APPENDICES

I. Minutes of Discussions (1)

MINUTES OF DISCUSSIONS
ON
THE EXPANSION AND DEVELOPMENT PROJECT
OF THE MEDIUM WAVE RADIO BROADCASTING NETWORK (PHASE 2)
IN THE KINGDOM OF NEPAL

In response to the request of His Majesty's Government of Nepal, the Government of Japan has decided to conduct a basic design study on the Expansion and Development of the Medium Wave Radio Broadcasting Network (Phase 2) (hereinafter referred to as "the Project"), and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent the basic design study team (hereinafter referred to as "the Team") headed by Mr. Minoru Kondoh, the Ministry of Posts and Telecommunications, to the Kingdom of Nepal from 6th March to 19th April, 1988.

The Team had a series of discussions on the Project with the officials concerned of His Majesty's Government of Nepal headed by Mr. Prachanda M.S. Pradhan, Managing Director, Radio Nepal. The major points of understanding between the two parties are shown in the Attachment.

The basic design study is to be conducted on the basis of the Attachment herewith.

Kathmandu, 10th March, 1988

MINORU KONDOH

Mr. Minoru Kondoh
Leader,
Basic Design Study Team
JICA

Prachanda Man Singh Pradhan

Mr. Prachanda M.S. Pradhan
Managing Director
Radio Broadcasting Service
Radio Nepal

ATTACHMENT

1. The objectives of the study are as follows:

   (1) To confirm the background of the Project
   (2) To examine and assess the technical and economic viability to the Project
   (3) To make a general layout and design
   (4) To estimate cost of the Project and to study its implementing schedule
   (5) To study a maintenance and operation plan
   (6) To evaluate the Project

2. The contents of request made by His Majesty's Government of Nepal are as follows:

   (1) Dhankuta : 100kW, 10kW(standby), one multi-purpose studio
   (2) Surkhet : 100kW, 10kW(standby), one multi-purpose studio
   (3) Dipayal : 10kW, one multi-purpose studio
   (4) Dhalkebar: 10kW
   (5) Jumla : 1kW
   (6) Ghorahi : ditto (or Tulsipur)
   (7) Butwal : ditto
   (8) Gorkha : ditto
   (9) Ramechhap: ditto

3. Executing Agency of the Project

   Radio Nepal is responsible for the implementation of the Project on Nepalese side.

4. Items to be studied during the field survey are as follows:

   (1) Ground conductivity check
   (2) Potential field intensity check
   (3) Confirmation of circumstances at the proposed sites
   (4) Confirmation of power supply condition
   (5) Confirmation of access road and transportation conditions

(6) Soil survey
(7) Collection and confirmation of other data and information related to the Project

5. Network configurations and coverage areas of the Project are to be studied with a view to cover as much area as possible with Appendix 1 as the guide line.

6. After the field survey in the Kingdom of Nepal, a progress report covering the following items will be prepared.

(1) Outline of field survey results
(2) Objective and necessity of the Project
(3) Outline of the Project
(4) The scope of work to be undertaken by the Nepalese side
(5) Others

7. The Final Report will be submitted to the Nepalese side by the end of September, 1988.

8. Undertakings of His Majesty's Government of Nepal

His Majesty's Government of Nepal will accord privileges, immunities and other benefitis to the Team as follows:

(1) To facilitate smooth conduct of the Study, His Majesty's Government of Nepal shall take necessary measures:

1) To inform the members of the Team of safety requirements in the course of the Study, and take precautions when it is required

2) To permit the members of the Team to enter, leave and sojourn in Nepal for the duration of their assignment therein, and exempt them from consular fees

3) To exempt the members of the Team from taxes, duties and any other charges on equipment, machinery and other materials brought into Nepal for the conduct of the Study as deemed necessary by Radio Nepal

4) To exempt the members of the Team from income tax and other charges of any kind imposed on or in connection

with any emolument of allowance paid to the members of the Team for their services in connection with the implementation of the Study

5) To provide necessary facilities to the Team for remittance as well as utilization of the funds introduced into Nepal from Japan in connection with the implementation of the Study

6) To secure permission for entry into any area deemed necessary for the conduct of the Study

7) To secure permission to take all permissible data and documents (including photographs) related to the Study out of Nepal to Japan by the Team

8) To provide medical services as needed, its expenses will be chargeable on the members of the Team

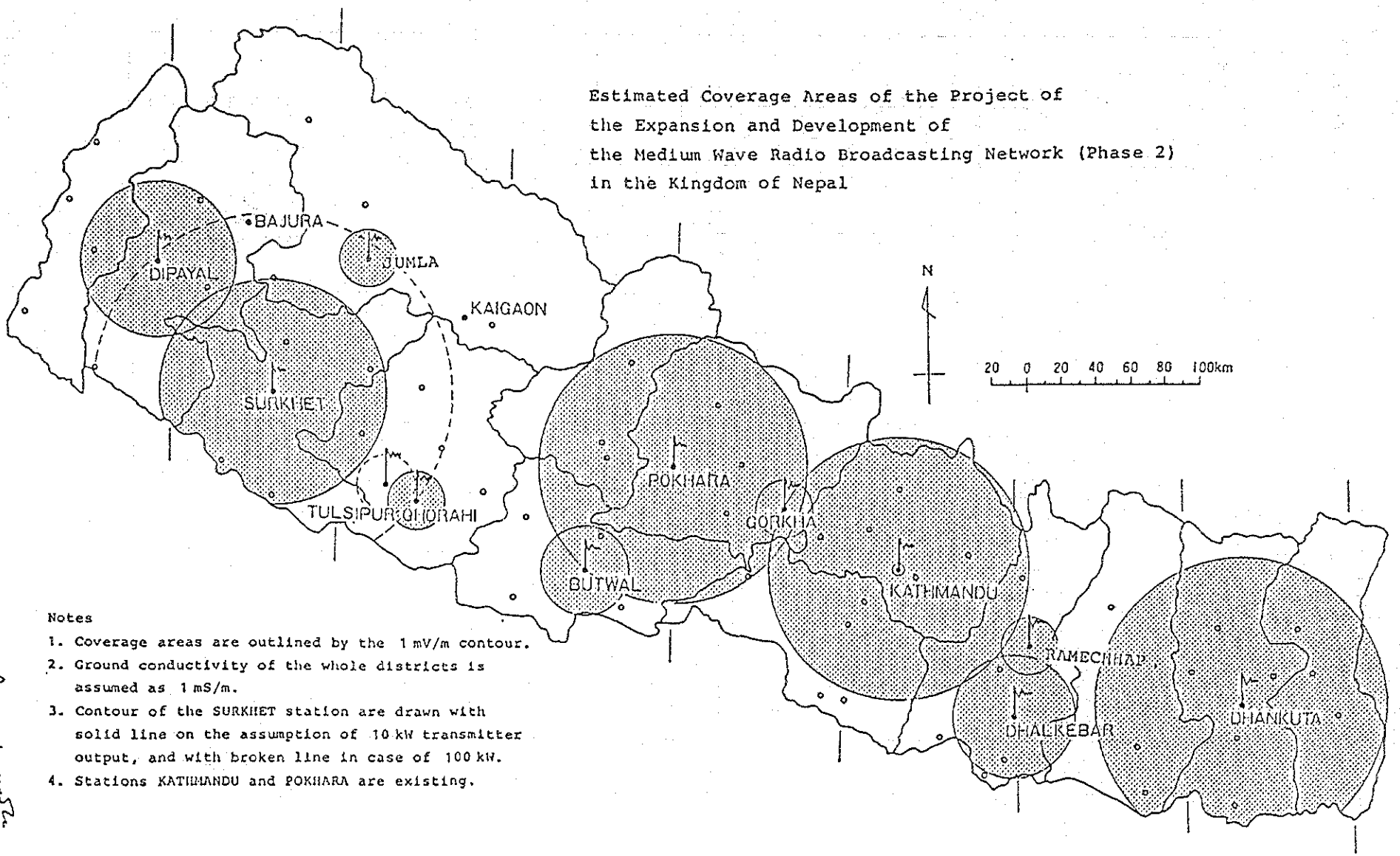
(2) His Majesty's Government of Nepal shall bear claims, if any arises, against the members of the Team resulting from, occuring in the course of, or otherwise connected with the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or wilful misconduct on the part of the members of the Team

(3) Radio Nepal shall act as counterpart agency to the Team and also coordinationg body in relation with other organizations concerned for the smooth implementation of the Study.

(4) Radio Nepal shall, at its own expense, provide the Team with the following, in cooperation with other relevant organizations:

1) Available data and information related to the Study
2) Counterpart personnel
3) Credentials or identification cards
4) Suitable office space and secretary service

Estimated Coverage Areas of the Project of
the Expansion and Development of
the Medium Wave Radio Broadcasting Network (Phase 2)
in the Kingdom of Nepal



Notes

1. Coverage areas are outlined by the 1 mV/m contour.
2. Ground conductivity of the whole districts is assumed as 1 mS/m.
3. Contour of the SURKHET station are drawn with solid line on the assumption of 10 kW transmitter output, and with broken line in case of 100 kW.
4. Stations KATHMANDU and POKHARA are existing.

Appendix-1

Appendix 2

Year & Month / Items	1988 February	March	April	May	June	July	August
Preparation Work							
Field Survey							
Explanation of the Draft Final Report							
Analysis Work in Japan						DF/R	F/R
Cost Estimation							

Appendix 3

ATTENDANT'S LIST

1. Radio Nepal

Mr. Prachanda M.S. Pradhan	: Managing Director Radio Nepal
Mr. M.P. Adhikari	: Acting Chief Engineer
Mr. Kedar Jung Thapa	: Engineer
Mr. Bishnu Prasad Shivakoti	: Assistant Engineer
Mr. Madan Bahadur Karki	: Section Officer
Mr. Govinda Prasad Shrestha	: Chief Accountant
Mr. Rajendra Shrestha	: Engineer
Mr. Sohan Bahaaur Nyachhyon	: Engineer
Mr. Ram Sharan Karki	: Engineer
Mr. Raghu Nath Adhikari	: Programme Controller
Mr. Uttam Lall Shrestha	: Chief Commercial Section

2. JICA Study Team

Mr. Minoru Kondoh	: Team Leader Ministry of Posts & Telecommunications
Mr. Masaei Matsunaga	: Coodinator JICA
Mr. Hajime Suga	: Survey leader, Network plan AJTS
Mr. Masatoshi Kurotani	: Programme plan, AJTS
Mr. Yutaka Hara	: Transmitting facilities, AJTS
Mr. Jiro Ohno	: ditto, AJTS
Mr. Koretaka Ogata	: Antenna, AJTS
Mr. Fumio Satoh	: ditto, AJTS
Mr. Hiroshi Sonoda	: Cost estimation, AJTS

3. JICA Nepal Office

Mr. Hideo Ono	: Resident Representative

MINUTES OF DISCUSSIONS FOR THE BASIC DESIGN STUDY ON THE EXPANSION AND DEVELOPMENT OF THE MEDIUM WAVE RADIO BROADCASTING NETWORK (PHASE 2) IN THE KINGDOM OF NEPAL

In response to the request of the Kingdom of Nepal, the Government of Japan decided to conduct a basic design study on the Project for the Expansion and Development of the Medium Wave Radio Broadcasting Network (Phase 2) (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to the Kingdom of Nepal the study team (hereinafter referred to as "the Team") headed by Mr. Minoru Kondoh, Ministry of Posts and Telecommunications, from 6th March to 19th April, 1988.

The Team had a series of discussions on the Project and exchanged views with the officials concerned of His Majesty's Government of Nepal headed by Mr. Prachanda M. S. Pradhan, Managing Director, Radio Nepal and conducted a field survey in the nine proposed sites and other areas.

As a result of the study, both parties have agreed to recommend to their respective governments that the major points of understanding reached between them, attached herewith, should be examined towards the realization of the Project.

Kathmandu, 17th April, 1988

MINORU KONDOH

Mr. Minoru Kondoh
Team Leader
Study Team
JICA

Prachanda M.S. Pradhan

Mr. Prachanda M. S. Pradhan
Managing Director
Radio Broadcasting Service
Radio Nepal

ATTACHMENT

1. The objective of the Project is to provide facilities and equipment for the medium wave radio broadcasting stations in order to improve the radio broadcasting service with a view to promoting educational & industrial activities and improving living standards in the country.

2. Radio Nepal is responsible for the implementation of the Project on Nepalese side.

3. According to priority, the proposed sites and the output power of the transmitters for the broadcasting stations are as follows:

   1) Surkhet : 100 kW and 10 kW standby transmitters
   2) Dhankuta : 100 kW and 10 kW standby transmitters
   3) Dipayal : 10 kW and 10 kW standby transmitters
   4) Dalkebar : 10 kW and 10 kW standby transmitters

4. The Japanese Study Team will convey to the Government of Japan the intention of His Majesty's Government of Nepal that the former takes the necessary measures to cooperate in implementing the Project and provide the facilities and equipment listed in Annex 1 for the radio broadcasting stations as stated in the paragraph 3 under the Japan's Grant Aid Programme.

5. His Majesty's Government of Nepal will take necessary measures listed in Annex 2 on condition that the grant aid by the Government of Japan is extended to the Project.

6. Both sides confirmed that the Japanese Study Team explained the Japan's Grant Aid Programme and Nepalese side understood it.

M. K

ANNEX 1

The facilities and equipment to be provided for the implementation of the Project are as follows :-

1. SURKHET
   (1) Transmitters, 100 kW and 10 kW
   (2) Transmitting antenna
   (3) Multi-purpose studio
   (4) Power supply
   (5) OB Van
   (6) Station house
   (7) Ancillaries

2 DHANKUTA
A. Multi-purpose studio in Dhankuta
   (1) Studio epuipment
   (2) Programme receiving equipment
   (3) Power supply
   (4) OB Van
   (5) Station house
   (6) Ancillaries
B. Transmitting station in Dharan
   (1) Transmitters, 100 kW and 10 kW
   (2) Transmitting antenna
   (3) Power supply
   (4) Station house
   (5) Ancillaries

3. DIPAYAL
   (1) Transmitters, 10 kW and 10 kW
   (2) Transmitting antenna
   (3) Multi-purpose studio
   (4) Power supply
   (5) OB Van
   (6) Station house
   (7) Ancillaries

4. DHALKEBAR

(1) Transmitters, 10 kW and 10 kW

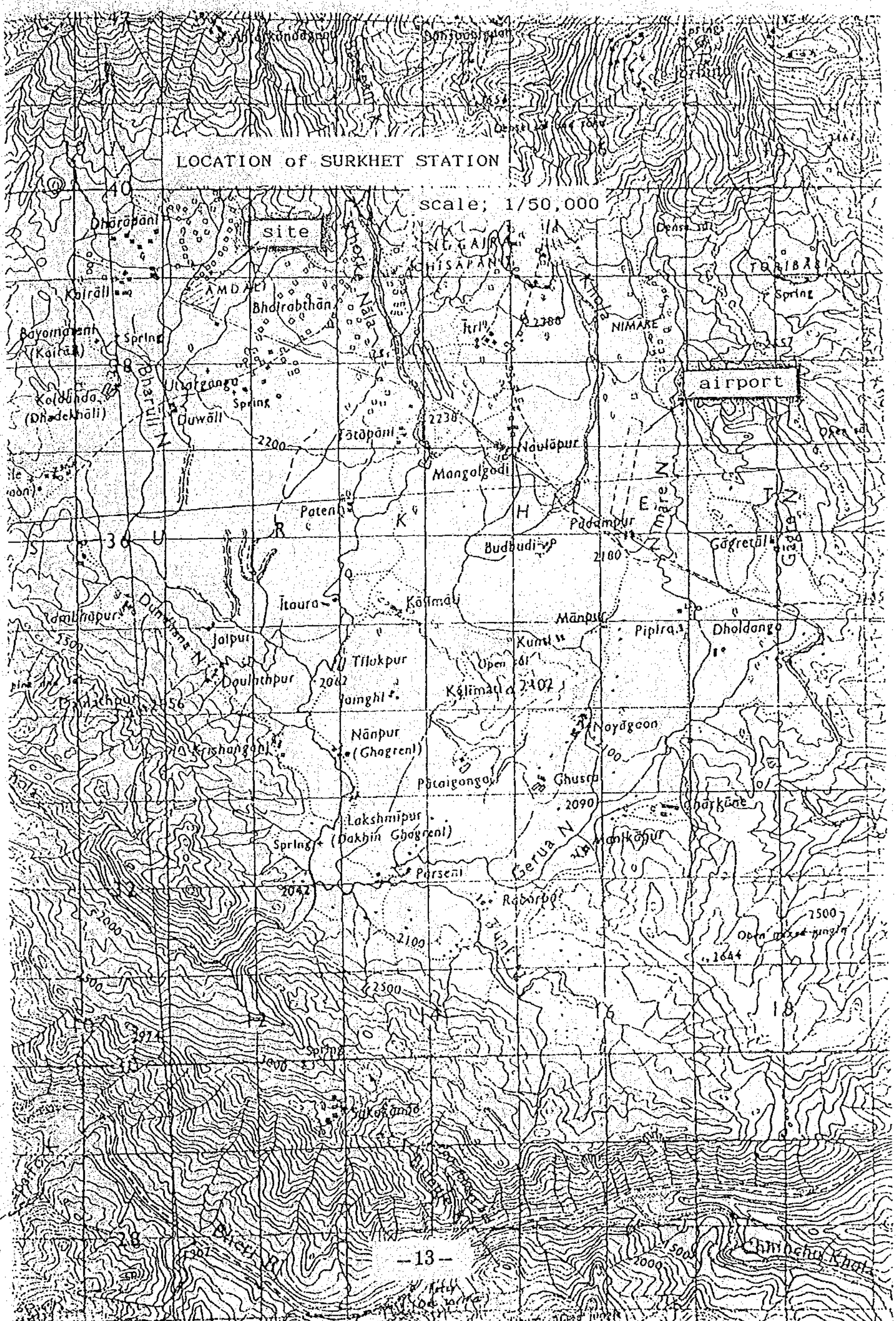
(2) Transmitting antenna

(3) Power supply

(4) Station house

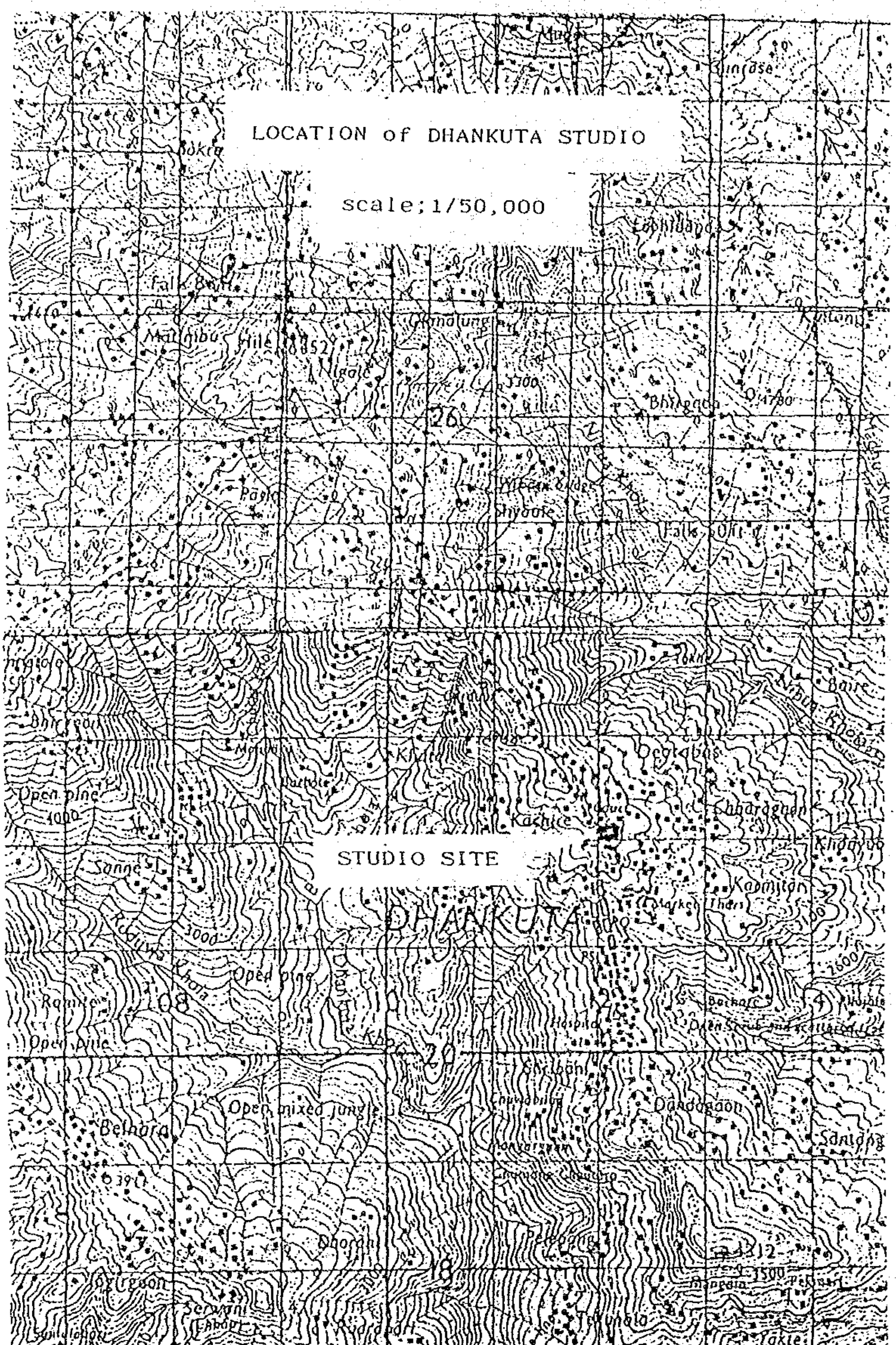
(5) Ancillaries

The locations of the sites are shown on the following sheets.

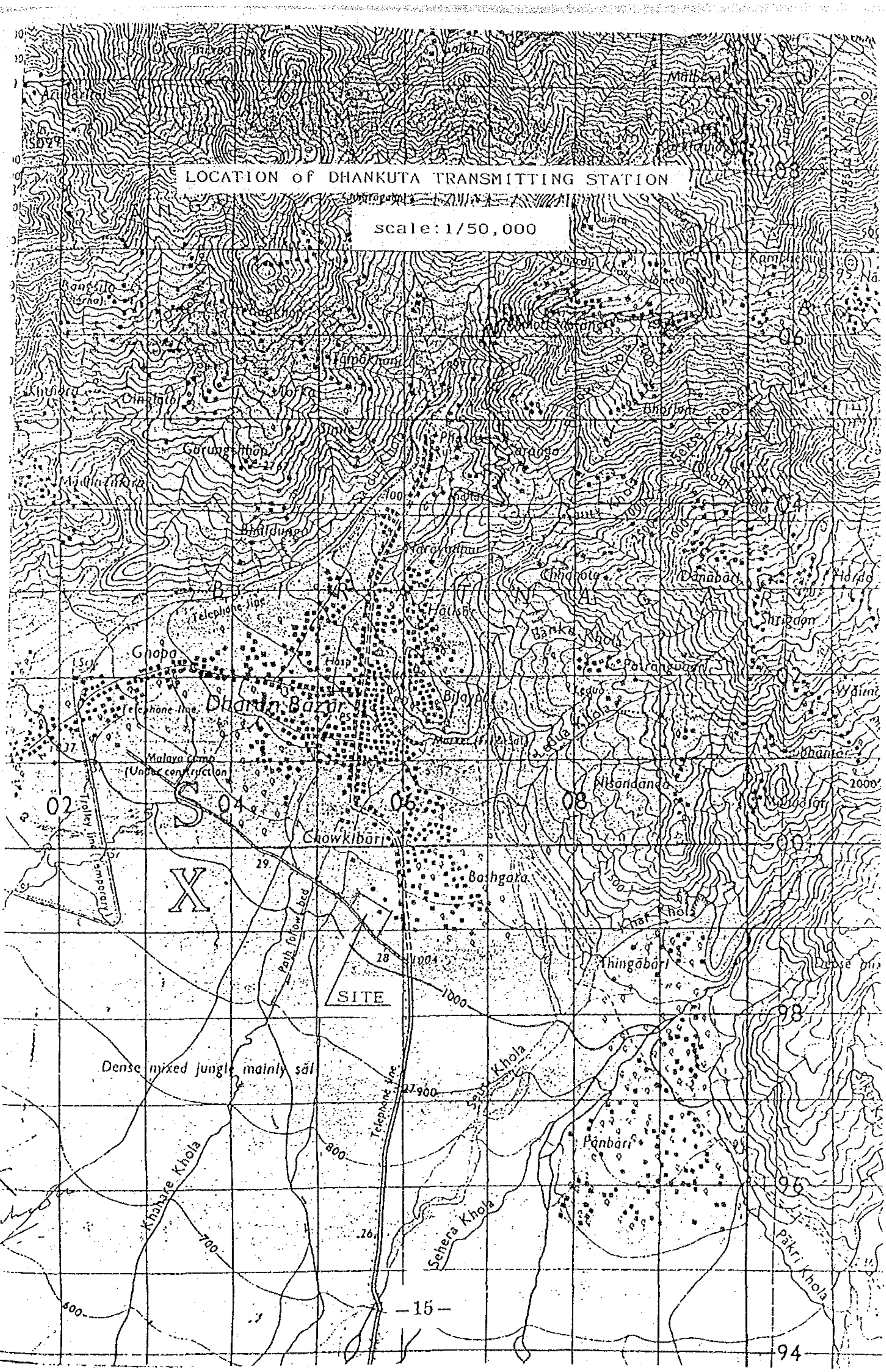

LOCATION of SURKHET STATION
scale; 1/50,000
site
airport
Dhārāpānī
Kairālī
AMDALI
Bhairabthān
KHISAPANI
NIMARE
TORIBARI
Spring
Uttarganga
Duwālī
Tātāpānī
Naulāpur
Mangalgadi
Patenī
Padampur
Budbudi
Gāgretāl
Kālimati
Mānpur
Pipira
Dholdanga
Jalpur
Tilokpur
Daulatpur
Kunti
Jainghī
Nānpur
(Ghagrenī)
Nayāgaon
Pātalganga
Ghusra
Lakshmīpur
(Dakhin Ghagrenī)
Parsenī
Gerua N
Manikāpur
Chhinchu Khola
2380
2238
2200
2180
2102
2090
2062
2042
2109
2500
2000
1644

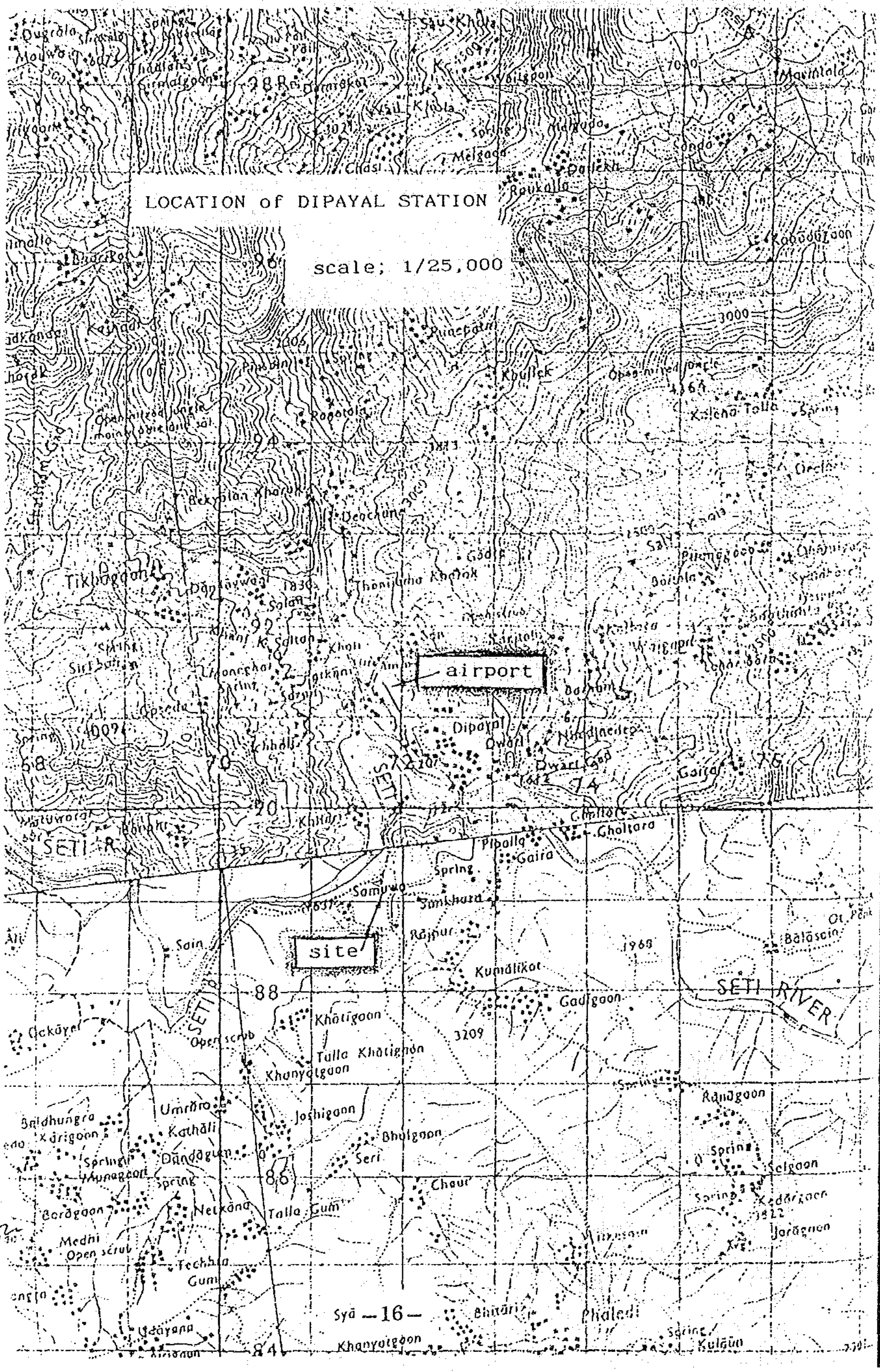
LOCATION of DHANKUTA STUDIO

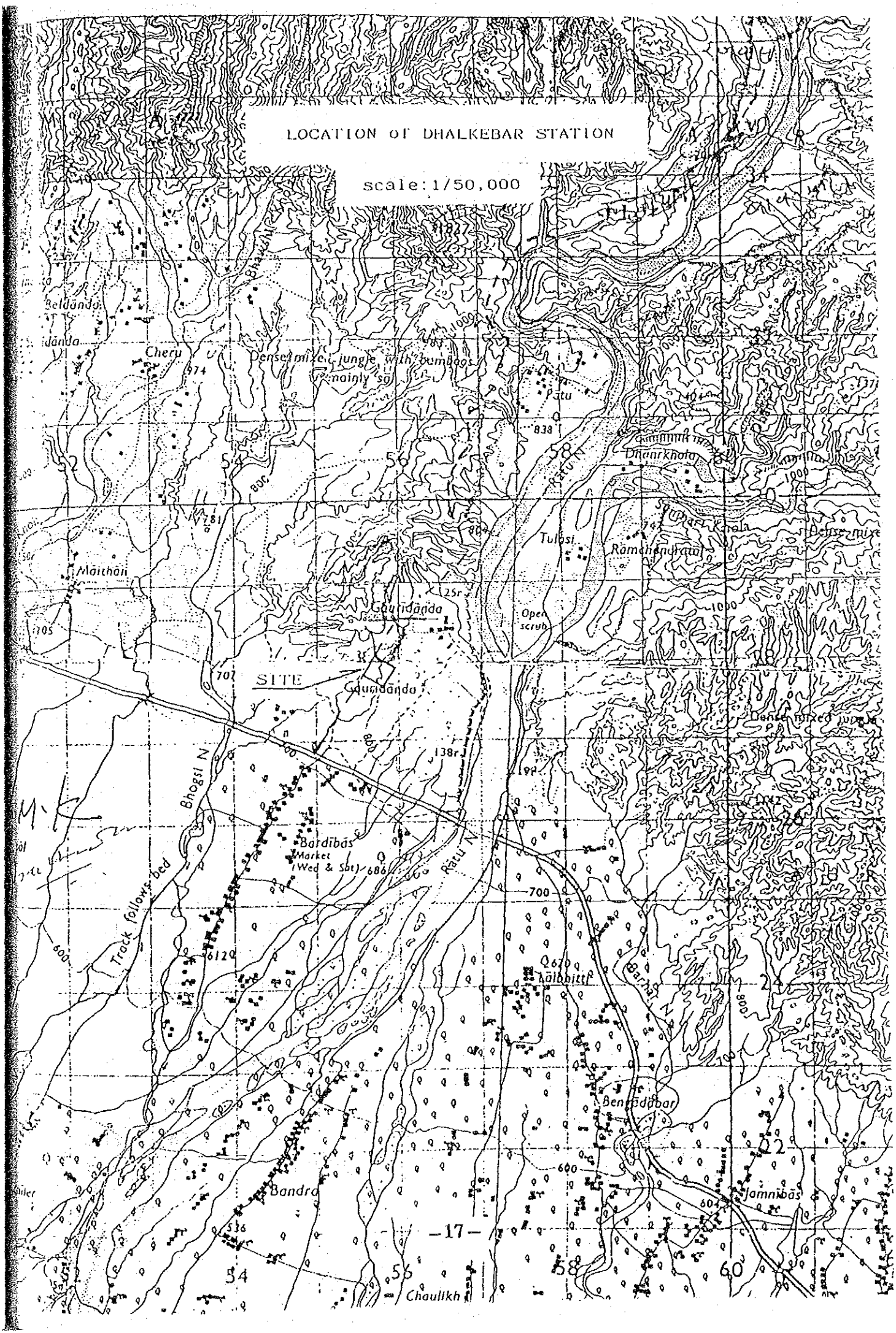
scale;1/50,000



M.K


LOCATION of DHANKUTA TRANSMITTING STATION
scale:1/50,000
SITE
Dense mixed jungle mainly sāl
Telephone line
Path follows bed
Trolley line (Temporary)
Malaya camp
(Under construction)
Chowkibari
Bashgara
Thingābari
Panbari
Khahare Khola
Sehera Khola
Pākri Khola
Nisandanda
Patranguan
Banka Khola
Telephone line
Ghopa
1000
900
800
700
600


LOCATION of DIPAYAL STATION
scale; 1/25,000
airport
site
Dipayal
SETI RIVER
SETI R.


LOCATION OF DHALKEBAR STATION
scale: 1/50,000
Beldanda
Cheru
Dense mixed jungle with bamboos mainly sal
Patu
Dhankhola
Tulasi
Ramchandrapur
Maithan
Gaurdanda
Open scrub
SITE
Bhagsi N
Track follows bed
Bardibas
Market (Wed & Sat)
Ratu N
Dhalkebar
Bandra
Chaulikh
Jamnibas
54
56
58
60
62

ANNEX 2

The following arrangements will be made by His Majesty's Government of Nepal.

1. To provide data and informations necessary for detailed design

2. To secure the lands necessary for the Project

3. To take necessary steps to ensure the reliable programme transmission to the proposed sites

4. To carry out site preparation such as clearing, leveling and access road before commencement of the construction works

5. To provide facilities for drainage, communications and security

6. To ensure the electricity power supply to the sites

7. To ensure prompt unloading, tax exemption, customs clearance at the border of Nepal and prompt internal transportation of the products purchased under the grant

8. To take necessary measures to the Government of India for the quick unloading, customs clearance at the port of disembarkation and for the smooth transportation through India to Nepal

9. To exempt the Japanese nationals concerned from custom duties, internal taxes and other fiscal levies imposed in Nepal with respect to the supply of the products and other authorization for carrying out the Project

10. To provide necessary permissions, licences and other authorizaton for carrying out the Project

11. To establish necessary operation and maintenance organizations in time for the completion of the radio broadcasting stations

PARTICIPANTS' LIST (Japanese Side)

(JICA Study Team)

Mr. Minoru Kondoh	: Team Leader Ministry of Posts & Telecommunications
Mr. Takashi Kawamoto	: Broadcasting Program Ministry of Posts & Telecommunications
Mr. Makoto Kashiwaya	: Coordinator JICA
Mr. Masaei Matsunaga	: Coordinator JICA
Mr. Hajime Suga	: Survey leader, Network plan All Japan Radio & Television Engineering Services Co. Ltd. (AJTS)
Mr. Masatoshi Kurotani	: Programme plan, AJTS
Mr. Yutaka Hara	: Transmitting facilities, AJTS
Mr. Jiro Ohno	: ditto, AJTS
Mr. Koretaka Ogata	: Antenna, AJTS
Mr. Fumio Satoh	: ditto, AJTS
Mr. Hiroshi Sonoda	: Cost estimation, AJTS

(JICA Nepal Office)

Mr. Hideo Ono	: Resident Representative

M-K

PARTICIPANTS' LIST (Nepalese Side)

(Radio Nepal)

Mr. Prachanda M.S. Pradhan	: Managing Director Radio Nepal
Mr. M.P. Adhikari	: Acting Chief Engineer
Mr. Uttam Lall Shrestha	: Chief Commercial Section
Mr. Kedar Jung Thapa	: Assistant Engineer
Mr. Rajendra Shrestha	: Assistant Engineer
Mr. Sohan Bahaaur Nyachhyon	: Assistant Engineer
Mr. Bishnu Prasad Shivakoti	: Assistant Engineer
Mr. Ram Sharan Karki	: Assistant Engineer
Mr. Govinda Prasad Shrestha	: Chief Accountant
Mr. Madan Bahadur Karki	: Section Officer
Mr. Raghu Nath Adhikari	: Programme Controller
Mr. Michel Harishchand	: News Editer & News Caster

M.K

(Ministry of Communications)

Mr. Krishna Bahadur Khatri	: Chief Engineer

(Nepal Electricity Authority)

Mr. Harsha Man Shresta	: Managing Director

(Nepal Telecommunications Corporation)

Mr. Suresh K.Pudasaini	: General Manager
Mr. Bhesh Raj Kanel	: Executive Engineer

(Department of Road)

Mr. N.D. Sharma	: Chief Engineer

(District Office)

- Ghorahi -

Mr. Prem Bahadur Shrestha	: Chief District Officer
Mr. Surya Bahadur Thapa	: President of Youth Organization
Mr. Narayau Prasad Gami	: Engineer, Electrical Office

- Dipayal -

Mr. P.R. Pradhan	: Regional Director
Mr. Kharel Achyut	: Regional Chief S.S.P. (Super Superintendent Police)
Mr. Tara Prasad Joshi	: Khardar, Administration, NEA
Mr. Shira Ram Panday	: Foreman, Electrical, NEA

- Surket -

Mr. Ram Ratan Misra	: Senior Administration Chief Officer
Mr. S.P. Lamsal	: Engineer, D.T.O. Surket
Mr. Durga Jung Thapa	: Incharge(Accauntant)
Mr. Hom Nath Bhandari	: Head assist.
Mr. Ishwar Man Tanirakar	: Senior D.E. Dept. of Water Supply and Sewerage
Mr. Guna Nand Mishra	: Assistant Eengineer Road Construction Office

M. K

Mr. Chatur Raj Prasai	: Engineer, T.P.I.C. (Town Planning Implementation Committee's Office)
- Janakpur -	
Mr. khagendra Prasad Poudel	: Chief District Officer
- Sindhulimadi -	
Mr. Krishna Murari Sharma	: Chief District Officer
- Dhankuta -	
Mr. Karki Nanda Kumar	: Chief District Officer
- Dharan -	
Mr. Bam Dewan	: Chief of City Panchayat
- Gorkha -	
Shiva Prasad Sharma	: Chief District Officer
Mr. Chandra Raj Pandey	: Posts Master
- Butwal -	
Mr. Basudev Khanal	: Assistant Zonal Commissioner

MINUTES OF DISCUSSIONS
ON THE PROJECT FOR EXPANSION AND DEVELOPMENT
OF THE MEDIUM WAVE RADIO BROADCASTING NETWORK (PHASE 2)
IN THE KINGDOM OF NEPAL

In response to the request of His Majesty's Government of Nepal for the Project for Expansion and Development of the Medium Wave Radio Broadcasting Network (Phase 2) (hereinafter refered to as "the Project"), the Government of Japan decided to conduct a basic design study on the Project and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to the Kingdom of Nepal the study team headed by Mr. Minoru Kondoh, Deputy Director of Engineering Division, Broadcasting Bureau, Ministry of Posts and Telecommunications, from March 6th to April 19th, 1988.

As the result of the study, JICA prepared a draft report and dispatched a team headed by Mr. Masato Iwasaki, Second Frequency Section Chief, Frequency Planning Division, Radio Department, Telecommunications Bureau, Ministry of Posts and Telecommunications, to explain and discuss it from July 22nd to July 31st, 1988.

Both parties had a series of discussions on the report and agreed to recommend to their respective Governments that the major points of understanding reached between them, attached herewith, should be examined towards the realization of the Project.

Kathmandu, July 27th, 1988

Masato Iwasaki

Mr. Masato Iwasaki
Team Leader,
Draft Final Report
Explanation Team
JICA

Prachanda M.S. Pradhan

Mr. Prachanda M.S. Pradhan
Managing Director
Radio Broadcasting Service
Radio Nepal

ATTACHMENT

1. The Nepalese side has agreed in principle to the basic design proposed in the Draft Final Report with minor but appropriate alteration mutually agreed upon to be incorporated in the Final Report.

2. The Nepalese side has understood Japan's grant aid system and confirmed that the necessary measures will be taken by the Nepalese side as shown in Annex-I which are manifested in the ANNEX-2 of the MINUTES OF DISCUSSIONS on the Project signed on 17th April, 1988, including some additional modifications on condition that the grant aid by the Government of Japan would be extended to the Project.

3. The Nepalese side ensured the provision of necessary budget for the adequate personnel services, maintenance and operation expenses of the broadcasting stations.

4. The Final Report (10 copies in English) will be submitted to the Nepalese side by the end of September, 1988.

M. Iwasaki

Annex-I

The following arrangements will be made by His Majesty's Government of Nepal.

1. To provide data and informations necessary for detailed design
2. To secure the lands necessary for the Project
3. To take necessary steps to ensure the reliable programme transmission to the proposed sites
4. To carry out site preparation such as clearing, leveling and access road before commencement of the construction works
5. To provide facilities for drainage, communications and security
6. To ensure the electricity power supply to the sites
7. To ensure prompt unloading, tax exemption, customs clearance at the border of Nepal and prompt internal transportation of the products purchased under the grant
8. To take necessary measures to the Government of India for the quick unloading, customs clearance at the port of disembarkation and for the smooth transportation through India to Nepal
9. To exempt the Japanese nationals concerned from custom duties, internal taxes and other fiscal levies imposed in Nepal with respect to the supply of the products and other authorization for carrying out the Project
10. To provide necessary permissions, licences and other authorizaton for carrying out the Project
11. To establish necessary operation and maintenance organizations in time for the completion of the radio broadcasting stations
12. To take necessary procedures to ITU (IFRB) and the related Government(s) regarding the alteration of the locations of the transmmitting stations of Dhankuta and Dipayal.

M Iwasaki

ATTENDANTS' LIST

1. Radio Nepal

Mr. Prachanda M.S. Pradhan	: Managing Director
Mr. M.P. Adhikari	: Acting Chief Engineer
Mr. U.L. Shrestha	: Chief Commercial Section
Mr. K.J. Thapa	: Assistant Engineer
Mr. B.P. Shivakoti	: Assistant Engineer
Mr. S.B. Nyachyon	: Assistant Engineer
Mr. R.S. Karki	: Assistant Engineer
Mr. G.P. Shrestha	: Chief Accountant
Mr. Michel Harishchand	: News Editor & News Caster

2. JICA Team

Mr. Masato Iwasaki	: Team Leader Ministry of posts and Telecommunications
Mr. Hiroshi Shiono	: Coordinator Japan International Cooperation Agency
Mr. Hajime Suga	: Member All Japan Radio & Television Engineering Services Co., Ltd. (AJTS)
Mr. Jiro Ohno	: Member AJTS

3. JICA Nepal Office

Mr. Mitsukuni Sugimoto	: Assistant Resident Representative

M Iwasaki

Prachanda

II. Member List of the Study Team

(1) Basic Design Study

Mr. Minoru Kondoh	: Team leader	:	Deputy Director, Engineering Division, Broadcasts Administration Bureau, Ministry of Posts & Telecommunications
Mr. Takashi Kawamoto	: Broadcasting Programme	:	International Cooperation Division, Communications Policy Bureau, Ministry of Posts & Telecommunications
Mr. Makoto Kashiwaya	: Coordinator	:	Second Basic Design Study Division, Grant Aid Planning and Survey Department, JICA
Mr. Masaei Matsunaga	: ditto	:	Okinawa International Centre, JICA
Mr. Hajime Suga	: Survey leader (A) Network plan	:	All Japan Radio & Television Engineering Services Co., Ltd. (AJTS)
Mr. Masatoshi Kurotani	: Programme plan (B)	:	AJTS

Mr. Yutaka Hara	: Transmitting facilities	(A) :	AJTS
Mr. Jiro Ohno	: ditto	(B) :	AJTS
Mr. Koretaka Ogata	: Antenna	(A) :	AJTS
Mr. Fumio Satoh	: ditto	(B) :	AJTS
Mr. Hiroshi Sonoda	: Cost estimation	(C) :	AJTS

(2) Explanation and Discussion on Draft Final Report

Mr. Masato Iwasaki	: Team leader	: Frequency Planning Division, Radio Department, Telecommunications Bureau, Ministry of Posts and Telecommunications
Mr. Hiroshi Shiono	:	Second Basic Design Study Division, Grant Aid Planning and Survey Department, Japnan International Cooperation Agency
Mr. Hajime Suga	:	International Department, All Japan Radio & Television Engineering Services Co., LTD.(AJTS)
Mr. Jiro Ohno	:	International Department, (AJTS)

III. Itinerary of the Study

(1) Basic Design Study

STUDY SCHEDULE

(March 6 ～ April 19, 1988)

			Gvt. Officials	Group A	Group B	Group C
1	March 6	SUN	Tokyo → Bangkok			
2	7	MON	Bangkok → Kathmandu, Meeting : JICA office			
3	8	TUE	Courtesy Call: Embassy of Japan, Radio Nepal and Related Agencies			
4	9	WED	Discussion, Radio Nepal			
5	10	THU	Signing to Minutes,	Preparation for Survey		
6	11	FRI	Survey, Kathmandu	Kathmandu → Ramechhap	Survey, Kathmandu	Same as Group B
7	12	SAT	Kathmandu → Bangkok	Survey, Ramechhap	〃	〃
8	13	SUN	Bangkok → Tokyo	〃	Kathmandu → Butwal	〃
9	14	MON	Mr. Minoru KONDOH Mr. Masaei MATSUNAGA	Ramechhap → Kathmandu	Butwal → Ghorahi	〃
10	15	TUE		Data analysis	Ghorahi → Nepalganj	〃
11	16	WED		Survey, Kathmandu	Data analysis	〃
12	17	THU		Kathmandu → Janakpur	Nepalganj → Dipayal	〃
13	18	FRI		Survey, Dhalkebar	Survey, Dipayal	〃
14	19	SAT		〃	〃	〃
15	20	SUN	(Group A) Mr. Hajime SUGA Mr. Yutaka HARA Mr. Koretaka OGATA	Janakpur → Sindhulimadi	〃	〃
16	21	MON		Sindhulimadi → Biratnagar	Dipayal → Nepalganj	〃
17	22	TUE		Biratnagar → Dhankuta	〃	Dipayal → Nepalganj
18	23	WED		Survey, Dhankuta	Nepalganj → Surkhet	Nepalganj → Surkhet
19	24	THU	(Group B) Mr. Jiro ONO Mr. Fumio SATO Mr. Masatoshi KUROTANI	〃	Survey, Surkhet	Surkhet → Nepalganj
20	25	FRI		〃	〃	Nepalganj → Kathmandu
21	26	SAT		〃	Surkhet → Nepalganj	Kathmandu → Biratnagar
22	27	SUN	(Group C) Mr. Hiroshi SONODA	Survey, Dharan	Nepalganj → Pokhara	Same as Group A
23	28	MON		Survey, Dhankuta	Pokhara → Kathmandu	〃
24	29	TUE		Dhankuta, Dharan→ Birganj	Survey, Kathmandu	〃
25	30	WED		Birganj → Kathmandu	〃	〃
26	31	THU		Data analysis	Nepalganj → Butwal	Survey, Kathmandu
27	April 1	FRI		Survey, Kathmandu	〃	〃
28	2	SAT		Team Meeting, Data analysis	〃 (Group B')	Provision returning to Japan
29	3	SUN		Kathmandu → Gorkha	〃 (KTM → SRKT)	Kathmandu → Bangkok
30	4	MON		Gorkha → Pokhara	〃 (Survey, SRKT)	Bangkok → Tokyo
31	5	TUE		Pokhara → Butwal	Kathmandu → Nepalganj, (Survey, Surkhet)	
32	6	WED		Survey, Butwal	Nepalganj → Jumla , (Surkhet → Kathmandu)	
33	7	THU	Mr. Minoru KONDOH Mr. Takashi KANAMOTO Mr. Makoto KASHIWAYA	Butwal → Kathmandu	Survey, Jumla (Survey, Kathmandu)	
34	8	FRI		Data analysis	Jumla → Kathmandu	
35	9	SAT		〃	Data analysis	
36	10	SUN	Tokyo → Bangkok	〃	Survey, Kathmandu	
37	11	MON	Bangkok → Kathmandu	Survey, Kathmandu		
38	12	TUE		Preparation for Progress Report		
39	13	WED		General Meeting with Radio Nepal		
40	14	THU		Preparation for "Minutes of Discussions"		
41	15	FRI	Kathmandu → Pokhara	Preparataion, Minutes & Progress Report		
42	16	SAT	Pokhara → Kathmandu	Provision for returning to Japan		
43	17	SUN	Signing to "Minutes of Discussions",			
44	18	MON	Report to Embassy of Japan, JICA, Kathmandu → Bangkok			
45	19	TUE		Bangkok → Tokyo		

(2) Explanation and Discussion on Draft Final Report

	Date		Schedule	
1	July 22	Fri	Tokyo → Bangkok	
2	23	Sat	Bangkok→ Kathmandu	
3	24	Sun	Courtesy call to Radio Nepal and Ministry of Communications Explanation of Draft Final Report (Radio Nepal)	
4	25	Mon	Courtesy call to Embassy of Japan & JICA Office Discussion on Draft Final Report (Radio Nepal)	
5	26	Tue	Meeting with Ministry of Road and NEA Courtesy call to the Principal Press Secretary, Minister and Secretary of Ministry of Communications Discussion DF/R, Preparation of "MINUTES OF MEETINGS"	
6	27	Wed	Meeting with NTC Signing "MINUTES OF MEETINGS."	
7	28	Thur	Report to Embassy of Japan and JICA Office (Governmental Member) Kathmandu → Bangkok	(Consultant Member) Supplementary Study
8	29	Fri	Bangkok→ Tokyo	Supplementary Study
9	30	Sat	————	Kathmandu → Bangkok
10	31	Sun	————	Bangkok→ Tokyo

IV. List of Interviewees

(Embassy of Japan)

H. E. Kazuaki Arichi	: Ambassador Extraordinary and Plenipotentiary
Mr. Takao Nishina	: First Secretary
Mr. Toshiaki Tanaka	: Second Secretary

(JICA Nepal Office)

Mr. Hideo Ono	: Resident Representative
Mr. Mitsukuni Sugimoto	: Assistant Resident Representative

(1) Basic Design Study

(Radio Nepal)

Mr. Prachanda M.S. Pradhan	: Managing Director Radio Nepal
Mr. M. P. Adhikari	: Acting Chief Engineer
Mr. Uttam Lall Shrestha	: Chief, Commercial Section
Mr. Kedar Jung Thapa	: Assistant Engineer
Mr. Rajendra Shrestha	: Assistant Engineer
Mr. Sohan Bahaaur Nyachhyon	: Assistant Engineer
Mr. Bishnu Prasad Shivakoti	: Assistant Engineer
Mr. Ram Sharan Karki	: Assistant Engineer
Mr. Govinda Prasad Shrestha	: Chief Accountant
Mr. Madan Bahadur Karki	: Section Officer
Mr. Raghu Nath Adhikari	: Programme Controller
Mr. Michel Harishchand	: News Editer & News Caster

(Royal Palace)

Mr. Chiran Sumsher Thapa	: Principal Press Secretary

(Ministry of Communications)

Mr. Bishnu Pratap Shah	: Secretary
Mr. Krishna Bahadur Khatri	: Chief Engineer

(Nepal Electricity Authority)

Mr. Harsha Man Shresta	: Managing Director

(Nepal Telecommunications Corporation)

Mr. Suresh K. Pudasaini	: General Manager
Mr. Bhesh Raj Kanel	: Executive Engineer

(Department of Road)

Mr. N.D. Sharma	: Chief Engineer

(District Office)

- Ghorahi -

Mr. Prem Bahadur Shrestha	: Chief District Officer
Mr. Surya Bahadur Thapa	: President of Youth Organization

Mr. Narayau Prasad Gami	: Engineer, Electrical Office

- Dipayal -

Mr. P.R. Pradhan	: Regional Director
Mr. Kharel Achyut	: Regional Chief S.S.P.(Super Superintendent Police)
Mr. Tara Prasad Joshi	: Khardar, Administration, NEA
Mr. Shira Ram Panday	: Foreman, Electrical, NEA

- Surkhet -

Mr. Ram Ratan Misra	: Senior Administration Chief Officer
Mr. S.P. Lamsal	: Engineer, D.T.O. Surkhet
Mr. Durga Jung Thapa	: Incharge (Accountant)
Mr. Hom Nath Bhandari	: Head assist.
Mr. Ishwar Man Tanirakar	: Senior D.E. Dept. of Water Supply and Sewerage
Mr. Guna Nand Mishra	: Assistant Engineer Road Construction Office

Mr. Chatur Raj Prasai	: Engineer, T.P.I.C. (Town Planning Implementation Committee's Office)

- Janakpur -

Mr. Khagendra Prasad Poudel	: Chief District Officer

- Sindhulimadi -

Mr. Krishna Murari Sharma	: Chief District Officer

- Dhankuta -

Mr. Karki Nanda Kumar	: Chief District Officer

- Dharan -

Mr. Bam Dewan	: Chief of City Panchayat

- Gorkha -

Shiva Prasad Sharma	: Chief District Officer
Mr. Chandra Raj Pandey	: Posts Master

- Butwal -

Mr. Basudev Khanal	: Assistant Zonal Commissioner

(2) Explanation and Discussion on Draft Final Report

(Royal Palace)

Mr. C.S. Thapa	: Principal Press Secretary to His Majesty the King

(Ministry of Communications)

Mr. H.B. Basnet	: Minister
Mr. B.P. Shah	: Secretary
Mr. Jit Bdr. Manandhar	: Additional Secretary

(Department of Road)

Mr. R.B. Sharma	: Superintending Engineer
Mr. M.B. Karki	: Senior Divisional Engineer

(Nepal Electricity Authority)

Mr. Harsha Man Shrestha	: Managing Director
Mr. M.R. Tuladhar	: Director Technical Services Department

(Nepal Telecommunications Corporation)

Mr. S.K. Pudasaini	: General Manager
Mr. C.S. Bohra	: Deputy General Manager
Mr. B.R. Kanel	: Executive Engineer

V. List of Collected Materials

- Organization Chart of His Majesty's Government of Nepal
- Organization Chart of Radio Nepal
- Basic Design Study of Medium Wave Radio Network Strengthening Project (Phase II)
- Long Term Plan for Expansion of Development of Radio Network
- Programme Production Data of Radio Nepal
- Broadcasting Programme Time Table of Radio Nepal
- Commercial activity of Radio Nepal
- Properties of Radio Nepal
- Statistic Data of Radio Receiver Sets
- Population Census Data
- Climatological Records of Nepal 1976~1980. 1981~1982. 1983~1984
- Economic Survey, Fiscal year 1986~1987
- Statistical Year Book of Nepal, 1987
- Radio Education Teacher Training Project
- Farm Broadcasting in Nepal
- Official Exchange Rate, Nepal Raster Bank
- Local Cost Data, Material and Labor Cost

VI. Country Data

(Weather and Climate)

The Kingdom of Nepal has a long land stretching east and west, and is linked with India to the south and the Tibetan region of the People's Republic of China to the north. Roughly rectangular in shape, Nepal covers an area of about 141,000 square kilometers with an average length of 880km east to west and a width of 190km north to south. The west direction points slightly to the north. Geographically, the country is divided into three regions running east to west.

The northern area is the Trans-Himalayan Region including the southern slope of the Himalayas and their foot areas. This Region lies at a high altitude and is covered with snow for many months.

The Middle Region includes two mountain ranges running east to west between which there are some basins. Kathmandu Basin, where the capital is located, is also one of these basins. This Region has a moderate climate and many sharp slopes and gorges eroded by rivers, which are geographically best described as "the stairsteps to the sky." The region covers 60% of the total area and 56% of the population of the country.

The southern area is the tropical lowland belt connecting to Indian Plain, thus there are many points in this Region common to India. The area is also called Terai Region which covers 17% of the country's total area but holds about 44% of the population and 2/3 of Nepal's cultivated land. The heavily forested range shelters a wide array of wildlife including tigers and elephants.

Some big rivers run south originated from Tibet, the Himalayas or the mountain ranges in the Middle Region reaching into India then forming the Ganges.

Clearly defined seasonal changes can be seen in the entire areas except the northern area because of the monsoon effect. About 80% of an annual rainfall is concentrated between June and September, and the dry season is from November to April. Precipitation and the areas related to transportation and work of this Project are listed in Fig.1 and Fig.2

As for the wind data disclosed by Nepal Meteorological Agency, only its average velocity is recorded. No data such as maximum instantaneous wind velocities used for design of antenna masts are available. But Nepal Telecommunications Corporation (NTC) specifies the maximum wind velocity used for design of their structures as 160km/hr, i.e. 44m/sec.

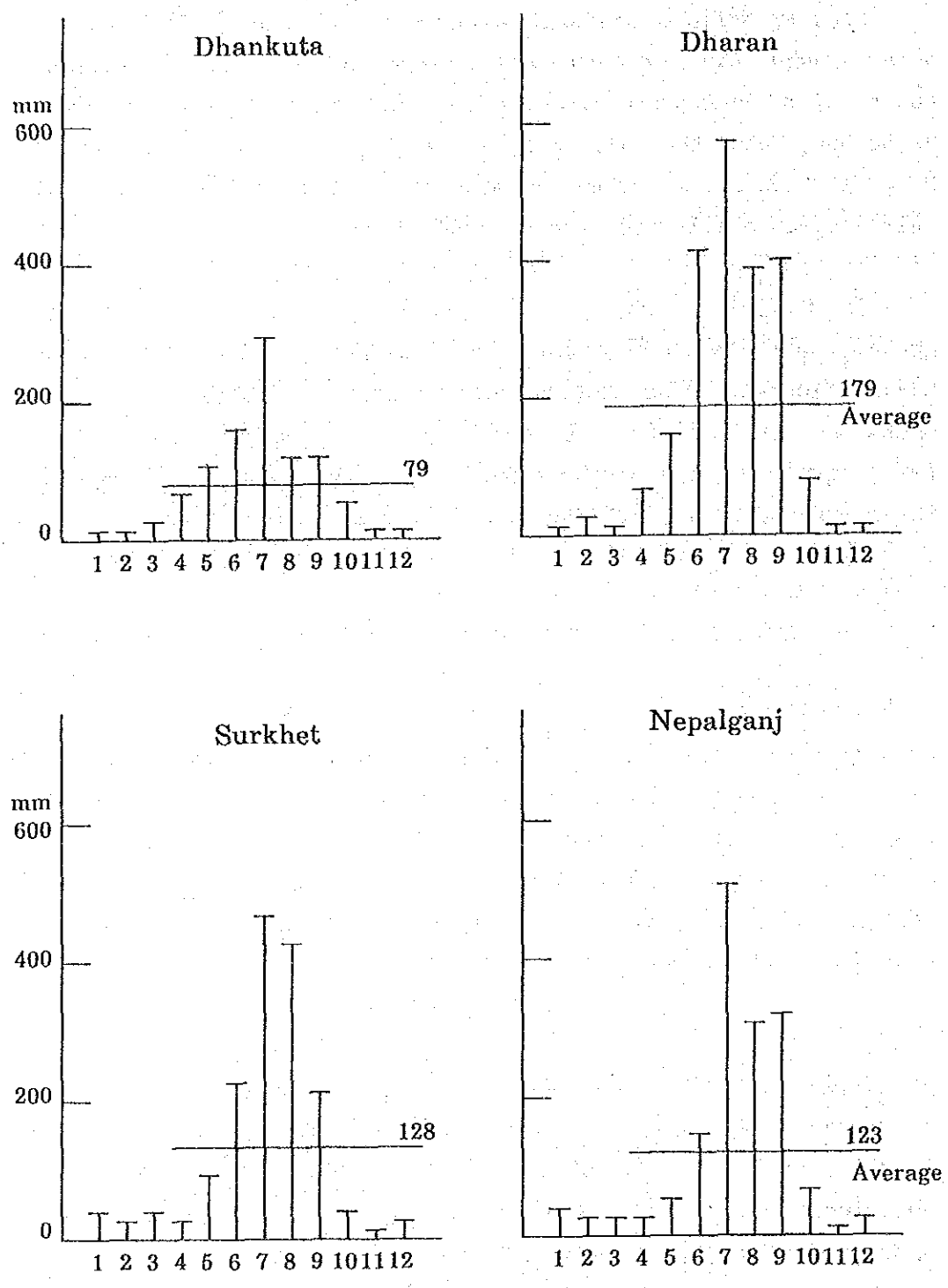


Fig. 1 Monthly Precipitation (1976~1984 mean)

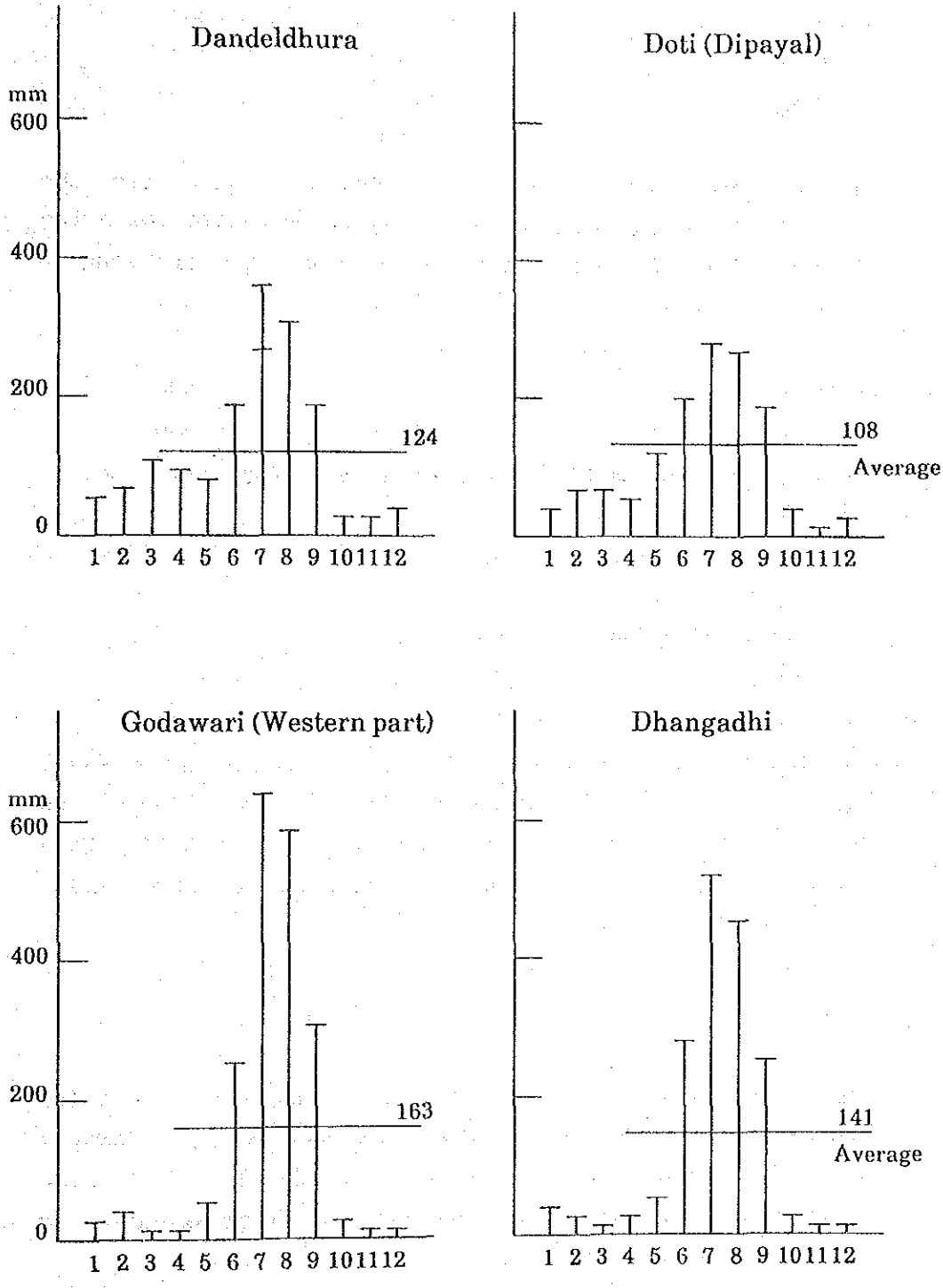


Fig. 2 Monthly Precipitation (1976~1984 mean)

(Transport)

1) Railway

Railway transport in Nepal is less developed, and the railway around Janakpur in Terai Region connecting with the Indian railway is 53km long and of narrow gauge, the longest in this country.

2) Automobile

The number of automobiles registered as of April 1987 is:

Bus and Mini bus	3,569
Truck	5,781
Jeep and sedan	11,802
Total	21,152

Trolley bus service linking Kathmandu and Bhaktapur (13km long) is available. Oil is not required for this type of bus and electric power can be domestically supplied, thus expansion of the bus service network is now under consideration.

3) Road

Since the railway transport is not yet adequate, roads for automobile have become the most important transport means, but the mountainous topography in Nepal makes road construction difficult and expensive. The road situation as of March 1987 is shown below:

Asphalt pavement	2,761km
Gravel road	966km
Road not paved	2,407km
Total	6,134km

Trunk road:

Mechi	Mahakali	1,030 km	(Asian Highway)
Kathmandu	Trisuli	72 km	
	Raxaul	185 km	
	Kodari	114 km	
Dhangadhi	Dandeldhura	140 km	
Kohalpur	Surkhet	92 km	
Lamosangu	Jiri	110 km	
Kathmandu	Pokhara	200 km	
Pokhara	Bhairahawa	200 km	
Gorkha	Narayangadh	65 km	
Dharan	Dhankuta	50 km	

4) Airtransport

Airline services have been used as a quick access means to link the capital and major cities in the country as well as remote and rural areas to which automobile roads are not extended. The Royal Nepal Airlines is a national corporation, and now has the following aircraft:

Boeing 727	3 aircraft
〃 757	2
Avro	3
Twinotter	10
Pilatus Porter	2
Total	20

Air services are available now in 39 domestic airports, and the distribution and runway situations are as follows:

Eastern Development Region	11 airports
Central Development Region	8
Western Development Region	6
Mid-Western Development Region	9
Far-Western Development Region	9
Total	43

Paved runway	5 airports
Not paved/good status	13
Not paved/fairly good	25
Total	43

Kathmandu International Airport is provided with a 10,000 foot long runway which enables A300B to take off and land.

International airlines from Thailand, India, Burma, Bangladesh, Pakistan, Singapore, Sri Lanka and West Germany are flying in and linking with the following cities in nine countries together with RNAC:

Delhi	Colombo
Calcutta	Dubai
Bangkok	Karachi
Hongkong	Dacca
Rangoon	Singapore

About 90% of visitors to Nepal are coming to Kathmandu International Airport via these air routes.

Air transport results of the FY 1985/86 are as follows:

	passengers	cargoes
Internal services	239,000 persons	771 tons
External services	197,000 persons	3,139 tons

There are two systems for internal service fares: less expensive for Nepalese and about three times on the average for foreigners. It costs 400NRs (equivalent to $55) between Kathmandu and Bhairahawa, 2.97 times the Nepalese fare.

Telephone

Diffusion of telephones in this country as of the end of 1985 is as follows:

	No. of persons registered	No. of cities
Magnetic	80	3
Common-battery	3,140	13
Automatic	9,494	3
Digital	11,054	5

Radio sets are provided at town offices and other 85 important places as a communication means with local areas where no telephones are available, among which 43 places keep radio sets operable with solar batteries.

Phase 2 of the local telephone network development plan is now under way with the assistance of Japan, and PCM multiple signals are loaded on a long distance micro network to make an automatic trunk connection possible throughout the country.

They have a plan to install public telephone booths in local cities also.

As for a trunk network, new extension or additional installation work of the digital relay link to the existing analog link is under way, and the conversion work to the digital system is also going on.

VII. Outline of Sites other than Proposed Ones

(Jumla)

Jumla is a city in the mountain region of the Mid-Western Development Region having a population of about 72,000.

Jumla is famous among tourists as a trekking base town, but a cultivated area is limited due to the city's hilly topography, and there is no special industry there, thus being a city hard to be developed.

Airline services are regularly available from Kathmandu and Nepalganj but no road is connected there.

No practical medium wave from other stations exists in the daytime in Jumla and the short wave broadcasting from Kathmandu Station can only be received from time to time with reception evaluation 2~3.

Meanwhile, the medium wave broadcasting from Pokhara Station can be received with evaluation 4 and Kathmandu Station with evaluation 3 at night, and people in restaurants or other gathering places are enjoying the MW services.

It seems preferable to locate a station there in view of the reception status, but no programme transmission network is available and there is no overland transportation means either. It would cost much to construct a radio station if relatively heavy materials and equipment were all transported by helicopter.

Fortunately, a radio station is presently supposed to be constructed in Surkhet, therefore it would be wise to make a decision whether to build a station or not by checking the reception status after completion of Surkhet Station. It is estimated that a reception field strength in Jumla from Surkhet Station would be

57~60dBμV/m assuming an earth conductivity of transmission path be 1mS/m.

Gaira Goan has some advantages as a transmitting station to cover main service areas in case that further expansion is initiated. Specifically speaking, it can be expected that, if located in Gaira Goan, this station will cover three valleys: the valley extending north through the city of Jumla, the valley extending west- southwest from the city and the valley extending north from Um Khola, a relatively densely populated area.

Gaira Goan is presently used as a paddy field, and earth conductivity is estimated fairly good, and the wave can be expected to cover the areas along three rivers also.

Although there exists neither automobile nor road for it, a walking road is extended up to the site and a power line is also extended about 300m away from the site.

(Ghorahi)

Ghorahi is located 25km north of a nearly halfway point of the main road between Butwal and Nepalganj and in the same administrative zone and basin as Tulsipur 20 km west of Ghorahi, thus being in the same life zone as Tulsipur.

An access road to Ghorahi is of a gravel type but transportation will be secured somehow even in the rainy season, thus no problem will arise for transportation of construction materials and equipment.

Electric power is insufficient now and power failure takes place often in the daytime. They have a plan to construct a power distribution network but its initiation time is not certain yet.

As for a programme transmission network, a digital relay link is planned from Nepalganj to Ghorahi, but it does not have a channel capacity for the programme transmission of Radio Nepal.

Broadcasting from Pokhara Station can be received in the daytime at 41dBμV/m with evaluation 3- in Ghorahi but reception at night is not good.

With completion of Surkhet Station, a field strength of 60dBμV/m or more can be expected in both Ghorahi and Tulsipur.

A flat site about 2km west of the city having enough space was selected for transmitting station if realized in the future. This site is a privately owned land now cultivating vegetables and wheat, and the town chief said that there would be no problem in purchasing this lot.

(Butwal)

Butwal is the centre in the Rupandehi district of the Western Development Region, and located at an intersection of the main road running east and west and the main road running north and south, Pokhara into India via Bhairahawa. In addition, Butwal is situated at a boundary between the mountain region and the Terai region, thus being a key transportation point.

An electric power line is already available, and an analog telephone relay link is under operation between Kathmandu and Butwal as to the programme transmission network.

The medium wave from Pokhara Station (with evaluation 3) and 2 short waves from Kathmandu Station can practically be received in the daytime, and also received well from both medium wave Stations (with evaluation 4) at night.

From the above reception status, it does not seem necessary to locate a station here at this stage which aims first at expansion of the same programme nationwide.

For a future station, a site was selected about 5km south of Butwal. The site is about 300m away from the main road. The access road is not paved.

(Gorkha)

Gorkha is located about 14km north of Abukhairani (about 6.5km north of Mugling) which is at about a halfway point of the Kathmandu to Pokhara main road. This is the centre of the Gorkha Area with a population of 251,000 and the city lies on the slope at an altitude ranging from 1060 to 1220m.

A branch road between Abukhairani and Gorkha is all paved, hence transportation will be secured even in the rainy season to some extent. But the main road between Kathmandu and Mugling is considerably damaged.

The broadcasting from Pokhara Station can be received at 66dBμV/m and from Kathmandu Station at 66.5 dBμV/m with evaluation 4 in the daytime, and Pokhara Station at 61~73dBμV/m and Kathmandu Station at 60~70dBμV/m with evaluation 3^+ to 4 at night, thus making good reception possible in Gorkha day and night. Accordingly, it seems unnecessary to place a station here at this stage.

In this area, it is difficult to find a suitable site for a medium wave broadcasting station because of the mountainous topography.

(Ramechhap)

Ramechhap is the centre city of this mountainous area located about 85km east-southeast of Kathmandu.

With no vehicle road, airline services are available twice a week from Kathmandu, and it is about 10km from Ramechhap Airport (altitude of 500m) to the city (altitude of 1500m) where district office is situated. The city is higher than the airport by 1000m, and hence it takes about five hours to get to the city on foot.

Electric power is not available and thus people are forced to depend upon oil lamps right now, but a 73kW hydraulic power station and distribution wiring will soon be completed.

A micro relay station has just been completed and several telephone circuits are branched out in this area.

In the centre of the city of an altitude of 1500m, the broadcasting from Kathmandu Station can be received at 63dBμV/m with evaluation 4 in the daytime, and from Kathmandu Station at 56~64dBμV/m with evaluation 3^+ and from Pokhara Station at 54~69dBμV/m with evaluation 3^+ at night.

Around the airport,the broadcasting from Kathmandu Station can be received at 51dBμV/m with evaluation 3^+ in the daytime, and at 45~60dBμV/m with evaluation 3 and from Pokhara Station at 45~60dBμV/m with evaluation 3^+ at night.

Accordingly, Ramechhap is practically covered by Kathmandu Station, and it seems unnecessary to place a station here for the time being.

Ⅷ. Summary of Reports on Soils and Foundation Investigations

1. Surkhet Broadcasting Station

2. Dhankuta Transmitting Station

3. Dipayal Broadcasting Station

4. Dhalkebar Transmitting Station

1. Surkhet Broadcastng Station

1. SUMMARY & CONCLUSIONS

The soils and foundation investigations report for medium wave transmission tower at Surkhet has been prepared as per bilateral agreement signed between M/S All Japan Radio & Television Engineering Co., Ltd., Tokyo, Japan and GEOTECH K.B. Ranamagar P. Ltd., Kathmandu.

The foundation investigations which have been carried out comprised of drilling 3 number of boreholes upto 10m depth each, along with standard penetration test at each 1.0m depth interval and extraction of disturbed and undisturbed soil samples. All the disturbed samples were collected from split spoon barrel of standard penetration test and undisturbed samples with the aid of open tube samplers.

Alternate compacted layers of plastic clayey silt with gravel and sandy silt with gravel are the main geological formations available at the site. A layer of plastic clayey silt is not seen in borehole-1 and is encountered from 2.5m to 4m in borehole-2 and has extended its thickness as it moves from borehole-2 to borehole-3 (Fig-2).

Power operated core drilling machine and high pressure pump along with NX and BX size casings and diamond bits were used. The geological soil profile, the depth at which soil samples were taken and ground water level were properly recorded and are presented in Appendix: A.

The report on foundation-soil investigations assembles all data determined in the field and laboratory and tries to give an interpretation of the characteristics of soils type encountered with relevance to the design of medium wave transmission tower foundation.

The field and laboratory investigations indicate that a square size isolated foundation is suitable for the wave transmission tower. The square size isolated foundation of 3.0m depth and 7.0m width resting directly on sandy silt with gravels available at and near the borehole-1 can give a bearing pressure of 20.0 tons/m^2.

The same foundation of the same depth and dimension can give a bearing pressure only 7.0 tons/m² on plastic clayey silt available at 3.0m depth of borehole-2 and 3.

The immediate and consolidation settlement of tower foundation on sandy silt with gravel and plastic clayey silt are found to be 25mm and 25.04mm respectively for the bearing pressures mentioned above. The bearing capacity of soils are calculated from direct shear and triaxial tests on disturbed as well as undisturbed soil samples.

From the bearing capacity analysis of chapter 6, we found that bearing capacity of soils not only depends upon SPT-value and angle of internal friction but also upon foundation dimensions on cohesionless soils i.e. sandy silt with gravels. But in case of clayey silt, the bearing capacity depends upon the cohesive strength of soils not the depth and width of the foundation which is obvious from chapter-6.

Chemical tests (pH and sulphate) on soil samples revealed that the foundation soils do not require any special sulphate resistant cement.

The regional geology and seismicity of the project site is briefly explained in chapter-2. The project area falls within an active seismic zone which has been proved by the major earthquakes experienced in the year 1803, 1833 and 1934, the largest being the Richter scale M = 8.3 Nepal-Bihar earthquake in 1934. The foundation design Engineer, therefore has to pay attention on earthquake consideration.

Prepared & submitted
by

K.B. Ranamagar
Executive Director
Geotechnical Engineer

Date: 7 July, 1988

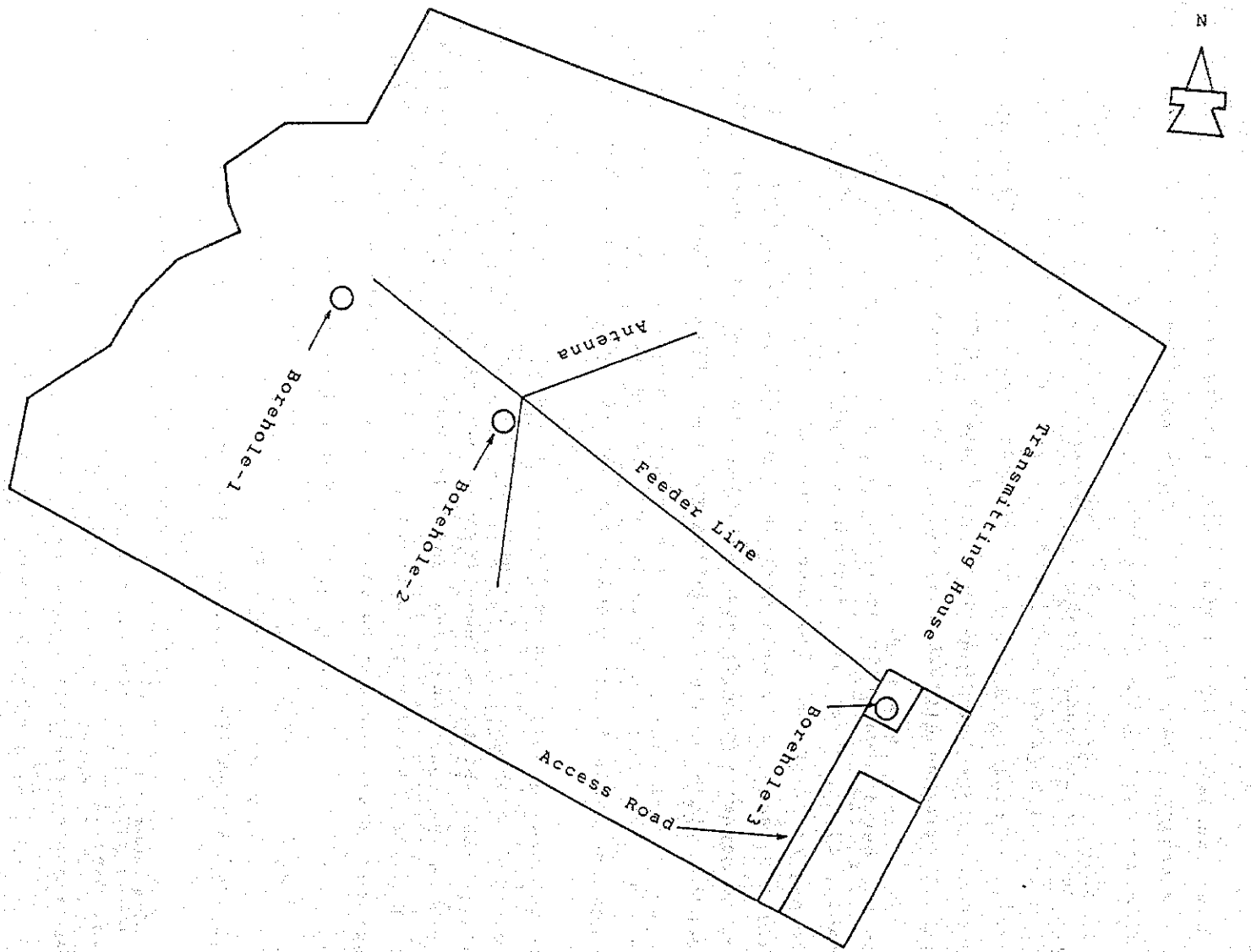


Fig - 1 Site plan of Surkhet medium wave transmission tower station (Scale: 1/2500)

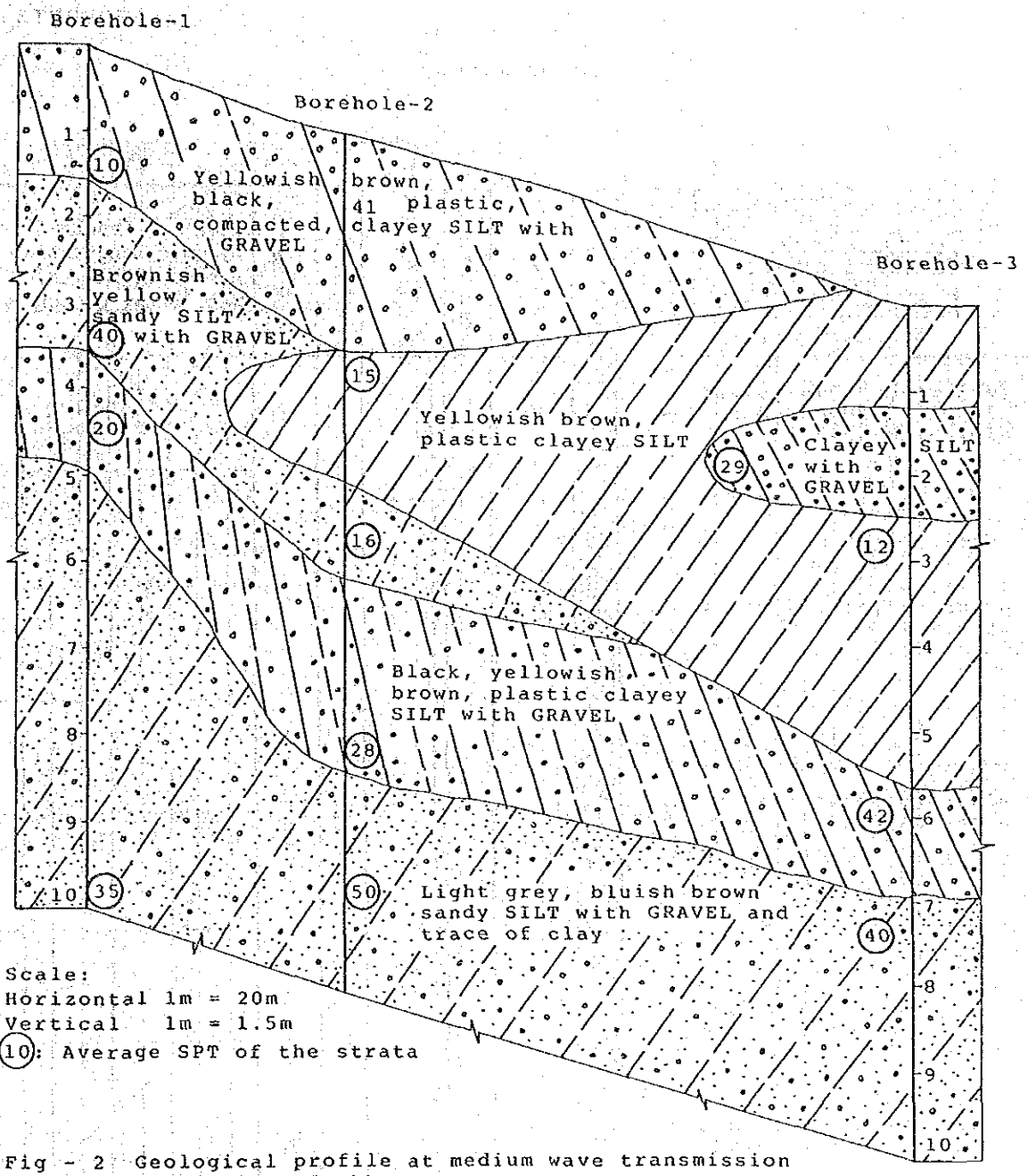
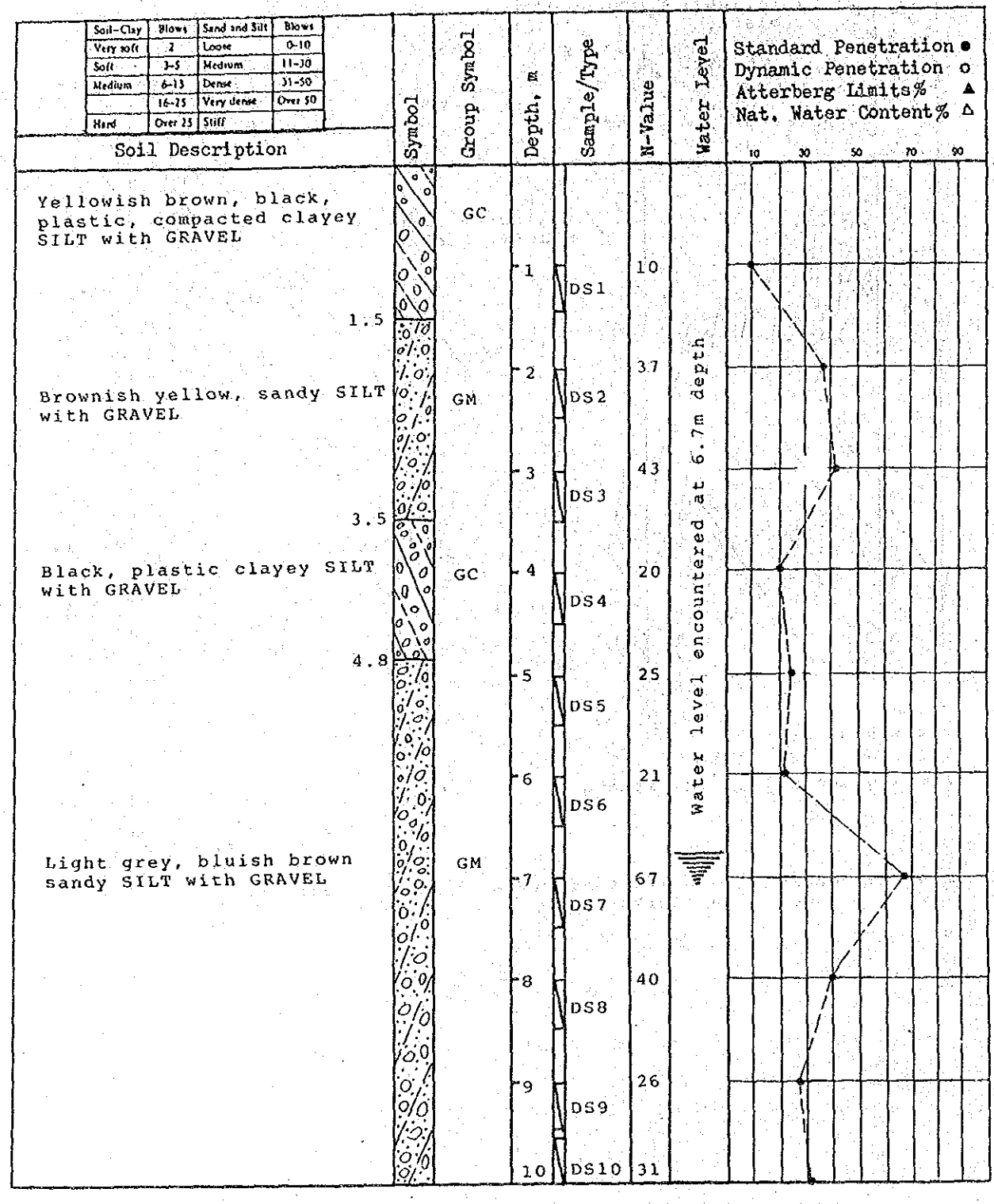


Fig - 2 Geological profile at medium wave transmission tower site, Surkhet

LOG OF BORING - 1

Date: 1.5.1988

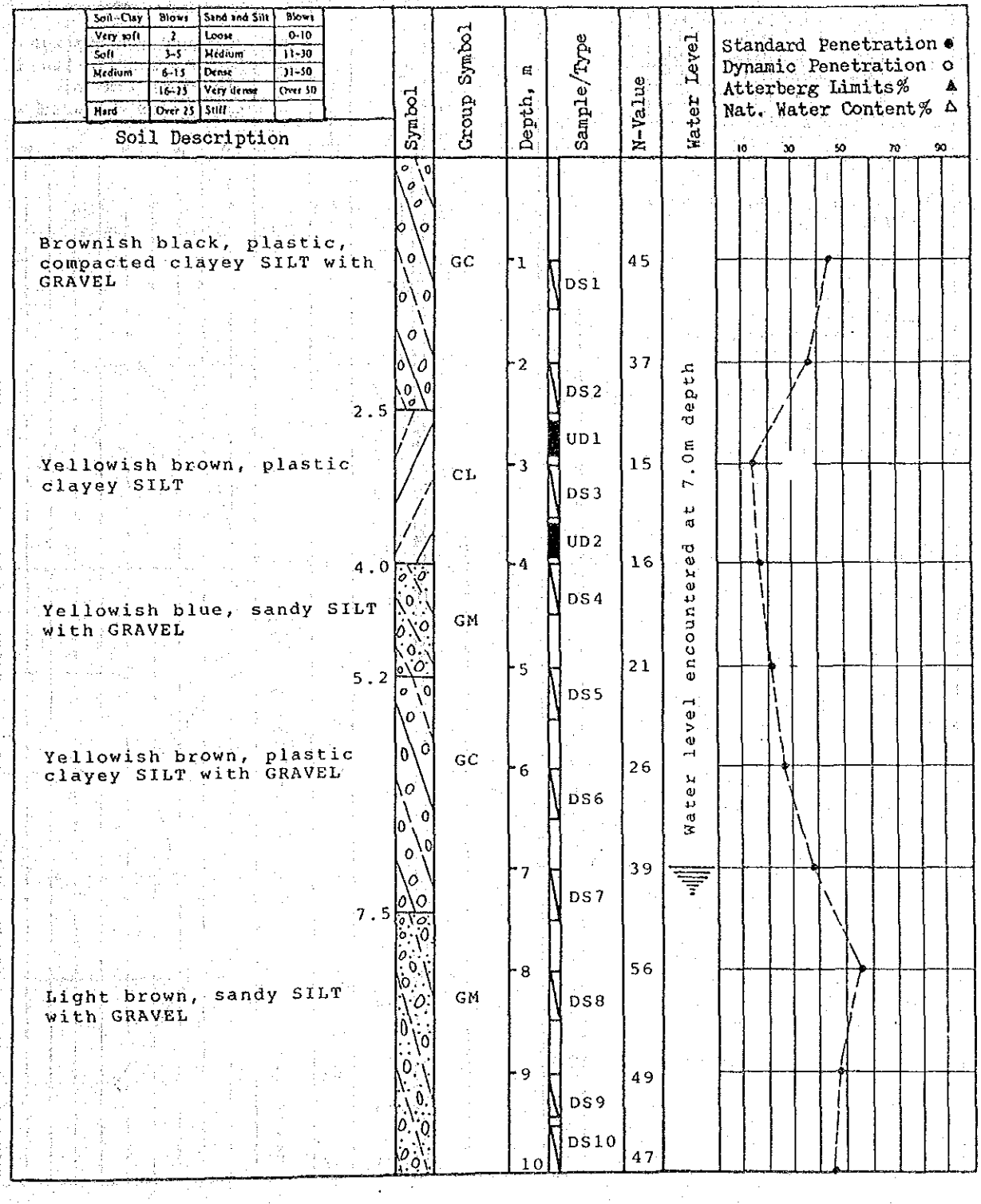
Soil-Clay	Blows	Sand and Silt	Blows
Very soft	2	Loose	0-10
Soft	3-5	Medium	11-30
Medium	6-15	Dense	31-50
	16-25	Very dense	Over 50
Hard	Over 25	Stiff	



LOG OF BORING - 2

Date: 4.5.1988

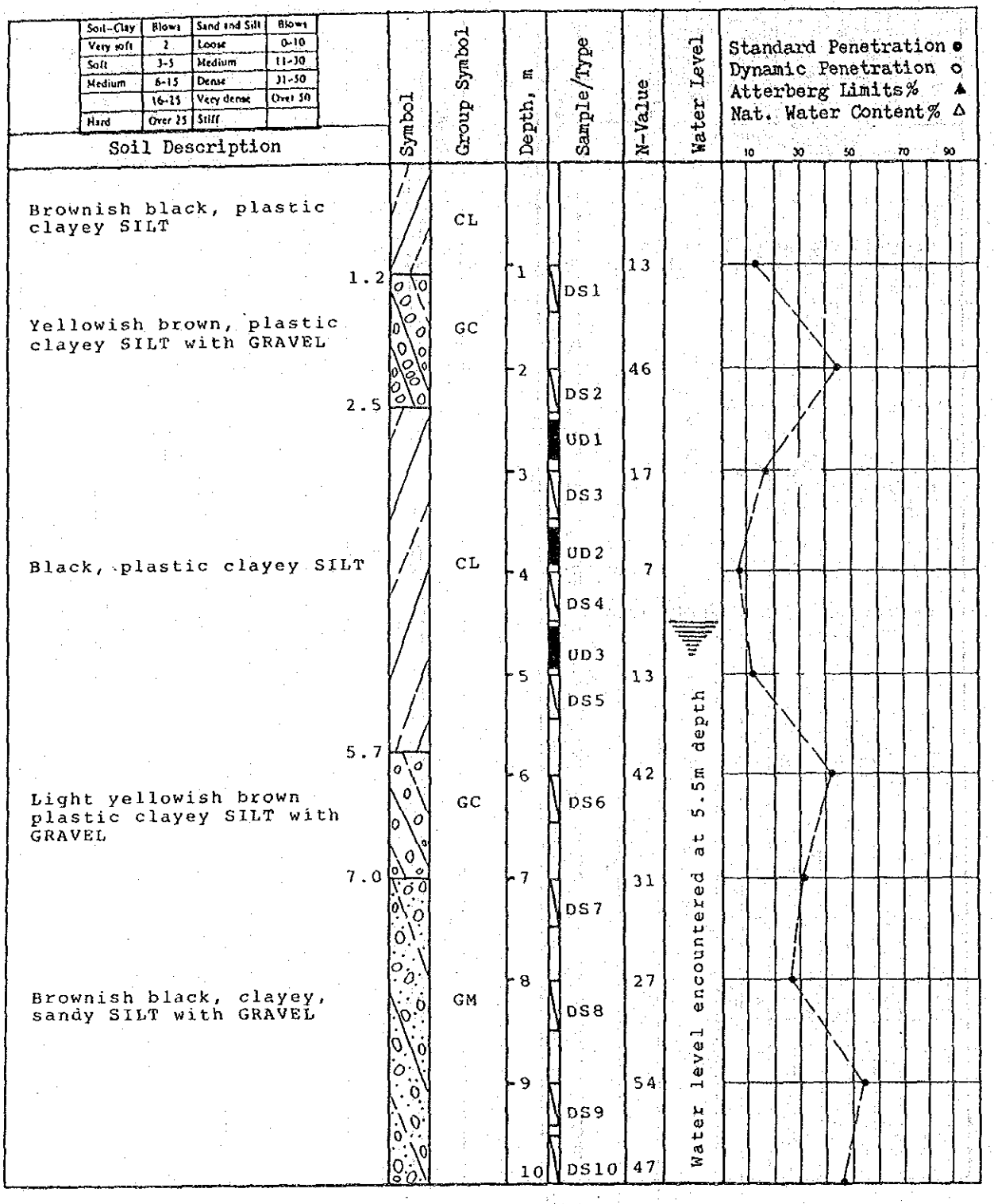
Soil-Clay	Blows	Sand and Silt	Blows
Very soft	2	Loose	0-10
Soft	3-5	Medium	11-30
Medium	6-15	Dense	31-50
	16-25	Very dense	Over 50
Hard	Over 25	Stiff	



LOG OF BORING - 3

Date: 6.5.1988

Soil-Clay	Blows	Sand and Silt	Blows
Very soft	2	Loose	0-10
Soft	3-5	Medium	11-30
Medium	6-15	Dense	31-50
	16-25	Very dense	Over 50
Hard	Over 25	Stiff	



2. Dhankuta Transmitting Station

1. SUMMARY & CONCLUSIONS

The soils and foundation investigations report for medium wave transmission tower at Dharan has been prepared as per bilateral agreement signed between M/S All Japan Radio & Television Engineering Co., Ltd., Tokyo, Japan and GEOTECH K.B. Ranamagar P. Ltd., Kathmandu Nepal.

The foundation investigations which have been carried out, comprised of drilling 3 number of boreholes upto 10.0m depth each, along with standard penetration test at each 1.0m depth interval and extraction of soil samples. A standard cone of apex angle 60 degree was used in very hard strata where split spoon barrel was unable to work in case of standard penetration test.

The sandy gravel with cobbles and boulders are the main geological strata available usually below 1.0m depth at the site. Power operated core drilling machine and high pressure pump along with NX and BX size casings and diamond bits were used. Foundation soils being very hard and difficult to drill, chieseling of cobble and boulders were carried out along with the bailing out of the churned and crushed materials.

The geological soil profile, the depth at which soil samples were taken and ground water level were properly recorded and are presented in Appendix: A and Fig-2.

The report on foundation-soil investigation assembles all data determined in the field and laboratory and tries to give an interpretation of the characteristics of soil types encountered with relevance to the design of medium wave transmission tower foundation.

The field and laboratory investigations indicate that a square size isolated foundation is suitable for the wave transmission tower. The square size isolated foundation of 3.0m depth and 7.0m width resting directly on soils can give a bearing pressure of 25.0 tons/m^2. The immediate foundation settlement as calculated by

the theory of elasticity is found to be 25.0mm which is within the permissible limit for isolated foundation. More than 90% settlement of foundation will take place during the construction of tower on the geological strata available at the site.

In case of higher design intensity is required, the depth and width of isolated foundation could be increased as sandy gravel with cobbles and boulders are available below the base of the foundation. From the bearing capacity analysis of chapter 6, we found that bearing capacity of soils not only depends upon SPT-value and angle of internal friction but also upon foundation dimensions. It is therefore foundation design Engineer could increase or decrease the bearing capacity of soils depending upon the selection of foundation dimension.

Chemical tests (pH and sulphate) on soil samples revealed that the foundation soils do not require any special sulphate resistant cement.

The regional geology and seismicity of the project site is briefly explained in chapter-2. The project area falls within an active seismic zone which has been proved by the major earthquakes experienced in the year 1803, 1833 and 1934, the largest being the Richter scale M = 8.3 Nepal-Bihar earthquake in 1934. The foundation design Engineer has to pay attention on earthquake consideration.

Prepared & submitted
by

K.B. Ranamagar
Geotechnical Engineer

Date: 7 July, 1988

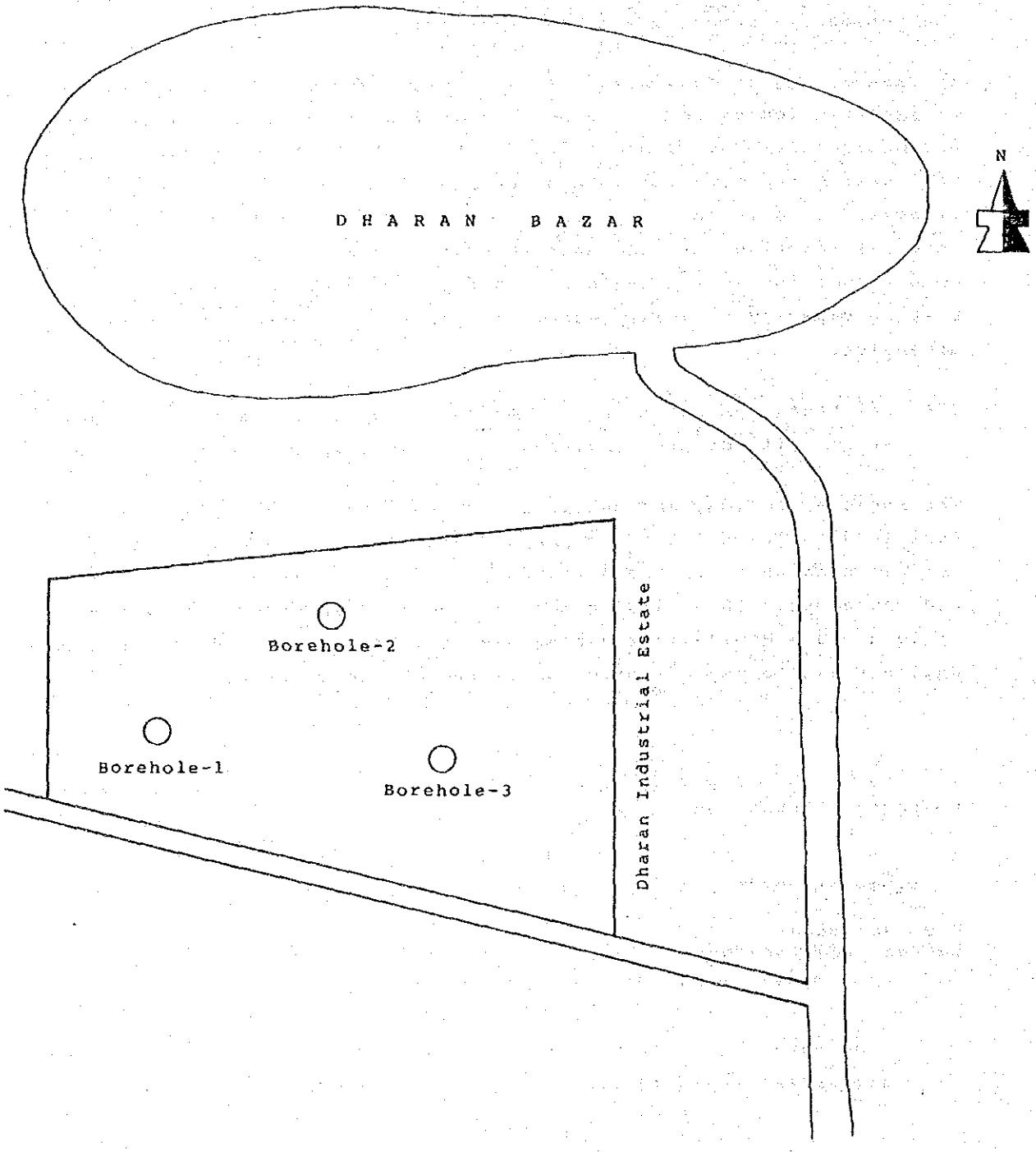
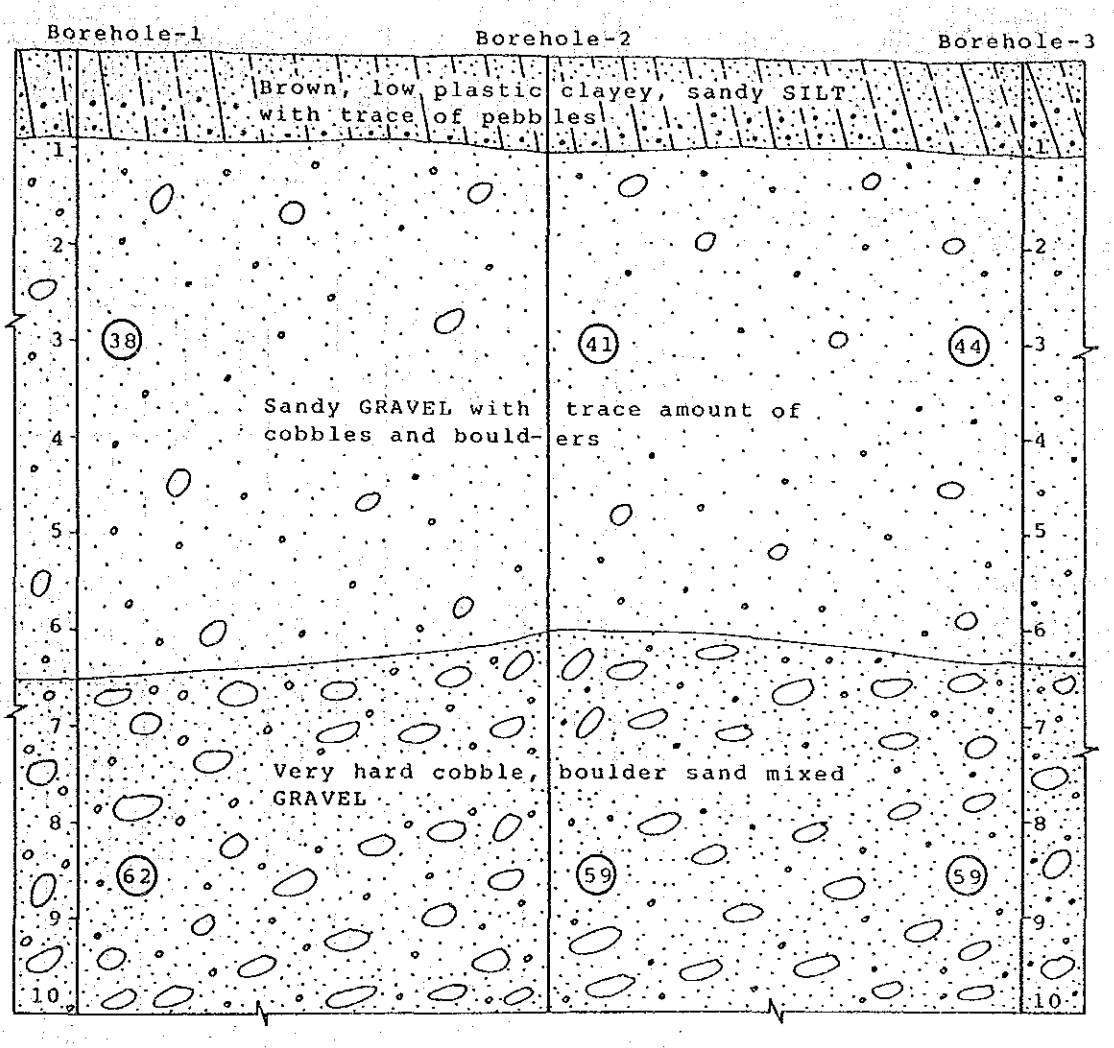


Fig-1 Location plan of borehole at Dharan
(Not in scale)



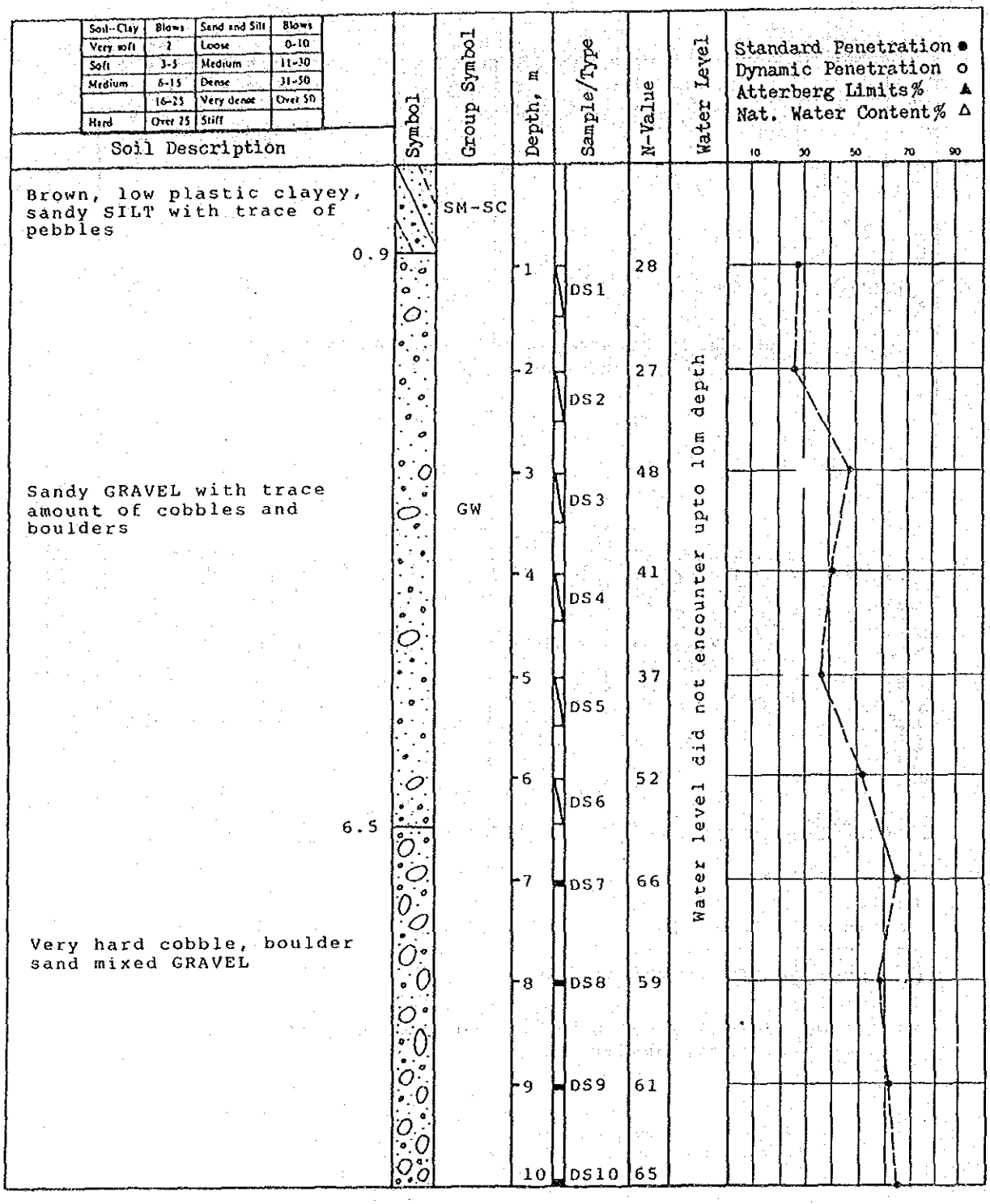
Scale:
Horizontal: 1m = 12m
Vertical: 1m = 1.5m
(38): Average SPT of the strata

Fig-2 Geological profile at medium wave project transmission tower site, Dharan.

LOG OF BORING- 1

Date: 10.61988

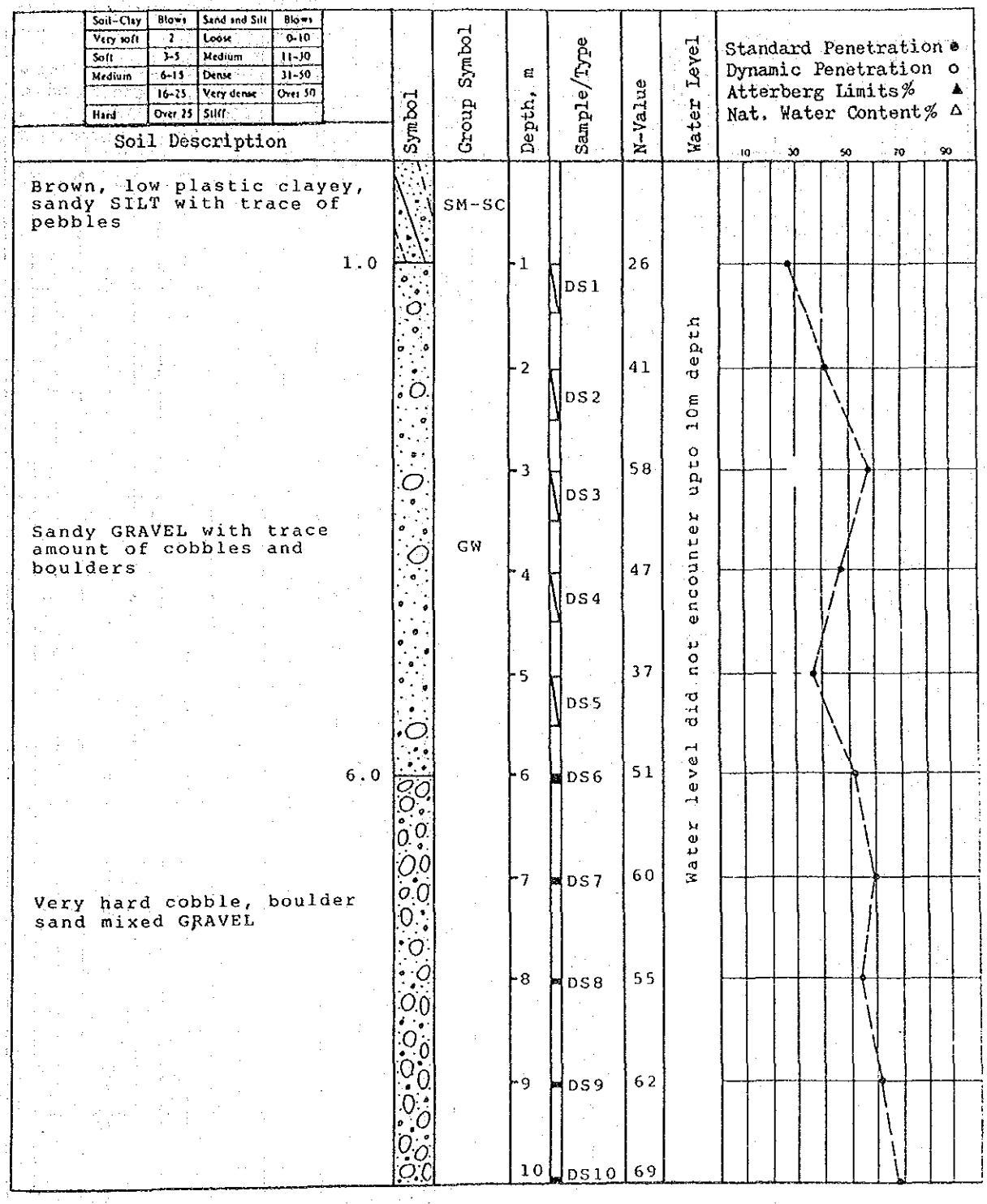
Soil-Clay	Blows	Sand and Silt	Blows
Very soft	2	Loose	0-10
Soft	3-5	Medium	11-30
Medium	6-15	Dense	31-50
	16-25	Very dense	Over 50
Hard	Over 25	Stiff	



LOG OF BORING - 2

Date: 13.6.198

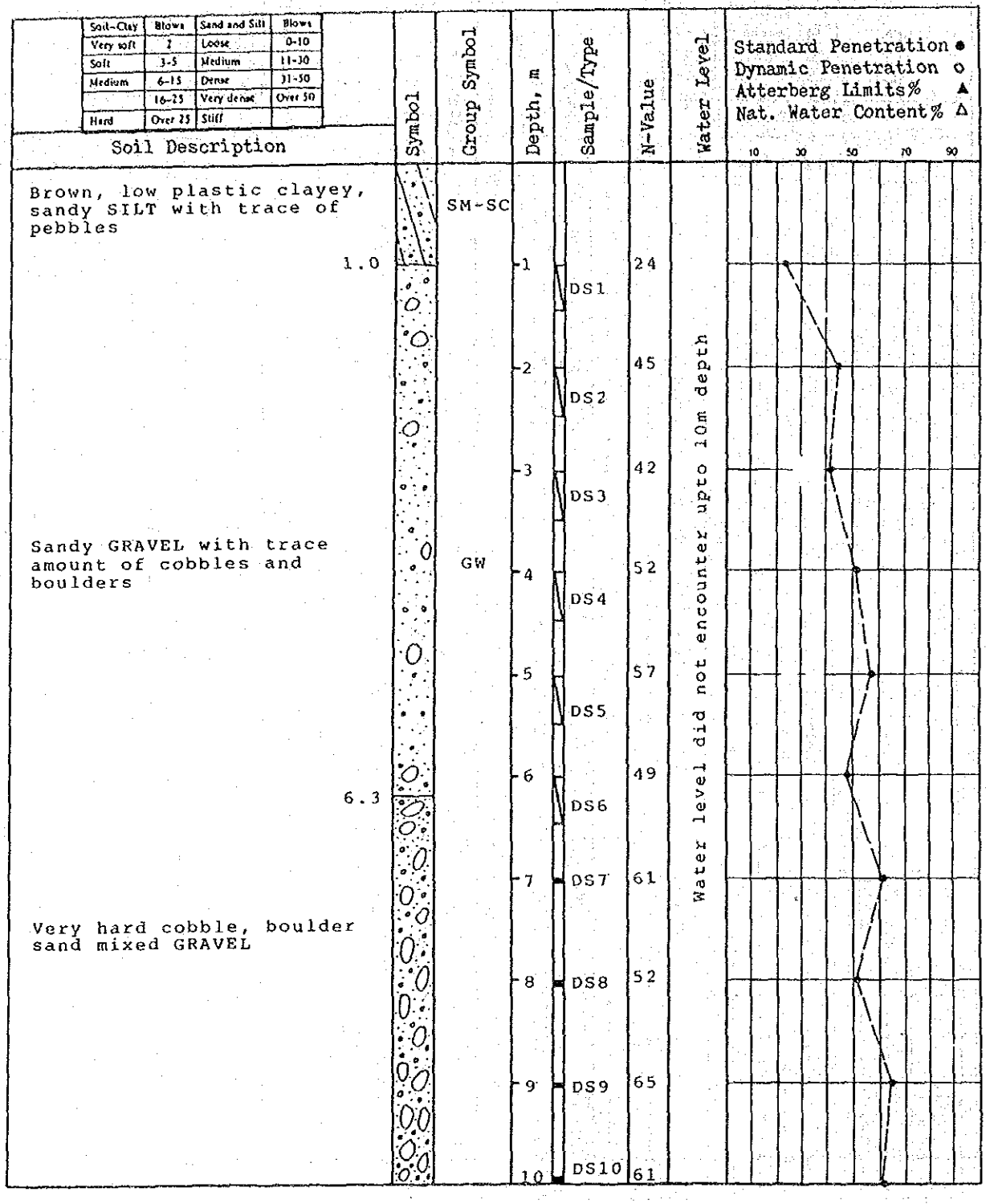
Soil-Clay	Blows	Sand and Silt	Blows
Very soft	2	Loose	0-10
Soft	3-5	Medium	11-30
Medium	6-15	Dense	31-50
	16-25	Very dense	Over 50
Hard	Over 25	Stiff	



LOG OF BORING - 3

Date: 21.6.1988

Soil-Clay	Blows	Sand and Silt	Blows
Very soft	2	Loose	0-10
Soft	3-5	Medium	11-30
Medium	6-15	Dense	31-50
	16-25	Very dense	Over 50
Hard	Over 25	Stiff	



3. Dipayal Broadcasting Station

1. SUMMARY & CONCLUSIONS

The soils and foundation investigations report for medium wave transmission tower at Dipayal has been prepared as per bilateral agreement signed between M/S All Japan Radio & Television Engineering Co. Ltd, Tokyo, Japan and GEOTECH K.B. Ranamagar P. Ltd, Kathmandu, Nepal.

The foundation investigations which have been carried out, comprised of drilling 2 number of boreholes upto 10.0m depth each, along with standard penetration test at each 1.0m depth interval and extraction of soil samples. All the disturbed soil samples were collected from split spoon barrel of standard penetration test.

Plastic, compacted clayey silty sand with gravel and trace of cobbles and boulders are the main geological formations available usually below 3.0m depth. A thin layer of plastic gravelly compacted clayey silt is available from 1.4m to 3.9m at borehole-1 and not available at borehole-2.

Power operated core drilling machine and high pressure pump along with NX and BX size casings and diamond bits were used. The geological soil profile, the depth at which soil samples were taken and ground water level were properly recorded and are presented in Appendix: A and Fig-2.

The report on foundation-soil investigation assembles all data determined in the field and laboratory and tries to give an interpretation of the characteristics of soil types encountered with relevance to the design of medium wave transmission tower foundation.

The field and laboratory investigation indicate that a square size isolated foundation is suitable for the wave transmission tower. The square size isolated foundation of 3.0m depth and 7.0m width resting directly on soils can give a bearing pressure of 23.10 tons/m^2.

The immediate foundation settlement as calculated by the theory of elasticity is found to be 25.04mm which is within the permissible limit for isolated foundation. More than 80% settlement of foundation will take place during the construction of tower on the geological strata available at the site.

In case of higher design intensity is required, the depth and width of isolated foundation could be increased. From the bearing capacity analysis of chapter 6, we found that bearing capacity of soils not only depends upon SPT-value and angle of internal friction but also upon foundation dimensions. It is therefore foundation design Engineer could increase or decrease the bearing capacity of soils depending upon the selection of foundation dimension.

Chemical tests (pH and sulphate) on soil samples revealed that the foundation soils do not require any special sulphate resistant cement.

The regional geology and seismicity of the project site is briefly explained in chapter-2. The project area falls within an active seismic zone which has been proved by the major earthquakes experienced in the year 1803, 1833 and 1934, the largest being the Richter scale M = 8.3 Nepal-Bihar earthquake in 1934. The foundation design Engineer therefore has to pay attention on earthquake consideration.

Prepared & submitted
by

K.B. Ranamagar
Geotechnical Engineer

Date: 7 July, 1988

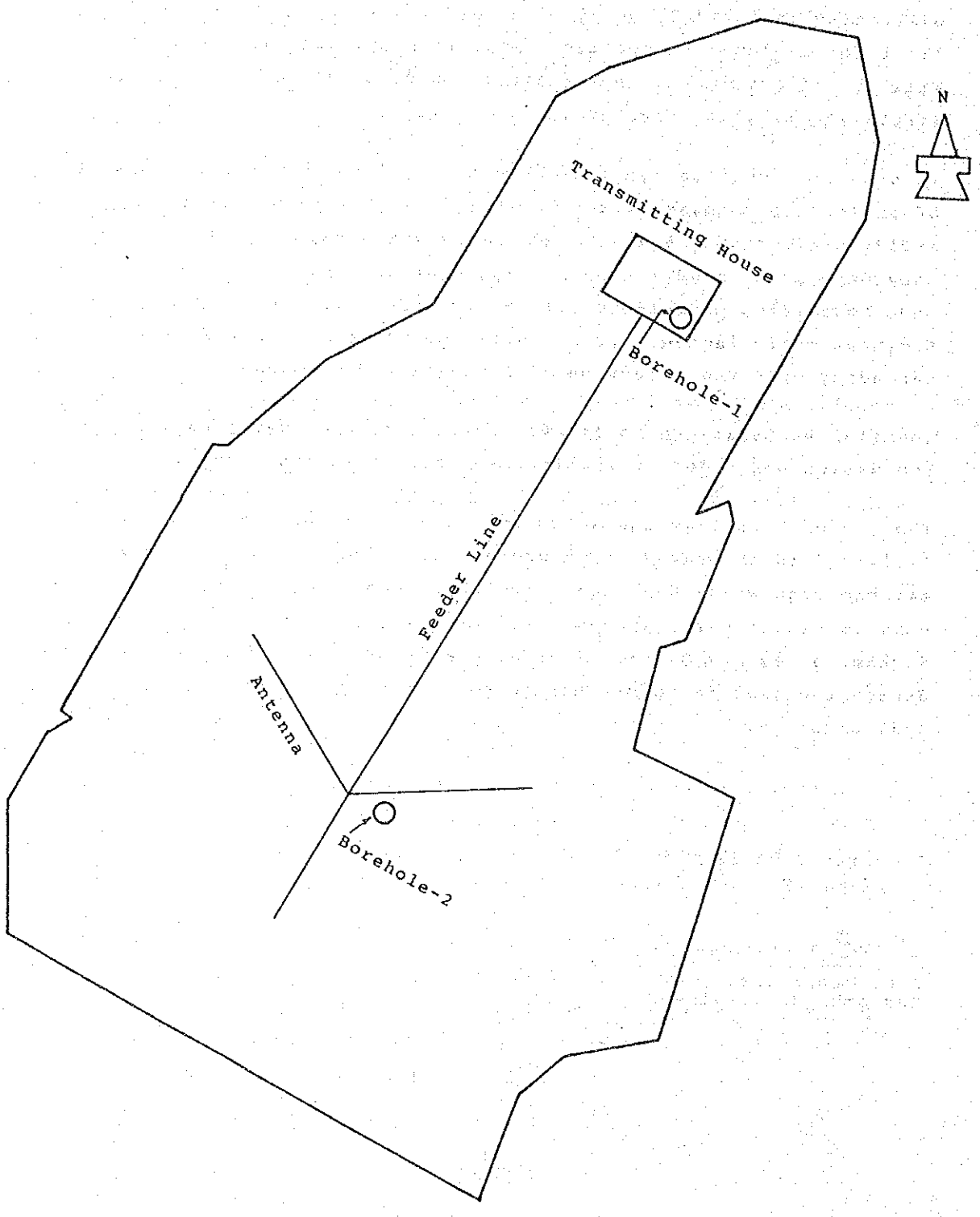
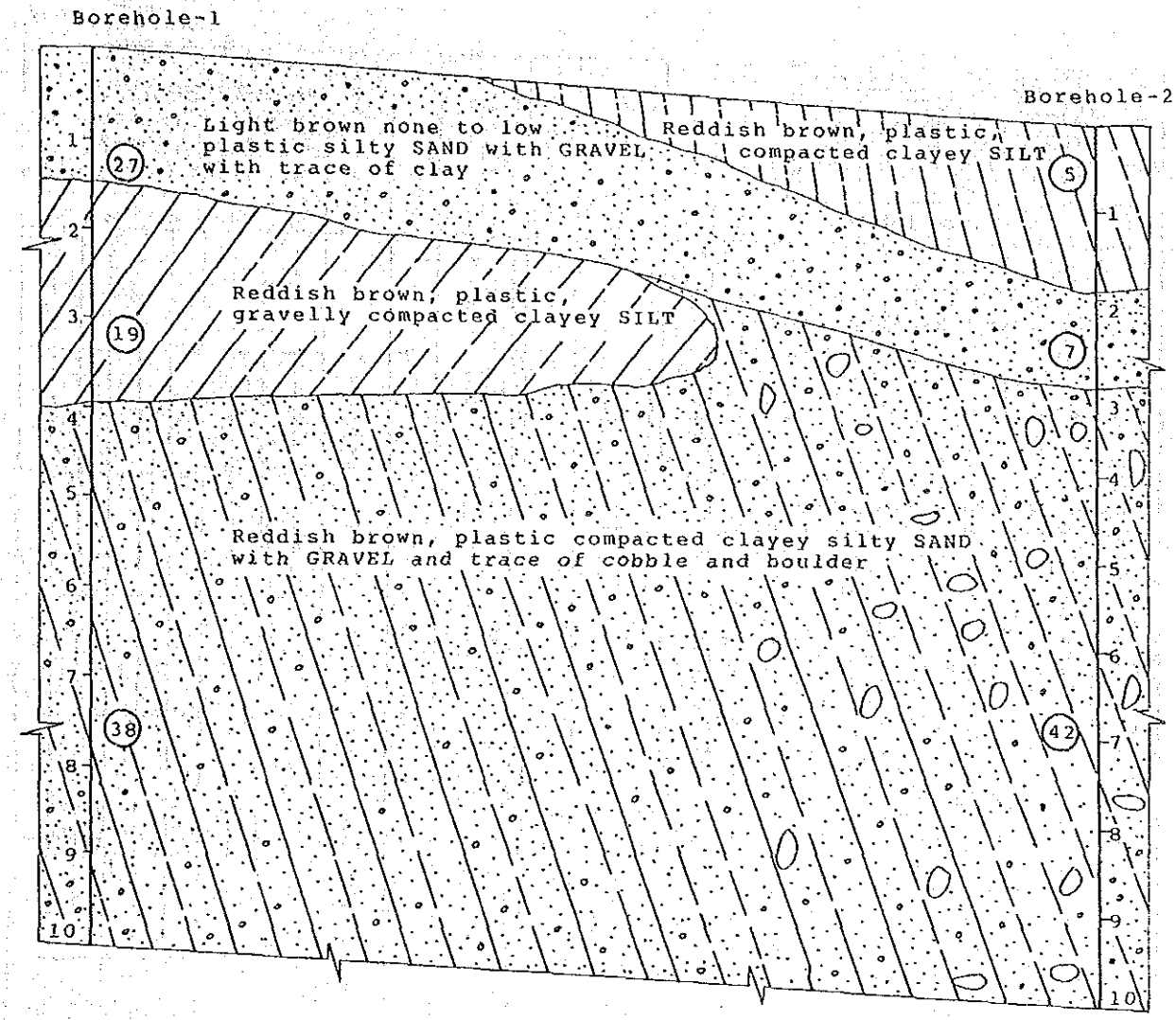


Fig - 1 Site plan of Dipayal medium wave transmission tower station (Scale: 1/1250)



Scale:

Horizontal 1m = 10m
Vertical 1m = 1.5m

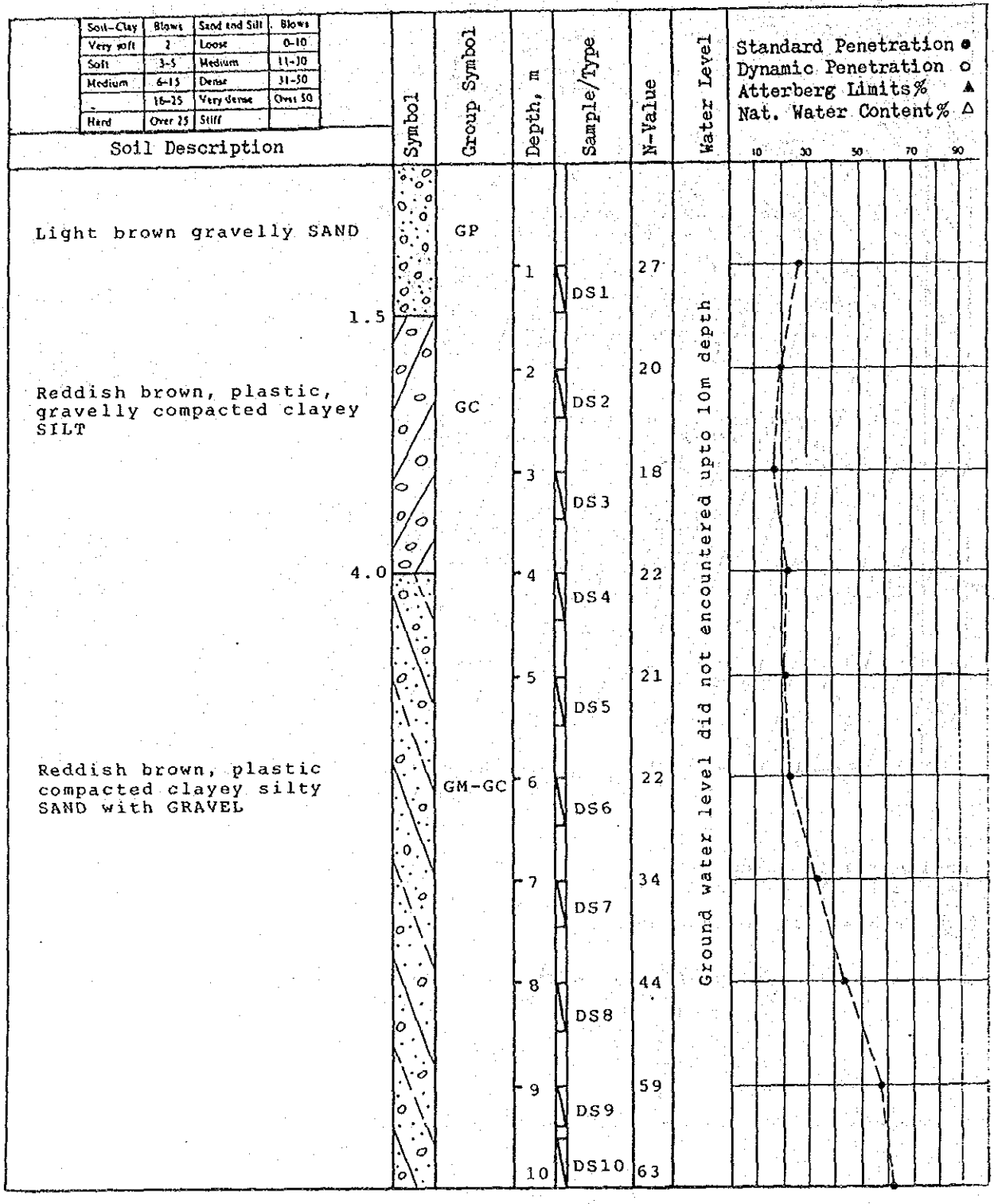
(27): Average SPT of the strata

Fig - 2 Geological profile at medium wave transmission tower site, Dipayal

LOG OF BORING - 1

Date: 23.4.1988

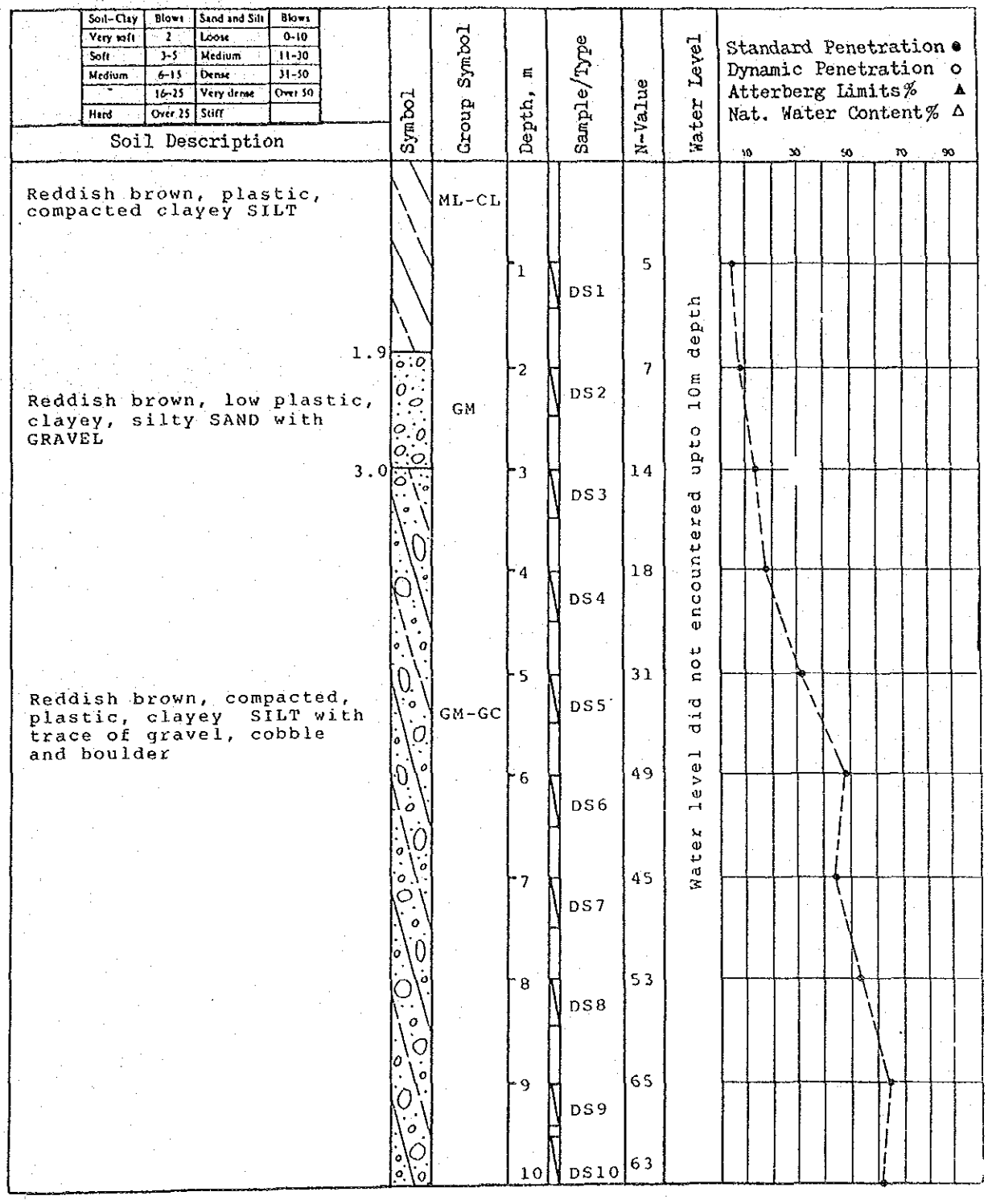
Soil-Clay	Blows	Sand and Silt	Blows
Very soft	2	Loose	0-10
Soft	3-5	Medium	11-30
Medium	6-15	Dense	31-50
	16-25	Very dense	Over 50
Hard	Over 25	Stiff	



LOG OF BORING - 2

Date: 25.4.1968

Soil-Clay	Blows	Sand and Silt	Blows
Very soft	2	Loose	0-10
Soft	3-5	Medium	11-30
Medium	6-15	Dense	31-50
-	16-25	Very dense	Over 50
Hard	Over 25	Stiff	



4. Dhalkebar Transmitting Station

1. SUMMARY & CONCLUSIONS

The soils and foundation investigations report for medium wave transmission tower at Dhalkebar has been prepared as per bilateral agreement signed between M/S All Japan Radio & Television Engineering Co;, Ltd., Tokyo, Japan and GEOTECH K.B. Ranamagar P. Ltd., Kathmandu Nepal.

The foundation investigations which have been carried out, comprised of drilling 2 number of boreholes upto 13.0m depth each, along with standard penetration test at each 1.0m depth interval and extraction of soil samples. A standard cone of apex angle 60 degree was used in very hard strata where split spoon barrel was unable to work in case of standard penetration test.

The silty sand with gravel and cobbles are the main geological strata available usually below 2.0m depth at the site. Power operated core drilling machine and high pressure pump along with NX and BX size casings and diamond bits were used. Foundation-soils being very hard and difficult to drill, chiseling of gravels and cobbles were carried out along with the bailing out of the churned and crushed materials.

The geological soil profile, the depth at which soil samples were taken and ground water level were properly recorded and are presented in Appendix: A and Fig-2.

The report on foundation-soil investigation assembles all data determined in the field and laboratory and tries to give an interpretation of the characteristics of soil types encountered with relevance to the design of medium wave transmission tower foundation.

The field and laboratory investigations indicate that a square size isolated foundation is suitable for the wave transmission tower. The square size isolated foundation of 3.0m depth and 7.0m width resting directly on soils can give a bearing pressure of 25.5 tons/m^2. The immediate foundation settlement as calculated by

the theory of elasticity is found to be 25.1 mm which is within the permissible limit for isolated foundation. More than 90% settlement of foundation will take place during the construction of tower on the geological strata available at the site.

In case of higher design intensity is required, the depth and width of isolated foundation could be increased as silty sand with gravel and cobbles are available below the base of the foundation. From the bearing capacity analysis of chapter 6, we found that bearing capacity of soils not only depends upon SPT-value and angle of internal friction but also upon foundation dimensions. It is therefore foundation design Engineer could increase or decrease the bearing capacity of soils depending upon the selection of foundation dimension.

Chemical tests (pH and sulphate) on soil samples revealed that the foundation soils do not require any special sulphate resistant cement.

The regional geology and seismicity of the project site is briefly explained in chapter-2. The project area falls within an active seismic zone which has been proved by the major earthquakes experienced in the year 1803, 1833 and 1934, the largest being the Richter scale M = 8.3 Nepal-Bihar earthquake in 1934. The foundation design Engineer therefore has to pay attention on earthquake consideration.

Prepared & submitted
by

K.B. Ranamagar
Geotechnical Engineer

Date: 7 July, 1988

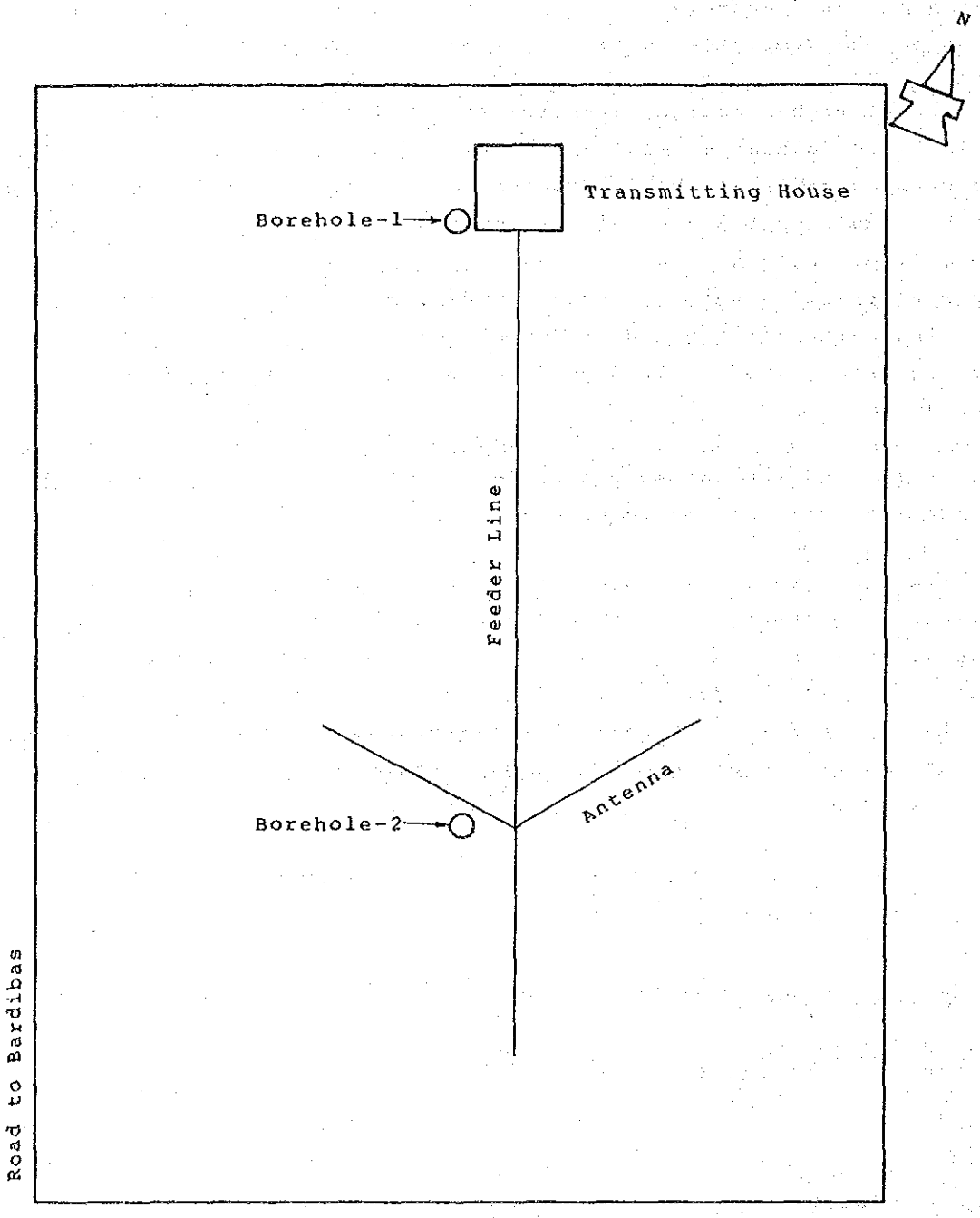
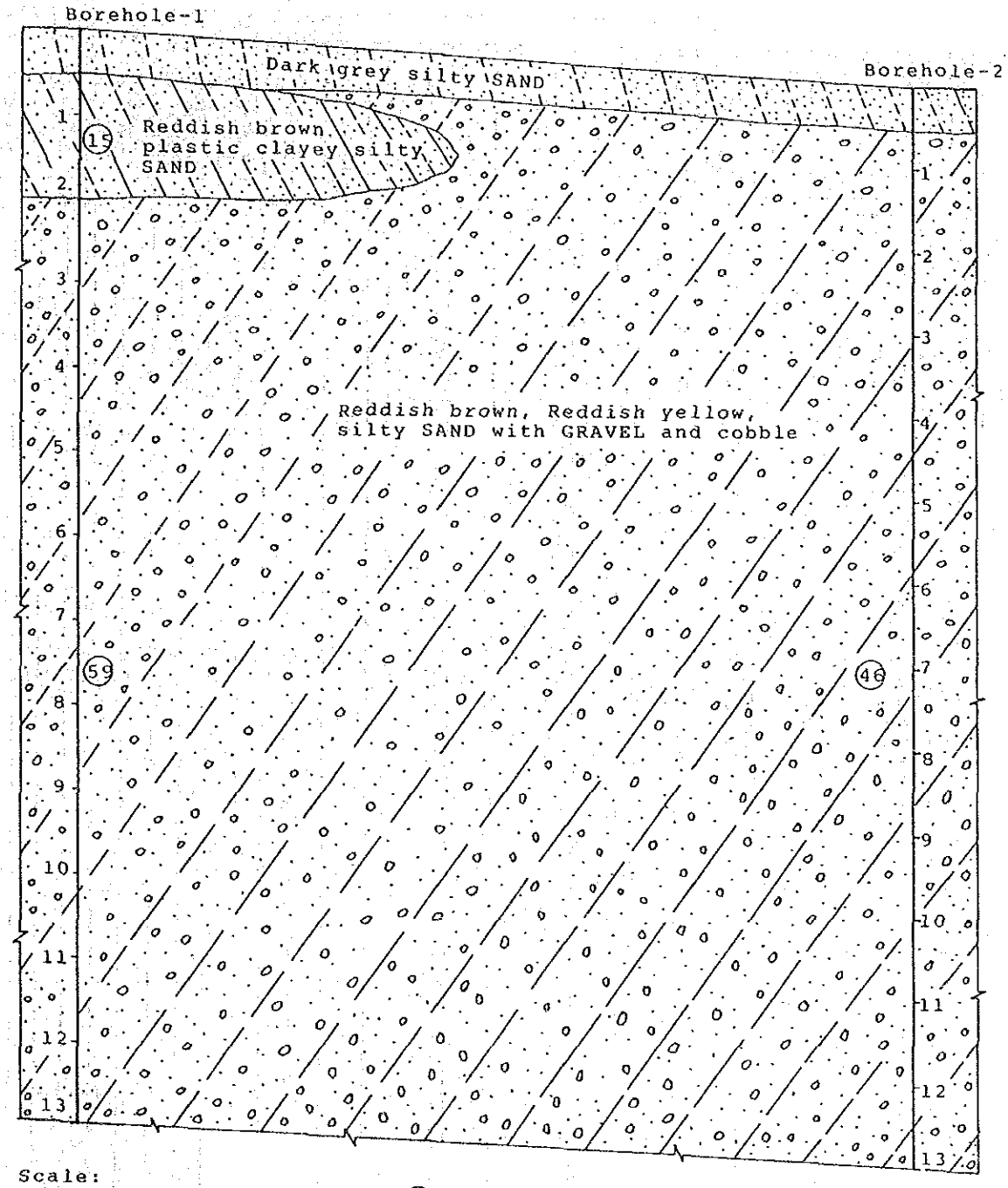


Fig - 1 Site plan of Dhalkebar Medium Wave transmission tower station (Scale: 1/1,250)



Scale:
Horizontal: 1m = 5m
Vertical: 1m = 1.5m

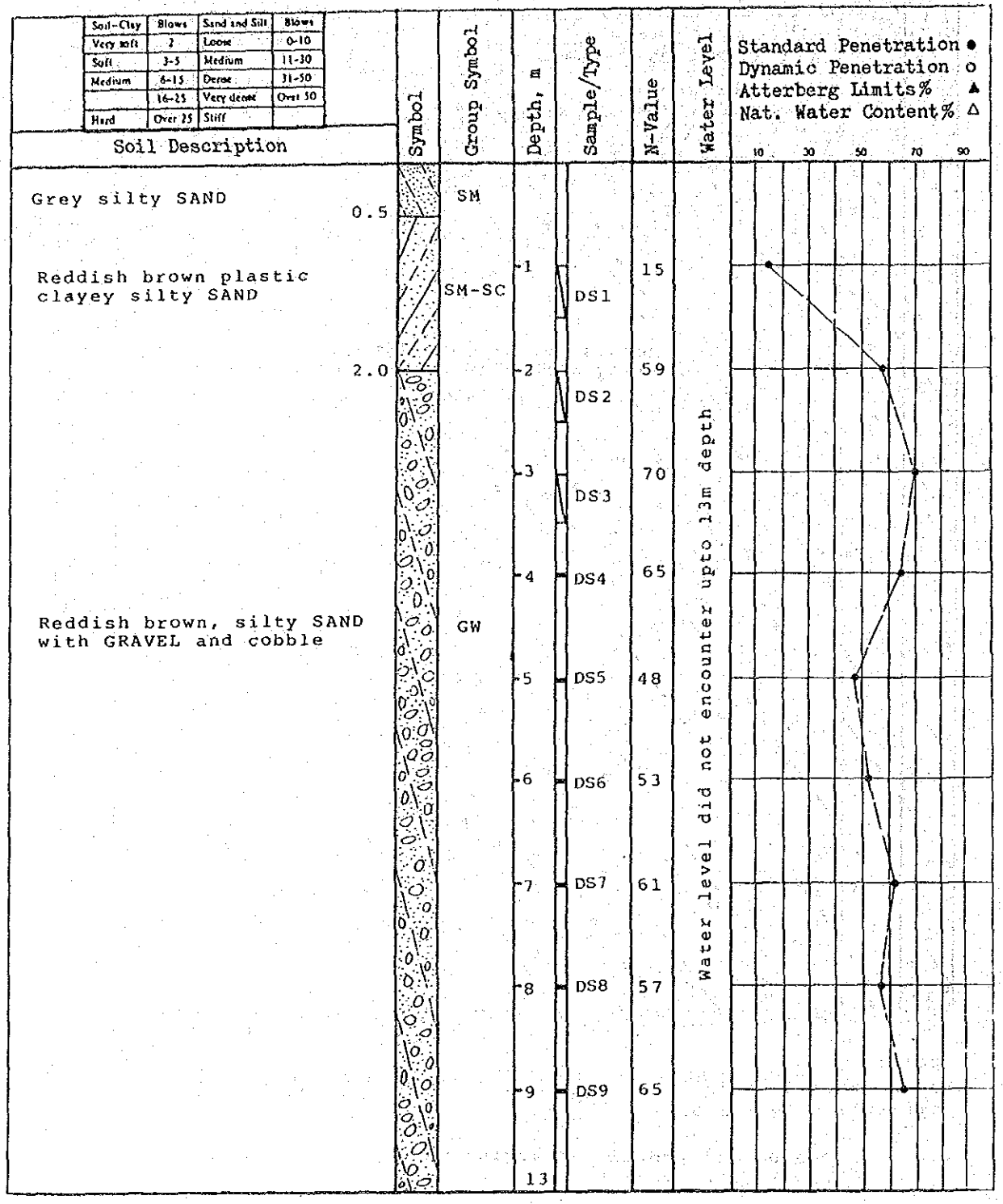
(15): Average SPT for the strata

Fig - 2 Geological profile at medium wave project transmission tower site, Dhalkebar.

LOG OF BORING - 1

Date: 18.5.1993

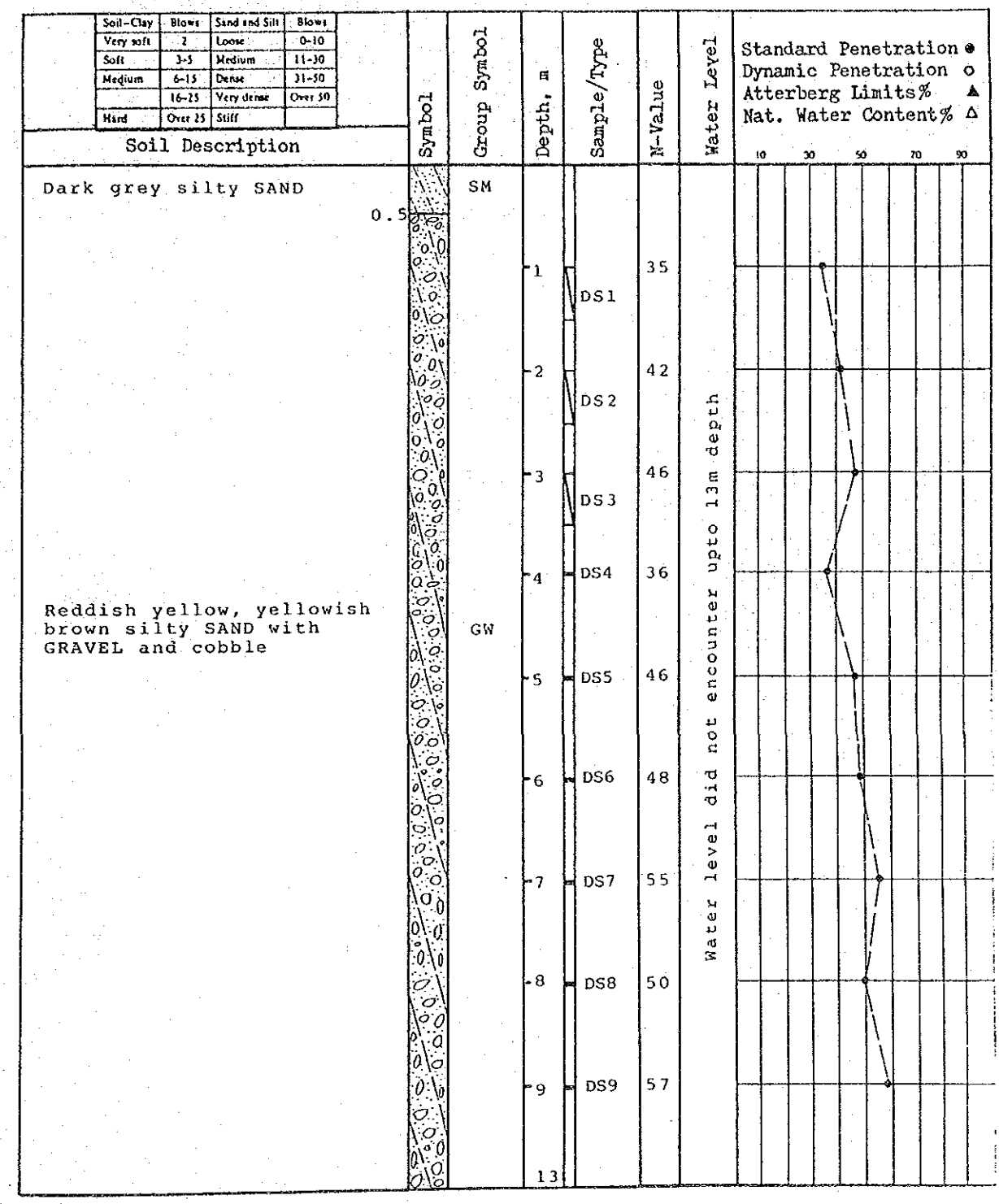
Soil-Clay	Blows	Sand and Silt	Blows
Very soft	2	Loose	0-10
Soft	3-5	Medium	11-30
Medium	6-15	Dense	31-50
	16-25	Very dense	Over 50
Hard	Over 25	Stiff	



LOG OF BORING - 2

Date: 22.5.1985

Soil-Clay	Blows	Sand and Silt	Blows
Very soft	2	Loose	0-10
Soft	3-5	Medium	11-30
Medium	6-15	Dense	31-50
	16-25	Very dense	Over 50
Hard	Over 25	Stiff	



JICA