

NAME AND SURNAME

TO THE CERTIFIED VERIFIER:

ENG. GHEORGHITA TITI

ADDRESS: Braila, str. Plevna nr. 90 A

No. 742

Date: 23 06 2022

REPORT

Regarding the quality requirement A.f: Preliminary geotechnical study -**Urban regeneration of Mircea cel Batran Square area, Unirii street, Trei Fantani park, pr. no. 86/2022**

1) Identification data:

- Specialist designer: SC Geotehnic SRL Tulcea
- Investor: UAT Tulcea Municipality
- Location: Tulcea Municipality, Mircea cel Batran Square, Unirii str., Isacsei FN, Trei Fantani Park, Land Register: 49098, 38495, Tulcea County
- Date of presentation for verification: 23 06 2022

2) The main characteristics of the project and construction

It is expected to create the documentation for a PUZ, regarding urban regeneration of an area in the Tulcea municipality. The land in the location is flat and stable.

The macroseismic characteristics of the locations are the ground acceleration for design $a_g=0.20g$ with $IMR=225$ years and 20% probability of exceedance in 50 years, and the control period (corner) of the response spectrum, $T_c=0.7$ seconds.

The foundation land is represented by an alluvial horizon, made of sandy dusty clay, brown, consistent, with high compressibility, based on a layer of gray dusty sand or rock boulders. The hydrostatic level of the groundwater was intercepted at depths of 2.6...2.8 m from the ground level. The intercepted alluvial complex falls into the category of difficult foundations.

The objective studied is classified in geotechnical category 2, with moderate geotechnical risk, in accordance with the provisions of the "Regulation on geotechnical documentation for constructions", indicative NP 074-2014.

For the dimensioning of the road structure of the proposed alleys and platforms, the soil type, P 5, the dynamic modulus of elasticity $E_p=70$ MPa, Poisson's coefficient $\nu=0.42$ and climatic type I will be considered.

For the foundation of the constructions related to the park, it is recommended to consolidate the moistened ground, with reduced consistency, with cushions of compacted granular material, made flared with respect to the perimeter of the foundations.

3) Documents to be submitted for verification:

Geotechnical study

4) Conclusions on the verification:

Following the verification of the documentation, the compliance with the technical regulations and the assurance of the applicable fundamental requirements, stipulated by the legislation in force, is found. The verified study is considered appropriate, right for which it was signed and stamped in 2 copies.

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Designer,
Official stamp

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I handed over 2 copies,
Certified technical verifier,
Eng. Gheorghita Titi

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SC GEOTEHNIC SRL

J36/54/2013; CUI RO15197173

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ISO 9001 certified company no. 09/NAT291/RO



pr. no. 86/2022
PRELIMINARY
GEOTECHNICAL STUDY

PROJECT NAME: URBAN REGENERATION OF THE AREA
„MIRCEA CEL BATRAN SQUARE, UNIRII
STREET, TREI FANTANI SQUARE”

LOCATION: Tulcea Mun., Mircea cel Batran Square str.,
Unirii str., Isacsei FN, Trei Fantani Park, Land
Register: 49098, 38495, Tulcea County

BENEFICIARY: TULCEA MUNICIPALITY U.A.T.

ELABORATION DATE: JUNE 2022

SUMMARY

CONTENTS

WRITTEN PARTS:

- Final sheet
- Summary
- GEOTECHNICAL STUDY
- Laboratory analyzes SC OPTIMUM GEOTEHNIC SRL

DRAWN PARTS:

- Situation plan
- Geotechnical drilling files

Elaborated:
Eng. Savu Laurentiu
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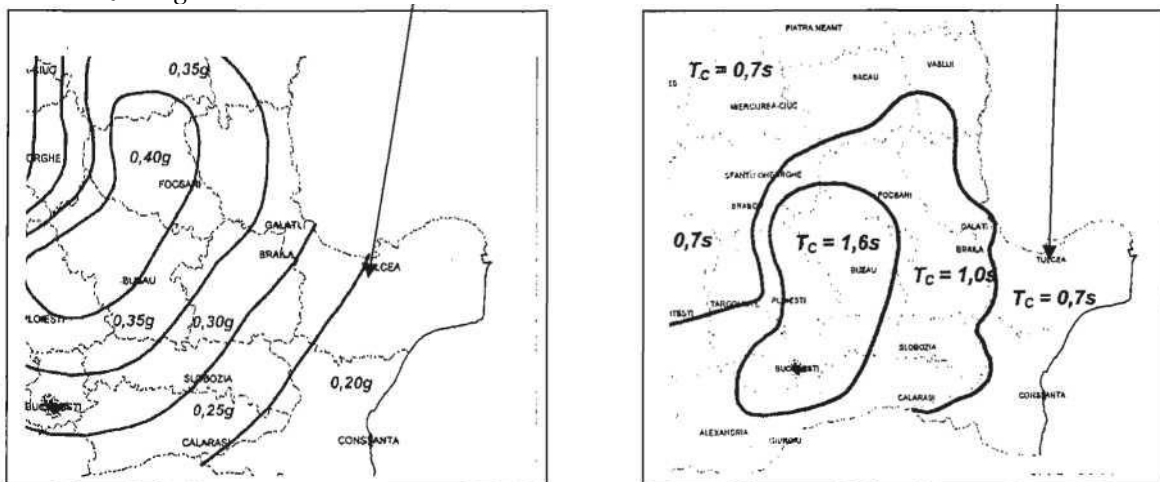
Pr. no. 86/2022
PRELIMINARY
GEOTECHNICAL STUDY

A3. Investigation of the foundation land / Categories of works

As part of the urban regeneration project, it is proposed to build alleys, urban furniture, etc., in the areas mentioned in detail in the first stage of the PUZ design phase of the foundation land, NP074/2014, considering the category of the designed work, geotechnical investigations were carried out on the proposed site.

B DATA REGARDING THE LAND IN THE SITE

Seismic zoning



According to Normative P100-1/2013, the peak value of the ground acceleration for design, for earthquakes with the average recurrence interval $IMR=225$ years, is $a_g=0.20$, and the control period (corner) of the response spectrum $T_c=0.7s$

B.2. General geological data

From a geological point of view, the area in which the municipality of Tulcea is located, belongs to the geological unit "North Dobrogean Orogen Tulcea Unit. The Tulcea unit, which is made up of a pre-alpine foundation and an alpine sedimentary cover made up of Triassic and Jurassic deposits widely folded in chimeric tectogenesis. The Quaternary covers the pre-existing relief and is represented by Upper Pleistocene deposits (loessoid deposits) and Holocene (dusty-sandy clays with cohesive rock fragments).

B.3. *Geomorphological, hydrological framework*

The city of Tulcea is developed at the contact of the Danube meadow with the extensions of the Tulcea hills, which dominate the Danube to the south like a promontory. These hills come into direct contact with the Danube meadow and were born as a result of the erosion action of external agents that created the alternation of insular hills with low plains. The proposed location is characterized as a typical relief of peneplena and moderately hilly formations. The underground water level in the urban area of the municipality is cantoned at different depths depending on the area, thus, in the area where the proposed location is located, the hydrostatic level is located at the base of the dry loess, outside the area of influence of the foundations.

B.5. *Neighborhoods (Buildings in the vicinity, Traffic, Networks, Vegetation, etc.)*

Location specific to urban agglomerations.

B.6. *placing the objective in risk areas (earthquake, landslides, floods)*

From the point of view of the National Territorial Development Plan - Section V Natural risk areas - earthquakes - the seismic intensity zone on the MSK scale is 7 1/2, with an average recovery period of approx. 50 years.

From the point of view of the National Territorial Development Plan - Section V Natural risk areas - landslides, potential for landslides - low.

C. PRESENTATION OF GEOTECHNICAL INFORMATION

C.1. *Field work carried out*

For the realization of this work, manual geotechnical drilling was performed and archive data was used.

C.2. *Methods, Equipment and equipment used*

The geotechnical drillings were carried out with a manual drill (USA) with a 3/4" drill bit diameter, with sampling.

C.3. *Data on field work / Laboratory*

The field/laboratory work was carried out in June 2022.

C.4. *Frost depth*

The value of the maximum frost depth according to STAS 6054/77, h=90cm.

C.5. Highlighted stratification

F 7959a

0.00m-0.25m Vegetable soil
0.25m - 0.80m Dusty sandy clay, brownish, consistent plastic
Stopped drilling in stone boulder, concrete fragment

F 7959b

0.00m - 0.25m Vegetable soil
0.25m - 0.90m Sandy dusty clay, brown, plastic consistency
Stopped drilling in stone boulder, concrete fragment

F 7959c

0.00m - 0.25m Vegetable soil
0.25m - 0.60m Dusty sandy clay, brownish, consistent plastic
Stopped drilling in stone boulder, concrete fragment F 7959
0.00m - 0.40m Vegetable soil
0.40m - 1.30m Sandy dusty clay, brownish, of medium plasticity, with rare small gravel, plastic consistency when flowing, wet when saturated
1.30m - 3.00m Dusty, brown, very wet, compressible sand The groundwater level was intercepted at a depth of 2.60m, compared to the natural ground

Name of authorized soil testing laboratory

The authorized laboratory for soil testing belongs to sc Optimum srl Rm. Valcea second grade laboratory authorized ISC no 3163/2016.

F 7959	1m	2m	3m
Granular composite according to STAS 1243-88			
Clay %	14.9	9.9	11.8
Dust %	39.1	38.7	41.1
Sand %	42.8	51.4	46.5
Gravel %	3.2	0.1	0.6
Granular composite according to SR EN 14688-2	cl.Si	cl.Si	Si
Clay %	9.3	7.9	7.2
Dust %	56.6	51.3	62.1
Sand %	30.8	40.7	30.1
Gravel %	3.2	0.1	0.6
Humidity w %	23.9	28.3	27.9
WP kneading limit	21.01		
Flow limit WL	28.84		
Plasticity index Ip	7.83		
Consistency index Ic	0.62		

F 7960

0.00m - 0.60m Vegetable soil
 0.60m - 1.50m Sandy dusty clay, brownish, with medium plasticity, with rare small gravel, hard, compressible, wet
 1.50m - 2.30m Gray sandy clay, very wet, with reduced plasticity, with rare small gravel, soft plastic, compressible
 2.30m - 1.30m Sandy dusty clay, brownish, of medium plasticity, compressible, saturated plastic

The underground water level was intercepted at a depth of 2.80m, compared to the natural terrain

Name of authorized soil testing laboratory

The authorized laboratory for soil testing belongs to sc Optimum srl Rm. Valcea grade II laboratory authorized ISC no 3163/2016. The samples taken from the boreholes show the following values:

F 7960	1m	2m	3m
Granular composite according to STAS 1243-88			
Clay %	14.6	15.1	19.9
Dust %	42.1	32.6	45.4
Sand %	34.7	44.8	34.7
Gravel %	4.6	7.5	0.0
Granular composite according to SR EN 14688-2			
	cl.Si	Cl.Si	cl.Si
Clay %	13.7	9.4	14.5
Dust %	60.4	48.8	71.0
Sand %	21.3	34.3	14.5
Gravel %	4.6	7.5	0.0
Humidity w %	16.95	30.59	29.17
WP kneading limit	18.15	23.52	25.96
Flow limit WL	32.33	33.25	40.34
Plasticity index Ip	14.16	9.72	14.38
Consistency index Ic	1.08	0.27	0.78

REUSED DRILLING

F 4641 Winmarkt store extension
 0.00m - 1.80m Wet filling (concrete, stones, etc.)
 1.80m - 2.80m Gray dusty sand, saturated, flowing plastic
 2.80m - 5.40m Gray clayey dust, saturated, consistent plastic
 5.40m - 6.00m Gray dusty sand, saturated

The underground water level was intercepted at - 1.70m depth, compared to the natural terrain

Name of authorized soil testing laboratory

The authorized laboratory for soil testing belongs to SC CIMEX SA TULCEA, grade II laboratory authorized ISC no. 3083/2015

F 4641	2m	3m	4m	5m	6m
Humidity w %	28,85	31,41	26,79	25,90	24,65

F 4644 Delta Hotel parking lot

0.00m - 0.55m Asphalt (3cm) + macadam

0.55m - 2.80m Sandy-clay dust, gray to blackish gray, with inhomogeneous filling elements (stones, wood, rubble, brick)

2.80m - 4.30m Clay dust, grey, saturated, soft plastic to consistent pl

4.30m - 6.00m Silty dusty clay, blackish gray, with high to very high plasticity towards the base of the borehole, consistent plastic to soft plastic, compressible, with sandy lenses disseminated in the layer

The level of the underground water measured the next day was established at a depth of 2.00 m, compared to the natural terrain and is influenced by the level of the Danube.

Name of authorized soil testing laboratory

The authorized laboratory for soil testing belongs to SC CIMEX SA TULCEA, grade II laboratory authorized ISC no. 3083/2015

F 4644	1m	2m	3m	4m	5m	6m
Humidity w %	28,6	30,1	38,6	30,1	40,3	39,9
Natural volume density 5w g/cm ³	1,79					
Dry bulk density 5d q/cm ³	1,39					
Porosity %	47,6					
Porosity index	0,91					

Analysis and interpretation of field and laboratory data

The characterization from a geotechnical point of view is in accordance with NP 074/2014. The foundation land in the immediate vicinity of the natural land surface is a cohesive soil with medium plasticity, under the conditions of a relatively uniform and horizontal stratification.

Considering the described, the characterization of the land according to NP074/2014 requires highlighting the existence of a difficult foundation land.

From the point of view of the physical-mechanical characteristics, the following should be noted:

- According to STAS 1243/88 granulometric sand fraction N (0.5-0.05) shows a variation from 34.7% to 51.4% dust fraction P (0.05-0.005) varies from 32.6% to 45.4%; the clay fraction (>0.005) varies between 9.9% and 19.9% From the point of view of granulometric characterization, the soil on the surface is represented by DUSTY CLAY, SANDY CLAY, SANDY SAND,
- According to SR EN 14668-2/2018 granulometric sand fraction N (0.5-0.05) shows a variation from 14.5% to 40.7% dust fraction P (0.05 - 0.005) varies from 48.8% to 71.0%; the clay fraction (>0.005) varies between 7.2% and 14.5%. The intercepted land code is included in class cl. Si, Si.

- The value of the Atterberg limits varies between 28.8% and 40.3% for the yield limits, and between 18.1% and 25.9% for the kneading limits, the plasticity indices vary between 7.8 and 14.3% indicating a cohesive soil with reduced plasticity to average. The consistency index I_c varies between 0.27 and 1.08, the soil is in the state of plastic flow consistency.
- According to STAS 1243/88 Table 21 we are in , the presence of a soil very sensitive to frost. Gel soils (sensitive to frost) are soils that essentially change their structure and properties as a result of freeze-thaw phenomena.
- Taking into account the humidity values, the foundation soil appears moist to saturated.

d. 3 Important variations of the underground water level or sources of infiltration

The level of the underground water is dependent on the variations of the main emissary (the Danube), the underground water intercepted at depths between 1.20 and 2.80m depending on the depth and the variations of the main emissary - the Danube river

A) The borehole executed near the town hall for the work Technical Expertise Consolidation Tulcea Town Hall intercepted the water at a depth of 1.60m, stabilizing after 6 hours at a depth of 1.20m (the borehole was executed during the period of the rise of the Danube)

B) For the work Technical Expertise Consolidation of the Tulcea County Council, a borehole was executed at a depth of 6.00m with pipes Ø 110 which was executed near the County Council headquarters (NW side). Before the casing of the hole at a depth of 3.00 m, water infiltrations appeared, most likely from losses in the canal water network. After 7 days, the water level measured in the piped borehole is stabilized at a depth of 2.20m (The drilling was carried out during the period of lowering of the Danube water level - prolonged drought). The water level can be measured periodically in the executed borehole that has a tube cover.

D. 4. Evaluation of the conventional base pressure (in case of direct foundation)

The conventional pressure is determined according to NP122/2014. For the alluvial layer identified in the drilled holes, the value of the conventional pressure will be considered: $P_{conv} = 110 \text{ kPa}$.

EVALUATION OF GEOTECHNICAL INFORMATION

D.1. Geotechnical category

The geotechnical category depending on the groups of factors is as follows:

a. the terrain conditions intercepted a type of terrain difficult to build, represented by alluvial terrain;	SCORE 6
b. from the point of view of the presence of underground water on the site, in correlation with the foundation solution, the excavation does not go below the level of the underground water, without risks of degradation of some adjacent structures.	SCORE 1
c. Construction classification according to importance category - cat. Normal	SCORE 3
d. From the neighborhood's point of view, we are in the risk-free category	SCORE 1
PARTIAL SCORE	11
SEISMIC AREA SCORE «D»	2
TOTAL SCORE	13

Depending on the score obtained, we are in the presence of a MODERATE geotechnical risk, the work falling into GEOTECHANICAL CATEGORY 2.

CONCLUSIONS

1. Taking into account the above, it is concluded that the foundation land is represented by an alluvial complex made up on the surface of alternating sandy dusts, dusty sands, brownish to gray sandy dusty clays, moist to saturated, compressible.

2. The conformation of the infrastructure will have to take into account the fact that the foundation land presents high to very high compressibility, the infrastructure having to take over the possible uneven settlements of the foundation land, providing measures to increase the resistance and spatial rigidity of the construction.

3. Having reached the stratification of the foundation land, the foundation depth will be determined according to C1, Annex C of the "Regulations on the design of surface foundations" indicative NP 112 - 2014. When establishing the foundation system, the provisions of NP 112-2014 pet II will be respected .7.7.4, para. 2

For light constructions (with ground floor height regime), taking into account the physical-mechanical characteristics in conjunction with the presence of heterogeneous fillings on the surface, it is recommended that the foundation be made by means of consolidation of the land surface by making flared broken stone pillows lateral to the foundations with a strip equal to the thickness of the pillow.

The realization of the pillow will lead to the improvement of the foundation land near the base of the foundations, where the demands are important to the reduction of the pressure transmitted to the natural land under the pillow and, as a consequence, to the reduction of its settlement and to the uniformity of the land under the base of the foundation. The granularity of the materials is recommended to be continuous with a non-uniformity coefficient $U_n > 5$, visible plant remains, pieces of wood, clay soils, etc. not being accepted.

4. For the purposes of the platform

a) The climate type identified is **type I**

b) The identified soil is sandy dusty clay. The soil type bears the symbol "P5", the degree of frost sensitivity of the land being "very sensitive"

The calculation values of the deformation mode for the types of soil identified in the road bed will be considered according to the catalog of structures from Normative PD 177/01

d) Taking into account the related hydrological regime, the calculation values of the dynamic modulus of elasticity E_p (Regulation PD177-2001 will be considered to be 70MPa (for soil type P5) according to the Normative for the dimensioning of flexible and semi-rigid systems PD 177-2001 table 2 , (assuming climate type I; hydrological regime 1,2b).

e) The calculation value of the Poisson's ratio (μ) for the P5 soil type can be considered as $\mu=0.42$ (Regulation PD177-2001).

2. The hydrological conditions of the road complex

The hydrological conditions of the road complex will be determined in conf. with STAS 1709/2-90. The underground water level is confined to depths that can influence the road bed. For the subsequent phases of the development of the PUZ (SF.DTAC), it is recommended to prepare a GEOTECHANICAL STUDY drawn up according to the provisions of the Normative on the principles, requirements and methods of the geotechnical investigation of the indicative foundation lands NP 074/2014.

Elaborated by:

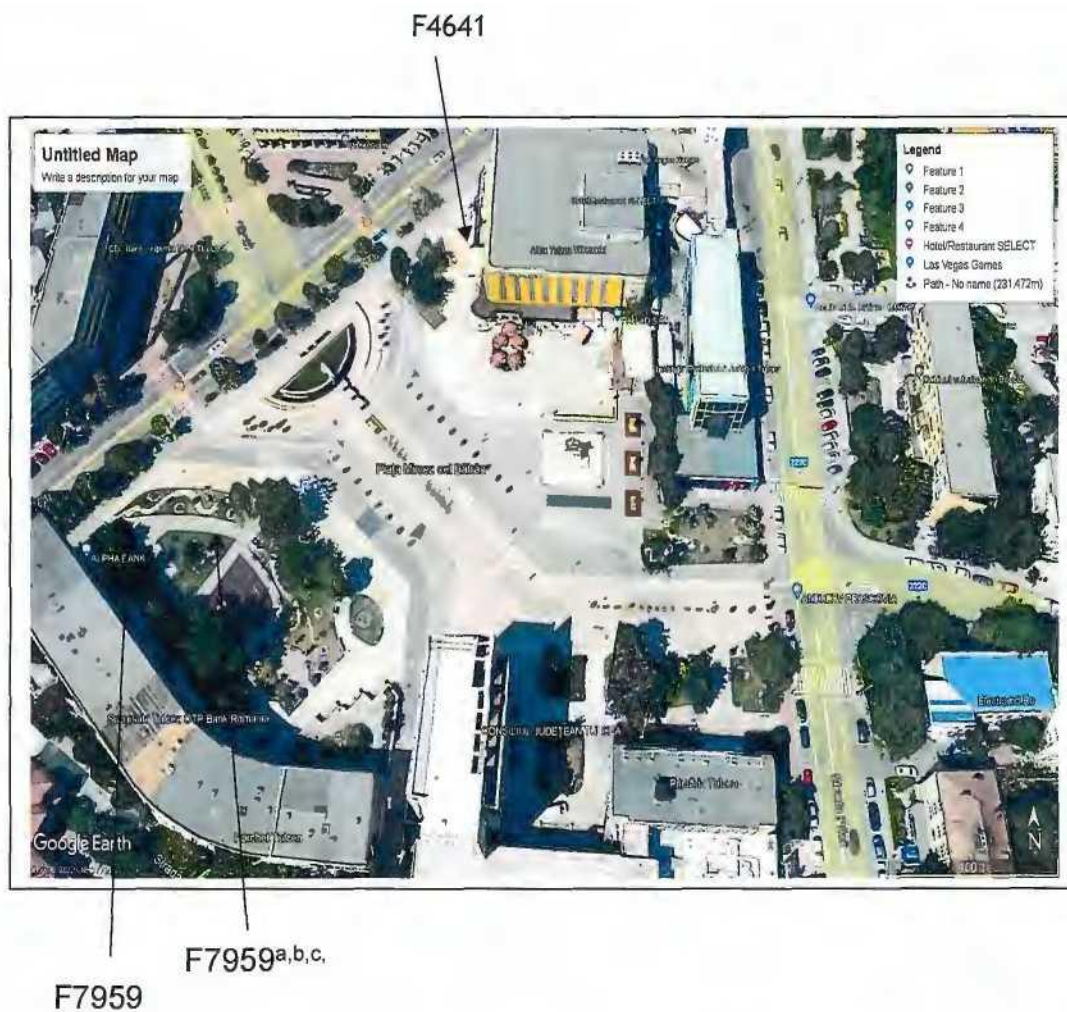
Eng. Savu Laurentiu

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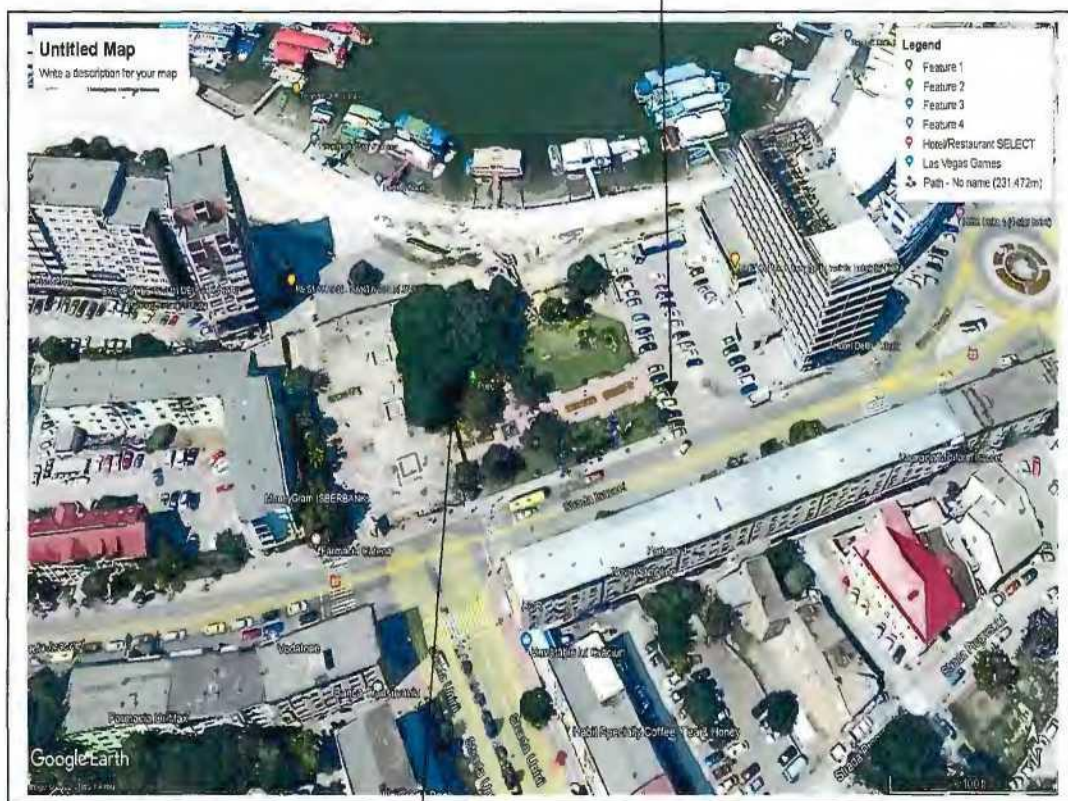
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S.C. GEOTEHNIC S.R.L. TULCEA J 36/ 54 / 2003 CUI RO 15197173			Geotechnical study: URBAN REGENERATION OF "MIRCEA CEL BATRAN" SQUARE, UNIRII STREET, TREI FANTANI PARK AREA, TULCEA Mun.		Pr. no. 86/2022
			Beneficiary: UAT TULCEA MUNICIPALITY		
Elaborated	Savu Laurentiu		Scale	Field work situation plan	PL1
Verified	Savu Laurentiu		Year: 2022		

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S.C. GEOTEHNIC S.R.L. TULCEA J 36/ 54 / 2003 CUI RO 15197173			Geotechnical study: URBAN REGENERATION OF "MIRCEA CEL BATRAN" SQUARE, UNIRII STREET, TREI FANTANI PARK AREA, TULCEA Mun.		Pr. no. 86/2022
			BeneficiarY: UAT TULCEA MUNICIPALITY		
Elaborated	Savu Laurentiu		Scale	Field work situation plan	PL.2
Verified	Savu Laurent		Year: 2022		





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Phone 0350.42 45 14, Fax. 0350.42 45 13, e-mail: ontimum.geo@8imum.ro

**Geotechnical laboratory tests for the work
"Urban regeneration of "Mircea cel Batran Square, Unirii str., 3
Fantani Park" area**

Contract: 149/ 2022- phase 6

Beneficiary: S.C. GEOTEHNIC S.R.L. Tulcea

GTF laboratory grade II
Authorized ISC: 3646 from 24.08.2020

TEST REPORT
No. 52 of 25.05.2022

Beneficiary: S.C. GEOTEHNIC S.R.L. - str Isaccei, nr.11b, Bl 1-4, Sc.A, Ap.5, jud. Tulcea
Title of the work: Geotechnical laboratory tests for the work:
"Urban regeneration of " Mircea cel Batran Square, Unirii str., 3 Fantani Park" area

Sample collection period/executor: /S.C. GEOTEHNIC S.R.L. Tulcea

Testing period: 19.05 -f 24.05.2022

Date of receipt of samples: 19.05.2022

Sampling reference and sample transport: The sampling is performed by the beneficiary and the samples are transported by the courier company.

Performed tests:	Determination of granularity according to STAS 1913/5-85	6 tests
	Determination of humidity according to STAS 1913/1-82	6 tests
	Determination of plasticity limits according to STAS 1913/4-86	4 tests

The report includes all the laboratory test sheets and contains 20 pages.

The results from the test report refer strictly to the sample subjected to the tests.

The test report cannot be multiplied or used for other purposes without the approval of SC OPTIMUM GEOTEHNIC SRL

The laboratory does not issue opinions or make recommendations.

We declare under our own responsibility that the tests were not carried out under pressure of any kind.

DEVELOPMENT TEAM,
Eng. Laura Denis PEPTINE
Tech. Valentin CEAUSESCU

Head of Laboratory,
Eng. Laura Denis Peptine

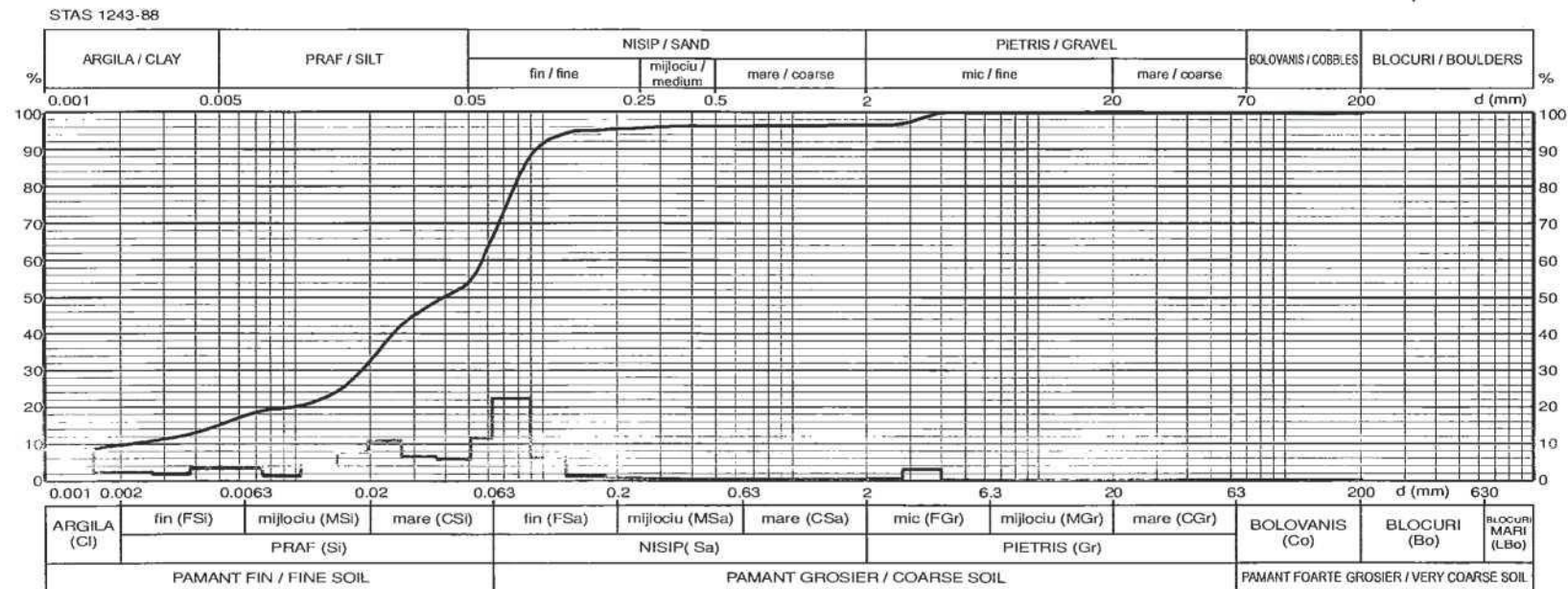
Amplasament: Regenerare urbana zona "Piata Mircea cel Batran str. Unirii, parcul 3 Fantani"

Curba granulometrica / Granulometric curve

Forajul/Borehole: F 7959

Proba/Sample: P1

Adancimea/Depth: 1.00 m



SR EN ISO 14688-2

Fracțiuni granulometrice conform STAS 1243-88

Argila / Clay 14.9 %
Praf / Silt 39.1 %
Nisip / Sand 42.8 %
Pietris / Gravel 3.2 %
Bolovanis / Cobbles 0.0 %

ARGILA prafoasa nisipoasa cafenie cu rar pietris mic

$w_{10} =$ n/a
 $w_{30} =$ n/a
 $w_{60} =$ n/a

Fracțiuni granulometrice conform SR EN 14688-2:2018

Argila / Clay 9.3 %
Praf / Silt 56.6 %
Nisip / Sand 30.8 %
Pietris / Gravel 3.2 %
Bolovanis / Cobbles 0.0 %

$C_u =$ #####
 $C_c =$ #####

Intocmit: tehn. Valentin CEAUSESCU

Data: 24.05.2022

Verificat: Șef Lab. Ing. Laura Denis PEPTINE

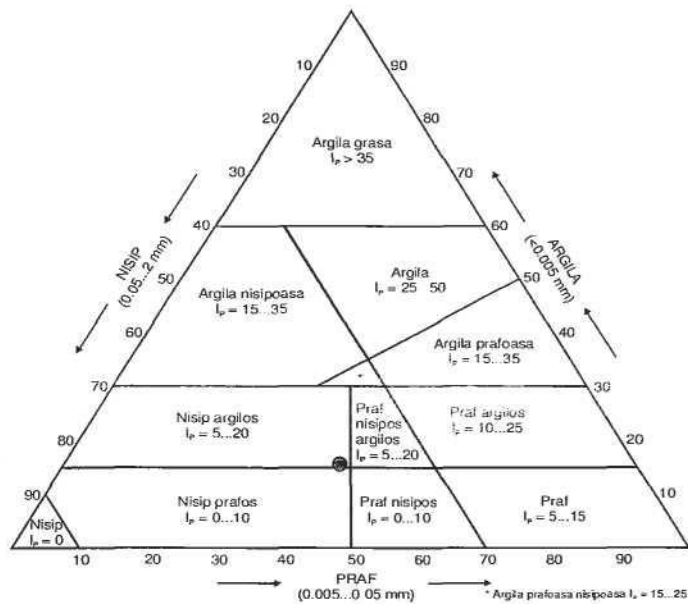
Amplasament: Regenerare urbana zona "F Forajul/Borehole: F 7959

Diagrama ternara / Ternary diagram

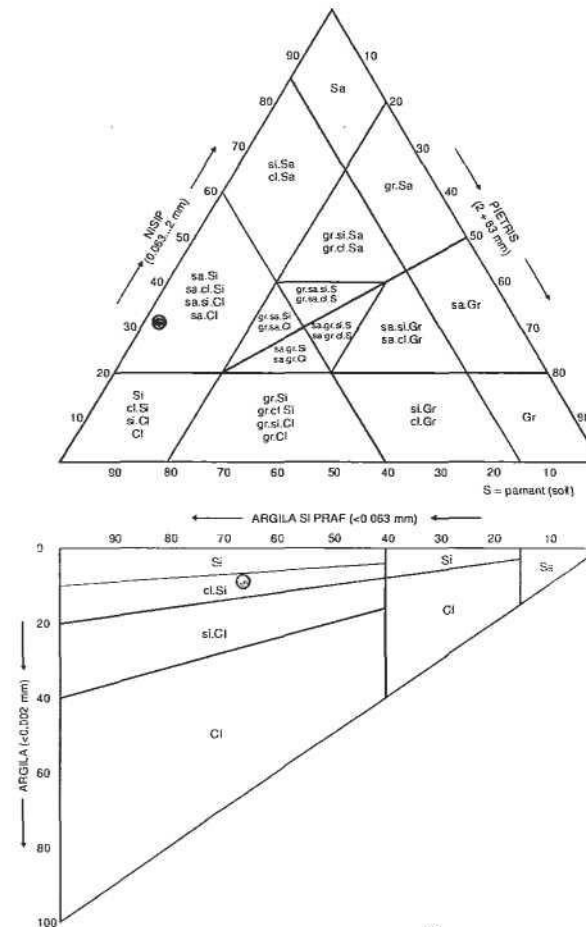
Proba/Sample: P1

Adancimea/Depth: 1.00 m

Clasificarea pamanturilor conform STAS 1243-88



Clasificarea pamanturilor conform SR EN 14688-2:2005



Intocmit: tehn. Valentin CEAUȘECU

Data: 24.05.2022

Verificat: Șef Lab. Ing. Laura Denis PEPTINE

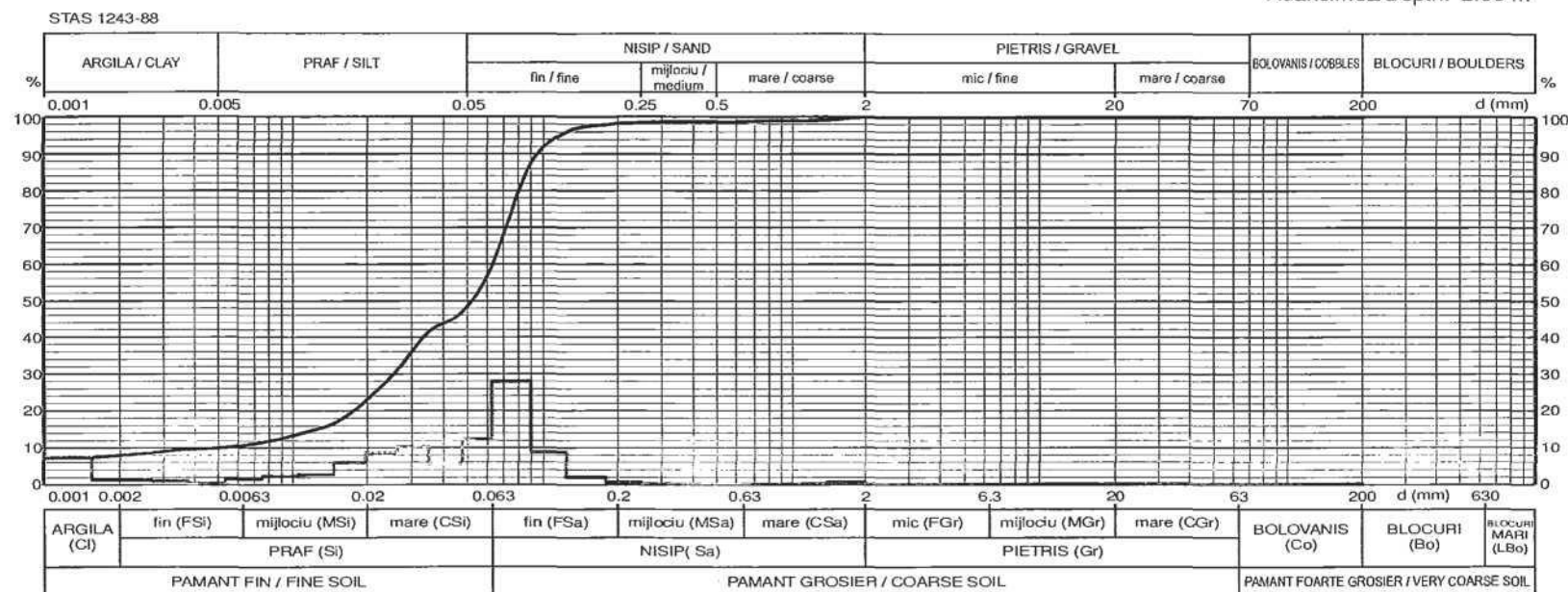
Amplasament: Regenerare urbana zona "Piata Mircea cel Batran str. Unirii, parcul 3 Fantani"

Curba granulometrica / Granulometric curve

Forajul/Borehole: F 7959

Proba/Sample: P2

Adancimea/Depth: 2.00 m



SR EN ISO 14688-2

Fractiuni granulometrice conform STAS 1243-88

Argila / Clay 9.9 %
 Praf / Silt 38.7 %
 Nisip / Sand 51.4 %
 Pietris / Gravel 0.1 %
 Bolovanis / Cobbles 0.0 %

NISIP prafos cafeniu (descriere conform STAS 1243-88)

$w_{liq} =$ n/a
 $w_{pl} =$ n/a
 $w_{sh} =$ n/a

Fractiuni granulometrice conform SR EN 14688-2:2018

Argila / Clay 7.9 %
 Praf / Silt 51.3 %
 Nisip / Sand 40.7 %
 Pietris / Gravel 0.1 %
 Bolovanis / Cobbles 0.0 %
 Cu = #####
 Cc = #####

Intocmit: tehn. Valentin CEALUSCUI

Data: 24.05.2022

Verificat: Șef Lab. Ing. Laura Denis PEPTINE

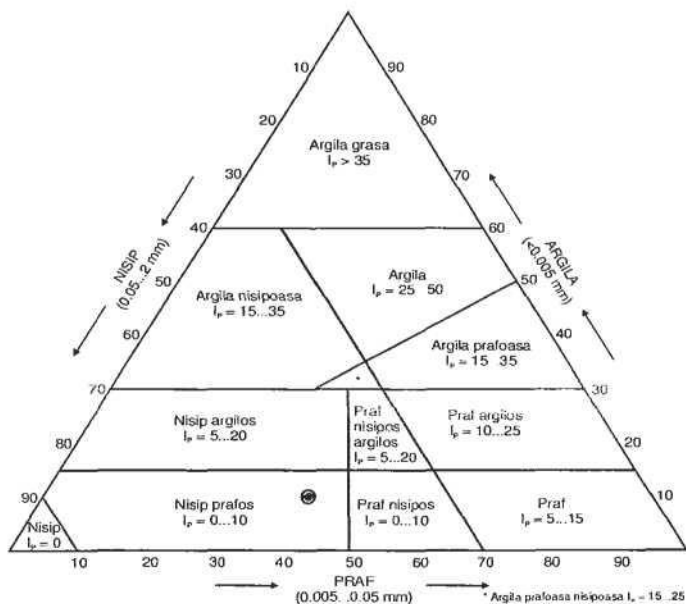
Amplasament: Regenerare urbana zona "F Forajul/Borehole: F 7959

Diagrama ternara / Ternary diagram

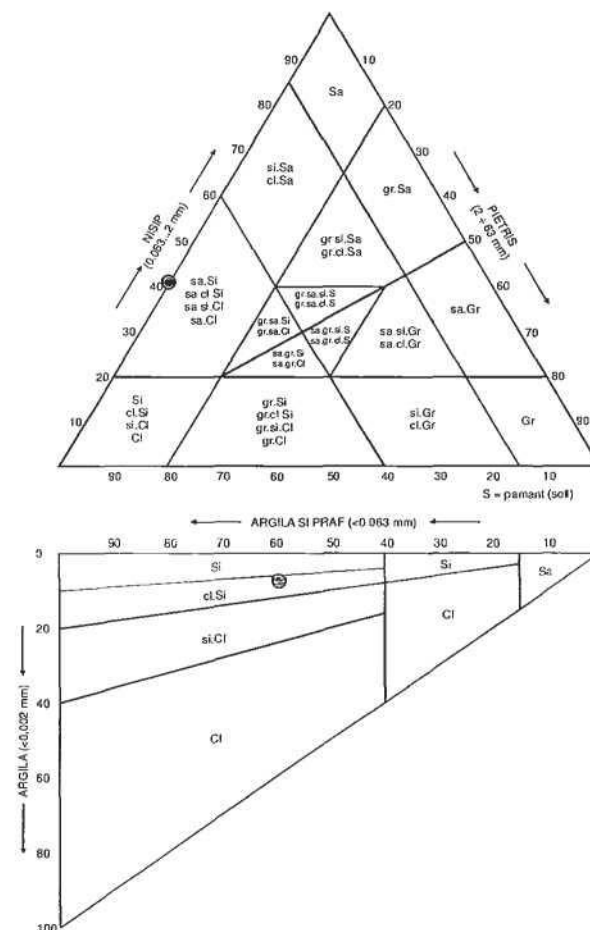
Proba/Sample: P2

Adancimea/Depth: 2.00 m

Clasificarea pamanturilor conform STAS 1243-88



Clasificarea pamanturilor conform SR EN 14688-2:2005



Intocmit: tehn. Valentin CEAUSESCU

Data: 24.05.2022

Verificat: Șef Lab. Ing. Laura Denis PEPTINE

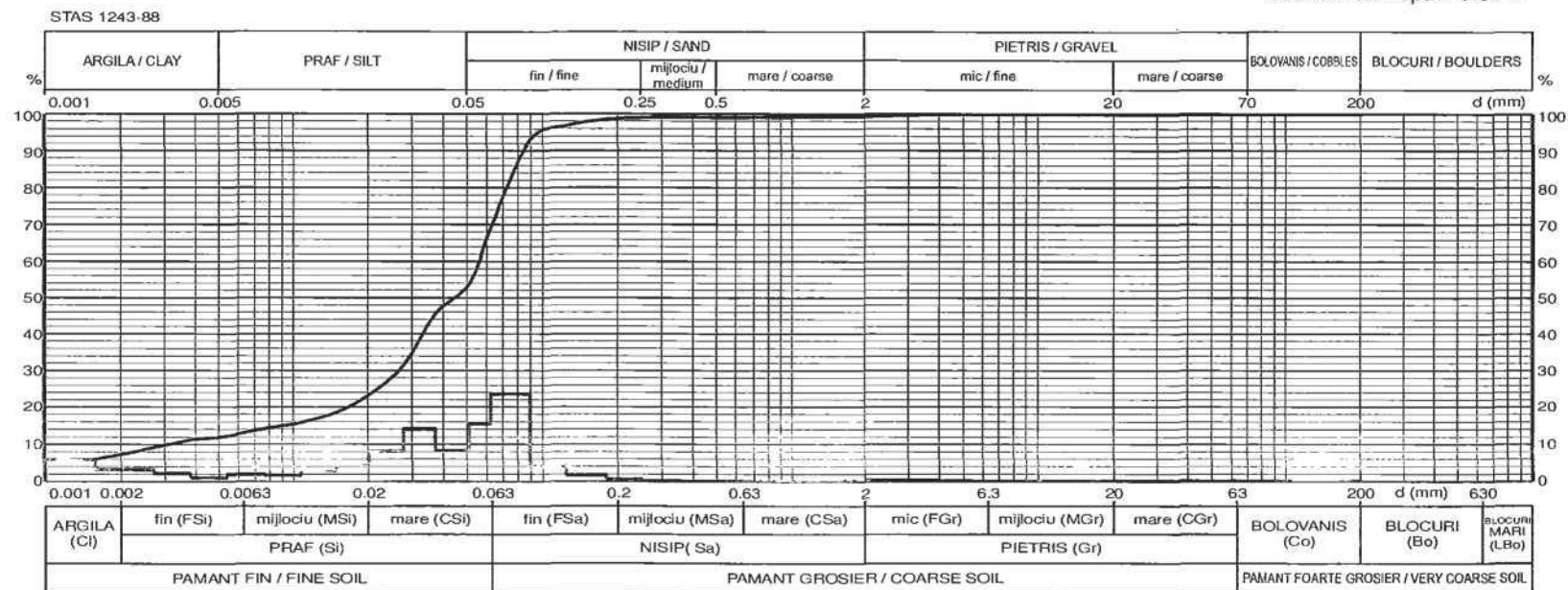
Amplasament: Regenerare urbana zona "Piata Mircea cel Batran str. Unirii, parcul 3 Fantani"

Curba granulometrica / Granulometric curve

Forajul/Borehole: F 7959

Proba/Sample: P3

Adancimea/Depth: 3.00 m



SR EN ISO 14688-2

Fractiuni granulometrice conform STAS 1243-88

Argila / Clay 11.8 %
 Praf / Silt 41.1 %
 Nisip / Sand 46.5 %
 Pietris / Gravel 0.6 %
 Bolovanis / Cobbles 0.0 %

NISIP praos cenușiu - cafeniu (descriere conform STAS 1243-88)

w_{cl} = n/a
 w_{pl} = n/a
 w_{liq} = n/a

Fractiuni granulometrice conform SR EN 14688-2:2018

Argila / Clay 7.2 %
 Praf / Silt 62.1 %
 Nisip / Sand 30.1 %
 Pietris / Gravel 0.6 %
 Bolovanis / Cobbles 0.0 %

C_u = #####
 C_c = #####

Intocmit: tehn. Valentin CEALUSescu

Data: 24.05.2022

Verificat: Șef Lab. Ing. Laura Denis PEPTINE

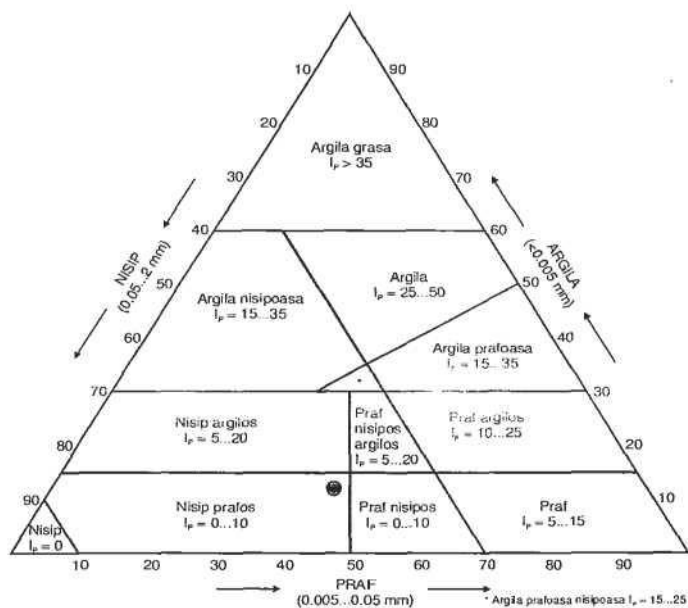
Amplasament: Regenerare urbana zona "F" Forajul/Borehole: F 7959

Diagrama ternara / Ternary diagram

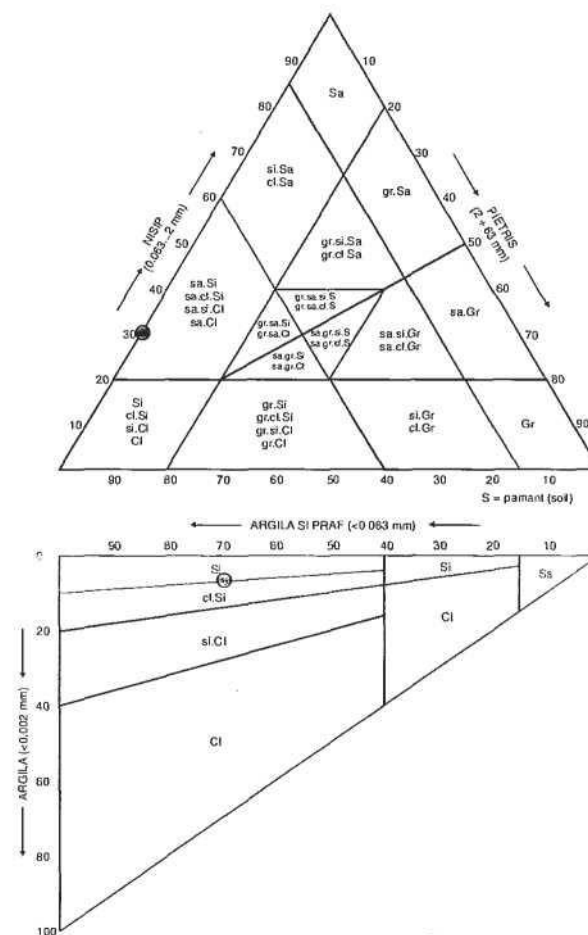
Proba/Sample: P3

Adancimea/Depth: 3.00 m

Clasificarea pamanturilor conform STAS 1243-88



Clasificarea pamanturilor conform SR EN 14688-2:2005



Intocmit: tehn. Valentin CEASCESCU

Data: 24.05.2022

Verificat: Șef Lab. Ing. Laura Denis PEPTINE

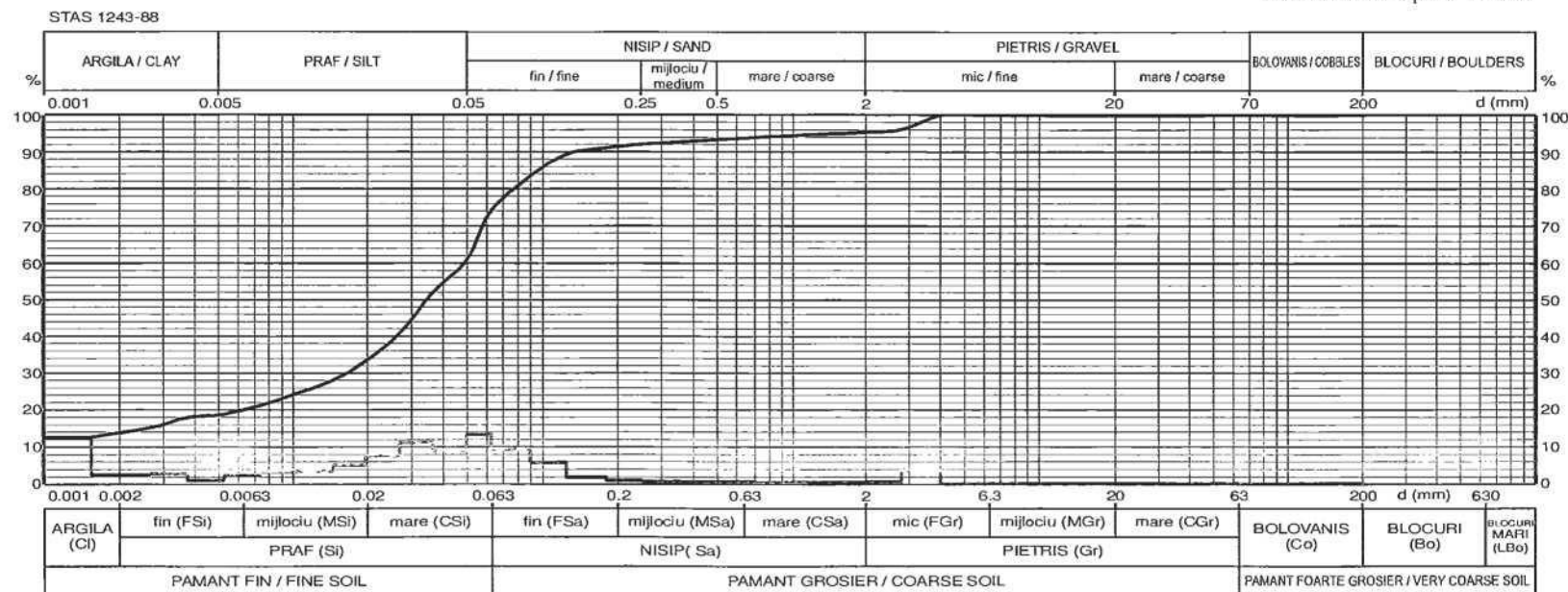
Amplasament: Regenerare urbana zona "Piata Mircea cel Batran str. Unirii, parcul 3 Fantani"

Curba granulometrica / Granulometric curve

Forajul/Borehole: F 7960

Proba/Sample: OP1

Adancimea/Depth: 1.00 m



SR EN ISO 14688-2

Fracțiuni granulometrice conform STAS 1243-88

Argila / Clay 18.6 %
Praf / Silt 42.1 %
Nisip / Sand 34.7 %
Pietris / Gravel 4.6 %
Bolovanis / Cobbles 0.0 %

ARGILA prafoasa nisipoasa cafenie cu rar pietris mic

$w_{liq} =$ n/a
 $w_{pl} =$ n/a
 $w_{cl} =$ n/a

Fracțiuni granulometrice conform SR EN 14688-2:2018

Argila / Clay 13.7 %
Praf / Silt 60.4 %
Nisip / Sand 21.3 %
Pietris / Gravel 4.6 %
Bolovanis / Cobbles 0.0 %
Cu = #####
Cc = #####

Intocmit: tehn. Valentin CEALUSescu

Data: 24.05.2022

Verificat: Șef Lab. Ing. Laura Denis PEPTINE

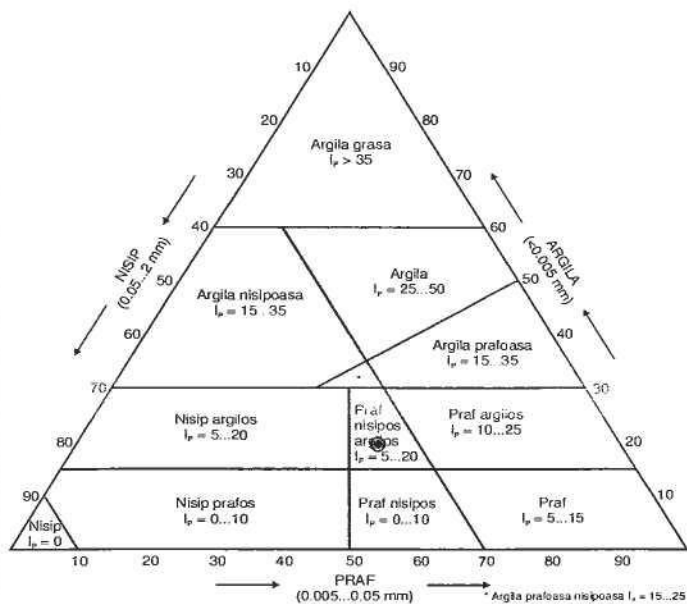
Amplasament: Regenerare urbana zona "F Forajul/Borehole: F 7960

Diagrama ternara / Ternary diagram

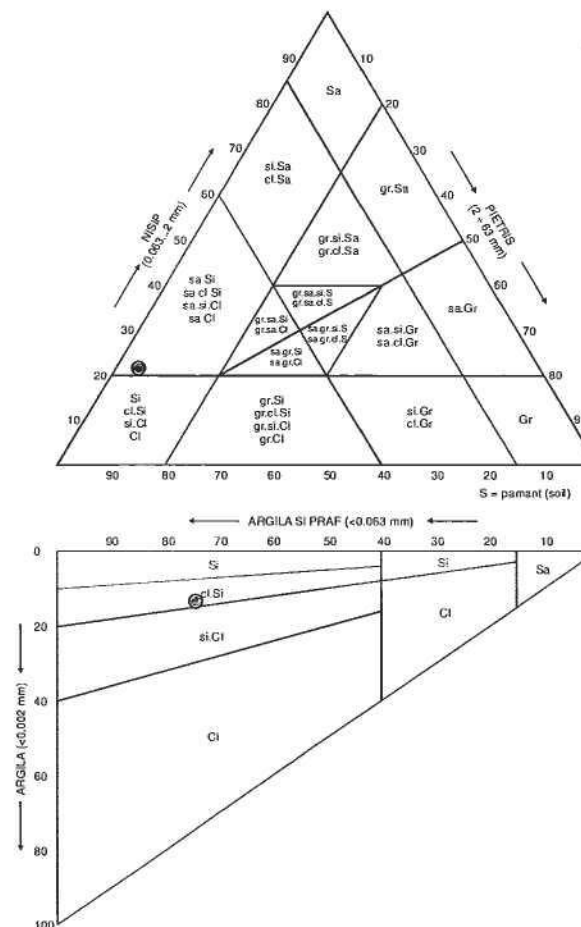
Proba/Sample: OP1

Adancimea/Depth: 1.00 m

Clasificarea pamanturilor conform STAS 1243-88



Clasificarea pamanturilor conform SR EN 14688-2:2005



Intocmit: tehn. Valentin CEAUSESCU

Data: 24.05.2022

Verificat: Șef Lab. Ing. Laura Denis PEPTINE

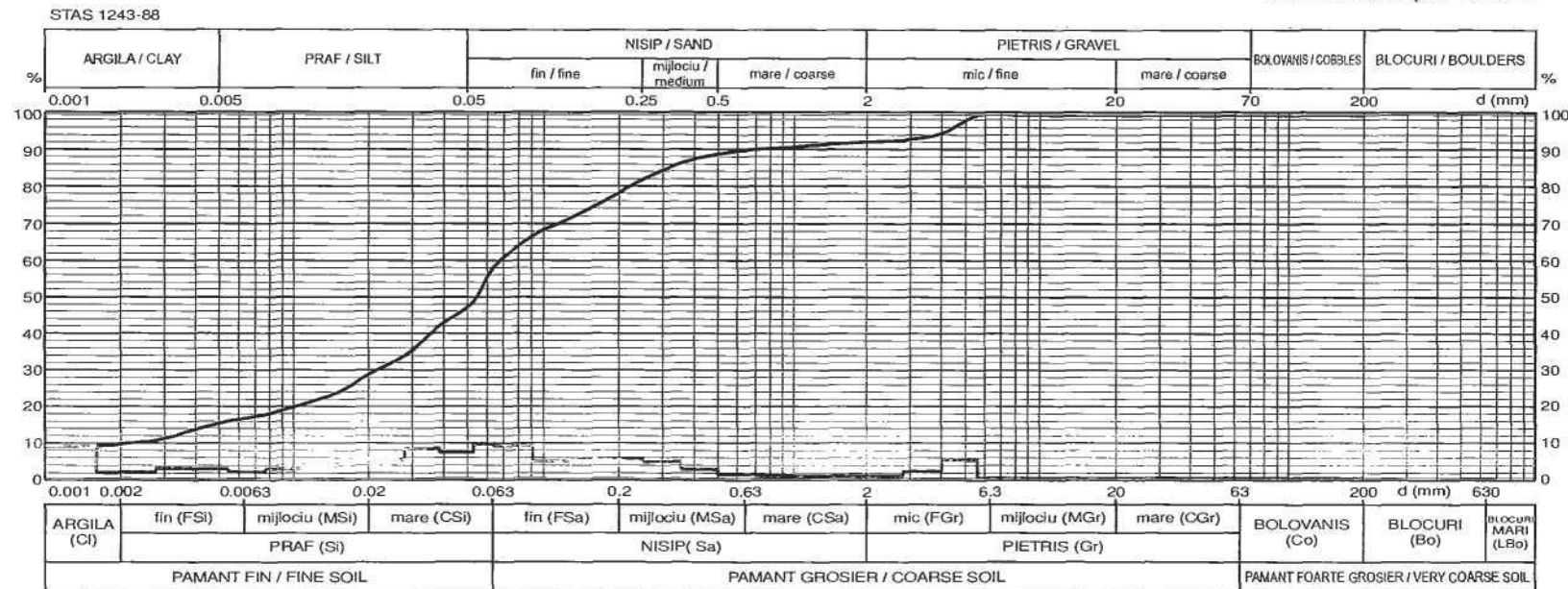
Amplasament: Regenerare urbana zona "Piata Mircea cel Batran str. Unirii, parcul 3 Fantani"

Curba granulometrica / Granulometric curve

Forajul/Borehole: F 7960

Proba/Sample: P2

Adancimea/Depth: 2.00 m



Fractiuni granulometrice conform STAS 1243-88

Argila / Clay 15.1 %
Praf / Silt 32.6 %
Nisip / Sand 44.8 %
Pietris / Gravel 7.5 %
Bolovanis / Cobbles 0.0

ARGILA nisipoasa cenusie cu rar pietris mic

w_{liq} = n/a
 w_{pl} = n/a
 w_{sh} = n/a

Fractiuni granulometrice conform SR EN 14688-2:2018

Argila / Clay 9.4 %
Praf / Silt 48.8 %
Nisip / Sand 34.3 %
Pietris / Gravel 7.5 %
Bolovanis / Cobbles 0.0 %

C_u = #####
 C_c = #####

Intocmit: tehn. Valentin CEAUSESCU

Data: 24.05.2022

Verificat: Șef Lab. Ing. Laura Denis PEPTINE

Amplasament: Regenerare urbana zona "F

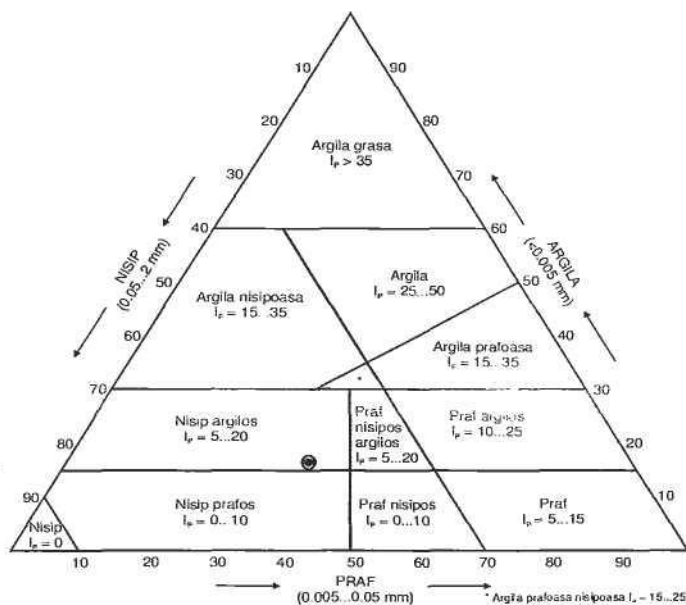
Forajul/Borehole: F 7960

Diagrama ternara / Ternary diagram

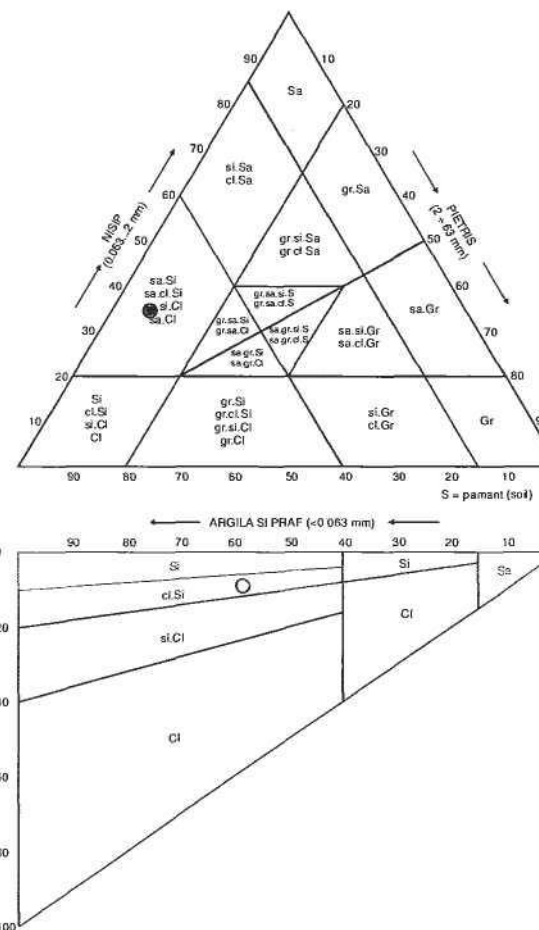
Proba/Sample: P2

Adancimea/Depth: 2.00 m

Clasificarea pamanturilor conform STAS 1243-88



Clasificarea pamanturilor conform SR EN 14688-2:2005



Intocmit: tehn. Valentin CEAUSESCU

Data: 24.05.2022

Verificat: Șef Lab. Ing. Laura Denis PEPTINE

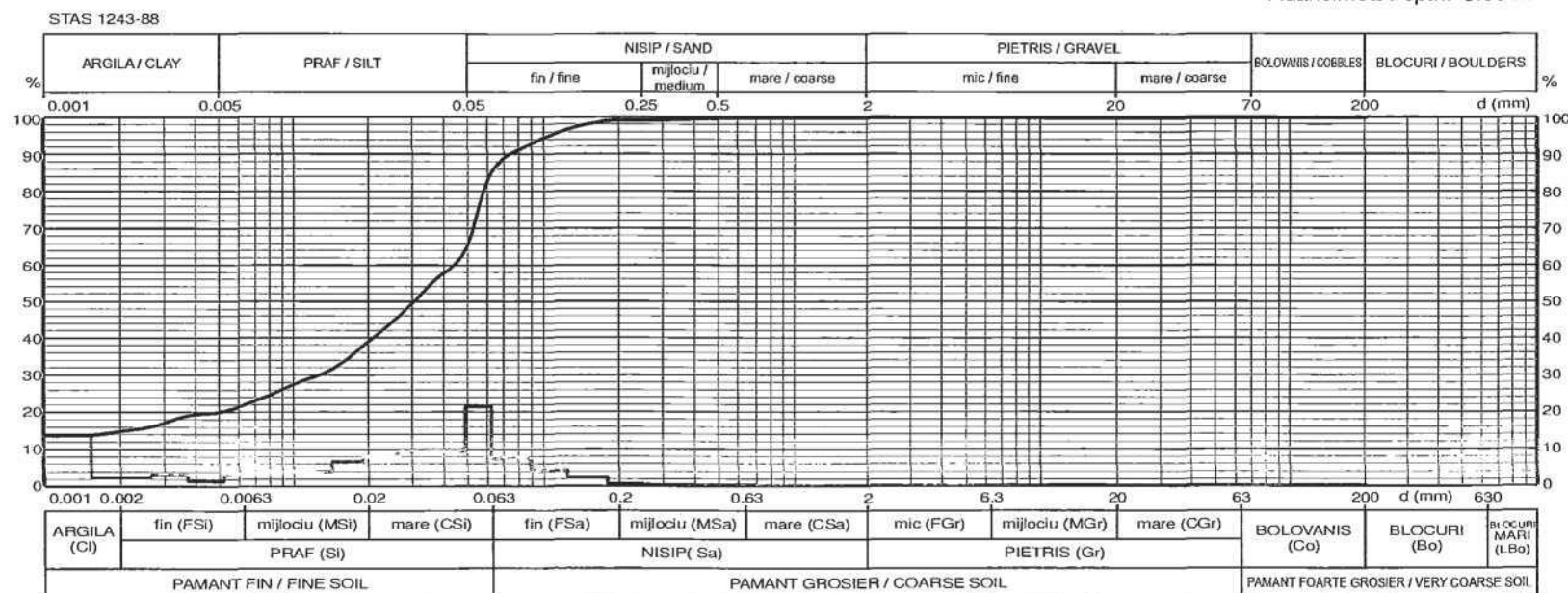
Amplasament: Regenerare urbana zona "Piata Mircea cel Batran str. Unirii, parcul 3 Fantani"

Curba granulometrica / Granulometric curve

Forajul/Borehole: F 7960

Proba/Sample: P3

Adancimea/Depth: 3.00 m



Fractiuni granulometrice conform STAS 1243-88

Argila / Clay	19.9	%
Praf / Silt	45.4	%
Nisip / Sand	34.7	%
Pietris / Gravel	0.0	%
Bolovanis / Cobbles	0.0	%

ARGILA prafoasa nisipoasa cenusie

$w_{liq} =$ n/a
 $w_{pl} =$ n/a
 $w_{sh} =$ n/a

Fractiuni granulometrice conform SR EN 14688-2:2018

Argila / Clay	14.5	%
Praf / Silt	71.0	%
Nisip / Sand	14.5	%
Pietris / Gravel	0.0	%
Bolovanis / Cobbles	0.0	%

$C_u =$ #####
 $C_c =$ #####

Intocmit: tehn. Valentin CEALUSCU

Data: 24.05.2022

Verificat: Șef Lab. Ing. Laura Denis PEPTINE

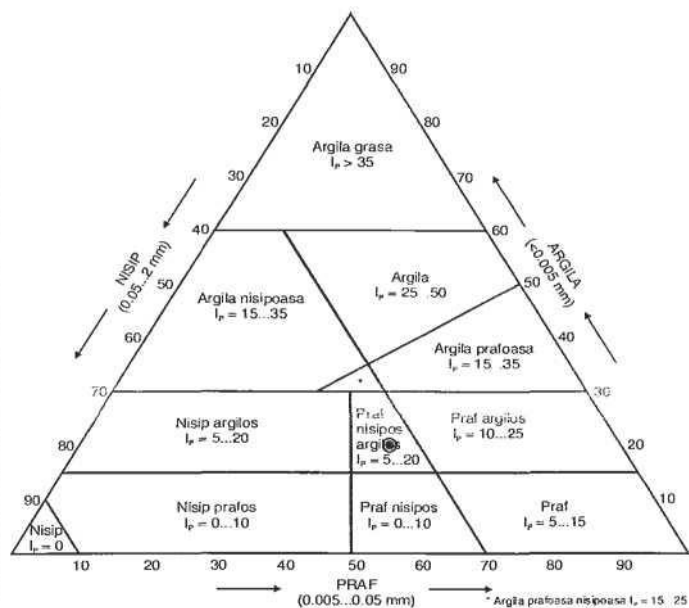
Amplasament: Regenerare urbana zona "F Forajul/Borehole: F 7960

Diagrama ternara / Ternary diagram

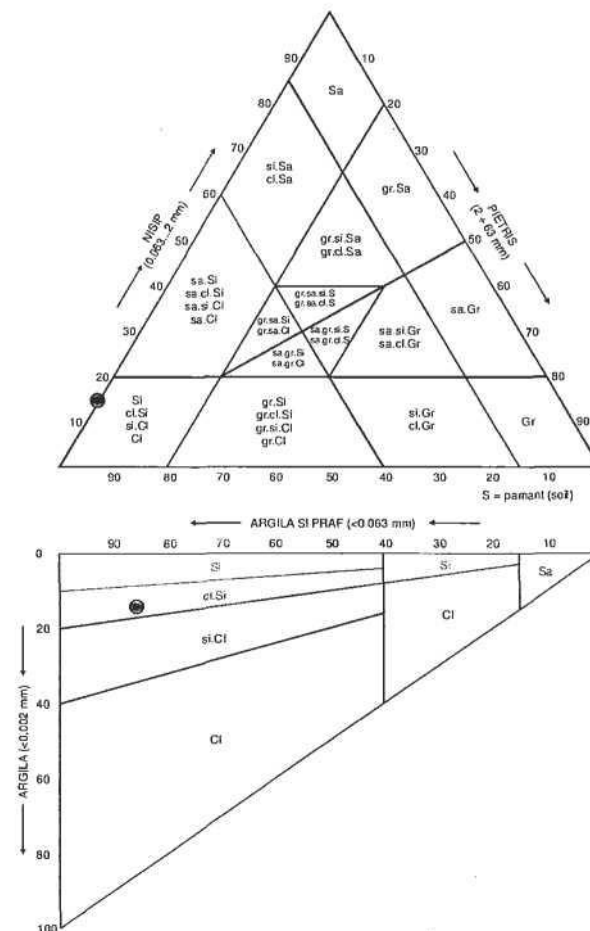
Proba/Sample: P3

Adancimea/Depth: 3.00 m

Clasificarea pamanturilor conform STAS 1243-88



Clasificarea pamanturilor conform SR EN 14688-2:2005



Intocmit: tehn. Valentin CEAUȘESCU

Data: 24.05.2022

Verificat: Șef Lab. Ing. Laura Denis PEPTINE

Amplasament: Regenerare urbana zona "Piata Mircea cel Batran str. Unirii, parcul 3 Fantani"

Limitele de plasticitate / Plasticity and liquid limit

Forajul/Borehole: F 7959

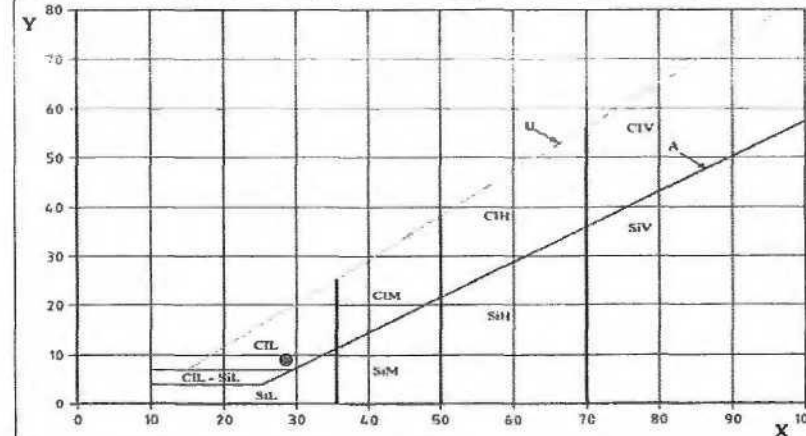
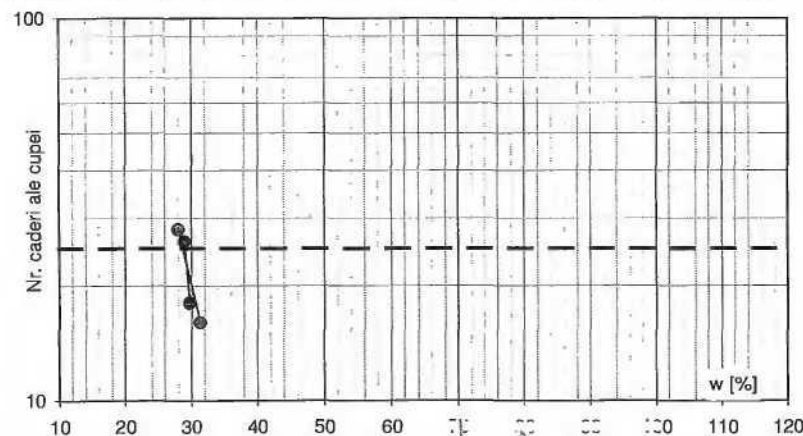
Proba/Sample: P1

Adancimea/Depth: 1.00 m

Mersul determinarilor	U.M.	Umiditatea naturala, w [%]			Limita inferioara de plasticitate, w _p [%]			Limita superioara de plasticitate, w _L [%]			
		1	2	3	1	2	3	1	2	3	4
Sticla de ceas nr.	-	195	162	184	144	110	104	9	72	54	83
Proba umeda + tara A	g	74.48	74.70	74.13	5.35	6.24	6.40	34.97	28.13	35.87	32.87
Proba uscata + tara B	g	60.30	60.92	59.97	4.76	5.47	5.59	28.09	23.08	29.16	27.00
Tara C	g	1.84	1.86	1.84	1.85	1.84	1.83	6.06	6.08	5.94	6.07
$w = (A-B)/(B-C) \cdot 100$	%	24.26	23.33	24.36	20.27	21.21	21.54	31.23	29.71	28.90	28.05
Umiditatea medie	%	23.98			21.01			28.84			
Numarul de caderi ale cupei		-			-			16	18	26	28

Clasificare material
(conform SR EN ISO 14688-2:2018)
ARGILA prafoasa nisipoasa cafenie cu rar
pietris mic

$I_p = 7.83 \%$ cu plasticitate redusa
 $I_c = 0.620$ plastic consistenta
 $I_L = 0.380$



Intocmit: tehn. Valentin CEAUSESCU

Data: 19.05.2022

Verificat: Șef Lab. Ing. Laura Denis PEPTINE

Amplasament: Regenerare urbana zona "Piata Mircea cel Batran str. Unirii, parcul 3 Fantani"

Determinarea umiditatii / Moisture content determination

Forajul/Borehole: F 7959


Proba/Sample: P2

Adancimea/Depth: 2.00 m

Mersul determinarii	UM	Epruveta			
		1	2	3	
Recipient nr.	-	133	121	191	
Masa proba umeda + tara, m_u	g	91.66	91.27	91.13	
Masa proba uscata + tara, m_d	g	71.94	71.59	71.4	
Tara, m_c	g	1.9	1.9	1.9	
$m_u - m_d$	g	19.72	19.68	19.73	
$m_d - m_c$	g	70.1	69.7	69.5	
$w = (m_u - m_d) / (m_d - m_c) * 100$	%	28.15	28.22	28.37	
Diferenta maxima (<2%)	%	0.22			
Media rezultatelor	%	28.25			

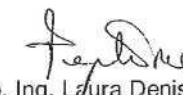
Descrierea materialului: NISIP prafos cafeniu (descriere conform STAS 1243-88)

Intocmit: tehn. Valentin CEAUSESCU



Data: 19.05.2022

Verificat: Șef Lab. Ing. Laura Denis PEPTINE



Amplasament: Regenerare urbana zona "Piata Mircea cel Batran str. Unirii, parcul 3 Fantani"

Determinarea umiditatii / Moisture content determination

Forajul/Borehole: F 7959

Proba/Sample: P3

Adancimea/Depth: 3.00 m

Mersul determinarii	UM	Epruveta			
		1	2	3	
Recipient nr.	-	163	200	164	
Masa proba umeda + tara, m_u	g	85.54	85.71	85.51	
Masa proba uscata + tara, m_d	g	67.15	67.34	67.4	
Tara, m_c	g	1.9	1.8	1.9	
$m_u - m_d$	g	18.39	18.37	18.11	
$m_d - m_c$	g	65.3	65.5	65.5	
$w = (m_u - m_d) / (m_d - m_c) * 100$	%	28.18	28.04	27.64	
Diferenta maxima (<2%)	%	0.54			
Media rezultatelor	%	27.96			

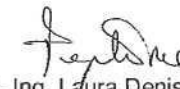
Descrierea materialului: NISIP prafos cenusiu - cafeniu (descriere conform STAS 1243-88)

Intocmit: tehn. Valentin CEAUSESCU



Data: 19.05.2022

Verificat: Șef Lab. Ing. Laura Denis PEPTINE



Amplasament: Regenerare urbana zona "Piata Mircea cel Batran str. Unirii, parcul 3 Fantani"

Limitele de plasticitate / Plasticity and liquid limit

Forajul/Borehole: F 7960

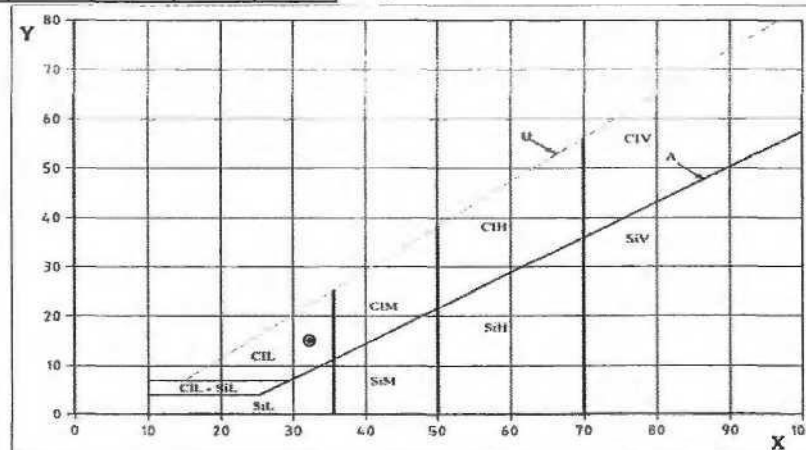
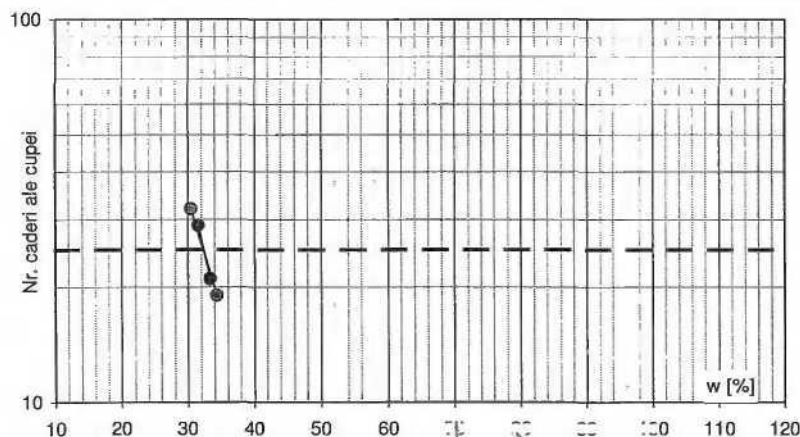
Proba/Sample: P1

Adancimea/Depth: 1.00 m

Mersul determinarilor	U.M.	Umiditatea naturala, w [%]			Limita inferioara de plasticitate, w _p [%]			Limita superioara de plasticitate, w _L [%]			
		1	2	3	1	2	3	1	2	3	4
Sticla de ceas nr.	-	144	110	123	195	154	138	2	34	44	38
Proba umeda + tara A	g	84.79	84.27	84.92	5.99	6.14	6.23	33.26	32.39	32.87	30.81
Proba uscata + tara B	g	72.91	72.32	72.75	5.36	5.48	5.56	26.34	25.83	26.44	25.05
Tara C	g	1.85	1.84	1.87	1.84	1.90	1.86	6.19	6.12	6.09	6.13
$w = (A-B)/(B-C) \cdot 100$	%	16.72	16.96	17.17	17.90	18.44	18.11	34.34	33.28	31.60	30.44
Umiditatea medie	%	16.95			18.15			32.33			
Numarul de caderi ale cupei		-			-			19	21	29	32

Clasificare material
 (conform SR EN ISO 14688-2:2018)
 ARGILA prafosa nisipoasa cafenie cu rar
 pietris mic

$I_p = 14.18 \%$ cu plasticitate redusa
 $I_c = 1.085$ tare
 $I_L = -0.085$



Intocmit: tehn. Valentin CEAUSESCU

Data: 19.05.2022

Verificat: Șef Lab. Ing. Laura Denis PEPTINE

Amplasament: Regenerare urbana zona "Piata Mircea cel Batran str. Unirii, parcul 3 Fantani"

Limitele de plasticitate / Plasticity and liquid limit

Forajul/Borehole: F 7960

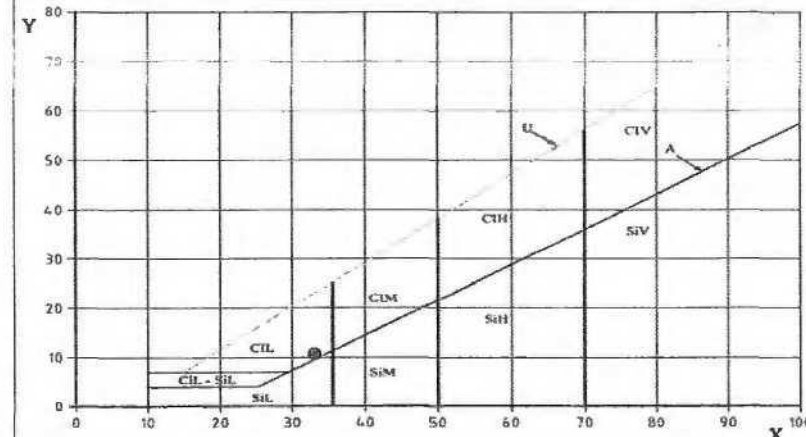
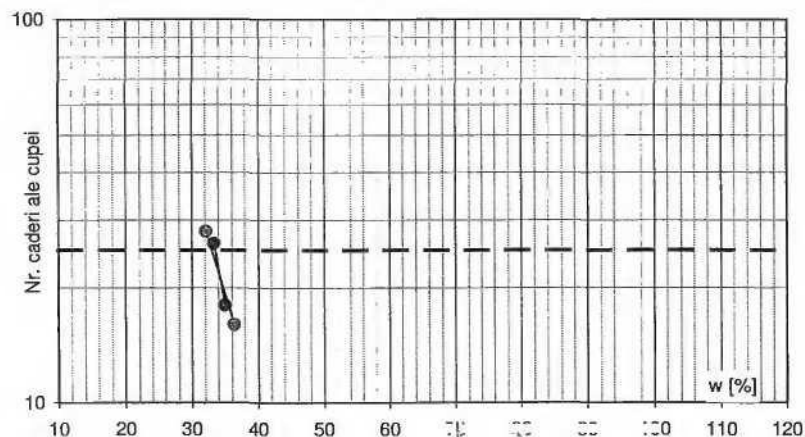
Proba/Sample: P2

Adancimea/Depth: 2.00 m

Mersul determinarilor	U.M.	Umiditatea naturala, w [%]			Limita inferioara de plasticitate, w _p [%]			Limita superioara de plasticitate, w _L [%]			
		1	2	3	1	2	3	1	2	3	4
Sticla de ceas nr.	-	146	142	158	123	102	179	59	48	23	87
Proba umeda + tara A	g	91.83	91.23	91.48	6.59	5.81	5.99	36.06	32.79	34.32	30.69
Proba uscata + tara B	g	70.74	70.49	70.31	5.67	5.04	5.22	28.08	25.80	27.26	24.71
Tara C	g	1.87	1.86	1.89	1.87	1.82	1.79	6.18	5.85	6.08	6.08
$w = (A-B)/(B-C) \cdot 100$	%	30.62	30.22	30.94	24.21	23.91	22.45	36.44	35.04	33.33	32.10
Umiditatea medie	%	30.59			23.52			33.25			
Numarul de caderi ale cupei		-			-			16	18	26	28

Clasificare material
(conform SR EN ISO 14688-2:2018)
ARGILA nisipoasa cenusie cu rar pietris mic

$I_p = 9.72 \%$ cu plasticitate redusa
 $I_c = 0.273$ plastic moale
 $I_L = 0.727$



Intocmit: tehn. Valentin CEAUSESCU

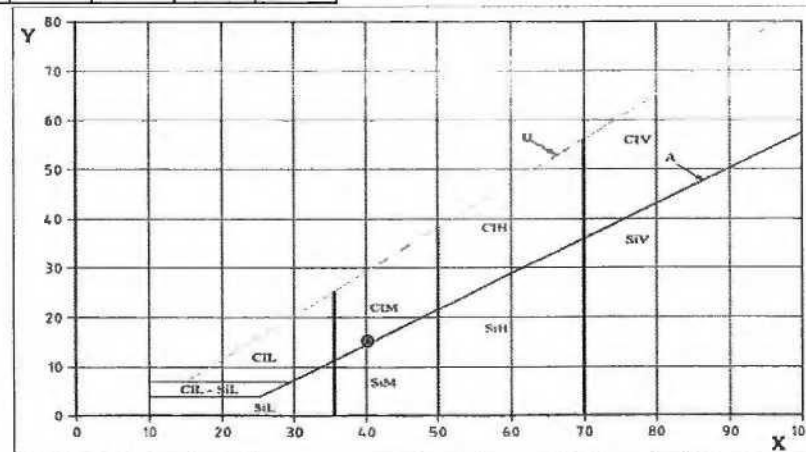
Data: 19.05.2022

Verificat: Șef Lab. Ing. Laura Denis PEPTINE

Adancimea/Depth: 3.00 m

Clasificare material
(conform SR EN ISO 14688-2:2018)
ARGILA prafoasa nisipoasa cenusie

$I_P = 14.38 \%$ cu plasticitate medie
 $I_C = 0.777$ plastic vartoasa
 $I_L = 0.223$



Verificat: Șef Lab. Ing. Laura Denis PEPTINE