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Engineering geology

Hydrogeology

Ecology

Biotechnology

EIA

Technical Infrastructure for Entrepreneurial Area Vlcovice

Engineering – Geological Prospecting

Final Report

Customer	Technoprojekt a.s. Ostrava
Date	January 2000

The primary documentation is deposited in the files of the firm GEOVA s.r.o. Ostrava.

Worked out by : RNDr. Jan Pytlíček
 RNDr. Radovan Pipek

Responsible worker : RNDr. Jan Pytlíček – holder of the certificate for qualification to project, carry out and evaluate the geological works in the branch engineering geology and hydrogeology according to the decision of MZP CR (Ministry of Living Environment of the Czech Republic) file number 1943/630/12646/99 and authorization for the activity according to the §.3, letter b) law No.440/1992 of the Law Digest about the mining activity, explosives and state administration, issued by Obvodní báňský úřad v Ostravě (District Mining Authority in Ostrava) file No. 5781/1999-415.3.

Technical works : Gustav Psenner
 Petr Sekáč

Subcontractors: Laboratory Unigeo a.s.
 Laboratory Elcom spol. s r.o.

Schedule of distribution :

Execution No.1-6 – Technoprojekt a.s.

Execution No.7 - Files of Geova s.r.o.

I. Introduction

On the basis of the order and the contract for work No. 03/2000 closed our firm has carried out the prospecting engineering-geological works in the framework of the action “Technical infrastructure for the entrepreneurial area Vlcovice“, job number of the customer 887-30250. The order subject and SoD was, according to the customer’s requirement, the carrying out of prospecting, especially of drilling works for the locality of the construction, and namely in the following scope:

- a. carrying out of six explanatory borings into the depth of 3.5 –5.0m in the total metrage (footage) 22 bm, situated in the area of the future entrepreneurial area according to the situation handed over and staking out of bore holes with the customer’s representative on January 5, 2000
- b. finding out of geological structure of interest territory and direction finding of underground water level
- c. finding out of underground water deleterious effects on concrete and iron structures in one sample
- d. carrying out of earths classification according to CSN 731001 in three earth’s samples
- e. carrying out evaluation and working out of the final report of engineering-geological prospecting

The final report being submitted summarizes the results and conclusions of prospecting works carried out in the scope of the customer’s requirement, results of laboratory tests are presented by protocols in the enclosure of the final report. According to the customer’s requirement the geological profile of the explanatory boring V 339 was included into the final report which was carried out in the interest territory by the firm Geotest n.p. Brno in the year 1974, and namely in the scope of documentation handed over by the customer. With the respect of absence of sectional system location the bore hole position in the situation is plotted only as orientation.

All works connected with the boring works carrying out, sequence, control and coordination of works were realized by our workers, the laboratory tests were realized by the subcontractors.

Compared with the customer’s requirement the responsible worker of the action has increased the total metrage (footage) of bore holes realized by 6 bm for the reason of possibility to reach the underground water level. This extension was carried out to our firm account.

II. Description of the locality

II.1 Geographical, geomorphologic a hydrological conditions

The territory of interest can be found in the vicinity of the area of the plant Tatra Koprivnice in the cadastre (local area) of Vlcovice and with one part in the local area of Drnholec nad Lubinou. The terrain of this locality is not built-on, it is created by lands under crop used by agriculture, in the places of boring works it is plain up to gently undulating, in the south part of the locality it is the terrain of declination, lucid.

The locality of prospecting works is situated in the region of North-Moravia on the sheet of the state map M 1 : 50 000 Novy Jicin 25-21 in the local area Sezenovy, Na ctvrti and Rybnikov.

From the geomorphologic point of view the territory belongs to External West Carpathians, West Beskids foot-hills, subsystem of Under-Beskids hilly country, Stramberk highlands in the vicinity of Landscape Park Cerveny kamen, sloping down to the valley of the river Lubina. The geomorphology of the original terrain is partially covered up by intensive agricultural activity, operated in the area of interest.

From the hydrographic point of view the terrain belongs to the regions of surface water III-A-4-d, i.e. into the area of mediate wateriness with the most watery month April, with strongly unsteady degree of runoff and very slow retention capability. The terrain of interest is generally drained by the river Lubina, the terrain belongs to the hydrological rank (order) 2-01-01-138 and 2-01-01-137. In the locality of boring works the terrain is meliorated.

II.2 Geological and hydrogeological conditions

The terrain of interest is composed of two main stratigraphic units – rocks of Mesozoic era (Mesozoicum) and Quaternary era (Quater). The Pre-Quarter subsoil of the territory is created by the rocks of Frydek strata of the Under-Silesian unit, represented by gray powder-like calcareous claystones, in the upper positions by the partially weathered ones.

In the geological structure of Quaternary covering formations of the territory of interest in the upper parts of the territory in the south locality part of declination there take share the deluvial argillaceous sediments of the holocene up to pleistocene age (bore hole S5) creating the dejection cone (bore hole S1) in a part of the locality, getting on to rocks of the Frydek strata.

In the plain part of the locality the covering of Mesozoic formations is created by argillaceous fluvial gravel of the upper accumulation of the main terrace of the river Lubina, on the loess (Eolic) clays of Würm Age (flooded) get on with the addition of the deluvial component (bore holes S2, S3). In the vicinity of local water flows and the river Lubina the covering formations are represented by fluvial sediments, in case of the river Lubina the valley terraces, represented by the flooding clays and argillaceous gravel (bore holes S4 and S6).

The youngest sediments in the territory investigated are the anthropogene made-up grounds reached by the bore hole S5, of the character of aggregate and cinders in the local road body.

From the hydrogeological point of view this area belongs to the region of shallow underground waters II-E-5 (Kriz, 1971), which is characterized by season supplementing of underground water reserves with the time occurrence of the highest average monthly states of underground water level in the months May-June. The average specific runoff of underground water makes 0,51-1,0 l/s.km².

The main collector of underground waters flowing is represented by argillaceous fluvial gravel of the terrace cascades of the Lubina river. It is the question of collector with the porous leakage (permeability) and level under pressure, the direction of underground water flowing is generally in the north direction to the Lubina river flow which drains the space of interest. To less significant collectors we count the positions of partially weathered claystones of upper parts of the Frydek strata and claystone series of strata, characterized by fissure leakage (permeability).

The strata of overlying deluvial, loess and flood clays belong to hydrogeological insulators and semi-insulators.

III. Results of prospecting works

III.1 Drilling prospecting

According to the order six engineering-geological prospecting bore holes into the depth of 33.0 –6.0 in places according to the staking out in the place itself and situation handed over were carried out in the territory. The bore holes were sunk with the drilling rig Tatra PZV, by dry drilling, with the drilling tool of the diameter 150 mm, under the leading of drilling foreman Mr. Gustav Psenner. In the course of drilling works carrying out the recovery of drilling tools was continuously deposited in wooden sample container of the length 1,0 m, after the macroscopic description of drilling profile and the direction finding of the underground water level the bore holes were liquidated by the rammed rip-rap.

The bore holes realized were identified as S1-S6 according to the orientation situation in the enclosure No. 2. The geological and technical profiles of bore holes we give in the enclosure No. 3.

III.2 Physically-mechanical properties of reached earth, bearing power

On the basis of drilling works carried out the following basic types of earth and materials were identified in the terrain of interest according to the situating of single bore holes:

- topsoil, made up grounds
- loess, flooding, deluvial clays
- argillaceous gravel, water-bearing argillaceous gravel
- partially weathered claystones, claystones

According to the customer's requirement three failed samples of earth were taken off for the carrying out of laboratory analyses and classification according to the CSN 731001, and namely from the bore hole S3 in metrage (footage) 0,8-1,5 m, 3,2-4,5 m, and the bore hole S6 0,2-1,0 m.

A. Topsoil

The topsoil creates the most upper position in prevailing part of the interest terrain. The topsoil is represented by the humus clay, darkly brown, of solid consistence. According to the CSN 731001 we include this earth into the group of special earth – organic earth with the identification CLO. For foundations of constructions this position is not considered.

B. Made-up grounds

In the space of interest the made-up grounds were reached only by the bore hole S5 in the line of local reinforced road. These earth are generally considered as unsuitable for foundations.

C. Argillaceous clays (clay loam)

In the subsoil of the upper position of topsoil the upper Quarter covering is mainly created by argillaceous clays (clay loam), according to the macroscopic description belonging in single locality parts to deluvial, loess and flooding argillaceous clays (clay loam). According to the CSN 731001 we include the argillaceous clays (clay loam) in the group of fine-grained earth, class F6 – symbol CL (clay with low plasticity), in the vicinity of the Lubina flow into the class F4 – symbol CS (arenaceous /sandy/ clay). Directive standard characteristics of physically-mechanical properties are given in the following table:

Indicator	Symbol/unit	F6 (CSN 731001)	F4 (CSN 731001)
Volume weight	γ kN/m ³	21,0	18,5
Deformation module	E_{def} Mpa	4	4
Total angle of internal friction	φ_u °	0	0
Total coherence	c_u kPa	50	50
Effective angle of internal friction	φ_{ef} °	18	22
Effective coherence	c_{ef} kPa	11	14
Poisson's number	ν -	0,4	0,35

D. Clay gravel

In the subsoil of argillaceous clays (clay loam), in the plain part of the locality, the clay gravel were reached, in the vicinity of the Lubina flow the clayey gravel, medium-compacted and compacted ones, dry and water bearing ones with the boulders 5 – 30 cm. According to the CSN 731001 we include these sediments in the group of gravel earth, class G5 – symbol GC (clay gravel), in the vicinity of the Lubina flow into the class G4 – symbol GM (argillaceous gravel). Directive standard characteristics of physically-mechanical properties are given in the following table:

Indicator	Symbol/unit	G5 (CSN 731001)	G4 (CSN 731001)
Volume weight	γ kN/m ³	19,5	19
Deformation module	E_{def} Mpa	40	60
Effective angle of internal friction	ϕ_{ef} °	28	30
Effective coherence	c_{ef} kPa	4	3
Poisson's number	ν -	0,3	0,3

E. Partially weathered claystones, claystones

In the subsoil of clay loam (argillaceous clays), in the sloping part of the locality, the claystones were reached, mainly to the final depth of bore holes the partially weathered ones. According to the CSN 731001 we include these rocks into the group of rock rocks, in the sense of article 63 the rocks were classified according to the compression strength, determined by an evaluation. The classification of rocks of single classes according to the strength of rock material is given in the following table.

Class	Strength (Mpa)	Strength	Characteristics
R6	0,5-1,5	Extremely low	The rock can be scraped by a nail
R5	1,5-5	Very low	The rock can be crushed down by a hand
R3	15-50	Medium	The rock can be easily crushed down by a hammer

With the drilling prospecting works the below given geological profile was reached with giving the classification according to the CSN 731001. The classification, in case of earth samples taken off, was carried out by the laboratory of the firm Unigeo a.s., in other cases the classification was carried out on the basis of macroscopic description. The values of table counted bearing capacity (power) R_{dt} (kPa) were determined with the respect of the CSN 731001 on the basis of the macroscopic description.

Bore hole S 1

0,0 - 0,1 humus loam (clay) – top soil, darkly brown, solid consistence, CLO

0,1 - 1,25 rusty brown loam (clay) (argillaceous clay), deluvial, powder-like, solid, F6 – CL, $R_{dt} = 100$ kPa

1,25 - 2,4 gray-brown clay loam (argillaceous clay), deluvial, powder-like with the addition of angular fragments of claystone, solid, F6 – CL, $R_{dt} = 120$ kPa

2,4 - 2,95 gray-brown decomposing weathered claystones with the claystone fragments (eluvium), R6, $R_{dt} = 150$ kPa

2,95 - 4,5 gray partially weathered claystones with the claystone fragments, R5, $R_{dt} = 200$ kPa

The underground water level: not reached

Bore hole S 2

0,0 - 0,2 humus loam (clay) – top soil, darkly brown, solid consistence, CLO

0,2 - 1,8 rusty brown loess argillaceous clay (clay loam), with gray ghost lines, solid, F6 – CL, $R_{dt} = 100$ kPa

1,8 - 3,1 rusty (fluvial) argillaceous clay, with the addition of organics and small boulders of gravel, solid, F6 – CL, $R_{dt} = 120$ kPa

3,1 - 4,2 gray-brown clay gravel with boulders up to 5 cm, medium-compacted, G5 – GC, $R_{dt} = 200$ kPa

4,2 - 4,5 gray clay gravel coarse with the boulders up to 20 cm, compacted, wet, G5 – GC, $R_{dt} = 250$ kPa

The underground water level: not reached

Bore hole S 3

0,0 - 0,4 humus loam (clay) – top soil, darkly brown, solid consistence, CLO

0,4 - 1,9 rusty gray clay loam, solid, F6 – CL, $R_{dt} = 100$ kPa

- 1,9 - 2,8 rusty brown clay gravel, with small boulders of sandstone up to 5 cm, medium-compacted, G5 – GC, $R_{dt} = 200$ kPa
2,8 - 3,2 rusty gray clay gravel with the boulders up to 20 cm, compacted, wet, G5 – GC, $R_{dt} = 220$ kPa
3,2 - 4,5 gray clay gravel coarse with the boulders up to 25 cm, compacted, water bearing beds, G5-GC, $R_{dt} = 250$ kPa

Underground water level:
Bumped into : 3,3 m p.p.t.
Stabilized: 1,3 m p.p.t.

Bore hole S 4

- 0,0 - 0,3 humus loam (clay) – top soil, darkly brown, solid consistence, CLO
0,3 - 0,7 brown-black rusty stained clay loam, solid, F6 - CL
0,7 - 1,0 gray clay loam with rusty ghost lines, solid, F6 – CL, $R_{dt} = 100$ kPa
1,0 - 2,5 rusty gray clay loam, solid, F6 – CL, $R_{dt} = 100$ kPa
2,5 - 2,8 rusty clay gravel with boulders up to 5 cm, medium-compacted, G5 – GC, $R_{dt} = 200$ kPa
2,8 - 4,3 rusty brown clay loam, solid, F6 – CL, $R_{dt} = 120$ kPa
4,3 - 5,5 rusty clay gravel with boulders up to 15 cm, water bearing beds, G5 – GC, $R_{dt} = 250$ kPa

Underground water level:
Bumped into: 4,6 m p.p.t.
Stabilized: 3,69 m p.p.t.

Bore hole S 5

- 0,0 - 1,0 the made up grounds of the aggregate and cinders character
1,0 - 2,3 yellow-brown argillaceous clays, at the basis with the claystone fragments, solid, F6 – CL, $R_{dt} = 100$ kPa
2,3 - 2,95 gray clays powder-like (eluvium), solid, F6 – CL, $R_{dt} = 100$ kPa
2,95 - 4,5 brown decomposing weathered argillaceous slates with the addition of vein quartz, R6, $R_{dt} = 150$ kPa
4,5 - 5,1 brown decomposing weathered argillaceous slates, wet, R6, $R_{dt} = 120$ kPa
5,1 – 5,3 brown decomposing partially weathered argillaceous slates, dry, R6, $R_{dt} = 150$ kPa
5,3 - 6,0 gray claystones, R3, $R_{dt} = 400$ kPa

Underground water level:
Bumped into : 4,6 m p.p.t.

Bore hole S 6

- 0,0 - 0,15 humus loam (clay) – top soil, darkly brown, solid consistence, CLO
0,15 - 1,0 brown-gray fluvial clay-sand loam (argillaceous-sand clay) with the small boulders of gravel, solid, F4 – CS, $R_{dt} = 150$ kPa
1,0 - 3,0 darkly brown argillaceous gravel with boulders of glauconitic sandstone, boulders up to 30 cm, wet, medium-compacted, G4 – GM, $R_{dt} = 400$ kPa

Underground water level: not reached

In the interest locality the foundations conditions can be characterized as simple ones, under the underground water level as complicated ones. For the case of foundation, for current objects, the value of bearing power 100 – 120 kPa can be recommended, in the depth highest than 2,5 m the value of 150 kPa. In case of foundation of high constructions it is necessary to make the foundation conditions more accurate by detailed prospecting in the place of construction, and in case of using of higher values than standardized ones the taking over of footing bottom by responsible geo-technician is necessary.

On the basis of the customer's requirements the classification of earth according to geological profile of the bore hole handed over, realized by the firm Geotest Brno in the year 1974, identified as V 339, was carried out. Classification and determination of table counted bearing power

was carried out by an evaluation according to the CSN 731001. The geological profile of the bore hole is given in the enclosure No. 3, the classification is given in the following table:

Characteristics	Metrage (footage)	Class – symbol	Bearing power R_{at} (kPa)
Topsoil	0,0 – 0,3	CLO	
Argillaceous clay	0,3 – 1,2	F6 – CL	100
Clay-sand gravel	1,2 – 5,5	G3 – G-F	300
Clays-solid	5,5 – 7,0	F6 – CL	100
Gray clays (eluvium)	7,0 – 7,5	R6	120
Partially weathered claystones	7,5 – 8,0	R5	150
Level bumped into: 1,2 m p.p.t. (318,4 m n.m.)			
Level stabilized: 0,1 m p.p.t. (319,5 m n.m.)			

III.3 Underground water with deleterious effects

On the basis of drilling prospecting the sample of underground water was taken of from the bore hole S4 by the sampling cylinder for the determination of water deleterious effects. Water was taken of into sampling vessels handed over to laboratory Elcom s.r.o. Ostrava, which carried out the sample analysis. The protocol is presented in the enclosure No. 4.

The analysis of underground water carried out proved the deleterious effects of water against concrete by the carbon component, the concentration exceeds the values permitted by the standard for normal Portland cement at the permanent water exerting.

According to the CSN 73 1215 Classification of aggressive environments the aggressiveness degree for carbon dioxide is 1a = weakly aggressive. Against steel, water has, according to the CSN 038375, the aggressiveness degree III – increased.

III.4 Classes of workability

The classes of workability of single reached earths are given according to the CSN 733050. The classification is mentioned in the following table.

Characteristics	Class of workability
Top soil	2
Made up grounds	3 – 4
Argillaceous clays	3
Argillaceous gravel	3 - 4
Partially weathered claystones	3 - 4
Claystones	6

IV. Conclusion

The submitted final report worked out for the needs of the action „Technical infrastructure for the entrepreneurial area Vlčovice“, summarizes the results and conclusions of prospecting engineering-geological works carried out in the scope of the order and SoD. The results of laboratory tests carried out are presented by protocols in the enclosure of the final report. According to the customer's requirement According to the customer's requirement the geological profile of the explanatory boring V 339 was included into the final report which was carried out in the interest territory by the firm Geotest n.p. Brno in the year 1974, and namely in the scope of documentation

handed over by the customer. With the respect of absence of sectional system location the bore hole position in the situation is plotted only as orientation.

In the locality, in the framework of prospecting works, six engineering-geological bore holes were carried out, and namely for finding out of geological structure of the territory, foundation conditions and classes of workability, according to the customer's requirement three failed earth samples were taken of for laboratory analyses for earth classification according to the CSN 731001. With the drilling works carried out the following types of earth and materials were reached in the territory of interest according to situating of single bore holes, and namely: top soil, made up grounds, loess clays, flooding clays, deluvial clays, argillaceous gravel, argillaceous water bearing gravel, partially weathered claystones, claystones.

The classification of earths, in case of earth samples taken of, was carried out by the laboratory of the firm Unigeo a.s., in other cases the classification was carried out on the basis of macroscopic description. The values of table counted bearing power were set with the respect of CSN 731001 on the basis of macroscopic description.

In the locality of interest the foundation conditions can be characterized as the simple ones, under the level of underground water as the complicated ones. In case of foundations of high constructions it is necessary to make the foundation conditions more accurate by detailed prospecting in the place of construction, and, in case of using of higher values than the standardized ones, the taking over of footing bottom by responsible geo-technician is necessary

On the basis of taking of and laboratory analysis of one sample of underground water reached the deleterious effects of underground water was set. The analysis of underground water carried out proved the deleterious effects of water against concrete by the carbon component, the concentration exceeds the values permitted by the standard for normal Portland cement at the permanent water exerting. According to the CSN 73 1215 Classification of aggressive environments the aggressiveness (deleterious effects) degree for carbon dioxide is 1a = weakly aggressive. Against steel, water has, according to the CSN 038375, the aggressiveness (deleterious effects) degree III – increased.

In Ostrava, January 19, 2000

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**Technical Infrastructure for Entrepreneurial
Area Vlčovice**

Engineering – Geological Prospecting

ENCLOSURES

Customer	Technoprojekt a.s. Ostrava
Date	January 2000

Enclosure No. 1

Situation of the wider environs of the interest locality

Zajmová lokalita.....locality of interest

Enclosure No. 2

Situation of bore holes (drills)

[attGS 2 - Sonds .jpg](#)

Direction finding by : Technoprojekt a.s.

Sonda.....probe (bore hole)
Silnice.....road
Tyc.....rod
Listnatý les.....broadleaved forest
Olše.....alder

Enclosure No. 2

Orientation situation of bore holes (drills)

[attGS Sond1.gif](#)

Geological and technical profile of the bore hole

Task 7/00 Sunk in the time period: **Bore hole identification:**
Name: **S-1**

Supplier of the task: District: Type of drilling rig: Map:
Place:
Drilling foreman Scale of depths: Dimension figure:
Scale of width: Figure of lagging slab:

Depth Lithological description Geological section and Figure (elevation) Thickness of layers
of rocks scheme of outfit

Stratigraphy Underground water Bore hole diameter Sealing Outfit
Bumped into: Stabilized: of the bore hole of the bore hole

Core recovery

1. Turf layer with root system
Argillaceous clay, rusty brown
2. Argillaceous clay, gray-brown with the fragments of claystone
Claystones strongly weathered with angular fragments.
3. Claystones weathered with angular fragments.

[attGS Sond2.gif](#)

Geological and technical profile of the bore hole

Task 7/00 Sunk in the time period: Bore hole identification:
Name: **S-2**

Supplier of the task: District: Type of drilling rig: Map:
Place:

Drilling foreman Scale of depths: Dimension figure:
Scale of width: Figure of lagging slab:

Depth Lithological description Geological section and Figure (elevation) Thickness of layers
of rocks scheme of outfit

Stratigraphy Underground water Bore hole diameter Sealing Outfit
Bumped into: Stabilized: of the bore hole of the bore hole

Core recovery

1. Humus topsoil, darkly brown, solid
Argillaceous clay rusty brown with gray ghost lines, solid
2. Argillaceous clay, rusty brown with the organic rests and additive of gravel
3. Argillaceous gravel with boulders up to 5 cm
4. Coarse grain gravel, gray, argillaceous, wet

[attGS Sond3.jpg](#)

Geological and technical profile of the bore hole

Task 7/00 Sunk in the time period: Bore hole identification:
Name: **S-3**

Supplier of the task: District: Type of drilling rig: Map:
Place:

Drilling foreman Scale of depths: Dimension figure:
Scale of width: Figure of lagging slab:

Depth Lithological description Geological section and Figure (elevation) Thickness of layers
of rocks scheme of outfit

Stratigraphy Underground water Bore hole diameter Sealing Outfit
Bumped into: Stabilized: of the bore hole of the bore hole

Core recovery

1. Humus topsoil, darkly brown,
Argillaceous clay rusty brown, solid
2. Gravel rusty gray with boulders of sandstone up to 5 cm, strongly argillaceous
3. Argillaceous gravel s boulders up to 20 cm, wet

[attGS Sond4.jpg](#)**Geological and technical profile of the bore hole**

Task 7/00 Sunk in the time period: Bore hole identification:
 Name: **S-4**

Supplier of the task: District: Type of drilling rig: Map:
 Place:

Drilling foreman Scale of depths: Dimension figure:
 Scale of width: Figure of lagging slab:

Depth Lithological description Geological section and Figure (elevation) Thickness of layers
 of rocks scheme of outfit

Stratigraphy Underground water Bore hole diameter Sealing Outfit
 Bumped into: Stabilized: of the bore hole of the bore hole

Core recovery

1. Humus topsoil, darkly brown
 Fluvial clay, brown-black with organic rests
 Fluvial clay, gray, with gray ghost lines, argillaceous, solid
2. Clay, rusty-gray, argillaceous, solid
 Gravel, argillaceous with boulder up to 5 cm
3. Clays, rusty-brown, argillaceous, solid
4. Gravel argillaceous with boulders up to 15 cm, wet

[attGS Sond5.gif](#)

Geological and technical profile of the bore hole

Task 7/00 Sunk in the time period: Bore hole identification:
Name: **S-5**

Supplier of the task: District: Type of drilling rig: Map:
Place:

Drilling foreman Scale of depths: Dimension figure:
Scale of width: Figure of lagging slab:

Depth Lithological description Geological section and Figure (elevation) Thickness of layers
of rocks scheme of outfit

Stratigraphy Underground water Bore hole diameter Sealing Outfit
Bumped into: Stabilized: of the bore hole of the bore hole

Core recovery

Embankment of the local road

1. Made-up grounds, sub-base of road, cinders and aggregate
Clay, yellow-brown, argillaceous with fragments
2. Claystones, gray, strongly weathered
3. Argillaceous slates, brown, weathered, dry, with fragments of quartz (silica)
4. Slates, brown, weathered.
5. Claystones, gray, dry

[attGS Sond6.gif](#)**Geological and technical profile of the bore hole**

Task 7/00 Sunk in the time period: Bore hole identification:
 Name: **S-6**

Supplier of the task: District: Type of drilling rig: Map:
 Place:

Drilling foreman Scale of depths: Dimension figure:
 Scale of width: Figure of lagging slab:

Depth Lithological description Geological section and Figure (elevation) Thickness of layers
 of rocks scheme of outfit

Stratigraphy Underground water Bore hole diameter Sealing Outfit
 Bumped into: Stabilized: of the bore hole of the bore hole

Core recovery

1. Humus topsoil, darkly brown,
 Clay, brown-gray, argillaceous, arenaceous with the additive of gravel
2. Gravel, coarse grained with boulders up to 30 cm, argillaceous

[attGS Sond_V 339.gif](#)

Geological and technical profile of the bore hole

Task 7/00 Sunk in the time period: Bore hole identification:
Name: **V 339**

Supplier of the task: District: Type of drilling rig: Map:
Place:

Drilling foreman Scale of depths: Dimension figure:
Scale of width: Figure of lagging slab:

Depth Lithological description Geological section and Figure (elevation) Thickness of layers
of rocks scheme of outfit

Stratigraphy Underground water Bore hole diameter Sealing Outfit
Bumped into: Stabilized: of the bore hole of the bore hole

Core recovery

1. Humus topsoil, darkly brown,
2. Argillaceous clay of the loess character, finely arenaceous
3. Clay, darkly brown with organic rests, compacted, very plastic one
4. Gravel gray, medium-compacted with organic residues, water bearing beds
5. Gravel, medium-size grain, weakly argillaceous, compacted, water bearing beds
Clays, powder-like with the fragments of sandstones, solid, wet
Clays, powder-like, gray, calcareous (eluvium)
Clays, lightly gray, partially weathered, calcareous, solid.

Physical and chemical analysis of water

[attGS Water Analysis 1-2.gif](#), [attGS Water Analysis 2-2.gif](#)

Place of taking of
Water resource
Date of taking of
Level depth
Weather
Color of non-filtered water
Color of filtered water
Cloudiness of non-filtered water
Cloudiness of filtered water
Odor (smell) at 20°C
Hydrogen monosulphid
Filtering property
All matters (substances)
Loss by annealing
Evaporation residue, dried
Evaporation residue, annealed
Index of stability
Index of saturation
Corrosive index according to Riddeck
Oxidability
.....substances
pH
Total acidity
Evident acidity
Total alkalinity
Evident alkalinity
Total hardness
Carbonate hardness
Non-carbonate hardness
Calcium hardness
Magnesium hardness
Sodium+ Potassium
Calcium
Magnesium
Ferrum (iron)
Manganese
Ammonia ions
Chlorides
Sulfates
Nitrites
Nitrates
Phosphates
Hydrogen-carbonates
Carbonates
Silicates
Conductivity
Carbon dioxide

“Reversible” CO₂ on Fe
“Reversible” CO₂ on CaO by the counting
Marbled test

ELCOM No. 55

S4

Result of the analysis

According to the pH value this water is slightly (weakly) acid, according to the hardness / medium-hard, it has the 3rd degree of the total hardness.

With the marbled test the content of aggressive CO₂ was found out.

The chlorides content and the oxidability are normal ones.

The content of sulfates is not dangerous for concrete.

The water components found out by the analysis were compared with the CSN 73 1001 (1966) for the evaluation of the impact (incursion) water aggressiveness (deleterious effects). It is evident, from the analysis evaluation, that this water is aggressive against water by its carbonate component. The concentration of this component exceeds the values admissible by the standard for normal Portland cement at the permanent water influence.

According to the CSN 73 1215 Classification of aggressive environs the aggressiveness degree for carbon dioxide makes

1a = weakly aggressive

Against steel this water has, according to the CSN 038 375, the aggressiveness degree

III – the increased one.

In Ostrava, January 18, 2000

Recorded by: A. Mala

[attGS Sectorial View.jpg](#)

GEOLOGICAL SECTIONAL VIEW A-A'

ACTION: Entrepreneurial area Vlcovice – Engineering-geological prospecting

Measure of length/heights 1 : 5000/200

LEGEND:

Topsoil
Clays, argillaceous, of solid consistence
Gravel, argillaceous
Clays, deluvial, of solid consistence
Claystones, from the above weathered, deeper weathered
The underground water level bumped into
The underground water level stabilized

[attGS 6 - Physical Properties.gif](#)

TABLE SURVEY OF EARTHS PHYSICAL PROPERTIES

Task name:
Task number:
Laboratory number:
Probe (bore hole):
Depth :
Kind :

Coefficient Z:

Volne sypana : Bulk
Setresena: shaken off

CURVES OF EARTHS' GRANULARITY

[attGS Earths Granularity 1-2.gif](#), [attGS Earths Granularity 2-2.gif](#)

Task name:
Task number:
Date:

Number of sample Bore hole Depth Graphical mark Filtration coefficient

Clay	Fine particles Powder (dust)	Sand	Gravel	Stones	Boulders
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