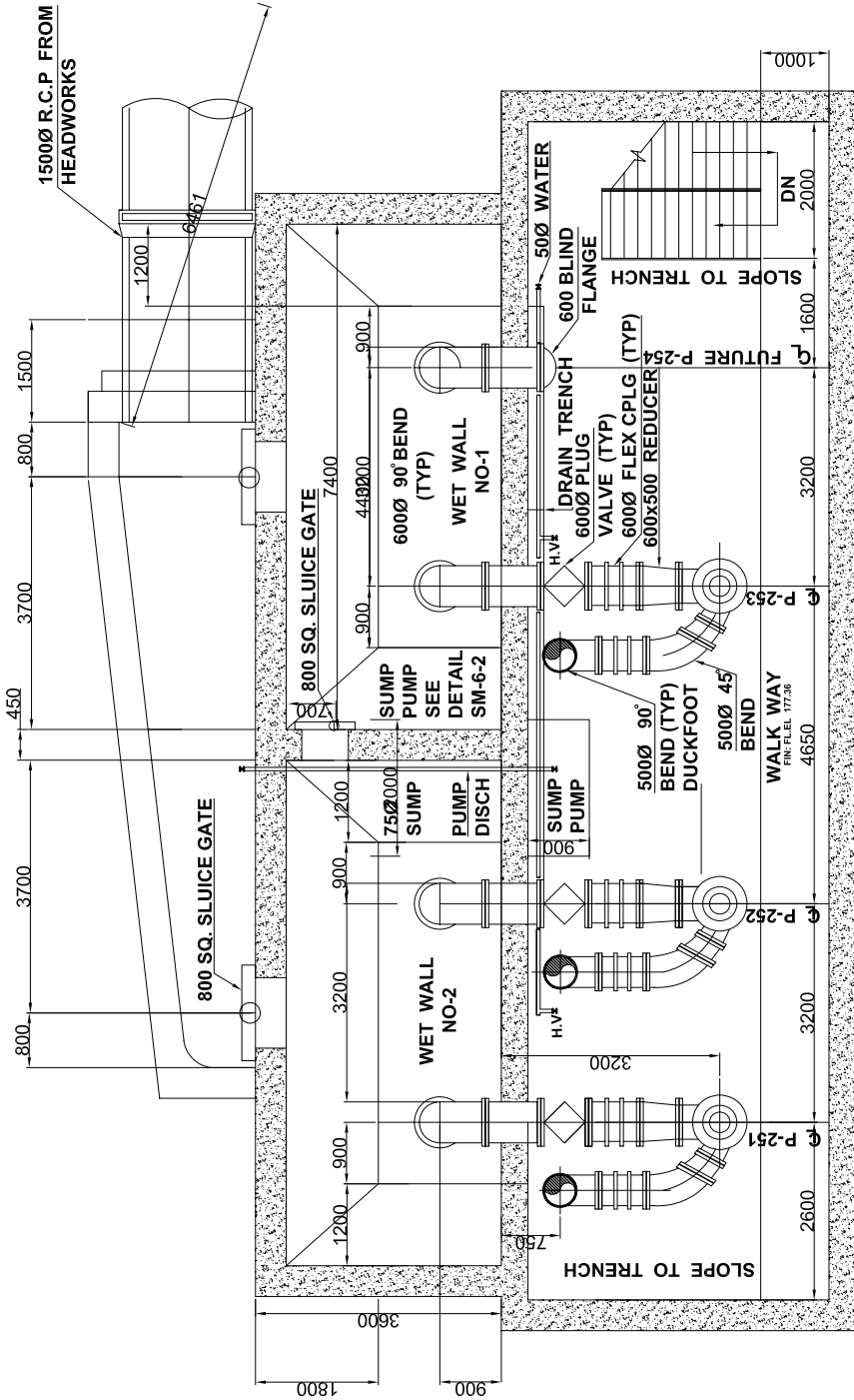


PROJECT NAME	THE PROJECT FOR UPGRADING OF MECHANICAL SYSTEM OF WASA FAISALABAD		
DRAWING TITLE	PS-30 MOTOR ROOM PLAN		
DRAWN DATE	-	NO	DRAWING NO.
SCALE	-	-	-
CONSULTANT	JAPAN TECHNO		
OWNER	JICA / JAPAN TECHNO CO., LTD.		

MOTOR ROOM PLAN

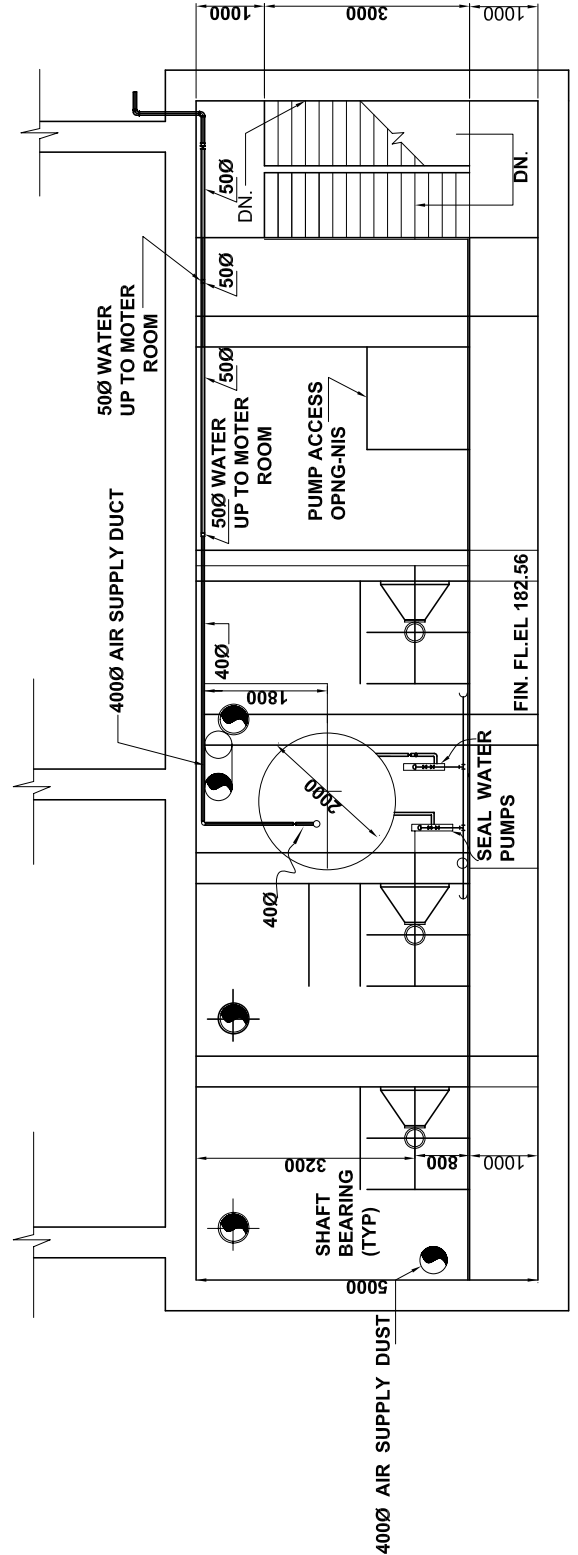
PUMP ROOM PLAN

EL. 178.00

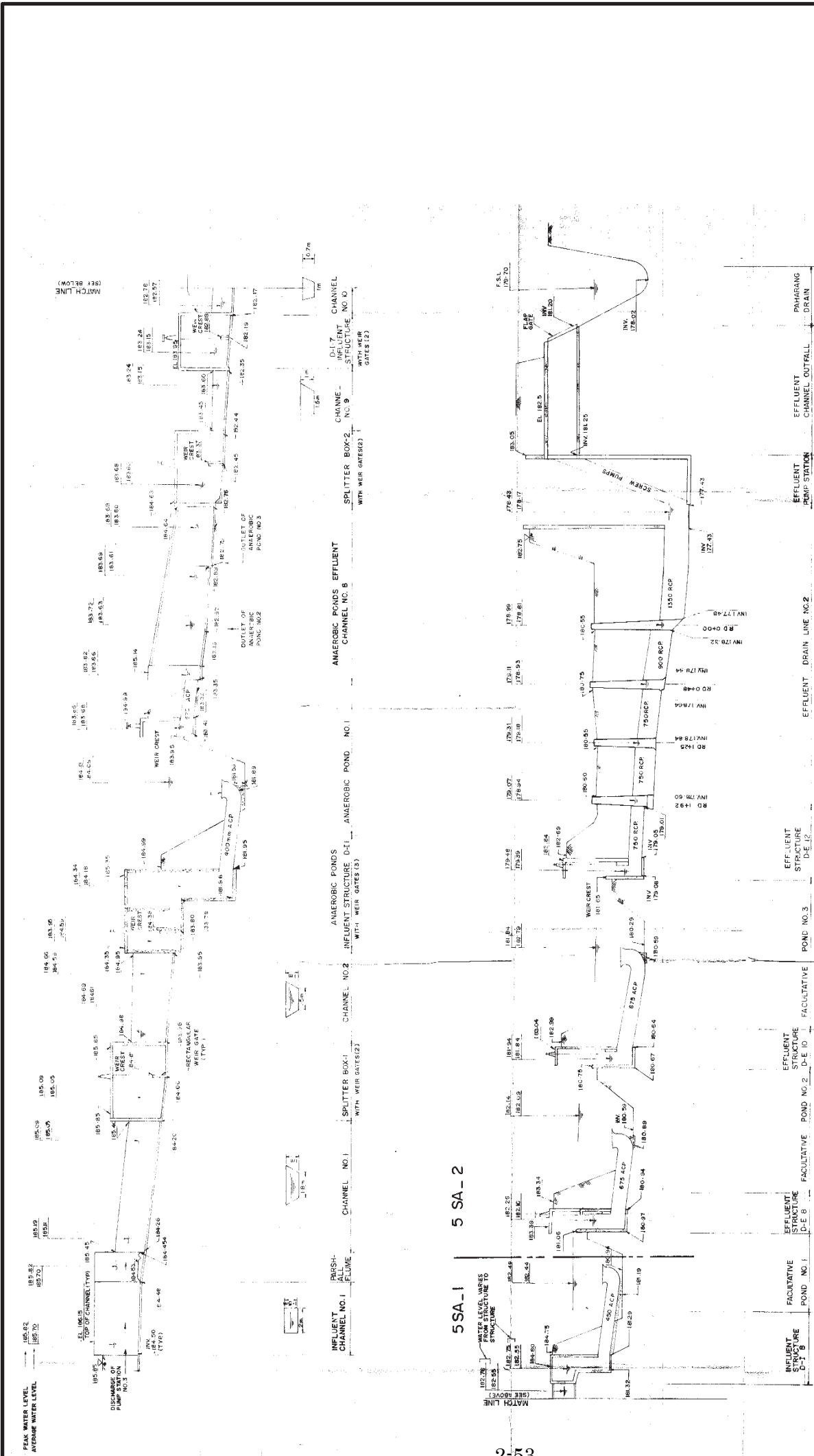


PUMP ROOM PLAN

EL. 184.00

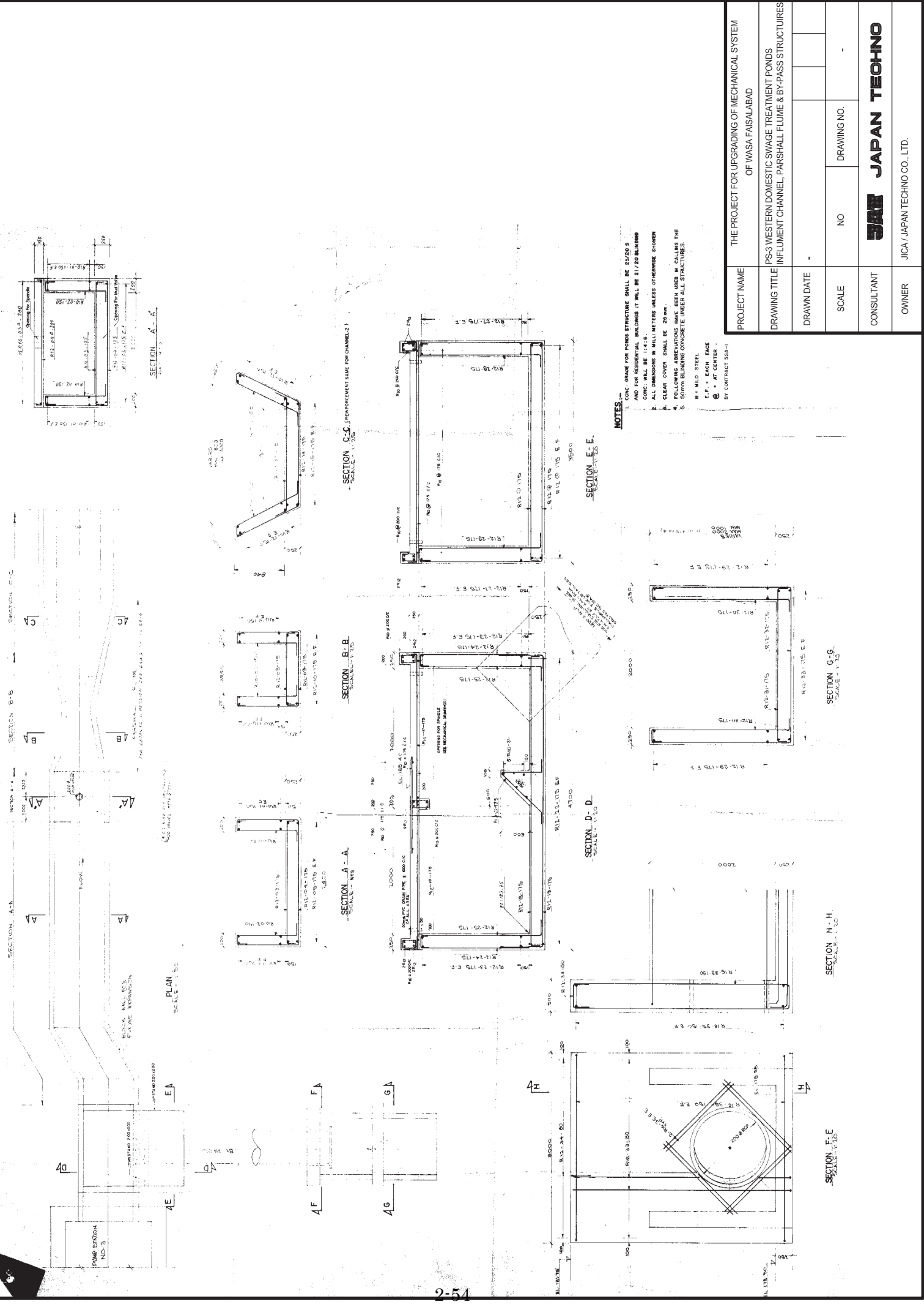


PROJECT NAME	THE PROJECT FOR UPGRADING OF MECHANICAL SYSTEM OF WASA FASALABAD		
DRAWING TITLE	PS-30 PUMP ROOM PLAN		
DRAWN DATE	-	NO	DRAWING NO.
SCALE	-	-	-
CONSULTANT	JAPAN TECHNO		
OWNER	JICA / JAPAN TECHNO CO., LTD.		



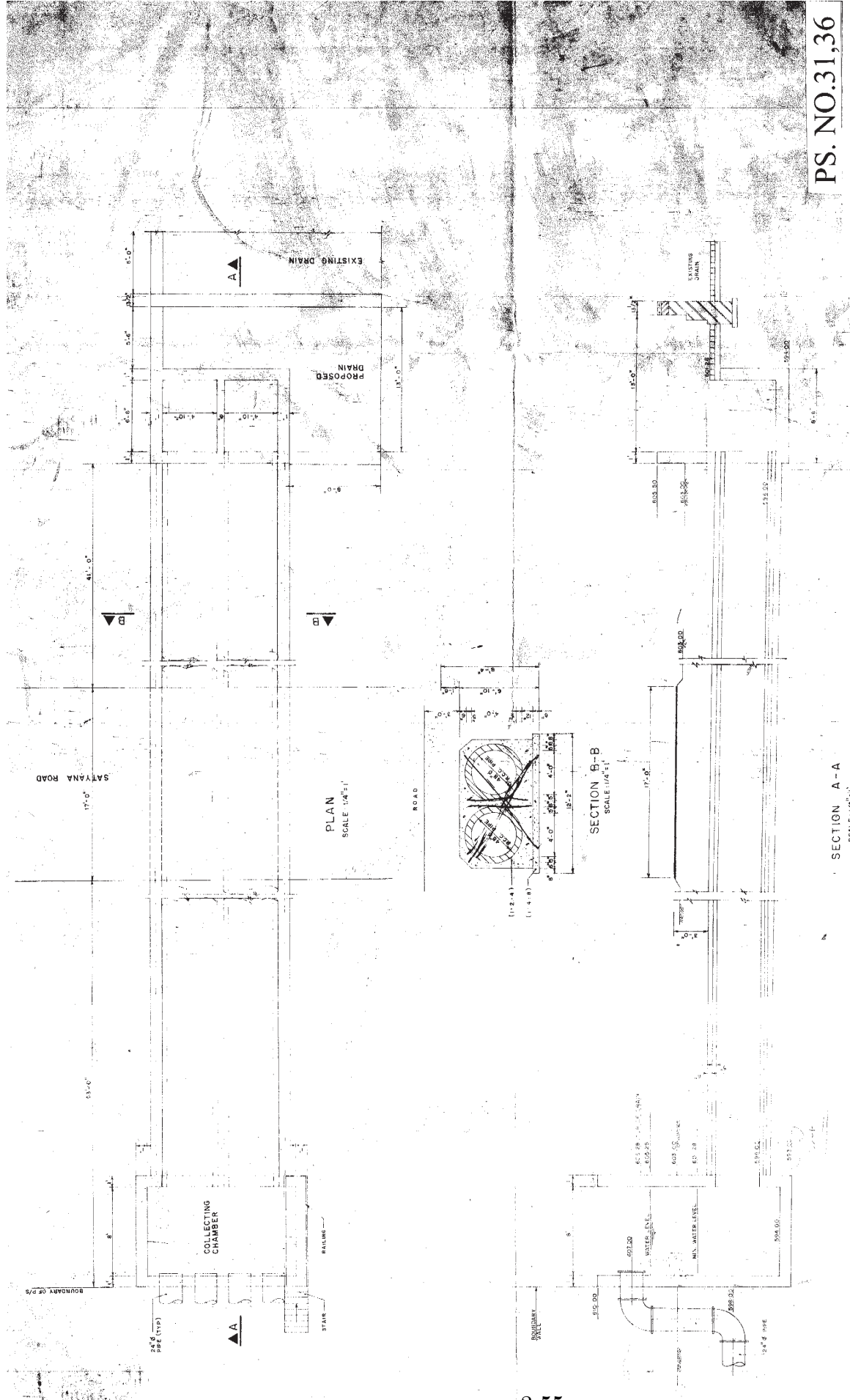
HYDRAULIC PROFILE

PROJECT NAME	THE PROJECT FOR UPGRADING OF MECHANICAL SYSTEM OF WASA FAISALABAD		
DRAWING TITLE	PS-3 WESTERN DOMESTIC SWAGE TREATMENT PONDS HYDRAULIC PROFILE		
DRAWN DATE	-	-	-
SCALE	NO	DRAWING NO.	-
CONSULTANT	JAPAN TECHNO		
OWNER	JICA / JAPAN TECHNO CO., LTD.		




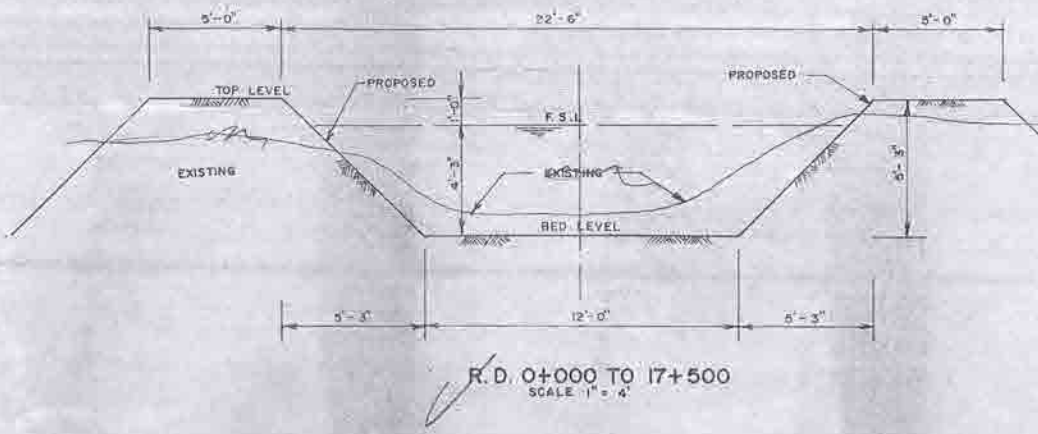
- NOTES:**
1. CONCRETE GRADE FOR POND STRUCTURE SHALL BE 25/20.5 AND FOR RESIDENTIAL BUILDINGS IT WILL BE 21/20 BUILDING CONC. WALL BE 1:1.5:8.
 2. ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE SHOWN.
 3. CLEAR COVER SHALL BE 25 mm.
 4. FOLLOWING ABBREVIATIONS HAVE BEEN USED IN CALLING THE STRUCTURES:
 - R - MILD STEEL
 - E.F. - EACH FACE
 - C - AT CENTER
 5. 50MM BLANKING CONCRETE UNDER ALL STRUCTURES BY CONTRACT SSA-1.

PROJECT NAME	THE PROJECT FOR UPGRADING OF MECHANICAL SYSTEM OF WASA FAISALABAD		
DRAWING TITLE	PS-3 WESTERN DOMESTIC SWAGE TREATMENT PONDS INFLUENT CHANNEL, PARSHALL FLUME & BY-PASS STRUCTURES		
DRAWN DATE	-	NO	DRAWING NO.
SCALE	-	-	-
CONSULTANT	JAPAN TECHNO		
OWNER	JICA / JAPAN TECHNO CO., LTD.		

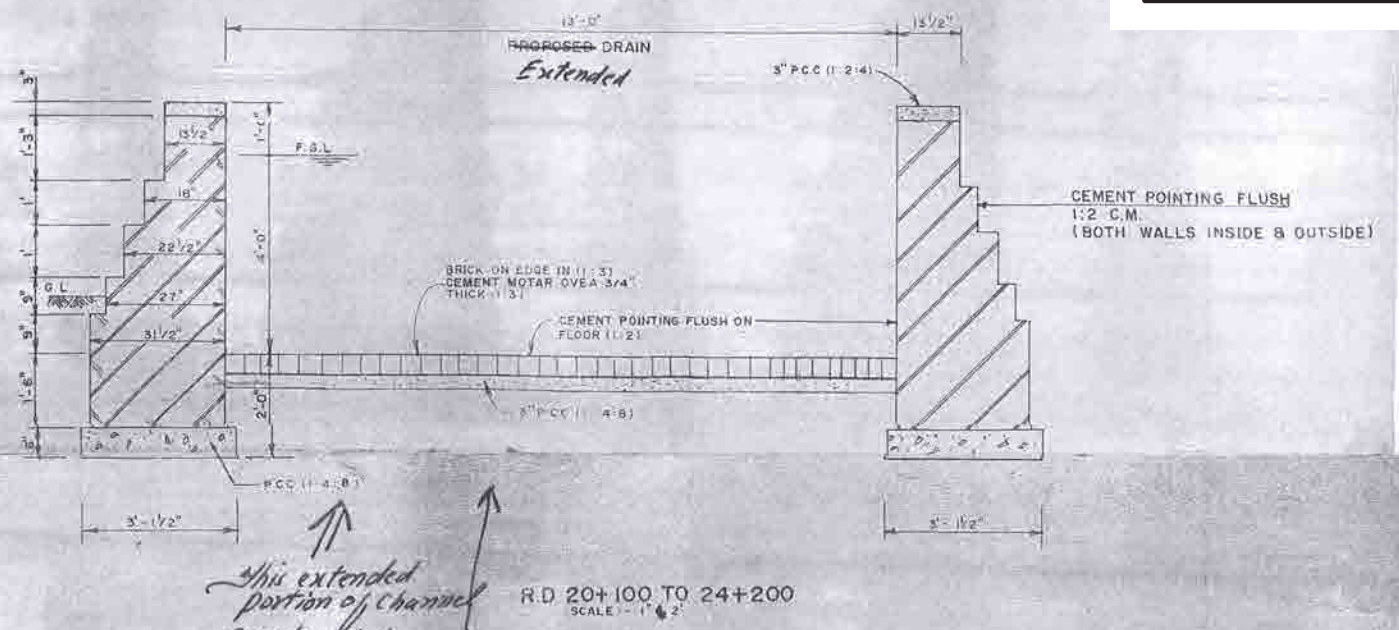


PS. NO.31,36

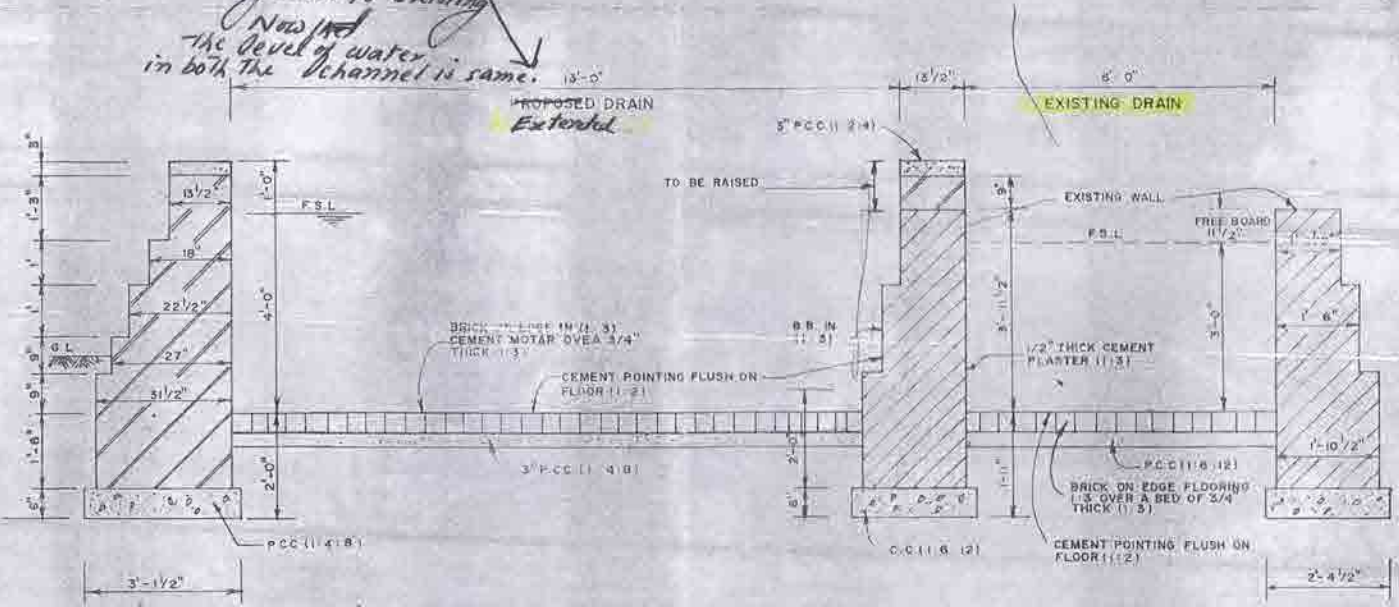
PROJECT NAME	THE PROJECT FOR UPGRADING OF MECHANICAL SYSTEM OF WASA FAISALABAD		
DRAWING TITLE	PS-31/36 COLLECTING CHAMBER AND ROAD CROSSING		
DRAWN DATE	-		
SCALE	NO	DRAWING NO.	-
CONSULTANT	 JAPAN TECHNO		
OWNER	JICA / JAPAN TECHNO CO., LTD.		



PROJECT NAME	THE PROJECT FOR UPGRADING OF MECHANICAL SYSTEM OF WASA FAISALABAD		
DRAWING TITLE	PS-31 SATIANA ROAD SULLAGE DRAIN		
DRAWN DATE		NO	DRAWING NO.
SCALE			
CONSULTANT	JAI JAPAN TECHNO		
OWNER	JICA / JAPAN TECHNO CO., LTD.		



This extended portion of channel constructed adjacent to existing. Now the level of water in both the channel is same.



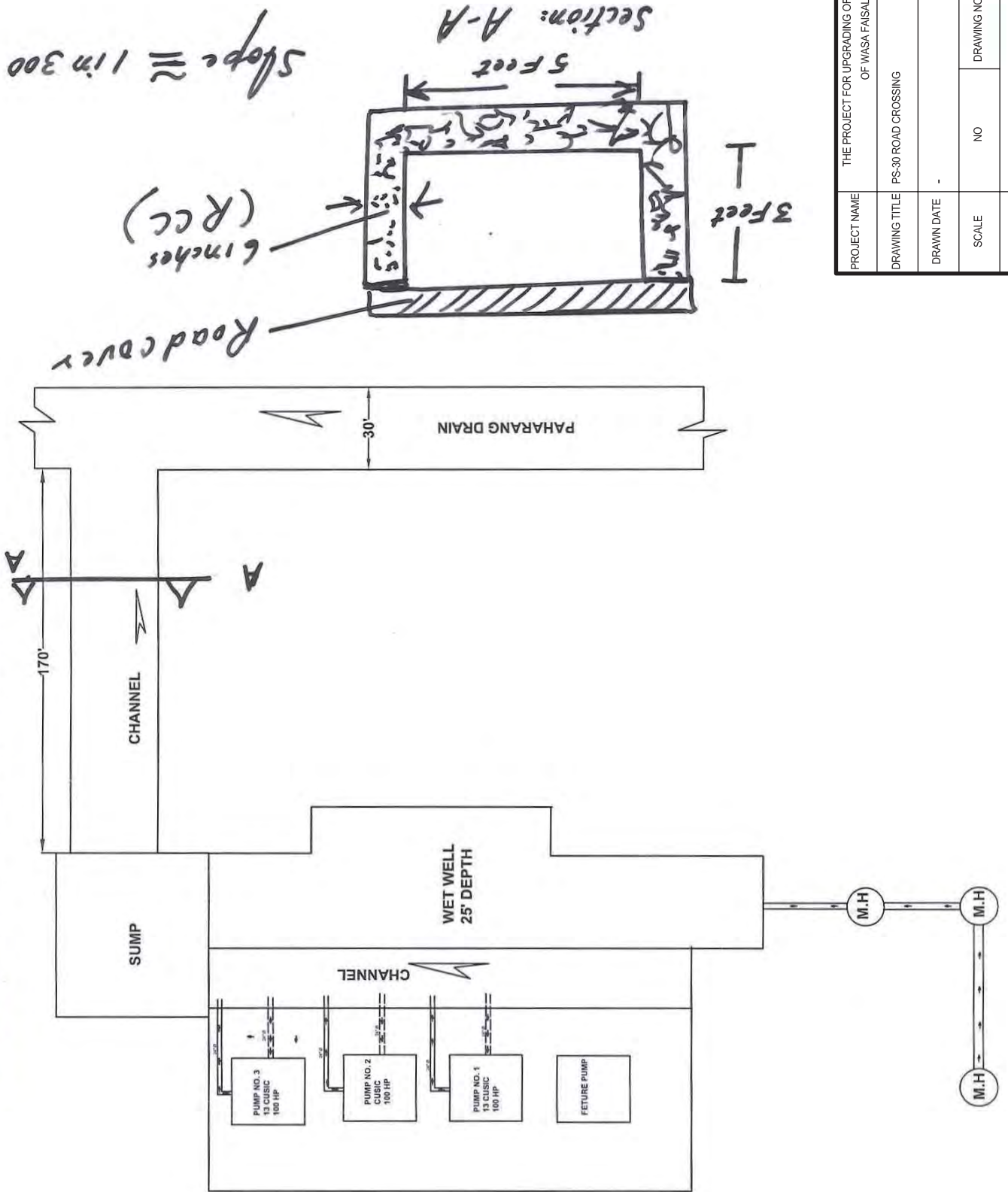
NOTE-1
This is the section of channel seen during visit. Old channel and new/extended channel running parallel and together.

NOTE-2
The channel can be raised, if needed in future depending upon the flow condition.

R.D. 17+500 TO 20+100 & R.D. 24+200 TO 27+400
 SCALE: 1" = 2'

TYPICAL SULLAGE DRAIN CROSS SECTIONS
NOTE-3 *The slope of channel 1:2.510*

P.S 30 DISPOSAL WORKS BAWA CHAK SARGODHA ROAD



PROJECT NAME	THE PROJECT FOR UPGRADING OF MECHANICAL SYSTEM OF WASA FAISALABAD		
DRAWING TITLE	PS-30 ROAD CROSSING		
DRAWN DATE	-	NO	DRAWING NO.
SCALE	-	-	-
CONSULTANT	JAPAN TECHNO		
OWNER	JICA / JAPAN TECHNO CO., LTD.		

2-2-4 Implementation Plan

2-2-4-1 Procurement Policy

This project will be implemented under the Japanese grant aid system. Upon approval of the cooperation plan by the Japanese government, the exchange of notes (E/N) will be concluded between both countries, and then implementation will start. After this process, a Japanese consultant will be selected by the Pakistani government and detailed designing will be carried out. After completion of the tender documents based on the results of the detailed design, equipment procurement can start by the Japanese contractor selected through tendering. Also, points needed for particular consideration in project implementation are as follows.

(1) Project Implementer

The execution agency for this project is WASA Faisalabad. As shown in Chapter 4, Faisalabad city, the responsible area of the executing agency, is divided into west and east with directorates having responsibilities in each area. Also, each directorate is further divided into 3 sub-divisions each to operate and maintain the equipments. The consultant and contractor will make discussions with WASA and hand over the equipments.

(2) Consultant

For equipment procurement under the Japanese grant aid, a Japanese consultant familiar with the standards and procedures of the Japanese grant aid will conclude a design supervision contract with the Pakistani government and carry out detailed design and procurement supervision. Also, the consultant will prepare tender documents and represent the project client to proceed with tender activities.

(3) Contractor

Under the Japanese grant aid system, the Japanese contractor selected through an open tender will procure the equipments. Also, after procurement, since after-care services such as supply of spare parts and handling of breakdowns are required to be continued, the contractor needs to sufficiently consider contacts and coordination.

(4) Necessity for Dispatch of Engineers

This project under Japanese grant aid involves procurement of equipment necessary for cleaning of sewers and channels as well as functional capacity strengthening of disposal stations, and includes installation of pumps. Therefore, dispatch of engineers related to test drive of vehicles and installation and test operation of pumps is necessary.

(5) Concept for Equipment Procurement

- 1) Procurement Policy for Strengthening of Disposal Stations
 - a. Upon examining the present capacity for sewage handling, and presuming the period of equipment procurement, the handling capacity for 2015 as the target year was predicted.
 - b. Upon discussions with WASA, and considering the present state and future urban development of existing disposal stations, the levels of importance of disposal stations were decided and reinforcement was planned according to the importance level.
 - c. WASA is now reviewing the sewerage system, and in 2010, new disposal stations have started to be constructed in the outskirts of the city with some already in operation. Since these facilities are new, they will be considered to be out of scope for this project.
 - d. Types of existing pumps are various, such as belt-driven horizontal motor pump, dual floor vertical motor pump, gear type horizontal motor pump, and submersible pump. Also, their capacities, and combination of inlet valve and check valve are different, but from the viewpoint of replacement and reinforcement of existing pumps, basically, types similar to existing pumps will be considered.
 - e. Pumps stop operating during blackouts. However, since most power failures are planned blackouts controlled for power adjustments, the importance of diesel engine generators is considered to be not very high. Generally, the situation is to be handled by existing generators, but considerations will be made for principal disposal stations having capacity shortages.
 - f. Pakistani commercial power ratings are 3-phase, 4-line 400V of 50Hz. However, since generator output is generally 60Hz, generators which can accept 50Hz output needs to be confirmed.
- 2) Procurement Policy for Flow Improvement and Capacity Assurance of Sewers/Channels
 - a. Faisalabad city has a flat geography. Since surface ground level differences are about 3m, the channel floor gradients are mild to slow down the flow of sewage flow. Also presently, since channels are accumulated with sludge and solid wastes, their original functioning is not being maintained. Sewers are also in the same state in which appropriate equipments are necessary to desludge and clean out wastes. Therefore, replacement of deteriorated equipments was considered.
 - b. WASA possesses equipment for cleaning sewers and channels, but most of them are deteriorated. For cleaning of sewers and channels, buckets and shovel cranes are useful. However, accessibilities to work sites are difficult and many roads in the city from the equipment storage places to sites are narrow. Also, electric lines to supply

power to households are hanging in low positions to limit operation of large equipment. Therefore, medium and small capacity equipment conforming to the work site was considered.

- c. WASA Faisalabad considers jet machines are effective for handling blockage of sewers. Blockages can be resolved by jetting blocked portions inside sewers to open the passageway to promote sewage flow. As service in response to complaints and dissatisfactions of residents, by determining the frequency of mobilizations from the number of complaints, the required quantity of equipment was considered. Although suction machines are used to remove overflowed wastewater, since overflowed wastewater naturally flows into low lying areas, workability for clearing sludge due to sewer blockages and sludge removal from wet wells was also considered.
- d. Portable dewatering sets are being used for clearing away inundated areas during the rainy season, rain flooded low lying areas and overflowed sewage. Many existing dewatering sets are available, but many are deteriorated, and therefore, replacement and reinforcement of these sets were considered.
- e. Appropriate equipment specifications and quantities were considered to avoid excessive procurement which can increase work loads, lower use frequencies and create low use effectiveness. For the procurement plan, the number of workers, work capacity, functionality of equipment, site conditions and other factors were considered.

2-2-4-2 Procurement Conditions

The conditions for pump replacement are as follows.

Since sewage removal capacity will temporarily lower during replacement of pumps, to minimize this influence, replacement order and replacement periods considering the rainy season will need be planned. For the presently non-functioning pumps such as those which are broken, all of them need to be replaced at the same time in consideration of influence on the entire system. For the pumps in operation, the replacement schedule will be prepared upon paying attention to the frequencies of inundation damages, absolute flow rate of sewage and alternate influence on continuous operation.

2-2-4-3 Scope of Work

(1) Responsibilities of Japanese Side

In this project, the Japanese side will provide the following.

- Consulting services to implement this project
- Procurement of cleaning equipment and disposal station equipment
- Transportation and insurance from origin to Faisalabad for the equipment to be procured
- Dispatch of technical experts for equipment inspection and operation guidance

(2) Responsibilities of Pakistani Side

Responsibilities to be borne by the Pakistani side are shown in “Chapter 3 Obligations of Recipient Country”. For equipment procurement, the following works concerning disposal stations were agreed to be the responsibility of the Pakistani side.

- ① Necessary rehabilitations, demolitions and new constructions of disposal station structures
- ② Demolition of existing appurtenant facilities (including pump foundations) conforming to the pump to be replaced
- ③ Construction of foundations for replaced pumps
- ④ Rehabilitations of appurtenant facilities of disposal stations

Also, the importance of implementing the above items from ① to ③ in accordance with the pump replacement plan and without influence to flow drainage operation was confirmed and agreed.

(3) Summary of Demarcations

The responsibilities explained above are summarized below.

Table 2-27 Demarcation of Responsibilities

Japanese Side	Pakistani Side
Consulting services	Storage of equipment procured from Japan and third countries until handover
Procurement of cleaning and disposal station equipment	Rehabilitation, demolition, construction of disposal station housing structure; demolition of existing appurtenant facilities including pump foundation; construction of pump foundation
Transportation and insurance from country of procurement to Faisalabad	
Dispatch of engineers for inspection and operation guidance of equipment	If necessary, procurement, installation and wiring of transformer and distribution board (Japanese responsible equipment only)
Local assembly of cleaning equipment	If necessary, rehabilitation of non-target disposal station appurtenant facilities
If necessary, operation guidance of cleaning equipment	Disposal of wastes generated by installation works
Site installation of pump body and related equipment (motor, control panel, drive transmission equipment, valves, inflow pipe, outlet pipe) and wiring (equipment having responsibility by Japanese side only)	
Test operation, adjustment and operation guidance at site of pumps	
Site installation, test operation, adjustment and operation guidance of generators	

2-2-4-4 Consultant Supervision

(1) Procurement Supervision Plan of Consultant

The work of the consultant in relation to equipment to be procured by the contractor consists of supervision of proper quality and schedule management as well as confirmation of proper installation and adjustment of equipment delivered to the site. The main activities for procurement supervision are as follows.

- Discussions with procurement contractor
- Attendance at factory and preshipment inspections
- Discussions with WASA and relevant organizations
- Confirmation of responsibilities of Pakistani side
- Confirmation of equipment procurement situation
- Confirmation and follow-up on progress of custom clearance of equipment
- Inspection of equipment and attendance at inspection of installation works
- Issuance of required certificates
- Submission of reports

The organization for supervision consists of 3 Japanese members as resident procurement supervision engineer, procurement supervision engineer and inspection engineer, and 1 local member as installation supervision assistant. The work responsibilities of each engineer are shown below.

Table 2-28 Organization for Supervision

Procurement Supervisor	Grade	Responsibility	Japan M/M	Local M/M
Resident Procurement Supervision Engineer	3	Supervision from arrival of equipment to handover, 150 days (including entry/exit, internal transfer and preparation/discussions)	-	5.00
Procurement Supervision Engineer	2	While equipments are being manufactured, upon arriving at the site, confirm the progress of Pakistani side responsibilities and conduct preliminary discussions with WASA.	-	0.33
		Also, after completion of installation works, preside over inspection and handover of equipment.	-	0.23
Inspection Engineer 1 (Confirmation and approval of shop drawings)	3	Before manufacturing, inspect and approve equipment drawings and related documents. Also, preside over factory inspections and preshipment inspections.	0.45	-
Inspection Engineer 2 (Shop inspection)	4	Handle preshipment inspections.	3.50	-
		Preloading approval and third party discussions.	0.10	-

(2) Procurement Management Plan of Contractor

The plan for procurement management and installation works at the sites is shown below. From the procurement contractor, a procurement /installation manager and several technicians to handle equipment installation works are to be dispatched.

Table 2-29 Procurement Management Plan of Contractor

Procurement Manager	Grade	Responsibility	Japan M/M	Local M/M
Procurement Manager in Pakistan	3	Mainly office work such as local arrangements Also, carry out unpacking and quantity inspections upon arrival of cleaning equipment, and initial operation guidance *Assuming same staff as that for Lot 2, therefore not accounted for	-	5.00
Inspection Staff 1 (Confirmation and approval of shop drawings)	3	Before manufacturing, inspect and approve equipment drawings and related documents. Jet machine and suction machine	0.45	-
Inspection Staff 2 (Shop inspection)	4	Preside over factory inspections and pre-shipment inspections, and manage preloading inspections. Jet machine and suction machine	0.35	-
		Preloading approval inspection	0.10	

2-2-4-5 Quality Control Plan

Before manufacturing of equipment, detailed meetings on specifications will be held with manufacturers to confirm drawings for approval. Before shipping of equipment, factory inspection will be carried out. At the time of equipment loading, submission of factory inspection data will be requested. For transportation of equipment, careful attention must be given to the environment during shipping and changes in environment, and insure against damages, corrosion and functional deterioration during transportation. Also, if special packing is required, its conformity needs to be confirmed.

Concerning storage, the responsible contractor must be instructed to be mindful of factors such as temperature, infrared rays, humidity, dust, corrosive gas and vibration, and in preparation for emergencies, to insure the equipment.

To be able to handle problems at the site, close communications with relevant concerns such as manufacturers, dealers, transport companies and insurance companies are needed and an organization which can properly handle the situation must be created.

2-2-4-6 Equipment Procurement Plan

The origin of procurement is an important point to consider for local operation and maintenance. Also, although those being circulated in the local market is less expensive in most cases, from the viewpoint of high resistance to corrosion, priority cannot be given to cost alone. Therefore, comparative consideration was made on costs and qualities between those in circulation locally

and third country products. As a result, Japan, Pakistan and third countries were considered as origins of procurement for equipment in this project as shown below.

Equipment to be procured can be divided into cleaning equipment and disposal station equipment. The former equipments are mainly vehicles and the latter are mechanical products. Therefore, manufacturers who can supply all equipment in one package are nonexistent and only trading firms can handle such matters. To assure economy of tendering, competition must be widened and without regard to trading firm or manufacturer, participation of as much tenderers as possible is desired.

Cleaning equipments are presumed to be offered by vehicle manufacturers or body assembling firms, and disposal stations equipments would be offered by plant and machine manufacturers. Therefore, cleaning equipment and disposal station equipment need to be divided into 2 lots.

Table 2-30 Origin of Equipment Procurement

Category	Equipment	Japan	Third Country	Local
Cleaning Equipment	Jet Machine	○		
	Suction Machine	○		
	Backhoe	○	○	
	Dump Truck	○		
	Dewatering Set			○
	Crane Cargo Truck	○		
Disposal Station Equipment	Pump	○	○	○
	Generator	○		○

2-2-4-7 Initial Operation Guidance Plan

After equipments are delivered from the transportation company to the storage area or installation site, assembly or installation works are carried out. After making test operation and adjustments, if necessary, initial operation guidance is conducted and then, handed over. Since the same types of equipments are presently being used by WASA, initial operation guidance is needed only for the differences in manufacturers between the existing ones. Therefore OJT is not required.

2-2-4-8 Soft Component (Technical Assistance) Plan

(1) Background for Planning of Soft Component

The objective of this project is the procurement of equipment necessary for cleaning of sewers and channels of WASA to effectively improve the cleaning activities, recover the drainage functions and minimize damages from inundations by torrential rains.

The responsibilities of WASA are divided by the Rakh Branch Canal flowing along the center of Faisalabad into West and East. For operation and maintenance, 2 directorates are allocated in the West and East with 3 sub-divisions under each directorate for a total of 6 sub-divisions. In 2012, a Directorate Drainage having responsibilities for channels was established to create a system capable to operate and maintain sewers and channels under the sub-divisions. Even when equipment are replaced through this project, these are to be handled basically by the present staffs of WASA, but for smooth management using the present organization, preparations for strengthening of capacities are needed.

Although WASA possesses capacity to quickly respond to emergencies such flooding, routine cleaning activities for sewers and channels to prevent emergency situations are considered to be insufficient. Since work plans suited to actual situations are not prepared, they are forced to handle emergencies whenever they arise. This project plans to procure equipment to solve problems in deterioration and insufficiency to reduce inundation damages chronically occurring in Faisalabad. Furthermore, maintenance methods, work plans and management plans for facilities and equipment need to be discussed in detail with sewerage and drainage staffs of WASA.

Since a number of equipment must be operated in parallel, with respect to management of these works, not only improvement of work efficiency of procured equipment, but from the point of safety management, an organization with sufficient guidance to workers must be formed. For WASA directors in charge of sewerage and drainage, in continuation from the planning stage, to acquire management techniques for implementation, technology transfer on topics such as field management, schedule management, quality management will be conducted based on work plans and management plans with practical work such as planning for maintenance and repair of equipment.

Based on the above and request of the Pakistani side, a soft component will be included in this project to give technical support related to operation and maintenance planning of cleaning activities. As a result of the technical support, by resolving the following issues

revealed through the study, sustainable generation of project effects is anticipated.

Present State and Issues

- 1) Inundations during the rainy season in the city are being handled by existing equipment, but they were procured in the 1980's and are deteriorated to lower their functioning.
- 2) Due to sewer and channel overflows and inundation damages, complaints from residents are pouring into WASA, and therefore, works of WASA becomes mostly emergency handling which deters periodic cleaning activities
- 3) Solid wastes and sludge removed from channels are piled and overflowing along sides of channels without final disposal handling.
- 4) Domestic wastes are thrown into sewers and channels to saturate their capacities and cause clogging. As sensitization activities of WASA, promotions through radio and newspaper are being carried out, but effects cannot be seen. Also, sewerage service is the responsibility of WASA, but management of solid wastes is under the responsibility of TMA, and therefore, activities need to be collaborated between WASA and TMA.

In response to this situation, in this project, based on cleaning work plans and cleaning equipment management plans, through practical activities, topics such as field management, schedule management and quality management to create a system for sustainable operation and maintenance are important to assure sustainable effects of the grant aid assistance and using soft component is determined to be suitable for carrying out support necessary for system establishment.

(2) Objective of Soft Component

The objective is to formulate realistic and feasible work plans and management plans in order for WASA to implement the cleaning plans after project completion to contribute to achieving the project goal of "In Faisalabad, functioning capacities of sewers and channels will be reinforced and damages from inundations will be reduced."

(3) Outputs of Soft Component

Direct effects (outputs) anticipated from soft component are as follows.

Output 1: Sub-Engineers and Sewer Supervisors of WASA acknowledge the necessity of cleaning work plan and management plan, and acquire technology to prepare the plans.

Output 2: Throwing of solid wastes into sewers and channels by residents is reduced.

(4) Confirmation Method of Output Achievement

The method of confirming the achievement of outputs set in (3) above, as well as indicators is

explained below.

Output 1: Sub-Engineers and Sewer Supervisors of WASA acknowledge the necessity of cleaning work plan and management plan, and acquire technology to prepare the plans.

Indicator 1-1	Accuracy of cleaning work plan
Method 1-1	Confirm calculations and equipment allocation plan

Indicator 1-2	Understanding level of manual on equipment maintenance, inspection and repairs
Method 1-2	Conduct tests

Output 2: The actions of throwing solid wastes into sewers and channels by residents are reduced.

Indicator 2-1	Raised awareness of residents on improvement of inundation damages
Method 2-1	Record amounts of solid wastes thrown by residents during cleaning

(5) Activities of Soft Component (Intervention Plan)

Necessary action plan to achieve (2) and (3) above was prepared. Since activities correspond to outputs, the broad categorization is as follows.

One Japanese expert will be dispatched to WASA for this program to support planning and management. Basically, the overall plan will be prepared and reviewed along with the 6 Assistant Directors of Sub-Divisions, and for the implementation, 16 Sub-Engineers and 19 Sewer Supervisors will also be included to carry out sufficient discussions to prepare the works plan and management method.

Activities for Output 1

- 1 Review of existing sewer and channel network map of WASA (Confirmation on accuracy through joint work with Sub-Engineers and carry out necessary revisions)
- 2 Preparation of cleaning work plan (work schedule, equipment allocation plan, earned value management plan) (Joint work with Assistant Directors and Sub-Engineers)
- 3 Monitoring and analysis of cooperation effects (Joint work with Sub-Engineers and Sewer Supervisors)

Monitoring Items:

- Establish a monitoring system for 20 constant inundation points selected in the target area, record data such as extent of inundation, inundation depth and clearing time for each point whenever torrential rains occur, and analyze the results.
- Since complaints from residents are presently being received at 43 WASA

complaint centers and 3 emergency centers (WASA headquarters, West Directorate, East Directorate, Drainage Section), systemize the complaints data compilation method.

- Removed sludge is stored at temporary stock areas, but these stock areas have no truck scales and truck numbers are not recorded, and therefore, establish a system to compile daily data. Also, sludge will be disposed at final landfill sites.
- 4 Preparation of manual for procedures and methods of daily inspections, maintenance and repairs of equipment (Joint work with Sub-Engineers and Sewer Supervisors)

Activity for Output 2

- 1 Preparation of promotion plan for sensitization activities to residents (Joint work with Assistant Directors and Sub-Engineers)

The above activities are divided into 3 stages. Objectives, target personnel, execution method, execution period, facilitation resources, outputs, and obligations of Japanese/Pakistani sides of these activities are shown in the following tables.

Table 2-31 Soft Component Activities Plan

Activity	Objective	Target	Method	Duration	Facilitation Resource 【Responsibility】	Output
Stage 1: Participatory Planning Stage						
0 Preparatory work in Japan by Japanese consultant	Prepare tools to be used for the soft component program according to activities policy of this program	Executing Agency	Preparation of Activities Tools	25 days	【Japanese Responsibility】 Japanese Consultant	Activities Tools
1 Identification of present state and issues	Due to sewer and channel overflows and inundation damages, works of WASA becomes mostly emergency handling of complaints from residents which prevent periodic cleaning activities. Therefore, issues related to management will be identified with the executing agency.	Executing Agency	Present State Survey together with Executing Agency	5 days	【Japanese Responsibility】 Japanese Consultant Local NGO/Consultant 【Pakistani Responsibility】 Executing Agency	Present State Report
2 Selection of local NGO/consultant and discussions with executing agency	A workshop will be held targeting the executing agency WASA FDA headquarters, East Directorate and West Directorate to explain the objectives of activities, contents and executing plan of this program, and receive understanding and cooperation, especially on operation and maintenance. Through analyses of problems and issues presumed for program execution and operation and maintenance, training needs for program execution will be clarified.	WASA FDA East Directorate West Directorate	Discussions with Executing Agency/ Workshop	10 days	【Japanese Responsibility】 Japanese Consultant Local NGO/Consultant 【Pakistani Responsibility】 Executing Agency	Minutes of Discussions Workshop Report
3 Review of WASA academy and WASA Lahore	Seminars on management, operation and maintenance held in WASA academy (JICA cooperation) and operation and maintenance situation of WASA Lahore implemented through a previous project will be confirmed, discussed and reflected in the soft component program.	WASA Faisalabad WASA Lahore JICA Team	Meetings	5 days/ Lahore	【Japanese Responsibility】 Japanese Consultant Local NGO/Consultant 【Pakistani Responsibility】 Executing Agency WASA Lahore/JICA	Review Report
4 Review of existing sewerage and drainage network map of target area	To prepare the cleaning work plan based on the sewerage and drainage network map already prepared by the executing agency, reconnaissance survey of the network will be conducted.	East Directorate West Directorate	Reconnaissance	14 days/ 1,785km	【Japanese Responsibility】 Japanese Consultant Local NGO/Consultant 【Pakistani Responsibility】 Executing Agency	Sewerage and Drainage Network Map
Stage 2: Plan Formulation Stage						
5 Preparation of cleaning work plan and management plan	Based on the sewerage and drainage network map, cleaning work plan and management plan including earned value management plan will be prepared, and sewers and channels will be periodically cleaned.	East Directorate West Directorate	Meetings/ Workshop	5 days	【Japanese Responsibility】 Japanese Consultant Local NGO/Consultant 【Pakistani Responsibility】 Executing Agency	Cleaning Work Plan Management Plan

Table 2-31 Soft Component Activities Plan

Activity	Objective	Target	Method	Duration	Facilitation Resource 【Responsibility】	Output
6 Preparation of inspection manual	For continuous operation and maintenance, procedures and methods of daily inspections, maintenance and repairs of equipment will be determined to improve technical capacity.	East Directorate West Directorate	Meeting/OJT	5 days	【Japanese Responsibility】 Japanese Consultant Local NGO/Consultant 【Pakistani Responsibility】 Executing Agency	Inspection Manual
7 Preparation of residents promotion plan	Sensitization activities to residents not to throw solid wastes into sewers and channels will be carried out.	East Directorate West Directorate	Meetings/ Workshop	4 days	【Japanese Responsibility】 Japanese Consultant Local NGO/Consultant 【Pakistani Responsibility】 Executing Agency	Promotion Plan
Stage 3: Monitoring Stage						
8 Preparation of monitoring plan	Methods and system for monitoring of activities according to the cleaning work plan, management plan, inspection manual and promotion plan will be determined, and a plan will be prepared.	WASA FDA East Directorate West Directorate	Meetings/ Workshop	5 days	【Japanese Responsibility】 Japanese Consultant Local NGO/Consultant 【Pakistani Responsibility】 Executing Agency	Monitoring Plan
9 Establishment of monitoring system	Based on the monitoring plan, monitoring systems at East Directorate and West Directorate will be established.	WASA FDA East Directorate West Directorate	Meetings/ Workshop	25 days	【Japanese Responsibility】 Local NGO/Consultant 【Pakistani Responsibility】 Executing Agency	Monitoring System Chart
1 Monitoring execution	Based on the monitoring plan, monitoring teams of East Directorate and West Directorate will carry out monitoring.	WASA FDA East Directorate West Directorate	Monitoring	25 days × 2 times	【Japanese Responsibility】 Local NGO/Consultant 【Pakistani Responsibility】 Executing Agency	Monitoring Report
1 Monitoring evaluation	The monitoring plan and monitoring execution method will be evaluated by the executing agency and Japanese consultant.	WASA FDA East Directorate West Directorate	Monitoring	25 days	【Japanese Responsibility】 Japanese Consultant Local NGO/Consultant 【Pakistani Responsibility】 Executing Agency	Monitoring Evaluation Report

(6) Facilitation Resources for Soft Component

To execute the soft component activities and conduct activities related to the work and management plans explained previously, experts capable of plan formulation; management of activities progress, method and results; supervision of overall schedule and activities; coordinate and hold discussions between stakeholders; and work schedule adjustments are needed. Therefore, a Japanese consultant and local resources will be arranged. Also, since the JICA technical cooperation project in Lahore (WASA academy) related to operation and maintenance of equipment is scheduled to start within 2011, appropriate participation of WASA Faisalabad staffs in the training will be considered.

Details of personnel needed to conduct the activities are explained below.

1) Japanese Consultant 1 person (in charge of operation and maintenance)

This person will be responsible to formulate the soft component plan; supervise the activities schedule and overall activities; communicate and report to the client and Japanese relevant agencies; and hold discussions, coordinate stakeholders, and adjust the procurement schedule. Also, technology transfer will be given to the local personnel explained below who are the main activities facilitators.

2) Local NGO/Consultant

To execute the soft component program, since accumulation of skills of the executing agency is poor, a local NGO or local consultant having capability and experience in similar projects in the target area will be used. The required personnels, in consideration of the scale of the target area and execution period, are detailed below. Personnel having experience in similar works and able to smoothly communicate with WASA will be allocated.

① Program Coordinator 1 person

Under the guidance of the Japanese consultant, this person will manage the activities progress, activities methods and outputs, and report to the Japanese consultant. This person must have experience as program representative of activities related to this program.

② Community Facilitator 1 person

This person will assist the program coordinator under his management. This person must have experience in programs related to management of organization capacity strengthening, establishment of an operation and maintenance system, participatory planning, monitoring and evaluation, as well as personnel capacity building.

The local NGO/consultant will form a team of 1 program coordinator and 1 community facilitator to carry out the activities.

(7) Execution Schedule of Soft Component (Shown with Equipment Schedule)

The schedule for soft component activities is shown in Section 2-2-4-9.

(8) Output Materials of Soft Component

The output materials of soft component are shown in the previous Table 2-31 for each activity. In addition to the soft component completion report to be submitted to the Pakistani side executing agency and Japanese side, the main output materials are cleaning work report, sewerage/drainage network map, monitoring plan report, promotion plan and minutes of meetings. Activities execution situation and achievement levels of outputs will be confirmed from these materials.

(9) Responsibilities of Pakistani Execution Agency

- Until now, since WASA was kept busy with handling emergencies, the organizational structure could not prepare plans for daily cleaning activities and plans on a m to long term bases. Due to execution of the soft component program, the system will be improved to be able to effectively carry out cleaning plans.
- Before the soft component program starts, WASA needs to confirm and update the existing sewerage and drainage network map in preparation for formulation of the cleaning work plan.
- Since WASA possesses data files of sewerage networks and channel drawings, addition of lacking information and updating are required.
- Since the Assistant Directors and Sub-Engineers of WASA will be able to acquire plan management technology from the Japanese consultant in the soft component program, for execution of the cleaning work plan, they should prepare attitudes of willing to absorb and understand the plan.

2-2-4-9 Implementation Schedule

After the exchange of notes (E/N) and the Grant Agreement (G/A) between the Japanese government and Pakistani government are concluded for this project, the grant aid assistance of the Japanese government will be executed. As shown in Table 2-32, the project implementation period from conclusion of E/N and G/A is, 6 months for detailed design including tendering procedures, 21 months for equipment manufacturing, procurement and installation, and then, the soft component is planned.

Table 2-32 Project Implementation Schedule

Month Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Detailed Design	● E/N, G/A																	
	■ Consultant Agreement, Field Survey in Pakistan																	
	□ Analysis in Japan, Tender Document Preparation																	
	■ Tender document Confirmation																	
Procurement Supervision	● □ Tender Announcement, Prequalification																	
	□ Tender document Handout and Explanation																	
	□ Tendering, Contractor Contracting																	
	● Contractor Contract Verification																	
	■ Equipment Manufacturing																	
Equipment Procurement	● Inspection																	
	● Packing																	
	■ Shipping, Transportation																	
	□ Unpacking, Delivery, Installation																	
Soft Component	■ Final Inspection, Handover ●																	
	□ Stage 1: Participatory Planning Stage																	
	■ Stage 2: Plan Formulation Stage																	
■ Stage 3: Monitoring Stage																		

□ : Japan

■ : Japan and/or Third country

■ : Pakistan

2-3 Obligations of Recipient Country

(1) Measures to be Handled by the Pakistani Side

For implementation of this project, the measures required to be handled by the Pakistani side, based on the minutes agreed during the preparatory mission, are as follows.

- 1) Secure necessary storage for each procured equipment
- 2) Smooth execution of arrangements for unloading at port and import customs clearance of procured equipment
- 3) Exemption of duties, internal taxes and any other taxes to be imposed on Japanese nationals in Pakistan in relation to procurement of equipment for this project
- 4) For smooth execution of services related this equipment procurement project, accord Japanese nationals with necessary facilities for entrance into and stay in Pakistan
- 5) Secure staff necessary to properly and effectively operate equipment to be procured in this project, and bear all expenses not covered in the grant aid scheme
- 6) Appropriate procurement of spare parts necessary for operation and maintenance of equipment to be procured to avoid parts shortage
- 7) No reexportation of the equipment to be procured in this project
- 8) Carry out banking arrangement (B/A) and pay advising charges and handling costs for authorization to pay (A/P) to the bank which handles the B/A

(2) Responsibilities to be Borne by the Pakistani Side

As demarcation of responsibilities, those to be borne by the Pakistani side are as follows.

1) Assurance of Safety

Sufficient consideration to assure safety including Japanese nationals of this study as well as Pakistani concerns was agreed. Due to procedures of WASA, safety was assured through guarding by policemen during field surveys. Also, the Pakistani side agreed to include costs for safety assurance in the PC-1.

2) Procedures for PC-1 Approval

The Pakistani side recognized the importance of the PC-1 and is making efforts to receive approval. Preparation of the PC-1 would be started without waiting for explanation of the draft project report, and the cost estimate will be provided by JICA.

3) Exemptions

Tax exemptions being the responsibility of the Pakistani government and WASA were confirmed through the Minutes of Meetings. In the on-going project, "Improvement of Water Supply System in Faisalabad", a master list of materials and equipment was submitted by the contractor and tax exemption procedures are being executed by WASA Faisalabad. At present, no claims related to tax exemption from the contractor have been submitted.

4) Works by Pakistani Side

The Pakistani side agreed that demolition and removal of existing facilities of disposal stations are under their responsibility. Since equipment delivery greatly influences the installation schedule, detailed schedule (such as removal period) has been discussed by the study team and agreement was received at the time of the draft final report explanation. Regarding the capacity of outlet facilities of each disposal station, it will basically accept the increased outflow in accordance with the dimensions and other relevant information provided from WASA. However, necessary dredging and cleaning for sludge in the channels shall be carried out for proper function.

Also, a shed with roofing to store the equipment was agreed to be constructed.

5) Project Promotion

The Pakistani side sufficiently acknowledges the importance of promoting the project. Therefore, development of promotion activities for this project as well as the presently on-going water supply project was confirmed.

6) Sensitization to Prevent Throwing of Solid Wastes

Through radio and newspapers, WASA has plans for sensitizing residents not to throw solid wastes into channels. The plan is that if someone is caught throwing wastes into channels, he will be fined 1,000 to 2,000Rs, and if it is not paid, he can be sent to prison. To enforce this plan, a magistrate from Punjab Province is scheduled to be dispatched to WASA. The fines from these activities are planned to be saved and allotted for cleaning sewers and channels. However, since residents throw away wastes during midnight and other periods when detection by WASA staffs is difficult, collecting fines is predicted to be difficult. Other preventative measures considered by WASA include installing panel boards. Since WASA is in charge of providing sewerage services and TMA is responsible for collecting solid wastes, sensitization activities are recommended to be carried out in collaboration between WASA and TMA.

2-4 Project Operation Plan

The areas of responsibilities are divided into two Directorates of West and East by Rakh Branch Canal flowing along the city center. Also, in each directorate, a Director of O&M and a Deputy Director are allocated with 3 Sub-Divisions under each directorate to carry out operation and maintenance activities. The sub-divisions are composed of staffs responsible for water supply and sewerage. In 2012, a new Directorate Drainage to be in charge of drain channels was established and the staff number became 614 in the West Directorate and 590 in the East Directorate, with 72 staff in the Directorate Drainage, where the sub-divisions are responsible for operation and maintenance of sewers and channels. This situation can explain that even when equipment is newly procured through this project, the present staff number will not present any problems in operation and maintenance.

Table 2-33 Composition of Sub-Division Staff in Charge of Sewage and Drainage (2009)

Zone	Sub-Division	Assistant Director	Sub-Engineer	Sewer Supervisor	Sewermen*		Total
					Regular	Work Charge	
West	Ghulam Muhammad Abad	1	2	5	46	20	74
	Gulberg	1	2	6	54	24	87
	Civil Line	1	4	1	52	12	70
	<i>Sub-Total</i>	3	8	12	152	56	231
East	Allama Iqbal Colony	1	3	2	72	22	100
	People's Colony	1	3	2	36	47	89
	Madina Town	1	2	3	29	25	60
	<i>Sub-Total</i>	3	8	7	137	94	249
Total		6	16	19	289	150	480

*Regular: Permanent staff Work Charge: Contracted staff

Source: Prepared by the study team using WASA data (2010)

Operation and maintenance of existing equipment of WASA presently has no special problems. When new equipments are procured through this project, the number of workers, personnel cost, and operation and maintenance cost are as explained in Section 2-5-2.

2-5 Project Cost Estimation

2-5-1 Initial Cost Estimation

(1) Cost to be Borne by Pakistani Side

139.6million Rs (about 161.9 million JP)

Item	Cost (million Rps)	Cost (million JP)	Remark
Demolition/Removal of Existing Disposal Station Facilities	23.6	27.4	4 disposal stations
Construction of sheds for parking	21.3	24.7	Directorate O&M (East&West) Directorate Drainage
Improvement of channels	25.3	29.3	PS-3、 PS-31 Disposal Station, Drains
Improvement of channels	3.0	3.5	
Bank commission	15.0	17.4	
Others	51.4	59.6	Wireless connections between sub-divisions for remote monitoring & control, Safety equipments etc
Total	139.6	161.9	

(2) Conditions for Cost Estimate

- ① Cost Estimate Period : December, 2011
- ② Currency Exchange Rate: 1 US\$ = ¥86.6
1 Rs = ¥1.16
- ③ Procurement Period: Periods required for detailed design and equipment procurement are as shown in the implementation schedule.
- ④ Others: Cost is estimated based on the Japanese grant aid system

2-5-2 Operation and Maintenance Cost

The operation and maintenance cost (salaries + management cost) for this project is calculated as shown in Table 2-34 based on the equipment procurement plan (refer to Table 2-37) of procuring 40 new equipment and using 71 existing equipment.

As a result of calculations, the total of salaries and management cost is 49,969 thousand Rs/year which is predicted to be about 8.1% of the 2008/2009 WASA operating budget of 614,663 thousand Rs. This is lower than the 9.7% ratio between the previous year actual operation and maintenance cost (Table 2-36 lower row) of 58,219 thousand Rs and the the operating budget (599,832 thousand Rs). Therefore, if a budget of similar level as 2009 can be secured in the fiscal year when this project is implemented, the operation and maintenance cost after project implementation will not put pressure on the financial situation of WASA.

Table 2-34 Calculation of Operation and Maintenance Cost

(Unit: Thousand Rs)

No.	Equipment	WASA Equipment Allocation Plan			Personnel Plan	O&M Cost
		Allotted Unit	New	Existing		
1	Jet Machine	West Directorate and 3 Sub-Divisions	4	3	1 operator x 7 = 7 pers 3 assistants x 7 = 21 pers Total: 28 persons	Salaries: 2,372 Fuel: 5,810 Repairs: 700 Total: 8,882
		East Directorate and 3 Sub-Divisions	4	4	1 operator x 8 = 8 pers 3 assistants x 8 = 24 pers Total: 32 persons	Salaries: 2,711 Fuel: 6,640 Repairs: 800 Total: 10,151
2	Suction Machine	West Directorate	1	1	1 operator x 2 = 2 pers 2 assistants x 2 = 4 pers Total: 6 persons	Salaries: 678 Fuel: 940 Repairs: 1,200 Total: 2,818
		East Directorate	1	1	1 operator x 2 = 2 pers 2 assistants x 2 = 4 pers Total: 6 persons	Salaries: 678 Fuel: 940 Repairs: 1,200 Total: 2,818
3	Wheel Type Backhoe	West Directorate	1*	1	1 operator x 2 = 2 pers 2 assistants x 2 = 4 pers Total: 6 persons	Salaries: 678 Fuel: 940 Repairs: 1,200 Total: 2,818
		East Directorate	1*	0	1 operator x 1 = 1 pers 2 assistants x 1 = 2 pers Total: 3 persons	Salaries: 339 Fuel: 550 Repairs: 150 Total: 1,039
4	Mini-Backhoe	West Directorate	1*	0	2 operators x 1 = 2 pers 4 assistants x 1 = 4 pers Total: 6 persons	Salaries: 339 Fuel: 536 Repairs: 200 Total: 1,075
		East Directorate	1*	0	2 operators x 1 = 2 pers 4 assistants x 1 = 4 pers Total: 6 persons	Salaries: 339 Fuel: 536 Repairs: 200 Total: 1,075
5	Bucket Crane	2 Directorates	0	2	2 operators x 1 = 2 pers 4 assistants x 1 = 4 pers Total: 6 persons	Salaries: 339 Fuel: 536 Repairs: 200 Total: 1,075
6	Dump Truck	West Directorate	4*	0	1 operator x 4 = 4 pers 1 assistant x 4 = 4 pers Total: 8 persons	Salaries: 926 Fuel: 2,534 Repairs: 466 Total: 3,926
		East Directorate	3*	0	1 operator x 3 = 3 pers 1 assistant x 3 = 3 pers Total: 6 persons	Salaries: 695 Fuel: 1,900 Repairs: 350 Total: 2,945
7	Crane cargo truck	3 Sub-Divisions in East Directorate	1*	0	1 operator x 1 = 1 pers 1 assistant x 1 = 1 pers Total: 2 persons	Salaries: 231 Fuel: 630 Repairs: 67 Total: 928
		3 Sub-Divisions in East Directorate	1*	0	1 operator x 1 = 1 pers 1 assistant x 1 = 1 pers Total: 2 persons	Salaries: 231 Fuel: 630 Repairs: 67 Total: 928
8	Pick-up Truck	3 Sub-Divisions in West Directorate	0	3	1 operator x 3 = 3 pers 1 assistant x 3 = 3 pers Total: 6 persons	Salaries: 669 Fuel: 425 Repairs: 200 Total: 1,294
		3 Sub-Divisions in East Directorate	0	3	1 operator x 3 = 3 pers 1 assistant x 3 = 3 pers Total: 6 persons	Salaries: 669 Fuel: 425 Repairs: 200 Total: 1,294
9	Dewatering Set	2 Directorates and 6 Sub-Divisions	17	W: 23 E: 30	1 operator x 70 = 70 pers 1 assistant x 70 = 70 pers Total: 140 persons Hired 4 months during rainy season	Salaries: 5,201 Fuel: 1,620 Repairs: 82 Total: 6,903
Total			40	71	43 operators 86 assistants Total: 129 persons (+140 hired in rainy season)	Salaries: 17,095 Fuel: 25,592 Repairs: 7,282 Total: 49,969

*to be allocated to Directorate Drainage after the reorganization in 2012

Source: Prepared by the study team using WASA data (2011)

A portion of the subsidies is to be allocated to loan repayment of previously implemented ADB support projects, but presently a large portion is used to cover operating expenses. Since using subsidies for this purpose is becoming difficult, to cover cost recovery and repayment, WASA decided to raise water supply fees by about 40% in March 2004 and even carried it back to January. The World Bank master plan proposed provision of previous project investment costs from the provincial government to the municipality, but this could not be realized. As a measure to restructure future management, taking the opportunity of water supply increase from the presently on-going water supply improvement project, realization of the transfer over to the pending metered system is recommended.

Table 2-35 WASA Operating Budget and Operation and Maintenance Cost

(Unit: Thousand Rs)

No.	WASA Budget	Budget Analysis	Equipment and Personnel Plan	O&M Cost
1	Budget for 2009-2010 (FY from July to end June)	Grand Total: 845,480 1) Salaries: 385,530 2) Management cost: 104,450 (Sewerage related fuel, repairs, etc.) 3) Power: 285,000 4) Others: 70,500	1) Equipment plan: for WASA 2 directorates + 6 sub-divisions • 40 newly procured • 71 existing use 2) Personnel plan: • 43 operators • 86 assistants Total: 129 persons However, 70 operators and 70 assistants for a total of 140 persons for dewatering sets to be hired for emergency measures during rainy season 3) Salaries: 17,095 (about 4.4% of salary budget of 385,530)	Due to procurement of new equipment, number of main equipment will increase to reinforce functional capacity of sewerage and drainage O&M cost for capacity strengthening is 32,874 which is about 31.5% of current management cost (104,450) O&M cost for equipment (40 new + 71 existing =111) Total: 32,874(31.5%) • Fuel: 25,592 • Repairs: 7,282
2	Actual cost for 2008-2009	Total expenditures: 592,316 1) Salaries: 258,719 2) Management cost (sewerage): 50,527 3) Management cost (water supply): 18,895 (Sewerage related fuel, repairs, etc.) 4) Other vehicle fuel, repairs: 7,692 5) Power (water supply & sewerage): 242,795 6) Office expenses and others: 13,688	(100%) (43.7%) (8.5%) (3.2%) (1.3%) (41.0%) (2.3%)	Actual O&M cost for 86 existing sewerage related equipment: 1) Management cost (sewerage): 50,527 2) Vehicle fuel, repairs: 7,692 3) Total: 58,219

Source: Prepared by the study team using WASA data (2011)

(1) Analysis of Operation and Maintenance Cost

According to the 2008/2009 fiscal year results for operation and maintenance cost, as shown

in Table 2-35, about 76.4% (44,487 thousand Rs) of the sewerage related management cost (58,219 thousand Rs) was used for operator salaries, fuel costs and other O&M costs for 86 deteriorated equipment as well as repair costs of equipment and vehicles. This reveals the necessity for efficient reinforcement of the operational capacity by procuring new equipment.

In this project, while making use of 71 existing equipment which can still be effectively used, 40 new equipments will be procured to strengthen the system to 111 equipment. In relation to the current year (2009/2010) equipment related budget (104,450 thousand Rs), sewerage related management cost including salaries under the newly procured equipment allocation plan (49,969 thousand Rs) shares about 47.8%. Although the present 86 number of equipment will increase to 111, since the budget can be constrained within previous year's 12% increase, in addition to capacity strengthening, effective improvements can be anticipated. For this improvement, as shown in the O&M cost calculations in Tables 2-34, and 2-36, although the total number of equipment to be handled by WASA will become 111 with procurement of new equipment, since personnel to handle dewatering sets (70 sets) can be employed seasonally for 4 months only, staff salaries can be reduced from 21.9 million Rs to 17.1 million Rs.

Table 2-36 WASA Budget and Equipment O&M Costs

(Unit: Thousand Rs)

WASA Budget	2008/2009 (Actual)	Implementation Year (Prediction)
Equipment O&M Cost	44,487 (86)	49,969 (111)
1) Salaries and Wages	21,926	17,095 Adopt seasonal employment
2) Fuel and other management (Sewerage)	18,418	25,592
3) Repairs and Maintenance (Equip)	4,143	7,282

Source: Prepared by the study team using WASA data (2011)

(2) Plan for New Procurement and Allocation of Equipment

The equipment allocation plan in consideration of this project and using existing plans is shown in Table 2-37.

Table 2-37 Equipment Allocation Plan

No.	Equipment	Allocation of New Equipment		Analysis of Existing Equipment/Functioning Year							Replace/Reinforce	
		Allocation	New	Existing		20 yrs+	15 yrs+	10 yrs+	5 yrs+	3 yrs+		3 yrs-
				Total	Continue use							
1	Jet Machine	W-Dir, 3 Sub-Div	4	3	3	2	1					Replace/Reinforce
		E-Dir, 3 Sub-Div	4	4	4	2	1		1			Replace/Reinforce
2	Suction Machine	West Directorate	1	2	1			1		1		Replace/Reinforce
		East Directorate	1	1	1				1			Replace/Reinforce
3	Wheel Type Backhoe	Directorate Drainage	2	1	1				1			Replace/Reinforce
4	Mini-Backhoe	Directorate Drainage	2	0	0							Reinforce
5	Bucket Crane (Clam Shell)	Directorate Drainage	0	2	2	2						Use existing
6	Dump Truck	Directorate Drainage	7	2	0			2				Replace/Reinforce
7	Crane Cargo Truck	Directorate Drainage	2	0	0							Reinforce
8	Pick-up Truck	Directorate Drainage	0	7	6	5			2			Use existing
9	Dewatering Set	2 Directorates & 6 Sub-Divisions	17	W:3	23		6	1			1	Replace/Reinforce
				E:3	30	7		2			1	Replace/Reinforce
Total			40	92	71	18	8	35	5	1	25	

Source: Prepared by the study team using WASA data (2011)

CHAPTER 3

PROJECT EVALUATION

Chapter 3 Project Evaluation

3-1 Preconditions

Execution of the following items by the Pakistani side is the precondition for proper implementation of the Project

- Completion of PC-1 procedures
- Budgetary measures
- Facilitation for customs clearance
- Measures for tax exemption
- Bearing of the charge for the Banking Arrangements

3-2 Necessary Inputs by Recipient Country

The following inputs by the Pakistani side are required to realize and sustain the expected effects of the Project.

- Allocation of operators

The allocation of enough number of operators and staff to operate the increased equipment is necessary for effective operation.

- Arrangements for parking of vehicles and storage of equipment

Since the existing parking facilities of WASA are open, appropriate sheds with roof for parking shall be prepared for longer life of vehicles and equipment.

- Proper operation and maintenance of the equipment

Proper operation and maintenance for sustainable use of the equipment shall be assured since the Project counts on the operation of both existing and newly procured equipments.

- Preparatory works for existing disposal stations

Installation of pumps and diesel generators shall be carried out by the Japanese side and removal of existing pumps, rehabilitation and construction of pump foundations shall be executed by the Pakistani side.

- Improvement of the existing outlet facilities of the disposal stations

Enough capacity of the outlet facilities of disposal stations shall be assured to receive outflow from reinforced pumping equipment. In accordance with the dimensions and other relevant information about outlet facilities at each disposal station provided from WASA, those outlets will duly accept the increased outflow. However, necessary dredging and cleaning for sludge in the channels shall be carried out for proper functioning.

- Awareness campaigns

Awareness campaigns shall be carried out for sensitization to prevent residents from throwing wastes into sewerage and drainage facilities as preventive measures.

3-3 Important Assumptions

The important assumptions to realize and sustain the effects of the Project are presumed as follows.

- The deterioration of security situations will not be developed.
- The financial circumstances of WASA and the government of Punjab will remain the same.

3-4 Project Evaluation

Relevance and effectiveness due to Project implementation are expected as explained below.

1) Relevance of the Project

- Damages caused by floods and inundations in Faisalabad are seriously affecting the economic and social activities as well as hygiene and sanitation aspects, and are issues required to be solved urgently.
- The Project will contribute directly to the above issues as an immediate effect on reduction of present damages.
- More than 1.6 millions population served by the sewerage and drainage system will benefit directly or indirectly from the Project.
- Since the inundation damages are causing serious affects especially to the areas where roads and housings are less developed, the Project will contribute to the socially weak people who are living in those areas.
- The Project links to the “Project for the Improvement of Water Supply System in

Faisalabad” financed by the Japanese government currently being implemented and this link will contribute as the integral conception between water supply and sanitation.

2) Effectiveness of the Project

Quantitative Effects

The following table shows the expected outputs to be achieved through implementation of the Project.

Output Indicator	Current Level (2011)	Planned Level (2013)
Reduction in period needed to completely clean the sewer system using cleaning equipment (jet machine + suction machine)	21.6 years	10.8 years
Increase in possible number of emergency dispatches		
Jet Machine (Ave. Dispatch Requests: 40.3/day)	18.9 times/day	40.5 times/day
Suction Machine (Ave. Dispatch Requests: 10.1/day)	6.0 times/day	12.0 times/day
Dewatering Pump Set (Ave. Dispatch Requests: 69.9/day)	53 times/day	More than 70 times/day
Decrease in minimum time required to reach site (Dewatering Pump Set and Transport Vehicle)	25 to 60min. (Livestock + Tractor)	Less than 20 min. (Crane Truck, Pick-up Truck)
Improvement in Emergency Drainage Capacity (Dewatering Pump Set)	26.5cfs	43.5cfs *64.2% capacity improvement
Increase in Amount of Sludge and Waste Removal		
Desludging Capacity (Excavator)	570 m ³ /day	936 m ³ /day
Transport Capacity (Dump Truck)	9.1 m ³ /day	63.7 m ³ /day
Capacity Improvement of 4 Target Disposal Stations which discharge into final drains	246cfs	376cfs *52.8% capacity improvement

Qualitative Effects

The Project expects the following qualitative effects.

- Due to reduction in damages from flooding and inundations, risks of water-borne diseases caused by these phenomena will be reduced.
- Social and economic activities impeded by inundations and flooding will be reactivated.
- Due to improvements in conditions of uncollected waste and chronic inundations, the sanitary environment in the city will be improved.

APPENDICES

Appendix 1. Member List of the Survey Team

Preparatory Survey

Name	Position	Affiliation
Mr. Noriaki Nagatomo	Team Leader	Senior Advisor to the Director General Water Resources and Disaster Management Group Global Environment Department, JICA
Mr. Mahmood A. Jilani	Planning Management	Deputy Resident Representative & Disaster Management Section JICA Pakistan Office
Mr. Shoji Fujii	Chief Consultant / Sewerage, Drainage and Waste Planner	Japan Techno Co., Ltd.
Mr. Takaaki Ogawa	Plant Planner	Japan Techno Co., Ltd.
Mr. Shigeyoshi Kagawa	Equipment Planner	Japan Techno Co., Ltd.
Mr. Shoji Takamatsu	Cost Estimator / Construction and Procurement Planner 1	Japan Techno Co., Ltd.
Mr. Koji Miyauchi	Cost Estimator / Construction and Procurement Planner 2	Japan Techno Co., Ltd.

Explanation on Draft Report

Name	Position	Affiliation
Ms. Hiroko Kamata	Head of Mission	Senior Advisor, JICA
Mr. Kenji Tanaka	Survey Planning	Deputy Assistant Director, Disaster Management Division 1, Water Resources and Disaster Management group, Global Environment Department, JICA
Mr. Mahmood Jilani	Project Management	Deputy Resident Representative & Disaster Management Section JICA Pakistan Office
Mr. Shoji Takamatsu	Cost Estimator / Construction and Procurement Planner 1	Japan Techno Co., Ltd.
Mr. Koji Miyauchi	Cost Estimator / Construction and Procurement Planner 2	Japan Techno Co., Ltd.

Appendix 2. Survey Schedule

Preparatory Survey

No	Date	Day	JICA		Consultant									
			Team Leader	Planning Management	Chief Consultant/ Sewerage, Drainage and Waste Planner	Plant Planner	Equipment Planner	Cost Estimator / Construction and Procurement Planner 1						
			Mr. Nagatomo	Mr. Jilani	Mr. Fujii	Mr. Ogawa	Mr. Kagawa	Mr. Takamatsu						
1	11	7	Sun	Dept from Tokyo, Arrival at Lahore		Dept from Osaka, Arrival at Lahore		Dept from Tokyo, Arrival at Lahore						
2		8	Mon	Courtesy call to P&D Urban Unit, Faisalabad FDA/WASA, Explanation of ICR, Site visiting										
3		9	Tue	Courtesy call to HUD&PHED, Explanation of ICR, Discussion on M/M										
4		10	Wed	Signing of M/M with HUD&PHED • P&D, Courtesy call to WASA Lahore, Observation of sewerage system in Lahore										
5		11	Thu	Proceed to Islamabad		World Bank Conference	Observation of sewerage system in Lahore							
6		12	Fri	Report to JICA,EOJ & EAD Dept from Islamabad		Proceed to Faisalabad Meeting with WASA Faisalabad, Data collection								
7		13	Sat	Arrival at Tokyo		Meeting with WASA Faisalabad, Site survey (Sewerage plant & drainage)								
8		14	Sun	Eid high holly day (17~19)					Internal Meeting, Data analysis					
9		15	Mon						Meeting with WASA Faisalabad, Site survey (Sewerage plant & drainage)					
10		16	Tue						Meeting with WASA Faisalabad, Site survey (Sewerage plant & drainage)					
11		17	Wed						Internal Meeting, Data analysis					
12		18	Thu						Meeting with WASA Faisalabad, Site survey (Sewerage plant & drainage)					
13		19	Fri						Site survey					
14		20	Sat						Equipment survey					
15		21	Sun						Internal Meeting, Data analysis					
16		22	Mon						Meeting with WASA, Equipment survey					Cost estimation survey
17		23	Tue						Meeting with WASA, Data collection					Cost estimation survey
18		24	Wed	Meeting with WASA Faisalabad, Site survey (Sewerage plant & drainage)										
19		25	Thu	Meeting with WASA, Reconfirmation of requested equipment										
20		26	Fri	Reconfirmation of requested equipment, discussion on priority of requested equipment					Cost estimation survey, Dept from Islamabad					
21		27	Sat	Data collection					Arrival at Tokyo					
22		28	Sun	Internal Meeting, Data analysis										
23		29	Mon	Meeting with WASA, Data collection										
24		30	Tue	Meeting with WASA Faisalabad, Site survey (Sewerage plant & drainage)										
25	12	1	Wed	Meeting with WASA Faisalabad, Site survey (Sewerage plant & drainage)										
26		2	Thu	Discussion about Technical Note(T/N) Signing of T/N										
27		3	Fri	Proceed to Lahore, Report to P&D & JICA										
28		4	Sat	Equipment survey, proceed to Islamabad										
29		5	Sun	Internal Meeting, Data analysis										
30		6	Mon	Report to EOJ, Dept from Islamabad	Arrival at Osaka	Arrival at Tokyo								
31		7	Tue	Arrival at Osaka										

Explanation on Draft Report

No.	Date	Day	JICA			Consultant	
			Head of Mission	Survey Planning	Project Management	Cost Estimator / Construction and Procurement Planner 1	Cost Estimator / Construction and Procurement Planner 2
			Ms. Kamata	Mr. Tanaka	Mr. Jilani	Mr. Takamatsu	Mr. Miyauchi
1	2	19	Sun	Dept from Toky, Arrival at Lahore		Dept from Toky, Arrival at Lahore	
2		20	Mon	Courtesy call to P&D, Proceed to Faisalabad, Courtesy call to WASA, Site visiting, confirmation on components borne by Pakistani side			
3		21	Tue	Proceed to Lahore, Discussion with HUD&PHED, FDA, WASA about M/M			
4		22	Wed	Discussion with HUD&PHED, FDA, WASA about M/M			
5		23	Thu	Signing of M/M			
				Proceed to Islamabad		Proceed to Faisalabad, Discussion about construction and demolition works borne by WASA	
6		24	Fri	Report to JICA, EOJ & EAD		Discussion about construction and demolition works borne by WASA	
				Dept from Islamabad		Proceed to Lahore, Dept from Lahore	
7		25	Sat	Arrival at Tokyo		Arrival at Tokyo	

Appendix 3. List of Participants Concerned in the Recipient Country

Pakistani side

Name	Affiliation	Position
Mr. Ubaid Rubbani Qureshi	P&D Department	Secretary
Dr. Nasir Javed	P&D Department, Urban Unit	Project Director
Ms. Sana Hussain	P&D Department, Urban Unit	Research Associate (Water & Sanitation)
Ms. Syeda Sani-e-Zahra Naqvi	P&D Department, Urban Unit	Urban Planner
Mr. Murad Khan Rana	P&D Department, Urban Unit	Research Assistant (SWM)
Ms. Samra Fatima	P&D Department, Urban Unit	Research Analyst
Mr. Irfan Ali	HUD&PHED	Secretary
Mr. Moazzam	HUD&PHED	Deputy Secretary (Tech)
Mr. Shahid	HUD&PHED	Additional Secretary (Tech)
Dr. Arshad Mahmood	FDA	Director General
Dr. Ijaz Ahmad Randhawa	WASA Faisalabad	Managing Director (Former) Project Director
Mr. Khawaja Mehboob Elahi	WASA Faisalabad	Deputy Managing Director (Services)
Mr. Muhammad Shouhat Ali	WASA Faisalabad	Director (O&M) West
Mr. Waseem Ahmed Hashmi	WASA Faisalabad	Director (O&M) East
Mr. Abdul Majid	WASA Faisalabad	Director (Water Resources)
Mr. Faqir Muhammad	WASA Faisalabad	Director Construction-I
Mr. Adnan Nisar	WASA Faisalabad	Director Construction-II (West)
Mr. Asghar Ali	WASA Faisalabad	Deputy Director, Drainage
Mr. Imran Butt	WASA Faisalabad	Personal Assistant to Managing Director
Mr. Naeem Mohayud Din	WASA Faisalabad	Assistant Director, People's Colony
Mr. Usman Talat	WASA Faisalabad	Assistant Director
Mr. Ghulam Sarwar	WASA Faisalabad	Sub-Engineer, Civil Line
Mr. Javid Iqbal	WASA Faisalabad	Sub-Engineer, Madina Town
Dr. Javed Iqbal	WASA Lahore	Managing Director
Engr. Syed Zahid Aziz	WASA Lahore WASA Faisalabad	Director (P&E)(Former) Managing Director
Engr. Ahsan Zamir	WASA Lahore	Assistant Director (P&E)

Japanese side

Name	Affiliation	Position
Mr. Naru Otsubo	Embassy of Japan	First Secretary
Mr. Akira Goto	Embassy of Japan	Second Secretary
Mr. Nozomu Ono	JICA Islamabad Office	Representative

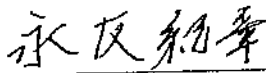
MINUTES OF DISCUSSIONS
PREPARATORY SURVEY (BASIC DESIGN)
ON
THE PROJECT FOR UPGRADATION OF MECHANICAL SYSTEM OF WASA FAISALABAD
IN
THE ISLAMIC REPUBLIC OF PAKISTAN

In response to a request from the Government of the Islamic Republic of Pakistan (hereinafter referred to as "Pakistan"), the Government of Japan decided to conduct a Preparatory Survey (Basic Design) on Upgradation of Mechanical System of WASA Faisalabad (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA"). JICA sent to Pakistan the Preparatory Survey Team (hereinafter referred to as "the Team"), which is headed by Mr. Noriaki NAGATOMO, Senior Advisor to the Director General, Global Environment Department, JICA, and is scheduled to stay in the country from November 7 to December 6, 2010.

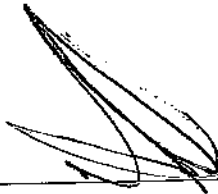
The Team held discussions with the officials concerned of the Government of Pakistan and conducted a field survey at the survey area.

In the course of discussions and field survey, both parties confirmed the main items described in the attached sheets. The Team will proceed to further works and prepare the preparatory survey report.

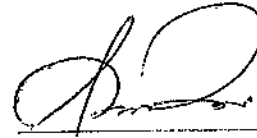
Lahore, November 11, 2010



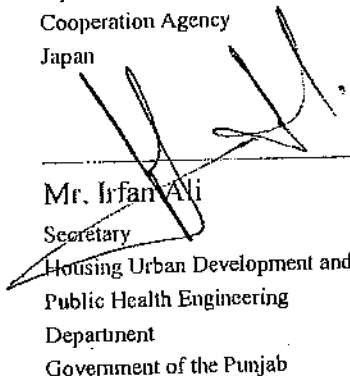
Mr. Noriaki Nagatomo
Leader
Preparatory Survey Team
Japan International
Cooperation Agency
Japan



Dr. Ijaz Ahmad Randhawa
Managing Director
Water and Sanitation Agency
Faisalabad Development Authority



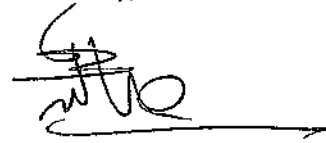
Dr. Arshad Mahmood
Director General
Faisalabad Development
Authority, Faisalabad



Mr. Irfan Ali
Secretary
Housing Urban Development and
Public Health Engineering
Department
Government of the Punjab



Mr. Ubaid Rabbani Qureshi
Secretary
Planning & Development Department
Government of the Punjab



Mr. Zafar Hassan Reza
Joint Secretary (ADB/Japan)
Economic Affairs Division
Government of Pakistan

ATTACHMENT

1. Objective of the Project

The objective of the Project is to improve the capacity of sewerage and drainage system in Faisalabad through replacement and procurement of equipments and machineries.

2. Project sites

The sites of the Project are located in Faisalabad as shown in **Annex-1**.

3. Responsible and Implementing Agency

3-1. The Sponsoring Agency: HUD & PHE Department, Government of the Punjab

3-2. The Implementing Agency: Water and Sanitation Agency (WASA), Faisalabad

The organization chart is shown in **Annex-2**.

4. Items requested by the Government of Pakistan

After the discussions, the items described in **Annex-3** were finally requested by the Pakistani side.

Both the sides confirmed that appropriateness of the request shall be examined in accordance with further studies and analysis in Japan and the final components of the Project would be decided by the Japanese side.

5. Japan's Grant Aid Scheme

5-1. The Pakistani side understands Japan's Grant Aid Scheme explained by the Team, as described in **Annex-4**.

5-2. The Pakistani side will take the necessary measures, as described in **Annex-5**, for smooth implementation of the Project, as a condition for the Japanese Grant Aid to be implemented.

6. Schedule of the Study

6-1. The consultants will proceed to further studies in Pakistan until December 6, 2010.

6-2. JICA will prepare the draft report in English and dispatch a mission in order to explain its contents in February, 2011.

6-3. If the contents of the report are accepted in principle by the Government of Pakistan, JICA will complete the final report and send it to the Government of Pakistan by April, 2011.

7. Other relevant issues

7-1. Security arrangement

The Government of Pakistan will take all possible measures to secure the safety for the concerned people during the Survey, and during implementation of the Project if the Grant Aid by the Government of Japan is extended under this Project.

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7-2. Approval of PC-I

The Team explained that the Project would be sent to the Japanese Cabinet for approval only after approval of the PC-I by the Pakistani side latest by April 2011.

The Pakistani side assured that approval of the PC-I would be completed by April, 2011. However, JICA will provide necessary cost estimates to Pakistani side for the preparation of PC-I.

7-3. External Facilities

Both the sides agreed that the Project component would be decided based on the original request of the Government of Pakistan and some essential parts of the equipment might be included on Pakistani side after the examination in Japan. However, additional requests are excluded from the Grant Aid of Japan.

7-4. Soft Component

The Team explained that the initial guidance and training for operation and maintenance of the equipments and machineries could be included in the Project to support smooth operation. Necessity and contents of the support will be examined during the Survey.

7-5. Tax Exemption

The tax exemption including Value Added Tax (VAT), custom duty, and any other taxes and fiscal levies in Pakistan which is to be arisen from the Project activities shall be ensured by the Government of Pakistan. The Government of Pakistan shall take necessary procedures for tax exemption.

7-6. Clearance of Existing Facilities

Both the sides confirmed that clearance work at existing facilities will be undertaken by the Pakistani side. Detail schedule will be discussed during the Survey.

7-7. Initial Environmental Examinations (IEE)

Both the sides agreed that the Pakistani side would complete necessary procedure of IEE, if so required, by the end of February 2011 in accordance with "the Environmental Protection Act 1997" of Pakistan.

7-8. Visibility of the Project

The Pakistani side affirmed the following measures to be taken in order to enhance publicity of the Project:

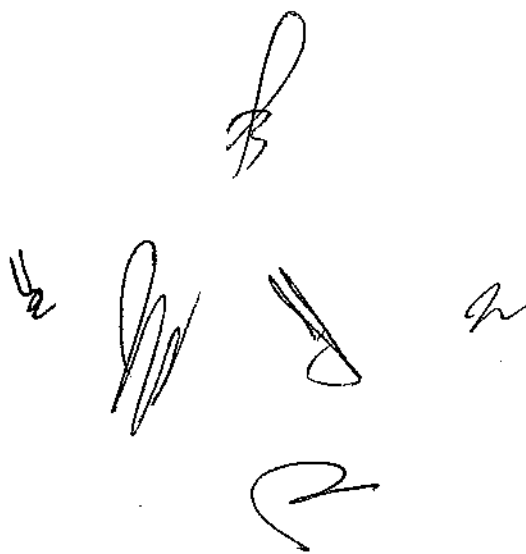
- (a) Mass media sources
- (b) Brochures
- (c) Commemoration panels

7-9. Public awareness

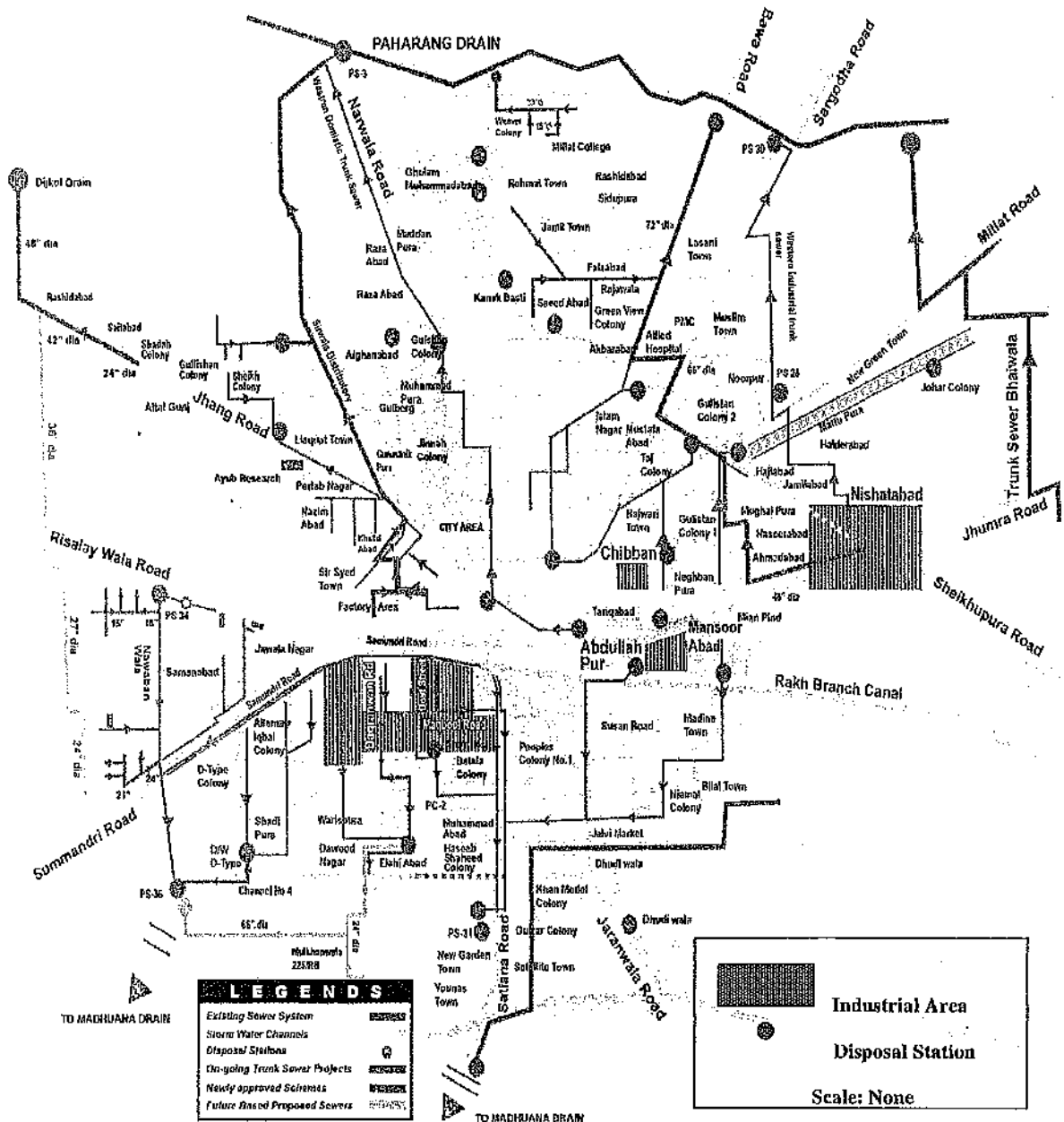
Both the sides agreed that the Pakistani side would take necessary actions including awareness campaign to refrain the public disposing of solid waste in the open channels.

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- Annex-1 Project Sites Map
- Annex-2 Organization Chart (WASA Faisalabad)
- Annex-3 Items Requested by the Pakistani Side
- Annex-4 Japan's Grant Aid Scheme
- Annex-5 Major Undertakings to be taken by each Government

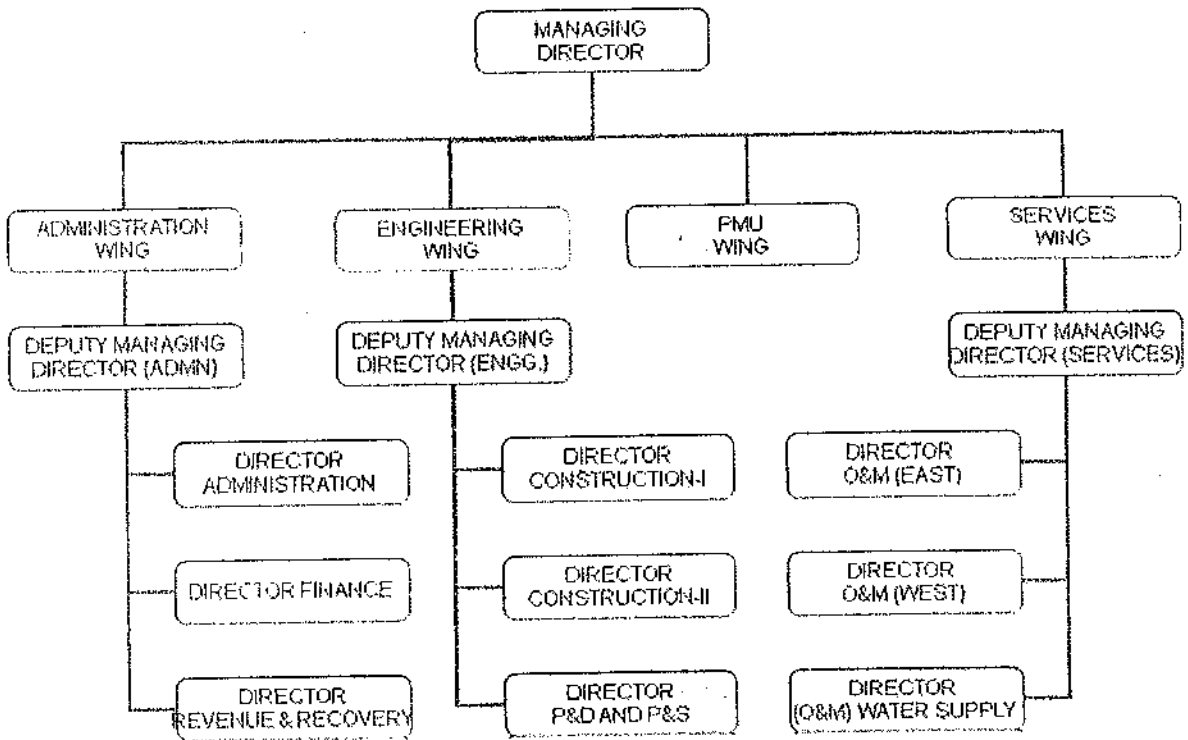
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Annex-1 Project Sites Map



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Annex-2 Organization Chart (WASA Faisalabad)



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Annex-3 Items Requested by the Pakistani Side

Priority (Tentative)	Item	Specification	Purpose
High	Jet machine	Tank capacity: 4,000lit.	Sewer cleaning
High	Suction machine	Tank capacity: 4,000lit.	Sewer cleaning
High	Excavator (Backhoe)	Bucket size:0.35m ³	Drain dredge
High	Bucket crane (Clam shell)	Lifting capacity: 12 ton Boom length:23.8m Jib length:5.5m	Drain dredge
High	Dump truck	Payload:4ton	Carrying silt to dump site
Medium	Dewatering set	1 cusec (Diesel) 4 cusec (Diesel) 4 cusec (Electric)	Temporary flow arrangement
High	Pumps for disposal stations	4 cusec 6 cusec 15 cusec 25 cusec	Replacement of existing equipment
High	Generator	100 kVA 200 kVA 300 kVA 500 kVA 635 kVA 730 kVA	Replacement of existing equipment
Medium	Tractor and Trolley	-	-
Medium	4-wheel drive jeeps	-	Mobilization
Medium	4-wheel drive pick-up truck	Double cabin	Mobilization
High	Safety equipment (Oxygen cylinder, mask, diving suit)	-	Safety measures for sewer cleaning
Low	Computer and software	-	Project monitoring
High	Communication Equipment	-	Communication
Medium	Workshop Equipment	-	Maintenance for equipment

The Government of Japan (hereinafter referred to as "the GOJ") is implementing the organizational reforms to improve the quality of ODA operations, and as part of this realignment, JICA was reborn on October 1, 2008. After the reborn of JICA, following the decision of the GOJ, Grant Aid for General Project is extended by JICA.

Grant Aid is non-reimbursable fund to a recipient country to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

1. Grant Aid Procedures (Attachment 1)

Japanese Grant Aid is conducted as follows-

- Preparatory Survey (hereinafter referred to as "the Survey")
 - the Survey conducted by JICA
- Appraisal & Approval
 - Appraisal by the GOJ and JICA, and Approval by the Japanese Cabinet
- Determination of Implementation
 - The Notes exchanged between the GOJ and a recipient country
- Grant Agreement (hereinafter referred to as "the G/A")
 - Agreement concluded between JICA and a recipient country
- Implementation
 - Implementation of the Project on the basis of the G/A

2. Preparatory Survey

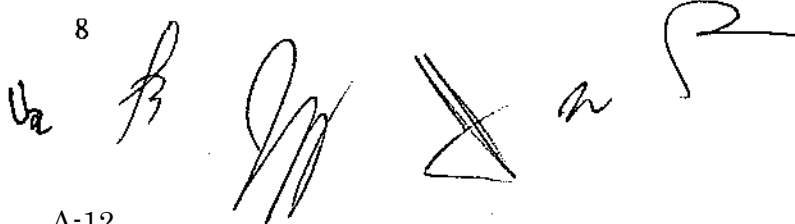
(1) Contents of the Survey

The aim of the Survey is to provide a basic document necessary for the appraisal of the Project by JICA and the GOJ. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of agencies concerned of the recipient country necessary for the implementation of the Project.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, financial, social and economic point of view.
- Confirmation of items agreed on by both parties concerning the basic concept of the Project.
- Preparation of a basic design of the Project.
- Estimation of costs of the Project.

The contents of the original request by the recipient country are not necessarily approved in their initial form as the contents of the Grant Aid Project. The Basic Design of the Project is confirmed considering the guidelines of the Japan's Grant Aid scheme.

JICA requests the Government of the recipient country to take whatever measures are necessary to

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ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA uses (a) registered consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

The Report on the Survey is reviewed by JICA, and after the appropriateness of the Project is confirmed, JICA recommends the GOJ to appraise the implementation of the Project.

3. Japan's Grant Aid Scheme

(1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the E/N will be signed between the GOJ and the Government of the recipient country to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the necessary articles to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

(2) Selection of Consultants

The consultant firm(s) used for the Survey will be recommended by JICA to the recipient country to also work on the Project's implementation after the E/N and the G/A, in order to maintain technical consistency.

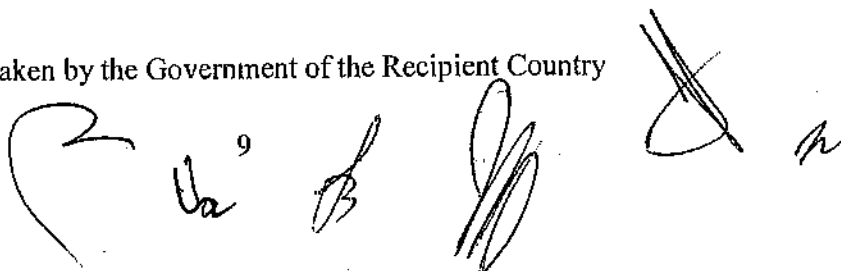
(3) Eligible Source Country

Under the Japanese Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. When JICA and the Government of the recipient country or its designated authority deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

(4) Necessity of "Verification"

The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by JICA. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

(5) Major undertakings to be taken by the Government of the Recipient Country

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In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as Attachment 1.

(6) Proper Use

The Government of recipient country is required to maintain and use the facilities constructed and the equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

(7) Export and Re-export

The products purchased under the Grant Aid should not be exported or re-exported from the recipient country.

(8) Banking Arrangements (B/A)

- a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). JICA will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.
- b) The payments will be made when payment requests are presented by the Bank to JICA under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

(9) Authorization to Pay (A/P)

The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions to the Bank.

(10) Social and Environmental Considerations

A recipient country must ensure the social and environmental considerations for the Project and must follow the environmental regulation of the recipient country and JICA socio-environmental guideline.



FLOW CHART OF JAPAN'S GRANT AID PROCEDURES

Stage	Flow & Works	Recipient Government	Japanese Government	JICA	Consultant	Contractor	Others
Application	<p>Request (T/R : Terms of Reference)</p> <p>Screening of Project → Evaluation of T/R → Project Identification Survey</p>	●					
Project Formulation & Preparation	Preparatory Survey	●	●	●			
	Preparatory Survey2 (Basic Design)	●	●	●	●		
	Explanation of Draft Final Report	●	●	●	●		
Appraisal & Approval	<p>Appraisal of Project</p> <p>Inter Ministerial Consultation</p> <p>Presentation of Draft Notes</p> <p>Approval by the Cabinet</p>		●				
Implementation	E/N & G/A (E/N : Exchange of Notes, G/A : Grant Agreement)	●	●	●			
	Banking Arrangement	●					●
	Consultant Contract → Verification → Issuance of A/P	●		●	●		
	Detailed Design & Tender Documents → Approval by Recipient Government → Preparation for Tendering	●		●	●		
	Tendering & Evaluation	●		●	●	●	
	Procurement /Construction Contract → Verification → A/P	●		●	●	●	
	Construction → Completion Certificate by Recipient Government → A/P	●		●	●	●	
Operation → Post Evaluation Study (A/P : Authorization to Pay)	●		●				
Evaluation & Follow up	<p>Ex-post Evaluation → Follow up</p>	●		●			

Annex-5: Major Undertakings to be taken by each Government

No	Items	To be covered by Grant Aid	To be covered by Recipient Side
1	To secure land		•
2	To clear, level and reclaim the sites when needed		•
3	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities		
	1) Electricity		
	a. The distributing line to the sites		•
	b. The drop wiring and internal wiring within the sites	(•)	(•)
	c. The main circuit breaker and transformer	(•)	(•)
	2) Water Supply		
	a. The city water distribution main to the sites		•
	b. The supply system within the sites (receiving and elevated tanks)	•	
	3) Drainage		
	a. The city drainage main (for storm sewer and others to the sites)		•
	b. The drainage system (for toilet sewer, ordinary waste, storm drainage and others) within the sites		•
4	To bear the following commissions to the Japanese foreign exchange banking service based upon the B/A		
	1) Advising commission of A/P		•
	2) Payment commission		•
5	To ensure unloading and customs clearance at the port of disembarkation in recipient country		
	1) Marine (Air) transportation of the products from Japan to the recipient country	•	
	2) Tax exemption and customs clearance of the products at the port of disembarkation		•
	3) Internal transportation from the port of disembarkation to the Project sites	(•)	(•)
6	To accord Japanese nationals whose service may be required in connection with the supply of the products and the services under the verified contract, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.		•
7	To exempt Japanese nationals engaged in the Project from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contracts engaged in the Project.		•
8	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid		•
9	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities as well as for the transportation and installation of the equipment		•

(B/A: Banking Arrangement, A/P: Authorization to Pay)

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Appendix 5 Technical Note

**TECHNICAL NOTE
FOR
PREPARATORY SURVEY
ON
THE PROJECT FOR UPGRADATION OF MECHANICAL SYSTEM OF
WASA FAISALABAD
IN
THE ISLAMIC REPUBLIC OF PAKISTAN**

In accordance with the Inception Report submitted on 8 November 2010 and the Minutes of Meetings signed on 11 November 2010, the Preparatory Survey Team (hereinafter referred to as "the Team") for the Preparatory Survey (Basic Design) on the Project for Upgradation of Mechanical System of WASA Faisalabad (hereinafter referred to as "the Project") conducted field surveys at the project target areas and held discussions with the relevant concerns of the Water and Sanitation Agency (WASA) Faisalabad.

As a result of field surveys and discussions, both parties confirmed the items described in the attached sheets. The Team will proceed to further works in Japan and prepare the draft final preparatory survey report to be submitted in February 2011.

Faisalabad, 2 December 2010



Shoji Fujii
Chief Consultant
Preparatory Survey Team
JICA



Dr. Ijaz Ahmad Randhawa
Managing Director
Water and Sanitation Agency
Faisalabad

1. Revision and Priority of Requested Equipment

As a result of the field surveys and discussions, the Pakistani side made revisions of the requested equipment as shown in the attachment. Also, the Pakistani side provided an alternative option as well as priorities of the equipment in order of their importance. Based on consideration of the various options, equipment to be procured will be proposed upon discussions with JICA headquarters.

2. Works to be borne by the Pakistani side

The Pakistani side clarified that if it becomes inevitable to demolish the existing pump housings and carry out the rehabilitation and/or new construction of housings for disposal stations, then it will be carried out by the Pakistani side.

3. Training of WASA Technicians

The Pakistani side mentioned the possibility for technicians of WASA-Faisalabad to participate in the JICA technical cooperation project being implemented in WASA-Lahore.

4. Awareness Campaign

The Pakistani side explained that awareness campaigns through radio and newspaper to restrain residents from throwing solid waste into channels and drains are being considered by WASA Faisalabad. Also, further educational activities to the communities by installing sensitization panel boards along the channels are under consideration.

Attachments

- Attachment 1: Revised List of Requested Equipment with Justifications
- Attachment 2: Options for Requested Equipment



Attachment 1: Revised List of Requested Equipment with Justifications

No.	Equipment	Specifications	Justification
1	Jet machine	Similar to existing equipment	There is a length of 1700 Km of Reinforced Cement Concrete (RCC) Pipelines in the network of WASA Faisalabad. Their diameters range between 300mm to 2700mm. Besides that, 75000 manholes are located on these lines in the service area. The industrial / commercial / domestic units discharge their sewer through the manholes into the network. Due to the inefficient machinery at the disposal stations, the complaints of blockade / chocking of pipeline are often received of which the statistical data are available and thus, new jet machines are needed.
2	Suction machine	Similar to existing equipment	There are 75000 manholes in WASA's network. Due to the accumulation of sludge in the manholes, there are flow retardations. Under such conditions, if the accumulated sludge (at the bottom of manhole) is not sucked up / cleaned, then the problem is shifted to upstream side which causes overflowing from the manholes and consequently giving rise to flooding conditions, and which further brings about the environmental hazards in the areas. The existing machines have outlived and need a lot of repairs for their maintenance, and hence are un-economical as well.
3	Excavator (Backhoe)	Medium capacity	The total length of storm water carriers/ channels is sixty-two kilometers, having very mild slope due to the flat-terrain of the city. As a result of which there are a lot number of complaints of blockade due to sedimentation of silt particles / sludge at the bottom of these channels. To keep the channels operational, frequent de-silting of these channels is necessary. The depth of the sludge within these channels can be assessed from the datasheet (available).
		Small capacity	There are certain reaches along the channels in populated areas where sufficient space for operation of bigger machines is not available and some smaller type of excavators is needed to be provided for efficient flow within the channel in these problematic areas.
4	Bucket crane (Clam shell)	Medium capacity	Some areas require cleaning of the channels with the help of machines suitable for space-constraint situations where operation and movement of machines become difficult. For these operations medium capacity bucket cranes are needed. Also, the dwellings and property lines are situated just on the banks of the channels. So, very slim machines which can perform these operations as well as the cleaning / dredging operation of wet-wells in the disposal station premises are needed to be provided to WASA.
		Small capacity	
5	Dump truck	Similar to existing equipment	When the channels are cleaned with the help of excavators and bucket cranes, the sludge taken out in the cleaning process has to be transported / conveyed to the landfill areas, at distant places. If that sludge volume is not immediately shifted, that may cause environmental problems and may be responsible for different diseases. Hence, for immediate disposal of the sludge to landfill sites, dump trucks will be sufficient for this purpose during the cleaning operation.
6	Crane cargo truck	Sufficient capacity to transport dewatering sets and small excavators	For the transportation of the dewatering sets to the affected / flooded areas, the present practice is that these dewatering sets are towed by the donkey carts. Now, the City Police as well as the District Governments have imposed ban on the movement of donkey carts on the major roads. Due to these restrictions, the transportation of the said dewatering units has become very difficult. To overcome this situation trailers and trolleys were requested, but for better efficiency, Crane Cargo Trucks are recommended to be provided




7	Pick-up truck	Double cabin	During break-downs, tools & plants & labor force has to be shifted on emergent basis to any part of the city. To dispatch materials efficiently to the sites and to provide the immediate relief to the public in the service area, the double cabin pick-up trucks are recommended to be provided.
8	Dewatering set	1 cusec (Diesel)	In the monsoon season, the complaints abruptly rushed up from all sides (domestic / industrial / commercial customers) simultaneously. It is impossible for WASA to provide the services to the huge number of complainants at the same time with the present arrangements (dewatering sets). Hence, the sizes of sets detailed in Column 3 are recommended for moderately / highly ponded / low-lying areas:
		2 cusec (Diesel)	
		2 cusec (Electric)	
9	Pumps for disposal stations	2 cusec	Most of the existing disposal stations were built 40-50 years back. The machinery installed on these disposal stations has either outlived or has become inefficient or is under-capacity. Besides that the population in the respective service areas / basins of these pump stations has been saturated. Furthermore, the growth rate is very high to the tune of 3.8 percent/annum. The overflowing through the manholes in the upstream areas is causing the flooding and environmental hazards besides the ponding in low lying areas. The situation has further worsened in some sensitive areas, i.e. near hospitals, schools and densely populated communities. Actually, all this is due to the inefficiency of existing pumping machinery installed at various pumping stations across the city. As per the general engineering practice, if the flow velocity within the sewage pipeline will be less than 0.75 meter/second, the silting up of pipelines starts. Velocities below can cause deterioration of the situation. To keep the velocity well within the range of self-cleaning velocity (0.75 meter/second) it is necessary to upgrade / enhance the lifting-capacity of different pumping stations by replacing the under-sized / outlived pumping machinery. Accordingly, the pumping machinery needed to be replaced at various disposal stations has been detailed out in Column 3.
		4 cusec	
		6 cusec	
		10 cusec	
		15 cusec	
		25 cusec	
10	Generator for disposal stations	50 kVA	Due to the frequent electric shutdowns, because of energy crises in Pakistan, big disposal stations situated in critical areas cannot perform for long times. For that reason, the overflowing / ponding / environmental problems crop up in the command areas / catchment basins of these pump stations. For smooth running of the system, during such blackouts / load sheddings, it is necessary to provide generators of sufficient capacities at these disposal stations. The details of the diesel generating sets are given under Column 3.
		75 kVA	
		210 kVA	
		300 kVA	
		500 kVA	
11	Station wagon	None	This equipment is needed for supervision and surveillance by WASA staff as well as transport of materials in emergent situations. However this function can be served by pick-up trucks and therefore, these will be procured by the Pakistani side as needed.
12	Safety equipment	None	This equipment is to be used for cleaning sewers in limited areas during specific periods. However, this equipment can be procured by the Pakistani side as the need arises.
13	Computer and software	None	This equipment can be procured by the Pakistani side as needed.
14	Communication Equipment	None	Walkie-talkies are requested but due to difficulties in arrangements for securing air-wave permits, procurement should be made by the Pakistani side whenever this equipment is needed.
15	Garage, Workshop	None	WASA does not possess a proper garage or workshop for repairs of equipment and WASA does not have sufficient staffs for repairs and maintenance. Therefore, since most repairs are outsourced, if the necessity for this equipment arises, then this can be procured by the Pakistani side.

Attachment 2: Options for Requested Equipment

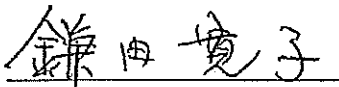
No.	Equipment	Specifications	1 st Option		2 nd Option		Priority Level
			Q'ty	Proposed Allocation	Q'ty	Proposed Allocation	
1	Jet machine	As existing	12	2 at each Sub-Division	8	1 at each Sub-Division and Directorate	High
2	Suction machine	As existing	2	1 at each Directorate	2	1 at each Directorate	High
3	Excavator (Backhoe)	Medium capacity	1	West Directorate	1	West Directorate	High
		Small capacity	1	East Directorate	1	East Directorate	
4	Bucket crane (Clam shell)	Medium capacity	2	1 at each Directorate	2	1 at each Directorate	High
		Small capacity	2	1 at each Directorate	2	1 at each Directorate	
5	Dump truck	As existing	6	1 at each Sub-Division	6	1 at each Sub-Division	High
6	Crane cargo truck	Carry dewatering sets and small excavator	6	1 at each Sub-Division	2	1 at each Directorate	Medium
7	Pick-up truck	Double cabin	6	1 at each Sub-Division	4	2 at each Directorate	Medium
8	Dewatering set	1 cusec (Diesel)	25	1 for 2 ponding areas	13	1 for 4 ponding areas	Low
		2 cusec (Diesel)	16	1 for each low lying area	4	1 for 4 low lying areas	
		2 cusec (Electric)	6	1 at each Sub-Division	4	2 at each Directorate	
9	Pumps for disposal stations	2 cusec	3	Replacement and upgrading of existing pumps	0	Replacement and upgrading of existing pumps at important disposal stations	Low
		4 cusec	14		0		Low
		6 cusec	3		0		Low
		10 cusec	5		2		Medium
		15 cusec	4		2		Medium
		25 cusec	12		10		High
10	Generator for disposal stations	50 kVA	1	Replacement and upgrading of existing generators	0	Replacement and upgrading of existing generators at important disposal stations	Low
		75 kVA	2		0		Low
		210 kVA	2		0		Low
		300 kVA	1		1		Medium
		500 kVA	4		2		Medium

MINUTES OF DISCUSSIONS
ON
THE PREPARATORY SURVEY
ON
THE PROJECT FOR UPGRADATION OF MECHANICAL SYSTEM OF WASA
FAISALABAD
IN
THE ISLAMIC REPUBLIC OF PAKISTAN
(EXPLANATION ON DRAFT REPORT)

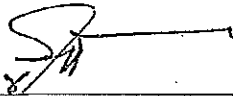
In response to a request from the Government of the Islamic Republic of Pakistan (hereinafter referred to as "Pakistan"), the Government of Japan (hereinafter referred to as "Japan") decided to conduct a Preparatory Survey on The Project for Upgrading of Mechanical System of WASA Faisalabad (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to Pakistan the Preparatory Survey Team (hereinafter referred to as "the Team"), which is headed by Ms. Hiroko KAMATA, Senior Advisor, JICA, and is scheduled to stay in the country from February 19 to 24, 2012.

The Team held discussions with the officials concerned of Pakistan and conducted a field survey at the project area. In the course of discussions and field survey, both parties confirmed the main items described in the attached sheets.




Ms. Hiroko KAMATA
Head
Preparatory Survey Team
Japan International
Cooperation Agency



SHAHID LATIF
Secretary
Housing Urban Development and
Public Health Engineering
Department
Government of the Punjab

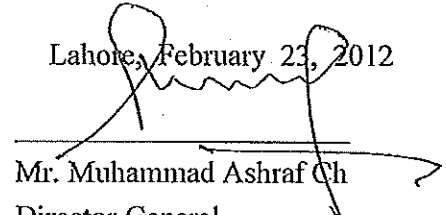


Mr. Syed Zahid Aziz
Managing Director
Water and Sanitation Agency
Faisalabad Development
Authority

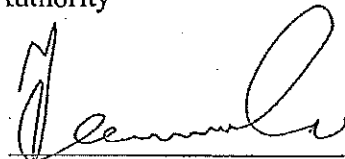


Mr. Ali Tahir
Secretary
Planning & Development
Department
Government of the Punjab

Lahore, February 23, 2012



Mr. Muhammad Ashraf Ch
Director General
Faisalabad Development
Authority



Mr. Jamil Anwar
Joint Secretary
(ADB/Japan)
Economic Affairs Division
Government of Pakistan

ATTACHMENT

1. Components of the Draft Report

The Pakistan side agreed and accepted in principle the components of the Draft Report explained by the Team. The components of the Project are shown in Annex-1. The scope/item contained in Annex-1 would be as per the approval/clearance of competent fora(PDWP/CDWP).

However, both sides recognized the output of generators and increase of number of Dump Truck shall be further considered by Japanese side.

2. Japan's Grant Aid scheme

The Pakistan side understood Japan's Grant Aid Scheme and the necessary measures to be taken by the Pakistan side as explained by the Team as per the Minutes of Discussions signed by both sides on 11th November 2010 (hereinafter referred to as "the Previous M/D").

3. Schedule of the Survey

JICA will complete the final report in accordance with the confirmed items and send it to the Pakistan side by April 2012.

4. Tentative Schedule of the Project

The Pakistan side understood the tentative time schedule of implementation stage of the Project as shown in Annex-2. The Pakistan side also understood the time schedule is subject to change, depending on the date of Exchange of Notes (hereinafter referred to as "E/N") and Grant Agreement (hereinafter referred to as "G/A").

5. Confidentiality of the Project

5.1 Detailed Specifications

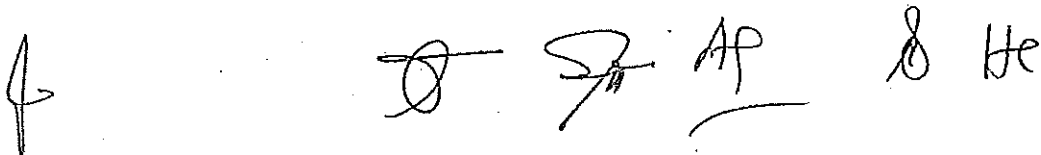
Both sides confirmed all the information related to the Project including detailed specifications of the equipment and other technical information shall not be released to any other party(ies) before the signing of all contract(s) for the Project.

5.2 Project Cost Estimate

The Team explained to the Pakistan side the estimated project cost to be borne by the Japan as attached in Annex-3.

The Pakistan side agreed to allocate necessary budget in order to bear requested undertakings as shown in Annex-3. The Team also explained that these cost estimations are subject to change since they are provisional and need to be further examined.

Both sides agreed that the Project Cost Estimate should never be duplicated in any form nor disclosed to any other party(ies) before the signing of all the Contract(s) for the Project. This confidentiality of the estimated project cost is necessary to ensure fairness of the tender procedure.



6. Undertakings of the Pakistan side

The Team requested and the Pakistan side agreed on the following undertakings in addition to the major undertakings described in the Previous M/D.

6.1 Security arrangement

The Government of Pakistan will take all possible measures to secure the safety for the concerned people during the Survey and implementation of the Project on condition that the Grant Aid by the Government of Japan is extended to the Project.

6.2 Tax Exemption

The Pakistan side agreed to ensure exemptions of Value Added Tax (VAT), customs duty, all other taxes and fiscal levies in the Pakistan which are to be arisen from the Project activities.

6.3 Demolishing Work and Construction of housings including foundations for new pumps and additional diesel generators

Both sides confirmed that the demolishing work of the existing pump housings, the rehabilitation and /or new construction of housings, the removal of existing pumps, pipes, control panels and other relevant equipment and disposal of construction debris shall be undertaken by the Pakistan side before commencement of the construction work by the Japanese side (As shown in Annex-4).

Detailed schedule will be discussed during the Detailed Design Study, but the removal of pumps, pipes, control panels which are out of order, shall be implemented in advance. In this relation, the Pakistan side agreed to allocate budget and take necessary measures according to the schedule of the Project.

6.4 Improvement of the existing channels and Construction of sheds for the new cleaning equipment

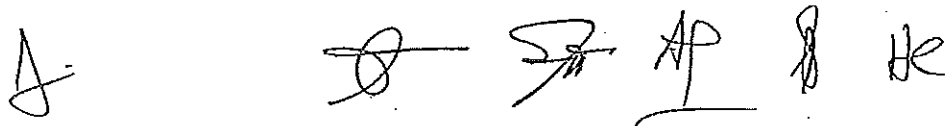
As a result of the field survey, the Japanese side proposed the Pakistan side that the capacity improvement of the existing channels shall be done in order to avoid the overflow due to the increase of the pumping capacities before the commencement of the project.

Regarding the installation of cleaning equipment such as suction machines, jet machines etc., both sides recognized the necessity of sheds with roof for a better parking of these new equipment.

6.5 Operation and Maintenance of the equipment to be procured and incidental facilities

The Pakistan side shall be responsible for the operation and maintenance of the equipment to be procured and incidental facilities such as housings with generator, drainage canals, pipes, and pump control panels, etc., including budget allocation under the supervision of the Government of the Punjab.

In this relation, the Pakistan side agreed to undertake the followings, regarding the cost estimation as shown in Annex-5:



- 1) To allocate relevant number of additional personnel in accordance with the increased number of equipment provided by the Project, before the installation of equipment.
- 2) To allocate the necessary budget for the operation and maintenance of relevant facilities, before finishing the installation of equipment.

6.6 Approval of PC-I

The Team explained that the Project would be sent to the Japanese Cabinet for approval only after approval of the PC-I by the Government of Pakistan. The Pakistan side assured to make the maximum efforts for approval of the PC-I from the competent fora by the end of April, 2012.

(END)

Annex -1 : Tentative list of Components of the Project

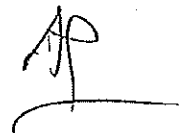
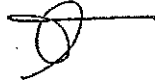
Annex -2 : Tentative Implementation Schedule

Annex -3 : Project Cost Estimation

Annex -4 : The Works to be borne by WASA Faisalabad

Annex -5 : Cost estimation on the increase of personnel cost and maintenance cost

Annex -6 : Decision of the CDWP(Central Development Working Party)



Annex-1 Tentative list of Components of the Project

1) The equipment to be procured:

No.	Equipment	Main Specifications	Quantity
1	Jet Machine	Tank capacity: >3,500 lit Pump capacity: About 200 lit/min	8
2	Suction Machine	Capacity: >3,500 lit	2
3	Wheel Backhoe	Struck capacity: 0.2 m ³ class Options: hydraulic clam shell, skeleton bucket	2
4	Mini-Backhoe	Struck capacity: 0.08 m ³ class Option: skeleton bucket	2
5	Dump Truck*1	Payload: >3,500 kg	6*1
6	Crane Cargo Truck	Payload: >2,500 kg Crane lifting capacity: 2.9t	2
7	Pick-up Truck*1	4x4 Double Cabin, diesel	6*1
8	Dewatering Set	1 cfs (Diesel)	17
9	Pumps for Disposal Stations	25 cfs	9
10	Generators for Disposal Station	150 kVA, Diesel*2	2*2
		300 kVA, Diesel	1
		500 kVA, Diesel*2	1

*1 The Japanese side originally proposed the procurement of 6 Pick-up Trucks, however the Pakistan side informed that in line with the policy of the Federal/Provincial government the procurement of Pick-up Truck which must be deleted. (copy attached Annex-6). The Pakistan side requested to utilize the saving for the procurement of the capacity enhancement of generators and additional Dump Truck. The mission explained that the Japanese side shall further consider.

*2 Generators with output of 500kVA and 150kVA are originally designed for PS-3 Chokera and PS-30 Bawa Chak, respectively. However, as a result of the field observations, these designed outputs shall be increased to 650kVA and 350kVA respectively due to the unavailability of the existing generators at these 2 stations.

2) Soft Component (Technical Assistance)

1	Review of existing sewer and channel network map of WASA (Confirmation on accuracy through joint work with Sub-Engineers and carry out necessary revisions)
2	Assistance for preparation of cleaning work plan (work schedule, equipment allocation plan, earned value management plan) (Joint work with Assistant Directors and Sub-Engineers)
3	Monitoring and analysis of cooperation effects (Joint work with Sub-Engineers and Sewer Supervisors)
4	Preparation of manual for procedures and methods of daily inspections, maintenance and repairs of equipment (Joint work with Sub-Engineers and Sewer Supervisors)

Annex-2 Tentative Implementation Schedule

Implementation Period (Cooperation Period: 25 months)

Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Activities	EN GA									Manufacturing						Transportation				Installation									
(1) Detail Designing																													
(2) Procurement																													
(3) Soft Component																													

A. [Signature] [Signature] [Signature] [Signature] [Signature] HC

Annex-3 Project Cost Estimation

The total amount required for execution of the Project is . The breakdown of the cost to be borne by the Japanese side and the Pakistan side is estimated as follows, based on the allocation of works between the two countries and in accordance with the conditions indicated in (3) below. However, the amount does not signify the maximum grant amount in the Exchange of Notes (E/N).

(1) Cost to be borne by the Japanese side

(2) Cost to be borne by the Pakistan side **150 million Pakistan Rupees***
*(subject to the approval of the PC-1)

The Cost shall cover the following items

- 1 Provision for civil works / foundation of pumps
- 2 Construction of sheds for parking
- 3 Improvement of channels
- 4 Awareness campaign
- 5 Bank commission
- 6 Others

A series of handwritten signatures and initials in black ink, including a stylized 'S', a circled 'O', a signature that looks like 'S/A', the letters 'AP', a signature that looks like 'B', and the letters 'HC'.

Annex-4

The Works to be borne by WASA Faisalabad

THE PROJECT FOR UPGRADATION OF MECHANICAL SYSTEM OF WASA FAISALABAD

The Works to be borne by WASA Faisalabad

	o: Existing pump	•: New pump	□: Existing Diesel Generator	■: New Diesel Generator
	Works to be borne by WASA Faisalabad			
	Works to be implemented by Japanese Grant Aid Project			
PS-3 Chokera	o 15cfs (Not working)*1 → • 25cfs o 15cfs (Not working)*1 → • 25cfs o 15cfs (Operating) → Remain same o 15cfs (Operating) → Remain same o 25cfs (Operating) → Remain same o 25cfs (Operating) → Remain same □ 200 kVA + ■ 500 kVA*3	<ul style="list-style-type: none"> ➤ Removal of existing two (2) pumps (15cfs), pipes, control panels and other relevant equipment ➤ Demolition of two (2) existing pump (15cfs) foundations ➤ Construction of two (2) foundations for new pumps (25cfs) ➤ Rehabilitation of existing channel from disposal station to lagoon ➤ Construction of bypass channel to Paharang drain ➤ Rehabilitation of existing crane in disposal station 	<ul style="list-style-type: none"> ➤ Installation of two (2) sets of pumps (25cfs), pipes, control panels and other relevant equipment ➤ Installation of one (1) set of Diesel Generator (500kVA) ➤ Electrical wiring works 	
PS-31 Satiana Road	o 15cfs (Not working)*1 → • 25cfs o 15cfs (Operating)*1 → • 25cfs o 25cfs (Operating/deteriorated)*2 → • 25cfs o 25cfs (Operating/deteriorated)*2 → • 25cfs □ 300 kVA + ■ 300 kVA	<ul style="list-style-type: none"> ➤ Removal of existing four (4) pumps (15cfs×2, 25cfs×2), pipes, control panels and other relevant equipment ➤ Demolition of four (4) existing pump foundations ➤ Construction of four (4) foundations for new pumps (25cfs) ➤ Improvement of Satiana Road Sullage Drain 	<ul style="list-style-type: none"> ➤ Installation of four (4) sets of pumps (25cfs), pipes, control panels and other relevant equipment ➤ Installation of one (1) set of Diesel Generator (300kVA) ➤ Electrical wiring works 	

(Handwritten signatures and initials)

	Scope of projected works	Works to be borne by WASA Faisalabad.	Works to be implemented by Japanese Grant Aid Project
PS-36 Ahmad Nagar	<ul style="list-style-type: none"> ○ 15cfs (Operating) * 1 → ● 25cfs ○ 15cfs (Operating) * 1 → ● 25cfs ○ 15cfs (Operating) → Remain same ○ 15cfs (Operating) → Remain same □ 300 kVA + ■ 150 kVA 	<ul style="list-style-type: none"> ➤ Removal of existing two (2) pumps (15cfs), pipes, control panels and other relevant equipment ➤ Demolition of two (2) existing pump (15cfs) foundations ➤ Construction of two (2) foundations for new pumps (25cfs) ➤ Rehabilitation of existing housing for diesel generator to accommodate new additional generator 	<ul style="list-style-type: none"> ➤ Installation of two (2) sets of pumps (25cfs), pipes, control panels and other relevant equipment ➤ Installation of one (1) set of Diesel Generator (150kVA) ➤ Electrical wiring works
PS-30 Bawa Chak	<ul style="list-style-type: none"> ○ 13cfs (Operating) → Remain same ○ 13cfs (Operating) → Remain same ○ 13cfs (Operating) → Remain same ◎ Empty bed + ● 25cfs □ 189 kVA + ■ 150 kVA * 3 	<ul style="list-style-type: none"> ➤ Rehabilitation of empty bed for new pump (25cfs) foundation ➤ Replacement of outlet pipe to the Paharang Drain according to increased discharge rate (if necessary) 	<ul style="list-style-type: none"> ➤ Installation of one (1) set of pump (25cfs), pipes, control panel and other relevant equipment ➤ Installation of one (1) set of Diesel Generator (150kVA) ➤ Electrical wiring works

*1 Pumps and foundations should be removed and the foundations must be constructed before the implementation stage starts.

*2 Pumps and their foundations should be removed during the implementation stage after the new two (2) pumps have been replaced and are in operation.

*3 Generators with output of 500kVA and 150kVA are originally designed for PS-3 Chokera and PS-30 Bawa Chak, respectively. However, as a result of the field observations, these designed outputs shall be increased to 650kVA and 350kVA respectively due to the unavailability of the existing generators at these 2 stations

Annex-5 Cost estimation on the increase of personnel cost and maintenance cost

(Unit: Thousand Rs)

	Actual expenses (2008/2009)	With Implementation (Prediction)	
1) Salaries and Wages	21,926	17,095	Adopt seasonal employment
2) Fuel and other management (Sewerage)	18,418	25,592	
3) Repairs and Maintenance (Equip)	4,143	7,282	
Total: Annual Equipment O&M Cost	44,487	49,969	

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Annex-6 Decision of the CDWP(Central Development Working Party)

Government of Pakistan
Planning Commission
Planning & Development Division

MINUTES OF CDWP MEETING HELD ON 7TH APRIL, 2011

Agenda Item No. CC-5: Up-gradation of Mechanical System of WASA, Faisalabad (Rs 680.50 million =JPY 813.20 Million)

The Chief (PP&H) apprised that subject concept clearance proposal aims to procure machinery / equipment for improvement of the service delivery system of WASA Faisalabad, through JICA's Grant-in-Aid. The project will help in retrieval of the water supply, sewerage & drainage system of WASA Faisalabad and improvement in the service delivery system of the city.

2. The said that the machinery / equipment requirement has not been rationalized as per decision of PDWP. The machinery / equipments should be rationalized on the basis of detailed analysis of existing system. Besides, procurement of vehicle is a non-development item which should be deleted.

3. The sponsors agreed to rationalize the scope & cost at time of formulation of the PC-I.

Decision:

The concept clearance proposal was cleared by the CCC/CDWP with the recommendation that scope of work should be rationalized at the time of formulation of the PC-I. Government of the Punjab should expedite the instructions of the CDWP in letter & spirit.



AddYbXjl + Conditions for Sewer Cleaning

Using the map provided by WASA which shows large diameter sewers (over 21inch), pipe lengths for each diameter were calculated and the total of these large diameter pipes is 3.8% of the total length of 1,784km. Small diameter pipes (from 21inch to 9inch) which are not shown on the map make up the remaining 1,716km. Since pipe of diameters larger than 27inch can be enter by personnel for cleaning, jet machines and suction machines are not necessary for cleaning these pipes. In consideration that, as the pipe diameter becomes smaller, the chances for blockages become higher, and therefore, the amounts of deposits inside the pipes were estimated. However, since sewage is actually flowing inside the pipes, the upper limit for becoming blocked will be set at 50%.

Table-1 Conditions for Sewer Cleaning and Years Necessary for Cleaning

Total sewer length (km)	1,785
Total length of pipes less than 27 in (km)	1,716.8
Daily amount of deposits possible to be cleaned by 1 equipment set (m ³ /day) (from Japan Sewerage Facilities Operation and Maintenance Cost Estimate Handbook, 2009)	1.2 to 4.5, depending on pipe diameter
Annual operation days (days)	250
Total amount of deposits inside pipes (m ³) N.B.1	44,583
Required cleaning days for 1 equipment set (days) N.B.2	10,803

N.B.1: For total amount of deposits inside pipes, refer to Table-3, 3rd row from bottom, Deposits Amount

N.B.2: For required number of days for 1 equipment set, refer to Table-3, last row, Working Days per Set

Table-2 Lengths of Sewers by Diameter (m)

Diam. (in)	Personnel can enter inside of pipe ← ← ← ← ← → → → Personnel cannot enter																	Total Sewer Length (m)
	72	66	60	54	48	42	36	33	30	27	24	21	18	15	12	9		
Diam. (mm)	1,829	1,676	1,524	1,372	1,219	1,067	914	838	762	686	610	533	457	381	305	229		
Trunk Sewer Bhai Wala	0	2,200	400	2,200	0	400	0	0	0	1,000	800	800	0	0	0	0	0	
Western Industrial Trunk Sewer	0	0	1,400	400	2,200	400	1,000	600	0	0	800	0	0	0	0	0	0	
Trunk Sewer Bawa Road	4,000	800	3,000	0	1,600	1,000	0	0	1,000	0	0	0	0	0	0	0	0	
Western Domestic Trunk Sewer	0	0	0	3,000	0	0	0	0	0	0	0	0	0	0	0	0	0	
Trunk Sewer Sir Wala Distributary	2,600	1,400	0	1,200	600	0	0	0	1,000	0	0	0	0	0	0	0	0	
Trunk Sewer Saifabad	0	0	0	0	800	400	0	0	1,200	0	0	400	0	0	0	0	0	
Trunk Sewer Khekashan Coony	2,200	0	1,200	1,400	0	2,400	0	0	0	0	0	0	0	0	0	0	0	
Sammakabad Trunk Sewer	0	0	0	0	0	0	0	0	3,800	0	800	0	0	0	0	0	0	
Others	0	0	0	0	1,200	2,400	3,600	2,800	1,200	3,000	3,600	68,672	137,344	274,688	549,376	686,720		
Total	8,800	4,400	6,000	8,200	6,400	7,000	4,600	3,400	8,200	4,000	6,000	69,872	137,344	274,688	549,376	686,720	1,785,000	

Grand total length of sewers (total of last row): 1,785km

Table-3 Amount of Deposits in Sewers and Daily Cleaning Rate per Equipment Set

Diam. (in)	Personnel can enter inside of pipe ←←←←←															Total Sewer Length (m)	
	72	66	60	54	48	42	36	33	30	27	24	21	18	15	12		9
Diam. (mm)	1,829	1,676	1,524	1,372	1,219	1,067	914	838	762	686	610	533	457	381	305	229	
Total (m)	8,800	4,400	6,000	8,200	6,400	7,000	4,600	3,400	8,200	4,000	6,000	69,872	137,344	274,688	549,376	686,720	1,785,000
Sludge Depth (%)										10	20	30	40	50	50	50	
Blockage Area ($\times 10^{-2} \text{m}^2$)										2.003	4.026	4.954	5.941	6.283	3.534	2.454	Total Deposits (m^3)
Deposit Amount (m^3)										80	242	3,461	8,160	17,259	19,415	16,852	44,583
Standard Deposit Cleaning per Set (m^3/day)										4.055	5.493	5.501	6.521	4.317	3.487	2.902	Total Days (1 set)
Working Days per Set										20	44	629	1,251	3,998	5,568	5,807	10,803

N.B.: 1 equipment set = 1 jet machine + 1 suction machine

Blockage cross-sectional areas are blockage cross-sectional areas for each pipe (unit: $\times 10^{-2} \text{m}^2$) of Table-4 which are the values where deposit depth (%) and pipe diameter (most nearest diam.) cross. For example, if the deposit depth of $\phi 27$ is 5%, the blockage cross-sectional area is obtained by using a diameter of 700mm (most nearest to $\phi 27$) and deposit depth of 5% from the table, and the value where they cross is $0.719 \times 10^{-2} \text{m}^2$.

Standard deposit cleaning rates (m^3/day) per set are obtained using Table-5 which are the values where deposit depth (%) and pipe diameter (most nearest diam.) cross. For example, if the deposit depth of $\phi 27$ is 5%, the standard deposit cleaning rate is obtained by using a diameter of 700mm (most nearest to $\phi 27$) and deposit depth of 5% from the table, and the value where they cross is $1.237 \text{ m}^3/\text{day}$.

Table-4 Blocakge Cross-Sectional Area per Diameter (Unit: $\times 10\text{-}2\text{m}^2$)

Diam. (mm) Deposit Depth (%)	←← Personnel cannot enter pipe →→							
	250	300	350	400	450	500	600	700
5	0.092	0.132	0.180	0.235	0.297	0.367	0.529	0.719
10	0.255	0.368	0.501	0.654	0.828	1.022	1.472	2.003
15	0.426	0.665	0.905	1.182	1.496	1.847	2.659	3.620
20	0.699	1.006	1.370	1.789	2.264	2.796	4.026	5.479
25	0.960	1.382	1.881	2.457	3.109	3.839	5.528	7.524
30	1.239	1.784	2.428	3.171	4.013	4.954	7.134	9.710
35	1.531	2.205	3.001	3.920	4.961	6.125	8.819	12.004
40	1.834	2.640	3.594	4.694	5.941	7.334	10.561	14.375
45	2.142	3.085	4.199	5.485	6.941	8.570	12.340	16.796
50	2.454	3.534	4.811	6.283	7.952	9.817	14.137	19.242
55	2.765	3.984	5.422	7.082	8.963	11.065	15.934	21.688
60	3.075	4.428	6.027	7.872	9.964	12.301	17.713	24.109
65	3.378	4.864	6.62	8.647	10.943	13.510	19.455	26.480
70	3.669	5.285	7.194	9.396	11.891	14.681	21.140	28.774
75	3.949	5.687	7.740	10.110	12.795	15.796	22.747	30.961
80	4.210	6.062	8.251	10.777	13.640	16.839	24.249	33.005
85	4.447	6.404	8.716	11.384	14.408	17.788	25.615	34.865
90	4.653	6.701	9.120	11.912	15.077	18.613	25.803	36.482
95	4.817	6.936	9.441	12.331	15.607	19.80	27.746	37.765
100	4.909	7.069	9.621	12.566	15.904	19.635	28.274	38.485

Source: Japan Sewerage Facilities Operation and Maintenance Cost Estimate Handbook, 2009

Table-5 Standard Deposit Cleaning Rate per Diameter (Unit: m^3/day)

Diam. (mm) Deposit Depth (%)	←← Personnel cannot enter pipe →→							
	250	300	350	400	450	500	600	700
5	0.509	0.733	0.906	1.071	1.189	1.303	1.337	1.237
10	1.005	1.413	1.647	1.870	2.044	2.166	2.104	2.283
15	1.556	2.008	2.317	2.600	2.812	2.881	3.032	3.222
20	1.999	2.536	2.900	3.185	2.442	3.522	3.865	4.055
25	2.505	3.054	3.499	3.783	4.042	4.107	4.809	5.041
30	2.911	3.531	4.030	4.249	4.535	4.607	5.493	5.535
35	3.307	3.947	4.472	4.704	4.961	5.083	6.262	6.482
40	3.814	4.541	5.067	5.398	5.463	5.501	6.970	7.044
45	4.049	4.658	5.249	5.649	5.692	5.913	7.404	7.222
50	4.466	5.125	5.917	5.969	6.521	6.283	8.341	7.889
55	3.926	4.301	4.715	4.742	4.659	4.535	5.574	6.070
60	3.782	4.047	4.352	4.317	4.279	4.047	5.018	5.727
65	3.577	3.791	3.969	3.888	3.827	3.645	4.471	5.027
70	3.385	3.487	3.667	3.475	3.328	3.082	4.015	4.602
75	3.159	3.182	3.325	3.030	2.940	2.683	3.636	4.021
80	2.902	2.907	2.968	2.692	2.453	2.356	3.150	3.628
85	2.715	2.563	2.617	2.392	2.163	1.958	2.563	3.140
90	2.418	2.277	2.279	2.024	1.808	1.674	2.143	2.552
95	2.166	1.941	1.981	1.725	1.560	1.348	1.941	2.264
100	1.914	1.766	1.635	1.507	1.272	1.178	1.696	2.309

Source: Japan Sewerage Facilities Operation and Maintenance Cost Estimate Handbook, 2009

AddYbXjl ', Confirmation on appropriateness of designed pump capacities

Confirmation on the appropriateness of designed pump capacities has been carried out using maximum inflows and outflows based on characteristics of each disposal station. Namely, the permissible maximum volumes of inflow and outflow from dimensions, shape and material of sewer pipes and channels connected to each disposal station were calculated and the designed pumping flow rates were verified so that the permissible rates are not exceeded.

The conditions for the verification procedure were determined in accordance with the Japanese guideline for designing of sewerage facilities and in consideration of the the actual situation of this project.

Inflow volume:

Maximum flow into disposal station was calculated by multiplying pipe cross section and flow velocity.

Outflow volume:

Permissible volume discharged from outlet of disposal station was calculated by multiplying outflow channel cross section and flow velocity.

Velocity:

The following values have been employed: for sewer pipes, 0.6 m/s (minimum) and 3.0 m/s (maximum); and for storm water and combined sewer pipes, 0.8 m/s (minimum) and 3.0 m/s (maximum). In general, velocities of 1.0 m/s to 1.8 m/s is preferable for either combined or separated sewer with increased velocities going downstream. Since actual topographic data are not available, the calculation was made using the gradient described below.

Gradient:

Due to the unavailability of data showing altitudes of the sites to determine gradients, as gradients to calculate velocities, the appropriate gradient in accordance with existing pipe diameters and an extreme value of 1.0‰ were used. Although the Japanese sewerage

facilities guideline does not give any special standard for gradient, it mentions that considerations should be given to lowering the gradient going downstream. Since Faisalabad has almost no undulations, as a realistic case, 2‰ was used, and for those surpassing this, a lower minimum value was used. For the outflow side, since the flow goes out into an open channel, the velocities were calculated using 1‰, which is a gradient lower than that of the pipeline. However, for PS-3 Chokera and PS-30 Bawa Chak, the gradients of 2‰ and 4‰, respectively, as confirmed from drawings of each disposal station were used

Water depth ratio:

In accordance with hydraulic characteristic curves, as water depth ratios, 80% for sewers, and 80% and 100% for open channels were used for calculation of flow.

Coefficient of roughness:

Standard values from Manning's equation conforming to the materials of pipes and channels connected to each disposal station were used to determine coefficients of roughness.

As a result of verification, at all disposal stations targeted for the project, we have confirmed that the inflow volume and pumping capacities are designed appropriately in accordance with the maximum permissible volume of inflow and outflow at existing facilities. Details of the verification procedure are shown in the attached sheet.

