 5-5.

5.2.3 Hydraulic head

The groundwater level in the area is found approximately 0.5 m under the ground surface, at an elevation of 10.7 m above sea level. Hydraulic head from start of the monitoring is shown in Figure 5-6.

5.2.4 Slug tests

The response in SSM00262 was quick and after approximately 60 seconds the water level was recovered. The water level oscillated during the test, which therefore was analysed using the method of /3/, Table 5-5.

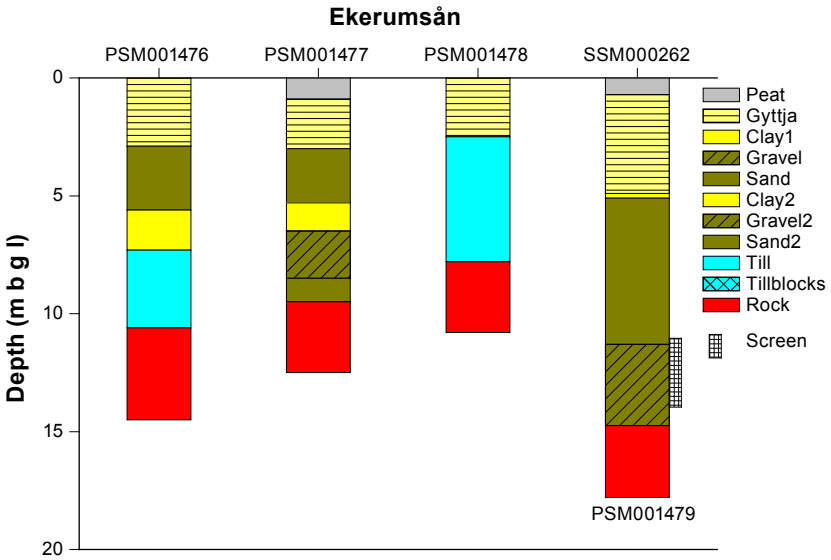


Figure 5-5. *Simplified stratigraphic interpretation at Ekerumsån. Ground elevations for each hole are given in Table 5-1.*

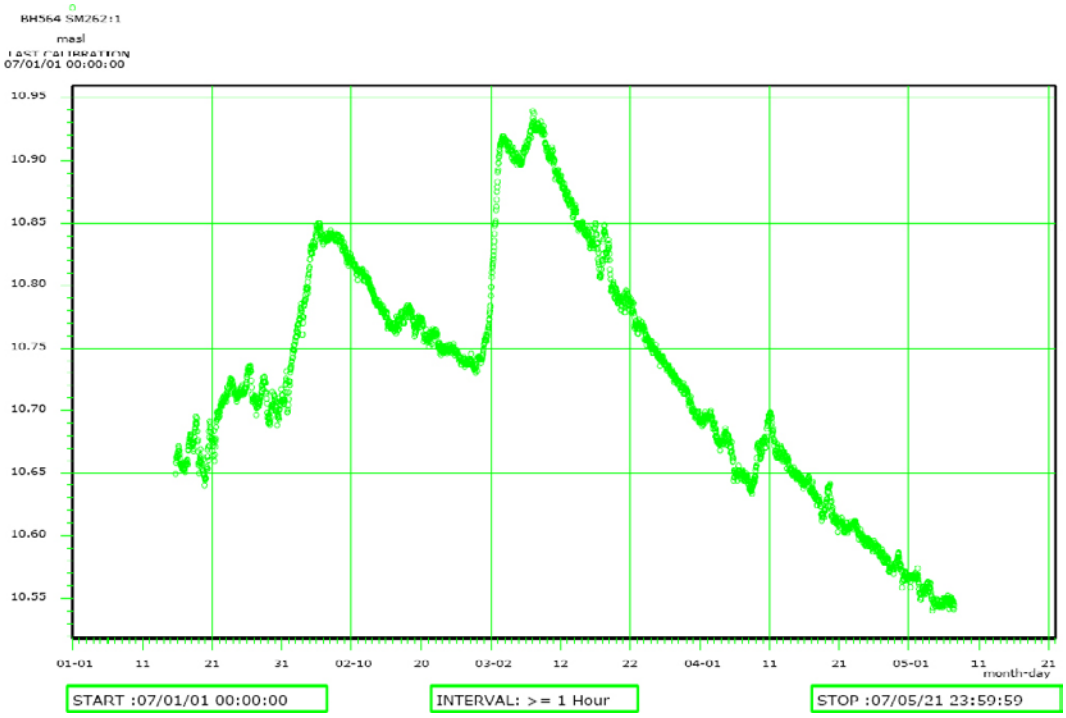


Figure 5-6. *Groundwater head at SSM000262.*

Table 5-5. Evaluated parameters for slug tests at Mederhult.

METHOD: McElwee-Zenner	Falling-head test		Rising-head test	
Observation well	Test no.	T (m²/s)	Test no.	T (m²/s)
SSM000262	1	3.0×10^{-3}		

5.3 Laxemarån

At Laxemarån, boreholes PSM001480–PSM001483 were drilled and groundwater monitoring well SSM000263 was installed. Locations are shown in Figure 5-7 and some basic site conditions in Table 5-6.

Table 5-6. Summary of geological conditions and groundwater levels given as intervals encountered at the site.

	Depth (m.b.g.l.)	Level (m.a.s.l.)
Ground surface	–	+3.5 to +3.8
Base of peat layer/Dry crust clay	0–1.4/0–1.5	+2.5 to +3.7/+2.2 to +3.5
Groundwater	–	+2.5
Base of clay	0–0.6	+3.4 to +3.7
Base of sand layer	0.6–3.4	–1.5 to + 2.2
Base of clay layer	0–3.1	–3.8 to +1.4
Base of non-cohesice soil layer	0.7–3.6	–7.5 to –0.9
Rock surface	–	–7.5 to –0.9

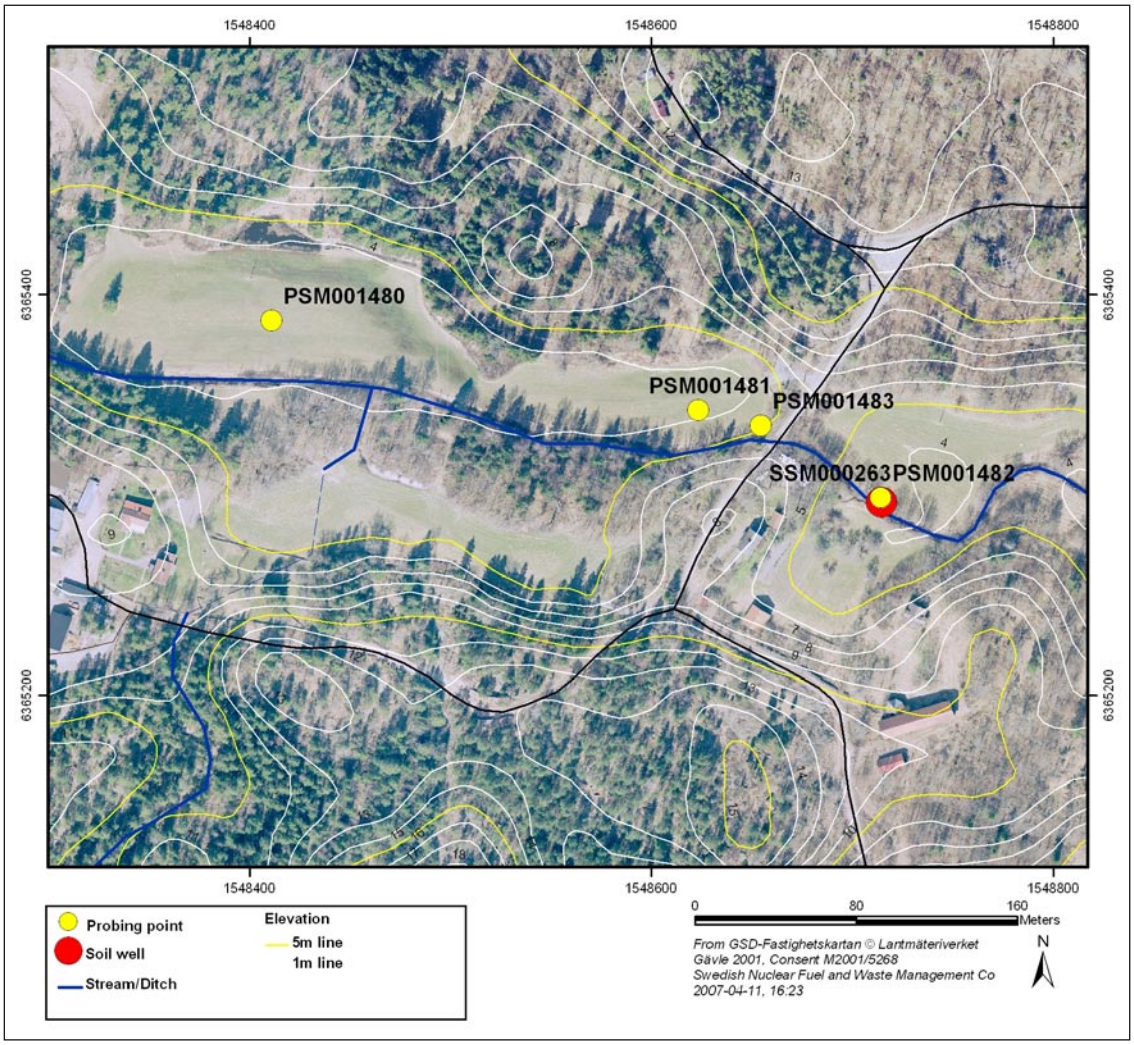


Figure 5-7. Location of probing points and soil wells at site 3 Laxemarån.

5.3.1 Topography

The ground surface in the site is flat, and varies between 3.5 and 3.8 m above sea level.

5.3.2 Stratigraphy

The geological conditions in Laxemarån are complicated, Appendix C is recommended as a complement for comprehension of this chapter.

Beneath the ground surface, there is in the west a layer of peat, 1.4 m thick, and clay, 0.55 m thick, and in the east mostly dry-crust clay, 0.9–1.5 m. Sand is located below those layers, with a variable thickness of 0.6–3.4 m, where the thinnest layer is located in the eastern part, and the thickest in the western part. The following layer consists of clay. The thickness is 2.4–3.1 m. However, in the eastern part there is an area where the clay layer is absent. Under the clay, a layer of non-cohesive soil is located, mainly containing sand/gravel and sandy or gravely till with some boulders. The layer is 0.7–3.6 m, and is thickest in the west. Under the non-cohesive soil presumed rock is found at level –1 to –8, slightly increasing to the east, with a small peak in the eastern part. The rock quality varies, and is generally fractured and of poor quality based on the drilling response during probing. The central part, however, seems though to be of good quality rock. The stratigraphic profile is shown in Figure 5-8.

5.3.3 Hydraulic head

Groundwater at Laxemarån is located approximately 1.2 m under the ground surface, at level +2.5. Monitored hydraulic head from inception is shown in Figure 5-9.

5.3.4 Slug tests

The response in SSM000263 was extremely rapid and after only 15–20 seconds the groundwater level stabilised at its original level. Table 5-7 presents the evaluated parameters for the slug tests at Laxemarån. Slug tests using both 0.5 m and 1.5 m slugs were conducted, but no significant differences in the results were detected using the two different slug lengths.

The very quick response 90% recovery after only 4 seconds means we only have few data points for fiting model and data which in turn introduces larger uncertainties in the T-value determination than usual.

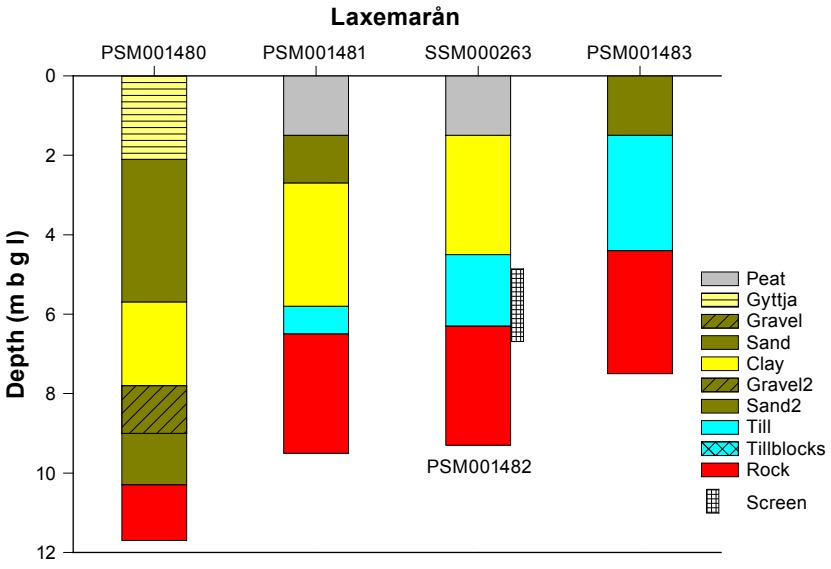


Figure 5-8. *Simplified stratigraphic interpretation at Laxemarån. Ground elevations for each hole are given in Table 5-1.*

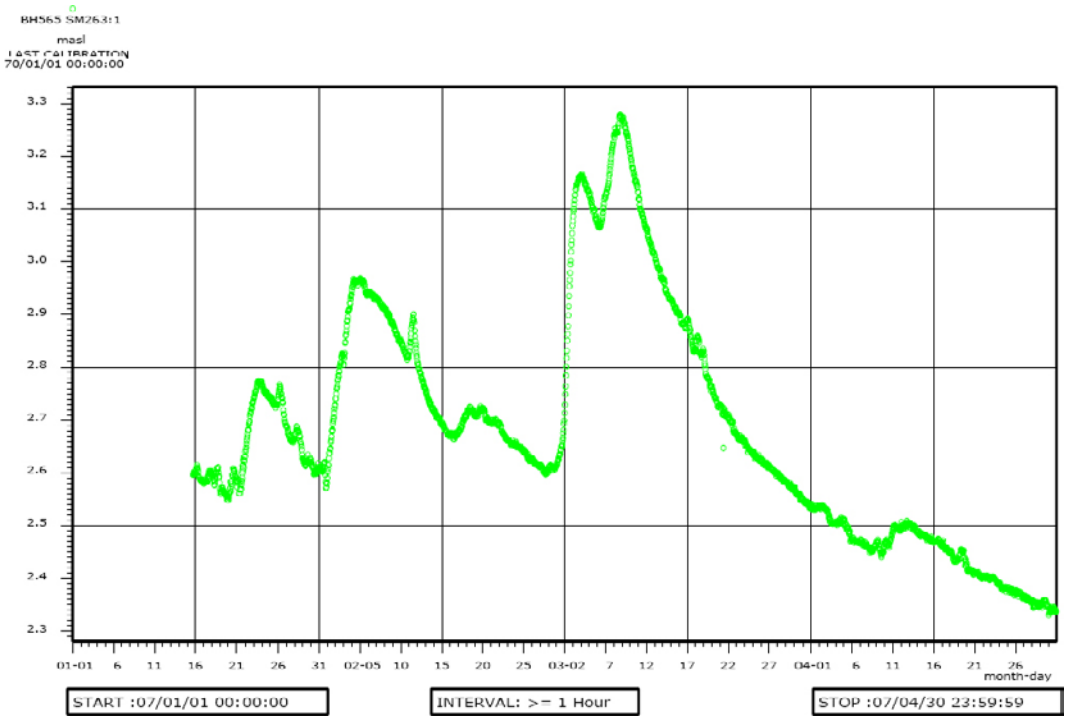


Figure 5-9. *Groundwater head at SSM000263.*

Table 5-7. Evaluated parameters for slug tests at Laxemarån. Boldfaced values are considered most representative.

METHOD: Cooper et al.	**Falling head test**		**Rising head test**	
Observation well	**Test no.**	**T (m²/s)**	**Test no.**	**T (m²/s)**
SSM000263	1	**8.6×10^{-4}**	1	–
METHOD: Hvorslev	**Falling head test**		**Rising head test**	
Observation well	**Test no.**	**T (m²/s)**	**Test no.**	**T (m²/s)**
SSM000263	1	7.4×10^{-4}	1	9.5×10^{-4}
METHOD: Bouwer Rice	**Falling head test**		**Rising head test**	
Observation well	**Test no.**	**T (m²/s)**	**Test no.**	**T (m²/s)**
SSM000263	1	3.4×10^{-4}	1	5.7×10^{-4}

5.4 Horvan Syd

At Horvan Syd, three probing holes were drilled PSM001484–PSM001486, and three groundwater monitoring wells SSM000264–SSM000266 were installed. Locations are shown in Figure 5-10 and some basic site conditions in Table 5-8.

5.4.1 Topography

The ground surface elevation in Horvan Syd varies from +14.6 m above sea level in the west to +5.7 m above sea level in the east, falling towards the southeast.

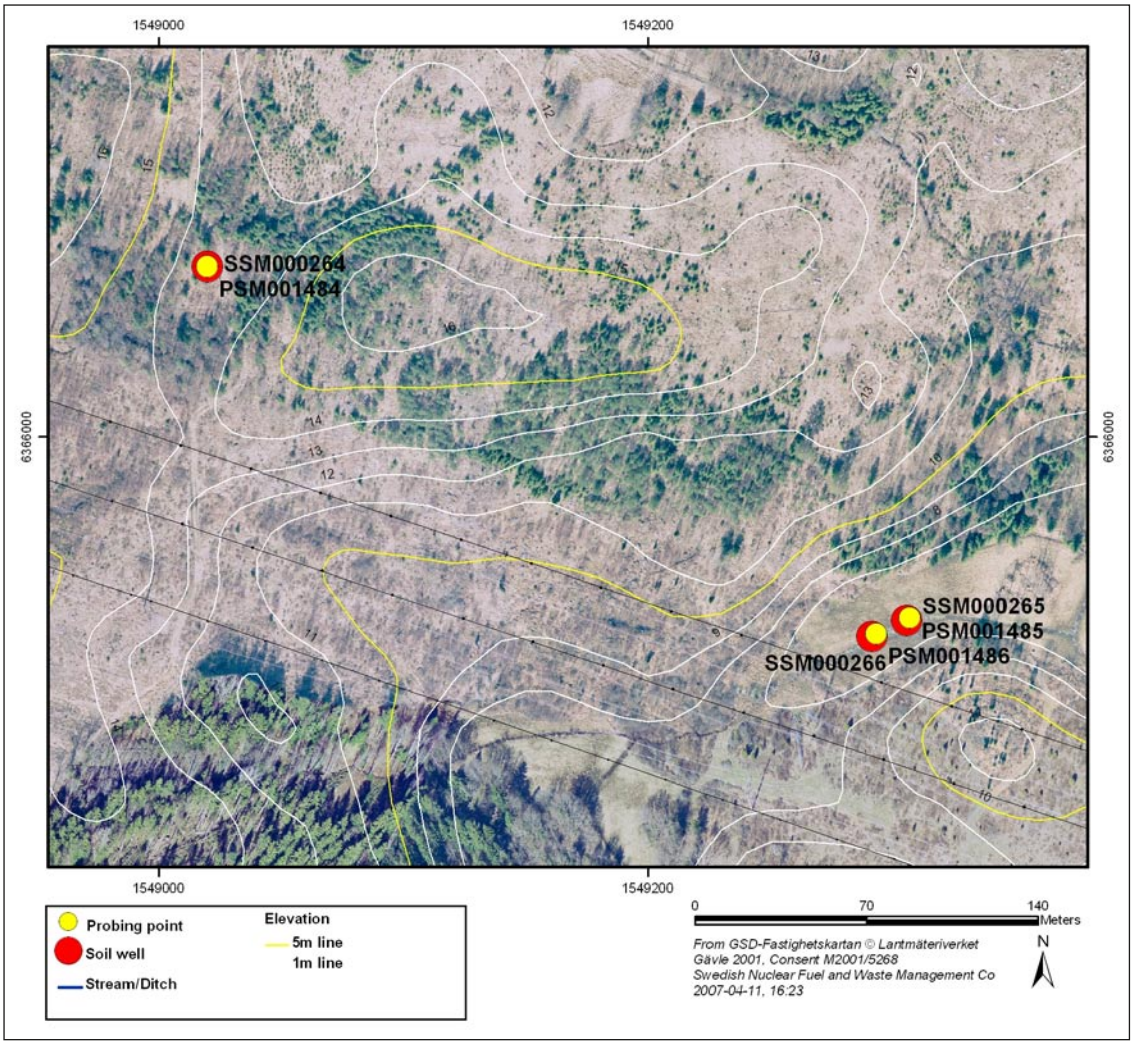


Figure 5-10. *Location of probing points and soil wells at site 4 Horvan Syd.*

Table 5-8. Summary of geological conditions and groundwater levels given as intervals encountered at the site.

	Depth (m.b.g.l.)	Level (m.a.s.l.)
Ground surface	–	+5.7 to +14.6
Base of peat layer/Sandy till	0–0.2/0–1.4	+5.5 to +6.0/+10.2 to +14.6
Groundwater level	–	+5.6 to +11.9
Base of clay layer	0–2.3	+3.2 to +6.6
Base of non-cohesice soil layer	1.0–1.5	+2.2 to +11.8
Rock surface		+2.2 to +11.8

5.4.2 Stratigraphy

Thegeological conditions in the area vary with the topography, where higher location are generally more eroded with coarser material than the lower situated locations. In the west there is sandy and gravely till, with elements of boulders, on rock. The depth from the ground surface to rock is 2.8 m. In the east there is a thin layer of peat, about 0.2 m, followed by silty clay, with a thickness of 1.0–2.3 m that tilts to the east, followed by a non-cohesive soil, mainly gravelly till, with a thickness of 0.6–1.0 m. Under the till in both the east and west rock is found at a level +12 in the west and +2 in the east. The rock quality varies and is both of good and poorer quality. The stratigraphic profiles are shown in Figure 5-11.

5.4.3 Hydraulic head

The groundwater monitoring wells indicate that the groundwater in the west is located around 2.8 m under the ground surface, which is close to the rock surface, and in the east around 0–0.1 m under the ground surface. The groundwater level varies between +11.9 and +5.7 m above sea level in Horvan Syd. hydraulic head monitored from start is shown in Figure 5-12.

5.4.4 Slug tests

Due to the damaged stand pipe the response to the slug test in SSM000264 could not be measured with the same accuracy as the other tests. The recovery was very quick and in just 15 seconds the groundwater level had stabilised. The analysis is based on very few data and consequently the results should be handled with care. The response in SSM000265 was very quick and after only a few seconds the groundwater level had stabilised at its original level. The groundwater fluctuation showed an oscillatory response during the test and the data has been analysed according to the method of /3/. Observation well SSM000266 indicated a slower response; the groundwater recovery period lasted approximately 30 minutes. The screened section in this well is installed in a layer of till as opposed to the intersection between till/fractured bedrock as is the case for the other observation wells. The transmissivity for this layer (SSM000266) also proved to be lower. Table 5-9 presents the evaluated parameters for the slug tests at Horvan Syd.

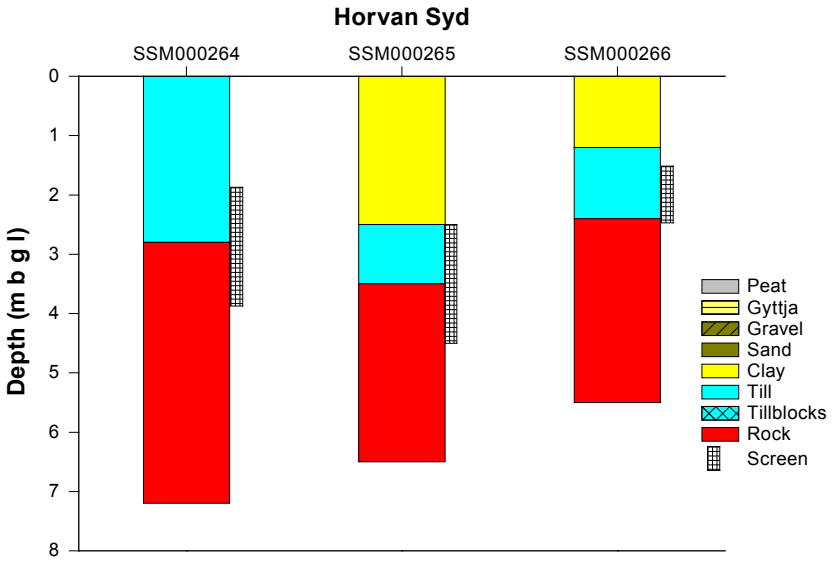


Figure 5-11. *Simplified stratigraphic interpretation at Horvan Syd. Ground elevations for each hole are given in Table 5-1.*

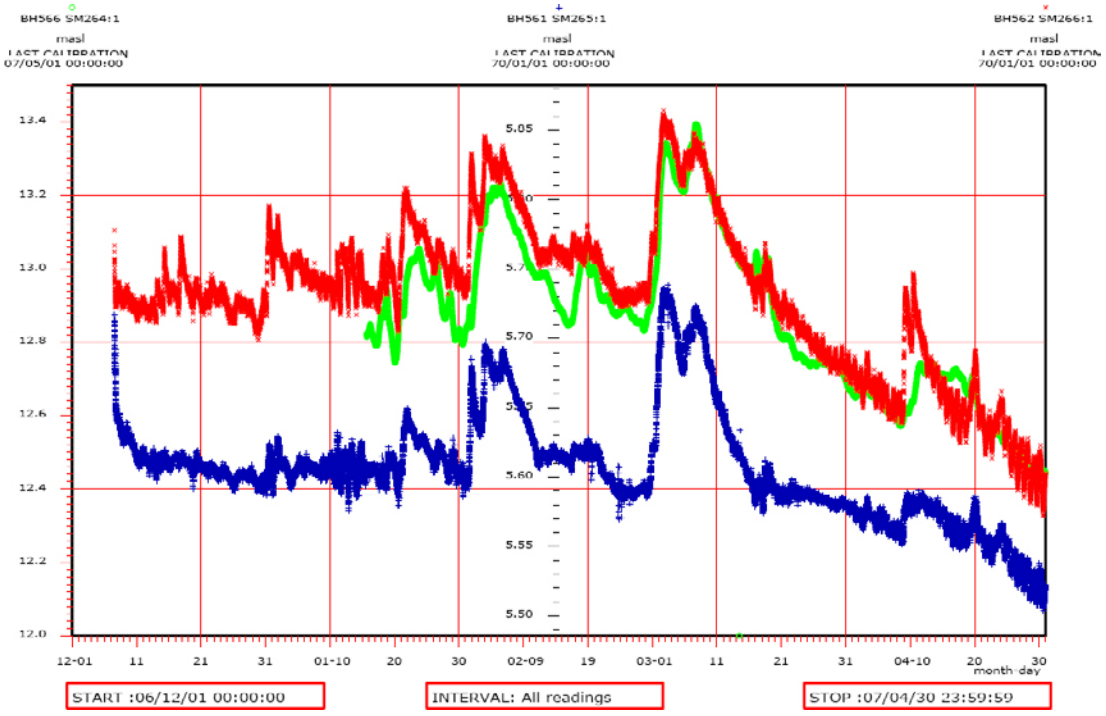


Figure 5-12. *Hydraulic head at SSM000264, SSM000265 and SSM000266.*

Table 5-9. Evaluated parameters for slug tests at Horvan Syd. Boldfaced values are considered most representative.

METHOD: Cooper et al.	**Falling head test**		**Rising head test**	
Observation well	**Test no.**	**T (m²/s)**	**Test no.**	**T (m²/s)**
SSM000264	1	–	1	–
SSM000266	1	3.0×10^{-6}	1	**6.9×10^{-6}**
METHOD: Hvorslev	**Falling head test**		**Rising head test**	
Observation well	**Test no.**	**T (m²/s)**	**Test no.**	**T (m²/s)**
SSM000264	1	–	1	–
SSM000266	1	4.3×10^{-6}	1	7.8×10^{-6}
METHOD: Bouwer Rice	**Falling head test**		**Rising head test**	
Observation well	**Test no.**	**T (m²/s)**	**Test no.**	**T (m²/s)**
SSM000264	1		1	**1.2×10^{-3}**
SSM000266	1	2.3×10^{-6}	1	3.7×10^{-6}
METHOD: McElwee-Zenner	**Falling head test**		**Rising head test**	
SSM000265		5.2×10^{-3}		

5.5 Lerängarna

At Lerängarna one borehole, PSM001487, was probed and one groundwater monitoring well (SSM000267) was installed. Locations are shown in Figure 5-13 and some basic site conditions are shown in Table 5-10.

5.5.1 Topography

The level of the borehole is +13.2 m above sea level.

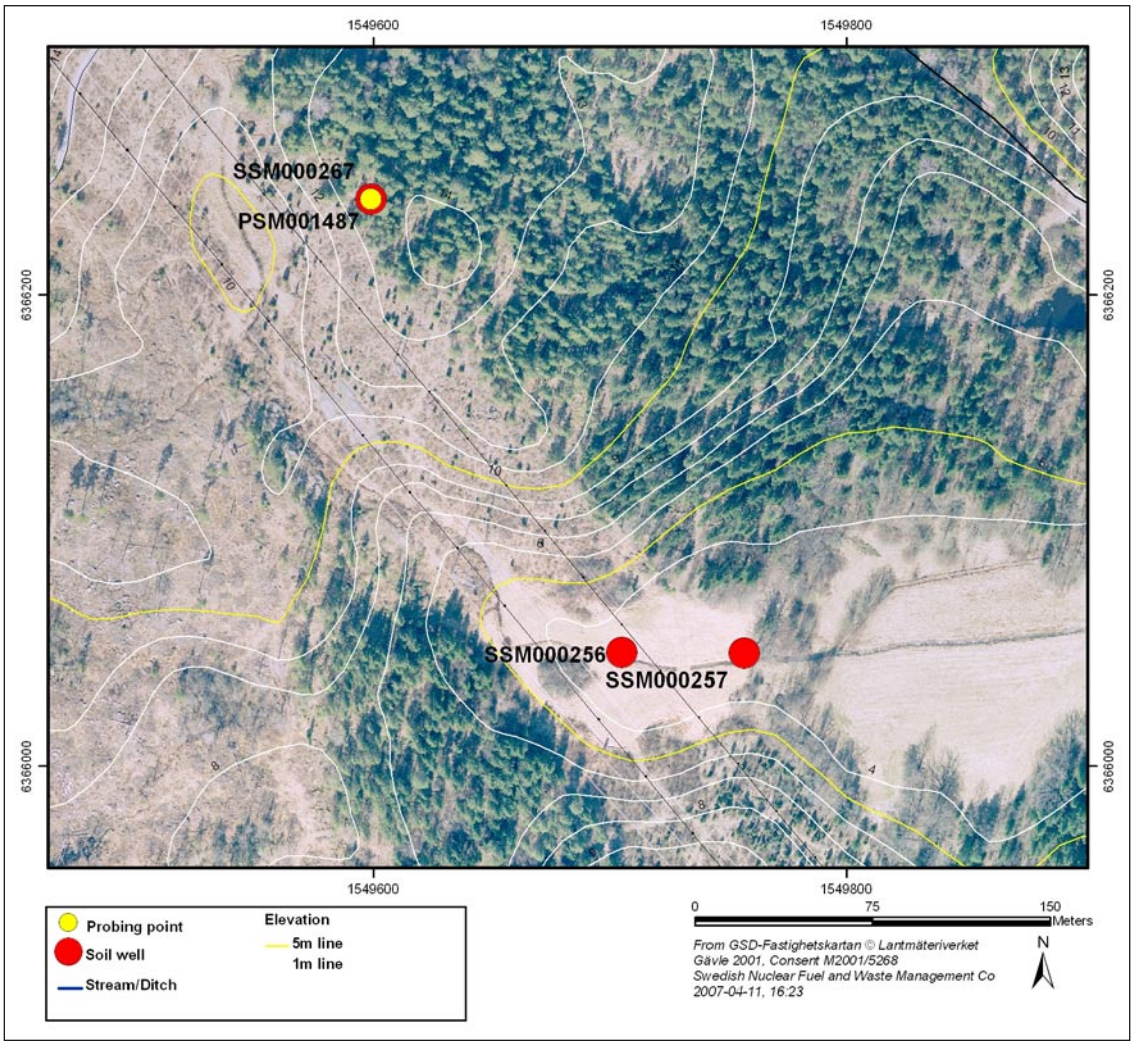


Figure 5-13. *Location of probing points and soil wells at site 5 Leräangarna.*

Table 5-10. Summary of geological conditions and groundwater levels given as intervals encountered at the site.

	Depth (m.b.g.l.)	Level (m.a.s.l.)
Ground surface	–	+13.2
Groundwater level	–	+9.6
Sandy till/Non-cohesice soil layer bottom	4.8	+8.4
Rock surface		+8.4

5.5.2 Stratigraphy

Soil well SSM000267 is situated close to a topographical high. Below the ground surface, there is a layer of non-cohesive soil, most likely sandy and gravely till, with numerous boulders. The thickness of this layer is 4.8 m. Below the till, the rock surface is located at level +8.4 m above sea level The rock quality most likely varies in the area, but it seems that it can be characterised generally being of good quality. SSM000256 and 257 are located in a topographical depression, where the till layer is thinner than at SSM000267 and covered with clay. The stratigraphic profiles are shown in Figure 5-14.

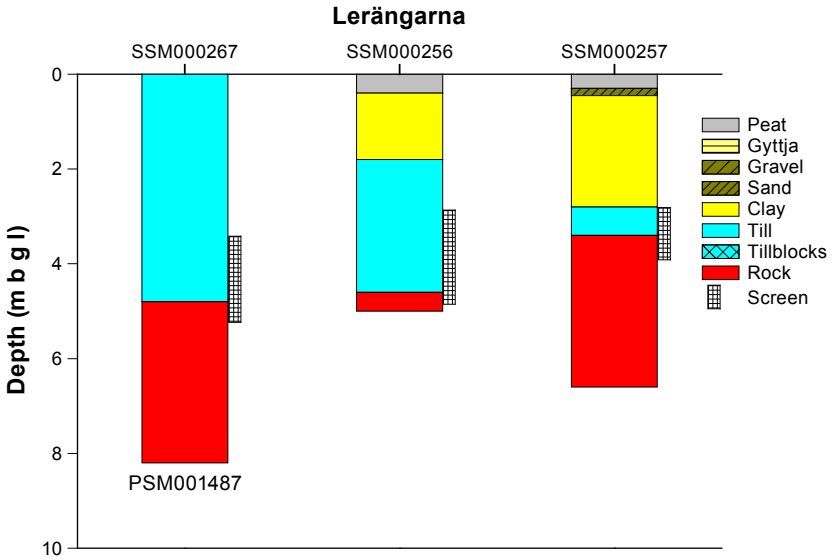


Figure 5-14. *Simplified stratigraphic interpretation for SSM000256, SSM000257 and SSM000267 at Lerängarna. Ground elevations for each borehole are given in Table 5-1.*

5.5.3 Hydraulic head

Groundwater levels were measured and converted into hydraulic head. The groundwater monitoring well shows a head of 9.6 m above sea level 3.5 m below ground surface. hydraulic head monitored from start is shown in Figure 5-15.

5.5.4 Slug tests

The response in SSM000267 was quick and the recovery period lasted for approximately 60 seconds. Table 5-11 presents the evaluated parameters for the slug tests at Lerängarna. Due to disturbances on rising head test no 1 the second rising head test has been used for the analyses.

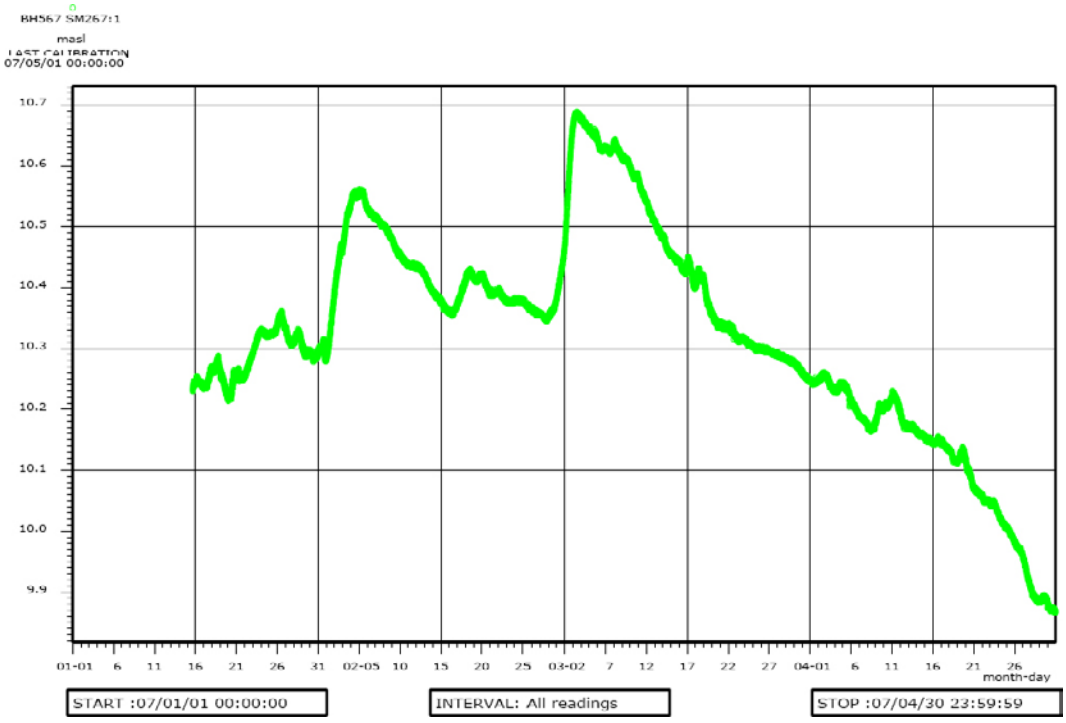


Figure 5-15. *Hydraulic head at SSM000267.*

Table 5-11. Evaluated parameters for slug tests at Lerängarna. Boldfaced values are considered most representative.

METHOD: Cooper et al.	Falling head test		Rising head test	
Observation well	Test no.	T (m^2/s)	Test no.	T (m^2/s)
SSM000256	1	2.2×10^{-4}		
SSM000257	2	(4.4×10^{-3})[1]		
SSM000267	1	2.4×10^{-4}	2	5.2×10^{-4}
METHOD: Hvorslev	**Falling head test**		**Rising head test**	
Observation well	**Test no.**	**T (m^2/s)**	**Test no.**	**T (m^2/s)**
SSM000267	1	**2.7×10^{-4}**	2	2.8×10^{-4}
METHOD: Bouwer Rice	**Falling head test**		**Rising head test**	
Observation well	**Test no.**	**T (m^2/s)**	**Test no.**	**T (m^2/s)**
SSM000267	1	1.7×10^{-4}	2	1.9×10^{-4}

[1] T-value is very uncertain.

The T-value derived for SSM000257 is considered very uncertain due to the small amount of data on which the evaluation was based. This T-value is therefore not reported to the site characterisation database, SICADA.

5.6 Dämmen and Långekärr

At Dämmen and Långekärr groundwater monitoring wells SSM000268 and SSM000269–SSM000271 were installed, respectively. These are primarily drilled with the specific purpose of environmental monitoring during drilling of KLX15A and HLX42. These soil wells will be incorporated into the long-term groundwater monitoring programme. Probing was undertaken in order to investigate the soil types, thicknesses and to and establish the depth to rock. Locations are shown in Figure 5-16 while basic site conditions are summarised in Table 5-12 and 5-13.

Table 5-12. Summary of geological conditions and groundwater levels given as intervals encountered at Dämmen, the KLX15A site.

	Depth (m.b.g.l.)	Level (m.a.s.l.)
Ground surface	–	+9.9
Groundwater level	–	+9.8
Dry crust clay	0.6	+9.3
Non-cohesice soil layer bottom	2.2	+7.1
Rock surface	–	+7.1

Table 5-13. Summary of geological conditions and groundwater levels given as intervals encountered at Långekärr, the KLX16A site.

	Depth (m.b.g.l.)	Level (m.a.s.l.)
Ground surface	–	+12.8 to +15.1
Sand	0.6–1.0	+11.8 to +14.3
Groundwater level	–	+12.2 to +14.3
Non-cohesice soil layer bottom	0–0.8	+11.0 to +13.7
Rock surface	–	+11.0 to +13.7

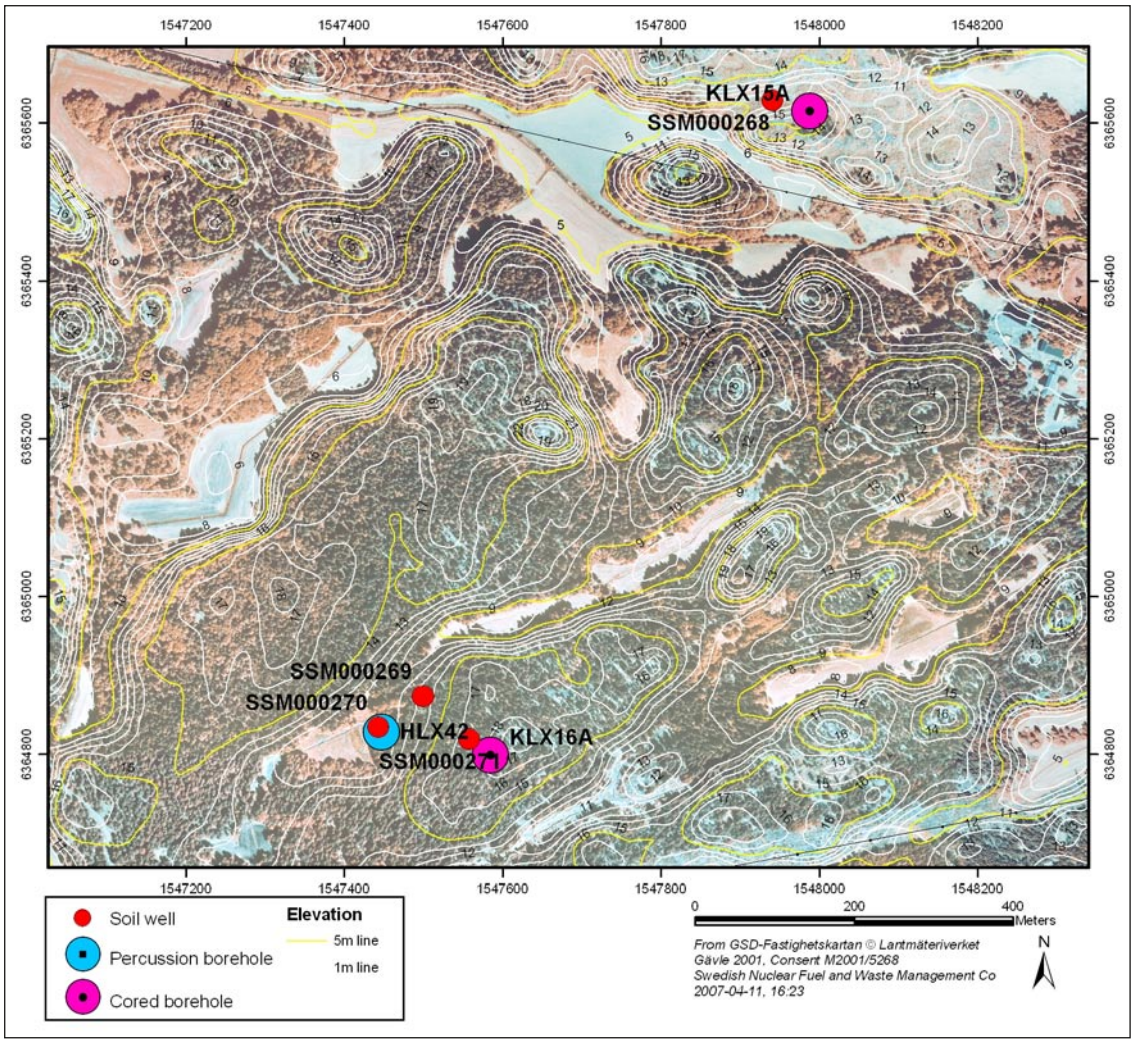


Figure 5-16. *Location of probing points and soil wells at Dämmen and.Långekärr.*

5.6.1 Topography

Dämmen

There is only one well in this area, SSM000268. The ground surface at the probing borehole is +9.9 m above sea level.

Långekärr

The ground surface varies between level +12.8 m above sea level in the west and +15.1 m above sea level in the east.

5.6.2 Stratigraphy

Dämmen – KLX15A site

Below ground surface at SSM000268, a layer of dry-crust clay is found, and its thickness is 0.6 m. Below the clay, there is a layer of non-cohesive soil, which is about 2.2 m thick. Rock was encountered at level +7.2, 2.7 m under the surface.

Långekärr – KLX16A site

Beneath the ground surface at SSM000269, SSM000270 and SSM000271, a layer of sand is found. The thickness of the layer is approximately 0.6–1.0 m. In the west at SSM000270 there is a layer of coarse friable material under the sand, which is approximately 0.8 m thick. In the east, rock is located directly below the sand layer. Rock is found at level +11 m above sea level in the west, and +14.5 m above sea level. in the east. The rock is fractured, and of varying quality.

The stratigraphic profile is shown in Figure 5-17.

5.6.3 Hydraulic head

Dämmen and Långekärr

The groundwater is located around 0.6–0.9 m under the ground surface, close to the rock surface. Monitored hydraulic head from inception is shown in Figure 5-18.

5.6.4 Slug tests

Observation well SSM000268 showed a recovery period of approximately 120 seconds. The well was tested at two occassions 2006-11-16 and 2006-11-28 of which the latter test is presented here. SSM000269 indicated a longer recovery period of approximately 10 minutes. The depth of water in the well was not sufficient to fully cover the slug when the falling head test was initiated and the response data for the falling head test shows a pattern that is similar to that of a positive hydraulic boundary during a pumping test. The change of gradient in the curve appears as the groundwater level falls below the top of the slug. In the analysis, the straight line is fitted to early data, that is, before the change of gradient. Also in the the analysis according to Cooper et al. the curve has been fitted to early data. Observation well SSM000270 had a short recovery period of around 30–60 seconds. Due to the limited water column in SSM000271 (2006-11-30), it was not possible to perform a slug test in the well.

Table 5-14 presents the evaluated parameters for the slug tests at Dämmen and Långekärr.

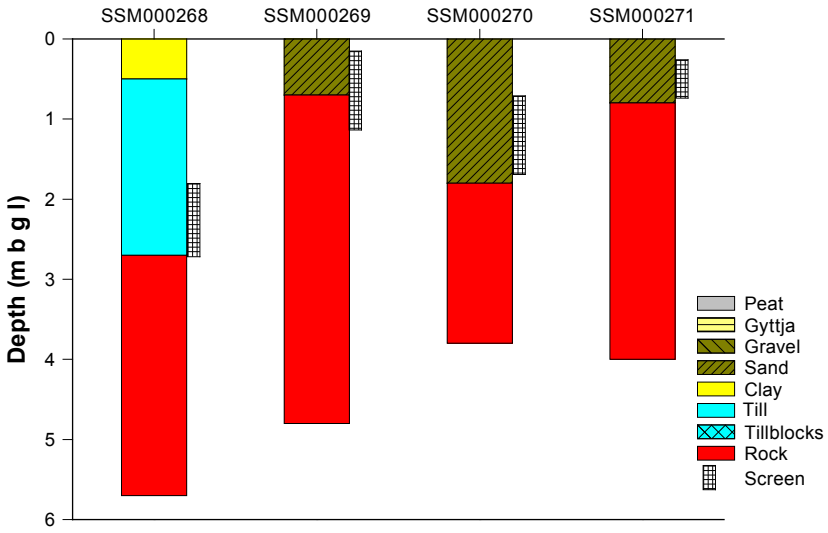


Figure 5-17. *Simplified stratigraphic interpretation at Dämmen and Långekärr. Ground elevations for each hole are given in Table 5-1.*

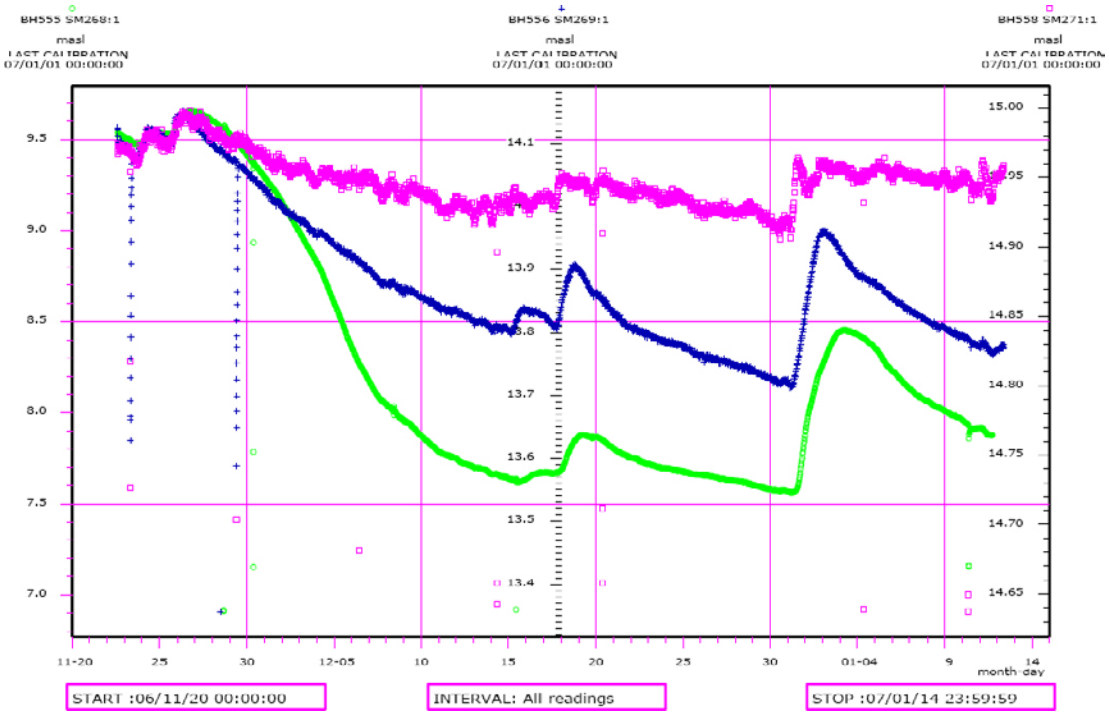


Figure 5-18. *Hydraulic head at SSM000268, SSM000269 and SSM000271.*

Table 5-14. Evaluated parameters for slug tests at Dämmen and Långekärr. Boldfaced values are considered most representative.

METHOD: Cooper et al.	**Falling head test**		**Rising head test**	
Observation well	**Test no.**	**T (m²/s)**	**Test no.**	**T (m²/s)**
SSM000268	1	1.5×10^{-4}	1	**2.8×10^{-4}**
SSM000269	1	**9.7×10^{-6}**	1	8.5×10^{-5}
SSM000270	1	2.8×10^{-4}	1	**3.6×10^{-4}**
METHOD: Hvorslev	**Falling head test**		**Rising head test**	
Observation well	**Test no.**	**T (m²/s)**	**Test no.**	**T (m²/s)**
SSM000268	1	6.0×10^{-5}	1	1.3×10^{-4}
SSM000269	1	3.7×10^{-6}	1	6.5×10^{-5}
SSM000270	1	2.9×10^{-4}	1	2.6×10^{-4}
METHOD: Bouwer Rice	**Falling head test**		**Rising head test**	
Observation well	**Test no.**	**T (m²/s)**	**Test no.**	**T (m²/s)**
SSM000268	1	3.3×10^{-5}	3	7.1×10^{-5}
SSM000269	1	1.9×10^{-6}	1	3.1×10^{-7}
SSM000270	1	1.6×10^{-4}	1	1.5×10^{-4}

5.7 Slug tests at Gäster and Rågängarna

Slug tests were undertaken in a 2 previously drilled soil wells. SSM000028 is located at site 9 Gäster and SSM000216 at site 10 Rågängarna, see map in Figure 1-1. These two wells were drilled as part of the activities AP PS 400-04-19 and AP PS 400-04-96.

In soil well SSM000028, the falling-head recovery period was approximately 10 minutes. For the rising-head test, 30% of the recovery remained after 3.5 hours. This may be due to the well being poorly developed during drilling, and also that the insertion of the slug caused fine grains which may have accumulated in the pipe over the years since drilling (in 2004) to flow into the formation and clog up the pores, thereby delaying the recovery of the rising head test. For SSM000216 the recovery for both the falling head and the rising head tests lasted approximately 3 minutes.

Table 5-15 presents the evaluated parameters for the slug tests.

5.8 Slug tests at Tyremosse

These soils wells were drilled for environmental control during the drilling of KLX17A. Results of evaluation of slugtest in SSM000252 and SSM000253 are compiled in Table 5-16.

5.9 Summary of slug test results

Slug test results are summarised in Table 5-17 with data on aquifer, hydraulic head and transmissivity.

Table 5-15. Evaluated parameters for slug tests at Gäster and Rågängarna. Boldfaced values are considered most representative.

METHOD: Cooper et al.	**Falling head test**		**Rising head test**	
Observation well	**Test no.**	**T (m^2/s)**	**Test no.**	**T (m^2/s)**
SSM000028	1	–	–	–
SSM000216	2	1.0×10^{-4}	1	**1.1×10^{-4}**
METHOD: Hvorslev	**Falling head test**		**Rising head test**	
Observation well	**Test no.**	**T (m^2/s)**	**Test no.**	**T (m^2/s)**
SSM000028	1	**1.0×10^{-5}**	–	–
SSM000216	2	4.0×10^{-5}	1	4.2×10^{-5}
METHOD: Bouwer Rice	**Falling head test**		**Rising head test**	
Observation well	**Test no.**	**T (m^2/s)**	**Test no.**	**T (m^2/s)**
SSM000028	1	5.2×10^{-6}	–	–
SSM000216	2	2.2×10^{-5}	1	2.2×10^{-5}

Table 5-16. Evaluated Parameters for slug tests at Tyremosse.

METHOD: Cooper et al.	**Falling head test**		**Rising head test**	
Observation well	Test no.	T (m^2/s)	Test no.	T (m^2/s)
SSM000252			2	4.1×10^{-4}
SSM000253	2	9.7×10^{-5}		

Table 5-17. Summary of slug test results. See Table 2-1 for main objectives with the activies for each well.

Soil well	Site	Screened aquifer stratigraphy	Length of screen	Soil aquifer thick-ness	Top of soil aquifer	Top of soil aquifer	Bottom of soil aquifer	Bottom of soil aquifer	Casing height	Ground-water level prior to slug test	Ground-water level prior to slug test	Top of screen	Bottom of screen	Transmis-sivity, best choice	Hydraulic conducti-vity, best choice
			(m)	(m)	(m.b.g.l.l)	(m.b.ToC.)	(m.b.g.l.)	(m.b.ToC.)	(m.a.g.l.)	(m.b.ToC.)	(m.b.g.l.)	(m.b.ToC.)	(m.b.ToC.)	(m^2/s)	(m/s)
SSM000028	9 Gäster	Gyttja	1	2.5	0	0.55	2.5	3.05	0.55	1.23	0.68	2	3	1.0E–05	1.0E–05
SSM000216	10 Rågängarna	Gravelly silty fine sand	1	0.8	0.4	0.7	1.2	1.5	0.3	0.54	0.24	1	2	1.1E–04	1.1E–04
SSM000252	11 Tyremosse	Sandy till	2	2.3	4.3	4.7	6.6	7.0	0.4	1.2	0.8	5.0	3.0	4.1E–04	2.0E–04
SSM000253	11 Tyremosse	Sandy till	1	0.1	3.5	4.0	3.6	4.1	0.5	1.1	0.4	7.0	4.0	9.7E–05	9.7E–05
SSM000256	5 Lerängarna	Till/rock	2	2.8	1.8	2.2	4.6	5	0.4	2.91	2.51	3	4	2.2E–04	1.1E–04
SSM000257	5 Lerängarna	Silty sandy till/rock	1	0.6	2.8	3.2	3.4	3.8	0.4	3.02	2.62	3	4	(4.4E–03)[1]	(4.4E–03)[1]
SSM000260	1 Mederhult	Gravelly sand/rock	2	1.8	5.8	6.87	7.6	8.67	1.07	0.99	–0.08	7.45	9.45	4.4E–04	2.2E–04
SSM000261	1 Mederhult	Sand	1	0.8	8.3	9.3	9.1	10.1	1	0.81	–0.19	9.2	10.2	4.2E–05	4.2E–05
SSM000262	2 Ekerumsån	Sandy gravel	3	3	10.8	11.7	13.8	14.7	0.9	0.75	–0.15	11.7	14.7	9.1E–03	3.0E–03
SSM000263	3 Laxemarån	Till/rock	2	1.8	4.5	5.52	6.3	7.32	1.02	1.8	0.78	6.3	8.3	8.6E–04	4.3E–04
SSM000264	4 Horvan Syd	Gravelly till/rock	2	0.8	2	3.2	2.8	4	1.2	3.14	1.94	3	5	1.2E–03	6.0E–04
SSM000265	4 Horvan Syd	Clayey gravelly till/rock	2	1	2.5	3.55	3.5	4.55	1.05	1.02	–0.03	3.58	5.58	5.2E–03	2.6E–03
SSM000266	4 Horvan Syd	Till/rock	1	1.2	1.2	2.67	2.4	3.87	1.47	1.38	–0.09	3.01	4.01	6.9E–06	6.9E–06
SSM000267	5 Lerängarna	Gravelly till/rock	2	4.8	0	0.65	4.8	5.45	0.65	3.48	2.83	4	6	2.7E–04	1.4E–04
SSM000268	6 Dämmen	Sand and till/rock	1	2.2	0.5	1.76	2.7	3.96	1.26	1.48	0.22	3.03	4.03	2.8E–04	2.8E–04
SSM000269	7 Långekärr	Sand and gravel/rock	0.8	0.7	0	0.8	0.7	1.5	0.8	1.05	0.25	1	1.8	9.7E–06	1.2E–05
SSM000270	8 Långekärr	Sand and gravel	1	1.8	0	1.32	1.8	3.12	1.32	1.96	0.64	2	3	3.6E–04	3.6E–04
SSM000271	7 Långekärr	Sand and gravel	0.5	0.8	0	0.74	0.8	1.54	0.74	0.84	0.10	0.99	1.49	Insufficient water	Insufficient water

[1] The transmissivty value for SSM000257 is very uncertain due to the small number of data on which the interpretation was based. It is not reported to the site characterisation database, SICADA. m.b.g.l.: metre below ground level, m.a.g.l.: metre above ground level, m.b.ToC.: metre below top of casing.

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Appendix A

Linear history plots of slug tests

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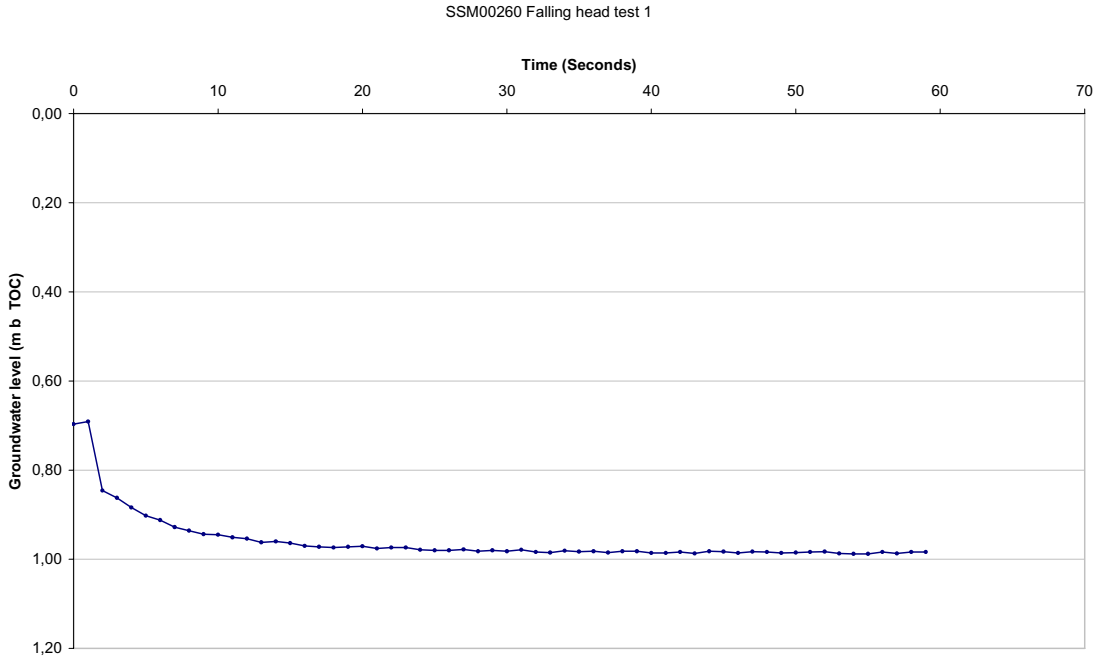

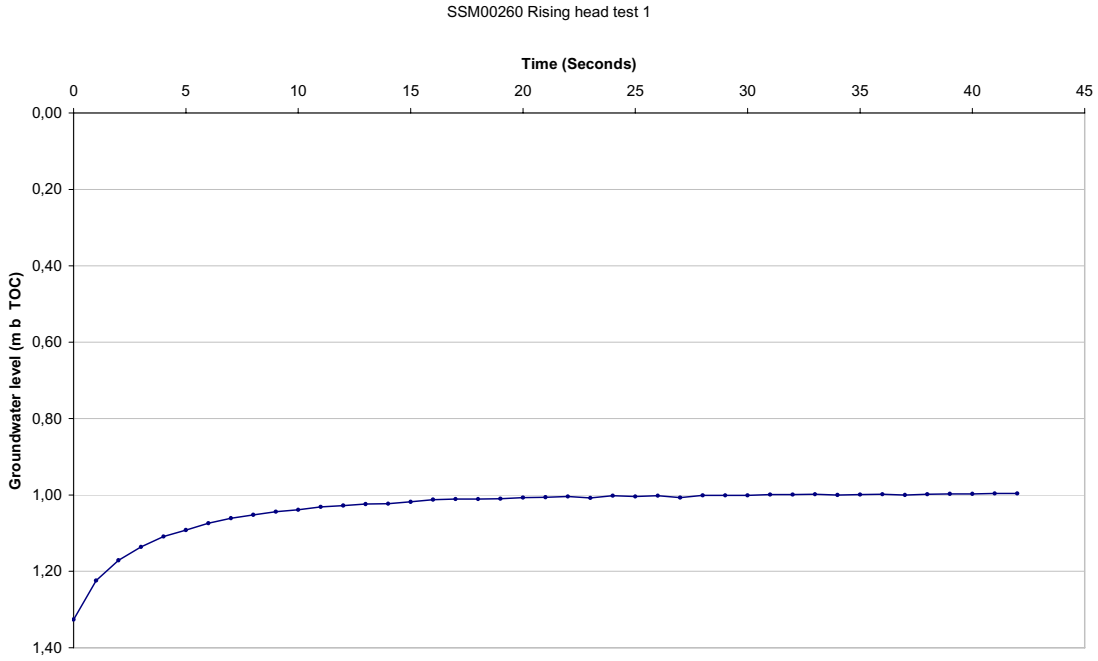

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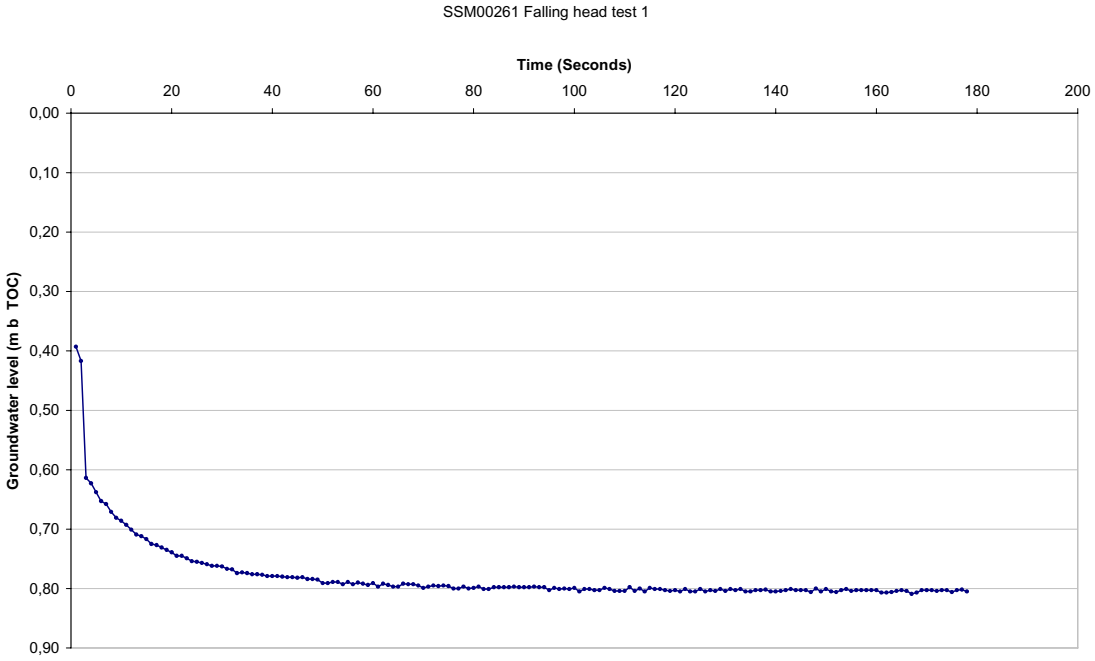
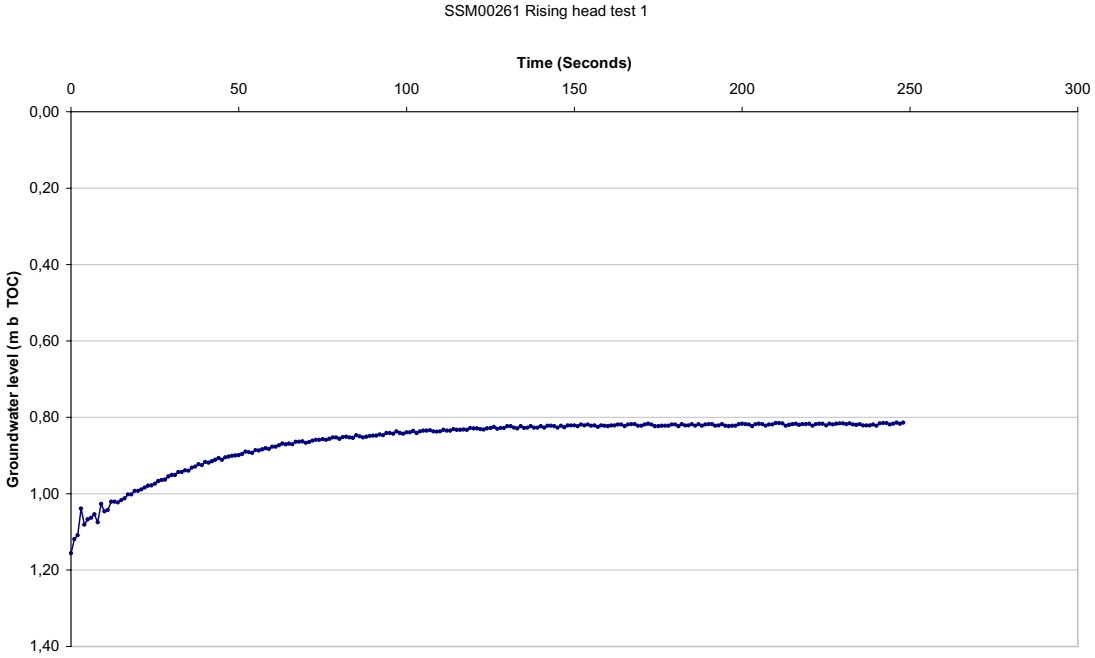
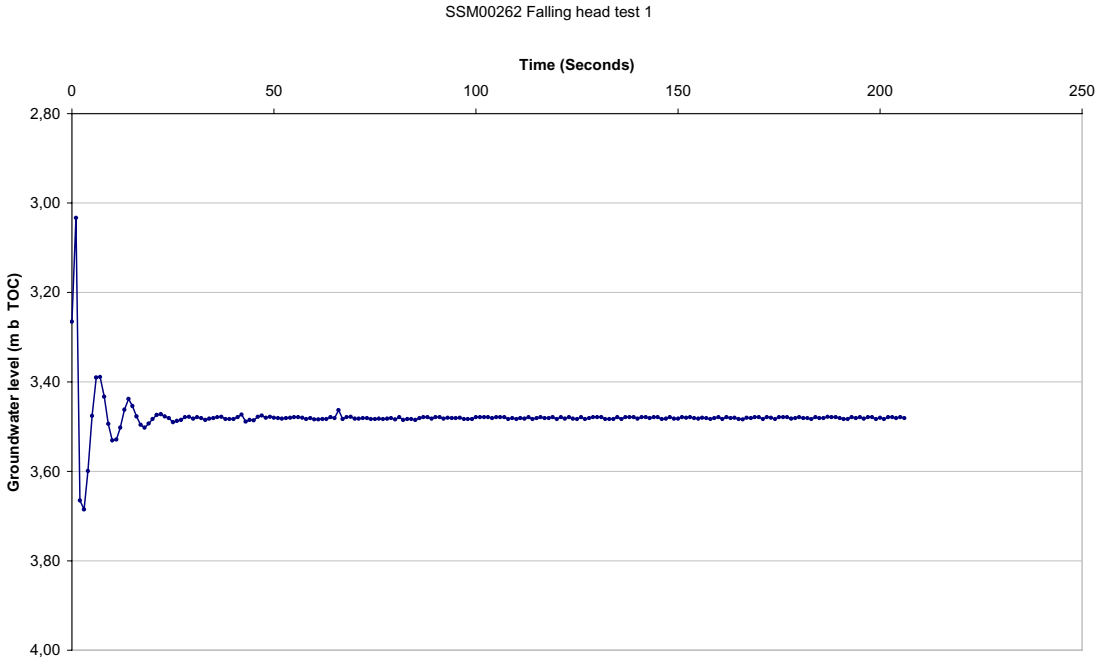
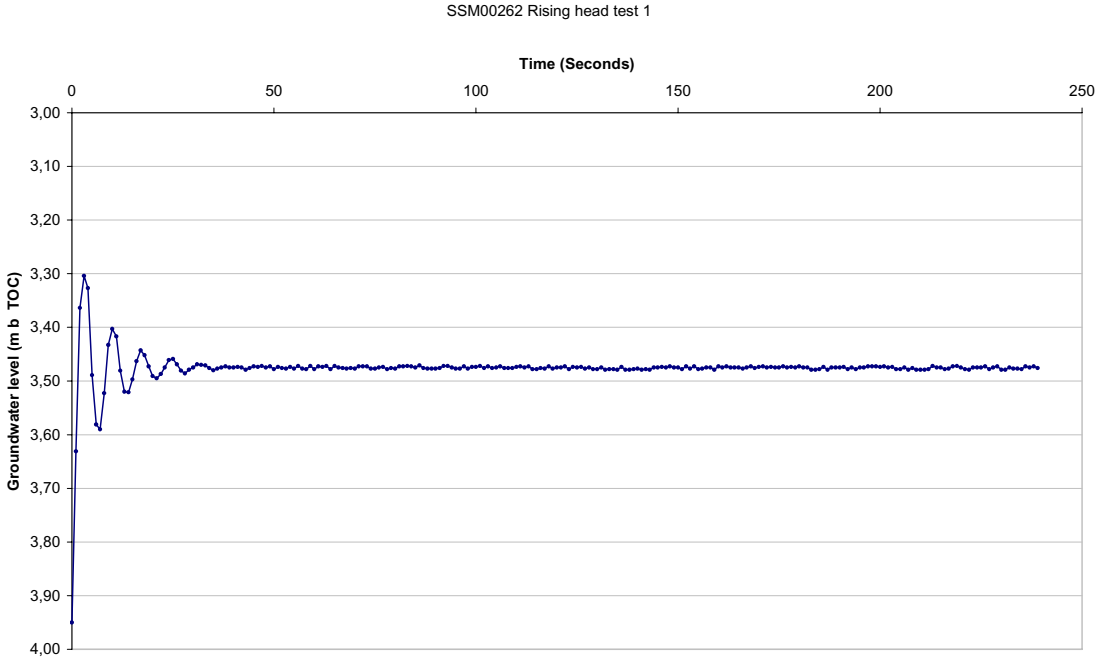




Ekerumsån SSM00262





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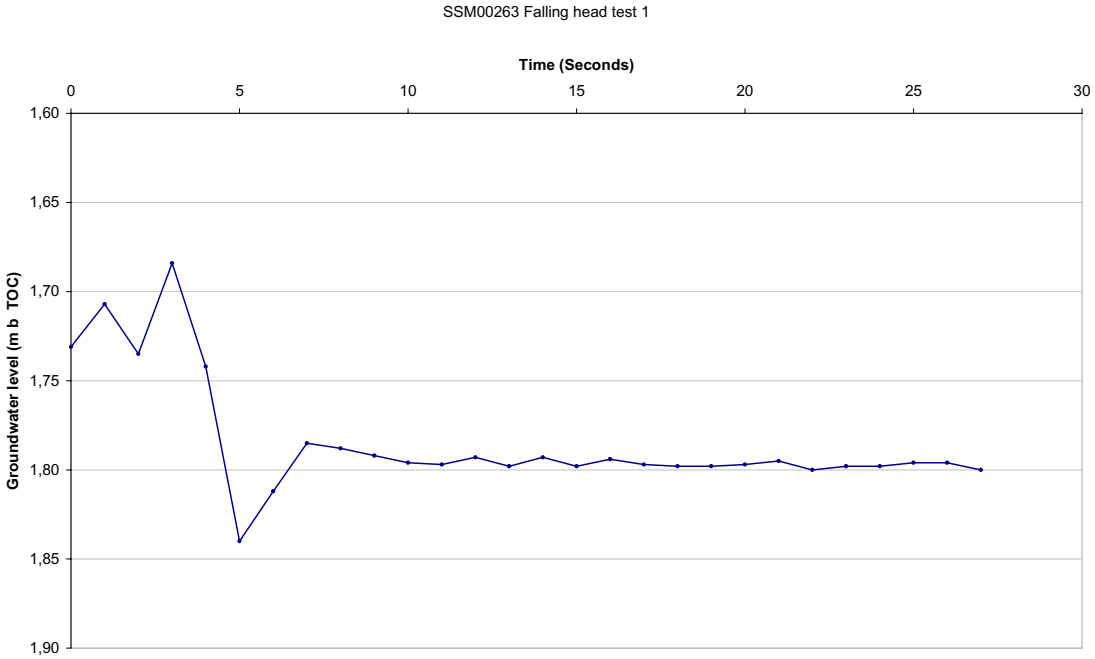

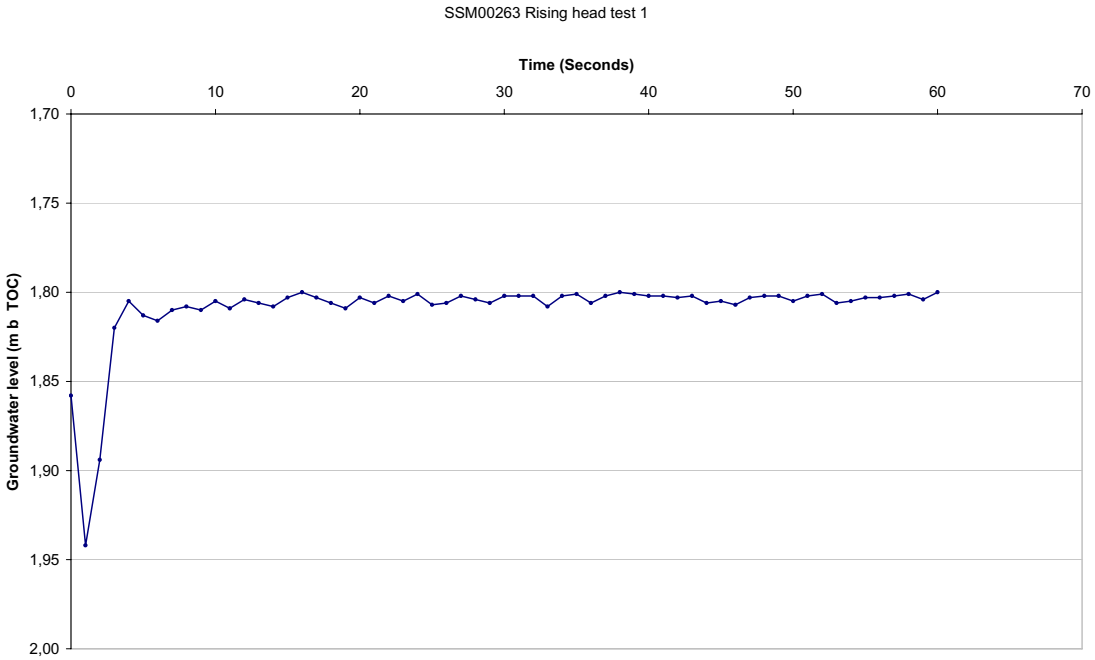

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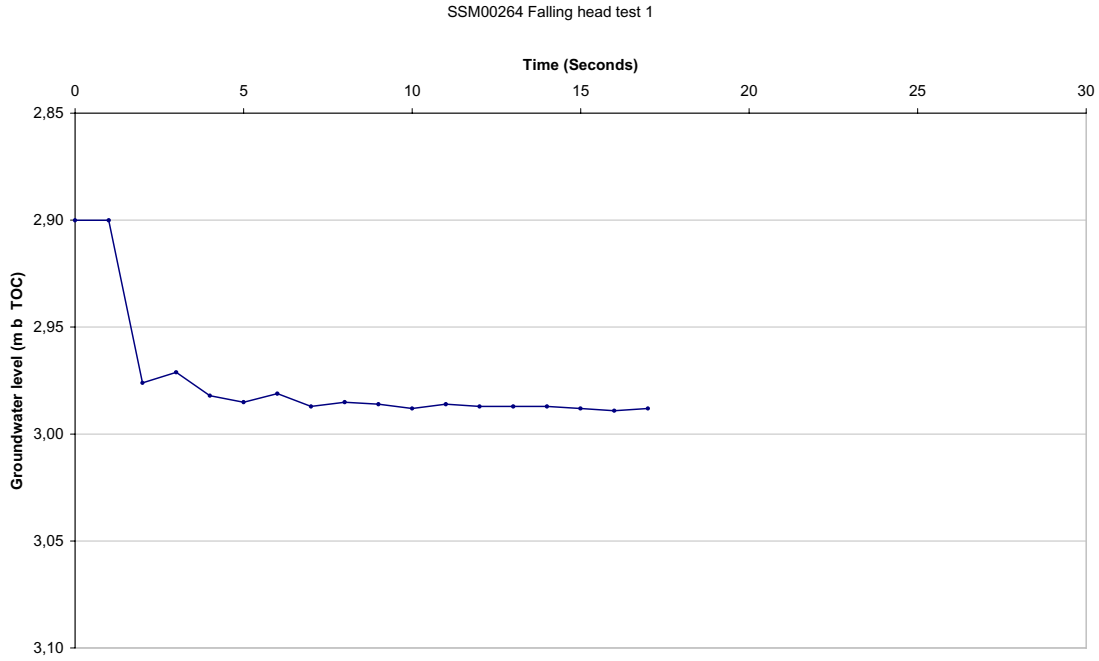
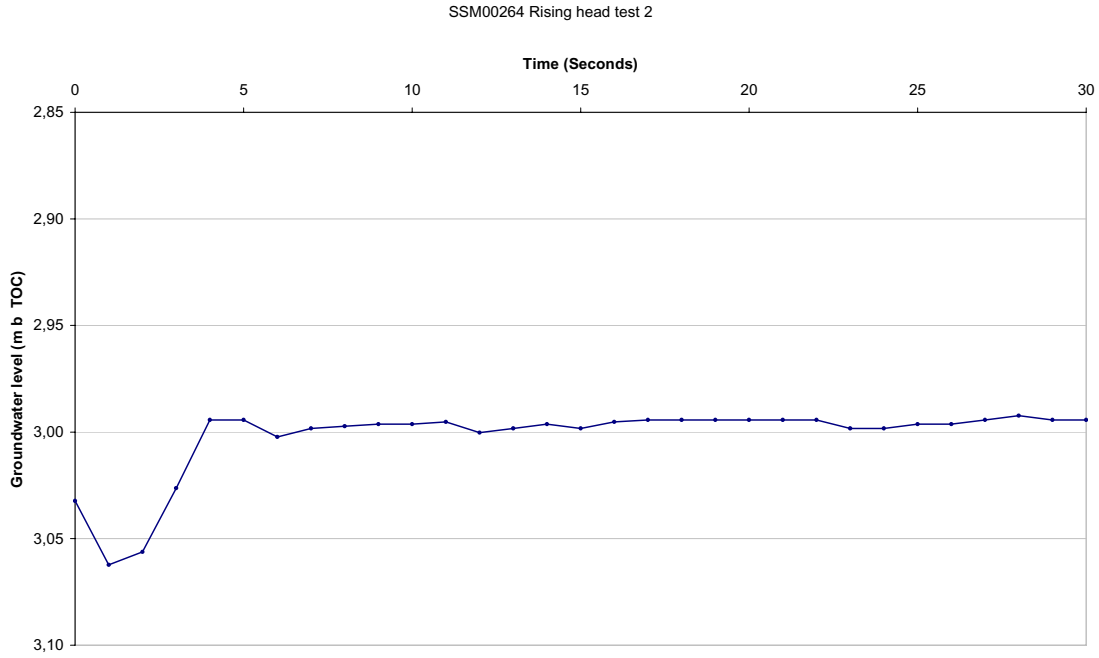


SSM00264 falling head test results uncertain, too little water- not covering top of slug

SSM00264 no rising head test data possible to evaluate, too little water



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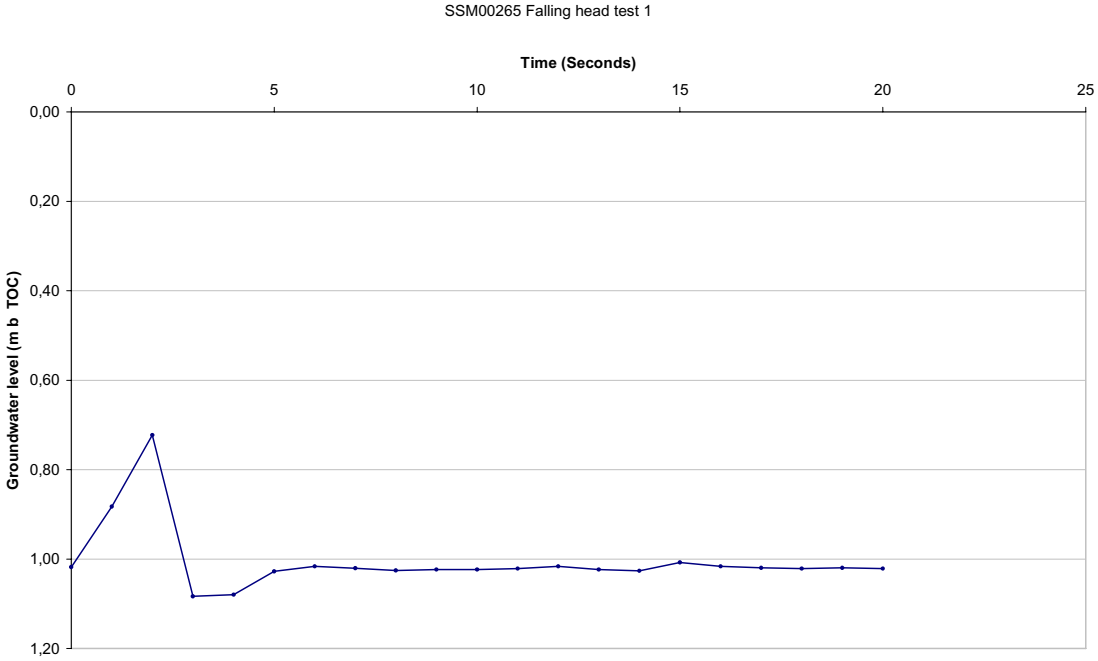
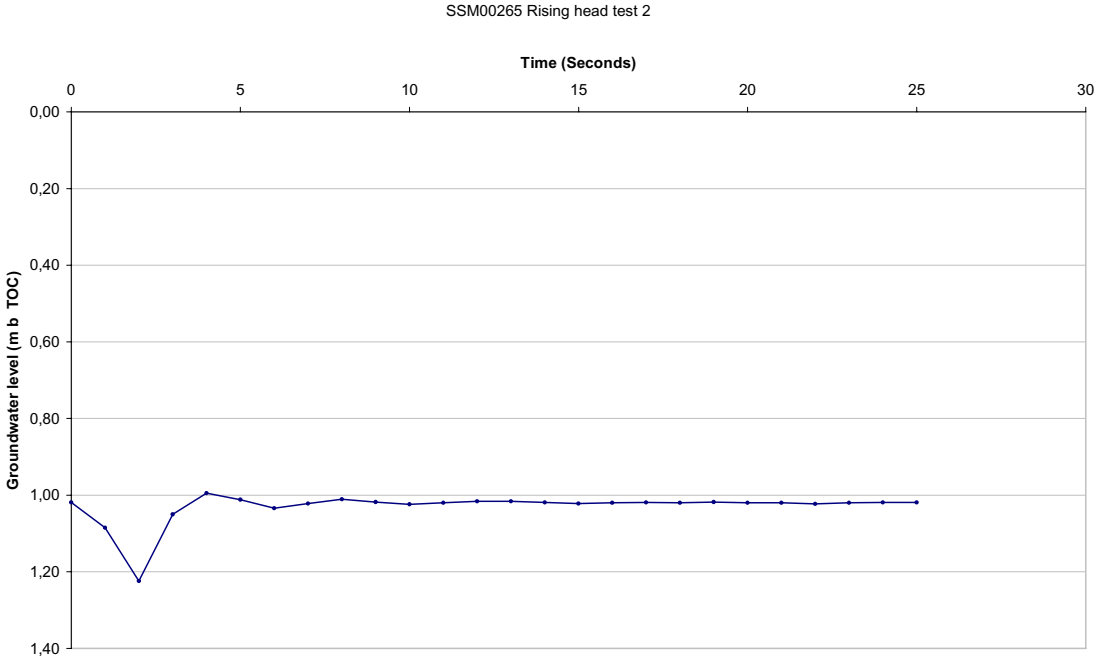
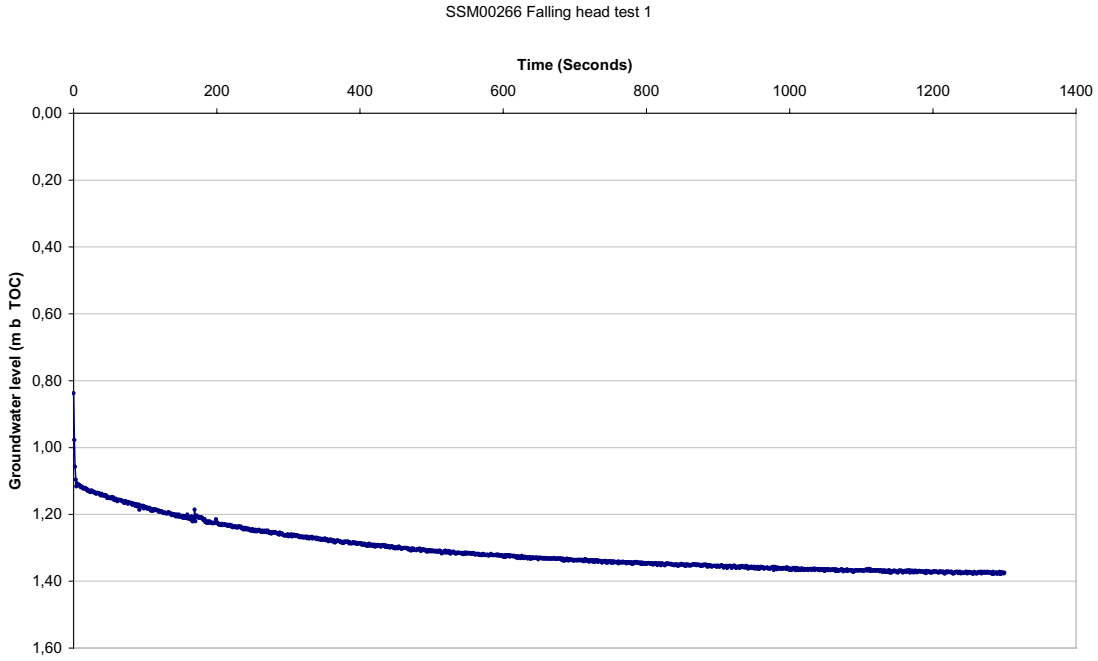
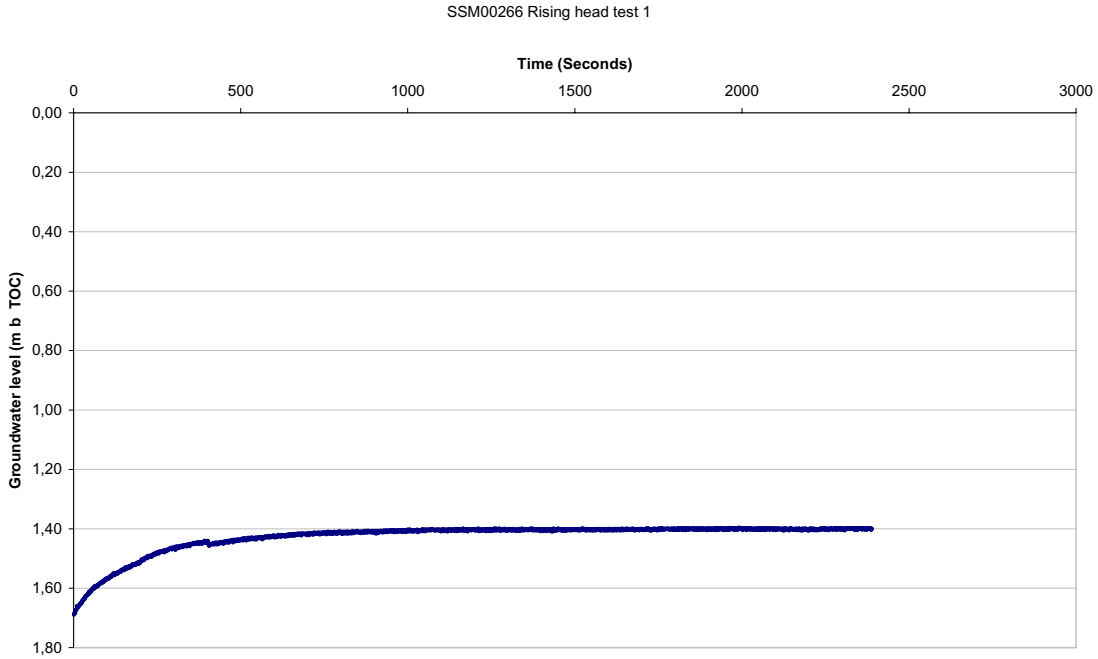




Horvan Syd SSM00266





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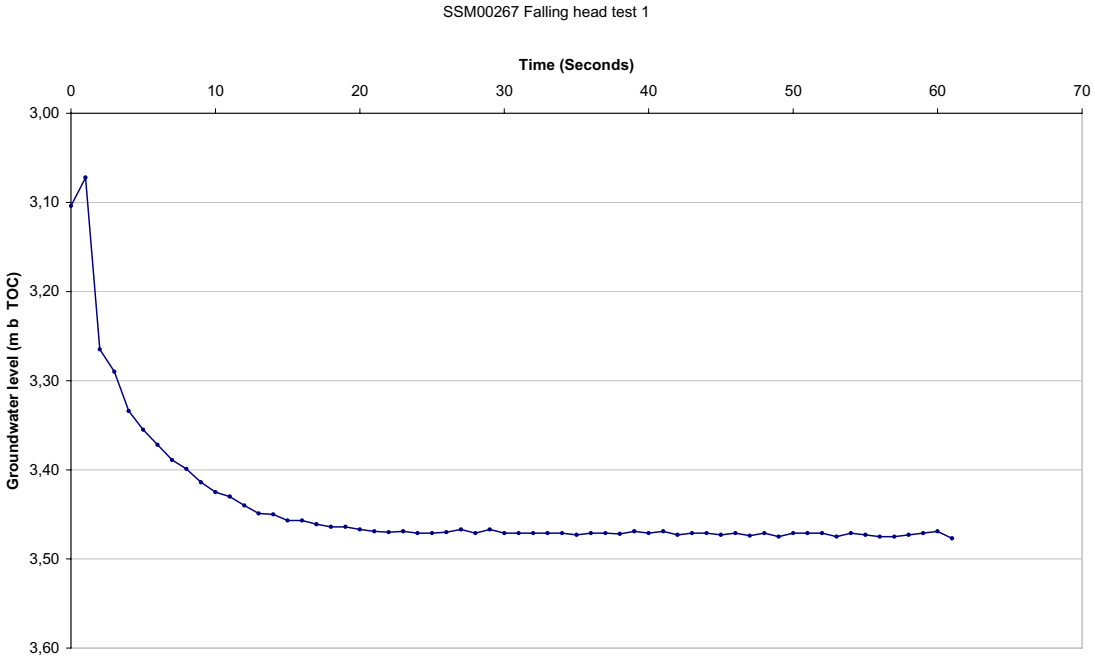
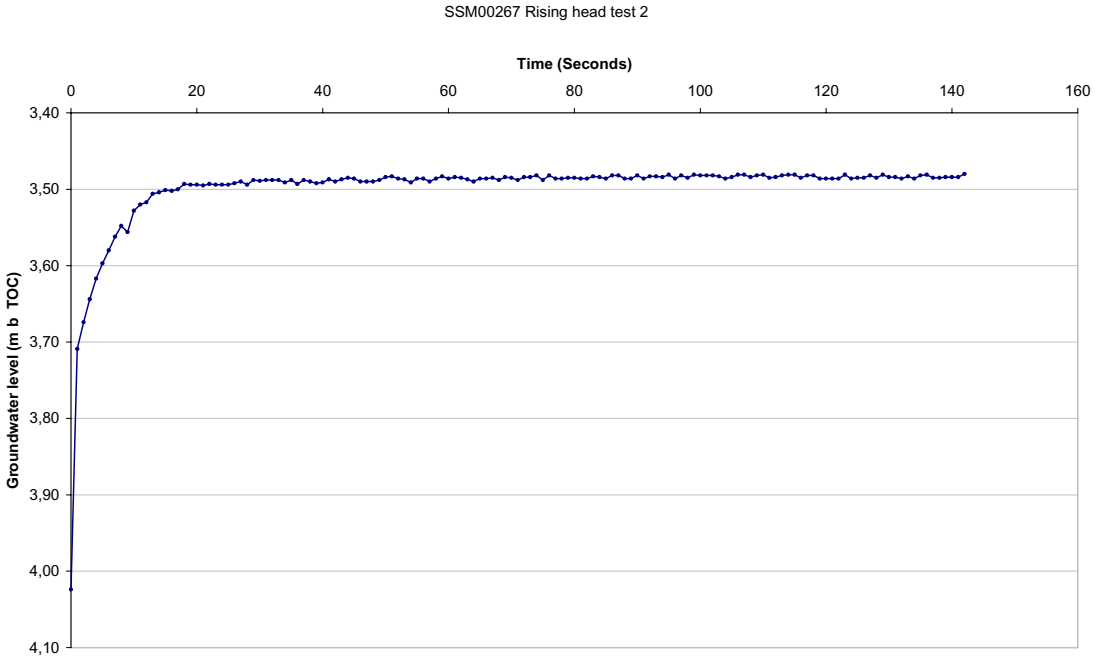
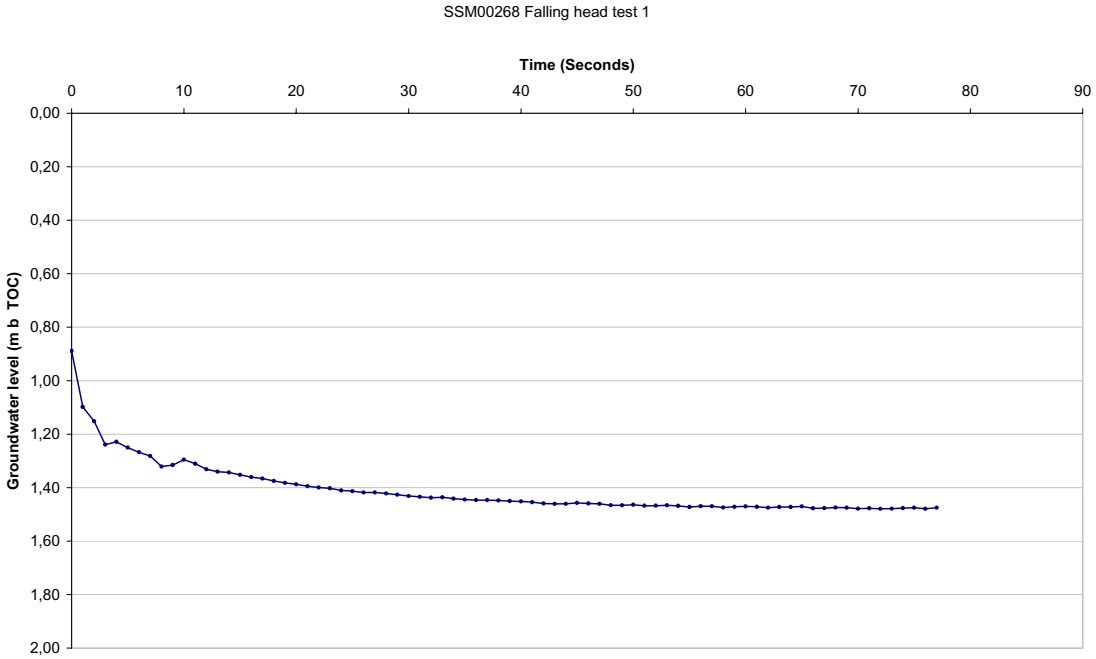
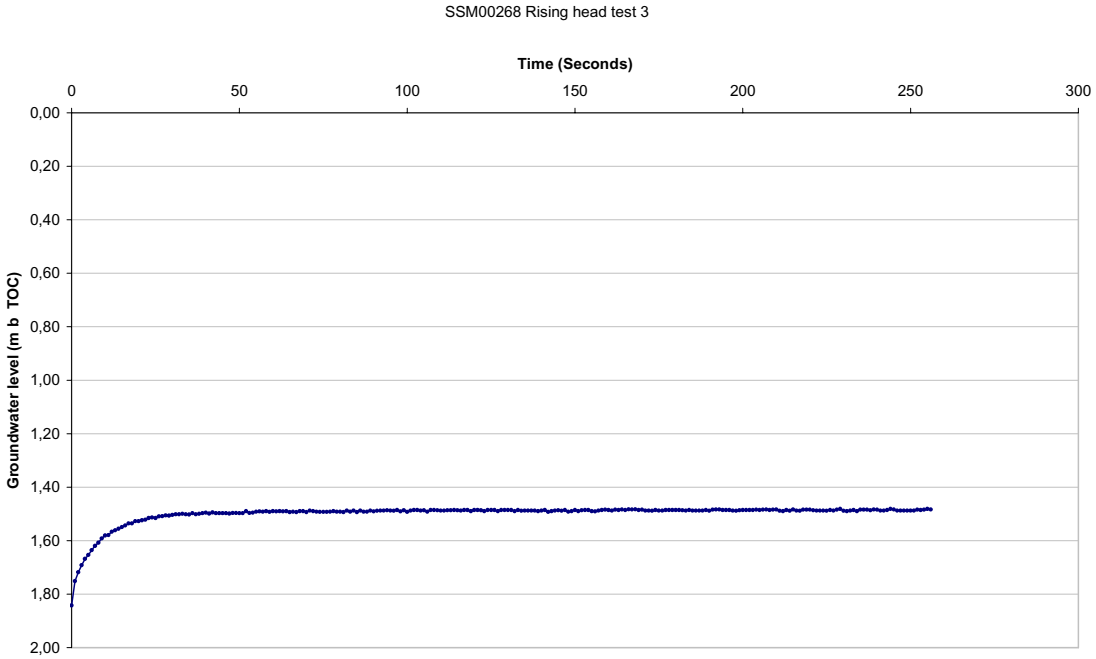




Dämmen and Långekärr SSM00268





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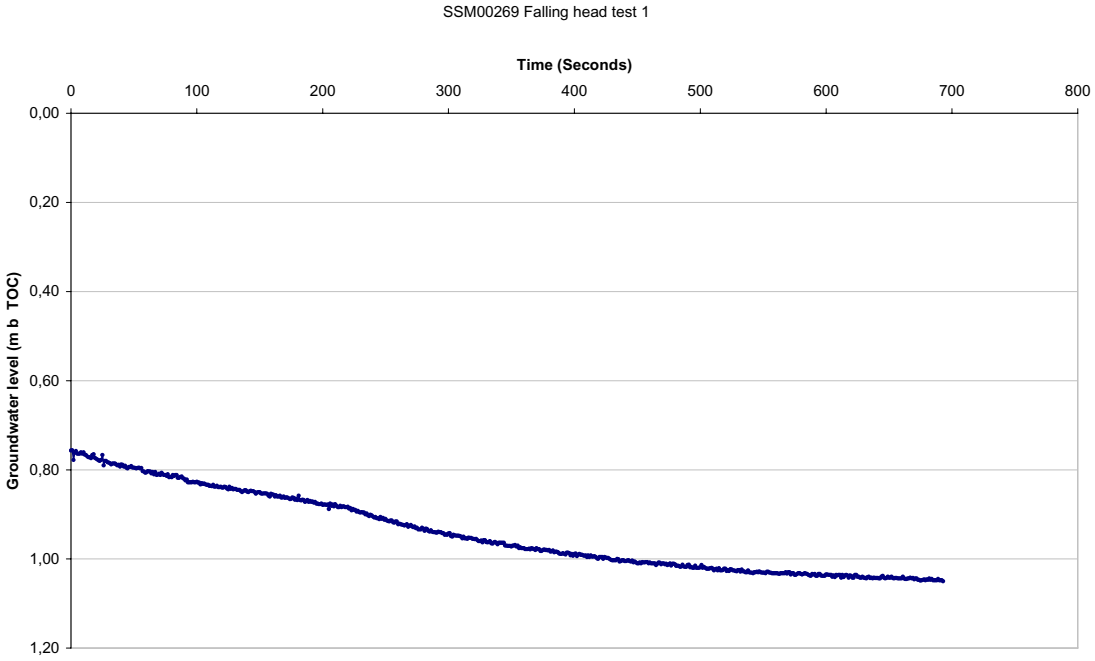
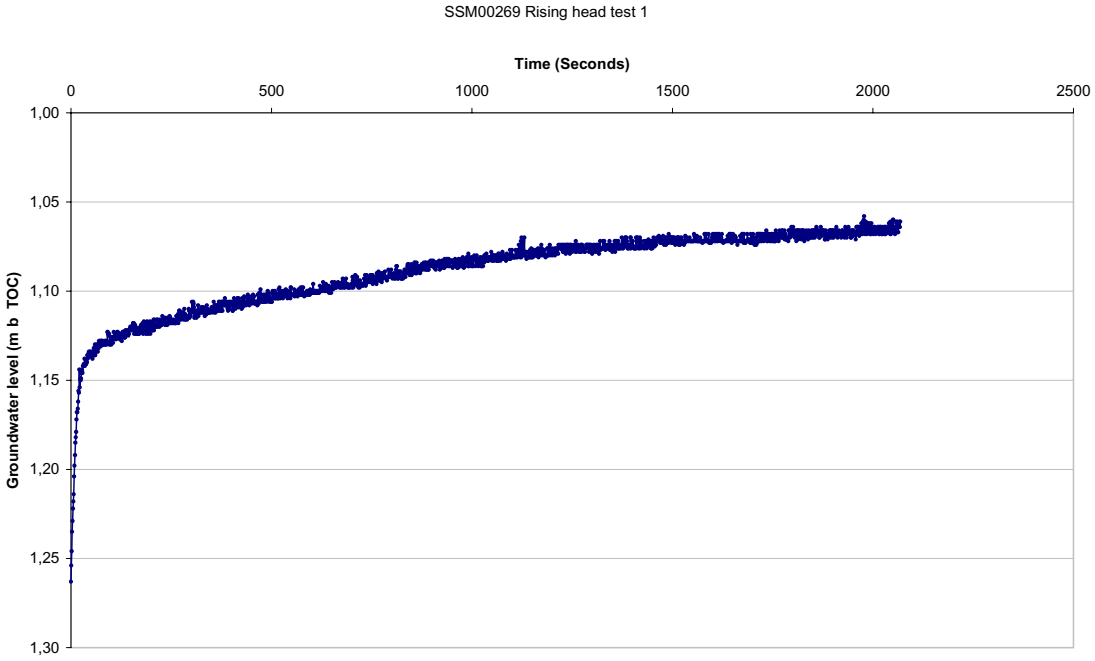
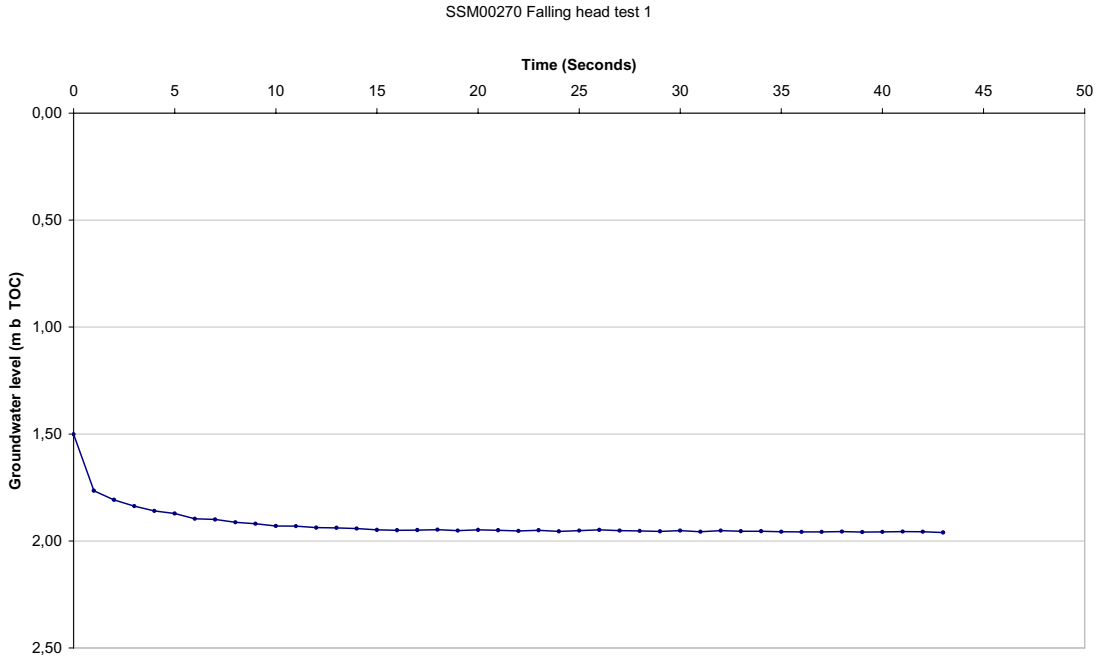
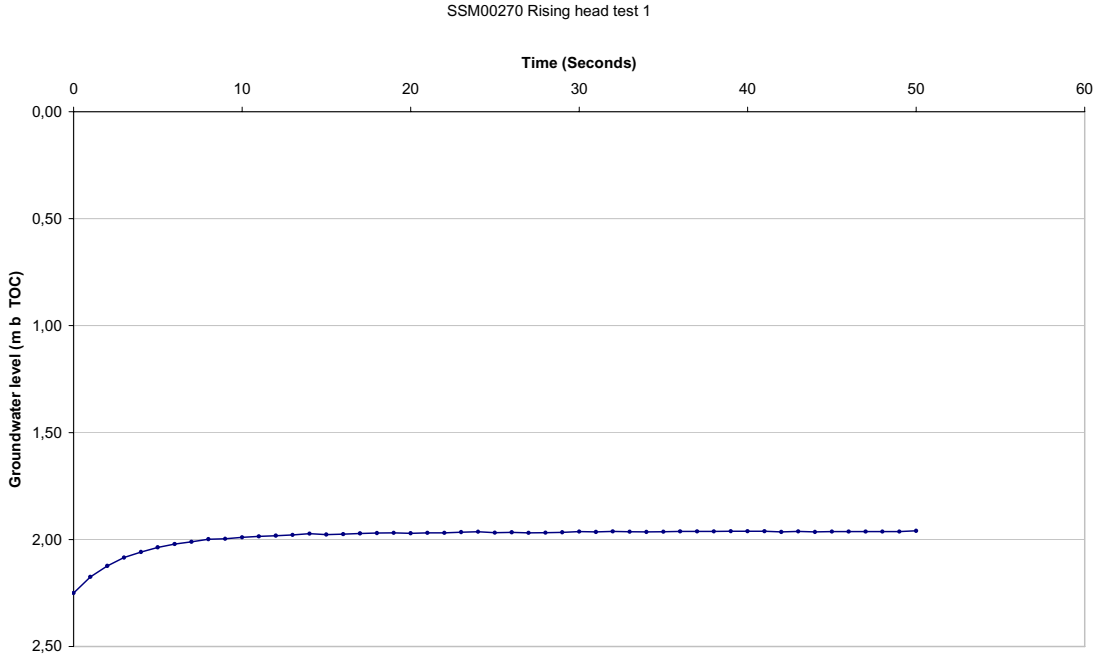




Dämmen and Långekärr SSM00270





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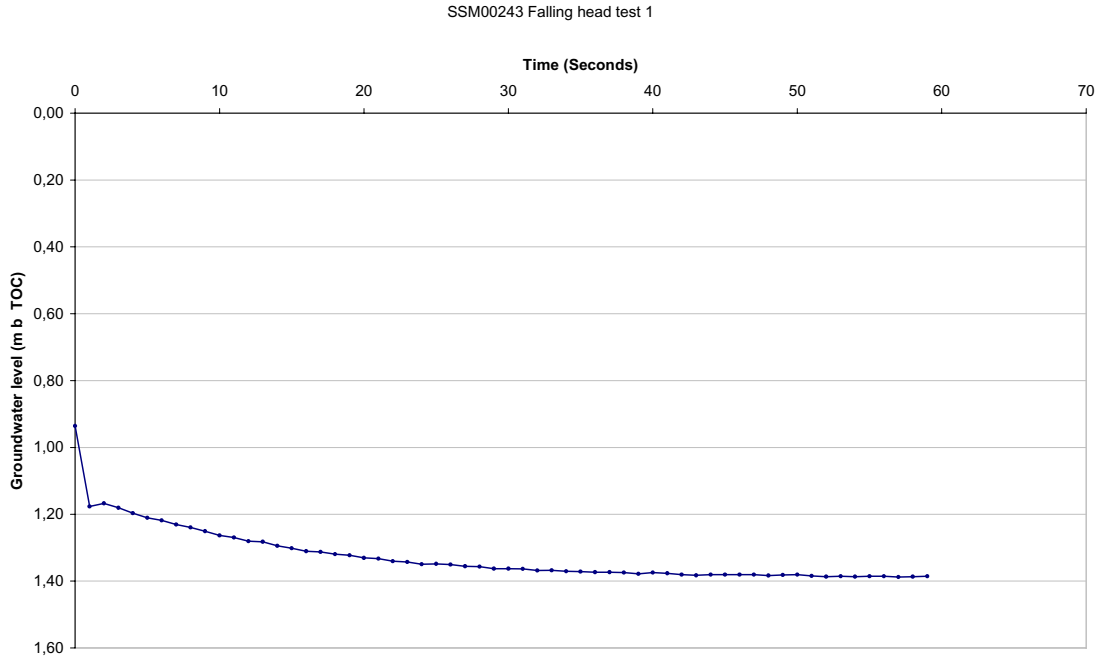
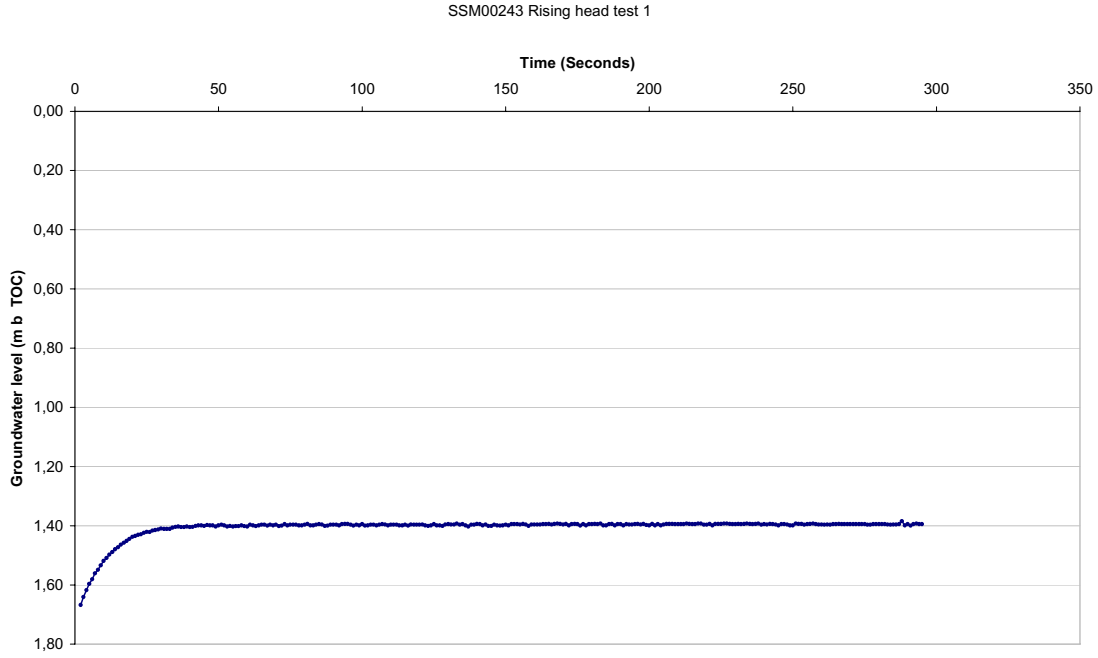
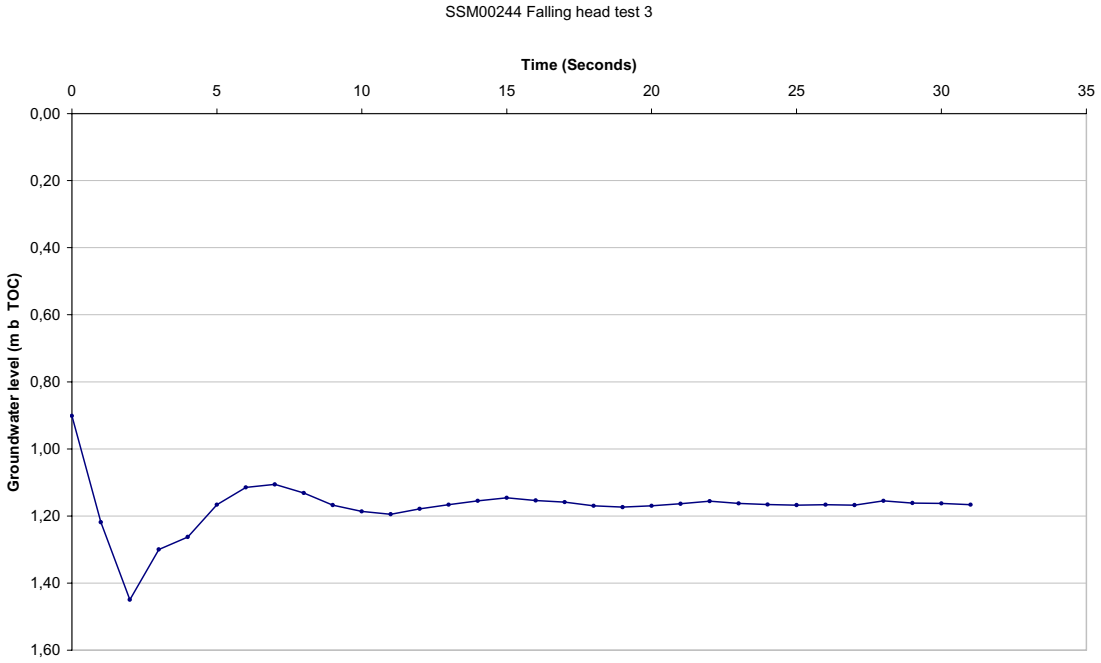
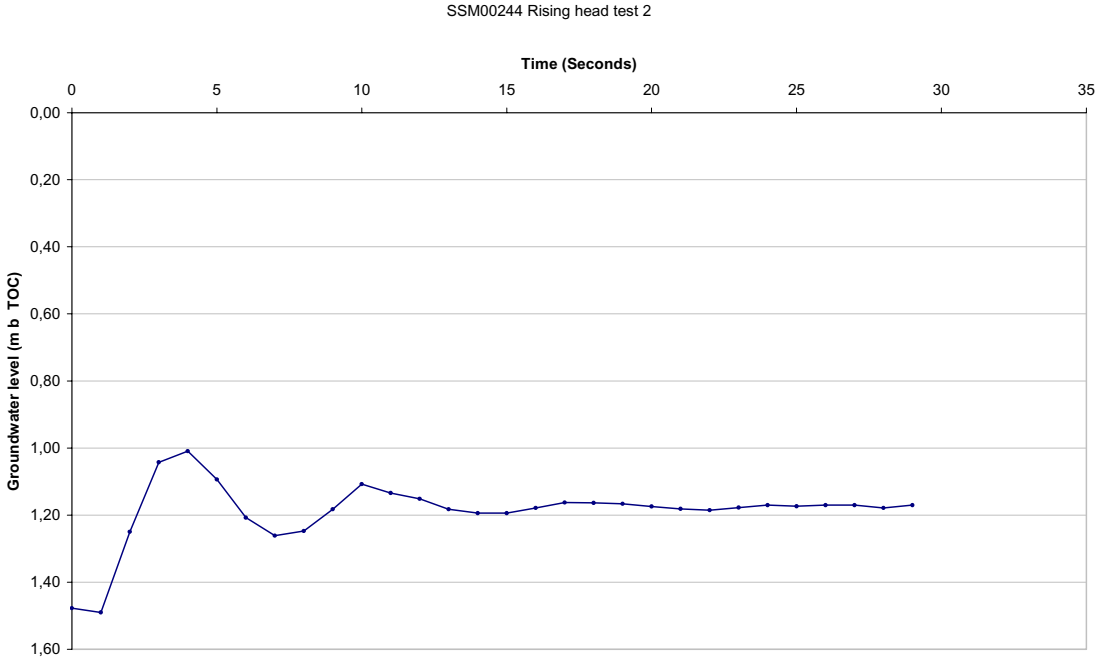


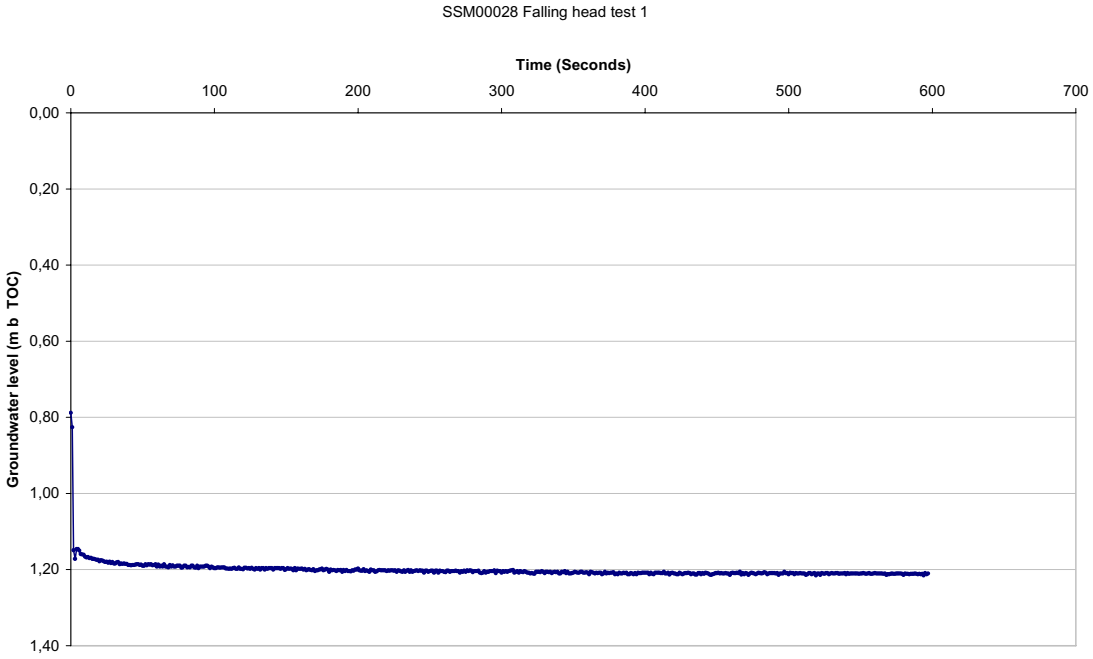


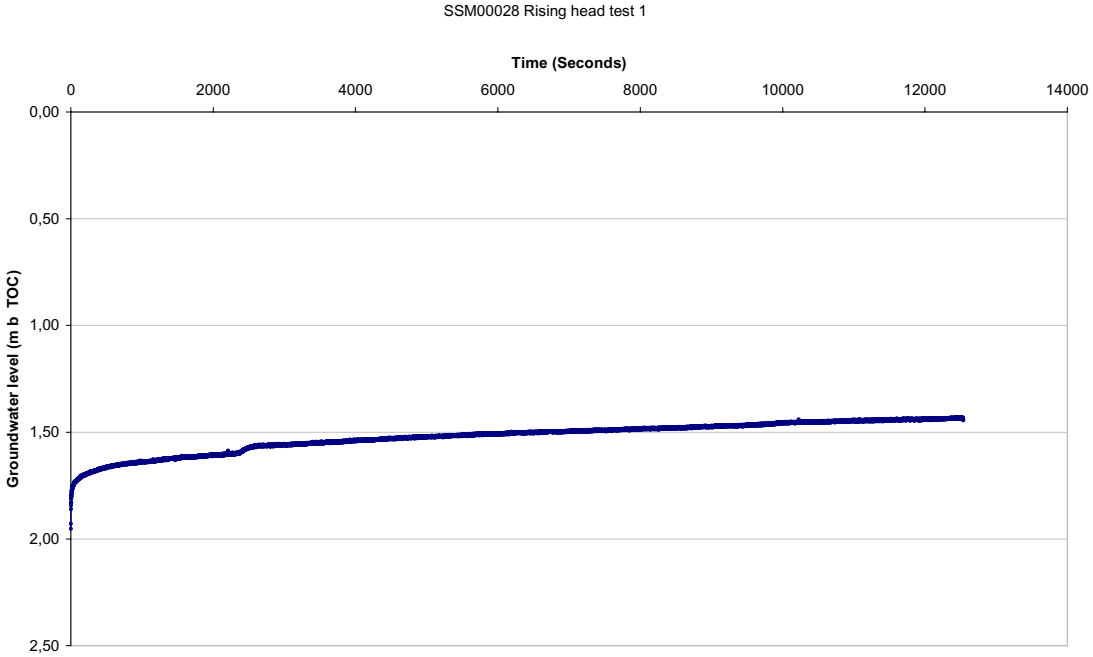
Other areas SSM00244



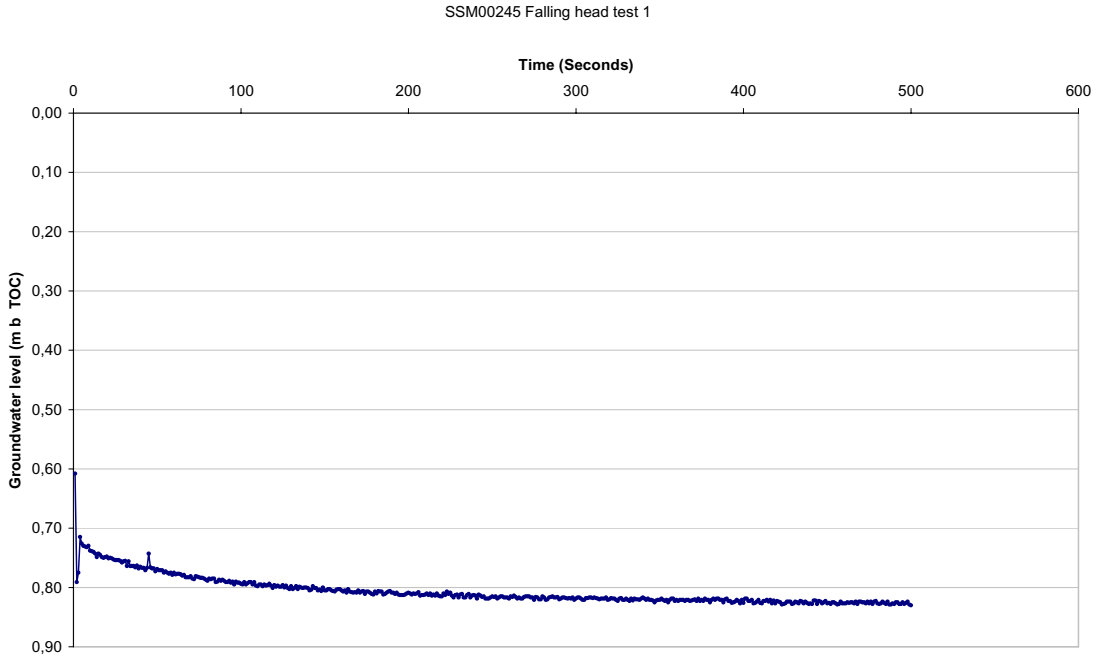


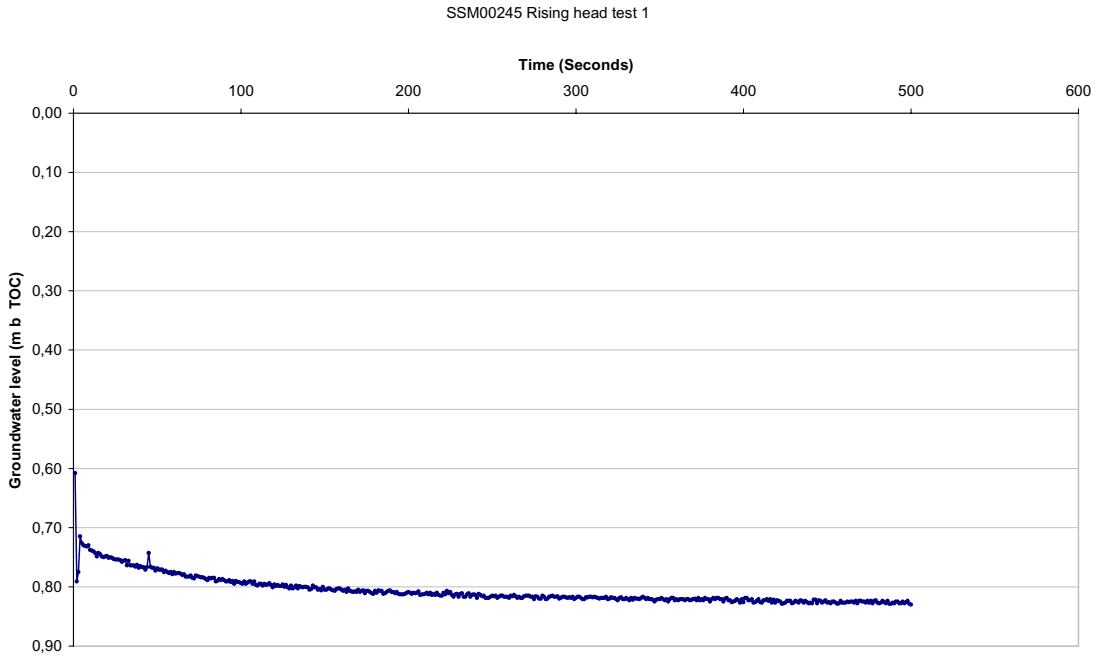
Other areas SSM00028



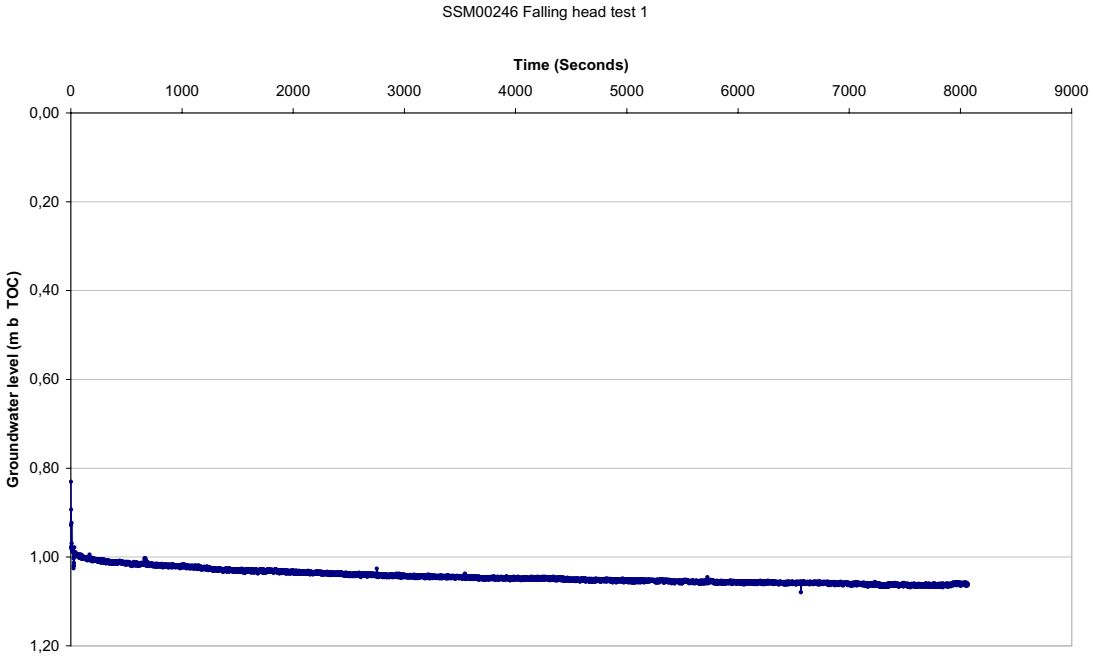


Other areas SSM00245

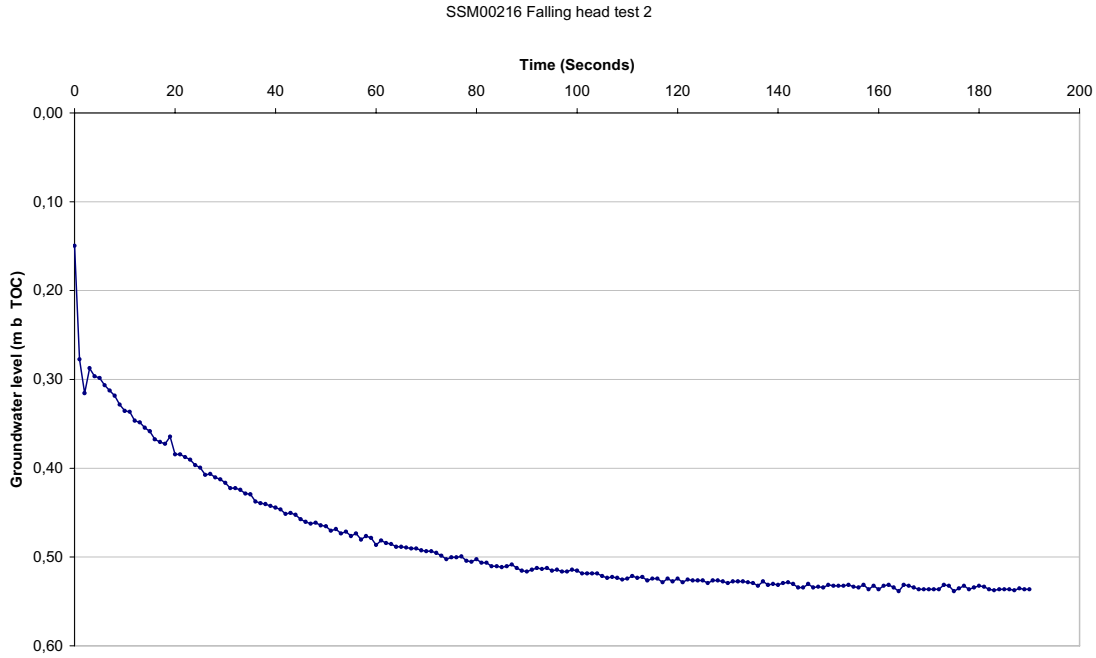


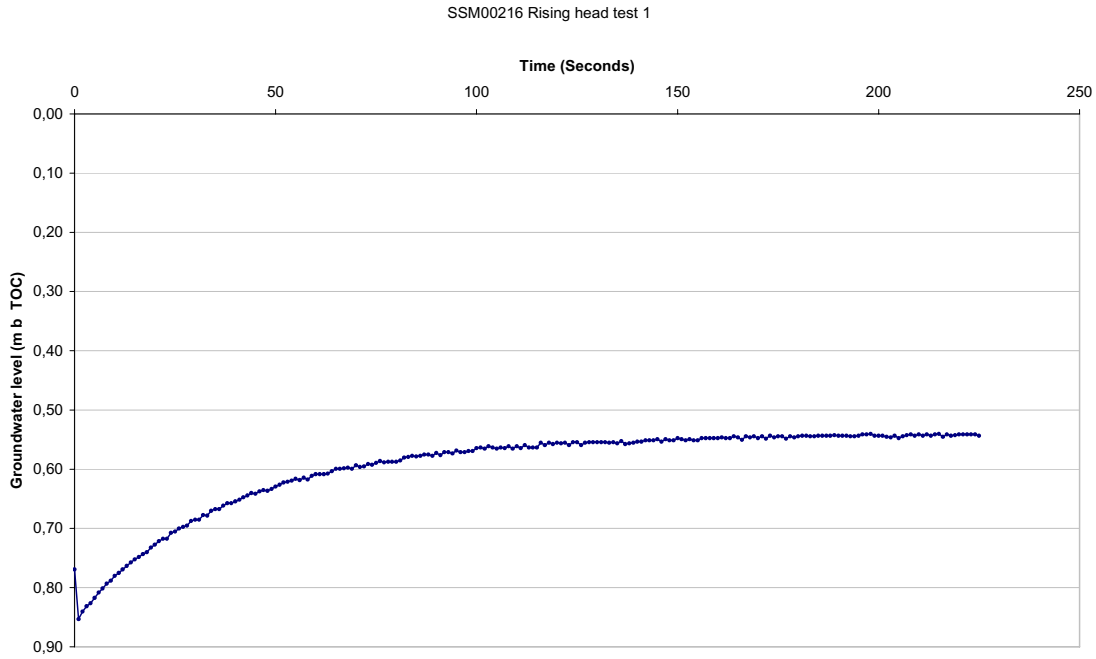


Other areas SSM00246



Other areas SSM00216

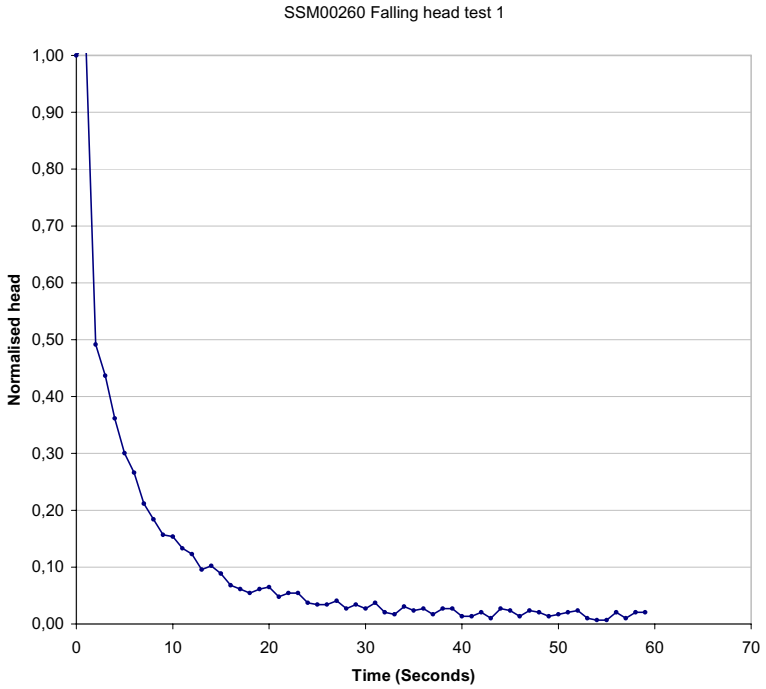


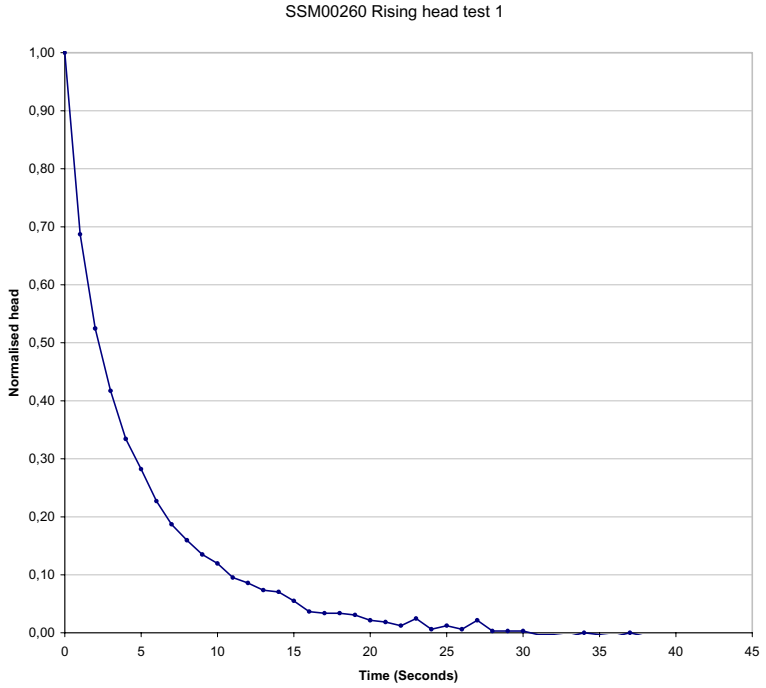


Appendix B

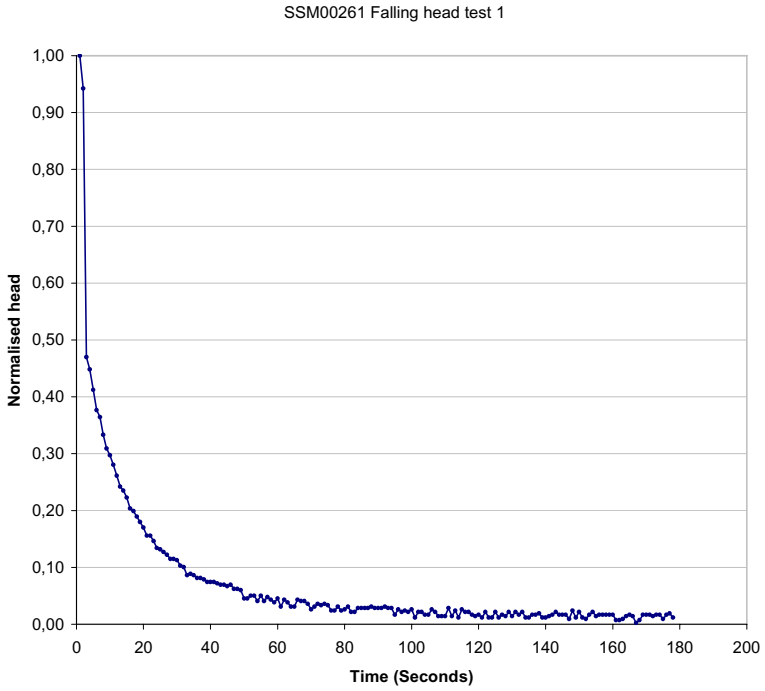
Normalised slug test plots

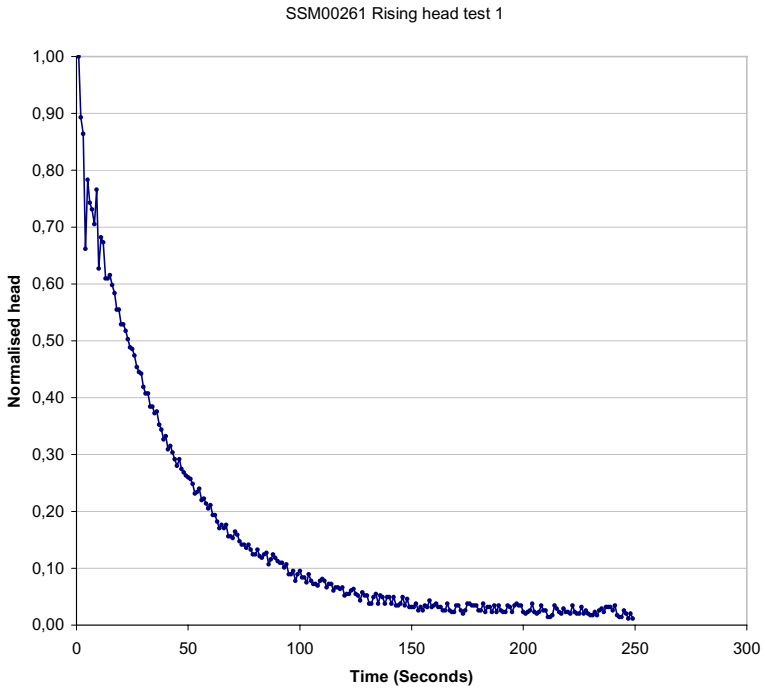
Mederhult SSM00260, SSM00261



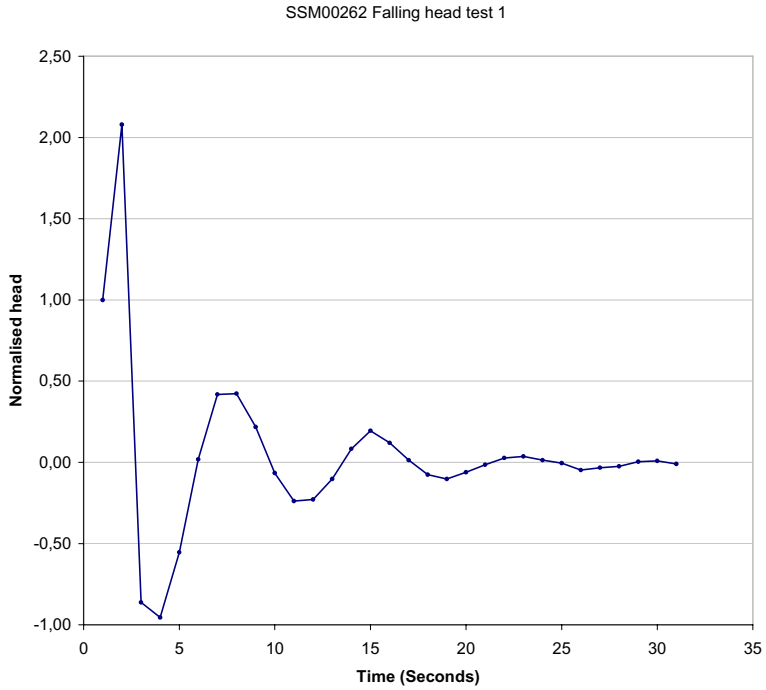


Mederhult SSM00261

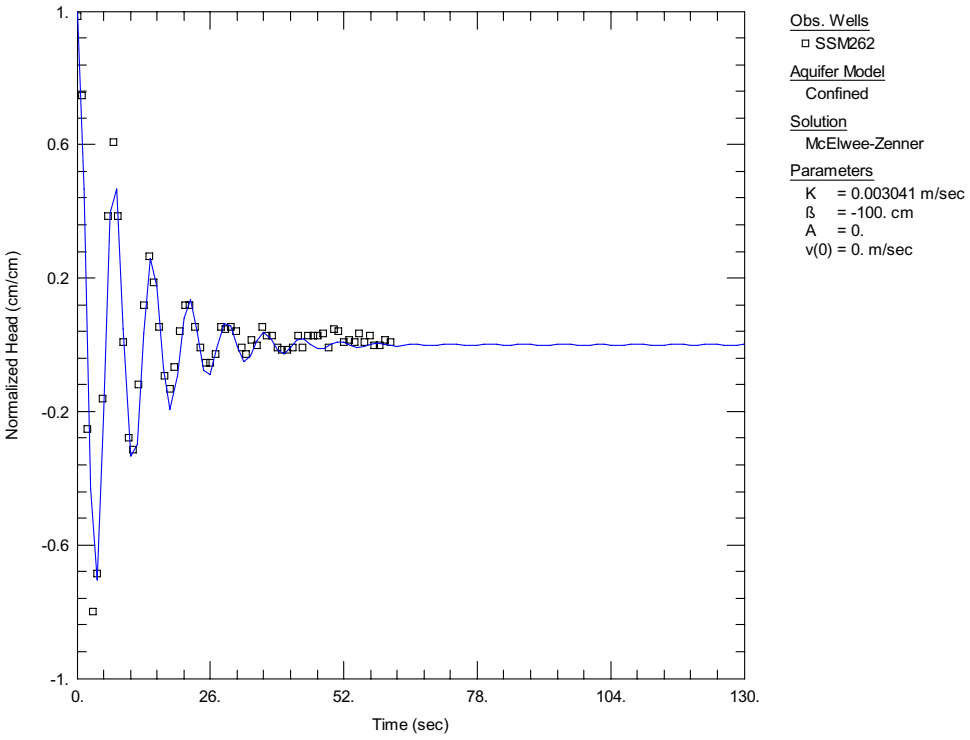




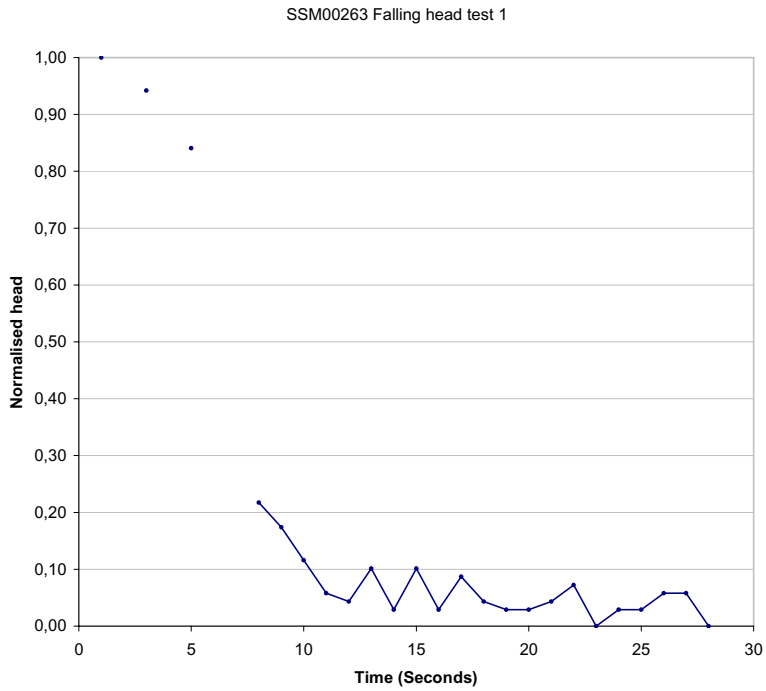
Ekerumsån SSM00262

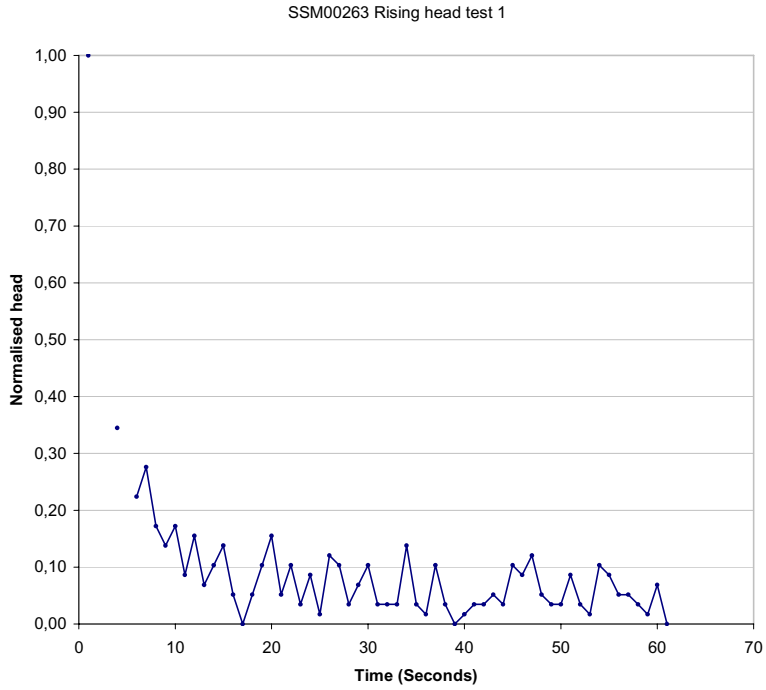


SSM000262 Rising head

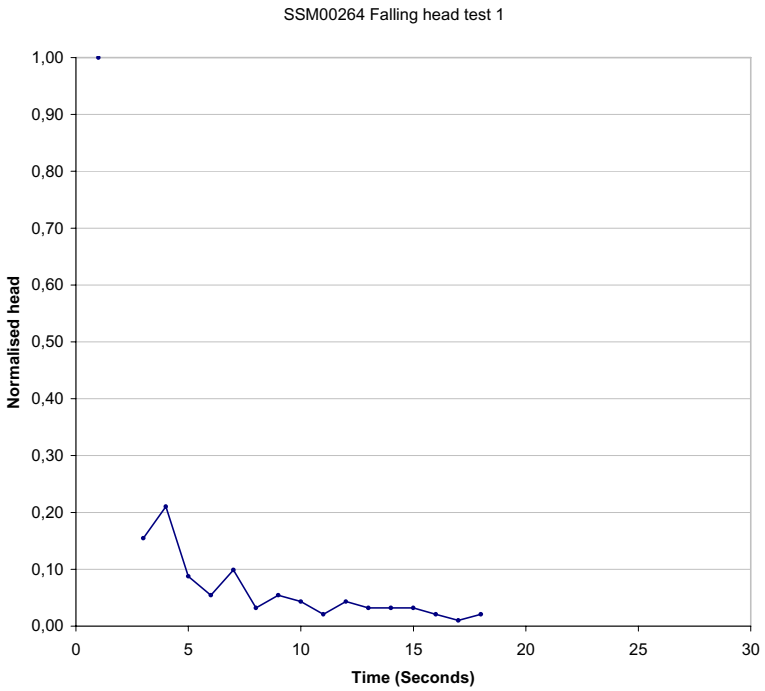


Laxemarån SSM00263



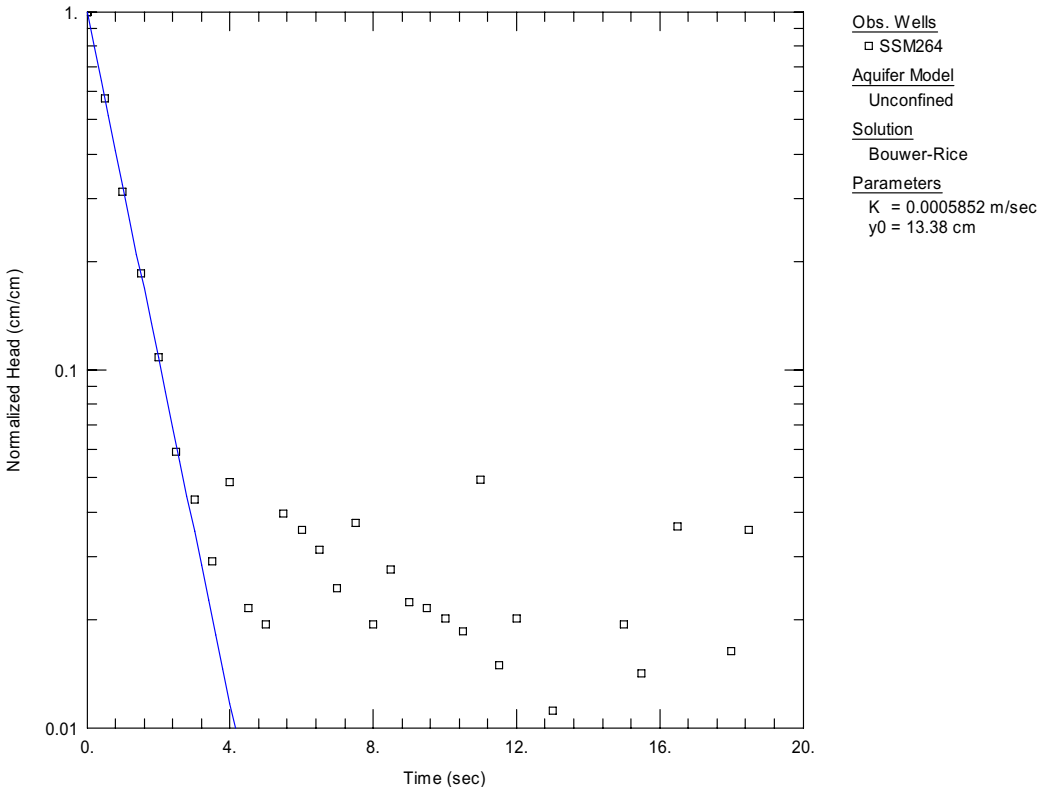


Horvan Syd SSM00264

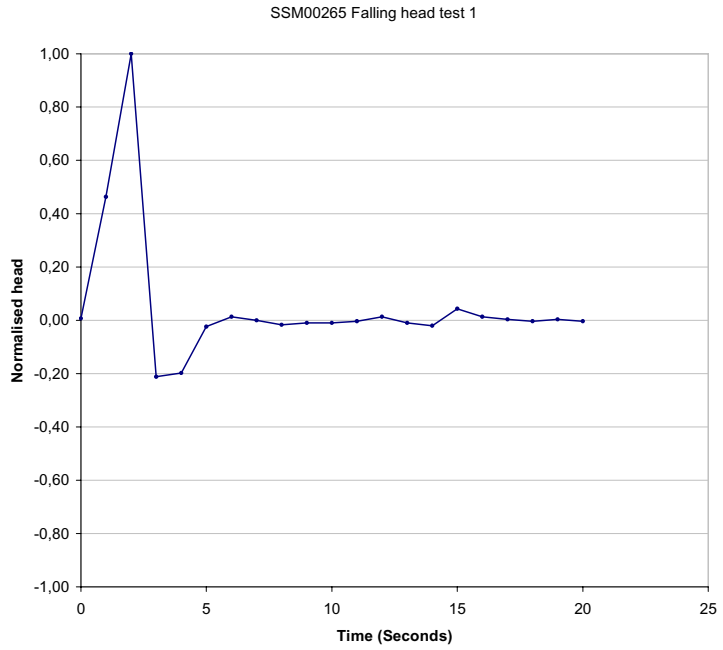


SSM00264 falling head test results uncertain, too little water- not covering top of slug

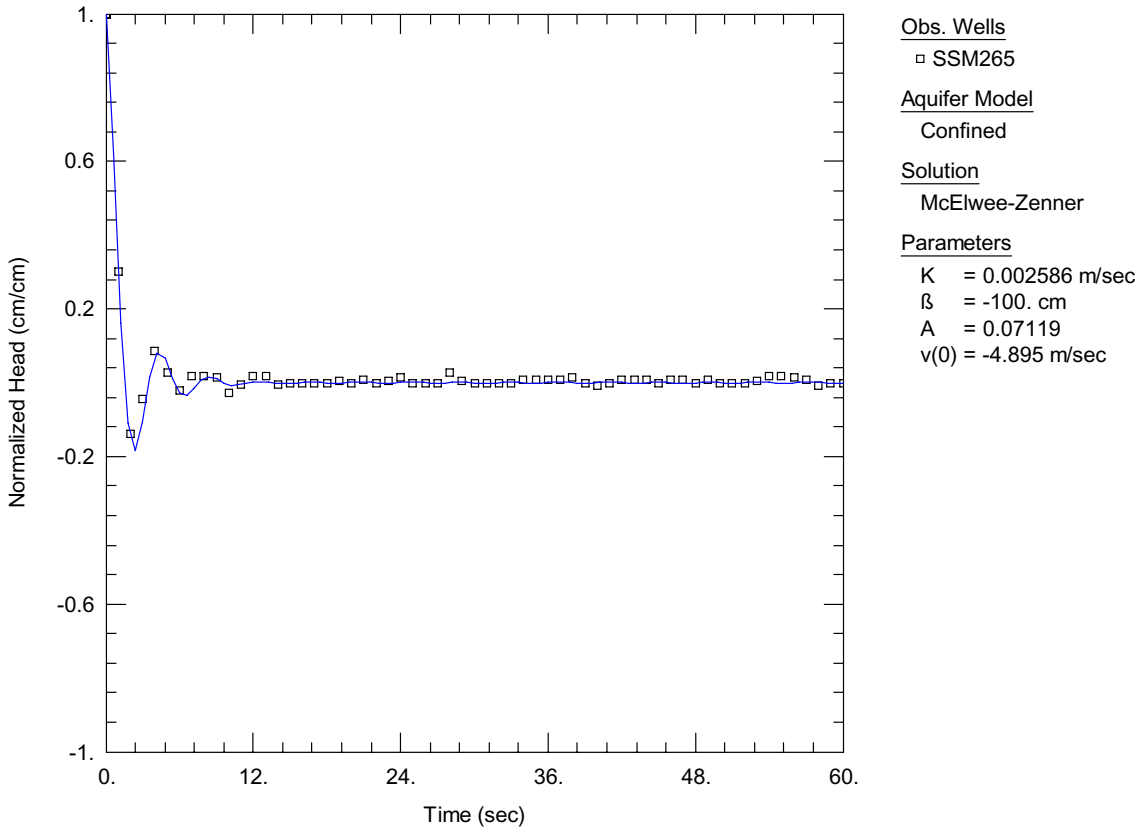
SSM000264 Test 2, rising head



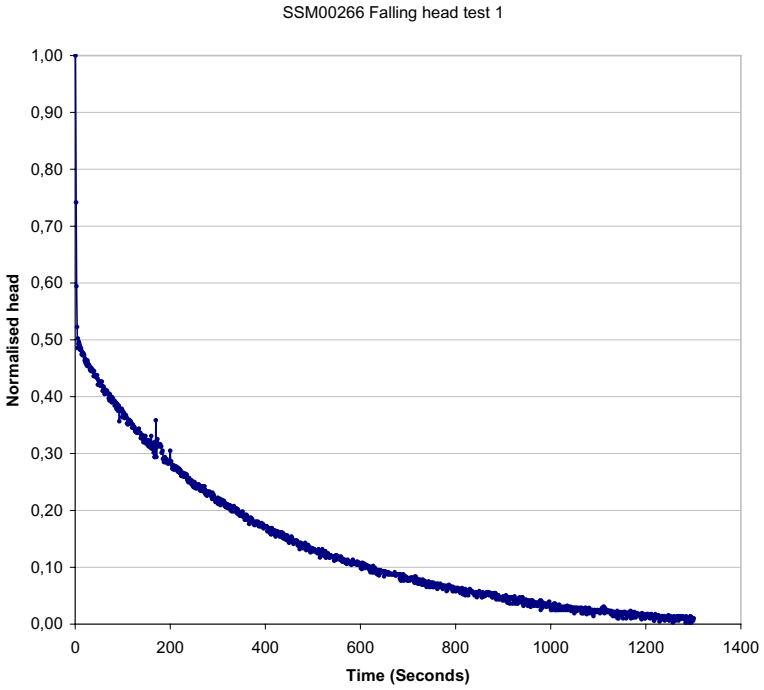
Horvan Syd SSM00265

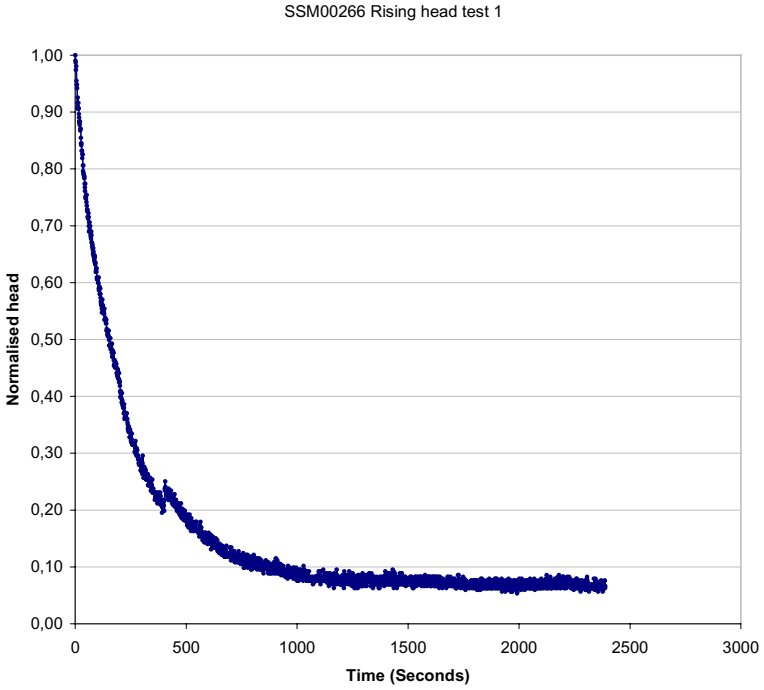


Horvan syd SSM00265 Rising head

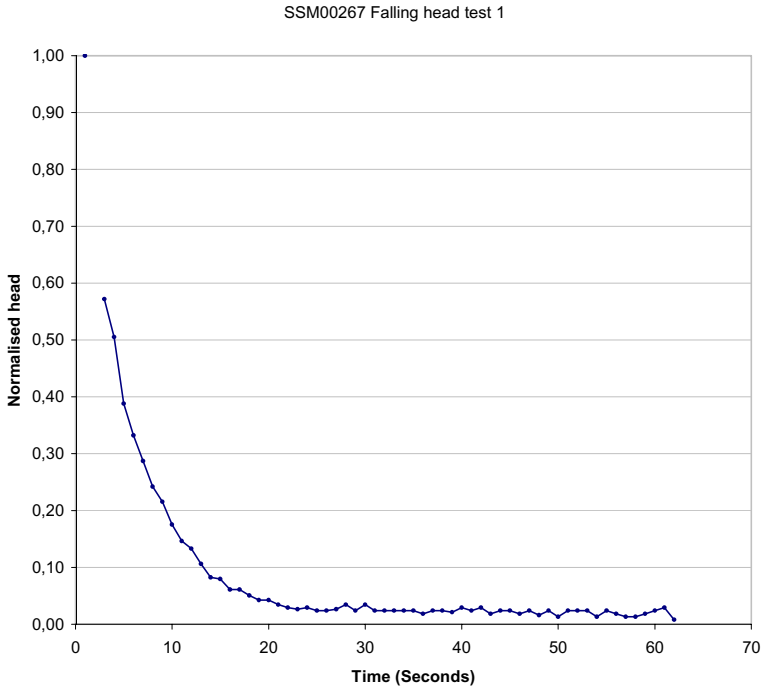


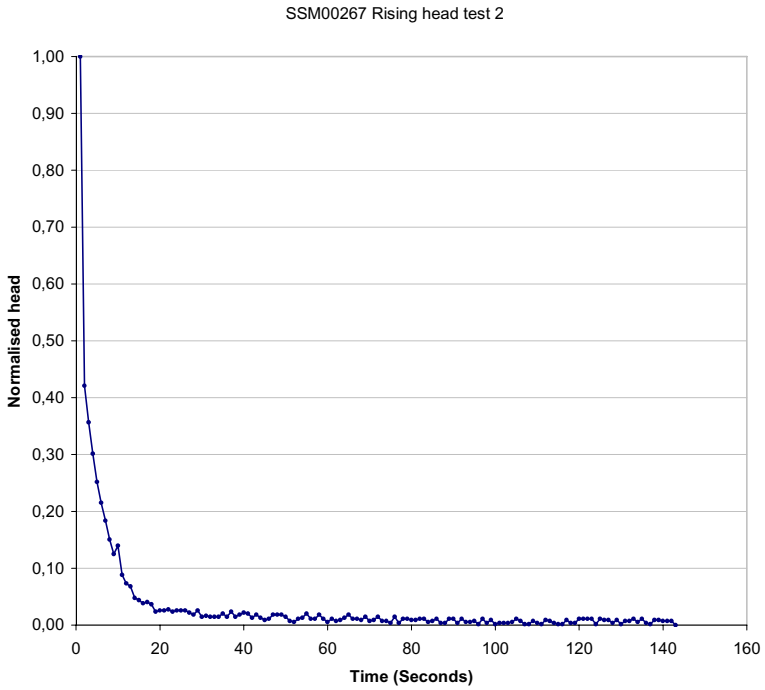
Horvan Syd SSM00266



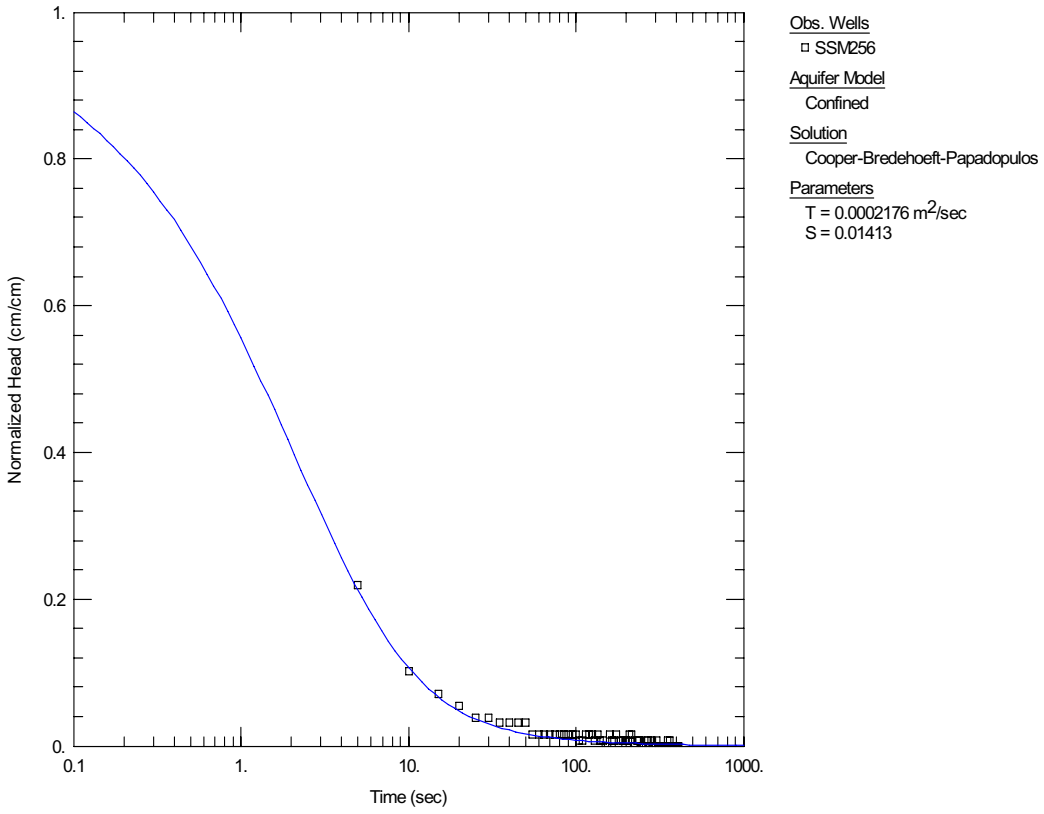


Leräangarna SSM00267

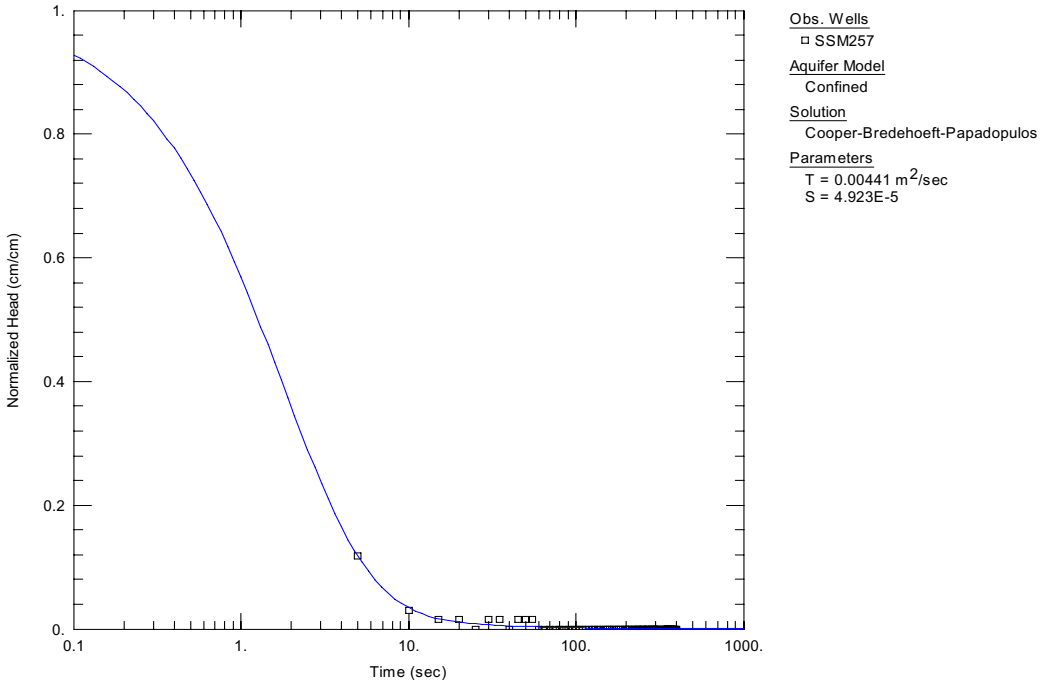




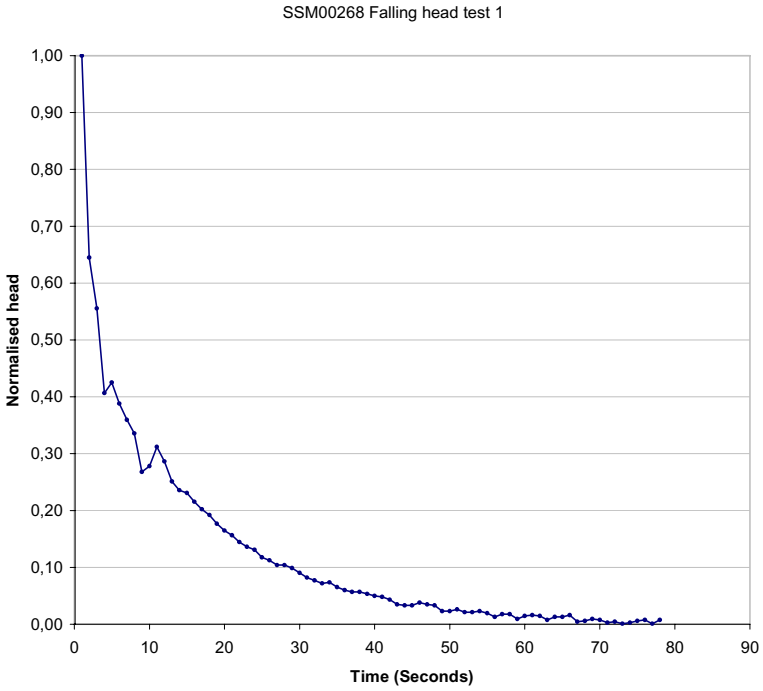
Lerängarna SSM000256

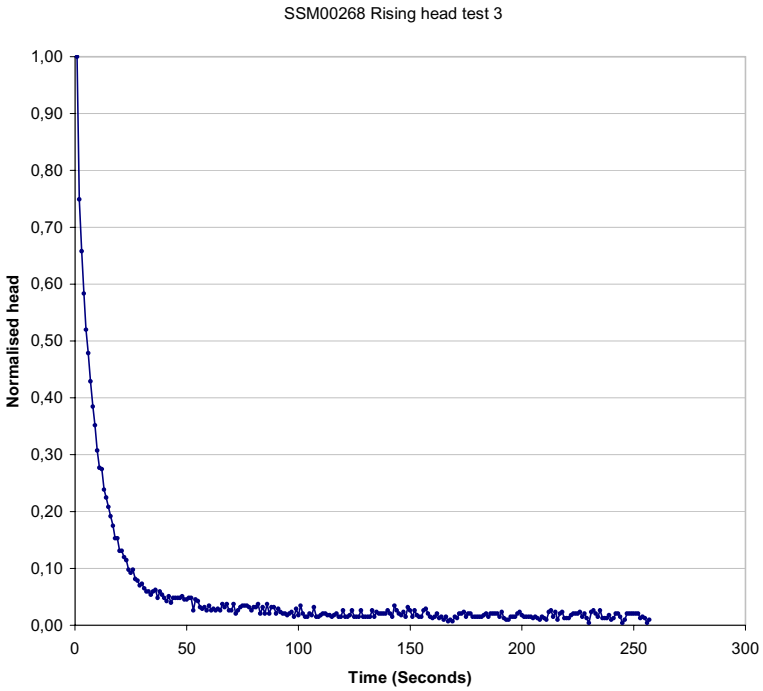


Lerängarna SSM000257

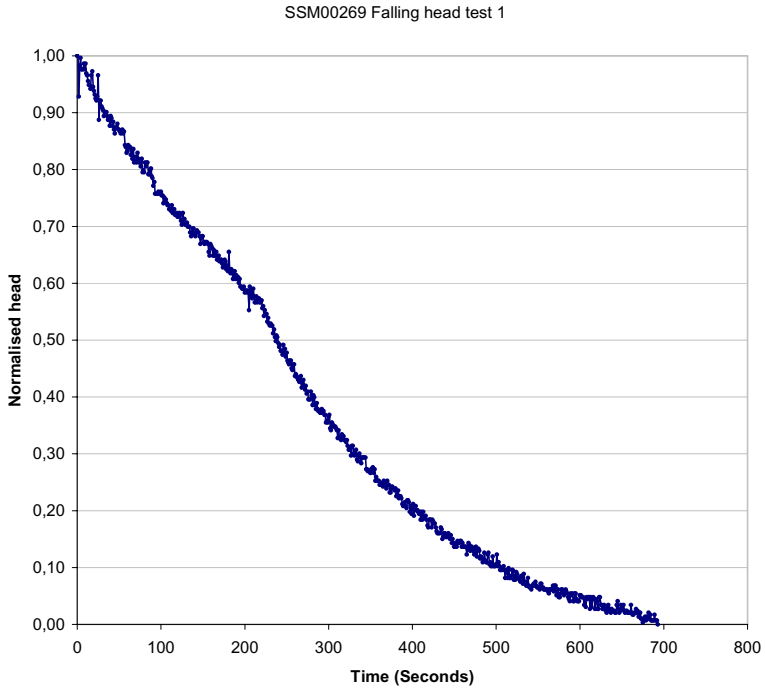


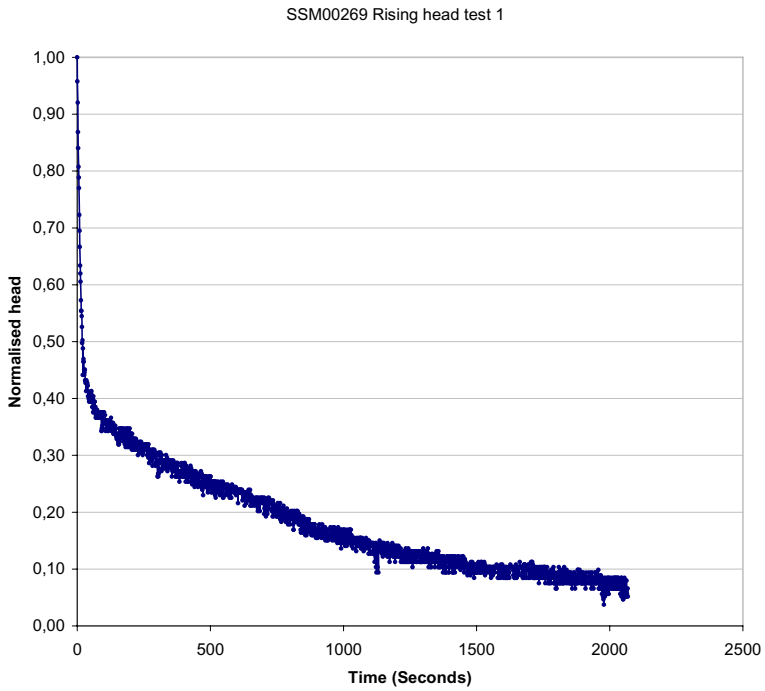
Dämmen and Långekärr SSM00268



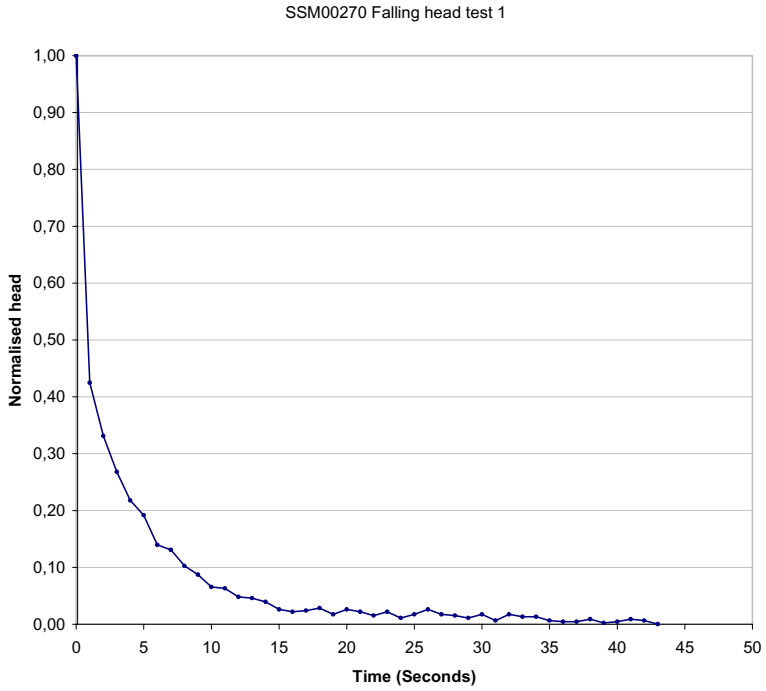


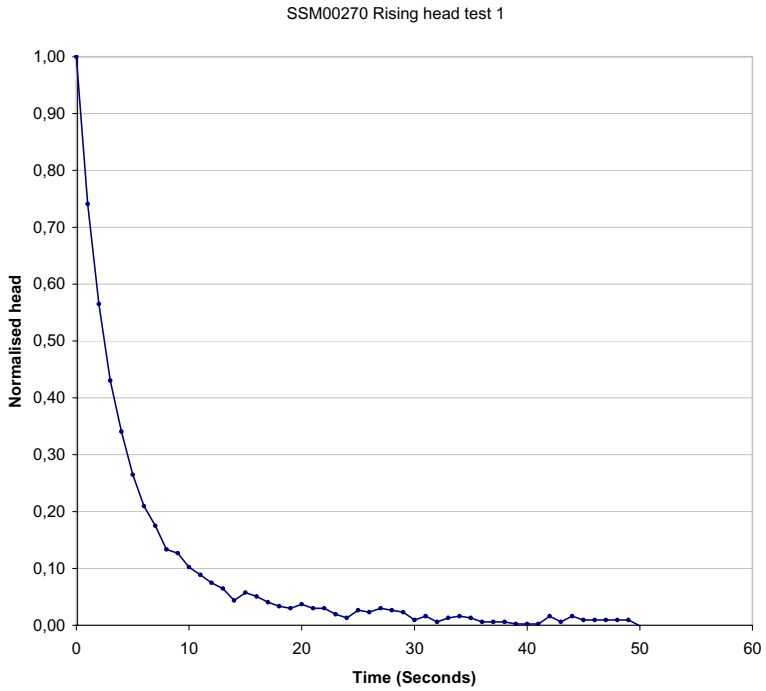
Dämmen and Långekärr SSM00269



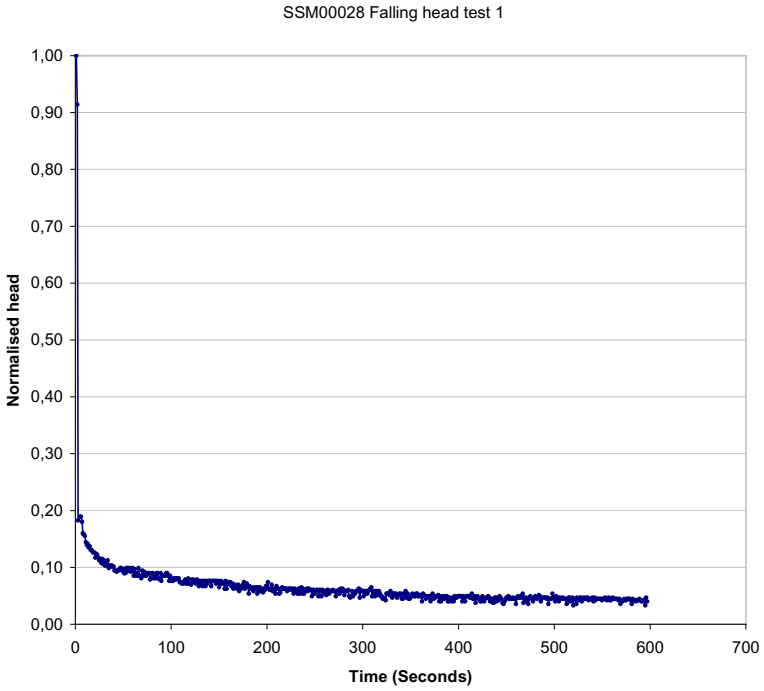


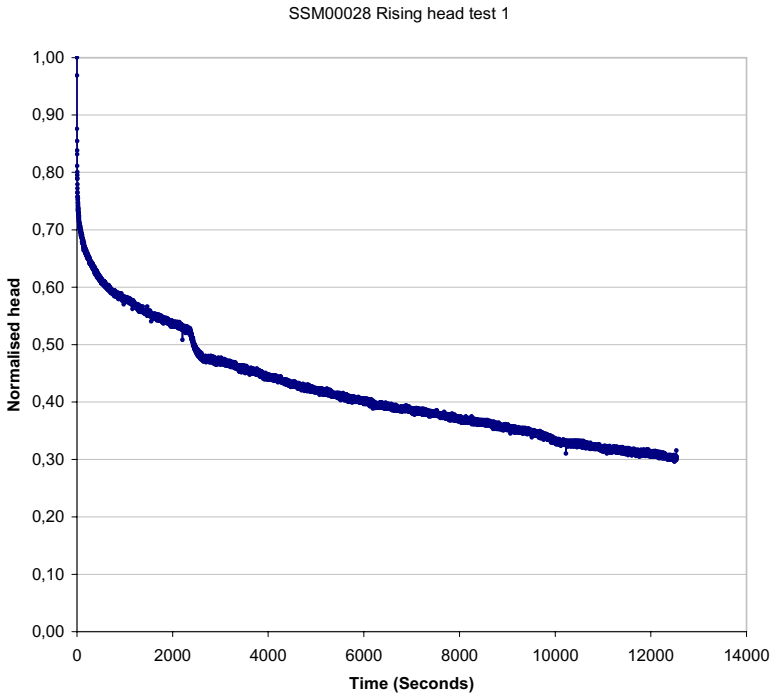
Dämmen and Långekärr SSM000270



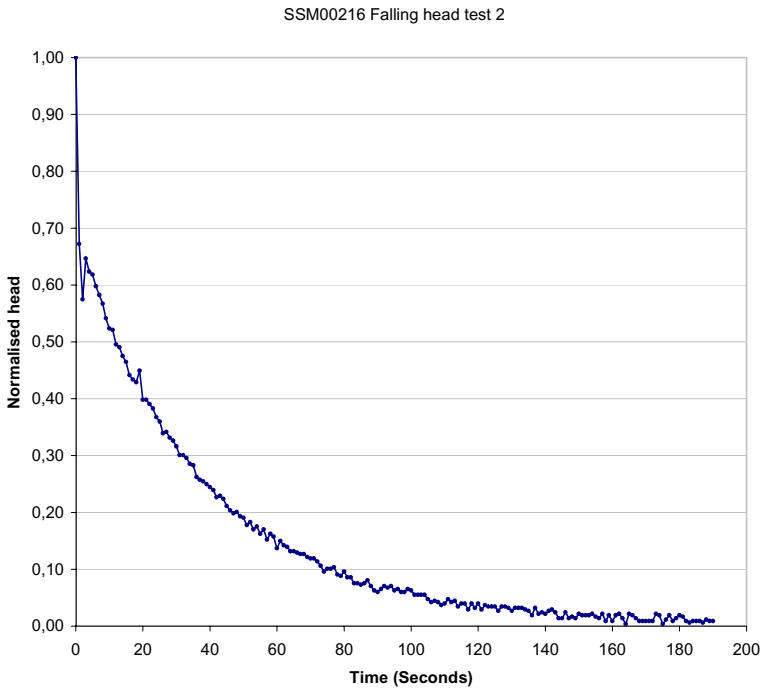


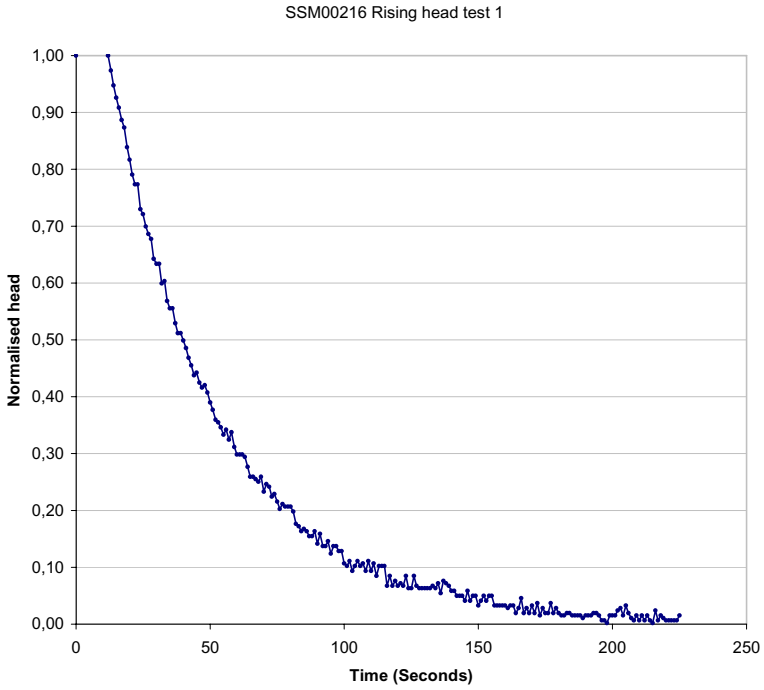
Other areas Gäster SSM00028





Other areas Rågängarna SSM000216

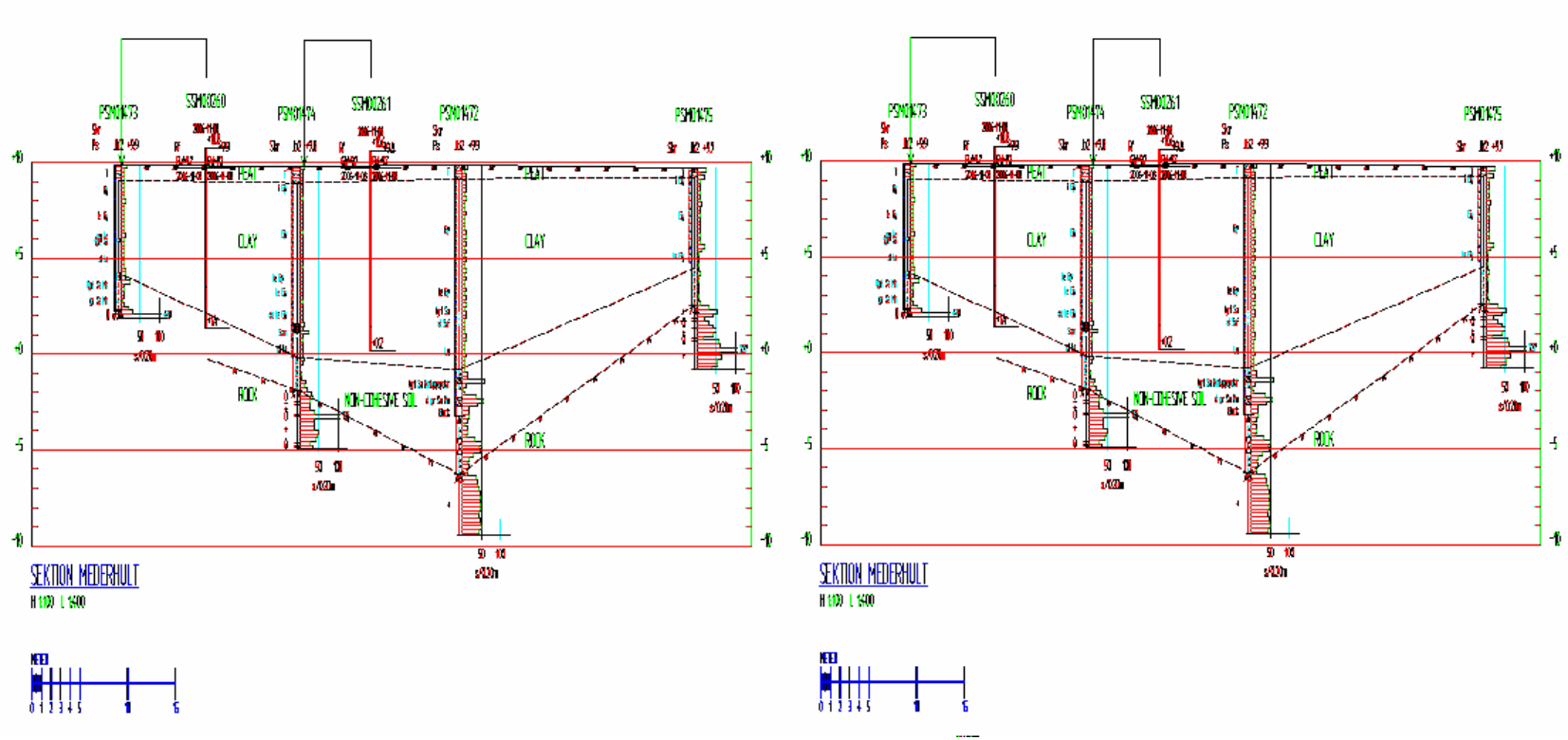




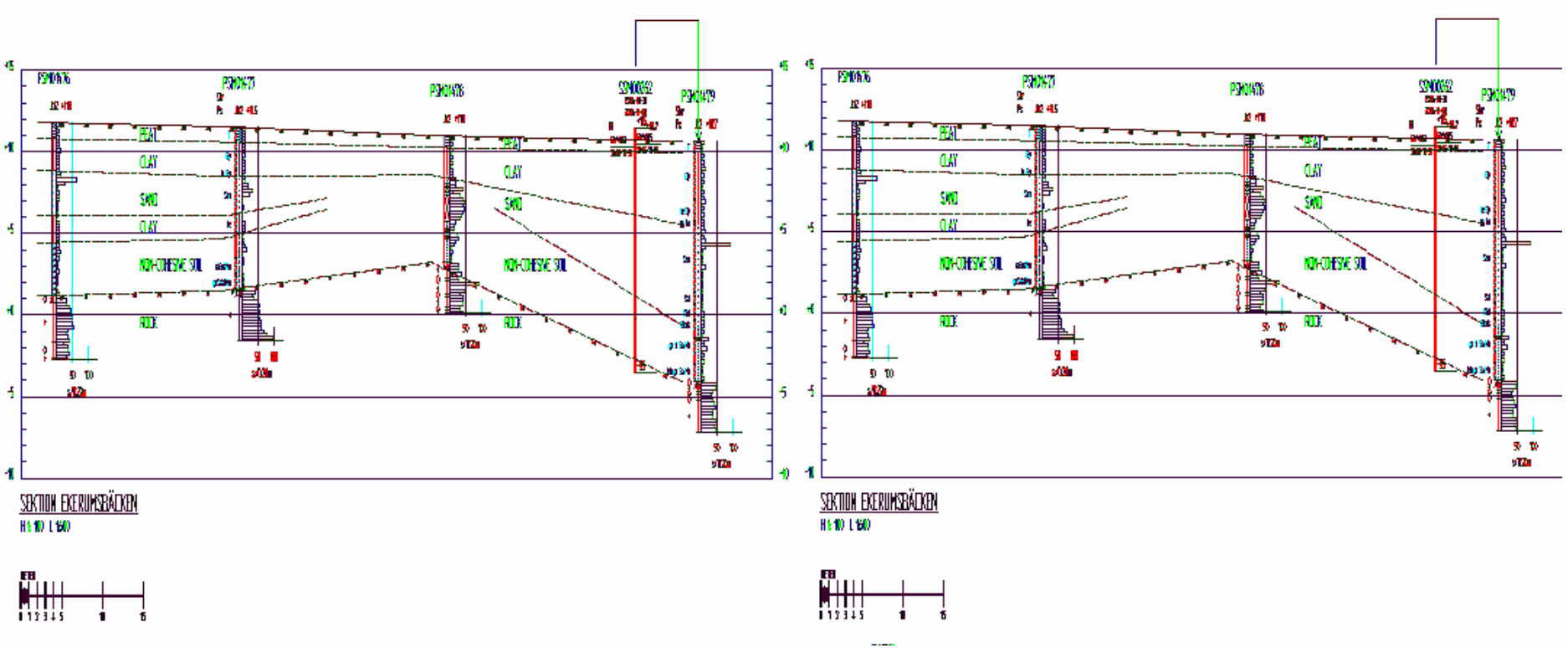
Cross sections of geological results

Geotechnical descriptions are found on www.sgf.net , “Beteckningssystem”. Borehole profiles are also presented in Appendix D
Probing hole and soil well profile

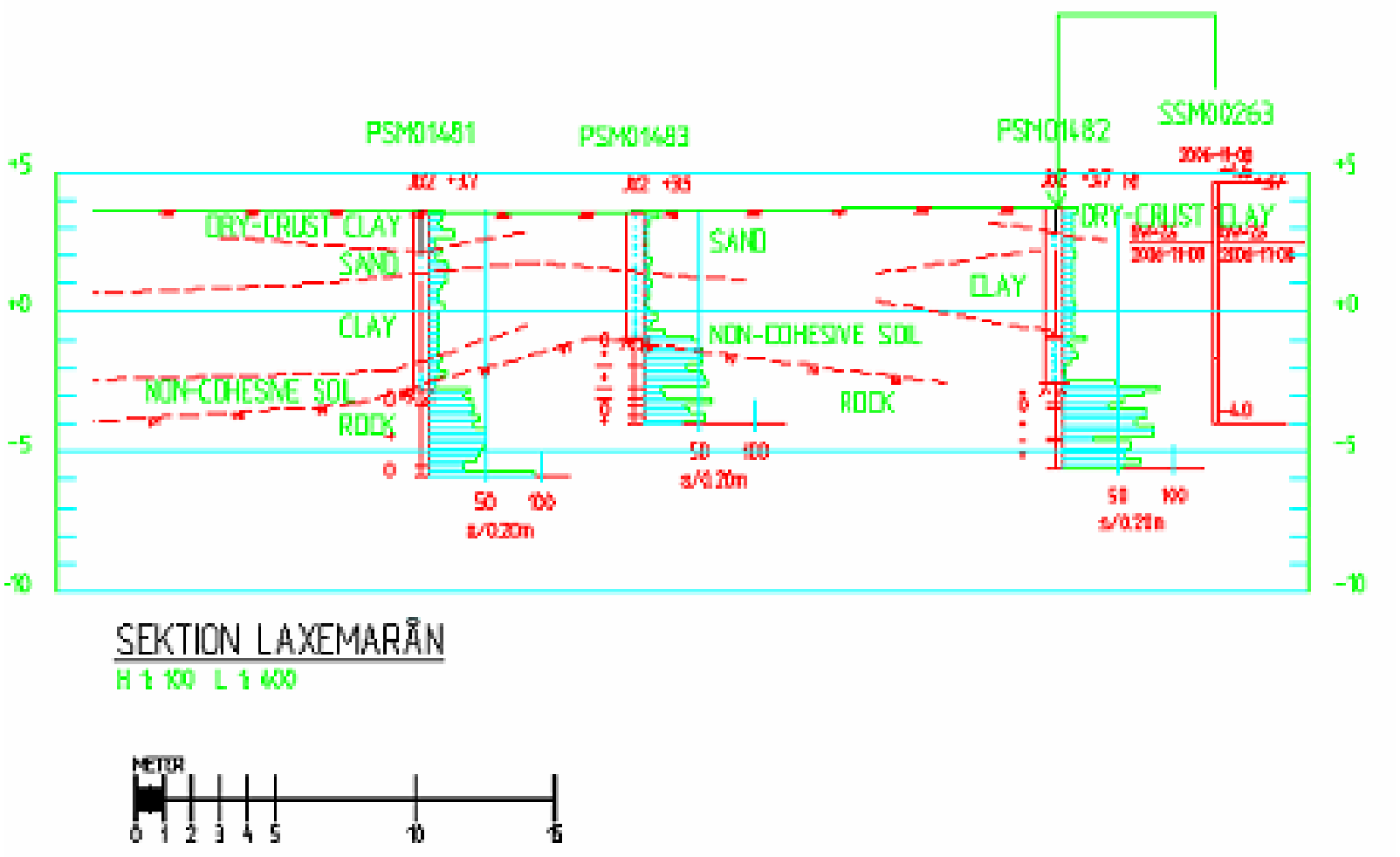
Mederhult Borehole elevation seen from the south to the north. Observe that the drawing scale is distorted!



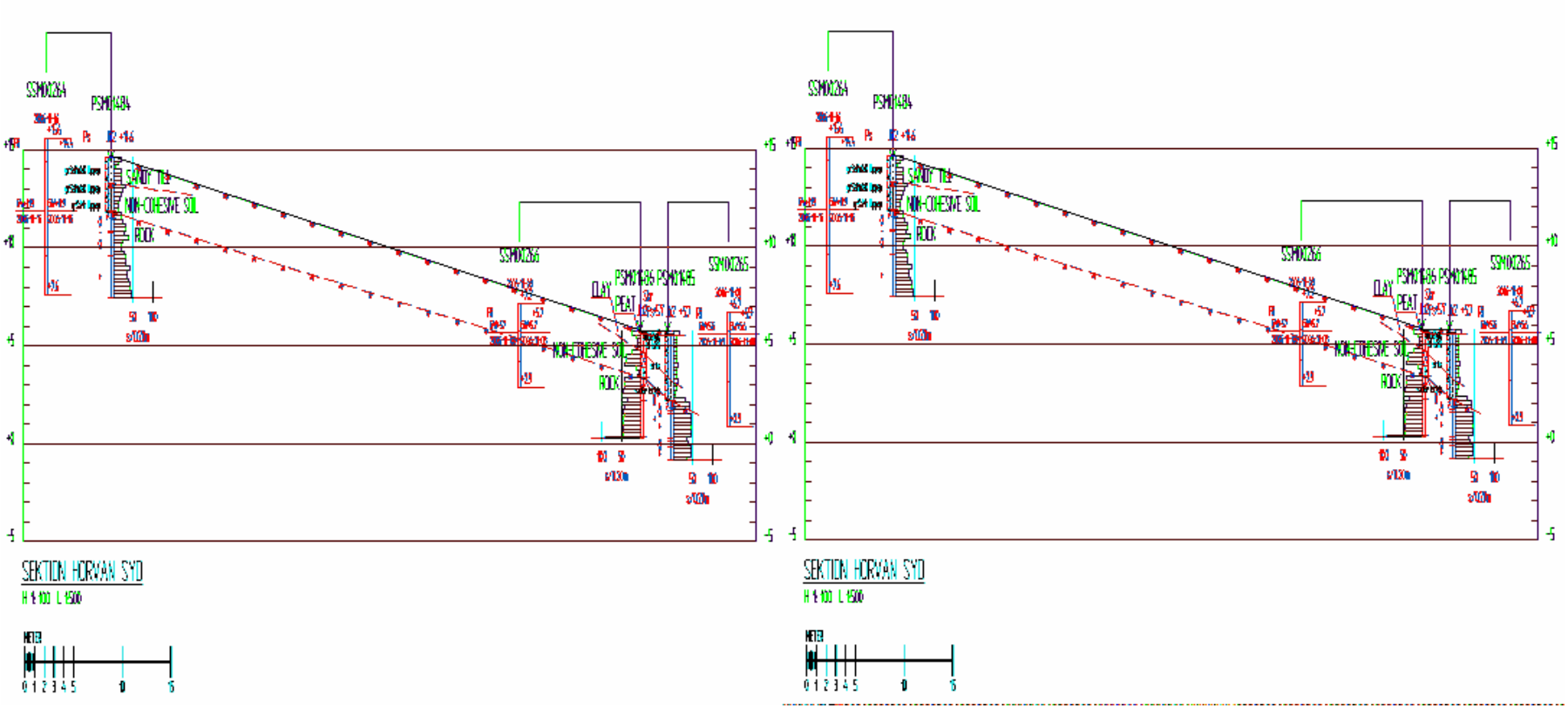
Ekerumsån Borehole elevation seen from the south to the north. Observe that the drawing scale is distorted!



Laxemarån Borehole elevation seen from the south to the north. Observe that the drawing scale is distorted!



Horvan Syd Borehole elevation seen from the south to the north. Observe that the drawing scale is distorted!



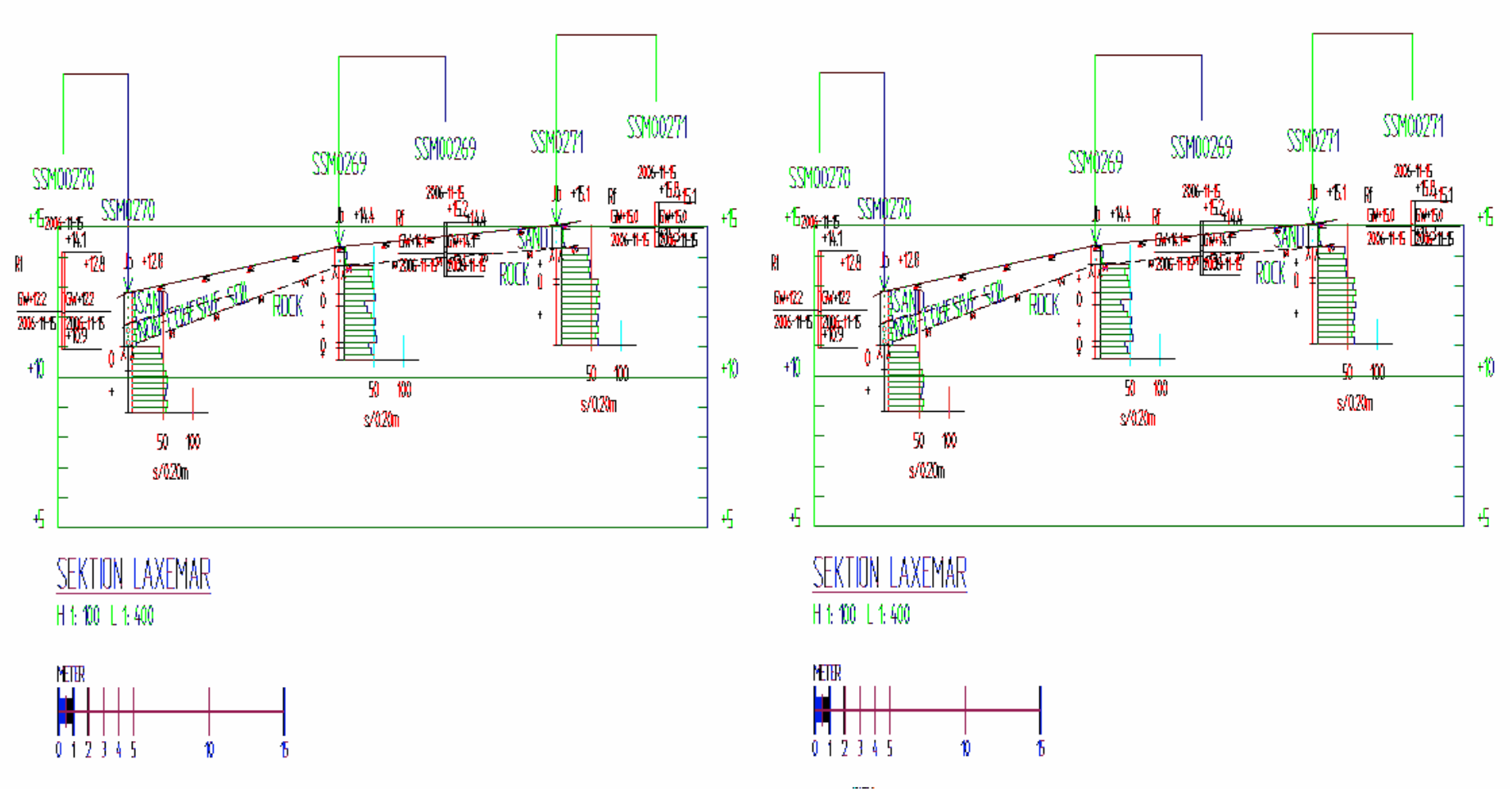
SSH00264
PSH01484
SAND TILL
NON-COHESIVE SOIL
ROCK
SSH00266
CLAY
PEAT
PSH01486
PSH01485
SSH00265
SEKTION HORVAN SYD
H 1:100 L 1:500
METER
0 1 2 3 4 5 10 15

Lerängarna See Appendix D Probing hole and soil well profile for PSM01487 and groundwater well SSM00267.

for borehole profile for PSM01487 and groundwater well SSM00267.

DämmenSee Appendix D Probing hole and soil well profile for groundwater well SSM00268.

Långekärr Borehole elevation seen from the south to the north. Observe that the drawing scale is distorted!

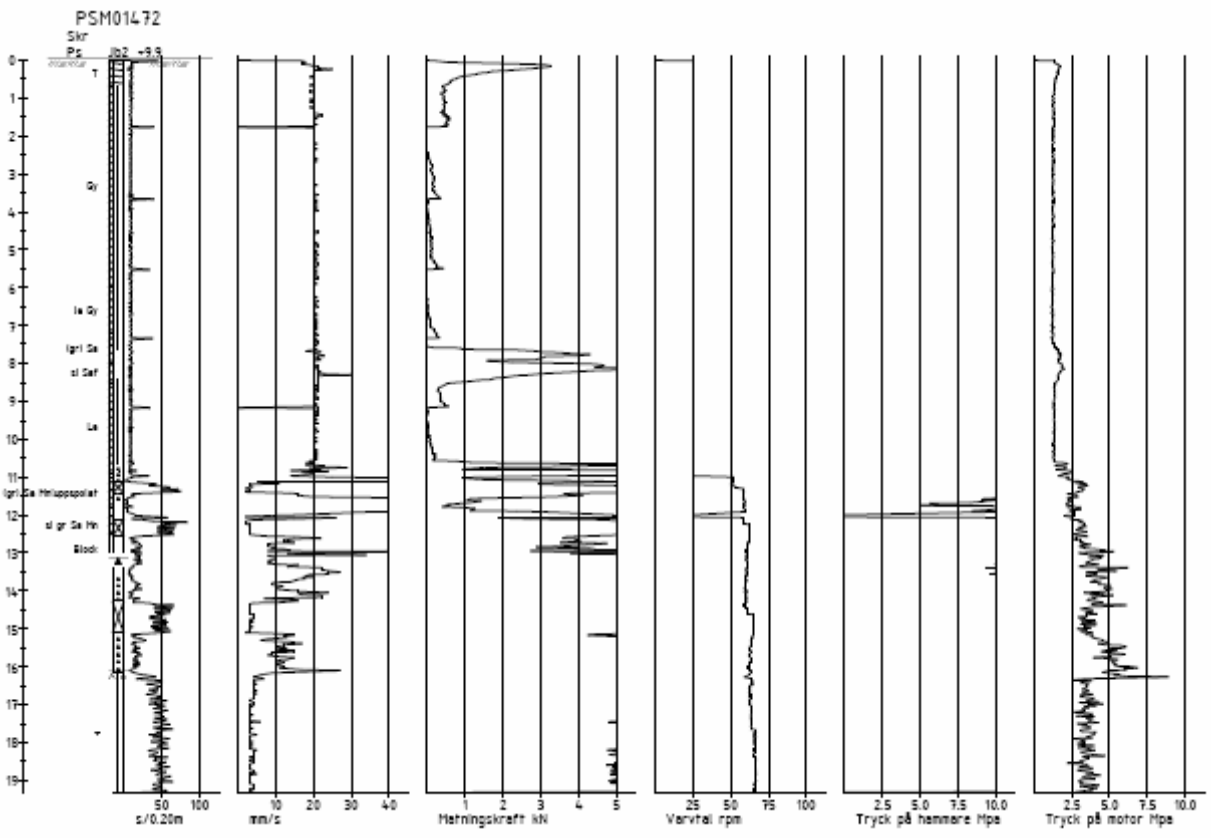


Appendix D

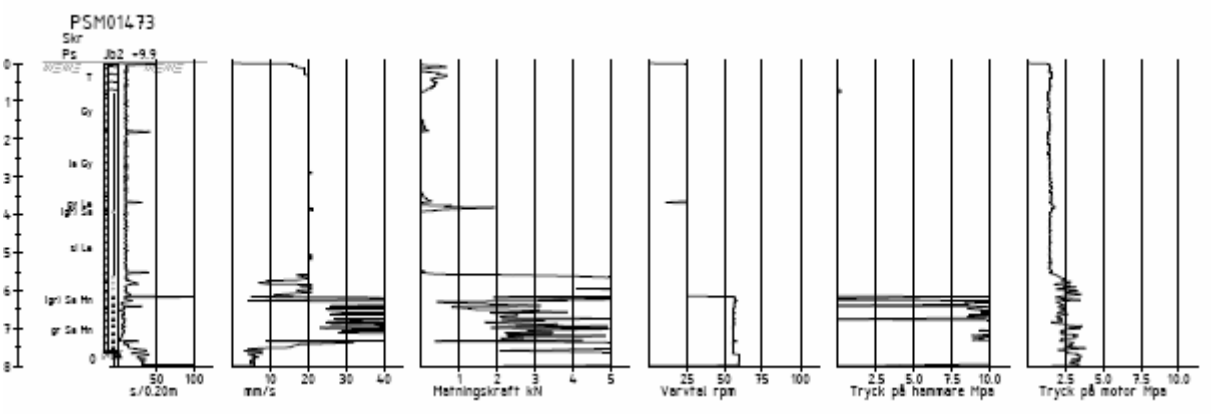
Probing hole and soil well profiles

Mederhult

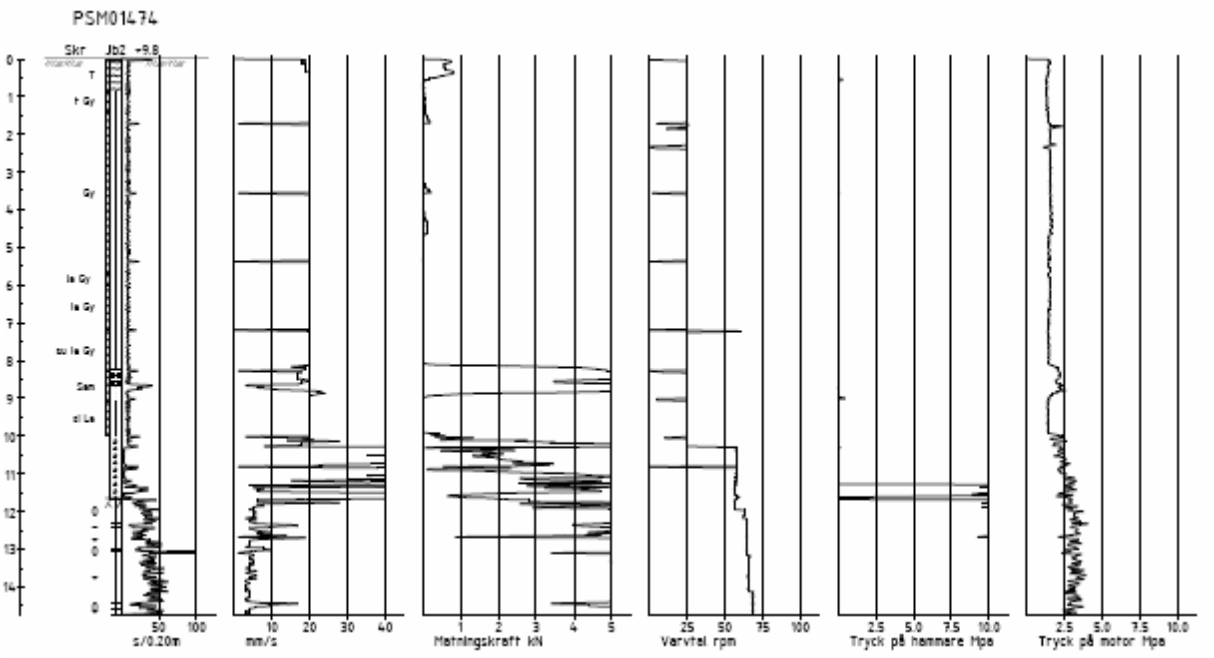
PSM0001472



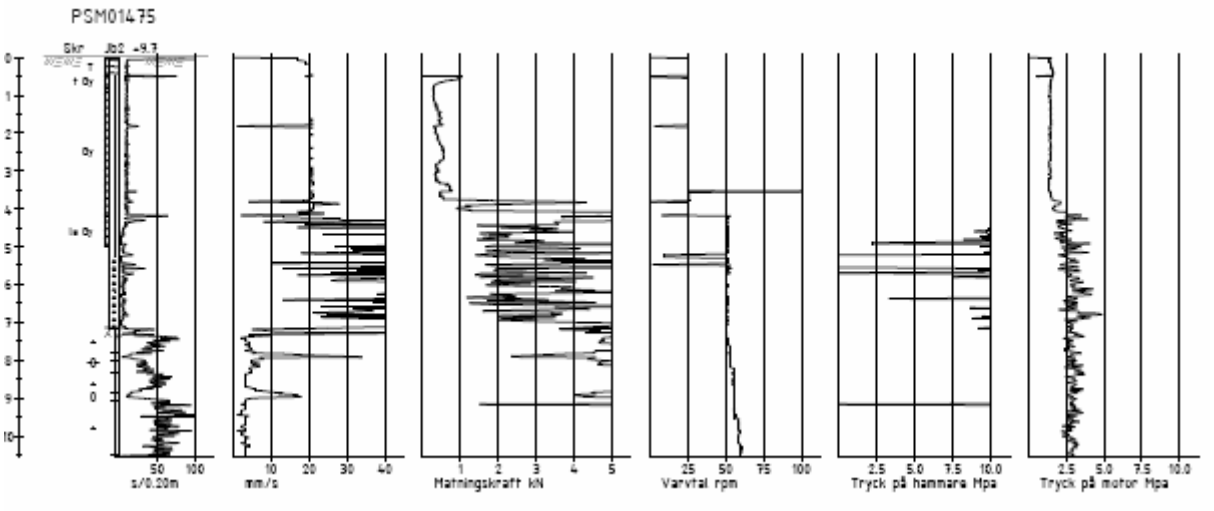
PSM001473



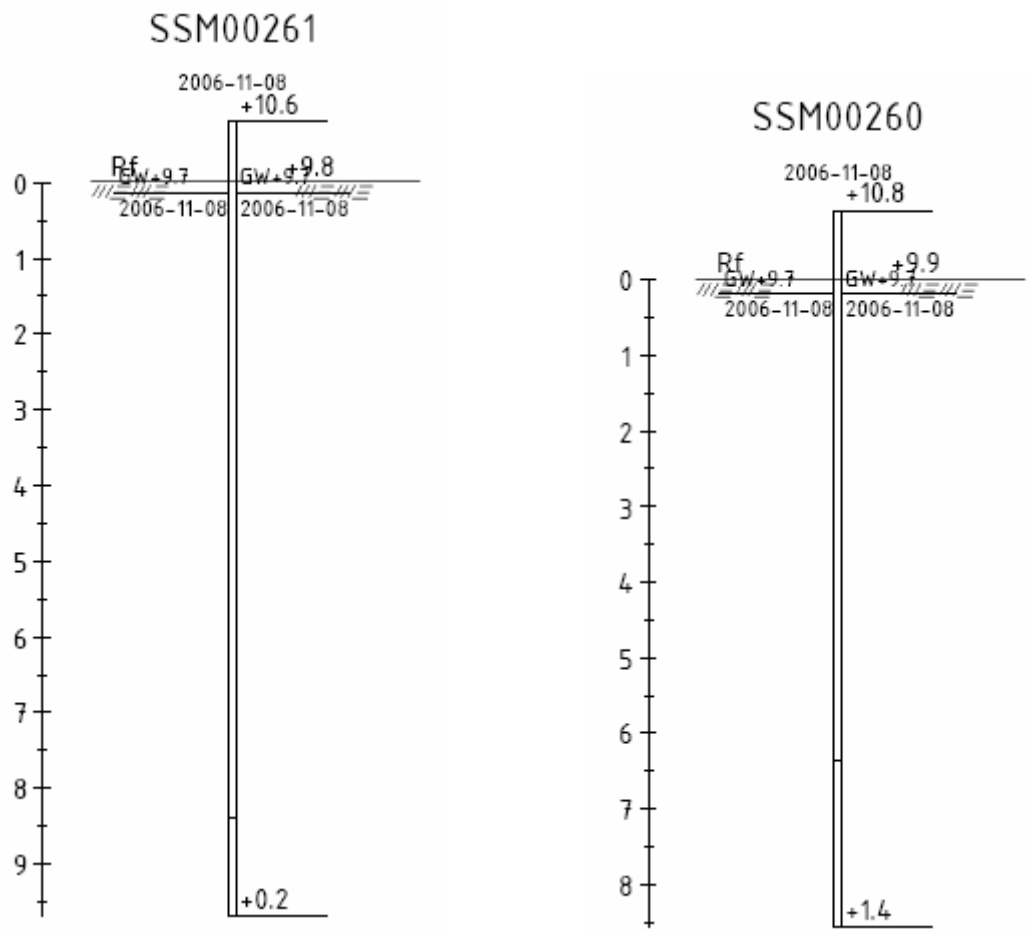
PSM001474



PSM001475

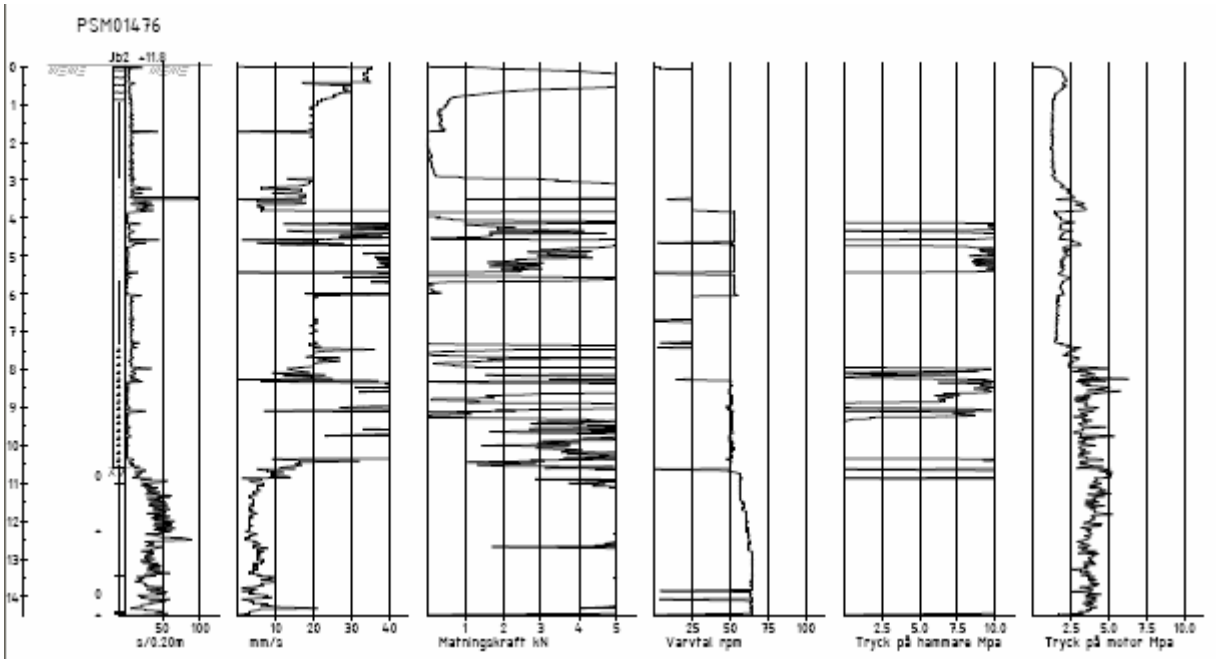


SSM000260 & SSM000261

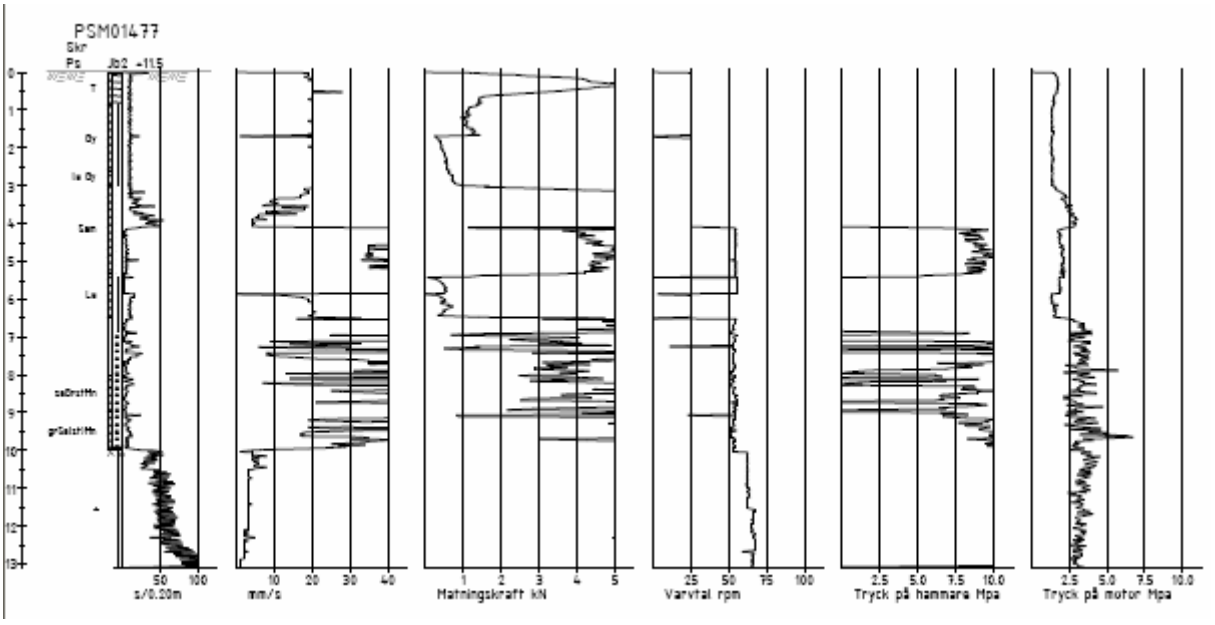


Ekerumsån

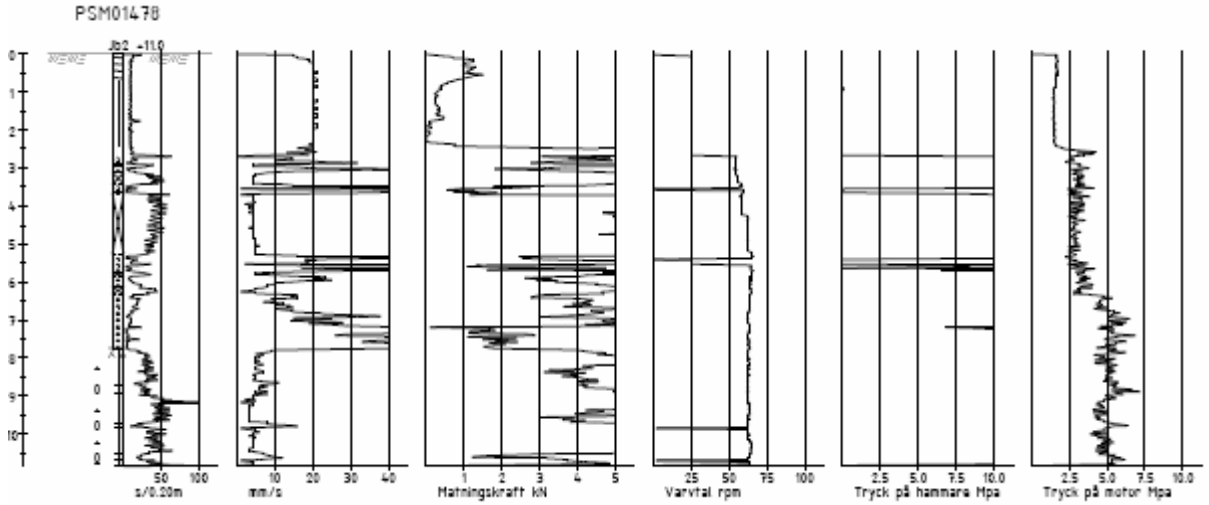
PSM001476



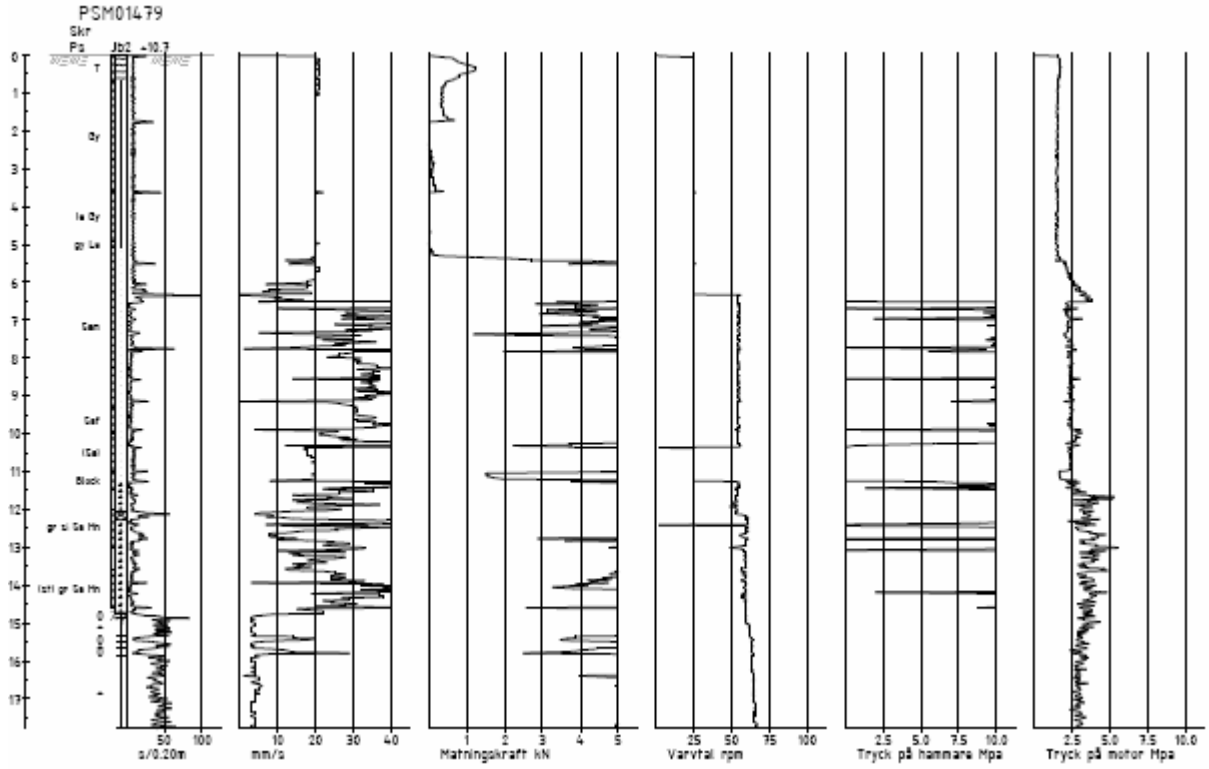
PSM001477



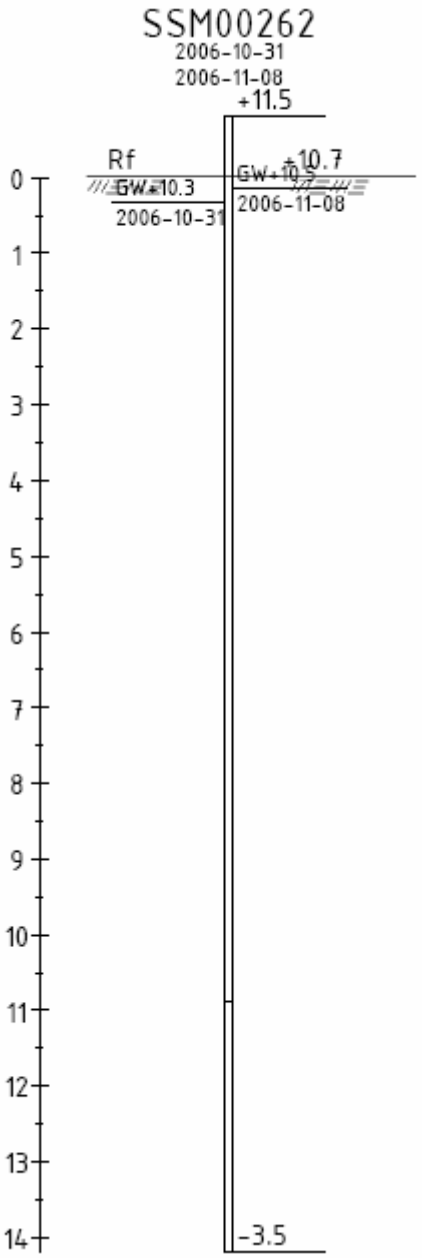
PSM001478



PSM001479

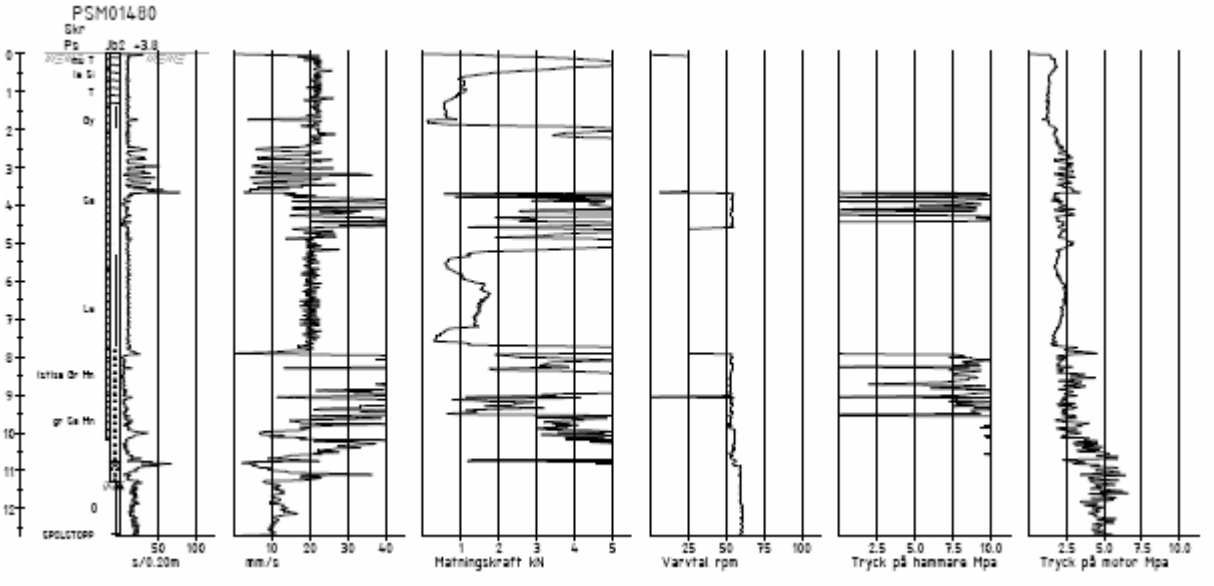


SSM000262

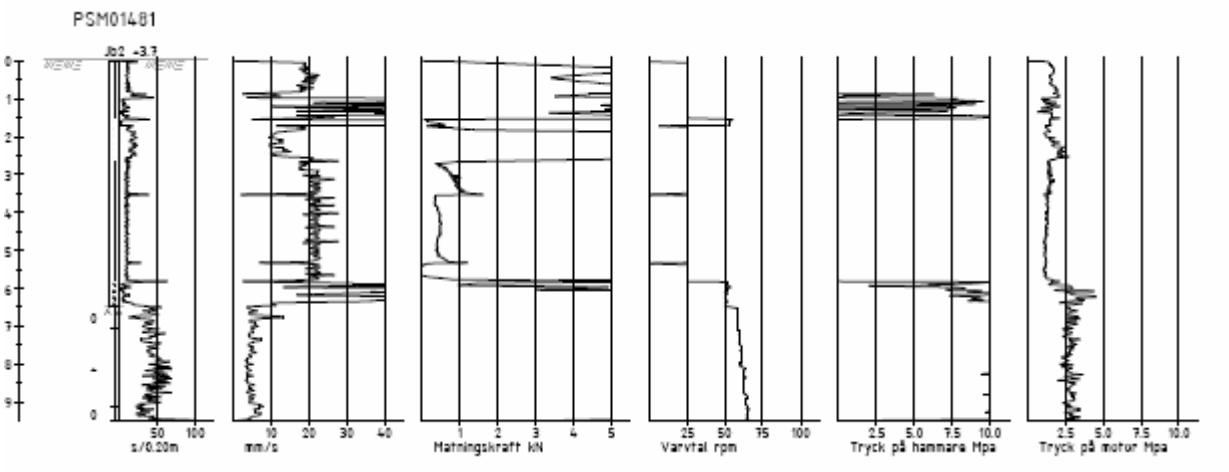

SSM00262
2006-10-31
2006-11-08
+11.5
Rf
+10.7
GW+10.3
2006-10-31
GW+10.5
2006-11-08
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
-3.5

Laxemarån

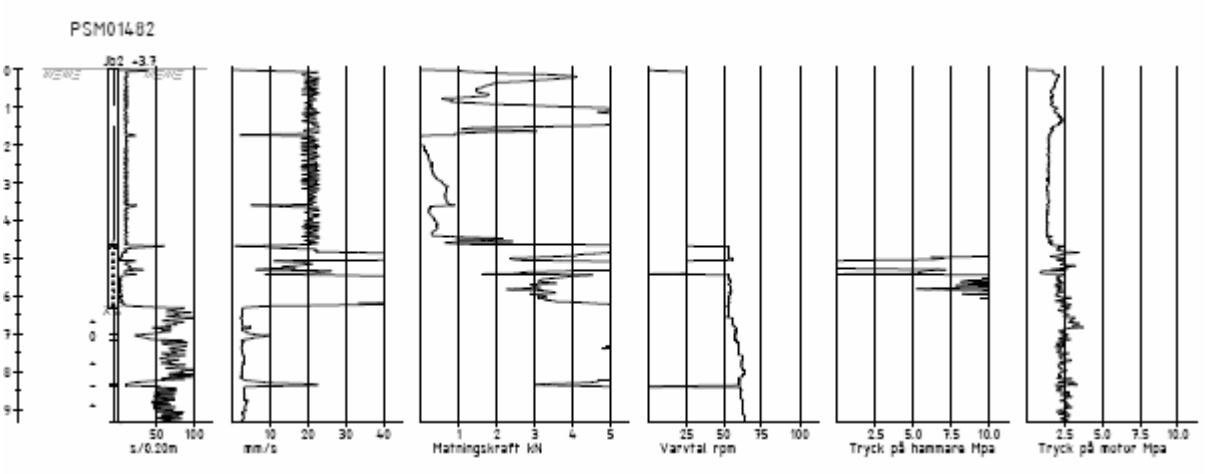
PSM001480



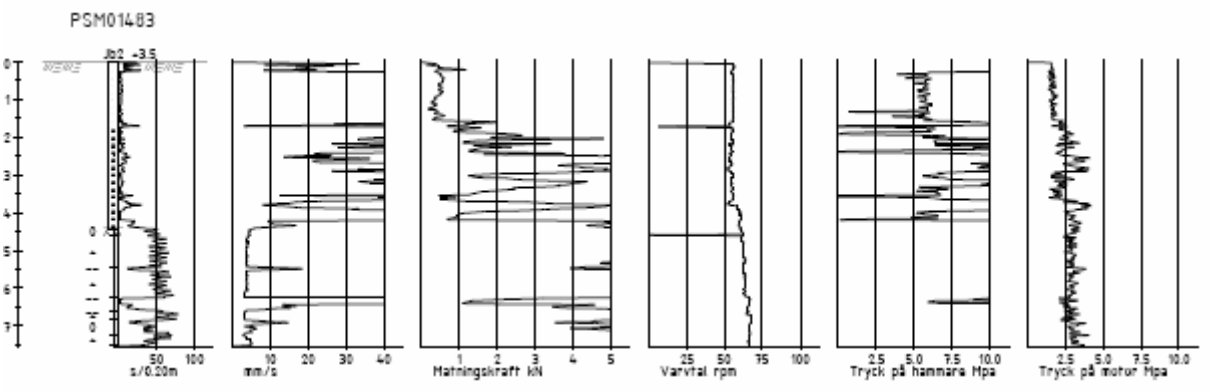
PSM001481



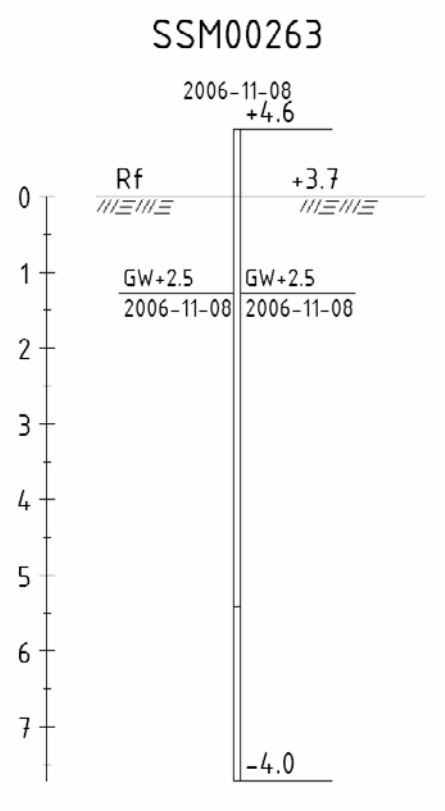
PSM001482



PSM001483

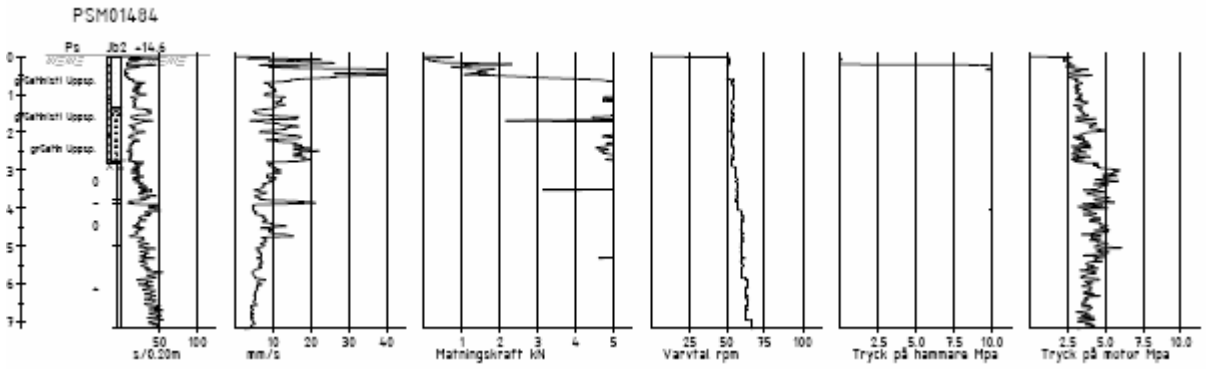


SSM000263



Horvan Syd

PSM001484



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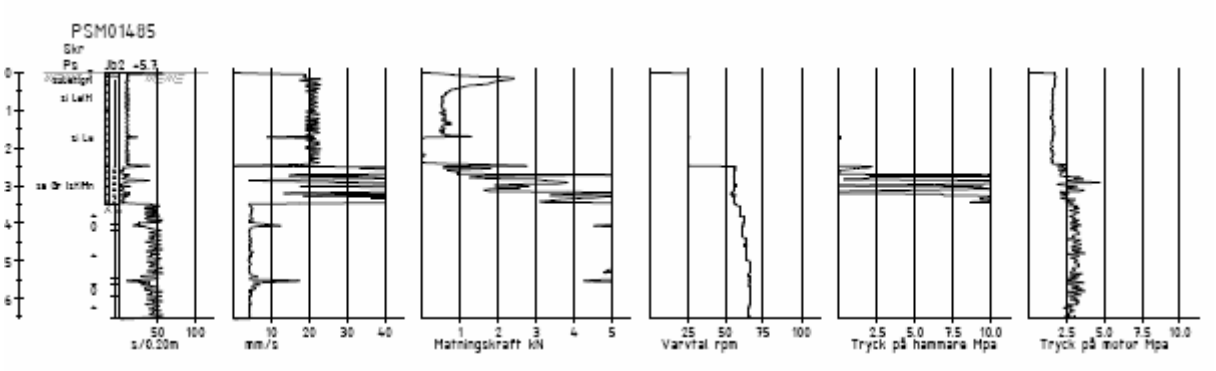

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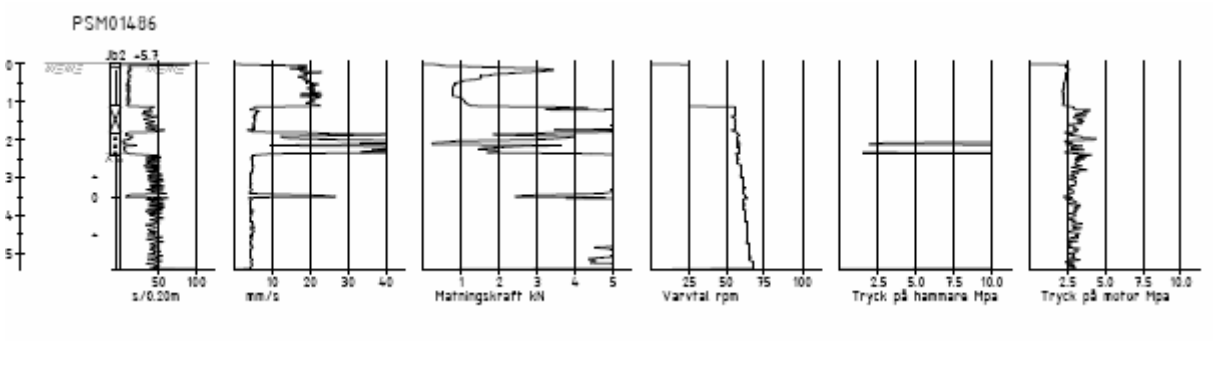
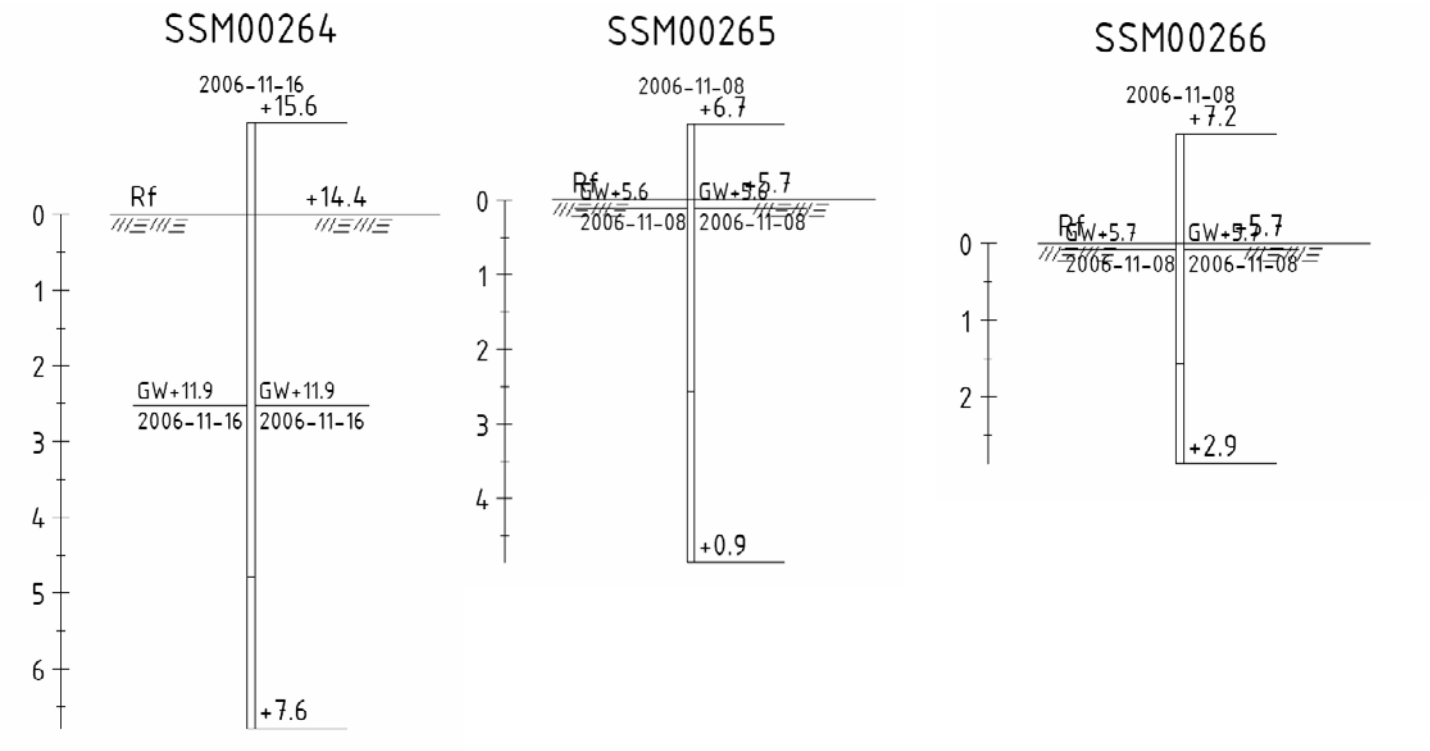
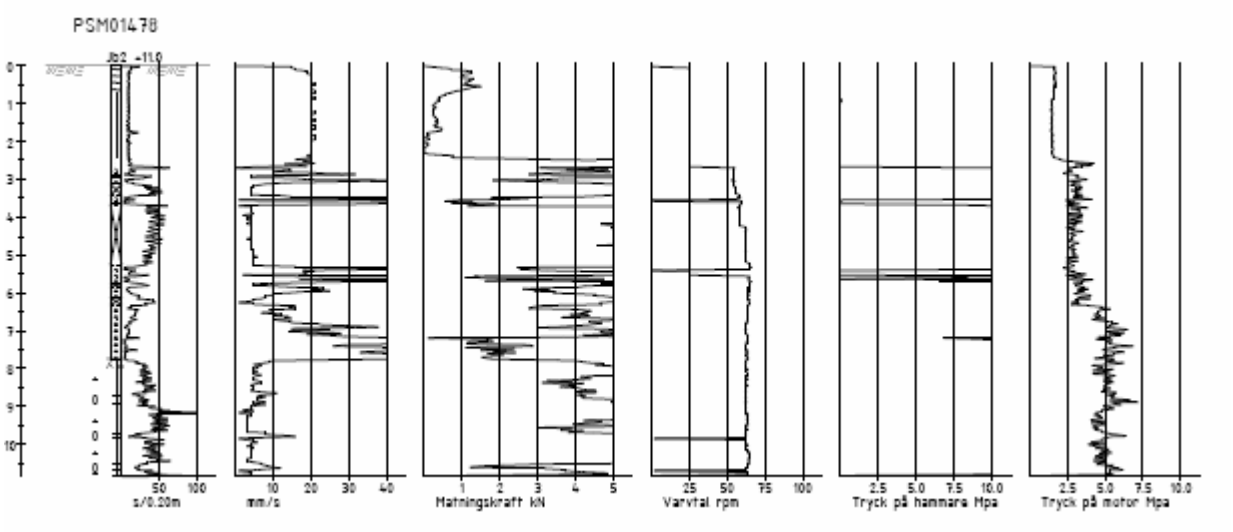


SSM000264, SSM000265 & SSM000266

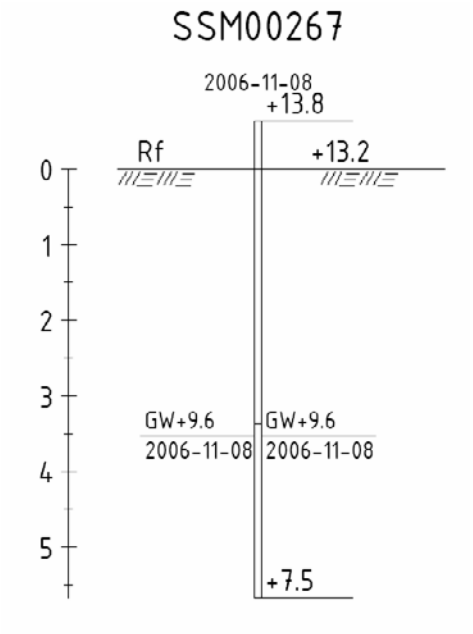


Leräangarna

PSM001487

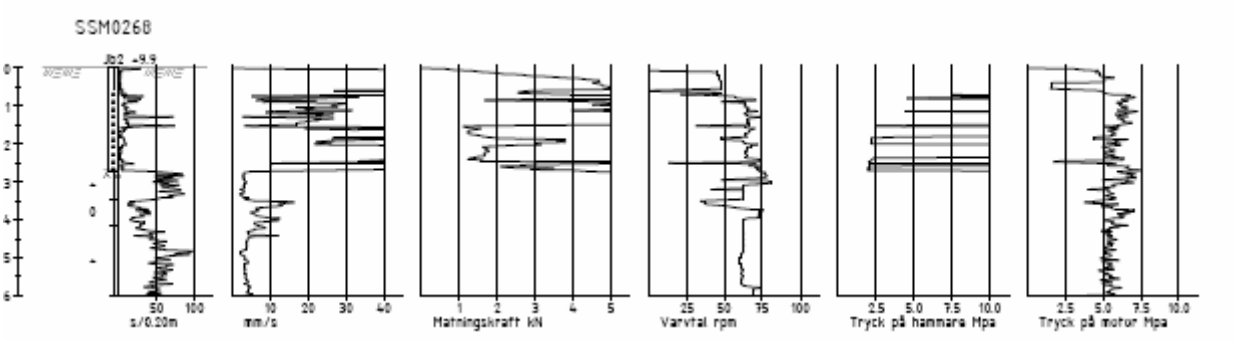


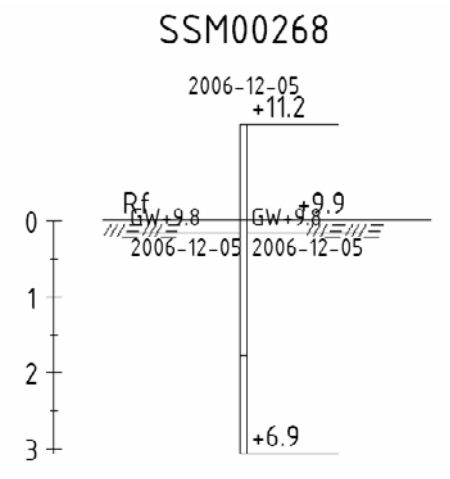
SSM000267



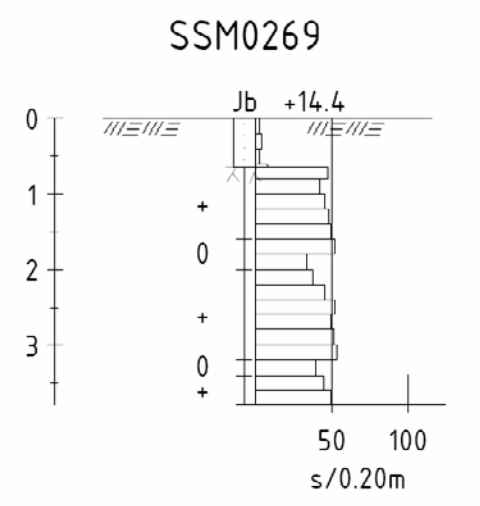
Dämmen and Långekärr

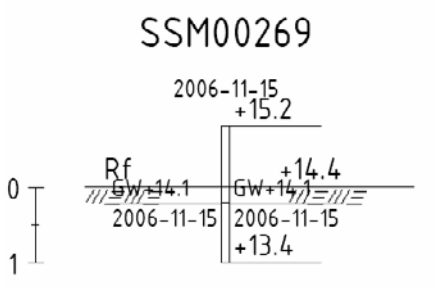
SSM000268



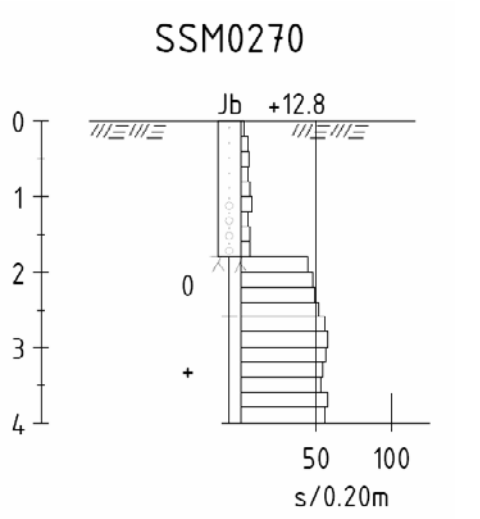


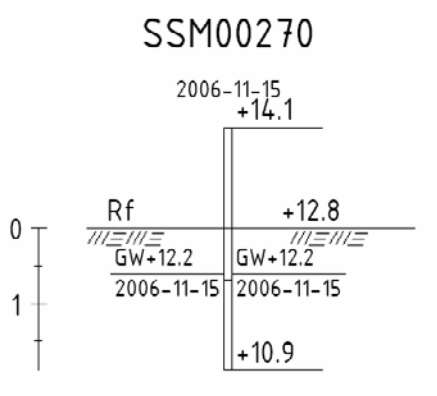
SSM000269





SSM000270





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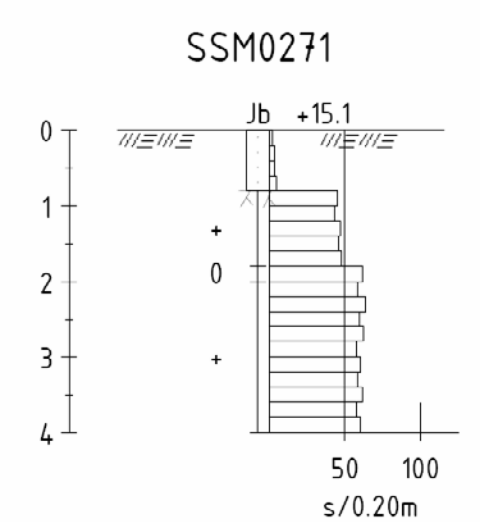
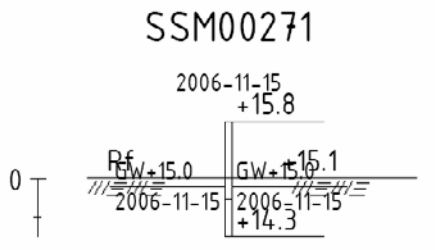




Appendix E

Photos before and after borehole work and groundwater well

Installation

Mederhult

Before probing and groundwater monitoring well installation

After probing and groundwater monitoring well installation

Ekerumsån

Before probing

After probing

Laxemarån

Before probing

After probing

Horvan Syd

Before probing and groundwater monitoring well installation

After probing and groundwater monitoring well installation

Leräangarna

Before probing and groundwater monitoring well installation

After probing and groundwater monitoring well installation

Dämmen and Långekärr

After installation of groundwater monitoring wells


Atlas Copco

Appendix F

Soil well construction

SSM000260

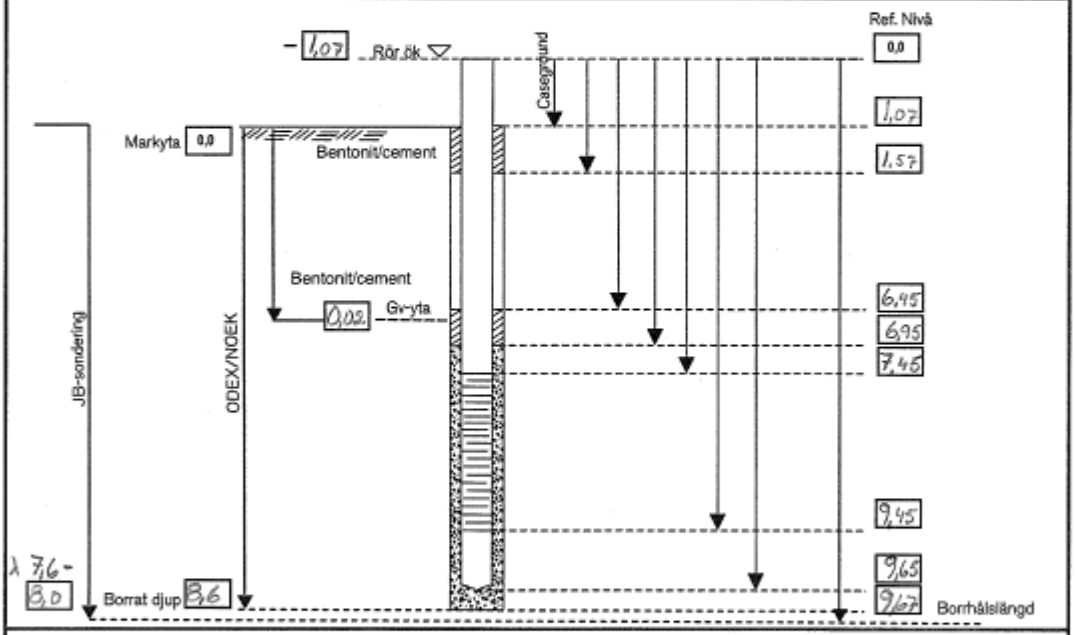
Version 2.0.0

SKB

INSTALLATION AV GRUNDVATTENRÖR OCH PORTRYCKSMÄTARE

FÄLTPROTOKOLL – P6 Protokoll av

OMRÅDE	PROJEKT	BORRHÅLSBETECKNING
Mederhult Plats1	Kompletterande jordborrningar och installation av grundvattenrör i kontakten jord-berg	SSM00260
FÖRETAG: Ramböll	UTFÖRARE: Tony Eriksson	AKTIVITETSPLANS NR: AP PS 400-06-78
DATUM: 2006-10-25	METOD: Grundvattenrör	REFERENS NIVÅ: Markytan
ÖPPET RÖR, TYP	FILTERSPETS, TYP: Grundvattenrör 63/50	PORTRYCKSMÄTARE, TYP
PUNKTSKISS	NIVÅ ÖK RÖR (från markyta): 1.07m	LUTN. RÖR (från hor. plan) / BÄRING
	PRELIMINÄR GPS-INMÄTNING	
	X-KOORD: / Y-KOORD. / FELANGIVELSE GPS	
	HÖJD- OCH KOORDINATSYSTEM	



FUNKTIONSKONTROLL AV GRUNDVATTENRÖR/PORTRYCKSMÄTARE VID INSTALLATION

DATUM/TID	GRUNDVATTENRÖR,	PORTRYCKSMÄTARE AV TYPEN BAT/GeoN			SIGN
	Avsänkning ÖK Rör (m)	A-värde (mvp)	C-värde (mvp)	Korrigerat värde: A-C+x	
25/10	1,30				
26/10	1,09				

Uppdragstagares signaturer samt datum		SKB:s signaturer samt datum	
Upprättad av Tony Eriksson 2006-11-29	Kvalitetsgodkänd för leverans 2006-11-30	Leverans godkänd	Införd i SICADA
Tony Eriksson	Sarah Simion		

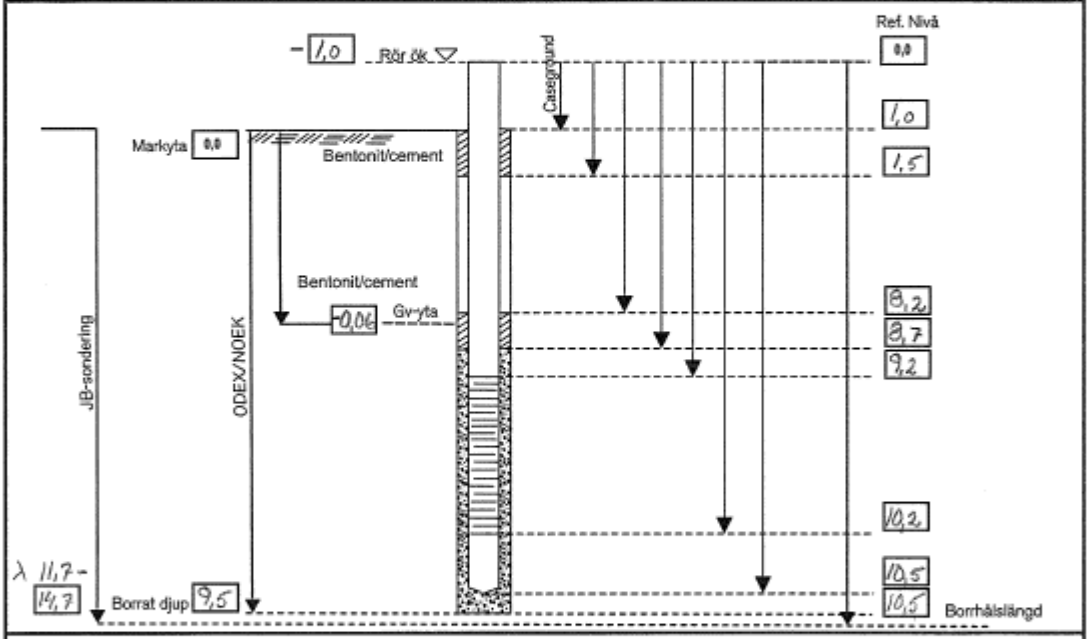
SSM000261

Version 2.0.0

INSTALLATION AV GRUNDVATTENRÖR OCH PORTRYCKSMÄTARE

FÄLTPROTOKOLL – P6 Protokoll av

OMRÅDE	PROJEKT	BORRHÅLSBETECKNING
Mederhult Plats1	Kompletterande jordborrningar och installation av grundvattenrör i kontakten jord-berg	SSM00261
FÖRETAG: Ramböll	UTFÖRARE: Tony Eriksson	AKTIVITETSPLANS NR: AP PS 400-06-78
DATUM: 2006-10-24	METOD: Grundvattenrör	REFERENS NIVÅ: Markytan
ÖPPET RÖR, TYP	FILGTERSPETS, TYP: Grundvattenrör 63/50	PORTRYCKSMÄTARE, TYP
PUNKTSKISS	NIVÅ ÖK RÖR (från markyta): 1.0m	LUTN. RÖR (från hor. plan) / BÄRING
	PRELIMINÄR GPS-INMÄTNING	
	X-KOORD: / Y-KOORD. / FELANGIVELSE GPS	
	HÖJD- OCH KOORDINATSYSTEM	



FUNKTIONSKONTROLL AV GRUNDVATTENRÖR/PORTRYCKSMÄTARE VID INSTALLATION

DATUM/TID	GRUNDVATTENRÖR, Avsänkning ÖK Rör (m)	PORTRYCKSMÄTARE AV TYPEN BAT/GeoN A-värde (mvp)	C-värde (mvp)	Korrigerat värde: A-C+x	SIGN
25/10	1,24				
8/11	0,94				

Uppdragstagares signaturer samt datum		SKB:s signaturer samt datum	
Upprättad av: Tony Eriksson 2006-11-29	Kvalitetsgodkänd för leverans: Sarah Simson 2006-11-30	Leverans godkänd	Införd i SICADA

Tony Eriksson

Sarah Simson

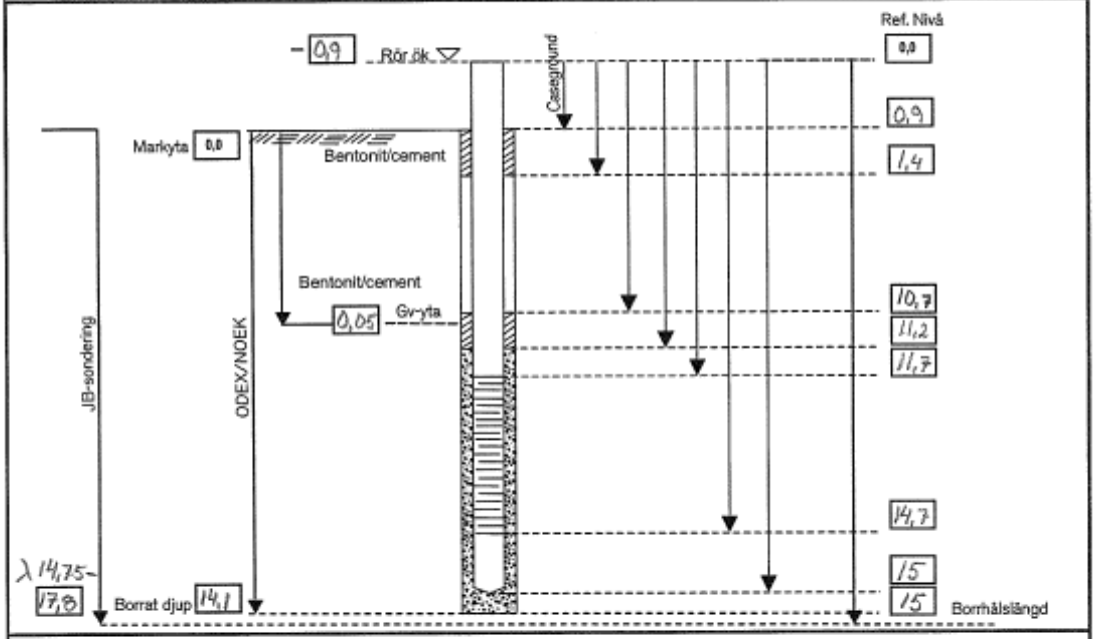
SSM000262

Version 2.0.0

INSTALLATION AV GRUNDVATTENRÖR OCH PORTRYCKSMÄTARE

FÄLTPROTOKOLL – P6 Protokoll av

OMRÅDE	PROJEKT	BORRHÅLSBETECKNING
Ekerumsbäcken Plats2	Kompletterande jordborrningar och installation av grundvattenrör i kontakten jord-berg	SSM00262
FÖRETAG: Ramböll	UTFÖRARE: Tony Eriksson	AKTIVITETSPLANS NR: AP PS 400-06-78
DATUM: 2006-10-30	METOD: Grundvattenrör	REFERENS NIVÅ: Markytan
ÖPPET RÖR, TYP	FILTERSPETS, TYP: Grundvattenrör 63/50	PORTRYCKSMÄTARE, TYP
PUNKTSKISS	NIVÅ ÖK RÖR (från markyta): 0.90m	LUTN. RÖR (från hor. plan) / BÄRING
	PRELIMINÄR GPS-INMÄTNING	
	X-KOORD: / Y-KOORD. / FELANGIVELSE GPS	
	HÖJD- OCH KOORDINATSYSTEM	



FUNKTIONSKONTROLL AV GRUNDVATTENRÖR/PORTRYCKSMÄTARE VID INSTALLATION

DATUM/TID	GRUNDVATTENRÖR, Avsänkning ÖK Rör (m)	PORTRYCKSMÄTARE AV TYPEN BAT/GeoN A-värde (mvp)	C-värde (mvp)	Korrigerat värde: A-C+x	SIGN
31/10	1,13				
8/11	0,95				

Uppdragstagares signaturer samt datum		SKB:s signaturer samt datum	
Upprättad av: Tony Eriksson 2006-11-29	Kvalitetsgodkänd för leverans	Leverans godkänd	Införd i SICADA

Tony Eriksson

Sarah Simson

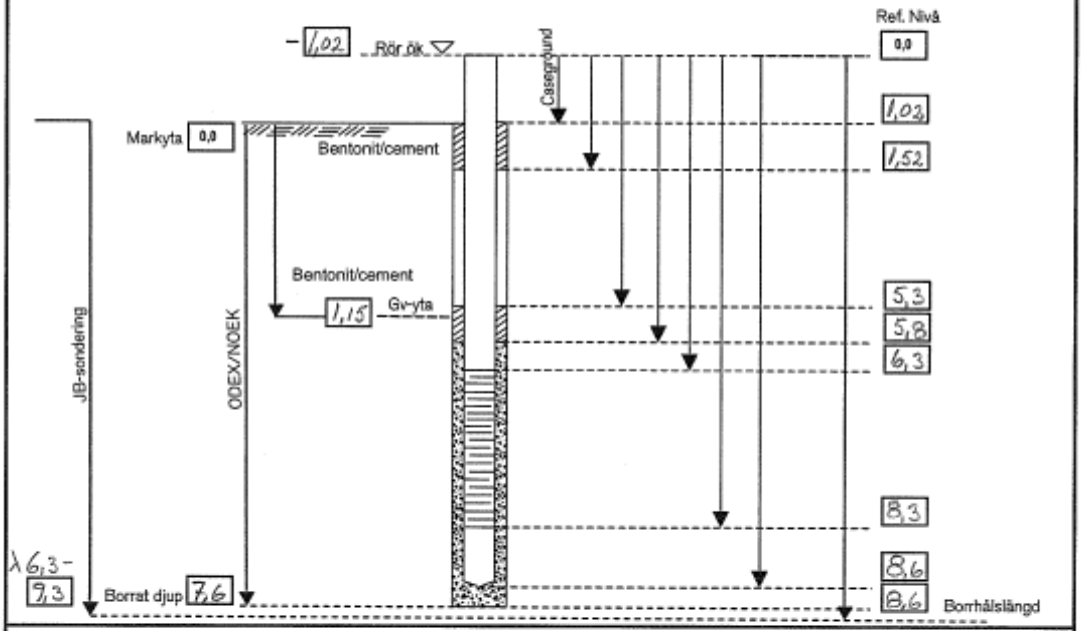
SSM000263

Version 2.0.0

INSTALLATION AV GRUNDVATTENRÖR OCH PORTRYCKSMÄTARE

FÄLTPROTOKOLL – P6 Protokoll av

OMRÅDE	PROJEKT	BORRHÅLSBETECKNING
Laxemarån Plats3	Kompletterande jordborrningar och installation av grundvattenrör i kontakten jord-berg	SSM00263
FÖRETAG: Ramböll	UTFÖRARE: Tony Eriksson	AKTIVITETSPLANS NR: AP PS 400-06-78
DATUM: 2006-11-02	METOD: Grundvattenrör	REFERENS NIVÅ: Markytan
ÖPPET RÖR, TYP	FILTERSPETS, TYP: Grundvattenrör 63/50	PORTRYCKSMÄTARE, TYP
PUNKTSKISS	NIVÅ ÖK RÖR (från markyta): 1.02m	LUTN. RÖR (från hor. plan) / BÄRING
	PRELIMINÄR GPS-INMÄTNING	
	X-KOORD: / Y-KOORD. / FELANGIVELSE GPS	
	HÖJD- OCH KOORDINATSYSTEM	



FUNKTIONSKONTROLL AV GRUNDVATTENRÖR/PORTRYCKSMÄTARE VID INSTALLATION

DATUM/TID	GRUNDVATTENRÖR, Avsänkning ÖK Rör (m)	PORTRYCKSMÄTARE AV TYPEN BAT/GeoN A-värde (mvp)	C-värde (mvp)	Korrigerat värde: A-C+x	SIGN
2/11	2,30				
8/11	2,17				

Uppdragstagares signaturer samt datum		SKB:s signaturer samt datum	
Upprättad av: Tony Eriksson 2006-11-29	Kvalitetsgodkänd för leverans	Leverans godkänd	Införd i SICADA

Tony Eriksson

Sarah Simson

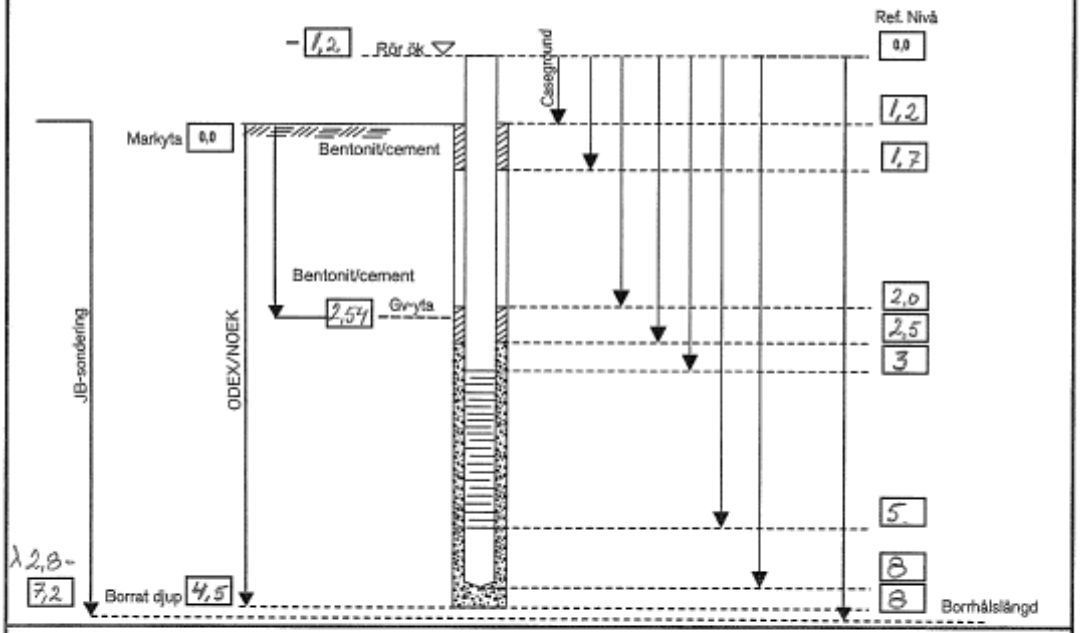
SSM000264

Version 2.0.0

INSTALLATION AV GRUNDVATTENRÖR OCH PORTRYCKSMÄTARE

FÄLTPROTOKOLL – P6 Protokoll av

OMRÅDE	PROJEKT	BORRHÅLSBETECKNING
Horvan syd Plats4	Kompletterande jordborrningar och installation av grundvattenrör i kontakten jord-berg	SSM00264
FÖRETAG: Ramböll	UTFÖRARE: Tony Eriksson	AKTIVITETSPLANS NR: AP PS 400-06-78
DATUM: 2006-11-16	METOD: Grundvattenrör	REFERENS NIVÅ: Markytan
ÖPPET RÖR, TYP	FILTERSPETS, TYP: Grundvattenrör 63/50	PORTRYCKSMÄTARE, TYP
PUNKTSKISS	NIVÅ ÖK RÖR (från markyta): 1.20m; LUTN. RÖR (från hor. plan); BÄRING	
	PRELIMINÄR GPS-INMÄTNING	
	X-KOORD: ; Y-KOORD. ; FELANGIVELSE GPS	
	HÖJD- OCH KOORDINATSYSTEM	



FUNKTIONSKONTROLL AV GRUNDVATTENRÖR/PORTRYCKSMÄTARE VID INSTALLATION

DATUM/TID	GRUNDVATTENRÖR, Avsänkning ÖK Rör (m)	PORTRYCKSMÄTARE AV TYPEN BAT/GeoN A-värde (mvp)	C-värde (mvp)	Korrigerat värde: A-C+x	SIGN
16/11	3,87				
17/11	3,74				

Uppdragstagares signaturer samt datum		SKB:s signaturer samt datum	
Upprättad av: Tony Eriksson 2006-11-29	Kvalitetsgodkänd för leverans: 2006-11-30	Leverans godkänd	Införd i SICADA

Tony Eriksson

Sarah Simon

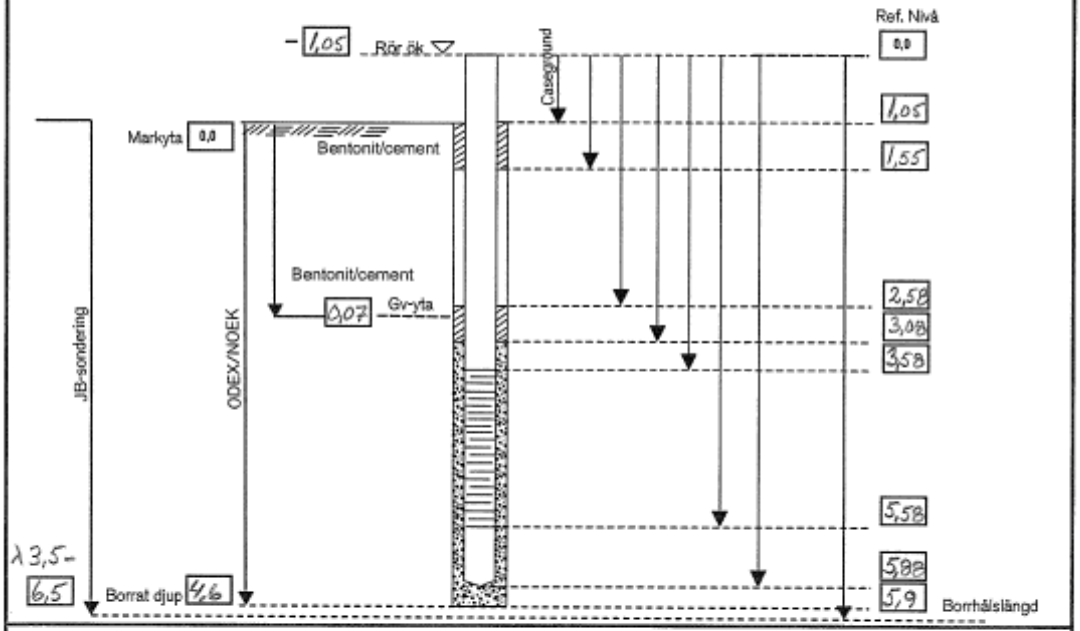
SSM000265

Version 2.0.0

INSTALLATION AV GRUNDVATTENRÖR OCH PORTRYCKSMÄTARE

FÄLTPROTOKOLL – P6 Protokoll av

OMRÅDE	PROJEKT	BORRHÅLSBETECKNING
Horvan syd Plats4	Kompletterande jordborningar och installation av grundvattenrör i kontakten jord-berg	SSM00265
FÖRETAG: Ramböll	UTFÖRARE: Tony Eriksson	AKTIVITETSPLANS NR: AP PS 400-06-78
DATUM: 2006-11-08	METOD: Grundvattenrör	REFERENS NIVÅ: Markytan
ÖPPET RÖR, TYP	FILTERSPETS, TYP: Grundvattenrör 63/50	PORTRYCKSMÄTARE, TYP
PUNKTSKISS	NIVÅ ÖK RÖR (från markyta): 1.05m	LUTN. RÖR (från hor. plan) / BÄRING
	PRELIMINÄR GPS-INMÄTNING	
	X-KOORD: / Y-KOORD. / FELANGIVELSE GPS	
	HÖJD- OCH KOORDINATSYSTEM	



FUNKTIONSKONTROLL AV GRUNDVATTENRÖR/PORTRYCKSMÄTARE VID INSTALLATION

DATUM/TID	GRUNDVATTENRÖR,	PORTRYCKSMÄTARE AV TYPEN BAT/GeoN			SIGN
	Avsänkning ÖK Rör (m)	A-värde (mvp)	C-värde (mvp)	Korrigerat värde: A-C+x	
8/11	1,12				

Uppdragstagares signaturer samt datum		SKB:s signaturer samt datum	
Upprättad av: Tony Eriksson 2006-11-29	Kvalitetsgodkänd för leverans: 2006-11-30	Leverans godkänd	Införd i SICADA

Tony Eriksson

Sarah Simson

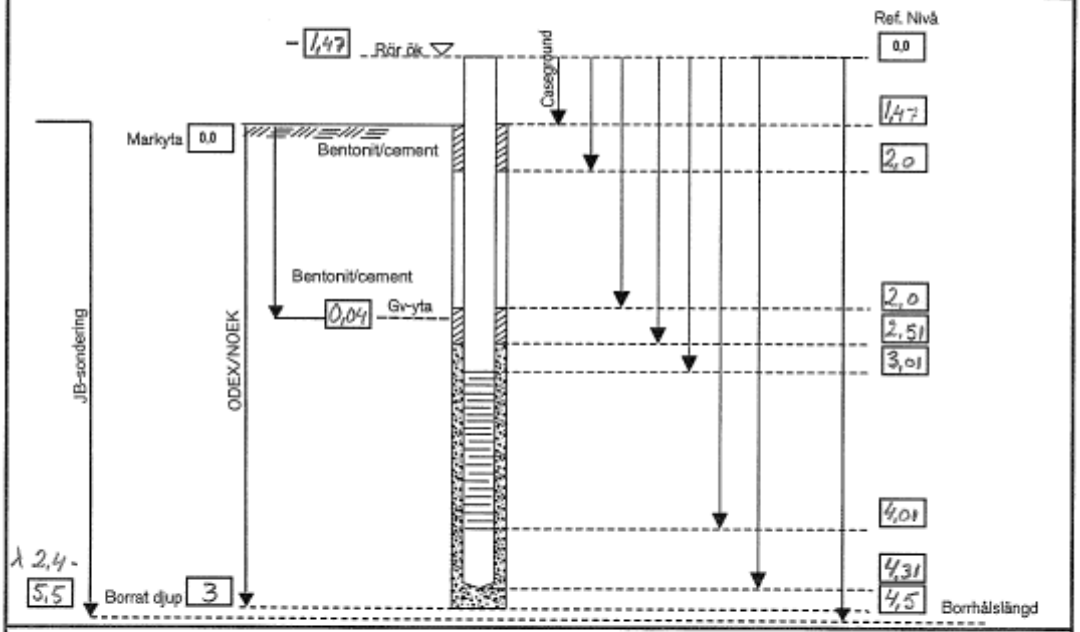
SSM000266

Version 2.0.0

INSTALLATION AV GRUNDVATTENRÖR OCH PORTRYCKSMÄTARE

FÄLTPROTOKOLL – P6 Protokoll av

OMRÅDE	PROJEKT	BORRHÅLSBETECKNING
Horvan syd Plats4	Kompletterande jordborrningar och installation av grundvattenrör i kontakten jord-berg	SSM00266
FÖRETAG: Ramböll	UTFÖRARE: Tony Eriksson	AKTIVITETSPLANS NR: AP PS 400-06-78
DATUM: 2006-11-08	METOD: Grundvattenrör	REFERENS NIVÅ: Markytan
ÖPPET RÖR, TYP	FILTERSPETS, TYP: Grundvattenrör 63/50	PORTRYCKSMÄTARE, TYP
PUNKTSKISS	NIVÅ ÖK RÖR (från markyta): 1.47m	LUTN. RÖR (från hor. plan) / BÄRING
	PRELIMINÄR GPS-INMÄTNING	
	X-KOORD: / Y-KOORD. / FELANGIVELSE GPS	
	HÖJD- OCH KOORDINATSYSTEM	



FUNKTIONSKONTROLL AV GRUNDVATTENRÖR/PORTRYCKSMÄTARE VID INSTALLATION

DATUM/TID	GRUNDVATTENRÖR,	PORTRYCKSMÄTARE AV TYPEN BAT/GeoN			SIGN
	Avsänkning ÖK Rör (m)	A-värde (mvp)	C-värde (mvp)	Korrigerat värde: A-C+x	
8/11	1,51				

Uppdragstagares signaturer samt datum		SKB:s signaturer samt datum	
Upprättad av: Tony Eriksson 2006-11-29	Kvalitetsgodkänd för leverans: Sarah Simson 2006-11-30	Leverans godkänd	Införd i SICADA

Tony Eriksson

Sarah Simson

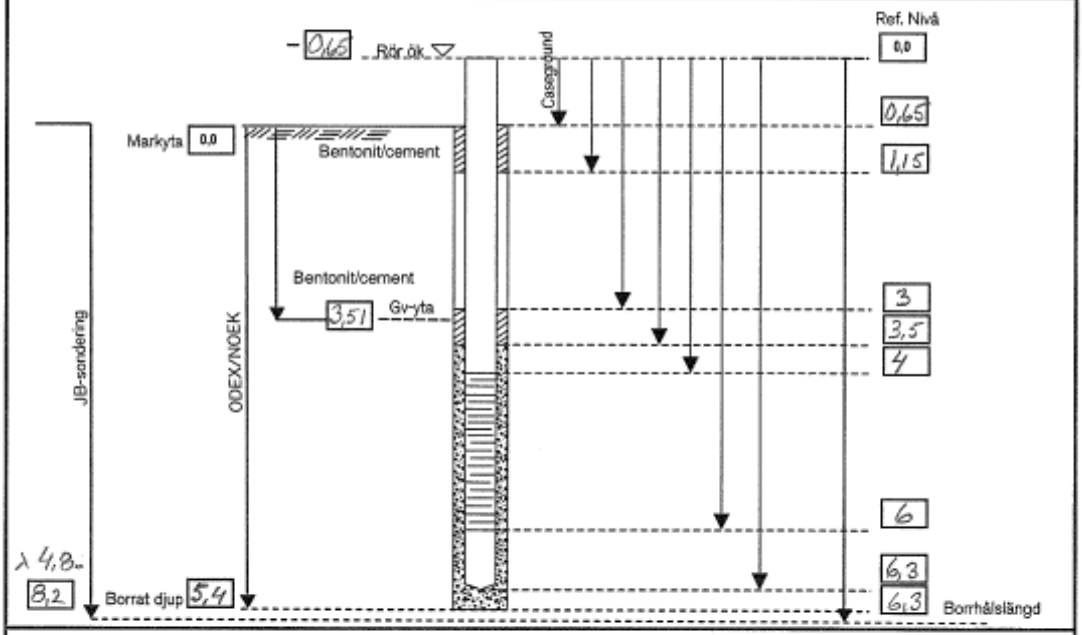
SSM000267

Version 2.0.0

INSTALLATION AV GRUNDVATTENRÖR OCH PORTRYCKSMÄTARE

FÄLTPROTOKOLL – P6 Protokoll av

OMRÅDE	PROJEKT	BORRHÅLSBETECKNING
Lerängarna Plats5	Kompletterande jordborningar och installation av grundvattenrör i kontakten jord-berg	SSM00267
FÖRETAG: Ramböll	UTFÖRARE: Tony Eriksson	AKTIVITETSPLANS NR: AP PS 400-06-78
DATUM: 2006-11-07	METOD: Grundvattenrör	REFERENS NIVÅ: Markytan
ÖPPET RÖR, TYP	FILTERSPETS, TYP: Grundvattenrör 63/50	PORTRYCKSMÄTARE, TYP
PUNKTSKISS	NIVÅ ÖK RÖR (från markyta): 0.65m	LUTN. RÖR (från hor. plan) / BÄRING
	PRELIMINÄR GPS-INMÄTNING	
	X-KOORD: / Y-KOORD. / FELANGIVELSE GPS	
	HÖJD- OCH KOORDINATSYSTEM	



FUNKTIONSKONTROLL AV GRUNDVATTENRÖR/PORTRYCKSMÄTARE VID INSTALLATION

DATUM/TID	GRUNDVATTENRÖR,	PORTRYCKSMÄTARE AV TYPEN BAT/GeoN			SIGN
	Avsänkning ÖK Rör (m)	A-värde (mvp)	C-värde (mvp)	Korrigerat värde: A-C+x	
7/11	4,17				
8/11	4,16				

Uppdragstagares signaturer samt datum		SKB:s signaturer samt datum	
Upprättad av: Tony Eriksson 2006-11-29	Kvalitetsgodkänd för leverans 2006-11-30	Leverans godkänd	Införd i SICADA

Tony Eriksson

Sarah Simsen

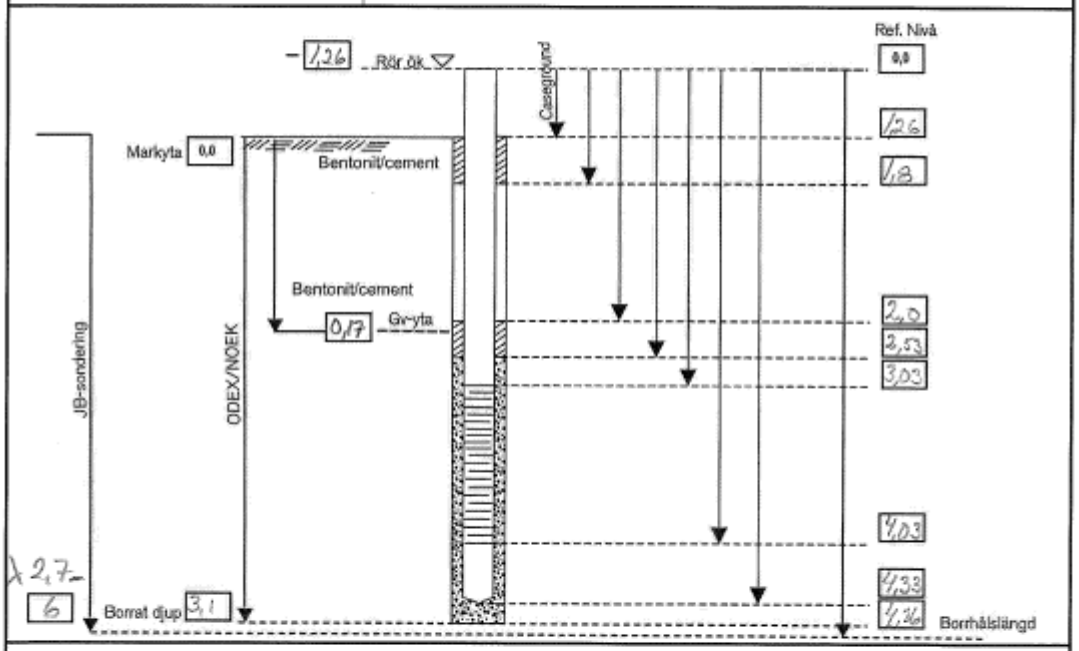
SSM000268

Version 2.0.0

INSTALLATION AV GRUNDVATTENRÖR OCH PORTRYCKSMÄTARE

FÄLTPROTOKOLL – P6 Protokoll ___ av

OMRÅDE SKB Oskarshamn	PROJEKT Installation av Grundvattenrör		BORRHÅLSBETECKNING SSM000268
FÖRETAG RAMBÖLL	UTFÖRARE Tony Eriksson		AKTIVITETSPLANS NR AP PS 400-06-78
DATUM 2006-11-15	METOD Grundvattenrör		REFERENS NIVÅ Markyta
ÖPPET RÖR, TYP	FILTERSPETS, TYP Grundvattenrör 62/50		PORTRYCKSMÄTARE, TYP
PUNKTSKISS	NIVÅ ÖK RÖR (från markyta) 1,26	LUTN. RÖR (från hor. plan) 90	BÄRING
	PRELIMINÄR GPS-INMÄTNING		
	X-KOORD:	Y-KOORD.	FELANGIVELSE GPS
	HÖJD- OCH KOORDINATSYSTEM		



FUNKTIONSKONTROLL AV GRUNDVATTENRÖR/PORTRYCKSMÄTARE VID INSTALLATION

DATUM/TID	GRUNDVATTENRÖR,	PORTRYCKSMÄTARE AV TYPEN BAT/GeoN			SIGN
	Avsänkning ÖK Rör (m)	A-värde (mvp)	C-värde (mvp)	Korrigerat värde: A-C+x	
2006-11-15	1,43				

Uppdragstagares signaturer samt datum		SKB:s signaturer samt datum	
2006-12-04 Tony Eriksson	2006-12-19		
Upprättad av	Kvalitetsgodkänd för leverans	Leverans godkänd	Införd i SICADA

Tony Eriksson

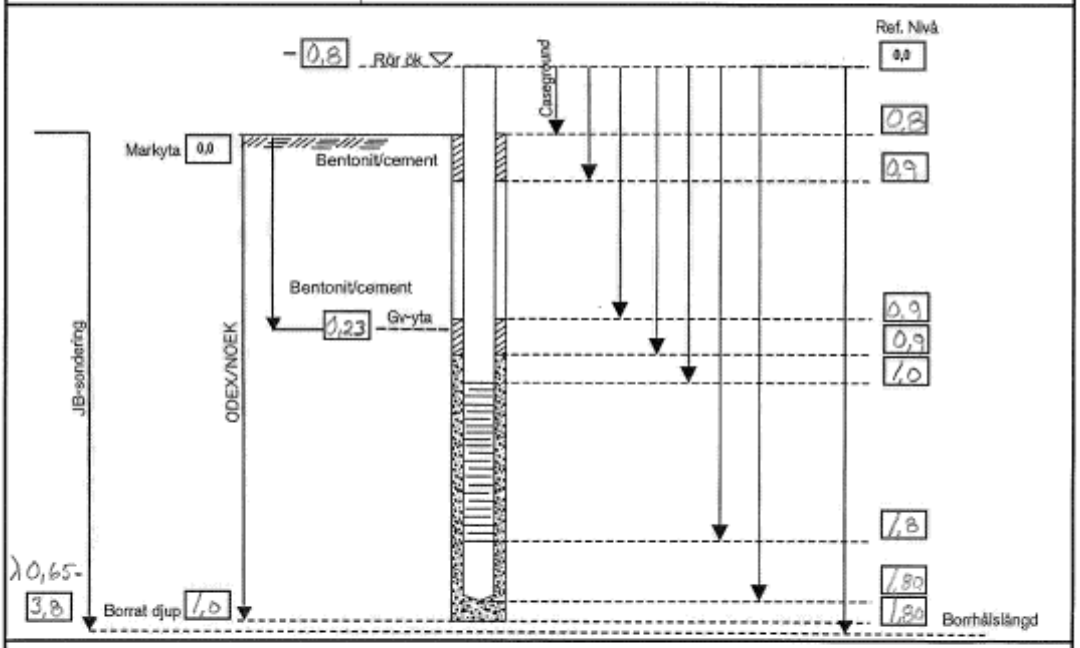
SSM000269

Version 2.0.0

INSTALLATION AV GRUNDVATTENRÖR OCH PORTRYCKSMÄTARE

FÄLTPROTOKOLL – P6 Protokoll av

OMRÅDE SKB Oskarshamn	PROJEKT Installation av Grundvattenrör	BORRHÅLSBETECKNING SSM00269
FÖRETAG RAMBÖLL	UTFÖRARE Tony Eriksson	AKTIVITETSPLANS NR APPS 400-06-78
DATUM 2006-11-15	METOD Grundvattenrör	REFERENS NIVÅ My
ÖPPET RÖR, TYP	FILTERSPETS, TYP Grundvattenrör 63/50	PORTRYCKSMÄTARE, TYP
PUNKTSKISS	NIVÅ ÖK RÖR (från markyta) 0,80 m / LUTN. RÖR (från hor. plan) 90 / BÄRING	
	PRELIMINÄR GPS-INMÄTNING	
	X-KOORD: / Y-KOORD. / FELANGIVELSE GPS	
	HÖJD- OCH KOORDINATSYSTEM	



FUNKTIONSKONTROLL AV GRUNDVATTENRÖR/PORTRYCKSMÄTARE VID INSTALLATION

DATUM/TID	GRUNDVATTENRÖR, Avsänkning ÖK Rör (m)	PORTRYCKSMÄTARE AV TYPEN BAT/GeoN A-värde (mvp)	C-värde (mvp)	Korrigerat värde: A-C+x	SIGN
15/11	1,03				

Uppdragstagares signaturer samt datum		SKB:s signaturer samt datum	
2006-12-04 Tony ERIKSSON Upprättad av	2006-12-19, Kvalitetsgodkänd för leverans	Leverans godkänd	Införd i SICADA

Tony Eriksson

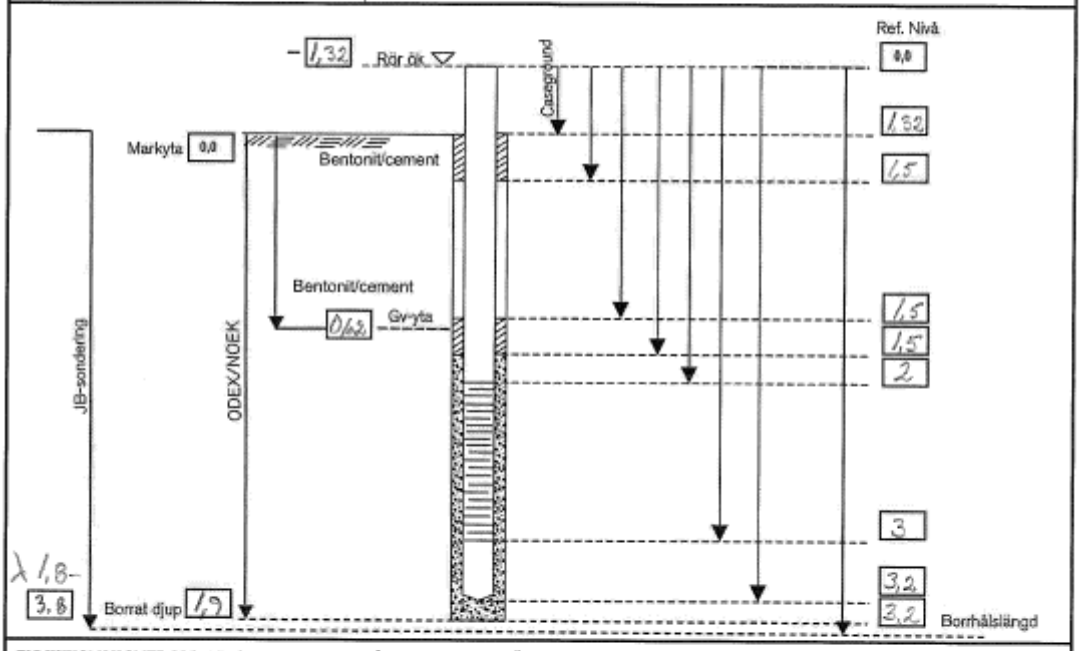
SSM000270

Version 2.0.0

INSTALLATION AV GRUNDVATTENRÖR OCH PORTRYCKSMÄTARE

FÄLTPROTOKOLL – P6 Protokoll av

OMRÅDE: SKB OSKARSHAMN	PROJEKT: Installation av Grundvattenrör	BORRHÅLSBETECKNING: SSM000270
FÖRETAG: RAMBÖLL	UTFÖRARE: Tony Eriksson	AKTIVITETSPLANS NR: APPS 400-06-78
DATUM: 2006-11-15	METOD: Grundvattenrör	REFERENS NIVÅ: Markytan
ÖPPET RÖR, TYP	FILTERSPETS, TYP: Grundvattenrör 63/50	PORTRYCKSMÄTARE, TYP
PUNKTSKISS	NIVÅ ÖK RÖR (från markyta): 1,32	LUTN. RÖR (från hor. plan): 90 / BÄRING
	PRELIMINÄR GPS-INMÄTNING	
	X-KOORD:	Y-KOORD. / FELANGIVELSE GPS
	HÖJD- OCH KOORDINATSYSTEM	



FUNKTIONSKONTROLL AV GRUNDVATTENRÖR/PORTRYCKSMÄTARE VID INSTALLATION

DATUM/TID	GRUNDVATTENRÖR, Avsänkning ÖK Rör (m)	PORTRYCKSMÄTARE AV TYPEN BAT/GeoN: A-värde (mvp)	C-värde (mvp)	Korrigerat värde: A-C+x	SIGN
2006-11-15	1,94				

Uppdragstagares signaturer samt datum		SKB:s signaturer samt datum	
2006-12-04 Tony Eriksson	2006-12-19 Jonah Sjöman		
Upprättad av	Kvalitetsgodkänd för leverans	Leverans godkänd	Införd i SICADA

TONY ERIKSSON

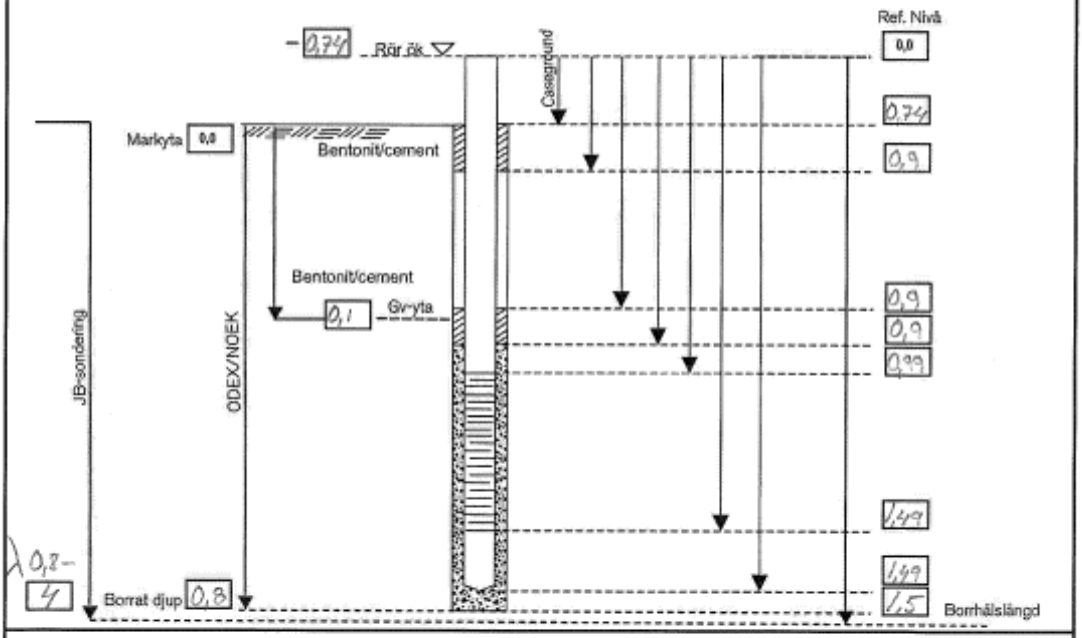
SSM000271

Version 2.0.0

INSTALLATION AV GRUNDVATTENRÖR OCH PORTRYCKSMÄTARE

FÄLTPROTOKOLL – P6 Protokoll av

OMRÅDE: SKB Oskarshamn	PROJEKT: Installation av Grundvattenrör	BORRHÅLSBETECKNING: SSM 000271
FÖRETAG: RAMBÖLL	UTFÖRARE: Tony Eriksson	AKTIVITETSPLANS NR: AP PS 400-06-78
DATUM: 2006-11-15	METOD: Grundvattenrör	REFERENS NIVÅ: Markytan
ÖPPET RÖR, TYP	FILTERSPETS, TYP: Grundvattenrör 63/50	PORTRYCKSMÄTARE, TYP
PUNKTSKISS	NIVÅ ÖK RÖR (från markyta): 0,74 / LUTN. RÖR (från hor. plan): 90 / BÄRING	
	PRELIMINÄR GPS-INMÄTNING	
	X-KOORD: / Y-KOORD. / FELANGIVELSE GPS	
	HÖJD- OCH KOORDINATSYSTEM	



FUNKTIONSKONTROLL AV GRUNDVATTENRÖR/PORTRYCKSMÄTARE VID INSTALLATION

DATUM/TID	GRUNDVATTENRÖR, Avsänkning ÖK Rör (m)	PORTRYCKSMÄTARE AV TYPEN BAT/GeoN A-värde (mvp)	C-värde (mvp)	Korrigerat värde: A-C+x	SIGN
2006-11-15	0,84				

Uppdragstagares signaturer samt datum		SKB:s signaturer samt datum	
2006-12-04 Tony Eriksson Upprättad av	2006-12-19 Kvalitetsgodkänd för leverans	Leverans godkänd	Införd i SICADA

Tony ERIKSSON

SSM000256

BOREHOLE SSM000256

Company rep.
Torbjörn Johansson

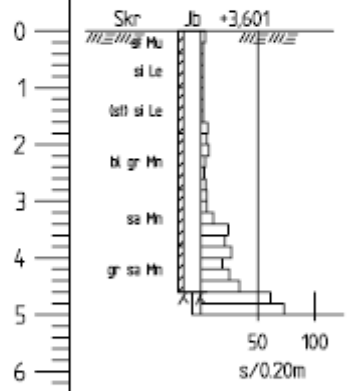
Client: Svensk Kärnbränslehantering AB

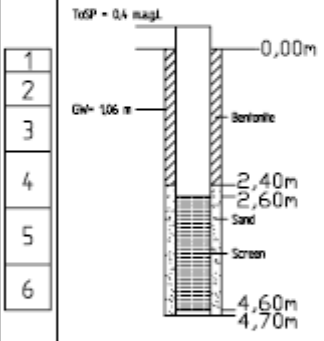
Northing :6366048,022
Easting :1549705,343

Coordinate system : RT90-RHB70

Top of stand pipe :0,4 m.a.g.l.
Total pipe length :5,10 m
Groundwater level :1,06 m.b.g.l.
Date of completion :2006-07-11

Depth (m)	Description	Samples	Groundwater monitoring well description	Borehole Construction Information





Drilling method :NOEK
Borehole diameter :120 mm
sampling method :Auger

CASING
Material :PEH
Outer diameter :63 mm
Inner diameter :50 mm
Total length :3,00 m

SCREEN
Material :PEH
Outer diameter :63 mm
Inner diameter :50 mm
Total length :3,00 m
Slot :0,3 mm

ANNULUS SEAL
Material :Bentonite clay
Total length :2,40 m

SAND PACK
Grain size :0,4-0,8 mm
Total length :2,30 m

DRILLING EQUIPMENT
Drilling rig :GM 65 GTT
Drill hammer :Furukawa HB26
Drill rod :Geostång Φ44
Drill bit :Stift Φ54

GEOLOGICAL LOG
0-0,4m Silty topsoil
0,4-1,0m silty clay
1,0-1,8m somewhat cobble-bearing silty clay
1,8-2,8m boulder-bearing gravelly till
2,8-3,8m sandy till
3,8-4,6m gravelly sandy till
4,6m rock surface

ToSP : Top of Stand Pipe
m.a.g.l. : meters above ground level
m.b.g.l. : meters below ground level

Nomenclature see SGF homepage
www.sgf.net

SSM000257

WSP

BOREHOLE SSM000257

Company rep.
Torbjörn Johansson

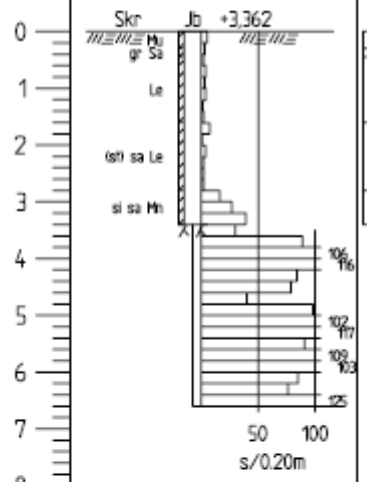
Client: Svensk Kärnbränslehantering AB

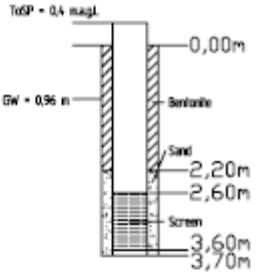
Northing :6366047,489
Easting :1549756,897

Coordinate system : RT90-RHB70

Top of stand pipe :0,4 m.a.g.l.
Total pipe length :4,10 m
Groundwater level :0,96 m.b.g.l.
Date of completion :2006-07-10

Depth (m)	Description	Samples	Groundwater monitoring well description	Borehole Construction Information





Drilling method :NOEK
Borehole diameter :120 mm
sampling method :Auger

CASING
Material :PEH
Outer diameter :63 mm
Inner diameter :50 mm
Total length :3,00 m

SCREEN
Material :PEH
Outer diameter :63 mm
Inner diameter :50 mm
Total length :1,00 m
Slot :0,3 mm

ANNULUS SEAL
Material :Bentonite clay
Total length :2,20 m

SAND PACK
Grain size :0,4-0,8 mm
Total length :1,50 m

DRILLING EQUIPMENT
Drilling rig :GM 65 GTT
Drill hammer :Furukawa HB2G
Drill rod :Geostång ϕ44
Drill bit :Stift ϕ54

GEOLOGICAL LOG
0-0,3m Topsoil
0,3-0,45m gravelly sand
0,45-1,6m clay
1,6-2,8m somewhat cobble-bearing sandy clay
2,8-3,4m silty sandy till
3,4m rock surface

ToSP : Top of Stand Pipe
m.a.g.l. : meters above ground level
m.b.g.l. : meters below ground level

Nomenclature see SGF homepage
www.sgf.net

Sieve curves for gran-size analysis

Table	sieve_analysis
	Sieve analysis (quart. deposit and fraction distribution)

Column	Datatype	Unit	Column Description
site	CHAR		Investigation site name
activity_type	CHAR		Activity type code
idcode	CHAR		Object or borehole identification code
secup	FLOAT	m	Upper section limit (m)
seclow	FLOAT	m	Lower section limit (m)
sign	CHAR		Activity QA signature
error_flag	CHAR		*: Data for the activity is erroneous and should not be used
sample_number	INTEGER	number	Sample or lab number
quartenary_deposit	CHAR		Quartenary deposit classification
sieved_weight	FLOAT	g	Sieved weight
sedimented_weight	FLOAT	g	Sedimented weight
fine_material	FLOAT	%	Fine material (<0.06)
sand	FLOAT	%	Sand fraction
gravel	FLOAT	%	Gravel fraction
clay_002_d_006	FLOAT	%	Clay fraction (0.002/0.006mm)
clay_less_002	FLOAT	%	Clay fraction (<0.002 mm)
d10	FLOAT	mm	10 % of the sample has a grain size <d10
d60	FLOAT	mm	60 % of the sample has a grain size <d60
d90	FLOAT	mm	90 % of the sample has a grain size <d90
d60_d10	FLOAT	no unit	d60/d10 ratio

Key

idcode	start_date	stop_date	(m) secup	(m) seclow	section_no	(number) sample_number	quartenary_deposit	(g) sieved_weight	(g) sedimented_weight	(%) fine_material	(%) sand	(%) gravel	(%) clay_002_d_006	(%) clay_less_002	(mm) d10	(mm) d60	(mm) d90	(no unit) d60_d10
PSM1472	2007-04-11 00:00	2007-05-02 00:00	0,0	0,7	1a	1	Pseudo-fibrous peat											
PSM1472	2007-04-11 00:00	2007-05-02 00:00	0,7	6,0	1a	2	Gyttja											
PSM1472	2007-04-11 00:00	2007-05-02 00:00	6,0	7,2	1a	3	Clay gyttja											
PSM1472	2007-04-11 00:00	2007-05-02 00:00	7,2	8,0	1a	4	Sand	346,00		5,8	91,9	2,3			0,0810	0,2960	0,6960	3,6600
PSM1472	2007-04-11 00:00	2007-05-02 00:00	8,5	10,9	1a	5	Clay		42,00	100,0			65,7	65,7			0,0170	
PSM1472	2007-04-11 00:00	2007-05-02 00:00	11,0	11,80	1a	6	Gravelly sand	631,00		1,7	50,2	48,0			0,1920	3,4030	13,3490	17,7640
PSM1472	2007-04-11 00:00	2007-05-02 00:00	12,0	12,5	1a	7	Sandy till	809,00	50,00	14,4	57,2	28,3	25,3	3,7	0,0260	1,0650	9,3140	41,2380
PSM1473	2007-04-11 00:00	2007-05-02 00:00	6,0	6,5	1b	1	Sandy gravel	515,00		4,5	41,6	54,0			0,1980	3,5730	13,4080	18,0910
PSM1473	2007-04-11 00:00	2007-05-02 00:00	6,5	7,65	1b	2	Gravelly sand	924,00		5,6	50,2	44,2			0,1360	2,5370	12,7480	18,6250
PSM1477	2007-04-11 00:00	2007-05-02 00:00	0,0	0,9	2b	1	Amorphous peat											
PSM1477	2007-04-11 00:00	2007-05-02 00:00	0,9	2,6	2b	2	Gyttja											
PSM1477	2007-04-11 00:00	2007-05-02 00:00	2,6	3,0	2b	3	Clay gyttja											
PSM1477	2007-04-11 00:00	2007-05-02 00:00	3,0	5,3	2b	4	Sand	297,00		3,0	96,7	0,3			0,1180	0,2380	0,4500	2,0270
PSM1477	2007-04-11 00:00	2007-05-02 00:00	5,3	6,5	2b	5	Clay	25,00	45,50	90,1	9,9	0,0	67,3	60,3		0,0020	0,0600	
PSM1477	2007-04-11 00:00	2007-05-02 00:00	8,0	9,0	2b	6	Gravel	84,00		8,3	10,7	81,0			0,1650	8,7030	16,2440	52,7640
PSM1477	2007-04-11 00:00	2007-05-02 00:00	9,0	10,0	2b	7	Gravelly sand	338,00	50,00	13,2	51,0	35,8	30,3	4,0	0,0210	1,7190	7,7030	83,6980
PSM1479	2007-04-11 00:00	2007-05-02 00:00	0,0	0,7	2d	1	Pseudo-fibrous peat											
PSM1479	2007-04-11 00:00	2007-05-02 00:00	0,7	3,6	2d	2	Gyttja											
PSM1479	2007-04-11 00:00	2007-05-02 00:00	3,6	4,9	2d	3	Gyttja											
PSM1479	2007-04-11 00:00	2007-05-02 00:00	5,1	9,3	2d	4	Sand	430,00		2,1	96,5	1,4			0,2510	0,5930	0,9810	2,3640
PSM1479	2007-04-11 00:00	2007-05-02 00:00	9,3	10,0	2d	5	Clayey sand	316,00	50,00	9,4	90,6	0,0	64,4	6,1	0,0640	0,1900	0,3730	2,9950
PSM1479	2007-04-11 00:00	2007-05-02 00:00	12,0	13,0	2d	6	Silty sandy gravel	590,00	50,00	28,0	35,1	36,6	17,4	28,0	0,0070	1,4140	12,1800	208,8500
PSM1479	2007-04-11 00:00	2007-05-02 00:00	13,6	14,6	2d	7	Sandy gravel	333,00		1,2	46,8	52,0			0,2250	4,7380	15,4100	21,0880
PSM1479	2007-04-11 00:00	2007-05-02 00:00	12,2	13,4	2d	8	Sandy gravel	524,00		0,6	28,2	71,2			0,3710	4,6880	10,7210	12,6260
PSM1479	2007-04-11 00:00	2007-05-02 00:00	13,4	14,2	2d	9	Sandy gravel	724,00		0,3	29,7	70,0			0,4120	5,6430	14,4250	13,6980
PSM1480	2007-04-11 00:00	2007-05-02 00:00	0,0	0,4	3a	1	Organic clayey sandy silt											
PSM1480	2007-04-11 00:00	2007-05-02 00:00	0,4	0,7	3a	2	Fine sandy clay gyttja											
PSM1480	2007-04-11 00:00	2007-05-02 00:00	0,7	1,4	3a	3	Gyttja											
PSM1480	2007-04-11 00:00	2007-05-02 00:00	1,4	2,1	3a	4	Gyttja											
PSM1480	2007-04-11 00:00	2007-05-02 00:00	2,1	5,7	3a	5	Sand	334,00		3,0	96,7	0,3			0,1230	0,2480	0,4570	2,0210
PSM1480	2007-04-11 00:00	2007-05-02 00:00	5,7	7,8	3a	6	Clay	29,00	46,40	89,8	10,2	0,0	66,2	59,5		0,0020	0,0610	
PSM1480	2007-04-11 00:00	2007-05-02 00:00	8,0	9,0	3a	7	Sandy gravel	242,00		2,1	23,1	74,8			0,3870	9,6090	16,6510	24,8230
PSM1480	2007-04-11 00:00	2007-05-02 00:00	9,2	10,2	3a	8	Gravelly sand	527,00		4,4	65,5	30,2			0,1770	1,2980	6,4070	7,3130
PSM1484	2007-04-11 00:00	2007-05-02 00:00	0,2	1,1	4a	1	Gravelly till	449,00	50,00	9,5	23,0	67,5	21,2	2,0	0,0670	5,0000	12,2550	75,0750
PSM1484	2007-04-11 00:00	2007-05-02 00:00	1,1	2,1	4a	2	Gravelly till	498,00	50,00	15,2	23,7	61,0	16,5	2,5	0,0290	4,8260	13,6300	167,1610
PSM1484	2007-04-11 00:00	2007-05-02 00:00	2,1	3,0	4a	3	Gravelly till	635,00	50,00	19,6	40,9	39,5	22,3	4,4	0,0140	1,9450	8,2830	138,3170
PSM1484	2007-04-11 00:00	2007-05-02 00:00	2,8	7,0	4a	4	Fractured rock	418,00	50,00	12,0	69,4	18,7	28,6	3,4	0,0330	0,8030	2,9420	24,0760
PSM1485	2007-04-11 00:00	2007-05-02 00:00	0,1	0,3	4b	1	Gravelly sandy silty clay	153,00	30,00	36,9	31,0	32,0	49,8	18,4		0,6600	9,9220	
PSM1485	2007-04-11 00:00	2007-05-02 00:00	0,3	1,0	4b	2	Clay		43,00	100,0	0,0	0,0	67,7	67,7			0,0160	
PSM1485	2007-04-11 00:00	2007-05-02 00:00	1,0	2,5	4b	3	Clay		48,10	100,0	0,0	0,0	72,9	72,9			0,0100	
PSM1485	2007-04-11 00:00	2007-05-02 00:00	2,5	3,5	4b	4	Clayey gravelly till	153,00	30,00	16,1	25,7	58,2	45,1	7,3	0,0090	6,5800	15,5000	693,5470
PSM1487	2007-04-11 00:00	2007-05-02 00:00	0,2	1,0	5a	1	Gravelly till	448,00	50,00	9,8	28,6	61,6	20,4	2,0	0,0620	4,5530	12,8630	72,9870
PSM1487	2007-04-11 00:00	2007-05-02 00:00	1,0	2,0	5a	2	Gravelly till	805,00	50,00	10,1	30,6	59,3	21,1	2,1	0,0590	3,9650	10,7610	67,5480
PSM1487	2007-04-11 00:00	2007-05-02 00:00	2,0	3,5	5a	3	Gravelly till	1103,00	50,00	12,6	33,9	53,5	23,9	3,0	0,0320	3,4420	10,9190	107,8960
PSM1487	2007-04-11 00:00	2007-05-02 00:00	4,4	4,8	5a	4	Clayey gravelly till	636,00	50,00	21,4	30,3	48,3	25,9	5,5	0,0090	3,8810	14,3080	433,9500

quart_deposit_analys

Quartenary deposit analysis

Datatype	Unit	Column Description
CHAR		Investigation site name
CHAR		Activity type code
CHAR		Object or borehole identification code
FLOAT	m	Upper section limit (m)
FLOAT	m	Lower section limit (m)
CHAR		Activity QA signature
CHAR		*: Data for the activity is erroneous and should not be used
INTEGER	number	Sample or lab number
CHAR		Munsell colour code
FLOAT	pH unit	pH
FLOAT	%	Organic carbon
FLOAT	%	Sulphur
FLOAT	%	Nitrogen
FLOAT	%	CaCO3
CHAR		Quartenary deposit

Key

start_date	stop_date	(m) secup	(m) seclow	section_no	(number) sample_number	colour	(pH unit) ph	(%) organic_carbon	(%) sulphur	(%) nitrogen	(%) caco3	quartenary_deposit
2007-04-11 00:00	2007-05-02 00:00	0,00	0,70	1a	1			79,30			0,2	Pseudo-fibrous peat
2007-04-11 00:00	2007-05-02 00:00	0,70	6,00	1a	2			39,10			0,3	Gyttja
2007-04-11 00:00	2007-05-02 00:00	6,00	7,20	1a	3			11,70			0,0	Clay gyttja
2007-04-11 00:00	2007-05-02 00:00	7,20	8,00	1a	4						0,1	Sand
2007-04-11 00:00	2007-05-02 00:00	8,50	10,90	1a	5						0,2	Clay
2007-04-11 00:00	2007-05-02 00:00	11,00	11,80	1a	6						0,7	Gravelly sand
2007-04-11 00:00	2007-05-02 00:00	12,00	12,50	1a	7						0,8	Sandy till
2007-04-11 00:00	2007-05-02 00:00	6,00	6,50	1b	1						1,1	Sandy gravel
2007-04-11 00:00	2007-05-02 00:00	6,50	7,65	1b	2						1,0	Gravelly sand
2007-04-11 00:00	2007-05-02 00:00	0,00	0,90	2b	1			22,10			0,1	Amorphous peat
2007-04-11 00:00	2007-05-02 00:00	0,90	2,60	2b	2			35,00			0,1	Gyttja
2007-04-11 00:00	2007-05-02 00:00	2,60	3,00	2b	3			9,30			0,0	Clay gyttja
2007-04-11 00:00	2007-05-02 00:00	3,00	5,30	2b	4						0,1	Sand
2007-04-11 00:00	2007-05-02 00:00	5,30	6,50	2b	5						0,2	Clay
2007-04-11 00:00	2007-05-02 00:00	8,00	9,00	2b	6						0,7	Gravel
2007-04-11 00:00	2007-05-02 00:00	9,00	10,00	2b	7						1,3	Gravelly sand
2007-04-11 00:00	2007-05-02 00:00	0,00	0,70	2d	1			75,10			0,4	Pseudo-fibrous peat
2007-04-11 00:00	2007-05-02 00:00	0,70	3,60	2d	2			34,00			0,2	Gyttja
2007-04-11 00:00	2007-05-02 00:00	3,60	4,90	2d	3			34,60			0,1	Gyttja
2007-04-11 00:00	2007-05-02 00:00	5,10	9,30	2d	4						0,0	Sand
2007-04-11 00:00	2007-05-02 00:00	9,30	10,00	2d	5						0,2	Clayey sand
2007-04-11 00:00	2007-05-02 00:00	12,00	13,00	2d	6						0,8	Silty sandy gravel
2007-04-11 00:00	2007-05-02 00:00	13,60	14,60	2d	7						0,6	Sandy gravel
2007-04-11 00:00	2007-05-02 00:00	12,20	13,40	2d	8						0,5	Sandy gravel
2007-04-11 00:00	2007-05-02 00:00	13,40	14,20	2d	9							Sandy gravel
2007-04-11 00:00	2007-05-02 00:00	0,00	0,40	3a	1			18,40			0,2	Organic clayey sandy silt
2007-04-11 00:00	2007-05-02 00:00	0,40	0,70	3a	2			6,20			0,2	Fine sandy clay gyttja
2007-04-11 00:00	2007-05-02 00:00	0,70	1,40	3a	3			24,70			0,3	Gyttja
2007-04-11 00:00	2007-05-02 00:00	1,40	2,10	3a	4			22,60			0,2	Gyttja
2007-04-11 00:00	2007-05-02 00:00	2,10	5,70	3a	5						0,0	Sand
2007-04-11 00:00	2007-05-02 00:00	5,70	7,80	3a	6						0,2	Clay
2007-04-11 00:00	2007-05-02 00:00	8,00	9,00	3a	7						0,2	Sandy gravel
2007-04-11 00:00	2007-05-02 00:00	9,20	10,20	3a	8						0,6	Gravelly sand
2007-04-11 00:00	2007-05-02 00:00	0,20	1,10	4a	1						0,2	Gravelly till
2007-04-11 00:00	2007-05-02 00:00	1,10	2,10	4a	2						0,3	Gravelly till
2007-04-11 00:00	2007-05-02 00:00	2,10	3,00	4a	3						0,3	Gravelly till
2007-04-11 00:00	2007-05-02 00:00	2,80	7,00	4a	4						1,6	Fractured rock
2007-04-11 00:00	2007-05-02 00:00	0,10	0,30	4b	1			4,30			0,4	Gravelly sandy silty clay
2007-04-11 00:00	2007-05-02 00:00	0,30	1,00	4b	2						0,3	Clay
2007-04-11 00:00	2007-05-02 00:00	1,00	2,50	4b	3						0,3	Clay
2007-04-11 00:00	2007-05-02 00:00	2,50	3,50	4b	4						0,4	Clayey gravelly till
2007-04-11 00:00	2007-05-02 00:00	0,20	1,00	5a	1						0,1	Gravelly till
2007-04-11 00:00	2007-05-02 00:00	1,00	2,00	5a	2						0,2	Gravelly till
2007-04-11 00:00	2007-05-02 00:00	2,00	3,50	5a	3						0,8	Gravelly till
2007-04-11 00:00	2007-05-02 00:00	4,40	4,80	5a	4						0,2	Clayey gravelly till

Kornfördelning
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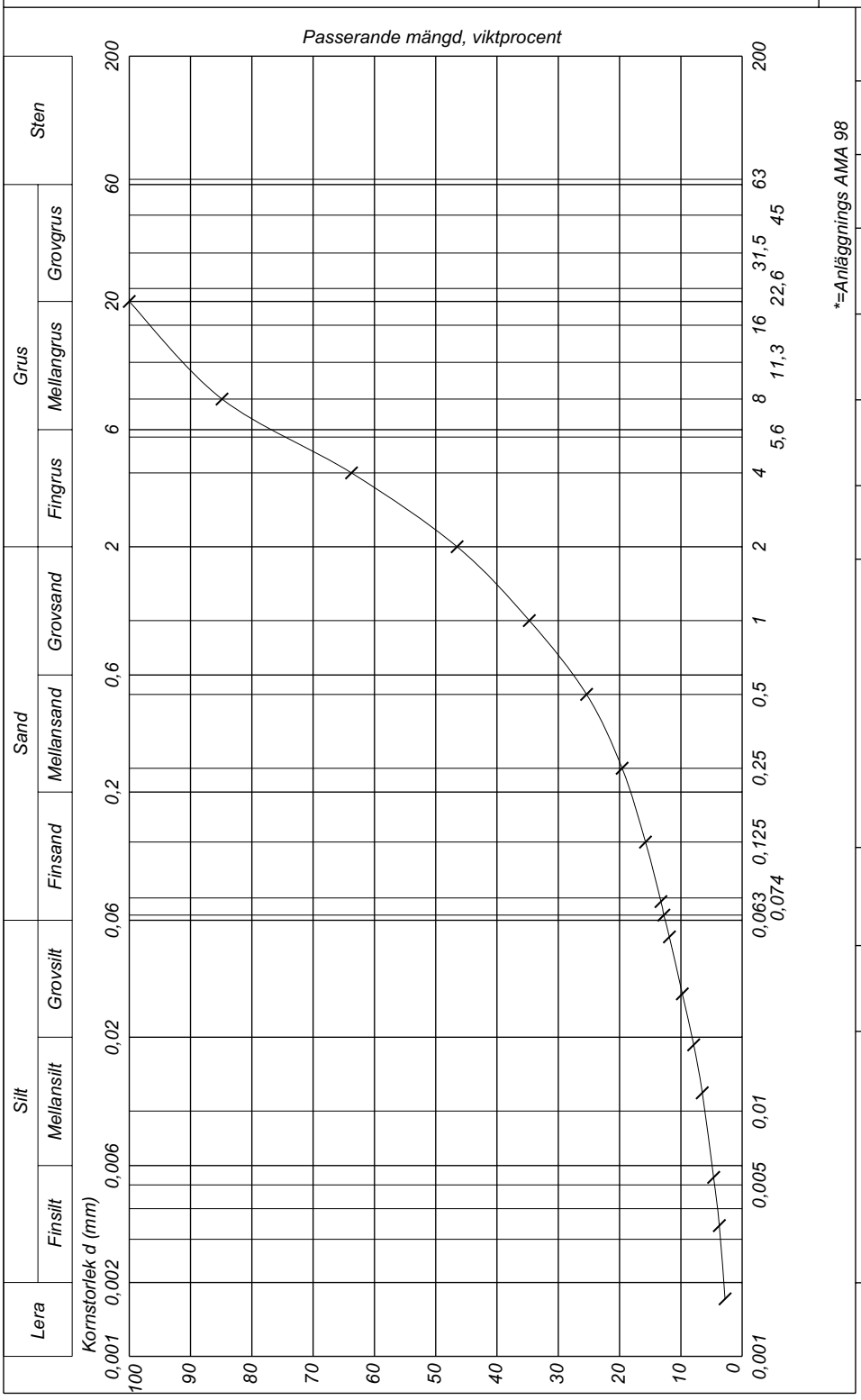
Projekt: **Karakterisering av jordprover Laxemar**			*Datum:* 2007-04-26
Uppdragsnr: AP PS 400-07-012	*Provtagningsdatum:* 2006-11-07		*Löp-nr:* 16822
Uppdragsgivare: Svensk Kärnbränslehantering AB,...			*Gransk./Sign:*



*=Anläggnings AMA 98

Sektion Borrhål	Prov-beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.-förlust %	Mtrl % > mm	Tjäl-farlighet	d10	d60	d90
5 Lerångarna PSM001487	—/—		2,0-3,5	Grusig morän (SGU serie Ae)	1103			2/1*	0,032	3,442	10,919

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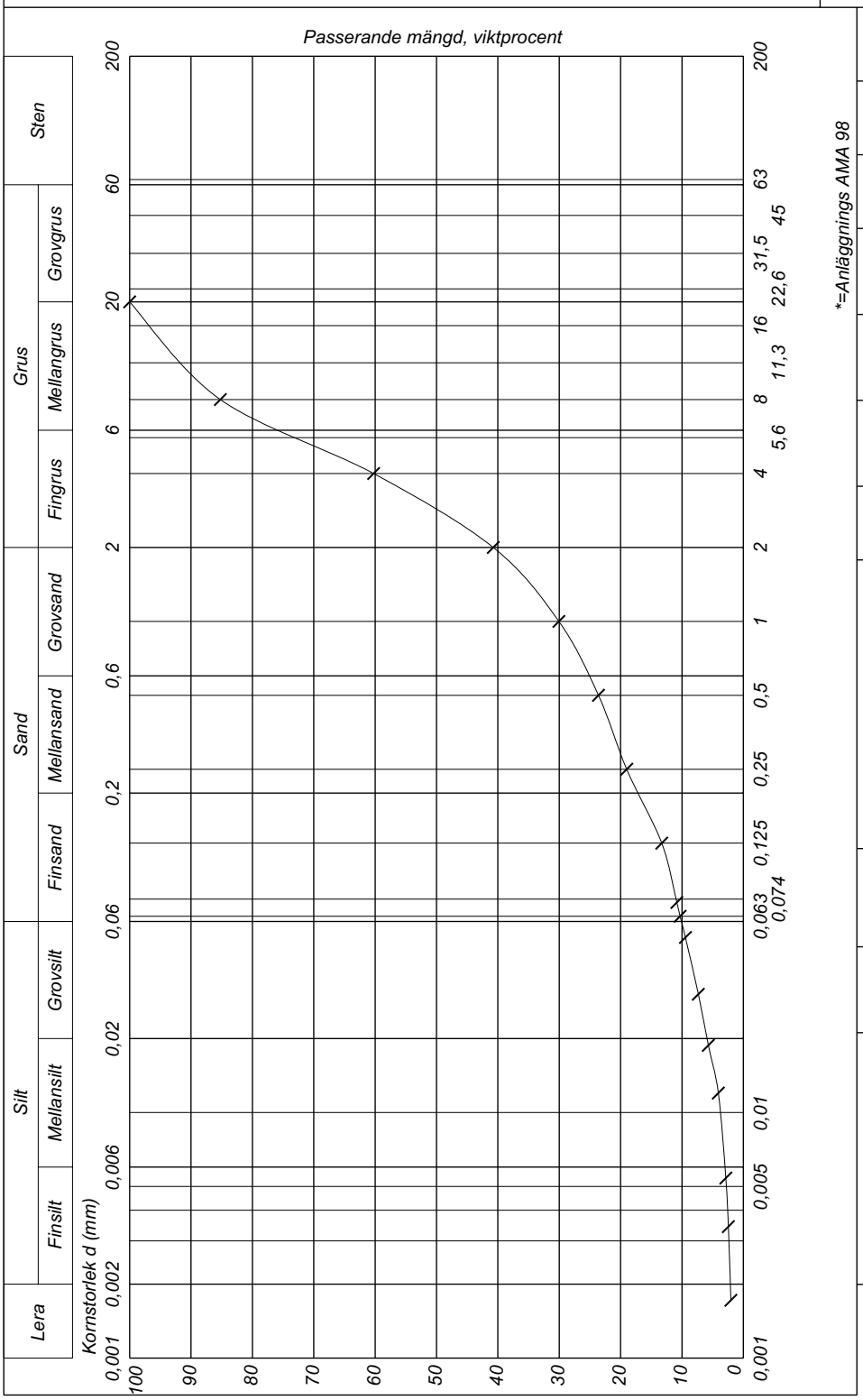
Projekt: **Karakterisering av jordprover Laxemar**			*Datum:* 2007-04-26
Uppdragsnr: AP PS 400-07-012	*Provtagningsdatum:* 2006-11-07		*Löp-nr:* 16822
Uppdragsgivare: Svensk Kärnbränslehantering AB,...			*Gransk./Sign:*



*=Anläggnings AMA 98

Sektion Borrhål	Prov-beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.-förlust %	Mtrl % > mm	Tjäl-farlighet	d10	d60	d90
5 Leräng arna PSM001487	—/—		1,0-2,0	Grusig morän (SGU serie Ae)	805			2/1*	0,059	3,965	10,761

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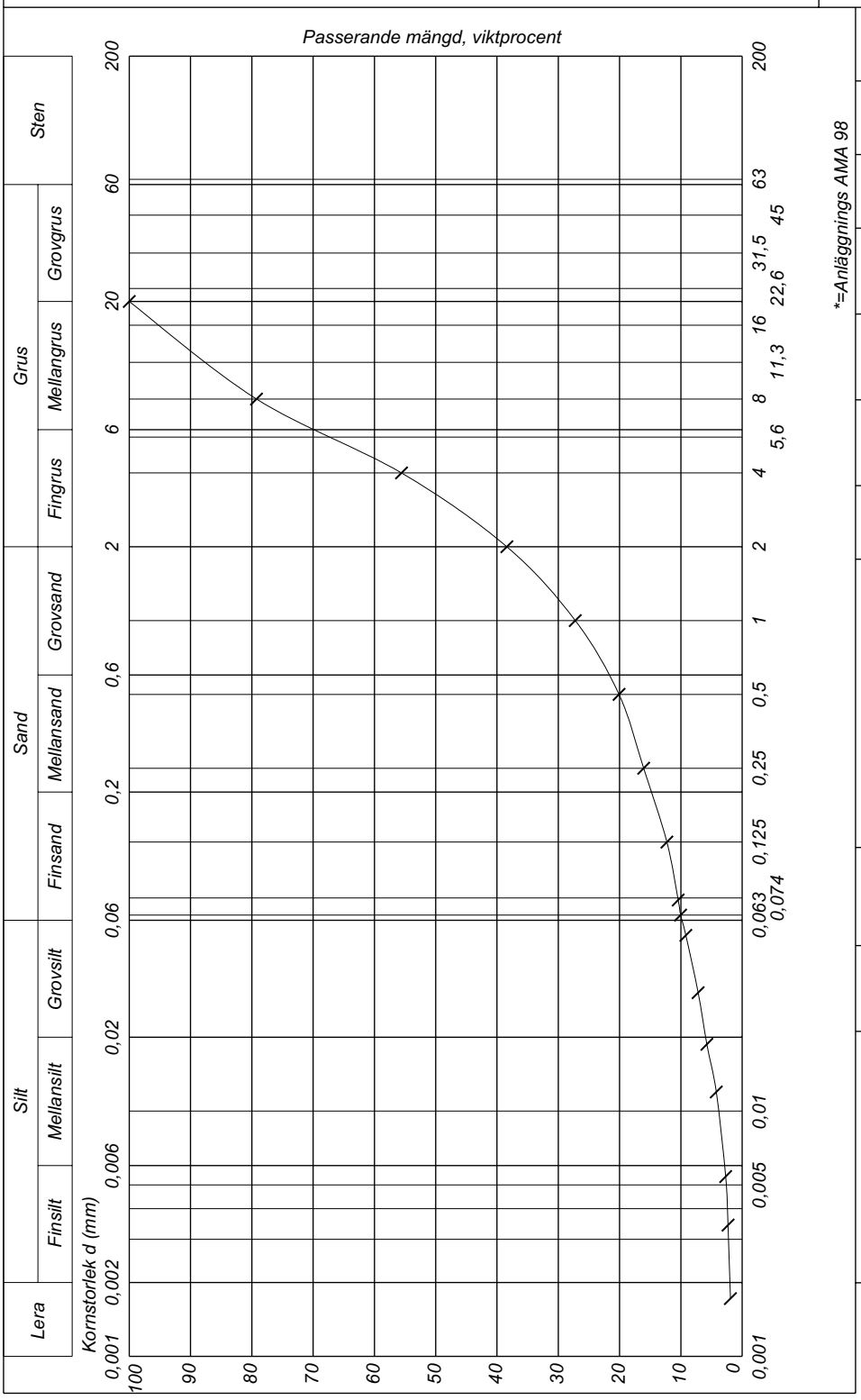
Projekt: **Karakterisering av jordprover Laxemar**			*Datum:* 2007-04-26
Uppdragsnr: AP PS 400-07-012	*Provtagningsdatum:* 2006-11-07		*Löp-nr:* 16822
Uppdragsgivare: Svensk Kärnbränslehantering AB,...			*Gransk./Sign:*



*=Anläggnings AMA 98

Sektion Borrhål	Prov-beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.-förlust %	Mtrl % > mm	Tjäl-farlighet	d10	d60	d90
5 Lerångarna PSM001487	—/—		0,2-1,0	Grusig morän (SGU serie Ae)	448			2/1*	0,062	4,553	12,863

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Projekt: **Karakterisering av jordprover Laxemar**			*Datum:* 2007-04-26
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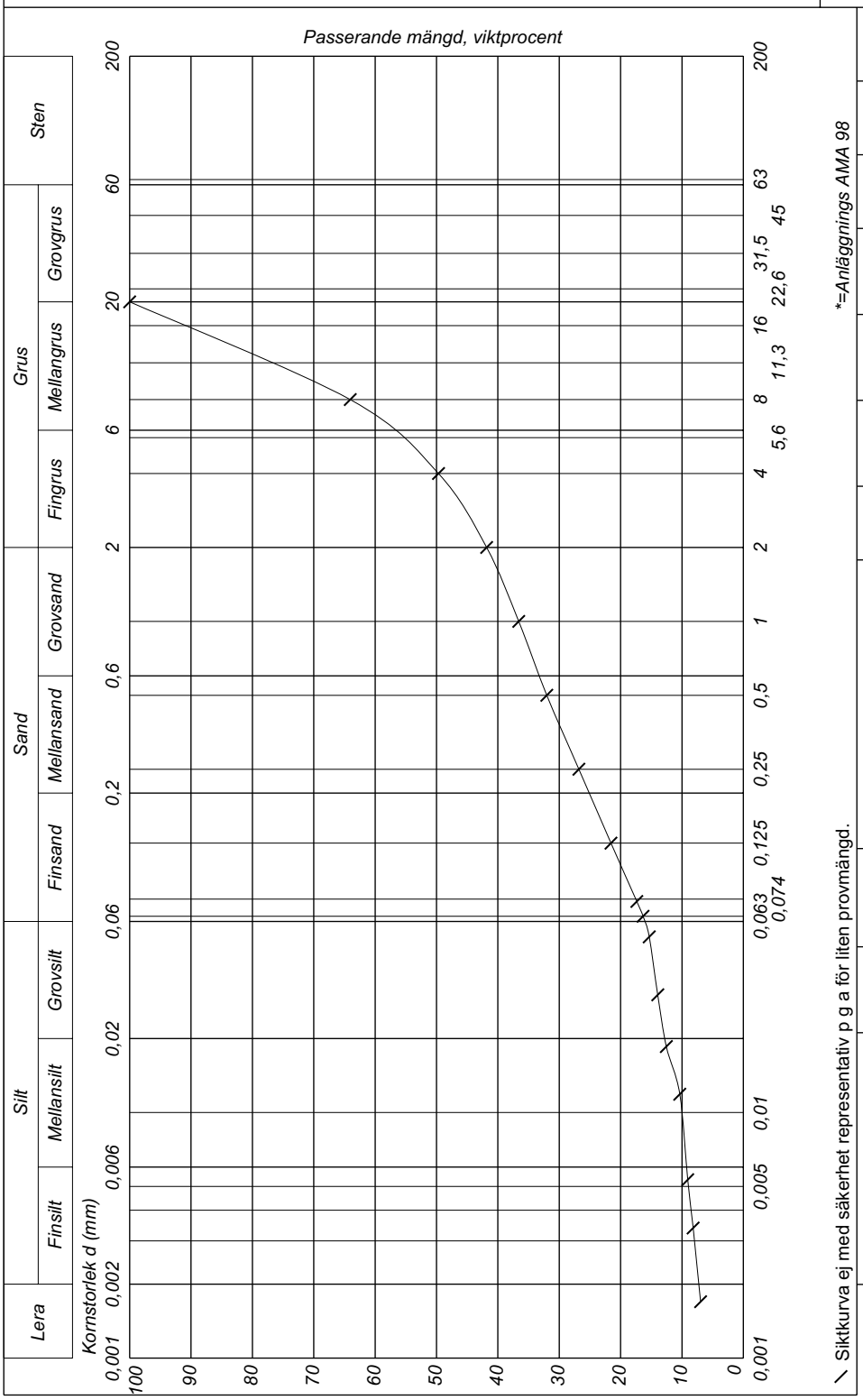

\ Siktkurva ej med säkerhet representativ p g a för liten provmängd.

*=Anläggnings AMA 98

Sektion Borrhål	Prov-beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.-förlust %	Mtrl % > mm	Tjäl-farlighet	d10	d60	d90
4 Horvan Syd PSM001485	—/—		2,5-3,5	Lerig grusig morän (SGU serie Ae)	153		41,2>20	3B/2*	0,009	6,580	15,500

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Projekt: **Karakterisering av jordprover Laxemar**		*Datum:* 2007-04-26
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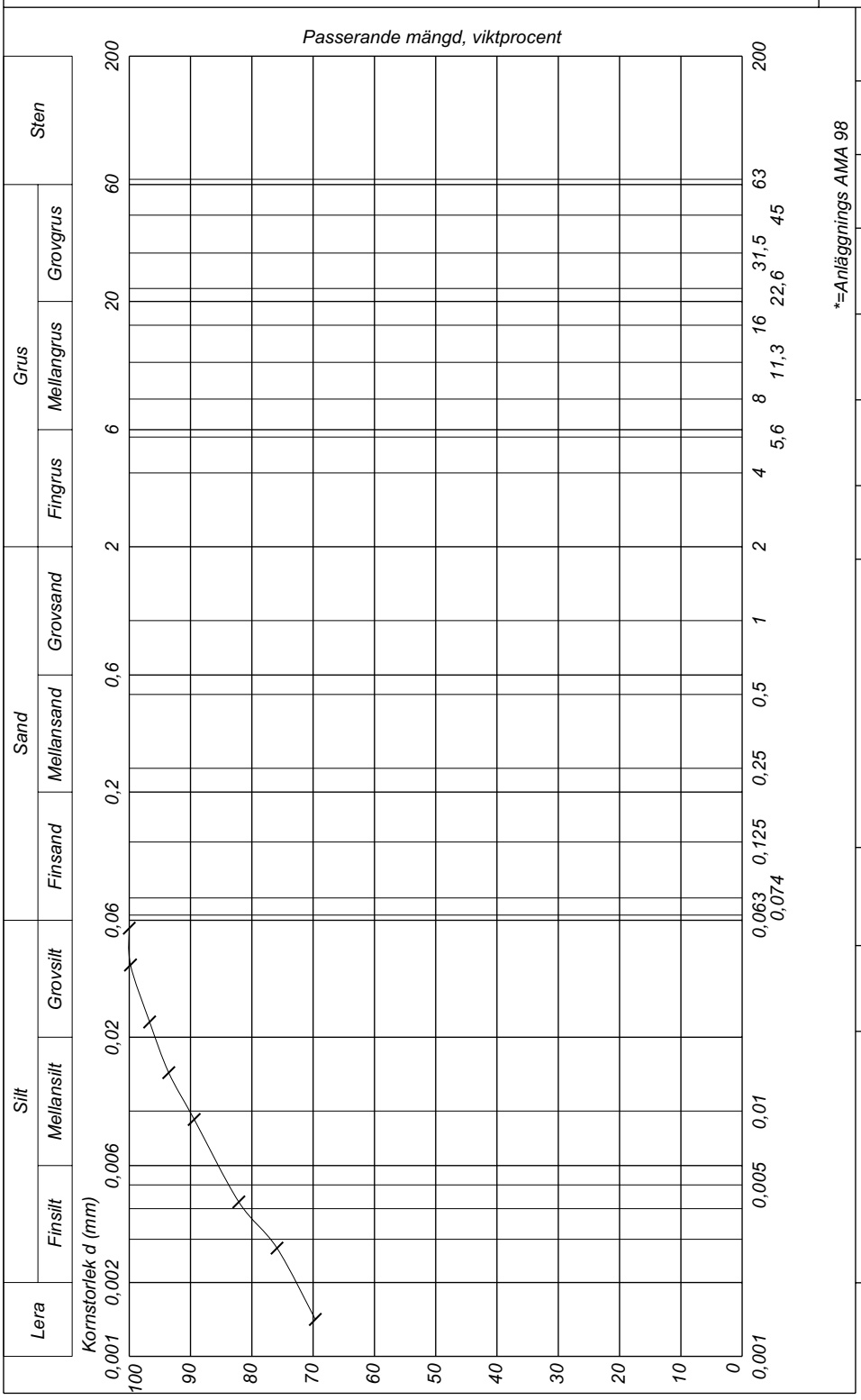
Uppdragsgivare: Svensk Kärnbränslehantering AB,...		*Gransk./Sign:*



*=Anläggnings AMA 98

Sektion Borrhål	Prov-beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.-förlust %	Mtrl % > mm	Tjäl-farlighet	d10	d60	d90
4 Horvan Syd PSM001485	—/—		1,0-2,5	Styv lera (SGU serie Ae)				4B/3*			0,010

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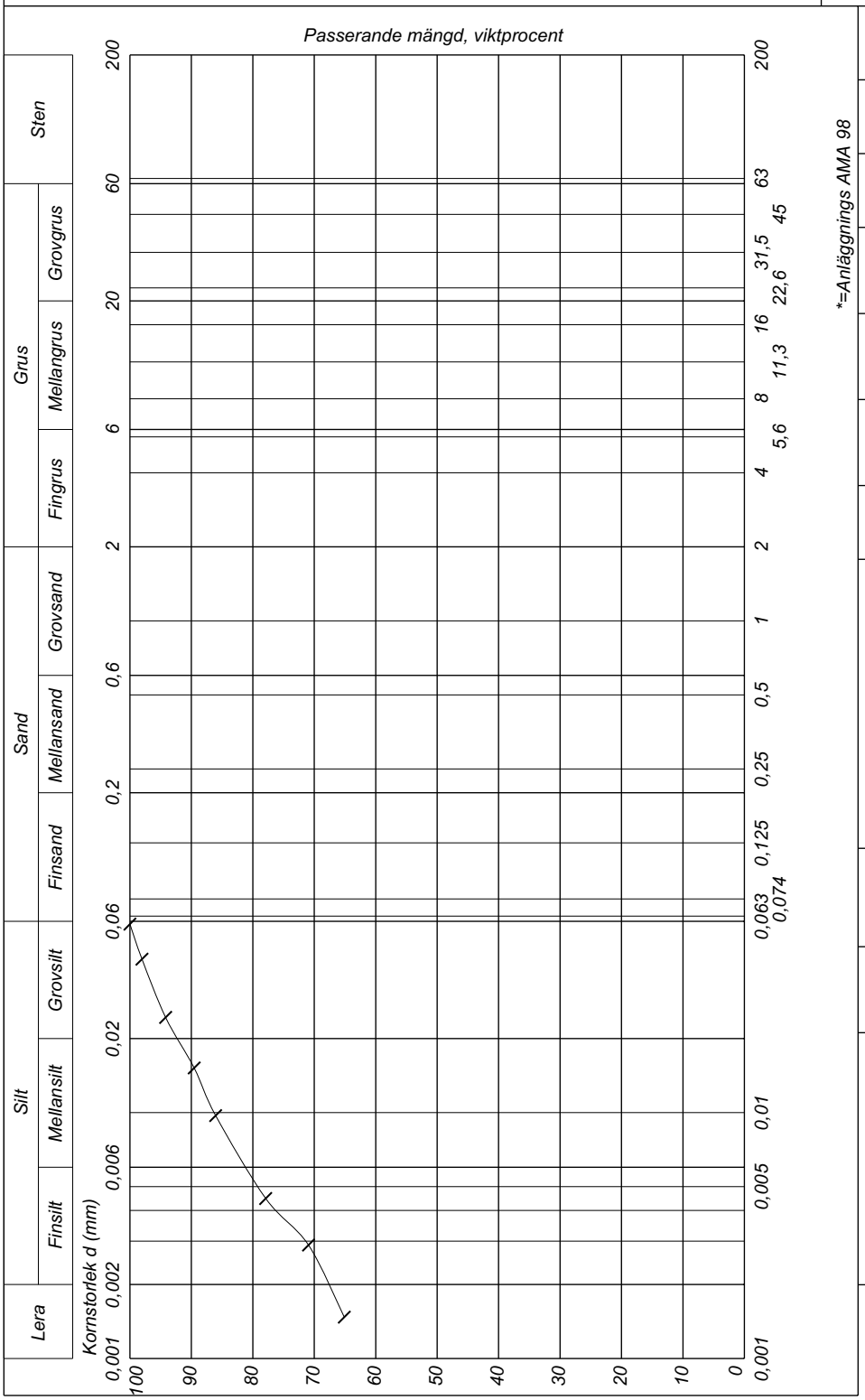
Projekt: **Karakterisering av jordprover Laxemar**			*Datum:* 2007-04-26
Uppdragsnr: AP PS 400-07-012		*Provtagningsdatum:* 2006-11-02	*Löp-nr:* 16822
Uppdragsgivare: Svensk Kärnbränslehantering AB,...			*Gransk./Sign:*



*=Anläggnings AMA 98

Sektion Borrhål	Prov-beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.-förlust %	Mtrl % > mm	Tjäl-farlighet	d10	d60	d90
4 Horvan Syd PSM001485	—\		0,3-1,0	Styv lera (SGU serie Ae)				4B/3*			0,016

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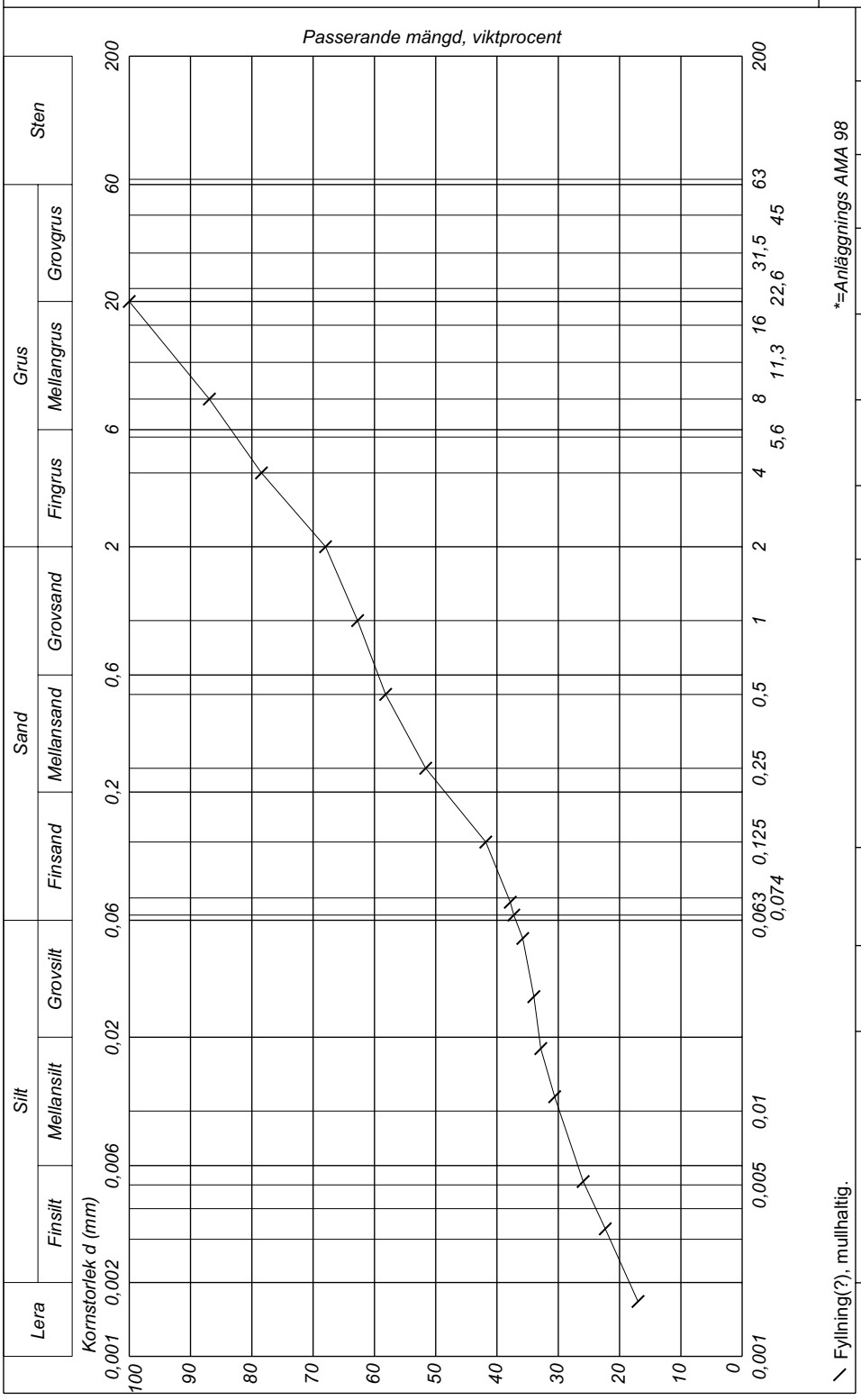
Projekt: **Karakterisering av jordprover Laxemar**			*Datum:* 2007-04-26
Uppdragsnr: AP PS 400-07-012	*Provtagningsdatum:* 2006-11-02		*Löp-nr:* 16822
Uppdragsgivare: Svensk Kärnbränslehantering AB,...			*Gransk./Sign:*



*=Anläggnings AMA 98

Sektion Borrhål	Prov-beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.-förlust %	Mtrl % > mm	Tjäl-farlighet	d10	d60	d90
4 Horvan Syd PSM001485	—/—		0,1-0,3	Grovlera (SGU serie Ae)	153	4,3		5B/4*		0,660	9,922

\ Fyllning(?), mullhaltig.

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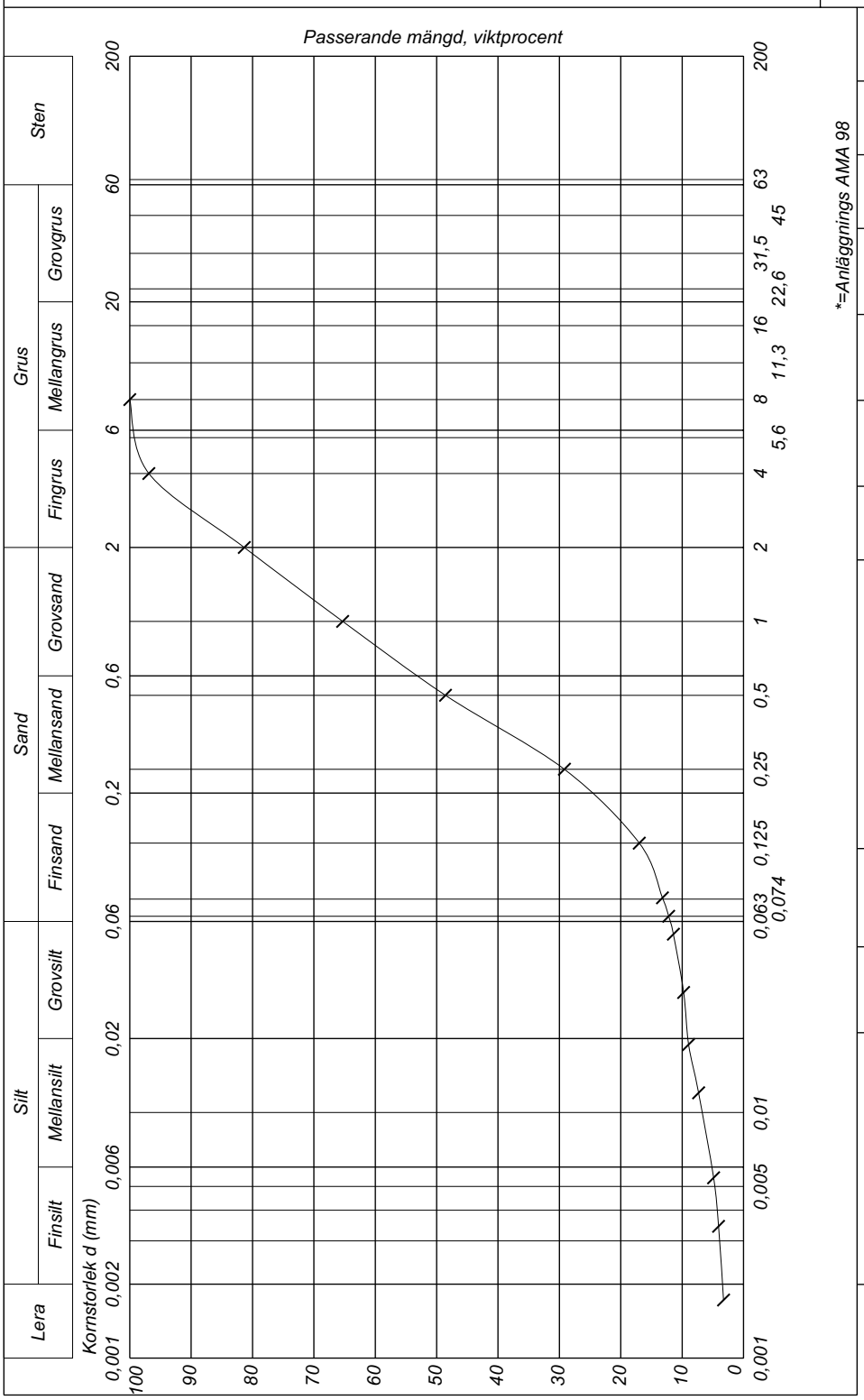
Projekt: **Karakterisering av jordprover Laxemar**	*Datum:* 2007-04-26
Uppdragsnr: AP PS 400-07-012 *Provtagningsdatum:* 2006-11-02	*Löp-nr:* 16822
Uppdragsgivare: Svensk Kärnbränslehantering AB,...	*Gransk./Sign:*



*=Anläggnings AMA 98

Sektion Borrhål	Prov-beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.-förlust %	Mtrl % > mm	Tjäl-farlighet	d10	d60	d90
4 Horvan Syd PSM001484	—		2,8-7,0	Bergkax (krossmaterial)	418			2/1*	0,033	0,803	2,942

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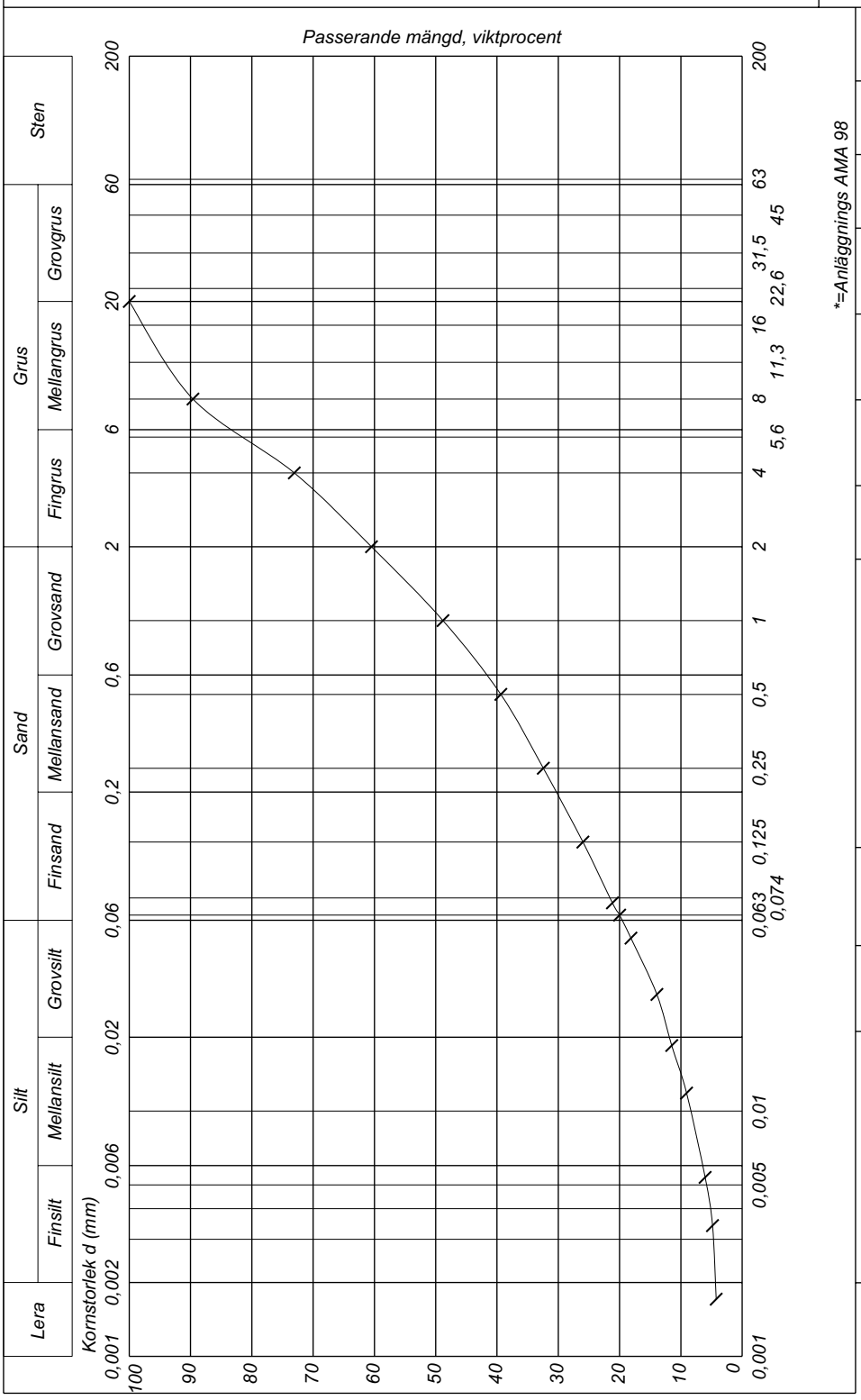
Projekt: **Karakterisering av jordprover Laxemar**			*Datum:* 2007-04-26
Uppdragsnr: AP PS 400-07-012	*Provtagningsdatum:* 2006-11-02		*Löp-nr:* 16822
Uppdragsgivare: Svensk Kärnbränslehantering AB,...			*Gransk./Sign:*



*=Anläggnings AMA 98

Sektion Borrhål	Prov-beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.-förlust %	Mtrl % > mm	Tjäl-farlighet	d10	d60	d90
4 Horvan Syd PSM001484	—/—		2,1-3,0	Grusig morän (SGU serie Ae)	635			3B/2*	0,014	1,945	8,283

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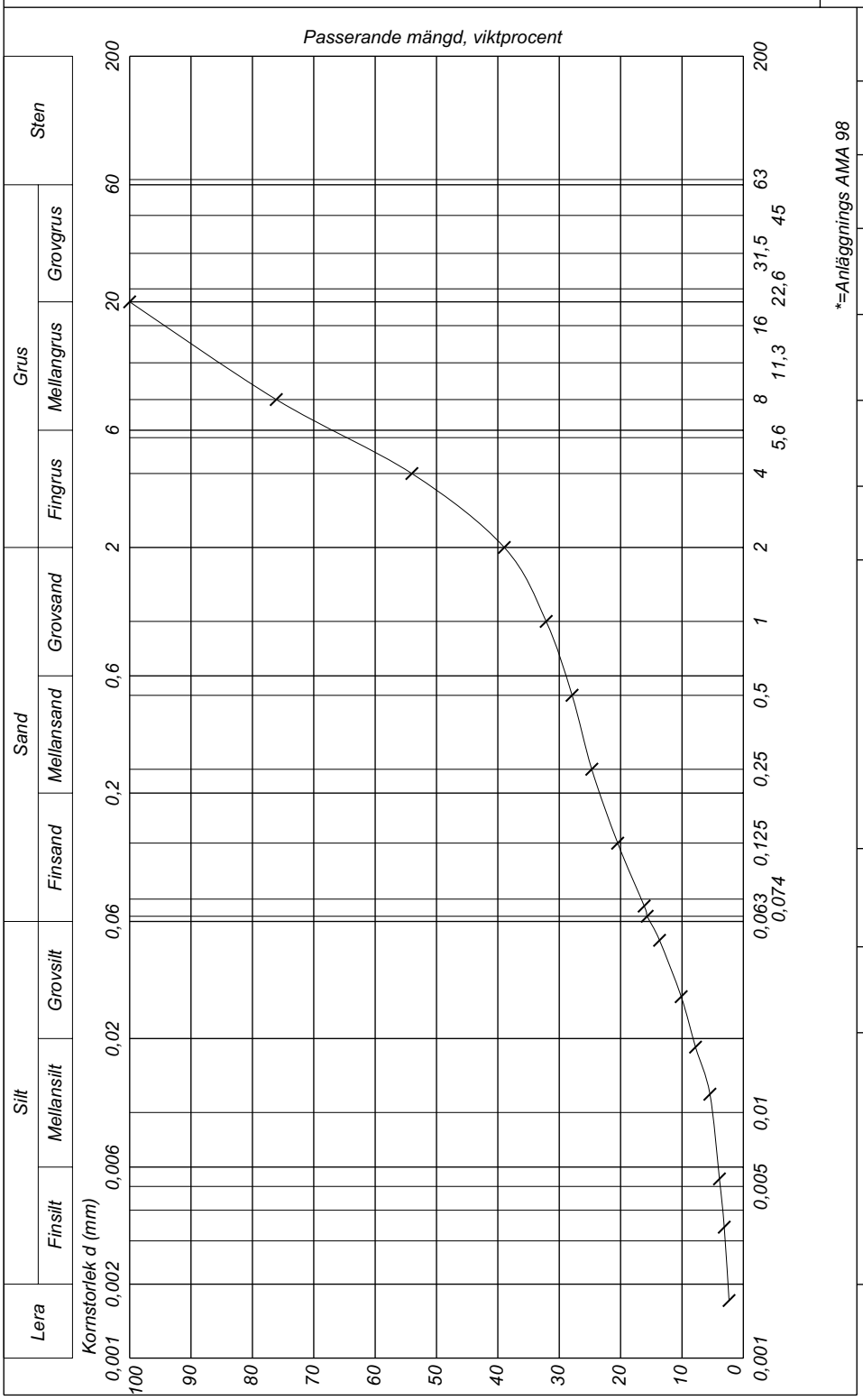
Projekt: **Karakterisering av jordprover Laxemar**			*Datum:* 2007-04-26
Uppdragsnr: AP PS 400-07-012	*Provtagningsdatum:* 2006-11-02		*Löp-nr:* 16822
Uppdragsgivare: Svensk Kärnbränslehantering AB,...			*Gransk./Sign:*



*=Anläggnings AMA 98

Sektion Borrhål	Prov-beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.-förlust %	Mtrl % > mm	Tjäl-farlighet	d10	d60	d90
4 Horvan Syd PSM001484	—/—		1,1-2,1	Grusig morän (SGU serie Ae)	498			3B/2*	0,029	4,826	13,630

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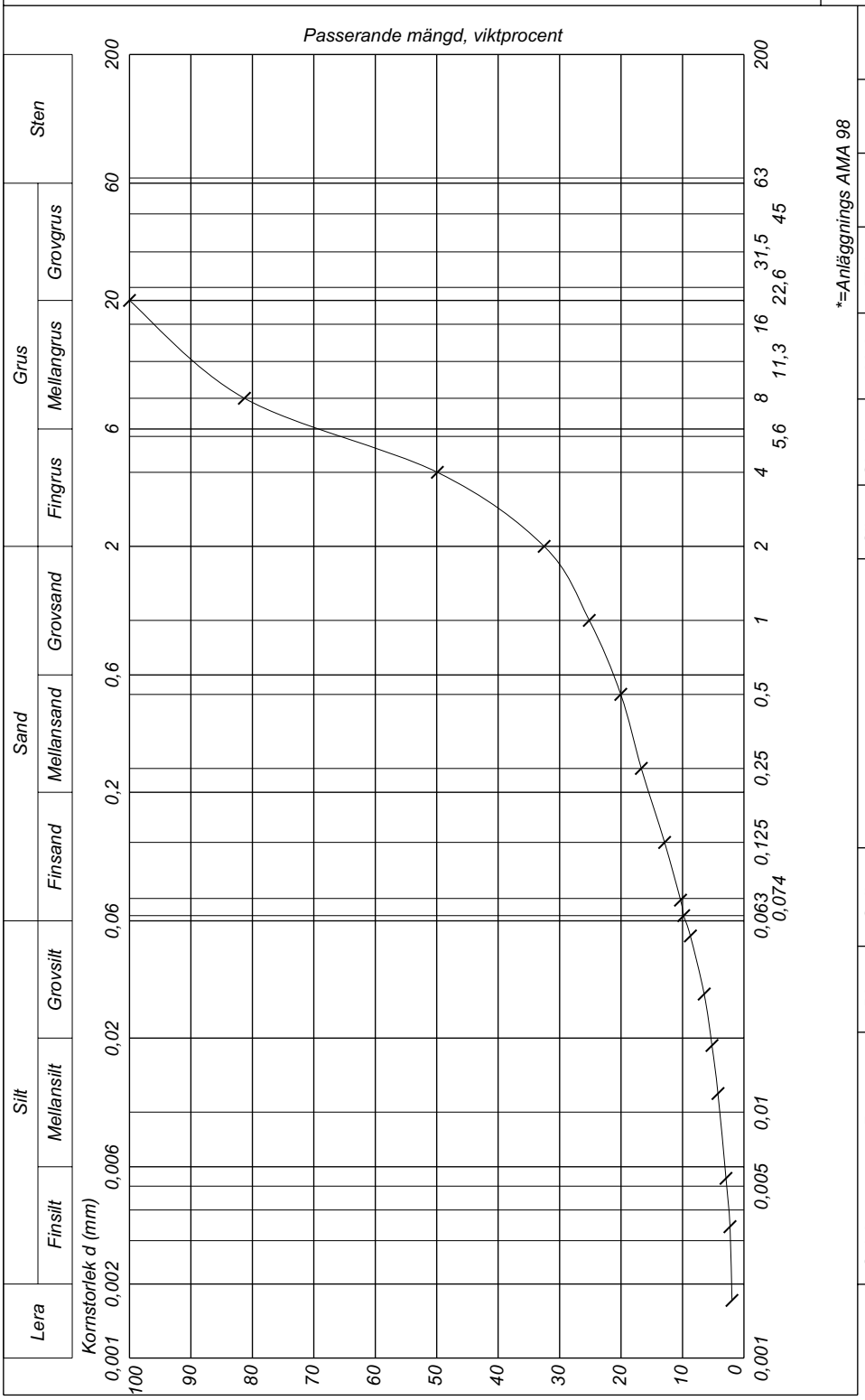
Uppdragsgivare: Svensk Kärnbränslehantering AB,...			*Gransk./Sign:*



*=Anläggnings AMA 98

Sektion Borrhål	Prov-beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.-förlust %	Mtrl % > mm	Tjäl-farlighet	d10	d60	d90
4 Horvan Syd PSM001484	—/—		0,2-1,1	Grusig morän (SGU serie Ae)	449			2/1*	0,067	5,000	12,255

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Projekt: **Karakterisering av jordprover Laxemar**			*Datum:* 2007-04-26
Uppdragsnr: AP PS 400-07-012	*Provtagningsdatum:* 2006-11-01		*Löp-nr:* 16822
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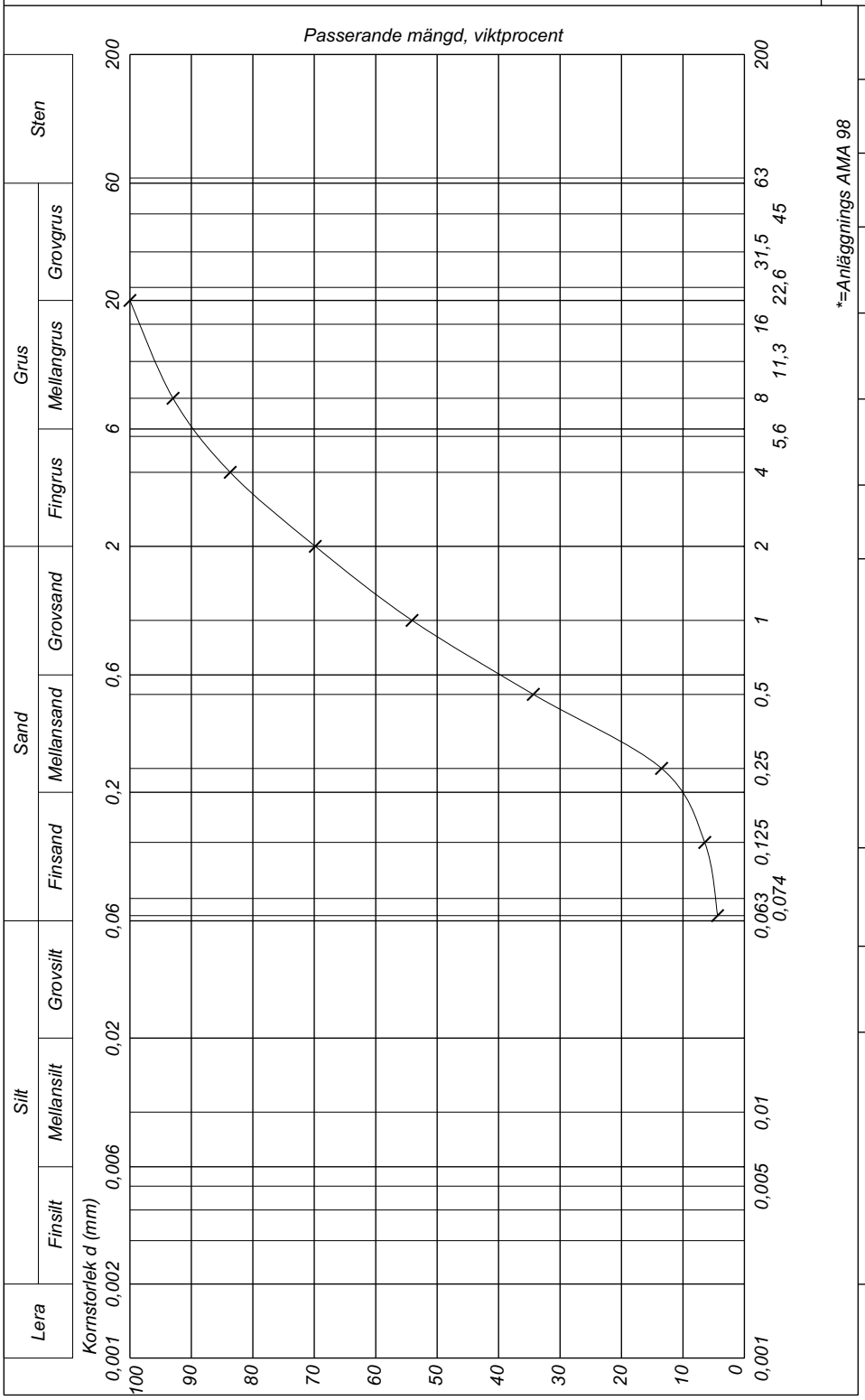

*=Anläggnings AMA 98

Sektion Borrhål	Prov-beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.-förlust %	Mtrl % > mm	Tjäl-farlighet	d10	d60	d90
3 Laxemarån PSM001480			9,2-10,2	Grusig sand (SGU serie Ae)	527		23,7>20	2/1*	0,177	1,298	6,407

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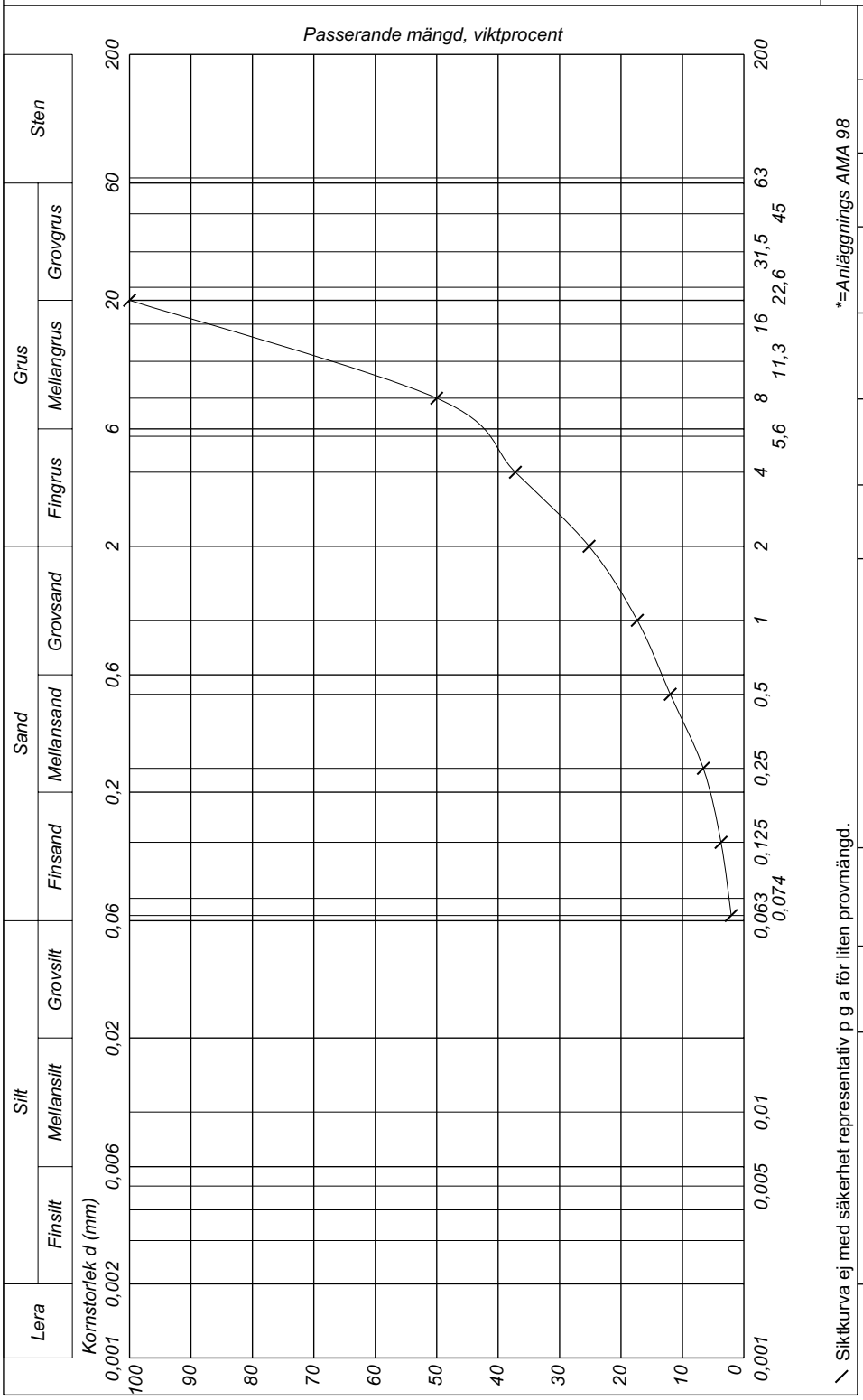
Uppdragsgivare: Svensk Kärnbränslehantering AB,...			*Gransk./Sign:*



\ Siktkurva ej med säkerhet representativ p g a för liten provmängd.

*=Anläggnings AMA 98

Sektion Borrhål	Prov-beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.-förlust %	Mtrl % > mm	Tjäl-farlighet	d10	d60	d90
3 Laxemarån PSM001480	—\—		8,0-9,0	Sandigt grus (SGU serie Ae)	242		32,8>20	2/1*	0,387	9,609	16,651

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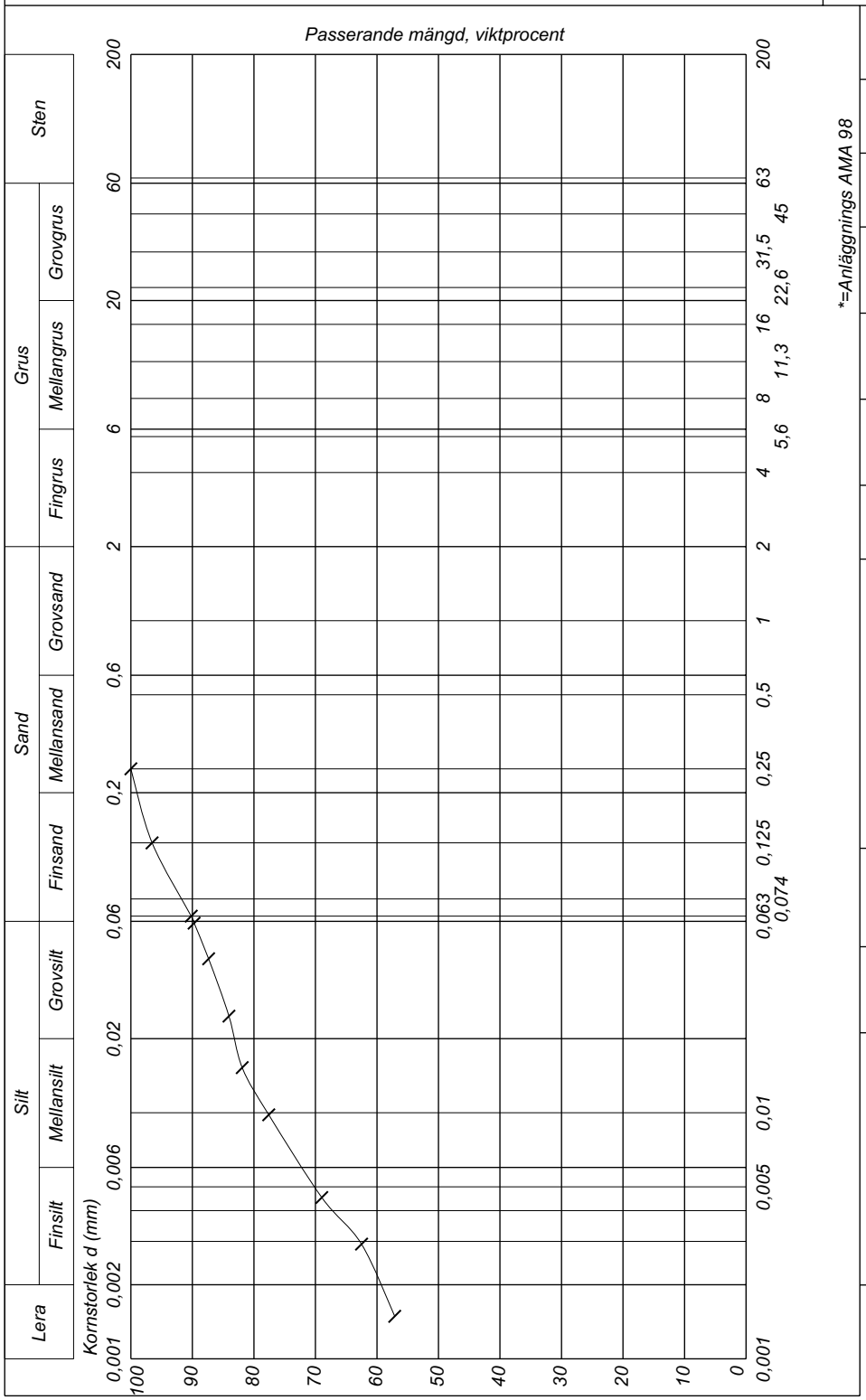
enl. SS027123 och SS027124

SWECO GEOLAB

Projekt: **Karakterisering av jordprover Laxemar**		*Datum:*	2007-04-26
Uppdragsnr: AP PS 400-07-012	*Provtagningsdatum:* 2006-11-01	*Löp-nr:*	16822
Uppdragsgivare: Svensk Kärnbränslehantering AB,...		*Gransk./Sign:*	



*=Anläggnings AMA 98

Sektion Borrhål	Prov-beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.-förlust %	Mtrl % > mm	Tjäl-farlighet	d10	d60	d90
3 Laxemarån PSM001480	—/—		5,7-7,8	Styv lera (SGU serie Ae)	29			4B/3*		0,002	0,061

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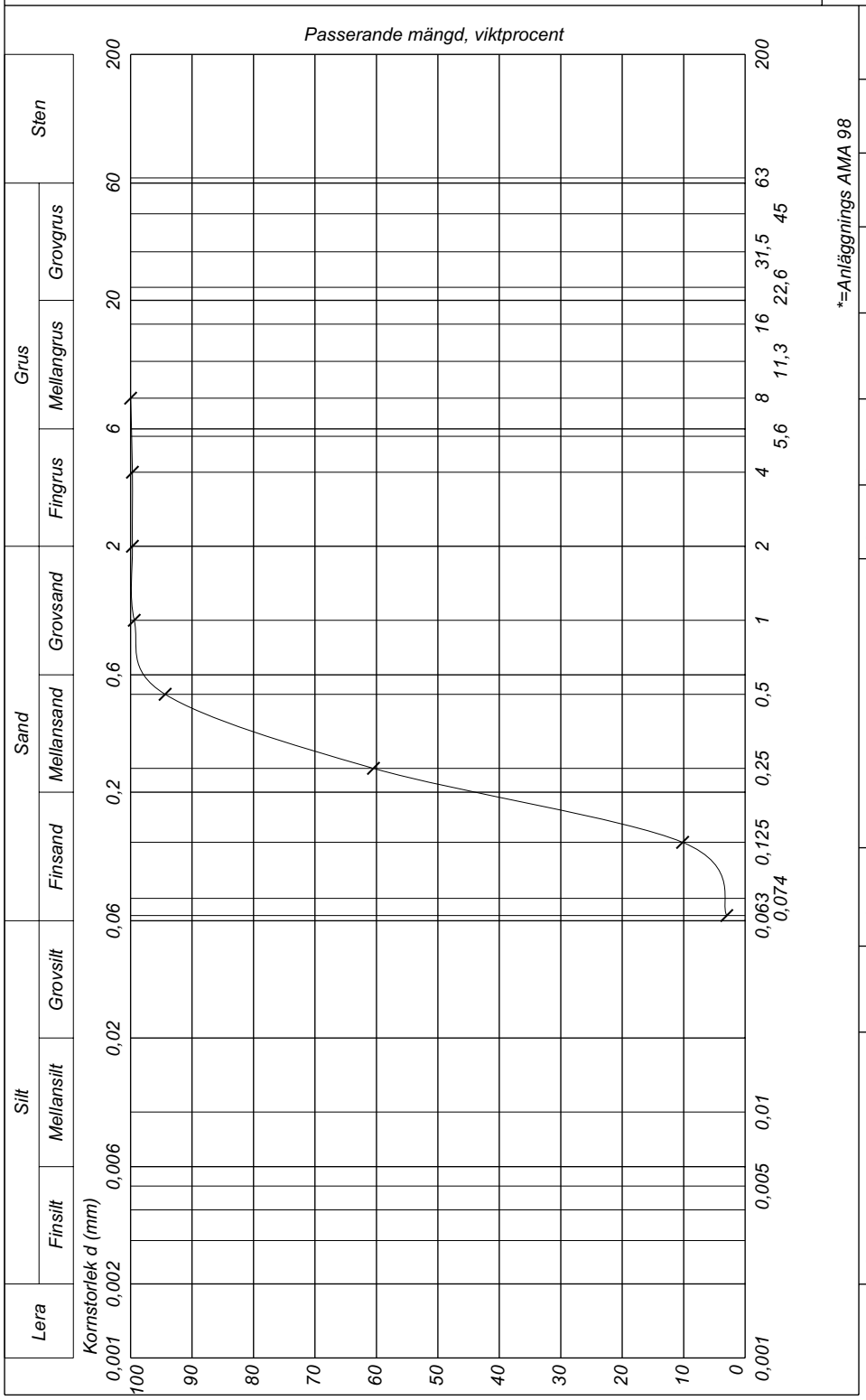
Projekt: **Karakterisering av jordprover Laxemar**			*Datum:* 2007-04-26
Uppdragsnr: AP PS 400-07-012	*Provtagningsdatum:* 2006-11-01		*Löp-nr:* 16822
Uppdragsgivare: Svensk Kärnbränslehantering AB,...			*Gransk./Sign:*



*=Anläggnings AMA 98

Sektion Borrhål	Prov-beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.-förlust %	Mtrl % > mm	Tjäl-farlighet	d10	d60	d90
3 Laxemarån PSM001480	—\		2,1-5,7	Sand (SGU serie Ae)	334			2/1*	0,123	0,248	0,457

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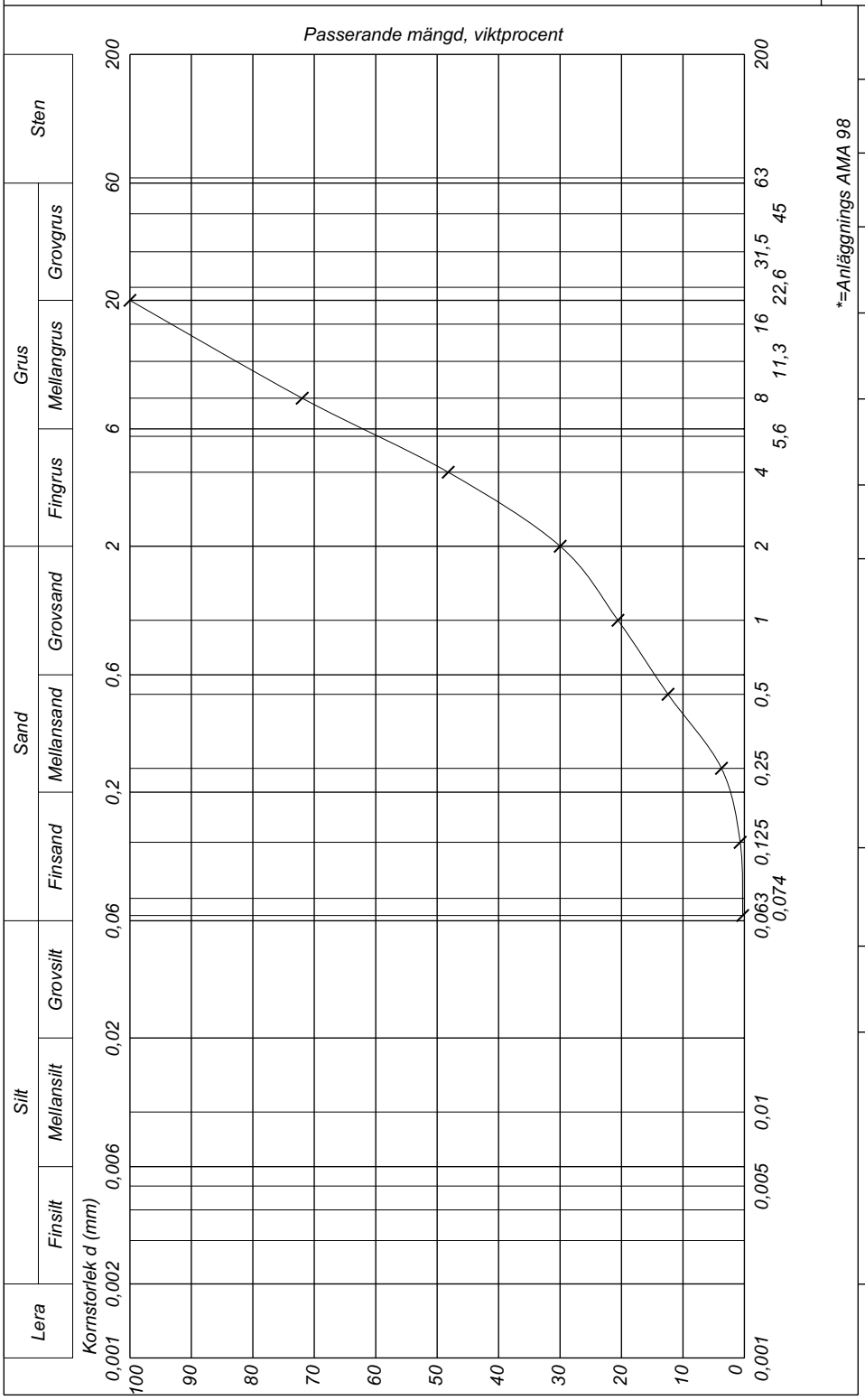
Projekt: **Karakterisering av jordprover Laxemar**			*Datum:* 2007-04-26
Uppdragsnr: AP PS 400-07-012	*Provtagningsdatum:* 2006-10-27		*Löp-nr:* 16822
Uppdragsgivare: Svensk Kärnbränslehantering AB,...			*Gransk./Sign:*



*=Anläggnings AMA 98

Sektion Borrhål	Prov-beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.-förlust %	Mtrl % > mm	Tjäl-farlighet	d10	d60	d90
2 Ekerumsbäcken PSM001479			13,4-14,2	Sandigt grus (SGU serie Ae)	724			2/1*	0,412	5,643	14,425

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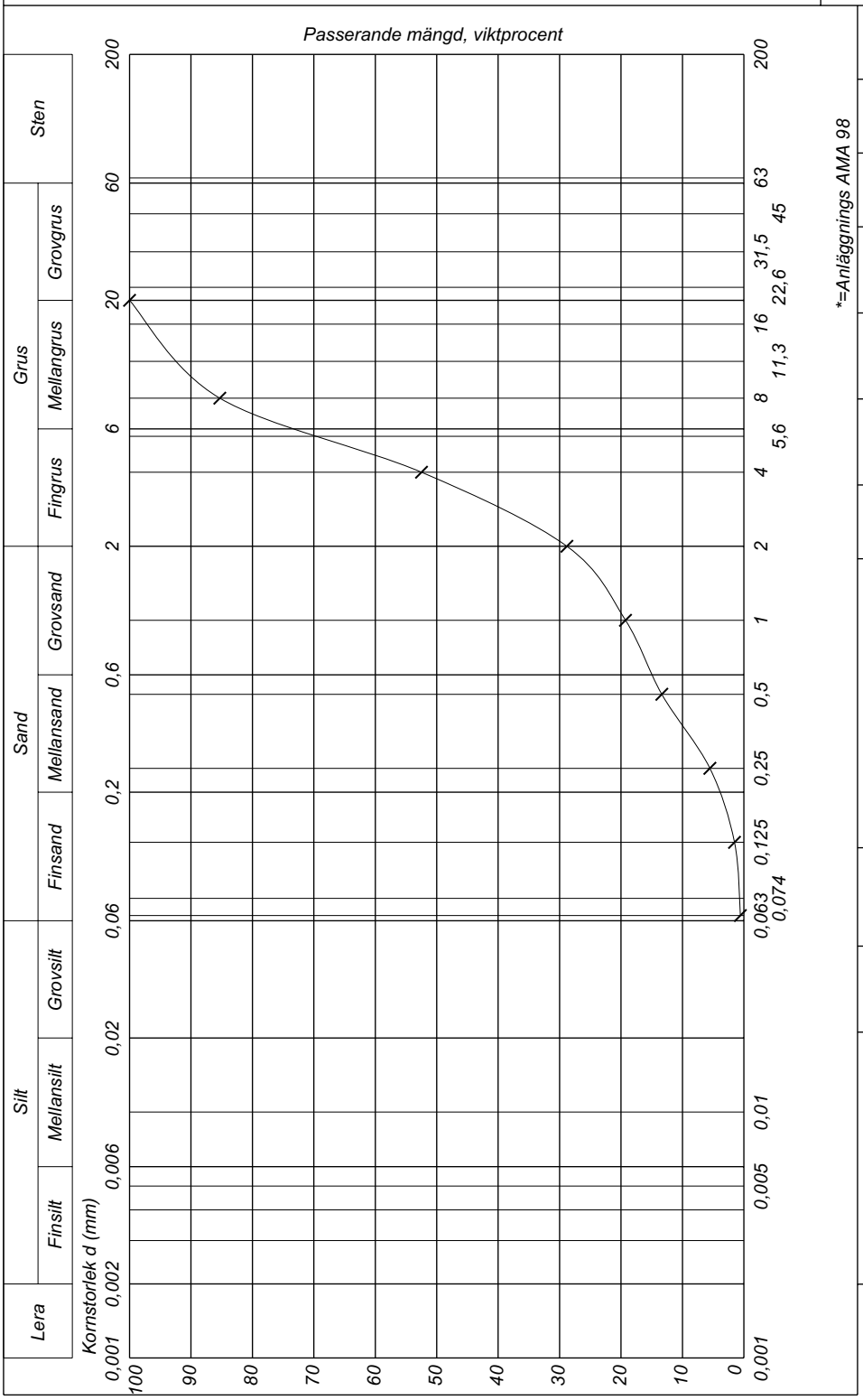
Uppdragsnr: AP PS 400-07-012	*Provtagningsdatum:* 2006-10-27		*Löp-nr:* 16822
Uppdragsgivare: Svensk Kärnbränslehantering AB,...			*Gransk./Sign:*



*=Anläggnings AMA 98

Sektion Borrhål	Prov-beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.-förlust %	Mtrl % > mm	Tjäl-farlighet	d10	d60	d90
2 Ekerumsbäcken PSM001479			12,2-13,4	Sandigt grus (SGU serie Ae)	524			2/1*	0,371	4,688	10,721

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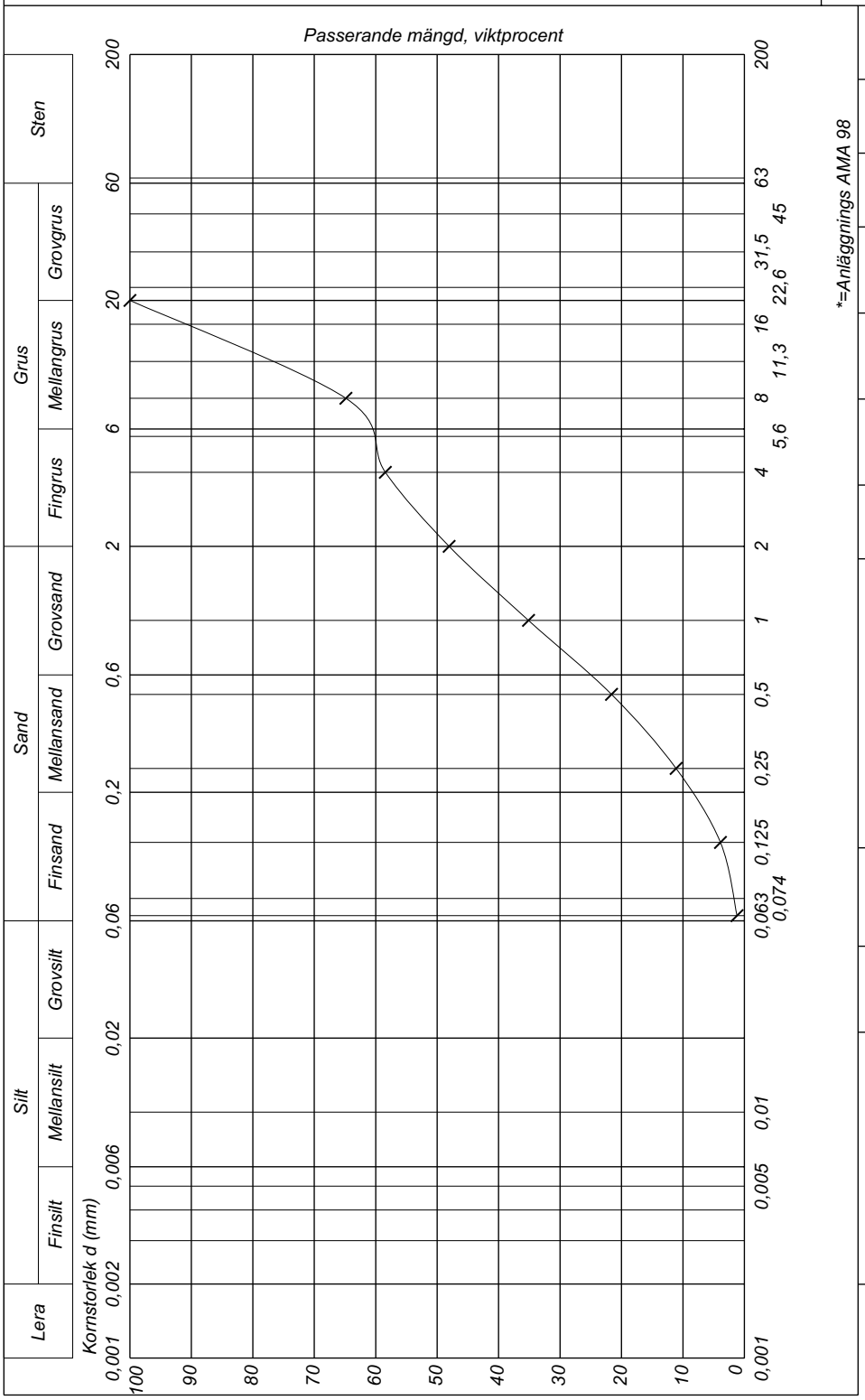
Projekt: **Karakterisering av jordprover Laxemar**	*Datum:* 2007-04-26
Uppdragsnr: AP PS 400-07-012 *Provtagningsdatum:* 2006-10-27	*Löp-nr:* 16822
Uppdragsgivare: Svensk Kärnbränslehantering AB,...	*Gransk./Sign:*



*=Anläggnings AMA 98

Sektion Borrhål	Prov-beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.-förlust %	Mtrl % > mm	Tjäl-farlighet	d10	d60	d90
2 Ekerumsbäcken PSM001479			13,6-14,6	Sandigt grus (SGU serie Ae)	333		22,7>20	2/1*	0,225	4,738	15,410

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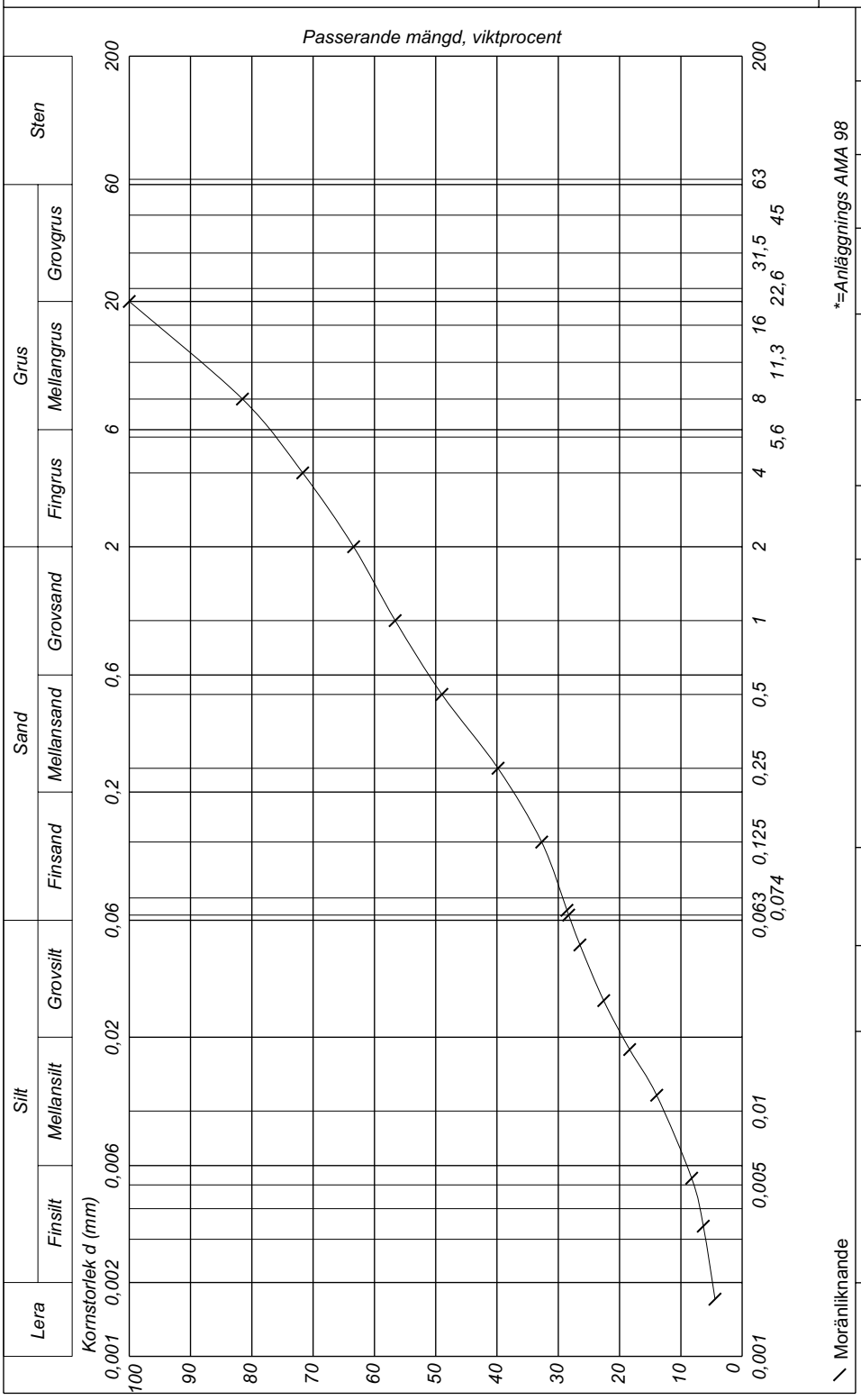
Uppdragsgivare: Svensk Kärnbränslehantering AB,...			*Gransk./Sign:*



*=Anläggnings AMA 98

Sektion Borrhål	Prov-beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.-förlust %	Mtrl % > mm	Tjäl-farlighet	d10	d60	d90
2 Ekerumsbäcken PSM001479			12,0-13,0	Siltigt sandigt grus (SGU serie Ae)	590		32,5>20	3B/2*	0,007	1,414	12,180

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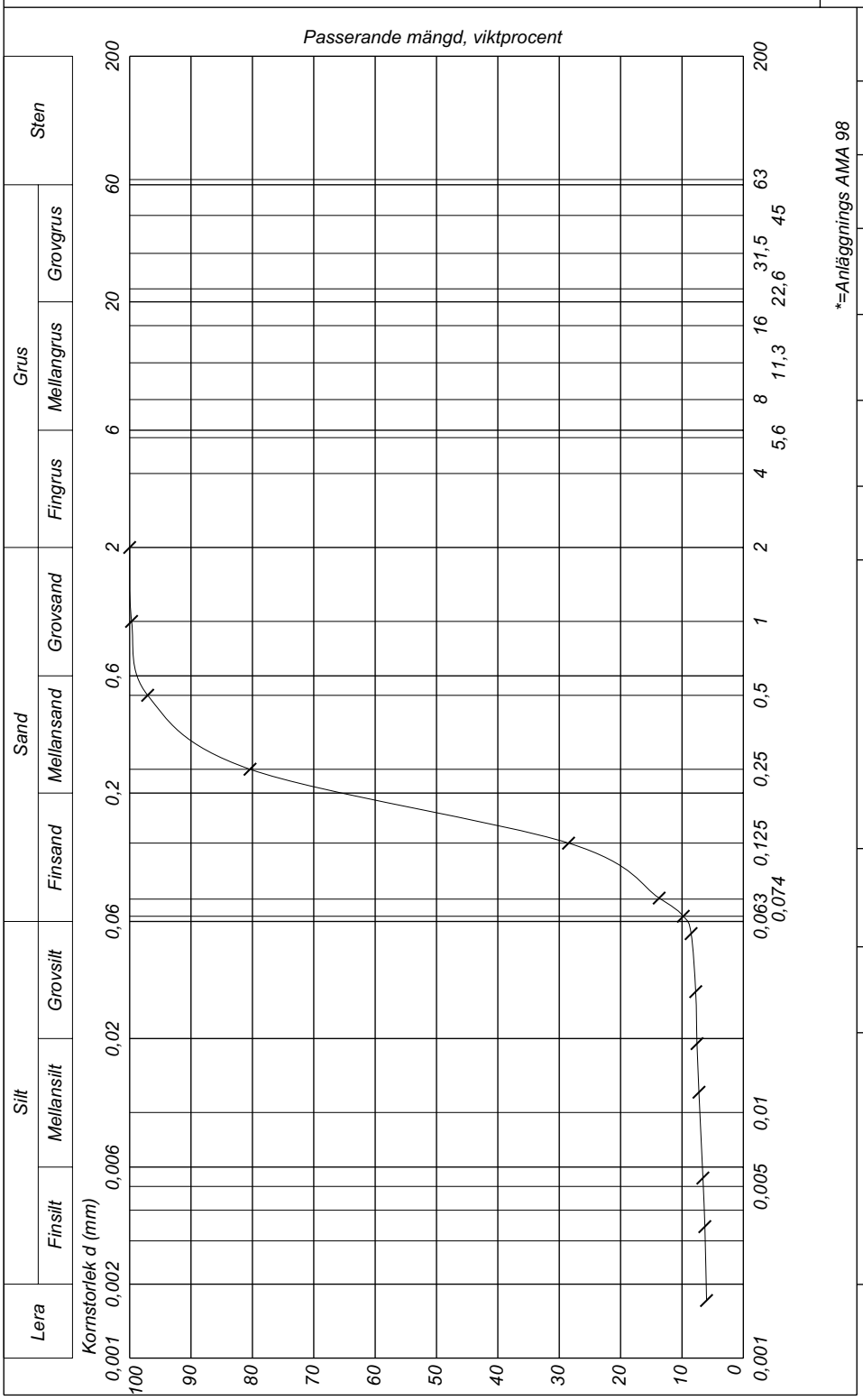
Uppdragsnr: AP PS 400-07-012	*Provtagningsdatum:* 2006-10-27		*Löp-nr:* 16822
Uppdragsgivare: Svensk Kärnbränslehantering AB,...			*Gransk./Sign:*



*=Anläggnings AMA 98

Sektion Borrhål	Prov-beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.-förlust %	Mtrl % > mm	Tjäl-farlighet	d10	d60	d90
2 Ekerumsbäcken PSM001479			9,3-10,0	Lerig sand (SGU serie Ae)	316			2/1*	0,064	0,190	0,373

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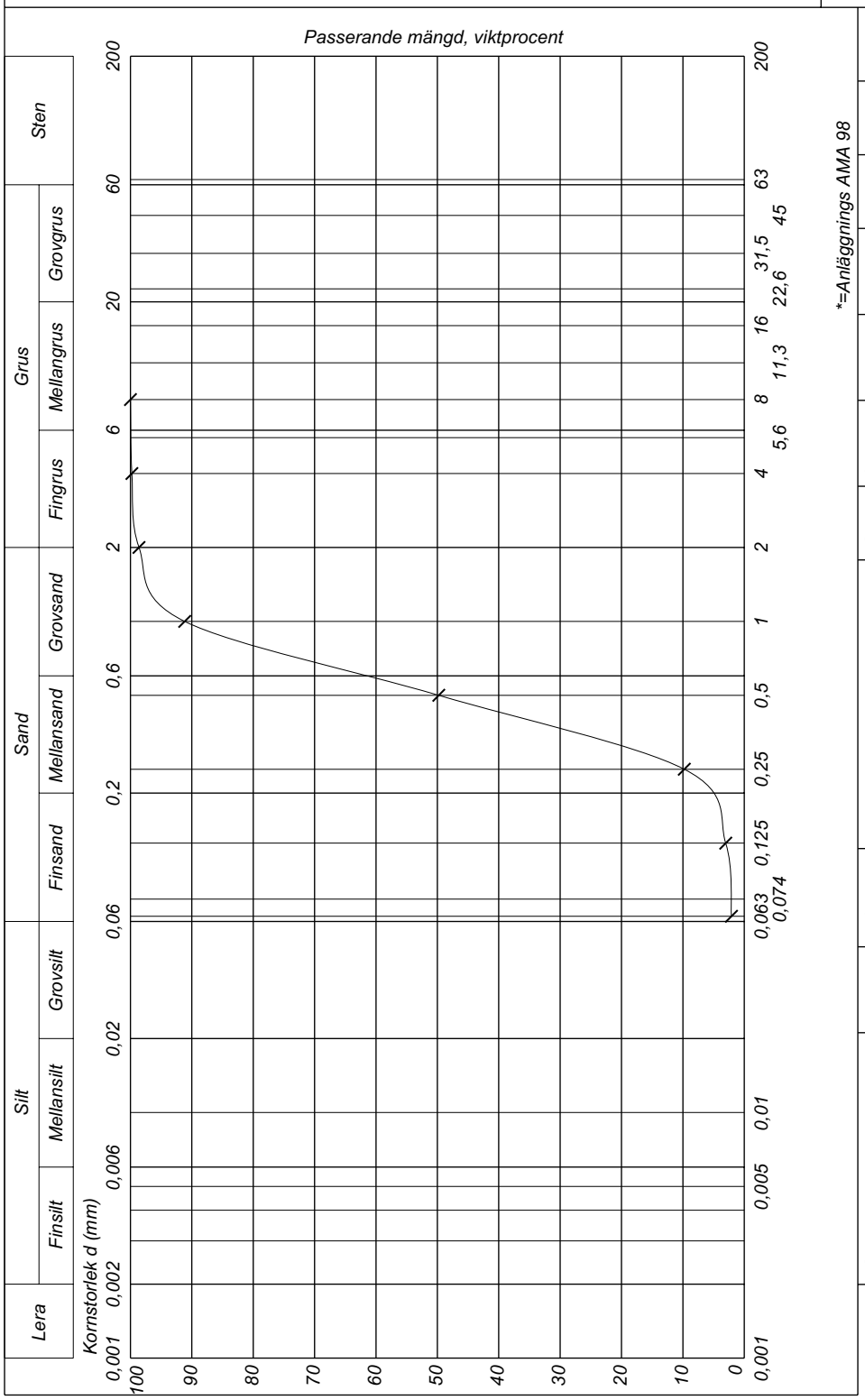
Uppdragsnr: AP PS 400-07-012	*Provtagningsdatum:* 2006-10-27	*Löp-nr:* 16822
Uppdragsgivare: Svensk Kärnbränslehantering AB,...		*Gransk./Sign:*



*=Anläggnings AMA 98

Sektion Borrhål	Prov-beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.-förlust %	Mtrl % > mm	Tjäl-farlighet	d10	d60	d90
2 Ekerumsbäcken PSM001479			5,1-9,3	Sand (SGU serie Ae)	430			2/1*	0,251	0,593	0,981

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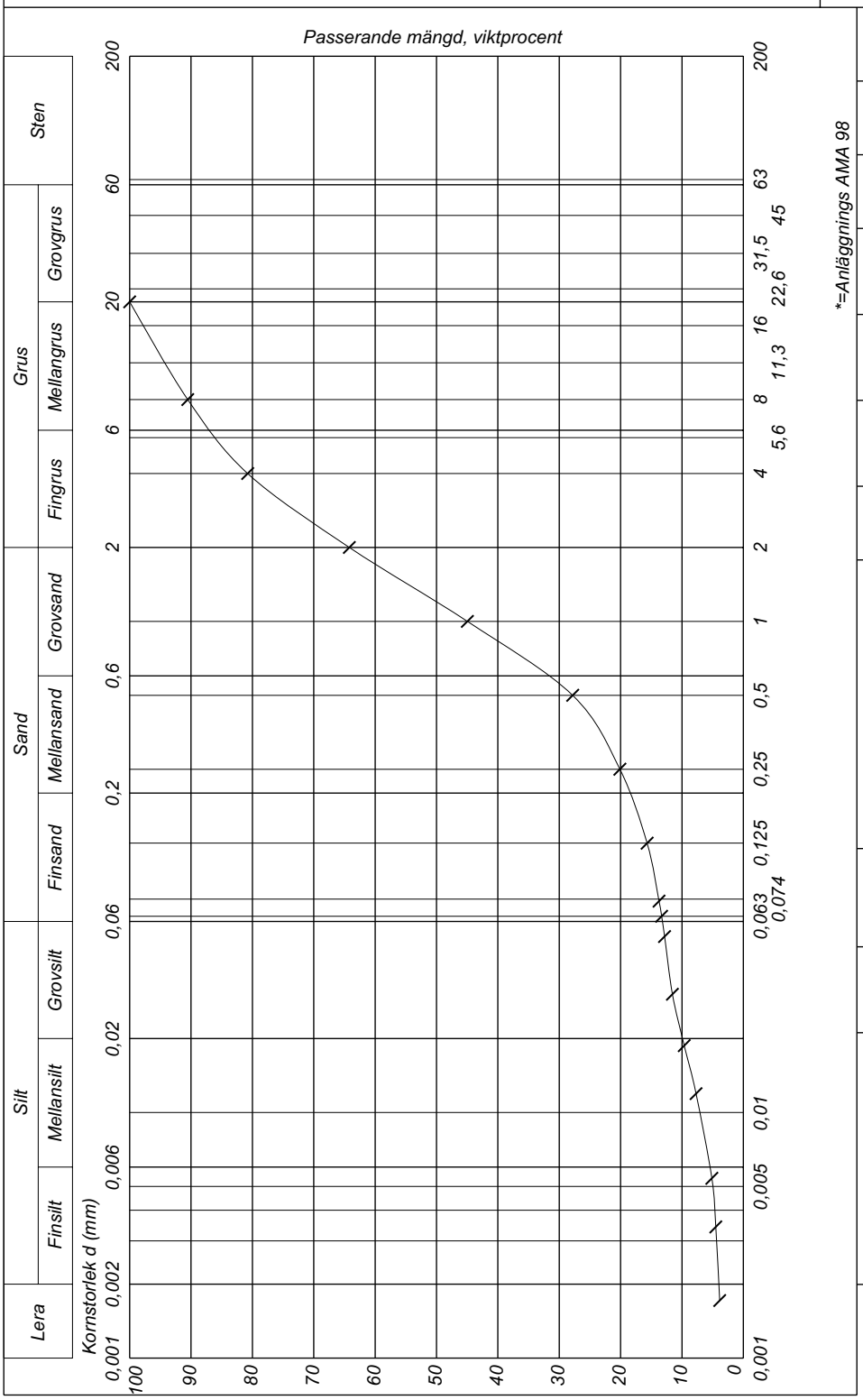
Projekt: **Karakterisering av jordprover Laxemar**			*Datum:* 2007-04-26
Uppdragsnr: AP PS 400-07-012	*Provtagningsdatum:* 2006-10-30		*Löp-nr:* 16822
Uppdragsgivare: Svensk Kärnbränslehantering AB,...			*Gransk./Sign:*



*=Anläggnings AMA 98

Sektion Borrhål	Prov-beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.-förlust %	Mtrl % > mm	Tjäl-farlighet	d10	d60	d90
2 Ekerumsbäcken PSM001477			9,0-10,0	Grusig sand (SGU serie Ae)	338			2/1*	0,021	1,719	7,703

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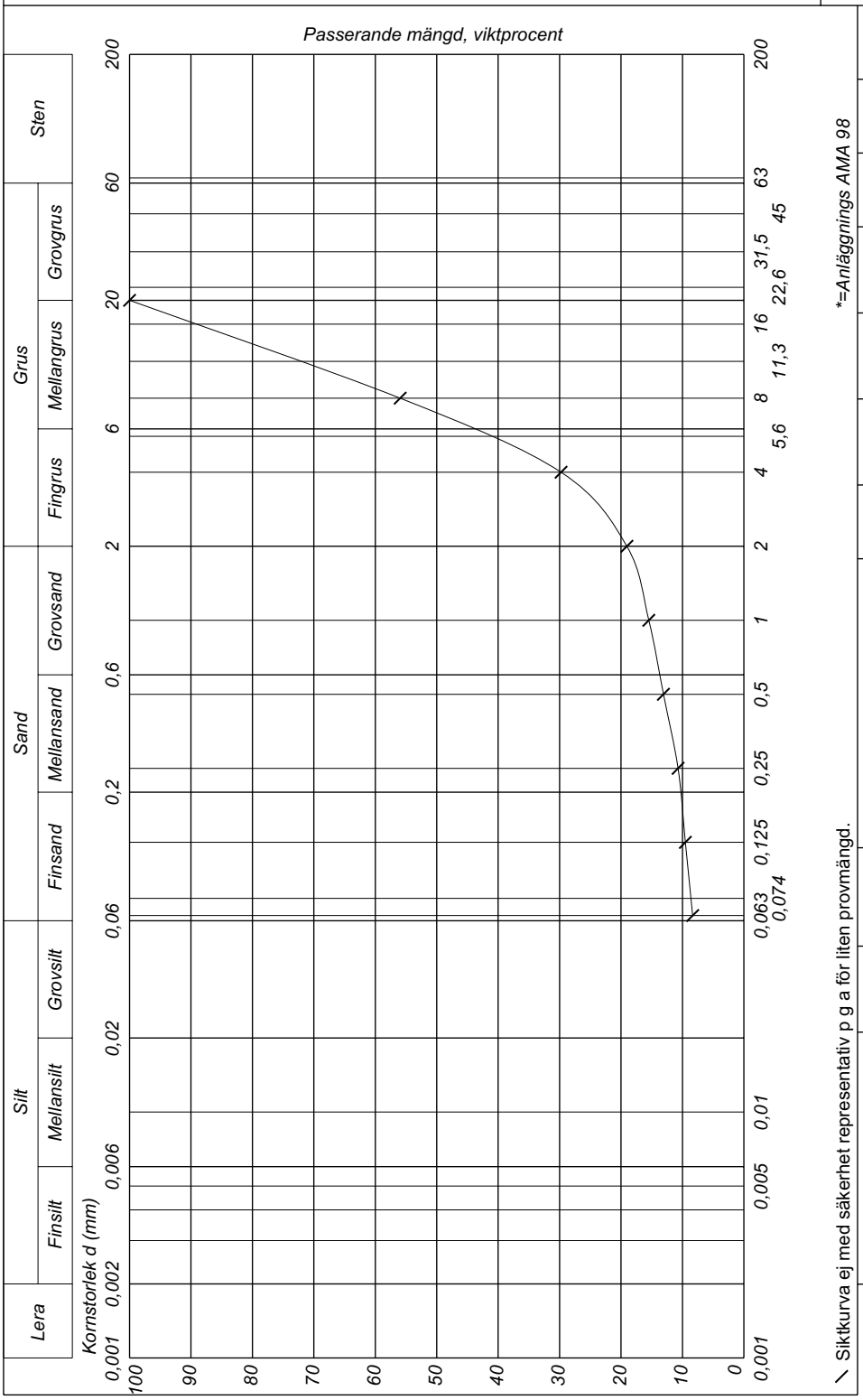

\ Siktkurva ej med säkerhet representativ p g a för liten provmängd.

*=Anläggnings AMA 98

Sektion Borrhål	Prov-beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.-förlust %	Mtrl % > mm	Tjäl-farlighet	d10	d60	d90
2 Ekerumsbäcken PSM001477	\		8,0-9,0	Grus (SGU serie Ae)	84		52,5>20	2/1*	0,165	8,703	16,244

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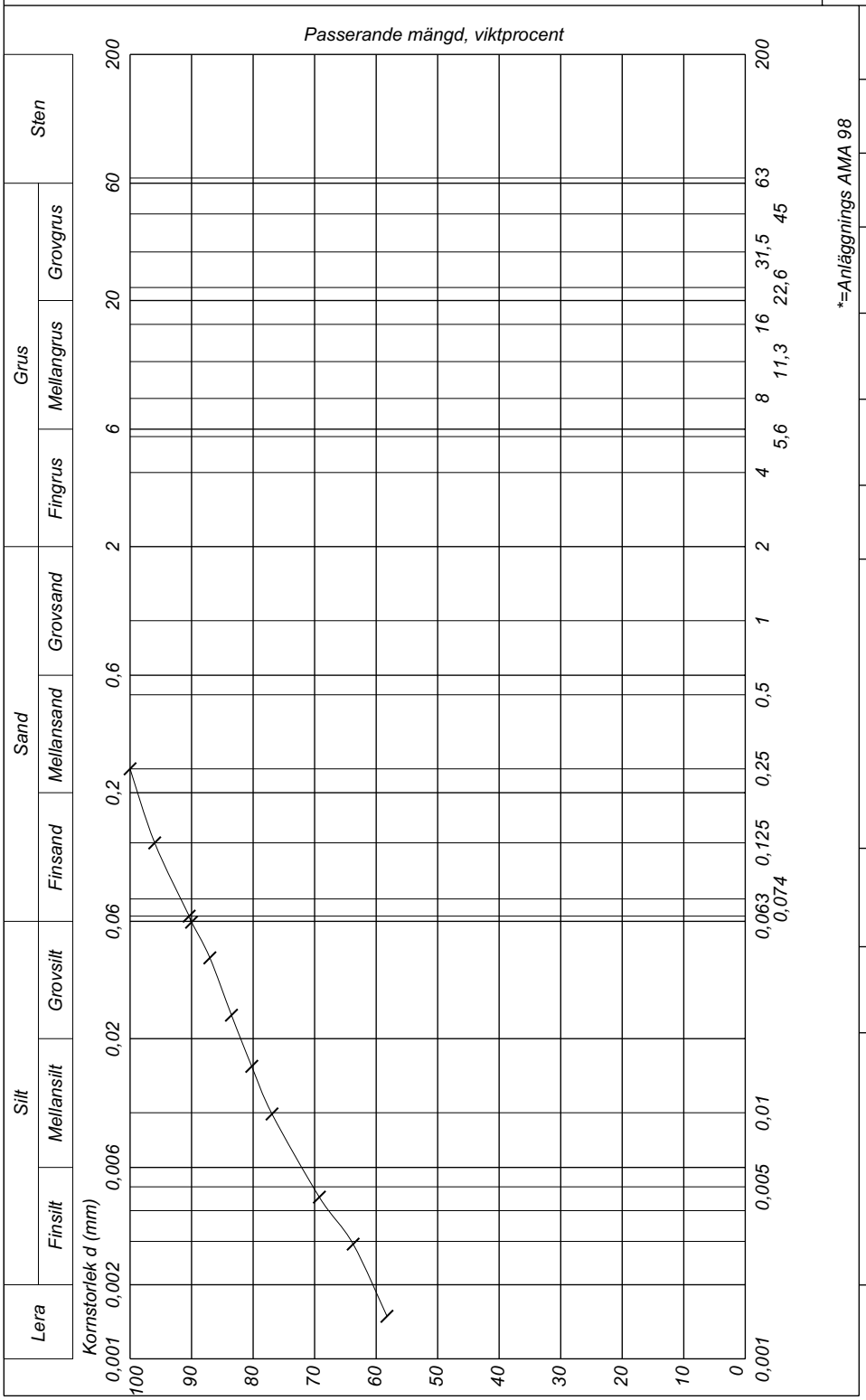
Projekt: **Karakterisering av jordprover Laxemar**			*Datum:* 2007-04-26
Uppdragsnr: AP PS 400-07-012	*Provtagningsdatum:* 2006-10-30		*Löp-nr:* 16822
Uppdragsgivare: Svensk Kärnbränslehantering AB,...			*Gransk./Sign:*



*=Anläggnings AMA 98

Sektion Borrhål	Prov-beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.-förlust %	Mtrl % > mm	Tjäl-farlighet	d10	d60	d90
2 Ekerumsbäcken PSM001477			5,3-6,5	Styv lera (SGU serie Ae)	25			4B/3*		0,002	0,060

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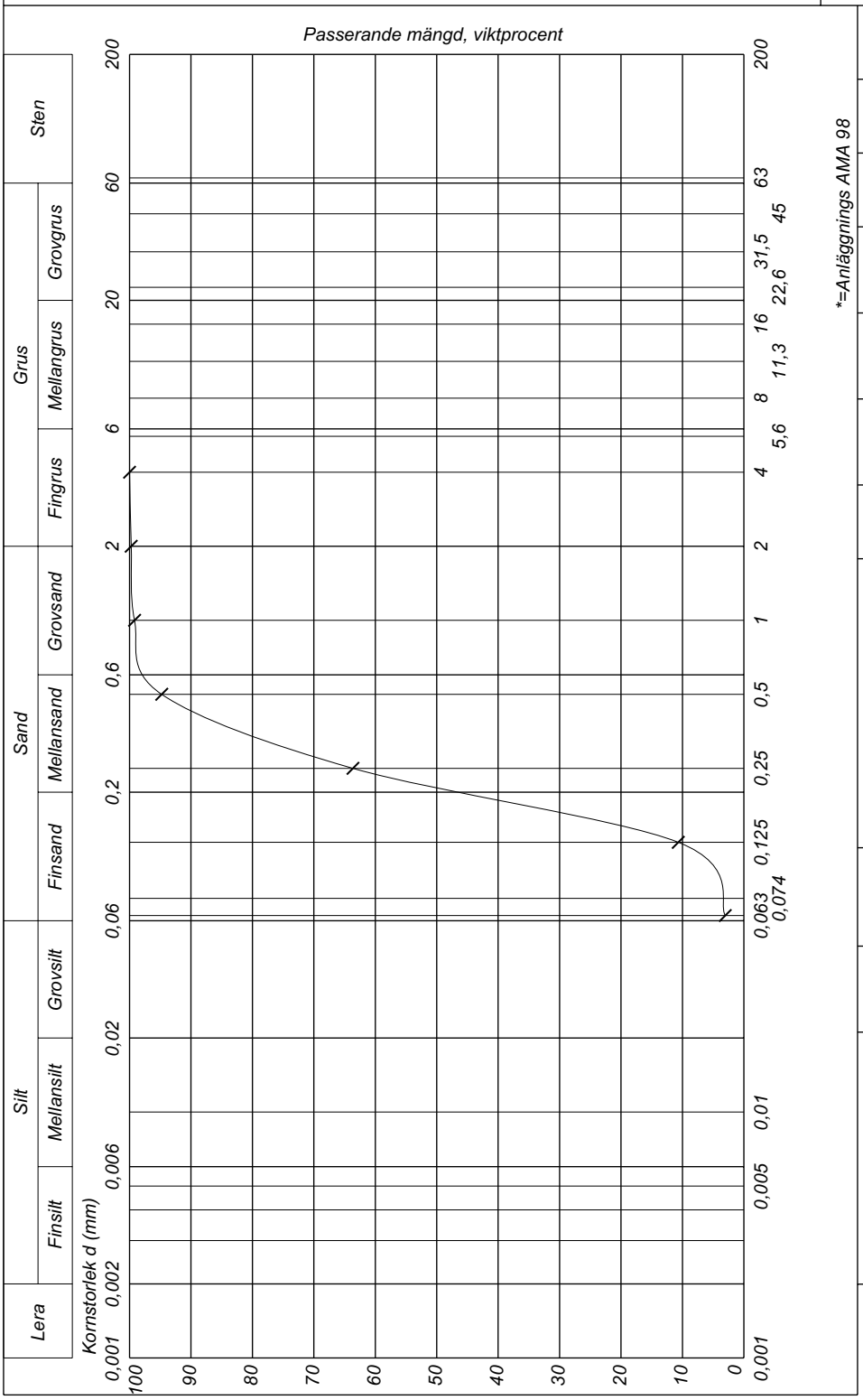

*=Anläggnings AMA 98

Sektion Borrhål	Prov-beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.-förlust %	Mtrl % > mm	Tjäl-farlighet	d10	d60	d90
2 Ekerumsbäcken PSM001477			3,0-5,3	Sand (SGU serie Ae)	297			2/1*	0,118	0,238	0,450

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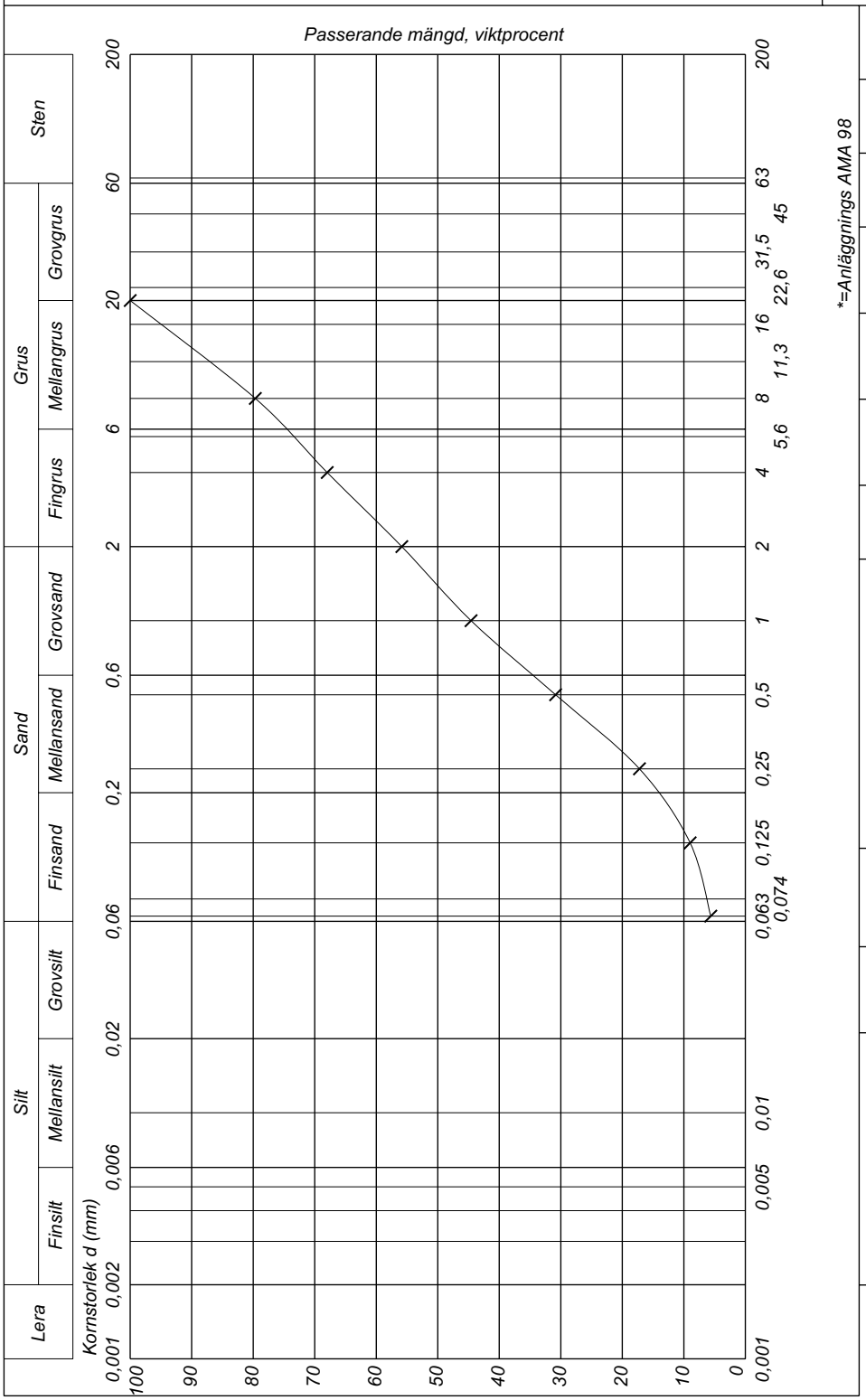

*=Anläggnings AMA 98

Sektion Borrhål	Prov-beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.-förlust %	Mtrl % > mm	Tjäl-farlighet	d10	d60	d90
1 Mederhult PSM001473	—/—		6,5-7,65	Grusig sand (SGU serie Ae)	924		7,2>20	2/1*	0,136	2,537	12,748

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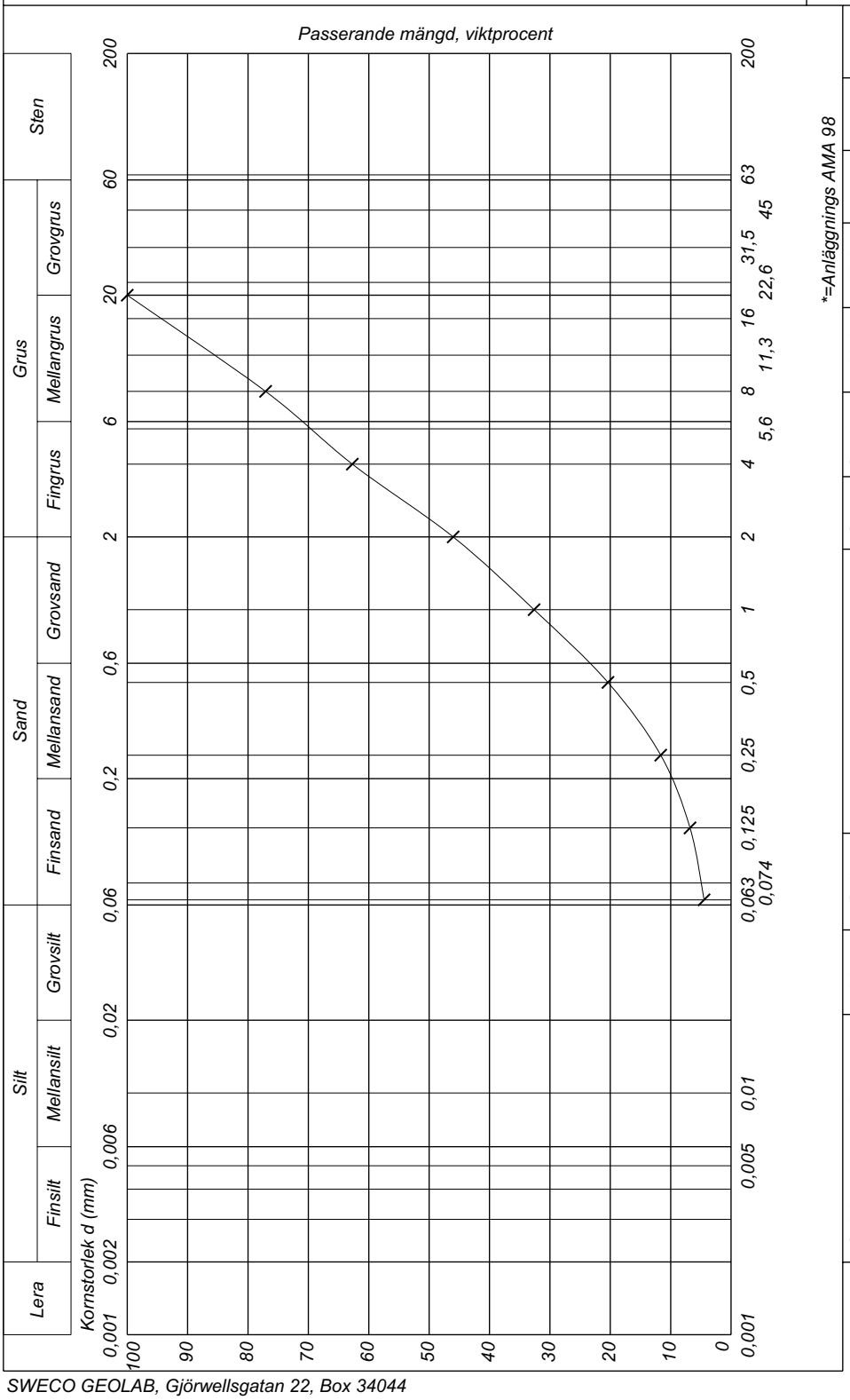
Uppdragsgivare: Svensk Kärnbränslehantering AB,...			*Gransk./Sign:*



*=Anläggnings AMA 98

Sektion Borrhål	Prov-beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.-förlust %	Mtrl % > mm	Tjäl-farlighet	d10	d60	d90
1 Mederhult PSM001473	—/—		6,0-6,5	Sandigt grus (SGU serie Ae)	515		7,7>20	2/1*	0,198	3,573	13,408

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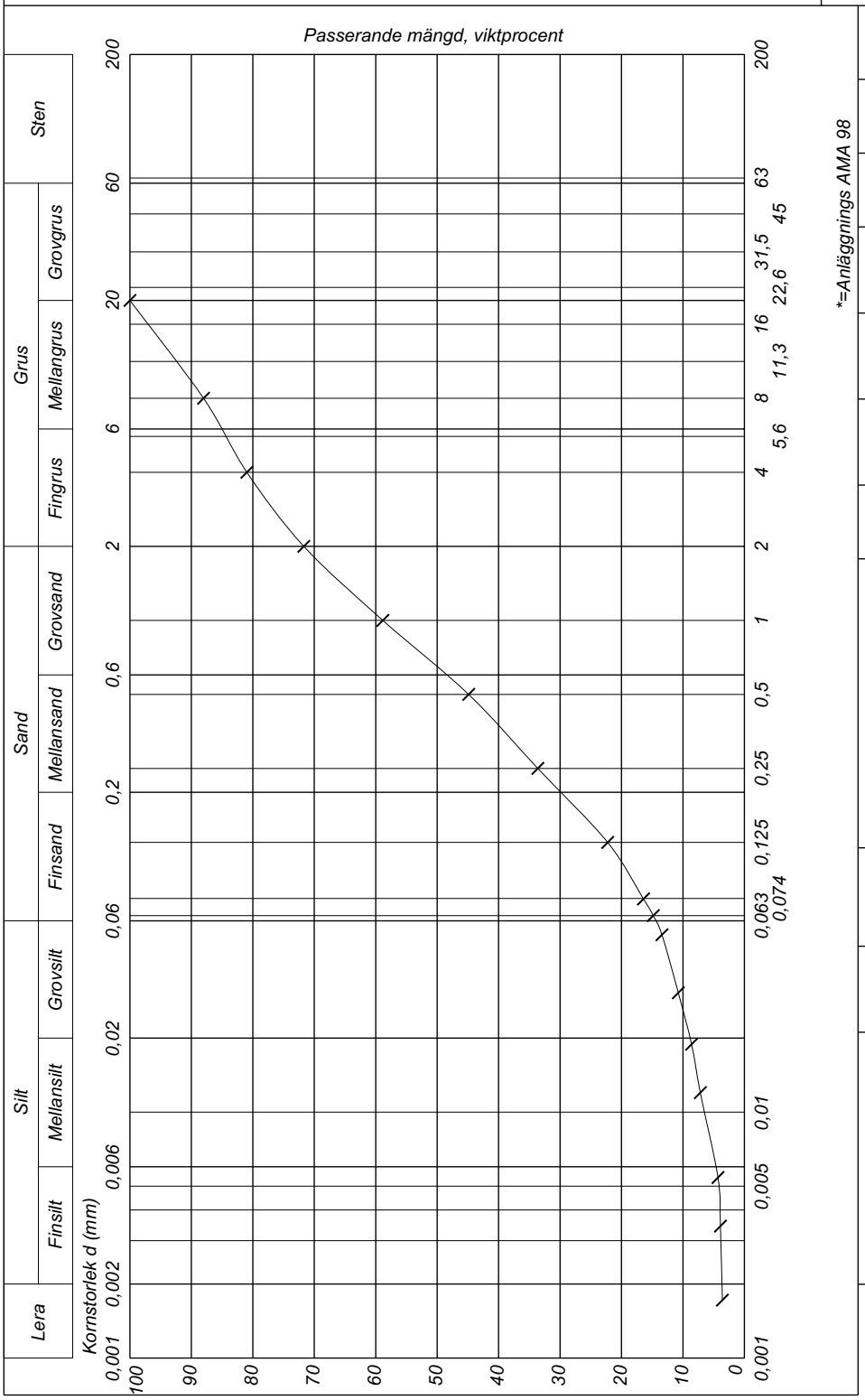

*=Anläggnings AMA 98

Sektion Borrhål	Prov-beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.-förlust %	Mtrl % > mm	Tjäl-farlighet	d10	d60	d90
1 Mederhult PSM001472			12,0-12,5	Sandig morän (SGU serie Ae)	809		6,8>20	2/1*	0,026	1,065	9,314

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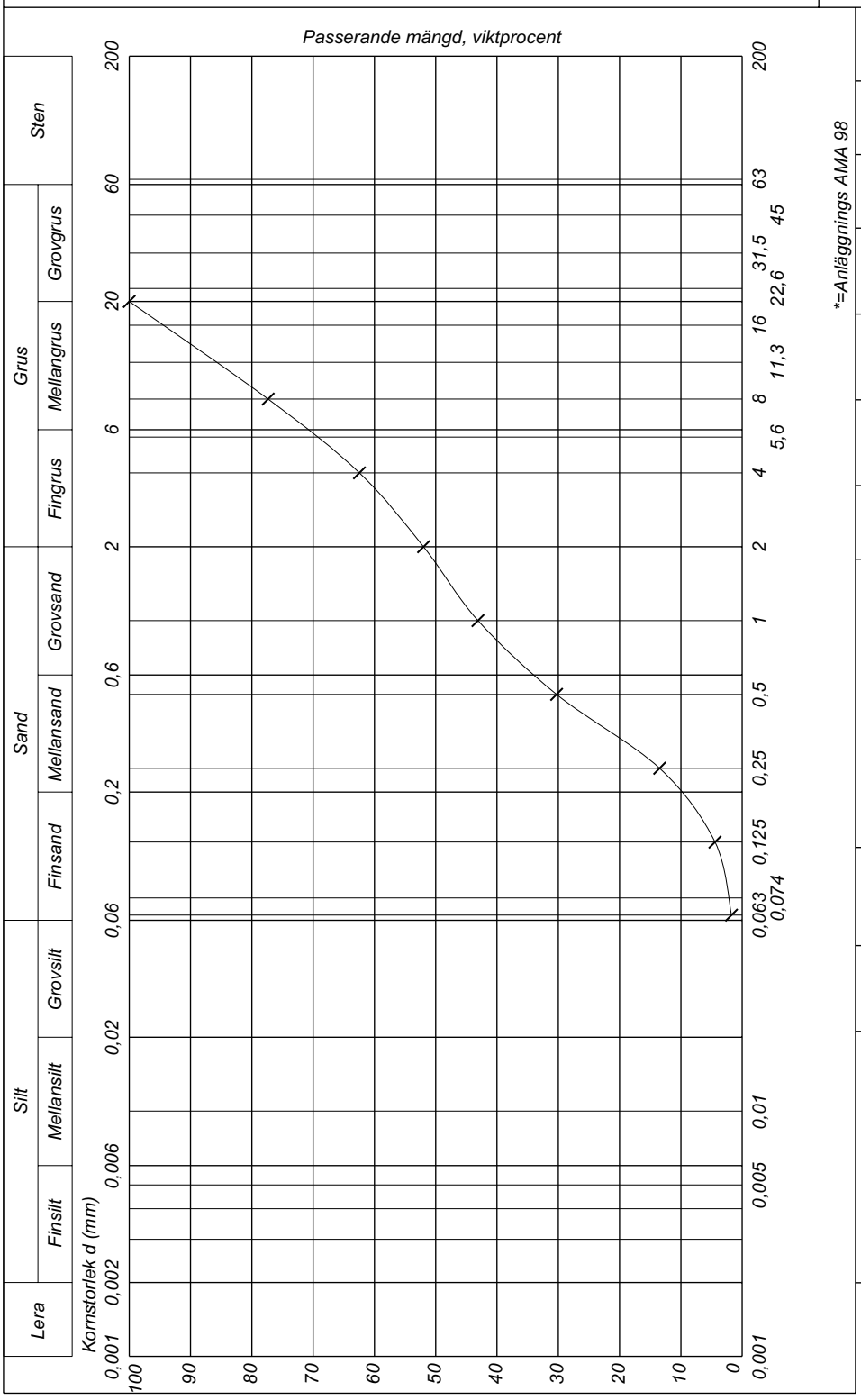
Kornfördelning
enl. SS027123 och SS027124

SWECO GEOLAB

Projekt: **Karakterisering av jordprover Laxemar**		*Datum:* 2007-04-26
Uppdragsnr: AP PS 400-07-012	*Provtagningsdatum:* 2006-10-26	*Löp-nr:* 16822
Uppdragsgivare: Svensk Kärnbränslehantering AB,...		*Gransk./Sign:*



*=Anläggnings AMA 98

Sektion Borrhål	Prov-beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.-förlust %	Mtrl % > mm	Tjäl-farlighet	d10	d60	d90
1 Mederhult PSM001472	—/—		11,0-11,8	Grusig sand (SGU serie Ae)	631		4,8>20	2/1*	0,192	3,403	13,349

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SWECO GEOLAB

Projekt: **Karakterisering av jordprover Laxemar**			*Datum:* 2007-04-26
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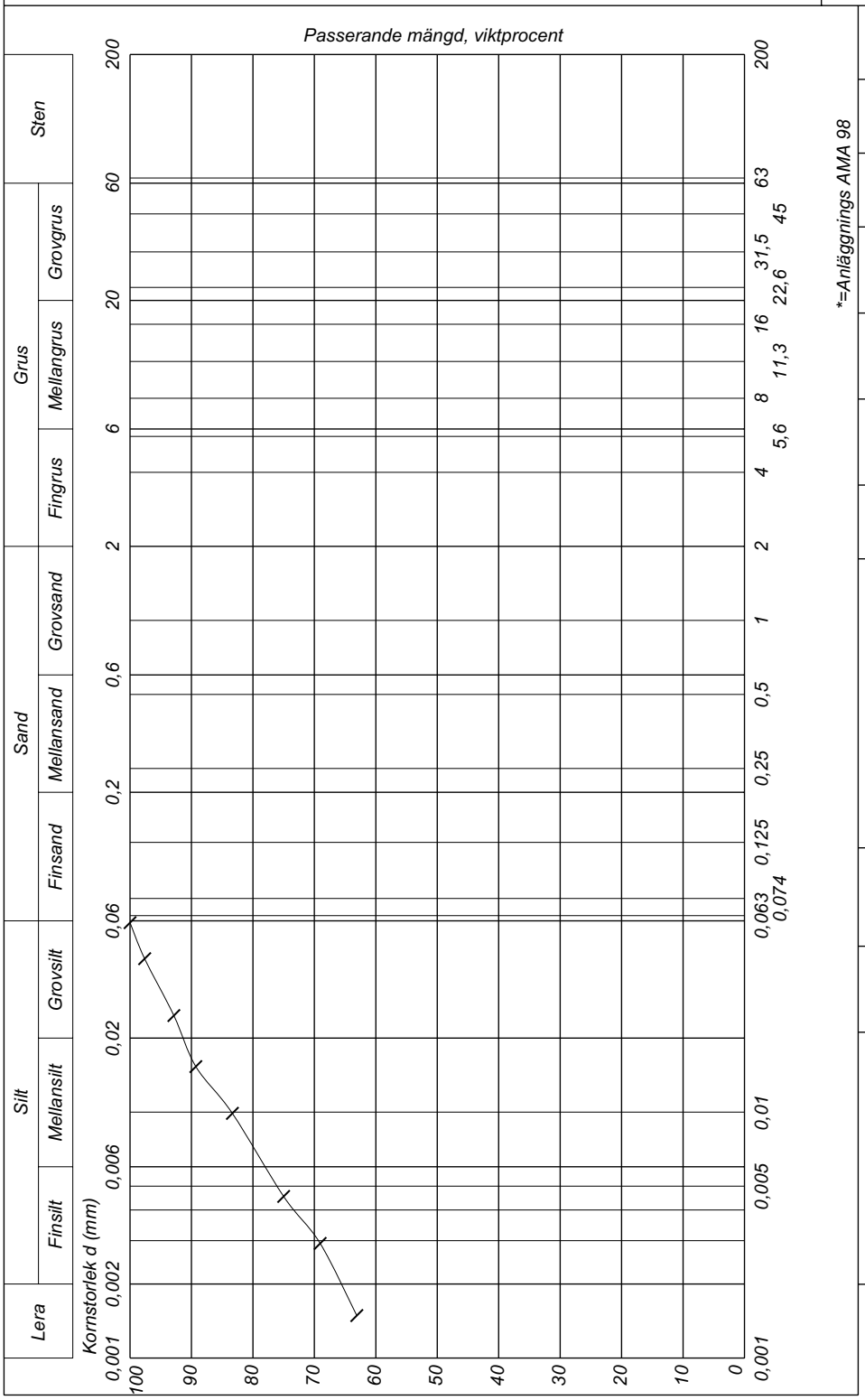
Uppdragsgivare: Svensk Kärnbränslehantering AB,...			*Gransk./Sign:*



*=Anläggnings AMA 98

Sektion Borrhål	Prov-beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.-förlust %	Mtrl % > mm	Tjäl-farlighet	d10	d60	d90
1 Mederhult PSM001472	—/—		8,5-10,9	Styv lera (SGU Serie Ae)				4B/3*			0,017

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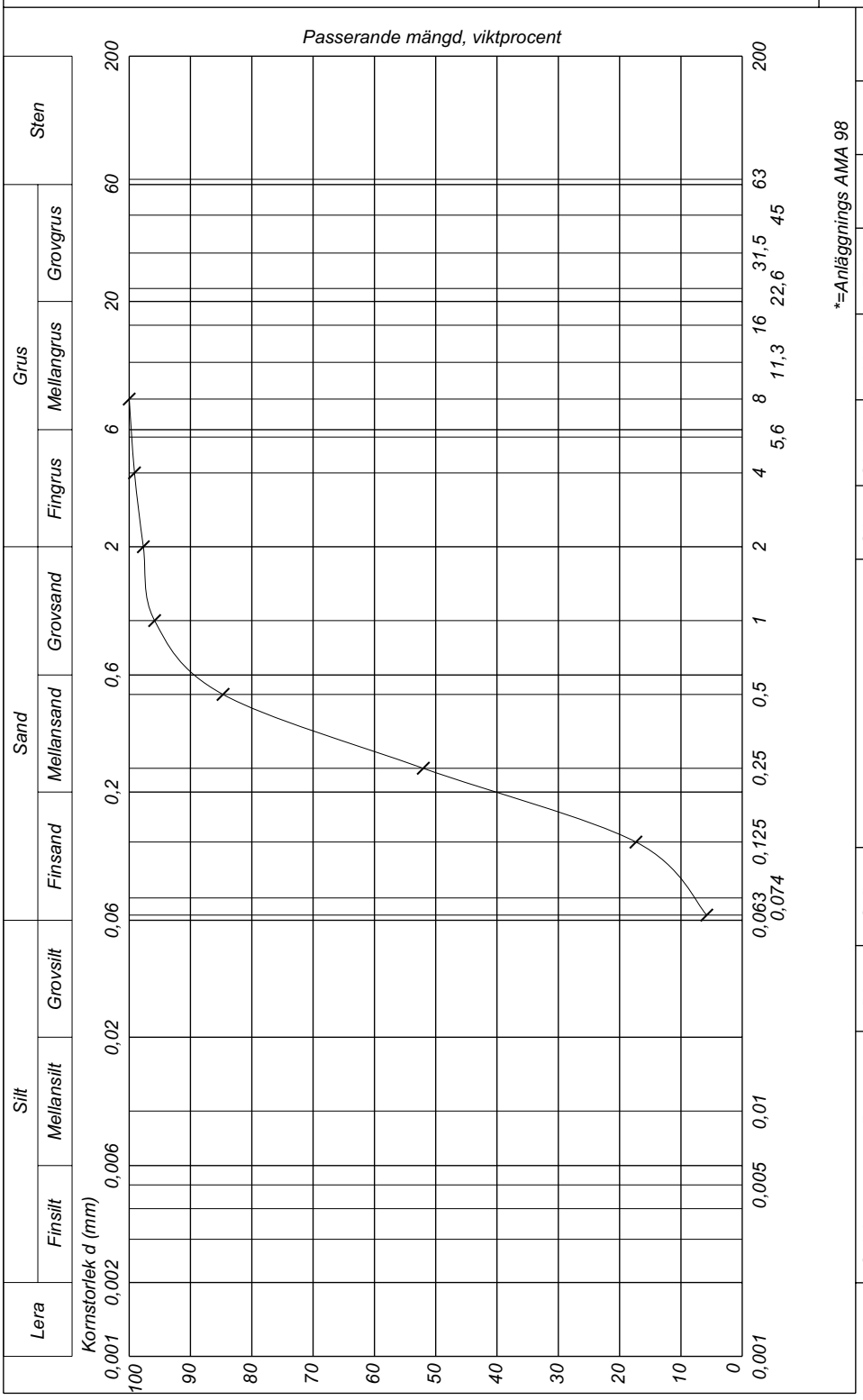
Kornfördelning
enl. SS027123 och SS027124

SWECO GEOLAB

Projekt: **Karakterisering av jordprover Laxemar**			*Datum:* 2007-04-26
Uppdragsnr: AP PS 400-07-012	*Provtagningsdatum:* 2006-10-26		*Löp-nr:* 16822
Uppdragsgivare: Svensk Kärnbränslehantering AB,...			*Gransk./Sign:*



*=Anläggnings AMA 98

Sektion Borrhål	Prov-beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.-förlust %	Mtrl % > mm	Tjäl-farlighet	d10	d60	d90
1 Mederhult PSM001472	—/—		7,2-8,0	Sand (SGU serie Ae)	346			2/1*	0,081	0,296	0,696

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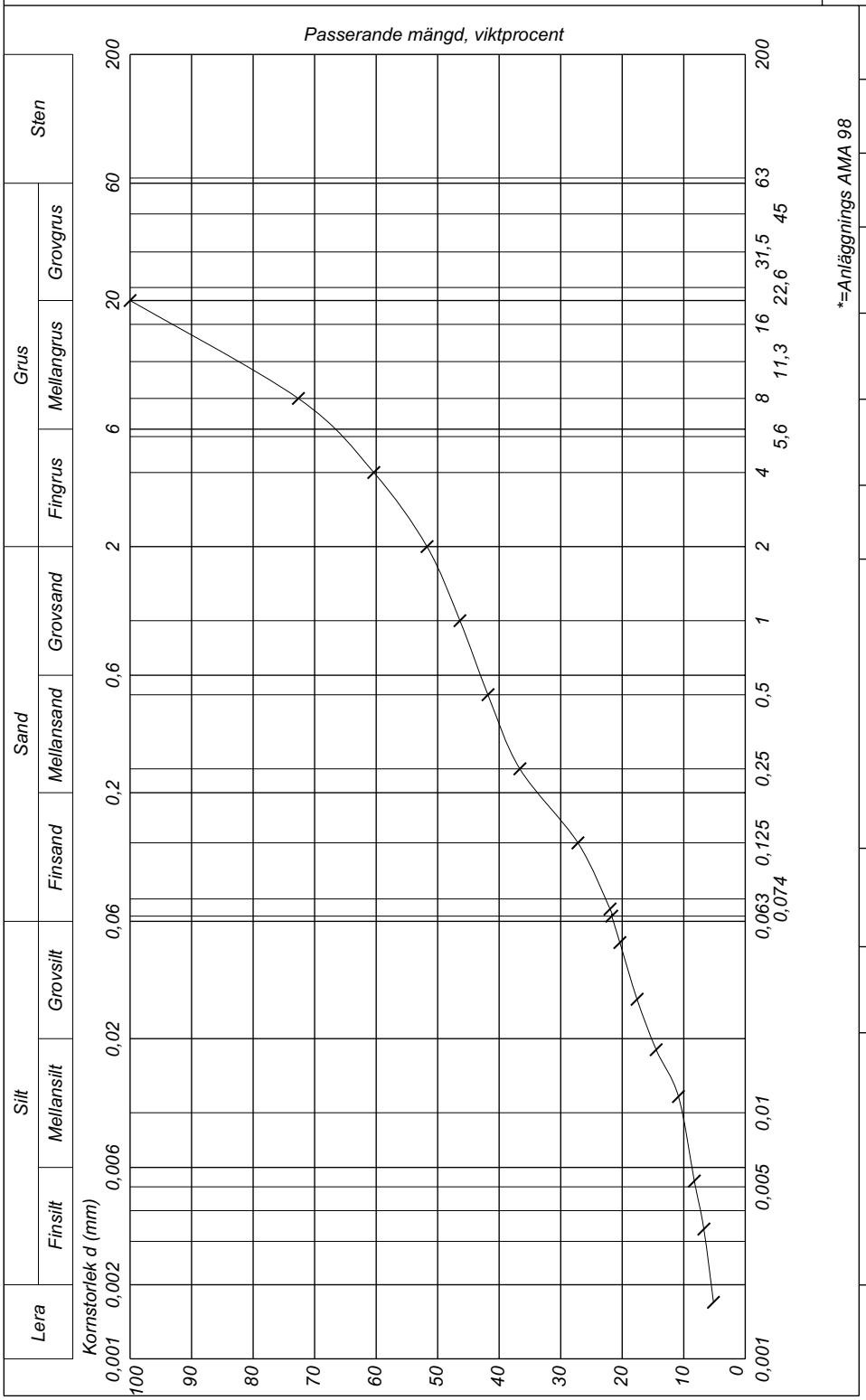
enl. SS027123 och SS027124

SWECO GEOLAB

Projekt: **Karakterisering av jordprover Laxemar**			*Datum:* 2007-04-26
Uppdragsnr: AP PS 400-07-012	*Provtagningsdatum:* 2006-11-07		*Löp-nr:* 16822
Uppdragsgivare: Svensk Kärnbränslehantering AB,...			*Gransk./Sign:*



*=Anläggnings AMA 98

Sektion Borrhål	Prov-beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.-förlust %	Mtrl % > mm	Tjäl-farlighet	d10	d60	d90
5 Lerångarna PSM001487	—/—		4,4-4,8	Lerig grusig morän (SGU serie Ae)	636			3B/2*	0,009	3,881	14,308

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Appendix H

Stratigraphic interpretation

		Stratigraphic interpretation								
Probing hole	Soil well	On-site by drilling crew based on JB2 probing and samples, Ramböll	On samples by expert geologist, SGU	Grain size analysis, Sweco Geolab	Secup JB2probing	Seclow JB2probing	Screen	Screen	Casing	Comment
					(m b gl)	(m b gl)	(m b gl)	(m b toc)	(m a gl)	
1 Mederhultsån										
PSM1472		Peat	Peat	Pseudo-fibrous peat	0,00	0,70				
		Gyttja	Gyttja	Gyttja	0,70	6,00				
		Gyttla clay	Gyttla clay	Clay gyttja	6,00	7,20				
		Gravel, wellsorted with edges	FinGravel	Sand	7,20	7,40				
		Medium sand with some gravel	FinGravel	Sand	7,40	8,00				
		Fine sand			8,00	8,50				
		Clay, svagt varvig	Clay	Clay	8,50	10,90				
		Till, with gravel	Till 11-12.5m	Gravelly sand	10,90	11,90				
		Till with boulder and gravel (uncertain) possibly fractured rock. Alternating weak and tough rock. Fracturezone?		Sandy till	11,90	16,20				
		Rock			16,20	19,30				
PSM1473	SSM000260	Peat			0,00	0,80			1,07	
		Gyttja			0,80	1,80				
		Clayey gyttja			1,80	3,50				
		Gyttla clay			3,50	3,90				
		Coarse sand till Gravel			3,90	4,00				
		Glacial Clay			4,00	5,80				
		Coarse Matrix, Till	Till	Sandy gravel 6-6.5m Gravelly sand 6.5-7.65m	5,80	7,60	6,38-8,38	7,45-9,45		
		Rock			7,60	8,60				
PSM1474	SSM000261	Peat	Peat		0,00	0,90			1,00	
		Gyttja	Gyttja		0,90	5,70				
		Clayey gyttja	Clayey gyttja		5,70	7,20				
		Clayey gyttja	Clayey gyttja		7,20	8,30				
		Sand Medium till Coarse, sulphur black	Mediumsand		8,30	9,10	8,2-9,2	9,2-10,2		
		GlacialClay	Clay		9,10	10,00				
		Till. Coarse Matrix, väldigt lite silt, ingen Clay	Till		10,00	11,70				
		Rock			11,70	14,70				
PSM1475		Peat	Peat		0,00	0,50				
		Gyttja	Gyttja		0,50	4,20				
		Lerig gyttja	Gyttja		4,20	5,20				
		Till	Till		5,20	7,20				
		Rock			7,20	10,50				
2 Ekerumsån										
PSM1476		Peat till gyttja			0,00	2,90				
		Sand			2,90	5,60				
		Clay			5,60	7,30				
		Till			7,30	10,60				
		Rock			10,60	14,50				
		Fractured Rock			13,50	14,50				
PSM1477		Peat	Peat	Amorphous peat	0,00	0,90				
		Gyttja	Gyttja, Clayey gyttja 2.6-3	Gyttja 0.9-2.6m Clay gyttja 2.6-3m	0,90	3,00				
		Sand	Mediumsand	Sand	3,00	5,30				
		Clay	Clay	Clay	5,30	6,50				
		Till	Till	Gravel 8-9m Gravelly sand 9-10	6,50	10,00				
		Rock			10,00	13,00				
PSM1478		Peat or gyttja			0,00	2,50				
		Till with boulders			2,50	6,50				
		Till			6,50	7,80				
		Crusched Rock			7,80	10,80				
PSM1479	SSM000262	Peat	Peat	Pseudo-fibrous peat	0,00	0,70			0,90	
		Gyttja	Gyttja	Gyttja	0,70	3,60				
		Clayey gyttja	Gyttja	Gyttja	3,60	4,90				
		Clay with gyttja			4,90	5,10				
		Mediumsand	Mediumsand	Sand	5,10	9,30				
		Fine sand	Fine sand	Clayey sand	9,30	10,00				
		Clay or silt or loosely deposited sand	Fine sand		10,00	11,30				
		Till	Till	Silty sandy gravel 12-13 Sandy gravel 12.2-14.2	11,30	14,75	10,8-13,8	11,7-14,7		
		Rock, weak or crushed at 15 -16m. Good rock further down			14,75	17,80				
3 Laxemarån										
PSM1480		Peat or gyttja	0-0.7m ?? Clay? 0.7-1.4m Gyttja	Organic clayey sandy silt 0-0.4 Fine sandy clay gyttja 0.4-0.7 Gyttja 0.7-1.4	0,00	1,40				
		Gyttja	Gyttja	Gyttja	1,40	2,10				
		Sand	Mediumsand	Sand	2,10	5,70				
		Clay	Clay	Clay	5,70	7,80				
		Till	Till	Sandy gravel 8-9 Gravelly sand 9.2-10.2	7,80	11,30				
		Bad Rock or Till			11,30	12,70				
PSM1481		Peat or gyttja (possibly a sand layer 1-1.5m)			0,00	1,00				
		Sand			1,00	2,70				
		Clay			2,70	5,80				
		Till			5,80	6,50				

		Rock			6,50	9,50				
PSM1482	SSM000263	Peat or gyttja (possibly sand layer 1-1.5m)			0,00	1,50			1,02	
		Clay			1,50	4,50				
		Till (block at c 5m)			4,50	6,30	5,28-7,28	6,3-8,3		
		Rock			6,30	9,30				
PSM1483		Sand			0,00	1,50				
		Till			1,50	4,50				
		Rock (soft at 6,5m)			4,50	7,50				
4 Horvan Syd										
PSM1484	SSM000264	Sand	Till	Gravelly till	0,00	1,30			1,20	Dry all the wa
		Small boulders	Till	Gravelly till	1,30	2,00				
		Coarser sand	Till	Gravelly till	2,00	2,80	1,8-3,8			
		Rock			2,80	7,00				
		Bad Rock			2,80	4,90				
		Better Rock	Till	Fractured rock 2.8-7	4,90	7,20				
PSM1485	SSM000265	Peat	Clay	Gravelly sandy silty cla	0,00	0,20			1,05	
		Clay, almost dry crust	FinClay	Clay 0.3-1	0,20	1,00				
		Clay, soft	FinClay	Clay	1,00	2,50				
		Till	Till	Clayey gravelly till	2,50	3,50	2,53-4,53	3,58-5,58		
		Rock			3,50	6,50				Jumpy drilling
PSM1486	SSM000266	Clay			0,00	1,20			1,47	
		Boulders and and till with boulders			1,20	1,70	1,54-2,54	3,01-4,01		
		Till			1,70	2,40				
		Rock			2,40	5,50				
5 Leräng arna										
PSM1487	SSM000267	Till with boulders	Till	Gravelly till	0,00	4,80	3,35-5,35	4,0-6,0	0,65	
		Boulders	Till	Gravelly till	3,60	4,50				Water
		Rock			4,80	8,20				
6 Gäster										
	SSM268	Clay, dry crust			0,00	0,50			1,26	
		Sand och Till			0,50	2,70	1,75-2,75			
		Rock			2,70	5,70		3,03-4,03		
7 Långekärr										
	SSM269	Sand and Gravel			0,00	0,70	0,2-1,0	1-1,8	0,80	
		Rock			0,70	1,00				
	SSM270	Sand			0,00	1,00			1,32	
		Coarser friable material			1,00	1,80	0,68-1,68	2.0-3.0		
		Rock			1,80	3,80				
	SSM271	Sandy gravelly material			0,00	0,80	0,25-0,75	0,99-1,49	0,74	
		Rock			0,80	4,00				

Appendix I

Organic carbon and $CaCO_3$ analysis

idcode	start_date	stop_date	(m) secup	(m) seclow	Section no	(number) Sample number	(%) Organic carbon	(%) CaCO3	quartenary_deposit
PSM1472	2007-04-11 00:00	2007-05-02 00:00	0.00	0.70	1a	1	79.30	0.2	Pseudo-fibrous peat
PSM1472	2007-04-11 00:00	2007-05-02 00:00	0.70	6.00	1a	2	39.10	0.3	Gyttja
PSM1472	2007-04-11 00:00	2007-05-02 00:00	6.00	7.20	1a	3	11.70	0.0	Clay gyttja
PSM1472	2007-04-11 00:00	2007-05-02 00:00	7.20	8.00	1a	4		0.1	Sand
PSM1472	2007-04-11 00:00	2007-05-02 00:00	8.50	10.90	1a	5		0.2	Clay
PSM1472	2007-04-11 00:00	2007-05-02 00:00	11.00	11.80	1a	6		0.7	Gravelly sand
PSM1472	2007-04-11 00:00	2007-05-02 00:00	12.00	12.50	1a	7		0.8	Sandy till
PSM1473	2007-04-11 00:00	2007-05-02 00:00	6.00	6.50	1b	1		1.1	Sandy gravel
PSM1473	2007-04-11 00:00	2007-05-02 00:00	6.50	7.65	1b	2		1.0	Gravelly sand
PSM1477	2007-04-11 00:00	2007-05-02 00:00	0.00	0.90	2b	1	22.10	0.1	Amorphous peat
PSM1477	2007-04-11 00:00	2007-05-02 00:00	0.90	2.60	2b	2	35.00	0.1	Gyttja
PSM1477	2007-04-11 00:00	2007-05-02 00:00	2.60	3.00	2b	3	9.30	0.0	Clay gyttja
PSM1477	2007-04-11 00:00	2007-05-02 00:00	3.00	5.30	2b	4		0.1	Sand
PSM1477	2007-04-11 00:00	2007-05-02 00:00	5.30	6.50	2b	5		0.2	Clay
PSM1477	2007-04-11 00:00	2007-05-02 00:00	8.00	9.00	2b	6		0.7	Gravel
PSM1477	2007-04-11 00:00	2007-05-02 00:00	9.00	10.00	2b	7		1.3	Gravelly sand
PSM1479	2007-04-11 00:00	2007-05-02 00:00	0.00	0.70	2d	1	75.10	0.4	Pseudo-fibrous peat
PSM1479	2007-04-11 00:00	2007-05-02 00:00	0.70	3.60	2d	2	34.00	0.2	Gyttja
PSM1479	2007-04-11 00:00	2007-05-02 00:00	3.60	4.90	2d	3	34.60	0.1	Gyttja
PSM1479	2007-04-11 00:00	2007-05-02 00:00	5.10	9.30	2d	4		0.0	Sand
PSM1479	2007-04-11 00:00	2007-05-02 00:00	9.30	10.00	2d	5		0.2	Clayey sand
PSM1479	2007-04-11 00:00	2007-05-02 00:00	12.00	13.00	2d	6		0.8	Silty sandy gravel
PSM1479	2007-04-11 00:00	2007-05-02 00:00	13.60	14.60	2d	7		0.6	Sandy gravel
PSM1479	2007-04-11 00:00	2007-05-02 00:00	12.20	13.40	2d	8		0.5	Sandy gravel
PSM1479	2007-04-11 00:00	2007-05-02 00:00	13.40	14.20	2d	9			Sandy gravel
PSM1480	2007-04-11 00:00	2007-05-02 00:00	0.00	0.40	3a	1	18.40	0.2	Organic clayey sandy silt
PSM1480	2007-04-11 00:00	2007-05-02 00:00	0.40	0.70	3a	2	6.20	0.2	Fine sandy clay gyttja
PSM1480	2007-04-11 00:00	2007-05-02 00:00	0.70	1.40	3a	3	24.70	0.3	Gyttja
PSM1480	2007-04-11 00:00	2007-05-02 00:00	1.40	2.10	3a	4	22.60	0.2	Gyttja
PSM1480	2007-04-11 00:00	2007-05-02 00:00	2.10	5.70	3a	5		0.0	Sand
PSM1480	2007-04-11 00:00	2007-05-02 00:00	5.70	7.80	3a	6		0.2	Clay
PSM1480	2007-04-11 00:00	2007-05-02 00:00	8.00	9.00	3a	7		0.2	Sandy gravel
PSM1480	2007-04-11 00:00	2007-05-02 00:00	9.20	10.20	3a	8		0.6	Gravelly sand
PSM1484	2007-04-11 00:00	2007-05-02 00:00	0.20	1.10	4a	1		0.2	Gravelly till
PSM1484	2007-04-11 00:00	2007-05-02 00:00	1.10	2.10	4a	2		0.3	Gravelly till
PSM1484	2007-04-11 00:00	2007-05-02 00:00	2.10	3.00	4a	3		0.3	Gravelly till
PSM1484	2007-04-11 00:00	2007-05-02 00:00	2.80	7.00	4a	4		1.6	Fractured rock
PSM1485	2007-04-11 00:00	2007-05-02 00:00	0.10	0.30	4b	1	4.30	0.4	Gravelly sandy silty clay
PSM1485	2007-04-11 00:00	2007-05-02 00:00	0.30	1.00	4b	2		0.3	Clay
PSM1485	2007-04-11 00:00	2007-05-02 00:00	1.00	2.50	4b	3		0.3	Clay
PSM1485	2007-04-11 00:00	2007-05-02 00:00	2.50	3.50	4b	4		0.4	Clayey gravelly till
PSM1487	2007-04-11 00:00	2007-05-02 00:00	0.20	1.00	5a	1		0.1	Gravelly till
PSM1487	2007-04-11 00:00	2007-05-02 00:00	1.00	2.00	5a	2		0.2	Gravelly till
PSM1487	2007-04-11 00:00	2007-05-02 00:00	2.00	3.50	5a	3		0.8	Gravelly till
PSM1487	2007-04-11 00:00	2007-05-02 00:00	4.40	4.80	5a	4		0.2	Clayey gravelly till

Appendix J

Soil samples classification

					Stratigraphic interpretation of soil samples							Sampling method		
Site	Sounding hole	Sample no	Sample code	Estimated sample volume	Preliminary field	Final field - to Sicada	Expert geologist - to Sicada.	Grain size analysis - to Sicada.	Sampling date	Secup sample depth	Seclow sample depth	Bottom soil sampler	Auger	Flushed
				(Liter)	(Ramböll)	(Ramböll)	(SGU)	(SWECO Geolab)		(m b gl)	(m b gl)			
1 Mederhult														
1 Mederhult	PSM1472	1	PSM1472:1:a	0,20	T	Torv	Torv		2006-10-26	0,0	0,7		X	
			PSM1472:1:b	0,20	T			Pseudo-fibrous peat	2006-10-26	0,0	0,7		X	
	PSM1472	2	PSM1472:2:a	0,15	Gy	Gyttja	Gyttja		2006-10-26	0,7	6,0		X	
			PSM1472:2:b	0,15	Gy			Gyttja	2006-10-26	0,7	6,0		X	
	PSM1472	3	PSM1472:3:a	0,35	LeGy	Gyttjelera	Gyttjelera		2006-10-26	6,0	7,2		X	
			PSM1472:3:b	0,35	LeGy			Clay gyttja	2006-10-26	6,0	7,2		X	
	PSM1472	4	PSM1472:4:a	0,25	(gr) Sa	Grus välsorterat och kantigt 7.2-7.4m / Mellan sand, något grusig 7.4-8.0m	Fingrus 7.2-7.4m Grusig mellan sand 7.4-8.0m		2006-10-26	7,2	8,0		X	
			PSM1472:4:b	0,25	(gr) Sa			Sand	2006-10-26	7,2	8,0		X	
	PSM1472	5	PSM1472:5:a	0,20	Le	Lera, svagt varvig	Lera 8.5-11.0m		2006-10-26	8,5	10,9		X	
			PSM1472:5:b	0,20	Le			Clay	2006-10-26	8,5	10,9		X	

	PSM1472	6	PSM1472:6:a	0,25	(Gr), Sa, Mn	Morän, grusig	Morän: sandig grusig diamikton 11.0-11.9m		2006-10-26	11,0	11,80			X
			PSM1472:6:b	0,25	(Gr), Sa, Mn			Gravelly sand	2006-10-26	11,0	11,80			X
	PSM1472	7	PSM1472:7:a	0,25	Si, gr, Sa, Mn	Blockig grusig morän (osäkert) eventuellt uppsprucket berg. Ömsomt svagt, ömsomt sarkt berg i omgångar. Sprickzon ?	Morän: Blockrik grusig diamikton 11.9-16.2m		2006-10-26	12,0	12,5	X		
			PSM1472:7:b	0,25	Si, gr, Sa, Mn			Sandy till	2006-10-26	12,0	12,5	X		
1 Mederhult	PSM1473	1	PSM1473:1:a	0,20	(Gr) Sa, Mn	Grov Matrix, Morän	Morän		2006-10-25	6,0	6,5	X		
		1	PSM1473:1:b	0,20	(Gr) Sa, Mn			Sandy gravel	2006-10-25	6,0	6,5	X		
	PSM1473	2	PSM1473:2:a	0,40	Gr, Sa, Mn	Grov Matrix, Morän	Morän		2006-10-25	6,5	7,65	X		
		2	PSM1473:2:b	0,40	Gr, Sa, Mn			Gravelly sand	2006-10-25	6,5	7,65	X		
1 Mederhult	PSM1474						Torv		No sample, field assement	0,0	0,90			
							Gyttja		No sample, field assement	0,9	5,70			
							Lergyttja		No sample, field assement	5,7	7,20			
							Lergyttja		No sample, field assement	7,2	8,30			

							Mellansand		No sample, field assement	8,3	9,20			
							Lera		No sample, field assement	9,2	10,40			
							Morän		No sample, field assement	10,4	11,90			
1 Mederhult	PSM1475						Torv		No sample, field assement	0,0	0,50			
							Gyttja		No sample, field assement	0,5	5,00			
							Morän		No sample, field assement	5,0	7,20			
2 Ekerumsån														
2 Ekerums-ån	PSM1477	1	PSM1477:1:a	0,30	T	Torv	Torv		2006-10-30	0,0	0,9		X	
			PSM1477:1:b	0,30	T			Amorphous peat	2006-10-30	0,0	0,9		X	
	PSM1477	2	PSM1477:2:a	0,50	Gy	Gyttja	Gyttja		2006-10-30	0,9	2,6		X	
			PSM1477:2:b	0,50	Gy			Gyttja	2006-10-30	0,9	2,6		X	
	PSM1477	3	PSM1477:3:a	0,20	Le, Gy	Gyttja	Lergyttja		2006-10-30	2,6	3,0		X	
			PSM1477:3:b	0,20	Le, Gy			Clay gyttja	2006-10-30	2,6	3,0		X	
	PSM1477	4	PSM1477:4:a	0,40	Sa	Sand	Mellansand		2006-10-30	3,0	5,3		X	
			PSM1477:4:b	0,40	Sa			Sand	2006-10-30	3,0	5,3		X	
	PSM1477	5	PSM1477:5:a	0,20	Le	Lera	Lera		2006-10-30	5,3	6,5		X	
			PSM1477:5:b	0,20	Le			Clay	2006-10-30	5,3	6,5		X	
	PSM1477	6	PSM1477:6:a	0,10	St, Sa, Gr, Mn	Morän	Morän 6.5-10m		2006-10-31	8,0	9,0	X		
			PSM1477:6:b	0,10	St, Sa, Gr, Mn			Gravel	2006-10-31	8,0	9,0	X		
	PSM1477	7	PSM1477:7:a	0,20	St, Sa, Gr, Mn	Morän	Morän 6.5-10m		2006-10-31	9,0	10,0	X		

			PSM1477:7:b	0,20	(st), Gr, Sa, Mn			Gravelly sand	2006-10-31	9,0	10,0	X		
2 Ekerumsån	PSM1479	1	PSM1479:1:a	0,20	T	Torv eller gyttja	Torv		2006-10-27	0,0	0,7		X	
			PSM1479:1:b	0,20	T			Pseudo-fibrous peat	2006-10-27	0,0	0,7		X	
	PSM1479	2	PSM1479:2:a	0,40	Gy	Gyttja	Gyttja		2006-10-27	0,7	3,6		X	
			PSM1479:2:b	0,40	Gy			Gyttja	2006-10-27	0,7	3,6		X	
	PSM1479	3	PSM1479:3:a	0,30	Le, Gy	Lerig gyttja	Gyttja		2006-10-27	3,6	4,9		X	
			PSM1479:3:b	0,30	Le, Gy			Gyttja	2006-10-27	3,6	4,9		X	
	PSM1479	4	PSM1479:4:a	0,40	Sa	Mellansand	mellansand 4.9-9.3m		2006-10-27	5,1	9,3		X	
			PSM1479:4:b	0,40	Sa			Sand	2006-10-27	5,1	9,3		X	
	PSM1479	5	PSM1479:5:a	0,20	Sef	Finsand	Finsand 9.3-11.2m		2006-10-27	9,3	10,0		X	
			PSM1479:5:b	0,20	Sef			Clayey sand	2006-10-27	9,3	10,0		X	
	PSM1479	6	PSM1479:6:a	0,25	Gr, Si, Sa, Mn	Mörän	Morän 11.2-13.0m		2006-10-27	12,0	13,0	X		
			PSM1479:6:b	0,25	Gr, Si, Sa, Mn			Silty sandy gravel	2006-10-27	12,0	13,0	X		
	PSM1479	7	PSM1479:7:a	0,20	Sä gr, Mn (St)	Mörän	Morän 13-14.7m		2006-10-30	13,6	14,6	X		
			PSM1479:7:b	0,20	Sä gr, Mn (St)			Sandy gravel	2006-10-30	13,6	14,6	X		
	PSM1479	8	PSM1479:8:a	0,20	Mn	Mörän	Morän 13-14.7m		2006-10-30	12,2	13,4			X
			PSM1479:8:b	0,20	Mn			Sandy gravel	2006-10-30	12,2	13,4			X
	PSM1479	9	PSM1479:9:a	0,30	Mn	Mörän	Morän 13-14.7m		2006-10-30	13,4	14,2			X
			PSM1479:9:b	0,30	Mn			Sandy gravel	2006-10-30	13,4	14,2			X
3 Laxemarån														
3 Laxemarån	PSM1480	1	PSM1480:1:a	0,20	muT	Torv eller gyttja	?? Lera?		2006-11-01	0,0	0,4		X	
			PSM1480:1:b	0,20	muT			Organic clayey sandy silt	2006-11-01	0,0	0,4		X	
	PSM1480	2	PSM1480:2:a	0,25	Le, Si	Torv eller gyttja	?? Lera?		2006-11-01	0,4	0,7		X	

			PSM1480:2:b	0,25	Le, Si			Fine sandy clay gyttja	2006-11-01	0,4	0,7		X	
	PSM1480	3	PSM1480:3:a	0,25	T	Torv eller gyttja	Gyttja		2006-11-01	0,7	1,4		X	
			PSM1480:3:b	0,25	T			Gyttja	2006-11-01	0,7	1,4		X	
	PSM1480	4	PSM1480:4:a	0,30	Gy	Gyttja	Gyttja		2006-11-01	1,4	2,1		X	
			PSM1480:4:b	0,30	Gy			Gyttja	2006-11-01	1,4	2,1		X	
	PSM1480	5	PSM1480:5:a	0,35	Sa	Sand	Mellansand		2006-11-01	2,1	5,7		X	
			PSM1480:5:b	0,35	Sa			Sand	2006-11-01	2,1	5,7		X	
	PSM1480	6	PSM1480:6:a	0,30	Le	Lera	Lera		2006-11-01	5,7	7,8		X	
			PSM1480:6:b	0,30	Le			Clay	2006-11-01	5,7	7,8		X	
	PSM1480	7	PSM1480:7:a	0,20	(St) Sa, Gr, Mn	Morän	Morän 7.8-10.2m		2006-11-01	8,0	9,0	X		
			PSM1480:7:b	0,20	(St) Sa, Gr, Mn			Sandy gravel	2006-11-01	8,0	9,0	X		
	PSM1480	8	PSM1480:8:a	0,25	Gr, Sa, Mn	Morän	Morän 7.8-10.2m		2006-11-01	9,2	10,2	X		
			PSM1480:8:b	0,25	Gr, Sa, Mn			Gravelly sand	2006-11-01	9,2	10,2	X		
4 Horvan Syd														
4 Horvan syd	PSM1484	1	PSM1484:1:a	0,15	Gr, Sa, Mn (St)	Sand	Morän		2006-11-06	0,2	1,1			X
			PSM1484:1:b	0,15	Gr, Sa, Mn (St)			Gravelly till	2006-11-06	0,2	1,1			X
	PSM1484	2	PSM1484:2:a	0,20	Gr, Sa, Mn (St)	Småblockigt	Morän		2006-11-06	1,1	2,1			X
			PSM1484:2:b	0,20	Gr, Sa, Mn (St)			Gravelly till	2006-11-06	1,1	2,1			X
	PSM1484	3	PSM1484:3:a	0,20	Gr, Sa, Mn	Lite grövre sand	Morän		2006-11-06	2,1	3,0			X
			PSM1484:3:b	0,20	Gr, Sa, Mn			Gravelly till	2006-11-06	2,1	3,0			X
	PSM1484	4	PSM1484:4:a	0,25	Berg Kax	Berg	Morän		2006-11-02	2,8	7,0			X
			PSM1484:4:b	0,25	Berg Kax			Fractured rock	2006-11-02	2,8	7,0			X
4 Horvan syd	PSM1485	1	PSM1485:1:a	0,15	Sa, Let, (Gr)	Torv	Diamikt lera 0-0.3m		2006-11-02	0,1	0,3		X	
			PSM1485:1:b	0,15	Sa, Let, (Gr)			Gravelly sandy silty clay	2006-11-02	0,1	0,3		X	

	PSM1485	2	PSM1485:2:a	0,20	Si, Le(t)	Lera, nästan torrskorpa	Finlera		2006-11-02	0,3	1,0		X	
			PSM1485:2:b	0,20	Si, Le(t)			Clay	2006-11-02	0,3	1,0		X	
	PSM1485	3	PSM1485:3:a	0,20	Si, Le	Lera mjuk	Finlera		2006-11-02	1,0	2,5		X	
			PSM1485:3:b	0,20	Si, Le			Clay	2006-11-02	1,0	2,5		X	
	PSM1485	4	PSM1485:4:a	0,15	Mn	Morän	Morän		2006-11-02	2,5	3,5	X		
			PSM1485:4:b	0,15	Mn			Clayey gravelly till	2006-11-02	2,5	3,5	X		
5 Lerängarna														
5 Lerängarna	PSM1487	1	PSM1487:1:a	0,20	Gr, Sa, Mn	Blockig morän	Morän		2006-11-07	0,2	1,0			X
			PSM1487:1:b	0,20	Gr, Sa, Mn			Gravelly till	2006-11-07	0,2	1,0			X
	PSM1487	2	PSM1487:2:a	0,30	B, (st), Sa, Gr, Mn	Blockig morän	Morän		2006-11-07	1,0	2,0			X
			PSM1487:2:b	0,30	B, (st), Sa, Gr, Mn			Gravelly till	2006-11-07	1,0	2,0			X
	PSM1487	3	PSM1487:3:a	0,40	Si, Sa, Gr, Mn	Blockig morän	Morän		2006-11-07	2,0	3,5			X
			PSM1487:3:b	0,40	Si, Sa, Gr, Mn			Gravelly till	2006-11-07	2,0	3,5			X
	PSM1487	4	PSM1487:4:a	0,20	Si, Sa, Gr, Mn	Blockig morän	Morän		2006-11-07	4,4	4,8			X
			PSM1487:4:b	0,20	Si, Sa, Gr, Mn			Clayey gravelly till	2006-11-07	4,4	4,8			X