

→ Sloffen, ASU KOSICE, Bitte um Stellungnahme am

ATTACHMENT F Montag, 18.08.03

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Brief evaluation of foundation conditions

The hydro-geological and engineering-geological survey was executed at the stage of an orientating research in 2001. There were some restrictions regarding the access of the area during the research works. The arrangement of exploratory drill holes and dynamic penetration probes depended on the area accessibility.

Based on the execution of the above-mentioned survey it is possible to state that the geological composition of the surveyed area is relatively simple. There is a layer of made up ground and crosscuts on the surface of the area that is 1,00 – 2,00 m u.t. deep, locally even 3,80 m u.t. deep. In some places there is a layer of fluvial clay, 0,50 – 0,70 m deep, below the made up ground.

There is a layer of proluvial gravel in the sub base of the made up ground or fluvial clay. It regards gravel with a mixture of fine-grained soil and there is also clay gravel at the bottom parts of the layer. Positions of 0,10 – 0,20 m thick clay can be found in the gravel. The total thickness of gravel has not been verified by drill holes 10 m deep.

All drill holes, 6,0 – 6,7 m u.t. deep, have confirmed the presence of underground water. After the encounter, water has risen by 0,60 – 0,70 m, up to a 5,20 – 6,00 m u.t. level. The underground water is bound on to the gravel positions and its level depends on the rainfall. The level of underground water as it has been found can be considered as average. During an increased rainfall period it is necessary to take into account a rise of the underground water level by 1,5 to 2 m.

Load:

During surface foundation lying we recommend to avoid foundation on non-homogeneous made up ground but we recommend lying foundation on a layer of settled gravel. At the depth of foundation laying $D = 1,0$ m u.t. for individual foundation width we can take into consideration the following values for loads:

Foundation width

0,5 m	load = 300 kN.m ⁻²
1,0 m	load = 450 kN.m ⁻²
3,0 m	load = 700 kN.m ⁻²
6,0 m	load = 500 kN.m ⁻²

Settlement

From the aspect of compressibility the gravel soils represent a very little compressible foundation ground. The settlement process will be weak and most of it will take place during the building works and its unstableness would not exceed the permitted values.

Recommendations:

The results of the geological survey match its stage and then available information regarding the character of the considered buildings. We suggest the following for further progress of works:

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- Following the accessibility of the future building site area verify the condition and character of made up ground, which is in the view of an intensive building activity within the company considerably non-homogeneous.
- Following the specification of designed buildings character we recommend to investigate the geological composition of the area by a detailed geological survey with the use of drill holes of suitable depth.

Results of the water chemical analysis from a drill hole V-1

Water temperature	12,0	Conductivity mS/m	88,60	CHSK_Mn (mg/l)	8,09
Air temperature	5,00	Mineralisation (mg/l)	833,86	Langelier's index	-0,56
PH	7,06			Total hardness (mmol/l)	4,07
KNK8,3 (mmol/l)	0,00			Ca+Mg---HCO ₃ (mmol/l)	1,92
KNK4,5 (mmol/l)	3,83			Ca+Mg---sil. kys (mmol/l).	2,15
ZNK8,3 (mmol/l)	0,03				

Cations				Anions			
	mg/l	mmol/l	equiv. %		mg/l	mmol/l	equiv. %
Na ⁺	83,91	3,65	30,28	Cl ⁻	58,79	1,66	14,47
K ⁺	4,64	0,12	0,98	SO ₄ ²⁻	262,32	2,73	47,64
Li ⁺	---			NO ₂ ⁻	0,270	0,01	0,051
Ca ²⁺	103,62	2,59	42,89	NO ₃ ⁻	30,42	0,49	4,28
Mg ²⁺	36,02	1,48	24,59	F ⁻	0,277	0,01	0,127
NH ₄ ⁺	0,33	0,02	0,154	PO ₄ ³⁻	<0.020		
Sr ²⁺	---			HCO ₃ ⁻	233,82	3,83	33,43
Fe ²⁺	0,541	0,01	0,1607	CO ₃ ²⁻	0,00	0,00	0,00
Mn ²⁺	3,120	0,06	0,9422	OH ⁻	0,00		

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Results of the water chemical analysis from a drill hole V-2

Water temperature	13,0	Conductivity mS/m	67,50	CHSK_Mn (mg/l)	50,18
Air temperature	5,00	Mineralisation (mg/l)	518,04	Langelier's index	-0,68
PH	7,30			Total hardness (mmol/l)	2,94
KNK8,3 (mmol/l)	0,00			Ca+Mg---HCO ₃ (mmol/l)	1,03
KNK4,5 (mmol/l)	2,07			Ca+Mg---sil. kys (mmol/l).	1,90
ZNK8,3 (mmol/l)	0,01				

Cations				Anions			
	mg/l	mmol/l	equiv. %		mg/l	mmol/l	equiv. %
Na ⁺	38,12	1,66	21,50	Cl ⁻	43,87	1,24	16,80
K ⁺	3,21	0,08	1,06	SO ₄ ²⁻	176,56	1,84	49,89
Li ⁺	---			NO ₂ ⁻	0,285	0,01	0,084
Ca ²⁺	68,41	1,71	44,26	NO ₃ ⁻	23,30	0,38	5,10
Mg ²⁺	29,92	1,23	31,92	F ⁻	<0,040		
NH ⁴⁺	1,34	0,07	0,965	PO ₄ ³⁻	<0.020		
Si ²⁺	---			HCO ₃ ⁻	126,14	2,07	28,06
Fe ²⁺	0,421	0,01	0,1954	CO ₃ ²⁻	0,00	0,00	0,00
Mn ²⁺	0,214	0,00	0,1010	OH ⁻	0,00		

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Results of the water chemical analysis from a drill hole V-4

Water temperature	---	Conductivity mS/m	122,00	CHSK_Mn (mg/l)	27,29
Air temperature	---	Mineralisation (mg/l)	818,53	Langelier's index	2,8
PH	11,27			Total hardness (mmol/l)	3,20
KNK8,3 (mmol/l)	1,31			Ca+Mg---HCO ₃ (mmol/l)	0,00
KNK4,5 (mmol/l)	1,92			Ca+Mg---sil. kys (mmol/l).	3,20
ZNK8,3 (mmol/l)	0,00				

Cations				Anions			
	mg/l	mmol/l	equiv. %		mg/l	mmol/l	equiv. %
Na ⁺	85,40	3,71	35,43	Cl ⁻	107,09	3,02	27,6
K ⁺	7,80	0,20	1,90	SO ₄ ²⁻	281,25	2,93	53,5
Li ⁺				NO ₂ ⁻	0,457	0,01	0,091
Ca ²⁺	125,75	3,14	59,85	NO ₃ ⁻	<4,00		
Mg ²⁺	1,52	0,06	1,19	F ⁻	1,352	0,07	0,650
NH ⁴⁺	2,92	0,16	1,547	PO ₄ ³⁻	0,111	0,00	0,021
Sr ²⁺				HCO ₃ ⁻	0,00	0,00	0,00
Fe ²⁺	0,080	0,00	0,02733	CO ₃ ²⁻	36,31	0,61	11,06
Mn ²⁺	0,140	0,00	0,0486	OH ⁻	0,71		