

3. Telegraph

As mentioned earlier in this report, this project is divided into Phase 1 and Phase 2. In Phase 1, telex exchange will be installed in the main portion of the telex network, that is in Baguio (Benguet) and Tuguegarao (Cagayan) and a telex concentrator in San Fernando (La Union). In Phase 2, telex concentrator will be installed in Laoag (Ilocos Norte), Vigan (Ilocos Sur), Dagupan (Pagasinan), Ilagan (Isabela), Santiago (Isabela), and Bayombong (Nueva-Vizcaya).

In order to compensate the blank interval between Phase 1 and Phase 2, Gentex stations will be installed in Phase 1 at offices where telex concentrator is expected to be installed in Phase 2. These Gentex stations will be connected to a telex exchange in the respective regions. By this, it is intended that the telegraph network to be established newly can contribute to telegram service as soon as possible.

Table VIII-3-1 shows the outline of installation plan in this project.

The plan is based on not only the idea as mentioned but the following items

- (1) Exchanges and concentrator, which are installed in Phase 1 will be planned to fully meet the demand by 1990 in order to avoid dual installation work for short period.
- (2) 61 Gentex stations, which are central towns of respective areas, are chosen out of the demand to be installed in this project.
- (3) The number of telex terminal equipment to be planned in this project is as follows.

75 sets in Phase 1

75 sets in Phase 2

They include telex terminal equipment for Gentex stations.

Table VIII-3-1 Installation Plan of Telegraph Facilities

Phase	Exchange (capacity)	Concentrator (capacity)	Gentex		Transmission System	Remarks
			Gentex Station	Number of Positions		
Phase 1	Baguio (480L)	-	Laoag	3	Carr.	They changes into concentrator in Phase 2.
			Vigan	2	"	
			Dagupan	3	"	
			Bangued	1	"	Accomodation changes into Vigan Conc. in Phase 2.
			La Trinidad	1	Cable	
			-	5	Cable	(Baguio Gentex positions)
		San Fernando (60L)	Bauang	1	Cable	
			Agoo	1	"	
		-	3	-	(San Fernando Gentex positions)	
	Tuguegarao (200L)	-	Ilagan	3	Carr.	They change into concentrator in Phase 2.
			Santiago	3	"	
			Bayombong	3	"	
			Aparri	3	"	
			Cabarroguis	1	"	Accomodation changes into Santiago Conc. in Phase 2.
Tuguegarao Capitol			1	Cable		
-			3	-	(Tuguegarao Gentex positions)	
Total	2 (680L)	1 (60L)	13	37	-	Total
Phase 2	Banguio	Laoag (60L)	Batac	1	Carr.	
			Dingras	1	"	
			-	3	-	
		Vigan (60L)	Narvacan	1	Carr.	
			Candon	1	"	
			(Bangued)	(1)	Carr.	Accomodation changes from Baguio Ex.
			-	3	-	(Vigan Gentex positions)

Phase	Exchange (capacity)	Concentrator (capacity)	Gentex		Transmission System	Remarks		
			Gentex Station	Number of Positions				
Phase 2	Baguio	Dagupan (100L)	Alaminos	1	Carr.			
			Lingayen	1	Cable			
			San Carlos	1	"			
			Urdaneta	3	"			
		-	3	-	(Dagupan Gentex positions)			
		Bontoc	1	Carr.				
	-	1	-	Extended Baguio Gentex positions				
	Tuguegarao	-	-	Sanchez-Mira	1	Carr.		
				Tuao	1	"		
				Alcala	1	"		
				Tabuk	3	"		
				Basco	1	"		
		Iligan (40L)	-	-	Naguilian	1	"	
					Iligan Capitol	1	Cable	
					-	3	-	(Iligan Gentex positions)
		Santiago (40L)	-	-	(Cabarroguis)	(1)	Carr.	Accomodation changes from Tuguegarao Ex.
					Echague	1	"	
					-	3	-	(Santiago Gentex positions)
		Bayombong (40L)	-	-	Bambang	1	Carr.	
					Banaue	1	Carr.	
					-	3	-	(Bayombong Gentex positions)
	Total		6 (340L)	19	42	-	Total	
	Total after completion of Phase 2		2 (680L)	7 (400L)	26	62		

3-1 Installation Plan in Phase 1

Fig. VIII-3-1 shows the scales and circuit configuration of the respective station to be established in Phase 1 by means of block diagrams.

(1) Construction of telex exchanges and concentrators

In Phase 1, a telex exchange will be constructed in Baguio and Tuguegarao and a telex concentrator in San Fernando. These exchange facilities will fully meet the demand to be made by 1990. Telex exchange terminal numbers are smaller than telephone exchange one. Thus if telex facilities sufficient for meeting the demand by 1985 are installed in Phase 1 and another facilities for meeting the demand by 1990 will be installed in Phase 2 for expansion, considerable disadvantages will be involved in installation work, existing service, etc. Accordingly, it is recommended to install as big exchanges and concentrators as will be required to meet to demand by 1990 in Phase 1 although the initial investment may be somehow large.

(2) Construction of carrier telegraph equipment

All that is required for trunk lines in Phase 1 is to install facilities so as to meet the demand by 1987. Facilities for trunk lines to meet the demand by 1990 will be installed in Phase 2. Of course, as many frames for equipment, MDF, IDF, etc., as will cover Phase 2 will be installed in Phase 1 from the standpoint of the efficiency of installation. The telex network to be established in Phase 1 is a tentative network to be used before Phase 2 is completed.

The number of carrier telegraph equipment to be required in Phase 1 is given in Table VIII-3-2.

(3) Construction of telegraph cables

Table VIII-3-2(2) shows the installation plan of telegraph cable. When the Gentex line is made of a cable, carrier system will not be employed in this project. Since the distance between San Fernando and Agoo is as long as 33 km, it is necessary either to install a repeater at Caba station on the way, cause double current to pass between San Fernando and Caba, and cause single current to pass between Caba and Agoo or to introduce single-current method by reducing the DC resistance of the line between San Fernando and Agoo through use of a pair of cables in the section.

(4) The other

In Phase 1, Bangued station (Abra) and Gabarroguis station (Quirino) will be constructed as Gentex stations of Baguio and Tuguegarao exchange respectively. These stations will be accommodated in the telex concentrators at Vigan and Santiago respectively in Phase 2.

LEGEND

- 2-5 ——— Equipment
- Demand
- : Telex Ex. or Telex Conc.
- : Gentex Station
- : Repeater Station
- ==== : Trunk Line(carr. teleg.)
- : Gentex Line(carr. teleg.)
- - - : Gentex Line(cable)
- - 2 - : Number of Gentex positions

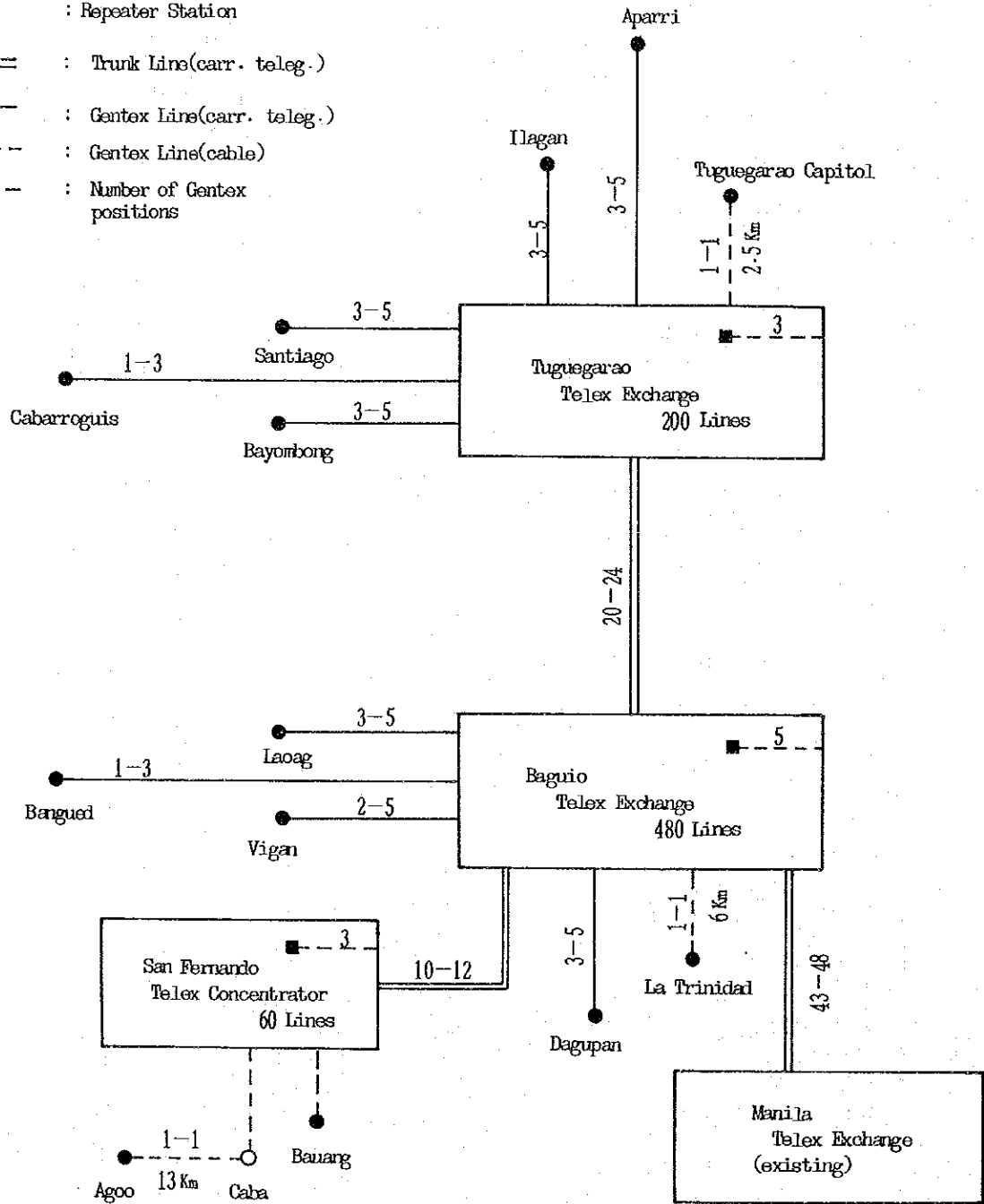


Fig.VIII-3-1 Installation of Telegraph Lines in Phase 1

Table VIII-3-2 Installation Plan of Transmission Facilities in Phase 1

(1) Carrier Telegraph Equipment

Station	Kind of Line	Connected Party	To or From Connected Party	Number of Lines Required	Number of Carr. Teleg. Sets	Remarks
Manila Ex.	Trunk	Baguio Ex.	To	19	24 ^{ch} x 2	Manila: Existing Ex.
			From	24		
Baguio Ex.	Trunk	Manila Ex.	To	24	24 ^{ch} x 2	
			From	19		
		Tuguegarao Ex.	To	9	24 ^{ch} x 1	
			From	11		
	San Fernando Conc.		BW	12	12 ^{ch} x 1	
	Laoag Gen.		"	3	5 ^{ch} x 1	
	Vigan Gen.		"	2	5 ^{ch} x 1	
	Dagupan Gen.		"	3	5 ^{ch} x 1	
Bangued Gen.		"	1	3 ^{ch} x 1		
Tuguegarao Ex.	Trunk	Baguio Ex.	To	11	24 ^{ch} x 1	
			From	9		
	Aparri Gen.		BW	3	5 ^{ch} x 1	
	Ilagan Gen.		"	3	5 ^{ch} x 1	
	Santiago Gen.		"	3	5 ^{ch} x 1	
	Bayombong Gen.		"	3	5 ^{ch} x 1	
Cabarroguis Gen.		"	1	3 ^{ch} x 1		
San Fernando Conc.	Trunk	Baguio Ex.	"	10	12 ^{ch} x 1	
Laoag Gen.	Gentex	"	"	3	5 ^{ch} x 1	
Vigan Gen.	"	"	"	2	5 ^{ch} x 1	
Dagupan Gen.	"	"	"	3	5 ^{ch} x 1	
Bangued Gen.	"	"	"	1	3 ^{ch} x 1	
Aparri Gen.	"	Tuguegarao Ex.	"	3	5 ^{ch} x 1	
Ilagan Gen.	"	"	"	3	5 ^{ch} x 1	
Santiago Gen.	"	"	"	3	5 ^{ch} x 1	
Bayombong Gen.	"	"	"	3	5 ^{ch} x 1	
Cabarroguis Gen.	"	"	"	1	3 ^{ch} x 1	
Total	Number of Carr. Teleg. Sets			24 ^{ch} x 6		
				12 ^{ch} x 2		
				5 ^{ch} x 14		
				3 ^{ch} x 4		

(2) Cable

Section	Distance	Number of Lines	Remarks
Baguio(Ex.) - La Trinidad(Gen.)	6 Km	1	Telegraph cable is installed.
San Fernando(Conc.) - Bauang(Gen.)	10 Km	1	"
" - Agoo(Gen.)	33 Km	1	"
Tuguegarao(Ex.) - Tuguegarao Capitol(Gen.)	2.5 Km	1	The existing cable is used.

3-2 Installation Plan in Phase 2

The scales and circuit configuration of stations to be constructed in Phase 2 are shown in Fig. VIII-3-2 by block diagrams.

(1) Construction of telex concentrators

The major items of installation in Phase 2 are installation of telex concentrators.

The 6 stations where telex concentrators will be installed will be connected to a telex exchange in the relevant regions to operate as Gentex stations in Phase 1.

(2) Construction of carrier telegraph equipment

The number of carrier telegraph equipment to be required in Phase 2 is given in Table VIII-3-3.

In connection with Item (1), the 5-channel carrier telegraph equipment, which will have been used for old Gentex stations, will be transferred to such stations that are expected to be connected to telex exchanges or telex concentrators to operate as new Gentex stations, which require 5-channel carrier equipment.

(3) Construction of telegraph cable

Table VIII-3-3(2) shows the installation plan of telegraph cable.

Of those sections using cables for telegraph lines, the Dagupan-Urdaneta section is as long as 33 km. In this section, point-to-point circuits have been operating by using teleprinters.

Accordingly, it is advantageous to connect the Gentex station at Urdaneta to Dagupan by the existing circuit. However, in case the existing circuit can not be used, it is necessary to provide a circuit for Gentex use by using a pair of cables for reducing the circuit resistance.

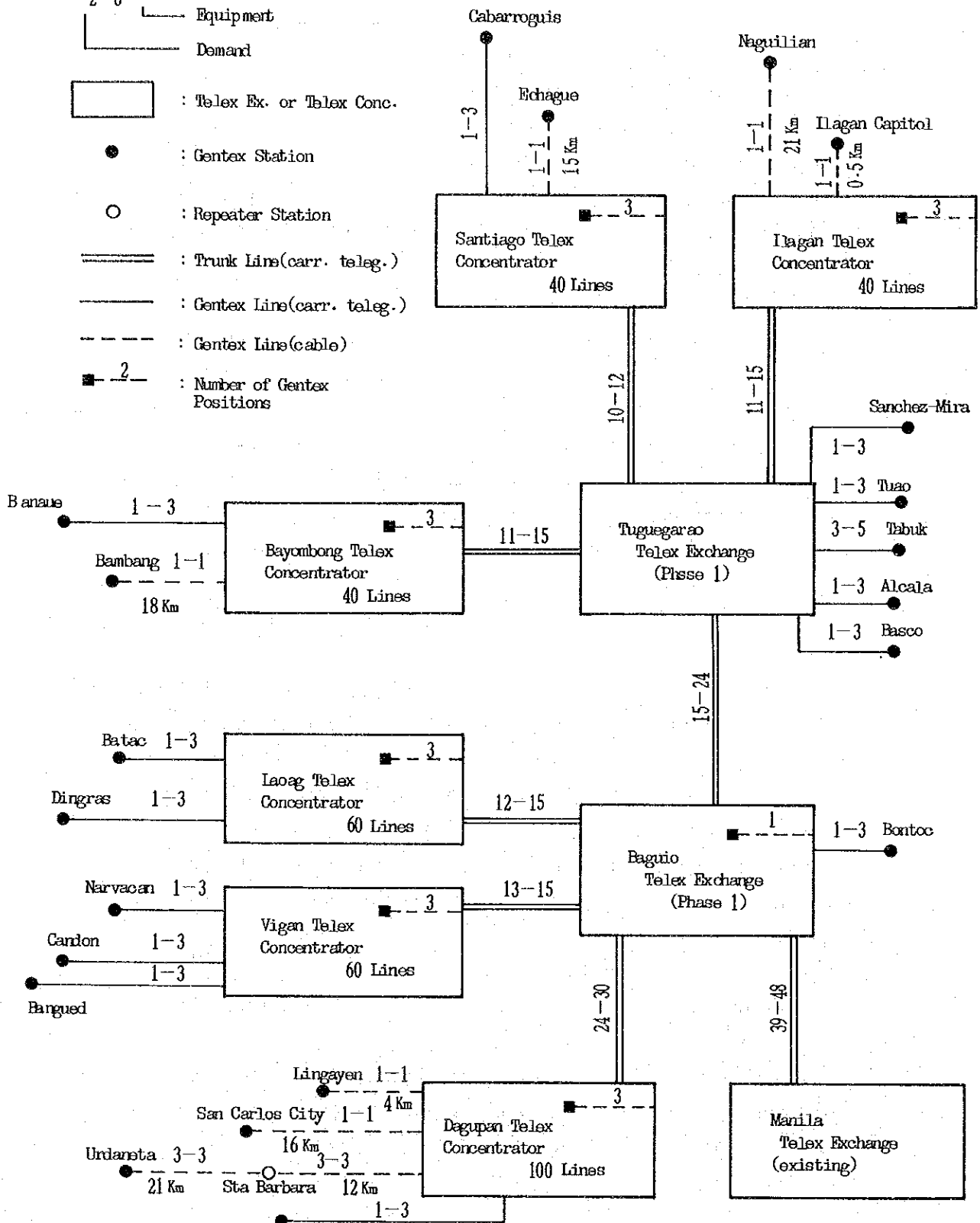
The Ilagan-Naguilian section is as long as 21 km and will require reduction of the DC resistance of the line by using a pair of cables.

(4) The other

Bangued and Cabarroguis telegraph offices established as Gentex stations in Phase 1 will be change accomodation in to concentrators at Vigan and Santiago, respectively in Phase 2.

LEGEND

- 2-6 — Equipment
- └── Demand
- : Telex Ex. or Tblex Conc.
- : Gentex Station
- : Repeater Station
- ══ : Trunk Line(carr. teleg.)
- : Gentex Line(carr. teleg.)
- - - : Gentex Line(cable)
- 2 : Number of Gentex Positions



ALAMINOS

Fig. VIII-3-2 Installation of Telegraph Lines in Phase 2

Table VIII-3-3 Installation Plan of Transmission Facilities in Phase 2

(1) Carrier Telegraph Equipment

Station	Kind of Line	Connected Party	To or From Connected Party	Number of Lines Required	Number of Carr. Teleg. Sets	Remarks
Manila Ex.	Trunk	Baguio Ex.	To	17	24 ^{ch} _{x2}	Extension
			From	22		
Baguio Ex.	Trunk	Manila Ex.	To	22	24 ^{ch} _{x2}	Extension
			From	17		
		Tuguegarao Ex.	To	7	24 ^{ch} _{x1}	
			From	8		
		Laoag Conc.	BW	12	15 ^{ch} _{x1}	
		Vigan Conc.	"	13	15 ^{ch} _{x1}	
	Dagupan Conc.	"	24	15 ^{ch} _{x2}		
SUB. (Gentex)	Bontoc Gen.	"	1	3 ^{ch} _{x1}		
Tuguegarao Ex.	Trunk	Baguio Ex.	To	8	24 ^{ch} _{x1}	Extension
			From	7		
		Ilagan	BW	11	15 ^{ch} _{x1}	
		Santiago Conc.	"	10	15 ^{ch} _{x1}	
	SUB. (Gentex)	Bayombong Conc.	"	11	15 ^{ch} _{x1}	
		Sanchez-Mira Conc.	"	1	3 ^{ch} _{x1}	
		Tuao Gen.	"	1	3 ^{ch} _{x1}	
		Alcala Gen.	"	1	3 ^{ch} _{x1}	
		Tabuk Gen.	"	3	5 ^{ch} _{x1}	
Basco Gen.	:	1	3 ^{ch} _{x1}			
Laoag Conc.	Trunk	Baguio Ex.	"	12	15 ^{ch} _{x1}	
	SUB. (Gentex)	Batac Gen.	"	1	3 ^{ch} _{x1}	
		Dingras Gen.	"	1	3 ^{ch} _{x1}	
Vigan Conc.	Trunk	Baguio Ex.	"	13	15 ^{ch} _{x1}	
	SUB. (Gentex)	Narvacan Gen.	"	1	3 ^{ch} _{x1}	
		Candon Gen.	"	1	3 ^{ch} _{x1}	
Dagupan Conc.	Trunk	Baguio Ex.	"	24	15 ^{ch} _{x2}	
	SUB. (Gentex)	Alaminos Gen.	"	1	3 ^{ch} _{x1}	
Ilagan Conc.	Trunk	Tuguegarao Ex.	"	11	15 ^{ch} _{x1}	

Station	Kind of Line	Connected Party	To or From Connected Party	Number of Lines Required	Number of Carr. Teleg. Sets	Remarks	
Santiago Conc.	Trunk	Tuguegarao Ex.	BW	10	15 ^{ch} x1		
Bayombong Conc.	"	Tuguegarao Ex.	"	11	15 ^{ch} x1		
	SUB. (Gentex)	Banaue Gen.	"	1	3 ^{ch} x1		
Bontoc Gen.	"	Baguio Ex.	"	1	3 ^{ch} x1		
Sanchez Mira Gen.	"	Tuguegarao Ex.	"	1	3 ^{ch} x1		
Tuao Gen.	"	"	"	1	3 ^{ch} x1		
Alcala Gen.	"	"	"	1	3 ^{ch} x1		
Tabuk Gen.	"	"	"	3	5 ^{ch} x1		
Basco Gen.	"	"	"	1	3 ^{ch} x1		
Batac Gen.	"	Laoag Conc.	"	1	3 ^{ch} x1		
Dingras Gen.	"	"	"	1	3 ^{ch} x1		
Narvacan Gen.	"	Vigan Conc.	"	1	3 ^{ch} x1		
Candon Gen.	"	"	"	1	3 ^{ch} x1		
Alaminos Gen.	"	Dagupan Conc.	"	1	3 ^{ch} x1		
Banaue Gen.	"	Bayombong Conc.	"	1	3 ^{ch} x1		
Total	Number of Carr. Teleg. Sets			24 ^{ch} x 6	15 ^{ch} x 14	5 ^{ch} x 2	3 ^{ch} x 22

(2) Cable

Section	Distance	Number of Lines	Remarks
Dagupan(Conc.) - Lingayen(Gen.)	15 Km	1	Leased line from private operator.
" - San Carlos(Gen.)	16 Km	1	"
" - Urdaneta(Gen.)	33 Km	3	"
Iligan(Conc.) - Iligan Capitol(Gen.)	2.5 Km	1	The existing cable is used.

4. Outside Plant

4-1 Local Lines

The subscriber's line facilities of this project are modeled in Fig. VIII-4-1-1 on the basis of the transmission engineering standard, design standard, and design principles. The total length of subscriber's line facilities is estimated by obtaining the product of the average cable length of each station and the number of stations to be installed. Offices expected to be introduced in Phase 1 (of which service is expected to be started in 1982) are given in Table VIII-4-1-1. Offices expected to be introduced in Phase 2 (of which service is expected to be started in 1985) are given in Table VIII-4-1-2. Lengths of the respective model office scales are as follows.

800T Office:	30 km
700T Office:	26 km
600T Office:	22 km
500T Office:	19 km
300T Office:	13 km
200T Office:	9 km
IPTS:	3 km

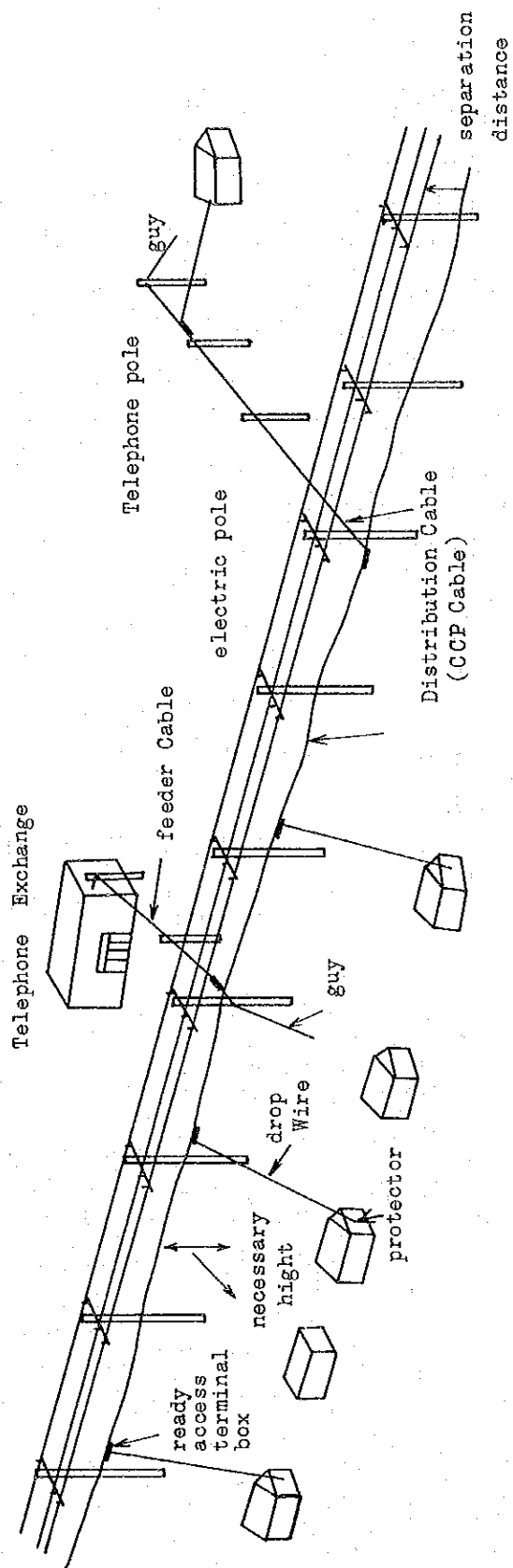


Fig. VIII-4-1-1 Subscriber Line System

Table VIII-4-1-1

Phase	Number of Terminals PC	L S						IPTS
		800L	700L	600L	500L	300L	200L	
I	Laoag	Batac				Dingras	Paoay Sarrat	Pasuquin, Piddig, Espiritu, Currimao
	Vigan			Bangued			Cabugao Narvacan Tagudin	Sto. Domingo, Santa, Sta Maria
	Baguio						Bontoc	
	Dagupan		Binalonan		Alaminos		San Fabian	Mapandan, San Jacinto, San Quintin
	Bayombong						Banbang	Banaue
	Iligan					San Matao	Tumauini Alicia Cabarroguis	Callang
	Tuguegarao						Enrile	Ballesteros, Tuao, Sanchez Mira, Gonzaga, Lal-lo, Claveria Basco
	No. of Offices	1	1	1	1	2	13	19 (38)

(The value in the parenthesis indicates
the total number.)

Table VIII-4-1-2

Phase	Number of Terminals PC	L S						IPTS
		200L	700L	600L	500L	300L	200L	
2	Laoag					Badoc	Pagudpud Vintar Pinili Solsona	Bangui, Marcos, Burgos, Nueva Era
	Vigan						Magsingal Sinait	Caoayan, Sta. Lucia
	Baguio					Mankayan		Bokod, Sagada
	Dagupan						Bolinao Bani Urbiztondo	Aguilar, Sto. Tomas
	Binalonan						Sison Asingan Alcala San nicolas Sta Maria	Balungao, Bautista Natividad
	Bayombong						Aritao Bagabag Dupaxdel Sur	Dupax del Norte, Mayoyao Kiangan, Sta. Fe
	Ilagan						San Mariano Angadanan Gamu Naguilian Diffun	Jones, Mallig, San Augustin, Cabagan, Aurora, Maddela
	Tuguegarao						Baggao Alcala	Abulug, Buguey, Camalaniugan, Piat, Lazam, Faire, Kabugao, Lubuagan
	No. of Offices					2	24	31 (57)
	Total	1	1	1	1	4	37	50 (95)

(The values in parentheses indicate the total numbers.)

Then, the major items of installation in Phase 1 are as follows.

Region I	Cable installation:	203km
	Pole installation:	833 poles
Region II	Cable installation:	94km
	Pole installation:	379 poles
Total	Cable installation:	297km
	Pole installation:	1,212 poles

The major items of installation in Phase 2 are as follows.

Region I	Cable installation:	191km
	Pole installation:	779 poles
Region II	Cable installation:	144km
	Pole installation:	578 poles
Total	Cable installation:	335km
	Pole installation:	1,357 poles



A member of the team is explaining an outline of the survey for the mayor of Lingayen



Members of the team are on the way of survey at Sual hill

4-2 Toll Lines

The toll telephone line configuration proposed on the basis of the calculation standards, design standard, and design principles is shown in Fig. VIII-4-2-1-1/7~7/7.

The overall toll cable section plan is shown in Fig. VIII-4-2-2.

By these, the items of installation of Phase 1 can be estimated as follows.

	<u>Item to be installed</u>	<u>No. of Sections</u>	<u>Total Length</u>
Region I	Toll telephone cable	19	91.3km
	Toll telegraph wire	3	39.0km
Region II	Toll telephone cable	10	70.0km
	Toll telegraph wire	1	2.5km
Total	Toll telephone cable	29	161.3km
	Toll telegraph wire	4	41.5km

The items of installation of Phase 2 can be estimated as follows.

	<u>Item to be installed</u>	<u>No. of Sections</u>	<u>Total Length</u>
Region I	Toll telephone cable	20	124.5km
	Toll telegraph wire	-	-
Region II	Toll telephone cable	18	113.7km
	Toll telegraph wire	1	15km
Total	Toll telephone cable	39	239.0km
	Toll telegraph wire	1	15km

4-3 Terminal Facilities

Terminal facilities comprises the outside wire ranging from the terminal box to subscriber's gap arrester, interior wire ranging from subscriber's gap arrester, interior wire ranging from subscriber's gap arrester to the rosette of the telephone, the telephone code from the rosette to the telephone, and the telephone.

The number of terminal facilities to be installed in this project is equal to the number of applications for the subscription of telephone in both phases 1 and 2 and can be estimated as follows.

Phase 1 (Service to be started in 1982)	Region I	2,880
	Region II	865
	<u>Total:</u>	3,445
Phase 2 (Service to be started in 1985)	Region I	1,735
	Region II	1,285
	<u>Total:</u>	3,020

Trunk Cable Plan (Region I)

Section	No. of Trunks	No. of Cable Pair	Cable Distance	Line Configuration	Phase
BANGUI -- PAGUDPUD IPTS LS	14	14	5.5 KM	IPTS --- 0.65 PEF-P LC --- LS	2
LAOAG -- BACARRA PC LS	26	28	7.5	PC --- 0.65 PEF-P LC --- LS	2
LAOAG -- VINTAR PC LS	18	28	8.5	PC --- 0.65 PEF-P LC --- LS	2
LAOAG -- LAOAG PC MC	88	100	4.0	PC --- 0.65 PEF-P NL --- MC	1
LAOAG -- SARRAT PC LS	17	28	11.0	PC --- 0.65 PEF-P LC --- LS	1
DINGRAS -- SOLSONA LS	14	14	9.1	LS --- 0.65 PEF-P LC --- LS	2
DINGRAS -- MARCOS LS IPTS	3	8	7.6	LS --- 0.65 PEF-P LC --- IPTS	2
ESPIRITU -- ESPIRITU RS IPTS	3	10	0.6	RS --- 0.5 NL --- IPTS	2
ESPIRITU -- NUEVA ERA RS IPTS	3	8	8.1	RS --- 0.65 PEF-P LC --- IPTS	2
BATAC -- PAOAY LS	21	28	5.3	LS --- 0.65 PEF-P LC --- LS	1
CRRIMAO -- CRRIMAO RS IPTS	3	8	0.5	RS --- 0.5 NL --- IPTS	1

IROCOS NORTE

Fig. VIII-4-2-1-1/7

Trunk Cable Plan (Region I)

Section	No. of Trunks	No. of Cable Pair	Cable Distance	Line Configuration
SINAIT --- BADOCS RS LS	21	28	6.1 KM	0.65 PEF-P LC RS LS
SINAIT --- SINAIT RS LS	14 (31)	28	3.9	0.65 PEF-P NL RS LS
SINAIT --- CABUGAO LS LS	17	28	10.1 (14.0)	0.65 PEF-P NL BOTH WAY Rep SINAIT CABUGAO RS LS LS
VIGAN --- STO. DOMINGO PC IPTS	3 (18)	28	9.5	0.65 PEF-P LC PC IPTS
STO. DOMINGO --- MAGSINGAL IPTS LS	15	14	5.8 (15.3)	0.65 PEF-P LC BOTH WAY Rep VIGAN STO. DOHINGO MAGSINGAL PC IPTS LS
VIGAN --- VIGAN PC LS	75	100	0.8	0.5 NL PC LS
VIGAN --- CAOYAN PC IPTS	3	8	3.9	0.65 PEF-P NL PC IPTS
NARVACAN --- STA. MARIA LS IPTS	3	8	6.1	0.65 PEF-P LC LS IPTS
CANDON --- CANDON RS LS	37	50	0.8	0.5 NL RS LS
CANDON --- STA. LUCIA RS IPTS	3	8	10.2	0.65 PEF-P LC RS IPTS
TAGUDIN --- TAGUDIN RS LS	14	14	3.3	0.65 PEF-P NL RS LS

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Fig. VIII-4-2-1-2/7

Trunk Cable Plan (Region I)

Section	No. of Trunks	No. of Cable Pair	Cable Distance	Line Configuration	Phase I
BONTOC -- BONTOC RS LS	14	14	1.5 KM	○ RS — 0.5 NL — ○ LS	1
SAGADA -- SAGADA RS IPTS	3	8	0.8	○ RS — 0.5 NL — ○ IPTS	2
MANKAYAN -- MANKAYAN RS LS	21	28	1.5	○ RS — 0.5 NL — ○ LS	2
BOKOD -- BOKOD RS IPTS	3	8	2.0	○ RS — 0.5 NL — ○ IPTS	2
BAGUIO -- LA TRINIDAD SC MC	1	2	6.0	○ SC — 0.9 SD Wire — ○ MC	1
BAGUIO -- BAGUIO SC MC	200	200	2.6	○ SC — 0.65 PEF-P NL — ○ MC	1
SAN-FERNAND -- BAUANG MC MC	1 (2)	2	10.0	○ MC — 0.9 SD Wire — ○ MC	1
BAUANG -- AGOO MC MC	1	2	23.0 (33.0)	○ MC — 0.9 SD Wire — ○ MC	1
BUGALLON -- AGUILAR RS IPTS	3	8	8.3	○ RS — 0.65 PEF-P LC — ○ IPTS	2
ALCALA -- BAUTISTA LS IPTS	3	8	7.9	○ LS — 0.65 PEF-P LC — ○ IPTS	2
MR. PROVINCE					
BENGUET					
LA UNION					
PANGASINAN					

Fig. VIII-4-2-1-3/7

Trunk Cable Plan (Region I)

Section	No. of Trunks	No. of Cable Pair	Cable Distance	Line Configuration
DAGUPAN -- DAGUPAN PC MC	74	100	2.0	0.5 NL PC --- MC
DAGUPAN -- (MANGALDAN) PC JUNCTION POINT	(42)	54	8.5	
(MANGALDAN) --- SAN FABIAN LS	19	28	7.2 (15.7)	0.65 PEF-P LC BOTH WAY Rep DAGUPAN MANGALDAN SAN FABIAN
(MANGALDAN) --- SAN JACINTO IPTS	3	8	3.5 (12.0)	0.65 PEF-P LC BOTH WAY Rep DAGUPAN MANGALDAN SAN JACINTO
(MANGALDAN) -- (GUE SANGEN) JUNCTION POINT	(20)	28	5.7 (14.2)	
(GUESANGEN) -- MAPANDAN IPTS	3	8	5.0 (19.2)	0.65 PEF-P LC BOTH WAY Rep DAGUPAN MANGALDAN GUESANGEN MAPANDAN
(GUESANGEN) -- STA BARBARA LS	17	28	4.4 (18.6)	0.65 PEF-P LC BOTH WAY Rep DAGUPAN MANGALDAN GUESANGEN STA BARBARA
BINALONAN -- POZZORUBIO PC LS	27	28	10.7	0.65 PEF-P LC PC --- LC
BINALONAN -- ASINGAN PC LS	20	28	10.5	0.65 PEF-P LC PC --- LC
SAN NICOLAS -- NATIVIDAD LS IPTS	3	8	5.5	0.65 PEF-P LC LS --- IPTS

PANGASTINAN

Fig. VIII-4-2-1-4/7

Trunk Cable Plan (Region II)

Section	No. of Trunks	No. of Cable Pair	Cable Distance	Line Configuration	Phase
SANCHEZMIRA -- CLAVERIA IPTS	3	8	24.3 KM	0.65 PEF-P NL END Rep IPTS	1
BALLESTEROS -- ABURUG IPTS	3	8	7.8	0.65 PEF-P LC IPTS	2
APARRI -- APARRI RS MC	3	6	2.5	0.65 SD Wire RS MC	1
GONZAGA -- GONZAGA RS IPTS	3	8	0.5	0.5 NL RS IPTS	1
LAL-LO -- CAMALANIUGAN IPTS	3	8	10.5	0.65 PEF-P LC IPTS	2
TUGUEGARAO -- TUGUEGARAO PC MC	83	100	2.5	0.65 PEF-P NL PC MC	1
TUGUEGARAO -- (BRANCH POINT) PC	(38)	54	3.6		1
(BRANCH POINT) -- SOLANA LS	21	28	5.6 (9.2)	0.65 PEF-P LC TUGUEGARAO BRANCH POINT SOLANA	1
(BRANCH POINT) -- ENRILE LS	17	28	8.4 (12.0)	0.65 PEF-P LC TUGUEGARAO BRANCH POINT ENRILE	1
KABUGAO -- KABUGAO RS IPTS	3	10	0.5	0.5 NL RS IPTS	2
LUBUAGAN -- LUBUAGAN RS IPTS	8	10	1.0	0.5 NL RS IPTS	2

CAGAYAN

Trunk Cable Plan (Region II)

Section	No. of Trunks	No. of Cable Pair	Cable Distance	Line Configuration	Phase	
ISABELA	ILAGAN -- ILAGAN PC MC	41	54	4.0 KM	0.65 PEF-P NL PC MC	1
	ILAGAN --- GAMU PC LS	15 (31)	28	14.4	0.65 PEF-P LC BOTH WAY Rep PC LS	2
	GAMU --- NAGUILIAN LS LS	16	14	4.0 (18.4)	0.65 PEF-P LC BOTH WAY Rep ILAGAN GAMU NAGUILIAN	2
SAN MARIANO -- SAN MARIANO RS LS	20	20	0.8	0.5 NL RS LS	2	
ALICIA -- ANGADANAN LS LS	15	14	6.9	0.65 PEF-P LC LS LS	2	
SAN MANUEL -- AURORA IPTS IPTS	3	8	4.3	0.65 PEF-P NL IPTS IPTS	2	
SANTIAGO -- ECHAGUE LS MC	1	2	15.0	0.9 SD Wire LS MC	2	
JONES -- SAN AUGUSTIN IPTS IPTS	3	8	9.0	0.65 PEF-P LC IPTS IPTS	2	
BANAUE -- BANAUE RS IPTS	3	10	1.0	0.5 NL RS IPTS	1	
CABARROGUIS -- DIFFUN LS LS	18	28	9.2	0.65 PEF-P LC LS LS	2	
MADDELA -- MADDELA RS IPTS	3	10	1.5	0.5 NL RS IPTS	2	
IFUGAO QUIRINO						

Fig. VIII-4-2-1-6/7

Trunk Cable Plan (Region II)

Section	No. of Trunks	No. of Cable Pair	Cable Distance	Line Configuration
BAYOMBONG --- SOLANO PC LS	37 (54)	54	5.3 KM	0.65 PEF-P NL PC LS
SOLANO --- BAGABAG LS LS	17	14	15.4 (20.7)	0.65 PEF-P NL PCM BAYOMBONG SOLANO BAGABAG
BAYOMBONG --- BAYOMBONG RS PC	93	100	2.8 KM	0.65 PEF-P NL RS PC
BAYOMBONG --- BAMBANG PC LS	19 (56)	28	17.3 KM	0.65 PEF-P NL PCM PC LS
BAMBANG --- (INEAGAN) LS	(37)	14	9.6 (26.9)	
(INEAGAN) --- ARITAO LS	17 (37)	14	7.8 (34.7)	0.65 PEF-P NL PCM BAYOMBONG BAMBANG INEAGAN ARITAO
(INEAGAN) --- DUPAX DEL NORTE IPTS	3 (20)	14	2.4 (29.3)	0.65 PEF-P NL PCM BAYOMBONG BAMBANG INEAGAN DUPAX DEL NORTE
DUPAX DEL NORTE --- IPTS DUPAX DEL SUR LS	17	14	3.3 (32.6)	0.65 PEF-P NL PCM BAYOMBONG BAMBANG INEAGAN DUPAX DEL NORTE DEL SUR

NUEVA VIZCAYA

LEGEND

RS: Radio Station
Rep: Repeater
NL: No Load Cable
PC: Primary Center
LS: Local Exchange
MC: Telegraph Message Center
LC: Load Cable
SC: Secondary Center

Fig. VIII-4-2-1-7/7

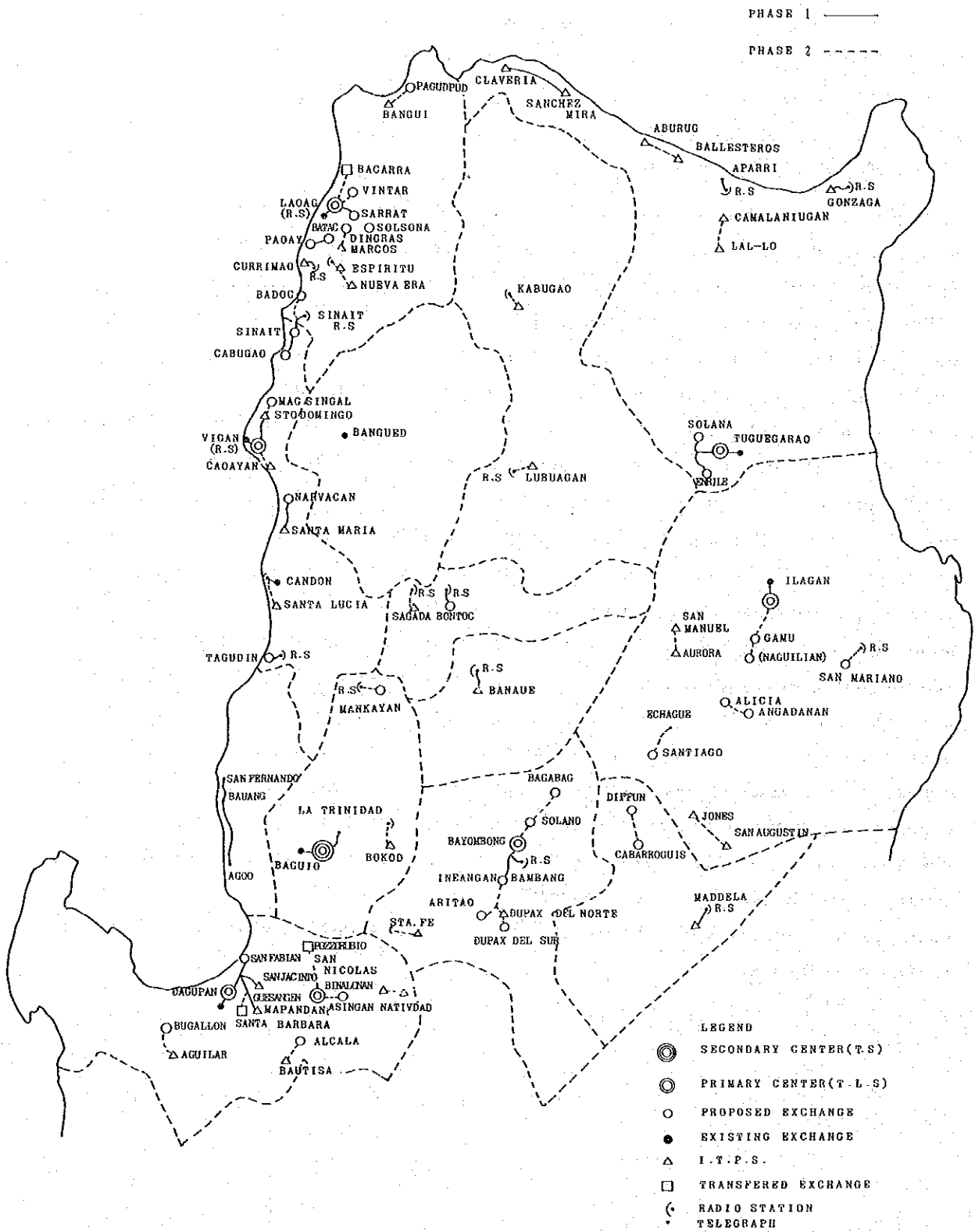


Fig. VII-4-2-2 TRUNK CABLE PLAN

5. Power Plant

The following four types of power plant facilities will be employed.

- (1) Battery
- (2) DC-DC converter
- (3) Rectifier
- (4) Engine generator

Usually, the commercial power will be used for the power supply. In this case, a AC 110V/220V power will be rectified so as to obtain necessary DC powers for communication equipment. The telephone and telex exchanges will require -48V, radio and carrier equipment will require -24V, and telegraph signalling voltage $\pm 60V$. When the station building accommodates telephone exchange, telex exchange and radio and carrier equipment all together, the power for exchange use (-48V obtained by rectifier) which will allow largest load rating will be obtained first and voltages other than 48V will be obtained through DC/DC converters. The same is applicable to the battery: facilities will be provided for -48V use and other voltages will be obtained through DC/DC converters. The engine generator is intended for use as the stand-by power supply and provides mainly power for communication equipment. Accordingly, power for airconditioning facilities, lighting in the office room, water supply pump, etc., will not be fed from the engine generator. The battery will play an auxiliary role for supplying power before the engine generator starts operation. Therefore, the battery expected to operate at a radio repeater on a hill or mountain will have a capacity of 8 hours and a battery expected to operate at other stations will have a capacity of 4 hours. At the small stations (IPTS plus V/UHF) where an engine generator of 3KVA is employed, no battery will be installed.

Power plant facilities to be installed at the respective stations are given in Table VIII-5-1.

Table VIII-5-1 Installation of Power Facilities

Station (: Phase 2)	Telecom. facilities			Power facilities			
	telephone	telegraph	wireless	rectifier (A)	DC/DC converter (A)	battery (AH)	engine (KVA)
Abra							
Bangued	(LE)			50		100	5
Bangued			V/U	*50		*400	5
Sulvec			V/U	*50		*600	5
Ilocos Norte							
Laoag	(TS)	(conc.)		300		800	30
Laoag			M, V/U, Mult	*300		2,500	25
Batac	(LE)		V/U	200	*50	400	15
Dingras	(LE)		V/U	100	*50	400	10
Paoay	(LE)			30		100	5
Sarrat	(LE)			20		100	5
Badoc	(LE)			20		100	5
Pagudpud	(LE)			20		100	5
Pinili	(LE)		V/U	50	*50	200	7.5
Solsona	(LE)			20		100	5
Currimaos	(IP)			2			
Currimaos			V/U	*50			3
Espiritu	(IP)			2			
Espiritu			V/U	*50			3
Pasquin	(IP)		V/U	*50	2		3
Piddig	(IP)		V/U	*50	2		3
Banguid	(IP)		V/U	*50	2		3
Burgos	(IP)		V/U	*50	2		3
Marcos	(IP)			2			
Nueva Era	(IP)			2			
Boboto			V/U	*100		*800	5
Vintar	(LE)			20		100	5
Ilocos Sur							
Vigan	(TS)	(conc.)		300		1,000	30
Vigan			M, V/U, Mult	*300		*2,500	25
Cabugao	(LE)			20		100	5
Narvacan	(LE)		V/U	50	*50	200	7.5

Station (: Phase 2)	Telecom. facilities			Power facilities			
	telephone	telegraph	wireless	rectifier (A)	DC/DC converter (A)	battery (AH)	engine (KVA)
Ilocos Sur (Cont'd)							
Tagudin	(LE)			20		100	5
Tagudin			M	*100		*1,000	7.5
*Magsingal	(LE)			20		100	5
*Sinait	(LE)			20		100	5
Sinait			M,V/U	*200		*1,400	15
Santa	(IP)		V/U	*50	2		3
Sta. Maria	(IP)			2			
Sto. Domingo	(IP)			2			
*Caoayan	(IP)			2			
*Sta. Lucia	(IP)			2			
Candon			V/U	*50		*400	5
Bigbiga			M,V/U	*200		*1,400	15
Mt. Province							
Bontoc	(LE)			20		100	5
Bontoc			V/U	*50		*400	5
*Sagada	(IP)			2			
Sagada			V/U	*100		*600	5
Mt. Mungueto			V/U	*100		*600	5
Mt. Data			V/U	*100		*600	5
La Union							
Sn Fernando		(conc.)		100		400	15
Guinguinabang			M	*100		*1,000	7.5
*Sto. Tomas	(IP)		V/U	*50	2		3
Benguet							
Baguio	(TS)	(ex.)	M,V/U, Mult	800	*400	3,000	75
*Mankayan	(LE)			20		100	5
*Mankayan			V/U	*50		*400	5
*Bokod	(IP)			2			
*Bokod			V/U	*50			3
Sto. Tomas			M,V/U	*400		*2,500	25

Station (: Phase 2)	Telecom. facilities			Power facilities			
	telephone	telegraph	wireless	rectifier (A)	DC/DC converter (A)	battery (AH)	engine (KVA)
Pangasinan							
Dagupan	(TS)	(conc.)	V/U	300	*100	1,000	35
Binalonan	(TS, LE)		M, V/U, Mult	400	*300	1,600	50
Alaminos	(LE)		V/U	100	*50	600	20
Sn Fabian	(LE)			50		200	7.5
*Bani	(LE)		V/U	50	*50	200	7.5
*Bolinao	(LE)			20		100	5
*Bolinao			V/U	*50		*400	5
*Urbiztondo	(LE)		V/U	50	*50	200	7.5
*Alcala	(LE)		V/U	50	*50	200	7.5
*Asingan	(LE)			20		100	5
*Sn Nicolas	(LE)		V/U	50	*50	200	7.5
*Sta Maria	(LE)		V/U	50	*50	200	7.5
*Sison	(LE)		V/U	50	*50	200	7.5
Mapandan	(IP)			2			
Sn Jacinto	(IP)			2			
Sn Quintin	(IP)		V/U	*100	2	*600	5
*Aguilar	(IP)			2			
*Balungao	(IP)		V/U	*50	2	*400	5
Balungao			M	*100		*1,000	7.5
*Bautista	(IP)			2			
*Natividad	(IP)			2			
Bugallon			V/U	*50			3
Sual			V/U	*20			3
*Umingan			V/U	*50			3
Kitakita			M	*100		*1,000	7.5
Batanes							
Basco	(IP)			2			
Basco			V/U	*50		*400	5
Cagayan							
Tuguegarao	(TS)	(ex.)	M, V/U, Mult	500	*300	1,600	50
Enrile	(LE)			20		100	5

Station (: Phase 2)	Telecom. facilities			Power facilities			
	telephone	telegraph	wireless	rectifier (A)	DC/DC converter (A)	battery (AH)	engine (KVA)
Cagayan (Cont'd)							
Solana	(LE)			20		100	5
*Alcala	(LE)		V/U	100	*100	400	10
*Baggao	(LE)		V/U	50	*50	200	7.5
Ballesteros	(IP)		V/U	*100	2	*600	5
Claveria	(IP)			2			
Gonzaga	(IP)		V/U	*50	2		3
Lal-lo	(IP)		V/U	*50	2		3
Sanchez Mira	(IP)		V/U	*50	2		3
Tuao	(IP)		V/U	*50	2		3
*Abulug	(IP)			2			
*Buguey	(IP)		V/U	*50	2		3
*Camalaniugan	(IP)			2			
*Lasam	(IP)		V/U	*50	2		3
*Piat	(IP)		V/U	*50	2		3
*Sto Nino	(IP)		V/U	*50	2		3
Aparri			V/U	*100		*1,000	7.5
Babalog			V/U	*100		*600	5
Nassiping			V/U	*100		*800	5
Kalinga-Apayao							
*Kabugao	(IP)			2			
*Kabugao			V/U	*50			3
*Lubuagan	(IP)			2			
*Lubuagan			V/U	*50			3
*Ag Lalamnan			V/U	*50			3
*Tomiangnan			V/U	*50			3
*Passonglao			V/U	*50			3
Isabela							
Ilagan	(TS)	(conc.)		300		1,600	35
Ilagan			M, V/U, Mult	*300		*2,500	25
Alicia	(LE)		V/U	100	*50	400	10

Station (: phase 2)	Telecom. facilities			Power facilities			
	telephone	telegraph	wireless	rectifier (A)	DC/DC converter (A)	battery (AH)	engine (KVA)
Isabela (Cont'd)							
Sn Mateo	(LE)			30		200	7.5
Sn Mateo			M,V/U	*200		*1,400	15
Tumauini	(LE)		V/U	100	*50	200	7.5
*Angadanan	(LE)			20		100	5
*Gamu	(LE)			20		100	5
*Naguilian	(LE)			20		100	5
*Sn Mariano	(LE)			30		200	7.5
*Sn Mariano			V/U	*50		*400	5
Sn Manuel	(IP)		V/U	*50	2	*400	5
*Aurora	(IP)			2			
*Cabagan	(IP)		V/U	*50	2		3
*Jones	(IP)		V/U	*100	2	*600	5
*Mallig	(IP)		V/U	*50	2		3
*Sn Augustin	(IP)		V/U	*50	2		3
Santiago		(conc.)	V/U	100	*100	600	20
Ifugao							
Banaue	(IP)			2			
Banaue			V/U	*50		*400	5
*Kiangnan	(IP)		V/U	*50	2		3
*Mayoyao	(IP)		V/U	*50	2		3
Quirino							
*Diffun	(LE)			20		100	5
Cabarroguis	(LE)		V/U	20		100	5
*Maddela	(IP)		V/U	*50	2		3
Nueva Vizcaya							
Bayombong	(TS)	(conc.)		200		800	25
Bayombong			M,Mult	*200		*1,400	15
Bambang	(LE)			20		100	5
*Aritao	(LE)			20		100	5
*Bagabag	(LE)			20		100	5

Station (: phase 2)	Telecom. facilities			Power facilities			
	telephone	telegraph	wireless	rectifier (A)	DC/DC converter (A)	battery (AH)	engine (KVA)
Nueva Vizcaya (Cont'd)							
*Dupax del Sur	(LE)			20		100	5
*Dupax del Norte	(IP)			2			
*Sta. Fe	(IP)		V/U	*50	2		3
Diadi			M, V/U	*200		*1,400	15
Dalton Pass			M, V/U	*200		*1,400	15
*Ibulao			V/U	*50			3

Note: telecom. facilities

(TS) : Toll switch
 (LE) : Local exchange
 (IP) : IPTS
 (conc.) : Telex concentrator
 (ex.) : Telex exchange
 M : Micro wave equipment
 V/U : V/UHF equipment
 Mult : Multiplexer for M'wave

power facilities

* Mark : for -24volt
 No Mark : for -48volt

6. Civil Work

6-1 Building Construction Plan

6-1-1 Types of Building

It is recommended to introduce the following 6 types of station/office buildings in this project.

Type A: Building expected to accommodate both telephone exchange and attended radio repeater station.

Type A': Building expected to accommodate telephone exchange and unattended radio repeater station.

Type B: Building expected to accommodate only telephone exchange

Type C: Building for IPTS guided by radio system.

Type D: Building for IPTS guided by cable system.

Type E: Building for attended radio repeater station.

Type E': Building for unattended radio repeater station.

Each type comprises:

- o Equipment room
 - o Power room
 - o Store room
 - o Underground oil tank (1000ℓ)
 - o Service yard.
 - o Office room for senior engineers
 - o Office room for nontechnical personnel
 - o Conference room
 - o Others
- } In case of attended office or station

For an IPTS building, the underground oil tank will be 200ℓ in capacity and only an engine generator will be installed.

Actual oil tank capacity should be individually decided by particular condition of each office/station.

TS offices, LS offices, and IPTS offices estimate space of a window service for application of telephones and telegrams.

Some radio stations will be maintained as an attended station and others will be as an unattended one.

But on both cases, an equipment room, power room, lodging space and sanitary area have been estimated.

At Baguio and Tuguegarao, some spaces for telex equipments and a function of maintenance centre have been also estimated.

6-1-2 Building Floor Space

Space estimation of the equipment room and others in local telephone exchanges, toll telephone exchange, and radio repeater station is made in consideration of the number of equipment to be installed and clearance to be required for the activity of the personnel.

Area estimation of office room, rest room, room for senior engineers, and conference room is made not individually but for the total area to include all these rooms as the office portion in the building.

The estimation standard of the room for senior engineer and that of the conference room are equally 18m^2 and that of the conference room is 20m^2 .

For other rooms, the estimation standard is made maximum $5\text{m}^2/\text{person}$.

The 35% of the estimation mentioned above is added more.

This will be for a front door hall, a corridor, and others.

6-1-3 Calculation of the bldg. floor space.

Table VIII-6-1 shows one of example of calculation result about the bldg. floor space.

And Table VIII-6-2 shows also the bldg. floor space, but lists up with each office/station.

Number of bldg. project for each provinces are shown on Table VIII-6-2 (b).

Bldg. type	Accommodated equipment	Flour space	Name office/station in Phase 1	Number of office/station	Name of office/station in Phase 2	Number of office/station	Total space in Phase 1	Total space in Phase 2
Type A	IS+LS+Radio	800 m ²	Binalonan	1			800 m ²	
	IS+Radio	700 m ²	Lacag. Vigan. Ilagan Dagupan	4			2700 m ²	
	IS+Radio with Telex (attend)	980 m ²	Baguio. Tuguegarao	2			1960 m ²	
Type A'	IS+Radio (attend)	400 m ²	Dingras. Alaminos. (1) Santiago. San Mateo. Bangued.	5			2000 m ²	
	LS+Radio (attend)	350 m ²	Batac. Naruacan. Tumauni. Alicia. Cabarroguis. Bugallon	6	Pinili. Bolinao. Bani. Urbiztondo. Umingan. San Nicolas. Sta. Maria. Alcala. Baggaog. Sison	10	2100 m ²	3500 m ²
Type B'	LS	320 m ²	Pacay. Sarrat. Cabaugao. Tagudin. San Fabian. Enrile. Solana. Bambang. Candon. Bontoc	9	Bodoc. Pagudpud. Solsona. Vintar. Baccara. Magsingal. Sinait. Ashingen. Pozzorubio. Sta. Barbara. Angadanan. Gamu. Neguilian. Mankayan. Diffum. Aritao. Bagabag. DupaxS. San Mariano.	16	2880 m ²	5120 m ²
	IS+LS	650 m ²	Bayombong	1			650 m ²	
Type C	IPTS guided by radio	30 m ²	Pasquin. Piddig. Santa. San Quintin. Lallo. Ballesteros. Sanchez Mira. Basco. Tuao. San Manuel. Buguey.	10	Burgos. Balungao. Sto Tomas. Sto Nino. Lazam. Piat. Lubuagan. Cabagan. Mallig. Jones. San Augustin. Kiangan. Mayoyao. Bangui.	14	300 m ²	420 m ²
	IPTS guided by Cable	15 m ²	Sta. Maria. Sto. Domingo. San Jacinto. Mapandan. Claveria. Currimao. Espiritu. Gonzaga. Banaue.	9	Marcos. Nueva Era. Cacoayan. Sta. Lucia. Bautista. Natividad. Aguilar. Abulug. Camalanuigan. Aurora. DupaxM. Sagada. Bokod. Kabugao. Maddela. StaFe.	16	135 m ²	242 m ²
Type E	Radio (attend)	320 m ²	Bayombong. Aparri. Manila	3			960 m ²	
Type E'	Radio (Unattend)	90 m ²	Sinait. Bigbiga. Tagudin. RS. Guinguinabang. Kitakita. Dalton Pass. Diadi. Tarlac. Dau. Pandi. Candon. RS. Nassiping.	12			1080 m ²	
		60 m ²	Sulvec. Babalog. Sual. Mt. Mungueto. Mt. Data. BontocRS.	6	Aglalamaan. Tomiangan. Pasonglao. Bobodo. Ibulao. MankayanRS. S. San MarianoRS.	7	360 m ²	420 m ²
Total of each phase		120 m ²	Sto Tomas. Balungao	2			240 m ²	
		30 m ²	CurrimaoRS. EspirituRS. SegadaRS. GonzagaRS. S. BanaueRS.	5	BokodRS. KabugaoRS. MaddelaRS. Sta FERS	4	150 m ²	120 m ²
Grand Total				75			16315 m ²	9820 m ²
							26135 m ²	

Table VIII-6-1 Bldg. floor space list for each office/station

- 1 Existing local exchange offices. Bldg. expansion is expected.
- 2 Proposed as a transferred office, but projected a radio station on Phase 1. Therefore, bldg. as IS+Radio is planned.
- 3 Existing local exchange office. Minor modification of the bldg. is only expected.
- 4 The number does not include Candon.
- 5 The number does not include Umingan.
- 6 The number does not include Baccara, Pazorubio, and Sta. Barbara.
- 7 These are planned as transferred offices. Actual construction plans of their bldg.s are not included by the project.
- 8 At Basco, the existing bldg. will be employed.
- 9 Umingan is planned as only tower project.

Table VIII-6-2 List of required land space,
floor space and tower height

Site	Ph 1 or 2	Land space (m ²)	Bldg. floor space (m ²)	Tower height (m)		Remarks	
				Self. s.	Guyed w.		
Ilocos Norte	Laoag	1	2,400	800	1000	Built at the existing radio station place	
	Pasquin	1	50	15		25	Bldg. for a power plant.
	Sarrat	1	1,000	320			
	Piddig	1	50	30		20	
	Dingras	1	1,300	400		45	
	Batac	1	875	350		35	
	Paoay	1	1,000	320			
	Currímao	1	50	15			
	Currímao R.S	1	400	30		20	
	Espiritu	1	50	15			
	Espiritu R.S	1	360	30		35	
	Solsona	2	1,000	320			
	Bangui	2	700	30		45	
	Burgos	2	*400	30		65	* The number does not included guey foundations.
	Bobodo	2	*400	60		65	"
	Pagudpud	2	1,000	320			
	Vintar	2	1,000	320			
	Badoc	2	1,000	320			
	Marcos	2	50	15			
Pinili	2	1,200	350		20		
Nueva Era	2	50	15				
Ilocos Sur	Vigan	1	2,100	700	70		Bldg. for TS and radio
	Narvacan	1	1,200	350		25	
	Tagudin	1	1,000	320			
	Tagudin R.S	1	400	90	20		
	Sta. Maria	1	50	15			
	Sto. Domingo	1	50	15			

Site	Ph 1 or 2	Land space (m ²)	Bldg. floor space (m ²)	Tower height (m)		Remarks	
				Self. s.	Guyed w.		
Ilocos Sur	Bigbiga	1	400	90	20	* The number does not include space for the wire foundation	
	Santa	1	400	30	20		
	Candon R.S	1	*400	90	75		
	Sinait R.S	1	400	90	55		
	Cabugao	1	1,000	320			
	Magsingal	2	1,000	320			
	Sinait	2	1,000	320			
	Caoayan	2	50	15			
	Sta. Lucia	2	50	15			
Abra	Bangued	1	1,400	400		25	
	Sulvec	1	400	60		25	
La Union	Guinguinabang	1	400	90	20		
	Sto. Tomas La Union	2	50	30		25	
Pangasinan	Binalonan	1	2,400	800	55	Local exchange on Phase 1	
	Alaminos	1	2,800	400			65
	Dagupan	1	1,200	400	50		
	Bugallon	1	1,000	350	60		
	San Fabian	1	1,000	320			
	San Quintin	1	50	15		20	Bldg. for power plant
	San Jacinto	1	50	15			
	Mapandan	1	50	15			
	Sual	1	400	60		25	
	Bani	2	850	350		35	
	Urbiztondo	2	1,200	350		45	
	San Nicolas	2	1,200	350		25	
	Alcala	2	1,200	350		45	
	Asingan	2	1,000	320			
	Bautista	2	50	15			
	Natividad	2	50	15			

Site		Ph 1 or 2	Land space (m ²)	Bldg. floor space (m ²)	Tower height (m)		Remarks
					Self. s.	Guyed w.	
Pangasinan	Aguilar	2	50	15			The office is assigned as a transferred office. But a tower is planned in the project.
	Umingan	2				25	
	Bolinao	2	1,100	350		40	
	Sison	2	1,200	350		25	
	Balungao	2	50	30		25	
	Sta. Maria	2	1,200	350		25	
Benguet	Baguio	1	3,000	930	25		Built behind the Director office.
	Sto. Tomas	1	400	120	20		
	Mt. Mungueto	1	400	60		30	
	Mt. Data	1	800	60		45	
	Bokod	2	50	15			
	Bokod R.S	2	400	30		25	
	Mankayan R.S	2	800	60		45	
	Mankayan	2	1,000	320			
Mt. Prov.	Bontoc	1	1,200	320			
	Bontoc R.S	1	800	60		45	
	Sagada	2	50	15		20	
	Sagada R.S	1	400	60		40	
Baguio - Manila route & Reg. 3	Manila	1			*20		The existing tower will be reinforced.
	Pandi	1	400	90	40		
	Dau	1	400	90	40		
	Tarlac	1	400	90	40		
	Balungao R.S	1	400	150	20		
	Kita kita	1	400	90	30		
Cagayan Batanes	Tuguegarao	1	3,200	930	115		Bldg. for TS and radio
	Enrile	1	1,000	320			
	Solana	1	1,000	320			

Site	Ph 1 or 2	Land space (m ²)	Bldg. floor space (m ²)	Tower height (m)		Remarks	
				Self. s.	Guyed w.		
Cagayan Batanes	Lal-lo	1	50	30		35	Bldg. for power plant
	Ballesteros	1	*50	30		65	
	Gonzaza	1	50	15			
	Gonzaza R.S	1	400	30		25	
	Sanchez Mira	1	2,200	30		65	
	Tuao	1	50	15		25	
	Claveria	1	400	90			
	Aparri	1	1,000	320	45		
	Basco	1				30	
	Buguey	1	400	30		25	
	Nassiping	1	400	90	25		
	Baggao	2	1,100	350		25	
	Sto. Nino	2	50	30		25	
	Lazam	2	50	30		25	
Cagayan	Alcala	2	720	350		30	
	Piat	2	50	30		25	
	Cabagan	2	50	30		25	
	Abulug	2	50	15			
	Camalaniugan	2	50	15			
Kalinga Apayas	Babalog	1	400	90		25	
	Kabugao R.S	2	400	30		25	
	Kabugao	2	50	15			
	Lubuagan	2	400	30		25	
	Ag Lalamnan	2	800	60		45	
	Tomangan	2	400	60		25	
	Pasonglao	2	400	60		25	
Isabela	Ilagan	1	2,100	700	75		Bldg. for TS and radio
	Santiago	1	1,200	*400	55		* The number includes present floor space.
	San Mateo	1	1,200	400	50		Bldg. for LS and radio

Site	Ph 1 or 2	Land space (m ²)	Bldg. floor space (m ²)	Tower height (m)		Remarks	
				Self. s.	Guyed w.		
Isabela	Tumauini	1	1,200	350		25	Bldg. for power plant The number does not include the guy foundation space
	Alicia	1	900	350		35	
	San Manuel	1	50	15		35	
	San Mariano	2	1,000	320			
	San Mariano R.S	2	400	60		25	
	Angadanan	2	1,000	320			
	Gamu	2	1,000	320			
	Naguilian	2	1,000	320			
	Mallig	2	50	30		25	
	Jones	2	*50	30		55	
	Aurora	2	50	15			
San Augustin	2	50	30		25		
N. Vizcaya	Bayombong R.S	1	1,000	320	35		Replacement of the radio station
	Bayombong	1		650			The existing office will be expanded so that 650 m ² is available.
	Diadi	1	400	90	20		
	Dalton Pass	1	400	90	50		
	Bambang	1	1,000	320			
	Bagabag	2	1,000	320			
	Dupax S.	2	1,000	320			
	Sta. Fe R.S	2	400	30		25	
	Sta. Fe	2	50	15			
	Aritao	2	1,000	320			
Dupax N.	2	50	15				
Ifugao	Banaue R.S	1	400	30		25	
	Banaue	1	50	15			
	Kiangan	2	400	30		25	
	Ibulao	2	400	30		35	
	Mayoyao	2	400	30		25	

Site	Ph 1 or 2	Land space (m ²)	Bldg. floor space (m ²)	Tower height (m)		Remarks
				Self. s.	Guyed w.	
Quirino	Qabarroguis	1,600	350		55	* The number does not include guy found- ations.
	Diffum	1,000	320			
	Maddela R.S	*400	30		75	
	Maddela	50	15			

Table VIII-6-2 (b) Number of building plan in each provinces

Prov.	Ph-1	Ph-2
Ilocos N.	11	10
Ilocos S.	11	4
Abra	2	0
La Union	1	1
Pangasinan	9	*12
Mt. Province	3	1
Benguet	4	4
Baguio Manila Reg.3	*5	0
Cagayan, Batanes	14	8
Kalinga Apayao	1	6
Isabela	6	9
N. Vizcaya	5	6
Ifugao	2	3
Quirino	1	3
Total	75	67

Umingan is not included in the number

* Manila does not include architectural plan

6-2 Construction Plan of Steel Towers and Others

6-2-1 Steel Towers

Two types of steel towers are proposed: selfsupporting tower and guyed mast. Tower height ranges 20m - 115m (13 steps).

A total of 89 towers will be installed in Phases 1 and 2. The total steel weight will be 3 thousand and 5 hundreds tones.

For the estimation of the total steel weight was made by effecting rough design for all types of towers. The number of towers of different heights and different types are given in Fig. VIII-6-3.

6-2-2 Underground Oil Tank

The oil tank is a directly buried tank of 2000ℓ in capacity.

6-2-3 Site Areas

For site areas, minimum site areas to be procured are estimated. The important factors for the determination of site area are the shape of the site, inclination, relationship with road and other environments. However, estimation is made for flat, not irregular sites. Space required within each site is for the station building, annex, car park, and steel tower if used. Site area estimation was made as per the following table.

Station/office without tower or with a self-supporting tower	Building floor area x 3
Station/office with a guyed tower of less than 30m	Building floor area x 3 + Steel tower site area
Station/Office with a guyed tower of more than 35m	Building floor area x 1.5 + Steel tower site area

For access road sites, considerable areas will be required for cutting and piling soil, so that an average width of 15m will be provided including all these areas although the net width of each access road is 3m.

Table VIII-6-2 shows an outline of required land space for an individual office/station case.

But summing up results for each provinces about the land space required are mentioned on Table VIII-6-2 (c).

Table VIII-6-4 shows total length of required access road.

Table VIII-6-2 (c)

Required site areas for each provinces.

	Ph1 (m ²)	Ph2 (m ²)
Ilocos N.	7,535	6,800
" S.	7,400	2,100
Abra	1,800	-
L. Union	400	50
Pangasinan	8,950	9,150
Benguet	4,600	2,250
Mt. Prov.	2,400	50
Reg. 3	2,000	-
Cagayan	10,200	2,120
K. Apayao	400	2,450
Isabela	6,650	4,600
N. Vizcaya	3,800	2,500
Ifugao	450	1,200
Quirino	1,600	1,450
Total	58,185 m ²	34,720 m ²

Table VIII-6-3 List of Towers

Remarks: Self supporting types are used in case of 2GHZ or 6GHZ system

Tower height	Phase 1		Phase 2	Total
	Self-support	Guyed wire	Gued wire	
20 ^m	5	1	1	7
25	3	6	*20	29
30	1	6	2	9
35	3	6	3	12
40			1	1
45	1	4	5	10
50	1	1		2
55	4	3	1	8
60				
65		3	2	5
70	1			1
75	1	1	1	3
80				
85				
90				
95				
100	1			1
105				
110				
115	1			1
Total	22	31	36	89
	53			

* Umingan is assigned as a transfered office. But a tower is planned in the project.

Table VIII-6-4 Access Road Lengths and Site Areas

	Phase 1	Phase 2	Total
Number of Sites	11	11	22
Length of Road (km)	20.6	30.4	51 ^{km}
Site Area (m ²)	309,000	456,000	765,000 ^{m²}

7. Connection with DOMSAT Ground Station

7-1 Outline of DOMSAT

The Philippines is now developing the DOMSAT Project. The object of the DOMSAT are:

- (1) - to accelerate the establishment of the nationwide telecommunications network as a catalyst to social, economic and political developments;
- (2) - to provide high quality telecommunications services via the application of modern and proven technology; and
- (3) - to promote simultaneous nationwide distribution of television and radio programs for information education and entertainment.

Ground stations are being constructed at the following 11 sites. They are expected to be completed by the end of 1978.

- | | |
|-------------|--------------------|
| (1) Manila | (2) Zamboanga |
| (3) Davao | (4) Cagayan de Oro |
| (5) Cebu | (6) Tacloban |
| (7) Iriga | (8) Tuguegarao |
| (9) Laoag | (10) Palawan |
| (11) Iloilo | |

In the areas to be covered by the present project DOMSAT ground stations are being constructed in Laoag and Tuguegarao. The locations of the two ground station sites are as follows.

Laoag	E: 120°35'27"
	N: 18°08'40"
Tuguegarao	E: 121°39'14"
	N: 17°39'22.5"

For the DOMSAT project the domestic satellite PALAPA possessed by the Indonesia will be used by borrowing a 1 1/2 transponder.

7-2 Connection with DOMSAT Ground Stations

It is intended, by the connection of the transmission lines to be established by this project with the DOMSAT ground stations, to back up the transmission lines and allow TV signal to be received in major cities and municipalities in Regions I and II via DOMSAT.

(1) Back-up circuit to Manila

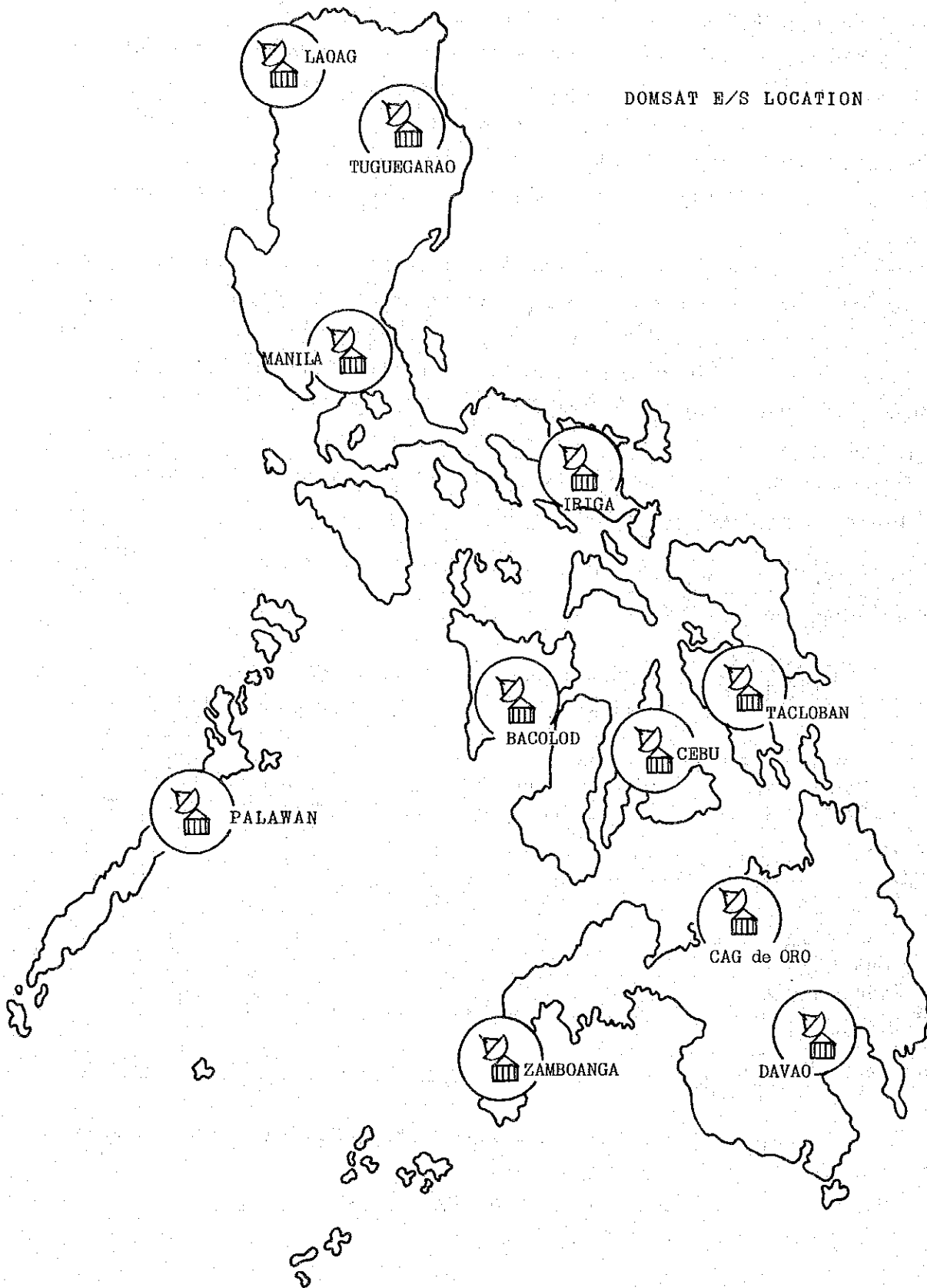
Transmission of one toll telephone line from each of the following stations to Manila via DOMSAT is planned.

Laoag (via Laoag Ground Station)	
Vigan (do.)	
Baguio(do.)	
Dagupan (do.)	
Tuguegarao (via Tuguegarao Ground Station)	
Iligan (do.)	
Bayombong (do.)	

The terminals of these lines will be connected to the telephone switchboard.

(2) Transmission of TV Signal

A 6GHz or 11GHz microwave link is planned for TV signal transmission between the ground stations in Laoag and Tuguegarao and BUTEL radio repeater stations in Laoag and Tuguegarao. By this, TV broadcasting service over Regions I and II can be achieved by transmission via DOMSAT as well.



DOMSAT E/S LOCATION

8. Connection with Private Operator's Facilities

Of the total number of telephones existing in the Philippines, the percentage of the number of telephones possessed by BUTEL is only 7% and the remaining 93% are possessed by private operators or by the governments of provinces. In the regions to be covered by the present project there are a total of about 11,200 telephones, of which only 1700 telephones are covered by BUTEL.

Although calls between local exchanges to be constructed in this project will be connected by STD service, this will not be sufficient for the benefit of people unless connection by STD from BUTEL's exchanges to be constructed newly to private operators' exchanges in Manila or major cities such as Baguio, Dagupan, and Tuguegarao in Regions I and II or is available. In other word, increased benefit of people or economical, social development in Regions I and II can not be expected so much unless connection between BUTEL's facilities and private operators' facilities is achieved.

Accordingly, the telecommunication network plan is proposed on the basis of the following service plan.

Table VIII-8-1 Toll Telephone Service between BUTEL Exchanges and Private Operator's Exchanges

Originating Station		Terminating Station	BUTEL's Exchange				Private Operator's Exchange		
			Regions I and II			Manila	Regions I and II		Manila
			(News)	(Existing)	IPTS		Major Cities*	Others	
BUTEL's Exchange	Regions I and II	New LS	o	o	Δ	o	o	Δ	o
		Existing LS	o	o	Δ	o	Δ	Δ	Δ
		IPTS	Δ	Δ	Δ	Δ	Δ	Δ	Δ
	Manila	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
Private Sector's Exchange			Δ	Δ	Δ	Δ	Δ	Δ	Δ

* Major cities: Baguio, Dagupan, Laoag, Tuguegarao, and Ilagan

o : STD service

o : Non-delay manual service

Δ : Delay service

Facilities to be installed on the BUTEL side for the above-mentioned services, that is, toll telephone exchange and transmission facilities are included in this project.

Accordingly, the following facilities should, in principle, be expanded or installed newly by private operators.

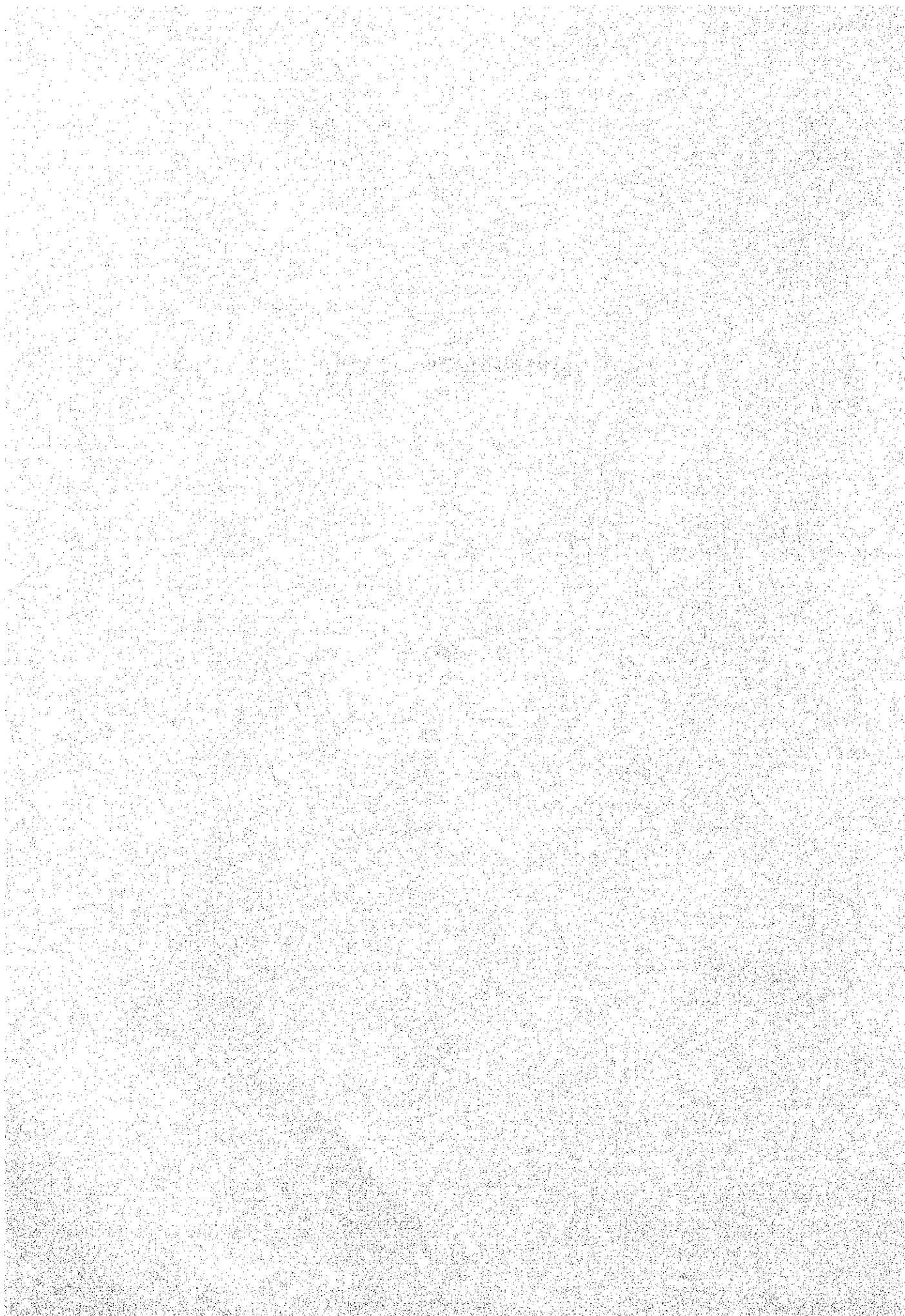
- (1) Transmission lines between BUTEL's toll exchange and private exchanges
- (2) Incoming and outgoing trunks installed at private operators' offices
- (3) Local exchange common control unit and related intermediate equipment installed at private operators' offices for coping with the traffic increases which will be caused by the implementation of this project.

Interconnecting points between BUTEL and private operator are shown in Fig. III-14-6. It is also necessary to install meters for measuring traffic in the interconnection for counting toll call charges. What type of meter to employ for this purpose depends on the method of counting toll call charges.

All these things should be determined through consultation with relevant private operators.

If this is not achievable, the effect of this project will be much less and it is no exaggeration to say that this project is no more feasible if it is not achievable.

IX. IMPLEMENTATION PLAN



IX. IMPLEMENTATION PLAN

1. Implementation System

This project is the first wide-range telecommunications project to be undertaken by BUTEL, and is not only large in scale but requires latest techniques which have not yet been introduced to BUTEL. BUTEL is expected to do its utmost to accomplish the project although it is not easy to complete the project smoothly. BUTEL is, therefore, expected to form a headquarters for the execution of the project (Telecommunication Development Plan of Regions I & II). This headquarters will incorporate Region I construction headquarters (local office of the bureau in Region I) and Region II construction headquarters (local office of the bureau in Region II), which will be engaged in the execution of installation in the respective regions, under administration and control by the project headquarters.

Installation work by foreign currency will be conducted on the turn-key base which is of no problem.

Detailed design, preparation of specifications for installation, assessment of tenders, supervision of a installation work, inspection and testing after completion of installation, etc., will be committed to a consulting company or the like. BUTEL will cover, in addition to the administration of installation to be executed by foreign and domestic currencies, the following items.

- (1) Procurement of sites for telephone offices, radio repeater stations, and access roads for repeater stations
- (2) Negotiation with private telephone operators on the following items
 - i) Type of service (STD, delay service or others)
 - ii) Specifications for expansion plans
 - iii) Technical examination on signaling system, loss allotment, etc.
 - iv) Interface
 - v) Job assignment to operators
 - vi) Adjustment of telephone charges
- (3) Action to inconvenient inventory and delayed installation
- (4) Coordination to delayed work by unexpected tempest or disaster
- (5) Training for BUTEL's personnel
- (6) Giving directions to consultant on important items to be implemented
- (7) Determination of radio frequencies

Although consultant may be employed on the turn-key basis as stated above, BUTEL's operations will range wide. Accordingly, the project headquarter-

ters to be formed by BUTEL will be required not only to administrate and control the installation but to coordinate problems in installation sites, individual bar charts, carryin of installation materials, etc., and solve these problems, so that coordinators should be assigned in the headquarters.

2. Installation Schedule (Bar Chart)

2-1 Phase 1

The installation schedule (bar chart) of Phase 1 is as shown in Fig. IX-2-1. Detailed design will be started in the beginning of 1979 and completed in 1982. In order for installation work to be progressed smoothly, it is necessary for the respective items of installation to be advanced as specified in the bar chart and, in particular, the following must be obeyed.

- 1) A total site area of about 58,000m² be procured by the end of 1979.
- 2) The construction of access roads, buildings, and steel towers be completed in the first half of 1981.
- 3) Smooth procurement of installation materials and equipments.
- 4) Smooth coordination between BUTEL and contractors for equipment and installation and contractor for civil work.

2-2 Phase 2

It is desirable to implement Phase 2 as much earlier as possible from the stand point of investment efficiency. We intend to recommend that the installation schedule of Phase 2 will be from 1983 to 1985.

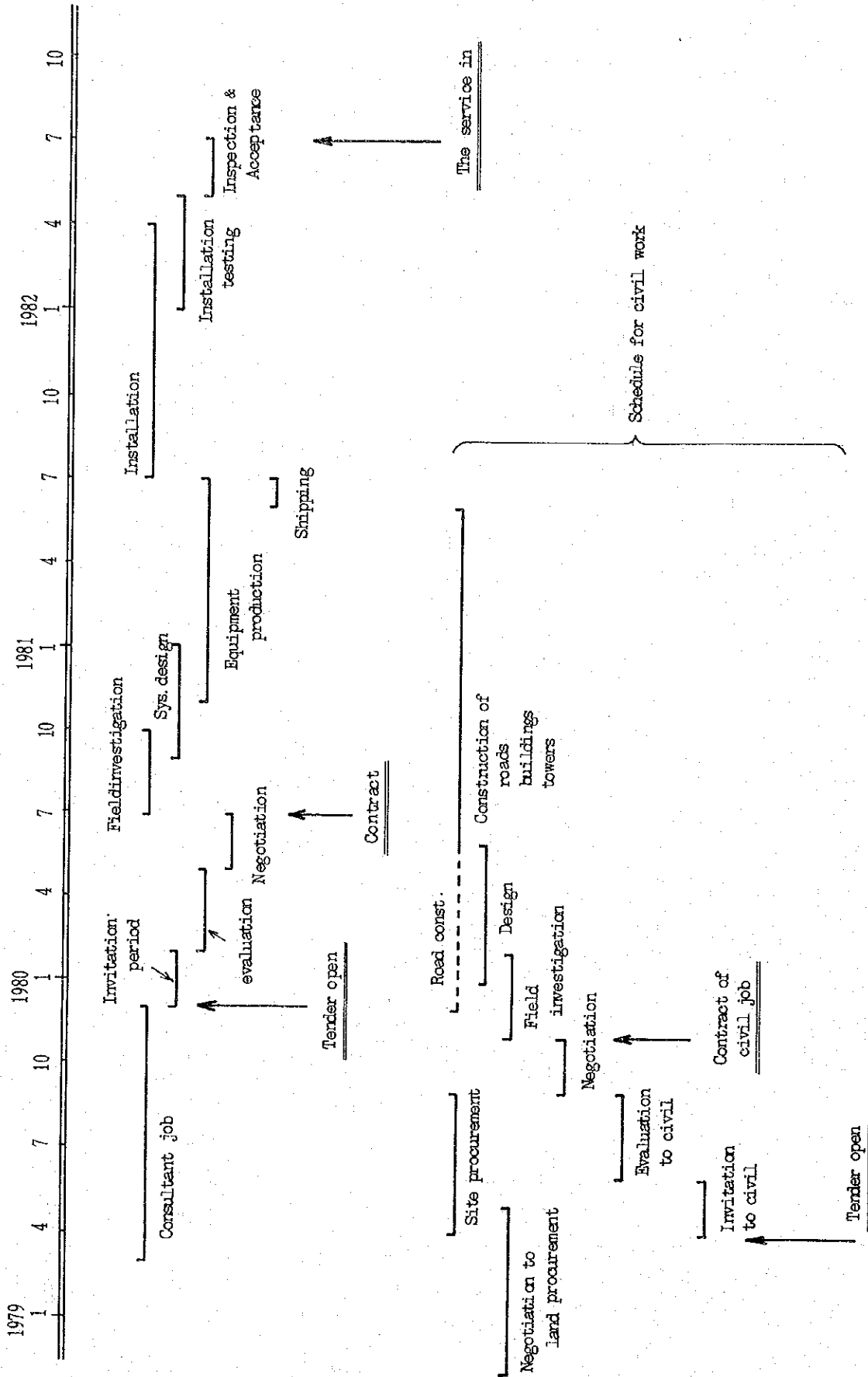
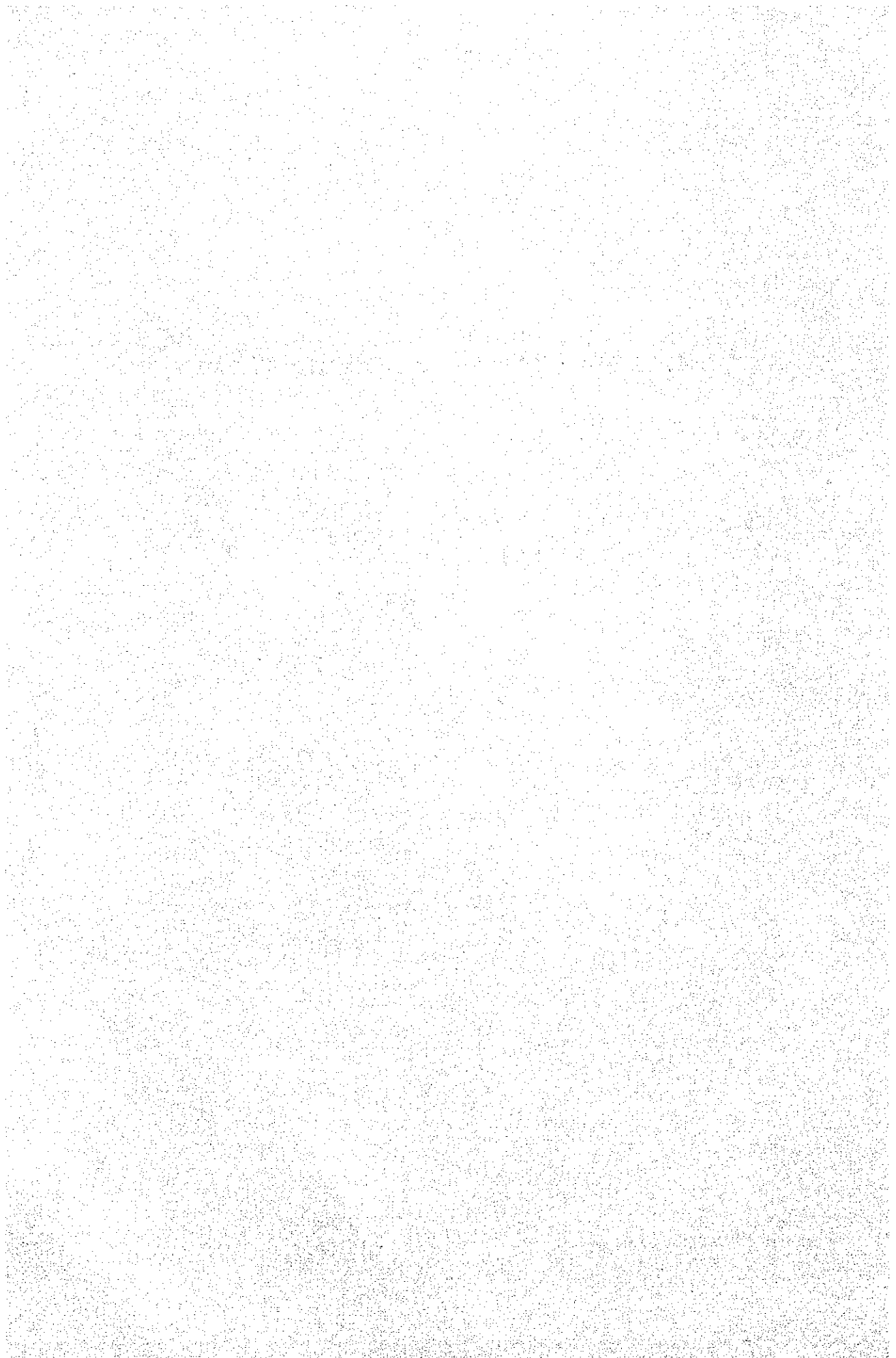


Fig. IX-2-1 Installation Schedule

X. MAINTENANCE AND OPEATION



X. MAINTENANCE AND OPERATION

1. General

The number of telephone offices (including toll exchanges) and IPTS's to be introduced by this project is 45 in Phase 1 and 58 in Phase 2. The number of radio repeater stations to be introduced is 51 in Phase 1 and 36 in Phase 2. The field organization expected to be engaged in the maintenance and operation of these telephone and telegraph facilities will be required to have a modern operating scheme and maintenance system for achieving required functions and high performance of these facilities. This section describes the maintenance and operating system and related items for these purposes.

2. Present Maintenance and Operating System

The present maintenance and operating system of BUTEL is such that the entire country is divided into 12 regions and the Northern Part of Luzon is covered by Regions I and II. General control over Region I is made by the regional office in Baguio and that over Region II is made by the regional office in Tuguegarao. Each regional office supervises two district offices. The district offices in Region I are located in San Fernand and Dagupan whereas the district offices in Region II are located in Tuguegarao and Bayombong. Actual maintenance and operation are conducted by the maintenance and operating sections of these district offices and 124 field organizations of Region I and 89 organizations of Region II. The number of maintenance and operating personnel engaged at present is 645, of which the breakdown is given as follows.

Operating personnel

Telegram operators	317
Teletype operators	37
Telephone operators	48
Telegram delivery personnel	78

Maintenance personnel

Telephone technicians	16
Line technicians	99
Transmission technicians	8
Radio technicians	7
Teletype technicians	22
Power supply technicians	10

It is understood that telegram operators and line technicians are great majority of these personnel. Typical numbers of personnels of these field organizations (including administrative personnel) are as follows.

Santiago telephone office:	14 personnel (including one administrative personnel)
San Fernando telegraph office:	19 personnel (including one administrative personnel)
Bayombong radio repeater station:	17 personnel (including one administrative personnel)

Region I has field organizations at 124 offices at present, of which 58 offices are expected to introduce facilities in this project, including Phase 2. Region II has field organizations at 89 offices, of which 47 offices are expected to introduce facilities. Although how many personnel each field organization have at present has not been known does for sure by the present survey, it may be estimated that the number of maintenance and operating personnel that can be provided for this project will roughly be as follows.

$$645 \text{ personnel} \times \frac{58 + 47}{124 + 89} = 318 \text{ personnel}$$

↑
Total number of
personnel in
Regions I and II

That is, 318 personnel out of 645 personnel can be assigned to maintenance and operation of facilities to be introduced by this project.

3. Necessary Maintenance and Operation System

The functions of the respective offices/stations to be constructed in this project are given in Table X-1.

Table X-1 Functions of Offices and Stations

o : planned for Phase 1

Δ : planned for Phase 2

Office/station	Toll ex-change	Local ex-change	IPTS	Radio of main route	Radio of spur route	Tele-graph	Phase 1 or 2	Remarks
Laoag	o			o	o	o	1	
Paoay		o					1	
Sarrat		o					1	
Badoc		Δ					2	
Pagudpud		Δ					2	
Salsona		Δ					2	
Vintar		Δ					2	
Marcos			Δ				2	
Nuera Era			Δ				2	
Baccara		Δ(T)					2	Transferred
Pasquin			o		o		1	
Dingras		o			o	Δ	1	Telegraph in Phase 2
Batac		o			o	Δ	1	
Sinait (R)				o	Δ		1	
Currimaao			o		o		1	
Pinili		Δ			Δ		2	
Bobodo					Δ		2	
Burgos			Δ		Δ		2	
Bangui			Δ		Δ		2	
Piddig			o		o		1	
Espiritu			o		o		1	
Cabugao		o					1	
Tagudin		o		o			1	
Sta. Maria			o				1	
Sto. Domingo			o				1	
Magsingal		Δ					2	
Sinait		Δ					2	
Gaoayan			Δ				2	
Sta. Lucia			Δ				2	
Vigan	o	Exist. o		o	o	o	1	LS existing
Sulvec					o		1	
Bangued		o			o	o	1	Existing
Santa			o		o		1	

Office/station	Toll ex-change	Local ex-change	IPTS	Radio of main route	Radio of spur route	Tele-graph	Phase 1 or 2	Remarks	
Bigbiga				o	o		1	Existing	
Candon		Exist. o							
Candon (R.S)					o	Δ	1		
Narvacan		o			o	Δ	1		
Bontoc		o			o	Δ	1		
Sagada			Δ		Δ		2		
Baguio	o			o	o	o	1		
Sto. Tomas				o	o		1		
Mt. Mungueto					o		1		
Mt. Data					o		1		
Bokod			Δ		Δ		2		
Mankayan		Δ			Δ		2		
San Fabian		o					1		
San Jacinto			o				1		
Asingan		Δ					2		
Bautista			Δ				2		
Natividad			Δ				2		
Pozorrubio		Δ(T)					2	Transferred	
Sta. Barbara		Δ(T)					2		
Dagupan	o				o	o	1	Transferred	
Bugallon		Δ(T)			o		2		
Sual					o		1		
Alaminos		o			o	Δ	1		
Bolinao		Δ			Δ		2		
Bani		Δ			Δ		2		
Urbiztondo		Δ			Δ		2		
Binalonan	Δ	o		o	o		1		T.S is for Phase 2
San Quintin			o		o		1		
Umingan		Δ(T)			Δ		2		Transferred
Sison		Δ			Δ	Δ	2		
San Nicolas		Δ			Δ		2		

Office/station	Toll ex-change	Local ex-change	IPTS	Radio of main route	Radio of spur route	Tele-graph	Phase 1 or 2	Remarks
Mapandan			o				1	
Aguilar			Δ				2	
Sta. Maria		Δ			Δ		2	
Alcala		Δ			Δ		2	
Balungao			Δ		Δ		2	
Sto. Tomas			Δ		Δ		2	
Enrile		o					1	
Solana		o					1	
Claveria			o				1	
Abulug			Δ				2	
Camalaniugan			Δ				2	
Tuguegarao	o			o	o		1	
Nassiping					o		1	
Aparri					o	o	1	
Sto. Nino			Δ		Δ		2	
Lazam			Δ		Δ		2	
Lal Lo			o		o		1	
Ballesteros			o		o		1	
Gonzaga			o		o		1	
Buguey			Δ		o		1	IPTS as Phase 2
Sanchez Mira			o		o	Δ	1	
Basco			o		o		1	
Alcala		Δ			Δ	Δ	2	
Baggao		Δ			Δ		2	
Babalog					o		1	
Tuao			o		o	Δ	1	
Piat			Δ		Δ		2	
Kabugao			Δ		Δ		2	
Lubuagan			Δ		Δ		2	
Ag Lalamnan					Δ		2	
Tomangan					Δ		2	
Pasong lao					Δ		2	

Office/station	Toll ex-change	Local ex-change	IPTS	Radio of main route	Radio of spur route	Tele-graph	Phase 1 or 2	Remarks
Angadanan		Δ					2	
Ilagan	o			o	o	o	1	
Tumauini		o			o		1	
Cabagan			Δ		Δ		2	
San Mateo		o		o	o		1	
San Manuel			o		o		1	
Mallig			Δ		Δ		2	
Alicia		o			o		1	
Santiago		Exist o			o	o	1	LS as existing
Jones			Δ		Δ		2	
San Augustin			Δ		Δ		2	
Maddela			Δ		Δ		2	
Cabarroguis		o			o	o	1	
San Mariano		Δ			Δ		2	
Gamu		Δ					2	
Naguilian		Δ				Δ	2	
Aurora			Δ				2	
Bayombong	o	Exist o		o		o	1	LS as existing
Diadi				o	o		1	
Banaue			o		o	Δ	1	
Dalton Pass				o	o		1	Spur as Phase 2
Sta. Fe			Δ		Δ		2	
Kiangan			Δ		Δ		2	
Mayoyao			Δ		Δ		2	
Ibulao					Δ		2	
Diffum		Δ					2	
Bambang		o				Δ	1	
Aritao		Δ					2	
Bagabag		Δ					2	
Dupax (S)		Δ					2	
Dupax (N)			Δ				2	

Office/station	Toll ex-change	Local ex-change	IPTS	Radio of main route	Radio of spur route	Tele-graph	Phase 1 or 2	Remarks
Guinguinabang				o			1	
Balungao (M/W)				o			1	
Kitakita				o			1	
	Total 106			Total 89		Total 22		
	(=44+62)			(=51+38)		(=10+12)		

As shown in Table X-1, field organizations to be introduced by this project are at 106 offices in the field of telephone exchange and at 87 stations in the field of radio transmission. At these offices and stations much higher maintenance techniques will be required than those required for the conventional facilities. Accordingly, it is recommended to establish the following organizations.

Regional offices

Regional offices will be located in Baguio and Tuguegarao as the conventional regional offices and conduct general control in the maintenance and operation of facilities to be introduced by this project. A maintenance center will be provided in each regional office so as to effect concentrative control of maintenance component parts and, preparation for repair, and control and storage of certain test equipment.

District offices

District offices will be located in Laoag, Vigan, Baguio, Dagupan, and Binalonan in Region I and in Aparri, Tuguegarao, Ilagan, Santiago, and Bayombong in Region II so as to provide guidance for actual maintenance and operation.

Repair of panels and control of most test equipments will be made at district offices.

Each district offices will be provided with 2 engineers (one in charge of exchange and line and the other in charge of radio transmission) and 2 ~ 4 technicians and office clerks.

Field organization

The exchange division covers toll exchanges, local offices, and IPTS's, whereas the radio transmission division covers main route radio repeater stations, spur route radio repeater stations.

Telegraph facilities will be accommodated at toll telephone exchanges or telephone offices, and carrier terminal equipment will be installed at respective radio repeater stations.

The principle for personnel assignment is as follows.

- o Toll telephone exchanges and telephone offices will be attended and IPTS's will be attended only by operators.

Repair of equipments and supply of components for IPTS's will be conducted conducted by the maintenance technicians for unattended stations from an adjacent telephone office.

o The following radio repeater stations will be attended.

Laoag, Dingras
Vigan, Bangued
Alaminos, Dagupan, Binalonan
Baguio, Bontoc,
Aparri,
Tuguegarao, Tuao
Ilagan, Santiago, San Mateo
Bayombong
Basco

o Other radio stations will all be unattended ones.

The maintenance areas of the respective attended radio repeater stations will be as follows.

Laoag (7 stations)

Burgos, Bangui, Bobodo, Pasquin
Batac, Currimao RS, and Sinait R.S

Dingras (3 stations)

Piat, Espiritu RS, and Pinili

Vigan (5 stations)

Santa,
Narvacan, Bigbiga, Candon RS and
Tagudin RS,

Bangued (1 station)

Sulbec

Alaminas (3 stations)

Bolinao, Bani, and Sual

Dagupan (4 stations)

Sto. Tomas, Urbizbondo, Bugallon,
RS and Kitakita

Binalonan (7 stations)

Sison, San Nicolas, San Quintin, Umingan,
Sta. Maria, Alcala, and Balungao RS.

Baguio (4 stations)

Sto. Tomas, Mt. Mungueto, Bokod, and Guinguinabang

Bontoc (3 stations)

Sagada, Mt. Data, and Mankayan

Aparri (5 stations)

Sanchez Mira, Ballestros,
Buguey, Gonzaga, and Lal-lo

Tuguegarao (5 stations)

Lazam, Nassiping, Sto. Niño,
Alcala, and Baggao

Tuao (7 stations)

Kabugao, Aglalamnan, Piat, Babalog,
Pasonglao, Tomiangan, and Lubuagan

Ilagan (3 stations)

San Mariano, Tumauni, and Cauayan

Santiago (4 stations)

Cabarroguis, Jones, San Augustin, and Maddela

San Mateo (4 stations)

Mayoyao, Alicia, Callang, and Mallig

Bayombong (6 stations)

Diadi, Banaue, Kiangan, Ibulao,
Dalton Pass and Santa. Fe

The organization charts for maintenance and operation in the respective Regions are shown below.

Regional Office
in Region I
(Baguio)

District Office Laoag		District Office Vigan		District Office Baguio		District Office Dagupan		District Office Binalonan	
Toll Exchange:	1	Toll Exchange:	1	Toll Exchange:	1	Toll Exchange:	1	Toll Exchange:	1
Telephone Offices:	10	Telephone Offices:	8	Telephone Offices:	2	Telephone Offices:	7	Telephone Offices:	8
IPTS's:	7	IPTS's:	5	IPTS's:	2	IPTS's:	4	IPTS's:	6
Radio Repeater Stations		Radio Repeater Stations		Radio Repeater Stations		Radio Repeater Stations		Radio Repeater Stations	
Attended:	2	Attended:	1	Attended:	2	Attended:	2	Attended:	1
Unattended:	10	Unattended:	7	Unattended:	7	Unattended:	8	Unattended:	7

Regional Office
in Region II
(Tuguegarao)

District Office Aparri		District Office Tuguegarao		District Office Ilagon		District Office Santiago		District Office Bayombong	
IPTS's:	9	Toll Exchanges:	1	Toll Exchange:	1	Telephone Offices:	4	Toll Exchange:	1
Radio Repeater Stations		Telephone Offices:	4	Telephone Offices:	4	IPTS's:	6	Telephone Offices:	5
Attended:	3	IPTS's:	6	IPTS's:	2	Radio Repeater Stations		IPTS's:	3
Unattended:	5	Radio Repeater Stations		Radio Repeater Stations		Attended:	2	Radio Repeater Stations	
		Attended:	2	Attended:	2	Unattended:	8	Attended:	1
		Unattended:	12	Unattended:	3			Unattended:	6

Fig. X-1 Organization Chart

For these organizations, the following numbers of respective personnel will be required for maintenance and operation.

Engineer or senior staff of the regional and district office.

Two engineers or senior staffs will be provided at each regional office and district office for the supervision, guidance and administration of various maintenance and operating services. Of the 2 engineers to be assigned to each office, one will be in charge of exchanging and line, and the other in charge of radio and transmission.

Regional office: 2 engineers x 2 offices = 4 engineers
District office: 2 engineers x 10 offices = 20 engineers
Total 24 engineers

Engineers of the field

Three engineers to the toll exchange office, one to the local exchange office and two to the attended radio station are proposed.

Their charges are the supervision, guidance and administration of a daily field work.

3 eng. x 7 offices + 1 eng. x 19 offices
number of TS number of LS

+ 2 eng. x 16 stations = 72 engineers
number of radio attended

Two engineers of each maintenance centre are proposed.

2 eng. x 2 centres = 4 engineers

Technicians and Operators

These personnels will be engaged in actual maintenance and operating servicing mainly in the fields of exchange (including telegraph exchange), lines, radio (including telegraph operators), power supply, telegram delivery, maintenance patrol, etc.

In actual personnel arrangement, the required number in each field should be estimated by thoroughly grasping the condition of each field organization.

But one of typical case proposed is as follows. This also mentions the regional and district office respectively.

Parenthesized number shows a number of the station in Phase 1.

Regional office (two)

Director	1
Assit. Director	1
Technicians	3
Clerks	10
<hr/>	
Total	15

District office (10)

Officers	2
Technicians	5
Clerks	5
<hr/>	
Total	12

Maintenance center (2)

Engineers	2
Technicians	6
Clerks	10
<hr/>	
Total	18

Field office

Toll exchange office (7)

Station master	1
Engineers	2
Technicians	10
Operators	3
Teleg. delivery men	3
Clerks and others	4
<hr/>	
Total	23

In case of Vigan PC, Bayombong PC, and Ilagan PC, these areas include BUTEL own exchange offices. Therefore, some of operators will be necessary for particular services to those subscribers whom the exchange offices cover. In other PC case, any BUTEL existing exchange is not in each PC area. But, with similar manner to the above, some operators will be needed for some assistances which is required by private management operators. The required number of operators in connection with the above BUTEL is as follows.

Vigan + Bayombong + Ilagan

8 + 7 + 5 = 20 switch boards.

2 + 2 + 1 = 5 switch boards. (Around clock operators)

Dagupan + Laoag + Baguio + Tuguegarao

2 + 1 + 1 + 1 = 5 switch boards.

Required number of operators is

5 switch boards x 3 shifts + 20 switch boards = 35 persons

Local exchange office (19)

Station master	1
Technicians	6
Teleg. delivery men	3
Clerks and others	4
<hr/>	
Total	14

IPTS (19)

Operators	2
-----------	---

Radio (Attended) station (16)

Station master	1
Engineers in charge	1
Technicians	6
Clerks	4
<hr/>	
Total	12

As a result, totalized numbers of personnels required at Phase 1 are shown on the following table.

	Head	Engineer in charge	Technician	Operator	Teleg. delivery man	Clerk and others	Total
Reg. off.	2	2	6			20	30
Dist. off.		20	50			50	120
T.S	7	14	70	61	21	28	201
L.S	19		114		57	76	266
IPTS				38			38
Radio	16	16	96			64	192
Main-tenance Centre		4	12			20	36
Total	44	56	348	99	78	258	883

Here in we can estimate that 878 personnels are required at Phase 1 project.

As already discussed, 318 personnels might be available by existing staff. About 50% of 318 must be telegram operators.

But the above table shows required operators are not so many.

The rest part of the personnels can be assigned to the clerk.

In case of the Phase 2, 31 local exchange offices and 31 IPTS will be opened.

[On the Phase 2, one toll exchange office, Binalonan, will be opened.

But Binalonan will be L.S at the moment. Only supplements will be made.

Therefore, less personnel will be necessary at the Phase 2.]

The table of required personnels in Phase 2 is shown as follows.

	Head	Engineer in charge	Technician	Operator	Teleg. delivery man	Clerk and others	Total
L.S	31		186		93	124	434
IPTS				62			62
Total	31		186	62	93	124	496

4. Training System

In order to secure the scale of personnel mentioned in the preceding paragraph, a system is required for smooth training of personnel. Facilities expected to be introduced by this project will exhibit required functions by providing maintenance at a high technical level and for this purpose training is essential.

This training will be considerably large in scale and could hardly be covered by the existing training facilities of BUTEL. The number of instructors does not seem to be sufficient. Accordingly, the Government of Japan should make cooperation in the training of engineers to be engaged in this project if so requested by the Government of the Philippines. The scale of this aid plan for the training of personnel should be roughly as follows.

Number of instructors:

Dispatch of a total of about 6 specialist in different fields

Equipment

Communication equipment and test equipment which will amount to about ¥350,000,000

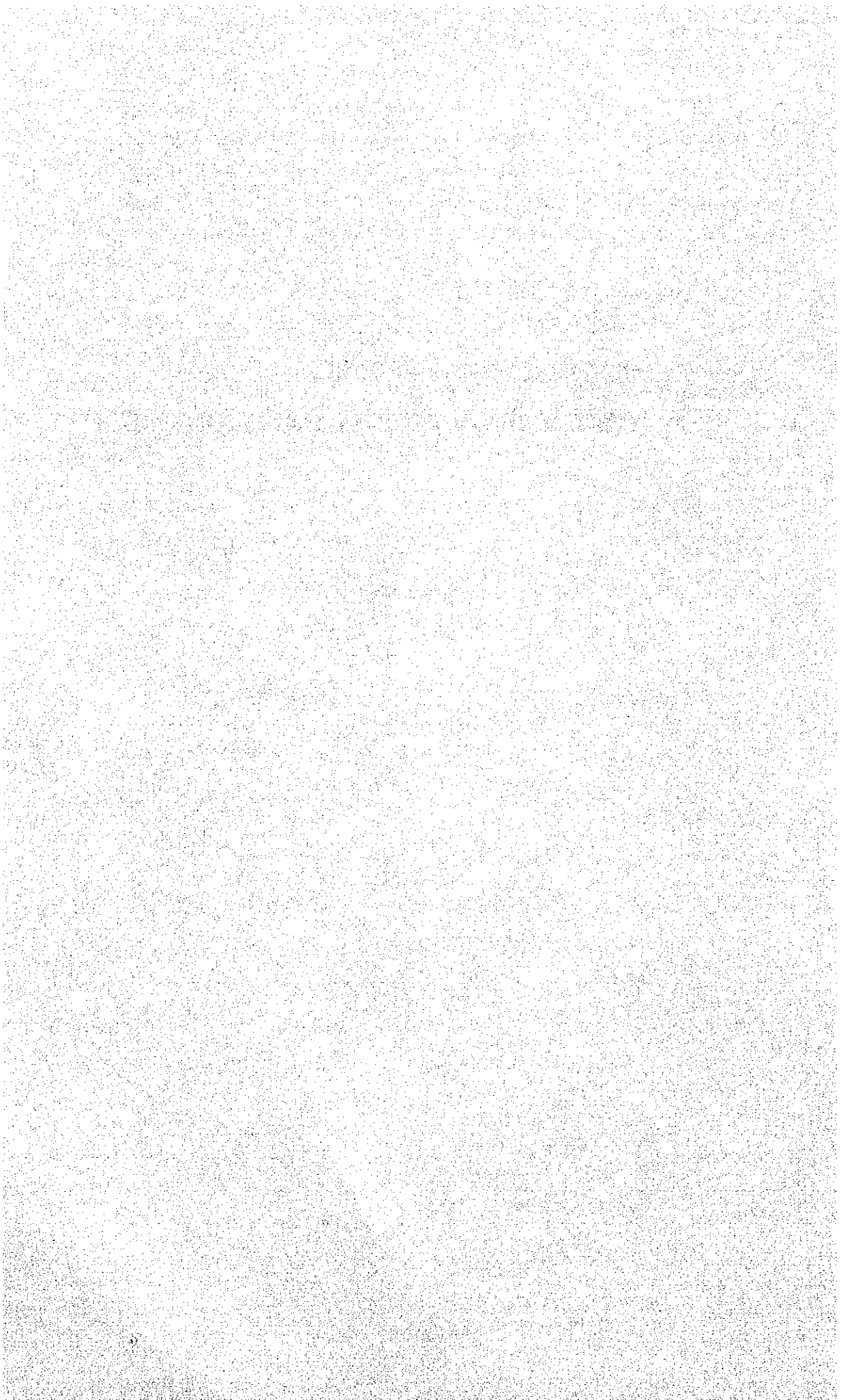
Scale of training

Training for a total of about 50 senior engineers and a total of 200 general engineers (technicians)

Training in Japan

A total of 20 trainees will be trained for three months in Japan.

XI. CONSTRUCTION EXPENSES
(ESTIMATION OF INSTALLATION COST)



XI. CONSTRUCTION EXPENSES (ESTIMATION OF INSTALLATION COST)

1. Outline

Construction expenses are estimated as follows.

- (1) Equipment installation is supposed to be made on the turn-key bases.
- (2) Consultant is supposed to be employed for detailed design, tender assessment, supervision for installation work, inspection and testing.
- (3) Detailed design for each station was not made in this survey, so that estimation was conducted for typical condition of a station or office.
- (4) Construction expenses have been estimated on the basis of prices in Japan in consideration of overseas prices.
- (5) Contingency for unexpected outgo is made 5% of the whole expense. Annual price rise is supposed to be 4% a year for expenses to be covered by foreign currency and 6% a year for expenses to be covered by the domestic currency.
- (6) Items of equipment installation and others to be covered by foreign currency and those to be covered by the domestic currency are as follows.

Items of work to be covered by foreign currency

Switching equipment

Radio and transmission equipment

Telegraph equipment

Power plant

Toll cable (for telephone)

Self-supporting distribution cable

Antennas and feeder

Various test equipment

Telephone sets

Consultant fee

Items of work to be covered by domestic currency

Local cable (for subscriber's lines)

Terminal facilities

Toll cable (for telegraph)

Pole

Station/office buildings

Steel towers

Access roads

Inland transportation

Site procurement and related survey
Storing charge
Procurement and maintenance of vehicles for construction
Provision of laborers
Living allowance

2. Details of Estimation

2-1 Switching Equipment

Estimation has been made on the assumption that all switching equipment will be crossbar type. Test equipment, measuring instrument for maintenance, etc., are also estimated. Estimation for switches is made for typical number of terminals for local exchanges and IPTS's. Estimation for toll exchanges is made for typical facilities and the expected traffic.

2-2 Radio and Transmission

The expenses for radio is estimated by multiplying a typical unit price for each radio system per station by the number of systems. The expense for carrier equipment is estimated by multiplying the unit price per channel of channel translators, per group of group translators or per supergroup of supergroup translator by the number of channels, groups or supergroups. A maintenance center is planned to be located in Baguio and Tuguegarao and expense for such measuring equipment kept there that require comparatively high measuring techniques is estimated.

The expense for toll telephone cables is estimated by modeling the expense to be required per kilometer for every cable pair and multiplying the model expense by the number of planned sections or the length.

The expense for toll telegraph cable are estimated in the same way as expense for toll telephone cables.

2-3 Local Cable and Terminal Facilities

Estimation of subscriber's line facilities is made for every modeled office as stated in paragraph XIII-4-1. The installation expense, transportation fee, expense for base camp management at sites, and expense for spare parts are estimated to be covered by domestic currency and expenses for test equipment and tools are estimated to be covered by foreign currency.

The expense for subscriber station facilities is estimated by multiplying the unit cost per subscriber by the number of initial subscriber lines on condition that all facilities but telephone sets will be covered by the domestic currency.

2-4 Telegraph

The expense for telex exchanges is estimated for a typical number of terminals on condition that all telex exchanges are of crossbar type.

2-5 Power Plant

For the power plants of microwave repeater stations, estimation is made on condition that the battery charge capacity will be 8 hours. For the power plants of other radio repeaters and telephone offices, estimation is made on condition that the battery discharge capacity is 3 hours. Estimation of IPTS is made on condition that only an engine generator with AVR will be furnished at each IPTS without battery.

2-6 Station/Office Buildings, Steel Towers and Access Roads

In the project, architectural construction cost is estimated by a cost per a square meter which imply all of material cost, its construction fee, cost of manufacturing the material, labour cost, interior facilities cost, and administration charge.

Namely, the bldg. cost is estimated by multiplying the cost per a square meter by bldg. floor space. About a radio steel tower, rough design for individual height and types of tower has been first made, then estimated a weight of iron angle material with number of ton. Construction cost per a ton has already been known.

Therefore, the number of the ton is multiplied into the cost per a ton. The cost per a ton implies all of steel material cost, manufacturing charge, assembling fee, tower foundation construction fee, transportation fee, and all administration cost. About road construction cost, the cost is estimated on the basis of a cost per a kilo-meter. Estimation of land procurement cost is based on a donation for town area sites but the estimation for hilly area is based on purchasing.

The expenses needed by the civil work are mostly estimated as local currency, but the expenses of designing radio towers and of supervising the installation work are considered as foreign currency.

2-7 Item of "Others"

For "Others", the expense for the stay of Japanese engineers in the Philippines, inland transportation of equipment and materials, expense for vehicles for construction, and textbooks and other materials for training are included.

2-8 Consultant Fee

The consultant fee of 1979 fiscal year expenditure comprises the expenses of drawing up the detailed design and making the tender specification for the installation of telecommunication facilities except local cables, and expense of making the basic plan of civil works. The expenditure after 1980 comprises the expenses of the followings

- (1) bidder evaluation for the installation of telecommunication facilities except local cables.
- (2) supervising the installation of telecommunication facilities except local cable.
- (3) control and coordination for the construction schedule of civilworks.
- (4) Acceptant test

3. Results of Estimation of Construction Expenses

Table XI-1 gives the results of estimation for construction expenses.

Table XI-1 Estimated construction expenses

Item	Phase 1		Phase 2	
	Foreign currency (million ¥)	Local currency (million Peso)	Foreign currency (million ¥)	Local currency (million Peso)
Exchange	1,176	0	1,093	0
Radio/Transmission (include Toll Cable)	2,444	4.5	1,329	5.3
Telegraph	250	0	274	0
Local cable/Subscriber stn. equipment	61	27.2	97	29.7
Power plant	784	0	426	0
Civil work	181	62.3	89	35.6
Others	0	10.1	0	5.6
Contingency (include price escalation)	626	12.1	822	23.6
Sub-total	5,522	116.2	4,130	99.8
Consultant fee (Design, supervising)	393	3.7	265	2.7
Grand total	5,915	119.7	4,395	102.5

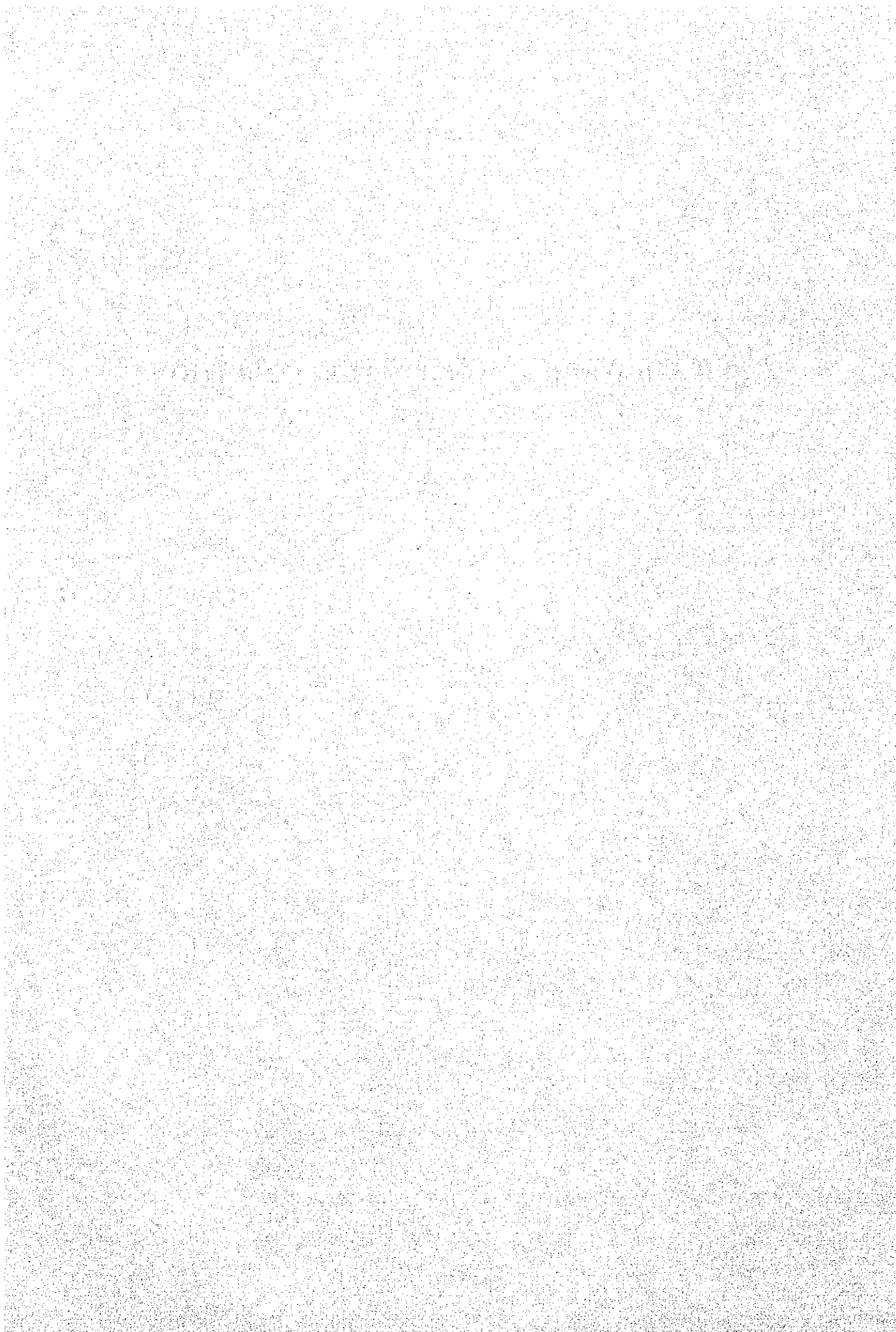
4. An Example of Disbursement Schedule

An example of disbursement schedules in foreign and domestic currencies for Phase 1 is as follows.

Table X-2

Year	Foreign Currency (million ¥)	Domestic Currency (million Peso)
1979	247	32.2
1980	1,577	49.4
1981	2,293	21.4
1982	1,798	16.9
Total	5,915	119.9

XII. BUTEL'S ADMINISTRATION CONDITION



XII. BUTEL'S ADMINISTRATION CONDITION

1. General

The accounting method of BUTEL is not like that of an ordinary enterprise engaged in an undertaking but is the same as that of the government. Depreciation of fixed assets is not employed and cash accounting is adopted. When expenditure can not be covered by incoming, supplementation is made from the general revenue source of the country.

Under these circumstances, it is extremely difficult to analyze the financial condition of BUTEL as an enterprise.

The balance sheet of BUTEL shows that the income from its undertaking covers only a part of its expenditure. One of the reasons for this condition is that BUTEL's rate standard is made rather low from policy. Another reason for the BUTEL's financial condition is that BUTEL provides, as its nature, service to areas of low earning rates.

Thus, BUTEL, in system and in reality, need not balance its incoming and outgoing or make earnings positively, and don't have much consciousness of being an enterprise.

2. Incoming and Outgoing

Table XII-2-1 shows BUTEL's incomes and expenditures in the recent years.

Table XII-2-2 shows BUTEL's operations statement of 1977. Items used in the balance sheet are identical to those of general accounts of the Government.

Table XII-2-1 Income and Expenditure of BUTEL

(10000 peso)

	FY 1969~70	FY 1970~71	FY 1971~72	FY 1972~73	FY 1973~74	CY 1975	CY 1976	CY 1977
Total Income	936	1116	-	-	1051	-	- (620)	1463
Total Expenditure	1992	2346	-	-	3940	6160	6698 (3056)	7293
Loss	1056	1230	-	-	2889	-	- (2436)	5830

- 1) For blank columns, data has not be obtained.
- 2) Calendar years are employed since 1975. Before that fiscal years (July to June) were used.
- 3) Figures in () in 1976 are those for the period of July to December, 1976.

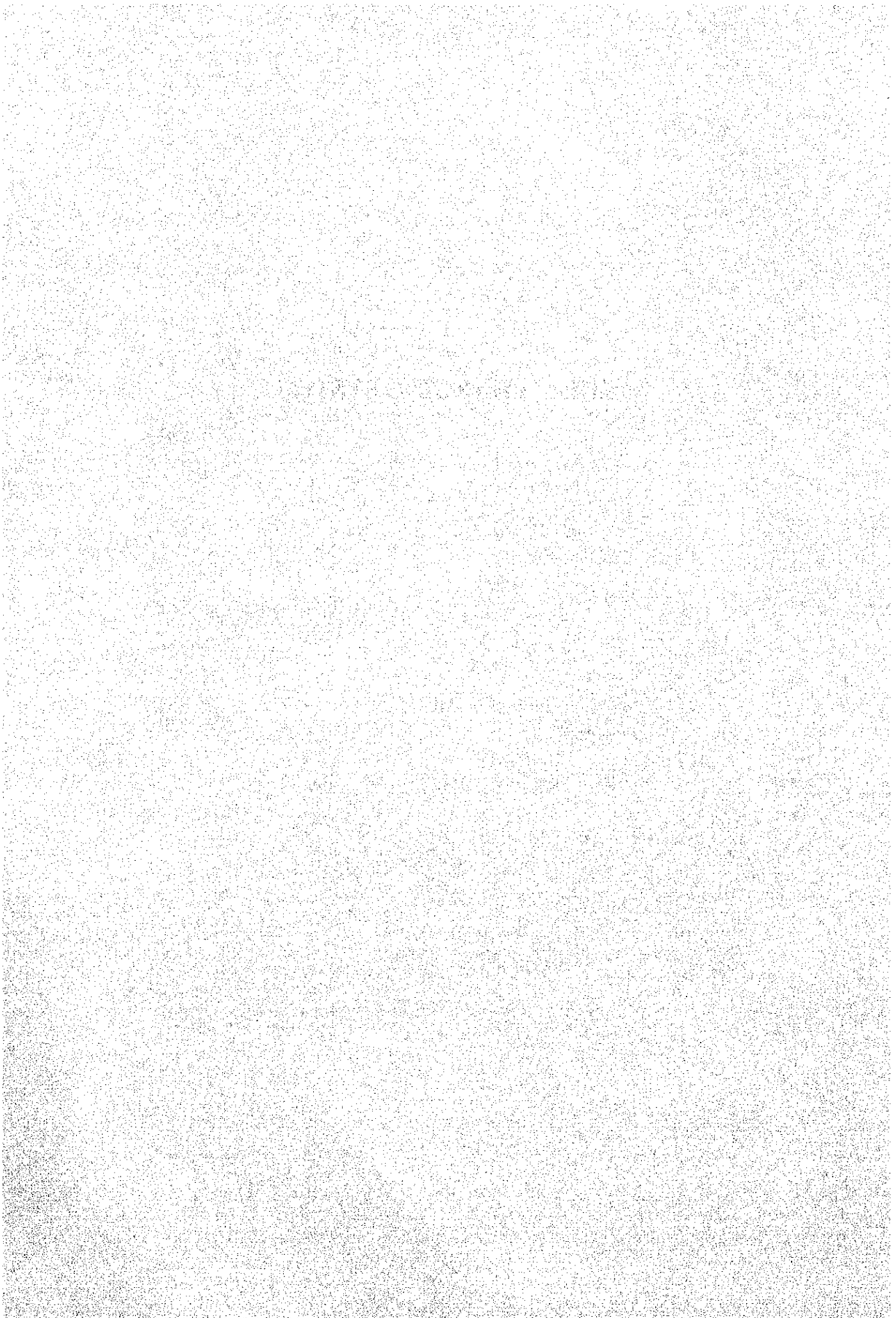
Table XII-2-2 Operations Statement of BUTEL
(1977.1.1 ~ 1977.12.31)

(Unit: Peso)

Income:	
Operating and Service Income	13,843,395.88
- Government Service	34,879.96
- Government Business Operation	13,808,515.92
Miscellaneous Income	786,534.35
- Fines and Penalties	14,147.23
- Miscellaneous Receipt	625,180.71
- Sales of Assets	147,206.23
Total Income	14,629,930.23
Expenditure	
Personal Service	54,620,429.14
Maintenance & Other Operating Expences	18,310,054.48
Total Expenditure	72,930,483.62
Loss	58,300,553.39

* General fund

XIII. CHARGING SYSTEM



XIII. CHARGING SYSTEM

1. Present Charging System

1-1 Telegram Rates of BUTEL

The latest revision of BUTEL's rates of telegraph was made in October 1976. The present BUTEL's rates of telegraph are outlines hereunder.

PLAIN - Ordinary

Up to 10 words P 2.50

For every additional word P 0.25

PLAIN - Rush or Urgent

Up to 10 words P 5.00

For every additional word P 0.50

CODE OR CIPHER, ETC. - Ordinary

Up to 10 words P 3.85

For every additional word P 0.38

CODE OR CIPHER, ETC. - Rush or Urgent

Up to 10 words P 7.70

For every additional word P 0.75

CITYGRAM - Ordinary

Up to 20 words P 1.75

For every additional word P 0.08

CITYGRAM - Rush or Urgent

Up to 20 words P 3.50

For every additional word P 0.15

NIGHT LETTERGRAM

Up to 25 words P 3.00

For every additional word P 0.12

PRESS TELEGRAMS (Domestic)

Up to 10 words P 0.50

For every additional word P 0.05

The above charging rates are all full rates. In addition to these telegrams, BUTEL handles 3 special low-rate telegrams to be sent by social request or governmental necessity (special-rate and nominal-rate telegrams) and also free-charge telegrams used for specific administrative operations in election, statistic analysis, etc. (free messages), which occupy a considerable percentage of all telegrams handled by BUTEL.

(See Table XIII-1-1)

1-2 Telephone Charges

BUTEL's telephone charges comprise rental fee, installation fee, transfer fee, and toll call charges. Local calls are free of charge irrespective of the times and duration of calls. In addition, a deposit money is required upon installation of a telephone set or other sets, etc. BUTEL's offices in respective areas have booths which allows toll calls to be made and most of toll calls handled by BUTEL are from these booths.

Table XIII-1-1 Volume of Telegrams Handled

	Full Rate	Nominal Rate Special Rate	Free Messages
1973	1,735,769	232,065	1,834,762
1974	1,050,457	207,642	1,324,575
1975	1,828,201	210,691	1,256,257
1976	1,377,740	172,308	1,812,752
1977	1,080,688	135,000	1,339,629

Among BUTEL's telephones installed in specific administrative authorities, some are free of charge although the number of such free-charge telephones is not so many. The latest revision of telephone rates was made in October. The present telephone charges are outlined hereunder.

(1) Rent (Monthly)

Single line for residence	P 30.00
Single line for business	P 40.00
Party line for residence	P 18.00
Party line for business	P 30.00

(2) Installation rate

First one telephone set	P 15.00
For every additional telephone set	P 7.50

(3) Transfer rate

a) Telephone set (per set)

Transfer within a building	P 5.00
Transfer from one building to another building or from one street to another street	Same as installation rate

b) Rate for change of type P 7.50

- (4) Deposits money
- | | |
|----------------------------|---|
| a) Deposite for facilities | P 100.00 |
| b) Deposit for guaranty | Rental for 2 months depending on
the type of telephone |

The above deposits are partly used for uncollected charges, and the remainder will be returned to the subscriber upon ceasing the service.

- (5) Toll call rate (Rate for long-distance calls)

An outline of BUTEL's toll call rate is as given in Table XIII-1-2.

Although BUTEL has no public telephone, the rate of public telephone installed in Manila by PLDT is 0.3 pesos per call.

1-3 Telephone Rates of PLDT

PLDT's telephone rates are given hereunder for reference' sake.

- (1) Rent (Monthly)

Single line for residence	P 35.20
Single line for business	P 63.61
Party line for residence	P 26.59
Party line for business	P 47.56

These rates are for desk type telephones in the Luzon area which have been revised in August 1975.

- (2) Toll call rates (Rate for long-distance calls)

As given in Table XIII-1-3.

Table XIII-1-2 Rate for Long Distance Calls (BUTEL)

AIR DISTANCE IN KMS		STATION TO STATION		PERSON TO PERSON	
FROM	TO	WEEKDAYS	NIGHT & SUNDAYS	WEEKDAYS	NIGHT & SUNDAYS
	20	P .20	P .20	P .30	P .20
24	30	.35	.30	.50	.40
31	40	.55	.40	.75	.60
41	50	.75	.65	1.10	.90
51	60	1.00	.75	1.45	1.10
61	70	1.20	1.00	1.70	1.35
71	80	1.40	1.10	2.00	1.60
81	90	1.60	1.25	2.30	1.85
91	100	1.80	1.45	2.65	2.05
101	120	2.00	1.60	2.90	2.35
121	140	2.25	1.80	3.20	2.55
141	160	2.45	1.95	3.50	2.80
161	180	2.65	2.10	3.85	3.05
181	200	2.85	2.30	4.10	3.30
201	225	3.10	2.45	4.40	3.50
226	250	3.30	2.65	4.70	3.75
251	275	3.50	2.80	5.05	4.00
276	300	3.70	2.95	5.30	4.25
301	325	3.90	3.15	5.60	4.50
326	350	4.15	3.30	5.90	4.70
351	375	4.35	3.50	6.25	4.95
376	400	4.55	3.65	6.50	5.20
401	425	4.75	3.80	6.80	5.45
426	450	4.95	4.00	7.00	5.70
451	475	5.20	4.15	7.45	5.90
476	500	5.40	4.35	7.70	6.15
501	525	5.55	4.40	7.90	6.30
526	550	5.65	4.55	8.10	6.50
551	575	5.80	4.60	8.30	6.65
576	600	5.95	4.75	8.50	6.80
601	625	6.10	4.90	8.70	6.95
626	650	6.25	4.95	8.90	7.10
651	675	6.35	5.10	9.10	7.30

AIR DISTANCE IN KMS		STATION TO STATION		PERSON TO PERSON	
FROM	TO	WEEKDAYS	NIGHT & SUNDAYS	WEEKDAYS	NIGHT & SUNDAYS
676	700	6.50	5.20	9.30	7.45
701	725	6.65	5.30	9.50	7.60
726	750	6.80	5.45	9.70	7.75
751	775	6.95	5.55	9.90	7.90
776	800	7.05	5.65	10.10	8.10
801	825	7.20	5.75	10.30	8.25
826	850	7.35	5.90	10.50	8.40
851	875	7.50	6.00	10.70	8.55
876	900	7.65	6.10	10.90	8.70
901	925	7.75	6.25	11.10	8.90
926	950	7.90	6.30	11.30	9.05
951	975	8.05	6.45	11.50	9.20
976	1000	8.20	6.60	11.70	9.35
1001	1050	8.35	6.65	11.90	9.50
1051	1100	8.45	6.80	12.10	9.70
1101	1150	8.60	6.85	12.30	9.85
1151	1200	8.75	7.00	12.50	10.00
1201	1250	8.90	7.15	12.70	10.15
1251	1300	9.05	7.20	12.90	10.30
1301	1350	9.15	7.35	13.10	10.50
1351	1400	9.30	7.40	13.30	10.65
1401	1450	9.45	7.55	13.50	10.80
1451	1500	9.60	7.70	13.70	10.95
1501	1550	9.75	7.75	13.90	11.10
1551	1600	9.85	7.90	14.10	11.30

* These rates shall be for the first two minutes. Revenue time in excess of the initial two minutes period shall be charged for at one half.

Table XIII-1-3 Rate for Long Distance Calls (PLDT)

AIR DISTANCE IN KMS			STATION TO STATION		PERSON TO PERSON	
			DAY:	NIGHT & SUNDAYS	DAY:	NIGHT & SUNDAYS
0	to less than	20	P 0.20	P 0.20	P 0.30	P 0.25
20	" "	28	0.40	0.25	0.60	0.30
28	" "	36	0.60	0.40	0.75	0.60
36	" "	44	0.80	0.60	1.15	0.75
44	" "	52	1.00	0.65	1.35	0.90
52	" "	60	1.15	0.80	1.65	1.15
60	" "	68	1.35	1.00	1.95	1.35
68	" "	76	1.55	1.15	2.25	1.60
76	" "	84	1.75	1.15	2.50	1.80
84	" "	92	1.95	1.35	2.85	2.05
92	" "	100	2.15	1.55	3.00	2.05
100	" "	110	2.35	1.55	3.40	2.25
110	" "	120	2.55	1.75	3.60	2.50
120	" "	130	2.75	1.95	3.90	2.70
130	" "	140	2.95	1.95	4.20	2.95
140	" "	150	3.00	2.15	4.50	3.15
150	" "	160	3.30	2.35	4.75	3.40
160	" "	170	3.50	2.55	5.10	3.60
170	" "	180	3.70	2.55	5.25	3.60
180	" "	190	3.90	2.75	5.65	3.85
190	" "	200	4.10	2.95	5.85	4.05
200	" "	220	4.30	2.95	6.15	4.30
220	" "	240	4.50	3.10	6.45	4.50
240	" "	260	4.70	3.30	6.75	4.75
260	" "	280	4.90	3.30	7.00	4.95
280	" "	300	5.05	3.50	7.35	5.20
300	" "	325	5.25	3.70	7.50	5.20
325	" "	350	5.45	3.90	7.90	5.40
350	" "	375	5.65	3.90	8.10	5.65
375	" "	400	5.85	4.10	8.40	5.85
400	" "	425	6.05	4.30	8.70	6.10
425	" "	450	6.25	4.30	9.00	6.30
450	" "	480	6.45	4.50	9.25	6.55
480	" "	510	6.65	4.70	9.60	6.75

AIR DISTANCE IN KMS				STATION TO STATION		PERSON TO PERSON	
				DAY:	NIGHT & SUNDAYS	DAY:	NIGHT & SUNDAYS
510	to less than	540	6.85	4.70	9.75	6.75	
540	" "	570	7.00	4.90	10.15	7.00	
570	" "	600	7.20	5.05	10.35	7.20	
600	" "	635	7.40	5.25	10.65	7.45	
635	" "	670	7.60	5.25	10.95	7.65	
670	" "	705	7.80	5.45	11.25	7.90	
705	" "	740	8.00	5.65	11.50	8.10	
740	" "	775	8.20	5.65	11.85	8.35	
775	" "	810	8.40	5.85	12.00	8.55	
810	" "	845	8.60	5.85	12.40	8.80	
845	" "	880	8.80	6.05	12.60	8.80	
880	" "	915	8.95	6.25	12.90	9.00	
915	" "	950	9.15	6.45	13.20	9.25	
950	" "	985	9.35	6.65	13.50	9.45	
985	" "	1020	9.55	6.65	13.75	9.70	
1020	" "	1070	9.75	6.85	14.10	9.90	
1070	" "	1120	9.95	7.00	14.25	9.90	
1120	" "	1170	10.15	7.00	14.65	10.15	
1170	" "	1220	10.35	7.20	14.85	10.35	
1220	" "	1270	10.55	7.40	15.15	10.60	
1270	" "	1320	10.75	7.40	15.45	10.80	
1320	" "	1370	10.90	7.60	15.75	11.05	
1370	" "	1420	11.10	7.80	16.00	11.25	
1420	" "	1470	11.30	7.80	16.35	11.50	
1470	" "	1520	11.50	8.00	16.50	11.50	

2. Rate System of This Project

2-1 Rate recording system

One of the major objectives to be established in this project, is the introduction of STD service. There are the following two STD rate recording systems.

- 1) Bulk billing system: In this system charges for local calls and toll calls are summed up and recorded on a subscriber meter.
- 2) Detailed billing system: In this system, the dialed number, the time of starting dialing, the time of completion, etc., of every toll call is recorded.

The detailed billing system has the disadvantages of (1) expensive charging equipment and (2) high cost for the preparation of bills for individual subscribers. For the charging method to be employed in this project, the bulk billing system is proposed in which local calls are metered by subscriber meters to be installed at individual subscribers and toll call charges are also recorded on the subscriber meters of the individual subscribers.

2-2-2 Tariff

Charges should be fair and comprehensible to all subscribers. Reasonableness in charging technique and in the cost of facilities is also important. Through synthetic examination of the present rate system of BUTEL and those used in various overseas countries, the following are proposed.

(1) Introduction of periodic pulse metering method

In the periodic pulse metering method, a given unit charge is set as the base and the duration for which the call can be continued by the unit charge is determined by the distance. This method provides such a rationality that long-distance calls can be made at low charges if they are short in the duration of call.

(2) Types of calls and tariffs

- 1) Local calls (calls between subscribers within a local exchange area): One message rate/call
- 2) Intra-provincial calls (calls between subscribers within a province): One message rate/30 sec.

- 3) Inter-provincial calls (calls between subscribers in different provinces): By periodic pulse metering method

<u>Distance Range</u>	<u>Unit Duration</u>
Less than 80 km	20 seconds
80 ~ 150 km	12
150 ~ 250 km	8
250 ~ 450 km	6
450 ~ 750 km	6
More than 750 km	4

- 4) Message rate: P 0.30

- (3) In consideration of the extreme increase of telephone utility by the introduction of STD, there is a possibility of raising the rental. It is recommendable to limit the amount of revision to five pesos or so for both household and business use even if the present rates of BUTEL are lower than those of other operators, in consideration of the drastic change of local call charge from "free" to "charged".

2-2-3 Other Rates

For other rates, the present rates will be continued. Many BUTEL's rates are made low by policy. Some of its services are even free. In particular, BUTEL presents services by telecommunications networks, and uncharged services and low rates may sometimes greatly affect the efficiency of the whole network. Accordingly, rates should be set at proper levels as much as practicable.

