

A. Geophysical instruments:

1. Electrical tomography LUND Imaging system (**TERRAMETER SAS 1000** (1 channel, max output current 1A & max output power 100W) plus electrode selector ES464 (4 channel & 64 electrodes)) of the Swedish company ABEM.
2. Electrical tomography LUND Imaging system (**TERRAMETER SAS 4000** (4 channel, max output current 1A & max output power 100W) plus electrode selector ES464 (4 channel & 64 electrodes)) of the Swedish company ABEM.
3. Electrical tomography **TERRAMETER LS** (4 channel, 64 electrodes max output current 2.5A & max output power 250W) of the Swedish company ABEM.
4. Geophysical instruments: **MX-30 Multiplex Switch** (30 channels, 30 electrodes max output current 5A & max output power 2500W), **GDP-32 receiver** (6 channels) and **ZT 30 Transmitter** (max output current 30A), of the American company ZONGE ENGINEERING.

The accessories include electrodes (porous pot or not) and 81 electrode electrical tomography wires, spaced 2m, 5m, 10m, 25m and 50m, which make it possible for the length of scans to be from 160m to 4000m from the beginning. At the same time, these cables allow us to apply the Roll along process, during which a much larger number of electrodes can be used, while at the same time the profiles of the tomographies can be developed as much as necessary in order to achieve the objectives of the geophysical research. For the interpretation and presentation of the results the software that is used is the programs RES2DINV and RES3DINV of GEOTOMO company.

For the realization of geoelectrical depth soundings (fundoscopy) of specific electrical resistance or conductivity (RES), spontaneous potential (SP), induced polarization (IP) and electrical conductivity, and depending on the desired depth of geophysical exploration the machinery used is: **Terrameter Sas 1000, Terrameter Sas 4000, Terrameter LS** and the system **MX-30 Multiplex Switch - GDP-32 receiver - ZT 30 Transmitter**. The office has the appropriate electrodes and cable of lengths up to 5km for Wenner and Schlumberger arrays. For the interpretation of the results the software used is IPI2WIN and RESIX PLUS programs.

5. Geophysical instruments: **GDP-32 receiver** (6 channels), **ZT 30 Transmitter** (max output current 30A), **NT 20 Transmitter** (max output current 20A), **NANOTEM receiver**, **XMT-32 Controller** and **Magnetic sensors TEM-3, ANT-3 and ANT-4** (of the American company ZONGE ENGINEERING). For the processing and interpretation of the measurements the software used is: DATPRO, STEMINV, CSAMT, EM2D and SCS2D. To receive measurements the Tem provisions applied are: In Loop, Moving Loop and Fix Loop.
6. Geophysical instrument Type 500Σ-E for measuring the specific electrical resistance, using Wenner and Schlumberger arrays.
7. Slingram system (**EMAC 36 180**) with 3.6 kHz emission frequency.
8. Slingram system (**EMAC HF EMAC 180**) with 18.1 kHz emission frequency.
9. The VLF WADI instrument system, with the measurement interpretation software SECTOR and RAMAC, of the company ABEM Sweden.



10. The **base station** and the **Magnetometer–Gradiometer G856**, plus the measurement interpretation software MAGMAP and MAGPLOT, of the American company GEOMETRICS.
11. **Motor geophysical machine of the Mercedes type, 410_D** (No. Circ. ME 105375). It can perform seismic-electric-electromagnetic geophysical measurements and borehole loggings at depths of up to 500 meters. It is equipped with special cameras (pan & tilt) monitoring wells and pipelines of the house IBAK (Argus & Rax 11.7). There is the possibility of moving the camera within the pipeline to a length of up to 450 meters. The inside diameter of the pipeline or drilling is 100mm.
12. The seismic recording equipment **BISON 9048-48 channel seismograph**.
13. **The TERRALOC MARK 6-24 channel seismograph** of the Swedish company ABEM. The auxiliary equipment includes the necessary cables, seismic sources and 150 horizontal/vertical geophones of different frequencies (6Hz to 14 Hz). The interpretation of the measurements is performed with the help of specialized software (WINSISM, SEISIMAGER etc.)
14. The **3D-Radar GPR system**, using step frequency radar technology and innovative multi channel antenna design of Norwegian company 3d-Radar,. The Antenna arrays are:
 - Model B1847, with continuous frequency coverage from 200MHz to 2.0GHz, 1.8 meter array length and 47 antennas elements.
 - Model B1823, with continuous frequency coverage from 100MHz to 2.0GHz, 1.8 meter array length and 23 antennas elements.
 For the processing and interpretation of GPR measurements the software used will be: Slice v.7, Examiner, Reflex and Reflex3D.
15. Mala **ProEx** system (Professional Explorer) with its shielded antennas of **250MHz, 500MHz, 1000MHz, 1600MHz, 2300MHz** and the **RTA antennas of 25-30MHz, 50MHz and 100MHz**.
16. The MALA GPR system **GX HDR** (Ground Explorer High Dynamic Range) with the shielded high frequency antennas of the Swedish House of Mala Geoscience, the central frequencies of which are **80MHz, 160MHz, 450MHz and 750MHz**. For the processing and interpretation of GPR measurements the software used will be: Slice v.7, Objectmapper, Geovision and RADEplorer.
17. The Mala **GPR Borehole, (Professional Explorer borehole logging system)**, with two pairs of optical (four-stranded) cables, 800m long each, and its unshielded borehole antennas of: **100MHz and 250MHz**. measurement devices: **Downhole and Crosshole**. For the processing and interpretation of the measurements the software used is: Radinter and Wintomo.
18. Geophysical systems EMI (Time Domain) from Canadian company GEONICS:
 - EM61 MK2 High Power
 - Geonics EM63
 - Geonics EM38

19. **Borehole Loggings including systems of:**

- Haferland Borehole Loggings system. Maximum depth of geophysical exploration 500m. Minimum drilling diameter 80mm. Continuous recordings of the electrical resistance are performed (single focus point resistance, three or four point lateral or normal sensitivity measurements 16 inch (short) or 64 inch (long) of natural radiation (gamma ray) and spontaneous potential (SP) of the formations drilled, as well as of the conductivity, temperature and speed of movement of water (flow meter) of the underground aquifers.
- System of visual vertical measurement of drilling.
- Scanprobe portable image recording and drilling videotaping system.
- Portable image and video recording system by PASI srl company. Continuous high resolution shots at depths up to 600m. Minimum internal drilling diameter: 80mm.
- Portable robotic camera system (image and video recording) by RICO GmbH.
- Continuous oriented high resolution shots at depths up to 200m. Minimum internal drilling diameter 90mm.
- Systems of the American company Hydrolab: datasonde and minisonde models 4, 4a and MS5, for continuous recording and monitoring (Loggings) of the quality of groundwater.
- Instruments (HQ40D) of the company Hache-Lange are used to record the physicochemical characteristics of groundwater (Ph, conductivity, temperature, redox potential and dissolved oxygen).

B. Geotechnical equipment

1. Grundojet 450 Track mounted drilling rig, of the firm Tracto-Technik, equipped with the appropriate equipment for directional drilling of geotechnical boreholes up to **80 meters in length-depth**. It is possible to change the drilling angle from 0 ° to 90 ° in the desired portions of soil or rocks, while at the same time electronically monitoring the direction and depth of the drilling.
2. DA-72 (RSB 0 / 1.4) self-propelled sampling drilling rig, of the house Nordmayer (Marketing authorisation number: ME 082674ICH). This equipment includes a dynamic penetrometer (DPL-DPM-DPH) of the house Nordmayer. Drilling methods: **Auger drilling, Percussion coring tube RKS, Open samplers, Rotary coring, Bailing and Hammering, Cases drilling and Straight flush rotary drilling.**
3. Menard Pressuremeter (MPM) with the respective pressuremeter shells of all calibers, in order to perform pressuremeter testing in sampling drillings up to 100 meters in depth.
4. Robotic remote-controlled pan & tilt surveillance and inspection cameras.

F. Microscopes

1. Microscopic automatic system Leitz Ergolux LAF-AMC plus MPV_3.
2. Leitz MM6 Metallographic microscope.
3. Leitz Orthoplan microscope.
4. Leitz Metalloplan microscope.
5. Leitz Ortholux microscope.
6. Leitz Orthoxul II microscope.



7. Leitz Ortholux UVMP ultraviolet microscope photometer.
8. Leitz Ortholux MPV_2 microscope photometer.
9. Leitz Dilatometer.
10. Leitz transmitted interference microscope (Mach-Zender).
11. Leitz interference microscope
12. Reichert MEF-2 Metallographic microscope.
13. Reichert Zetopan microscopes.
14. Nikon Apophot microscopes.
15. Nikon Metallographic invert microscope.
16. Nikon comparison microscope.
17. Olympus PME Metallographic microscope.
18. Olympus Vanox microscopes.
19. Olympus IM invert microscope.
20. Leitz και Olympus stereoscopes.

Δ. Control and measurement instruments.

1. Reichert micro-hardness tester, with measuring objective and indenter with diamond prism (Vickers method).
2. Leitz automatic micro-hardness tester system , with micrometer measuring objective and indenters with diamond prisms (Vickers and Knoop indentations).
3. Leitz Miniload 2 micro-hardness tester for Vickers, Knoop and Scratch Hardness.
4. Leitz Universal Delatometer UMB model , includes furnace for up to 1150° C and to 1600° C, heating and cooling device, time recorder for temperature and expansions, reflecting galvanometer test pieces and comparsion rods. Suitable for differential and absolute methods of investigations.

E. Environmental and water control systems

1. Portable spectrophotometers Foxboro Miran 1B2 & Foxboro Sapphire (Portable Ambient Analyzers)
2. Portable instrument (Hydrogen Sulfide Analyzer) Jerome 631 of Arizona instruments
3. Radioactivity measurement instruments (α , β γ) of Innova company.
4. Instruments (HQ40D) of the company Hache-Lange.
5. Systems (8 Recording units and 20 multiparameters probes) of the american company Hydrolab. Up to 12 parameters are controlled and continuously recorded, concerning the quality of water, the main of which are: Temperature, Conductivity, Salinity, Depth, pH, ORP, Dissolved Oxygen, Turbidity, Ammonium, Nitrate, Chloride, TDG.
6. Multiparameter Oceanografic logging system. Recording Units and 2 multiparameters probes of the company ME MEERESTECHNIK-ELEKTRONIK GMBH.
7. Multiparameter Oceanografic logging system. Type Sal-1.
8. Flow current meters that measure the flow of surface runoff in gullies and rivers.
9. Thermal cameras FLIR E8 και E95.