(2) Natural Environment

Hydrological Observation: During Construction

Monitoring Item	Remarks
Water level at intake mouth	Around intake, Once/week, Water level measurement

(3) Social Environment

1) Local Economy (Livelihood, Employment, etc.): During Construction

Monitoring Item	Remarks
Efficient traffic control to reduce impact on local traffic flow	Around construction site, Once/week, Inquiries to relevant persons (residents, local businesses, shop owners, etc.) and physical observation (conducting of traffic control and installation of signboards)
Economic activities of shops and offices due to reduced accessibility to the construction	Around construction site, Once/week, Inquiries to relevant persons (residents, local businesses, shop owners, etc.) and physical observation (existence of temporary closure of shops and offices)

2) Water Use and Water Rights

a) During Construction

Monitoring Item	Remarks
Fluctuation of water quantity and quality in canal	Canal downstream the intake of WTP Once/week, Inquiries to relevant person and physical observation (fluctuation in water quantity and quality in canal)

b) During Operation

Monitoring Item	Remarks
Change in irrigation water to downstream, especially during dry season	Agricultural lands downstream the intake of WTP, Quarterly, Physical observation and inquiries to the Irrigation Department (change in amount of irrigation water)

3) Existing Infrastructures and Social Services: During Construction

Monitoring Item	Remarks
Traffic obstacles and reduced access to existing infrastructure	Around construction site, Once/week, Inquiries to relevant persons and physical observation (existence of traffic obstacles and reduced access to existing infrastructure)

4) Landscape during Construction

Monitoring Item	Remarks
Change in landscape around construction site	Around construction site, Once/month, Physical observation (change in landscape)

5) Infectious Diseases such as HIV/AIDS : During Construction

Monitoring Item	Remarks
Implementation of guidance on prevention of infectious diseases	In the construction site, Once/month, Physical observation (execution status of guidance)

6) Work[illegible] Conditions: During Construction

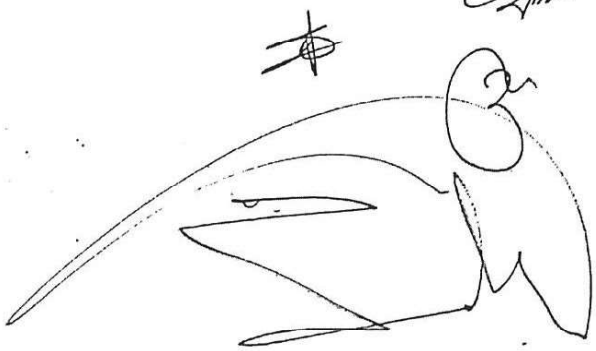
	Remarks
Execution [illegible] safety and health guidance [illegible] meetings	In the construction site, Once/week, Physical observation (execution status of guidance and meetings) and reports on workshops and safety meetings

7) Accid[illegible] During Construction

	Remarks
Install[illegible] areas such as fences a[illegible]	Around construction site, Once/week, Inquiries to relevant persons and physical observation (Installation of safety measures)

8) The F[illegible] Operation

	Remarks
Impact fr[illegible] to household[illegible] group	In the project site, Every 6 months, Inquiries to relevant persons (impact from water tariff system to the poverty group)



Appendix 5
Soft Component (Technical Assistance) Plan

Appendix-5 Soft Component (Technical Assistance) Plan

Soft Component Plan (Draft)

1. Background for planning the soft component

1.1 Background of the Project

Under “The Project for Water Supply, Sewerage and Drainage Master Plan of Faisalabad (2016-19) (hereinafter referred to as “M/P Project”)”, the priority project was formulated. A part of the priority project is to renew and expand the Old Jhal Khanuana (hereinafter referred to as "JK") Water Treatment Plant (hereinafter referred to as "WTP"), of which implementation was requested as Japan's Grant Aid under the project title, "The Project for Improvement of Water Treatment Plant and Water Distribution System in Faisalabad " (hereinafter referred to as "the Project").

The main objectives of the Project are i) to renew the Old JK WTP and ii) to develop the transmission/distribution mains to improve the water supply capacity. Through the achievement of the objectives, improvement of the living environment is also expected. The contents of the outline of the Project are:

1) The slow sand filtration system (3.5MGD) is replaced with a rapid sand filtration system (5.0MGD) to enhance the water treatment capacity using the existing facility of the raw water reservoir at the Old JK WTP.
2) For the water transmission/distribution facilities, the pipelines i) from the Old JK WTP to the distribution centers as the transmission main, and ii) from the distribution centers to the existing pipelines as the distribution main are installed. At the distribution centers, the ground reservoirs (hereinafter referred to as "GR") and the overhead reservoirs (hereinafter referred to as "OHR") are also constructed in this Project.

1.2 Needs for the Soft Components

(1) Water Treatment

The water supply by Water and Sanitation Agency, Faisalabad (hereinafter referred to as "WASA-F") relies on groundwater for 86% of its water source. Therefore, treated groundwater is supplied to most of the service area of WASA-F through the distribution networks. As the water source for the remaining 14%, surface water is distributed after treatment at the Old JK WTP and the New JK WTP, constructed with the support from France.

At the Old JK WTP, the turbidity is adjusted at the raw water reservoir before treatment. After the adjustment, the water is treated with the slow sand filtration system and a small-scale rapid sand filtration system (1,000 m^3/d), separately. However, the small-scale rapid sand filtration with coagulant mixing and the ordinary sedimentation has not been operated in recent years because of difficulties in controlling the required turbidity.

The New JK WTP has been operated by local operators employed by a French company. However, after the company departed, the operation management has weakened. The New JK WTP is the only one operating with a rapid sand filtration in Faisalabad. The treated water meets the quality standards. However, to improve daily activities, procedures such as jar test, chemical dosage, etc. are required Since the operation period is just a few years, WASA-F needs more experience on the operation. Therefore, it is necessary to provide the training on O&M of the rapid sand filtration system installed by the Project.

(2) Water Transmission and Distribution

The treated water at the Old JK WTP is transmitted to two distribution centers from the transmission pump stations at the WTP. In the transmission process, the operation of transmission pumps shall be properly controlled according to the water demand fluctuations, as such through the monitoring of the water level of the GR at the distribution center to cope with the demand variations between the days and nights, weather conditions, and so forth. After flowing into the GR, the water is pumped up to the OHR by the lift pump. From the OHR, the water is distributed to the service area by gravity. Therefore, the lift pump shall be operated in accordance with the time fluctuation of the water demand in the service area.

The water source for the New JK WTP and the Old JK WTP is Rakh Branch Canal (hereinafter referred to as "RBC"). The RBC is closed for approximately 3 weeks in January and February. During that period, there is no water flow. However, the Old JK WTP is planned to continue its operation even during the period of the closure through bypassing the existing distribution main of the Arterial Main to the clear water reservoir of the Old JK WTP. This operation requires controlling the valves installed on the bypass.

In the water transmission/distribution processes, the failure in communicating between the operators and sharing such information as confirmed water levels of reservoirs may result in overflows and/or insufficient water levels. Therefore, proper communication with information sharing is required for the improvement of service level.

WASA-F has provided the water service without proper monitoring of the entire process from intake to water treatment, and water treatment to transmission/distribution including transmission of bypassed water from the existing pipeline. In addition, the above-mentioned activities need to be properly implemented for proper operation. Therefore, it is necessary to provide training on O&M of transmission/distribution facilities installed by the Project.

(3) Facility maintenance

The maintenance of the facilities is very important to maximize the functions and to extend the life span. Since the facility maintenance is related to the activities of (1) and (2) described above, the training on the facility maintenance shall be implemented together with (1) and (2). In the training, the followings are also included: i) compliance with the manual, ii) establishment of a communication system, iii) confirmation of procedures, and iv) reporting. The trainings are planned partially through On-the-job training for the appropriate and smooth implementation of these activities.

2. Purpose of Soft Component

The soft component of the Project focuses on WASA-F to obtain sufficient skills for supplying water which is safer and having more stable quality/pressure/quantity through the training on O&M of the Old JK WTP and the transmission/distribution facilities to cope with changes in raw water quality and fluctuations in the demand.

3. Outputs of Soft Component

The outputs of the soft component are as follows.

(1) Water Treatment

By improving the O&M skills for the operation of the WTP, the facility is properly operated and maintained according to the manual. As a result, water will be supplied stably and efficiently satisfying the requirements in water quantity and quality.

- The intake/water-treatment based on the water demand and chemical dosage based on the raw water quality are implemented appropriately.
- The operation methods of the WTP under unusual situations (power outage, suspension of intake, out of order equipment, equipment inspection, etc.) are established and implemented.
- The water treatment facilities are properly operated and maintained.

(2) Water Transmission and Distribution

By improving the O&M skills for the water transmission/distribution facilities, stable and efficient pump operation and water supply volume control is implemented.

- Efficient pump operation and flow rate adjustments are implemented according to changes in the water demand.
- Water is continuously transmitted/distributed during the closing period of RBC.

4. Verification of achievement

(1) Outline of verification of achievement

The outputs of the soft component are "improvement of O&M skills for WTP" and "improvement of O&M skills for water transmission and distribution facilities". The details are described below.

1) Improvement of O&M skills for WTP

In order to maximize the functions of the Old JK WTP and to provide stable and safe water supply, it is necessary to manage each process of the treatment properly. For better management, it is necessary to prepare the procedure manuals. The training is provided based on the manuals, which include the operation of the equipment and WTP.

2) Improvement of O&M skills for water transmission/distribution facilities

As well as 1) above, for better management, it is necessary to prepare the procedure manuals. The training is provided based on the procedure manuals, which include the operation of the equipment and water transmission/distribution facilities.

(2) Verified indicators and means of verification for outputs

The followings are the indicators and means of verification for outputs. Information and data necessary for the verification are collected in collaboration with the counterparts. Based on them, the effects of activities are verified.

Table-1 Verified indicators and means of verification for outputs

Outputs	Verified indicators	Means of verification
[Output 1] Capacity to operate and maintain WTP is improved.	1) Water is produced according to the water demand plan.	1-1) It is confirmed by the achievement confirmation list* that the operation of water receiving and treatment facilities are implemented stably and efficiently. 1-2) It is confirmed by the operation procedure and the achievement confirmation list* that data required for operation is recorded and analyzed. 1-3) It is confirmed by the operation procedure and the achievement confirmation list* whether suitable methods for water quality analyses are applied for changes in water quality. *All items on the confirmation list must be checked.
	2) Operation method of Old JK WTP under unusual circumstances is established and implemented.	2) It is confirmed by the achievement confirmation list* that WASA-F counterparts can operate the equipment independently. *All items on the confirmation list must be checked.
	3) Water treatment facilities are properly maintained, of which operation data is kept for a certain period	3) It is confirmed by the achievement confirmation list* that the actual facilities and equipment are properly inspected according to the maintenance manual. *All items on the confirmation list must be checked.
[Output 2] Capacity to operate and maintain water transmission/ distribution facilities is improved.	1) Pumps are efficiently operated with adjustment of flow rate according to changes in demand.	1) It is confirmed by the operation procedure and the achievement confirmation list* that WASA-F counterparts can independently operate the facilities and equipment according to the operation procedure. *All items on the confirmation list must be checked.
	2) Water is continuously transmitted and distributed when RBC is closed.	2) It is confirmed by the procedure manual and the achievement confirmation list* that the facilities are properly operated against unforeseen circumstances according to the operation procedure. *All items on the confirmation list must be checked.

Note: "Achievement Confirmation List" and "Procedure Manual" are prepared for each item of the verified indicators of Outputs 1 and 2.

5. Activities and inputs of soft component

(1) Target staff of WASA-F for soft component

The soft component is targeted on the operators (Process Engineer: 1 person, Plant Operator: 3 persons) for the Old JK WTP (Output 1) and the operators (Pump Operator: 6 persons, Supervisor: 4 persons, Engineer: 2 persons) for water transmission/distribution facilities (Output 2). Since the water source and the treatment method of the Old JK WTP are the same as those of the New JK WTP, it may be proper to share the challenges in the operation with the staff of the New JK WTP for identification and consideration of further issues. Therefore, it is planned that the trainings are also provided for the management staff of the Old JK WTP and the New JK WTP.

(2) Activities and inputs

Table-2 presents the learning items set for each of the outputs. In addition, Table-3 presents the activities plan. The trainers are 2 Japanese engineers (water treatment: 1 person × 2 times, water transmission and distribution: 1 person × 1 time) with total Man/Months of 2.40 M/M including the work in Japan.

Table-2 Soft component activities (learning items)

Outputs		Activities (Learning Items)
[Output 1] Capacity to operate and maintain WTP is improved.	1) Water is produced according to water demand plan.	1. Knowledge on function of Old JK WTP 2. Knowledge on chemicals and water quality tests applied 3. Data recording and analysis methods for daily reporting
	2) Operation method of Old JK WTP under unusual circumstances is established and implemented.	1. Identification of unusual conditions 2. Establishment of appropriate operation method based on various statistical data analyses, and operation
	3) Water treatment facilities are properly maintained, of which operation data is kept for a certain period.	1. Confirmation of data obtaining procedure for inspection of equipment at New JK WTP, and improvement 2. Operation of equipment 3. Inspection items and implementation procedures for each equipment
[Output 2] Capacity to operate and maintain water transmission/ distribution facilities is improved.	1) Pumps are efficiently operated with adjustment of flow rate according to changes in demand.	1. Knowledge on the newly established water transmission/distribution functions 2. Operation for water transmission/distribution including pump operation and water level monitoring
	2) Water is continuously transmitted and distributed when RBC is closed.	1. Continuous water transmission/distribution and communication system

Table-3 Activities Plan for Soft component

Outputs	Required skills, targeted staff	Current skill levels / Required skill levels	Target group	Implementation method*	Inputs	Prepared documents
[Output 1] Capacity to operate and maintain WTP is improved. 1) Water is produced according to the water demand plan.	Water treatment engineers who have knowledge on facilities and functions in the process from intake to water treatment	➢ Insufficient understanding on the functions of water treatment facilities ➢ Inappropriate dosages of chemicals not in accordance with the water quality ➢ Insufficient recording and reporting of operating data ➢ Insufficient understanding on the concept of operation for water intake, water treatment, and water distribution as a series ➢ Proper knowledge on each function of WTP ➢ To determine required amount of chemical dosage based on data and statistical analysis ➢ To prepare documents such as daily/monthly/annual reports, operation records, and accident reports, and report to section/department in charge ➢ To operate transmission / distribution facilities appropriately under various conditions with comprehensive understanding of intake, treatment, and transmission / distribution	WTP operators / Maintenance Engineers / Process Engineers / Laboratory specialists / Mechanical and Electrical Technicians	1. Lecture on the functions of Old JK WTP 2. Review of recording data at New JK WTP 3. Lecture on chemicals, selection of required water quality tests 4. Data recording and analysis methods for daily reports, etc., data and documents archives 5. Preparation of operation procedures for WTP 6. Lectures / workshops regarding the operation procedures, implementation of training including OJT based on the operation procedure, confirmation of the understanding level 7. Evaluation of WTP operation	1 Japanese engineer: Work in Pakistan: 35 days, Work in Japan: 2 days 1 local engineer: 28 days	Operation procedure for WTP: regular conditions

[Output 1] 2) Operation method of Old JK WTP under unusual circumstances is established and implemented.	Water treatment engineers who have knowledge on overall water treatment and statistical analysis	➢ Inappropriate measures taken and insufficient operational structure to cope with the unusual conditions ➢ To identify the types of unusual conditions and take appropriate countermeasures at any time	WTP Operators/ Maintenance Engineers / Process Engineers	1. Identification of unusual conditions 2. Review of data related to unusual cases at New JK WTP 3. Establishment of appropriate operation methods and preparation of operation procedure guidelines based on various statistical data collection and analysis 4. Implementation of training including OJT on countermeasures for unusual conditions, confirmation of the understanding level	1 Japanese engineer: Work in Pakistan: 8 days, Work in Japan: 1 day 1 local engineer: 7 days	Operation procedure for WTP: unusual conditions
[Output 1] 3) Water treatment facilities are properly maintained, of which operation data is kept for a certain period.	Engineers who have knowledge on overall water treatment and the equipment	➢ To repair equipment after detecting problems upon regular inspections for preventive measure ➢ Application of preventive measures based on inspection plan	WTP plant Operators / Engineers / Mechanical and Electrical Technicians	1. Review of inspection data for equipment at New JK WTP 2. Review of equipment manuals 3. Preparation of procedures for cleaning and inspection (items, frequency), and reporting 4. Implementation of training including OJT regarding operation according to the maintenance procedure, confirmation of the understanding level 5. Confirmation of inspection implementation	1 Japanese engineer: Work in Pakistan: 8 days, Work in Japan: 1 day 1 local engineer: 7 days	Maintenance procedure for water treatment facilities
[Output 2] Capacity to operate and maintain water transmission/ distribution facilities is improved 1) Pumps are efficiently operated with adjustment of	Water transmission and distribution engineers who have knowledge on overall water transmission and distribution facilities with the functions	➢ Insufficient confirmation on the water level of OHR and inadequate communication and information sharing, as well as insufficient operation of inflow valves, resulting in overflow and lowering of water level in OHR. ➢ Insufficient information sharing especially for accidents / incidents / troubles not observed by the public ➢ Insufficient optimization of water	Engineers / Sub-Engineer of WDM (Water Distribution & Management)	1. Lecture on the newly established water transmission/distribution function 2. Review of current status on water transmission/distribution 3. Preparation of operation procedure for water distribution including pump operation and water level monitoring 4. Implementation of training including OJT on operation	1 Japanese engineer: Work in Pakistan: 9 days, Work in Japan: 1 day 1 local engineer: 8 days	Operation procedure for transmission and distribution facilities (except Output 2, 2))

flow rate according to changes in demand.	Engineers who have knowledge on equipment	transmission / distribution not according to the demand ➢ Water is transmitted / distributed according to the demand and the operation procedure. ➢ To operate pumps properly without occurrence of failures		according to operation procedure, confirmation of the understanding level 5. Evaluation on operation status		
[Output 2] 2) Water is continuously transmitted and distributed when RBC is closed.	Water transmission and distribution engineers who have knowledge on condition of water transmission / distribution network	➢ To stop operation for both New and Old JK WTP during the closing period of RBC ➢ Transmission / distribution to the service area during the closing period of RBC through understanding on the procedure to intake from the Arterial Main	Engineer / Sub-Engineer of WDM (Water Distribution & Management)	1. Establishment of communication system during the closing period of RBC, confirmations of the process on water transmission operation, preparation of operation procedure 2. Collection and analysis of various statistical data for the operation under unusual conditions 3. Implementation of training including OJT on operation according to the operation procedure on water intake from the distribution main when RBC is closed, confirmation of the understanding level	1 Japanese engineer: Work in Pakistan: 3 days, Work in Japan: 1 day 1 local engineer: 2 days	Operation procedure for transmission and distribution facilities (section of "operation during closing period of RBC")
[Output 1 and 2] During absence of Japanese engineers in Pakistan					1 local engineer: 22 days	

* The skills are obtained by (i) learning the basic principles through classroom learning, (ii) preparing the operation procedures, (iii) implementing OJT through trial operations, exercises, etc., and (iv) evaluating the understanding levels.

6. Trainers of soft component

WTP and water transmission/distribution facilities shall be operated and maintained not only under regular conditions, but also unusual circumstances. Therefore, Japanese engineers with various knowledge and experience shall be selected as the trainers. The training is provided on-site directly by Japanese engineers with the assistance of the national engineers.

Two (2) local engineers (one water treatment engineer and one water transmission/distribution engineer) will be employed to support the technical guidance provided by the Japanese engineers under the soft component. The employment period for the local engineers will be from the commencement of "Water Treatment Activities in Phase 1" to the completion of "Water Treatment Activities in Phase 2" described in "11. Implementation Schedule". In the absence of Japanese engineers in Faisalabad, the local engineers will continue to provide the technical guidance under the remote supervision of Japanese engineers. The continuous support will help the operators to obtain the skills coping with changes in raw water quality and water demand. In addition, any questions by the trainees will be informed to Japanese engineers by the local engineers. Then Japanese engineers will give the guidance to the local engineers or to the trainees directly through on-line.

In addition, the local engineers will provide English-local language interpretation in the training/guidance, while translating instruction materials, procedure manuals, and questions/answers for confirmation tests.

Table-4 presents the items of lectures/exercises to be provided by the Japanese engineer and the supports given by the local engineers.

Table-4 Lectures/exercises by Japanese engineer and support by local engineers

Outputs	Japanese Engineer	Local Engineers
Output 1 Water treatment Phase 1 Phase 2	Water treatment engineer: 1 person ➢ Confirmation on functions and roles of WTP and facilities/equipment at the WTP ➢ Review of risks at WTP and confirmation of countermeasures for risks ➢ SCADA operation and alarm setting under unusual circumstances ➢ Confirmation of the operation method for New JK WTP ➢ WTP operation (water treatment, water volume control, flow rate operation) ➢ WTP operation (data management, statistical analysis, reporting) ➢ WTP operation (water quality test, chemicals management, procurement) ➢ WTP operation (working schedule, labor management, liaison system) ➢ Operation during regular and unusual conditions ➢ Maintenance/cleaning inspection ➢ Preparation of procedures for WTP and water treatment ➢ Workshop on WTP and water treatment ➢ Achievement confirmation test	Water treatment engineer: 1 person (additional assignment to water quality) ➢ assistance to lectures, exercises and actual machine operations, assistance to technical guidance, and interpretation ➢ Translation of training materials (some parts) ➢ Assistance for preparing procedures ➢ Translation and interpretation of confirmation tests
Output 2 Water transmission and	Water transmission and distribution engineer: 1 person ➢ Lecture on pump operation (basic) ➢ Method of adjusting flow of transmission / distribution (during pump operation, out of order and inspection) ➢ Method of adjusting flow of transmission / distribution	Water transmission / distribution engineer: 1 person ➢ Assistance to lectures, exercises, and actual machine

distribution	(valve operation at distribution center) ➢ Operation during regular and unusual conditions ➢ Operation procedure during the closing period of RBC ➢ Workshop on water transmission / distribution ➢ Preparation of water transmission / distribution procedures ➢ Achievement confirmation test	operations, assistance to technical guidance, interpretation ➢ Translation of training materials (some parts) ➢ Assistance for preparing procedures ➢ Translation and interpretation of confirmation tests

7. Implementation process of soft component

The overall implementation process of the soft component is shown in Table-5.

The activities for Output 1 are carried out after completion of the WTP construction and the trial operation. Considering the current construction schedule, it is expected that, during the implementation of the soft component, the quality of the raw water will change due to the transition period from dry to rainy season. Therefore, the activities by the Japanese engineer are implemented in two stages applied for both seasons.

In the first phase, the activities include lectures, actual operations, and exercises. Each operation procedure is prepared. During the absent period of the Japanese engineer, WASA-F counterparts, together with local engineers, will i) review the field activities, ii) treat water, iii) inspect equipment, iv) keep records, and, v) prepare related procedure manuals. The Japanese engineer will support the operators through the local engineers.

In the second phase, the operation procedures are finalized based on the activities implemented until that time. Before the completion of the training, WASA-F counterparts are tested for confirming the understanding level through the written documents and on-site operation of the equipment.

As for Output 2 regarding the water transmission and distribution facilities, related activities are started after the completion of construction and trial operation of the water transmission and distribution facilities. The Japanese engineer implements the activities in Pakistan at once seamlessly without dividing the period of implementation. As well as Output 1, WASA-F counterparts are tested for confirming the understanding level through examining the written documents and operating the equipment before the completion of the training.

Output 1 and 2 are implemented separately. However, in the actual operation, each equipment/facility of the entire system shall be operated with the monitoring of other equipment/facilities. Therefore, at the final stage, the training on the operation for the entire system from intake/water treatment to distribution is included.

Table-5 Schedule for soft component

Items	Engineer	Engineer Type	2023				2024									Day		
			Jul	---	Nov	---	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	JPN	PAK	SUM
Output 1 1) Water treatment according to water demand	Japanese	Water treatment								2		25	10			2	35	37
	Pakistani	Water treatment										21	7				28	28
Output 1 2) Operation of WTP for unusual conditions	Japanese	Water treatment								1		7	1			1	8	9
	Pakistani	Water treatment										6		1			7	7
Output 1 3) Maintenance of facilities	Japanese	Water treatment								1		7		1		1	8	9
	Pakistani	Water treatment										6		1			7	7
Output 2 1) Management of water transmission /distribution	Japanese	Transmission/ distribution								1		9				1	9	10
	Pakistani	Transmission/ distribution										8					8	8
Output 2 2) Operation when RBC is closed	Japanese	Transmission/ distribution								1		3				1	3	4
	Pakistani	Transmission/ distribution										2					2	2
During absence of Japanese engineers in Pakistan	Pakistani	Water treatment										2	14				16	16
		Transmission/ distribution											6				6	6
Japanese engineer															Output 1	4	51	55
															Output 2	2	12	14
															Total	6	63	69
Pakistani engineer															Output 1		58	58
															Output 2		16	16
															Total		74	74

	2023				2024								
	Jul	---	Nov	---	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Completion report													▲
Construction of water treatment facilities													
Construction of OHRs													
Pipe installation													
Installation of SCADA													
Trial operation													

* Inclusion of water quality

8. Documents prepared through soft component

The documents prepared through soft component are presented in Table-6. Based on the basic manual and the procedure guide for the basic operation prepared by the contractor, the comprehensive operation procedure is prepared by incorporating the know-how and skills obtained through the experience in Japan's waterworks, which is adjusted to suit the practical use by WASA-F.

The completion report is prepared in accordance with "JICA Soft Component Guidelines (3rd Edition) (2010)". The report includes the guidance items (actual results) and the results (achievement of the outputs, future issues and recommendations, etc.).

Table-6 List of documents prepared through soft component

Type	Name of Document	Contents	Submission	Pages
Work manual	Operation procedure for WTP: regular condition	➢ Describe the management system and operation method of the WTP ➢ Describe the data records, analysis/statistical procedures, reporting format, etc. ➢ Describe the method of selecting the chemicals and the dosage amounts	August 2024	40
	Operation procedure for WTP: unusual conditions	➢ Describe the daily/monthly/annual reports prepared from data on water treatment ➢ Describe actions against high turbidity, power failure, equipment failure, etc. ➢ Describe the operation of the WTP during the closing period of RBC	August 2024	50
	Maintenance procedure for water treatment facilities	➢ Describe the maintenance of the equipment for operating the WTP	August 2024	10
	Operation procedure for transmission and distribution facilities	➢ Describe the utilization of pipelines for regular operation and during the closing period of RBC, etc. ➢ Describe the pump operation ➢ Describe the operation management for water transmission and distribution	August 2024	30
Record	Training participation record	➢ Daily or weekly report ➢ Photo album	August 2024	--
Report	Soft component completion report	➢ Plan and execution of activities ➢ Achievement of activities and outputs ➢ Factors influenced on the achievement of outputs ➢ Sustaining outputs, challenges for improvement, suggestions ➢ List of documents	September 2024	30

9. Responsibilities of WASA-F for implementation of soft component

The following is the responsibilities of WASA-F for implementing the soft component smoothly and effectively, and continuing the activities even after the Project.

- Permission for domestic movement of Japanese engineers implementing the soft component
- Securing necessary personnel, training facilities and materials for implementing the soft component

- Payment of salaries and other expenses for trainees from WASA-F and security guards, as well as provision of training facilities and materials
- Securing the trainees, materials, budget for activities of soft component and activities after the Project

10. Implementation Schedule (Year 2024)

The soft component training will be conducted separately for i) the first phase and the second phase of water treatment, and ii) water transmission and distribution. The detailed schedules of Table-5 are indicated in the tables below.

During the absent period of Japanese engineers, the Pakistani engineers follow the trainees and receive instructions from the Japanese engineer and respond to the trainees remotely.

(1) Water treatment [Phase 1] (Dry season, 39 days)

Date	Day	Activities	Training place	Job classification			Car *4
				JP*1	P1*2	P2*3	
May 06	Mon	Arrival at Lahore		11*5			L
May 07	Tue	Moving from Lahore to Faisalabad, Training guidance	Old JK WTP	11	11		L
May 08	Wed	[OP1] 1) Confirmation of the functions and roles of WTP and facilities/equipment at WTP	Old JK WTP	11	11		F
May 09	Thu	[OP1] 1) Review of risks at WTP and confirmation of countermeasures to risks	Old JK WTP	11	11		F
May 10	Fri	[OP1] 1) Operation of WTP: Operation of New JK WTP	New JK WTP	11	11		F
May 11	Sat	Preparation for training	Old JK WTP	11	11		F
May 12	Sun	Preparation for training		11			
May 13	Mon	[OP1] 1) Operation of WTP: Relationship among intake, water treatment, water transmission, water storage	Old JK WTP	11	11		F
May 14	Tue	[OP1] 1) Operation of WTP: Chemical storage, chemical injection rate, jar test	Old JK WTP	11	11		F
May 15	Wed	[OP1] 1) Operation of WTP: Chemical mixing, coagulation/sedimentation, filtration, sludge treatment	Old JK WTP	11	11		F
May 16	Thu	[OP1] 1) Operation of WTP: Operation of SCADA during unusual conditions, setting of alarm values	Old JK WTP	11	11		F
May 17	Fri	[OP1] 1) Operation of WTP: Working shift, task requirements of daytime/nighttime	Old JK WTP	11	11		F
May 18	Sat	Preparation for training	Old JK WTP	11	11		F
May 19	Sun	Preparation for training		11			
May 20	Mon	[OP1] 1) Operation of WTP: Items and frequency of water quality tests	Old JK WTP	11	11		F
May 21	Tue	[OP1] 1) Operation of WTP: Data collection, statistical analysis of data, database, reporting	Old JK WTP	11	11		F
May 22	Wed	[OP1] 1) Operation of WTP: Data collection, statistical analysis of data, database, reporting	Old JK WTP	11	11		F
May 23	Thu	[OP1] 1) Preparation of operation procedure for regular conditions	Old JK WTP	11	11		F
May 24	Fri	[OP1] 1) Implementation according to operation procedure	Old JK WTP	11	11		F

May 25	Sat	Preparation for training	Old JK WTP	11	11		F
May 26	Sun	Preparation for training		12*6			
May 27	Mon	[OP1] 2) Operation of WTP: Unusual conditions such as stormy weather, malfunctioning of equipment	Old JK WTP	12	12		F
May 28	Tue	[OP1] 2) Operation of WTP: Unusual conditions such as power failure, generator operation, suspension of intake	Old JK WTP	12	12		F
May 29	Wed	[OP1] 2) Operation of WTP: Preventive measures and actions for occurrences during unusual conditions	Old JK WTP	12	12		F
May 30	Thu	[OP1] 2) Operation of WTP: Preparation of operation procedure for unusual conditions	Old JK WTP	12	12		F
May 31	Fri	[OP1] 2) Operation of WTP: Preparation of operation procedure for unusual conditions	Old JK WTP	12	12		F
Jun. 01	Sat	Preparation for training	Old JK WTP	12	12		F
Jun. 02	Sun	Preparation for training		13*7			
Jun. 03	Mon	[OP1] 3) On-site confirmation of water treatment facility for maintenance, review of inspection, preparation of maintenance procedure	New JK WTP Old JK WTP	13	13		F
Jun. 04	Tue	[OP1] 3) Study on inspection of WTP, measures against defects and failures, preparation of maintenance procedure	Old JK WTP	13	13		F
Jun. 05	Wed	[OP1] 3) Cleaning and inspection of WTP facility for maintenance, preparation of maintenance procedure	Old JK WTP	13	13		F
Jun. 06	Thu	[OP1] 3) Preparation of maintenance procedure	Old JK WTP	13	13		F
Jun. 07	Fri	[OP1] 1)-3) Preparation of operation and maintenance procedures, preparation of Achievement Confirmation Test	Old JK WTP	13	13		F
Jun. 08	Sat	Preparation for training	Old JK WTP	13	13		F
Jun. 09	Sun	Preparation for training		11			
Jun. 10	Mon	[OP1] 1)-3) Preparation of operation and maintenance procedures, preparation of Achievement Confirmation Test	Old JK WTP	11	11		F
Jun. 11	Tue	[OP1] Summary of activities, preparation of operation and maintenance procedures, implementation of Achievement confirmation test, evaluation	Old JK WTP	11	11		F
Jun. 12	Wed	[OP1] Review of activities during absence of Japanese engineer, moving from Faisalabad to Lahore	Old JK WTP	11	11		L
Jun. 13	Thu	Leaving Lahore	Old JK WTP	11	11		L

Note:
*1: Japanese engineer, *2: Pakistani engineer (Output 1: water treatment), *3: Pakistani engineer (Output 2: water transmission/distribution), *4: Car ("L" for Lahore-Faisalabad, "F" for Faisalabad), *5: Activity for Output 1, 1) or various activities of Output 1, *6: Activity for Output 1, 2), *7: Activity for Output 1, 3)

(2) Follow-up (2 days)

Date	Day	Activities	Training place	Job classification			Car *4
				JP*1	P1*2	P2*3	
Jun. 14	Fri	Review of training activities of Output 1, 1) and Question & Answer	Old JK WTP		11*5		F
Jun. 15	Sat	Review of training activities of Output 1, 1) and Question & Answer	Old JK WTP		11		F

Note:
*1: Japanese engineer, *2: Pakistani engineer (Output 1: water treatment), *3: Pakistani engineer (Output 2: water transmission/distribution), *4: Car ("L" for Lahore-Faisalabad, "F" for Faisalabad), *5: Activity for Output 1, 1) or various activities of Output 1

(3) Water Transmission and Distribution (14 days)

Date	Day	Activities	Training place	Job classification			Car[*4]
				JP[*1]	P1[*2]	P2[*3]	
Jun. 16	Sun	Arrival at Lahore		21[*5]			
Jun. 17	Mon	Moving from Lahore to Faisalabad, Training guidance	Old JK WTP	21		21	L
Jun. 18	Tue	[OP2] 1) Accidents/incidents of operating pumps for transmission/distribution at New JK WTP, and countermeasures	New JK WTP	21		21	L
Jun. 19	Wed	[OP2] 1) Adjustment of water volume for transmission/distribution facilities (GR, OHR, pump operation, water level monitoring, valve operation, recording/reporting)	Old JK WTP	21		21	F
Jun. 20	Thu	[OP2] 1) Adjustment of water volume for transmission/distribution facilities (countermeasures, accident report, pump operation, valve operation)	Old JK WTP	21		21	F
Jun. 21	Fri	[OP2] 1) Preparation of operation procedure	Old JK WTP	21		21	F
Jun. 22	Sat	Preparation for training	Old JK WTP	22[*6]		22	F
Jun. 23	Sun	Preparation for training		22			F
Jun. 24	Mon	[OP2] 2) Study on water transmission/distribution method during the closing period of RBC, preparation of operation procedure, preparation of Achievement Confirmation Test	Old JK WTP	22		22	F
Jun. 25	Tue	[OP2] Summary of activities, preparation of operation procedure, implementation of Achievement confirmation test, evaluation	Old JK WTP	21		21	F
Jun. 26	Wed	[OP2] Summary of activities, moving from Faisalabad to Lahore	Old JK WTP	21		21	L
Jun. 27	Thu	Leaving Lahore	Old JK WTP	21		21	L

Note:
*1: Japanese engineer, *2: Pakistani engineer (Output 1: water treatment), *3: Pakistani engineer (Output 2: water transmission/distribution), *4: Car ("L" for Lahore-Faisalabad, "F" for Faisalabad), *5: Activity for Output 2, 1), or 1) and 2) of Output 2, *6: Activity for Output 2, 2)

(4) Follow-up (18 days)

Date	Day	Activities	Training place	Job classification			Car[*4]
				JP[*1]	P1[*2]	P2[*3]	
Jun. 28	Fri	Review of training activities of Output 1, 1) and Question & Answer	Old JK WTP		11[*5]		F
Jun. 29	Sat	Review of training activities of Output 1, 1) and Question & Answer	Old JK WTP		11		F
Jun. 30	Sun						
Jul. 01	Mon	Review of training activities of Output 1, 1) and Question & Answer	Old JK WTP		11		F
Jul. 02	Tue	Review of training activities of Output 1, 1) and Question & Answer	Old JK WTP		11		F
Jul. 03	Wed	Review of training activities of Output 1, 1) and Question & Answer	Old JK WTP		12[*6]		F
Jul. 04	Thu	Review of training activities of Output 1, 1) and Question & Answer	Old JK WTP		12		F
Jul. 05	Fri	Review of training activities of Output 1, 2) and Question & Answer	Old JK WTP		12		F
Jul. 06	Sat	Review of training activities of Output 1, 2) and Question & Answer	Old JK WTP		13[*7]		F
Jul. 07	Sun						

Jul. 08	Mon	Review of training activities of Output 1, 1) & 3) and Question & Answer	Old JK WTP		13		F
Jul. 09	Tue	Review of training activities of Output 1, 1) & 3) and Question & Answer	Old JK WTP		13		F
Jul. 10	Wed	Review of training activities of Output 2, 1) and Question & Answer	Old JK WTP			21*8	F
Jul. 11	Thu	Review of training activities of Output 2, 1) and Question & Answer	Old JK WTP			21	F
Jul. 12	Fri	Review of training activities of Output 2, 1) and Question & Answer	Old JK WTP			21	F
Jul. 13	Sat	Review of training activities of Output 2, 2) and Question & Answer	Old JK WTP			22*9	F
Jul. 14	Sun						
Jul. 15	Mon	Review of training activities of Output 1, 1) and Question & Answer	Old JK WTP		11		F
Jul. 16	Tue	Review of training activities of Output 1, 1) and Question & Answer	Old JK WTP		11		F
Jul. 17	Wed	Review of training activities of Output 1, 2) and Question & Answer	Old JK WTP		12		F
Jul. 18	Thu	Review of training activities of Output 1, 1) & 3) and Question & Answer	Old JK WTP		13		F
Jul. 19	Fri	Review of training activities of Output 2, 1) and Question & Answer	Old JK WTP			21	F
Jul. 20	Sat	Review of training activities of Output 2, 2) and Question & Answer	Old JK WTP			22	F

Note:
*1: Japanese engineer, *2: Pakistani engineer (Output 1: water treatment), *3: Pakistani engineer (Output 2: water transmission/distribution), *4: Car ("L" for Lahore-Faisalabad, "F" for Faisalabad), *5: Activity for Output 1, 1) or various activities of Output 1, *6: Activity for Output 1, 2), *7: Activity for Output 1, 3), *8: Activity for Output 2, 1), or 1) and 2) of Output 2, *9: Activity for Output 2, 2)

(5) Water treatment [Phase 2] (Rainy season, 14 days)

Date	Day	Activities	Training place	Job classification			Car
				JP*1	P1*2	P2*3	
Jul. 21	Sun	Arrival at Lahore		31*5			
Jul. 22	Mon	Moving from Lahore to Faisalabad, Training guidance	Old JK WTP	31	31		L
Jul. 23	Tue	[OP1] 1) Operation of WTP: Review of working shift and tasks for day/night time, activities' review of water amount of intake, treatment, transmission, difference in dry/rainy season	Old JK WTP	31	31		L
Jul. 24	Wed	[OP1] 1) Operation of WTP: Review of operation procedure with difference in dry/rainy season regarding chemical mixing, coagulation/sedimentation, filtration, sludge treatment	Old JK WTP	31	31		F
Jul. 25	Thu	[OP1] 2) Review of working system and operation for unusual conditions with difference in dry/rainy season	Old JK WTP	32*6	32		F
Jul. 26	Fri	[OP1] 3) Review of water treatment facility on site, review of inspection for water treatment facilities and equipment, review of operation procedure with difference in dry/rainy season, preparation of achievement confirmation test	Old JK WTP	33*7	33		F
Jul. 27	Sat	Preparation for training	Old JK WTP	31	31		F
Jul. 28	Sun	Preparation for training		31			F
Jul. 29	Mon	[OP1 Summary of activities, confirmation of water operation from intake to water transmission/distribution	Old JK WTP	31	31		F
Jul. 30	Tue	[OP1] Summary of activities, workflow modification, implementation of Achievement confirmation test, evaluation	Old JK WTP	31	31		F

Jul. 31	Wed	[OP1] Summary of entire activities, moving from Faisalabad to Lahore	Old JK WTP	31	31		L
Aug. 01	Thu	Leaving Lahore	Old JK WTP	31			L

Note:
*1: Japanese engineer, *2: Pakistani engineer (Output 1: water treatment), *3: Pakistani engineer (Output 2: water transmission/distribution), *4: Car ("L" for Lahore-Faisalabad, "F" for Faisalabad), *5: Activity for Output 1, 1) or various activities of Output 1, *6: Activity for Output 1, 2), *7: Activity for Output 1, 3)

(6) Total (days of assignment)

Job classification	Days
JP: Japanese engineer	63
P1: Pakistani engineer (Output 1: water treatment)	58
P2: Pakistani engineer (Output 2: water transmission/distribution)	16
Car between Lahore - Faisalabad	12
Car in Faisalabad	66

Appendix 6
Other Relevant Data

Appendix 6 Other Relevant Data
(1) Background of M/P Project and Outline of Formulated Plan

(1) Background

Faisalabad is the second largest city in Punjab Province and the third largest city in Pakistan. The population in the urban areas of Faisalabad was at 2.7 million in 2015, and is expected to increase to over 4 million by 2038. Rapid population growth in Faisalabad has made it difficult to secure adequate quantities of water for supply from both infrastructure development and resource development perspectives.

As of 2015, only 60% of the households in the city had access to municipal water supplied by Water and Sanitation Agency, Faisalabad (WASA-F). The sewerage coverage ratio within the current WASA-F service area was only 73% in 2015. The areas without sewerage must cope with chronically unsanitary conditions, while the areas with sewerage drains must cope with pressing challenges to maintenance.

In this context, the Government of Pakistan requested the Government of Japan to provide support for the establishment of a long-term plan for i) appropriate water resource development, ii) facility investment linked to urban planning, iii) the proper maintenance of existing facilities, iv) increased water and sewerage revenue, v) improved financial performance, and vi) the sustainable operation of water supply and sewerage services. Based on this request, M/P Project was conducted from 2016 to 2019. One of the result was to formulate water supply mater plan.

(2) Water Supply Master Plan

The following is the detail of the water supply master plan formulated by the M/P Project.

1) Project Components

Due to satisfy the future water demand, new water sources shall be developped. The poroject components for the development are as follows.

- Construction and expansion of WTPs and tubewells
- Installation and expansion of transmission mains
- Installation and expansion of Arterial Mains
- Installation and expansion of distribution mains
- Construction and expansion of Terminal Reservoirs
- Construction of distribution centers
- Construction and expansion of distribution networks
- Service connections

2) Outline of Phased Project Plan

When the population served increases, the water demande also increase. Based on the expected water demand, the corresponded facilities shall be planned and constructed. The following is the outline of the phased project.

Table 1 Outline of Phased Project Plan

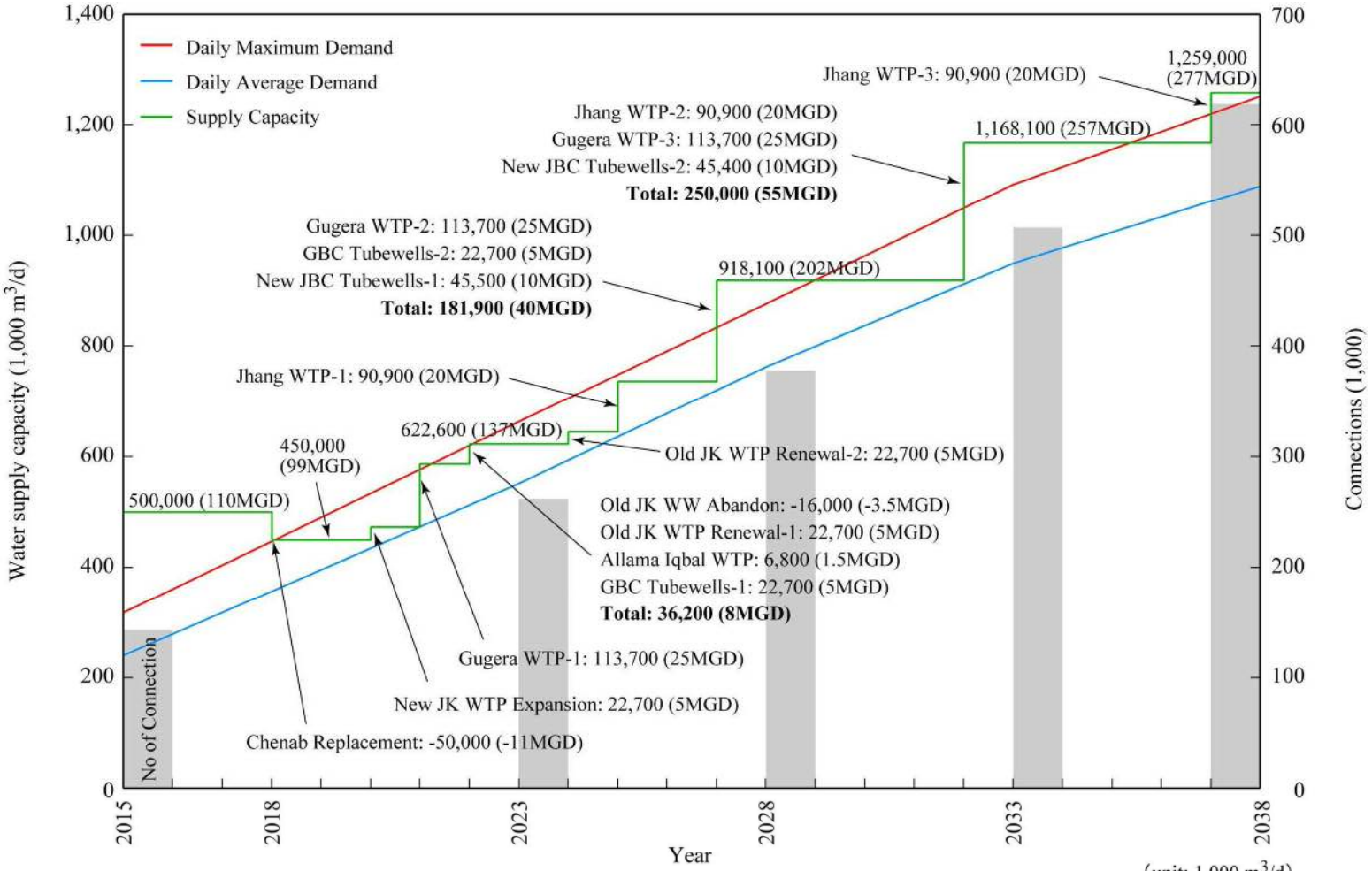
Items	Unit	Phase 1	Phase 2	Phase 3	Phase 4
		Yr 2018-2023	Yr 2024-2028	Yr 2029-2033	Yr 2034-2038
Population in Service Area	person	3,026,190	3,399,500	3,772,800	4,146,110
Population Served	person	1,815,700	2,549,600	3,395,500	4,146,100
Service Ratio	%	60%	75%	90%	100%
Total Demand (Daily Ave.)	1,000 m^3/day	329	528	703	859
Total Demand (Daily Max.)	1,000 m^3/day	664	870	1,092	1,252
Total Water Sources	1,000 m^3/day	714	918	1,077	1,259

3) Facility Development in Phased Project Plan

In order to satisfy the total demand, an increase in the total water source shall be required to an amount of 1,259,000 m^3/d (277 MGD) in 2038. Table 2 presents the phased plan for the facility development targetted on the amount. The result of the phased plan on Table 2 is summarised in Fig. 1 together with supply capacity, connections, and water demand.

Table 2 Facility Development in Phased Project Plan

Project No	Contents
Phase 1 (2018～2023)	
1-1	Old JK WTP: Replacement of the existing slow sand filter system, 16,000 m^3/day (3.5 MGD), to a rapid sand filtration system, 22,700 m^3/day (5 MGD)
1-2	New JK WTP: Extenssion, 22,700 m^3/day (5 MGD)
1-3	Gugera WTP-1: New construction, 113,700 m^3/day (25 MGD)
1-4	GBC New Tubewells-1: New construction, 22,700 m^3/day (5 MGD)
1-5	Allama Iqbal WTP: New construction, 6,800 m^3/day (1.5 MGD)
Phase 2 (2024～2028)	
2-1	Old JK WTP: Extenssion of the rapid sand filtration system, 22,700 m^3/day (5 MGD)
2-2	Jhang WTP-1: New construction, 90,900 m^3/day (20 MGD)
2-3	Gugera WTP-2: Extension, 113,700 m^3/day (25 MGD)
2-4	GBC Tubewells-2: Extension, 22,700 m^3/day (5 MGD)
2-5	JBC New Tubewells-1: New construction, 45,500 m^3/day (10 MGD)
Phase 3 (2029～2033)	
3-1	Jhang WTP-2: Extension, 90,900 m^3/day (20 MGD)
3-2	Gugera WTP-3: Extension, 113,700 m^3/day (25 MGD)
3-3	JBC New Tubewells-2: Extension, 45,400 m^3/day (10 MGD)
Phase 4 (2034～2038)	
4-1	Jhang WTP-3: Extension, 90,900 m^3/day (20 MGD)

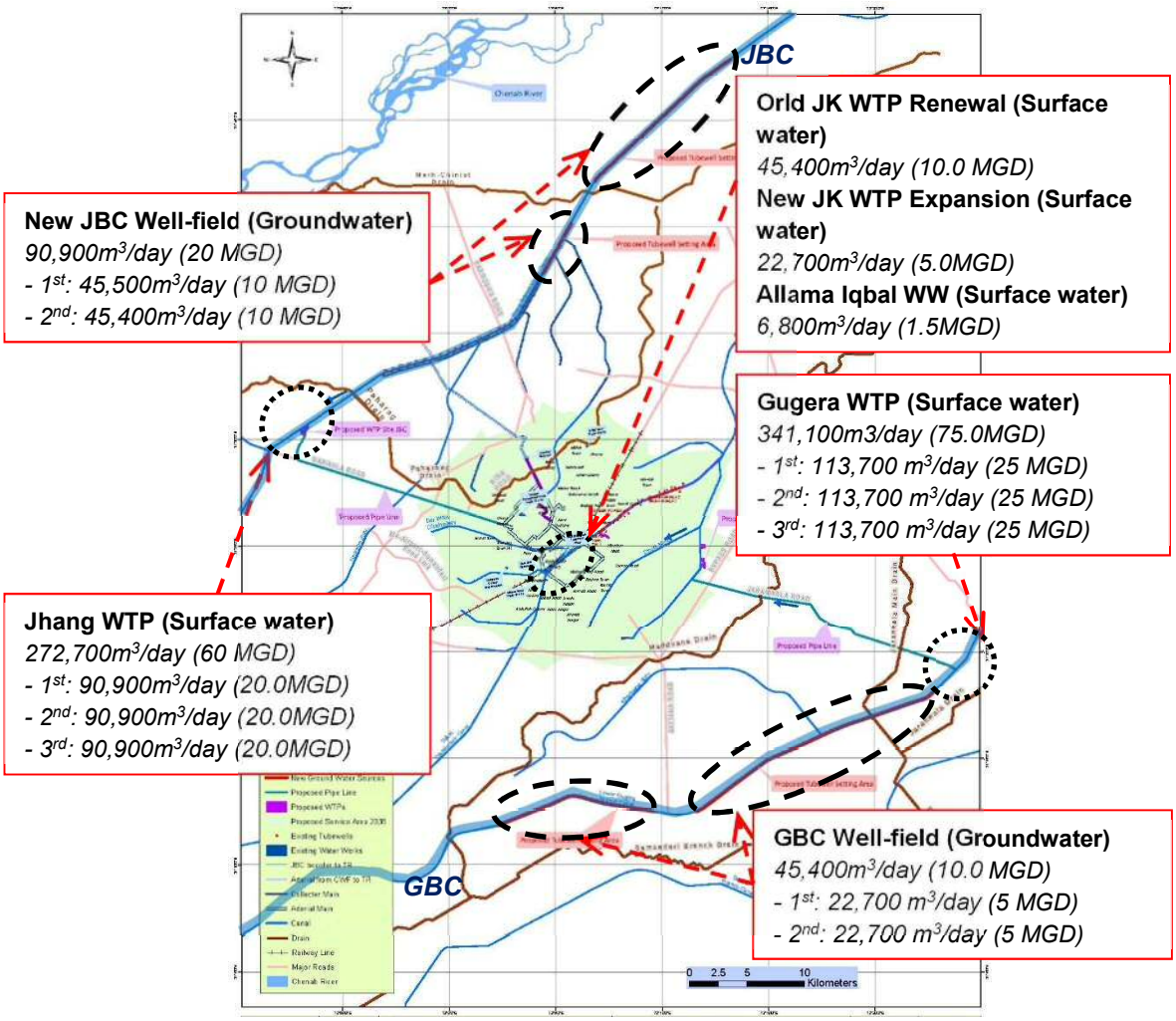


(unit: 1,000 m3/d)

Day Ave Demand	240	552	762	949	1,089
Day Max Demand	318	663	876	1,092	1,252
Supply capacity	500	622	918	1,168	1,259

Fig 1 Facility Development in Phased Project Plan and Water Supply Capacity

Fig. 2 presents the location of the facilities as new water source development indicated in Fig. 1.



Source: M/P

Fig. 2 Location of Facilities for New Water Source Development

(3) Priority Project in M/P and scope of the project

M/P formulated the priority project, which is merged with Project No 1-1 and 2-1 in Table 2. This preparatory survey is targetted on Project No 1-1 for the outline design. Fig. 3 illlustrates the distribution area for Project No 1-1. Dot line for the waer service improvement area in Fig. 3 indicates the area for Project No 2-1.

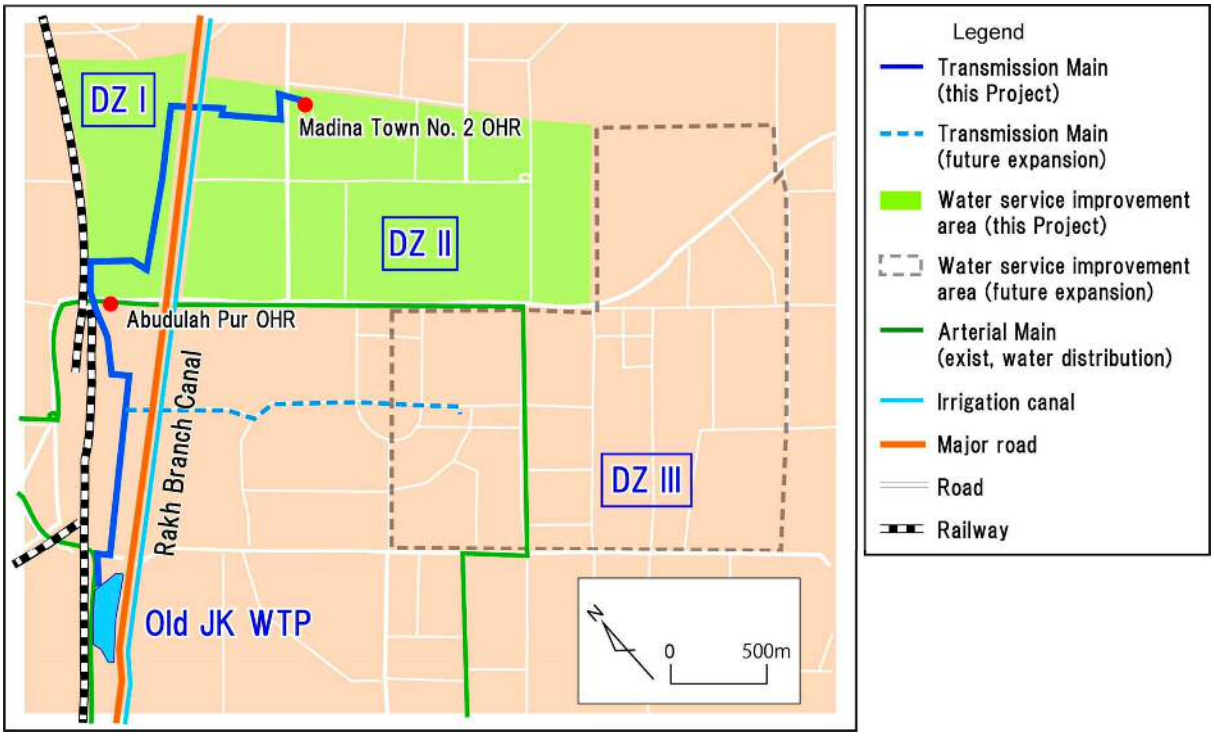


Fig. 3 Water Service Improvement Area for Outline Design in Preparatory Survey

Appendix 6 Other Relevant Data
(2) Letter on Pipeline Installation Route from Relevant Authorities

WATER & SANITATION AGENCY, FAISALABAD
OFFICE OF THE DIRECTOR (P&D)
No. 1070 /D (P&D)/WASA/2019
Dated 29 / 10 /2019

To

The Team Leader,
JICA Preparing Survey,
Faisalabad.

Subject:- **PROPOSED PIPE LINE ROUTE & CHAMBER LOCATION.**

Ref:- Your office letter No. JICA/W.F/2019/013 dated 23-05-2019.

The proposed pipe line & chamber locations as referred above were shared with concerned quarters / other Departments vide letter No.589-99/D(P&D)/WASA/2019 dated 24-06-2019 and no major observation is received by them only General Manager Operations vide his letter No. FWMC/1509 dated 17-07-2019 in which he asked FWMC is unable to remove C&D waste other than its allocated task with its limited resources, the request is being forwarded to ensure removal of excavated material of the project. So, the consultant shall proceed further in designing the pipe lines and DMA's.

Director (P&D)
Water and Sanitation Agency
Faisalabad

Endst:No _____/D(P&D)/WASA/2019. Dated _____/2019.

A copy is forwarded for information to:-

1. Deputy Managing Director (Engg), WASA, Faisalabad.
2. S.O to Managing Director, WASA, Faisalabad.

Director (P&D)
Water and Sanitation Agency
Faisalabad

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GOVERNMENT OF PUNJAB

FAISALABAD WASTE MANAGEMENT COMPANY

(Company Registered under section 42 of Companies Ordinance)

No: FWMC/1509

Date: 17-07-2019

To, for n/action

Director (P&D),

WASA Faisalabad.

DMD-E. 17.7.19 MD WASA

DMD-S

SUBJECT: PROPOSED PIPELINE ROUTES & DMA CHAMBER LOCATIONS.

Kindly refer to your office letter no.589-99/D (P&D)/WASA/2019 Dated 24/06/2019 regarding subject cited above.

FWMC is in the view that removal of excavated material should be added in the responsibility of contractor at the time of finalization. It has been observed in previous WASA construction projects that the contractor do not remove the excavated material after completion of the project which creates hindrance for general public, it also affects the decent look of the area, causes accumulation of water and accidents.

So keeping in view FWMC is unable to remove C&D waste other than its allocated tasks with its limited resources, the request is being forwarded to ensure removal of excavated material of the project please.

Dir. P&D Dairy No. 2746 /P&D WASA, FDA, Dated 20-7-19

Office of The MD, WASA Diary No. 5124 Dated: 17-07-19

With best Regards,

DD-IV

Director (P&D) Water & Sanitarian Agency Faisalabad

General Manager Operations
Faisalabad Waste Management Company
Faisalabad

Dir (P&D)

CC:

1: Managing Director WASA Faisalabad.
2: Chief Executive Officer FWMC.

RK PA

AD (Engineering) Dy No. 1393 DMD(E) WASA, FDA, Dated 18/7/19

Office: FWMC Complex, University Road, Near DC Office, Faisalabad Tel: +92 41 92[illegible]

(3)

WATER AND SANITATION AGENCY, FAISALABAD
OFFICE OF THE DIRECTOR (P&D)

No. 589-99/D(P&D)/WASA/2019
Dated 24/6/2019

1. The Chief Engineer,
   Faisalabad Development Authority,
   Faisalabad.
2. The Chief Officer Municipal Corporation,
   Faisalabad.
3. The XEN Highway Division (M&R) No.1,
   Faisalabad.
4. The Civil Engineer Irrigation LCCW,
   Faisalabad.
5. The District Officer Environment,
   Faisalabad.
6. The Chief Officer FESCO,
   Faisalabad.
7. The Superintend Railway,
   Faisalabad.
8. The Director (Dev. & Finance),
   Commissioner Office,
   Faisalabad.
9. The Superintend Engineer Public Health Engineering,
   Faisalabad.
10. The Chief FWMC,
    Faisalabad.
11. The Chief Engineer (PHA),
    Faisalabad.

Subject:- **PROPOSED PIPE LINE ROUTES & DMA CHAMBER LOCATIONS.**

It is brought to your kind attention that the preparatory study for JICA grant-in-Aid project of Improvement of Water Treatment Plant & Water Distribution System is being conducted by JICA expert team. Under this project, the rehabilitation of existing old Jhal Treatment Plant, new distribution centers (at Madina Town, Abdullah Pur along-with transmission & distribution pipe line (38km length) will be executed in Phase-I. The proposal for location of distribution centers & pipe line routes as recommended by JICA experts is attached. The construction works under this project are scheduled in 2020. The proposal is therefore / hereby shared with your department for comments and feed backs for smooth execution at construction stage.

Director (P&D)
Water and Sanitation Agency
Faisalabad.

The Preparatory Survey for the Project for Improvement of Water Treatment Plant and Water Distribution System in Faisalabad

Dated: May 23, 2019
Ref # JICA/W-F/2019/013

The
Director Planning & Design,
WASA, FDA

Recieved
23-5-19

SUBJECT: Proposed Pipelines route and DMA chambers location

We are pleased to submit the proposal for pipe lines route & DMA chambers location keeping in view the best available options. You are therefore requested to review, comment and feedback to proceed for finalization of the proposal

Your cooperation & prompt response will be highly acknowledged in this regard.

With best Regards,

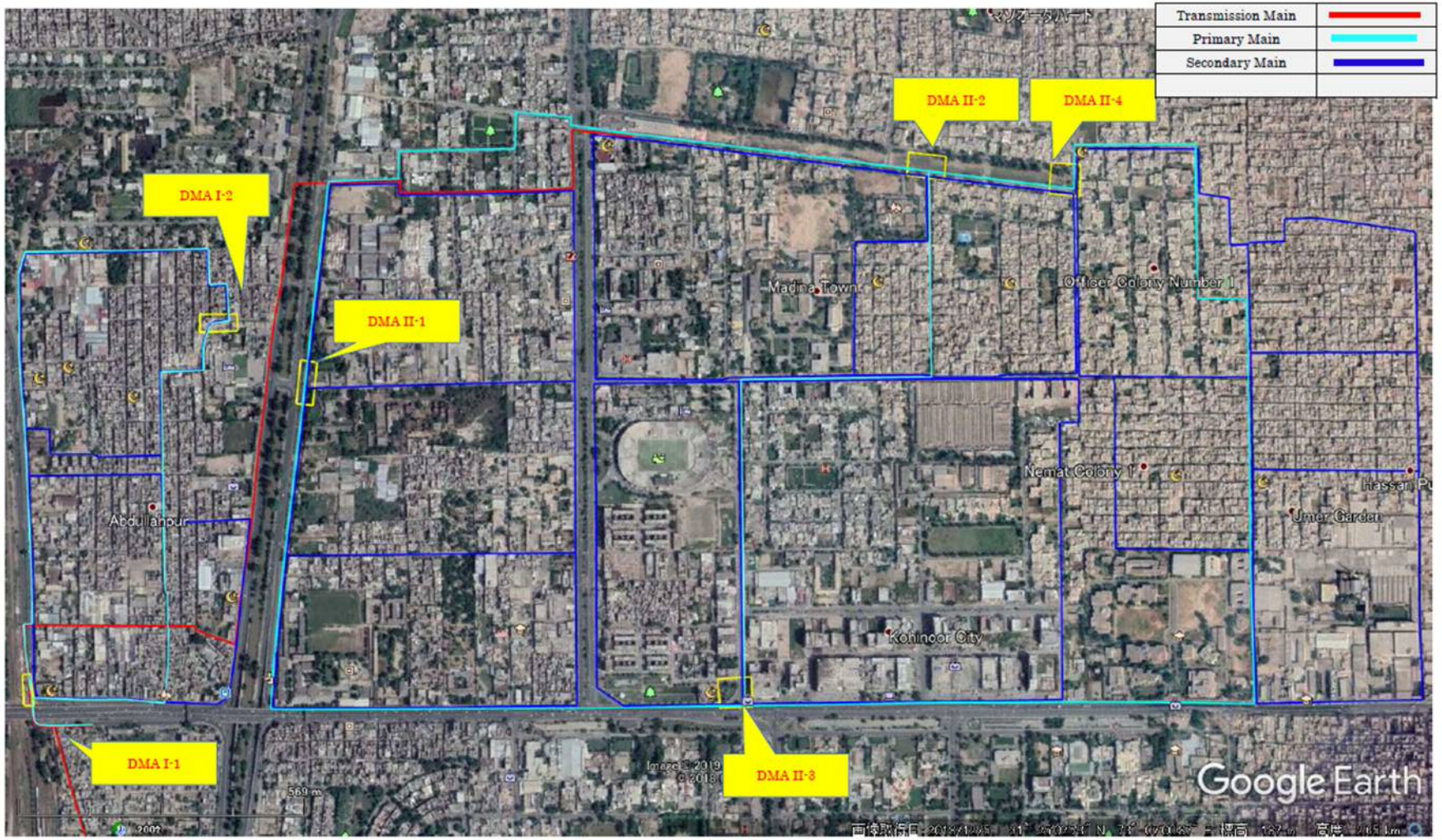
for (Dr. NOBUYUKI SATO)
Project Manager

DR. NOBUYUKI SATO
Project Manager
The Preparatory Survey for the Project for Improvement of Water Treatment Plant and Water Distribution System in Faisalabad

Kashif Ali
Secretary
JICA Preparatory Survey Team

Dir. P&D
Dairy No. 1983 /P&D
WASA, FDA, Dated 23-5-19


Railway Colony
Railway Colony
Kachi Abadi
Jhaal Khanwana
Fateh Abad
Fatehabad Chandi
Old JK WTP
Google Earth


Transmission Main
Primary Main
Secondary Main
DMA I-2
DMA II-2
DMA II-4
DMA II-1
DMA I-1
DMA II-3
Madina Town
Officer Colony Number 1
Nemat Colony 1
Kohinoor City
Abdullahpur
Umer Garden
Google Earth

App 6(2)-6

Appendix 6 Other Relevant Data
(3) Letter on Construction Permission of Intake Mouth and Pipe Bridge

REMINDER

WATER & SANITATION AGENCY, FAISALABAD

OFFICE OF THE DIRECTOR (P&D)

No. 18 /D(P&D)/WASA/2020

Dated 13 / 01 /2020

To

The Chief Engineer Irrigation LCCW,
Faisalabad.

Subject: - **APPROVAL OF CONSTRUCTION OF INTAKE FACILITY AT RAKH BRANCH CANAL.**

Ref: - This office letters No. 1106/D(P&D)/WASA/2019 dated 06-11-2019 & No.1119/D(P&D)/WASA/2019 dated 14-11-2019.

As already requested vide letters referred above that the preparatory study for JICA grant-in-Aid project for Improvement of Water Treatment Plant & Water Distribution System is being conducted by JICA expert team. Under this project, the re-construction of intake facility at old Jhal Water Treatment Plant as per approved water (Copy enclosed) is required. It is necessary to obtain NOC / Consent of your department by the end of December 2019 if possible and by the end of January 2020 at the last as a pre-requisite for approval of grant by the donor but no response has been received.

You are once again requested to issue NOC at the earliest so that the approval of grant can be processed.

Director (P&D)
Water and Sanitation Agency
Faisalabad

Endst: No. 19-21 /D(P&D)/WASA/2019 Date 13-01-2019

A copy is forwarded for information to the:-

1. Deputy Managing Director (Engg), WASA, Faisalabad.
2. Dr. NOBUYUKI SATO, Team Leader JICA Preparatory Survey, WASA, Faisalabad.
3. S.O to Managing Director, WASA, Faisalabad.

Director (P&D)
Water and Sanitation Agency
Faisalabad

c: letter dir(p&d)letter july, 2019.doc 139

WATER & SANITATION AGENCY, FAISALABAD

OFFICE OF THE DIRECTOR (P&D)
No. _____/D(P&D)/WASA/2019
Dated _____/____/2019

To

The Chief Engineer Irrigation LCCW,
Faisalabad.

Subject:- **APPROVAL OF CONSTRUCTION OF PIPE BRIDGE AT RAKH BRANCH CANAL.**

It is brought to your kind attention that the preparatory study for JICA grant-in-Aid project for Improvement of Water Treatment Plant & Water Distribution System is being conducted by JICA expert team. Under this project, they are planned to cross the Rakh Branch Canal in front of FESCO main office with new transmission pipe line for supply of water DC # 2 of the project. It is necessary to obtain NOC / Consent of your department by the end of December 2019 if possible and by the end of January 2020 at the last as a pre-requisite for approval of grant by the donor.

Construction plan is as follows.

- Basic design: refer to the basic design drawings of intake facility
- Construction site: refer to the longitudinal section of dijkot disty
- Construction schedule (tentative): During the annual closure periods of 2020-2022. The detailed schedule shall be intimated after mobilization of contractor.

Director (P&D)
Water and Sanitation Agency
Faisalabad

Endst: No. 1128 – 22 /D(P&D)/WASA/2019 Date 14-11-/2019

A copy is forwarded for information to the:-

1. Deputy Managing Director (Engg), WASA, Faisalabad.
2. Dr. NOBUYUKI SATO, Team Leader JICA Preparatory Survey, WASA, Faisalabad w.r.to his office No. JICA/W-F/2019/027 dated 28-10-2019.
3. S.O to Managing Director, WASA, Faisalabad w.r.to his office No. 7935/MD/WASA/2019 dated 28-10-2019.

Director (P&D)
Water and Sanitation Agency
Faisalabad

Appendix 6 Other Relevant Data
(4) Scope of the Distribution Mains by the Pakistani Side

Scope for the Distribution Mains by the Pakistani Side

The present plan intends to install the primary main, the secondary main, the tertiary main and the district meters in the target service area: Abudulah Pur and Madina Town No. 2. Also, distribution zones and DMA are planned to be developed. Each distribution zone and DMA are hydraulically separated from surrounding areas.

The Japanese side will develop part of the scope due to budget constraints. The remaining part will be developed by the Pakistani side.

The scope for the Pakistani side is shown in Table 1 and Figure 1~4. The primary main is about 7.1 km, the secondary main is about 18.1 km and about 25.2 km in total. Also, the Pakistani side will install the four district meters, replace the tertiary main and develop the distribution zone/DMA.

Table-1 Scope for the Distribution Mains by the Pakistani Side

Class	Area	Diameter	Material	Total Amount	Japanse side	Pakistani side
Primary Main	DZ-I	350	HDPE	630 m	630 m	0 m
		300	HDPE	60 m	0 m	60 m
				690 m	630 m	60 m
	DZ-II	450	HDPE	590 m	590 m	0 m
		400	HDPE	2,610 m	0 m	2,610 m
		300	HDPE	4,410 m	0 m	4,410 m
				7,610 m	590 m	7,020 m
	Subtotal			**8,300 m**	**1,220 m**	**7,080 m**
Secondary Main	DMA I-1	200	HDPE	260 m	260 m	0 m
		150	HDPE	1,440 m	0 m	1,440 m
				1,700 m	260 m	1,440 m
	DMA I-2	200	HDPE	1,020 m	0 m	1,020 m
		150	HDPE	680 m	0 m	680 m
				1,700 m	0 m	1,700 m
	DMA II-1	200	HDPE	530 m	0 m	530 m
		150	HDPE	3,740 m	0 m	3,740 m
				4,270 m	0 m	4,270 m
	DMA II-2	200	HDPE	540 m	540 m	0 m
		150	HDPE	2,780 m	1,100 m	1,680 m
				3,320 m	1,640 m	1,680 m
	DMA II-3	200	HDPE	1,280 m	0 m	1,280 m
		150	HDPE	2,530 m	0 m	2,530 m
				3,810 m	0 m	3,810 m
	DMA II-4	250	HDPE	460 m	0 m	460 m
		200	HDPE	1,830 m	0 m	1,830 m
		150	HDPE	2,910 m	0 m	2,910 m
				5,200 m	0 m	5,200 m
	Subtotal			**20,000 m**	**1,900 m**	**18,100 m**
Total				**28,300 m**	**3,120 m**	**25,180 m**
District Meter	DZ I			2 nos.	1 nos.	1 nos.
	DZ II			4 nos.	1 nos.	3 nos.
	Total			**6 nos.**	**2 nos.**	**4 nos.**
Tertiary Main		Replacement of existing mains of dia. 75~100			-	all
Development of Distribution Zone and DMA				DMA 6 nos.	-	DMA 6 nos.

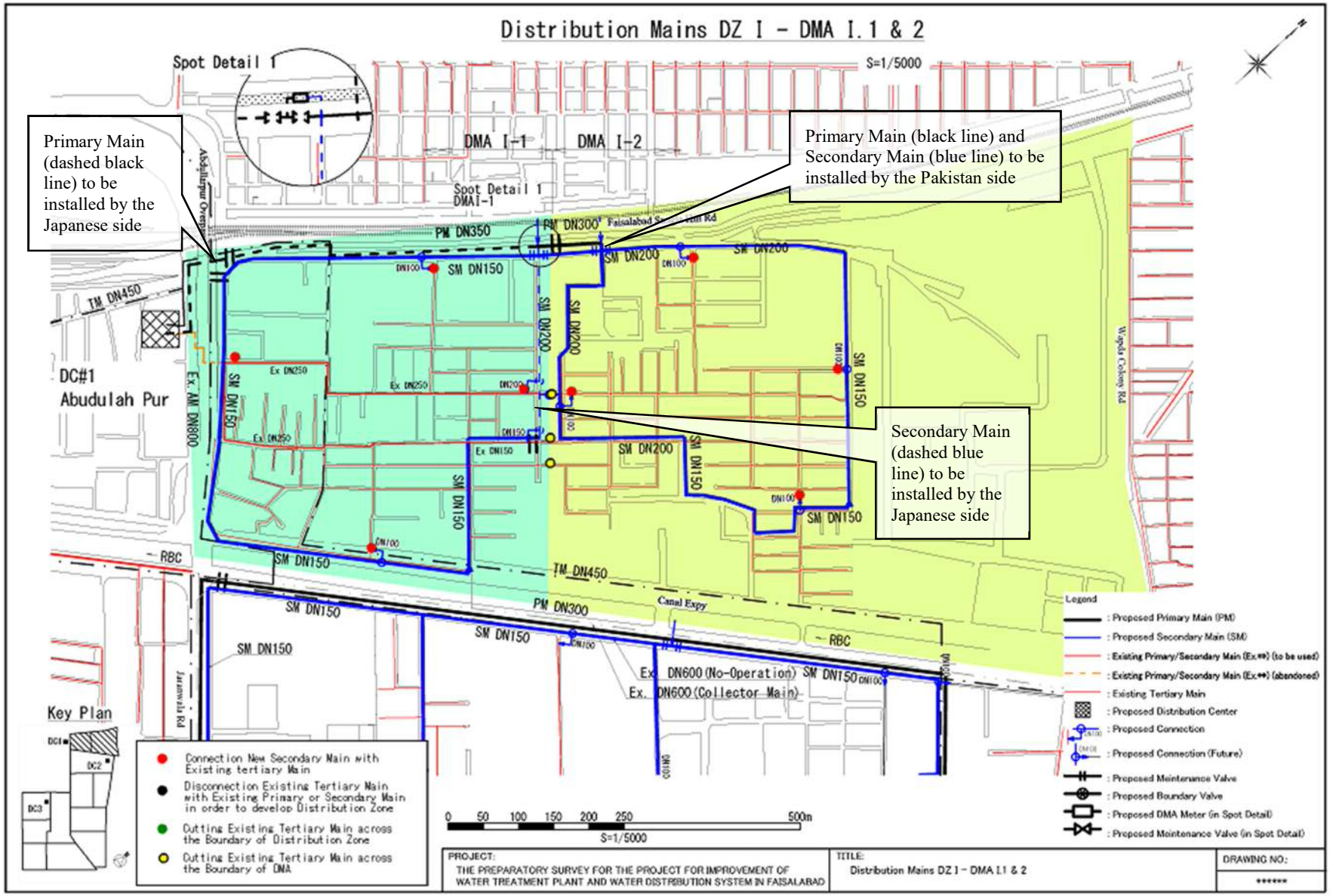


Figure-1 Scope for the Distribution Mains by the Pakistani Side, Abudulah Pur

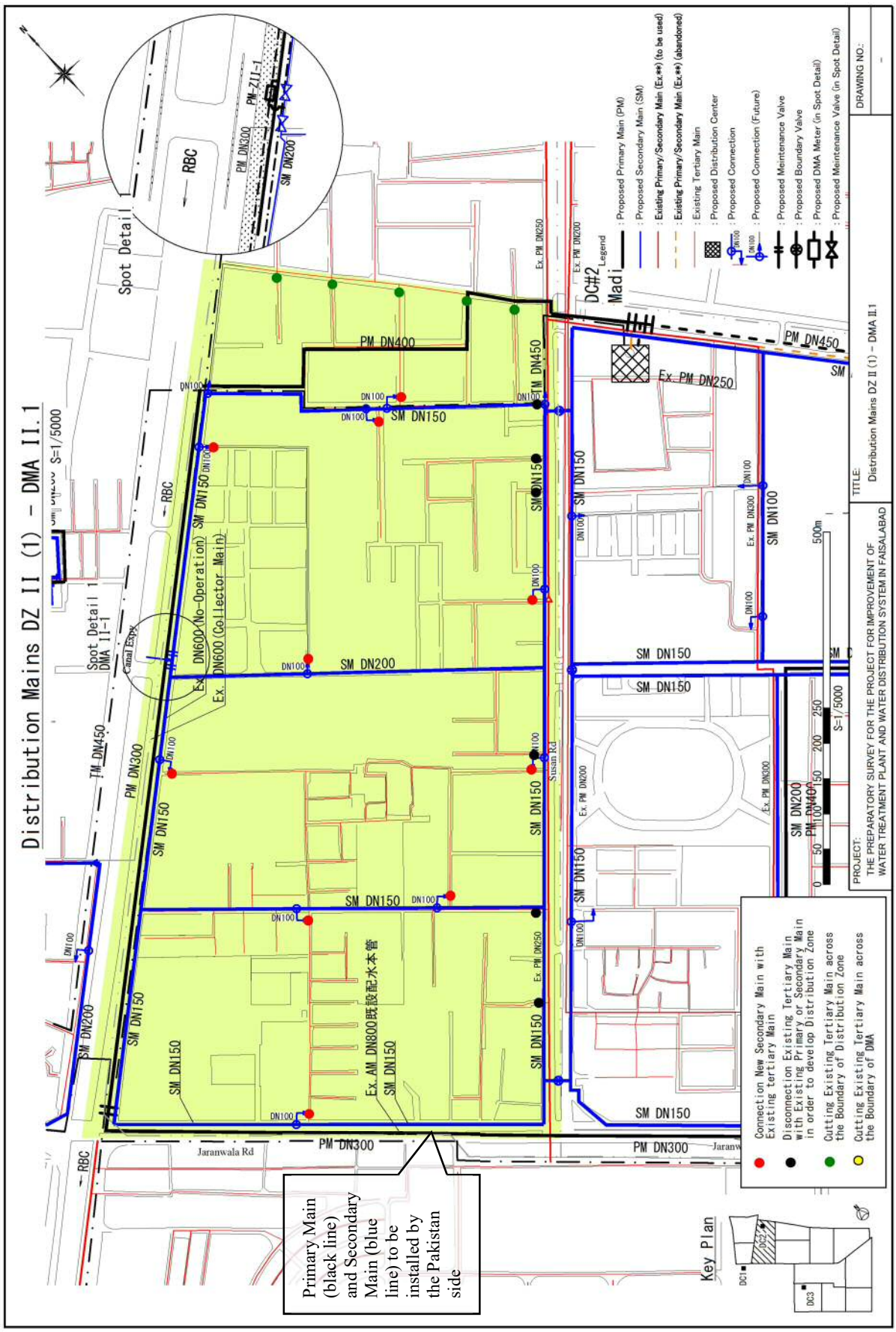


Figure-2 Scope for the Distribution Mains by the Pakistani Side, Madina Town No. 2 (1)

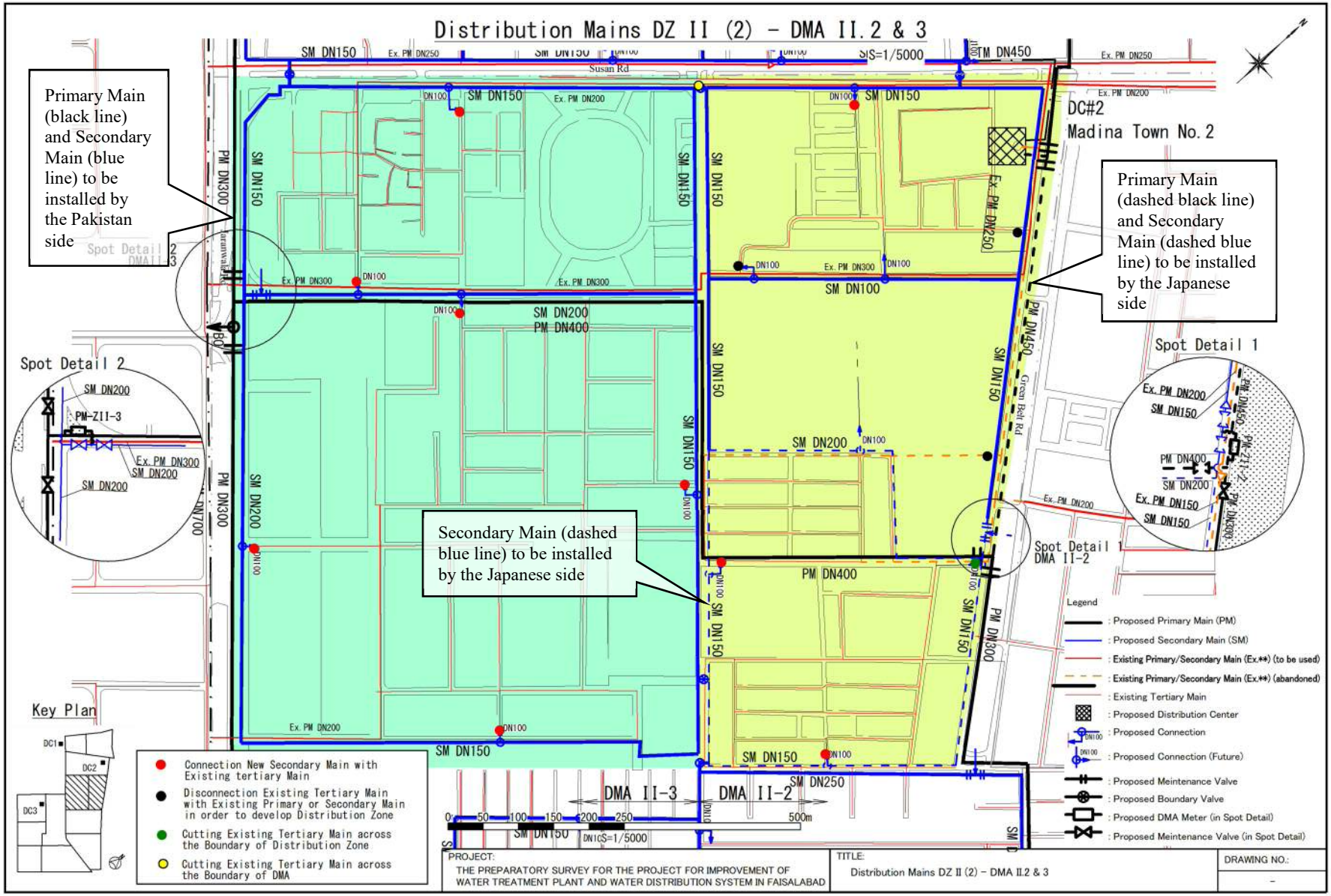


Figure-3 Scope for the Distribution Mains by the Pakistani Side, Madina Town No. 2 (2)

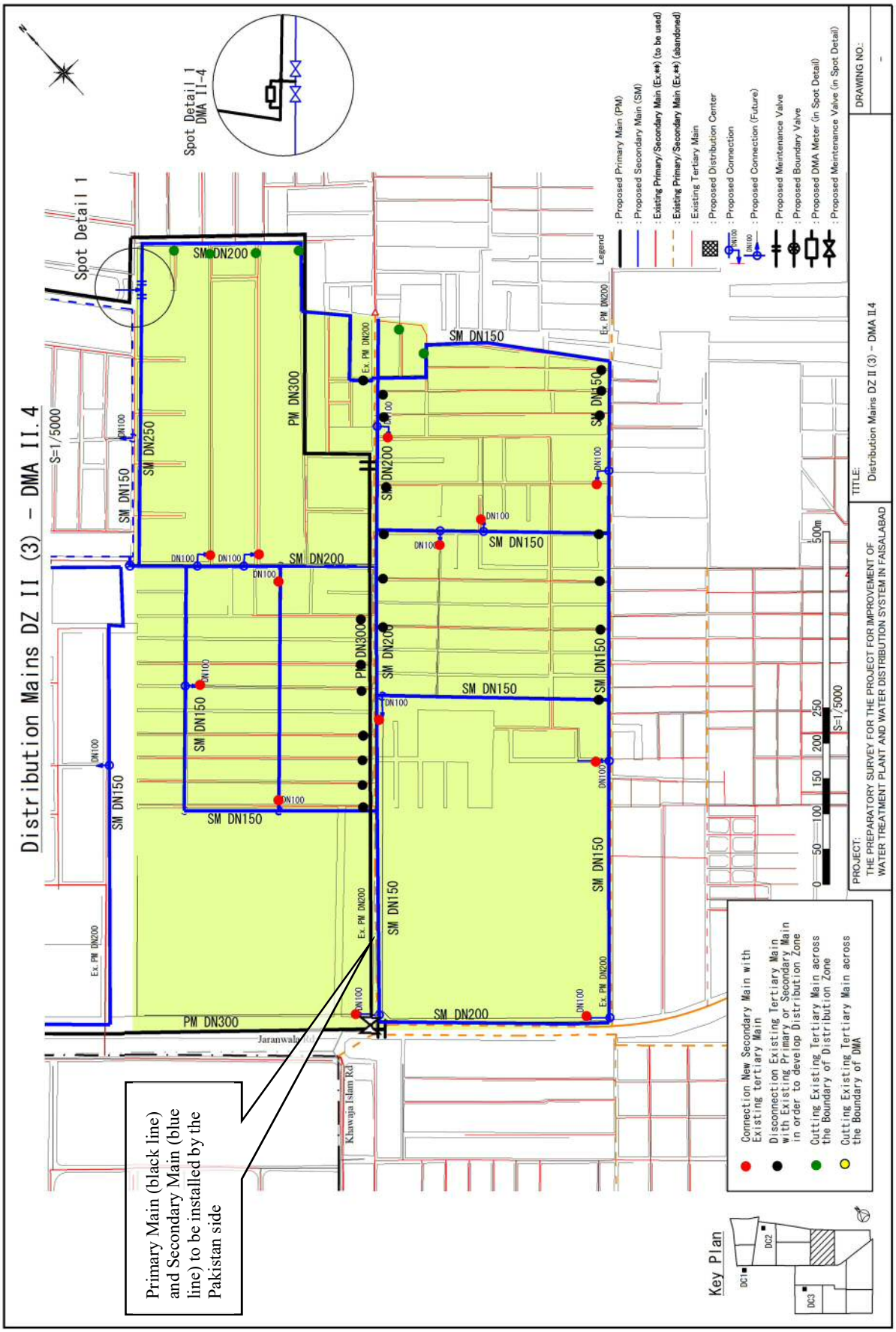


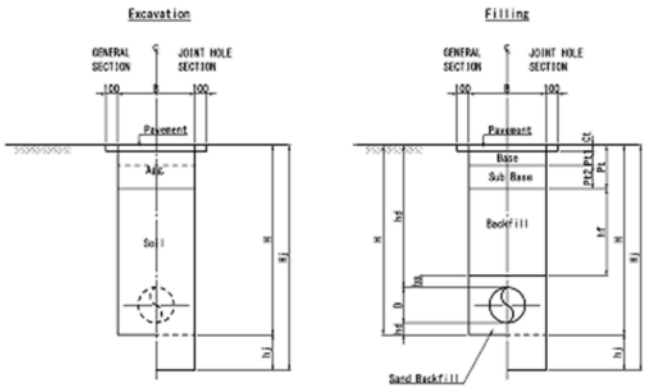
Figure-4 Scope for the Distribution Mains by the Pakistani Side, Madina Town No. 2 (3)

Earth Work Standards(1)

S=1/20

Trench Work

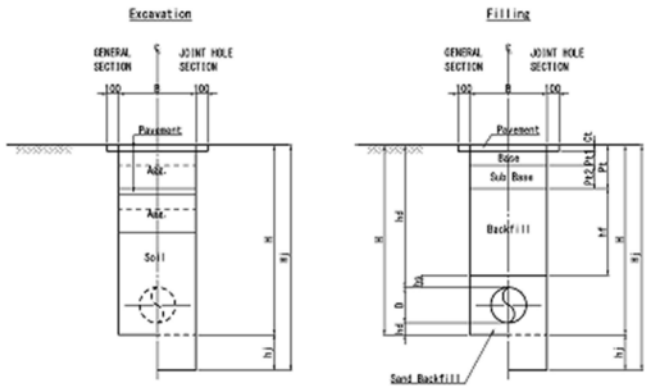
1 Layer



Standard DP Hd=1.20m

Pipeline	Material	ND (mm)	B m Open	B m Shttering	hb m	H m	ha m	hj m	Hj m	l m
Transmission Main	HDPE	300		0.95	0.10	1.60	0.10	0.90	2.20	0.80
		400		1.05	0.10	1.70	0.10	0.90	2.30	0.80
		450		1.15	0.10	1.75	0.10	0.90	2.35	0.80
	DIP	600		1.25	0.10	1.90	0.10	0.90	2.50	0.80
Distribution Primary Main	HDPE	350		0.95	0.10	1.65	0.10	0.90	2.25	0.80
		450		1.05	0.10	1.75	0.10	0.90	2.35	0.80
Distribution Secondary Main	HDPE	75	0.50		0.10	1.38	0.10	0.90	1.98	0.80
		100	0.50		0.10	1.40	0.10	0.90	2.00	0.80
		150	0.50		0.10	1.45	0.10	0.90	2.05	0.80
		250		0.90	0.10	1.55	0.10	0.90	2.15	0.80
		300		0.95	0.10	1.60	0.10	0.90	2.20	0.80

2 Layers



Standard DP Hd=0.90m

Pipeline	Material	ND (mm)	B m Open	B m Shttering	hb m	H m	ha m	hj m	Hj m	l m
Distribution Secondary Main	HDPE	75	0.50		0.10	1.08	0.10	0.60	1.68	0.80
		100	0.50		0.10	1.10	0.10	0.60	1.70	0.80
		150	0.50		0.10	1.15	0.10	0.60	1.75	0.80
		200	0.50		0.10	1.20	0.10	0.60	1.80	0.80
		250	0.55		0.10	1.25	0.10	0.60	1.85	0.80

NOTE:Pavement Thickness(Pt) refer to "Road Pavement".

	PROJECT TITLE:	DRAWING TITLE:	SCALE:	DRAWING NO:
	THE PREPARATORY SURVEY FOR THE PROJECT FOR IMPROVEMENT OF WATER TREATMENT PLANT AND WATER DISTRIBUTION SYSTEM IN FAISALABAD	EARTH WORK STANDARDS(1)	1/20	TYP- 01

Figure-5 Scope for the Distribution Mains by the Pakistani Side, Earth Work Standards

Appendix6 Other Relevant Data
(5) Procurement and Installation Technique for Water Meter

Procurement and Installation Technique for Water Meter

1. Water Meter Procurement in Punjab Province

Government of Punjab announced in September 2018 that the budget of procuring water meters would be secured at an amount of 1.5 billion PKR for 5 WASAs. However, this budget was not allocated because the meter procurement by PPP started discussing positively. Fig. 1 presents the schematic flow of meter procurement by PPP and ADP.

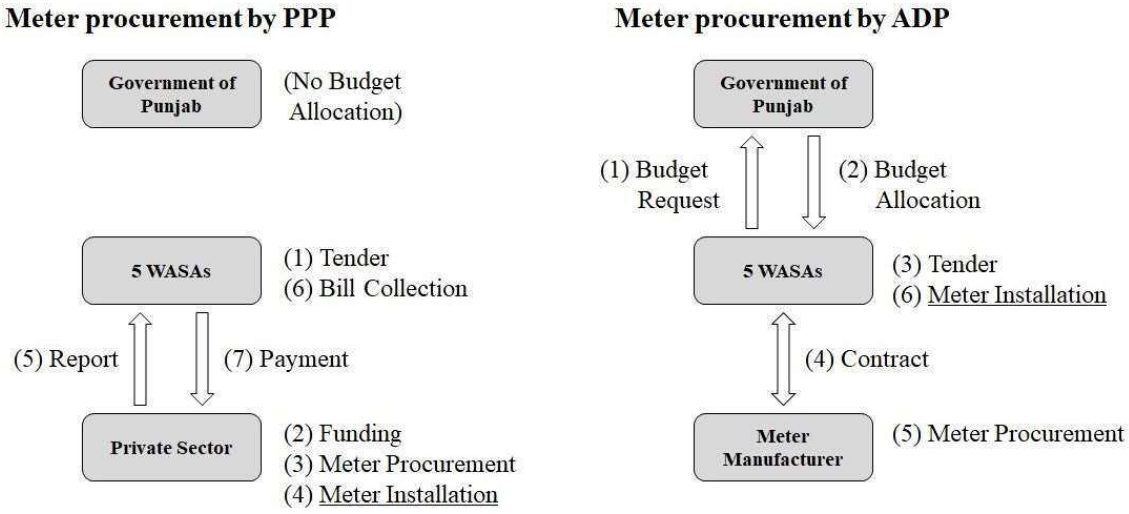


Fig. 1 Schematic Flow of Meter Procurement by PPP and ADP

For procuring water meter by ADP, WASA requests the budget annually. If approved by the provincial government, the budget is allocated to WASA. Then WASA can purchase necessary number of the meters directly from the market. In this procurement process, WASA can select and change the specification for the meters at any time by its own decision.

Under the scheme of PPP, the contracted private company procures and installs the meters by its own fund. Area where the meters are installed will be shifted to the metered rate from the fix. As a result, the income from the tariff will be increased. The part of the increased revenue will be paid to the contracted company. Therefore, the budget allocation from the provincial government is not necessary regarding the water meter procurement.

In Punjab, WASA Lahore has started preparing the procurement of water meter by PPP. The number of the meter is 700,000. WASA Lahore has studied the contract specification for PPP scheme. The contract period of PPP is planned for 10 years. The other WASAs seek the applicability to them based on the administrative and technical approach by WASA Lahore.

2. Technical Level for Installing Water Meter

The manual for water meter installation was prepared through the pilot activity in M/P Project. Based on the manual, WASA Faisalabad installed the water meters at two locations of the pilot areas and at the other areas in the city. Therefore, it is considered that WASA-F has sufficient technique for installing water meters.

3. Suggestion to WASA Faisalabad regarding water meter procurement

The expected benefit through this project is to improve water service such as the supplied volume and the pressure. WASA Faisalabad is planning to shift the tariff system to the metered rate from the flat by procuring water meters. If the metered rate is applied, the expectation is the financial improvement.

WASA-F procures the water meters either PPP or ADP. Either scheme needs to sustain the technical improvement and the services providing the satisfaction to the customers. For this requirement, the suggestion is to form the section which has responsibility of installing water meters and reviewing specification of the meters.

Project Monitoring Report
on
Project Name
Grant Agreement No. XXXXXXX

2020, December

Organizational Information

Signer of the G/A (Recipient)	Person in Charge (Designation) Contacts Address: Phone/FAX: Email:
Executing Agency	**WASA Faisalabad** Person in Charge Mr. xxxx xxxx, (Designation) Contacts Address: Near Allied Hospital, Jail Road Faisalabad, Pakistan Phone/FAX: +92 41 921 0049 / 0054 Email: info@wasafaisalabad.gop.pk
Line Ministry	**Ministry of Economic Affairs** Person in Charge Mr. XXXX XXXX, (Designation) Contacts Address: Block C, Pak Secretariat, Islamabad Pakistan Phone/FAX: Email:

General Information:

Project Title	The Project for Improvement of Water Treatment Plant and Water Distribution System in Faisalabad
E/N	Signed date: Duration:
G/A	Signed date: Duration:
Source of Finance	Government of Japan: Not exceeding JPY mil. Government of Pakistan:

1: Project Description

1-1 Project Objective

Living environment in Faisalabad is improved through an improvement of the water supply capacity by renewing and expanding the existing WTP and development of transmission and distribution facilities.

1-2 Project Rationale

- Higher-level objectives to which the project contributes (national/regional/sectoral policies and strategies)
- Situation of the target groups to which the project addresses

Higher-level objectives:
Water supply facilities are developed according to M/P Project through the financial improvement of WASA-F as a result of an increase in income by an increase in a number of the customers and the tariff collection rate.

Situation of the target groups:
Water supply demand has been increased by an increase in population. Consequently, it is expected that the (maximum) daily demand for Faisalabad in 2023 will exceed the current water supply capacity by approximately 30%. Furthermore, improper segmentation of the service area and inadequate water distribution management have caused low water pressure and intermittent water supply limited for about six hours per day in the area.

1-3 Indicators for measurement of "Effectiveness"

Quantitative indicators to measure the attainment of project objectives		
Indicators	Original (Yr 2020)	Target (Yr 2027)
Production volume by WTP*1	6,800 m^3/day	14,800 m^3/day
Distribution pressure	approximately 0 - 8 m (average: 1.7 m) *2	25 m or higher*3

Qualitative indicators to measure the attainment of project objectives

- Improvement of living environment and public health for citizens, and contribution in promoting infection control measures by improving water supply services such as water supply hours
- Improvement of WASA-F's financial status by increasing a number of customers and the income from water tariff

Note:
*1: Average of production volume by WTP without closing period of RBC approximately for 3 weeks per year
*2: Average of maximum pressure at tap surveyed in 2019-20
*3: Measurement at flowmeter room of OHR

2: Details of the Project

2-1 Location

Components	Original *(proposed in the outline design)*	Actual
Construction of WTP and transmission / distribution facilities	i) Old JK WTP, ii) Abudulah Pur, and iii) Madina Town in Faisalabad	

2-2 Scope of the work

Components	Original *(proposed in the outline design)*	Actual
1. Construction of Intake (10 MGD)	- Intake mouth, branch valve chamber - Raw water pump station	
2. Construction of Water Treatment Plant (5 MGD) (Applicable to expand the capacity to 10 MGD)	- Receiving and distribution tank - Mixing tank - Flocculation tank - Settling tank - Rapid sand filter - Clear water reservoir - Transmission pump station - Waste water and sludge tank - Sludge thickener - Sludge extraction pump house - Sludge drying bed - Chemical building - Administration building - Power receiving and transforming, and generator house - Electricity meter house	
3. Construction of Distribution Center	- Ground reservoir (2 ponds) - Overhead reservoir (2 ponds)	
4. Construction of Transmission and Distribution Main (Applicable to transmit a capacity of 10 MGD partially)	- Transmission main (4.1 km) - Distribution primary main (1.2 km) - Distribution secondary main (1.9 km)	

Reasons for modification of scope (if any).

(PMR)

2-3 Implementation Schedule

Items	Original		Actual
	(proposed in the outline design)	***(at the time of signing the Grant Agreement)***	
Cabinet Approval	12/2020		
E/N	2/2021		
G/A	2/2021		
Consultant Contract	3/2021		
Detailed Design	3/2021 - 9/2021		
Prequalification	10/2021		
Bidding	12/2021		
Contract with Contractor	1/2022		
Construction	1/2021 - 5/2024		
Soft component	4/2024 - 9/2024		

Defect Liability Period	4/2025		
Project Completion	4/2025		

Reasons for any changes of the schedule, and their effects on the project (if any)

2-4 Obligations by the Recipient

2-4-1 Progress of Specific Obligations

See Attachment 2.

2-4-2 Activities

See Attachment 3.

2-4-3 Report on RD

See Attachment 11.

2-5 Project Cost

2-5-1 Cost borne by the Grant (Confidential until the Bidding)

Components			Cost (Million Yen)	
	Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original[1),2)] *(proposed in the outline design)*	Actual
	1.			
Total				

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar = Yen

2-5-2 Cost borne by the Recipient

Components		Cost (million PKR)	
Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original[1),2)] *(proposed in the outline design)*	Actual
Rehabilitation of Raw Water Reservoir A		59.38	
Dismantling of Existing Facilities		29.97	
Relocation of WASA-F and FDA Staff		19.98	
Electrical Works		22.29	
Total		131.62	

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar = 105.74 JPY

Reasons for the remarkable gaps between the original and actual cost, and the countermeasures (if any)

(PMR)

2-6 Executing Agency

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

Original *(at the time of outline design)* - Name: Water and Sanitation Agency Faisalabad - Role: To provide water supply, sewerage and drainage services to citizen of Faisalabad - Financial situation: The financial sources for the development and the non-development budget of WASA-F are subsidy from the provincial government and the income from water tariff, etc. The income from water tariff has been increased as a result of the pilot activities on the Master Plan Project. - Institutional and organizational arrangement (organogram): The organization is headed by MD and formed by three DMDs sectionalized in i) finance & revenue, ii) engineering, and iii) services. - Human resources (number and ability of staff): Total number of staff is 2,567. The staff of WDM is responsible and properly working for the operation of WTP and distribution management.
Actual *(PMR)*

2-7 Environmental and Social Impacts

- The results of environmental monitoring based on Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- The results of social monitoring based on in Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- Disclosed information related to results of environmental and social monitoring to local stakeholders (whenever applicable).

3: Operation and Maintenance (O&M)

3-1 Physical Arrangement

- Plan for O&M (number and skills of the staff in the responsible division or section, availability of manuals and guidelines, availability of spare parts, etc.)

Original *(at the time of outline design)* Operator/Maintenance Engineer (2), Process Engineer (1), Plant Operator (3), Mechanic / Helper Mechanic (3), Electrician / Helper Electrician (3), Laboratory specialist / Assistant (4), Plumber / Helper Automation (3)
Actual *(PMR)*

3-2 Budgetary Arrangement

- Required O&M cost and income by water tariff

Original *(at the time of outline design)* O&M cost and income from water tariff at water transmission of 20,450 m^3/d are projected as follows: - O&M cost: 101 million PKR/year - income from water tariff at collection rate of 40%: 113 million PKR
Actual *(PMR)*

4: Potential Risks and Mitigation Measures

- Potential risks which may affect the project implementation, attainment of objectives, sustainability
- Mitigation measures corresponding to the potential risks

Assessment of Potential Risks (*at the time of outline design)*

Potential Risks	Assessment
1. Air Pollution	Probability: High/(Moderate)/Low
	Impact: High/(Moderate)/Low
	Analysis of Probability and Impact:
	<u>During Construction</u> Temporary deterioration of air quality is expected due to operation of construction machineries and vehicles.
	Mitigation Measures:
	- Use of construction equipment with exhaust gas emission control - Careful operation and self-regulation of speed of construction machineries and vehicles - Watering to prevent dust
	Action required during the implementation stage:
	Contingency Plan (if applicable):
2. Water Pollution	Probability: High/(Moderate)/Low
	Impact: High/(Moderate)/Low
	Analysis of Probability and Impact:
	<u>During Construction</u> Due to construction of the intake facility, temporary water pollution such as soil runoff downstream is expected.
	Mitigation Measures:
	- Control of soil flown out to RBC from the working area of intake facility - Preventive maintenance of construction machineries and vehicles - Wastewater control at accommodation for workers

	Action required during the implementation stage:
	Contingency Plan (if applicable):
3. Solid Waste	Probability: High/(Moderate)/Low
	Impact: High/(Moderate)/Low
	Analysis of Probability and Impact:
	During Construction Generation of construction debris and waste materials is expected. During Operation Sludge will be generated from the water treatment plant, and the generated sludge is planned to be transported to the waste treatment plant as waste.
	Mitigation Measures:
	- Proper waste handling at waste disposal site and treatment plant - Guidance to workers on construction site cleaning
	Action required during the implementation stage:
	Contingency Plan (if applicable):
Actual Situation and Countermeasures	
(PMR)	

5: Evaluation and Monitoring Plan (after the work completion)

5-1 Overall evaluation

Please describe your overall evaluation on the project.

5-2 Lessons Learnt and Recommendations

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

5-3 Monitoring Plan of the Indicators for Post-Evaluation

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

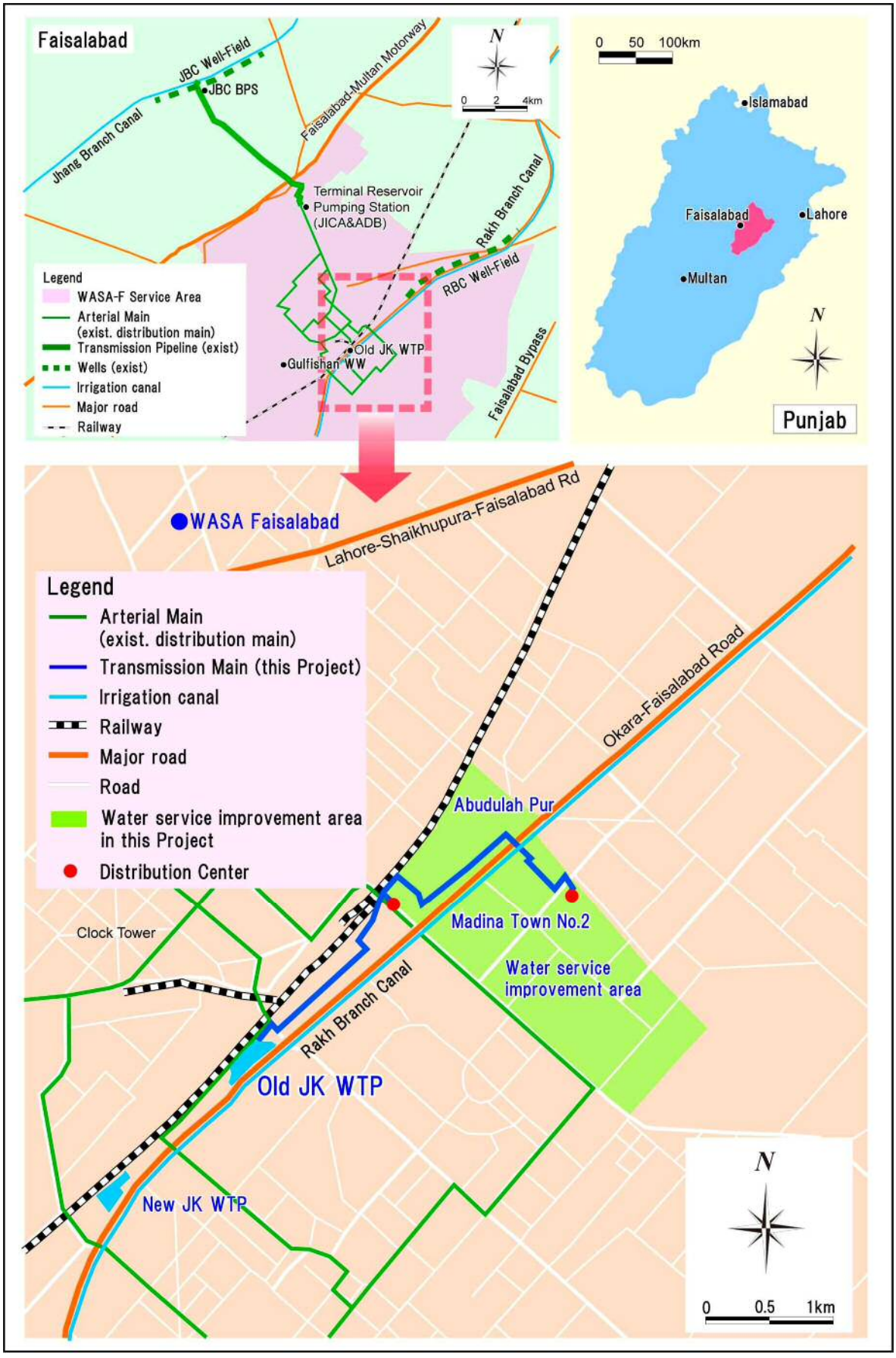
The production volume by WTP and the distribution pressure are monitored and recorded in SCADA installed at WTP.

Attachment

1. Project Location Map
2. Specific obligations of the Recipient which will not be funded with the Grant
3. Monthly Report submitted by the Consultant (not available in current version)

Appendix - Photocopy of Contractor's Progress Report (if any)
- Consultant Member List
- Contractor's Main Staff List

4. Check list for the Contract (including Record of Amendment of the Contract/Agreement and Schedule of Payment) (not available in current version)
5. Environmental Monitoring Form / Social Monitoring Form
6. Monitoring sheet on price of specified materials (Quarterly)
7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR (final)only)
8. Pictures (by JPEG style by CD-R) (PMR (final)only) (not available in current version)
9. Equipment List (PMR (final)only) (not available in current version)
10. Drawing (PMR (final)only) (not available in current version)
11. Report on RD (After project) (not available in current version)



Location Map

Specific obligations of the Government of Pakistan ("the Recipient" of the Grant) which will not be funded with the Grant

(1) Before the Bidding

No	Items	Deadline	In charge	Estimated Cost	Ref.
1	To open bank account (B/A)	within 1 month after the signing of the G/A	WASA-F	―	
2	To issue A/P to a bank in Japan (the Agent Bank) for the payment to the consultant	within 1 month after the signing of the contract	WASA-F	6,000 JPY/each issue 4,000 JPY/each amendment	
3	To approve IEE/EIA(Conditions of approval should be fulfilled, if any) and secure the necessary budget for implementation.	before the announcement of tender	WASA-F	1.5 million PKR (for entire period until "After the Project")	
4	To complete the relocation of WASA-F and FDA officials living around the distribution centers of Abudulah Pur and Madina Town No. 2 where the overhead reservoirs will be demolished for the Project	before the signing of the G/A	WASA-F	19.98 million PKR	
5	To secure and clear the following lands 1) Site for Old JK WTP (existing rapid sand filter, storage etc.) 2) Site for the distribution centers of Abudulah Pur and Madina Town No. 2	before the announcement of tender	WASA-F	29.97 million PKR	
6	To rehabilitate the raw water reservoir A	before the announcement of tender	WASA-F	59.38 million PKR	
7	To bring power to Old JK WTP and distribution centers of Abudulah Pur and Madina Town No. 2	before the announcement of tender	WASA-F	22.29 million PKR	
8	To submit Project Monitoring Report (with the result of Detailed Design)	before the announcement of tender	WASA-F	―	
9	To establish Project Implementation Unit and assign WASA-F staff	soon after Detailed Design starts	WASA-F	1.25 million PKR/month	
10	To coordinate and acquire permission/approval from relevant agencies/organizations when any types of permission are required for construction under the Project	before preparation of bidding document(s)	WASA-F	16 million PKR	

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable)

(2) During the Project Implementation

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To issue A/P to a bank in Japan (the Agent Bank) for the payment to the Suppliers (s).	within 1 month after the signing of the contract(s)	WASA-F	6,000 JPY/each issue 4,000 JPY/each amendment	
2	To bear the following commissions to a bank in Japan for the banking services based upon the B/A			—	
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	WASA-F	6,000 JPY/each issue 4,000 JPY/each amendment	
	2) Payment commission for A/P	every payment	WASA-F	0.1% of every payment	
3	To handle duty (tax) exemption procedures and to take necessary measures as well as provide requisite legal and/or administrative documentations for customs clearance to the customs broker/forwarder to be employed by the Supplier(s) at the port of disembarkation for the materials and equipment imported for the Project as well as sending back of any defective equipment and/or spare parts to the manufacturer for repair at the factory or replacement and importation thereof into the country of the Recipient during the implementation and warranty periods of the Project.	during the Project	EAD WASA-F	—	
4	To accord Japanese physical persons and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the country of the Recipient and stay therein for the performance of their work.	during the Project	EAD WASA-F	—	
5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the products and/or the services be exempted. (with regard to the internal taxes, the total percentages of rates of the sales tax imposed on the said purchase shall be zero percent (0%) or the sales tax imposed on the said purchase shall be exempted.)	during the Project	EAD WASA-F	—	
6	To arrange the maximum countermeasures and ensure the appropriate security of the whole Project sites and of the Japanese and other foreign nationals assigned to the Project, with deployment of city police through its Administration & Security Branch in addition to the private security arrangement by the Suppliers(s). 1) To arrange security around the Project sites with the police. 2) To arrange security around the accommodation(s) of the Suppliers(s) with the police. 3) To arrange escort guard with the police during movements between the accommodation(s) of the Supplier(s) and the Project sites. 4) To install monitoring cameras at Old JK WTP and distribution centers of Abudulah Pur and Madina Town No. 2.	prior to the commencement of and during implementation of the Project	WASA-F through District Police	10 million PKR	

	5) To repair the wall around distribution centers of Abudular Pur.				
7	To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities necessary for the implementation of the Project outside the site(s).			—	
	1) Electricity The distributing line to the site including utilization of electricity for trial operation	before start of the construction	WASA-F		
	2) Water Supply The city water distribution main to the site including utilization of water for trial operation and construction works such as cleaning sites and facilities, pressure test, etc.	before start of the construction	WASA-F		
	3) Drainage The city drainage main (for storm, sewer and others) to the site including utilization of drainage main for trial operation and construction works such as wastewater from cleaning sites and facilities, pressure test, etc.	before start of the construction	WASA-F		
8	To provide necessary working spaces for the Project Office of the Suppliers(s).	during the Project	WASA-F		
9	To bear all the expenses, other than those to be covered by the Grant, necessary for the implementation of the Project.	during the Project	Govt. of Punjab & WASA-F	—	
10	To implement EMP and EMoP	during the construction	WASA-F	—	
11	To submit results of environmental and social monitoring to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	during the construction	WASA-F	—	
12	To take necessary measures on controlling traffic and/or detouring traffic for securing safety to workers and all types of the traffic	during the construction	WASA-F	—	
13	1)To submit Project Monitoring Report	every month	WASA-F	—	
	2)To submit Project Monitoring Report (final)	within 1 month after issuance of Certificate of Completion for the works under the contract(s)	WASA-F	—	
14	To submit a report concerning completion of the Project	within 6 months after completion of the Project	WASA-F	—	

(Suppliers(s): suppliers, contractors and/or consultants)

(3) After the Project

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To implement EMP and EMoP	for a period based on EMP and EMoP	WASA-F	—	
2	To submit results of environmental and social monitoring to JICA, by using the monitoring form, semiannually - The period of environmental and social monitoring may be extended if any significant negative impacts on the environment are found. The extension of environmental and social monitoring will be decided based on the agreement between WASA-F and JICA.	for three years after the Project	WASA-F	—	
3	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid 1) Allocation of maintenance cost 2) Allocation of additional staff for operation and maintenance 3) Routine check/Periodic inspection	After completion of the construction	WASA-F	—	

Environmental and Social Monitoring Form (Draft)

(1) Pollution Control Measures

1) Air Pollution: During Construction

a) Observation

Monitoring Item	Remarks
Dust generated at construction site	Construction site, Four times/year, Physical observation (existence of dust)

b) Measurement (Environmental Standard)

Item (Unit)	Measured Value (Mean)	Measured Value (Maximum)	Local Standard	Japanese Standard	Remarks (Measurement point, frequency, method)
CO (mg/m^3)			<5	<11.5	Air quality measurement around construction site, Four times/year, Air quality measurement
SO_2 ($\mu g/m^3$)			<120	<105	
NOx ($\mu g/m^3$)			<80	—	
PM_{10} ($\mu g/m^3$)			<150	<100	

2) Water Pollution (Effluent/Drinking Water Quality Standard): During Construction

Item (Unit)	Measured Value (Mean)	Measured Value (Maximum)	Local Standard	Japanese Standard	Remarks (Measurement point, frequency, method)
COD (mg/L)			<150	≤160	Effluent quality measurement around construction site, Twice/year, Water quality analysis
SS (mg/L)			<200	≤200	
pH			6.5-8.5	5.8-8.6	Drinking water quality downstream of construction site at intake facility, Twice/year, Water quality analysis
Odour			NO	NO	
Taste			NO	NO	
Colour (Pt-Co)			≤15 TCU	≤5 CU	
Turbidity (NTU)			<5	≤2	
Total Hardness (mg/L)			< 500	≤ 300	
TDS (mg/L)			<1000	≤500	
Cl (mg/L)			< 250	≤200	
CN (mg/L)			≤0.05	≤0.01	
F (mg/L)			≤ 1.5	≤0.8	
NO_2^- (mg/L)			≤3	≤0.04 (as N)	
NO_3^- (mg/L)			≤ 50	≤10 (NO_3^--N + NO_2^--N)	
Phenol (mg/L)			—	≤0.005	
Residual Cl (mg/L)			0.2-0.5	—	
Al (mg/L)			≤ 0.2	≤0.2	
Pesticides (mg/L)			—	—	
Cd (mg/L)			0.01	≤0.003	
Cu (mg/L)			2	≤1.0	

Item (Unit)	Measured Value (Mean)	Measured Value (Maximum)	Local Standard	Japanese Standard	Remarks (Measurement point, frequency, method)
Cr (mg/L)			≤ 0.05	≤0.02 (Cr^{6+})	
Hg (mg/L)			≤ 0.001	≤0.0005	
Sb (mg/L)			≤ 0.005	—	
Ni (mg/L)			≤ 0.02	—	
Zn (mg/L)			5.0	≤1.0	
As (mg/L)			≤ 0.05	≤0.01	
Ba (mg/L)			0.7	—	
Mn (mg/L)			≤ 0.5	≤0.05	
B (mg/L)			0.3	≤1.0	
Pb (mg/L)			≤ 0.05	≤0.01	
Se (mg/L)			0.01	≤0.01	
Total Coliforms			0/100ml	≤100/1ml (Common bacteria)	
Faecal Coliforms			0/100ml	Not to be detected (E. Coli)	

3) Solid Waste

a) During Construction

Monitoring Item	Remarks
• Proper waste handling at disposal site and treatment plant • Cleaning of construction site by workers	Construction site and disposal site, Once/month, Physical observation (proper disposal, cleaning situation)

b) During Operation

Monitoring Item	Remarks
Proper removal and disposal of generated sludge	Water treatment plant, Once/month, Physical observation (status of sludge removal and disposal)

4) Soil Contamination: During Construction

Monitoring Item	Remarks
Proper storage and disposal of fuel, soil etc.	Construction site, Once/month, Physical observation (status of fuel and oil storage and disposal.)

5) Noise and Vibration: During Construction/During Operation

Item (Unit)	Measured Value (Mean)	Measured Value (Maximum)	Local Standard	Japanese Standard	Remarks (Measurement point, frequency, method)
Noise Level (dB)			<75	<85	During construction: Daytime industrial area surrounding construction site, Twice/year, Sound level meter During operation: Daytime industrial area surrounding water treatment plant. Every 6 months, Sound level meter

(2) Natural Environment

Hydrological Conditions: During Construction

Monitoring Item	Remarks
Water level near intake mouth	Around intake, Once/week, Water level measurement

(3) Social Environment

1) Local Economy (Livelihood, Employment, etc.): During Construction

Monitoring Item	Remarks
Efficient traffic regulation to reduce impact on local economy	Around construction site, Once/week, Inquiries to relevant persons (residents, local businesses, shop owners, etc.) and physical observation (conducting of traffic control and installation of signboards)
Economic impact on shops and offices due to reduced access due to the construction	Around construction site, Once/week, Inquiries to relevant persons (residents, local businesses, shop owners, etc.) and physical observation (existence of temporary closure of shops and offices)

2) Water Use and Water Rights

a) During Construction

Monitoring Item	Remarks
Fluctuations in water quantity and quality in canal due to the construction of intake facility	Canal downstream the intake of WTP Once/week, Inquiries to relevant person and physical observation (fluctuation in water quantity and quality in canal)

b) During Operation

Monitoring Item	Remarks
Changes in amounts of irrigation water to downstream agricultural lands especially during drought periods	Agricultural lands downstream the intake of WTP, Quarterly, Physical observation and inquiries to the Irrigation Department (change in amount of irrigation water)

3) Existing Social Infrastructures and Social Services: During Construction

Monitoring Item	Remarks
Traffic obstacles and reduced access to existing infrastructures	Around construction site, Once/week, Inquiries to relevant persons and physical observation (existence of traffic obstacles and reduced access to existing infrastructure)

4) Landscape: During Construction

Monitoring Item	Remarks
Changes in landscape around construction site	Around construction site, Once/month, Physical observation (change in landscape)

5) Infectious Diseases such as HIV/AIDS : During Construction

Monitoring Item	Remarks
Implementation of guidance on prevention of infectious diseases	In the construction site, Once/month, Physical observation (execution status of guidance)

6) Working Conditions: During Construction

Monitoring Item	Remarks
Execution of occupational safety and health guidance and periodic safety meetings	In the construction site, Once/week, Physical observation (execution status of guidance and meetings) and reports on workshops and safety meetings

7) Accidents: During Construction

Monitoring Item	Remarks
Installation of safety mesaures such as fences and warning signs	Around construction site, Once/week, Inquiries to relevant persons and physical observation (Installation of safety measures)

8) The Poor: During Operation

Monitoring Item	Remarks
Impact from water tariff system to household economy of poverty group	In the project site, Every 6 months, Inquiries to relevant persons (impact from water tariff system to the poverty group)

Monitoring sheet on price of specified materials

1. Initial Conditions (Confirmed)

	Items of Specified Materials	Initial Volume A	Initial Unit Price (¥) B	Initial total Price C=A×B	1% of Contract Price D	Condition of payment	
						Price (Decreased) E=C－D	Price (Increased) F=C＋D
1	Item 1	●●t	●	●	●	●	●
2	Item 2	●●t	●	●	●		
3	Item 3						
4	Item 4						
5	Item 5						

2. Monitoring of the Unit Price of Specified Materials

(1) Method of Monitoring : ●●

(2) Result of the Monitoring Survey on Unit Price for each specified materials

	Items of Specified Materials	1st ●month, 2015	2nd ●month, 2015	3rd ●month, 2015	4th	5th	6th
1	Item 1						
2	Item 2						
3	Item 3						
4	Item 4						
5	Item 5						

(3) Summary of Discussion with Contractor (if necessary)

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Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)
（Actual Expenditure by Construction and Equipment each）

	Domestic Procurement (Recipient Country) A	Foreign Procurement (Japan) B	Foreign Procurement (Third Countries) C	Total D
Construction Cost	(A/D%)	(B/D%)	(C/D%)	
Direct Construction Cost	(A/D%)	(B/D%)	(C/D%)	
others	(A/D%)	(B/D%)	(C/D%)	
Equipment Cost	(A/D%)	(B/D%)	(C/D%)	
Design and Supervision Cost	(A/D%)	(B/D%)	(C/D%)	
Total	(A/D%)	(B/D%)	(C/D%)	

Appendix 7
References

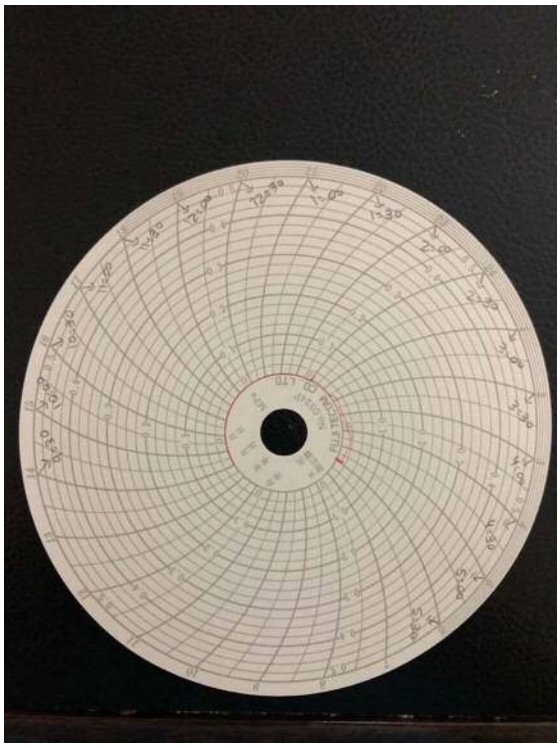
Appendix7 References
(1) Water Pressure Records on Water Service Pipes

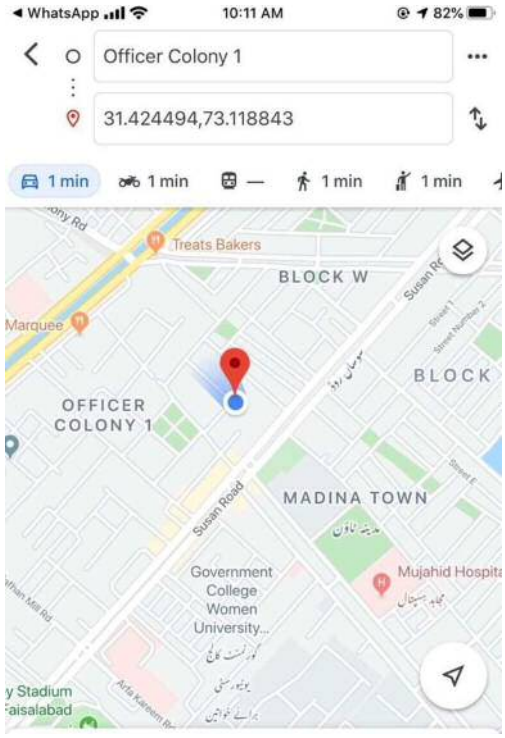
Water Pressure Records on Water Servise Pipes

One day for each point from Oct 2019 to Mar 2020

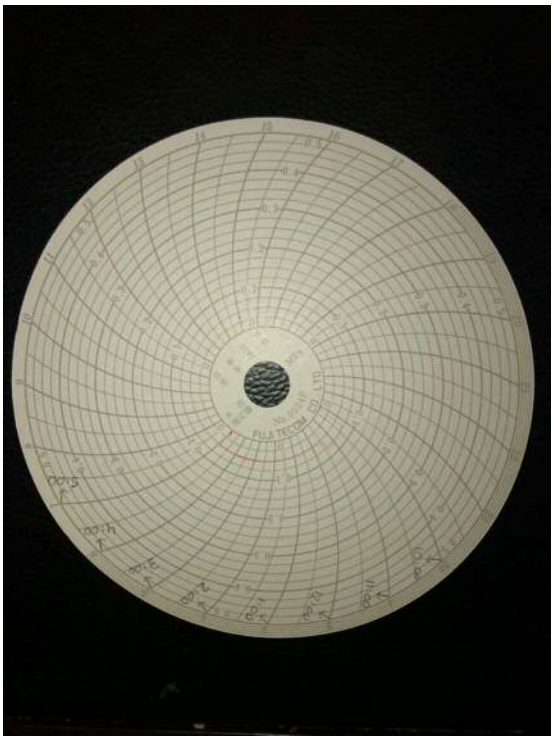
Sr#	DMA	Measuring Time			Pressure (bar)		Supply Time	
		Date	From	To	Lower	Ave/Upper	A.M.	P.M.
1	DMA-II-1	22-1-2020	9:30 AM	5:30 PM	0.15	0.24	5:30 to 7:30	4:30 to 6:30
2	DMA-II-1	11-2-2020	10:00 AM	5:00 PM	0.50	0.77	5:30 to 7:30	4:30 to 6:30
3	DMA-II-1	12-2-2020	10:00 AM	5:00 PM	0.10	0.20	5:30 to 7:30	4:30 to 6:30
4	DMA-II-1	13-2-2020	11:50 AM	5:00 PM	0.12	0.12	5:30 to 7:30	4:30 to 6:30
5	DMA-II-1	17-2-2020	10:00 AM	5:00 PM	0.00	0.00	5:30 to 7:30	4:30 to 6:30
6	DMA-II-1	18-2-2020	10:30 AM	5:00 PM	0.10	0.40	5:30 to 7:30	4:30 to 6:30
7	DMA-II-2	19-2-2020	10:20 AM	5:00 PM	-	0.10	5:30 to 7:30	4:30 to 6:30
8	DMA-II-2	21-1-2020	10:20 AM	5:30 PM	-	0.25	5:30 to 7:30	4:30 to 6:30
9	DMA-II-2	4-2-2020	10:25 AM	5:00 PM	-	0.00	5:30 to 7:30	4:30 to 6:30
10	DMA-II-2	5-2-2020	10:00 AM	5:00 PM	0.23	0.38	Tube well timing	
11	DMA-II-2	21-10-2019	10:15 AM	5:45 PM	0.00	0.23	-	4:00 to 6:00
12	DMA-II-2	10-2-2020	10:20 AM	5:30 PM	-	0.00	5:30 to 7:30	4:30 to 6:30
13	DMA-II-3	23-1-2020	9:30 AM	6:30 PM	0.15	0.24	5:30 to 7:30	4:30 to 6:30
14	DMA-II-3	27-1-2020	9:40 AM	5:45 PM	0.00	0.14	5:30 to 7:30	4:30 to 6:30
15	DMA-II-3	28-1-2020	11:10 AM	5:00 PM	-	0.00	5:30 to 7:30	4:30 to 6:30
16	DMA-II-3	29-1-2020	10:00 AM	5:10 PM	-	0.00	5:30 to 7:30	4:30 to 6:30
17	DMA-II-3	30-1-2020	10:00 AM	5:30 PM	-	0.20	5:30 to 7:30	4:30 to 6:30
18	DMA-II-3	3-2-2020	9:45 AM	5:00 PM	-	0.18	5:30 to 7:30	4:30 to 6:30
19	DMA-II-4	25-2-2020	10:10 AM	5:00 PM	-	0.00	5:30 to 7:30	4:30 to 6:30
20	DMA-II-4	24-2-2020	10:10 AM	5:00 PM	0.00	0.10	5:30 to 7:30	4:30 to 6:30
21	DMA-II-4	20-2-2020	10:20 AM	5:00 PM	-	0.10	5:30 to 7:30	4:30 to 6:30
22	DMA-II-4	30-10-2019	9:45 AM	5:15 PM	0.00	0.27	-	4:00 to 6:00
23	DMA-II-4	4-11-2019	10:00 AM	5:00 PM	0.06	0.10	-	4:00 to 6:00
24	DMA-II-4	6-11-2019	10:00 AM	5:30 PM	0.00	0.03	-	4:00 to 6:00
25	DMA-I-1	22-10-2019	9:30 AM	5:30 PM	0.20	0.23	-	4:00 to 6:00
26	DMA-I-1	3-3-2020	10:20 AM	5:00 PM	0.14	0.30	5:30 to 7:30	4:30 to 6:30
27	DMA-I-1	2-3-2020	10:00 AM	5:00 PM	-	0.10	5:30 to 7:30	4:30 to 6:30
28	DMA-I-1	27-2-2020	10:20 AM	5:00 PM	0.20	0.50	5:30 to 7:30	4:30 to 6:30
29	DMA-I-1	26-2-2020	10:25 AM	5:00 PM	-	0.12	5:30 to 7:30	4:30 to 6:30
30	DMA-I-1	24-10-2019	10:00 AM	5:30 PM	-	0.22	-	4:30 to 6:30
31	DMA-I-2	29-10-2019	9:30 AM	5:30 PM	0.00	0.03	-	4:00 to 6:00
32	DMA-I-2	9-3-2020	10:15 AM	5:00 PM	-	0.12	5:30 to 7:30	4:30 to 6:30
33	DMA-I-2	5-3-2020	10:15 AM	5:00 PM	-	0.00	5:30 to 7:30	4:30 to 6:30
34	DMA-I-2	4-3-2020	10:20 AM	5:00 PM	0.10	0.30	5:30 to 7:30	4:30 to 6:30
35	DMA-I-2	31-10-2019	10:00 AM	5:15 PM	0.00	0.10	-	4:00 to 6:00
36	DMA-I-2	5-11-2019	10:00 AM	5:30 PM	0.00	0.08	-	4:30 to 6:30
				min	0.00	0.00		
				ave	0.10	0.17		
				max	0.50	0.77		

1 22-1-2020 (Consumer Comments: low pressure problems, use pumps for fill up tanks)

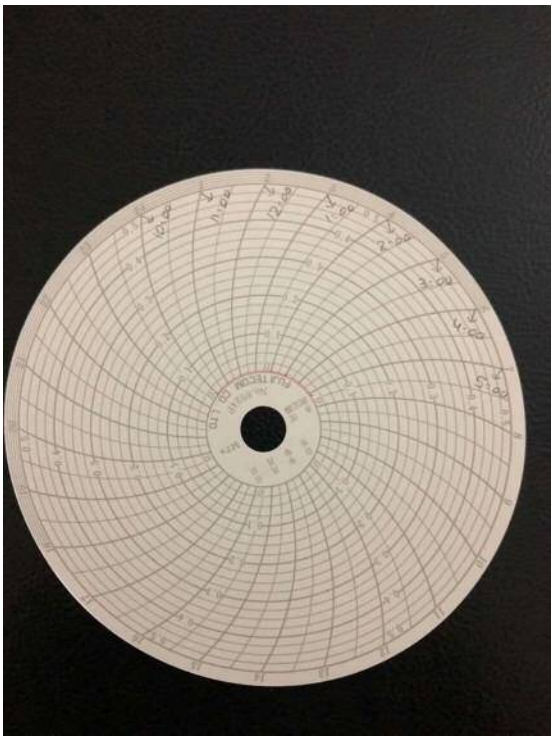


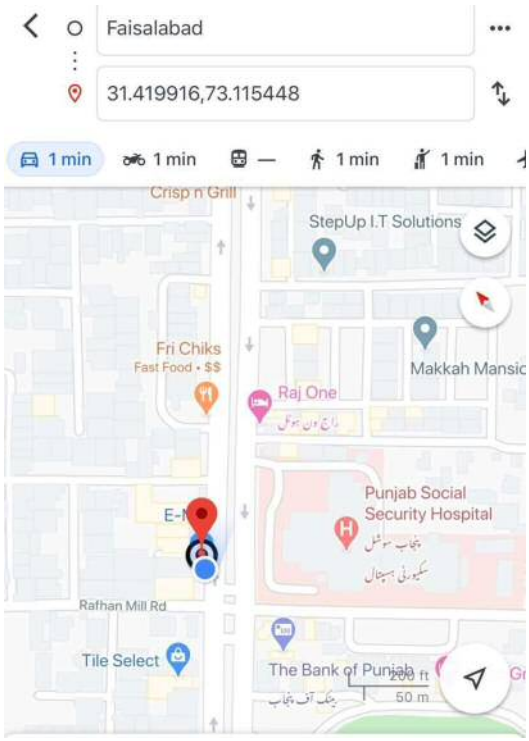


2 11-2-2020 (Consumer Comments: Water pressure good due to water supply from tubewells)

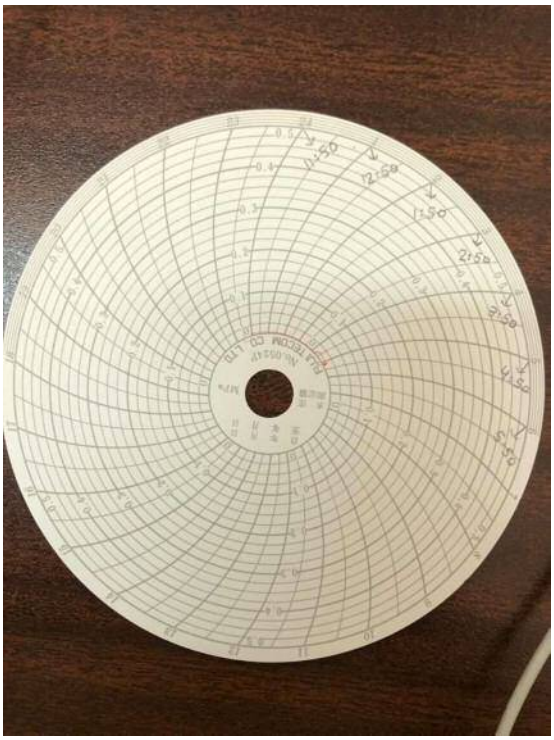


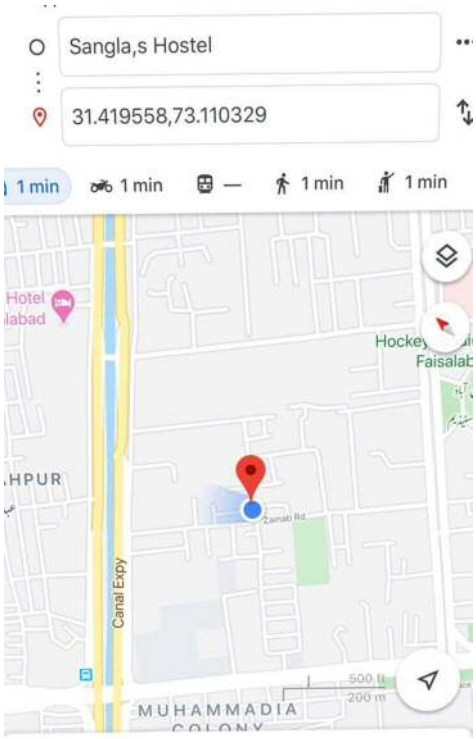
3 12-2-2020 (Consumer Comments: Water pressure low)



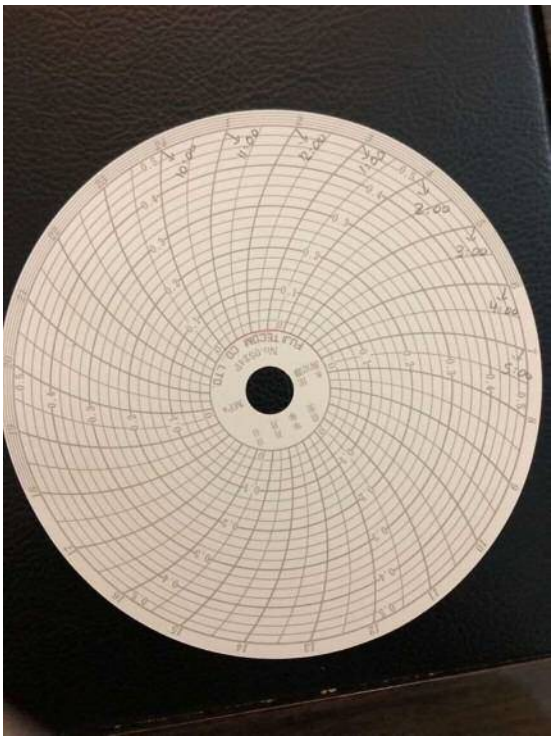


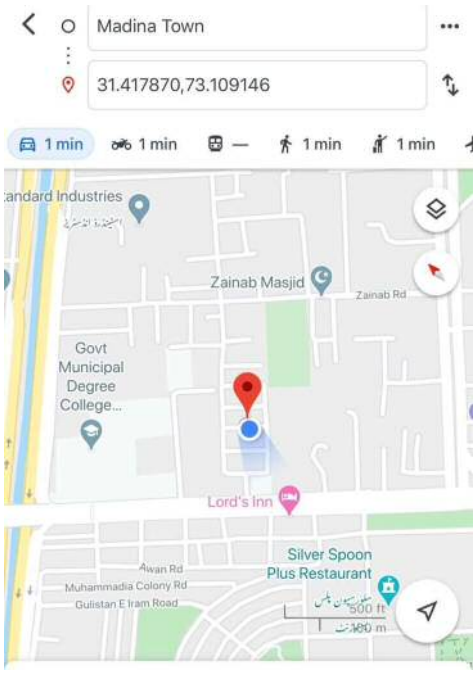
4 13-2-2020 (Consumer Comments: Water pressure low)

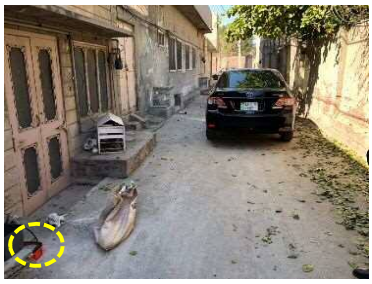




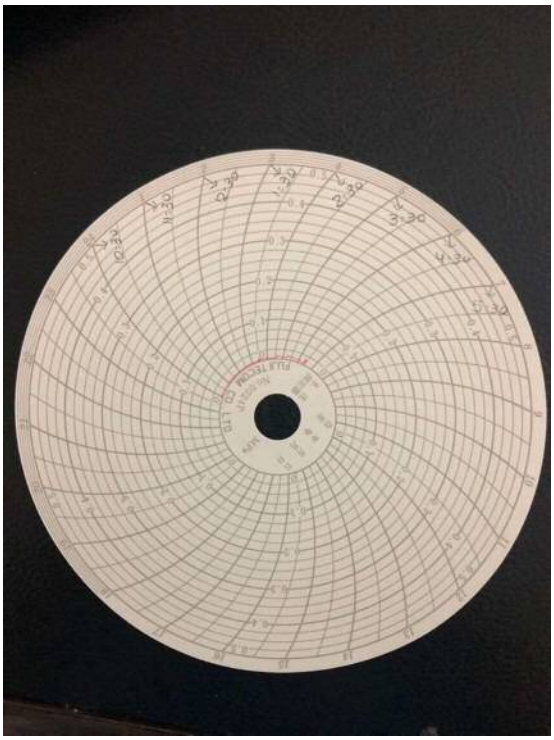
5 17-2-2020 (Consumer Comments: Water pressure too low, consumers not using water due to low pressure)



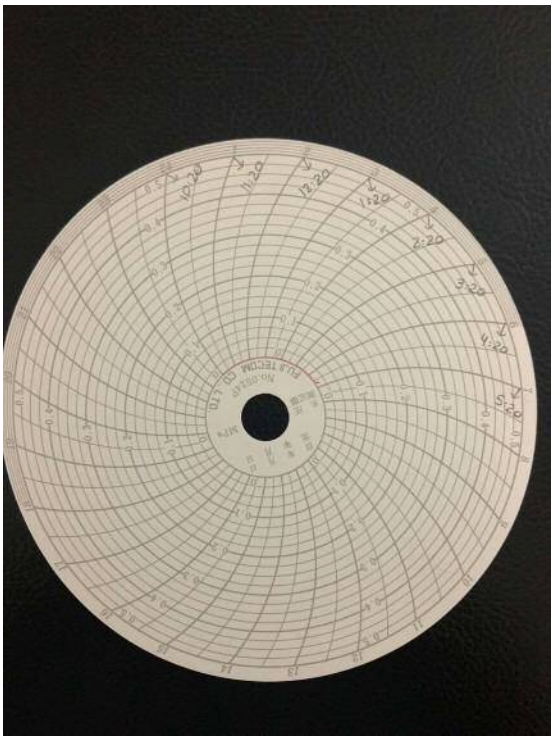




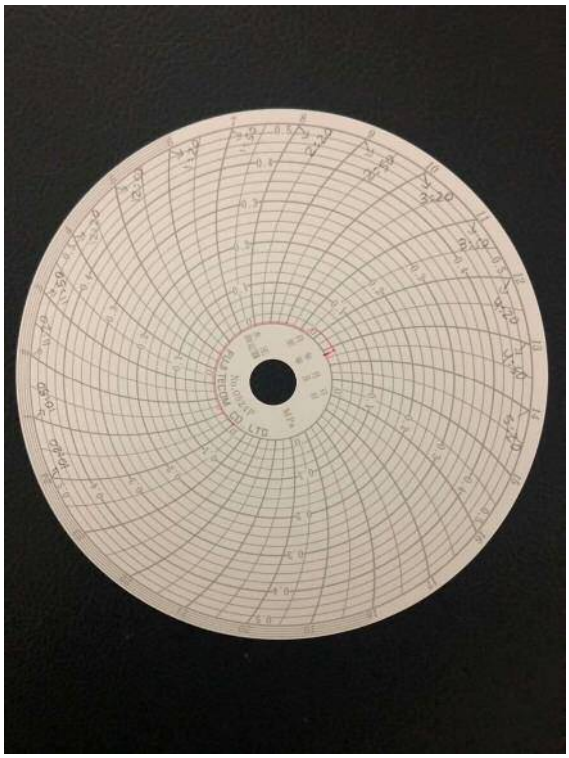
6 18-2-2020 (Consumer Comments: Water pressure too low, Consumers not satisfy with pressure)



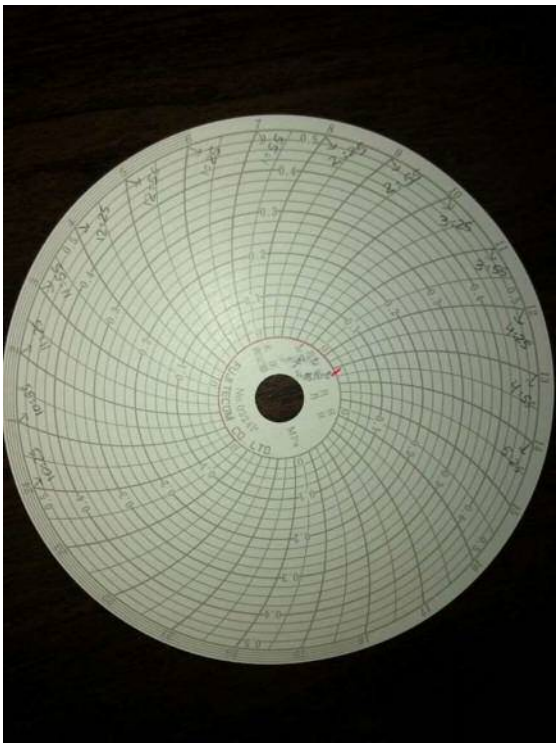
7 19-2-2020 (Consumer Comments: Poor water pressure)

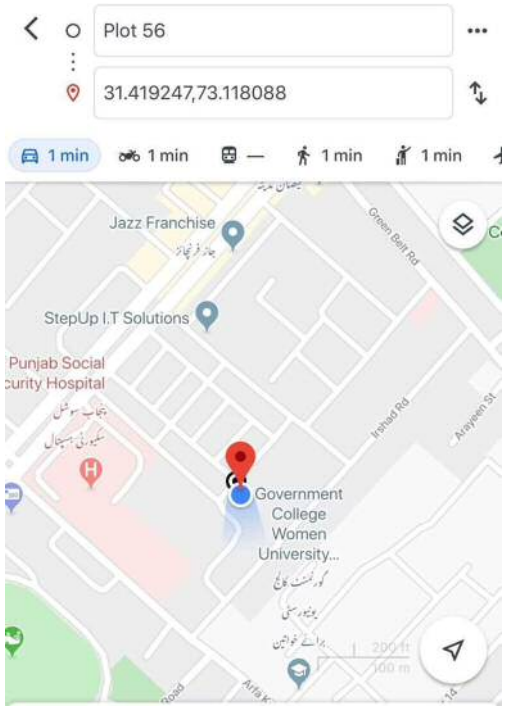


8 21-1-2020 (Consumer Comments: (pressure is not good)



9 4-2-2020 (Consumer Comments: very low pressure)





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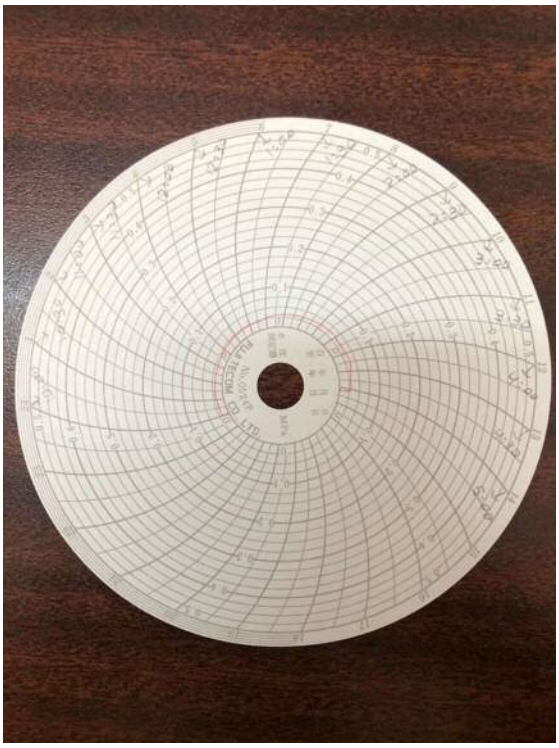
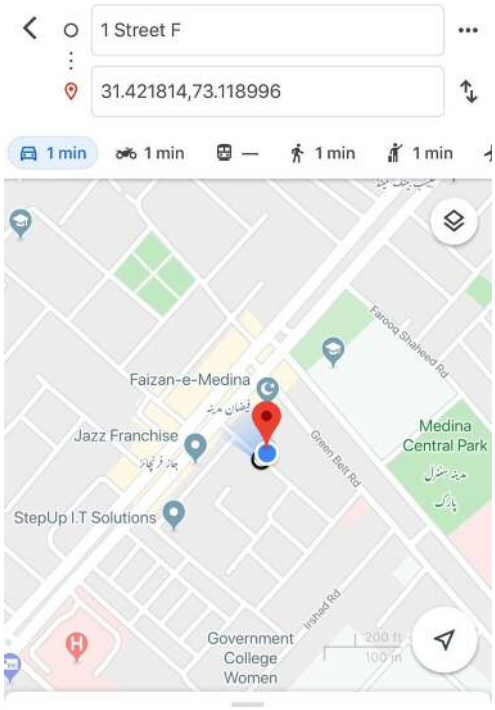
10 5-2-2020 (Consumer Comments: pressure is good due to direct supply from tube wells of 8" line)





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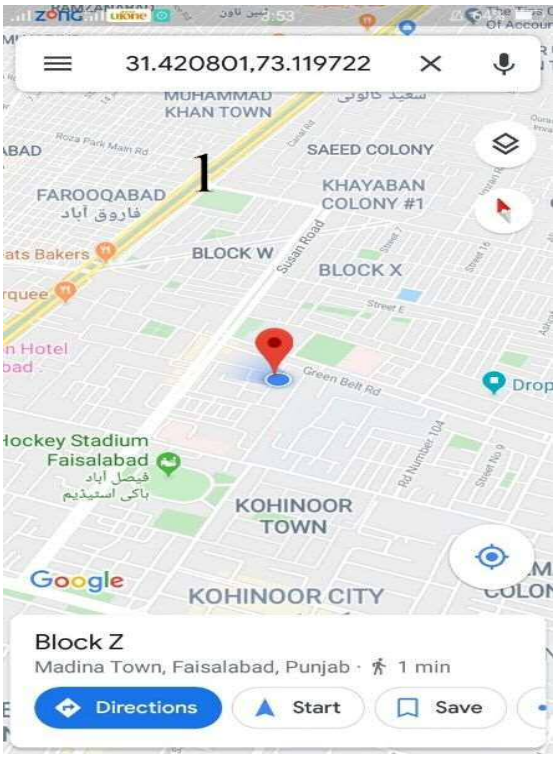
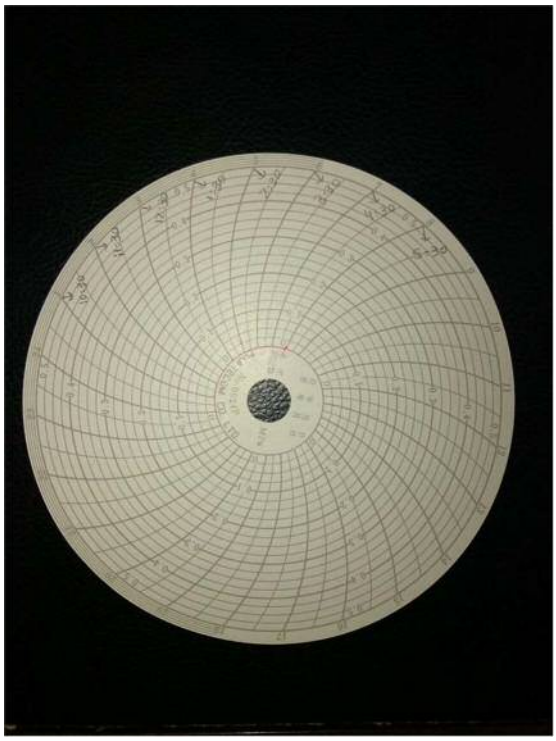
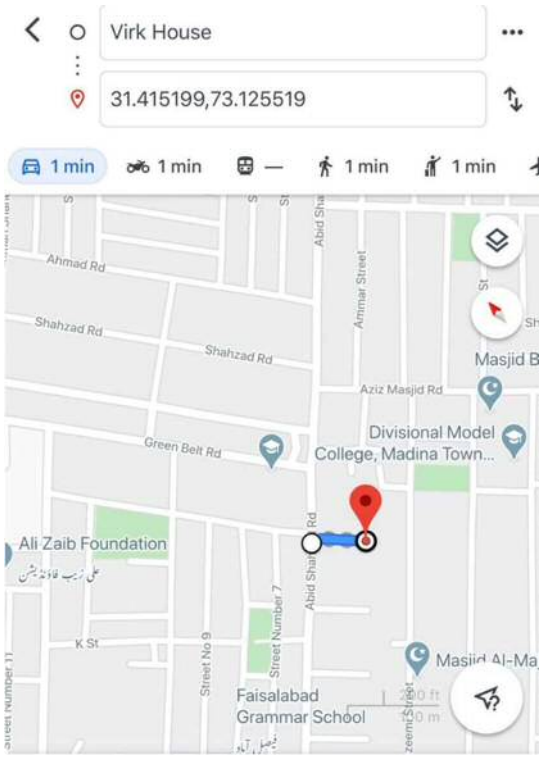
11 21-10-2019(Consumer Comments: low pressure problems)

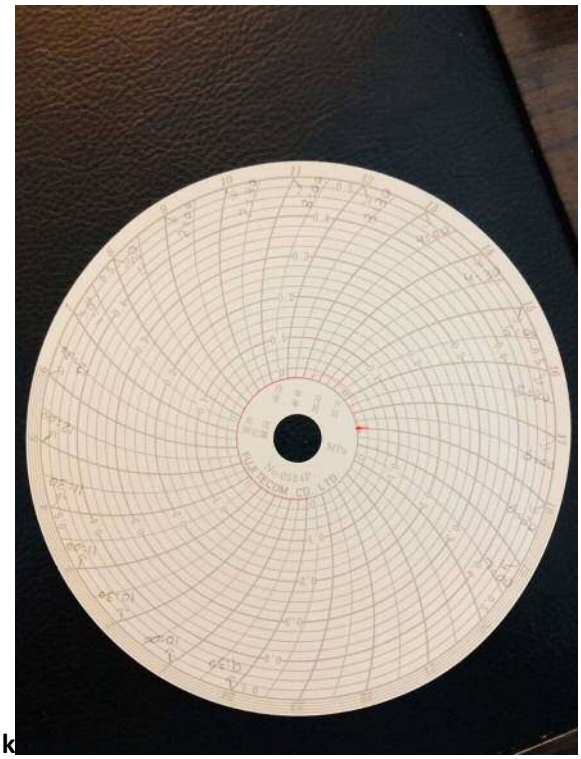


12 10-2-2020 (Consumer Comments: Water pressure very low)





13 23-1-2020 (Consumer Comments: low pressure problems, use pumps)



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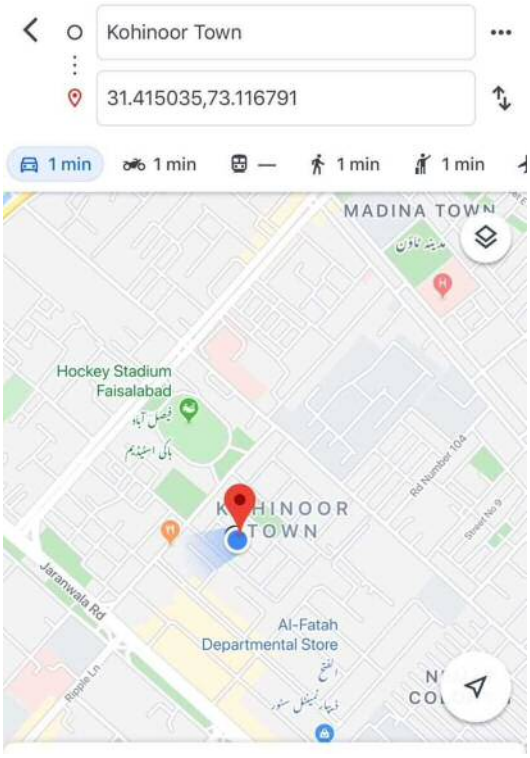
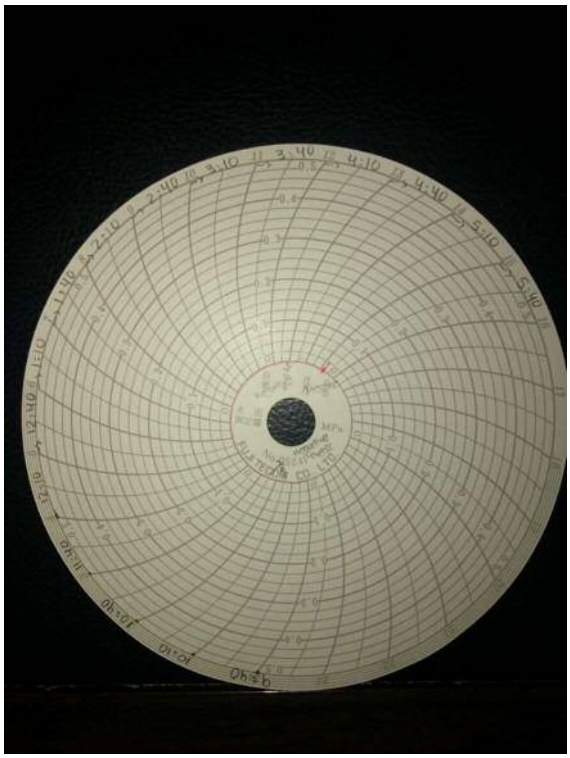
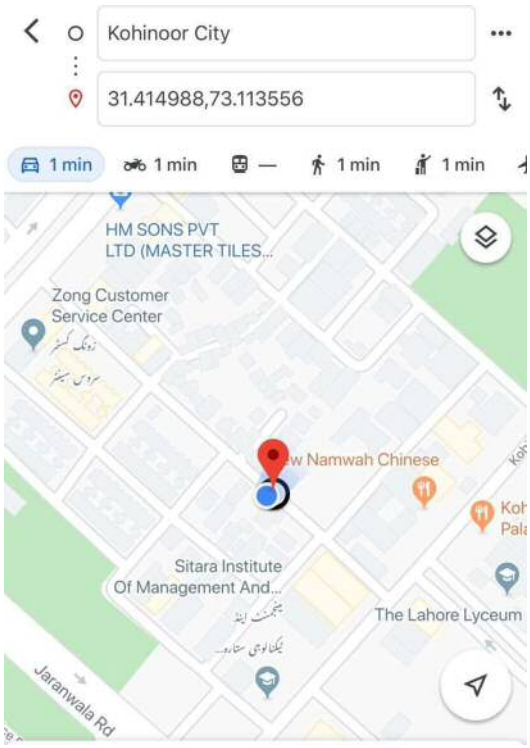
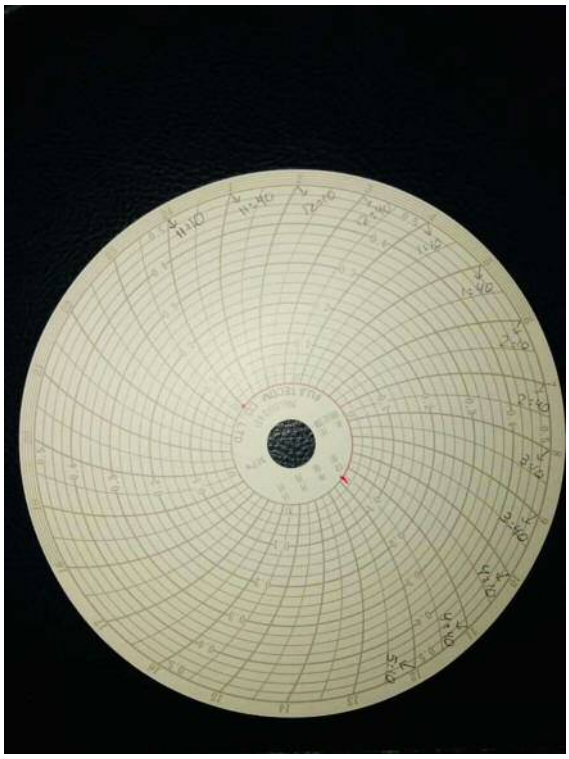


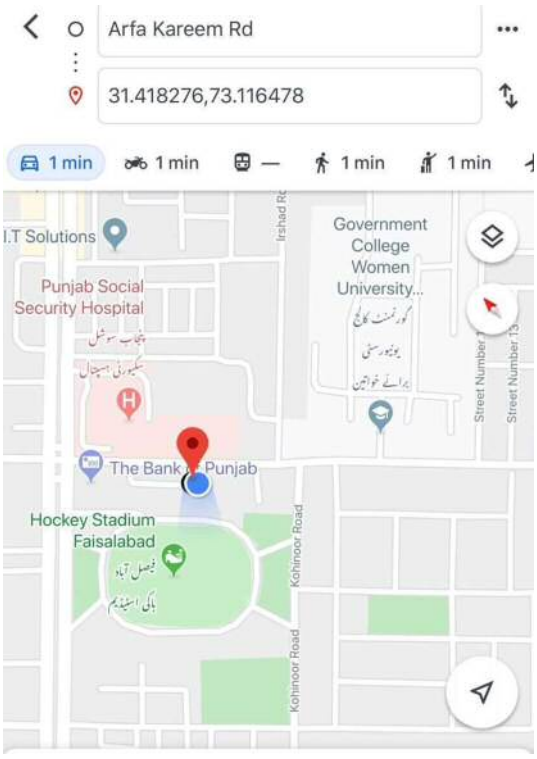
14 27-1-2020 (Consumer Comments: Pressure is not good)

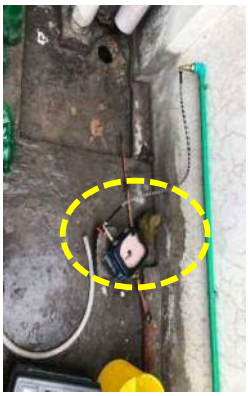




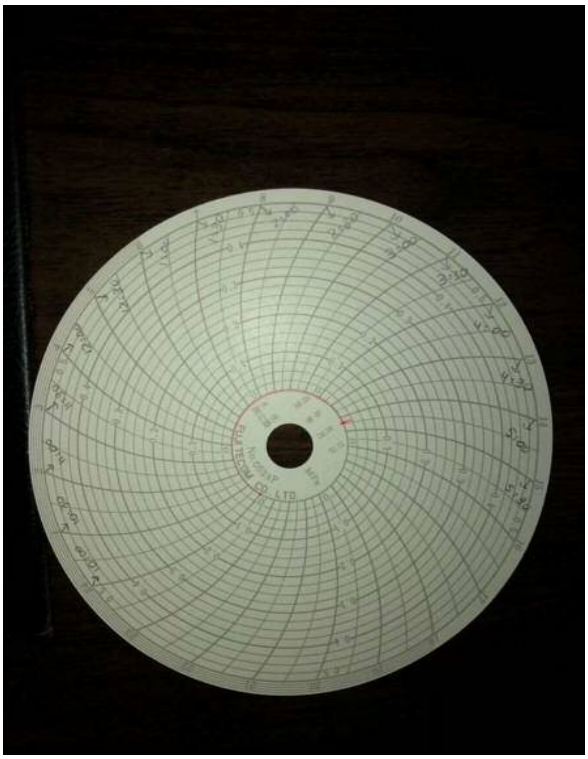
15 28-1-2020 (Consumer Comments: very low pressure)



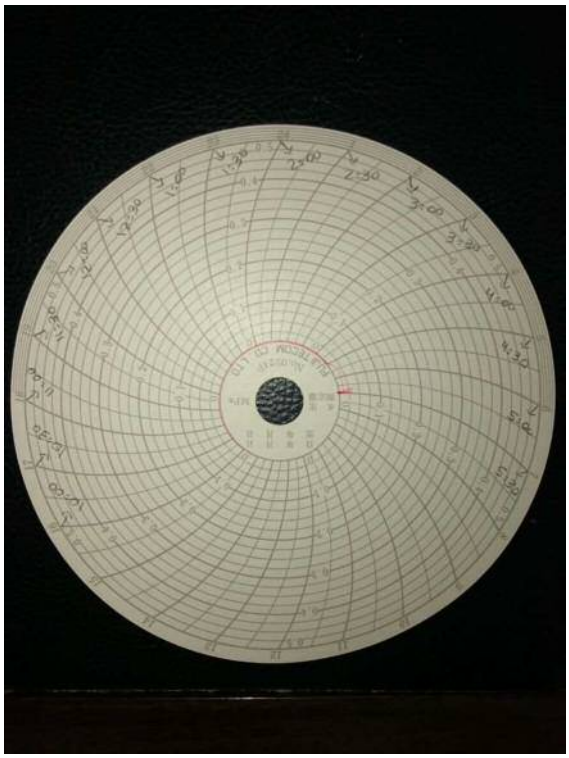


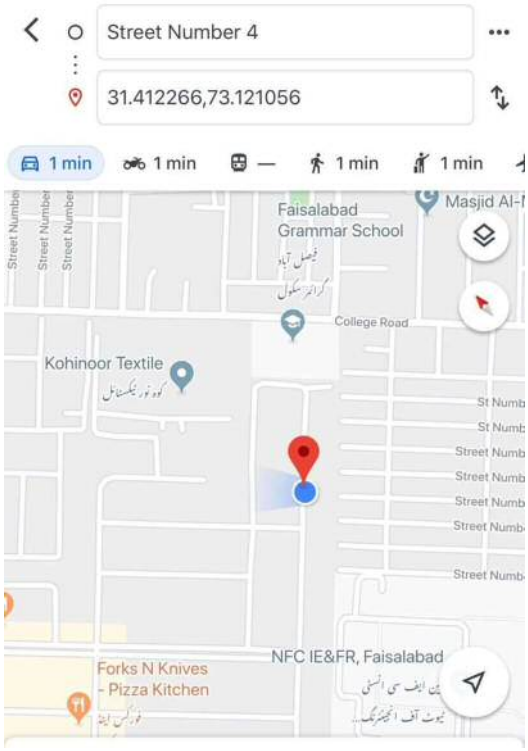


16 29-1-2020 (Consumer Comments: very low pressure)

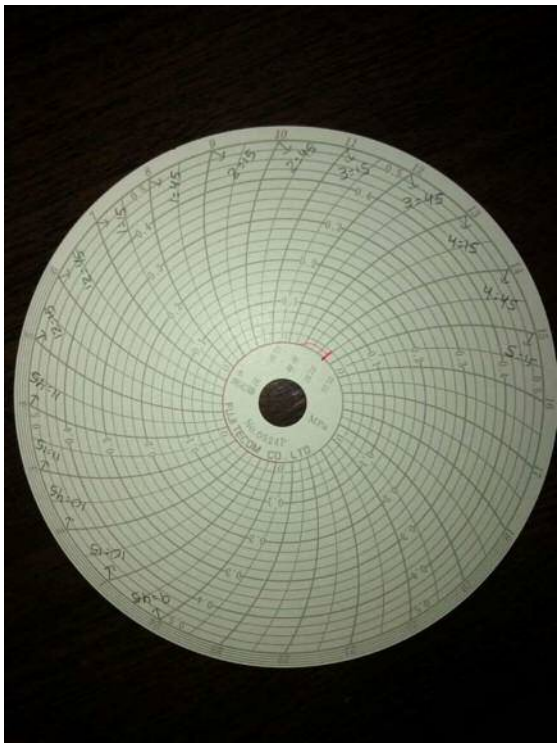


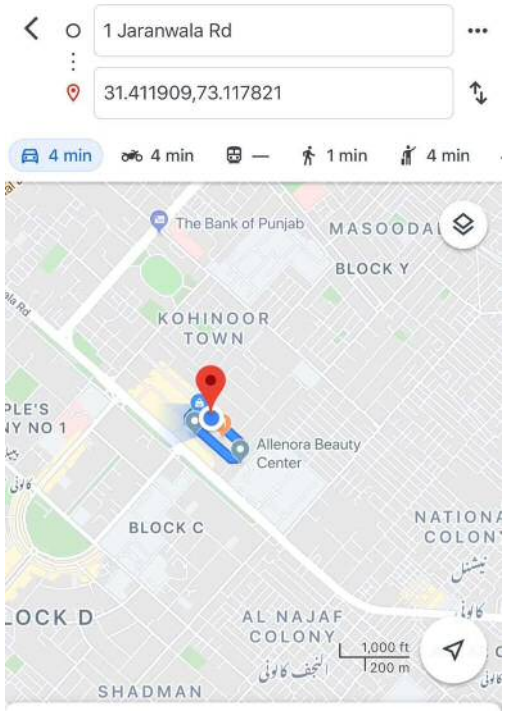
17 30-1-2020 (Consumer Comments: (pressure is not good)



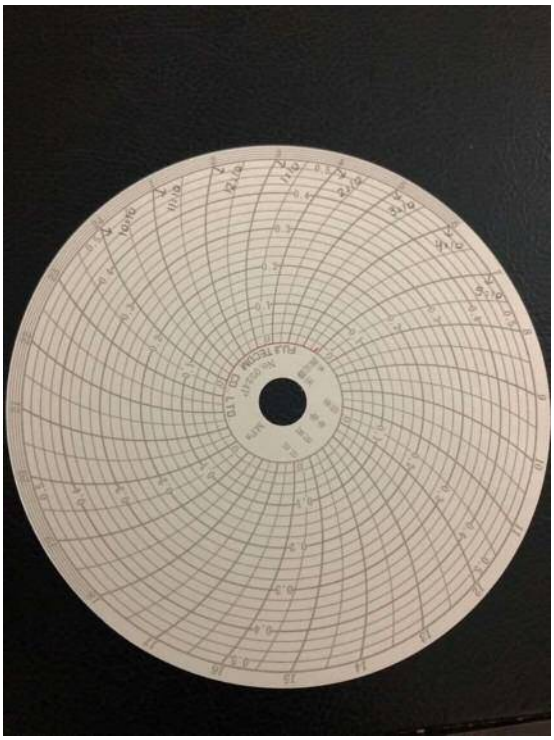


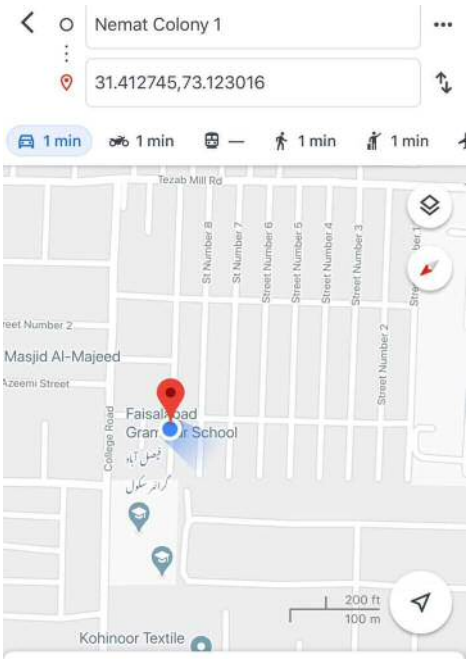
18 3-2-2020 (Consumer Comments: low pressure problems, use pumps for fill up tanks)



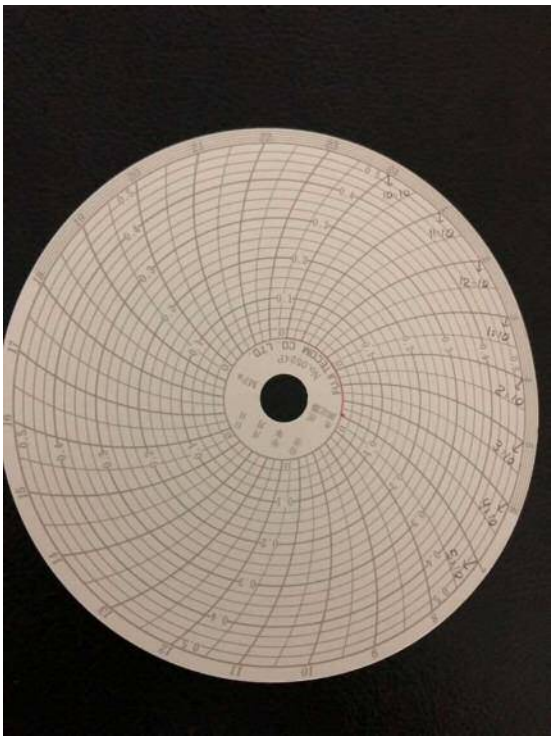


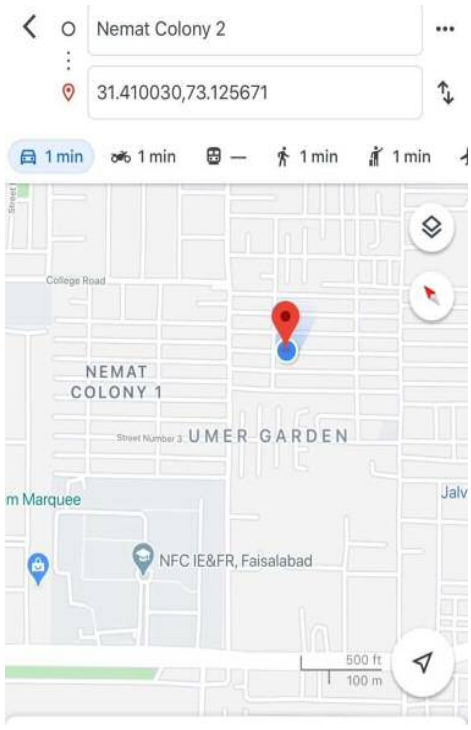
19 25-2-2020 (Consumer Comments: Poor water pressure, not using water due to very low pressure)



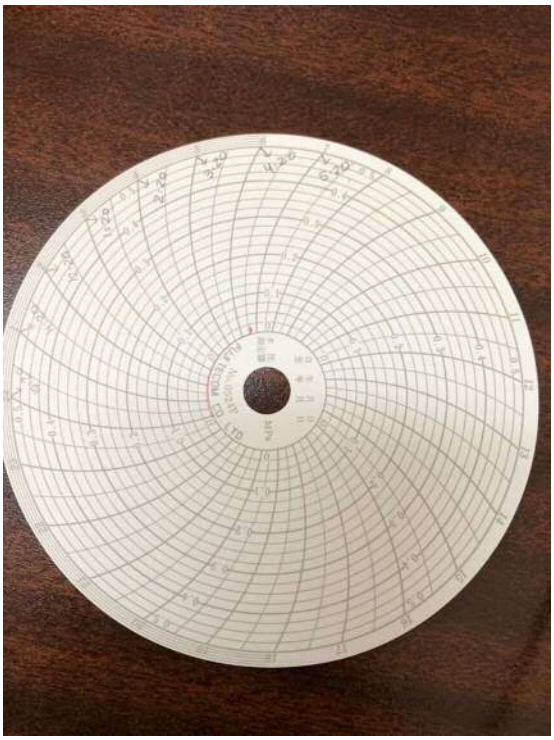


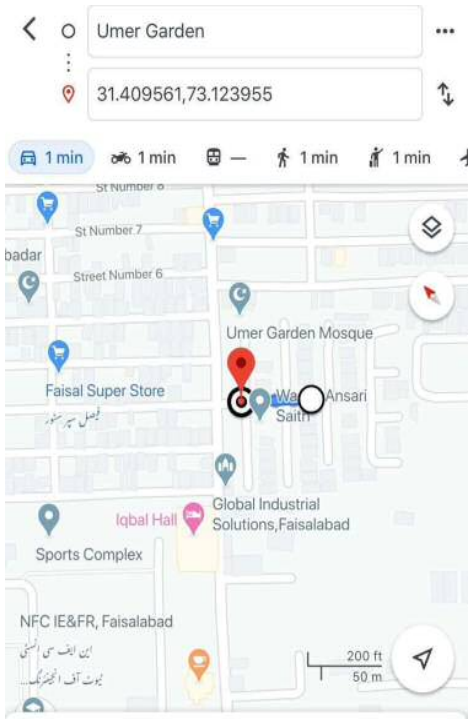
20 24-2-2020 (Consumer Comments: Poor water pressure)



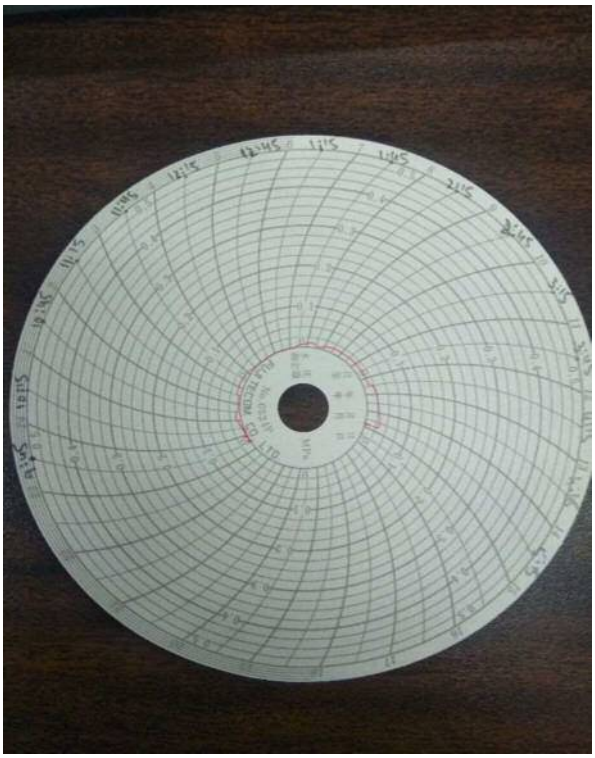


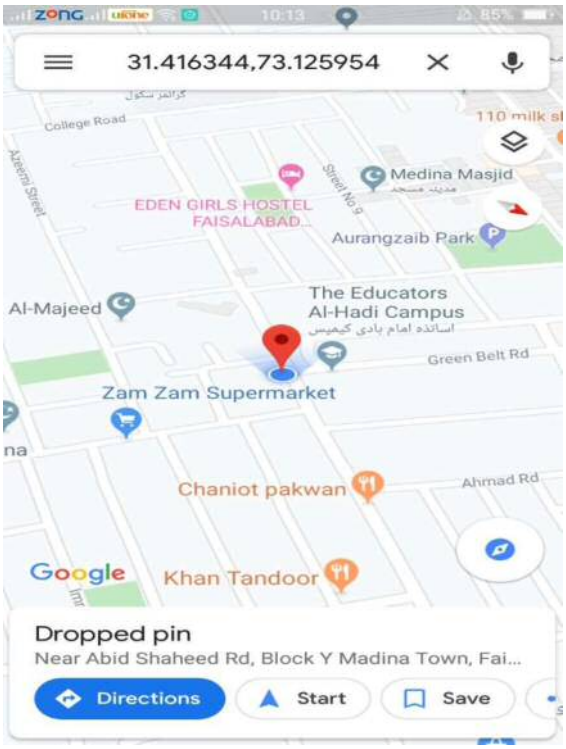
21 20-2-2020 (Consumer Comments: Poor water pressure)



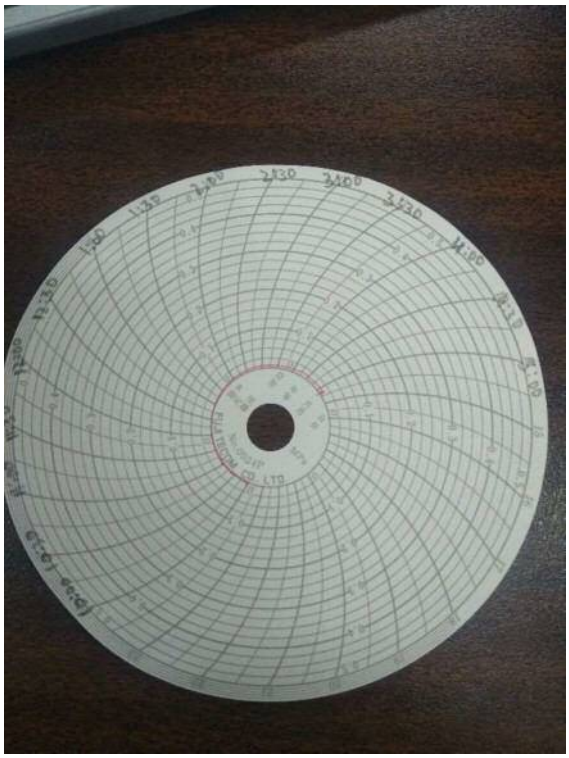


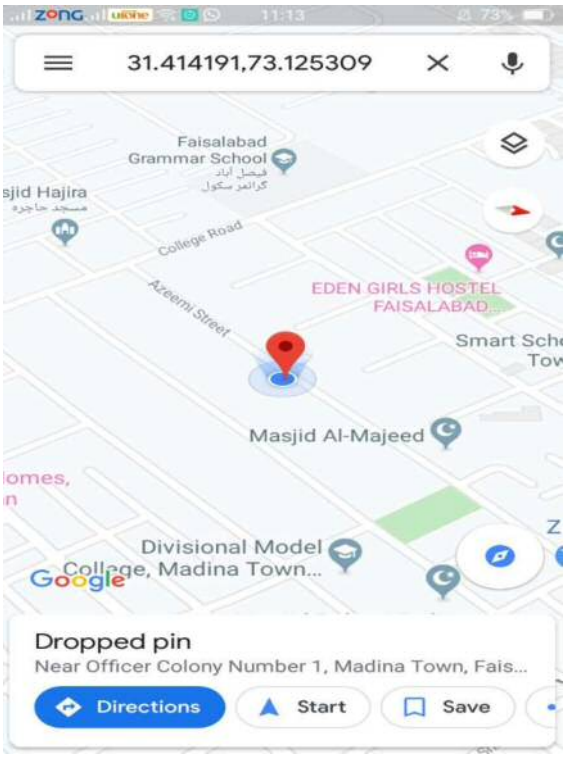
22 30-10-2019(Consumer Comments: Pressure is satisfying due to nearest point of Main Line)



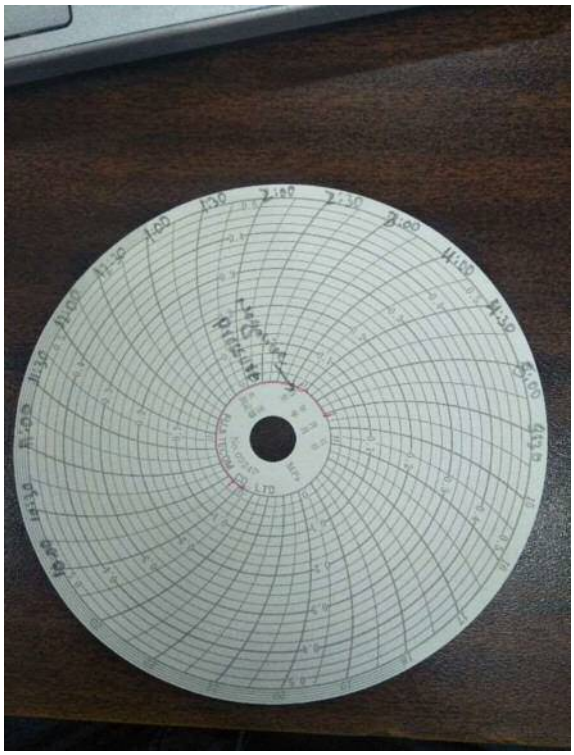


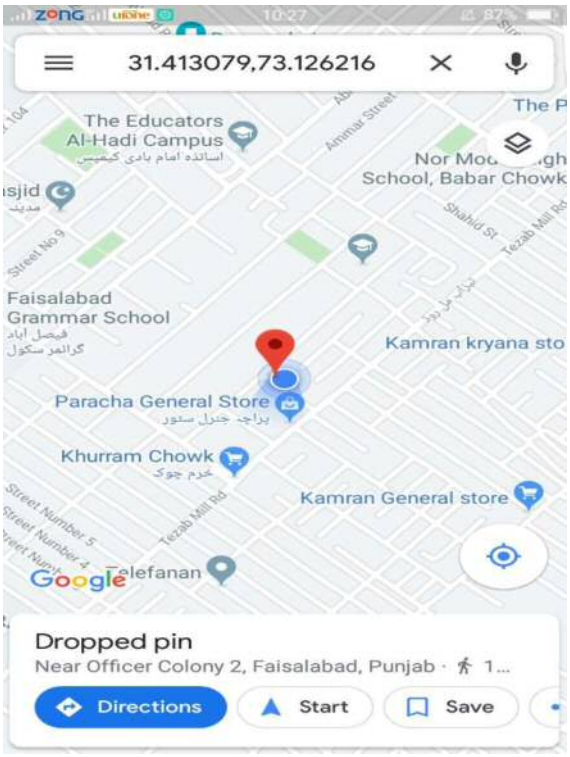
23 4-11-2019(Consumer Comments: Very low pressure)



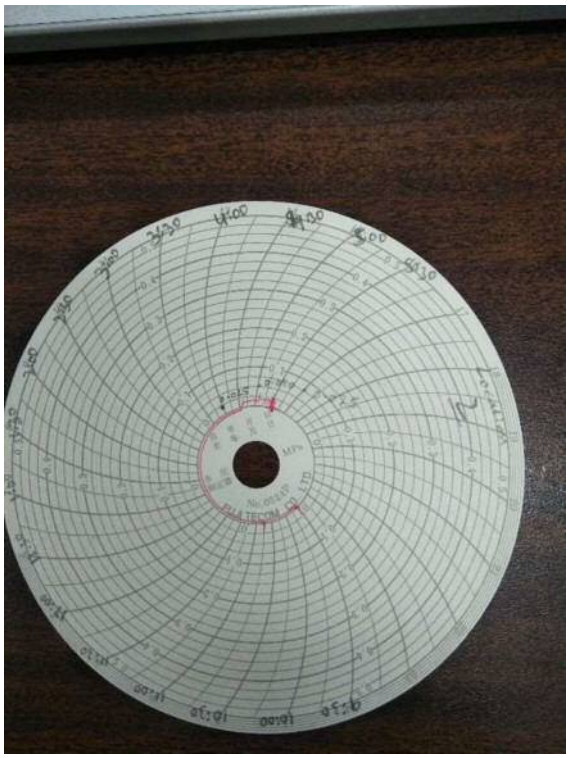


24 6-11-2019(Consumer Comments: Very low pressure)

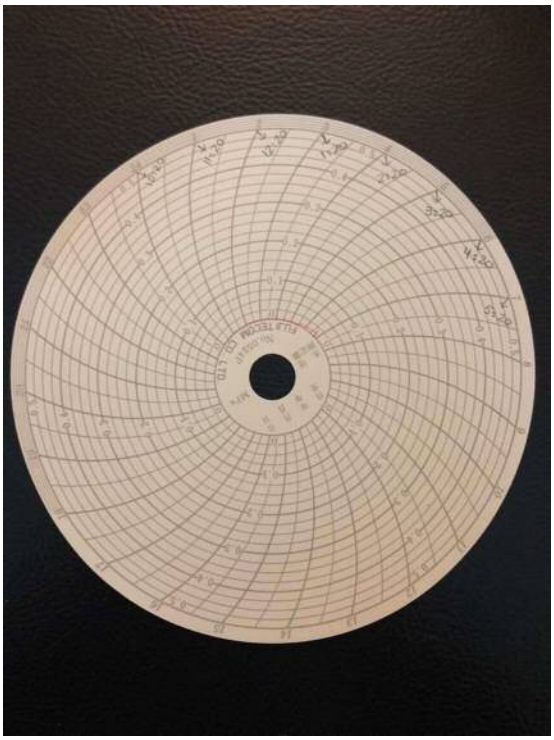


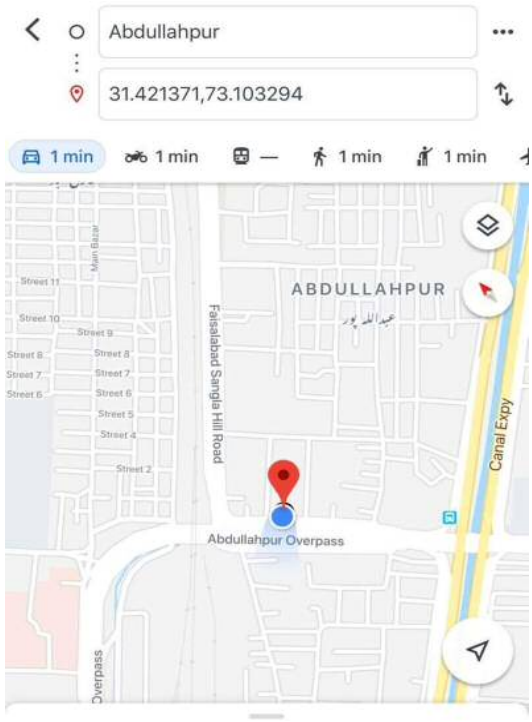


25 22-10-2019(Consumer Comments: Pressure is very low)

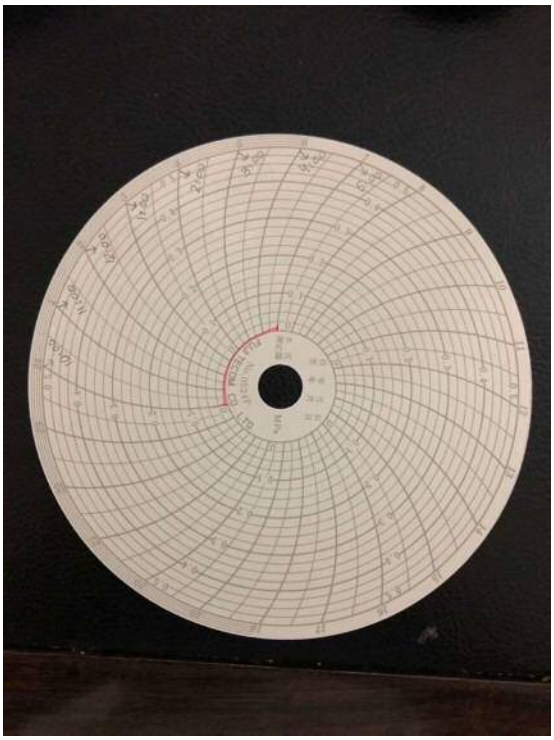


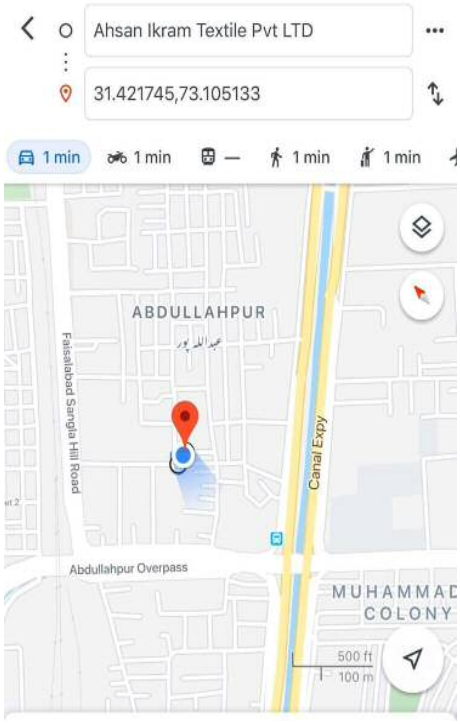
26 3-3-2020 (Consumer Comments: low water pressure, use without motor)

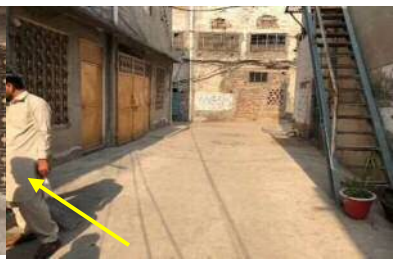




27 2-3-2020 (Consumer Comments: low water pressure, mixing of sewerage water complain)







28 27-2-2020 (Consumer Comments: low water pressure, use water by pumping)