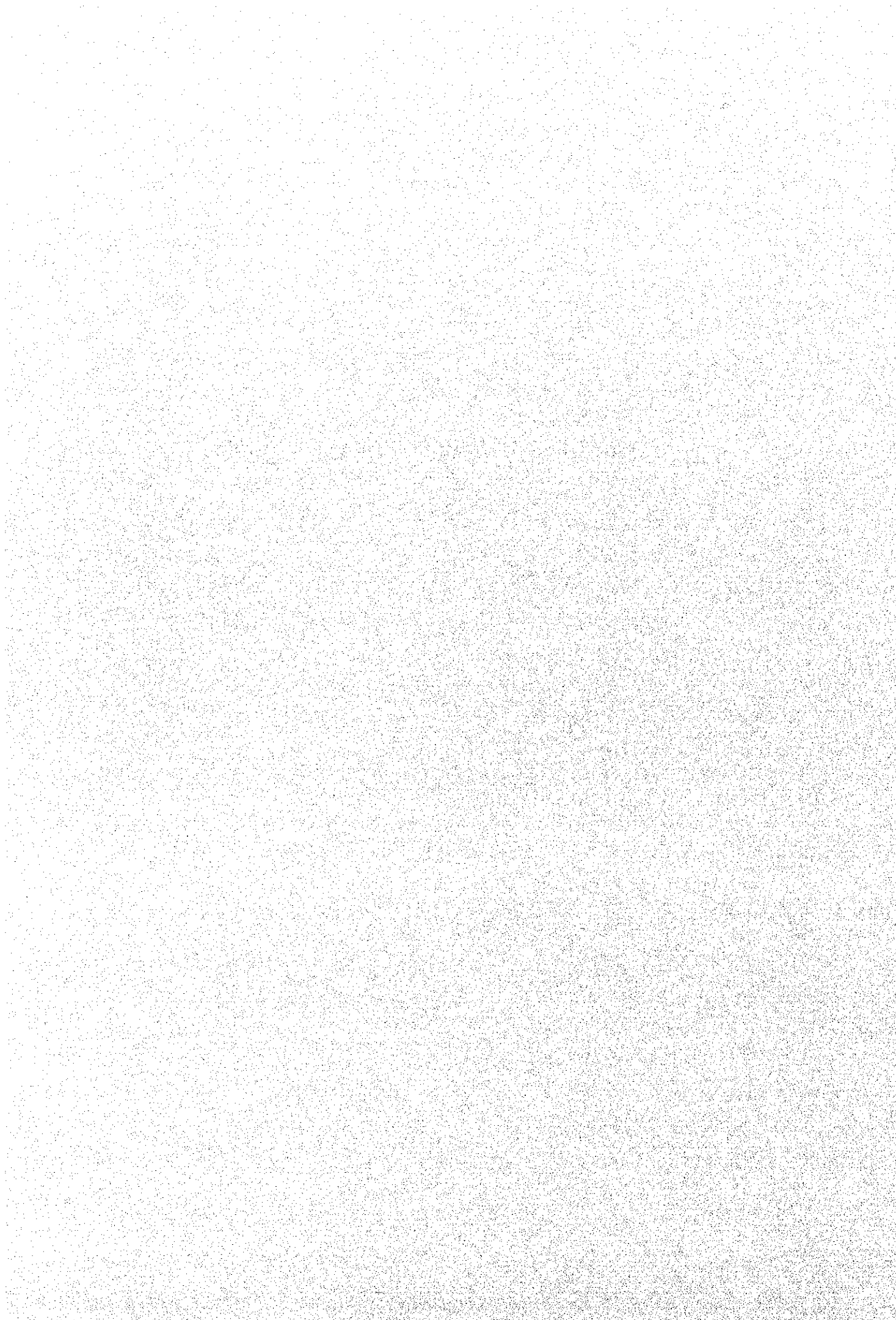


CHAPTER 3 IMPLEMENTATION PLAN



Chapter 3 Implementation Plan

3-1 Implementation Plan

3-1-1 Implementation Concept

(1) Basic Concept of Implementation

Facility construction, consisting of deep tube well drilling, pump houses and irrigation facilities, is the main scope of this Project. However, as procurement of pump facility equipment, which is united with the wells, is included, the contract shall be a blanket contract with a general contractor or joint ventures of general contractors and trading firms. The prime contractor shall be Japanese nationals and selected through competitive bidding.

The deep tube wells shall be drilled with the provision of utilization of the drilling rigs with necessary equipment which were provided under the past two Japan's Grant Aid Schemes, namely "The Project for Supply of Equipment for Irrigation in Eastern Area (1/2) and (2/2)".

The local contractors will be employed by the prime contractor as sub-contractors for the construction. The farmers in the project area shall be employed as labors at the construction stage in order to improve their sense of participation in the Project.

The implementation period shall be less than one year with the provision of executing under Japan's Grant Aid Scheme by single fiscal year execution.

(2) Project Implementation Organization

In the event that the Project is implemented under Japan's Grant Aid, the executing agency will be the Directorate General of Water Resources Development (DGWRD), the Ministry of Public Works based on Indonesian administrative jurisdictions. The Directorate of Implementation Guidance for East Region under DGWRD through its sub-directorates in charge of each area will be responsible for monitoring the implementation, and the Directorate of Technical Guidance through the Sub-directorate of Groundwater will be responsible for technical and engineering aspects at the central level. The groundwater development sub-project offices under the irrigation project offices will be responsible for the implementation at the provincial level. There are four

groundwater development sub-project offices concerning the Project. The Sub-directorate of Groundwater is the office to contact this Project.

The signers of the documents concerning the Project are as follows.

- Consultant Contract : Director of Technical Guidance
- Approval of Detailed Design : Director of Technical Guidance
- Bidding : Director of Technical Guidance
- Construction Contract : Director of Implementation Guidance for Eastern Region
- Certificate of Completion : Director of Implementation Guidance for Eastern Region and Director of Technical Guidance

(3) Use of Local Contractors

The prime contractor, a Japanese construction company, will employ local firms as sub-contractors. Several sub-contractors will be employed as the sites are scattered and there are four kinds of main works namely well drilling, pump installation, facility construction and pump house construction. Conditions that are needed to select proper sub-contractors shall be described in the specifications, such as the sub-contractors should have experience in construction conducted by DGWRD.

(4) Scheme of Operation

Two implementation groups shall be composed taking into account procurement period of equipment, scattering conditions of the sites, rainy season period and Japan's Grant Aid Scheme by single fiscal year execution. One group shall be in charge of the sites in North Sulawesi and NTT Sumba and the other group shall be in charge of them in Southeast Sulawesi and NTT Flores. One group shall consist of a drilling squad and a construction squad. Apart from these groups, a working group in charge of pump installation and its test run shall be composed.

The equipment procurement shall be commenced soon after the construction contract signing. Irrigation facilities construction shall be commenced after mobilization and shall be simultaneously carried out in the sites which are located near one another and one after another in the sites which are located far one another. Well drilling will be commenced at the time when well equipment arrives at the sites, that will be after four months of the commencement. Since about thirty days are needed for drilling one well including machine transportation, two drilling rigs shall be used for the drilling at the sites in North Sulawesi and Southeast Sulawesi. After the drilling and pumping test,

pump house construction will be carried out in sequence. Pump installation and its test run will be commenced at the time when pump equipment arrives at the sites after around eight months of the commencement. The completed sites will be handed over to DGWRD/PAT one after another soon after completion of each site.

(5) Formation of Japanese Engineers

Japanese engineers shall be allocated in accordance with the above-mentioned scheme of operation. They are the agent, a civil engineer, in charge of total management of the construction, one office manager in charge of administration of field office including material and equipment management and some civil and drilling engineers in charge of quality control and progressing.

Local engineers are able to deal with pump installation. However, Japanese drilling engineers are needed in order to give instruction and technical transfer as the B/D study has proved that local contractors' engineering and techniques, concerning analysis of electrical logging and decision of screen location and length which are the lifelines of wells, are judged still poor.

3-1-2 Implementation Conditions

In order to ensure smooth implementation, the scheme of operation shall be made taking into account (1) the allocation of Japanese engineers, (2) selection of sub-contractors, (3) procurement of equipment and its management and (4) timing between works and procurement of equipment. Sufficient care should be taken since the sites are broadly scattered. Especially, there are many sites without any direct links with other sites and Jakarta, and the time tables of local planes are inconvenient and unstable. Countermeasures to solve such problems shall be made sufficiently. The constraint related to the rainy season shall be taken into account as well.

As the well drilling is carried out using the drilling rigs lent by DGWRD, careful dealing with the rigs, such as setting condition of qualified operator, shall be taken into account.

It shall be proposed that the contractors employ farmers in the project area as labors for the local economy, improving farmer's motivation of participation in the Project and sustainable project promotion.

Since the safe yield, which is decided based on pumping test, is the most important point for the sustainability of the Project, it is necessary to pay sufficient attention on the pumping test and the analysis of the results. Elevation of well location points and electric conductivity at pumping test shall be measured further on pumping test in order to confirm safety from saline water intrusion at the sites No. 8, 9, 11, 12, 13, 14 and 17. Concerning influence over surrounding wells at the site No. 14, sufficient study shall be made.

3-1-3 Scope of Works

The Japanese side will handle the most part of the Project, namely the deep well drilling, pump and engine installation with their procurement and the construction of the pump house and irrigation facilities. Meanwhile, the Indonesian side will provide the drilling rigs with the appurtenant equipment, as shown in the following table, procured under Japan's Grant Aid Scheme, and the land for the facilities to be constructed including the pump houses, distribution boxes, etc.

Table 3-1 Drilling Rigs to be Provided by Indonesian Side

Area	Drilling Rig with Appurtenant Equipment				Year Procured	Project	Remarks
	Drilling Rig	Compressor	Mud Pump	Truck with Crane			
North Sulawesi	TONE T-150	ATLAS COPCO	TONE NP.1000	ISUZU	1998	(1/2)	
	TONE T-150	ATLAS COPCO	TONE NP.1000	ISUZU	1998	(1/2)	
Southeast Sulawesi	TONE T-150	ATLAS COPCO	TONE NP.1000	NISSAN	1998	(1/2)	of 2 sets
	TONE T-150	ATLAS COPCO	TONE NP.1000	NISSAN	1998	(1/2)	
	KOKEN FSW-5T	HOKUETSU PDSF530S	KOKEN MG75WB-T	ISUZU FTS33H	1999	(2/2)	
NTT Sumba	TONE T-150	ATLAS COPCO	TONE NP.1000	NISSAN	1998	(1/2)	
NTT Flores	KOKEN FSW-5T	HOKUETSU PDSF530S	KOKEN MG75WB-T	ISUZU FTS33H	1999	(2/2)	

Note: (1/2): The Project for Supply of Equipment for Irrigation in Eastern Area (1/2) 1996
 (2/2): The Project for Supply of Equipment for Irrigation in Eastern Area (2/2) 1997

3-1-4 Consultant Supervision

The detailed design and supervisory work will be conducted by a Japanese consulting firm in accordance with the consultant contract to be signed with DGWRD following the signing of the Exchange of Notes (E/N). This consultant contract will be prepared in accordance with the E/N, and will come into effect after its verification by the Government of Japan.

(1) Detailed Design Work

Detailed design work consists of site survey in Indonesia, designing and bidding work in Japan.

In order to make a final decision on design conditions, the confirmation of project areas and property borders, reconfirmation of pump locations, and acquisition of farmers' consensus on the alignments of pipeline and locations of distribution box are the works to be carried out during the site survey. Concerning the deep tube wells, further study and collection of additional data about surrounding wells will be carried out for the detailed design, and the conditions of drilling rigs to be provided by DGWRD will be confirmed.

Moreover, PAT and the consultant shall make an explanatory session about the Project with the farmers gathered at each site during the site survey, in order to improve the farmer's motivation of participation in the Project and to achieve smooth implementation. Water management shall be further explained at the session, and importance and roles of WUA and project sustainability shall be explained as well.

After one and a half months site survey, the consultant will complete the detailed design with the preparation of bid documents and visit Indonesia to get the approval of DGWRD on the bidding documents. Then the bidding work will be commenced and after four and a half months of consultant contract, the bidding will be carried out.

(2) Supervisory Work

Supervisory work shall be carried out in accordance with the above-mentioned implementation concept, and the use of local consultant as assistant consultant engineers is taken into account.

Under the Japanese resident engineer, two local assistant engineers shall be in charge of the sites in North Sulawesi and NTT Sumba and the sites in Southeast Sulawesi and NTT Flores respectively. The resident engineer shall be in charge of the coordination among DGWRD, JICA and the Embassy of Japan and of the assistance of WUA establishment collaborating with PAT.

3-1-5 Procurement Plan

Common materials such as cement, aggregates, lumber, reinforcing bars, etc. are all available at the local markets near each site. Other materials and equipment are vertical turbine pumps, diesel engines, FRP pipes for casing, PVC pipes for irrigation pipeline and valves, which shall be procured other than the local markets near each site.

The vertical pumps of American made and Japanese made are used for the existing wells, and the diesel engines of German made and Japanese made are in circulation in Indonesia. In order to deal with the limited construction period and introduce the principles of competition, Japanese made pumps and engines are selected.

FRP pipes locally made are not available, therefore Japanese made FRP pipes are selected.

The procurement period of the vertical turbine pumps and diesel engines will be six and a half months, namely four and a half months for fabrication and two months for transportation, and that of the FRP pipes will be three months, namely one month for fabrication and two months for transportation.

Concerning the PVC pipes and valves which are air valves, sluice valves and alfalfa valves, are available in Jakarta and Surabaya, therefore, procurement from Surabaya will be made.

3-1-6 Implementation Schedule

(1) Detailed Design Work

The implementation schedule from the E/N till the construction contract for this Project is as follows.

Consultant Contract	about one month
Site Survey	about one and a half months
Detailed Design/Bid Documents	about one month
Approval of Bid Documents	about a half month
Bidding Work/Construction Contract	about one and a half months

(2) Supervisory Work

In order to complete the implementation of this Project in single fiscal year, as mentioned before, 14 sites shall be divided into two large groups. The period of each work shall be as follows.

Mobilization	about one month
Procurement of Equipment (FRP Pipes)	about three months
Procurement of Equipment (Pumps and Engines)	about six and a half months
Well Drilling	about five months
Pump Installation/Test Run	about two months
Irrigation Facilities, etc.	about seven months

Figure 3-1 shows the implementation schedule.

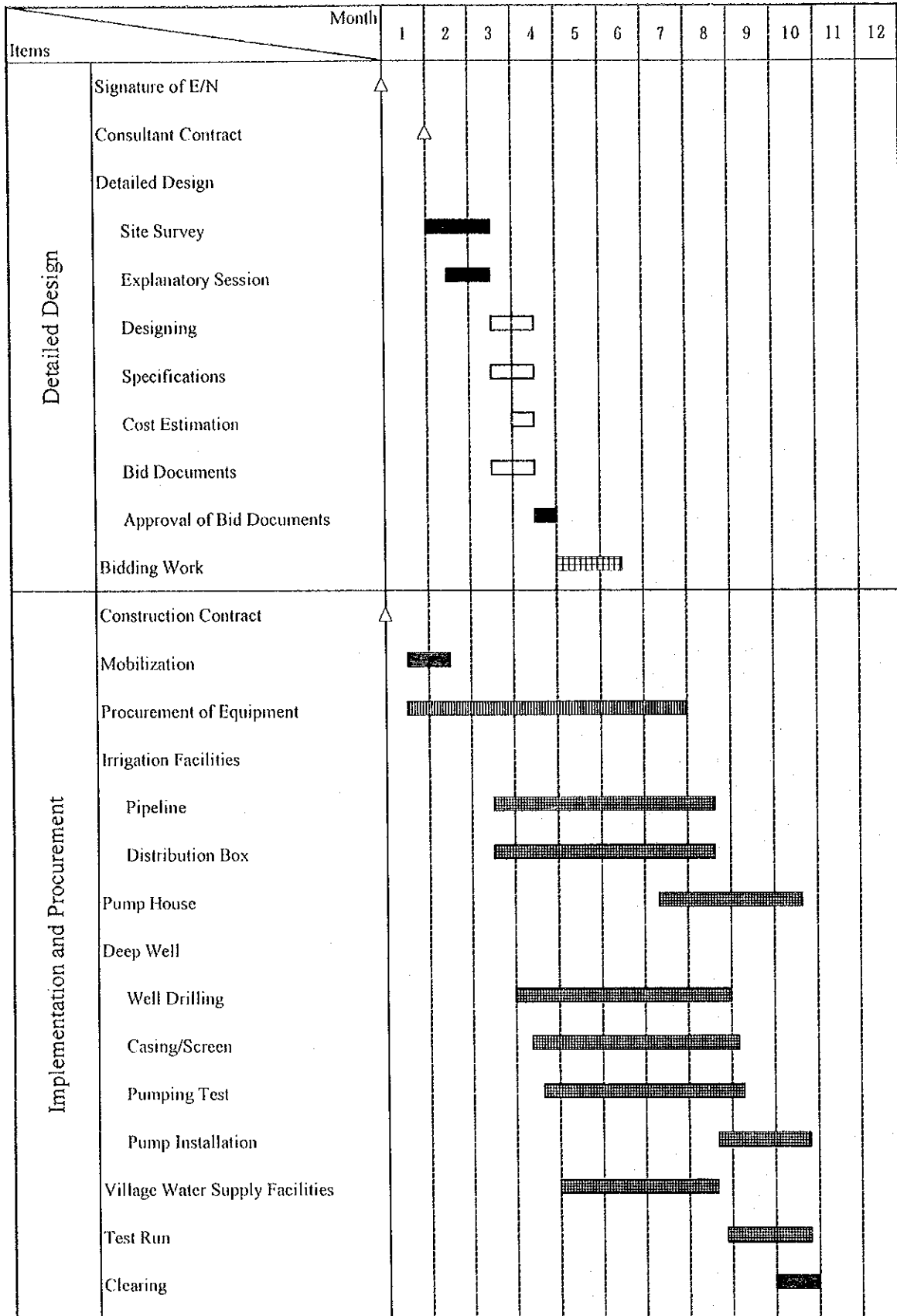


Figure 3-1 Implementation Schedule

3-1-7 Obligation of Recipient Country

The following is the obligation of the Indonesia side confirmed in the minutes of discussions signed on 20th April 1999 at Jakarta, in case Japan's Grant Aid is extended.

1. To provide data and information necessary for the Project.
2. To secure the land necessary for the execution of the Project.
3. To clear the sites prior to the commencement of the construction, if required.
4. To make passable all roads and bridges leading to the Projects sites before the commencement of inland transportation of materials and equipment, if required.
5. To bear commissions to the Japanese foreign exchange bank for its banking services based upon the Banking Arrangement, namely the advising commission of the "Authorization to Pay" and payment commission.
6. To ensure prompt unloading, tax exemption, customs clearance at the port of disembarkation in the Republic of Indonesia and prompt internal transportation of the materials and equipment for the Project purchased under the Grant Aid.
7. To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the verified contracts.
8. To accord Japanese nationals whose services may be required in connection with the supply of products and the services under the verified contract such facilities as may be necessary for their entry into the Republic of Indonesia and stay therein for the performance of their work.
9. To provide necessary permissions, licenses and other authorizations for implementing the Project, if necessary.
10. To maintain and use properly and effectively the facilities constructed under the Project.
11. To coordinate and solve any issues related to the Project which may be raised from third parties or inhabitants in the Project area during implementation of the Project.

3-2 Project Cost Estimation

The Project cost to be borne by the Government of Indonesia is estimated as follows.

- | | |
|------------------------------------|---|
| 1. Fence Work | 64 Million Rupia |
| 2. Provision Cost of Drilling Rigs | 2,903 Million Rupia |
| 3. Land Acquisition Cost | "to be provided by the benefited farmers" |

3-3 Operation and Maintenance Cost

The operation & maintenance costs of facilities are subsidized by GOI for the first two years of operation. Subsequently, the operation & maintenance is transferred to a water users' association (WUA), which has to carry out autonomously its management from then on with irrigation service fees collected from farmers. Therefore, the farmers should be able to shoulder the fees for the project to be sustainable.

The operation and maintenance costs are calculated for the typical sites and farmer's income and expenditure, which are calculated in paragraph 2-3-2 (2), are confirmed. Then the operation and maintenance costs, which are calculated from the perspective of farm economy, are evaluated and the sustainability of the Project is examined. Since the perfectly autonomous management starts from the third year of operation, the farmer's income and expenditure in the third year are also examined. Five typical sites, which are selected in paragraph 2-3-2 (2), are Bongo I and Bong III in North Sulawesi, Ranometo in Southeast Sulawesi, Kalembukaha in Sumba and Nawangkewa in Flores.

The current irrigation service fees of the existing WUA informed at the study area include only operating cost and no stock fund for facility replacement cost. The benefited farmers currently understand that the main facilities are replaced by GOI. However, as mentioned in paragraph 2-3-2 (5), GOI has announced that the operation and maintenance for such small scale irrigation project shall be managed entirely by WUA, which is given full responsibility and authority. Therefore, even the main facility replacement cost for this Project will be shouldered by WUA at the time of replacement. In the case that WUA does not have any fund at the replacement time, WUA shall make a loan or abandon irrigation farming. Therefore, in this calculation, the replacement cost is taken into account together with ordinary operation and maintenance costs. The ordinary operation and maintenance costs consist of fuel fee, oil fee, operator wages, allowance for administration staff members, spare parts cost and small repair cost. Facility replacement cost estimation is carried out adopting the method employed by the World Bank as follows. "The pumps and engines have an assumed life of 15 years reflecting average annual running hours. Other components of the facilities (pump houses and distribution systems) are maintained through the project life and do not require replacement."

The project production costs and income of each typical site are calculated based on the cropping patterns, and the net income is calculated subtracting the production costs from the income.

Table 3-2 shows the result of the examination.

Table 3-2 Operation and Maintenance Cost (per 1 ha)

Site	Cropping Intensity (%)	Operating Cost (Rp/hr)	Annual Operating Hours (Hours)	Annual Operating Cost (1,000 Rp)	Annual Replacement Cost (1,000 Rp)	Annual O&M Costs (1,000 Rp)	Annual Net Income (1,000 Rp)	O&M Costs/Net Income (%)
Planned								
Bongo I	250	1,731	111	193	352	545	8,160	6.7
Bongo III	250	2,489	111	277	384	661	8,044	8.2
Ranometo	250	1,315	87	114	417	531	8,568	6.2
Kalembukaha	250	1,864	150	280	867	1,147	7,425	15.5
Nawangkewa	200	668	185	124	733	857	4,064	21.1
Third Year								
Bongo I	225	1,731	99	171	352	523	4,820	10.9
Bongo III	225	2,489	99	246	384	630	4,714	13.4
Ranometo	175	1,315	62	81	417	498	3,899	12.8
Kalembukaha	225	1,864	152	284	867	1,150	3,240	35.5
Nawangkewa	150	668	139	93	733	826	1,757	47.0

Note: Operating hours are calculated based on water requirements calculation
Concerning the net income calculation, refer to 2-3-2 (2)

The summary of the above-mentioned result is as follows.

Annual operation and maintenance costs of each site vary in big range depending on irrigation area and groundwater conditions. Concerning the ratio to the net income, the biggest value is about 21 %, and it is valid compared with the values which the World Bank showed in appraisal on deep wells, which are from 18% to 36%. Moreover, since the production costs include labor cost, the real burden on the farmers is smaller than the above figures.

Concerning the third year, the ratios to the net income in Kalembukaha and Nawangkewa are rather big. However, these net incomes calculated taking operation and maintenance costs into account are 250% and 200% of the current values respectively (refer to 2-3-2 (2)). Therefore, the practical use of the stock fund saved in the first two years will enable the farmers to deal with the transitional period till the time when the estimated net incomes are achieved.

CAPTER 4 PROJECT EVALUATION AND RECOMMENDATION

Chapter 4 Project Evaluation and Recommendation

4-1 Project Effect

(1) Appropriateness of the Project

This Project is judged appropriate as a Japan's Grant Aid Scheme from the following aspects.

1) The beneficiaries of the Project are the social poor.

The proposed 14 sites of the Project are located in the rural areas of three provinces in the Eastern Area, which is considered an economically disadvantaged region of Indonesia. The sites are poor regions relying on rain-fed agriculture. Therefore, most of the beneficiaries are poor farmers, amounting to nearly 2,500.

2) The Project swiftly contributes to the stabilization of the livelihood and betterment of the living standard of the farmers who were exposed to the drought in 1997 and the economic crisis erupted in the same year.

The Project is for the poor farmers in the area where drought routinely occurs, which includes NTT province that was seriously hit in 1997. The Project aims at improving weak agricultural structure that relies only on rainfall and securing stable agricultural production. Since its implementation period can be shorter than one year, it will bring an immediate effect and swiftly contributes to the betterment of the living standard of the benefited farmers.

3) GOI's own budget, staff and techniques can ensure the management, operation and maintenance of the Project.

The management, operation and maintenance costs of the groundwater irrigation facilities constructed in this Project shall be borne by the fund collected as irrigation service fee from the member farmers of each water users' association (WUA) established in 14 sites. However, the operating cost of the facilities shall be borne by subsidies from the sub-project of groundwater development (PAT) for the first 2 years after construction. WUA shall also be provided with instruction and training for the management, operation and maintenance by PAT. Although there are still many issues to be improved, WUA seems sufficiently able to manage, operate and maintain the Project in consideration of similar projects already in operation in the project areas.

4) The Project contributes to the objectives of the National Development Plans of Indonesia.

GOI has stressed food self-sufficiency, redress of regional gaps and poverty eradication as prioritized tasks in the 6th National 5-year Development Plan (PELITA VI). Priority has been given especially to the poorly developed Eastern Area, through the promotion of irrigation project by groundwater development. On the other hand, this Project encourages the progress of irrigation projects by groundwater development which have been hampered by the economic crisis, therefore it surely contributes to the objectives of the National Development Plans of Indonesia.

5) The Project does not induce environmentally ill effects.

In the case that huge amount of groundwater is pumped up, there is danger of ill effects such as exhaustion of aquifer, land subsidence, etc. However, in this Project, the discharge of groundwater per one well is not that huge and ranges between 10 - 30 liters per second, and the pumps are not always operating and their annual operating hours are around 120 hours on average. Therefore, the Project does not induce environmentally ill effects. Additionally, it is stated in the plan that groundwater condition shall be always observed during the operation, and electric conductivity shall be always measured at the sites near the seacoast in order to monitor the likelihood of saline water intrusion.

6) It is possible to implement the Project without any difficulties under a Japan's Grant Aid Scheme.

It is a characteristic of this Project that the proposed sites are scattered in three provinces with three islands. However, as each project scale is small, which admits of less than one year construction period, it is possible to implement the Project without any difficulties, provided that consideration shall be given to the implementation plan and no security problems will occur.

(2) Project Effect

The effect expected to derive from the execution of the Project is summarized as follows.

1) Direct effect

- A weak agricultural structure that relies only on rainfall will be improved and changed to a more stable one with irrigation facilities provided in 241 ha of

farmland in 14 sites.

- Agricultural production will increase, and farmers' income for 385 households involved in 241 ha of farmland in 14 sites will increase.

Newly constructed irrigation facilities will increase annual cropping intensity from 160% to 240% and triple agricultural product. As a result, farmers' annual income (net income) will greatly increase.

- Introduction of cash crops and production of crops that meet the needs of market will become possible.
- Flexible irrigation that meets the demands will become possible.
- Farmers' food will be secured and their living standard will be improved by the increase of agricultural product and farmers' income.
- Working opportunities for the rural poor and weak will increase due to the increase of cropping intensity, and poverty alleviation will be realized.
- Labor burdens of drawing and carrying water for women and children will be alleviated.
- Irrigation projects with groundwater development planned by GOI will be promoted.

2) Indirect effect

- Rural economy will be reinvigorated.
- The Project will contribute to one of the national objectives.
- The Project will contribute to food security (urgent food increase in production), which is an urgent task in the agricultural sector, in the Social Safety Net Program (SSN) that is one of the national priority issues.
- Relating to assistance of the social poor which is an urgent task, the Project will contribute to poverty alleviation and redress of regional gaps.
- WUA will grow up along with farmers' autonomy.
- The irrigation projects by groundwater development that bring an immediate effect will spread to the surrounding areas of the sites.
- Groundwater development techniques that include deep well drilling skills (mud water cycling system, gravel filling, well washing and screen setting) and well test skills will be improved.
- The Project will be a visible assistance and will deepen mutual friendship.

4-2 Recommendation

As mentioned above, a huge benefit is expected when the Project is implemented, which will contribute to the improvement of BHN of the farmers in the proposed sites. Hence, it is judged that the implementation of the Project under Japan's Grant Aid is appropriate. Moreover, concerning the management and operation/maintenance, the responsible organization of Indonesia has sufficient personnel and budget, and it is expected to be no problems.

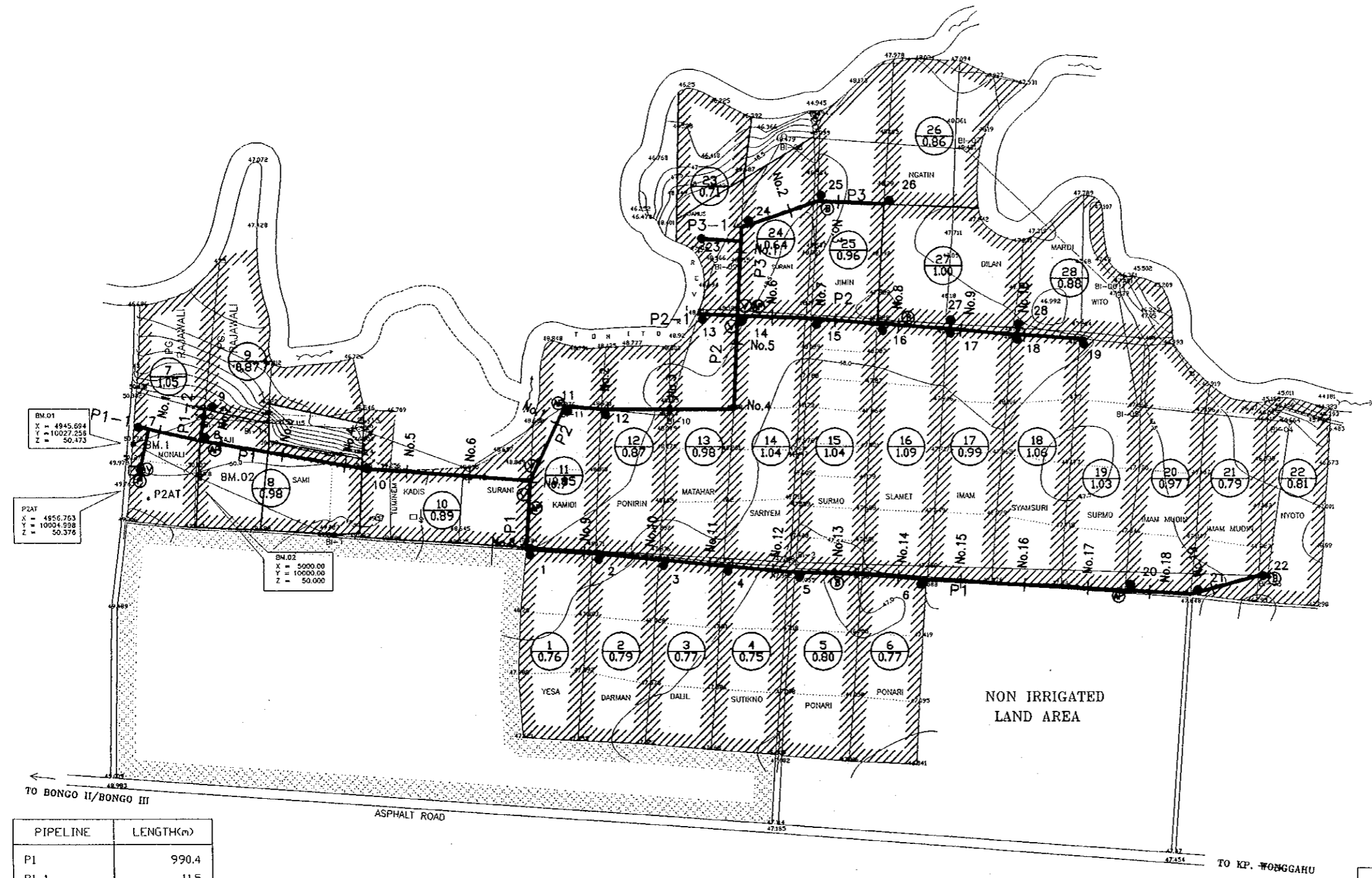
It is considered, however, that if the following points are improved and maintained by GOI, the Project will be carried out more smoothly, and its benefit and sustainability will be secured.

- Necessary procedures for the implementation of the Project shall be surely carried out before its construction.
- Prompt measures shall be carried in preparing proper organizations and systems for executing GOI's obligation in the implementation of the Project.
- Participation of the benefited farmers in the Project from the detailed design stage till the O&M stage passing through the construction stage shall be planned.
- Establishment of WUA shall be realized before the completion of the facilities construction.
- Assistance for technical guidance and training to establish and operate WUA (especially at the beginning of O&M) and to change rain-fed farming to irrigation farming shall be properly carried out.
- Budget for the aforementioned and O&M for the first 2 years of operation shall be properly secured.
- Strong guidance shall be made to WUA to properly secure O&M costs including facility replacement cost.

BASIC DESIGN DRAWINGS

LIST OF DRAWINGS

Drawing No.	Title of Drawings
1	GENERAL PLAN No.1 BONGO-I
2	GENERAL PLAN No.2 BONGO-II
3	GENERAL PLAN No.3 BONGO-III
4	GENERAL PLAN No.4 TEMPOK
5	GENERAL PLAN No.5 PAREPE
6	GENERAL PLAN No.6 RANOOHA
7	GENERAL PLAN No.7 RANOMETO
8	GENERAL PLAN No.8 LAPULU
9	GENERAL PLAN No.9 MOOLO INDAH
10	GENERAL PLAN No.11 KALEMBUKAHA
11	GENERAL PLAN No.12 PALAKAHEMBI
12	GENERAL PLAN No.13 NAMANGKEWA
13	GENERAL PLAN No.14 MAGEPANDA
14	GENERAL PLAN No.17 TOTOMALA
15	LONG SECTION OF PIPELINE No.1 BONGO-I
16	LONG SECTION OF PIPELINE No.2 BONGO-II(1/2)
17	LONG SECTION OF PIPELINE No.2 BONGO-II(2/2)
18	LONG SECTION OF PIPELINE No.3 BONGO-III(1/2)
19	LONG SECTION OF PIPELINE No.3 BONGO-III(2/2)
20	LONG SECTION OF PIPELINE No.4 TEMPOK(1/2)
21	LONG SECTION OF PIPELINE No.4 TEMPOK(2/2)
22	LONG SECTION OF PIPELINE No.5 PAREPE(1/2)
23	LONG SECTION OF PIPELINE No.5 PAREPE(2/2)
24	LONG SECTION OF PIPELINE No.6 RANOOHA
25	LONG SECTION OF PIPELINE No.7 RANOMETO(1/2)
26	LONG SECTION OF PIPELINE No.7 RANOMETO(2/2)
27	LONG SECTION OF PIPELINE No.8 LAPULU
28	LONG SECTION OF PIPELINE No.9 MOOLO INDAH(1/2)
29	LONG SECTION OF PIPELINE No.9 MOOLO INDAH(2/2)
30	LONG SECTION OF PIPELINE No.11 KALEMBUKAHA
31	LONG SECTION OF PIPELINE No.12 PALAKAHEMBI
32	LONG SECTION OF PIPELINE No.13 NAMANGKEWA
33	LONG SECTION OF PIPELINE No.14 MAGEPANDA
34	LONG SECTION OF PIPELINE No.17 TOTOMALA
35	WELL PROFILE
36	PUMP HOUSE GENERAL PLAN
37	PUMP HOUSE
38	PUMP ALLOCATION
39	DISTRIBUTION BOX AND MEASUREMENT DEVICE
40	RELATIVE STRUCTURE(1/2)
41	RELATIVE STRUCTURE(2/2);AQUADUCT IN RANOMETO
42	WATER TANK Q=10m ³
43	WATER TANK Q=5m ³
44	WATER TANK Q=2m ³



LEGEND

- PUMP HOUSE
- SLUICE VALVE
- AIR STAND
- AIR VALVE
- DISTRIBUTION BOX
- BLOW OFF
- WATER TANK
- IRRIGATION COMMAND AREA
- ← COMMAND AREA No.
- ← AREA (Ha)

PIPELINE	LENGTH(m)
P1	990.4
P1-1	11.5
P1-2	28.2
P2	546.5
P2-1	30.8
P3	189.0
P3-1	27.4
Box 17	5.0
Box 18	5.0



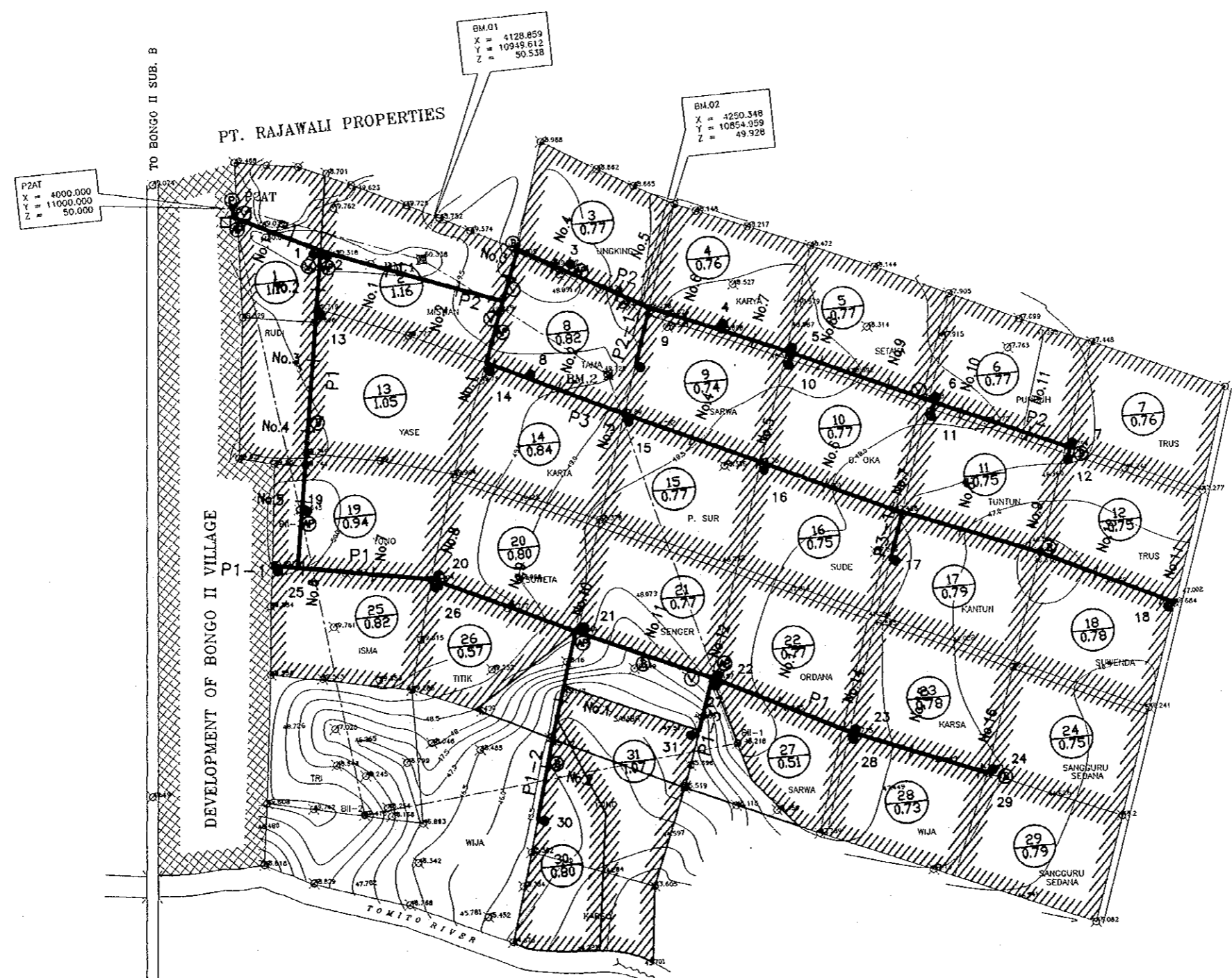
THE REPUBLIC OF INDONESIA

THE BASIC DESIGN STUDY ON THE PROJECT
FOR CONSTRUCTION OF FACILITY FOR IRRIGATION
EASTERN AREA

GENERAL PLAN
No.1 BONGO-I

Date		No.	1
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JAPAN INTERNATIONAL COOPERATION AGENCY



LEGEND

- ⊕ PUMP HOUSE
- ⊕ SLUICE VALVE
- ⊕ AIR STAND
- ⊕ AIR VALVE
- DISTRIBUTION BOX
- ⊕ BLOW OFF
- WATER TANK
- ▨ IRRIGATION COMMAND AREA
- ⊕ COMMAND AREA No.
- ⊕ AREA (Ha)

PIPELINE	LENGTH(m)
P1	810.1
P1-1	16.9
P1-2	136.2
P1-3	41.3
P2	585.7
P2-1	45.0
P3	560.4
P3-1	35.0
Box 5	5.0
Box 6	5.0
Box 7	5.0



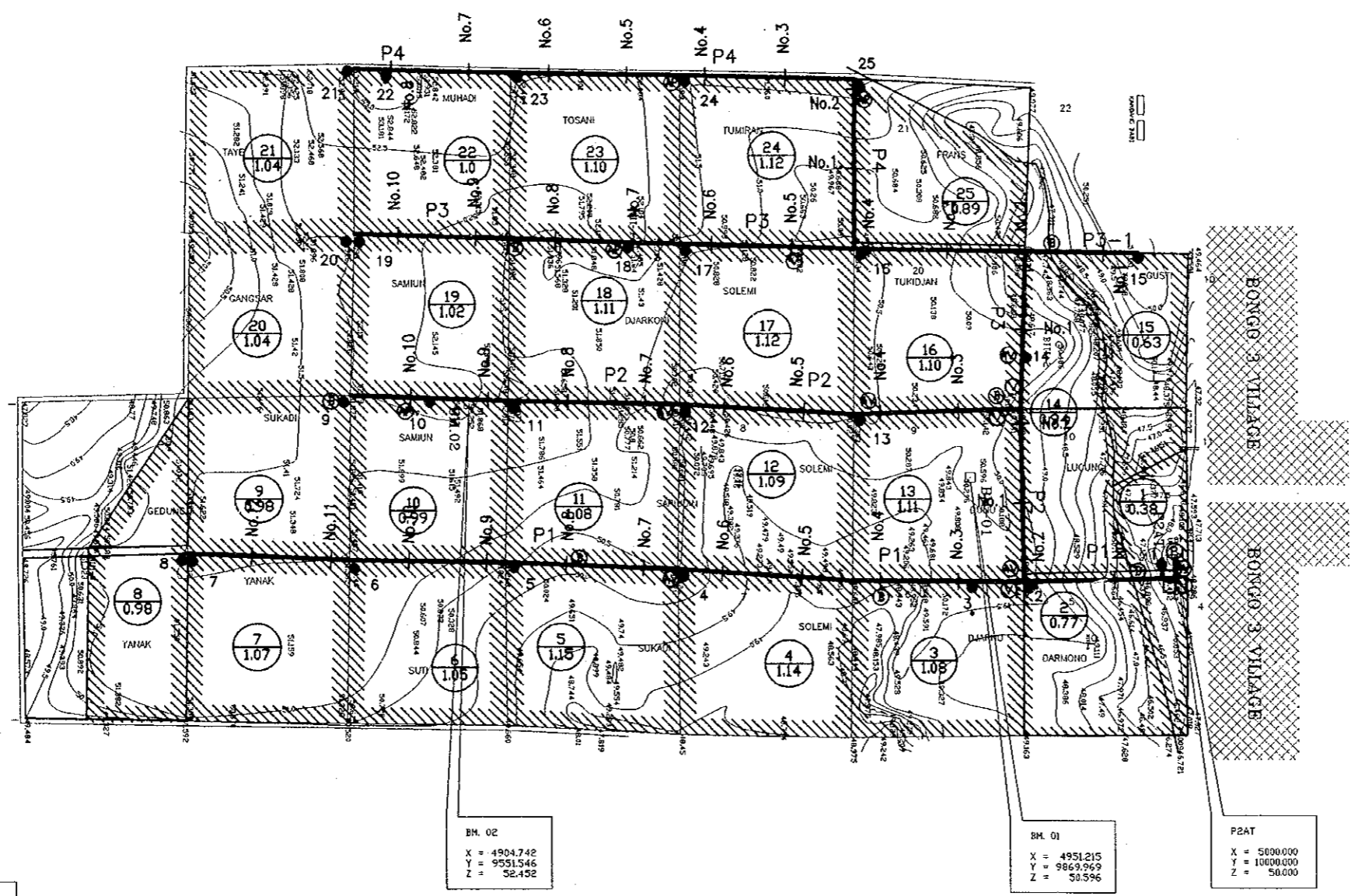
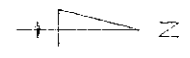
THE REPUBLIC OF INDONESIA

THE BASIC DESIGN STUDY ON THE PROJECT
FOR CONSTRUCTION OF FACILITY FOR IRRIGATION
EASTERN AREA

GENERAL PLAN
No.2 BONGO-II

Date		No.	2
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JAPAN INTERNATIONAL COOPERATION AGENCY



LEGEND

- PUMP HOUSE
- SLUICE VALVE
- AIR STAND
- AIR VALVE
- DISTRIBUTION BOX
- BLOW OFF
- WATER TANK
- IRRIGATION COMMAND AREA
- ← COMMAND AREA No.
- ← AREA (Ha)

PIPELINE	LENGTH(m)
P1	645.8
P2	541.5
P3	532.6
P3-1	426.8
P4	72.1
Box 1	5.0



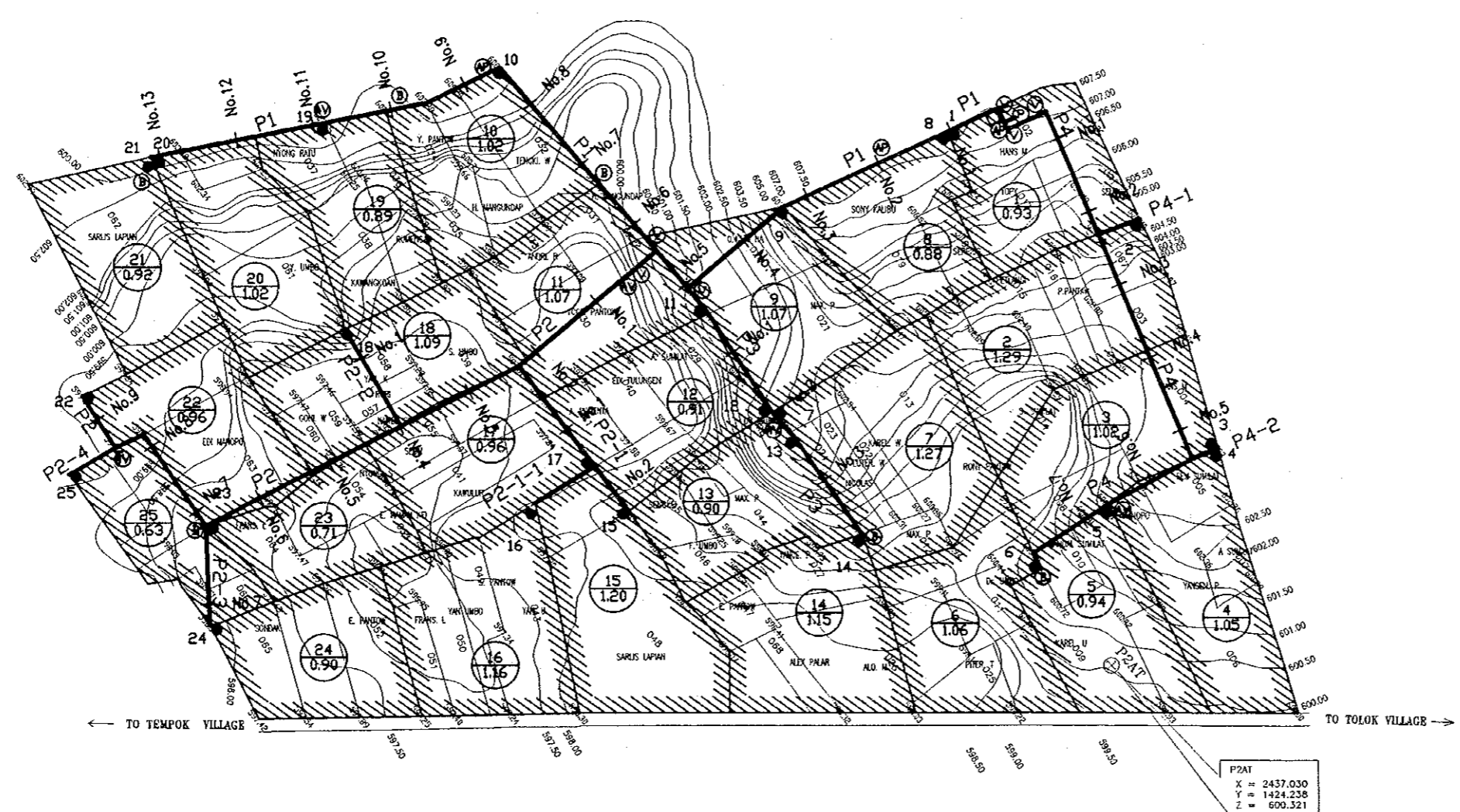
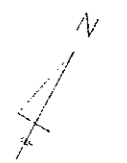
THE REPUBLIC OF INDONESIA

THE BASIC DESIGN STUDY ON THE PROJECT
FOR CONSTRUCTION OF FACILITY FOR IRRIGATION
EASTERN AREA

GENERAL PLAN
No.3 BONGGO-III

Date		No.	3
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JAPAN INTERNATIONAL COOPERATION AGENCY

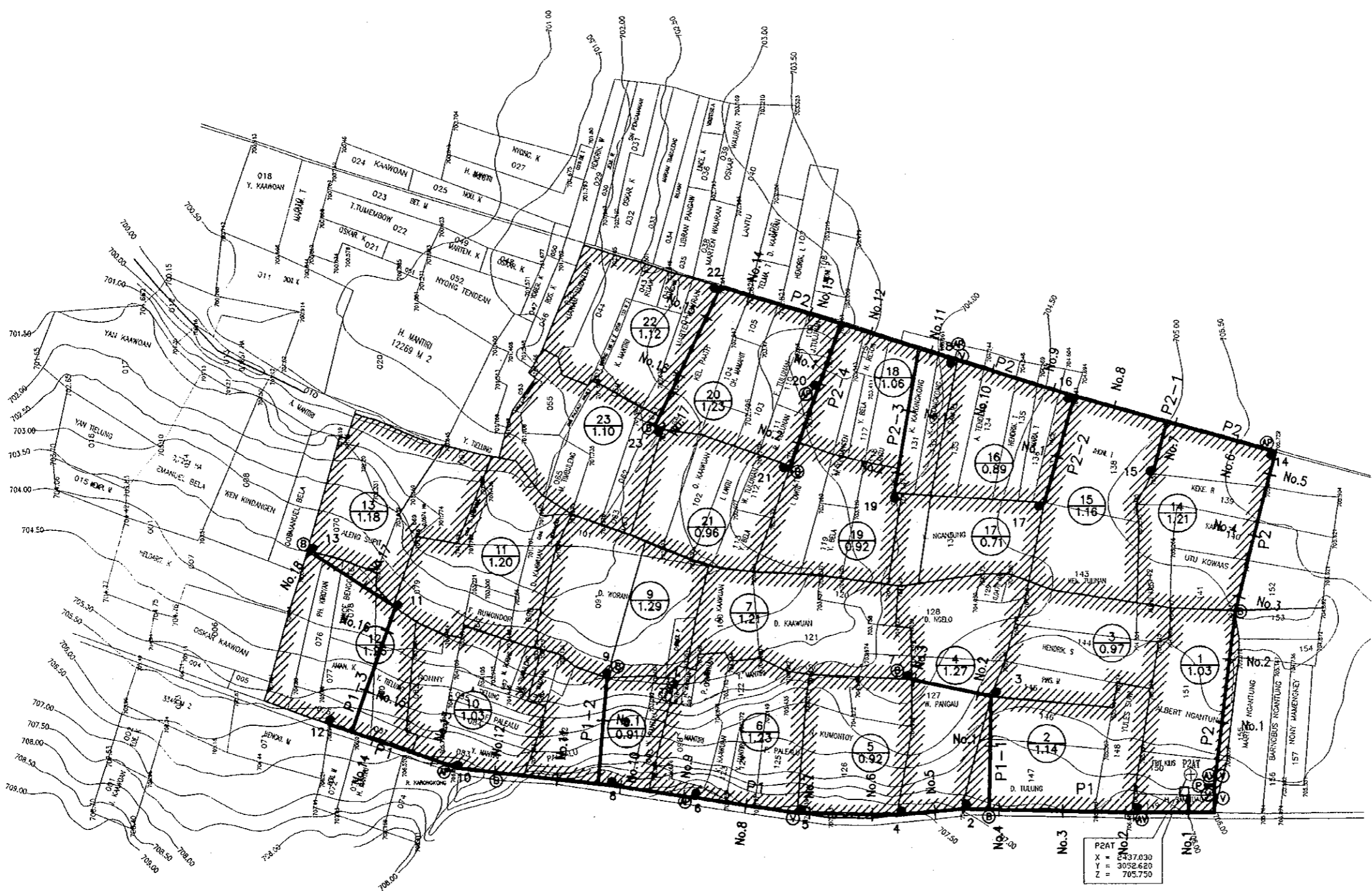


LEGEND	
	PUMP HOUSE
	SLUICE VALVE
	AIR STAND
	AIR VALVE
	DISTRIBUTION BOX
	BLOW OFF
	WATER TANK
	IRRIGATION COMMAND AREA
	← COMMAND AREA No.
	← AREA (Ha)

PIPELINE	LENGTH(m)
P1	663.6
P2	467.2
P2-1	118.2
P2-1-1	48.0
P2-2	71.0
P2-3	65.9
P2-4	33.5
P3	194.6
P4	399.0
P4-1	28.0
P4-2	18.3



THE REPUBLIC OF INDONESIA			
THE BASIC DESIGN STUDY ON THE PROJECT FOR CONSTRUCTION OF FACILITY FOR IRRIGATION EASTERN AREA			
GENERAL PLAN No.4 TEMPOK			
Date		No.	4
JAPAN INTERNATIONAL COOPERATION AGENCY			



LEGEND

- PUMP HOUSE
- SLUICE VALVE
- AIR STAND
- AIR VALVE
- DISTRIBUTION BOX
- BLOW OFF
- WATER TANK
- IRRIGATION COMMAND AREA
- ← COMMAND AREA No.
- ← AREA (Ha)

PIPELINE	LENGTH(m)
P1	902.0
P1-1	155.5
P1-2	87.1
P1-3	18.9
P2	851.2
P2-1	42.3
P2-2	90.1
P2-3	115.5
P2-4	122.0



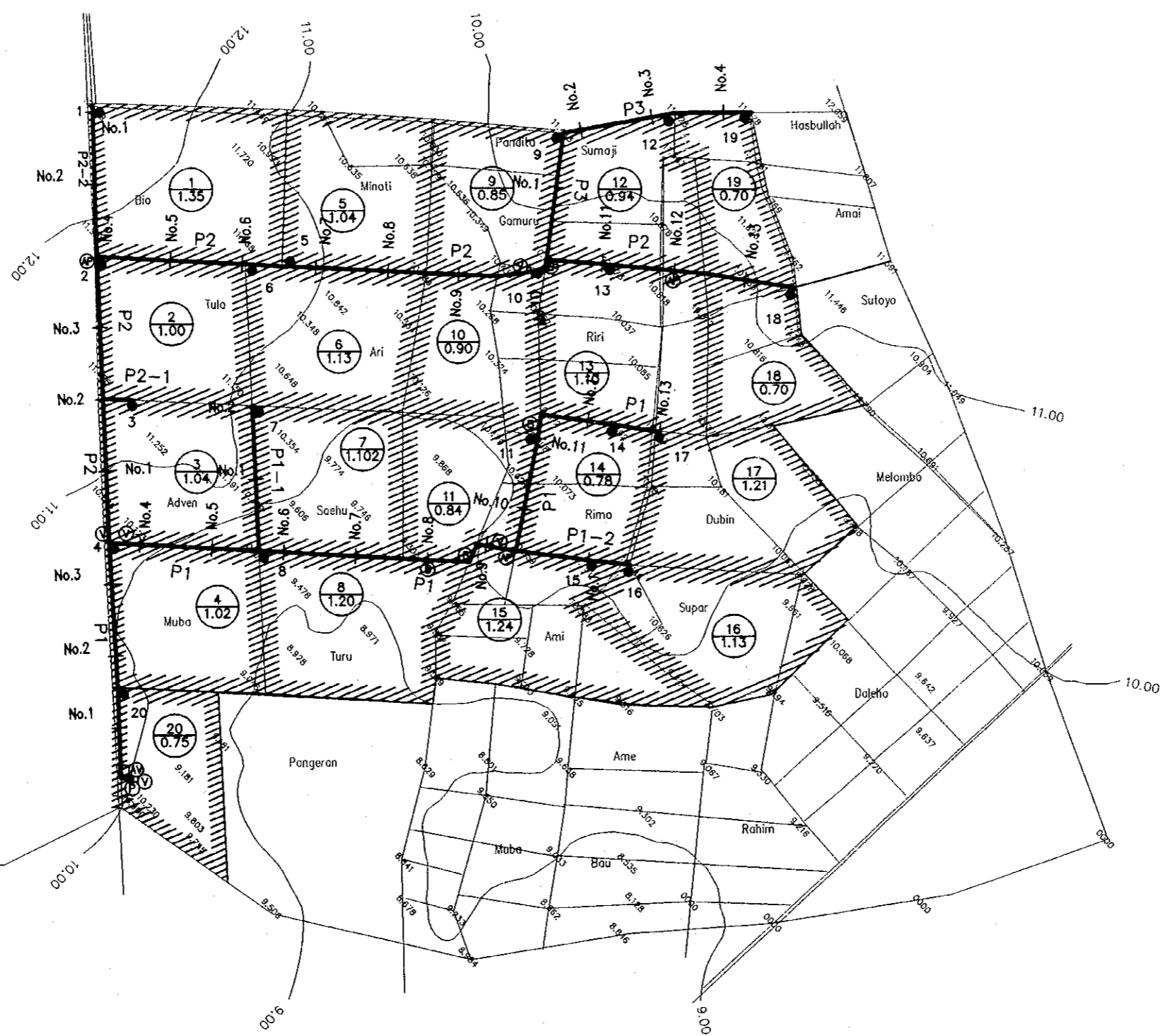
THE REPUBLIC OF INDONESIA

THE BASIC DESIGN STUDY ON THE PROJECT
FOR CONSTRUCTION OF FACILITY FOR IRRIGATION
EASTERN AREA

GENERAL PLAN
No.5 PAREPE

Date	No.	5
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JAPAN INTERNATIONAL COOPERATION AGENCY



BM.RD.1
 X = 1,000.000
 Y = 1,000.000
 Z = +10.000

LEGEND

- Ⓟ PUMP HOUSE
- Ⓥ SLUICE VALVE
- Ⓜ AS AIR STAND
- Ⓜ AV AIR VALVE
- DISTRIBUTION BOX
- Ⓟ BO BLOCK OFF
- WATER TANK
- ▨ IRRIGATION COMMAND AREA
- Ⓢ ← COMMAND AREA No.
- ← AREA (Ha)



PIPELINE	LENGTH(m)
P1	650.2
P1-1	101.2
P1-2	81.6
P2	694.6
P2-1	20.0
P2-2	103.6
P3	219.2

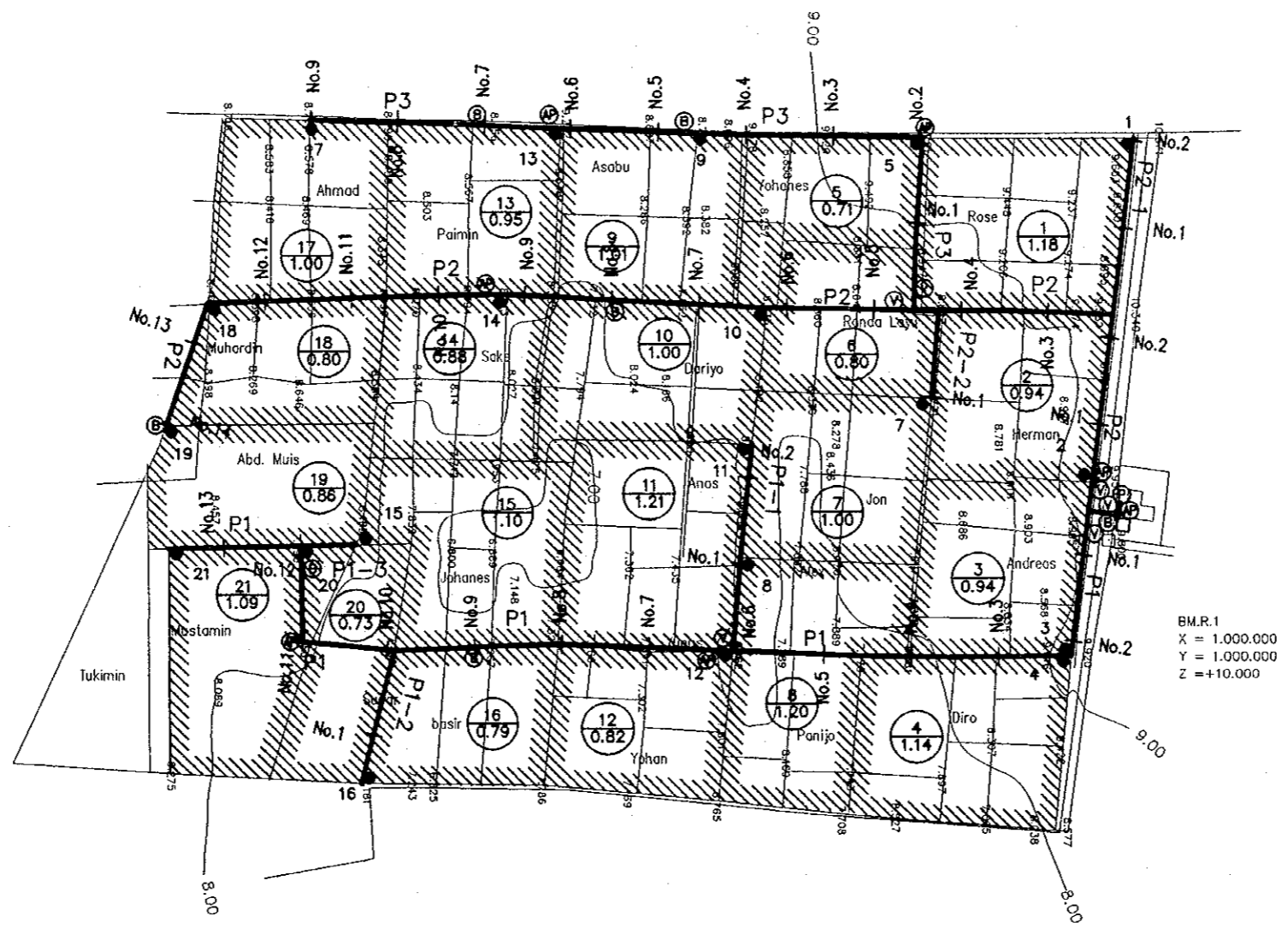
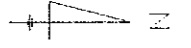
THE REPUBLIC OF INDONESIA

THE BASIC DESIGN STUDY ON THE PROJECT
 FOR CONSTRUCTION OF FACILITY FOR IRRIGATION
 EASTERN AREA

GENERAL PLAN
 No.6 RANOOGHA

Date		No.	6
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JAPAN INTERNATIONAL COOPERATION AGENCY



LEGEND

- Ⓟ PUMP HOUSE
- Ⓥ SLUICE VALVE
- Ⓜ AIR STAND
- Ⓦ AIR VALVE
- DISTRIBUTION BOX
- Ⓟ BLOW OFF
- WATER TANK
- ▨ IRRIGATION COMMAND AREA
- Ⓢ ← COMMAND AREA No.
- ← AREA (Ha)

PIPELINE	LENGTH(m)
P1	681.1
P1-1	118.3
P1-2	81.6
P1-3	34.8
P2	709.3
P2-1	101.9
P2-2	53.7
P3	453.3



THE REPUBLIC OF INDONESIA

THE BASIC DESIGN STUDY ON THE PROJECT
FOR CONSTRUCTION OF FACILITY FOR IRRIGATION
EASTERN AREA

GENERAL PLAN
No.7 RANOMETO

Date		No.	7
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JAPAN INTERNATIONAL COOPERATION AGENCY



B.M.L.1
 X = 1.000.000
 Y = 1.000.000
 Z = +6.000

LEGEND

- PUMP HOUSE
- SLUICE VALVE
- AIR STAND
- AIR VALVE
- DISTRIBUTION BOX
- BLOW OFF
- WATER TANK
- IRRIGATION COMMAND AREA
- ← COMMAND AREA No. 8
- ← AREA (Ha)



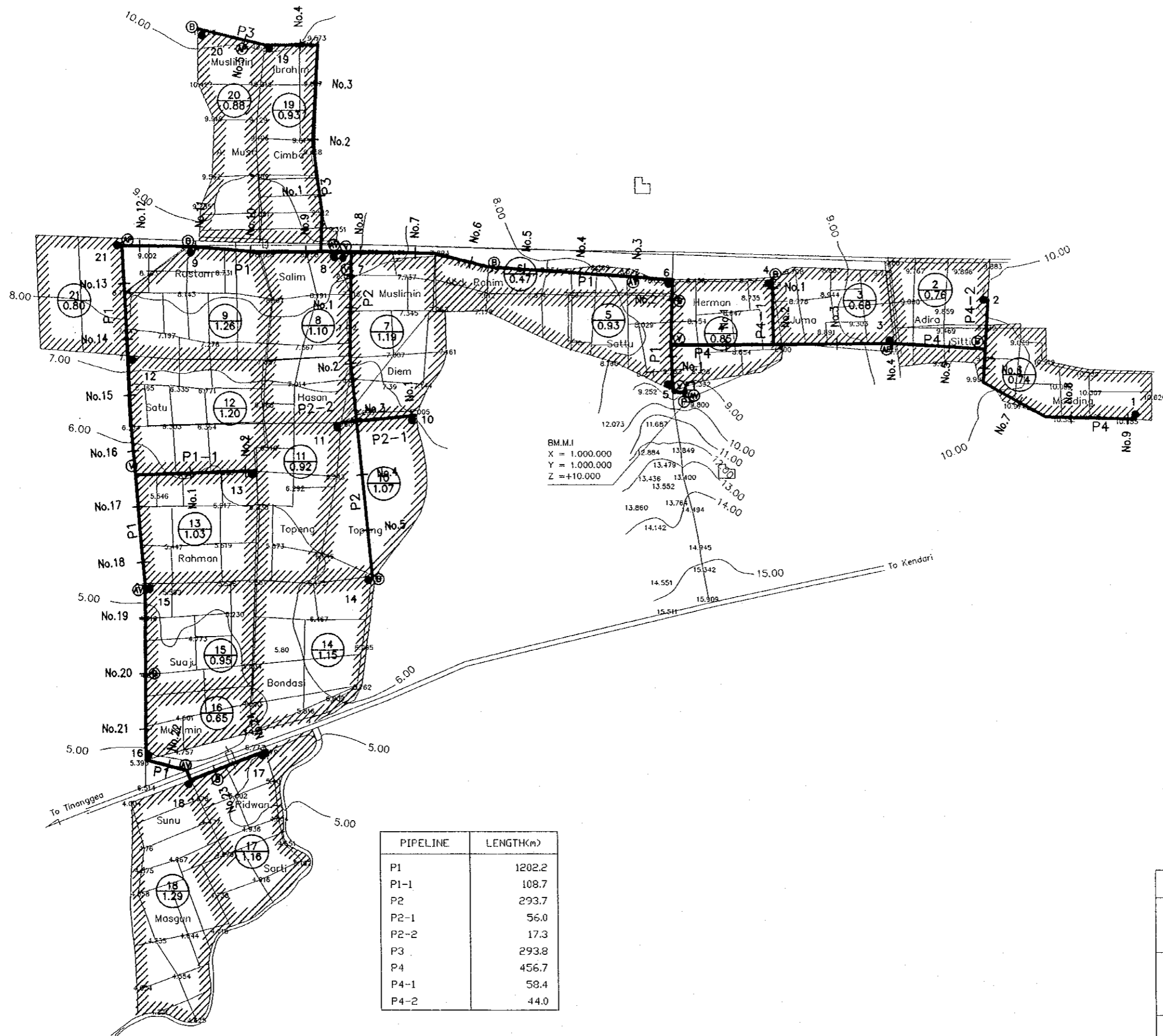
PIPELINE	LENGTH(m)
P1	481.0
P2	247.8

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 THE BASIC DESIGN STUDY ON THE PROJECT
 FOR CONSTRUCTION OF FACILITY FOR IRRIGATION
 EASTERN AREA

GENERAL PLAN
 No.8 LAPULU

Date		No.	8
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JAPAN INTERNATIONAL COOPERATION AGENCY



LEGEND

- Ⓟ PUMP HOUSE
- Ⓥ SLUICE VALVE
- Ⓜ AS AIR STAND
- Ⓜ AV AIR VALVE
- DISTRIBUTION BOX
- Ⓟ BLOW OFF
- WATER TANK
- ▨ IRRIGATION COMMAND AREA
- Ⓟ ← COMMAND AREA No.
- ← AREA (Ha)

PIPELINE	LENGTH(m)
P1	1202.2
P1-1	108.7
P2	293.7
P2-1	56.0
P2-2	17.3
P3	293.8
P4	456.7
P4-1	58.4
P4-2	44.0



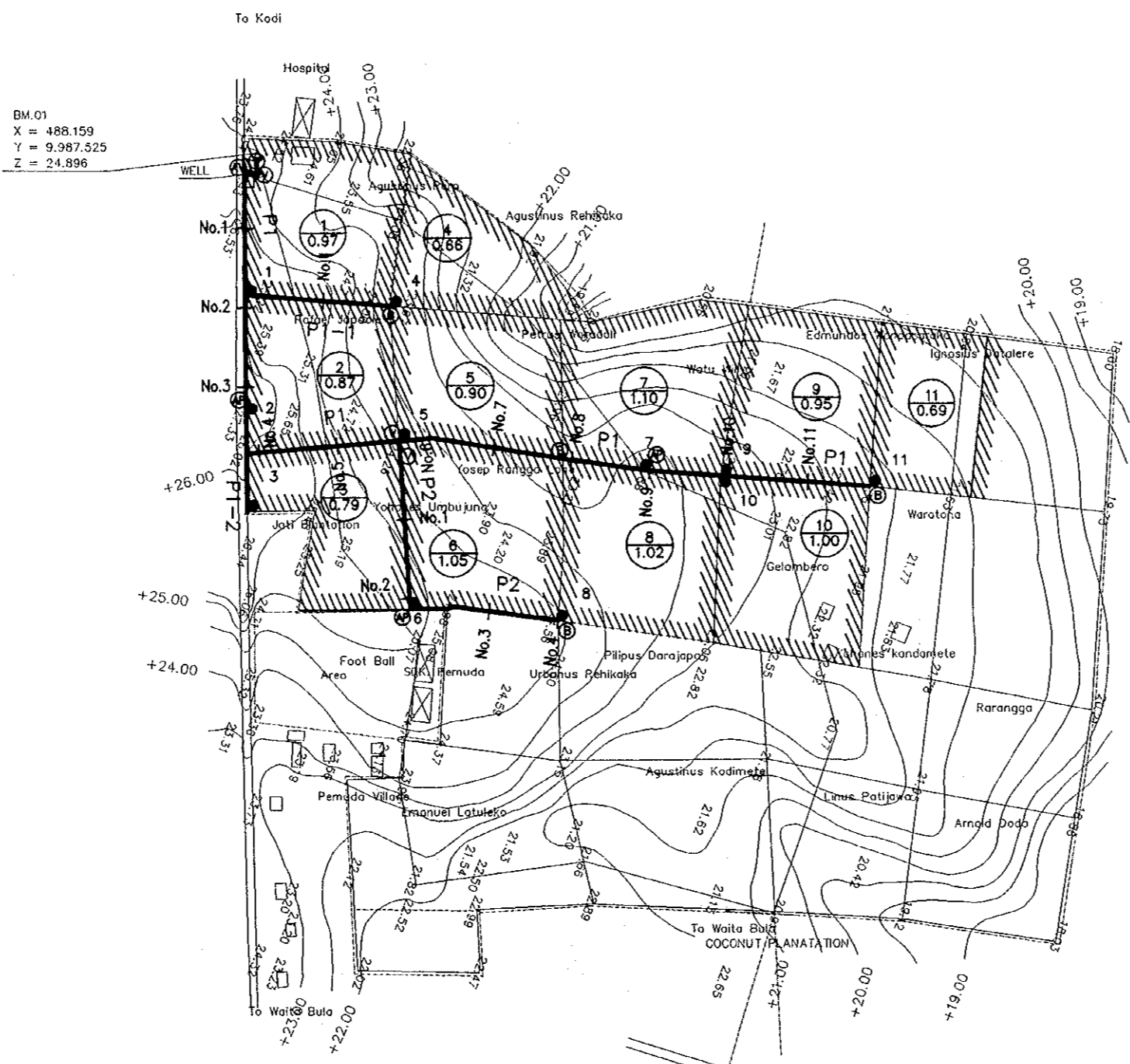
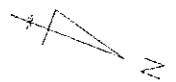
THE REPUBLIC OF INDONESIA

THE BASIC DESIGN STUDY ON THE PROJECT FOR CONSTRUCTION OF FACILITY FOR IRRIGATION EASTERN AREA

GENERAL PLAN
No.9 MOOLO INDAH

Date		No.	9
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JAPAN INTERNATIONAL COOPERATION AGENCY



BM.01
 X = 488.159
 Y = 9.987.525
 Z = 24.896

LEGEND

- ⊙ PUMP HOUSE
- ⊕ SLUICE VALVE
- ⊙ AIR STAND
- ⊕ AIR VALVE
- DISTRIBUTION BOX
- ⊕ BLOW OFF
- WATER TANK
- ▨ IRRIGATION COMMAND AREA
- ⊙ 8 / 0.98 ← COMMAND AREA No. / AREA (Ha)



PIPELINE	LENGTH(m)
P1	592.3
P1-1	95.5
P1-2	36.9
P2	204.2

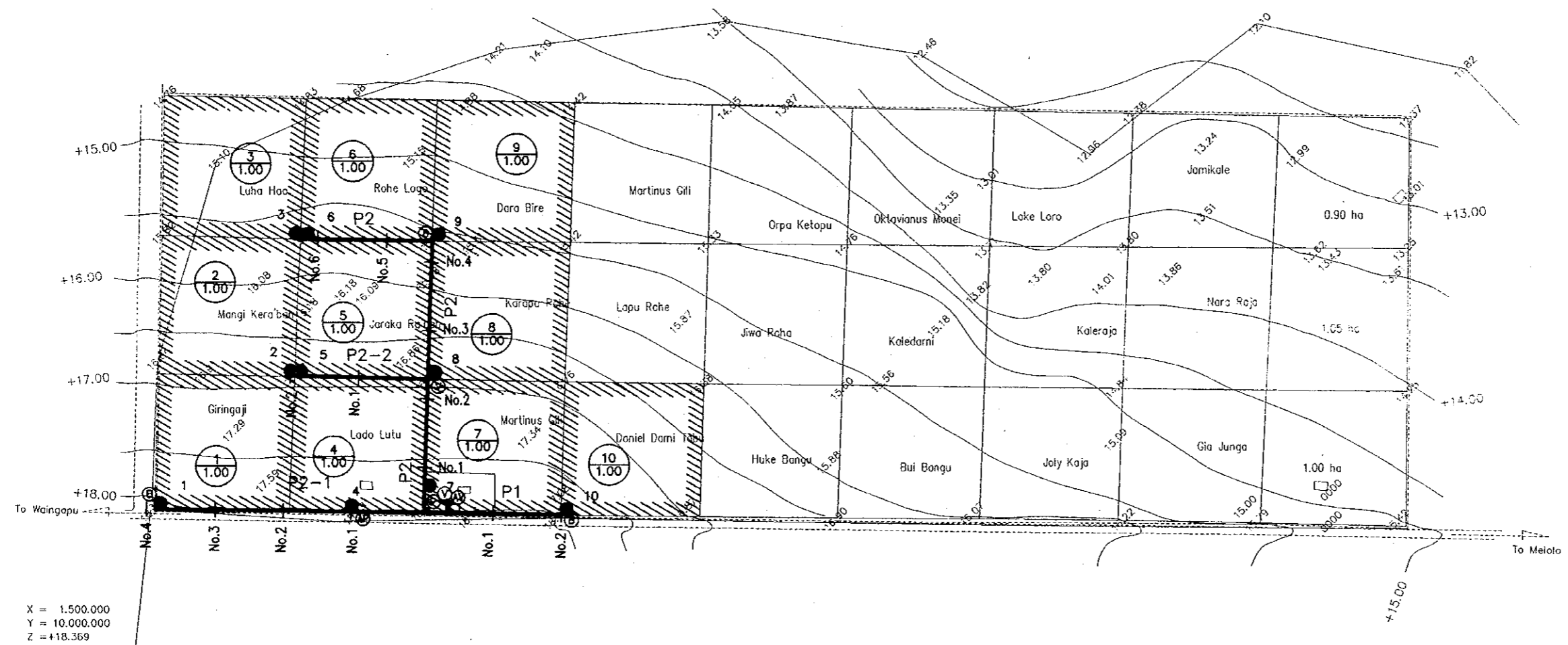
THE REPUBLIC OF INDONESIA

THE BASIC DESIGN STUDY ON THE PROJECT
 FOR CONSTRUCTION OF FACILITY FOR IRRIGATION
 EASTERN AREA

GENERAL PLAN
 No.11 KALEMBUKAHA

Date		No.	10
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JAPAN INTERNATIONAL COOPERATION AGENCY



LEGEND

- ⊕ PUMP HOUSE
- ⊙ SLUICE VALVE
- ⊙ AIR STAND
- ⊙ AIR VALVE
- DISTRIBUTION BOX
- ⊙ BLOW OFF
- WATER TANK
- ▨ IRRIGATION COMMAND AREA
- ⊙ 8
0.98 → COMMAND AREA No.
- AREA (Ha)



PIPELINE	LENGTH(m)
P1	101.0
P2	320.0
P2-1	203.0
P2-2	103.0

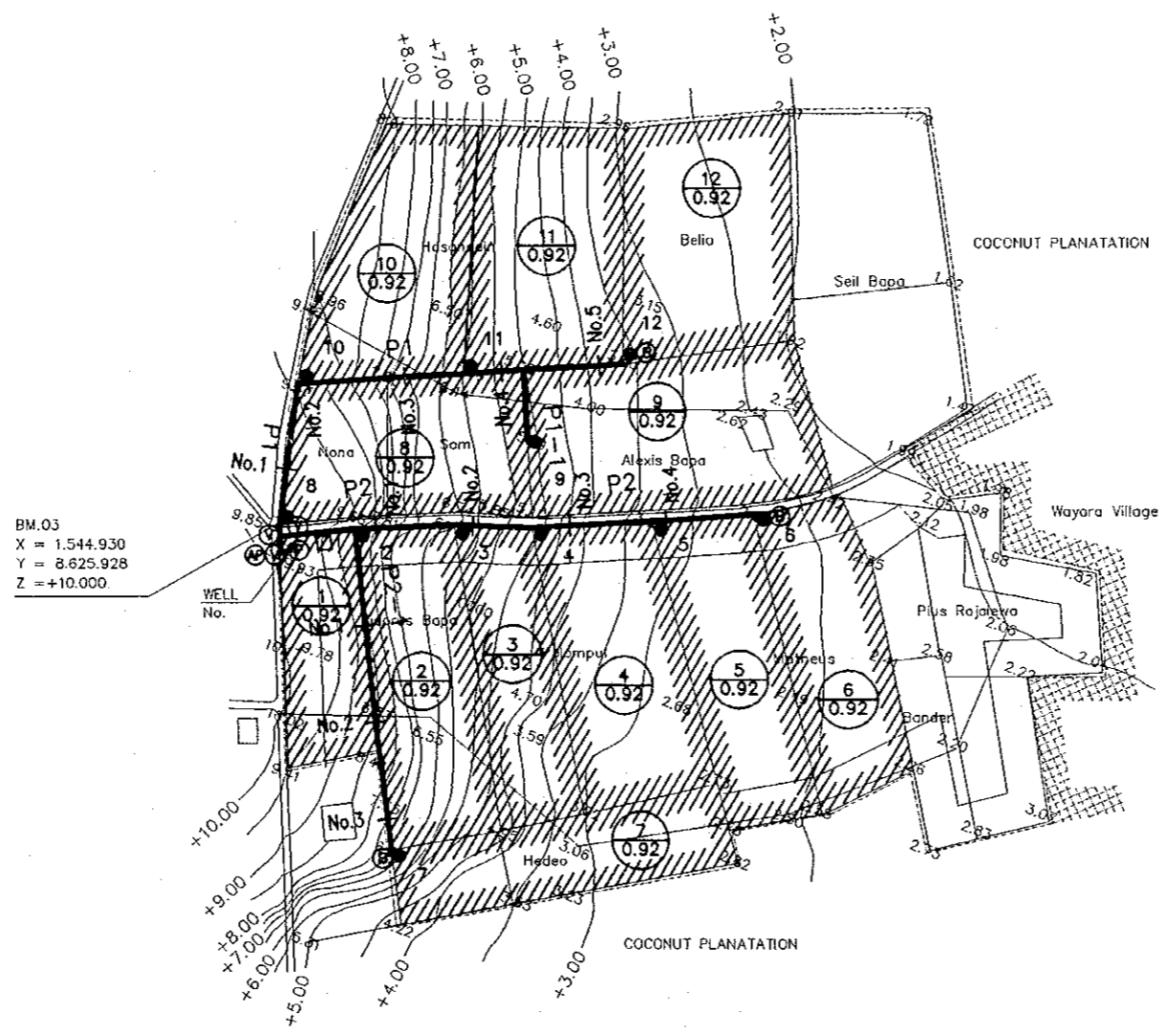
THE REPUBLIC OF INDONESIA

THE BASIC DESIGN STUDY ON THE PROJECT
FOR CONSTRUCTION OF FACILITY FOR IRRIGATION
EASTERN AREA

GENERAL PLAN
No.12 PALAKAHEMBI

Date		No.	11
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JAPAN INTERNATIONAL COOPERATION AGENCY



LEGEND

- PUMP HOUSE
- SLUICE VALVE
- AIR STAND
- AIR VALVE
- DISTRIBUTION BOX
- BLOW OFF
- WATER TANK
- IRRIGATION COMMAND AREA
- ← COMMAND AREA No.
- ← AREA (Ha)



PIPELINE	LENGTH(m)
P1	265.7
P1-1	36.7
P2	248.9
P2-1	168.9

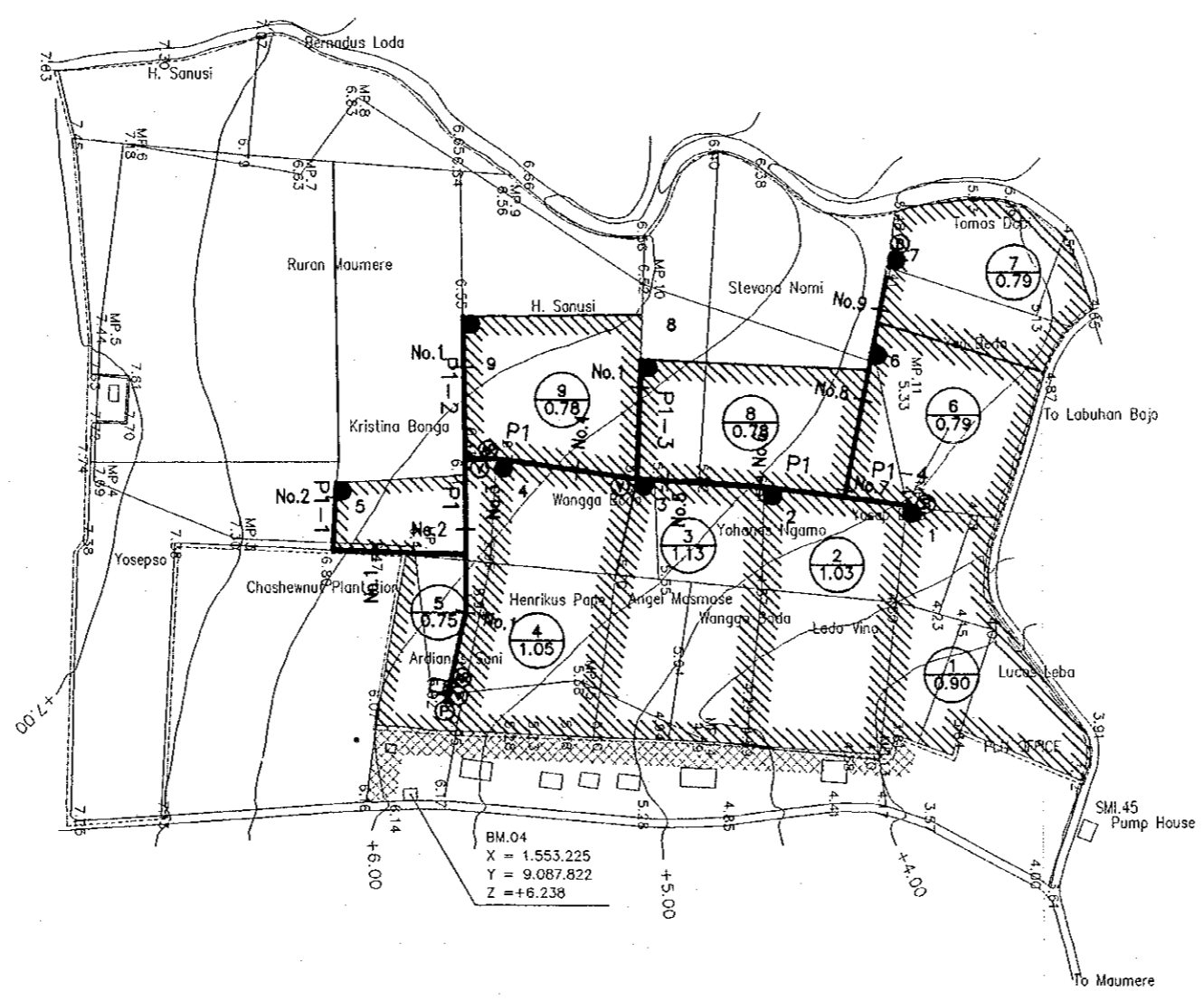
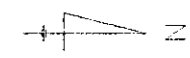
THE REPUBLIC OF INDONESIA

THE BASIC DESIGN STUDY ON THE PROJECT
FOR CONSTRUCTION OF FACILITY FOR IRRIGATION
EASTERN AREA

GENERAL PLAN
No.13 NAMANGKEWA

Date		No.	12
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JAPAN INTERNATIONAL COOPERATION AGENCY



LEGEND

- PUMP HOUSE
- SLUICE VALVE
- AIR STAND
- AIR VALVE
- DISTRIBUTION BOX
- BLOW OFF
- WATER TANK
- IRRIGATION COMMAND AREA
- ← COMMAND AREA No. 8
← AREA (Ha)



PIPELINE	LENGTH(m)
P1	476.6
P1-1	108.0
P1-2	77.4
P1-3	65.0
P1-4	37.6

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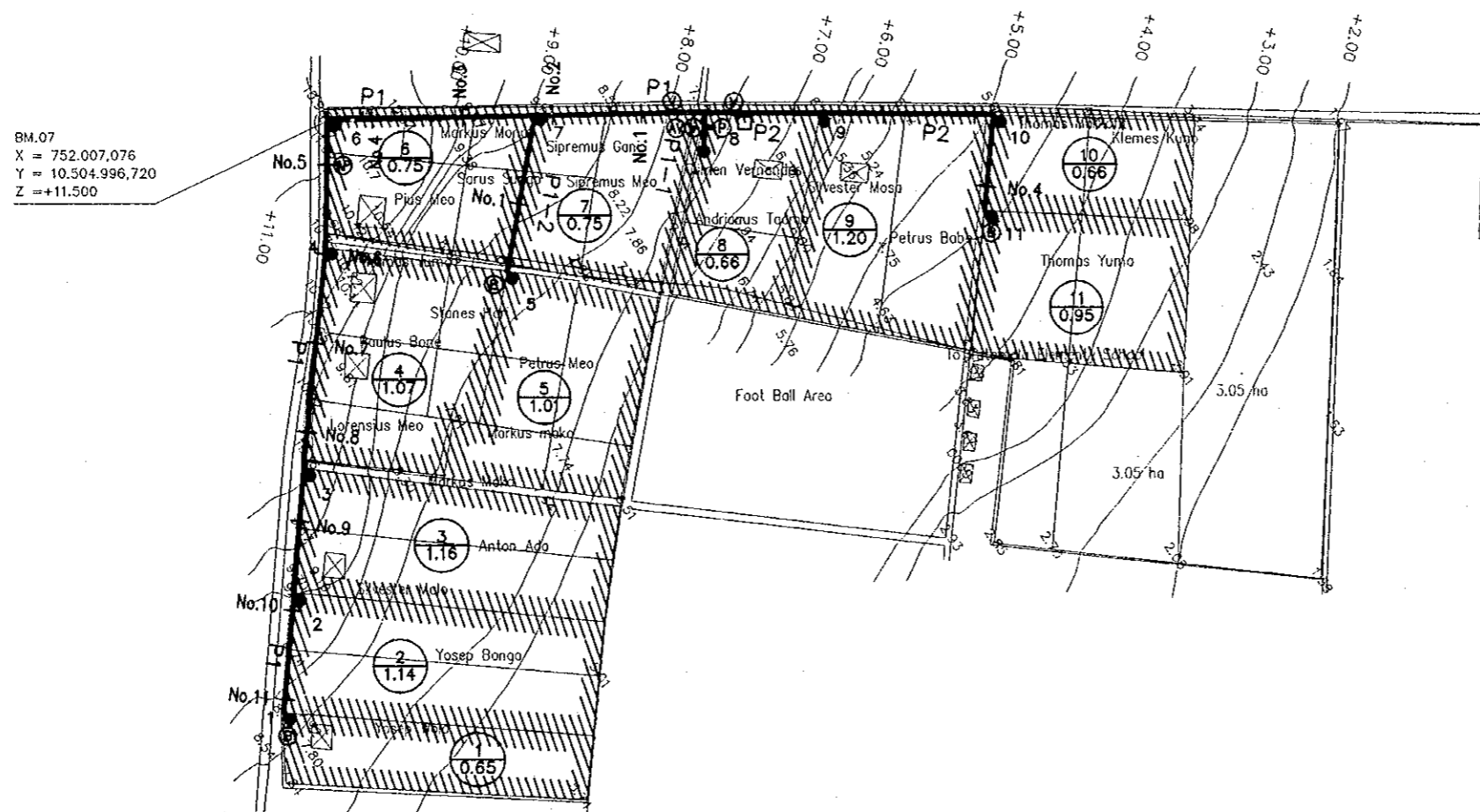
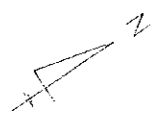
THE BASIC DESIGN STUDY ON THE PROJECT
FOR CONSTRUCTION OF FACILITY FOR IRRIGATION
EASTERN AREA

GENERAL PLAN
No.14 MAGEPANDA

Date		No.	13
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JAPAN INTERNATIONAL COOPERATION AGENCY

BM.04
X = 1.553.225
Y = 9.087.822
Z = +6.238



LEGEND

- PUMP HOUSE
- SLUICE VALVE
- AIR STAND
- AIR VALVE
- DISTRIBUTION BOX
- BLOW OFF
- WATER TANK
- IRRIGATION COMMAND AREA
- ← COMMAND AREA No. 8
← AREA (Ha) 0.98



PIPELINE	LENGTH(m)
P1	553.5
P1-1	10.0
P1-2	91.3
P2	216.8

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THE BASIC DESIGN STUDY ON THE PROJECT
FOR CONSTRUCTION OF FACILITY FOR IRRIGATION
EASTERN AREA

GENERAL PLAN
No.17 TOTOMALA

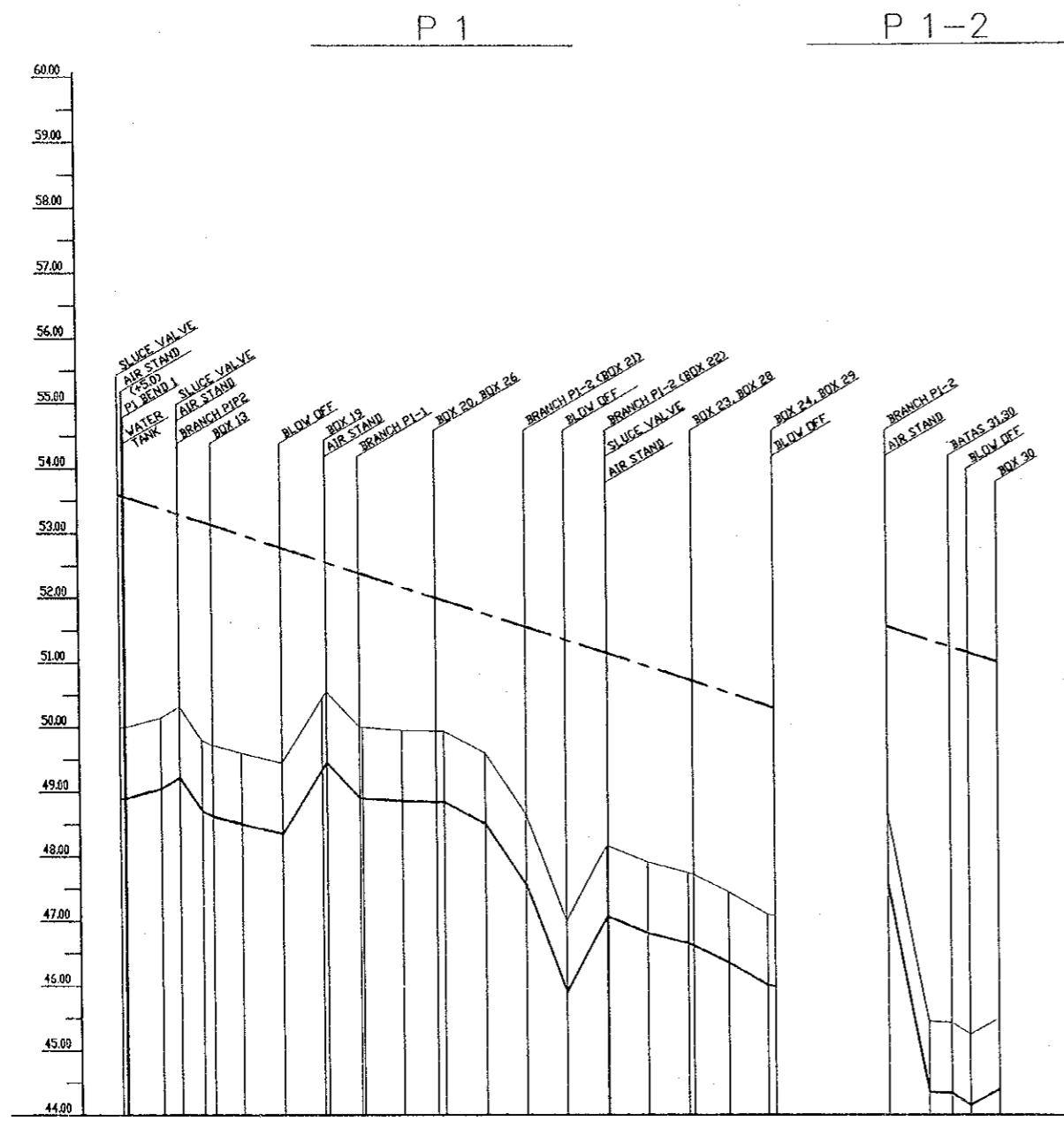
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JAPAN INTERNATIONAL COOPERATION AGENCY

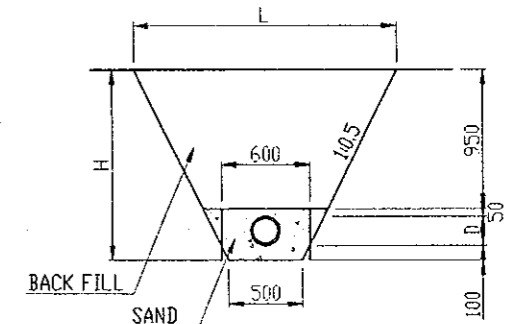
LONGITUDINAL SECTION

LEGEND

LINE	NAME
—	PIPE CENTER LEVEL
—	GROUND LEVEL
- - -	DYNAMIC WATER LEVEL



PIPE INSTALLATION



D	200	150
H	1300	1250
L	1800	1750

PIPE	Q = 0.030m ³ /s															Q = 0.030m ³ /s														
	PVC φ = 200															PVC φ = 200														
DYNAMIC WATER ELEVATION	53.36	53.39	53.29	53.18	52.98	52.78	52.55	52.38	52.37	52.16	52.00	51.96	51.76	51.55	51.35	51.14	50.94	50.74	50.53	50.33	50.29	51.55	51.35	51.24	51.15	51.00				
PIPE CENTER ELEVATION	48.90	49.95	49.22	48.70	48.62	48.50	48.95	48.85	48.94	48.84	48.84	48.50	47.55	45.90	47.36	46.81	46.65	46.35	46.00	45.99	47.55	44.35	44.33	44.15	44.10					
GROUND LEVEL	50.00	50.15	50.32	49.90	49.72	49.60	49.45	49.45	50.00	49.95	49.94	49.94	49.60	48.65	47.00	48.16	47.91	47.72	47.45	47.10	47.09	48.65	45.45	45.43	45.25	45.50				
ACCUMULATED DISTANCE	0.0	5.0	72.6	100.0	115.3	150.0	200.0	250.0	256.2	350.0	391.3	460.0	500.0	500.0	550.0	600.0	650.0	700.0	750.0	800.0	801.1	0.0	50.0	77.97	100.0	136.19				
DISTANCE	0.0	4.9	22.6	27.4	13.3	36.7	50.0	50.0	3.8	50.0	41.3	8.7	50.0	50.0	49.7	50.0	48.3	50.0	48.2	50.0	10.1	0.0	50.0	27.97	22.03	36.19				
STATION	ND.0	ND.1	ND.2	ND.3	ND.4	ND.5	ND.6	ND.7	ND.8	ND.9	ND.10	ND.11	ND.12	ND.13	ND.14	ND.15	ND.16	ND.17	ND.18	ND.19	ND.20	ND.21	ND.22	ND.23	ND.24	ND.25				

THE REPUBLIC OF INDONESIA

THE BASIC DESIGN STUDY ON THE PROJECT
FOR CONSTRUCTION OF FACILITY FOR IRRIGATION
EASTERN AREA

LONG SECTION OF PIPELINE
NO.2 BONGO-II (1/2)

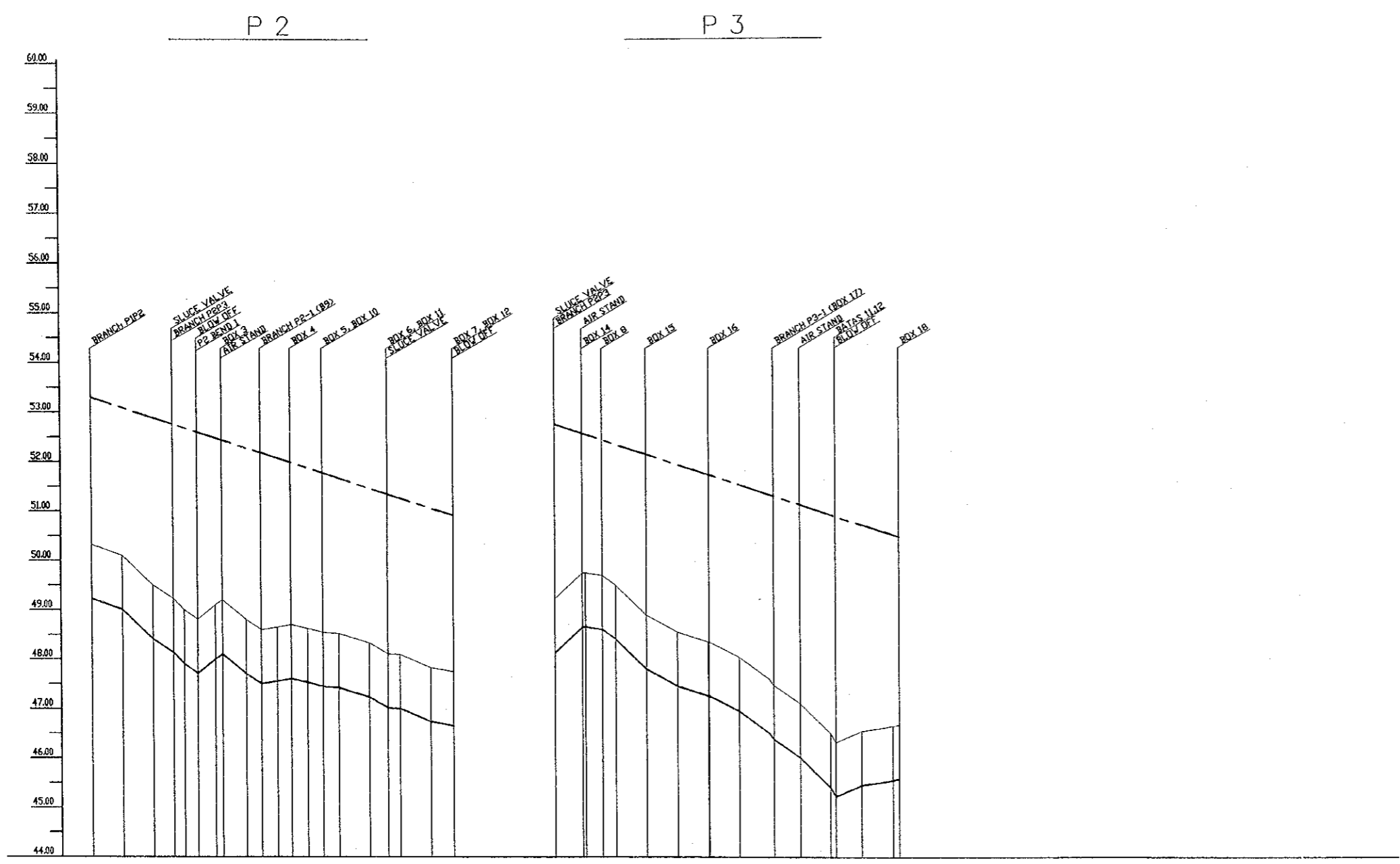
Date	No.	16
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JAPAN INTERNATIONAL COOPERATION AGENCY

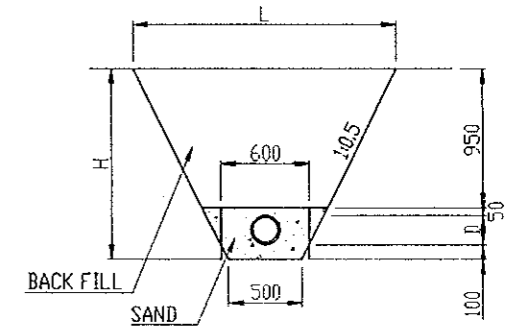
LONGITUDINAL SECTION

LEGEND

LINE	NAME
—	PIPE CENTER LEVEL
—	GROUND LEVEL
- - -	DYNAMIC WATER LEVEL



PIPE INSTALLATION



D	200	150
H	1300	1250
L	1800	1750

PIPE	Q = 0.030m ³ /s											Q = 0.030m ³ /s																								
	PVC ø = 200											PVC ø = 200																								
DYNAMIC WATER ELEVATION	53.29	53.09	52.88	52.75	52.68	52.59	52.48	52.27	52.18	52.07	51.98	51.87	51.77	51.66	51.46	51.34	51.25	51.06	50.91	52.75	52.57	52.35	52.43	52.34	52.14	51.94	51.73	51.53	51.30	51.12	50.96	50.72	50.51	50.47		
PIPE CENTER ELEVATION	49.22	49.00	48.40	48.13	47.90	47.71	47.60	47.50	47.35	47.23	47.10	47.00	47.00	46.73	46.65	46.33	46.11	46.00	46.00	48.13	48.65	48.65	48.60	48.40	47.73	47.45	47.25	46.94	46.50	46.32	46.45	45.55	45.58			
GROUND LEVEL	50.32	50.10	49.50	49.23	49.00	48.81	48.70	48.60	48.55	48.33	48.11	48.00	48.00	47.83	47.75	48.33	48.11	48.00	47.83	49.23	49.75	49.75	49.70	49.50	48.88	48.55	48.35	48.04	47.49	46.50	46.32	46.55	46.65	46.68		
ACCUMULATED DISTANCE	0.0	50.0	100.0	132.5	173.3	213.3	252.0	289.3	325.3	360.0	393.3	425.3	456.0	485.3	513.3	540.0	565.3	590.0	614.7	0.0	45.2	80.2	114.7	148.7	182.0	214.7	246.7	278.0	308.7	338.7	368.0	396.7	425.0	452.7	480.0	506.7
DISTANCE	0.0	50.0	100.0	32.5	73.3	113.3	150.0	185.3	219.3	252.0	283.3	313.3	342.0	369.3	395.3	420.0	443.3	465.3	486.0	0.0	45.2	90.2	134.7	178.7	222.0	264.7	306.7	347.0	386.7	425.0	461.7	497.0	531.0	563.7	595.0	625.0
STATION	ND.0	ND.1	ND.2	ND.3	ND.4	ND.5	ND.6	ND.7	ND.8	ND.9	ND.10	ND.11	ND.12	ND.13	ND.14	ND.15	ND.16	ND.17	ND.18	ND.0	ND.1	ND.2	ND.3	ND.4	ND.5	ND.6	ND.7	ND.8	ND.9	ND.10	ND.11					

THE REPUBLIC OF INDONESIA

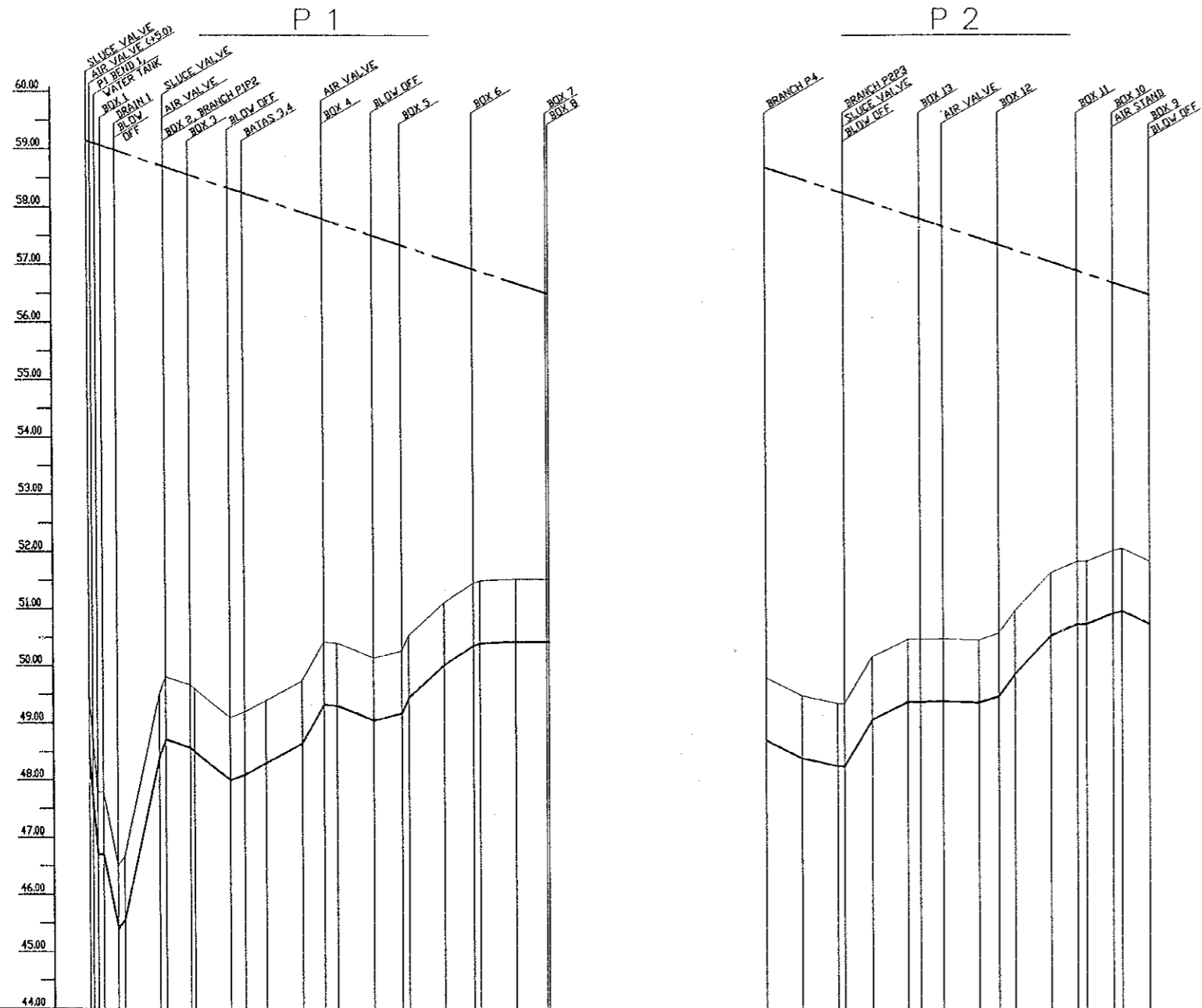
THE BASIC DESIGN STUDY ON THE PROJECT
FOR CONSTRUCTION OF FACILITY FOR IRRIGATION
EASTERN AREA

LONG SECTION OF PIPELINE
NO.2 BONGO-II (2/2)

Date		No.	17
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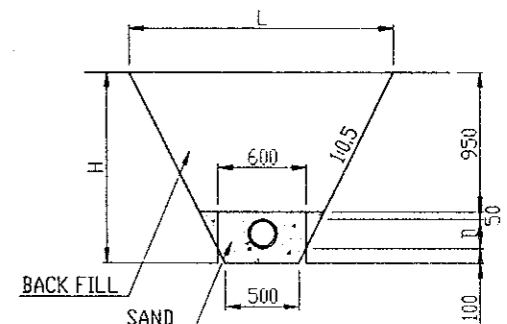
JAPAN INTERNATIONAL COOPERATION AGENCY

LONGITUDINAL SECTION



LEGEND	
LINE	NAME
—	PIPE CENTER LEVEL
- - -	GROUND LEVEL
· · ·	DYNAMIC WATER LEVEL

PIPE INSTALLATION



D	200	150
H	1300	1250
L	1800	1750

PIPE	Q = 0.030 m ³ /s												Q = 0.030 m ³ /s																								
	PVC # = 200												PVC # = 200																								
DYNAMIC WATER ELEVATION	59.64	59.76	59.88	59.99	59.85	59.73	59.65	59.52	59.32	59.24	59.12	58.91	58.69	58.49	58.28	58.24	58.08	57.87	57.80	57.67	57.46	57.35	57.26	57.06	56.85	56.74	56.51	56.30									
PIPE CENTER ELEVATION	48.38	48.70	48.70	48.40	48.57	48.00	48.10	48.30	48.65	48.33	48.30	49.05	49.17	49.40	49.09	49.40	49.40	49.41	49.39	49.51	49.90	50.57	50.77	50.78	50.78	50.78	50.77	50.77									
GROUND LEVEL	45.88	47.80	46.50	46.66	49.90	49.81	49.10	49.20	49.75	50.43	50.40	50.15	50.22	50.55	51.12	51.46	51.50	51.53	51.63	51.87	51.80	51.67	51.87	51.87	51.87	51.87	51.87	51.87	51.87								
ACCUMULATED DISTANCE	0.0	20.0	40.0	60.0	100.0	169.3	150.0	200.0	220.4	250.0	300.0	400.0	447.7	490.0	500.0	540.6	550.0	600.0	642.8	645.8	0.0	50.0	100.0	109.9	150.0	200.0	218.0	250.0	300.0	327.8	350.0	400.0	437.5	450.0	487.6	500.0	538.6
DISTANCE	0.0	20.0	40.0	60.0	100.0	169.3	150.0	200.0	220.4	250.0	300.0	400.0	447.7	490.0	500.0	540.6	550.0	600.0	642.8	645.8	0.0	50.0	100.0	109.9	150.0	200.0	218.0	250.0	300.0	327.8	350.0	400.0	437.5	450.0	487.6	500.0	538.6
STATION	ND.0	ND.1	ND.2	ND.3	ND.4	ND.5	ND.6	ND.7	ND.8	ND.9	ND.10	ND.11	ND.12	ND.13	ND.14	ND.15	ND.16	ND.17	ND.18	ND.19	ND.20	ND.21	ND.22	ND.23	ND.24	ND.25	ND.26	ND.27	ND.28	ND.29	ND.30	ND.31	ND.32	ND.33	ND.34	ND.35	ND.36

THE REPUBLIC OF INDONESIA

THE BASIC DESIGN STUDY ON THE PROJECT
FOR CONSTRUCTION OF FACILITY FOR IRRIGATION
EASTERN AREA

LONG SECTION OF PIPELINE
NO.3 BONGO-III (1/2)

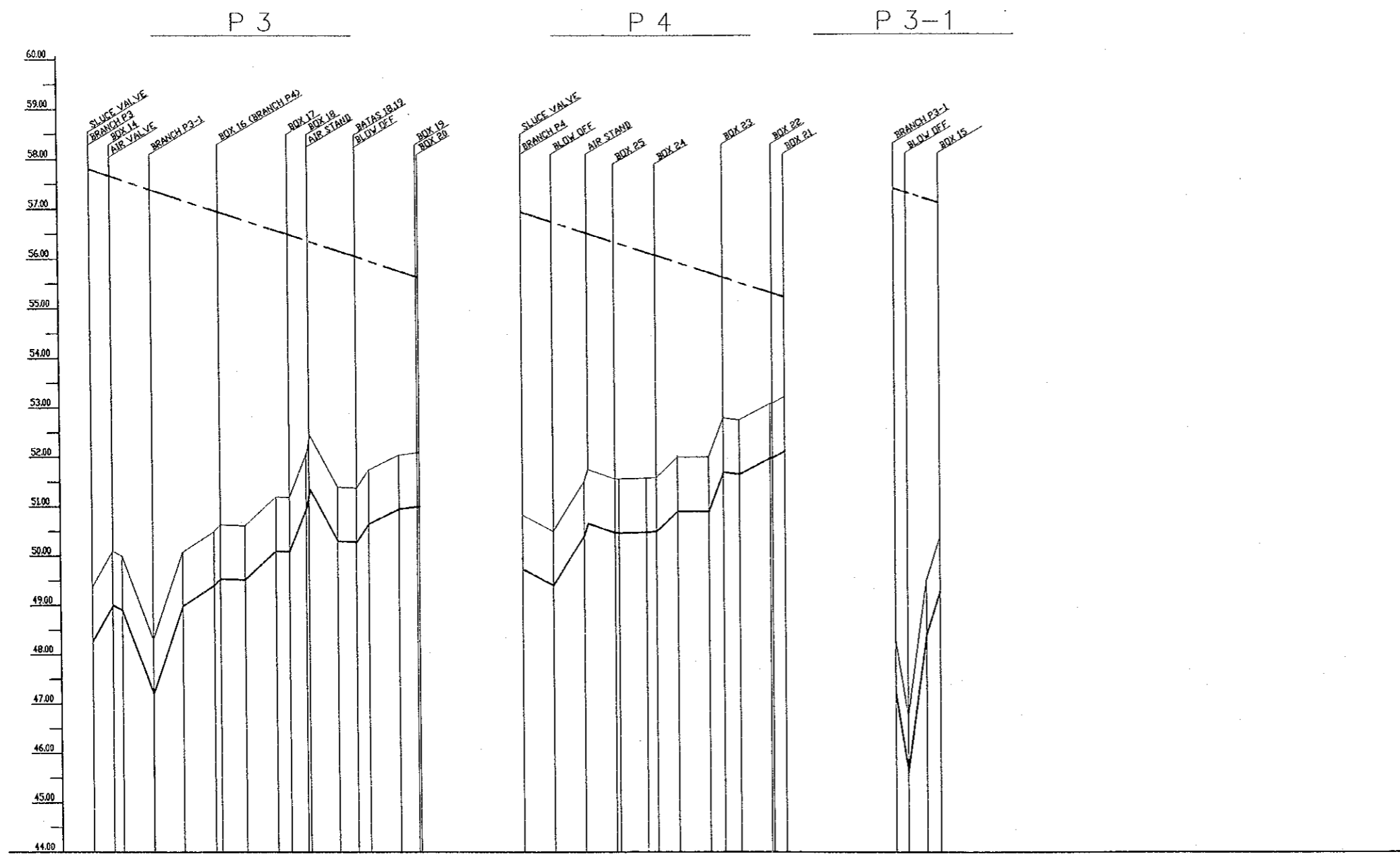
Date		No.	18
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JAPAN INTERNATIONAL COOPERATION AGENCY

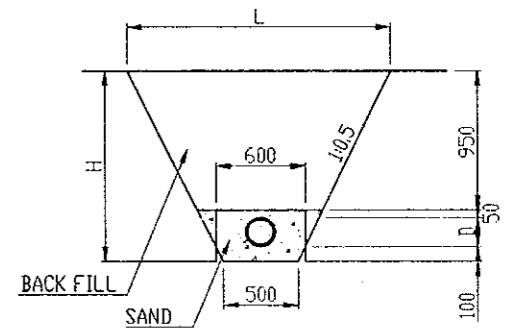
LONGITUDINAL SECTION

LEGEND

LINE	NAME
—	PIPE CENTER LEVEL
—	GROUND LEVEL
- - -	DYNAMIC WATER LEVEL



PIPE INSTALLATION



D	200	150
H	1300	1250
L	1800	1750

PIPE	Q = 0.030m ³ /s										Q = 0.030m ³ /s								Q = 0.030m ³ /s																	
	PVC φ = 200										PVC φ = 200								PVC φ = 200																	
DYNAMIC WATER ELEVATION	57.80	57.66	57.60	57.39	57.19	56.99	56.94	56.78	56.58	56.49	56.27	56.25	56.17	56.05	55.97	55.76	55.64	55.63	56.94	56.74	56.53	56.53	56.13	56.06	55.93	55.72	55.63	55.52	55.22	55.22	55.22	57.39	57.31	57.19	57.10	
PIPE CENTER ELEVATION	48.27	49.00	48.50	47.20	48.98	49.40	49.53	49.52	50.10	50.09	50.03	50.03	50.30	50.28	50.65	50.95	51.00	51.00	49.73	49.40	50.40	50.46	50.47	50.49	50.90	50.90	51.09	51.65	51.65	51.68	51.68	51.68	47.20	45.84	48.40	49.28
GROUND LEVEL	49.37	50.10	50.00	48.30	50.08	50.50	50.63	50.62	51.20	51.19	51.03	51.03	51.40	51.38	51.75	52.05	52.10	52.10	50.83	50.50	51.50	51.56	51.57	51.59	52.00	52.00	52.79	52.75	53.08	53.08	53.22	48.30	46.74	49.50	50.38	
ACCUMULATED DISTANCE	0.0	33.89	50.0	58.96	150.0	200.0	210.46	250.0	300.0	321.16	330.0	334.06	400.0	430.26	450.0	500.0	509.56	532.56	0.0	50.0	100.0	150.0	200.0	215.7	250.0	300.0	323.8	350.0	400.0	423.8	423.8	0.0	20.0	50.0	72.1	
DISTANCE	0.0	33.89	16.11	49.96	50.0	10.46	39.54	50.0	21.16	20.94	4.86	45.94	30.26	19.74	50.0	29.56	3.0	0.0	0.0	50.0	50.0	43.7	50.0	15.7	34.3	50.0	23.8	26.2	50.0	26.2	0.0	20.0	30.0	22.1		
STATION	ND.0	ND.1	ND.2	ND.3	ND.4	ND.5	ND.6	ND.7	ND.8	ND.9	ND.10	ND.11	ND.12	ND.13	ND.14	ND.15	ND.16	ND.17	ND.18	ND.19	ND.20	ND.21	ND.22	ND.23	ND.24	ND.25	ND.26	ND.27	ND.28	ND.29	ND.30	ND.31	ND.32	ND.33		

THE REPUBLIC OF INDONESIA

THE BASIC DESIGN STUDY ON THE PROJECT
FOR CONSTRUCTION OF FACILITY FOR IRRIGATION
EASTERN AREA

ND.3 BONGO-III (2/2)

Date	No.	19
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JAPAN INTERNATIONAL COOPERATION AGENCY