BOS 100® - In-situ Remediation of Chlorinated Solvents
Brownfield Redevelopment Project
Sundbyberg, Stockholm, Sweden

Period – June 2011 – January 2012

Project Value - $1.3 million

Background Information

A former industrial site since the 1890s is being developed into a commercial and residential property. The facility has been used for the manufacturing of tools, vinyl records, and CDs. Site investigations over the years have documented that site soil and groundwater is impacted with chlorinated constituents (primarily Tetrachloroethene (PCE) and its degradation products). The area of concern is approximately 1,460 square meters.

Environmental site investigations started at the site in January 2011 and included:

- MIP-probing to delineate the vertical and horizontal extent of the plume, and
- Soil, groundwater, and soil gas sampling to confirm the findings of the MIP.

The overburden soils consist primarily of clay to approximately 11 meters (top of bedrock) below ground surface (bgs). The depth to groundwater varies across the site from approximately 4 to 4.5 meters bgs. Monitoring wells installed to the top of bedrock indicate the presence of chlorinated solvents in groundwater above industrial risk levels. A groundwater analytical table is attached that includes the baseline concentrations in the groundwater in the on-site monitoring wells. The highest concentration of PCE (180,000 ug/l) and TCE (150,000 ug/l) was observed in GV01 in the area of the former manufacturing operations. The concentrations in GV01 indicate that free phase chlorinated solvents may be present in the area of GV01 although not observed during monitoring.

Description of Remedial Effort

An easement of remedial technologies was completed by AF Infrastructure AB, the Swedish Environmental Consultant for the project. AF Infrastructure decided that an in-situ injection approach was necessary due to the site constraints associated with the existing building. A unique injection product BOS 100® was selected to remediate the site. BOS 100® consists of a catalyst that traps contaminants and treat them through reductive dechlorination. The catalyst is a specially prepared activated carbon impregnated with elemental iron. The resident solutes are reduced to an innocuous end product via the impregnated elemental iron.

Based on the site investigation results, a remedial design was prepared for the installation of ~20,000 kg of BOS 100®. Phase 1 of the BOS 100® injection began in June 2011 and was completed in September 2011. A total of 600 injection points were completed on a 1.5 to 2.25 meter grid pattern through out the 1,460 square meters. Injections were completed every 0.6 meters starting at approximately 3.5 meters bgs down to bedrock. The BOS 100® loadings varied from 3.2 kgs to 6 kgs. per injection depending on the grid spacing. The design injection locations are identified on the attached Figure 1. Figure 2 shows additional points added in the courtyard area.

The demolition and construction of sections of the building were being completed simultaneously while the injections were being completed in other areas of the site. The injection crews observed free phase solvents collecting on the ground surface during installation of sheet piling in the GV01. After approximately 3 months of monitoring, the concentrations in GV01 and some of the wells close to this area were not reducing in concentration. With the confirmation of the presents of free phase solvents observed during the construction activities it was decided to complete an additional injection in the GV01 area. The Phase 2 injection had to be completed within a 2-week window during the Christmas holiday shut down of construction operations.

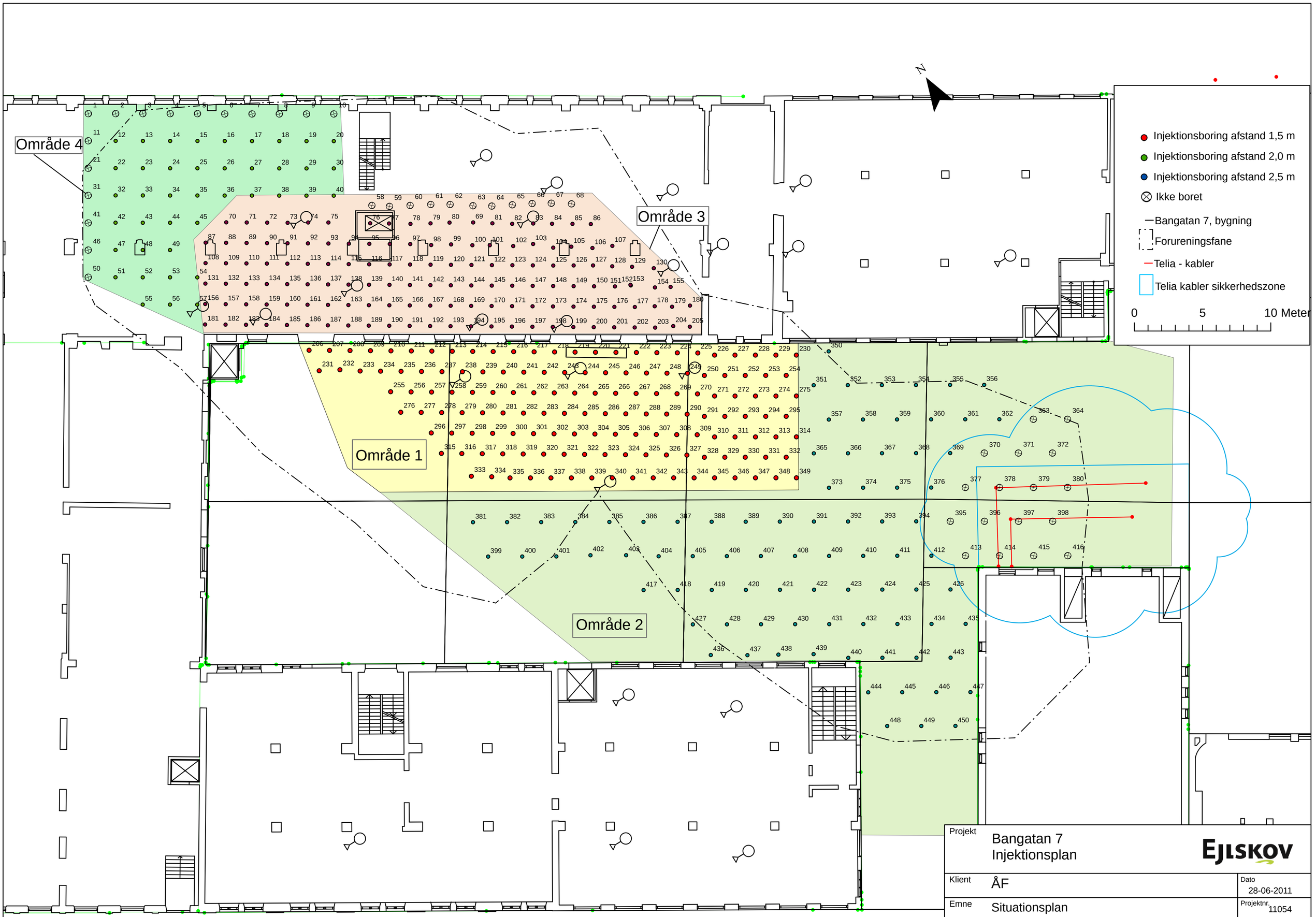
On December 27, 2012, injection crews were mobilized to the site and installed 7,000 kgs of BOS 100® as part of the Phase 2 injection effort. During injections completed adjacent to GV01 the bedrock was encountered approximately 2 meters deeper than the surrounding area indicating a bedrock low exist within the area.

Also, included on the attached groundwater analytical table are the results of the pre and post Phase 1 and 2 injections from the eleven impacted monitoring wells within the treatment area. The monitoring well locations are identified on the attached Figure 3. The majority of the wells are on a downward trend and five of the wells have reached the remedial goals. Four of the five wells that have reached the remedial goals (GV02, GV04, GV012 and GV013) contained significant concentrations of chlorinated hydrocarbons prior to beginning injections. Two additional wells, GV07 and GV013, are very close to achieving cleanup goals. The remaining wells GV01, GV18, GV09, and GV03 that contain concentrations above the targeted cleanup goal are within the footprint of the building or directly adjacent to the building footer where the manufacturing operations were conducted (source area). These wells have historically contained some of the highest concentrations in the groundwater and have exhibited a 70 to 90% reduction in contaminant concentrations after the injection activities without an increase in daughter generation.

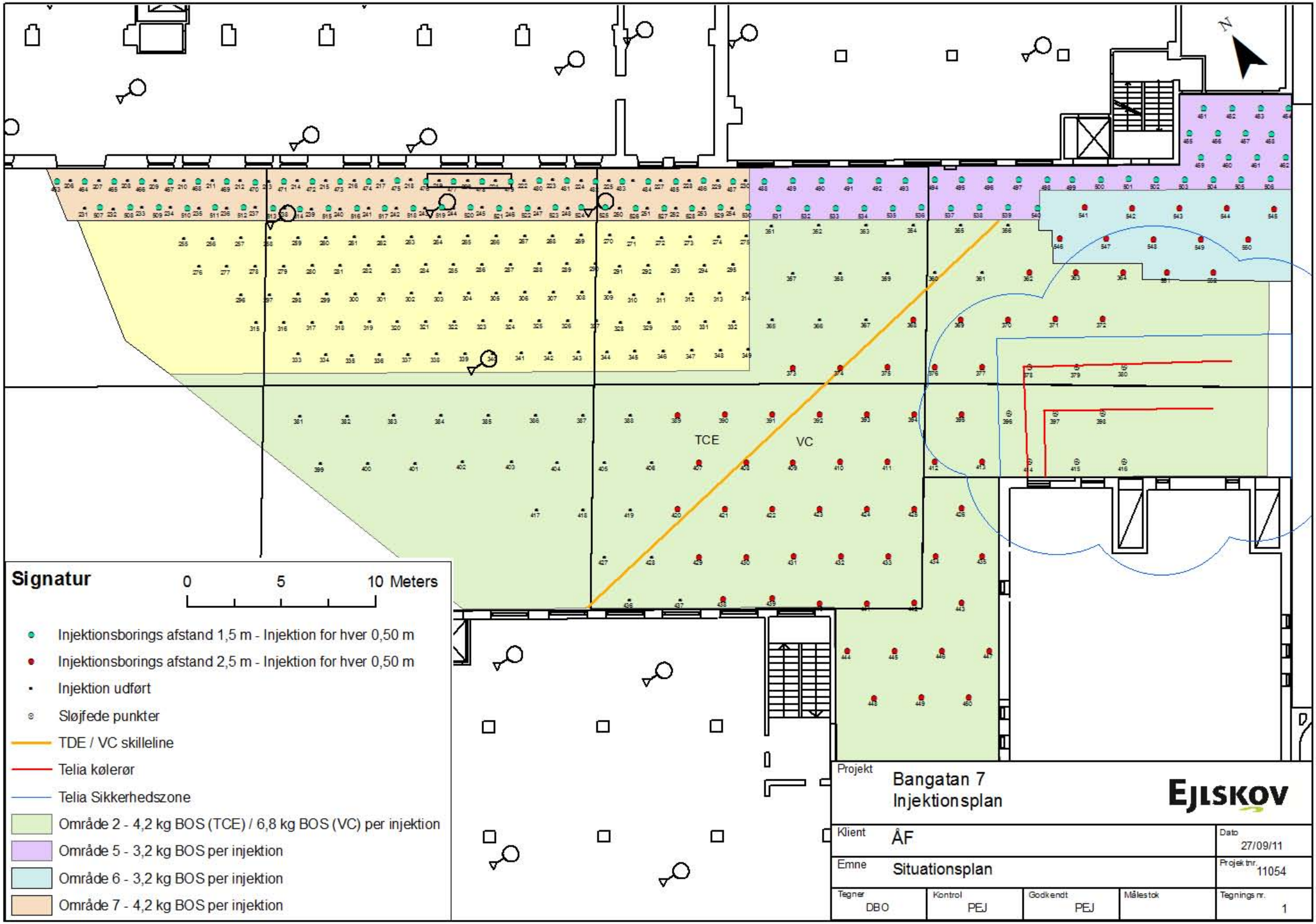
Monitoring of the site groundwater is ongoing.

GRUNDVATTEN

ELEMENT	datum (åååå-mm/åååå-mm-dd)	diklormetan	1,1-dikloretan	1,2-dikloretan	trans-1,2-dikloreten	cis-1,2-dikloreten	1,2-diklorpropan	triklormetan	tetraklormetan	1,1,1-trikloretan	1,1,2-trikloretan	trikloreten	tetrakloreten	vinylklorid	etan	eten
SAMPLE		µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
GV Ö1	2011-06	<1.0	5.1	<1.0	170	8300	<10	23	<0.20	<0.20	2400	**150000**	**180000**	**380**	11	49
GV Ö1	2011-09	<50	<50	<50	92	4000	<50	<20	<20	<20	820	**150000**	**110000**	**150**	23	602
GV Ö1	2011-10-10	<1.0	2	2.7	130	4700	<5.0	6.1	<0.20	<0.20	590	**99000**	**49000**	**380**	152	2310
GV Ö1	2011-11-02	<1.0	1.3	<1.0	130	5800	<0.50	4.6	<0.20	<0.20	440	**140000**	**59000**	**650**	146	1860
GV Ö1	2011-11-07	<1.0	1.1	2.3	110	5500	<0.50	4.4	<0.20	<0.20	390	**120000**	**61000**	**210**	57	844
GV Ö1	2011-11-14	<100	<100	<100	180	5300	<50	<20	<20	<20	600	**120000**	**110000**	**460**		
GV Ö1	2011-11-21	<100	<100	<100	140	4700	<50	<10	<10	<10	500	**96000**	**55000**	**350**	84	1200
GV Ö1	2011-12-09	<1.0	<5.0	<10	120	6600	<10	<2.0	<2.0	<2.0	410	**160000**	**120000**	**420**		
GV Ö1	2012-02-24	<10	<10	<10	250	10000	14	7.2	<2.0	<2.0	1300	**550000**	**1200000**	**470**	1270	18370
GV Ö1	2012-03-01	<10	<10	<10	350	18000	<10	12	<2.0	<2.0	540	**270000**	**150000**	**760**		
GV Ö1	2012-03-08	1.1	1.7	<1.0	200	11000	<0.50	4.7	<0.20	<0.20	560	**170000**	**81000**	**390**	195	2040
GV Ö1	2012-03-16	<20	<20	<20	160	12000	<10	6	<2.0	<2.0	480	**160000**	**82000**	**270**	121	1410
GV Ö2	2011-10-10	<1.0	<1.0	1.9	51	2600	<5.0	3.6	<0.20	<0.20	300	**44000**	**16000**	**100**	14	271
GV Ö2	2011-11-02	<1.0	160	<1.0	26	850	<0.50	0.2	<0.20	<0.20	25	**6300**	1300	**42**	<2.0	6.9
GV Ö2	2011-11-07	<1.0	<1.0	<1.0	9	390	<0.50	<0.20	<0.20	<0.20	9.9	820	180	6.5	<2.0	<2.0
GV Ö2	2011-11-14	<1.0	<1.0	<1.0	17	790	<0.50	<0.20	<0.20	<0.20	8	1000	220	19		
GV Ö2	2011-11-21	<10	<0.0001	<10	20	1100	<5.0	<2.0	<2.0	<2.0	<5.0	1500	320	15	<2.0	2.2
GV Ö2	2011-12-09	<2.0	<1.0	<1.0	11	730	<0.50	<0.20	<0.20	<0.20	7.1	830	150	8.5		
GV Ö2	2012-01-19	<1.0	<1.0	<1.0	4.6	530	<0.50	<0.20	<0.20	<0.20	96	110	19	2.7	<2.0	<2.0
GV Ö2	2012-01-26	<1.0	<1.0	<1.0	11	880	<0.50	<0.20	<0.20	<0.20	1.7	71	11	**20**	3,6	17
GV Ö2	2012-02-24	<1.0	<1.0	<1.0	8.4	340	<0.50	<0.20	<0.20	<0.20	1	40	9.2	**23**	24	55
GV Ö2	2012-03-01	<1.0	<1.0	<1.0	9.6	680	<0.50	<0.20	<0.20	<0.20	1.1	30	6.5	12		
GV Ö2	2012-03-08	<1.0	<1.0	<1.0	13	1100	<0.50	<0.20	<0.20	<0.20	1.5	51	9.4	14	3.1	11
GV Ö2	2012-03-16	<1.0	<1.0	<1.0	13	960	<0.50	<0.20	<0.20	<0.20	<0.50	320	390	5.4	<2.0	5,8
GV Ö3	2011-11-02	<1.0	<1.0	<1.0	120	25000	<0.50	<0.20	<0.20	<0.20	<0.50	**35000**	**12000**	**5800**	28	612
GV Ö3	2011-11-07	<1.0	<1.0	1.3	120	33000	<0.50	<0.20	<0.20	<0.20	<0.50	**35000**	**12000**	**1600**	40	462
GV Ö3	2011-11-14	<1.0	<1.0	<1.0	100	24000	<0.50	<0.20	<0.20	<0.20	<5.0	**29000**	**15000**	**2100**		
GV Ö3	2011-11-21	<10	<1.0	2.1	110	21000	<0.50	<0.20	<0.20	<0.20	9	**23000**	7000	**900**	16	234
GV Ö3	2011-12-05	<1.0	<1.0	<1.0	78	25000	<0.50	<0.20	<0.20	<0.20	<5.0	**24000**	6400	**1200**		
GV Ö3	2012-01-19	15	<10	<10	210	58000	<5.0	<2.0	<2.0	<2.0	4.4	**16000**	4700	**500**	11	296
GV Ö3	2012-01-26	<1.0	<1.0	2,4	87	24000	<5.0	<2.0	<2.0	<2.0	1.5	**5200**	620	**550**	4.7	93
GV Ö3	2012-02-09	<10	<10	<10	130	57000	<10	<2.0	<2.0	<2.0	<10	**15000**	4200	**1600**		
GV Ö3	2012-02-14	<10	<10	<10	150	50000	<10	<2.0	<2.0	<2.0	<10	**80000**	1200	**690**		
GV Ö3	2012-02-24	<10	<10	<10	17	47000	<10	<2.0	<2.0	<2.0	<10	**11000**	2000	**710**	121	2030
GV Ö3	2012-03-01	<10	<10	<10	230	50000	<10	<2.0	<2.0	<2.0	<10	**9400**	2300	**1200**		
GV Ö3	2012-03-16	<20	<20	<20	100	46000	<10	<4.0	<4.0	<4.0	<10	**5600**	1100	**340**	19	211
GV Ö4	2011-06	<1.0	<1.0	<1.0	86	5700	<0.50	<0.20	<0.20	<0.20	42	5900	1100	190	4.7	21
GV Ö4	2011-11-02	<1.0	<1.0	<1.0	2.3	120	<0.50	<0.20	<0.20	<0.20	<0.50	140	100	11	3.1	18
GV Ö4	2011-11-07	<1.0	<1.0	<1.0	1.8	120	<0.50	<0.20	<0.20	<0.20	<0.50	100	100	5.4	3.1	14
GV Ö4	2011-11-14	<1.0	<1.0	<1.0	1.6	110	<0.50	<0.20	<0.20	<0.20	<0.50	74	100	7.7		
GV Ö4	2011-11-21	<1.0	<1.0	<1.0	<1.0	85	<0.50	<0.20	<0.20	<0.20	<0.50	53	56	5.4	4.3	16
GV Ö4	2011-12-05	<1.0	<1.0	<1.0	1.4	130	<0.50	<0.20	<0.20	<0.20	<0.50	68	49	9.5		
GV Ö4	2012-01-19	<1.0	<1.0	<1.0	6.1	500	<0.50	<0.20	<0.20	<0.20	<0.50	230	260	6.4	15	48
GV Ö4	2012-01-26	<1.0	<1.0	<1.0	<1.0	56	<0.50	<0.20	<0.20	<0.20	<0.50	23	16	1.6	6.4	17
GV Ö4	2012-02-09	<1.0	<1.0	<1.0	<1.0	72	<0.50	<0.20	<0.20	<0.20	<0.50	25	14	3		
GV Ö4	2012-02-14	<1.0	<1.0	<1.0	1	120	<0.50	<0.20	<0.20	<0.20	<0.50	42	22	2.6		
GV Ö4	2012-02-24	<1.0	<1.0	<1.0	<1.0	71	<0.50	<0.20	<0.20	<0.20	<0.50	27	13	2.3	130	218
GV Ö4	2012-03-01	<1.0	<1.0	<1.0	1.2	240	<0.50	<0.20	<0.20	<0.20	<0.50	74	50	5.3		
GV Ö5	2011-06	<1.0	<1.0	<1.0	16	110	<0.50	<0.20	<0.20	<0.20	2.8	29	0.9	28	<2.0	<2.0
GV Ö5	2011-11-02	<1.0	<1.0	<1.0	22	490	<0.50	<0.20	<0.20	<0.20	2.9	150	17	7.6	<2.0	<2.0
GV Ö5	2011-11-07	<1.0	<1.0	<1.0	24	450	<0.50	<0.20	<0.20	<0.20	1.6	140	29	8.6	2.3	<2.0
GV Ö5	2011-11-14	<1.0	<1.0	<1.0	28	500	<0.50	<0.20	<0.20	<0.20	1.6	200	35	11		
GV Ö5	2011-11-21	<1.0	<1.0	<1.0	22	420	<0.50	<0.20	<0.20	<0.20	1.5	140	33	10	<2.0	<2.0
GV Ö5	2011-12-05	<1.0	<1.0	<1.0	24	430	<0.50	<0.20	<0.20	<0.20	<0.50	180	34	10		
GV Ö5	2012-01-19	<1.0	<1.0	<1.0	24	490	<0.50	<0.20	<0.20	<0.20	1.3	210	29	5.3	<2.0	<2.0
GV Ö5	2012-01-26	<1.0	<1.0	<1.0	21	410	<0.50	<0.20	<0.20	<0.20	1.2	180	34	4.1	<2.0	<2.0
GV Ö5	2012-02-09	<1.0	<1.0	<1.0	16	300	<0.50	<0.20	<0.20	<0.20	1.5	140	22	2.2		
GV Ö5	2012-02-14	<1.0	<1.0	<1.0	14	290	<0.50	<0.20	<0.20	<0.20	1.3	140	19	1.6		
GV Ö5	2012-02-24	<1.0	<1.0	<1.0	15	240	<0.50	<0.20	<0.20	<0.20	0.9	120	18	1.4	<2.0	<2.0
GV Ö5	2012-03-01	<1.0	<1.0	<1.0	7.1	130	<0.50	<0.20	<0.20	<0.20	0.9	65	16	<1.0		
GV Ö6	2011-06	<1.0	<1.0	<1.0	11	1700	<0.50	<0.20	<0.20	<0.20	<0.50	140	1.5	140	<2.0	2.1
GV Ö6	2011-11-02	<1.0	<1.0	<1.0	<1.0	31	<0.50	<0.20	<0.20	<0.20	<0.50	14	3.8	3.6	<2.0	<2.0
GV Ö6	2011-11-07	<1.0	<1.0	<1.0	<1.0	18	<0.50	<0.20	<0.20	<0.20	<0.50	17	7.1	<1.0	<2.0	<2.0
GV Ö6	2011-11-14	<1.0	<1.0	<1.0	<1.0	39	<0.50	<0.20	<0.20	<0.20	<0.50	43	14	3.4		
GV Ö6	2011-11-21	<1.0	<1.0	<1.0	<1.0	23	<0.50	0.2	<0.20	<0.20	<0.50	44	31	<1.0	<2.0	<2.0
GV Ö7	2011-06	<1.0	<1.0	<1.0	11	1700	<0.50	<0.20	<0.20	<0.20	<0.50	140	1.5	**140**	<2.0	2.1
GV Ö7	2011-11-02	<1.0	<1.0	<1.0	<1.0	180	<0.50	<0.20	<0.20	<0.20	<0.50	43	6	**34**	<2.0	<2.0
GV Ö7	2011-11-07	<1.0	<1.0	<1.0	1	140	<0.50	<0.20	<0.20	<0.20	<0.50	25	3.5	**38**	<2.0	5.5
GV Ö7	2011-11-14	<1.0	<1.0	<1.0	<1.0	59	<0.50	<0.20	<0.20	<0.20	<0.50	11	2.7	19		
GV Ö7	2011-11-21	<1.0	<1.0	<1.0	<1.0	59	<0.50	<0.20	<0.20	<0.20	<0.50	10	3	**33**	<2.0	2.3
GV Ö7	2011-12-05	<1.0	<1.0	<1.0	<1.0	48	<0.50	<0.20	<0.20	<0.20	<0.50	4.9	1.4	**27**		
GV Ö9	2011-06	<1.0	<1.0	49	52	6300	<0.50	0.2	<0.20	<0.20	4.4	**5900**	100	**66**	6.5	12
GV Ö9	2011-11-02	<1.0	<1.0	45	98	11000	<0.50	<0.20	<0.20	<0.20	<0.50	**15000**	160	**250**	3.7	18
GV Ö9	2011-11-07	<1.0	<1.0	44	120	14000	<0.50	<0.20	<0.20	<0.20	<0.50	**19000**	330	**250**	6.9	26
GV Ö9	2011-11-14	<1.0	<1.0	<1.0	120	14000	<0.50	<0.20	<0.20	<0.20	<5.0	**18000**	350	**430**		
GV Ö9	2011-11-21	<1.0	<1.0	27	150	15000	<0.50	<0.20	<0.20	<0.20	<0.50	**24000**	310	**<500**	10	35
GV Ö9	2011-12-05	<1.0	<1.0	43	140	16000	<5.0	<0.20	<0.20	<0.20	<50	**29000**	360	**500**		
GV Ö9	2012-01-19	<1.0	<1.0	29	110	17000	<0.50	<0.20	<0.20	<0.20	1.9	**22000**	280	**280**	13	56
GV Ö9	2012-01-26	<1.0	<1.0	29	92	14000	<0.50	0,3	<0.20	<0.20	4.9	**19000**	340	**280**	6.6	29
GV Ö9	2012-02-09	<10	<10	<10	73	11000	<10	<2.0	<2.0	<2.0	<10	**16000**	310	**140**		
GV Ö9	2012-02-14	<10	<10	30	78	8600	<10	<2.0	<2.0	<2.0	11	**14000**	360	**140**		
GV Ö9	2012-02-24	<10	<10	<10	60	8100	<10	<2.0	<2.0	<2.0	<10	**14000**	310	**130**	91	415
GV Ö9	2012-03-01	<10	<10	<10	60	7800	<10	<2.0	<2.0	<2.0	13	**12000**	520	**140**		
GV Ö9	2012-03-16	<20	<20	<20	26	4900	<10	<4.0	<4.0	<4.0	<10	**6600**	250	**43**	8.4	24
GV Ö10	2011-11-02	<1.0	<1.0	<1.0	<1.0	3	<0.50	<0.20	<0.20	<0.20	<0.50	2.9	0.6	2.1	<2.0	<2.0
GV Ö10	2011-11-07	<1.0	<1.0	<1.0	<1.0	2.9	<0.50	<0.20	<0.20	<0.20	<0.50	2.9	0.7	<1.0	<2.0	<2.0
GV Ö10	2011-11-14	<1.0	<1.0	<1.0	<1.0	2	<0.50	<0.20	<0.20	<0.20	<0.50	2.8	0.91	<1.0		
GV Ö10	2011-11-21	<1.0	<1.0	<1.0	<1.0	2	<0.50	<0.20	<0.20	<0.20	<0.50	1.9	0.9	1.5	<2.0	<2.0
GV Ö10	2011-12-05	<1.0	<1.0	<1.0	<1.0	2.4	<0.50	<0.20	<0.20	<0.20	<0.50	1.8	0.64	2.7		
GV Ö10	2012-01-19	<1.0	<1.0	<1.0	<1.0	8.6	<0.50	<0.20	<0.20	<0.20	<0.50	6.3	1.9	2.8	<2.0	<2.0
GV Ö10	2012-02-14	<1.0	<1.0	<1.0	30	5400	<0.50	<0.20	<0.20	<0.20	0.7	31	43	**85**		
GV Ö10	2012-02-24	<1.0	<1.0	<1.0	<1.0	5	<0.50	<0.20	<0.20	<0.20	<0.50	1.3	0.4	4	<2.0	<2.0
GV Ö10	2012-03-01	<1.0	<1.0	<1.0	<1.0	6.1	<0.50	<0.20	<0.20	<0.20	<0.50	1.2	0.9	4.1		
GV Ö10	2012-03-08	<1.0	<1.0	<1.0	<1.0	5.9	<0.50	<0.20	<0.20	<0.20	<0.50	0.7	0.4	4.9	<2.0	<2.0
GV Ö10	2012-03-16	<1.0	<1.0	<1.0	<1.0	6.1	<0.50	<0.20	<0.20	<0.20	<0.50	0.72	0.36	7.6	<2.0	<2.0
GV Ö10	2012-03-29	<1.0	<1.0	<1.0	<1.0	6.8	<0.50	<0.20	<0.20	<0.20	<0.50	2.5	0.8	<1.0	<2.0	<2.0
GV Ö11	2011-11-02	<1.0	<1.0	<1.0	2.5	130	<0.50	<0.20	<0.20	<0.20	1	110	250	5.6	<2.0	2.2
GV Ö11	2011-11-07	<1.0	<1.0	<1.0	10	680	<0.50	<0.20	<0.20	<0.20	<0.50	170	160	**21**	5.3	13
GV Ö11	2011-11-14	<1.0	<1.0	4.2	5.2	990	<0.50	<0.20	<0.20	<0.20	<0.50	360	280	11		
GV Ö11	2011-11-21	<1.0	<1.0	5.3	6.5	820	<0.50	<0.20	<0.20	<0.20	<0.50	280	26	9.8	2.1	3.6
GV Ö12	2011-09	<50	<50	<50	680	54000	<50	<20	<20	<20	<50	**64000**	6300	**3200**	22	839
GV Ö12	2011-11-02	1.9	<1.0	<1.0	56	3800	<0.50	<0.20	<0.20	<0.20	<0.50	1300	690	18	<2.0	<2.0
GV Ö12	2011-11-07	<1.0	<1.0	<1.0	11	750	<0.50	<0.20	<0.20	<0.20	<0.50	630	1000	2.1	<2.0	<2.0
GV Ö13	2011-11-02	<1.0	<1.0	<1.0	49	8500	<0.50	<0.20	<0.20	<0.20	<0.50	2700	160	10	11	128
GV Ö13	2011-11-07	<1.0	<1.0	<1.0	23	14000	<0.50	<0.20	<0.20	<0.20	<0.50	2400	110	5.8	<2.0	<2.0
GV Ö13	2011-11-14	<1.0	<1.0	<1.0	18	8600	<0.50	<0.20	<0.20	<0.20	<0.50	2500	150	6.6		
GV Ö13	2011-11-21	<1.0	<1.0	<1.0	170	25000	<0.50	<0.20	<0.20	<0.20	<0.50	2400	17	**270**	11	129
GV Ö13	2011-12-05	<1.0	<1.0	<1.0	50	20000	<0.50	<0.20	<0.20	<0.20	<1.0	1400	39	**36**		
GV Ö13	2012-01-19	<50	<50	<50	640	70000	<50	<5.0	<5.0	<5.0	<50	**20000**	**25000**	**200**	4.4	12
GV Ö13	2012-01-26	<1.0	<1.0	<1.0	4.3	620	<0.50	<0.20	<0.20	<0.20	<0.50	30	26	15	4.3	24
GV Ö13	2012-02-09	<1.0	<1.0	<1.0	31	2400	<0.50	<0.20	<0.20	<0.20	<0.50	86	55	**96**		
GV Ö13	2012-02-14	<1.0	<1.0	<1.0	<1.0	6.7	<0.50	<0.20	<0.20	<0.20	<0.50	0.8	0.2	6.9		
GV Ö13	2012-02-24	<1.0	<1.0	<1.0	19	3000	<0.50	<0.20	<0.20	<0.20	<0.50	16	11	**97**	127	1180
GV Ö13	2012-03-01	<1.0	<1.0	<1.0	16	3900	<0.50	<0.20	<0.20	<0.20	<0.50	12	4	**59**		
GV 18	2011-02	<1.0	<1.0	<1.0	170	14000	<0.50	1.8	<0.20	<0.20	90	**26000**	9800	**1300**		
GV 18	2011-05	<1.0	<1.0	<1.0	47	7300	<0.50	0.6	<0.20	<0.20	18	**4800**	770	**270**		
GV 18	2011-09	<50	<50	<50	110	10000	<50	<10	<10	<10	32	**14000**	9600	**1000**		
GV 18	2011-10-10	<1.0	<1.0	<1.0	29	2300	<0.50	0.3	<0.20	<0.20	<0.50	**4900**	2700	**190**	9.8	47
GV 18	2011-11-02	<1.0	<1.0	<1.0	21	1700	<0.50	<0.20	<0.20	<0.20	7.3	**4500**	1900	**100**	8.9	37
GV 18	2011-11-07	<1.0	<1.0	<1.0	27	2100	<0.50	<0.20	<0.20	<0.20	13	**5600**	2500	**88**	6.8	24
GV 18	2011-11-14	<1.0	<1.0	<1.0	17	1900	<0.50	<0.20	<0.20	<0.20	10	**5100**	1400	**86**		
GV 18	2011-11-21	<20	<10	<10	13	1700	<5.0	<2.0	<2.0	<2.0	<20	**3900**	1800	**42**	16	60
GV 18	2011-12-05	<100	<100	<100	<100	4100	<50	<20	<20	<20	<50	**4200**	1900	**120**		
GV 18	2012-02-09	<10	<10	<10	18	3000	<10	<2.0	<2.0	<2.0	<10	**5700**	3800	**24**		
GV 18	2012-02-14	<10	<10	<10	19	2800	<10	<2.0	<2.0	<2.0	<10	**7800**	2700	**42**		
GV 18	2012-02-24	<10	<10	<10	22	2400	<10	<2.0	<2.0	<2.0	19	**10000**	2600	**35**	111	370
GV 18	2012-03-01	<10	<10	<10	17	2000	<10	<2.0	<2.0	<2.0	13	**8200**	4000	**28**		
GV 18	2012-03-16	<20	<20	<20	<20	1300	<10	<4.0	<4.0	<4.0	<10	**3900**	2500	<20	10	23
Platsspecifika riktvärden för grundvatten												**3600**	**11000**	**20**		



Projekt: Bangatan 7 Injektionsplan				EJLSKOV
Klient: ÅF				Dato: 28-06-2011
Emne: Situationsplan				Projektnr.: 11054
Tegner: HRU	Kontrol: PEJ	Godkendt: PEJ	Målestok: 1:175	Tegningsnr.: 1



Signatur

0 5 10 Meters

- Injektionsborings afstand 1,5 m - Injektion for hver 0,50 m
- Injektionsborings afstand 2,5 m - Injektion for hver 0,50 m
- Injektion udført
- Sløjfede punkter
- TDE / VC skilleline
- Telia kølerør
- Telia Sikkerhedszone
- Område 2 - 4,2 kg BOS (TCE) / 6,8 kg BOS (VC) per injektion
- Område 5 - 3,2 kg BOS per injektion
- Område 6 - 3,2 kg BOS per injektion
- Område 7 - 4,2 kg BOS per injektion

Projekt: Bangatan 7 Injektionsplan				EJLSKOV
Klient: ÅF				Dato: 27/09/11
Emne: Situationsplan				Projekt nr.: 11054
Tegner: DBO	Kontrol: PEJ	Godkendt: PEJ	Målestok:	Tegnings nr.: 1

BILAGA 1

FÖRKLARINGAR.

BH — PROVTAGNINGSPUNKTER MED SKRUVPROVTAGNING

MIP — PROVTAGNINGSPUNKTER MED MIPSONDERING

GV — GRUNDVATTENRÖR

P16 — PROVTAGNINGSPUNKTER FÖR PORGASMÄTNING

TVÄRSNITT MED BORRPROFILER, REDOVISAS I BILAGA 4

Bangatan

Vasagatan

Plåten 5

GV8,GV11

GV9 GV3 GV13 GV1 GV4 GV2 GV5 GV6 GV12 GV7 GV8 GV7,GV10

P21 P14 P13 P15 P16 P12

A B C D E F G H I J K L M N O

0 5 10m

BET	ANT	ÄNDRINGEN AVSER	SIGN	DATUM

AF-INFRASTRUCTURE
FROSUNDALEDEN_2
16999_STOCKHOLM

KV_PLATEN
SUNDBYBERG_STAD
GRUNDVATTENROR

RITAD AV, KONSTRUERAD AV	ARBETSNUMMER
C.LINDMARK	553181
VALFRIRUBRIK	DATUM
KV_PLATEN	2011-11-11

RITNINGSNUMMER: BILAGA_1

ÄNDR BET