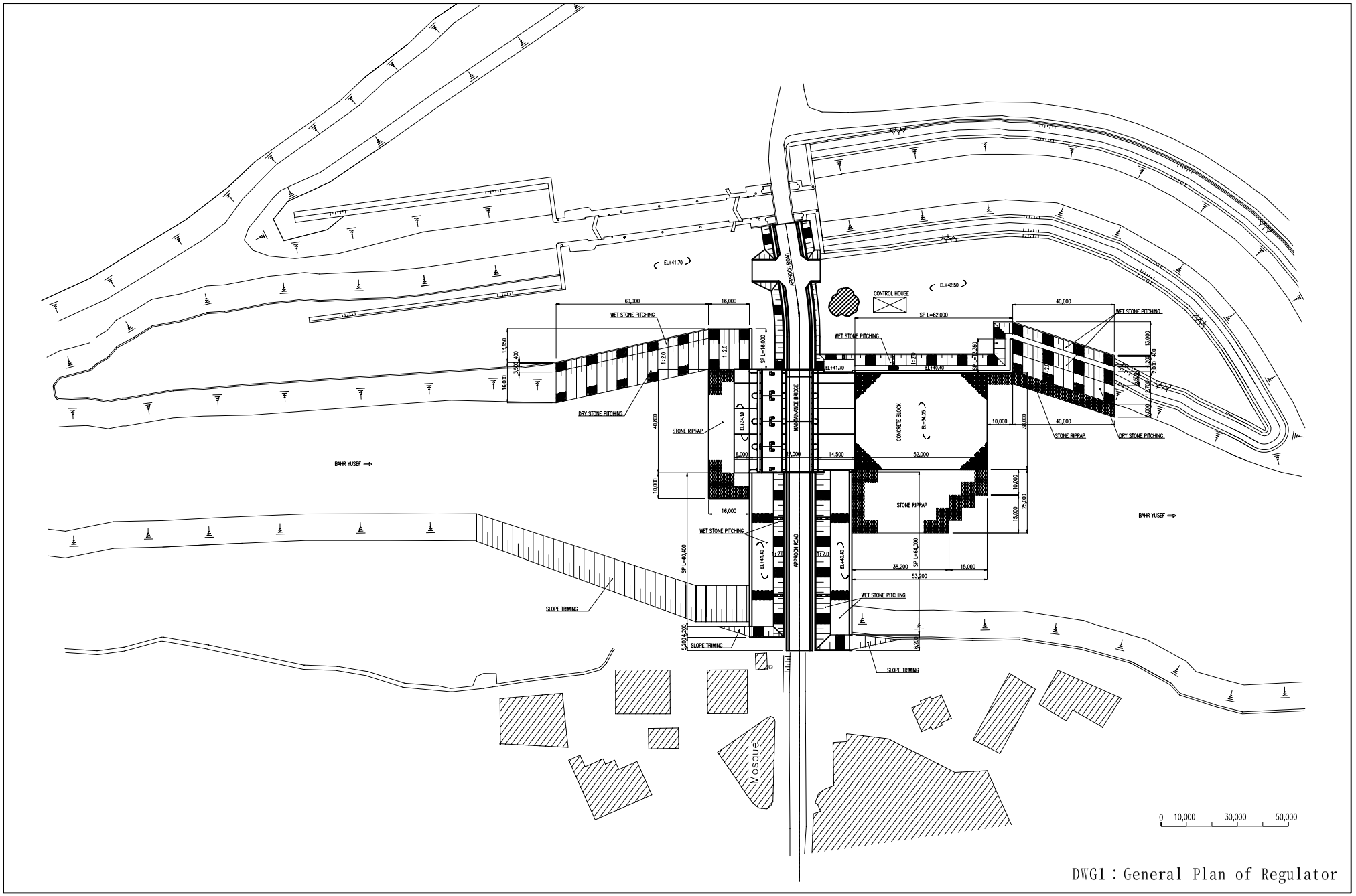
2-2-3 Basic Design Drawing

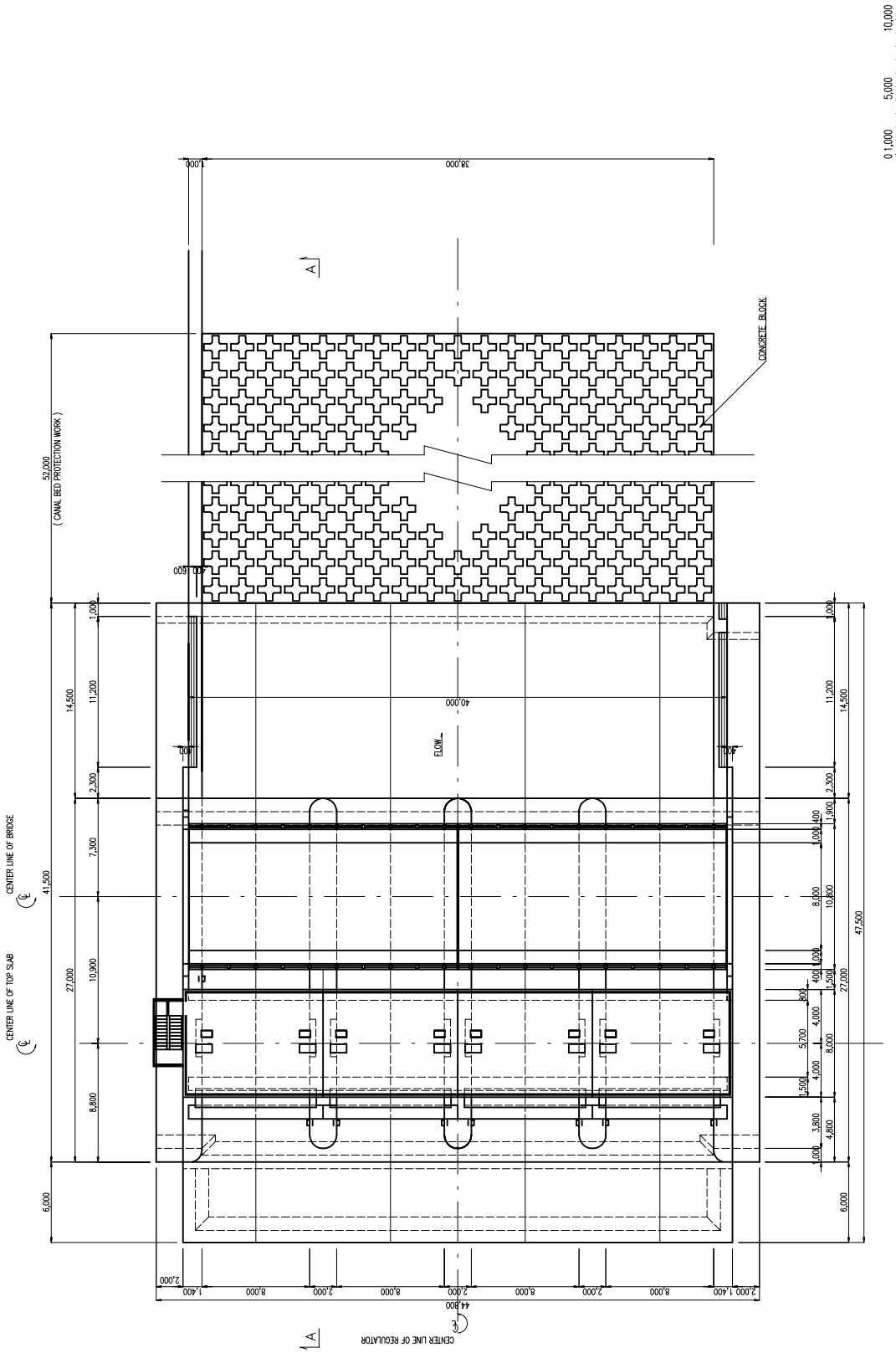
List of Basic Design Drawings

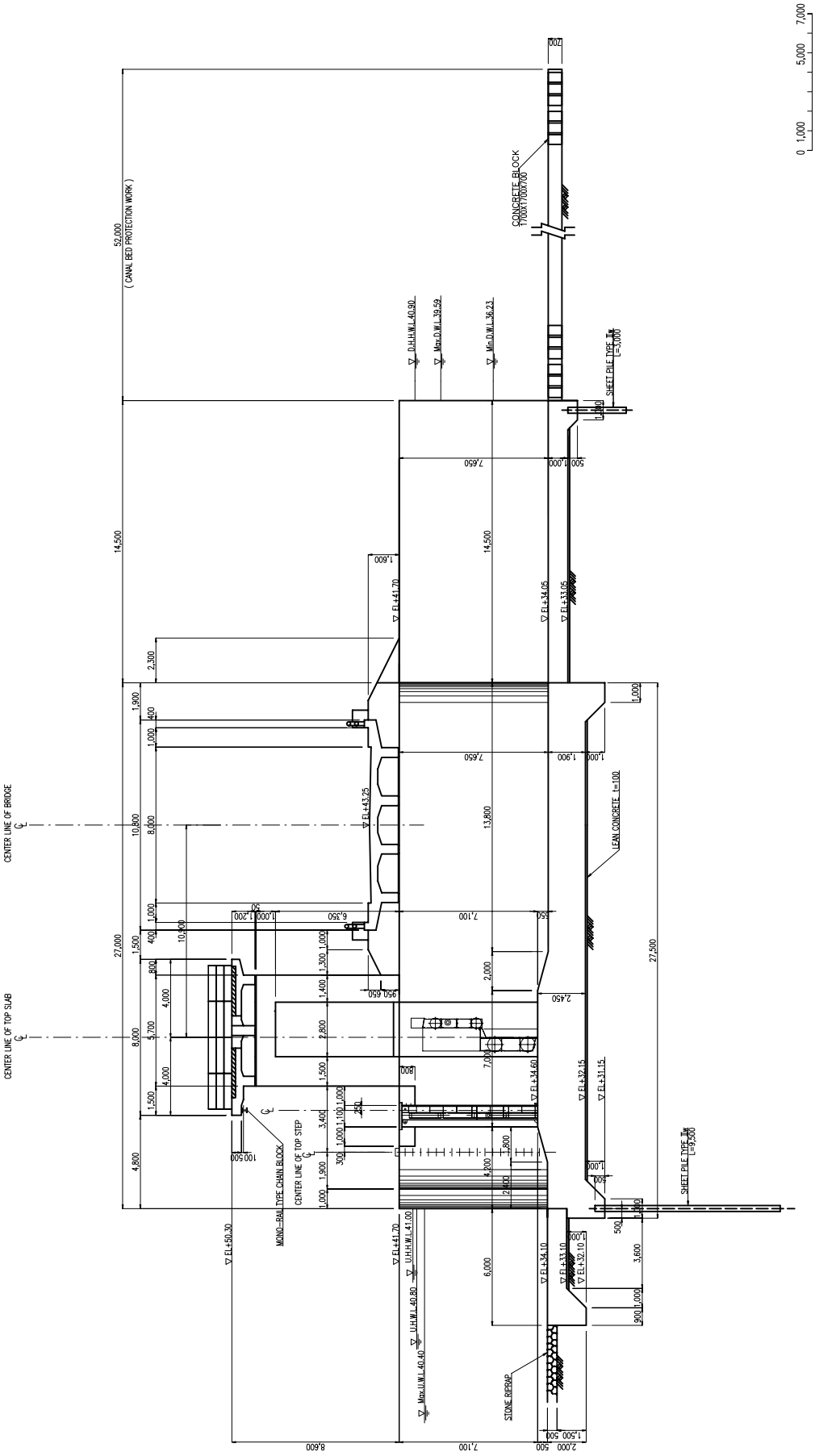
Drawing No.	Title of Drawing
DWG-1	General Plan of Regulator
DWG-2	Detailed Plan of Regulator
DWG-3	Longitudinal Profile of Regulator
DWG-4	Elevation of Regulator
DWG-5	Regulator bridge
DWG-6	Sheet Pile Protection Wall (1/2)
DWG-7	Sheet Pile Protection Wall (2/2)
DWG-8	Plan of Foundation of Control House
DWG-9	Section of Foundation of Control House
DWG-10	General Drawing of Gate Facility
DWG-11	Assembling Drawing of Gate Leaf
DWG-12	Assembling Drawing of Hoisting Device
DWG-13	Assembling Drawing of Stop Log
DWG-14	Single Line Diagram
DWG-15	Wiring Diagram of Control System
DWG-16	Plan of Temporary Facility
DWG-17	Section of Temporary Cofferdam
DWG-18	Plan of Temporary Bridge



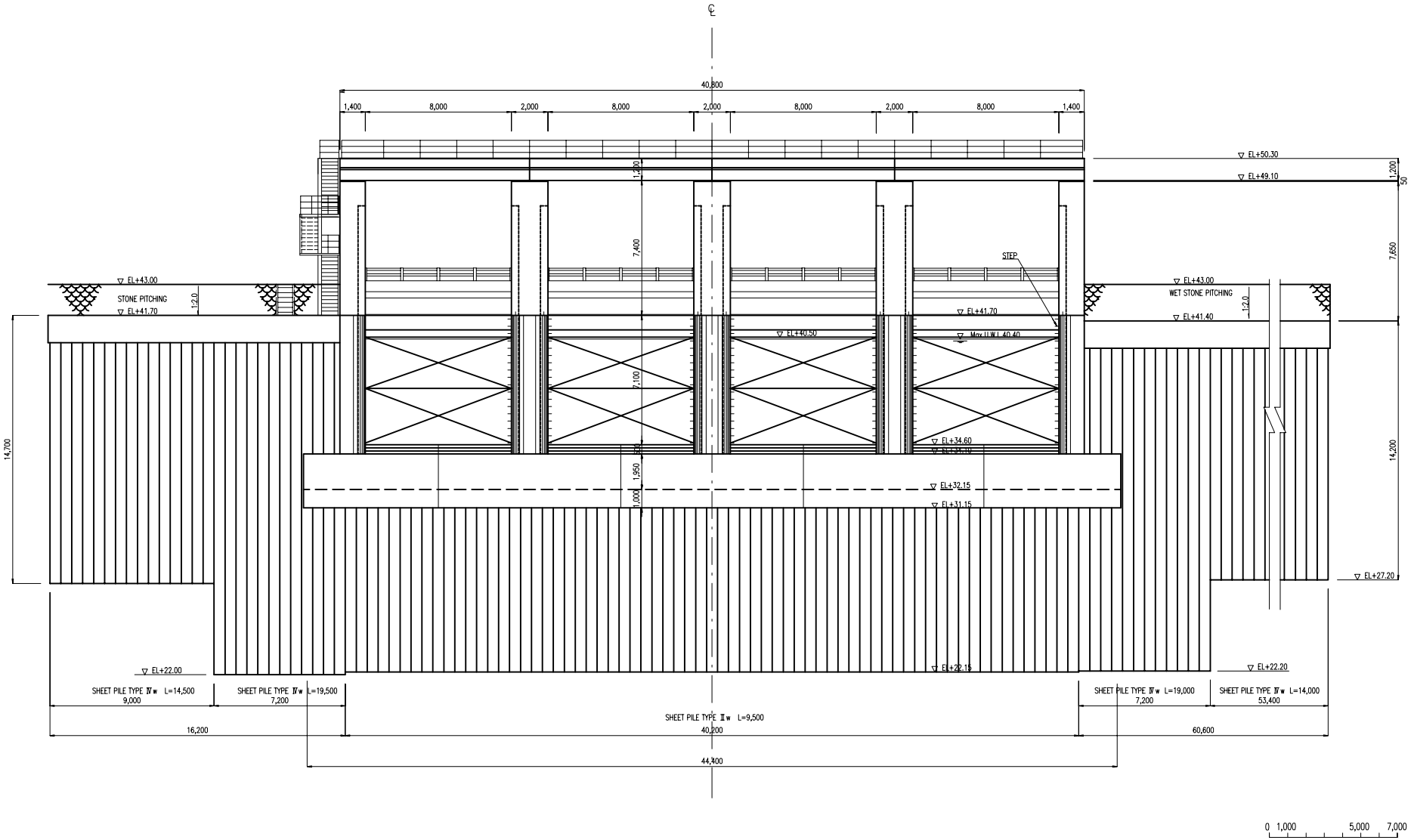
DWG1 : General Plan of Regulator

DWG2 : Detailed Plan of Regulator

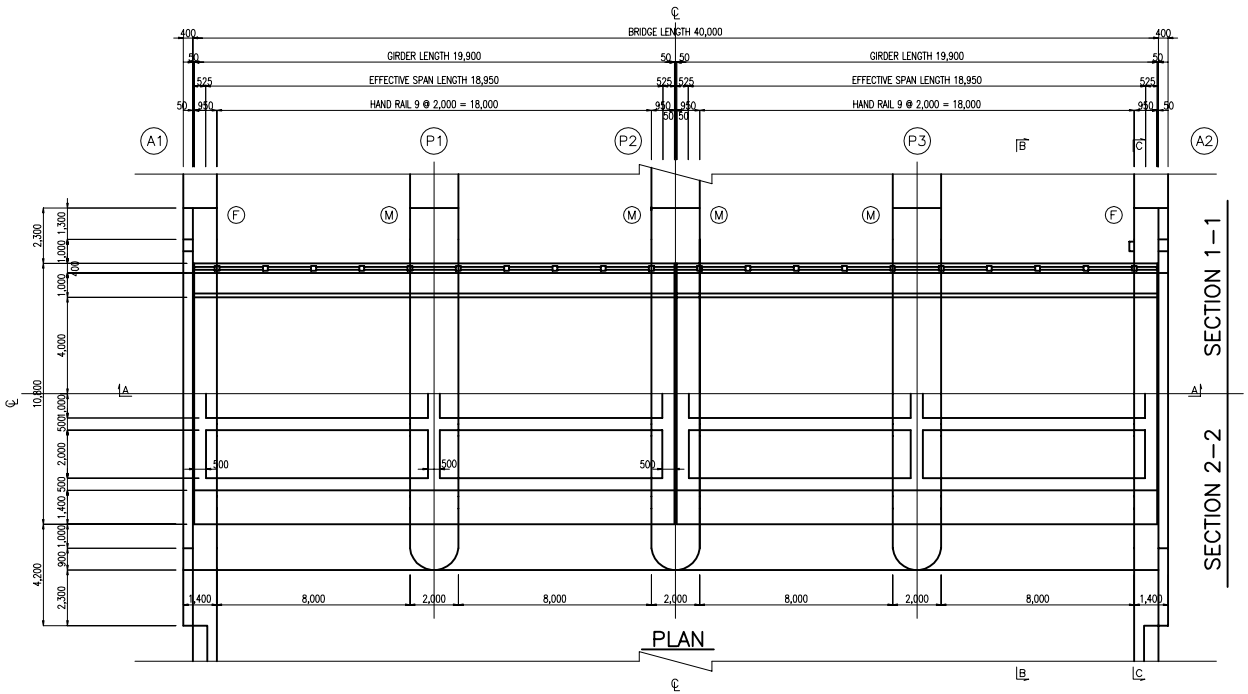




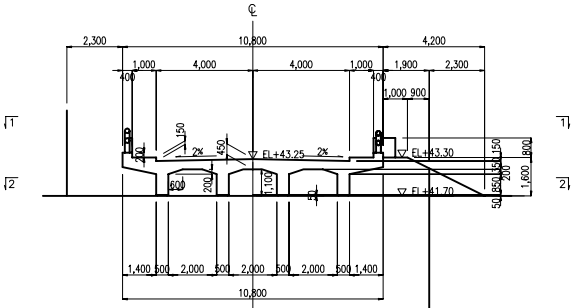
DWG3 : Longitudinal Profile of Regulator

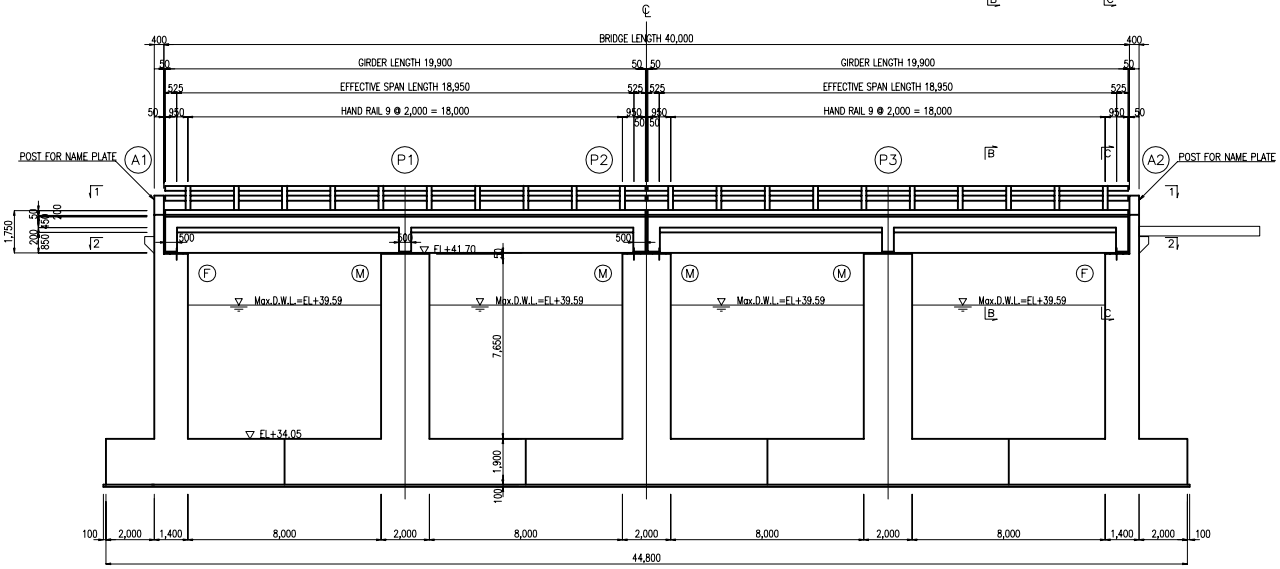


DWG4 : Elevation of Regulator



PLAN

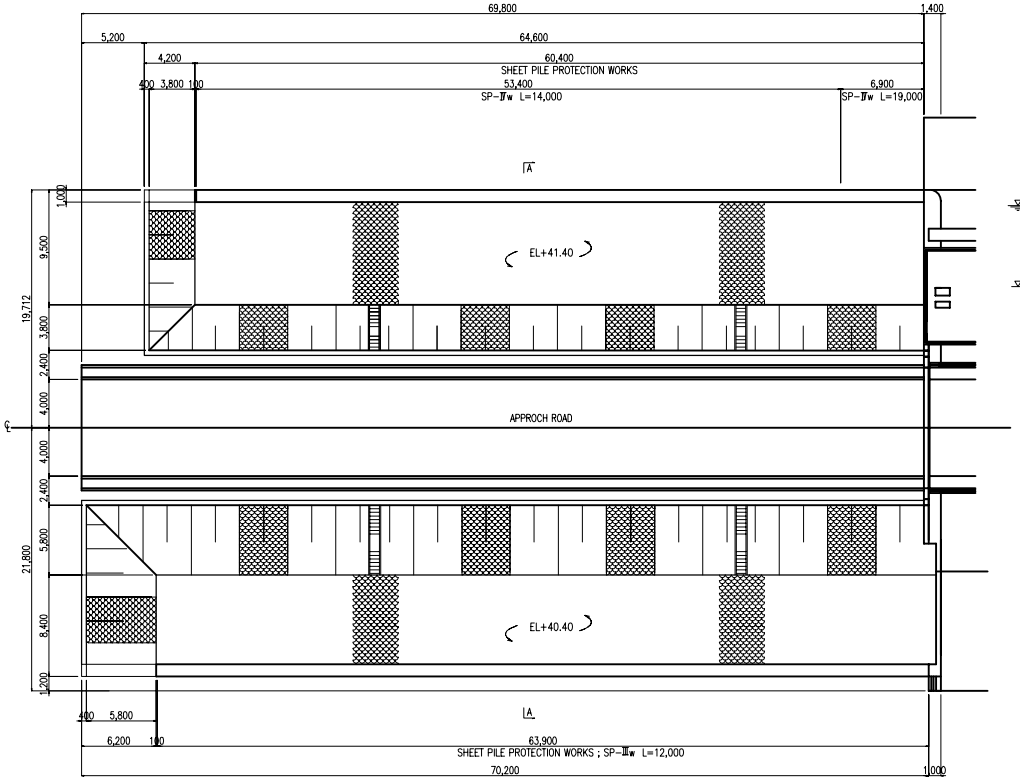




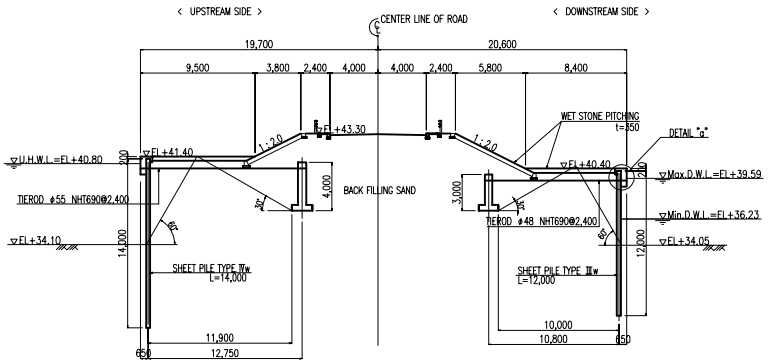
SECTION A–A
SCALE 1:200

0 1,000 5,000 7,000

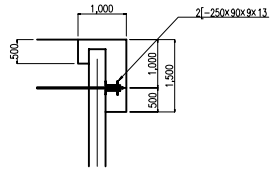
DWG5 : Regulator bridge



PLAN



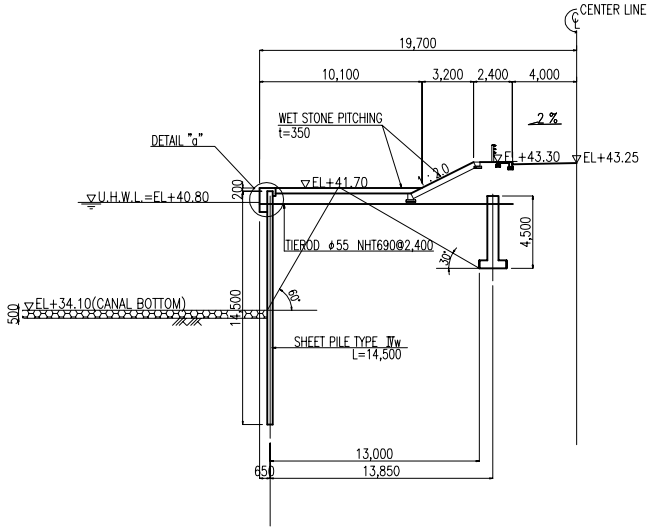
SECTION A-A



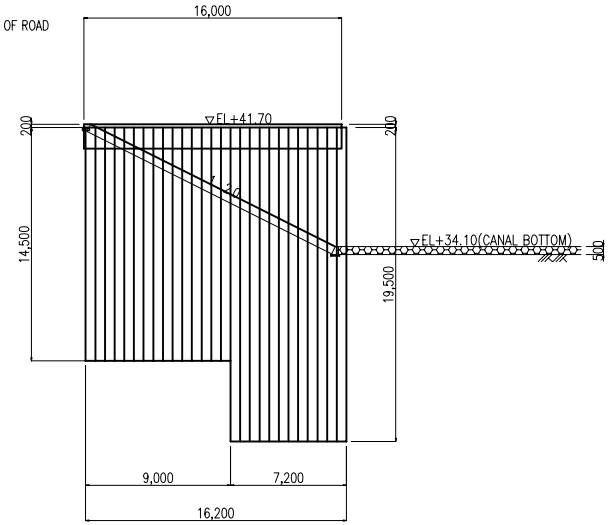
DETAIL "a"

0 2,000 10,000 14,000

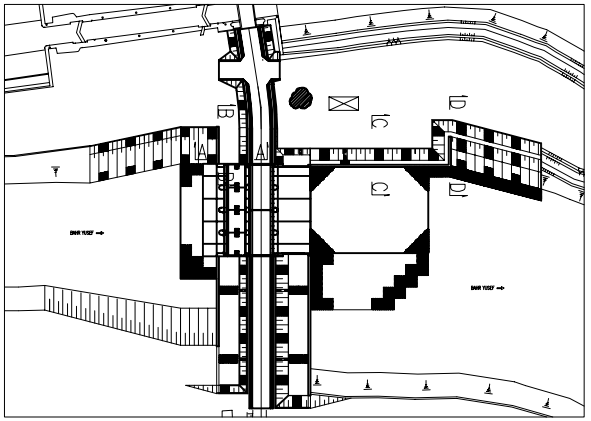
DWG6 : Sheet Pile Protection Wall (1/2)



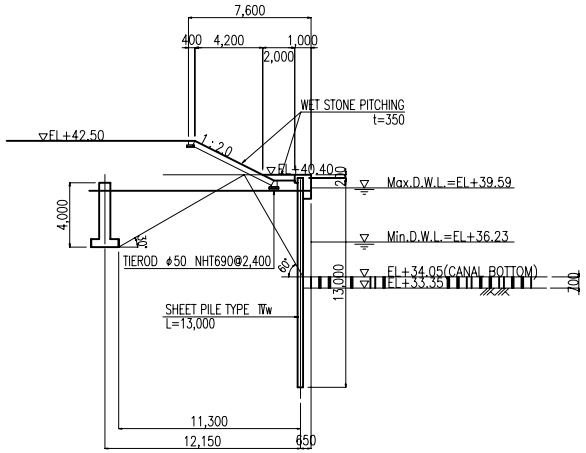
SECTION A–A



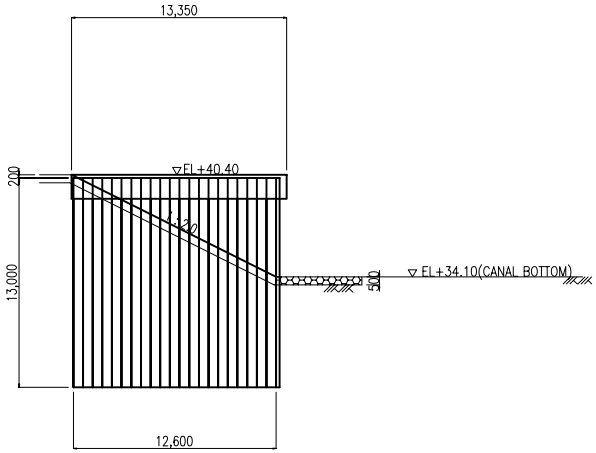
SECTION B–B



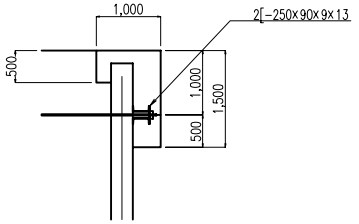
KEY PLAN



SECTION C–C



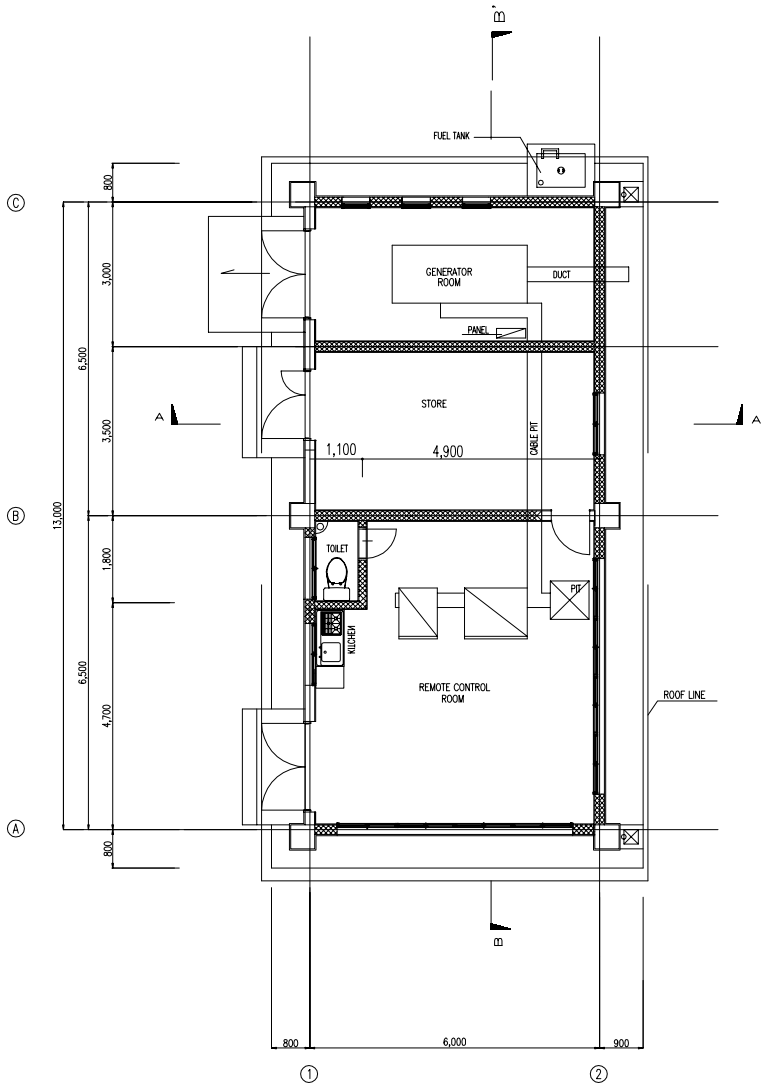
SECTION D–D



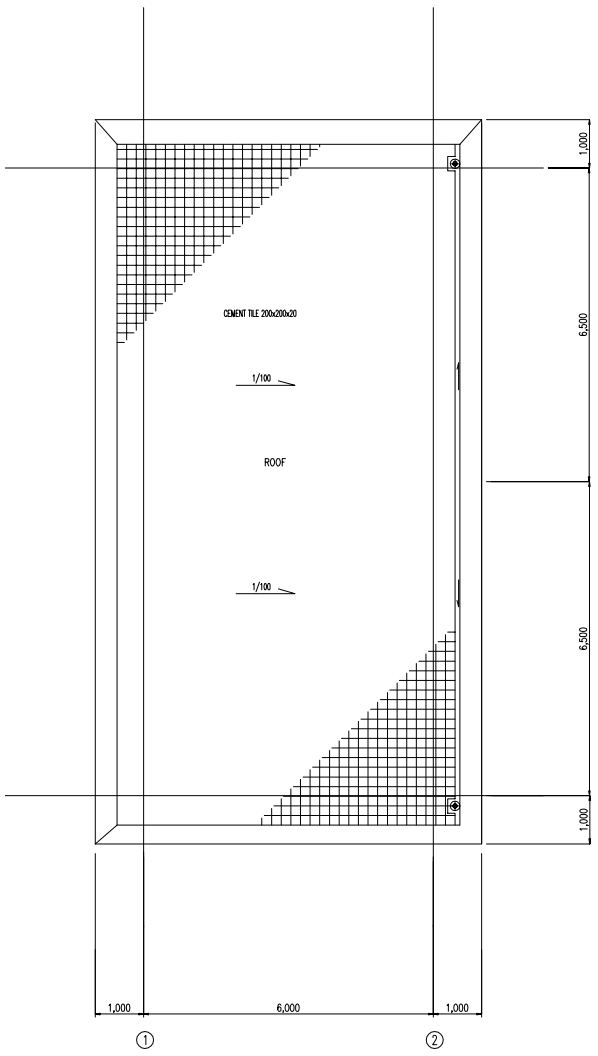
DETAIL "a"

0 2,000 5,000 10,000

DWG7 : Sheet Pile Protection Wall (2/2)



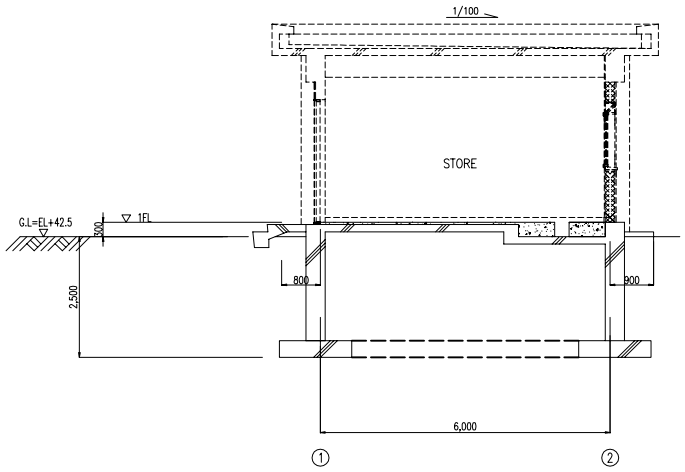
GROUND FLOOR PLAN



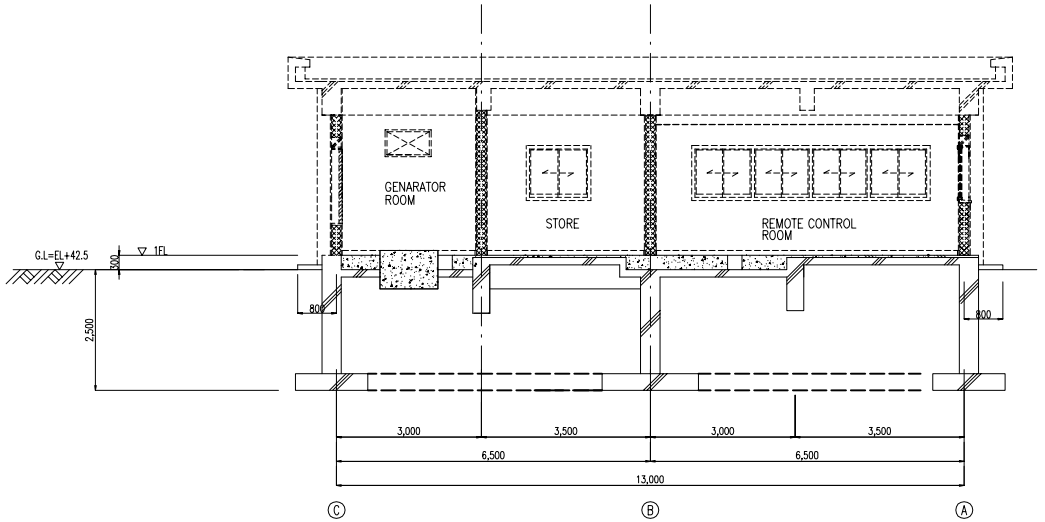
ROOF FLOOR PLAN

0 2,000 4,000

DWG8 : Plan of Foundation of Control House



SECTION A–A

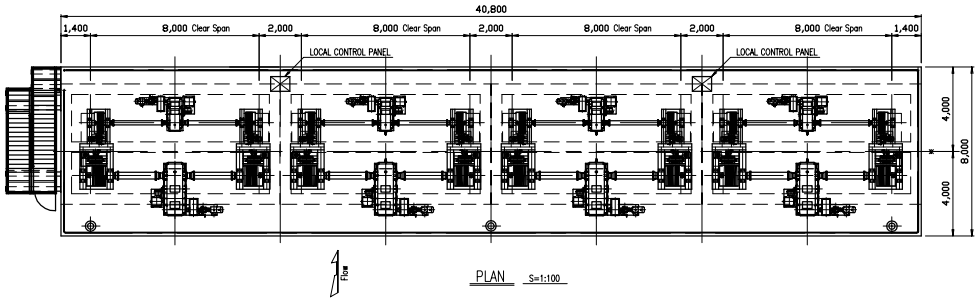


SECTION B–B'

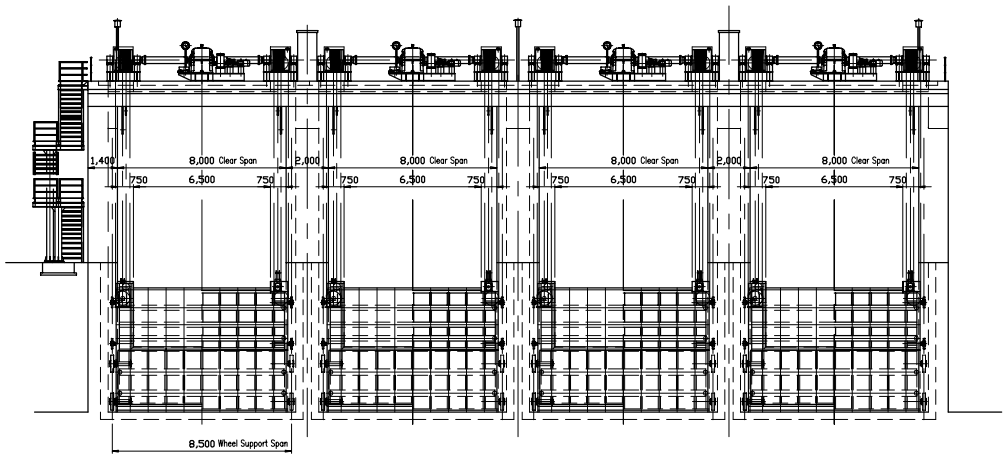
0 2,000 4,000

DWG9 : Section of Foundation of Control House

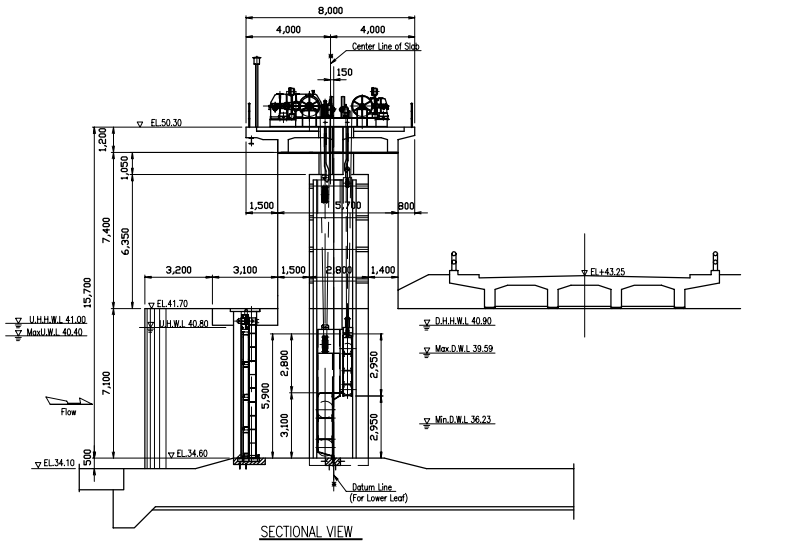
DESIGN DATA	
Type of Gate	Steel Double Leaf Roller Gate
Quantity	Four(4) sets
Clear span	8.00 m
Height of Gate	5.90 m
Design Water Level	Upstream : UHWL.40.80
	Downstream : EL.34.60
Sill Elevation	EL.34.60
Sealing System	3 Edges with Rubber Seals at Upstream
Operating Device	Electrically driven, 2motor 4drum type.
Hoisting Speed	More than 0.3m/min
Control System	Local and remote control



PLAN S=1:100



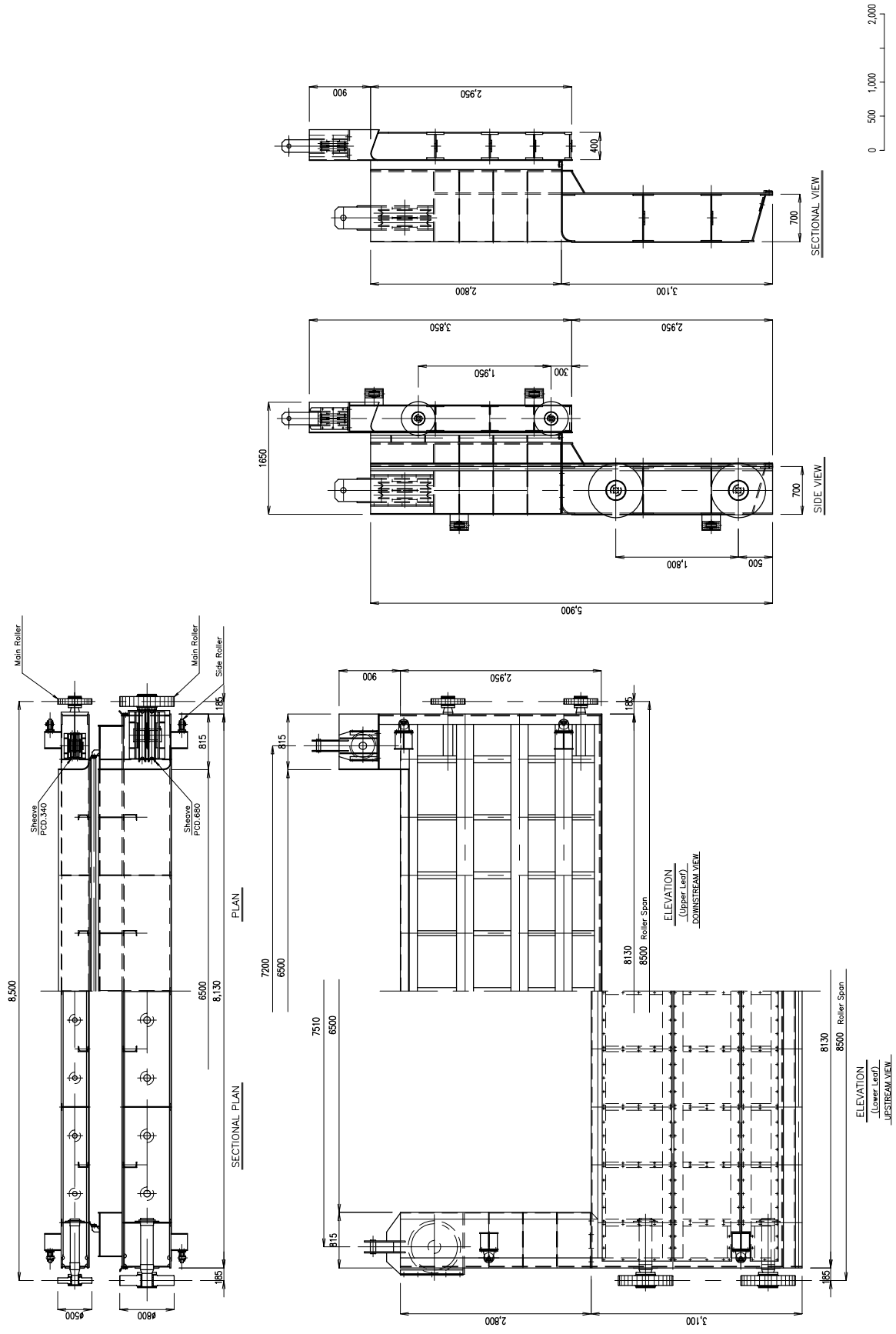
UPSTREAM ELEVATION DOWNSTREAM ELEVATION



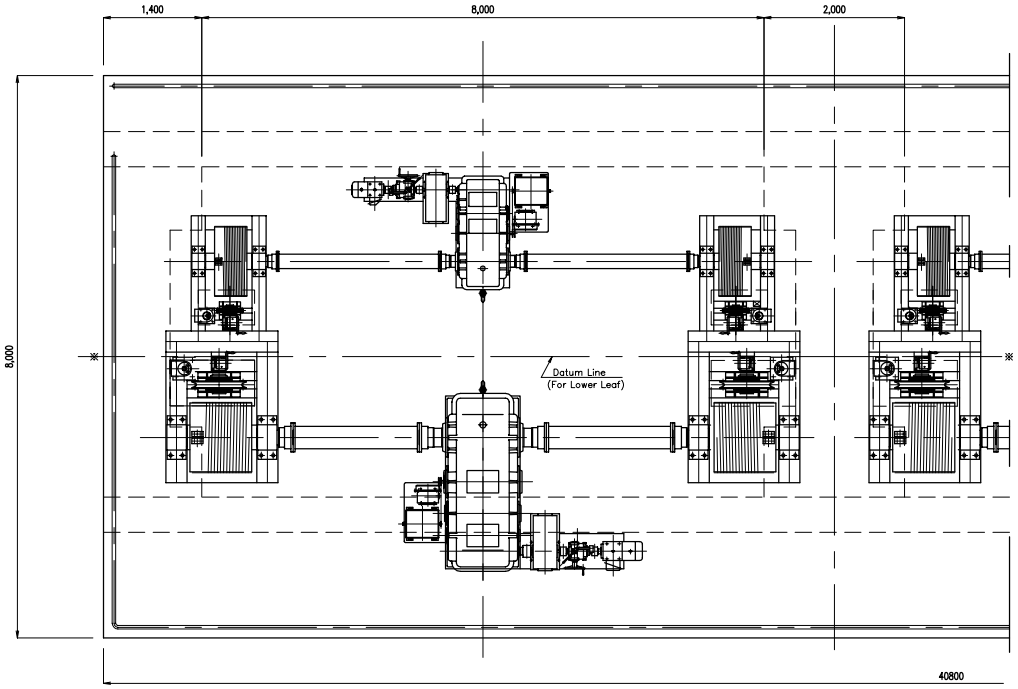
SECTIONAL VIEW

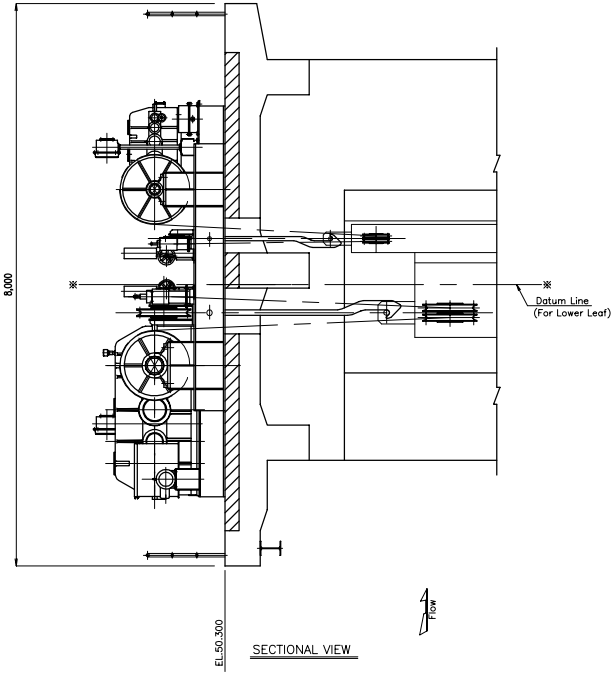
0 2,000 5,000 10,000

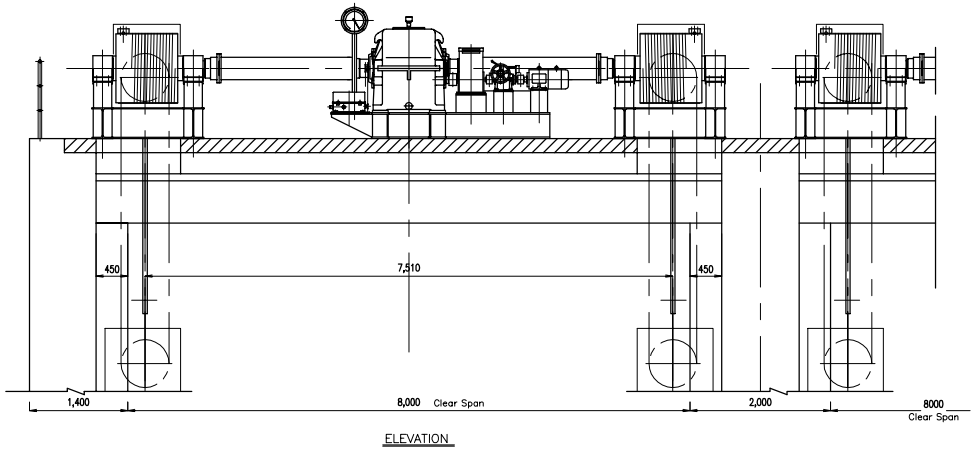
DWG10 : General Drawing of Gate Facility

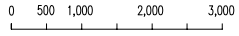


DWG11 : Assembling Drawing of Gate Leaf

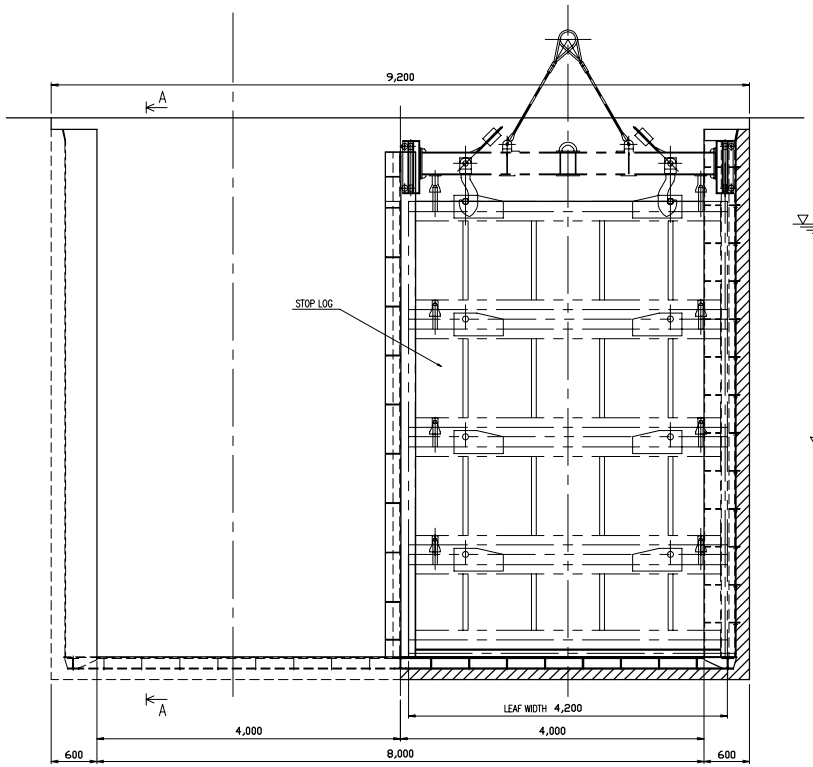




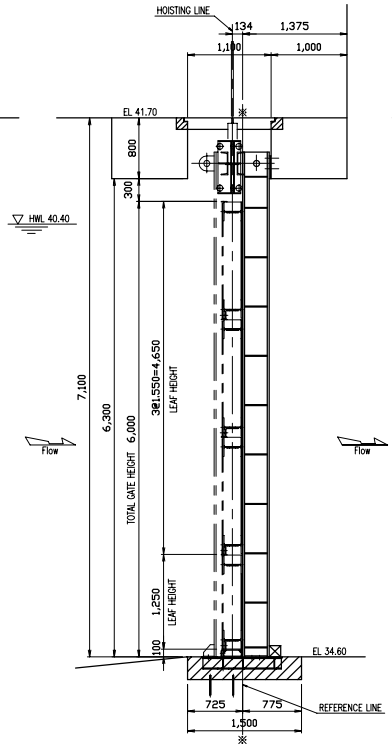




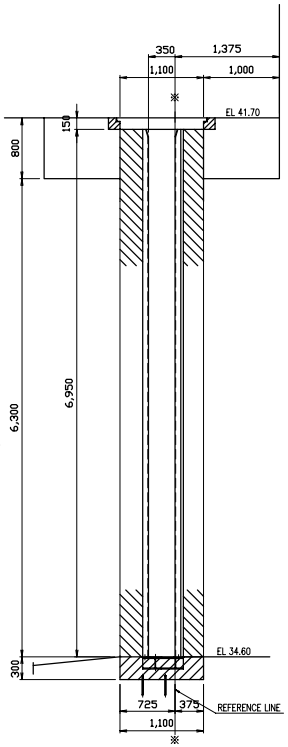
DWG12 : Assembling Drawing of Hoisting Device



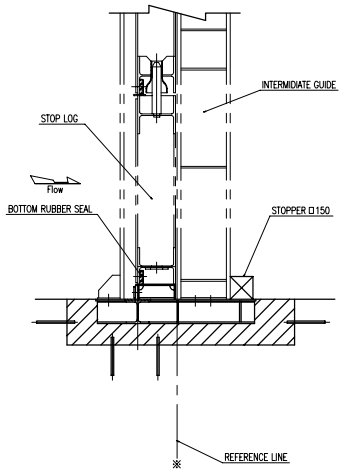
ELEVATION



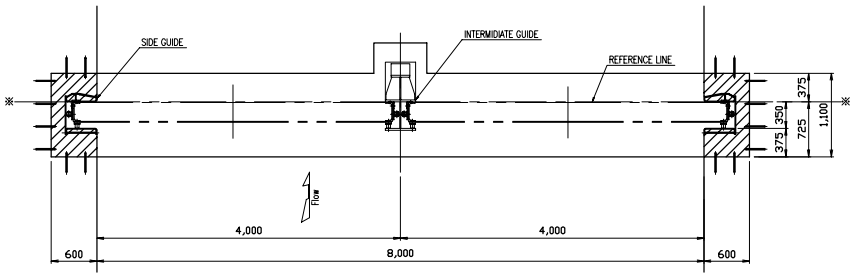
PROFILE



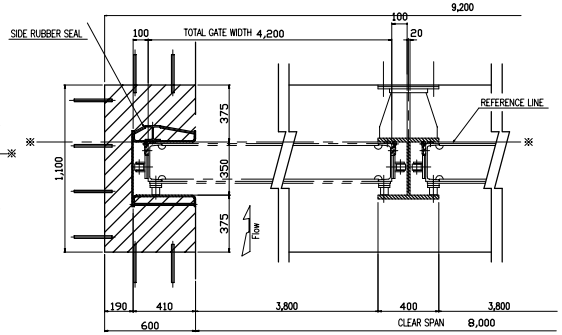
SECTION A – A



DETAIL OF INTERMIDIATE AND BOTTOM SEAL



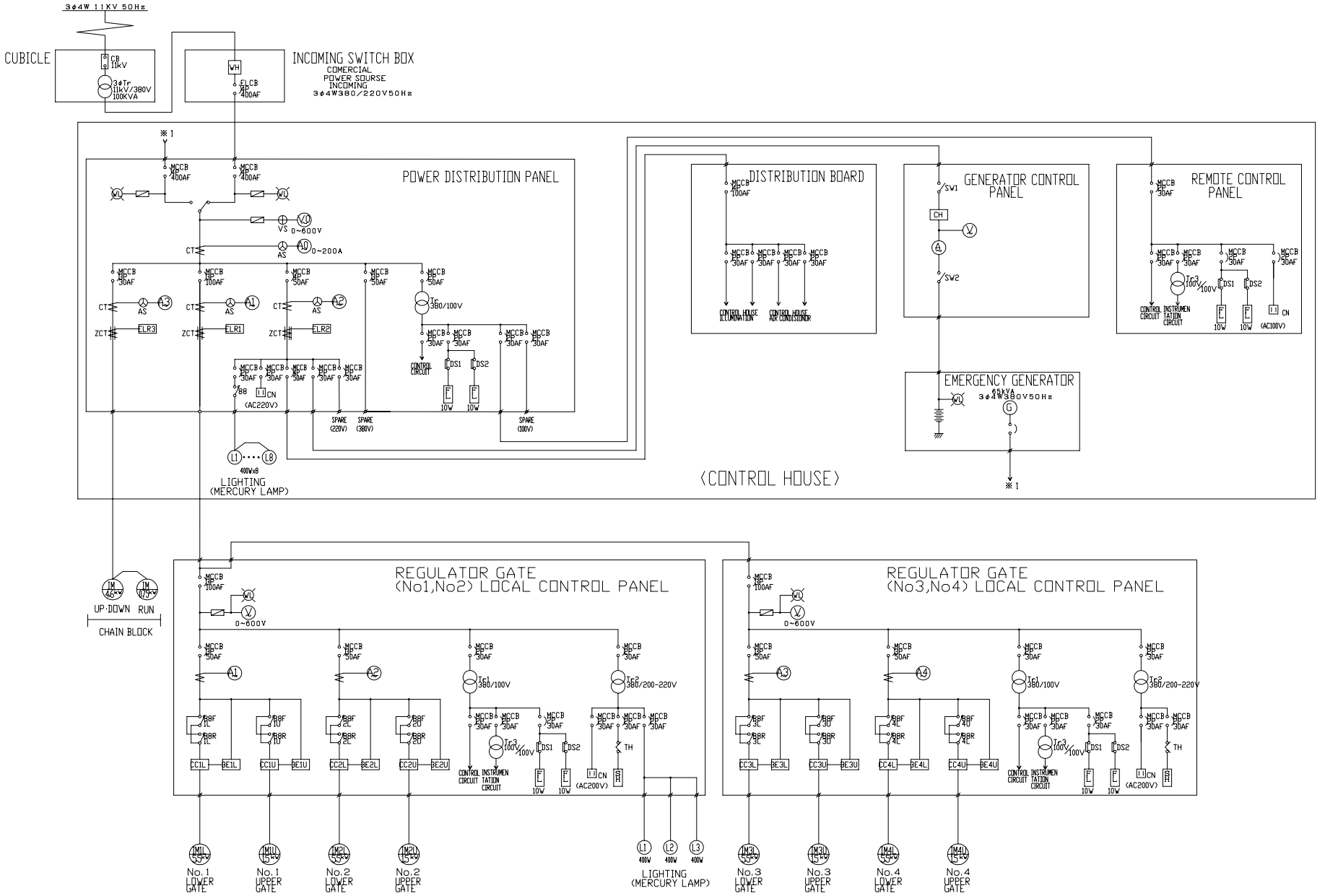
PLAN



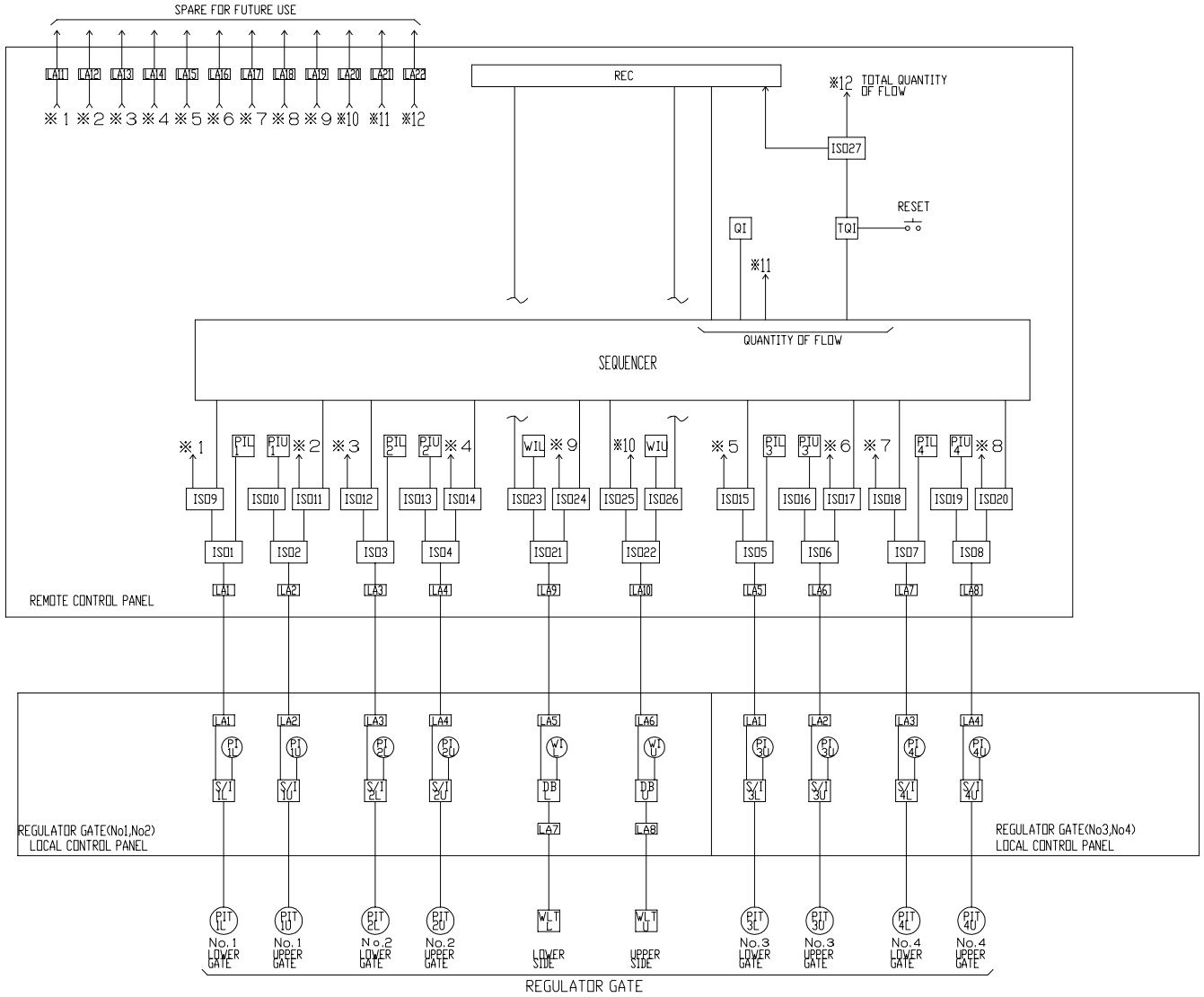
DETAIL OF SIDE SEAL

0 500 1,000 2,000 2,500

DWG13 : Assembling Drawing of Stop Log

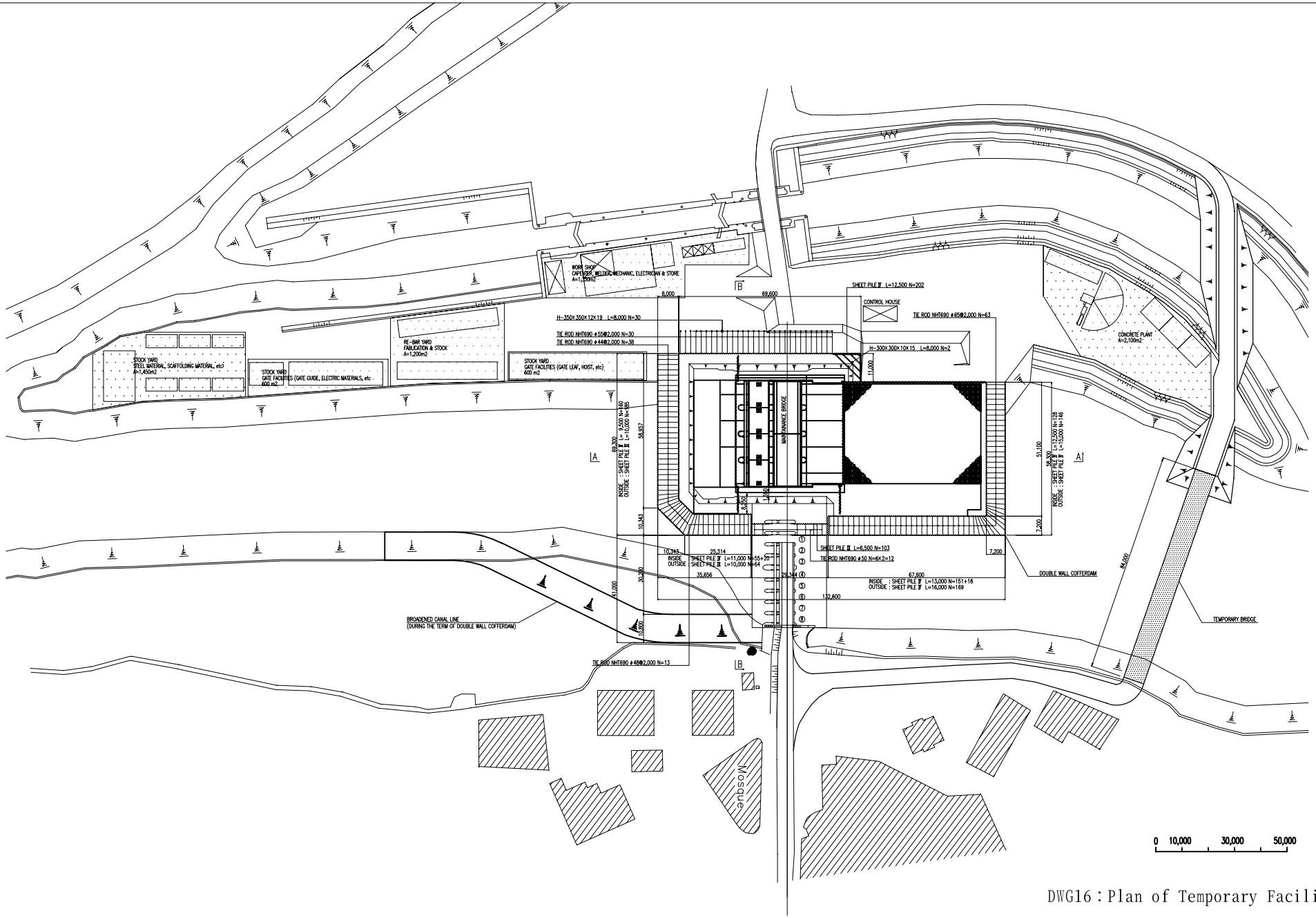


DWG14 : Single Line Diagram

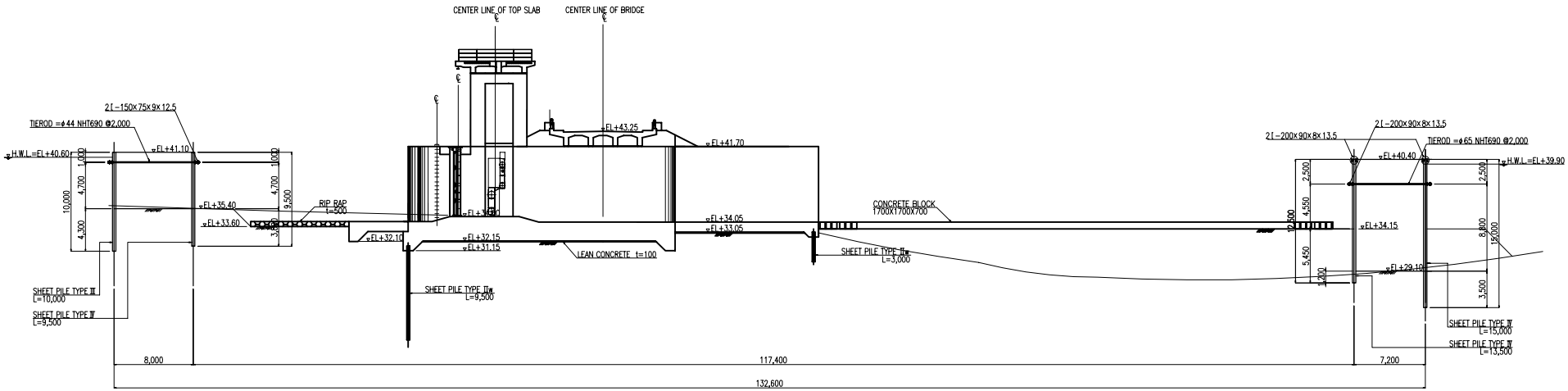


MARK	LETTER	NOTE
REC	RECORDER	
QI	QUANTITY OF FLOW INDICATOR	DIGITAL
TQI	TOTAL QUANTITY OF FLOW INDICATOR	DIGITAL
SEQUENCER	QUANTITY OF FLOW COMPUTING ELEMENT	
PIL	POSITION INDICATOR(LOWER GATE)	DIGITAL
PIU	POSITION INDICATOR(UPPER GATE)	DIGITAL
WI	WATER LEVEL INDICATOR	DIGITAL
ISO	ISOLATOR	
LA	LIGHTNING ARRESTER	
(PI)	POSITION INDICATOR	ANALOG
(WI)	WATER LEVEL INDICATOR	ANALOG
S/I	SYNCHRO/CURRENT TRANSDUCER	
DB	DISTRIBUTER	
PIT	POSITION INDICATOR TRANSMITTER	
WLT	WATER LEVEL TRANSMITTER	

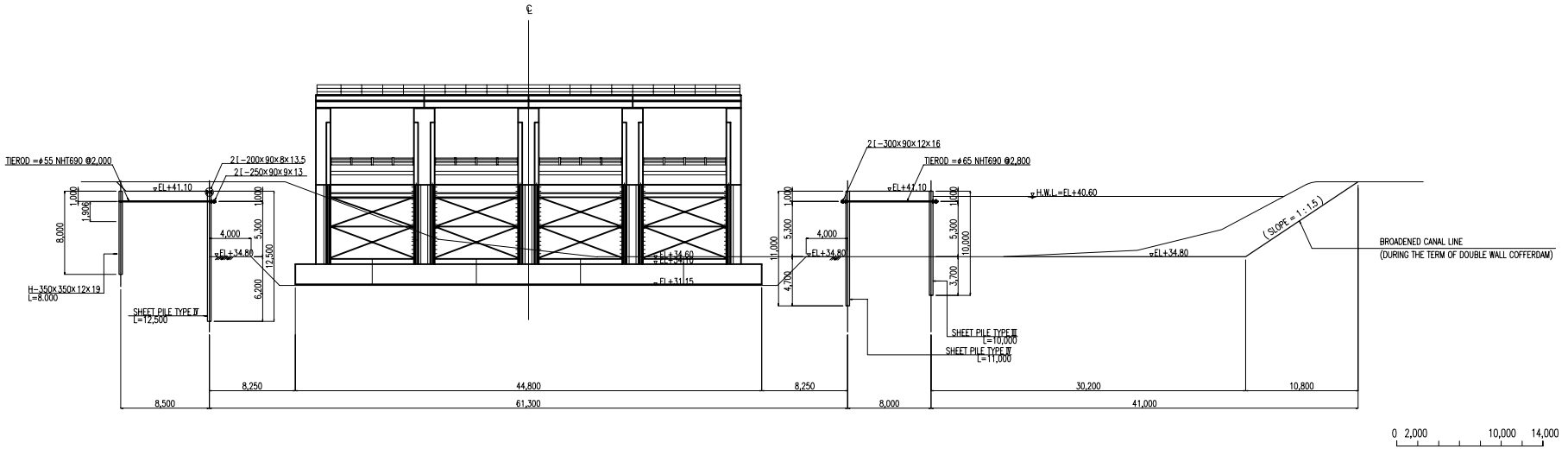
DWG15 : Wiring Diagram of Control System



DWG16 : Plan of Temporary Facility

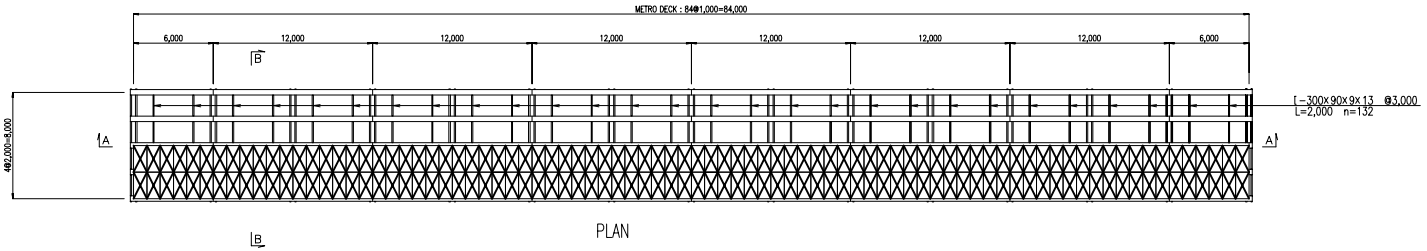


SECTION A–A

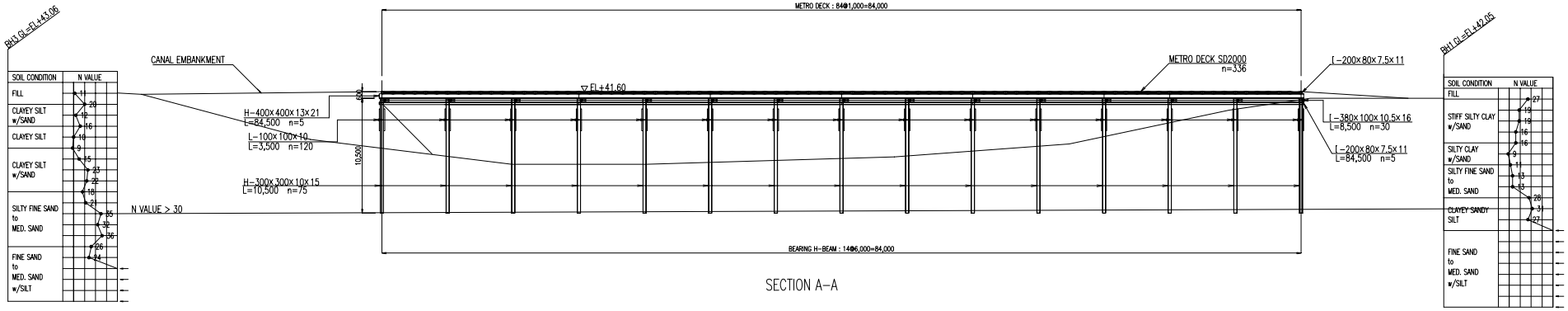


SECTION B–B

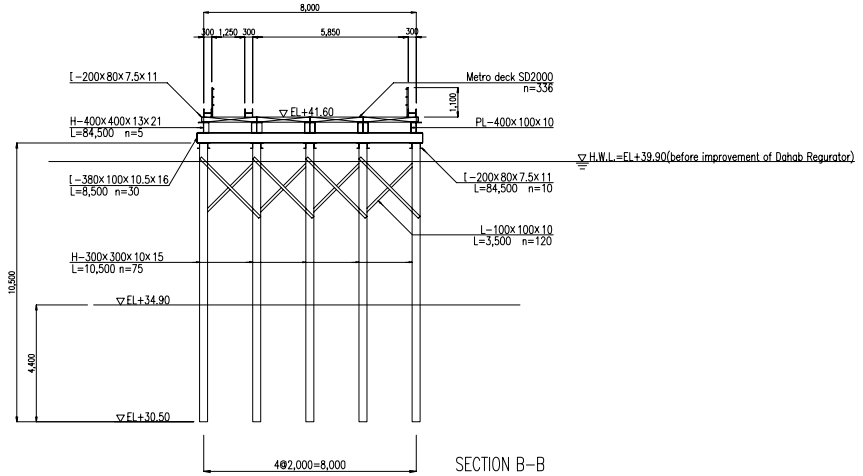
DWG17 : Section of Temporary Cofferdam



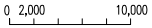
PLAN



SECTION A-A



SECTION B-B



DWG18 : Plan of Temporary Bridge

2-2-4 Implementation Plan

2-2-4-1 Implementation policy/Procurement policy

(1) Implementation policy

a) Implementation policy

This project is for the rehabilitation of the Dahab Regulator. The project will cover the construction of the civil engineering facilities including rehabilitation of the existing regulator structures and the manufacture and installation of the gates and gate-operating machinery and equipment, and the construction of the civil engineering facilities including the construction of the control house in which the operating machinery and equipment are accommodated. It will be implemented as part of the grant aid cooperation of Japan. The implementing agency of the recipient country is the Irrigation Improvement Sector (IIS) of the Ministry of Water Resources and Irrigation.

b) Consultant

A Japanese Consultant get contracts with IIS under MWRI for the implementation of the construction works and the procurement of the equipments for this Project to manage the entire project. The consultant will make the tender documents, and carry out tender ceremony and evaluation of the tender instead of IIS.

c) Contractor

A contractor who will be selected in an open tender ceremony will carry out the construction works and procurement of the Project based on the regulation of Japanese Grant Aid Project. A contractor has responsibility to follow the aftercare services of rehabilitation or repair of all the facilities. The selection of contractor should, therefore, be carried out in careful consideration on the condition of communication method between both sides even after the completion of the works.

d) Necessity of engineer dispatched for specific fields

The implementation work will need 22 months, and the Project consists of large-scale temporary works, civil works and installation work of gates.

Since the reliability of implementation works and construction management are important, Japanese engineers in specific fields are required to dispatch to keep good performance of the Project.

e) Implementation policy for the facilities

The policy of the implementation of the construction works are defined to carry out smooth construction and reduction of the construction cost by using local construction materials and equipments effectively.

(2) Procurement policy

Int the entire fields of the Project such as inland transportation, procurement of construction equipments, finishing of construction works, earth works and procurement of construction materials and labors, cost reduction will be taken into account by hiring local contractors.

2-2-4-2 Implementation Conditions

(1) Important notices for implementation works

(a) Management of canal

The beginning of the rehabilitation work starts with removal of the existing weir with the length of 54m out of the total 88m, and the new regulator with four gates will be constructed on the removed part. During the construction period, the Bahr Yusef Canal should be operated through the existing eight gates, which are attached in the remaining existing weir of 24m at the right bank. Egyptian Government has responsibility to manage and control the irrigation system for the beneficiaries through the construction period by rehabilitating canals and the eight gates.

(b) Implementation of river double cofferdam

To keep safety of the construction of the regulator, a temporary yard is secured by a river double cofferdam, which is made of steel sheet-pile. The supervision of the temporary works should be carried out carefully for protection of permeation of irrigation water based on appropriate foundation depth of the sheet pile.

(c) Consideration to the existing public facilities

There are no infrastructure such as electricity , water supply and communication, and the existing trees in the construction yard shall be kept safely for recreation center of local residents.

(d) Environmental measure for construction work

The prevention works for water pollution should be carried out through the construction period using oil-fence for the double cofferdam.

(e) Preparation of bypass road and temporary bridge

The bypass road and temporary bridge shall be needed to secure the present traffic condition before the removal of the existing Dahab Regulator. To secure the present traffic condition, additional condition should be considered such as construction vehicles and construction equipments.

(f) Secure of temporary yard

The temporary yards are located at river sandbar of the left bank and surround of the existing building of Mynia IIS. The confirmation of permission for using these proposed sites with Egyptian Government will be required. Additionally, though permission to backfill the existing navigation lock has already been given by the navigation authority, it is essential to confirm it again before the beginning of the construction to backfill the navigation lock by earth to be dug out from the construction site.

(2) Important notices for procurement

Inland transportation cost for the imported materials and equipments shall be undertaken by Japanese side. Those materials and equipments are transported by trucks from Alexandria where there is a port of discharge to the project site. In case of transportation of the special long length materials and equipments, the road along the right bank shall be used for accessing to the project site.

2-2-4-3 Scope of Works

(1) Land expropriation/lease

This project is designed so that there will be no need for land expropriation. The Egyptian side will provide land required for the temporary work within the construction site. Private houses near the construction site will be rented and used as accommodation for the Japanese staff and local employees including local engineers after their renovation. For the skilled laborers and general laborers recruited in Cairo, accommodation will be constructed with concrete blocks, wooden trusses and corrugated iron sheets near the site.

Part of the earth generated during the construction and concrete waste will be disposed into the navigation lock.

The table below shows the scope of works by the two countries relating to the temporary yards and other issues.

Scope of works for the temporary yards

	Site preparation/permission to use the land	Costs related to land	Ground leveling	Development	Backfill	Restoration
Sandbank	E	E	E	J	No need	J
Navigation lock	E	E	No need	No need	J	No need

※"J" is the responsibility of the Japanese side. "E" is the responsibility of the Egyptian side.

(2) Financial responsibility for inland transport of imported materials and equipment

The Japanese side will bear the costs of the inland transport of imported materials and equipment shipped from Japan via sea after their arrival at the Port of Alexandria.

(3) Scope of works for the power receiving facilities

Electric power is supplied along a road up to approximately 350 m from the right bank of the regulator. As this is capable of supplying 300kVA of electric power, it will be used as the basic electric power source for the project. However, as power failures reportedly happen once every one to two weeks, generators will be installed for the duration of works, such as steel sheet-pile driving and deep well work, which require large concentrated amounts of power in a short period and in which sudden outage of the power caused by power failure may cause a serious accident.

The power supply to the tools and lighting in the temporary yards, the accommodation for laborers and the concrete plant, which will require a constant power supply for a long period, will be provided through the purchase of a commercial power supply. Generators will be installed as a supplementary power source for use in case of power failure.

The planned scope of works by the donor and recipient countries relating to the power system is shown in the table below.

Scope of works relating to the power system

	Details of the work	Procurement	Installation	Removal
1. Temporary power receiving facilities during the work	Temporary power receiving facilities and wiring within the site	J	J	J
	Cable extension from and connection to the low-voltage power source located 350m from the right-bank side of the regulator.	E	E	E
2.Power receiving facilities at the completion of the work	Permanent transformers, circuit breakers and wiring within the site	J	J	
	High-voltage cable extension from and connection to the high-voltage transmission lines located 700m from the right-bank side of the regulator	E	E	

※"J" is the responsibility of the Japanese side. "E" is the responsibility of the Egyptian side.

2-2-4-4 Consultant Supervision

(1) Design and works supervision by the consultant

The following personnel will be assigned for the detailed design and preparation of tender documents.

• Consultant personnel plan for the works design

Type of job	Rank	Duration (M/M)			Responsibilities
		At the site	In Japan	Total	
Project Manager (Overall supervision)	2	1.33	2.50	3.83	To gather design details in each job and prepare the detailed design and tender documents
Civil engineer A (Preparation of the specifications for the civil engineering works)	3	1.00	4.50	5.50	To prepare specifications for the civil engineering structures and buildings on the basis of the outcome of the detailed design.
Civil engineer B (Civil engineering structural design)	3	—	4.50	4.50	Responsible for the design of civil engineering structures. To conduct structural calculation and prepare drawings of the main structures.
Civil engineer C (Civil engineering structural design)	4	—	4.00	4.00	Responsible for the design of civil engineering structures. To conduct structural calculation and prepare drawings of the ancillary structures
Civil engineer D (Civil engineering structural design)	4	—	3.50	3.50	Responsible for the design of civil engineering structures. To prepare detailed drawings and estimate quantities
Civil engineer E (Cost estimate/ procurement plan)	4	—	3.00	3.00	To review the cost estimate of the basic design on the basis of the outcome of the detailed design
Architect engineer (design of control house basement)	3	—	1.00	1.00	Responsible for the design of the control house basement. To perform structural calculation and estimate quantities.
Mechanical engineer A (Preparation of the specifications for the gate manufacture and installation))	3	0.83	2.50	3.33	To prepare the specifications for manufacture and installation of the gates on the basis of the outcome of the detailed design.
Mechanical engineer B (Mechanical design)	3	—	2.50	2.50	To decide the specifications for the gates, perform structural calculations, prepare drawings and estimate quantities.
Electrical engineer (electrical design)	3	—	2.50	2.50	To prepare specifications related to electrical facilities on the basis of the outcome of the detailed design.
Tender documents	3	—	2.50	2.50	To compile the outcome of the detailed design into tender documents
Drafter	6	—	3.50	3.50	To prepare and compile detailed drawings of the civil engineering structures, construction structures, gates and electrical facilities.
Technical assistant	6	—	3.50	3.50	To assist in structural investigation of the civil engineering structures, construction structures, gates and electrical facilities, and quantity estimates
Total		3.16	40.00	43.16	

For the consultant supervision, the personnel plans will be so designed as to guarantee safe and trouble-free implementation of the project. In particular, as the project includes a plan to remove part of the existing regulator and construct a new regulator on the vacated site, an engineer who has knowledge of the design and implementation of irrigation facilities and maintenance/supervision of the facilities will need to be selected as a permanent supervisor. In addition, to ensure that the gate facilities are installed safely and perform their functions satisfactorily, a specialist engineer will need to be selected to provide guidance and

supervision for their installation and adjustment.

The following are the personnel plans incorporating the above considerations.

• Consultant personnel plan for the tender work

Type of job	Rank	Duration (M/M)			Responsibilities
		At the site	In Japan	Total	
Project Manager (Overall supervision)	2	0.33	0.25	0.58	To conduct screening of bidders, assessment of bids and technical assessment.
Civil Engineer A	3	0.33	0.25	0.58	To conduct screening of bidders, assessment of bids and technical assessment.
Total		0.66	0.50	1.16	

• Consultant personnel plan for the works supervision

Type of job	Rank	Duration (M/M)			Responsibilities
		At the site	In Japan	Total	
Works technology supervisor	2	1.00	—	1.00	To witness commencement and completion of the work and coordinate with relevant organizations.
Permanent works supervisor	3	22.00	—	22.00	To act as an on-site witness of the entire work, including the civil engineering, construction, mechanical and electrical facility works, and to provide advice on adjustment, work schedule, quality and safety. To approve changes in drawings and design of the civil engineering and construction works and to provide advice and guidance on methods of maintenance, management and operation.
Construction engineer	3	1.50	—	1.50	To be assigned to the site at appropriate stages of the work schedule to provide advice and instruction to the contractor. To witness and give advice on the foundation work in the construction work and to coordinate the finishing work on the building and the electrical facility work.
Mechanical engineer	3	2.00	0.15	2.15	To be assigned to the site at appropriate stages of the work schedule to provide advice and instruction to the contractor. In particular, to witness the assembly and installation of the water gates and to provide advice on adjustment, quality and safety. To approve the mechanical drawings.
Electrical engineer	3	2.00	0.15	2.15	To be assigned to the site at appropriate stages of the work schedule to provide advice and instruction to the contractor. In particular, to witness the assembly and installation of the hoists and provide advice on adjustment, quality and safety. To witness and provide advice on the adjustment of the gate facilities as a whole. To approve electrical drawings
Completion inspector	3	0.23	—	0.23	To conduct completion inspection
Total		28.73	0.30	29.03	

Supplementary information on the details of the works in Japan and at the site regarding the gate facilities is given below.

• Details of the works supervision of the mechanical and electrical engineers

Type of job	Details
Work in Japan	To approve drawings at the completion of the design work in Japan, conduct manufacture inspection and inspection of the package specifications of machines and electrical equipment and verify the export reports.
Work at the site	To approve drawings, witness unpacking inspection and conduct on-site and completion inspections.

(2) Contractor's works management plan

This project consists of the civil engineering work to be implemented mostly on-site and the large-scale gate work comprised mainly of the manufacture of the gates at a factory and their installation on-site. As the civil engineering work will be implemented using materials mostly available locally and with locally-employed subcontractors and laborers, a permanent supervisor will be required who has sufficient technical capacity and experience in this type of work and also experience in construction works in Egypt.

As this project will involve the setting up of a double steel sheet-pile cofferdam, which has rarely been done in Egypt, the dispatch of Japanese skilled laborers will be required so that they will be able to give instruction on the driving and pulling of steel sheet piles, execution of the double cofferdam work and underwater work directly at the site. To guarantee the precise execution and quality of the large-scale concrete structures, a skilled worker will be dispatched from Japan. The skilled worker will ensure the quality of the forms and concrete works of the sluice (accuracy of the form assembly and joint treatment technology, in particular) and give safety instruction on height work.

The large-scale two-leaf gates to be installed on this regulator are of a type available only in Japan, and no other country has experience in the manufacture/installation of this type of gate. Therefore, an experienced skilled laborer will be dispatched to oversee the safe installation of the gates and a specialist trainer will be dispatched from Japan at the time of the test run of the gates.

Therefore, Japanese engineers will be dispatched as shown below.

• Permanent engineer assignment schedule

Type of job	Rank	Duration (month)	Responsibilities
Director	3	22.0	Overall management of the work, safety and hygiene management and consultation and coordination with the owner.
Chief Engineer	3	21.0	Overall execution management and execution schedule coordination between all the work divisions. Directly responsible for concrete manufacture, laboratory work, temporary work, cofferdam and road work
Works manager (Civil engineering works)	4	16.0	Responsible for execution and quality control of the regulator sluice structure work including the temporary work
Works manager (Construction)	4	2.0	responsible for quality control and works management of the construction of the control house basement and coordination with the building facilities
Works manager (mechanical)	4	6.5	Responsible for quality control and works management of the machinery and equipment for the water gates
Works manager (Electrical work)	4	4.0	Responsible for quality control and works management of electric equipment for the water gates and in the Administration Building.
Administrator	4	22.0	Responsible for customs clearance and transport of materials, labor management of employees, improvement of living conditions, safety and hygiene, and consideration of neighboring areas.
Total		93.5	

• Details of the Japanese skilled laborers to be dispatched

Type of job	Duration (months)	Responsibilities
Steeplejack A (Cofferdam and temporary bridge works)	5.5	Responsible for the particularly dangerous and critical task of installation and removal of the steel sheet piles, steel H-beams, tie-rods and wales associated with the cofferdam and temporary bridge works
Steeplejack B (Steel sheet-pile driving work)	9.5	Responsible for driving and pulling of the steel sheet piles, repair and diversion of the steel sheet piles and inspection and maintenance of the pile drivers throughout the entire work period
Specialized worker A (Ground improvement work) Specialized worker B (Ground improvement work)	1.5 1.5	Responsible for the specialized task of ground improvement work (column jet-grout (CJG) method) This is a job requiring quality control, executed by specialized machine operation, which requires experience. The work requires two workers, one for management of the injection plant and the other for injection.
Form worker A Form worker B	12.5 7.5	Responsible for assembly and dismantling of forms and reinforcing bar arrangement of the regulator sluice structure and for the construction of the Administration Building, both of which jobs require quality and accuracy. One worker will be responsible for the concrete work of revetments in addition to the sluice structure.
Equipment and machine technician (Machine installation work for the gates)	5.5	Responsible for installation and test run of the large-scale gate machinery and equipment
Electrical technician (Electrical equipment installation work)	3.5	Responsible for the installation and test run of the power receiving and distributing facilities and regulating equipment of the water gates.
Specialized worker C (Gate operation trainer)	1.5	Responsible for the inspection of and on-the-job training (OJT) in gate operation before and after the commencement of water flow
Total	48.5	

(3) Communications system for the work

The first floor of the existing building owned by the owner of the project will be renovated and used as the office of the consultant and the site office of the contractor. In addition, as the project site is approximately 260km away from Cairo city, which is the major source of procurement of materials and equipment, it is planned to rent premises as a liaison office in Cairo and to provide equipment required for tasks such as the procurement of materials and equipment and the relaying of communications regarding the transport of goods from Alexandria. As frequent trips between Cairo, Minya and the site are expected for the procurement and transport of materials and equipment, consultation and liaison with the owner, etc., vehicles for liaison suitable for the geographic conditions of the areas will be provided.

(4) Security control system

An adequate security system will be established during the work period with the cooperation of the local government. Security facilities and systems, such as communication equipment, temporary fencing and security guards, around the site and for the vehicles for liaison, offices and lodgings, will be incorporated in the design.

Following are the details of the security personnel for the project.

Details of security personnel

Traffic controllers	Temporary road	Two (2) persons x 20 months
Security guards	Temporary yards	One person each day and night x 3 locations x 21 months
	Site office	One person each day and night x 21 months
	Lodgings	One person each day and night x 21 months

2-2-4-5 Quality Control Plan

The plan will include the following quality control on the earth, concrete and mechanical/electrical works.

• Quality Control Plan

Type of work	Control item	Method	Frequency
Excavation	Soil condition Width and height Bearing capacity	Visual inspection Measurement of dimensions and height Plate bearing test	For each major part For each major part Once for each major structure
Embankment	Compaction rate	In-situ density	Every 400m^2
Concrete	Aggregate Cement Fresh concrete Concrete strength	Grain size analysis Physical and chemical tests Slump, air content and chloride content Compressive strength test	Every 3000m^2 Every 1000t Every casting Every casting location or every 200m^2
Reinforcing bars	Strength Bar arrangement	Tensile strength Arrangement analysis	Every 200t Every casting part
Finished work quality of structures	Finished work dimensions	Measurement of dimensions	For each major member
Chine facilities	Installation accuracy Function	Measurement of the installation location Load operation test	For all the equipment For all the equipment at test rum

2-2-4-6 Procurement Plan

1) Labor

General workers can be employed in Minya City and neighboring towns and villages. However, these workers would have little experience in construction work. It is considered difficult to find workers with sure technical ability in and around Minya City. Therefore, permanent employees such as engineers and drivers, general skilled laborers such as carpenters, steel erectors and plasterers, and additional general workers to be required at the height of the construction work will be recruited in Cairo City. In this case, various allowances including transportation allowance and 'living away from home' allowance will have to be provided to the permanent employees and skilled laborers in addition to their basic salaries.

2) Construction materials

[General construction materials]

Cement, reinforcing bars, timber, lightweight steel goods, fittings, ventilation equipment and lighting fittings can be procured in Egypt. Most of the materials will be procured in Cairo, where they are readily available, and transported to the site.

As reinforcing bars can be obtained only in Alexandria, they will be procured directly from the factory in the city and transported directly to the site.

[Banking materials, aggregate and stone materials]

Banking materials, aggregate and stone materials will be procured from quarries near the site, Minya City and Assiut.

Sandy backfilling materials:	A quarry along a desert road approximately 10km from the site
Rubble and masonry stone materials:	Minya East Bank approximately 30km from the site
Sand for concrete:	El-Bahnasa near Hiba (Approximately 100km from the site) * Although there is a sand quarry near the site, the sand from the quarry was considered inappropriate for concrete work because of the high chloride content revealed in the material analysis.
Gravel for concrete:	A location approximately 25km from the Dahab Regulator.

[Steel materials]

While steel H-beams up to a size of H-250mm can be procured at the local market, beams larger than H-250mm have to be imported. As these materials are not manufactured in Egypt, their manufacture and transport has to be ordered through local agents for importation. It has been concluded that this arrangement will make it difficult to procure materials required for this project at the required time in the required quantities.

Therefore, while steel H-beams up to H-250mm will be procured locally, steel materials larger than H-250mm will be procured from Japan.

【Scaffolding and form materials】

As most of the local construction companies use timber for scaffolding and supports and wooden laths as form materials, wooden materials can be procured locally. However, because of the poor quality, the locally-manufactured plywood forms cannot be reused. In addition, it has been confirmed that the quality of the finish of concrete structures in Egypt is significantly poorer than the quality of the Lahoun, Mazoura and Sakoula Regulators, as the finish quality depends on the accuracy of the forms.

Therefore, plywood forms and steel materials for scaffolding and supports will be procured from Japan, while timber for scaffolding and supports and wooden laths will be procured locally.

- **Procurement from Japan and third countries**

【Special construction materials】

Special materials such as steel sheet piles, large-sized steel materials and plywood form materials will be procured from Japan, as local procurement cannot guarantee strict adherence to the delivery date or stable and sufficient supply of the materials, as described in the section on local procurement conditions. High-tension tie rods and bridge bearings will be procured from Japan because they must be of particularly high quality and they are difficult to procure in Egypt.

【Gate equipment】

Two-stage panel gates have been chosen to be installed on the regulator in order to comply with the effective and efficient use of the limited water resources as laid down in the water resources policy of Egypt, and also considering the investment effect of reducing ineffective discharge (valued by agricultural outputs) to the beneficiary areas by the Dahab Regulator. As this type of gate is available only from Japan, the entire set of the gate equipment will be procured from Japan for the reasons of manufacturing technology, past record and quality.

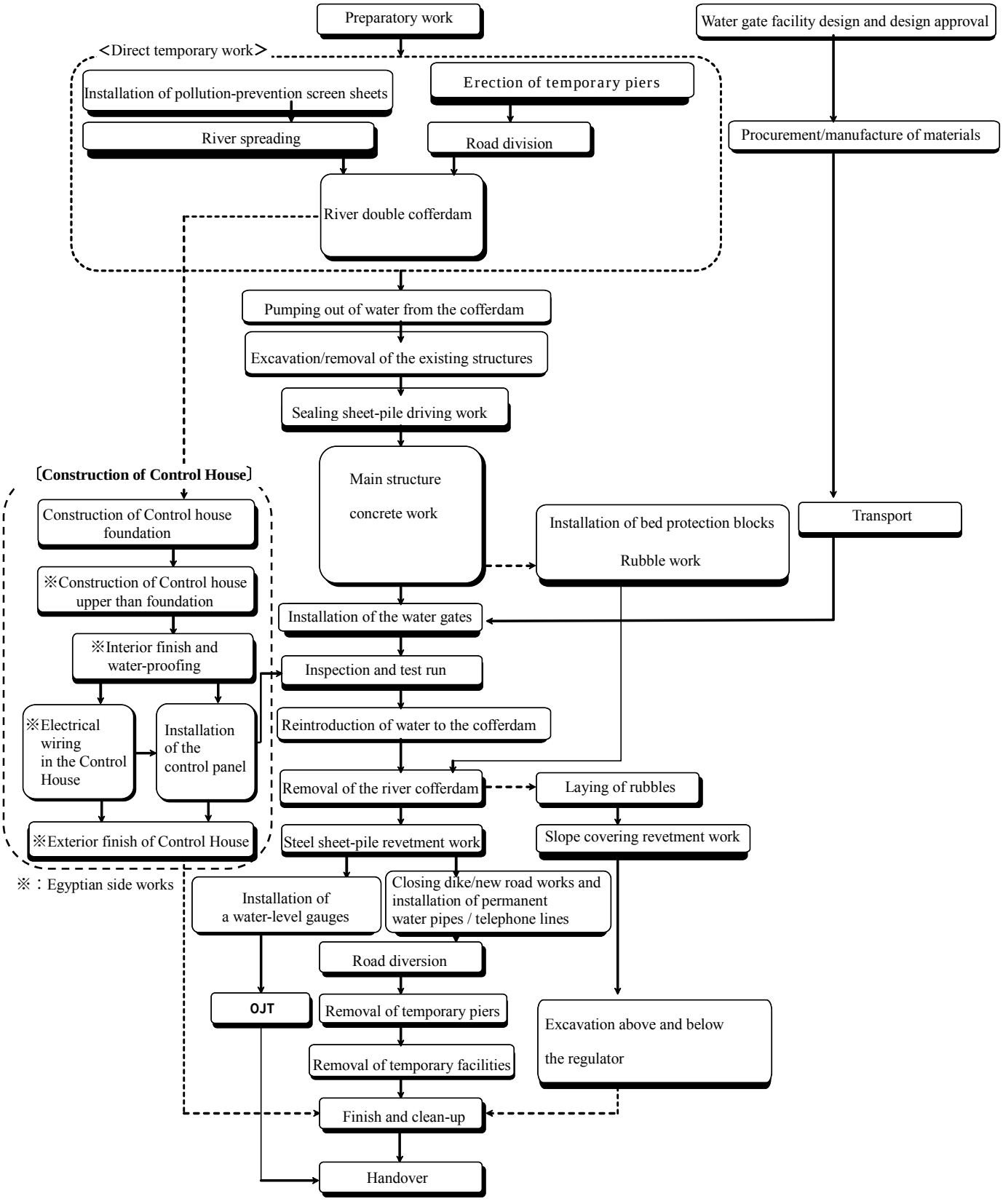
In this project, the transport of materials and equipment is planned from Japan only, and no transport from a third country is expected. Transport from Japan to the Port of Alexandria via the Indian Ocean and the Suez Canal is expected to take approximately 1.5 months. Unloading and customs clearance at Alexandria will take approximately two weeks. Then cargos will be transported to the Dahab Regulator via Cairo City on trucks and trailers.

The inland transport from Alexandria to the Dahab Regulator is expected to take approximately two days.

2-2-4-7 Implementation Schedule

(1) Order of work execution

The order of work execution is shown in the flowchart below.



(2) Plan for the numbers of workdays for major types of works

The critical path for the work schedule of this project will be; preparatory work → temporary bridge → cofferdam → removal of the existing structures/excavation in the pit → construction of the sluice structure → assembly, installation, test run and adjustment of the water gates → removal of the cofferdam/switching of water flow → revetment closing dikes/ancillary works (road and power supply) → removal of the temporary bridge → clean-up of the site/handover.

Calculation of the critical path

Work	Type of work	Quantitty of work	unit	Quantity per unit	Number of groups	Number of work day	Workable efficiency 22.6/30	Work periond		Remarks
								Estimate	Critical period	
Preparatory work	Procurement/Office/Temporary Yards/Transport	1.0	Lot			90.0	1.00	90.0	**90.0**	
Canal earthwork	Canal widening work	8,100.0	m3	190.0	2.0	21.3	1.21	**26.0**	-	During the period of preparatory work
Temporary work	Temporary bridge erection	84.0	m	2.95	1.0	28.5	1.21	35.0	**35.0**	
	Cofferdam erection	1,430.0	Pcs	24.00	1.0	59.6	1.21	72.0	**72.0**	
	Existing weir body foundation work	35.0	Pcs	0.90	1.0	38.9	1.21	**47.0**	-	Simultaneously with the cofferdam work
	Drainage (deep well method)	1.0	Lot	0.50	1.0	2.0	1.00	2.0	**2.0**	Pumping at the rate of 10cm/hour
Removal of existing structure	Full-scale removal work	3,600.0	m3	63.0	2.0	28.6	1.21	**35.0**	-	Simultaneously with the weir excavation
	Upper part removal work	610.0	m3	63.0	1.0	9.7	1.21	12.0	**12.0**	
Weir body work	Weir excavation(Include riprap part)	19,200.0	m3	300.0	2.0	32.0	1.21	39.0	**39.0**	Soil in the pit + rubble from the demolition of the exisiting structures / simultaneously with the water stop sheet-pile work
	water stop sheet-pile driving	140.0	Pcs	19.0	1.0	7.4	1.21	**9.0**	**6.0**	Jet-Vibro(JV) technique / Downstream sheet pile work will be down simultaneously with apron
	Apron	3,700.0	m3	120.0	1.0	30.8	1.21	38.0	**38.0**	Casting at night
	Weir pier	2,010.0	m3	28.5	1.0	70.5	1.21	86.0	**86.0**	Casting at night
	Regulator bridge	310.0	m3	9.9	1.0	31.4	1.21	38.0	**38.0**	Casting at night
	Top slabs	160.0	m3	4.31	1.0	37.1	1.21	45.0	**45.0**	Casting at night
Riprap work	Riprap Backfill for scour part	1,490.0	m3	400.0	1.0	3.7	1.21	**5.0**	-	Soil in the pit + rubble from the demolition of the exisiting structures / simultaneously with the water stop sheet-pile work
	Riprap With block	494.0	Pcs	5.0	2.0	49.4	1.21	**60.0**	-	Simultaneously with the weir work
	Riprap Rubblework	1,990.0	m2	55.8	1.0	35.7	1.21	**43.0**	-	Simultaneously with the weir work
Revetment work	Steel sheet-pile revetment Left bank,downstream	27.0	Pcs	1.20	1.0	22.5	1.21	**28.0**	-	Jet-Vibro(JV) technique / Simultaneously with the weir work
	Steel sheet-pile revetment Left bank,upstream	126.0	Pcs	2.90	1.0	43.4	1.21	**53.0**	**16.0**	Jet-Vibro(JV) technique / Simultaneously with the weir work
	Cofferdam	168.0	Pcs	5.50	1.0	30.5	1.21	37.0	**37.0**	Jet-Vibro(JV) technique / Proceed to the anchor block construction after completing half of the driving
Ancillary works	Rord work Pavement work	1,120.0	m2	58.0	1.0	19.3	1.21	24.0	**24.0**	Foundation and surface layers
Gete work	Gate design	1.0	Lot			90.0	1.00	**90.0**	-	
	Materials supply / production	1.0	Lot			165.0	1.00	**165.0**	-	
	Factory inspection / packing	1.0	Lot			30.0	1.00	**30.0**	-	
	Transportation	1.0	Lot			60.0	1.00	**60.0**	-	The sea and inland transportation / Including custom clearance
	Installation of guide	1.0	Lot			40.0	1.21	**49.0**	-	Including secondary concrete works
	Installation of gate leave	1.0	Lot			19.0	1.21	**19.0**	**19.0**	Including period to assemble the gate
	Installation of hoists	1.0	Lot			30.0	1.21	**37.0**	**27.0**	Including secondary concrete works and period to assemble gate
	Installation of operation panel / electric construction	1.0	Lot			35.0	1.21	43.0	-	
	Inspection in the trial run / adjustment / out of discharge	1.0	Lot			10.0	1.21	13.0	**13.0**	
	Inspection with discharge	1.0	Lot			10.0	1.21	**13.0**	-	
Removal of Temporary work	Removal of cofferdam (removal of steel sheet pile)	1,200.0	Pcs	43.8	1.0	27.4	1.21	34.0	**34.0**	
	Removal of temporary piers	84.0	m	4.7	1.0	17.9	1.21	21.0	**21.0**	
Clean-up/Handover						22.0	1.21	27.0	**7.0**	
							Total number of critical days		**661.0**	
							Total number of critical months		**22.0**	

(3) Setting of the work period

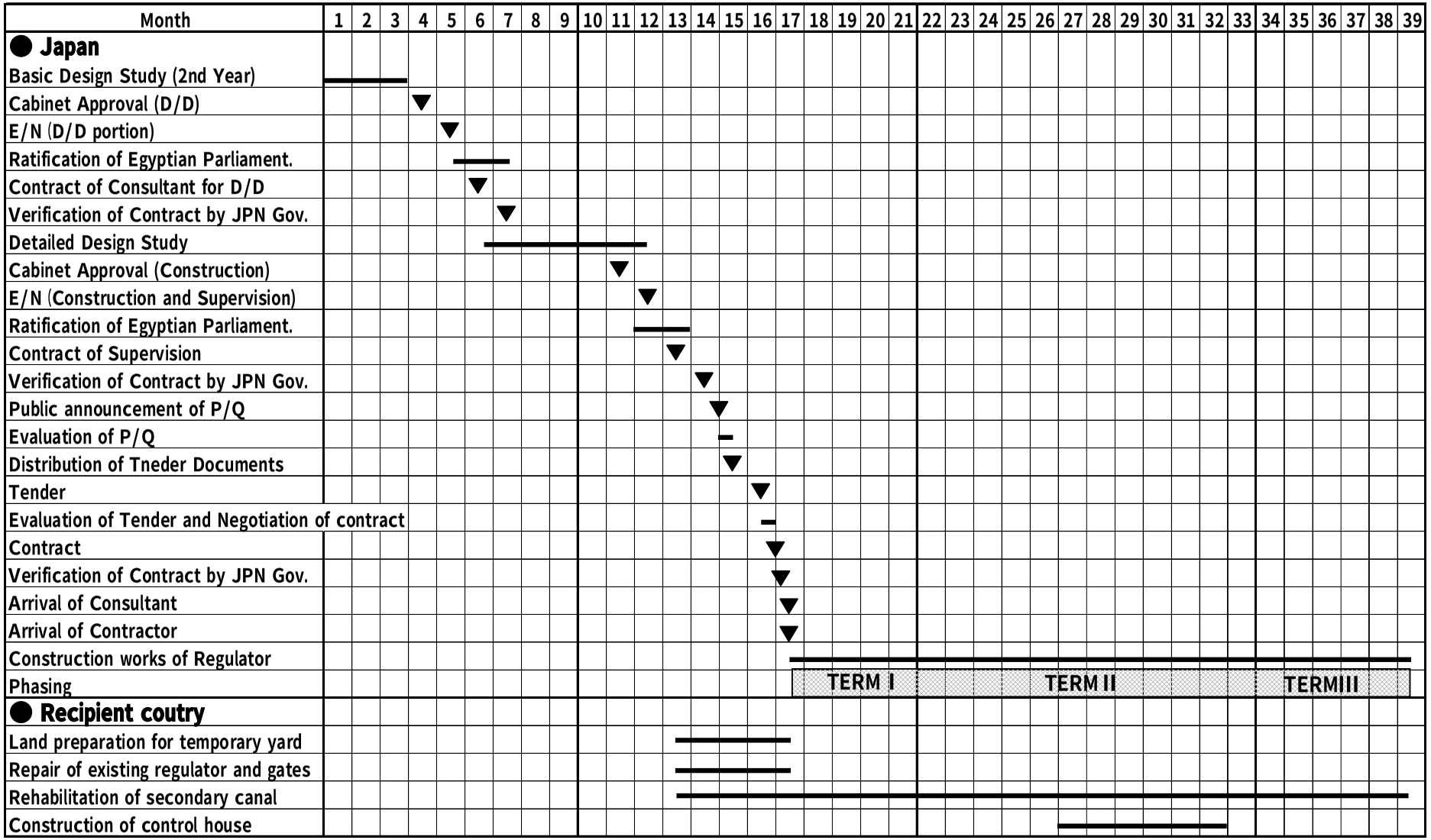
The progress schedule for this project will include approximately six months for the detailed design and preparation of tender documents and three months for bidding and selection of the contractor. The preparatory work → temporary bridge → cofferdam → removal of the existing structures/excavation in the pit → construction of the sluice structure → assembly, installation, test run and adjustment of the water gates → removal of the cofferdam/switching of water flow → revetment closing dikes/ancillary works (road and electrical works) → removal of the temporary bridge → clean-up of the site/handover will comprise the critical path in the work schedule for the work execution, and the total work period will be 22 months.

The manufacture and transport of mechanical and electrical gate facilities, construction work and road works will be carried out simultaneously with the structure construction work and gate installation/test-run work.

The entire work schedule incorporating the date of E/N is shown in the next section.

Tentative Schedule of the Project

The sequence of works, shown in the table below, will be followed by the Project after Echange of Notes between the Government of Egypt and the Government of Japan.



2-3 Obligations of Egyptian Government

2-3-1 General Obligations

1) To provide the data and information necessary for the detailed design study to be carried out by a Japanese consultant after implementation of the project is decided upon,

2) To ensure a site necessary for the placing of material and equipment to be used for the improvement to be carried out through this project,

3) To prepare and/or improve facilities including an electric power system, which will be necessary for the operation of the material and equipment involved in this project,

4) To pay bank charges as necessary to the bank in accordance with the banking arrangements,

5) To ensure prompt landing, customs clearance and tax exemption procedures for the material and equipment to be brought into the country for this project,

6) To waive or absorb the customs duties, domestic taxes and other governmental charges that would otherwise be imposed on the procurement of material and equipment and provision of services by Japanese citizens in Egypt for this project,

7) To provide the Japanese nationals who will provide services for the implementation of this project the necessary facilities for their entry into and sojourn in Egypt so that they can perform their tasks,

8) To maintain and operate appropriately and efficiently the material and equipment to be improved through this project. Also to report the operating conditions of the material and equipment to Japan as requested by Japan, and

9) To bear all necessary expenses not included in the grant aid cooperation by Japan.

2-3-2 Project Obligations of the Recipient

1) To repair the existing eight gates at right bank side of the Dhab Regulator before the start of the construction work and to regulate the water and manage the water flow through the gates during the construction work, as it will be necessary to regulate and manage the water flow of the Bahr Yusef Canal through the eight gates at the right bank side of the regulator during the construction work,
2) To apply and obtain advance permission for the removal of the electricity, water and communication facilities set up in the existing Dahab Regulator onto the temporary bridge from the respective authorities before the 12 gates at the left bank side of the Dahab Regulator is demolished, and to coordinate with these authorities to ensure that removal of these facilities can be done in accordance with the construction work schedule,
3) To complete the relevant procedures for obtaining permission to use a site as a temporary yard (approx. 6,700m^2) within the construction site, and to complete leveling of the ground before the start of the construction work,

4) To secure a site as a temporary yard outside of the construction site, to level its ground and to secure a soil dumping ground,

5) To select a competent vendor to handle tax exemption and customs clearance procedures for imported material and equipment and to have these procedures completed before the start of the construction work,

6) To complete the lead-in work (approx. 550m) from the high-voltage line (high-voltage cable of 11KV) on the right bank before the start of the construction work. The power receiving facility to be set up will be connected to this lead-in to provide electricity for civil engineering work and to operate the gate facilities after the water starts to flow,

7) Lead-in work (approx. 550m) from the existing telephone line in the town on the right bank to the control house,

8) Lead-in work (approx. 170m) from the existing water pipe already laid close to the right bank of the Bahr Yusef Canal, to the Administration Building, and

9) To construct the Control House to put operation panel and emergency generator, in the sandbar along the river

10) To complete the cross-section restoration and improvement work (resultant extension: approx. 6.0km; volume of dredged soil: approx. 8,200m^3) on the Rahiel Canal (located approx. 300 above the Dahab Regulator; beneficiary area: 6,620 feddan (2,780ha); secondary canal extension: 9.21km; design flow rate: 2.08m^3/sec; current flow capacity: 1.40m^3/sec) before the completion of the permanent works, because it is considered that of the secondary canals only the Rahiel Canal needs to be restored and improved (see following section for details).

11) Egyptian government have to confirm that good solid wastes and concrete wastes are disposed to the navigation lock near the site, to related organization.

2-3-3 Restoration and Improvement Plan for Secondary Canal

(1) Current Flow Capacity of Secondary Canals

From the field survey of the current condition of the secondary canals, the flow capacity of the secondary canals is estimated as shown in the following table:

With the exception of the Rahiel Canal, the secondary canals are judged to have sufficient flow capacity for the design flow rates. However, the base width of the Rahiel Canal is as narrow as 1.50m and it is calculated that the current flow capacity is only 1.40 m^3/sec, while the design flow rate is 2.08 m^3/sec (i.e. only 67% of the design flow rate). Thus, restoration and improvement work on the Rahiel Canal, including the widening of the canal, is considered necessary.

Table 2-3-3.1 Secondary Canals Data

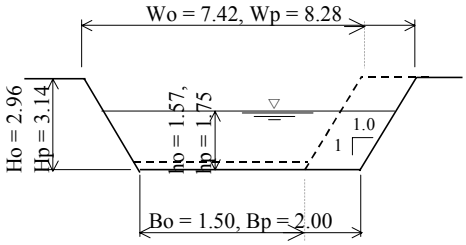
Name of Secondary Canal	Kilometer Post (km)	Beneficiary Area		Canal Extension (km)	Design Flow Rate (m^3/sec)	Base Width of Canal (m)	Water Depth (m)	Flow Velocity (m)	Current Flow Rate (m^3/sec)	Flow Rate %
		Feddan	ha							
1) Arab Beni Khalid	39.30	2,130	890	7.35	0.67	2.00	1.40	0.27	1.30	1.94
2) Beni Khalid	42.60	2,550	1,070	7.10	0.80	3.00	1.53	0.32	2.23	2.78
3) Mousa	62.36	300	130	2.10	0.10	1.50	1.46	0.34	1.48	15.19
4) Asmant	63.45	450	190	2.45	0.14	1.50	1.49	0.35	1.54	10.82
5) Khor Balansora	67.07	100	40	1.00	0.03	1.50	1.53	0.35	1.62	54.22
6) Balansora	67.37	250	110	2.80	0.08	1.50	1.37	0.28	1.35	16.35
7) El Soltan Hasan	69.24	300	130	2.04	0.10	1.10	1.31	0.27	0.97	10.00
8) El Nebt	74.74	200	80	1.62	0.06	1.50	1.26	0.26	0.90	15.05
9) Maburouk	75.38	1,100	460	3.59	0.34	1.50	1.37	0.27	1.06	3.09
10) Manshat El Dahab	77.30	63,627	26,72	62.87	20.02	17.00	2.57	0.45	22.80	1.14
11) Rahiel	77.30	6,620	2,780	9.21	2.08	1.50	1.57	0.29	1.40	0.67
12) Ganabia Tokh	77.30	2,600	1,090	14.65	0.82	1.50	1.47	0.28	1.22	1.50
13) El ganabia El Ola	77.30	720	300	6.70	0.22	1.50	1.52	0.29	1.31	5.83
Total	-	80,947	34,000	123.48	25.47	-	-	-	39.1	1.54
14)Direct Water Intake	-	7,543	3,170	0.00	2.38	-	-	-	-	-
Grand Total	-	88,490	37,170	123.48	27.85	-	-	-	-	-

Notes: From the development study report

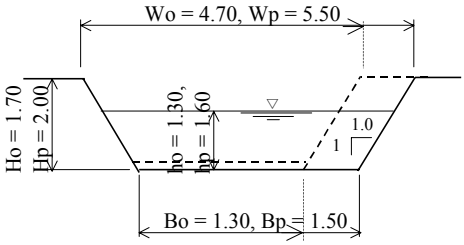
1. Total water flow at Dahab Regulator: Q = (226.50 + 11.50) – 210.15 = 27.85 m^3/sec
2. Unit water volume at Dahab Regulator: q = 27.85 / 37,170 x 1,000 = 0.749 l/sec/feddan
3. Water depth of secondary canal: h = (water level of the Bahr Yusef Canal at each point) – (base elevation of the starting point of the secondary canal)

(2) Secondary Canal Restoration and Improvement Plan

The Rahiel Canal, which currently is the only one of the secondary canals with an insufficient flow capacity, will be restored and improved to secure the design flow rate through the widening and dredging of the canal. The restoration and improvement plan for the Rahiel Canal is as follows:



Standard Cross-section of Upper Section



Standard Cross-section of Midway Section

Item	Legend	Unit	Upper Section		Midway Section		Remarks
			Current	Improvement Plan	Current	Improvement Plan	
Shape of cross-section	—	—	Trapezoidal	Trapezoidal	Trapezoidal	Trapezoidal	
Section Extension	L	km	3.00	3.00	3.00	3.00	
Base Width of Canal	B	m	1.50	2.00	1.30	1.50	
Top Width of Canal	W	m	7.42	8.28	4.70	5.50	
Height of Side Wall	H	m	2.96	3.14	1.70	2.00	
Gradient of Side Wall	N	—	1.00	1.00	1.00	1.00	
Longitudinal Gradient	I	—	1/10,000	1/10,000	1/10,000	1/10,000	
			0.000100	0.000100	0.000100	0.000100	
Roughness Coefficient	n	—	0.030	0.030	0.030	0.030	
Water Depth	h	m	1.57	1.75	1.30	1.60	
Flow Area	A	m^2	4.82	6.56	3.38	4.96	
Wetted Perimeter	P	m	5.94	6.95	4.98	6.03	
Hydraulic Radius	R	m	0.811	0.944	0.679	0.823	
Flow Velocity	V	m/s	0.29	0.32	0.26	0.29	
Flow Rate	Q_1	m^3/s	1.40	2.11	0.87	1.45	
Design Flow Rate	Q	cm/sec	2.08	2.08	1.39	1.39	

• Restoration and Improvement Work Volume for Rahiel Canal:

1. Canal dredging (0.8m^3-class backhoe)

Upper section: Au per meter = 0.50 x 3.14 + 1/2 (1.50 + 1.86) x 0.18 = 1.872m^3/m)1.872 x 3,000 = 5,600m^3

Midway section: Am per meter = 0.20 x 2.00 + 1/2 (1.30 + 1.90) x 0.30 = 0.880m^3/m)0.880 x 3,000 = 2,600m^3

Canal Dredging Total = 8,200m^3

2. Slope shaping (0.8m^3-class backhoe)

Upper section: (lu per meter = 3.14 x 1.414 = 4.441m^2/m)	4.441 x 3,000	= 13,300m^2
Midway section: (lm per meter = 2.00 x 1.414 = 2.828m^2/m)	2.828 x 3,000	= 8,500m^2
Slope Shaping Total		= 21,800m^2

2-3-4 Projects Planned by Egypt

The Bahr Yusef Canal and its associated facilities are maintained, managed and operated by the Machinery and Electricity Bureau and the Drainage Bureau of the West Minia Irrigation Directorate. The current condition and state of the facilities of the secondary canals of the Bahr Yusef Canal and its associated canals and their maintenance and management requirement are shown in Table 3-2. Meanwhile, the West Minia Irrigation Directorate has developed the 5-year plan shown in Table 3-3 for facility maintenance and management, expansion of the irrigated areas (horizontal expansion of the irrigated areas), installation of new groundwater pumps to secure irrigation water, improvement of the end waterways, and restoration and improvement of the secondary canals of the Bahr Yusef Canal.

The year-by-year summary of these projects is given below:

Table 2-3-4.1 5 Years Plan for Improvement and Maintenance/Management of Canals

Unit; 1,000LE

Items	2007/08	2008/09	2009/10	2010/11	2011/12	5 years total
Improvement of Tube Wells For Irrigation water	50	50	50	50	50	250
Improvement of farm land facilities (ex. Mesca)	100	100	100	100	100	500
Imporvement of irrigation facilities in west side of Buhr Yusef Canal	250	250	300	250	300	1,350
Construction and Rehabilitation of Kamadir Pump Station	62,032	800	200	300	200	63,532
Total	62,432	1,200	650	700	650	65,632

It is understood from the current condition of the canals and their associated facilities, their maintenance and management as shown in Table 3-3 and the above-mentioned 5-year Plan, that Egypt has developed a plan to improve the secondary canals and their associated facilities in a planned and consistent way over the next 5 years. However, since the restoration and improvement project of the Rahiel Secondary Canal proposed this time is not included in the 5-year Plan for Improvement and Maintenance/Management of Canal Facilities shown in Table 3-3, it needs to be implemented by the recipient country as a part of this grant aid program.

Table 2-3-4.2 Current Condition of Secondary Canals and Associated Facilities, and Evaluation

Name of Canal/Facility	Water Intake Facility	Canal	Evaluation
Arab Beni Khalid	The structures directly face the Bahr Yusef Canal and the water surface in front of the division work is clean. In addition to the FH-type division work, there is also a lift pump station with two lift pumps of ∅500mm. Some deterioration is observed in the concrete structure of the division work, but the shape remains good. The FH-type gate can be opened and closed smoothly.	In some areas of the upper section of the canal the side slope has collapsed and thus the design cross-section has been lost, but the flow cross-section is secured. Although the cross-section of the canal is secured, a pump has been installed near the end-user farm fields as a facility within the farm fields to pump up groundwater to obtain the necessary water volume when water from the canal is not sufficient.	It is judged that the cross-section shaping etc., of the canal should be included in the maintenance and management expenses, and that the cost of division work upgrading is covered by the budget of the 5-year Plan.
	The lift pump station which is operated when the water level of the Bahr Yusef Canal drops does not have a shed, and an outdoor-type control panel is installed. The lift pumps are single-suction volute pumps of ∅500mm. These are updated nearly every 10 years by the Machinery and Electricity Bureau.		It is judged that collaborative works with the Machinery and Electricity Bureau will be continued.
Beni Khalid	The structures directly face the Bahr Yusef Canal and the water surface in front of the division work is clean. In addition to the FH-type division work, there is also a lift pump station with three lift pumps of ∅500mm. Some deterioration is observed in the concrete structure of the division work, but the shape remains good. The FH-type gate can be opened and closed smoothly.	Approx. 100m near the starting point of the canal is lined with wet masonry and concrete. Vegetation is observed within the canal in many places in the midway section, but the flow cross-section is secured.	It is judged that the cross-section shaping etc., of the canal should be included in the maintenance and management expenses, and that the cost of division work upgrading is covered by the budget of the 5-year Plan.
	The lift pump station which is operated when the water level of the Bahr Yusef Canal drops does not have a shed, and an outdoor-type control panel is installed. The lift pumps are single-suction volute pumps of ∅500mm. These are updated nearly every 10 years by the Machinery and Electricity Bureau.		It is judged that collaborative works with the Machinery and Electricity Bureau will be continued.
Mousa	The structures directly face the Bahr Yusef Canal and the water surface in front of the division work is clean. The division work is located in a village and the concrete structure and the slide gate are kept in good condition.	The upper section of the canal runs through a village and garbage is left on the canal slope, but the required cross-section of the canal is still secured.	It is judged that the cross-section shaping etc., of the canal should be included in the maintenance and management expenses, and that the cost of division work upgrading is covered by the budget of the 5-year Plan.

Name of Canal/Facility	Water Intake Facility	Canal	Evaluation
Asmant	The structures directly face the Bahr Yusef Canal and the water surface in front of the division work is clean. The concrete structure and the slide gate are kept in a good condition.	The inside of the canal is kept in good condition.	It is judged that the cross-section shaping etc., of the canal should be included in the maintenance and management expenses, and that the cost of division work upgrading is covered by the budget of the 5-year Plan.
Khor Balansora	The structures are set up 5 meters away from the Bahr Yusef Canal and stagnation and vegetation are observed. However, the concrete structure and the gate are in good condition.	While vegetation is observed in some parts of the midway and lower sections, the upper section is maintained in a relatively good condition and the cross-section is still secured.	It is judged that the cross-section shaping, removal of the vegetation in front of the division work, etc., should be included in the maintenance and management expenses, and that the cost of division work upgrading is covered by the budget of the 5-year Plan.
Balansora	The structures are set up 5 meters away from the Bahr Yusef Canal and stagnation and vegetation are observed. However, the concrete structure and the gate are in good condition.	While vegetation is observed in some parts of the midway and lower sections, the upper section is maintained in a relatively good condition and the cross-section is still secured.	It is judged that the cross-section shaping, removal of the vegetation in front of the division work, etc. should be included in the maintenance and management expenses, and that the cost of division work upgrading is covered by the budget of the 5-year Plan.
El Soltan Hasan	The structures directly face the Bahr Yusef Canal and the water surface in front of the division work is clean. The concrete structure and the gate are kept in good condition.	Some areas have vegetation growing up to the canal shoulder, probably because the canal runs through an uncultivated area. There is no vegetation inside the canal and the flow cross-section is secured.	It is judged that the cross-section shaping etc., of the canal should be included in the maintenance and management expenses, and that the cost of division work upgrading is covered by the budget of the 5-year Plan.
El Nebt	There is a brick-built division work, facing the Bahr Yusef Canal. The surface of the division work has deteriorated to some extent through water erosion, but the gate can be operated without any problem.	While the slope inside the canal has collapsed to some extent, the flow cross-section is still secured.	It is judged that the cross-section shaping etc., of the canal should be included in the maintenance and management expenses, and that the cost of division work upgrading is covered by the budget of the 5-year Plan.
Mabrouk	There is a brick-built division work, facing the Bahr Yusef Canal. The surface of the division work has deteriorated to some extent through water erosion, but the gate can be operated smoothly.	While the slope inside the canal has collapsed to some extent, the flow cross-section is still secured.	It is judged that the cross-section shaping etc., of the canal should be included in the maintenance and management expenses, and that the cost of division work upgrading is covered by the budget of the 5-year Plan

Name of Canal/Facility	Water Intake Facility	Canal	Evaluation
Manshat El Dahab	A division work gate structure is located approx. 500m from the separation point of the canal, which branches off approx. 300m above the Dahab Regulator. This gate structure has been constructed in recent years and the gate can be opened and closed smoothly.	The canal has a base width of 15m or more, and a sufficient flow cross-section is secured.	It is judged that the cross-section shaping etc., of the canal should be included in the maintenance and management expenses, and that the cost of division work upgrading is covered by the budget of the 5-year.
Rahiel	The concrete structure and the gate are kept in good condition.	Because the slope inside the canal has collapsed and the base width of the canal is as narrow as 1.5m, the flow cross-section is insufficient.	Because the flow cross-section of the canal is insufficient, it is judged that restoration and improvement works including widening and dredging of the canal are necessary.
Ganabia Tokh	This was built at the same time as the Dahab division work and the gate can be opened and closed smoothly.	While the slope inside the canal has collapsed to some extent, the flow cross-section is still secured.	It is judged that the cross-section shaping etc., of the canal should be included in the maintenance and management expenses, and that the cost of division work upgrading is covered by the budget of the 5-year Plan
El Ganabia El Ola	The concrete structure and the gate are kept in good condition.	While the slope inside the canal has collapsed to some extent, the flow cross-section is still secured.	It is judged that the cross-section shaping etc., of the canal should be included in the maintenance and management expenses, and that the cost of division work upgrading is covered by the budget of the 5-year Plan
Kamadir pump station and canal	This is the pump station that will take water from the Dahab Canal and pump up water to irrigate the Kamadir area. Currently, four axial-flow pumps are installed to irrigate 13,727 feddan of the East Kamadir area. Upgrading of all the facilities including the pump motors started in January 2007 with the benefit of EU loans. North of the current pump station, construction of Kamadir B Pump Station started with the benefit of a loan from the World Bank, to secure irrigation water for the newly-developed West Kamadir area (9,100 feddan).	The canal is a combination of an earth canal and a canal made of concrete on three sides. Both the earth canal portion and the concrete canal portion are well maintained. It is planned to widen the canal because of the increase in irrigation water.	It is judged that the pump station will come into service in or before 2010.

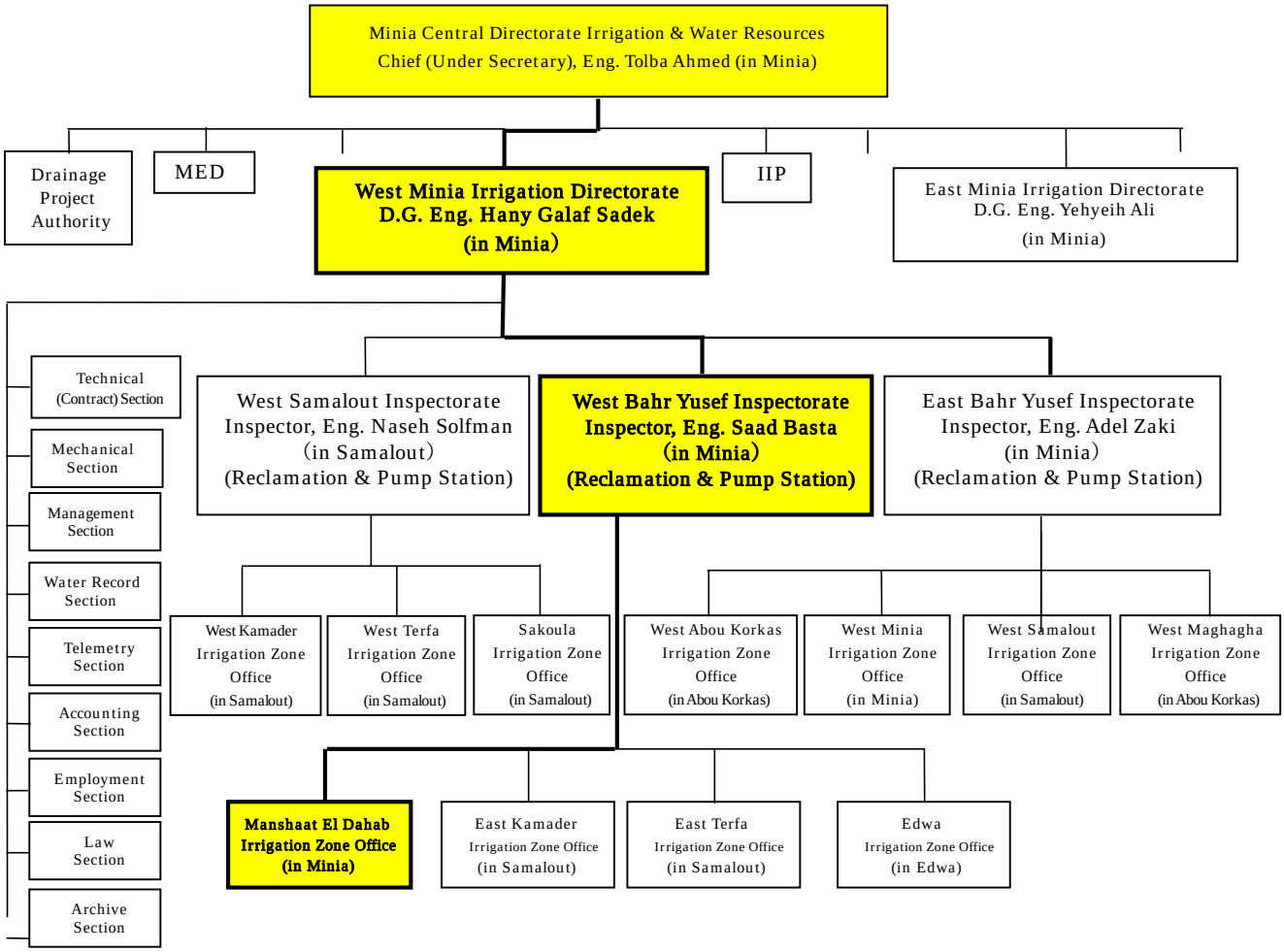
Name of Canal/Facility	Water Intake Facility	Canal	Evaluation
Badraman pump station	This drainage pump station returns the water of the drainage canal along the left bank above the Bahr Yusef Canal to the Bahr Yusef Canal, and it is set up for groundwater level lowering and recycling of irrigation water within the farm fields. This drainage pump station is operated and managed by the Machinery and Electricity Bureau taking into account the water level of the drainage canal. The operating staff is stationed there. The drainage pump station is well managed and maintained.	The drainage canal is managed and maintained by the Drainage Bureau. The drainage canal has some slope failure, but it is managed and maintained in such a way that it can fulfill its function.	It is judged that collaborative works with the Machinery and Electricity Bureau and the Drainage Bureau will be continued.
Kabkab pump station	This drainage pump station returns the water of the drainage canal between the Bahr Yusef Canal and the Ibrahimia Canal to the Bahr Yusef Canal, and it is set up for groundwater level lowering and recycling of irrigation water within the farm fields. This drainage pump station is operated and managed by the Machinery and Electricity Bureau taking into account the water level of the drainage canal. The operating staff is stationed there. The drainage pump station is well managed and maintained.	The drainage canal is managed and maintained by the Drainage Bureau. The drainage canal has some slope failure, but it is managed and maintained in such a way that it can fulfill its function.	It is judged that collaborative works with the Machinery and Electricity Bureau and the Drainage Bureau will be continued.
Touna pump station	This drainage pump station returns the water of the drainage canal north of the Badraman Drainage Pump Station on the left bank of the Bahr Yusef Canal to the Bahr Yusef Canal, and it is set up for groundwater level lowering and recycling of irrigation water within the farm fields. This drainage pump station is operated and managed by the Machinery and Electricity Bureau taking into account the water level of the drainage canal. The operating staff is stationed there. The drainage pump station is well managed and maintained.	The drainage canal is managed and maintained by the Drainage Bureau. The drainage canal has some slope failure, but it is managed and maintained in such a way that it can fulfill its function.	It is judged that collaborative works with the Machinery and Electricity Bureau and the Drainage Bureau will be continued.

2-4 Project Operation Plan

2-4-1 Operating and maintenance/management structure

(1) Project implementation structure

While the Irrigation Improvement Sector (IIS) of the Ministry of Water Resources and Irrigation (MWRI) is the highest-level implementing agency of the Government of Egypt in this project, after completion of the grant aid program the main part of the operation and maintenance/management of the regulator will be transferred to the Irrigation Sector (IS) of the same ministry. As was the case before the rehabilitation, when the rehabilitated Dahab Regulator goes into actual operation, the Assiut Irrigation Directorate (IDir) under the IS will be responsible for the water management works including formulation of the water allocation plan and water usage plan for all the four rehabilitated regulators on the Bahr Yusef Canal, including the Dahab Regulator which is located uppermost on the canal, as well as the Sakoula, Mazoura and Lahoun Regulators. The Bahr Yusef Canal runs from Minia Governorate through Beni Suef, Faiyum and Giza Governorates. However, as the Dahab Regulator to be rehabilitated in this project and its entire beneficiary area are located in the Minia Governorate, the West Minia IDir is taking responsibility for the facility and water management. The Dahab Regulator comes under the West Bahr Yusef Inspectorate, which is a subordinate organ of the West Minia IDir; and the office at Manshaat el Dahab gives direct instructions regarding the operation of the regulator.



(2) Personnel assignment

The current organizations and structures will be maintained at the West Minia IDir and the West Bahr Yusef Inspectorate, the organizations superior to the Dahab Regulator Management Office in the operation and maintenance/management of the Dahab Regulator, as there will be no change at these organizations after the rehabilitation in the current structural chain of command and procedures with regard to operation and maintenance/management.

On the other hand, at the Dahab Regulator Management Office, the current structure for the daily operation and maintenance/management of the Dahab Regulator will be replaced according to the change of work procedures and a structure rationalized through the modernization and automation of the facilities. While this change will reduce the number of staff in the office, hiring of workers with qualifications equivalent to graduation from the Technical Secondary School in the Minia Governorate is recommended, as the workers will be required to master the operation of the electric gates. The table below summarizes the current assignment and the assignment of personnel for the operation and maintenance/management of the Dahab Regulator after the rehabilitation.

Table 2-4-1.1 Personnel assignment for the operation and maintenance/management of the Dahab Regulator

Job title	West Bahr Yusef Inspectorate	Manshaat el Dahab Office	Dahab Regulator	
			Current	After rehabilitation
1) Head of Inspectorate	1			
2) Practical Technical Expert	3			
3) Practical Technical Assistant	2			
4) Irrigation Civil Engineer	1	1		
5) Mechanical Engineer	2			
6) Technician	11	18		
7) Office Worker	18	3		
8) Chief Gate Operator			1	1
9) Gate Operator		30	10	10
10) Worker	12	40	10	3
11) Driver	3	1		
Total	53	93	21	14

2-4-2 Details of the maintenance/management

Below are the details of the maintenance/management works which should be implemented daily and/or regularly by the Government of Egypt after the Dahab Regulator has been rehabilitated through the implementation of this grant aid program.

2-4-2-1 Daily inspection

(1) Visual inspection is to be carried out for cracks on, and differential settlement of, the concrete structures such as the dam and bridge, and peeling of paint and rust on steel structures such as the gates.

(2) With regard to the equipment on the operation console installed in the Administration Building for the remote control of the gates, the indicator lights that indicate normal/abnormal operation are to be checked at the beginning of operation every day.

(3) Retention of floating grass and debris on the front-side upstream of the gates is expected to rarely happen partly because the overflow gates to be installed at the Dahab Regulator will have a span-length of 8m. However, floating matter such as grass may be caught in the rollers of the gates. The gates are to be visually inspected for debris on a daily basis and, if such debris is spotted, it should be removed immediately.

(4) The equipment including the gates, the hoists and the operation console in the Administration Building is to be monitored for abnormal vibration, noise and heating.

2-4-2-2 Monthly inspection

(1) Comparison of gauge readings and analog and digital displays of the water level gauges to verify their concordance.

(2) Inspection of the reading of the gate opening indicators and gate opening speed.

(3) Inspection of the wire-ropes of the gate hoists for looseness, damage and wear.

(4) Inspection of the water sealing rubber of the gates for deterioration

(5) Inspection of concrete with a test hammer for deterioration

(6) Inspection of the power supply system for possible electric leak

(7) Inspection of the oil supply equipment.

(8) Inspection of nuts and bolts for looseness.

2-4-2-3 Annual inspection

(1) At the time of low water level during the annual closure of the Bahr Yusef Canal (in January), the substructure work of the dam, floor slabs and bed protective works are to be inspected for cracks, settlement and piping, and surveyfor accurate measuring.

(2) Inspection of the revetment works and the bed protective blocks for abnormality

(3) Inspection of gate sheets and door contact points for water leakage

2-4-2-4 Long-term monitoring, replacement and repair

The following are items which should be monitored over long-term use or which are to be replaced or repaired after long-term use.

Item for repair/replacement	Frequency
Re-painting of the gates	Every 10 years
Inspection of the motors of the gate hoists by disassembly	Every 10 years
Replacement of switchboards	Every 10 years
Inspection and replacement of the recorders	Every 10 years
Meters (indicators, lamp operation buttons and wiring)	Every 5 years

2-5 Project Cost Estimation

2-5-1 Initial Cost Estimation of the Project

(1) Project Cost to be borne by the Egyptian Side

Project cost to be borne by the Egyptian side is estimated at Japanese Yen 317 million. Table below shows the contents of the project cost. The amounts below will be reviewed latter in Japan.

Project Cost Borne by the Egyptian Side

Category		Amount(JY million)
①	Land preparation for temporary yard	2.7
	Rehabilitation of secondary canal	7.2
	Construction of upper part of control house	20.1
	Repair of existing regulator and gates	1.7
	Installation of the lines or Pipes of Electricity, water and telephone	5.8
	Banking Commission	0.8
	Furniture and Others	0.2
	Total ①	**38.5**
Custom duties imposed on the whole construction of import matter		278.1
Total ② (Total①＋Taxes)		**316.6**

(2) Condition of Estimation

① Date of estimation ; March, 2007

② Exchange rate ; 1 USD = 119.59 Yen (Average of the past 6 months)

; 1 LE = 20.94 Yen (Average of the past 6 months)

③ Construction periods ; As shown in the Annex 2

④ Others ; Cost estimation is in accordance with the framework of Japanese grant aid scheme.

2-5-2 Operating and Maintenance Costs

The table below shows the operating and maintenance costs (in LE) of the existing Dahab Regulator over the last five years.

Item	Before project implementation					After implementation
	2002/03	2003/04	2004/05	2005/06	2006/07	Maintenance costs
1. Personnel costs	84,000	90,000	96,000	109,000	115,000	100,000
2. Operating costs 1) Administration and inspection 2) Utility and communication costs	6,280	6,900	7,500	8,000	8,500	6,000
3. Maintenance costs 1) Facility management costs	1,600	1,800	2,000	2,000	2,500	3,000
4. Long-term repair costs					500,000	
Total	91,880	98,700	105,500	119,000	626,000	109,000

The table of the actual expenditures for the maintenance of the existing Dahab Regulator over the last five years shows that an annual budget of approximately 100,000LE (approximately 2.1 million Yen) excluding the long-term repair costs have been allocated to the regulator. Therefore, the maintenance budget amount of 109,000 LE (approximately 2,289 thousand Yen) expected after the completion of the project is considered appropriate, taking into consideration the financial situation of the IIS. Because a budget of 400,000 LE (8.4 million Yen) was allocated for the long-term repair in Fiscal 2006/07, it is expected that an appropriate budget to cover the cost of painting and repairing the gates, which will be required every three to ten years, will be allocated.

Chapter 3 Project Evaluation and Recommendation

Chapter 3. Project Evaluation and Recommendations

3-1 Project Effect

The rehabilitation and improvement of the Dahab Regulator would have a direct effect on solving the problem of constant water shortage in its beneficiary area by stabilizing the water level upstream from the regulator and ensuring a stable supply of the required amount of irrigation water. Indirect effects such as an increase in crop yields and consequent increase in agricultural output in the beneficiary area could also be expected. In addition, stabilization of both the water level upstream from the regulator and the supply of irrigation water to the beneficiary area should reduce haphazard pumping, which is often practiced by private pump owners along the tertiary couldals of the beneficiary area. This would result in the decrease of the operation time of their pumps. Upgrading the regulator bridge would enhance the improvement of the commodity distribution condition in the region as well. The introduction of overflow-type two-leaf gates is also expected to improve the hygienic condition around the Dahab Regulator by eliminating retention of debris and carcasses currently observed at the gates of the existing regulator. The table below summarizes the above-mentioned effects.

Current conditions and problems	Measures to be taken by the cooperation project	Direct effects and extent of improvement	Indirect effects and extent of improvement
The unstable water level upstream from the Dahab Regulator caused by its severe deterioration due to aging of the weir and 20 gates has led to the inability to supply the required amount of irrigation water to the beneficiary area and also a constant water shortage in the fields. Discharge to the three downstream regulators is also unstable.	・ Replacement of the Dahab Weir ・ Upgrading of the gates ・ Construction of a regulator bridge ・ Foundation work on the control house to be used for remote operation of the gates and installation of the equipment for the operation of the gates.	1)The shortage of $52,205 \times 10^3 m^3$ against the total water requirement of $489,650 \times 10^3$ m^3 would be eliminated, which means an increase of 10.7% in water supply. 2)It would solve the waiting time by traffic jams with improvement in traffic condition by increasing the width of the regulator bridge.	1)The yield and crop production in the beneficiary area would increase. The production would increase by 89,478 tons (or 8%) per year. 2)The agricultural output in the beneficiary area would increase. The output would increase by 59,220 LE (or 6.3%) per year. 3)It would become possible to discharge the required amount of water to the three downstream regulators. Discharge rate = 38.42 m^3/sec to 210.15 m^3/sec 4)Excessive operation of the pumps and the maintenance and management costs of the pumps would be reduced. 5)An increase in the width of the regulator bridge would improve the distribution of agricultural produce. 6)Introduction of overflow-type two-leaf gates would improve water quality by eliminating retention of debris and carcasses upstream of the gates.

3-1-1 Direct Effects

(1) Recovery of the available irrigation water

The table below shows the result of the analysis on the effect of the increase in the volume of irrigation water with project implementation using actual data of water intake from the 13 secondary couldals, which receive water from the existing Dahab Regulator, in 2005.

Comparison between the monthly water requirement for crops and actual water intake in the beneficiary area irrigated by gravity from the secondary couldals in 2005 revealed that the actual volume of irrigation water was estimated at $437,445 \times 10^3$ m^3/year based on the daily record of the upstream water level at the Dahab Regulator against the required irrigation water volume of $489,650 \times 10^3$ m^3/year.

The rehabilitation and improvement of the Dahab Regulator is expected to have the direct effect of supplying the required water volume of $489,650 \times 10^3$ m^3/year to the beneficiary area by the result of creating a stabilized water level upstream from the regulator and steady irrigation water supply to the secondary couldals after the completion of the project.

3-1-1.1 Comparison between the monthly water requirement and actual water intake in the beneficiary areas of the Dahab Regulator

(1,000m^3)

Name of zone	Item	January	February	March	April	May	June	July	August	September	October	November	December	Total	Total excluding January
		Winter crops				Summer crops					Winter crops				
Manshat El Dahab	Water requirement	23,669	30,237	38,744	35,540	28,982	50,031	60,497	51,644	14,981	9,402	11,602	17,487	372,817	349,148
	Intake volume	6,595	24,728	34,130	33,579	28,765	47,764	48,847	44,196	14,981	9,402	11,602	16,381	320,971	314,376
	Shortage volume	-17,074	-5,509	-4,614	-1,961	-217	-2,267	-11,650	-7,448	0	0	0	-1,106	-51,846	-34,772
	Shortage by percent (%)	-72%	-18%	-12%	-6%	-1%	-5%	-19%	-14%	0%	0%	0%	-6%	-14%	-10%
	Shortage volume per crop season	-30,264				-21,582					–			-51,846	-34,772
West Minia	Shortage (%)	-84%	-48%	-32%	-16%	-4%	-10%	-16%	-10%	-5%	-9%	-4%	-41%	-22%	-18%
	Water requirement	6,784	8,572	10,253	9,118	7,855	14,446	17,635	15,034	4,307	2,972	2,930	4,739	104,645	97,861
	Shortage volume	-5,717	-4,135	-3,296	-1,453	-341	-1,374	-2,862	-1,474	-212	-258	-106	-1,922	-23,151	-17,433
	Shortage volume per crop season	-16,886				-6,263					–			-23,150	-17,432
East Minia	Shortage (%)	-54%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-4%	0%
	Water requirement	2,999	3,737	4,372	3,870	3,428	6,309	7,702	6,567	1,897	1,336	1,328	2,095	45,640	42,641
	Shortage volume	-1,624	0	0	0	0	0	0	0	0	0	0	0	-1,624	0
	Shortage volume per crop season	-1,624				0					–			-1,624	0
Whole Area	Water requirement	33,452	42,547	53,370	48,527	40,264	70,787	85,834	73,245	21,186	13,710	15,860	24,321	523,102	489,650
	Intake volume	9,037	32,903	45,460	45,113	39,706	67,146	71,322	64,323	20,973	13,451	15,754	21,292	446,482	437,445
	Shortage volume	-24,415	-9,643	-7,910	-3,415	-558	-3,641	-14,512	-8,922	-212	-258	-106	-3,028	-76,620	-52,205
	Shortage by percent (%)	-73%	-23%	-15%	-7%	-1%	-5%	-17%	-12%	-1%	-2%	-1%	-12%	-15%	-11%
	Shortage volume per crop season	-48,775 (-24,360)				-27,845					–			-100,979	-76,565
	Shortage per crop season (%)	-21.0% (-12.3%)				-9.6%					-			-	-

(2) Improvement in traffic condition by increasing the width of the regulator bridge

The regulator bridge is expected to be an important point of regional traffic. The total width of the bridge is expanded to 10 m with 2 lanes, so that smooth passing of the traffic through the bridge would be possible throughout the day without causing traffic jam. Additionally a large-sized car would be available to pass through the bridge, though the present decrepit bridge does not allow the one to pass. Expansion of the width of the bridge would also resolve the waiting time of around 5 minutes for vehicle passengers when one has to wait for the opposite to pass the bridge ahead during traffic jam.

3-1-2 Indirect Effects

(1) Increase in crop production in the beneficiary areas

The rehabilitation and improvement of the Dahab Regulator is expected to have the indirect effect to increase in crop production as shown in the table bellow, by realizing the supply of the required water volume of 489,650$\times 10^3$ m^3/year to the beneficiary area.

The estimation of the increase was done based on the literatures for the crop production with irrigation and without irrigation. The unit yields of crop are reported as the table bellow, and the productivity coefficient, i.e. the effect of irrigation over the unit crop yield, is calculated as setting the unit yield without irrigation as 1.00.

3-1-2.1 Ratio of crop yields with and without irrigation in the arid area

Crop	(1) Unit yield on non-irrigated farmland (kg)	(2) Unit yield on irrigated farmland (kg)	Increase ratio (2)/(1)
Wheat	583	1,245	2.14
Barley	761	1,265	1.66
Millet	760	1,082	1.42
Other cereals	906	1,571	1.73
Pulses	475	630	1.33
Potatoes	2,000	5,082	2.90
Cotton	790	991	1.25
Sugar beat	625	20,258	32.41
Oil seed	54	273	5.06
Vegetables	2,497	8,985	3.60
Alfalfa	446	2,559	5.74
Other field crops	1,331	2,163	1.63

Source: "Water Management in arid area" ADCA

The increase of crop production was estimated as the table bellow based on the above-mentioned coefficient. As a result, crop yields are estimated to increase by 2 to 11 % from the current level. The crop production in the irrigation area as a whole is expected to increase from 1,189$\times 10^3$t to 1,278$\times 10^3$t, or by 89$\times 10^3$t, which means an expected improvement of productivity by approximately 8%.

3-1-2.2 Increase in yields and crop production from the current level when the planned amount of irrigation water is distributed

Classification			Present						After project				Product increase	
Item		Product rate: Productivity rate between irrigated / non-irrigated	Cropping area (1)		Unit crop yield (2)			Production (3) (1)x(2)	Unit crop yield (4)			Production (5) (1)x(3)	Increase (6) (5)-(3)	Rate (7) (6)/(2)
			Feddan	ha		/ fed	Ton/ha	Ton		/ fed	Ton/ha	Ton	Ton	%
Winter crops	Wheat	2.14	40,802	17,137	21.71	Ardeb	7.75	132,872	23.23	Ardeb	8.30	142,173	9,302	7%
	Bean	1.33	6,471	2,718	7.07	Ardeb	2.61	7,091	7.29	Ardeb	2.69	7,314	223	3%
	Barley	1.66	181	76	14.98	Ardeb	4.28	325	15.75	Ardeb	4.50	342	17	5%
	Vegetables	3.60	5,065	2,127	16.85	Ton	40.12	85,345	18.49	Ton	44.02	93,652	8,307	10%
	Long Berseem/ Clover	5.74	14,147	5,942	27.63	Ton	65.79	390,882	30.75	Ton	73.21	434,998	44,117	11%
	Onion	3.60	1,441	605	10.00	Ton	23.81	14,410	10.97	Ton	26.13	15,813	1,403	10%
	Helba, Lentil	1.73	1,247	524	4.00	Ardeb	1.52	798	4.22	Ardeb	1.61	842	44	5%
	Garlic	3.60	1,065	447	10.00	Ton	23.81	10,650	10.97	Ton	26.13	11,687	1,037	10%
	Others	1.63	6,649	2,793	10.00	Ton	23.81	66,490	10.50	Ton	25.00	69,803	3,313	5%
	Sub-total		**77,068**	**32,369**				**708,863**				**776,624**	**67,761**	10%
Summer crops and Nili crops	Cotton	1.25	5,783	2,429	4.96	Ton	11.81	28,684	5.06	Ton	12.04	29,243	559	2%
	Maize	1.73	54,366	22,834	23.65	Ardeb	7.88	180,006	24.64	Ardeb	8.21	187,571	7,565	4%
	Soyabean	1.73	2,420	1,016	1.30	Ton	3.10	3,146	1.35	Ton	3.23	3,278	132	4%
	Sugar Cane	1.63	533	224	49.00	Ton	116.67	26,117	50.88	Ton	121.14	27,119	1,002	4%
	Summer Vegetable	3.60	8,214	3,450	8.60	Ton	20.48	70,640	9.24	Ton	21.99	75,878	5,238	7%
	Nili Vegetables	3.60	1,483	623	12.00	Ton	28.57	17,796	12.89	Ton	30.69	19,116	1,320	7%
	Others	1.63	12,818	5,384	12.00	Ton	28.57	153,816	12.46	Ton	29.67	159,716	5,900	4%
	Sub-total		**85,617**	**35,959**				**480,205**				**501,921**	**21,716**	5%
Total			**162,685**	**68,328**				**1,189,068**				**1,278,546**	**89,477**	**8%**

(2) Increase in agricultural production

The table below shows the results of the evaluation of the change in agricultural production (output) with and without project implementation using the unit prices of crops in 2005. It is estimated that the agricultural output in the entire irrigation beneficiary area would increase from the current level of 926,940 $\times 10^3$ LE/year to 986,160$\times 10^3$ LE/year. This increase of approximately 59,220 million LE$\times 10^3$ LE/year is translated into an increase of approximately 6.3% from the current level.

Table 3-1-2.3 Changes in agricultural output before and after project implementation (in LE/year)

Item	Implementation of Project		Deference(LE)	Increase Ratio(%)
	Without (LE)	With (LE)		
Agricultural output				
Winter Crops	446,256,437	482,365,133	36,108,696	108%
Summer Crops and Nil Crops	480,684,254	503,795,229	23,110,975	105%
Total	926,940,691	986,160,362	59,219,671	106%

(3) Improvement of downstream discharge of the Dahab Regulator

Current water management method of the Dahab Regulator is operating by monitoring of downstream water level because of difficulty in manual gate operation method. After installation of overflow-type two-leaf gates, high accuracy water management would be available with realizing of stable upstream water level (38.42 m^3/sec～210.15m^3/sec). Since, including the Dahab Regulator and other three regulators (Lahoun, Mazoura, Sakoula Regulator) which were rehabilitated by Japan's Grant Aid, would be installed by same type gate named in overflow-type two-leaf gates, water management of four regulators would have same function. It would be expected to realize the integrated water management together with four regulators, and would be expected to possible the effective use of the limited water resources.

(4) Improvement of operation and maintenance cost

As unstable upstream water level of the existing Dahab Regulator result in unstable supply of irrigation water to the beneficiary area, because designed suction water level for pump could not be kept steadily. In this condition, it is compelled to do operate the pumps for a long time to meet the required pump-up volume. It is major reason of mechanical trouble of the pumps. And additional pumps are compelled to operate excessively. By the realizing of stable upstream water level and stable suction water level would be kept by the rehabilitation of the Dahab Regulator, the costs for the maintenance and management of the pump operation would be reduced.

(5) Improvement of physical distribution by increasing the width of the regulator bridge

The regulator bridge of the Dahab Regulator plays an important role as hub of local transport. Taking its importance into consideration, the regulator bridge would be replaced in this project together with the rehabilitation and improvement of the Dahab Regulator. Since the width would be increase to 10m from 4m, it would be used for one-lane traffic mutually and it would be used the bridge by large vehicles, which is currently banned because of deterioration due to age, would once again be allowed. Therefore, rehabilitation of the regulator bridge is expected to facilitate shipment of agricultural produce from the beneficiary area smoothly, and to contribute for mass transportation. It is improvement of entire distribution environment.

(6) Improvement in hygiene

Local residents and their livestock use water flowing in downstream of the Bahr Yusef Canal as drinking water. Since, existing regulator has damaged gates due to age, and is operating by underflow method of gates, often create retention of debris and carcasses on the surface of the upstream of the regulator. Decomposition of the retained debris and carcasses has deteriorated water quality. This unhygienic condition would be eliminated because the retention of debris and carcasses would not occur after the replacement of the existing gates with the overflow-type two-leaf gates in this project, and maintenance cost for cleaning of garbage would be expected to reduce.

3-2 Recommendations

3-2-1 Recommendations and measures to be taken by the Government of Egypt

Upon the rehabilitation and improvement of the Dahab Regulator, it is recommended that Egypt side would implement measures as follows;

(1) Sustainable expansion of the Irrigation Improvement Project (IIP)

The Ministry of Water Resources and Irrigation is implementing the Irrigation Improvement Project (IIP) nationwide in preparation for the possibility of an agricultural water demand crisis in the future. The Meska Improvement Project is a part of IIP. IIP project has been implemented in the beneficiary area of the Ibrahimia Canal located adjacent to the Bahr Yusef Canal. Positive results have been coming out from this project in such ways: 1) effective water management at the field level, 2) equitable water distribution, 3) capacity building in project operation by the relevant officials and 4) establishment of water users associations.

The improvement of the Dahab Regulator is expected to improve irrigation efficiency in the area irrigated by the regulator. This would be accomplished by implementing the meska improvement project in the beneficiary area of the Dahab Regulator using the lessons learned from the above-mentioned project while taking into account not only measures for the improvement of irrigation facilities but also the other measures consistently such as irrigation water management and the extension of farming techniques in the fields.

(2) Cooperation between the Irrigation Directorates on the operation of the overflow-type two-leaf gates with the intention of integrated water management at the four regulators

Among the three regulators, which have already been improved by the grant aid program funded by the Government of Japan, the Beni Suef Irrigation Directorate is responsible for the maintenance, operation and management of the Mazoura and Lahoun Regulators while the West Minia Irrigation Directorate is responsible for the Sakoula Regulator. The Dahab Regulator is to be maintained, operated and managed by the West Minia Irrigation Directorate just like the Sakoula Regulator. As the other three regulators have already been improved, all the four intake regulators located on the Bahr Yusef Canal would be equipped with overflow-type two-leaf gates upon completion of the Dahab Regulator project. Completion of the project would create an environment enabling an efficient water resource management in the Bahr Yusef Canal, which utilizes as much as 5 billion m^3 of precious water resources, as well as a flow rate control with high operational performance and accuracy. Replacing individual operation of the four regulators to the integrated management of the Bahr Yusef Canal with application of a unified water management system is expected to realize rational and efficient use of the available water resources without excessive intake or discharge as well as appropriate distribution of valuable irrigation water to the 323,400 ha of the beneficiary area. To realize these expectations, it is strongly recommended that the Irrigation Directorates responsible for the four regulators should cooperate each other in their maintenance, operation and management, e.g. routine procedures and activities in water management and gate operation towards

the integrated management in the future.

3-2-2 Technical cooperation and cooperation with other donors

Egypt is confronted with the problems associated with population growth such as increasing demand for food. In order to steadily advance measures against these problems in the area of agricultural production, promotion of further utilization of the Bahr Yusef Canal (the main irrigation facility in the Middle Egypt) would be required. Therefore, it is necessary to further improve on the technology to use the canal by analyzing the outcomes of the improvements on the irrigation facilities, the four regulators, including the Dahab Regulator. By managing this group of the four regulators in an integrated fashion and realizing water management under mutual cooperation among them, it would become possible to rationally utilize the limited water resources and realize Egypt's national policy of the horizontal expansion (agricultural land expansion) and the vertical expansion (increase of production volume and productivity). It is recommended that sustainable operation along with maintenance and management of the four regulators, including the Dahab Regulator, be implemented in an integrated fashion taking into consideration technical cooperation for changing the agriculture practice based on the traditional way of water use, to which farmers in Egypt have insistently adhered, into modern one with higher productivities through introducing to the Japanese modern irrigation facility development method integrated with rational water management technologies along with cooperation from other donors.

3-3 Relevance of the project

In Egypt, the self-sufficiency rate of wheat, the staple food, is as low as approximately 50%. Egypt relies on import for a large part of its food supply as processed foods, rice, potatoes, cottons and various kinds of foods. Total amount of imported foods was accounted for 27% of entire imports in 1997 (National Water Resources Plan, 1999). In 2004, Egypt had a population of approximately 72.6 million. Its population is expected to reach 86 million by 2022. Therefore, improving food self-sufficiency and increasing food production to meet the population growth are both urgent tasks to realize the policy mentioned in The Fifth Five-Year Plan as a slogan "Poverty alleviation and attenuation of income disparities". It is the time for Egypt to realize "Freedom from deficiency" which is one of the seven viewpoints of the concept of Human Security.

However, annual precipitation of only 5 mm, the 55.5 billion m^3 of water resources available annually in accordance with the Nile Treaty, and limited arable land that comprises only 4% of Egypt's total arable land, are all severe constraints for implementing the agricultural policy to develop new farmland in order to increase agricultural production.

In order to implement the above-mentioned measures, the Ministry of Water Resources and Irrigation is improving or replacing regulators on the River Nile and the main irrigation canals branching from it (constructed during the latter half of the 1800's and at the beginning of the 1900's) in phases in accordance

with “National Water Resources Plan 2017.” However, the ministry still has a long way to go in improving the entire main and branch canals. Therefore, water intake facilities constructed more than 100 years ago with problems such as water leakage are still widely used. The use of such facilities is a large obstacle to the promotion of agricultural policy.

Water intake to the Bahr Yusef Canal, a main irrigation canal from the River Nile in the Middle Egypt, is 5 billion m^3 per year, which corresponds to approximately 9% of the water volume of 55.5 billion m^3 allocated for Egypt under the Nile Treaty. The Bahr Yusef Canal, whose irrigation area covers 11% of the total arable land in Egypt, is an important key agricultural facility for agriculture in the Middle Egypt. However, the deterioration due to age of the Dahab Regulator located at the most upstream part of the canal has failed not only in stably supplying water to the beneficiary area upstream from the regulator, but also in realizing stable discharge to the three downstream regulators from the Dahab Regulator, which have already been improved through the grant aid cooperation. Thus, it is feared that this deterioration may affect the agricultural production in the entire beneficiary area, which depends on irrigation water from the Bahr Yusef Canal.

There are four regulators on the Bahr Yusef Canal. The existing Dahab Regulator located most upstream commands gravity and pumping irrigation areas of 33,998 and 3,168 ha, respectively. The comparison of water requirement for crops and actual water intake in the fields in the irrigation areas confirmed the shortage of water supply of total $52,205 \times 10^3$ m^3 ($27,845 \times 10^3 m^3$ for the summer crop season and $24,360 \times 10^3 m^3$ for the winter crop season) which corresponds to 11% of the annual requirement of water intake of $489,650 \times 10^3 m^3$.

The above-mentioned shortage in the irrigation water and unstable water intake level upstream from the regulator result from: 1) water leakage through the regulator caused by the deterioration due to age of the gates and weir of the existing Dahab Regulator and 2) unstable upstream water level of the regulator resulting from ineffective discharge generated by the adjustment of the downstream water level of the regulator by manual operation of the regulator gates.

Under such circumstances, it is considered that this grant aid project would enable the restoration of the functions and roles borne by the Dahab Regulator as the core irrigation facility for agriculture in the Middle Egypt. The project is also consistent with the agricultural policy of Egypt, namely Irrigation Infrastructure Improvement Plan, which has been forwarded to rehabilitate the old irrigation facilities in nation wide. The necessity and relevance of this project are considered to be high because implementation of this project could contribute to irrigating the entire beneficiary area of 37,116ha covered by the Dahab Regulator steadily and continuously, and it could also contribute to realizing the self-supporting livelihood of the beneficiaries of 656,000 people. Furthermore, it is expected that the agricultural products from the beneficiary area through the implementation of the project would support the self-consumption of the beneficiaries as well as their income by selling the surpluses in the hinterland market. It could be, therefore, judged that the project meets the basic human needs from the viewpoint of the Human Security.

Most of the irrigation facilities in Egypt were constructed more than 100 years ago. The government personnel and institutions engaged in operation and maintenance of the old irrigation facilities have acquired by their own efforts the abilities of budgetary management and fundamental technologies for rational utilization of the water resources. Based on the fact that the existing three regulators, which have been rehabilitated by Japan's Grant Aid, are giving fully effects to the regions, it could be judged that there are not insecure factor on the preparation of the budget and operation skill by the Government of Egypt, for the entrusting of the operation and maintenance of the Dahab Regulator which would be rehabilitated by Japan's Grant Aid Project.

Finally, it is clear that there is no influence to the environmental negative impacts with implementation of the Project, because Egyptian Environment Affair Authority (EEAA) has already given a permission to implement the project on July, 2007, after examination of environmental assessment by EEAA.

3-4 Conclusion

As mentioned above, this project is expected to contribute to improving farm income of the farmers in the beneficiary area of the Dahab Regulator by realizing a stable supply of irrigation water to the area, that leads to improvement in agricultural productivity and the consequent increase in agricultural production. Therefore, implementation of Japan's Grant Aid for the above-mentioned purpose is considered highly relevant. It is considered that the Ministry of Water Resources and Irrigation of Egypt would have no problems with operating, maintaining, and managing this project as we have confirmed the specific planning and preparation of the ministry both in human resources and funding through consultation with the Government of Egypt during the Basic Design Study.

[Appendixes]

1. Member List of the Study Team
2. Study Schedule
3. List of Attendance
4. Minutes of Discussions
   - 4-1 At Basic Design Study
   - 4-2 At Explanation on Draft B/D Report
5. List of Data collected

Appendix 1.Menber List of the Study Team

1-1 Study Team for Basic Design Study

Responsibility	Name	Organization
General Team Leader	Mr. Noriaki NAGATOMO	Team Leader, Rural Development Team, Project Management Group III, Grant Aid Management Department, JICA
Team Leader	Mr. Hiroyuki TAKADA	Manager, Program Team II, Tsukuba International Center, Japan International Cooperation Agency (JICA)
Chief Consultant / Facility Planning and Irrigation Planning	Mr. Tomiji SHIMOJI	Sanyu Consultants Inc.
Irrigation Facility Planning I	Mr. Fumihiko KOMADA	Sanyu Consultants Inc.
Irrigation Facility Planning II / Natural Condition Survey	Mr. Hiroshi KONDO	Sanyu Consultants Inc.
Construction Planning / Cost Estimation	Mr. Kazuma AKIYOSHI	Sanyu Consultants Inc.
Coordinator / Canal Structure	Mr. Tatsuya IEIZUMI	Sanyu Consultants Inc.

1-2 Study Team for Explanation of the Draft Basic Design Report

Responsibility	Name	Organization
General Team Leader	Mr, Noriaki NAGATOMO	Team Leader, Rural Development Team, Project Management Group III, Grant Aid Management Department, JICA
Chief Consultant / Facility Planning and Irrigation Planning	Mr. Tomiji SHIMOJI	Sanyu Consultants Inc.
Irrigation Facility Planning I	Mr. Tatsuhiko MORI *	Sanyu Consultants Inc.
Construction Planning / Cost Estimation	Mr. Kazuma AKIYOSHI	Sanyu Consultants Inc.

* The member change was concerted according to the records of meeting on July 26, 2007

Appendix 2.Study Schedule

2-1 Study Team for Basic Design Study

Date	Day	Official Member (General Team Leader, Project Management)	Consultant				
			Chief Consultant／Facility Planning and Irrigation Planning (Tomiji Shimoji)	Irrigation Facility Planning I (Fumihiko Komada)	Irrigation Facility Planning II / Natural Condition Survey (Hiroshi Kondo)	Construction Planning / Cost Estimation (Kazuma Akiyoshi)	Coordinator / Canal Structure (Tatsuya Ieizumi)
Feb. 26	Mon	Haneda→Kansai(23:15)(JL5099) →Dubai(6:05)	Nagoya(23:00)(JL5097)→Dubai(6:10)			Nagoya(23:00)(JL5097) →Dubai(6:10)	
Feb. 27	Tue	Dubai(8:50)(EK927) →Cairo(11:00) Visit to JICA Cairo Office Courtesy call at EOJ	Dubai(8:50)(EK927)→Cairo(11:00) Visit to JICA Cairo Office, Courtesy call at EOJ			Dubai(8:50)(EK927) →Cairo(11:00) Visit to JICA Cairo Office Courtesy call at EOJ	
Feb. 28	Wed	Courtesy call at MOIC Meeting at IIS	Courtesy call at MOIC Meeting at IIS (discussion on Inception report, M/M, questionnaire) Negotiation on consigned survey			Courtesy call at MOIC Meeting at IIS Negotiation on consigned survey	
Mar. 1	Thu	Move(Cairo→Minia) Visit to ID, Minia and Dahab Regulator	Move(Cairo→Minia), Visit to ID, Minia to explain Inception report Site survey at Dahab Regulator			Move(Cairo→Minia) Visit to ID, Minia Interview with Surveyor	
Mar. 2	Fri	Visit to secondary canal and drainage pump station, Move(→Cairo)	Site survey at secondary canal and drainage pump station Move(→Cairo)			Site survey (Secondary canal, pump station), Move(→Cairo)	
Mar. 3	Sat	Material arrangement	Material arrangement			Material collection (Cost Estimation, Procurement)	
Mar. 4	Sun	Meeting at IIS	Meeting at IIS	Meeting on consigned work (topo-survey, soil survey)		〃	
Mar. 5	Mon	Signing on M/M, Report to JICA, Move(Cairo→Dubai)	Signing on M/M, Report to JICA Cairo Office	Signing on M/M, Report to JICA Cairo Office	Nagoya(23:00)(JL5097) →Dubai(6:10)	Signing on M/M, Report to JICA Cairo Office	
Mar. 6	Tue	(Dubai(02:50)→Kansai(16:40) Kansai (19:40)→Haneda	Move(Cairo→Minia),	Move(Cairo→Minia),	Dubai(8:50)(EK927) →Cairo(11:00)	Material collection (Construction Planning)	Nagoya(23:00)(JL5097) →Dubai(6:10)
Mar. 7	Wed		Meeting at ID, Minia		Interim evaluation of consigned surveyor	〃	Dubai(8:50)(EK923) →Cairo(17:55)
Mar. 8	Thu		Field Survey (O&M conditions of the existing facilities constructed on the former Japanese grant aid project)		Move(Cairo→Minia), Field Survey (Baseline survey)	Move(Cairo→Minia), Field Survey (Facility conditions)	Move(Cairo→Minia), Field Survey (former grant aid project)
Mar. 9	Fri		Collected data arrangement		Collected data arrangement	Collected data arrangement	Collected data arrangement
Mar. 10	Sat		Meeting at ID, Minia, Field Survey (O&M conditions of the existing facilities constructed on Japanese grant aid project)				
Mar. 11	Sun						
Mar. 12	Mon		Field Survey(Facility Planning) Move(Minia→Cairo)	Field Survey (consigned survey)	Field Survey (end part of canal)	Field Survey(Facility Planning) Move(Minia→Cairo)	Field Survey(Facility Planning) Move(Minia→Cairo)
Mar. 13	Tue		Meeting at MWRI (O&M staff arrangement)	Field Survey(Facility)	〃	Material collection (Cost Estimation, Procurement condition)	Material collection (Cost Estimation, Procurement condition)
Mar. 14	Wed		Move(Cairo→Minia) Field Survey	〃	〃	Move(Cairo→Minia) Field Survey	Move(Cairo→Minia) Field Survey
Mar. 15	Thu		Field Survey (O&M, other donor's project)	〃	〃	Field Survey (Construction Planning)	Field Survey (Natural Condition Survey)
Mar. 16	Fri		Collected data arrangement, analysis	Collected data arrangement, analysis	Collected data arrangement, analysis	Collected data arrangement, analysis	Collected data arrangement, analysis
Mar. 17	Sat		Field Survey (O&M, other donor's project)	Field Survey(Facility)	Field Survey (Natural Condition Survey)	Field Survey (Construction Planning)	Field Survey (Natural Condition Survey)
Mar. 18	Sun		Meeting at ID, Minia				
Mar. 19	Mon		Move(Minia→Cairo) making Summary of Survey	Move(Minia→Cairo) making Summary of Survey	Field Survey (Natural Condition Survey)	Move(Minia→Cairo) making Summary of Survey	Move(Minia→Cairo) making Summary of Survey
Mar. 20	Tue		making Summary of Field Survey	Move(Minia→Cairo) making Summary of Survey	Move(Minia→Cairo) making Summary of Survey	making Summary of Field Survey	making Summary of Field Survey
Mar. 21	Wed		Report to JICA Cairo Office, IIS making of Summary of Field Survey				
Mar. 22	Thu		making of Summary of Field Survey Report to EOJ				
Mar. 23	Fri		Cairo(19:15)EK924→Dubai(0:25)				
Mar. 24	Sat		Dubai(2:45)JL5098→Nagoya(16:50)				Dubai(2:50)JL5090→ Kansai(16:40)→Haneda

2-2 Study Team for Explanation of the Draft Basic Design Report

Date	Day	Schedule	Official Member		Consultant	
			Time	Nagatomo	Time	Shimoji, Mori, Akiyoshi
Aug.10	Fri				14:45(Leave) 22:20(Arrive)	Kansai→Cairo (MS963)
Aug.11	Sat					Cairo
Aug.12	Sun	9:30 JICA Egypt office 12:00 Move to Minia (Consultant)	18:30(Leave) 19:45(Arrive) 22:45(Leave)	Narita→Kansai →Dubai		Cairo→Minia
Aug.13	Mon	8:30 Meeting at Irrigation Improvement Department, Minia	04:45(Arrive) 15:10(Leave) 18:00(Arrive)	Dubai→Cairo (EK923)	8:30	Minia→Cairo
Aug.14	Tue	9:00 JICA Egypt office 10:00 Meeting at IIS 11:30 Courtesy call at MWRI 13:00 Meeting at MOIC 15:00 Courtesy call at EOJ	see the left column	Cairo	see the left column	Cairo
Aug.15	Wed	9:30 Meeting at IIS (on Minutes and Summary)		Cairo		Cairo
Aug.16	Thu	11:30 Signing on Minutes 13:00 Report to JICA 15:00 Report to EOJ	23:00	Cairo→Dubai (MS910)		
Aug.17	Fri		15:55	Dubai→Hong Kong (EK380)	18:50(Leave)	Cairo→Narita (MS964)
Aug.18	Sat			Hong Kong→Narita (JL736)	12:55(Arrive)	Narita

General Team Leader : Mr. Noriaki Nagatomo (JICA)

Chief Consultant / Facility Planning and Irrigation Planning : Mr. Tomiji Shimoji (Sanyu Consultants Inc.)

Irrigation Facility Planning I : Mr. Tatsuhiko Mori (Sanyu Consultants Inc.)

Construction Planning / Cost Estimation : Mr. Kazuma Akiyoshi (Sanyu Consultants Inc.)

Appendix 3.List of Parties Concerned

3-1 Study Team for Basic Design Study

(1) Ministry of Water Respurces and Irrigation (MWRI)

Prof.Dr M.B.A.Soad	Deputy Minister
Eng. Hasam M.A Oswan	Head of Reservoirs and Grand Barrages Sector
Eng. Mahumoud Ratee Mohamed Ebrahim	Reservoirs and Grand Barrages Sector
Eng. Navira	Technical Office of Deputy Minister

(2) Irrigation Improvement Sector (IIS)

Eng. Essam Barakat	Head of Sector
Eng. Aly Abd El Razik	Under Secretary
Eng. Abel said El Madboully	Director of Construction Manager
Eng. Ala Esmail	Director of technical Office
Eng. Ali Kamal Omar	Design Manager
Eng. Khuttab Abdalla	Technical Office

(3) Irrigation Improvement Department, Minia

Eng. Mohamed Nabil El Grandour	General Director
Eng. Samy Zakg Shenode	Depty General Director
Eng. William Zaki Hana	First Director of Works
Eng. Nabil Sadek Saeed	Director of Works
Eng. Wagih Mikhaeel Samueel	Director of Works
Eng. Tarek Mahmaud	Director of Works
Eng. Hossam Fawzy	Director of Works
Eng. Alla Eshak Tosa	Director of Works

(4) Head of Central Department of Water Resource and Irrigation, Minia

Eng. Ali Yahya Mohamed	Under Secretary
Eng. kamal Taha Sherit	General Director of Horizontal Expansion of Benisueff
Eng. Adel Shalf	Inspector of IID of Benisueff

(5) Ministry of International Cooperation (MOIC)

Mr. Nabi Abdel Hamid Hassan	Firstunder Secretary
Mr. Samiha Barakaf	Direct General MOIC
Mr. Dina Farout	Economic Reasher MOIC

(6) Embassy of Japan, Cairo

Mr. Nobutaka Nonaka	First Secretary

(7) Japan International Cooperation Agency (JICA), Egypt office

Mr. Masakatsu Komori	Deputy Resident Representative
Mr. Kenshiro Tanaka	Assistant Resident Representative
Ms. Izumi Shoji	Assistant ResidentRepresentative
Mr. Sherif Ahmed Yousri	Project Officer
Mr. Hiroshi Suzuki	JICA Expert (MWRI)

3-2 Study Team for Explanation of the Draft Basic Design Report

(1) Ministry of Water Respurces and Irrigation (MWRI)

Prof. Dr. Hussaim El-Atfy	Chairman of Irrigation Department
Eng. Navira	Technical Office of Deputy Minister

(2) Irrigation Improvement Sector (IIS)

Eng. Fawzy El Abd	Head of Sector
Eng. Mahmaound Dawound	Under Secretary
Eng. Adel El Madboully	General Director of Construction
Eng. Khuttab Abdalla	Technical Office

(3) Irrigation Improvement Department, Minia

Eng. William Zaki Hana	First Director of Works

(4) Ministry of International Cooperation (MOIC)

Mr. Nabi Abdel Hamid Hassan	Firstunder Secretary

(5) Embassy of Japan, Cairo

Mr. Nobutaka Nonaka	First Secretrary

(6) Japan International Cooperation Agency (JICA), Egypt office

Mr. Katsuhiko Ozawa	Resident Representative
Mr. Masakatsu Komori	Deputy Resident Representative
Ms. Nobue Hayashi	Assistant Resident Representative
Mr. Sherif Ahmed Yousri	Project Officer
Mr. Hiroshi Suzuki	JICA Expert (MWRI)

4.Minutes of Discussions

4-1 Basic Design Study

MINUTES OF DISCUSSIONS
ON THE BASIC DESIGN STUDY
ON THE PROJECT FOR REHABILITAION OF MONSHAT EL DAHAB REGULATOR ON BAHR YUSEF CANAL
IN THE ARAB REPUBLIC OF EGYPT

Based on the results of the Preparatory Study, the Government of Japan decided to conduct a Basic Design Study on the Project for Rehabilitation of Monshat El Dahab Regulator on Bahr Yusef Canal (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to the Arab Republic of Egypt (hereinafter referred to as "the Egypt") the Basic Design Study Team (hereinafter referred to as "the Team"), which is headed by Mr. Hiroyuki Takada, Chief, Tsukuba International Centre, Japan International Cooperation Agency , and is scheduled to stay in the country from 27th February, 2007 to 23rd March, 2007.

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

In the course of discussions and field survey, both parties confirmed the main items described on the attached sheets. The Team will proceed to further works and prepare the Basic Design Study Report.

Cairo, 5th March, 2007

Mr. Hiroyuki Takada
Leader
Basic Design Study Team
Japan International Cooperation Agency
(Japan)

Eng. Essam Barakat
Head of Irrigation Improvement Sector
Irrigation Department
Ministry of Water Resource and Irrigation
Arab Republic of Egypt

Witnessed by Mr. Nabil Abdel Hamid Hassan
First Under Secretary of State
Ministry of International Cooperation
Asia & Australian Cooperation Affairs
Arab Republic of Egypt

ATTACHMENT

1. Objective of the Project

The objective of the Project is to improve irrigation efficiency of the target area (Minya Governorate) through the rehabilitation of Monshat El Dahab Regulator.

2. Project site

The site of the Project is located approximately 250 km Southern from Cairo on Bahr Yusef Canal in Minya Governorate as shown in Annex I.

3. Responsible and Implementing Agency

3-1. The Responsible and Implementing Agency is Irrigation Improvement Sector, Irrigation Department, Ministry of Water Resource and Irrigation (MWRI).

3-2. The organization chart of MWRI is shown in Annex II.

4. Items requested by the Government of Egypt

After discussions with the Team, the following items were finally requested by the Egyptian side. JICA will assess the appropriateness of the request and will recommend to the Government of Japan for approval.

(1) Replacement of the head regulator body

(2) Replacement of the existing gates

(3) Construction of regulator bridge

(4) Renovation of the existing building of West Minia Irrigation Directorate located near the regulator as control house to operate the gates by remote control

5. Japan's Grant Aid Scheme

The Egyptian side understands the Japan's Grant Aid Scheme and the necessary measures to be taken by the Government of Egypt as explained by the Team and described in Annex-IV of the Minutes of Discussions of Preliminary Study on the Project signed by both parties on 28th November, 2006, and summarized in Annex III.

6. Schedule of the Study

6-1. The consultants will proceed to further studies in Egypt until 23rd March, 2007.

6-2. JICA will prepare the draft report in English and dispatch a mission in order to explain its contents around July, 2007.

6-3. In case that the contents of the report is accepted in principle by the Government of Egypt, JICA will complete the final report and send it to the Government of Egypt by October, 2007.

7. Other relevant issues

7-1. Improvement of related facilities

In order to assure effectiveness of the Project, the Egyptian side shall take necessary measures to improve or rehabilitate secondary canals, pump stations, Mesqa (farmers canal) and necessary facilities in relation with benefited area of the Project.

The facilities which need rehabilitation will be elaborated by field survey conducted by consultants.

7-2. Breadth of the regulator bridge

Breadth of the regulator bridge will be decided based on the present traffic condition studied by the field survey.

In case of expansion of breadth for the regulator bridge, the Egyptian side shall take necessary measures to expand the breadth of access road to meet the regulator bridge.

7-3. Control house

The Team confirmed the feasibility of rehabilitation and utilization on the existing building of West Minia Irrigation Directorate located near the regulator as a control house instead of constructing a new building, and proposed the idea to the Egyptian side. The Egyptian side agreed to study the proposal, and report the result to the consultant by 22nd March..

7-4. Operation and Maintenance

The Team explained that if the Project would be implemented, the Egyptian side would be fully responsible for the proper operation and maintenance of the provided facilities.

7-5. Environmental Impact Assessment (EIA)

The Egyptian side shall complete the Environment Impact Assessment according to the laws of Egypt and report the result to JICA Egypt Office by the end of July 2007.

7-6. Location of new regulator

The Team proposed the three options of location for the new regulator. The location of new regulator will be decided after further examination in Japan in terms of cost, schedule and other relevant factors. The Egyptian side agreed on the proposal with recommendation to the Team that the location of new regulator would be at the same place of the present regulator existed.

In this regard, it is essential to acquire necessary information to make comparison among options. The team requested the Egyptian side to provide the information to the consultant.

7-7. Coordination

The Egyptian side shall coordinate agencies related to the Project such as Irrigation Sector and other relevant organizations for the purpose of smooth implementation of the Project.

7-8. Navigation Lock

The Team has been informed that the navigation lock located beside the regulator must be preserved as it is under the instruction of the Navigation Authority of the Ministry of Transportation. The Team considers it would affect to make comparison among options of location for new regulator in terms of design, cost, construction procedure and others, and requested the Egyptian side to provide necessary information to the consultant.

7-9. Support to the further study

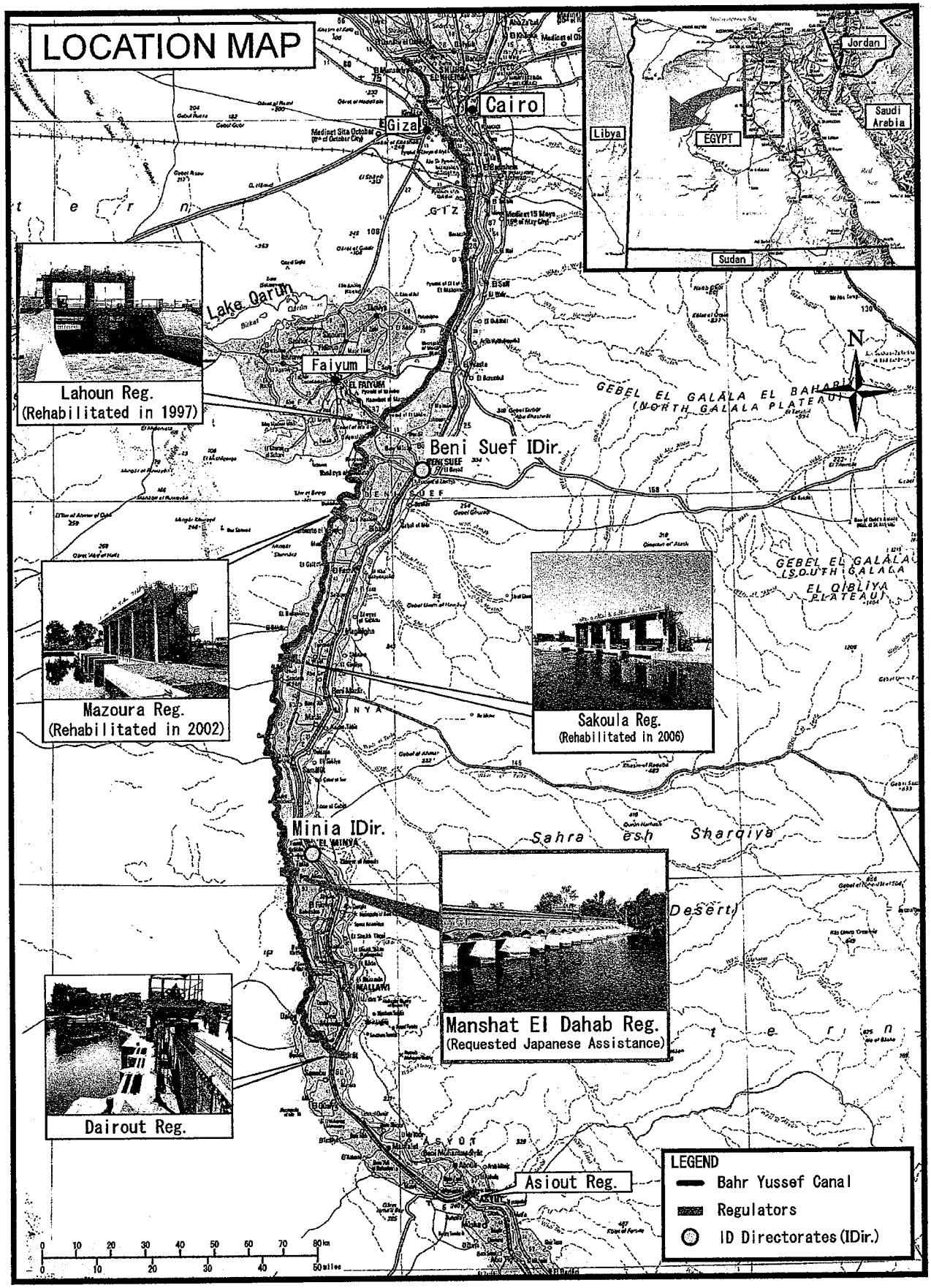
The Egyptian side shall take necessary measures to support the consultants for the smooth implementation of the study and the security of persons concerned of the study.

Annex I: Project site

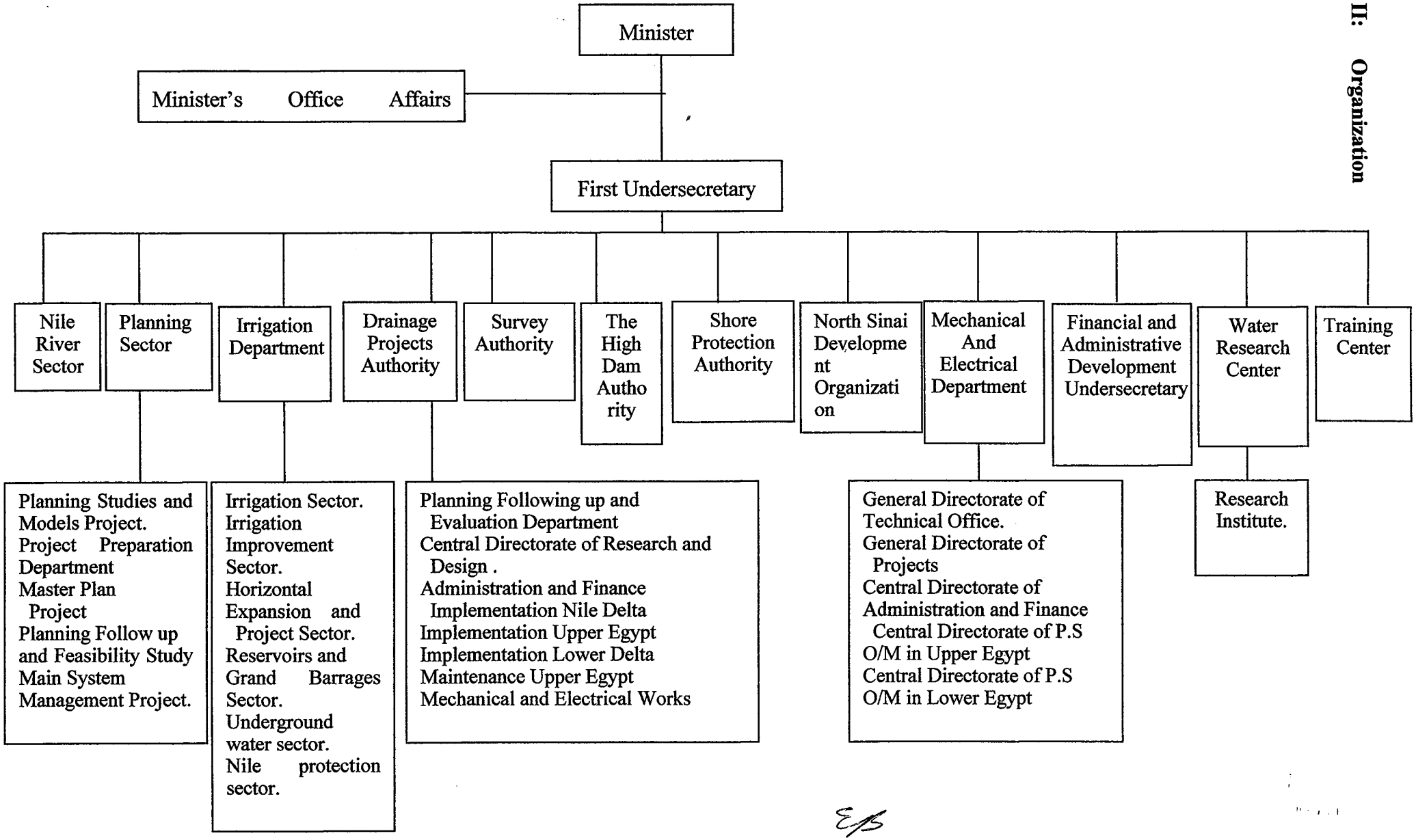
Annex II: Organization chart of MWRI

Annex III. Major Undertakings to be taken by Each Government

Annex I: Project site

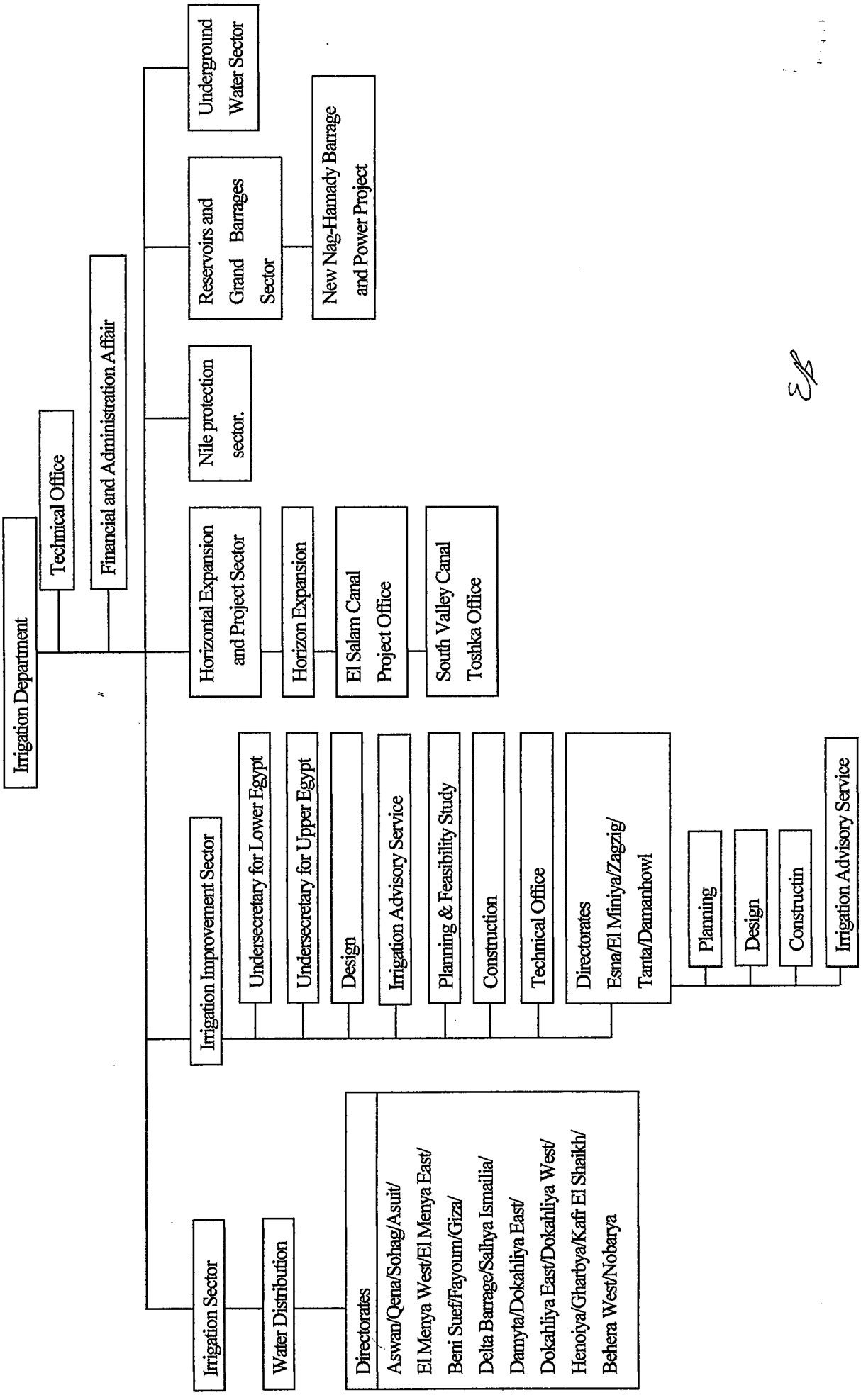


ORGANIZATION CHART
(MINISTRY OF WATER RESOUCES AND IRRIGATION)



Annex II: Organization

ORGANIZATION CHART
(IRRIGATION DEPRTMENT)



Annex III. 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 side when needed		●
3	To construct gates and fences in and around the site		●
4	To construct the parking lot	●	
5	To construct roads		
	1) Within the site	●	
	2) Outside the site		●
6	To construct the building	●	
7	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities		
	1) Electricity		
	a. The distributing line to the site		●
	b. The drop wiring and internal wiring within the site	●	
	c. The main circuit breaker and transformer	●	
	2) Water Supply		
	a. The city water distribution main to the site		●
	b. The supply system within the site (receiving and elevated tanks)	●	
	3) Drainage		
	a. The city drainage main (from storm sewer and other to the site)		●
	b. The drainage system (for toilet sewer, ordinary waste, storm drainage and others) within the site	●	
	4) Gas Supply		
	a. The city gas main to the site		●
	b. The gas supply system within the site	●	
	5) Telephone System		
	a. The telephone trunk line to the main distribution frame/panel (MDF) of the building		●
	b. The MDF and the extension after the frame/panel	●	
	6) Furniture and Equipment		
	a. General furniture		●
	b. Project equipment	●	
8	To bear the following commissions to the Japanese bank for banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
9	To ensure unloading and customs clearance at port disembarkation in recipient country		
	1) Marine (Air) transportation of the products from Japan the recipient	●	
	2) Tax exemption and custom clearance of the products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	●	
10	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		●
11	To exempt Japanese nationals 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 contract		●
12	To maintain and use properly and effectively the facilities contracted and equipment provided under the Grant		●
13	To bear all the expenses, other than those to be borne by the Grant, necessary for construction of the facilities as well as for the transportation and installation of the equipment		●

EB

4-2 Explanation of the Draft Basic Design Report

MINUTES OF DISCUSSIONS
ON THE BASIC DESIGN STUDY
ON THE PROJECT FOR REHABILITAION OF MONSHAT EL DAHAB REGULATOR
ON BAHR YUSEF CANAL
IN THE ARAB REPUBLIC OF EGYPT
(EXPLANATION ON DRAFT REPORT)

In February, 2007, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched a Basic Design Study Team on the Project for Rehabilitation on Monshat el Dahab Regulator on Bahr Yusef Canal (hereinafter referred to as "the Project") to Arab Republic of Egypt (hereinafter referred to as "Egypt"), and through discussion, field survey and technical examination of the results in Japan, JICA prepared a draft report of the study.

In order to explain and to consult the Egypt on the components of the draft report, JICA sent to Egypt the Draft Report Explanation Team (hereinafter referred to as " the Team "), which is headed by Mr. Noriaki Nagatomo, Team Director, Rural Development Team, Grant Aid department, JICA, from 13th August, 2007 to 16th August, 2007.

As a result of discussions, both parties confirmed the main items described on the attached sheets.

Cairo, 16th August, 2007

永友紀章

Mr. Noriaki Nagatomo
Leader
Draft Report Explanation Team
Japan International Cooperation Agency
(Japan)

Dr.Hussain El-Atfy

Chairman of Irrigation Department
Ministry of Water Resources and Irrigation
(Arab Republic of Egypt)

Dr. Nabil Abdel-Hamid Hassan
First Under Secretary of State
Ministry of International Cooperation
Arab Republic of Egypt

ATTACHMENT

1. Components of the Draft Report

The Government of Egypt agreed and accepted in principle the components of the draft report explained by the Team.

2. Japan's Grant Aid scheme

Egypt side understands the Japan's Grant Aid Scheme and the necessary measures to be taken by the Government of Egypt as explained by the Team and described in Annex- III of the Minutes of Discussions signed by both parties on 5th March, 2007.

3. Schedule of the Study

JICA will complete the final report in accordance with the confirmed item and send it to the Government of Egypt by October 2007.

4. Confidentiality of the Project

4-1 Detailed specifications of the Facilities

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

4-2 Confidentiality of the Project Cost Estimation

The Team explained the cost estimation of the Project as described in Annex-I. Both sides agreed that the Project Cost Estimation should never be duplicated or released to any outside parties before signing of all the Contract(s) for the Project. Egypt side understood that the Project Cost Estimation attached as Annex-I is not final and is subject to change.

5. Other relevant issues

5-1 Environment Impact Assessment (EIA)

Egypt side explained the Team that EIA was approved by the Egyptian Environmental Affairs Agency (EEAA). According to the suggestion of the EEAA, Egypt side shall take necessary measures during the construction.

5-2 Undertakings by the Egypt side

Both parties confirmed that, for the smooth implementation of the Project, the Government of Egypt should particularly implement the following matters as scheduled and secure the necessary budget described in Annex-I.

5-2-1 Rehabilitation of secondary canal

Egypt side confirmed to take necessary measures to rehabilitate secondary canal in parallel with the construction of the new Dahab Regulater to maximize project effect. The Team pointed out that Rahiel canal needs urgent rehabilitation and Egypt side agreed to put high priority on that canal.

5-2-2 Rehabilitation of present Dahab regulator

Egypt side rehabilitates the gate(s) of present Dahab Regulator in order to secure water distribution during construction of new Dahab Regulater.

5-3 Control House

The Team proposed Egypt side for construction of the Control House as one of undertakings. Egypt side agreed to share the construction of the Control House under the following conditions.

- Egypt side is responsible for building of the Control House excluding basement and foundation works.
- Egypt side will make contract with local contractor in accordance with rules and regulations of Egypt.
- Design of the Control House is attached as Annex III for a reference.
- Basement and foundation works of the Control House are responsibility of Japanese side.
- Construction of the building will be completed within four months after completion of the basement and foundation works.
- Cost estimation will be revised according to these conditions.

5-4 Operation and Maintenance of new Dahab Regulator

Both sides confirmed that Ministry of Water Resources and Irrigation takes full responsibility for operating new Dahab Regulator. Egypt side also promised to maintain the regulator effectively under proper management plan.

Annex-II Tentative Schedule of the Project

Annex-III Minimum Requirement of Building of the Control House

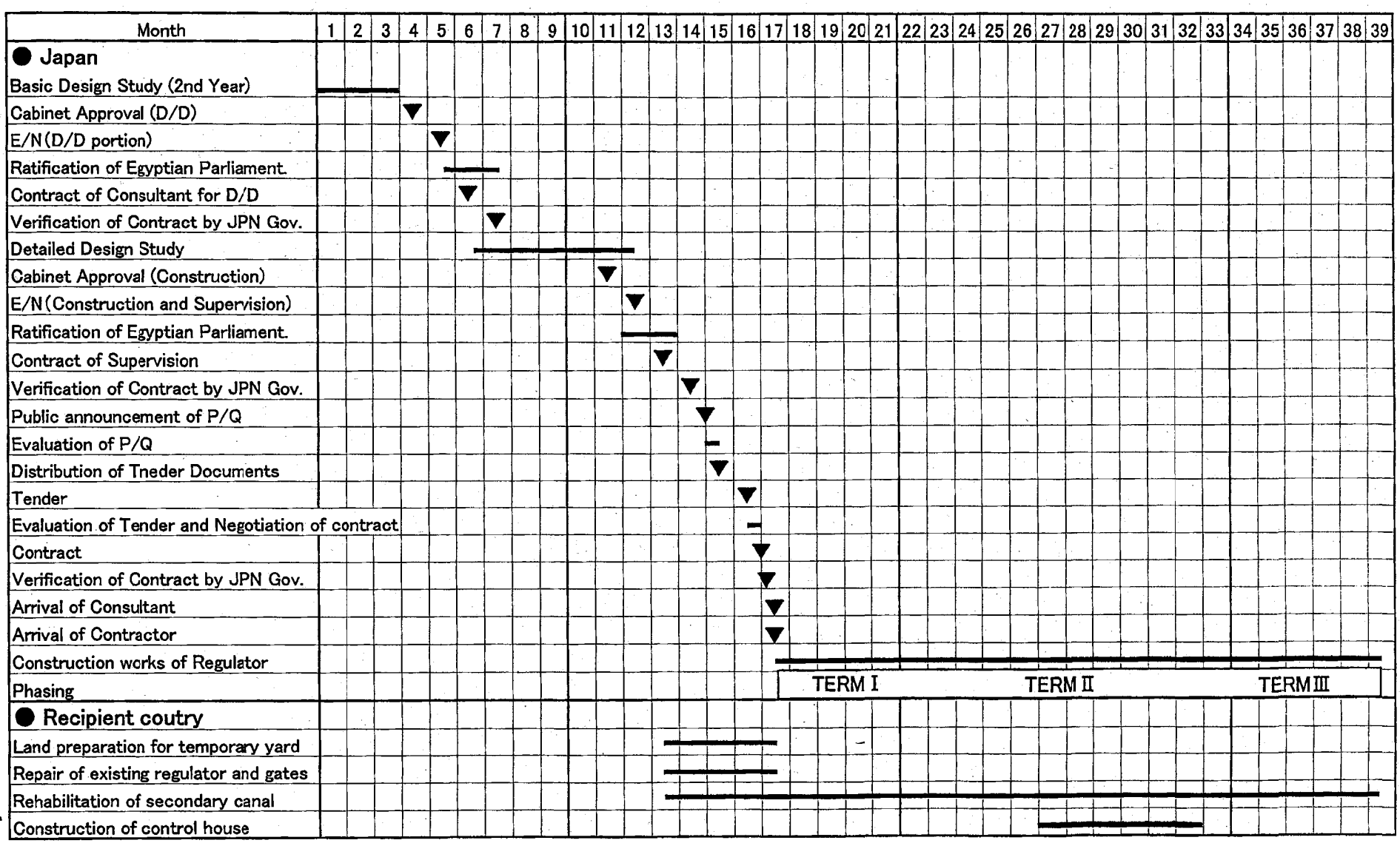
(3) Condition of Estimation

①	Date of estimation	;	March, 2007
②	Exchange rate	;	1 USD = 119.59 Yen (Average of the past 6 months)
		;	1 LE = 20.94 Yen (Average of the past 6 months)
③	Construction periods	;	As shown in the Annex 2
④	Others	;	Cost estimation is in accordance with the framework of Japanese grant aid scheme.

Annex-II

Tentative Schedule of the Project

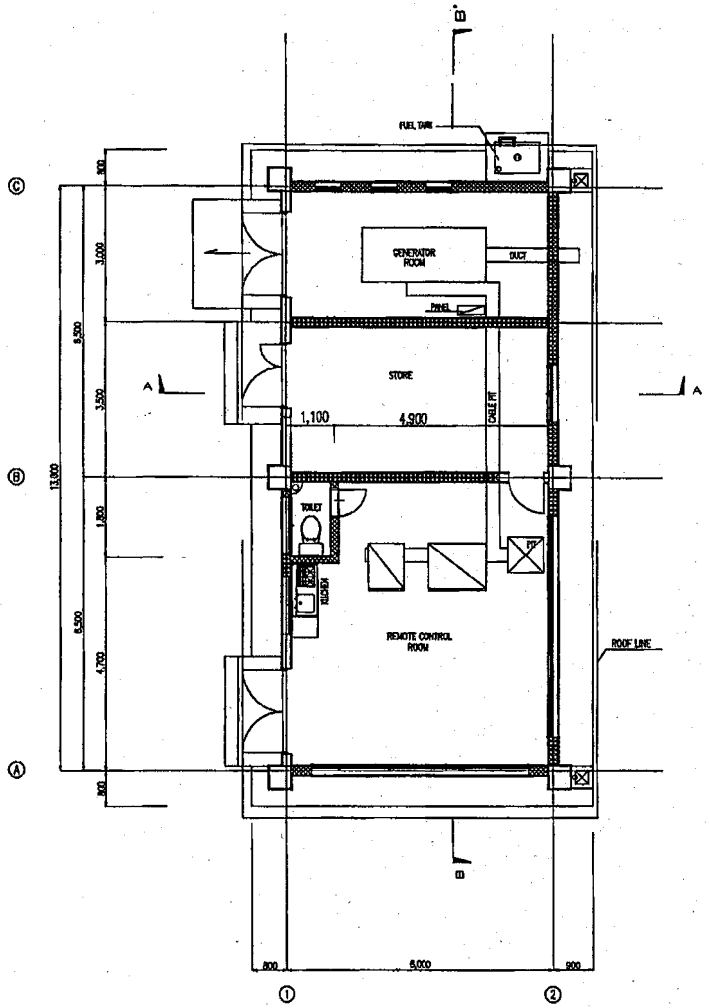
The sequence of works, shown in the table below, will be followed by the Project after Echange of Notes between the Government of Egypt and the Government of Japan.



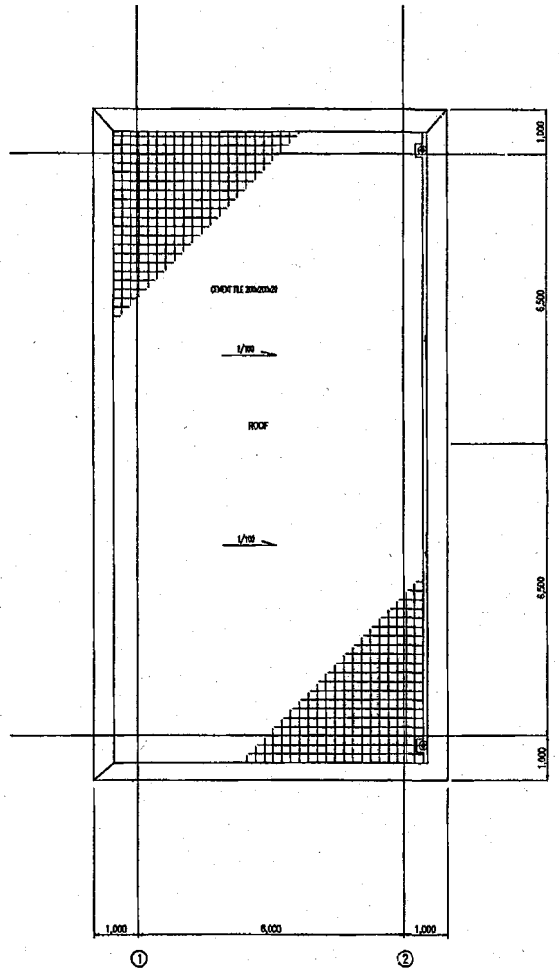
A20

Minimum Requirement of Building of the Control House

<table>
<tr><th>Description</th><th>Essential Consideration</th></tr>
<tr><td>1.Outline</td><td>・The purpose of the Control House is to install the Remote Control Panel, Emergency Generator and other related facilities. Operation and maintenance of new Dahab Regulator shall be executed based on function of the Control House after the completion of the Project.</td></tr>
<tr><td>2.Construction Location</td><td>・The Construction site is located in left bank and downstream of the existing Dahab Regulator, Miniya, Egypt
(See the attached drawing :"General plan of regulator")</td></tr>
<tr><td>3.Structual Design</td><td>・Structural Specification : RC Structure 1 - story building
(See next the attached Drawing)
・Total Floor Area ;
<table>
<tr><td>1</td><td>Generator Room</td><td>18.00 M^2</td></tr>
<tr><td>2</td><td>Store Room</td><td>21.00 M^2</td></tr>
<tr><td>3</td><td>Toilet</td><td>1.98 M^2</td></tr>
<tr><td>4</td><td>Remote Control Room</td><td>37.02 M^2</td></tr>
<tr><td colspan="2">Total</td><td>78.00 M^2</td></tr>
</table></td></tr>
<tr><td>4.Content of Main Works</td><td>・Architectural Works
Concrete Works, Form Works, Reinforcement-Bar Works, Water Proofing Works, Wooden Works, Metal Works, Plaster Works, Doors & Windows Works, Painting Works, Interior Finishing Works, Miscellaneous Works
・Electric Works
Interior : Light fixtures, telephone line laying
Exterior : Lighting fixtures
・Mechanical Works
Interior : Air conditioning facilities, ventilating facilities, Water supply and sewage works, Sanitary equipment, Alarm apparatus
*Septic tank is responsible for Japanese side.</td></tr>
<tr><td>5.Construction Period</td><td>・Construction of the building will be completed within four months after completion of basement and foundation works.</td></tr>
<tr><td>6.Material</td><td>・Specification of Material
a) Reinforcement Bar
Egyptian Standard Grade36/52 (fy=5,200kg/cm2)
b) Concrete
<table>
<tr><th>Classification</th><th>Specified Compressive strength at 28 days</th></tr>
<tr><td>Structural Concrete</td><td>σ_{28}=21/mm^2</td></tr>
<tr><td>Plain Concrete</td><td>σ_{28}=18/mm^2</td></tr>
<tr><td>Lean Concrete</td><td>σ_{28}=18/mm^2</td></tr>
</table></td></tr>
</table>



GROUND FLOOR PLAN



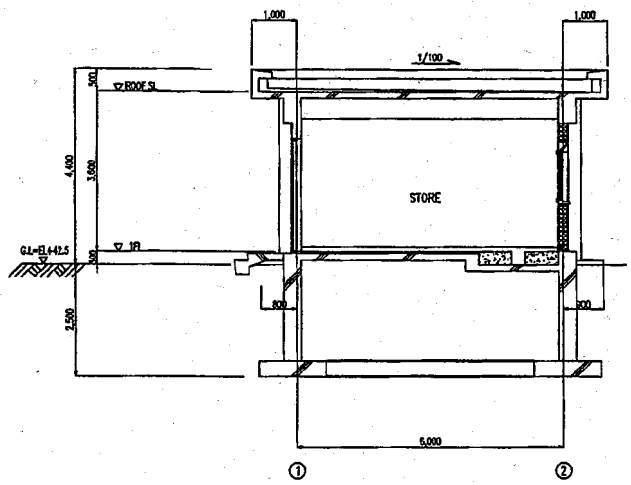
ROOF FLOOR PLAN

0 1,000 2,000 4,000

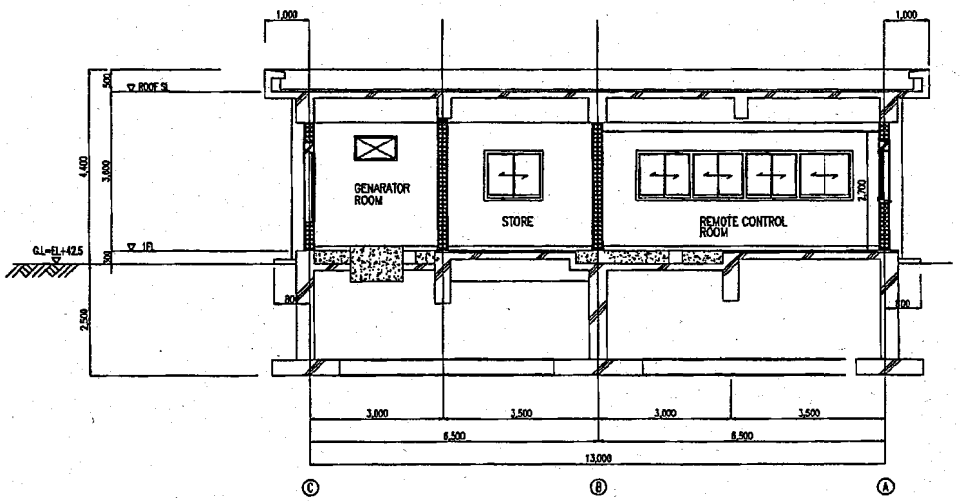
Reference Drowing

※Plan of Control House

A22



SECTION A-A



SECTION B-B'

0 1,000 2,000 4,000

Reference Drowing

※ Section of Control House

A23

5.List of Data Collected

No	Name	Form	Original/Copy	Publisher	Year
1	Letter of the instruction to operate by over flow gate	Document	Copy	Beni Suef	
2	Boring data of the Bridge near the Dahab	Document	Copy	Minia IID	
3	Rehabilitation plan of Pump facilities in Bahr Yuseff (1/2)	Document	Copy	MED Mimya	
4	Rehabilitation plan of Pump facilities in Bahr Yuseff (2/2)	Document	Copy	MED Mimya	
5	Change of Irrigation area after Rehabilitation the Regulator	Document		Beni Suef	
6	Change of Length of the Secondary Canal after Rehabilitation the Regulator	Document		Beni Suef	
7	Change of Maintenance cost of the Secondary Canal after Rehabilitation the Regulator	Document		Beni Suef	
8	Institutional Reform Vision Implementation Plan 2007 DRAFT FINAL REPORT	DATA (PDF)	Copy	MWRI	2007
9	Land Map around Dahab	MAP	Copy	Survey Authority	
10	Statistical year Book	Report	Original		
11	Agricultural Statistics	Report	Original		