GEOTECHNICAL REPORT

FOR

CONSTRUCTION OF AN ELECTRICITY STORAGE FACILITY AND CONNECTION TO CEF GLODENI 1, IN GLODENI, MURES COUNTY

GLODENI MUNICIPALITY, CF 50604, 52635, 52833, MUREȘ COUNTY, ROMÂNIA

CLIENT: S.C. GLODENI ENERGY S.R.L.

TECHNICAL SPECIALIST: S.C. GEO SEARCH S.R.L.

PROJECT NO: 3140LGS/2025

DESIGN PHASE: P.TH.+D.E.

DATA: MARCH 2025

Lazar Laura
Digitally signed by Lazar Laura
Date: 2025.10.01 12:34:18 +03'00'

LIST OF SIGNATURES

TECHNICAL DOCUMENTATION

CONSTRUCTION OF AN ELECTRICITY STORAGE FACILITY AND CONNECTION TO CEF GLODENI 1, IN GLODENI, MURES COUNTY

GLODENI MUNICIPALITY, CF 50604, 52635, 52833, MUREȘ COUNTY, ROMÂNIA

Elaborated by:

Geologist Andrea FANGLI _____

Content

List of figures

List of tables

APPEDIX

APPENDIX 1: TERM OF REFERENCE

APPENDIX 2: GENERAL PLAN

APPENDIX 3: SITE PLAN

APPENDIX 4: BOREHOLE LOGS AND COLUMNS

APPENDIX 5: DYNAMIC PROBING TEST REPORTS

APPENDIX 6: LABORATORY TEST REPORTS

List of norms

ID	Title
C 107-3-05	Normative regarding the calculation of thermal energy performances of building construction elements – Annex D
CR 1-1-3-2013	Design Code - Evaluation of snow action on constructions
CR 1-1-4-2012	Design Code - Evaluation of wind action on constructions
Law no. 575/ 2001	National spatial plan - Section V Natural risk areas
NE 012 - 1: 2022	Code of practice for the execution of concrete, reinforced concrete, and prestressed concrete works. Part 1: Production of concrete
NP 074 - 2022	Normative regarding geotechnical documentation for construction
NP 112 - 2014	Normative for the design of direct foundation structures
NP 122 - 2010	Normative regarding the determination of characteristic and calculation values of geotechnical parameters
NP 126 - 2010	Normative regarding for foundation of buildings swelling and contracting soils
P 100-1/ 2013	Seismic design code - Part 1 - Design provisions for buildings
SR 1709-1-90	The action of the thaw - frost phenomenon at road works: 1. Freezing depth in the road complex
SR EN 1997-1:2004 **SR EN 1997-1:2004 AC:2009** **SR EN 1997-1:2004/A1:2014**	Eurocode 7: Geotechnical design. Part 1: General rules
SR EN 1997-1:2004/NB:2016	Eurocode 7: Geotechnical design. Part 1: General rules. National Annex
SR EN 1997-2:2007 **SR EN 1997-2:2007/AC:2010**	Eurocode 7: Geotechnical design. Part 2: Investigation and testing
SR EN 1997-2:2007/NB:2009	Eurocode 7: Geotechnical design. Part 2: Investigation and testing. National Annex
SR EN ISO 14688-1:2018	Geotechnical investigations and tests. Identification and classification of soil. Part 1: Identification and description
SR EN ISO 14688-2:2018	Geotechnical investigations and tests. Identification and classification of soil. Part 2: Principles for classification
SR EN ISO 22475-1:2021	Geotechnical investigations and tests. Sampling methods and groundwater measurements. Part 1: Technical principles for execution
SR EN ISO 22476-2:2006	Geotechnical investigation and testing — Field testing — Part 2: Dynamic probing
STAS 2914-1984	Roadworks. Earthworks. General requirements for quality
STAS 6054-77	Foundation soil. Maximum frost depths. Division in zones of the territory of Romania
TS - MLPAT 1994	Indicator of specification and catalogue standard for excavation works

1. Executive summary

1.1. Purpose of the work

This paper will provide data on the project ***" Construction of an electricity storage facility and connection to CEF Glodeni 1, in Glodeni, Mures County",*** located in Glodeni municipality, CF 50604, 52635, 52833, Mureș county, România.

This site investigation program consists of:

- identification and determination of the distribution and thickness of the layers around influence and development of the projected constructions.
- soil sampling to determinate the physical and mechanical parameters for each intercepted layer in accordance with the geotechnical category.
- in situ testing of soils by dynamic probing heavy (DPH).
- statistical processing of the values obtained from laboratory tests and the values derived from in-situ tests.
- identification of the underground water level.

The present geotechnical study is prepared in accordance with the provisions of **SR EN 1997-1** (*Geotechnical Design 1. General rules*), **SR EN 1997-2** (*Geotechnical design - 2. Investigation and testing*) and **NP74-2022** (*Normative on geotechnical documentation for construction*).

Between 21-22.10.2022 S.C. SAIDEL Engineering S.A. carried out 7 geotechnical boreholes up to a depth of 8.00 m from execution surface, on the neighboring site (cadastral no. 50606). The results of these boreholes were provided by the customer for a more accurate evaluation of the site investigated in the current project. The borehole logs are attached to this study in *Appendix 4*.

1.2. Client

DTEK RENEWABLES INTERNATIONAL B.V.

1.3. Technical specialist

S.C. GEO SEARCH S.R.L.

1.4. Synthesis of information

Geotechnical investigations

The field investigation program was executed in 2 phases:

➢ ***Phase I*** conducted in 25 January 2024 and consists of:

- **3 geotechnical boreholes (FS01 ÷ FS03),** each with a depth of 8.00 meters from the execution level, totaling 24.00 linear meters. These boreholes were executed by continuous rotating coring, with single and double wall core, with diameters

between 116 ÷ 101 mm, in dry and wet system, with a ROLATEC RL48L equipment.

- **8 standard penetration tests (SPT),** conducted inside of boreholes.

➢ ***Phase II*** realized in 21 March 2025 and consists of:

- **4 geotechnical boreholes (FS04 ÷ FS07),** executed by a GeoTool LSKM heavy dynamic penetrometer, to depths between 2.30 ÷ 3.20 m from execution surface, summing 10.90 linear meter.
- **4 dynamic probing heavy test (DPH)** executed in the continuation of the geotechnical boreholes, up to depths between 3,50 ÷ 3,90 m from the execution level.

Lithology

The following geotechnical units were identified: *topsoil layer, clayey alluvial layer, weak clayey alluvial layer, granular alluvial layer.*

Underground water

The groundwater level on the current investigation phase was NOT intercepted.

In previous phases the boreholes executed by S.C. Geo Search S.R.L. intercepted the groundwater level from 2.40 m depth, respectively the boreholes executed by SAIDEL Engineering S.A. intercepted in the depth range 5.70 ÷ 6.00 m.

Geotechnical category according to NP074-2022

The studied area fits **in geotechnical category 1.**

Foundation depths and foundation systems

Details of recommended foundation depths can be found in **Chapter 5.5.**

Excavations and supports

Under current legislation we recommend the following:
Excavations above groundwater level with unsupported vertical walls can be carried out with depths up to:
•0,75 m in the case of non-cohesive and weakly cohesive soils.
•1,25 m for medium cohesion soil.
•2,00 m for very cohesive soil.
In the case of excavations with unsupported vertical walls, the following measures shall be taken to maintain the stability of the banks:

- The land around the excavation is not allowed to be loaded and does not suffer vibration.
- The soil resulting from digging should not be deposited at less than 1,00 m from the edge of the foundation pit; for excavations up to 1.00 m deep, the distance can be taken equal to the depth of the excavation.
- Measures shall be taken to remove rapidly the rainwater or accidental waters.

- If, for unforeseen reasons, the foundations are not poured immediately after excavation has been completed and phenomena indicating a danger of subsidence are observed, measures will be taken to support the wall in the area in question or to convert them into walls with a slope.

The constructor is obliged to monitor the appearance and development of longitudinal cracks parallel to the edge of the excavation which may indicate the beginning of bank subsidence and to take measures to prevent accidents.

If the depth of the excavation exceeds the recommended values for unsupported vertical walls, the excavations may be made in the slope under the following conditions:

• The soil has a natural humidity of 12-18% and conditions are provided so that it does not grow.

• foundation excavation does not stay open for long.

In all other cases (when it is not possible to excavate with unsupported vertical walls or on a slope), excavation can only be carried out under the protection of the supports, respecting the recommendations of the legislation in force. A solution of tangent/spaced piles or a molded wall support may be chosen.

The land around the excavation is not allowed to be loaded and does not suffer vibration.

The soil resulting from the excavation will be deposited at a distance at least equal to the depth of the excavation.

Table 1. Recommended values

	Water content	Plasticity index	Consistency index	Bulk unit weight	Saturated unit weight	Void ratio	Degree of saturation	Free swelling	Oedometric deformation modulus	Swelling pressure	Effective angle of friction	Effective cohesion	Post-peak eff. angle of friction	Post-peak eff. cohesion	Undrained shear strength	Relative density	Internal friction angle	Linear deformation
	w	**I_p**	**I_c**	**γ**	**γ_{sat}**	**e**	**S_r**	**U_L**	**$E_{200-300}$**	**Pu**	**ϕ'**	**c`**	**ϕ'_{pp}**	**c'_{pp}**	**c_u**	**D_{R*}**	**φ'***	**E_{s*}**
	[%]	**-**	**-**	**[kN/m³]**	**[kN/m³]**	**-**	**[%]**	**[%]**	**[kPa]**	**[kPa]**	**[°]**	**[kPa]**	**[°]**	**[kPa]**	**[kPa]**	**[%]**	**[°]**	**[kPa]**
Alluvial layer	19	21	0,78	19,2	19,9	0,6	90	100	14700	9,4	27,5	27,4	26,8	18,3	-	-	-	-
Weak alluvial layer	20	16	0.6	18.9	19.8	0.7	77	70	6200	5	26.5	14	24.7	6	90	-	-	-
Granular alluvial layer	11	-	-	21.9*	-	-	-	-	-	-	-	-	-	-	-	73	38	53700

**Values derived from SPT and DPH tests*

2. Preliminary investigations of studied site

2.1. Geomorphology and geology of studied area

Geomorphologically the investigated area is in the eastern extremity of the Mădărașului Hills [7], at the contact with the Mureș Corridor, part of the Sarmas Plain (Transylvanian Plain).

In the relief of the Transylvanian Plain, soft Miocene rocks (clays, marls, sands) are imposed with a structure dominated by gentle hills with altitudes below 600 m and with the usual dome appearance, river meadows with short but very wide valleys in the form of wide aisles, all determined by monoclin asymmetries, thus acquiring a hilly appearance [7][8].

The investigated site is located on the right side of the Șar river, on a relatively flat terrain, being located on the altitude gap 350 ÷ 375 m (rMN). The Șar river is a right tributary of Mureș River, which is the principal river in the area. The meteoric water drains to the Șar river or infiltrates in the ground, following the same main flow direction [7]. Several nameless streams and valleys with temporary watercourses were identified around the investigated site.

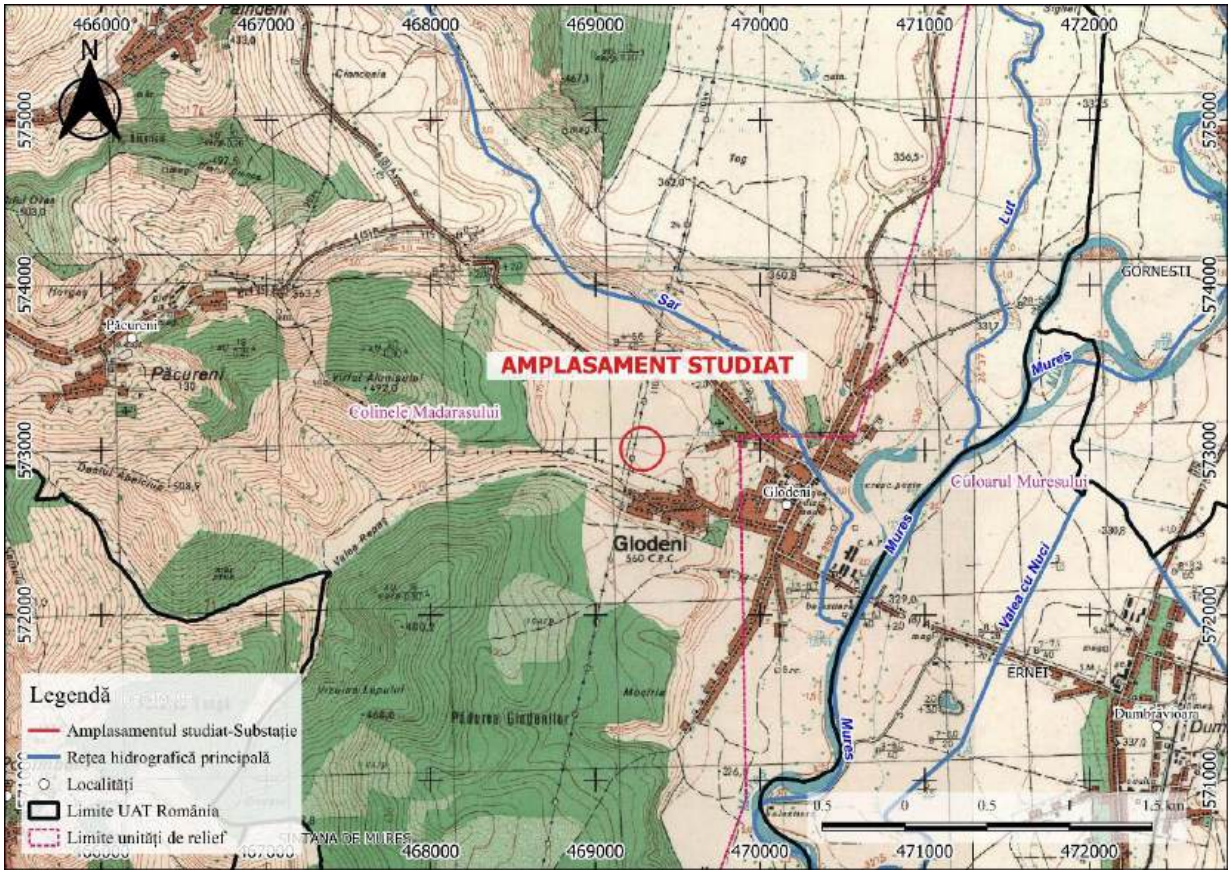


Fig. 1. Framing of the studied area on the topographical map, scale de 1: 25000.

The investigated site is in the central part of the *Transylvanian Basin*. This basin **geologically** is a sedimentary basin, formed in the Upper Cretaceous, and has gone through four tectono-structural mega sequences: Upper Cretaceous (rift type), Paleogene (sag basin), Lower Miocene (flexural basin) and Middle Miocene – upper (back arc basin) [4]. The sedimentation period ended after the Pannonian (9 Ma) [3]. In the Late Badenian - Pliocene period the basin underwent a southeastward tilting and in the Pliocene regional uplift, thus a period of erosion began.[8][4].

The bedrock in the studied area is represented by Sarmatian marine deposits which are composed by the alternation of marly clays with sands and tuffs. The Sarmatian deposits are delimited in this area are by the horizon of the Ghiriș tuff in the lower part and the level of the Bazna tuff in the upper part [8].

Over the Sarmatian deposits can be found the Pannonian ones, also with marine origin, with a thickness varying between 0.50 and 10 m, consisting of sandy marls with thin intercalations of marly limestones and sandstones [8].

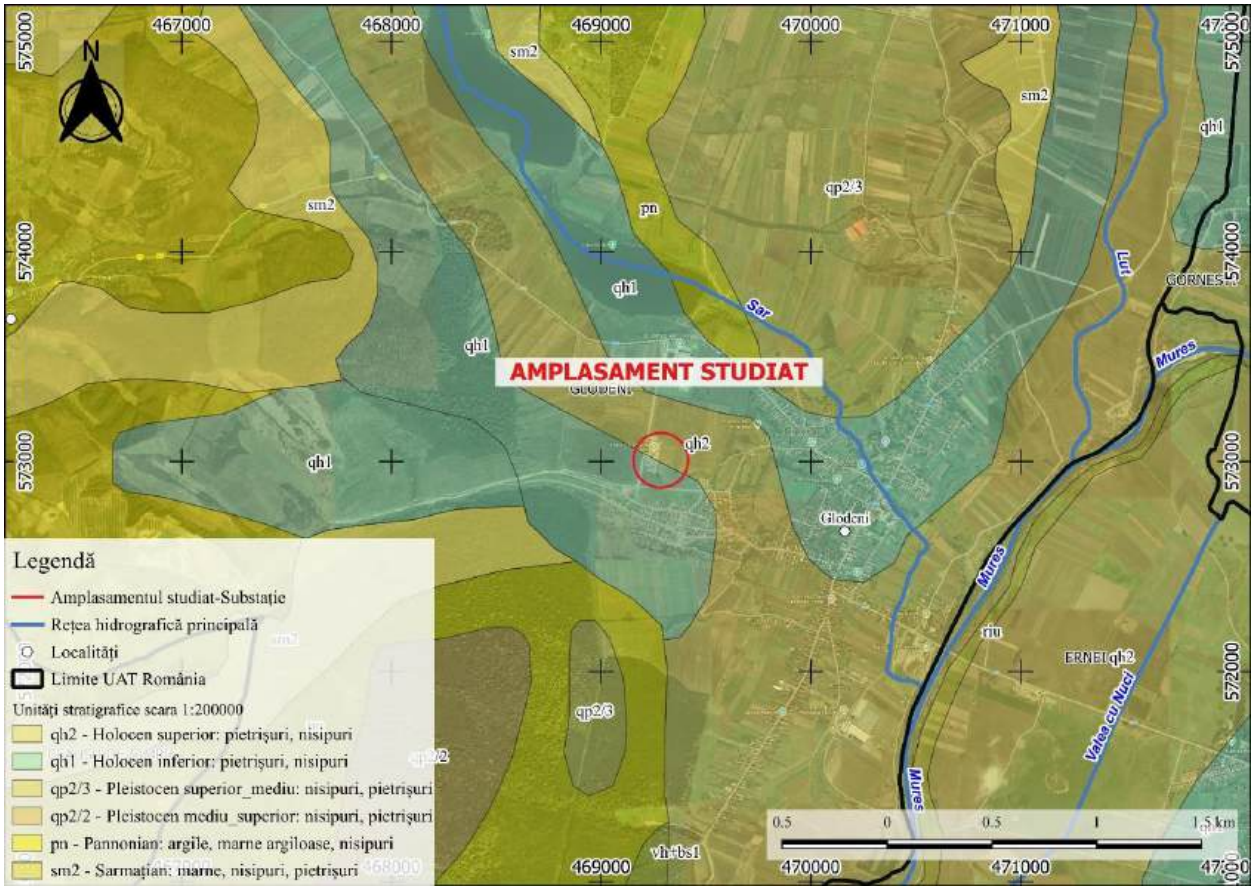


Fig. 2. Framing of the studied area on the geological map, page 11 – Bistrița, L-35-VII, scale 1:200000 (1967)

To identify the boundary between Sarmatian and Pannonian deposits is very difficult. In the analyzed perimeter both marine deposits consist of the same alternations of clay and sands, but in Pannonian deposits in some level's sands may predominate, joined in places by layers of yellowish tuffs and several levels of gravel [8].

The bedrock in the investigated area is covered by recent alluvial deposits (Holocene) of the Mureș River and its tributaries, represented by successions of gravel with sand, respectively sand with gravel and clay material from the floodplain of the river covering the coarse deposits[8].

The investigated land has no industrial or urban history, thus a topsoil layer develops at the top of alluvial deposits.

2.2. Maximum frost depth

According to **STAS 6054-77**, the studied area has a frost depth of **80 ÷ 90 cm**.

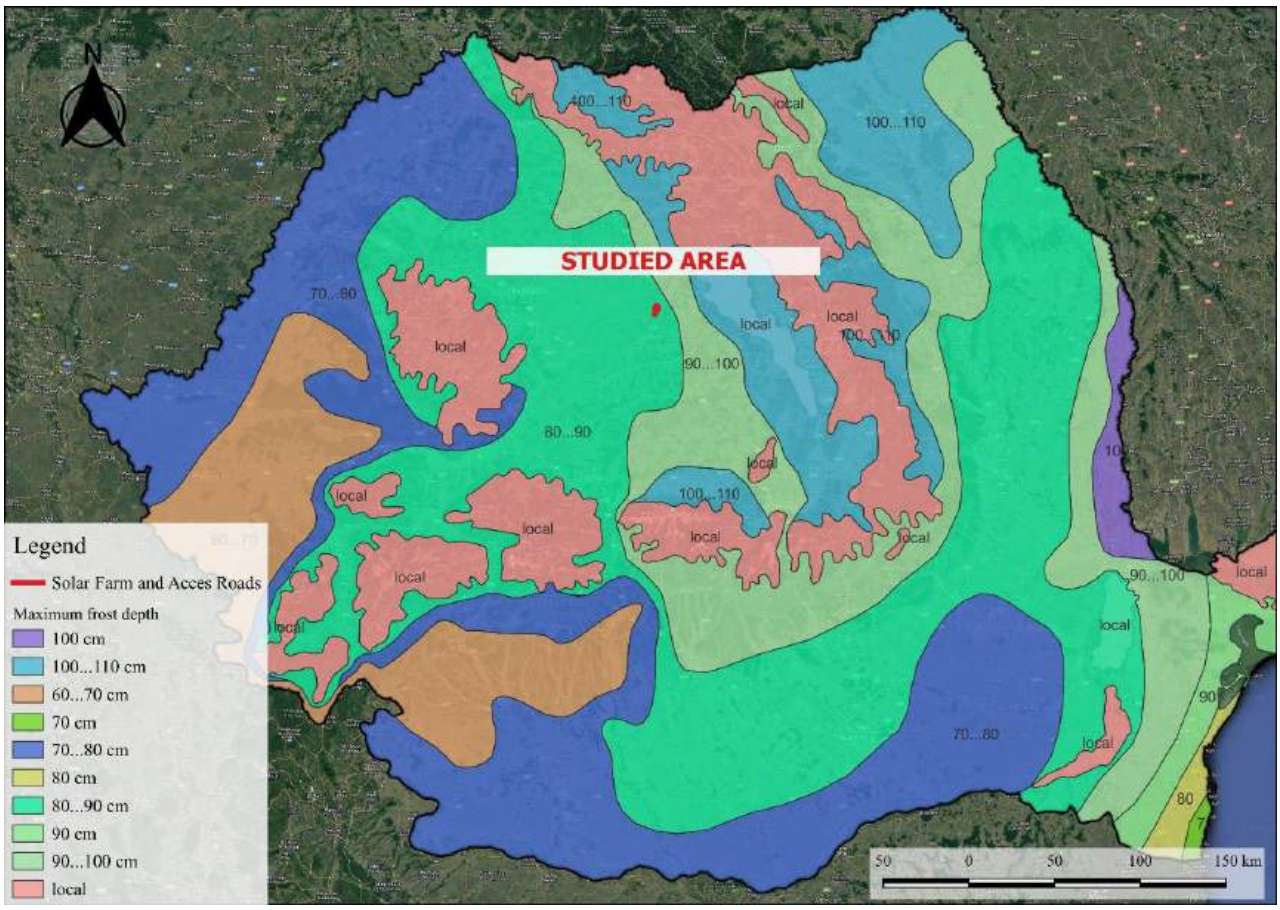


Fig. 3. Maximum frost depth in the studied area

2.3. Seismic zone

According to technical regulation **P 100-1/2013**, the studied area has the ground acceleration **a_g = 0.10 g** having the average recurrence interval IMR = 225 years and the corner period, **Tc = 0.7**.

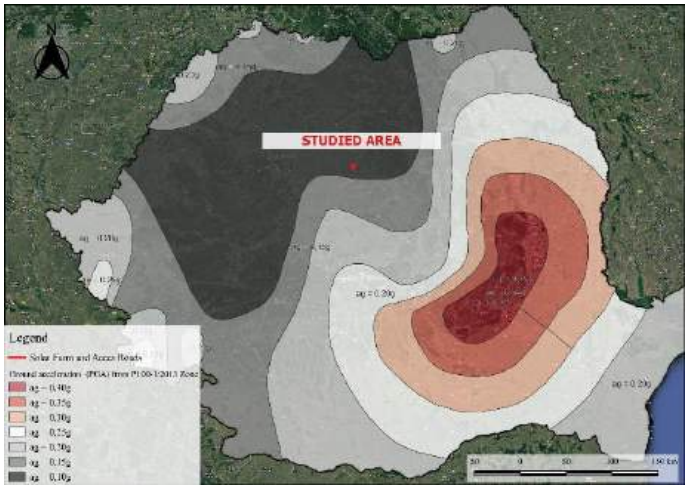


Fig. 4. Ground acceleration in the studied area

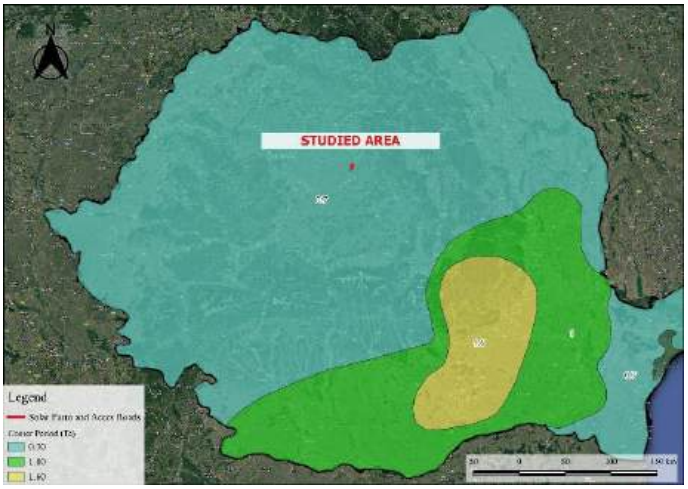


Fig. 5. Corner period in the studied area

The horizontal and vertical seismic coefficients of ground movement k_{sh} and k_{sv} are calculated as:

$$k_s = 0{,}5 * \gamma_l * \frac{ag}{g}$$
$$k_{sv} = 0{,}5 * k_s$$
$$k_{sh} = k_s$$

2.4. Climate characteristics

Climate characteristics of Voivodeni and Glodeni commune, Mureș County are represented on the bellowed table (Table 2):

Table 2. Climate characteristics

Characteristics	Standard	Value
Temperatures during winter period (T_e)	**C 107-3-05, Appendix D -** Norm regarding the calculation of the thermo-energetic performances of the construction elements of buildings	-21 (C^o) Area II
Humidity index (I_m)	**SR 1709-1-90** The action of the freeze-unfreeze phenomenon in road works: 1. The depth of frost in the road complex	0…20 Climatic type I
Characteristic value of loads from snow on the ground (s_k)	**CR 1-1-3-2013** *Design code - Evaluation of loads of snow on constructions*	1,5 ($kN/m^{2)}$
Dynamic wind pressure reference value (q_b)	**CR 1-1-4-2012** *Design code - Assessment of wind action on buildings*	0,4 (kPa)

2.5. Natural hazards

The classification is made based on law 575/14.11.2001, law on the approval of the *National Territorial Development Plan - Section V - Natural Risk Areas*, updated on 07.06.2011. The law classifies natural hazards into three categories caused by earthquakes, floods, and landslides.

Natural risk areas are geographically defined areas with a potential for destructive natural phenomena, which can affect the population, human activities, the natural and built environment and cause damage and human victims.

According to Law 575/14.11.2001, updated on 06.07.2011, the commune of Voivodeni and Glodeni, could be affected with the following risks (Table 3):

Table 3. Natural Darks

commune	Flood types		The potential for landslides	Landslide type	
	Floods on watercourses	On torrents		Floods on watercourses	On torrents
com. Voivodeni	yes	-	-	-	-
com. Glodeni	is not mentioned in Law 575/14.11.2001				

According to PUG Voivodeni, the investigated site is located outside the areas associated with flooding risk by reversing of high intensity, with low frequency.

According to the General Urban Plan (GUP) the territory of Glodeni commune is not characterized by risks associated with landslides or floods.

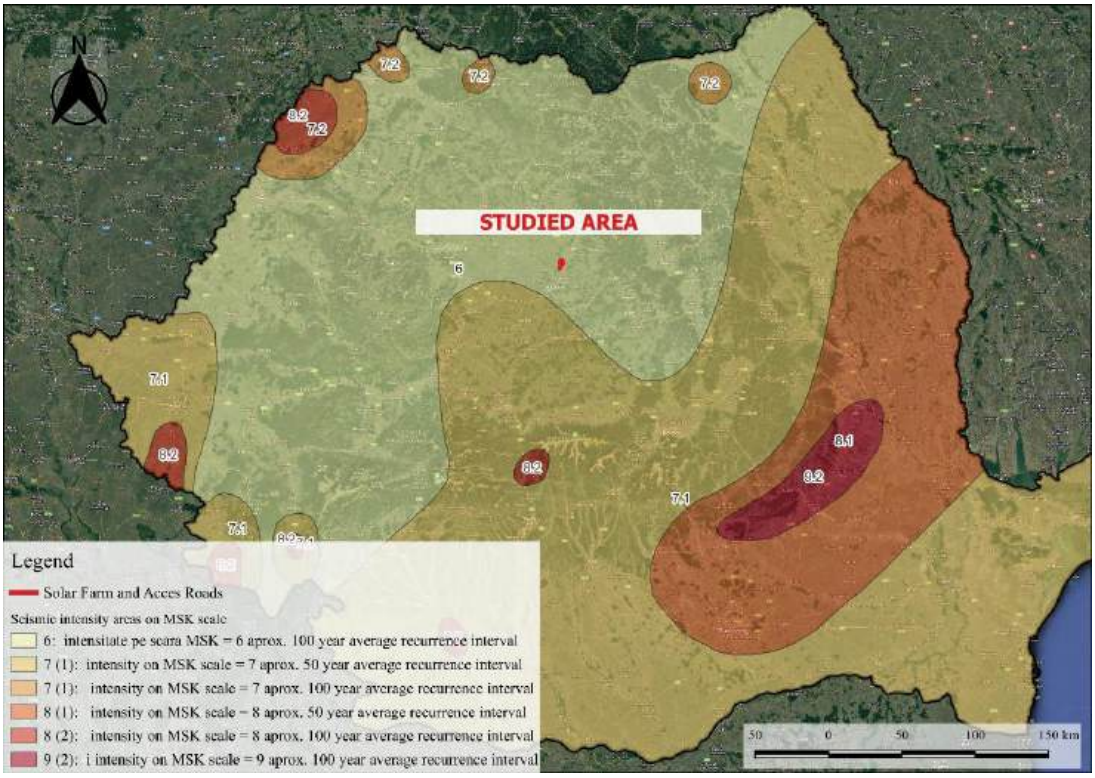


Fig. 6. Seismic intensity in the studied area

3. Execution and information from boreholes

3.1. Geotechnical field investigations faze

Between 21-22.10.2022 S.C. SAIDEL Engineering S.A. carried out 7 geotechnical boreholes up to a depth of 8.00 m from execution surface, on the neighboring site (cadastral no. 50606). The results of these boreholes were provided by the customer for a more accurate evaluation of the site investigated in the current project. The borehole logs are attached to this study in *Appendix 4*.

3.1.1. Ground investigations

The field investigation program was executed in 2 phases:

- ***Phase I*** conducted in 25 January 2024 and consists of:

- **3 geotechnical boreholes (FS01 ÷ FS03),** each with a depth of 8.00 meters from the execution level, totaling 24.00 linear meters. These boreholes were executed by continuous rotating coring, with single and double wall core, with diameters between 116 ÷ 101 mm, in dry and wet system, with a ROLATEC RL48L equipment.
- **8 standard penetration tests (SPT),** conducted inside of boreholes.

- ***Phase II*** realized in 21 March 2025 and consists of:

- **4 geotechnical boreholes (FS04 ÷ FG07),** executed by a GeoTool LSKM heavy dynamic penetrometer, to depths between 2.30 ÷ 3.20 m from execution surface, summing 10.90 linear meter.
- **4 dynamic probing heavy test (DPH)** executed in the continuation of the geotechnical boreholes, up to depths between 3,50 ÷ 3,90 m from the execution level.

The borehole execution, and the soil and groundwater sampling were carried out in accordance with **SR EN ISO 22475-1:2021** (Geotechnical investigations and tests. Sampling methods and measurements relating to groundwater. Part 1: Technical principles for soil, rock and groundwater sampling).

This site investigation program consists of:

- identification and determination of the distribution and thickness of the layers around influence and development of the projected constructions.
- soil sampling to determinate the physical and mechanical parameters for each intercepted layer in accordance with the geotechnical category.
- in situ testing of soils by dynamic probing heavy (DPH).
- statistical processing of the values obtained from laboratory tests and the values derived from in-situ tests.
- identification of the underground water level.

The position of the geotechnical boreholes is figured in the site plan (*Appendix 3*) and in Table 4.

Table 4. Geotechnical investigations

Borehole ID	Execution date	Topographic coordonates		Elevation (Z) [m]	Investigations depth [m]
		(X)	(Y)		
FS01	25 January 2024	469296.31	573030.76	362.01	8.00
FS02	25 January 2024	469284.24	572964.02	361.46	8.00
FS03	25 January 2024	469269.91	572999.35	362.04	8.00
FS04+DPH	21 March 2025	469294.65	572921.94	-	3.80
FS05+DPH	21 March 2025	469269.75	572930.51	-	3.50
FS06+DPH	21 March 2025	469262.80	572950.22	-	3.90
FS07+DPH	21 March 2025	469233.47	572960.82	-	3.90

The location of the geotechnical investigation points is presented in Fig. 7 ÷ Fig. 13.

Fig. 7. Execution of borehole FS01

Fig. 8. Execution of borehole FS02

Fig. 9. Execution of borehole FS03

Fig. 10. Execution of borehole FS04+DPH

Fig. 11. Execution of borehole FS05+DPH

Fig. 12. Execution of borehole FS06+DPH

Fig. 13. Execution of borehole FS07+DPH

3.1.2. In-situ investigations

Execution of standard penetration tests (SPT)

During the geotechnical drills, **8** standard penetration tests (SPT) were carried out.

The standard penetration test is a common in situ dynamic testing method used to determine the dynamic penetration resistance of a cone or sampler with well-defined characteristics. The test is carried out within a borehole.

A hammer of 63.5 kg (140 lbs.) is dropped repeatedly from a height of 76 cm (30 inches) with a frequency not exceeding 40 beats/minute, driving the cone or sampler into the ground until reaching a depth of 15 cm (6 inches). The number of the required blows is recorded as $\mathbf{N_0}$. This procedure is repeated two more times until a total penetration of 45 cm (18 inches) is achieved, this will be noted as $\mathbf{N_1}$ and $\mathbf{N_2}$.

The total number of blows ($N_{60}= N_1 + N_2$) represent the uncorrected dynamic penetration resistance. The test may be stopped if the total number of strokes (N60) reaches 50. In soft rocks it can be raised to 100 strokes.

To the value (N60) obtained in the field was applied a series of correction factors, according to the SR EN ISO 22476-3. The chosen factors for this project consider the length of rod, type of sampler (without thin sampler), borehole diameter, equipment efficiency and geological pressure correction where applicable. The value of the C_N factor (effect of geological pressure) has been limited to 1.2 for this project.

The standard penetration tests were carried out in accordance with **SR EN 1997-2:2007** (Geotechnical design - 2. Field investigation and testing) and **SR EN ISO 22476-3** (Geotechnical research and testing. Field tests. Part 3: Standard penetration test).

Regarding the relative density and peak friction angle, interpolation between values provided in the following table were used:

Table 5. Table used for correlations

N60	D_r [%]	φ` [°]
0	0	26
3	15	28
8	35	30
25	65	36

42	85	41
58	85	41

Deformation modulus was derived using the following equation:

sandy GRAVEL: $E_s = 900 \cdot [N60(cor) + 6]$ Equation 1

gravelly SAND: $E_s = (600 \cdot [N60(cor) + 6]) + 2000$ Equation 2

clayey SAND: $E_s = 320 \cdot [N60(cor) + 15]$ Equation 3

Undrained shear strength was deriving using following equation:

Clayey soils: $c_u = 6{,}25 \cdot N60(cor)$ Equation 4

Execution of dynamic heavy penetration (DPH)

The purpose of the dynamic penetration test is to determine in situ the resistance of a soil or soft rock to dynamic cone penetration. The penetration resistance is defined as the number of blows required to drive the penetrometer a defined distance. It shall be recorded continuously as a function of depth. The method does not involve sampling.

The dynamic penetration test equipment must be placed vertically so that it is not displaced during the test. The inclination of the device and the beating rods shall not exceed more than 2% from vertical. If this criterion cannot be met, the penetration test shall be stopped.

The beating rods and the tip shall be inserted in such a way that they do not suffer excessive bending. No load must be applied to the anvil and the rods during the raising of the ram.

The rods should be inserted into the ground continuously. The frequency of strikes shall be maintained between 15 and 30 strikes per minute. For each meter penetrated the rods shall be rotated a minimum of one and one-half turns or until maximum torque is reached. The maximum torque required to rotate the rods shall be measured with a torque wrench.

The dynamic heavy penetration (DPH) tests were performed in accordance with **SR EN 1997-2:2007** (*Eurocode 7: Geotechnical design. Part 2: Investigation and testing*) and **EN ISO 22476-2** (*Geotechnical investigation and testing — Field testing — Part 2: Dynamic probing*).

The graphical interpretation of the heavy dynamic penetration tests is attached to this geotechnical study in *Appendix 5*.

For the present project the values from DPH were equivalated to N60 drops, based on kinetic energy correlations. So, in the case of non-cohesive soils, formulas from SPT were used to derive the geotechnical parameters. In the case of cohesive soils, the correlation between drops and undrained shear strength was not used, because the SPT formula is used only where split barrel sampler is used (Raymod).

3.2. Laboratory investigations

The sampling, handling and transportation of soil and groundwater samples was made in accordance with **SR EN ISO 22475-1:2021** (Geotechnical investigations and tests. Sampling methods and measurements relating to groundwater. Part 1: Technical principles for soil, rock, and groundwater sampling).

3.2.1. Soil sampling for geotechnical investigations

The soil samples obtained from the geotechnical investigations were analyzed inside of *S.C. Geo Search S.R.L. - Grad II Laboratory – Certificate of authorization no. 4056/ISC/L01/22.06.2023*.

The results of these laboratory tests will be represented on borehole logs (*Appendix 4*) and on laboratory reports (*Appendix 6*), which are attached to this desktop study.

3.2.2. Soil sampling for chemical aggressiveness determinations

During the project, soil samples were taken on the investigated site to determine its aggressiveness on concrete according to Table 6.

Table 6. Soil samples chemical aggressiveness

Borehole ID	Purpose of the work	Sample ID	Sampling depth [m]	Sampling date	Lithostratigraphic unit
FS01	SPP Substation	42671	1.50-2.00	January 23, 2024	*weak clayey alluvial layer*
FS02	SPP Substation	42676	1.00-1.50	January 23, 2024	*weak clayey alluvial layer*
FS03	SPP Substation	42683	1.50-2.00	January 16, 2024	*weak clayey alluvial layer*
FS03	SPP Substation	42684	3.40-3.85	January 16, 2024	*weak clayey alluvial layer*

The soil samples obtained from the geotechnical investigations were analyzed inside of *S.C. ALS Life Science Romania S.R.L. – str. Constantin Stere, no. 16, Ploiesti municipality, Prahova County.*

The results of these laboratory tests will be attached to this desktop study on laboratory reports (*Appendix 6*) and summarized in Table 7.

Table 7. Chemical aggressiveness of soils in geotechnical boreholes

	Sampling depth	**Electrical Resistivity**	**Oxidation-Reduction Potential (ORP)**	**Conductivity**	**pH (H2O)**	**Chloride as Cl-**	**Sulfides**	**Acid Neutralising Capacity**	**Base Neutralising Capacity (BNC)**	**Sulfate as SO4 - Soluble**	**Sulfate as SO4 - Soluble**
Limit of reporting	-	*10.0*	-	*0.10*	*2.00*	*0.0010*	*10.00*	*1.0*	*1.0*	*50*	*500*
Unit	***[m]***	***ohm m***	***mV***	***µS/cm***	***pH Unit***	***% DW***	***mg/kg DW***	***mol/kg DW***	***mol/kg DW***	***mg/kg DW***	***mg/kg DW***
FS01	1.50-2.00	325	367.7	34.3	8.31	0.0071	<10.0	<1.0	<1.0	<50	<500
FS02	1.00-1.50	343	366.6	32.5	7.91	0.0078	<10.0	<1.0	<1.0	<50	<500
FS03	1.50-2.00	370	361.7	30.2	7.75	0.0064	<10.0	<1.0	<1.0	<50	<500
FS03	3.40-3.85	308	356.7	36.2	7.14	0.0074	<10.0	<1.0	<1.0	<50	<500

3.3. Groundwater

During the actual geotechnical investigations phase the groundwater level was NOT identified.

But also, in the previous investigation phases the groundwater level was identified at the following depths (Table 8):

Table 8. Groundwater depth measurements inside of boreholes

Borehole ID	Purpose of the work	Depth from ground level [m]	Type	Lithostratigraphic unit	Date of measurements
FS01	Solar Farm	2.4	GWL*	weak clayey alluvial layer	January 25, 2024
SUB1	Substation	6	GW	-	October 21, 2022
SUB4	Substation	5.7	GW	-	October 22, 2022
SUB5	Substation	5.7	GW	-	October 21, 2022
SUB6	Substation	5.7	GW	-	October 22, 2022
SUB7	Substation	5.7	GW	-	October 21, 2022

GW = groundwater level, measured during the execution
GWL = groundwater level, extrapolated.*

The location of groundwater is influenced by local lithology, through the presence of sandy intercalations within the sandy alluvial complex. Their level can be influenced by variations in atmospheric precipitation as well as by the lithological distribution of sandier levels that have higher permeability.

4. Geological and geotechnical characterization of studied area

The final lithological sequence elaborated based on field observations and laboratory determinations is shown in the borehole logs shown in *Appendix 4*.

Based on field observations and laboratory tests, the identified layers were classified into geotechnical complexes in order to characterize the earth massif and develop the terrain model.

The classification and characterization of intercepted soils during the geotechnical investigations was made based on **SR EN ISO 14688-2:2018 (***Geotechnical investigations and tests. Identification and classification of soils. Part 2: Principles for a classification).*

The following lithostratigraphic units were identified on the investigated area: *topsoil layer, clayey alluvial layer, weak clayey alluvial layer and granular alluvial layer.*

These units are geological complexes defined based on stratigraphic criteria and are not lithological homogeneous. The geotechnical characterization is conducted on the predominant lithologies in each complex.

The intercepted lithological complexes are described in more detail below, and the minimum, maximum and average values of the geotechnical parameters, as well as the lower and upper characteristic values, are presented in table form. These parameters are calculated according to *NP122:2010.*

4.1. Topsoil layer

On the investigated site, a thin layer of topsoil was identified, intercepted in all geotechnical boreholes, with a thickness between 0.20 ÷ 0.80 m. The thickness of topsoil was considered the one described by our field geologists.

This layer is composed of *firm, low organic, brown sandy CLAY.*

Due to the variable origin and thickness as well as high heterogeneity, **direct foundation of buildings in this layer is NOT recommended**.

4.2. Alluvial deposits

Alluvial deposits were formed over the base layer, from detritus material transported with flowing waters, and deposited on the bottom of the riverbed, on the meadow or at the mouth.

Depending on the predominant lithology the following complexes have been separated: *clayey alluvial layer, weak clayey alluvial layer,* and *granular alluvial layer,* which will be described separately.

4.2.1. Clayey alluvial layer

The clayey alluvial layer was identified in all geotechnical boreholes in current investigation phase, under the topsoil layer, on a thickness varying between 1.60 ÷ 3.00 m.

This layer is composed of *firm to stiff, low to medium plasticity, greyish-reddish-brown sandy CLAY, locally with gravel intercalations.* From a lithological and structural point of view, these sequences are characterized by **high heterogeneity**.

Fig. 14. FS04+DPH, 1,30 ÷ 1,50 m – *clayey alluvial layer*

Fig. 15. FS05+DPH, 1,50 ÷ 1,70 m – *clayey alluvial layer*

Fig. 16. FS06+DPH, 1,70 ÷ 2,00 m – *clayey alluvial layer*

Fig. 17. FS07+DPH, 1,50 ÷ 1,70 m – *clayey alluvial layer*

Statistically analyzed physical parameters for *clayey alluvial layer* can be found in Table 9.

Table 9. Statistical processing of physical parameters for *clayey alluvial layer*

	Water content	**Plasticity index**	**Consistency index**	**Bulk unit weight**	**Saturated unit weight**	**Void ratio**	**Degree of saturation**	**Free swelling**	**Activity index**	**Liquidity index**
	w	**I_p**	**I_c**	**γ**	**γ_{sat}**	**e**	**S_r**	**U_L**	**I_A**	**I_L**
	[%]	**-**	**-**	**[kN/m^3]**	**[kN/m^3]**	**-**	**[%]**	**[%]**	**-**	**-**
No. sample	*4*	*4*	*4*	*4*	*4*	*4*	*4*	*4*	*4*	*4*
Vx	*0.228*	*0.266*	*0.078*	*0.021*	*0.029*	*0.124*	*0.107*	*0.236*	*0.085*	*0.282*
Min. value	14.79	15.68	0.74	18.76	19.15	0.55	73	60	0.51	0.13
Average value	19.48	21.78	0.78	19.24	19.93	0.64	82	76	0.56	0.22
Max. value	25.20	29.18	0.87	19.58	20.56	0.74	90	100	0.62	0.26

Given the physical parameters, the *clayey alluvial layer* has a low to medium swelling potential (Fig. 18), and a medium to high (Fig. 19) with maximal determinate value for free swelling **U_L = 100%**, and activity index **I_A = 0,62**, thus falling into the active category.

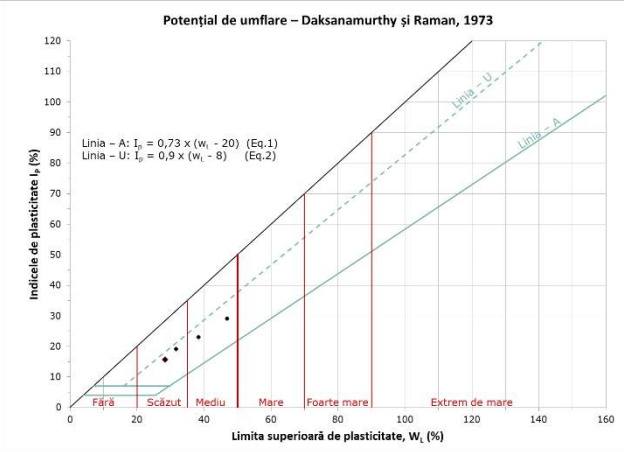


Fig. 18. Swelling potential Daksanamurthy, Raman [2] – *clayey alluvial layer*

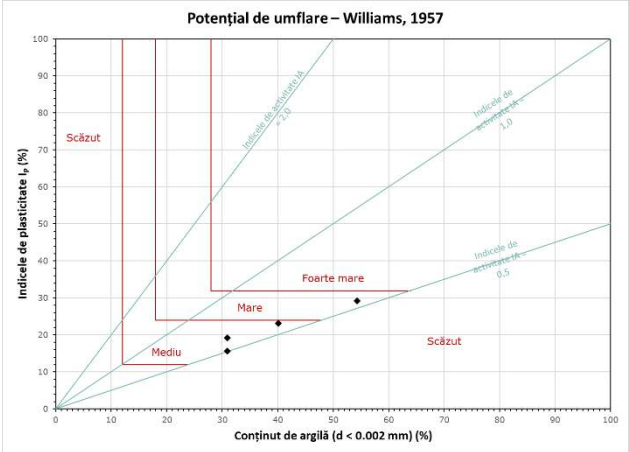


Fig. 19. Swelling potential Van Der Merwe [10] – *clayey alluvial layer*

To verify the real swelling potential, **swelling pressure** tests were made. The highest determined value is **9.40 kPa**, therefore the *clayey alluvial layer* **falls into the category of PUCM soils (swelling and contracting soils) with low activity.**

Statistically analyzed mechanical parameters for *clayey alluvial layer* can be found in Table 10.

Table 10. Statistical processing of mechanical parameters for *clayey alluvial layer*

	Oedometric deformation modulus	**Swelling pressure**	**Effective angle of friction - peak**	**Effective cohesion - peak**	**Post-peak eff. angle of friction**	**Post-peak eff. Cohesion**
	$E_{200-300}$	**p_u**	**ϕ'**	**c`**	**ϕ'_{pp}**	**c'_{pp}**
	[kPa]	**[kPa]**	**[°]**	**[kPa]**	**[°]**	**[kPa]**
No. sample	*2*	*2*	*2*	*2*	*2*	*2*
Min. value	14286	0.40	25.53	19.60	24.81	8.16
Average value	14719	4.90	27.54	27.47	26.88	18.31
Max. value	15152	9.40	29.55	35.34	28.96	28.46

4.2.2. Weak clayey alluvial layer

Within the clayey alluvial layer, areas with weaker characteristics were identified with thicknesses varying between 2.10 ÷ 4.00 m. This layer was identified only in previous investigation phase (January 2024) and is composed of *firm, low plasticity, yellowish-brown locally grey sandy CLAY, locally with sandy nests/intercalations.*

From a lithological and structural point of view, these sequences are characterized by **high heterogeneity**.

Fig. 20. FS01, 2,00 ÷ 2,40 m – *weak clayey alluvial layer*

Fig. 21. FS03, 3,00 ÷ 3,40 m – *weak clayey alluvial layer*

Given the high lithological heterogeneity of the alluvial layer, it is recommended to consider the most unfavorable values of physical and mechanical parameters (conservative values).

Statistically analyzed physical parameters for *weak clayey alluvial layer* can be found in Table 11.

Table 11. Statistical processing of physical parameters for *weak clayey alluvial layer*

	Water content	**Plasticity index**	**Consistency index**	**Bulk unit weight**	**Saturated unit weight**	**Void ratio**	**Degree of saturation**	**Free swelling**	**Activity index**	**Liquidity index**
	w	**I_p**	**I_c**	**γ**	**γ_{sat}**	**e**	**S_r**	**U_L**	**I_A**	**I_L**
	[%]	**-**	**-**	**[kN/m^3]**	**[kN/m^3]**	**-**	**[%]**	**[%]**	**-**	**-**
No. sample	*4*	*4*	*4*	*4*	*4*	*4*	*4*	*3*	*4*	*4*
Min. value	18.93	11.88	0.59	18.64	19.69	0.68	74	50	0.38	0.34
Average value	19.70	16.28	0.62	18.92	19.83	0.70	77	63	0.50	0.38
Max. value	20.67	20.02	0.66	19.02	19.95	0.72	81	70	0.55	0.41

Given the physical parameters, the *weak clayey alluvial layer* has a low swelling potential (Fig. 22), and medium (Fig. 23) with maximal determinate value for free swelling **U_L = 70%**, and activity index **I_A = 0,55**, thus falling into the medium active category.

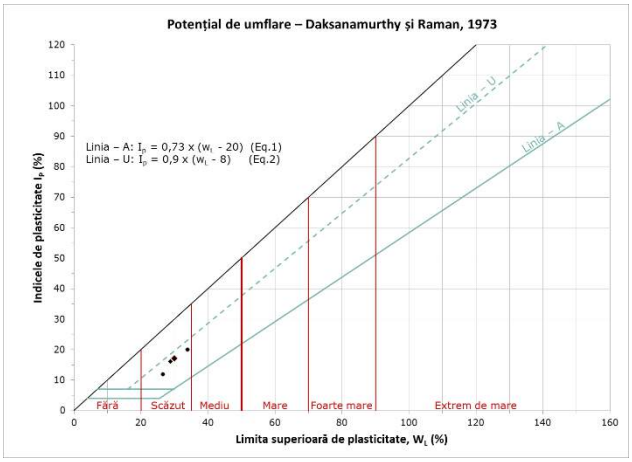


Fig. 22. Swelling potential Daksanamurthy, Raman [2] – *weak clayey alluvial layer*

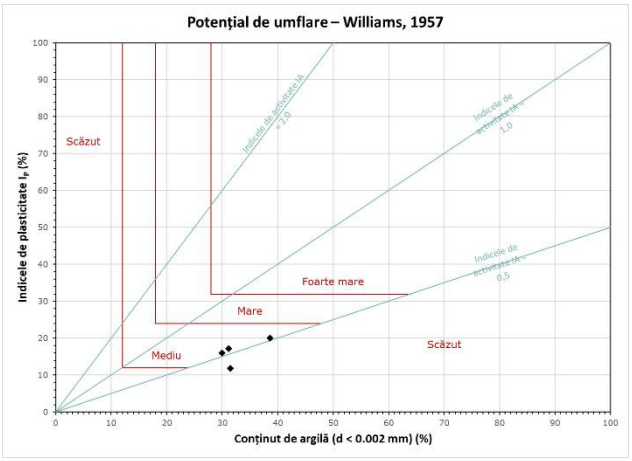


Fig. 23. Swelling potential Van Der Merwe [10] – *weak clayey alluvial layer*

To verify the real swelling potential, **swelling pressure** tests were made. The highest determined value is **5.00 kPa**, therefore the *weak clayey alluvial layer* **falls into the category of PUCM soils (swelling and contracting soils) with low activity.**

Statistically analyzed mechanical parameters for *weak clayey alluvial layer* are found in Table 12.

Table 12. Statistical processing of mechanical parameters for *weak clayey alluvial layer*

	Oedometric deformation modulus	**Swelling pressure**	**Effective angle of friction - peak**	**Effective cohesion - peak**	**Post-peak eff. angle of friction**	**Post-peak eff. Cohesion**	**Undrained shear strength – SPT**
	$E_{200-300}$	**p_u**	**ϕ'**	**c`**	**ϕ'_{pp}**	**c'_{pp}**	**c_{u_SPT}**
	[kPa]	**[kPa]**	**[°]**	**[kPa]**	**[°]**	**[kPa]**	**[kPa]**
No. sample	*3*	3	3	3	2	2	1
Min. value	6135	0.00	25.16	8.32	23.12	5.72	-
Average value	6218	2.13	26.56	13.94	24.73	6.69	90
Max. value	6309	5.00	27.32	22.08	26.33	7.66	-

4.2.3. Granular alluvial layer

The granular alluvial layer consists of *dense (D_R=65÷85%), brown sandy GRAVEL with cobble, locally with clayey intercalations/matrix* and *dense (DR=78%), yellowish-brown silty/clayey SAND with gravel.*

This layer was identified by all geotechnical boreholes from the depth of 2.30 ÷ 4.30 m from execution level. The actual thickness of granular layer is not precisely known, because the boreholes that intercepted were stopped in it.

The mechanical and physical parameters for this unit were obtained from in-situ test like standard penetration (SPT) and dynamic heavy penetration (DPH). The obtained results were statistically processed and will be presented in Table 13:

Table 13. Characteristic values for alluvial gravely layer

	Water content	**Bulk density**	**Relative density**	**Internal friction angle**	**Deformation modulus**
	w	**γ**	**D_R ***	**ϕ'***	**E_s ***
	[%]	**[kN/m^3]**	**[%]**	**[°]**	**[kPa]**
No. of samples	*5*	*9*	*9*	*9*	*9*
Vx	*0.297*	*0.037*	*0.124*	*0.060*	*0.372*
Min. value	7.89	19.77	56	34.00	10336
Average value	11.89	21.39	79	39.78	43565
Max. value	17.20	21.93	85	41.00	58680
$X_{k\ lower}$	8.53	20.90	73	38.29	33432
$X_{k\ upper}$	15.26	21.89	-	-	53698

**Values derived from SPT and DPH tests*

5. Assessment of geotechnical information

5.1. Recommended values of allowable bearing pressure according to NP112-2014

The allowable bearing pressure $\bar{p}_{conv}$ [kPa] presented in this chapter is in accordance with **Appendix D, NP 112-2014.** These values are valid for a foundation width of **B = 1.00 m** and a final depth of **D_f = 2.00 m**. For other dimensions of foundations, or other depths corrections factors according to the norm must be applied. The values for allowable bearing pressure were determinate based on plasticity index (I_P), consistency index (I_C) and void ratio (e).

Table 14. Allowable bearing pressure

Lithological complex	**recommended $\bar{p}_{conv}$ [kPa]**
Clayey alluvial layer	350
Weak clayey alluvial layer	250
Granular alluvial layer	550

This allowable bearing pressure can be used for **predesigning of foundation**, or even for **final design**, only if all conditions for **Table I4** from **NP112-2014** norm are respected. If conditions from Table I4 cannot be respected, the allowable bearing pressure must be determined according to **SR EN 1997-1-2004 and NP 112-2014**, based on bearing capacity of the soil and settlement limitations.

These allowable bearing pressures are used in general for foundation of buildings, and not for foundations of solar farms, but can be used without a problem if the conformation of a designed foundation is similar to one of a building.

5.2. Recommended values

Through this geotechnical report, for each intercepted lithostratigraphy layer were realized the statistical processing of laboratory results.

In accordance with NP074-2022, appendix C, chapter 2.4, paragraph g) during the geotechnical design, shall be determined and used the characteristic values and appropriated calculations of geotechnical parameters, based on the values presented in the geotechnical study, in accordance with NP 122. These values will be chosen depending on the designed geotechnical structure and the analyzed limit states.

The recommended values presented in Table 15 are values chosen in accordance with statistical processing and the observations during the geotechnical investigations (field descriptions, laboratory primary descriptions etc.), to provide an overview for the identified lithological layers.

Table 15. Recommended values

	Water content	Plasticity index	Consistency index	Bulk unit weight	Saturated unit weight	Void ratio	Degree of saturation	Free swelling	Oedometric deformation modulus	Swelling pressure	Effective angle of friction	Effective cohesion	Post-peak eff. angle of friction	Post-peak eff. cohesion	Undrained shear strength	Relative density	Internal friction angle	Linear deformation
	w	**I_p**	**I_c**	**γ**	**γ_{sat}**	**e**	**S_r**	**U_L**	**$E_{200-300}$**	**Pu**	**ϕ'**	**c`**	**ϕ'_{pp}**	**c'_{pp}**	**c_u**	**D_{R*}**	**φ'***	**E_{s*}**
	[%]	-	-	**[kN/m³]**	**[kN/m³]**	-	**[%]**	**[%]**	**[kPa]**	**[kPa]**	**[°]**	**[kPa]**	**[°]**	**[kPa]**	**[kPa]**	**[%]**	**[°]**	**[kPa]**
Alluvial layer	19	21	0,78	19,2	19,9	0,6	90	100	14700	9,4	27,5	27,4	26,8	18,3	-	-	-	-
Weak alluvial layer	20	16	0.6	18.9	19.8	0.7	77	70	6200	5	26.5	14	24.7	6	90	-	-	-
Granular alluvial layer	11	-	-	21.9*	-	-	-	-	-	-	-	-	-	-	-	73	38	53700

**Values derived from SPT and DPH tests*

5.3. Final classifications of geotechnical category

The final classification of geotechnical category is made in accordance with **NP 074 – 2022.** The final score for this phase of investigation is showed in Table 16.

Table 16. The final classification in geotechnical category (NP 074-2022)

Factors considered	Description	Reason	Score
Field conditions	Medium soils	Soils with low activity regarding swelling and contraction	3
Groundwater	No dewatering	Infiltration groundwater level 2.40 ÷ 6.0080 m	1
Classification of the construction according to its relevance category	Normal	In accordance with Terms of reference	3
Vicinities	Without risks	the proposed construction does not represent a risk for the neighbors	1
Geotechnical risk points corresponding to the seismic area, having the value of land acceleration for design a(g) defined in P100-1/2013 Code		$a_g < 0,15$	1
Total scoring			**9**
Geotechnical category			**1**

5.4. Framing land categories stipulated by the regulations relating to earth works

Framing the land for earth works is done according to Table 17:

Table 17. Land framing in estimate norms according to Romanian legislation - TS - MLPAT 1994

Soil type	Position in Guide	Manual excavation	Mechanized excavation	Medium bulk density (in excavation) kg/cm	Loosening after excavation%
Topsoil until 0,30 m depth	3	Easy	I	1200-1400	14-28
sandy CLAY with a maximum 10% gravel content	10	Hard	II	1600-1800	26-32
sandy GRAVEL	18	Hard	II	1750-2000	14-28
silty SAND	13	Medium	II	1500-1700	8-17
Clay in general	27	Very hard	II	1800-2000	24-30

5.5. Foundation conditions for future construction

The chapters below present the recommendations regarding the minimum foundation depth, the related foundation layer, and the foundation system for each work purpose.

Table 18. Depths / foundation layer

Minimum depth foundation Designed Ground Level	Foundation layer	Foundation system	Observations
-2,00 m (zone FS01, FS02, FS03)	*Weak clayey alluvial layer*	Direct foundation Continuous, isolated Depending on the structural system	Direct foundation on topsoil is not recommended A foundation depth between 1,1 m and 2,00 m can be chosen if mentions from NP126-2010 regarding foundations in seasonal variation zone are being respected.
-2,00 m (zone FS04, FS05, FS06, FS07)	*Clayey alluvial layer*		

** The clayey alluvial layer is considered a PUCM soil, so compliance with the provisions of the NP 126-10 norm – "Normative on the foundation of constructions on land with large swelling and contractions" will be pursued.*

Frost susceptibility evaluation and quality assessment of soils identified as terracing material

The classification of the intercepted soil types regarding frost susceptibility and quality as earthworks material was done for each identified lithology type according to **SR EN ISO 14688-1/ 2004, STAS 2914- 1984 and STAS 1709/ 2-90**. For lithologies where no samples were analyzed, the classification was based on field and laboratory description of the samples and on assimilation with similar samples for which laboratory analyses were performed.

Table 19. Frost susceptibility evaluation and quality assessment of soils identified as terracing material

ID	Layer tickness [m]	Lithostratigraphic units	Symbol	Soil quality as terracing material	Soil type	Frost sensibility
			STAS 2914- 1984		STAS 1709/ 2-90	
FS01	0.30	topsoil layer	4a/4d	Bad/Medium	P5	Very sensible
	2.10	weak clayey alluvial layer	4a	Medium	P5	Very sensible
	1.60	granular alluvial layer	3a/3b	Medium	P5	Very sensible
	4.00	granular alluvial layer	1b	Very good	P1	Insensitive
FS02	0.20	topsoil layer	4a/4d	Bad/Medium	P5	Very sensible
	3.40	weak clayey alluvial layer	4a	Medium	P5	Very sensible
	4.40	granular alluvial layer	1b	Very good	P1	Insensitive
FS03	0.30	topsoil layer	4a/4d	Bad/Medium	P5	Very sensible
	4.00	weak clayey alluvial layer	4b	Medium	P5	Very sensible
	3.70	granular alluvial layer	1b	Very good	P1	Insensitive
FS04+ DPH	0,80	topsoil layer	4a/4d	Bad/Medium	P5	Very sensible
	1,60	clayey alluvial layer	4a	Medium	P5	Very sensible
	1,40	granular alluvial layer	1b	Very good	P1	Insensitive
FS05+ DPH	0,70	topsoil layer	4a/4d	Bad/Medium	P5	Very sensible
	1,60	clayey alluvial layer	4b	Medium	P5	Very sensible
	1,20	granular alluvial layer	1b	Very good	P1	Insensitive
FS06+ DPH	3,00	topsoil layer	4a/4d	Bad/Medium	P5	Very sensible
	0,90	granular alluvial layer	1b	Very good	P1	Insensitive
FS07+ DPH	0,40	topsoil layer	4a/4d	Bad/Medium	P5	Very sensible
	2,80	clayey alluvial layer	4b	Medium	P5	Very sensible
	0,70	granular alluvial layer	1b	Very good	P1	Insensitive

5.5.1. Constructive measures in case of foundations at the minimum foundation depth (NP126-2010):

- The entering and leaving water pipes on the buildings shall be provided with elastic and watertight connections when crossing walls or foundations. It is advisable that inside the buildings the pipes will be mounted in the basement, respectively on the first level in the case of constructions are without a basement. So, they are accessible for the periodical control to be carried out, or for reparations that can be carried out as soon as any leakage is detected.
- Making airtight sidewalks around the buildings with a minimum width of 1.00 m, to be laid on a 20.0 cm thick layer of stabilized soil with a slope of 5% outwards. To be airtight, the pavement can be made of poured asphalt or stone or concrete slabs with cement mortar or bituminous mask.
- The building annexes (staircases, terraces, etc.) shall be found at the same depth as the respective constructions, to avoid their degradation due to different settlements or swelling from one point to another. Depending on the tendencies and possibilities of ground deformation by shrinkage or swelling, they will either be directly connected to the building by rigid tie or will be completely separated and treated independently.
- Drainage of surface water and landscaping of the surrounding land with outward drainage slopes. Roof drainage should be provided by downpipes, specially designed for this purpose, with secured outlets and preferably directly into the sewerage system. Vertical systematization measures should avoid stagnation of surface water at distances of less than 10,0 m around each building.

Constructive measures in case of foundation at a depth included in the seasonal humidity variation zone (NP126-2010) – The case of foundation at 1.50 m compared to stabilized ground surface:

- Making airtight sidewalks around the buildings with a minimum width of 1.50 m, to be laid on a 20.0 cm thick layer of stabilized soil.
- To reduce ground swelling, increase the effective pressure on the foundation to match the swelling pressure determined from multiple oedometric tests, without surpassing the ground's bearing capacity.
- The construction of supporting structures or constructive measures to take up the non-uniform loads or displacements caused by the moistening or drying of the foundation layer, such as the construction of steel reinforced concrete belts, continuous along the entire length of the exterior and interior walls, load bearing or load bearing, located at each level of the construction, including the base.

5.5.2. General recommendations for execution of foundations for future buildings

Recommendations for execution of excavations and supports.

When carrying out excavations for foundations, the following should be considered:

- maintaining the natural balance around the foundation pit or existing foundations for a sufficient distance so as not to jeopardize neighboring installations and constructions.
- When concrete is not poured into the foundation immediately after finishing the execution of the excavation, in water-sensitive soils, the digging will be stopped at a

higher elevation than the final elevation to prevent changes in the physical and mechanical characteristics of the layer under the base of the foundation.

The need to support the walls of the foundation excavations will be determined considering the depth of the excavation, the nature, homogeneity, stratification, cohesion, crack intensity, ground humidity, the groundwater flow rate, the weather and climatic conditions during the execution of the excavation works, and the execution technology adopted.

Excavations of long lengths for foundations shall be organized in such a way that, at any stage of work, the bottom of the excavation is inclined to one or more points, to ensure water collection during execution.

It will be considered that the exhaust works do not produce changes in the stability of the earth massifs in their area of influence, or damage due to the underside of the neighboring installations, constructions and building elements.

Collection wells shall not be placed under the foundations of buildings or heavy machinery or plants for drainage purposes.

Excavations to be carried out with excavators may not exceed the designed excavation profile in any case. For this purpose, the excavation should stop 20-30 cm above the final excavation profile, the difference being executed with other mechanical equipment (bulldozers, rakes) or manually.

In the case of water sensitive surfaces, the foundation excavation shall stop at a higher level than the one specified in the project, as follows:

- for fine sands 0,20 to 0,30 m.
- for clayey soils 0,15 to 0,25 m.
- for wetting sensitive soil 0,40 to 0,50 m.

Digging and finishing this layer will be done immediately before the start of the execution of the foundation.

In case of shallow wetting, due to unforeseen atmospheric precipitation, the bottom of the foundation pit should be allowed to wrinkle before the start of work on the execution of the foundation (concreting), and if the wetting is strong, the mud layer will be removed.

In case of excavations near existing or ongoing constructions, special measures will be provided by the project to ensure their stability (support for existing foundations or constructions, underbuilding in case of deeper excavations, etc.).

If these works have been omitted from the project, the contractor is not absolved of the obligation to investigate the existing foundations and immediately take measures to ensure the stability of these constructions, immediately notifying the beneficiary and the designer of the work to establish the appropriate measures.

Excavations above groundwater level with unsupported vertical walls

Excavations with unsupported vertical walls can be carried out with depths up to:

- 0,75 m in the case of non-cohesive and weakly cohesive soils.
- 1,25 m for medium cohesion soil.
- 2,00 m for very cohesive soil.

In the case of excavations with unsupported vertical walls, the following measures shall be taken to maintain the stability of the banks:

- The land around the excavation is not allowed to be loaded and does not suffer vibration.
- The soil resulting from digging should not be deposited at less than 1,00 m from the edge of the foundation pit; for excavations up to 1.00 m deep, the distance can be taken equal to the depth of the excavation.
- Measures shall be taken to remove rapidly the rainwater or accidental waters.
- If, for unforeseen reasons, the foundations are not poured immediately after excavation has been completed and phenomena indicating a danger of subsidence are observed, measures will be taken to support the wall in the area in question or to convert them into walls with a slope.

The constructor is obliged to monitor the appearance and development of longitudinal cracks parallel to the edge of the excavation which may indicate the beginning of bank subsidence and to take measures to prevent accidents.

Excavations above groundwater level with walls in the slope

These excavations can be carried out in any kind of terrain under the following conditions:

- The soil has a natural humidity of 12-18% and conditions are provided so that it does not grow.
- foundation excavation does not stay open for long.

Table 20. Bank slope depending on depth.

Nature of soil	up to 3 m	greater than 3 m
tg B = h/b		tg B = h/b
sand, gravel	1/1,25	1/1,50
clayey sand	1/0,67	1/1
sandy clay	1/0,67	1/0,75
clay	1/0,50	1/0,67
loess	1/0,50	1/0,75

In the rest of the cases, excavations can only be done under the protection of supports.

5.5.3. Design of surface foundations

The following boundary conditions must be considered in the geotechnical design of surface foundations:

A) GEO-type ultimate limit states, characterized by:

- loss of general stability.

- exhaustion of bearing capacity, failure by punching.
- failure by sliding.
- combined ground failure.
- combined failure in ground and structure.

B) The STR-type ultimate limit state, characterized by large, amortized displacements of the foundations, may manifest in structural failure.

At the ultimate limit state, the design model should simulate the failure mechanism as best as possible:

- For the calculation of the bearing capacity, the method based on an analytical calculation model presented in Annex F to NP 112 is used.
- For the verification against failure by sloping on the base, which must be carried out when the loading is not normal on the base of the foundation, the method presented in point. I.6.2 of NP 112.

C) Limit states of service may be manifested by:

- excessive settlement.
- excessive ground lift due to swelling, frost, and other causes.
- unacceptable vibration.

At the limit state of operation, a settlement calculation is required. The calculation methods used are:

- The method of cumulated settlement on elementary layers (Appendix H to NP 112).
- Methods based on solutions from elasticity theory for the calculation of settlement (Appendix F to SR EN 1997-1), respectively for the calculation of the slope of rectangular, circular, or continuous foundations (Appendix H to NP 112).

When executing the works, the dispositions of the current legislation regarding the quality, durability, stability, and safety in functioning of constructions and installations related to Law no. 10/1995 will be respected.

6. Bibliography

[1] Băcilă, I. et. all, 1979. Geologie inginerească - Vol I., editura Tehnică București.

[2] Daksanamurty, V., Raman, V., 1973. A simple method of identifying an expansive soil. Soils and Foundation, Jap. Soc. Soil Mech. Found. Eng., 13(1):97-104.

[3] Filipescu, S. 2011. Cenozoic lithostratigraphic units in Transylvania. In: Bucur I. & Săsăran E. (eds.)- Calcareous algae from Romanian Carpathians. Field trip Guidebook. Presa Universitară Clujeană.

[4] Krézsek, Cs., Bally, A.W. 2006. The Transylvanian Basin (Romania) and its relation to the Carpathian fold and thrust belt: Insights in gravitational salt tectonics. Marine and Petroleum Geology, volume 23, issue 4, pp. 405-442.

[5] Păunescu, M., Pop, V., Silion, T., 1982, Geotehnică și Fundații, Editura Didactică și Pedagogică, București.

[6] Popa, A., Ilieș, N.M., 2012. Fundații, Editura Casa Cărții de Știință, Cluj-Napoca, p. 307-309.

[7] Posea, G., 2005. Geomorfologie României. Relief: tipuri, geneză, evoluție, regionare. Ediţia a II-a - Bucureşti, Editura Fundaţiei România de Mâine.

[8] Raileanu. Gr., Rădulescu. D., Marinescu. Fl., Peltz. S. 1967. Explanatory note to the Geological Map of Romania. Scale 1:200,000, sheet L-35-VII, Bistrița. State Committee of Geology. Geological Institute. Bucharest.

[9] Roman, F., 2011. Aplicații de inginerie geotehnică, Editura Papyrus Print, Cluj-Napoca, p 19.

[10] Van Der Merwe, D.H. 1975. Contribution to Specialty Session B, Current Theory and Practice for Building on Expansive Clays. Proceedings of the 6th Regional Conference for Africa on Soil Mechanics and Foundation Engineering, Durban, 2:166-167.

ANEXA 1

CONȚINUT:

- *Tema pentru elaborarea studiului geotehnic*

TERMS OF REFERENCE

to perform geological surveys for Glodeni 2 Solar power plant in Romania:

List of basic data and requirements	Basic data and scope of requirements
1. Full name of the object	Glodeni 2 Solar Farm 49.9 MW AC
2. Location of the object (by administrative division)	Municipality Voivodeni and Glodeni, County Mures, Romania
3. The customer	DTEK RENEWABLES INTERNATIONAL B.V..
4. Design stage	Proiect Tehnic (P.T.) stage Detalii de Executie (D.E.) stage
5. Information on the availability of materials of engineering and geological surveys of previous years	Provided by the Customer. There is a geotechnical report for Glodeni Solar Farm, Glodeni village, Mures county and for SS Glodeni 110/33kV (Cadastral number is 50606), performed by SAIDEL Engineering SA in 2023.
6. Special requirements for research results	<u>Solar farm:</u> It is planned to drill boreholes with total quantity 60 psc. The depth of each borehole is up to 5 m below ground level, evenly distributed over the site with a grid pattern with points at not more than 150 m distance. In case no stable soil is identified after 5 m, the drilling shall be extended until stable soil is detected. The number of samples should be -2 undisturbed samples, 2 disturbed samples but not less than three samples for each geological layer. On undisturbed samples, also the flooded test for determination of the Loess layers shall be carried out (if any). <u>Access Roads:</u> For the investigation of the solar plant access roads, it is necessary to carry out one drilling of at least 500 m, so we have 3 drillings. These drillings shall reach a depth of 5 m, and 2 disturbed soil samples shall be taken from each drilling but not less than two samples for each geological layer. <u>The SPP Substation (Cadastral number is 50605):</u> In the area of The SPP Substation three boreholes of 8 m depth with disturbed and undisturbed samples (2 undisturbed samples, 2 disturbed samples but not less than three samples for each geological layer). **The exact locations of boreholes and should be clarified and agreed with the Customer before execution of works.** <u>General requirements to Geotechnical survey:</u>

	- Perform for each layer of soil at least three times the full set of physical and mechanical properties of soils with shear and compression tests, as well as the list but not limited to: ✓ Natural humidity (W) ✓ Plasticity index (Ip) ✓ Plastic limit (Wp) ✓ Liquidity index (I_L) at natural humidity and full water-saturated state ✓ Liquidity limit (wL). ✓ Soil void ratio (e) ✓ Degree of humidity (Sr) ✓ Density (ρI, ρII) ✓ Density of dry soil (ρd) ✓ Static modulus of deformation (E) ✓ Angle of shearing of soil (ϕI, ϕII) ✓ Ground cohesion (cI, cII) - For soils with special properties (if any) additionally determine (depending on the properties), but not limited to: ✓ Relative swelling deformation (Esw) ✓ Humidity relative swelling deformation (Wsw) ✓ Soil swelling pressure (Psw) ✓ Initial subsidence pressure of forest-like subsidence soil (Psl) ✓ The angle of internal friction of water-saturated forest-like subsidence soil (ϕsat) ✓ Specific adhesion of water-saturated forest-like subsidence soil (Csat) ✓ Module of deformation of water-saturated forest-like subsidence soil (Esat) ✓ Other physical and mechanical properties in a state of complete water saturation ✓ Provide a calculation of the type of soil conditions for subsidence - Perform a standard chemical analysis of groundwater (if available) and chemical analysis of water extract from the soil (soil aggressiveness) of at least 10 samples at Solar Farm plot and at least 3 samples of groundwater at SS plot in order to determine its aggressiveness on concrete and metal. Soil and groundwater corrosion tests: • Specific electrical resistance of the soil (Electrical Resistivity) • Oxidation-Reduction Potential(ORP) • Chloride content (Cl) • Sulfide content (S2-) • Sulfate content (SO4) • Sulphate and chloride concentration in H2O-extract • Sulphate concentration in the HCl-extract • Redox potential • Acid and base capacity • pH (H2O)

	• other, required by national standards Define the soil corrosivity class by I, II III according to follow the norm DIN 50929-3:2018-03 or other local requirements. Indicate groundwater chemical aggressiveness on concrete and metal, according to SR 13510:2006. - Make engineering - geological sections according to geological research to make decisions on the location and design of roads and transformers foundations; - Provide recommendations on the types of foundations, the depth of their laying, types of earthworks, etc.
7. Special requirements for documentation	The geotechnical report shall be split into two parts; the first part is written in English language and shall contain a short description of the field campaign, the measured results and the recommendations and findings for the foundation design. The second part, which is written in English and in Romanian language, will contain all the detailed results like drillings logs, sounding profiles, laboratory soil test, etc. pp. The second report will be already proofed and verified by a Romanian geotechnical expert, who is allowed to check and stamp the report. All graphic documents must be provided to the Customer in the *.dwg format

Annexes:

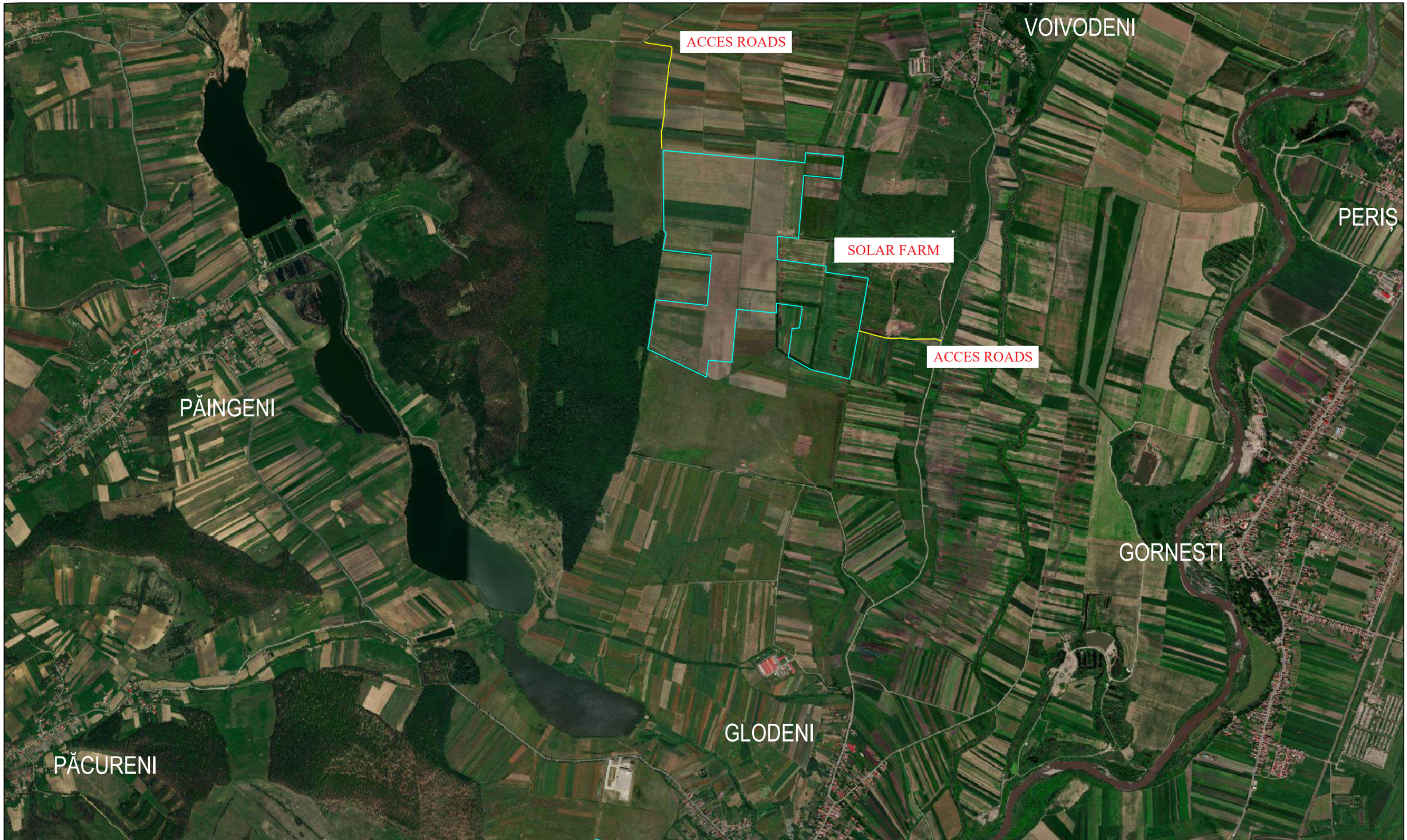
1 Solar Plant Map.

2 Topographic plan with boreholes at the Substations

APPENDIX 2

Content

- *General Plan*



GeoSearch
loc. Rădaia, com. Baciu, nr. 49, corp A., E-81, jud. Cluj
J12/1280, CUI RO18573868
office@geosearch.ro

specification	name and surename	signature	scale: 1:20000
project manager	geol. Andrea FANGLI		date: 03.2025
designed	ing. Ioan CRIȘAN		

Client: S.C. GLODENI ENERGY S.R.L.

Project no: 3140LGS

Project title:
Construction of an electricity storage facility and connection to CEF Glodeni 1, in Glodeni, Mures County
Glodeni municipality, CF 50604, 52635, 52833, Mureș county, România

Phase: P.Th D.E.

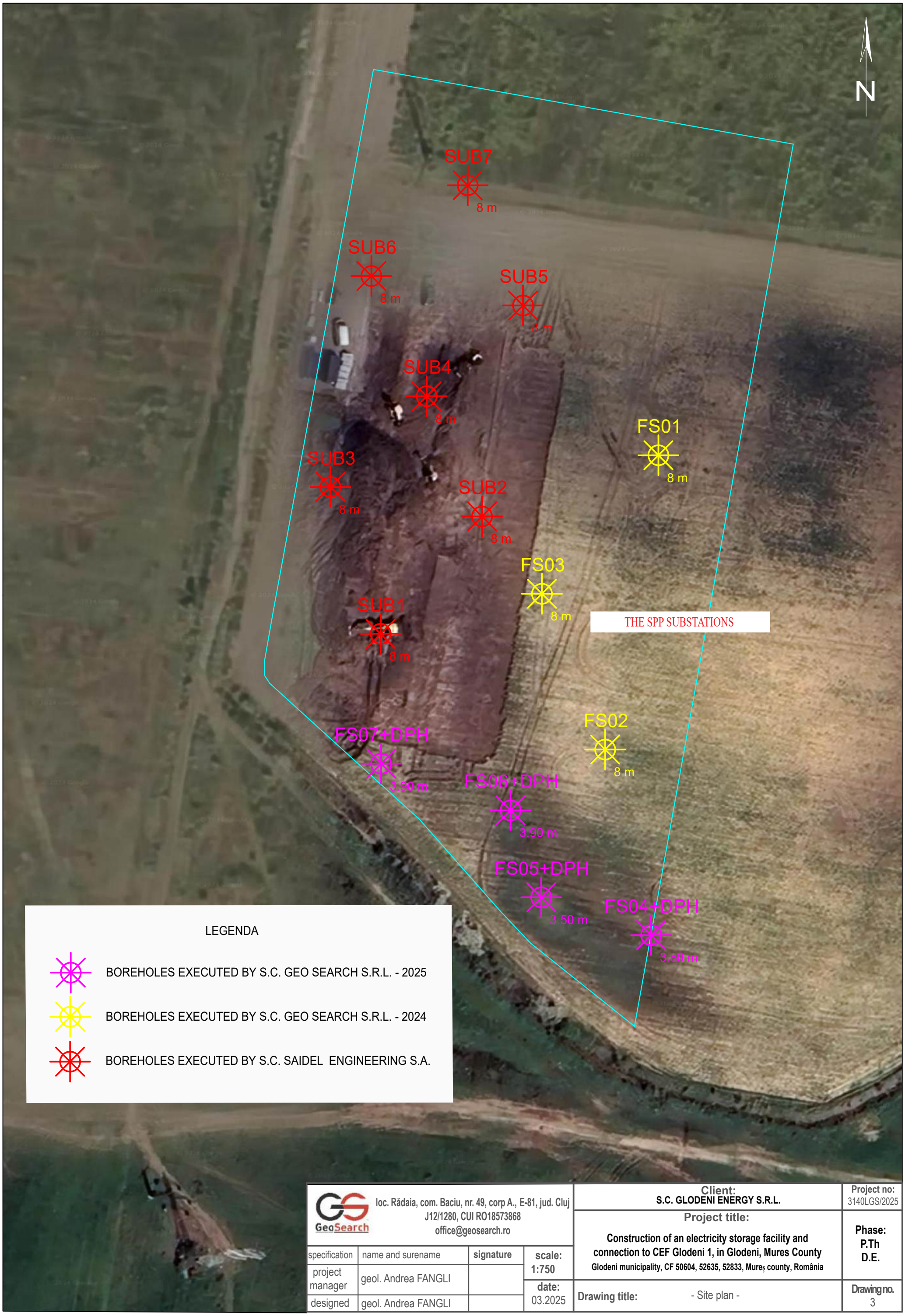
Drawing title: - General plan -

Drawing no. 1

APPENDIX 3

Content

- *Site Plan*



GeoSearch
loc. Rădaia, com. Baciu, nr. 49, corp A., E-81, jud. Cluj
J12/1280, CUI RO18573868
office@geosearch.ro

specification	name and surename	signature	scale: 1:750
project manager	geol. Andrea FANGLI		
designed	geol. Andrea FANGLI		date: 03.2025

Client: S.C. GLODENI ENERGY S.R.L.

Project title:
Construction of an electricity storage facility and connection to CEF Glodeni 1, in Glodeni, Mures County
Glodeni municipality, CF 50604, 52635, 52833, Mureș county, România

Drawing title: - Site plan -

Project no: 3140LGS/2025

Phase: P.Th D.E.

Drawing no. 3

APPENDIX 4

CONTENT:

- *Borehole logs and columns*

COORD. (STEREO 70, Marea Neagră)			FIȘA FORAJULUI NR. / BOREHOLE LOG NO.: FS01	COD / CODE: 2819LGS/2024
X: 469296.3	Y: 573030.76	Z: 362.0 m	CLIENT: S.C. GLODENI ENERGY S.R.L.	
DATA ÎNCEPERE START DATE	DATA FINALIZARE FINISH DATE		PROIECT/PROJECT: Construction of an electricity storage facility and connection to CEF Glodeni 1, in Glodeni, Mures County	
25-Jan-2024	25-Jan-2024		AMPLASAMENT/ LOCATION: Glodeni municipality, CF 50604, 52635, 52833, Mureș county, România	

Scara/Scale: 1:100

Adâncime/Depth	Cotă/Elevation	Complex geotehnic Geotechnical unit	Nivel apă/Groundwater level	SPT – N60	Descriere detaliată Layer description	Cod probă Sample code	Argilă Clay	Praf Silt	Nisip Sand	Pietriș Gravel	Umiditate naturală Water content	Limita de curgere Liquid limit	Limita de plasticitate Plastic limit	Indice de plasticitate Plasticity index	Indice de consistență Consistency index	Greutatea vol. naturală Bulk unit weight	Indicele porilor Void ratio	Gradul de saturație Degree of saturation	Umflarea liberă Free swelling	Unghi de forfecare internă efectiv Effective angle of friction	Coeziune efectivă Effective cohesion	Unghi de forf. int. ef. post-cedare Post-peak eff. angle of friction	Coeziune efectivă post-cedare Post-peak eff. cohesion	Modul edometric (200 kPa-300 kPa) Oed. modulus (200 kPa-300 kPa)	Presiunea de umflare Swelling pressure	Rez. la forfecare nedrenată Undrained shear strength	Rez. la forfecare nedrenată - SPT Undrained shear strength - SPT	Unghi de forfecare internă ef. - SPT Effective angle of friction - SPT	Modul de deformație linear - SPT Soil modulus - SPT	Grad de îndesare Relative density
–	–					–	Cl %	Si %	Sa %	Gr %	w %	wL %	wP %	Ip %	Ic –	γ kN/m3	e –	Sr %	UL %	φ °	c kPa	φpc °	cpc kPa	M2-3 MPa	pu kPa	cu kPa	cu-SPT kPa	φ-SPT °	Es MPa	ID %
0	362	ts			0.0 – 0.3m: TOPSOIL: firm, brown sandy silty CLAY																										
					0.3 – 2.4m: firm, low plasticity yellowish-brown sandy CLAY																										
1	361	w-cl-al																													
2	360		NAS 2.4			42672	31.15	25.42	43.18	0.25	19.62	29.93	12.78	17.15	0.6	18.64	0.72	74	50	27.32	8.32	26.33	5.72	6.2	0.0	–	–	–	–	–
				17.3	2.4 – 4.0m: low plasticity, yellowish-brown clayey SAND with gravel	–	–	–	–	–	–	–	–	–	–	19.77*	–	–	–	–	–	–	–	–	–	–	–	31.3	10.3	56
3	359	gr-al																													
4	358					42674	14.22	16.45	44.28	25.05	17.2	–	–	–	–	20.28	0.55	85	–	–	–	–	–	–	–	–	–	–	–	–	–
				59.2	4.0 – 8.0m: very dense (DR=85%), brown sandy silty GRAVEL with cobble	–	–	–	–	–	–	–	–	–	–	21.92*	–	–	–	–	–	–	–	–	–	–	–	41.0	58.7	85
5	357																														
6	356	gr-al				42675	5.4	8.39	23.63	62.58	7.89	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
7	355																														
8																															

Bază foraj/Total depth: 8.0 m

Observații/Notes: *Valori derivate din încercarea SPT/SPT derived values

S.C. GeoSearch S.R.L. CLUJ - ROMÂNIA

Întocmit/Made by: geol. Andrea Fangli

Format/Size: A4

COORD. (STEREO 70, Marea Neagră)			FIȘA FORAJULUI NR. / BOREHOLE LOG NO.: FS02	COD / CODE: 2819LGS/2024
X: 469284.24	Y: 572964.02	Z: 361.5 m	CLIENT: S.C. GLODENI ENERGY S.R.L.	
DATA ÎNCEPERE START DATE	DATA FINALIZARE FINISH DATE		PROIECT/PROJECT: Construction of an electricity storage facility and connection to CEF Glodeni 1, in Glodeni, Mures County	
25-Jan-2024	25-Jan-2024		AMPLASAMENT/ LOCATION: Glodeni municipality, CF 50604, 52635, 52833, Mureș county, România	

Scara/Scale: 1:100

Adâncime/Depth Cotă/Elevation	Complex geotehnic Geotechnical unit	Nivel apă/Groundwater level	SPT – N60	Descriere detaliată Layer description	Cod probă Sample code	Argilă Clay	Praf Silt	Nisip Sand	Pietriș Gravel	Umiditate naturală Water content	Limita de curgere Liquid limit	Limita de plasticitate Plastic limit	Indice de plasticitate Plasticity index	Indice de consistență Consistency index	Greutatea vol. naturală Bulk unit weight	Indicele porilor Void ratio	Gradul de saturație Degree of saturation	Umflarea liberă Free swelling	Unghi de forfecare internă efectiv Effective angle of friction	Coeziune efectivă Effective cohesion	Unghi de forf. int. ef. post-cedare Post-peak eff. angle of friction	Coeziune efectivă post-cedare Post-peak eff. cohesion	Modul edometric (200 kPa-300 kPa) Oed. modulus (200 kPa-300 kPa)	Presiunea de umflare Swelling pressure	Rez. la forfecare nedrenată Undrained shear strength	Rez. la forfecare nedrenată - SPT Undrained shear strength - SPT	Unghi de forfecare internă ef. - SPT Effective angle of friction - SPT	Modul de deformație linear - SPT Soil modulus - SPT	Grad de îndesare Relative density
–	–				–	Cl	Si	Sa	Gr	w	wL	wP	Ip	Ic	γ	e	Sr	UL	φ	c	φpc	cpc	M2-3	pu	cu	cu-SPT	φ-SPT	Es	ID
						%	%	%	%	%	%	%	%	–	kN/m3	–	%	%	°	kPa	°	kPa	MPa	kPa	kPa	kPa	°	MPa	%
0																													
361	ts			0.0 – 0.2m: TOPSOIL: firm, brown sandy silty CLAY																									
1				0.2 – 3.6m: firm, low plasticity, yellowish-brown, locally greyish sandy CLAY																									
360					42677	31.47	23.55	43.87	1.11	19.56	26.55	14.67	11.88	0.59	18.99	0.69	77	70	27.2	22.08	–	–	6.3	1.4	–	–	–	–	–
2	w-cl-al		19.8		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
359					42679	29.95	22.52	47.53	0.0	18.93	28.84	12.79	16.05	0.62	19.02	0.68	76	–	–	–	–	–	–	–	–	–	–	–	–
3																													
358																													
4			56.6	3.6 – 8.0m: very dense (DR=85%), yellowis-brown sandy GARVEL with cobble and locally with brown sandy clayey/clayey sandy intercalations	–	–	–	–	–	–	–	–	–	–	21.92*	–	–	–	–	–	–	–	–	–	–	41.0	56.3	85
357																													
5																													
356																													
6	gr-al		51.3		–	–	–	–	–	–	–	–	–	–	21.92*	–	–	–	–	–	–	–	–	–	–	41.0	51.6	85
355																													
7																													
354					42682	5.77	3.92	28.19	62.12	13.31	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
8																													

Bază foraj/Total depth: 8.0 m

Observații/Notes: *Valori derivate din încercarea SPT/SPT derived values

Întocmit/Made by: geol. Andrea Fangli

Format/Size: A4

COORD. (STEREO 70, Marea Neagră)			FIȘA FORAJULUI NR. / BOREHOLE LOG NO.: FS03	COD / CODE: 2819LGS/2024
X: 469269.91	Y: 572999.35	Z: 362.0 m	CLIENT: S.C. GLODENI ENERGY S.R.L.	
DATA ÎNCEPERE START DATE	DATA FINALIZARE FINISH DATE		PROIECT/PROJECT: Construction of an electricity storage facility and connection to CEF Glodeni 1, in Glodeni, Mures County	
25-Jan-2024	25-Jan-2024		AMPLASAMENT/ LOCATION: Glodeni municipality, CF 50604, 52635, 52833, Mureș county, România	

Scara/Scale: 1:100

Adâncime/Depth	Cotă/Elevation	Complex geotehnic / Geotechnical unit	Nivel apă/Groundwater level	SPT – N60	Descriere detaliată / Layer description	Cod probă / Sample code	Argilă / Clay %	Praf / Silt %	Nisip / Sand %	Pietriș / Gravel %	Umiditate naturală / Water content %	Limita de curgere / Liquid limit %	Limita de plasticitate / Plastic limit %	Indice de plasticitate / Plasticity index %	Indice de consistență / Consistency index –	Greutatea vol. naturală / Bulk unit weight kN/m3	Indicele porilor / Void ratio –	Gradul de saturație / Degree of saturation %	Umflarea liberă / Free swelling %	Unghi de forfecare internă efectiv / Effective angle of friction °	Coeziune efectivă / Effective cohesion kPa	Unghi de forf. int. ef. post-cedare / Post-peak eff. angle of friction °	Coeziune efectivă post-cedare / Post-peak eff. cohesion kPa	Modul edometric (200 kPa-300 kPa) / Oed. modulus (200 kPa-300 kPa) M2-3 MPa	Presiunea de umflare / Swelling pressure pu kPa	Rez. la forfecare nedrenată / Undrained shear strength cu kPa	Rez. la forfecare nedrenată - SPT / Undrained shear strength - SPT cu-SPT kPa	Unghi de forfecare internă ef. - SPT / Effective angle of friction - SPT φ-SPT °	Modul de deformație linear - SPT / Soil modulus - SPT Es MPa	Grad de îndesare / Relative density ID %
						–	Cl %	Si %	Sa %	Gr %	w %	wL %	wP %	Ip %	Ic –	γ kN/m3	e –	Sr %	UL %	φ °	c kPa	φpc °	cpc kPa	M2-3 MPa	pu kPa	cu kPa	cu-SPT kPa	φ-SPT °	Es MPa	ID %
0	362	ts			0.0 – 0.3m: TOPSOIL: firm, brown sandy silty CLAY																										
					0.3 – 4.3m: firm, locally soft, low plasticity, yellowish-brown sandy CLAY																										
1	361					42685	38.57	25.44	35.88	0.11	20.67	33.84	13.82	20.02	0.66	19.02	0.7	81	70	25.16	11.42	23.12	7.66	6.1	5.0	–	–	–	–	–
				14.4		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	90.0	–	–	–
2	360	w-cl-al																												
3	359																													
				34.7		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
4	358																													
					4.3 – 8.0m: dense (DR=82%), GRAVEL and cobble in yellowish-brown silty sandy matrix with clayey intercalations																										
5	357					42689	9.27	9.58	24.5	56.65	10.22	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
6	356	gr-al																												
				47.9		–	–	–	–	–	–	–	–	–	–	21.93*	–	–	–	–	–	–	–	–	–	–	–	41.0	48.5	82
7	355																													
8																														

Bază foraj/Total depth: 8.0 m

Observații/Notes: *Valori derivate din încercarea SPT/SPT derived values

Întocmit/Made by: geol. Andrea Fangli

Format/Size: A4

FS01

FS02

FS03

COORD. (STEREO 70, Marea Neagră)			FIȘA FORAJULUI NR. / BOREHOLE LOG NO.: FS04+DPH	COD / CODE: 3140LGS/2025
X: 469294.65	Y: 572921.94	Z: –	CLIENT: S.C. GLODENI ENERGY S.R.L.	
DATA ÎNCEPERE START DATE	DATA FINALIZARE FINISH DATE		PROIECT/PROJECT: Construction of an electricity storage facility and connection to CEF Glodeni 1, in Glodeni, Mures County	
21-Mar-2025	21-Mar-2025		AMPLASAMENT/ LOCATION: Glodeni municipality, CF 50604, 52635, 52833, Mureș county, România	

Scara/Scale: 1:100

Adâncime/Depth	Cotă/Elevation	Complex geotehnic	Geotechnical unit	Nivel apă/Groundwater level	SPT – N60	Descriere detaliată / Layer description	Cod probă / Sample code	Suma totală părți fine ≤0,063 mm / Total of fine particles ≤0,063 mm	Argilă / Clay	Praf / Silt	Nisip / Sand	Pietriș / Gravel	Umiditate naturală / Water content	Limita de curgere / Liquid limit	Limita de plasticitate / Plastic limit	Indice de plasticitate / Plasticity index	Indice de consistență / Consistency index	Greutatea vol. naturală / Bulk unit weight	Greutatea volumică în stare saturată / Saturated unit weight	Indicele porilor / Void ratio	Gradul de saturație / Degree of saturation	Umflarea liberă / Free swelling	Modul edometric (200-300 kPa) / Oed. modulus (200-300 kPa)	Presiunea de umflare / Swelling pressure	Unghi de forf. int. efectiv / Effective angle of friction	Coeziune efectivă / Effective cohesion	Unghi de forf. int. ef. post-cedare / Post-peak eff. angle of friction	Coeziune efectivă post-cedare / Post-peak eff. cohesion	Modul de def. linear / Soil modulus	Unghi de forfecare internă ef. - SPT / Effective angle of friction - SPT	Grad de îndesare / Relative density
							–	fine	Cl	Si	Sa	Gr	w	wL	wP	Ip	Ic	γ	γsat	e	Sr	UL	M2-3	pu	φ	c	φpc	cpc	Es	φ-SPT	ID
							–	%	%	%	%	%	%	%	%	%	–	kN/m3	kN/m3	–	%	%	kPa	kPa	°	kPa	°	kPa	kPa	°	%
0																																
1	Fără cotă / Without elevation	ts				0.0 – 0.8m: TOPSOIL: firm, brown sandy silty CLAY																												
2		cl-al-ly				0.8 – 2.4m: stiff, low plasticity, greyish-reddish-brown sandy CLAY, locally gravel intercalations	47589	–	30.91	24.6	43.62	0.87	14.79	28.37	12.69	15.68	0.87	19.58	20.56	0.55	73	60	–	–	–	–	–	–	–	–
							47590	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	25.53	35.34	24.81	28.46	–	–	–
3		gr-al-ly				2.4 – 3.8m: dense (DR=78%), yellowish-brown silty SAND with gravel. Extrapolated based on DPH tests, executed in the follow-up of borehole	47597	–	11.26	11.64	49.93	27.17	10.85	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Bază foraj/Total depth: 3.8 m

Întocmit/Made by: geol. Andrea Fangli

Format/Size: A4

COORD. (STEREO 70, Marea Neagră)			FIȘA FORAJULUI NR. / BOREHOLE LOG NO.: FS05+DPH	COD / CODE: 3140LGS/2025
X: 469269.75	Y: 572930.51	Z: –	CLIENT: S.C. GLODENI ENERGY S.R.L.	
DATA ÎNCEPERE START DATE	DATA FINALIZARE FINISH DATE		PROIECT/PROJECT: Construction of an electricity storage facility and connection to CEF Glodeni 1, in Glodeni, Mures County	
21-Mar-2025	21-Mar-2025		AMPLASAMENT/ LOCATION: Glodeni municipality, CF 50604, 52635, 52833, Mureș county, România	

Scara/Scale: 1:100

Adâncime/Depth Cotă/Elevation	Complex geotehnic Geotechnical unit	Nivel apă/Groundwater level	SPT – N60	Descriere detaliată Layer description	Cod probă Sample code	Suma totală părți fine ≤0,063 mm Total of fine particles ≤0,063 mm	Argilă Clay	Praf Silt	Nisip Sand	Pietriș Gravel	Umiditate naturală Water content	Limita de curgere Liquid limit	Limita de plasticitate Plastic limit	Indice de plasticitate Plasticity index	Indice de consistență Consistency index	Greutatea vol. naturală Bulk unit weight	Greutatea volumică în stare saturată Saturated unit weight	Indicele porilor Void ratio	Gradul de saturație Degree of saturation	Umflarea liberă Free swelling	Modul edometric (200-300 kPa) Oed. modulus (200-300 kPa)	Presiunea de umflare Swelling pressure	Unghi de forf. int. efectiv Effective angle of friction	Coeziune efectivă Effective cohesion	Unghi de forf. int. ef. post-cedare Post-peak eff. angle of friction	Coeziune efectivă post-cedare Post-peak eff. cohesion	Modul de def. linear Soil modulus	Unghi de forfecare internă ef. - SPT Effective angle of friction - SPT	Grad de îndesare Relative density
					–	fine	Cl	Si	Sa	Gr	w	wL	wP	Ip	Ic	γ	γsat	e	Sr	UL	M2-3	pu	φ	c	φpc	cpc	Es	φ-SPT	ID
					–	%	%	%	%	%	%	%	%	%	–	kN/m3	kN/m3	–	%	%	kPa	kPa	°	kPa	°	kPa	kPa	°	%
0																														
1	ts			0.0 – 0.7m: TOPSOIL: brown sandy clay with vegetal reamins																										
	cl-al-ly			0.7 – 2.3m: stiff, medium plasticity, greyish-brown sandy CLAY, locally gravel intercalations	47591	–	40.12	25.01	31.73	3.14	20.37	38.37	15.27	23.1	0.78	19.57	20.03	0.62	88	80	–	–	–	–	–	–	–	–	–
2					47592	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	14286	0.4	–	–	–	–	–	–	–
3	gr-al-ly			2.3 – 3.5m: dense (DR=85%), brown sandy GRAVEL. Extrapolated based on DPH tests, executed in the follow-up of borehole																										

Fără cotă / Without elevation

Bază foraj/Total depth: 3.5 m

Întocmit/Made by: geol. Andrea Fangli

Format/Size: A4

COORD. (STEREO 70, Marea Neagră)			FIȘA FORAJULUI NR. / BOREHOLE LOG NO.: FS06+DPH	COD / CODE: 3140LGS/2025
X: 469262.8	Y: 572950.22	Z: –	CLIENT: S.C. GLODENI ENERGY S.R.L.	
DATA ÎNCEPERE START DATE	DATA FINALIZARE FINISH DATE		PROIECT/PROJECT: Construction of an electricity storage facility and connection to CEF Glodeni 1, in Glodeni, Mures County	
21-Mar-2025	21-Mar-2025		AMPLASAMENT/ LOCATION: Glodeni municipality, CF 50604, 52635, 52833, Mureș county, România	

Scara/Scale: 1:100

Adâncime/Depth	Cotă/Elevation	Complex geotehnic	Geotechnical unit	Nivel apă/Groundwater level	SPT – N60	Descriere detaliată / Layer description	Cod probă / Sample code	Suma totală părți fine ≤0,063 mm / Total of fine particles ≤0,063 mm	Argilă / Clay	Praf / Silt	Nisip / Sand	Pietriș / Gravel	Umiditate naturală / Water content	Limita de curgere / Liquid limit	Limita de plasticitate / Plastic limit	Indice de plasticitate / Plasticity index	Indice de consistență / Consistency index	Greutatea vol. naturală / Bulk unit weight	Greutatea volumică în stare saturată / Saturated unit weight	Indicele porilor / Void ratio	Gradul de saturație / Degree of saturation	Umflarea liberă / Free swelling	Modul edometric (200-300 kPa) / Oed. modulus (200-300 kPa)	Presiunea de umflare / Swelling pressure	Unghi de forf. int. efectiv / Effective angle of friction	Coeziune efectivă / Effective cohesion	Unghi de forf. int. ef. post-cedare / Post-peak eff. angle of friction	Coeziune efectivă post-cedare / Post-peak eff. cohesion	Modul de def. linear / Soil modulus	Unghi de forfecare internă ef. - SPT / Effective angle of friction - SPT	Grad de îndesare / Relative density
							–	fine	Cl	Si	Sa	Gr	w	wL	wP	Ip	Ic	γ	γsat	e	Sr	UL	M2-3	pu	φ	c	φpc	cpc	Es	φ-SPT	ID
							–	%	%	%	%	%	%	%	%	%	–	kN/m3	kN/m3	–	%	%	kPa	kPa	°	kPa	°	kPa	kPa	°	%
0																																
1	Fără cotă / Without elevation	cl-al-ly				0.0 – 3.0m: firm, low plasticity, greyish-reddish-brown sandy CLAY, locally gravel intercalations	47593	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	29.55	19.6	28.96	8.16	–	–	–
2							47594	–	30.94	24.0	44.96	0.1	17.56	31.7	12.53	19.17	0.74	19.06	19.99	0.63	75	65	–	–	–	–	–	–	–	–	–
3		gr-al-ly				3.0 – 3.9m: dense (DR=72%), brown sandy GRAVEL. Extrapolated based on DPH tests, executed in the follow-up of borehole																										

Bază foraj/Total depth: 3.9 m

Întocmit/Made by: geol. Andrea Fangli

Format/Size: A4

COORD. (STEREO 70, Marea Neagră)			FIȘA FORAJULUI NR. / BOREHOLE LOG NO.: FS07+DPH	COD / CODE: 3140LGS/2025
X: 469233.47	Y: 572960.82	Z: –	CLIENT: S.C. GLODENI ENERGY S.R.L.	
DATA ÎNCEPERE START DATE	DATA FINALIZARE FINISH DATE		PROIECT/PROJECT: Construction of an electricity storage facility and connection to CEF Glodeni 1, in Glodeni, Mures County	
21-Mar-2025	21-Mar-2025		AMPLASAMENT/ LOCATION: Glodeni municipality, CF 50604, 52635, 52833, Mureș county, România	

Scara/Scale: 1:100

Adâncime/Depth	Cotă/Elevation	Complex geotehnic	Geotechnical unit	Nivel apă/Groundwater level	SPT – N60	Descriere detaliată / Layer description	Cod probă / Sample code	Suma totală părți fine ≤0,063 mm / Total of fine particles ≤0,063 mm	Argilă / Clay	Praf / Silt	Nisip / Sand	Pietriș / Gravel	Umiditate naturală / Water content	Limita de curgere / Liquid limit	Limita de plasticitate / Plastic limit	Indice de plasticitate / Plasticity index	Indice de consistență / Consistency index	Greutatea vol. naturală / Bulk unit weight	Greutatea volumică în stare saturată / Saturated unit weight	Indicele porilor / Void ratio	Gradul de saturație / Degree of saturation	Umflarea liberă / Free swelling	Modul edometric (200-300 kPa) / Oed. modulus (200-300 kPa)	Presiunea de umflare / Swelling pressure	Unghi de forf. int. efectiv / Effective angle of friction	Coeziune efectivă / Effective cohesion	Unghi de forf. int. ef. post-cedare / Post-peak eff. angle of friction	Coeziune efectivă post-cedare / Post-peak eff. cohesion	Modul de def. linear / Soil modulus	Unghi de forfecare internă ef. - SPT / Effective angle of friction - SPT	Grad de îndesare / Relative density
–	–						–	fine	Cl	Si	Sa	Gr	w	wL	wP	Ip	Ic	γ	γsat	e	Sr	UL	M2-3	pu	φ	c	φpc	cpc	Es	φ-SPT	ID
								%	%	%	%	%	%	%	%	%	–	kN/m3	kN/m3	–	%	%	kPa	kPa	°	kPa	°	kPa	kPa	°	%
0																																
1		ts				0.0 – 0.4m: TOPSOIL: brown sandy clay with vegetal reamins																												
						0.4 – 3.2m: firm, low plasticity, brown sandy CLAY	47595	–	54.31	31.85	13.84	–	25.2	46.87	17.69	29.18	0.74	18.76	19.15	0.74	90	100	–	–	–	–	–	–	–	–	–
2		cl-al-ly					47596	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	15152	9.4	–	–	–	–	–	–	–
3	Fără cotă / Without elevation																															
		gr-al-ly				3.2 – 3.9m: dense (DR=85%), brown sandy GRAVEL. Extrapolated based on DPH tests, executed in the follow-up of borehole																												

Bază foraj/Total depth: 3.9 m

Întocmit/Made by: geol. Andrea Fangli

Format/Size: A4

Nr. pagină/Page no.: 1/1

INTOCMITOR STUDIU GEOTEHNIC SAIDEL Engineering SA
GEOTECHNICAL REPORT ISSUER

BENEFICIAR GLODENI ENERGY SRL
BENEFICIARY

CONTRACT nr. 22-SENG-37-SG/19.09.2022
CONTRACT no.

Fişa Forajului / Borehole Log — SUB1

REZULTATELE ANALIZELOR DE LABORATOR
LABORATORY TEST RESULTS

LUCRAREA / PROJECT Glodeni Solar Farm

ADRESA / ADDRESS Glodeni village, Mures county

DATA FINALIZĂRII FORAJULUI / DATE OF BOREHOLE FINALIZATION 21.10.2022

Diametru foraj	Cota fata de: Marea Neagra	Cota fata de: Foraj	Grosimea stratului	Adancimea apei subterane	Stratificatia	DENUMIREA STRATULUI	Borcan / Stut / Carota: Numarul probelor	Borcan / Stut / Carota: Adancimea	Compozitie granulometrica (d. in mm): Argila	Praf	Nisip	Pietris	Bolovanis	Blocuri	Coeficientul de neuniformitate	Limitele Atterberg: Limita de curgere	Limita de plasticitate	Indicele de plasticitate	Umiditatea	Indicele de consistenta	Gradul si/sau capacitatea de indesare	Greutatea volumica	Greutatea volumica in stare uscata	Porozitatea	Indicele porilor	Gradul de umiditate	Contractilitatea: Indicele de activitate	Umflarea libera	Presiunea de umflare	Compresibilitatea: Modulul de deformatie edometrica 50-100 MPa	Modulul de deformatie edometrica 100-200 MPa	Modulul de deformatie edometrica 200-300 MPa	Modulul de deformatie edometrica 300-500 MPa	Modulul de deformatie edometrica 500-800 MPa	Modulul de deformatie edometrica 800-1600 MPa	Tasare specifica la 200 kPa	Coef. compresibilitate volumica 200-300 kPa	Coeficient de compresibilitate 200-300 kPa	Coeficient de consolidare 200-300 kPa	Tasarea specifica supl. prin umezire	Tipul determinarii	Rezistenta la forfecare: Unghiul de frecare int.	Coeziunea kPa	Tipul determinarii	Test forfecare cu palete/ Penetrometru de buzunar
mm	rMN	m	m	m				m	0.002	0.0063	2.00	63.00	200.00	630.00	$U_n=\frac{d_{60}}{d_{10}}$	W_L %	W_P %	I_P %	w %	I_C	$\frac{I_D}{C_i}$	$\frac{kN}{m^3}\gamma$	$\frac{kN}{m^3}\gamma_d$	n %	e	Sr	I_A	U_L %	Pu kPa	M_{oed} 50-100 MPa	M_{oed} 100-200 MPa	M_{oed} 200-300 MPa	M_{oed} 300-500 MPa	M_{oed} 500-800 MPa	M_{oed} 800-1600 MPa	ε_{200} %	m_v MPa^{-1}	a_v MPa^{-1}	c_v $\frac{m^2}{s}$	$i_{m_{100}}$ %	Ed. L/ Ed. N/ Ed. U300	Φ	c kPa	UU/ CU/ CD	c_{u}^{ne} (kPa) / c_{u}^{reduc} (kPa)
	Level vs:						Jar / Tube / Core: Number and type of samples	Depth	Particle size distribution: Clay	Silt	Sand	Gravel	Cobbles	Boulders	Non-uniformity coefficient	Atterberg's limits: Liquid limit	Plastic limit	Plasticity index	Moisture content	Consistency index	Compaction degree Compaction capacity	Unit weight	Unit dry weight	Porosity	Void ratio	Degree of saturation	Shrinkage swelling: Activity index	Unconfined swelling	Swelling pressure	Compressibility: Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Specific settlement at 200 kPa	Coefficient of volume compressibility 200-300 kPa	Coefficient of compressibility	Coefficient of consolidation at 200-300 kPa	Addit. spec. settl by wetting	Type of test	Shear strength: Angle of int. friction	Cohesion kPa	Type of test	Miniature Vane test/ Pocket penetrometer
Borehole diameter	+361.67 Black Sea Level	0.00 Bore-hole (pit)	Stratum thickness	Underground water depth	Stratification	STRATUM DESCRIPTION	Number and type of samples	Depth	Clay	Silt	Sand	Gravel	Cobbles	Boulders	Non-uniformity coefficient	Liquid limit	Plastic limit	Plasticity index	Moisture content	Consistency index	Compaction degree Compaction capacity	Unit weight	Unit dry weight	Porosity	Void ratio	Degree of saturation	Activity index	Unconfined swelling	Swelling pressure	Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Specific settlement at 200 kPa	Coefficient of volume compressibility 200-300 kPa	Coefficient of compressibility	Coefficient of consolidation at 200-300 kPa	Addit. spec. settl by wetting	Type of test	Angle of int. friction	Cohesion kPa	Type of test	Miniature Vane test/ Pocket penetrometer
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
Ø = 127 mm	+361.67	0.00					1	1.00	28	31	41					53.3	19.8	33.5	21	1						1.2																				
	+358.67	-3.00	3.00			Argilă prăfoasă, nisipoasă, cafenie/ Brownish sandy silty clay,	2	3.00	29	35	36								16.2																											
	+355.27	-6.40	3.40	-6.00		Pietriş cu nisip, mediu, cenuşiu/ Grayish gravel with sand, medium	3	6.00	7	11	17	65							3.4																											
	+353.67	-8.00	1.60			Argilă prăfoasă, cu oxizi de Fe şi Mn, cenuşie/ Greyish silty clay, with iron and manganese oxides	4	6.00	32	58	10					46.3	20.4	25.9	25	0.8						0.8																					

EXECUTANT FORAJ / DRILLING CONTRACTOR SAIDEL Engineering SA

EXECUTANT DETERMINĂRI DE LABORATOR / LABORATORY TESTS CONTRACTOR SAIDEL Engineering - LABORATOR

Întocmit / Issued by:
ing. Alexandra Vişan

Verificat / Verified by:
ing. Alexandra Meiroşu

INTOCMITOR STUDIU GEOTEHNIC SAIDEL Engineering SA
GEOTECHNICAL REPORT ISSUER

BENEFICIAR GLODENI ENERGY SRL
BENEFICIARY

CONTRACT nr. 22-SENG-37-SG/19.09.2022
CONTRACT no.

Fişa Forajului / Borehole Log

SUB2

Page 1/1

REZULTATELE ANALIZELOR DE LABORATOR
LABORATORY TEST RESULTS

LUCRAREA / PROJECT Glodeni Solar Farm

ADRESA / ADDRESS Glodeni village, Mures county

DATA FINALIZĂRII FORAJULUI / DATE OF BOREHOLE FINALIZATION 21.10.2022

Diametru foraj	Cota fata de: Marea Neagra	Foraj	Grosimea stratului	Adancimea apei subterane	Stratificatia	DENUMIREA STRATULUI	Borcan / Stut / Carota: Numarul probelor	Adancimea	Compozitie granulometrica (d. in mm): Argila	Praf	Nisip	Pietris	Bolovanis	Blocuri	Coeficientul de neuniformitate	Limitele Atterberg: Limita de curgere	Limita de plasticitate	Indicele de plasticitate	Umiditatea	Indicele de consistenta	Gradul si/sau capacitatea de indesare	Greutatea volumica	Greutatea volumica in stare uscata	Porozitatea	Indicele porilor	Gradul de umiditate	Contractilitatea: Indicele de activitate	Umflarea libera	Presiunea de umflare	Compresibilitatea: Modulul de deformatie edometrica	Modulul de deformatie edometrica	Modulul de deformatie edometrica	Modulul de deformatie edometrica	Modulul de deformatie edometrica	Modulul de deformatie edometrica	Tasare specifica la 200 kPa	Coef. compresibilitate volumica 200-300 kPa	Coeficientul de compresibilitate 200-300 kPa	Coeficient de consolidare 200-300 kPa	Tasarea specifica supl. prin umezire	Tipul determinarii	Rezistenta la forfecare: Unghiul de frecare int.	Coeziunea kPa	Tipul determinarii	Test forfecare cu palete/ Penetrometru de buzunar
mm	rMN	m	m	m				m	0.002	0.0063	2.00	63.00	200.00	630.00	$U_n=\frac{d_{60}}{d_{10}}$	W_L %	W_P %	I_P %	w %	I_C	$\frac{I_D}{C_i}$	$\frac{kN}{m^3}\gamma$	$\frac{kN}{m^3}\gamma_d$	n %	e	Sr	I_A	U_L %	Pu kPa	M_{oed} 50-100 MPa	M_{oed} 100-200 MPa	M_{oed} 200-300 MPa	M_{oed} 300-500 MPa	M_{oed} 500-800 MPa	M_{oed} 800-1600 MPa	ε_{200} %	m_v $\frac{1}{MPa}$	a_v $\frac{1}{MPa}$	c_v $\frac{m^2}{s}$	$i_{m_{100}}$ %	Ed. L/ Ed. N/ Ed. I300	Φ	c kPa	UU/ CU/ CD	c_{u}^{ne} (kPa) / c_{u}^{reduc} (kPa)
	Level vs:						Jar / Tube / Core: Number and type of samples	Depth	Particle size distribution: Clay	Silt	Sand	Gravel	Cobbles	Boulders	Non-uniformity coefficient	Atterberg's limits: Liquid limit	Plastic limit	Plasticity index	Moisture content	Consistency index	Compaction degree Compaction capacity	Unit weight	Unit dry weight	Porosity	Void ratio	Degree of saturation	Shrinkage swelling: Activity index	Unconfined swelling	Swelling pressure	Compressibility: Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Specific settlement at 200 kPa	Coefficient of volume compressibility 200-300 kPa	Coefficient of compressibility	Coefficient of consolidation at 200-300 kPa	Addit. spec. settl by wetting	Type of test	Shear strength: Angle of int. friction	Cohesion kPa	Type of test	Miniature Vane test/ Pocket penetrometer
Borehole diameter	+361.98 Black Sea Level	0.00 Bore-hole (pit)	Stratum thickness	Underground water depth	Stratification	STRATUM DESCRIPTION																																								
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
Ø=127 mm			2.20			Argila prafoasă, cafenie, nisipoasă, cu piatra/ Brownish silty sandy clay, with stone	1	1.00	20	25	54	1							16.4 15.9 14			17.4	14.9	42.9	0.8	0.6				4.5	6.9	10.0	12.5			4.8	0.100	0.175			EDn	23	18	CUn	
	+359.78	-2.20					2	2.00	27	28	42	3							18.4 18.5 18.3			19.5	16.5	37.1	0.6	0.8				7.1	7.6	9.6	12.7			4.2	0.105	0.166			EDn	24	38	CUn	
	+359.48	-2.50	0.30			Praf argilos, cafeniu/ Brownish clayey silt																																							
						Pietriş cu nisip, cafeniu, în masă prăfoasă/ Brownish gravel with sand, in silty mass	3	5.00	8	14	21	57							4.9																											
	+354.68	-7.30	4.80																																										
	+353.98	-8.00	0.70			Argilă prăfoasă, usor nisipoasă, cenuşie/ Greyish sandy silty clay, with sand	4	8.00	33	51	13	3				39.9	17.5	22.4	22.2	0.8									0.7																			

EXECUTANT FORAJ / DRILLING CONTRACTOR SAIDEL Engineering SA

EXECUTANT DETERMINĂRI DE LABORATOR / LABORATORY TESTS CONTRACTOR SAIDEL Engineering - LABORATOR

Întocmit / Issued by:
ing. Alexandra Vişan

Verificat / Verified by:
ing. Alexandra Meiroşu

INTOCMITOR STUDIU GEOTEHNIC SAIDEL Engineering SA
GEOTECHNICAL REPORT ISSUER

BENEFICIAR GLODENI ENERGY SRL
BENEFICIARY

CONTRACT nr. 22-SENG-37-SG/19.09.2022
CONTRACT no.

Fişa Forajului / Borehole Log — SUB3

Page 1/1

REZULTATELE ANALIZELOR DE LABORATOR
LABORATORY TEST RESULTS

LUCRAREA / PROJECT Glodeni Solar Farm

ADRESA / ADDRESS Glodeni village, Mures county

DATA FINALIZĂRII FORAJULUI / DATE OF BOREHOLE FINALIZATION 21.10.2022

Diametru foraj	Cota fata de: Marea Neagra	Cota fata de: Foraj	Grosimea stratului	Adancimea apei subterane	Stratificatia	DENUMIREA STRATULUI	Borcan / Stut / Carota: Numarul probelor	Adancimea	Compozitie granulometrica (d. in mm): Argila	Praf	Nisip	Pietris	Bolovanis	Blocuri	Coeficientul de neuniformitate	Limitele Atterberg: Limita de curgere	Limita de plasticitate	Indicele de plasticitate	Umiditatea	Indicele de consistenta	Gradul si/sau capacitatea de indesare	Greutatea volumica	Greutatea volumica in stare uscata	Porozitatea	Indicele porilor	Gradul de umiditate	Contractilitatea: Indicele de activitate	Umflarea libera	Presiunea de umflare	Compresibilitatea: Modulul de deformatie edometrica 50-100 MPa	Modul de deformatie edometrica 100-200 MPa	Modul de deformatie edometrica 200-300 MPa	Modul de deformatie edometrica 300-500 MPa	Modul de deformatie edometrica 500-800 MPa	Modul de deformatie edometrica 800-1600 MPa	Tasare specifica la 200 kPa	Coef. compresibilitate volumica 200-300 kPa	Coeficient de compresibilitate 200-300 kPa	Coeficient de consolidare 200-300 kPa	Tasarea specifica supl. prin umezire	Tipul determinarii	Rezistenta la forfecare: Unghiul de frecare int.	Coeziunea kPa	Tipul determinarii	Test forfecare cu palete/ Penetrometru de buzunar
mm	rMN	m	m	m				m	0.002	0.0063	2.00	63.00	200.00	630.00	$U_n=\frac{d_{60}}{d_{10}}$	W_L %	W_P %	I_P %	w %	I_C	$\frac{I_D}{C_i}$	$\frac{kN}{m^3}\gamma$	$\frac{kN}{m^3}\gamma_d$	n %	e	Sr	I_A	U_L %	Pu kPa	M_{oed} 50-100 MPa	M_{oed} 100-200 MPa	M_{oed} 200-300 MPa	M_{oed} 300-500 MPa	M_{oed} 500-800 MPa	M_{oed} 800-1600 MPa	ε_{200} %	m_v MPa^{-1}	a_v MPa^{-1}	c_v $\frac{m^2}{s}$	$i_{m_{100}}$ %	Ed. L/ Ed. N/ Ed. I300	Φ	c kPa	UU/ CU/ CD	c_u^{ne} (kPa) / c_u^{reduc} (kPa)
	Level vs:						Jar / Tube / Core: Number and type of samples	Depth	Particle size distribution: Clay	Silt	Sand	Gravel	Cobbles	Boulders	Non-uniformity coefficient	Atterberg's limits: Liquid limit	Plastic limit	Plasticity index	Moisture content	Consistency index	Compaction degree Compaction capacity	Unit weight	Unit dry weight	Porosity	Void ratio	Degree of saturation	Shrinkage swelling: Activity index	Unconfined swelling	Swelling pressure	Compressibility: Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Specific settlement at 200 kPa	Coefficient of volume compressibility 200-300 kPa	Coefficient of compressibility	Coefficient of consolidation at 200-300 kPa	Addit. spec. settl by wetting	Type of test	Shear strength: Angle of int. friction	Cohesion kPa	Type of test	Miniature Vane test/ Pocket penetrometer
Borehole diameter	Black Sea Level	Bore-hole (pit)	Stratum thickness	Underground water depth	Stratification	STRATUM DESCRIPTION	Number and type of samples	Depth	Clay	Silt	Sand	Gravel	Cobbles	Boulders	Non-uniformity coefficient	Liquid limit	Plastic limit	Plasticity index	Moisture content	Consistency index	Compaction degree Compaction capacity	Unit weight	Unit dry weight	Porosity	Void ratio	Degree of saturation	Activity index	Unconfined swelling	Swelling pressure	Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Specific settlement at 200 kPa	Coefficient of volume compressibility 200-300 kPa	Coefficient of compressibility	Coefficient of consolidation at 200-300 kPa	Addit. spec. settl by wetting	Type of test	Angle of int. friction	Cohesion kPa	Type of test	Miniature Vane test/ Pocket penetrometer
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
Ø = 127 mm	+361.25	-0.40	0.40			Sol vegetal/ Top soil																																								
						Argila prafoasă, cafenie, nisipoasă/ Brownish silty sandy clay, with stone	1	1.00	27	44	29					45.6	17.2	28.4	22.4 21.2 21	0.9		19.3	15.8	39.7	0.7	0.9	1.1			3.3	7.4	13.2	20.0			4.1	0.076	0.125			EDn	22	64	CUn	
							2	2.00	26	34	39	1				42.8	17.2	25.6	16.7	1						1																	
	+359.15	-2.50	2.10				3	3.00	13	21	30	36							9.7																								
						Pietriş cu nisip, cafeniu, în masă prăfoasă/ Brownish gravel with sand, in silty mass	4	6.00	10	17	27	46							4.7																											
	+353.65	-8.00	5.50																																										

EXECUTANT FORAJ / DRILLING CONTRACTOR SAIDEL Engineering SA

EXECUTANT DETERMINĂRI DE LABORATOR / LABORATORY TESTS CONTRACTOR SAIDEL Engineering - LABORATOR

Întocmit / Issued by:
ing. Alexandra Vişan

Verificat / Verified by:
ing. Alexandra Meiroşu

INTOCMITOR STUDIU GEOTEHNIC SAIDEL Engineering SA
GEOTECHNICAL REPORT ISSUER

BENEFICIAR GLODENI ENERGY SRL
BENEFICIARY

CONTRACT nr. 22-SENG-37-SG/19.09.2022
CONTRACT no.

Fişa Forajului / Borehole Log — SUB4

Page 1/1

REZULTATELE ANALIZELOR DE LABORATOR
LABORATORY TEST RESULTS

LUCRAREA / PROJECT Glodeni Solar Farm

ADRESA / ADDRESS Glodeni village, Mures county

DATA FINALIZĂRII FORAJULUI / DATE OF BOREHOLE FINALIZATION 22.10.2022

Diametru foraj	Cota fata de: Marea Neagra	Cota fata de: Foraj	Grosimea stratului	Adancimea apei subterane	Stratificatia	DENUMIREA STRATULUI	Borcan / Stut / Carota: Numarul probelor	Borcan / Stut / Carota: Adancimea	Compozitie granulometrica (d. in mm): Argila	Praf	Nisip	Pietris	Bolovanis	Blocuri	Coeficientul de neuniformitate	Limitele Atterberg: Limita de curgere	Limita de plasticitate	Indicele de plasticitate	Umiditatea	Indicele de consistenta	Gradul si/sau capacitatea de indesare	Greutatea volumica	Greutatea volumica in stare uscata	Porozitatea	Indicele porilor	Gradul de umiditate	Contractilitatea: Indicele de activitate	Umflarea libera	Presiunea de umflare	Compresibilitatea: Modulul de deformatie edometrica 50-100 MPa	100-200 MPa	200-300 MPa	300-500 MPa	500-800 MPa	800-1600 MPa	Tasare specifica la 200 kPa	Coef. compresibilitate volumica 200-300 kPa	Coeficientul de compresibilitate 200-300 kPa	Coeficient de consolidare 200-300 kPa	Tasarea specifica supl. prin umezire	Tipul determinarii	Rezistenta la forfecare: Unghiul de frecare int.	Coeziunea kPa	Tipul determinarii	Test forfecare cu palete/ Penetrometru de buzunar
mm	rMN	m	m	m				m	0.002	0.0063	2.00	63.00	200.00	630.00	$U_n=\frac{d_{60}}{d_{10}}$	W_L %	W_P %	I_P %	w %	I_C	$\frac{I_D}{C_i}$	$\frac{kN}{m^3}\ \gamma$	$\frac{kN}{m^3}\ \gamma_d$	n %	e	Sr	I_A	U_L %	Pu kPa	M_{oed} 50-100 MPa	M_{oed} 100-200 MPa	M_{oed} 200-300 MPa	M_{oed} 300-500 MPa	M_{oed} 500-800 MPa	M_{oed} 800-1600 MPa	ε_{200} %	m_v $\frac{1}{MPa}$	a_v $\frac{1}{MPa}$	c_v $\frac{m^2}{s}$	$i_{m_{100}}$ %	Ed. L/ Ed. N/ Ed. I300	Φ	c kPa	UU/ CU/ CD	c_{u}^{ne} (kPa) / c_{u}^{reduc} (kPa)
	Level vs:						Jar / Tube / Core: Number and type of samples	Depth	Particle size distribution: Clay	Silt	Sand	Gravel	Cobbles	Boulders	Non-uniformity coefficient	Atterberg's limits: Liquid limit	Plastic limit	Plasticity index	Moisture content	Consistency index	Compaction degree Compaction capacity	Unit weight	Unit dry weight	Porosity	Void ratio	Degree of saturation	Shrinkage swelling: Activity index	Unconfined swelling	Swelling pressure	Compressibility: Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Specific settlement at 200 kPa	Coefficient of volume compressibility 200-300 kPa	Coefficient of compressibility	Coefficient of consolidation at 200-300 kPa	Addit. spec. settl by wetting	Type of test	Shear strength: Angle of int. friction	Cohesion kPa	Type of test	Miniature Vane test/ Pocket penetrometer
Borehole diameter	Black Sea Level	Bore-hole (pit)	Stratum thickness	Underground water depth	Stratification	STRATUM DESCRIPTION																																								
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
Ø = 127 mm	+361.33	-0.40	0.40			Sol vegetal/ Top soil																																								
						Argila prafoasă, cafenie, nisipoasă/ Brownish silty sandy clay, with stone	1	1.00	20	39	35	6				39.4	15.5	24	15.3	1						1.2																					
							2	2.00	13	16	68	3							16.5 / 14.7			17.8	15.3	41.7	0.7	0.6				5.1	6.9	13.2	26.4			4.2	0.076	0.130			EDn				
	+359.23	-2.50	2.10																																								
						Pietriş cu nisip, cafeniu, în masă prăfoasă/ Brownish gravel with sand, in silty mass	3	4.00	7	12	24	57							7.4																												
				-5.70																																								
	+355.13	-6.60	4.10																																									
						Argilă prăfoasă, usor nisipoasă, cenuşie/ Greyish sandy silty clay	4	8.00	31	55	13	1				46.9	20.2	26.7	22	0.9						0.9																					
	+353.73	-8.00	1.40																																								

EXECUTANT FORAJ / DRILLING CONTRACTOR SAIDEL Engineering SA

EXECUTANT DETERMINĂRI DE LABORATOR / LABORATORY TESTS CONTRACTOR SAIDEL Engineering - LABORATOR

Întocmit / Issued by:
ing. Alexandra Vişan

Verificat / Verified by:
ing. Alexandra Meiroşu

INTOCMITOR STUDIU GEOTEHNIC SAIDEL Engineering SA
GEOTECHNICAL REPORT ISSUER

BENEFICIAR GLODENI ENERGY SRL
BENEFICIARY

CONTRACT nr. 22-SENG-37-SG/19.09.2022
CONTRACT no.

Fişa Forajului / Borehole Log — SUB5

Page 1/1

REZULTATELE ANALIZELOR DE LABORATOR
LABORATORY TEST RESULTS

LUCRAREA / PROJECT Glodeni Solar Farm

ADRESA / ADDRESS Glodeni village, Mures county

DATA FINALIZĂRII FORAJULUI / DATE OF BOREHOLE FINALIZATION 21.10.2022

Diametru foraj	Cota fata de: Marea Neagra	Cota fata de: Foraj	Grosimea stratului	Adancimea apei subterane	Stratificatia	DENUMIREA STRATULUI	Numarul probelor	Adancimea	Compozitie granulometrica (d. in mm): Argila	Praf	Nisip	Pietris	Bolovanis	Blocuri	Coeficientul de neuniformitate	Limitele Atterberg: Limita de curgere	Limita de plasticitate	Indicele de plasticitate	Umiditatea	Indicele de consistenta	Gradul si/sau capacitatea de indesare	Greutatea volumica	Greutatea volumica in stare uscata	Porozitatea	Indicele porilor	Gradul de umiditate	Contractilitatea: Indicele de activitate	Umflarea libera	Presiunea de umflare	Compresibilitatea: Modulul de deformatie edometrica	Modulul de deformatie edometrica	Modulul de deformatie edometrica	Modulul de deformatie edometrica	Modulul de deformatie edometrica	Modulul de deformatie edometrica	Tasare specifica la 200 kPa	Coef. compresibilitate volumica 200-300 kPa	Coeficient de compresibilitate 200-300 kPa	Coeficient de consolidare 200-300 kPa	Tasarea specifica supl. prin umezire	Tipul determinarii	Rezistenta la forfecare: Unghiul de frecare int.	Coeziunea kPa	Tipul determinarii	Test forfecare cu palete/ Penetrometru de buzunar
mm	rMN	m	m	m				m	0.002	0.0063	2.00	63.00	200.00	630.00	$Un=\frac{d_{60}}{d_{10}}$	W_L %	W_P %	I_P %	w %	I_C	$\frac{I_D}{C_i}$	$\frac{kN}{m^3}\gamma$	$\frac{kN}{m^3}\gamma_d$	n %	e	Sr	I_A	U_L %	Pu kPa	M_{oed} 50-100 MPa	M_{oed} 100-200 MPa	M_{oed} 200-300 MPa	M_{oed} 300-500 MPa	M_{oed} 500-800 MPa	M_{oed} 800-1600 MPa	ε_{200} %	m_v MPa^{-1}	a_v MPa^{-1}	c_v $\frac{m^2}{s}$	$i_{m_{100}}$ %	Ed. L/ Ed. N/ Ed. I300	Φ	c kPa	UU/ CU/ CD	c_{u}^{ne} (kPa) / c_{u}^{reduc} (kPa)
	Level vs:								Particle size distribution							Atterberg's limits											Shrinkage swelling			Compressibility											Shear strength			
Borehole diameter	+362.00 Black Sea Level	0.00 Bore-hole (pit)	Stratum thickness	Underground water depth	Stratification	STRATUM DESCRIPTION	Number and type of samples	Depth	Clay	Silt	Sand	Gravel	Cobbles	Boulders	Non-uniformity coefficient	Liquid limit	Plastic limit	Plasticity index	Moisture content	Consistency index	Compaction degree Compaction capacity	Unit weight	Unit dry weight	Porosity	Void ratio	Degree of saturation	Activity index	Unconfined swelling	Swelling pressure	Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Specific settlement at 200 kPa	Coefficient of volume compressibility 200-300 kPa	Coefficient of compressibility	Coefficient of consolidation at 200-300 kPa	Addit. spec. settl by wetting	Type of test	Angle of int. friction	Cohesion kPa	Type of test	Miniature Vane test/ Pocket penetrometer
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
Ø = 127 mm						Argilă prafoasă, nisipoasă cafenie, nisipoasă/ Brownish silty sandy clay	1	1.00	32	25	43					49.8	17.5	32.2	18.6	1						1																				
							2	2.00	18	18	64								17.2 16.6 16.1			19.3	16.5	37.2	0.6	0.8				8.0	10.5	12.5	15.1			2.7	0.080	0.127			EDn	29	19	CUn	
	+358.00	-3.00	3.00				3	3.00	22	20	56	2				40.5	13.3	26.8	14.9	0.9						1.2																	
	+357.00	-5.00	1.00			Pietriş cu nisip cafeniu/ Gravel with brownish sand	4	5.00	7	6	21	66							6.2																										
	+354.80	-7.20	2.20	-5.70		Nisip mediu, cafeniu cu pietriş şi bolovăniş/ Brownish medium sand with gravel and coddle																																							
	+353.73	-8.00	1.40			Argilă prăfoasă, uşor nisipoasă, cenuşie/ Greyish sandy silty clay, slightly sandy	5	8.00	29	45	16	10				41.6	18.6	23	23.2	0.8						0.8																				

EXECUTANT FORAJ / DRILLING CONTRACTOR SAIDEL Engineering SA

EXECUTANT DETERMINĂRI DE LABORATOR / LABORATORY TESTS CONTRACTOR SAIDEL Engineering - LABORATOR

Întocmit / Issued by:
ing. Alexandra Vişan

Verificat / Verified by:
ing. Alexandra Meiroşu

INTOCMITOR STUDIU GEOTEHNIC SAIDEL Engineering SA
GEOTECHNICAL REPORT ISSUER

BENEFICIAR GLODENI ENERGY SRL
BENEFICIARY

CONTRACT nr. 22-SENG-37-SG/19.09.2022
CONTRACT no.

Fişa Forajului / Borehole Log

SUB6

REZULTATELE ANALIZELOR DE LABORATOR
LABORATORY TEST RESULTS

LUCRAREA / PROJECT Glodeni Solar Farm

ADRESA / ADDRESS Glodeni village, Mures county

DATA FINALIZĂRII FORAJULUI / DATE OF BOREHOLE FINALIZATION 22.10.2022

Cota fata de / Level vs: Marea Neagra / Black Sea Level +361.79 (rMN); Foraj / Borehole (pit) 0.00 (m)

Diametru foraj / Borehole diameter: Ø = 127 mm

Legend: Borcan / Jar; Stut / Tube; Carota / Core

2 Black Sea Level (rMN)	3 Borehole (pit) (m)	4 Grosimea stratului / Stratum thickness (m)	5 Adancimea apei subterane / Underground water depth (m)	7 Denumirea stratului / Stratum description
+361.59	-0.20	0.20		Sol vegetal/ Topsoil
+359.69	-2.30	2.10		Praf nisipos argilos, cafeniu la nisip prăfos/ Brownish sandy clayey silt to silty sand
+358.39	-3.40	1.20		Praf argilos nisipos, cafeniu cu oxizi de Mn/ Brownish sandy clayey silt, with manganese oxides
+355.39	-6.40	3.00	-5.70	Nisip prăfos mediu, cafeniu, cu pietriş şi bolovăniş
+353.79	-8.00	1.60		Praf nisipos argilos, cenuşiu/ Greyish sandy clayey silt

8 Nr. probei / Sample no.	9 Adancimea / Depth (m)	10 Argila / Clay 0.002	11 Praf / Silt 0.0063	12 Nisip / Sand 2.00	13 Pietris / Gravel 63.00	14 Bolovanis / Cobbles 200.00	15 Blocuri / Boulders 630.00	16 Coef. de neuniformitate / Non-uniformity coefficient $U_n = d_{60}/d_{10}$	17 Limita de curgere / Liquid limit W_L %	18 Limita de plasticitate / Plastic limit W_P %	19 Indicele de plasticitate / Plasticity index I_P %	20 Umiditatea / Moisture content w %	21 Indicele de consistenta / Consistency index I_C	22 Gradul de indesare / Compaction degree I_D / C_i	23 Greutatea volumica / Unit weight γ kN/m³	24 Greutatea volumica in stare uscata / Unit dry weight $γ_d$ kN/m³	25 Porozitatea / Porosity n %	26 Indicele porilor / Void ratio e	27 Gradul de umiditate / Degree of saturation Sr
1 (Stut / Tube)	1.00	24	32	43	1							15 17 16.9			20.1	17.4	33.4	0.5	0.8
2 (Borcan / Jar)	2.00	15	14	70	1				32.9	22.9	10	16.6	1.6						
3 (Borcan / Jar)	3.00	21	27	49	3				38.7	13.7	25	16.3	0.9						
4 (Borcan / Jar)	5.00	10	8	38	44							8.2							
5 (Borcan / Jar)	8.00	18	30	36	16				43.6	17.4	26.2	16.2	1						

8 Nr. probei / Sample no.	28 Indicele de activitate / Activity index I_A	29 Umflarea libera / Unconfined swelling U_L %	30 Presiunea de umflare / Swelling pressure Pu kPa	31 M_{oed} 50-100 MPa	32 M_{oed} 100-200 MPa	33 M_{oed} 200-300 MPa	34 M_{oed} 300-500 MPa	35 M_{oed} 500-800 MPa	36 M_{oed} 800-1600 MPa	37 Tasare specifica la 200 kPa / Specific settlement $ε_{200}$ %	38 Coef. compresibilitate volumica 200-300 kPa / m_v MPa^{-1}	39 Coeficientul de compresibilitate 200-300 kPa / a_v MPa^{-1}	40 Coeficient de consolidare 200-300 kPa / c_v m^2/s	41 Tasarea specifica supl. prin umezire / i_{m300} %	42 Tipul determinarii / Type of test (Ed. I./ Ed. N/ Ed. I300)	43 Unghiul de frecare int. / Angle of int. friction Φ	44 Coeziunea / Cohesion c kPa	45 Tipul determinarii / Type of test (UU/ CU/ CD)	46 Test forfecare cu palete / Penetrometru de buzunar (kPa)
1				6.9	15.3	17.6	22.4			2.4	0.057	0.085			EDn	31	28	CUn	
2	0.7																		
3	1.2																		
4																			
5	1.5																		

EXECUTANT FORAJ / DRILLING CONTRACTOR SAIDEL Engineering SA

EXECUTANT DETERMINĂRI DE LABORATOR / LABORATORY TESTS CONTRACTOR SAIDEL Engineering - LABORATOR

Întocmit / Issued by: ing. Alexandra Vişan

Verificat / Verified by: ing. Alexandra Meiroşu

INTOCMITOR STUDIU GEOTEHNIC SAIDEL Engineering SA
GEOTECHNICAL REPORT ISSUER

BENEFICIAR GLODENI ENERGY SRL
BENEFICIARY

CONTRACT nr. 22-SENG-37-SG/19.09.2022
CONTRACT no.

Fişa Forajului / Borehole Log — SUB7

Page 1/1

REZULTATELE ANALIZELOR DE LABORATOR
LABORATORY TEST RESULTS

LUCRAREA / PROJECT Glodeni Solar Farm

ADRESA / ADDRESS Glodeni village, Mures county

DATA FINALIZĂRII FORAJULUI / DATE OF BOREHOLE FINALIZATION 21.10.2022

Diametru foraj	Cota fata de: Marea Neagra	Cota fata de: Foraj	Grosimea stratului	Adancimea apei subterane	Stratificatia	DENUMIREA STRATULUI	Numarul probelor	Adancimea	Compozitie granulometrica (d. in mm): Argila	Praf	Nisip	Pietris	Bolovanis	Blocuri	Coeficientul de neuniformitate	Limitele Atterberg: Limita de curgere	Limita de plasticitate	Indicele de plasticitate	Umiditatea	Indicele de consistenta	Gradul si/sau capacitatea de indesare	Greutatea volumica	Greutatea volumica in stare uscata	Porozitatea	Indicele porilor	Gradul de umiditate	Contractilitatea: Indicele de activitate	Umflarea libera	Presiunea de umflare	Compresibilitatea: Modul de deformatie edometrica 50-100 MPa	Modul de deformatie edometrica 100-200 MPa	Modul de deformatie edometrica 200-300 MPa	Modul de deformatie edometrica 300-500 MPa	Modul de deformatie edometrica 500-800 MPa	Modul de deformatie edometrica 800-1600 MPa	Tasare specifica la 200 kPa	Coef. compresibilitate volumica 200-300 kPa	Coeficient de compresibilitate 200-300 kPa	Coeficient de consolidare 200-300 kPa	Tasarea specifica supl. prin umezire	Tipul determinarii	Rezistenta la forfecare: Unghiul de frecare int.	Coeziunea kPa	Tipul determinarii	Test forfecare cu palete/ Penetrometru de buzunar
mm	rMN	m	m	m				m	0.002	0.0063	2.00	63.00	200.00	630.00	$U_n=\frac{d_{60}}{d_{10}}$	W_L %	W_P %	I_P %	w %	I_C	$\frac{I_D}{C_i}$	$\frac{kN}{m^3}\gamma$	$\frac{kN}{m^3}\gamma_d$	n %	e	Sr	I_A	U_L %	Pu kPa	M_{oed} 50-100 MPa	M_{oed} 100-200 MPa	M_{oed} 200-300 MPa	M_{oed} 300-500 MPa	M_{oed} 500-800 MPa	M_{oed} 800-1600 MPa	ε_{200} %	m_v MPa^{-1}	a_v MPa^{-1}	c_v $\frac{m^2}{s}$	$i_{m_{100}}$ %	Ed. L/ Ed. N/ Ed. I300	Φ	c kPa	UU/ CU/ CD	c_u^{lab} (kPa) / c_u^{teren} (kPa)
	Level vs:								Particle size distribution: Clay	Silt	Sand	Gravel	Cobbles	Boulders		Atterberg's limits: Liquid limit	Plastic limit										Shrinkage swelling: Activity index	Unconfined swelling	Swelling pressure	Compressibility: Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Specific settlement at 200 kPa	Coefficient of volume compressibility 200-300 kPa	Coefficient of compressibility	Coefficient of consolidation at 200-300 kPa	Addit. spec. settl by wetting	Type of test	Shear strength: Angle of int. friction	Cohesion kPa	Type of test	Miniature Vane test/ Pocket penetrometer
Borehole diameter	+361.93 Black Sea Level	0.00 Bore-hole (pit)	Stratum thickness	Underground water depth	Stratification	STRATUM DESCRIPTION	Number and type of samples	Depth	Clay	Silt	Sand	Gravel	Cobbles	Boulders	Non-uniformity coefficient	Liquid limit	Plastic limit	Plasticity index	Moisture content	Consistency index	Compaction degree Compaction capacity	Unit weight	Unit dry weight	Porosity	Void ratio	Degree of saturation	Activity index	Unconfined swelling	Swelling pressure	Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Oedometer deformation modulus	Specific settlement at 200 kPa	Coefficient of volume compressibility 200-300 kPa	Coefficient of compressibility	Coefficient of consolidation at 200-300 kPa	Addit. spec. settl by wetting	Type of test	Angle of int. friction	Cohesion kPa	Type of test	Miniature Vane test/ Pocket penetrometer
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
Ø = 127 mm	+361.53	-0.40	0.40			Sol vegetal/ Top soil																																								
						Argilă prăfoasă, nisipoasă, cafenie cu intercalaţii cenuşii/ Brownish sandy silty clay with greyish intercalations	1	1.00	21	37	34	8				35	15.7	19.4	15.4	1						0.9																						
	+359.93	-2.00	1.60				2	2.00	12	15	66	7							14.4 14.7 14.3			18.5	16.2	38.3	0.6	0.6				6.5	8.6	14.9	21.3			3.1	0.067	0.109		EDn	31	17	CUn	
	+359.13	-2.80	0.80			Nisip prăfos cafeniu/ Brownish silty sand																																							
						Pietriş cafeniu, în masă prăfoasă, cu bolovăniş/ Brownish gravel, in silty mass, with cobble	3	4.00	6	10	16	68							7																												
							4	5.00	4	7	12	77							5																											
	+355.93	-6.00	3.20	-5.70			5	6.00	8	10	21	60							7																											
						Argilă prăfoasă slab nisipoasă cenuşie/Greyish sandy silty clay	6	7.00	31	56	13					46.6	20.1	26.5	26.8	0.7						0.9																						
	+353.93	-8.00	2.00																																										

EXECUTANT FORAJ / DRILLING CONTRACTOR SAIDEL Engineering SA

EXECUTANT DETERMINĂRI DE LABORATOR / LABORATORY TESTS CONTRACTOR SAIDEL Engineering - LABORATOR

Întocmit / Issued by:
ing. Alexandra Vişan

Verificat / Verified by:
ing. Alexandra Meiroşu

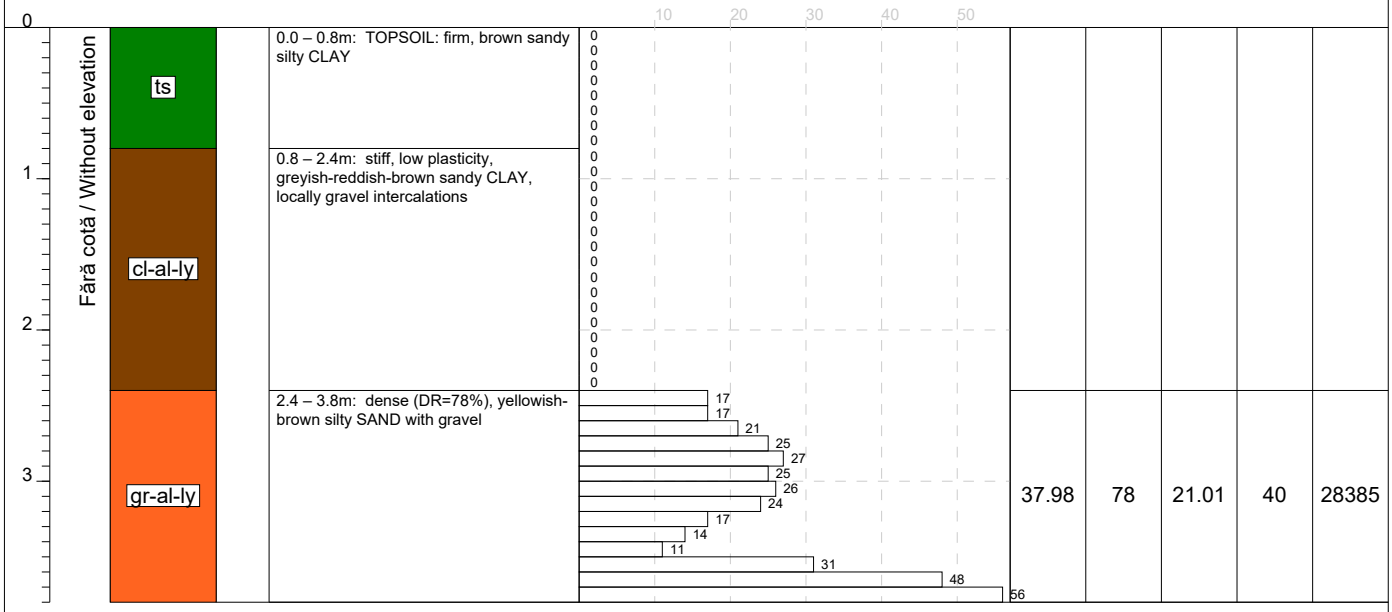
APPENDIX 5

CONTENT:

- *Dynamic heavy penetration tests (DPH)*

COORD. (STEREO 70, Marea Neagră)			FIȘA PDG / DPH LOG: FS04+DPH
X: 469294.65	**Y:** 572921.94	**Z:** –	**CLIENT:** S.C. GLODENI ENERGY S.R.L.
DATA ÎNCEPERE START DATE	**DATA FINALIZARE FINISH DATE**		**PROIECT/PROJECT:** Construction of an electricity storage facility and connection to CEF Glodeni 1, in Glodeni, Mures County
21-Mar-2025	21-Mar-2025		**AMPL./LOC.:** Glodeni municipality, CF 50604, 52635, 52833, Mureș county

Scara/Scale: 1:50



Adâncime/Depth Cotă/Elevation	Complex geotehnic Geotechnical unit	Nivel apă Groundwater level	Descriere detaliată Layer description	Număr bătăi pe 10 cm/ Number of blows each 10 cm	N60 corectat N60 corrected N60cor -	Grad de îndesare Relative density ID %	Greutatea vol. naturală Bulk unit weight γ kN/m3	Unghi de forf. int. efectiv Effective angle of friction φ °	Modul de def. linear Soil modulus Es kPa
0.0 – 0.8	ts		0.0 – 0.8m: TOPSOIL: firm, brown sandy silty CLAY						
0.8 – 2.4	cl-al-ly		0.8 – 2.4m: stiff, low plasticity, greyish-reddish-brown sandy CLAY, locally gravel intercalations						
2.4 – 3.8	gr-al-ly		2.4 – 3.8m: dense (DR=78%), yellowish-brown silty SAND with gravel	17, 17, 21, 25, 27, 25, 26, 24, 17, 14, 11, 31, 48, 56	37.98	78	21.01	40	28385

Bază penetrare/Total depth: 3.8 m

Întocmit/Made by: geol. Andrea Fangli

Format/Size: A4

COORD. (STEREO 70, Marea Neagră)			FIȘA PDG / DPH LOG: FS05+DPH
X: 469269.75	**Y:** 572930.51	**Z:** –	**CLIENT:** S.C. GLODENI ENERGY S.R.L.
DATA ÎNCEPERE START DATE	**DATA FINALIZARE FINISH DATE**		**PROIECT/PROJECT:** Construction of an electricity storage facility and connection to CEF Glodeni 1, in Glodeni, Mures County
21-Mar-2025	21-Mar-2025		**AMPL./LOC.:** Glodeni municipality, CF 50604, 52635, 52833, Mureș county

Scara/Scale: 1:50

Adâncime/Depth Cotă/Elevation	Complex geotehnic Geotechnical unit	Nivel apă Groundwater level	Descriere detaliată Layer description	Număr bătăi pe 10 cm/ Number of blows each 10 cm	N60 corectat N60 corrected N60cor -	Grad de îndesare Relative density ID %	Greutatea vol. naturală Bulk unit weight γ kN/m3	Unghi de forf. int. efectiv Effective angle of friction φ °	Modul de def. linear Soil modulus Es kPa
Fără cotă / Without elevation	ts		0.0 – 0.7m: TOPSOIL: brown sandy clay with vegetal reamins						
	cl-al-ly		0.7 – 2.3m: stiff, medium plasticity, greyish-brown sandy CLAY, locally gravel intercalations						
	gr-al-ly		2.3 – 3.5m: dense (DR=85%), brown sandy GRAVEL	20, 19, 24, 24, 27, 30, 29, 34, 27, 54, 40, 42	43.4	85	21.62	41	44460

Bază penetrare/Total depth: 3.5 m

Întocmit/Made by: geol. Andrea Fangli

Format/Size: A4

COORD. (STEREO 70, Marea Neagră)			FIȘA PDG / DPH LOG: FS06+DPH
X: 469262.8	**Y:** 572950.22	**Z:** –	**CLIENT:** S.C. GLODENI ENERGY S.R.L.
DATA ÎNCEPERE START DATE	**DATA FINALIZARE FINISH DATE**		**PROIECT/PROJECT:** Construction of an electricity storage facility and connection to CEF Glodeni 1, in Glodeni, Mures County
21-Mar-2025	21-Mar-2025		**AMPL./LOC.:** Glodeni municipality, CF 50604, 52635, 52833, Mureș county

Scara/Scale: 1:50

Adâncime/Depth Cotă/Elevation	Complex geotehnic Geotechnical unit	Nivel apă Groundwater level	Descriere detaliată Layer description	Număr bătăi pe 10 cm/ Number of blows each 10 cm	N60 corectat N60 corrected N60cor -	Grad de îndesare Relative density ID %	Greutatea vol. naturală Bulk unit weight γ kN/m3	Unghi de forf. int. efectiv Effective angle of friction φ °	Modul de def. linear Soil modulus Es kPa
Fără cotă / Without elevation	cl-al-ly		0.0 – 3.0m: firm, low plasticity, greyish-reddish-brown sandy CLAY, locally gravel intercalations						
	gr-al-ly		3.0 – 3.9m: dense (DR=72%), brown sandy GRAVEL	20, 16, 18, 21, 22, 45, 44, 52	33.33	72	20.53	38	35392

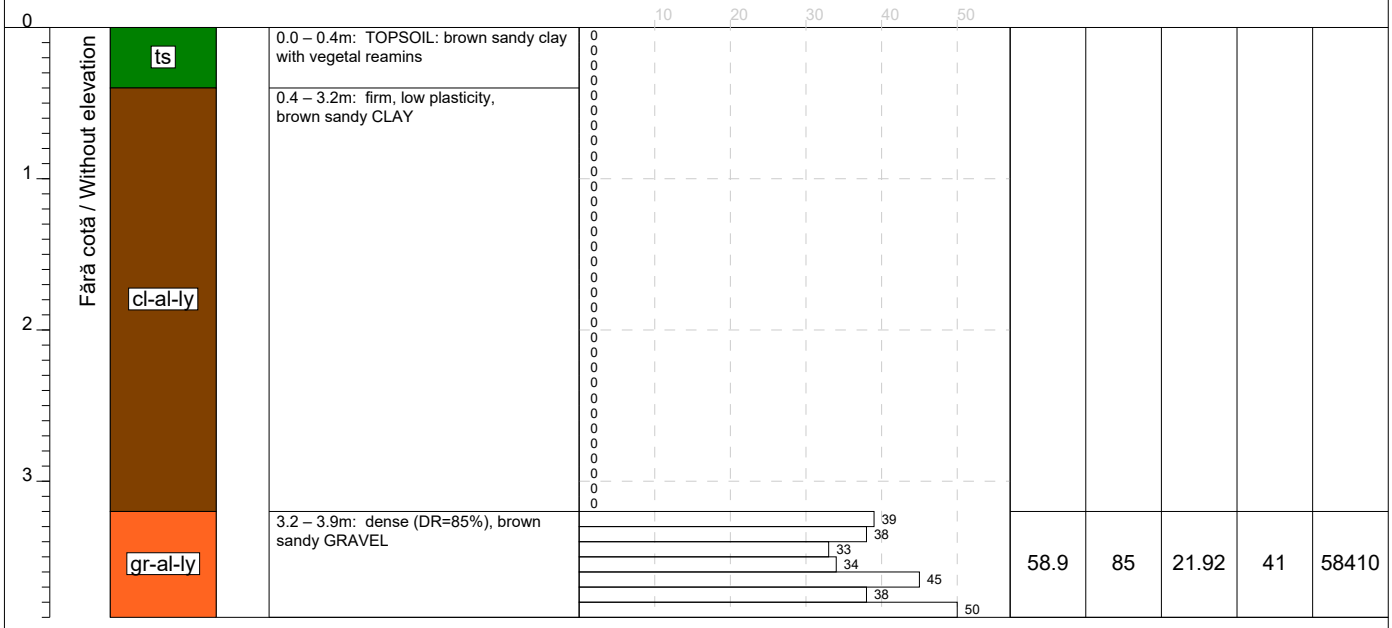
Bază penetrare/Total depth: 3.9 m

Întocmit/Made by: geol. Andrea Fangli

Format/Size: A4

COORD. (STEREO 70, Marea Neagră)			FIȘA PDG / DPH LOG: FS07+DPH
X: 469233.47	**Y:** 572960.82	**Z:** –	**CLIENT:** S.C. GLODENI ENERGY S.R.L.
DATA ÎNCEPERE START DATE	**DATA FINALIZARE FINISH DATE**		**PROIECT/PROJECT:** Construction of an electricity storage facility and connection to CEF Glodeni 1, in Glodeni, Mures County
21-Mar-2025	21-Mar-2025		**AMPL./LOC.:** Glodeni municipality, CF 50604, 52635, 52833, Mureș county

Scara/Scale: 1:50



Bază penetrare/Total depth: 3.9 m

Întocmit/Made by: geol. Andrea Fangli

Format/Size: A4

APPENDIX 6

CONTENT:

- *Laboratory test reports*

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

IDENTIFICATION AND MACROSCOPIC DESCRIPTION OF LABORATORY SAMPLES

according to SR EN ISO 14688-1:2018

Test report

Client	*S.C. Glodeni Energy S.R.L.*			**Project No.**	*2819LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*			**Date of description**	*5-Feb-2024*
Borehole No.	*FS01*	**Superior depth of sample (m)**	2.00	**Sample No.**	*42672*
		Inferior depth of sample (m)	2.40		

DESCRIPTION OF SOIL PROPERTIES		
Type of soil		*coarse soil*
Particle size distribution	Primary fraction	*SAND*
	Secondary fraction I.	*clay*
	Secondary fraction II.	*silt*
	Tertiary fraction	-
Particle shape (in case of gravel, cobble and boulders)	Form	-
	Angularity/roundness	-
	Surface texture	-
Colour of sample	Hue	*brown*
	Chroma	*yellowish*
Consistency of fine fraction		*soft*
Carbonate content		*non-calcareous*
Organic content		*inorganic*
Macroscopic observations		*soft/firm*

IDENTIFICATION OF FINE FRACTION	
Dilatancy	*medium*
Toughness	*low*
Plasticity	*low*
Dry strength	*low*
Feel	*granular*
Behaviour in water	*fast disintegration*
Behaviour in air	*fast drying*
Cohesion	*plastic deformation*
DESCRIPTION OF BEDDING AND DISCONTINUITY	
Bedding	*no bedding*
Discontinuity	*without discontinuities*

SAMPLE PICTURES

Fig. 1

Fig. 2

Laboratory personel responsible for description:	*Fodor-Ianosi Evelin*

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

IDENTIFICATION AND MACROSCOPIC DESCRIPTION OF LABORATORY SAMPLES

according to SR EN ISO 14688-1:2018

Test report

Client	*S.C. Glodeni Energy S.R.L.*			**Project No.**	*2819LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*			**Date of description**	*5-Feb-2024*
Borehole No.	*FS01*	**Superior depth of sample (m)**	2.40	**Sample No.**	*42673*
		Inferior depth of sample (m)	2.85		

DESCRIPTION OF SOIL PROPERTIES		
Type of soil		*coarse soil*
Particle size distribution	Primary fraction	*SAND*
	Secondary fraction I.	*silt*
	Secondary fraction II.	*clay*
	Tertiary fraction	-
Particle shape (in case of gravel, cobble and boulders)	Form	-
	Angularity/roundness	-
	Surface texture	-
Colour of sample	Hue	*brown*
	Chroma	*yellowish*
Consistency of fine fraction		*firm*
Carbonate content		*non-calcareous*
Organic content		*inorganic*
Macroscopic observations		-

IDENTIFICATION OF FINE FRACTION	
Dilatancy	*rapid*
Toughness	*low*
Plasticity	*neplastic*
Dry strength	*low*
Feel	*granular*
Behaviour in water	*fast disintegration*
Behaviour in air	*fast drying*
Cohesion	*crumbles*
DESCRIPTION OF BEDDING AND DISCONTINUITY	
Bedding	*no bedding*
Discontinuity	*without discontinuities*

SAMPLE PICTURES

Fig. 1

Fig. 2

Laboratory personel responsible for description:	*Fodor-Ianosi Evelin*

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

IDENTIFICATION AND MACROSCOPIC DESCRIPTION OF LABORATORY SAMPLES

according to SR EN ISO 14688-1:2018

Test report

Client	*S.C. Glodeni Energy S.R.L.*			**Project No.**	*2819LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*			**Date of description**	*5-Feb-2024*
Borehole No.	*FS01*	**Superior depth of sample (m)**	3.60	**Sample No.**	*42674*
		Inferior depth of sample (m)	4.00		

DESCRIPTION OF SOIL PROPERTIES		
Type of soil		*fine soil*
Particle size distribution	Primary fraction	*CLAY*
	Secondary fraction I.	*sand*
	Secondary fraction II.	*gravel*
	Tertiary fraction	-
Particle shape (in case of gravel, cobble and boulders)	Form	*cubic*
	Angularity/roundness	*subangular*
	Surface texture	*rough*
Colour of sample	Hue	*brown*
	Chroma	*yellowish*
Consistency of fine fraction		*firm*
Carbonate content		*non-calcareous*
Organic content		*inorganic*
Macroscopic observations		-

IDENTIFICATION OF FINE FRACTION	
Dilatancy	*medium*
Toughness	*medium*
Plasticity	*low*
Dry strength	*high*
Feel	*granular*
Behaviour in water	*slow disintegration*
Behaviour in air	*slow drying*
Cohesion	*plastic deformation*
DESCRIPTION OF BEDDING AND DISCONTINUITY	
Bedding	*no bedding*
Discontinuity	*without discontinuities*

SAMPLE PICTURES

Fig. 1

Fig. 2

Laboratory personel responsible for description:	*Fodor-Ianosi Evelin*

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

IDENTIFICATION AND MACROSCOPIC DESCRIPTION OF LABORATORY SAMPLES

according to SR EN ISO 14688-1:2018

Test report

Client	*S.C. Glodeni Energy S.R.L.*			**Project No.**	*2819LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*			**Date of description**	*5-Feb-2024*
Borehole No.	*FS01*	**Superior depth of sample (m)**	5.50	**Sample No.**	*42675*
		Inferior depth of sample (m)	7.00		

DESCRIPTION OF SOIL PROPERTIES		
Type of soil		*coarse soil*
Particle size distribution	Primary fraction	*SAND*
	Secondary fraction I.	*gravel*
	Secondary fraction II.	*clay*
	Tertiary fraction	-
Particle shape (in case of gravel, cobble and boulders)	Form	*cubic*
	Angularity/roundness	*subrounded*
	Surface texture	*smooth*
Colour of sample	Hue	*brown*
	Chroma	-
Consistency of fine fraction		-
Carbonate content		*non-calcareous*
Organic content		*inorganic*
Macroscopic observations		-

IDENTIFICATION OF FINE FRACTION	
Dilatancy	-
Toughness	-
Plasticity	-
Dry strength	-
Feel	-
Behaviour in water	-
Behaviour in air	-
Cohesion	-
DESCRIPTION OF BEDDING AND DISCONTINUITY	
Bedding	*no bedding*
Discontinuity	*without discontinuities*

SAMPLE PICTURES

Fig. 1

Fig. 2

Laboratory personel responsible for description:	*Fodor-Ianosi Evelin*

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

IDENTIFICATION AND MACROSCOPIC DESCRIPTION OF LABORATORY SAMPLES

according to SR EN ISO 14688-1:2018

Test report

Client	*S.C. Glodeni Energy S.R.L.*			**Project No.**	*2819LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*			**Date of description**	*5-Feb-2024*
Borehole No.	*FS02*	**Superior depth of sample (m)**	1.60	**Sample No.**	*42677*
		Inferior depth of sample (m)	2.00		

DESCRIPTION OF SOIL PROPERTIES		
Type of soil		*fine soil*
Particle size distribution	Primary fraction	*CLAY*
	Secondary fraction I.	*sand*
	Secondary fraction II.	*silt*
	Tertiary fraction	-
Particle shape (in case of gravel, cobble and boulders)	Form	-
	Angularity/roundness	-
	Surface texture	-
Colour of sample	Hue	*brown*
	Chroma	*yellowish*
Consistency of fine fraction		*firm*
Carbonate content		*non-calcareous*
Organic content		*inorganic*
Macroscopic observations		-

IDENTIFICATION OF FINE FRACTION	
Dilatancy	*medium*
Toughness	*medium*
Plasticity	*medium*
Dry strength	*high*
Feel	*granular*
Behaviour in water	*slow disintegration*
Behaviour in air	*slow drying*
Cohesion	*plastic deformation*
DESCRIPTION OF BEDDING AND DISCONTINUITY	
Bedding	*no bedding*
Discontinuity	*without discontinuities*

SAMPLE PICTURES

Fig. 1

Fig. 2

Laboratory personel responsible for description:	*Fodor-Ianosi Evelin*

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

IDENTIFICATION AND MACROSCOPIC DESCRIPTION OF LABORATORY SAMPLES

according to SR EN ISO 14688-1:2018

Test report

Client	*S.C. Glodeni Energy S.R.L.*			**Project No.**	*2819LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*			**Date of description**	*5-Feb-2024*
Borehole No.	*FS02*	**Superior depth of sample (m)**	2.00	**Sample No.**	*42678*
		Inferior depth of sample (m)	2.45		

DESCRIPTION OF SOIL PROPERTIES		
Type of soil		*fine soil*
Particle size distribution	Primary fraction	*CLAY*
	Secondary fraction I.	*sand*
	Secondary fraction II.	*silt*
	Tertiary fraction	-
Particle shape (in case of gravel, cobble and boulders)	Form	-
	Angularity/roundness	-
	Surface texture	-
Colour of sample	Hue	*yellow*
	Chroma	*brownish*
Consistency of fine fraction		*firm*
Carbonate content		*non-calcareous*
Organic content		*inorganic*
Macroscopic observations		-

IDENTIFICATION OF FINE FRACTION	
Dilatancy	*medium*
Toughness	*medium*
Plasticity	*medium*
Dry strength	*high*
Feel	*granular*
Behaviour in water	*slow disintegration*
Behaviour in air	*slow drying*
Cohesion	*plastic deformation*
DESCRIPTION OF BEDDING AND DISCONTINUITY	
Bedding	*no bedding*
Discontinuity	*without discontinuities*

SAMPLE PICTURES

Fig. 1

Fig. 2

Laboratory personel responsible for description:	*Fodor-Ianosi Evelin*

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

IDENTIFICATION AND MACROSCOPIC DESCRIPTION OF LABORATORY SAMPLES

according to SR EN ISO 14688-1:2018

Test report

Client	*S.C. Glodeni Energy S.R.L.*			**Project No.**	*2819LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*			**Date of description**	*5-Feb-2024*
Borehole No.	*FS02*	**Superior depth of sample (m)**	2.60	**Sample No.**	*42679*
		Inferior depth of sample (m)	3.00		

DESCRIPTION OF SOIL PROPERTIES		
Type of soil		*fine soil*
Particle size distribution	Primary fraction	*CLAY*
	Secondary fraction I.	*sand*
	Secondary fraction II.	*silt*
	Tertiary fraction	-
Particle shape (in case of gravel, cobble and boulders)	Form	-
	Angularity/roundness	-
	Surface texture	-
Colour of sample	Hue	*yellow*
	Chroma	*greyish*
Consistency of fine fraction		*firm*
Carbonate content		*non-calcareous*
Organic content		*inorganic*
Macroscopic observations		-

IDENTIFICATION OF FINE FRACTION	
Dilatancy	*medium*
Toughness	*medium*
Plasticity	*medium*
Dry strength	*high*
Feel	*granular*
Behaviour in water	*slow disintegration*
Behaviour in air	*slow drying*
Cohesion	*plastic deformation*
DESCRIPTION OF BEDDING AND DISCONTINUITY	
Bedding	*no bedding*
Discontinuity	*without discontinuities*

SAMPLE PICTURES

Fig. 1

Fig. 2

Laboratory personel responsible for description:	*Fodor-Ianosi Evelin*

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

IDENTIFICATION AND MACROSCOPIC DESCRIPTION OF LABORATORY SAMPLES

according to SR EN ISO 14688-1:2018

Test report

Client	*S.C. Glodeni Energy S.R.L.*			**Project No.**	*2819LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*			**Date of description**	*5-Feb-2024*
Borehole No.	*FS02*	**Superior depth of sample (m)**	3.60	**Sample No.**	*42680*
		Inferior depth of sample (m)	3.78		

DESCRIPTION OF SOIL PROPERTIES		
Type of soil		*coarse soil*
Particle size distribution	Primary fraction	*SAND*
	Secondary fraction I.	*gravel*
	Secondary fraction II.	*clay*
	Tertiary fraction	-
Particle shape (in case of gravel, cobble and boulders)	Form	*cubic*
	Angularity/roundness	*subangular*
	Surface texture	*smooth*
Colour of sample	Hue	*yellow*
	Chroma	*brownish*
Consistency of fine fraction		-
Carbonate content		*non-calcareous*
Organic content		*inorganic*
Macroscopic observations		-

IDENTIFICATION OF FINE FRACTION	
Dilatancy	-
Toughness	-
Plasticity	-
Dry strength	-
Feel	-
Behaviour in water	-
Behaviour in air	-
Cohesion	-
DESCRIPTION OF BEDDING AND DISCONTINUITY	
Bedding	*no bedding*
Discontinuity	*without discontinuities*

SAMPLE PICTURES

Fig. 1

Fig. 2

Laboratory personel responsible for description:	*Fodor-Ianosi Evelin*

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

IDENTIFICATION AND MACROSCOPIC DESCRIPTION OF LABORATORY SAMPLES

according to SR EN ISO 14688-1:2018

Test report

Client	*S.C. Glodeni Energy S.R.L.*			**Project No.**	*2819LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*			**Date of description**	*5-Feb-2024*
Borehole No.	*FS02*	**Superior depth of sample (m)**	4.00	**Sample No.**	*42681*
		Inferior depth of sample (m)	5.00		

DESCRIPTION OF SOIL PROPERTIES		
Type of soil		*coarse soil*
Particle size distribution	Primary fraction	*SAND*
	Secondary fraction I.	*clay*
	Secondary fraction II.	*gravel*
	Tertiary fraction	-
Particle shape (in case of gravel, cobble and boulders)	Form	*cubic*
	Angularity/roundness	*subrounded*
	Surface texture	*smooth*
Colour of sample	Hue	*brown*
	Chroma	*yellowish*
Consistency of fine fraction		*firm*
Carbonate content		*non-calcareous*
Organic content		*inorganic*
Macroscopic observations		-

IDENTIFICATION OF FINE FRACTION	
Dilatancy	*medium*
Toughness	*medium*
Plasticity	*low*
Dry strength	*high*
Feel	*granular*
Behaviour in water	*fast disintegration*
Behaviour in air	*fast drying*
Cohesion	*plastic deformation*
DESCRIPTION OF BEDDING AND DISCONTINUITY	
Bedding	*no bedding*
Discontinuity	*without discontinuities*

SAMPLE PICTURES

Fig. 1

Fig. 2

Laboratory personel responsible for description:	*Fodor-Ianosi Evelin*

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

IDENTIFICATION AND MACROSCOPIC DESCRIPTION OF LABORATORY SAMPLES

according to SR EN ISO 14688-1:2018

Test report

Client	*S.C. Glodeni Energy S.R.L.*			**Project No.**	*2819LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*			**Date of description**	*5-Feb-2024*
Borehole No.	*FS02*	**Superior depth of sample (m)**	7.00	**Sample No.**	*42682*
		Inferior depth of sample (m)	8.00		

DESCRIPTION OF SOIL PROPERTIES		
Type of soil		*coarse soil*
Particle size distribution	Primary fraction	*SAND*
	Secondary fraction I.	*gravel*
	Secondary fraction II.	*silt*
	Tertiary fraction	-
Particle shape (in case of gravel, cobble and boulders)	Form	*cubic*
	Angularity/roundness	*subrounded*
	Surface texture	*smooth*
Colour of sample	Hue	*yellow*
	Chroma	*brownish*
Consistency of fine fraction		-
Carbonate content		*non-calcareous*
Organic content		*inorganic*
Macroscopic observations		-

IDENTIFICATION OF FINE FRACTION	
Dilatancy	-
Toughness	-
Plasticity	-
Dry strength	-
Feel	-
Behaviour in water	-
Behaviour in air	-
Cohesion	-
DESCRIPTION OF BEDDING AND DISCONTINUITY	
Bedding	*no bedding*
Discontinuity	*without discontinuities*

SAMPLE PICTURES

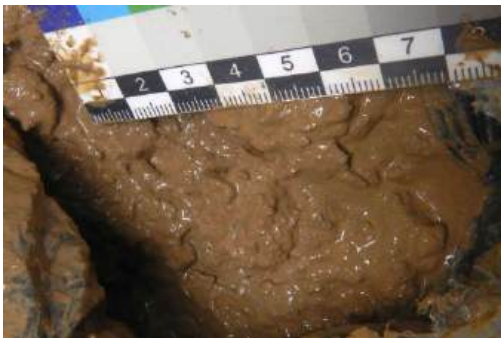


Fig. 1

Fig. 2

Laboratory personel responsible for description:	*Fodor-Ianosi Evelin*

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

IDENTIFICATION AND MACROSCOPIC DESCRIPTION OF LABORATORY SAMPLES

according to SR EN ISO 14688-1:2018

Test report

Client	*S.C. Glodeni Energy S.R.L.*			**Project No.**	*2819LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*			**Date of description**	*5-Feb-2024*
Borehole No.	*FS03*	**Superior depth of sample (m)**	1.00	**Sample No.**	*42685*
		Inferior depth of sample (m)	1.40		

DESCRIPTION OF SOIL PROPERTIES		
Type of soil		*fine soil*
Particle size distribution	Primary fraction	*CLAY*
	Secondary fraction I.	*sand*
	Secondary fraction II.	*silt*
	Tertiary fraction	-
Particle shape (in case of gravel, cobble and boulders)	Form	-
	Angularity/roundness	-
	Surface texture	-
Colour of sample	Hue	*brown*
	Chroma	*yellowish*
Consistency of fine fraction		*stiff*
Carbonate content		*non-calcareous*
Organic content		*inorganic*
Macroscopic observations		-

IDENTIFICATION OF FINE FRACTION	
Dilatancy	*slow*
Toughness	*medium*
Plasticity	*medium*
Dry strength	*high*
Feel	*granular*
Behaviour in water	*slow disintegration*
Behaviour in air	*slow drying*
Cohesion	*plastic deformation*
DESCRIPTION OF BEDDING AND DISCONTINUITY	
Bedding	*no bedding*
Discontinuity	*without discontinuities*

SAMPLE PICTURES

Fig. 1

Fig. 2

Laboratory personel responsible for description:	*Fodor-Ianosi Evelin*

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

IDENTIFICATION AND MACROSCOPIC DESCRIPTION OF LABORATORY SAMPLES

according to SR EN ISO 14688-1:2018

Test report

Client	*S.C. Glodeni Energy S.R.L.*			**Project No.**	*2819LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*			**Date of description**	*5-Feb-2024*
Borehole No.	*FS03*	**Superior depth of sample (m)**	1.40	**Sample No.**	*42686*
		Inferior depth of sample (m)	1.85		

DESCRIPTION OF SOIL PROPERTIES		
Type of soil		*fine soil*
Particle size distribution	Primary fraction	*CLAY*
	Secondary fraction I.	*sand*
	Secondary fraction II.	*silt*
	Tertiary fraction	-
Particle shape (in case of gravel, cobble and boulders)	Form	-
	Angularity/roundness	-
	Surface texture	-
Colour of sample	Hue	*yellow*
	Chroma	*brownish*
Consistency of fine fraction		*firm*
Carbonate content		*non-calcareous*
Organic content		*inorganic*
Macroscopic observations		-

IDENTIFICATION OF FINE FRACTION	
Dilatancy	*slow*
Toughness	*medium*
Plasticity	*medium*
Dry strength	*high*
Feel	*adherent*
Behaviour in water	*slow disintegration*
Behaviour in air	*slow drying*
Cohesion	*plastic deformation*
DESCRIPTION OF BEDDING AND DISCONTINUITY	
Bedding	*no bedding*
Discontinuity	*without discontinuities*

SAMPLE PICTURES

Fig. 1

Fig. 2

Laboratory personel responsible for description:	*Fodor-Ianosi Evelin*

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

IDENTIFICATION AND MACROSCOPIC DESCRIPTION OF LABORATORY SAMPLES

according to SR EN ISO 14688-1:2018

Test report

Client	*S.C. Glodeni Energy S.R.L.*			**Project No.**	*2819LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*			**Date of description**	*5-Feb-2024*
Borehole No.	*FS03*	**Superior depth of sample (m)**	2.00	**Sample No.**	*42687*
		Inferior depth of sample (m)	2.40		

DESCRIPTION OF SOIL PROPERTIES		
Type of soil		*fine soil*
Particle size distribution	Primary fraction	*CLAY*
	Secondary fraction I.	*sand*
	Secondary fraction II.	*silt*
	Tertiary fraction	-
Particle shape (in case of gravel, cobble and boulders)	Form	-
	Angularity/roundness	-
	Surface texture	-
Colour of sample	Hue	*yellow*
	Chroma	*brownish*
Consistency of fine fraction		*firm*
Carbonate content		*non-calcareous*
Organic content		*inorganic*
Macroscopic observations		-

IDENTIFICATION OF FINE FRACTION	
Dilatancy	*slow*
Toughness	*medium*
Plasticity	*medium*
Dry strength	*high*
Feel	*adherent*
Behaviour in water	*slow disintegration*
Behaviour in air	*slow drying*
Cohesion	*plastic deformation*
DESCRIPTION OF BEDDING AND DISCONTINUITY	
Bedding	*no bedding*
Discontinuity	*without discontinuities*

SAMPLE PICTURES

Fig. 1

Fig. 2

Laboratory personel responsible for description:	*Fodor-Ianosi Evelin*

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

IDENTIFICATION AND MACROSCOPIC DESCRIPTION OF LABORATORY SAMPLES

according to SR EN ISO 14688-1:2018

Test report

Client	*S.C. Glodeni Energy S.R.L.*			**Project No.**	*2819LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*			**Date of description**	*5-Feb-2024*
Borehole No.	*FS03*	**Superior depth of sample (m)**	3.00	**Sample No.**	*42688*
		Inferior depth of sample (m)	3.40		

DESCRIPTION OF SOIL PROPERTIES		
Type of soil		*coarse soil*
Particle size distribution	Primary fraction	*SAND*
	Secondary fraction I.	*clay*
	Secondary fraction II.	*silt*
	Tertiary fraction	-
Particle shape (in case of gravel, cobble and boulders)	Form	-
	Angularity/roundness	-
	Surface texture	-
Colour of sample	Hue	*yellow*
	Chroma	*brownish*
Consistency of fine fraction		*firm*
Carbonate content		*non-calcareous*
Organic content		*inorganic*
Macroscopic observations		-

IDENTIFICATION OF FINE FRACTION	
Dilatancy	*medium*
Toughness	*low*
Plasticity	*low*
Dry strength	*low*
Feel	*granular*
Behaviour in water	*fast disintegration*
Behaviour in air	*fast drying*
Cohesion	*crumbles*
DESCRIPTION OF BEDDING AND DISCONTINUITY	
Bedding	*no bedding*
Discontinuity	*without discontinuities*

SAMPLE PICTURES

Fig. 1

Fig. 2

Laboratory personel responsible for description:	*Fodor-Ianosi Evelin*

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

IDENTIFICATION AND MACROSCOPIC DESCRIPTION OF LABORATORY SAMPLES

according to SR EN ISO 14688-1:2018

Test report

Client	*S.C. Glodeni Energy S.R.L.*			**Project No.**	*2819LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*			**Date of description**	*5-Feb-2024*
Borehole No.	*FS03*	**Superior depth of sample (m)**	4.30	**Sample No.**	*42689*
		Inferior depth of sample (m)	6.00		

DESCRIPTION OF SOIL PROPERTIES		
Type of soil		*coarse soil*
Particle size distribution	Primary fraction	*SAND*
	Secondary fraction I.	*gravel*
	Secondary fraction II.	*silt*
	Tertiary fraction	-
Particle shape (in case of gravel, cobble and boulders)	Form	*cubic*
	Angularity/roundness	*subrounded*
	Surface texture	*rough*
Colour of sample	Hue	*brown*
	Chroma	*yellowish*
Consistency of fine fraction		-
Carbonate content		*non-calcareous*
Organic content		*inorganic*
Macroscopic observations		-

IDENTIFICATION OF FINE FRACTION	
Dilatancy	-
Toughness	-
Plasticity	-
Dry strength	-
Feel	-
Behaviour in water	-
Behaviour in air	-
Cohesion	-
DESCRIPTION OF BEDDING AND DISCONTINUITY	
Bedding	*no bedding*
Discontinuity	*without discontinuities*

SAMPLE PICTURES

Fig. 1

Fig. 2

Laboratory personel responsible for description:	*Fodor-Ianosi Evelin*

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

IDENTIFICATION AND MACROSCOPIC DESCRIPTION OF LABORATORY SAMPLES

according to SR EN ISO 14688-1:2018

Test report

Client	*S.C. Glodeni Energy S.R.L.*			**Project No.**	*2819LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*			**Date of description**	*5-Feb-2024*
Borehole No.	*FS03*	**Superior depth of sample (m)**	7.00	**Sample No.**	*42690*
		Inferior depth of sample (m)	8.00		

DESCRIPTION OF SOIL PROPERTIES		
Type of soil		*coarse soil*
Particle size distribution	Primary fraction	*SAND*
	Secondary fraction I.	*gravel*
	Secondary fraction II.	*silt*
	Tertiary fraction	-
Particle shape (in case of gravel, cobble and boulders)	Form	*cubic*
	Angularity/roundness	*subrounded*
	Surface texture	*smooth*
Colour of sample	Hue	*brown*
	Chroma	*yellowish*
Consistency of fine fraction		-
Carbonate content		*non-calcareous*
Organic content		*inorganic*
Macroscopic observations		-

IDENTIFICATION OF FINE FRACTION	
Dilatancy	-
Toughness	-
Plasticity	-
Dry strength	-
Feel	-
Behaviour in water	-
Behaviour in air	-
Cohesion	-
DESCRIPTION OF BEDDING AND DISCONTINUITY	
Bedding	*no bedding*
Discontinuity	*without discontinuities*

SAMPLE PICTURES

Fig. 1

Fig. 2

Laboratory personel responsible for description:	*Fodor-Ianosi Evelin*

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

IDENTIFICATION AND MACROSCOPIC DESCRIPTION OF SOIL SAMPLES IN LABORATORY

according to SR EN ISO 14688-1:2018

Test report - no. 47589-RDM/03.31.2025

Client	*S.C. GLODENI ENERGY S.R.L.*			**Project No.**	*3140LGS*
Location	*MUNICIPALITY VOIVODENI AND GLODENI, MUREȘ COUNTY, ROMÂNIA*			**Date of description**	*24-Mar-2025*
Borehole No.	*FS04*	**Superior depth of sample (m)**	1.30	**Sample No.**	*47589*
		Inferior depth of sample (m)	1.50		

DESCRIPTION OF SOIL PROPERTIES		
Type of soil		*Fine soil*
Particle size distribution	Primary fraction	*CLAY*
	Secondary fraction I.	*silt*
	Secondary fraction II.	*sand*
	Tertiary fraction	-
Particle shape (in case of gravel, cobble and boulders)	Form	-
	Angularity/roundness	-
	Surface texture	-
Colour of sample	Hue	*brown*
	Chroma	*greyish*
Consistency of fine soil		*stiff*
Carbonate content		*non-calcareous*
Organic content		*inorganic*
Macroscopic observations		-

IDENTIFICATION OF FINE FRACTION	
Dilatancy	*slow*
Toughness	*medium*
Plasticity	*medium*
Dry strength	*high*
Feel	*adherent*
Behaviour in water	*slow disintegration*
Behaviour in air	*slow drying*
Cohesion	*plastic deformation*
DESCRIPTION OF BEDDING AND DISCONTINUITY	
Bedding	*no bedding*
Discontinuity	*without discontinuities*

SAMPLE PICTURES

Fig. 1

Fig. 2

Laboratory personel responsible for description:	*Bunu Eduard, Fodor-Ianosi Evelin*

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

File code FL-111

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

IDENTIFICATION AND MACROSCOPIC DESCRIPTION OF SOIL SAMPLES IN LABORATORY

according to SR EN ISO 14688-1:2018

Test report - no. 47590-RDM/03.31.2025

Client	*S.C. GLODENI ENERGY S.R.L.*			**Project No.**	*3140LGS*
Location	*MUNICIPALITY VOIVODENI AND GLODENI, MUREȘ COUNTY, ROMÂNIA*			**Date of description**	*25-Mar-2025*
Borehole No.	*FS04*	**Superior depth of sample (m)**	1.50	**Sample No.**	*47590*
		Inferior depth of sample (m)	1.70		

DESCRIPTION OF SOIL PROPERTIES		
Type of soil		*Fine soil*
Particle size distribution	Primary fraction	*CLAY*
	Secondary fraction I.	*silt*
	Secondary fraction II.	*sand*
	Tertiary fraction	-
Particle shape (in case of gravel, cobble and boulders)	Form	-
	Angularity/roundness	-
	Surface texture	-
Colour of sample	Hue	*brown*
	Chroma	*greyish*
Consistency of fine soil		*stiff*
Carbonate content		*non-calcareous*
Organic content		*inorganic*
Macroscopic observations		-

IDENTIFICATION OF FINE FRACTION	
Dilatancy	*slow*
Toughness	*medium*
Plasticity	*medium*
Dry strength	*high*
Feel	*adherent*
Behaviour in water	*slow disintegration*
Behaviour in air	*slow drying*
Cohesion	*plastic deformation*
DESCRIPTION OF BEDDING AND DISCONTINUITY	
Bedding	*no bedding*
Discontinuity	*without discontinuities*

SAMPLE PICTURES

Fig. 1

Fig. 2

Laboratory personel responsible for description:	*Bunu Eduard, Fodor-Ianosi Evelin*

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

File code FL-111

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

IDENTIFICATION AND MACROSCOPIC DESCRIPTION OF SOIL SAMPLES IN LABORATORY

according to SR EN ISO 14688-1:2018

Test report - no. 47597-RDM/03.31.2025

Client	*S.C. GLODENI ENERGY S.R.L.*			**Project No.**	*3140LGS*
Location	*MUNICIPALITY VOIVODENI AND GLODENI, MUREȘ COUNTY, ROMÂNIA*			**Date of descriptio**	*24-Mar-2025*
Borehole No.	*FS04*	**Superior depth of sample (m)**	2.50	**Sample No.**	*47597*
		Inferior depth of sample (m)	3.20		

DESCRIPTION OF SOIL PROPERTIES		
Type of soil		*Coarse soil*
Particle size distribution	Primary fraction	*SAND*
	Secondary fraction I.	*gravel*
	Secondary fraction II.	*silt*
	Tertiary fraction	-
Particle shape (in case of gravel, cobble and boulders)	Form	*cubic*
	Angularity/roundness	*subrounded*
	Surface texture	*rough*
Colour of sample	Hue	*brown*
	Chroma	*yellowish*
Consistency of fine soil		-
Carbonate content		*non-calcareous*
Organic content		*inorganic*
Macroscopic observations		-

IDENTIFICATION OF FINE FRACTION	
Dilatancy	-
Toughness	-
Plasticity	-
Dry strength	-
Feel	-
Behaviour in water	-
Behaviour in air	-
Cohesion	-
DESCRIPTION OF BEDDING AND DISCONTINUITY	
Bedding	*no bedding*
Discontinuity	*without discontinuities*

SAMPLE PICTURES

Fig. 1

Fig. 2

Laboratory personel responsible for description:	*Bunu Eduard, Fodor-Ianosi Evelin*

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

File code FL-111

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

IDENTIFICATION AND MACROSCOPIC DESCRIPTION OF SOIL SAMPLES IN LABORATORY

according to SR EN ISO 14688-1:2018

Test report - no. 47591-RDM/03.31.2025

Client	*S.C. GLODENI ENERGY S.R.L.*			**Project No.**	*3140LGS*
Location	*MUNICIPALITY VOIVODENI AND GLODENI, MUREȘ COUNTY, ROMÂNIA*			**Date of descriptio**	*24-Mar-2025*
Borehole No.	*FS05*	**Superior depth of sample (m)**	1.30	**Sample No.**	*47591*
		Inferior depth of sample (m)	1.50		

DESCRIPTION OF SOIL PROPERTIES		
Type of soil		*Fine soil*
Particle size distribution	Primary fraction	*CLAY*
	Secondary fraction I.	*silt*
	Secondary fraction II.	*sand*
	Tertiary fraction	-
Particle shape (in case of gravel, cobble and boulders)	Form	-
	Angularity/roundness	-
	Surface texture	-
Colour of sample	Hue	*grey*
	Chroma	*brownish*
Consistency of fine soil		*firm*
Carbonate content		*non-calcareous*
Organic content		*inorganic*
Macroscopic observations		-

IDENTIFICATION OF FINE FRACTION	
Dilatancy	*slow*
Toughness	*medium*
Plasticity	*medium*
Dry strength	*high*
Feel	*adherent*
Behaviour in water	*slow disintegration*
Behaviour in air	*slow drying*
Cohesion	*plastic deformation*
DESCRIPTION OF BEDDING AND DISCONTINUITY	
Bedding	*no bedding*
Discontinuity	*without discontinuities*

SAMPLE PICTURES

Fig. 1

Fig. 2

Laboratory personel responsible for description:	*Bunu Eduard, Fodor-Ianosi Evelin*

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

File code FL-111

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

IDENTIFICATION AND MACROSCOPIC DESCRIPTION OF SOIL SAMPLES IN LABORATORY

according to SR EN ISO 14688-1:2018

Test report - no. 47592-RDM/03.31.2025

Client	*S.C. GLODENI ENERGY S.R.L.*			**Project No.**	*3140LGS*
Location	*MUNICIPALITY VOIVODENI AND GLODENI, MUREȘ COUNTY, ROMÂNIA*			**Date of descriptio**	*24-Mar-2025*
Borehole No.	*FS05*	**Superior depth of sample (m)**	1.50	**Sample No.**	*47592*
		Inferior depth of sample (m)	1.70		

DESCRIPTION OF SOIL PROPERTIES		
Type of soil		*Fine soil*
Particle size distribution	Primary fraction	*CLAY*
	Secondary fraction I.	*silt*
	Secondary fraction II.	*sand*
	Tertiary fraction	-
Particle shape (in case of gravel, cobble and boulders)	Form	-
	Angularity/roundness	-
	Surface texture	-
Colour of sample	Hue	*brown*
	Chroma	-
Consistency of fine soil		*firm*
Carbonate content		*non-calcareous*
Organic content		*inorganic*
Macroscopic observations		-

IDENTIFICATION OF FINE FRACTION	
Dilatancy	*slow*
Toughness	*medium*
Plasticity	*medium*
Dry strength	*high*
Feel	*adherent*
Behaviour in water	*slow disintegration*
Behaviour in air	*slow drying*
Cohesion	*plastic deformation*
DESCRIPTION OF BEDDING AND DISCONTINUITY	
Bedding	*no bedding*
Discontinuity	*without discontinuities*

SAMPLE PICTURES

Fig. 1

Fig. 2

Laboratory personel responsible for description:	*Bunu Eduard, Fodor-Ianosi Evelin*

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

File code FL-111

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

IDENTIFICATION AND MACROSCOPIC DESCRIPTION OF SOIL SAMPLES IN LABORATORY

according to SR EN ISO 14688-1:2018

Test report - no. 47593-RDM/03.31.2025

Client	*S.C. GLODENI ENERGY S.R.L.*			**Project No.**	*3140LGS*
Location	*MUNICIPALITY VOIVODENI AND GLODENI, MUREȘ COUNTY, ROMÂNIA*			**Date of description**	*24-Mar-2025*
Borehole No.	*FS06*	**Superior depth of sample (m)**	1.50	**Sample No.**	*47593*
		Inferior depth of sample (m)	1.70		

DESCRIPTION OF SOIL PROPERTIES		
Type of soil		*Fine soil*
Particle size distribution	Primary fraction	*CLAY*
	Secondary fraction I.	*silt*
	Secondary fraction II.	*sand*
	Tertiary fraction	-
Particle shape (in case of gravel, cobble and boulders)	Form	-
	Angularity/roundness	-
	Surface texture	-
Colour of sample	Hue	*brown*
	Chroma	-
Consistency of fine soil		*firm*
Carbonate content		*non-calcareous*
Organic content		*inorganic*
Macroscopic observations		-

IDENTIFICATION OF FINE FRACTION	
Dilatancy	*slow*
Toughness	*medium*
Plasticity	*medium*
Dry strength	*high*
Feel	*adherent*
Behaviour in water	*slow disintegration*
Behaviour in air	*slow drying*
Cohesion	*plastic deformation*
DESCRIPTION OF BEDDING AND DISCONTINUITY	
Bedding	*no bedding*
Discontinuity	*without discontinuities*

SAMPLE PICTURES

Fig. 1

Fig. 2

Laboratory personel responsible for description:	*Bunu Eduard, Fodor-Ianosi Evelin*

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

File code FL-111

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

IDENTIFICATION AND MACROSCOPIC DESCRIPTION OF SOIL SAMPLES IN LABORATORY

according to SR EN ISO 14688-1:2018

Test report - no. 47594-RDM/03.31.2025

Client	*S.C. GLODENI ENERGY S.R.L.*			**Project No.**	*3140LGS*
Location	*MUNICIPALITY VOIVODENI AND GLODENI, MUREȘ COUNTY, ROMÂNIA*			**Date of descriptio**	*24-Mar-2025*
Borehole No.	*FS06*	**Superior depth of sample (m)**	1.70	**Sample No.**	*47594*
		Inferior depth of sample (m)	2.00		

DESCRIPTION OF SOIL PROPERTIES		
Type of soil		*Fine soil*
Particle size distribution	Primary fraction	*CLAY*
	Secondary fraction I.	*silt*
	Secondary fraction II.	*sand*
	Tertiary fraction	-
Particle shape (in case of gravel, cobble and boulders)	Form	-
	Angularity/roundness	-
	Surface texture	-
Colour of sample	Hue	*brown*
	Chroma	*greyish*
Consistency of fine soil		*firm*
Carbonate content		*non-calcareous*
Organic content		*inorganic*
Macroscopic observations		-

IDENTIFICATION OF FINE FRACTION	
Dilatancy	*slow*
Toughness	*medium*
Plasticity	*medium*
Dry strength	*high*
Feel	*adherent*
Behaviour in water	*slow disintegration*
Behaviour in air	*slow drying*
Cohesion	*plastic deformation*
DESCRIPTION OF BEDDING AND DISCONTINUITY	
Bedding	*no bedding*
Discontinuity	*without discontinuities*

SAMPLE PICTURES

Fig. 1

Fig. 2

Laboratory personel responsible for description:	*Bunu Eduard, Fodor-Ianosi Evelin*

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

File code FL-111

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

IDENTIFICATION AND MACROSCOPIC DESCRIPTION OF SOIL SAMPLES IN LABORATORY

according to SR EN ISO 14688-1:2018

Test report - no. 47595-RDM/03.31.2025

Client	*S.C. GLODENI ENERGY S.R.L.*			**Project No.**	*3140LGS*
Location	*MUNICIPALITY VOIVODENI AND GLODENI, MUREȘ COUNTY, ROMÂNIA*			**Date of description**	*24-Mar-2025*
Borehole No.	*FS07*	**Superior depth of sample (m)**	1.30	**Sample No.**	*47595*
		Inferior depth of sample (m)	1.50		

DESCRIPTION OF SOIL PROPERTIES		
Type of soil		*Fine soil*
Particle size distribution	Primary fraction	*CLAY*
	Secondary fraction I.	*silt*
	Secondary fraction II.	*sand*
	Tertiary fraction	*carbonate fragments*
Particle shape (in case of gravel, cobble and boulders)	Form	-
	Angularity/roundness	-
	Surface texture	-
Colour of sample	Hue	*brown*
	Chroma	-
Consistency of fine soil		*firm*
Carbonate content		*slightly calcareous*
Organic content		*inorganic*
Macroscopic observations		-

IDENTIFICATION OF FINE FRACTION	
Dilatancy	*slow*
Toughness	*high*
Plasticity	*high*
Dry strength	*high*
Feel	*adherent*
Behaviour in water	*slow disintegration*
Behaviour in air	*slow drying*
Cohesion	*plastic deformation*
DESCRIPTION OF BEDDING AND DISCONTINUITY	
Bedding	*no bedding*
Discontinuity	*without discontinuities*

SAMPLE PICTURES

Fig. 1

Fig. 2

Laboratory personel responsible for description:	*Bunu Eduard, Fodor-Ianosi Evelin*

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

File code FL-111

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

IDENTIFICATION AND MACROSCOPIC DESCRIPTION OF SOIL SAMPLES IN LABORATORY

according to SR EN ISO 14688-1:2018

Test report - no. 47596-RDM/03.31.2025

Client	*S.C. GLODENI ENERGY S.R.L.*	**Project No.**	*3140LGS*
Location	*MUNICIPALITY VOIVODENI AND GLODENI, MUREȘ COUNTY, ROMÂNIA*	**Date of description**	*24-Mar-2025*
Borehole No.	*FS07*	**Superior depth of sample (m)** 1.50 **Inferior depth of sample (m)** 1.70	**Sample No.** *47596*

DESCRIPTION OF SOIL PROPERTIES		
Type of soil		*Fine soil*
Particle size distribution	Primary fraction	*CLAY*
	Secondary fraction I.	*sand*
	Secondary fraction II.	*silt*
	Tertiary fraction	-
Particle shape (in case of gravel, cobble and boulders)	Form	-
	Angularity/roundness	-
	Surface texture	-
Colour of sample	Hue	*brown*
	Chroma	*yellowish*
Consistency of fine soil		*firm*
Carbonate content		*non-calcareous*
Organic content		*inorganic*
Macroscopic observations		-

IDENTIFICATION OF FINE FRACTION	
Dilatancy	*medium*
Toughness	*low*
Plasticity	*low*
Dry strength	*low*
Feel	*granular*
Behaviour in water	*fast disintegration*
Behaviour in air	-
Cohesion	*crumbles*
DESCRIPTION OF BEDDING AND DISCONTINUITY	
Bedding	*no bedding*
Discontinuity	*without discontinuities*

SAMPLE PICTURES

Fig. 1

Fig. 2

Laboratory personel responsible for description:	*Bunu Eduard, Fodor-Ianosi Evelin*

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

File code FL-111

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF WATER CONTENT, PLASTICITY AND FREE SWELL INDEX OF SOILS
according to SR EN ISO 17892-1:2015, SR EN ISO 17892-12:2018, STAS 1913/12 - 88
Test report

Client	*S.C. Glodeni Energy S.R.L.*					**Project No.**	*2819LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*					**Date of reception**	*18.01.2024*
Borehole No.	*FS01*	**Superior depth of sample (m)**	*2.00*	**Sample description**	*low plasticity sandy CLAY*	**Date of test**	*05.02.2024*
		Inferior depth of sample (m)	*2.40*			**Sample No.**	*42672*

DETERMINATION OF WATER CONTENT – FL – 093				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Container no.	[–]	377	588	-
Mass of container (m_c)	[g]	34.83	42.62	-
Mass of moist test specimen + container (m_u)	[g]	165.060	985.200	-
Mass of dried test specimen + container (m_d)	[g]	143.810	829.750	-
Formula $w = \frac{m_u - m_d}{m_d - m_c} x100$				
Water content (w)	[%]	19.50	19.75	-
Admissibility (Max - Min < 2%)	[%]	**0.25 – ACCEPTED**		
Average result	[%]	**19.62**		

DETERMINATION OF PLASTIC LIMIT – THREAD ROLLING TEST METHOD – FL – 094				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Container no.	[–]	226	231	271
Mass of container (m_c)	[g]	21.11	21.50	21.20
Mass of moist test specimen + container (A)	[g]	23.830	24.400	23.700
Mass of dried test specimen + container (B)	[g]	23.510	24.080	23.420
Formula $w_p = \frac{A - B}{B - mC} x100$				
Plastic limit (w_P)	[%]	13.33	12.40	12.61
Admissibility (Max - Min < 2 %)	[%]	**0.93 – ACCEPTED**		
Average result	[%]	**12.78**		

DETERMINATION OF LIQUID LIMIT – FALL CONE TEST METHOD – FL – 094					
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**	**Specimen no. 4**
		1	**2**	**3**	**4**
Container no.	[–]	998	1000	1002	1007
Mass of the container (C)	[g]	12.63	12.35	12.79	11.84
Mass of moist test specimen + container (A)	[g]	27.420	29.700	28.890	30.100
Mass of dried test specimen + container (B)	[g]	24.220	25.770	24.990	25.590
Cone penetration depth (N)	[mm]	16.95	19.16	22.61	23.82
Water content (w)	[%]	27.61	29.28	31.97	32.80
BEST STRAIGHT-LINE FIT METHOD – THE MEASURED WATER CONTENTS IN ORDINATE AND THE CORRESPONDING CONE PENETREATIONS AS ABSCISSA. THE VALUE OF LIQUID LIMIT IS THE WATER CONTENT CORRESPONDING TO 20 mm PENETRATION.					

Laboratory evaluator
eng. geol. Gáll Hunor

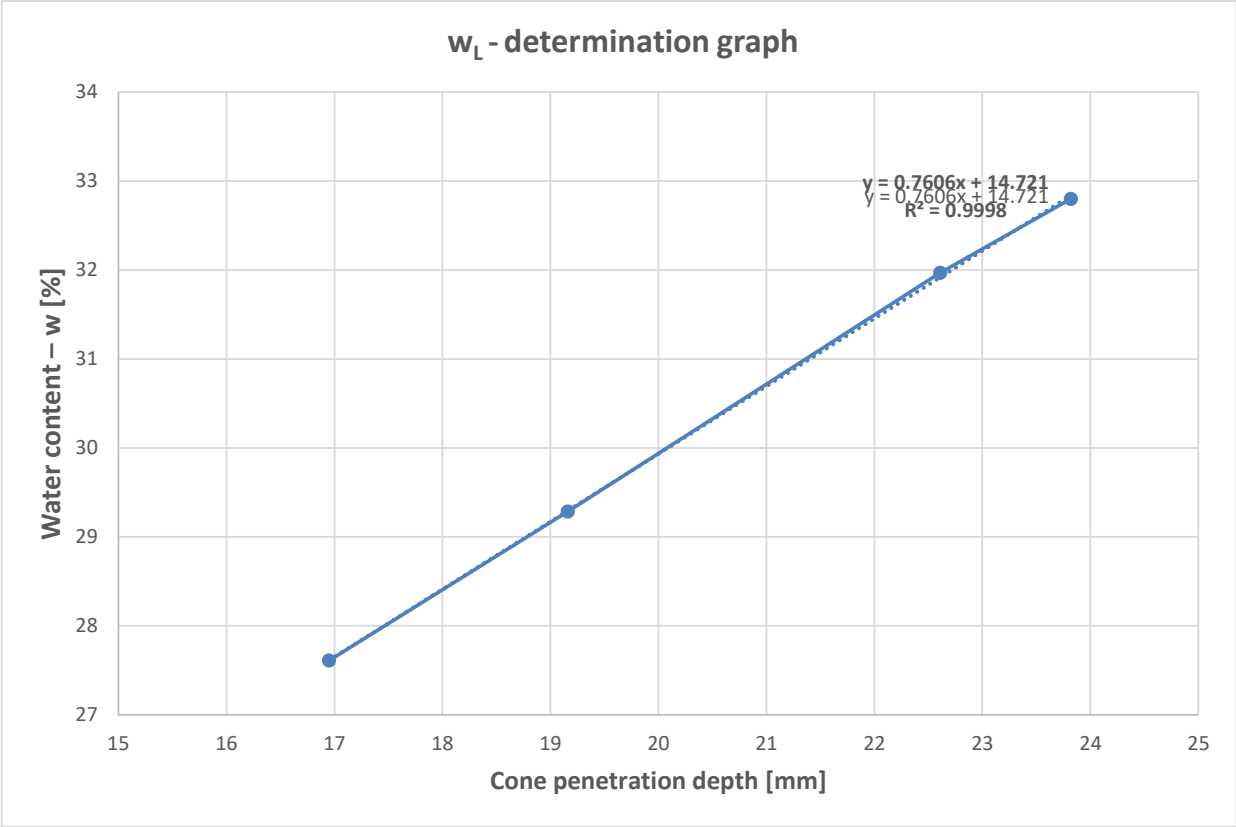
Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

Test report



Admissibility (collinearity 3 pct.)	[%]	**DA**
Liquid limit (w_L)	[%]	**29.93**
Correlation coefficient	[-]	**0.9998**

DETERMINATION OF FREE SWELL INDEX (12g MATERIAL) – FL– 096				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Graduated cyilinder no.	[–]	1	2	201
Initial volume of soil specimen (V_i)	[cm^3]	10	10	10
Final volume of soil specimen (V_f)	[cm^3]	15	15	15
Formula	$U_L = 10x(V_f - V_i)$			
Free swell index (U_L)	[%]	50	50	50
Admissibility (Max - Min < 10%)	[%]	**0 – ACCEPTED**		
Average result	[%]	**50**		

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF BULK AND PARTICLE DENSITY OF SOILS
according to SR EN ISO 17892-2:2015, SR EN ISO 17892-3:2016
Test report

Client	*S.C. Glodeni Energy S.R.L.*					**Project No.**	*2819LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*					**Date of reception**	*18.01.2024*
Borehole No.	*FS01*	**Superior depth of sample (m)**	*2.00*	**Sample description**	*low plasticity sandy CLAY*	**Date of test**	*05.02.2024*
		Inferior depth of sample (m)	*2.40*			**Sample No.**	*42672*

DETERMINATION OF BULK DENSITY – IMMERSION IN FLUID METHOD – FL – 095				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Mass of the soil specimen (m_0)	[g]	29.980	30.590	33.330
Mass of the specimen with coating wax (m_1)	[g]	31.470	32.670	34.790
Mass of the immersed specimen (m_2)	[g]	14.110	14.260	15.780
Formula	$V_1 = \frac{m_1 - m_2}{\rho_{fluid}}$, $\rho_{fluid} = 0,998 g/cm^3$	$V_2 = \frac{m_1 - m_0}{\rho_{wax}}$	$\rho_{specimen} = \frac{m_0}{V_1 - V_2}$	
Volume of the immersed specimen (V_1)	[cm^3]	17.39	18.45	19.05
Volume of the coating wax (V_2)	[cm^3]	1.62	2.26	1.59
Bulk density (ρ_i)	[g/cm^3]	1.90	1.89	1.91
Admissibility ((ρ_i-ρ_{i_min}) / ρ_i < 1%)	[%]	**0.55 – ACCEPTED**	**0 – ACCEPTED**	**0.99 – ACCEPTED**
Average result - Bulk Density (ρ)	[g/cm^3]	**1.90**		
Average result - Bulk unit weight (γ)	[kN/m^3]	**18.64**		

DETERMINATION OF PARTICLE DENSITY – FLUID PYCNOMETER METHOD – FL – 099			
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**
		1	**2**
Pycnometer no.	[-]	-	-
Mass of the oven dried test specimen (m_4)	[g]	-	-
Mass of the pycnometer + specimen + control fluid (m_3)	[g]	-	-
Mass of the dry pycnometer (m_0)	[g]	-	-
Mass of the pycnometer + control fluid (m_1)	[g]	-	-
Mass of the pycnometer + dry specimen (m_2)	[g]	-	-
Formula	$\rho_s = \frac{m_4}{(m_1 - m_0) - (m_3 - m_2)} * \rho_L$	$\rho_{L\,(20^oC)} = 0,99823\ g/cm^3$	
Soil particle density (ρ_s)	[g/cm^3]	-	-
Soil particle unit weight (γ_s)	[kN/m^3]	-	-
Admissibility (ρ_{s2}-min(ρ_{s1},ρ_{s2}) < 0.03 g/cm^3)	[g/cm^3]	-	-
Average result - Soil particle density ($\rho_{s\ -\ final}$)	[g/cm^3]	-	
Average result - Soil particle unit weight ($\gamma_{s\ -\ final}$)	[kN/m^3]	-	

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMANIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF WATER CONTENT, PLASTICITY AND FREE SWELL INDEX OF SOILS according to SR EN ISO 17892-1:2015, SR EN ISO 17892-12:2018, STAS 1913/12 - 88

Test report

Client	*S.C. Glodeni Energy S.R.L.*					**Project No.**	*2819LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*					**Date of reception**	*18.01.2024*
Borehole No.	*FS01*	**Superior depth of sample (m)**	*3.60*	**Sample description**	*gravelly low plasticity clayey SAND*	**Date of test**	*05.02.2024*
		Inferior depth of sample (m)	*4.00*			**Sample No.**	*42674*

DETERMINATION OF WATER CONTENT – FL – 093				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Container no.	[–]	416	1053	-
Mass of container (m_c)	[g]	34.93	226.65	-
Mass of moist test specimen + container (m_u)	[g]	257.490	1491.180	-
Mass of dried test specimen + container (m_d)	[g]	225.010	1304.620	-
Formula $w = \frac{m_u - m_d}{m_d - m_c} x100$				
Water content (w)	[%]	17.09	17.31	-
Admissibility (Max - Min < 2%)	[%]	**0.22 – ACCEPTED**		
Average result	[%]	**17.20**		

DETERMINATION OF PLASTIC LIMIT – THREAD ROLLING TEST METHOD – FL – 094				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Container no.	[–]	896	897	898
Mass of container (m_c)	[g]	19.92	20.61	21.99
Mass of moist test specimen + container (A)	[g]	22.770	23.100	24.380
Mass of dried test specimen + container (B)	[g]	22.430	22.810	24.100
Formula $w_p = \frac{A - B}{B - mC} x100$				
Plastic limit (w_P)	[%]	13.55	13.18	13.27
Admissibility (Max - Min < 2 %)	[%]	**0.36 – ACCEPTED**		
Average result	[%]	**13.33**		

DETERMINATION OF LIQUID LIMIT – FALL CONE TEST METHOD – FL – 094					
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**	**Specimen no. 4**
		1	**2**	**3**	**4**
Container no.	[–]	962	963	965	968
Mass of the container (C)	[g]	11.93	11.61	11.69	12.91
Mass of moist test specimen + container (A)	[g]	29.830	31.770	31.770	31.880
Mass of dried test specimen + container (B)	[g]	25.880	27.210	27.070	27.330
Cone penetration depth (N)	[mm]	17.82	19.25	21.59	23.27
Water content (w)	[%]	28.32	29.23	30.56	31.55
BEST STRAIGHT-LINE FIT METHOD – THE MEASURED WATER CONTENTS IN ORDINATE AND THE CORRESPONDING CONE PENETREATIONS AS ABSCISSA. THE VALUE OF LIQUID LIMIT IS THE WATER CONTENT CORRESPONDING TO 20 mm PENETRATION.					

Laboratory evaluator
eng. geol. Gáll Hunor

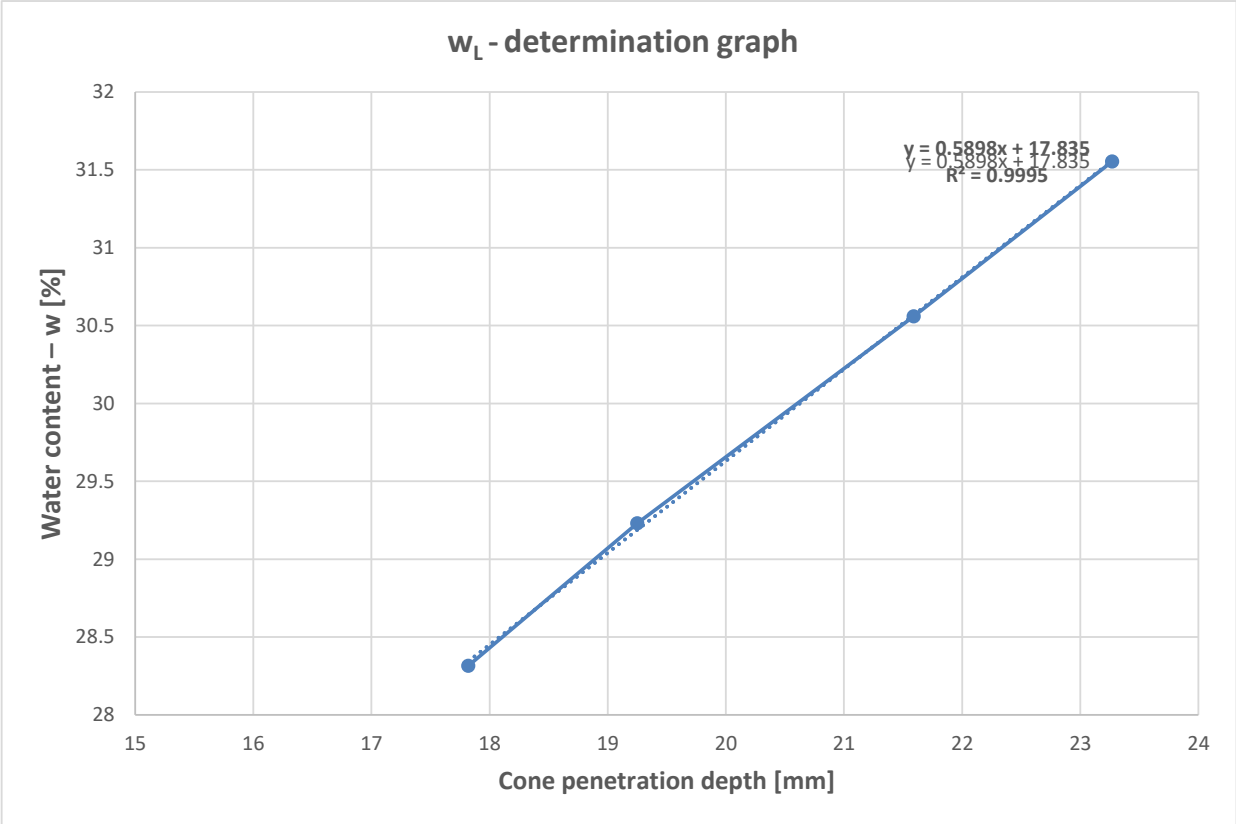
Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

Test report



Admissibility (collinearity 3 pct.)	[%]	**DA**
Liquid limit (w_L)	[%]	**29.63**
Correlation coefficient	[-]	**0.9995**

DETERMINATION OF FREE SWELL INDEX (12g MATERIAL) – FL– 096				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Graduated cyilinder no.	[–]	-	-	-
Initial volume of soil specimen (V_i)	[cm^3]	-	-	-
Final volume of soil specimen (V_f)	[cm^3]	-	-	-
Formula	$U_L = 10x(V_f - V_i)$			
Free swell index (U_L)	[%]	-	-	-
Admissibility (Max - Min < 10%)	[%]	-		
Average result	[%]	-		

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF BULK AND PARTICLE DENSITY OF SOILS
according to SR EN ISO 17892-2:2015, SR EN ISO 17892-3:2016
Test report

Client	*S.C. Glodeni Energy S.R.L.*					**Project No.**	*2819LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*					**Date of reception**	*18.01.2024*
Borehole No.	*FS01*	**Superior depth of sample (m)**	*3.60*	**Sample description**	*gravelly low plasticity clayey SAND*	**Date of test**	*05.02.2024*
		Inferior depth of sample (m)	*4.00*			**Sample No.**	*42674*

DETERMINATION OF BULK DENSITY – IMMERSION IN FLUID METHOD – FL – 095				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Mass of the soil specimen (m_0)	[g]	40.920	53.520	33.210
Mass of the specimen with coating wax (m_1)	[g]	43.070	56.020	34.870
Mass of the immersed specimen (m_2)	[g]	20.900	27.490	17.100
Formula $V_1 = \frac{m_1 - m_2}{\rho_{fluid}}$, $\rho_{fluid} = 0,998 g/cm^3$ $V_2 = \frac{m_1 - m_0}{\rho_{wax}}$ $\rho_{specimen} = \frac{m_0}{V_1 - V_2}$				
Volume of the immersed specimen (V_1)	[cm^3]	22.21	28.59	17.81
Volume of the coating wax (V_2)	[cm^3]	2.34	2.72	1.80
Bulk density (ρ_i)	[g/cm^3]	2.06	2.07	2.08
Admissibility ((ρ_i-ρ_{i_min}) / ρ_i < 1%)	[%]	**0 – ACCEPTED**	**0.49 – ACCEPTED**	**0.81 – ACCEPTED**
Average result - Bulk Density (ρ)	[g/cm^3]	**2.07**		
Average result - Bulk unit weight (γ)	[kN/m^3]	**20.28**		

DETERMINATION OF PARTICLE DENSITY – FLUID PYCNOMETER METHOD – FL – 099			
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**
		1	**2**
Pycnometer no.	[-]	-	-
Mass of the oven dried test specimen (m_4)	[g]	-	-
Mass of the pycnometer + specimen + control fluid (m_3)	[g]	-	-
Mass of the dry pycnometer (m_0)	[g]	-	-
Mass of the pycnometer + control fluid (m_1)	[g]	-	-
Mass of the pycnometer + dry specimen (m_2)	[g]	-	-
Formula $\rho_s = \frac{m_4}{(m_1 - m_0) - (m_3 - m_2)} * \rho_L$ $\rho_{L\,(20^oC)} = 0,99823\ g/cm^3$			
Soil particle density (ρ_s)	[g/cm^3]	-	-
Soil particle unit weight (γ_s)	[kN/m^3]	-	-
Admissibility (ρ_{s2}-min(ρ_{s1},ρ_{s2}) < 0.03 g/cm^3)	[g/cm^3]	-	-
Average result - Soil particle density ($\rho_{s\ -\ final}$)	[g/cm^3]	-	
Average result - Soil particle unit weight ($\gamma_{s\ -\ final}$)	[kN/m^3]	-	

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMANIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF WATER CONTENT, PLASTICITY AND FREE SWELL INDEX OF SOILS according to SR EN ISO 17892-1:2015, SR EN ISO 17892-12:2018, STAS 1913/12 - 88

Test report

Client	*S.C. Glodeni Energy S.R.L.*					**Project No.**	*2819LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*					**Date of reception**	*18.01.2024*
Borehole No.	*FS01*	**Superior depth of sample (m)**	*5.50*	**Sample description**	*sandy silty GRAVEL*	**Date of test**	*05.02.2024*
		Inferior depth of sample (m)	*7.00*			**Sample No.**	*42675*

DETERMINATION OF WATER CONTENT – FL – 093				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Container no.	[–]	574	1059	-
Mass of container (m_c)	[g]	36.86	236.58	-
Mass of moist test specimen + container (m_u)	[g]	437.660	2765.740	-
Mass of dried test specimen + container (m_d)	[g]	405.610	2598.540	-
Formula	$w = \frac{m_u - m_d}{m_d - m_c} x100$			
Water content (w)	[%]	8.69	7.08	-
Admissibility (Max - Min < 2%)	[%]	**1.61 – ACCEPTED**		
Average result	[%]	**7.89**		

DETERMINATION OF PLASTIC LIMIT – THREAD ROLLING TEST METHOD – FL – 094				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Container no.	[–]	-	-	-
Mass of container (m_c)	[g]	-	-	-
Mass of moist test specimen + container (A)	[g]	-	-	-
Mass of dried test specimen + container (B)	[g]	-	-	-
Formula	$w_p = \frac{A - B}{B - mC} x100$			
Plastic limit (w_P)	[%]	-	-	-
Admissibility (Max - Min < 2 %)	[%]	-		
Average result	[%]	-		

DETERMINATION OF LIQUID LIMIT – FALL CONE TEST METHOD – FL – 094					
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**	**Specimen no. 4**
		1	**2**	**3**	**4**
Container no.	[–]	-	-	-	-
Mass of the container (C)	[g]	-	-	-	-
Mass of moist test specimen + container (A)	[g]	-	-	-	-
Mass of dried test specimen + container (B)	[g]	-	-	-	-
Cone penetration depth (N)	[mm]	-	-	-	-
Water content (w)	[%]	-	-	-	-
BEST STRAIGHT-LINE FIT METHOD – THE MEASURED WATER CONTENTS IN ORDINATE AND THE CORRESPONDING CONE PENETREATIONS AS ABSCISSA. THE VALUE OF LIQUID LIMIT IS THE WATER CONTENT CORRESPONDING TO 20 mm PENETRATION.					

Laboratory evaluator
eng. geol. Gáll Hunor

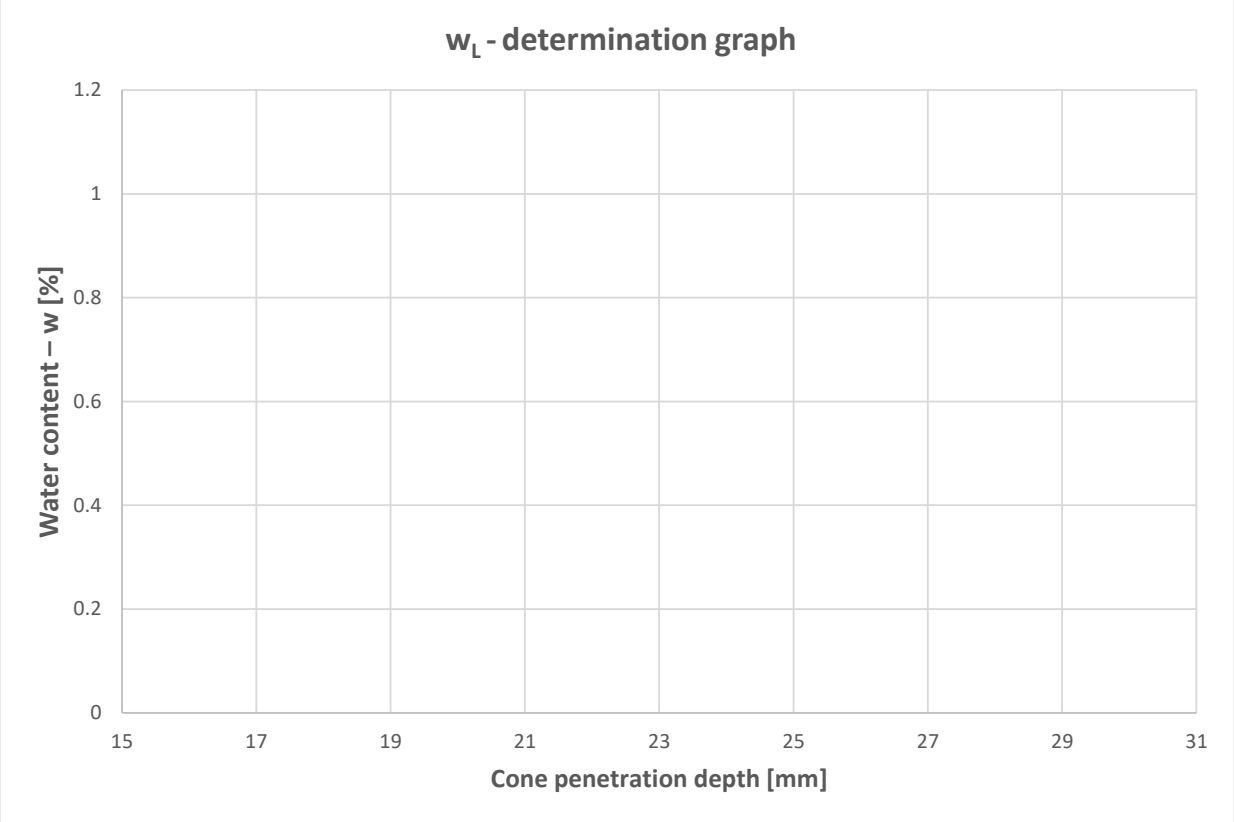
Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

Test report



Admissibility (collinearity 3 pct.)	[%]	-
Liquid limit (w_L)	[%]	-
Correlation coefficient	[-]	-

DETERMINATION OF FREE SWELL INDEX (12g MATERIAL) – FL– 096				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Graduated cyilinder no.	[–]	-	-	-
Initial volume of soil specimen (V_i)	[cm^3]	-	-	-
Final volume of soil specimen (V_f)	[cm^3]	-	-	-
Formula $U_L = 10x(V_f - V_i)$				
Free swell index (U_L)	[%]	-	-	-
Admissibility (Max - Min < 10%)	[%]	-		
Average result	[%]	-		

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF WATER CONTENT, PLASTICITY AND FREE SWELL INDEX OF SOILS
according to SR EN ISO 17892-1:2015, SR EN ISO 17892-12:2018, STAS 1913/12 - 88
Test report

Client	*S.C. Glodeni Energy S.R.L.*					**Project No.**	*2819LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*					**Date of reception**	*18.01.2024*
Borehole No.	*FS02*	**Superior depth of sample (m)**	*1.60*	**Sample description**	*low plasticity sandy CLAY*	**Date of test**	*05.02.2024*
		Inferior depth of sample (m)	*2.00*			**Sample No.**	*42677*

DETERMINATION OF WATER CONTENT – FL – 093				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Container no.	[–]	3014	781	-
Mass of container (m_c)	[g]	36.57	61.53	-
Mass of moist test specimen + container (m_u)	[g]	186.140	848.400	-
Mass of dried test specimen + container (m_d)	[g]	162.040	717.780	-
Formula	$w = \frac{m_u - m_d}{m_d - m_c} x100$			
Water content (w)	[%]	19.21	19.90	-
Admissibility (Max - Min < 2%)	[%]	**0.7 – ACCEPTED**		
Average result	[%]	**19.56**		

DETERMINATION OF PLASTIC LIMIT – THREAD ROLLING TEST METHOD – FL – 094				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Container no.	[–]	217	218	219
Mass of container (m_c)	[g]	20.36	21.24	21.75
Mass of moist test specimen + container (A)	[g]	23.020	23.620	23.340
Mass of dried test specimen + container (B)	[g]	22.680	23.310	23.140
Formula	$w_p = \frac{A - B}{B - mC} x100$			
Plastic limit (w_P)	[%]	14.66	14.98	14.39
Admissibility (Max - Min < 2 %)	[%]	**0.59 – ACCEPTED**		
Average result	[%]	**14.67**		

DETERMINATION OF LIQUID LIMIT – FALL CONE TEST METHOD – FL – 094					
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**	**Specimen no. 4**
		1	**2**	**3**	**4**
Container no.	[–]	970	971	972	973
Mass of the container (C)	[g]	12.33	12.51	13.03	12.80
Mass of moist test specimen + container (A)	[g]	34.670	34.280	37.660	37.180
Mass of dried test specimen + container (B)	[g]	31.250	30.330	31.910	30.610
Cone penetration depth (N)	[mm]	17.16	18.56	21.36	23.38
Water content (w)	[%]	18.08	22.17	30.46	36.89
BEST STRAIGHT-LINE FIT METHOD – THE MEASURED WATER CONTENTS IN ORDINATE AND THE CORRESPONDING CONE PENETREATIONS AS ABSCISSA. THE VALUE OF LIQUID LIMIT IS THE WATER CONTENT CORRESPONDING TO 20 mm PENETRATION.					

Laboratory evaluator
eng. geol. Gáll Hunor

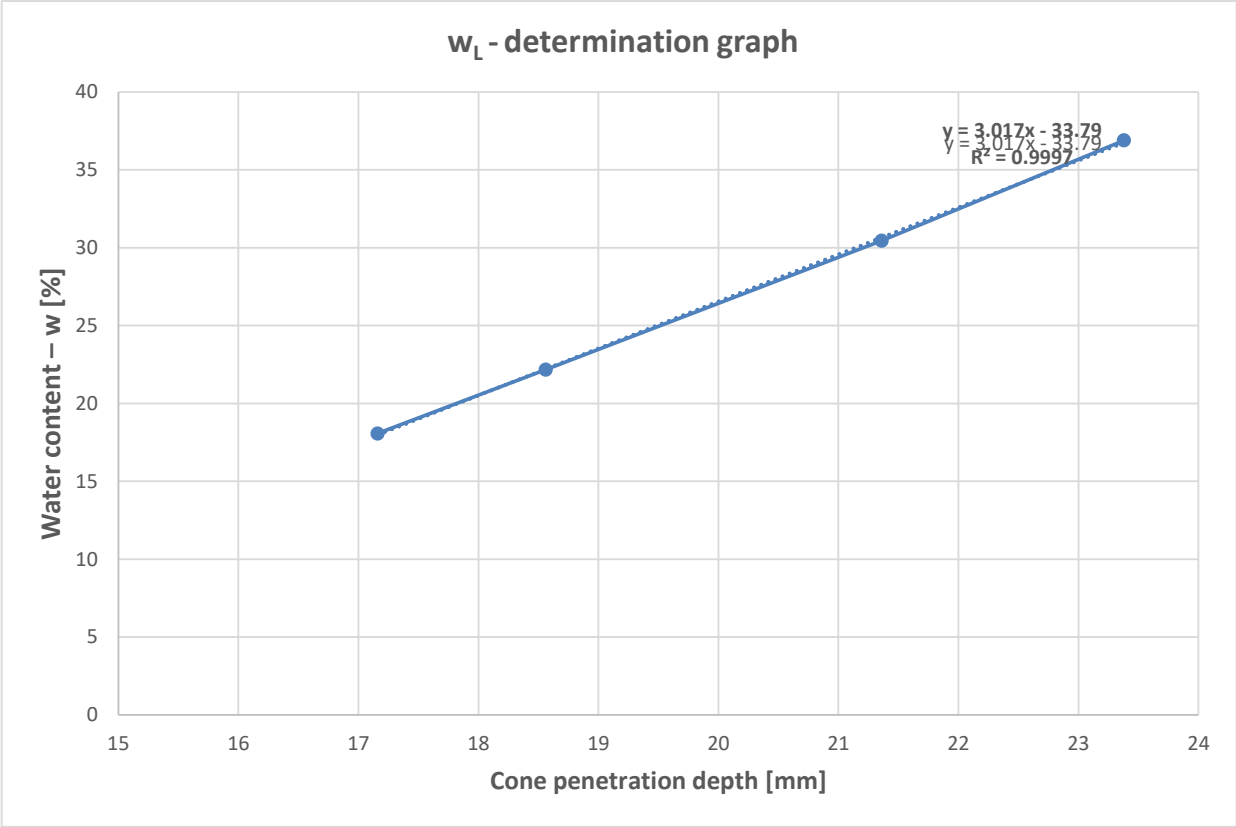
Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

Test report



Admissibility (collinearity 3 pct.)	[%]	**DA**
Liquid limit (w_L)	[%]	**26.55**
Correlation coefficient	[-]	**0.9997**

DETERMINATION OF FREE SWELL INDEX (12g MATERIAL) – FL– 096				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Graduated cyilinder no.	[–]	3	4	202
Initial volume of soil specimen (V_i)	[cm^3]	10	10	10
Final volume of soil specimen (V_f)	[cm^3]	17	17	17
Formula	$U_L = 10x(V_f - V_i)$			
Free swell index (U_L)	[%]	70	70	70
Admissibility (Max - Min < 10%)	[%]	**0 – ACCEPTED**		
Average result	[%]	**70**		

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF BULK AND PARTICLE DENSITY OF SOILS
according to SR EN ISO 17892-2:2015, SR EN ISO 17892-3:2016
Test report

Client	*S.C. Glodeni Energy S.R.L.*					**Project No.**	*2819LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*					**Date of reception**	*18.01.2024*
Borehole No.	*FS02*	**Superior depth of sample (m)**	*1.60*	**Sample description**	*low plasticity sandy CLAY*	**Date of test**	*05.02.2024*
		Inferior depth of sample (m)	*2.00*			**Sample No.**	*42677*

DETERMINATION OF BULK DENSITY – IMMERSION IN FLUID METHOD – FL – 095				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Mass of the soil specimen (m_0)	[g]	27.500	37.740	21.470
Mass of the specimen with coating wax (m_1)	[g]	29.480	39.730	22.920
Mass of the immersed specimen (m_2)	[g]	13.150	18.110	10.280
Formula	$V_1 = \frac{m_1 - m_2}{\rho_{fluid}}$, $\rho_{fluid} = 0,998 g/cm^3$	$V_2 = \frac{m_1 - m_0}{\rho_{wax}}$	$\rho_{specimen} = \frac{m_0}{V_1 - V_2}$	
Volume of the immersed specimen (V_1)	[cm^3]	16.36	21.66	12.67
Volume of the coating wax (V_2)	[cm^3]	2.15	2.16	1.58
Bulk density (ρ_i)	[g/cm^3]	1.94	1.94	1.94
Admissibility ((ρ_i-ρ_{i_min}) / ρ_i < 1%)	[%]	**0 – ACCEPTED**	**0.01 – ACCEPTED**	**0.05 – ACCEPTED**
Average result - Bulk Density (ρ)	[g/cm^3]	**1.94**		
Average result - Bulk unit weight (γ)	[kN/m^3]	**18.99**		

DETERMINATION OF PARTICLE DENSITY – FLUID PYCNOMETER METHOD – FL – 099			
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**
		1	**2**
Pycnometer no.	[-]	-	-
Mass of the oven dried test specimen (m_4)	[g]	-	-
Mass of the pycnometer + specimen + control fluid (m_3)	[g]	-	-
Mass of the dry pycnometer (m_0)	[g]	-	-
Mass of the pycnometer + control fluid (m_1)	[g]	-	-
Mass of the pycnometer + dry specimen (m_2)	[g]	-	-
Formula	$\rho_s = \frac{m_4}{(m_1 - m_0) - (m_3 - m_2)} * \rho_L$	$\rho_{L\,(20^oC)} = 0,99823\ g/cm^3$	
Soil particle density (ρ_s)	[g/cm^3]	-	-
Soil particle unit weight (γ_s)	[kN/m^3]	-	-
Admissibility (ρ_{s2}-min(ρ_{s1},ρ_{s2}) < 0.03 g/cm^3)	[g/cm^3]	-	-
Average result - Soil particle density ($\rho_{s\ -\ final}$)	[g/cm^3]	-	
Average result - Soil particle unit weight ($\gamma_{s\ -\ final}$)	[kN/m^3]	-	

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMANIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF WATER CONTENT, PLASTICITY AND FREE SWELL INDEX OF SOILS
according to SR EN ISO 17892-1:2015, SR EN ISO 17892-12:2018, STAS 1913/12 - 88
Test report

Client	*S.C. Glodeni Energy S.R.L.*					**Project No.**	*2819LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*					**Date of reception**	*18.01.2024*
Borehole No.	*FS02*	**Superior depth of sample (m)**	*2.60*	**Sample description**	*low plasticity sandy CLAY*	**Date of test**	*05.02.2024*
		Inferior depth of sample (m)	*3.00*			**Sample No.**	*42679*

DETERMINATION OF WATER CONTENT – FL – 093				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Container no.	[–]	400	582	-
Mass of container (m_c)	[g]	36.13	34.63	-
Mass of moist test specimen + container (m_u)	[g]	207.220	882.420	-
Mass of dried test specimen + container (m_d)	[g]	180.300	745.900	-
Formula	$w = \frac{m_u - m_d}{m_d - m_c} x100$			
Water content (w)	[%]	18.67	19.19	-
Admissibility (Max - Min < 2%)	[%]	**0.52 – ACCEPTED**		
Average result	[%]	**18.93**		

DETERMINATION OF PLASTIC LIMIT – THREAD ROLLING TEST METHOD – FL – 094				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Container no.	[–]	211	212	213
Mass of container (m_c)	[g]	22.31	22.78	22.42
Mass of moist test specimen + container (A)	[g]	25.000	25.320	24.690
Mass of dried test specimen + container (B)	[g]	24.700	25.030	24.430
Formula	$w_p = \frac{A - B}{B - mC} x100$			
Plastic limit (w_P)	[%]	12.55	12.89	12.94
Admissibility (Max - Min < 2 %)	[%]	**0.38 – ACCEPTED**		
Average result	[%]	**12.79**		

DETERMINATION OF LIQUID LIMIT – FALL CONE TEST METHOD – FL – 094					
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**	**Specimen no. 4**
		1	**2**	**3**	**4**
Container no.	[–]	942	943	944	945
Mass of the container (C)	[g]	11.63	11.98	11.72	11.79
Mass of moist test specimen + container (A)	[g]	32.830	32.830	31.640	32.510
Mass of dried test specimen + container (B)	[g]	28.350	28.180	27.110	27.570
Cone penetration depth (N)	[mm]	17.38	19.72	20.84	23.18
Water content (w)	[%]	26.79	28.70	29.43	31.31
BEST STRAIGHT-LINE FIT METHOD – THE MEASURED WATER CONTENTS IN ORDINATE AND THE CORRESPONDING CONE PENETREATIONS AS ABSCISSA. THE VALUE OF LIQUID LIMIT IS THE WATER CONTENT CORRESPONDING TO 20 mm PENETRATION.					

Laboratory evaluator
eng. geol. Gáll Hunor

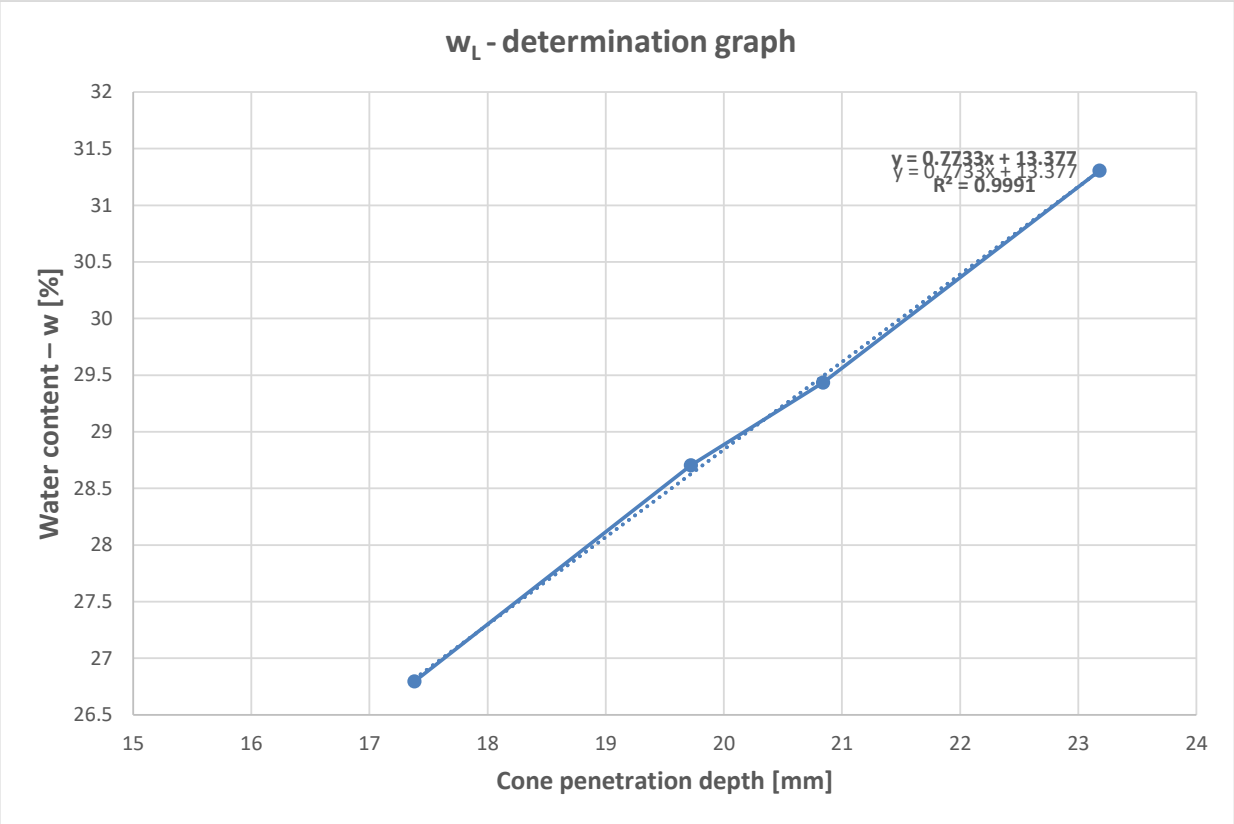
Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

Test report



Admissibility (collinearity 3 pct.)	[%]	**DA**
Liquid limit (w_L)	[%]	**28.84**
Correlation coefficient	[-]	**0.9991**

DETERMINATION OF FREE SWELL INDEX (12g MATERIAL) – FL– 096				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Graduated cyilinder no.	[–]	-	-	-
Initial volume of soil specimen (V_i)	[cm^3]	-	-	-
Final volume of soil specimen (V_f)	[cm^3]	-	-	-
Formula	$U_L = 10x(V_f - V_i)$			
Free swell index (U_L)	[%]	-	-	-
Admissibility (Max - Min < 10%)	[%]	-		
Average result	[%]	-		

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF BULK AND PARTICLE DENSITY OF SOILS
according to SR EN ISO 17892-2:2015, SR EN ISO 17892-3:2016
Test report

Client	*S.C. Glodeni Energy S.R.L.*					**Project No.**	*2819LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*					**Date of reception**	*18.01.2024*
Borehole No.	*FS02*	**Superior depth of sample (m)**	*2.60*	**Sample description**	*low plasticity sandy CLAY*	**Date of test**	*05.02.2024*
		Inferior depth of sample (m)	*3.00*			**Sample No.**	*42679*

DETERMINATION OF BULK DENSITY – IMMERSION IN FLUID METHOD – FL – 095				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Mass of the soil specimen (m_0)	[g]	38.520	38.380	31.530
Mass of the specimen with coating wax (m_1)	[g]	40.480	39.980	33.020
Mass of the immersed specimen (m_2)	[g]	18.470	18.610	15.110
Formula $V_1 = \frac{m_1 - m_2}{\rho_{fluid}}$, $\rho_{fluid} = 0,998 g/cm^3$ $V_2 = \frac{m_1 - m_0}{\rho_{wax}}$ $\rho_{specimen} = \frac{m_0}{V_1 - V_2}$				
Volume of the immersed specimen (V_1)	[cm^3]	22.05	21.41	17.95
Volume of the coating wax (V_2)	[cm^3]	2.13	1.74	1.62
Bulk density (ρ_i)	[g/cm^3]	1.93	1.95	1.93
Admissibility ((ρ_i-ρ_{i_min}) / ρ_i < 1%)	[%]	**0.11 – ACCEPTED**	**1 – ACCEPTED**	**0 – ACCEPTED**
Average result - Bulk Density (ρ)	[g/cm^3]	**1.94**		
Average result - Bulk unit weight (γ)	[kN/m^3]	**19.02**		

DETERMINATION OF PARTICLE DENSITY – FLUID PYCNOMETER METHOD – FL – 099			
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**
		1	**2**
Pycnometer no.	[-]	-	-
Mass of the oven dried test specimen (m_4)	[g]	-	-
Mass of the pycnometer + specimen + control fluid (m_3)	[g]	-	-
Mass of the dry pycnometer (m_0)	[g]	-	-
Mass of the pycnometer + control fluid (m_1)	[g]	-	-
Mass of the pycnometer + dry specimen (m_2)	[g]	-	-
Formula $\rho_s = \frac{m_4}{(m_1 - m_0) - (m_3 - m_2)} * \rho_L$ $\rho_{L\,(20^oC)} = 0,99823\ g/cm^3$			
Soil particle density (ρ_s)	[g/cm^3]	-	-
Soil particle unit weight (γ_s)	[kN/m^3]	-	-
Admissibility (ρ_{s2}-min(ρ_{s1},ρ_{s2}) < 0.03 g/cm^3)	[g/cm^3]	-	-
Average result - Soil particle density ($\rho_{s\ -\ final}$)	[g/cm^3]	-	
Average result - Soil particle unit weight ($\gamma_{s\ -\ final}$)	[kN/m^3]	-	

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMANIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF WATER CONTENT, PLASTICITY AND FREE SWELL INDEX OF SOILS according to SR EN ISO 17892-1:2015, SR EN ISO 17892-12:2018, STAS 1913/12 - 88

Test report

Client	*S.C. Glodeni Energy S.R.L.*					**Project No.**	*2819LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*					**Date of reception**	*18.01.2024*
Borehole No.	*FS02*	**Superior depth of sample (m)**	*7.00*	**Sample description**	*sandy GRAVEL*	**Date of test**	*05.02.2024*
		Inferior depth of sample (m)	*8.00*			**Sample No.**	*42682*

DETERMINATION OF WATER CONTENT – FL – 093				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Container no.	[–]	598	2022	-
Mass of container (m_c)	[g]	34.02	782.14	-
Mass of moist test specimen + container (m_u)	[g]	737.040	4119.620	-
Mass of dried test specimen + container (m_d)	[g]	650.220	3747.950	-
Formula	$w = \frac{m_u - m_d}{m_d - m_c} x100$			
Water content (w)	[%]	14.09	12.53	-
Admissibility (Max - Min < 2%)	[%]	**1.56 – ACCEPTED**		
Average result	[%]	**13.31**		

DETERMINATION OF PLASTIC LIMIT – THREAD ROLLING TEST METHOD – FL – 094				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Container no.	[–]	-	-	-
Mass of container (m_c)	[g]	-	-	-
Mass of moist test specimen + container (A)	[g]	-	-	-
Mass of dried test specimen + container (B)	[g]	-	-	-
Formula	$w_p = \frac{A - B}{B - mC} x100$			
Plastic limit (w_P)	[%]	-	-	-
Admissibility (Max - Min < 2 %)	[%]	-		
Average result	[%]	-		

DETERMINATION OF LIQUID LIMIT – FALL CONE TEST METHOD – FL – 094					
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**	**Specimen no. 4**
		1	**2**	**3**	**4**
Container no.	[–]	-	-	-	-
Mass of the container (C)	[g]	-	-	-	-
Mass of moist test specimen + container (A)	[g]	-	-	-	-
Mass of dried test specimen + container (B)	[g]	-	-	-	-
Cone penetration depth (N)	[mm]	-	-	-	-
Water content (w)	[%]	-	-	-	-
BEST STRAIGHT-LINE FIT METHOD – THE MEASURED WATER CONTENTS IN ORDINATE AND THE CORRESPONDING CONE PENETREATIONS AS ABSCISSA. THE VALUE OF LIQUID LIMIT IS THE WATER CONTENT CORRESPONDING TO 20 mm PENETRATION.					

Laboratory evaluator
eng. geol. Gáll Hunor

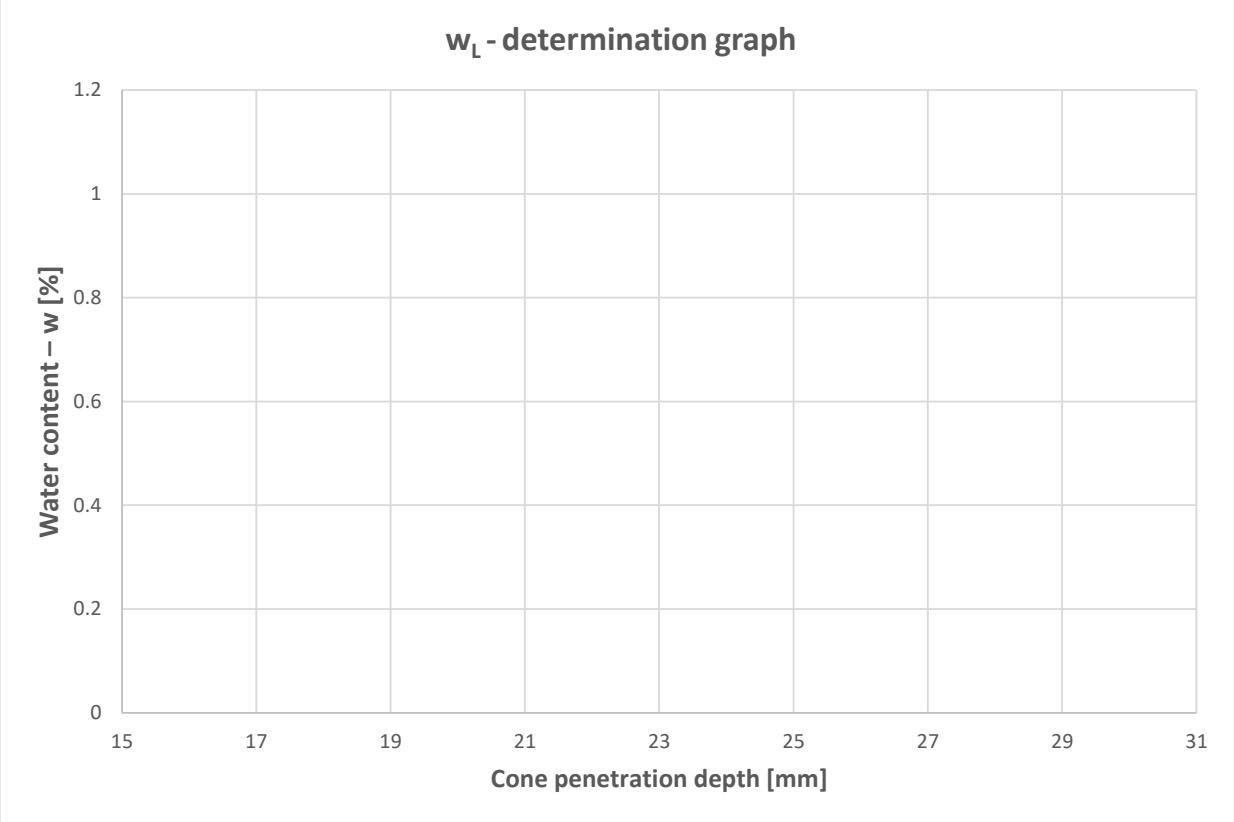
Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

Test report



Admissibility (collinearity 3 pct.)	[%]	-
Liquid limit (w_L)	[%]	-
Correlation coefficient	[-]	-

DETERMINATION OF FREE SWELL INDEX (12g MATERIAL) – FL– 096				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Graduated cyilinder no.	[–]	-	-	-
Initial volume of soil specimen (V_i)	[cm^3]	-	-	-
Final volume of soil specimen (V_f)	[cm^3]	-	-	-
Formula $U_L = 10x(V_f - V_i)$				
Free swell index (U_L)	[%]	-	-	-
Admissibility (Max - Min < 10%)	[%]	-		
Average result	[%]	-		

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF WATER CONTENT, PLASTICITY AND FREE SWELL INDEX OF SOILS
according to SR EN ISO 17892-1:2015, SR EN ISO 17892-12:2018, STAS 1913/12 - 88
Test report

Client	*S.C. Glodeni Energy S.R.L.*					**Project No.**	*2819LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*					**Date of reception**	*18.01.2024*
Borehole No.	*FS03*	**Superior depth of sample (m)**	*1.00*	**Sample description**	*low plasticity sandy CLAY*	**Date of test**	*05.02.2024*
		Inferior depth of sample (m)	*1.40*			**Sample No.**	*42685*

DETERMINATION OF WATER CONTENT – FL – 093				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Container no.	[–]	412	597	-
Mass of container (m_c)	[g]	34.55	38.70	-
Mass of moist test specimen + container (m_u)	[g]	177.460	800.400	-
Mass of dried test specimen + container (m_d)	[g]	152.900	670.380	-
Formula $w = \frac{m_u - m_d}{m_d - m_c} x100$				
Water content (w)	[%]	20.75	20.58	-
Admissibility (Max - Min < 2%)	[%]	**0.17 – ACCEPTED**		
Average result	[%]	**20.67**		

DETERMINATION OF PLASTIC LIMIT – THREAD ROLLING TEST METHOD – FL – 094				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Container no.	[–]	196	197	198
Mass of container (m_c)	[g]	23.26	22.16	26.84
Mass of moist test specimen + container (A)	[g]	27.880	25.420	29.340
Mass of dried test specimen + container (B)	[g]	27.300	25.020	29.050
Formula $w_p = \frac{A - B}{B - mC} x100$				
Plastic limit (w_P)	[%]	14.36	13.99	13.12
Admissibility (Max - Min < 2 %)	[%]	**1.23 – ACCEPTED**		
Average result	[%]	**13.82**		

DETERMINATION OF LIQUID LIMIT – FALL CONE TEST METHOD – FL – 094					
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**	**Specimen no. 4**
		1	**2**	**3**	**4**
Container no.	[–]	985	986	987	988
Mass of the container (C)	[g]	13.03	12.52	12.95	12.66
Mass of moist test specimen + container (A)	[g]	32.400	30.700	34.680	33.640
Mass of dried test specimen + container (B)	[g]	27.770	26.230	29.110	28.190
Cone penetration depth (N)	[mm]	16.16	18.05	20.92	22.06
Water content (w)	[%]	31.41	32.60	34.47	35.09
BEST STRAIGHT-LINE FIT METHOD – THE MEASURED WATER CONTENTS IN ORDINATE AND THE CORRESPONDING CONE PENETREATIONS AS ABSCISSA. THE VALUE OF LIQUID LIMIT IS THE WATER CONTENT CORRESPONDING TO 20 mm PENETRATION.					

Laboratory evaluator
eng. geol. Gáll Hunor

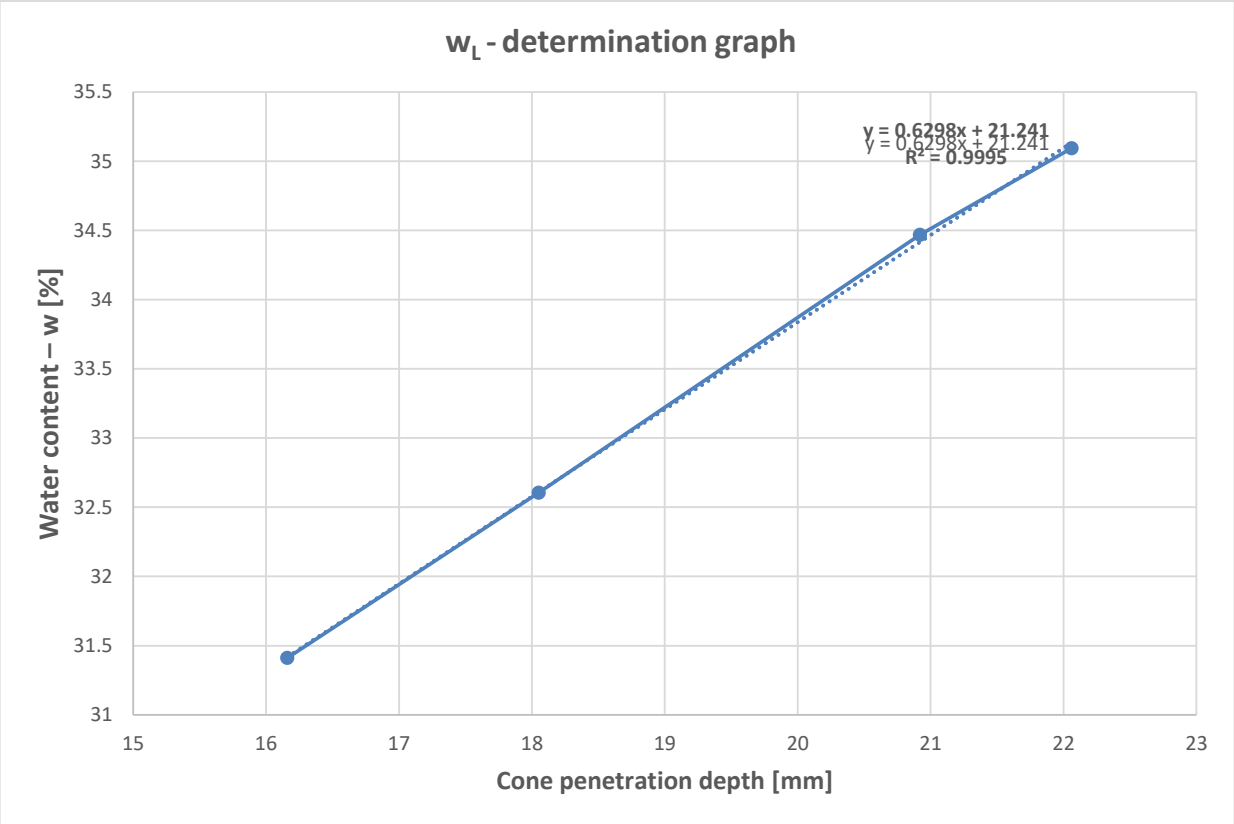
Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

Test report



Admissibility (collinearity 3 pct.)	[%]	**DA**
Liquid limit (w_L)	[%]	**33.84**
Correlation coefficient	[-]	**0.9995**

DETERMINATION OF FREE SWELL INDEX (12g MATERIAL) – FL– 096				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Graduated cyilinder no.	[–]	5	6	203
Initial volume of soil specimen (V_i)	[cm^3]	10	10	10
Final volume of soil specimen (V_f)	[cm^3]	17	17	17
Formula	$U_L = 10x(V_f - V_i)$			
Free swell index (U_L)	[%]	70	70	70
Admissibility (Max - Min < 10%)	[%]	**0 – ACCEPTED**		
Average result	[%]	**70**		

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF BULK AND PARTICLE DENSITY OF SOILS
according to SR EN ISO 17892-2:2015, SR EN ISO 17892-3:2016
Test report

Client	*S.C. Glodeni Energy S.R.L.*					**Project No.**	*2819LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*					**Date of reception**	*18.01.2024*
Borehole No.	*FS03*	**Superior depth of sample (m)**	*1.00*	**Sample description**	*low plasticity sandy CLAY*	**Date of test**	*05.02.2024*
		Inferior depth of sample (m)	*1.40*			**Sample No.**	*42685*

DETERMINATION OF BULK DENSITY – IMMERSION IN FLUID METHOD – FL – 095				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Mass of the soil specimen (m_0)	[g]	40.810	37.810	35.260
Mass of the specimen with coating wax (m_1)	[g]	43.010	39.570	39.960
Mass of the immersed specimen (m_2)	[g]	19.680	18.220	16.630
Formula	$V_1 = \frac{m_1 - m_2}{\rho_{fluid}}$, $\rho_{fluid} = 0,998 g/cm^3$	$V_2 = \frac{m_1 - m_0}{\rho_{wax}}$	$\rho_{specimen} = \frac{m_0}{V_1 - V_2}$	
Volume of the immersed specimen (V_1)	[cm^3]	23.38	21.39	23.38
Volume of the coating wax (V_2)	[cm^3]	2.39	1.91	5.11
Bulk density (ρ_i)	[g/cm^3]	1.94	1.94	1.93
Admissibility ((ρ_i-ρ_{i_min}) / ρ_i < 1%)	[%]	**0.75 – ACCEPTED**	**0.56 – ACCEPTED**	**0 – ACCEPTED**
Average result - Bulk Density (ρ)	[g/cm^3]	**1.94**		
Average result - Bulk unit weight (γ)	[kN/m^3]	**19.02**		

DETERMINATION OF PARTICLE DENSITY – FLUID PYCNOMETER METHOD – FL – 099			
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**
		1	**2**
Pycnometer no.	[-]	-	-
Mass of the oven dried test specimen (m_4)	[g]	-	-
Mass of the pycnometer + specimen + control fluid (m_3)	[g]	-	-
Mass of the dry pycnometer (m_0)	[g]	-	-
Mass of the pycnometer + control fluid (m_1)	[g]	-	-
Mass of the pycnometer + dry specimen (m_2)	[g]	-	-
Formula	$\rho_s = \frac{m_4}{(m_1 - m_0) - (m_3 - m_2)} * \rho_L$	$\rho_{L\,(20^oC)} = 0,99823\ g/cm^3$	
Soil particle density (ρ_s)	[g/cm^3]	-	-
Soil particle unit weight (γ_s)	[kN/m^3]	-	-
Admissibility (ρ_{s2}-min(ρ_{s1},ρ_{s2}) < 0.03 g/cm^3)	[g/cm^3]	-	-
Average result - Soil particle density ($\rho_{s\ -\ final}$)	[g/cm^3]	-	
Average result - Soil particle unit weight ($\gamma_{s\ -\ final}$)	[kN/m^3]	-	

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMANIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF WATER CONTENT, PLASTICITY AND FREE SWELL INDEX OF SOILS according to SR EN ISO 17892-1:2015, SR EN ISO 17892-12:2018, STAS 1913/12 - 88

Test report

Client	*S.C. Glodeni Energy S.R.L.*					**Project No.**	*2819LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*					**Date of reception**	*18.01.2024*
Borehole No.	*FS03*	**Superior depth of sample (m)**	*4.30*	**Sample description**	*sandy silty GRAVEL*	**Date of test**	*05.02.2024*
		Inferior depth of sample (m)	*6.00*			**Sample No.**	*42689*

DETERMINATION OF WATER CONTENT – FL – 093				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Container no.	[–]	577	2004	-
Mass of container (m_c)	[g]	34.91	710.80	-
Mass of moist test specimen + container (m_u)	[g]	590.950	3345.520	-
Mass of dried test specimen + container (m_d)	[g]	535.990	3117.600	-
Formula $w = \frac{m_u - m_d}{m_d - m_c} x100$				
Water content (w)	[%]	10.97	9.47	-
Admissibility (Max - Min < 2%)	[%]	**1.5 – ACCEPTED**		
Average result	[%]	**10.22**		

DETERMINATION OF PLASTIC LIMIT – THREAD ROLLING TEST METHOD – FL – 094				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Container no.	[–]	-	-	-
Mass of container (m_c)	[g]	-	-	-
Mass of moist test specimen + container (A)	[g]	-	-	-
Mass of dried test specimen + container (B)	[g]	-	-	-
Formula $w_p = \frac{A - B}{B - mC} x100$				
Plastic limit (w_P)	[%]	-	-	-
Admissibility (Max - Min < 2 %)	[%]	-		
Average result	[%]	-		

DETERMINATION OF LIQUID LIMIT – FALL CONE TEST METHOD – FL – 094					
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**	**Specimen no. 4**
		1	**2**	**3**	**4**
Container no.	[–]	-	-	-	-
Mass of the container (C)	[g]	-	-	-	-
Mass of moist test specimen + container (A)	[g]	-	-	-	-
Mass of dried test specimen + container (B)	[g]	-	-	-	-
Cone penetration depth (N)	[mm]	-	-	-	-
Water content (w)	[%]	-	-	-	-
BEST STRAIGHT-LINE FIT METHOD – THE MEASURED WATER CONTENTS IN ORDINATE AND THE CORRESPONDING CONE PENETREATIONS AS ABSCISSA. THE VALUE OF LIQUID LIMIT IS THE WATER CONTENT CORRESPONDING TO 20 mm PENETRATION.					

Laboratory evaluator
eng. geol. Gáll Hunor

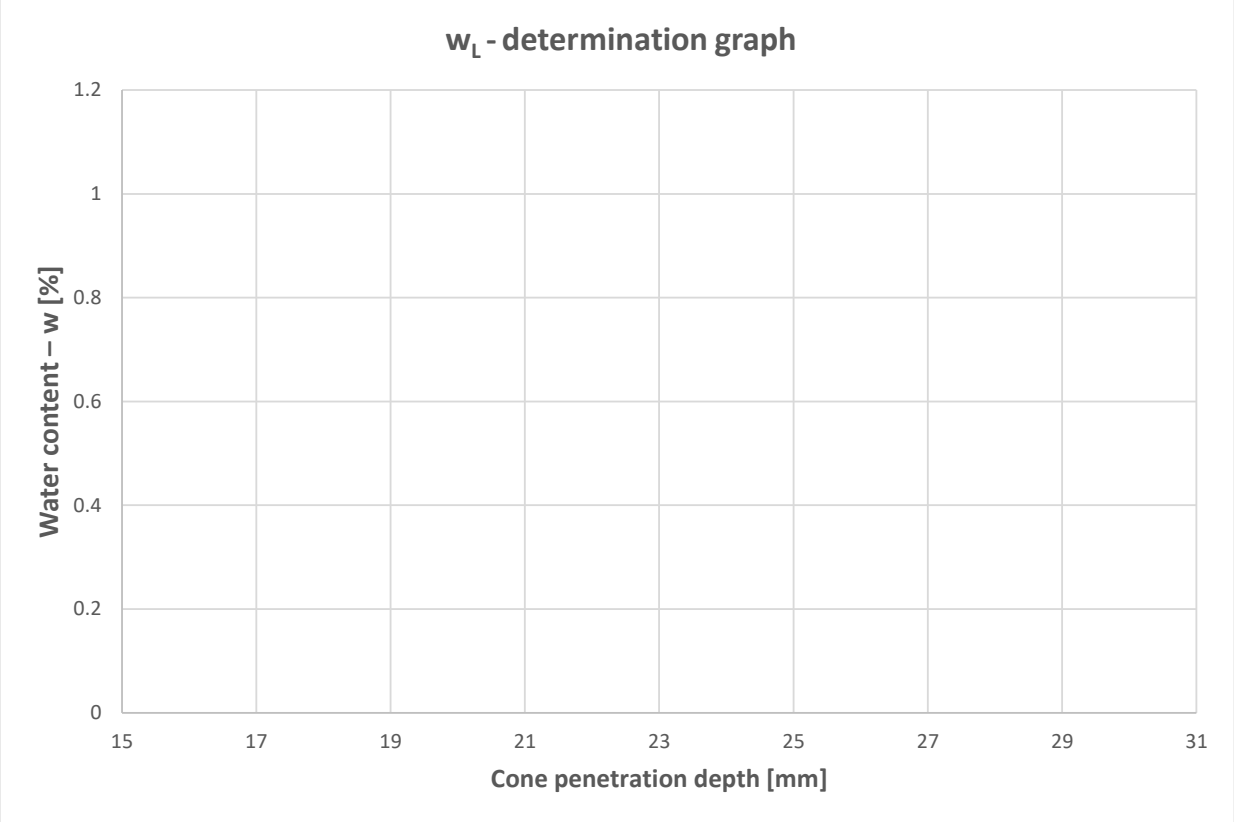
Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

Test report



Admissibility (collinearity 3 pct.)	[%]	-
Liquid limit (w_L)	[%]	-
Correlation coefficient	[-]	-

DETERMINATION OF FREE SWELL INDEX (12g MATERIAL) – FL– 096				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Graduated cyilinder no.	[–]	-	-	-
Initial volume of soil specimen (V_i)	[cm^3]	-	-	-
Final volume of soil specimen (V_f)	[cm^3]	-	-	-
Formula $U_L = 10x(V_f - V_i)$				
Free swell index (U_L)	[%]	-	-	-
Admissibility (Max - Min < 10%)	[%]	-		
Average result	[%]	-		

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF WATER CONTENT, PLASTICITY AND FREE SWELL INDEX OF SOILS according to SR EN ISO 17892-1:2015, SR EN ISO 17892-12:2018, STAS 1913/12 - 88

Test report

Client	*S.C. GLODENI ENERGY S.R.L.*					**Project No.**	*3140LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*					**Date of reception**	*24-Mar-2025*
Borehole No.	*FS04*	**Superior depth of sample (m)**	*1.30*	**Sample description**	*low plasticity sandy CLAY*	**Date of test**	*24-Mar-2025*
		Inferior depth of sample (m)	*1.50*			**Sample No.**	*47589*

DETERMINATION OF WATER CONTENT - no. 47589-RU/03.31.2025				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Container no.	[–]	408	812	-
Mass of container (m_c)	[g]	37.87	50.49	-
Mass of moist test specimen + container (m_u)	[g]	186.760	937.920	-
Mass of dried test specimen + container (m_d)	[g]	167.190	825.960	-
Formula	$w = \frac{m_u - m_d}{m_d - m_c} x100$			
Water content (w)	[%]	15.13	14.44	-
Admissibility (Max - Min < 2%)	[%]	**0.7 – ACCEPTED**		
Average result	[%]	**14.79**		

DETERMINATION OF PLASTIC LIMIT – THREAD ROLLING TEST METHOD - no. 47589-RWP/03.31.2025				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Container no.	[–]	191	192	195
Mass of container (m_c)	[g]	21.19	23.33	22.00
Mass of moist test specimen + container (A)	[g]	23.620	26.550	24.880
Mass of dried test specimen + container (B)	[g]	23.350	26.200	24.540
Formula	$w_p = \frac{A - B}{B - mC} x100$			
Plastic limit (w_p)	[%]	12.50	12.20	13.39
Admissibility (Max - Min < 2 %)	[%]	**1.19 – ACCEPTED**		
Average result	[%]	**12.69**		

DETERMINATION OF LIQUID LIMIT – FALL CONE TEST METHOD - no. 47589-RWL/03.31.2025					
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**	**Specimen no. 4**
		1	**2**	**3**	**4**
Container no.	[–]	961	963	966	969
Mass of the container (C)	[g]	12.01	11.61	11.64	13.05
Mass of moist test specimen + container (A)	[g]	28.400	28.680	30.360	33.650
Mass of dried test specimen + container (B)	[g]	24.990	25.010	26.210	28.990
Cone penetration depth (N)	[mm]	16.11	18.07	20.23	21.63
Water content (w)	[%]	26.27	27.39	28.48	29.23
BEST STRAIGHT-LINE FIT METHOD – THE MEASURED WATER CONTENTS IN ORDINATE AND THE CORRESPONDING CONE PENETREATIONS AS ABSCISSA. THE VALUE OF LIQUID LIMIT IS THE WATER CONTENT CORRESPONDING TO 20 mm PENETRATION.					

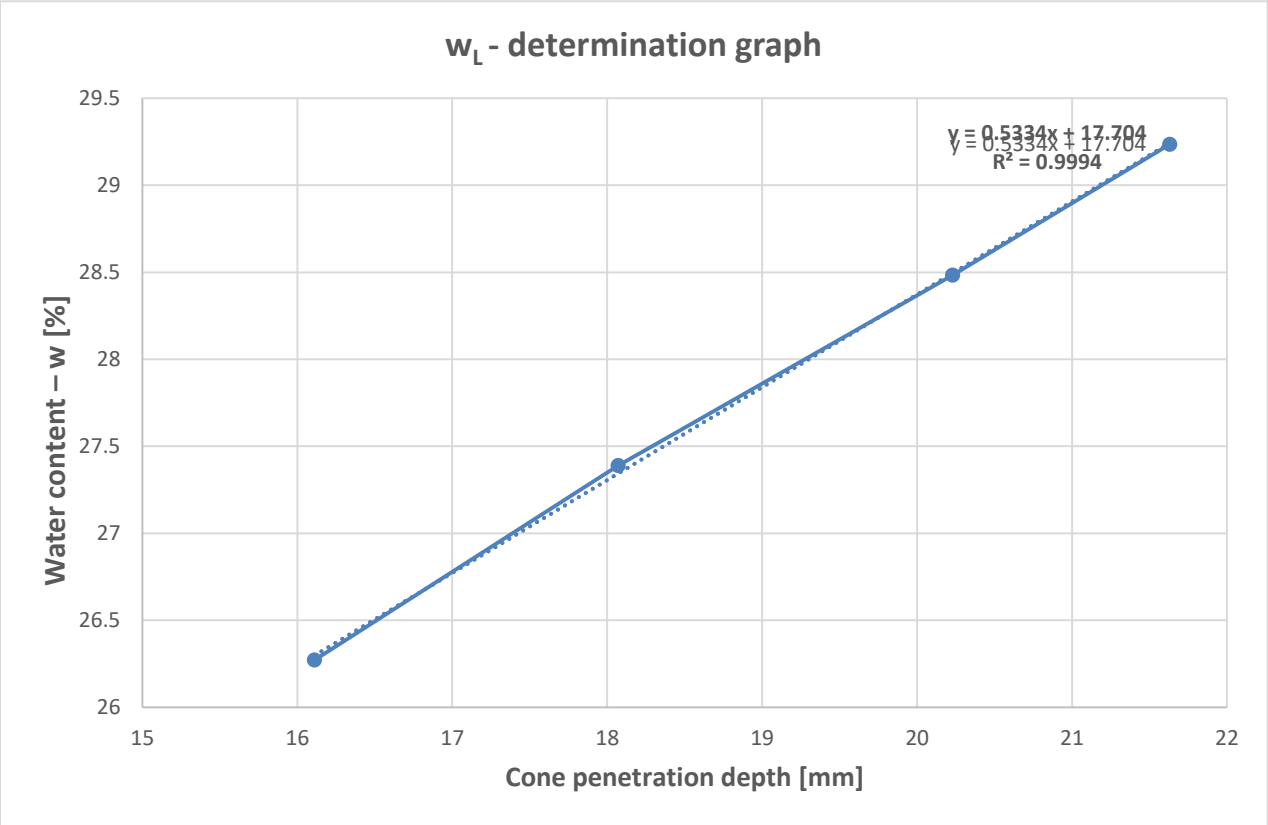
Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

Test report



Admissibility (collinearity 3 pct.)	[%]	**YES**
Liquid limit (w_L)	[%]	**28.37**
Correlation coefficient	[-]	**0.9994**

DETERMINATION OF FREE SWELL INDEX (12g MATERIAL) - no. 47589-RUL/03.31.2025				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Graduated cyilinder no.	[–]	5	6	203
Initial volume of soil specimen (V_i)	[cm^3]	10	10	10
Final volume of soil specimen (V_f)	[cm^3]	16	16	16
Formula	$U_L = 10x(V_f - V_i)$			
Free swell index (U_L)	[%]	60	60	60
Admissibility (Max - Min < 10%)	[%]	**0 – ACCEPTED**		
Average result	[%]	**60**		

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF BULK AND PARTICLE DENSITY OF SOILS
according to SR EN ISO 17892-2:2015, SR EN ISO 17892-3:2016
Test report

Client	*S.C. GLODENI ENERGY S.R.L.*					**Project No.**	*3140LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*					**Date of reception**	*24-Mar-2025*
Borehole No.	*FS04*	**Superior depth of sample (m)**	*1.30*	**Sample description**	*low plasticity sandy CLAY*	**Date of test**	*24-Mar-2025*
		Inferior depth of sample (m)	*1.50*			**Sample No.**	*47589*

DETERMINATION OF BULK DENSITY – IMMERSION IN FLUID METHOD - no. 47589-RDS/03.31.2025				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Mass of the soil specimen (m_0)	[g]	19.940	24.380	21.520
Mass of the specimen with coating wax (m_1)	[g]	21.150	25.870	23.040
Mass of the immersed specimen (m_2)	[g]	9.870	12.020	10.670
Formula	$V_1 = \frac{m_1 - m_2}{\rho_{water}}, \rho_{water} = 0,998 g/cm^3$	$V_2 = \frac{m_1 - m_0}{\rho_{wax}}$	$\rho_{sample} = \frac{m_0}{V_1 - V_2}$	
Volume of the immersed specimen (V_1)	[cm^3]	11.30	13.88	12.39
Volume of the coating wax (V_2)	[cm^3]	1.32	1.62	1.65
Bulk density (ρ_i)	[g/cm^3]	2.00	1.99	2.00
Admissibility ($(\rho_i-\rho_{i\_min}) / \rho_i < 1\%$)	[%]	**0.38 – ACCEPTED**	**0 – ACCEPTED**	**0.72 – ACCEPTED**
Average result - Bulk Density (ρ)	[g/cm^3]	**2.00**		
Average result - Bulk unit weight (γ)	[kN/m^3]	**19.58**		

DETERMINATION OF PARTICLE DENSITY – FLUID PYCNOMETER METHOD - no. 47589-RDP/03.31.2025			
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**
		1	**2**
Pycnometer no.	[-]	22	23
Mass of the oven dried test specimen (m_4)	[g]	10.02	10.08
Mass of the pycnometer + specimen + control fluid (m_3)	[g]	118.06	119.77
Mass of the dry pycnometer (m_0)	[g]	53.37	54.86
Mass of the pycnometer + control fluid (m_1)	[g]	111.74	113.41
Mass of the pycnometer + dry specimen (m_2)	[g]	63.39	64.94
Formula	$\rho_s = \frac{m_4}{(m_1-m_0)-(m_3-m_2)} * \rho_L$	$\rho_{L\ (20^oC)} = 0,99823\ g/cm^3$	
Soil particle density (ρ_s)	[g/cm^3]	2.703	2.705
Soil particle unit weight (γ_s)	[kN/m^3]	26.51	26.53
Admissibility (ρ_{s2}-min(ρ_{s1},ρ_{s2}) < 0.03 g/cm^3)	[g/cm^3]	**ACCEPTED - Δρ = 0**	**ACCEPTED - Δρ = 0.002**
Average result - Soil particle density ($\rho_{s\ -\ final}$)	[g/cm^3]	**2.700**	
Average result - Soil particle unit weight ($\gamma_{s\ -\ final}$)	[kN/m^3]	**26.52**	

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMANIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF CARBONATE AND HUMUS CONTENT OF SOILS
according to ASTM 4373 - 21, STAS 7107/1 - 76
Test report

Client	*S.C. GLODENI ENERGY S.R.L.*					**Project No.**	*3140LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*					**Date of reception**	*24-Mar-2025*
Borehole No.	*FS04*	**Superior depth of sample (m)**	*1.30*	**Sample description**	*low plasticity sandy CLAY*	**Date of test**	*24-Mar-2025*
		Inferior depth of sample (m)	*1.50*			**Sample No.**	*47589*

DETERMINATION OF CARBONATE CONTENT			
Test report - no. 47589-RC/03.31.2025			
Characteristics		**Specimen no. 1**	**Specimen no. 2**
		1	**2**
Calcimeter no.	**u.m.**	**2**	-
Injection pressure (P_i)	[bar]	**0.167**	-
Mass of dried specimen (m_1)	[g]	**1.000**	-
Measured CO_2 pressure (P_c)	[bar]	**0.175**	-
Formula	$CaCO_3 = \frac{(P_c - Pi) * 100}{(m_1) * P_{max}}$		
Carbonate content (calcite equivalent)	[%]	**0.43**	-
Admissibility (Max - Min < 2%)	[%]	**0 – ADMIS**	
Average result - Carbonate content (calcite equivalent)	[%]	**0.43**	

DETERMINATION OF HUMUS CONTENT			
Test report - no. 47589-RH/03.31.2025			
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**
		1	**2**
Cylinder no.	[–]	**102**	**302**
Formula		**Colour**	**Humus content**
		Colorless	*0 - 1 %*
		Yellowish	*1 - 2 %*
		From yellow to brownish	*2 - 5 %*
		Brown	*> 5 %*
Test colour	[–]	**incolor**	**incolor**
Humus content	[%]	**0**	**0**
Average result - Humus content	[%]	**0**	

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF WATER CONTENT, PLASTICITY AND FREE SWELL INDEX OF SOILS according to SR EN ISO 17892-1:2015, SR EN ISO 17892-12:2018, STAS 1913/12 - 88

Test report

Client	*S.C. GLODENI ENERGY S.R.L.*					**Project No.**	*3140LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*					**Date of reception**	*24-Mar-2025*
Borehole No.	*FS04*	**Superior depth of sample (m)**	*2.50*	**Sample description**	*gravelly silty SAND*	**Date of test**	*24-Mar-2025*
		Inferior depth of sample (m)	*3.20*			**Sample No.**	*47597*

DETERMINATION OF WATER CONTENT - no. 47597-RU/03.31.2025				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Container no.	[–]	1040	-	-
Mass of container (m_c)	[g]	194.44	-	-
Mass of moist test specimen + container (m_u)	[g]	1851.190	-	-
Mass of dried test specimen + container (m_d)	[g]	1688.980	-	-
Formula	$w = \frac{m_u - m_d}{m_d - m_c} x100$			
Water content (w)	[%]	10.85	-	-
Admissibility (Max - Min < 2%)	[%]	**0 – ACCEPTED**		
Average result	[%]	**10.85**		

DETERMINATION OF PLASTIC LIMIT – THREAD ROLLING TEST METHOD				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Container no.	[–]	-	-	-
Mass of container (m_c)	[g]	-	-	-
Mass of moist test specimen + container (A)	[g]	-	-	-
Mass of dried test specimen + container (B)	[g]	-	-	-
Formula	$w_p = \frac{A - B}{B - mC} x100$			
Plastic limit (w_p)	[%]	-	-	-
Admissibility (Max - Min < 2 %)	[%]	-		
Average result	[%]	-		

DETERMINATION OF LIQUID LIMIT – FALL CONE TEST METHOD					
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**	**Specimen no. 4**
		1	**2**	**3**	**4**
Container no.	[–]	-	-	-	-
Mass of the container (C)	[g]	-	-	-	-
Mass of moist test specimen + container (A)	[g]	-	-	-	-
Mass of dried test specimen + container (B)	[g]	-	-	-	-
Cone penetration depth (N)	[mm]	-	-	-	-
Water content (w)	[%]	-	-	-	-
BEST STRAIGHT-LINE FIT METHOD – THE MEASURED WATER CONTENTS IN ORDINATE AND THE CORRESPONDING CONE PENETREATIONS AS ABSCISSA. THE VALUE OF LIQUID LIMIT IS THE WATER CONTENT CORRESPONDING TO 20 mm PENETRATION.					

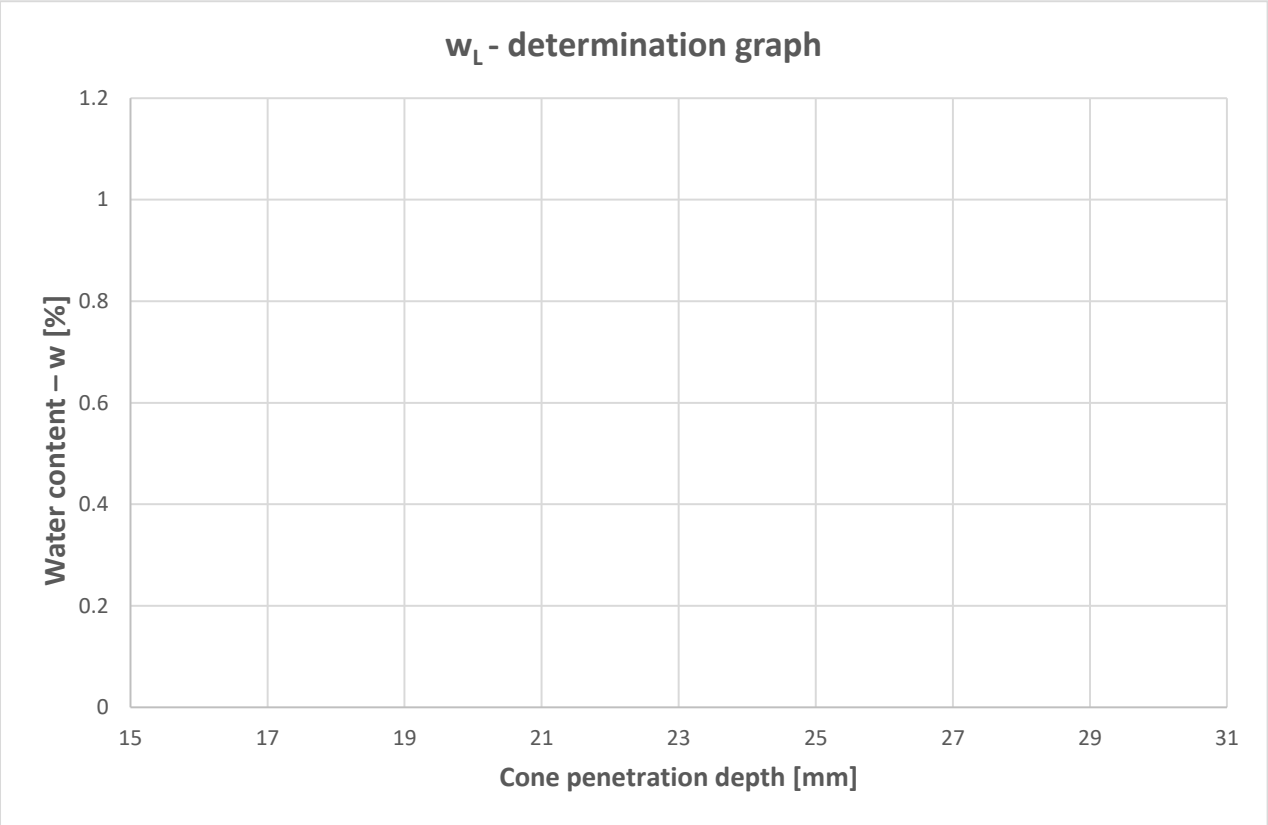
Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

Test report



Admissibility (collinearity 3 pct.)	[%]	-
Liquid limit (w_L)	[%]	-
Correlation coefficient	[-]	-

DETERMINATION OF FREE SWELL INDEX (12g MATERIAL)				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Graduated cyilinder no.	[–]	-	-	-
Initial volume of soil specimen (V_i)	[cm^3]	-	-	-
Final volume of soil specimen (V_f)	[cm^3]	-	-	-
Formula	$U_L = 10x(V_f - V_i)$			
Free swell index (U_L)	[%]	-	-	-
Admissibility (Max - Min < 10%)	[%]	-		
Average result	[%]	-		

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF WATER CONTENT, PLASTICITY AND FREE SWELL INDEX OF SOILS according to SR EN ISO 17892-1:2015, SR EN ISO 17892-12:2018, STAS 1913/12 - 88

Test report

Client	*S.C. GLODENI ENERGY S.R.L.*					**Project No.**	*3140LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*					**Date of reception**	*24-Mar-2025*
Borehole No.	*FS05*	**Superior depth of sample (m)**	*1.30*	**Sample description**	*medium plasticity sandy CLAY*	**Date of test**	*24-Mar-2025*
		Inferior depth of sample (m)	*1.50*			**Sample No.**	*47591*

DETERMINATION OF WATER CONTENT - no. 47591-RU/03.31.2025				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Container no.	[–]	381	808	-
Mass of container (m_c)	[g]	34.72	55.96	-
Mass of moist test specimen + container (m_u)	[g]	175.520	874.360	-
Mass of dried test specimen + container (m_d)	[g]	152.300	732.340	-
Formula	$w = \frac{m_u - m_d}{m_d - m_c} x100$			
Water content (w)	[%]	19.75	21.00	-
Admissibility (Max - Min < 2%)	[%]	**1.25 – ACCEPTED**		
Average result	[%]	**20.37**		

DETERMINATION OF PLASTIC LIMIT – THREAD ROLLING TEST METHOD - no. 47591-RWP/03.31.2025				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Container no.	[–]	904	908	909
Mass of container (m_c)	[g]	20.81	19.96	21.24
Mass of moist test specimen + container (A)	[g]	23.200	22.220	24.760
Mass of dried test specimen + container (B)	[g]	22.880	21.920	24.300
Formula	$w_p = \frac{A - B}{B - mC} x100$			
Plastic limit (w_p)	[%]	15.46	15.31	15.03
Admissibility (Max - Min < 2 %)	[%]	**0.43 – ACCEPTED**		
Average result	[%]	**15.27**		

DETERMINATION OF LIQUID LIMIT – FALL CONE TEST METHOD - no. 47591-RWL/03.31.2025					
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**	**Specimen no. 4**
		1	**2**	**3**	**4**
Container no.	[–]	971	972	982	997
Mass of the container (C)	[g]	12.51	13.03	12.93	12.45
Mass of moist test specimen + container (A)	[g]	30.740	30.360	30.530	34.490
Mass of dried test specimen + container (B)	[g]	26.040	25.700	25.610	28.190
Cone penetration depth (N)	[mm]	15.42	17.92	20.47	22.19
Water content (w)	[%]	34.74	36.78	38.80	40.03
BEST STRAIGHT-LINE FIT METHOD – THE MEASURED WATER CONTENTS IN ORDINATE AND THE CORRESPONDING CONE PENETREATIONS AS ABSCISSA. THE VALUE OF LIQUID LIMIT IS THE WATER CONTENT CORRESPONDING TO 20 mm PENETRATION.					

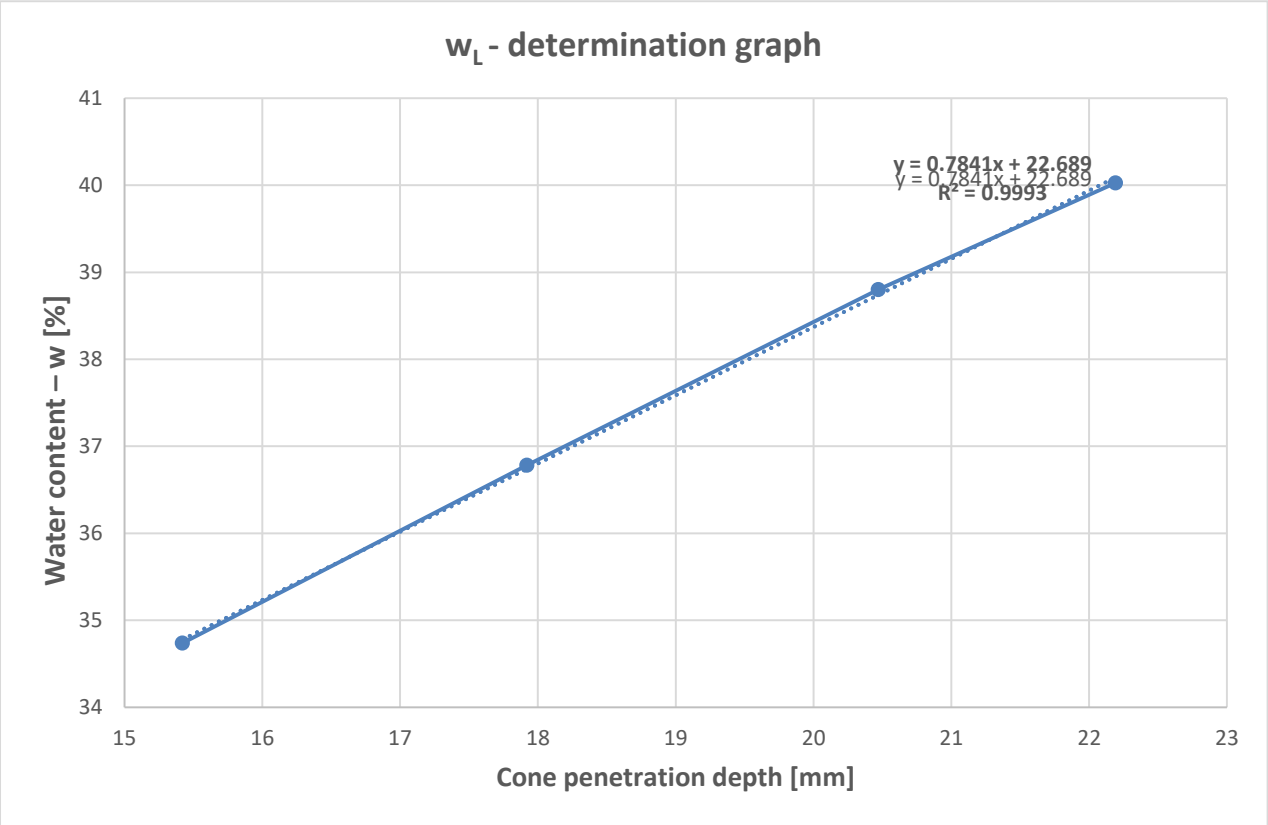
Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

Test report



Admissibility (collinearity 3 pct.)	[%]	**YES**
Liquid limit (w_L)	[%]	**38.37**
Correlation coefficient	[-]	**0.9993**

DETERMINATION OF FREE SWELL INDEX (12g MATERIAL) - no. 47591-RUL/03.31.2025				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Graduated cyilinder no.	[–]	7	8	204
Initial volume of soil specimen (V_i)	[cm^3]	10	10	10
Final volume of soil specimen (V_f)	[cm^3]	18	18	18
Formula	$U_L = 10x(V_f - V_i)$			
Free swell index (U_L)	[%]	80	80	80
Admissibility (Max - Min < 10%)	[%]	**0 – ACCEPTED**		
Average result	[%]	**80**		

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF BULK AND PARTICLE DENSITY OF SOILS
according to SR EN ISO 17892-2:2015, SR EN ISO 17892-3:2016
Test report

Client	*S.C. GLODENI ENERGY S.R.L.*					**Project No.**	*3140LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*					**Date of reception**	*24-Mar-2025*
Borehole No.	*FS05*	**Superior depth of sample (m)**	*1.30*	**Sample description**	*medium plasticity sandy CLAY*	**Date of test**	*24-Mar-2025*
		Inferior depth of sample (m)	*1.50*			**Sample No.**	*47591*

DETERMINATION OF BULK DENSITY – IMMERSION IN FLUID METHOD - no. 47591-RDS/03.31.2025				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Mass of the soil specimen (m_0)	[g]	21.070	28.520	22.190
Mass of the specimen with coating wax (m_1)	[g]	22.760	30.170	23.570
Mass of the immersed specimen (m_2)	[g]	10.350	14.140	10.980
Formula	$V_1 = \frac{m_1 - m_2}{\rho_{water}}, \rho_{water} = 0,998 g/cm^3$	$V_2 = \frac{m_1 - m_0}{\rho_{wax}}$	$\rho_{sample} = \frac{m_0}{V_1 - V_2}$	
Volume of the immersed specimen (V_1)	[cm^3]	12.43	16.06	12.62
Volume of the coating wax (V_2)	[cm^3]	1.84	1.79	1.50
Bulk density (ρ_i)	[g/cm^3]	1.99	2.00	2.00
Admissibility ((ρ_i-ρ_{i_min}) / ρ_i < 1%)	[%]	**0 – ACCEPTED**	**0.53 – ACCEPTED**	**0.41 – ACCEPTED**
Average result - Bulk Density (ρ)	[g/cm^3]	**1.99**		
Average result - Bulk unit weight (γ)	[kN/m^3]	**19.57**		

DETERMINATION OF PARTICLE DENSITY – FLUID PYCNOMETER METHOD - no. 47591-RDP/03.31.2025			
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**
		1	**2**
Pycnometer no.	[-]	24	25
Mass of the oven dried test specimen (m_4)	[g]	10.07	10.06
Mass of the pycnometer + specimen + control fluid (m_3)	[g]	117.56	119.25
Mass of the dry pycnometer (m_0)	[g]	52.40	57.86
Mass of the pycnometer + control fluid (m_1)	[g]	111.22	112.92
Mass of the pycnometer + dry specimen (m_2)	[g]	62.47	67.92
Formula	$\rho_s = \frac{m_4}{(m_1 - m_0) - (m_3 - m_2)} * \rho_L$	$\rho_{L\ (20^oC)} = 0,99823\ g/cm^3$	
Soil particle density (ρ_s)	[g/cm^3]	2.695	2.692
Soil particle unit weight (γ_s)	[kN/m^3]	26.43	26.40
Admissibility (ρ_{s2}-min(ρ_{s1},ρ_{s2}) < 0.03 g/cm^3)	[g/cm^3]	**ACCEPTED - $\Delta\rho$ = 0.003**	**ACCEPTED - $\Delta\rho$ = 0**
Average result - Soil particle density ($\rho_{s\ -\ final}$)	[g/cm^3]	**2.690**	
Average result - Soil particle unit weight ($\gamma_{s\ -\ final}$)	[kN/m^3]	**26.41**	

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMANIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF CARBONATE AND HUMUS CONTENT OF SOILS
according to ASTM 4373 - 21, STAS 7107/1 - 76
Test report

Client	*S.C. GLODENI ENERGY S.R.L.*					**Project No.**	*3140LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*					**Date of reception**	*24-Mar-2025*
Borehole No.	*FS05*	**Superior depth of sample (m)**	*1.30*	**Sample description**	*medium plasticity sandy CLAY*	**Date of test**	*24-Mar-2025*
		Inferior depth of sample (m)	*1.50*			**Sample No.**	*47591*

DETERMINATION OF CARBONATE CONTENT			
Test report - no. 47591-RC/03.31.2025			
Characteristics		**Specimen no. 1**	**Specimen no. 2**
		1	**2**
Calcimeter no.	**u.m.**	**2**	-
Injection pressure (P_i)	[bar]	**0.167**	-
Mass of dried specimen (m_1)	[g]	**1.000**	-
Measured CO_2 pressure (P_c)	[bar]	**0.173**	-
Formula	$CaCO_3 = \frac{(P_c - Pi) * 100}{(m_1) * P_{max}}$		
Carbonate content (calcite equivalent)	[%]	**0.32**	-
Admissibility (Max - Min < 2%)	[%]	**0 – ADMIS**	
Average result - Carbonate content (calcite equivalent)	[%]	**0.32**	

DETERMINATION OF HUMUS CONTENT			
Test report - no. 47591-RH/03.31.2025			
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**
		1	**2**
Cylinder no.	[–]	**103**	**303**
Formula		**Colour**	**Humus content**
		Colorless	*0 - 1 %*
		Yellowish	*1 - 2 %*
		From yellow to brownish	*2 - 5 %*
		Brown	*> 5 %*
Test colour	[–]	**incolor**	**incolor**
Humus content	[%]	**0**	**0**
Average result - Humus content	[%]	**0**	

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF WATER CONTENT, PLASTICITY AND FREE SWELL INDEX OF SOILS according to SR EN ISO 17892-1:2015, SR EN ISO 17892-12:2018, STAS 1913/12 - 88

Test report

Client	*S.C. GLODENI ENERGY S.R.L.*					**Project No.**	*3140LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*					**Date of reception**	*24-Mar-2025*
Borehole No.	*FS06*	**Superior depth of sample (m)**	*1.70*	**Sample description**	*low plasticity sandy CLAY*	**Date of test**	*24-Mar-2025*
		Inferior depth of sample (m)	*2.00*			**Sample No.**	*47594*

DETERMINATION OF WATER CONTENT - no. 47594-RU/03.31.2025				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Container no.	[–]	385	789	-
Mass of container (m_c)	[g]	40.82	80.31	-
Mass of moist test specimen + container (m_u)	[g]	195.260	925.620	-
Mass of dried test specimen + container (m_d)	[g]	172.570	797.300	-
Formula	$w = \frac{m_u - m_d}{m_d - m_c} x100$			
Water content (w)	[%]	17.22	17.90	-
Admissibility (Max - Min < 2%)	[%]	**0.68 – ACCEPTED**		
Average result	[%]	**17.56**		

DETERMINATION OF PLASTIC LIMIT – THREAD ROLLING TEST METHOD - no. 47594-RWP/03.31.2025				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Container no.	[–]	202	203	250
Mass of container (m_c)	[g]	21.73	21.66	20.90
Mass of moist test specimen + container (A)	[g]	24.220	24.270	23.710
Mass of dried test specimen + container (B)	[g]	23.930	23.990	23.400
Formula	$w_p = \frac{A - B}{B - mC} x100$			
Plastic limit (w_p)	[%]	13.18	12.02	12.40
Admissibility (Max - Min < 2 %)	[%]	**1.16 – ACCEPTED**		
Average result	[%]	**12.53**		

DETERMINATION OF LIQUID LIMIT – FALL CONE TEST METHOD - no. 47594-RWL/03.31.2025					
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**	**Specimen no. 4**
		1	**2**	**3**	**4**
Container no.	[–]	1017	1018	1020	1024
Mass of the container (C)	[g]	11.94	12.21	11.93	12.03
Mass of moist test specimen + container (A)	[g]	28.450	30.110	30.050	33.770
Mass of dried test specimen + container (B)	[g]	24.710	25.930	25.620	28.320
Cone penetration depth (N)	[mm]	15.9	17.99	21.16	22.9
Water content (w)	[%]	29.29	30.47	32.36	33.46
BEST STRAIGHT-LINE FIT METHOD – THE MEASURED WATER CONTENTS IN ORDINATE AND THE CORRESPONDING CONE PENETREATIONS AS ABSCISSA. THE VALUE OF LIQUID LIMIT IS THE WATER CONTENT CORRESPONDING TO 20 mm PENETRATION.					

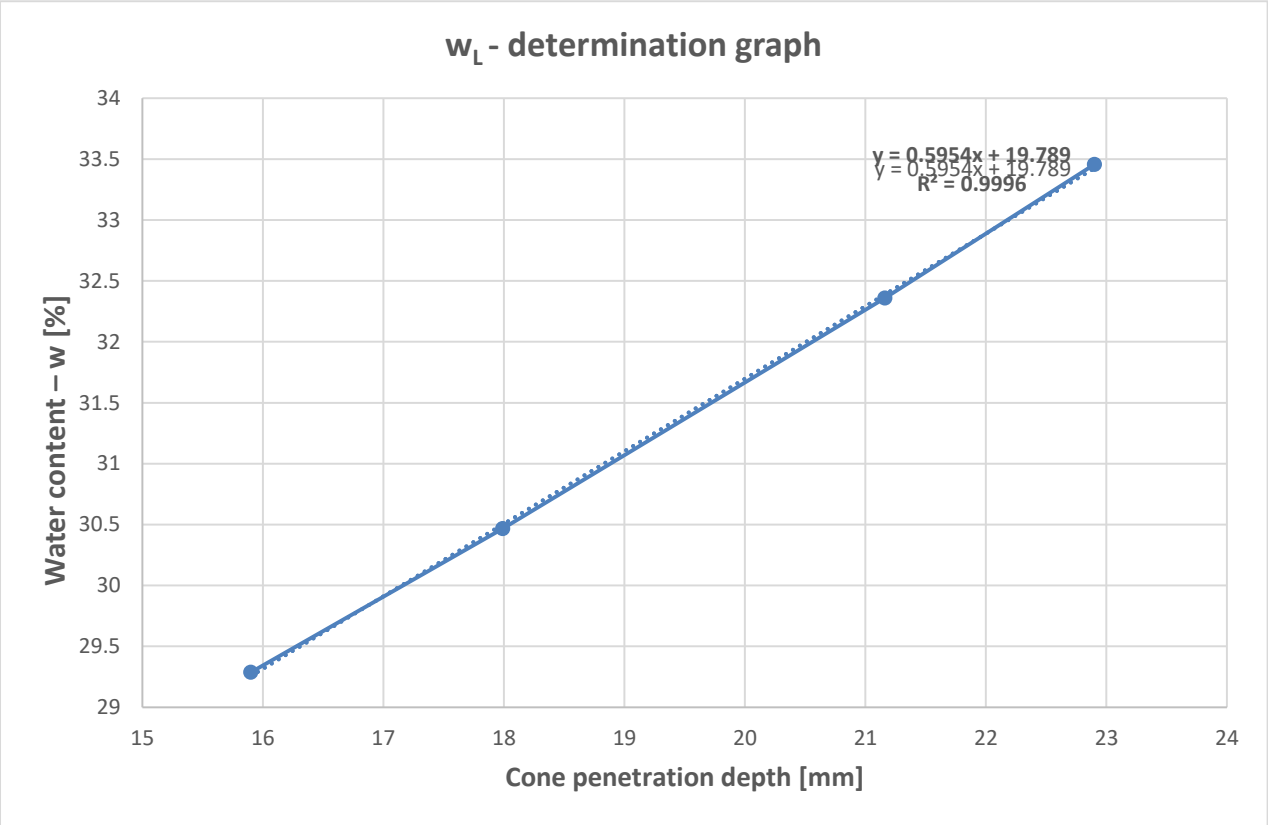
Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

Test report



Admissibility (collinearity 3 pct.)	[%]	**YES**
Liquid limit (w_L)	[%]	**31.7**
Correlation coefficient	[-]	**0.9996**

DETERMINATION OF FREE SWELL INDEX (12g MATERIAL) - no. 47594-RUL/03.31.2025				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Graduated cyilinder no.	[–]	9	10	205
Initial volume of soil specimen (V_i)	[cm^3]	10	10	10
Final volume of soil specimen (V_f)	[cm^3]	16	16.5	16.5
Formula	$U_L = 10x(V_f - V_i)$			
Free swell index (U_L)	[%]	60	65	65
Admissibility (Max - Min < 10%)	[%]	**5 – ACCEPTED**		
Average result	[%]	**65**		

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF BULK AND PARTICLE DENSITY OF SOILS
according to SR EN ISO 17892-2:2015, SR EN ISO 17892-3:2016
Test report

Client	*S.C. GLODENI ENERGY S.R.L.*					**Project No.**	*3140LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*					**Date of reception**	*24-Mar-2025*
Borehole No.	*FS06*	**Superior depth of sample (m)**	*1.70*	**Sample description**	*low plasticity sandy CLAY*	**Date of test**	*24-Mar-2025*
		Inferior depth of sample (m)	*2.00*			**Sample No.**	*47594*

DETERMINATION OF BULK DENSITY – IMMERSION IN FLUID METHOD - no. 47594-RDS/03.31.2025

Characteristics	unit	Specimen no. 1	Specimen no. 2	Specimen no. 3
		1	2	3
Mass of the soil specimen (m_0)	[g]	15.480	19.150	22.200
Mass of the specimen with coating wax (m_1)	[g]	16.900	21.160	24.070
Mass of the immersed specimen (m_2)	[g]	7.380	9.120	10.710
Formula	$V_1 = \frac{m_1 - m_2}{\rho_{water}}, \rho_{water} = 0,998 g/cm^3$	$V_2 = \frac{m_1 - m_0}{\rho_{wax}}$	$\rho_{sample} = \frac{m_0}{V_1 - V_2}$	
Volume of the immersed specimen (V_1)	[cm^3]	9.54	12.06	13.39
Volume of the coating wax (V_2)	[cm^3]	1.54	2.18	2.03
Bulk density (ρ_i)	[g/cm^3]	1.94	1.94	1.96
Admissibility ((ρ_i-ρ_{i_min}) / ρ_i < 1%)	[%]	**0 – ACCEPTED**	**0.12 – ACCEPTED**	**0.98 – ACCEPTED**
Average result - Bulk Density (ρ)	[g/cm^3]	**1.94**		
Average result - Bulk unit weight (γ)	[kN/m^3]	**19.06**		

DETERMINATION OF PARTICLE DENSITY – FLUID PYCNOMETER METHOD - no. 47594-RDP/03.31.2025

Characteristics	unit	Specimen no. 1	Specimen no. 2
		1	2
Pycnometer no.	[-]	28	29
Mass of the oven dried test specimen (m_4)	[g]	10.05	10.09
Mass of the pycnometer + specimen + control fluid (m_3)	[g]	118.57	116.83
Mass of the dry pycnometer (m_0)	[g]	53.86	51.76
Mass of the pycnometer + control fluid (m_1)	[g]	112.25	110.48
Mass of the pycnometer + dry specimen (m_2)	[g]	63.91	61.85
Formula	$\rho_s = \frac{m_4}{(m_1 - m_0) - (m_3 - m_2)} * \rho_L$	$\rho_{L\,(20^oC)} = 0,99823\ g/cm^3$	
Soil particle density (ρ_s)	[g/cm^3]	2.690	2.693
Soil particle unit weight (γ_s)	[kN/m^3]	26.38	26.41
Admissibility (ρ_{s2}-min(ρ_{s1},ρ_{s2}) < 0.03 g/cm^3)	[g/cm^3]	**ACCEPTED - Δρ = 0**	**ACCEPTED - Δρ = 0.003**
Average result - Soil particle density ($\rho_{s\ -\ final}$)	[g/cm^3]	**2.690**	
Average result - Soil particle unit weight ($\gamma_{s\ -\ final}$)	[kN/m^3]	**26.39**	

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMANIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF CARBONATE AND HUMUS CONTENT OF SOILS
according to ASTM 4373 - 21, STAS 7107/1 - 76
Test report

Client	*S.C. GLODENI ENERGY S.R.L.*					**Project No.**	*3140LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*					**Date of reception**	*24-Mar-2025*
Borehole No.	*FS06*	**Superior depth of sample (m)**	*1.70*	**Sample description**	*low plasticity sandy CLAY*	**Date of test**	*24-Mar-2025*
		Inferior depth of sample (m)	*2.00*			**Sample No.**	*47594*

DETERMINATION OF CARBONATE CONTENT			
Test report - no. 47594-RC/03.31.2025			
Characteristics		**Specimen no. 1**	**Specimen no. 2**
		1	**2**
Calcimeter no.	**u.m.**	**2**	-
Injection pressure (P_i)	[bar]	**0.167**	-
Mass of dried specimen (m_1)	[g]	**1.000**	-
Measured CO_2 pressure (P_c)	[bar]	**0.179**	-
Formula	$CaCO_3 = \frac{(P_c - Pi) * 100}{(m_1) * P_{max}}$		
Carbonate content (calcite equivalent)	[%]	**0.64**	-
Admissibility (Max - Min < 2%)	[%]	**0 – ADMIS**	
Average result - Carbonate content (calcite equivalent)	[%]	**0.64**	

DETERMINATION OF HUMUS CONTENT			
Test report - no. 47594-RH/03.31.2025			
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**
		1	**2**
Cylinder no.	[–]	**104**	**304**
Formula		**Colour**	**Humus content**
		Colorless	*0 - 1 %*
		Yellowish	*1 - 2 %*
		From yellow to brownish	*2 - 5 %*
		Brown	*> 5 %*
Test colour	[–]	**incolor**	**incolor**
Humus content	[%]	**0**	**0**
Average result - Humus content	[%]	**0**	

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF WATER CONTENT, PLASTICITY AND FREE SWELL INDEX OF SOILS according to SR EN ISO 17892-1:2015, SR EN ISO 17892-12:2018, STAS 1913/12 - 88

Test report

Client	*S.C. GLODENI ENERGY S.R.L.*					**Project No.**	*3140LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*					**Date of reception**	*24-Mar-2025*
Borehole No.	*FS07*	**Superior depth of sample (m)**	*1.30*	**Sample description**	*medium plasticity CLAY*	**Date of test**	*24-Mar-2025*
		Inferior depth of sample (m)	*1.50*			**Sample No.**	*47595*

DETERMINATION OF WATER CONTENT - no. 47595-RU/03.31.2025				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Container no.	[–]	426	805	-
Mass of container (m_c)	[g]	36.34	61.61	-
Mass of moist test specimen + container (m_u)	[g]	151.680	822.750	-
Mass of dried test specimen + container (m_d)	[g]	128.670	668.220	-
Formula	$w = \frac{m_u - m_d}{m_d - m_c} x100$			
Water content (w)	[%]	24.92	25.47	-
Admissibility (Max - Min < 2%)	[%]	**0.55 – ACCEPTED**		
Average result	[%]	**25.20**		

DETERMINATION OF PLASTIC LIMIT – THREAD ROLLING TEST METHOD - no. 47595-RWP/03.31.2025				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Container no.	[–]	833	838	839
Mass of container (m_c)	[g]	21.25	21.27	21.20
Mass of moist test specimen + container (A)	[g]	23.580	24.100	24.230
Mass of dried test specimen + container (B)	[g]	23.230	23.660	23.790
Formula	$w_p = \frac{A - B}{B - mC} x100$			
Plastic limit (w_p)	[%]	17.68	18.41	16.99
Admissibility (Max - Min < 2 %)	[%]	**1.42 – ACCEPTED**		
Average result	[%]	**17.69**		

DETERMINATION OF LIQUID LIMIT – FALL CONE TEST METHOD - no. 47595-RWL/03.31.2025					
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**	**Specimen no. 4**
		1	**2**	**3**	**4**
Container no.	[–]	3006	3008	3009	3010
Mass of the container (C)	[g]	13.19	11.70	11.69	11.66
Mass of moist test specimen + container (A)	[g]	27.390	30.700	29.880	35.870
Mass of dried test specimen + container (B)	[g]	23.180	24.790	24.050	27.960
Cone penetration depth (N)	[mm]	15.1	18.21	20.32	21.7
Water content (w)	[%]	42.14	45.15	47.17	48.53
BEST STRAIGHT-LINE FIT METHOD – THE MEASURED WATER CONTENTS IN ORDINATE AND THE CORRESPONDING CONE PENETREATIONS AS ABSCISSA. THE VALUE OF LIQUID LIMIT IS THE WATER CONTENT CORRESPONDING TO 20 mm PENETRATION.					

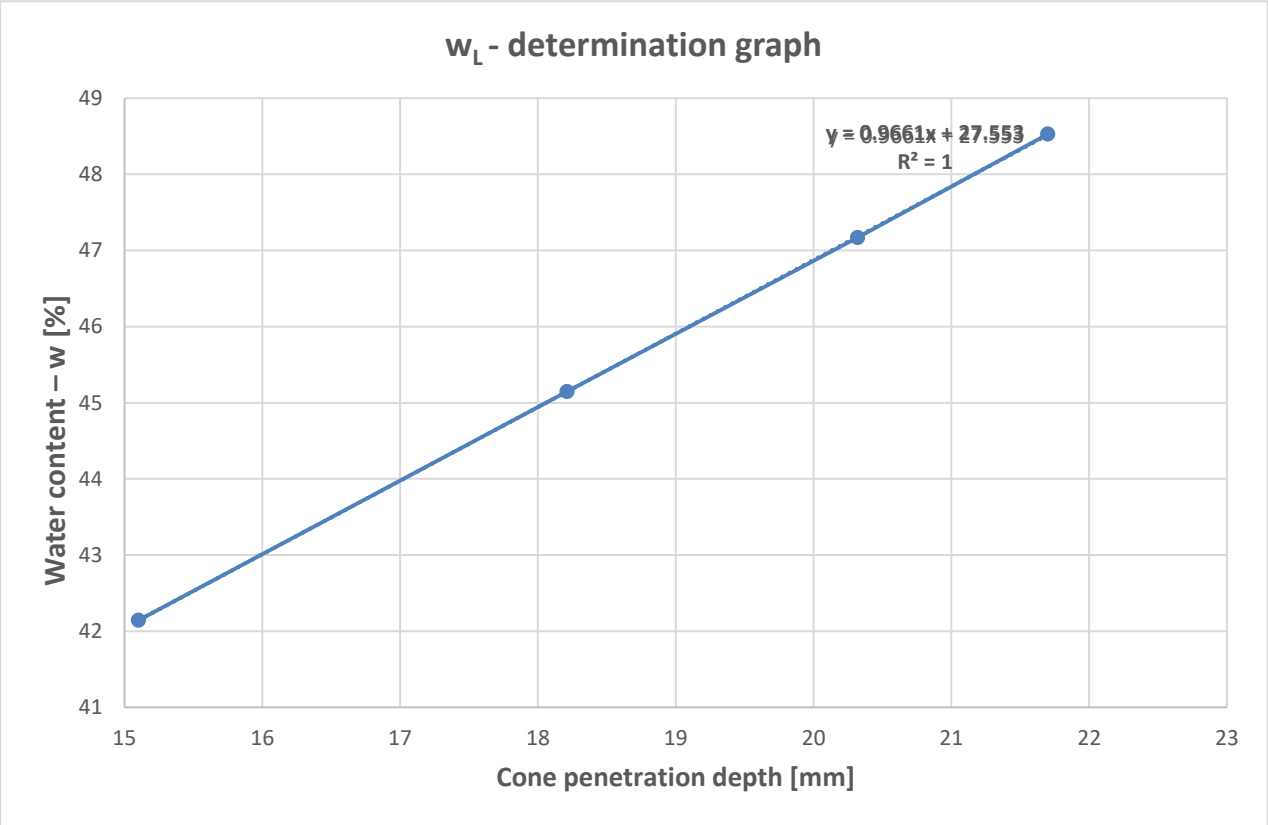
Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

Test report



Admissibility (collinearity 3 pct.)	[%]	**YES**
Liquid limit (w_L)	[%]	**46.87**
Correlation coefficient	[-]	**1**

DETERMINATION OF FREE SWELL INDEX (12g MATERIAL) - no. 47595-RUL/03.31.2025				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Graduated cyilinder no.	[–]	11	12	206
Initial volume of soil specimen (V_i)	[cm^3]	10	10	10
Final volume of soil specimen (V_f)	[cm^3]	20	20	20
Formula	$U_L = 10x(V_f - V_i)$			
Free swell index (U_L)	[%]	100	100	100
Admissibility (Max - Min < 10%)	[%]	**0 – ACCEPTED**		
Average result	[%]	**100**		

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF BULK AND PARTICLE DENSITY OF SOILS according to SR EN ISO 17892-2:2015, SR EN ISO 17892-3:2016

Test report

Client	*S.C. GLODENI ENERGY S.R.L.*					**Project No.**	*3140LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*					**Date of reception**	*24-Mar-2025*
Borehole No.	*FS07*	**Superior depth of sample (m)**	*1.30*	**Sample description**	*medium plasticity CLAY*	**Date of test**	*24-Mar-2025*
		Inferior depth of sample (m)	*1.50*			**Sample No.**	*47595*

DETERMINATION OF BULK DENSITY – IMMERSION IN FLUID METHOD - no. 47595-RDS/03.31.2025				
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**	**Specimen no. 3**
		1	**2**	**3**
Mass of the soil specimen (m_0)	[g]	20.250	20.860	21.680
Mass of the specimen with coating wax (m_1)	[g]	22.470	22.750	23.620
Mass of the immersed specimen (m_2)	[g]	9.500	9.800	10.210
Formula	$V_1 = \frac{m_1 - m_2}{\rho_{water}}, \rho_{water} = 0,998 g/cm^3$	$V_2 = \frac{m_1 - m_0}{\rho_{wax}}$	$\rho_{sample} = \frac{m_0}{V_1 - V_2}$	
Volume of the immersed specimen (V_1)	[cm^3]	13.00	12.98	13.44
Volume of the coating wax (V_2)	[cm^3]	2.41	2.05	2.11
Bulk density (ρ_i)	[g/cm^3]	1.91	1.91	1.91
Admissibility ((ρ_i-ρ_{i_min}) / ρ_i < 1%)	[%]	**0.18 – ACCEPTED**	**0 – ACCEPTED**	**0.2 – ACCEPTED**
Average result - Bulk Density (ρ)	[g/cm^3]	**1.91**		
Average result - Bulk unit weight (γ)	[kN/m^3]	**18.76**		

DETERMINATION OF PARTICLE DENSITY – FLUID PYCNOMETER METHOD - no. 47595-RDP/03.31.2025			
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**
		1	**2**
Pycnometer no.	[-]	30	31
Mass of the oven dried test specimen (m_4)	[g]	10.05	10.04
Mass of the pycnometer + specimen + control fluid (m_3)	[g]	117.46	118.21
Mass of the dry pycnometer (m_0)	[g]	53.72	53.00
Mass of the pycnometer + control fluid (m_1)	[g]	111.18	111.95
Mass of the pycnometer + dry specimen (m_2)	[g]	63.77	63.04
Formula	$\rho_s = \frac{m_4}{(m_1 - m_0) - (m_3 - m_2)} * \rho_L$	$\rho_{L\,(20^oC)} = 0,99823\ g/cm^3$	
Soil particle density (ρ_s)	[g/cm^3]	2.661	2.651
Soil particle unit weight (γ_s)	[kN/m^3]	26.09	26.00
Admissibility (ρ_{s2}-min(ρ_{s1},ρ_{s2}) < 0.03 g/cm^3)	[g/cm^3]	**ACCEPTED - Δρ = 0.01**	**ACCEPTED - Δρ = 0**
Average result - Soil particle density ($\rho_{s\ -\ final}$)	[g/cm^3]	**2.660**	
Average result - Soil particle unit weight ($\gamma_{s\ -\ final}$)	[kN/m^3]	**26.05**	

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMANIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF CARBONATE AND HUMUS CONTENT OF SOILS
according to ASTM 4373 - 21, STAS 7107/1 - 76
Test report

Client	*S.C. GLODENI ENERGY S.R.L.*					**Project No.**	*3140LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*					**Date of reception**	*24-Mar-2025*
Borehole No.	*FS07*	**Superior depth of sample (m)**	*1.30*	**Sample description**	*medium plasticity CLAY*	**Date of test**	*24-Mar-2025*
		Inferior depth of sample (m)	*1.50*			**Sample No.**	*47595*

DETERMINATION OF CARBONATE CONTENT			
Test report - no. 47595-RC/03.31.2025			
Characteristics		**Specimen no. 1**	**Specimen no. 2**
		1	**2**
Calcimeter no.	**u.m.**	**2**	-
Injection pressure (P_i)	[bar]	**0.167**	-
Mass of dried specimen (m_1)	[g]	**1.000**	-
Measured CO_2 pressure (P_c)	[bar]	**0.185**	-
Formula	$CaCO_3 = \frac{(P_c - Pi) * 100}{(m_1) * P_{max}}$		
Carbonate content (calcite equivalent)	[%]	**0.97**	-
Admissibility (Max - Min < 2%)	[%]	**0 – ADMIS**	
Average result - Carbonate content (calcite equivalent)	[%]	**0.97**	

DETERMINATION OF HUMUS CONTENT			
Test report - no. 47595-RH/03.31.2025			
Characteristics	**unit**	**Specimen no. 1**	**Specimen no. 2**
		1	**2**
Cylinder no.	[–]	**105**	**305**
Formula		**Colour**	**Humus content**
		Colorless	*0 - 1 %*
		Yellowish	*1 - 2 %*
		From yellow to brownish	*2 - 5 %*
		Brown	*> 5 %*
Test colour	[–]	**slab gălbui**	**slab gălbui**
Humus content	[%]	**1**	**1**
Average result - Humus content	[%]	**1**	

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

Classification of soils based on particle size distribution and plasticity

according to SR EN ISO 14688:2-2018 / SR EN ISO 17892-4:2017 / SR EN ISO 17892-12:2018

Test report

Client S.C. GLODENI ENERGY S.R.L. **Project No.** *2819LGS*

Location Glodeni municipality, CF 50604, 52635, 52833, Mureș county **Date of reception** *18.01.2024*

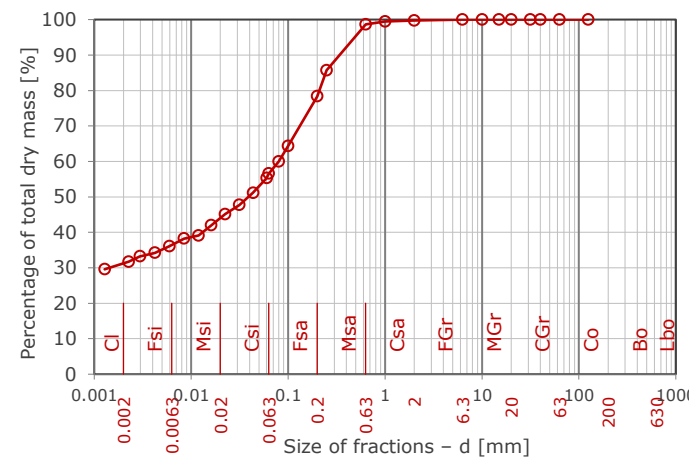
Borehole No. *FS01* **Sample No.** *42672* **Superior depth of sample (m)** *2.00* **Inferior depth of sample (m)** *2.40* **Date of test** *05.02.2024*

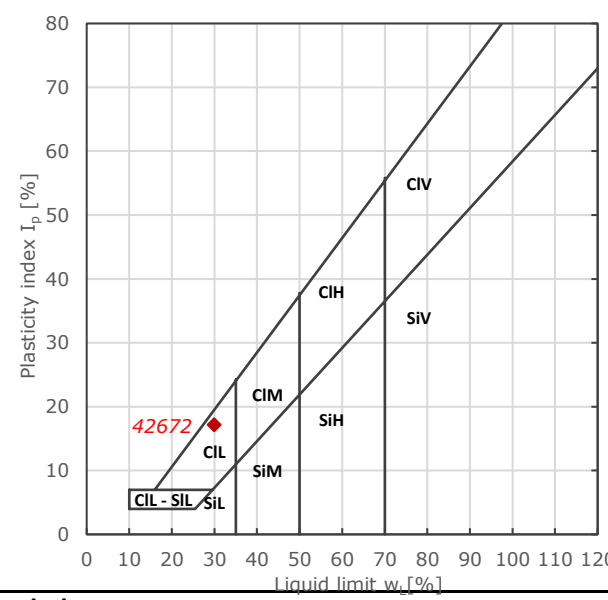
Dry sample mass for granulometry [g]	60.42

Soil group	Subdivision	Symbol	Size [mm]	Quantification [%]
Very coarse	Large boulders	Lbo	> 630	0.00
	Boulders	Bo	200-630	0.00
	Cobbles	Co	63-200	0.00
Coarse	Coarse gravel	CGr	20-63	0.00
	Medium gravel	MGr	6,3-20	0.00
	Fine gravel	FGr	2-6,3	0.25
	Coarse sand	Csa	0,63-2	1.12
	Medium sand	Msa	0,2-0,63	20.28
	Fine sand	Fsa	0,063-0,2	21.78
Fine	Coarse silt	Csi	0,02-0,063	12.65
	Medium silt	Msi	0,0063-0,02	7.53
	Fine silt	Fsi	0,002-0,0063	5.24
	Clay	Cl	≤ 0,002	31.15

Particle diameters [mm]	d_{10}	d_{30}	d_{60}
	-	0.00147	0.08009
Uniformity coefficient – C_U	**Coefficient of curvature – C_C**		
-	-		

Plasticity [%]	I_p	w_L
	17.15	29.93





Cohesive soil (more than 50% fine particles)

% sand + % gravel = 43.43

% sand (43.18) >= % gravel (0.25)

Sample description

low plasticity sandy CLAY

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

Classification of soils based on particle size distribution and plasticity

according to SR EN ISO 14688:2-2018 / SR EN ISO 17892-4:2017 / SR EN ISO 17892-12:2018

Test report

Client S.C. GLODENI ENERGY S.R.L. **Project No.** *2819LGS*

Location Glodeni municipality, CF 50604, 52635, 52833, Mureș county **Date of reception** *18.01.2024*

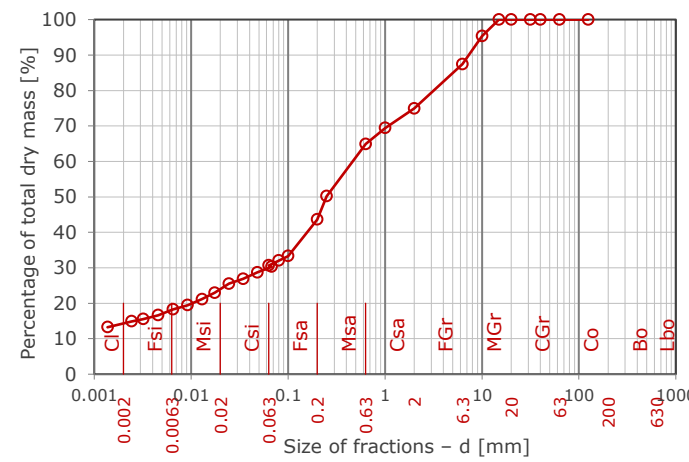
Borehole No. *FS01* **Sample No.** *42674* **Superior depth of sample (m)** *3.60* **Inferior depth of sample (m)** *4.00* **Date of test** *25.01.2024*

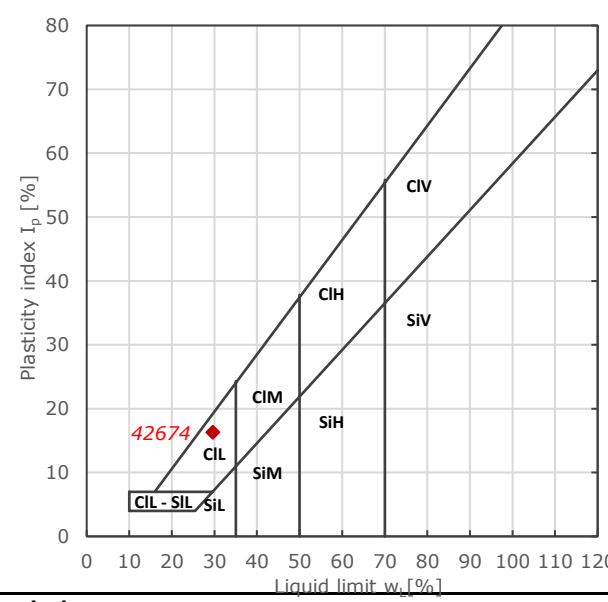
Dry sample mass for granulometry [g]	68.87

Soil group	Subdivision	Symbol	Size [mm]	Quantification [%]
Very coarse	Large boulders	Lbo	> 630	0.00
	Boulders	Bo	200-630	0.00
	Cobbles	Co	63-200	0.00
Coarse	Coarse gravel	CGr	20-63	0.00
	Medium gravel	MGr	6,3-20	12.56
	Fine gravel	FGr	2-6,3	12.49
	Coarse sand	Csa	0,63-2	10.07
	Medium sand	Msa	0,2-0,63	21.25
	Fine sand	Fsa	0,063-0,2	12.96
Fine	Coarse silt	Csi	0,02-0,063	6.80
	Medium silt	Msi	0,0063-0,02	5.74
	Fine silt	Fsi	0,002-0,0063	3.91
	Clay	Cl	≤ 0,002	14.22

Particle diameters [mm]	d_{10}	d_{30}	d_{60}
	-	0.06384	0.50376
Uniformity coefficient – C_U	**Coefficient of curvature – C_C**		
-	-		

Plasticity [%]	I_p	w_L
	16.30	29.63





Non-cohesive soil (more than 50% coarse particles)
% sand + % gravel = 69.33
% sand (44.28) >= % gravel (25.05)

Sample description

gravelly low plasticity clayey SAND

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel: +40 753 099 590
E-mail: office@geosearch.ro

File code
FL-073

Classification of soils based on particle size distribution and plasticity

according to SR EN ISO 14688:2-2018 / SR EN ISO 17892-4:2017 / SR EN ISO 17892-12:2018

Test report

Client S.C. GLODENI ENERGY S.R.L. **Project No.** *2819LGS*

Location Glodeni municipality, CF 50604, 52635, 52833, Mureș county **Date of reception** *18.01.2024*

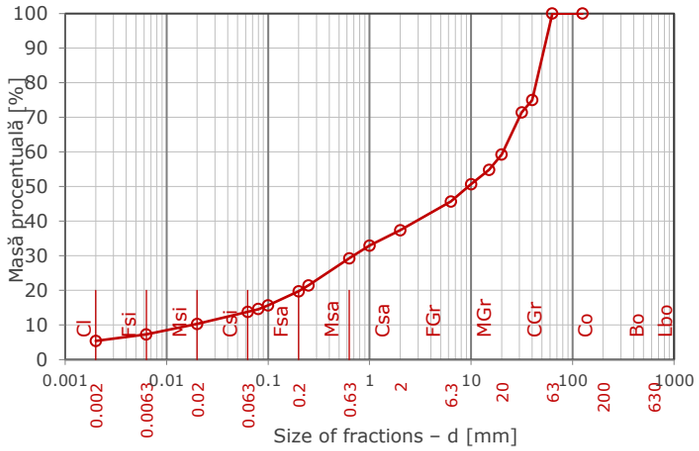
Borehole No. *FS01* **Sample No.** *42675* **Superior depth of sample (m)** *5.50* **Inferior depth of sample (m)** *7.00* **Date of test** *05.02.2024*

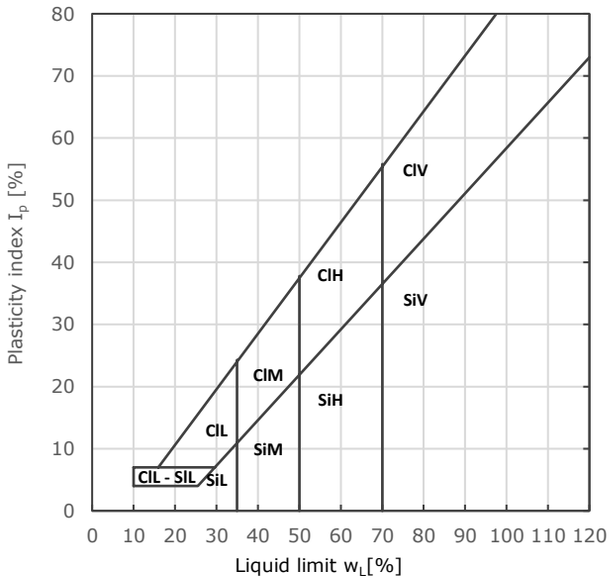
Dry sample mass for granulometry [g]	2361.96

Soil group	Subdivision	Symbol	Size [mm]	Quantification [%]
Very coarse	Large boulders	Lbo	> 630	0.00
	Boulders	Bo	200-630	0.00
	Cobbles	Co	63-200	0.00
Coarse	Coarse gravel	CGr	20-63	40.69
	Medium gravel	MGr	6,3-20	13.62
	Fine gravel	FGr	2-6,3	8.27
	Coarse sand	Csa	0,63-2	8.13
	Medium sand	Msa	0,2-0,63	9.58
	Fine sand	Fsa	0,063-0,2	5.92
Fine	Coarse silt	Csi	0,02-0,063	3.51
	Medium silt	Msi	0,0063-0,02	3.03
	Fine silt	Fsi	0,002-0,0063	1.85
	Clay	Cl	≤ 0,002	5.40

Particle diameters [mm]	d_{10}	d_{30}	d_{60}
	-	0.70119	20.65470
Uniformity coefficient – Cu	**Coefficient of curvature – Cc**		
-	-		

Plasticity [%]	I_p	w_L
	-	-





Pământ necoeziv (mai mult de 50% părți grosiere)
% nisip + % pietriș = 86.21

Sample description

sandy silty GRAVEL

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

Classification of soils based on particle size distribution and plasticity

according to SR EN ISO 14688:2-2018 / SR EN ISO 17892-4:2017 / SR EN ISO 17892-12:2018

Test report

Client S.C. GLODENI ENERGY S.R.L. **Project No.** *2819LGS*

Location Glodeni municipality, CF 50604, 52635, 52833, Mureș county **Date of reception** *18.01.2024*

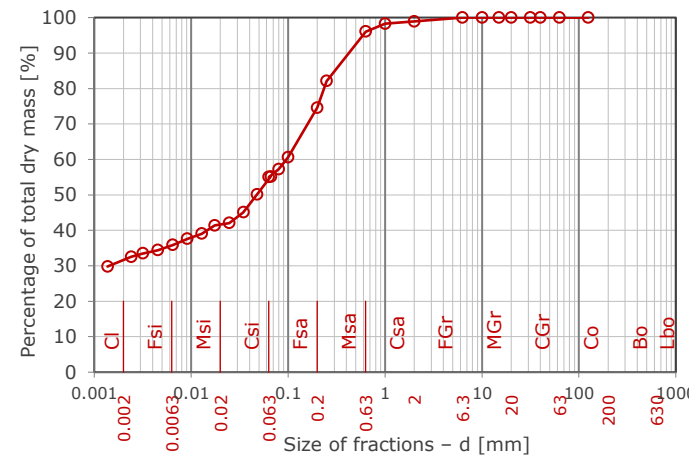
Borehole No. *FS02* **Sample No.** *42677* **Superior depth of sample (m)** *1.60* **Inferior depth of sample (m)** *2.00* **Date of test** *25.01.2024*

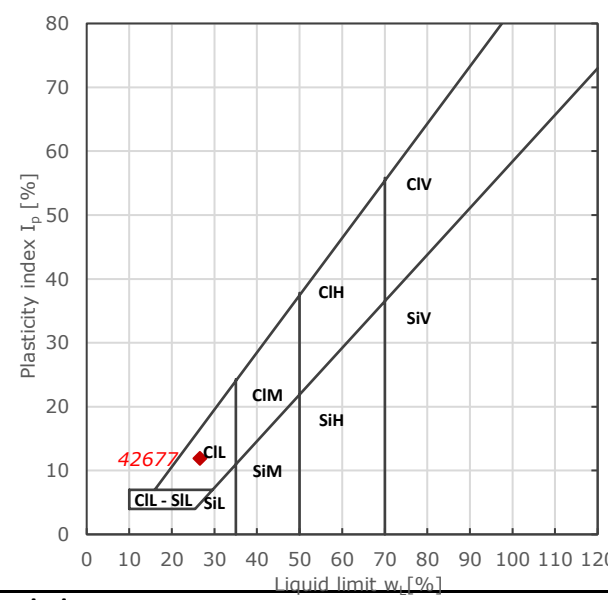
Dry sample mass for granulometry [g]	47.00

Soil group	Subdivision	Symbol	Size [mm]	Quantification [%]
Very coarse	Large boulders	Lbo	> 630	0.00
	Boulders	Bo	200-630	0.00
	Cobbles	Co	63-200	0.00
Coarse	Coarse gravel	CGr	20-63	0.00
	Medium gravel	MGr	6,3-20	0.00
	Fine gravel	FGr	2-6,3	1.11
	Coarse sand	Csa	0,63-2	2.85
	Medium sand	Msa	0,2-0,63	21.47
	Fine sand	Fsa	0,063-0,2	19.55
Fine	Coarse silt	Csi	0,02-0,063	13.40
	Medium silt	Msi	0,0063-0,02	5.89
	Fine silt	Fsi	0,002-0,0063	4.26
	Clay	Cl	≤ 0,002	31.47

Particle diameters [mm]	d_{10}	d_{30}	d_{60}
	-	0.00144	0.09637
Uniformity coefficient – C_U	**Coefficient of curvature – C_C**		
-	-		

Plasticity [%]	I_p	w_L
	11.88	26.55





Cohesive soil (more than 50% fine particles)
% sand + % gravel = 44.98
% sand (43.87) >= % gravel (1.11)

Sample description

low plasticity sandy CLAY

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

Classification of soils based on particle size distribution and plasticity

according to SR EN ISO 14688:2-2018 / SR EN ISO 17892-4:2017 / SR EN ISO 17892-12:2018

Test report

Client S.C. GLODENI ENERGY S.R.L. **Project No.** *2819LGS*

Location Glodeni municipality, CF 50604, 52635, 52833, Mureș county **Date of reception** *18.01.2024*

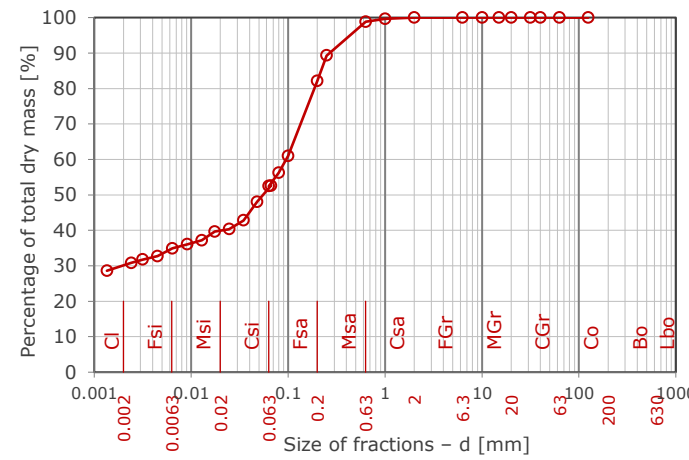
Borehole No. *FS02* **Sample No.** *42679* **Superior depth of sample (m)** *2.60* **Inferior depth of sample (m)** *3.00* **Date of test** *25.01.2024*

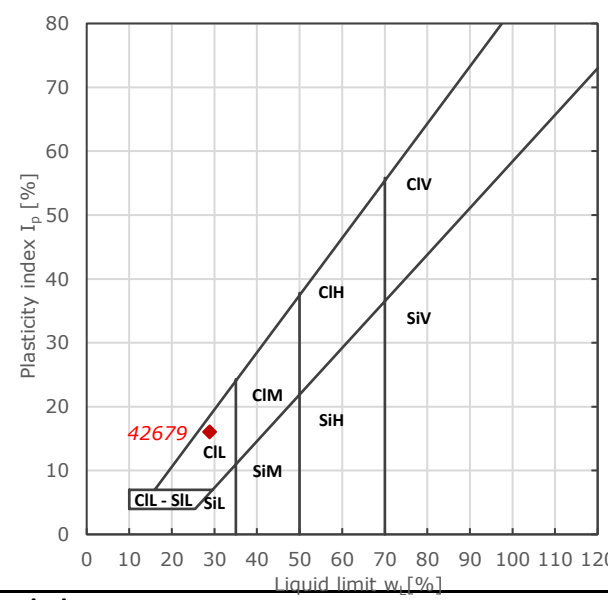
Dry sample mass for granulometry [g]	45.10

Soil group	Subdivision	Symbol	Size [mm]	Quantification [%]
Very coarse	Large boulders	Lbo	> 630	0.00
	Boulders	Bo	200-630	0.00
	Cobbles	Co	63-200	0.00
Coarse	Coarse gravel	CGr	20-63	0.00
	Medium gravel	MGr	6,3-20	0.00
	Fine gravel	FGr	2-6,3	0.00
	Coarse sand	Csa	0,63-2	1.19
	Medium sand	Msa	0,2-0,63	16.74
	Fine sand	Fsa	0,063-0,2	29.60
Fine	Coarse silt	Csi	0,02-0,063	12.59
	Medium silt	Msi	0,0063-0,02	5.09
	Fine silt	Fsi	0,002-0,0063	4.84
	Clay	Cl	≤ 0,002	29.95

Particle diameters [mm]	d_{10}	d_{30}	d_{60}
	-	0.00202	0.09593
Uniformity coefficient – C_U	**Coefficient of curvature – C_C**		
-	-		

Plasticity [%]	I_p	w_L
	16.05	28.84





Cohesive soil (more than 50% fine particles)
% sand + % gravel = 47.53
% sand (47.53) >= % gravel (0)

Sample description

low plasticity sandy CLAY

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel: +40 753 099 590
E-mail: office@geosearch.ro

File code
FL-073

Classification of soils based on particle size distribution and plasticity

according to SR EN ISO 14688:2-2018 / SR EN ISO 17892-4:2017 / SR EN ISO 17892-12:2018

Test report

Client S.C. GLODENI ENERGY S.R.L. **Project No.** *2819LGS*

Location Glodeni municipality, CF 50604, 52635, 52833, Mureș county **Date of reception** *18.01.2024*

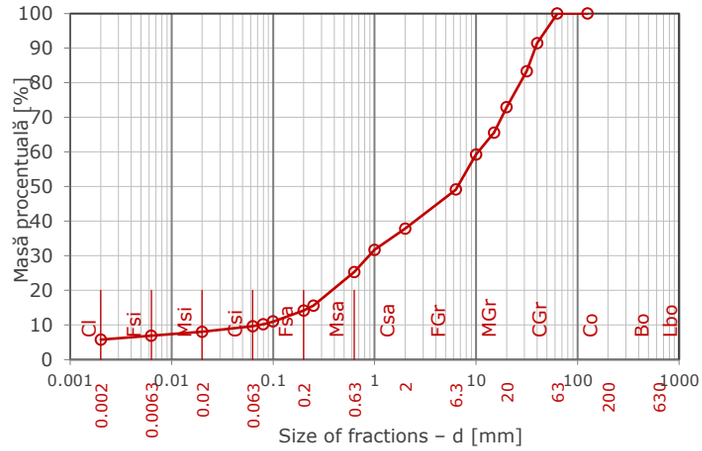
Borehole No. *FS02* **Sample No.** *42682* **Superior depth of sample (m)** *7.00* **Inferior depth of sample (m)** *8.00* **Date of test** *05.02.2024*

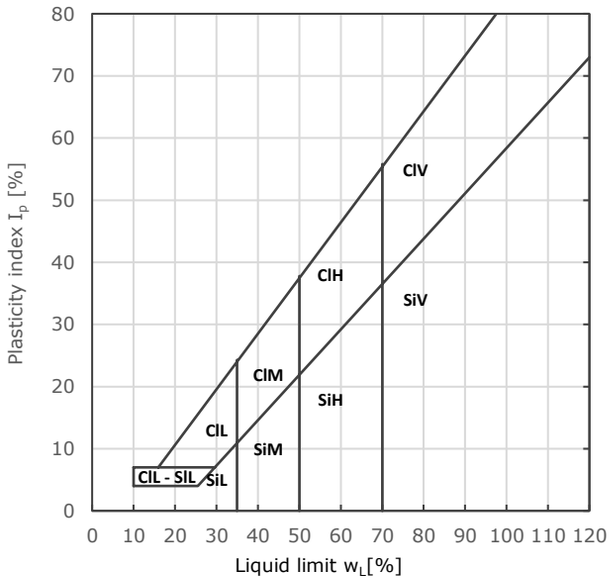
Dry sample mass for granulometry [g]	2965.81

Soil group	Subdivision	Symbol	Size [mm]	Quantification [%]
Very coarse	Large boulders	Lbo	> 630	0.00
	Boulders	Bo	200-630	0.00
	Cobbles	Co	63-200	0.00
Coarse	Coarse gravel	CGr	20-63	27.05
	Medium gravel	MGr	6,3-20	23.82
	Fine gravel	FGr	2-6,3	11.25
	Coarse sand	Csa	0,63-2	12.57
	Medium sand	Msa	0,2-0,63	11.13
	Fine sand	Fsa	0,063-0,2	4.49
Fine	Coarse silt	Csi	0,02-0,063	1.66
	Medium silt	Msi	0,0063-0,02	1.15
	Fine silt	Fsi	0,002-0,0063	1.11
	Clay	Cl	≤ 0,002	5.77

Particle diameters [mm]	d_{10}	d_{30}	d_{60}
	0.07294	0.90114	10.54762
Uniformity coefficient – Cu	**Coefficient of curvature – Cc**		
144.61	1.06		

Plasticity [%]	I_p	w_L
	-	-





Pământ necoeziv (mai mult de 50% părți grosiere)
% nisip + % pietriș = 90.31

Sample description

sandy GRAVEL

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

Classification of soils based on particle size distribution and plasticity

according to SR EN ISO 14688:2-2018 / SR EN ISO 17892-4:2017 / SR EN ISO 17892-12:2018

Test report

Client S.C. GLODENI ENERGY S.R.L. **Project No.** *2819LGS*

Location Glodeni municipality, CF 50604, 52635, 52833, Mureș county **Date of reception** *18.01.2024*

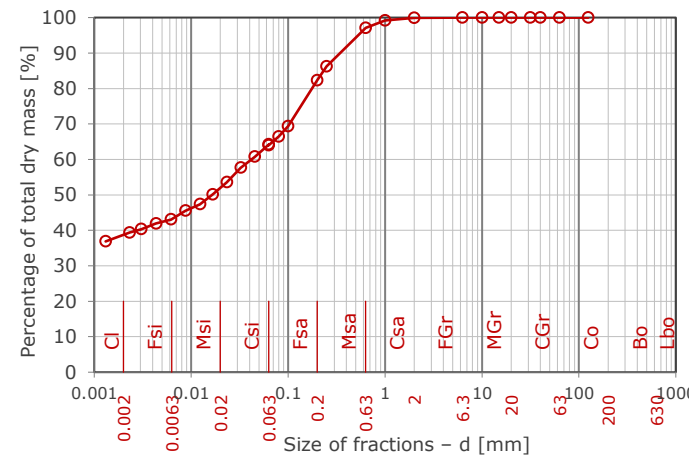
Borehole No. *FS03* **Sample No.** *42685* **Superior depth of sample (m)** *1.00* **Inferior depth of sample (m)** *1.40* **Date of test** *25.01.2024*

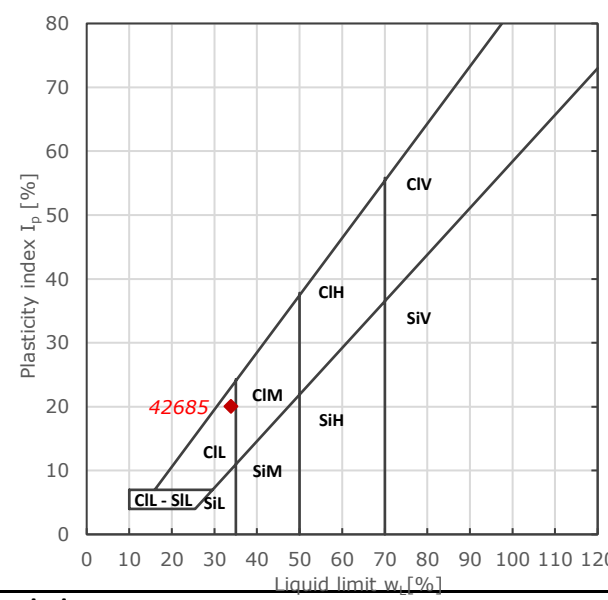
Dry sample mass for granulometry [g]	45.90

Soil group	Subdivision	Symbol	Size [mm]	Quantification [%]
Very coarse	Large boulders	Lbo	> 630	0.00
	Boulders	Bo	200-630	0.00
	Cobbles	Co	63-200	0.00
Coarse	Coarse gravel	CGr	20-63	0.00
	Medium gravel	MGr	6,3-20	0.00
	Fine gravel	FGr	2-6,3	0.11
	Coarse sand	Csa	0,63-2	2.83
	Medium sand	Msa	0,2-0,63	14.75
	Fine sand	Fsa	0,063-0,2	18.30
Fine	Coarse silt	Csi	0,02-0,063	12.19
	Medium silt	Msi	0,0063-0,02	8.65
	Fine silt	Fsi	0,002-0,0063	4.60
	Clay	Cl	≤ 0,002	38.57

Particle diameters [mm]	d_{10}	d_{30}	d_{60}
	-	-	0.04213
Uniformity coefficient – C_U	**Coefficient of curvature – C_C**		
-	-		

Plasticity [%]	I_p	w_L
	20.02	33.84





Cohesive soil (more than 50% fine particles)

% sand + % gravel = 35.99

% sand (35.88) >= % gravel (0.11)

Sample description

low plasticity sandy CLAY

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel: +40 753 099 590
E-mail: office@geosearch.ro

File code
FL-073

Classification of soils based on particle size distribution and plasticity

according to SR EN ISO 14688:2-2018 / SR EN ISO 17892-4:2017 / SR EN ISO 17892-12:2018

Test report

Client S.C. GLODENI ENERGY S.R.L. **Project No.** *2819LGS*

Location Glodeni municipality, CF 50604, 52635, 52833, Mureș county **Date of reception** *18.01.2024*

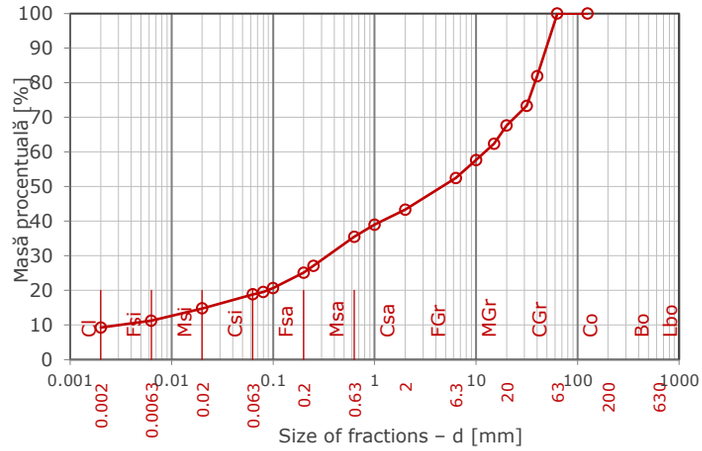
Borehole No. *FS03* **Sample No.** *42689* **Superior depth of sample (m)** *4.30* **Inferior depth of sample (m)** *6.00* **Date of test** *05.02.2024*

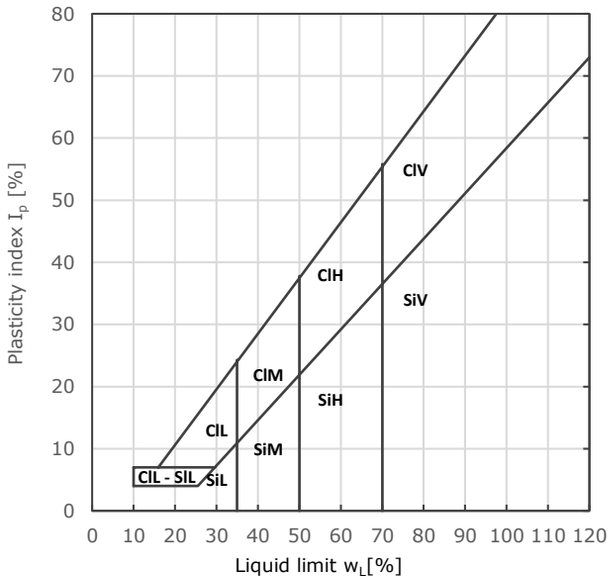
Dry sample mass for granulometry [g]	2406.80

Soil group	Subdivision	Symbol	Size [mm]	Quantification [%]
Very coarse	Large boulders	Lbo	> 630	0.00
	Boulders	Bo	200-630	0.00
	Cobbles	Co	63-200	0.00
Coarse	Coarse gravel	CGr	20-63	32.34
	Medium gravel	MGr	6,3-20	15.21
	Fine gravel	FGr	2-6,3	9.10
	Coarse sand	Csa	0,63-2	7.83
	Medium sand	Msa	0,2-0,63	10.39
	Fine sand	Fsa	0,063-0,2	6.28
Fine	Coarse silt	Csi	0,02-0,063	4.05
	Medium silt	Msi	0,0063-0,02	3.51
	Fine silt	Fsi	0,002-0,0063	2.02
	Clay	Cl	≤ 0,002	9.27

Particle diameters [mm]	d_{10}	d_{30}	d_{60}
	-	0.38029	12.44211
Uniformity coefficient – Cu	**Coefficient of curvature – Cc**		
-	-		

Plasticity [%]	I_p	w_L
	-	-





Sample description

sandy silty GRAVEL

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

Classification of soils based on particle size distribution and plasticity

according to SR EN ISO 14688:2-2018 / SR EN ISO 17892-4:2017 / SR EN ISO 17892-12:2018

Test report - no. 47589-RG/03.31.2025

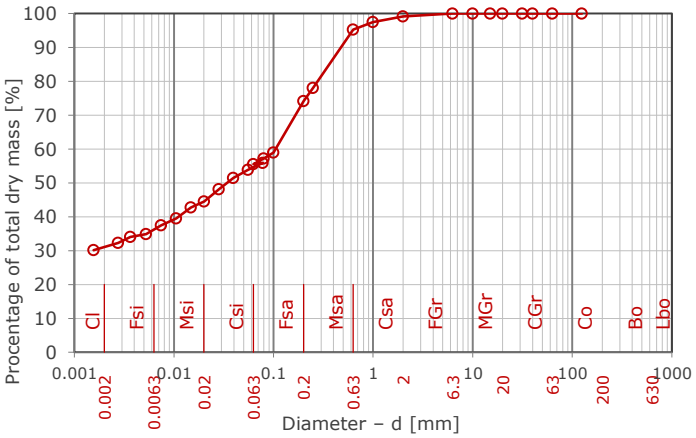
Client	S.C. GLODENI ENERGY S.R.L.	**Project No.**	*3140LGS*
Location	MUNICIPALITY VOIVODENI AND GLODENI, MUREȘ COUNTY, ROMÂNIA	**Date of reception**	*45740*
Borehole No. *FS04*	**Sample No.** *47589*	**Superior depth of sample (m)** *1.30* / **Inferior depth of sample (m)** *1.50*	**Date of test** *45741*

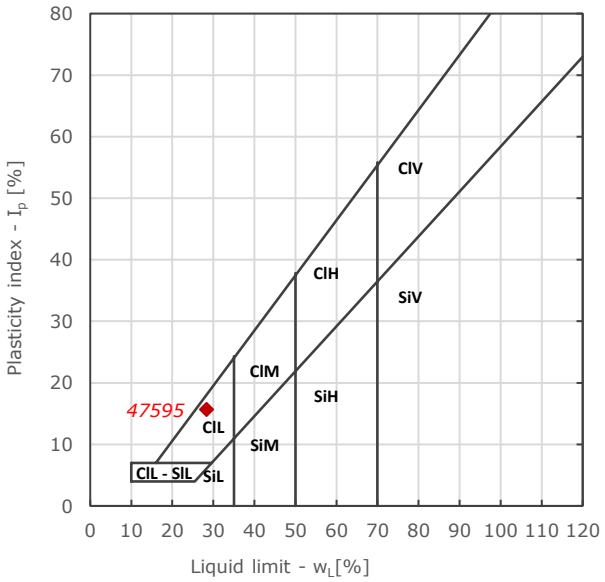
Dry sample mass for granulometry [g]	52.62

Soil group	Subdivision	Symbol	Size [mm]	Quantified [%]
Very coarse	Large boulders	Lbo	> 630	0.00
	Boulders	Bo	200-630	0.00
	Cobbles	Co	63-200	0.00
Coarse	Coarse gravel	CGr	20-63	0.00
	Medium gravel	MGr	6,3-20	0.00
	Fine gravel	FGr	2-6,3	0.87
	Coarse sand	Csa	0,63-2	3.86
	Medium sand	Msa	0,2-0,63	21.12
	Fine sand	Fsa	0,063-0,2	18.64
Fine	Coarse silt	Csi	0,02-0,063	11.05
	Medium silt	Msi	0,0063-0,02	8.36
	Fine silt	Fsi	0,002-0,0063	5.19
	Clay	Cl	≤ 0,002	30.91

Particle diameters [mm]	d_{10}	d_{30}	d_{60}
	-	-	0.10679
Uniformity coefficient – C_U	**Coefficient of curvature – C_C**		
-	-		

Plasticity [%]	I_p	w_L
	15.68	28.37





Cohesive soil (more than 50% fine particles)
% sand + % gravel = 44.49
% sand (43.62) >= % gravel (0.87)

Sample description

low plasticity sandy CLAY

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

File code
FL-102

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

Classification of soils based on particle size distribution and plasticity

according to SR EN ISO 14688:2-2018 / SR EN ISO 17892-4:2017 / SR EN ISO 17892-12:2018

Test report - no. 47597-RG/03.31.2025

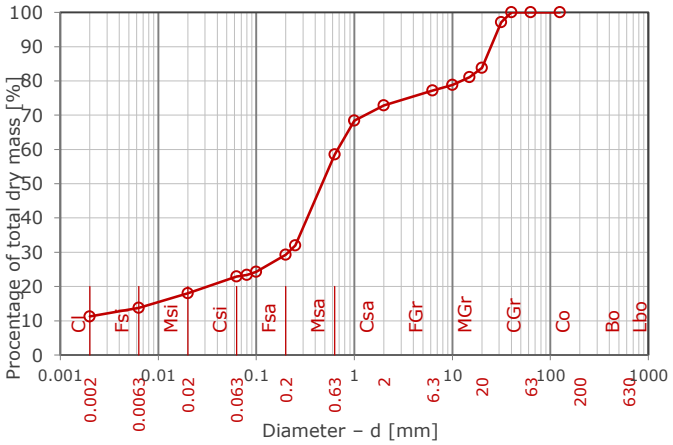
Client	S.C. GLODENI ENERGY S.R.L.	**Project No.**	*3140LGS*
Location	MUNICIPALITY VOIVODENI AND GLODENI, MUREŞ COUNTY, ROMÂNIA	**Date of reception**	*24.03.2025*
Borehole No. *FS04* **Sample No.** *47597*	**Superior depth of sample (m)** *2.50* / **Inferior depth of sample (m)** *3.20*	**Date of test**	*25.03.2025*

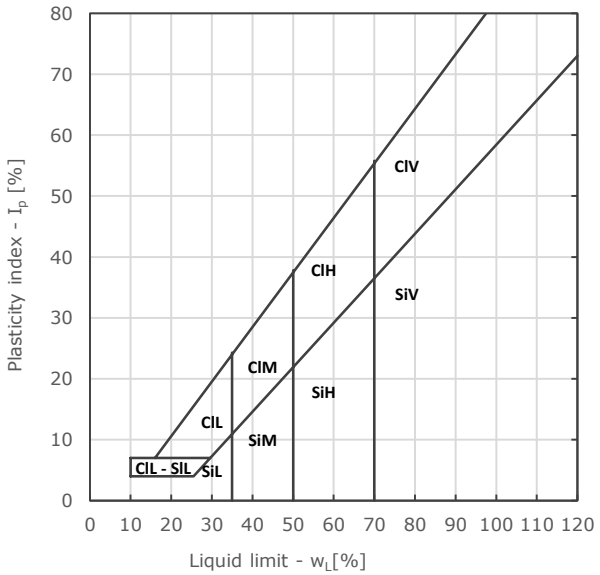
Dry sample mass for granulometry [g]	1494.54

Soil group	Subdivision	Symbol	Size [mm]	Quantification [%]
Very coarse	Large boulders	Lbo	> 630	0.00
	Boulders	Bo	200-630	0.00
	Cobbles	Co	63-200	0.00
Coarse	Coarse gravel	CGr	20-63	16.24
	Medium gravel	MGr	6,3-20	6.61
	Fine gravel	FGr	2-6,3	4.32
	Coarse sand	Csa	0,63-2	14.27
	Medium sand	Msa	0,2-0,63	29.29
	Fine sand	Fsa	0,063-0,2	6.37
Fine	Coarse silt	Csi	0,02-0,063	4.92
	Medium silt	Msi	0,0063-0,02	4.27
	Fine silt	Fsi	0,002-0,0063	2.45
	Clay	Cl	≤ 0,002	11.26

Particle diameters [mm]	d_{10}	d_{30}	d_{60}
	-	0.21337	0.68398
Uniformity coefficient – Cu	**Coefficient of curvature – Cc**		
-	-		

Plasticity [%]	I_p	w_L
	-	-





Sample description

gravelly silty SAND

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

File code
FL-102

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

Classification of soils based on particle size distribution and plasticity

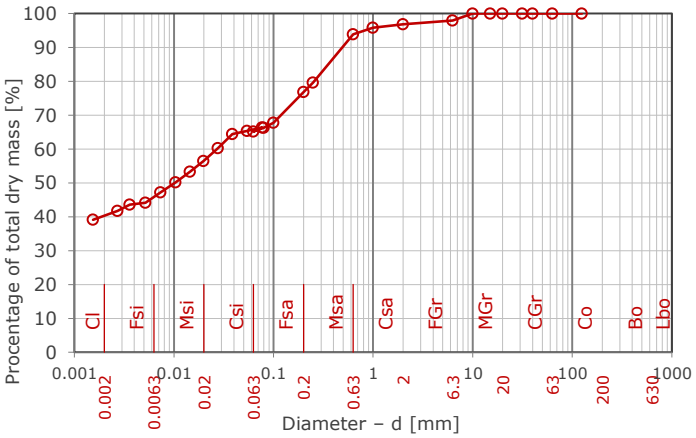
according to SR EN ISO 14688:2-2018 / SR EN ISO 17892-4:2017 / SR EN ISO 17892-12:2018

Test report - no. 47591-RG/03.31.2025

Client	S.C. GLODENI ENERGY S.R.L.	**Project No.**	*3140LGS*
Location	MUNICIPALITY VOIVODENI AND GLODENI, MUREȘ COUNTY, ROMÂNIA	**Date of reception**	*45740*
Borehole No. *FS05*	**Sample No.** *47591*	**Superior depth of sample (m)** *1.30* / **Inferior depth of sample (m)** *1.50*	**Date of test** *45741*

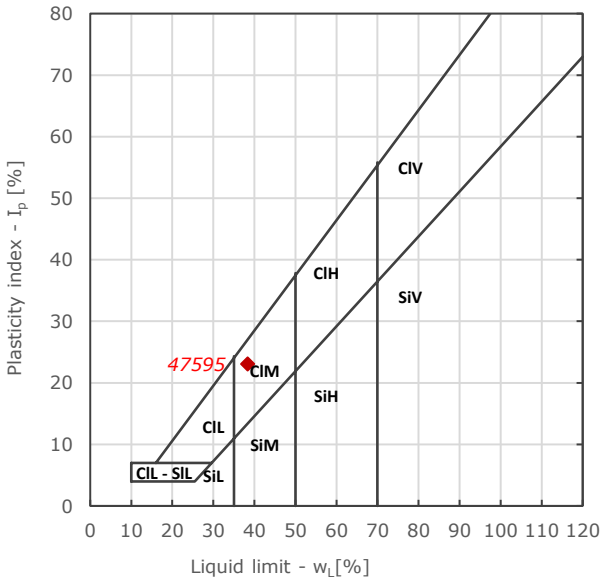
Dry sample mass for granulometry [g]	49.38

Soil group	Subdivision	Symbol	Size [mm]	Quantified [%]
Very coarse	Large boulders	Lbo	> 630	0.00
	Boulders	Bo	200-630	0.00
	Cobbles	Co	63-200	0.00
Coarse	Coarse gravel	CGr	20-63	0.00
	Medium gravel	MGr	6,3-20	2.07
	Fine gravel	FGr	2-6,3	1.07
	Coarse sand	Csa	0,63-2	2.99
	Medium sand	Msa	0,2-0,63	17.08
	Fine sand	Fsa	0,063-0,2	11.66
Fine	Coarse silt	Csi	0,02-0,063	8.61
	Medium silt	Msi	0,0063-0,02	10.79
	Fine silt	Fsi	0,002-0,0063	5.61
	Clay	Cl	≤ 0,002	40.12



Particle diameters [mm]	d_{10}	d_{30}	d_{60}
	-	-	0.02726
Uniformity coefficient – C_U	**Coefficient of curvature – C_C**		
-	-		

Plasticity [%]	I_p	w_L
	23.10	38.37



Cohesive soil (more than 50% fine particles)

% sand + % gravel = 34.87

% sand (31.73) >= % gravel (3.14)

Sample description

medium plasticity sandy CLAY

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

File code
FL-102

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

Classification of soils based on particle size distribution and plasticity

according to SR EN ISO 14688:2-2018 / SR EN ISO 17892-4:2017 / SR EN ISO 17892-12:2018

Test report - no. 47594-RG/03.31.2025

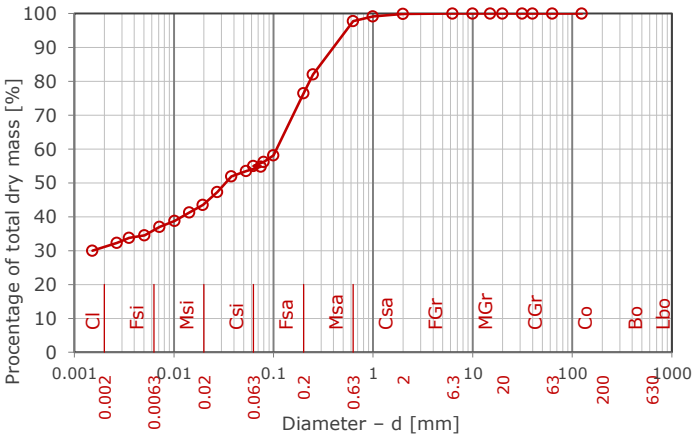
Client	S.C. GLODENI ENERGY S.R.L.	**Project No.**	*3140LGS*
Location	MUNICIPALITY VOIVODENI AND GLODENI, MUREȘ COUNTY, ROMÂNIA	**Date of reception**	*45740*
Borehole No. *FS06*	**Sample No.** *47594*	**Superior depth of sample (m)** *1.70* / **Inferior depth of sample (m)** *2.00*	**Date of test** *45741*

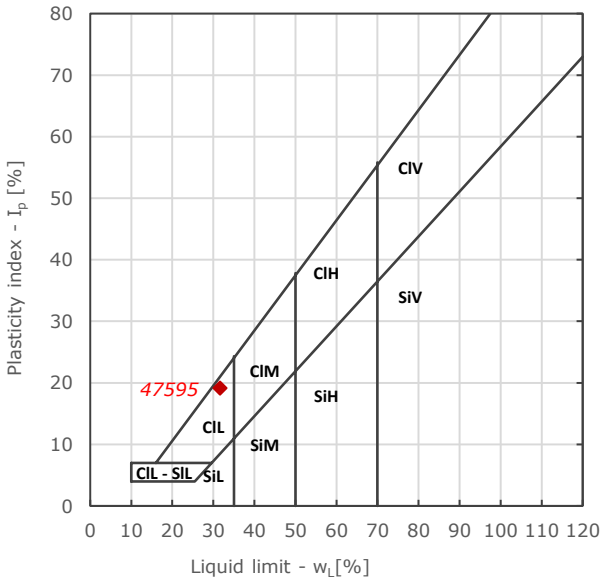
Dry sample mass for granulometry [g]	62.02

Soil group	Subdivision	Symbol	Size [mm]	Quantified [%]
Very coarse	Large boulders	Lbo	> 630	0.00
	Boulders	Bo	200-630	0.00
	Cobbles	Co	63-200	0.00
Coarse	Coarse gravel	CGr	20-63	0.00
	Medium gravel	MGr	6,3-20	0.00
	Fine gravel	FGr	2-6,3	0.10
	Coarse sand	Csa	0,63-2	2.18
	Medium sand	Msa	0,2-0,63	21.25
	Fine sand	Fsa	0,063-0,2	21.53
Fine	Coarse silt	Csi	0,02-0,063	11.18
	Medium silt	Msi	0,0063-0,02	7.86
	Fine silt	Fsi	0,002-0,0063	4.96
	Clay	Cl	≤ 0,002	30.94

Particle diameters [mm]	d_{10}	d_{30}	d_{60}
	-	0.00153	0.11034
Uniformity coefficient – C_U	**Coefficient of curvature – C_C**		
-	-		

Plasticity [%]	I_p	w_L
	19.17	31.70





Cohesive soil (more than 50% fine particles)
% sand + % gravel = 45.06
% sand (44.96) >= % gravel (0.1)

Sample description

low plasticity sandy CLAY

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

File code
FL-102

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

Classification of soils based on particle size distribution and plasticity

according to SR EN ISO 14688:2-2018 / SR EN ISO 17892-4:2017 / SR EN ISO 17892-12:2018

Test report - no. 47595-RG/03.31.2025

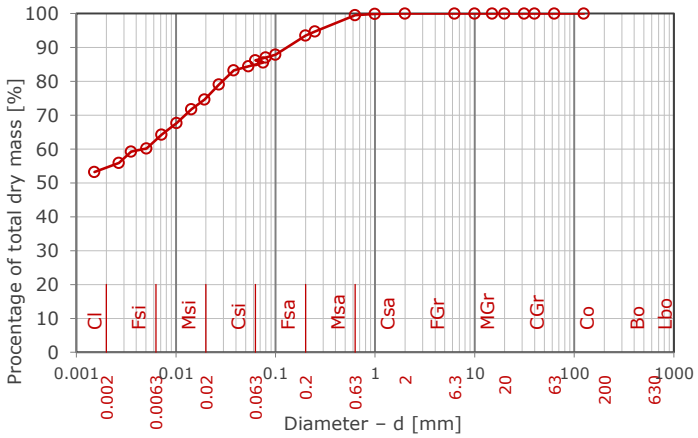
Client	S.C. GLODENI ENERGY S.R.L.			**Project No.**	*3140LGS*
Location	MUNICIPALITY VOIVODENI AND GLODENI, MUREȘ COUNTY, ROMÂNIA			**Date of reception**	*45740*
Borehole No.	*FS07*	**Sample No.**	*47595*	**Superior depth of sample (m)**	*1.30*
				Inferior depth of sample (m)	*1.50*
				Date of test	*45741*

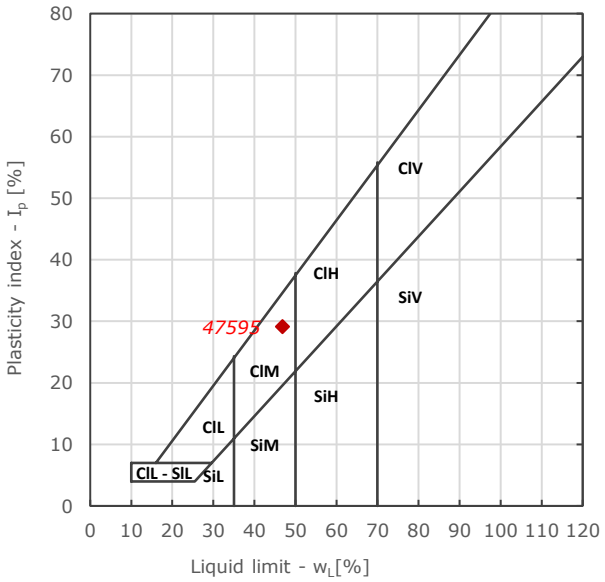
Dry sample mass for granulometry [g]	42.41

Soil group	Subdivision	Symbol	Size [mm]	Quantified [%]
Very coarse	Large boulders	Lbo	> 630	0.00
	Boulders	Bo	200-630	0.00
	Cobbles	Co	63-200	0.00
Coarse	Coarse gravel	CGr	20-63	0.00
	Medium gravel	MGr	6,3-20	0.00
	Fine gravel	FGr	2-6,3	0.00
	Coarse sand	Csa	0,63-2	0.54
	Medium sand	Msa	0,2-0,63	6.01
	Fine sand	Fsa	0,063-0,2	7.29
Fine	Coarse silt	Csi	0,02-0,063	11.19
	Medium silt	Msi	0,0063-0,02	12.44
	Fine silt	Fsi	0,002-0,0063	8.22
	Clay	Cl	≤ 0,002	54.31

Particle diameters [mm]	d_{10}	d_{30}	d_{60}
	-	-	0.00478
Uniformity coefficient – C_U	**Coefficient of curvature – C_C**		
-	-		

Plasticity [%]	I_p	w_L
	29.18	46.87





Cohesive soil (more than 50% fine particles)
% sand + % gravel = 13.84
% sand + % gravel has no influence on soil behavior

Sample description

medium plasticity CLAY

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

File code
FL-102

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

street Principală, no. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF THE SHEAR STRENGTH OF SOILS THROUGH DIRECT SHEAR TEST

according to *SR EN ISO 17892-10:2019*

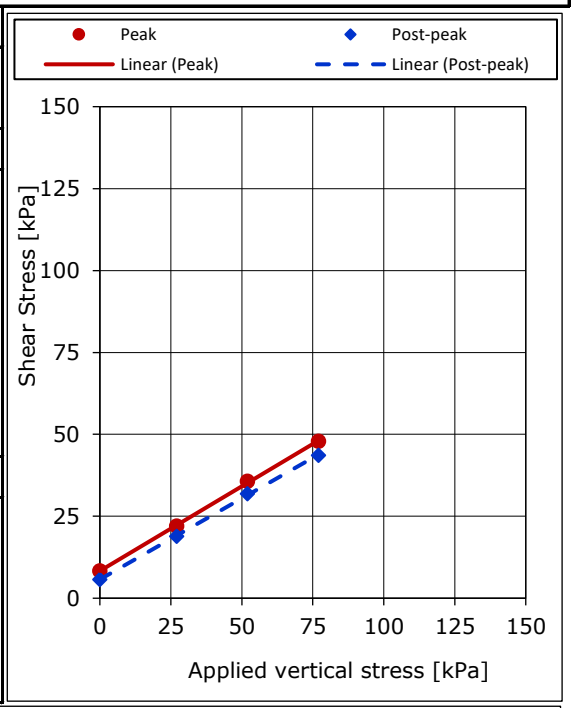
Test report

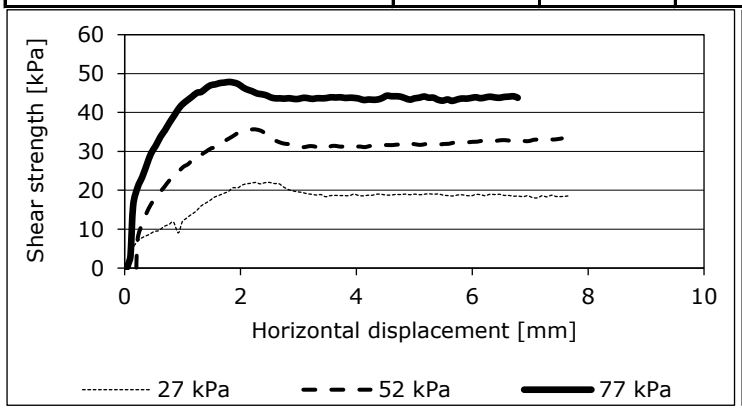
Client	*S.C. Glodeni Energy S.R.L.*	**Order nr.**	*2819LGS*
		Date of reception	*18-Jan-2024*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*	**Test date**	*17-Feb-2024*
Sample type	*undisturbed*	**Superior depth of sample** *2.00 m*	**Borehole no.** *FS01*
Test type	*consolidated-drained (CD)*	**Inferior depth of sample** *2.40 m*	**Sample no.** *42672*

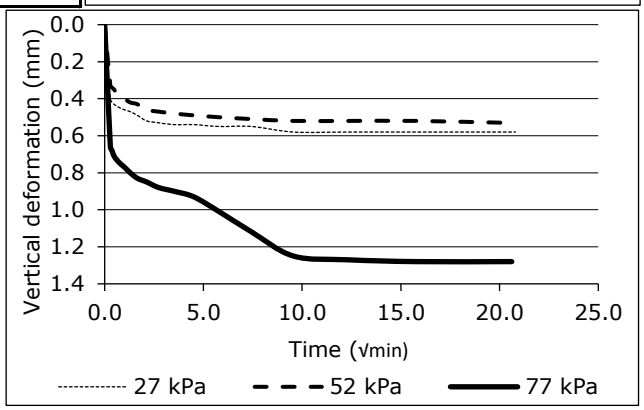
Sample description	**yellowish brown low plasticity sandy CLAY**
Final observations	-

Nominal dimensions				
Diameter	[mm]	50	Machine type	6. Controls 27-WF21A60
Area	[cm^2]	19.63		

Initial physical parameters				
Vertical load	[kPa]	27 kPa	52 kPa	77 kPa
Initial water content	w [%]	19.01	18.97	19.06
Particle density	γ_s [kN/m^3]	26.8	26.8	26.8
Initial dry density	γ_d [kN/m^3]	16.51	16.86	16.70
Initial bulk density	γ [kN/m^3]	19.65	20.05	19.89
Void ratio	e	0.62	0.59	0.60
Degree of saturation	Sr [%]	83.33	87.86	86.14
Shear parameters				
Shear rate	[mm/min]	0.0080	0.0080	0.0080
Maximum shear strength	[kPa]	22.03	35.67	47.86
Chosen post-peak shear strength	[kPa]	18.89	31.83	43.64
Displacement at failure	[mm]	2.26	2.21	1.80
Chosen post-peak displacement	[mm]	3.39	2.85	2.60







Shear resistance parameters			
ϕ' peak	**c' peak**	**ϕ' post-peak**	**c' post-peak**
27.32 °	**8.32 °**	**26.33 °**	**5.72 °**

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

street Principală, no. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF THE SHEAR STRENGTH OF SOILS THROUGH DIRECT SHEAR TEST

according to *SR EN ISO 17892-10:2019*

Test report

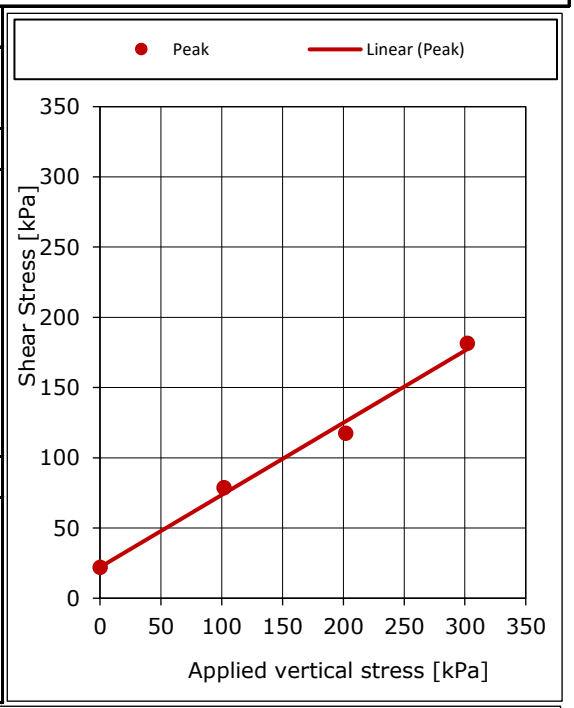
Client	*S.C. Glodeni Energy S.R.L.*	**Order nr.**	*2819LGS*
		Date of reception	*18-Jan-2024*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*	**Test date**	*16-Feb-2024*
Sample type	*undisturbed*	**Superior depth of sample** *1.60 m*	**Borehole no.** *FS02*
Test type	*consolidated-drained (CD)*	**Inferior depth of sample** *2.00 m*	**Sample no.** *42677*

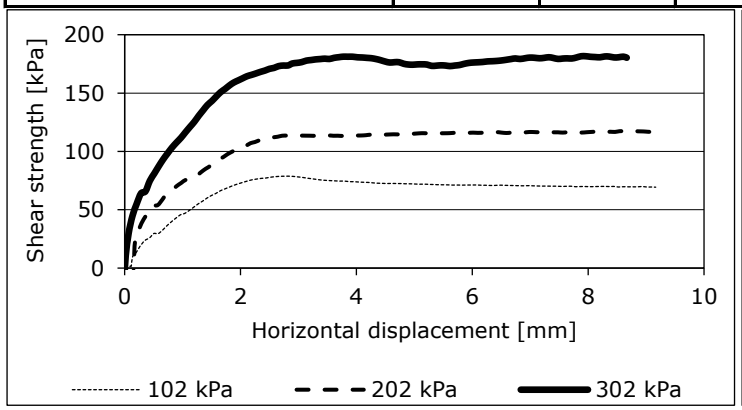
Sample description	**yellowish brown firm low plasticity sandy CLAY**
Final observations	-

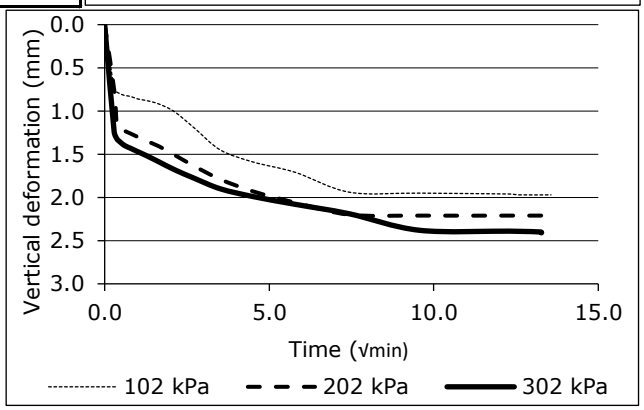
Nominal dimensions				
Diameter	[mm]	50	Machine type	4. Controls 27-WF21A60
Area	[cm^2]	19.63		

Initial physical parameters				
Vertical load	[kPa]	102 kPa	202 kPa	302 kPa
Initial water content	w [%]	17.44	17.40	17.49
Particle density	γ_s [kN/m^3]	26.8	26.8	26.8
Initial dry density	γ_d [kN/m^3]	17.10	16.63	16.93
Initial bulk density	γ [kN/m^3]	20.08	19.53	19.89
Void ratio	e	0.57	0.61	0.58
Degree of saturation	Sr [%]	84.01	77.75	81.96

Shear parameters				
Shear rate	[mm/min]	0.0080	0.0080	0.0080
Maximum shear strength	[kPa]	78.77	117.35	181.55
Chosen post-peak shear strength	[kPa]	-	-	-
Displacement at failure	[mm]	2.83	8.79	7.96
Chosen post-peak displacement	[mm]	-	-	-







Shear resistance parameters			
ϕ' peak	**c' peak**	**ϕ' post-peak**	**c' post-peak**
27.20 °	**22.08 °**	-	-

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

street Principală, no. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF THE SHEAR STRENGTH OF SOILS THROUGH DIRECT SHEAR TEST

according to *SR EN ISO 17892-10:2019*

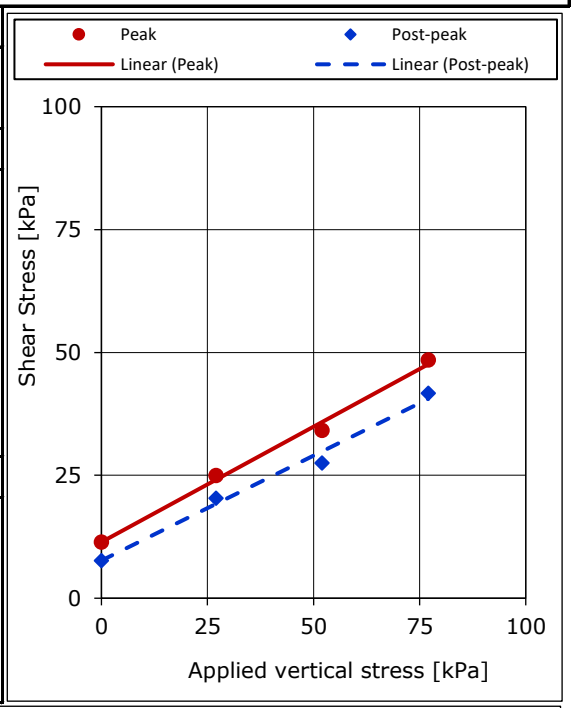
Test report

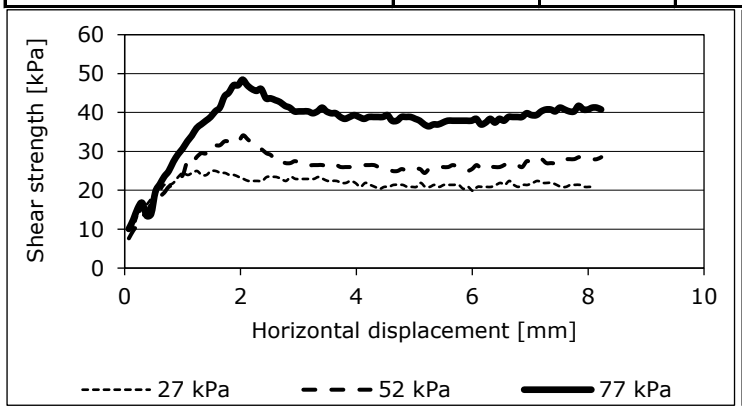
Client	*S.C. Glodeni Energy S.R.L.*	**Order nr.**	*2819LGS*
		Date of reception	*18-Jan-2024*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county*	**Test date**	*19-Feb-2024*
Sample type	*undisturbed*	**Superior depth of sample** *1.00 m*	**Borehole no.** *FS03*
Test type	*consolidated-drained (CD)*	**Inferior depth of sample** *1.40 m*	**Sample no.** *42685*

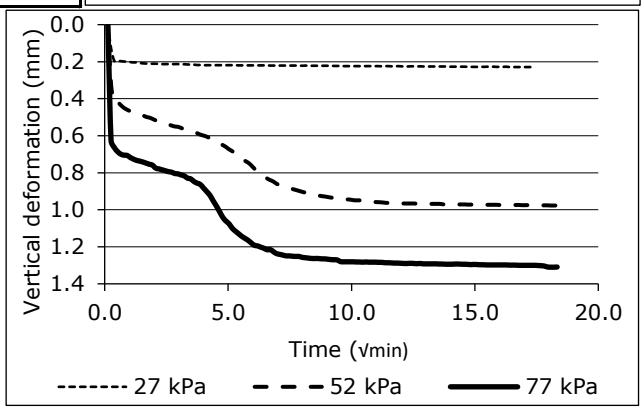
Sample description	**yellowish brown firm low plasticity sandy CLAY**
Final observations	-

Nominal dimensions				
Diameter	[mm]	50	Machine type	9. Matest S277-01
Area	[cm^2]	19.63		

Initial physical parameters				
Vertical load	[kPa]	27 kPa	52 kPa	77 kPa
Initial water content	w [%]	20.47	20.41	20.53
Particle density	γ_s [kN/m^3]	26.8	26.8	26.8
Initial dry density	γ_d [kN/m^3]	15.63	15.51	15.47
Initial bulk density	γ [kN/m^3]	18.82	18.68	18.65
Void ratio	e	0.72	0.73	0.73
Degree of saturation	Sr [%]	78.18	76.60	76.59
Shear parameters				
Shear rate	[mm/min]	0.0080	0.0080	0.0080
Maximum shear strength	[kPa]	24.96	34.12	48.44
Chosen post-peak shear strength	[kPa]	20.37	27.50	41.72
Displacement at failure	[mm]	1.25	2.04	2.04
Chosen post-peak displacement	[mm]	4.40	1.09	2.77







Shear resistance parameters			
ϕ' peak	**c' peak**	**ϕ' post-peak**	**c' post-peak**
25.16 °	**11.42 °**	**23.12 °**	**7.66 °**

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

Principală street, no. 49
Rădaia 407059, Cluj county
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF THE SHEAR STRENGTH OF SOILS THROUGH DIRECT SHEAR TEST

according to *SR EN ISO 17892-10:2019*

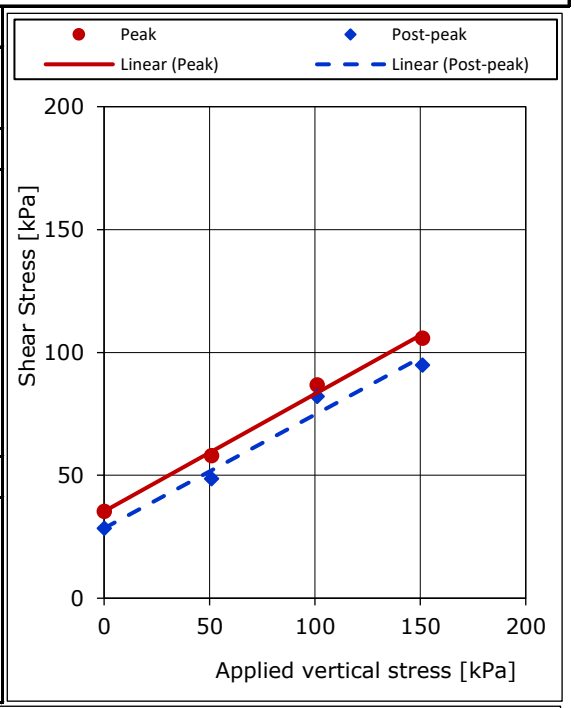
Test report - no.47590-RFD/03.31.2025

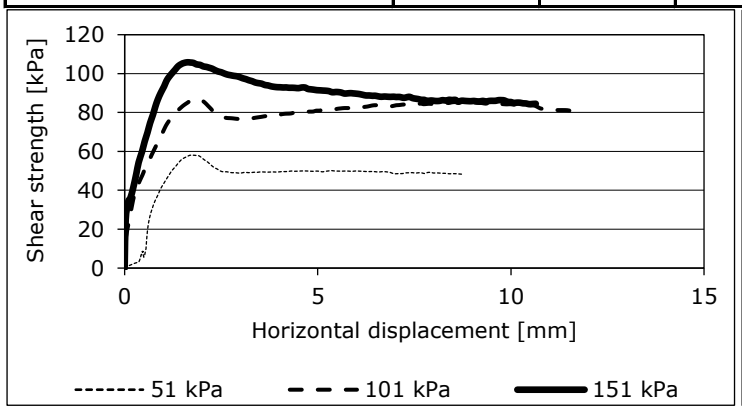
Client	*S.C. GLODENI ENERGY S.R.L.*			**Order no.**	*3140LGS*
Project	-			**Date of reception**	*24-Mar-2025*
Location	*MUNICIPALITY VOIVODENI AND GLODENI, MUREȘ COUNTY, ROMÂNIA*			**Test date**	*24-Mar-2025*
Sample type	*undisturbed*	**Top depth of sample**	*1.50 m*	**Borehole no.**	*FS04*
Test type	*consolidated-drained (CD)*	**Bottom depth of sample**	*1.70 m*	**Sample number**	*47590*

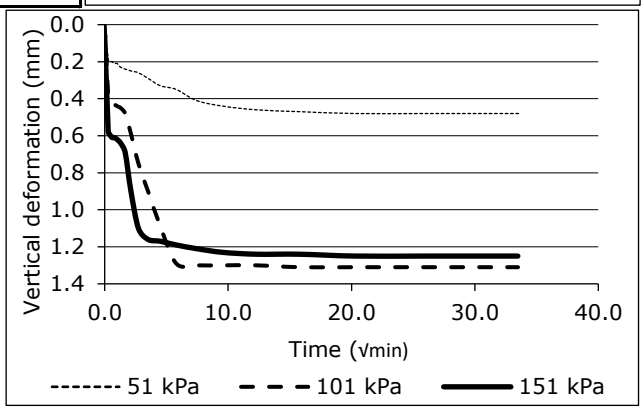
Sample description	**greyish-brown, stiff, low plasticity sandy CLAY**
Final observations	-

Nominal dimensions				
Diameter	[mm]	50	Device type	1. Controls 27-WF2060
Area	[cm^2]	19.63		

Initial physical parameters				
Load	[kPa]	51 kPa	101 kPa	151 kPa
Initial water content	w [%]	18.74	18.69	18.78
Particle density	γ_s [kN/m^3]	26.52	26.52	26.52
Initial dry density	γ_d [kN/m^3]	17.27	17.40	17.51
Initial bulk density	γ [kN/m^3]	20.51	20.65	20.80
Void ratio	e	0.54	0.52	0.51
Degree of saturation	Sr [%]	94.65	96.33	98.65
Shear parameters				
Rate of shear displacement	[mm/min]	0.0080	0.0080	0.0080
Maximum Shear strength	[kPa]	58.06	86.84	105.82
Chosen post-peak shear strength	[kPa]	48.58	82.07	94.80
Displacement at failure	[mm]	1.76	1.85	1.62
Displacement chosen for post-peak	[mm]	7.12	10.89	3.55







Shear resistance parameters			
ϕ' peak	**c' peak**	**ϕ' post-peak**	**c' post-peak**
25.53 °	**35.34 kPa**	**24.81 °**	**28.46 kPa**

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

Principală street, no. 49
Rădaia 407059, Cluj county
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF THE SHEAR STRENGTH OF SOILS THROUGH DIRECT SHEAR TEST

according to *SR EN ISO 17892-10:2019*

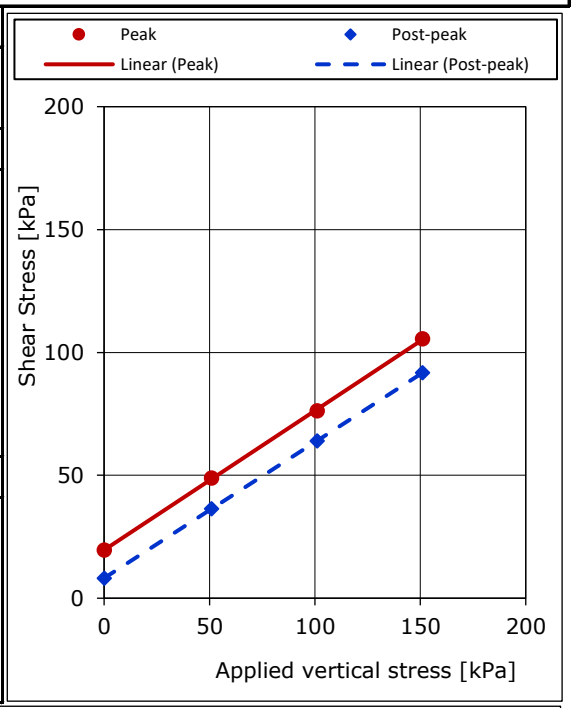
Test report - no.47593-RFD/03.31.2025

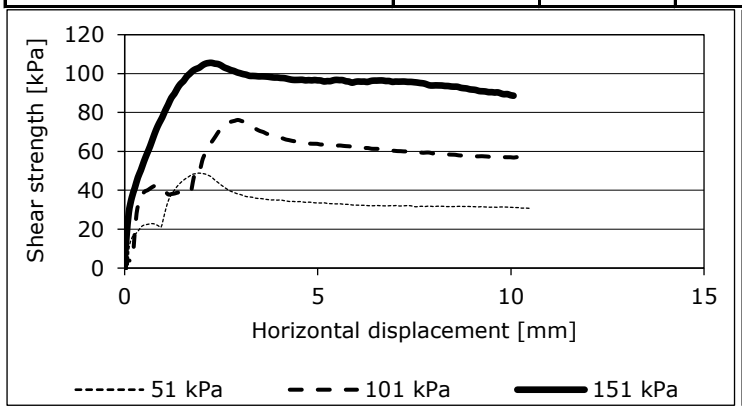
Client	*S.C. GLODENI ENERGY S.R.L.*			**Order no.**	*3140LGS*
Project	-			**Date of reception**	*24-Mar-2025*
Location	*MUNICIPALITY VOIVODENI AND GLODENI, MUREȘ COUNTY, ROMÂNIA*			**Test date**	*24-Mar-2025*
Sample type	*undisturbed*	**Top depth of sample**	*1.50 m*	**Borehole no.**	*FS06*
Test type	*consolidated-drained (CD)*	**Bottom depth of sample**	*1.70 m*	**Sample number**	*47593*

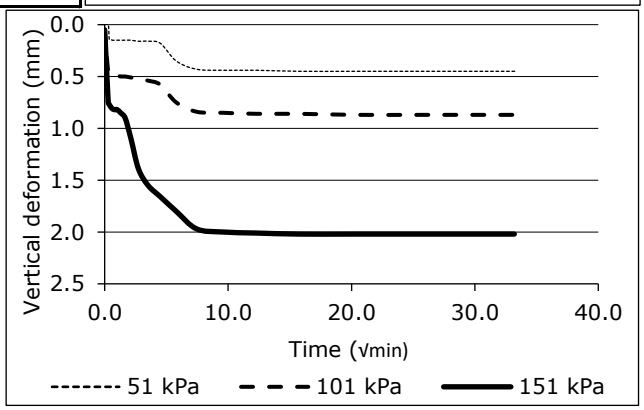
Sample description	**greyish-brown, firm, low plasticity sandy CLAY**
Final observations	-

Nominal dimensions				
Diameter	[mm]	50	Device type	4. Controls 27-WF21A60
Area	[cm^2]	19.63		

Initial physical parameters				
Load	[kPa]	51 kPa	101 kPa	151 kPa
Initial water content	w [%]	14.76	14.72	14.80
Particle density	γ_s [kN/m^3]	26.39	26.39	26.39
Initial dry density	γ_d [kN/m^3]	17.86	17.59	17.63
Initial bulk density	γ [kN/m^3]	20.50	20.18	20.24
Void ratio	e	0.48	0.50	0.50
Degree of saturation	Sr [%]	83.16	79.11	80.15
Shear parameters				
Rate of shear displacement	[mm/min]	0.0080	0.0080	0.0080
Maximum Shear strength	[kPa]	48.85	76.18	105.53
Chosen post-peak shear strength	[kPa]	36.42	63.96	91.75
Displacement at failure	[mm]	1.92	2.93	2.25
Displacement chosen for post-peak	[mm]	3.31	4.82	9.02







Shear resistance parameters			
ϕ' peak	**c' peak**	**ϕ' post-peak**	**c' post-peak**
29.55 °	**19.60 kPa**	**28.96 °**	**8.16 kPa**

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

street Principală, no. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

Incremental loading oedometer test

according to SR EN ISO 17892-5:2017

Test report

Client *S.C. Glodeni Energy S.R.L.*
Location *Glodeni municipality, CF 50604, 52635, 52833, Mureș county*

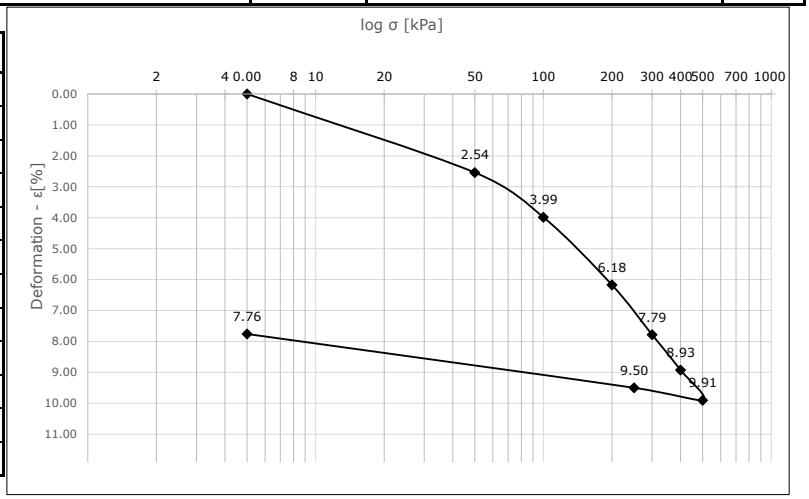
Order no. *2819LGS*
Reception date *18-Jan-2024*
Test date *16-Feb-2024*

Borehole *FS01* **Sample number** *42672* **Sample depth** *2.00 - 2.40 m* **Machine type** *CONTROLS 26-WF31E20* **Loading cell** *ACE 8*

Test data		
Test method	Oedometer compressibility test	
Sample preparation procedure	Undisturbed - Flooded	
Sample description	yellowish brown low plasticity sandy CLAY	
Observations	-	

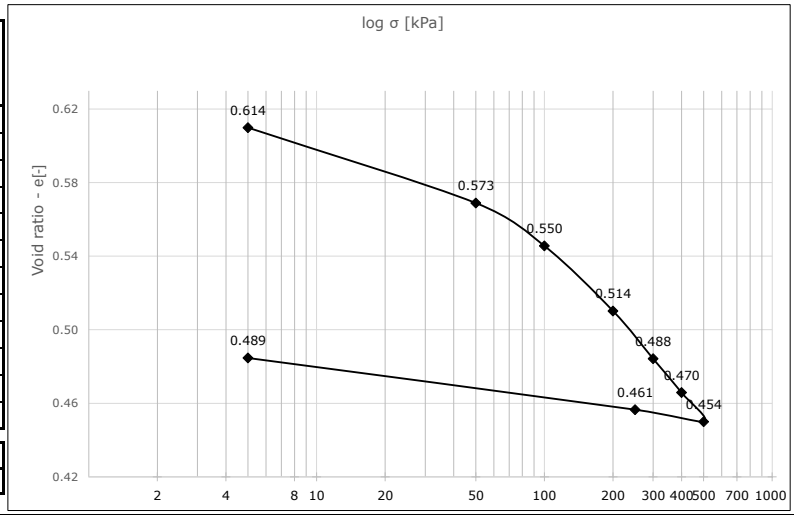
Initial physical parameters									
Diameter	D_0[mm]	71.40	Particle density	γ_s [kN/m^3]	26.80	Initial water content	w_0[%]	19.01
Sample height	H_o [mm]	20	Initial dry density	γ_d [kN/m^3]	16.60	Degree of saturation	S_r[%]	84.61
Sample mass	m_0[g]	161.35	Initial bulk density	γ [kN/m^3]	19.76	Void ratio	e_0 [-]	0.614

Determined sample parameters	Loading stage	Pressure σ [kPa]	Deformation ε[%]	Void ratio e [-]
	Stage 1	5 - 50	2.540	0.573
	Stage 2	50 - 100	3.985	0.550
	Stage 3	100 - 200	6.175	0.514
	Stage 4	200 - 300	7.785	0.488
	Stage 5	300 - 400	8.925	0.470
	Stage 6	400 - 500	9.905	0.454
	Stage 7	500 - 250	9.500	0.461
	Stage 8	250 - 5	7.760	0.489
	Stage 9	-	-	-
	Stage 10	-	-	-
	Stage 11	-	-	-
	Stage 12	-	-	-



Determined sample parameters	Loading stage	Pressure σ [kPa]	Coef. of vertical consolidation cv [m2/s]	Coef. of secondary compression Cα [-]
	Stage 1	5 - 50	-	-
	Stage 2	50 - 100	-	-
	Stage 3	100 - 200	-	-
	Stage 4	200 - 300	-	-
	Stage 5	300 - 400	-	-
	Stage 6	400 - 500	-	-
	Stage 7	500 - 250	-	-
	Stage 8	250 - 5	-	-
	Stage 9	-	-	-
	Stage 10	-	-	-
	Stage 11	-	-	-
	Stage 12	-	-	-

Swelling pressure	p_u [kPa]	0.00
Preload	p_{pr} [kPa]	5.00



Determined sample parameters	Loading stage	Pressure σ [kPa]	Temperature T [°C]	Initial bulk density γ [kN/m^3]	Specimen height change under load ΔH [mm]	Volume of soil particles V_s [%]	Volume of pores V_p [%]	Oedometer modulus E_{oed} [kPa]	Coef. of compressibility a_v [m^2/MN]	Coef. of volume compressibility m_v [m^2/MN]	Compression index C_c [-]	Swelling index C_s [-]
	Stage 1	5 - 50	20	20.28	0.508	63.57	36.43	1772	0.911	0.564		
	Stage 2	50 - 100	20	20.58	0.797	64.52	35.48	3460	0.467	0.289		
	Stage 3	100 - 200	20	21.06	1.235	66.03	33.97	4566	0.354	0.219		
	Stage 4	200 - 300	20	21.43	1.557	67.18	32.82	6211	0.260	0.161		
	Stage 5	300 - 400	20	21.70	1.785	68.02	31.98	8772	0.184	0.114		
	Stage 6	400 - 500	20	21.93	1.981	68.76	31.24	10204	0.158	0.098		
	Stage 7	500 - 250	20	21.83	1.9	68.45	31.55	-	-	-	0.151	0.017
	Stage 8	250 - 5	20	21.42	1.552	67.16	32.84	-	-	-		
	Stage 9	-	-	-	-	-	-	-	-	-		
	Stage 10	-	-	-	-	-	-	-	-	-		
	Stage 11	-	-	-	-	-	-	-	-	-		
	Stage 12	-	-	-	-	-	-	-	-	-		

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

street Principală, no. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

Incremental loading oedometer test

according to SR EN ISO 17892-5:2017

Test report

Client *S.C. Glodeni Energy S.R.L.*
Location *Glodeni municipality, CF 50604, 52635, 52833, Mureș county*

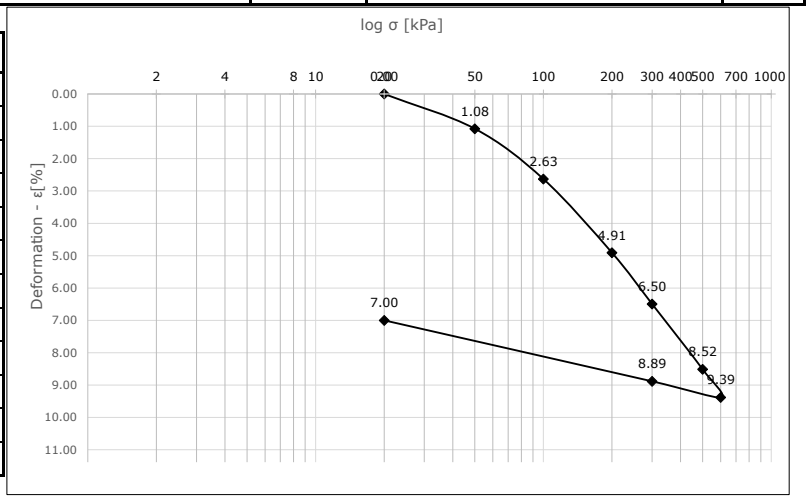
Order no. *2819LGS*
Reception date *18-Jan-2024*
Test date *16-Feb-2024*

Borehole *FS02* **Sample number** *42677* **Sample depth** *1.60 - 2.00 m* **Machine type** *CONTROLS 26-WF31E20* **Loading cell** *ACE 4*

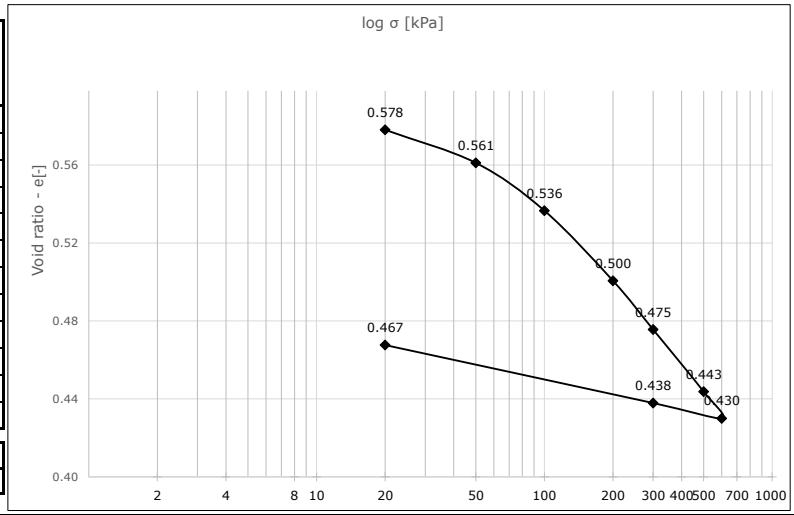
Test data		
Test method	Oedometer compressibility test	
Sample preparation procedure	Undisturbed - Flooded	
Sample description	yellowish brown firm low plasticity sandy CLAY	
Observations	-	

Initial physical parameters									
Diameter	D_0[mm]	71.40	Particle density	γ_s [kN/m^3]	26.80	Initial water content	w_0[%]	17.44
Sample height	H_o [mm]	20	Initial dry density	γ_d [kN/m^3]	16.99	Degree of saturation	S_r[%]	82.52
Sample mass	m_0[g]	162.90	Initial bulk density	γ [kN/m^3]	19.95	Void ratio	e_0 [-]	0.578

Determined sample parameters	Loading stage	Pressure σ [kPa]	Deformation ε[%]	Void ratio e [-]
	Stage 1	20 - 50	1.075	0.561
	Stage 2	50 - 100	2.630	0.536
	Stage 3	100 - 200	4.910	0.500
	Stage 4	200 - 300	6.495	0.475
	Stage 5	300 - 500	8.515	0.443
	Stage 6	500 - 600	9.385	0.430
	Stage 7	600 - 300	8.885	0.438
	Stage 8	300 - 20	7.000	0.467
	Stage 9	-	-	-
	Stage 10	-	-	-
	Stage 11	-	-	-
	Stage 12	-	-	-



Determined sample parameters	Loading stage	Pressure σ [kPa]	Coef. of vertical consolidation cv [m2/s]	Coef. of secondary compression Cα [-]
	Stage 1	20 - 50	-	-
	Stage 2	50 - 100	-	-
	Stage 3	100 - 200	-	-
	Stage 4	200 - 300	-	-
	Stage 5	300 - 500	-	-
	Stage 6	500 - 600	-	-
	Stage 7	600 - 300	-	-
	Stage 8	300 - 20	-	-
	Stage 9	-	-	-
	Stage 10	-	-	-
	Stage 11	-	-	-
	Stage 12	-	-	-



Swelling pressure	p_u [kPa]	1.40
Preload	p_{pr} [kPa]	20.00

Determined sample parameters	Loading stage	Pressure σ [kPa]	Temperature T [°C]	Initial bulk density γ [kN/m^3]	Specimen height change under load ΔH [mm]	Volume of soil particles V_s [%]	Volume of pores V_p [%]	Oedometer modulus E_{oed} [kPa]	Coef. of compressibility a_v [m^2/MN]	Coef. of volume compressibility m_v [m^2/MN]	Compression index C_c [-]	Swelling index C_s [-]
	Stage 1	20 - 50	20	20.17	0.215	64.07	35.93	2791	0.565	0.358		
	Stage 2	50 - 100	20	20.49	0.526	65.09	34.91	3215	0.491	0.311		
	Stage 3	100 - 200	20	20.98	0.982	66.66	33.34	4386	0.360	0.228		
	Stage 4	200 - 300	20	21.34	1.299	67.79	32.21	6309	0.250	0.159		
	Stage 5	300 - 500	20	21.81	1.703	69.28	30.72	9901	0.159	0.101		
	Stage 6	500 - 600	20	22.02	1.877	69.95	30.05	11494	0.137	0.087		
	Stage 7	600 - 300	20	21.90	1.777	69.56	30.44	-	-	-	0.143	0.025
	Stage 8	300 - 20	20	21.45	1.4	68.15	31.85	-	-	-		
	Stage 9	-	-	-	-	-	-	-	-	-		
	Stage 10	-	-	-	-	-	-	-	-	-		
	Stage 11	-	-	-	-	-	-	-	-	-		
	Stage 12	-	-	-	-	-	-	-	-	-		

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

Incremental loading oedometer test

according to SR EN ISO 17892-5:2017

Test report

Client *S.C. Glodeni Energy S.R.L.*

Location *Glodeni municipality, CF 50604, 52635, 52833, Mureş county*

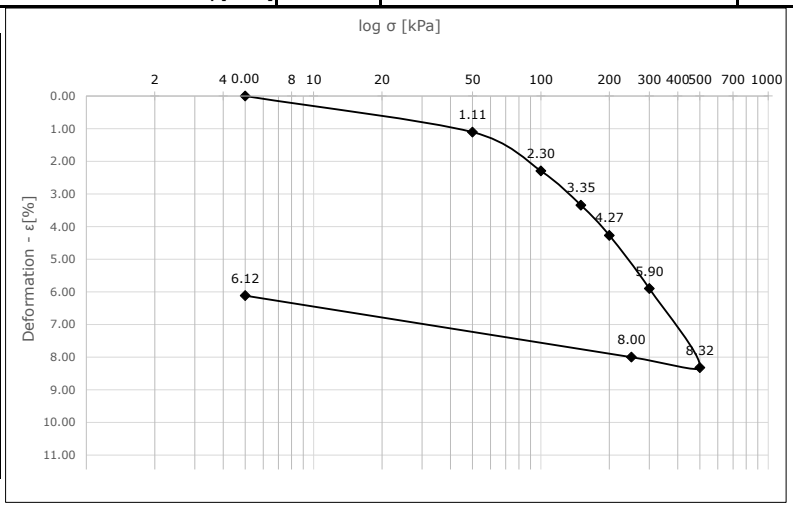
Borehole *FS03* **Sample no.** *42685* **Sample depth** *1.00 - 1.40 m* **Machine type** *CONTROLS 27-T0302*

Order no. *2819LGS*
Reception date *18-Jan-2024*
Test date *19-Feb-2024*
Loading cell *Cell 5*

Test data		
Test method	Oedometer compressibility test	
Sample preparation procedure	Undisturbed - Flooded	
Sample description	yellowish brown firm low plasticity sandy CLAY	
Observations	-	

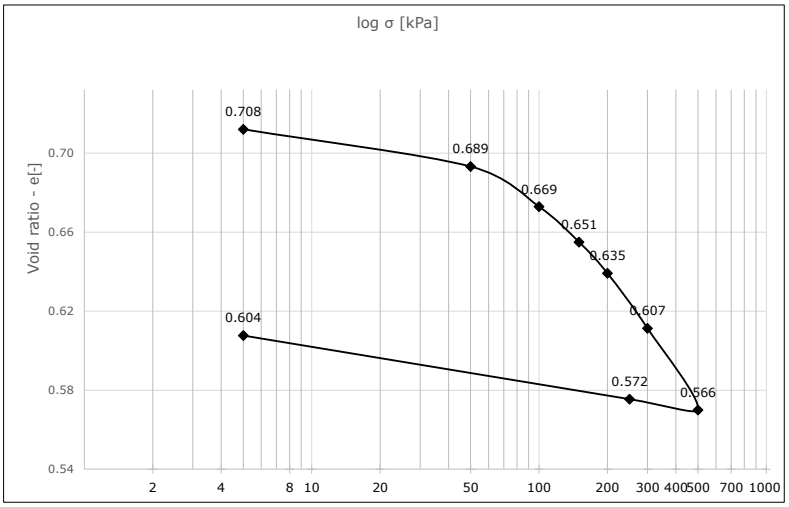
Initial physical parameters								
Diameter	D_0[mm]	71.40	Particle density	γ_s [kN/m^3]	26.80	Initial water content	w_0[%]	19.32
Height	H_o [mm]	20	Initial dry density	γ_d [kN/m^3]	15.69	Degree of saturation	S_r[%]	74.55
Sample mass	m_0[g]	152.86	Initial bulk density	γ [kN/m^3]	18.72	Void ratio	e_0 [-]	0.708

Determined sample parameters	Loading stage	Pressure σ [kPa]	Deformation ε[%]	Void ratio e [-]
	Stage 1	5 - 50	1.105	0.689
	Stage 2	50 - 100	2.295	0.669
	Stage 3	100 - 150	3.345	0.651
	Stage 4	150 - 200	4.270	0.635
	Stage 5	200 - 300	5.900	0.607
	Stage 6	300 - 500	8.320	0.566
	Stage 7	500 - 250	8.000	0.572
	Stage 8	250 - 5	6.115	0.604
	Stage 9	-	-	-
	Stage 10	-	-	-
	Stage 11	-	-	-
	Stage 12	-	-	-



Determined sample parameters	Loading stage	Pressure σ [kPa]	Coef. of vertical consolidation c_v [m^2/s]	Coef. of secondary compression C_α [-]
	Stage 1	5 - 50	-	-
	Stage 2	50 - 100	-	-
	Stage 3	100 - 150	-	-
	Stage 4	150 - 200	-	-
	Stage 5	200 - 300	-	-
	Stage 6	300 - 500	-	-
	Stage 7	500 - 250	-	-
	Stage 8	250 - 5	-	-
	Stage 9	-	-	-
	Stage 10	-	-	-
	Stage 11	-	-	-
	Stage 12	-	-	-

Preload	p_{pr} [kPa]	2.00
Swelling pressure	p_u [kPa]	5.00



Determined sample parameters	Loading stage	Pressure σ [kPa]	Temperature T [°C]	Initial bulk density γ [kN/m^3]	Specimen height change under load ΔH [mm]	Volume of soil particles V_s [%]	Volume of pores V_p [%]	Oedometer modulus E_{oed} [kPa]	Coef. of compressibility a_v [m^2/MN]	Coef. of volume compressibility m_v [m^2/MN]	Compression index C_c [-]	Swelling index C_s [-]
	Stage 1	5 - 50	20	18.93	0.221	59.20	40.80	4072	0.419	0.246		
	Stage 2	50 - 100	20	19.16	0.459	59.92	40.08	4202	0.407	0.238		
	Stage 3	100 - 150	20	19.37	0.669	60.57	39.43	4762	0.359	0.210		
	Stage 4	150 - 200	20	19.56	0.854	61.15	38.85	5405	0.316	0.185		
	Stage 5	200 - 300	20	19.89	1.180	62.21	37.79	6135	0.278	0.163		
	Stage 6	300 - 500	20	20.42	1.664	63.85	36.15	8264	0.207	0.121		
	Stage 7	500 - 250	20	20.35	1.600	63.63	36.37	-	-	-	0.174	0.019
	Stage 8	250 - 5	20	19.94	1.223	62.36	37.64	-	-	-		
	Stage 9	-	-	-	-	-	-	-	-	-		
	Stage 10	-	-	-	-	-	-	-	-	-		
	Stage 11	-	-	-	-	-	-	-	-	-		
	Stage 12	-	-	-	-	-	-	-	-	-		

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

Principală street, no. 49
Rădaia 407059, Cluj county
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

Incremental loading oedometer test

according to SR EN ISO 17892-5:2017

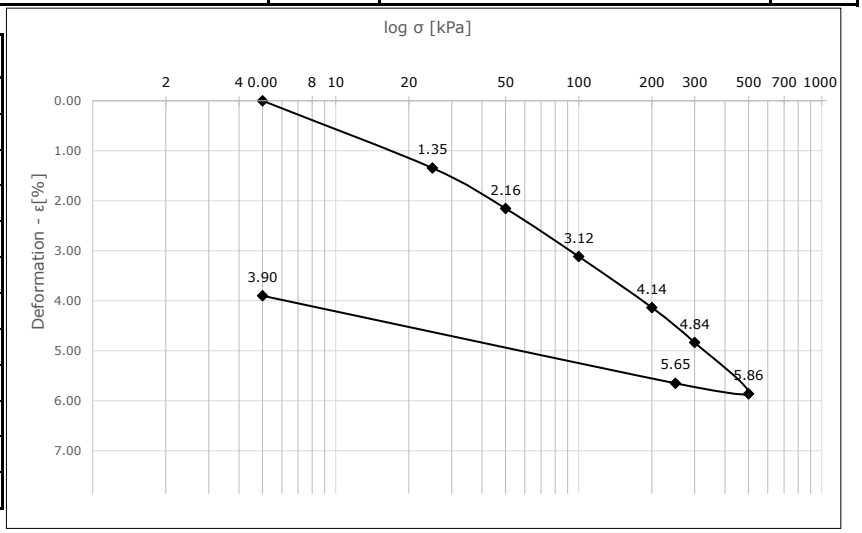
Test report - no. 47592-RE/03.31.2025

Client	*S.C. GLODENI ENERGY S.R.L.*					**Order nr.**	*3140LGS*
Location	*MUNICIPALITY VOIVODENI AND GLODENI, MUREŞ COUNTY, ROMÂNIA*					**Reception date**	*24-Mar-2025*
Project	-					**Test date**	*24-Mar-2025*
Borehole	*FS05*	**Sample number**	*47592*	**Depth**	*1.50 - 1.70*	**Device type**	*CONTROLS 26-WF31E20*	**Loading cell**	*ACE 7*

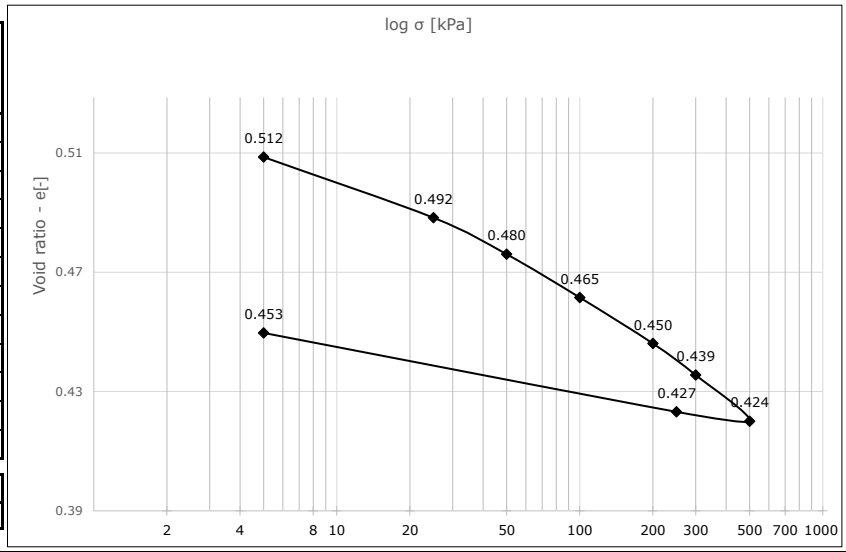
Test data	Test method	Consolidation test
	Sample preparation procedure	Undisturbed - Flooded
	Sample description	brownish-grey, stiff, medium plasticity sandy CLAY
	Observations	-

Initial physical parameters	Diameter	**D_0[mm]**	50.47	Particle density	**γ_s [kN/m^3]**	26.41	Initial water content	**w_0[%]**	17.17
	Sample height	**H_o [mm]**	20	Initial dry density	**γ_d [kN/m^3]**	17.47	Degree of saturation	**S_r[%]**	90.27
	Sample mass	**m_0[g]**	83.49	Initial bulk density	**γ [kN/m^3]**	20.46	Void ratio	**e_0 [-]**	0.512

	Loading stage	Pressure **σ [kPa]**	Deformation **ε[%]**	Void ratio **e [-]**
Determined sample parameters	Stage 1	5 - 25	1.345	0.492
	Stage 2	25 - 50	2.155	0.480
	Stage 3	50 - 100	3.115	0.465
	Stage 4	100 - 200	4.135	0.450
	Stage 5	200 - 300	4.835	0.439
	Stage 6	300 - 500	5.860	0.424
	Stage 7	500 - 250	5.650	0.427
	Stage 8	250 - 5	3.900	0.453
	Stage 9	-	-	-
	Stage 10	-	-	-
	Stage 11	-	-	-
	Stage 12	-	-	-



	Loading stage	Pressure **σ [kPa]**	Coef. Of vertical consolidation **cv [m2/s]**	Coef. Of secondary compression **Cα [-]**
Determined sample parameters	Stage 1	5 - 25	-	-
	Stage 2	25 - 50	-	-
	Stage 3	50 - 100	-	-
	Stage 4	100 - 200	-	-
	Stage 5	200 - 300	-	-
	Stage 6	300 - 500	-	-
	Stage 7	500 - 250	-	-
	Stage 8	250 - 5	-	-
	Stage 9	-	-	-
	Stage 10	-	-	-
	Stage 11	-	-	-
	Stage 12	-	-	-



Swelling pressure	**p_u [kPa]**	0.40
Preload	**p_{pr} [kPa]**	5.00

	Loading stage	Pressure **σ [kPa]**	Temperature **T [°C]**	Initial bulk density **γ [kN/m^3]**	Specimen height change under load **ΔH [mm]**	Volume of soil particles **V_s [%]**	Volume of pores **V_p [%]**	Oedometer modulus **E_{oed} [kPa]**	Coef. of compressibility **a_v [m^2/MN]**	Coef. Of volume compressibility **m_v [m^2/MN]**	Compression index **C_c [-]**	Swelling index **C_s [-]**
Determined sample parameters	Stage 1	5 - 25	20	20.74	0.269	67.03	32.97	1487	1.017	0.672	0.059	0.015
	Stage 2	25 - 50	20	20.91	0.431	67.59	32.41	3086	0.490	0.324		
	Stage 3	50 - 100	20	21.12	0.623	68.26	31.74	5208	0.290	0.192		
	Stage 4	100 - 200	20	21.35	0.827	68.98	31.02	9804	0.154	0.102		
	Stage 5	200 - 300	20	21.50	0.967	69.49	30.51	14286	0.106	0.070		
	Stage 6	300 - 500	20	21.74	1.172	70.25	29.75	19512	0.077	0.051		
	Stage 7	500 - 250	20	21.69	1.13	70.09	29.91	-	-	-		
	Stage 8	250 - 5	20	21.29	0.78	68.81	31.19	-	-	-		
	Stage 9	-	-	-	-	-	-	-	-	-		
	Stage 10	-	-	-	-	-	-	-	-	-		
	Stage 11	-	-	-	-	-	-	-	-	-		
	Stage 12	-	-	-	-	-	-	-	-	-		

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

File code
FL-116

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

Principală street, no. 49
Rădaia 407059, Cluj county
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

Incremental loading oedometer test

according to SR EN ISO 17892-5:2017

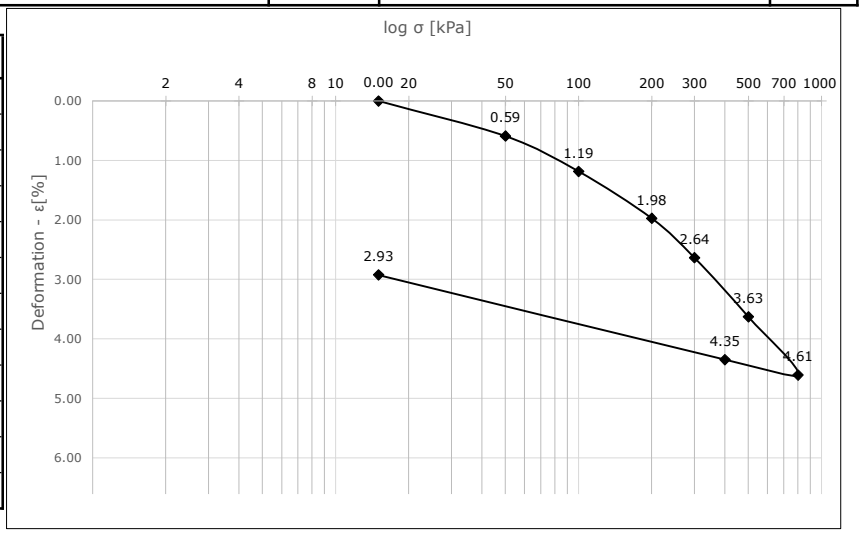
Test report - no. 47596-RE/03.31.2025

Client	*S.C. GLODENI ENERGY S.R.L.*					**Order nr.**	*3140LGS*
Location	*MUNICIPALITY VOIVODENI AND GLODENI, MUREȘ COUNTY, ROMÂNIA*					**Reception date**	*24-Mar-2025*
Project	-					**Test date**	*24-Mar-2025*
Borehole	*FS07*	**Sample number**	*47596*	**Depth**	*1.50 - 1.70*	**Device type**	*CONTROLS 26-WF31E20*	**Loading cell**	*ACE 8*

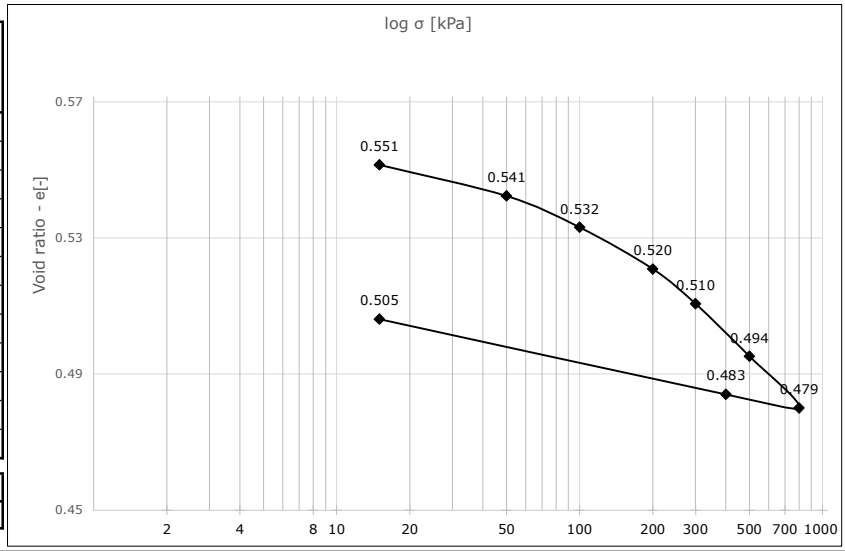
Test data		
Test method	Consolidation test
Sample preparation procedure	Undisturbed - Flooded
Sample description	brown, firm, medium plasticity CLAY
Observations	-

Initial physical parameters								
Diameter	D_0[mm]	50.47	Particle density	γ_s [kN/m^3]	26.05	Initial water content	w_0[%]	19.25
Sample height	H_o [mm]	20	Initial dry density	γ_d [kN/m^3]	16.80	Degree of saturation	S_r[%]	92.87
Sample mass	m_0[g]	81.74	Initial bulk density	γ [kN/m^3]	20.03	Void ratio	e_0 [-]	0.551

Determined sample parameters	Loading stage	Pressure σ [kPa]	Deformation ε[%]	Void ratio e [-]
	Stage 1	15 - 50	0.590	0.541
	Stage 2	50 - 100	1.185	0.532
	Stage 3	100 - 200	1.975	0.520
	Stage 4	200 - 300	2.635	0.510
	Stage 5	300 - 500	3.630	0.494
	Stage 6	500 - 800	4.610	0.479
	Stage 7	800 - 400	4.350	0.483
	Stage 8	400 - 15	2.925	0.505
	Stage 9	-	-	-
	Stage 10	-	-	-
	Stage 11	-	-	-
	Stage 12	-	-	-



Determined sample parameters	Loading stage	Pressure σ [kPa]	Coef. Of vertical consolidation cv [m2/s]	Coef. Of secondary compression Cα [-]
	Stage 1	15 - 50	-	-
	Stage 2	50 - 100	-	-
	Stage 3	100 - 200	-	-
	Stage 4	200 - 300	-	-
	Stage 5	300 - 500	-	-
	Stage 6	500 - 800	-	-
	Stage 7	800 - 400	-	-
	Stage 8	400 - 15	-	-
	Stage 9	-	-	-
	Stage 10	-	-	-
	Stage 11	-	-	-
	Stage 12	-	-	-



Swelling pressure	p_u [kPa]	9.40
Preload	p_{pr} [kPa]	15.00

Determined sample parameters	Loading stage	Pressure σ [kPa]	Temperature T [°C]	Initial bulk density γ [kN/m^3]	Specimen height change under load ΔH [mm]	Volume of soil particles V_s [%]	Volume of pores V_p [%]	Oedometer modulus E_{oed} [kPa]	Coef. of compressibility a_v [m^2/MN]	Coef. Of volume compressibility m_v [m^2/MN]	Compression index C_c [-]	Swelling index C_s [-]
	Stage 1	15 - 50	20	20.15	0.118	64.88	35.12	5932	0.261	0.169		
	Stage 2	50 - 100	20	20.28	0.237	65.27	34.73	8403	0.185	0.119		
	Stage 3	100 - 200	20	20.44	0.395	65.79	34.21	12658	0.122	0.079		
	Stage 4	200 - 300	20	20.58	0.527	66.24	33.76	15152	0.102	0.066		
	Stage 5	300 - 500	20	20.79	0.726	66.92	33.08	20101	0.077	0.050		
	Stage 6	500 - 800	20	21.00	0.922	67.61	32.39	30612	0.051	0.033		
	Stage 7	800 - 400	20	20.95	0.87	67.43	32.57	-	-	-	0.072	0.015
	Stage 8	400 - 15	20	20.64	0.585	66.44	33.56	-	-	-		
	Stage 9	-	-	-	-	-	-	-	-	-		
	Stage 10	-	-	-	-	-	-	-	-	-		
	Stage 11	-	-	-	-	-	-	-	-	-		
	Stage 12	-	-	-	-	-	-	-	-	-		

Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

File code
FL-116

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

street Principală, no. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF SOIL SWELLING PRESSURE

according to SR EN ISO 17892-5:2017

Test report

Client	*S.C. Glodeni Energy S.R.L.*	**Order no.**	*2819LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county Thin-*	**Date of reception**	*18-Jan-2024*
Sampling method	*walled tube (Shelby)*	**Test date**	*16-Feb-2024*
Machine type	*CONTROLS 27-T0302*	**Superior depth of sample** *2.00*	**Borehole no.** *FS01*
		Inferior depth of sample *2.40*	**Sample number** *42672*

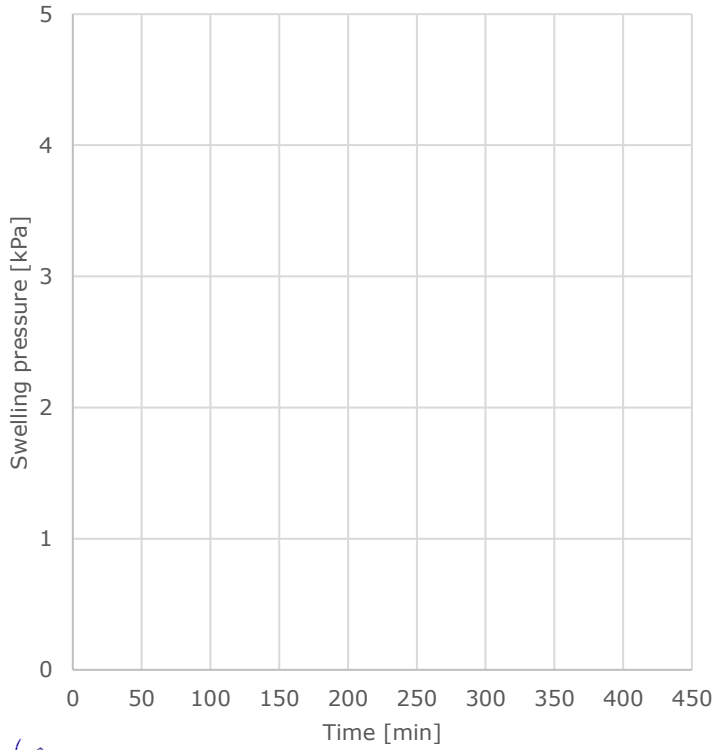
Sample type	cohesive
Sample description	yellowish brown low plasticity sandy CLAY
Observations	-

Initial sample measurements		
Diameter	D_0 [mm]	71.4
Height	L_0 [mm]	20
Area	A_0 [cm^2]	40.04
Volume	V_0 [cm^3]	80.08

Initial physical parameters		
Initial water content	w_0 [%]	19.01
Initial bulk density	γ [kN/m^3]	19.77
Void ratio	e_0 [–]	0.61
Degree of saturation	Sr [%]	84.65

Swelling pressure	Pu [kPa]	**0.00**

Final physical parameters		
Final water content	w_0 [%]	19.42
Void ratio	e_0 [–]	0.62
Degree of saturation	Sr [%]	86.25



Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

FL-080

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

street Principală, no. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF SOIL SWELLING PRESSURE

according to SR EN ISO 17892-5:2017

Test report

Client	*S.C. Glodeni Energy S.R.L.*	**Order no.**	*2819LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county Thin-*	**Date of reception**	*18-Jan-2024*
Sampling method	*walled tube (Shelby)*	**Test date**	*16-Feb-2024*
Machine type	*CONTROLS 27-T0302*	**Borehole no.**	*FS02*
Superior depth of sample	*1.60*	**Sample number**	*42677*
Inferior depth of sample	*2.00*		

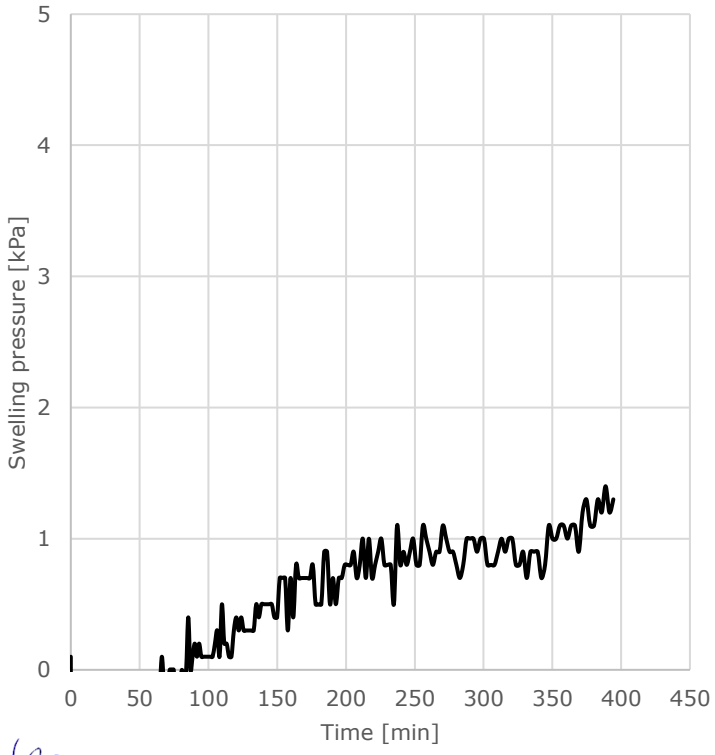
Sample type	cohesive
Sample description	yellowish brown firm low plasticity sandy CLAY
Observations	-

Initial sample measurements		
Diameter	D_0 [mm]	71.4
Height	L_0 [mm]	20
Area	A_0 [cm^2]	40.04
Volume	V_0 [cm^3]	80.08

Initial physical parameters		
Initial water content	w_0 [%]	17.44
Initial bulk density	γ [kN/m^3]	19.96
Void ratio	e_0 [–]	0.58
Degree of saturation	Sr [%]	82.56

Swelling pressure	Pu [kPa]	**1.40**

Final physical parameters		
Final water content	w_0 [%]	17.83
Void ratio	e_0 [–]	0.58
Degree of saturation	Sr [%]	84.19



Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

S.C. GeoSearch S.R.L. CLUJ-NAPOCA, ROMÂNIA

FL-080

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

street Principală, no. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF SOIL SWELLING PRESSURE

according to SR EN ISO 17892-5:2017

Test report

Client	*S.C. Glodeni Energy S.R.L.*	**Order no.**	*2819LGS*
Location	*Glodeni municipality, CF 50604, 52635, 52833, Mureș county Thin-*	**Date of reception**	*18-Jan-2024*
Sampling method	*walled tube (Shelby)*	**Test date**	*19-Feb-2024*
Machine type	*CONTROLS 27-T0302*	**Superior depth of sample** *1.00*	**Borehole no.** *FS03*
		Inferior depth of sample *1.40*	**Sample number** *42685*

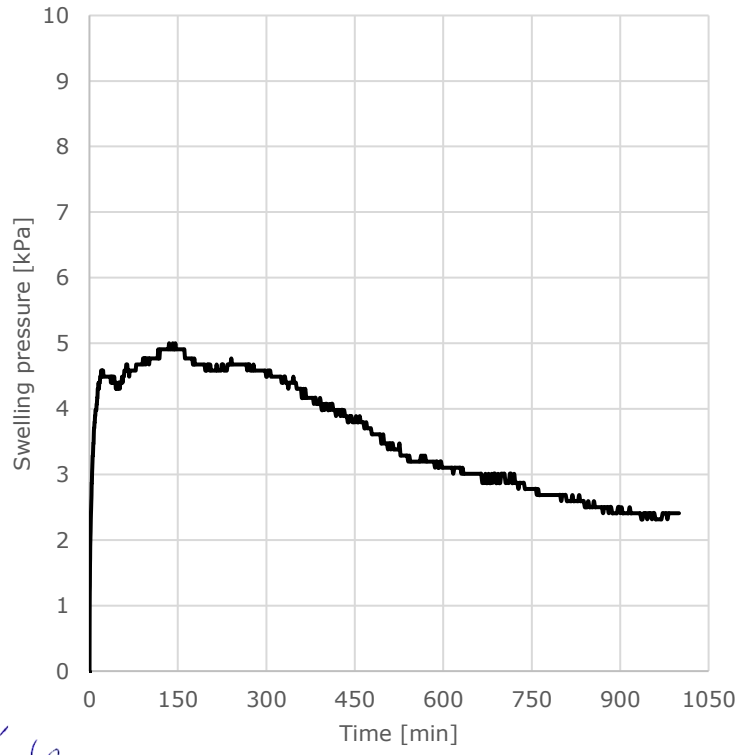
Sample type	cohesive
Sample description	yellowish brown firm low plasticity sandy CLAY
Observations	-

Initial sample measurements		
Diameter	D_0 [mm]	71.4
Height	L_0 [mm]	20
Area	A_0 [cm^2]	40.04
Volume	V_0 [cm^3]	80.08

Initial physical parameters		
Initial water content	w_0 [%]	19.32
Initial bulk density	γ [kN/m^3]	18.73
Void ratio	e_0 [–]	0.71
Degree of saturation	Sr [%]	74.58

Swelling pressure	Pu [kPa]	**5.00**

Final physical parameters		
Final water content	w_0 [%]	19.84
Void ratio	e_0 [–]	0.71
Degree of saturation	Sr [%]	76.28



Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

FL-080

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF SOIL SWELLING PRESSURE

according to SR EN ISO 17892-5:2017

Test report - no. 47592-RPU/03.31.2025

Client	*S.C. GLODENI ENERGY S.R.L.*			**Order no.**	*3140LGS*
Location	*MUNICIPALITY VOIVODENI AND GLODENI, MUREȘ COUNTY, ROMÂNIA*			**Date of reception**	*24-Mar-2025*
Sampling metho	*Thin-walled tube (Shelby)*			**Test date**	*24-Mar-2025*
Device type	*ACE - CONTROLS 26-WF31E20*	**Top height of sample [m]**	*1.50*	**Borehole no.**	*FS05*
		Bottom height of sample [m]	*1.70*	**Sample number**	*47592*

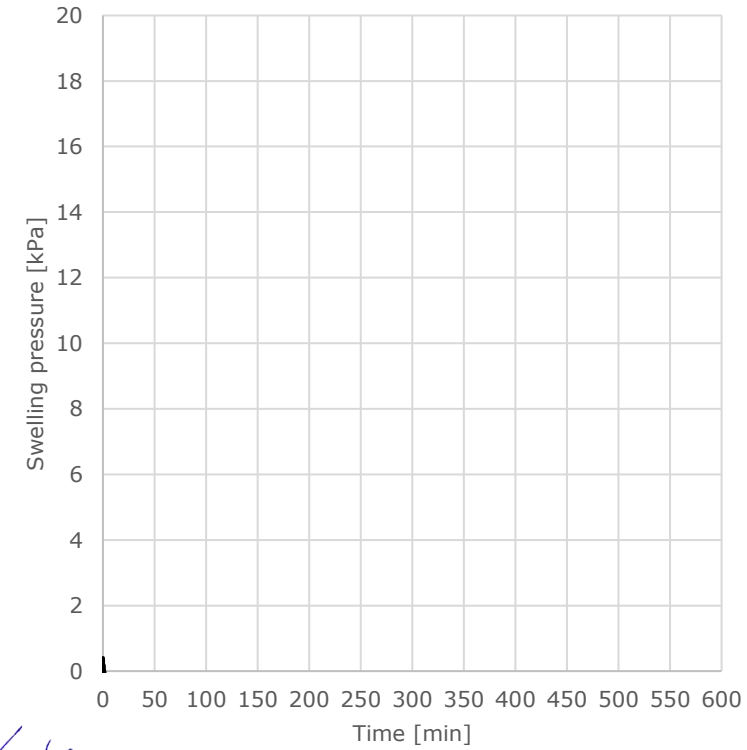
Sample type	cohesive
Sample description	brownish-grey, stiff, medium plasticity sandy CLAY
Observations	-

Initial sample measurements		
Diameter	D_0 [mm]	50.47
Height	L_0 [mm]	20
Area	A_0 [cm^2]	20.01
Volume	V_0 [cm^3]	40.01

Initial physical parameters		
Initial water content	w_0 [%]	17.17
Initial bulk density	γ [kN/m^3]	20.47
Void ratio	e_0 [–]	0.51
Degree of saturation	Sr [%]	90.33

Swelling pressure	Pu [kPa]	**0.40**

Final physical parameters		
Final water content	w_0 [%]	17.68
Void ratio	e_0 [–]	0.51
Degree of saturation	Sr [%]	93.15



Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

File code
FL-121

Laboratory of testing and analysis in construction
Authorization no. 4056/ISC/22.06.2023

str. Principală, nr. 49
Rădaia 407059, jud. Cluj
Tel.: +40 753 099 590
E-mail: office@geosearch.ro

DETERMINATION OF SOIL SWELLING PRESSURE

according to SR EN ISO 17892-5:2017

Test report - no. 47596-RPU/03.31.2025

Client	*S.C. GLODENI ENERGY S.R.L.*			**Order no.**	*3140LGS*
Location	*MUNICIPALITY VOIVODENI AND GLODENI, MUREȘ COUNTY, ROMÂNIA*			**Date of reception**	*24-Mar-2025*
Sampling metho	*Thin-walled tube (Shelby)*			**Test date**	*24-Mar-2025*
Device type	*ACE - CONTROLS 26-WF31E20*	**Top height of sample [m]**	*1.50*	**Borehole no.**	*FS07*
		Bottom height of sample [m]	*1.70*	**Sample number**	*47596*

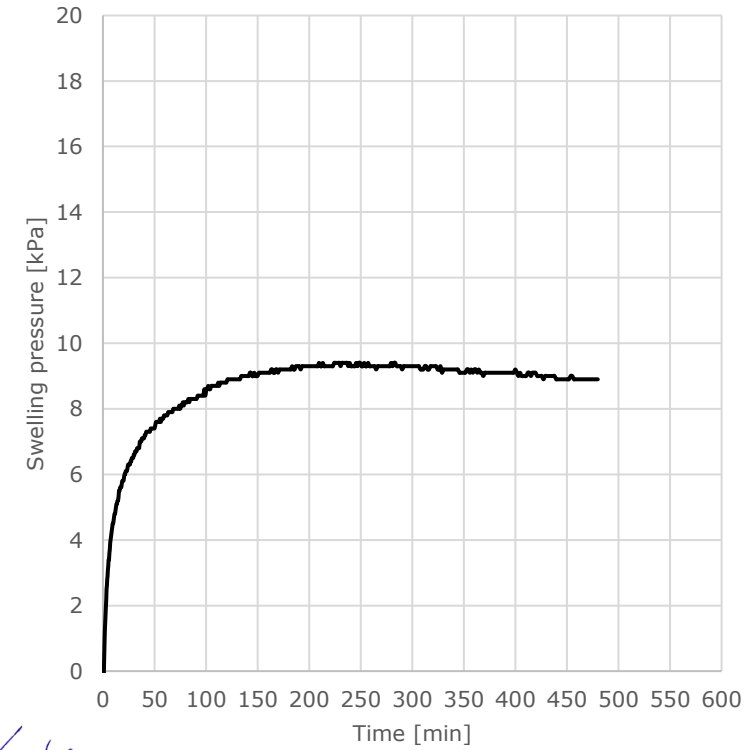
Sample type	cohesive
Sample description	brown, firm, medium plasticity CLAY
Observations	-

Initial sample measurements		
Diameter	D_0 [mm]	50.47
Height	L_0 [mm]	20
Area	A_0 [cm^2]	20.01
Volume	V_0 [cm^3]	40.01

Initial physical parameters		
Initial water content	w_0 [%]	11.61
Initial bulk density	γ [kN/m^3]	20.78
Void ratio	e_0 [–]	0.40
Degree of saturation	Sr [%]	77.19

Swelling pressure	Pu [kPa]	**9.40**

Final physical parameters		
Final water content	w_0 [%]	12.08
Void ratio	e_0 [–]	0.40
Degree of saturation	Sr [%]	80.47



Laboratory evaluator
eng. geol. Gáll Hunor

Head of laboratory
eng. geol. Nagy Szilárd

File code
FL-121

INSPECTORATUL DE STAT ÎN CONSTRUCŢII

AUTORIZAŢIE

T.S.

Nr. 4056
Data: 22.06.2023

Se autorizează Laboratorul: "LABORATOR DE ANALIZE ŞI ÎNCERCĂRI ÎN ACTIVITATEA DE CONSTRUCŢII - S.C. GEO SEARCH S.R.L." situat în JUD. CLUJ, LOCALITATEA BACIU, SAT RĂDAIA, NR. 49, CORP A
aparţinând "S.C. GEO SEARCH S.R.L."
înmatriculată sub Nr J12/1280/2006 C.I.F. RO 18573868
având sediul social în JUD. CLUJ, LOCALITATEA BACIU, SAT RĂDAIA, NR. 49, CORP A, pentru efectuarea de încercări şi verificări de laborator, în profilurile şi pentru încercările din anexă.
Standard de referinţă SR EN ISO/IEC 17025.
Termen de valabilitate 4 ani

INSPECTOR GENERAL

ROMÂNIA
MINISTERUL LUCRĂRILOR PUBLICE, DEZVOLTĂRII ŞI ADMINISTRAŢIEI
INSPECTORATUL DE STAT ÎN CONSTRUCŢII
L.S.

Anexa 1 - pag. 1 la autorizaţia Laboratorului "LABORATOR DE ANALIZE ŞI ÎNCERCĂRI ÎN ACTIVITATEA DE CONSTRUCŢII - S.C. GEO SEARCH S.R.L. situat în JUD. CLUJ, LOCALITATEA BACIU, SAT RĂDAIA, NR. 49, CORP A

Nr. 4056 / 22.06.2023

ÎNCERCĂRI AUTORIZATE

Denumire profil / Nomenclator încercări	Denumire profil / Nomenclator încercări
D - drumuri	**GTF - geotehnică şi teren de fundare**
Amestecuri de agregate netratate şi tratate cu lianţi hidraulici. Metode de încercare pentru determinarea în laborator a masei volumice de referinţă şi a conţinutului de apă. Compactare Proctor	Teren de fundare. Cercetări prin sondaje deschise. Prelevare probe
Controlul calităţii terasamentelor. Determinarea capacităţii portante a terasamentelor. Verificarea capacităţii portante cu aparatul CBR în laborator	Teren de fundare. Determinarea caracteristicilor de compactare. Încercarea Proctor
Controlul calităţii terasamentelor. Determinarea capacităţii portante a terasamentelor. Verificarea capacităţii portante cu aparatul CBR pe teren	Teren de fundare. Determinarea caracteristicilor fizice şi mecanice ale pământurilor cu umflări şi contracţii mari. Determinarea contracţiei liniare
Controlul calităţii terasamentelor. Determinarea capacităţii portante a terasamentelor. Verificarea capacităţii portante cu placa statică Lucas	Teren de fundare. Determinarea caracteristicilor fizice şi mecanice ale pământurilor cu umflări şi contracţii mari. Determinarea limitei de contractie
Controlul calităţii terasamentelor. Determinarea modulului dinamic de deflecţie Evd obţinut cu deflectometrul dinamic uşor LWD	Teren de fundare. Determinarea caracteristicilor fizice şi mecanice ale pământurilor cu umflări şi contracţii mari. Determinarea presiunii de umflare
Determinarea prin deflectometrie a capacităţii portante a drumurilor cu structuri rutiere suple şi semirigide cu deflectometrul cu pârghie tip Benkelman	Teren de fundare. Determinarea caracteristicilor fizice şi mecanice ale pământurilor cu umflări şi contracţii mari. Determinarea umflării libere
Lucrări de drumuri. Straturi rutiere din agregate naturale sau pământuri stabilizate cu lianţi hidraulici sau puzzolanici. Metode de determinare şi încercare. Determinarea compoziţiei granulometrice a amestecului de pământ şi liant	Teren de fundare. Determinarea compresibilităţii pământurilor prin încercarea în edometru. Determinarea compresibilităţii pământurilor
	Teren de fundare. Determinarea compresibilităţii pământurilor prin încercarea în edometru. Determinarea consolidării pământurilor
	Teren de fundare. Determinarea conţinutului de carbonaţi. Metoda de laborator
	Teren de fundare. Determinarea densităţii pământurilor. Metoda cu ştanţa
Lucrări de drumuri. Straturi rutiere din agregate naturale sau pământuri stabilizate cu lianţi hidraulici sau puzzolanici. Metode de determinare şi încercare. Determinarea umidităţii în laborator	Teren de fundare. Determinarea densităţii pământurilor. Metoda prin cântărire hidrostatică
	Teren de fundare. Determinarea densităţii scheletului pământului
GTF - geotehnică şi teren de fundare	Teren de fundare. Determinarea granulozităţii. Metoda cernerii
Determinarea indicelui Californian de capacitate portanta (CBR) in laborator	Teren de fundare. Determinarea granulozităţii. Metoda sedimentării
	Teren de fundare. Determinarea greutăţii volumice, pe teren. Metoda determinării volumului cu apă şi cu folie de material plastic
Determinarea indicelui Californian de capacitate portanta (CBR) pe teren	Teren de fundare. Determinarea greutăţii volumice, pe teren. Metoda determinării volumului cu nisip afânat
Investigaţii şi încercări geotehnice. Încercări de laborator pe pământuri. Încercare triaxială neconsolidată nedrenată	Teren de fundare. Determinarea limitelor de plasticitate. Determinarea limitei inferioare de plasticitate. Metoda cilindrilor de pământ
Investigaţii şi încercări geotehnice. Încercări de laborator pe pământuri. Încercări consolidate de compresiune triaxială ale pământurilor saturate	Teren de fundare. Determinarea limitelor de plasticitate. Determinarea limitei superioare de plasticitate. Metoda cu conul
Investigaţii şi încercări geotehnice. Încercări pe teren. Încercare de penetrare cu conul electric şi cu piezoconul	Teren de fundare. Determinarea limitelor de plasticitate. Determinarea limitei superioare de plasticitate. Metoda cu cupa
Investigaţii şi încercări geotehnice. Încercări pe teren. Încercare de penetrare dinamică. Încercare de penetrare dinamică grea	Teren de fundare. Determinarea materiilor organice. Identificarea conţinutului de humus solubil în alcalii
Investigaţii şi încercări geotehnice. Încercări pe teren. Încercare de penetrare dinamică. Încercare de penetrare dinamică medie	Teren de fundare. Determinarea modulului de deformaţie liniară prin încercări pe teren cu placa
Investigaţii şi încercări geotehnice. Încercări pe teren. Încercare de penetrare dinamică. Încercare de penetrare dinamică uşoară	Teren de fundare. Determinarea permeabilităţii în laborator. Metoda permeametrului cu gradient constant cu sucţiune
Investigaţii şi încercări geotehnice. Încercări pe teren. Încercare de penetrare standard	Teren de fundare. Determinarea permeabilităţii în laborator. Metoda permeametrului cu gradient variabil
Investigaţii şi încercări geotehnice. Monitorizare geotehnică prin instrumentare in situ. Măsurarea deplasării de-a lungul unei linii: înclinometre	Teren de fundare. Determinarea rezistenţei pământurilor la forfecare, prin încercarea de forfecare directă. Încercarea de forfecare consolidată - drenată (CD)
Teren de fundare. Cercetări geotehnice prin foraje executate în pământuri. Prelevare probe	

INSPECTOR GENERAL

L.Ş.

Anexa 1 - pag. 2 la autorizaţia Laboratorului "LABORATOR DE ANALIZE ŞI ÎNCERCĂRI ÎN ACTIVITATEA DE CONSTRUCŢII - S.C. GEO SEARCH S.R.L. situat în JUD. CLUJ, LOCALITATEA BACIU, SAT RĂDAIA, NR. 49, CORP A

Nr. 4056 / 22.06.2023

ÎNCERCĂRI AUTORIZATE

Denumire profil / Nomenclator încercări
GTF - geotehnică şi teren de fundare
Teren de fundare. Determinarea umidităţii în laborator
Teren de fundare. Încercarea pământurilor la compresiune monoaxială

INSPECTOR GENERAL

L.S.

ROMÂNIA
MINISTERUL LUCRĂRILOR PUBLICE, DEZVOLTĂRII ŞI ADMINISTRAŢIEI
I.S.C.
INSPECTORATUL DE STAT ÎN CONSTRUCŢII

ALS LIFE SCIENCES ROMANIA SRL
ENVIRONMENTAL LABORATORY
Str. Constantin Stere, Nr. 16, Ploiesti
100573 PRAHOVA Romania
Tel.: 0244-596193; E-mail: info.ro@alsglobal.com

accredited for TESTING
SR EN ISO/IEC 17025:2018
ACCREDITATION CERTIFICATE
LI 828

CERTIFICATE OF ANALYSIS

Work Order	: **PI2400768**	Issue Date	: 09-Feb-2024
Customer	: **SC GEO SEARCH SRL**	Laboratory	: ALS LIFE SCIENCES ROMANIA SRL
Contact	: Florin Borbei	Contact	: Client Service
Address	: STR. AVRAM IANCU 442-446 JUD. CLUJ FLORESTI	Address	: STR. CONSTANTIN STERE, NR. 16 PLOIESTI 100573 PRAHOVA Romania
E-mail	: borbeif@geosearch.ro	E-mail	: info.ro@alsglobal.com
Telephone	: ----	Telephone	: 0244-596193
Project	: ----	Page	: 1 of 3
Order number	: 329/01.02.2024	Copy No.	: 1
C-O-C number	: ----	Date Samples Received	: 01-Feb-2024
Site	: Com Voievodeni si Com. Glodeni, Jud. Mures, Romania	Quote number	: PI2019GEOSE-RO0001 (RO-102-18-001190)
Sampled by	: Client	Date of test	: 01-Feb-2024 - 09-Feb-2024
		QC Level	: ALS RO Quality Control Schedule

General Comments

The results are refering only to the analysed sample.
Values denoted with "<" represents smaller values than the reporting limits of the method.
The laboratory does not keep replicates.
The report shall not be reproduced partiallly or in full without prior written approval from ALS LIFE SCIENCES ROMANIA.
Test report was issued in 1 copy for the client.
The related comments are not covered by Renar accreditation.
For more informations please consult Renar web site.
The samples are kept in the laboratory only until test reports will be issued.

SAMPLING AND CONSERVATION DATA: The information about sampling, preservation and transport of the samples was provided to the client in the submitted technical - financial offer. The sample was provided by the client. The client has the responsibility for collecting, preserving and transporting the sample. Receiving conform sample.

Responsible for accuracy

Signatories		*Position*	
Lucretia Tudorache		Laboratory Manager	

Analytical Results

Sub-Matrix: **SOIL**

	Client sample ID	Proba FS01 Ad. prelevare 1.50 m	Proba FS02 Ad. prelevare 1.00 m	Proba FS03 Ad. prelevare 1.50 m
	Laboratory sample ID	PI2400768001	PI2400768002	PI2400768003
	Client sampling date / time	[01-Feb-2024]	[01-Feb-2024]	01-Feb-2024 00:00
Parameter	*Method* / *LOR* / *Unit*	**Result**	**Result**	**Result**
Nonmetalic Inorganic Parameters				
Electrical Resistivity	S-REZV-NA / 10.0 / ohm m	325	343	370
Oxidation-Reduction Potential(ORP)	S-ORP-NA / - / mV	367.7	366.6	361.7
Physical Parameters				
Conductivity	S-CON-ELE / 0.10 / µS/cm	34.3	32.5	30.2
pH (H2O)	S-PH-ELE01 / 2.00 / pH Unit	8.31	7.91	7.75
Nonmetallic Inorganic Parameters				
Chloride as Cl-	S-CL-TIT-R / 0.0010 / % DW	0.0071	0.0078	0.0064
Sulfides	S-SFD-TIT / 10.0 / mg/kg DW	<10.0	<10.0	<10.0
Acid Neutralising Capacity	S-ANC-TIT / 1.0 / mol/kg DW	<1.0	<1.0	<1.0
Base Neutralising Capacity (BNC)	S-ANC-TIT / 1.0 / mol/kg DW	<1.0	<1.0	<1.0
Sulfate as SO4 - Soluble	S-SO4-GR / 50 / mg/kg DW	<50	<50	<50
Sulfate as SO4 - Soluble	S-SO4A-GR / 500 / mg/kg DW	<500	<500	<500

Sub-Matrix: **SOIL**

	Client sample ID	Proba FS03 Ad. prelevare 3.40 m	Proba FG26 Ad. prelevare 1.00 m	Proba FG29 Ad. prelevare 1.00 m
	Laboratory sample ID	PI2400768004	PI2400768005	PI2400768006
	Client sampling date / time	01-Feb-2024 00:00	01-Feb-2024 00:00	01-Feb-2024 00:00
Parameter	*Method* / *LOR* / *Unit*	**Result**	**Result**	**Result**
Nonmetalic Inorganic Parameters				
Electrical Resistivity	S-REZV-NA / 10.0 / ohm m	308	148	300
Oxidation-Reduction Potential(ORP)	S-ORP-NA / - / mV	356.7	347.8	346.8
Physical Parameters				
Conductivity	S-CON-ELE / 0.10 / µS/cm	36.2	75.4	37.2
pH (H2O)	S-PH-ELE01 / 2.00 / pH Unit	7.14	7.03	7.62
Nonmetallic Inorganic Parameters				
Chloride as Cl-	S-CL-TIT-R / 0.0010 / % DW	0.0074	0.0081	0.0057
Sulfides	S-SFD-TIT / 10.0 / mg/kg DW	<10.0	<10.0	<10.0
Acid Neutralising Capacity	S-ANC-TIT / 1.0 / mol/kg DW	<1.0	<1.0	<1.0
Base Neutralising Capacity (BNC)	S-ANC-TIT / 1.0 / mol/kg DW	<1.0	<1.0	<1.0
Sulfate as SO4 - Soluble	S-SO4-GR / 50 / mg/kg DW	<50	<50	<50
Sulfate as SO4 - Soluble	S-SO4A-GR / 500 / mg/kg DW	<500	<500	<500

Sub-Matrix: **SOIL**

	Client sample ID	Proba FG41 Ad. prelevare 1.00 m	----	----
	Laboratory sample ID	PI2400768007	----	----
	Client sampling date / time	01-Feb-2024 00:00	----	----
Parameter	*Method* / *LOR* / *Unit*	**Result**	**Result**	**Result**
Nonmetalic Inorganic Parameters				
Electrical Resistivity	S-REZV-NA / 10.0 / ohm m	317	----	----
Oxidation-Reduction Potential(ORP)	S-ORP-NA / - / mV	346.3	----	----
Physical Parameters				
Conductivity	S-CON-ELE / 0.10 / µS/cm	35.2	----	----
pH (H2O)	S-PH-ELE01 / 2.00 / pH Unit	7.10	----	----
Nonmetallic Inorganic Parameters				
Chloride as Cl-	S-CL-TIT-R / 0.0010 / % DW	0.0060	----	----
Sulfides	S-SFD-TIT / 10.0 / mg/kg DW	<10.0	----	----
Acid Neutralising Capacity	S-ANC-TIT / 1.0 / mol/kg DW	<1.0	----	----
Base Neutralising Capacity (BNC)	S-ANC-TIT / 1.0 / mol/kg DW	<1.0	----	----
Sulfate as SO4 - Soluble	S-SO4-GR / 50 / mg/kg DW	<50	----	----

Sub-Matrix: **SOIL**				Client sample ID	**Proba FG41 Ad. prelevare 1.00 m**	**----**	**----**
				Laboratory sample ID	PI2400768007	----	----
				Client sampling date / time	01-Feb-2024 00:00	----	----
Parameter	*Method*	*LOR*	*Unit*		**Result**	**Result**	**Result**
Nonmetallic Inorganic Parameters - Continued							
Sulfate as SO4 - Soluble	S-SO4A-GR	500	mg/kg DW		<500	----	----

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, delivery date in brackets without a time component will be displayed instead.

Key: LOR = Limit of reporting

The end of result part of the certificate of analysis

Brief Method Summaries

Analytical Methods	*Method Descriptions*
* S-ANC-TIT	Metoda interna conform SR EN 14429:2015 Anexa C. Determinarea preliminară a consumului de acid/bază;
S-CL-TIT-R	PSL-38, STAS 7184/7-87 Soil. Determination of mineral salts in aqueous extract 1: 5 (pct.2) and 4.2 Determination of the chlorine anion (Cl-), by titration; 7
S-CON-ELE	PSL-27, SR ISO 11265+A1:1998 Soil quality. Determination of the specific electrical conductivity; 2
* S-ORP-NA	Metoda interna de determinare
S-PH-ELE01	PSL-18, SR EN ISO 10390:2022 Sludge, treated biowaste and soil. Determination of pH; 1
* S-REZV-NA	Metoda de calcul din valorile masurate ale Conductivitatii electrice.
* S-SFD-TIT	STAS 7184/7-1987, SR 7510:1997 Determination of Sulfide content. Iodometric Method.
S-SO4A-GR	PSL-37, Acid soluble Sulfate; SR ISO 11048:1999 Soil quality. Determination of water-soluble and acid soluble sulphate; 15
S-SO4-GR	PSL-37, Water soluble Sulfate; SR ISO 11048:1999 Soil quality. Determination of water-soluble and acid soluble sulphate; 15

A `*` symbol preceeding any method indicates RENAR non-accredited test. A `**` symbol preceeding any method description indicates test made in a subcontracted laboratory outside the ALS LIFE SCIENCES ROMANIA SRL laboratory.