資料 - 7： その他の活動実績

I. 流量モニタリングシステム

7.I Flow Monitoring System

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1. Purpose of flowmeter monitoring system

It was decided at the 1st JCC to establish a monitoring system for the following purposes;

1) To monitor the volume of water delivered and distributed, which is the most basic data required for the operation of water services
2) To utilize the flow data for non-revenue water management
3) To prepare an efficient water transmission and distribution management plan and to aim at fair water transmission and distribution.

In order to achieve the above objectives, the following flow measurements will be carried out;

1) Water deliveries from WTP (Nyaunghnapin WTP)
2) Water deliveries in backbone pipeline (reservoir deliveries and water pump deliveries)
3) Distribution volume in backbone distribution pipeline (inflow and outflow at core distribution pumping stations and distribution reservoirs)

Note: In Nyaunghnapin WTP, two flow meters are already installed and this flow data is also included in the monitoring.

2. Configuration of flow meter and installation location

The configuration of flowmeter is shown in Figure 1. The flowmeter consists of an ultrasonic sensor and flowmeter body (both from Tokyo Keiki), a Remote Terminal Unit (RTU) and a data logger (both from Delairco Japan). The ultrasonic sensor (hereafter, "sensor") is installed directly on the pipe, while the flowmeter body, RTU and data logger are installed on the kiosk.

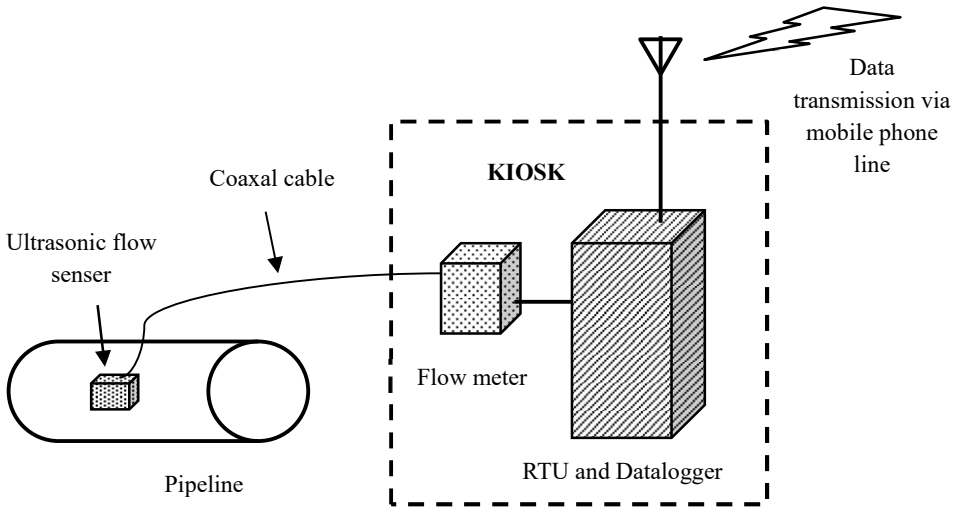


Figure 1 Configuration of flow meter system

Location of flowmeter is shown in Table 1. Flow meter was installed in 21 locations and these flow meters were connected to 9 kiosks. Detailed location of flow meter is shown in Attachment 1. From

these 9 kiosks, measured flow data is periodically transmitted via mobile phone lines to central data room located in the YCDC-WRAWSA HQ. Measured data sent from kiosks are collected in the server in the central data room and monitored and analyzed in the central data room.

Table 1 No. of flowmeter and location of kiosk

Location of kiosk	No. of flow meter
After Gyobyu Reservoir	1
After Phugyi Reservoir and Aqueduct	2
Phugyi and Gyobyu pipe connection at Pyawbwesu PS	3, 4
Naunghnapin Phase 1&2 WTP and PS	5, 6 Existing Nyaunghnapin 1, Existing Nyaunghnapin 2
Hlawga PS No.1	7
Hlawga PS No.2	8
Yegu PS	9, 10, 11, 12, 13, 14
Kokkine SR	15, 16, 17
Shwedagon SR	18, 19, 20, 21

3. Demarcation of flow meter system installation

Installation of flow meter was carried out in cooperation with the following three parties.

- ✓ WRAWSA: Construction of kiosk and related preparatory works
- ✓ Tokyo Keiki Inc.: Installation of flow meter and sensor
- ✓ Delairco Japan KK: Installation of RTU and communication equipment, data collection and analysis equipment (central data room) and remote monitoring

4. Progress of installation work

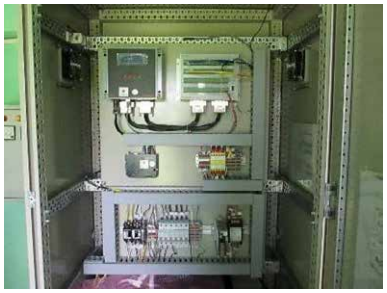
The progress of flowmeter installation work is shown in Table 2. Photos of flow meter installed are also shown in Table 3. The installation work of flowmeter and communication device started in February 2019. Initially, it was planned that the installation work would be completed in August 2019 and the equipment would be handed over to WRAWSA after on-the-job training on its operation. However, during the verification work in August 2019, it became clear that the data reading errors of the Yegu No.9 and No.12 exceeded the specified error value (1%). Therefore, it was decided to postpone the handover to EDWS and to take measures to eliminate the reading error. In addition, during the work in October 2019, it was observed that the sensor of Nyaunghnapin Existing No. 2 had dropout and fixing wire of Yegu No. 11 had corroded. However, after January 2020, travel to Yangon is no longer possible due to COVID-19 pandemic. For this reason, no measures have been taken to address the above issues.

Table 2 Progress of flow meter installation work until Nov. 2019

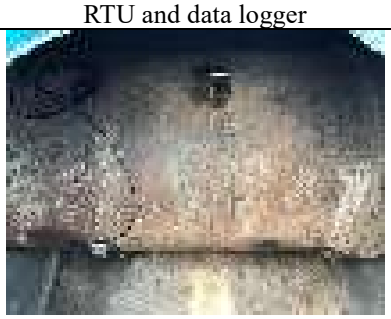
Period	Work description	Problems and actions to be taken
18 – 27 Feb. 2019	Installation of Data logger and RTU	
5 May – 30 June 2019	Installation of flow meter and sensor	

Period	Work description	Problems and actions to be taken
7-15July 2019	Server and PC setup in YCDC-WRAWSA HQ (Central data room) Checking the communication status between each kiosk and central data room	<u>Operation the facility</u> ✓ UPS battery trouble at Gyobyu kiosk. ✓ It was caused by improper operation (breaker manually turned off for and leaving more than a month). ✓ OJT on correct operation including handling of power supply. <u>Initial failure of monitoring equipment</u> ✓ The initial fault was found on the circuit board of the communication device. ✓ The circuit boards were replaced at the time of dispatch in August 2019. <u>Noise in YeguPS</u> ✓ High input voltage of RTU was observed. ✓ It was presumed that the noise was superimposed from motor (pump of Yegu PS). **Note**: At this time, the source of the noise was presumed to be the motor at Yegu pumping station. <u>Shwedagon SR</u> ✓ It was found that all three outlets of Shwedagon SR were not always full because of the low volume of water transmitting to Shwedagon SR. ✓ Expert proposed to WRAWSA to relocate the location of flow meter sensor. ✓ CE stated that this problem will be solved in the future when more water is transmitted to Shwedagon SR. ✓ Therefore, the relocation of flow meter sensor was not implemented.
18 – 23 Aug. 2019	Checking flowmeter reading error of measured values	<u>Flowmeter performance</u> ✓ Checking flowmeter reading data errors for all 9 kiosks ✓ No.9, 10, 12 and 13 flowmeters at Yegu PS had large data reading errors (>1%). The cause of data reading error and noise in the Yegu PS was unclear, therefore, it was decided to continue investigating countermeasures.
21 Oct. – 1st Nov. 2019	Checking flow meter performance and taking action to eliminate noise that cause flow meter reading error	<u>Meter reading error</u> ✓ Checking flow meter reading error of all 9 kiosks ✓ For Yegu PS kiosk, grounded earth and high frequency filters have been installed. ✓ However, noise could not be eliminated completely from Yegu No. 9 and 12 flowmeters and significant data reading errors (>1%) remained. <u>Noise investigation</u> ✓ As a result of the noise investigation, it was confirmed that the noise was a superposition of amplitude modulated (AM) waves with a frequency of around 630KHz. ✓ From this result, it was presumed that the noise source was a radio transmitter such as a broadcasting station. <u>Checking the operating condition of all flowmeters</u> ✓ Checking operational condition of all (21) flowmeters ✓ Corrosion of mounting rack and dropout of sensor of Nyaunghnapin Existing No.2 was confirmed. ✓ Corrosion of mounting rack of Yegu No.11 was confirmed.

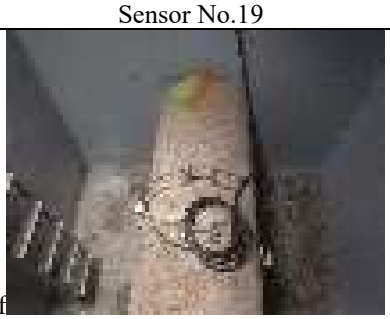
Table 3 Photos of flow meter installed

Location	No. of flow meter	Photo	
After Gyobyu Reservoir	1	 Sensor No.1 protection box	 Inside the protection box and sensor No.1
		 RTU and data logger	 Kiosk
After Phugyi Reservoir at Aqueduct	2	 Sensor No.2 protection box	 Inside of the protection box and sensor No.2
		 No.2 flow meter	 Kiosk
Phugyi and Gyobyu pipe connection at Pyawbwesu Pump Station	3 4	 Sensor No.3 protection box	 Sensor No.4 protection box

Location	No. of flow meter	Photo	
		 Flow meter No.3 and No.4 (Installed in PS building)	 RTU and data logger (Installed in PS building)
Nyaughnapin Phase 1&2 WTP and PS	5	 Sensor No.5	 Sensor No.6
	6	 Flow meter	 Kiosk
	Existing No.1 No.2	 Existing No.1	 Existing No.2
Hlawga PS No.1	7	 Sensor No.7	 Flow meter No.7

Location	No. of flow meter	Photo	
		 RTU and data logger	 Kiosk
Hlawga PS No.2	8	 Sensor No.8	 Flow meter No.8
		 RTU and data logger	 Equipment booth in PS building
Yegu PS	9 10 11 12 13 14	 Sensor No.9	 Sensor No.10
		 Sensor No.11	 Sensor No.12

Location	No. of flow meter	Photo	
		 Sensor No.13	 Sensor No.14
		 Flow meter No.9, 10, 11 and 12	 Flow meter No.13 and 14
		 RTU and data logger	 Kiosk
Kokkine Service Reservoir	15 16 17	 Sensor No.15	 Sensor No.16
		 Sensor No.17	 Setup of flow meter

Location	No. of flow meter	Photo	
		 RTU and data logger	 Inside the kiosk
Shwedagon Service Reservoir	18 19 20 21	 Sensor No.18	 Sensor No.19
		 Sensor No.20	 Sensor No.21
		 Flow meter No.18 and 19	 RTU and data logger

5. Operation status

The operational status as of November 2019 is shown in Table 4 and Table 5. After this, the flowmeter system is remotely monitored by Delairco Japan.

Table 4 Operation status as of Nov. 2019

Location	No.	Operation status	Problem
After Gyobyu Reservoir	1	Good	None
After Phugyi Reservoir and Aqueduct	2	Good	None
Phugyi and Gyobyu pipe connection at Pyawbwesu PS	3	Good	None
	4	Good	None

Location	No.	Operation status	Problem
Nyaunghnapin Phase 1&2 WTP and PS	5	Good	None
	6	Good	None
	Existing 1	Good	None
	Existing 2	Inoperative	✓ Dropout of sensor ✓ Reinstallation of sensor
Hlawga PS No.1	7	Good	None
Hlawga PS No.2	8	Good	None
Yegu PS	9	Inoperative	✓ Indication of external noise ✓ Data reading errors (>1%) ✓ Consideration of measures including relocation of flow meters
	10	Good	None
	11	Good	✓ Corrosion of fixing wire ✓ Replacement of fixing wire
	12	Inoperative	✓ Indication of external noise ✓ Data reading errors (>1%) ✓ Consideration of measures including relocation of flow meters
	13	Good	None
	14	Good	None
Kokkine SR	15	Good	None
	16	Good	None
	17	Good	✓ Noise detected, but measurement is possible
Shwedagon SR	18	Good	None
	19	Good	✓ Flow measurement is not possible because pipe is not always full. ✓ Expert team proposed CE to relocate flowmeter
	20	Good	
	21	Good	

Table 5 Result of data reading test

No.	Location	Simulation flow value (m^3/h)	RTU read out (m^3/h)	Error (%) 2019/10	Error (%) 2019/8
1	After Gyobyu Reservoir	10,000	9973.6	0.26	0.19
2	After Phugyi Reservoir at Aqueduct	10,000	9996.17	0.04	0.02
3	Phugyi and Gyobyu pipe connection at Pyawbwesu Pump Station	10,000	9996.2	0.04	0.00
4		10,000	10001.4	0.01	0.08
5	Nyaughnapin Phase 1&2 WTP	5,000	5035.27	0.71	0.71
6		5,000	4997.22	0.06	0.05
-	Nyaughnapin Existing No.1 (PS)	5,000	4995.48	0.09	0.04
-	Nyaughnapin Existing No.2 (PS)	5,000	5002.42	0.05	0.03
7	Hlawga PS No.1	10,000	9990.00	0.1	0.07
8	Hlawga PS No.2	10,000	10006.58	0.07	0.08
9	Yegu PS	5,000	4855.83	**2.88**	**15.04**
10		5,000	4932.78	1.34	1.02
11		5,000	4939.78	1.22	0.44
12		5,000	4939.16	1.25	**3.70**
13		5,000	4978.88	0.42	1.84
14		5,000	4937.61	1.25	0.82
15	Kokkine Service Reservoir	5,000	5000.69	0.01	0.01
16		5,000	4992.9	0.14	0.14
17		5,000	4998.08	0.04	0.03
18	Shwedagon Service Reservoir	5,000	4957.33	0.85	0.21

No.	Location	Simulation flow value (m^3/h)	RTU read out (m^3/h)	Error (%) 2019/10	Error (%) 2019/8
19		5,000	4990.27	0.19	0.07
20		5,000	4984.2	0.32	0.04
21		5,000	4999.82	0	0.01

6. YCDC-WRAWSA central data room

Central data room has been set up in YCDC-WRAWSA HQ for the collection, monitoring and analysis of flow data from 21 flow meters.

Photo 1 Central data room

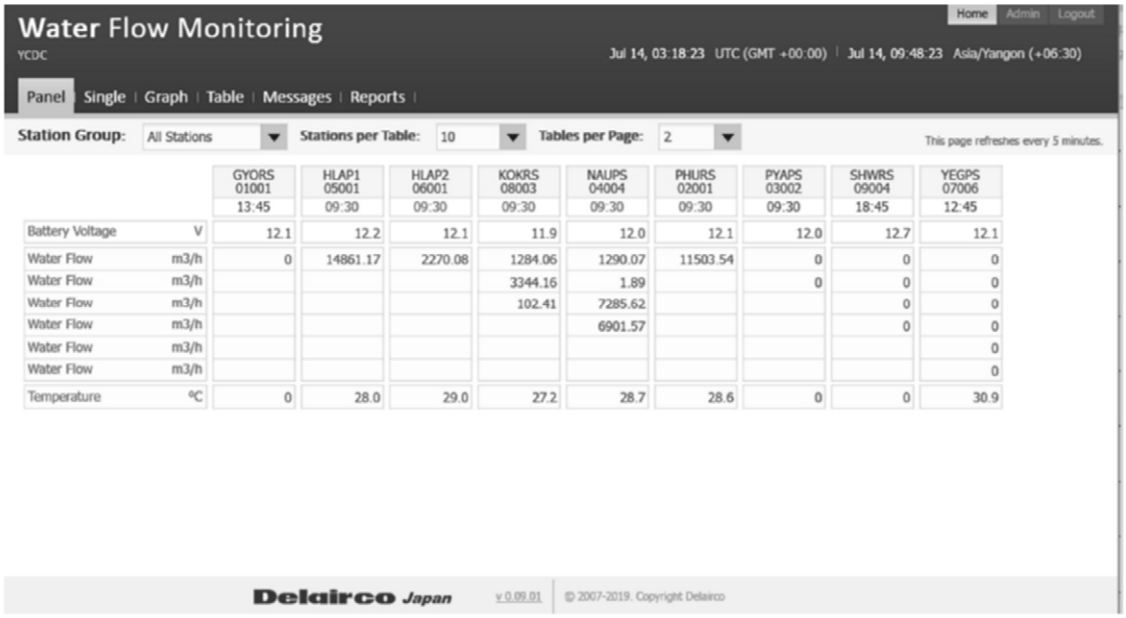


Figure 2 Display of flow data analysis system

7. OJT

6 times of on-the-job training (OJT) sessions have been carried out. Table 6 shows the summary of OJT. The teaching materials, photographs and a list of participants are shown in Attachment 2.

Table 6 Summary of OJT

No.	Date	Venue	Trainer	Participants	Contents of OJT
1	28 Jun. 2019	Yegu PS	Tokyo Keiki Inc.	Kiosk manager at each flow meter site Staffs of central data room	Flowmeter O&M training using UFL-30 Maintenance manual Practical training in Yegu PS flow meter kiosk
2	13 July 2019	Yegu PS	Delairco Japan KK	Kiosk manager at each flow meter site Staffs of central data room	Management of UPS (Uninterruptible Power Supply) Operation of data collection system
3	15 July 2019	Central data room	Delairco Japan KK	Staffs of central data room	Remote operation of flow meter Collection, analysis and management of flow data
4	21 Aug. 2019	Central data room	Delairco Japan KK	Staffs of central data room	Remote operation of flow meter Collection, analysis and management of flow data
5	30 Oct. 2019	Yegu PS	Tokyo Keiki Inc. Delairco Japan KK	Kiosk manager at each flow meter site Staffs of central data room	O& M of kiosk
6	1st Nov 2019	Central data room	Delairco Japan KK	Staffs of central data room	Flow data management

8. Remaining issues

Since the start of operation of flowmeter and data correction system in 2019, the following issues are remaining. However, due to COVID-19 pandemic (Jan. 2020-) and the outbreak of political upheaval (Feb. 2021-), travel to Yangon has been difficult and the measures have not been implemented.

(1) Sensor dropout of Nyaunghnapin Existing No.2 and fixing wire corrosion of Yegu No.11

The status of Nyaunghnapin Existing No.2 and Yegu No.11 at the time the problem was identified is shown in Photo 2. In Nyaunghnapin Existing No.2, the sensor attached on the side of pipe dropped out due to corrosion of steel fixing wire. In Yegu No. 11, the sensor is still on the pipe but the steel fixing wire are corroded and need to be replaced as soon as possible.

The reasons for the use of steel wire, which are the cause of these problems, are described below.

Nyaunghnapin existing No.2

Nyaunghnapin Existing No.2 was planned to carry out only coaxal cable extension and connection works. However, on checking the inside of the flowmeter chamber, it was found that the fixing wire was already corroded and needed to be replaced.

Because re-installation work of existing No. 2 sensor had not been planned, there was no extra stainless-steel wire for this purpose. Therefore, it was decided to purchase an alternative fixing wire in Yangon. However, stainless-steel wire was not available in Yangon, it was decided to use steel wire which was available in Yangon.

Yegu No.11

Yegu No.11 sensor was originally planned to be installed on a pipe with a diameter of 600 mm,

but after installation it was found that the pipe was not always full. Therefore, it was decided to replace the No. 11 sensor on the 1200 mm diameter pipe, which is always full.
However, there was no extra stainless-steel wire because this re-location work was not planned. Therefore, it was decided to purchase an alternative fixing wire (steel wire) in Yangon.

Nyaunghnapin Existing No.2
Dropped sensor: In the red circle

Yegu No.11
Corroded steel wire: In the red circle

Photo 2 Problems that have occurred in Nyaunghnapin Existing No.2 and Yegu No.11

(2) The effect of electrical noise on Yegu No.9 and No.12

The location of the sensors installed in Yegu PS is shown in Figure 3. The sensors that cannot be measured due to noise are No. 9 and No. 12 are installed on Gyobyu - Kokkine 56-inch MS pipeline. Photos of Gyobyu - Kokkine 56-inch MS pipeline are shown in Photo 3. Near Yegu PS, the pipeline is installed above ground.

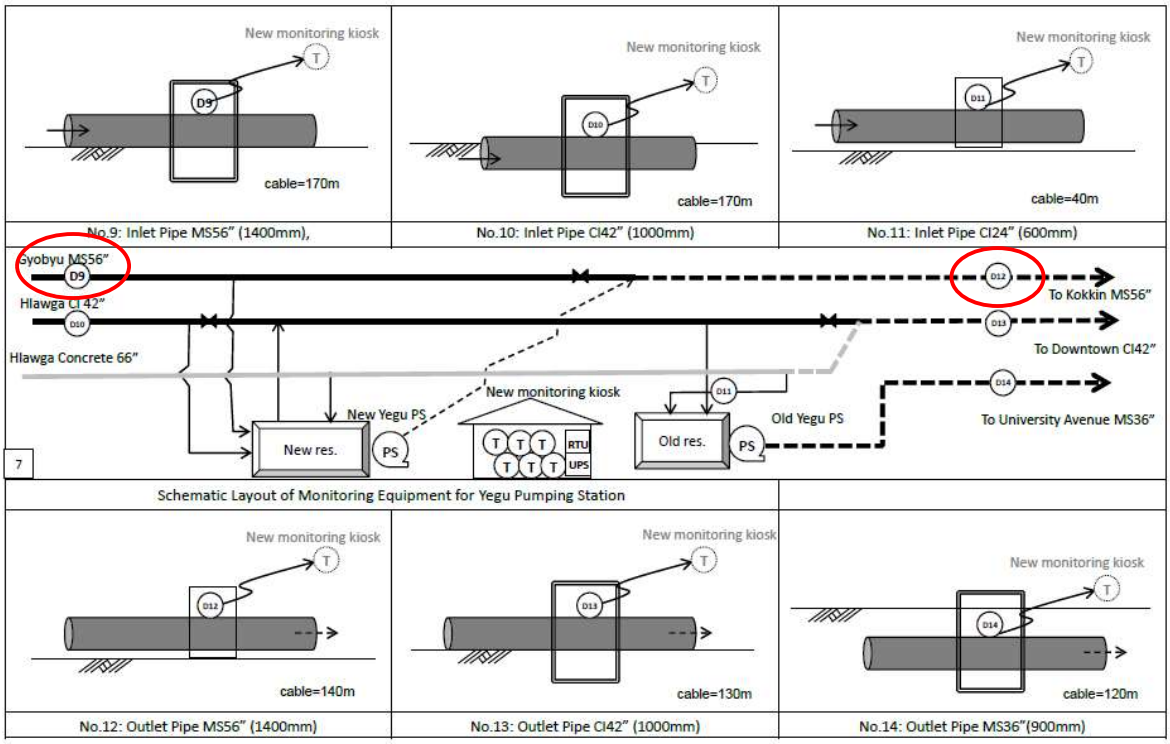


Figure 3 Location of sensors in YeguPS

From YeguPS towards Gyobyu Reservoir
(Upstream direction)

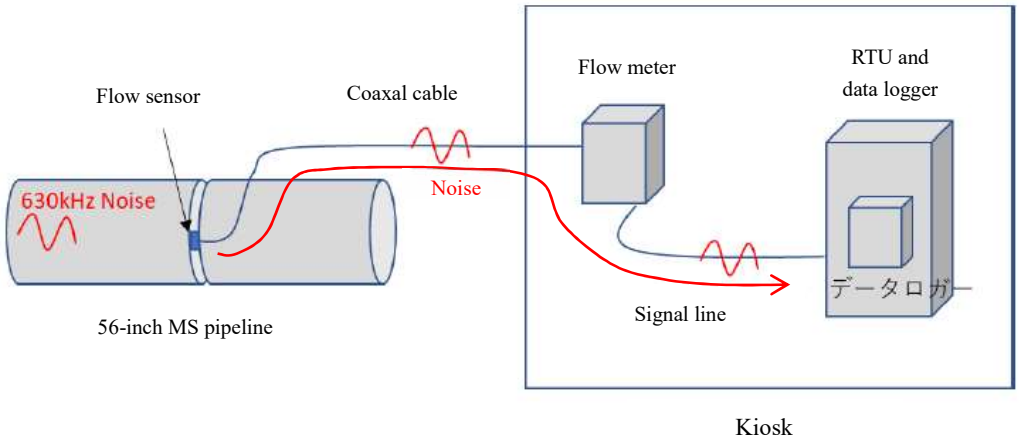
From YeguPS towards Kokkine SR
(Downstream direction)

Photo 3 Gyobyu – Kokkine56 inch MS pipeline

An investigation of the sources and transmission pathways of noise in YeguPS has been carried out. The current findings are presented below.

Noise transmission path

Figure 4 shows the presumed transmission path of the noise. It is assumed that the noise is transmitted through the MS pipeline. Furthermore, it was thought that the noise transmitted through the MS pipeline was picked up by the sensor (No.9 and / or No.12) and transmitted through the signal line (coaxal cable) and flowmeter, then reach to the data logger.



Source: Delairco Japan KK, Dispatch report, Nov. 2019.

Figure 4 Estimated noise path way

Estimation of noise source

To estimate the noise source, the frequency and waveform of the noise of No.9 and No.12 were measured. As a result, it was found that

- ✓ Frequency of the noise: around 630kHz
- ✓ Waveform of the noise: Sine wave
- ✓ Characteristics of amplitude modulation (AM) (Photo 4)

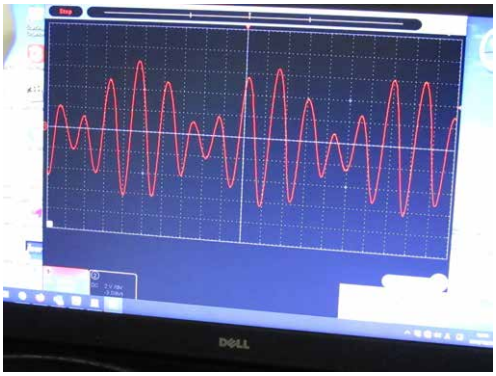


Photo 4 Obtained waveform of noise

Based on the above observations, the noise was assumed to be interference caused by high-frequency waves. Thus, the Gyobyu-Kokkine MS pipeline installed on the ground acts as an aerial, and receives high frequency waves, then reach the data logger through the sensor and signal line.

Near YeguPS, there is a Ministry of Information broadcast station (Yay-Kuu broadcast station) (Figure 5). The broadcasting station is used for Myanmar radio national service and relay broadcasting of NHK (Nihon Housou Kyoukai) on medium and short-wave band with maximum power 50KW. The Gyobyu-Kokkine MS tube is located along the Yay-Kuu transmitter station, and the shortest distance between the transmitter station (aerial) and the pipeline is about 100m.

Figure 5 Location of Yegu PS and Yay-Kuu broadcasting station

The relationship between the broadcasting schedule of Yay-Kuu broadcasting station and the noise was examined in the terms of the time of the occurrence of the noise and the broadcast frequency.

Figure 6 shows the flow data of Yegu No.9 and No.12. The flow rate fluctuates strongly from 6 am to 8 pm. This fluctuation in the data was considered to be due to the influence of noise, and the noise was considered to have occurred between 6am and 8pm.

Next, the broadcasting schedule of Yay-Kuu transmitter station was checked (Table 7). There were no broadcasts on 630 kHz in the medium wave band, and no broadcasts that matched the time of day when the noise occurred appeared to be made.

However, the Yay-Kuu transmitter station near YeguPS is the most likely source of AM modulated noise. Therefore, for the time being, the Yay-Kuu transmitter station is assumed to be the source of the noise, and countermeasures will be studied.

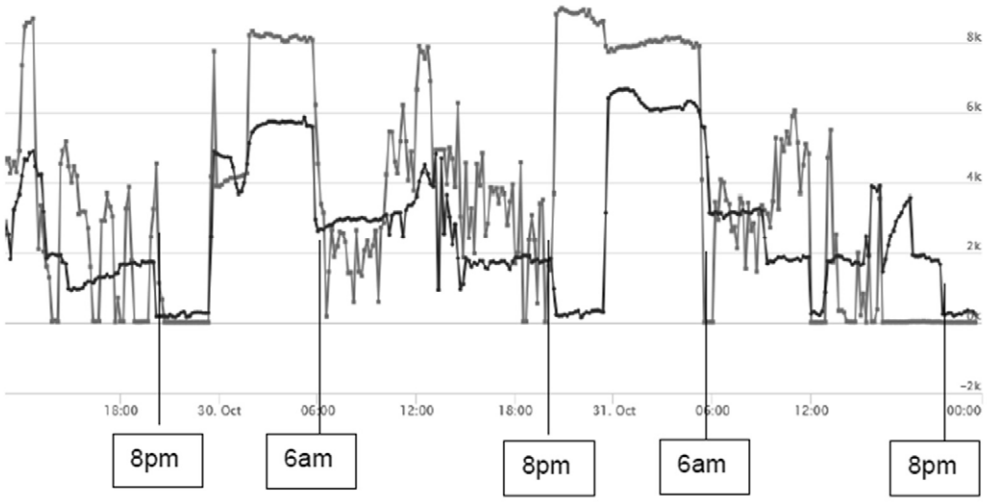


Figure 6 flow data record of YeguPS No.9and No.12

Table 7 Broadcasting schedule of Yay-Kuu broadcasting station (Mid wave band)

Frequency	Service
(1) Myanmar Radio National Service	
576 kHz	2300-1700Z (05:30-23:30 MMT), Power: 100 kW.
729 kHz	2300/2330-1630Z (05:30 / 06:00 – 23:00 MMT), Power: 50 kW.
(2) NHK World	
576kHz	Wed / Sat, 1445 – 1505Z (21:15 – 21:35 MMT)
Source; (1) https://www.asiawaves.net/myanmar-radio.htm (2) https://www3.nhk.or.jp/nhkworld/resources/brochure/pdf/rj_frequency.pdf	

Noise reduction measures taken in 2019

The noise reduction measures taken in 2019 are shown in Photo 5. However, in this case, the noise was directly superimposed on the sensor output, therefore, installation of frame ground and radio - frequency filter (RF filter) were not effective.

Measures implemented in Yegu PS

- ✓ Installation of Frame Ground (FG)
- ✓ Installation of RF filter using ferrite core

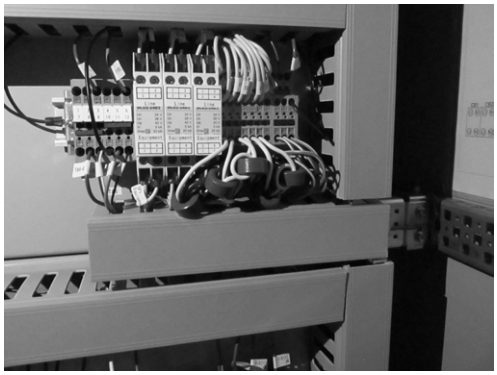
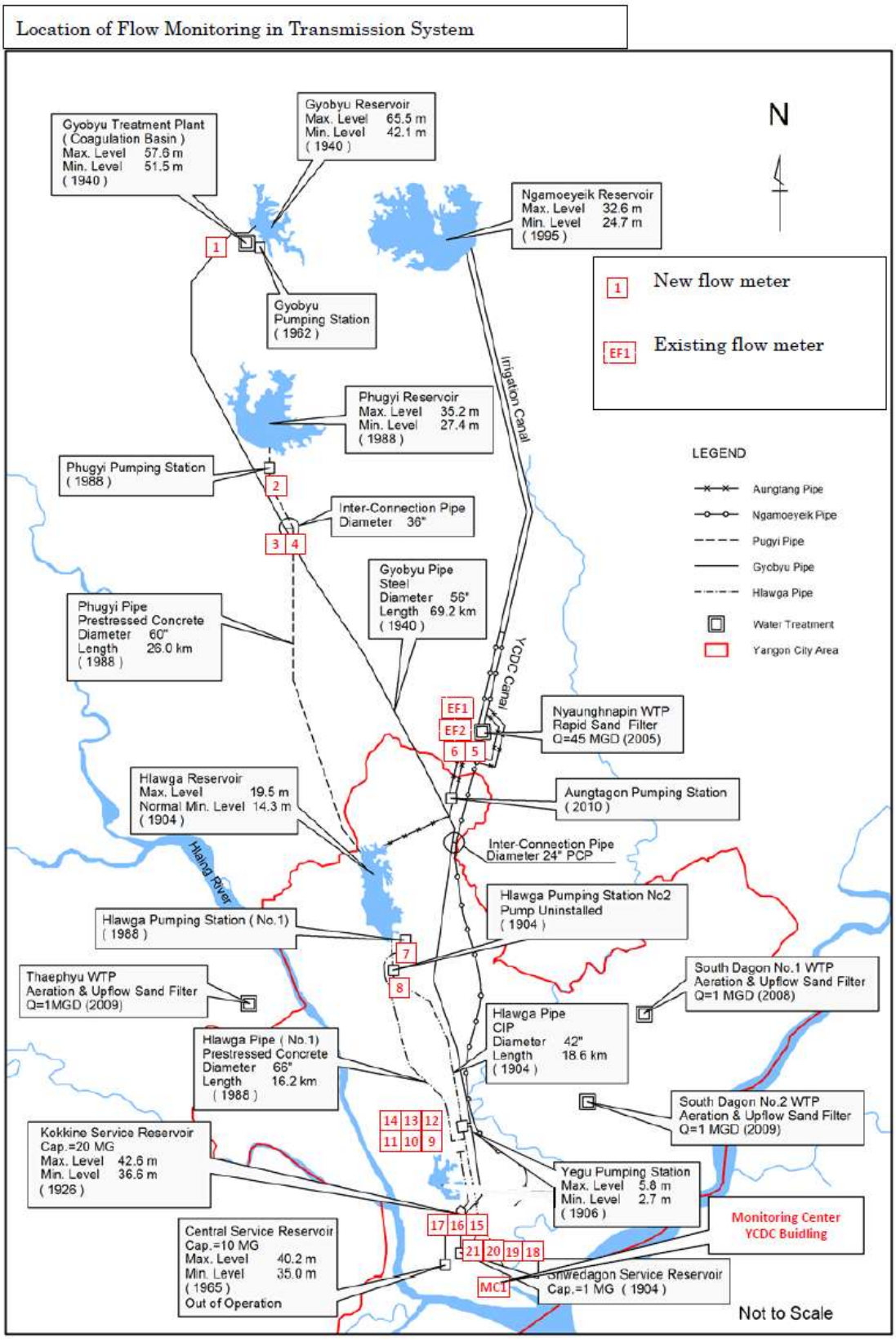
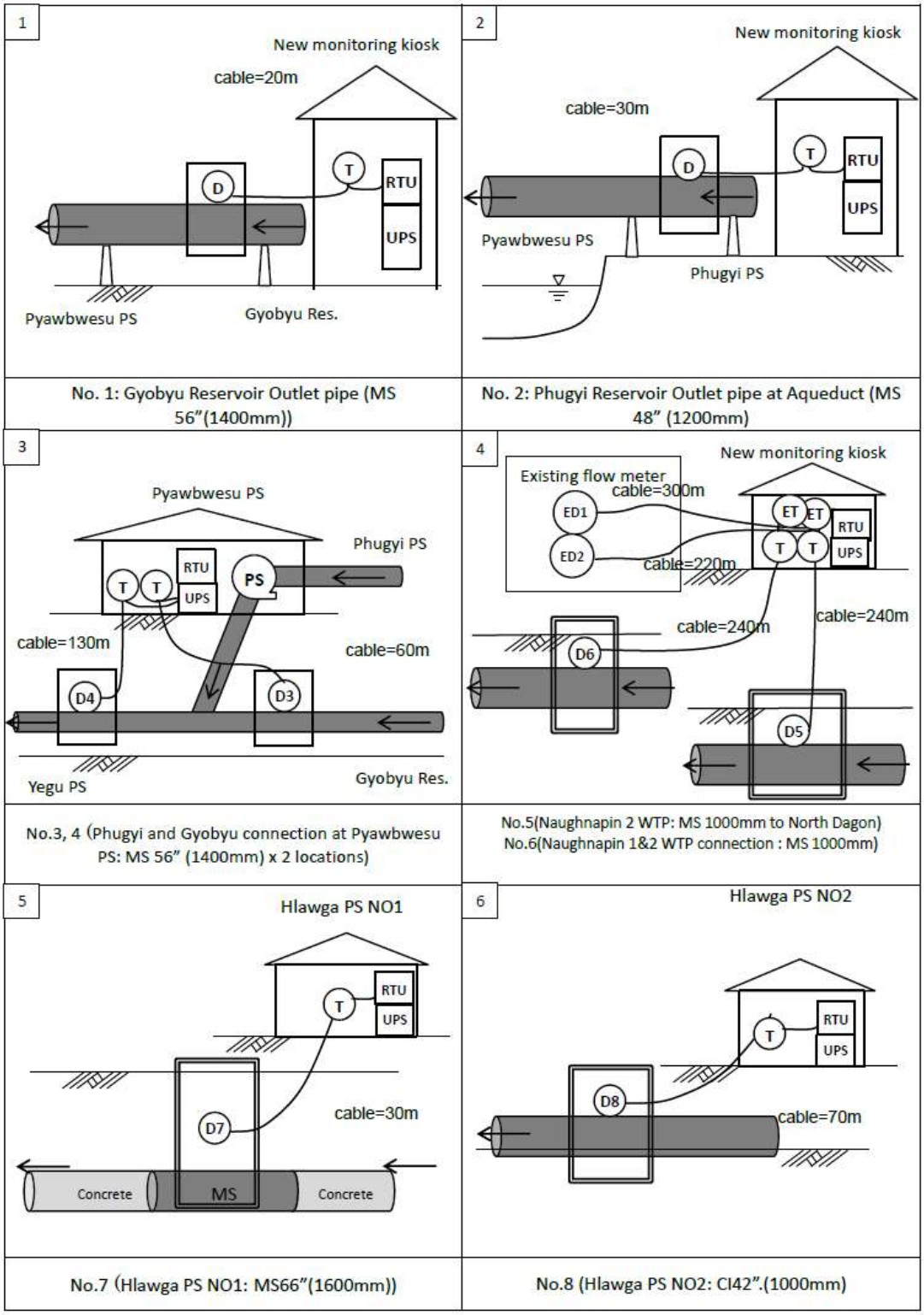
	
Installation of FG	Installation of RF filter

Photo 5 Implemented measure in Yegu PS

Attachment 1

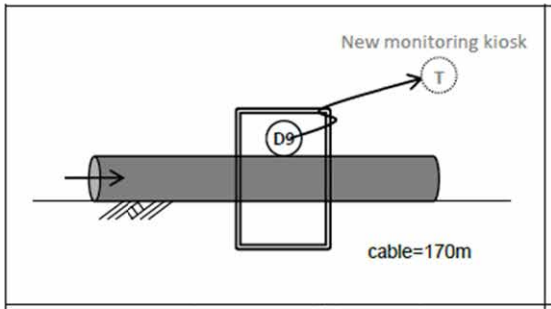
Location of kiosk and flow meter



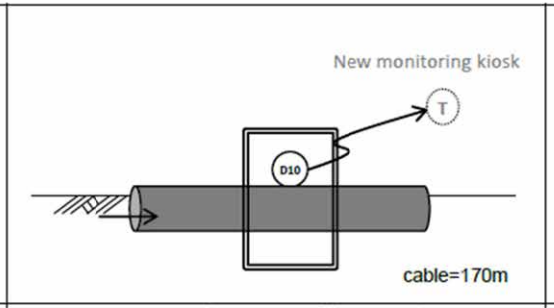


Note: Diameter (mm) is reference only.

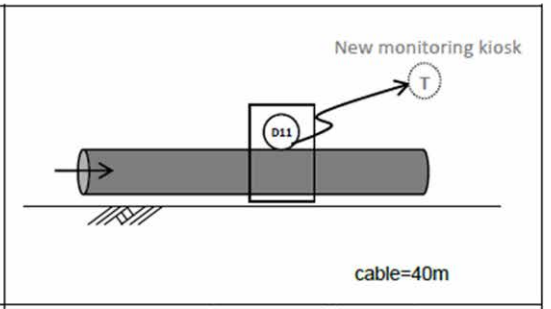
D: Detector, T: Transducer, RTU: Remote Terminal Unit, UPS: Uninterruptible Power System



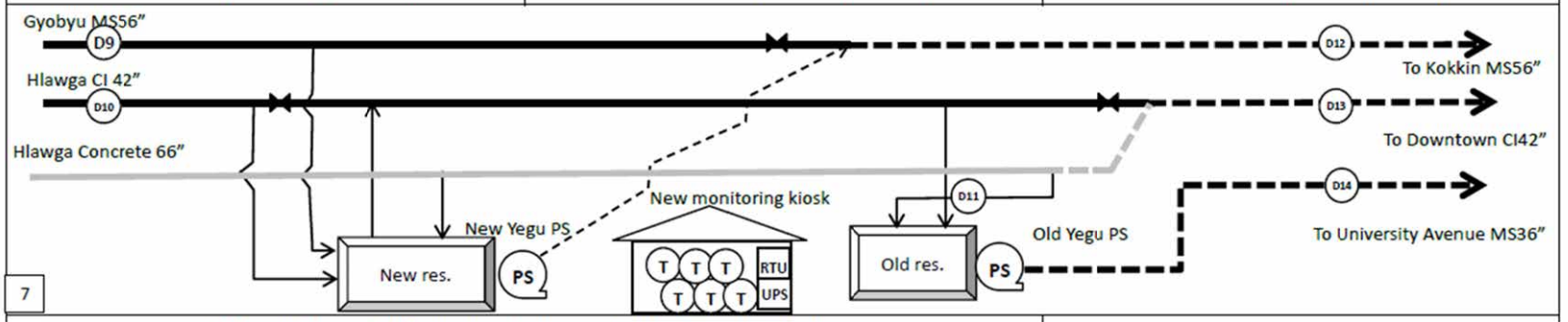
No.9: Inlet Pipe MS56" (1400mm),



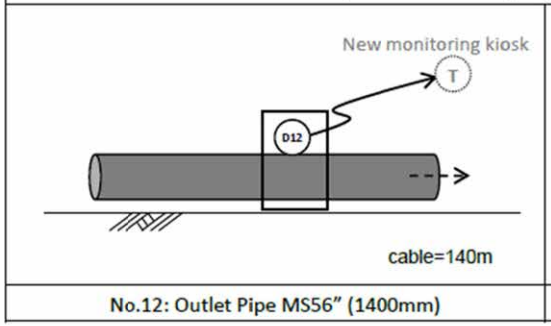
No.10: Inlet Pipe CI42" (1000mm)



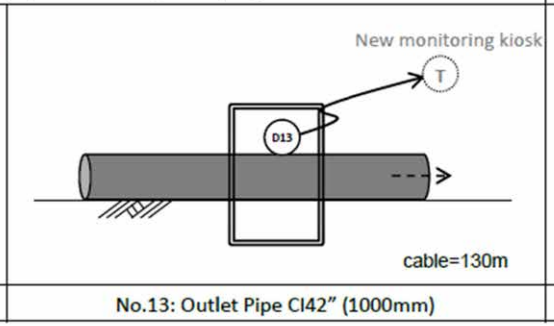
No.11: Inlet Pipe CI24" (600mm)



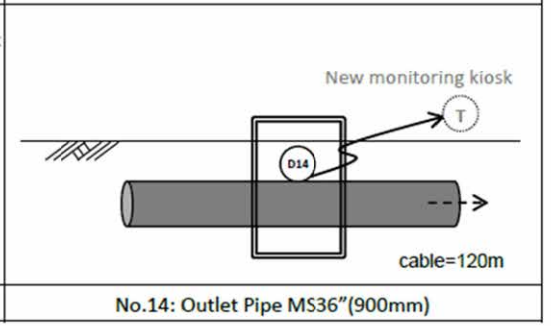
Schematic Layout of Monitoring Equipment for Yegu Pumping Station



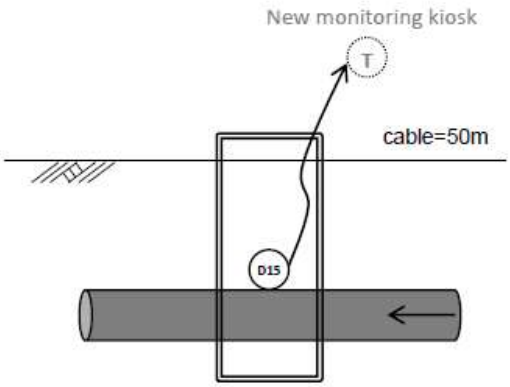
No.12: Outlet Pipe MS56" (1400mm)



No.13: Outlet Pipe CI42" (1000mm)

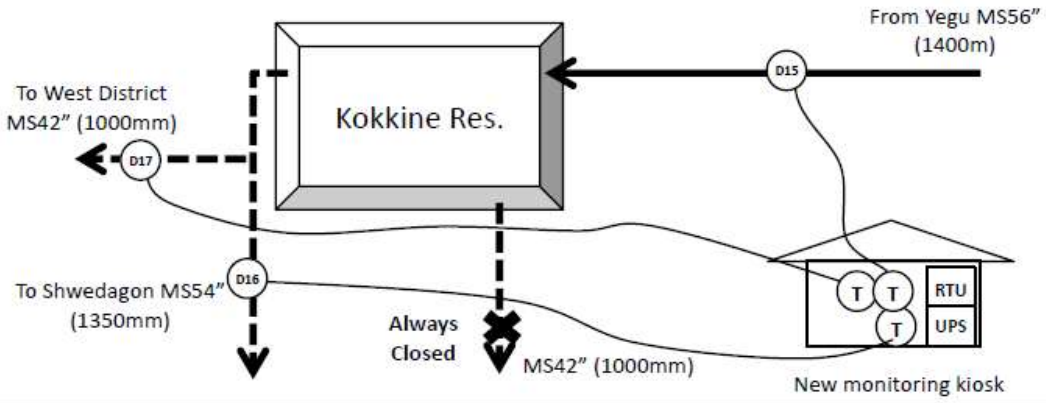


No.14: Outlet Pipe MS36"(900mm)

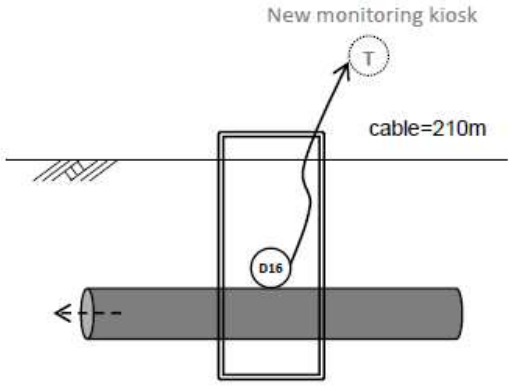


No. 15: Inlet pipe (MS 56"(1400mm))

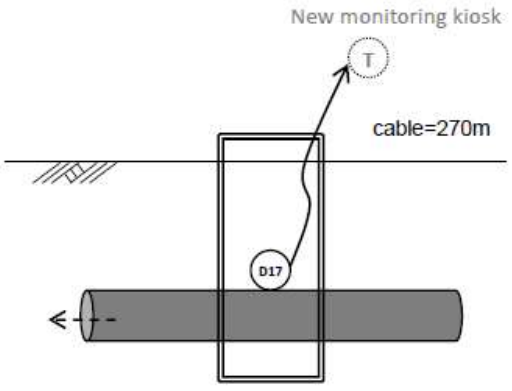
8



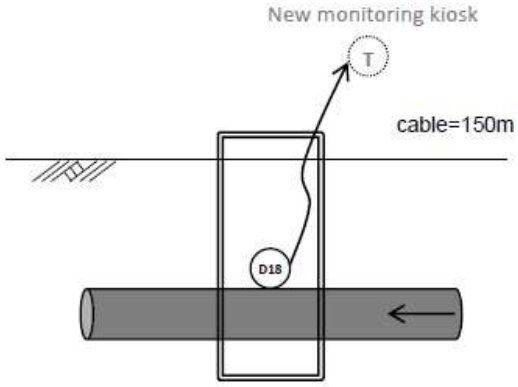
Schematic Layout of Monitoring Equipment for Kokkin Reservoir



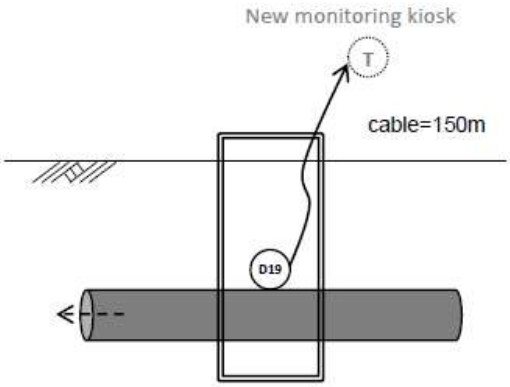
No. 16: Outlet pipe (MS54"(1350mm))



No. 17: Outlet pipe (MS42"(1000mm))

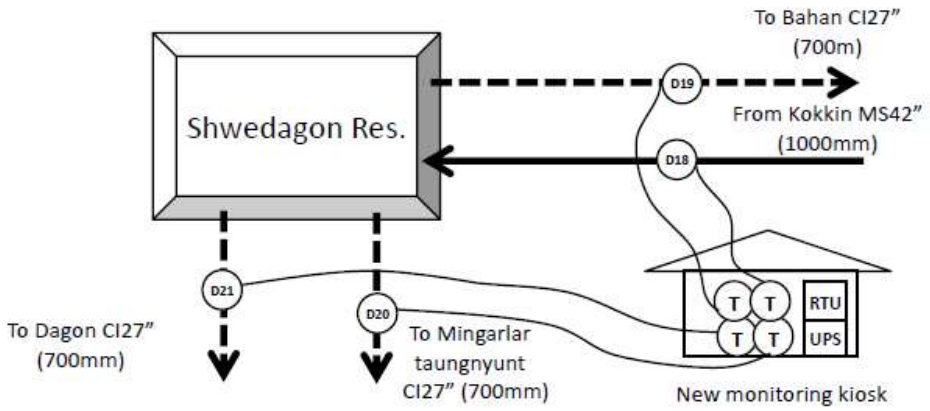


No. 18: Inlet pipe (MS42"(1000mm))

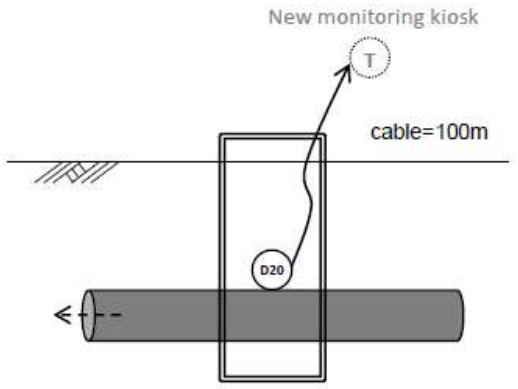


No. 19: Inlet pipe (CI27"(700mm))

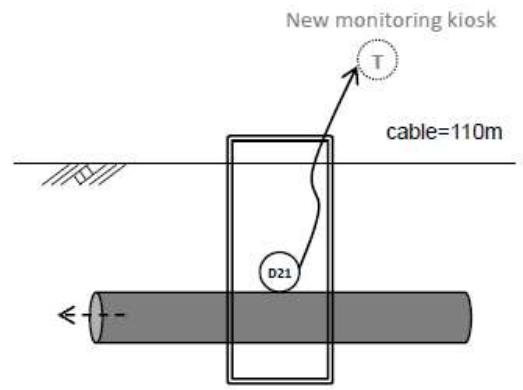
9



Schematic Layout of Monitoring Equipment for Shwedagon Reservoir



No. 20: Outlet pipe (CI27"(700mm))



No. 21: Outlet pipe (CI27"(700mm))

Flow Monitoring Locations and Flow Meters

Monitoring location (RTU)		Nos of Flow meters	No.	Cable (m)	Pipe material and diameter for flow meter
Location No.	Location				
1	After Gyobyu Reservoir	1	1	20	MS56in.(1400mm)
2	After Phugyi Reservoir at Aqueduct	1	2	30	MS48 in. (1200mm) MS part in Concrete pipe (56in.)
3	Phugyi and Gyobyu pipe connection at Pyawbwesu Pump Station	2	3	60	MS56in(1400mm)
			4	130	MS56in.(1400mm)
4	Naughnapin Phase 1&2 WTP and PS	2	5	240	1000mm
			6	240	1000mm
		Existing	-	300	-
		Existing	-	220	-
5	Hlawga PS NO1	1	7	30	MS66in.(1600mm) MS part in concrete pipe (66in.)
6	Hlawga PS NO2	1	8	70	CI42in.(1000mm)
7	Yegu Pump Station	6	9	170	Inlet: MS56in.(1400mm)
			10	170	CI42in.(1000mm)
			11	40	CI24in.(600mm)
			12	140	Outlet: MS56in.(1400mm)
			13	130	CI42in.(1000mm)
			14	120	MS36in.(900mm)
8	Kokine Service Reservoir	3	15	50	MS56in.(1400mm)
			16	210	MS54in.(1350mm)
			17	270	MS42in.(1000mm)
9	Shwedagon Service Reservoir	4	18	150	MS42in.(1000mm)
			19	150	CI27in.(700mm)
			20	100	CI27in.(700mm)
			21	110	CI27in.(700mm)
		21	21	3,150	

Note: Diameter(mm) is reference only.

Attachment 2

Training material

Note: 2nd, 3rd and 5th OJT were practical training in Yegu PS kiosk and central data room

1st OJT: 28 July 2019

TOKYO KEIKI

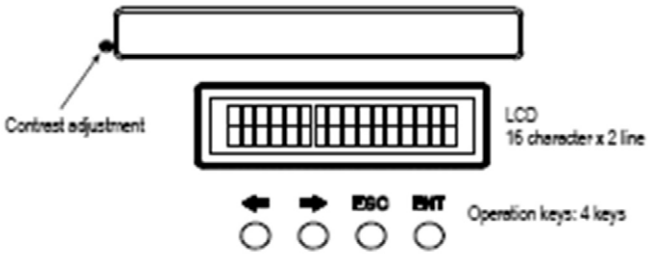
Troubleshooting

Main flowmeter (electronics) unit and components

In the event of problems, please review this section to identity causes and suggested remedies.
If the steps shown in this section cannot solve a problem, contact Tokyo Keiki.

- Unit does not startup when the system is powered up.
  - Is the main circuit breaker activated?
  - Is the fuse burned out?

- LCD display is dim.
  - Was contrast adjusted?
  - Has the specification life been exceeded?



- Flow values do not vary.
  - Does 'R', 'D' marks or ' ERR" ' appear? (Values are held)

- Analog output does not vary.
  - Is analog check mode activated? (Is <A > displayed?)

Measurement

The following is a description of some general problems and remedies relating to measurement.
If the steps shown in this section cannot solve a problem, contact Tokyo Keiki.

(1) Fluids which cannot be measured

- The presence of continuous and large amounts of bubbles in the fluid will greatly attenuate the acoustic signal, cause missed measurements, or make measurement impossible. Even ultrasonic flowmeters employing the Doppler method which works better under such entrained bubble conditions compared to transit-time flowmeters also encounter missed measurements or are unable to make measurements when there is a continuous and large amount of bubbles contained in the fluid being measured.

(2) Given measurement accuracy cannot be obtained

- Check pipe specification.

- Cause may also be attributable to changes in fluid cross sectional area due to pipe rust and scale and partially filled pipe conditions.

TOKYO KEIKI

[Distributor Profile]
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Mayangone Township , Yangon , Myanmar
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Fax : + 95 1 650488,651251,661030
Email : sales@hstengineering.com
james.purity@gmail.com
Website :www.hstengineering.com
Contact person : Mr. Thant Zin James (President)
Mr. Thant Sin Oo

[Tokyo Keiki Inc. Profile]
Tokyo Keiki Inc.
2-16-46, Minami-Kamata, Ohta-Ku, Tokyo JAPAN
Phone : + 81 3 37378664
Fax : + 81 3 37378665
Email : overseas-sales03@tokyo-keiki.co.jp
Website http://www.tokyo-keiki.co.jp/e/company.html
Contact person : Mr. Takayuki Shirakawa

4th OJT: 21 Aug. 2021

Water Flow Monitoring Operation Handbook -Admin Function-

Delairco Japan

1

Login - admin

2

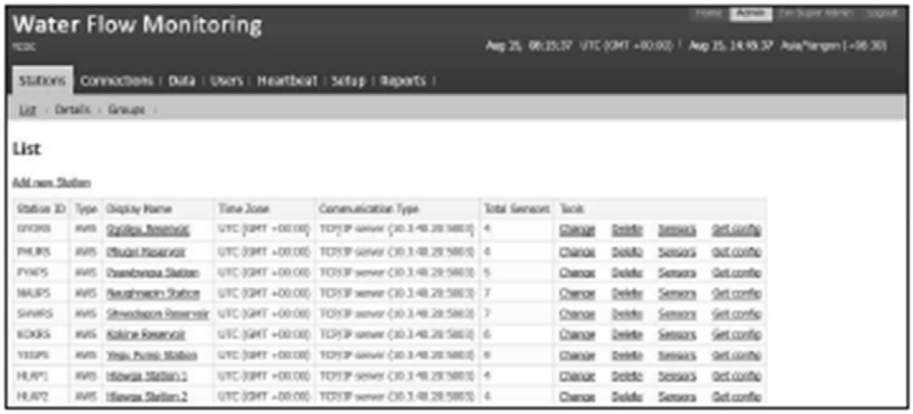
Setup

Setup

T1> : if current value is over 21000, create alert
T1< : if current value is under 0, create alert
T0-T1: if Difference between previous and current value is over 20000, create alert

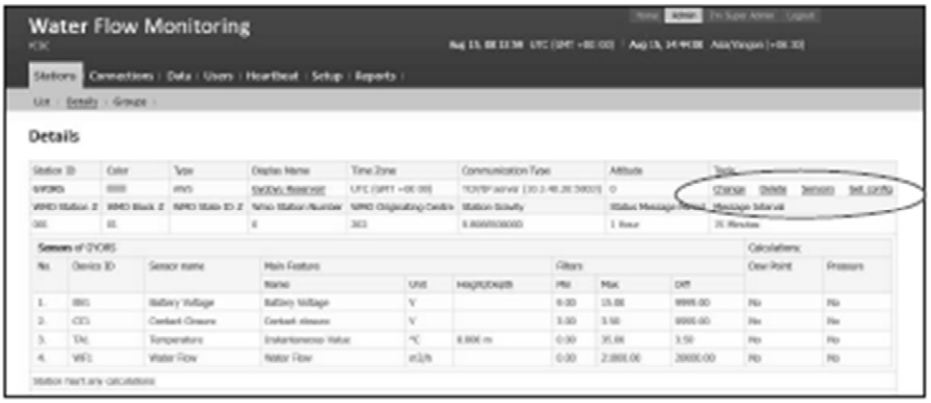
Alert makes values red in data Table.

Stations - List



5

Stations - Details



6

Station

Station - Sensors

Station - Groups

Users

Manage users member and password, enable function for each

Users

11

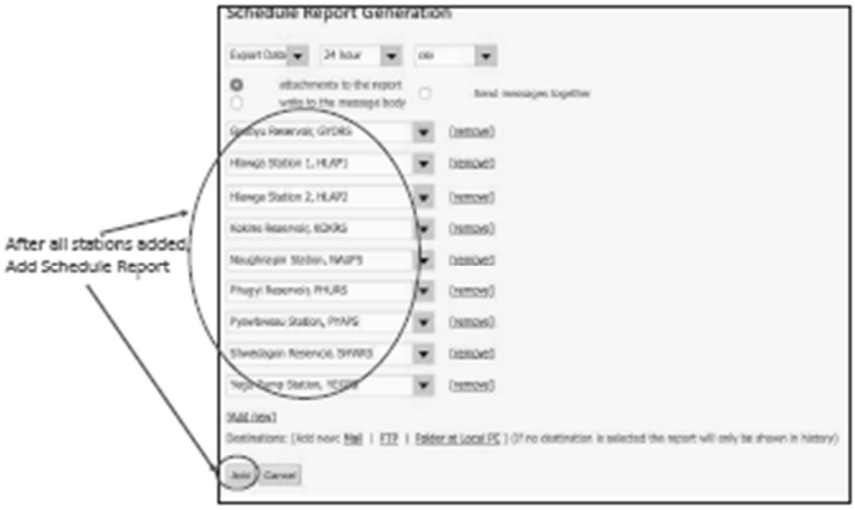
Schedule Report Generation

This function needs correction and will be made available for YCDC users in September 2019

12

Schedule Report Generation

Schedule Report Generation



Schedule Report Generation

15

Delairco Japan KK will add function and update the WFM Software within maintenance period.

Contact person :

Dlairco Japan : Kinya TODA (toda@delairco.com)

YCDC :_____

16

6th OJT: 1st Nov.2021

Water Flow Monitoring Operation Handbook -Error Report -Report Function

Delairco corp

1

Error Report

What was happed

2019/9/20
WFM system ran "re-install" script. then all database were overwritten by incorrect version.

2019/10/1
Delairco recover the database setting manually.
-> Browser was recovered but database is not created.

What was wrong

1. the system included inappropriate function which can work from local browser.
2. Backup data was able to be overwritten accidentally.

2

Error Report

What Delairco have done to fix them

1. make inactive "re-install" script.
2. The backup policy is reviewed and longer retention options are available

   A. Monthly retention of Daily Full backups
   B. Yearly retention of Monthly Full backups
   C. Daily retention of 2 hourly backups

all data (from start) will keep in HDD more than 10 years. (as calculated HDD volume)

Report Function

Daily Scheduled reporting is implemented for the purpose of data analysis by client.
The reports cannot be deleted by client and can serve as backup as well.

Advise to client: Maintain copy of Reports outside of Water Flow Monitoring Server.

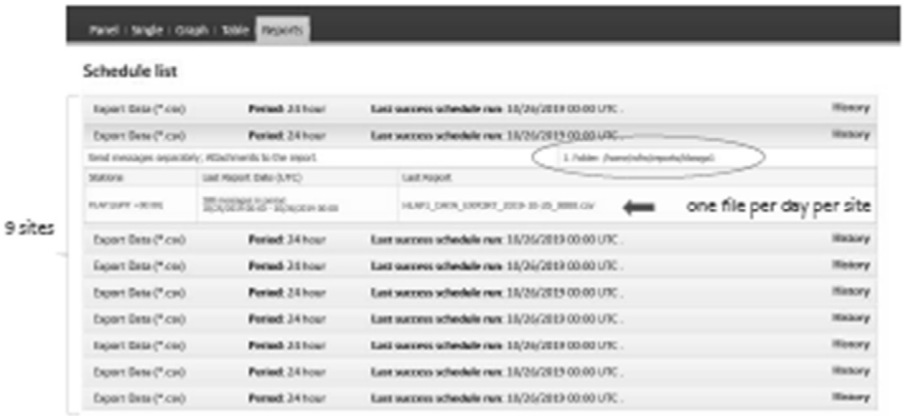
Annual data growth: 365 files per folder, total: 100MB.

1. File format: CSV (import in Excel or LibreOffice Calc)
2. Server folder and subfolders:

/home/wfycdc/Downloads/reports/ gyobyu
hlawga1
hlawga2
kokine
naughnapin
phugyi
pyawbwesu
shwedagon
yegu

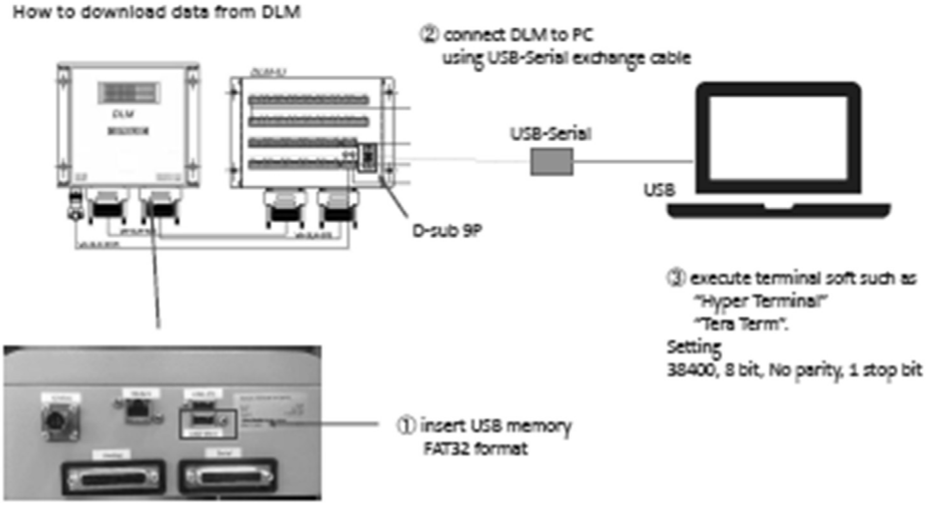
Contents format: Station code, Tx DateTime, BV1 (V),CC1(V), TA1 (oC), WF1,..,WF6 (m3/hr)
Example import in excel:

Report Function



5

How to download data from DLM



6

④ DLM Operation and Maintenance Manual 10 page

3.2.4 (4) Off-load Data to USB flash memory

Allows the user to download the data log for further analysis. The data format is *.csv and is compatible with Microsoft Excel and other spreadsheet applications.
The Filename format is < yymmddF>.CSV e.g. 181029F.CSV

⑤ Storage Data

One unit of data: appx. 100 byte
(6 sensors)
Volume of Memory in DLM: 4Mbyte
Sampling period: 5 min (288 times /day)

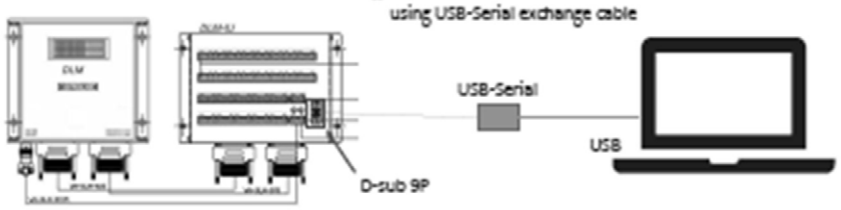
4M/(100 x288) =138 days

Stick the memory stick in the lower USB input of the DLM, upside down, Once you have selected ***how much to off-load***, type "Y" to start off-load.

Important: Please check the downloaded data file before erasing the log.

How to change the data interval period

① connect DLM to PC
using USB-Serial exchange cable

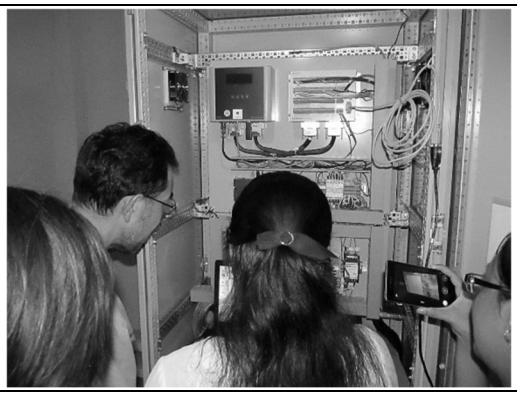


② execute terminal soft such as
"Hyper Terminal"
"Tera Term".
Setting
38400, 8 bit, No parity, 1 stop bit

③
>mm
Main menu
>6. Configure Station
>2. Logger Settings
>1. Logging Interval
>5(intended time)
>5. Configure TCP Messages
>4. Message Interval
>5(intended time)

Photo of OJT

1st: 28 June 2019	
	
2nd: 13 July 2019	
	
3rd: 15 July 2019	
	
4th: 23 Aug. 2019	
	

5th: 30 Oct. 2019	
	
6th: 1st Nov.2019	
	

OJT Participant list

1st: 28 June 2019

JICA

Title: Ultrasonic Flowmeter OJT (Yegu) Date: 28.6.2019 (Fri)

Venue:

	Name	Department	Title/ Position	Telephone/Mobile	Signature
1					
2	U Aung Htut Lin	Yaegu Pumping Station	AE	0925080221	[signature]
3	Daw Naw Eblinder	Yegu Pumping station	SAE	09450091518	[signature]
4	Daw May Thaw Tar Oo.	Nyaunghnapin W.TP	Flat	09-979872950	[signature]
5	U Aung Aung	Nyaunghnapin WTP	W.A	09.250957517	[signature]
6	U Soe Mine Ture	GVO Byu	[illegible]	09-780538806	[signature]
7	U Saw william.	GYOByu	[illegible]	09799912906	[signature]
8	U SAI AUNG PWINT	PYAW BWESU	[illegible]	09420041223	[signature]
9	U Aung Moe Kyaw.	Head office.	SAE	09250792934	[signature]
10	Daw Naw Ser Eh Dor	Hlawga Pumping Station	Flat	09782943801	[signature]
11	Saw Ei Nyein Htay	Yegu Pumping Station	Flat	09784808171	[signature]
12	U Bhone Thet Naing.	Hlawga Pomping Station	SAE	09.43094616	[signature]

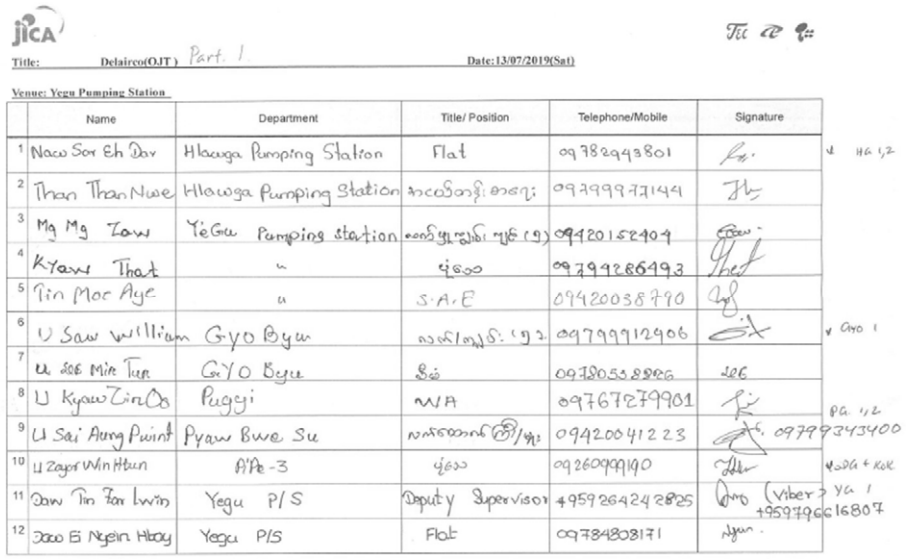
JICA

Title: Date:

Venue:

	Name	Organization/ Department	Title/ Position	Telephone/Mobile	Signature
13	U Zayar Win Htun	(Pipe 3) water and sanitation	Flat	09-260999190	[signature]
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					

2nd: 13 July 2019

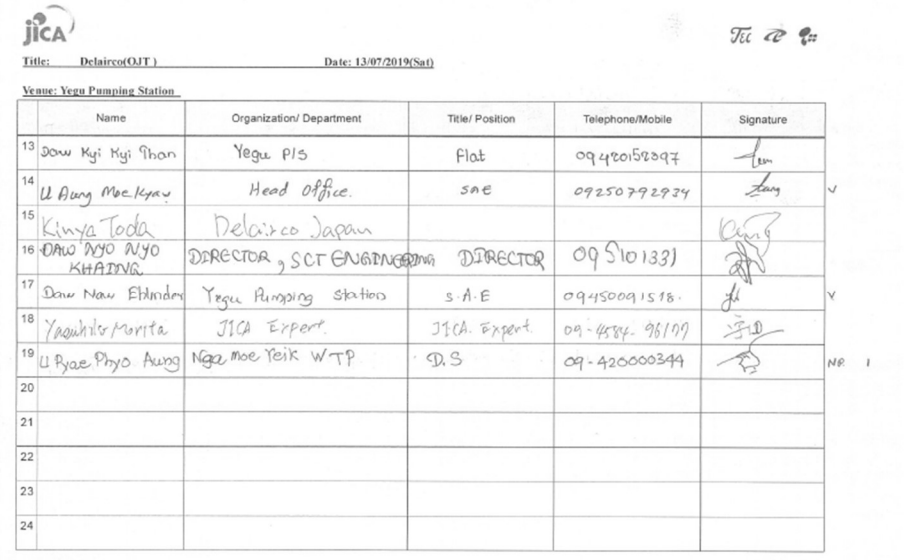


JICA

Title: Delairco(OJT) Part. 1 Date: 13/07/2019(Sat)

Venue: Yegu Pumping Station

	Name	Department	Title/ Position	Telephone/Mobile	Signature
1	Naw Sor Eh Dar	Hlawga Pumping Station	Flat	09782943801	
2	Than Than Nwe	Hlawga Pumping Station	[illegible]	09799977144	
3	Mg Mg Zaw	YeGu Pumping station	[illegible]	09420158404	
4	Kyaw That	〃	[illegible]	09799286493	
5	Tin Moe Aye	〃	S.A.E	094200387 90	
6	U Saw William Gyo Byu	[illegible]	[illegible]	09799912906	
7	U Saw Min Tun	GyO Byu	[illegible]	09780558826	
8	U Kyaw Zin Oo	Puggi	MA	09767879901	
9	U Sai Aung Paint	Pyaw Bwe Su	[illegible]	094200412 23	
10	U Zayar Win Htun	A/Pe-3	[illegible]	09260999190	
11	Daw Tin Zar Lwin	Yegu P/S	Deputy Supervisor	+959264242825	(Viber) +959799616807
12	Daw Ei Nyein Htay	Yegu P/S	Flat	09784808171	



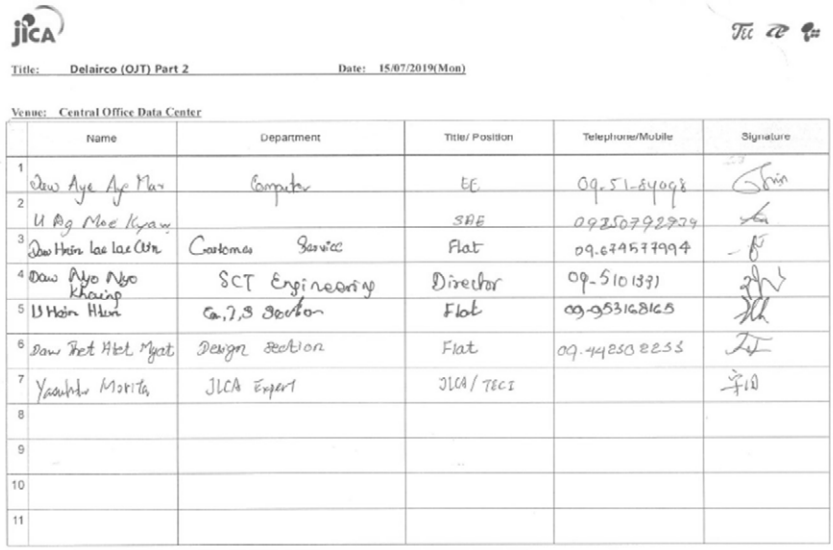
JICA

Title: Delairco(OJT) Date: 13/07/2019(Sat)

Venue: Yegu Pumping Station

	Name	Organization/ Department	Title/ Position	Telephone/Mobile	Signature
13	Daw Kyi Kyi Phan	Yegu P/S	Flat	09420158297	
14	U Aung Moe Kyaw	Head Office.	SAE	09250792934	
15	Kinya Toda	Delairco Japan			
16	DAW NYO NYO KHAING	DIRECTOR, SCT ENGINEERING DIRECTOR		09 5101331	
17	Daw Naw Ethinder	Yegu Pumping Station	S.A.E	09450091518.	
18	Yasuhiko Morita	JICA Expert	JICA Expert	09-4584-96199	
19	U Pyae Phyo Aung	Nga Moe Yeik WTP	D.S	09-420000344	
20					
21					
22					
23					
24					

3rd: 15 July 2019



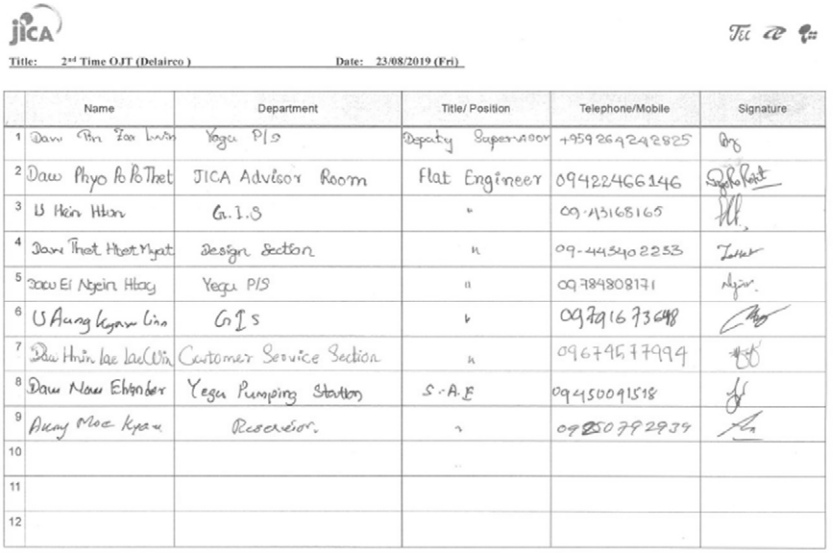
JICA

Title: Delairco (OJT) Part 2 Date: 15/07/2019(Mon)

Venue: Central Office Data Center

	Name	Department	Title/ Position	Telephone/Mobile	Signature
1	Daw Aye Aye Mar	Computer	EE	09-51-64963	
2	U Ag Moe Kyaw		SDE	09250792934	
3	Daw Hnin Lae Lae Cho	Customer Service	Flat	09.674577994	
4	Daw Phyo Nyo Khaing	SCT Engineering	Director	09-5101371	
5	U Hein Htun	G.7,8 Section	Flat	09-953168165	
6	Daw Thet Htet Myat	Design Section	Flat	09.449502255	
7	Yasuhito Morita	JICA Expert	JICA / TECI		
8					
9					
10					
11					

4th: 23 Aug. 2019



JICA

Title: 2nd Time OJT (Delairco) Date: 23/08/2019 (Fri)

	Name	Department	Title/ Position	Telephone/Mobile	Signature
1	Daw Thu Zar Lwin	Yegu PIS	Deputy Supervisor	+959264242825	
2	Daw Phyo Pa Pa Thet	JICA Advisor Room	Flat Engineer	09422466146	
3	U Hein Htun	G.1.8	"	09-453168165	
4	Daw Thet Htet Myat	Design Section	"	09-449502253	
5	Daw Ei Ngein Htay	Yegu PIS	"	09784808171	
6	U Aung Kyaw Lin	GIS	"	09791673498	
7	Daw Hnin Lae Lae Cho	Customer Service Section	"	09674577994	
8	Daw Nan Ehandar	Yegu Pumping Station	S-A.E	09450091518	
9	Aung Moe Kyaw	Reservoir.	"	09250792934	
10					
11					
12					

5th: 30 Oct. 2019

JICA

Title: Tokyo Keiki (OJT)   Date: 30/10/2019 (Wed) 3:00 PM

Venue: Yegu Pumping Station

	Name	Department	Title/ Position	Telephone/Mobile	Signature
1	Ms. Pin Zar Lwin	Water Resources & Water Supply Authority, Yegu P/S	Deputy Supervisor	+959264242825	
2	Ms. Kyi Kyi Than	"	Flat	+959420152397	
3	Mg Mg Zaw	YeGu Pumping station	[illegible] Skill Full worker - 5	+09420152464	
4	Daw Naw Ehlinder	Yegu Pumping station	S.A.E	09450091518	
5	Daw Tin Moe Aye	Yegu Pumping station	S.A.E	09420038790	
6	Aung Moe Kyaw	YCDC.	SAE	09250792924	
7					
8					
9					
10					
11					
12					

6th: 1st Nov.2019

JICA

Title: Delairco OJT   Date: 1/11/2019 (Fri) 10:00AM

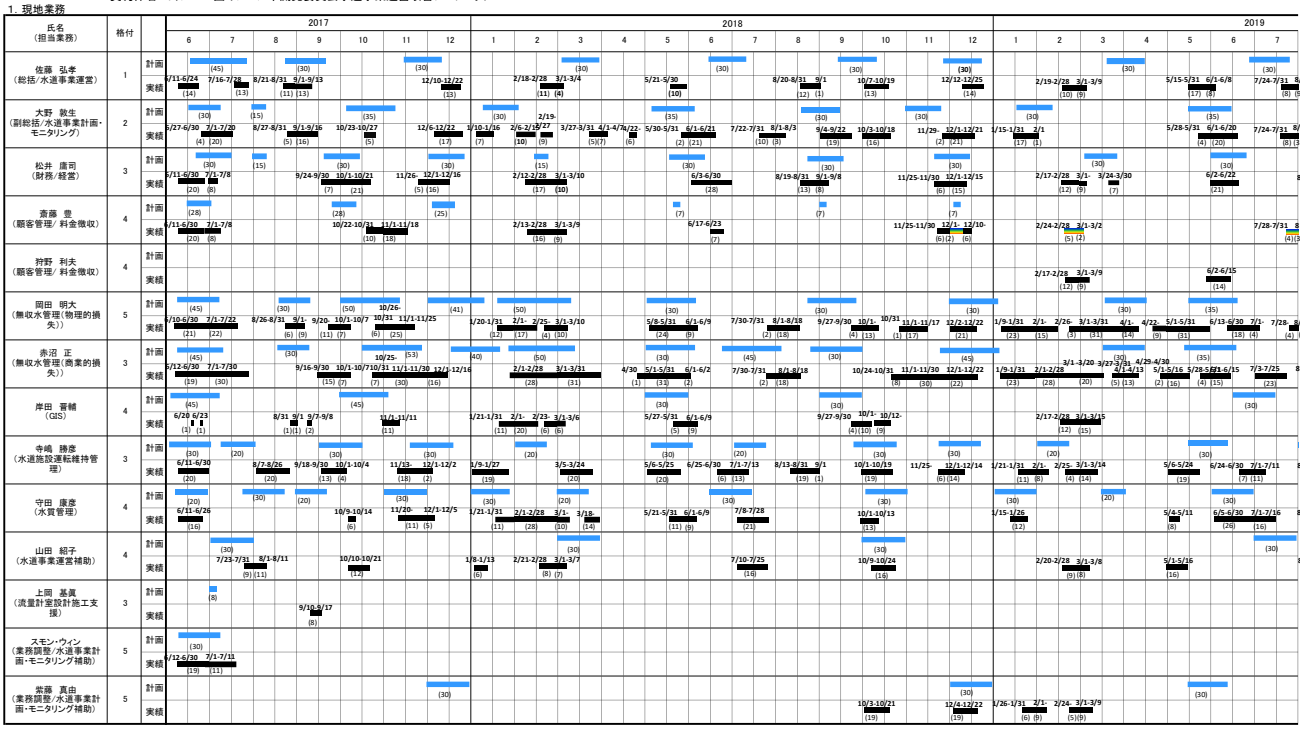
	Name	Department	Title/ Position	Telephone/Mobile	Signature
1	Ms. Pin Zar Lwin	Yegu P/S	Deputy Supervisor	+959264242825	
2	Ms Kyi Kyi Than	"	Flat	+959420152397	
3	Ms E Nyein Htay	"	Flat	+959784808771	
4	Ma Hnin Lae Lae Win	Customer Service Section	"	+959674677994	
5	Daw Naw Ehlinder	Yegu Pumping Station	S.A.E	09450091578	
6	Naw Say Eh Dar	Hlawga Pumping Station	Flat	0978294380 1	
7	Ye Zay Ya	GIS	FLAT	09795286322	
8	Nyein Chan Aung	GIS	FLAT	09-969657902	
9	U Hein Htun	G.I.S	FLAT	09-431681c5	
10	Daw Khine Cho Win	Design Section	FLAT	09-799498973	
11	Daw May Htoo Aung	Electrical Section	FLAT	09-421727525	
12					

資料－８： 専門家派遣実績

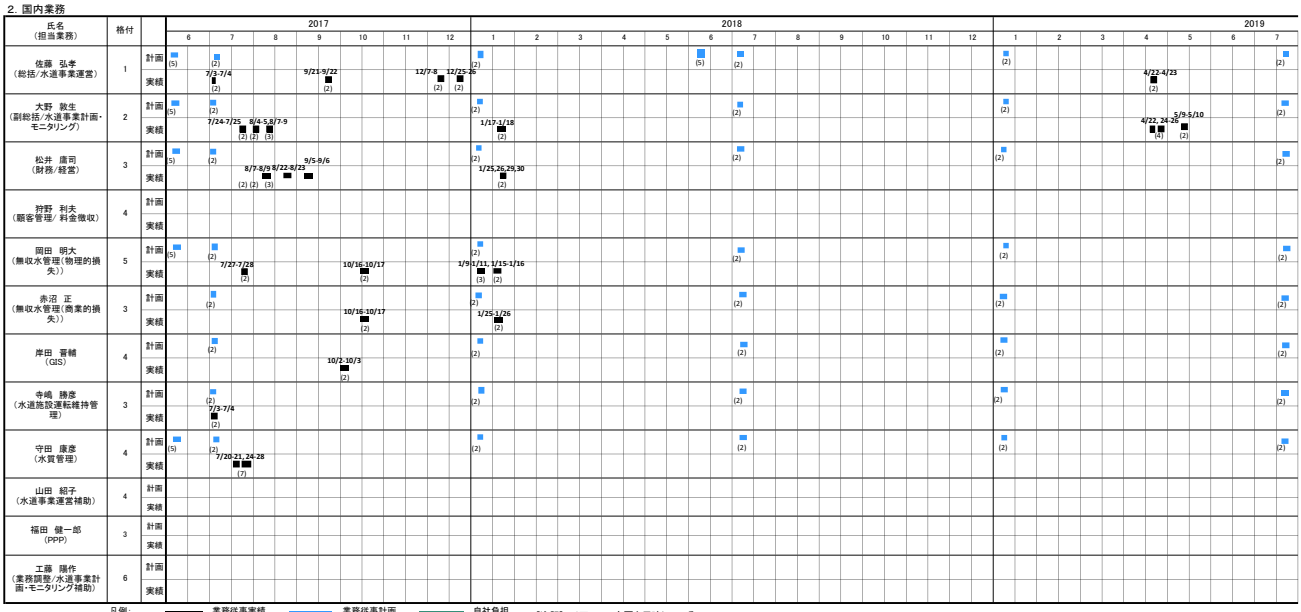
業務従事者の従事計画/実績表

契約件名：ミャンマー国ヤンゴン市開発委員会水道事業運営改善プロジェクト

1. 現地業務



2. 国内業務



凡例：業務従事実績　業務従事計画　自社負担

※ 自社負担の人月数は合計から除く

[注記] 以下のMM変更を反映している。
[注記1] 2018年8月17日付打合せ簿「業務従事者間のM/M振り替え」による振替後のM/Mを反映している。
[注記2] 2020年6月15日付打合せ簿「契約の変更について」による振替後のM/Mを反映している。
[注記3] M/Mが変更となった第2回、第4回、第5回の変更契約を反映している。

報告書等				
	業務計画書	▲		
	ワークプラン	△ 案△ 確定版		
	事業進捗/完了報告書		△ 進捗報告書	△ 進捗報告書

別添

1．現地業務

氏名（担当業務）	日数	人月
佐藤　弘孝（総括/水道事業運営）	256	8.53
	256	8.53
大野　敦生（副総括/水道事業計画・モニタリング）	338	11.27
	338	11.27
松井　唐司（財務/経営）	293	9.77
	293	9.77
斎藤　豊（顧客管理/ 料金徴収）	172	5.73
	102	3.40
狩野　利夫（顧客管理/ 料金徴収）	0	0.00
	70	2.33
岡田　明大（無収水管理(物理的損失)）	500	16.67
	500	16.67
赤沼　正（無収水管理(商業的損失)）	580	19.33
	580	19.33
岸田　晋輔（GIS）	142	4.73
	142	4.73
寺嶋　勝彦（水道施設運転維持管理）	361	12.03
	361	12.03
守田　康彦（水質管理）	333	11.10
	333	11.10
山田　絹子（水道事業運営補助）	189	6.30
	189	6.30
上岡　基廣（流量計室設計施工支援）	8	0.27
	8	0.27
スモン・ウィン（業務調整/水道事業計画・モニタリング補助）	97	3.23
	30	1.00
紫藤　真由（業務調整/水道事業計画・モニタリング補助）	0	0.00
	67	2.23
現地業務小計	計画	3,269	108.96
	実績	3,269	108.96

2．国内業務

氏名（担当業務）	日数	人月
佐藤　弘孝（総括/水道事業運営）	100.4	5.02
	104.5	5.22
大野　敦生（副総括/水道事業計画・モニタリング）	93.0	4.65
	88.2	4.41
松井　唐司（財務/経営）	83.6	4.18
	83.6	4.18
狩野　利夫（顧客管理/ 料金徴収）	48.4	2.42
	48.4	2.42
岡田　明大（無収水管理(物理的損失)）	81.6	4.08
	81.7	4.09
赤沼　正（無収水管理(商業的損失)）	52.8	2.64
	52.7	2.64
岸田　晋輔（GIS）	18.0	0.90
	18.0	0.90
寺嶋　勝彦（水道施設運転維持管理）	61.4	3.07
	61.4	3.07
守田　康彦（水質管理）	51.0	2.55
	43.5	2.18
山田　絹子（水道事業運営補助）	36.0	1.80
	25.0	1.25
福田　健一郎（PPP）	40.0	2.00
	40.0	2.00
工藤　陽作（業務調整/水道事業計画・モニタリング補助）	0	0.00
	11.0	0.55
国内業務小計	計画	666.2	33.31
	実績	658.0	32.91
合計	計画	142.27
	実績	141.87

報告書等	
	△ 進捗報告書 △ 進捗報告書 △ 事業完了報告書