SR 3-2(1) Survey Results of Core Samples in Khvein and Kravan Sites, and Observation Result of Core Samples of Angkor Ruins

(1) Survey Results of Core Samples in Khvein and Kravan Sites

In the same locations as construction sites of monitoring wells, each one core boring with 80 m depth and core size of 66 mm were conducted to check geological conditions prior to well drilling. Core boring sites are located within 5 m from the construction places of monitoring wells. Core samples were brought out from 180 pieces of sampling steel pipes with 1 m length by steel cutters and they were kept in 32 pieces of wooden-made core sample boxes. Each sample box keeps 5 pieces of core samples of 1 m length.

The sample observation survey of the core boring showed the following results:

- Khvein site

In Khvein site, clay formations are mainly distributed from ground surface to depth of 9 m. In depth of 9 m to 50 m, sandy clay formations are mainly distributed and sandy layers with thickness of 1 m to 4 m are interbeded. These formations form alternating layers. Clay formations are distributed in depth of 50 m to 63.5 m and their thickness is about 13 m. By these clay formations, it is considered that we can divide into two aquifers of shallow and deep ones: shallow aquifer on upper formations than clay formations distributed in depth of 50 m to 63.5 m and deep aquifer on lower formations than the clay formation.

- Kravan site

In Kravan site, clay or sandy clay formations in depth of ground surface to 7 m are distributed. In the lower part of the clay or sandy clay formations, sand formations are distributed up to depth of 80 m. Based on geological formations, it is considered that there is only one aquifer in Kravan site.

(2) Observation Result of Core Samples of Angkor Ruins

JSA (Japanese Government Team for Safeguarding Angkor) carried out core boring survey for ground investigation in Angkor ruins on March 1995. The core borings were conducted in the yard of Angkor Wat (Sample No. AV-1B) and Bayon (Sample No. BY-1B). These core samples were observed by the observation survey for core samples in this study on January 2011 as reference samples for reviewing underground structures in Siem Reap area.

The core samples have been fairly consolidated by drying with passage of time of about 16 years since core borings were conducted. Further, there are many parts of no core samples by the

reason why sand layers could not be sampled. Locations of core borings are shown in Figure 3.2.1 (2) and observation results in Figure 3.2.1 (3). The sample observation survey of the core boring showed the following results:

- Angkor Wat site (Sample No. AV-1B, Core boring depth: 100 m)

In the depth of ground surface to 6m, there are no core samples. Alternating layers consisting of sandy clay, clayey sand, clay are distributed in the depth of 6 m to 43 m and their layer thickness ranges from 0.8 m to 3m. The alternating layers are underlain by thick clay formations in the depth of 43 m to 68 m and they are not consolidated rocks like shale and claystone. Under the clay formations, sandy clay formations are distributed in the depth of 68.50 m to 74 m and the formation thickness is about 5 m. The sandy clay formations are underlain by hard basement rocks in the depth of 74.20 to 100 m.

- Bayon (Sample No. BY-1B, Core boring depth: 87 m)

In the depth of ground surface to 3 m, there are no core samples. Sandy clay and clay formations are distributed in the depth of 3 m to 7 m. Under these formations, sand, silt, and gravel formations are underlain. In the depth of 9.5 m to 83 m, clay formations are mainly occupied, except the depth of 50 m to 51 m covered by silt, of 58 m to 59 m by sandy clay, of 65 m to 73 m by sandy clay, and of 81 m to 82 m by fine sand. Under the clay formations, basement rocks of tuff (rock) and diorite are distributed in the depth of 83.5 m to 87m. The clay formations observed in the depth of 9.5 m to 83 m are different from consolidated rocks like shale and claystone.

In both sites, as observation results by this survey with passage of time of about 16 years after core sampling, the change of formation facies between Quaternary and Tertiary formations could not be observed. In addition, in these core samples, in the similar way to Khvein and Kravan sites, formations equivalent to Tertiary formations could not also be recognized.

Depth (m)	Kravan Core Boring	Khvein Core Boing
1.0	Silt	Clay
2.0	Sandy Clay	
3.0	Sand	
4.0	Clay	
5.0	Sand	
6.0	Clay	Sand
7.0	Fine to Medium Sand	Silty Sand
8.0	Clay	Clay
9.0	Fine to Medium Sand	
10.0		Medium Sand
11.0	Medium Sand	Sandy Clay
12.0	Fine Sand	
13.0		Fine to Medium Sand
14.0		
15.0		Sandy Clay
16.0		Clayey Sand
17.0		
18.0		
19.0		
20.0	Medium Sand	Sandy Clay
21.0		Clay
22.0	Fine Sand	Fine Sand
23.0		Sandy Clay
24.0		
25.0		
26.0	Very Fine Sand	Clayey Sand
27.0	Fine Sand	Fine Sand
28.0		Sandy Clay
29.0		Clayey Sand
30.0		Sandy Clay
31.0		
32.0		
33.0		Clay
34.0	Medium Sand	Sandy Clay
35.0	Fine Sand	Clayey Sand
36.0	Fine Sand	Fine Sand
37.0		Sandy Clay
38.0		Fine Sand
39.0		

Figure 3.2.1 (1)-A Observation Results of Core Boring Samples in Khvein and Kravan Sites

Depth (m)	Kravan Core Boring	Khvein Core Boing
40.0	Fine Sand	Fine Sand
41.0		Sandy Silt
42.0		Sandy Clay
43.0		Clayey Sand
44.0		Sandy Clay
45.0		Clayey Sand
46.0		Fine Sand
47.0		Medium Sand
48.0		Fine to Medium Sand
49.0	Medium Sand	Fine Sand
50.0	Fine Sand	Clayey Sand
51.0		Clay
52.0		
53.0	Fine to Medium Sand	
54.0	Fine Sand	
55.0	Fine to Medium Sand	
56.0	Fine Sand	
57.0	Fine Sand	
58.0	Fine to Medium Sand	Clayey Sand
59.0	Fine Sand	Clay
60.0		
61.0		
62.0	Fine to Medium Sand	Clayey Sand
63.0		Sandy Clay
64.0	Medium Sand	Clay
65.0	Fine Sand	Fine Sand
66.0	Medium Sand	
67.0	Fine to Medium Sand	
68.0		
69.0	Fine Sand	
70.0		
71.0		
72.0		
73.0	Very Fine Sand	
74.0		
75.0		
76.0	Fine Sand	
77.0		
78.0		
79.0	Fine to Medium Sand	
80.0		

Figure 3.2.1 (1)-B Observation Results of Core Boring Samples in Khvein and Kravan Sites

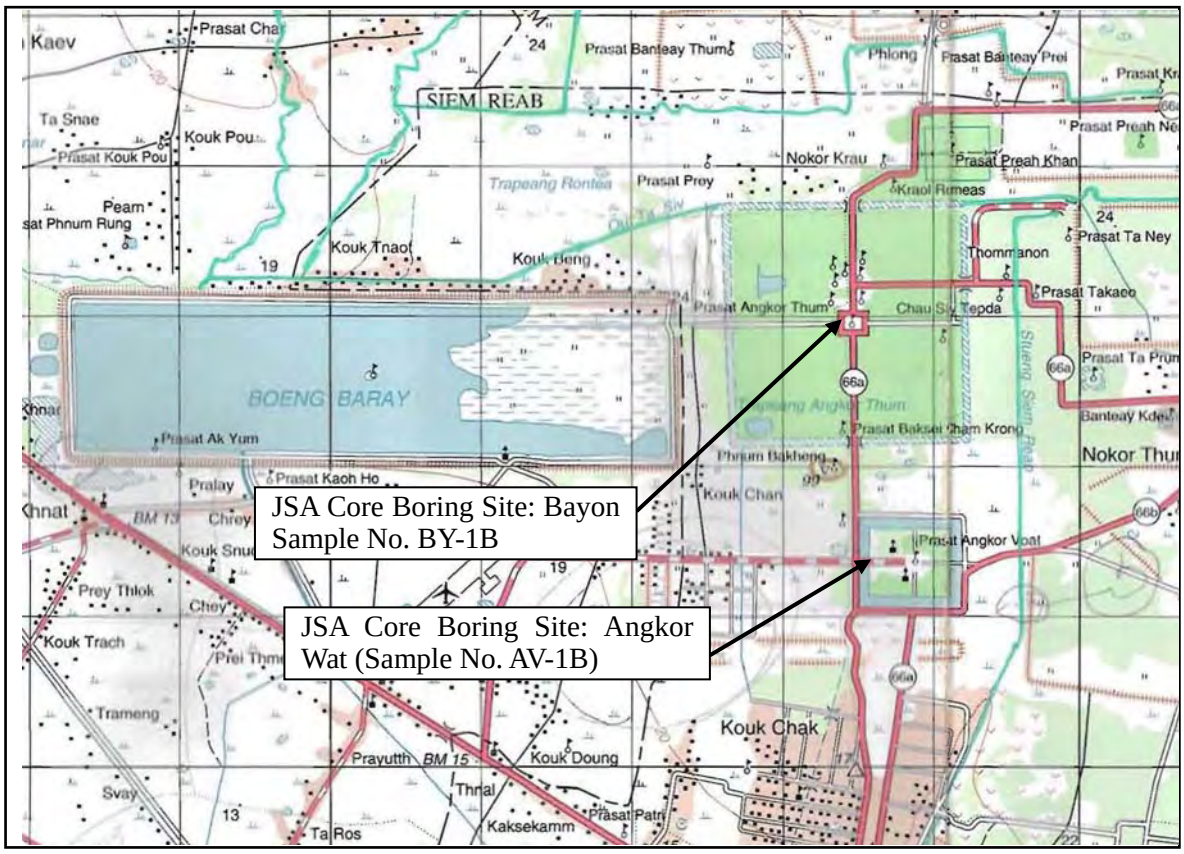


Figure 3.2.1 (2) Locations of JSA Core Boring Sites (Core Boring Date: 1995)

Observation results are shown in Figure 3.2.1 (3)

(Observation survey of core samples was conducted on January 2011 by this study.)

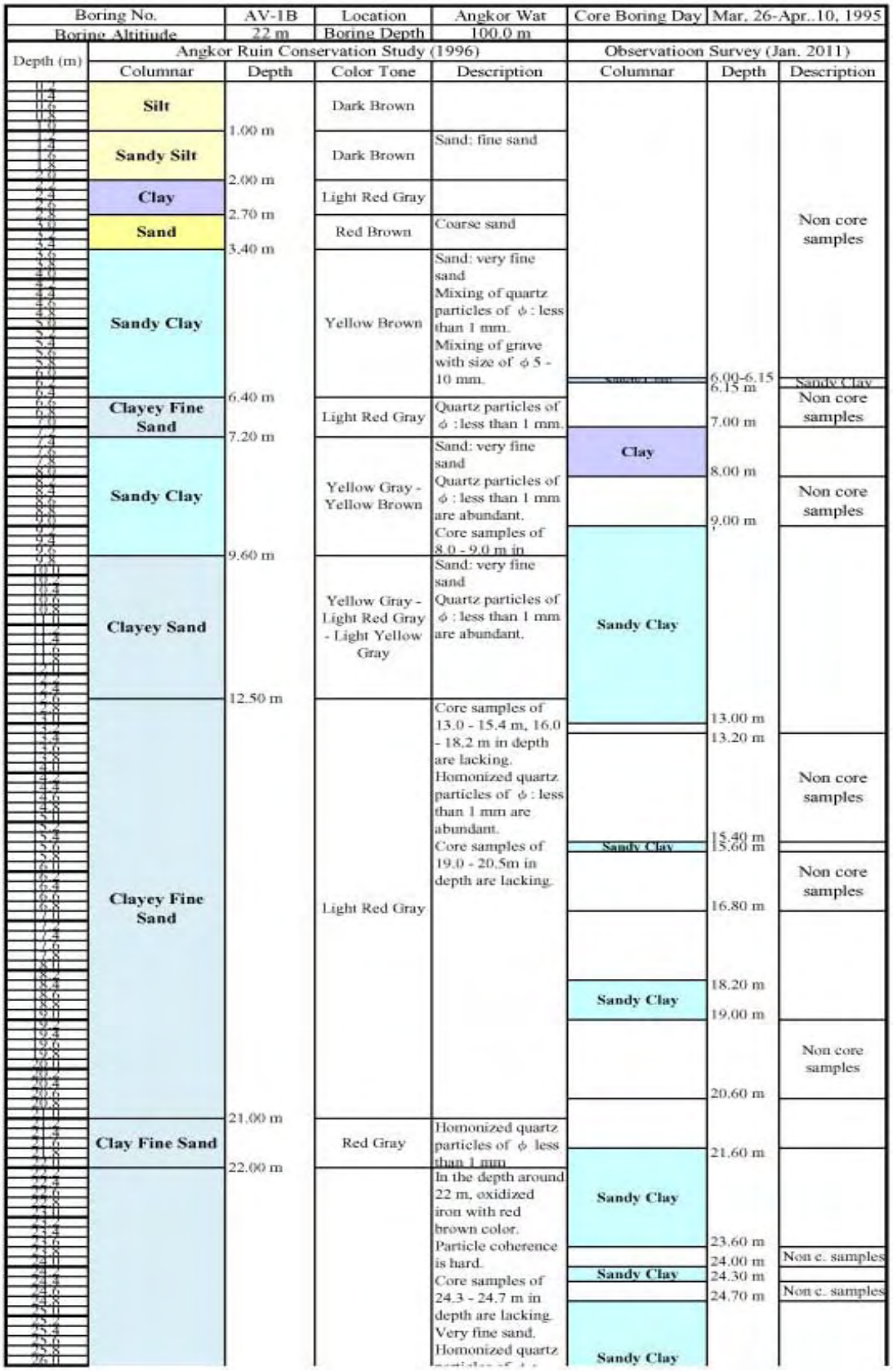


Figure 3.2.1 (3)-A Observation Results of Core Samples at Angkor Wat Site

(The observation survey dated on January 2011 was conducted by this study.)

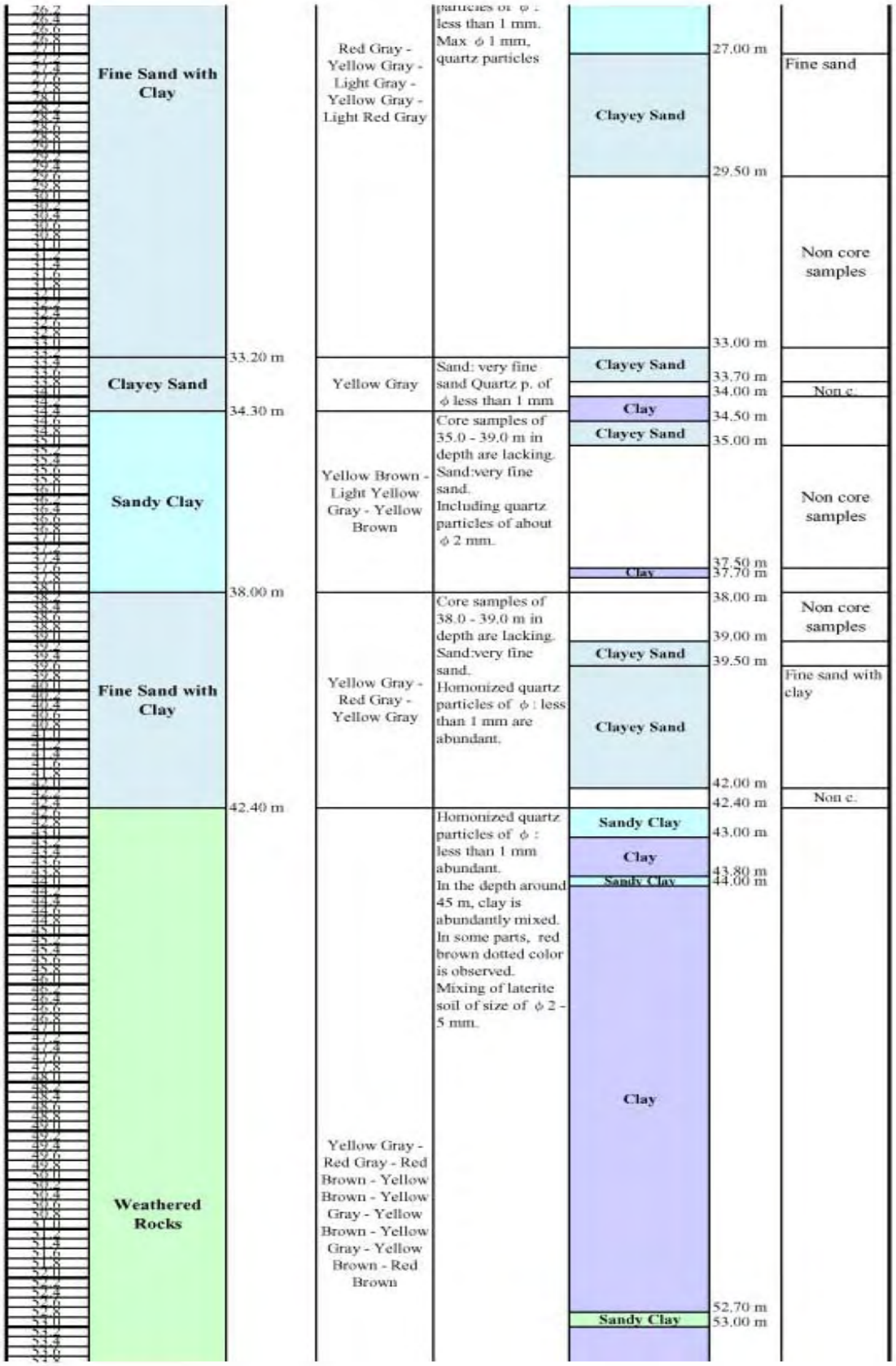


Figure 3.2.1 (3)-B Observation Results of Core Samples at Angkor Wat Site

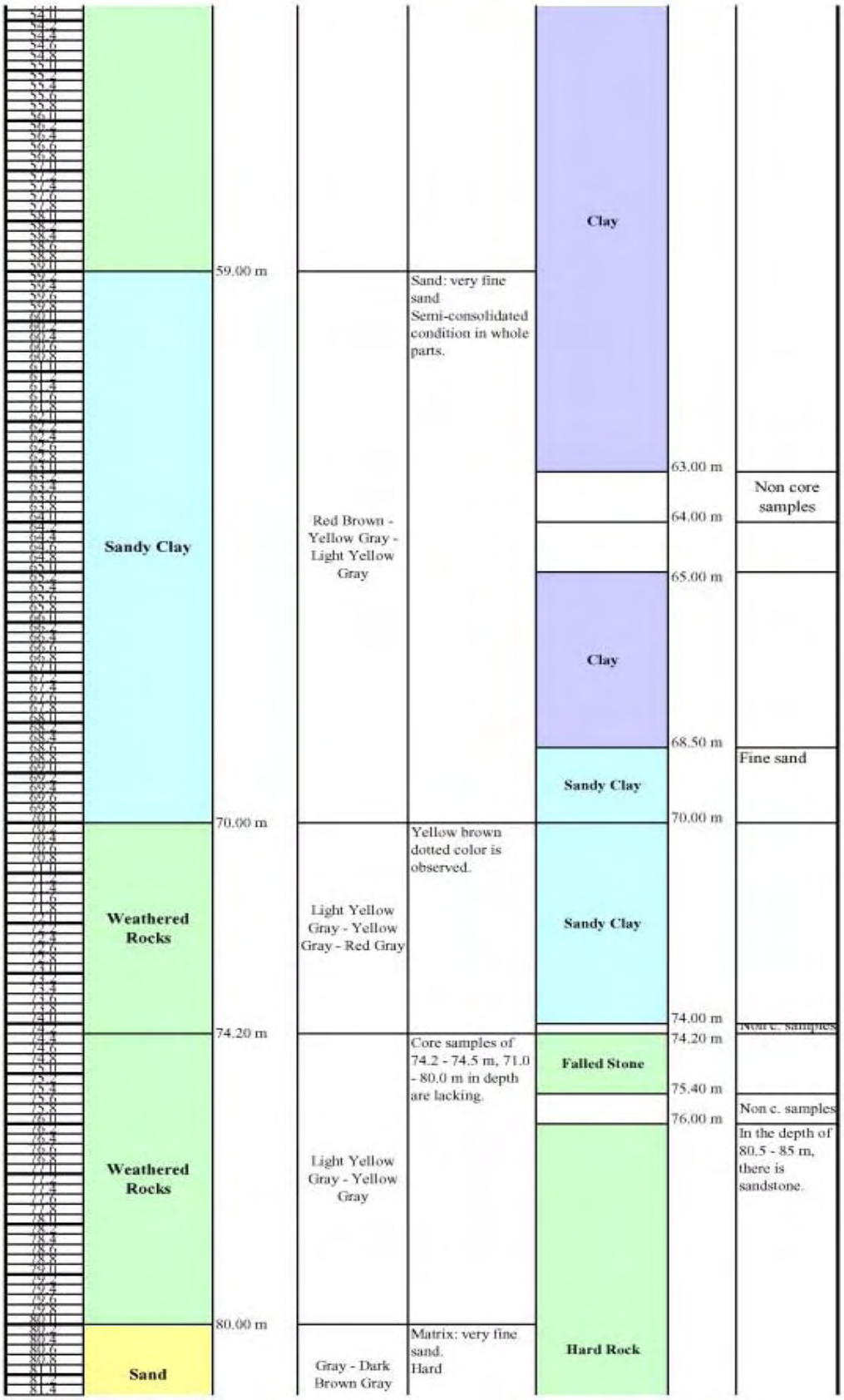


Figure 3.2.1 (3)-C Observation Results of Core Samples at Angkor Wat Site

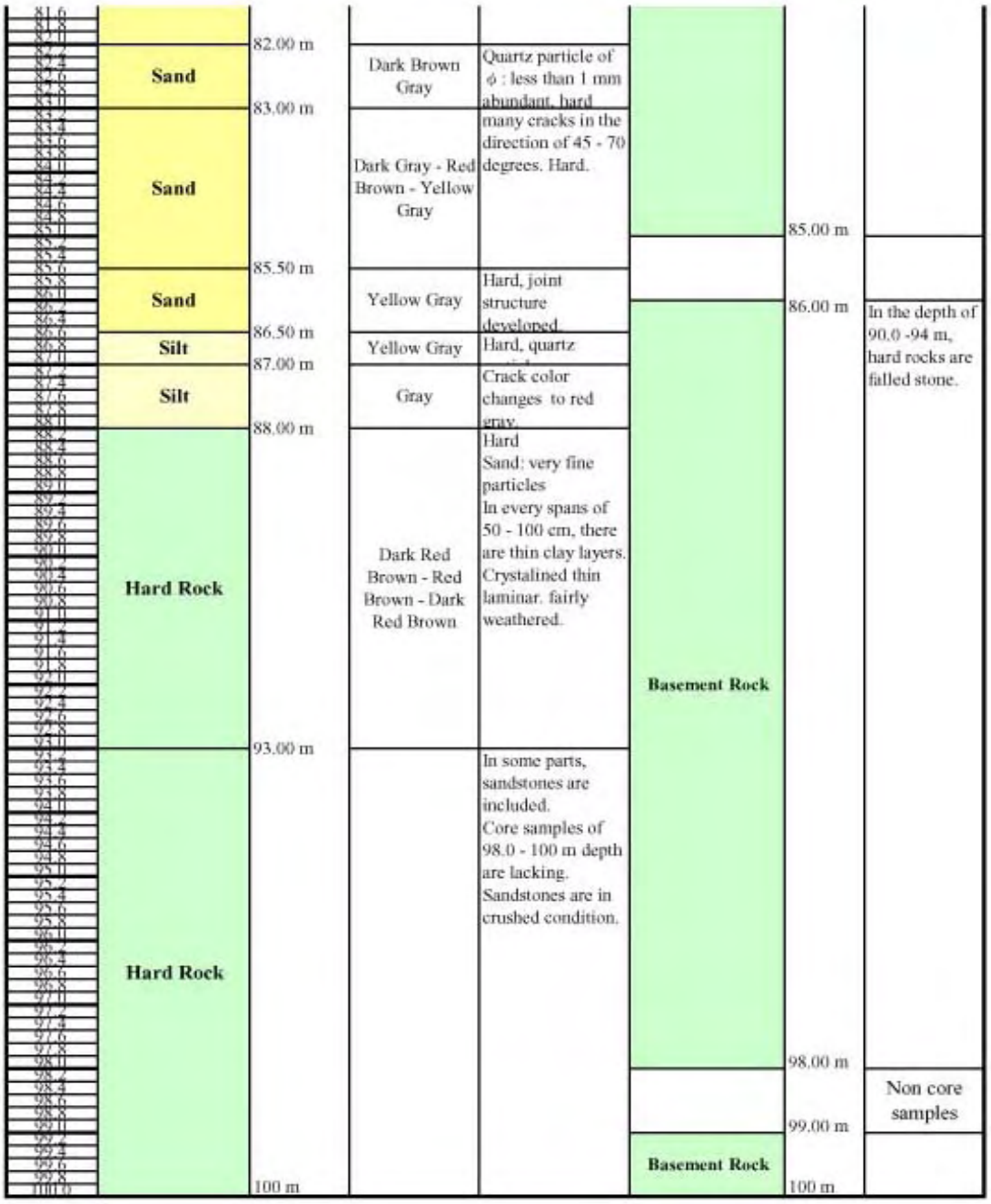
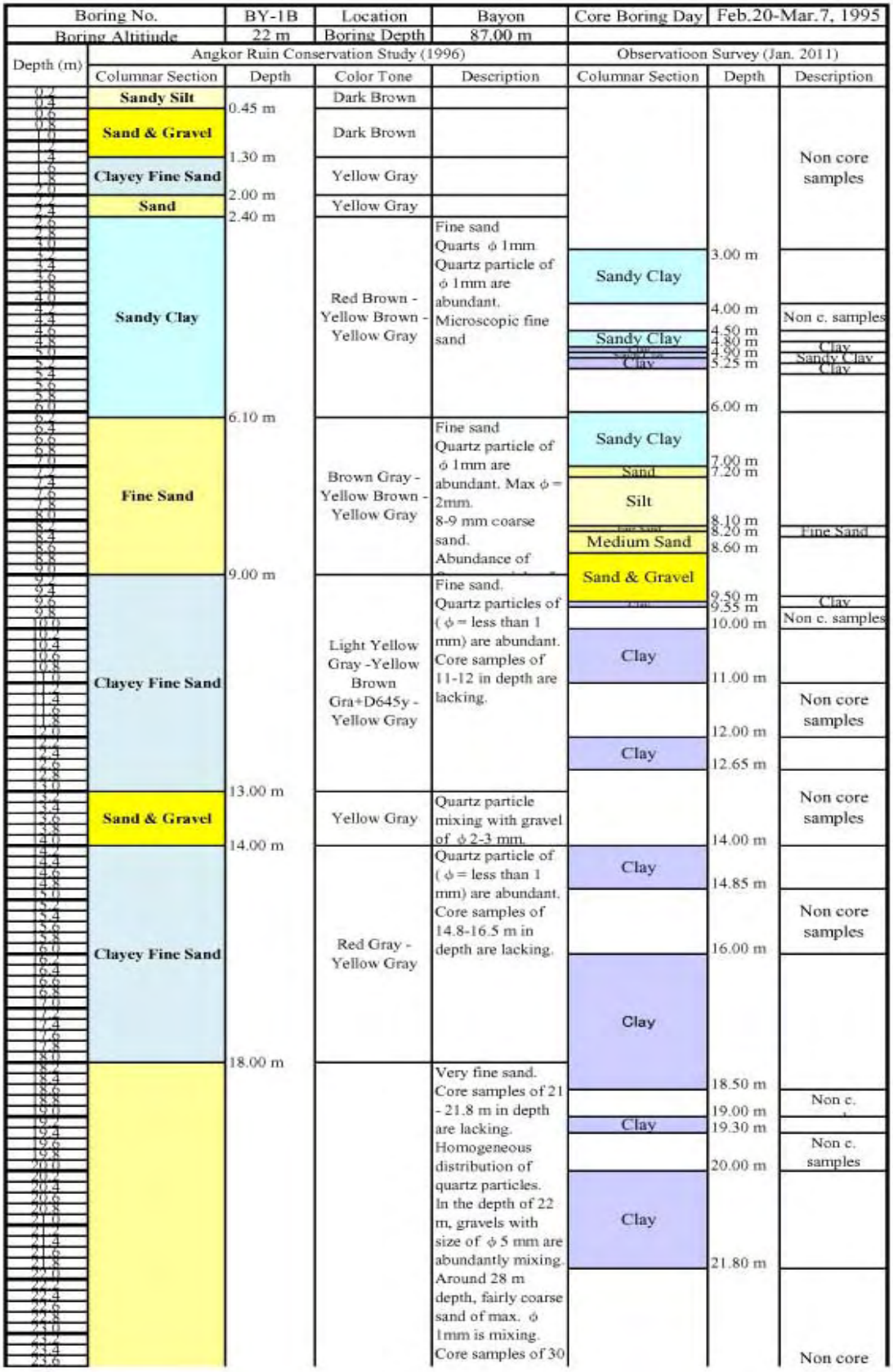


Figure 3.2.1 (3)-D Observation Results of Core Samples at Angkor Wat Site



igure 3.2.1 (3)-E Observation Results of Core Samples at Bayon Site

(The observation survey dated on January 2011 was conducted by this study.)

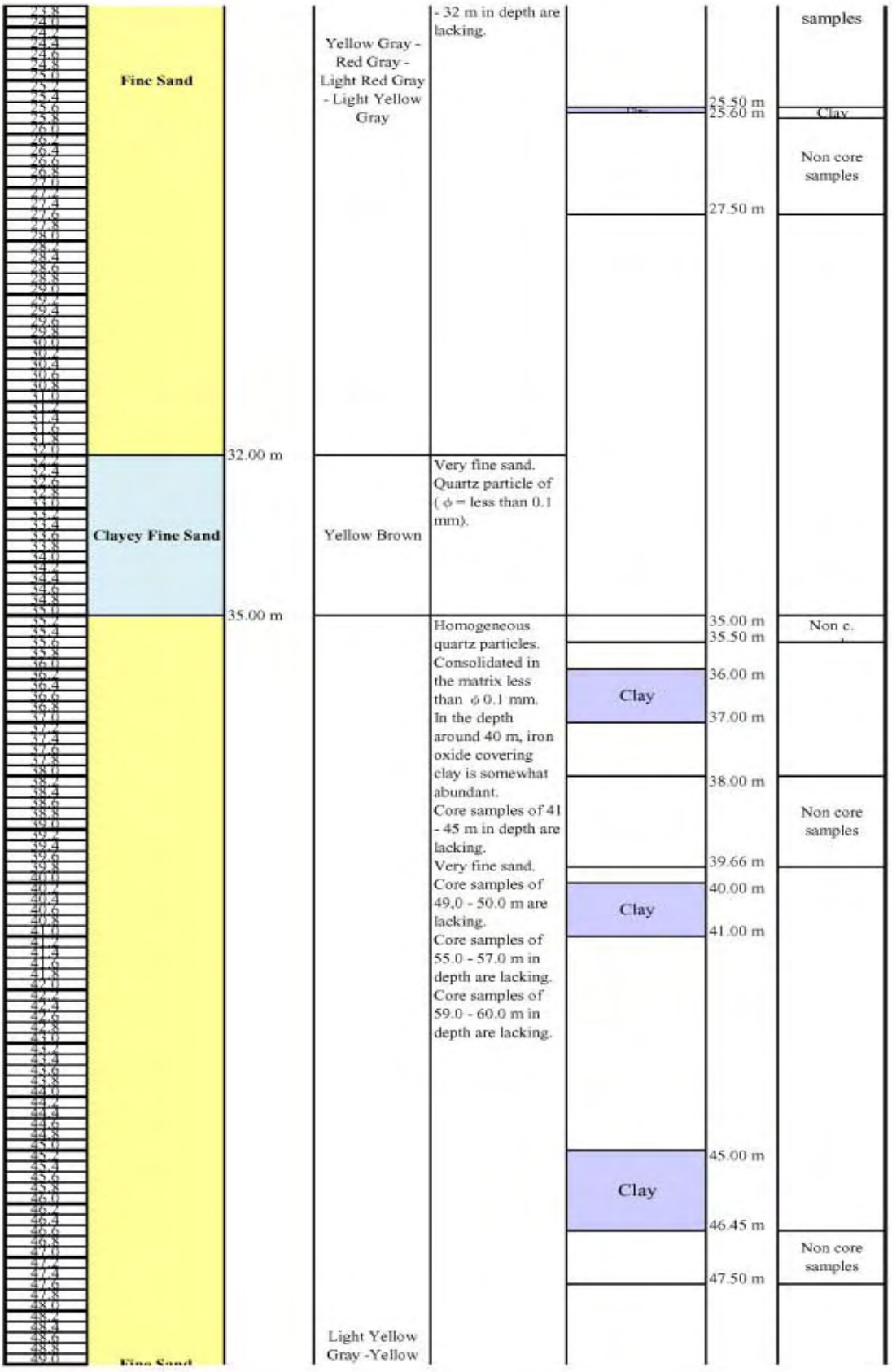


Figure 3.2.1 (3)-F Observation Results of Core Samples at Bayon Site

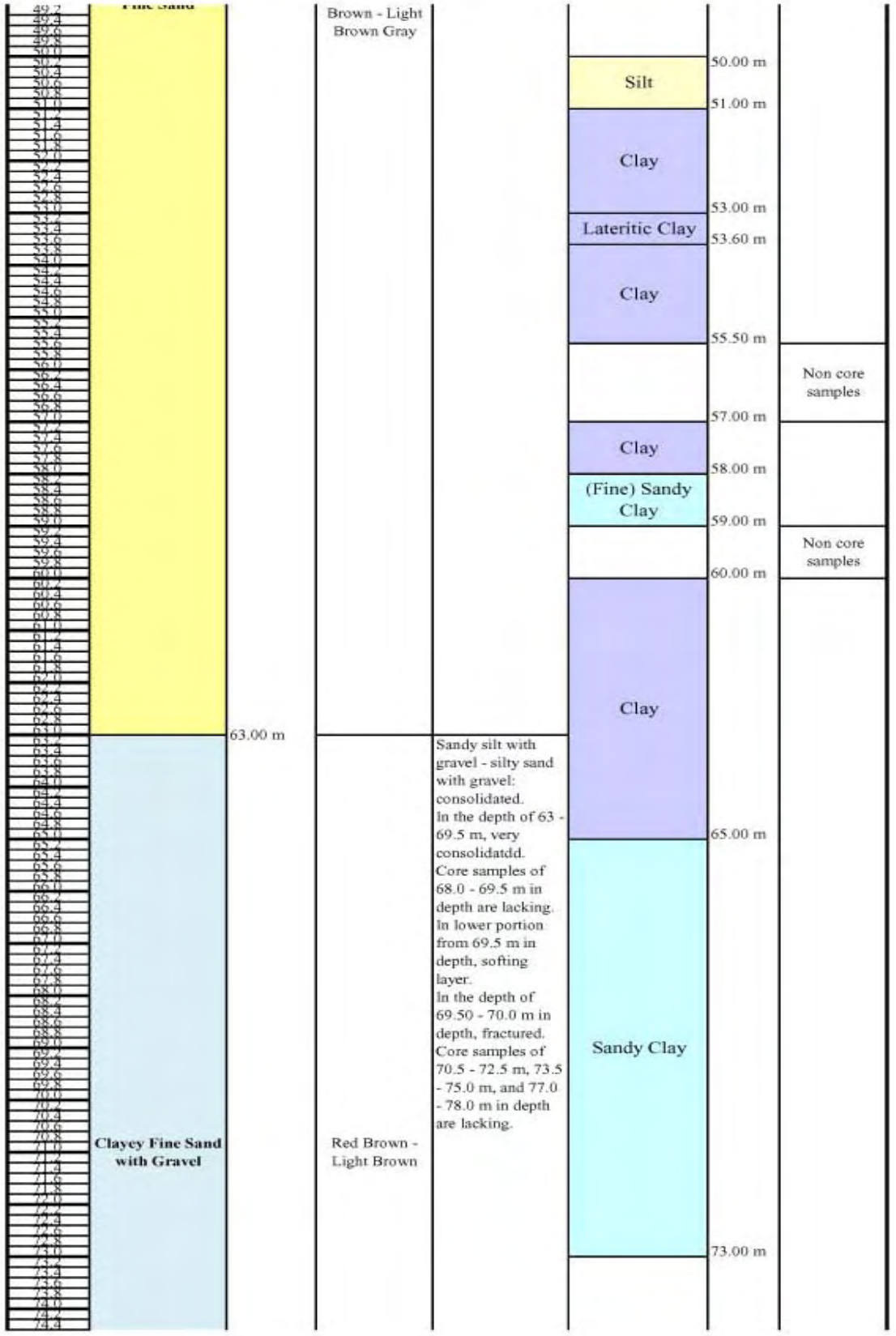


Figure 3.2.1 (3)-G Observation Results of Core Samples at Bayon Site

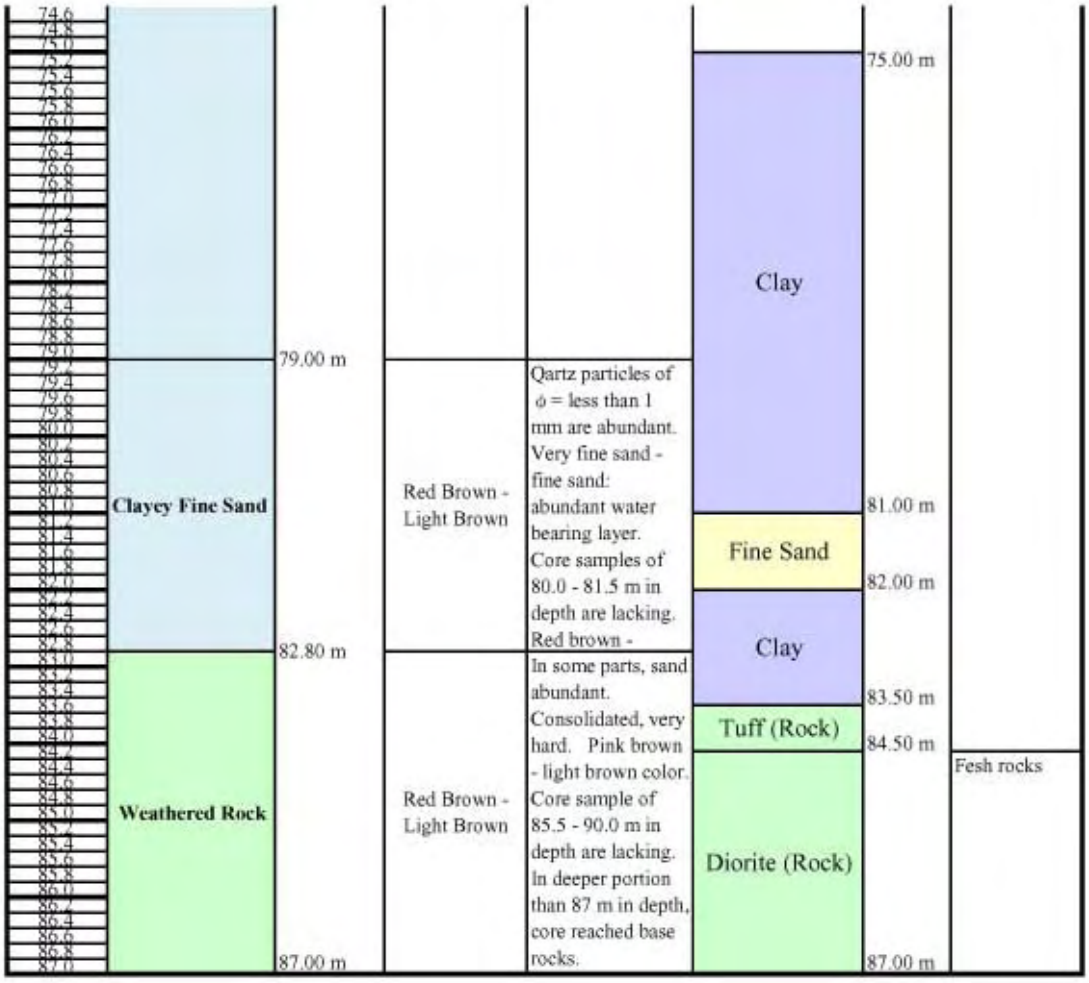
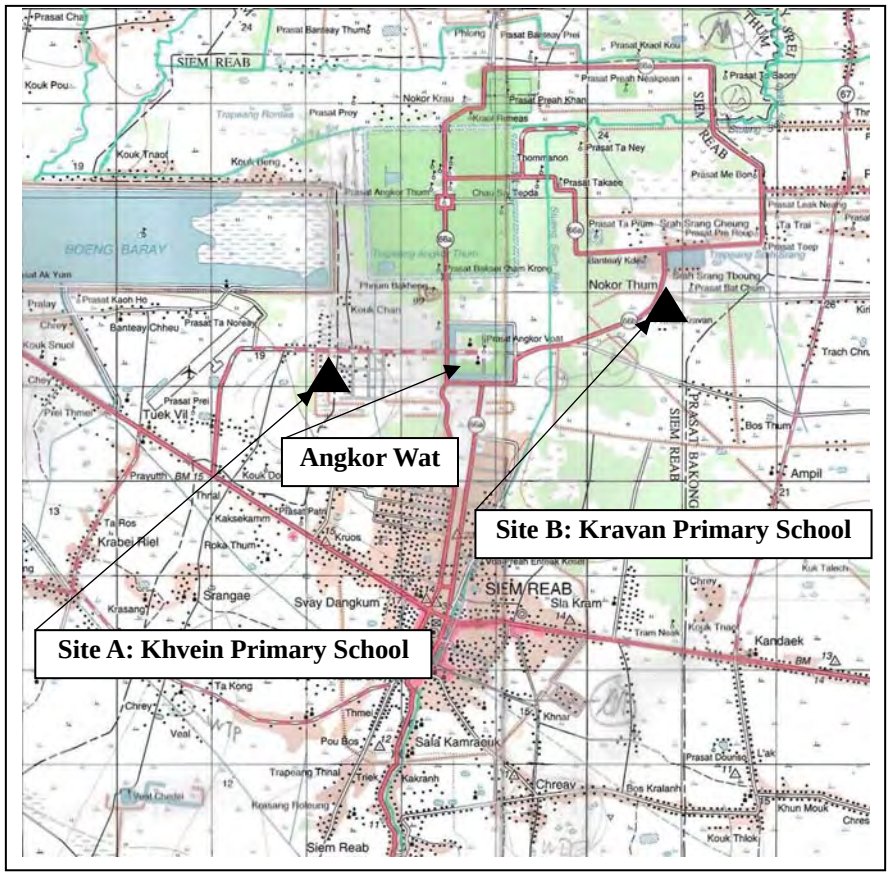


Figure 3.2.1 (3)-H Observation Results of Core Samples at Bayon Site

SR 3-2 (2) New Construction of Khvein and Kravan Monitoring Wells

Khvein Primary School



Kravan Primary School

Figure 3.2.2 (1) Location Map of Khvein and Kravan Monitoring Wells

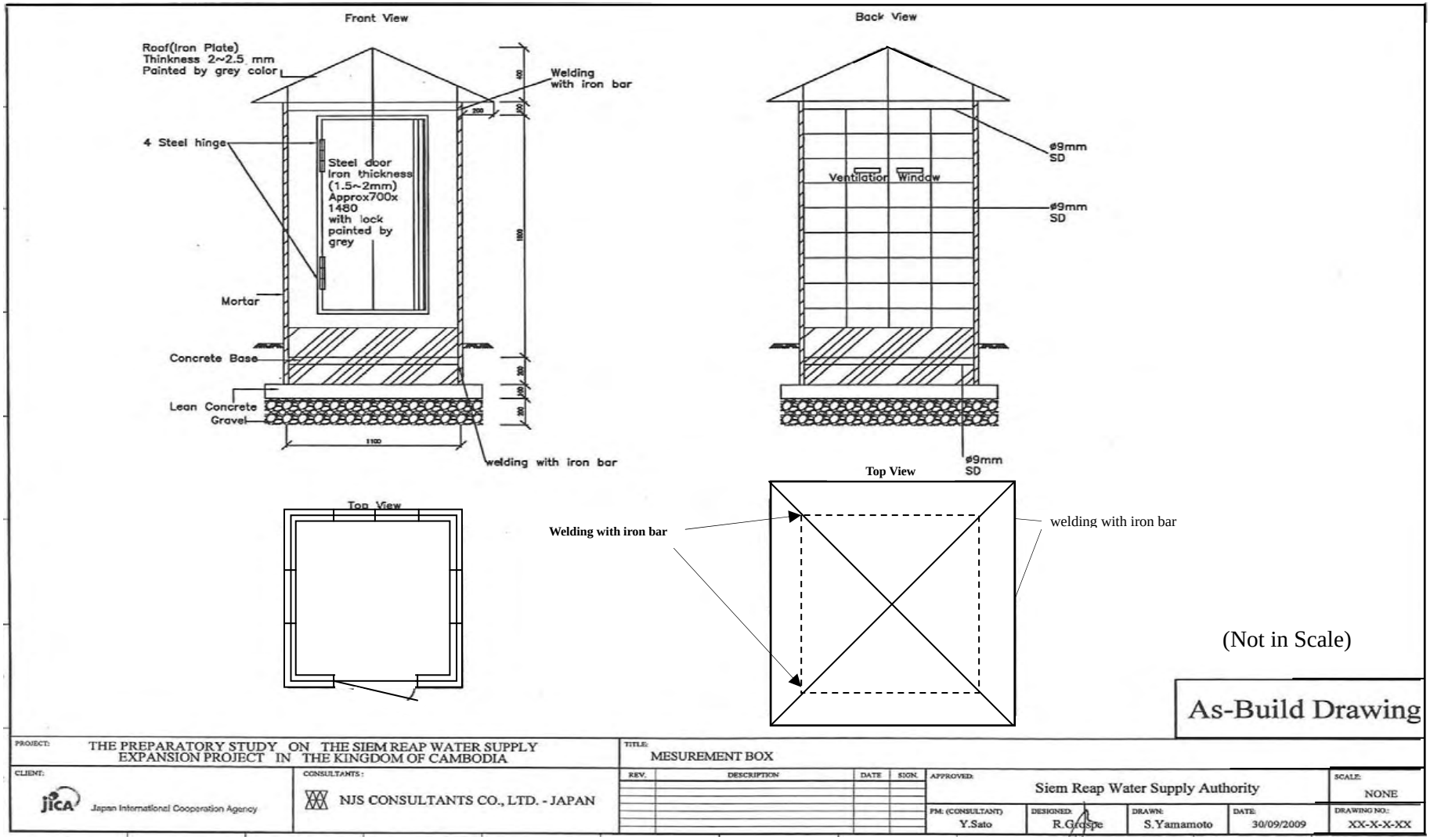


Figure 3.2.2 (2) As-Build Drawing of Measurement Box

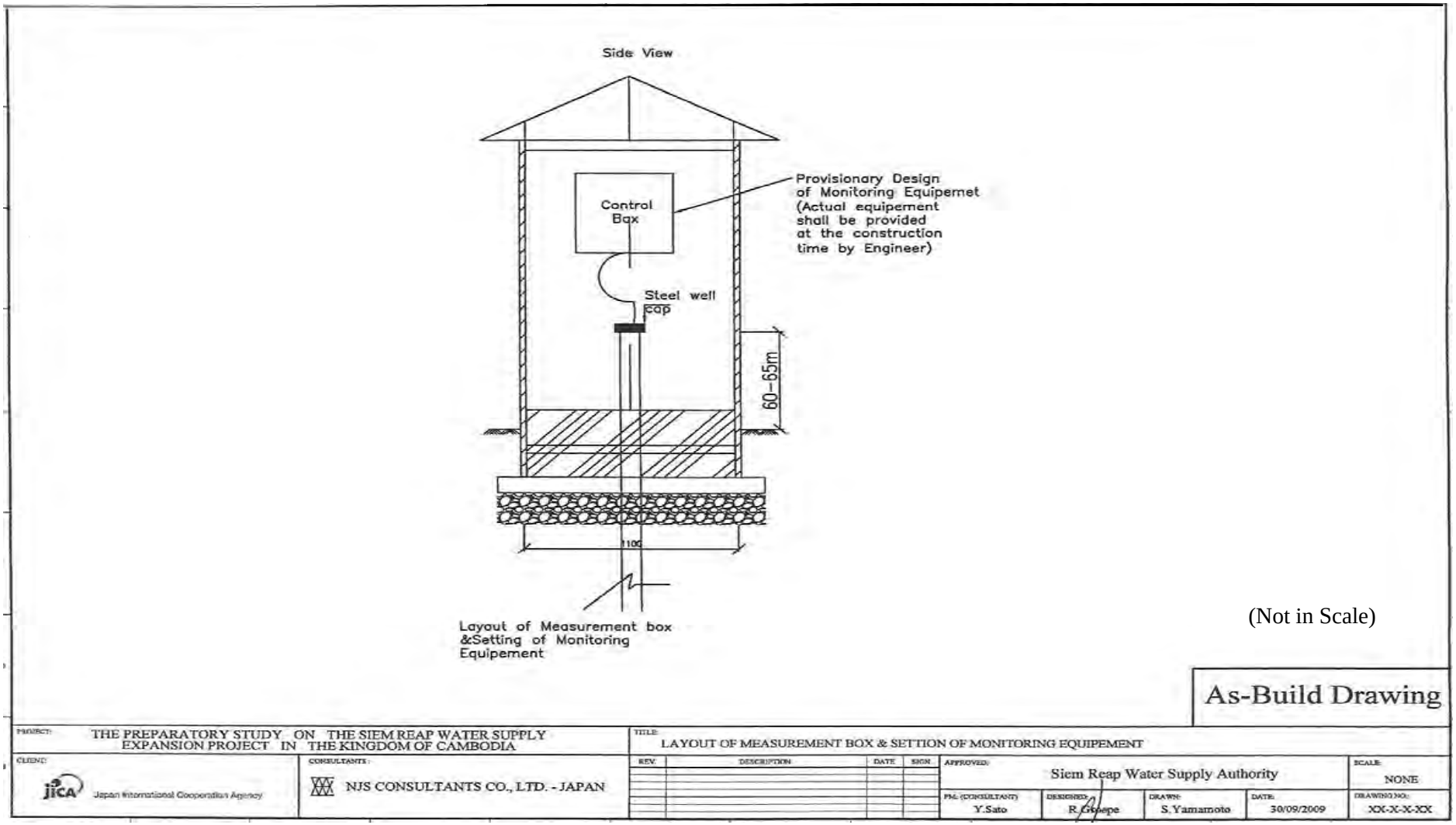


Figure 3.2.2 (3) As-Build Drawing of Layout of Measurement Box and Setting of Monitoring Equipment

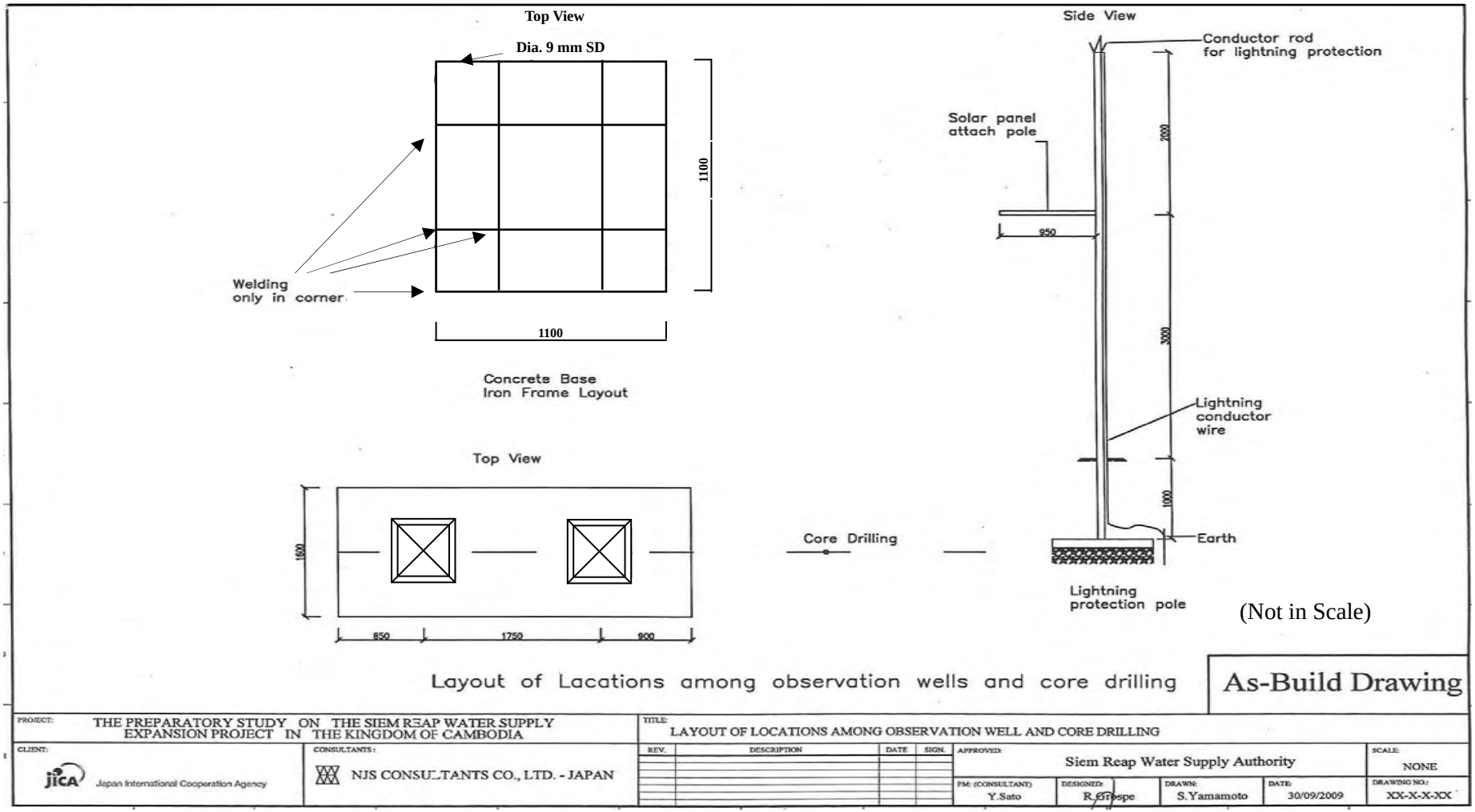


Figure 3.2.2 (4) As-Build Drawing of Layout of Locations among Observation Well and Core Boring

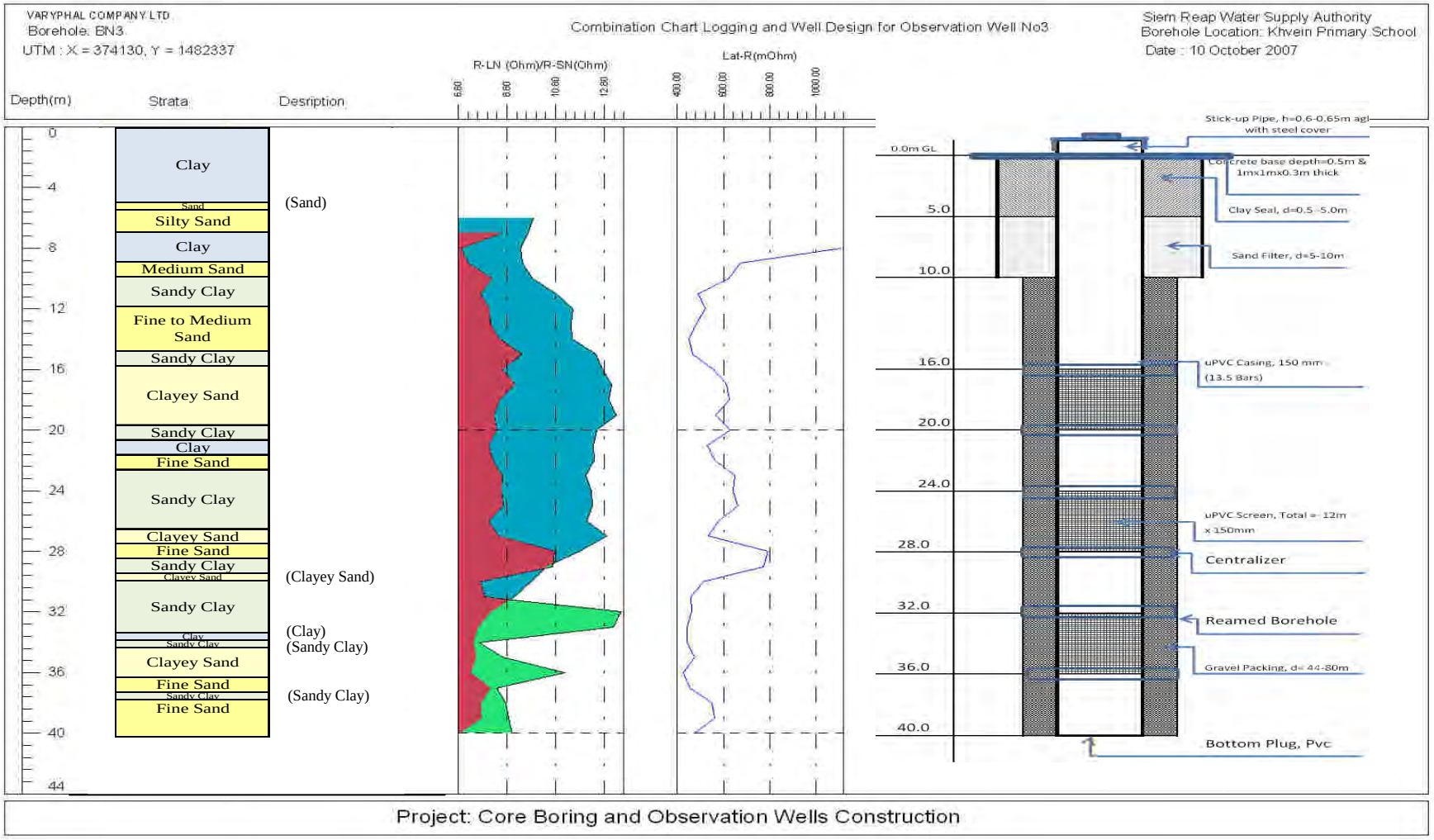


Figure 3.2.2 (5) Khvein Shallow Well: 40 m Depth, Geological Column, Logging Curve and Well Structure

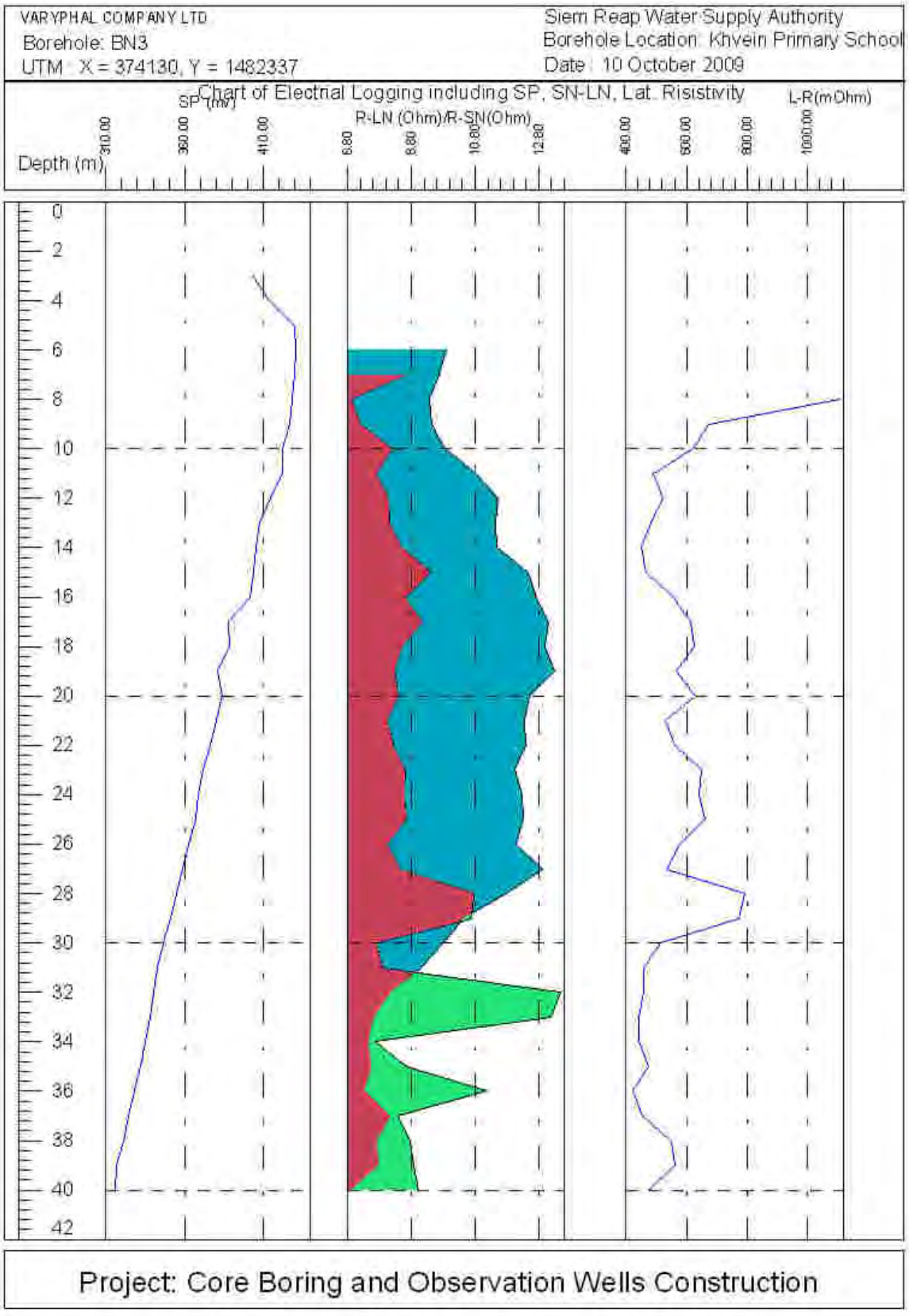


Figure 3.2.2 (6) Khvein Shallow Well: 40 m depth, Geophysical Logging Graph

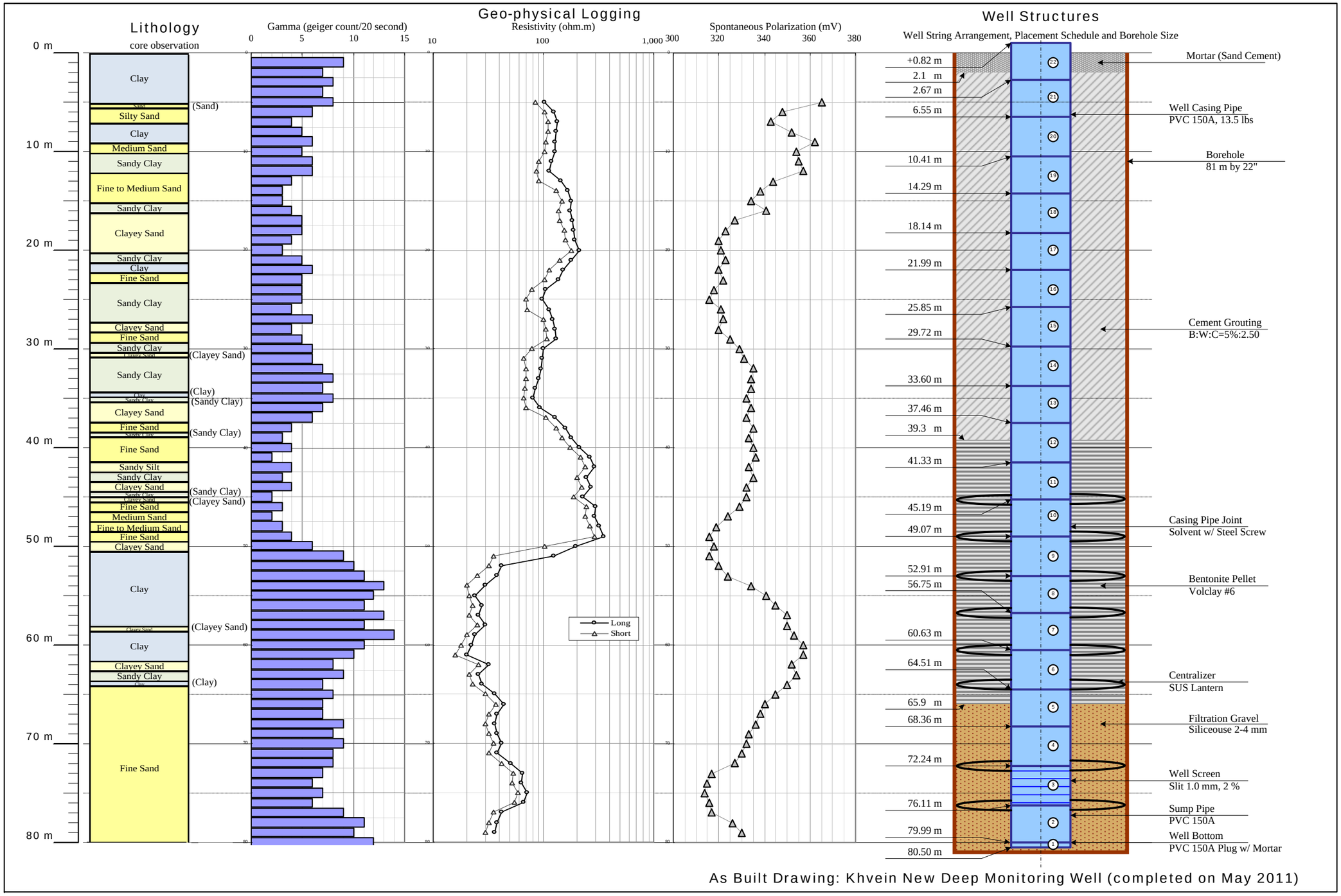


Figure 3.2.2 (7) Khvein Deep Well: 80 m depth, Geological Column, Logging Curve and Well Structure

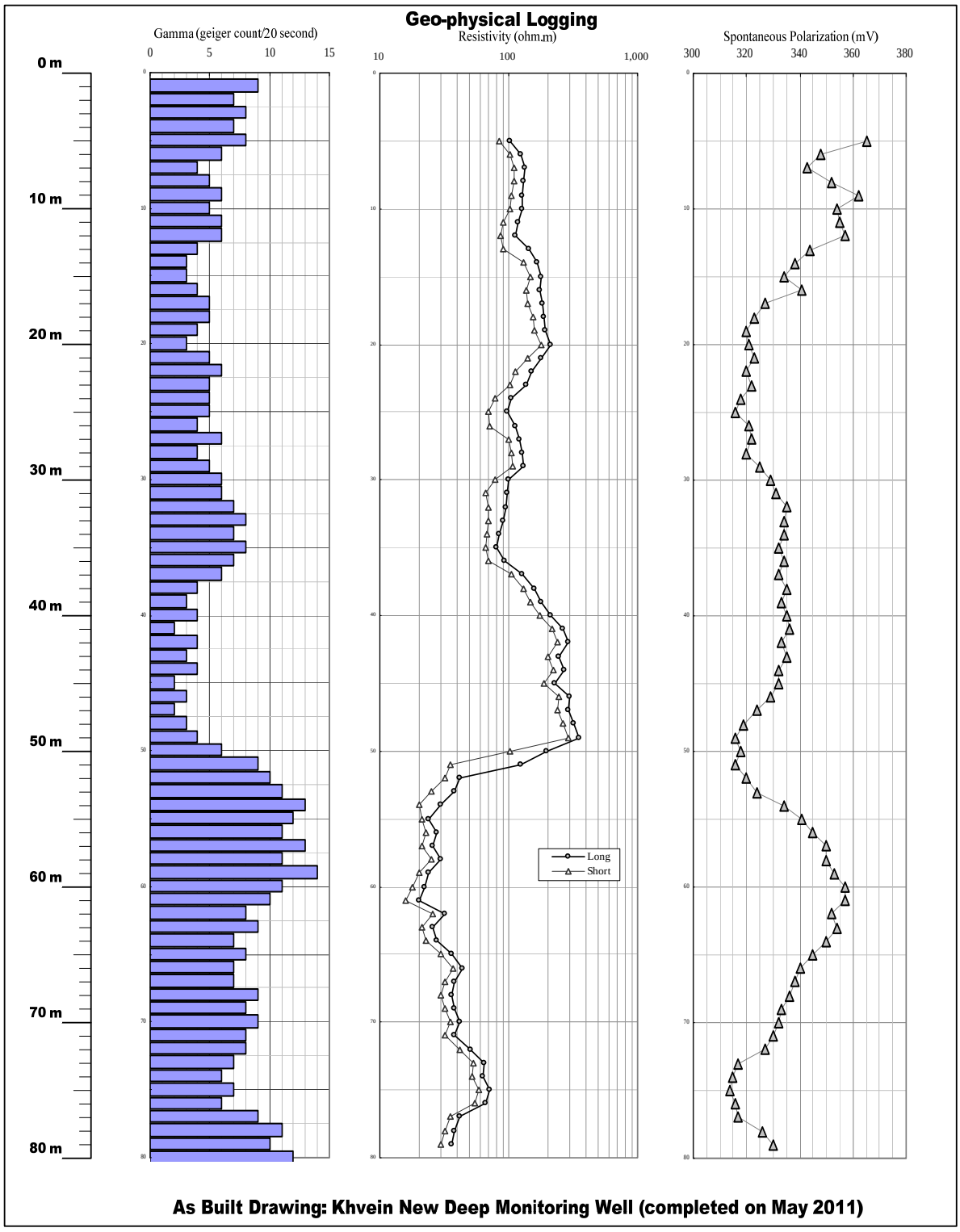


Figure 3.2.2 (8) Khvein Deep Well: 80 m depth, Geophysical Logging Graph

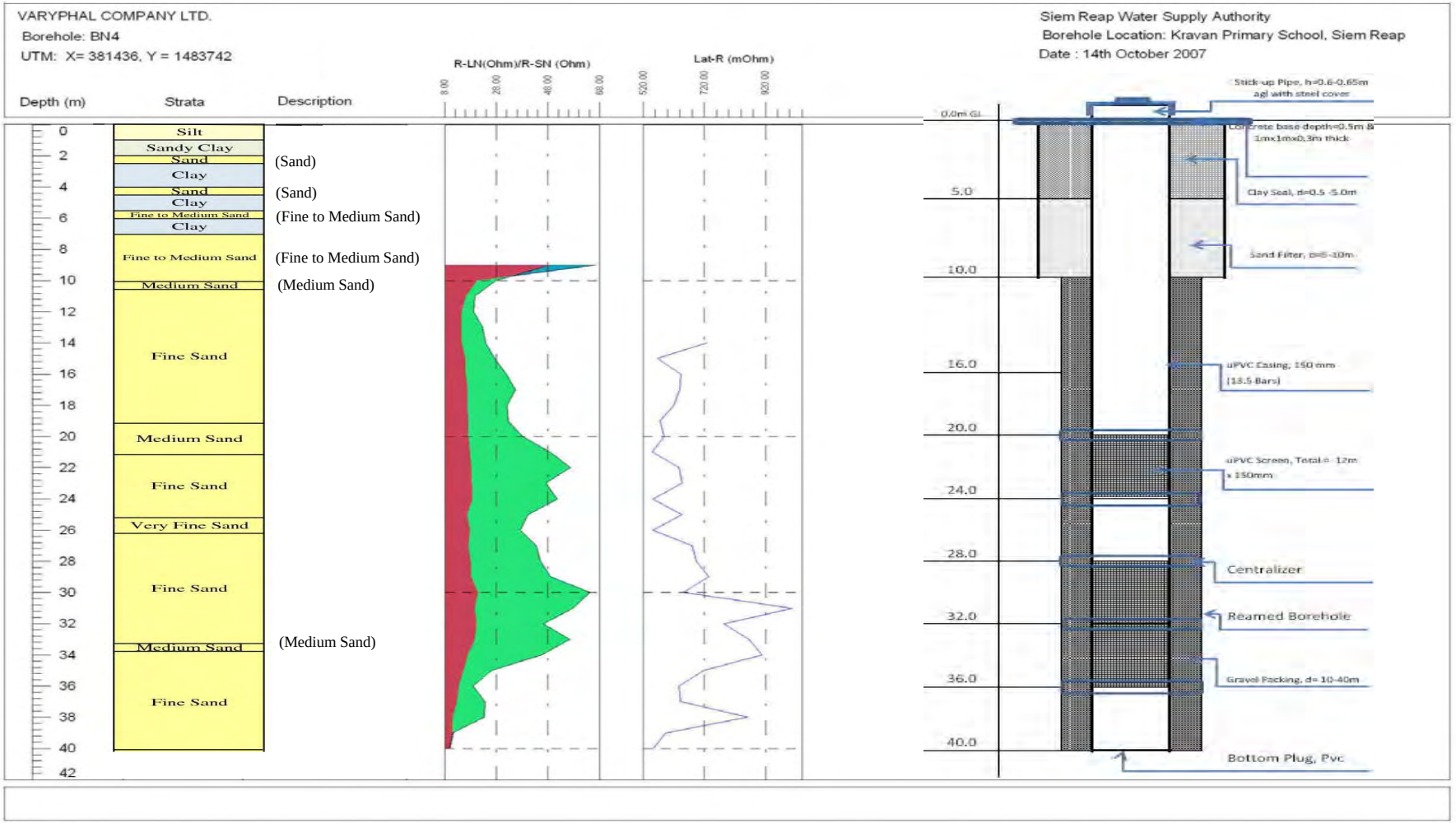


Figure 3.2.2 (9) Kravan Shallow Well: 40 m depth, Geological Column, Logging Curve and Well Structure

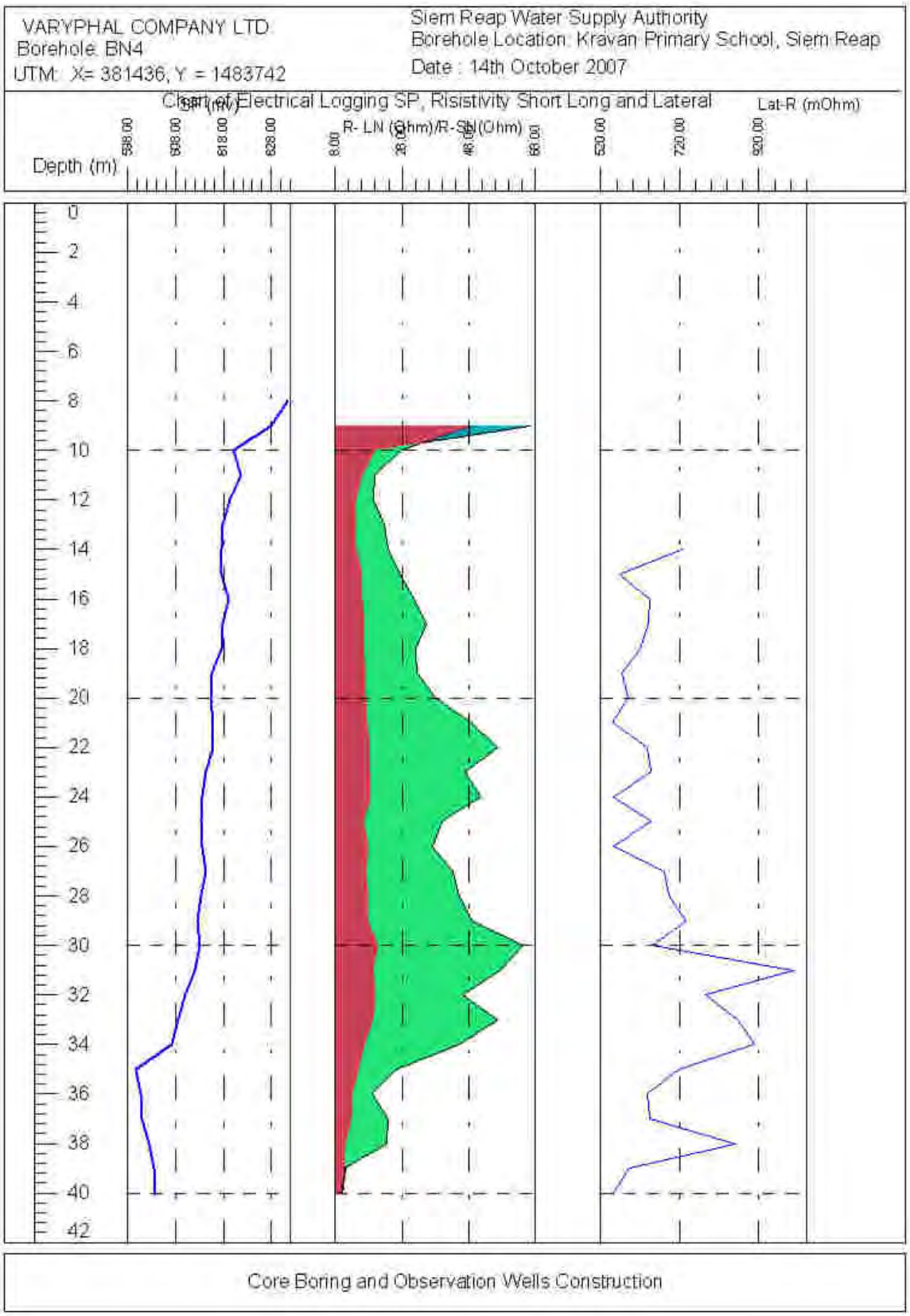


Figure 3.2.2 (10) Kravan Shallow Well: 40 m depth, Geophysical Logging Graph

SR 3-2(3) Groundwater Levels of Khvein and Kravan Monitoring Wells

(3) Monitored Groundwater levels of Khvein and Kravan Wells

A new monitoring well for shallow aquifer in Khvein primary school was constructed on October 2009 and one for deep aquifer was constructed on May 2011. At Kravan site, new monitoring well was constructed on October 2009. Locations of both sites are shown in Figure 3.2.2 (1) of the Supporting Report and Figure 3.1 of the Main Report.

Table 3.2.3.1 Outline of New Monitoring Wells at Khvein and Kravan Sites and Monitored Data

Well Site	Well Depth (m)	Casing Diameter	Well Screen (m)	Construction Year	Monitored Data
Khvein Well-1	40 m	UPVC 6”	16-20, 24-28 32-36	2009/10	2010/2/17-2010/9/7 2011/5/17-2011/6/30
Khvein Well-2	80 m	UPVC 6”	72.24-76.11	May 2011/5	2011/5/17-2011/6/30
Kravan Well-1	40 m	UPVC 6”	20-24, 28-36	2009/10	2010/2/18-2010/9/6

Monitored groundwater level of Khvein Well-1 for about 7 months in the period of February 17 to September 7, 2010 is shown in Figure 3.2.3.1 (1). The well monitors groundwater level of shallow aquifer which consists of alluvium and diluvium formations. It indicates the lowest one in the middle of April and it rapidly rise up on July with large fluctuation. In Cambodia, rainy season starts from May and continues to October. This fluctuation is considered to indicate seasonal fluctuation of groundwater level in rainy and dry seasons and groundwater recharge by rainfall.

On the other hand, Khvein Well-2 monitors groundwater level of deep aquifer which is formed by Tertiary formation. This formation generally belongs to aquiclude with low permeability, consisting of sand and clayey formations.

Khvein Well-2 (deep well) started to monitor groundwater level from 9:00 of May 23, 2011 after the completion of the well. To compare groundwater levels among Khvein Well-1, Khvein Well-2, and Kravan Well-1 (shallow well), monitoring data in the period of May 24 to July 1, 2011 are shown in Figure 3.2.3 (2)

Monitored groundwater levels of Khvein W-1 and Kravan Well-1 are fairly similar in fluctuation pattern. Both wells monitor groundwater levels of shallow aquifers. The similar fluctuation pattern shall reflect groundwater recharge by rainfall and rising up of groundwater level in rainy season.

On the other hand, groundwater level fluctuation of Khvein Well-2 is very different to those of shallow wells of Khvein Well-1 and Kravan Well-1. The fluctuation of Khven Well-2 does not directly reflect groundwater recharge by rainfall and has fairly smooth curve compared with those of shallow wells. This reflects the difference of aquifer characteristics between shallow and deep aquifers: shallow aquifer with high permeability in unconfined condition; deep aquifer with low permeability in confined condition.

The monitoring of deep well (Khvein Well-2) just starts. Its seasonal fluctuation and difference of fluctuation patterns between shallow and deep groundwater levels are not clear. The monitoring of groundwater levels in shallow and deep aquifers at Khvein sites may give interest results to monitor behavior of groundwater level at the same site if monitoring is continued in the future.

The Kravan Well-1 is located near many ruins of East Baray. Thus, the monitoring data of this well shall be an important indicator to check the influence of groundwater development in city center area to the ruins of East Baray. Monitored result of groundwater level at Kravan Well-1 for about 7 months in the period of February 18 to September 6, 2010 is shown in Figure 3.2.3 (3). It seasonal fluctuation pattern is fairly similar to that of Khven Well-1.

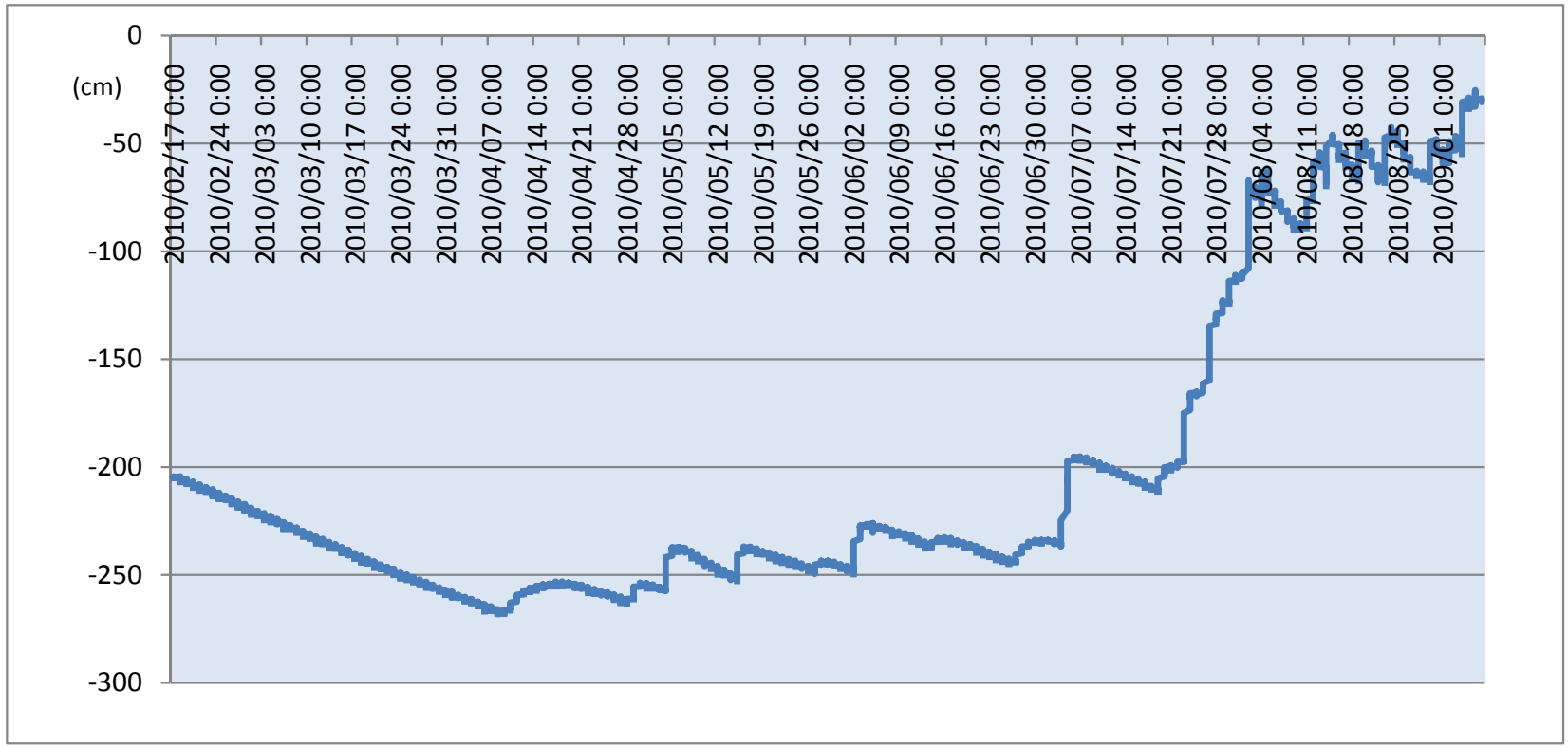


Figure 3.2.3 (1) Khvein Well-1, Monitored Groundwater Level of Shallow Aquifer, (Monitoring Period: February 17 to September 7, 2010)

The above graph shows the original data from monitoring site of Khvein Well-1. As erroneous data has been found in the original data, it is indispensible in inspect the data before using.

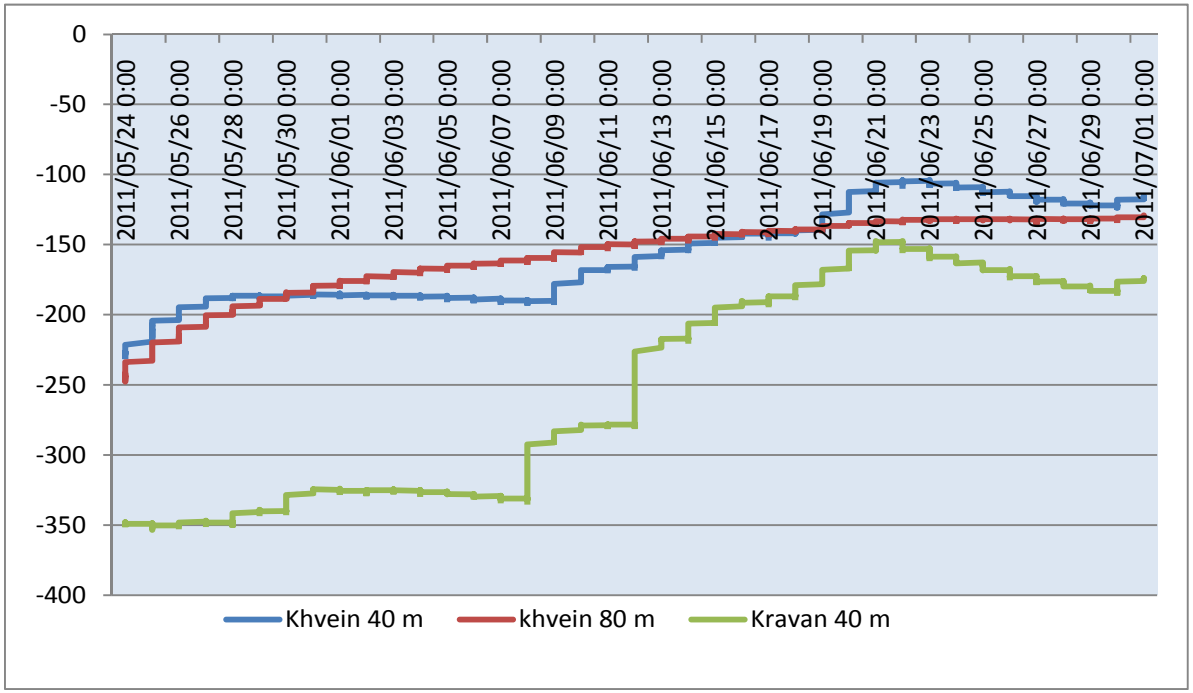


Figure 3.2.3 (2) Monitored Groundwater Level of Khvein Well-1 (Shallow Well) , Khvein Well-2 (Deep Well), and Kravan Well-1 (Shallow Well) (Monitoring Period: May 24 to July 1, 2011)

The above graph shows the original data from monitoring site of Khvein and Kravan Wells. As erroneous data has been found in the original data, it is indispensible in inspect the data before using.

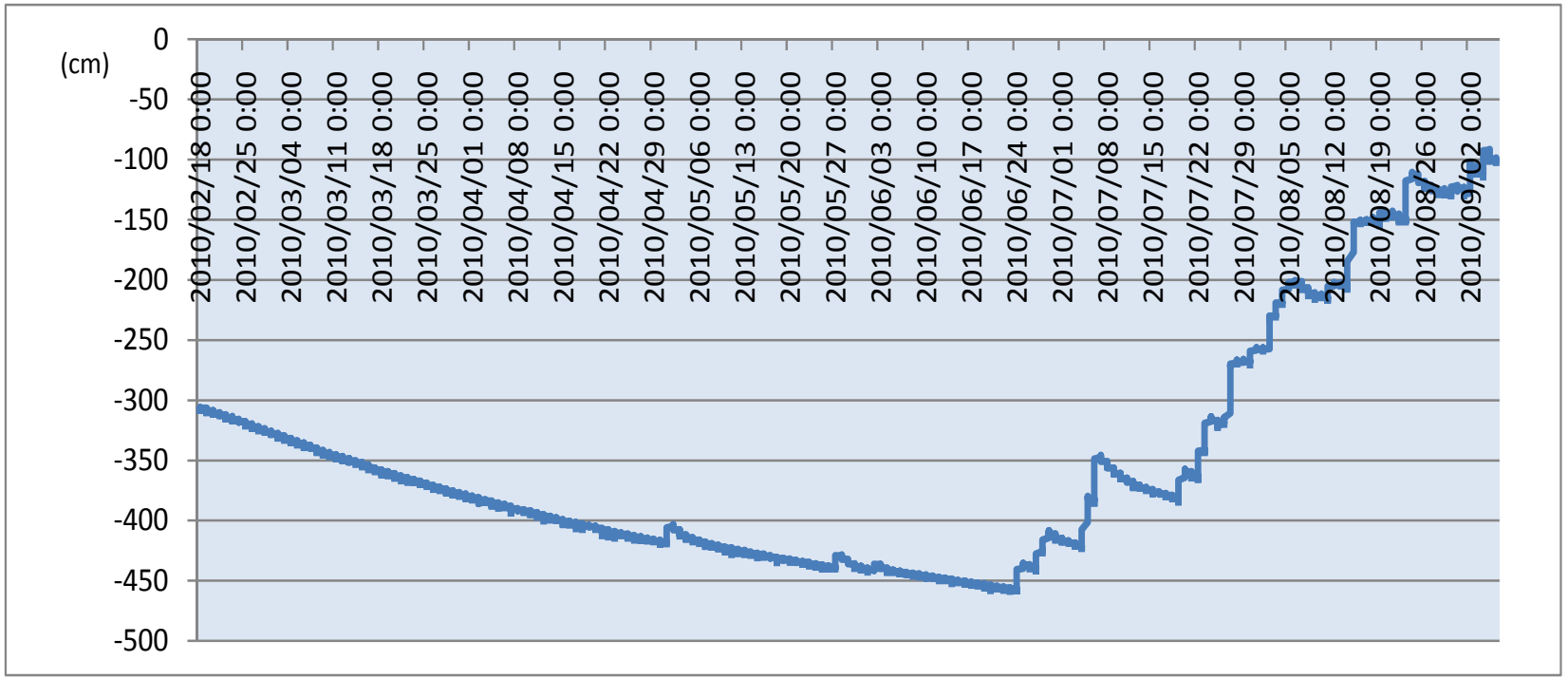


Figure 3.2.3 (3) Kravan Well-1, Monitored Groundwater Level of Shallow Aquifer, (Monitoring Period: February 18 to September 6, 2010)

The above graph shows the original data from monitoring site of Kravan Well-1. As erroneous data has been found in the original data, it is indispensible in inspect the data before using.

SR 3-3(1) Data of Existing Monitoring Wells Constructed by "the Study on Water Supply System for Siem Reap Region in Cambodia by JICA, March 2000"

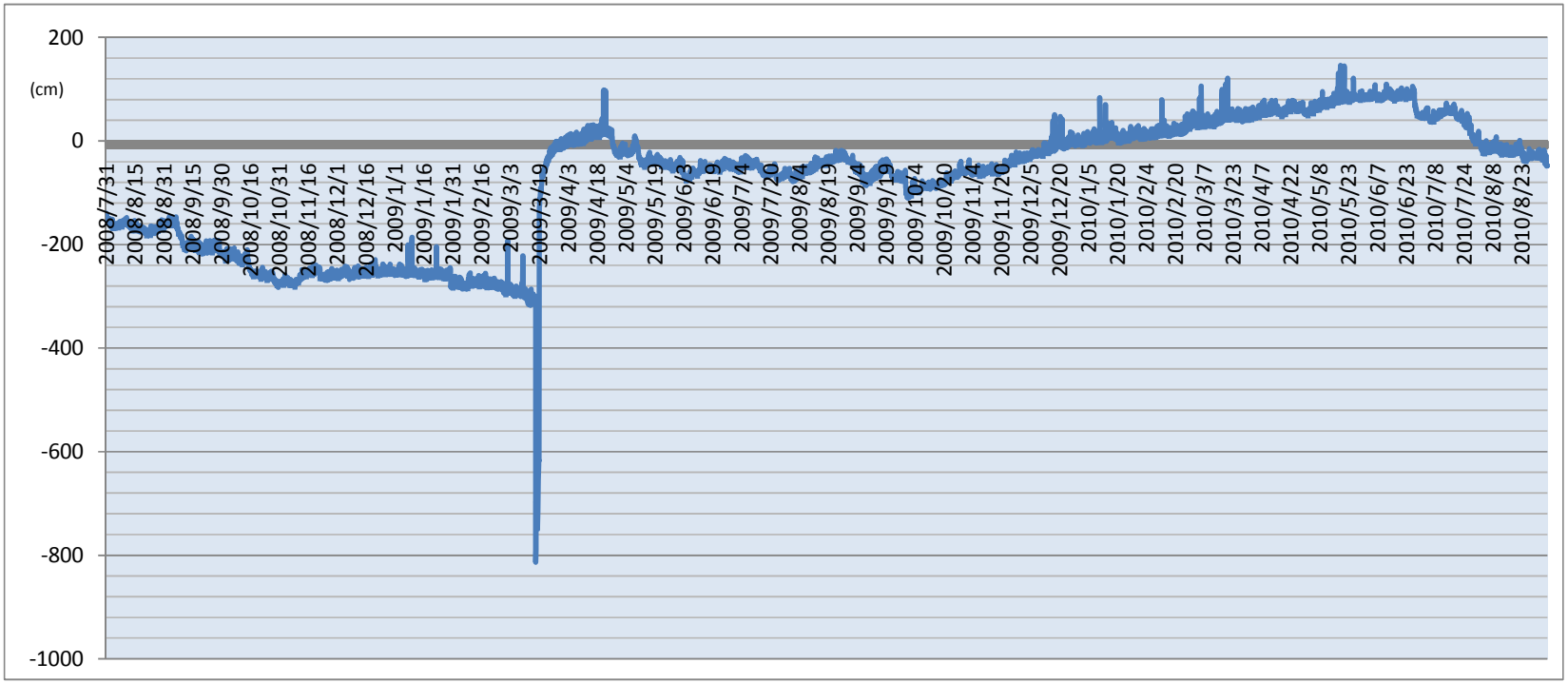


Figure 3.3.1 (1) Groundwater Level Fluctuation at WT-4 (Monitoring Period: July 31, 2008 to September 6, 2010)

The above graph shows the original data from monitoring site of WT-4. As erroneous data has been found in the original data, it is indispensible in inspect the data before using.

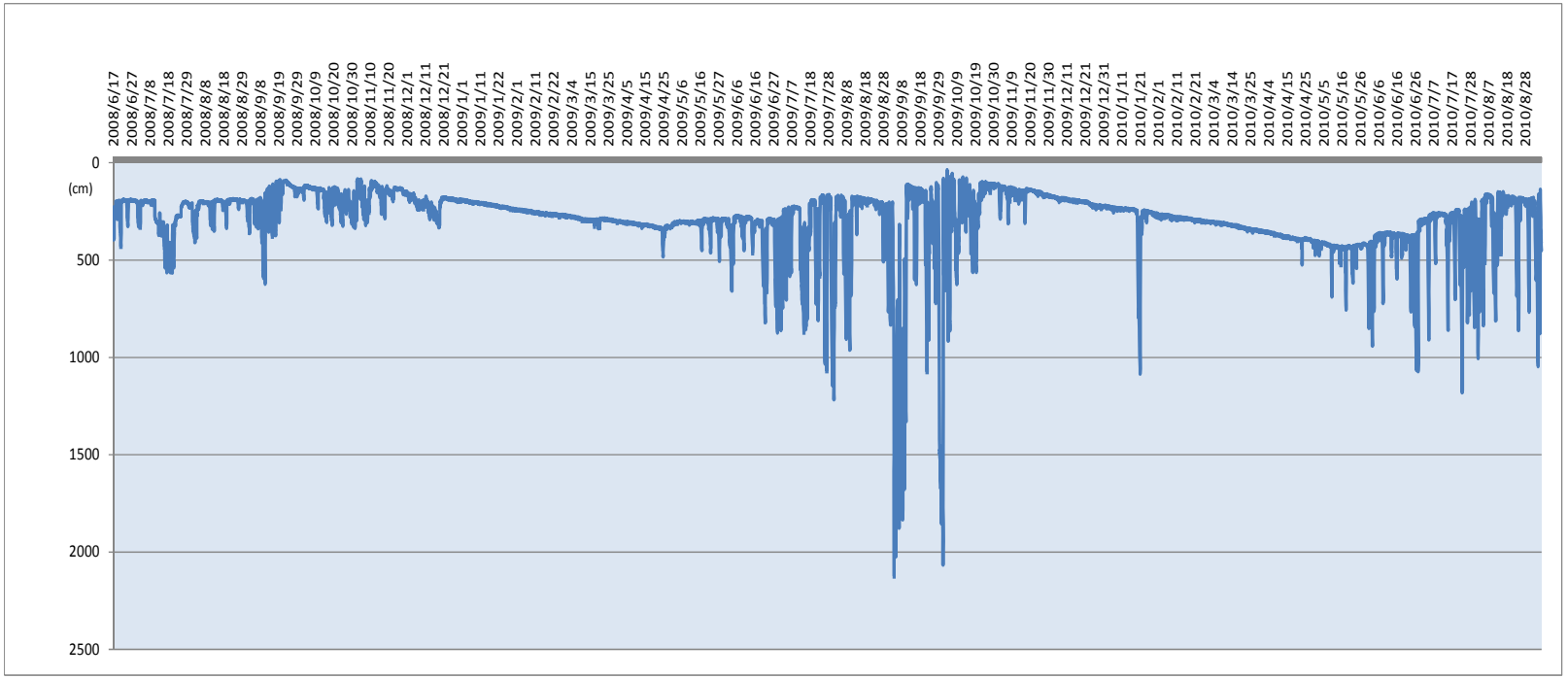


Figure 3.3.1 (2) Groundwater Level Fluctuation at WT-5 (Monitoring Period: June 17, 2008 to September 7, 2010)

The above graph shows the original data from monitoring site of WT-5. As erroneous data has been found in the original data, it is indispensible in inspect the data before using.

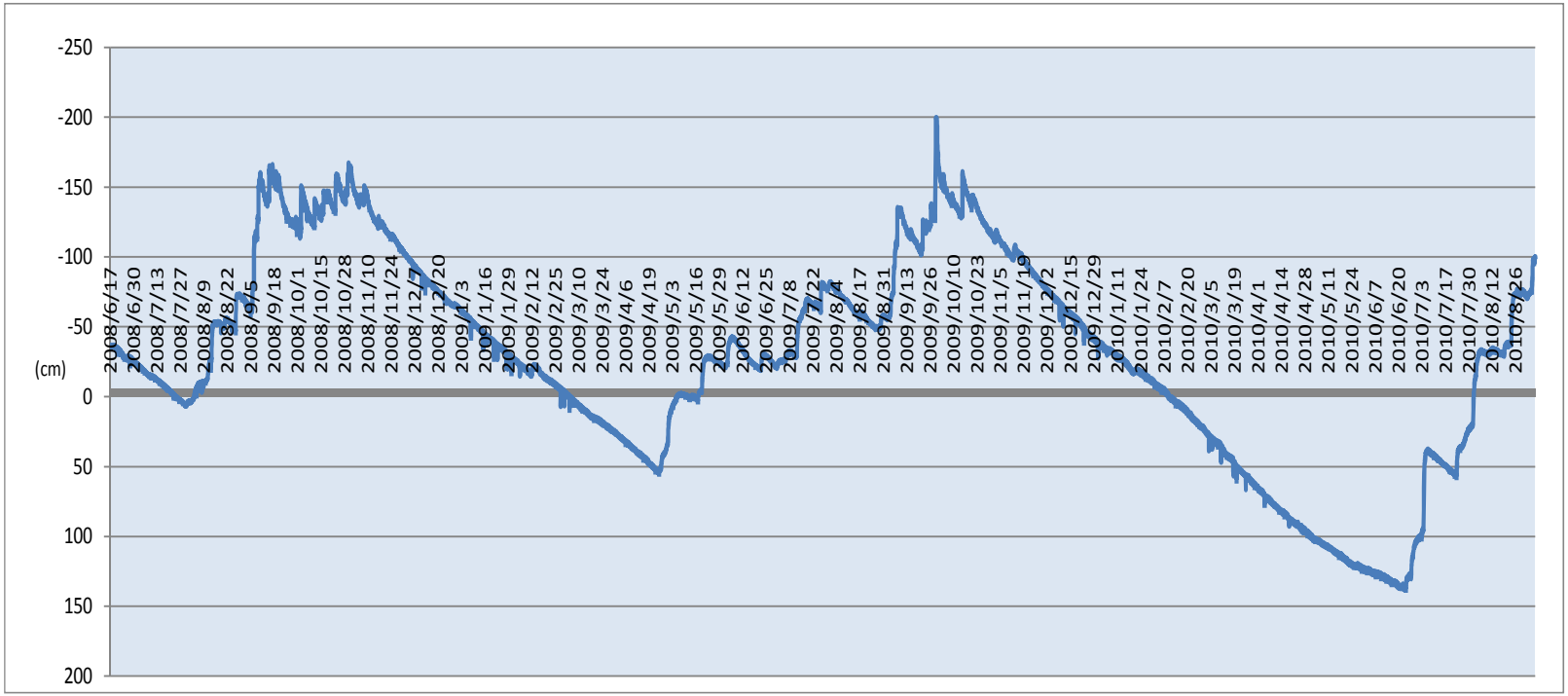


Figure 3.3.1 (3) Groundwater Level Fluctuation at WT-6 (Monitoring Period: June 17, 2008 to September 6, 2010)

The above graph shows the original data from monitoring site of WT-6. As erroneous data has been found in the original data, it is indispensible in inspect the data before using.

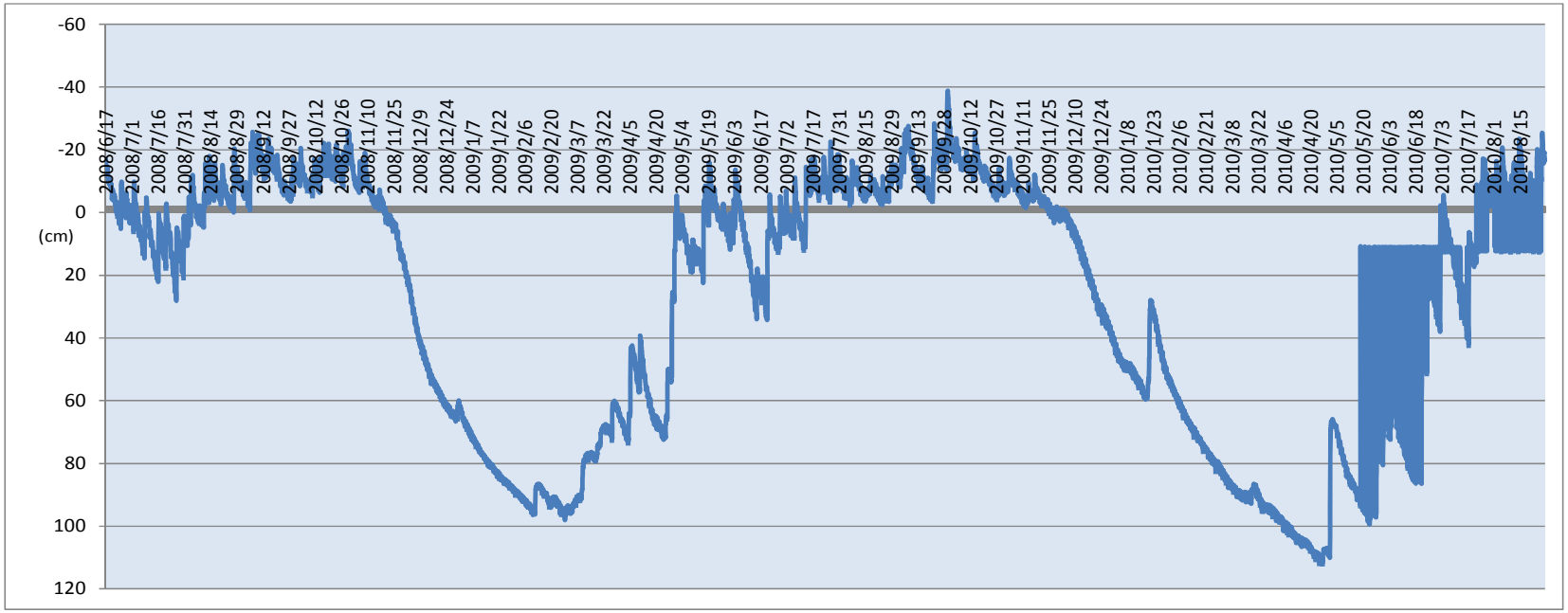


Figure 3.3.1 (4) Groundwater Level Fluctuation at WT-7 (Monitoring Period: June 17, 2008 to August 29, 2010)

The above graph shows the original data from monitoring site of WT-7. As erroneous data has been found in the original data, it is indispensible in inspect the data before using.

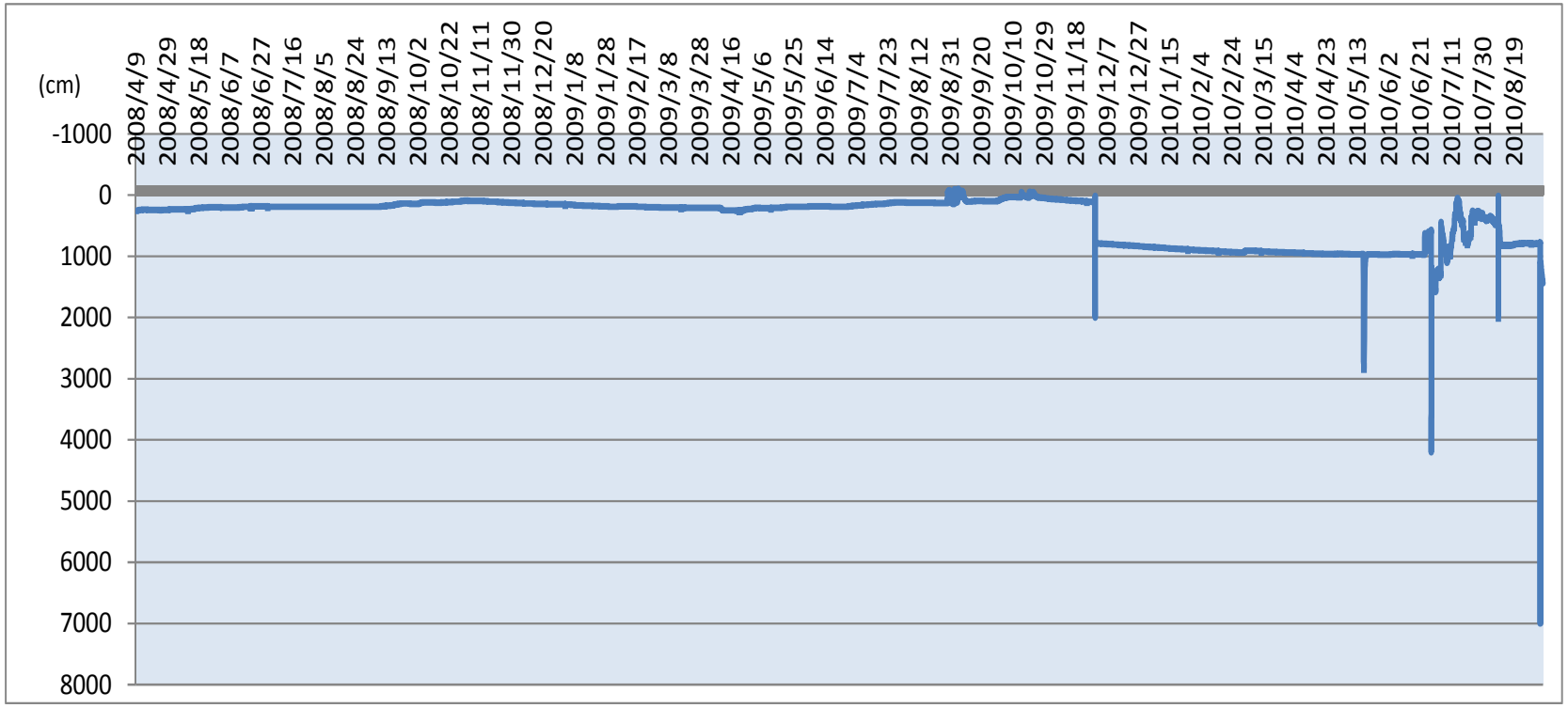


Figure 3.3.1 (5) Groundwater Level Fluctuation at WT-8 (Monitoring Period: April 9, 2008 to September 6, 2010)

The above graph shows the original data from monitoring site of WT-8. As erroneous data has been found in the original data, it is indispensible in inspect the data before using.

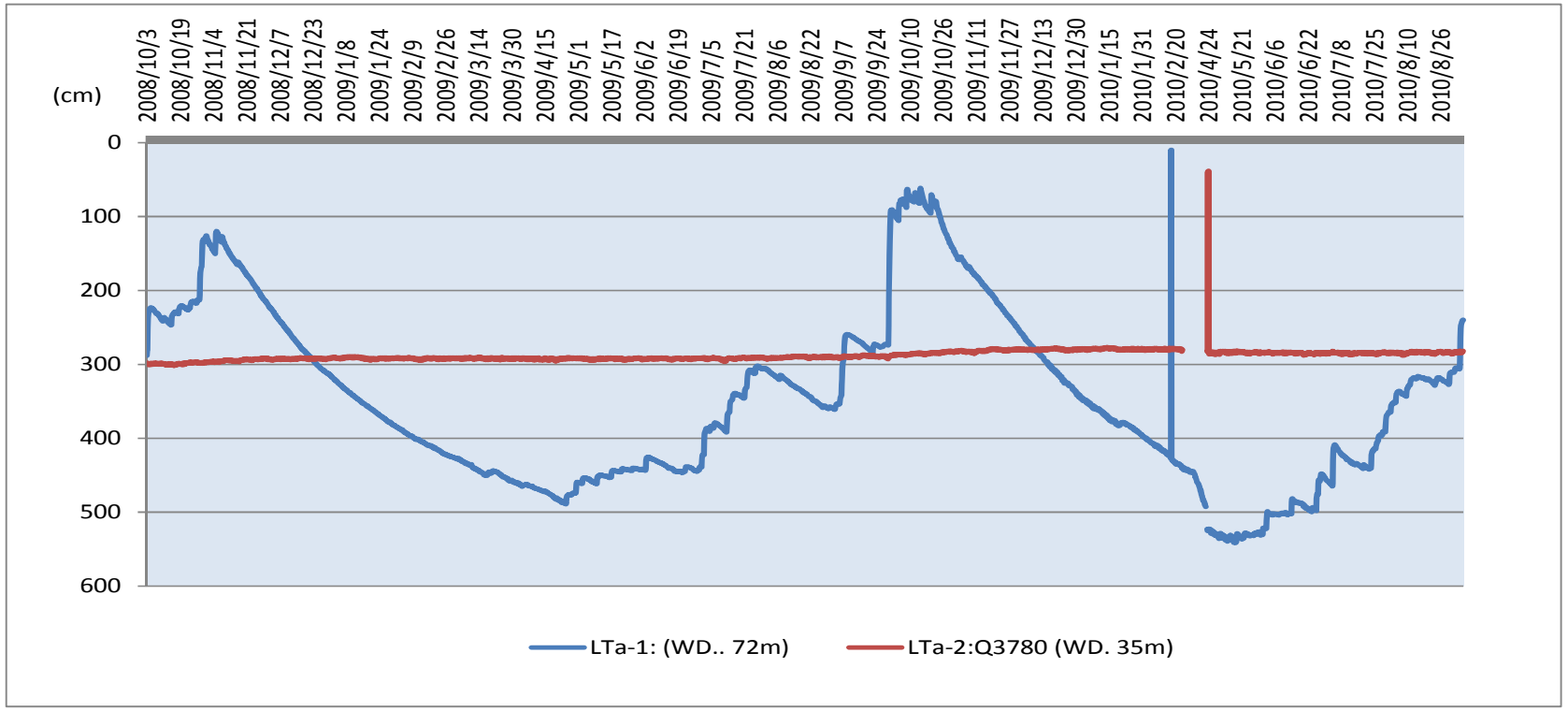


Figure 3.3.1 (6) Groundwater Level Fluctuation at LTa-1&2 (Monitoring Period: August 3, 2008 to September 6, 2010)

The above graph shows the original data from monitoring site of LTa-1&2. As erroneous data has been found in the original data, it is indispensible in inspect the data before using.

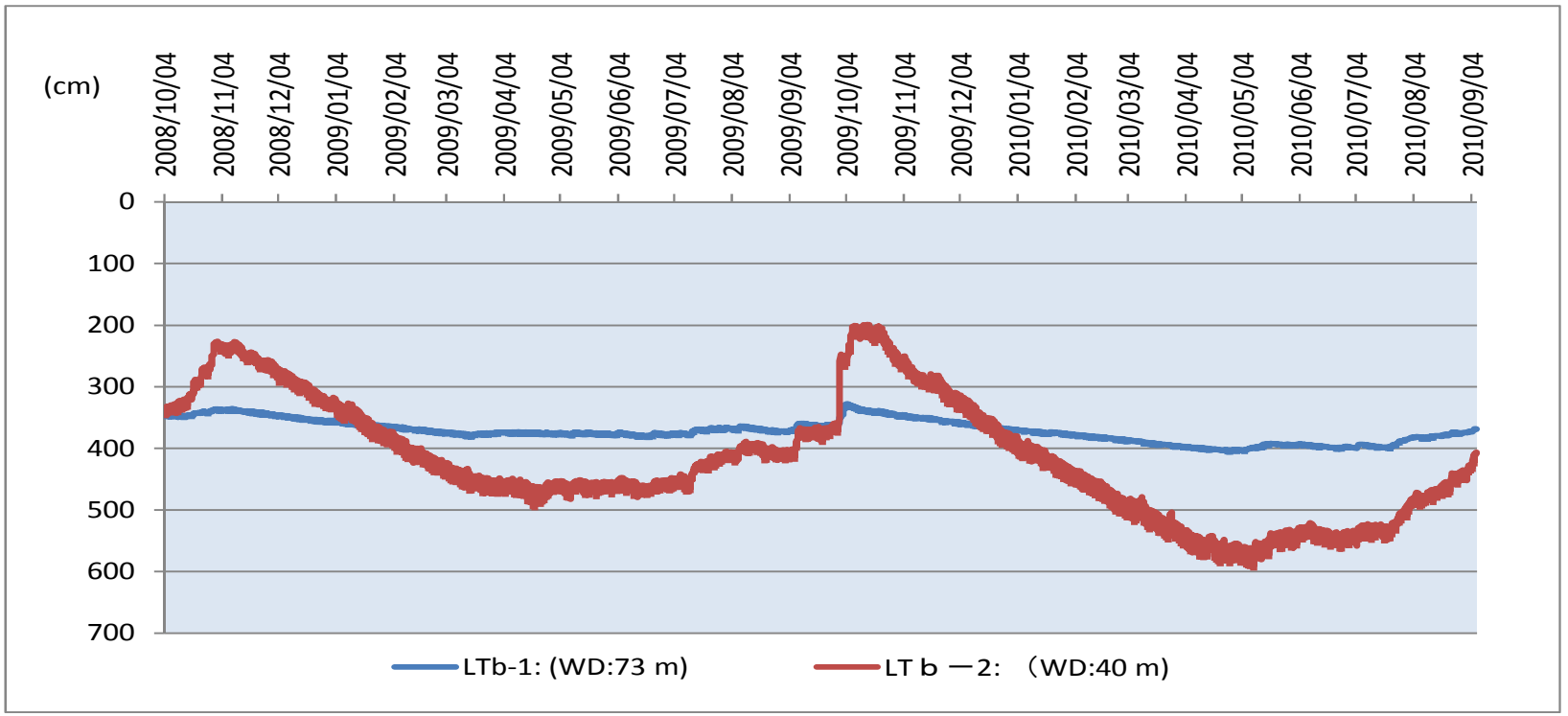


Figure 3.3.1 (7) Groundwater Level Fluctuation at LTb-1&2 (Monitoring Period: August 4, 2008 to September 6, 2010)

The above graph shows the original data from monitoring site of LTb-1&2. As erroneous data has been found in the original data, it is indispensible in inspect the data before using.

Supporting Report

Chapter 4.
Hydrological Conditions in Siem Reap

SR 4-1(1) Simultaneous Groundwater Level Observation Survey Data Sheet

Table 4.1.1 (1) Data Sheet of Simultaneous Groundwater Level Observation Survey

Serious Code	Survey Code	Lati. Deg.	Lati. Min.	Lati. Sec.	Long. Deg.	Long. Min.	Long. Sec.	Address	Onwer	Elevation (m)	Head (cm)	Depth (m)	Level (cm)_R	Level (cm)_D	Type	Pump	Platform	Utility
GWO_001	1-1	13	28	9.7	103	43	35.1	Preah_Ang_Trong	Mr.Srey_Vorn	16.95	77	7.5	167	404	Dug	Yes	Yes	10family,_55p
GWO_002	1-2	13	30	21.5	103	43	36.9	Prolet,Pouk	Mr_Kong_Thy	18.29	69	7	142	632	Dug	No	Yes	4families,23p
GWO_003	1-3	13	31	3.1	103	43	41.1	Trapang_Resey	Mr_Mean_Mot	18.79	71	8	121	446	Dug	No	Yes	2families,10p
GWO_004	1-4	13	31	49.7	103	43	48.5	Kheak_Tom	Mrs_Kim_Savy	19.29	67	4	95		Dug	No	Yes	4families,26p
GWO_005	1-5	13	32	35.8	103	43	42	Trapang_Svay	Mrs_Nok_Pheuk	19.61	68	4	115	395	Dug	No	No	2families,_06p
GWO_006	1-6	13	33	0.4	103	43	25.2	Trapang_Svay	Mrs_Lam_Ran	19.73	25	3	55	234	Dug	No	No	1family,2p
GWO_007	1-7	13	34	14.2	103	42	42.5	Chhouk,Pouk	Mr_Som_Theat	21.17	57	4	92	400	Dug	No	Yes	3families,21p
GWO_008	1-8	13	32	22.4	103	44	6.6	Khek_Tom	Mr_Lat_Lei	19.63	77	6			Dug	No	Yes	3families,10p
GWO_009	1-9	13	32	40.6	103	45	33.1	Kouk_Trach	Mrs._Lon_Le	20.94	60	4	130	337	Dug	No	Yes	7families,39p
GWO_010	1-10	13	32	32.8	103	46	5.5	Kouk_Knang	Mr.Oeun_Chhon	22	50	3	67	282	Dug	No	Yes	3families,15p
GWO_011	1-11	13	31	51.4	103	47	30	Bos_Ta_Trav	Ms._Chhon_Kea	24.27	73	5	109	343	Dug	No	Yes	4families,_18p
GWO_012	1-12	13	32	0.4	103	48	20.1	Ta_Trav	Mrs_Chea_Ploeuy	26.44	71	4			Dug	No	Yes	1family,3p
GWO_013	1-13	13	29	56.6	103	49	48.9	Preah_Korthmey	Mr_Mao_Horn	27.32	74	6	155	330	Dug	No	Yes	2families,11p
GWO_014	1-14	13	30	28.8	103	49	6.1	Svay_Chek	Mrs_Lin_Heam	26.49	71	5	91	280	Dug	Yes	Yes	2families,8p
GWO_015	1-15	13	31	24.6	103	48	57.9	Kandol	Mr_Lon_Vorn	27.15	70	6	110	288	Dug	No	Yes	3families,12
GWO_016	1-16	13	32	1.8	103	48	46.4	Tatrav	Mr_Hun_Mot	27.68	75	5	114	321	Dug	No	Yes	1family,6p
GWO_017	1-17	13	32	45.3	103	48	46.9	Preah_Kor	Mrs_Song_Un	28.96	79	5	106	330	Dug	No	Yes	2families,16p
GWO_018	1-18	13	30	55	103	48	19.8	Kouk_Kok	Mr_Ei_Heat	25.03	77	5	142	366	Dug	No	Yes	2families,14p
GWO_019	1-19	13	30	28.4	103	47	29.1	Kouk_Kok	Mrs_Siem_Sophean	22.74	62	5	115	357	Dug	No	Yes	1family,8p
GWO_020	1-20	13	29	7.7	103	46	46.4	Tnaot_Chrum	Mr_Chhun_Mao	20.14	64	9	164	405	Dug	No	Yes	10family,48p
GWO_021	1-21	13	28	26.6	103	46	36.9	La_Boeuk	Mr_Svang_Hong	20.06	70	NA	245	595	Dug	No	Yes	4families,23p
GWO_022	1-22	13	28	25.4	103	47	16.1	La_Boeuk	Mr_Moun_Khor	20.4	65	5	167	351	Dug	No	Yes	1family,7p
GWO_023	1-23	13	28	28.2	103	47	42.6	Prasat_Char	Mrs_Hang_Hong	20.99	66	7	121	297	Dug	No	Yes	1family,7p
GWO_024	1-24	13	26	47.7	103	49	37.2	Kouk_Beng	Mr_Leoung_Chory	24	63	4	219	390	Dug	No	Yes	3families,15p
GWO_025	1-25	13	26	43.7	103	48	48.4	Kouk_Tnaot	Mrs_Tek_Prun	21.5	69	4	195	315	Dug	No	Yes	3families,16p
GWO_026	1-26	13	26	44.2	103	48	25.4	Kouk_Tnaot	Mr_Chhub_Mul	20.47	67	4	193	315	Dug	No	Yes	5families,22p
GWO_027	1-27	13	26	45.7	103	46	44.1	Peam	Mrs_Chhorm_Ny	20.41	60	5	245	467	Dug	No	Yes	2families,9p
GWO_028	1-28	13	26	45.8	103	45	24.9	Kouk_Thmey	Mrs_Louem_Pech	18.11	67	7	256	485	Dug	No	Yes	6families,36p
GWO_029	1-29	13	26	2.6	103	43	47.5	Kampong_Tayang	Mr_Ea_Phong	15.66	46	4	121	355	Dug	No	Yes	1family,5p
GWO_030	1-30	13	25	19.2	103	43	53.3	Prey_Veng	Mr_Rouen_Sambath	14.93	66	5	150	325	Dug	No	No	1family,4p
GWO_031	1-31	13	24	57.5	103	43	55.9	Prasat,Pouk	Mrs_Mon_Toa	14.62	64	5	164	300	Dug	No	No	3families,17p
GWO_032	1-32	13	24	20	103	44	0.7	Samrong_Yea	Mrs_Thim_Sok	13.58	67	5	149	400	Dug	No	Yes	1family,8p
GWO_033	1-33	13	23	1.9	103	44	6.2	Kouk_Risey	Mr_Mut_Sel	12.16	56	5	214	310	Dug	Yes	No	1family,5p
GWO_034	1-34	13	22	23.6	103	43	48.6	Kouk_Por	Mr_So_Nhek	11.25	67	6	512		Dug	No	Yes	1family,9p
GWO_035	1-35	13	21	58.3	103	43	28.3	Svay_Chek	Mr_Lun_On	10.65	75	5	112	282	Dug	No	No	2families,13p
GWO_036	1-36	13	24	10.5	103	44	13.4	Ta_Chek	Mr_Mouen_Thy	13.46	28	5			Dug	No	No	3families,15p
GWO_037	1-37	13	24	37.2	103	44	46.2	Ampil_Peam	Mr_Hing_Phy	14.21	60	4	135	215	Dug	No	No	3families,14
GWO_038	1-38	13	21	53.3	103	48	40.1	Prey_Thom	Prey_Thom_Pagoda	15.36	50	6	156	326	Dug	No	Yes	NA
GWO_039	1-39	13	21	23.9	103	48	27.1	Phnov,Sambou	Mr_Soeum_Ros	14.43	57	6	105	357	Dug	No	Yes	1family,6p
GWO_040	1-40	13	20	48.5	103	48	48.7	Sambour	Mrs_Soeun_Rean	14.15	55	NA	77	300	Dug	No	No	1family,7p
GWO_041	1-41	13	20	47.1	103	48	16.3	Chey	Mr_Ngoung_Kong	13.7	69	NA	134	365	Dug	No	Yes	1family,5p
GWO_042	1-42	13	21	12.5	103	47	51.9	Tachork	Mrs_Vong_Vet	13.5	71	9	145	285	Dug	No	Yes	1family,7p
GWO_043	1-43	13	22	4.1	103	46	43.5	Kouk_Dong	Mr_Rong_Ron	13.9	76	5	169	300	Dug	No	Yes	Not_use
GWO_044	1-44	13	22	10.7	103	46	25.2	Bueng	Mrs_Chen_Leap	13.87	76	5			Dug	Yes	No	1family,5p
GWO_045	1-45	13	22	2.5	103	46	16.4	Prama	Mr_Phat_Khut	13.34	75	5	138	300	Dug	No	No	1family,4p
GWO_046	1-46	13	22	28.3	103	45	52.8	Prey_Krouch	Mr_Yeoung_Reoub	13.21	62	5	96	407	Dug	No	Yes	1family,5p
GWO_047	1-47	13	23	5.1	103	44	55.7	Kompeum	Mr_Moy_Neou	12.69	80	4	144	295	Dug	No	No	1family,7p
GWO_048	1-48	13	23	25.2	103	45	0.1	Kompeum	Mr_Luch_Lom	13.13	72	7			Dug	No	Yes	1family,2p
GWO_049	1-49	13	23	48.1	103	45	48.1	Chroloang,Knat	Prasat_Pagoda	14.66	53	4.5	160	325	Dug	No	Yes	NA
GWO_050	1-50	13	24	21	103	45	38.9	Kouk_Trach	Mr_Thor_Reas	15.01	68	6	133	343	Dug	Yes	Yes	1family,7p
GWO_051	1-51	13	25	11	103	45	50.5	Knat	Mr_Suy_Sok	17.31	66	4	104	225	Dug	No	Yes	1family,8p

Table 4.1.1 (2) Data Sheet of Simultaneous Groundwater Level Observation Survey

Serious Code	Survey Code	Lati. Deg.	Lati. Min.	Lati. Sec.	Long. Deg.	Long. Min.	Long. Sec.	Address	Onwer	Elevation (m)	Head (cm)	Depth (m)	Level (cm)_R	Level (cm)_D	Type	Pump	Platform	Utility
GWO_052	1-52	13	25	32.3	103	45	22	Bueng Khna	Mr_Nhong_Koeu	16.56	69	5	180	405	Dug	No	Yes	1family,8p
GWO_053	1-53	13	25	56.6	103	44	36.9	Pouk_Chas	Mr_Peam_Nav	16.39	59	5	105	187	Dug	No	Yes	2families,9p
GWO_054	1-54	13	24	33.4	103	46	50.4	Chey	Mr_Lous_Kek	17.09	57	4	70	173	Dug	No	Yes	1family,4p
GWO_055	1-55	13	24	6.2	103	47	34.5	Phrey_Thmey	Mr_Choa_An	17.11	67	4	155	258	Dug	No	Yes	1family,5p
GWO_056	1-56	13	20	32.9	103	51	13.3	Watsuoy	Wat_Svay	15.19	61	5	104	445	Dug	No	Yes	NA
GWO_057	1-57	13	19	49.3	103	50	52.1	Kaknach	Mr._Yen_Houn	13.99	55	4.5	71	427	Dug	No	Yes	1family
GWO_058	1-58	13	19	42	103	50	51.7	Kakranh Village	Mr._Pek_Yek	13.86	56	NA	160	440	Dug	No	Yes	1family
GWO_059	1-59	13	21	8	103	51	23.4	Wat_Dan_Nak	Pogoda	16.5	64	NA	149	452	Dug	No	Yes	NA
GWO_060	1-N-1	13	31	51.3	103	43	46.7	Ka_Ek_Tom Village	Nhim Saved	19.29	75	6		526	Dug	No		
GWO_061	1-N-2	13	30	11.9	103	46	15	Daun_On Village	Khoy_Teb	19.99	60	7		391	Dug	No		1family, 6p
GWO_062	1-N-3	13	29	41.5	103	46	42.6	Niem_Roub_Pagoda	Niem_Roub_pagoda	20.16	65	7		517	Dug	Yes		
GWO_063	1-N-4	13	29	23.1	103	45	56.6	Daun_koav_Village	Khit_Siem	19.51	66	8		416	Dug	No		3family, 11p
GWO_064	2-1	13	18	37.1	103	51	1.1	Arang_Village	Sem (Pagoda_Committee)	12.34	63	13	207	395	Dug	No	Yes	NA
GWO_065	2-2	13	18	15.1	103	50	53.9	Aranh_Village	Kian_Ann	11.92	49	9	105	263	Dug	No	Yes	NA
GWO_066	2-3	13	17	21.2	103	48	58.5	Wat_Phnom_Kraom	Noa_Hurng	10.2	65	15	147	710	Dug	No	Yes	NA
GWO_067	2-4(1)	13	17	18.7	103	48	47.9	Phnum_Kraom	Koe_Sarang	12.01	50	10			Dug	No	No	NA
GWO_068	2-4(2)	13	19	47.7	103	53	13.7	Wat_Chok	Ly_Pich	11.12	78	7			Dug	No	Yes	NA
GWO_069	2-5(1)	13	17	17.8	103	48	43.1	Phnum_Kraom	Chau_Bet	12.8	59	8	287	580	Dug	No	Yes	NA
GWO_070	2-5(2)	13	20	18.6	103	49	58.7	Pou_Bos	Ouv_Sopheap	14.01	62	5	110		Dug	No	Yes	3hours
GWO_071	2-6(1)	13	19	45.4	103	53	18.7	Tachek_Village	Kap	14.59	74	6	118	340	Dug	No	Yes	NA
GWO_072	2-6(2)	13	21	56.2	103	49	43	Krous_Village	Ty	16.33	68	5	815		Dug	No	Yes	8hours
GWO_073	2-7(1)	13	19	39.3	103	53	24.7	Tachek_Village	An_Reiv	14.36	70	5			D_Tube	No	Yes	NA
GWO_074	2-7(2)	13	21	22	103	49	0.5	Takong	Chrak_Cham	14.94	70	4	160	315	Dug	No	Yes	2hours
GWO_075	2-8(1)	13	19	34	103	53	22.4	Tachek_Village	Sok_Norm	14.05	80	6	178	352	Dug	No	Yes	NA
GWO_076	2-8(2)	13	22	23.2	103	49	29.9	Kasekamm	Pich_Sokhan (Monk)	17.29	55	5	160	345	Dug	No	Yes	6hours
GWO_077	2-9(1)	13	19	44	103	53	10.6	Tachek_Village	Nov_Nourm	14.24	73	5	145	335	Dug	No	Yes	NA
GWO_078	2-9(2)	13	22	45	103	50	2.7	Prasat_Patri	Klot_Sou (Monk)	18.51	67	5			Dug	No	Yes	6hours
GWO_079	2-10(1)	13	19	45.9	103	53	13.7	Tachek_Village	Ly_Phaiy	14.42	60	5	110	297	Dug	No	No	NA
GWO_080	2-10(2)	13	19	38.7	103	53	48.5	Bos_Kralanh	Namm	14.3	69	4	110	320	Dug	No	Yes	3hours
GWO_081	2-11	13	19	43.7	103	55	22	Khun_Mouk,Kandek	Porm_Porn	14.31	58	5	92	327	Dug	No	Yes	4hours
GWO_082	2-12	13	19	34.3	103	56	19.6	Chres	Sang_Chamreon	13.98	60	5	110		Dug	No	No	3hours
GWO_083	2-13	13	19	30.1	103	56	39.6	Chres	Sain_Pov	13.73	70	4	110	315	Dug	No	Yes	4hours
GWO_084	2-14	13	19	28.2	103	57	7.8	Ou	Pa_Thim	13.87	76	6	145	345	Dug	No	No	6hours
GWO_085	2-15	13	20	8.7	103	57	58.7	Ov_Laok	Kinal	15.75	73	4	150	366	Dug	Yes	Yes	6hours
GWO_086	2-16	13	20	1.6	103	58	42.2	Thnal_Trang	Em_Preach	16.12	60	5	132	337	Dug	No	Yes	8hours
GWO_087	2-17	13	19	12.7	103	59	56.7	Momeanh	Paiy	16.06	74	4	116	345	Dug	No	Yes	NA
GWO_088	2-18	13	19	0	103	59	37.5	Ta_Preak	Chea_Ourm	15.26	40	3	96		Dug	No	No	4hours
GWO_089	2-19	13	18	47.1	103	59	22.7	Kanchor	Primary_School	14.49	82	6	154	400	Dug	No	Yes	NA
GWO_090	2-19_n	13	19	49.2	103	59	3.6	Siem_Moa (Thanal_Trong)	Siem_Moa	16.28	60			375	Dug	No	Yes	8p
GWO_091	2-20	13	19	31.7	103	59	39.2	Ro_Lous	Kim_Hann	16.37	50	5	162	416	Dug	No	No	4hours
GWO_092	2-21	13	19	47.4	103	58	44.8	Cham_Bak	Suy_Nom	15.67	63	5	115	360	Dug	No	Yes	3hours
GWO_093	2-22	13	21	0.8	103	58	34.4	Loley	Samut	16.91	69	5	122	340	Dug	Yes	Yes	NA
GWO_094	2-23	13	21	6.7	103	59	31	Steung	Mout_Muy	18.88	35	5	180	410	Dug	No	Yes	NA
GWO_095	2-27	13	21	58.6	103	53	40.8	Phum_Chongavsou	Seng_Sareon	18.85	68	4	121	335	Dug	No	No	2hours
GWO_096	2-28	13	20	49	103	55	5.2	Kouk_Tnaot	Cheng_Choun	16.86	71	6	108	295	Dug	No	Yes	4hours
GWO_097	2-29	13	21	36.6	103	55	2.5	Chrey	Som_Sem	18.28	50	5	72	270	Dug	No	No	4hours
GWO_098	2-30	13	22	7.3	103	55	10.1	Prey_Kuy	Sok_Nai	19.87	41	4	95	285	Dug	No	No	5hours
GWO_099	2-31	13	21	34.9	103	52	50.6	Lucky_Hotel	Thea_Siva	17.7	10	NA			Dug	Yes	Yes	10 m^3
GWO_100	2-32	13	21	36.8	103	52	12.7	Sery_Pheap_Hotel_	Ly_Vong_D	17.68	10	NA	415		Dug	Yes	Yes	21 m^3

Table 4.1.1 (3) Data Sheet of Simultaneous Groundwater Level Observation Survey

Serious Code	Survey Code	Lati. Deg.	Lati. Min.	Lati. Sec.	Long. Deg.	Long. Min.	Long. Sec.	Address	Onwer	Elevation (m)	Head (cm)	Depth (m)	Level (cm)_R	Level (cm)_D	Type	Pump	Platform	Utility
GWO_148	3-8	13	26	46.4	103	49	31	Kouk_Beng	Che_Sarouert	23.65	60	5			Dug	No	Yes	20minutes
GWO_149	3-8(2)	13	31	26.4	103	56	30	Prei	Mr_Prok	41.55	68	4	100	317	Dug	No	No	20minutes
GWO_150	3-9(1)	13	26	43.8	103	49	12.9	Kouk_Beng	Som_Sea	22.69	67	5			Dug	No	Yes	20minutes
GWO_151	3-9(2)	13	28	1.5	103	56	17.8	Ta_Kos_	Mrs_Lem_Lean	30.58	71	6		423	Dug	No	Yes	40minutes
GWO_152	3-9(2)n	13	28	1.3	103	56	17.7	Ta_Kos_	Mrs. Souern_Chhean	30.59	73	7	189		Dug	Yes	Yes	NA
GWO_153	3-10(1)	13	26	43.8	103	48	48.2	Kouk_Beng	Tek_Proon	21.49	72	4			Dug	No	Yes	1hourour
GWO_154	3-10(2)	13	32	17.7	103	56	41	Knar	Nhory_Morn(Mrs)	43.35	68	4	91	320	Dug	No	Yes	20minutes
GWO_155	3-11(1)	13	26	45.9	103	49	52.8	Kouk_Beng	Mrs. Meas	24.46	70	5			Dug	No	Yes	20minutes
GWO_156	3-11(2)	13	33	36.1	103	56	58.1	Kos_Chrum	Mrs_Mao_Bouern	48.52	81	6	219	475	Dug	No	Yes	2hours
GWO_157	3-12(1)	13	27	25.9	103	51	18.8	Nokor_Krav	Public_Use	27.12	70	4			Dug	No	No	Not_use
GWO_158	3-12(2)	13	30	52.6	103	56	29.1	Sanday	Mr_Nok_Norn	40.21	60	4	100	298	Dug	No	Yes	1hour
GWO_159	3-13(1)	13	27	27.4	103	51	5	Nokor_Krav	Tem_Sok	27.08	78	8	276	518	Dug	No	Yes	40minutes
GWO_160	3-13(2)	13	29	24.3	103	56	29.1	Takos	Mr_Houn	34.12	73	4	103	343	Dug	No	No	20minutes
GWO_161	3-14(1)	13	27	23.5	103	50	44.4	Nokor_Krav	Hin_Dong	26.69	34	6	236	452	Dug	No	Yes	20minutes
GWO_162	3-14(2)	13	28	20.9	103	56	20.2	Popel_Chrum	Mrs_Pong_Ngeak	29.9	87	4	172	423	Dug	No	No	20minutes
GWO_163	3-15(1)	13	27	35.2	103	50	45.2	Nokor_Krav	Sem_Phon	27.37	66	5	83	335	Dug	No	No	Not_use
GWO_165	3-16	13	26	42.2	103	56	19.3	Preah_Dak	Mrs_Kun_Sreynat	28.27	75	5	127	260	Dug	Yes	Yes	1hour
GWO_166	3-17	13	29	9.1	103	58	36.9	Sala_Kravan	Mrs_Poy_Keng	33.9	64	5	157	439	Dug	No	No	20minutes
GWO_167	3-18	13	28	38.2	103	59	30.8	Sre_Chong_Hot	Mrs_Heng_Ton	33.21	54	3	125	372	Dug	No	Yes	10minutes
GWO_168	3-19	13	27	33.6	103	59	4.8	Run_Ta_Ek	Mr_Kuk_Lin	40.84	48	13	787		D_Tube	No	Yes	20minutes
GWO_169	3-19n	13	27	31.5	103	59	0.8	Run_Taek	Mr. Chey_Sarat	41.82	57	10.5		977	Tube	No		45minutes
GWO_170	3-20	13	26	40.1	103	57	22.3	O_Ta_Teng	Mr_Chhert_Chhorng	28.45	72	4	69	282	Dug	No	No	20minutes
GWO_171	3-21	13	26	37.6	103	55	49.1	Preah_Dak	Mrs_Srey	27.98	63	3	145	233	Dug	Yes	Yes	2hours
GWO_172	3-22	13	21	16.4	103	58	26.3	Lolei	Mrs_Chhut_	17.92	59	4	98	311	Dug	No	No	20minutes
GWO_173	3-23	13	21	16.1	103	57	45.5	Lolei	Mr_Lach_Ly	17.13	68	3	95	297	Dug	No	No	20minutes
GWO_174	3-24	13	23	5	103	57	14.2	Tra_Peang_Run	Mrs_Kruch_Kha	20.62	74	4	133	307	Dug	No	Yes	30minutes
GWO_175	3-25	13	24	30.6	103	57	12	Ta_Pang	Mrs_Um_Rat	23.96	63	3	112	317	Dug	No	Yes	30minutes
GWO_176	3-26	13	25	19	103	57	14.1	Khiri_Minon	Mrs_Tuch_Savong	25.9	66	4	124	309	Dug	No	Yes	20minutes
GWO_177	3-27	13	24	28.4	103	57	4.1	Ta_Pang	Mr_Douerm	23.83	57	3			Dug	No	Yes	20minutes
GWO_178	3-28	13	23	48.2	103	57	5.1	Tra_Peang_Run	Mr_Eang_Eourn	22.46	70	8	250	433	Dug	No	Yes	1hour
GWO_179	3-29	13	23	41.6	103	56	6.7	Tral_Bak	Mrs_Ou_Sot	22.12	55	3	95		Dug	No	Yes	20minutes
GWO_180	3-30	13	24	46.2	103	55	52.4	Trach_Chrum	Mrs_Nouerm_Yi	24.44	65	4	131	307	Dug	No	Yes	20minutes
GWO_181	3-31	13	23	54.7	103	55	39.1	Bos_Tom	Mr_Chea_Loa	22.64	55	4	92	279	Dug	No	No	1hour
GWO_182	3-32	13	22	54.1	103	55	23.5	Kok_Chan	Mrs_Tuch_Kong	20.74	60	4	98	295	Dug	No	Yes	30minutes
GWO_183	3-33	13	22	54.2	103	55	23.6	Spean_Thei	Mrs_Horng_Sout	20.74	73	6			Dug	No	Yes	2hours
GWO_184	3-34	13	33	0.7	103	52	59	Sandan	Mr_Mit_Ry	43.18	74	5	140	356	Dug	No	Yes	1hour
GWO_185	3-35	13	31	12.5	103	52	43	Bompenh_Reach	Mrs_Bong_Kerng	37.52	65	8	107	358	Dug	No	Yes	30minutes
GWO_186	3-36	13	30	15.2	103	52	34.4	Trapang_Svay	Mr_Sanh_Say	34.68	60	6	91	252	Dug	No	Yes	30minutes
GWO_187	3-37	13	29	9.7	103	52	13.9	Phlung_Village	Mr_Ean_San	30.67	71	4	110	350	Dug	No	No	30minutes
GWO_188	3-38	13	29	34.2	103	50	54.8	Kouk_Kreul	Mrs_Soum_Sam_Ol	29.23	55	3	68	253	Dug	No	No	30minutes
GWO_189	3-39	13	29	49.5	103	50	0.9	Preah_Kor_Thmery	Mrs_Lam_Phalnith	27.63	73	6	185	360	Dug	No	Yes	30minutes
GWO_190	3-40	13	29	33	103	53	56	Sam_Raong	Soum Moa	34.06	68	6	190	446	Dug	No	Yes	2hours
GWO_191	3-41	13	29	9.3	103	53	53.8	Sam_Raong	Mrs_Sao_Houn	32.59	79	6	169	431	Dug	No	Yes	2hour
GWO_192	3-42	13	30	8.5	103	53	11.4	Ta_Prok	Mrs_Keab_Eam	35.34	75	8			Dug	No	Yes	20minutes
GWO_193	3-43	13	29	4.7	103	53	8.6	Leang_Dai	Ms_Pat_Kert	31.72	79	6	129	397	Dug	No	Yes	30minutes
GWO_194	3-44	13	28	35.9	103	53	2.7	Leang_Dai	Mr_Chhen_Chea	30.13	75	6	116	361	Dug	Yes	Yes	20minutes
GWO_195	3-45	13	28	45.5	103	52	15.7	Phlung_Village	Mr_Meas_Mouery	30.07	75	10	244	470	D_Tube	No	Yes	2hours
GWO_196	3-46	13	26	55.4	103	51	28.6	Tep_Pronom	Pagoda	27.01	50	15	489	912	Dug	No	Yes	2hours
GWO_197	3-47	13	25	59.3	103	53	50.8	Rohal	Mrs_Chhun_Pheap	26.16	85	6	208	556	Dug	No	Yes	3hours
GWO_198	3-48	13	26	1.3	103	54	33.4	Sras_Srong	Mrs_Such_Eang	27.69	60	5	145		Dug	No	Yes	30minutes
GWO_199	3-49	13	25	23.3	103	54	8.8	Kravann	Mrs_Thy	25.3	96	4	125	410	Dug	No	No	NA

Table 4.4.1 (4) Data Sheet of Simultaneous Groundwater Level Observation Survey

Serious Code	Survey Code	Lati. Deg.	Lati. Min.	Lati. Sec.	Long. Deg.	Long. Min.	Long. Sec.	Address	Onwer	Elevation (m)	Head (cm)	Depth (m)	Level (cm)_R	Level (cm)_D	Type	Pump	Platform	Utility
GWO_200	3-50	13	24	36.4	103	52	0	Angkor_Toch_Pagoda	Na	24.77	44	10	378	560	Dug	No	Yes	2hours
GWO_201	3-51	13	25	42.3	103	50	27.3	Kouk_Tachan	Mr_Khem_Lunh	24.49	84	5	227	406	Dug	Yes	No	1hour
GWO_202	3-52	13	25	9.8	103	47	19.2	Chrey	Mr_Chum_Kong	19.54	50	4	133	244	Dug	No	Yes	1hour
GWO_203	3-53	13	24	49.6	103	49	19.8	Prie_Village	Mrs_Meas_Sam_Oern	20.87	59	4	148	381	Dug	Yes	Yes	30minutes
GWO_204	3-54	13	25	24.4	103	49	4.3	Ban_Teay_Chheu	Mrs_Phlong_Meas	21.77	80	6	385		Dug	No	No	NA
GWO_205	3-54n	13	21	44.8	103	51	22.7	Banteay Chheu	Mrs. Ry	17.95	50	6		315	Tube	No	Yes	1hour
GWO_206	3-55	13	25	13.1	103	48	43.5	Ban_Teay_Chheu	Mr_Man_Neang	20.63	55	4	140	335	Dug	No	Yes	20minutes
GWO_207	3-56	13	25	13	103	47	50.6	Chrey_Primary_School	Na	19.91	52	5	139	326	Dug	No	Yes	20minutes
GWO_208	3-57	13	26	10.3	103	56	6.3	Ta_Tray	Mrs._Sorn_Noun	26.94	63	4	87	282	Dug	No	No	20minutes
GWO_209	3-58	13	25	21.9	103	56	0.6	Kiri_Meanon	Mes._Raeb	25.77	50	4	140	331	Dug	No	Yes	30minutes
GWO_210	3-59	13	23	43.4	103	56	39.4	Trapeang_Run	Mr._Map_Meat	22.37	58	5	171	355	Dug	No	Yes	20minutes
GWO_211	3-60	13	21	49.7	103	48	17.8	Sarangae	Mrs. Chheurm Sopheap	14.84	59	4		340	Tube	Yes	Yes	4.5hour
GWO_212	3-61	13	20	57.2	103	51	16	Sala Kam Rewak	Ngeat Somneang	16.06	50	5		317	Dug	No	No	0.5hour

Supporting Report

Chapter 5.
Groundwater Simulation

SR 5-1(1) Volume Compressibility (Mv) Test Result

Table 5.1.1 (1) Soil Laboratory Test in 1998-1999

Volume compressibility (Mv) test result is derived from the previous JICA study (The Study on Water Supply System for Siem Reap Region in Cambodia, 2000)

Hole No.	Sample No.	Depth (m)	ESO including plasticity creep area (ton/m^2)	ESO in Elastic area (ton/m^2)	Poisson 's Ratio	Coefficeint of Volume Compressibility (m^2/kg)	Thickness (m)	Drawdown (m)	Specific Weight of Water (kg/m^3)	Settlement (mm)
WT-3	DB-2B	20.40-20.50	489	1525	0.3	4.87E-07	5	2.300	1000	5.60
WT-3	DB-3	27.20-27.50	1464	3250	0.3	2.29E-07	5	2.300	1000	2.63
WT-3	DB-4A	29.00-29.50	174	5700	0.3	1.30E-07	5	2.300	1000	1.50
WT-3	DB-4B	29.00-29.50	8177	11450	0.3	6.49E-08	5	2.300	1000	0.75
WT-3	DB-5A	33.00-33.45	472	850	0.3	8.74E-07	5	2.300	1000	10.05
WT-3	DB-5B	33.00-33.45	396	867	0.3	8.57E-07	5	2.300	1000	9.85
WT-3	DB-6A	36.10-36.60	1015	1577	0.3	4.71E-07	5	2.300	1000	5.42
WT-3	DB-6B	36.10-36.60	1150	19400	0.3	3.83E-08	5	2.300	1000	0.44
WT-4	DB-1	9.40-9.60	579	1367	0.3	5.43E-07	5	2.300	1000	6.25
WT-4	DB-2A	18.40-18.80	1463	2225	0.3	3.34E-07	5	2.300	1000	3.84
WT-4	DB-2B	18.40-18.80	1314	2308	0.3	3.22E-07	5	2.300	1000	3.70
WT-4	DB-3	29.20-29.50	786	1427	0.3	5.21E-07	5	2.300	1000	5.99
WT-4	DB-4A	32.50-32.95	8138	16250	0.3	4.57E-08	5	2.300	1000	0.53
WT-4	DB-4B	32.50-32.95	4553	7619	0.3	9.75E-08	5	2.300	1000	1.12
WT-4	DB-5	36.75-37.00	7498	23095	0.3	3.22E-08	5	2.300	1000	0.37
WT-4	DB-6A	54.60-55.00	2224	3926	0.3	1.89E-07	5	2.300	1000	2.18
WT-4	DB-6B	54.60-55.00	1393	1675	0.3	4.43E-07	5	2.300	1000	5.10
WT-4	DB-7A	57.10-57.45	1154	1541	0.3	4.82E-07	5	2.300	1000	5.54
WT-4	DB-7B	57.10-57.45	1414	1414	0.3	5.25E-07	5	2.300	1000	6.04
WT-5	DB-1	14.00-14.50	447	618	0.3	1.20E-06	5	2.300	1000	13.82
WT-5	DB-3A	46.70-47.00	1225	2286	0.3	3.25E-07	5	2.300	1000	3.74
WT-5	DB-3B	46.70-47.00	1059	1259	0.3	5.90E-07	5	2.300	1000	6.79
WT-5	DB-4	53.60-53.90	156	1864	0.3	3.99E-07	5	2.300	1000	4.58
WT-5	DB-5A	58.50-59.00	1819	1921	0.3	3.87E-07	5	2.300	1000	4.45

Table 5.1.1 (2) Soil Laboratory Test in 1998-1999

Volume compressibility (Mv) test result is derived from the previous JICA study (The Study on Water Supply System for Siem Reap Region in Cambodia, 2000)

Hole No.	Sample No.	Depth (m)	ESO including plasticity creep area (ton/m^2)	ESO in Elastic area (ton/m^2)	Poisson 's Ratio	Coefficeint of Volume Compressibility (m^2/kg)	Thickness (m)	Drawdown (m)	Specific Weight of Water (kg/m^3)	Settlement (mm)
WT-7	DB-2B	19.00-19.60	428	1625	0.3	4.57E-07	5	2.300	1000	5.26
WT-7	DB-3	23.00-23.40	346	771	0.3	9.63E-07	5	2.300	1000	11.08
WT-7	DB-4A	27.15-27.50	2411	7667	0.3	9.69E-08	5	2.300	1000	1.11
WT-7	DB-4B	27.15-27.50	3411	7400	0.3	1.00E-07	5	2.300	1000	1.15
WT-7	DB-5A	35.50-35.80	401	1663	0.3	4.47E-07	5	2.300	1000	5.14
WT-7	DB-5B	35.50-35.80	475	1813	0.3	4.10E-07	5	2.300	1000	4.71
WT-7	DB-6A	46.20-46.75	618	1115	0.3	6.66E-07	5	2.300	1000	7.66
WT-7	DB-6B	46.20-46.75	718	1905	0.3	3.90E-07	5	2.300	1000	4.48
WT-7	DB-7	48.25-48.50	890	1500	0.3	4.95E-07	5	2.300	1000	5.70
WT-8	DB-1	9.40-9.80	362	383	0.3	1.94E-06	5	2.300	1000	22.31
WT-8	DB-3A	45.50-45.90	918	923	0.3	8.05E-07	5	2.300	1000	9.26
WT-8	DB-3B	45.50-45.90	927	927	0.3	8.01E-07	5	2.300	1000	9.22
WT-8	DB-4A	53.05-53.35	1220	1771	0.3	4.19E-07	5	2.300	1000	4.82
WT-8	DB-4B	53.05-53.35	992	1149	0.3	6.47E-07	5	2.300	1000	7.44
WT-8	DB-6	80.00-80.40	1060	1096	0.3	6.78E-07	5	2.300	1000	7.79
WT-8	DB-7	84.50-84.75	332	453	0.3	1.64E-06	5	2.300	1000	18.86