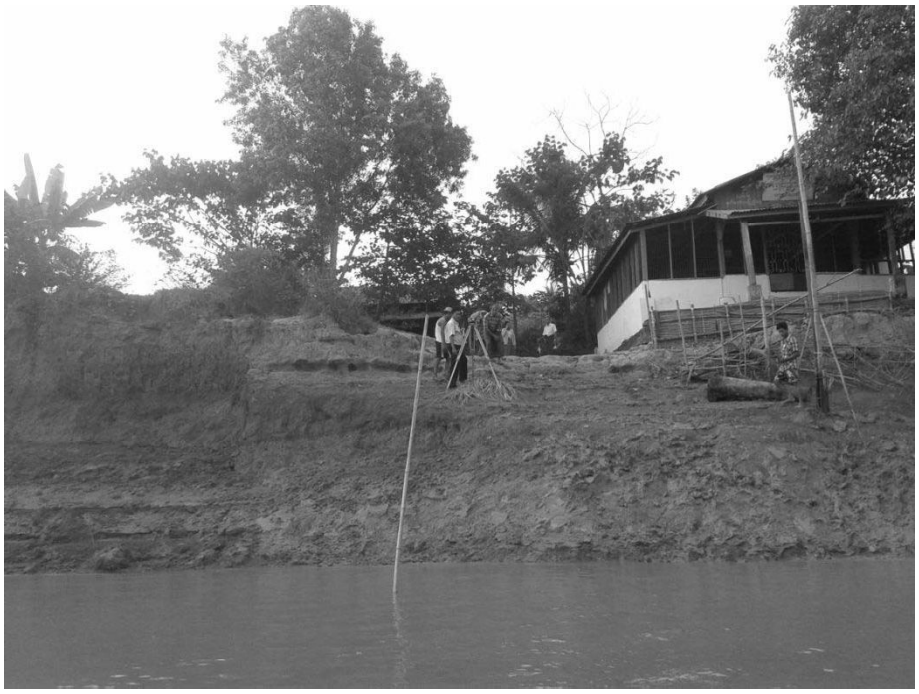
Discharge Measured by River Surveyor M 9 at Kokkowa River

Monitoring with Laptop when discharge measured by River Surveyor M9



Taking Surveying at the bank of Kokkowa River

Participate in a Trip of Measuring discharge at Kokkowa River by River Surveyor M9

The Republic of The Union of Myanmar

Ministry of Agriculture and Irrigation

Irrigation Department

Report of the Flow Measurement by Using River Surveyor M-9 at Kawhmu Township,Toe River

Hydrology Branch

2012, December, (30)

Report of the Flow Measurement by Using River Surveyor M-9 at Kawhmu Township , Toe River

Introduction

1. Hydrology Branch was given the assignment to take the flow measurement at Toe river near Kyaik Htaw village by using the River surveyor M-9. This assignment was given from the outcome of the meeting between JICA Team (YCDC) (The Project for the Improvement of water supply, sewerage and Drainage system in Yangon City) and Team of the Irrigation Department headed by Deputy Director General (Lower Myanmar) Irrigation Dept. which was held on 23 Nov 2012 at Head office Yangon.

Location of Station

2. Water level station at Toe river near Kyaik Htaw village , Kawhmu Township,. Yangon Region

Field Observation

3. Measuring Discharge by using River surveyor M-9 and taking survey data in both side of River bank and water level were carried out by staff of Hydrology Branch. The mean velocity of Toe River is approximate 0.593 m/sec. Discharge of thr River is 2572.541 m^3/ sec measuring by boat using M-9 are taken 2 times.

Result

4. The location map of the flow measurement at Toe river is as shown in Annex (1). The discharge of Toe River taking on (11.12.12) time (10:00) Am is 2572.541 m^3/sec and as shown in Annex (2). Cross section of Kokkowa River by using River Surveyor M-9 is as shown in Annex (3). River Cross Section at the water level station is as shown in Annex (4).

Sr. No	Station	Width (m)	Area (m^2)	Mean Velocity (m/s)	Total Discharge (Q) m^3/sec
1.	Kyaik Htaw Water level station (Toe River)	884.42	4339.9	0.593	2572.541

Water level of Toe river station at (11.12.12) time (10:00) Am is (60) cm.

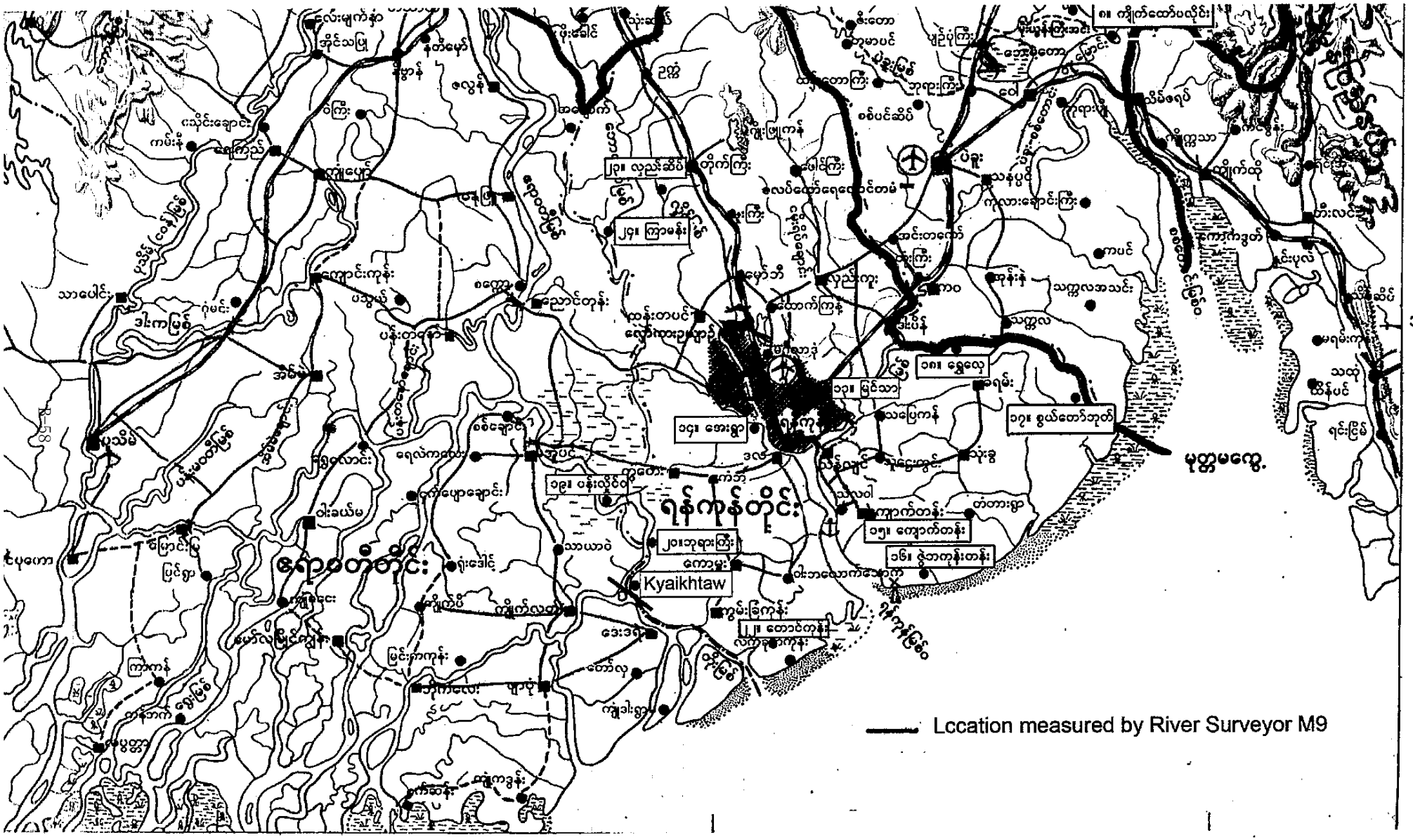
Remark

Measuring of discharge by using River Surveyor M9 are (6) Times . But only (2) times Results are good . (4) times of results are not good because of the Toe River Water Level is rising and the tidal is occurred at the time 10:33 a.m to 11:15 a.m. The velocity is very low and discharge can not be measured actually. Therefore only two time results measuring should be used safety .

The list of the staffs and officers of Hydrology Branch in taking flow measurement at Toe river by using River Surveyor M-9.

Date 11.12.12

Sr.No	Name	Designation	Office
1.	Daw Than Win	Assistant Director	Assistant Director Office Hydrology Branch, Yangon
2.	Daw Khin Si Si Hlaing	S.S.A.E	〃
3.	U Zaw Min Oo	S.A.E	〃
4.	U Myint Htwe	〃	〃
5.	U San Lin Myint	E.S	〃
6.	Daw Lwin Mar Kywe	〃	〃
7.	Daw Phyu Hnin Su	〃	〃


ရန်ကုန်တိုင်း
ရော်ဗတိတိုင်း
Kyaikhtaw
Lccation measured by River Surveyor M9

Discharge Measurement Summary

Date Measured: Tuesday, December 11, 2012

Site Information	
Site Name	Kyaikhtaw
Station Number	1
Location	Toe River

Measurement Information	
Party	Hydro
Boat/Motor	Boat
Meas. Number	2

System Information	
System Type	RS-M9
Serial Number	2365
Firmware Version	2.00
Software Version	2.70

System Setup	
Transducer Depth (m)	0.08
Salinity (ppt)	0.0
Magnetic Declination (deg)	0.8

Units	
Distance	m
Velocity	m/s
Area	m2
Discharge	m3/s
Temperature	degC

Discharge Calculation Settings			
Track Reference	Bottom-Track	Left Method	Sloped Bank
Depth Reference	Vertical Beam	Right Method	Sloped Bank
Coordinate System	ENU	Top Fit Type	Power Fit
		Bottom Fit Type	Power Fit

Discharge Results	
Width (m)	884.42
Area (m2)	4,339.9
Mean Speed (m/s)	0.593
Total Q (m3/s)	2,572.541

Measurement Results

Trans.		Time		Distance				Mean Vel.		Discharge							%
#		Time	Duration	Temp.	Track	DMG	Width	Area	Boat	Water	Left	Right	Top	Middle	Bottom	Total	MBTotal	Measured
1	L	10:03:49 AM	0:10:45	27.0	894.92	876.45	884.95	4,338.4	1.387	0.674	0.11	0.12	233.19	2,210.97	481.67	2,926.053	--	75.6
2	R	10:20:53 AM	0:12:33	27.2	962.92	875.39	883.89	4,341.3	1.279	0.511	0.07	0.08	179.18	1,676.44	363.26	2,219.030	--	75.5
			Mean	27.1	928.92	875.92	884.42	4,339.9	1.333	0.593	0.09	0.10	206.18	1,943.71	422.46	2,572.541	0.000	75.6
			Std Dev	0.1	34.00	0.53	0.53	1.4	0.054	0.082	0.02	0.02	27.01	267.26	59.20	353.512	0.000	0.0
			COV	0.0	0.037	0.001	0.001	0.000	0.041	0.138	0.240	0.178	0.131	0.138	0.140	0.137	0.000	0.000

Exposure Time: 0:23:18

Tr1=20121211100348r.rivr; Tr2=20121211102052r.rivr;

Comments

Tr1=20121211100348r.rivr - 60 cm; Tr2=20121211102052r.rivr - 60 cm;

Compass Calibration

Results: PASS
Score is excellent.
Magnetic interference is very low.

Calibration score: M6.00Q9

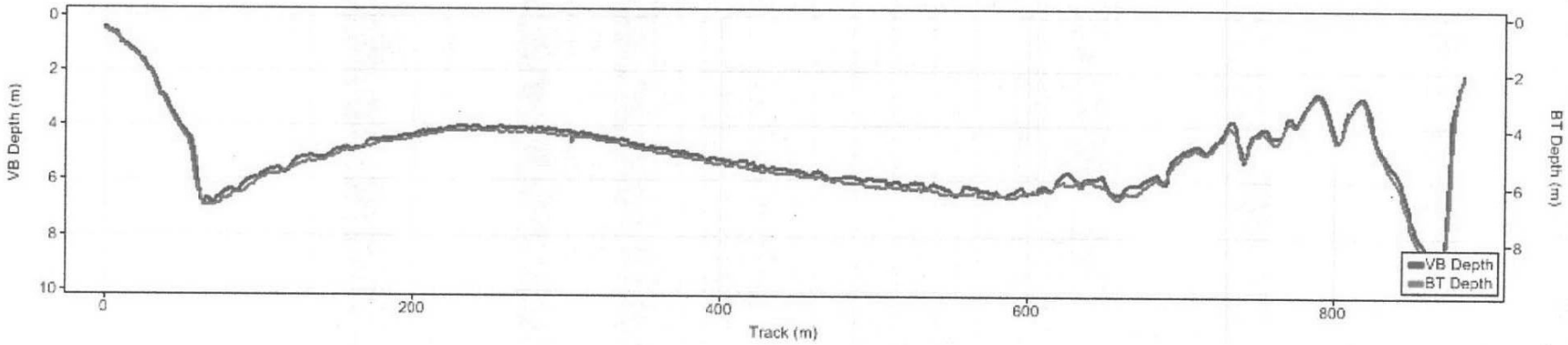
System Test

System Test: PASS

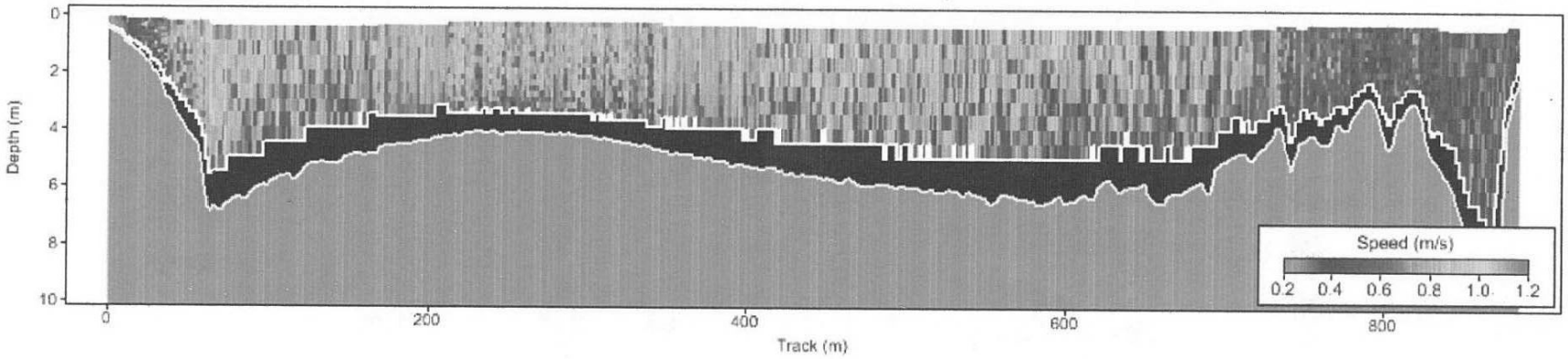
Parameters and settings marked with a * are not constant for all files.

Report generated using SonTek RiverSurveyor Live v2.70

Toe River @ Kyaikhtaw Water Level Station



Cross Section of Toe River



Velocity Distribution of Toe River

)ischarge Measurement Summary

Date Measured: Tuesday, December 11, 2012

Site Information	
te Name	Kyaikhtaw
tation Number	1
ocation	Toe River

Measurement Information	
Party	Hydro
Boat/Motor	Boat
Meas. Number	6

System Information	
ystem Type	RS-M9
erial Number	2365
irmware Version	2.00
oftware Version	2.70

System Setup	
Transducer Depth (m)	0.08
Salinity (ppt)	0.0
Magnetic Declination (deg)	0.8

Units	
Distance	m
Velocity	m/s
Area	m2
Discharge	m3/s
Temperature	degC

Discharge Calculation Settings			
rack Reference	Bottom-Track	Left Method	Sloped Bank
epth Reference	Vertical Beam	Right Method	Sloped Bank
oordinate System	ENU	Top Fit Type	Power Fit
		Bottom Fit Type	Power Fit

Discharge Results	
Width (m)	888.27
Area (m2)	4,530.6
Mean Speed (m/s)	0.339
Total Q (m3/s)	1,506.755

Measurement Results

		Time		Distance			Mean Vel		Discharge						%
	Time	Duration	Temp	Track	DMG	Width	Area	Boat	Water	Left	Right	Top	Middle	Bottom	Total	MB Total	Measured
L	10:03:49 AM	0:10:45	27.0	894.92	876.45	884.95	4,338.4	1.387	0.674	0.11	0.12	233.19	2,210.97	481.67	2,926.053	--	75.6
R	10:20:53 AM	0:12:33	27.2	962.92	875.39	883.89	4,341.3	1.279	0.511	0.07	0.08	179.18	1,676.44	363.26	2,219.030	--	75.5
L	10:33:42 AM	0:15:30	27.4	953.49	886.07	895.07	4,537.0	1.025	0.359	0.05	0.02	130.78	1,237.92	262.30	1,631.055	--	75.9
R	10:49:26 AM	0:11:40	27.4	912.61	880.56	889.56	4,583.9	1.304	0.260	0.01	-0.03	96.76	894.44	200.25	1,191.423	--	75.1
L	11:01:21 AM	0:14:12	27.5	954.93	881.87	890.87	4,653.0	1.121	0.162	0.01	-0.05	61.65	569.33	121.57	752.513	--	75.6
R	11:15:58 AM	0:12:45	27.8	990.96	876.28	885.28	4,730.1	1.295	0.068	-0.13	-0.07	25.60	242.77	52.28	320.456	--	75.7
		Mean	27.4	944.97	879.44	888.27	4,530.6	1.235	0.339	0.02	0.01	121.19	1,138.65	246.89	1,506.755	0.000	75.6
		Std Dev	0.3	32.04	3.79	3.95	147.4	0.123	0.206	0.07	0.07	69.85	662.73	144.14	876.814	0.000	0.2
		COV	0.0	0.034	0.004	0.004	0.033	0.099	0.607	3.750	5.787	0.576	0.582	0.584	0.582	0.000	0.003

osure Time: 1:17:25

=20121211100348r.rivr; Tr2=20121211102052r.rivr; Tr3=20121211103341r.rivr; Tr4=20121211104924r.rivr; Tr5=20121211110119r.rivr; Tr6=20121211111556r.rivr;

omments

l=20121211100348r.rivr - 60 cm; Tr2=20121211102052r.rivr - 60 cm; Tr3=20121211103341r.rivr - 60 cm;
4=20121211104924r.rivr - 60 cm; Tr5=20121211110119r.rivr - 60 cm; Tr6=20121211111556r.rivr - 60 cm;

ompass Calibration

sults: PASS
ore is excellent.
gnetic interference is very low.

ibration score: M6.00Q9

ystem Test

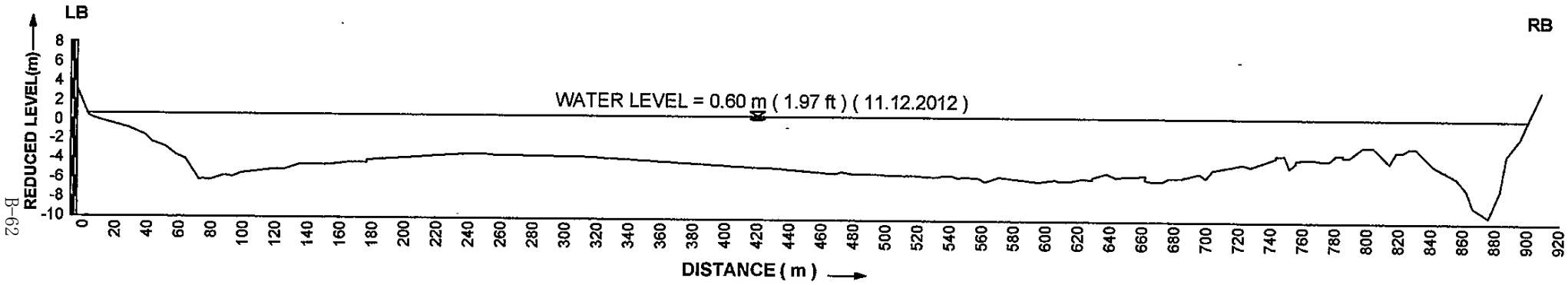
tem Test: PASS

eters and settings marked with a * are not constant for all files.

Report generated using SonTek RiverSurveyor Live v2.70

Annex (4)

CROSS SECTION OF TOE RIVER ,KAWHMU TOWNSHIP



RD (m)	RL (m)
000.00	-0.00
11.50	0.03
32.33	-0.91
42.75	-1.62
55.25	-2.80
67.75	-4.09
78.17	-6.09
91.92	-5.74
102.33	-5.50
124.00	-5.03
138.58	-4.56
157.33	-4.56
169.83	-4.33
180.25	-4334.09
211.50	-3.74
220.67	-3.62
244.83	-3.38
259.42	-3.50
315.67	-3.62
424.00	-4.68
471.92	-5.27
482.33	-5.27
498.17	-5.27
519.83	-5.38
529.00	-5.50
539.83	-5.38
549.00	-5.62
561.50	-5.62
574.00	-5.50
599.00	-5.97
609.42	-5.74
619.00	-5.86
623.33	-5.74,-5.5
641.50	-5.03
652.33	-5.38
665.67	-5.26,5.74
676.08	-5.85
688.58	-5.50
699.00	-5.03
726.08	-4.09
746.92	3.38,-3.15
759.42	3.86,-3.62
770.67	-3.50
792.75	-3.27
807.33	-2.21
817.75	-3.86
830.25	-2.33
844.83	-4.09
859.42	-5.38
869.83	-8.33
879.42	-9.38
890.67	-3.03
903.50	0.38
912.50	3.62

AREA = 4466.51 m

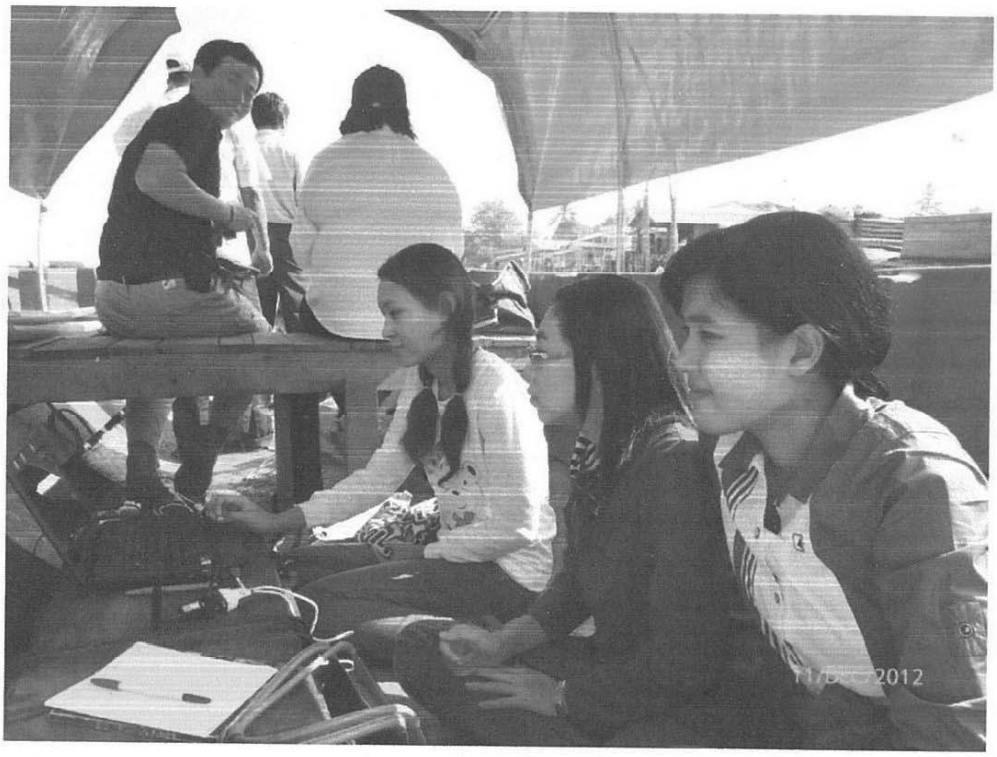
WETTED PARAMETER P = 904.01 m^2

NOTE: TBM = 3.378 m (11.08 ft)

RIVER WIDTH = 897.7 m

X : Y = 1 : 6

Discharge Measured by River Surveyor M 9 at Toe River



Monitoring with Laptop when discharge measured by River Surveyor M9

The Republic of The Union of Myanmar
Ministry of Agriculture and Irrigation
Irrigation Department

Report of the Flow Measurement by Using River Surveyor M-9 at Kawhmu Township,Toe River

Hydrology Branch
2013, April, (18)

Report of the Flow Measurement by Using River Surveyor M-9 at Kawhmu Township , Toe River

Introduction

1. Hydrology Branch was given the assignment to take the flow measurement at Toe river near Kyaik Htaw village by using the River surveyor M-9. This assignment was given by the Head Office. Irrigation Department Letter No. 1804/Siman-1 dated at (14.3.13) and to assist (YCDC) (The Project for the Improvement of water supply, sewerage and Drainage system in Yangon City) .

Location of Station

2. Water level station at Toe river near Kyaik Htaw village, Kawhmu Township, Yangon Region, as indicated in Annex (1).

Field Observation

3. Measuring Discharge by using River Surveyor M-9 and taking survey data in both side of River bank and water level were carried out by staff of Hydrology Branch at (18.3.13). The three no. of Discharge measurements by Boat were taken at that time. Cross Sections and velocity distribution of each measurement are as shown in Annex 4-6. Measuring Time is from 3:15 P.M to 4:15 P.M.

Results

4. The result for Three no of flow measurements are as shown in Annex (2). According the result of one flow measurement, One result should be used to compute the mean discharge and as shown in Annex (3). Detail results are as followed.

Sr. No	Station	Width (m)	Area (m^2)	Velocity (m/s)	Total Discharge (Q) m^3/sec
1.	Kyaik Htaw Water level station (Toe River)	953.9	4193.9	0.46	1930.544

Water level of Toe river station at (18.3.13) time (3:15) Pm is (52) cm.

Remark

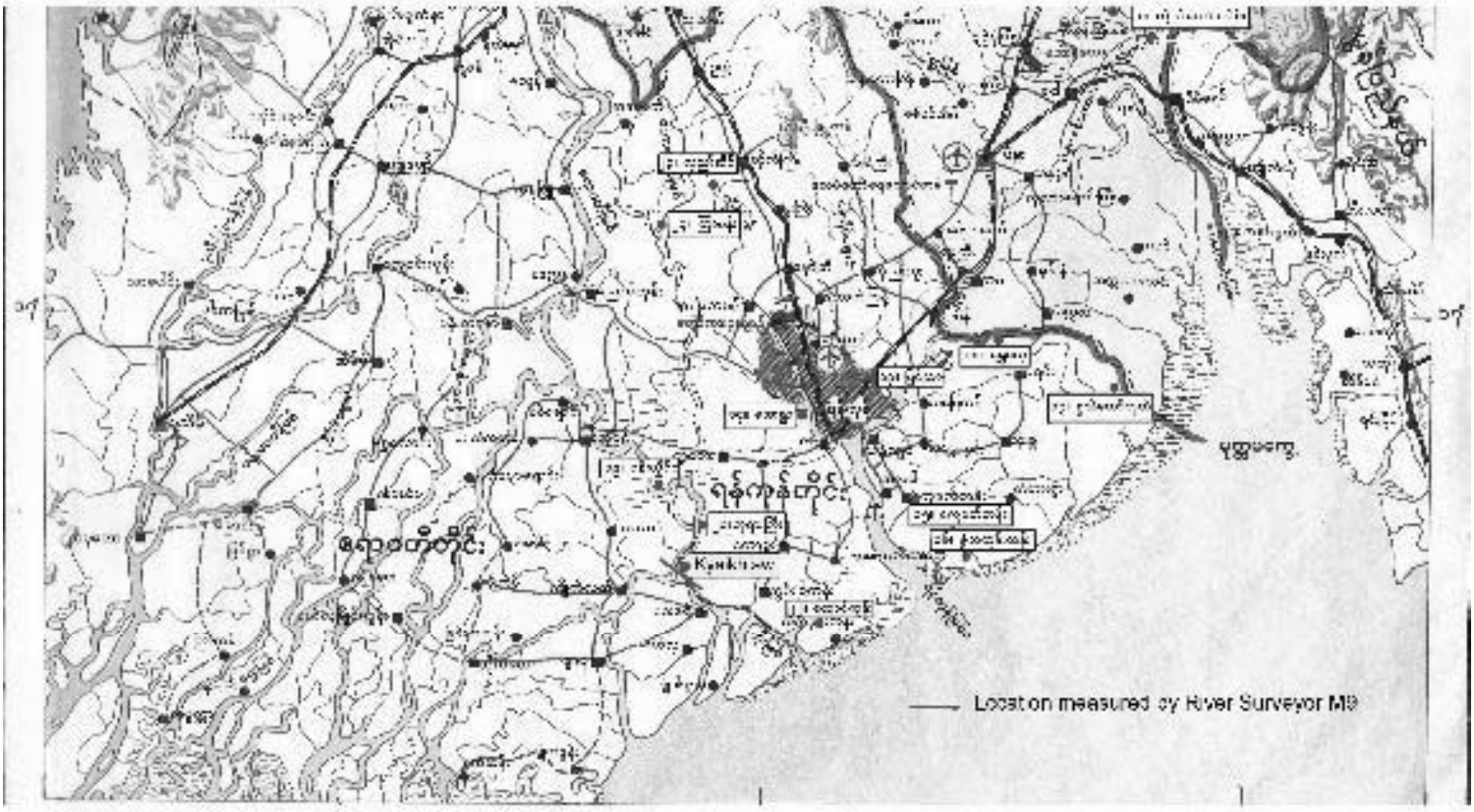
Numbers of Measuring of discharge by using River Surveyor M9 are three times. But only one result of measurement is good. Results of two measurements are considered unreliable, because of the tide effect. Therefore only one time measured result should be used reliably.

The list of the staffs and officers of Hydrology Branch in taking flow measurement at Toe river by using River Surveyor M-9.

Date 18.3.13

Sr.No	Name	Designation	Office
1.	Daw Than Win	Assistant Director	Assistant Director Office Hydrology Branch, Yangon
2.	U Tin Yu	A.E	
3.	U Zaw Min Oo	S.S.A.E	
4.	Daw Khin Si Si Hlaing		
5.	U Sein Lwin	E.S	
6.	Daw Lwin Mar Kywe		
7.	U Thet Wai Htun	A.E	Director Office Hydrology Branch, Yangon

Location Map of the Flow Measurement by using River Surveyor M-9 at Kawhmu Township ,Toe River



Discharge Measurement Summary

Date Measured: Monday, March 18, 2013

Site Information	
Site Name	Toe River
Station Number	1
Location	Toe

Measurement Information	
Party	Hydro
Boat/Motor	Boat
Meas. Number	1

System Information	
System Type	RS-M9
Serial Number	2365
Firmware Version	2.00
Software Version	2.70

System Setup	
Transducer Depth (m)	0.08
Salinity (ppt)	0.0
Magnetic Declination (deg)	0.8

Units	
Distance	m
Velocity	m/s
Area	m2
Discharge	m3/s
Temperature	degC

Discharge Calculation Settings			
Track Reference	Bottom-Track	Left Method	Sloped Bank
Depth Reference	Vertical Beam	Right Method	Sloped Bank
Coordinate System	ENU	Top Fit Type	Power Fit
		Bottom Fit Type	Power Fit

Discharge Results	
Width (m)	953.90
Area (m2)	4,193.9
Mean Speed (m/s)	0.460
Total Q (m3/s)	1,930.544

Measurement Results

Tr		Time			Distance				Mean Vel		Discharge							%
#		Time	Duration	Temp.	Track	DMG	Width	Area	Boat	Water	Left	Right	Top	Middle	Bottom	Total	MBTotal	Measured
1	L	3:16:36 PM	0:13:29	30.5	958.68	943.90	953.90	4,193.9	1.185	0.460	0.00	0.25	158.00	1,453.73	318.55	1,930.544	--	75.3
			Mean	30.5	958.68	943.90	953.90	4,193.9	1.185	0.460	0.00	0.25	158.00	1,453.73	318.55	1,930.544	0.000	75.3
			Std Dev	0.0	0.00	0.00	0.00	0.0	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.0
			COV	0.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Exposure Time: 0:13:29

Tr1=20130318151636r.rivr;

Comments

Tr1=20130318151636r.rivr - 52 cm;

Compass Calibration

Results: PASS
Score is excellent.
Magnetic interference is very low.

Calibration score: M7.00Q9

System Test

System Test: PASS

Parameters and settings marked with a * are not constant for all files.

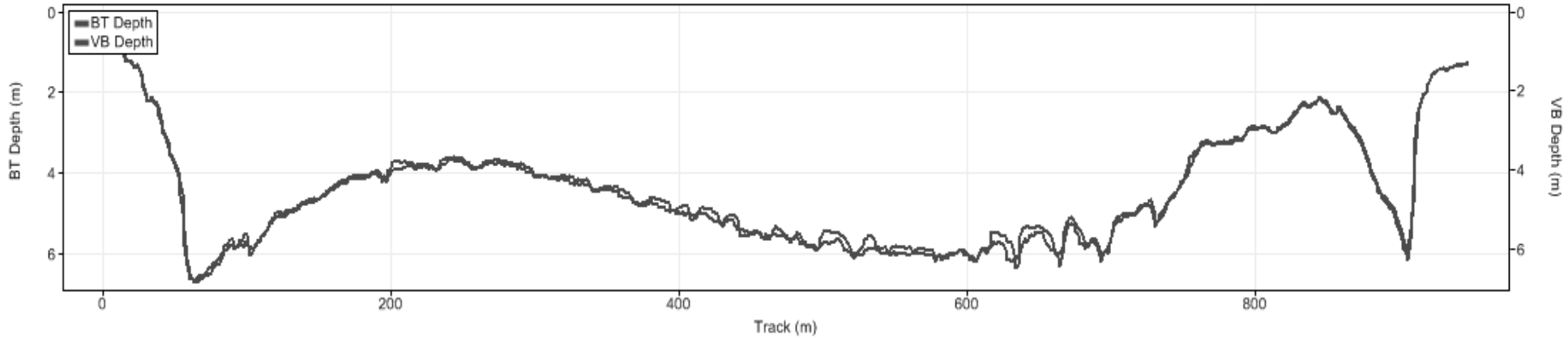
Report generated using SonTek RiverSurveyor Live v2.70

Toe River @ Water Level Station

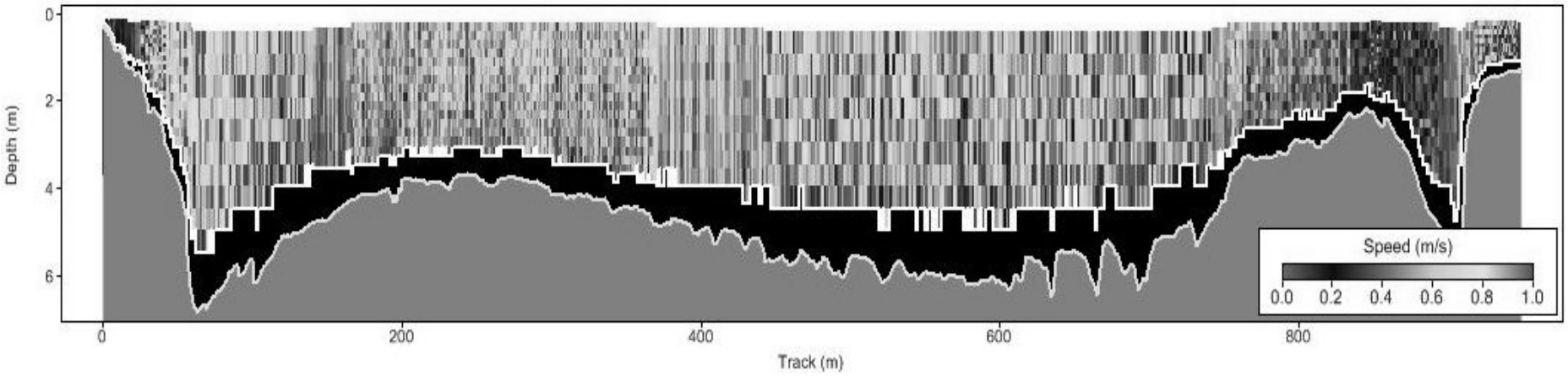
Measure at Time 3:16 P.M

Water Level = 0.52 m

Results Q = 1930.544 cumec



Cross Section of Toe River



Velocity Distribution of Toe River

CROSS SECTION OF TOE RIVER

RL(M)	3.088	-0.92	-4.0	-5.0	-6.0	-3.0	-0.77	3.206
RD (M)	0	22.86	222.86	422.86	622.86	822.86	955.86	975.67

aemufqufwGJ (7)

Discharge Measurement Summary

Date Measured: Monday, March 18, 2013

Site Information	
Site Name	Kyaikhtaw
Station Number	1
Location	Toe River

Measurement Information	
Party	Hydro
Boat/Motor	Boat
Meas. Number	3

System Information	
System Type	RS-M9
Serial Number	2365
Firmware Version	2.00
Software Version	2.70

System Setup	
Transducer Depth (m)	0.08
Salinity (ppt)	0.0
Magnetic Declination (deg)	0.8

Units	
Distance	m
Velocity	m/s
Area	m2
Discharge	m3/s
Temperature	degC

Discharge Calculation Settings			
Track Reference	Bottom-Track	Left Method	Sloped Bank
Depth Reference	Vertical Beam	Right Method	Sloped Bank
Coordinate System	ENU	Top Fit Type	Power Fit
		Bottom Fit Type	Power Fit

Discharge Results	
Width (m)	946.63
Area (m2)	4,265.9
Mean Speed (m/s)	0.296
Total Q (m3/s)	1,252.432

Measurement Results

Tr		Time			Distance				Mean Vel		Discharge							%
#		Time	Duration	Temp.	Track	DMG	Width	Area	Boat	Water	Left	Right	Top	Middle	Bottom	Total	MBTotal	Measured
1	L	3:16:36 PM	0:13:29	30.5	958.68	943.90	953.90	4,193.9	1.185	0.460	0.00	0.25	158.00	1,453.73	318.55	1,930.544	–	75.3
2	R	3:45:14 PM	0:12:19	30.4	943.69	938.48	948.48	4,245.5	1.277	0.275	0.03	0.51	97.73	876.01	191.77	1,166.050	–	75.1
3	L	3:59:36 PM	0:10:27	29.9	931.09	927.52	937.52	4,358.3	1.485	0.152	-0.04	0.01	53.75	497.33	109.66	660.701	–	75.3
			Mean	30.3	944.49	936.63	946.63	4,265.9	1.316	0.296	0.00	0.26	103.16	942.36	206.66	1,252.432	0.000	75.2
			Std Dev	0.3	11.28	6.82	6.82	68.7	0.125	0.127	0.03	0.21	42.74	393.26	85.93	521.997	0.000	0.1
			COV	0.0	0.012	0.007	0.007	0.016	0.095	0.429	-8.043	0.801	0.414	0.417	0.416	0.417	0.000	0.001

Exposure Time: 0:36:15

Tr1=20130318151636r.rivr; Tr2=20130318154513r.rivr; Tr3=20130318155935r.rivr;

Comments

Tr1=20130318151636r.rivr - 52 cm; Tr2=20130318154513r.rivr - 52 cm; Tr3=20130318155935r.rivr - 52 cm;

Compass Calibration

Results: PASS
Score is excellent.
Magnetic interference is very low.

Calibration score: M7.00Q9

System Test

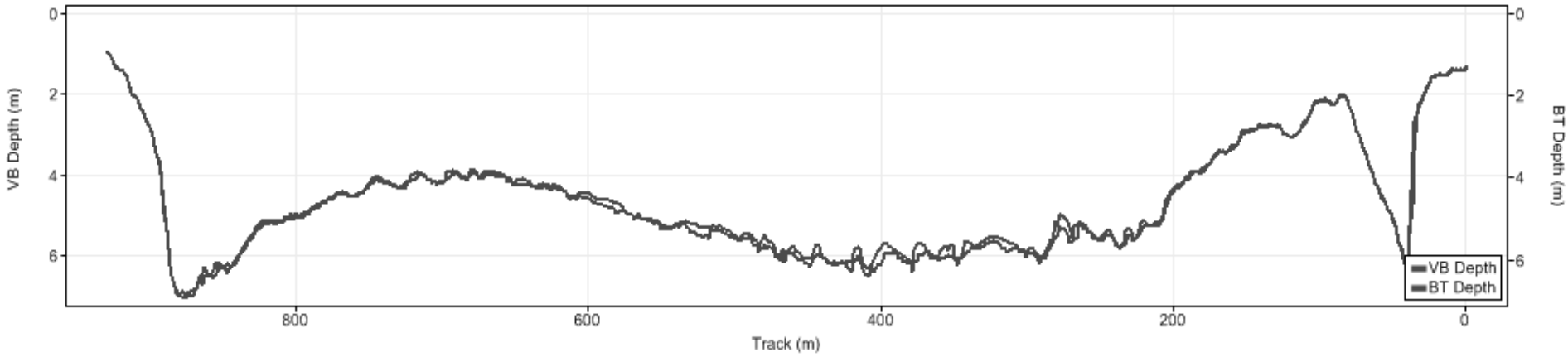
System Test: PASS

Parameters and settings marked with a * are not constant for all files.

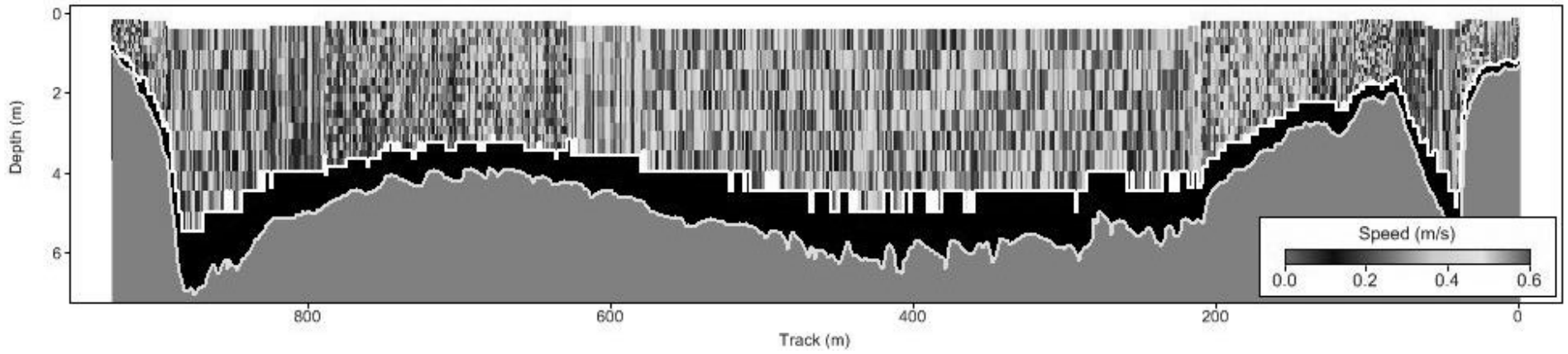
Report generated using SonTek RiverSurveyor Live v2.70

Toe River @ Water Level Station

Measure at Time 3:45 P.M Water Level = 0.52 m Results Q = 1166.05 cumec



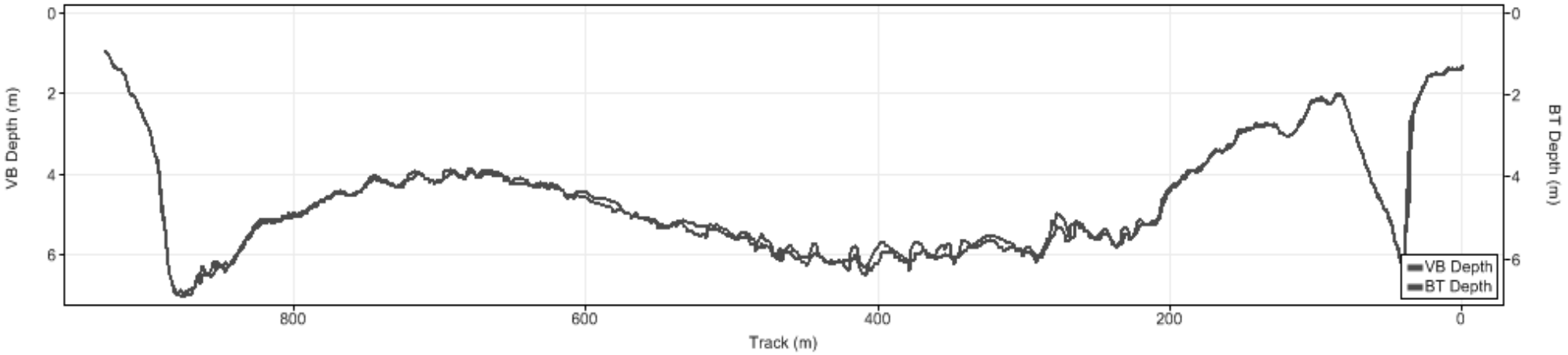
Cross Section of Toe River



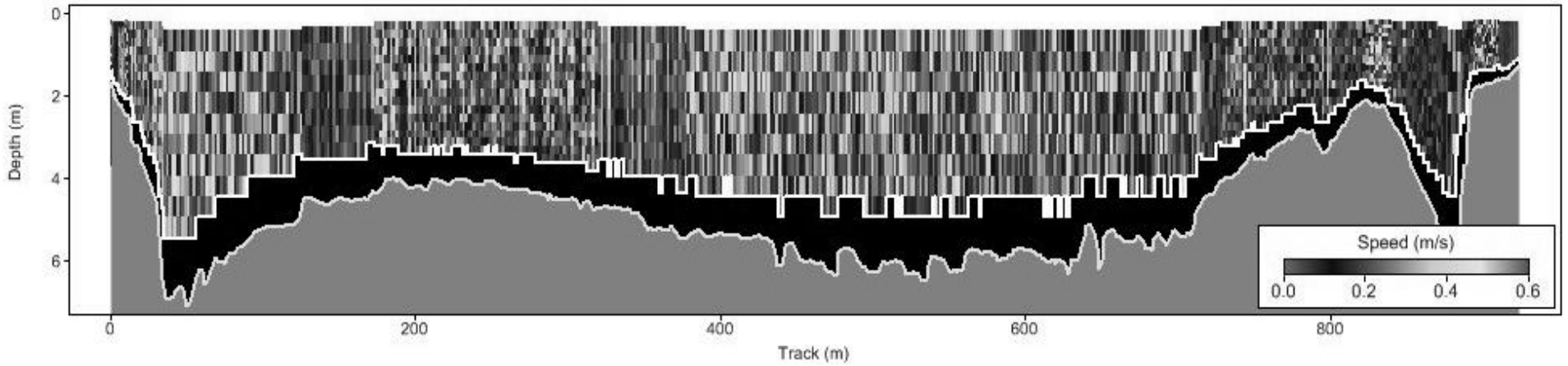
Velocity Distribution of Toe River

Toe River @ Water Level Station

Measure at Time 3:59 P.M Water Level = 0.52 m Results Q = 660.701 cumec



Cross Section of Toe River



Velocity Distribution of Toe River

Discharge Measured by River Surveyor M 9 at Toe River

Preparing to measure Discharge by River Surveyor M9

Setting the computer to measure discharge by River Surveyor M9

Water Level Post of Kyaeik Htaw Water Level Gauge Station