JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

SRI LANKA TELECOM (SLT)

THE STUDY ON TELECOMMUNICATIONS NETWORKS IN THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA

FINAL REPORT

VOLUME-III

FEASIBILITY STUDY FOR THE PRIORITY PROJECTS

MAY 1996

NIPPON TELECOMMUNICATIONS CONSULTING CO., LTD. (NTC)

JAPAN TELECOMMUNICATIONS ENGINEERING
AND CONSULTING SERVICE (JTEC)

TOKYO, JAPAN

CURRENCY AND EQUIVALENT UNITS

As of May 1995

Currency Unit	=	Sri Lanka Rupees(SRs)
US$ 1.00	=	SRs 50.0
SRs 1.00	=	US$ 0.02

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

SRI LANKA TELECOM (SLT)

THE STUDY
ON
TELECOMMUNICATIONS NETWORKS
IN
THE DEMOCRATIC SOCIALIST REPUBLIC OF
SRI LANKA

FINAL REPORT

VOLUME-III

FEASIBILITY STUDY FOR THE PRIORITY PROJECTS

MAY 1996

NIPPON TELECOMMUNICATIONS CONSULTING CO., LTD. (NTC)

JAPAN TELECOMMUNICATIONS ENGINEERING
AND CONSULTING SERVICE (JTEC)

TOKYO, JAPAN

PREFACE

In response to a request from the Government of the Democratic Socialist Republic of Sri Lanka, the Government of Japan decided to conduct a study on Telecommunications Networks in the Democratic Socialist Republic of Sri Lanka and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Sri Lanka a study team headed by Mr. Tatsumi AMANO, Nippon Telecommunications Consulting Co., Ltd., three times between March 1995 and May 1996.

The team held discussions with the officials concerned of the Government of Sri Lanka, and conducted field surveys at the study area. After the team returned to Japan, further studies were made and the present report was prepared.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Democratic Socialist Republic of Sri Lanka for their close cooperation extended to the team.

May 1996

Kimio Fujita
President
Japan International Cooperation Agency

May 1996

Mr. Kimio Fujita
President
Japan International Cooperation Agency

Dear Mr. Fujita:

Letter of Transmittal

It is our great pleasure to submit to you the Study Report on Telecommunications Networks in the Democratic Socialist Republic of Sri Lanka.

This report has been prepared by Nippon Telecommunications Consulting Co., Ltd. (NTC) and Japan Telecommunications Engineering and Consulting Service (JTEC), based on a contract with JICA. The study team conducted the works from March 1995 to May 1996.

The study aims at formulating the master plan for telecommunications networks development up to the year 2015 and feasibility study for priority projects which will be implemented by the year 2000, in the Democratic Socialist Republic of Sri Lanka.

Objective areas of the study covered the whole country for the master plan and several target areas for the feasibility study. Through field surveys and analyses of data / information collected, the master plan has been drawn up covering mainly development targets and strategies, network development plan, facilities plan, implementation plan, operation / maintenance / human resource plans as well as cost estimate and project evaluation. The feasibility study has been made for three priority projects identified as a result of the master plan study.

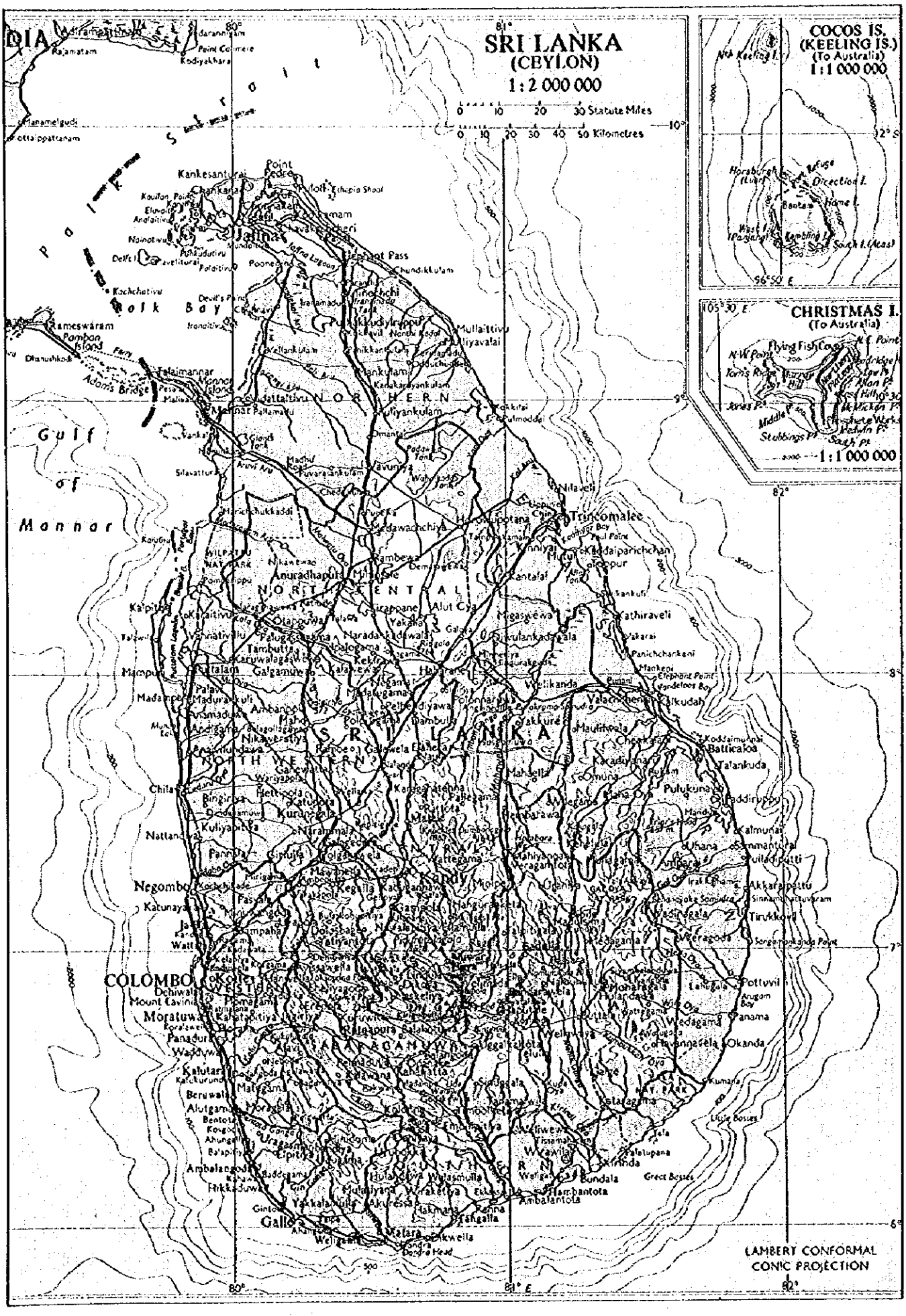
We wish to take this opportunity to express our deep gratitude to the officials concerned of the Japan International Cooperation Agency and other authorities concerned of the Government of Japan. We wish to offer our sincere appreciation to the officials concerned of Ministry of Posts and Telecommunications, Sri Lanka Telecom and other authorities concerned of the Government of Sri Lanka for their unlimited cooperation and assistance extended to the study team in connection with the execution of their duties.

Finally, we earnestly hope that this report will contirbute to future telecommunications development in the Democratic Socialist Republic of Sri Lanka.

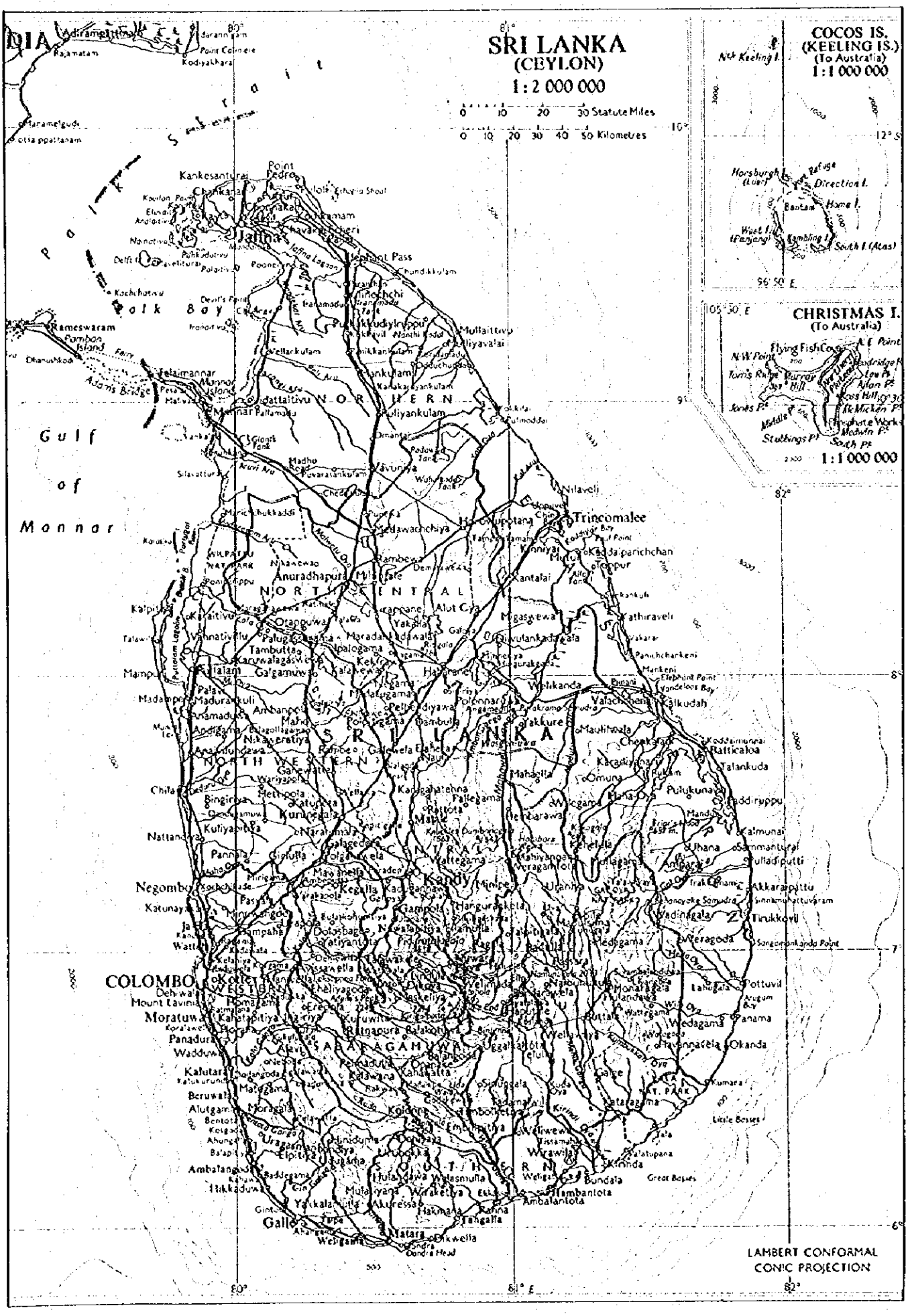
Very truly yours,

Tatsumi Amano
Team Leader
Study on Telecommunications Networks
in the Democratic Socialist Republic
of Sri Lanka

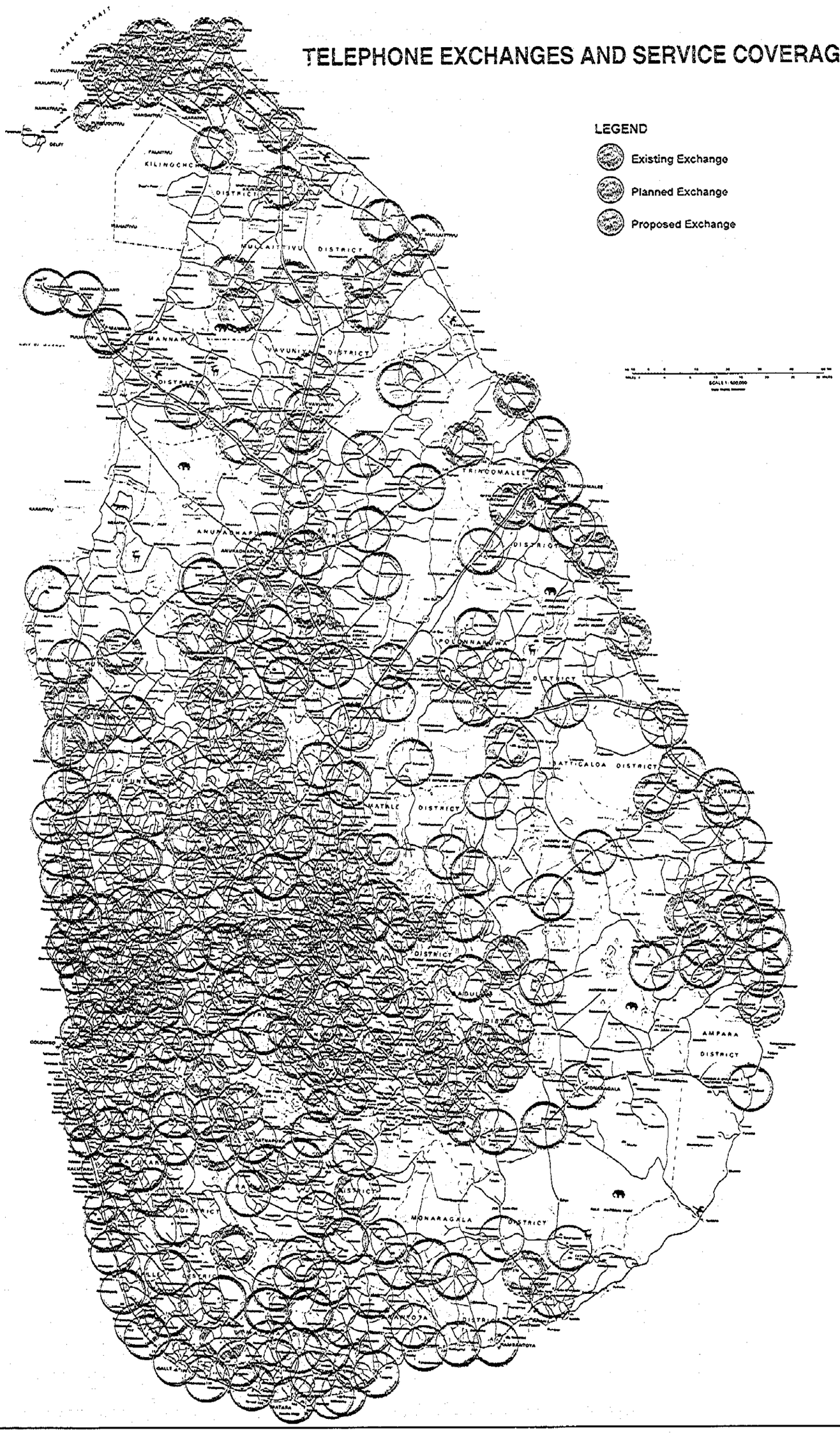
THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA



THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA



TELEPHONE EXCHANGES AND SERVICE COVERAGE



CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

ADB	Asian Development Bank
AMPS	Advanced Mobile Phone Services
ATM	Asynchronous Transfer Mode
B-ISDN	Broadband ISDN
BOO	Build, Own and Operate
BOT	Build, Operation and Transfer
BTT	Turnover Tax
CC	Country Code
CCB	Coin and Collection Box Telephone
CCS	Common Channel Signalling System
CLR	Circuit Loudness Rating
CSPDN	Circuit Switched Public Data Network
DANIDA	Danish International Development Agency
DEL	Direct Exchange Line
DF/R	Draft Final Report
DGT	Director General of Telecommunications
DN	Destination Network
DNC	Destination Network Code
DP	Distribution Point
DRMASS	Digital Radio Multiple Access Subscriber System
DUP	Data User Part
EDCF	Economic Development Co-operation Fund, Korea
EIRR	Economic Internal Rate of Return
ERC	Economic Restructure Credit
ERC II	Economic Restructure Credit II
F/R	Final Report
F/S	Feasibility Study
FDM	Frequency Division Modulation
FIRR	Financial Internal Rate of Return
FIRROE	Financial Internal Rate of Return on Equity
FIRROI	Financial Internal Rate of Return on Investment
FISU	Fill-in Signal Unit
FM	Frequency Modulation
FOTS	Fibre Optic Transmission System
GCTNIP	Greater Colombo Telecommunications Network Improvement Project
GDP	Gross Domestic Product
GMDSS	Global Maritime Distress and Safety System
GOSL	Government of Sri Lanka
GRDP	Gross Regional Domestic Product
GSM	Global System for Mobile Communication
HF	High Frequency
IC/R	Inception Report
IDA	International Development Bank
IDD	International Direct Dialling
IDN	Integrated Digital Network

IN	Intelligent Network
INMARSAT	International Maritime Satellite Organisation
INTELSAT	International Satellite Organisation
ISC	International Switching Centre
ISDN	Integrated Services Digital Network
ISPC	International Signalling Point Code
ISUP	ISDN User Part
IT/R	Interim Report
ITU	International Telecommunications Union
JICA	Japan International Co-operation Agency
LAN	Local Area Network
LE	Local Exchange
LR	Loudness Rating
LSSU	Link Status Signal Unit
M/P	Master Plan
MF	Medium Frequency
MIS	Management Information System
MSU	Message Signal Unit
MTP	Message Transfer Part
N-ISDN	Narrowband ISDN
NPV	Net Present Value
NSB	National Saving Bank
NSC	National Switching Centre
NSN	National Significant Number
O&M	Operation and Maintenance
ODA	Official Development Assistance
OECF	Overseas Economic Cooperation Fund, Japan
OLR	Overall Loudness Rating
PAD	Packet Assembly / Disassembly
PCM	Pulse Code Modulation
PDCA	Plan, Do, Check and Action
PDH	Presiochronous Digital Hierarchy
PIP	Public Investment Programme
POTS	Plain Ordinary Telephone Service
PSPDN	Packet Switched Public Data Network
PSTN	Public Switched Telephone Network
QC	Quality Control
RLR	Receiving Loudness Rating
RSU	Remote Switching Unit
RTE	Regional Telecommunications Engineer
SCCP	Signalling Connection Control Part
SCP	Signal Control Point
SCPC	Single Channel Per Carrier
SDH	Synchronous Digital Hierarchy
SEA-ME-WE3	International Submarine Cable (via South East Asia - Middle East - Western Europe)
SLR	Sending Loudness Rating

SLT	Sri Lanka Telecom
SLTA	Sri Lanka Telecommunications Authority
SLTD	Sri Lanka Telecommunications Department
SN	Subscriber Number
SRS	Subscriber Radio System
SSC	Secondary Switching Centre
STD	Subscriber Trunk Dialling
TACS	Total Access Communications System
TC	Trunk Code
TCAP	Transaction Control Application Protocol
TDM	Tandem Switch
TMN	Telecommunications Management Network
TQC	Total Quality Control
TSC	Tertiary Switching Centre
TUP	Telephone User Part
UHF	Ultra High Frequency
UPT	Universal Personal Communications
VHF	Very High Frequency
WB	World Bank

List of SLT's Telephone Exchange Codes (Alphabetical Order)

Exchange Name	Code
Ambanpola	ABP
Anuradhapura (OLD)	AD
Adampan	ADP
Ambalangoda	AG
Akuressa	AK
Alawwa	ALW
Angoda	AN
Anamaduwa	ANA
Angunukolapelassa	ANK
Agarapatana	AP
Ampitikanda	APK
Ampara	APR
Ambalantota	AQ
Akkaraipatthu	AR
Aralaganvila	ARG
Akurana	ARN
Attanakadawala	ATK
Ankumbura	AU
Achchuveli	AV
Awissawella	AW
Aranayaka	AY
Ayagama	AYG
Bogawantalawa	BA
Bambarabotuwa	BBT
Batticaloa	BC
Batticaloa 5ESS	BC1
Badulla	BD
Bandaragama	BDG
Badalgama	BDL
Baddegama	BE
Balangoda	BG
Bengamuwa	BGM
Bibile	BI
Badalkubura	BK
Bakamuna	BKM
Beliatta	BL
Boralanda	BLD
Bulathsinhala	BLS
Bingiriya	BN
Beruwala	BR
Beralapanatara	BRP
Baduraliya	BRY
Boralesgamuwa	BS
Bentota	BT
Battuluoya	BTL
Bulatkohupitiya	BU
Bandarawela	BW
Buttala	BZ
China Bay	CB

Exchange Name	Code
Central Camp	CC
Cheddikulam	CDD
Cheddipalaiyam	CDP
Craig Head	CHD
Chunnakam	CK
Central North E-10	CN
Chavakachcheri	CV
Chilawathura	CVT
Chilaw	CW
Central City E-10B	CY
Dambulla	DB
Diyabeduma	DBD
Dodangoda	DD
Diddeniya	DDN
Dolosbage	DG
Dehiatta Kandiya	DHK
Deraniyagala	DI
Digana	DIN
Dunagaha	DJ
Dankotuwa	DK
Deniyaya	DN
Peradeniya	DN
Delft	DQ
Dodanduwa	DU
Dikwella	DW
Thimbolketiya	EH
Embilipitiya	EMB
Elpitiya	EP
Eppawala	EPA
Erukkalampiddi	ERK
Eravur	EV
Galhinna	GAN
Giribawa	GB
Galle CONT.	GC
Ganemulla	GE
Galagedara	GG
Galgamuwa	GGM
Galaha	GH
G.Ihala Korale	GIK
Galkiriyagama	GKY
Galle SSC	GL
Galenbindunawewa	GLE
Galnewa	GLN
Galewela	GLW
Galigamuwa	GM
Gomarankadawala	GMK
Galamunnai	GMW
Gelioya	GO
Gampola	GP

Exchange Name	Code
Gampaha	GQ
Gampaha 1	GQ1
Gampaha 2	GQ2
Girandurukotte	GRK
Ginigathena	GT
Giriulla	GU
Hakmana	HA
Hambantota	HB
Habarana	HBR
Hokandara	HC
Habaraduwa	HD
Handessa	HDS
Haliela	HE
Hungama	HGB
Hingurana	HGR
Havelock TOWN	HK
Hikkaduwa	HKD
Hadummulla	HM
Hingurakgoda	HN
Homagama	HO
Haputale	HP
Hiripitiya	HPT
Horana	HR
Horowpathana	HRP
Hatton	HT
Halgran oya	HY
Hettipola	HZ
Inginiya	IG
Inginiyagala	IGG
Iakachi	IK
Imaduwa	IM
Irataperiyakulam	IPK
Jaffna	JA
Jaela	JL
Kadugannawa	KA
Kataragama	KAG
Kaleliya	KAL
Kalpitiya	KAP
Kayts	KB
Kebitigollawa	KBT
Kochchikade	KC
Kuchchaweli	KCH
Kochchikade (RS)	KCR
Koslanda	KD
Kottegoda	KDE
Kodikamam	KDK
Kaduwela	KDL
Kandaketiya	KDT
Kadawata	KDW

List of SLT's Telephone Exchange Codes (Alphabetical Order)

Exchange Name	Code
Kotadeniyawa	KDY
Kegalle	KE
Kiriella	KEL
Kurunegala	KG
Kahatagasdigiliya	KGD
Kelaniya	KI
Kiliveddi	KID
Kamburupitiya	KJ
Kalmune	KL
Kolonna	KLN
Kuliyapitiya	KLY
Kotmale	KM
Kirimetiyana	KMT
Kankasanture	KN
Kantale	KNT
Kinniya	KNY
Kilinochchi	KO
Kosgoda	KOD
Kotiyakumbura	KOK
Kosgama	KOM
Kotapola	KOP
Katupota	KP
Kollupitiya	KPT
Kopay	KPY
Karainagar	KRG
Katugastota	KS
Kalutara	KT
Kathankudi	KTK
Katana	KTN
Katunayake	KTY
Kitulgala	KV
Karaveddy	KVD
Kehelwatta	KHW
Kuruwita	KW
Karawitagara	KWA
Kekirawa	KWA
Karuwalagaswewa	KWG
Kirindiwela	KWL
Kalawana	KWN
Kotte	KX
Kandy (A)	KYA
Kandy (B)	KYB
Kandy (C)	KYC
Karadiyanaru	KYN
Kandy TSC	KYT
Lunugamwehera	LGW
Laggala Pallegama	LPG
Lunuwila	LU
Malwana	MAL

Exchange Name	Code
Mannar	MB
Mahakumbukkadawala	MBD
Marawila	MC
Madu Church	MCH
Maradana	MD
Medagama	MDG
Madurankuliya	MDK
Mundel	MDL
Madu Road	MDR
Mardankadawala	MDW
Maskeliya	ME
Moratuwa	MF
Mattegoda	MG
Magandena	MGD
Megahatenna	MGE
Negampaha	MGP
Matara	MH
Maharagama	MHG
Mirigama	MI
Middeniya	MIA
Monaragala	MJ
Makandura	MKD
Mankulam (Jaffna SSC)	MKL
Mankulam (Vavuniya SSC)	MKL
Murunkan	MKN
Mulliyawalai	MLI
Madulsima	MM
Mamaduwa	MMD
Medamahanuwara	MMN
Madolkele	MN
Mawanella	MNA
Manampitiya	MNP
Maha Oya	MO
Mulativu	MP
Maspota	MPT
Maho	MQ
Matugama	MR
Medirygiriya	MRG
Morawewa	MRW
Melsiripura	MSP
Manmunai South West	MSW
Matale	MT
Mihintale	MTE
Muthiyanwela	MTH
Mattakkuliya	MTK
Muruthalawa	MTW
Maturata	MU
Muttur	MUT
Mt. Lavinia	MV

Exchange Name	Code
Mt. Lavinia CSE	MV(R)
Minuwangoda	MWG
Medawachchiya	MWI
Morawaka	MWK
Mawarala	MWR
Mawathagama	MWT
Madampe	MX
Manipay	MY
Mahiyanganaya	MYN
Nivitigala	NA
Neboda	NB
Narammala	NC
Negombo (CONT.)	NEC
Nochchiyagama	NCH
Nugegoda	ND
Nikadalupotha	NDP
Negombo	NE
Norton Bridge	NE
Nagoda	NF
Negombo (NX 61)	NG
Nintavur	NIT
Nikaweratiya	NK
Naula	NL
Nelululam	NLL
Nilaweli	NLV
Neluwa	NLW
Namunukula	NM
Nanatan	NN
Nedunkeni	NQ
Neriyakulam	NRK
Nawalapitiya	NT
Nainativu	NTV
Nuwera eliya	NW
Odduchuddan	ODU
Omantai	OM
Oluvil	OV
Pallai	PA
Pitabeddara	PBD
Padiyathalawa	PDT
Padaviya	PDY
Pelmadulla	PE
Panadura	PH
Passara	PJ
Padukka	PK
Punakari	PKR
Pannala	PL
Pallewela	PLA
Palfekele	PLK
Pelatiyawa	PLT

List of SLT's Telephone Exchange Codes (Alphabetical Order)

Exchange Name	Code
Palavi	PLV
Pulmodai	PME
Pooneryn	PN
Pinapana	PNP
Pallepola	POL
Pointpedro	PQ
Polonnaruwa	PR
Polpithigama	PRG
Porativu	PRT
Pesale	PSL
Padawi Sripura	PSP
Pasyala	PSY
Pandattarippu	PT
Pulasthigama	PTG
Potuhera	PTH
Puthukudiyirippu	PTK
Pilimathalawa	PTL
Potuvil	PTV
Punkunduthivu	PUN
Pussellawa	PV
Polgahawela	PW
Pawatkulam	PWK
Puttalam	PX
Pundaluoya	PY
Piliyandala	PYL
Rangala	RA
Ramboda	RB
Rambewa	RBW
Ruwanwella	RC
Rajakadaluwa	RD
Raddolugama	RDG
Ragama	RG
Ridigama	RGM
Rambukkana	RK
Rikillagaskada	RKL
Ratmalana	RM
Rukmalgama	RMG
Ratnapura	RN
Ranpokunagama	RPK
Rakwana	RW
Rattota	RX
Ridimaliyadda	RY
Siyambalanduwa	SBD
Siyabaladuwa	SD
Sevanagala	SEV
Sigiriya	SG
Sithankerni	SKR
Sandalankawa	SL
Sammanthurai	SMT

Exchange Name	Code
Seruwawila	SW
Sooriyawewa	SYW
Ehaliyagoda	TBL
Tabuttegama	TBT
Trincomalee	TC
Tangalle	TG
Thalpota	THP
Telijjawila	TJ
Talawakele	TK
Tirrukkovil	TKV
Talawa	TL
Tillicoultry	TLC
Talaimannar	TM
Thunukkai	TNK
Tanamalwila	TNL
Toppur	TP
Thissamaharamaya	TR
Tirappane	TRP
Talatuoya	TT
Thawalama	TWL
Tampalakamam	TZ
Urubokka	UB
Udubeddawa	UBD
Undugoda	UD
Udappuwa	UDP
Udatuttiripitiya	UDT
Uhana	UHN
Ulukkulama	UKL
Uyilankulama	UKM
Udugama	UM
Urapola	UO
Udupussellawa	UP
Upcot	UPC
Uva Paranagama	UPR
Ukuwela	UW
Veyangoda	VG
Valachchena	VH
Velanai	VI
Vaddukodde	VK
Vidattaltivu	VKM
Vakarai	VKR
Velvetiture	VL
Veliveriya	VR
Vavuniya	VU
Wellawaya	WA
Watagoda	WB
Wedduwa	WD
Watawala	WF
Wilgamuwa	WG

Exchange Name	Code
Wattegama	WH
Wellampitiya	WI
Weligama	WJ
Warakapola	WK
Welikanda	WLK
Weligepola	WLP
Welimada	WM
Wariyapola	WP
Wattala	WT
Watumulla	WTM
Wanathawilluwa	WTW
Walasmulla	WU
Weeraketiya	WY
Anuradhapura	XA
Galle TSC	XG
Havelock TDM	XH
Yakkalamulla	YKM
Yatiyana	YMH
Central 5ESS	YS
Yatakalanpattuwa	YTP
Colombo ISC ARE13	ZA
Colombo ISC NEAX61	ZN
Colombo ISC 5ESS	ZS

Major References

No.

<Socio-economy and Finance>

1 Annual Report, Central Bank of Sri Lanka, 1994
2 International Investor Guide to Sri Lanka, Richard Mann,1993
3 The world in 1996, The economist, 1996
4 Telecommunications and Economic Development, World Bank, 1994
5 Challenge for the Telecommunications sector in the asia pacific region ADB & APTEL, 1991
6 Public Investment Programme 1995 - 1999 MOF, National Planning Dept., 1995
7 Statistical Abstract of the democratic socialist republic of Sri Lanka MOF, Department of Census and Statistics,1994
8 Shri Lanka, Gillian wright,1994
9 Sri Lanka Year 2000 : Towards the 21 st century, a CRDS panel of Authors,1995
10 Economic Valuation Techniques for the Environment John A.Dixon and Maynard M.Hufschmidt, 1986
11 The Economics of Telecommunications, John T.Wenders,1987
12 Cost-Benefit Analysis, D.W.Pearce,1989
13 Cost-Benefit Analysis, World Bank,1989
14 Revised Colombo Metropolitan Regional Outline Structure Plan Urban Development Authority,1995
15 Demographic survey,1994, MOF, Dept. of Census and Statistics
16 Sri Lanka : Country economic Update FY93, World Bank, 1993
17 A strategy for skills-development and Employment policy in Sri Lanka Terence F.Kelly, 1992
18 Recent Trends in Foreign AID, Shakuntala Kuruppu,1994
19 An Economic Financial and Investment Guide, Central Bank of Sri Lanka,1992
20 Macroeconomic Policies, Crises, and Growth in Sri Lanka, World Bank,1994
21 The Accelerated MAHAWELI programme and its IMPACT, GOSL
22 World Development Report, World Bank, 1992
23 World Telecommunication Development Report, World Bank, 1994
24 Privatisation, World Bank, 1992

<Telecommunications>

25 Sri Lanka Telecom. Annual Report-1993, SLT,1994
26 Sri Lanka Telecom. Development Study Final Report, Ewbank Preece, 1990
27 The consultancy Service of the Network Management System Development for SLT Korea Telecom, 1992
28 Sri Lanka second Telecommunications Project Study Report, SOFRECOM,1993
29 Yearbook of Common Carrier Telecommunications Statistics, ITU, 1994
30 CCITT Manual, General Network Planning, ITU,1983
31 CCITT Manual, Local Network Planning, ITU,1979
32 CCITT Recommendations(Blue Book), ITU,1989

CHAPTER 1

INTRODUCTION

CHAPTER 1

INTRODUCTION

1. Background of the Priority Projects

1.1 General

To realise higher economic growth and equitable distribution of social benefits, the Government of Sri Lanka has been strongly emphasising the needs for adequate, efficient and reliable infrastructures in the national development policy. Telecommunications development is placed as a highest priority in the development policy for industrial development, higher productivity of agriculture and enhancing efficiency in the service sector.

In 1988, the Government of Sri Lanka set up the short-term telecommunications development target aiming at the total provision of 500,000 telephone lines including the existing lines by the end of year 1995 based on the master plan formed under the support of Asian Development Bank.

However, due to unstable social condition, shortage of the budget and delay in design work, some difficulties will be expected on achievement of the development targets. At present, approximately 180,000 telephone lines in whole country are supplied. In spite of an development effort, 187,000 of applicants are still on the waiting lists. In order to clear this situation, a master plan with a long-term view and adequate development strategies is required, while the present master plan is of short-term and already outdated.

Considering the above condition, the Government of Sri Lanka requested the Government of Japan to revise and update the master plan to incorporate the latest changes in policy and environment and to extend a development target year to the year 2015. In response to the request, the Government of Japan dispatched a Study Team of Japan International Co-operation Agency (JICA). The Study Team has carried out the study in accordance with the Scope of Work of the Study agreed upon between Sri Lanka Telecom (SLT) and JICA.

1.2 Objectives of the Study

❑ **Phase-I Study**

To formulate a long-term plan for the development of telecommunications networks in the Democratic Socialist Republic of Sri Lanka up to the year 2015.

❑ **Phase-II Study**

To conduct a feasibility study for the priority project(s) identified in consequence of the Phase-I Study.

This Volume-III of the Study Report covers a Feasibility Study for three priority projects selected from a urgent development program in the Master Plan for the development of telecommunications networks in the Democratic Socialist Republic of Sri Lanka up to the year 2015. The priority projects aim to be completed by the year 2000.

The feasibility study as Phase-II Study has been carried out in accordance with the work plan and schedule of the study which were discussed and agreed upon between SLT and JICA. The study work has been done both in Sri Lanka and in Japan. The major items of the feasibility study are referred to in the following :

The Feasibility Study in Sri Lanka (18 October - 14 December 1995)

a) Explanation and discussion of the Interim Report;
b) Decision of objective priority projects for feasibility study;
c) Collection of data and information regarding the priority projects from a view of both technical and socio-economic points;
d) Field survey for the objective priority projects;
e) Preparation of scope of work for the objective priority projects;
f) Explanation and discussion of scope of work for the objective priority projects;

The Feasibility Study in Japan (15 December 1995 - 14 February 1996)

a) Socio-economic analysis for the objective area;
b) Technical study and project basic design;
c) Project cost estimate;
d) Preparation of project implementation plan;
e) Project evaluation;
f) Preparation of draft final report consisting of master plan and feasibility study;

2. Selection of Priority Projects for the Feasibility Study

2.1 Selection of the Priority Projects

In the Phase-I Study for preparing a Master Plan, a project implementation plan up to the year 2015 was prepared. The project implementation plan consists of short-term, medium-term and long-term plans. The priority projects for the feasibility study were selected from the short-term plan as a urgent programme consisting of twenty one (21) projects which aims to meet rapidly growing telephone demand and to catch up 100% fulfilment to the waiting demand by the year 2001. The details of project formation and selection of the priority projects for feasibility study are referred to in Section 2 of Chapter 16 in Volume-II. The following figure 1-2-1 shows a flow of project formation :

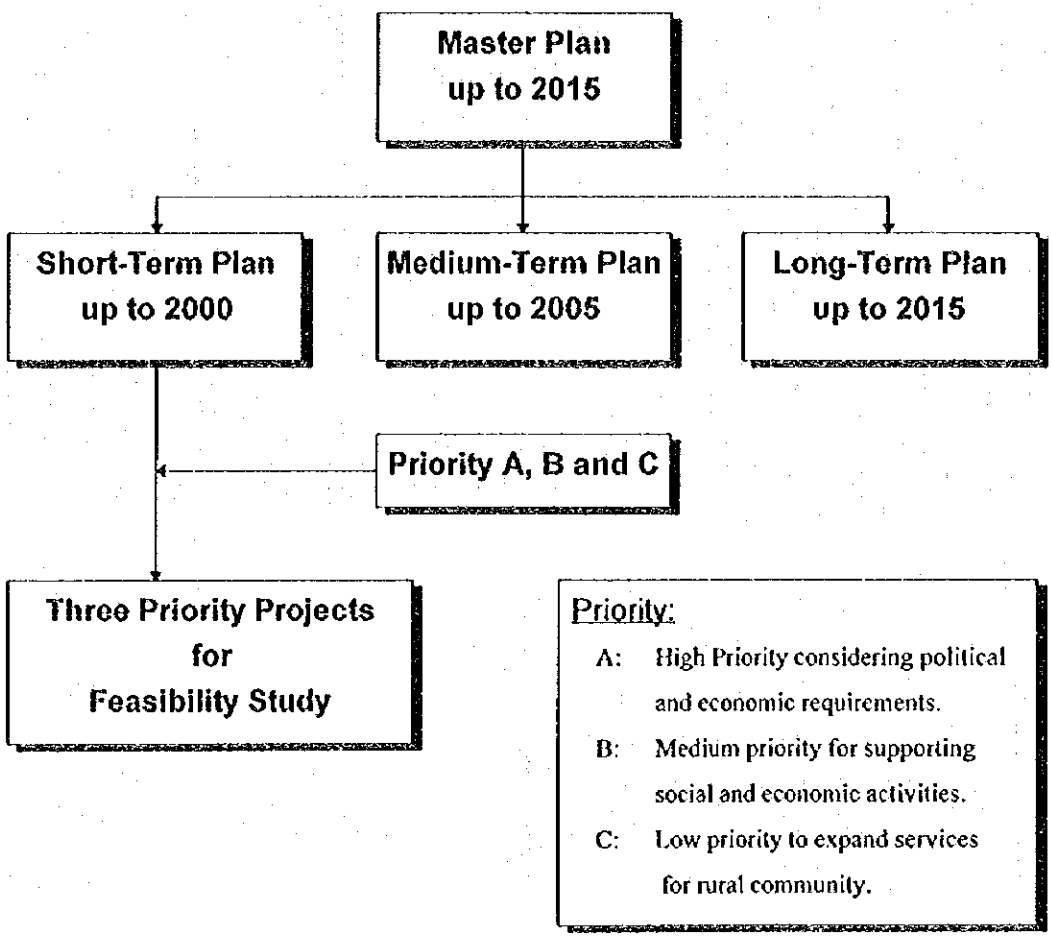
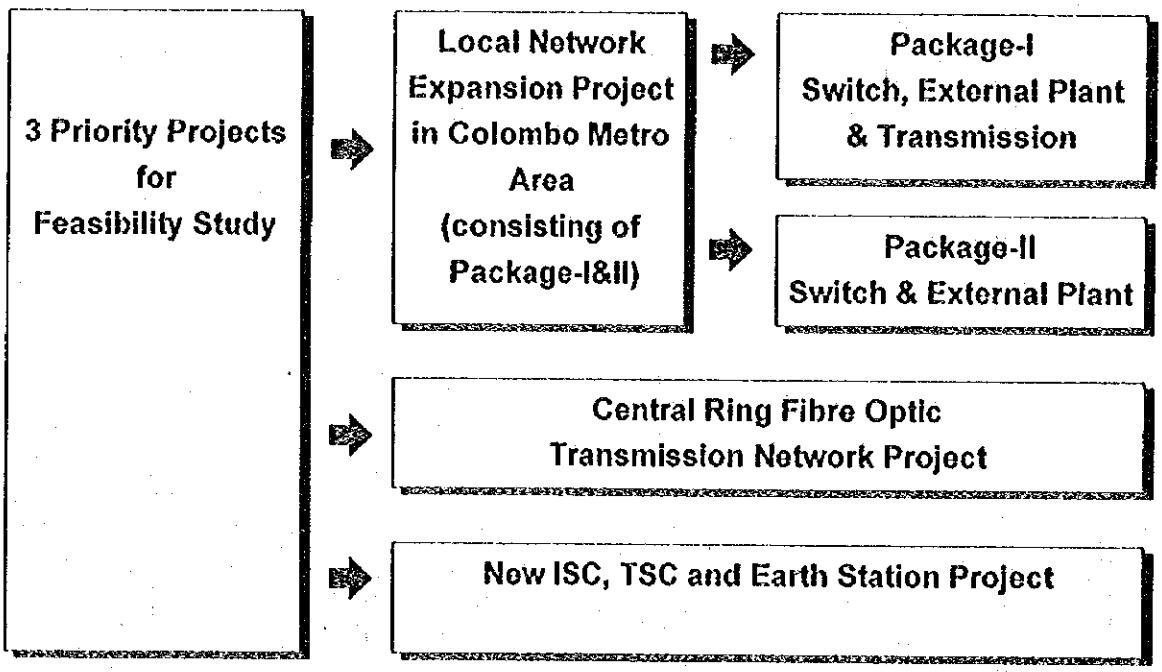


Figure 1-2-1 A Flow of Project Formation

2.2 Priority Projects Selected for the Feasibility Study

Through the discussion between SLT and JICA Study Team, three priority projects were agreed to conduct feasibility study as shown in Figure 1-2-2. The target areas of priority projects are shown in Figure 1-2-3.



Note: details oh the scope of projects are referred to in later Chapters.

Figure 1-2-2 Three Priority Projects for Feasibility Study

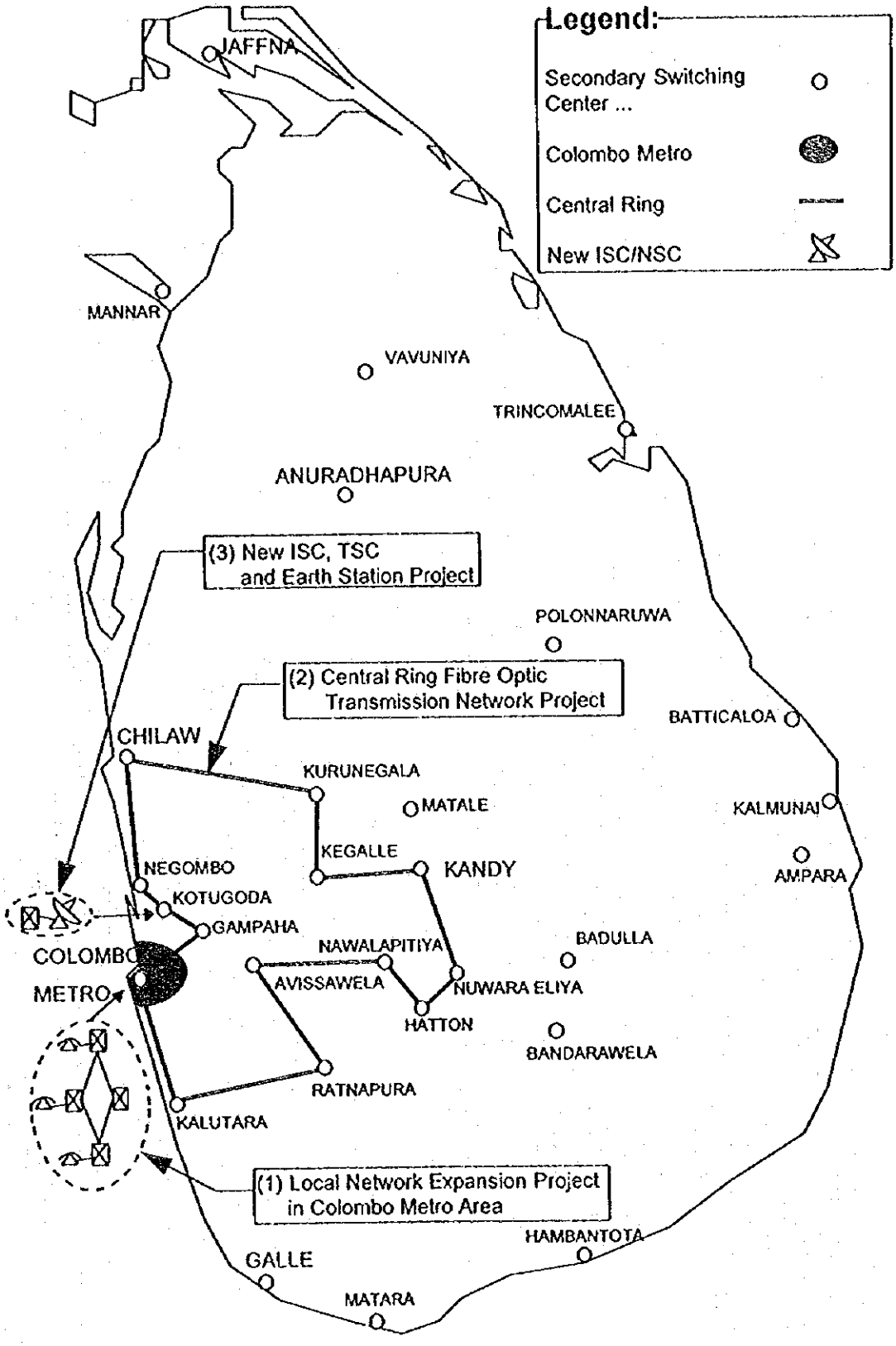


Figure 1-2-3 Target Areas of Priority Projects

3. Precondition of the Feasibility Study

3.1 General

Up to the present, private participation in value-added telecommunications services has been promoted in Sri Lanka. In addition, POTS which is major service of basic telecommunication services is also going to be opened to private WLL operators under the telecommunications policy in Sri Lanka. In this circumstances, there will be difficulty to make detail planning and design in the feasibility study without any precondition. Because network configuration and supply volume, etc. will be unforeseeable depending on business strategies of respective private operators. Accordingly, this feasibility study is carried out in consideration of the following :

- **Impacts by Participation of Private Wireless Local Loop (WLL) Operators**
- **Modified Telephone DEL Supply Plan for Feasibility Study**
- **Future Progress of Telephone Network Expansion by SLT**

3.2 Impacts by Participation of Private WLL Operators

By participation of private WLL operators into POTS, the feasibility study is carried out taking into account :

a) Quicker network expansion by both SLT and private operators will bring higher telephone DEL supply speed.
b) The higher supply speed will bring more expressed demand by activating suppressed demand.
c) By sound competition among SLT and private operators including mobile telephone operators, various qualities of service will be much improved.
d) Corporate efficiency of SLT will be much improved by the competition.
e) A burden for the Government in the telecommunications sector will be reduced.

Considering the above, this feasibility study is carried out on condition that the future telephone demand consists of satisfied demand (DEL) + registered waiters + suppressed demand which is estimated as 20% of expressed demand.

3.3 Modified Telephone DEL Supply Plan for Feasibility Study

By participation of private WLL operators into POTS, the feasibility study is carried out on condition that :

a) More suppressed demand will be remarkably expressed in consequence of completion of on-going projects by both SLT and private operators after the year 2000.
b) The supply of DELs by private WLL operators is assumed as 200,000 in 2000 and 300,000 in 2005.
c) The accumulated supply of DELs by SLT is estimated as 614,000 in 2000 and 873,000 in 2005. The figures of DEL are almost same as those of the original supply plan based on the expressed demand basis in the master plan.
d) The provision of DELs by SLT will be mainly made by subscriber cables which is dimensioned covering the next 5 year demand.

3.4 Future Progress of Telephone Network Expansion by SLT

As priority projects are depending on future progress of telephone network expansion by SLT, the feasibility study is carried out on condition that :

a) The accumulated number of DELs by the completion of on-going projects by the end of 1997 will reach to 571,200.
b) In addition to the above number of DELs, the number of DELs to be newly supplied by SLT by the year 2000 will be 312,000.

From the above expected scenario mentioned in the subsections 3.2, 3.3 and 3.4, various planning values for the feasibility study are referred to in Figure 1-2-1 and Figure 1-2-2 and Table 1-2-1 to Table 1-2-3.

3.5 Project Site for New ISC, TSC and Earth Station

Regarding new ISC, TSC and earth station project, the new site has not been decided by SLT during the study period. In consequence, this feasibility study is carried out on condition that the new site will be located at Kotugoda, because of a limited study period.

Table 1-3-1 Telephone Supply Plan by SSC considering Suppressed Demand

No.	SSC	Capacity in 1997			SLT Exp.	Demand in 2000				Demand in 2005			
		Switch	Cable	Eff. Lines	in 2000	Total	% of WLL	WLLs	SLT	Total	% of WLL	WLLs	SLT
8	Colombo	306,027	388,690	298,992	**180,631**	465,427	30%	139,628	325,799	685,176	30%	205,553	479,623
1	Ampara	3,644	4,650	3,577	**0**	2,891	10%	289	2,602	4,079	10%	408	3,671
2	Anuradhapura	7,050	12,130	7,050	**4,756**	10,639	10%	1,064	9,575	13,118	10%	1,312	11,806
3	Awissawella	5,000	8,770	5,000	**5,826**	8,273	10%	827	7,446	12,029	10%	1,203	10,826
4	Badulla	6,972	10,870	6,972	**3,092**	8,807	10%	881	7,926	11,182	10%	1,118	10,064
5	Bandarawela	3,940	5,900	3,940	**2,865**	6,042	10%	604	5,438	7,561	10%	756	6,805
6	Batticaloa	7,196	9,300	7,154	**3,636**	8,455	10%	846	7,609	11,989	10%	1,199	10,790
7	Chilaw	8,470	18,700	8,470	**0**	9,254	10%	925	8,329	12,857	10%	1,286	11,571
9	Galle	19,555	18,550	14,269	**8,371**	20,105	20%	4,021	16,084	28,300	20%	5,660	22,640
10	Gampaha	11,484	46,818	11,484	**23,140**	30,910	25%	7,728	23,182	46,165	25%	11,541	34,624
11	Hambantota	8,402	11,700	8,402	**4,238**	10,266	10%	1,027	9,239	14,045	10%	1,405	12,640
12	Hatton	2,850	3,385	2,604	**0**	2,777	10%	278	2,499	3,434	10%	343	3,091
13	Jaffna	0	0	0	**29,371**	27,398	20%	5,480	21,918	39,162	25%	9,791	29,371
14	Kalmune	6,524	6,400	4,923	**6,082**	8,672	10%	867	7,805	12,228	10%	1,223	11,005
15	Kalutara	50,820	67,825	50,820	**0**	29,209	20%	5,842	23,367	42,485	25%	10,621	31,864
16	Kandy	47,254	62,930	47,254	**0**	44,868	25%	11,217	33,651	63,792	25%	15,948	47,844
17	Kegalle	6,672	10,368	6,672	**6,170**	11,144	10%	1,114	10,030	16,052	20%	3,210	12,842
18	Kurunegala	15,260	20,800	15,260	**7,583**	22,074	20%	4,415	17,659	30,457	25%	7,614	22,843
19	Mannar	1,400	400	308	**1,541**	1,528	10%	153	1,375	2,054	10%	205	1,849
20	Matale	10,628	14,985	10,628	**0**	8,326	10%	833	7,493	10,440	10%	1,044	9,396
21	Matara	15,200	20,600	15,200	**0**	17,968	20%	3,594	14,374	25,117	20%	5,023	20,094
22	Nawalapitiya	1,394	3,380	1,394	**0**	1,471	10%	147	1,324	2,093	10%	209	1,884
23	Negombo	13,600	25,200	13,600	**12,778**	23,896	20%	4,779	19,117	35,171	25%	8,793	26,378
24	Nuwera Eliya	4,912	8,975	4,912	**1,235**	5,522	10%	552	4,970	6,830	10%	683	6,147
25	Polonnaruwa	5,450	9,400	5,450	**0**	4,951	10%	495	4,456	6,374	10%	637	5,737
26	Ratnapura	10,178	12,670	9,746	**3,900**	11,993	10%	1,199	10,794	17,058	20%	3,412	13,646
27	Trincomalee	4,650	7,470	4,650	**3,634**	6,516	10%	652	5,864	9,204	10%	920	8,284
28	Vavuniya	2,500	4,700	2,500	**2,711**	4,370	10%	437	3,933	5,790	10%	579	5,211
	Total	587,032	815,566	571,231	**311,560**	813,752	25%	199,894	613,858	1,174,242	26%	301,696	872,546
	Colombo	306,027	388,690	298,992	**180,631**	465,427	30%	139,628	325,799	685,176	30%	205,553	479,623
	Other SSCs	281,005	426,876	272,239	**130,929**	348,325	17%	60,266	288,059	489,066	20%	96,143	392,923

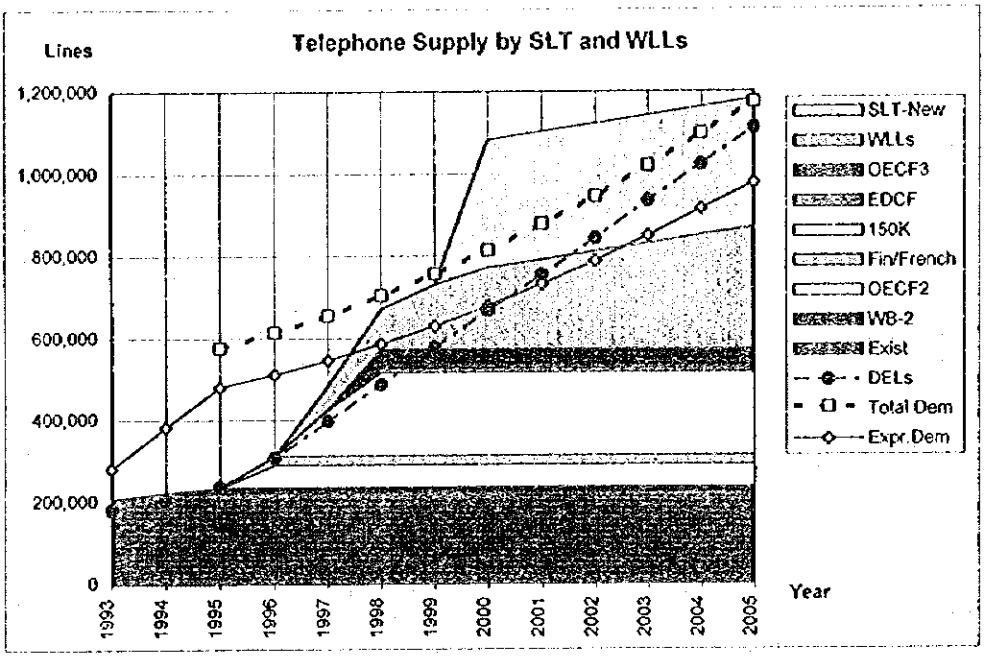


Figure 1-3-1 Telephone Supply by SLT and Private WLL Operators

Table 1-3-2 Telephone Supply by SLT and Private WLL Operators

Year	Exist	WB-2	OECF2	Fin/Frenc	150K	EDCF	OECF3	WLLs
1993	207,227	0	0	0	0	0	0	0
1994	222,636	0	0	0	0	0	0	0
1995	222,636	11,064	0	0	0	0	0	0
1996	222,636	11,064	55,318	22,646	0	0	0	0
1997	222,636	11,064	55,318	22,646	113,389	0	0	60,000
1998	222,636	11,064	55,318	22,646	204,543	10,000	45,024	100,000
1999	222,636	11,064	55,318	22,646	204,543	10,000	45,024	160,000
2000	222,636	11,064	55,318	22,646	204,543	10,000	45,024	200,000
2001	222,636	11,064	55,318	22,646	204,543	10,000	45,024	220,000
2002	222,636	11,064	55,318	22,646	204,543	10,000	45,024	240,000
2003	222,636	11,064	55,318	22,646	204,543	10,000	45,024	260,000
2004	222,636	11,064	55,318	22,646	204,543	10,000	45,024	280,000
2005	222,636	11,064	55,318	22,646	204,543	10,000	45,024	300,000

Year	SLT-New	Total	Expr.Dem	Total Dem		Expr.DEL	Supp.DEL	DELs
1993	0	207,227	281,836	0		180,720		180,720
1994	0	222,636	383,011	0		207,227		207,227
1995	0	233,700	480,679	576,815		237,000		237,000
1996	0	311,664	511,303	613,564		307,000		307,000
1997	0	485,053	545,869	655,043		397,000		397,000
1998	0	671,231	586,114	703,337		487,000		487,000
1999	0	731,231	629,600	755,520		577,000		577,000
2000	312,000	1,083,231	678,127	813,752		667,000		667,000
2001	312,000	1,103,231	731,811	878,173		731,811	21,954	753,765
2002	312,000	1,123,231	788,234	945,881		788,234	55,176	843,410
2003	312,000	1,143,231	850,024	1,020,029		850,024	85,002	935,026
2004	312,000	1,163,231	915,526	1,098,631		915,526	108,032	1,023,558
2005	312,000	1,183,231	978,536	1,174,243		978,536	133,081	1,111,617

Note: The volume shows approx. effective capacity for DELs connection.

Table 1-3-3 Telephone Supply Plan up to 2015 Based on an Assumption of WLL DEL Supply

A	B	C	D	E	F	G	H	I	J	K	L
Year	Expre Dem DEL+Waiter	20%Suppre Demand	Total Dem (B+C)	Fill Rate (F/B)%	Expre DEL	Fill Rate (H/C)%	Supp DEL	Total DEL (F+H)	LL's DE	LL Shar (J/I)%	SLT's DEL (I-J)
1993	281,836			64%	180,720			180,720		0%	180,720
1994	383,011			54%	207,227			207,227		0%	207,227
1995	480,679	96,136	576,815	49%	237,000			237,000		0%	237,000
1996	511,303	102,261	613,564	60%	307,000			307,000		0%	307,000
1997	545,869	109,174	655,043	73%	397,000			397,000	60,000	15%	337,000
1998	586,114	117,223	703,337	83%	487,000			487,000	100,000	21%	387,000
1999	629,600	125,920	755,520	92%	577,000			577,000	160,000	28%	417,000
2000	678,127	135,625	813,752	98%	667,000			667,000	200,000	30%	467,000
2001	731,811	146,362	878,173	100%	731,811	15%	21,954	753,765	220,000	29%	533,765
2002	788,234	157,647	945,881	100%	788,234	35%	55,176	843,410	240,000	28%	603,410
2003	850,024	170,005	1,020,029	100%	850,024	50%	85,002	935,026	260,000	28%	675,026
2004	915,526	183,105	1,098,631	100%	915,526	59%	108,032	1,023,558	280,000	27%	743,558
2005	978,536	195,707	1,174,243	100%	978,536	68%	133,081	1,111,617	300,000	27%	811,617
2006	1,045,326	209,065	1,254,391	100%	1,045,326	75%	156,799	1,202,125	320,000	27%	882,125
2007	1,115,688	223,138	1,338,826	100%	1,115,688	79%	176,279	1,291,967	340,000	26%	951,967
2008	1,181,592	236,318	1,417,910	100%	1,181,592	84%	198,507	1,380,099	360,000	26%	1,020,099
2009	1,250,336	250,067	1,500,403	100%	1,250,336	87%	217,558	1,467,894	380,000	26%	1,087,894
2010	1,310,795	262,159	1,572,954	100%	1,310,795	93%	243,808	1,554,603	400,000	26%	1,154,603
2011	1,374,981	274,996	1,649,977	100%	1,374,981	97%	266,746	1,641,727	420,000	26%	1,221,727
2012	1,442,318	288,464	1,730,782	100%	1,442,318	100%	288,464	1,730,782	440,000	25%	1,290,782
2013	1,512,441	302,488	1,814,929	100%	1,512,441	100%	302,488	1,814,929	460,000	25%	1,354,929
2014	1,586,358	317,272	1,903,630	100%	1,586,358	100%	317,272	1,903,630	480,000	25%	1,423,630
2015	1,663,173	332,635	1,995,808	100%	1,663,173	100%	332,635	1,995,808	500,000	25%	1,495,808

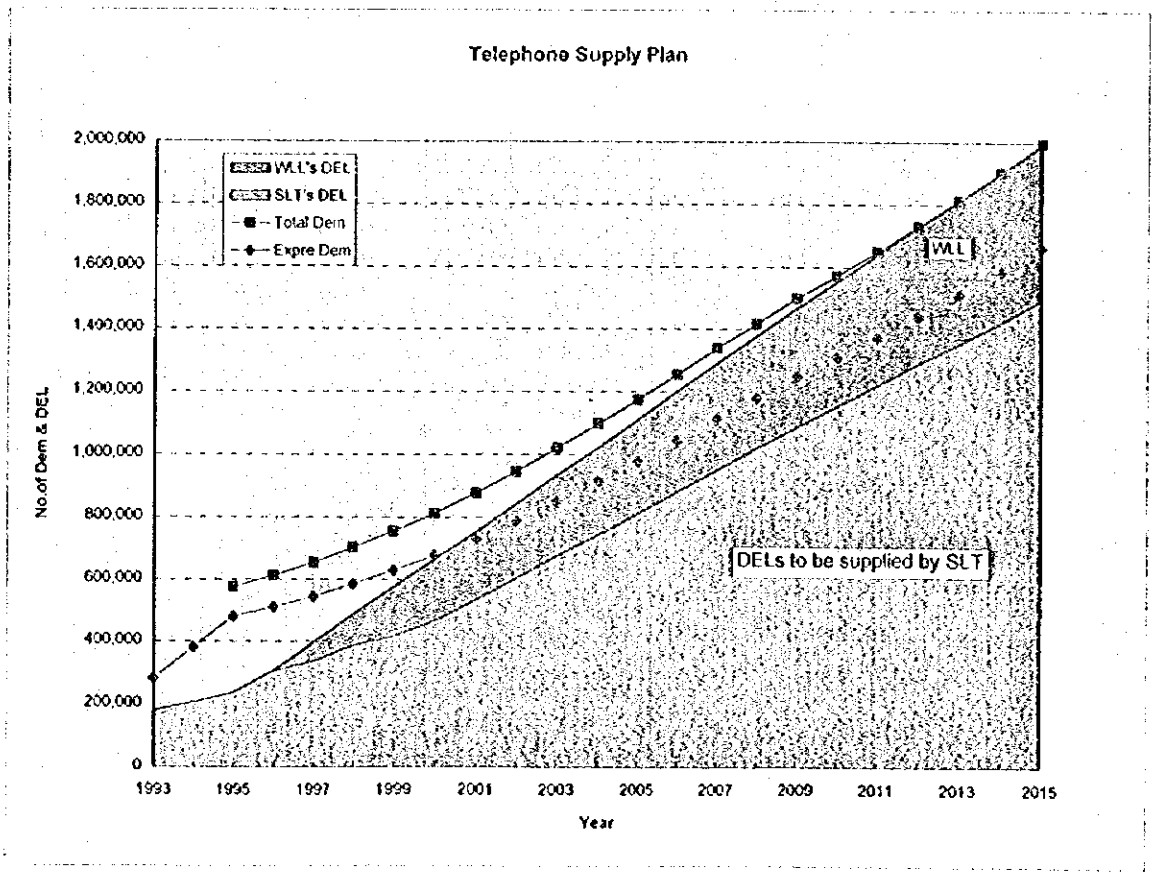


Figure 1-3-2 Telephone Supply Plan up to 2015

4. Work Schedule for the Feasibility Study

4.1 Overall Time Schedule of the Study

The study period consisting of Phase-I and Phase-II Study is from the end of March 1995 up to the middle of April 1996. The time schedule of this Study by study stage is shown in Table 1-4-1. The feasibility study was carried out in the period of Second Study in Sri Lanka and Second Study in Japan.

Table 1-4-1 Work Schedule of the Study

Study Stages	1995				1996
First Study in Sri Lanka	3M				
First Study In Japan		3M			
Second Study in Sri Lanka			2M		
Second Study in Japan				2M	
Discussion of Draft Final Report				2W	
Preparation of Final Report					1.5M
Submission of Reports	IC/R	P/R	IT/R	D/F	F/R

IC/R: Inception Report
P/R: Progress Report
IT/R: Interim Report
DF/R: Draft Final Report
F/R: Final Report

M: Months
W: Weeks

4.2 Progress in the Second Study in Sri Lanka

During the second study in Sri Lanka from 18th October to 14th December 1995, the study team carried out the following work together with counterparts :

a) Explanation and discussion of Interim Report submitted from the study team;
b) Selection of priority projects for feasibility study;
c) Presentation and discussion on Joint Work-Shop with JICA team and telecommmunications sector in Sri Lanka, chaired by Secretary of MPT, held on 8th Nov. 1995;

d) Collection of data and information for feasibility study;
e) Field survey for priority projects selected for the feasibility study;
f) Preparation of a report consisting of basic conditions of feasibility study and outlines of project scope;
g) Technology transfer through field survey and project basic design;
h) Explanation and discussion of basic conditions of feasibility study and outlines of project scope.

4.3 Progress in the Second Study in Japan

During the second study in Japan from 15th December 1995 to 13th February 1996, the study team prepared a draft final report consisting of a master plan and feasibility study for three (3) priority projects. The study team carried out the following work :

a) Modification of the master plan submitted as Interim Report;
b) Basic design and cost estimate for the priority projects selected for feasibility study;
c) Evaluation of objective priority projects for feasibility study;
d) Preparation of a draft final report consisting of a master plan study and feasibility study.

4.4 Progress in the Third Study in Sri Lanka

During the third study in Sri Lanka from 14th to 26th February 1996, the study team carried out explanation and discussion of a draft final report with SLT key personnels, counterparts and other officials from organisations concerned. Contents of the draft final report has been basically accepted.

4.5 Progress in the Third Study in Japan

During the third study in Japan from 15th April 1996 to 29th April 1996, the study team prepared a final report consisting of a master plan and feasibility study for three (3) priority projects based on the results of explanation and discussion on the draft final report.

CHAPTER 2

FEASIBILITY STUDY ON LOCAL NETWORK EXPANSION PROJECT IN COLOMBO METRO AREA

CHAPTER 2

FEASIBILITY STUDY ON LOCAL NETWORK EXPANSION PROJECT IN COLOMBO METRO AREA

1. Background of the Feasibility Study

SLT is required to provide more telecommunications facilities for international and national traffic to meet the rapid increase of telephone demand in coming years. In 1997, telecommunications facilities capacity of SLT network will be around 597,000 lines in switching capacity and around 937,000 lines in external plant, while JICA Study Team forecasts around 1,174,000 lines of telephone demand in 2005. SLT's capacity will become insufficient in 2000, even in the case that private networks other than SLT provide about a quarter of the demand in 1997, in the local, trunk and international network. This feasibility study was planned to find a project to solve the demand-fulfilment gap in relation to the local and trunk network in Colombo Metro Area.

Before this feasibility study, SLT has driven forward its plans to meet the requirements pointed out in the new telecommunications policy, in line with the National Policy on Telecommunications which follows the Economic Policy Statement of the Government of Sri Lanka announced on 13th September 1994.

The Government of Sri Lanka intends to achieve the following targets:

a) Telephone to be made available on demand by 1998. All waiters' lists to be cleared by this time. Those who are far away from cable networks will be provided the service by wireless means.
b) To provide telephones, telegraph and facsimile access to all villages and villagers by 1998.

It was estimated, in keeping with the aspirations of the people and the demand arising from rapid economic growth, that the requirement for telephone (Direct Exchange Lines, DEL) will be in the following order of magnitude:

December 1995 - 460,000 lines;
December 1998 - 565,600 lines;
December 2000 - 636,000 lines.

In response to the requirements, SLT is expanding its network adding around 385,600 new lines to the existing approximately 180,000 lines by the year 1998. The on-going programmes by means of financing by World Bank, OECF, Finnish Export Credit, ADB, French Protocol, EDCF Korea, SLT fund and the supplier's credit for "150,000 Lines" were expected to meet the requirement. Those programmes are being carried out by introducing new digital switches, providing subscriber network by cables or radio systems, and expanding transmission network linking exchanges, whole the country except areas where there is security problem.

According to a recent study on telecommunications demand conducted by Japan International Cooperation Agency (JICA), however, it has been found that the telecommunications facilities planned to be provided by the year 1997 will be insufficient to meet the demand after the year 2000. This feasibility study aims to conduct a study of projects to be implemented by the year 2000.

This feasibility study puts focus on the telecommunications facilities related to the local switching facilities, external plant and transmission facilities linking those exchanges in Colombo Metro Area.

2. Objectives and Scope of the Project

2.1 Objectives

This project is aimed to provide telecommunications facilities by the year 2000 to meet increasing telephone demand in Colombo Metro Area.

JICA Study Team forecasts a total of 1,174,000 fixed telephone subscriber lines and another 196,000 mobile telephone lines in the year 2005 as presented in its Master Plan Study. JICA Study Team advises Sri Lanka Telecom (SLT) to provide telecommunications facilities with which SLT can satisfy the demand in its network in due waiting time and with adequate grade of service. The forecast number of telephone subscriber lines is five times comparing to the existing. The traffic will increase corresponding to the telephone subscriber lines. For ensuring a smooth traffic flow to foreign countries and in the country, including that to WLL networks in the country, switching system capacity, transmission system capacity and external plant capacity should be duly expanded. Such capacity should be available by the year 2000.

This project is consisted of three parts; a) Switching facilities plan for expanding telephone switch capacity, b) Transmission facilities plan for expanding transmission network capacity, and c) External plant plan for expanding external plant capacity, in the relevant area.

2.2 Feasibility Study Area and Project Locations

The feasibility study area for the local network expansion project was decided taking account of the capacity expansion plan under the on-going projects in Colombo Metro Area. Figure 2-2-1 shows the fundamental feasibility study area, where the external plant feasibility study was conducted. The feasibility study area was expanded, however, in the case of switching and transmission facilities because of their characteristics forming the network. Thus feasibility study areas differs by facilities and, accordingly, the locations to be involved in this project (hereinafter referred to as Project Locations) differ by facilities.

The external plant feasibility study area included the exchanges the planned capacity of which was definite before the study started. As a result of the study, it was concluded that the all exchanges in the study area should be expanded with the capacity. Accordingly, the project locations are same as the exchange areas selected for feasibility study.

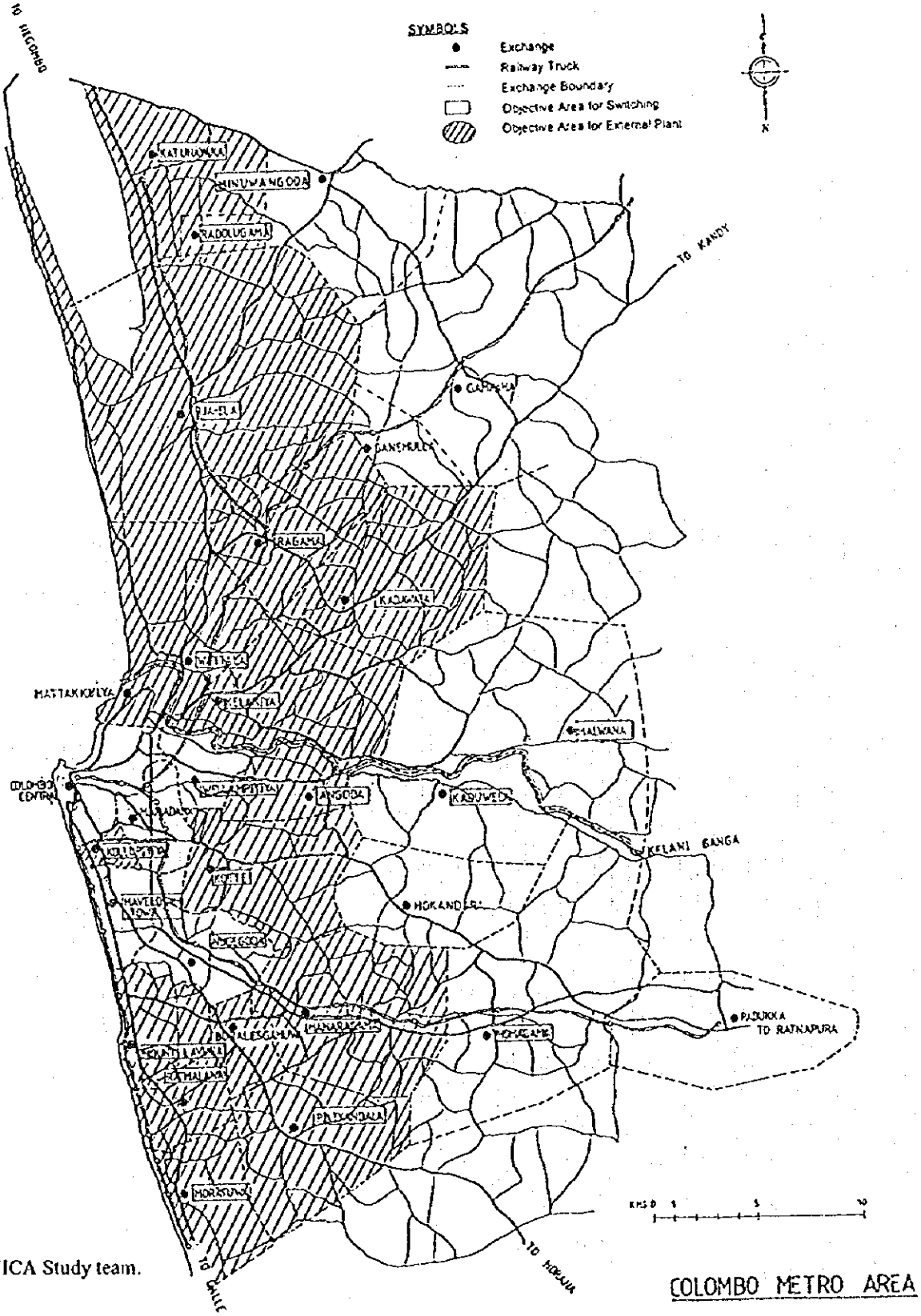
As to the switching facilities plan, the all units of switching system located in Colombo Metro Area, which form the Colombo SSC Area network being linked closely, were put under the study, because it was not practical to conduct the study cutting the network in pieces. Transit switches were also included in the study as part consisting the network. Figure 2-2-2 shows exchanges in Colombo SSC Area marking with rectangular those requiring switching capacity expansion or the project locations.

As to the transmission facilities, because of the same reason as the switching facilities, all nodes in the Colombo SSC Area were put under the study. As a result of the study, it was concluded that Mattegoda, Padukka, and Rukmalgama should be excluded of this project. Figure 2-2-3 shows the nodes in Colombo SSC Area. In Figure 2-2-3, the nodes marked with parenthesis are those excluded of this projects.

2.3 Project Packaging

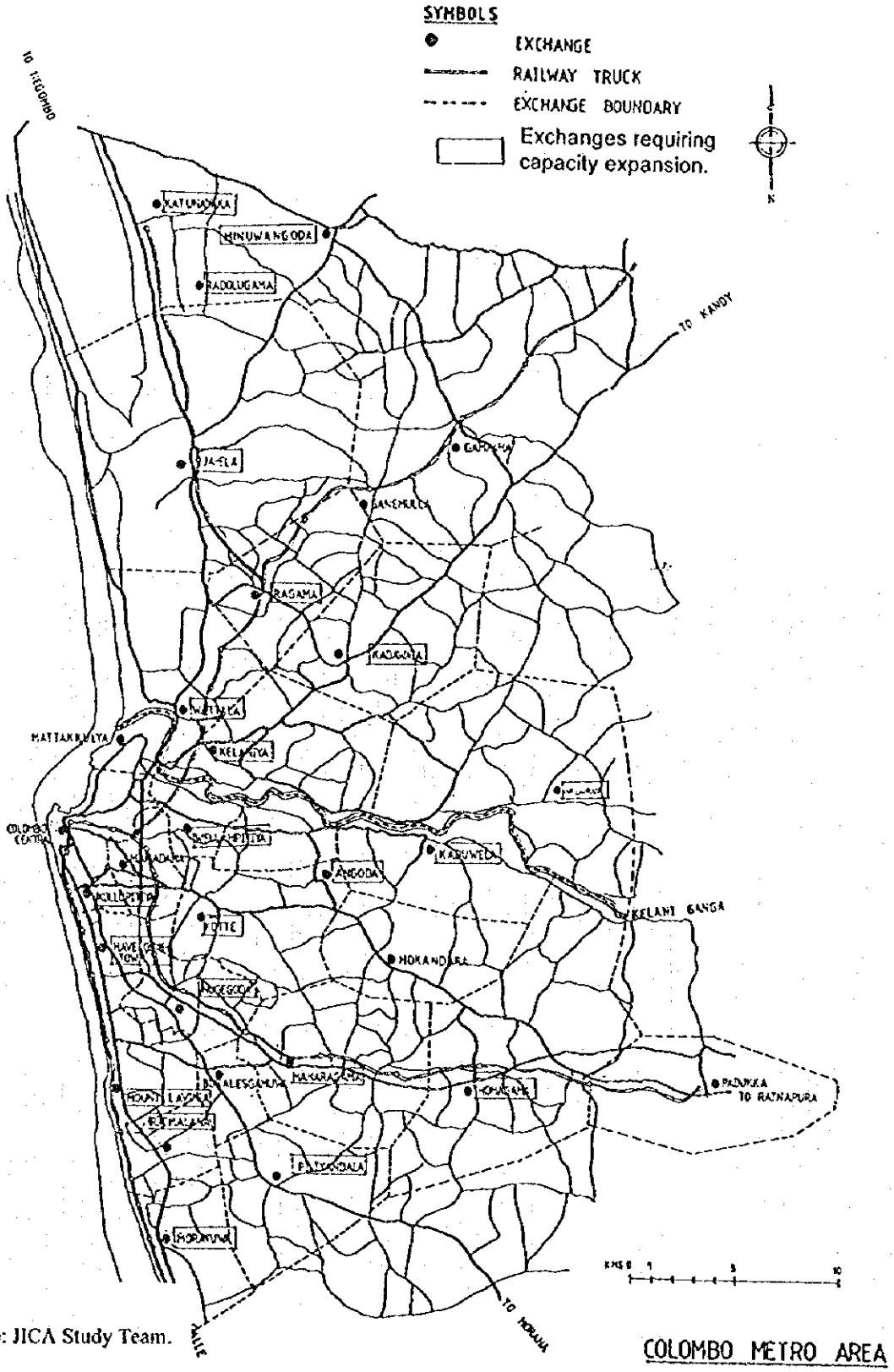
This project is formed in one package. This project can be split into packages, if required. Upon splitting the project, attention should be paid so that each package is properly made up to provide a balanced network in relation to the traffic flow and facilities usage.

In splitting the project, the capacity of the switching facilities and external plant should be balanced at each exchange. Grouping of switching system units should be in harmony with the switching network structure. Splitting the proposed transmission facilities is not advantageous, because it is designed as a complete system.



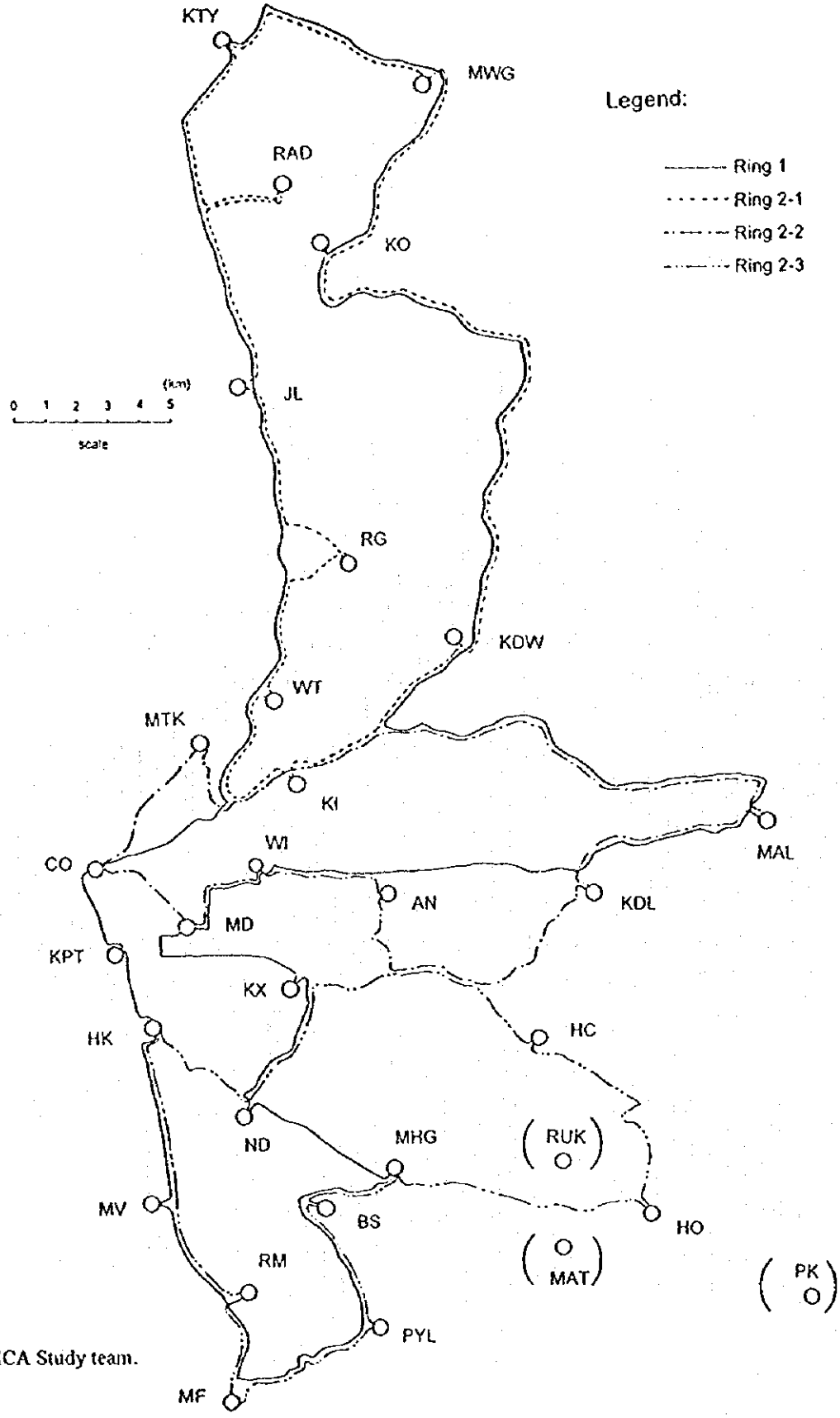
Source: JICA Study team.

Figure 2-2-1 Objective Areas of External Plant Expansion



Source: JICA Study Team.

Figure 2-2-2 Objective Exchanges of Switching Facilities Expansion



Source: JICA Study team.

Figure 2-2-3 Objective Areas of Transmission System Expansion

2.3 Scope of the Project

This project includes the purchase, installation, testing and training of the following telecommunications facilities.

2.3.1 Switching System

A total capacity of around 144,000 subscriber lines will be increased for the local exchanges in Colombo Metro Area by introducing 16 units of switching system and expanding existing 7 exchanges, under this project by 2000. Furthermore, two units of transit switching system with a total capacity of inter-exchange circuits of 42,000 will be introduced under this project by 2000.

2.3.2 Transmission System

Fibre optic cable transmission systems, of SDH (Synchronous Digital Hierarchy) transmission technology, for the junction network in Colombo Metro Area covering the traffic demand in the year 2005.

The backbone system and some area based sub-systems will be divided for hierarchical and flexible network structure.

2.3.3 External Plant

Primary cables connected to local exchanges, secondary cables, civil facilities, and supplementary equipment, which are required to satisfy the demand in 2005.

3. Socio-Economy in the Objective Area

With the Government of Sri Lanka making strong efforts to develop and expand its economy and trade, the targeted area would seem likely to develop into a centre of related activities. With government support, foreign capital investment in the region will help to strengthen industry infrastructure. Over time, businesses associated with the utilities, transportation, communication, and similar sectors will be inevitably established within the area.

Various industries are already operating in the northern part of the targeted area. Notable economic activity is underway in an extended free trade zone located near the Katunayake Airport and continuing into Ja-Ela, Ragama, and Wattala. About one half of local residents work in this free trade zone, with remainder commuting daily to Colombo to work in the city's commercial district. In response to this success, a second free trade zone is under consideration for the Kelaniya and Biya Gama area. This new project is based on the assumption that population growth in the area will provide sufficient labour resources for the zone.

The area under consideration is easily accessible from both sea and air, which would facilitate physical distribution of commodities. It will eventually become a thriving distribution centre, making the importance of the information communications business there all the more evident.

Now that considerable foreign capital has been invested in Sri Lanka and further economic growth achieved, one of development strategies should include a focus on establishing a national communications infrastructure in the coming years.

Table 2-3-1 Population of Divisional Secretariat by Sex and Age

Divisional Secretariat	Total Population	sex		age group		
		male	female	O-14	15-65	65&Over
Biyagama	108,991	52,816	56,175	16,695	83,543	8,753
Kelaniya	128,416	61,074	67,342	10,721	89,605	10,090
Manara-kadawata	128,994	63,851	65,143	21,994	94,423	12,577
Ja.Ela	140,059	69,911	70,148	19,640	108,515	11,904
Wattala	127,117	63,199	63,918	21,090	95,674	10,353
katana-katunayake	4,738	n.a				
Raddolugama	10,555					
Kollupitiya	12,912					
Mattakkuliya	61,520					
Angoda	11,000					
Nugegoda-kotte	129,144					
Maharagama	119,581	57,397	62,184	15,460	92,416	11,705
Piliyandala	183,132					
Boralesgamuwa						
Mt.Lavinia . Dehiwala	209,937	102,924	107,014	30,193	159,681	20,063
Rathmalana						
Moratuwa	186,321	90,619	95,702	28,966	141,633	15,722

Source: SLT.

Table 2-3-2 Labour force by Divisional secretariat

Divisional Secretariat	Total labour Force	Employed	Unemployed
Biyagama	42,900	36,138	6,762
Kelaniya	52,115	42,142	9,973
Manara-kadawata	48,324	43,850	4,474
Ja.Ela	55,628	47,242	8,386
Wattala	46,724	1,100	7,402
katana-katunayake	8,400	6,750	2,600
Raddolugama	9,350		
Kollupitiya	2,184	2,029	155
Mattakkuliya	17,294	13,450	3,844
Angoda		6,780	
Nugegoda-kotte	60,050	34,918	25,132
Maharagama	48,503	41,409	7,094
Piliyandala		67,659	
Boralesgamuwa			
Mt.Lavinia . Dehiwala	77,673	70,182	7,491
Rathmalana			
Moratuwa	71,086	62,837	8,249

Source: SLT

Table 2-3-3 Subscribers and waiters of Telecommunication

Divisional Secretariat	RTE Area	NO of Local Subscribers	No of IDD Subscribers	NO of Wailers
Biyagama	Maradana	419		980
Kelaniya	Maradana	1,541	105	5,708
Manara-kadawata	Maradama	656	40	3,130
Ja.Ela	Wattala	1,323	129	4,349
Wattala	Wattala	1,374	145	4,402
katana-katunayake	Negombo	1,592		
Raddolugama		205	256	3,680
Kollupitiya	Colombo	4,047	920	2,723
Mattakkuliya	Central	2,335	256	1,464
Angoda	kotte	326	25	1,828
Nugegoda-kotte	kotte	6,350	869	9,398
Maharagama		1,749	120	8,726
Piliyandala	Ratmalana	676	40	3,921
Boralesgamuwa		1,454	83	1,058
Mt.Lavinia . Dehiwala	Rathmalana	12,390	656	5,746
Rathmalana		5,709	230	1,182
Moratuwa	Rathmalana	1,524	78	4,260

Source: SLT

4. Present Conditions of Telecommunications Services in the Objective Area

4.1 Available Services

SLT offers various telecommunications services and those services are all available in the objective area, or actually Colombo SSC Area. Besides SLT, as the objective area is the national capital of Sri Lanka, most of private operating entities in Sri Lanka are located there to exploit their asset for services.

As the leading network provider of Sri Lanka, SLT provides;

a) Plain ordinary telephone service (of domestic and international service);
b) Telex service (of domestic and international service);
c) Telegram service (of domestic and international service);
d) Leased circuits service;
e) Public payphone service;
f) Cellular mobile service;
g) Packet switched service under joint venture with Indian Saga;
h) Radio maritime services including INMARSAT services.

Private telecommunications network operating companies are providing various services supplementing the basic telecommunications services offered by SLT. There are four (4) providers of cellular mobile telephone service, five (5) providers of paging service, two (2) providers of stored and forward facsimile service, three (3) providers of data transmission service, one (1) provider of mobile radio trunking service and three (3) providers of payphone service.

4.2 Telephone Demand

Telephone demand has not been fulfilled and remained unsatisfactory for more than a decade. The number of waiters for basic telephone service exceeded the lines in use in number in 1994. The objective area occupied around a half of the unfulfilled application of the country as at end of December 1995.

SLT offers basic telecommunications services to the public having around 280 exchanges scattered in the country. SLT's total capacity of telephone exchange was 237,000

with 180,000 subscriber lines in service as at the end of 1994. The fixed line telephone service, which is one of the most important service of the basic telecommunications services, has been offered by only SLT up to now. In order to accelerate telephone demand fulfilment speed, two (2) wireless local loop (WLL) networks are to be introduced to provide fixed line telephone service in 1997.

In the objective area, SLT had 29 exchange to offer telecommunications services to the public as at December 1994. The total capacity was around 159,000 in switching system and around 189,000 in primary loops. The exchanges were digital except one unit situated at Mount Lavinia.

SLT has increased the main lines or direct exchange lines (DEL) at an annual increase rate of 8.5 % for the past 10 years. The number of DELs at the end of the year 1994 recorded 180,724. However, the numbers of waiters recorded 45,924 in the year 1985 came up to 186,245 as of the end of 1994, i.e., it increased at an average increase rate of 16.8 % per year, which is almost double of DEL increase rate.

The objective area had a total of 124,032 telephone lines in use as at the end of 1994. This was around 67 % of the national total. The objective area had a waiting list of around 89,000 telephone lines registered formally to SLT. In addition to this, around 10% of the formally registered waiting applications were then assumed as suppressed demand.

SLT plans to have a local exchange switching capacity of 316,000 subscriber lines and a total of external plant capacity of 506,000 primary lines in Colombo SSC Area in the year 1997 by on-going projects under way. All the exchanges will be digital when the projects end in the year 1997.

The service grade for the lines in use was poor, i.e., the successful call rate remained to mark around 30% in the national average in 1994. The number of faults per month per 100 DELs counted 25.99 as the national average, which was 16.78 in the objective area, in 1994.

5. Project Basic Design

5.1 Forecast

5.1.1 Demand Forecast

As discussed in Sec. 3 "Preconditions of the Feasibility Study", Chapter 1, Volume III, JICA Study Team forecast 813,752 telephone lines, 1,174,243 telephone lines and 1,995, 808 telephone lines in the whole country in the year 2000, 2005 and 2015, receptively. The telephone demand includes a certain extent of hidden demand besides the demand apparently expressed.

The demand was forecast for the whole country based on a regression formula obtained through analysing correlation between Gross Domestic Per Capita (GDP) and the penetration rate of telephone lines of selected countries. ITU Data as at 1992 of selected 50 countries were collected for the analysis. The regression formula applied to forecast telephone demand is as follows. The national telephone demand was divided to local areas in reference to their expressed demand, in principle.

$$\text{Ln}((\text{ML} + \text{WE}) / \text{POP} \times 100) = -5.149 + 0.9692 \times \text{Ln}(\text{GDP/POP})$$

Where,
- Ln: National logarithmic operator;
- ML: Number of main lines as at 1992;
- WE: Number of registered waiters as at 1992;
- POP: Population as at 1992;
- GDP: GDP at 1992 price.

As to the demand of the objective area or in Colombo Metro SSC Area, JICA Study Team forecasts 465,427 fixed telephone subscriber lines in 2000 and 685,176 fixed telephone subscriber lines in 2005. As mentioned in Chapter 1, JICA Study Team also assumes 70% of the total demand will be catered by SLT in that area.

JICA Study Team recommends SLT to provide more telephone facilities as the planned capacity for the year 1997 to be provided by the on-going projects will not be sufficient to meet the said demand in the year 2000. Table 2-5-1 shows the demand breakdown by exchange of the objective area.

Table 2-5-1 Fixed-line Telephone Demand in Colombo Metro SSC Area in 2000 and 2005

Exchange	Demand (Total)		Demand (SLT) %SLT= 70%	
	2000	2005	2000	2005
Angoda	4,613	6,773	3,229	4,741
Boralesgamuwa	5,494	8,066	3,846	5,646
Central	94,474	138,724	66,132	97,104
Havelock	48,272	70,882	33,790	49,617
Hokandara	3,091	4,538	2,164	3,177
Homagama	5,410	7,943	3,787	5,560
Ja-Ela	11,756	17,558	8,229	12,291
Kadawata	7,848	11,720	5,494	8,204
Kaduwela	3,086	4,532	2,160	3,172
Katunayake	9,535	14,243	6,675	9,970
Kelaniya	15,028	22,445	10,520	15,712
Kollupitiya	14,502	21,293	10,151	14,905
Kotte	35,465	52,075	24,826	36,453
Maharagama	19,306	28,348	13,514	19,844
Malwana	2,899	4,330	2,029	3,031
Maradana	37,876	55,614	26,513	38,930
Mattakkuliya	8,136	11,946	5,695	8,362
Mattegoda	3,074	4,516	2,152	3,161
Minuwangoda	2,850	4,256	1,995	2,979
Moratuwa	10,114	14,850	7,080	10,395
Mount Lavinia	33,803	49,636	23,660	34,745
Nugegoda	38,933	57,167	27,253	40,017
Padukka	1,854	2,722	1,298	1,905
Piliyandala	9,661	14,186	6,763	9,930
Raddolugama	3,053	4,560	2,137	3,192
Ragama	5,086	7,595	3,560	5,317
Ratmalana	12,936	18,995	9,055	13,297
Rukmalgama	1,025	1,505	718	1,054
Wattala	11,971	17,880	8,380	12,516
Wellampitiya	4,276	6,278	2,993	4,395
Total	465,427	685,176	325,798	479,622

Source: JICA Study Team.

5.1.2 Traffic forecast

(1) Conditions

Traffic in the objective area was forecast on the condition that a) the total number of subscribers of fixed lines of SLT would be 479,626 and b) the total number of WLL would be 205,553 lines, respectively, in Colombo Metro Area in the year 2005. These values were obtained multiplying 70% to the total demand forecast in that area in the year 2005.

The traffic was calculated assuming a calling rate (origination) of 0.08 erlangs per subscriber line per busiest one hour in Colombo Metro Area, 0.055 erlangs in areas other than Colombo Metro Area taking the mean value. These values were decided learning after SLT's planning values.

Traffic distribution by call categories was assumed learning after SLT's planning values and in consideration of WLL networks' participation which would take a total of 26% of subscribers in the whole country. Table 2-5-2 shows the assumed traffic distribution by call categories for traffic forecast.

Table 2-5-2 Traffic Distribution Ratio by Call Categories

Area	C.R. (Erl)	SLT Network			Other networks		Total
		Own	Within SSC	Others	WLL	Others	
Colombo SSC Area	0.080	8.9%	46.6%	16.5%	26.0%	2.0%	100.0%
Other areas	0.055	8.9%	14.8%	49.3%	26.0%	1.0%	100.0%

C.R.: Traffic per line per busiest one hour.

Source: JICA Study Team.

The traffic matrix was made up based on the gravity model, or the methodology presented in General Network Planning, GAS-3, ITU-T.

(2) Calculation outcome

a) Local exchange traffic in Colombo Metro Area

The traffic of local exchanges of the objective area was calculated under the conditions stated in the previous paragraph. The traffic was calculated by main exchange, placing remote switch units under corresponding main exchange. Dividing the exchange into switching system units and its dimensioning are discussed in Sec. 5.3. Table 2-5-3 shows the calculation outcome

of each main exchange traffic. The remote switch unit will have no links to other exchanges but its main exchange. Table 2-5-4 shows the traffic matrix between local (main) exchanges.

Table 2-5-3 Traffic of Local (Main) Exchanges in Colombo Metro Area in 2005

Unit: Erlang.

Main Exchange	Demand for SLT in 2005	Traffic (Org., Erl)	%SLT Network			%Private Networks	
			Own	Local	Others	WLL	Others
		0.08	8.9%	46.6%	16.5%	26.0%	2.0%
Central City	20,000	1,600.0	142.1	745.9	264.0	416.0	32.0
Central North	24,896	1,991.7	176.9	928.5	328.6	517.8	39.8
Central NSC	24,000	1,920.0	170.5	895.1	316.8	499.2	38.4
Havelock TDM	15,400	1,232.0	109.4	574.4	203.3	320.3	24.6
Havelock Town	24,423	1,953.8	173.5	910.9	322.4	508.0	39.1
Kollupitiya-1	8,500	680.0	60.4	317.0	112.2	176.8	13.6
Kolte-1	24,000	1,920.0	170.5	895.1	316.8	499.2	38.4
Maradana-1	16,536	1,322.9	117.5	616.7	218.3	343.9	26.5
Nugegoda-1	24,000	1,920.0	170.5	895.1	316.8	499.2	38.4
Ratumalana-1	16,395	1,311.6	116.5	611.5	216.4	341.0	26.2
Angoda-2	3,717	297.4	26.4	138.6	49.1	77.3	5.9
Central New	20,000	1,600.0	142.1	745.9	264.0	416.0	32.0
Central TDM	22,000	1,760.0	156.3	820.5	290.4	457.6	35.2
Haveock New	18,617	1,489.4	132.3	694.3	245.7	387.2	29.8
Ja-Ela-2	5,791	463.3	41.1	216.0	76.4	120.5	9.3
Kadawata-2	4,404	352.3	31.3	164.3	58.1	91.6	7.0
Kalunayake-1	17,671	1,413.7	125.5	659.1	233.3	367.6	28.3
Kalunayake-2	4,970	397.6	35.3	185.4	65.6	103.4	8.0
Kelaniya-1	11,600	928.0	82.4	432.6	153.1	241.3	18.6
Kelaniya-2	7,912	633.0	56.2	295.1	104.4	164.6	12.7
Kollupitiya-2	6,405	512.4	45.5	238.9	84.5	133.2	10.2
Kolte-2	12,453	996.2	88.5	464.4	164.4	259.0	19.9
Maharagama-1	23,480	1,878.4	166.8	875.7	309.9	488.4	37.6
Maharagama-2	8,044	643.5	57.1	300.0	106.2	167.3	12.9
Maradana-2	22,394	1,791.5	159.1	835.2	295.6	465.8	35.8
Mattakuliya-2	2,825	226.0	20.1	105.4	37.3	58.8	4.5
Moratuwa-2	6,000	480.0	42.6	223.8	79.2	124.8	9.6
Mt. Lavinia-3	20,995	1,679.6	149.1	783.0	277.1	436.7	33.6
Mt. Lavinia-4	13,750	1,100.0	97.7	512.8	181.5	286.0	22.0
Nugegoda-2	16,017	1,281.4	113.8	597.4	211.4	333.2	25.6
Piliyandala-2	4,930	394.4	35.0	183.9	65.1	102.5	7.9
Ratmalana-2	6,297	503.8	44.7	234.9	83.1	131.0	10.1
Wattala-1	13,317	1,065.4	94.6	496.7	175.8	277.0	21.3
Wattala-2	4,516	361.3	32.1	168.4	59.6	93.9	7.2
Wellanpitiya-2	3,371	269.7	23.9	125.7	44.5	70.1	5.4
	479,626	38,370	3,407	17,888	6,331	9,976	767

Source: JICA Study Team.

Table 2-5-4 Traffic Matrix between Main Exchanges in Colombo SSC Area in 2005

Unit: Erlang.

Exchange		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
Central City	A	0.0	93.9	90.0	17.5	29.4	17.3	25.5	33.2	19.0	11.1	3.8	73.3	81.6	21.5	8.3	4.9	18.2	1.8
Central North	B	93.9	0.0	115.2	22.3	37.6	22.1	32.6	42.5	24.3	14.2	4.9	93.9	104.4	27.6	8.1	6.3	23.3	2.2
Central NSC	C	90.0	115.2	0.0	21.4	36.1	21.2	31.3	40.8	23.3	13.6	4.7	90.0	100.1	26.4	7.7	6.0	22.3	2.2
Havelock TDM	D	17.5	22.4	21.5	0.0	82.2	14.8	34.2	21.1	33.9	14.4	3.5	17.5	19.5	60.2	4.1	3.5	12.7	1.2
Havelock Town	E	29.4	37.7	36.1	82.2	0.0	24.9	57.6	35.5	57.0	24.2	5.9	29.4	32.8	101.4	7.0	5.9	21.3	2.1
Kolluptiya-1	F	17.3	22.2	21.3	14.8	24.9	0.0	14.1	18.5	10.9	5.7	1.7	17.3	19.3	19.2	2.3	1.9	8.9	0.7
Kotte-1	G	25.5	32.7	31.3	34.2	57.6	14.1	0.0	36.3	67.0	25.0	12.1	25.5	28.4	42.2	8.7	8.5	25.6	2.5
Maradana-1	H	33.2	42.6	40.8	21.1	35.5	18.5	36.3	0.0	21.5	10.8	4.3	33.2	37.0	26.0	5.1	4.5	14.8	1.4
Nugegoda-1	I	19.1	24.4	23.4	33.9	57.1	10.9	67.1	21.5	0.0	42.3	7.3	19.1	21.2	41.8	7.1	6.4	22.3	2.1
Ratumalana-1	J	11.1	14.2	13.7	14.4	24.3	5.7	25.1	10.8	42.3	0.0	4.0	11.1	12.4	17.8	5.2	4.3	17.1	1.6
Angoda-2	K	3.9	4.9	4.7	3.5	5.9	1.7	12.1	4.3	7.3	4.0	0.0	3.9	4.3	4.3	2.2	2.8	8.2	0.6
Central New	L	73.3	93.9	90.0	17.5	29.4	17.3	25.5	33.2	19.0	11.1	3.8	0.0	81.6	21.5	8.3	4.9	18.2	1.8
Central TDM	M	81.6	104.4	100.1	19.4	32.7	19.2	28.3	37.0	21.2	12.3	4.3	81.6	0.0	23.9	7.0	5.5	20.2	2.0
Havelock New	N	21.5	27.6	26.5	60.2	101.4	19.2	42.2	26.0	41.8	17.7	4.3	21.5	24.0	0.0	5.1	4.3	15.6	1.5
Ja Ela-2	O	8.3	8.1	7.8	4.2	7.0	2.3	8.7	5.2	7.1	5.2	2.2	8.3	7.0	5.1	0.0	8.4	47.6	4.6
Kadawata-2	P	4.9	6.3	6.0	3.5	5.9	1.9	8.5	4.5	6.4	4.3	2.8	4.9	5.5	4.3	8.4	0.0	14.5	1.4
Katunayake-1	Q	18.3	23.5	22.5	12.7	21.4	7.0	25.7	14.9	22.4	17.1	8.3	18.3	20.4	15.7	47.8	14.6	0.0	134.7
Katunayake-2	R	1.8	2.3	2.2	1.2	2.1	0.7	2.5	1.4	2.2	1.7	0.8	1.8	2.0	1.5	4.8	1.4	134.8	0.0
Kelaniya-1	S	14.0	17.9	17.2	8.8	14.7	5.2	22.7	14.1	14.1	8.3	6.2	14.0	15.6	10.8	7.8	9.2	18.9	1.8
Kelaniya-2	T	9.1	11.7	11.2	5.7	9.6	3.4	14.8	9.2	9.2	5.4	4.0	9.1	10.1	7.0	4.9	6.0	12.3	1.2
Kolluptiya-2	U	12.9	16.5	15.9	11.0	18.6	9.4	10.5	13.8	8.1	4.2	1.3	12.9	14.4	13.6	1.7	1.4	5.2	0.5
Kotte-2	V	11.9	15.3	14.7	18.0	27.0	8.6	85.7	17.0	31.4	11.7	5.7	11.9	13.5	19.7	4.1	4.0	12.0	1.2
Maharagama-1	W	17.8	22.8	21.9	22.0	37.1	8.9	52.6	18.5	77.5	58.9	9.4	17.8	19.8	27.1	9.0	8.3	28.9	2.6
Mahalagama-2	X	4.7	6.0	5.8	5.8	9.8	2.4	13.9	4.9	20.5	15.5	2.5	4.7	5.2	7.2	2.4	2.2	7.6	0.7
Maradana-2	Y	48.6	59.7	57.2	29.5	49.7	25.9	50.8	73.1	30.1	15.1	8.0	48.6	51.8	36.4	7.2	8.3	20.7	2.0
Mattakuliya-2	Z	2.8	3.6	3.5	1.4	2.4	0.9	3.1	2.4	2.1	1.3	0.7	2.8	3.2	1.7	1.3	1.2	3.2	0.3
Moratuwa-2	AA	4.5	5.7	5.5	5.2	8.7	2.2	9.2	4.2	13.0	29.0	1.6	4.5	5.0	8.4	2.3	1.9	7.9	0.8
Mt Lavinia-3	AB	16.1	20.6	19.8	24.0	40.3	8.7	34.7	15.6	82.4	76.3	4.9	16.1	17.9	29.5	8.4	5.2	20.9	2.0
Mt Lavinia-4	AC	9.6	12.3	11.8	14.3	24.1	5.2	20.4	9.3	37.2	45.5	2.9	9.6	10.7	17.6	3.5	3.1	12.5	1.2
Nugegoda-2	AD	11.8	15.2	14.5	21.0	35.4	6.8	41.6	13.4	110.5	26.2	4.5	11.8	13.2	25.9	4.4	4.0	13.8	1.3
Piliyandala-2	AE	3.4	4.3	4.2	3.9	6.8	1.6	8.2	3.3	11.4	15.6	1.5	3.4	3.8	4.8	1.8	1.6	8.1	0.8
Ratmalana-2	AF	3.7	4.7	4.5	4.8	8.1	1.9	8.3	3.6	14.1	47.4	1.3	3.7	4.1	5.9	1.7	1.4	5.7	0.5
Wattala-1	AG	17.5	22.3	21.4	9.8	16.5	6.0	22.7	15.4	15.4	9.5	5.6	17.5	19.4	12.1	10.8	11.1	25.5	2.5
Wattala-2	AH	5.2	6.7	6.4	2.9	4.9	1.8	6.8	4.6	4.6	2.8	1.7	5.2	5.8	3.6	3.2	3.3	7.6	0.7
Wellampitiya-2	AI	4.6	5.9	5.6	3.3	5.6	2.0	10.5	6.7	4.9	2.5	1.7	4.6	5.1	4.1	1.4	1.5	4.0	0.4
TOTAL		745.2	927.6	894.2	573.4	909.3	318.6	893.4	615.9	893.1	609.9	138.3	745.2	819.7	693.2	215.4	163.9	654.4	184.8

Exchange		S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	TOTAL
Central City	A	14.0	9.1	12.9	11.9	17.8	4.7	48.6	3.9	4.5	18.0	9.6	11.8	3.4	3.7	17.6	5.3	4.6	745.6
Central North	B	18.0	11.7	16.5	15.3	22.8	6.0	59.6	5.0	5.7	20.5	12.3	15.1	4.3	4.7	22.5	6.7	5.9	928.1
Central NSC	C	17.2	11.2	15.8	14.5	21.8	5.8	57.2	4.8	5.5	19.7	11.7	14.5	4.1	4.5	21.6	6.5	5.6	894.7
Havelock TDM	D	8.8	5.7	11.0	16.0	22.0	5.8	29.6	1.9	5.2	23.9	14.3	21.0	3.9	4.8	9.9	3.0	3.3	574.1
Havelock Town	E	14.8	9.6	18.6	27.0	37.0	9.8	49.8	3.3	8.7	40.3	24.0	35.4	6.6	8.0	16.6	5.0	5.6	910.5
Kolluptiya-1	F	5.2	3.4	9.4	6.6	8.9	2.4	25.9	1.2	2.2	8.7	5.2	8.8	1.6	1.9	6.0	1.8	2.0	316.9
Kotte-1	G	22.6	14.9	10.5	85.7	52.5	13.9	50.9	4.3	9.2	34.1	20.4	41.8	8.2	8.3	22.9	6.9	10.5	894.7
Maradana-1	H	14.2	9.2	13.6	17.0	18.5	4.8	73.1	3.3	4.2	15.6	9.3	13.3	3.3	3.6	15.6	4.7	6.7	619.5
Nugegoda-1	I	14.2	9.3	8.2	31.4	77.5	20.5	30.2	2.9	13.0	62.4	37.2	130.5	11.3	14.0	15.5	4.7	5.0	894.7
Ratumalana-1	J	8.4	5.5	4.2	11.7	58.9	15.6	15.1	1.8	29.0	78.3	45.5	26.3	15.6	47.9	9.6	2.9	2.5	611.2
Angoda-2	K	6.2	4.0	1.3	5.7	9.4	2.5	6.0	1.0	1.8	4.9	2.9	4.5	1.5	1.3	5.7	1.7	1.7	138.6
Central New	L	14.0	9.1	12.9	11.9	17.8	4.7	48.6	3.9	4.5	16.0	9.6	11.8	3.4	3.7	17.6	5.3	4.6	745.6
Central TDM	M	15.5	10.2	14.4	13.3	19.6	5.2	51.8	4.2	5.0	17.9	10.6	13.1	3.8	4.1	19.5	5.9	5.1	820.2
Havelock New	N	10.8	7.1	13.6	19.7	27.1	7.1	36.5	2.4	6.4	29.5	17.6	25.9	4.8	5.9	12.2	3.6	4.1	684.0
Ja Ela-2	O	7.6	5.0	1.7	4.1	9.0	2.4	7.2	1.8	2.3	8.4	3.8	4.4	1.8	1.7	10.9	3.3	1.5	215.9
Kadawata-2	P	9.2	6.0	1.4	4.0	8.3	2.2	8.3	1.6	1.9	5.2	3.1	3.9	1.6	1.4	11.1	3.3	1.5	164.2
Katunayake-1	Q	19.1	12.4	5.2	12.0	29.0	7.7	20.9	4.3	8.0	21.0	12.5	13.9	6.2	5.7	25.8	7.7	4.0	658.8
Katunayake-2	R	1.8	1.2	0.5	1.2	2.8	0.7	2.0	0.4	0.8	2.0	1.2	1.3	0.6	0.5	2.5	0.7	0.4	155.3
Kelaniya-1	S	0.0	38.7	3.8	10.8	15.9	4.2	19.8	7.4	3.5	10.6	8.4	8.8	2.9	2.8	53.6	15.1	8.1	432.4
Kelaniya-2	T	38.7	0.0	2.5	6.9	10.3	2.7	12.9	4.8	2.2	7.0	4.2	5.7	1.9	1.8	34.9	10.5	4.0	295.0
Kolluptiya-2	U	3.9	2.5	0.0	4.9	8.6	1.8	19.3	0.9	1.6	6.5	3.9	5.0	1.2	1.4	4.5	1.3	1.5	238.8
Kotte-2	V	10.7	6.9	4.9	0.0	24.6	6.5	23.8	2.0	4.3	16.0	9.5	19.5	3.8	3.9	10.7	3.2	4.9	464.2
Maharagama-1	W	16.0	10.4	8.7	24.6	0.0	93.1	26.0	3.1	20.4	54.5	32.5	48.1	31.4	19.6	17.5	5.3	4.9	875.3
Mahalagama-2	X	4.2	2.8	1.8	6.5	93.2	0.0	6.9	0.8	5.4	14.4	8.6	12.7	8.3	5.2	4.6	1.4	1.3	299.9
Maradana-2	Y	19.8	12.9	19.3	23.6	25.9	6.8	0.0	4.6	5.9	21.8	13.0	18.7	4.6	5.0	21.8	6.5	9.4	834.8
Mattakuliya-2	Z	5.4	3.5	0.7	1.5	2.3	0.5	3.4	0.0	0.5	1.7	1.0	1.3	0.4	0.4	11.9	3.6	0.8	77.1
Moratuwa-2	AA	3.5	2.3	1.6	4.3	20.4	5.4	5.9	0.7	0.0	19.5	11.6	8.0	7.0	8.6	4.0	1.2	1.0	223.7
Mt Lavinia-3	AB	10.9	7.1	6.5	16.0	54.5	14.4	21.9	2.3	19.5	0.0	113.3	38.7	11.5	25.3	12.4	3.7	3.4	782.7
Mt Lavinia-4	AC	6.5	4.2	3.9	9.5	32.5	8.8	13.1	1.4	11.6	113.4	0.0	23.1	8.9	15.1	7.4	2.2	2.0	512.6
Nugegoda-2	AD	8.8	5.7	5.1	19.5	48.1	12.7	18.7	1.8	8.0	38.7	23.1	0.0	7.0	8.7	9.6	2.9	3.1	597.1
Piliyandala-2	AE	2.9	1.9	1.2	3.6	31.4	8.3	4.7	0.6	7.0	11.5	8.9	7.0	0.0	5.2	3.3	1.0	0.8	183.6
Ratmalana-2	AF	2.8	1.8	1.4	3.9	19.6	5.2	5.0	0.6	9.7	25.4	15.1	8.7	5.2	0.0	3.2	1.0	0.8	234.8
Wattala-1	AG	53.4	34.8	4.4	10.6	17.3	4.8	21.7	16.2	4.0	12.3	7.3	9.5	3.3	3.1	0.0	27.8	5.3	498.5
Wattala-2	AH	16.0	10.4	1.3	3.2	5.2	1.4	6.5	4.9	1.2	3.7	2.2	2.9	1.0	0.9	27.8	0.0	1.6	168.4
Wellampitiya-2	AI	6.2	4.0	1.5	4.9	4.9	1.3	9.4	1.1	1.0	3.4	2.0	3.1	0.8	0.8	5.4	1.6	0.0	125.7
TOTAL		431.7	294.5	238.6	453.5	873.5	299.2	834.1	105.2	223.2	781.1	511.5	596.0	183.4	234.2	495.6	168.1	125.5	17,852.2

Source: JICA Study Team.

b) National trunk traffic

The traffic of national trunk network was calculated under the conditions stated in the previous paragraph. The traffic was calculated by SSC. Table 2-5-5 shows the calculation outcome of each SSC traffic. Table 2-5-6 shows the traffic matrix between SSCs.

Table 2-5-5 Trunk Traffic of SSC in 2005

Unit: Erlang.

No.	SSC	Demand for SLT in 2005	Traffic (Org., Erl)	%SLT Network			%Private Networks	
				Own	Local/SSC	Others	WLL	Others
			Traffic	8.9%	14.8%	49.3%	26.0%	1.0%
1	Ampara	3,671	201.9	17.9	29.9	99.6	52.5	2.0
2	Anuradhapura	11,806	649.3	57.7	96.1	320.2	168.8	6.5
3	Awissawella	10,826	595.4	52.9	88.1	293.7	154.8	6.0
4	Badulla	10,064	553.5	49.2	81.9	273.0	143.9	5.5
5	Bandarawela	6,805	374.3	33.2	55.4	184.6	97.3	3.7
6	Batticaloa	10,790	593.5	52.7	87.8	292.7	154.3	5.9
7	Chilaw	11,571	636.4	56.5	94.2	313.9	165.5	6.4
8	Colombo	479,623	38,369.8	3,407.0	17,888.0	6,331.0	9,976.2	767.4
9	Galle	22,640	1,245.2	110.6	184.3	614.1	323.8	12.5
10	Gampaha	34,624	1,904.3	169.1	281.8	939.2	495.1	19.0
11	Hambantota	12,640	695.2	61.7	102.9	342.9	180.8	7.0
12	Hatton	3,091	170.0	15.1	25.2	83.8	44.2	1.7
13	Jaffna	29,371	1,615.4	143.4	239.1	796.7	420.0	16.2
14	Kalmune	11,005	605.3	53.7	89.6	298.5	157.4	6.1
15	Kalutara	31,864	1,762.5	155.6	259.4	864.3	455.7	17.5
16	Kandy	47,844	2,631.4	233.7	389.5	1,297.8	684.2	26.3
17	Kegalle	12,842	706.3	62.7	104.5	348.4	183.6	7.1
18	Kurunegala	22,843	1,256.4	111.6	185.9	619.6	326.7	12.6
19	Mannar	1,849	101.7	9.0	15.1	50.2	26.4	1.0
20	Matale	9,396	516.8	45.9	76.5	254.9	134.4	5.2
21	Matara	20,094	1,105.2	98.1	163.6	545.1	287.3	11.1
22	Nawalapitiya	1,884	103.6	9.2	15.3	51.1	26.9	1.0
23	Negombo	26,378	1,450.8	128.8	214.7	715.5	377.2	14.5
24	Nuwara eliya	6,147	338.1	30.0	50.0	166.7	87.9	3.4
25	Polonnaruwa	5,737	315.5	28.0	46.7	155.6	82.0	3.2
26	Ratnapura	13,646	750.5	66.6	111.1	370.2	195.1	7.5
27	Trincomalee	8,284	455.6	40.5	67.4	224.7	118.5	4.6
28	Vavuniya	5,211	286.6	25.5	42.4	141.4	74.5	2.9
29	National total	872,546	59,980.6	5,326.1	21,086.5	16,989.9	15,595.2	983.5

Source: JICA Study Team.

Table 2-5-6 National Trunk Traffic Matrix in 2005

Unit: Erlang

Sw. Centres	NSC/WLL/M&L	Colom	Awiss	Chila	Gampa	Kalut	Kegal	Kurun	Negom	Kandy	Ampar	Badul	Banda	Batti	Hatto
NSC/WLL/M&L	0.0	10,743.4	160.8	171.9	514.1	473.2	190.8	339.3	391.7	710.5	54.5	149.4	101.0	160.2	45.9
Colombo	10,743.4	0.0	162.0	318.8	629.6	505.4	202.2	418.8	549.2	753.1	44.2	130.9	85.5	140.1	40.2
Awissawella	160.8	159.1	0.0	0.1	23.2	15.5	6.3	6.1	7.0	19.2	0.8	3.1	2.3	2.3	1.8
Chilaw	171.9	310.6	0.1	0.0	0.4	0.3	0.1	0.2	0.3	0.4	0.0	0.1	0.0	0.1	0.0
Gampaha	514.1	617.0	23.1	0.4	0.0	40.2	16.1	18.8	40.0	45.5	2.1	7.4	5.2	6.2	3.1
Kalutara	473.2	495.9	15.5	0.3	40.3	0.0	10.3	14.0	19.6	42.2	2.8	9.4	7.4	7.7	3.7
Kegalle	190.8	198.5	6.3	0.1	16.1	10.3	0.0	13.8	6.8	37.3	0.9	3.7	2.4	2.8	1.6
Kurunegara	339.3	410.3	6.0	0.3	18.8	14.0	13.8	0.0	10.3	49.0	1.6	5.6	3.4	5.2	1.7
Negombo	391.7	537.3	6.9	0.3	39.6	19.6	6.7	10.3	0.0	21.7	1.1	3.7	2.5	3.4	1.3
Kandy	710.5	738.9	19.2	0.4	45.6	42.2	37.3	49.1	21.7	0.0	5.9	27.8	15.5	17.6	8.4
Ampara	54.5	43.5	0.8	0.0	2.1	2.8	0.9	1.6	1.1	5.9	0.0	2.4	1.3	5.8	0.3
Badulla	149.4	128.6	3.1	0.1	7.4	9.4	3.7	5.6	3.7	27.9	2.4	0.0	9.8	5.7	1.7
Bandarawella	101.0	84.0	2.3	0.1	5.2	7.4	2.4	3.4	2.5	15.5	1.3	9.8	0.0	3.1	1.4
Batticaloa	160.2	137.6	2.3	0.1	6.2	7.7	2.8	5.2	3.4	17.6	5.8	5.7	3.1	0.0	0.9
Hatton	45.9	39.5	1.8	0.0	3.1	3.7	1.6	1.7	1.3	8.4	0.3	1.7	1.4	0.9	0.0
Kalmunee	163.5	135.8	2.4	0.1	6.3	8.1	2.9	5.1	3.5	18.1	12.0	6.5	3.5	34.6	1.0
Matale	139.6	130.9	2.5	0.1	6.7	6.1	4.9	10.7	3.5	44.2	1.0	3.7	2.0	3.1	0.9
Nawalapitiya	27.9	24.6	1.1	0.0	2.0	1.8	1.6	1.3	0.8	7.2	0.2	0.8	0.5	0.5	0.5
Nuwara Eliya	91.3	76.6	2.5	0.0	5.1	6.2	2.8	3.5	2.4	21.0	0.8	6.0	4.2	2.2	2.1
Anuradhapura	175.3	206.2	2.1	0.1	6.4	6.7	2.8	6.4	4.0	14.2	1.2	2.9	1.7	4.4	0.7
Jaffna	436.2	518.1	5.7	0.3	17.3	21.4	6.8	13.4	10.9	34.0	3.7	7.9	5.0	12.9	1.8
Mannar	27.4	29.5	0.3	0.0	0.9	1.0	0.4	0.7	0.6	1.7	0.2	0.4	0.2	0.6	0.1
Polonnaruwa	85.2	85.3	1.2	0.1	3.5	3.8	1.7	3.7	2.0	10.9	1.1	2.4	1.3	4.7	0.5
Trincomalee	123.1	123.9	1.6	0.1	4.7	5.5	2.1	4.2	2.8	11.5	1.5	2.8	1.6	6.7	0.6
Vavunia	77.4	81.7	0.9	0.0	2.7	3.0	1.1	2.4	1.7	5.8	0.6	1.3	0.8	2.1	0.3
Galle	335.3	295.3	7.6	0.2	18.9	53.4	6.2	8.9	9.8	29.0	2.4	7.9	6.6	6.5	2.6
Hambantota	187.8	162.6	3.8	0.1	9.3	16.3	3.7	5.6	4.9	20.4	2.5	7.8	7.2	5.8	1.7
Matara	298.4	252.5	6.2	0.2	15.3	34.0	5.4	7.9	8.0	26.9	2.6	8.2	7.1	6.6	2.3
Ratnapura	202.6	184.8	9.4	0.1	16.2	28.9	5.6	6.7	6.9	24.6	1.3	5.5	4.7	3.6	3.5
TOTAL	16,678.7	16,952.0	457.5	494.2	1,467.1	1,348.0	543.2	968.3	1,120.2	2,023.8	154.9	424.8	287.1	455.5	130.5

Sw. Centres	Kalmu	Matal	Nawal	Nuwar	Anura	Jaffn	Manna	Polo	Trinc	Vavun	Galle	Hamba	Matar	Ratna	TOTAL
NSC/WLL/M&L	163.5	139.6	27.9	91.3	175.3	436.2	27.4	85.2	123.1	77.4	335.3	187.8	298.4	202.6	16,578.7
Colombo	138.2	133.2	25.1	78.0	210.4	528.7	30.0	86.9	126.2	83.2	300.8	165.5	257.0	188.1	17,074.4
Awissawella	2.4	2.5	1.1	2.4	2.1	5.7	0.3	1.2	1.6	0.9	7.6	3.8	6.2	9.4	454.7
Chilaw	0.1	0.1	0.0	0.0	0.1	0.3	0.0	0.1	0.1	0.0	0.2	0.1	0.1	0.1	486.1
Gampaha	6.3	6.7	2.0	5.1	6.4	17.3	0.9	3.5	4.7	2.6	18.8	9.3	15.2	16.2	1,454.1
Kalutara	8.1	6.1	1.8	6.2	6.8	21.4	1.0	3.8	5.5	3.0	53.3	16.2	33.9	28.9	1,338.3
Kegalle	2.9	4.9	1.6	2.8	2.8	6.8	0.4	1.7	2.1	1.1	6.2	3.7	5.4	5.6	539.5
Kurunegara	5.1	10.7	1.3	3.5	6.4	13.4	0.7	3.7	4.2	2.4	8.8	5.5	7.9	6.6	959.5
Negombo	3.5	3.4	0.8	2.4	4.0	10.9	0.6	2.0	2.8	1.6	9.7	4.8	7.9	6.8	1,107.9
Kandy	18.0	44.2	7.2	20.9	14.2	34.0	1.7	10.9	11.5	5.8	29.0	20.4	26.9	24.6	2,009.5
Ampara	12.0	1.0	0.2	0.8	1.2	3.8	0.2	1.1	1.5	0.6	2.4	2.5	2.6	1.3	154.2
Badulla	6.5	3.7	0.8	6.0	2.9	8.0	0.4	2.4	2.8	1.3	7.9	7.8	8.2	5.5	422.6
Bandarawella	3.5	2.0	0.5	4.2	1.7	5.0	0.2	1.3	1.6	0.8	6.6	7.2	7.1	4.7	285.8
Batticaloa	34.6	3.1	0.5	2.2	4.4	13.0	0.6	4.7	6.7	2.1	6.5	5.8	6.6	3.6	453.1
Hatton	1.0	0.9	0.5	2.1	0.7	1.8	0.1	0.5	0.6	0.3	2.6	1.7	2.3	3.5	129.8
Kalmunee	0.0	3.0	0.5	2.4	4.0	12.2	0.5	3.9	5.5	1.9	7.0	6.6	7.2	3.9	462.3
Matale	3.0	0.0	0.7	2.2	2.9	6.1	0.3	2.3	2.2	1.1	4.2	2.9	3.9	3.2	394.7
Nawalapitiya	0.5	0.7	0.0	0.8	0.4	1.0	0.1	0.3	0.3	0.2	1.1	0.7	1.0	1.2	79.1
Nuwara Eliya	2.4	2.2	0.8	0.0	1.5	4.0	0.2	1.1	1.3	0.6	4.7	3.7	4.5	4.4	258.2
Anuradhapura	4.0	2.8	0.4	1.5	0.0	18.9	1.2	3.5	6.2	6.6	4.9	3.3	4.5	2.8	495.8
Jaffna	12.2	6.1	1.0	4.0	18.9	0.0	7.2	6.9	17.0	13.6	16.4	10.9	15.4	8.4	1,233.6
Mannar	0.5	0.3	0.1	0.2	1.2	7.2	0.0	0.3	0.7	0.8	0.8	0.5	0.7	0.4	77.6
Polonnaruwa	3.9	2.3	0.3	1.1	3.6	6.9	0.3	0.0	4.0	1.4	2.9	2.3	2.8	1.8	241.0
Trincomalee	5.5	2.2	0.3	1.3	5.2	17.0	0.7	4.0	0.0	3.8	4.3	3.3	4.2	2.4	348.0
Vavunia	1.9	1.1	0.2	0.6	6.6	13.6	0.8	1.4	3.8	0.0	2.2	1.5	2.1	1.2	218.9
Galle	7.0	4.2	1.1	4.7	4.9	16.5	0.8	2.9	4.4	2.2	0.0	19.7	74.2	17.1	951.0
Hambantota	6.6	2.9	0.7	3.7	3.3	11.0	0.5	2.3	3.3	1.5	19.7	0.0	28.0	8.1	531.0
Matara	7.2	3.9	1.0	4.5	4.5	15.5	0.7	2.8	4.2	2.1	74.2	28.0	0.0	13.8	844.0
Ratnapura	3.9	3.2	1.2	4.4	2.8	8.4	0.4	1.8	2.4	1.2	17.1	8.1	13.8	0.0	573.1
TOTAL	464.6	396.9	79.4	269.4	509.1	1,244.7	78.1	242.6	350.3	220.4	956.0	633.7	848.1	576.2	60,156.3

Source: JICA Study Team.

5.1.3 Circuit Requirements

(1) Inter-exchange circuits in Colombo Metro Area

The number of circuits required to local exchanges in the year 2000 was calculated based on the traffic matrix between exchanges in the year 2005 which was obtained in the previous section.

In the calculation, the digital circuit modularity applied to was 30 channels, the per-link grade of service was 0.01, the lower threshold for direct circuit routing was 20.00 erlangs and the upper threshold for direct high usage circuit routing was 100 erlangs.

Table 2-5-7 shows the circuits matrix in Colombo Metro Area to be provided by the year 2000. The number of circuits between main exchange and remote switch unit is as shown in Table 2-5-8. The demarcation of switching system to "main" and "remote" is discussed in Sec. 5.3.1.

(2) Trunk and junction circuits

The number of trunk circuits to be provided by Colombo TSC and that of junction circuits to be provided by Colombo TDM switches were calculated based on the traffic matrices between SSCs and local exchanges in Colombo Metro, respectively, which were obtained in the previous section.

In the calculation, the digital circuit modularity applied to was 30 channels, the per-link grade of service was 0.01, the lower threshold for direct circuit routing was 20.00 erlangs and the upper threshold for direct high usage circuit routing was 100 erlangs. Table 2-5-9 shows the circuits matrix between SSCs to be provided by the year 2000. The number of junction circuits to be provided by Colombo TDM switches is found in the Table 2-5-7.

Table 2-5-7 Junction Circuit Matrix in Colombo Metro Area to be Provided by 2000

Exchange		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
Havelock TDM	A	0	240	330	330	330	390u	270	330	360	390	330	0	0	60h	0	0	0	0
Central TDM	B	180	0	90h	150d	150d	30h	30h	60h	30h	30h	30h	180	420u	360	210	210	420	90
Central City	C	120	360d	0	120d	120d	30h	0	30h	30h	30h	0	0	90u	0	0	0	0	0
Central North	D	120	360d	120u	0	150d	30h	0	30h	30h	30h	0	0	120u	30h	0	0	30h	0
Central NSC	E	120	360d	120u	150d	0	30h	0	30h	30h	30h	0	0	120u	30h	0	0	0	0
Havelock Town	F	150d	270d	30h	30h	30h	0	30h	60h	30h	60h	30h	0	30h	120u	0	0	0	0
Kollupitiya-1	G	150	180d	0	0	0	30h	0	0	0	0	0	0	0	0	0	0	0	0
Kotte-1	H	120	330d	30h	30h	30h	60h	0	0	30h	60h	30h	0	30h	30h	0	0	30h	0
Maradana-1	I	150	270d	30h	30h	30h	30h	0	30h	0	0	0	0	30h	30h	0	0	0	0
Nugegoda-1	J	150	300d	0	30h	30h	60h	0	60h	0	0	30h	0	0	30h	0	0	0	0
Ratumalana-1	K	120	240d	0	0	0	30h	0	30h	0	30h	0	0	0	0	0	0	0	0
Angoda-2	L	30h	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Central New	M	60h	360u	90u	120u	120u	30h	0	30h	30h	0	0	0	0	0	0	0	0	0
Havelock New	N	180d	240	0	30h	30h	120u	0	30h	30h	30h	0	0	0	0	0	0	0	0
Ja-Ela-2	O	60h	180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30h	0
Kadawata-2	P	30h	180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Katunayake-1	Q	180d	300	0	30h	0	0	0	30h	0	0	0	0	0	0	30h	0	0	180u
Katunayake-2	R	0	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	180u	0
Kelaniya-1	S	180d	270	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kelaniya-2	T	90h	180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kollupitiya-2	U	150d	150	0	0	0	0	30u	0	0	0	0	0	0	0	0	0	0	0
Kotte-2	V	120d	210	0	0	0	30h	0	120u	0	30h	0	0	0	0	0	0	0	0
Maharagama-1	W	210d	240	0	0	0	30h	0	30h	0	60h	60h	0	0	30h	0	0	30h	0
Maharagama-2	X	90h	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maradana-2	Y	150d	330	30h	60h	60h	30h	30h	30h	90u	30h	0	0	30h	30h	0	0	0	0
Mattakuliya-2	Z	30h	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Moratuwa-2	AA	60h	180	0	0	0	0	0	0	0	0	30h	0	0	0	0	0	0	0
Mt Lavinia-3	AB	180d	270	0	0	0	30h	0	30h	0	60h	60h	0	0	30h	0	0	0	0
Mt Lavinia-4	AC	150d	210	0	0	0	30h	0	0	0	30h	30h	0	0	0	0	0	0	0
Nugegoda-2	AD	150d	270	0	0	0	30h	0	30h	0	150u	30h	0	0	30h	0	0	0	0
Pillyandala-2	AE	60h	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ratmalana-2	AF	30h	180	0	0	0	0	0	0	0	0	90u	0	0	0	0	0	0	0
Wattala-1	AG	180d	270	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30h	0
Wattala-2	AH	30h	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wellampitiya-2	AI	30h	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		3,810	7,830	870	1,110	1,080	1,050	390	1,050	690	1,020	750	180	870	810	240	210	750	270

Exchange		S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	TOTAL
Havelock TDM	A	0	0	0	0	0	0	30h	0	0	30h	0	0	0	0	0	0	0	3480
Central TDM	B	390	270	270	330	420	240	420	150	240	390	330	360	180	210	420	180	150	7820
Central City	C	0	0	0	0	0	0	30h	0	0	0	0	0	0	0	0	0	0	930
Central North	D	0	0	0	0	0	0	60h	0	0	0	0	0	0	0	0	0	0	1110
Central NSC	E	0	0	0	0	0	0	60h	0	0	0	0	0	0	0	0	0	0	1080
Havelock Town	F	0	0	0	30h	30h	0	30h	0	0	30h	30h	30h	0	0	0	0	0	1050
Kollupitiya-1	G	0	0	30u	0	0	0	30h	0	0	0	0	0	0	0	0	0	0	420
Kotte-1	H	0	0	0	120u	30h	0	30h	0	0	30h	0	30h	0	0	0	0	0	1050
Maradana-1	I	0	0	0	0	0	0	90u	0	0	0	0	0	0	0	0	0	0	720
Nugegoda-1	J	0	0	0	30h	60h	0	30h	0	0	60h	30h	150u	0	0	0	0	0	1050
Ratumalana-1	K	0	0	0	0	60h	0	0	0	30h	60h	30h	30h	0	90u	0	0	0	750
Angoda-2	L	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	180
Central New	M	0	0	0	0	0	0	30h	0	0	0	0	0	0	0	0	0	0	870
Havelock New	N	0	0	0	0	30h	0	30h	0	0	30h	0	30h	0	0	0	0	0	810
Ja-Ela-2	O	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	270
Kadawata-2	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	210
Katunayake-1	Q	0	0	0	0	30h	0	0	0	0	0	0	0	0	0	30h	0	0	810
Katunayake-2	R	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	270
Kelaniya-1	S	0	60u	0	0	0	0	0	0	0	0	0	0	0	0	30h	0	0	540
Kelaniya-2	T	60u	0	0	0	0	0	0	0	0	0	0	0	0	0	30h	0	0	360
Kollupitiya-2	U	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	330
Kotte-2	V	0	0	0	0	30h	0	30h	0	0	0	0	0	0	0	0	0	0	570
Maharagama-1	W	0	0	0	30h	0	120u	30h	0	0	60h	30h	30h	30h	0	0	0	0	1020
Maharagama-2	X	0	0	0	0	120u	0	0	0	0	0	0	0	0	0	0	0	0	360
Maradana-2	Y	0	0	0	30h	30h	0	0	0	0	0	0	0	0	0	0	0	0	960
Mattakuliya-2	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120
Moratuwa-2	AA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	270
Mt Lavinia-3	AB	0	0	0	0	60h	0	0	0	0	0	150u	30h	0	30h	0	0	0	930
Mt Lavinia-4	AC	0	0	0	0	30h	0	0	0	0	150u	0	0	0	0	0	0	0	630
Nugegoda-2	AD	0	0	0	0	30h	0	0	0	0	30h	0	0	0	0	0	0	0	750
Pillyandala-2	AE	0	0	0	0	30h	0	0	0	0	0	0	0	0	0	0	0	0	240
Ratmalana-2	AF	0	0	0	0	0	0	0	0	0	30h	0	0	0	0	0	0	0	330
Wattala-1	AG	30h	30h	0	0	0	0	0	0	0	0	0	0	0	0	0	60u	0	600
Wattala-2	AH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60u	0	0	240
Wellampitiya-2	AI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150
TOTAL		480	360	300	570	990	360	930	150	270	900	600	690	210	330	570	240	150	31,080

Note: Letters after value mean:
d = Direct Final;
u = Inter-unit Final (of a same building);
h = High usage;
(nothing) = Basic route Final.

H-TDM means Havelock tandem.
C-TDM means Central tandem.

Source: JICA Study Team.

Table 2-5-8 Number of Circuits of RSU-Main Exchange in Colombo Metro Area to be Provided by 2000

Exchange		DELs	Traffic	Circuits	
Remote Switch Unit	Main		(O/G) (erl.)	to Main Exchange (voice Ch.)	2-MHz Ch.
			0		
Angoda	Cent. North	1,024	82	98	4
Boralesgamua	Havelock town	5,646	452	478	16
Hokandara	Havelock town	3,177	254	277	10
Homagama	Maharagama	5,150	412	438	15
Homagama	Nugegoda	500	40	53	2
Ja-Ela	Katunayake	6,500	520	547	19
Kadawata	Kelaniya	3,800	304	328	11
Kaduwela	Cent. North	3,172	254	277	10
Malwana	Cent. North	3,031	242	265	9
Mattegoda	Maharagama	3,161	253	276	10
Minuwangoda	Katunayake	2,979	238	261	9
Moratuwa	Ratmalana	6,000	480	507	17
Mt. Lavinia	Havelock town	3,000	240	262	9
Mt. Lavinia	Ratmalana	1,000	80	96	4
Padukka	Maharagama	1,500	120	138	5
Padukka	Nugegoda	500	40	53	2
Piliyandala	Ratmalana	5,000	400	426	15
Raddolugma	Katunayake	3,192	255	278	10
Ragama	Wattala	5,317	425	451	16
Rukumalgama	Maharagama	1,054	84	101	4
Wellanpitiya	Cent. North	4,395	352	376	13
Total		69,098	5,528	5,986	210

Source: JICA Study Team.

Table 2-5-9 Trunk Circuit Matrix between SSCs to be Provided by 2000

Sw. Centres	NSC/WLD/M	C-TSC	K-TSC	A-TSC	G-TSC	Awiss	Chila	Gampa	Kalut	Kegal	Kurun	Negom	Ampar
NSC/WLD/MBL	0	18,450	1,680	960	1,080	0	0	0	0	0	0	0	0
COL-TSC	18,450	0	930	300	360	480	540	1,440	1,290	570	990	1,140	30
KAN-TSC	1,680	990	0	150	120	0	0	30	30	0	30	0	150
ANU-TSC	960	300	150	0	90	0	0	0	0	0	0	0	0
GAL-TSC	1,050	420	120	90	0	0	0	0	30	0	0	0	0
Awissawela	0	510	0	0	0	0	0	0	0	0	0	0	0
Chilaw	0	540	0	0	0	0	0	0	0	0	0	0	0
Gampaha	0	1,350	90	0	60	0	0	0	30	0	0	0	0
Kalutara	0	1,110	120	30	150	0	0	30	0	0	0	0	0
Kegalle	0	540	60	0	0	0	0	0	0	0	0	0	0
Kurunegara	0	930	90	0	0	0	0	0	0	0	0	0	0
Negombo	0	1,110	30	0	0	0	0	0	0	0	0	0	0
Ampara	0	30	150	0	0	0	0	0	0	0	0	0	0
Badulla	0	180	300	0	0	0	0	0	0	0	0	0	0
Bandarawella	0	120	210	0	0	0	0	0	0	0	0	0	0
Batticaloa	0	180	330	0	0	0	0	0	0	0	0	0	0
Hatton	0	30	150	0	0	0	0	0	0	0	0	0	0
Kalmunee	0	180	330	0	0	0	0	0	0	0	0	0	0
Matale	0	180	270	0	0	0	0	0	0	0	0	0	0
Nawalapitiya	0	0	120	0	0	0	0	0	0	0	0	0	0
Nuwara Eliya	0	120	180	0	0	0	0	0	0	0	0	0	0
Jaffna	0	630	90	570	30	0	0	0	0	0	0	0	0
Mannar	0	0	0	120	0	0	0	0	0	0	0	0	0
Polonnaruwa	0	120	0	180	0	0	0	0	0	0	0	0	0
Trincomalee	0	180	0	240	0	0	0	0	0	0	0	0	0
Vavunia	0	120	0	150	0	0	0	0	0	0	0	0	0
Hambantota	0	240	60	0	300	0	0	0	0	0	0	0	0
Matara	0	360	60	0	510	0	0	0	0	0	0	0	0
Ratnapura	0	300	60	0	300	0	0	0	0	0	0	0	0
TOTAL	22,140	29,220	5,580	2,790	3,000	480	540	1,500	1,380	570	1,020	1,140	180

Sw. Centres	Kalmu	Matal	Nawal	Nuwar	Jaffn	Mannа	Polo	Trinc	Vavun	Hamba	Matar	Ratna	TOTAL
NSC/WLD/MBL	0	0	0	0	0	0	0	0	0	0	0	0	22,170
COL-TSC	180	180	0	60	600	0	120	180	120	210	300	240	26,970
KAN-TSC	360	300	120	240	90	0	0	0	0	60	60	60	4,260
ANU-TSC	0	0	0	0	570	120	180	240	150	0	0	0	1,500
GAL-TSC	0	0	0	0	30	0	0	0	0	330	540	330	1,710
Awissawela	0	0	0	0	0	0	0	0	0	0	0	0	510
Chilaw	0	0	0	0	0	0	0	0	0	0	0	0	540
Gampaha	0	0	0	0	0	0	0	0	0	0	0	0	1,530
Kalutara	0	0	0	0	0	0	0	0	0	0	0	0	1,440
Kegalle	0	0	0	0	0	0	0	0	0	0	0	0	600
Kurunegara	0	0	0	0	0	0	0	0	0	0	0	0	1,020
Negombo	0	0	0	0	0	0	0	0	0	0	0	0	1,140
Ampara	0	0	0	0	0	0	0	0	0	0	0	0	180
Badulla	0	0	0	0	0	0	0	0	0	0	0	0	480
Bandarawella	0	0	0	0	0	0	0	0	0	0	0	0	330
Batticaloa	0	0	0	0	0	0	0	0	0	0	0	0	510
Hatton	0	0	0	0	0	0	0	0	0	0	0	0	180
Kalmunee	0	0	0	0	0	0	0	0	0	0	0	0	510
Matale	0	0	0	0	0	0	0	0	0	0	0	0	450
Nawalapitiya	0	0	0	0	0	0	0	0	0	0	0	0	120
Nuwara Eliya	0	0	0	0	0	0	0	0	0	0	0	0	300
Jaffna	0	0	0	0	0	0	0	0	0	0	0	0	1,320
Mannar	0	0	0	0	0	0	0	0	0	0	0	0	120
Polonnaruwa	0	0	0	0	0	0	0	0	0	0	0	0	300
Trincomalee	0	0	0	0	0	0	0	0	0	0	0	0	420
Vavunia	0	0	0	0	0	0	0	0	0	0	0	0	270
Hambantota	0	0	0	0	0	0	0	0	0	0	0	0	600
Matara	0	0	0	0	0	0	0	0	0	0	0	0	930
Ratnapura	0	0	0	0	0	0	0	0	0	0	0	0	660
TOTAL	540	480	120	300	1,290	120	300	420	270	600	900	630	71,070

Source: JICA Study Team.