

***Data F***  
***Borehole Log and Pumping Test***

Drilling No .1 Village name: Lusitla (Singida Region) Drilling Contractor: Maji Tech Engineering Ltd.  
 BH ID # 654/2006  
 Coordinates: Long 35.19889E, Lat 5.91841S Altitude: 830m

Drilling No .2 Village name: Kongogo (Dodoma Region) Drilling Contractor: Maji Tech Engineering Ltd.  
 BH ID # 636/2006  
 Coordinates: Long 35.62715E, Lat 5.65422S Altitude: 1,053m

Date: 16 October 2006

Date: 11 October 2006

Elevation (m)	Depth (Cl-m)	Symbol	Lithology	Colour	Weathered	Water level (m)	Casing Program	Description	Electrical Logging
831	5		Sand with gravels	Brown				0-5m including lateritic gravels and plants. Colour is red, white, gray and brown gravels. These size are mostly less than 2mm. Figure is shown as angular.	Not implemented due to No Water Level
826	10		Sand with gravels	Whitish brown				Angular gravels. Size is around 2mm. Cutting sample consists of gravels mainly.	
821	15		Sand with gravels	Grayish white			18.40	Weathered granitic gravel. Biotite and muscovite are found.	
816	20		Sand with gravels	Grayish white					
811	25	+		Grayish white			22.30	Fine sandy sample. Quartz, biotite, muscovite which are originated in weathered granite are found. 27.6m - 35m depth. Cutting sample is siliceous.	
806	30	+		Whitish gray	Highly		28.20	The sample is shown as approximately 5mm angular gravel. The section seems to be fracture zone.	
801	35	+	granite						
796	40	+		Reddish white			37.05	Fine sandy sample. Quartz, biotite, muscovite which are originated in weathered granite are found.	
791	45	+							
786	50	V				05			No Water
781	55	V							
776	60	V							
771	65	V			Highly				
766	70	V							
761	75	V	Rhyolite	Grayish white				Cutting sample is shown as fine to medium grain size.	
756	80	V						Biotite and quartz are found mainly in the cutting samples.	
751	85	V						Increase in contents of the quartz from below 80m depth.	
746	90	V			Moderate				
741	95	V							
736	100	V							

Elevation (m)	Depth (Cl-m)	Symbol	Lithology	Colour	Weathered	Water level (m)	Casing Program	Description	Electrical Logging
1048	5	*	Clay with Sand	Dark Gray to Light Gray		8.2		Top soil layer 2.0m thickness. Medium grained quartz sand inclusive 10mm fragmentary clayey sample. Cutting sample is expressed as powdery.	
1043	10	*							
1038	15	*	Sandy Clay	Light Brown					
1033	20	*							
1028	25	*		Light Gray					
1023	30	*	Clayey Sand	Yellowish Gray				Fine to medium sand with clay. Slightly moisture.	
1018	35	o o	Sandy Gravel	Light Gray				5mm rounded quartz gravel. 35m - 37.5m. Clayey sand is found. Slightly moisture.	
1013	40	o o							
1008	45	o o	Sand with Gravel	Yellowish Brown				Fine to medium grained sand. 3-5mm quartz gravel inclusive. Slightly moisture.	
1003	50	o o		Brown				5-10mm gravel. Medium moisture.	
998	55	o o	Sandy Gravel	Greenish Gray					
993	60	+			Highly			Water Strike: GL-57.5m	
988	65	+		Yellowish Gray				5-10mm rock fragment. No returned water from GL-67.5 to 69.5m.	
983	70	+							
978	75	+	Granite	Whitish Gray					
973	80	+							
968	85	+							
963	90	+		Gray					
958	95	+							
953	100	+		Bluish Gray					
948	105	+							

Date: 18 September 2006

Drilling No. 3 Village name: Bubutole (Dodoma Region) Drilling Contractor: Maji Tech Engineering Ltd.

BH ID #: 640/2006

Coordinates: Long 35.55380E, Lat 5.31306S

Altitude: 1,110m

Elevation (m)	Depth (GL - m)	Symbol	Lithology	Colour	Weathered	Water level (m)	Casing Program	Description	Electrical Logging $\frac{\mu m}{m}$
1105	5	.....		Dark Gray				Top soil layer: 2.0m thickness	
1100	10	.....	Sandy Clay	Yellowish to Greenish Gray				Powdery clayey sample with medium sand	
1095	15	.....							
1090	20	.....							
1085	25	.....							
1080	30	.....	Sand with Gravel	Light Brown		24		Medium to coarse sand with 5mm diameter granitic gravel	
1075	35	.....						Water Strike: GL-39m	
1070	40	.....		Light Gray				2-5mm weathered rock fragment	
1065	45	.....		Light Greenish Gray				Fractured granitic gneiss	
1060	50	.....						From GL-49m, amount of returned water is increased	
1055	55	.....	Granitic Gneiss		Moderate	85	46.85	2-5mm rock fragment	
1050	60	.....		Greenish Gray				1-4mm rock fragment sample	
1045	65	.....						Highly fractured granitic gneiss	
1040	70	.....						From GL-65m, amount of returned water is increased	
1035	75	.....		Light Gray	Highly			2-10mm rock fragment sample	
1030	80	.....		Greenish Gray	Moderate			10mm rock fragment sample	
								Surface of fracture is expressed brown colour	

Date: 31 August 2006

Drilling No. 4 Village name: Loo (Dodoma Region) Drilling Contractor: Maji Tech Engineering Ltd.

BH ID #: 381/2006

Coordinates: Long 35.87000E, Lat 4.88863S

Altitude: 1,488m

Elevation (m)	Depth (GL - m)	Symbol	Lithology	Colour	Weathered	Water level (m)	Casing Program	Description	Electrical Logging $\frac{\mu m}{m}$
831	5	.....	Sandy Clay	Dark Greenish Gray		7.9		Top soil: Reddish Brown, till 0.5m	
826	10	.....						Semi-rounded quartz sand inclusive.	
821	15	.....	Clay with gravel	Reddish Brown				Coarse sand	
816	20	.....	Sandy Clay	Light Gray				Medium Moisture	
811	25	.....		Brown	Highly			River bed deposit	
806	30	.....		Dark Brown				Gravel size 2 to 5mm diameter	
801	35	.....		Dark Gray				Groundwater is found from GL-17.5m	
796	40	.....						Content of sand in this layer is more than the upper sandy clay layer	
791	45	.....						The sample is expressed as sandy gravel.	
786	50	.....						Generally, many garnet are found in the cutting samples	
781	55	.....						Gravel size 2 to 3mm diameter	
776	60	.....	Granitic Gneiss	Light Greenish Gray	Moderate			The sample of this section is expressed as clayey. Some rock fragment are found in the sample. Rock fragment size is 2-5mm. Many Garnet are found in the samples	
771	65	.....						Amount of returned water is decreased from GL-62.5m to GL-70.0m	
766	70	.....						Returned water is expressed as dense mud water with some rock fragment from GL-60.0m to GL-70.0m	
761	75	.....		Dark Reddish Brown	Moderate			This section is respected as fault fractured zone	
756	80	.....						The sample is expressed as sandy.	
751	85	.....		Brownish gray	Highly			Amount of returned water is increased from GL-70.0m	
746	90	.....		Light Gray	Fresh			Content of clayey samples is decreased.	
741	95	.....						2-5mm rock fragment is found in the sample	
736	100	.....						Around 1mm rock fragment is found in the sample. Quartz, biotite and garnet	

Drilling No .5 Village name: Nholi (Dodoma Region) Date: 11 October 2006  
 BH ID #: 638/2006 Drilling Contractor: Maji Tech Engineering Ltd.  
 Coordinates: Long 35.47256E, Lat 6.34680S Altitude: 94.1m

Elevation (m)	Depth (GL-m)	Symbol	Lithology	Colour	Weathered	Water level (m)	Casing Program	Description	Electrical Logging
831	5		Sand	White/whitish red				Rounded coarse sand. Sand is silty. Average 6mm gravels are found in the sample from 7.5-10m depth. These gravels are expressed as flaky.	
826	10		Sand	White-gray				The cutting sample is expressed fine sand, including less than 2mm semi-rounded coarse sand. Angular gravel are found.	
821	15		Sand with gravel	Yellowish white				The cutting sample is expressed silty. Biotite and muscovite are found in the sample.	
816	20		White	White		17		The cutting sample is expressed sandy Granitic rock fragment is found in the sample. These size are 30mm-80mm	
811	25	+		Dark gray				The cutting sample is expressed as silty. Biotite and muscovite are found in the sample	
806	30	+		Reddish white				The cutting sample is expressed sandy Granitic rock fragment is found in the sample. The rock fragment size is 2mm-3mm, and expressed semi-rounded figure	
801	35	+		Gray to White				The first water strike is found at GL-52.5m	
796	40	+		Reddish white	Highly			The second water strike is found at GL-61m	
791	45	+		Gray to Brown				The composition minerals of granite are found in the cutting samples. (Reddish quartz, biotite, feldspar)	
786	50	+		Reddish white		45	49.9	The third water strike is found at GL-72m	
781	55	+		Gray to Brown				The amount of returned water is increasing from 87.5m-92.5m depth	
776	60	+	Granite	Reddish white		62	61.7		
771	65	+		Reddish white			67.6		
766	70	+		Reddish white			76.5		
761	75	+		Reddish white			88.3		
756	80	+		Reddish white			97.1		
751	85	+		Reddish white	Slightly		103		
746	90	+		Reddish white					
741	95	+		Reddish white					
736	100	+		Reddish white					
731	105	+		Reddish white					

Drilling No 6 Village name: Numbeta (Manyara Region) Date: 24 August 2006  
 BH ID #: Coordinates: Long 35.36895E, Lat 4.58404S Altitude: 1.546m

Elevation (m)	Depth (GL-m)	Symbol	Lithology	Colour	Weathered	Water level (m)	Casing Program	Description	Electrical Logging
1541	5		Top soil	Reddish gray				Top soil laterite Basaltic tuff	Not implemented due to No Water Level
1536	10			Yellowish brown				The cutting samples are expressed as sandy and silty. 3-4mm tuff fragment are found in the samples partially. Muscovite is found in this layer.	
1531	15			Yellowish brown					
1526	20			Yellowish brown to Gray					
1521	25		Tuff		Highly			Silty sample is found at 5.7.5m and 45-47.5m.	
1516	30			Yellowish brown to Gray					
1511	35			Yellowish brown to Gray					
1506	40			Yellowish brown to Gray					
1501	45			Yellowish brown to Gray					
1496	50			Light brown to Red	Highly		52.5	The cutting sample is expressed as flaky. Muscovite are found in the sample.	
1491	55			Dark gray to Red				The cutting sample is expressed as sandy and silty. Biotite and muscovite are found.	
1486	60			Dark gray to White	Moderate			The cutting sample is expressed rock fragment. Biotite and muscovite are found in the sample.	
1481	65			Dark gray to Red				Surface of the rock fragment are shown brownish	
1476	70			Dark gray to Red				Fractured rock	
1471	75			Dark gray to Red				The cutting sample are expressed as 2mm rock fragments.	
1466	80		Basaltic pyroclastic rock					Biotite and feldspar are found in the sample.	
1461	85			Whitish gray to Dark gray	Slightly				
1456	90			Whitish gray to Dark gray					
1451	95			Whitish gray to Dark gray					
1446	100			Whitish gray to Dark gray					
1441	105			Whitish gray to Dark gray					
1436	110			Whitish gray to Dark gray					
1431	115			Whitish gray to Dark gray					
1426	120			Whitish gray to Dark gray					

Drilling No. 7 Village name: Barmi/Seloto (Manyara Region) Drilling Contractor: Maji Tech Engineering Ltd.  
 BH ID #: 371/2006  
 Coordinates: Long 35.48875E, Lat 4.24282S Altitude: 1,675m

Drilling No. 8 Village name: Ikasi (Singida Region) Drilling Contractor: Maji Tech Engineering Ltd.  
 BH ID #: 637/2006  
 Coordinates: Long 35.17512E, Lat 6.26388S Altitude: 863m

Elevation (m)	Depth (GL-m)	Symbol	Lithology	Colour	Weathered	Water level (m)	Casing program	Description	Electrical Logging
1670	5	Top soil	Top soil	Brown to Red				Top soil / laterite, 0-2.5m depth Brown, 2.5-5.0m depth Reddish brown	
1665	10	Clay	Clay	White to Gray				The cutting sample is expressed as powdery. Coarse sand is found partially.	
1660	15	Sand with gravel	Sand with gravel	Brownish light gray				Sand with angular gravel. The size of gravels are less than 3mm.	
1655	20								
1650	25								
1645	30			Light gray	Highly	30		The cutting sample are express as sandy and silty.	
1640	35							Few rock fragment are found in this section. Almost gravel are angular shape and less than 3mm diameter.	
1635	40								
1630	45							The cutting sample are express as sandy and silty.	
1625	50		Coarse	Dark gray	Slightly			Rock fragment are found more than upper section. Almost fragment are angular shape and 3-6mm diameter.	
1620	55								
1615	60								
1610	65			Dark reddish gray				The cutting sample are express as fine sandy and gravely	
1605	70				Moderate			Almost fragment are angular shape and 3mm diameter.	
1600	75								
1595	80			Light red					

Elevation (m)	Depth (GL-m)	Symbol	Lithology	Colour	Weathered	Water level (m)	Casing program	Description	Electrical Logging
828	5	Top soil	Top soil	Brown				Top soil: 5.0m thickness. The cutting sample is expressed as medium to coarse sandy	
823	10	Clayey sand	Clayey sand					Brownish coarse sand with clay.	
818	15			Dark brown				The cutting sample is expressed as sandy to clayey.	
813	20								
808	25		Brownish gray					The cutting sample is expressed as medium to coarse grained sandy. Quarts from weathered granites.	
803	30		Dark gray						
798	35								
793	40							From 30-45m depth: The cutting sample is expressed as medium to coarse sandy. This section is highly weathered.	
788	45				Highly				
783	50								
778	55			Gray				From 45-55m depth: The cutting sample is expressed as rock fragment which size 5mm ave. Water strike: GL-47m	
773	60								
768	65		Granite					From 55-80m depth: The cutting sample is expressed as fine to coarse sandy. The rock fragment is found partially. Water strike: GL-70m	
763	70								
758	75								
753	80								
748	85			Dark gray				From 80-90m depth: 1-5mm rock fragment are found. The sample are from weathered granite.	
743	90								
738	95			Brown	Moderate			From 90-120m depth: The cutting sample is expressed as fine to coarse sandy. This section is weathered granite, and expected fractured zone	
733	100								
728	105								
723	110								
718	115			Greenish gray					
713	120								

Drilling No. 9 Village name: Ilo (Singida Region) Date: 30 October 2006  
 BH ID #: 162/2006 Drilling Contractor: Maji Tech Engineering Ltd.

Coordinates: Long 34.99391E, Lat 5.67623S Altitude: 1,076m

Elevation (m)	Depth (CL-m)	Symbol	Lithology	Colour	Weathered	Water level (m)	Casing Program	Description	Electrical Logging
1077	5			Reddish gray				Medium sand with rounded gravel. Inorganic, gravel size is 2mm.	Not implemented due to No Water Level
1072	10			Brown				Medium sand with siliceous gravel. The size is 20-20mm.	
1067	15			Which red		14.7		Medium sand with sub rounded granitic gravel.	
1062	20			Reddish brown		22.55		Coarse sand with siliceous gravel. Granitic rock fragments are found in the cutting samples. The size of the gravel is uniform in the samples.	
1057	25							The cutting sample is expressed as clayey. Rounded quartz are found in the sample. Highly weathered rock fragments are found.	
1052	30								
1047	35								
1042	40								
1037	45			Brownish gray to yellow					
1032	50								
1027	55								
1022	60			Red to Gray				The cutting sample is expressed as silty. Rounded rock fragments are found.	
1017	65								
1012	70								
1007	75								
1002	80								
997	85								
992	90								
987	95								
982	100								
977	105								
972	110								
967	115								
962	120								
957	125								
952	130								
947	135								

Drilling No. 10 Village name: Hirbadaw (Manyara Region) Date: 30 July 2006  
 BH ID #: 372/2006 Drilling Contractor: Maji Tech Engineering Ltd.

Coordinates: Long 34.90203E, Lat 4.35454S Altitude: 1,063m

Elevation (m)	Depth (CL-m)	Symbol	Lithology	Colour	Weathered	Water level (m)	Casing Program	Description	Electrical Logging
1058	5			Reddish white				0.5-0.3m depth: feldspar laterite	
1053	10							Highly weathered granite. The cutting sample is expressed as sandy and silty. Angular rock fragments are found 5-10m depth and 20-30m depth. The fragment size are maximum 20mm. The sections are expected a remaining moderate weathered granitic layers or blocks in highly weathered granite. The colour of the sample are changed from reddish white to grayish white at 12.5m	
1048	15			Grayish white	Highly				
1043	20								
1038	25								
1033	30			Brown		30			
1028	35								
1023	40								
1018	45								
1013	50			Grayish white				The cutting sample is expressed as sandy and silty with rock fragment. The fragment is angular, and the size is 8mm ave. Fragments are found in the sample from 42.5-45m depth mainly. The section is expected to be fractured zone.	
1008	55								
1003	60								
998	65								
993	70								
988	75								
983	80								
978	85								
973	90								
968	95								
963	100								
958	105								
953	110								
948	115								
943	120								
938	125								
933	130								
928	135								
923	140								
918	145								
915.5	147.5								

Drilling No. 11 Village name: Tiawi (Manyara Region) Drilling Contractor: Maji Tech Engineering Ltd.  
 BH ID #: 370/2008  
 Coordinates: Long 35.44907E, Lat 3.90797S Altitude: 1,952m  
 Date: 14 August 2006

Elevation (m)	Depth (GL - m)	Symbol	Lithology	Colour	Weathered	Water level (m)	Casing program	Description	Electrical Logging
1947	5	X	Top soil	Brown		11		Top soil / laterite	
1942	10		Clay with sand	Light gray				Stiff clay with medium to coarse sand. The sand is expressed to be rounded. The grain size of the sand is changed depending on the depth.	
1937	15	~						The cutting sample is expressed as sandy and silty. Few rock fragment are found. Size of the fragment are less than 3mm. and expressed as angular shape. From 15-25m depth, the rock fragments are found more than the upper depths.	
1932	20	~							
1927	25	~			Highly				
1922	30	~		Light gray					
1917	35	~							
1912	40	~	Gneiss					The rock fragments are found more than upper section. The fragments are maximum 50mm. and expressed angular shape.	
1907	45	~			Moderate				
1902	50	~		Yellowish gray				The cutting sample is expressed sandy. The rock fragment are found in the sample. Size of the fragments are 3mm uniform. and expressed as angular shape.	
1897	55	~		Bluish gray	Slightly			From 57.5m depth, sample has a slightly moisture	
1892	60	~						The water strike are 65m depth.	
1887	65	~				62.85		The cutting sample is expressed as silty to fine sandy. Few rock fragment are found.	
1882	70	~							
1877	75	~	Schist	Gray	Slightly			The silty sample are found until 75m depth, then changed to fine sandy samples	
1872	80	~							
1867	85	~							
1862	90	~						At 87m depth, the amount of the returned water is increase.	
1857	95	~	Gneiss	Light gray	Slightly			The cutting sample is expressed as coarse sandy 3-5mm rock fragment are found. The shape of the fragment is angular.	
1851	101	~							

Drilling No. 12 Village name: Misingi (Singida Region) Drilling Contractor: Maji Tech Engineering Ltd.  
 BH ID #: 651/2006  
 Coordinates: Long 34.54847E, Lat 4.33553S Altitude: 1,245m  
 Date: 1 November 2006

Elevation (m)	Depth (GL - m)	Symbol	Lithology	Colour	Weathered	Water level (m)	Casing program	Description	Electrical Logging
1240	5	X	Top soil	Dark gray		7		Top soil: dry peat	
1235	10	o	Gravel	Brown				The gravel is weathered granite. The shape is rounded, and size is 3-5mm.	
1230	15	o		Brown				Medium sand and gravel are found in the sample. The gravel is 3-5mm and rounded shape. Quartz and feldspar are found.	
1225	20	o	Sand with gravel	Light brown					
1220	25	o							
1215	30	o							
1210	35	o	Sand	Light red		34		Coarse sand. Muscovite are found.	
1205	40	o	Sand with gravel	Brown				Fine sand with gravels. Quartz are found.	
1200	45	o							
1195	50	+					44.85	Highly weathered granite	
1190	55	+		Brown to Light red	Highly		53.7	The cutting sample is expressed as silty and rock fragment. The fragment size is 2-5mm. Quartz, feldspar and muscovite are found.	
1185	60	+					59.6	First water strike: GL-49m	
1180	65	+					65.5	The cutting sample are expressed rock fragment. Size is the fragment is about 50mm. Quartz, feldspar and muscovite are found.	
1175	70	+		Brown	Moderate		71.4	Second water strike: GL-62m	
1170	75	+	Granite					Third water strike: GL-72m	
1165	80	+		Light reddish gray	Moderate		80.25	The cutting sample is expressed as fine sandy. Some granitic rock fragment are found. Quartz, feldspar and muscovite are found.	
1160	85	+					86.15		
1155	90	+							
1150	95	+		Gray	Slightly		82.05	Slightly weathered granite	
1145	100	+						The cutting sample is expressed as fine sand. Rock fragments are found. Size the fragment are 30-50mm.	

Drilling No. 13 Village name: Sepuka (Singida Region) Date: 22 October 2006  
 BH ID #: 642/2006 Drilling Contractor: Maji Tech Engineering Ltd.

Coordinates: Long 34.53607E, Lat 4.74932S Altitude: 1,476m

Elevation (m)	Depth (GL-m)	Symbol	Lithology	Colour	Weathered	Water level (m)	Casing Program	Description	Electrical Logging
1471	5	+	Sand	Brown	X	3.2		Coarse sand with rounded gravel. Surface casing is installed till 7.5m depth.	0 1000 2000 3000 4000 5000
1466	10	+		Reddish to Light gray		7.7		Then cutting sample is expressed 2-5mm rounded rock fragment.	
1461	15	+		Light gray	Highly				
1456	20	+						Angular rock fragment sample. The first water strike: GL-30m	
1451	25	+	Granite	Gray to Light gray	Moderate				
1446	30	+						The cutting sample is expressed as coarse sandy. Biotite, muscovite, feldspar and quartz are found. The second water strike: GL-40m	
1441	35	+		Light reddish gray		36.15			
1436	40	+						Medium sandy cutting sample	
1431	45	+			slightly	42.05			

Drilling No. 14 Village name: Igogo (Tabora Region) Date: 29 October 2006  
 BH ID #: Drilling Contractor: Maji Tech Engineering Ltd.

Coordinates: Long 33.76144E, Lat 4.29724S Altitude: 1,109m

Elevation (m)	Depth (GL-m)	Symbol	Lithology	Colour	Weathered	Water level (m)	Casing Program	Description	Electrical Logging
1104	5	X	Top soil	Brownish gray				Top soil / Laterite. The cutting sample is expressed as medium to coarse sandy.	Not implemented due to No Water Level
1099	10			Light gray				Clay. The cutting sample is expressed as flaky. Size of the samples are 5-10mm. Few fine sand are found in the clay samples. No moisture.	
1094	15							Sandy clay with gravel. Gravels are originated from Banded iron rock. The gravel is angular shape and 5-10mm large.	
1089	20								
1084	25							Banded iron rock. Slightly weathered.	
1079	30			Brownish gray					
1074	35		Clay	Reddish gray				Sandy clay with gravel. Gravels are originated from Banded iron rock. The gravel is angular shape and 5-10mm large.	
1069	40								
1064	45							Sandy clay with gravel. Gravels are originated from Banded iron rock. The gravel is angular shape and 5-10mm large.	
1059	50								
1054	55							Sandy clay with gravel. Gravels are originated from Banded iron rock. The gravel is angular shape and 5-10mm large.	
1049	60			Brown					
1044	65							Sandy clay with gravel. Gravels are originated from Banded iron rock. The gravel is angular shape and 5-10mm large.	
1039	70								
1034	75							Sandy clay with gravel. Gravels are originated from Banded iron rock. The gravel is angular shape and 5-10mm large.	
1029	80								
1024	85							Sandy clay with gravel. Gravels are originated from Banded iron rock. The gravel is angular shape and 5-10mm large.	
1019	90								
1014	95		Banded iron rock	Reddish gray	slightly			Banded iron rock. Slightly weathered.	
1009	100								



Drilling No. 15 Village name: Nkongwa (Tabora Region) Date: 11 October 2006  
 BH ID #: 650/2006 Drilling Contractor: Maji Tech Engineering Ltd.

Coordinates: Long 33.99646E, Lat 5.36013S Altitude: 1,283m

Elevation (m)	Depth (GL -m)	Symbol	Lithology	Colour	Weathered	Water level (m)	Casing Program	Description	Electrical Logging (ohm.m)
1278	5	+							
1273	10	+		Light gray		7.7		The cutting samples are expressed as medium to coarse sandy.	
1268	15	+			Highly				
1263	20	+							
1258	25	+		Light brown				Rounded medium to coarse sandy sample. The first water strike: GL-22m	
1253	30	+	Granite	Dark brown			29.0	Angular medium to coarse sandy sample.	
1246	35	+						The second water strike: GL-37m	
1243	40	+							
1238	45	+		Brown, Light gray			37.85	Fine sandy cutting samples Biotite, muscovite and feldspar are found.	
1233	50	+			Moderate				
1228	55	+		Gray		05		Coarse sandy cutting samples. The sample are siltificated.	
1223	60	+							

Drilling No. 16 Village name: Kininginla (Tabora Region) Date: 6 November 2006  
 BH ID #: Drilling Contractor: Maji Tech Engineering Ltd.

Coordinates: Long 33.91155E, Lat 4.03112S Altitude: 1,546m

Elevation (m)	Depth (GL -m)	Symbol	Lithology	Colour	Weathered	Water level (m)	Casing Program	Description	Electrical Logging (ohm.m)
1541	5			Gray				Topsoil 0.8m thickness.	
1536	10			Light yellow				Silt with rounded sand	
1531	15			Whitish yellow brown				The cutting sample is expressed as flaky.	
1526	20							Silt	
1521	25						24.9		
1516	30			Brown to Red Yellowish Red				With rounded laterite gravels	
1511	35			Yellowish White			30.8	calcareous clay with laterite gravels, gravel size is 1-3mm and rounded Deeper and gravel content rate is high	
1506	40		Calcareous Clay			41			
1501	45			Rue to yellowish light to dark brown			42.6	With laterite gravels. Gravels size are 2-3mm	
1496	50			Grayish brown			48.5	Moistured Laterite gravels are found	
1491	55							Moistured silty clay	
1486	60					60	54.4		
1481	65			Reddish brown to brownish gray			60.6	The silty clay are expressed two colours, reddish brown and brownish gray, alternately. The silty clay are consolidated, but it is easy to crush by finger.	
1476	70						66.2		
1471	75						72.1		
1466	80		silt rock	Brownish gray			75.05	Consolidated silt	

Drilling No. 17 Village name: Mapea (Manyara Region) Drilling Contractor: Maji Tech Engineering Ltd.  
 BH ID #: 652/2006

Date: 12 December 2006

Coordinates: Long 35.75789E, Lat 4.00821S Altitude: 1,006m

Elevation (m)	Depth (GL-m)	Symbol	Lithology	Colour	Weathered	Water level (m)	Casing Program	Description	Electrical Logging
1001	5	X	Clay (top Soil)	Dark gray		5		Top soil, clay	
996	10	~	Clay	Gray				The cutting sample is expressed as flaky and powdery	
991	15	~							
986	20	~		Gray			20.5	Clayey sand. Fine to medium sand. Few gravel are found. The first water strike: GL-27m	
981	25	~	Clayey Sand						
976	30	~							
971	35	~		Dark brown			25.4 35.28	Clayey sand. Few coarse sand are found.	
966	40	~	Clay with Silt	Dark gray				Clay with silt. Few fine to coarse sand is found. The second water strike: GL-40m	
961	45	~					44.1		
956	50	~					49.98		
951	55	~						45-75m depth, the cutting sample are expressed as fine to coarse sandy to silty.	
946	60	~					56.8		
941	65	~	Gneiss	Dark gray	Highly		64.68		
936	70	~							
931	75	~						70-80m depth, the cutting sample is expressed as fine to coarse sandy. The third water strike : GL-72m	
926	80	~					73.5		

Drilling No. 18 Village name: Masange (Dodoma Region) Drilling Contractor: Maji Tech Engineering Ltd.  
 BH ID #:

Date: 31 August 2006

Coordinates: Long 35.80318E, Lat 4.60344S Altitude: 1,245m

Elevation (m)	Depth (GL-m)	Symbol	Lithology	Colour	Weathered	Water level (m)	Casing Program	Description	Electrical Logging
1240	5	X	Top soil	Light red				Top soil: laterite	
1235	10	~		Reddish brown	Highly			Highly weathered rock. The cutting sample is expressed as clayey. Quartz and mica are found in the sample.	Not implemented due to Not enough Water Level
1230	15	~		Yellowish brown	Moderate			Moderate weathered rock	
1225	20	~		Greenish gray				Quartz, mica and feldspar are found in the samples. These samples have slightly been moistured.	
1220	25	~					22.8		
1215	30	~		Dark gray	Slightly			Slightly Weathered rock	
1210	35	~	Gneiss	Yellowish gray/Moderate				Quartz, mica and feldspar can be found in the samples. Fractured zone.	
1205	40	~					37.55	The cutting sample is expressed as powdery	
1200	45	~						Not moistured.	
1195	50	~						32.5-35.0m depth, moderate weathered zone	
1190	55	~		Dark gray	Slightly	50			
1185	60	~							
1180	65	~							
1175	70	~					62		

Drilling No. 19 Village name: Makame (Manyara Region) Date: 10 September 2006  
 BH ID #: 635/2006 Drilling Contractor: Maji Tech Engineering Ltd.

Coordinates: Long 36.70853E, Lat 4.63158S Altitude: 1,049m

Elevation (m)	Depth (GL-m)	Symbol	Lithology	Colour	Weathered	Water level (m)	Casing Program	Description	Electrical Logging
1044	5		Laterite	Grayish Brown				Top soil, Laterite	
1039	10		Clayey Sand	Brown				Coarse sand, Sediments layer	
1034	15							Highly weathered granitic gneiss The cutting sample is expressed as fine sandy, Quartz and biotite are found in the sample	
1029	20							Moderate weathered granitic gneiss.	
1024	25			Light Gray	Highly			Highly weathered rock	
1019	30								
1014	35					36.36			
1009	40			Grayish Brown	Moderate				
1004	45		Granitic gneiss		Highly		48.45		
999	50							The first water strike: GL-46m The cutting sample is expressed as coarse to medium sandy.	
994	55								
988	60			Light Gray	Moderate	48.45			
984	65						57.3		
979	70							The second water strike: GL-69m to GL-70m	
974	75				Slightly		56.15	1.5mm angular gneiss fragment.	

Drilling No. 20 Village name: Ngofia (Shinyanga Region) Date: 20 December 2006  
 BH ID #: 653/2006 Drilling Contractor: Maji Tech Engineering Ltd.

Coordinates: Long 33.78151E, Lat 3.93233S Altitude: 1,057m

Elevation (m)	Depth (GL-m)	Symbol	Lithology	Colour	Weathered	Water level (m)	Casing Program	Description	Electrical Logging
1056	5		Top soil	Reddish brown		4		Top soil, Peat soil	
1051	10		Clay with gravel	Reddish brown				Calcareous clay with gravel Angular gravel are found, and the size is 20-30mm From 5m depth, medium to coarse sand is found in the samples.	
1046	15			Dark brown				Medium sandy quartz are found.	
1041	20		Sand	Dark brown					
1036	25			Dark grey					
1031	30		Clayey sand					Clayey sand The cutting sample is expressed as flaky, and the sizes are 5-8mm.	
1026	35			Grey					
1021	40								
1016	45								
1011	50		Sand	Light gray			48.45	Medium to coarse sand, Angular shape. Sandy quartz are found.	
1006	55								
1001	60								
996	65		Clay with sand	Gray			60.25	Grayish clay with medium to coarse sand. Quartz and mica are found.	
991	70		Sand	Light gray				Medium to coarse sand, Angular shape. Sandy quartz are found.	
986	75						72.09		

Drilling No .21 Village name: Mwasayi (Shinyanga Region) Drilling Contractor: Maji Tech Engineering Ltd.  
 BH ID #:   
 Coordinates: Long 33.68677E, Lat 3.34095S Altitude: 1,217m

Date: 14 August 2007  
 Date: 7 September 2007  
 Village name: Mwangudo (Shinyanga Region) Drilling Contractor: Maji Tech Engineering Ltd.  
 BH ID #:   
 Coordinates: Long 36.84932E, Lat 3.146085S Altitude: 1,438m

Elevation (m)	Depth (GL-m)	Symbol	Lithology	Colour	weathered	Water level (m)	Casing Program	Description	Electrical Logging
1212	5	+	Sand	Light gray	<input checked="" type="checkbox"/>	5.5		Top soil /Medium sand	
1207	10	+						1cm Granite rock gravel. Angular shape.	
1202	15	+		Light reddish gray	Moderate			Rounded biotite fragment is found.	
1197	20	+						0.5 - 1.0cm rock fragment. Angular shape.	
1192	25	+			Strongly			Partly. 5cm size ones are found.	
1187	30	+		Light gray	Moderate			Phenocrists in the rock fragments are 2 - 5mm	
1182	35	+			Strongly			The trace of oxidation is not found on the surface of fragment	
1177	40	+	Granite Pegmatite					Partly. there are some dikes which biotite is cumulative.	
1172	45	+			Moderate			GL-35m Water strike	
1167	50	+		Dark gray				0.2cm rock fragment sample	
1162	55	+						Quartz, muscovite and biotite.	
1157	60	+						The trace of oxidation is found on surface of the fragments.	
1152	65	+			Slightly				
1147	70	+							

Elevation (m)	Depth (GL-m)	Symbol	Lithology	Colour	weathered	Water level (m)	Casing Program	Description	Electrical Logging
1433	5	+	Top soil	Brown	Strongly			Sandy Soil	
1428	10	+	Granite	Whitish brown	Moderate			0.2 - 1.0cm Angular shape sample	Not implemented due to Not enough Water Level
1423	15	+	Granodiorite	Light red				The trace of oxidation is found on sample surface	
1418	20	+		Blackish gray / Dark gray				0.5 - 2.0cm rock fragment sample.	
1413	25	+		Red				The trace of oxidation is found on sample surface	
1408	30	+						0.5cm rock fragment sample.	
1403	35	+		Light to reddish gray	Moderate			Angular shape.	
1398	40	+						The trace of oxidation is found on sample surface	
1393	45	+							
1388	50	+			Fresh Slightly			Less than 2mm cutting sample	
1383	55	+			Fresh			Fresh	
1378	60	+	Granite						
1373	65	+			Slightly				
1368	70	+							
1363	75	+		Whitish gray				GL-70.0 to 72.5m biotite fragment content is increase.	
1358	80	+							
1353	85	+			Fresh				
1348	90	+							
1343	95	+							
1338	100	+							Powdery sample. Fresh/ hard

Date: 27 October 2007

Drilling No. 23 Village name: Loliondo (Arusha region) Drilling Contractor: Maji Tech Engineering Ltd.  
 BH ID #: Coordinates: Long 35.61991E, Lat 2.05134S Altitude: 2,138m

Elevation (m)	Depth (GL-m)	Symbol	Lithology	Colour	Weathered	Water level (m)	Casing Program	pack	Description	Electrical Logging
2133	5	X	Top soil	Blackish brown					Clay with sand	
2128	10	•••••	Fluvial sediments						Fluvial sediments	
2123	15	•••••	Brownish clay.						Brownish clay.	
2118	20	•••••	Fine to medium quartz sand are found						Fine to medium quartz sand are found	
2113	25	•••••	Rounded shape	Grayish brown		16			Rounded shape	
2108	30	•••••								
2103	35	•••••	Sandy clay						Fine quartz sand are found. Rounded shape	
2098	40	•••••		Dark brown						
2093	45	•••••								
2088	50		Clay with sand	Brown					Brownish clay with medium size sand. Quartz sand are found.	
2083	55	•••••							Collapsing soil	
2078	60	○ ○ ○ ○	Sand with gravel	Dark brown					Fluvial sediments	
2073	65	○ ○ ○ ○							Water struck GL-56m	
2068	70	○ ○ ○ ○							Fine to medium sand	
2063	75	○ ○ ○ ○							1 - 2cm rounded quartz gravel are found	
2058	80	○ ○ ○ ○							River bed deposit	
2053	85	○ ○ ○ ○	Gravel with sand	Light gray					Rounded Quartzite gravel and pebble (d: 5 - 15cm, t: 2cm). Platy shape	
2048	90	○ ○ ○ ○							Partly, medium sand are found in the cutting sample	
2043	95	○ ○ ○ ○							Water struck GL-65, -70, -80 and -85m	
2038	100	○ ○ ○ ○								

Date:

Drilling No. 24 Village name: Basotu (Manyara region) Drilling Contractor: Maji Tech Engineering Ltd.  
 BH ID #: Coordinates: Long 35.06010E, Lat 4.39915S Altitude: 1,612m

Elevation (m)	Depth (GL-m)	Symbol	Lithology	Colour	Weathered	Water level (m)	Casing Program	pack	Description	Electrical Logging
1607	5	X	Top soil	Dark brown					Clay with coarse sand	
1602	10	•••••	Clay	Brown					Powdery cutting sample	
1597	15	•••••							2 - 20mm gravel are found	
1592	20	•••••		Reddish brown					Slightly moistured	
1587	25	○ ○ ○ ○	Sandy clay with gravel						Fine to medium sand inclusive	
1582	30	•••••		Yellowish brown					2mm gravel are found partly	
1577	35	•••••	Clay with sand	Yellowish gray					Below 25m depth, decrease content of gravel in the cutting sample	
1572	40	•••••		Dark gray					Coarse sands are found partly	
1567	45	•••••								
1562	50	•••••							Rounded medium sand inclusive slightly	
1557	55								Slightly moistured	
1552	60			Dark brown	Highly				Weathered hornblend schist	
1547	65			Dark greenish gray	Moderate				GL-52m Water strike	
1542	70								1 - 2mm rock fragment sample	
1537	75								Fractured zone	
1532	80								GL-60m and 70m Water strike	
1527	85									
1522	90			Dark blueish gray	Slightly				1 - 20mm rock fragment sample	
1517	95									
1512	100									

Drilling No. 26 Village name: Engaruka (Arusha Region) Drilling Contractor: Maji Tech Engineering Ltd.  
 BH ID #: Coordinates: Long 35.99940E, Lat 2.99348S Altitude: 844m Date: 10 July 2007

Elevation (m)	Depth (GL-m)	Symbol	Lithology	Colour	Weathered	Water level (m)	Casing Program	Description	Electrical Logging
889	5	△	Top soil	Red				Laterite: Medium sand with basaltic rock gravel. Outside surface casing (12inch) 1m: Inner surface casing (9inch) 8m: Quartz, biotite and Muscovite	Not implemented due to Not enough Water Level
834	10	○	Sand with gravel	Brown					
829	15	△		Light brown					
824	20	△						Tuffaceous sand (medium particle size) Angular tuff fragments are found in the cutting sample Volcanic glass	
819	25	△		Dark brown					
814	30	△							
809	35	△							
804	40	△						Tuffaceous sand (fine to medium particle size) 3 - 5mm gravels including: round shape	
799	45	△	Pyroclastic sediments	Dark gray					
794	50	△							
789	55	△		Dark brown				Tuffaceous sand (medium particle size) GL-60 to 70m, rounded tuff fragment are found, 0.5cm	
784	60	△							
779	65	△		Brownish gray					
774	70	△							
769	75	△		Dark brown				Below GL-80m, 1cm volcanic rock fragment including: Semi-rounded shape. Drilling with soap bubble: Basaltic pyroclastic rock	
764	80	△						Matrix is tuffaceous sand 2cm basaltic rock fragments Slightly weathered	
758	85	△							
754	90	△	Agglomerate	Gray	Slightly				
749	95	△							
744	100	△							
739	105	△						Basaltic pyroclastic rock	
734	110	△						GL-105 to 125m, amount of rock fragment is decrease	
729	115	△							
724	120	△							
719	125	△							
714	130	△							

Drilling No. 25 Village name: Orkejuoongishu (Arusha Region) Drilling Contractor: Maji Tech Engineering Ltd.  
 BH ID #: Coordinates: Long 36.30634E, Lat 2.82878S Altitude: 1,223m Date: 4 August 2007

Elevation (m)	Depth (GL-m)	Symbol	Lithology	Colour	Weathered	Water level (m)	Casing Program	Description	Natural Gamma count
1218	5	△	Pyroclastic sediment	Whitish red				1-3mm particle size sample 5mm basaltic rock fragment including Porous Drilling ratio is 7.5m/hour	0
1213	10	△		Dark brown					5
1208	15	△		Reddish brown					10
1203	20	△						Powdery cutting sample. 1 - 2cm angular shape rock fragments are found partly. Porous/hard GL-20m, Matrix part is become brown color clay material by weathering and oxidation.	15
1198	25	△	Tuff Brecca	Dark gray	Moderate				20
1193	30	△							25
1188	35	V						From 30m, soap drilling: Porous rock fragments sample Sample shows brownish color cause oxidation No returned water No cutting sample from GL-40m below	30
1183	40	V	Basalt (lava)	Reddish brown	Strongly				35
1178	45	V							40
1173	50	V						Drilling ratio is 10m/day	45

Drilling No. 27 Village name: Mirejei (Arusha Region) Drilling Contractor: Maji Tech Engineering Ltd.  
 BH ID #: Coordinates: Long 36.44655E, Lat 3.17237S Altitude: 1,333m

Drilling No. 28 Village name: Olmolog (Arusha Region) Drilling Contractor: Maji Tech Engineering Ltd.  
 BH ID #: Coordinates: Long 37.12249E, Lat 2.86338S Altitude: 1,675m

Date: 21 July 2007

Date: 12 September 2007

Elevation (m)	Depth (GL-m)	Symbol	Lithology	Colour	Weathered	Water level (m)	Casing Program	Description	Electrical Logging
1328	5	X	Top soil	Yellowish gray	X			Tuffaceous material	Not implemented due to Not enough Water Level
1323	10	V	Tuff	Whiteish gray	Strongly Moderate		Very easy to break by finger.		
1318	15	V					Basaltic lava		
1313	20	V		Brownish gray			Sandy cutting sample.		
1308	25	V					1.0 - 1.5cm rock fragments are found.		
1303	30	V	Basalt (Lava)				Angular shape.		
1298	35	V			Slightly		GL-15 to 20m, Infiltration clay is found.		
1293	40	V		Dark brown			Cooling fractured rock/ Clinker		
1288	45	V		Reddish brown			Drilling bit stacked at GL- 35m		
1283	50	V					Basaltic agglomerate		
1278	55	V			Slightly	No Water	0.5 - 1.0cm rock fragment sample. The fragment is porous and angular shape.		
1273	60	V					GL-50 to 60m, brown color clay by argillization are found partly.		
1268	65	V	Agglomerate	Dark gray	Moderate				
1263	70	V			Slightly		GL-65 to 70m, Sandy cutting sample (Medium particle size)		
1258	75	V			Moderate		GL-70m, brown color clay by argillization are found. 0.5cm angular shape rock fragment including		
1253	80	V					GL-75 to 85m, 0.5cm rock fragments sample		
1248	85	V		Dark brown					
1243	90	V			Slightly		0.3 - 0.5cm porous rock fragment sample		
1238	95	V		Dark blueish gray			No return of injected water		
1233	100	V				No Water			

Elevation (m)	Depth (GL-m)	Symbol	Lithology	Colour	Weathered	Water level (m)	Casing Program	Description	Electrical Logging
1670	5	X	Top soil	Dark brown	X			Clayey soil Lamina structure	Not implemented due to Not enough Water Level
1665	10	Δ		Dark brown	Strongly			The cutting sample is expressed as tuffaceous clay with gravel.	
1660	15	Δ	Tuff breccia	Dark gray				0.5 - 1.0cm basaltic rock fragment are found.	
1655	20	Δ		Brown	Moderate				
1650	25	Δ							
1645	30	▲		Dark gray	Slightly			Basaltic pyroclastic rock Matrix is tuffaceous clay 0.5 - 1.0cm porous rock fragments	
1640	35	▲							
1635	40	▲						Brown color clay by argillization are found partly.	
1630	45	▲							
1625	50	▲							
1620	55	▲							
1615	60	▲	Agglomerate						
1610	65	▲		Dark brown	Moderate			Matrix is tuffaceous sand. 0.5 - 1.0cm porous rock fragments Angular shape.	
1605	70	▲							
1600	75	▲							
1595	80	▲							
1590	85	▲						Fractured zone' GL-60 - 70m and GL-80 - 100m	
1585	90	▲							
1580	95	▲							
1575	100	▲				No Water			

Drilling No. 29 Village name: Uwiro (Arusha Region) Drilling Contractor: Maji Tech Engineering Ltd.  
 BH ID #:   
 Coordinates: Long 36.84932E, Lat 3.146085S Altitude: 1,436m

Drilling No. 30 Village name: Tingatinga (Arusha Region) Drilling Contractor: Maji Tech Engineering Ltd.  
 BH ID #:   
 Coordinates: Long 36.96155E, Lat 2.96533S Altitude: 1,223m

Elevation (m)	Depth (GL-m)	Symbol	Lithology	Colour	weathered	Water level (m)	Casing program	Description	Electrical Logging
1433	5		Fine Sand	Whitish brown				Rounded fine sand (Volcanic sand) surface casing(9inch) 4m	
1428	10	∧	Tuff	Yellowish brown	Strongly			Hard layer and soil layer are appeared alternatively.	
1423	15	▲						Porous rock fragment including / Volcanic glass is found. rock fragment is tuffaceous rock material.	
1418	20	▲		Dark gray / gray				First water strike GL- 80m	
1413	25	▲				25			
1408	30	▲							
1403	35	▲	Agglomerate		Slightly				
1398	40	▲		Dark gray				Rounded basaltic fragment including Second water strike GL-45m.	
1393	45	▲							
1388	50	▲							
1383	55	▲							
1378	60	∨						Sandy layer and tuffish layer are appeared alternatively.	
1373	65	∨	Tuff	Dark brown	Moderate			Lamina structure are found. Third water strike GL- 60m	
1368	70	∨						Unrounded medium sandy sample.	
1363	75	∨							
1358	80	△	Tuff breccia	Light gray	Moderate			Powdery cutting sample. Rounded basaltic rock fragments including	
1353	85	▲						0.2 to 0.5cm basaltic rock fragment sample. Porous rock	
1348	90	▲						Biotite and muscovite are found in cutting sample.	
1343	95	▲	Agglomerate	Dark gray	Slightly				
1338	100	▲							
1333	105	▲							

Elevation (m)	Depth (GL-m)	Symbol	Lithology	Colour	weathered	Water level (m)	Casing program	Description	Electrical Logging
1218	5	∨	Top soil	Light gray				Tuffaceous soil	
1213	10	∨						Basaltic pyroclastic rock	
1208	15	∨						Powdery cutting sample. 2.5 - 3.5cm scoria including	
1203	20	∨	Tuff	Gray to Dark gray	Moderate				
1199	25	∨							
1193	30	∨							
1188	35	∨							
1183	40	▲						Basaltic pyroclastic rock	
1178	45	▲		Dark gray	Slightly			Basaltic rock fragment sample	
1173	50	▲						Void of the rock fragment surface is bridged by brownish clay material	
1168	55	▲		Brown					
1163	60	▲						0.5cm basaltic rock fragment cutting sample. Angular shape	
1158	65	▲						The trace of oxidation is not found on rock surface	
1153	70	▲	Agglomerate						
1148	75	▲							
1143	80	▲		Dark gray	Slightly			Fractured Zone from GL-80m	
1138	85	▲							
1133	90	▲							
1128	95	▲							
1123	100	▲							
1118	105	▲						Basaltic pyroclastic rock	
1113	110	▲						0.2 - 0.5cm basaltic rock fragment cutting sample	
1108	115	▲		Dark brown	Moderate			Partly 2cm rounded rock fragments are found.	
1103	120	▲						The samples are porous. Pyroclastic material	
1098	125	▲							
1093	130	▲							



**Pumping Test Log**

The Study on the Groundwater Resources Development and Management  
in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Step	1 & 2	Test Team	MAITECH ENGINEERING Ltd.			
Borehole No.	TD-2			District	Dodoma Rural			
Coordinate	Longitude Latitude Altitude		35.62646 -5.65423	Division	Munoemu			
Static Water Level (m)			29.39	Ward	Babayu			
				Village	Kongogo			
Static Water level shall be measured before first step testing.								
Time (min)	Date	Time (hrs min)	Water level (m)	Yield (L/hour)	Time (hrs min)	Water level (m)	Yield (L/hour)	
0.5	2007/1/12		29.56	6000	0.5	2007/1/12	31.75	12000
1			29.61	6000	1		31.78	12000
1.5			29.76	6000	1.5		31.79	12000
2			29.89	6000	2		31.80	12000
2.5			30.01	6000	2.5		31.81	12000
3			30.15	6000	3		31.82	12000
3.5			30.25	6000	3.5		31.83	12000
4			30.32	6000	4		31.84	12000
4.5			30.36	6000	4.5		31.85	12000
5			30.38	6000	5		31.86	12000
6			30.41	6000	6		31.87	12000
7			30.45	6000	7		31.88	12000
8			30.47	6000	8		31.89	12000
9			30.48	6000	9		32.00	12000
10			30.48	6000	10		32.12	12000
12			30.50	6000	12		32.13	12000
14			30.51	6000	14		32.14	12000
16			30.52	6000	16		32.15	12000
18			30.53	6000	18		32.16	12000
20			30.54	6000	20		32.17	12000
23			30.54	6000	23		32.18	12000
26			30.55	6000	26		32.20	12000
30			30.55	6000	30		32.21	12000
35			30.56	6000	35		32.22	12000
40			30.57	6000	40		32.23	12000
45			30.57	6000	45		32.24	12000
50			30.58	6000	50		32.25	12000
55			30.59	6000	55		32.26	12000
60			30.59	6000	60		32.27	12000
70			30.59	6000	70		32.27	12000
80			30.60	6000	80		32.28	12000
90			30.60	6000	90		32.28	12000
100			30.60	6000	100		32.29	12000
110			30.61	6000	110		32.29	12000
120			30.61	6000	120		32.30	12000

**Pumping Test Log**

The Study on the Groundwater Resources Development and Management  
in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Step	3 & 4	Test Team	MAITECH ENGINEERING Ltd.			
Borehole No.	TD-2			District	Dodoma Rural			
Coordinate	Longitude Latitude Altitude		35.62646 -5.65423	Division	Munoemu			
Static Water Level (m)			29.39	Ward	Babayu			
				Village	Kongogo			
Static Water level shall be measured before first step testing.								
Time (min)	Date	Time (hrs min)	Water level (m)	Yield (L/hour)	Time (hrs min)	Water level (m)	Yield (L/hour)	
0.5	2007/1/12		32.40	18000	0.5	2007/1/12	34.2	24000
1			32.49	18000	1		34.37	24000
1.5			32.53	18000	1.5		34.58	24000
2			32.58	18000	2		34.67	24000
2.5			23.63	18000	2.5		34.75	24000
3			32.67	18000	3		34.83	24000
3.5			32.71	18000	3.5		34.89	24000
4			32.75	18000	4		34.94	24000
4.5			32.79	18000	4.5		34.96	24000
5			32.83	18000	5		34.97	24000
6			32.87	18000	6		34.98	24000
7			32.89	18000	7		34.99	24000
8			32.92	18000	8		35.11	24000
9			32.95	18000	9		35.22	24000
10			32.98	18000	10		35.33	24000
12			33.13	18000	12		35.45	24000
14			33.26	18000	14		35.57	24000
16			33.47	18000	16		35.69	24000
18			33.58	18000	18		35.71	24000
20			33.61	18000	20		35.79	24000
23			33.65	18000	23		35.86	24000
26			33.68	18000	26		35.89	24000
30			33.70	18000	30		35.98	24000
35			33.75	18000	35		36.03	24000
40			33.76	18000	40		36.08	24000
45			33.77	18000	45		36.13	24000
50			33.78	18000	50		36.17	24000
55			33.79	18000	55		36.21	24000
60			33.80	18000	60		36.24	24000
70			33.84	18000	70		36.26	24000
80			33.86	18000	80		36.26	24000
90			33.87	18000	90		36.27	24000
100			33.88	18000	100		36.28	24000
110			33.89	18000	110		36.29	24000
120			33.90	18000	120		36.30	24000

**Pumping Test Log**

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Step	Test Team		MAJITECH ENGINEERING Ltd.	
Borehole No.	TD-2		District	Dodoma Rural		
			Division	Munoemu		
Coordinate			Ward	Babayu		
			Village	Kongogo		
Static Water Level (m) 29.39						
Static Water level shall be measured before first step testing.						
Time (min)	Date	Time (min)	Time (hrs min)	Water level (m)	Yield (L/hour)	Time (min)
0.5	2007/1/12	36.55		36.55	28000	
1		36.70		36.70	28000	
1.5		36.84		36.84	28000	
2		36.97		36.97	28000	
2.5		37.09		37.09	28000	
3		37.21		37.21	28000	
3.5		37.33		37.33	28000	
4		37.45		37.45	28000	
4.5		37.56		37.56	28000	
5		37.68		37.68	28000	
6		37.80		37.80	28000	
7		37.92		37.92	28000	
8		39.01		39.01	28000	
9		38.13		38.13	28000	
10		38.28		38.28	28000	
12		38.43		38.43	28000	
14		38.68		38.68	28000	
16		38.94		38.94	28000	
18		39.24		39.24	28000	
20		39.44		39.44	28000	
23		39.72		39.72	28000	
26		39.90		39.90	28000	
30		40.04		40.04	28000	
35		40.16		40.16	28000	
40		40.18		40.18	28000	
45		40.23		40.23	28000	
50		40.24		40.24	28000	
55		40.25		40.25	28000	
60		40.26		40.26	28000	
70		40.26		40.26	28000	
80		40.28		40.28	28000	
90		40.28		40.28	28000	
100		40.28		40.28	28000	
110		40.29		40.29	28000	
120		40.30		40.30	28000	

**Pumping Test Log**

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Constant rate	Recovery	Test Team		MAJITECH ENGINEERING Ltd.	
Borehole No.	TD-2			District	Dodoma Rural		
				Division	Munoemu		
Coordinate				Ward	Babayu		
				Village	Kongogo		
Static Water Level (m) 29.39							
Static Water level shall be measured before first step testing.							
Time (min)	Date	Time (hrs min)	Time (min)	Water level (m)	Yield (L/hour)	Time (hrs min)	Water level (m)
0.5	2007/1/13	31.04		31.04	23,000	220	35.88
1		32.18		32.18	23,000	240	35.90
1.5		32.80		32.80	23,000	280	35.94
2		33.21		33.21	23,000	320	35.98
2.5		33.51		33.51	23,000	360	36.14
3		33.75		33.75	23,000	420	37.42
3.5		33.90		33.90	23,000	480	37.49
4		34.05		34.05	23,000	540	37.56
4.5		34.17		34.17	23,000	600	37.60
5		34.25		34.25	23,000	660	37.65
6		34.40		34.40	23,000	720	37.66
7		34.52		34.52	23,000	840	37.68
8		34.63		34.63	23,000	960	37.69
9		34.72		34.72	23,000	1080	37.72
10		34.78		34.78	23,000	1200	37.73
12		34.88		34.88	23,000	1320	37.75
14		34.97		34.97	23,000	1440	37.77
16		35.04		35.04	23,000	1560	37.79
18		35.11		35.11	23,000	1680	37.80
20		35.16		35.16	23,000	1800	37.82
23		35.22		35.22	23,000	1920	37.84
26		35.28		35.28	23,000	2040	37.85
30		35.35		35.35	23,000	2160	37.85
35		35.41		35.41	23,000	2280	37.85
40		35.46		35.46	23,000	2400	37.85
45		35.52		35.52	23,000	2520	37.86
50		35.56		35.56	23,000	2640	37.86
55		35.60		35.60	23,000	2760	37.87
60		35.63		35.63	23,000	2880	37.87
70		35.65		35.65	23,000		
80		35.72		35.72	23,000		
90		35.72		35.72	23,000		
100		35.73		35.73	23,000		
110		35.75		35.75	23,000		
120		35.77		35.77	23,000		
140		35.81		35.81	23,000		
160		35.84		35.84	23,000		
180		35.86		35.86	23,000		
200		35.87		35.87	23,000		

### Pumping Test Log

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Constant-rate		Recovery		Test Team		MAJITECH ENGINEERING Ltd.		
Borehole No.	TD-2	District	Dodoma Rural	Division	Muroerut	Ward	Babayu	Village	Kongogo	
Coordinate	Longitude Latitude Altitude	35.62646 -5.65423 29.39								
Static Water Level (m)		29.39								
Static Water level shall be measured before first step testing.										
Time (min)	Date	Time (min)	Time (hrs:min)	Water level (m)	Yield (L/hour)	Time (min)	Date	Time (hrs:min)	Water level (m)	Yield (L/hour)
0.5	2007/1/15	220		34.27		220			29.41	
1		240		32.81		240			29.41	
1.5		280		32.10		280			29.41	
2		320		31.00		320			29.41	
2.5		360		31.06		360			29.41	
3		420		30.78		420			29.41	
3.5		480		30.62		480			29.40	
4		540		30.46		540			29.40	
4.5		600		30.31		600			29.40	
5		660		30.22		660			29.39	
6		720		30.08		720			29.39	
7		840		30.00		840				
8		960		29.93		960				
9		1080		29.87		1080				
10		1200		29.82		1200				
12		1320		29.78		1320				
14		1440		29.74		1440				
16		1560		29.70		1560				
18		1680		29.69		1680				
20		1800		29.67		1800				
23		1920		29.60		1920				
26		2040		29.62		2040				
30		2160		29.60		2160				
35		2280		29.57		2280				
40		2400		29.55		2400				
45		2520		29.30		2520				
50		2640		29.52		2640				
55		2760		29.51		2760				
60		2880		29.50		2880				
70				29.49						
80				29.48						
90				29.46						
100				29.45						
110				29.44						
120				29.44						
140				29.43						
160				29.42						
180				29.41						
200				29.41						

### Pumping Test Log

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Step		I & 2		Test Team		MAJITECH ENGINEERING Ltd.		
Borehole No.	TD-3	District	Kombwa	Division	Farkwa	Ward	Farkwa	Village	Buburiole	
Coordinate	Longitude Latitude Altitude	35.5538 -5.31306 28.4								
Static Water Level (m)		28.4								
Static Water level shall be measured before first step testing.										
Time (min)	Date	Time (min)	Time (hrs:min)	Water level (m)	Yield (L/hour)	Time (min)	Date	Time (hrs:min)	Water level (m)	Yield (L/hour)
0.5	#####	2812		28.38		2812			35.20	3000
1		2812		30.00		2812			35.24	3000
1.5		2812		30.63		2812			35.25	3000
2		2812		31.00		2812			35.26	3000
2.5		2812		31.30		2812			35.29	3000
3		2812		31.58		2812			35.30	3000
3.5		2812		31.78		2812			35.33	3000
4		2812		31.97		2812			35.35	3000
4.5		2812		32.17		2812			35.38	3000
5		2812		32.35		2812			35.48	3000
6		2812		32.50		2812			35.46	3000
7		2812		32.74		2812			35.51	3000
8		2812		32.93		2812			35.59	3000
9		2812		33.17		2812			35.63	3000
10		2812		33.26		2812			35.69	3000
12		2812		33.41		2812			35.74	3000
14		2812		33.62		2812			35.79	3000
16		2812		33.80		2812			35.81	3000
18		2812		33.92		2812			35.84	3000
20		2812		34.02		2812			35.88	3000
23		2812		34.08		2812			35.92	3000
26		2812		34.18		2812			35.98	3000
30		2812		34.26		2812			36.00	3000
35		2812		34.33		2812			36.04	3000
40		2812		34.48		2812			36.07	3000
45		2812		34.61		2812			36.12	3000
50		2812		34.72		2812			36.15	3000
55		2812		34.75		2812			36.18	3000
60		2812		34.83		2812			36.22	3000
70		2812		34.88		2812			36.24	3000
80		2812		34.95		2812			36.33	3000
90		2812		35.02		2812			36.39	3000
100		2812		35.08		2812			36.44	3000
110		2812		35.14		2812			36.50	3000
120		2812		35.20		2812			36.55	3000

### Pumping Test Log

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Step	3 & 4		Test Team		MAJITECH ENGINEERING Ltd.	
Borehole No.		TD-3			Kondoa			
Coordinate		Longitude Latitude Altitude	35.5538 -5.31306		Parkwa			
Static Water Level (m)			28.4		Bubutole			
Static Water level shall be measured before first step testing.								
Time (min)	Date	Time (hrs min)	Water level (m)	Yield (L/hour)	Time (hrs min)	Date	Water level (m)	Yield (L/hour)
0.5	#####		36.56	3600	0.5	#####	44.58	4000
1			36.51	3600	1		44.62	4000
1.5			36.59	3600	1.5		44.65	4000
2			36.61	3600	2		44.67	4000
2.5			36.64	3600	2.5		44.71	4000
3			36.66	3600	3		44.73	4000
3.5			36.69	3600	3.5		44.76	4000
4			36.71	3600	4		44.80	4000
4.5			36.74	3600	4.5		44.83	4000
5			36.77	3600	5		44.86	4000
6			36.83	3600	6		44.95	4000
7			36.90	3600	7		44.99	4000
8			36.94	3600	8		45.06	4000
9			36.94	3600	9		45.13	4000
10			37.02	3600	10		45.18	4000
12			37.12	3600	12		45.32	4000
14			37.16	3600	14		45.45	4000
16			37.20	3600	16		45.58	4000
18			37.25	3600	18		45.71	4000
20			37.30	3600	20		45.84	4000
23			37.29	3600	23		46.03	4000
26			37.31	3600	26		46.23	4000
30			37.34	3600	30		46.38	4000
35			37.38	3600	35		46.57	4000
40			37.41	3600	40		46.78	4000
45			37.45	3600	45		46.95	4000
50			37.51	3600	50		47.08	4000
55			37.61	3600	55		47.34	4000
60			37.66	3600	60		47.49	4000
70			37.77	3600	70		47.75	4000
80			37.82	3600	80		47.91	4000
90			37.85	3600	90		48.10	4000
100			37.88	3600	100		48.41	4000
110			37.92	3600	110		48.53	4000
120			37.95	3600	120		48.72	4000

### Pumping Test Log

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Test method		Step	5		Test Team		MAJITECH ENGINEERING Ltd.	
Borehole No.		TD-3			Kondoa			
Coordinate		Longitude Latitude Altitude	35.5538 -5.31306		Parkwa			
Static Water Level (m)			28.4		Bubutole			
Static Water level shall be measured before first step testing.								
Time (min)	Date	Time (hrs min)	Water level (m)	Yield (L/hour)	Time (hrs min)	Date	Water level (m)	Yield (L/hour)
0.5	#####		48.73	4500	0.5			
1			48.74	4500	1			
1.5			48.75	4500	1.5			
2			48.76	4500	2			
2.5			48.77	4500	2.5			
3			48.78	4500	3			
3.5			48.79	4500	3.5			
4			48.80	4500	4			
4.5			48.81	4500	4.5			
5			48.82	4500	5			
6			48.82	4500	6			
7			48.83	4500	7			
8			48.84	4500	8			
9			48.85	4500	9			
10			48.86	4500	10			
12			48.86	4500	12			
14			48.86	4500	14			
16			49.30	4500	16			
18			50.05	4500	18			
20			51.81	4500	20			
23			52.28	4500	23			
26			52.88	4500	26			
30			53.31	4500	30			
35			53.58	4500	35			
40			53.90	4500	40			
45			54.43	4500	45			
50			54.83	4500	50			
55			54.67	4500	55			
60			54.25	4500	60			
70			53.46	4500	70			
80			52.92	4500	80			
90			52.86	4500	90			
100			52.28	4500	100			
110			54.46	4500	110			
120			55.20	4500	120			

**Pumping Test Log**

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

<b>Test method</b>		<b>Constant rate</b>		<b>Recovery</b>		<b>Test Team</b>		<b>MAJITECH ENGINEERING Ltd.</b>	
Borehole No. TD-3		District Kondoa		Division Farkwa		District Kondoa		Division Farkwa	
Coordinate		Longitude 35.5538		Latitude -5.31306		Ward Farkwa		Bubunole	
Static Water Level (m)		28.4		35.5538		-5.31306		35.5538	

Time (min)	Date	Time		Yield (L/hour)	Water level (m)	Time		Yield (L/hour)
		hrs	min			hrs	min	
0.5	###/###/###			3,600	41.60			3,600
1				3,600	41.72			3,600
1.5				3,600	41.90			3,600
2				3,600	42.06			3,600
2.5				3,600	44.72			3,600
3				3,600	45.40			3,600
3.5				3,600	45.88			3,600
4				3,600	46.11			3,600
4.5				3,600	46.33			3,600
5				3,600	46.62			3,600
6				3,600	46.83			3,600
7				3,600	46.97			3,600
8				3,600	47.07			3,600
9				3,600	47.33			3,600
10				3,600	47.53			3,600
12				3,600	47.65			3,600
14				3,600	47.79			3,600
16				3,600	47.81			3,600
18				3,600	48.13			3,600
20				3,600	48.69			3,600
23				3,600	51.07			3,600
26				3,600	51.55			3,600
30				3,600	51.75			3,600
35				3,600	51.93			3,600
40				3,600	52.28			3,600
45				3,600	52.46			3,600
50				3,600	52.60			3,600
55				3,600	52.75			3,600
60				3,600	52.86			3,600
70				3,600				
80				3,600				
90				3,600				
100				3,600				
110				3,600				
120				3,600				
140				3,600				
160				3,600				
180				3,600				
200				3,600				

**Pumping Test Log**

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

<b>Test method</b>		<b>Constant rate</b>		<b>Recovery</b>		<b>Test Team</b>		<b>MAJITECH ENGINEERING Ltd.</b>	
Borehole No. TD-3		District Kondoa		Division Farkwa		District Kondoa		Division Farkwa	
Coordinate		Longitude 35.5538		Latitude -5.31306		Ward Farkwa		Bubunole	
Static Water Level (m)		28.4		35.5538		-5.31306		35.5538	

Time (min)	Date	Time		Yield	Water level (m)	Time		Yield
		hrs	min			hrs	min	
0.5	2007/1/15			48.16	30.26			
1				46.55	30.18			
1.5				44.55	30.07			
2				43.25	29.87			
2.5				42.52	29.81			
3				41.85	29.67			
3.5				41.15	29.53			
4				40.50	29.39			
4.5				39.95	29.32			
5				39.41	29.20			
6				38.37	29.11			
7				37.55	29.04			
8				36.70				
9				36.05				
10				35.45				
12				34.57				
14				33.98				
16				33.57				
18				33.27				
20				33.03				
23				32.73				
26				32.48				
30				32.01				
35				31.87				
40				31.73				
45				31.59				
50				31.50				
55				31.37				
60				31.37				
70				31.27				
80				31.17				
90				31.03				
100				30.95				
110				30.90				
120				30.81				
140				30.67				
160				30.35				
180				30.45				
200				30.35				

**Pumping Test Log**

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Step		1 & 2		3 & 4		Test Team		MAJITECH ENGINEERING Ltd.	
Borehole No.		TD-4		District		Kondoa		Pahi			
Coordinate		Longitude Latitude		35.87 -4.88863		Division		Kalamba			
Static Water Level (m)		Altitude		9.22		Ward		Loo			
Static Water level shall be measured before first step testing.											
Time (min)	Date	Time hrs	min	Water level (m)	Yield (L/hour)	Time hrs	min	Water level (m)	Yield (L/hour)	Time (min)	Date
0.5	2007/9/26			9.77	2000			13.23	4000	0.5	2007/9/26
1				9.94	2000			13.23	4000	1	
1.5				10.07	2000			13.24	4000	1.5	
2				10.25	2000			13.2	4000	2	
2.5				10.44	2000			13.26	4000	2.5	
3				10.6	2000			13.27	4000	3	
3.5				10.83	2000			13.28	4000	3.5	
4				10.96	2000			13.3	4000	4	
4.5				11.1	2000			13.31	4000	4.5	
5				11.19	2000			13.31	4000	5	
6				11.32	2000			13.32	4000	6	
7				11.43	2000			13.33	4000	7	
8				11.67	2000			13.34	4000	8	
9				11.85	2000			13.35	4000	9	
10				12.03	2000			13.36	4000	10	
12				12.21	2000			13.37	4000	12	
14				12.36	2000			13.38	4000	14	
16				12.43	2000			13.39	4000	16	
18				12.55	2000			13.41	4000	18	
20				12.62	2000			13.42	4000	20	
23				12.7	2000			13.44	4000	23	
26				12.84	2000			13.45	4000	26	
30				12.91	2000			13.47	4000	30	
35				12.97	2000			13.48	4000	35	
40				13.05	2000			13.51	4000	40	
45				13.09	2000			13.53	4000	45	
50				13.12	2000			13.55	4000	50	
55				13.15	2000			13.57	4000	55	
60				13.17	2000			13.62	4000	60	
70				13.19	2000			13.66	4000	70	
80				13.2	2000			13.68	4000	80	
90				13.21	2000			13.69	4000	90	
100				13.22	2000			13.7	4000	100	
110				13.22	2000			13.71	4000	110	
120				13.22	2000			13.72	4000	120	

**Pumping Test Log**

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Step		3 & 4		Test Team		MAJITECH ENGINEERING Ltd.			
Borehole No.		TD-4		District		Kondoa		Pahi			
Coordinate		Longitude Latitude		35.87 -4.88863		Division		Kalamba			
Static Water Level (m)		Altitude		9.22		Ward		Loo			
Static Water level shall be measured before first step testing.											
Time (min)	Date	Time hrs	min	Water level (m)	Yield (L/hour)	Time (min)	Date	Time hrs	min	Water level (m)	Yield (L/hour)
0.5	2007/9/26			13.74	6000	0.5	2007/9/26			14.33	8000
1				13.75	6000	1				14.38	8000
1.5				13.77	6000	1.5				14.41	8000
2				13.78	6000	2				14.45	8000
2.5				13.79	6000	2.5				14.52	8000
3				13.81	6000	3				14.58	8000
3.5				13.82	6000	3.5				14.64	8000
4				13.82	6000	4				14.71	8000
4.5				13.83	6000	4.5				14.79	8000
5				13.84	6000	5				14.85	8000
6				13.85	6000	6				14.93	8000
7				13.87	6000	7				15	8000
8				13.88	6000	8				15.09	8000
9				13.89	6000	9				15.19	8000
10				13.91	6000	10				15.28	8000
12				13.92	6000	12				15.37	8000
14				13.93	6000	14				15.49	8000
16				13.94	6000	16				15.6	8000
18				13.95	6000	18				15.72	8000
20				13.96	6000	20				15.81	8000
23				13.97	6000	23				15.94	8000
26				13.98	6000	26				16.1	8000
30				13.99	6000	30				16.22	8000
35				14.02	6000	35				16.35	8000
40				14.05	6000	40				16.44	8000
45				14.07	6000	45				16.52	8000
50				14.08	6000	50				16.61	8000
55				14.1	6000	55				16.7	8000
60				14.13	6000	60				16.75	8000
70				14.15	6000	70				16.83	8000
80				14.16	6000	80				16.87	8000
90				14.18	6000	90				16.89	8000
100				14.2	6000	100				16.9	8000
110				14.21	6000	110				16.92	8000
120				14.22	6000	120				16.93	8000

### Pumping Test Log

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Step	5	Test Team		MAJITECH ENGINEERING Ltd.	
Borehole No.		TD-4		District	Kondoa		
Coordinate		Longitude Latitude Altitude	35.87 -4.88863 9.22	Division	Pahi		
Static Water Level (m)				Ward	Kalamba		
				Village	Loo		
Static Water level shall be measured before first step testing.							
Time (min)	Date	Time (hrs min)	Water level (m)	Yield (L/hour)	Time (hrs min)	Water level (m)	Yield (L/hour)
0.5	2007/9/26		16.98	10000	0.5		
1			17.15	10000	1		
1.5			17.28	10000	1.5		
2			17.39	10000	2		
2.5			17.53	10000	2.5		
3			17.6	10000	3		
3.5			17.66	10000	3.5		
4			17.71	10000	4		
4.5			17.78	10000	4.5		
5			17.85	10000	5		
6			17.91	10000	6		
7			17.98	10000	7		
8			18.05	10000	8		
9			18.1	10000	9		
10			18.14	10000	10		
12			18.19	10000	12		
14			18.22	10000	14		
16			18.26	10000	16		
18			18.29	10000	18		
20			18.32	10000	20		
23			18.34	10000	23		
26			18.37	10000	26		
30			18.39	10000	30		
35			18.41	10000	35		
40			18.43	10000	40		
45			18.46	10000	45		
50			18.49	10000	50		
55			18.51	10000	55		
60			18.53	10000	60		
70			18.54	10000	70		
80			18.56	10000	80		
90			18.57	10000	90		
100			18.59	10000	100		
110			18.61	10000	110		
120			18.65	10000	120		

### Pumping Test Log

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Constant rate	Recovery	Test Team		MAJITECH ENGINEERING Ltd.	
Borehole No.		TD-4		District	Kondoa		
Coordinate		Longitude Latitude Altitude	35.87 -4.88863 9.22	Division	Pahi		
Static Water Level (m)				Ward	Kalamba		
				Village	Loo		
Static Water level shall be measured before first step testing.							
Time (min)	Date	Time (hrs min)	Water level (m)	Yield (L/hour)	Time (hrs min)	Water level (m)	Yield (L/hour)
0.5	2007/9/27		9.96	4000	220	2007/9/27	4000
1			10.17	4000	240		4000
1.5			10.3	4000	280		4000
2			10.49	4000	320		4000
2.5			10.69	4000	360		4000
3			10.75	4000	420		4000
3.5			10.92	4000	480		4000
4			11.08	4000	540		4000
4.5			11.34	4000	600		4000
5			11.48	4000	660		4000
6			11.73	4000	720		4000
7			11.96	4000	840		4000
8			12.18	4000	960		4000
9			12.34	4000	1080		4000
10			12.55	4000	1200		4000
12			12.7	4000	1320		4000
14			12.87	4000	1440		4000
16			12.99	4000	1560		4000
18			13.18	4000	1680		4000
20			13.27	4000	1800		4000
23			13.35	4000	1920		4000
26			13.42	4000	2040		4000
30			13.48	4000	2160		4000
35			13.53	4000	2280		4000
40			13.57	4000	2400		4000
45			13.59	4000	2520		4000
50			13.61	4000	2640		4000
55			13.62	4000	2760		4000
60			13.63	4000	2880		4000
70			13.64	4000			
80			13.66	4000			
90			13.7	4000			
100			13.68	4000			
110			13.7	4000			
120			13.71	4000			
140			13.71	4000			
160			13.72	4000			
180			13.75	4000			
200			13.77	4000			

### Pumping Test Log

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Constant-rate Recovery		Test Team		MAJITECH ENGINEERING Ltd.			
Borehole No.	TD-4	District	Kondoa						
Coordinate	Longitude Latitude Altitude	Division	Pahi						
Static Water Level (m)	9.22	Ward	Kalamba						
		Village	Loo						
Static Water level shall be measured before first step testing.									
Time (min)	Date	Time (hrs min)	Water level (m)	Yield	Time (min)	Date	Time (hrs min)	Water level (m)	Yield
0.5	2007/9/28		13.62		220				
1			13.29		240				
1.5			13		280				
2			12.84		320				
2.5			12.5		360				
3			12.25		420				
3.5			12.12		480				
4			11.93		540				
4.5			11.75		600				
5			11.58		660				
6			11.3		720				
8			10.87		840				
9			10.55		960				
10			10.38		1080				
12			10.13		1200				
14			9.84		1320				
16			9.6		1440				
18			9.48		1560				
20			9.4		1680				
23			9.34		1800				
26			9.28		1920				
30			9.24		2040				
35			9.18		2160				
40			9.12		2280				
45			9.1		2400				
50			9.09		2520				
55			9.04		2640				
60			9.02		2760				
70			9		2880				
80			8.97						
90			8.93						
100			8.91						
110			8.89						
120			8.88						
140			8.87						
160			8.85						
180			8.84						
200			8.84						

### Pumping Test Log

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Step		Test Team		MAJITECH ENGINEERING Ltd.			
Borehole No.	TD-5	District	Dodoma Rural						
Coordinate	Longitude Latitude Altitude	Division	Chipalanga						
Static Water Level (m)	17.35	Ward	Mpalanga						
		Village	Nholi						
Static Water level shall be measured before first step testing.									
Time (min)	Date	Time (hrs min)	Water level (m)	Yield (L/hour)	Time (min)	Date	Time (hrs min)	Water level (m)	Yield (L/hour)
0.5	2007/9/22		41.87	5000	0.5	2007/9/22		42.67	10000
1			42.07	5000	1			42.69	10000
1.5			42.17	5000	1.5			42.7	10000
2			42.24	5000	2			42.71	10000
2.5			42.3	5000	2.5			42.72	10000
3			42.33	5000	3			42.73	10000
3.5			42.35	5000	3.5			42.74	10000
4			42.36	5000	4			42.75	10000
4.5			42.37	5000	4.5			42.76	10000
5			42.38	5000	5			42.77	10000
6			42.39	5000	6			42.78	10000
7			42.39	5000	7			42.79	10000
8			42.4	5000	8			42.79	10000
9			42.4	5000	9			42.79	10000
10			42.4	5000	10			42.8	10000
12			42.4	5000	12			42.8	10000
14			42.4	5000	14			42.8	10000
16			42.4	5000	16			42.8	10000
18			42.4	5000	18			42.81	10000
20			42.41	5000	20			42.81	10000
23			42.41	5000	23			42.82	10000
26			42.42	5000	26			42.82	10000
30			42.42	5000	30			42.82	10000
35			42.42	5000	35			42.83	10000
40			42.42	5000	40			42.83	10000
45			42.43	5000	45			42.83	10000
50			42.43	5000	50			42.83	10000
55			42.43	5000	55			42.83	10000
60			42.43	5000	60			42.83	10000
70			42.43	5000	70			42.83	10000
80			42.43	5000	80			42.83	10000
90			42.43	5000	90			42.83	10000
100			42.43	5000	100			42.83	10000
110			42.43	5000	110			42.83	10000
120			42.43	5000	120			42.83	10000



### Pumping Test Log

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Step	3 & 4		Test Team		MAJITECH ENGINEERING Ltd.		
Borehole No. TD-5			District Dodoma Rural		Division Chipalanga				
Coordinate			Longitude 35.47181		Latitude -6.34712				
Static Water Level (m)			Ward Mpalanga		Village Nholi				
			Static Water level shall be measured before first step testing.		Altitude 17.35				
Time (min)	Date	Time (hrs min)	Water level (m)	Yield (L/hour)	Time (min)	Date	Time (hrs min)	Water level (m)	Yield (L/hour)
0.5	2007/9/22	0.5	43.1	15000	0.5	2007/9/22	43.98	20000	20000
1		1	43.12	15000	1		44.1	20000	20000
1.5		1.5	43.14	15000	1.5		44.15	20000	20000
2		2	43.15	15000	2		44.19	20000	20000
2.5		2.5	43.16	15000	2.5		44.23	20000	20000
3		3	43.17	15000	3		44.28	20000	20000
3.5		3.5	43.18	15000	3.5		44.32	20000	20000
4		4	43.19	15000	4		44.36	20000	20000
4.5		4.5	43.2	15000	4.5		44.39	20000	20000
5		5	43.21	15000	5		44.42	20000	20000
6		6	43.22	15000	6		44.43	20000	20000
7		7	43.23	15000	7		44.45	20000	20000
8		8	43.24	15000	8		44.46	20000	20000
9		9	43.25	15000	9		44.46	20000	20000
10		10	43.26	15000	10		44.47	20000	20000
12		12	43.27	15000	12		44.47	20000	20000
14		14	43.28	15000	14		44.48	20000	20000
16		16	43.29	15000	16		44.49	20000	20000
18		18	43.3	15000	18		44.5	20000	20000
20		20	43.31	15000	20		44.51	20000	20000
23		23	43.32	15000	23		44.52	20000	20000
26		26	43.33	15000	26		44.53	20000	20000
30		30	43.34	15000	30		44.54	20000	20000
35		35	43.35	15000	35		44.55	20000	20000
40		40	43.35	15000	40		44.56	20000	20000
45		45	43.35	15000	45		44.57	20000	20000
50		50	43.36	15000	50		44.58	20000	20000
55		55	43.36	15000	55		44.59	20000	20000
60		60	43.36	15000	60		44.6	20000	20000
70		70	43.37	15000	70		44.61	20000	20000
80		80	43.37	15000	80		44.61	20000	20000
90		90	43.38	15000	90		44.62	20000	20000
100		100	43.38	15000	100		44.62	20000	20000
110		110	43.38	15000	110		44.63	20000	20000
120		120	43.38	15000	120		44.63	20000	20000

### Pumping Test Log

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Step	5		Test Team		MAJITECH ENGINEERING Ltd.		
Borehole No. TD-5			District Dodoma Rural		Division Chipalanga				
Coordinate			Longitude 35.47181		Latitude -6.34712				
Static Water Level (m)			Ward Mpalanga		Village Nholi				
			Static Water level shall be measured before first step testing.		Altitude 17.35				
Time (min)	Date	Time (hrs min)	Water level (m)	Yield (L/hour)	Time (min)	Date	Time (hrs min)	Water level (m)	Yield (L/hour)
0.5	2007/9/22	0.5	44.9	25000	0.5				
1		1	45.05	25000	1				
1.5		1.5	45.18	25000	1.5				
2		2	45.23	25000	2				
2.5		2.5	45.31	25000	2.5				
3		3	45.39	25000	3				
3.5		3.5	45.43	25000	3.5				
4		4	45.45	25000	4				
4.5		4.5	45.48	25000	4.5				
5		5	45.53	25000	5				
6		6	45.56	25000	6				
7		7	45.57	25000	7				
8		8	45.58	25000	8				
9		9	45.61	25000	9				
10		10	45.63	25000	10				
12		12	45.65	25000	12				
14		14	45.67	25000	14				
16		16	45.68	25000	16				
18		18	45.69	25000	18				
20		20	45.7	25000	20				
23		23	45.71	25000	23				
26		26	45.72	25000	26				
30		30	45.73	25000	30				
35		35	45.74	25000	35				
40		40	45.75	25000	40				
45		45	45.76	25000	45				
50		50	45.77	25000	50				
55		55	45.78	25000	55				
60		60	45.79	25000	60				
70		70	45.8	25000	70				
80		80	45.81	25000	80				
90		90	45.82	25000	90				
100		100	45.83	25000	100				
110		110	45.84	25000	110				
120		120	45.85	25000	120				

### Pumping Test Log

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Constant rate		Recovery		Test Team	
Borehole No.	TD-5	District Dodoma Rural Chipalanga		District Dodoma Rural Chipalanga		MAJITECH ENGINEERING Ltd.	
Coordinate	Longitude Latitude Altitude	35.47181 -6.34712		35.47181 -6.34712			
Static Water Level (m) 17.35							
Time (min)	Date	Time (hrs:min)	Water level (m)	Yield (L/hour)	Time (hrs:min)	Water level (m)	Yield (L/hour)
0.5	2007/9/23	41:99	41.99	15,000	220	2007/9/24	15,000
1		42:18	42.18	15,000	240		15,000
1.5		42:3	42.3	15,000	280		15,000
2		42:43	42.43	15,000	320		15,000
2.5		42:47	42.47	15,000	360		15,000
3		42:54	42.54	15,000	420		15,000
3.5		42:59	42.59	15,000	480		15,000
4		42:66	42.66	15,000	540		15,000
4.5		42:74	42.74	15,000	600		15,000
5		42:81	42.81	15,000	660		15,000
6		42:89	42.89	15,000	720		15,000
7		42:98	42.98	15,000	840		15,000
8		43:07	43.07	15,000	960		15,000
9		43:11	43.11	15,000	1080		15,000
10		43:13	43.13	15,000	1200		15,000
12		43:16	43.16	15,000	1320		15,000
14		43:18	43.18	15,000	1440		15,000
16		43:21	43.21	15,000	1560		15,000
18		43:23	43.23	15,000	1680		15,000
20		43:25	43.25	15,000	1800		15,000
23		43:26	43.26	15,000	1920		15,000
26		43:27	43.27	15,000	2040		15,000
30		43:28	43.28	15,000	2160		15,000
35		43:29	43.29	15,000	2280		15,000
40		43:31	43.31	15,000	2400		15,000
45		43:32	43.32	15,000	2520		15,000
50		43:33	43.33	15,000	2640		15,000
55		43:34	43.34	15,000	2760		15,000
60		43:35	43.35	15,000	2880		15,000
70		43:37	43.37	15,000			
80		43:38	43.38	15,000			
90		43:39	43.39	15,000			
100		43:4	43.4	15,000			
110		43:41	43.41	15,000			
120		43:42	43.42	15,000			
140		43:44	43.44	15,000			
160		43:46	43.46	15,000			
180		43:48	43.48	15,000			
200		43:49	43.49	15,000			

### Pumping Test Log

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Test method		Constant rate		Recovery		Test Team			
Borehole No.	TD-5	District Dodoma Rural Chipalanga		District Dodoma Rural Chipalanga		MAJITECH ENGINEERING Ltd.			
Coordinate	Longitude Latitude Altitude	35.47181 -6.34712		35.47181 -6.34712					
Static Water Level (m) 17.35									
Time (min)	Date	Time (hrs:min)	Water level (m)	Yield	Time (min)	Date	Time (hrs:min)	Water level (m)	Yield
0.5	2007/9/24	42:52	42.52		220		15:07		
1		42:26	42.26		240		14:3		
1.5		42:05	42.05		280		14:2		
2		41:87	41.87		320		14:18		
2.5		41:78	41.78		360		14:17		
3		41:3	41.3		420		14:16		
3.5		41:03	41.03		480				
4		40:84	40.84		540				
4.5		40:46	40.46		600				
5		40:05	40.05		660				
6		39:83	39.83		720				
7		39:52	39.52		840				
8		39:01	39.01		960				
9		38:81	38.81		1080				
10		38:6	38.6		1200				
12		38:29	38.29		1320				
14		38:08	38.08		1440				
16		37:58	37.58		1560				
18		37:78	37.78		1680				
20		37:57	37.57		1800				
23		37:26	37.26		1920				
26		37:04	37.04		2040				
30		36:83	36.83		2160				
35		36:6	36.6		2280				
40		36:27	36.27		2400				
45		36:05	36.05		2520				
50		35:53	35.53		2640				
55		35:62	35.62		2760				
60		35:18	35.18		2880				
70		34:72	34.72						
80		34:16	34.16						
90		33:25	33.25						
100		32:02	32.02						
110		32:14	32.14						
120		31:78	31.78						
140		29:04	29.04						
160		23:15	23.15						
180		18:39	18.39						
200		16:40	16.40						

### Pumping Test Log

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Step		Test Team		MAITECH ENGINEERING Ltd.	
Borehole No. TD-7		District Babati		Bashanet			
Coordinate		Longitude 35.48875		Division Dareda			
Static Water Level (m)		Latitude 4.24282		Ward Seloto			
		Altitude 31.2		Village Seloto			
Static Water level shall be measured before first step testing.							
Time (min)	Date	Time hrs	min	Date	Time hrs	min	Yield (L/hour)
0.5	2007/1/27	0.5		2007/1/27			12000
1		1					12000
1.5		1.5					12000
2		2					12000
2.5		2.5					12000
3		3					12000
3.5		3.5					12000
4		4					12000
4.5		4.5					12000
5		5					12000
6		6					12000
7		7					12000
8		8					12000
9		9					12000
10		10					12000
12		12					12000
14		14					12000
16		16					12000
18		18					12000
20		20					12000
23		23					12000
26		26					12000
30		30					12000
35		35					12000
40		40					12000
45		45					12000
50		50					12000
55		55					12000
60		60					12000
70		70					12000
80		80					12000
90		90					12000
100		100					12000
110		110					12000
120		120					12000

### Pumping Test Log

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Step		Test Team		MAITECH ENGINEERING Ltd.	
Borehole No. TD-7		District Babati		Bashanet			
Coordinate		Longitude 35.48875		Division Dareda			
Static Water Level (m)		Latitude 4.24282		Ward Seloto			
		Altitude 31.2		Village Seloto			
Static Water level shall be measured before first step testing.							
Time (min)	Date	Time hrs	min	Date	Time hrs	min	Yield (L/hour)
0.5	2007/1/27	0.5		2007/9/12			24000
1		1					24000
1.5		1.5					24000
2		2					24000
2.5		2.5					24000
3		3					24000
3.5		3.5					24000
4		4					24000
4.5		4.5					24000
5		5					24000
6		6					24000
7		7					24000
8		8					24000
9		9					24000
10		10					24000
12		12					24000
14		14					24000
16		16					24000
18		18					24000
20		20					24000
23		23					24000
26		26					24000
30		30					24000
35		35					24000
40		40					24000
45		45					24000
50		50					24000
55		55					24000
60		60					24000
70		70					24000
80		80					24000
90		90					24000
100		100					24000
110		110					24000
120		120					24000

**Pumping Test Log**

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Step		5		Test Team		MAJITECH ENGINEERING Ltd.		
Borehole No.		TD-7		District		Babati		Babati		
Coordinate		Longitude Latitude		35.48875 4.24282		Division		Bashanet		
Static Water Level (m)		Altitude		31.2		Ward		Dareda		
						Village		Seloto		
Static Water level shall be measured before first step testing.										
Time (min)	Date	Time (min)	Time (hrs)	Time (min)	Water level (m)	Yield (L/hour)	Time (hrs)	Time (min)	Water level (m)	Yield (L/hour)
0.5	2007/1/27	0.5			33.27	33120				
1		1			33.30	33120				
1.5		1.5			33.32	33120				
2		2			33.33	33120				
2.5		2.5			33.34	33120				
3		3			33.35	33120				
3.5		3.5			33.37	33120				
4		4			33.39	33120				
4.5		4.5			33.40	33120				
5		5			33.40	33120				
6		6			33.41	33120				
7		7			33.42	33120				
8		8			33.43	33120				
9		9			33.44	33120				
10		10			33.44	33120				
12		12			33.45	33120				
14		14			33.46	33120				
16		16			33.47	33120				
18		18			33.47	33120				
20		20			33.48	33120				
23		23			33.49	33120				
26		26			33.49	33120				
30		30			33.50	33120				
35		35			33.51	33120				
40		40			33.52	33120				
45		45			33.53	33120				
50		50			33.54	33120				
55		55			33.55	33120				
60		60			33.56	33120				
70		70			33.57	33120				
80		80			33.58	33120				
90		90			33.59	33120				
100		100			33.60	33120				
110		110			33.61	33120				
120		120			33.61	33120				

**Pumping Test Log**

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Recovery		Test Team		MAJITECH ENGINEERING Ltd.				
Borehole No.		TD-7		District		Babati				
Coordinate		Longitude Latitude		35.48875 4.24282		Division				
Static Water Level (m)		Altitude		31.2		Ward				
						Village				
						Seloto				
Static Water level shall be measured before first step testing.										
Time (min)	Date	Time (min)	Time (hrs)	Time (min)	Water level (m)	Yield (L/hour)	Time (hrs)	Time (min)	Water level (m)	Yield (L/hour)
0.5	2006/10/2	0.5			32.20	30,000				
1		1			32.60	30,000				
1.5		1.5			32.70	30,000				
2		2			32.75	30,000				
2.5		2.5			32.75	30,000				
3		3			32.80	30,000				
4		4			32.82	30,000				
4.5		4.5			32.84	30,000				
5		5			32.86	30,000				
6		6			32.88	30,000				
7		7			32.90	30,000				
8		8			32.92	30,000				
9		9			32.93	30,000				
10		10			32.95	30,000				
12		12			32.95	30,000				
14		14			32.97	30,000				
16		16			32.98	30,000				
18		18			33.00	30,000				
20		20			33.02	30,000				
23		23			33.04	30,000				
25		25			33.05	30,000				
30		30			33.06	30,000				
35		35			33.07	30,000				
40		40			33.08	30,000				
45		45			33.10	30,000				
50		50			33.12	30,000				
55		55			33.13	30,000				
60		60			33.15	30,000				
70		70			33.18	30,000				
80		80			33.20	30,000				
90		90			33.23	30,000				
100		100			33.26	30,000				
110		110								
120		120								



### Pumping Test Log

The Study on the Groundwater Resources Development and Management  
in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Step	3 & 4		Test Team		MAJITECH ENGINEERING Ltd.	
Borehole No.		TD-8			Manyoni Nkonko			
Coordinate		Longitude Latitude Altitude	35.16049 6.24609		Sanza Ikasi			
Static Water Level (m)			34.7		Static Water level shall be measured before first step testing.			
Time (min)	Date	Time (min)	Time (hrs min)	Water level (m)	Yield (L/hour)	Time (hrs min)	Water level (m)	Yield (L/hour)
0.5	2007/9/24	0.5	2007/9/24	44.22	9000	0.5	2007/9/24	44.61
1		1		44.25	9000	1		46.27
1.5		1.5		44.27	9000	1.5		46.42
2		2		44.29	9000	2		46.48
2.5		2.5		44.3	9000	2.5		46.54
3		3		44.32	9000	3		46.58
3.5		3.5		44.34	9000	3.5		46.61
4		4		44.34	9000	4		46.63
4.5		4.5		44.34	9000	4.5		46.65
5		5		44.34	9000	5		46.66
6		6		44.35	9000	6		46.69
7		7		44.35	9000	7		46.71
8		8		44.35	9000	8		46.72
9		9		44.36	9000	9		46.75
10		10		44.36	9000	10		46.78
12		12		44.37	9000	12		46.79
14		14		44.38	9000	14		46.81
16		16		44.38	9000	16		46.82
18		18		44.39	9000	18		46.83
20		20		44.39	9000	20		46.84
23		23		44.4	9000	23		46.86
26		26		44.41	9000	26		46.88
30		30		44.42	9000	30		46.89
35		35		44.43	9000	35		47.04
40		40		44.44	9000	40		47.08
45		45		44.45	9000	45		47.12
50		50		44.46	9000	50		47.14
55		55		44.46	9000	55		47.15
60		60		44.47	9000	60		47.16
70		70		44.47	9000	70		47.17
80		80		44.47	9000	80		47.17
90		90		44.47	9000	90		47.17
100		100		44.47	9000	100		47.18
110		110		44.47	9000	110		47.18
120		120		44.47	9000	120		47.18

### Pumping Test Log

The Study on the Groundwater Resources Development and Management  
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Test method		Step	5		Test Team		MAJITECH ENGINEERING Ltd.	
Borehole No.		TD-8			Manyoni Nkonko			
Coordinate		Longitude Latitude Altitude	35.16049 6.24609		Sanza Ikasi			
Static Water Level (m)			34.7		Static Water level shall be measured before first step testing.			
Time (min)	Date	Time (min)	Time (hrs min)	Water level (m)	Yield (L/hour)	Time (hrs min)	Water level (m)	Yield (L/hour)
0.5	2007/9/24	0.5	2007/9/24	46.13	15000	0.5		
1		1		46.27	15000	1		
1.5		1.5		46.42	15000	1.5		
2		2		46.48	15000	2		
2.5		2.5		46.54	15000	2.5		
3		3		46.58	15000	3		
3.5		3.5		46.61	15000	3.5		
4		4		46.63	15000	4		
4.5		4.5		46.65	15000	4.5		
5		5		46.66	15000	5		
6		6		46.69	15000	6		
7		7		46.71	15000	7		
8		8		46.72	15000	8		
9		9		46.75	15000	9		
10		10		46.78	15000	10		
12		12		46.79	15000	12		
14		14		46.81	15000	14		
16		16		46.82	15000	16		
18		18		46.83	15000	18		
20		20		46.84	15000	20		
23		23		46.86	15000	23		
26		26		46.88	15000	26		
30		30		46.89	15000	30		
35		35		47.04	15000	35		
40		40		47.08	15000	40		
45		45		47.12	15000	45		
50		50		47.14	15000	50		
55		55		47.15	15000	55		
60		60		47.16	15000	60		
70		70		47.17	15000	70		
80		80		47.17	15000	80		
90		90		47.17	15000	90		
100		100		47.18	15000	100		
110		110		47.18	15000	110		
120		120		47.18	15000	120		

**Pumping Test Log**

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Constant rate		Recovery		Test Team		MAJITECH ENGINEERING Ltd.	
Borehole No.	TD-8	District		Manyoni		Nkonko			
Coordinate		Longitude		35.16049		Division			
		Latitude		6.24609		Ward		Sanza	
		Altitude		34.7		Village		Ikasi	
Static Water Level (m)								34.7	
Static Water level shall be measured before first step testing.									
Time (min)	Date	Time (min)	Time (hrs min)	Water level (m)	Yield (L/hour)	Time (min)	Time (hrs min)	Water level (m)	Yield (L/hour)
0.5	2007/9/24	220	2007/9/24	44.59	9,000	220	2007/9/24	44.59	9,000
1		240		44.6	9,000	240		44.6	9,000
1.5		280		44.65	9,000	280		44.65	9,000
2		300		44.66	9,000	300		44.66	9,000
2.5		360		44.67	9,000	360		44.67	9,000
3		420		44.69	9,000	420		44.69	9,000
3.5		480		44.72	9,000	480		44.72	9,000
4		540		44.75	9,000	540		44.75	9,000
4.5		600		44.8	9,000	600		44.8	9,000
5		660		44.82	9,000	660		44.82	9,000
6		720		44.85	9,000	720		44.85	9,000
7		780		44.9	9,000	780		44.9	9,000
8		840		44.92	9,000	840		44.92	9,000
9		900		44.93	9,000	900		44.93	9,000
10		960		44.95	9,000	960		44.95	9,000
12		1020		44.96	9,000	1020		44.96	9,000
14		1080		44.96	9,000	1080		44.96	9,000
16		1140		44.97	9,000	1140		44.97	9,000
18		1200		44.99	9,000	1200		44.99	9,000
20		1260		44.99	9,000	1260		44.99	9,000
23		1320		44.08	9,000	1320		44.08	9,000
25		1380		44.14	9,000	1380		44.14	9,000
30		1440		44.2	9,000	1440		44.2	9,000
35		1500		44.25	9,000	1500		44.25	9,000
40		1560		44.31	9,000	1560		44.31	9,000
45		1620		44.34	9,000	1620		44.34	9,000
50		1680		44.39	9,000	1680		44.39	9,000
55		1740		44.42	9,000	1740		44.42	9,000
60		1800		44.45	9,000	1800		44.45	9,000
65		1860		44.47	9,000	1860		44.47	9,000
70		1920		44.48	9,000	1920		44.48	9,000
80		2040		44.49	9,000	2040		44.49	9,000
90		2160		44.1	9,000	2160		44.1	9,000
100		2280		44.52	9,000	2280		44.52	9,000
105		2340		44.53	9,000	2340		44.53	9,000
120		2400		44.53	9,000	2400		44.53	9,000
140		2460		44.54	9,000	2460		44.54	9,000
150		2520		44.54	9,000	2520		44.54	9,000
180		2640		44.55	9,000	2640		44.55	9,000
200		2880		44.57	9,000	2880		44.57	9,000

**Pumping Test Log**

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Test method		Constant rate		Recovery		Test Team		MAJITECH ENGINEERING Ltd.	
Borehole No.	TD-8	District		Manyoni		Nkonko			
Coordinate		Longitude		35.16049		Division			
		Latitude		6.24609		Ward		Sanza	
		Altitude		34.7		Village		Ikasi	
Static Water Level (m)								34.7	
Static Water level shall be measured before first step testing.									
Time (min)	Date	Time (min)	Time (hrs min)	Water level (m)	Yield	Time (min)	Time (hrs min)	Water level (m)	Yield
0.5	2007/9/25	220		44		220		30.9	
1		240		43.15		240		30.9	
1.5		280		42.74		280			
2		320		41.92		320			
2.5		360		40		360			
3		420		38.98		420			
3.5		480		36.16		480			
4		540		35.82		540			
4.5		600		35		600			
5		660		34.77		660			
6		720		34.25		720			
7		840		34.02		840			
8		960		33.75		960			
9		1080		33.44		1080			
10		1200		33.13		1200			
12		1320		32.86		1320			
14		1440		32.64		1440			
16		1560		32.31		1560			
18		1680		32.09		1680			
20		1800		31.97		1800			
23		1920		31.3		1920			
25		2040		31.31		2040			
30		2160		31.12		2160			
35		2280		30.98		2280			
40		2400		30.97		2400			
45		2520		30.96		2520			
50		2640		30.96		2640			
55		2760		30.95		2760			
60		2880		30.94		2880			
70				30.94					
80				30.94					
90				30.93					
100				30.92					
110				30.91					
120				30.91					
140				30.91					
150				30.9					
160				30.9					
180				30.9					
200				30.9					

**Pumping Test Log**

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Step		1 & 2		Test Team		MAJITECH ENGINEERING Ltd.			
Borehole No.		TD-10		District		Hanang		Bassuto			
Coordinate		Longitude		34.90203		Division		Bassuto			
Static Water Level (m)		Latitude		-4.35454		Ward		Hirbadaw			
		Altitude		31.75		Village		Hirbadaw			
Static Water level shall be measured before first step testing.											
Time (min)	Date	Time (hrs min)	Water level (m)	Yield (L/hour)	Time (hrs min)	Water level (m)	Yield (L/hour)	Date	Time (hrs min)	Water level (m)	Yield (L/hour)
0.5	2006/11/1		32.5	1000		58.44	1300	2007/9/24			
1		33.53	1000		58.61	1300					
1.5		33.43	1000		58.8	1300					
2		33.62	1000		58.95	1300					
2.5		33.76	1000		59.12	1300					
3		34.31	1000		59.28	1300					
3.5		34.77	1000		59.45	1300					
4		34.80	1000		59.62	1300					
4.5		34.87	1000		59.77	1300					
5		34.96	1000		59.92	1300					
6		35.46	1000		60.25	1300					
7		35.87	1000		60.55	1300					
8		36.31	1000		60.84	1300					
9		36.62	1000		61.12	1300					
10		36.97	1000		61.41	1300					
12		37.45	1000		61.95	1300					
14		38.30	1000		62.46	1300					
16		39.00	1000		63.15	1300					
18		39.67	1000		63.65	1300					
20		40.34	1000		63.86	1300					
23		41.25	1000		64.78	1300					
26		42.14	1000		65.10	1300					
30		43.27	1000		65.90	1300					
35		44.78	1000		66.96	1300					
40		46.00	1000		67.97	1300					
45		47.27	1000		68.86	1300					
50		48.53	1000		69.74	1300					
55		49.64	1000		70.57	1300					
60		50.58	1000		71.91	1300					
70		52.41	1000		72.40	1300					
80		53.92	1000		74.16	1300					
90		55.17	1000		75.94	1300					
100		56.31	1000		77.87	1300					
110		57.27	1000		78.69	1300					
120		58.18	1000		80.30	1300					

**Pumping Test Log**

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Test method		Recovery		Test Team		MAJITECH ENGINEERING Ltd.	
Borehole No.		TD-10		District		Hanang	
Coordinate		Longitude		34.90203		Division	
Static Water Level (m)		Latitude		-4.35454		Ward	
		Altitude		31.75		Hirbadaw	
Static Water level shall be measured before first step testing.							
Time (min)	Date	Time (hrs min)	Water level (m)	Yield (L/hour)	Time (hrs min)	Water level (m)	Yield (L/hour)
0.5	2006/11/2		32.86	1,000		60.90	1,000
1		34.04	1,000		61.60	1,000	
1.5		34.67	1,000		62.43	1,000	
2		35.03	1,000		62.91	1,000	
2.5		35.40	1,000		63.34	1,000	
3		35.70	1,000		63.64	1,000	
3.5		35.77	1,000		63.90	1,000	
4		35.89	1,000		64.40	1,000	
4.5		36.06	1,000		65.70	1,000	
5		36.13	1,000		66.10	1,000	
6		36.28	1,000		66.48	1,000	
7		36.50	1,000		66.55	1,000	
8		36.75	1,000		68.28	1,000	
9		37.17	1,000		68.76	1,000	
10		37.65	1,000		68.89	1,000	
12		38.26	1,000		69.47	1,000	
14		38.84	1,000		70.70	1,000	
16		39.40	1,000		71.10	1,000	
18		39.97	1,000		71.68	1,000	
20		40.46	1,000		72.89	1,000	
23		41.20	1,000		73.45	1,000	
25		41.87	1,000		74.43	1,000	
30		42.80	1,000		75.50	1,000	
35		43.80	1,000		79.62	1,000	
40		44.76	1,000		81.52	1,000	
45		45.60	1,000				
50		46.37	1,000				
55		47.13	1,000				
60		47.93	1,000				
75		49.20	1,000				
80		50.23	1,000				
90		51.15	1,000				
100		51.95	1,000				
105		52.65	1,000				
120		53.23	1,000				
140		54.20	1,000				
150		56.62	1,000				
180		58.50	1,000				
200		59.75	1,000				



### Pumping Test Log

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Test method		Constant rate		Recovery		Test Team		MAJITECH ENGINEERING LTD.	
Borehole No.	TD-10					District	Hanang		
Coordinate		Longitude	34.90203	Division	Bassuto				
		Latitude	-4.35454	Ward	Hirbadaw				
		Altitude		Village	Hirbadaw				
Static Water Level (m)		31.75		Static Water level shall be measured before first step testing.					
Time (min)	Date	Time (min)	Yield (L/hour)	Time (hrs)	Date	Time (hrs)	Water level (m)	Yield (L/hour)	Yield (L/hour)
0.5	2006/11/4	220		2006/11/4	220	32.27			
1		240			240	32.22			
1.5		280			280	32.16			
2		320			320	32.07			
2.5		360			360	32.00			
3		420			420	31.95			
3.5		480			480	31.93			
4		540			540	31.90			
4.5		600			600	31.87			
5		660			660	31.85			
6		720			720	31.80			
7		840			840	31.75			
8		960			960				
9		1080			1080				
10		1200			1200				
12		1320			1320				
14		1440			1440				
16		1560			1560				
18		1680			1680				
20		1800			1800				
23		1920			1920				
25		2040			2040				
30		2160			2160				
35		2280			2280				
40		2400			2400				
45		2520			2520				
50		2640			2640				
55		2760			2760				
60		2880			2880				
70									
80									
90									
100									
110									
120									
140									
160									
180									
200									

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Test method		Constant rate		Recovery		Test Team		MAJITECH ENGINEERING LTD.	
Borehole No.	TD-11					District	Mbulu		
Coordinate		Longitude	35.44907	Division	Endagikot				
		Latitude	-3.90797	Ward	Tlawi				
		Altitude		Village	Tlawi				
Static Water Level (m)		10.68		Static Water level shall be measured before first step testing.					
Time (min)	Date	Time (min)	Yield (L/hour)	Time (hrs)	Date	Time (hrs)	Water level (m)	Yield (L/hour)	Yield (L/hour)
0.5	2006/10/6	220		2006/10/6	220	38.90			
1		240			240				
1.5		280			280				
2		300			300				
2.5		360			360				
3		420			420				
3.5		480			480				
4		540			540				
4.5		600			600				
5		660			660				
6		720			720				
7		780			780				
8		840			840				
9		900			900				
10		960			960				
12		1020			1020				
14		1080			1080				
16		1200			1200				
18		1320			1320				
20		1440			1440				
23		1560			1560				
25		1680			1680				
30		1800			1800				
35		1920			1920				
40		2040			2040				
45		2160			2160				
50		2280			2280				
55		2400			2400				
60		2520			2520				
75		2640			2640				
80		2760			2760				
90		2880			2880				
100									
105									
120									
140									
160									
180									
200									

**Pumping Test Log**

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Test method		Constant-rate Recovery		Test Team		MAJITECH ENGINEERING Ltd.	
Borehole No.	TD-11	District	Mbulu	District	Mbulu	District	Endegikit
Coordinate	Longitude Latitude Altitude	35.44907 -3.90797 10.668	35.44907 -3.90797 10.668	Division	Endegikit	Division	Endegikit
Static Water Level (m)		10.668	10.668	Ward	Tlavi	Ward	Tlavi
Village							
Static Water level shall be measured before first step testing.							
Time (min)	Date	Time (min)	Yield (L/hour)	Time (min)	Date	Time (min)	Yield (L/hour)
0.5	2006/10/6	220	49.50	240		280	
1		240	38.90	320		360	
1.5		320	33.50	420		480	
2		360	29.75	540		600	
2.5		420	26.54	660		720	
3		480	23.58	840		960	
3.5		540	21.31	1080		1200	
4		600	19.28	1320		1440	
4.5		660	17.75	1560		1680	
5		720	16.51	1800		1920	
6		840	15.55	2040		2160	
7		960	14.21	2280		2400	
8		1080	13.61	2520		2640	
9		1200	13.20	2760		2880	
10		1320	12.98				
12		1440	12.83				
14		1560	12.66				
16		1680	12.59				
18		1800	12.44				
20		1920	12.40				
23		2040	12.32				
25		2160	12.30				
30		2280	12.28				
35		2400	12.26				
40		2520	12.17				
45		2640	12.13				
50		2760	12.07				
55		2880	12.04				
60			12.00				
75			11.90				
80							
90							
100							
105							
120							
140							
150							
180							
200							

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Test method		Step 1 & 2		Test Team		MAJITECH ENGINEERING Ltd.	
Borehole No.	TD-12	District	Iramba	District	Iramba	District	Kinyangili
Coordinate	Longitude Latitude Altitude	34.54847 -4.33553 7	34.54847 -4.33553 7	Division	Misingi	Division	Misingi
Static Water Level (m)		7	7	Ward	Misingi	Ward	Misingi
Village							
Static Water level shall be measured before first step testing.							
Time (min)	Date	Time (min)	Yield (L/hour)	Time (min)	Date	Time (min)	Yield (L/hour)
0.5	#####	0.5	6.33	0.5	#####	0.5	7.45
1		1	6.84	1		1	7.47
1.5		1.5	6.36	1.5		1.5	7.49
2		2	6.90	2		2	7.50
2.5		2.5	6.98	2.5		2.5	7.50
3		3	7.00	3		3	7.49
3.5		3.5	7.01	3.5		3.5	7.49
4		4	7.02	4		4	7.49
4.5		4.5	7.03	4.5		4.5	7.49
5		5	7.03	5		5	7.49
6		6	7.09	6		6	7.49
7		7	7.06	7		7	7.49
8		8	7.08	8		8	7.49
9		9	7.10	9		9	7.49
10		10	7.00	10		10	7.49
12		12	7.13	12		12	7.52
14		14	7.14	14		14	7.52
16		16	7.16	16		16	7.53
18		18	7.17	18		18	7.53
20		20	7.19	20		20	7.54
23		23	7.26	23		23	7.54
26		26	7.22	26		26	7.54
30		30	7.24	30		30	7.54
35		35	7.26	35		35	7.54
40		40	7.28	40		40	7.54
45		45	7.29	45		45	7.55
50		50	7.30	50		50	7.55
55		55	7.33	55		55	7.55
60		60	7.33	60		60	7.55
70		70	7.34	70		70	7.56
80		80	7.34	80		80	7.58
90		90	7.36	90		90	7.60
100		100	7.40	100		100	7.61
110		110	7.40	110		110	7.61
120		120	7.40	120		120	7.61

**Pumping Test Log**

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Test method	Step	5	Test Team	MAJITECH ENGINEERING LTD.
Borehole No.	TD-12		Iramba	
Coordinate	Longitude Latitude Altitude	34.54847 -4.33553	Kinyangili	
Static Water Level (m)		7	Misingi	
Static Water level shall be measured before first step testing.				
Time (min)	Date	Time (hrs min)	Water level (m)	Yield (L/hour)
0.5	#####	0.5	10.60	33000
1		1	10.97	33000
1.5		1.5	11.14	33000
2		2	11.25	33000
2.5		2.5	11.30	33000
3		3	11.35	33000
3.5		3.5	11.36	33000
4		4	11.38	33000
4.5		4.5	11.45	33000
5		5	11.47	33000
6		6	11.50	33000
7		7	11.54	33000
8		8	11.58	33000
9		9	11.60	33000
10		10	11.64	33000
12		12	11.68	33000
14		14	11.73	33000
16		16	11.77	33000
18		18	11.80	33000
20		20	11.84	33000
23		23	11.88	33000
26		26	11.90	33000
30		30	11.94	33000
35		35	11.98	33000
40		40	11.98	33000
45		45	12.03	33000
50		50	12.03	33000
55		55	12.13	33000
60		60	12.12	33000
70		70	12.15	33000
80		80	12.00	33000
90		90	12.23	33000
100		100	12.23	33000
110		110	12.25	33000
120		120	12.28	33000

**Pumping Test Log**

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Test method	Constant rate Recovery	Test Team	MAJITECH ENGINEERING LTD.	
Borehole No.	TD-12		Iramba	
Coordinate	Longitude Latitude Altitude	34.54847 -4.33553	Kinyangili	
Static Water Level (m)		7	Misingi	
Static Water level shall be measured before first step testing.				
Time (min)	Date	Time (hrs min)	Water level (m)	Yield (L/hour)
0.5	#####	0.5	8.40	25,000
1		1	8.85	25,000
1.5		1.5	8.90	25,000
2		2	8.98	25,000
2.5		2.5	8.99	25,000
3		3	9.00	25,000
3.5		3.5	9.05	25,000
4		4	9.11	25,000
4.5		4.5	9.15	25,000
5		5	9.18	25,000
6		6	9.26	25,000
7		7	9.34	25,000
8		8	9.40	25,000
9		9	9.47	25,000
10		10	9.52	25,000
12		12	9.62	25,000
14		14	9.70	25,000
16		16	9.78	25,000
18		18	9.90	25,000
20		20	9.98	25,000
23		23	10.08	25,000
26		26	10.20	25,000
30		30	10.27	25,000
35		35	10.36	25,000
40		40	10.38	25,000
45		45	10.40	25,000
50		50	10.48	25,000
55		55	10.56	25,000
60		60	10.63	25,000
70		70	10.72	25,000
80		80	10.78	25,000
90		90	10.84	25,000
100		100	10.87	25,000
110		110	10.90	25,000
120		120	10.98	25,000
140		140	10.98	25,000
160		160	11.03	25,000
180		180	11.07	25,000
200		200	11.10	25,000

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Test method		Constant rate		Recovery		Test Team		MAJITECH ENGINEERING Ltd.	
Borehole No.	TD-12	District		Iiamba		District		Singida Rural	
Coordinate		Longitude		34.54847		Division		Sepuka	
Static Water Level (m)		Latitude		-4.33553		Ward		Sepuka	
		Altitude		Missing		Village		Sepuka	
Static Water level shall be measured before first step testing.									
Time (min)	Date	Time (min)	Water level (m)	Time (min)	Water level (m)	Time (min)	Water level (m)	Time (min)	Yield (L/hour)
0.5 #####		220	10.11		7.51				
1		240	10.09		7.47				
1.5		280	9.85		7.48				
2		320	9.82		7.33				
2.5		360	9.70		7.27				
3		420	9.65		7.15				
3.5		480	9.56		7.11				
4		540	9.50		7.16				
4.5		600	9.45		7.02				
5		660	9.38		6.96				
6		720	9.30		6.97				
7		840	9.20		6.97				
8		960	9.15		6.96				
9		1080	9.08						
10		1200	9.02						
12		1320	8.90						
14		1440	8.85						
16		1560	8.70						
18		1680	8.68						
20		1800	8.62						
23		1920	8.56						
26		2040	8.47						
30		2160	8.39						
35		2280	8.36						
40		2400	8.30						
45		2520	8.26						
50		2640	8.22						
55		2760	8.17						
60		2880	8.15						
70			8.07						
80			7.92						
90			7.87						
100			7.83						
110			7.81						
120			7.70						
140			7.70						
160			7.65						
180			7.58						
200			7.54						

### Pumping Test Log

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Test method		Step		1 & 2		Test Team		MAJITECH ENGINEERING Ltd.	
Borehole No.	TD-13	District		Singida Rural		District		Singida Rural	
Coordinate		Longitude		34.53607		Division		Sepuka	
Static Water Level (m)		Latitude		-4.74932		Ward		Sepuka	
		Altitude		3.2		Village		Sepuka	
Static Water level shall be measured before first step testing.									
Time (min)	Date	Time (min)	Water level (m)	Time (min)	Water level (m)	Time (min)	Water level (m)	Time (min)	Yield (L/hour)
0.5 #####		0.5 #####	3.13						
1		1	3.75						
1.5		1.5	4.23						
2		2	4.65						
2.5		2.5	5.03						
3		3	5.42						
3.5		3.5	5.82						
4		4	6.15						
4.5		4.5	6.27						
5		5	6.43						
6		6	6.66						
7		7	6.78						
8		8	6.97						
9		9	7.42						
10		10	7.75						
12		12	7.92						
14		14	8.25						
16		16	8.62						
18		18	8.68						
20		20	8.70						
23		23	8.74						
26		26	8.75						
30		30	8.82						
35		35	8.84						
40		40	8.85						
45		45	8.93						
50		50	8.98						
55		55	9.03						
60		60	9.07						
70		70	9.12						
80		80	9.16						
90		90	9.20						
100		100	9.22						
110		110	9.25						
120		120	9.26						

Pumping Test Log

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Test method		Step	3 & 4		Test Team		MAITECH ENGINEERING Ltd.	
Borehole No.	TD-13				District	Singida Rural		
					Division	Sepuka		
Coordinate		Longitude	34.53607		Ward	Sepuka		
		Latitude	-4.74932		Village	Sepuka		
		Altitude						
Static Water Level (m)			3.2		Static Water level shall be measured before first step testing.			
Time (min)	Date	Time hrs min	Water level (m)	Yield (L/hour)	Time hrs min	Date	Water level (m)	Yield (L/hour)
0.5 #####				2000		0.5 2006/10/28	21.52	2300
1			15.58	2000			21.19	2300
1.5			16.15	2000			22.34	2300
2			16.64	2000			22.68	2300
2.5			17.04	2000			23	2300
3			17.34	2000			23.1	2300
3.5			17.8	2000			23.16	2300
4			17.9	2000			23.22	2300
4.5			18.1	2000			23.27	2300
5			18.22	2000			23.32	2300
6			18.43	2000			23.43	2300
7			18.64	2000			23.50	2300
8			18.82	2000			23.58	2300
9			18.97	2000			23.69	2300
10			19.12	2000			23.73	2300
12			19.37	2000			23.84	2300
14			19.6	2000			23.94	2300
16			19.8	2000			24.03	2300
18			19.94	2000			24.08	2300
20			20.07	2000			24.16	2300
23			20.24	2000			24.23	2300
26			20.4	2000			24.31	2300
30			20.53	2000			24.38	2300
35			20.68	2000			24.45	2300
40			20.8	2000			24.50	2300
45			20.87	2000			24.56	2300
50			20.95	2000			24.61	2300
55			21.02	2000			24.67	2300
60			21.07	2000			24.70	2300
70			21.18	2000			24.81	2300
80			21.27	2000			24.84	2300
90			21.31	2000			24.88	2300
100			21.4	2000			24.94	2300
110			21.48	2000			24.97	2300
120			21.5	2000			25.04	2300

Pumping Test Log

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Test method		Step	3 & 4		Test Team		MAITECH ENGINEERING Ltd.	
Borehole No.	TD-13				District	Singida Rural		
					Division	Sepuka		
Coordinate		Longitude	34.53607		Ward	Sepuka		
		Latitude	-4.74932		Village	Sepuka		
		Altitude						
Static Water Level (m)			3.2		Static Water level shall be measured before first step testing.			
Time (min)	Date	Time hrs min	Water level (m)	Yield (L/hour)	Time hrs min	Date	Water level (m)	Yield (L/hour)
0.5 #####				1300		2006/10/2	13.68	1300
1			6.54	1300			13.74	1300
1.5			7.65	1300			13.83	1300
2			8.45	1300			13.92	1300
2.5			8.52	1300			14.00	1300
3			8.56	1300			14.10	1300
3.5			8.60	1300			14.15	1300
4			8.61	1300			14.25	1300
4.5			8.89	1300			14.30	1300
5			9.18	1300			14.33	1300
6			9.83	1300			14.40	1300
7			10.16	1300			14.52	1300
8			10.35	1300			14.54	1300
9			10.53	1300			14.54	1300
10			10.73	1300			14.54	1300
12			11.00	1300			14.54	1300
14			11.21	1300			14.54	1300
16			11.45	1300			14.58	1300
18			11.67	1300			14.58	1300
20			12.10	1300			14.66	1300
23			12.71	1300			14.68	1300
25			12.99	1300			14.76	1300
30			12.48	1300			14.92	1300
35			12.76	1300			14.96	1300
40			12.91	1300			15.00	1300
45			13.01	1300			15.03	1300
50			13.07	1300			15.06	1300
55			13.13	1300			15.14	1300
60			13.16	1300			15.14	1300
75			13.23	1300			15.15	1300
80			13.29	1300			15.15	1300
90			13.33	1300			15.15	1300
100			13.35	1300			15.15	1300
105			13.40	1300			15.15	1300
120			13.42	1300				
140			13.48	1300				
150			13.54	1300				
180			13.60	1300				
200			13.63	1300				

**Pumping Test Log**

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Constant rate Recovery		Test Team		MAJITECH ENGINEERING Ltd.	
Borehole No.	TD-13	District		Singida Rural			
Coordinate		Longitude	34.53607	Division	Sepuka		
Static Water Level (m)		Latitude	-4.74932	Ward	Sepuka		
		Altitude		Village	Sepuka		
			3.2	Static Water level shall be measured before first step testing.			
Time (min)	Date	Time (hrs min)	Water level (m)	Time (hrs min)	Water level (m)	Yield (L/hour)	Yield (L/hour)
0.5	#####						
1		11:50	12.90		3:14		
1.5		11:05	11.05		3:10		
2		10:78	10.78		3:03		
2.5		10:30	10.30		2:96		
3		10:12	10.12		2:92		
3.5		9:76	9.76		2:83		
4		9:41	9.41		2:76		
4.5		9:16	9.16		2:71		
5		8:86	8.86		2:64		
6		8:35	8.35		2:62		
7		7:86	7.86		2:58		
8		7:46	7.46		2:52		
9		7:06	7.06				
10		6:74	6.74				
12		6:18	6.18				
14		5:72	5.72				
16		5:43	5.43				
18		5:17	5.17				
20		4:55	4.55				
23		4:68	4.68				
25		4:55	4.55				
30		4:38	4.38				
35		4:22	4.22				
40		4:12	4.12				
45		4:03	4.03				
50		3:95	3.95				
55		3:88	3.88				
60		3:82	3.82				
70		3:72	3.72				
80		3:66	3.66				
90		3:59	3.59				
100		3:30	3.30				
110		3:48	3.48				
120		3:43	3.43				
140		3:36	3.36				
160		3:28	3.28				
180		3:23	3.23				
200		3:18	3.18				

**Pumping Test Log**

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Step		Test Team		MAJITECH ENGINEERING Ltd.	
Borehole No.	TD-15	District		Uyui			
Coordinate		Longitude	33.99646	Division	Igalula		
Static Water Level (m)		Latitude	5.36013	Ward	Kizengi		
		Altitude		Village	Nkongwa		
			7.7	Static Water level shall be measured before first step testing.			
Time (min)	Date	Time (hrs min)	Water level (m)	Time (hrs min)	Water level (m)	Yield (L/hour)	Yield (L/hour)
0.5	#####						
1		8:31	8.17		12:30		2000
1.5		8:42	8.31		12:66		2000
2		8:57	8.42		13:14		2000
2.5		8:67	8.57		13:47		2000
3		8:80	8.67		13:82		2000
3.5		8:92	8.80		14:13		2000
4		8:95	8.92		14:38		2000
4.5		9:05	8.95		14:54		2000
5		9:08	9.05		4:80		2000
6		9:20	9.08		14:93		2000
7		9:37	9.20		15:36		2000
8		9:47	9.37		15:70		2000
9		9:57	9.47		15:92		2000
10		9:70	9.57		16:06		2000
12		9:87	9.70		16:26		2000
14		10:03	9.87		16:68		2000
16		10:15	10.03		16:92		2000
18		10:33	10.15		17:04		2000
20		10:44	10.33		17:15		2000
23		10:57	10.44		17:20		2000
26		10:66	10.57		17:40		2000
30		10:80	10.66		17:54		2000
35		10:96	10.80		17:56		2000
40		11:04	10.96		17:82		2000
45		11:26	11.04		17:97		2000
50		11:35	11.26		18:06		2000
55		11:48	11.35		18:15		2000
60		11:60	11.48		18:25		2000
70		11:67	11.60		18:28		2000
80		11:78	11.67		18:40		2000
90		11:86	11.78		18:50		2000
100		11:94	11.86		18:53		2000
110		11:96	11.94		18:60		2000
120		11:98	11.96		18:64		2000
			11:98		18:76		2000

### Pumping Test Log

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Step	3 & 4		Test Team		MAITECH ENGINEERING LTD.		
Borehole No.		TD-15			Uyui		Igahla		
Coordinate		Longitude	33.99646		Division		Kizengi		
		Latitude	5.36013		Ward		Nkongwa		
		Altitude	7.7		Village				
Static Water Level (m)			7.7		Static Water level shall be measured before first step testing.				
Time (min)	Date	Time (hrs min)	Water level (m)	Yield (L/hour)	Time (min)	Date	Time (hrs min)	Water level (m)	Yield (L/hour)
0.5	#####		18.74	5000	1	0.5 2007/1/27		24.34	6000
1			18.78	5000				24.38	6000
1.5			18.82	5000				24.42	6000
2			18.87	5000				24.47	6000
2.5			18.94	5000				24.54	6000
3			19.06	5000				24.70	6000
3.5			19.24	5000				24.80	6000
4			19.40	5000				24.85	6000
4.5			19.56	5000				25.00	6000
5			19.70	5000				25.33	6000
6			19.94	5000				26.22	6000
7			20.14	5000				27.04	6000
8			20.28	5000				27.7	6000
9			20.37	5000				28.24	6000
10			20.56	5000				28.57	6000
12			20.75	5000				28.95	6000
14			20.92	5000				29.30	6000
16			21.12	5000				29.32	6000
18			21.30	5000				29.73	6000
20			21.46	5000				29.88	6000
23			21.67	5000				30.12	6000
26			21.91	5000				30.33	6000
30			22.12	5000				30.55	6000
35			22.37	5000				31.00	6000
40			22.60	5000				31.45	6000
45			22.86	5000				32.00	6000
50			23.05	5000				32.52	6000
55			23.23	5000				32.80	6000
60			23.37	5000				33.23	6000
70			23.65	5000				35.14	6000
80			23.92	5000				36.87	6000
90			24.07	5000				38.73	6000
100			24.18	5000				40.47	6000
110			24.22	5000				41.67	6000
120			24.30	5000				42.67	6000

### Pumping Test Log

The Study on the Groundwater Resources Development and Management in the internal Drainage Basin in the United Republic of Tanzania

Test method		Constant rate	Recovery		Test Team		MAITECH ENGINEERING LTD.		
Borehole No.		TD-15			Uyui		Igahla		
Coordinate		Longitude	33.99646		Division		Kizengi		
		Latitude	5.36013		Ward		Nkongwa		
		Altitude	7.7		Village				
Static Water Level (m)			7.7		Static Water level shall be measured before first step testing.				
Time (min)	Date	Time (hrs min)	Water level (m)	Yield (L/hour)	Time (min)	Date	Time (hrs min)	Water level (m)	Yield (L/hour)
0.5	#####		8.67	3.000	220	#####		14.82	3.000
1			9.05	3.000	240			14.86	3.000
1.5			9.35	3.000	280			14.95	3.000
2			9.62	3.000	320			15.02	3.000
2.5			9.68	3.000	360			15.10	3.000
3			9.70	3.000	420			15.20	3.000
3.5			9.75	3.000	480			15.30	3.000
4			9.84	3.000	540			15.40	3.000
4.5			10.00	3.000	600			15.45	3.000
5			10.14	3.000	660			15.50	3.000
6			10.42	3.000	720	#####		15.56	3.000
7			10.67	3.000	780			15.60	3.000
8			10.94	3.000	840			15.70	3.000
9			11.15	3.000	900			15.75	3.000
10			11.33	3.000	960			15.83	3.000
12			11.68	3.000	1020			15.76	3.000
14			11.98	3.000	1080			16.00	3.000
16			12.20	3.000	1200			16.10	3.000
18			12.41	3.000	1320			16.14	3.000
20			12.57	3.000	1440			16.26	3.000
23			12.72	3.000	1560			16.34	3.000
25			12.88	3.000	1680			16.40	3.000
30			13.17	3.000	1800			16.45	3.000
35			13.42	3.000	1920			16.50	3.000
40			13.62	3.000	2040			16.56	3.000
45			13.70	3.000	2160			16.57	3.000
50			13.80	3.000	2280			16.58	3.000
55			13.85	3.000	2400			16.59	3.000
60			13.93	3.000	2520				
75			14.03	3.000	2640				
80			14.13	3.000	2760				
90			14.23	3.000	2880				
100			14.33	3.000					
105			14.38	3.000					
120			14.43	3.000					
140			14.56	3.000					
150			14.65	3.000					
180			14.70	3.000					
200			14.75	3.000					





### Pumping Test Log

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Test method		Step		3 & 4		Test Team		MAJITECH ENGINEERING LTD.		
Borehole No.		TD-17				District		Babati		
Coordinate		Longitude Latitude Altitude		35.75789 -4.00821		Division		Mbugwe		
Static Water Level (m)				8.38		Ward		Magugu		
						Village		Mapera		
Static Water level shall be measured before first step testing.										
Time (min)	Date	Time (min)	Time (hrs min)	Water level (m)	Yield (L/hour)	Time (min)	Date	Time (hrs min)	Water level (m)	Yield (L/hour)
0.5	2007/1/18	0.5	2007/1/27	18.37	10000	0.5	2007/1/18	0.5	2007/1/18	12500
1		1.5		18.64	10000	1		1.5		12500
1.5		2		18.88	10000	1.5		2		12500
2		2.5		19.10	10000	2		2.5		12500
2.5		3		19.46	10000	2.5		3		12500
3		3.5		19.64	10000	3		3.5		12500
3.5		4		19.82	10000	3.5		4		12500
4		4.5		20.34	10000	4		4.5		12500
4.5		5		20.76	10000	4.5		5		12500
5		6		21.02	10000	5		6		12500
6		7		21.32	10000	6		7		12500
7		8		21.61	10000	7		8		12500
8		9		21.74	10000	8		9		12500
9		10		21.84	10000	9		10		12500
10		12		21.90	10000	10		12		12500
12		14		21.98	10000	12		14		12500
14		16		22.07	10000	14		16		12500
16		18		22.20	10000	16		18		12500
18		20		22.23	10000	18		20		12500
20		23		22.33	10000	20		23		12500
23		26		22.35	10000	23		26		12500
26		30		22.25	10000	26		30		12500
30		35		22.34	10000	30		35		12500
35		40		22.42	10000	35		40		12500
40		45		22.45	10000	40		45		12500
45		50		22.52	10000	45		50		12500
50		55		22.60	10000	50		55		12500
55		60		22.66	10000	55		60		12500
60		70		22.69	10000	60		70		12500
70		80		22.66	10000	70		80		12500
80		90		22.70	10000	80		90		12500
90		100		22.78	10000	90		100		12500
100		110		22.80	10000	100		110		12500
110		120		22.94	10000	110		120		12500
120				23.00	10000	120				12500

### Pumping Test Log

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Step		5		Test Team		MAJITECH ENGINEERING LTD.		
Borehole No.		TD-17				District		Babati		
Coordinate		Longitude Latitude Altitude		35.75789 -4.00821		Division		Mbugwe		
Static Water Level (m)				8.38		Ward		Magugu		
						Village		Mapera		
Static Water level shall be measured before first step testing.										
Time (min)	Date	Time (min)	Time (hrs min)	Water level (m)	Yield (L/hour)	Time (min)	Date	Time (hrs min)	Water level (m)	Yield (L/hour)
0.5	2007/1/18	0.5	2007/1/18	23.65	12500	0.5		0.5		12500
1		1.5		24.05	12500	1		1.5		12500
1.5		2		24.54	12500	1.5		2		12500
2		2.5		24.60	12500	2		2.5		12500
2.5		3		24.73	12500	2.5		3		12500
3		3.5		24.83	12500	3		3.5		12500
3.5		4		24.90	12500	3.5		4		12500
4		4.5		24.95	12500	4		4.5		12500
4.5		5		25.00	12500	4.5		5		12500
5		6		25.12	12500	5		6		12500
6		7		25.20	12500	6		7		12500
7		8		25.23	12500	7		8		12500
8		9		25.46	12500	8		9		12500
9		10		25.60	12500	9		10		12500
10		12		25.71	12500	10		12		12500
12		14		25.83	12500	12		14		12500
14		16		25.98	12500	14		16		12500
16		18		26.14	12500	16		18		12500
18		20		26.30	12500	18		20		12500
20		23		26.69	12500	20		23		12500
23		26		26.80	12500	23		26		12500
26		30		26.97	12500	26		30		12500
30		35		27.18	12500	30		35		12500
35		40		27.72	12500	35		40		12500
40		45		27.78	12500	40		45		12500
45		50		27.86	12500	45		50		12500
50		55		28.20	12500	50		55		12500
55		60		28.28	12500	55		60		12500
60		70		28.36	12500	60		70		12500
70		80		28.43	12500	70		80		12500
80		90		28.51	12500	80		90		12500
90		100		28.57	12500	90		100		12500
100		110		28.65	12500	100		110		12500
110		120		28.74	12500	110		120		12500
120				28.82	12500	120				12500



### Pumping Test Log

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Test method		Constant rate		Recovery		Test Team		MAJITECH ENGINEERING Ltd.	
Borehole No.	TD-19	District	Kiloto	Division	Makami	District	Kiloto	Division	Makami
Coordinate	Longitude Latitude Altitude	36.70853 -4.63158	Longitude Latitude Altitude	36.70853 -4.63158	35.7	Static Water Level (m)	Static Water level shall be measured before first step testing.		
Time (min)	Date	Time (min)	Date	Time (min)	Date	Time (min)	Date	Time (min)	Date
0.5	2007/9/29	35.87	2007/9/29	37.1	2007/9/29	37.1	2007/9/29	37.1	2007/9/29
1		35.92		37.12		37.12		37.12	
1.5		3.98		37.15		37.15		37.15	
2		36.07		37.18		37.18		37.18	
2.5		36.08		37.22		37.22		37.22	
3		36.12		37.26		37.26		37.26	
3.5		36.16		37.31		37.31		37.31	
4		36.22		37.37		37.37		37.37	
4.5		36.26		37.44		37.44		37.44	
5		36.32		37.5		37.5		37.5	
6		36.35		37.5		37.5		37.5	
7		36.38		37.62		37.62		37.62	
8		36.41		37.7		37.7		37.7	
9		36.44		37.74		37.74		37.74	
10		36.46		37.76		37.76		37.76	
12		36.49		37.78		37.78		37.78	
14		36.52		37.79		37.79		37.79	
16		36.53							
18		36.55							
20		36.58							
23		36.6							
25		36.62							
30		36.64							
35		36.67							
40		36.7							
45		36.74							
50		36.78							
55		36.81							
60		36.85							
75		36.87							
80		36.89							
90		36.91							
100		36.93							
105		36.95							
140		36.98							
150		36.99							
180		37.03							
200		37.07							

### Pumping Test Log

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Constant rate		Recovery		Test Team		MAJITECH ENGINEERING Ltd.	
Borehole No.	TD-19	District	Kiloto	Division	Makami	District	Kiloto	Division	Makami
Coordinate	Longitude Latitude Altitude	36.70853 -4.63158	Longitude Latitude Altitude	36.70853 -4.63158	35.7	Static Water Level (m)	Static Water level shall be measured before first step testing.		
Time (min)	Date	Time (min)	Date	Time (min)	Date	Time (min)	Date	Time (min)	Date
0.5	2007/9/30	37		37		37		37	
1		36.37		36.21		36.21		36.21	
1.5		36.21		36.16		36.16		36.16	
2		36.16		36.1		36.1		36.1	
2.5		36.05		36.04		36.04		36.04	
3		36.04		35.97		35.97		35.97	
3.5		35.97		35.94		35.94		35.94	
4		35.94		35.9		35.9		35.9	
4.5		35.9		35.88		35.88		35.88	
5		35.88		35.85		35.85		35.85	
6		35.85		35.84		35.84		35.84	
7		35.84		35.81		35.81		35.81	
8		35.81		35.79		35.79		35.79	
9		35.79		35.75		35.75		35.75	
10		35.75		35.71		35.71		35.71	
12		35.71		35.69		35.69		35.69	
14		35.69		35.65		35.65		35.65	
16		35.65		35.63		35.63		35.63	
18		35.63		35.6		35.6		35.6	
20		35.6		35.58		35.58		35.58	
23		35.58		35.57		35.57		35.57	
25		35.57		35.56		35.56		35.56	
30		35.56		35.54		35.54		35.54	
35		35.54		35.53		35.53		35.53	
40		35.53		35.52		35.52		35.52	
45		35.52		35.52		35.52		35.52	
50		35.52		35.52		35.52		35.52	
55		35.52		35.52		35.52		35.52	
60		35.52		35.52		35.52		35.52	
70		35.52		35.52		35.52		35.52	
80		35.52		35.52		35.52		35.52	
90		35.52		35.52		35.52		35.52	
100		35.52		35.52		35.52		35.52	
110		35.52		35.52		35.52		35.52	
120		35.52		35.52		35.52		35.52	
140		35.52		35.52		35.52		35.52	
160		35.52		35.52		35.52		35.52	
180		35.52		35.52		35.52		35.52	
200		35.52		35.52		35.52		35.52	

### Pumping Test Log

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Step		1 & 2		Test Team		MAJITECH ENGINEERING Ltd.	
Borehole No.	TD-20	District	Kishapu	Division	Negezi				
Coordinate	Longitude Latitude Altitude	33.78151 -3.93233 4.3		Ward	Ngoftia				
Static Water Level (m)		Static Water level shall be measured before first step testing.							
Time (min)	Date	Time (min)	Water level (m)	Yield (L/hour)	Time (min)	Date	Time (hrs min)	Water level (m)	Yield (L/hour)
0.5	2007/9/12	0.5	11.07	800	0.5	2007/9/12	0.5	11.07	800
1		1	11.08	800	1		1	11.08	800
1.5		1.5	11.09	800	1.5		1.5	11.09	800
2		2	11.10	800	2		2	11.10	800
2.5		2.5	11.14	800	2.5		2.5	11.14	800
3		3	11.10	800	3		3	11.10	800
3.5		3.5	11.19	800	3.5		3.5	11.19	800
4		4	11.22	800	4		4	11.22	800
4.5		4.5	11.24	800	4.5		4.5	11.24	800
5		5	11.27	800	5		5	11.27	800
6		6	11.29	800	6		6	11.29	800
7		7	11.32	800	7		7	11.32	800
8		8	11.34	800	8		8	11.34	800
9		9	11.36	800	9		9	11.36	800
10		10	11.39	800	10		10	11.39	800
12		12	11.41	800	12		12	11.41	800
14		14	11.45	800	14		14	11.45	800
16		16	11.49	800	16		16	11.49	800
18		18	11.53	800	18		18	11.53	800
20		20	11.55	800	20		20	11.55	800
23		23	11.60	800	23		23	11.60	800
26		26	11.70	800	26		26	11.70	800
30		30	11.75	800	30		30	11.75	800
35		35	11.79	800	35		35	11.79	800
40		40	11.83	800	40		40	11.83	800
45		45	11.88	800	45		45	11.88	800
50		50	11.87	800	50		50	11.87	800
55		55	11.89	800	55		55	11.89	800
60		60	11.91	800	60		60	11.91	800
70		70	11.93	800	70		70	11.93	800
80		80	11.95	800	80		80	11.95	800
90		90	11.98	800	90		90	11.98	800
100		100	11.99	800	100		100	11.99	800
110		110	12.00	800	110		110	12.00	800
120		120	12.05	800	120		120	12.05	800

### Pumping Test Log

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Step		3 & 4		Test Team		MAJITECH ENGINEERING Ltd.	
Borehole No.	TD-20	District	Kishapu	Division	Negezi				
Coordinate	Longitude Latitude Altitude	33.78151 -3.93233 4.3		Ward	Ngoftia				
Static Water Level (m)		Static Water level shall be measured before first step testing.							
Time (min)	Date	Time (min)	Water level (m)	Yield (L/hour)	Time (min)	Date	Time (hrs min)	Water level (m)	Yield (L/hour)
0.5	2007/9/12	0.5	12.26	1000	0.5	2007/9/12	0.5	12.26	1000
1		1	12.33	1000	1		1	12.33	1000
1.5		1.5	12.50	1000	1.5		1.5	12.50	1000
2		2	12.66	1000	2		2	12.66	1000
2.5		2.5	12.71	1000	2.5		2.5	12.71	1000
3		3	12.80	1000	3		3	12.80	1000
3.5		3.5	12.89	1000	3.5		3.5	12.89	1000
4		4	12.93	1000	4		4	12.93	1000
4.5		4.5	12.99	1000	4.5		4.5	12.99	1000
5		5	13.05	1000	5		5	13.05	1000
6		6	13.10	1000	6		6	13.10	1000
7		7	13.16	1000	7		7	13.16	1000
8		8	13.24	1000	8		8	13.24	1000
9		9	13.31	1000	9		9	13.31	1000
10		10	13.39	1000	10		10	13.39	1000
12		12	13.45	1000	12		12	13.45	1000
14		14	13.53	1000	14		14	13.53	1000
16		16	13.60	1000	16		16	13.60	1000
18		18	13.70	1000	18		18	13.70	1000
20		20	13.80	1000	20		20	13.80	1000
23		23	13.94	1000	23		23	13.94	1000
26		26	14.03	1000	26		26	14.03	1000
30		30	14.13	1000	30		30	14.13	1000
35		35	14.21	1000	35		35	14.21	1000
40		40	14.30	1000	40		40	14.30	1000
45		45	14.38	1000	45		45	14.38	1000
50		50	14.44	1000	50		50	14.44	1000
55		55	14.47	1000	55		55	14.47	1000
60		60	14.50	1000	60		60	14.50	1000
70		70	14.60	1000	70		70	14.60	1000
80		80	14.65	1000	80		80	14.65	1000
90		90	14.75	1000	90		90	14.75	1000
100		100	14.80	1000	100		100	14.80	1000
110		110	14.86	1000	110		110	14.86	1000
120		120	14.89	1000	120		120	14.89	1000

**Pumping Test Log**

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Test method		Step	5	Test Team		MAJITECH ENGINEERING Ltd.	
Borehole No.	TD-20			District	Kishapu		
Coordinate		Longitude	33.78151	Division	Negezi		
		Latitude	-3.93233	Ward	Ngofila		
		Altitude		Village	Ngofila		
Static Water Level (m)		4.3		Static Water level shall be measured before first step testing.			
Time (min)	Date	Time hrs min	Water level (m)	Yield (L/hour)	Time hrs min	Water level (m)	Yield (L/hour)
0.5	2007/9/12	0.5	18.04	1500			
1		1	18.70	1500			
1.5		1.5	18.90	1500			
2		2	19.20	1500			
2.5		2.5	19.35	1500			
3		3	19.42	1500			
3.5		3.5	19.47	1500			
4		4	19.56	1500			
4.5		4.5	19.65	1500			
5		5	19.77	1500			
6		6	19.88	1500			
7		7	19.93	1500			
8		8	20.02	1500			
9		9	20.12	1500			
10		10	20.17	1500			
12		12	20.27	1500			
14		14	20.36	1500			
16		16	20.45	1500			
18		18	20.56	1500			
20		20	20.62	1500			
23		23	20.78	1500			
26		26	20.98	1500			
30		30	21.01	1500			
35		35	21.06	1500			
40		40	21.25	1500			
45		45	21.48	1500			
50		50	21.63	1500			
55		55	21.86	1500			
60		60	21.98	1500			
70		70	22.05	1500			
80		80	22.16	1500			
90		90	22.28	1500			
100		100	22.40	1500			
110		110	22.45	1500			
120		120	22.47	1500			

**Pumping Test Log**

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Recovery	Test Team		MAJITECH ENGINEERING Ltd.			
Borehole No.	TD-20			District	Kishapu			
Coordinate		Longitude	33.78151	Division	Negezi			
		Latitude	-3.93233	Ward	Ngofila			
		Altitude		Village	Ngofila			
Static Water Level (m)		4.3		Static Water level shall be measured before first step testing.				
Time (min)	Date	Time hrs min	Water level (m)	Yield (L/hour)	Time hrs min	Water level (m)	Yield (L/hour)	
0.5	2007/9/12	0.5	6.74	840	220	2007/9/13	12.85	840
1		1	7.33	840	240		12.99	840
1.5		1.5	7.59	840	280		12.99	840
2		2	7.94	840	300		13.06	840
2.5		2.5	8.45	840	360		13.18	840
3		3	8.67	840	420		13.27	840
3.5		3.5	8.89	840	480		13.47	840
4		4	9.03	840	540		13.56	840
4.5		4.5	9.15	840	600		13.71	840
5		5	9.26	840	660		13.85	840
6		6	9.41	840	720		13.99	840
7		7	9.54	840	780		14.13	840
8		8	9.68	840	840		14.26	840
9		9	9.83	840	900		14.38	840
10		10	9.97	840	960		14.43	840
12		12	10.20	840	1020		14.47	840
14		14	10.39	840	1080		14.52	840
16		16	10.55	840	1200			
18		18	10.66	840	1320			
20		20	10.74	840	1440			
23		23	10.83	840	1560			
25		25	10.92	840	1680			
30		30	11.06	840	1800			
35		35	11.17	840	1920			
40		40	11.25	840	2040			
45		45	11.33	840	2160			
50		50	11.41	840	2280			
55		55	11.54	840	2400			
60		60	11.66	840	2520			
75		75	11.73	840	2640			
80		80	11.83	840	2760			
90		90	11.94	840	2880			
100		100	12.01	840				
105		105	12.09	840				
120		120	12.16	840				
140		140	12.34	840				
150		150	12.55	840				
180		180	12.70	840				
200		200	12.74	840				

### Pumping Test Log

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Test method		Constant rate		Recovery		Test Team		MAJITECH ENGINEERING Ltd.		
Borehole No.	TD-20					District	Kishapu			
Coordinate		Longitude	33.78151			Division	Negezi			
Static Water Level (m)		Latitude	-3.03233			Ward	Ngojila			
		Altitude				Village	Ngojila			
Static Water level shall be measured before first step testing.										
Time (min)	Date	Time (min)	Water level (m)	Yield	Time (min)	Water level (m)	Yield	Time (min)	Water level (m)	Yield
0.5	2007/9/14	220	13.98		220	6.32		240	6.08	
1		240	13.00		240	5.89		280	5.57	
1.5		320	12.65		320	5.57		360	5.07	
2		420	12.41		420	4.71		480	4.39	
2.5		540	12.06		540	4.34		600	4.33	
3		600	11.98		600	4.33		720	4.33	
3.5		720	11.75		720	4.33		840	4.33	
4		840	11.56		840			960		
4.5		960	11.30		960			1080		
5		1080	11.12		1080			1200		
6		1200	10.94		1200			1320		
7		1440	10.71		1440			1560		
8		1680	10.57		1680			1800		
9		1800	10.43		1800			1920		
10		2040	10.32		2040			2160		
12		2280	10.20		2280			2400		
14		2520	10.11		2520			2640		
16		2760	10.11		2760			2880		
18			9.45							
20			9.80							
22			9.68							
25			9.49							
30			9.30							
35			9.13							
40			8.98							
45			8.81							
50			8.66							
55			8.57							
60			8.48							
70			8.33							
80			8.21							
90			8.09							
100			8.00							
110			7.89							
120			7.76							
140			7.44							
160			7.23							
180			6.80							
200			6.56							

### Pumping Test Log

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Test method		Step		Test Team		MAJITECH ENGINEERING Ltd.	
Borehole No.	TD-21			District	Maswa		
Coordinate		Longitude	33.68677	Division	Kigoku		
Static Water Level (m)		Latitude	-3.34095	Ward	Masela		
		Altitude		Village	Mwasayi		
Static Water level shall be measured before first step testing.							
Time (min)	Date	Time (min)	Water level (m)	Yield (L/hour)	Time (min)	Water level (m)	Yield (L/hour)
0.5	2007/9/15	0.5	20.07	800	0.5	19.52	1600
1		1	6.1	800	1	19.74	1600
1.5		1.5	9.25	800	1.5	19.87	1600
2		2	12.44	800	2	19.98	1600
2.5		2.5	15.61	800	2.5	20.1	1600
3		3	16.2	800	3	20.22	1600
3.5		3.5	17	800	3.5	20.35	1600
4		4	17.31	800	4	20.51	1600
4.5		4.5	17.65	800	4.5	20.6	1600
5		5	17.81	800	5	20.78	1600
6		6	17.99	800	6	20.81	1600
7		7	18.1	800	7	20.9	1600
8		8	18.23	800	8	20.97	1600
9		9	18.36	800	9	21.02	1600
10		10	18.49	800	10	21.08	1600
12		12	18.58	800	12	21.12	1600
14		14	18.65	800	14	21.15	1600
16		16	18.71	800	16	21.18	1600
18		18	18.8	800	18	21.22	1600
20		20	18.88	800	20	21.24	1600
23		23	18.99	800	23	21.25	1600
26		26	19.04	800	26	21.26	1600
30		30	19.14	800	30	21.27	1600
35		35	19.21	800	35	21.27	1600
40		40	19.25	800	40	21.28	1600
45		45	19.28	800	45	21.28	1600
50		50	19.29	800	50	21.29	1600
55		55	19.3	800	55	21.29	1600
60		60	19.3	800	60	21.29	1600
70		70	19.31	800	70	21.29	1600
80		80	19.31	800	80	21.29	1600
90		90	19.31	800	90	21.3	1600
100		100	19.31	800	100	21.3	1600
110		110	19.31	800	110	21.3	1600
120		120	19.31	800	120	21.3	1600

### Pumping Test Log

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Test method		Step		3 & 4		Test Team		MAJITECH ENGINEERING Ltd.	
Borehole No. TD-21		District Maswa		Kigoku					
Coordinate		Longitude 33.68677		Division		Maswa			
		Latitude -3.34095		Ward Masela					
		Altitude		Village Mwasayi					
Static Water Level (m)		5.9		Static Water level shall be measured before first step testing.					
Time (min)	Date	Time (min)	Yield (L/hour)	Time (min)	Water level (m)	Time (min)	Yield (L/hour)	Time (min)	Water level (m)
0.5	2007/9/15	21.67	2400	0.5	2007/9/15	24.83	3200	0.5	2007/9/15
1		21.99	2400	1		24.83	3200	1	
1.5		21.31	2400	1.5		25.12	3200	1.5	
2		21.59	2400	2		25.44	3200	2	
2.5		21.81	2400	2.5		25.95	3200	2.5	
3		21.04	2400	3		26.11	3200	3	
3.5		21.28	2400	3.5		26.35	3200	3.5	
4		21.35	2400	4		26.55	3200	4	
4.5		21.46	2400	4.5		26.83	3200	4.5	
5		21.54	2400	5		27	3200	5	
6		21.77	2400	6		27.13	3200	6	
7		21.88	2400	7		27.25	3200	7	
8		21.95	2400	8		27.33	3200	8	
9		22.03	2400	9		27.46	3200	9	
10		22.11	2400	10		27.62	3200	10	
12		22.13	2400	12		27.75	3200	12	
14		22.15	2400	14		27.9	3200	14	
16		22.16	2400	16		28.01	3200	16	
18		22.18	2400	18		28.09	3200	18	
20		22.21	2400	20		28.15	3200	20	
23		22.23	2400	23		28.19	3200	23	
26		22.23	2400	26		28.21	3200	26	
30		22.23	2400	30		28.22	3200	30	
35		22.23	2400	35		28.23	3200	35	
40		22.23	2400	40		28.25	3200	40	
45		22.24	2400	45		28.28	3200	45	
50		22.24	2400	50		28.3	3200	50	
55		22.24	2400	55		28.3	3200	55	
60		22.26	2400	60		28.3	3200	60	
70		22.27	2400	70		28.31	3200	70	
80		22.28	2400	80		28.31	3200	80	
90		22.28	2400	90		28.32	3200	90	
100		22.29	2400	100		28.32	3200	100	
110		22.29	2400	110		28.33	3200	110	
120		22.29	2400	120		28.33	3200	120	

### Pumping Test Log

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Test method		Step		5		Test Team		MAJITECH ENGINEERING Ltd.	
Borehole No. TD-21		District Maswa		Kigoku					
Coordinate		Longitude 33.68677		Division		Maswa			
		Latitude -3.34095		Ward Masela					
		Altitude		Village Mwasayi					
Static Water Level (m)		5.9		Static Water level shall be measured before first step testing.					
Time (min)	Date	Time (min)	Yield (L/hour)	Time (min)	Water level (m)	Time (min)	Yield (L/hour)	Time (min)	Water level (m)
0.5	2007/9/15	28.96	4000	0.5	2007/9/15	28.96	4000	0.5	2007/9/15
1		29.45	4000	1		29.45	4000	1	
1.5		29.92	4000	1.5		29.92	4000	1.5	
2		30.33	4000	2		30.33	4000	2	
2.5		30.85	4000	2.5		30.85	4000	2.5	
3		31.02	4000	3		31.02	4000	3	
3.5		31.25	4000	3.5		31.25	4000	3.5	
4		31.48	4000	4		31.48	4000	4	
4.5		31.71	4000	4.5		31.71	4000	4.5	
5		31.88	4000	5		31.88	4000	5	
6		31.94	4000	6		31.94	4000	6	
7		31.99	4000	7		31.99	4000	7	
8		32.05	4000	8		32.05	4000	8	
9		32.15	4000	9		32.15	4000	9	
10		32.19	4000	10		32.19	4000	10	
12		32.23	4000	12		32.23	4000	12	
14		32.25	4000	14		32.25	4000	14	
16		32.26	4000	16		32.26	4000	16	
18		32.29	4000	18		32.29	4000	18	
20		32.3	4000	20		32.3	4000	20	
23		32.32	4000	23		32.32	4000	23	
26		32.32	4000	26		32.32	4000	26	
30		32.32	4000	30		32.32	4000	30	
35		32.32	4000	35		32.32	4000	35	
40		32.33	4000	40		32.33	4000	40	
45		32.33	4000	45		32.33	4000	45	
50		32.33	4000	50		32.33	4000	50	
55		32.33	4000	55		32.33	4000	55	
60		32.34	4000	60		32.34	4000	60	
70		32.34	4000	70		32.34	4000	70	
80		32.34	4000	80		32.34	4000	80	
90		32.34	4000	90		32.34	4000	90	
100		32.34	4000	100		32.34	4000	100	
110		32.34	4000	110		32.34	4000	110	
120		32.34	4000	120		32.34	4000	120	

**Pumping Test Log**

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Test method		Constant rate		Recovery		Test Team		MAJITECH ENGINEERING Ltd.	
Borehole No. TD-21		District Maswa		Division Kigoko		District Maswa		Division Kigoko	
Coordinate		Longitude 33.68677		Latitude -3.34095		Division Kigoko		Division Kigoko	
Static Water Level (m)		Altitude		Ward Masela		District Maswa		Division Kigoko	
5.9		Mwasavi		District Maswa		Division Kigoko		Division Kigoko	
Static Water level shall be measured before first step testing.									

Time (min)	Date	Time		Water level (m)	Yield (L/hour)	Time (min)	Time		Water level (m)	Yield (L/hour)
		hrs	min				hrs	min		
0.5	2007/9/15			6.51	2,000	220			22.12	2000
1				8.19	2,000	240			22.15	2000
1.5				9.72	2,000	280			22.19	2000
2				11.93	2,000	320			22.21	2000
2.5				13.54	2,000	360			22.25	2000
3				15.61	2,000	420			22.28	2000
3.5				16.17	2,000	480			22.3	2000
4				17.21	2,000	540			22.32	2000
4.5				17.93	2,000	600			22.33	2000
5				18.22	2,000	660			22.33	2000
6				18.45	2,000	720			22.34	2000
7				18.63	2,000	780			22.35	2000
8				18.8	2,000	840			22.35	2000
9				18.9	2,000	900			22.36	2000
10				18.98	2,000	960			22.36	2000
12				19.05	2,000	1020			22.37	2000
14				19.14	2,000	1080			22.38	2000
16				19.27	2,000	1200			22.39	2000
18				19.36	2,000	1320			22.4	2000
20				19.48	2,000	1440				
23				19.55	2,000	1560				
25				19.62	2,000	1680				
30				19.79	2,000	1800				
35				19.87	2,000	1920				
40				19.95	2,000	2040				
45				20.1	2,000	2160				
50				20.32	2,000	2280				
55				20.6	2,000	2400				
60				20.88	2,000	2520				
75				21	2,000	2640				
80				21.2	2,000	2760				
90				21.47	2,000	2880				
100				21.54	2,000					
105				21.62	2,000					
120				21.71	2,000					
140				21.8	2,000					
150				21.89	2,000					
180				22	2,000					
200				22.08	2,000					

**Pumping Test Log**

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Constant rate		Recovery		Test Team		MAJITECH ENGINEERING Ltd.	
Borehole No. TD-21		District Maswa		Division Kigoko		District Maswa		Division Kigoko	
Coordinate		Longitude 33.68677		Latitude -3.34095		Division Kigoko		Division Kigoko	
Static Water Level (m)		Altitude		Ward Masela		District Maswa		Division Kigoko	
5.9		Mwasavi		District Maswa		Division Kigoko		Division Kigoko	
Static Water level shall be measured before first step testing.									

Time (min)	Date	Time		Water level (m)	Yield	Time (min)	Time		Water level (m)	Yield
		hrs	min				hrs	min		
0.5	2007/9/24			31.14		220			4.32	
1				30.18		240			4.32	
1.5				29.11		280			4.32	
2				28.71		320			4.32	
2.5				27.61		360				
3				26.5		420				
3.5				25.52		480				
4				24.91		540				
4.5				23.47		600				
5				22.73		660				
6				21.44		720				
7				20.16		840				
8				18		960				
9				16.81		1080				
10				14.92		1200				
12				13.98		1320				
14				13		1440				
16				12		1560				
18				10.1		1680				
20				9.03		1800				
23				8.25		1920				
25				7.76		2040				
30				7.23		2160				
35				7		2280				
40				6.6		2400				
45				6.32		2520				
50				6.08		2640				
55				5.89		2760				
60				5.57		2880				
70				5.07						
80				4.92						
90				4.71						
100				4.53						
110				4.39						
120				4.3						
140				4.33						
160				4.33						
180				4.33						
200				4.32						



**Pumping Test Log**

The Study on the Groundwater Resources Development and Management  
in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Step		1 & 2		Test Team		MAJITECH ENGINEERING Ltd.	
Borehole No.	TD-29			District	Arumeru				
Coordinate		Longitude		Division	Kingori				
		Latitude		Ward	Ngarananyuki				
		Altitude		Village	Uwiro				
Static Water Level (m)		25		Static Water level shall be measured before first step testing.					
Time (min)	Date	Time (hrs:min)	Water level (m)	Yield (L/hour)	Time (min)	Date	Time (hrs:min)	Water level (m)	Yield (L/hour)
0.5	2007/8/27		28.2	3272	0.5	2007/8/27		29.5	4000
1			28.8	3272	1			29.6	4000
1.5			28.9	3272	1.5			29.72	4000
2			28.94	3272	2			29.83	4000
2.5			28.98	3272	2.5			29.92	4000
3			29	3272	3			29.99	4000
3.5			29.04	3272	3.5			30.08	4000
4			29.08	3272	4			30.16	4000
4.5			29.1	3272	4.5			30.25	4000
5			29.13	3272	5			30.34	4000
6			29.16	3272	6			30.42	4000
7			29.19	3272	7			30.54	4000
8			29.23	3272	8			30.67	4000
9			29.25	3272	9			30.79	4000
10			29.29	3272	10			30.91	4000
12			29.31	3272	12			31.05	4000
14			29.33	3272	14			31.19	4000
16			29.33	3272	16			31.35	4000
18			29.34	3272	18			31.48	4000
20			29.34	3272	20			31.69	4000
23			29.35	3272	23			31.84	4000
26			29.36	3272	26			31.92	4000
30			29.37	3272	30			32.08	4000
35			29.37	3272	35			32.23	4000
40			29.37	3272	40			32.47	4000
45			29.38	3272	45			32.68	4000
50			29.39	3272	50			32.89	4000
55			29.39	3272	55			33.01	4000
60			29.39	3272	60			33.17	4000
70			29.4	3272	70			33.25	4000
80			29.4	3272	80			33.34	4000
90			29.41	3272	90			33.42	4000
100			29.41	3272	100			33.5	4000
110			29.41	3272	110			33.56	4000
120			29.41	3272	120			33.62	4000

**Pumping Test Log**

The Study on the Groundwater Resources Development and Management  
in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Step		3 & 4		Test Team		MAJITECH ENGINEERING Ltd.	
Borehole No.	TD-29			District	Arumeru				
Coordinate		Longitude		Division	Kingori				
		Latitude		Ward	Ngarananyuki				
		Altitude		Village	Uwiro				
Static Water Level (m)		25		Static Water level shall be measured before first step testing.					
Time (min)	Date	Time (hrs:min)	Water level (m)	Yield (L/hour)	Time (min)	Date	Time (hrs:min)	Water level (m)	Yield (L/hour)
0.5	2007/8/27		33.89	7000	0.5	2007/8/27		37.62	10000
1			34.05	7000	1			37.74	10000
1.5			34.19	7000	1.5			37.89	10000
2			34.33	7000	2			38.07	10000
2.5			34.5	7000	2.5			38.13	10000
3			34.71	7000	3			38.27	10000
3.5			34.88	7000	3.5			38.39	10000
4			34.99	7000	4			38.55	10000
4.5			35.16	7000	4.5			38.72	10000
5			35.29	7000	5			38.89	10000
6			35.43	7000	6			39.07	10000
7			35.58	7000	7			39.22	10000
8			35.7	7000	8			39.38	10000
9			35.81	7000	9			39.56	10000
10			35.89	7000	10			39.71	10000
12			35.98	7000	12			39.85	10000
14			36.07	7000	14			39.97	10000
16			36.17	7000	16			40.12	10000
18			36.25	7000	18			40.31	10000
20			36.37	7000	20			40.57	10000
23			36.49	7000	23			40.8	10000
26			36.56	7000	26			40.96	10000
30			36.65	7000	30			41.19	10000
35			36.74	7000	35			41.53	10000
40			36.82	7000	40			41.6	10000
45			36.91	7000	45			41.89	10000
50			37.03	7000	50			42.05	10000
55			37.14	7000	55			42.17	10000
60			37.22	7000	60			42.23	10000
70			37.3	7000	70			42.29	10000
80			37.36	7000	80			42.33	10000
90			37.41	7000	90			42.37	10000
100			37.46	7000	100			42.4	10000
110			37.49	7000	110			42.42	10000
120			37.51	7000	120			42.43	10000

**Pumping Test Log**

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

<b>Test method</b>	<b>Step</b>	<b>5</b>	<b>Test Team</b>	MAJITECH ENGINEERING Ltd.		
Borehole No.	TD-29		District	Arumeru		
			Division	Kingori		
Coordinate	Longitude Latitude Altitude	36.84932 3.14609	Ward	Ngarenanyuki		
			Village	Uwiro		
Static Water Level (m)		25	Static Water level shall be measured before first step testing.			

Time (min)	Date	Time		Water level (m)	Yield (L/hour)
		hrs	min		
0.5	2007/8/27			42.49	14000
1				42.63	14000
1.5				42.88	14000
2				43.16	14000
2.5				43.44	14000
3				43.77	14000
3.5				44.03	14000
4				44.37	14000
4.5				44.69	14000
5				44.95	14000
6				45.27	14000
7				45.63	14000
8				45.91	14000
9				46.3	14000
10				46.87	14000
12				47.23	14000
14				47.74	14000
16				47.97	14000
18				48.24	14000
20				48.81	14000
23				49.35	14000
26				49.78	14000
30				49.97	14000
35				50.24	14000
40				50.37	14000
45				50.49	14000
50				50.64	14000
55				50.69	14000
60				50.75	14000
70				50.79	14000
80				50.82	14000
90				50.84	14000
100				50.85	14000
110				50.85	14000
120				50.85	14000

**Pumping Test Log**

The Study on the Groundwater Resources Development and Management in the Internal Drainage Basin in the United Republic of Tanzania

<b>Test method</b>	<b>Constant rate</b>	<b>Recovery</b>	<b>Test Team</b>	MAJITECH ENGINEERING Ltd.		
Borehole No.	TD-29		District	Arumeru		
			Division	Kingori		
Coordinate	Longitude Latitude Altitude	36.84932 3.14609	Ward	Ngarenanyuki		
			Village	Uwiro		
Static Water Level (m)		25	Static Water level shall be measured before first step testing.			

Time (min)	Date	Time		Water level (m)	Yield (L/hour)
		hrs	min		
0.5	2007/8/27			26.46	3,600
1				27.25	3,600
1.5				27.7	3,600
2				27.97	3,600
2.5				28.19	3,600
3				28.47	3,600
3.5				28.6	3,600
4				28.65	3,600
4.5				28.7	3,600
5				28.8	3,600
6				28.93	3,600
7				29	3,600
8				29.08	3,600
9				29.2	3,600
10				29.27	3,600
12				29.35	3,600
14				29.37	3,600
16				29.4	3,600
18				29.45	3,600
20				29.5	3,600
23				29.55	3,600
25				29.57	3,600
30				29.62	3,600
35				29.7	3,600
40				29.7	3,600
45				29.73	3,600
50				29.73	3,600
55				29.74	3,600
60				29.74	3,600
75				29.74	3,600
80				29.77	3,600
90				29.78	3,600
100				29.78	3,600
105				29.8	3,600
120				29.8	3,600
140				29.81	3,600
150				29.82	3,600
180				29.82	3,600
200				29.82	3,600

### Pumping Test Log

The Study on the Groundwater Resources Development and Management  
in the Internal Drainage Basin in the United Republic of Tanzania

Test method		Constant rate		Recovery		Test Team		MAJITECH ENGINEERING Ltd.			
Borehole No.	TD-29					District	Arumeru				
						Division	Kingori				
Coordinate	Longitude	36.84932					Division				
	Latitude	3.14609					Ward	Ngarenanyuki			
	Altitude						Village	Uwiro			
Static Water Level (m)	25					Static Water level shall be measured before first step testing.					
Time (min)	Date	Time (hrs)	min	Water level (m)	Yield	Time (min)	Date	Time (hrs)	min	Water level (m)	Yield
0.5	2007/8/28			28.6		220					
1				27.06		240					
1.5				26.1		280					
2				25.75		320					
2.5				25.67		360					
3				25.64		420					
3.5				25.58		480					
4				25.51		540					
4.5				25.48		600					
5				25.43		660					
6				25.38		720					
7				25.33		840					
8				25.31		960					
9				25.3		1080					
10				25.25		1200					
12				25.21		1320					
14				25.18		1440					
16				25.16		1560					
18				25.15		1680					
20				25.12		1800					
23				25.11		1920					
25				25.11		2040					
30				25.1		2160					
35				25.1		2280					
40				25.1		2400					
45				25.1		2520					
50				25.1		2640					
55				25.1		2760					
60				25.1		2880					
70				25.1							
80				25.1							
90											
100											
110											
120											
140											
160											
180											
200											

***Data G***  
***Manual and Guideline for***  
***Organization Strengthening***

**THE UNITED REPUBLIC OF TANZANIA  
MINISTRY OF WATER**



**INTERNAL DRAINAGE BASIN STAFF,  
EQUIPMENTS, TOOLS AND  
ACTIVITIES GUIDELINES MANUAL  
(Draft 2)**

**INTERNAL DRAINAGE BASIN  
SINGIDA HEAD OFFICE**

**MARCH, 2007**

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### ABBREVIATION

<b>IDB</b>	<b>: Internal Drainage Basin</b>
<b>IDBO</b>	<b>: Internal Drainage Basin Office</b>

## **1. INTRODUCTION:**

Water is one of the many National natural resources.

Water Resources Management which is in general a process by which Resources are maintained in a preserved and conserved environmental surroundings while their utilization are logically supervised can in Tanzania be counted to have started in the colonial Rule soon after the 1<sup>st</sup> World War when Elements of Water Resources management were discussed.

Principal rules and laws were later legislated with ordinance No. 3 of 1959. This Ordinance (laws or Act) was later Amended to form Act No.42 of 1974 which in 1981 underwent some Amendments to form Act No. 10 of 1981 called Water Utilization (Control and Regulation) Amendment Act of 1981 which contained articles on the formation of Basin Water Boards and Water Offices, Pollution issues, drinking water and effluents standard was the basis for our present water Act No.42 of 1974 officially called THE WATER UTILIZATION (CONTROL AND REGULATION) ACT.

Internal Drainage Basin Office (IDBO) was established in Singida Municipality on 29<sup>th</sup> October 2004 headed by Mr. Nasari as Basin Water Officer. IDBO main office is in Singida and sub-offices are in Shinyanga and Arusha (Babati). Internal Drainage Basin (IDB) is the 2<sup>nd</sup> largest Basin among the 9 Basins in Tanzania covering an area of about 143,000 km<sup>2</sup>. and extends into six regions (Singida, Dodoma, Manyara, Tabora, Arusha and Shinyanga) has a total number of 24 Districts, 2 Municipalities and 1 Township (see Appendix 1) is topographically located between latitudes 2<sup>o</sup> and 7<sup>o</sup> South and longitudes 33<sup>o</sup> and 37<sup>o</sup> East in an area which has a semi desert type of climate having annual rainfall of between 400 and 600 mm. No many perennial rivers and surface water bodies can exist in such climatical conditions.

## **2. OBJECTIVES FOR THE ESTABLISHMENT OF INTERNAL DRAINAGE BASIN (IDBO):**

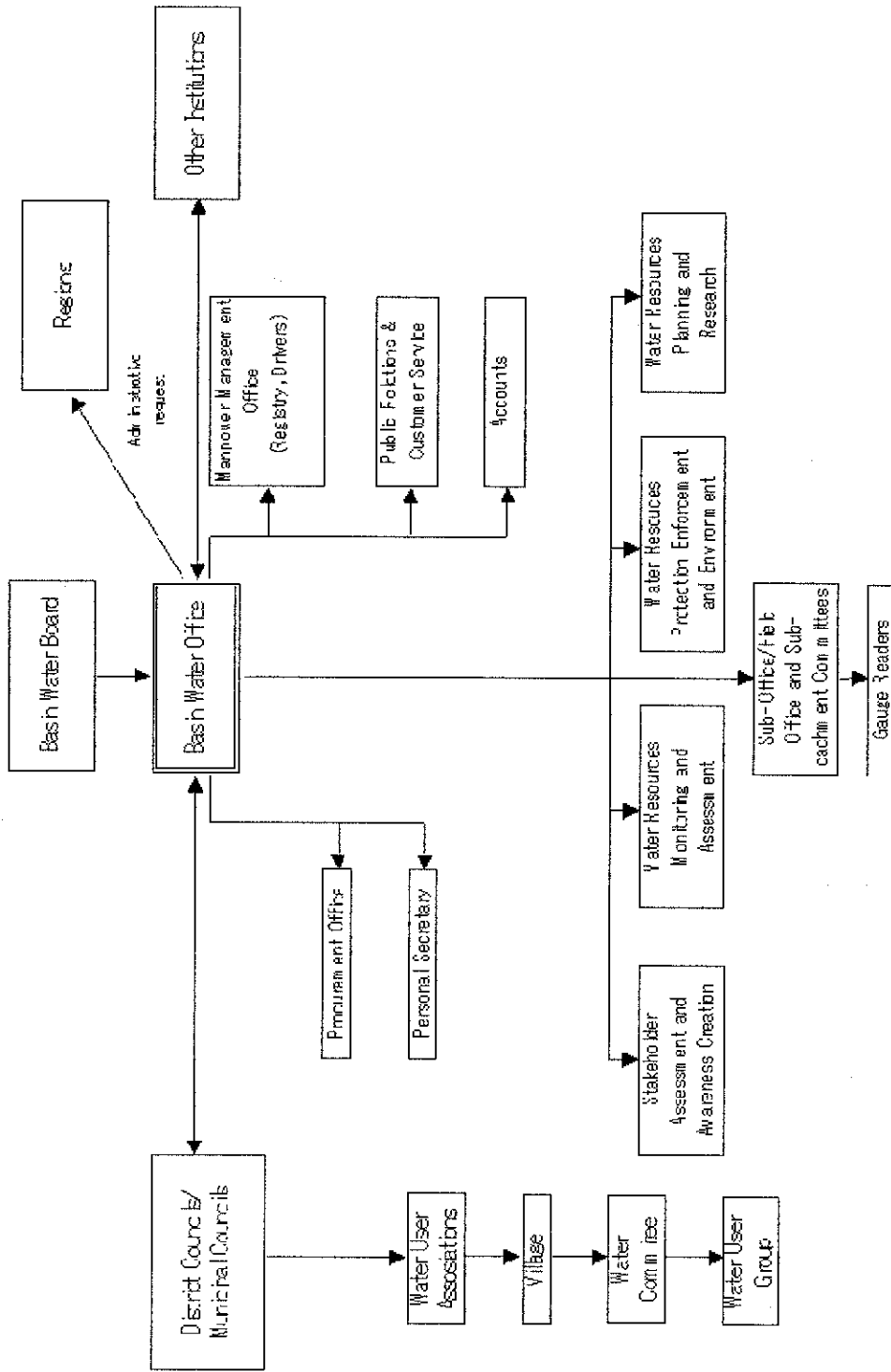
Establishment of any Organization should target some Operational objectives so as to fulfill its goals and obligations for smooth running its activities. The formation of IDBO has therefore the below listed establishment objectives.

- (1) To develop a comprehensive framework for promoting sustainable and equitable development and use of water resources for the benefit of all Tanzanians, based on a clear set of guiding principles.
- (2) To have in place fair and equal procedures in access to and allocation of water resources so that all social and economic activities are able to maximize their capacities.
- (3) To have criteria for prioritization of water allocation so as to ensure that socio-economic activities and the environment receive their adequate share of the water resources on the basis of its availability, and enable the sectors increase productivity, and mitigate conflicts

- (4) To have in place appropriate principles and procedures for managing the quality and conservation of water resources as well as improve and protect the ecological systems and wetlands.
- (5) To have sustainable surface and groundwater resources for the present and future generation.
- (6) To have water resources with an acceptable quality.
- (7) To have in place water management system which protects the environment, ecological system and biodiversity.
- (8) To have appropriate and sustainable procedures for management and preparation of water use plans.
- (9) To have sustainable plans and development of water resources.
- (10) To have correct and timely data and information for design, construction and operation of different projects.
- (11) To increase knowledge, information and communication between community and resource users.
- (12) To have adequate number of staff who would supervise different water Resources activities
- (13) To have flood mitigation plans.
- (14) To minimize the positive impacts of droughts.
- (15) To have procedure for safety and ownership of dams.
- (16) To protect against hazards associated with pollution of water sources.



### 3.0 ORGANIZATION CHART FOR INTERNAL DRAINAGE BASIN:



- Notes:
- Den and Line
  - ↔ Administrative request
  - Line of communication and information dissemination

#### 4. 0 EXISTING PERSONNEL

INTERNAL DRAINAGE BASIN (IDBO) Personnel is divided into three major groups. These groups are A: Professional, B: Technical, which is also sub divided into four sections of Hydrology, Hydrogeology, Laboratory and Operation and Maintenance and C: Supporting Staff.

##### A. PROFESSIONAL

S/NO.	STAFF	DESIGNATION	POSITION	PLACE
1	Joseph Nasari	Principal Hydrologist I	Basin Water Officer	Singida
2	Ahmed Bwanguzo	Principal Hydrogeologist I	Hydrogeologist	Singida
3	N.M. Mgozi	Principal Hydrogeologist I	Hydrogeologist	Shinyanga
4	Naamani Sumari	Principal Engineer II	Mechanical Engineer	Singida

##### B. TECHNICAL:

###### HYDROLOGY:

S/NO.	STAFF	DESIGNATION	POSITION	PLACE
1	Yohana Hema	Principal Technician I	Hydrology Technician	Singida
2	KAGS. Luvanda	Principal Technician II	Hydrology Technician	Shinyanga
3	Ezekiel Malando	Principal Technician II	Hydrology Technician	Shinyanga
4	Charles Kalusa	Principal Technician II	Hydrology Technician	Shinyanga
5	Naftali Kuro	-	Gauge Reader	Singida
6	Mwassy Mayeye	-	Gauge Reader	Singida
7	Jumanne Iddi	-	Met. Observer	Singida
8	Shabani Ally	-	Gauge Reader	Singida
9	Joseph Kinyami	-	Gauge Reader	Shinyanga
10	John Mafunda	-	Gauge Reader	Shinyanga
11	Eliasi Kasiga	-	Gauge Reader	Shinyanga
12	Sostheness Malala	-	Met. Observer	Dodoma
13	Kaunda Mwaluanda	-	Met. Observer	Dodoma
14	Amina Hassan	-	Gauge Reader	Dodoma
15	Salimu Iddi	-	Gauge Reader	Dodoma
16	Hassan Shabani	-	Gauge Reader	Dodoma
17	Thuway Lulu	-	Gauge Reader	Manyara
18	Khalifa Yakobo	-	Gauge Reader	Manyara
19	Jumanne Hassan	-	Gauge Reader	Manyara
20	Daniel Kwahi	-	Gauge Reader	Manyara
21	Amina Bakari	-	Gauge Reader	Manyara
22	Ferdinand Clemence	-	Gauge Reader	Arusha

###### HYDROGEOLOGY:

S/NO.	STAFF	DESIGNATION	POSITION	PLACE
1	Joseph Mghanga	Principal Technician II	Hydrogeology Technician	Singida
2	Emmanuel Nyallandu	Principal Technician II	Hydrogeology Technician	Singida
3	Gaspar Joseph	Principal Technician II	Hydrogeology Technician	Shinyanga
4	Barnabas Gimbishi	Principal Technician II	Hydrogeology Technician	Shinyanga
5	Laurent Mabina	Principal Technician II	Hydrogeology Technician	Shinyanga

6	Golden Lyatuu	Principal Technician II	Hydrogeology Technician	Arusha
7	Orgen Shao	Technician I	Hydrogeology Technician	Arusha
8	Emmanuel Chibile	Technician II	Hydrogeology Technician	Arusha
9	Wanindila Kishaluli	Draughting Technician II	Hydrogeology Technician	Singida

**LABORATORY:**

S/NO.	STAFF	DESIGNATION	POSITION	PLACE
1	Festo Saroni	Principal Technician II	Water Laboratory Techn.	Singida
2	Shifaya Munisi	Principal Technician II	Water Laboratory Techn.	Singida
3	Emmanuel Cherehani	Principal Technician II	Water Laboratory Techn.	Shinyanga
4	Juliasi Bujiku	Principal Technician II	Water Laboratory Techn.	Shinyanga
5	Annet Masudi	Senior Technician II	Water Laboratory Techn.	Shinyanga

**OPERATION AND MAINTENANCE:**

S/NO.	STAFF	DESIGNATION	POSITION	PLACE
1	Ramadhani Kidumwu	Principal Technician II	Civil Technician	Singida
2	Alfani O.J. Kitogo	Senior Technician II	Civil Technician	Singida
3	Valentine Duru	Senior Technician II	Civil Technician	Singida
4	Jacobo Lembele	Senior Technician II	Civil Technician	Singida
5	Pendaël Madale	Senior Technician II	Civil Technician	Singida
6	Samwel B. Kilaili	Assist. Technician	Windmill Technician	Singida
7	Pius Lugongo	Assist. Technician	Windmill Technician	Singida
8	Elisha B. Msambu	Assist. Technician	Windmill Technician	Singida

**C: SUPPORTING STAFF:**

S/NO.	STAFF	DESIGNATION	POSITION	PLACE
1	Paulina Duki	Personal Secretary III	Personal Secretary	Singida
2	Martina Chamwali	Senior Accountant I	Accountant	Shinyanga
3	Nelson Masero	Accountant I	Accountant	Singida
4	Paulina Mrosso	Personal Secretary	Secretary	Shinyanga
5	Vicent Adriano	Driver	Driver	Singida
6	Walter Okashi	Driver	Driver	Singida
7	Octavian Chagula	Driver	Driver	Singida
8	Amina Ally	Senior Office Attendant II	Office Attendant	Singida
9	Abdallah Hollota	Watchman	Watchman	Singida
10	Ramadhani Hamisi	Watchman	Watchman	Singida
11	Kinondo Mayunga	Watchman	Watchman	Shinyanga

## 5.0 EQUIPMENTS AND TOOLS:

	Equipments:	Tools:
<b>I.0: ADMINISTRATION:</b>		
1.1: Head Office Singida:		
• Computer	3	-
• Photocopy Machine	1	-
• Fax	1	-
• Telephone	1	-
• Vehicle	3	-
• Internet Network	1	-
1.2: Sub Office Arusha:	-	-
1.3: Sub Office Shinyanga	-	-
<b>2.0: Hydrology:</b>		
2.1: Head Office Singida		
• Current meter large	1	-
• Levelling Instrument	1	-
• Tripod	1	-
• Levelling Staff	1	-
2.2: Sub Office Arusha:	-	-
2.3: Sub Office Shinyanga:		
• Current meter large	1	-
• Levelling Instrument	1	-
• Tripod	1	-
• Levelling Staff	1	-
<b>3.0: Hydrogeology:</b>		
3.1: Head Office Singida		
3.2: Sub Office Arusha		
3.3: Sub Office Shinyanga		
<b>4.0: Laboratory:</b>		
4.1: Head Office Singida		
• Analytical equipment	1	-
• Glassware	1	-
• Field Test kit	1	-
• Microbiological equipment	1	-
4.2: Sub Office Arusha	-	-
4.3: Sub Office Shinyanga:		
• Analytical equipment	1	-
• Glassware	1	-
• Field Test kits	1	-
• Microbiological equipment	1	-

**6.0 PRESENT AND REQUIRED PERSONNEL & EQUIPMENTS IN IDBO**

HUMAN RESOURCES		EQUIPMENTS		BUDGET	COMMUNICATION BY
PERSONNEL'S TITLE	PRESENT	REQUIRED	PRESENT		
<b>ADMINISTRATION</b>					
<b>Head office - Singida</b>					
Basin Water Officer	Joseph Nasari	-	Computers	3	Postal Mail
Establishment Officer	-	1	Photocopier	1	Fax
Office Supervisor	-	1	Fax	1	E-mail
Personal Secretary	Pauline Duki	-	Telephone	1	Telephone
Accountant	Nelson Masero	-	Vehicles	3	Ministry of Water & Water User Fee
Drivers - 3	Vicent Adriano	3	- Double Cabin	2	
	Walter Okashi	-	- Lorry	1	
	Octavian Chagula	-	E-mail	-	
Office Attendants	Amina Ally	1	Internet connection system between IDB Offices and its sub-offices		
Watchmen - 2	Abdallah Holota	2			
	Ramadhani Hamisi	-			
<b>Sub-Office Arusha ( Babati)</b>					
Office Supervisor	-	1	Computer set		
Personal Secretary	-	1	Photocopier		
Accounts Clerk	-	1	Fax		
Drivers	-	2	Telephone		
Office Attendants	-	2	Vehicle		
Watchmen	-	2			
<b>Sub-Office Shinyanga</b>					
Office Supervisor	-	1	Computer set		
Personal Secretary	Paulina Miroso	-	Photocopier		
Accountant	Martina Chamwali	-	Fax		
Drivers	-	1	Telephone		
Office Attendants	-	2	Vehicle		
Watchmen	8	-			

HUMAN RESOURCES		EQUIPMENTS		BUDGET	COMMUNICATION BY
PERSONNEL'S TITLE	PRESENT	REQUIRED	PRESENT	REQUIRED	
<b>HYDROLOGY SECTION</b>					
<b>Head Office Singida</b>					
Hydrologist	-	1	Currentmeter Large	1	
Principal Technician	Yohana Hema	-	Levelling Instrument	1	
Senior Technician	-	1	Tripod	1	
Gauge Readers	2 Present	6	Levelling Staff	1	
Meteorological Observers	2 Present	1	Computer set	1	As above
			GPS	1	
			Currentmeter Pygmy	2	
			Vehicle	1	
			Compass	1	
			Engine Boat	1	
<b>Sub-Office Arusha (Babati)</b>					
Principal Technician	-	1	Currentmeter Large	2	
Technicians	-	2	Levelling Instrument	2	
Gauge Readers	-	6	Tripod	2	
Meteorological Observer	-	1	Levelling Staff	2	
			Computer set	1	As above
			GPS	1	
			Currentmeter Pygmy	2	
			Compass	1	
			Vehicle	1	
			Engine Boat	1	
<b>Sub-Office Shinyanga</b>					
Principal Technicians - 3	Klonda.AGS. Luvanda	-	Currentmeter Large	1	
	Ezekiel Malando	-	Levelling Instrument	1	
	Charles Kalusha	-	Tripod	1	
Gauge Readers	5 Present	8	Levelling Staff	1	
Meteorological Observers	2 Present	2	Computer set	1	As above
			GPS	1	
			Vehicle	1	
			Fax	1	
			Compass	1	
			Currentmeter Pygmy	2	
			Engine Boat	1	

HUMAN RESOURCES		EQUIPMENTS		BUDGET	COMMUNICATION BY
PERSONNEL'S TITLE	PRESENT	REQUIRED	PRESENT	REQUIRED	
<b>HYDROGEOLOGY SECTION</b>					
<b>Head Office Singida</b>					
Hydrogeologist	Ahmed Bwanguzo	-		Terrameter set	1
Principal Technicians - 2	Joseph Mghanga	-		Magnetometer	1
	Emmanuel Nyallandu	-		GPS	2
Draughting Technician II	Wanindila Kishatuli	-	Nil	Computer set	1
				Compass	2
				Dipper	1
				Borehole Logger	1
				Vehicle	1
<b>Sub-Office Arusha ( Babati)</b>					
Hydrogeologist	-	1		As in Singida H/Office	
Principal Technician	Golden Lyatuu	-	Nil	except for the Borehole	
Technicians - 2	Orgen Shao	-		Logger	
	Emmanuel Chibile	-			
<b>Sub-Office Shinyanga</b>					
Hydrogeologist	N.M.Mgozi	-			
Principal Technicians - 3	Gaspar. I. Joseph	-	Nil	As in Arusha Sub-Offices	
	Barnabas Gimishi	-			
	Laurent Mabina	-			
<b>LABOTATORY SECTION</b>					
<b>Head Office Singida</b>					
Principal Technicians - 2	Festo Saroni	-	Analytical Equipment	-	
	Shifaya A. Munisi	-	Glassware	-	
			Field Test kits	-	
			Microbiological equip..	-	
			Analytical Equipment	4	
			Computer set	1	
			GPS	1	
			Field Test kits	3	
			Microbiological		
			Accessories (Packs)	10	
			Vehicle	1	
					As above

HUMAN RESOURCES			EQUIPMENTS		BUDGET	COMMUNICATION BY
PERSONNEL'S TITLE	PRESENT	REQUIRED	PRESENT	REQUIRED		
<b>Sub-Office Arusha ( Babati)</b>						
Technicians	Nil	2	Nil	As in Singida Head Office	-	-
<b>Sub-Office Shinyanga</b>						
Principal Technicians - 2	Emmanuel Charahani Julius Bujiku Annet Masudi	- - -	As In Singida H/Office Laboratory	As in Singida H/Office Laboratory	As above	As above
<b>OPERATION &amp; MAINTENANCE SECTION</b>						
<b>Head Office Singida</b>						
Principal Mechanical Engineer II	Naaman R.T. Sumari	-	Nil	Compass Theodolite set Levelling Staff	As above	As above
Principal Technician II	Ramadhani Kidumwu	-				
Senior Technicians II	Valentine Duru Halfan O.J. Kitogo Jacobo Lembele Pendael Madale Samwel B. Kiliali Plus Lugongo Elisha B. Msambu	- - - - - - -				
Windmill Technicians - 3			Tools Spare	GPS		



## **7.0 TASKS OF INTERNAL DRAINAGE BASIN OFFICE (IDBO)**

Below is the list of Tasks in the IDBO.

1. Establish/update personnel database
2. Capacity building for the Basin staff
3. Deal with employment issues
4. Communication with other Institutions
5. Keep records and Office documents
6. Prepare meetings/workshops/seminars etc
7. Training
8. Information Dissemination
9. Prepare Basin Annual Work Plans
10. Coordinate, utilize and disseminate different research results
11. Prepare Project write-ups
12. Data collection –Hydrometeorological/Hydrometric and Hydrogeological
13. Data processing and analysis - Hydrometeorological/Hydrometric and Hydrogeological
14. To liaise with other institutions in data collection.
15. Routine inspection of data collecting stations
16. Establish/update hydrological and hydrogeological database
17. Involve communities in preventing vandalism against Hydrological and Hydrogeological networks
18. Assess adequacy of data collecting stations in the network
19. Demarcation of water sources .
20. Receive discharge and water permit applications
21. Submission of processed water permit application to Basin Water Board (BWB)
22. Water users inspection for compliance.
23. Operate and maintain ground water monitoring stations and hydrological data collection networks
24. Groundwater exploration
25. Identify and list potential aquifers
26. Identify and demarcate potential groundwater areas that can be affected by human activities
27. Monitor drilling activities (Private Drillers should notify IDB office about their activities)
28. Prepare Hydrogeological map of Internal Drainage Basin
29. Prepare a water balance map of various rivers and streams in the Internal Drainage Basin
30. Prepare Borehole location maps
31. Supervision of B/Hole Drilling and Pumping test

32. Investigation and construction of shallow wells
33. Water sources protection in collaboration with other stakeholders
34. Awareness creation to the Communities on Environmental protection and degradation issues.
35. Water quality monitoring and pollution control
36. Prosecution of defaulters
37. Water facilities data collection.
38. Data base creation.

## 8.0 SERVICES TO BE OBTAINED BY OTHER ORGANISATIONS

Following below are the services which can be obtained by other Organizations from the IDBO.

1. Legal protection of natural resources
2. Resolution of water conflicts
3. Management of water resources
4. Environmental protection
5. Availability of a known source of accurate water resources data
6. Provision of water rights to water users
7. Provision of technical advises in water resources

## 9.0 COOPERATION SYSTEM BETWEEN INTERNAL DRAINAGE BASIN OFFICE (IDBO) AND OTHER ORGANISATIONS:

The Internal Drainage Basin Office(IDBO) is expecting to receive cooperation in the below mentioned fields from other Organizations in order to achieve its goals:-

- (a) Technical
- (b) Professional

### INTERNAL DRAINAGE BASIN IS PROPOSING THE FOLLOWING SYSTEM OF COOPERATION WITH OTHER RELATED ORGANIZATIONS.

Activity	Organizations	When	Implementation methodologies
Meetings	IDBO, Councils (DWEs/MWEs etc.)	Quarterly	By meeting together
To conduct seminars to the villagers	IDBO and Councils (DWEs/MWEs etc.)	Once per year	by contact with water users
Protection and conservation of water sources	IDBO, DWEs/MWEs, Villagers, Water User Groups, Water User Committees and Water User Associations	Frequently	by using village governments

To collect water supply data	District water engineers	Occasionally	By using village governments
Water user fees collection	IDBO and District Water Engineers	Once per year	By visiting water users
Water Resources Data Collection (i) Hydrology (ii) Hydrogeology (iii) Water Quality (iv) Socioeconomic	IDBO, Councils (DWEs/MWEs, CDOs)	Regularly	By receiving from Gauge readers and visiting water sources.
Identification of water sources and water users	IDBO, Councils(DWEs/MWEs etc.)	Occasionally	By visiting them
Training of water users on water sources protection, pollution control and water laws	IDBO, Councils(DWEs/MWEs, CDOs and DHOs etc.)	Occasionally	By holding meetings, seminars
Publication of IDB	IDBO, Media/Press	Frequently	News papers, Radio, television, magazine, Brochures, Pamphlets, Maji Week and RCC Meeting
Community mobilization in the development of water supply source	Councils (DCDOs, DWEs/MWEs stc)	Frequently	By holding meetings with the communities
Community sensitization on ownerships of water facilities.	Councils (DCDOs, DWEs/MWEs stc)	Frequently	By holding meetings, seminars and workshop with the communities
Conduct workshops	IDBO, Councils (Land, Forest, Water, Environment and Agriculture)	Occasionally	Workshops
Seminars for DEDs and Councilors	IDBO, Councils (DED etc)	Twice in five years	Seminars
Water Right Issues	IDBO, Council(DWEs/MWEs etc)	Occasionally	Visiting/Meetings

## 10.0 FUTURE PLANS FOR IMPROVEMENT OF INTERNAL DRAINAGE BASIN OFFICE (IDBO) ACTIVITIES.

INTERNAL DRAINAGE BASIN OFFICE (IDBO) which is only two years old has some how attained some remarkable achievement in Water Resources Management in general though has various weaknesses which hinder rapid water resources development and management.

For resolving the existing various IDBO's weakness, IDBO intends to make sure that:

1. IDBO conducts weekly, monthly and quarterly management meetings which will come out with concrete Activity Plans. Monthly reports should be submitted to IDB Head Office.

2. That implementation of IDBO's activities which are currently done unsystematically should be done in a coordinated manner.
3. IDBO has wholly many activities to be implemented in various areas of the Basin. These activities were not implemented earlier due to lack of sufficient financial resources, appropriate equipments and tools. The Basin is therefore intending to aquire the financial capability, equipments and tools which are lacking for smooth implementation of activities.
4. IDBO has insufficient staff and other important professional sections. It is the plan of IDBO to increase the number of staff per Professions and again start/form some of the important professional sections which are missing.
5. IDBO lacks adequate financial resources. It is therefore among the plans of the Basin to make sure that water users are inventorised so as to ease and strengthen water user fees revenue collection.
6. Funds to IDBO are always scarce that do not coop with the enormous IDBO's activities. In order to reduce the scarcity of funds, the Basin is planning to identify all its water users for increasing/raising water user fees revenue collection, increase water user fees revenue collection percentage and make frequent follow ups to the Ministry for funding.
7. Lack of communication systems between the IDB Head Office and its Sub-Offices hinders somehow implementation of some existing activities in the Basin area. It is therefore the IDBO Plan to establish a workable system that will be used by all IDB offices for communication of information and data, either on water resources management issues or on other Basin implementation activities.

The Map of Management Area by each office (Head office and sub-offices) shows in Appendix-2, and Future Plan shows in Appendix-3.

## **11.0 FUTURE PLANS FOR DATA COLLECTION SYSTEM:**

### **1. Planning of the data collection systems between IDBO, DWEs/MWEs, Regional Water Advisors and Other institutions.**

#### **1-1 TYPE OF DATA:**

There are two types of data

- (1) Collected
- (2) Analysed

#### **(1) COLLECTED DATA**

##### **(1)-1 HYDROLOGICAL/HYDROGEOLOGICAL AND WATER QUALITY DATA**

(1)-1-1 Hydrological and water quality data should be collected entirely by Internal Drainage Basin Office(IDBO) staffs.

[a] Data to be collected by hydrological staff

- ◇ Water levels, rainfall intensities and meteorological
  - ◇ Discharge measurements - rivers, streams and springs.
  - ◇ Inventory of hydrometric, meteorological and rainfall stations.
  - ◇ Inventory of water sources, rivers, springs, streams, dams and lakes.
  - Water right collection
- [b] Data to be collected by hydrogeological staff
- ◇ Borehole discharge measurements
  - ◇ Borehole inventory
  - ◇ Inventory of catchments and sub-catchments areas.
  - ◇ Inventory of type of aquifers.
  - ◇ Static water levels.
  - ◇ Aquifers discharge potential.
  - ◇ Data on specific capacities of various aquifers.
  - ◇ Cone of depression (radius of influence) in various aquifers.
- [c] Data to be collected by water quality staff
- ◇ Water quality.
- [d] Data to be collected by Administration
- Water user fees
- (1)-1-2 Data to be collected by IDBO in collaboration with other Institutions.
- [a] Social economic
  - [b] Drilling and completion
  - [c] Water sources
  - [d] Number of water facilities
  - [e] Water users conflicts and resolutions

## **(2) ANALYSED DATA**

Analysed data is that data obtained through the analysis of collected data. Such data includes:

- [a] Chemical water analysis
- [b] Pump test aquifer analysis
- [c] Borehole lithological logs analysis
- [d] River discharge and stages analysis
- [e] Rainfall intensities analysis
- Flow chart of Data collection between IDBOffices, Districts, Regions and other Institutions is shown in Figure-1.
- Flow chart for Hydrogeological and Hydrological Gauge Readers data collection and submission is shown in Figure-2.

### **(2)-1 IDENTIFICATION OF WATER SOURCES**

Identification of water sources should be done by the IDBO in collaboration with respective DWEs and MWEs.

### **(2)-2 CATEGORIZATION OF WATER SOURCES**

Categorization of water sources should be done by IDBO staff.

### **(2)-3 IDENTIFICATION AND CLASSIFICATION OF WATER USERS—DOMESTIC, INDUSTRIAL, MINING AND LARGE IRRIGATION.**

Identification and classification of water users-domestic, industrial, mining, and large scale irrigation should be conducted by the IDBO staff.

(2)-4 ENVIRONMENTAL CONSERVATION IN INTERNAL DRAINAGE BASIN (IDB)

This is a multisectoral issue that should be implemented by IDB office in collaboration with other institutions.

Figure -1 FLOW CHART OF DATA COLLECTION BETWEEN IDB OFFICES, DISTRICTS, REGIONS AND OTHER INSTITUTIONS

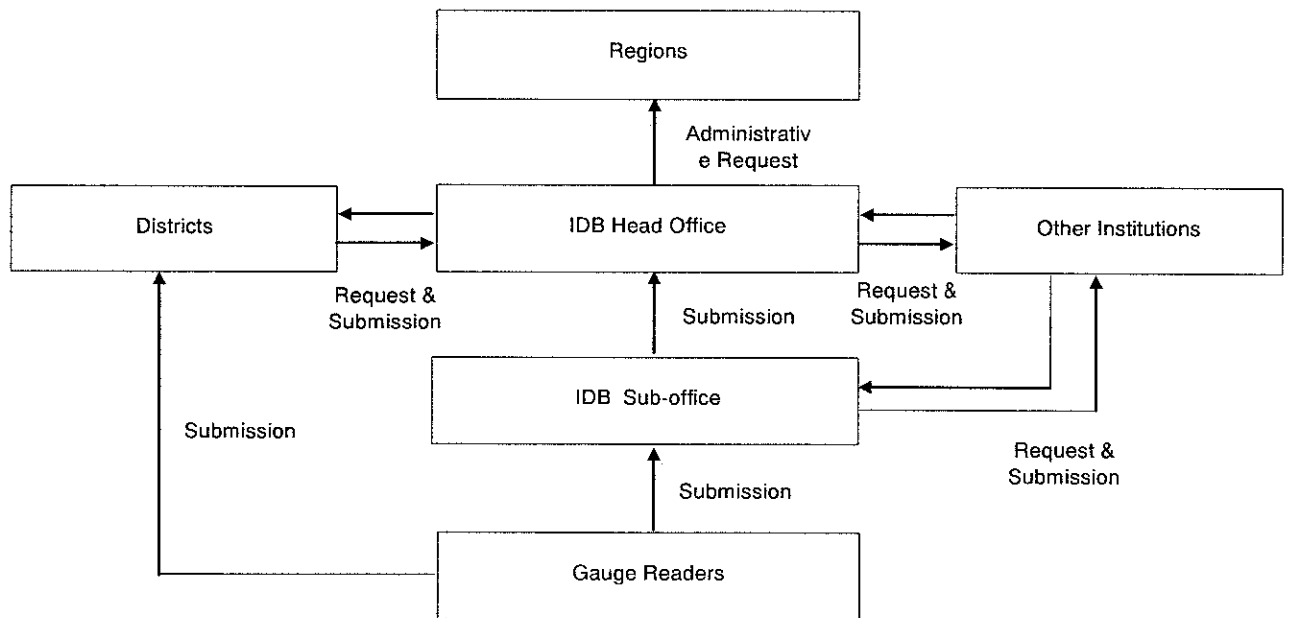
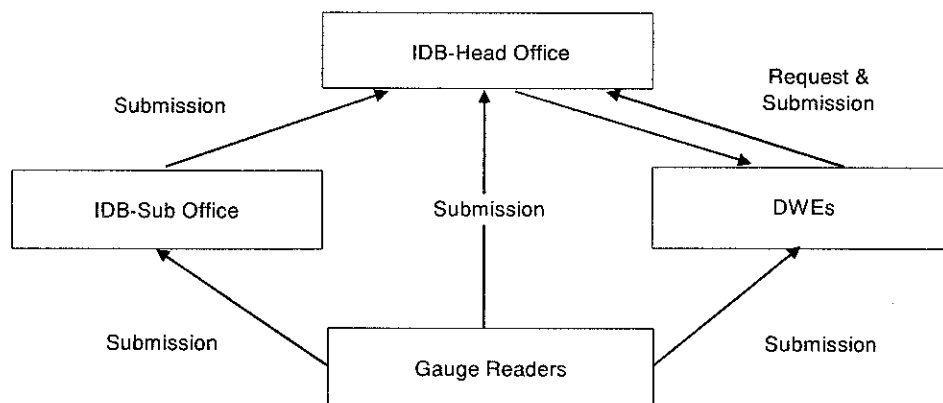


Figure-2 FLOW CHART FOR HYDROGEOLOGICAL AND HYDROLOGICAL GAUGE READERS DATA COLLECTION AND SUBMISSION



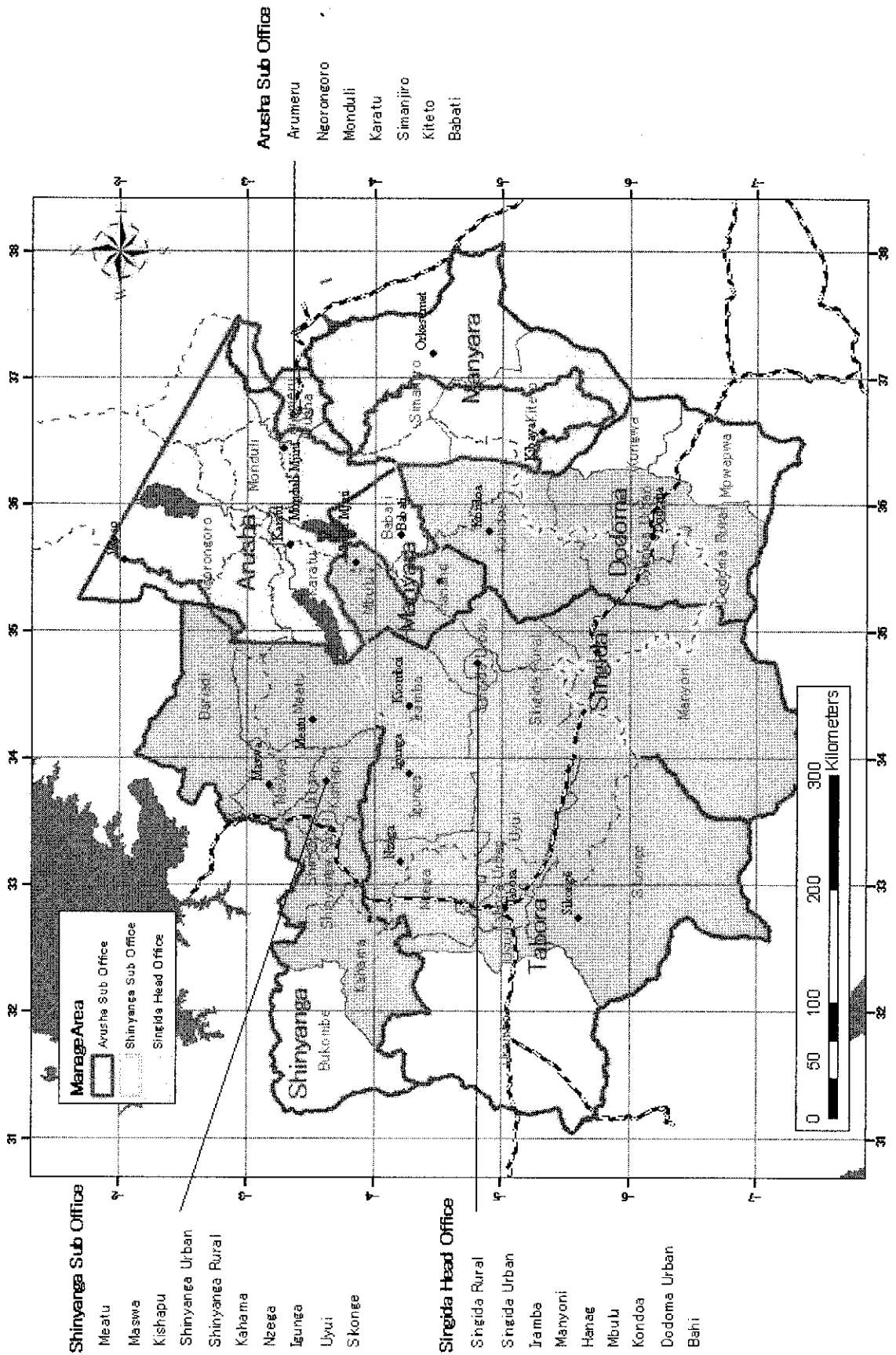
## Appendix-1

**PROVISIONAL LIST OF DISTRICTS IN  
INTERNAL DRAINAGE BASIN:**

<b>S/No.</b>	<b>Region</b>	<b>Districts/Municipality</b>
1	<b>SHINYANGA</b>	1. Maswa
		2. Meatu
		3. Kishapu
		4. Shinyanga
		5. Kahama
		6. Shinyanga Municipal
2	<b>TABORA</b>	1. Nzega
		2. Igunga
		3. Uyui
		4. Sikonge
3	<b>SINGIDA</b>	1. Iramba
		2. Singida
		3. Manyoni
		4. Singida Municipality
4	<b>DODOMA</b>	1. Kondoa
		2. Bahi
		3. Dodoma Urban
5	<b>MANYARA</b>	1. Mbulu
		2. Hanang
		3. Babati
		4. Kiteto
		5. Simanjiro
		6. Babati Township
6	<b>ARUSHA</b>	1. Ngorongor
		2. Karatu
		3. Monduli
		4. Arumeru
		27



The Management Area by Each Office



# Appendix-3

Appendix-3

Future Plan for IDBO (Draft)

Activity	Expected Output	Schedule					Section/Person in charge	Personnel	Equipment and Tools	Funds and Budget	Remarks
		2007	2008	2009	2010	2011					
3. Scenario and Staffs											
3.1 Scenario	-To improve implementation performance										
3.2 Staffs	-To improve implementation performance										
2. Equipment and Tools											
2.1 To purchase equipments and tools as per section demand											
2.1.1 Hydrology Section											
Vehicle											
Computer Set											
Current Meter Pycnomy											
GPS											
Leveling Instrument Complete Set											
Engine Boat											
2.1.2 Technology Section											
Vehicle											
Terminator SAS 300 C with board											
GPS											
Mission Meter Set (ENV-Scanner)											
Computer Set											
Printer											
Benchable Logger											
Geological Compass											
2.1.3 Laboratory Section											
Analytical Equipments											
Computer Set											
GPS											
Field Test Kit											
Microbiology											
2.1.4 Conservation, O&M Section											
GPS											
Leveling Instrument											
Computer Set											
2.1.5 Administration Section											
Computer Set											
Photocopy											
FAX											
Telephone											
Internet Communication System											
3. Management Meeting											
3.1 Weekly Meeting	-Review last week performance -Discuss current activities -Plan weekly activities										
3.2 Monthly Meeting	-Compile monthly activities -Submit monthly report to IDB Head Office and Sub-Offices										
3.3 Quarterly Meeting	-To review activities from Sub-Offices and Head Office -Plan future activities										

Note: ... Conservation, O&M Section shifted from former IDBO. This plan is tentative. After IDBO study, 14 of GPS, 3 of Computer Set, 2 of Photocopy, 1 of FAX, and some field kits to be received from IDBO. Budget from World Bank Program