Annex-9

Social Condition Survey

A9-1 Survey Contents

Based on the initial/additional request from the Djibouti government, settlements accessible by car (shown in Table A9-1) were chosen for the social situation survey.

Table A9-1 List of Social Situation Survey

No.	Province	Settlement	Initial Request (MM)	Additional Request
1	Dikhil	Unda Yaggouri	●	
2		Unda Yaggouri(2)		●
3		As-Eyla	●	
5		Gaali Hatayata	●	
6		Blan Bale	●	
7		Sankal		●
8		Zina Male	●	
9		Kouta Bouya	●	
10		Daguiro	●	
12		Garafi		●
13		Hombola		●
15		Sek Sabir		●
16		Assa Koma		●
17		Mindil		●
18		Afkha Arraba		●
21	Ali-Sabieh	Hambocta	●	
22		Guelile	●	
23		Midgan	●	
24		Hol Hol(Digri)	●	
25		Assamo	●	
26		Doussagoud Moune	●	
27		Ali Adde	●	
29		Midgarra		●
30		Ouarabalei		●
31	Arta	Hilbahey	●	
32		Petit Bara	●	
33		PK30	●	

In each settlement shown above, there are several camps and a settlement leader who represents all the camps. The Survey Team visited the camp where the settlement leader resides. Furthermore, the Survey Team visited surrounding camp(s) that were accessible by car. In each camp, a questionnaire survey was given to the settlement leader (camp leader) (+ its committee), female residents and households.

A9-2 Survey Results

In order to evaluate the potential ability to conduct water supply facility O&M (operation and maintenance), items such as the existing type of water source that inhabitants are using, situation of illness due to unclean water, distance to water source, and water consumption rate per day were included in the questionnaire. Furthermore, experience in participating in a water management committee or women's association, willingness to pay for water and at what amount were also included. Based on the results, the priority to construct a water supply facility is summarized in Table A9-4. The situation of each settlement is summarized in Table 9-5(a)~(m). At settlements that were chosen to conduct trial wells, the outline of the water management committee was explained to the settlement leader and its committee. After the explanations, the settlement leader was asked to sign an agreement stating that a water management committee will be established when the water supply facility is constructed. (See Table A9-6).

Although there are existing water supply facilities (deep wells) at As Eyla and Galafi,

the deep wells are not being used to their full capacity. These wells need to be rehabilitated or require a system readjustment (e.g. change the pump if the pump capacity is not adequate or add solar panels if power is not sufficient). Therefore, As Eyla and Galafi are excluded from this Project, which constructs only new water supply facilities. Furthermore, because the population at Hombola and Digri is small, these two (2) areas are also excluded from this project.

(1) Economic Situation

Nomadic people live in the target area of this Project, and they raise livestock such as goats, sheep, donkeys, camels, etc. The milk of goats, sheep and camels is one of their sources of income. Camels and donkeys are raised to transport material, water, cabin baggage, etc. Goats and sheep are raised for food, and for selling when nomadic people need a large amount of revenue. However, due to the recent droughts, the number of livestock has decreased and has made the life of nomadic people tougher.

Natural coconut groves are present in the Daguiro region. People who live around this area sell coconut handicrafts. In Assamo, Hambocta (in Ali Sabieh) and Afka Arraba, Mindli (in between Mouloud and Dikhil), there are irrigation systems using well water and people in these areas sell agricultural products.

(2) Population

The total population of Djibouti is 818,159 (as of 2009, Census Data by Department of Statistics), and 70% of the people live in urban areas. Furthermore, 86% of the urban population lives in Djibouti city.

On the other hand, the distribution of the rural population for three (3) provinces in southern Djibouti is shown in Table A9-2. The total population is 205,008. 69% (142,192 people) of this population, including nomads, live in rural areas.

Table A9-2 Rural Population and its Distribution Situation

Region	Area (km^2)	Population			Density in Rural (Pop./km^2)	Estimated Population in Radius 5km
		Urban	Rural (+ Nomad)	Total		
Dikhil	6,450	24,886	64,062	88,948	9.9	777
Ali Sabieh	2,060	37,939	49,010	86,940	23.8	1,868
Arta	2,025	13,260	29,120	29,120	14.4	1,130

(3) Form of Settlement / Ethnic Groups

In the target area, inhabitants live in a small family unit, called a camp. Several camps are scattered in a settlement and there is a settlement leader.

The major ethnic group in Djibouti is the Afar ethnic group (of Ethiopian origin) and the Issa ethnic group (of Somalian origin). In Ali Sabieh Prefecture, the majority is the Issa ethnic group. In Dikhil/ Arta Prefecture, both the Afar ethnic group and Issa ethnic group are the majorities. There are settlements that consist of these two (2) ethnic groups, but there is no camp that consists of two (2) ethnic groups. At present, there are no ethic conflicts. In some settlements, these two (2) ethnic groups work together to construct roads. However, in general, it seems that there is little cooperation between ethnic groups. Therefore, when water supply facilities are constructed, O&M education shall be instructed by the government.

(4) Water Supply / Water Resource Situation

The water supply ratio in Djibouti city is 92%, however it is only 54% in rural areas (as

of 2006). Other than in Guelile (Ali Sabieh Prefecture), Sek Sabir and Sankal (Dikhil Prefecure) in the target area, settlements are formed by camps that are scattered. Since camps are scattered, there are no water supply facilities. People in these settlements generally use water from shallow wells but these wells tend to dry up during the dry season. As a countermeasure, water tanks have been installed and water trucks are expected to distribute water to the tanks. However, due to a shortage of fuel, water trucks are not supplying water in many areas. As an emergency measure, people pool funds to buy water. When there is a lack of water and food for livestock, people tend to move from where they live to a new area.

Due to the recent droughts, the water shortage situation is continuing and nomadic people are losing their livestock. To mitigate this situation, the Djibouti government is implementing a policy to promote nomads to settle down in one area and to promote agriculture. In order to support this policy of the Djibouti government, water supply facilities are necessary.

(5) Education

In the target area, children and women are in charge of fetching water. Since there is a water shortage, fetching water is time consuming and difficult. Table A9-3 shows the education situation for three (3) southern provinces. In the target area, only Sankal has a primary school. Since primary schools are not present in the other target areas, children in these areas need to go to primary school in Dikhil, Yoboki or As Eyla. In order to attend these schools, children need to leave their home and stay at a dormitory or acquaintance's home.

Table A9-3 Education Situation in Three (3) Southern Provinces

Region	Primary School*1	Junior High School*1	Total*1	Population	Percentage Attending Primary / Junior High School among Number of School Age Children (%)	Number of School Age Children	Rate of School Attendance (%)
Dikhil	4282	2012	6294	88,948	22.14*2	19,693	32.0
Ali-Sabieh	4148	2161	6309	86,940	14.76 (Primary School)	19,249	32.8
Arta	2084	671	2755	29,120		6,447	42.7

*1 Department of Education, Annual Statistics 2008-2009
*2 Department of Statistics (DISED) 2002/2003

The rate of school attendance for the three (3) prefectures is between 32% and 43%. Considering that the rate of school attendance in urban areas is higher than rural areas, the rate of school attendance in rural areas is assumed to be about 25%. If water supply facilities are constructed in the target area, water-drawing labor will be less time consuming and it is expected that the rate of school attendance in these areas will increase. Furthermore, owing to water supply facilities, the population will increase. As a result, schools might be constructed and rates of school attendance in rural areas will increase.

(6) Healthcare / Medical Treatment

The child mortality rate is 6.7% (MICS/EDIM-2006 Survey) and the major causes are Acute Respiratory Infection (ARI) (such as pneumonia), diarrhea, malaria and malnutrition. Since most of the settlements in the survey area do not have clinics or hospitals, there are no data showing the causes of child mortality. Based on the questionnaire results, bronchial infections and diarrhea are the major causes of child mortality.

Drinking polluted water cause diarrhea. During the survey, water quality analysis was conducted and bacillus coli was detected from almost all the shallow wells. When livestock excreta penetrate into the shallow wells, or contaminated pails are used to

draw water from the shallow wells, the water will be polluted.
Furthermore, contaminants on surfaces can be flushed by rainfall causing pollution of the shallow water layer. In April 2010, a mass diarrhea outbreak occurred in Ali Adde (Ali Sabieh Prefecture) and was assumedly caused by heavy rain right before the outbreak. If water supply facilities (deep wells) are constructed by this Project, it is expected that the rate of illness due to water contamination will decrease.

Table A9-4 Result of Social Survey

Prefecture	Settlement	Water Usage Situation, etc.	Target Population		Water Resource		Illness due to Water		Distance to Water Resource		Water Consumption per Day		Top: Willingness to Establish Water Committee Bottom: Experience in Joining Committee		Willingness to pay for Water		Total Point	Priority
			People	Point	Type	Point	Type	Point	Km	Point	L/ person	Point		Point	DJF	Point		
Dikhil	As Eyla	Water is not sufficient because fuel to generate pump is not adequate. Priority is higher for improving the existing facility rather than constructing a new facility. Thus, this Project will not construct a facility at this site.	0		-	-	-	-	-	-	-	-	－ －	-	-	-	—	×
	Assa Koma	Inhabitants get water from traditional hand dug wells. Although more water is necessary, it is not difficult to get water at this site.	1020	3	A B	2	Diarrhea Cholera	3	0.5 – 1.5	2	10	4	－ ○	2	100	2	18	○
	Daguiro	Water trucks have not supplied water to this site for a long time. Inhabitants get water from traditional hand dug wells.	682	2	A (C)	3	-	1	0.5	1	11	4	○ ×	2	50	2	15	○
	Unda Yagouri (2)	There is no water source near this area. Inhabitants get water from Daguiro, which is 5 km away.	912	2	A	3	-	1	5.0	3	30	1	× ×	1	200	3	14	△
	Garil Hatayata	Although inhabitants insist that there is not enough water, it is easy to get water from the shallow water layer at this site. Sanitary conditions are not good.	2300	3	A	3	Stomach ache	2	1	1	10	4	○ ○	3	100	2	18	○
	Galafi	Pump power source was changed to solar power from fuel (diesel generator). However, amount of pumped water has decreased due to the change. Instead of constructing a new facility, readjustment of the existing facility has a higher priority.	0		-	-	-	-	-	-	-	-	－	-	-	-	—	×
	Kouta Bouya	Since salinity of groundwater is increasing and the concentration of arsenic/fluorine is higher than water quality standards, it is difficult to develop a water supply facility in this area.	5500	3	A B	2	Diarrhea Stomacha che Dysentery	3	0.5 - 2	2	12	4	○ ×	2	100	2	18	○
	Zina Male	Inhabitants get water from traditional hand dug wells and springs. Inhabitants can access deep wells (in some camps) but they are far away.	592	2	A (D)	3	Diarrhea	2	1 - 15	3	7	4	○ ×	2	100	2	18	○

Prefecture	Settlement	Water Usage Situation, etc.	Target Population		Water Resource		Illness due to Water		Distance to Water Resource		Water Consumption per Day		Top: Willingness to Establish Water Committee Bottom: Experience in Joining Committee		Willingness to pay for Water		Total Point	Priority
			People	Point	Type	Point	Type	Point	Km	Point	L/ person	Point		Point	DJF	Point		
	Blan Bale	Although inhabitants did not insist that water is insufficient, inhabitants get water from a deep well in Mouloud / Dikhil (10~15 km away).	272	1	A (D)	3	Diarrhea	2	10 - 15	3	7	4	× ×	1	250	3	17	○
	Sek Sabir	Inhabitants get water from traditional hand dug wells. Water trucks come rarely.	1888	3	A,B (C)	2	Diarrhea	2	0.5 - 2	2	27	1	○ ○	3	100	2	15	○
	Afka Araba	Although there is a small-scale plantation, there is not enough water due to drought. It seems that many inhabitants have left this area because water is insufficient.	250	1	A B	2	-	1	0.5	1	18	3	○ ×	2	100	2	12	×
	Mindil	Some inhabitants get water from a public tap (water from Mouloud: 10 km pipeline) Basically, inhabitants depend on water from water trucks. Only a few wells exist in this area.	496	2	A (C,D)	3	-	1	2－10	3	20	2	○ ×	2	50	2	15	○
	Hombola	During the social survey, there was only 1 household at this site. The number of inhabitants change depending on the season. O&M will be difficult if there are not enough inhabitants throughout the year.	0		-	-	-	-	-	-	-	-	－	-	-	-	—	×
	Sankal	Inhabitants cross the border to get water from a shallow well in Ethiopia. Water quality is poor. Disinfectant is added to the water before drinking. Water is insufficient and nomads are losing their livestock.	3000	3	A	3	Cholera	3	2	2	15	3	○	2	65	2	18	○
Ali Sabieh	Ali Adde	Although there are public taps, water supply for these taps is insufficient. Therefore, many inhabitants get water from traditional hand dug wells. Water trucks rarely come to this site because road conditions are poor. Food is sufficient.	875	2	A B (D)	2	Diarrhea Cholera	3	0.1-1	1	9	4	○ ○	3	100	2	17	○
	Assamo	There is a deep well at the school/clinic and water is sufficient. Water for agriculture is	750	2	B D	1	Diarrhea	2	0.1- 0.7	1	25	1	○ ○	3	50	2	12	×

Prefecture	Settlement	Water Usage Situation, etc.	Target Population		Water Resource		Illness due to Water		Distance to Water Resource		Water Consumption per Day		Top: Willingness to Establish Water Committee Bottom: Experience in Joining Committee		Willingness to pay for Water		Total Point	Priority
			People	Point	Type	Point	Type	Point	Km	Point	L/ person	Point		Point	DJF	Point		
		pumped up by solar system.																
	Dousagoud Moune	Water trucks supply water to this site because there is a school/mosque. Construction of a water supply facility is desired at this site.	2400	3	A B	2	Diarrhea	2	0.3 - 4	3	18	3	○ ○	3	100	2	18	○
	Guelile	During the dry season, shallow wells often dry up. Although the degree of water insufficiency is not high, it is desirable to construct a water supply facility at this site because this is a border town.	2065	3	B	2	-	1	0.6	1	14	3	○ ○	3	50	2	15	○
	Hambocta	Many inhabitants insist that water is insufficient. This site is along a national road and there is a school and farms. This Project was asked to install pipes from the existing well to the school (capacity of existing well is unknown).	675	2	B	2	-	1	0.1 - 3	2	17	3	○ ○	3	50	2	15	○
	Digri	All the inhabitants who answered the questionnaire insisted that water is insufficient. This settlement is a part of Hol Hol.	50	1	A	3	-	1					× ×	1			—	×
	Midgan	Inhabitants get water from traditional hand dug wells along the wadi. This site is at the upstream of wadi, so there is little water, especially during the dry season. Water consumption rate is low (6 L/d).	385	1	A B	2	-	1	1 - 4	3	6	4	× ×	1	50	2	14	△
	Midgarra (for Ali Adde)	During the social survey, there were no inhabitants at the site. In order to supply water to Ali Adde, this Project will construct a well at this site.	0	-	-	-	-	-	-	-	-	-	−	-	-	-	—	×
	Hol Hol	Water consumption is 17 L/d, which is not high. Water is insufficient for the population. It is easy to access to water at this site.	0	-	-	-	-	-	-	-	-	-	−	-	-	-	—	×

Prefecture	Settlement	Water Usage Situation, etc.	Target Population		Water Resource		Illness due to Water		Distance to Water Resource		Water Consumption per Day		Top: Willingness to Establish Water Committee Bottom: Experience in Joining Committee		Willingness to pay for Water		Total Point	Priority
			People	Point	Type	Point	Type	Point	Km	Point	L/ person	Point		Point	DJF	Point		
	Ouarabalei	Many inhabitants insist that water is insufficient. Water consumption is low (20 L/d). Distance to the water source is far.	680	2	A	3	Diarrhea	2	10－15	3	20	2	○ ×	2	100	2	16	○
Arta	PK30	All inhabitants get water from water trucks. Thus, water that inhabitants can use is limited.	450	1	C	2	Diarrhea	2	0.1－2	2	10	4	○ ○	3	50	2	17	○
	Petit Bala	Water is insufficient and access to water is difficult because this site is in a mountainous area and is far from the national road.	620	2	A C	2	Diarrhea	2	0.1－2	2	16	3	○ ×	2	100	2	15	○
	Hilbahey	There is a well protected by concrete at the valley entrance. Inhabitants come to this well to get water.	750	2	B C	2	-	1	0.2－3	2	9	4	○ ×	2	100	2	15	○

Target Population
1 point: below 400 people, 2 points: 401 ~ 1000 people, 3 points: over 1001 people

Water Source
A: Traditionally well constructed by manpower, B: Protected shallow well, C: Water truck, D: Deep well / 1 point: D, 2 points: B or C, 3 points: A

Illness due to Water
1 point: Nil, 2 points: Diarrhea, 3 points: Infectious disease such as cholera, etc.

Distance to Water Source
1 point: less than 1 km, 2 points: 1～4 km、3 points: over 4 km

Water Consumption Rate
1 point: over 25 L/d, 2 points: 20~24 L/d, 3 points: 14~19 L/d, 4 points: under 13 L/d

Willingness to Establish Water Committee / Experience Joining Committee
1 point: not willing to establish water committee / no experience joining committee,
2 points: either willing to establish water committee or have experience joining committee,
3 points: willing to establish water committee and have experience joining committee

Willingness to Pay for Water Tariff
1 point: not willing to pay, 2 points: willing to pay below 100 DJF, 3 points: willing to pay above 101 DJF

Priority
over 15 points: ○ High priority, 13～14 points: △ medium priority, below 12 points: × Low priority

Table A9-5(a) Results of Social Situation Survey (1)

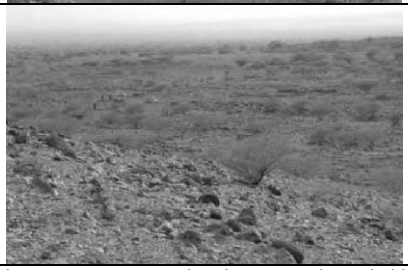
No.1	Unda Yaggouri (2)	As-Eyla
Settlement Location		
Settlement Situation		
Well Drilling Location		Additional well will not be constructed.
Settlement Form	There are 7 camps that have 114 households (Population: 900 people) Dhaniaf (20 households) Yaguer (27 households) Kaona Dhaar (10 households) Ourghoyta (6 households) Kassan (16 households) Bodoli (15 households) Yiyaf (20 households)	As Eyla: about 5,100 people Camps around As Eyle are as below: Yaguer (27 households) Kaona Dhaar (10 households) Ourghoyta (6 households) Kassan (16 households) Bodoli (15 households) Yiyaf (20households) Total population: around 11,000 people
Settlement Situation	Inhabitants settle in this area.	Inhabitants settle in this area.
Living (Nomadic) Style	Inhabitants at this site are nomadic around Hanle valley (in between the border and Yoboki). The nomadic area is not far from the camp.	
Water Consumption Situation	Inhabitants at this area use water from a spring at Daguiro and traditional hand dug wells. However, water salinity is high and it is unhygienic. Inhabitants travel 5 km (one way) to get water every day.	Inhabitants use water from a well previously constructed by JICA. Due to insufficient fuel (diesel), the water supply is not adequate.
Willingness to Relocate to Area that has Water Supply Facility	If there is a water supply facility around this area, inhabitants are wiling to move close to the facility.	Nil
Experience Joining Water Management Committee, etc. and Willingness to Join Such Committee	Nil	There is a water management committee and a wife association (Gobaad wife association) with 120 members.
Accessibility Situation	In order to provide better accessibility to get water, the water department improved the path to the water source. Since it is just a simple road, the path may be destroyed if there is a flood.	No problem
Agreement to Establish Water Management Committee with Settlement Leader	Nil	Nil
Issues on Establishing Water Management Committee	There are about 1,000 people at this site. Based on the trial drilling, it is clear that water potential at this site is low. Agreement to establish a water management committee has not been received from settlement leader.	No problem

Table A9-5(b) Results of Social Situation Survey (2)

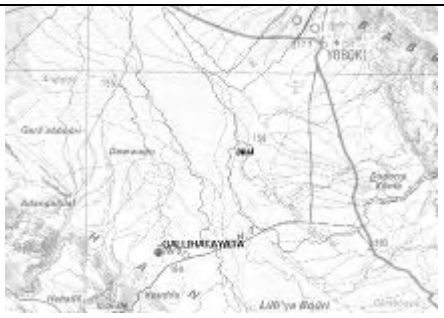
No.2	Gaali Hatayata	Blanbale
Settlement Location		
Settlement Situation		
Well Drilling Location	Well drilling will not be conducted.	Well drilling will not be conducted.
Settlement Form	Inki Ara Camp (at Hanle valley): 1840 people Harougo, Gini Bad, Adaytou, Amayle, Abaa Camp (Dakka Highland): 2,300 people	There are camps as below: Tourkaylo: 40 people Gelehabad: 56 people Beyaade: 56 people Kileyta: 56 people Birtader: 64 people (along National Road No.1) Total population is 272 people
Settlement Situation	Inhabitants settle in this area.	Half the inhabitants settle, half the inhabitants are nomadic.
Living (Nomadic) Style	Inhabitants at this site are nomadic between their camp and Hanle wadi. Both men and women are nomadic. Inhabitants get revenue from selling wood for fuel, working at farms or working for the army.	Women/children look after livestock and graze livestock around Blanbale everyday.
Water Consumption Situation	Inhabitants are buying water from a farm (1 km away) for their livestock. Water for human consumption is taken from a traditional hand dug well at Hanle wadi.	There is no well around this site. Women/children travel 10~15 km to Mouloud or Dikhil to get water.
Willingness to Relocate to Area that has Water Supply Facility	Since sand storms are frequent at this site, inhabitants are willing to relocate.	Inhabitants are willing to relocate to an area where a water supply facility is constructed.
Experience Joining Water Management Committee, etc. and Willingness to Join Such Committee	There is a women's association to manage well of Hanle2.	Nil
Accessibility Situation	Poor condition. Since there is loose sand at the wadi crossing area, it is difficult for cars to cross the wadi.	No problem
Agreement to Establish Water Management Committee with Settlement Leader	Nil	Nil
Issues on Establishing Water Management Committee	Need to discuss with the settlement "Hanle2" if a well at this site will be constructed. Agreement to establish a water management committee has not been received from settlement leader.	Agreement to establish water management committee has not been received from settlement leader. In this settlement, camps are scattered and the population is small. Thus, the cost for O&M will be relatively high.

Table A9-5(c) Results of Social Situation Survey (3)

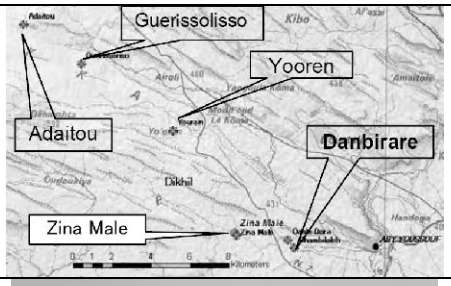
No.3	Sankal (Sabbalou)	Zina Male
Settlement Location		
Settlement Situation		
Well Drilling Location		
Settlement Form	There is no camp at the well drilling location (Sabbalou). Water from the well is planned to supply Sankal, which is 3.4 km south of the well. Since Sankal is near the border of Ethiopia, there are 500 households and the population is 3,000.	There are 74 households (population 600) in 7 camps as below. It is about 18 km from Danbiraleh to Adaitou. Zina Male: 5 households, Adaitou: 10 households Ooren: 2 households, Guerissolisso: 4 households Dhale Dora: 15 households Danbiraleh: 20 households, Adi Biyui: 18 households
Settlement Situation	Inhabitants settle in this area.	Inhabitants do not settle in this area.
Living (Nomadic) Style	Due to the recent droughts , there is a water shortage for Sankal's inhabitants. On average, one (1) household owns 1~2 livestock.	During the survey, water was insufficient at Dakka highland. Thus, many inhabitants were staying temporarily at Danbirare to use water of Abiyoussof. The period of temporary residency at Danbirare is three (3) months ~ two (2) years.
Water Consumption Situation	Inhabitants use water from shallow wells at the boundary of Djibouti-Ethiopia and shallow wells in the wadi in Ethiopia. Water is deposited/disinfected before drinking.	In this settlement, the major water source is a traditional hand dug well. Inhabitants at Danbirare can use deep well water at Kontali/Abiyoussof (constructed by Abu Dhabi Fund) but these two (2) sites are about 10 ~15 km away.
Willingness to Relocate to Area that has Water Supply Facility	Inhabitants are not willing to relocate.	Since this area (Dakka highland) has insufficient water, inhabitants are willing to relocate to a place that has a water supply facility.
Experience Joining Water Management Committee, etc. and Willingness to Join Such Committee	Inhabitants have no experience in joining a committee. If water from the Sabbalou well will be supplied to Sankal, inhabitants are willing to establish a water management committee.	Inhabitants have no experience in joining a committee. The settlement leader understands that money is necessary for the water supply facility O&M and agrees to collect tariffs for using water. However, the settlement leader does not agree to establish a water management committee.
Accessibility Situation	Good condition. However, the existing route might be cut off by flood.	When it rains, the access road will be muddy and car cannot access.
Agreement to Establish Water Management Committee with Settlement Leader	Settlement leader has signed an agreement to establish a water management committee on the condition that water from Sabbalou well will be supplied to Sankal. The agreement was signed by Mr. Mohamoud Rohlett Wais.	Agreed (by Mr.Helem Hamad Hachim, Mr.Hamed Boulssa Barhabe, Mrs.Fatouma Hamad Moussa)
Issues on Establishing Water Management Committee	At this moment, there is no detailed plan showing how to deliver water from Sabbalou to Sankal. (Delivering water by pipeline, water trucks, camel or donkey might be alternatives.) Planning the water supply method will be the first priority before establishing a water management committee.	During the survey, water was insufficient at Dakka highland and inhabitants moved to Danbirare to stay temporarily. Therefore, inhabitants at this site wish to have their own water supply facility. If a water supply facility is constructed at Zina Male, inhabitants who are living in scattered camps might gather around the facility. In order to establish a water management committee, cooperation between camps is essential.

Table A9-5(d) Results of Social Situation Survey (4)

No.4	Kouta Bouya	Daguiro
Settlement Location		
Settlement Situation		
Well Drilling Location	Well drilling will not be conducted.	
Settlement Form	Koutabouya population: about 4000 Surrounding camps area as follows: Afahtou: 1,500 people Chadir: 1,500 people Farra: 3,000 people In total about 10,000 people. The existing water supply facility provides water to 5,500 people.	Camps of this settlement are along national road No.1 at intervals of about 5 km. The well is located 5 km south of Ararou. Total households are 124 in this settlement (about 700 people). Dahetou: 44 households Ararou: 46 households Gablaaf: 34 households
Settlement Situation	Inhabitants settle in this area.	Inhabitants settle in this area. Since there is a natural coconut grove in this wet area, people have settled in this area since a long time ago.
Living (Nomadic) Style	Nomadic at Dekka highland and its surroundings.	Nomadic only during droughts.
Water Consumption Situation	Inhabitants use water from a protected shallow well located south of the main camp. Water from the well is pumped up by generator and water is supplied to the camp by pipeline. Both water quality and quantity are poor.	Inhabitants get water from a traditional hand dug well. Although (500~1,000 L) plastic water tanks supplied by UNICEF are located at intervals of several km along the national road, the tanks are empty because water trucks have not supplied water to the tanks recently.
Willingness to Relocate to Area that has Water Supply Facility	Not willing to relocate.	Willing to relocate.
Experience Joining Water Management Committee, etc. and Willingness to Join Such Committee	There is a women's association. A settlement community is also functioning. Thus, water facility management will not be an issue at this site.	Although inhabitants do not have experience in joining a committee, inhabitants are willing to pay or donate things to the committee when a water supply facility is constructed. Inhabitants do not have any comments regarding the members or the committee (it seems that settlement leader will decide this matter).
Accessibility Situation	There is no problem at this moment. However, there are few wadi crossing the path to the settlement. Thus, there is a possibility that roads to the settlement will be cut off during a flood.	Since this site is along national road No.1, there is no problem regarding access to this site.
Agreement to Establish Water Management Committee with Settlement Leader	Agreed (by Mr. Mohamed Abass Hassan, Mr. Abdoulkader Wetti Mohamed)	Agreed (by Mr. Mohamed Hamad Moussa)
Issues on Establishing Water Management Committee	It seems there is no problem in establishing a water management committee. Instead of establishing a new committee to manage the water facility, adding a role to the existing committee to manage the water facility might be an alternative and this matter will be considered.	Although inhabitants have an understanding of a water management committee, they did not show their willingness to be members of the committee. Accessibility between all camps in this settlement is good; thus, it shall be comparatively easy to establish a good relationship between camps. Regarding the establishment of a water management committee, the settlement leader will be the key person for further discussion.

Table A9-5(e) Results of Social Situation Survey (5)

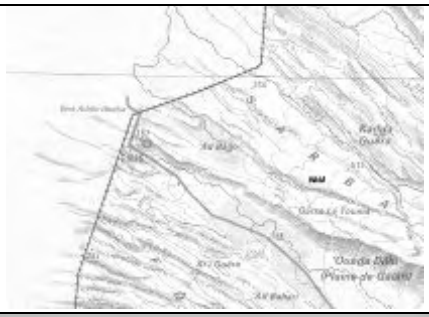
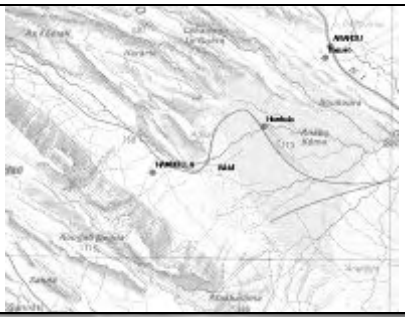
No.5	Garafi	Hombola
Settlement Location		
Settlement Situation		
Well Drilling Location	Well drilling will not be conducted.	Well drilling will not be conducted.
Settlement Form	Population at the main camp is 1,200, at the border is 300, and at the surrounding camps is 3,800. The total population in this settlement is about 5,300. There are many camps along national road No.1.	During the survey, there was only 1 household at this site, thus this site cannot be considered as a settlement.
Settlement Situation	Inhabitants settle in this area.	Inhabitants do not settle in this area. (They sometimes stay at this site and sometimes stay in Ethiopia.)
Living (Nomadic) Style	Women and children take care of livestock. Livestock is occasionally taken to Mikileh (10km away).	Inhabitants in this area move between Ethiopia and Hombola.
Water Consumption Situation	There is a well constructed by Italy in the 1980s, 2 km from the border. Solar power is used to pump water but until 2009, diesel was used. Pumped up water is insufficient at this site. Water is supplied to the border from this site.	Inhabitants get water from each location during nomadic relocation. At Hombola, inhabitants dug a well along the wadi in a traditional way to get water.
Willingness to Relocate to Area that has Water Supply Facility	Not willing to relocate.	Not willing to relocate.
Experience Joining Water Management Committee, etc. and Willingness to Join Such Committee	Inhabitants in this settlement do not have experience in joining a committee such as a women's association. There is no water facility management committee for the existing facility.	Inhabitants do not have experience in joining a committee. Nomadic people and the settlement leader stated that they are willing to participate the water facility management committee at the interview.
Accessibility Situation	Site is along national road No.1. No problem.	Need to cross Hanle wadi in order to access this site. It is difficult for heavy vehicles to access to this site because there is a wide area with loose sand.
Agreement to Establish Water Management Committee with Settlement Leader	Nil	Agreed (by Mr. Walho Gada Walho)
Issues on Establishing Water Management Committee	It seems that there is no particular problem in establishing water management committee at this settlement.	It is difficult to establish a water management committee because there are no permanent inhabitants in this area.

Table A9-5(f) Results of Social Situation Survey (6)

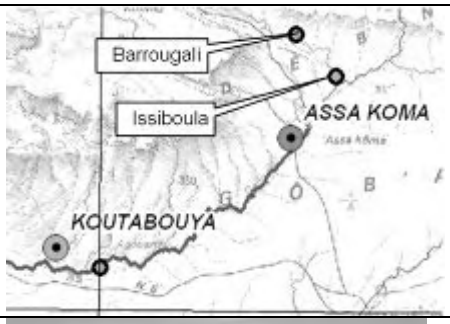
No.6	Sek Sabir	Assa Koma
Settlement Location		
Settlement Situation		
Well Drilling Location		
Settlement Form	Sek Sabir (105 households) is the main camp of this settlement. There are 5 camps within 2 km surrounding Sek Sabir: Sabir (50 households), Ounda Sabir (10 households), Alailegero (10 households), Sablola (40 households), Oudoudlebahi (7 households). Total population is about 1,900.	Issiboula camp (2.5 km from the well): 40 households Barrougali camp: 10 households Surrounding camps: 12 households Total: about 1,000 people
Settlement Situation	All camps at this settlement are permanent.	All camps at this settlement are permanent (since 1944).
Living (Nomadic) Style	Inhabitants travel 500 m ~ 2 km everyday to take their livestock to the meadow.	Inhabitants at this settlement travel everyday to Dakka highland, which is 3~5 km north of the camps.
Water Consumption Situation	Inhabitants mainly use water from a traditional hand dug well. When water is supplied to the water tank located along the national road, inhabitants use water from the tank. During the period of water shortage, inhabitants buy water from a deep well located 5 km to the north (Gourabous).	Inhabitants get water from the traditional hand dug well. However, water is insufficient. In Issiboula, there is a plan to install a solar pump and water tank at the existing well. A water management committee was established and collection of water tariffs was conducted. However, the solar system and water tank have not yet been installed.
Willingness to Relocate to Area that has Water Supply Facility	Since this settlement is not scattered, all the camps can easily access the well (which will be constructed by this Project). Inhabitants do not have to relocate.	Inhabitants are not willing to relocate.
Experience Joining Water Management Committee, etc. and Willingness to Join Such Committee	There is a Sek Sabir women's association (10 members). The purpose of this association is to improve the living situation. Members of this association donate 500 DJF to the association.	In order to pay for the O&M for the solar system, a committee was established at the end of 2009. There are 47 members and each member donates 100 DJF.
Accessibility Situation	Camps at this settlement are along national road No.1; thus, there is no access problem.	In order to drill a well, the road was repaired. However, the road may be easily cut off if there is a flood.
Agreement to Establish Water Management Committee with Settlement Leader	Agreed (by Mr. Moussa Gouro Ali)	Nil
Issues on Establishing Water Management Committee	It seems that there will not be any particular problem to establish committee at this site.	From the camp, the existing water source (shallow well along the wadi) location is closer than the well that will be constructed by this Project. Since the water quality of the existing well is poor, it is recommended that water from the deep well (constructed by this Project) be used for human consumption and water of the shallow well be used for daily life. It is necessary to have an agreement with the settlement leader regarding this matter.

Table A9-5(g) Results of Social Situation Survey (7)

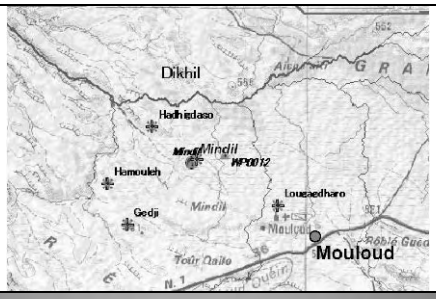
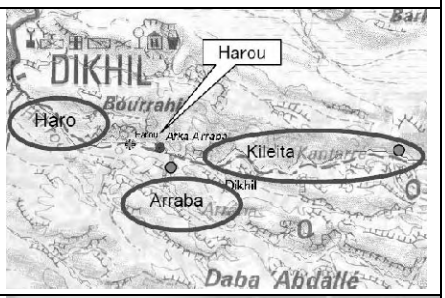
No.7	Mindil	Afkha Arraba
Settlement Location		
Settlement Situation		
Well Drilling Location		
Settlement Form	There are 62 households (about 500 people) in camps as below: In Mindil Area: Moussetikoma (16 households), Dhugasasloub (3 households), Hahaileh (2 households), Hadhigadasso (10 households), Loughagdaaro (10 households) At Okahleh Area: Hamouleh (7 households), Guedjik (3 households), Diheyayati (3 households), Gedcambar (2 households), Seiti Dabi (2 households), Guelleh Gawleh (4 households)	There are 3 camps as below: (25 households, about 250 people). Afka Araba (10 households) Kileta (7 households) Harrou (8 households)
Settlement Situation	Since the independence of Djibouti in 1977, there have been inhabitants living at this settlement. There are also inhabitants who move to this settlement during droughts.	There are long-term and temporary residences in this area.
Living (Nomadic) Style	Inhabitants travel everyday to a meadow 3 km away.	Inhabitants are nomadic everyday around their camps.
Water Consumption Situation	Inhabitants normally use water from a hand dug traditional well. When inhabitants buy things at Mouloud, some of them use the deep well water at Mouloud. (The distance between the well drilling location of this Project and Mouloud is 6 km.)	Inhabitants at this area generally use a traditional hand dug well. During the dry season, water is insufficient in this area. Due to recent droughts, many inhabitants have left this settlement. There are a few small-scale farms along the valley using water from the shallow well.
Willingness to Relocate to Area where has Water Supply Facility	75% of population is willing to relocate.	75% of population is willing to relocate.
Experience Joining Water Management Committee, etc. and Willingness to Join Such Committee	No experience.	No experience.
Accessibility Situation	Due to rain, access from the national road to the site will be muddy and it will thus be difficult to access.	There is no problem to access to the site at this moment. However, there are few wadi crossing the areas to approach the site. Road repair at the wadi might be necessary.
Agreement to Establish Water Management Committee with Settlement Leader	Agreed (by Mr. Houssein Barreh Kayad, Mr. Mohamed Sougueh Barreh, Mr. Hachim Robleh Omar)	Agreed (by Mr. Djama Guedi Dideh)
Issues on Establishing Water Management Committee	The Survey Team still has not visited the camp where the settlement leader is staying. The settlement leader is an educator and resides in Mouloud. The population at this settlement is small; thus, it is necessary for the camps to cooperate and to increase the population to use the water from the newly construct well.	It is necessary to confirm the population who will use the water that will be constructed by this Project.

Table A9-5(h) Results of Social Situation Survey (8)

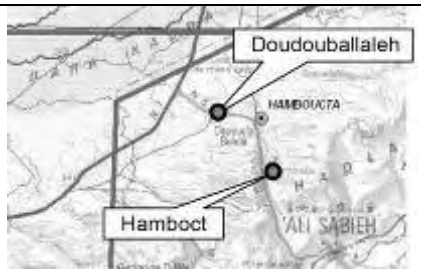
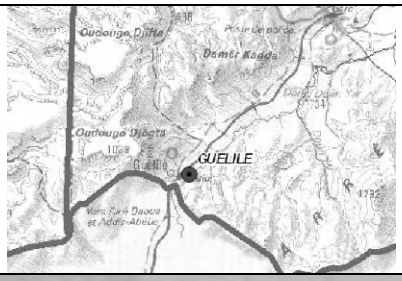
No.8	Hambocta	Guelile
Settlement Location		
Settlement Situation		
Well Drilling Location		
Settlement Form	Hambocta (20 households) is the main camp at this settlement. The surrounding camps are below: Adegaha (2 households), Gacham (3 households) Isodar (2 households), Harla (4 households) Afyare (3 households), Doudouballaleh (50 households; 5 km from from Hambouctа) Total number of households is 84 and the population is about 680.	There is a settlement (Guelile: population of 1,900) across the border. Surrounding camps are as below: Labakouroussley (105 households) Guelile (60 households) Total population around this area is 2,065.
Settlement Situation	Inhabitants settled at Hambocta/Doudouballaleh. Due to the recent droughts, inhabitants surrounding above camps have moved away. Inhabitants in surrounding camps have moved away due to floods. There is a possibility that more inhabitants will settle down in this settlement.	Inhabitants in this settlement stay here permanently.
Living (Nomadic) Style	Inhabitants are nomadic 2~3 km around their camps everyday.	Inhabitants are nomadic near their camps (Alley mountain; 1 km away) everyday.
Water Consumption Situation	Inhabitants living at Hambocta use water from a protected shallow well. At Doudouballaleh, there are 2 deep wells for farm use. Although these wells are for farm use, some inhabitants use this water. During the drought, inhabitants pay a fee for diesel fuel (500 DJF/month).	Inhabitants use water from a traditional hand dug well / protected shallow well. Water is insufficient during the dry season / drought.
Willingness to Relocate to Area where has Water Supply Facility	Half of the inhabitants are not willing to relocate.	Half of the inhabitants are not willing to relocate.
Experience Joining Water Management Committee, etc. and Willingness to Join Such Committee	There is a women's association at Hambocta established in 2009 (establishment was instructed by the settlement leader). Although inhabitants did not answer whether they are willing or not to join the water management committee, inhabitants are aware of the need to pay for using water.	There is a women's association at Guelile. Inhabitants did not express their opinions on whether they are willing or not to join the water management committee. However, inhabitants understand that it is necessary to pay for water.
Accessibility Situation	No problem	No problem
Agreement to Establish Water Management Committee with Settlement Leader	Agreed (by Mr. Ibrahum Dide Douale)	Agreed (by Mr. Ismael Darar Yabe)
Issues on Establishing Water Management Committee	During the social survey at Doudouballaleh, it seemed that there are inhabitants using water from the farm. These inhabitants' thoughts on water are quite different from the people of Hambocta. There is a request from the local people to install a pipeline from the well to the primary school. Stakeholder coordination is difficult.	It is necessary to conduct more surveys in the surrounding camps to collect more information.

Table A9-5(i) Results of Social Situation Survey (9)

No.9	Midgan	Hol Hol (Digri)
Settlement Location		
Settlement Situation		
Well Drilling Location	Well drilling will not be conducted.	Well drilling will not be conducted.
Settlement Form	Total population at this settlement is about 400. Number of households at each camp is below: Beyodaad (40 households) Dagaade (50 households) Gasle (30 households) Wadda (40 households) Abesale (50 households) Dadarada (45 households) Odadley (55 households) Dourdourwanabe (40 households)	There is a town (Hol Hol) near the requested site (Digri). However, there is no camp at Digri. Since Digri is located on a basalt plateau. It can be assumed that there is no shallow well around this area.
Settlement Situation	There are inhabitants who moved to this settlement due to the drought a few months before. If good quality water is developed, inhabitants will settle at this site.	There are no inhabitants at this site.
Living (Nomadic) Style	Men are in charge of the nomadic lifestyle. The nomadic area is around the camps.	(No information)
Water Consumption Situation	Inhabitants use water from the traditional hand dug well or protected shallow well. However, well water is unavailable during the dry season. Water consumption rate is 6 L/person, at least at the target area.	(No information)
Willingness to Relocate to Area that has Water Supply Facility	The camp leader is not willing to move to the area where the new water supply facility will be constructed. Housewives are willing to move.	(No information)
Experience Joining Water Management Committee, etc. and Willingness to Join Such Committee	Inhabitants have no experience in joining committees.	(No information)
Accessibility Situation	One route to access to this site is to travel through Ali Sabieh. On this route, the road conditions are poor because it is hilly/narrow and is not paved.	The road from Dikhil to this site is rocky. It seems that there is shallow groundwater along the wadi. However, the Survey Team could not access this location because there were fallen rocks (as of February 2010).
Agreement to Establish Water Management Committee with Settlement Leader	Nil	Nil
Issues on Establishing Water Management Committee	It is necessary for the settlement leader to agree on the establishment of a committee. It is also essential to listen to the opinions of the inhabitants in the surrounding camps.	It is necessary to listen to the opinions of the inhabitants in the surrounding camps. It is also essential to get agreement from the settlement leader to establish a water management committee.

Table A9-5(j) Result of Social Situation Survey (10)

No.10	Assamo	Doussagoud Moune
Settlement Location		
Settlement Situation		
Well Drilling Location	Well drilling will not be conducted.	Well drilling will not be conducted.
Settlement Form	There is a primary school and clinic in this camp and these facilities are concentrated. The population is 750 people. Total population of the surrounding camps (Edisso, Bohocha, Dagwen) is 1,800 people.	There is a mosque and a newly constructed primary school in the main camp. Population of the main camp (Goddaawo) is 400, and the surrounding camps have 2,000 people.
Settlement Situation	Willing to relocate.	Willing to relocate.
Living (Nomadic) Style	Children graze livestock 2~3 km around the wadi of Assamo.	Children graze livestock 2~4 km around the camp everyday.
Water Consumption Situation	Inhabitants use water from the protected shallow well. Water is relatively abundant and there are many inhabitants who engage in farming. Some wells use a solar system to pump up water from the well.	Inhabitants use water from the protected shallow well. However, the well is dry during the dry season. Water trucks supply water to the tank at the primary school. However, road conditions from Ali-Sabieh to this site are poor. Thus, the water truck does not come often.
Willingness to Relocate to Area that has Water Supply Facility	Since inhabitants can get water relatively easily at this time, inhabitants answered that they are not willing to relocate.	Inhabitants in this settlement are willing to relocate.
Experience Joining Water Management Committee, etc. and Willingness to Join Such Committee	There is a women's association (Assamo Women's Association), but there is no water management committee.	There is a women's association to promote improvement of health. Activity cost is 100 DJF/month.
Accessibility Situation	In order to access this settlement, there is a route from Ali Sabieh. However, the road is poor because it is hilly and not paved.	In order to access this settlement, there is a route from Ali Sabieh. However, the road is poor because it is hilly and not paved.
Agreement to Establish Water Management Committee with Settlement Leader	Agreed (by Mr. Moussa Souguih Amir)	Agreed (by Mr. Mahamoud Elmi Egueh)
Issues on Establishing Water Management Committee	The settlement leader has agreed to establish a water management committee.	The settlement leader has agreed to establish a water management committee. Furthermore, since there is an existing women's association, the newly established water management committee can cooperate with the women's association and can function easily. Therefore, there are few issues on the establishment of a water management committee.

Table A9-5(k) Result of Social Situation Survey (11)

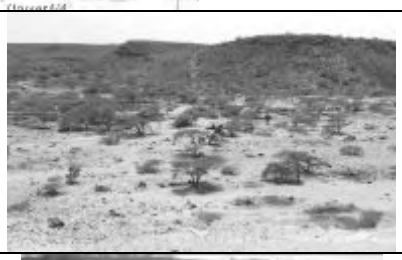
No.11	Ali Adde	Midgarra
Settlement Location		
Settlement Situation		
Well Drilling Location	Well drilling will not be conducted at this site. (A well will be constructed at Midgarra; water of Midgarra is planned to supply this site.)	
Settlement Form	Ali Adde is the main camp of this settlement. Surrounding camps are Nakhal, Bilhile, Guedgarissare, Biokalaf, Lastagawa, Gachamaleh, and Midgan. Since the well drilling location of this Project is about 10 km from Ali Adde, it is assumed that half of the Ali Adde population will use water from the newly constructed well. (880 people)	During the social survey (February 2010), no camps could be confirmed at Midgarra.
Settlement Situation	All inhabitants in this area are permanent inhabitants. Although there is a refugee camp (about 10,000 people) beside this settlement, a new water supply facility is not being considered for the refugee camp.	There are no inhabitants in this area.
Living (Nomadic) Style	Inhabitants travel 2~6 km to the mountains everyday. Some inhabitants hire people to graze their livestock (for about 10,000 DJF/month).	Nomadic people stay in this area only in some seasons.
Water Consumption Situation	Inhabitants in this settlement use water from a public tap (water source: deep well), a shallow well along the wadi, and a traditional hand dug well. Water is insufficient especially during the dry season.	Unknown
Willingness to Relocate to Area that has Water Supply Facility	Most of the inhabitants are not willing to relocate.	Unknown
Experience Joining Water Management Committee, etc. and Willingness to Join Such Committee	In the settlement of Ali Adde, there is a women's association. There is also a committee to collect donations in case of emergency. Most of the inhabitants understand that payment shall be made for the O&M if there is a new water supply facility.	Unknown
Accessibility Situation	No problem	The route from Ali-Sabieh to this site is hilly and narrow. It is difficult for oversized vehicles to access.
Agreement to Establish Water Management Committee with Settlement Leader	Agreed (by Mr. Idriss Samriye)	Nil
Issues on Establishing Water Management Committee	Inhabitants at Ali Adde are not willing to relocate. It is essential to establish a water management committee at the newly constructed deep well. Therefore, it is necessary to make sure that there will be inhabitants using water at Midgarra and a water management committee will be established.	Water management committee will not be established at Midgarra.

Table A9-5(I) Results of Social Situation Survey (12)

No.12	Ouarabalei	Hilbahey
Settlement Location		
Settlement Situation		
Well Drilling Location		
Settlement Form	This settlement consists of a main camp (30 households) and 4 surrounding camps as follows: Wanani (10 households) Oubaley (20 households) Gouraley (10 households) Arey (15 households) Total households are 85 and population is about 680.	The main camp is Kalalabada (45 households) and there are camps along Hilgahey valley as below at intervals of about 2 km. The total number of households is 69 and the population is about 750. Diksley (5 households), Asargour (3 households), Guedijaleh (6 households) Bagayaleh (10 households)
Settlement Situation	All camps at this settlement are permanent.	All camps at this settlement are permanent (this settlement's history starts from 1949).
Living (Nomadic) Style	Inhabitants travel everyday to the mountains that are about 500 m ~ 2 km away from their camps.	Inhabitants travel everyday to areas that are about 5~6 km away from their camps.
Water Consumption Situation	Inhabitants use water from a traditional hand dug well that is along the wadi. However, it is about 10 km away. There is no water source at this area.	Inhabitants use water from the protected shallow well located at the exit of Hilbahey wadi. Other than the shallow well, inhabitants use water of a deep well along national road No.1 or water supplied by the water truck.
Willingness to Relocate to Area that has Water Supply Facility	Willing to relocate.	Willing to relocate.
Experience Joining Water Management Committee, etc. and Willingness to Join Such Committee	Inhabitants have no experience in joining a committee. Although inhabitants mentioned that they are willing to pay for using water, inhabitants are not willing to participate in a water management committee.	Inhabitants have no experience in joining a committee. Many inhabitants said that they are not willing to participate in a water management committee. However, inhabitants understand that money is necessary for the O&M of the water supply facility, and are willing to pay for the O&M when the water facility is constructed.
Accessibility Situation	No problem	No problem
Agreement to Establish Water Management Committee with Settlement Leader	Agreed (by Mr. Hassan Guelleh Olow)	Agreed (by Mr. Ahmed Waiss Robleh)
Issues on Establishing Water Management Committee	Need to confirm with surrounding camps.	Need to confirm with surrounding camps.

Table A9-5(m) Results of Social Situation Survey (13)

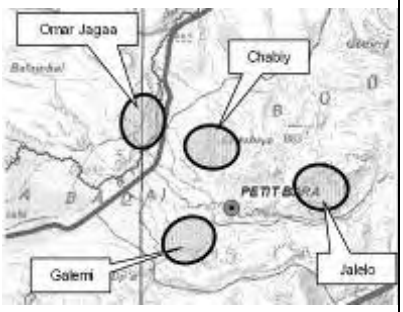
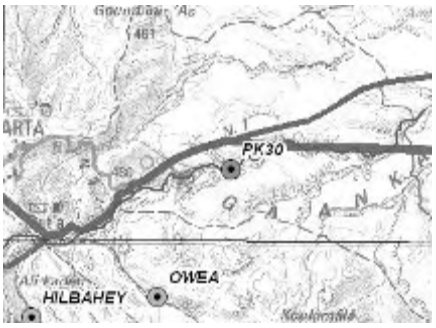
No.13	Petit Bara	PK30
Settlement Location		
Settlement Situation		
Well Drilling Location		
Settlement Form	The main camp of Petit Bala is OmarJagaa. Surrounding camps are as follows: Galema: 30 households, Jalelo: 33 households, Chabiyo: 15 households Although there is an existing water supply facility at Omar Jagaa, the surrounding camps do not have a water supply facility. There are 78 households in the surrounding area and the total population is 620.	There are 6 camps as follows scattered in this area. Jabanasse: 2 households Lanbodaleh: 15 households Gouboubasse: 12 households Guedgarase: 5 households Borleh: 12 households Bklilwaine : 30 households In total: 76 households and about 450 people.
Settlement Situation	Omar Jagaa is along national road No.1 and is a camp that has history. Other than this camp, all the camps are new. Normally, people leave the new camps in the winter and come back in the summer.	Permanent camp
Living (Nomadic) Style	Inhabitants travel 2 km around their camp everyday.	Inhabitants travel everyday about 3 km around the camp.
Water Consumption Situation	Since there is a deep well (using solar power to pump up water) along national road No.1 for the inhabitants of Omar Jagaa, an additional well is not necessary. Inhabitants other than Omar Jagaa use water from a traditional hand dug well along the wadi.	Inhabitants use water from a tank that is supplied 100% by water trucks.
Willingness to Relocate to Area that has Water Supply Facility	Inhabitants are not willing to relocate.	Inhabitants are not willing to relocate.
Experience Joining Water Management Committee, etc. and Willingness to Join Such Committee	No experience	There is a women's association consisting of six (6) women to improve life and welfare. This settlement is willing to establish a water management committee.
Accessibility Situation	No problem	No problem
Agreement to Establish Water Management Committee with Settlement Leader	Agreed (by Mr. Okal Elmi Miguil、Mr. Abdallah Waiss Robleh)	Agreed (by Mr. Djama Dirir Wais)
Issues on Establishing Water Management Committee	Need to confirm with surrounding camps.	Need to confirm with surrounding camps.

Table A9-6 Settlement that Agree to Establish Water Management Committee

	Region	Settlement	Settlement Leader	Camp
1	Dikhil	Hambola	Mr. Walho Gada Walho	Agna
2	Dikhil	Daguirou	Mr. Mohamed Hamad Moussa	Ararou
3	Dikhil	Seki Sabir	Mr. Moussa Gouro Ali	Sabir
4	Dikhil	Afka Araba	Mr. Djama Guedi Dideh	Harou
5	Dikhil	Zinamale	Mr. Helem Hamad Hachim	Ado Bouyi
6	Dikhil	Kouta Bouya	Mr. Mohamed Abass Hassan	Kouta Bouya
7	Dikhil	Kouta Bouya	Mr. Abdoulkader Witti Mohamed	Afahtou
8	Dikhil	Mindil	Mr. Mohamed Sougueh Barreh	Madal
9	Dikhil	Guerassoliso	Mr. Ali Boulssa	Guerassoliso
10	Dikhil	Zinamale	Mr. Hamed Boulssa Barhabe	Dalilali
11	Dikhil	Zinamale	Ms. Fatouma Hamad Moussa	Adaitou
12	Dikhil	Mindil	Mr. Houssein Barreh Kayad	Moussayti Koma
13	Dikhil	Sankal	Mr. Mohamoud Rohlett Wais	Sankal
14	Dikhil	Mouloud	Mr. Ali Elmi Warsama	Loubakdara
15	Dikhil	Mouloud	Mr. Mohamed Obsieh Warsama	Hamoule
16	Dikhil	Mindil	Mr. Hachim Robleh Omar	Harigdassod
17	Dikhil	Afkaraba	Mr. Elmi Wageri Diraneh	Harou
18	Ali Sabieh	Aualabalei	Mr. Hassan Guelleh Olow	Daguwein
19	Ali Sabieh	Assamo	Mr. Moussa Souguih Amir	Daguwein
20	Ali Sabieh	Doussagoud Moune	Mr. Mahamoud Elmi Egueh	Godawar
21	Ali Sabieh	Ali Adde	Mr. Idriss Semjuye	Refugee Camp
22	Ali Sabieh	Galile	Mr. Ismael Dasar Yabe	Galile Foste
23	Ali Sabieh	Hamboukta	Mr. Ibrahim Dide Douale	Hamboukta
24	Arta	Helbahey	Mr. Ahmed Waiss Robleh	Helbahey
25	Arta	Petit Bara	Mr. Okal Elmi Miguil	Omar Jagaa
26	Arta	Petit Bara	Mr. Abdallah Waiss Robleh	Gued Balaran
27	Arta	PK30	Mr. Djama Dirir Wais	Gabanass

Annex-10

Test Well Drilling

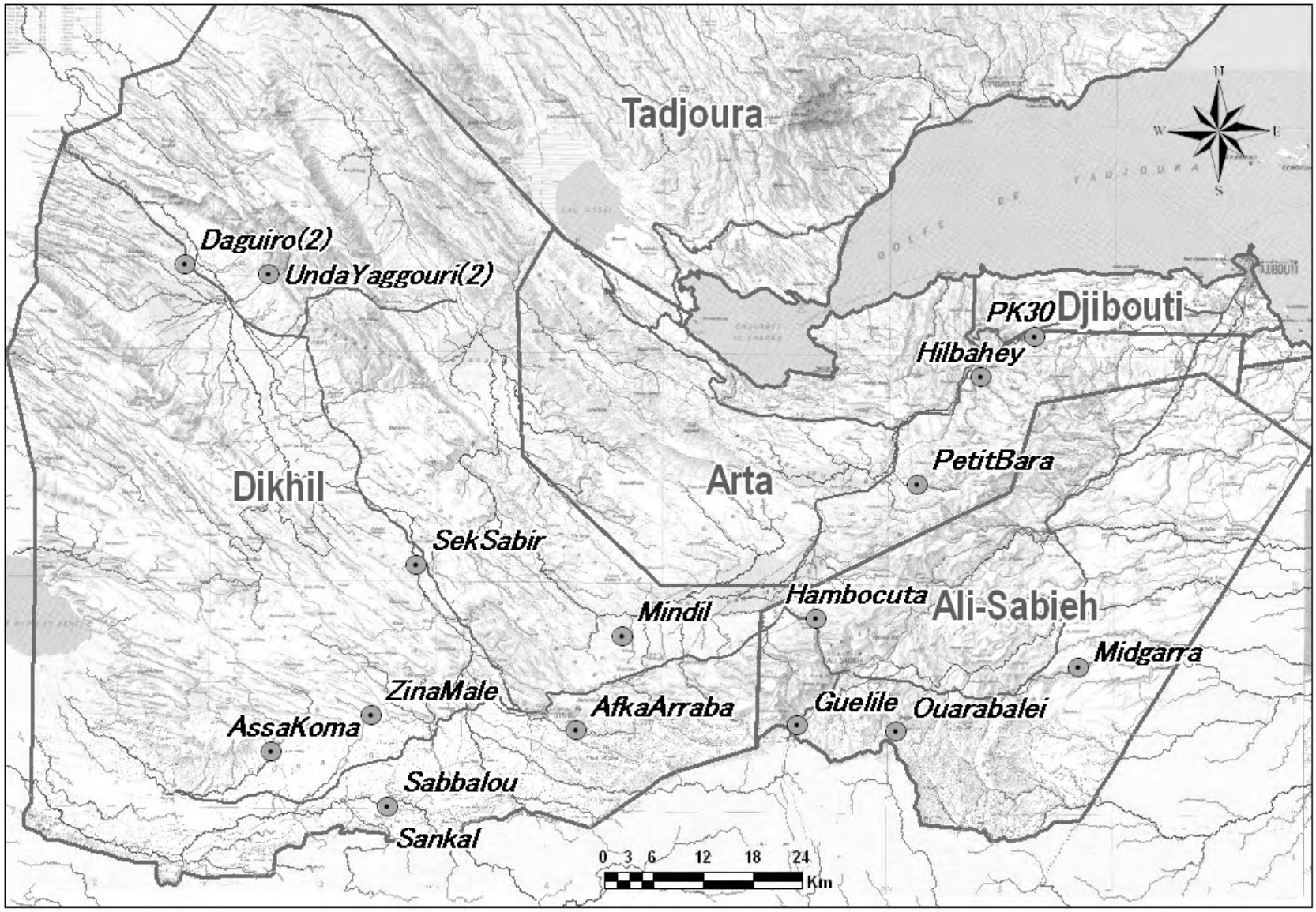


Figure A10-1 Location Map of Drilling Sites

SUMARRAY OF WELL CONDITION

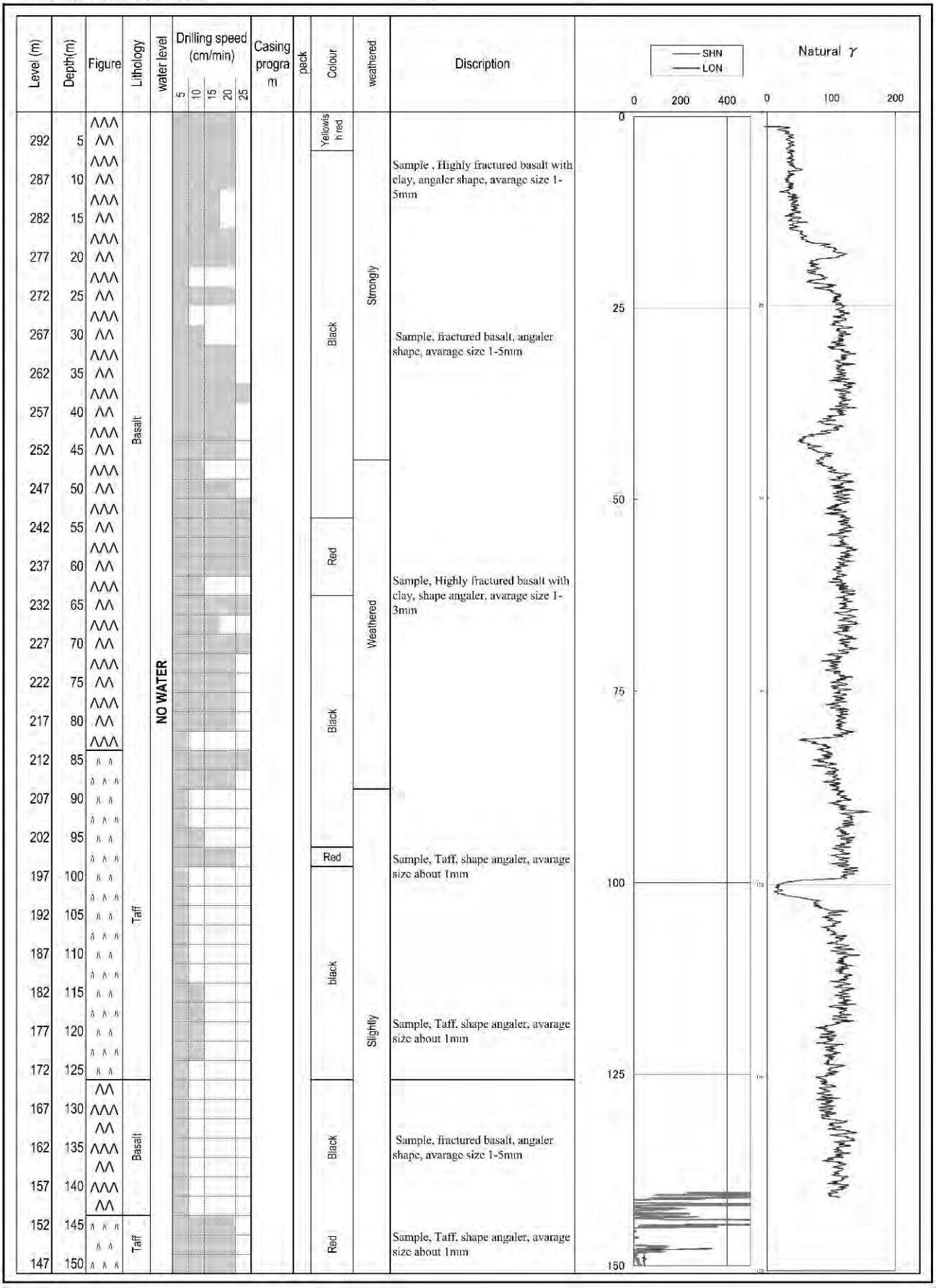
LOCATION: UNDA YAGGOURI **DATE:**

	GEO MARK	LITHOLOGY	WATER LEVEL	SUMMARY OF WATER PUMP TEST
0	^ ^ ^	0-144m		
	^ ^			**5 STEP TEST**
	^ ^ ^	basalt terace		NO WATER
	^ ^			
	^ ^ ^	block lava		
	^ ^			
	^ ^ ^	hard and tight		
	^ ^	crack is rare	NO WATER	
	^ ^ ^	up to 50m		**24 HOURS CONTINUOUS UP LIFT**
	^ ^			NO WATER
	^ ^ ^	slightly weathered		
	^ ^			
50	^ ^ ^	low permeability		
	^ ^			
	^ ^ ^			
	^ ^			
	^ ^ ^			
	^ ^			**RECOVERY TEST**
	^ ^ ^			NO WATER
	^ ^			
	^ ^ ^			
	^ ^			
	^ ^ ^			
	^ ^			
	^ ^ ^			
	^ ^			**WATER QUALITY**
100	^ ^ ^			NO WATER
	^ ^			
	^ ^ ^			
	^ ^			
	^ ^ ^			
	^ ^			
	^ ^ ^			
	^ ^			
	^ ^ ^			
	^ ^			
	^ ^ ^			
	X X X	144-158m		
150	X X X	tuff compact		

Drilling BH 10-8-2
Coordinates: 11.58050N, 42.06158E

WATER SOURCE
Alititude: 297 m

Date:27 -AUGUST-2010
UNDA YAGGOURI(2)



SUMARRAY OF WELL CONDITION

LOCATION: SABALLOU **DATE:** 2-3NOV, 2010

	GEO MARK	LITHOLOGY	WATER LEVEL
0	o o o	0--25	
	o o o	sand Gravel	
	o o o	Old terrace deposit	**S.W.L=** 16.75
	o o o	High permeability	
	o o o	rich aquifer	**DWWL=** 24.05
	o o o		
	o o o		
		25--75	
		Cretaceous base rock	
50		loose and soft	
		High permeability	
75		Hole Bottom	

Remark

Drilling stopped 75m in depth.
Reason is Possibility to reach salt water layer below 75m deep.

SUMMARY OF WATER PUMP TEST

5 STEP TEST
PROPER Q=6.5 L/S
DRAW DOWN= 4.2 M

24 HOURS CONTINUOUS UP LIFT

UPLIFT Q= 6.5 L/S
TOTAL Q= 561.6 M^3 / 24 HOURS
DRAW DOWN=4.13M
TRANSIMISIVITY=115.2M^2/DAY

RECOVERY TEST

REMAINING W L= 24.05 M
RECOVERY TIME= MIN
TRANSIMISIVITY=146.6M^2/DAY

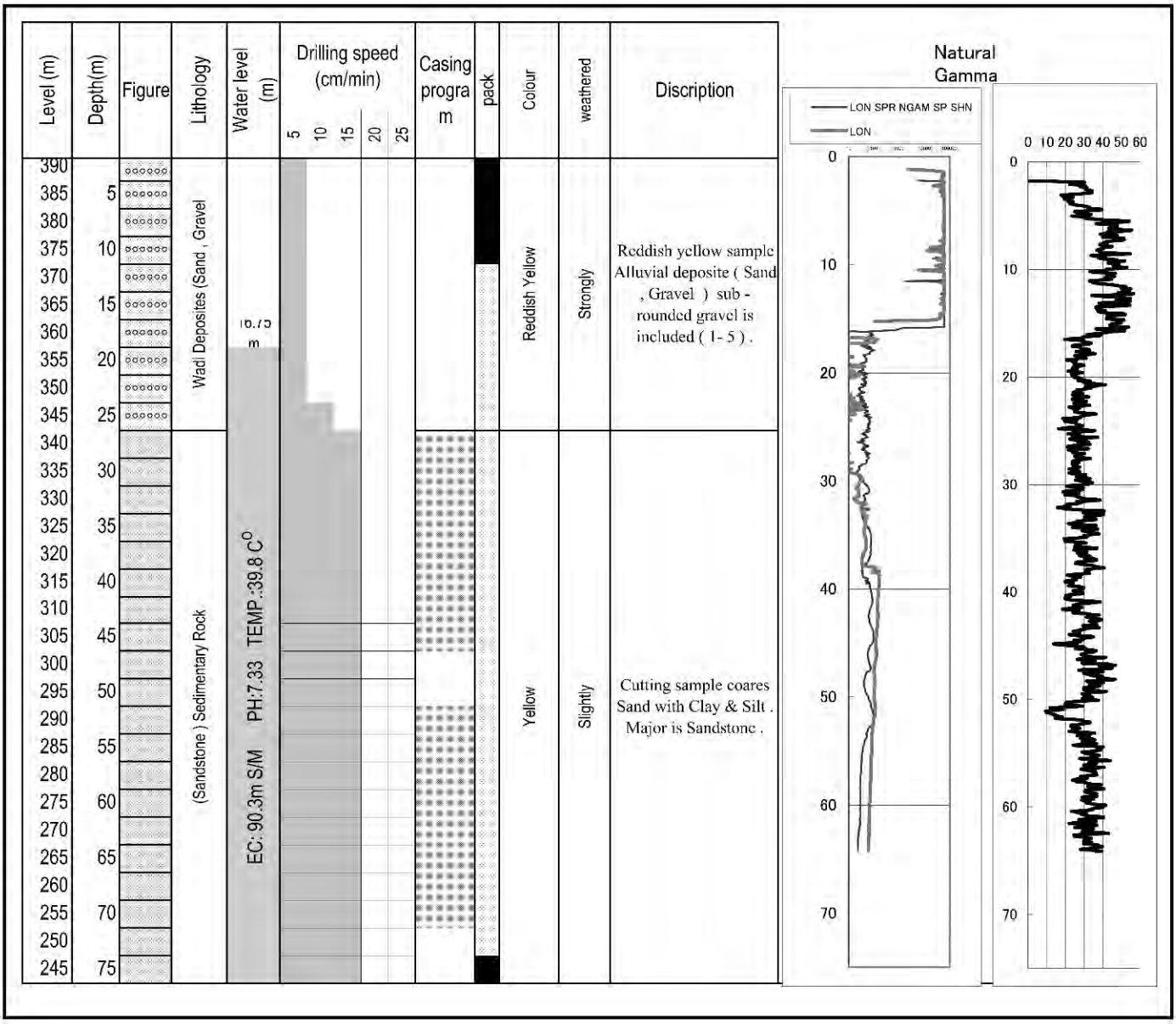
WATER QUALITY

EC= 90.3 ^{M} S/M
PH= 7.33
TEMPERATURE= 39.8 C^O

Date: - 31 -10 -2010

Drilling BH 15 Village name Saballou

Coordinates: 0194843E, 1217787N Alititude: 390 m



Step draw down test record

Pumping Rate

	1st step	2nd step	3rd step	4th step	5th step
Q (L/s)	2.9	4.4	6.7	8	11
Duration (min)					
S = DW (m)	1.96	3.70	5.15	6.13	7.10

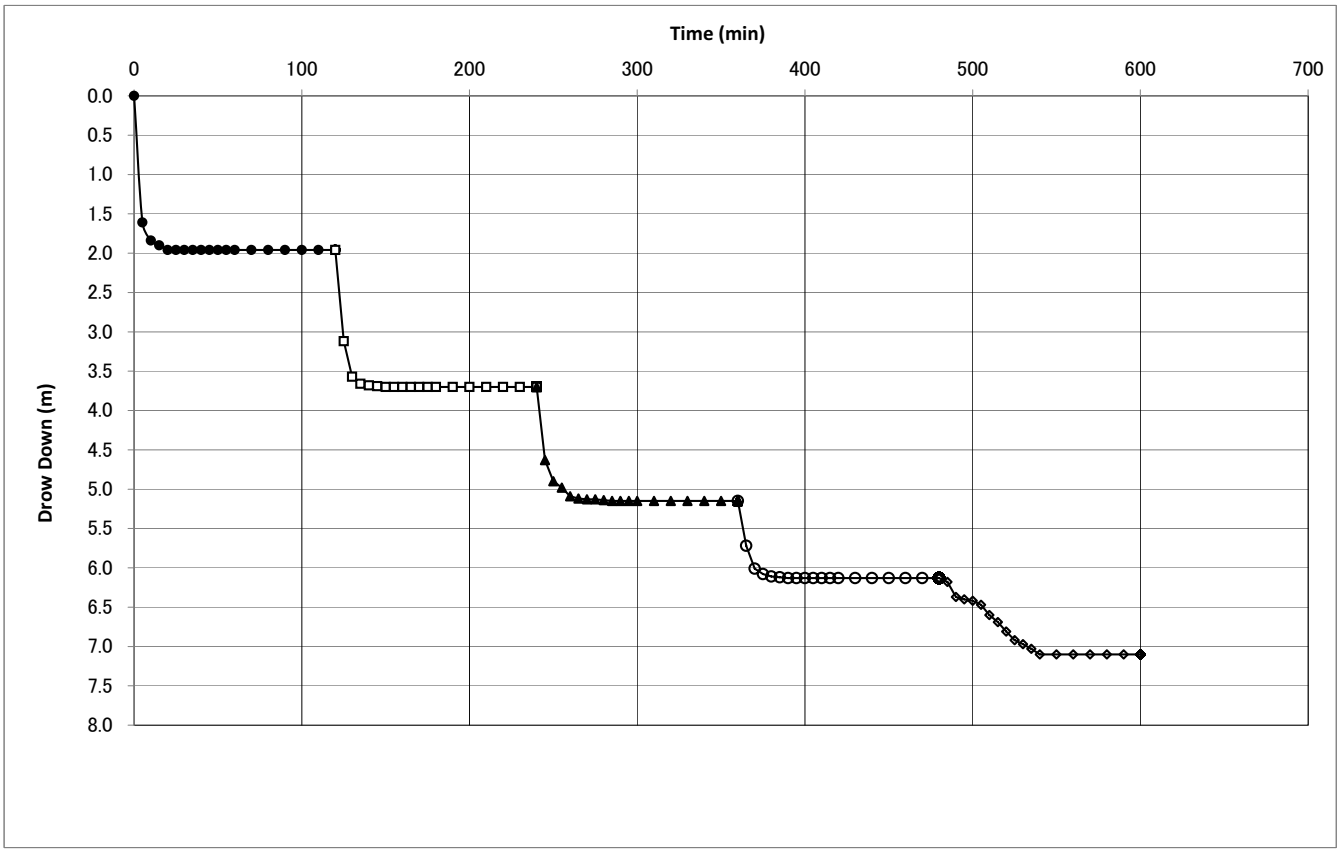
①Stastic Water Level	16.75
Record Keeper	

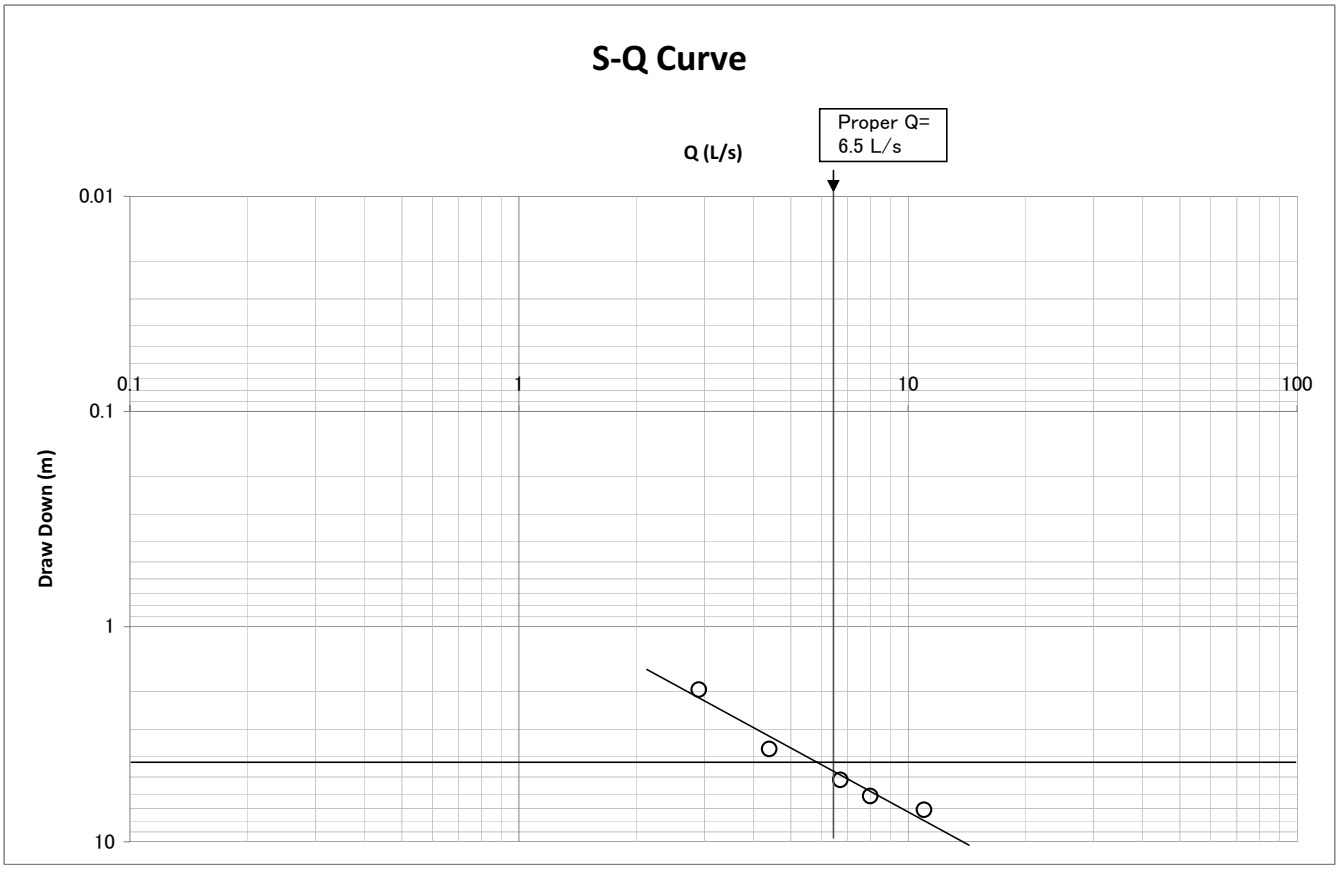
③＝②－①

Time	1st step		2nd step		3rd step		4th step		5th step	
	②Water Level	③Draw Down	Water Level	Draw Down	Water Level	Draw Down	Water Level	Draw Down	Water Level	Draw Down
(min)	(GL-m)	(m)	(GL-m)	(m)	(GL-m)	(m)	(GL-m)	(m)	(GL-m)	(m)
0	16.75	0.00	18.71	1.96	20.45	3.70	21.90	5.15	22.88	6.13
5	18.36	1.61	19.87	3.12	21.38	4.63	22.47	5.72	22.93	6.18
10	18.59	1.84	20.32	3.57	21.65	4.90	22.76	6.01	23.12	6.37
15	18.65	1.90	20.41	3.66	21.73	4.98	22.83	6.08	23.15	6.40
20	18.71	1.96	20.43	3.68	21.84	5.09	22.86	6.11	23.17	6.42
25	18.71	1.96	20.44	3.69	21.87	5.12	22.87	6.12	23.22	6.47
30	18.71	1.96	20.45	3.70	21.88	5.13	22.88	6.13	23.35	6.60
35	18.71	1.96	20.45	3.70	21.88	5.13	22.88	6.13	23.44	6.69
40	18.71	1.96	20.45	3.70	21.89	5.14	22.88	6.13	23.56	6.81
45	18.71	1.96	20.45	3.70	21.90	5.15	22.88	6.13	23.67	6.92
50	18.71	1.96	20.45	3.70	21.90	5.15	22.88	6.13	23.72	6.97
55	18.71	1.96	20.45	3.70	21.90	5.15	22.88	6.13	23.78	7.03
60	18.71	1.96	20.45	3.70	21.90	5.15	22.88	6.13	23.85	7.10
70	18.71	1.96	20.45	3.70	21.90	5.15	22.88	6.13	23.85	7.10
80	18.71	1.96	20.45	3.70	21.90	5.15	22.88	6.13	23.85	7.10
90	18.71	1.96	20.45	3.70	21.90	5.15	22.88	6.13	23.85	7.10
100	18.71	1.96	20.45	3.70	21.90	5.15	22.88	6.13	23.85	7.10
110	18.71	1.96	20.45	3.70	21.90	5.15	22.88	6.13	23.85	7.10
120	18.71	1.96	20.45	3.70	21.90	5.15	22.88	6.13	23.85	7.10
180										
240										
300										
360										
420										
480										
540										
600										
660										
720										
780										
840										
900										
960										
1020										
1080										
1140										
1200										
1260										
1320										
1380										
1440										

Measurement of Water Quality					
time	9:40-11:40	11:40-13:40	13:40-15:40	15:40-17:40	17:40-19:40
EC(μs/cm)	90.3m S/M	90.3m S/M	90.3m S/M	90.3m S/M	90.3m S/M
PH	7.33	7.33	7.33	7.33	7.33
Temp	39.8	39.8	39.8	39.8	39.8

Sabbalou Step Drawdown Test





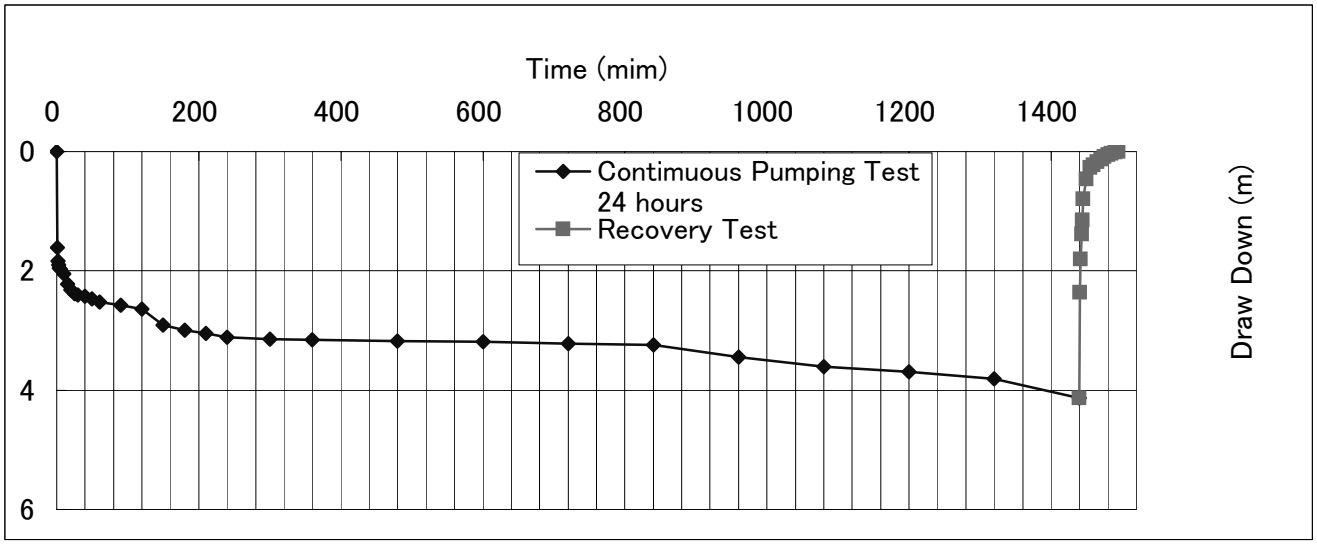
Continuous Pumping Test

Site Name: SABALLOU

Date: 2-3NOV, 2010

Static Water Level: 16.75 M

Contimuous Pumping Test 24 hours					Recovery Test			
Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	Pumping Late (L/s)		Total Elapsed	Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)
0	16.75	0			1440	0	20.88	4.13
1	18.36	1.61			1441	1	19.11	2.36
2	18.59	1.84			1442	2	18.55	1.8
3	18.65	1.90			1443	3	18.13	1.38
4	18.70	1.95			1444	4	17.9	1.15
5	18.73	1.98			1445	5	17.54	0.79
10	18.8	2.05			1450	10	17.21	0.46
15	18.97	2.22			1455	15	17.02	0.27
20	19.07	2.32	6.7		1460	20	16.98	0.23
25	19.13	2.38			1465	25	16.92	0.17
30	19.15	2.40	6.5		1470	30	16.88	0.13
40	19.18	2.43			1475	35	16.84	0.09
50	19.22	2.47			1480	40	16.8	0.05
60	19.27	2.52			1485	45	16.78	0.03
90	19.33	2.58			1490	50	16.76	0.01
120	19.39	2.64	6.5		1495	55	16.75	0
150	19.66	2.91						
180	19.74	2.99						
210	19.8	3.05						
240	19.86	3.11	6.5					
300	19.89	3.14						
360	19.91	3.16						
480	19.93	3.18	6.5					
600	19.94	3.19						
720	19.97	3.22						
840	19.99	3.24						
960	20.2	3.45						
1080	20.36	3.61						
1200	20.44	3.69	6.5					
1320	20.56	3.81						
1440	20.88	4.13	6.5					



Continuous Pumping Test LOG- DG

Site Name SABALLOU

Contimuous Pumping Test 24 hours			
Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	Pumping Late (L/s)
0	16.75	0	
1	18.36	1.61	
2	18.59	1.84	
3	18.65	1.90	
4	18.70	1.95	
5	18.73	1.98	
10	18.8	2.05	
15	18.97	2.22	
20	19.07	2.32	5.1
25	19.13	2.38	
30	19.15	2.40	
40	19.18	2.43	
50	19.22	2.47	
60	19.27	2.52	
90	19.33	2.58	
120	19.39	2.64	
150	19.66	2.91	5.1
180	19.74	2.99	
210	19.8	3.05	
240	19.86	3.11	
300	19.89	3.14	
360	19.91	3.16	
480	19.93	3.18	5.1
600	19.94	3.19	
720	19.97	3.22	
840	19.99	3.24	
960	20.2	3.45	
1080	20.36	3.61	5.1
1200	20.44	3.69	
1320	20.56	3.81	
1440	20.88	4.13	5.1

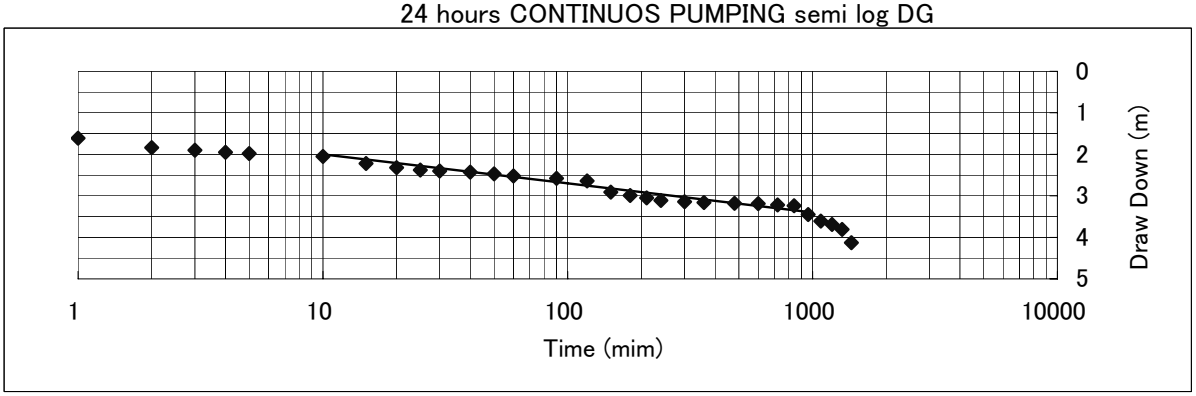
Transmissivity (T) = 0.183*Q/ΔS
(Jacob Method)

Q= 440.6 m3/d

	Time(min)	Drawdown(m)
S1	10	2
S2	100	2.7

T= 115.2 m3/d/m

24 hours CONTINUOS PUMPING semi log DG



RECOVERY Pumping Test LOG- DG (Recovery)

Site Name SABALLOU

Recovery Test				
Total Elapsed Time (min)	Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	t/t'
1440	0	20.88	4.13	
1441	1	19.11	2.36	1440
1442	2	18.55	1.8	720
1443	3	18.13	1.38	480
1444	4	17.9	1.15	360
1445	5	17.54	0.79	288
1450	10	17.21	0.46	144
1455	15	17.02	0.27	96
1460	20	16.98	0.23	72
1465	25	16.92	0.17	58
1470	30	16.88	0.13	48
1475	35	16.84	0.09	41
1480	40	16.8	0.05	36
1485	45	16.78	0.03	32
1490	50	16.76	0.01	29
1495	55	16.75	0	26

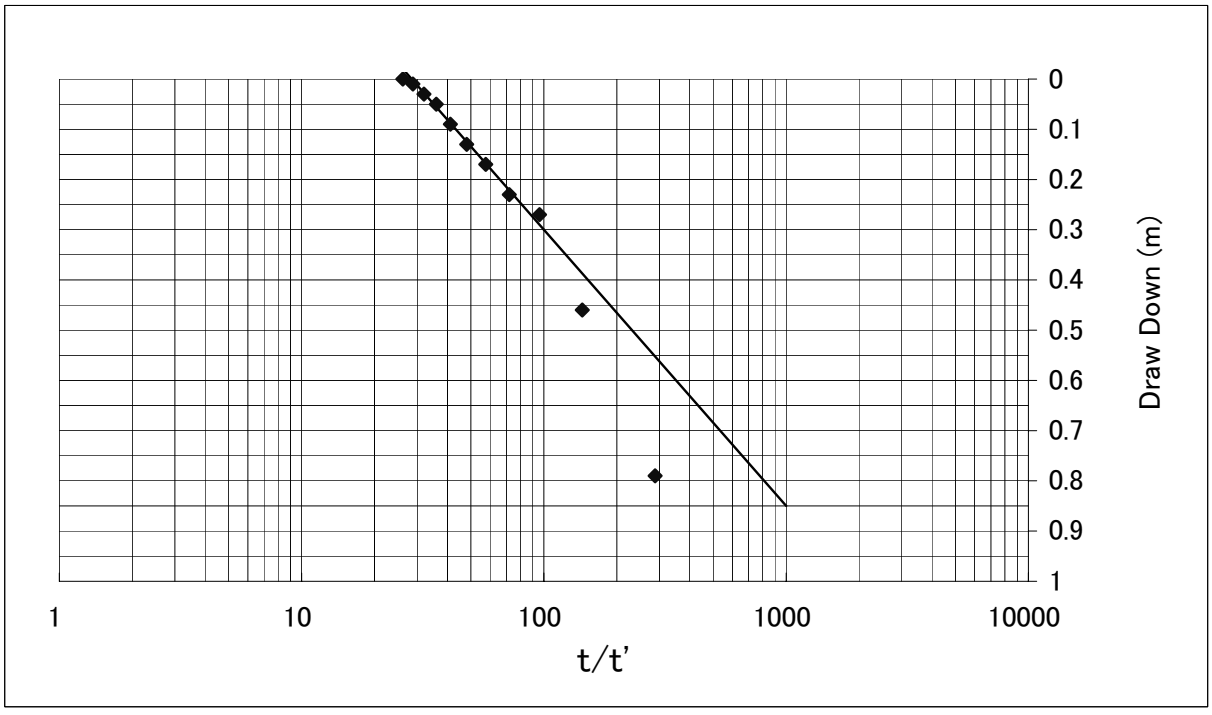
Transmissivity (T) = 0.183*Q/ΔS
(Theis Method)

Q= 440.64 m3/d

	Time(min)	Drawdown(m)
S1	10	-0.25
S2	100	0.3

T= 146.6 m3/d/m

Recovery test semi log DG



SUMARRAY OF WELL CONDITION

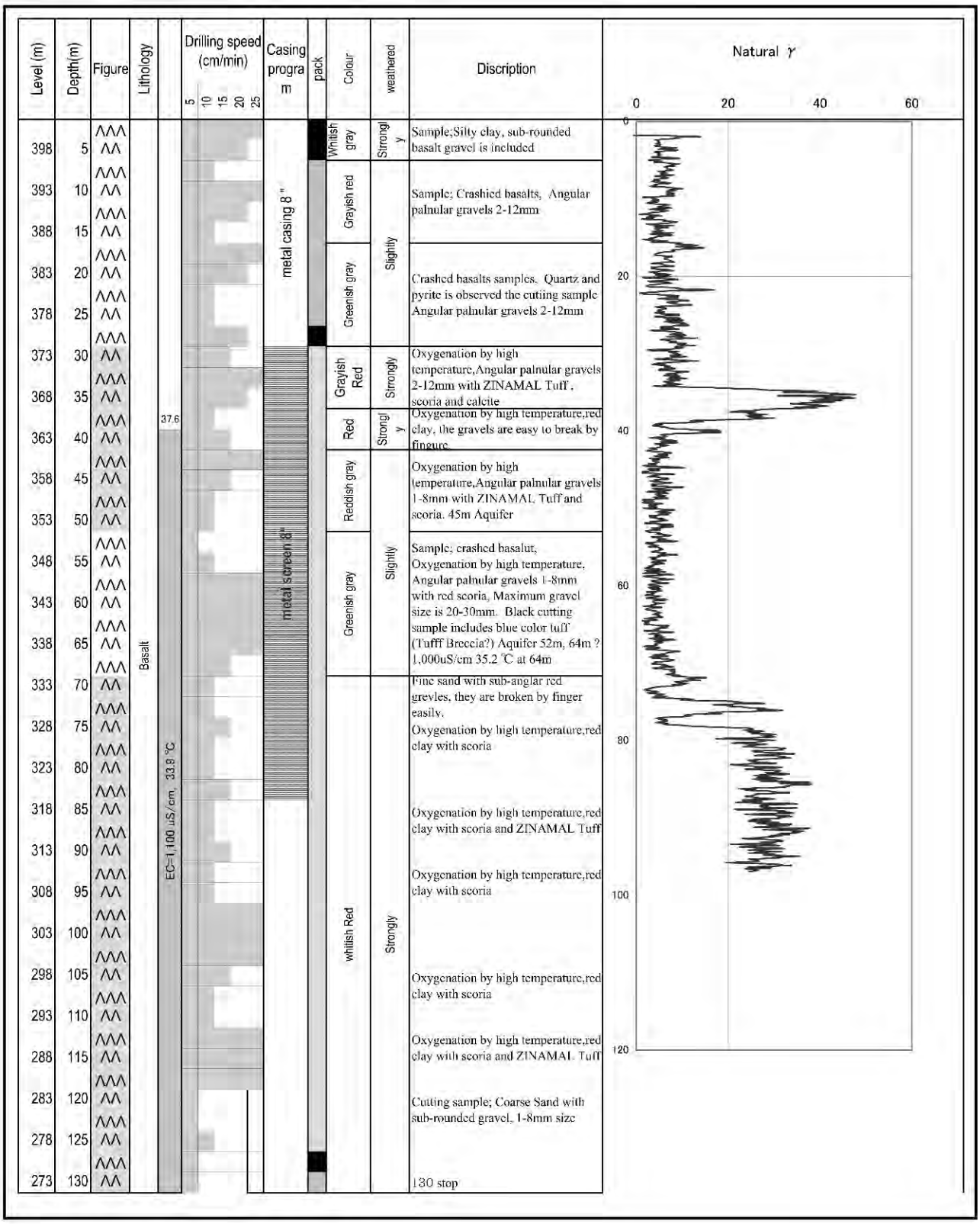
LOCATION: ZANIMALLE **DATE:** 29-30,SEP 2010

	GEO MARK	LITHOLOGY	WATER LEVEL	SUMMARY OF WATER PUMP TEST
0	^ ^ ^	basalt lava		
	^ ^			**5 STEP TEST**
	^ ^ ^	0-5		PROPER Q=1.8 L/S
	^ ^	weathered and		DRAW DOWN=2.3 M
	^ ^ ^	cracked into		
	^ ^	sub gravel		
	^ ^ ^			
	^ ^	25-May		
	^ ^ ^			**24 HOURS CONTINUOUS UP LIFT**
	^ ^	weathered fractured		
	^ ^ ^	with clay seam	**S.W.L=** 37.6	UPLIFT Q= 1.8L/S
	^ ^	**aquifer** 40m		TOTAL Q= 155.5 M^3 / 24 HOl
50	^ ^ ^			DRAW DOWN=16.52 M
	^ ^	40-75m	**DWWL** 54.12	TRANSIMISIVITY=4.1M^2/DAY
	^ ^ ^	cracked fractured		
	^ ^	into high premeablity		
	^ ^ ^			
	^ ^			**RECOVERY TEST**
	^ ^ ^			
	^ ^			REMAINING W L= 16.52 M
	^ ^ ^			FULL RECOVERY TIME= 120 MIN
	^ ^			TRANSIMISIVITY=4.9M^2/DAY
	^ ^ ^	75-150m		
	^ ^	hard and rather light		
	^ ^ ^			
	^ ^	relatively low		**WATER QUALITY**
100	^ ^ ^	premeability		
	^ ^			EC= 0.135 S/M
	^ ^ ^			PH= 7.25
	^ ^			TEMPERATURE= 35.1C^O
	^ ^ ^			
	^ ^			
	^ ^ ^			
	^ ^			
	^ ^ ^			
	^ ^			
	^ ^ ^			
150	^ ^ ^			

Date:30 -sep-2010

Drilling BH 10-6-8 | WATER SOURCE | ZINAMAL

Coordinates:11.10118N,42.18067E | Alititude: | 403 m



Step draw down test record

Pumping Rate

	1st step	2nd step	3rd step	4th step	5th step
Q (L/s)	1	1.2	1.6	2	2.3
Duration (min)					
S = DW (m)	0.58	0.73	1.62	2.86	4.32

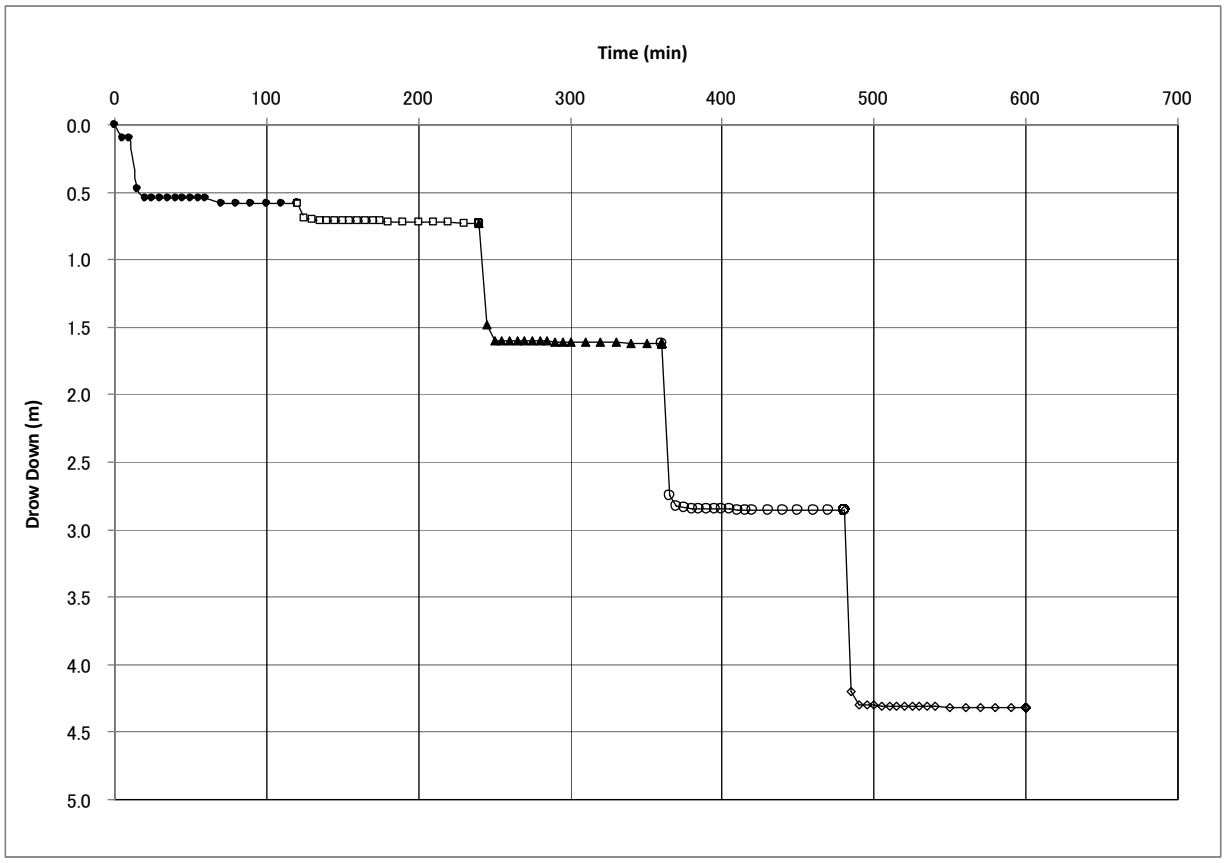
①Stastic Water Level	37.5
Record Keeper	

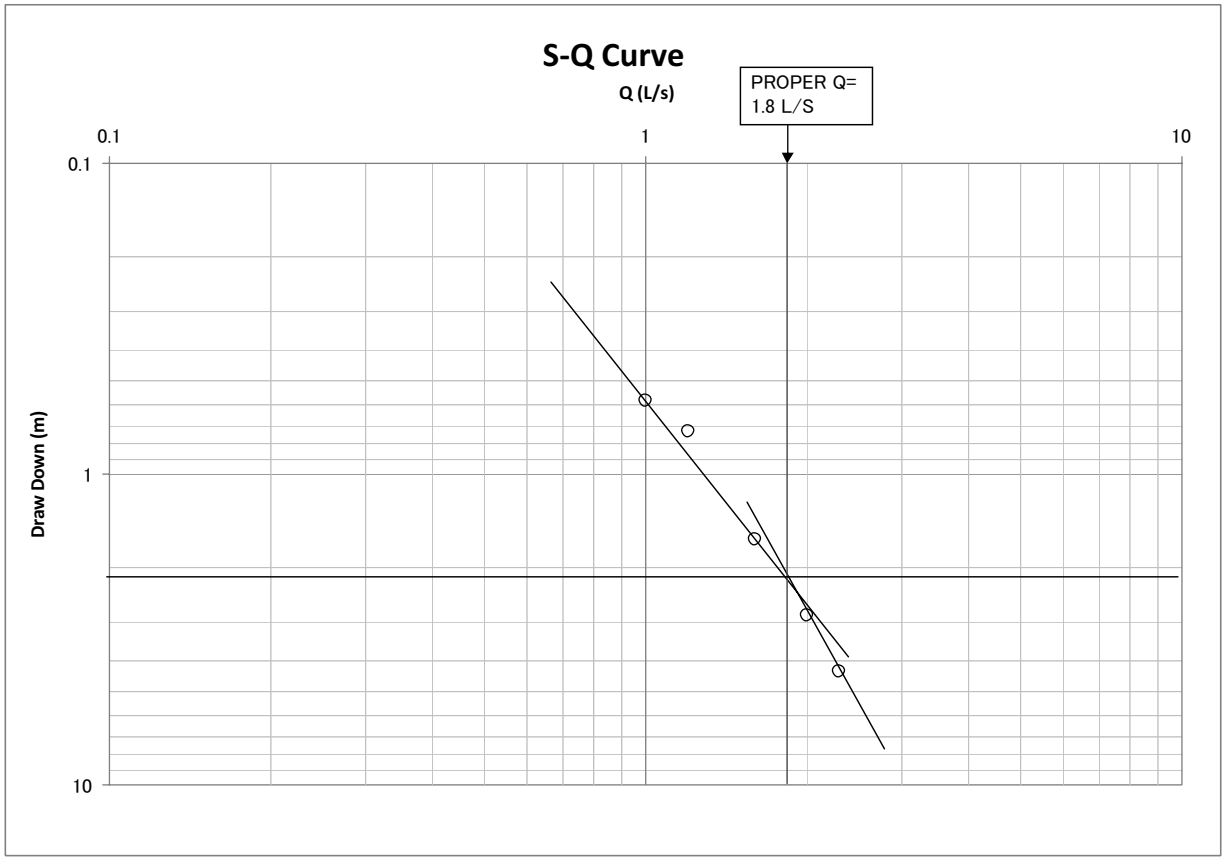
③＝②－①

Time	1st step		2nd step		3rd step		4th step		5th step	
	②Water Level	③Draw Down	Water Level	Draw Down	Water Level	Draw Down	Water Level	Draw Down	Water Level	Draw Down
(min)	(GL-m)	(m)	(GL-m)	(m)	(GL-m)	(m)	(GL-m)	(m)	(GL-m)	(m)
0	37.50	0.00	38.08	0.58	38.23	0.73	39.12	1.62	40.36	2.86
5	37.60	0.10	38.19	0.69	38.98	1.48	40.25	2.75	41.70	4.20
10	37.60	0.10	38.20	0.70	39.10	1.60	40.33	2.83	41.80	4.30
15	37.97	0.47	38.21	0.71	39.10	1.60	40.34	2.84	41.80	4.30
20	38.04	0.54	38.21	0.71	39.10	1.60	40.35	2.85	41.80	4.30
25	38.04	0.54	38.21	0.71	39.10	1.60	40.35	2.85	41.81	4.31
30	38.04	0.54	38.21	0.71	39.10	1.60	40.35	2.85	41.81	4.31
35	38.04	0.54	38.21	0.71	39.10	1.60	40.35	2.85	41.81	4.31
40	38.04	0.54	38.21	0.71	39.10	1.60	40.35	2.85	41.81	4.31
45	38.04	0.54	38.21	0.71	39.10	1.60	40.35	2.85	41.81	4.31
50	38.04	0.54	38.21	0.71	39.11	1.61	40.36	2.86	41.81	4.31
55	38.04	0.54	38.21	0.71	39.11	1.61	40.36	2.86	41.81	4.31
60	38.04	0.54	38.22	0.72	39.11	1.61	40.36	2.86	41.81	4.31
70	38.08	0.58	38.22	0.72	39.11	1.61	40.36	2.86	41.82	4.32
80	38.08	0.58	38.22	0.72	39.11	1.61	40.36	2.86	41.82	4.32
90	38.08	0.58	38.22	0.72	39.11	1.61	40.36	2.86	41.82	4.32
100	38.08	0.58	38.22	0.72	39.12	1.62	40.36	2.86	41.82	4.32
110	38.08	0.58	38.23	0.73	39.12	1.62	40.36	2.86	41.82	4.32
120	38.08	0.58	38.23	0.73	39.12	1.62	40.36	2.86	41.82	4.32
180										
240										
300										
360										
420										
480										
540										
600										
660										
720										
780										
840										
900										
960										
1020										
1080										
1140										
1200										
1260										
1320										
1380										
1440										

Measurement of Water Quality					
time	09:30-11:30	11:30-13:30	13;30-15:30	15:30-17:30	19:30-21:30
EC(μs/cm)	0.135 s/m	0.135 s/m	0.135 s/m	0.135 s/m	0.135 s/m
PH	7.25	7.25	7.25	7.25	7.25
Temp	35.1 C	35.1 C	35.1 C	35.1 C	35.1 C

Zina Male Step Drawdown Test





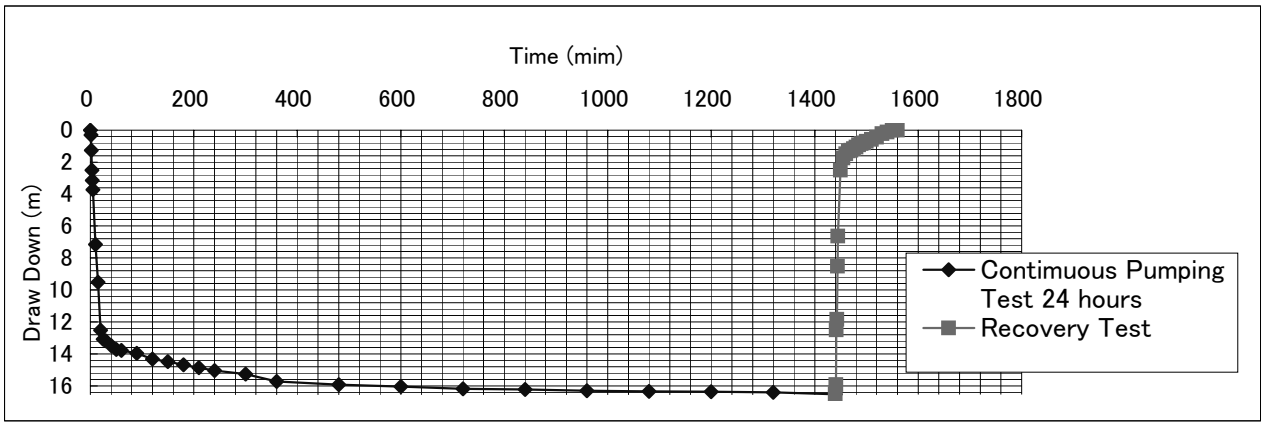
Continuous Pumping Test

Site Name: ZANEMALLE (2)

Date: 29-30,SEP 2010

Static Water Level: 37.6 M

Contimuous Pumping Test 24 hours				Recovery Test			
Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	Pumping Late (L/s)	Total Elapsed Time	Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)
0	37.6	0		1440	0	54.12	16.52
1	37.91	0.31		1441	1	53.52	15.92
2	38.86	1.26		1442	2	50.1	12.5
3	40.11	2.51		1443	3	49.45	11.85
4	40.75	3.15		1444	4	46.12	8.52
5	41.33	3.73		1445	5	44.23	6.63
10	44.75	7.15		1450	10	40.11	2.51
15	47.12	9.52		1455	15	39.34	1.74
20	50.12	12.52	1.8	1460	20	39.09	1.49
25	50.68	13.08		1465	25	38.9	1.3
30	50.78	13.18	1.8	1470	30	38.87	1.27
40	51.08	13.48		1475	35	38.76	1.16
50	51.32	13.72		1480	40	38.67	1.07
60	51.38	13.78	1.8	1485	45	38.52	0.92
90	51.57	13.97		1490	50	38.44	0.84
120	51.92	14.32		1495	55	38.4	0.8
150	52.09	14.49		1500	60	38.3	0.7
180	52.28	14.68		1510	70	38.18	0.58
210	52.46	14.86		1520	80	38.05	0.45
240	52.64	15.04	1.8	1530	90	37.82	0.22
300	52.86	15.26		1540	100	37.72	0.12
360	53.33	15.73		1550	110	37.6	0
480	53.52	15.92		1560	120	37.6	0
600	53.64	16.04	1.8				
720	53.78	16.18					
840	53.83	16.23					
960	53.91	16.31					
1080	53.94	16.34	1.8				
1200	53.97	16.37					
1320	54.01	16.41					
1440	54.12	16.52	1.8				



Continuous Pumping Test

Site Name ZANEMALLE (2)

Date: 29-30,SEP 2010

Static Water Level: 37.6 M

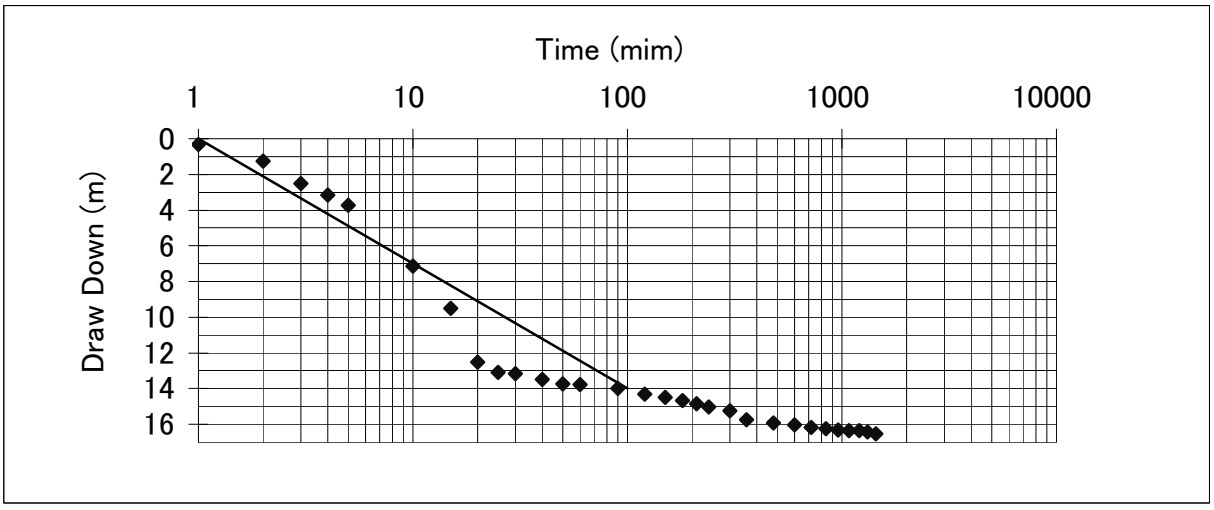
Contimuous Pumping Test 24 hours			
Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	Pumping Late (L/s)
0	37.6	0	
1	37.91	0.31	
2	38.86	1.26	
3	40.11	2.51	
4	40.75	3.15	
5	41.33	3.73	
10	44.75	7.15	
15	47.12	9.52	
20	50.12	12.52	1.8
25	50.68	13.08	
30	50.78	13.18	1.8
40	51.08	13.48	
50	51.32	13.72	
60	51.38	13.78	1.8
90	51.57	13.97	
120	51.92	14.32	
150	52.09	14.49	
180	52.28	14.68	
210	52.46	14.86	
240	52.64	15.04	1.8
300	52.86	15.26	
360	53.33	15.73	
480	53.52	15.92	
600	53.64	16.04	1.8
720	53.78	16.18	
840	53.83	16.23	
960	53.91	16.31	
1080	53.94	16.34	1.8
1200	53.97	16.37	
1320	54.01	16.41	
1440	54.12	16.52	1.8

Transmissivity (T) = 0.183*Q/ΔS
(Jacob Method)

Q= 155.5 m3/d

	Time(min)	Drawdown(m)
S1	1	0
S2	10	7

T= 4.1 m3/d/m



Continuous Pumping Test (RECOVERY)

Site Name ZANEMALLE (2)

Date: 29-30,SEP 2010

Static Water Level: 37.6 M

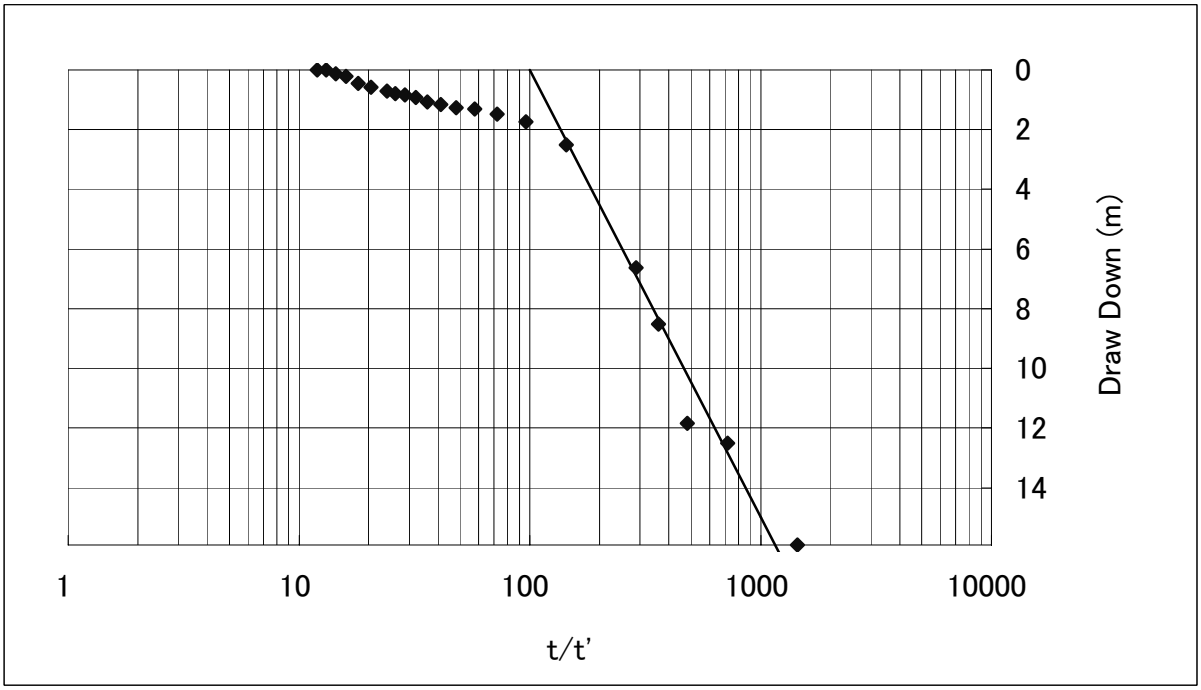
Recovery Test				
Total Elapsed Time (min)	Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	t/t'
1440	0	54.12	16.52	
1441	1	53.52	15.92	1440
1442	2	50.1	12.5	720
1443	3	49.45	11.85	480
1444	4	46.12	8.52	360
1445	5	44.23	6.63	288
1450	10	40.11	2.51	144
1455	15	39.34	1.74	96
1460	20	39.09	1.49	72
1465	25	38.9	1.3	58
1470	30	38.87	1.27	48
1475	35	38.76	1.16	41
1480	40	38.67	1.07	36
1485	45	38.52	0.92	32
1490	50	38.44	0.84	29
1495	55	38.4	0.8	26
1500	60	38.3	0.7	24
1510	70	38.18	0.58	21
1520	80	38.05	0.45	18
1530	90	37.82	0.22	16
1540	100	37.72	0.12	14
1550	110	37.6	0	13
1560	120	37.6	0	12

Transmissivity (T) = 0.183*Q/ΔS
(Theis Method)

Q= 401.76 m3/d

	Time(min)	Drawdown(m)
S1	100	0
S2	1000	15

T= 4.9 m3/d/m



SUMARRAY OF WELL CONDITION

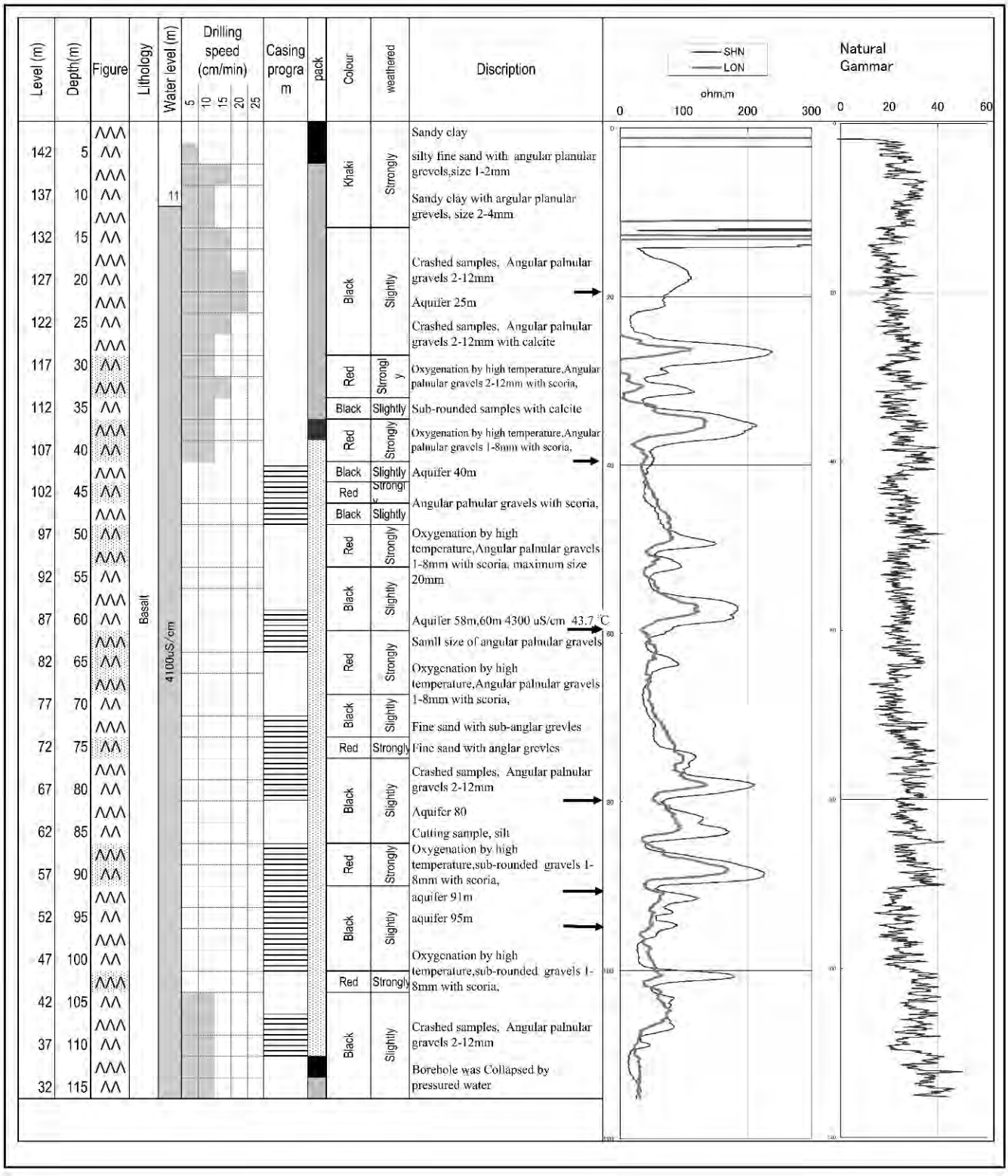
LOCATION: DGOURI 2 **DATE:**

	GEO MARK	LITHOLOGY	WATER LEVEL	SUMMARY OF WATER PUMP TEST
0		0--11 Sand Gravel		**5 STEP TEST**
			S.W.L= 11.90	NOT DONE
		11--150 Basalt Lava Cracked and fractured	**DWWL=** 21.1	
		into angular fragments		
		Weathered with clay seam in some places		**24 HOURS CONTINUOUS UP LIFT**
		High permeability		UPLIFT Q= 4.4 L/S TOTAL Q= 380.6 M^3 / 24 HOURS
50		45m Aquifer		DRAW DOWN=9.2M TRANSIMMISIVITY=14.5M^2/DAY
		60m aquifer		**RECOVERY TEST**
				REMAINING W L= 24.05 M RECOVERY TIME= 110 MIN TRANSIMMISIVITY=12.6M^2/DAY
		95m Aquifer		**WATER QUALITY**
100		100mbelow Fresh rock Crack developed		EC= 552 uS/cm PH= 7.3 TEMPERATURE= 39.8 C^O
150				

Drilling BH 10-5-11
Coordinates:11.59117N, 41.96897E

Village name DAGUIRO(2)
Alititude: 147 m

Date:29 -JULY-2010



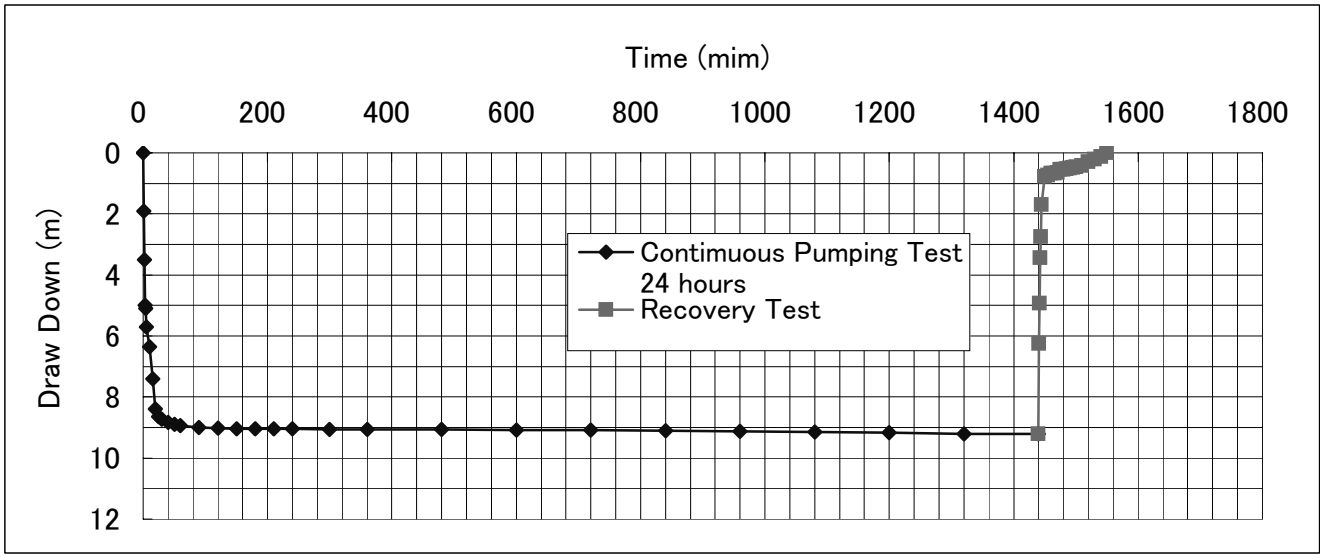
Continuous Pumping Test

Site Name: DAGIROU

Date: 12-Aug-10

Static Water Level: 11.9 M

Contimuous Pumping Test 24 hours				Recovery Test			
Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	Pumping Late (L/s)	Total Elapsed	Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)
0	11.9	0		1440	0	21.1	9.2
1	13.8	1.9		1441	1	18.15	6.25
2	15.4	3.5		1442	2	16.82	4.92
3	16.9	5		1443	3	15.35	3.45
4	17	5.1		1444	4	14.65	2.75
5	17.6	5.7		1445	5	13.6	1.7
10	18.26	6.36		1450	10	12.68	0.78
15	19.3	7.4	4.4	1455	15	12.63	0.73
20	20.3	8.4	4.4	1460	20	12.58	0.68
25	20.55	8.65		1465	25	12.57	0.67
30	20.62	8.72		1470	30	12.56	0.66
40	20.74	8.84		1475	35	12.45	0.55
50	20.8	8.9		1480	40	12.44	0.54
60	20.84	8.94		1485	45	12.42	0.52
90	20.89	8.99		1490	50	12.4	0.5
120	20.93	9.03		1495	55	12.38	0.48
150	20.94	9.04	4.4	1500	60	12.36	0.46
180	20.95	9.05		1510	70	12.32	0.42
210	20.95	9.05		1520	80	12.2	0.3
240	20.95	9.05		1530	90	12.11	0.21
300	20.96	9.06		1540	100	12.02	0.12
360	20.96	9.06		1550	110	11.9	0
480	20.96	9.06	4.4				
600	20.98	9.08					
720	20.99	9.09					
840	21.01	9.11					
960	21.02	9.12	4.4				
1080	21.05	9.15					
1200	21.07	9.17					
1320	21.1	9.2					
1440	21.1	9.2					



Continuous Pumping Test LOG- DG

Site Name DAGIROU

Contimuous Pumping Test			
Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	Pumping Late (L/s)
0	11.9	11.9	
1	13.8	1.9	
2	15.4	3.5	
3	16.9	5	
4	17	5.1	
5	17.6	5.7	
10	18.26	6.36	
15	19.3	7.4	4.4
20	20.3	8.4	4.4
25	20.55	8.65	
30	20.62	8.72	
40	20.74	8.84	
50	20.8	8.9	
60	20.84	8.94	
90	20.89	8.99	
120	20.93	9.03	
150	20.94	9.04	4.4
180	20.95	9.05	
210	20.95	9.05	
240	20.95	9.05	
300	20.96	9.06	
360	20.96	9.06	
480	20.96	9.06	4.4
600	20.98	9.08	
720	20.99	9.09	
840	21.01	9.11	
960	21.02	9.12	4.4
1080	21.05	9.15	
1200	21.07	9.17	
1320	21.1	9.2	
1440	21.1	9.2	

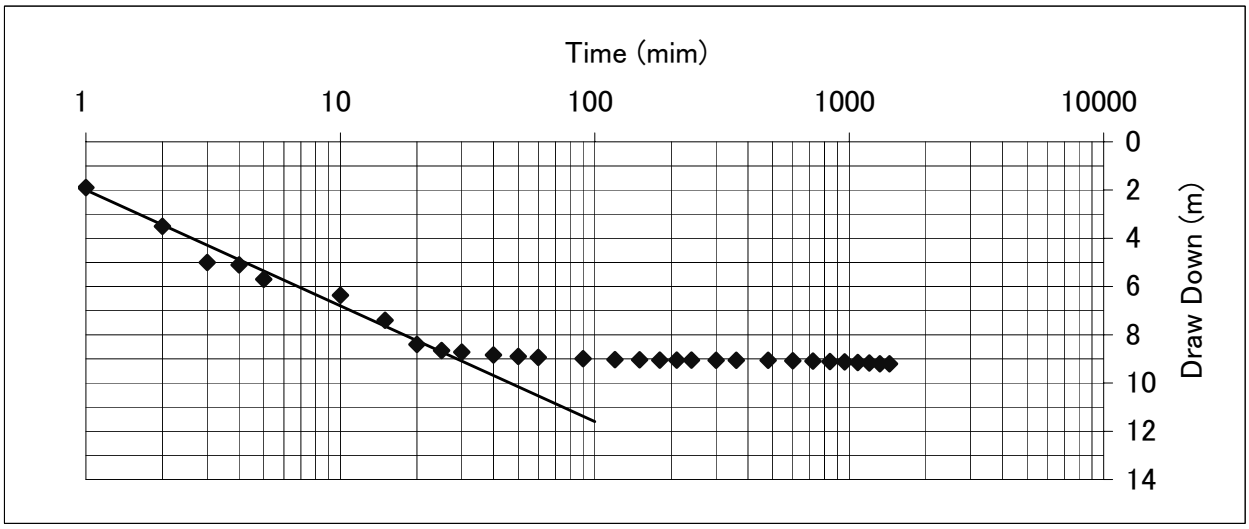
Transmissivity (T) = 0.183*Q/ΔS
(Jacob Method)

Q= 380.2 m3/d

	Time(min)	Drawdown(m)
S1	1	2
S2	10	6.8

T= 14.5 m3/d/m

24 hours CONTINUOS PUMPING semi log DG



RECOVERY Pumping Test LOG- DG (Recovery)

Site Name DAGIROU

Recovery Test				
Total Elapsed Time (min)	Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	t/t'
1440	0	21.1	9.2	
1441	1	18.15	6.25	1440
1442	2	16.82	4.92	720
1443	3	15.35	3.45	480
1444	4	14.65	2.75	360
1445	5	13.6	1.7	288
1450	10	12.68	0.78	144
1455	15	12.63	0.73	96
1460	20	12.58	0.68	72
1465	25	12.57	0.67	58
1470	30	12.56	0.66	48
1475	35	12.45	0.55	41
1480	40	12.44	0.54	36
1485	45	12.42	0.52	32
1490	50	12.4	0.5	29
1495	55	12.38	0.48	26
1500	60	12.36	0.46	24
1510	70	12.32	0.42	21
1520	80	12.2	0.3	18
1530	90	12.11	0.21	16
1540	100	12.02	0.12	14
1550	110	11.9	0	13

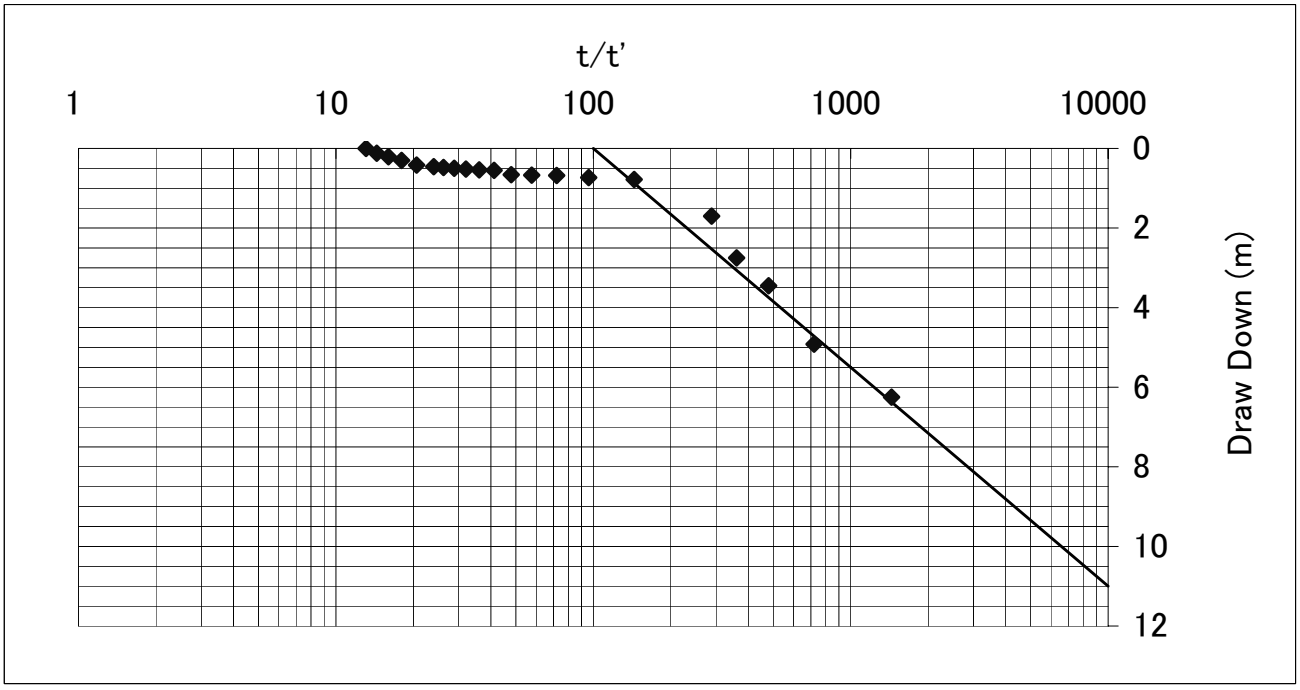
Transmissivity (T) = 0.183*Q/ΔS
(Theis Method)

Q= 380.16 m3/d

	Time(min)	Drawdown(m)
S1	100	0
S2	1000	5.5

T= 12.6 m3/d/m

Recovery test semi log DG



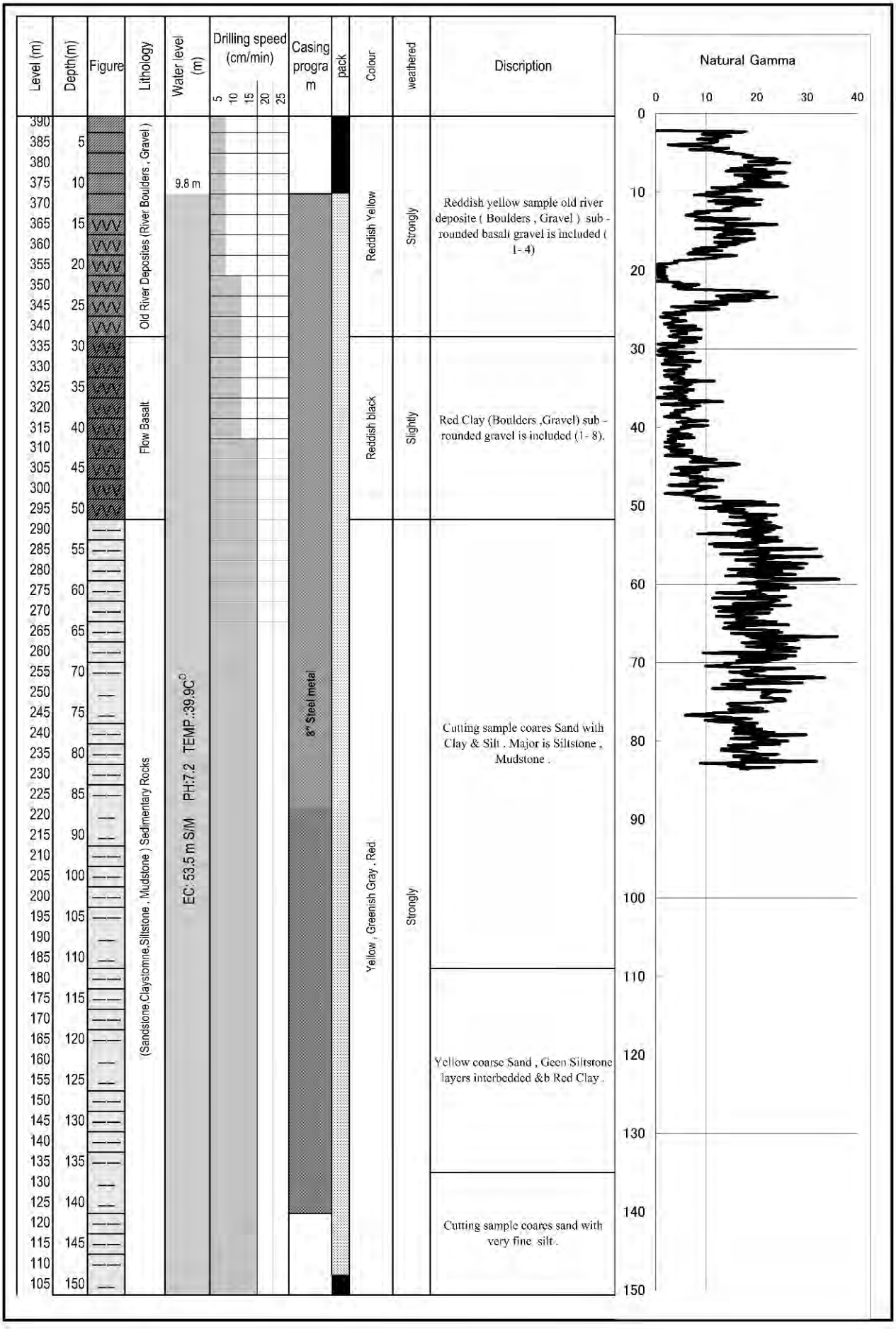
SUMARRAY OF WELL CONDITION

LOCATION: SEK SABER **DATE:** 26-28,October 2010

	GEO MARK	LITHOLOGY	WATER LEVEL	SUMMARY OF WATER PUMP TEST
0	0 0 0 0 0	0--12 Gravel Boulder of Basalt		**5 STEP TEST**
		12--30 Sand gravel Old terrace deposit rich aquifer High permeability	**S.W.L=** 9.9 **DWWL=** 11.36	PROPER Q=9 L/S DRAW DOWN= 1.5 M
	^ ^ ^ ^ ^ ^ ^ ^ ^ ^	30--52 Basalt Porous and fractured		**24 HOURS CONTINUOUS UP LIFT**
50	^ ^ ^	High permeability		UPLIFT Q= 9 L/S TOTAL Q= 777.6 M^3 / 24 HOURS DRAW DOWN=1.46M TRANSIMISIVITY=316.2M^2/DAY
		52m below Mudstone with minor sandstone Cretaceous sedimentary rock layer		**RECOVERY TEST**
		Driing sample very stick clayy Low permeability		REMAINING W L= 11.36M RECOVERY TIME= 70 MIN TRANSIMISIVITY=330.9M^2/DAY
100				**WATER QUALITY**
				EC= 53.5^M S/M PH= 7.2 TEMPERATURE= 39.9C^O
150				

Drilling BH 13
Coordinates: 0197488E, 1247173N

Date: - 13 -10 -2010
Village name Chekh Saber
Alititude: 306 m



Step draw down test record

Pumping Rate

	1st step	2nd step	3rd step	4th step	5th step
Q (L/s)	5	8.7	10	11.1	13.3
Duration (min)					
S = DW (m)	1.13	1.35	1.49	1.73	1.90

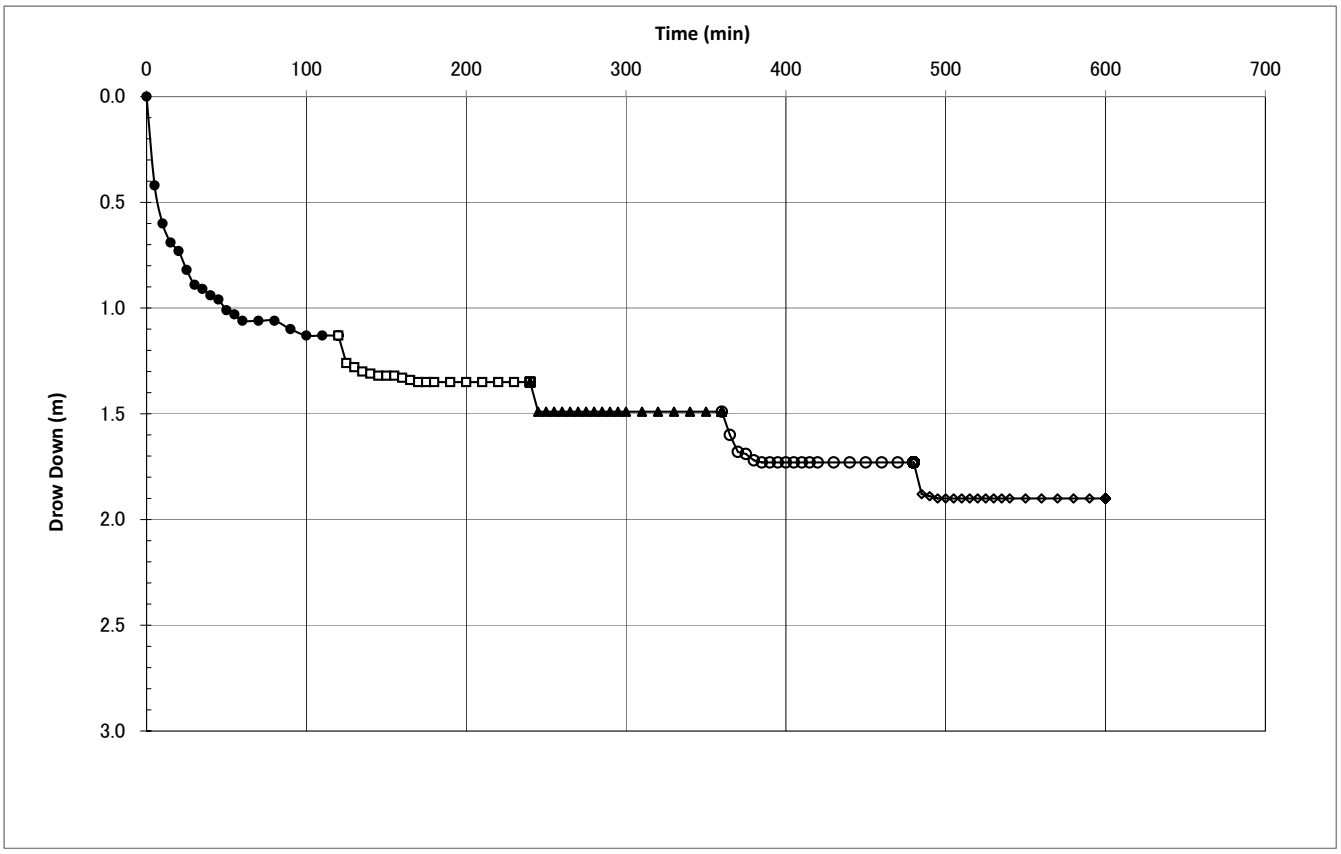
①Stastic Water Level	9.9
Record Keeper	

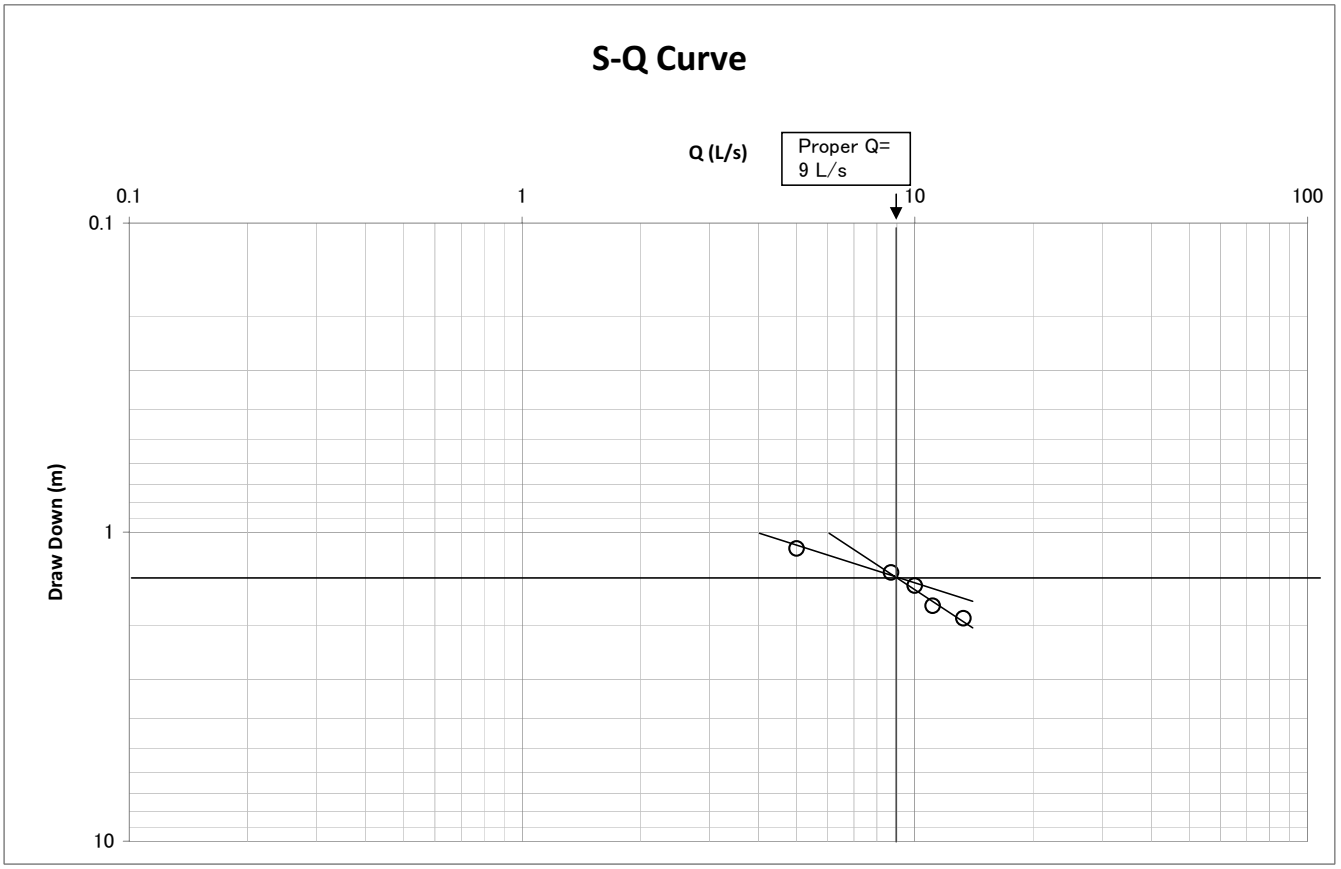
③＝②－①

Time	1st step		2nd step		3rd step		4th step		5th step	
	②Water Level	③Draw Down	Water Level	Draw Down	Water Level	Draw Down	Water Level	Draw Down	Water Level	Draw Down
(min)	(GL-m)	(m)	(GL-m)	(m)	(GL-m)	(m)	(GL-m)	(m)	(GL-m)	(m)
0	9.90	0.00	11.03	1.13	11.25	1.35	11.39	1.49	11.63	1.73
5	10.32	0.42	11.16	1.26	11.39	1.49	11.50	1.60	11.78	1.88
10	10.50	0.60	11.18	1.28	11.39	1.49	11.58	1.68	11.79	1.89
15	10.59	0.69	11.20	1.30	11.39	1.49	11.59	1.69	11.80	1.90
20	10.63	0.73	11.21	1.31	11.39	1.49	11.62	1.72	11.80	1.90
25	10.72	0.82	11.22	1.32	11.39	1.49	11.63	1.73	11.80	1.90
30	10.79	0.89	11.22	1.32	11.39	1.49	11.63	1.73	11.80	1.90
35	10.81	0.91	11.22	1.32	11.39	1.49	11.63	1.73	11.80	1.90
40	10.84	0.94	11.23	1.33	11.39	1.49	11.63	1.73	11.80	1.90
45	10.86	0.96	11.24	1.34	11.39	1.49	11.63	1.73	11.80	1.90
50	10.91	1.01	11.25	1.35	11.39	1.49	11.63	1.73	11.80	1.90
55	10.93	1.03	11.25	1.35	11.39	1.49	11.63	1.73	11.80	1.90
60	10.96	1.06	11.25	1.35	11.39	1.49	11.63	1.73	11.80	1.90
70	10.96	1.06	11.25	1.35	11.39	1.49	11.63	1.73	11.80	1.90
80	10.96	1.06	11.25	1.35	11.39	1.49	11.63	1.73	11.80	1.90
90	11.00	1.10	11.25	1.35	11.39	1.49	11.63	1.73	11.80	1.90
100	11.03	1.13	11.25	1.35	11.39	1.49	11.63	1.73	11.80	1.90
110	11.03	1.13	11.25	1.35	11.39	1.49	11.63	1.73	11.80	1.90
120	11.03	1.13	11.25	1.35	11.39	1.49	11.63	1.73	11.80	1.90
180										
240										
300										
360										
420										
480										
540										
600										
660										
720										
780										
840										
900										
960										
1020										
1080										
1140										
1200										
1260										
1320										
1380										
1440										

Measurement of Water Quality					
time	12:00-14:00	14:00-16:00	16:00-18:00	18:00-20:00	20:00-22:00
EC(μs/cm)	53.5 m S/M	53.5 m S/M	53.5 m S/M	53.5 m S/M	53.5 m S/M
PH	7.2	7.2	7.2	7.2	7.2
Temp	39.9 C	39.9 C	39.9 C	39.9 C	39.9 C

Sek Sabir Step Drawdown Test





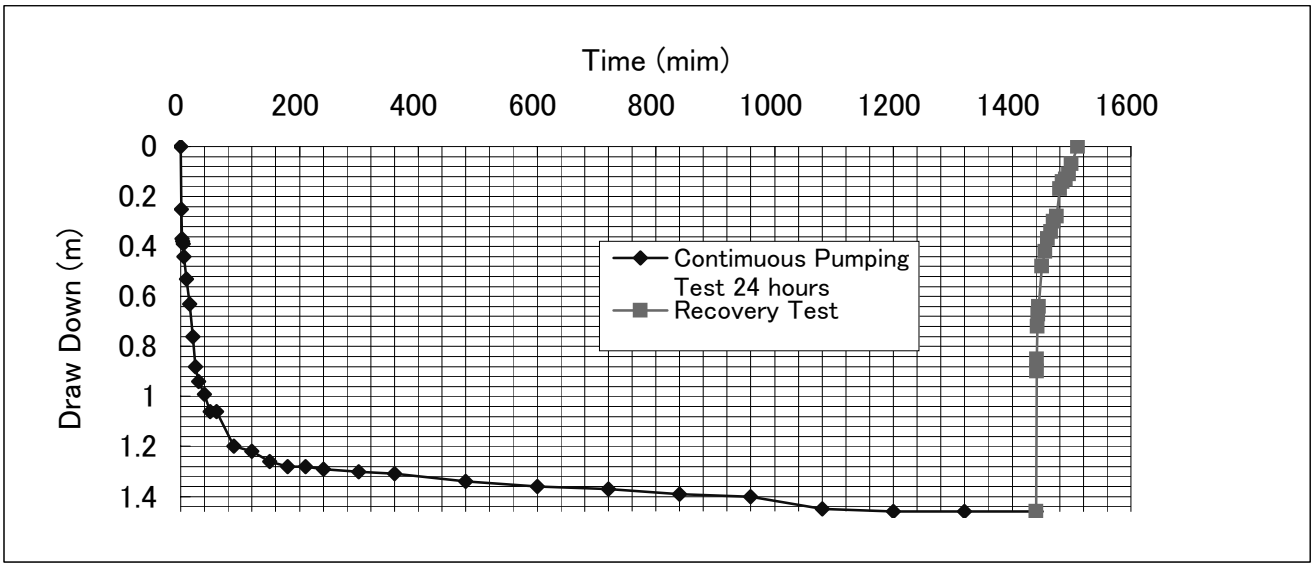
Continuous Pumping Test

Site Name: SEK SABIR

Date: 26-28,October 2010

Static Water Level: 9.9 M

Contimuous Pumping Test 24 hours					Recovery Test			
Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	Pumping Late (L/s)		Total Elapsed	Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)
0	9.9	0			1440	0	11.36	1.46
1	10.15	0.25			1441	1	10.8	0.9
2	10.27	0.37			1442	2	10.75	0.85
3	10.28	0.38			1443	3	10.62	0.72
4	10.29	0.39			1444	4	10.57	0.67
5	10.34	0.44			1445	5	10.54	0.64
10	10.43	0.53			1450	10	10.38	0.48
15	10.53	0.63	8		1455	15	10.32	0.42
20	10.66	0.76	9.1		1460	20	10.27	0.37
25	10.78	0.88			1465	25	10.24	0.34
30	10.84	0.94			1470	30	10.2	0.3
40	10.89	0.99			1475	35	10.18	0.28
50	10.96	1.06			1480	40	10.07	0.17
60	10.96	1.06			1485	45	10.04	0.14
90	11.1	1.2			1490	50	10.03	0.13
120	11.12	1.22			1495	55	10.01	0.11
150	11.16	1.26	9		1500	60	9.97	0.07
180	11.18	1.28			1510	70	9.9	0
210	11.18	1.28						
240	11.19	1.29						
300	11.2	1.3						
360	11.21	1.31						
480	11.24	1.34	9					
600	11.26	1.36						
720	11.27	1.37						
840	11.29	1.39						
960	11.3	1.4	9					
1080	11.35	1.45						
1200	11.36	1.46						
1320	11.36	1.46						
1440	11.36	1.46						



Continuous Pumping Test LOG- DG

Site Name SEK SABIR

Contimuous Pumping Test			
Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	Pumping Late (L/s)
0	9.9	0	
1	10.15	0.25	
2	10.27	0.37	
3	10.28	0.38	
4	10.29	0.39	
5	10.34	0.44	
10	10.43	0.53	
15	10.53	0.63	8
20	10.66	0.76	9.1
25	10.78	0.88	
30	10.84	0.94	
40	10.89	0.99	
50	10.96	1.06	
60	10.96	1.06	
90	11.1	1.2	
120	11.12	1.22	
150	11.16	1.26	9
180	11.18	1.28	
210	11.18	1.28	
240	11.19	1.29	
300	11.2	1.3	
360	11.21	1.31	
480	11.24	1.34	9
600	11.26	1.36	
720	11.27	1.37	
840	11.29	1.39	
960	11.3	1.4	9
1080	11.35	1.45	
1200	11.36	1.46	
1320	11.36	1.46	
1440	11.36	1.46	

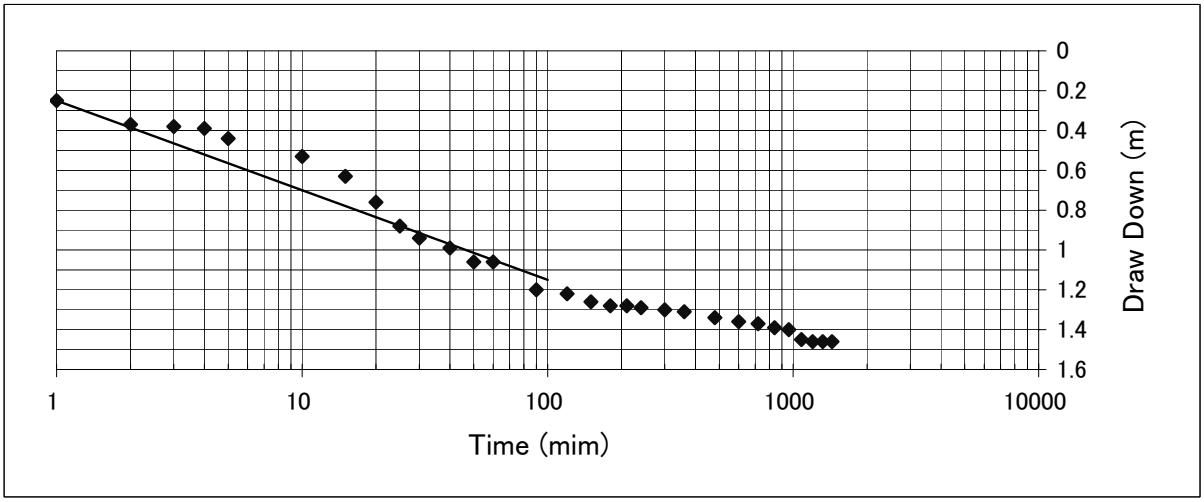
Transmissivity (T) = 0.183*Q/ΔS
(Jacob Method)

Q= 777.6 m3/d

	Time(min)	Drawdown(m)
S1	1	0.25
S2	10	0.7

T= 316.2 m3/d/m

24 hours CONTINUOS PUMPING semi log DG



RECOVERY Pumping Test LOG- DG (Recovery)

Site Name SEK SABIR

Contimuous Pumping Test			
Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	Pumping Late (L/s)

Recovery Test				
Total Elapsed Time (min)	Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	t/t'
1440	0	11.35	1.45	
1441	1	10.8	0.9	1440
1442	2	10.75	0.85	720
1443	3	10.62	0.72	480
1444	4	10.57	0.67	360
1445	5	10.54	0.64	288
1450	10	10.38	0.48	144
1455	15	10.32	0.42	96
1460	20	10.27	0.37	72
1465	25	10.24	0.34	58
1470	30	10.2	0.3	48
1475	35	10.18	0.28	41
1480	40	10.07	0.17	36
1485	45	10.04	0.14	32
1490	50	10.03	0.13	29
1495	55	10.01	0.11	26
1500	60	9.97	0.07	24
1510	70	9.9	0	21

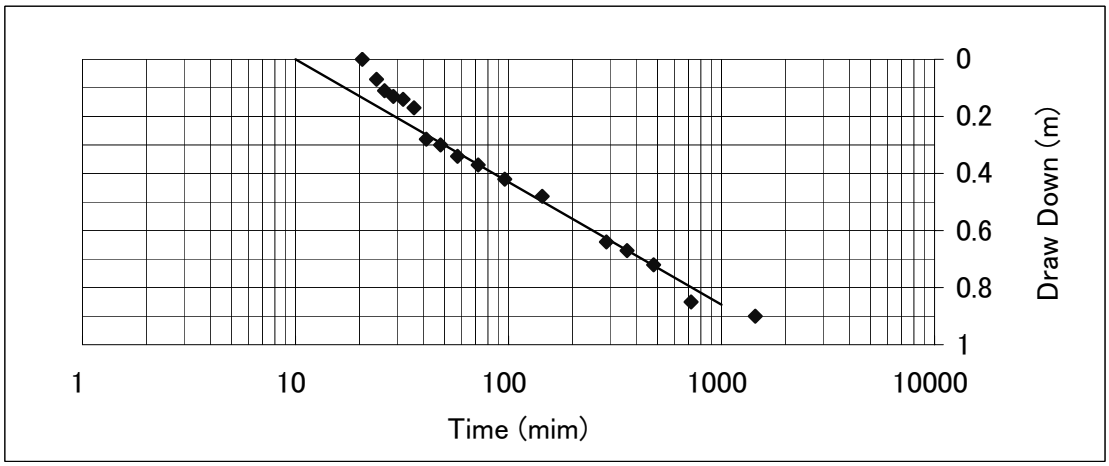
Transmissivity (T) = 0.183*Q/ΔS
(Theis Method)

Q= 777.6 m3/d

	Time(min)	Drawdown(m)
S1	10	0
S2	100	0.43

T= 330.9 m3/d/m

Recovery test semi log DG



SUMARRAY OF WELL CONDITION

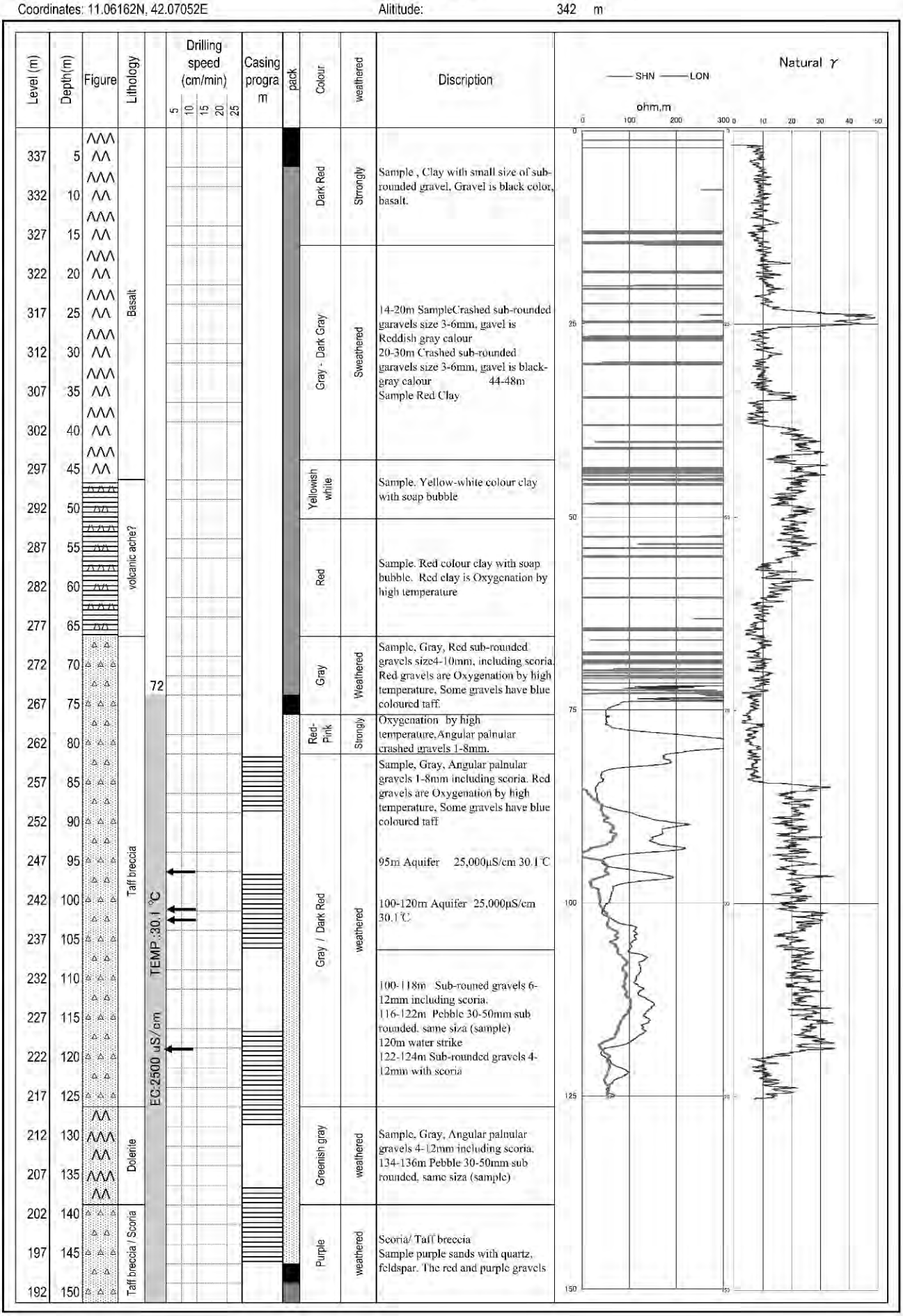
LOCATION: ASSA KOMA **DATE:** 4-5NOV, 2010

	GEO MARK	LITHOLOGY	WATER LEVEL	SUMMARY OF WATER PUMP TEST
0	^ ^ ^	0-46m		
	^ ^			**5 STEP TEST**
	^ ^ ^	basalt		PROPER Q=3.5 L/S
	^ ^	basalt eraptions		DRAW DOWN= 0.45 M
	^ ^ ^			
	^ ^	parouse and		
	^ ^ ^	high polosity		
	^ ^			
	^ ^ ^			**24 HOURS CONTINUOUS UP LIFT**
	^ ^			
	X X X	46-66m		UPLIFT Q= 4.3 L/S
	X X X	tuff/ weathered basalt		TOTAL Q= 370 M^3 / 24 HOURS
50	X X X	stiff. Low		DRAW DOWN=0.59M
	X X X	permaeablity		TRANSMISSIVITY=251.8M^2/DAY
	^ ^ ^	66-150m		
	^ ^	basalt associated		
	^ ^ ^	scoria		
	^ ^			**RECOVERY TEST**
	^ ^ ^			
	^ ^			REMAINING W L= 24.05 M
	^ ^ ^			RECOVERY TIME= MIN
	^ ^			TRANSMISSIVITY=226.6M^2/DAY
	^ ^ ^		**S.W.L=** 72.00	
	^ ^	**aquifer** 75 m	**DWWL=** 72.60	
	^ ^ ^	80m below prouse basalt		
	^ ^			**WATER QUALITY**
100	^ ^ ^	cracked and		
	^ ^	fractured		EC= 90.3 ^{M} S/M
	^ ^ ^			PH= 7.33
	^ ^	highly permeable		TEMPERATURE= 39.8 C^O
	^ ^ ^			
	^ ^			
	^ ^ ^			
	^ ^			
	^ ^ ^			
	^ ^			
	^ ^ ^			
	^ ^			
150	^ ^ ^			

Date:5 -AUGUST-2010

Drilling BH 10-7-16 | WATER SOURCE | ASSA KOMA

Coordinates: 11.06162N, 42.07052E | Alititude: | 342 m



Step draw down test record

Pumping Rate

	1st step	2nd step	3rd step	4th step	5th step
Q (L/s)	1	2.5	4.7	5.7	6.7
Duration (min)					
S = DW (m)	0.19	0.37	0.72	0.97	1.37

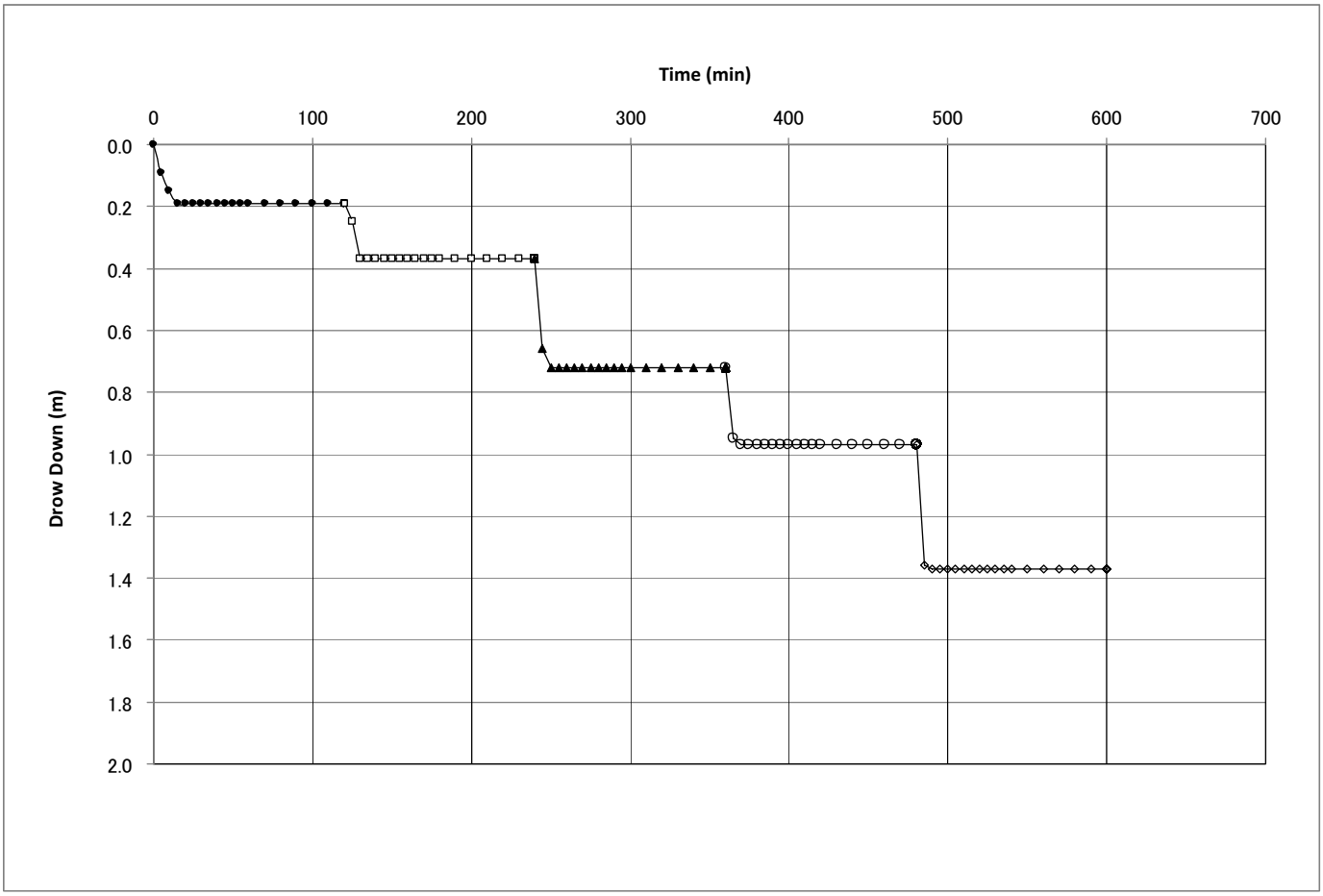
①Stastic Water Level	72
Record Keeper	

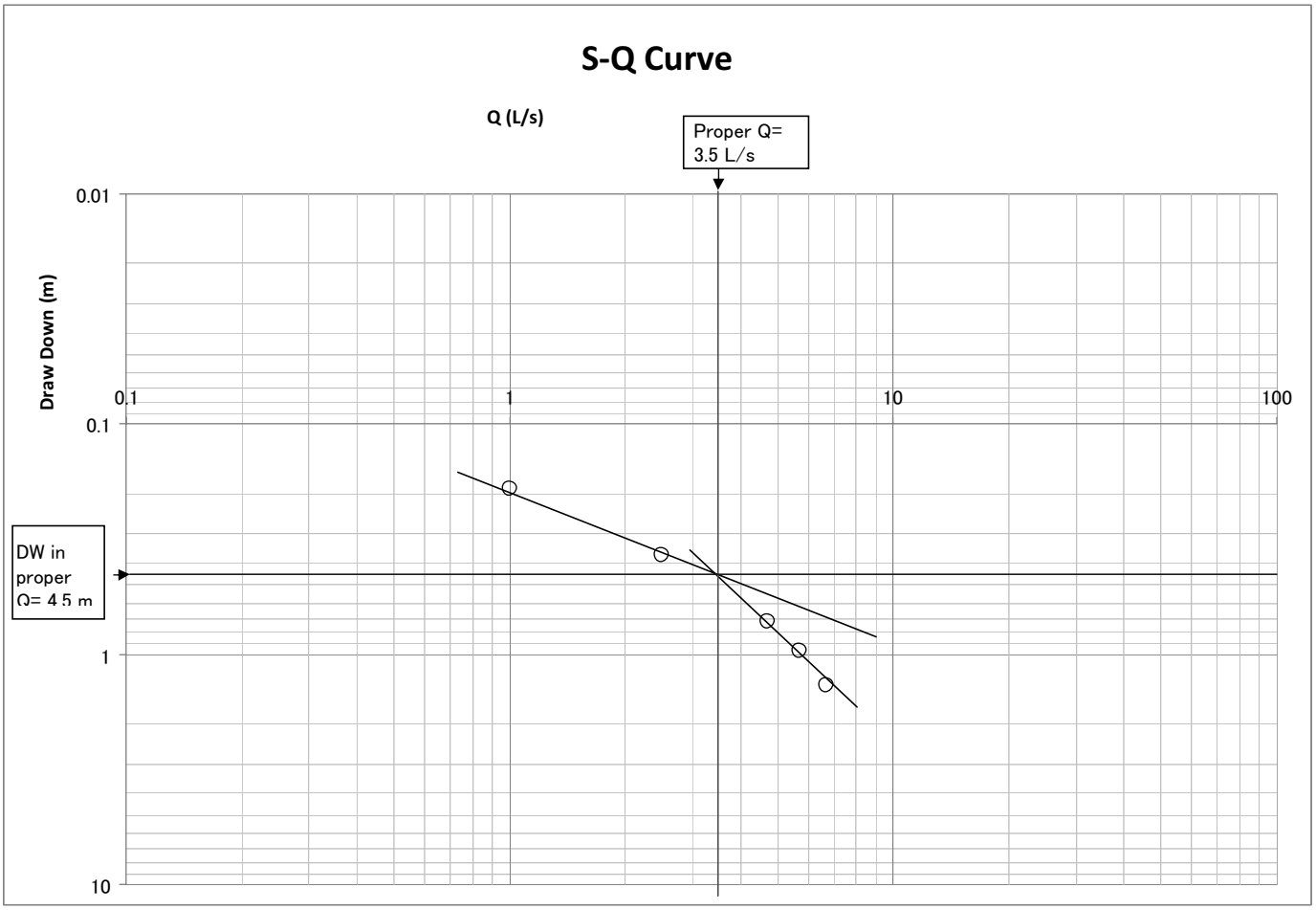
③＝②－①

Time	1st step		2nd step		3rd step		4th step		5th step	
	②Water Level	③Draw Down	Water Level	Draw Down	Water Level	Draw Down	Water Level	Draw Down	Water Level	Draw Down
(min)	(GL-m)	(m)	(GL-m)	(m)	(GL-m)	(m)	(GL-m)	(m)	(GL-m)	(m)
0	72.00	0.00	72.19	0.19	72.37	0.37	72.72	0.72	72.97	0.97
5	72.09	0.09	72.25	0.25	72.66	0.66	72.95	0.95	73.36	1.36
10	72.15	0.15	72.37	0.37	72.72	0.72	72.97	0.97	73.37	1.37
15	72.19	0.19	72.37	0.37	72.72	0.72	72.97	0.97	73.37	1.37
20	72.19	0.19	72.37	0.37	72.72	0.72	72.97	0.97	73.37	1.37
25	72.19	0.19	72.37	0.37	72.72	0.72	72.97	0.97	73.37	1.37
30	72.19	0.19	72.37	0.37	72.72	0.72	72.97	0.97	73.37	1.37
35	72.19	0.19	72.37	0.37	72.72	0.72	72.97	0.97	73.37	1.37
40	72.19	0.19	72.37	0.37	72.72	0.72	72.97	0.97	73.37	1.37
45	72.19	0.19	72.37	0.37	72.72	0.72	72.97	0.97	73.37	1.37
50	72.19	0.19	72.37	0.37	72.72	0.72	72.97	0.97	73.37	1.37
55	72.19	0.19	72.37	0.37	72.72	0.72	72.97	0.97	73.37	1.37
60	72.19	0.19	72.37	0.37	72.72	0.72	72.97	0.97	73.37	1.37
70	72.19	0.19	72.37	0.37	72.72	0.72	72.97	0.97	73.37	1.37
80	72.19	0.19	72.37	0.37	72.72	0.72	72.97	0.97	73.37	1.37
90	72.19	0.19	72.37	0.37	72.72	0.72	72.97	0.97	73.37	1.37
100	72.19	0.19	72.37	0.37	72.72	0.72	72.97	0.97	73.37	1.37
110	72.19	0.19	72.37	0.37	72.72	0.72	72.97	0.97	73.37	1.37
120	72.19	0.19	72.37	0.37	72.72	0.72	72.97	0.97	73.37	1.37
180										
240										
300										
360										
420										
480										
540										
600										
660										
720										
780										
840										
900										
960										
1020										
1080										
1140										
1200										
1260										
1320										
1380										
1440										

Measurement of Water Quality					
time	13:50-15:50	15:50-17:50	17:50-19:50	19:50-21:50	21:50-23:50
EC(μs/cm)	0.226 s/m	0.226 s/m	0.226 s/m	0.226 s/m	0.226 s/m
PH	7.53	7.53	7.53	7.53	7.53
Temp	41.3	41.3	41.3	41.3	41.3

Assa Koma – Step Draw Down Test





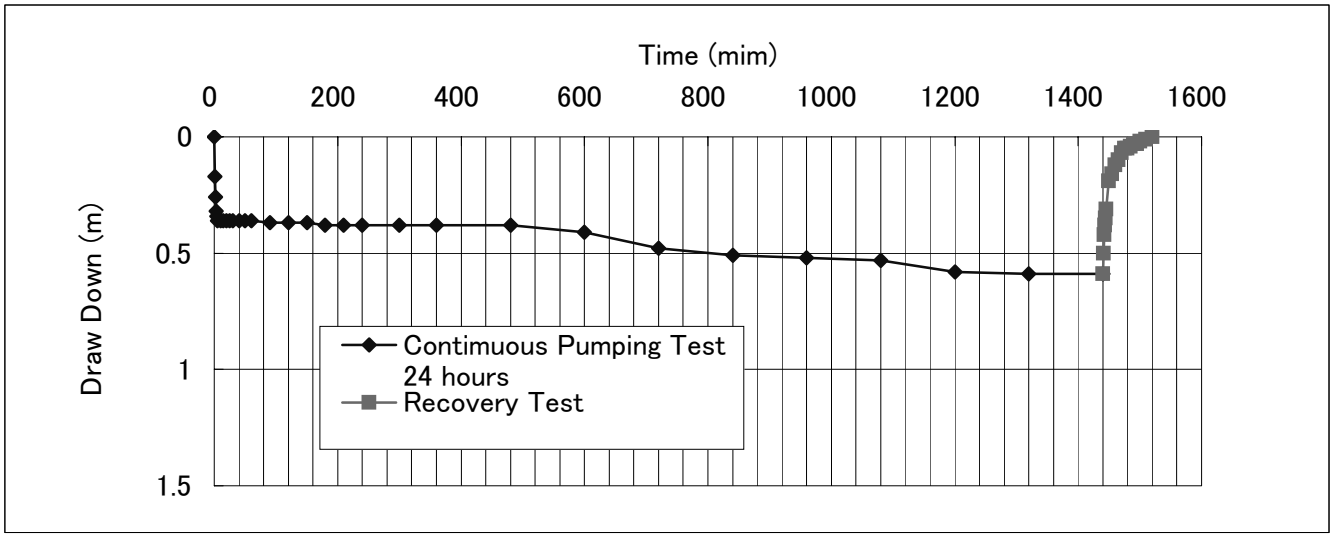
Continuous Pumping Test

Site Name: ASSAKOMA

Date: 4-5NOV, 2010

Static Water Level: 72 M

Contimuous Pumping Test 24 hours					Recovery Test			
Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	Pumping Late (L/s)		Total Elapsed	Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)
0	72.00	0			1440	0	72.59	0.59
1	72.17	0.17			1441	1	72.5	0.5
2	72.26	0.26			1442	2	72.42	0.42
3	72.32	0.32			1443	3	72.38	0.38
4	72.34	0.34			1444	4	72.35	0.35
5	72.36	0.36			1445	5	72.31	0.31
10	72.36	0.36			1450	10	72.19	0.19
15	72.36	0.36			1455	15	72.16	0.16
20	72.36	0.36	4.3		1460	20	72.12	0.12
25	72.36	0.36			1465	25	72.1	0.1
30	72.36	0.36	4.3		1470	30	72.07	0.07
40	72.36	0.36			1475	35	72.05	0.05
50	72.36	0.36	4.3		1480	40	72.05	0.05
60	72.36	0.36			1485	45	72.04	0.04
90	72.37	0.37			1490	50	72.03	0.03
120	72.37	0.37			1495	55	72.03	0.03
150	72.37	0.37			1500	60	72.02	0.02
180	72.38	0.38			1510	70	72.01	0.01
210	72.38	0.38			1520	80	72	0
240	72.38	0.38	4.3					
300	72.38	0.38						
360	72.38	0.38						
480	72.38	0.38	4.3					
600	72.41	0.41						
720	72.48	0.48						
840	72.51	0.51						
960	72.52	0.52						
1080	72.53	0.53						
1200	72.58	0.58						
1320	72.59	0.59						
1440	72.59	0.59						



Continuous Pumping Test LOG- DG

Site Name ASSAKOMA

Contimuous Pumping Test 24 hours			
Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	Pumping Late (L/s)
0	72.00	72	
1	72.17	0.17	
2	72.26	0.26	
3	72.32	0.32	
4	72.34	0.34	
5	72.36	0.36	
10	72.36	0.36	
15	72.36	0.36	
20	72.36	0.36	4.3
25	72.36	0.36	
30	72.36	0.36	4.3
40	72.36	0.36	
50	72.36	0.36	4.3
60	72.36	0.36	
90	72.37	0.37	
120	72.37	0.37	
150	72.37	0.37	
180	72.38	0.38	
210	72.38	0.38	
240	72.38	0.38	4.3
300	72.38	0.38	
360	72.38	0.38	
480	72.38	0.38	4.3
600	72.41	0.41	
720	72.48	0.48	
840	72.51	0.51	
960	72.52	0.52	
1080	72.53	0.53	
1200	72.58	0.58	
1320	72.59	0.59	
1440	72.59	0.59	

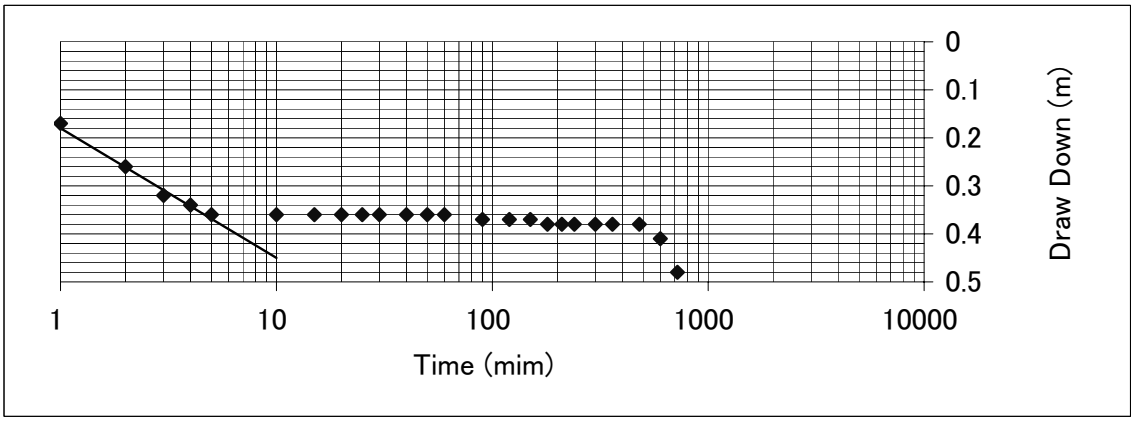
Transmissivity (T) = 0.183*Q/ΔS

Q= 371.52 m3/d

	Time(min)	Drawdown(m)
S1	1	0.18
S2	10	0.45

T= 251.808 m3/d/m

24 hours CONTINUOS PUMPING semi log DG



RECOVERY Pumping Test LOG- DG (Recovery)

Site Name ASSA KOMA

Recovery Test

	Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	t/t'
1440	0	72.59	0.59	
1441	1	72.5	0.5	1440
1442	2	72.42	0.42	720
1443	3	72.38	0.38	480
1444	4	72.35	0.35	360
1445	5	72.31	0.31	288
1450	10	72.19	0.19	144
1455	15	72.16	0.16	96
1460	20	72.12	0.12	72
1465	25	72.1	0.1	58
1470	30	72.07	0.07	48
1475	35	72.05	0.05	41
1480	40	72.05	0.05	36
1485	45	72.04	0.04	32
1490	50	72.03	0.03	29
1495	55	72.03	0.03	26
1500	60	72.02	0.02	24
1510	70	72.01	0.01	21
1520	80	72	0	18

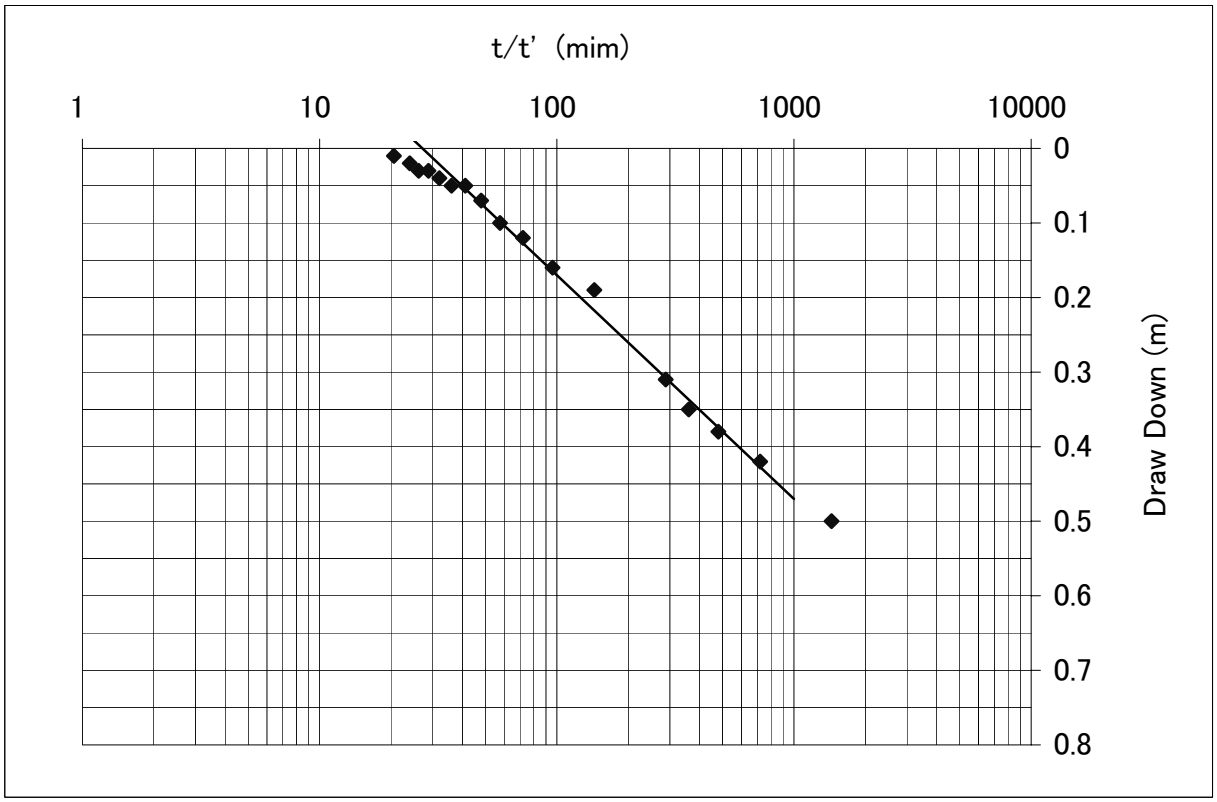
Transmissivity (T) = 0.183*Q/ΔS
(Theis Method)

Q= 371.52 m3/d

	Time(min)	Drawdown(m)
S1	10	-0.13
S2	100	0.17

T= 226.6 m3/d/m

Recovery test semi log DG



SUMARRAY OF WELL CONDITION

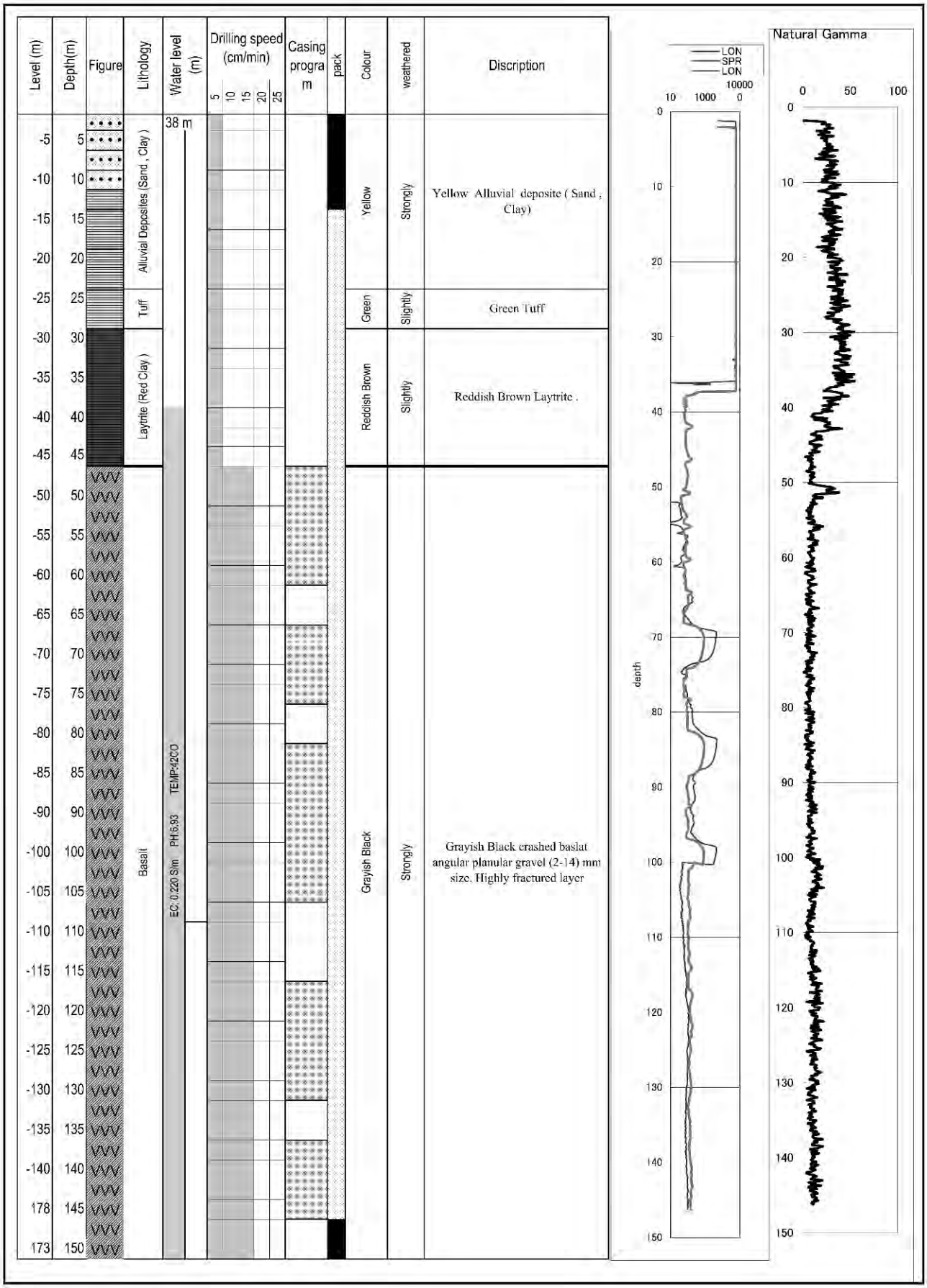
LOCATION: MINDIL **DATE:** 31OCT-1NOV, 2010

	GEO MARK	LITHOLOGY	WATER LEVEL	SUMMARY OF WATER PUMP TEST
0		0--22 Sand Gravel Alluvial basin deposit		**5 STEP TEST** PROPER Q=5.1 L/S DRAW DOWN= 0.19 M
	X X X X X X X X X X X X X X X X X X X X X X X X	22--46 Tuff Similar to Weathered Basalt Massive and compact Low permeability Weathered abd reddish	**S.W.L=** 38.00 **DWWL=** 38.27	**24 HOURS CONTINUOUS UP LIFT** UPLIFT Q= 5.1 L/S TOTAL Q= 440 M^3 / 24 HOURS DRAW DOWN=0.27M TRANSIMISIVITY=733.1M^2/DAY
50	^ ^	46--150 Basalt Weathered abd reddish Cracked and fractured Porus and appears scoria High permeability 65m Aquifer 80m aquifer 100m Aquifer		**RECOVERY TEST** REMAINING W L= 38.27M RECOVERY TIME= 80 MIN TRANSIMISIVITY=620.3M^2/DAY
100				**WATER QUALITY** EC= 22 ^{M} S/M PH= 69.3 TEMPERATURE= 42C^O
150				

Drilling BH 14 Date: - 31-10 -2010

Coordinates: 42.43183E 11.2066N Village name Mindil

Alititude: 521m



Step draw down test record

Pumping Rate

	1st step	2nd step	3rd step	4th step	5th step
Q (L/s)	2.2	4.4	5.9	8	10
Duration (min)					
S = DW (m)	0.10	0.18	0.25	0.33	0.40

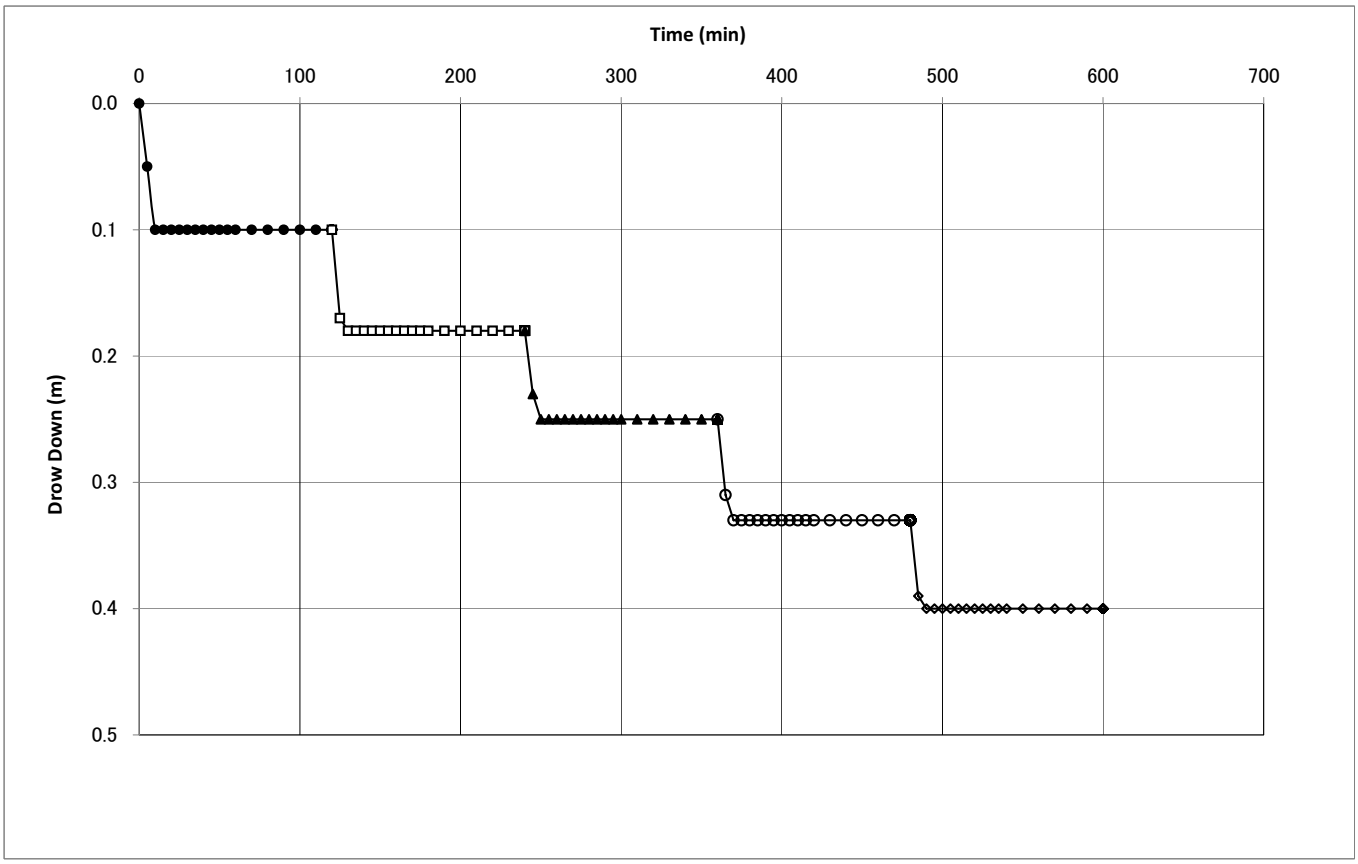
①Stastic Water Level	38
Record Keeper	

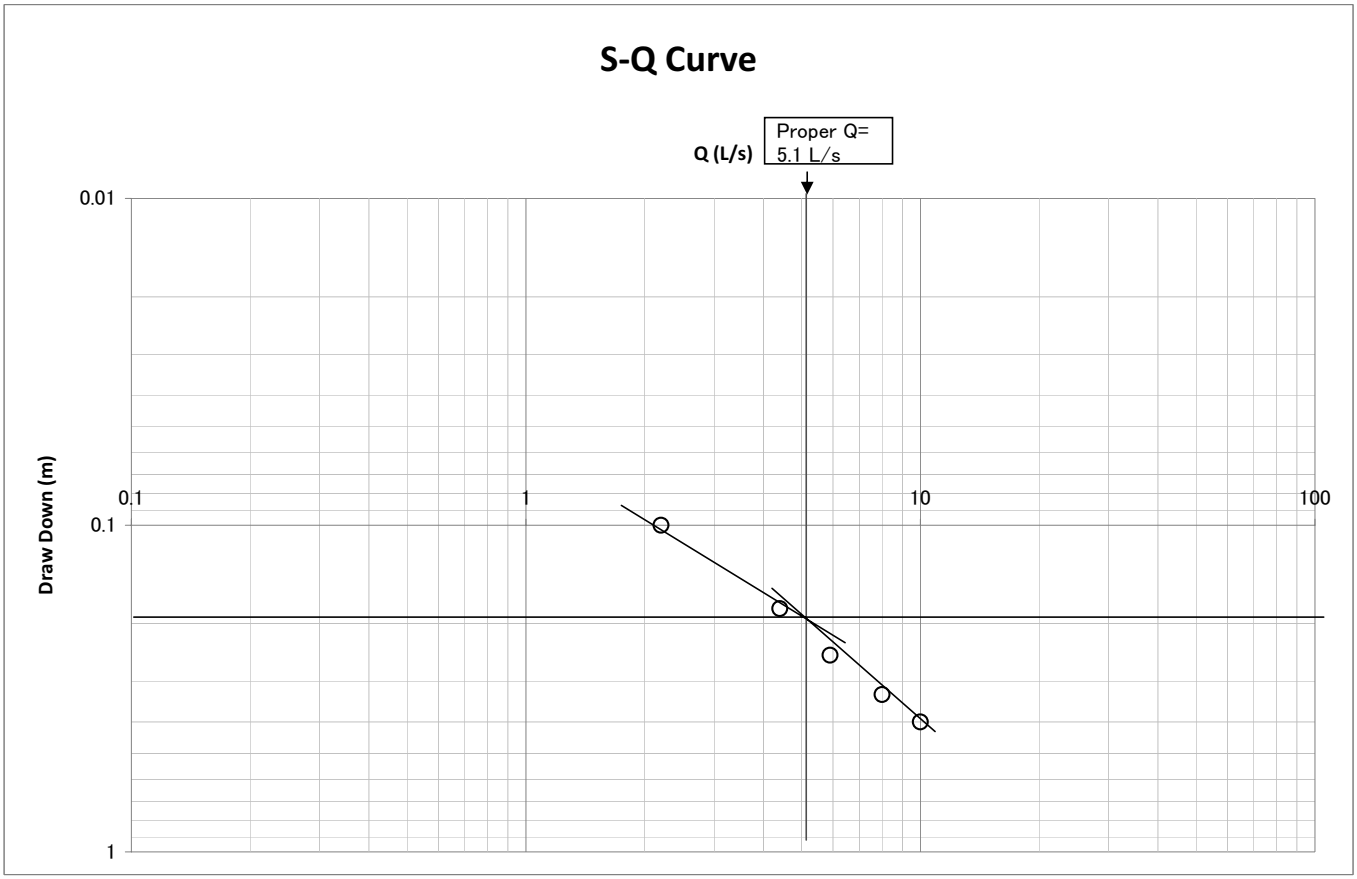
③＝②－①

Time	1st step		2nd step		3rd step		4th step		5th step	
	②Water Level	③Draw Down	Water Level	Draw Down	Water Level	Draw Down	Water Level	Draw Down	Water Level	Draw Down
(min)	(GL-m)	(m)	(GL-m)	(m)	(GL-m)	(m)	(GL-m)	(m)	(GL-m)	(m)
0	38.00	0.00	38.10	0.10	38.18	0.18	38.25	0.25	38.33	0.33
5	38.05	0.05	38.17	0.17	38.23	0.23	38.31	0.31	38.39	0.39
10	38.10	0.10	38.18	0.18	38.25	0.25	38.33	0.33	38.40	0.40
15	38.10	0.10	38.18	0.18	38.25	0.25	38.33	0.33	38.40	0.40
20	38.10	0.10	38.18	0.18	38.25	0.25	38.33	0.33	38.40	0.40
25	38.10	0.10	38.18	0.18	38.25	0.25	38.33	0.33	38.40	0.40
30	38.10	0.10	38.18	0.18	38.25	0.25	38.33	0.33	38.40	0.40
35	38.10	0.10	38.18	0.18	38.25	0.25	38.33	0.33	38.40	0.40
40	38.10	0.10	38.18	0.18	38.25	0.25	38.33	0.33	38.40	0.40
45	38.10	0.10	38.18	0.18	38.25	0.25	38.33	0.33	38.40	0.40
50	38.10	0.10	38.18	0.18	38.25	0.25	38.33	0.33	38.40	0.40
55	38.10	0.10	38.18	0.18	38.25	0.25	38.33	0.33	38.40	0.40
60	38.10	0.10	38.18	0.18	38.25	0.25	38.33	0.33	38.40	0.40
70	38.10	0.10	38.18	0.18	38.25	0.25	38.33	0.33	38.40	0.40
80	38.10	0.10	38.18	0.18	38.25	0.25	38.33	0.33	38.40	0.40
90	38.10	0.10	38.18	0.18	38.25	0.25	38.33	0.33	38.40	0.40
100	38.10	0.10	38.18	0.18	38.25	0.25	38.33	0.33	38.40	0.40
110	38.10	0.10	38.18	0.18	38.25	0.25	38.33	0.33	38.40	0.40
120	38.10	0.10	38.18	0.18	38.25	0.25	38.33	0.33	38.40	0.40
180										
240										
300										
360										
420										
480										
540										
600										
660										
720										
780										
840										
900										
960										
1020										
1080										
1140										
1200										
1260										
1320										
1380										
1440										

Measurement of Water Quality					
time	8:30-10:30	10:30-12:30	12:30-14:30	14:30-16:30	16:30-18:30
EC(μs/cm)	0.220 S/m	0.220 S/m	0.220 S/m	0.220 S/m	0.220 S/m
PH	6.93	6.93	6.93	6.93	6.93
Temp	42 C	42 C	42 C	42 C	42 C

Mindil Step Draw Down Test





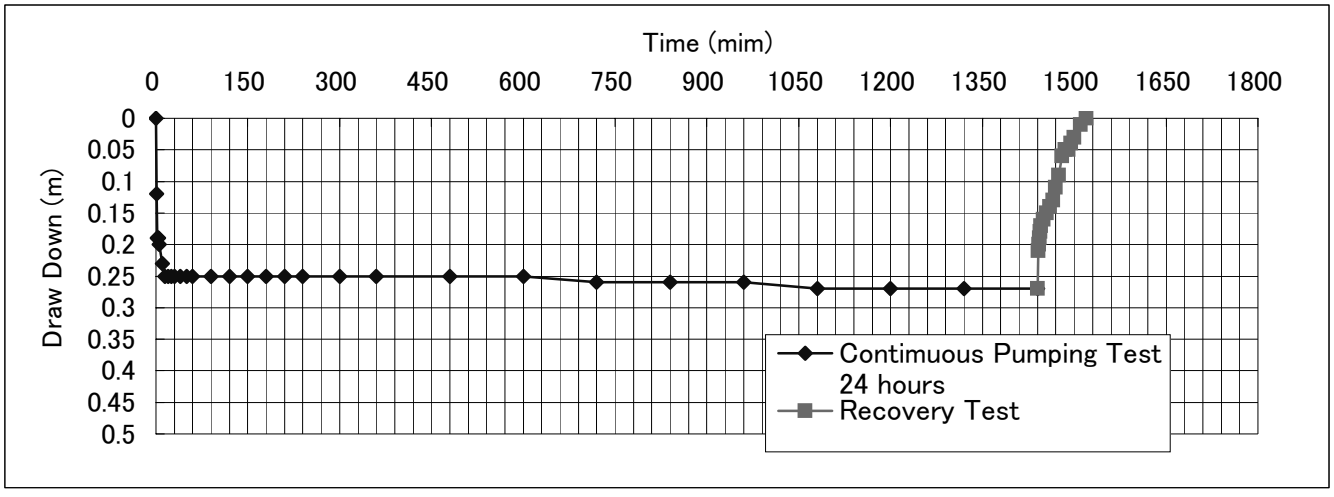
Continuous Pumping Test

Site Name: MINDIL

Date: 31OCT-1NOV, 2010

Static Water Level: 38 M

Contimuous Pumping Test 24 hours					Recovery Test			
Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	Pumping Late (L/s)		Total Elapsed	Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)
0	38	0			1440	0	38.27	0.27
1	38.12	0.12			1441	1	38.21	0.21
2	38.19	0.19			1442	2	38.2	0.2
3	38.19	0.19			1443	3	38.19	0.19
4	38.19	0.19			1444	4	38.18	0.18
5	38.2	0.2			1445	5	38.17	0.17
10	38.23	0.23			1450	10	38.16	0.16
15	38.25	0.25			1455	15	38.15	0.15
20	38.25	0.25	5.1		1460	20	38.14	0.14
25	38.25	0.25			1465	25	38.13	0.13
30	38.25	0.25			1470	30	38.11	0.11
40	38.25	0.25			1475	35	38.09	0.09
50	38.25	0.25			1480	40	38.06	0.06
60	38.25	0.25			1485	45	38.05	0.05
90	38.25	0.25			1490	50	38.05	0.05
120	38.25	0.25			1495	55	38.04	0.04
150	38.25	0.25	5.1		1500	60	38.03	0.03
180	38.25	0.25			1510	70	38.01	0.01
210	38.25	0.25			1520	80	38	0
240	38.25	0.25						
300	38.25	0.25						
360	38.25	0.25						
480	38.25	0.25	5.1					
600	38.25	0.25						
720	38.26	0.26						
840	38.26	0.26						
960	38.26	0.26						
1080	38.27	0.27	5					
1200	38.27	0.27						
1320	38.27	0.27						
1440	38.27	0.27	5					



Continuous Pumping Test LOG- DG

Site Name MINDIL

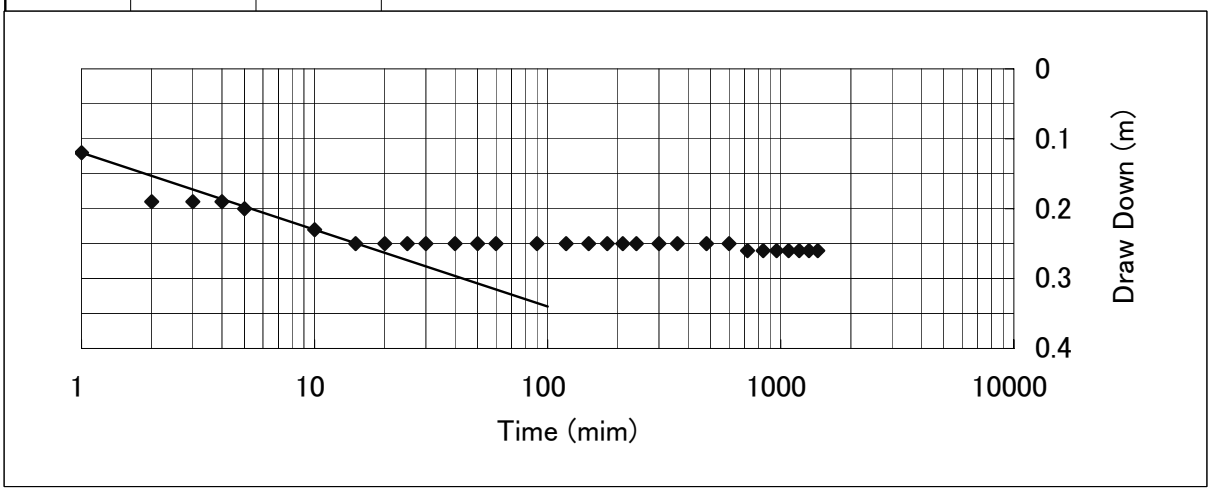
Contimuous Pumping Test 24 hours			
Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	Pumping Late (L/s)
0	38	38	
1	38.12	0.12	
2	38.19	0.19	
3	38.19	0.19	
4	38.19	0.19	
5	38.2	0.2	
10	38.23	0.23	
15	38.25	0.25	
20	38.25	0.25	5.1
25	38.25	0.25	
30	38.25	0.25	
40	38.25	0.25	
50	38.25	0.25	
60	38.25	0.25	
90	38.25	0.25	
120	38.25	0.25	
150	38.25	0.25	5.1
180	38.25	0.25	
210	38.25	0.25	
240	38.25	0.25	
300	38.25	0.25	
360	38.25	0.25	
480	38.25	0.25	5.1
600	38.25	0.25	
720	38.26	0.26	
840	38.26	0.26	
960	38.26	0.26	
1080	38.26	0.26	5.1
1200	38.26	0.26	
1320	38.26	0.26	
1440	38.26	0.26	5.1

Transmissivity (T) = 0.183*Q/ΔS
(Jacob Method)

Q= 440.6 m3/d

	Time(min)	Drawdown(m)
S1	1	0.12
S2	10	0.23

T= 733.1 m3/d/m



RECOVERY Pumping Test LOG- DG (Recovery)

Site Name MINDIL

Contimuous Pumping Test			
Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	Pumping Late (L/s)

Recovery Test				
Total Elapsed Time (min)	Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	t/t'
1440	0	38.27	0.27	
1441	1	38.21	0.21	1440
1442	2	38.2	0.2	720
1443	3	38.19	0.19	480
1444	4	38.18	0.18	360
1445	5	38.17	0.17	288
1450	10	38.16	0.16	144
1455	15	38.15	0.15	96
1460	20	38.14	0.14	72
1465	25	38.13	0.13	58
1470	30	38.11	0.11	48
1475	35	38.09	0.09	41
1480	40	38.06	0.06	36
1485	45	38.05	0.05	32
1490	50	38.05	0.05	29
1495	55	38.04	0.04	26
1500	60	38.03	0.03	24
1510	70	38.01	0.01	21
1520	80	38	0	18

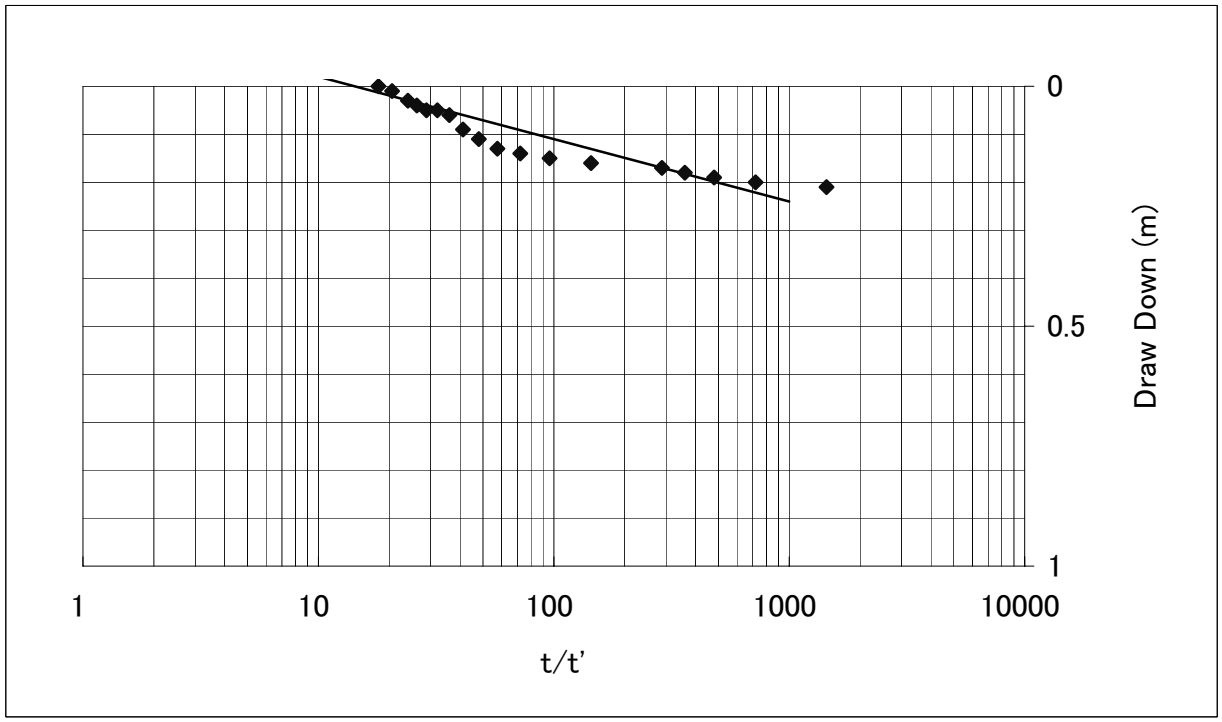
Transmissivity (T) = 0.183*Q/ΔS
(Theis Method)

Q= 440.6 m3/d

	Time(min)	Drawdown(m)
S1	10	-0.02
S2	100	0.11

T= 620.3 m3/d/m

Recovery test semi log DG



SUMARRAY OF WELL CONDITION

LOCATION: AFKA ARRABA **DATE:** 22-24,October 2010

	GEO MARK	LITHOLOGY	WATER LEVEL	SUMMARY OF WATER PUMP TEST
0		0--14 Sand Gravel		**5 STEP TEST**
	^ ^ ^		**S.W.L=** 14.00	PROPER Q=.47 L/S
	^ ^	14--150		DRAW DOWN=46 M
	^ ^ ^			
	^ ^	Basalt Lava		
	^ ^ ^	Hard rock		
	^ ^	Cracked and fractured in some places		
	^ ^ ^			**24 HOURS CONTINUOUS UP LIFT**
	^ ^	up to 80m		
	^ ^ ^	Slightly weathered		UPLIFT Q= 0.47 L/S
	^ ^	clay seam interlaid		TOTAL Q= 40.6 M^3 / 24 HOURS
50	^ ^ ^			DRAW DOWN=53.5 M
	^ ^			TRANSIMISIVITY=0.28M^2/DAY
	^ ^ ^			
	^ ^		**DWWL=** 67.5	
	^ ^ ^			
	^ ^	75--85		**RECOVERY TEST**
	^ ^ ^	Cracked and fractured		
	^ ^	High permeability		REMAINING W L= 67.5 M
	^ ^ ^			RECOVERY TIME= 190 MIN
	^ ^			TRANSIMISIVITY=0.21M^2/DAY
	^ ^ ^			
	^ ^			
	^ ^ ^			
	^ ^			**WATER QUALITY**
100	^ ^ ^	100m below		
	^ ^	relatively fresh		EC= 111.4^M S/M
	^ ^ ^	Hard and tight		PH= 7.25
	^ ^	Low permeability		TEMPERATURE= 39C^O
	^ ^ ^			
	^ ^			
	^ ^ ^			
	^ ^			
	^ ^ ^			
	^ ^			
	^ ^ ^			
	^ ^			
150	^ ^ ^			

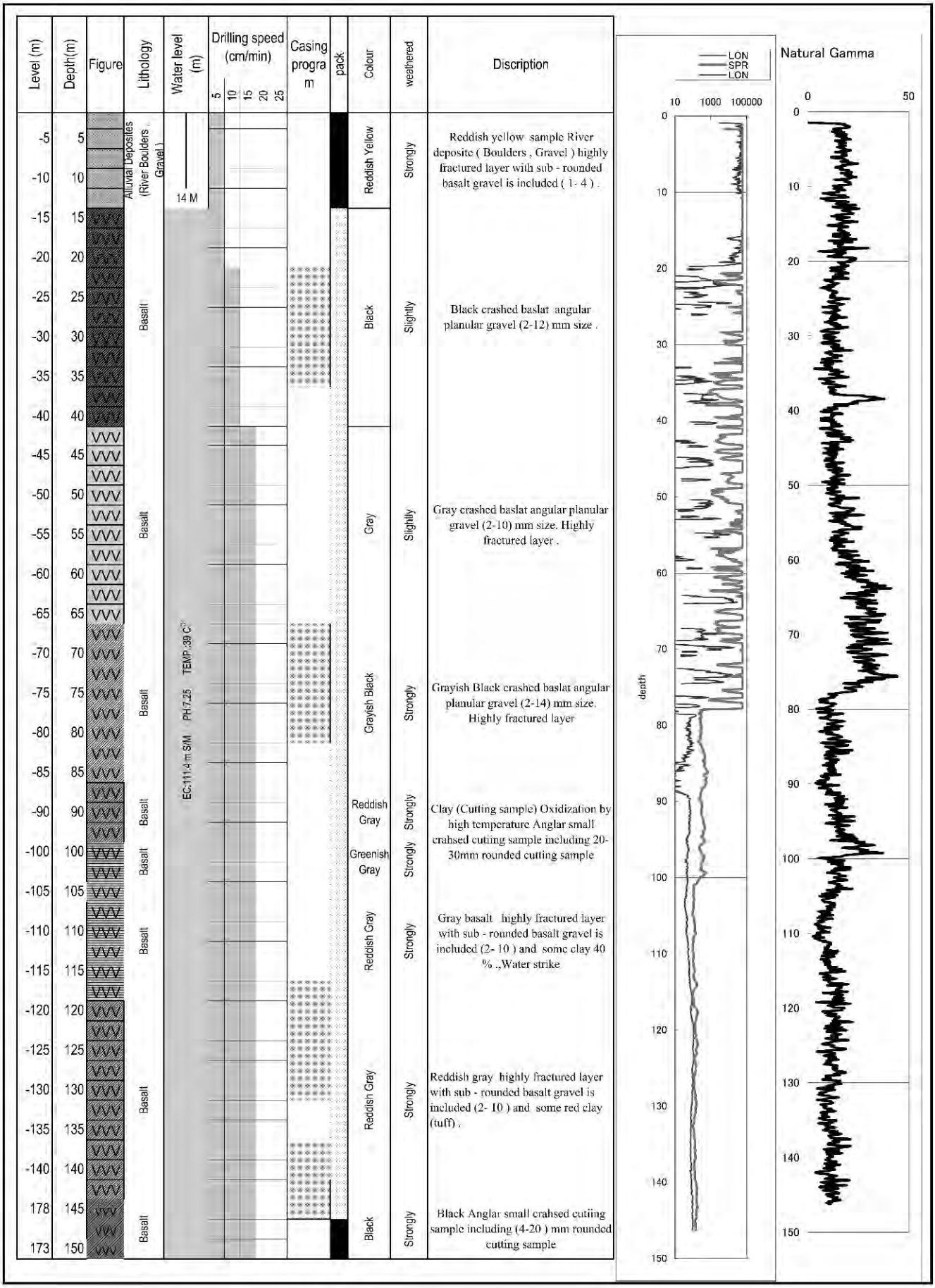
Drilling BH

Coordinates: 0216744 E,1226754 N

Date: - 10 -10 -2010

Village name Afka Araba

Alititude: 536m



Step draw down test record

Pumping Rate

	1st step	2nd step	3rd step	4th step	5th step
Q (L/s)	0.42	0.44	0.45	0.46	0.48
Duration (min)					
S = DW (m)	38.66	43.85	46.39	51.70	57.90

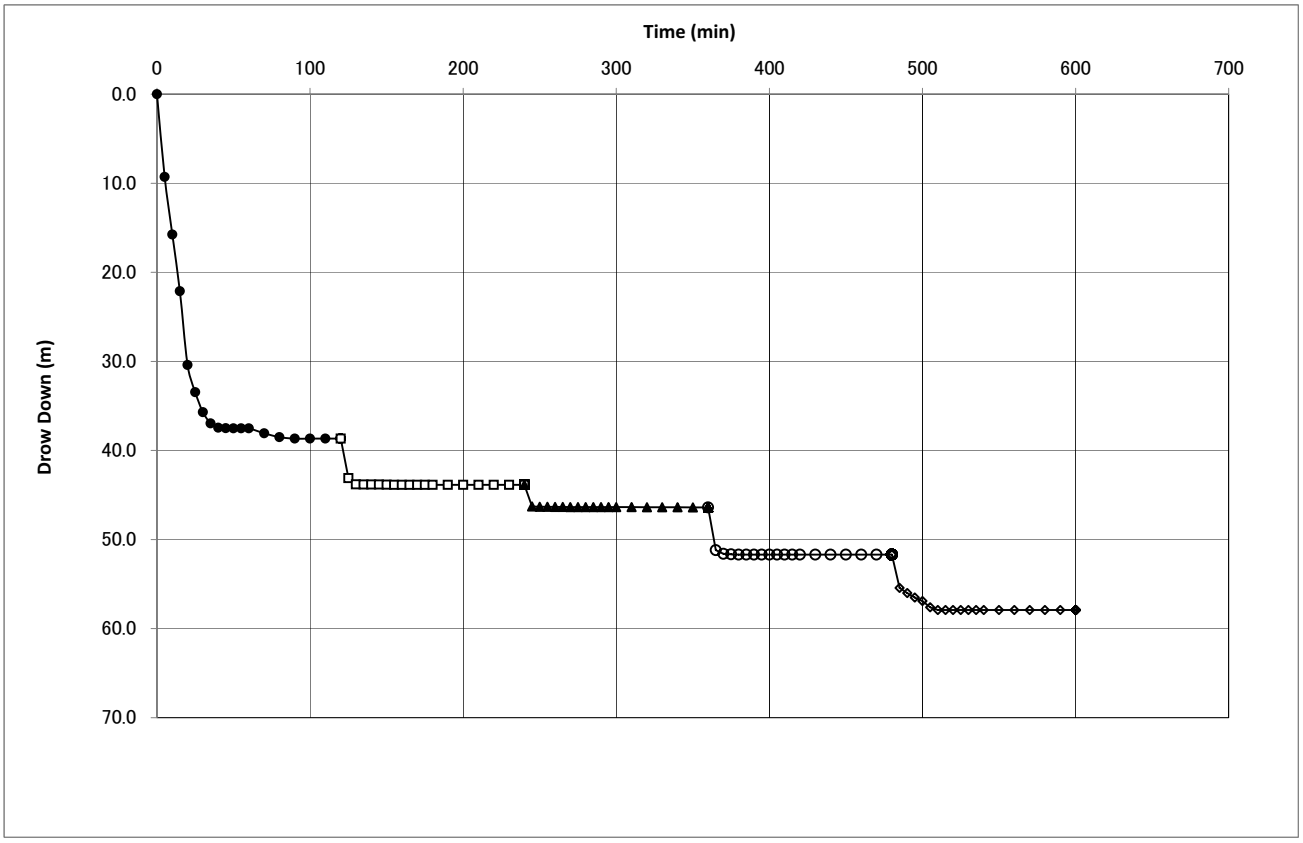
①Stastic Water Level	14
Record Keeper	

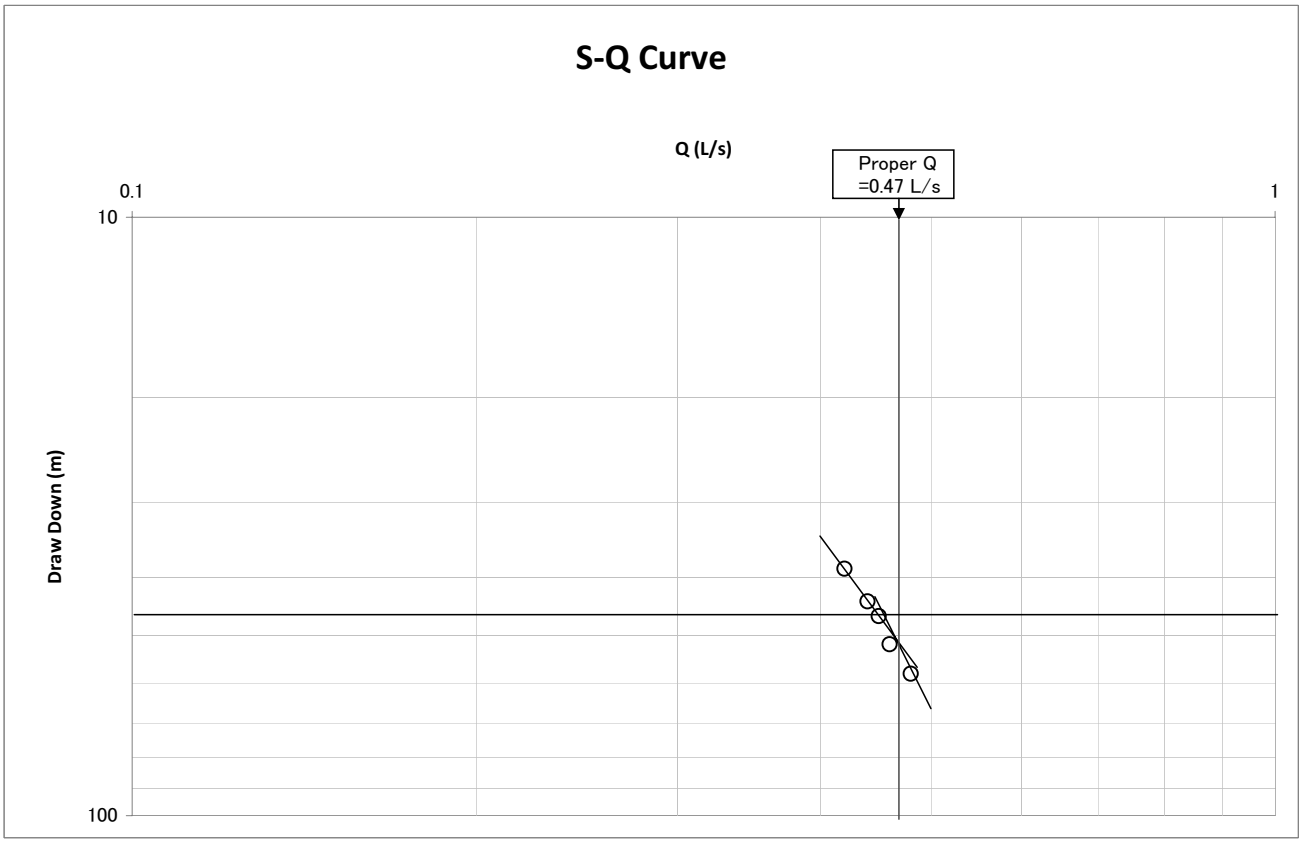
③＝②－①

Time	1st step		2nd step		3rd step		4th step		5th step	
	②Water Level	③Draw Down	Water Level	Draw Down	Water Level	Draw Down	Water Level	Draw Down	Water Level	Draw Down
(min)	(GL-m)	(m)	(GL-m)	(m)	(GL-m)	(m)	(GL-m)	(m)	(GL-m)	(m)
0	14.00	0.00	52.66	38.66	57.85	43.85	60.39	46.39	65.70	51.70
5	23.29	9.29	57.10	43.10	60.28	46.28	65.18	51.18	69.42	55.42
10	29.75	15.75	57.81	43.81	60.32	46.32	65.60	51.60	70.00	56.00
15	36.12	22.12	57.83	43.83	60.32	46.32	65.66	51.66	70.50	56.50
20	44.40	30.40	57.83	43.83	60.33	46.33	65.70	51.70	70.90	56.90
25	47.45	33.45	57.83	43.83	60.34	46.34	65.70	51.70	71.60	57.60
30	49.70	35.70	57.84	43.84	60.35	46.35	65.70	51.70	71.90	57.90
35	50.95	36.95	57.85	43.85	60.35	46.35	65.70	51.70	71.90	57.90
40	51.44	37.44	57.85	43.85	60.35	46.35	65.70	51.70	71.90	57.90
45	51.50	37.50	57.85	43.85	60.35	46.35	65.70	51.70	71.90	57.90
50	51.51	37.51	57.85	43.85	60.35	46.35	65.70	51.70	71.90	57.90
55	51.51	37.51	57.85	43.85	60.35	46.35	65.70	51.70	71.90	57.90
60	51.51	37.51	57.85	43.85	60.35	46.35	65.70	51.70	71.90	57.90
70	52.08	38.08	57.85	43.85	60.36	46.36	65.70	51.70	71.90	57.90
80	52.50	38.50	57.85	43.85	60.37	46.37	65.70	51.70	71.90	57.90
90	52.66	38.66	57.85	43.85	60.37	46.37	65.70	51.70	71.90	57.90
100	52.66	38.66	57.85	43.85	60.37	46.37	65.70	51.70	71.90	57.90
110	52.66	38.66	57.85	43.85	60.39	46.39	65.70	51.70	71.90	57.90
120	52.66	38.66	57.85	43.85	60.39	46.39	65.70	51.70	71.90	57.90
180										
240										
300										
360										
420										
480										
540										
600										
660										
720										
780										
840										
900										
960										
1020										
1080										
1140										
1200										
1260										
1320										
1380										
1440										

Measurement of Water Quality					
time	12:10-14:10	14:10-16:10	16:10-18:10	18:10-20:10	20:10-22:10
EC(μs/cm)	111.4 m S/M	111.4 m S/M	111.4 m S/M	111.4 m S/M	111.4 m S/M
PH	7.25	7.25	7.25	7.25	7.25
Temp	39 C	39 C	39 C	39 C	39 C

Afka Arraba Step Darwdown Test





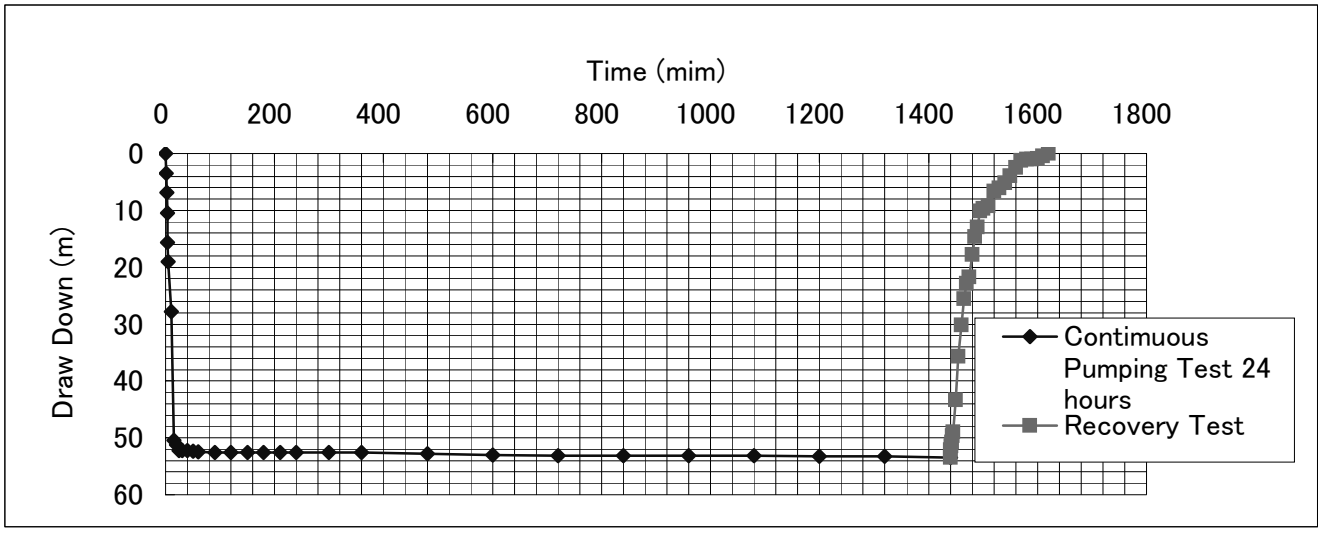
Continuous Pumping Test

Site Name: AFKA ARRABA

Date: 22-24,October 2010

Static Water Level: 14 M

Contimuous Pumping Test 24 hours					Recovery Test			
Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	Pumping Late (L/s)		Total Elapsed	Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)
0	14	0			1440	0	67.5	53.5
1	17.45	3.45			1441	1	66.1	52.1
2	20.82	6.82			1442	2	65.42	51.42
3	24.48	10.48			1443	3	64.78	50.78
4	29.63	15.63			1444	4	63.63	49.63
5	33.05	19.05	0.47		1445	5	62.92	48.92
10	41.78	27.78			1450	10	57.37	43.37
15	64.47	50.47			1455	15	49.67	35.67
20	65.21	51.21			1460	20	44.16	30.16
25	66.27	52.27			1465	25	39.58	25.58
30	66.28	52.28			1470	30	36.8	22.8
40	66.28	52.28			1475	35	35.75	21.75
50	66.36	52.36			1480	40	31.75	17.75
60	66.42	52.42			1485	45	28.65	14.65
90	66.6	52.6			1490	50	26.92	12.92
120	66.61	52.61	0.47		1495	55	24.12	10.12
150	66.61	52.61			1500	60	23.64	9.64
180	66.61	52.61			1510	70	23.2	9.2
210	66.62	52.62			1520	80	20.6	6.6
240	66.62	52.62			1530	90	20.11	6.11
300	66.62	52.62			1540	100	19.23	5.23
360	66.62	52.62			1550	110	17.94	3.94
480	66.76	52.76			1560	120	16.45	2.45
600	67	53	0.475		1570	130	15.2	1.2
720	67.1	53.1			1580	140	15.03	1.03
840	67.12	53.12			1590	150	14.98	0.98
960	67.14	53.14			1600	160	14.94	0.94
1080	67.16	53.16			1610	170	14.5	0.5
1200	67.22	53.22			1620	180	14	0
1320	67.3	53.3	0.465		1630	190	14	0
1440	67.5	53.5			1640	200		



Continuous Pumping Test LOG- DG

Site Name AFKA ARRABA

Contimuous Pumping Test			
Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	Pumping Late (L/s)
0	14	0	
1	17.45	3.45	
2	20.82	6.82	
3	24.48	10.48	
4	29.63	15.63	
5	33.05	19.05	0.47
10	41.78	27.78	
15	64.47	50.47	
20	65.21	51.21	
25	66.27	52.27	
30	66.28	52.28	
40	66.28	52.28	
50	66.36	52.36	
60	66.42	52.42	
90	66.6	52.6	
120	66.61	52.61	0.47
150	66.61	52.61	
180	66.61	52.61	
210	66.62	52.62	
240	66.62	52.62	
300	66.62	52.62	
360	66.62	52.62	
480	66.76	52.76	
600	67	53	0.475
720	67.1	53.1	
840	67.12	53.12	
960	67.14	53.14	
1080	67.16	53.16	
1200	67.22	53.22	
1320	67.3	53.3	0.465
1440	67.5	53.5	

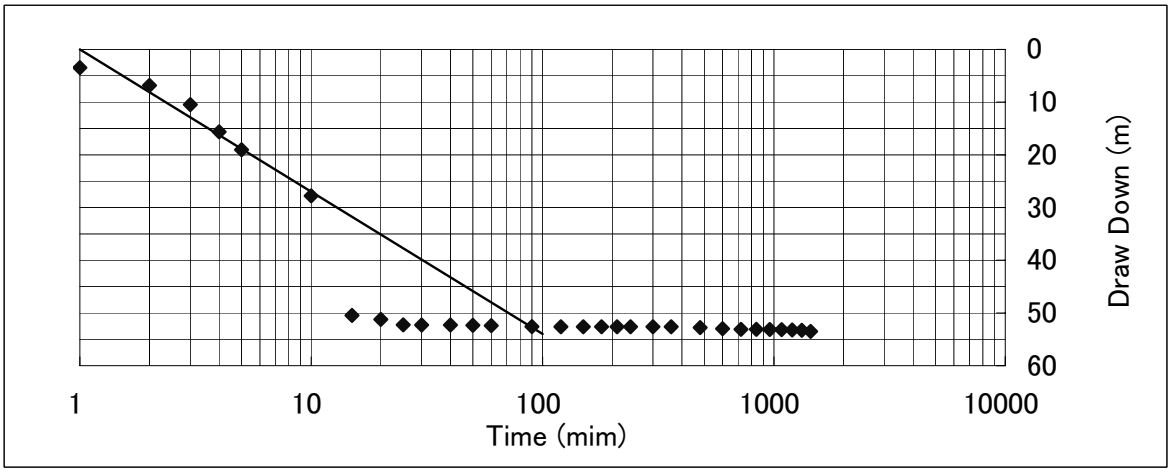
Transmissivity (T) = 0.183*Q/ΔS
(Jacob Method)

Q= 40.6 m3/d

	Time(min)	Drawdown(m)
S1	1	0
S2	10	27

T= 0.28 m3/d/m

24 hours CONTINUOS PUMPING semi log DG



Continuous Pumping Test LOG- DG (Recovery)

Site Name AFKA ARRABA

Recovery Test				
Total Elapsed Time (min)	Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	t/t'
1440	0	67.5	53.5	
1441	1	66.1	52.1	1440
1442	2	65.42	51.42	720
1443	3	64.78	50.78	480
1444	4	63.63	49.63	360
1445	5	62.92	48.92	288
1450	10	57.37	43.37	144
1455	15	49.67	35.67	96
1460	20	44.16	30.16	72
1465	25	39.58	25.58	58
1470	30	36.8	22.8	48
1475	35	35.75	21.75	41
1480	40	31.75	17.75	36
1485	45	28.65	14.65	32
1490	50	26.92	12.92	29
1495	55	24.12	10.12	26
1500	60	23.64	9.64	24
1510	70	23.2	9.2	21
1520	80	20.6	6.6	18
1530	90	20.11	6.11	16
1540	100	19.23	5.23	14
1550	110	17.94	3.94	13
1560	120	16.45	2.45	12
1570	130	15.2	1.2	11
1580	140	15.03	1.03	10
1590	150	14.98	0.98	10
1600	160	14.94	0.94	9
1610	170	14.5	0.5	8
1620	180	14	0	8
1630	190	14	0	8

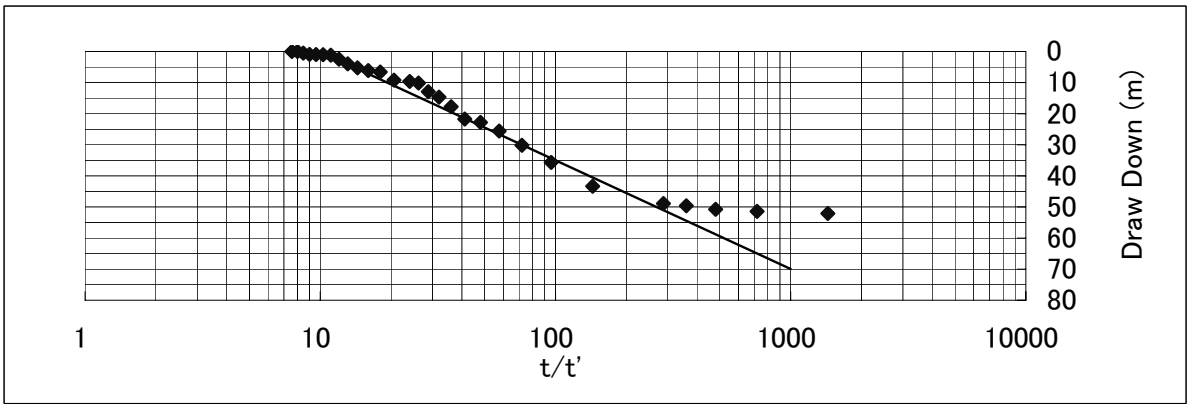
Transmissivity (T) = 0.183*Q/ΔS
(Theis Method)

Q= 40.608 m3/d

	Time(min)	Drawdown(m)
S1	10	0.05
S2	100	35

T= 0.21 m3/d/m

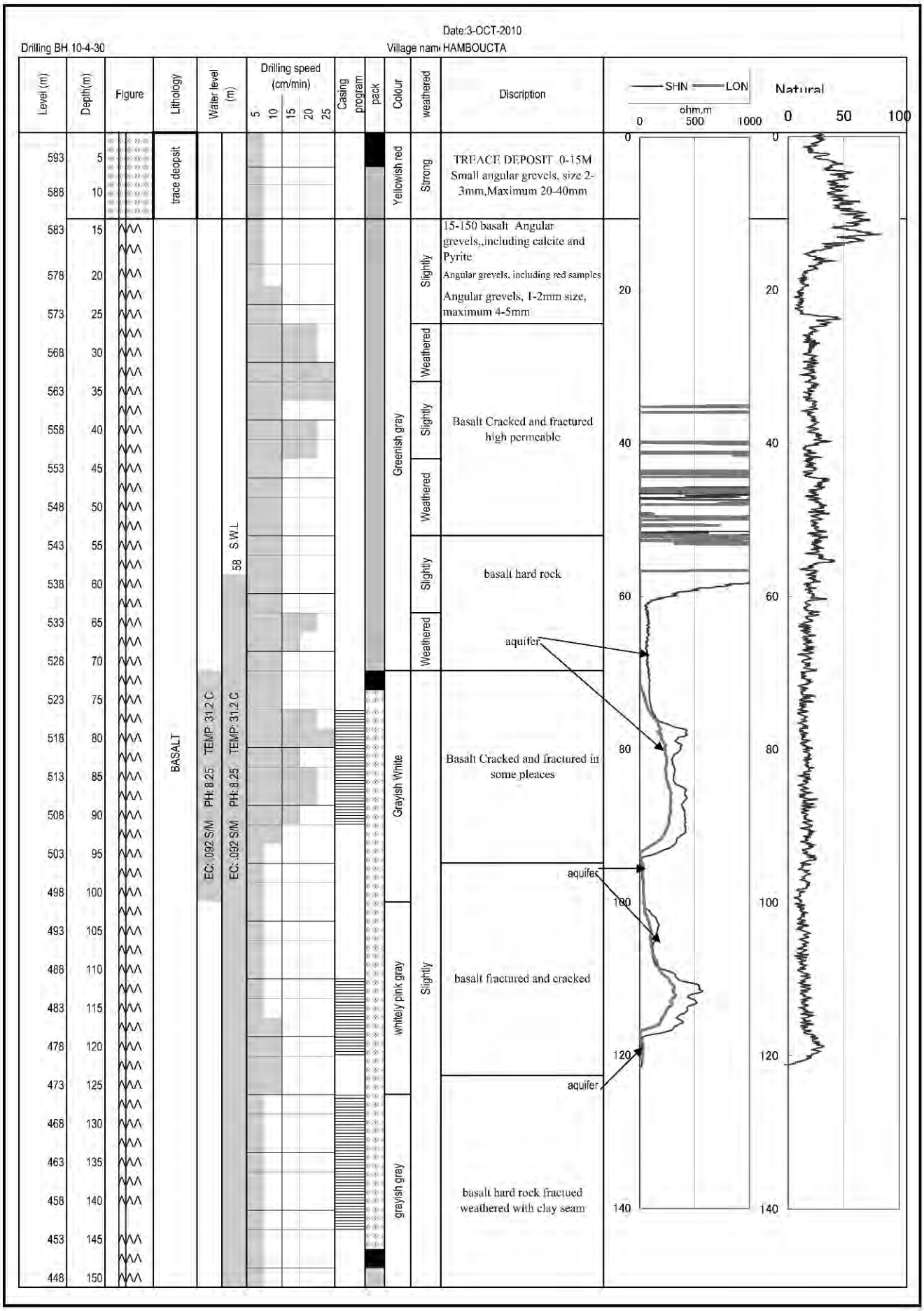
Recovery test semi log DG



SUMARRAY OF WELL CONDITION

LOCATION: HAMBOUCTA **DATE:** 04-06,October 2010

	GEO MARK	LITHOLOGY	WATER LEVEL	SUMMARY OF WATER PUMP TEST
0		0-14 sand gravel		**5 STEP TEST** PROPER Q=4.7 L/S DRAW DOWN= 0.4 M
	^ ^ ^	14-150		
	^ ^ ^			
	^ ^ ^			
	^ ^ ^	baslat lava		
	^ ^ ^	hard rock		**24 HOURS CONTINUOUS UP LIFT**
	^ ^ ^			
	^ ^ ^			UPLIFT Q= 4.7L/S
	^ ^ ^			TOTAL Q= 406.1M^3 / 24 HOURS
50	^ ^ ^	in some please		DRAW DOWN=0.74 M
	^ ^ ^	block lava	**S.W.L=** 58.25	TRANSIMISSIVITY=490.1M^2/DAY
	^ ^ ^		**DWWL=** 58.99	
	^ ^ ^	50m below		
	^ ^ ^	fractured and		
	^ ^ ^	cracked		**RECOVERY TEST**
	^ ^ ^			
	^ ^ ^	high premeability		REMAINING W L= 58.99 M
	^ ^ ^			RECOVERY TIME= 200 MIN
	^ ^ ^			TRANSIMISSIVITY=294.1M^2/DAY
	^ ^ ^			
	^ ^ ^	**aquifer** 70-80m		
	^ ^ ^			
	^ ^ ^	**aquifer** 90m		**WATER QUALITY**
100	^ ^ ^			
	^ ^ ^			EC= 0.092 S/M
	^ ^ ^			PH= 8.25
	^ ^ ^			TEMPERATURE= 31.2C^O
	^ ^ ^			
	^ ^ ^			
	^ ^ ^			
	^ ^ ^			
	^ ^ ^			
	^ ^ ^	**aquifer** 125m		
	^ ^ ^			
	^ ^ ^			
150	^ ^ ^			


Date:3-OCT-2010
Drilling BH 10-4-30
Village nam HAMBOUCTA
Level (m)
Depth(m)
Figure
Lithology
Water level (m)
Drilling speed (cm/min)
Casing program
pack
Colour
weathered
Discription
SHN
LON
Natural
ohm.m
TREACE DEPOSIT 0-15M
Small angular grevels, size 2-3mm,Maximum 20-40mm
trace deopsit
Yellowish red
Strong
15-150 basalt Angular grevels,,including calcite and Pyrite
Angular grevels, including red samples
Angular grevels, 1-2mm size, maximum 4-5mm
Slightly
Weathered
Basalt Cracked and fractured high permeable
Greenish gray
basalt hard rock
aquifer
Basalt Cracked and fractured in some pleaces
Grayish White
basalt fractured and cracked
whitely pink gray
basalt hard rock fractued weathered with clay seam
grayish gray
BASALT
S.W.L
EC: .092 S/M PH: 8.25 TEMP: 31.2 C

Step draw down test record

Pumping Rate

	1st step	2nd step	3rd step	4th step	5th step
Q (L/s)	2.9	4	5	5.7	6
Duration (min)					
S = DW (m)	0.24	0.35	0.50	0.65	0.71

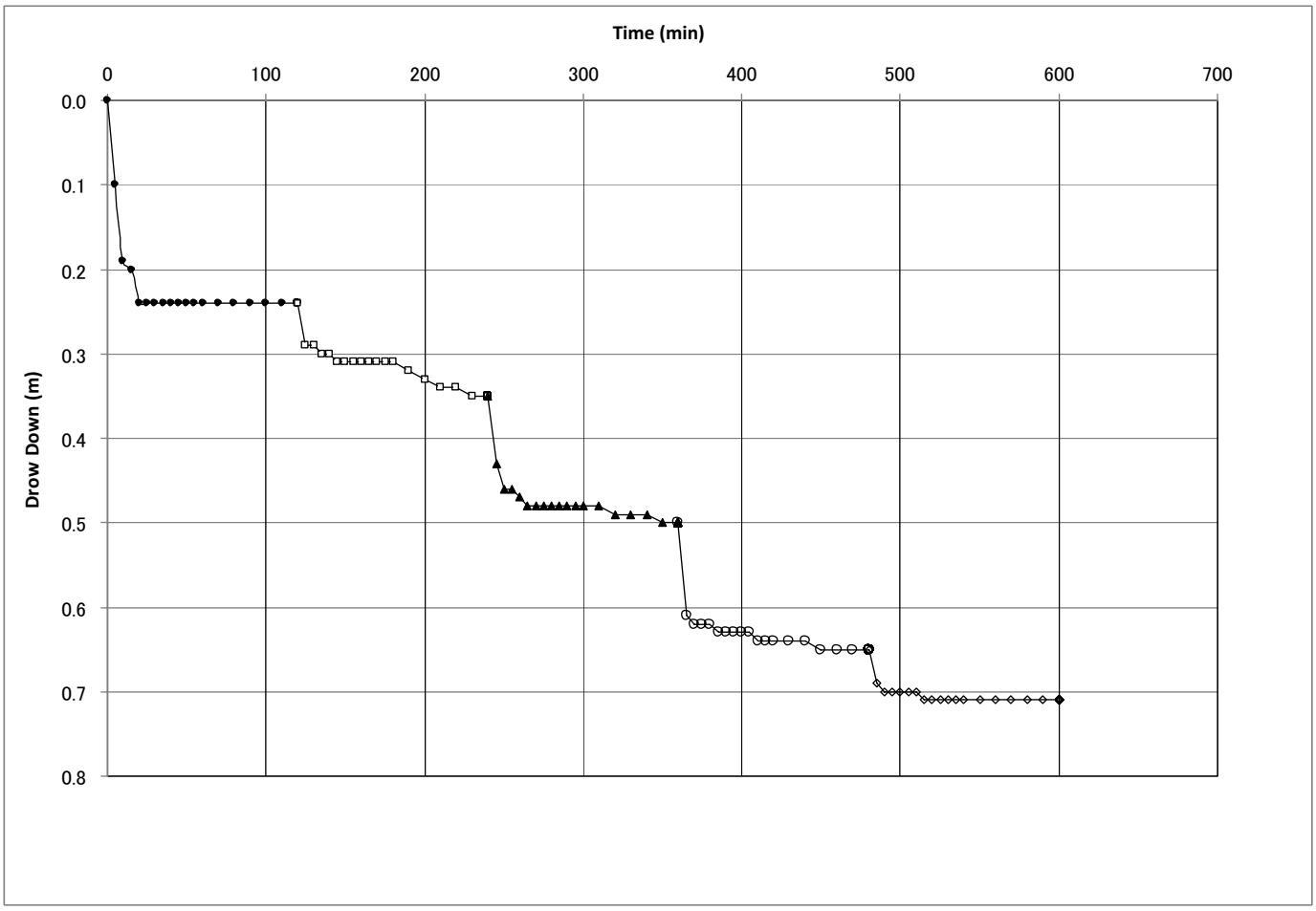
①Stastic Water Level	58.25
Record Keeper	

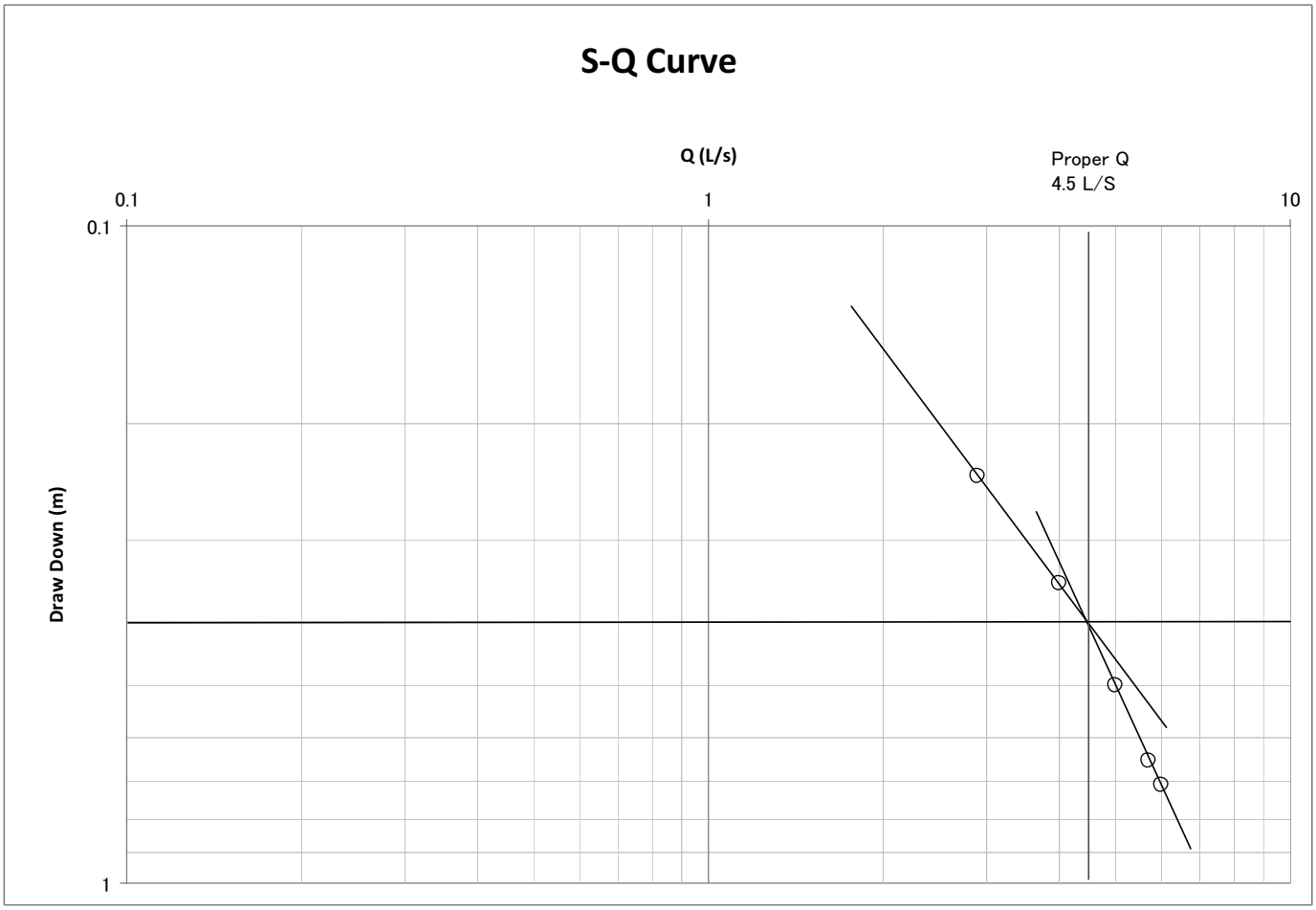
③＝②－①

Time	1st step		2nd step		3rd step		4th step		5th step	
	②Water Level	③Draw Down	Water Level	Draw Down	Water Level	Draw Down	Water Level	Draw Down	Water Level	Draw Down
(min)	(GL-m)	(m)	(GL-m)	(m)	(GL-m)	(m)	(GL-m)	(m)	(GL-m)	(m)
0	58.25	0.00	58.49	0.24	58.60	0.35	58.75	0.50	58.90	0.65
5	58.35	0.10	58.54	0.29	58.68	0.43	58.86	0.61	58.94	0.69
10	58.44	0.19	58.54	0.29	58.71	0.46	58.87	0.62	58.95	0.70
15	58.45	0.20	58.55	0.30	58.71	0.46	58.87	0.62	58.95	0.70
20	58.49	0.24	58.55	0.30	58.72	0.47	58.87	0.62	58.95	0.70
25	58.49	0.24	58.56	0.31	58.73	0.48	58.88	0.63	58.95	0.70
30	58.49	0.24	58.56	0.31	58.73	0.48	58.88	0.63	58.95	0.70
35	58.49	0.24	58.56	0.31	58.73	0.48	58.88	0.63	58.96	0.71
40	58.49	0.24	58.56	0.31	58.73	0.48	58.88	0.63	58.96	0.71
45	58.49	0.24	58.56	0.31	58.73	0.48	58.88	0.63	58.96	0.71
50	58.49	0.24	58.56	0.31	58.73	0.48	58.89	0.64	58.96	0.71
55	58.49	0.24	58.56	0.31	58.73	0.48	58.89	0.64	58.96	0.71
60	58.49	0.24	58.56	0.31	58.73	0.48	58.89	0.64	58.96	0.71
70	58.49	0.24	58.57	0.32	58.73	0.48	58.89	0.64	58.96	0.71
80	58.49	0.24	58.58	0.33	58.74	0.49	58.89	0.64	58.96	0.71
90	58.49	0.24	58.59	0.34	58.74	0.49	58.90	0.65	58.96	0.71
100	58.49	0.24	58.59	0.34	58.74	0.49	58.90	0.65	58.96	0.71
110	58.49	0.24	58.60	0.35	58.75	0.50	58.90	0.65	58.96	0.71
120	58.49	0.24	58.60	0.35	58.75	0.50	58.90	0.65	58.96	0.71
180										
240										
300										
360										
420										
480										
540										
600										
660										
720										
780										
840										
900										
960										
1020										
1080										
1140										
1200										
1260										
1320										
1380										
1440										

Measurement of Water Quality					
time	12:00-14:00	14:00-16:00	16:00-18:00	18:00-20:00	20:00-22:00
EC(μs/cm)	0.092 s/m	0.092 s/m	0.092 s/m	0.092 s/m	0.092 s/m
PH	8.25	8.25	8.25	8.25	8.25
Temp	31.2 C	31.2 C	31.2 C	31.2 C	31.2 C

Hambocta Step Drawdown Test





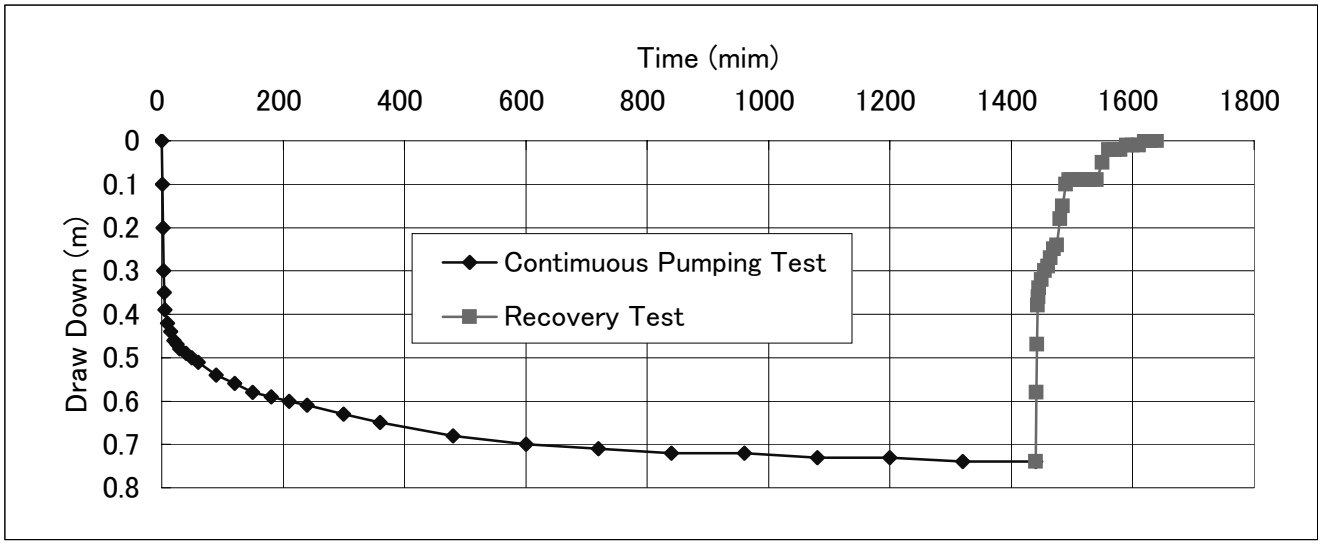
Continuous Pumping Test

Site Name: Hambocta

Date: 04-06,October 2010

Static Water Level: 58.25 m

Contimuous Pumping Test					Recovery Test			
Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	Pumping Late (L/s)		Total Elapsed	Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)
0	58.25	0			1440	0	58.99	0.74
1	58.35	0.1			1441	1	58.83	0.58
2	58.45	0.2			1442	2	58.72	0.47
3	58.55	0.3			1443	3	58.63	0.38
4	58.6	0.35			1444	4	58.61	0.36
5	58.64	0.39	4.7		1445	5	58.59	0.34
10	58.67	0.42			1450	10	58.57	0.32
15	58.69	0.44			1455	15	58.55	0.3
20	58.71	0.46			1460	20	58.54	0.29
25	58.72	0.47			1465	25	58.52	0.27
30	58.73	0.48			1470	30	58.5	0.25
40	58.74	0.49			1475	35	58.49	0.24
50	58.75	0.5			1480	40	58.43	0.18
60	58.76	0.51			1485	45	58.4	0.15
90	58.79	0.54			1490	50	58.35	0.1
120	58.81	0.56	4.7		1495	55	58.34	0.09
150	58.83	0.58			1500	60	58.34	0.09
180	58.84	0.59			1510	70	58.34	0.09
210	58.85	0.6			1520	80	58.34	0.09
240	58.86	0.61			1530	90	58.34	0.09
300	58.88	0.63			1540	100	58.34	0.09
360	58.9	0.65			1550	110	58.3	0.05
480	58.93	0.68			1560	120	58.27	0.02
600	58.95	0.7	4.75		1570	130	58.27	0.02
720	58.96	0.71			1580	140	58.27	0.02
840	58.97	0.72			1590	150	58.26	0.01
960	58.97	0.72			1600	160	58.26	0.01
1080	58.98	0.73			1610	170	58.26	0.01
1200	58.98	0.73			1620	180	58.25	0
1320	58.99	0.74	4.65		1630	190	58.25	0
1440	58.99	0.74			1640	200	58.25	0



Continuous Pumping Test

Site Name Hambocta

Date: 21,October 2010

Static Water Level: 58.25 m

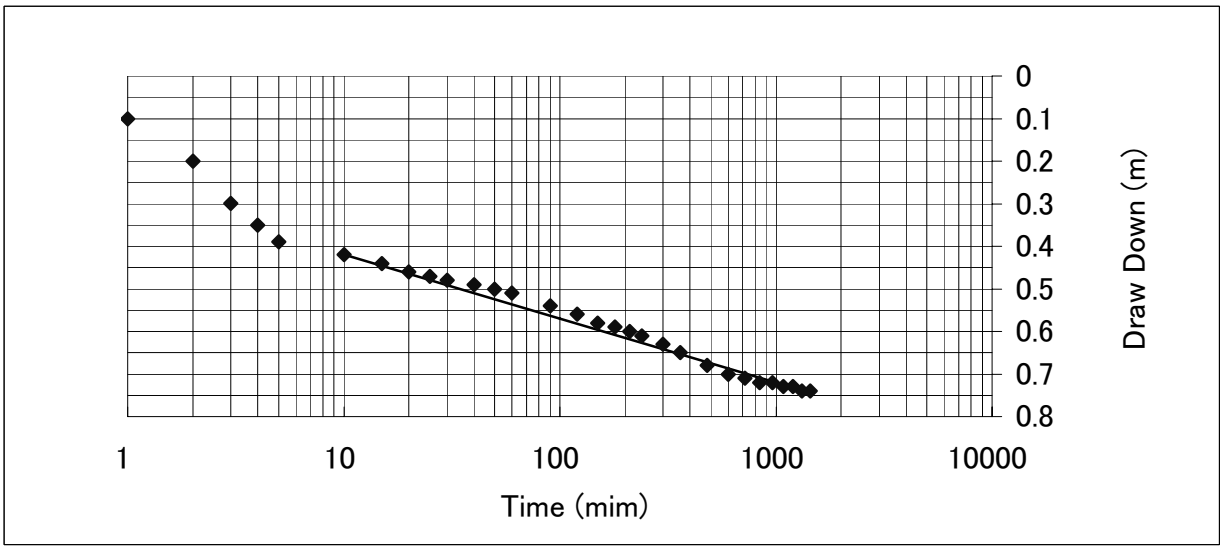
Contimuous Pumping Test			
Elapsed Time (min)	Water Level (GL−m)	Draw Down (GL− m)	Pumping Late (L/s)
0	58.25	0	
1	58.35	0.1	
2	58.45	0.2	
3	58.55	0.3	
4	58.6	0.35	
5	58.64	0.39	4.7
10	58.67	0.42	
15	58.69	0.44	
20	58.71	0.46	
25	58.72	0.47	
30	58.73	0.48	
40	58.74	0.49	
50	58.75	0.5	
60	58.76	0.51	
90	58.79	0.54	
120	58.81	0.56	4.7
150	58.83	0.58	
180	58.84	0.59	
210	58.85	0.6	
240	58.86	0.61	
300	58.88	0.63	
360	58.9	0.65	
480	58.93	0.68	
600	58.95	0.7	4.75
720	58.96	0.71	
840	58.97	0.72	
960	58.97	0.72	
1080	58.98	0.73	
1200	58.98	0.73	
1320	58.99	0.74	4.65
1440	58.99	0.74	

Transmissivity (T) = 0.183*Q/ΔS
(Jacob Method)

Q= 401.8 m3/d

	Time(min)	Drawdown(m)
S1	10	0.42
S2	100	0.57

T= 490.1 m3/d/m



RECOVERY Pumping Test

Site Name Hambocta

Date: 04-05,October 2010

Static Water Level: 58.25 m

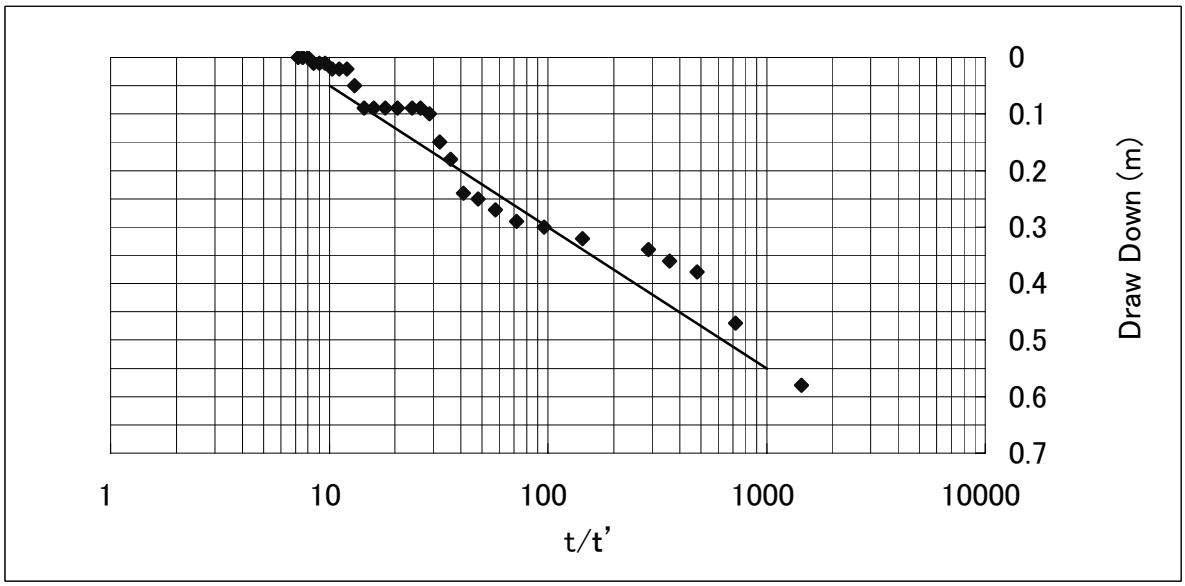
Recovery Test				
Total Elapsed Time (min)	Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	t/t'
1440	0	58.99	0.74	
1441	1	58.83	0.58	1440
1442	2	58.72	0.47	720
1443	3	58.63	0.38	480
1444	4	58.61	0.36	360
1445	5	58.59	0.34	288
1450	10	58.57	0.32	144
1455	15	58.55	0.3	96
1460	20	58.54	0.29	72
1465	25	58.52	0.27	58
1470	30	58.5	0.25	48
1475	35	58.49	0.24	41
1480	40	58.43	0.18	36
1485	45	58.4	0.15	32
1490	50	58.35	0.1	29
1495	55	58.34	0.09	26
1500	60	58.34	0.09	24
1510	70	58.34	0.09	21
1520	80	58.34	0.09	18
1530	90	58.34	0.09	16
1540	100	58.34	0.09	14
1550	110	58.3	0.05	13
1560	120	58.27	0.02	12
1570	130	58.27	0.02	11
1580	140	58.27	0.02	10
1590	150	58.26	0.01	10
1600	160	58.26	0.01	9
1610	170	58.26	0.01	8
1620	180	58.25	0	8
1630	190	58.25	0	8
1640	200	58.25	0	7

Transmissivity (T) = 0.183*Q/ΔS
(Theis Method)

Q= 401.76 m3/d

	Time(min)	Drawdown(m)
S1	10	0.05
S2	100	0.3

T= 294.1 m3/d/m



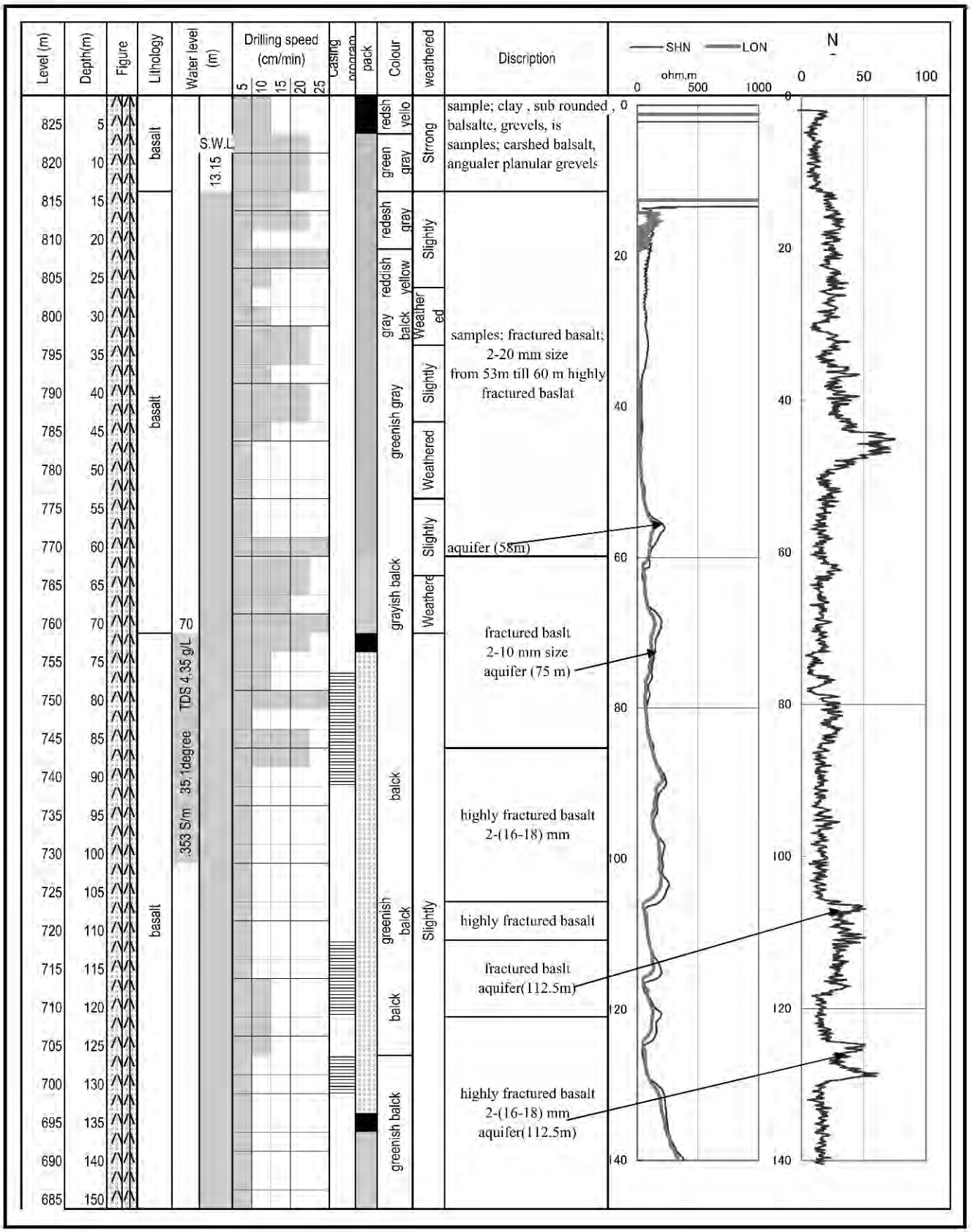
SUMARRAY OF WELL CONDITION

LOCATION: GELLILE **DATE:** 06-08,October 2010

	GEO MARK	LITHOLOGY	WATER LEVEL	SUMMARY OF WATER PUMP TEST
0		0--6 Sand Gravel		**5 STEP TEST**
	^ ^ ^		**S.W.L=** 13.15	PROPER Q=3 L/S
	^ ^	6--70		DRAW DOWN= 29 M
	^ ^ ^	Porous and fractured		
	^ ^	Basalt		
	^ ^ ^	Weathered and cracked		
	^ ^	into fragments		
	^ ^ ^	Scoria-like		**24 HOURS CONTINUOUS UP LIFT**
	^ ^	High permeability		
	^ ^ ^			UPLIFT Q= 3 L/S
	^ ^			TOTAL Q= 259.2 M^3 / 24 HOURS
50	^ ^ ^			DRAW DOWN=42.95 M
	^ ^	58m Aquifer	**DWWL=** 56.1	TRANSIMISIVITY=1.7M^2/DAY
	^ ^ ^			
	^ ^			
	^ ^ ^			
	^ ^	70-150m		**RECOVERY TEST**
	^ ^ ^			
	^ ^	Basalt Lava		REMAINING W L= 42.95 M
	^ ^ ^	Slightly Weathered		RECOVERY TIME= 260 MIN
	^ ^	Hard rock		TRANSIMISIVITY=1.7M^2/DAY
	^ ^ ^	Cracked in part		
	^ ^			
	^ ^ ^			
	^ ^			**WATER QUALITY**
100	^ ^ ^			
	^ ^	105m Aquifer		EC= 0.353 S/M
	^ ^ ^			PH= 7.2
	^ ^			TEMPERATURE= 35.1C^O
	^ ^ ^	120m Aquifer		
	^ ^			
	^ ^ ^			
	^ ^			
	^ ^ ^			
	^ ^			
	^ ^ ^			
	^ ^			
150	^ ^ ^			

Drilling BH 10-4-30

Date:6-OCT-2010
Village nam GUALLILE
Alititu 830 m



Step draw down test record

Pumping Rate

	1st step	2nd step	3rd step	4th step	5th step
Q (L/s)	1.21	2.67	3.33	3.64	4.00
Duration (min)					
S = DW (m)	8.96	28.12	34.85	41.18	42.26

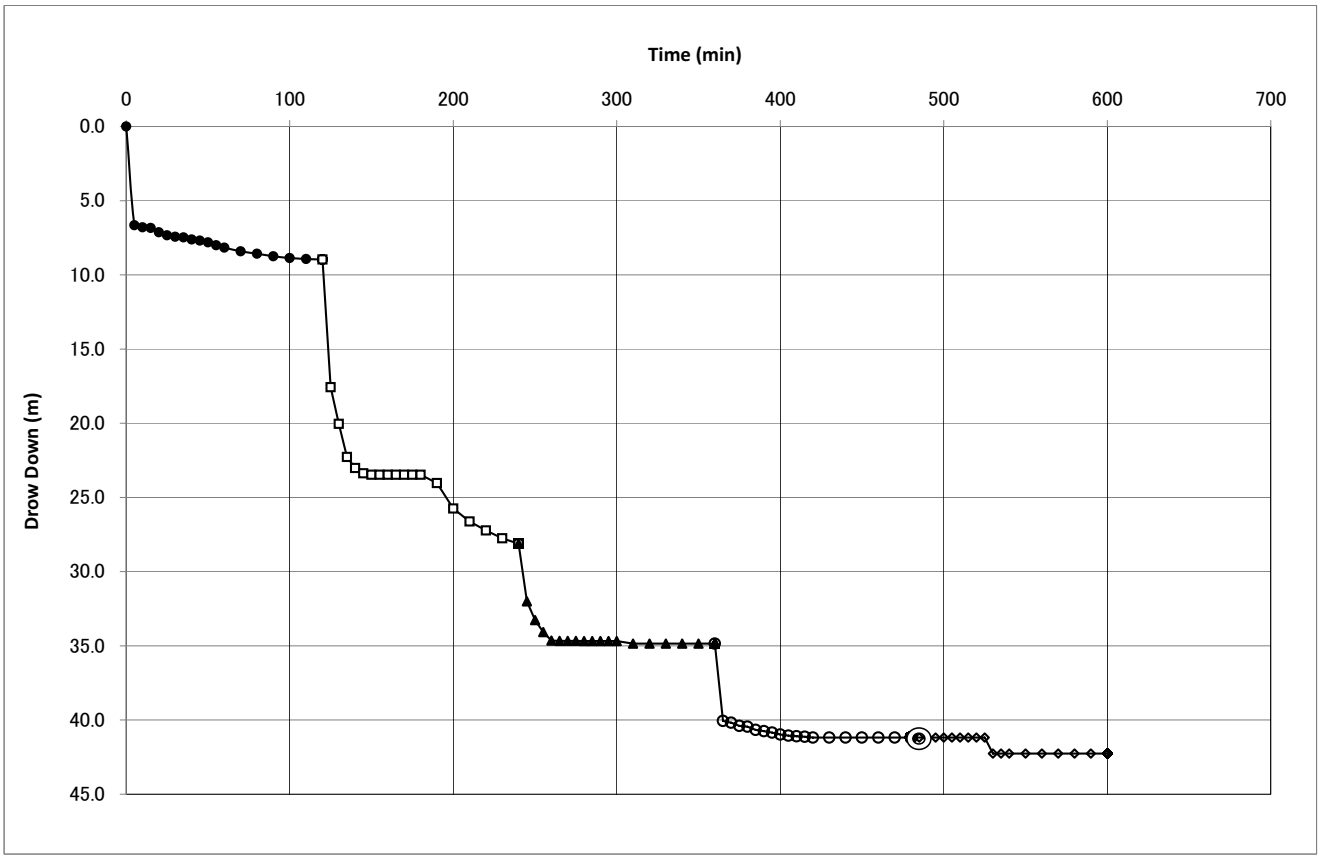
①Stastic Water Level	13.15
Record Keeper	

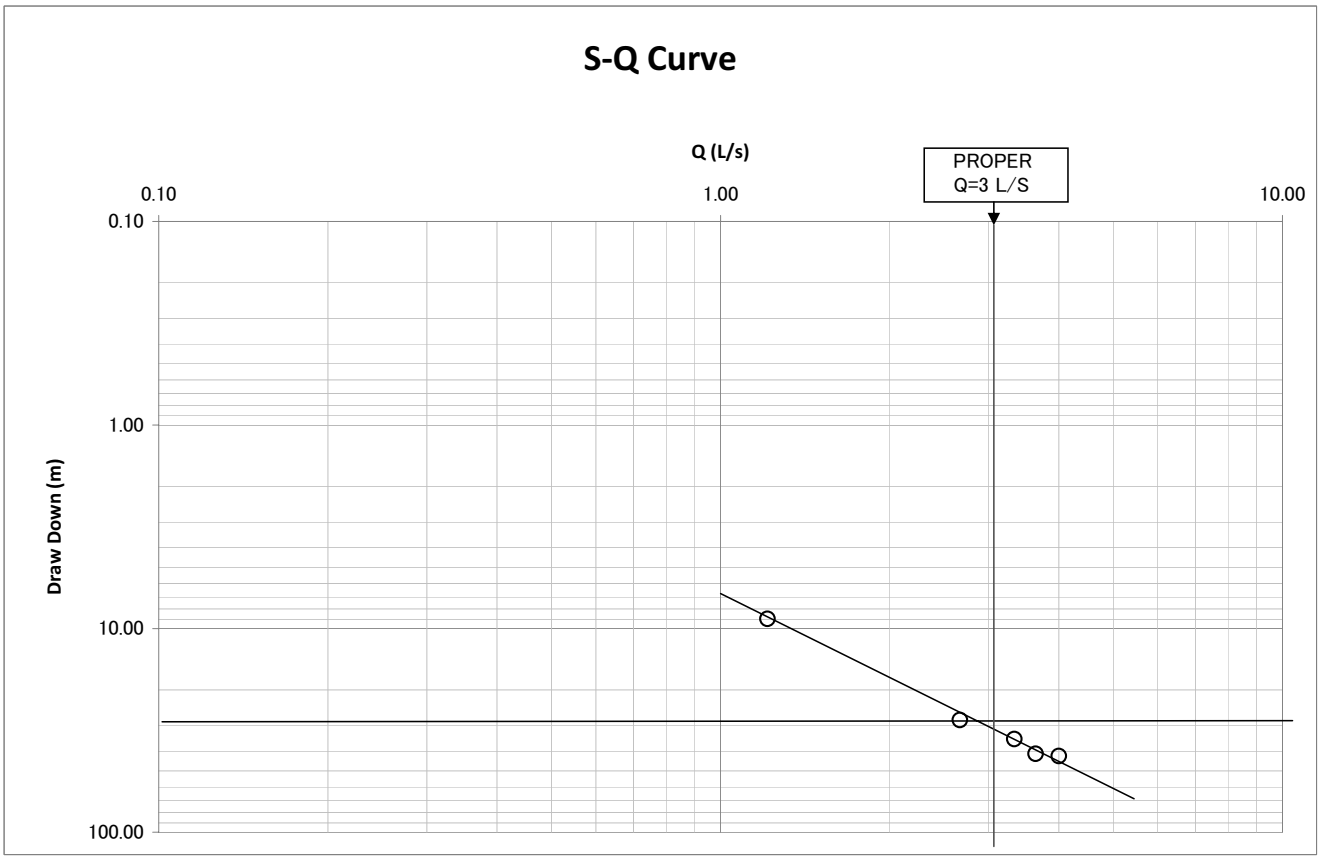
③＝②－①

Time	1st step		2nd step		3rd step		4th step		5th step	
	②Water Level	③Draw Down	Water Level	Draw Down	Water Level	Draw Down	Water Level	Draw Down	Water Level	Draw Down
(min)	(GL-m)	(m)	(GL-m)	(m)	(GL-m)	(m)	(GL-m)	(m)	(GL-m)	(m)
0	13.15	0.00	22.11	8.96	41.27	28.12	48.00	34.85	54.33	41.18
5	19.80	6.65	30.72	17.57	45.15	32.00	53.21	40.06	54.33	41.18
10	19.94	6.79	33.19	20.04	46.42	33.27	53.33	40.18	54.33	41.18
15	19.99	6.84	35.42	22.27	47.22	34.07	53.54	40.39	54.33	41.18
20	20.28	7.13	36.17	23.02	47.80	34.65	53.60	40.45	54.33	41.18
25	20.48	7.33	36.52	23.37	47.82	34.67	53.81	40.66	54.33	41.18
30	20.58	7.43	36.62	23.47	47.82	34.67	53.90	40.75	54.33	41.18
35	20.62	7.47	36.62	23.47	47.82	34.67	54.00	40.85	54.33	41.18
40	20.77	7.62	36.62	23.47	47.83	34.68	54.13	40.98	54.33	41.18
45	20.84	7.69	36.62	23.47	47.83	34.68	54.20	41.05	54.33	41.18
50	20.96	7.81	36.62	23.47	47.83	34.68	54.25	41.10	55.41	42.26
55	21.15	8.00	36.62	23.47	47.83	34.68	54.28	41.13	55.41	42.26
60	21.31	8.16	36.62	23.47	47.83	34.68	54.33	41.18	55.41	42.26
70	21.56	8.41	37.18	24.03	48.00	34.85	54.33	41.18	55.41	42.26
80	21.72	8.57	38.90	25.75	48.00	34.85	54.33	41.18	55.41	42.26
90	21.90	8.75	39.77	26.62	48.00	34.85	54.33	41.18	55.41	42.26
100	22.02	8.87	40.37	27.22	48.00	34.85	54.33	41.18	55.41	42.26
110	22.08	8.93	40.90	27.75	48.00	34.85	54.33	41.18	55.41	42.26
120	22.11	8.96	41.27	28.12	48.00	34.85	54.33	41.18	55.41	42.26
180										
240										
300										
360										
420										
480										
540										
600										
660										
720										
780										
840										
900										
960										
1020										
1080										
1140										
1200										
1260										
1320										
1380										
1440										

Measurement of Water Quality					
time	08:00-10:00	10:00-12:00	12:00-14:00	14:00-16:00	16:00-18:00
EC(μs/cm)	0.353 s/m	0.353 s/m	0.353 s/m	0.353 s/m	0.353 s/m
PH	7.2	7.2	7.2	7.2	7.2
Temp	35.1 C	35.1 C	35.1 C	35.1 C	35.1 C

Guelile Step Darwdown Test





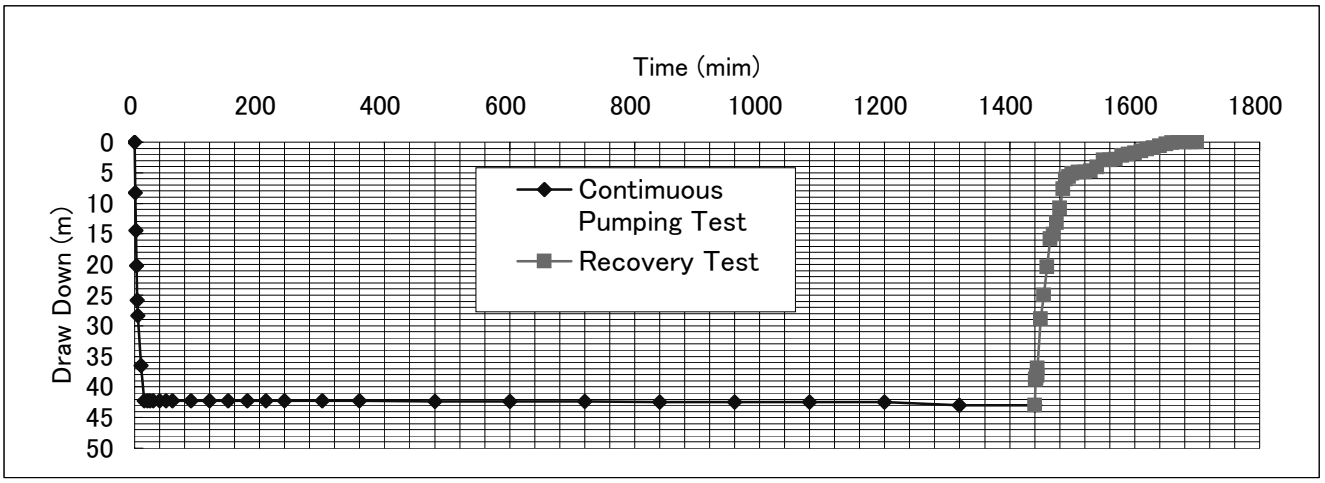
Continuous Pumping Test

Site Name: GUALILLE

Date: 06-08,October 2010

Static Water Level: 13.15 M

Contimuous Pumping Test				Recovery Test			
Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	Pumping Late (L/s)	Total Elapsed	Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)
0	13.15	0		1440	0	56.1	42.95
1	21.45	8.3		1441	1	52	38.85
2	27.56	14.41		1442	2	51.7	38.55
3	33.33	20.18		1443	3	51.3	38.15
4	39	25.85		1444	4	51.2	38.05
5	41.5	28.35		1445	5	50.1	36.95
10	49.67	36.52		1450	10	41.98	28.83
15	55.4	42.25		1455	15	38.11	24.96
20	55.4	42.25		1460	20	33.56	20.41
25	55.4	42.25		1465	25	28.98	15.83
30	55.4	42.25		1470	30	28.18	15.03
40	55.4	42.25		1475	35	26.34	13.19
50	55.4	42.25		1480	40	23.9	10.75
60	55.4	42.25		1485	45	20.78	7.63
90	55.4	42.25		1490	50	19.22	6.07
120	55.43	42.28		1495	55	18.77	5.62
150	55.43	42.28		1500	60	18.25	5.1
180	55.43	42.28		1510	70	18.11	4.96
210	55.43	42.28		1520	80	18.09	4.94
240	55.43	42.28		1530	90	17.9	4.75
300	55.43	42.28		1540	100	17.21	4.06
360	55.43	42.28		1550	110	16.08	2.93
480	55.5	42.35		1560	120	16.05	2.9
600	55.53	42.38		1570	130	15.95	2.8
720	55.53	42.38		1580	140	15.33	2.18
840	55.6	42.45		1590	150	15.1	1.95
960	55.6	42.45		1600	160	14.88	1.73
1080	55.65	42.5		1610	170	14.65	1.5
1200	55.65	42.5		1620	180	14.3	1.15
1320	56.1	42.95	3	1630	190	14.05	0.9
1440	56.1	42.95		1640	200	13.8	0.65
				1650	210	13.44	0.29
				1660	220	13.26	0.11
				1670	230	13.18	0.03
				1680	230	13.16	0.01
				1690	240	13.16	0.01
				1700	260	13.15	0



Continuous Pumping Test LOG- DG

Site Name GUELILLE

Contimuous Pumping Test			
Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	Pumping Late (L/s)
0	13.15	0	
1	21.45	8.3	
2	27.56	14.41	
3	33.33	20.18	
4	39	25.85	
5	41.5	28.35	
10	49.67	36.52	
15	55.4	42.25	
20	55.4	42.25	
25	55.4	42.25	
30	55.4	42.25	
40	55.4	42.25	
50	55.4	42.25	
60	55.4	42.25	
90	55.4	42.25	
120	55.43	42.28	
150	55.43	42.28	
180	55.43	42.28	
210	55.43	42.28	
240	55.43	42.28	
300	55.43	42.28	
360	55.43	42.28	
480	55.5	42.35	
600	55.53	42.38	
720	55.53	42.38	
840	55.6	42.45	
960	55.6	42.45	
1080	55.65	42.5	
1200	55.65	42.5	
1320	56.1	42.95	
1440	56.1	42.95	3

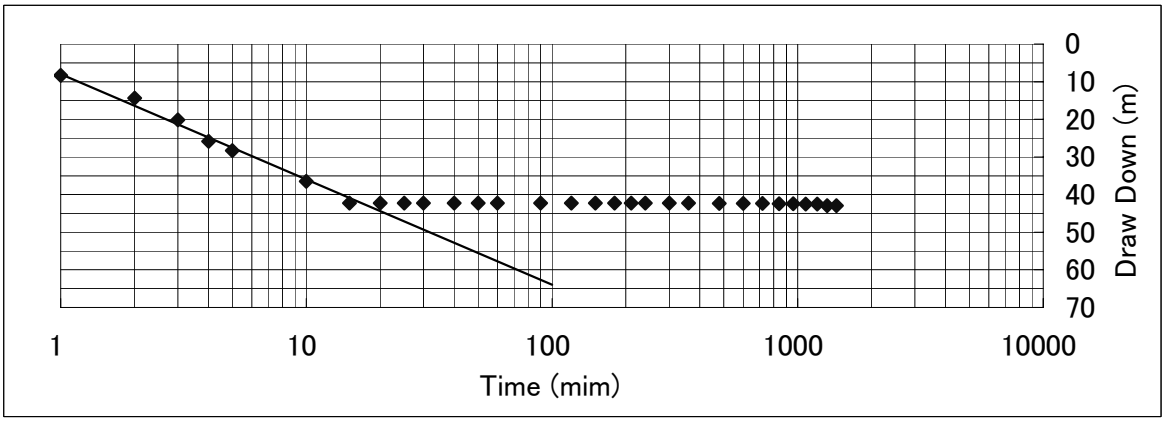
Transmissivity (T) = 0.183*Q/ΔS
(Jacob Method)

Q= 259.2 m3/d

	Time(min)	Drawdown(m)
S1	1	8
S2	10	36

T= 1.7 m3/d/m

24 hours CONTINUOS PUMPING semi log DG



Continuous Pumping Test LOG- DG (Recovery)

Site Name Gualille

Recovery Test				
Total Elapsed Time (min)	Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	t/t'
1440	0	56.1	42.95	
1441	1	52	38.85	1440
1442	2	51.7	38.55	720
1443	3	51.3	38.15	480
1444	4	51.2	38.05	360
1445	5	50.1	36.95	288
1450	10	41.98	28.83	144
1455	15	38.11	24.96	96
1460	20	33.56	20.41	72
1465	25	28.98	15.83	58
1470	30	28.18	15.03	48
1475	35	26.34	13.19	41
1480	40	23.9	10.75	36
1485	45	20.78	7.63	32
1490	50	19.22	6.07	29
1495	55	18.77	5.62	26
1500	60	18.25	5.1	24
1510	70	18.11	4.96	21
1520	80	18.09	4.94	18
1530	90	17.9	4.75	16
1540	100	17.21	4.06	14
1550	110	16.08	2.93	13
1560	120	16.05	2.9	12
1570	130	15.95	2.8	11
1580	140	15.33	2.18	10
1590	150	15.1	1.95	10
1600	160	14.88	1.73	9
1610	170	14.65	1.5	8
1620	180	14.3	1.15	8
1630	190	14.05	0.9	8
1640	200	13.8	0.65	7
1650	210	13.44	0.29	7
1660	220	13.26	0.11	7
1670	230	13.18	0.03	6
1680	240	13.16	0.01	6
1690	250	13.16	0.01	6
1700	260	13.15	0	6

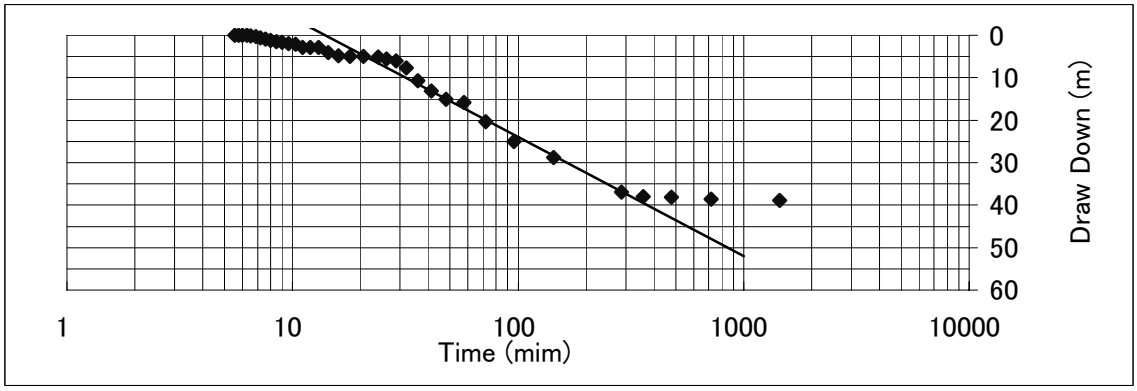
Transmissivity (T) = 0.183*Q/ΔS
(Theis Method)

Q= 259.2 m3/d

	Time(min)	Drawdown(m)
S1	10	-4
S2	100	24

T= 1.7 m3/d/m

Recovery test semi log DG



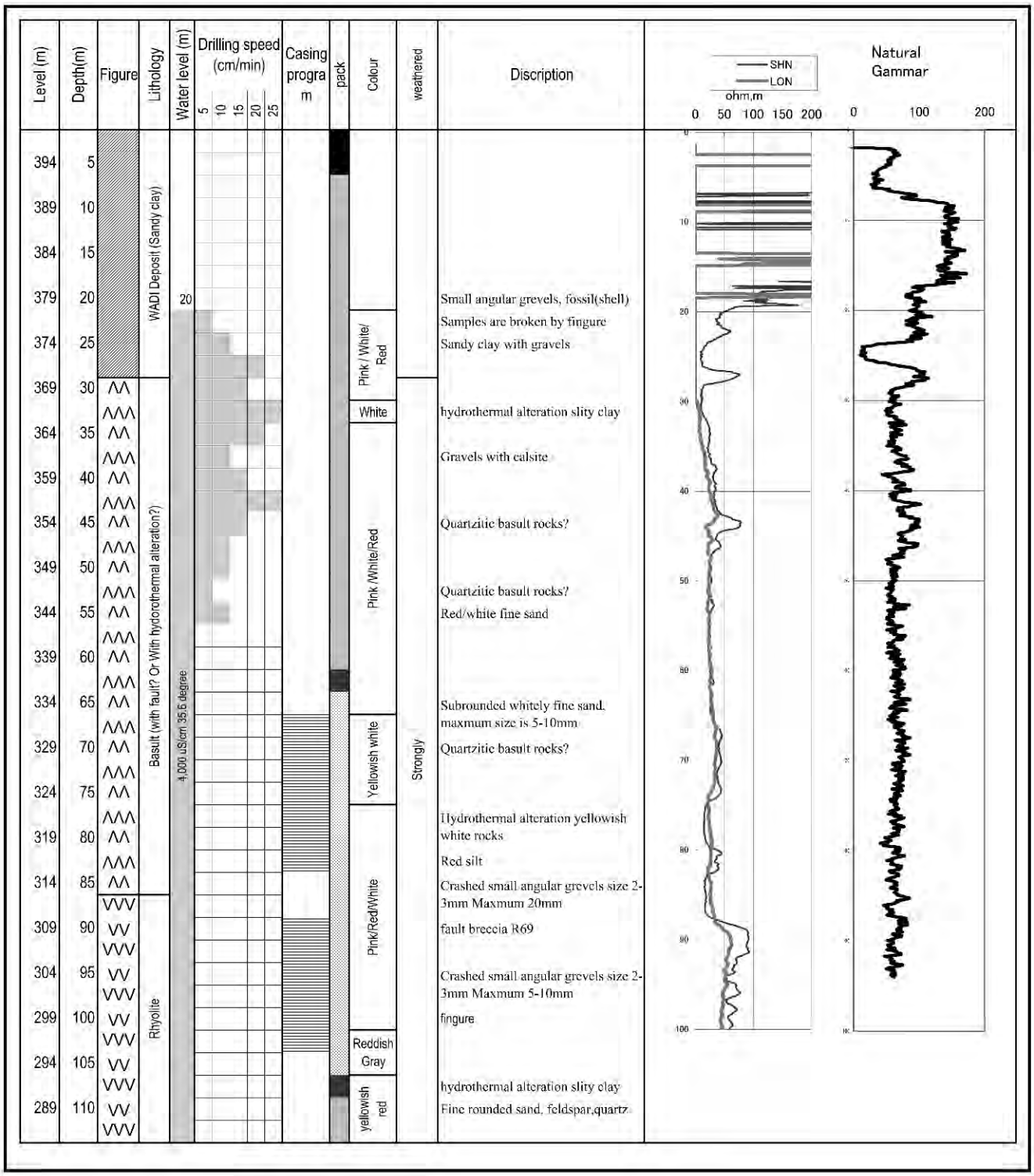
SUMARRAY OF WELL CONDITION

LOCATION: MIDDIGARRA **DATE:** 20-Aug-10

	GEO MARK	LITHOLOGY	WATER LEVEL	SUMMARY OF WATER PUMP TEST
0		0-28m	**S.W.L=** 3.9	**5 STEP TEST**
		WADI Deposit sand rich gravel with boulder		
	^ ^ ^ ^ ^ ^ ^ ^ ^ ^ ^ ^ ^ ^ ^	0-86m basalt weathered and Hydrothermal alternation lava	**DWWL=** 30.3	**24 HOURS CONTINUOUS UP LIFT** UPLIFT Q= 6.7 L/S TOTAL Q= 578.9 M^3 / 24 HOURS
50	^ ^ ^ ^ ^ ^ ^ ^ ^ ^ ^ ^ ^ ^ ^	high permeability		DRAW DOWN=26.4M TRANSMISIVITY=13.2M2/DAY **RECOVERY TEST**
	^ ^ ^ ^ ^ ^ ^ ^ ^ ^ ^ ^	86-150m basalt weathered into reddish color		REMAINING W L= 26.4M RECOVERY TIME=160 MIN TRANSMISIVITY=8.1M2/DAY
100	^ ^	cracked and Fractured into fragment with clay seam		**WATER QUALITY** EC= 0.657 S/M PH= 7.1 TEMPERATURE= 37C^O
150	^ ^ ^			

Drilling BH 10-3-29
Coordinates: 11.16117N, 42.96377 E

Date:27 -JULY-2010
Village name MIDGARRA
Alititude 399 m



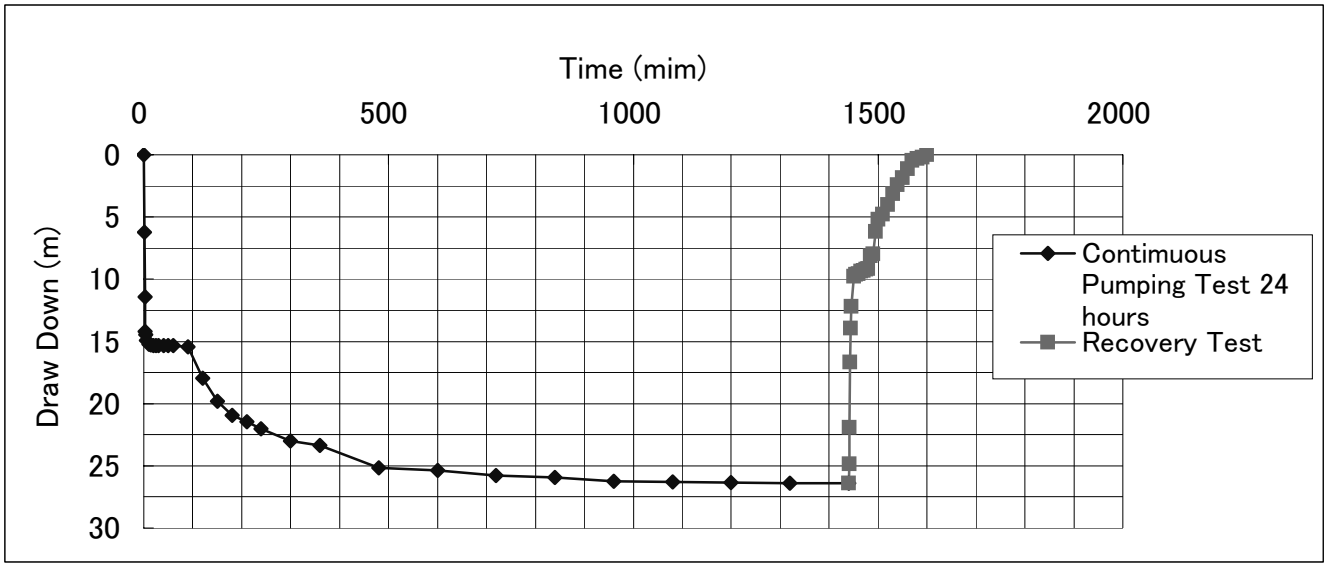
Continuous Pumping Test

Site Name: MIDDIGARRA

Date: 20-Aug-10

Static Water Level: 3.9 M

Contimuous Pumping Test 24 hours					Recovery Test			
Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	Pumping Late (L/s)		Total Elapsed	Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)
0	3.9	0			1440	0	30.3	26.4
1	10.12	6.22			1441	1	28.73	24.83
2	15.3	11.4			1442	2	25.8	21.9
3	18.08	14.18			1443	3	20.59	16.69
4	18.35	14.45			1444	4	17.85	13.95
5	18.8	14.9			1445	5	16.1	12.2
10	19.12	15.22			1450	10	13.7	9.8
15	19.2	15.3	6.7		1455	15	13.5	9.6
20	19.24	15.34	6.7		1460	20	13.47	9.57
25	19.25	15.35			1465	25	13.26	9.36
30	19.25	15.35			1470	30	13.19	9.29
40	19.26	15.36			1475	35	13.11	9.21
50	19.26	15.36			1480	40	13.05	9.15
60	19.26	15.36			1485	45	12.05	8.15
90	19.33	15.43			1490	50	11.9	8
120	21.85	17.95			1495	55	10.08	6.18
150	23.69	19.79	6.7		1500	60	9.11	5.21
180	24.84	20.94			1510	70	8.67	4.77
210	25.35	21.45			1520	80	7.89	3.99
240	25.91	22.01			1530	90	7.05	3.15
300	26.88	22.98			1540	100	6.3	2.4
360	27.24	23.34			1550	110	5.75	1.85
480	29.05	25.15	6.7		1560	120	5.05	1.15
600	29.29	25.39			1570	130	4.34	0.44
720	29.67	25.77			1580	140	4.2	0.3
840	29.85	25.95			1590	150	4.11	0.21
960	30.15	26.25	6.7		1600	160	3.9	0
1080	30.19	26.29						
1200	30.26	26.36						
1320	30.3	26.4						
1440	30.3	26.4						



Continuous Pumping Test LOG- DG

Site Name MIDIGARRA

Contimuous Pumping Test			
Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	Pumping Late (L/s)
0	3.9	3.9	
1	10.12	6.22	
2	15.3	11.4	
3	18.08	14.18	
4	18.35	14.45	
5	18.8	14.9	
10	19.12	15.22	
15	19.2	15.3	6.7
20	19.24	15.34	6.7
25	19.25	15.35	
30	19.25	15.35	
40	19.26	15.36	
50	19.26	15.36	
60	19.26	15.36	
90	19.33	15.43	
120	21.85	17.95	
150	23.69	19.79	6.7
180	24.84	20.94	
210	25.35	21.45	
240	25.91	22.01	
300	26.88	22.98	
360	27.24	23.34	
480	29.05	25.15	6.7
600	29.29	25.39	
720	29.67	25.77	
840	29.85	25.95	
960	30.15	26.25	6.7
1080	30.19	26.29	
1200	30.26	26.36	
1320	30.3	26.4	
1440	30.3	26.4	

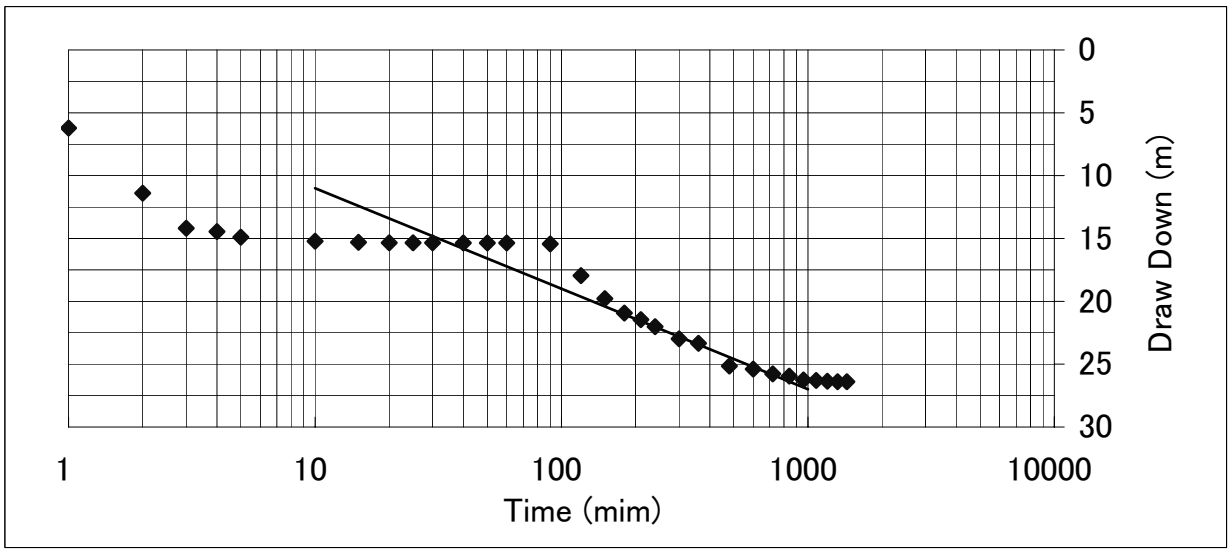
Transmissivity (T) = 0.183*Q/ΔS
(Jacob Method)

Q= 578.9 m3/d

	Time(min)	Drawdown(m)
S1	10	11
S2	100	19

T= 13.2 m3/d/m

24 hours CONTINUOS PUMPING semi log DG



RECOVERY Pumping Test LOG- DG (Recovery)

Site Name MIDIGARRA

Recovery Test				
Total Elapsed Time (min)	Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	t/t'
1440	0	30.3	26.4	
1441	1	28.73	24.83	1440
1442	2	25.8	21.9	720
1443	3	20.59	16.69	480
1444	4	17.85	13.95	360
1445	5	16.1	12.2	288
1450	10	13.7	9.8	144
1455	15	13.5	9.6	96
1460	20	13.47	9.57	72
1465	25	13.26	9.36	58
1470	30	13.19	9.29	48
1475	35	13.11	9.21	41
1480	40	13.05	9.15	36
1485	45	12.05	8.15	32
1490	50	11.9	8	29
1495	55	10.08	6.18	26
1500	60	9.11	5.21	24
1510	70	8.67	4.77	21
1520	80	7.89	3.99	18
1530	90	7.05	3.15	16
1540	100	6.3	2.4	14
1550	110	5.75	1.85	13
1560	120	5.05	1.15	12
1570	130	4.34	0.44	11
1580	140	4.2	0.3	10
1590	150	4.11	0.21	10
1600	160	3.9	0	9
1610				

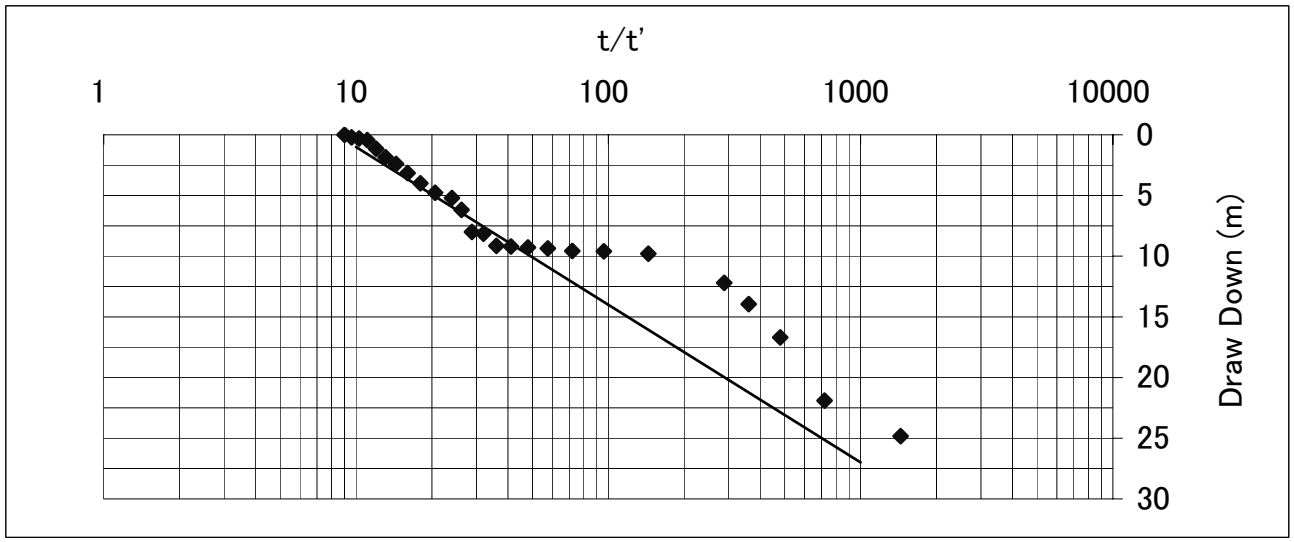
Transmissivity (T) = 0.183*Q/ΔS
(Theis Method)

Q= 578.88 m3/d

	Time(min)	Drawdown(m)
S1	10	1
S2	100	14

T= 8.1 m3/d/m

Recovery test semi log DG



SUMARRAY OF WELL CONDITION

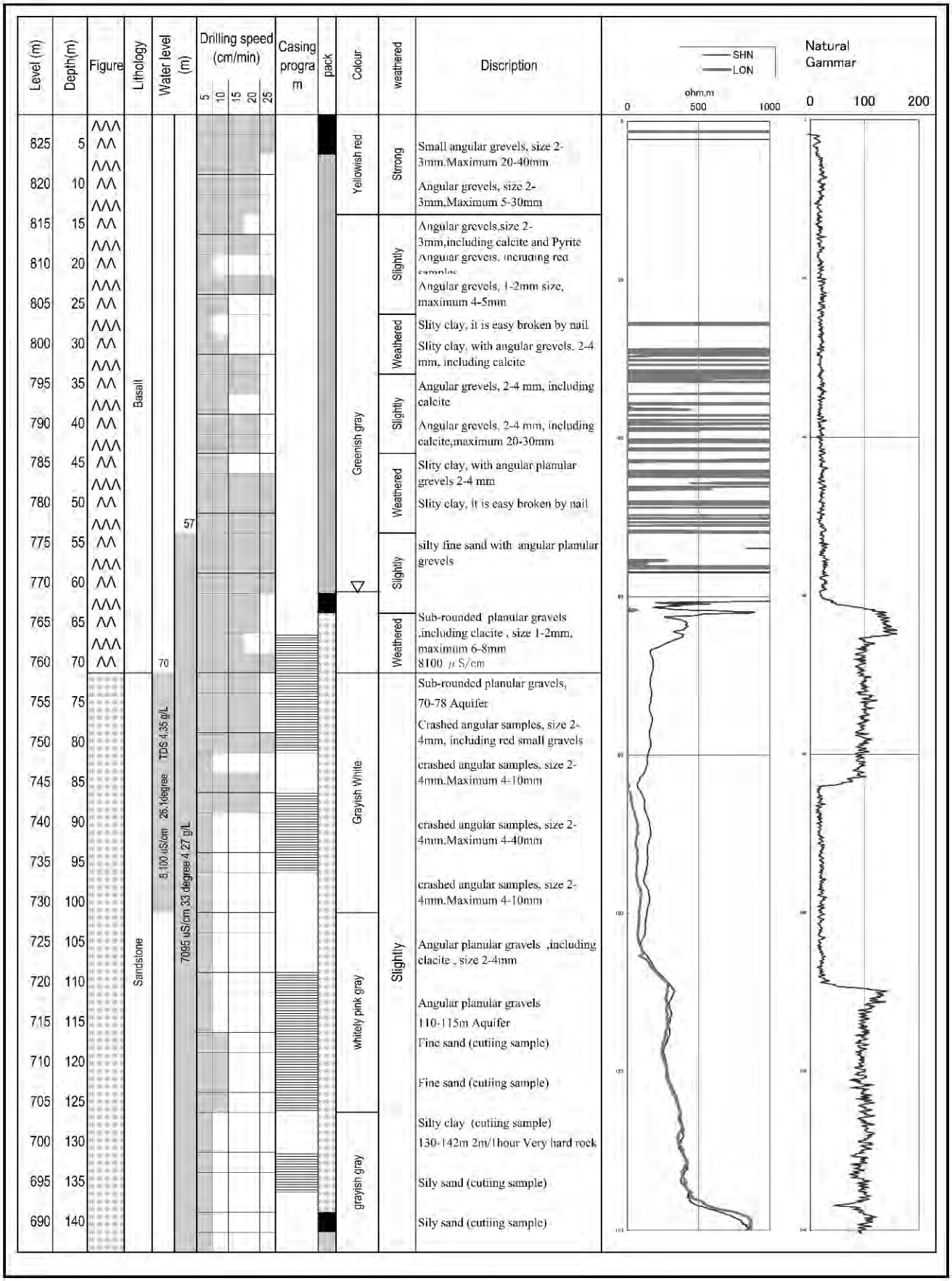
LOCATION: OURABALLIE **DATE:** 17-Aug-10

	GEO MARK	LITHOLOGY	WATER LEVEL	SUMMARY OF WATER PUMP TEST
0	^ ^	0-71m basalt weathered cracked and fractured into fragments perous partly scoria-like high permebility **aquifer** 65-70m	**S.W.L=** 31.1	**5 STEP TEST** **24 HOURS CONTINUOUS UP LIFT** UPLIFT Q= 4 L/S TOTAL Q= 345.6 M^3 / 24 HOURS DRAW DOWN=59.05M TRANSMISIVITY=3.0M2/DAY
50		70-150m sandstone with minoy mudstone louse and soft high permeability	**DWWL=** 90.15	**RECOVERY TEST** REMAINING W L= 59.05M RECOVERY TIME= 90 MIN TRANSMISIVITY=2.5M2/DAY
100		partly bearing salty meterial		**WATER QUALITY** EC= 22 ^{M} S/M PH= 69.3 TEMPERATURE= 42C^O
150				

Date:29 -JULY-2010

Drilling BH 10-4-30 Village name OUARABALEI

Coordinates:11.08918N, 42.76075E Alititude 830 m



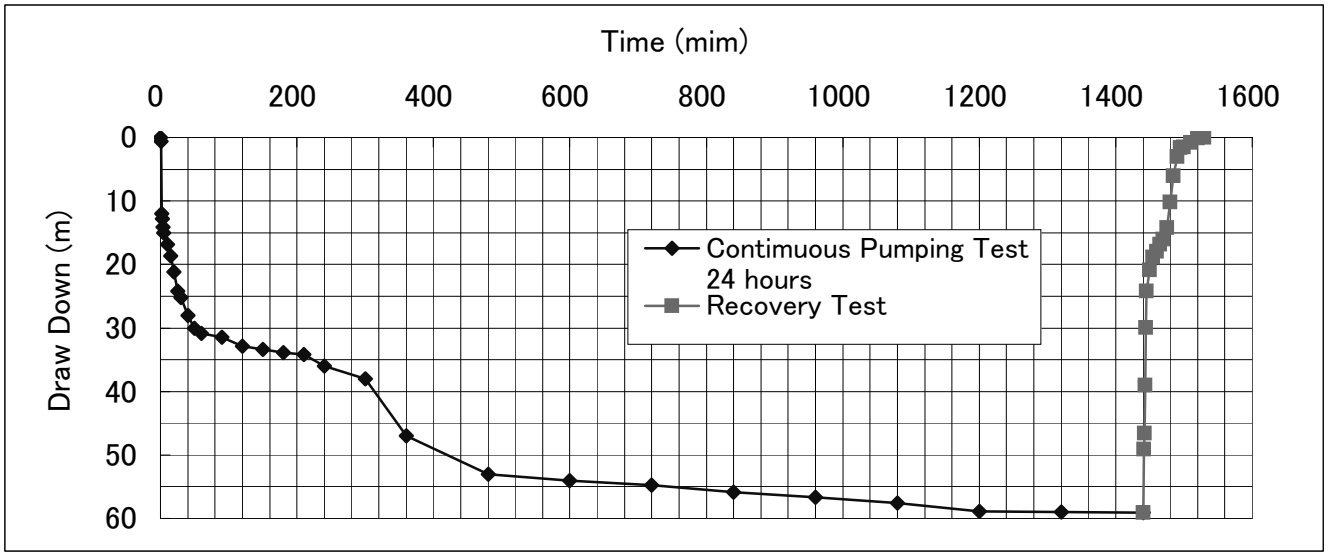
Continuous Pumping Test

Site Name: OURIBALLE

Date: 17-Aug-10

Static Water Level: 31.1 M

Contimuous Pumping Test 24 hours				Recovery Test			
Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	Pumping Late (L/s)	Total Elapsed	Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)
0	31.1	0		1440	0	90.15	59.05
1	31.73	0.63		1441	1	80.21	49.11
2	43.12	12.02		1442	2	77.7	46.6
3	43.9	12.8		1443	3	70.12	39.02
4	45.19	14.09		1444	4	61.07	29.97
5	46.09	14.99		1445	5	55.27	24.17
10	47.9	16.8		1450	10	51.94	20.84
15	49.73	18.63	4	1455	15	49.99	18.89
20	52.31	21.21	4	1460	20	49.05	17.95
25	55.3	24.2		1465	25	47.89	16.79
30	56.27	25.17		1470	30	47.1	16
40	59.18	28.08		1475	35	45.27	14.17
50	61.11	30.01		1480	40	41.3	10.2
60	61.92	30.82		1485	45	37.12	6.02
90	62.55	31.45		1490	50	34.1	3
120	64.02	32.92		1495	55	32.7	1.6
150	64.44	33.34	4	1500	60	32.64	1.54
180	64.98	33.88		1510	70	31.9	0.8
210	65.28	34.18		1520	80	31.2	0.1
240	67.05	35.95		1530	90	31.1	0
300	69.11	38.01					
360	78.08	46.98					
480	84.18	53.08	4				
600	85.12	54.02					
720	85.81	54.71					
840	86.92	55.82					
960	87.81	56.71	4				
1080	88.63	57.53					
1200	89.96	58.86					
1320	90.1	59					
1440	90.15	59.05					



Continuous Pumping Test LOG- DG

Site Name Ouarabaley

Contimuous Pumping Test			
Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	Pumping Late (L/s)
0	31.1	31.1	
1	31.73	0.63	
2	43.12	12.02	
3	43.9	12.8	
4	45.19	14.09	
5	46.09	14.99	
10	47.9	16.8	
15	49.73	18.63	4
20	52.31	21.21	4
25	55.3	24.2	
30	56.27	25.17	
40	59.18	28.08	
50	61.11	30.01	
60	61.92	30.82	
90	62.55	31.45	
120	64.02	32.92	
150	64.44	33.34	4
180	64.98	33.88	
210	65.28	34.18	
240	67.05	35.95	
300	69.11	38.01	
360	78.08	46.98	
480	84.18	53.08	4
600	85.12	54.02	
720	85.81	54.71	
840	86.92	55.82	
960	87.81	56.71	4
1080	88.63	57.53	
1200	89.96	58.86	
1320	90.1	59	
1440	90.15	59.05	

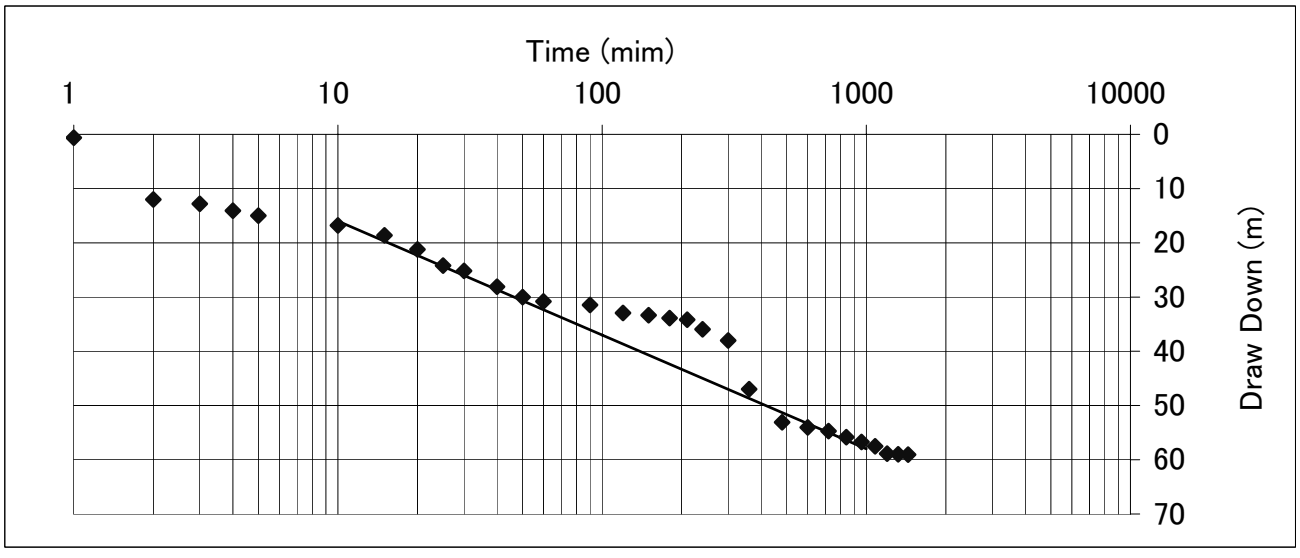
Transmissivity (T) = 0.183*Q/ΔS
(Jacob Method)

Q= 345.6 m3/d

	Time(min)	Drawdown(m)
S1	10	16
S2	100	37

T= 3.0 m3/d/m

24 hours CONTINUOS PUMPING semi log DG



RECOVERY Pumping Test LOG- DG (Recovery)

Site Name Ouarabaley

Recovery Test				
Total Elapsed Time (min)	Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	t/t'
1440	0	90.15	59.05	
1441	1	80.21	49.11	1440
1442	2	77.7	46.6	720
1443	3	70.12	39.02	480
1444	4	61.07	29.97	360
1445	5	55.27	24.17	288
1450	10	51.94	20.84	144
1455	15	49.99	18.89	96
1460	20	49.05	17.95	72
1465	25	47.89	16.79	58
1470	30	47.1	16	48
1475	35	45.27	14.17	41
1480	40	41.3	10.2	36
1485	45	37.12	6.02	32
1490	50	34.1	3	29
1495	55	32.7	1.6	26
1500	60	32.64	1.54	24
1510	70	31.9	0.8	21
1520	80	31.2	0.1	18
1530	90	31.1	0	16

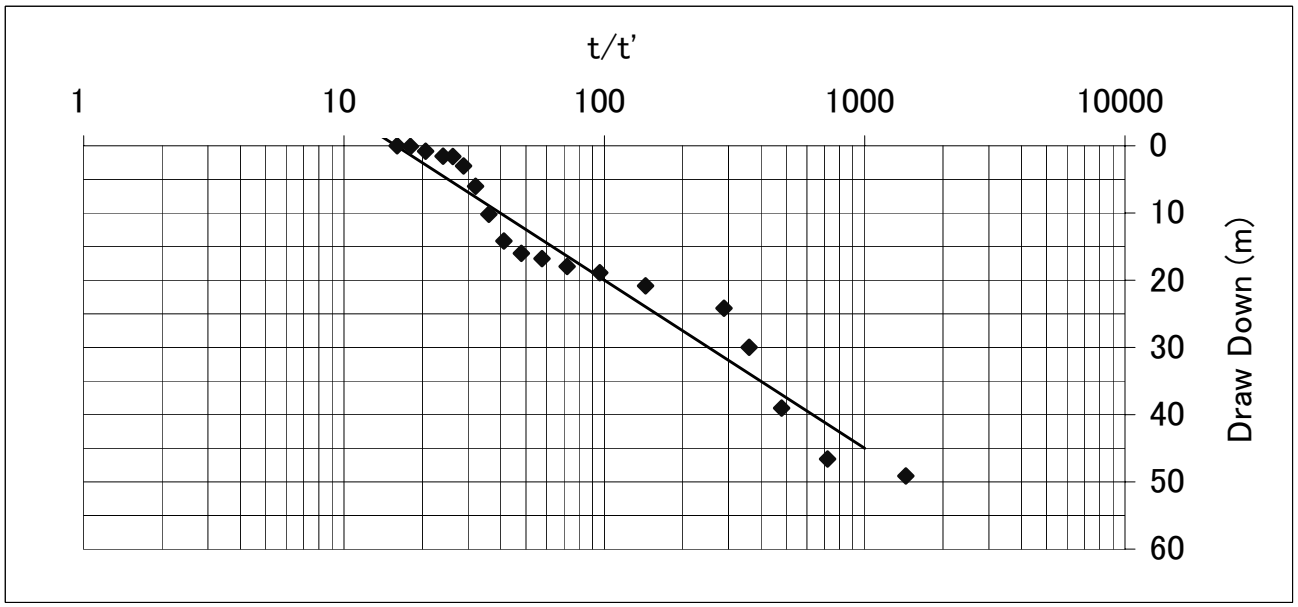
Transmissivity (T) = 0.183*Q/ΔS
(Theis Method)

Q= 345.6 m3/d

	Time(min)	Drawdown(m)
S1	10	-5
S2	100	20

T= 2.5 m3/d/m

Recovery test semi log DG



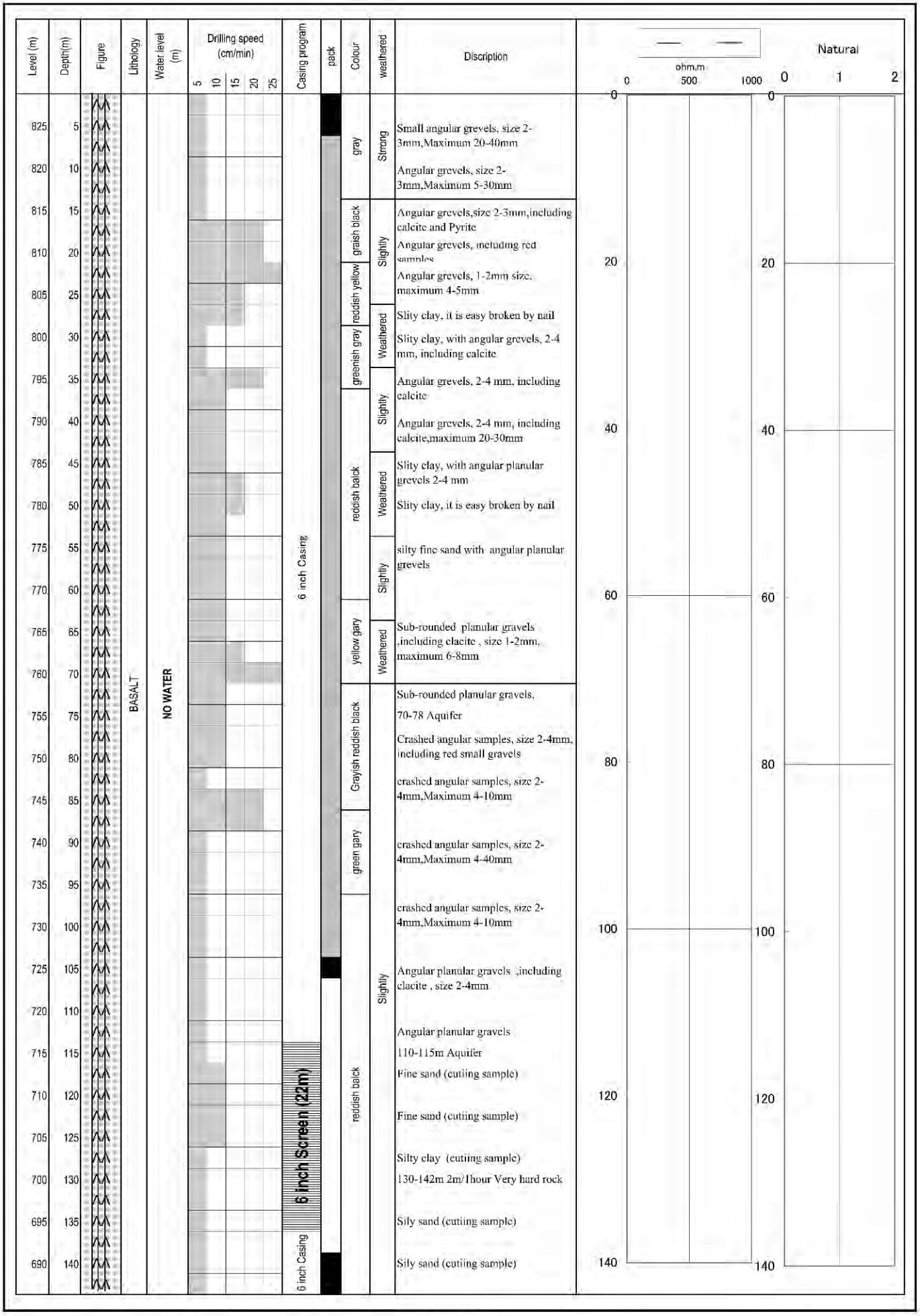
SUMARRAY OF WELL CONDITION

LOCATION: HILBALY **DATE:**

	GEO MARK	LITHOLOGY	WATER LEVEL	SUMMARY OF WATER PUMP TEST
0		0-12M gravel boulder		**5 STEP TEST** NO WATER
	^ ^ ^ ^ ^	12-150m basalt lava typical lava hard and tight rock cracked is rare		**24 HOURS CONTINUOUS UP LIFT** NO WATER
50	^ ^ ^ ^ ^	weathered in some plaeces fresh locally fractured		**RECOVERY TEST** NO WATER
	^ ^ ^ ^ ^			**WATER QUALITY**
100	^ ^ ^ ^ ^			NO WATER
150	^ ^ ^			

Drilling BH 10-4-30

Date:3-OCT-2010
Village name HALEBALY
Alititud 830 m



SUMARRAY OF WELL CONDITION

LOCATION: PETIT BARRA **DATE:**

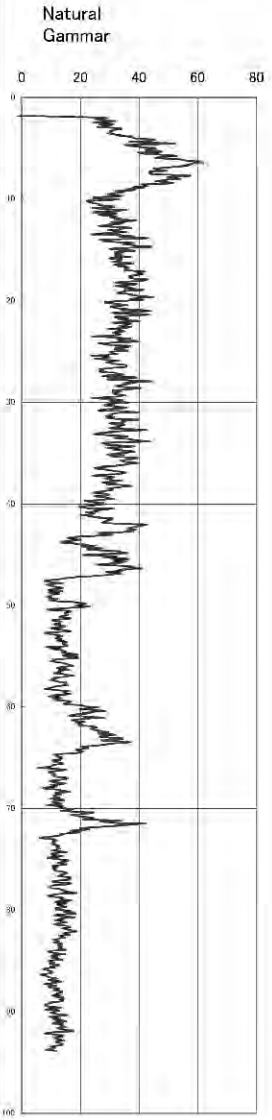
	GEO MARK	LITHOLOGY	WATER LEVEL	SUMMARY OF WATER PUMP TEST
0	^ ^	0--150		
	^ ^ ^	Basalt Lava		**5 STEP TEST**
	^ ^	Hard and tight rock		
	^ ^ ^	oartially only cracked		
	^ ^	Low permeability		
	^ ^ ^			
	^ ^	0--40m		
	^ ^ ^	Weathered and fractured		
	^ ^	with clay seam		**24 HOURS CONTINUOUS UP LIFT**
	^ ^ ^			
	^ ^			UPLIFT Q= 7 L/S
	^ ^ ^			TOTAL Q= 604.8 M^3 / 24 HOURS
50	^ ^			DRAW DOWN=0.86M
	^ ^ ^	50--55		TRANSMISIVITY=460.6M2/DAY
	^ ^	Weathered with clay		
	^ ^ ^			
	^ ^	60--65		
	^ ^ ^	Weathered reddish		**RECOVERY TEST**
	^ ^	in color		
	^ ^ ^			REMAINING W L= 111.76M
	^ ^			RECOVERY TIME= 45 MIN
	^ ^ ^			TRANSMISIVITY=407.4M2/DAY
	^ ^			
	^ ^ ^			
	^ ^			
	^ ^ ^			**WATER QUALITY**
100	^ ^	100m below		
	^ ^ ^	Cracked and fractured	**S.W.L=** 110.9	EC= 4400 ^{M} S/M
	^ ^	High permeability	**DWWL=** 111.76	PH= 7.33
	^ ^ ^			TEMPERATURE= 31.7C^O
	^ ^	118m below		
	^ ^ ^	Aquifer rich		
	^ ^			
	^ ^ ^			
	^ ^			
	^ ^ ^			
	^ ^			
	^ ^ ^			
150	^ ^			

Date:15 -JULY-2010

Drilling BH 10-2-32 Village name PETIT BARA

Coordinates: 11.35762E, 42.78563 E Alititude 620 m

Level (m)	Depth(m)	Figure	Lithology	Water level (m)	Drilling speed (cm/min) 5 10 15 20 25	Casing program	pack	Colour	weathered	Discription
615	5		Basalt					Reddish Brown	Strongly	Surface Casing from 0m to -2m Subanglar,Very small 20-30mm Subrounded cutting sample
610	10							Dark Gray		Subanglar very small cutiing sample
605	15							Reddish Brown		ubanglar very small cutiing sample including 20-40mm rounded ones
600	20							Reddish Dark Gray		Red samples are broken by finger with water
595	25									Subrounded small cutiing sample including red ones
590	30							Greenish Gray	Moderate	Anglar small crahsed cutiing sample including 20-30mm rounded gray ones
585	35							Greenish Brown		
580	40									
575	45									
570	50							Pink Gray	Strongly	Subrounded small crahsed cutiing sample
565	55							Brownish Red		Clay (Cutting sample) Oxidization by high temperature
560	60									
555	65							Dark Gray	Slightly	Subrounded small crahsed cutiing sample
550	70									
545	75									
540	80							Red	Strongly	Subrounded small crahsed cutiing sample, They are broken by finger
535	85							Dark Gray	Slightly	Clay (Cutting sample) Oxidization by high temperature
530	90									
520	100							Red	Strongly	Anglar small crahsed cutiing sample including 20-30mm rounded cutting sample
515	105									Reddish cutting of clay with fragment and cutting of dolelite
510	110			107				Dark Gray	Slightly	Some cutting of basalt angler and sup angler ,soft which material ,
505	115									
500	120			EC: 3400uS/cm				Reddish Gray	Moderate	118-128,Water strike reddish clay
495	125									
490	130									Cutting of dolelite greenish granular
485	135							Dark Gray	Slightly	Cutting of clay strike with cutting dolelite rocks
480	140									134-140,Water strike Cutting of dolelite, fragment variegated fine green size of different soft
178	145							Reddish Gray	Slightly	Detruded deposit with reddish cutting soft clay
173	150									



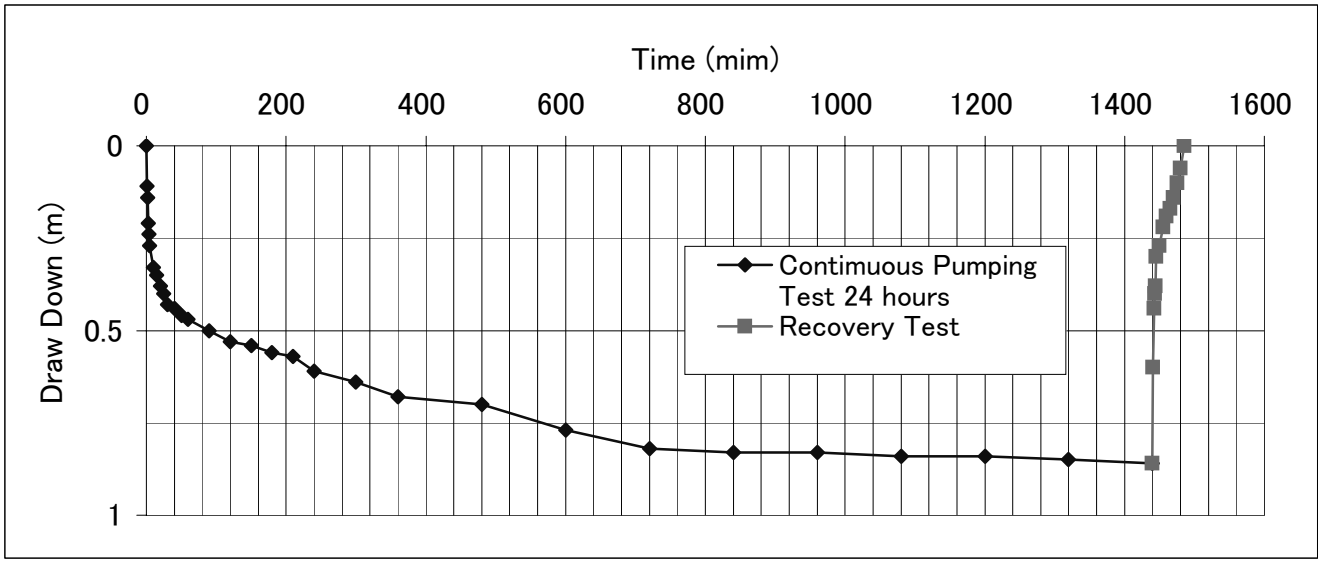
Continuous Pumping Test

Site Name: PETIT BARRA

Date: 4-Aug-10

Static Water Level: 110.9 M

Contimuous Pumping Test 24 hours					Recovery Test			
Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	Pumping Late (L/s)		Total Elapsed	Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)
0	110.9	0			1440	0	111.76	0.86
1	111.01	0.11			1441	1	111.5	0.6
2	111.04	0.14			1442	2	111.34	0.44
3	111.11	0.21			1443	3	111.3	0.4
4	111.14	0.24			1444	4	111.28	0.38
5	111.17	0.27			1445	5	111.2	0.3
10	111.23	0.33			1450	10	111.17	0.27
15	111.25	0.35	6.7		1455	15	111.12	0.22
20	111.28	0.38	6.7		1460	20	111.09	0.19
25	111.3	0.4			1465	25	111.07	0.17
30	111.33	0.43			1470	30	111.04	0.14
40	111.34	0.44			1475	35	111	0.1
50	111.36	0.46			1480	40	110.96	0.06
60	111.37	0.47			1485	45	110.9	0
90	111.4	0.5						
120	111.43	0.53						
150	111.44	0.54	6.7					
180	111.46	0.56						
210	111.47	0.57						
240	111.51	0.61						
300	111.54	0.64						
360	111.58	0.68						
480	111.6	0.7	6.7					
600	111.67	0.77						
720	111.72	0.82						
840	111.73	0.83						
960	111.73	0.83	6.7					
1080	111.74	0.84						
1200	111.74	0.84						
1320	111.75	0.85						
1440	111.76	0.86						



Continuous Pumping Test LOG- DG

Site Name PETIT BARRA

Contimuous Pumping Test			
Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	Pumping Late (L/s)
0	110.9	110.9	
1	111.01	0.11	
2	111.04	0.14	
3	111.11	0.21	
4	111.14	0.24	
5	111.17	0.27	
10	111.23	0.33	
15	111.25	0.35	6.7
20	111.28	0.38	6.7
25	111.3	0.4	
30	111.33	0.43	
40	111.34	0.44	
50	111.36	0.46	
60	111.37	0.47	
90	111.4	0.5	
120	111.43	0.53	
150	111.44	0.54	6.7
180	111.46	0.56	
210	111.47	0.57	
240	111.51	0.61	
300	111.54	0.64	
360	111.58	0.68	
480	111.6	0.7	6.7
600	111.67	0.77	
720	111.72	0.82	
840	111.73	0.83	
960	111.73	0.83	6.7
1080	111.74	0.84	
1200	111.74	0.84	
1320	111.75	0.85	
1440	111.76	0.86	

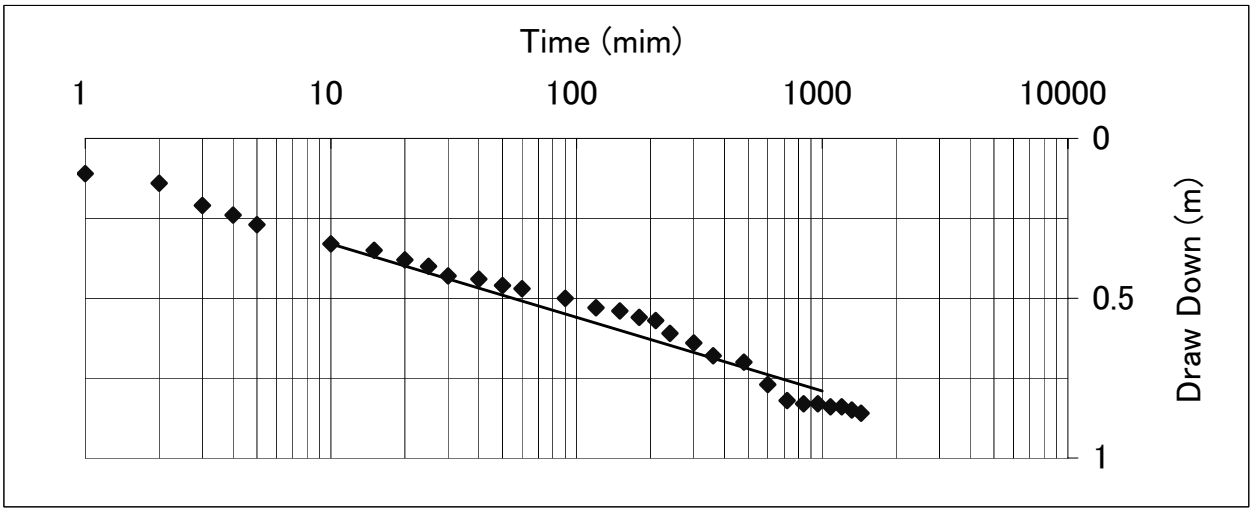
Transmissivity (T) = 0.183*Q/ΔS
(Jacob Method)

Q= 578.9 m3/d

	Time(min)	Drawdown(m)
S1	10	0.33
S2	100	0.56

T= 460.6 m3/d/m

24 hours CONTINUOS PUMPING semi log DG



RECOVERY Pumping Test LOG- DG (Recovery)

Site Name PETIT BARRA

Recovery Test				
Total Elapsed Time (min)	Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	t/t'
1440	0	111.76	0.86	
1441	1	111.5	0.6	1440
1442	2	111.34	0.44	720
1443	3	111.3	0.4	480
1444	4	111.28	0.38	360
1445	5	111.2	0.3	288
1450	10	111.17	0.27	144
1455	15	111.12	0.22	96
1460	20	111.09	0.19	72
1465	25	111.07	0.17	58
1470	30	111.04	0.14	48
1475	35	111	0.1	41
1480	40	110.96	0.06	36
1485	45	110.9	0	32

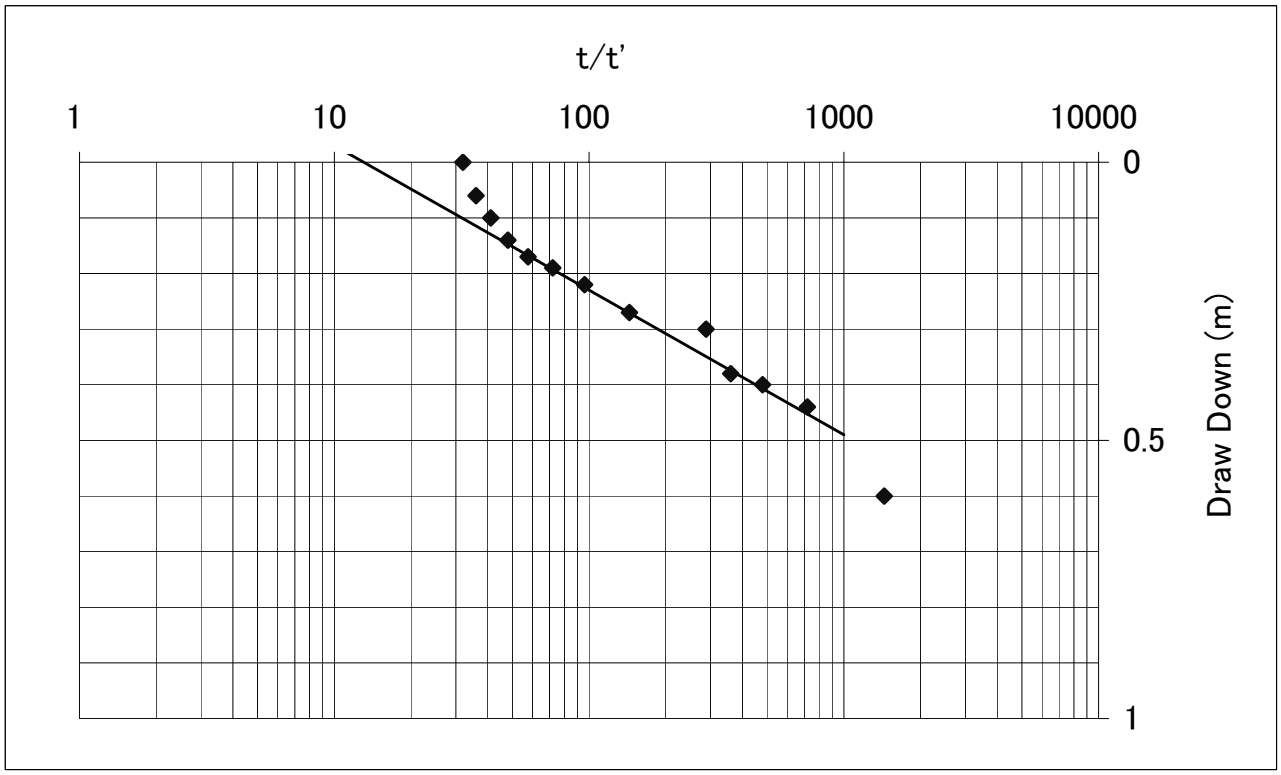
Transmissivity (T) = 0.183*Q/ΔS
(Theis Method)

Q= 578.88 m3/d

	Time(min)	Drawdown(m)
S1	10	-0.03
S2	100	0.23

T= 407.4 m3/d/m

Recovery test semi log DG



SUMARRAY OF WELL CONDITION

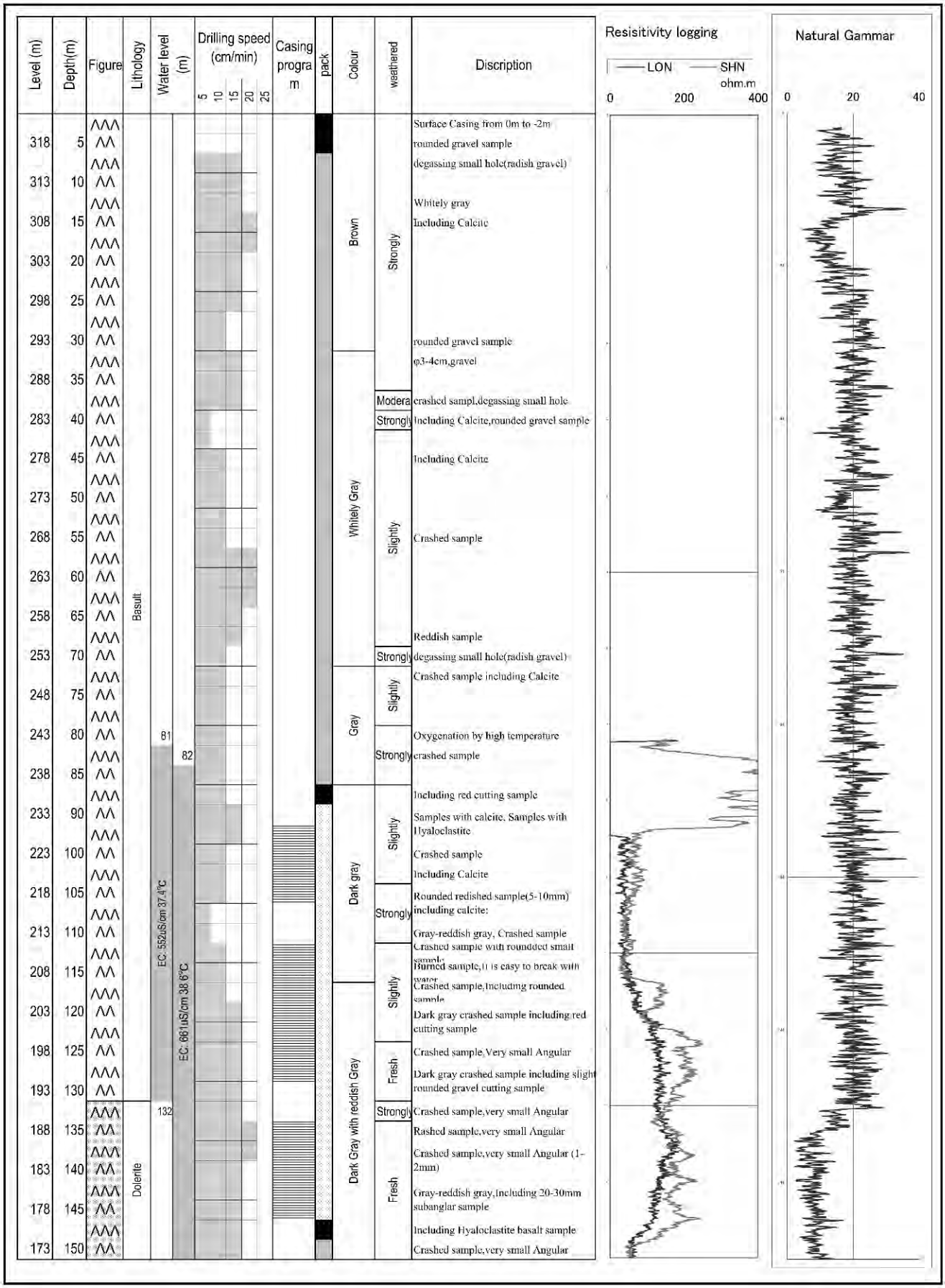
LOCATION: PK30 **DATE:**

	GEO MARK	LITHOLOGY	WATER LEVEL	SUMMARY OF WATER PUMP TEST
0	^ ^ ^	0--150		**5 STEP TEST**
	^ ^	Basalt		
	^ ^ ^	Typical Lava		Not done
	^ ^	Vertical joint developped		due to short discharge
	^ ^ ^	Hard and tight rock		
	^ ^	Slightly cracked		
	^ ^ ^	Low permeability		
	^ ^			**CONTINUOUS UP LIFT**
	^ ^ ^	0--40		
	^ ^	slightly weathered		UPLIFT Q= 0.27 L/S
	^ ^ ^			TOTAL Q= 0,95m^3 / HOUR
	^ ^			DRAW DOWN=47.6M
50	^ ^ ^			TRANSIMISIVITY=0.14M^2/DAY
	^ ^			
	^ ^ ^			
	^ ^			
	^ ^ ^			
	^ ^			**RECOVERY TEST**
	^ ^ ^			
	^ ^			REMAINING W L=47.6 M
	^ ^ ^			RECOVERY TIME= 130 MIN
	^ ^			TRANSIMISIVITY=0.21M^2/DAY
	^ ^ ^			
	^ ^	90m below		
	^ ^ ^	Cracked and fractured	**S.W.L=** 81.9	
	^ ^	in some places		**WATER QUALITY**
100	^ ^ ^			
	^ ^	Low permeability		EC= 552 uS/cm
	^ ^ ^			PH= 7.3
	^ ^			TEMPERATURE= 38.3 C^O
	^ ^ ^			
	^ ^			
	^ ^ ^			
	^ ^			
	^ ^ ^			
	^ ^		**DWWL=** 128.90	
	^ ^ ^			
	^ ^			
150	^ ^ ^			

Date:15 -JULY-2010

Drilling BH 10-1-33 Village name PK30

Coordinates: 11.52272N, 42,91245E Alititude 323 m



Step draw down test record PK-30

Pumping Rate

	1st step	2nd step	3rd step	4th step	5th step
Q (L/s)	0.33	0.44			
Duration (min)					
S = DW (m)	47.60	47.60	0.00	0.00	0.00

①Stastic Water Level	81.9
Record Keeper	

③＝②－①

Time	1st step		2nd step		3rd step		4th step		5th step	
	②Water Level	③Draw Down	Water Level	Draw Down	Water Level	Draw Down	Water Level	Draw Down	Water Level	Draw Down
(min)	(GL-m)	(m)	(GL-m)	(m)	(GL-m)	(m)	(GL-m)	(m)	(GL-m)	(m)
0	81.90	0.00	81.90	0.00						
5	96.30	14.40	100.55	18.65						
10	103.65	21.75	128.00	46.10						
15	111.10	29.20	128.00	46.10						
20	128.00	46.10	128.00	46.10						
25	128.20	46.30	128.00	46.10						
30	129.00	47.10	128.00	46.10						
35	129.00	47.10	128.00	46.10						
40	129.00	47.10	128.00	46.10						
45	129.50	47.60	128.20	46.30						
50	129.50	47.60	129.00	47.10						
55	129.50	47.60	129.00	47.10						
60	129.50	47.60	129.50	47.60						
70	129.50	47.60	129.50	47.60						
80	129.50	47.60	129.50	47.60						
90	129.50	47.60	129.50	47.60						
100	129.50	47.60	129.50	47.60						
110	129.50	47.60	129.50	47.60						
120	129.50	47.60	129.50	47.60						
180										
240										
300										
360										
420										
480										
540										
600										
660										
720										
780										
840										
900										
960										
1020										
1080										
1140										
1200										
1260										
1320										
1380										
1440										

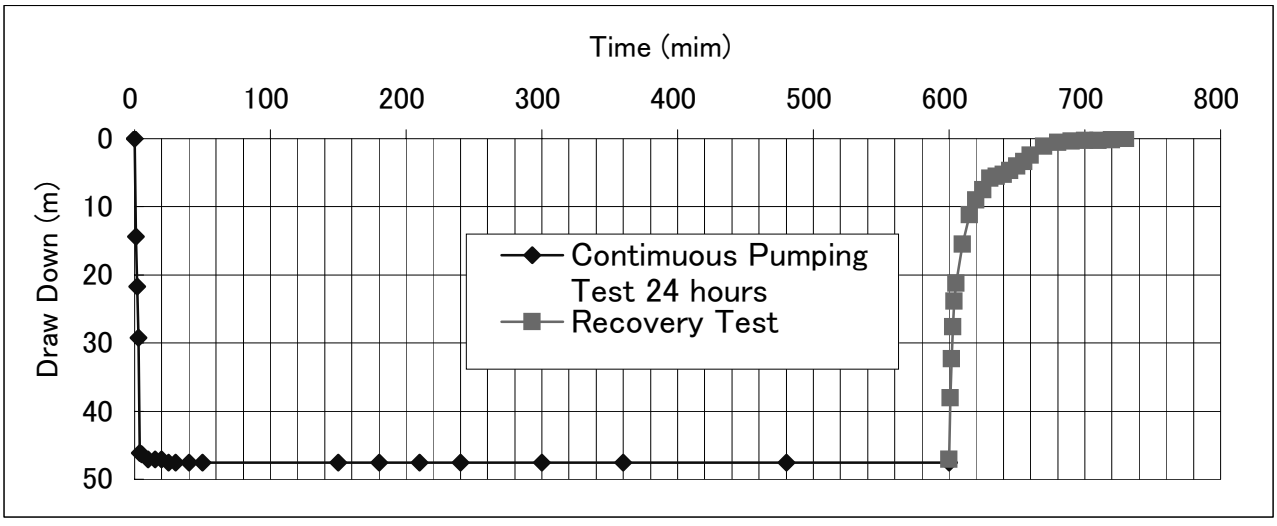
Measurement of Water Quality					
time	12:00-14:00	14:00-16:00			
EC(μs/cm)	552 uS/cm	552 uS/cm			
PH	7.3	7.3			
Temp	38.6 C	38.6 C			

Continuous Pumping Test

Site Name PK30 Date:

Static Water Level: 81.9 M

Contimuous Pumping Test 24 hours					Recovery Test			
Elapsed Time (min)	Water Level (GL−m)	Draw Down (GL− m)	Pumping Late (L/s)		Total Elapsed Time (min)	Elapsed Time (min)	Water Level (GL−m)	Draw Down (GL− m)
0	81.90	0			600	0	129.00	47.10
1	96.30	14.4			601	1	120.00	38.10
2	103.65	21.8			602	2	114.20	32.30
3	111.10	29.2			603	3	109.50	27.60
4	128.00	46.1			604	4	105.80	23.90
5	128.20	46.3			605	5	103.10	21.20
10	129.00	47.1			610	10	97.40	15.50
15	129.00	47.1			615	15	93.10	11.20
20	129.00	47.1	0.43		620	20	90.90	9.00
25	129.50	47.6			625	25	89.40	7.50
30	129.50	47.6	0.43		630	30	87.72	5.82
40	129.50	47.6			635	35	87.43	5.53
50	129.50	47.6	0.43		640	40	87.17	5.27
150	129.50	47.6			645	45	86.60	4.70
180	129.50	47.6			650	50	85.90	4.00
210	129.50	47.6			655	55	85.30	3.40
240	129.50	47.6			660	60	84.30	2.40
300	129.50	47.6			670	70	83.00	1.10
360	129.50	47.6			680	80	82.48	0.58
480	129.50	47.6	0.27		690	90	82.30	0.40
600	129.50	47.6			700	100	82.22	0.32
					710	110	82.20	0.30
					720	120	82.10	0.20
					730	130	81.90	0.00



Continuous Pumping Test LOG- DG

Site Name PK30

Contimuous Pumping Test 24 hours			
Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	Pumping Late (L/s)
0	81.90	0.0	
1	96.30	14.4	
2	103.65	21.8	
3	111.10	29.2	
4	128.00	46.1	
5	128.20	46.3	
10	129.00	47.1	
15	129.00	47.1	
20	129.00	47.1	0.43
25	129.50	47.6	
30	129.50	47.6	0.43
40	129.50	47.6	
50	129.50	47.6	0.43
150	129.50	47.6	
180	129.50	47.6	
210	129.50	47.6	
240	129.50	47.6	
300	129.50	47.6	
360	129.50	47.6	
480	129.50	47.6	0.27
600	129.50	47.6	

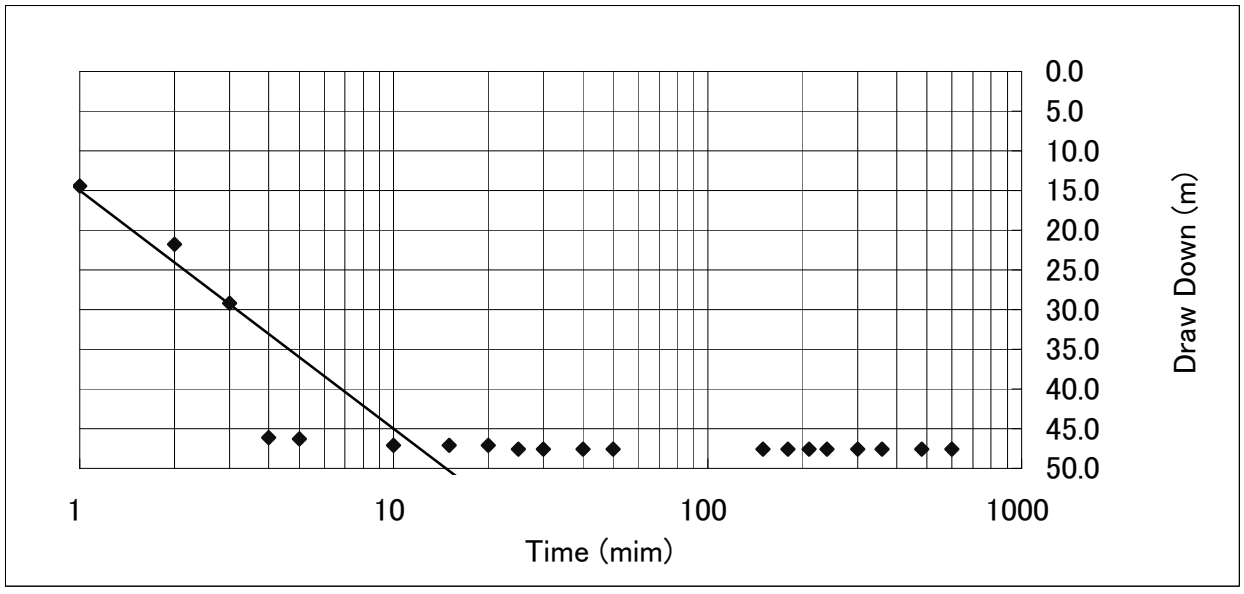
Transmissivity (T) = 0.183*Q/ΔS
(Jacob Method)

Q= 23.3 m3/d

	Time(min)	Drawdown(m)
S1	1	15
S2	10	45

T= 0.14 m3/d/m

24 hours CONTINUOS PUMPING semi log DG



RECOVERY Pumping Test

Site Name PK30

Date: 04-05,July 2010

Static Water Level: 81.9 m

Recovery Test				
Total Elapsed Time (min)	Elapsed Time (min)	Water Level (GL-m)	Draw Down (GL- m)	t/t'
600	0	129.00	47.1	
601	1	120.00	38.1	600
602	2	114.20	32.3	300
603	3	109.50	27.6	200
604	4	105.80	23.9	150
605	5	103.10	21.2	120
610	10	97.40	15.5	60
615	15	93.10	11.2	40
620	20	90.90	9	30
625	25	89.40	7.5	24
630	30	87.72	5.82	20
635	35	87.43	5.53	17
640	40	87.17	5.27	15
645	45	86.60	4.7	13
650	50	85.90	4	12
655	55	85.30	3.4	11
660	60	84.30	2.4	10
670	70	83.00	1.1	9
680	80	82.48	0.58	8
690	90	82.3	0.4	7
700	100	82.22	0.32	6
710	110	82.2	0.3	5
720	120	82.1	0.2	5
730	130	81.9	0	5

Transmissivity (T) = 0.183*Q/ΔS
(Theis Method)

Q= 23.328 m3/d

	Time(min)	Drawdown(m)
S1	10	1
S2	100	21

T= 0.21 m3/d/m