CHAPTER 7 MAINTENANCE AND OPERATION PLAN

CHAPTER 7 MAINTENANCE AND OPERATION PLAN

7-1 Maintenance and Operation Scheme

A well trained and highly qualified staff should be assigned for the maintenance and operation of the facilities to be introduced by this project, and to provide the stable and qualified telephone services over the long term after the completion of this project.

The following maintenance and operation scheme shall be established in order to maintain the facilities completed by this project.

Subscriber Cable Network (including subscribers' premises)

Switching System ----- Khartoum South Exchange
-- Burri Exchange
Junction Network ----- Optical Fiber Cable
-- Transmission Facilities

7-2 Maintenance and Operation Plan

(1) Maintenance and operation works are classified as follows:

1) Maintenance of Facilities

a) Preliminary maintenance
Test, inspection, patrol, repair and replacement

b) Posterior maintenance
Trouble-shooting and rehabilitation

c) Safety management
Custody of facilities and plant record keeping

2) Maintenance of Service

a) Operation of facilities
Operation as well as supervision and control

b) System management
Control of unusual difficulties

3) Collateral work

a) Staff personnel management
Assignment plan and duty regulation

b) Capability improvement
Training and education

c) Equipment control
Safe-keeping of machines and implements, measuring equipment, etc.

In order to perform the above-mentioned maintenance works, various drawings and tables to show the details of the existing facilities and the past faults will be provided in the maintenance section.
The maintenance work flow is indicated below:

Provision of Service	Fault	Repair of Fault	Analysis	Preventive Maintenance

(2) Maintenance for Outside Plant

The majority of the outside plant facilities installed are exposed to the severe natural environments of temperature, humidity, rain, wind and lightning attacks. It also receives the various effects from the social environments of power lines, railways, industrial pollutions, vehicles and other factory constructions. Under the above-mentioned environments, the following maintenance procedures shall be performed in order to maintain the outside plant facilities in a good and stable condition.

- To carry out routine patrols to prevent any fault on the outside plant facilities (preventive maintenance)

- To find quickly the fault which has occurred and to repair it completely.

- To analyze the reason of the fault so that a smilar fault does not recur.

7-3 Maintenance and Operation Cost

(1) Maintenance and Operation Staff

To ensure the stable operation and maintenance of the facilities for a long period and to provide high quality service, the assignment of a fully trained maintenance and operation staff is essential. STPC is requested to re-train part of STPC's employees now assigned to the telephone exchange for the maintenance and operation of the facilities, and, at the same time, to fill the vacancies by new employment and invite new trainees, if there are staff shortages. The numbers of operation and maintenance staff required are as follows:

1) Maintenance staff for outside plant

To ensure the stable operation of the outside plants for a long period and to provide high quality service, the assignment of a fully trained maintenance staff is essential. A maintenance group consisting of 2 engineers and 3 technicians should be organized to carry out routine patrols for the completed outside plant facilities, including the junction cables.

2) Maintenance and operation staff for inside plant

For maintenance and operation works for the switching, transmission and power supply facility after the completion of this project, the following assignment of personnel will be considered for the normal work, routine test, emergency operation and maintenance, through 24-hour shift work.

3) Operation Staff

	Engineers	Technicians
a) Staff for switching equipment	2	2
b) Staff for cable test board	2	2
c) Staff for transmission equipment	2	1

4) Maintenance Staff

	Engineers	Technicians
a) Outside Plant	2	3
b) Switching Equipment		
Khartoum South Exchange (3 shifts).	1	9
Burri Exchange (3 shifts)	1	5
c) Transmission Equipment		
Khartoum Central Exchange(3 shifts)	1	3
Burri Exchange (3 shifts)	1	3
d) Power Supply Equipment		
Khartoum South Exchange	1	3
Burri Exchange	1	3

(2) Maintenance and Operation Cost

Maintenance cost is expressed by the sum of maintenance personnel expenses and cost of maintenance materials.

Average personnel expenses per month are mentioned below:

Engineers : Approx. 30,000 Sudanese Pounds
Technicians: Approx. 20,000 Sudanese Pounds

1) Maintenance cost

Personnel expenses : 860,000 Sudanese Pounds
Maintenance cost = 910,000 Sudanese Pounds

2) Operation cost

Operation cost = 310,000 Sudanese Pounds

3) Power cost

For power cost, or more precisely, the electric power cost, the charge system of the National Electricity Co. of the Sudan is referred to.
Electric power charges in the Sudan consists of four segments. That is,

- Segment 1 : For general households
- Segment 2 : For commercial and light industry users
- Segment 3 : For small factories
- Segment 4 : For heavy industry and large scale agricultural users

Charges for the power consumption by the projected system, this time will be by Segment 4.

Segment 4 is further divided into the following three sub-segments by each capability:

a) 2,500 kVA or more (33 kV power received)
b) 1,000 kVA or more (11 kV power received)
c) 100 - 1,000 kVA (415 V power received)

Power consumption by the whole network is less than 200 kVA even when the consumption by the subscriber station is included. This means that even if the receive contract for the whole system is of a) or b) above, power cost of communication equipment only will probably come under c). In this case, charge is for 100 - 1,000 kVA, i.e., 0.26 Sudanese Pounds/KWH.

Power consumption by the whole system is as follows:

- Khartoum Central exchange : 7,450 KWH/month
- Khartoum South exchange : 11,658 KWH/month
- Burri exchange : 12,649 KWH/month
- Total : 31,757 KWH/month

Therefore the charge is 8,300 Sudanese Pounds/month, and the annual total is 99,600 Sudanese Pounds.

Where the commercial power supply is not available, the power supply to the equipment installed is by diesel engine generator (DEG). In this case, annual DEG fuel cost accounts for the power cost. Where the commercial power supply is usually available and DEG is installed for emergency power supply, DEG fuel cost is regarded as being included in the power cost.

a) Basic Power Consumption (annual)

240 kVA : 74/h x 40 h/month x 12 months = 35.52 K

b) Annual Power Consumption

35.52K x 2 = 71.04 K = 15.6 Kgal

c) Fuel Cost

DEG fuel cost is 9.5 Sudanese Pounds/gallon.

Annual total is 148,200 Sudanese Pounds.

(3) Annual Cost of Maintenance and Operation

Here, the annual cost for the operation and power is obtained in the sum of the operation, maintenance and power cost.

a)	Annual operation cost	:	310 Sudanese Pounds
b)	Annual maintenance cost	:	1,770 Sudanese Pounds
c)	Power cost	:	248 Sudanese Pounds
	Total	:	2,328 Sudanese Pounds

CHAPTER 8 PROJECT EVALUATION

CHAPTER 8 PROJECT EVALUATION

8-1 Effects of Project Implementation

The telephone services in the capital city, Khartoum, are in such a poor condition that the speedy transmission of information is extremely difficult. It seriously impedes the promotion of the economic development programme, and the stimulation of economic activities in general. Therefore, the benefits described below can be expected from the Project's implementation.

(1) Direct Effects

1) Promotion of the economic development programme and the stimulation of economic activities

Gross domestic product (GDP) for the fiscal year 1986 to 1987 was 20,763.8 million Sudanese Pounds ($4614.2 million), and per capita GDP was 861.6 Sudanese Pounds ($348.8). The Sudan national economic development programme aims to realize a GDP growth rate of 5%. However, the poor situation of the telephone services is a serious obstacle to the promotion of economic development plans and the stimulation of economic activity. With improvement in the facilities resulting from this telephone network rehabilitation project, information transmission will proceed faster, and this will contribute significantly to promote the economic development programme.

2) Improvement of services for social welfare

Contacts with hospitals, police stations and fire stations have been inadequate. Implementation of this telephone network rehabilitation project will significantly improve telecommunications facilities, making it easy to make contact with these institutions. This will improve social welfare services to the regional population of approximately 557,000 people.

3) Restoration of broken lines

Approximately 60% (approximately 7000 subscribers) of the total subscribers in Khartoum do not have telephone services during the rainy season due to water penetration into cables. This telephone network rehabilitation project will improve subscriber cables, eliminating the problem of water permeation damage in cables and completely restoring approximately 3600 of the telephones which have been out of service.

4) Improving telecommunications services

Breakdown of telephone lines became permanent, and defective relay line equipment resulted in insufficient lines, diminishing the availability of electrical telecommunications services. Consequently, the STPC was not able to collect telephone charges from many subscribers. Once this telephone technology plan is implemented, electrical telecommunication services will be improved, and this will result in a higher rate of collection of telephone charges from subscribers. Furthermore, restoration of service to the subscribers whose services had been cut off, as described above, will also improve STPC income, enabling strengthened maintenance and support control and improved telecommunications services.

5) Improvement of telecommunications services at the Khartoum International Airport

Khartoum International Airport telephone and telex main lines will be improved.

(2) Indirect Results

1) Development of the Sudan's electrical telecommunications network

This telephone network technology plan will also promote technology plans for regions not covered by this plan, and thereby promote the further development of telecommunications in the Sudan.

2) Relieving traffic congestion

As telephone connections become broken or difficult, people have to take cars or other means of transport to the parties to whom they want to transmit or exchange information. When normal information transmission can be completed using the telephone, this should relieve traffic congestion considerably.

8-2 Validity of Implementation

In promoting the Sudan's economic development plan, telecommunications technology forms an indispensable part of the country's infrastructure. In particular, this telephone network technology plan deals with the capital city Khartoum, the most important area of the country, and its effects and repercussions on the economic development plan, in stimulation of economic activity and social welfare and other functions, will be incalculable.

CHAPTER 9 CONCLUSIONS AND RECOMMENDATION

CHAPTER 9 CONCLUSION AND RECOMMENDATIONS

9-1 Conclusion

The foregoing studies regarding the implementation of this Project have reached the conclusion that considerable improvement can be expected in the telephone network facilities in the Project coverage areas where the governmental offices and the economic activity areas are concentrated in Khartoum, the capital city, including the Khartoum international airport area, and the telephone service improvement achieved through above will lead to increase of social welfare for inhabitants of not only these areas, but also Greater Khartoum. Furthermore, a great deal of contribution will be made to the promotion of the national economic development programme, as well as the stimulation of economic activities in general.

9-2 Recommendations

(1) The following measures must be taken to ensure the smooth implementation of this Project, and to ensure that it is not subject to delays.

1) Close, effective, and flexible contacts must be maintained by the organizations and personnel involved in implementing this project from both countries.

2) Budgetary measures must be taken by the government of the Sudan to provide the facilities it will be responsible for promptly after signing the official exchange statement.

3) The STPC will draw up a work implementation schedule for the facilities to be provided by the Sudan.

(2) The STPC Operation System after Completion of the Project

1) Constant efforts to improve the technical level of personnel are absolutely indispensable to ensure the provision of personnel with advanced technical knowledge in the fields required for maintenance and operation of the telecommunications technology. Excellent personnel, and systematic and serious work on effectively planned

training, must be maintained to improve the technical level of personnel.

2) Maintenance of optical fiber cables requires intensive patrolling at regular intervals to prevent any damage and to conduct preventive maintenance. The presence of STPC maintenance personnel during road construction is necessary to oversee the laying of water pipes or electrical lines and to ensure that no damage is done to the cables.

BASIC DESIGN DRAWINGS

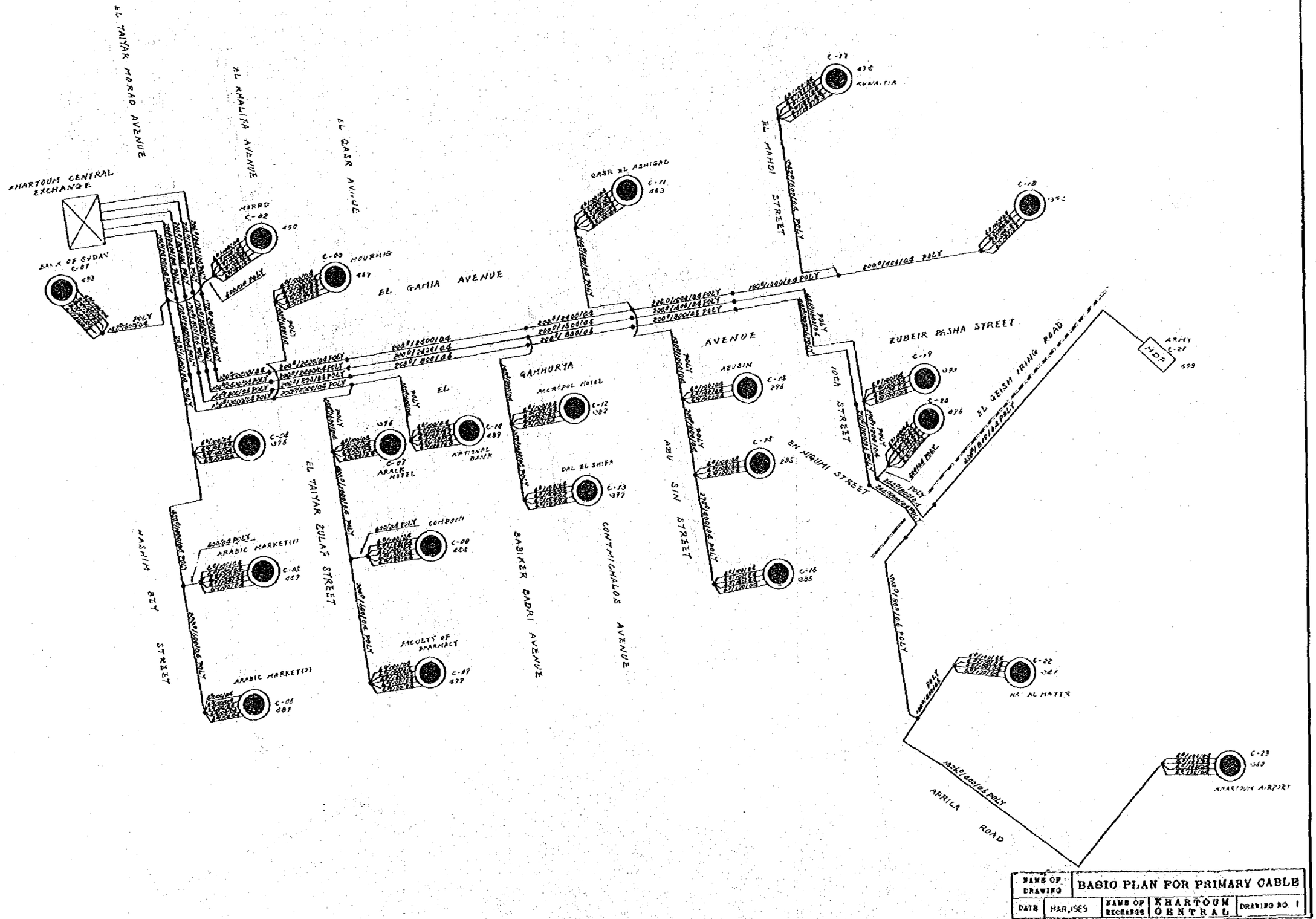
Drawing No. 1 - Drawing No. 36

Outside Plant Facilities

Schematic Diagram

Legend

◉	:	Cabinet
C-04	:	Cabinet No.
457	:	Number of Existing Subscribers
◎	:	Indoor Type Distribution Box
◎	:	Wall Type Distribution Box
○	:	Pole Type Distribution Box
•	:	Cable Jointing Point
POLY	:	Polyethylene Cable
200.0/2400/0.4	:	Distance (m) 200.0 m Number of pairs 2400 pairs Diameter of Conductor 0.4 mm
□	:	Manhole/Handhole
S-1	:	Type of Manhole (Straight Type-1)
S-2	:	Type of Manhole (Straight Type-2)
S-3	:	Type of Manhole (Straight Type-3)
H-1	:	Type of Handhole (Type-1)
MDF	:	Main Distribution Frame
150.0 (7)	:	Distance (m) 150.0 m Number of Ducts (7 pipes)



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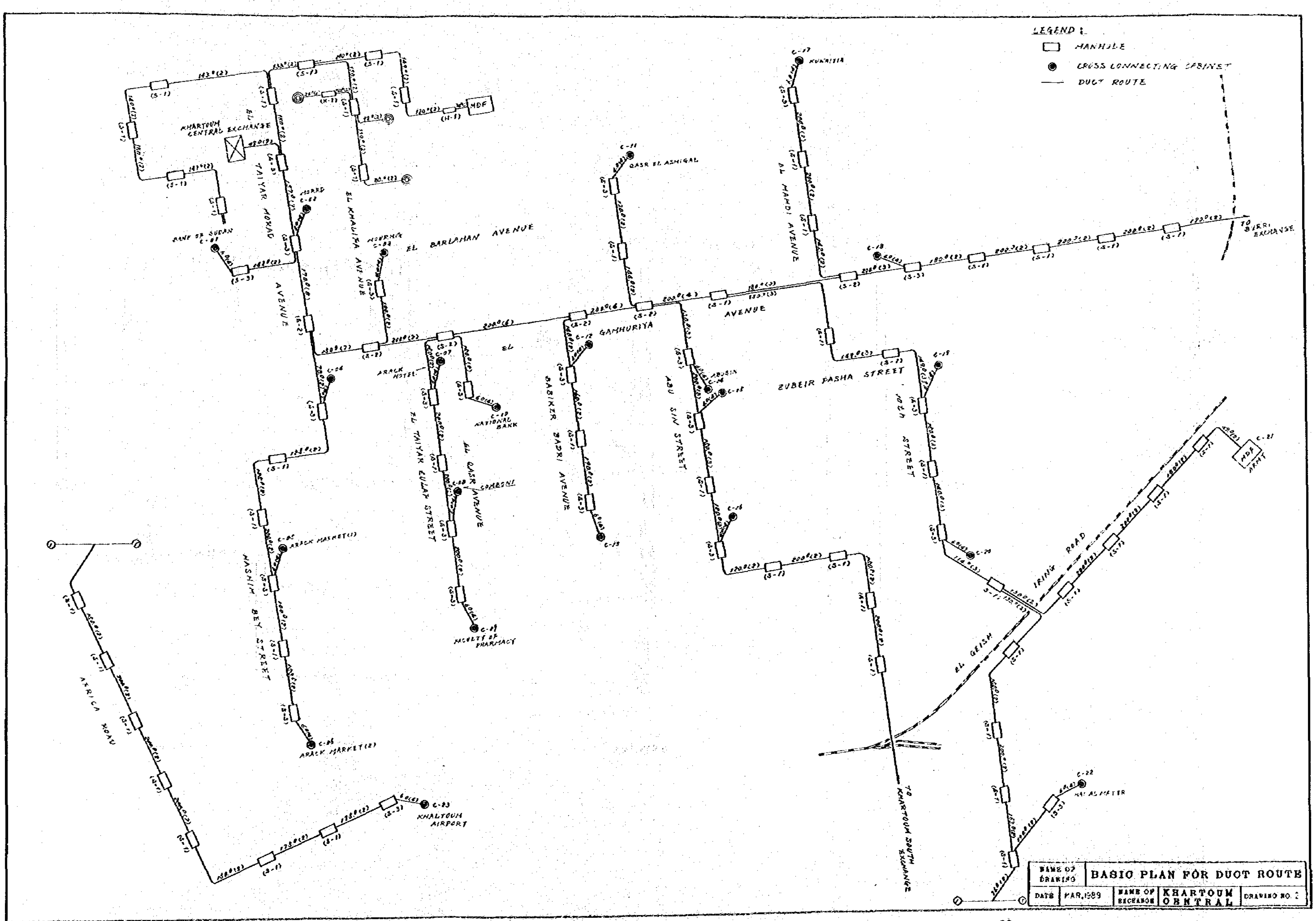
LEGEND :
MANHOLE
CROSS CONNECTING CABINET
DUCT ROUTE
KHARTOUM CENTRAL EXCHANGE
MDF
EL TAIYAR MORAD AVENUE
EL KHALIFA AVENUE
EL BARLAMAN AVENUE
EL GAMHURIYA AVENUE
QASR EL ASHIGAL
EL MAHDI AVENUE
TO SIRRI EXCHANGE
ZUBEIR PASHA STREET
10th STREET
EL TAIYAR KULAP STREET
EL QASR AVENUE
BABIKER BADRI AVENUE
ABU SIN STREET
HASHIM BEY STREET
AFRICA ROAD
KHALTOUM AIRPORT
FACULTY OF PHARMACY
NATIONAL BANK
ARACK HOTEL
ARACK MARKET(1)
ARACK MARKET(2)
EL GEISH
RING ROAD
TO KHARTOUM SOUTH EXCHANGE
MDF ARMY
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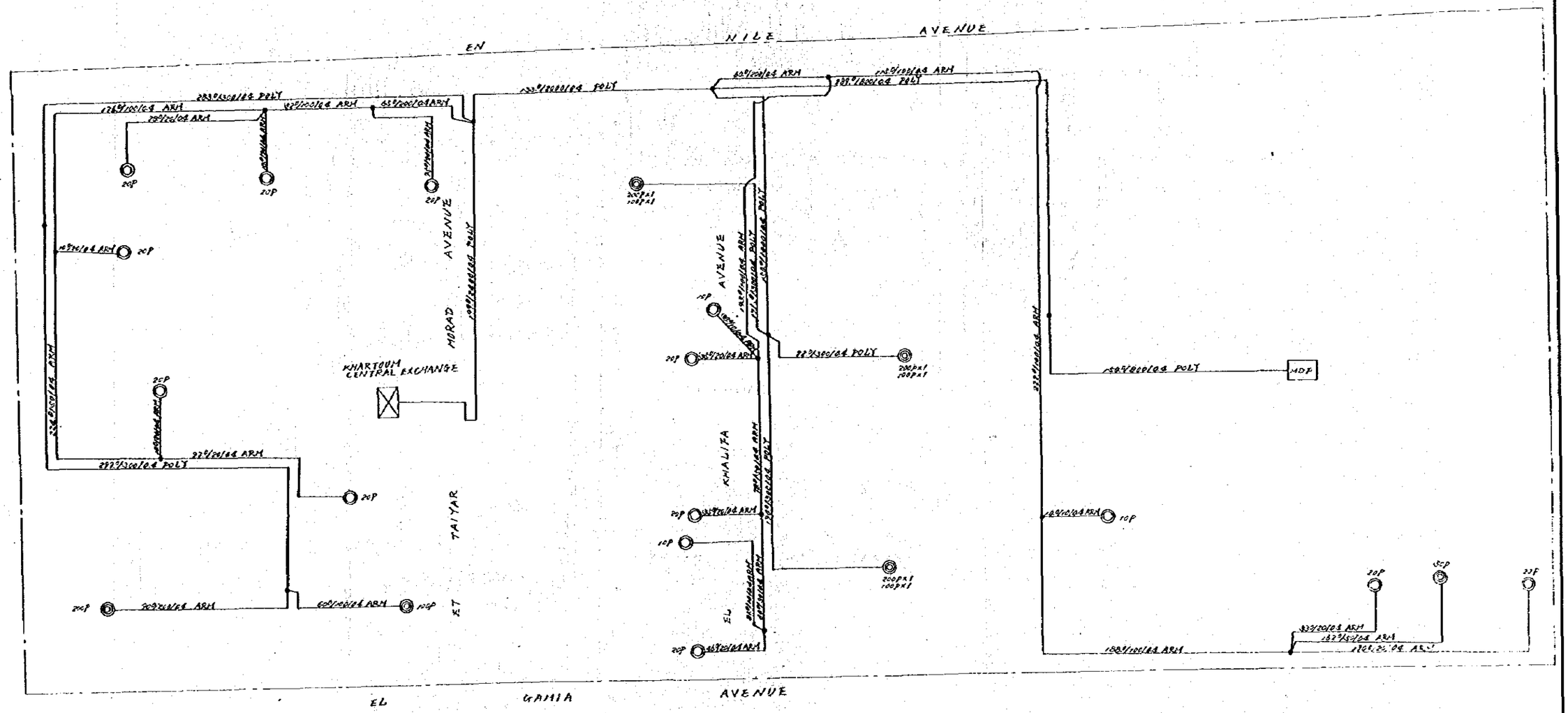

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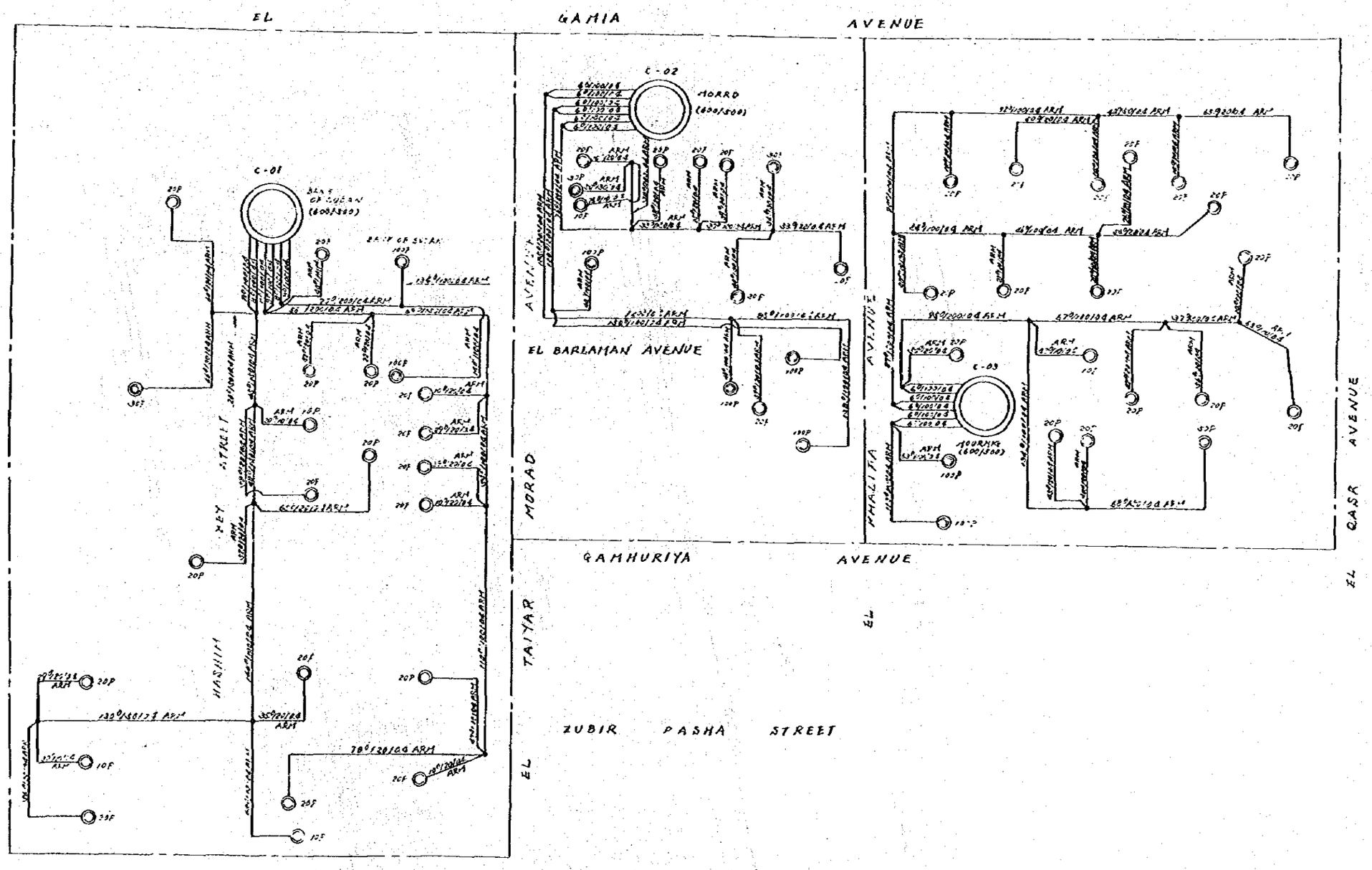

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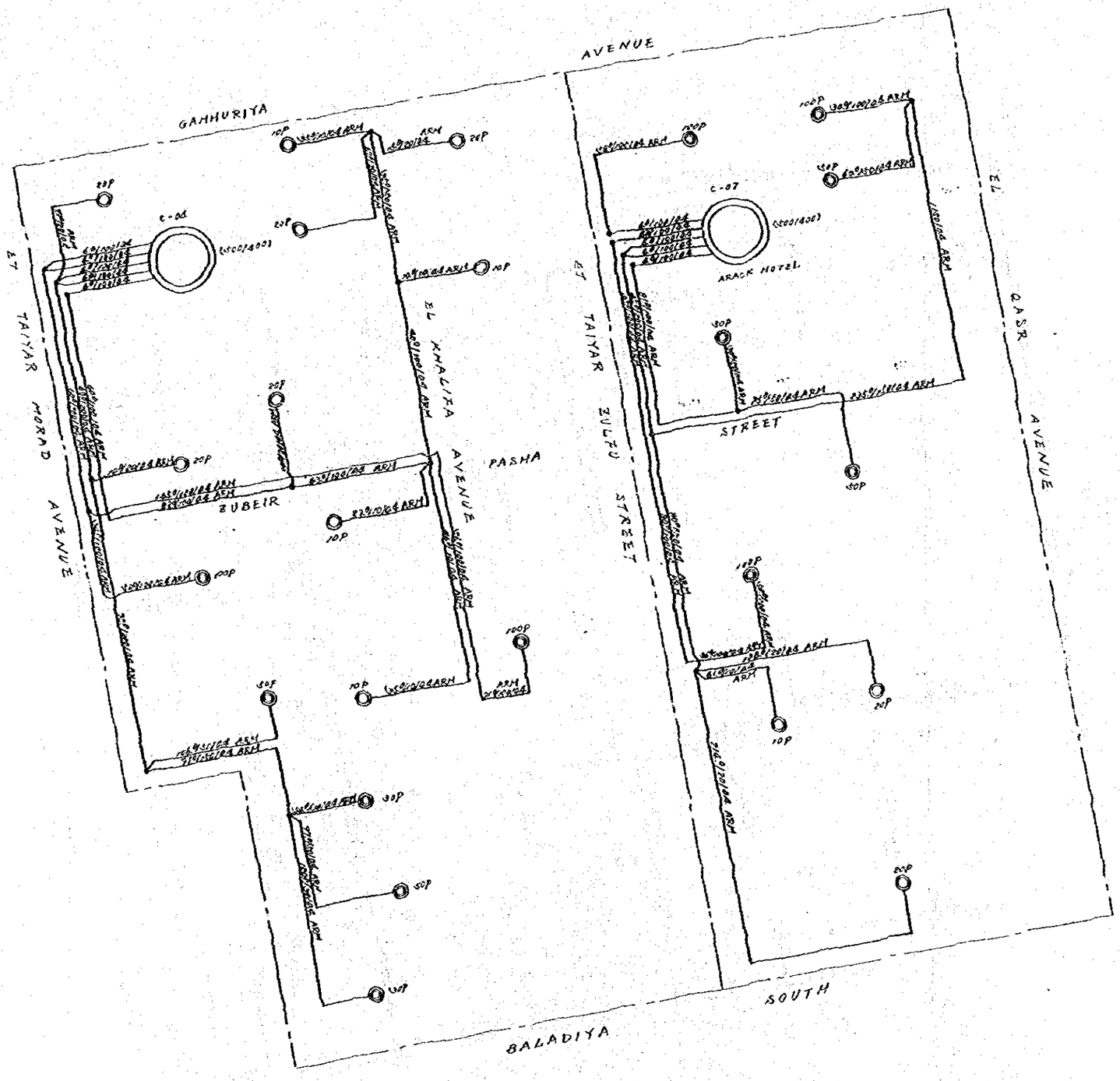

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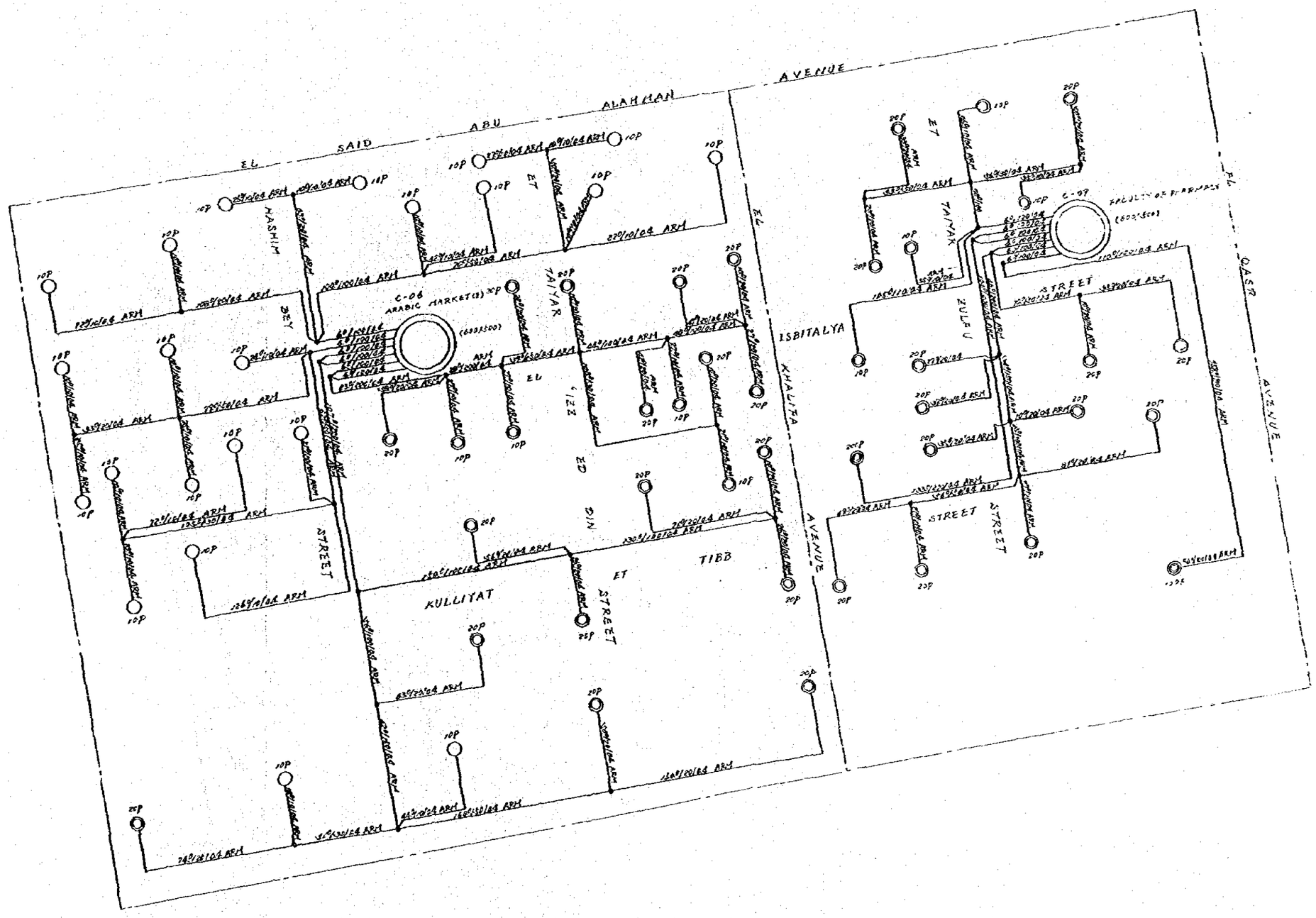

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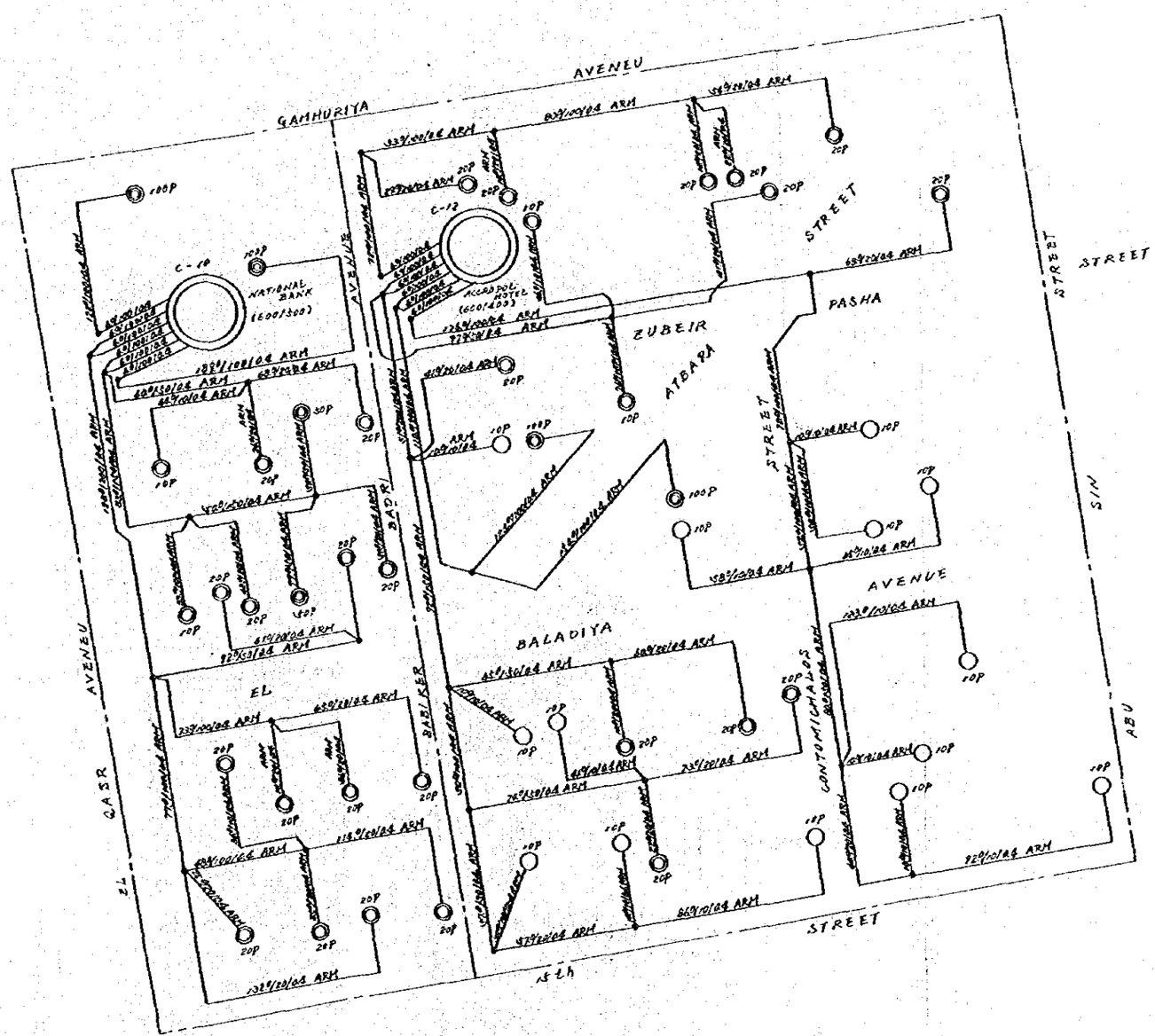

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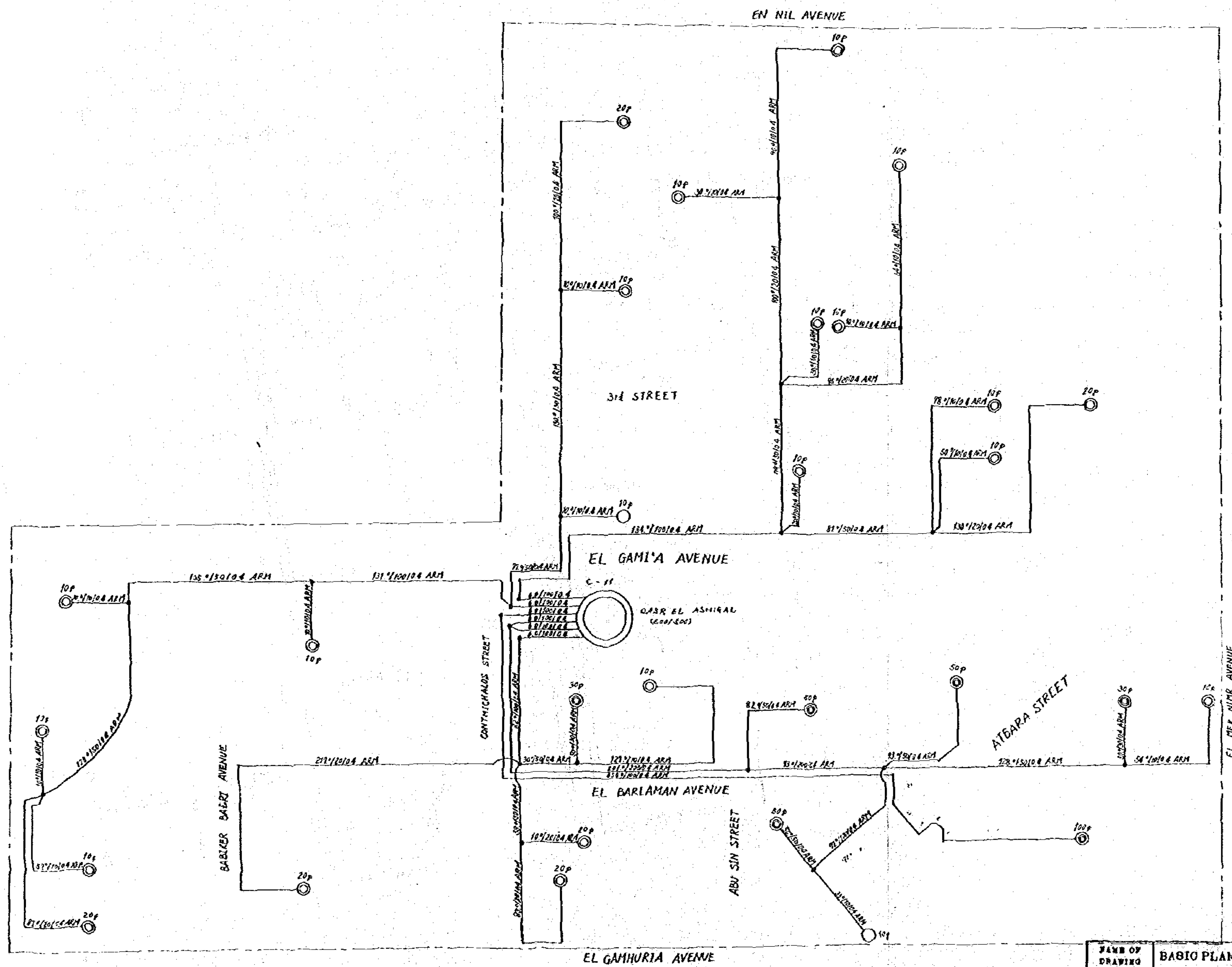

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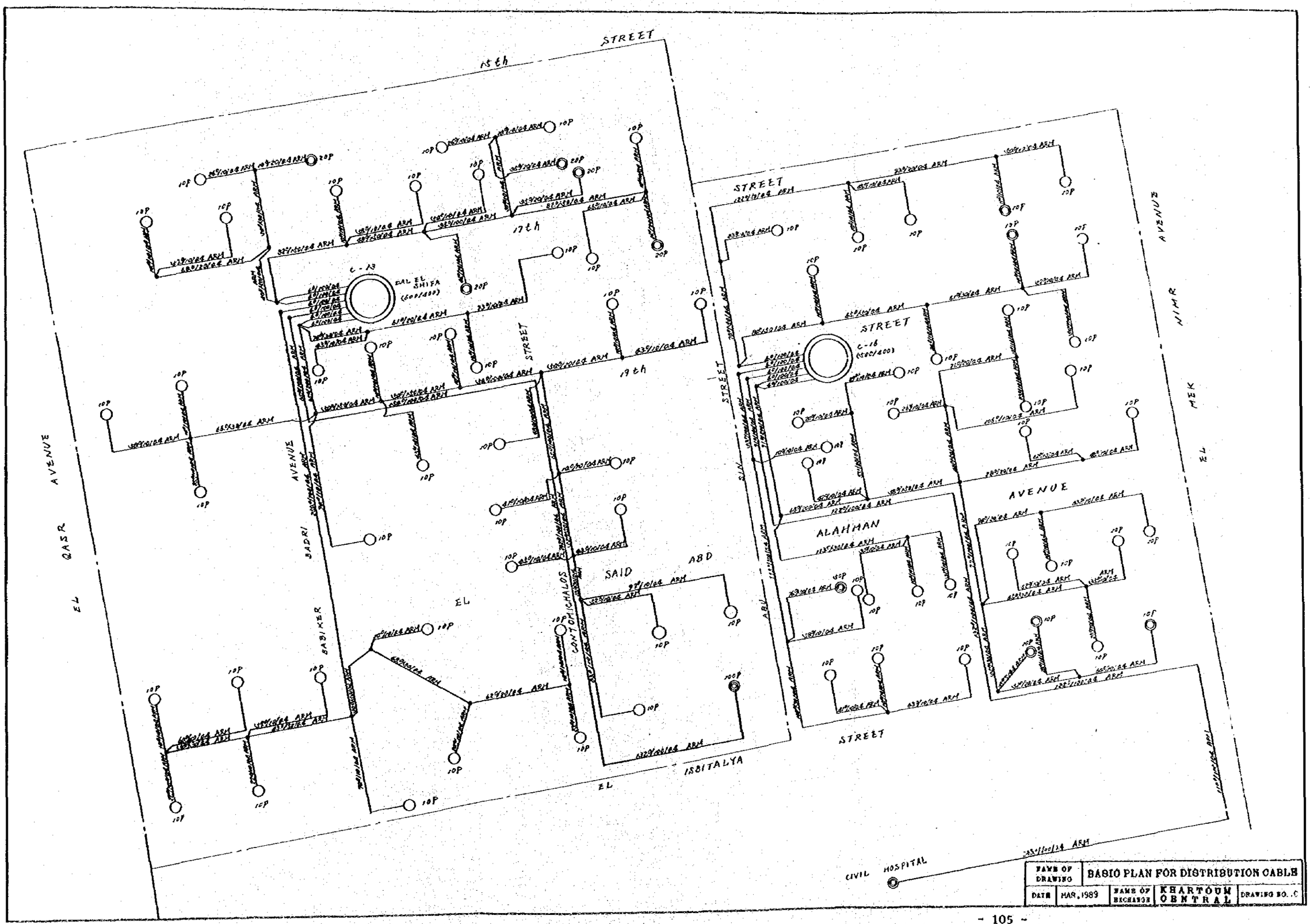

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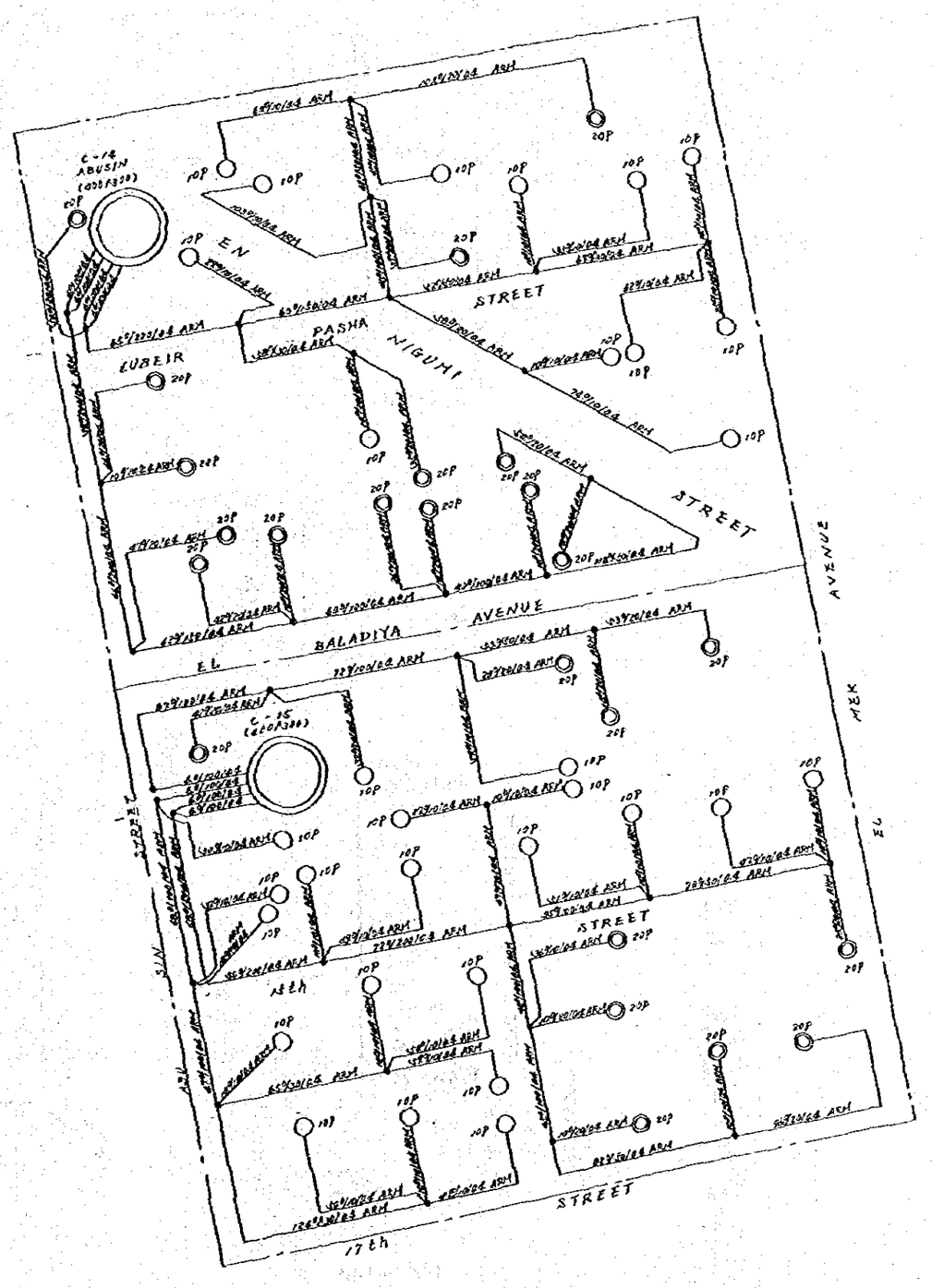

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EN NIL AVENUE

EL MEK NIMR AVENUE

'OTHMAN DIQNA AVENUE

C-17

KUNAITIA (600/200)

Ministry of Health

3rd STREET

EL GAMI'A AVENUE

ALI DEINAR AVENUE

EL DARLAMAN AVENUE

EL GAMHURIYA AVENUE

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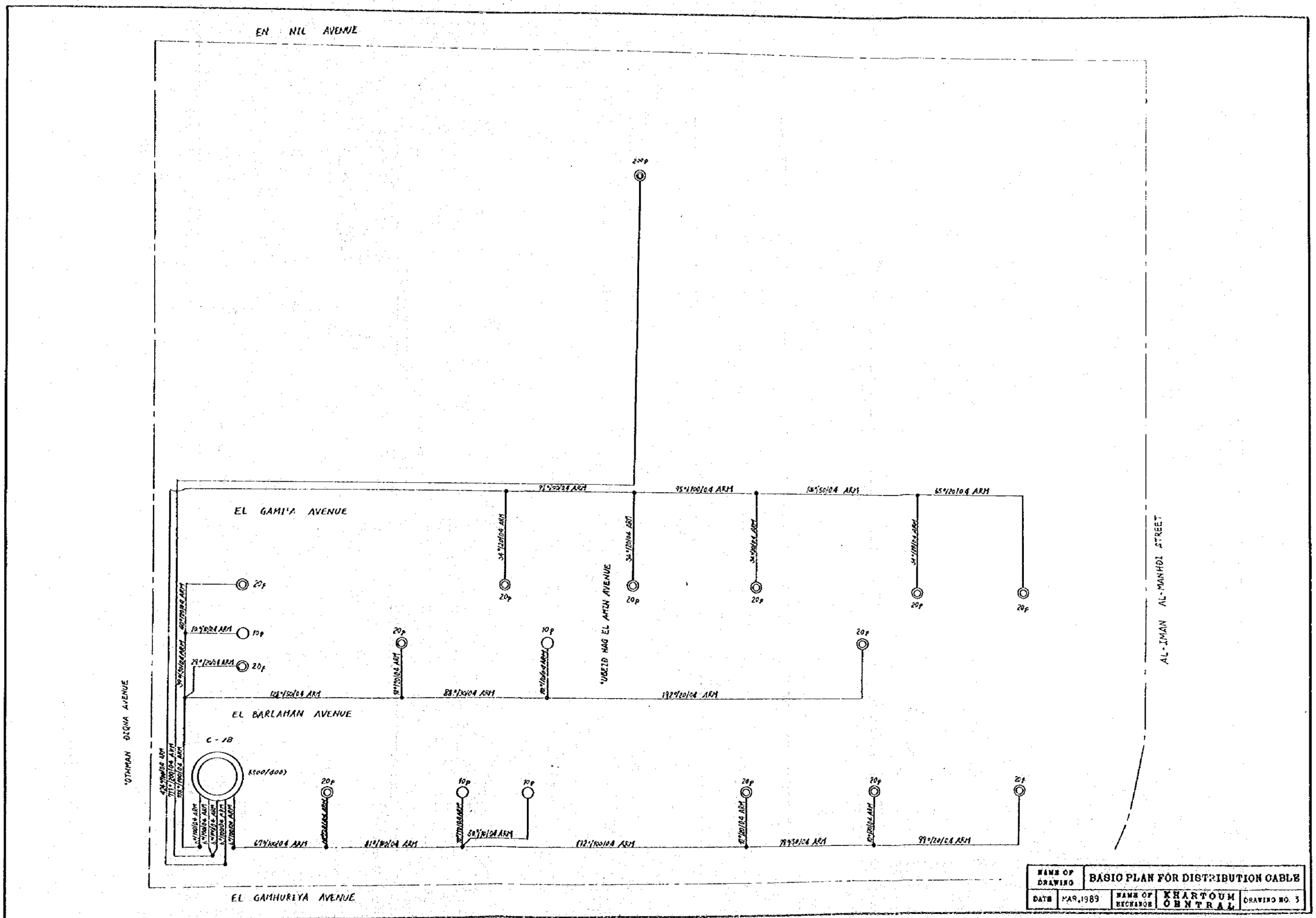

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DATE	MAR.1989
NAME OF DESIGNER	KHARTOUM CENTRAL
DRAWING NO. 4	

EL MEK NIMR AVENUE

EL GAMHURIYA AVENUE

ALI DEINAR AVENUE

ZUBEIR PASHA STREET

EL BALADIYA AVENUE

OTHMAN DIQNA AVENUE

EL BALADIYA AVENUE

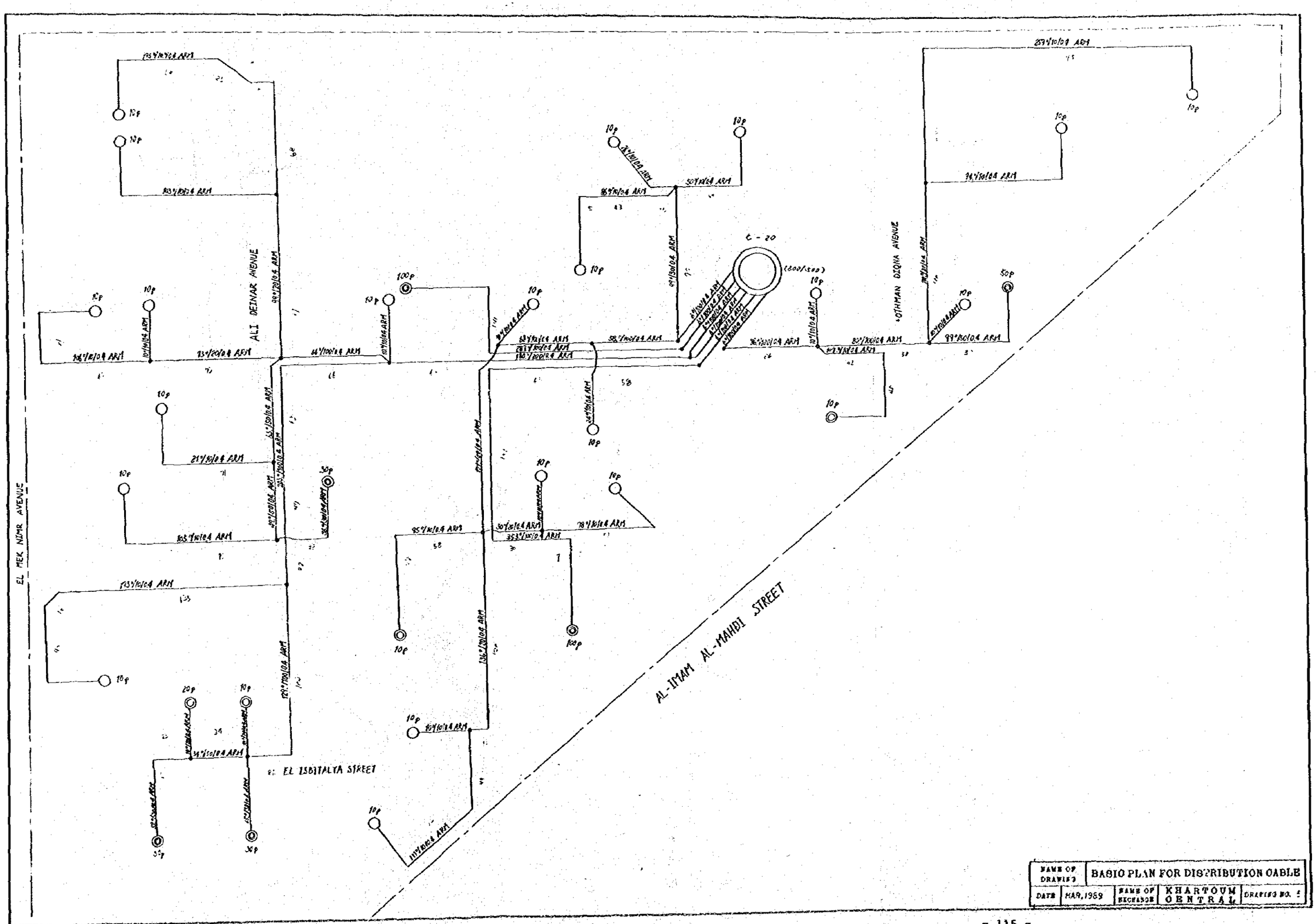
ZUBEIR PASHA STREET

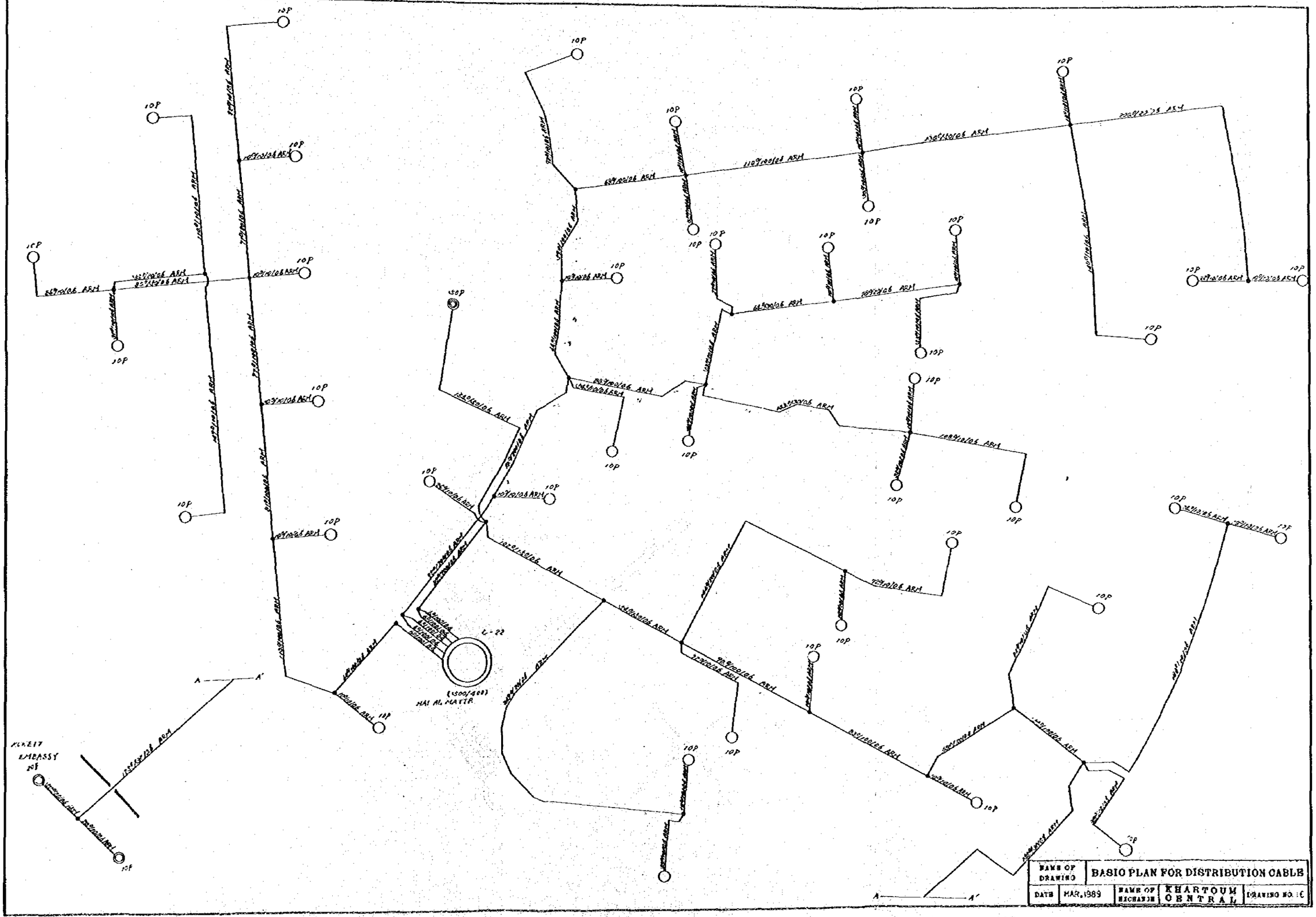
EL GAMHURIYA AVENUE

OBEID HAG EL AMIN AVENUE

AL-IMAN AL-MAHDI

OTHMAN DIQNA AVENUE


ALI DEINAR AVENUE
EL MEK NIMR AVENUE
OTHMAN DIGNA AVENUE
AL-IMAM AL-MAHDI STREET
EL ISBITALYA STREET
C - 20
(600/500)
BASIC PLAN FOR DISTRIBUTION CABLE
KHARTOUM CENTRAL
MAR, 1969


10P
L-22
(1500/400)
HAI AL MATTR
FINNEY
EMBASSY
A
A'
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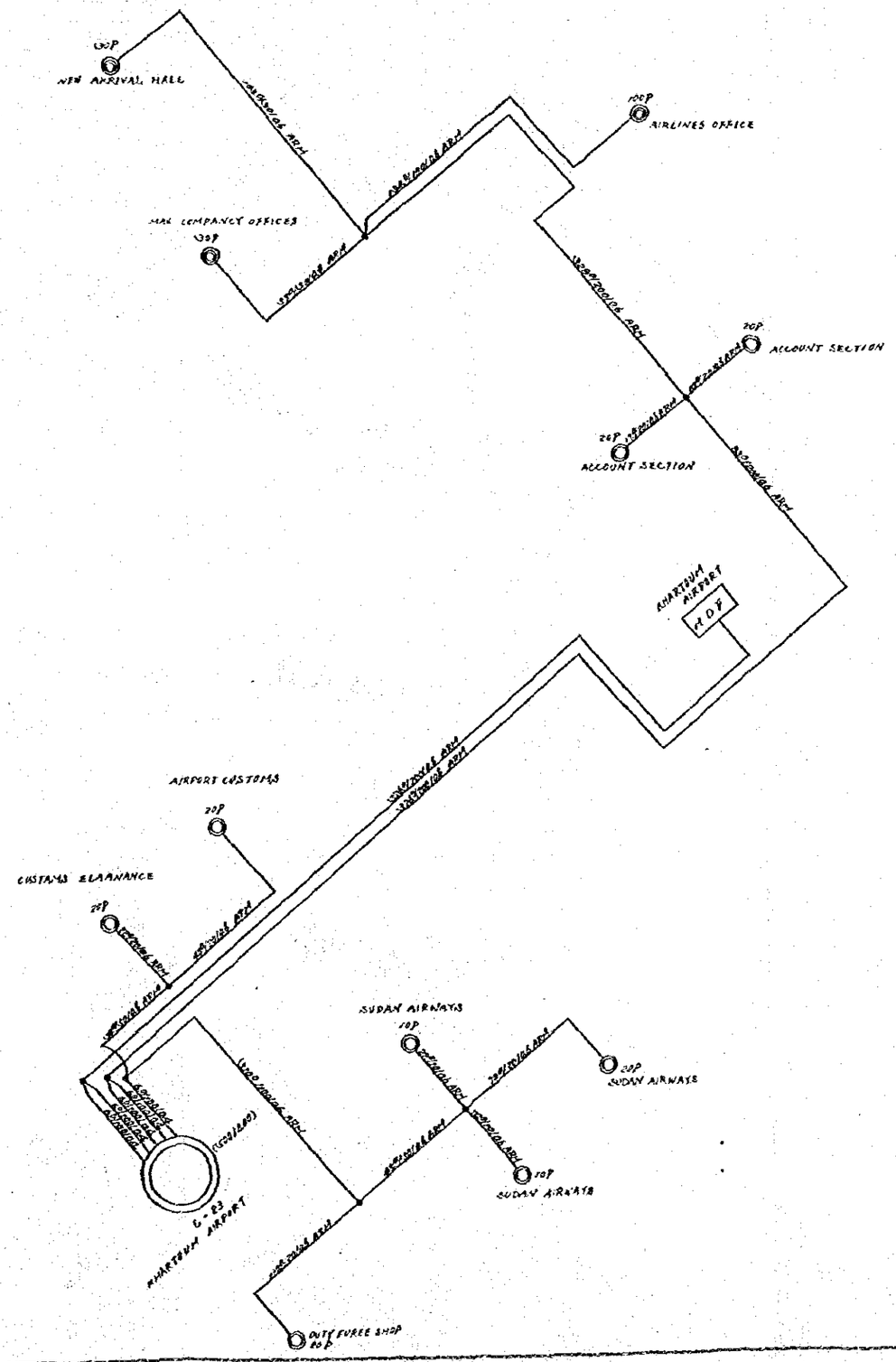

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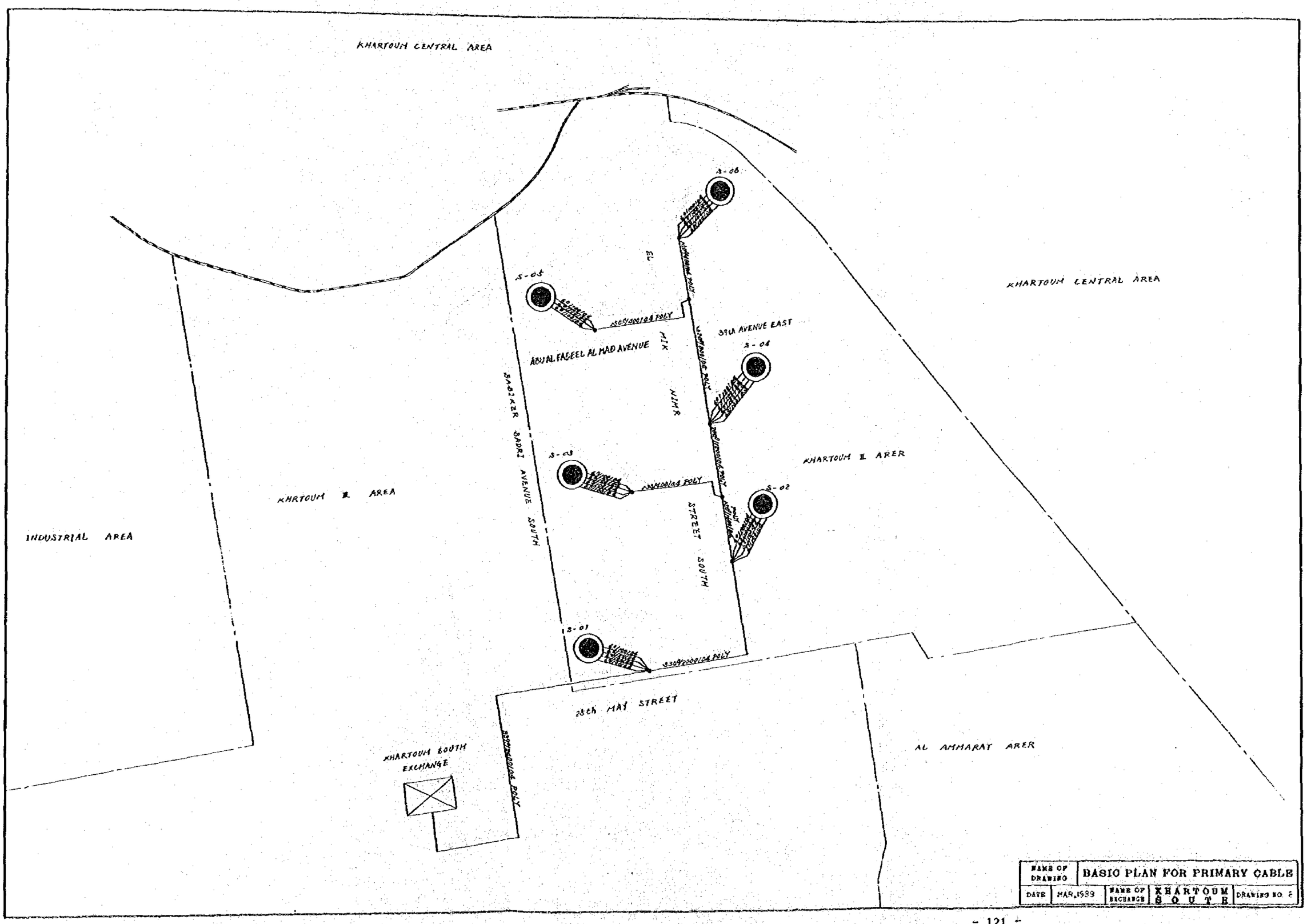
KHARTOUM CENTRAL AREA
S-08
S-05
S-04
S-03
S-02
S-01
ABU AL FADEEL AL MAD AVENUE
39th AVENUE EAST
BADRI AVENUE SOUTH
STREET SOUTH
KHARTOUM CENTRAL AREA
KHARTOUM II AREA
KHARTOUM II ARER
INDUSTRIAL AREA
28th MAY STREET
KHARTOUM SOUTH EXCHANGE
AL AMMARAT ARER
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BASIC PLAN FOR PRIMARY CABLE
DATE
MAR,1989
NAME OF EXCHANGE
KHARTOUM SOUTH
DRAWING NO. 5

KHARTOUM CENTRAL AREA

KHARTOUM CENTRAL EXCHANGE

LEGEND :

- MANHOLE
- CROSS CONNECTING CABINET
- DUCT ROUTE

KHARTOUM CENTRAL AREA

EL MEK NIMR STREET

ABU AL FADEEL AL MAD AVENUE

39th AVENUE EAST

AFRICA AVENUE

ES SAYYID ALI STREET

KHRTOUM III AREA

SAMKER WADI AVENUE SOUTH

INDUSTRIAL AREA

EL TAIYAR ZUHU STREET SOUTH

25th MAY STREET

AL AMMARAT ARER

AL SAGGANA ARER

KHARTOUM SOUTH EXCHANGE

AL HILLA ARER

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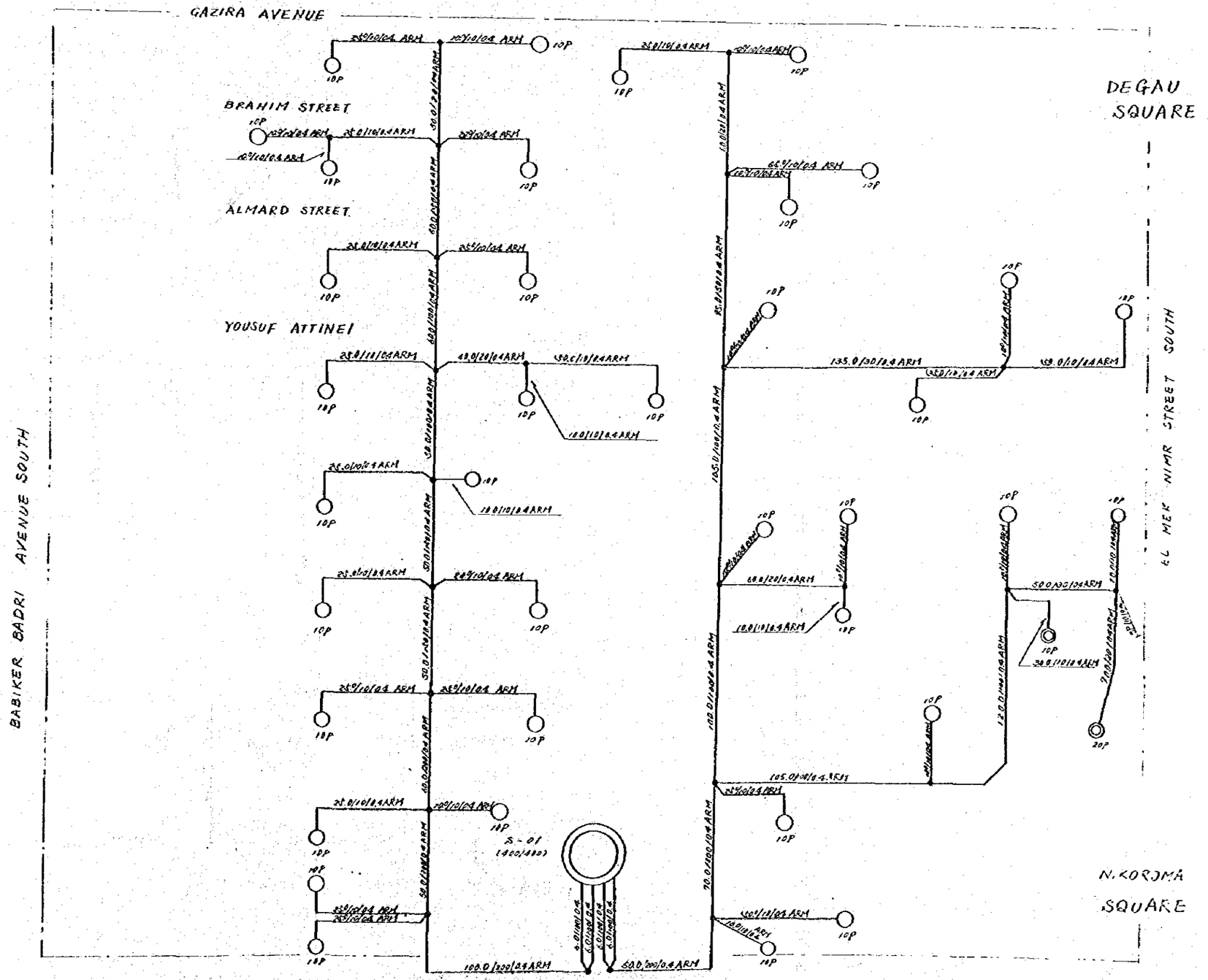

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GAZIRA AVENUE

EL NIMR STREET SOUTH

THE ARMED FORCES CLUB

SPORTS CLUBS AREA

AFRICA AVENUE

S-02

WELFARE CENTRE

NIKROMA SQUARE

EAST (ND)

RECREATION AREA

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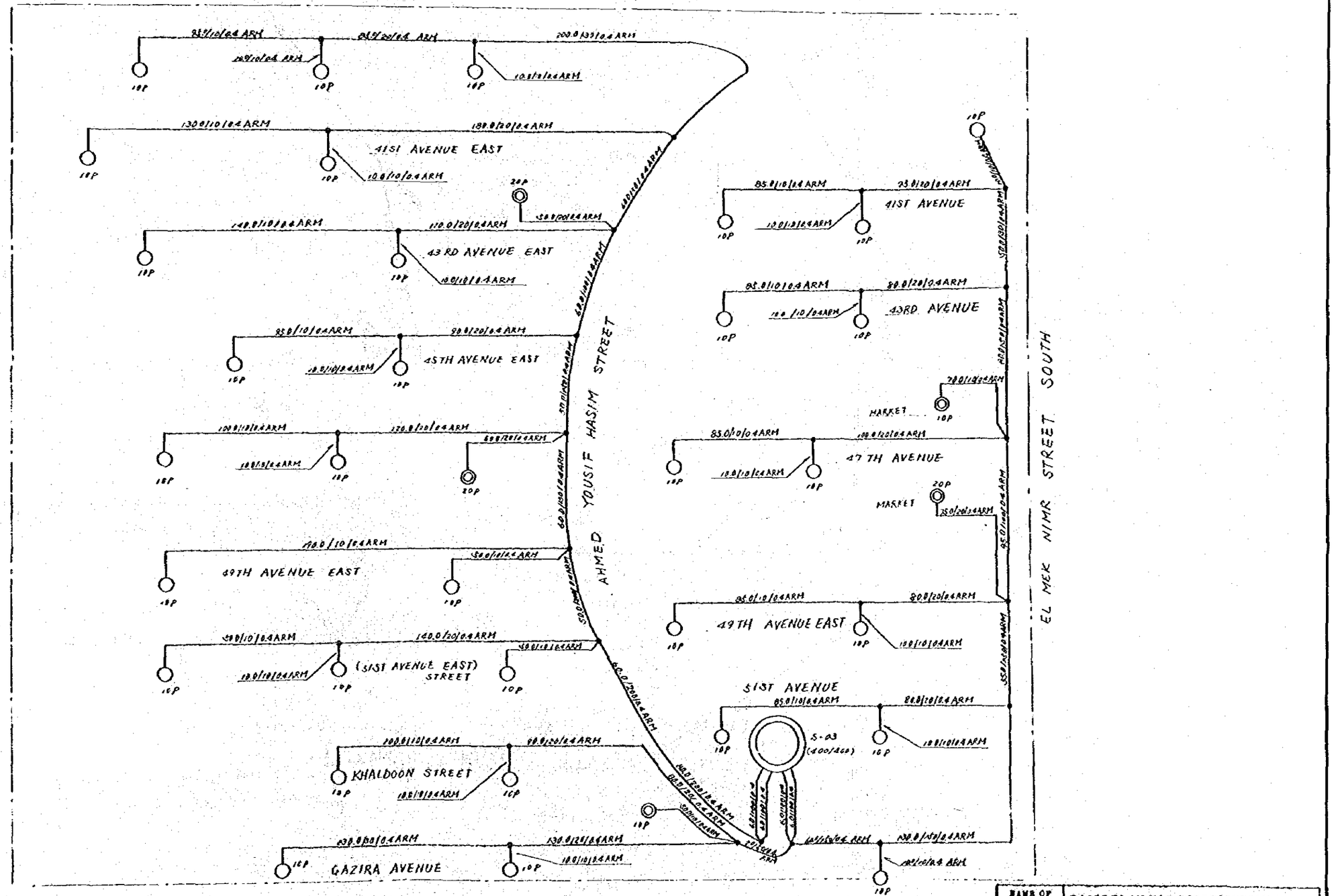

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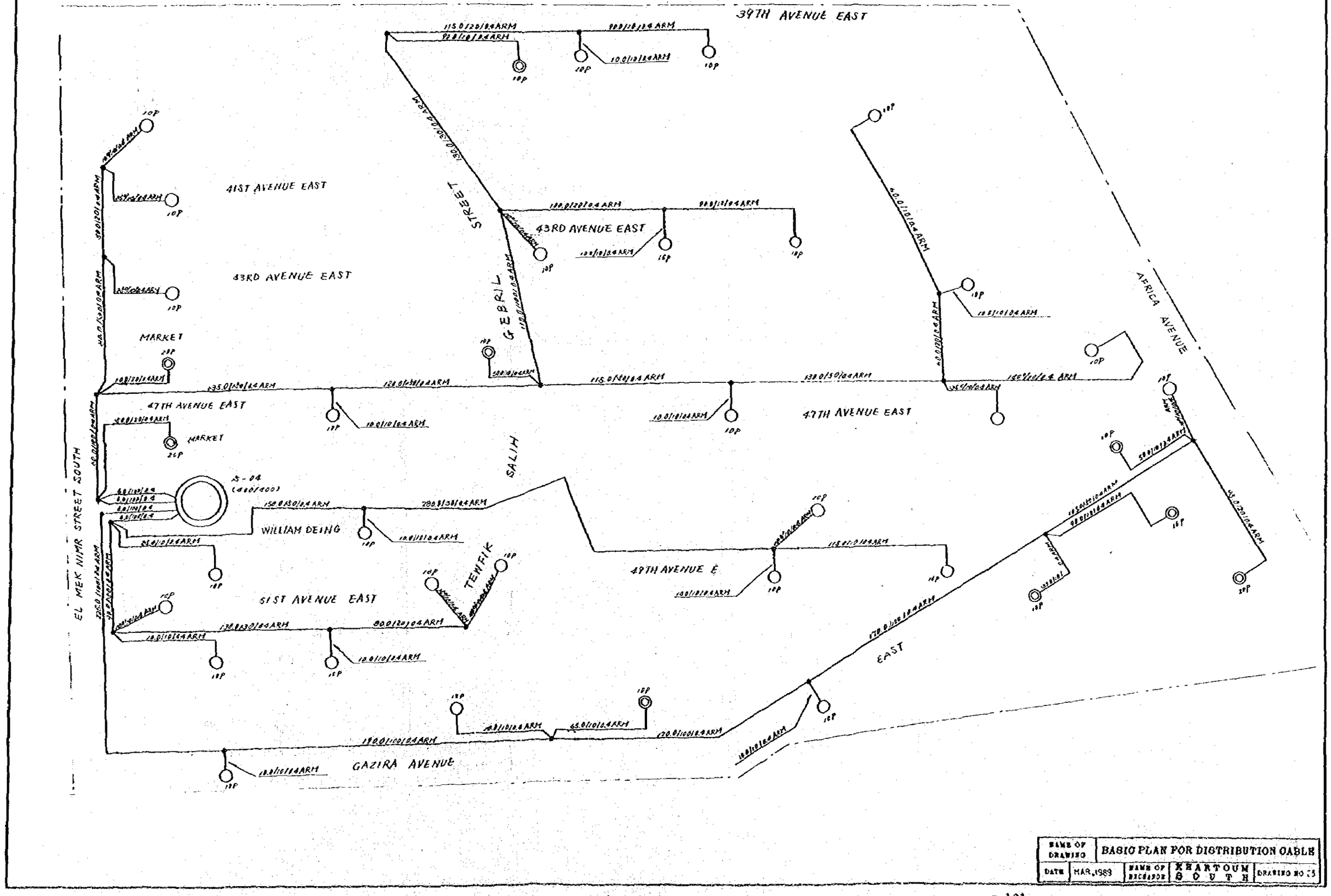

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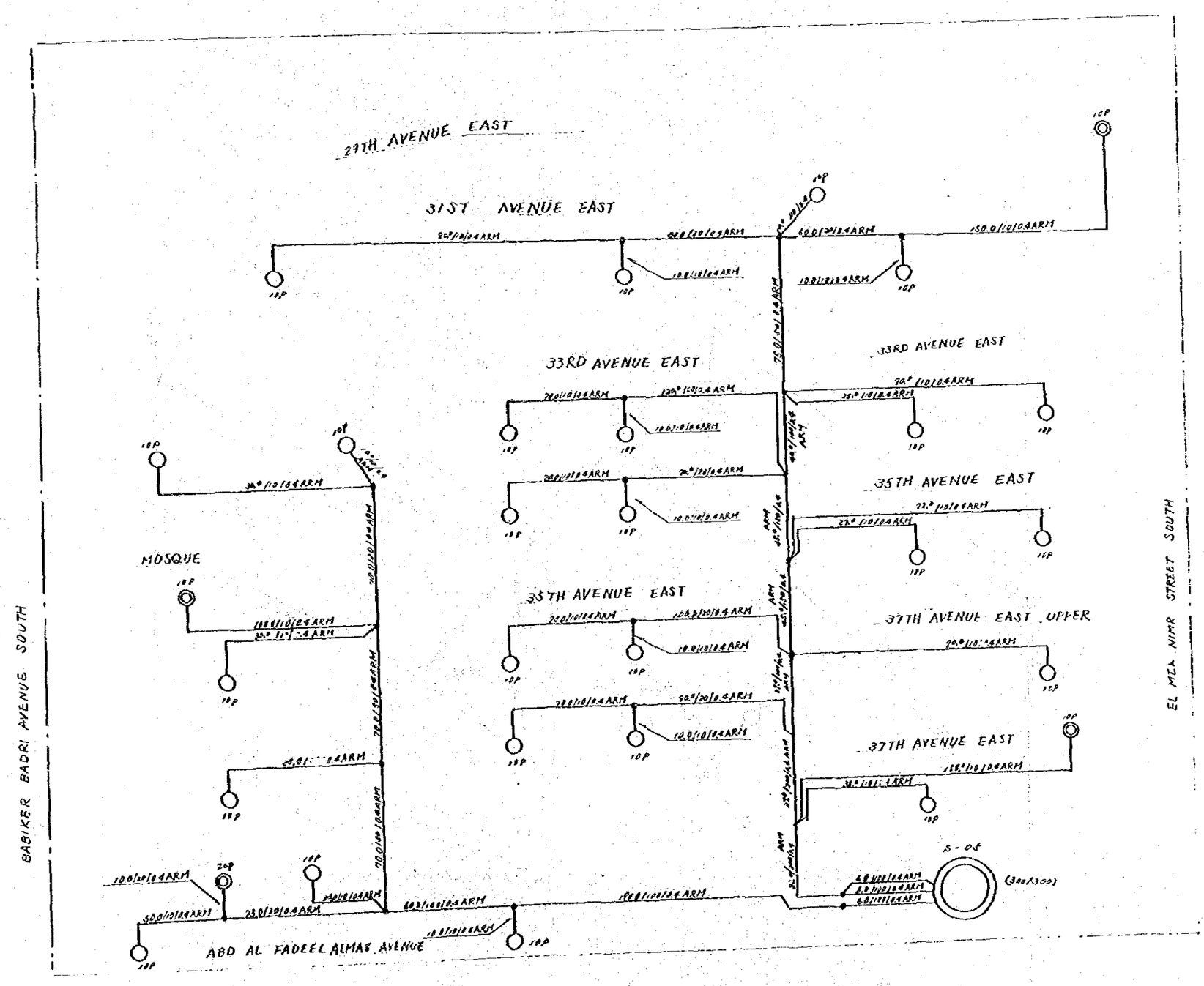

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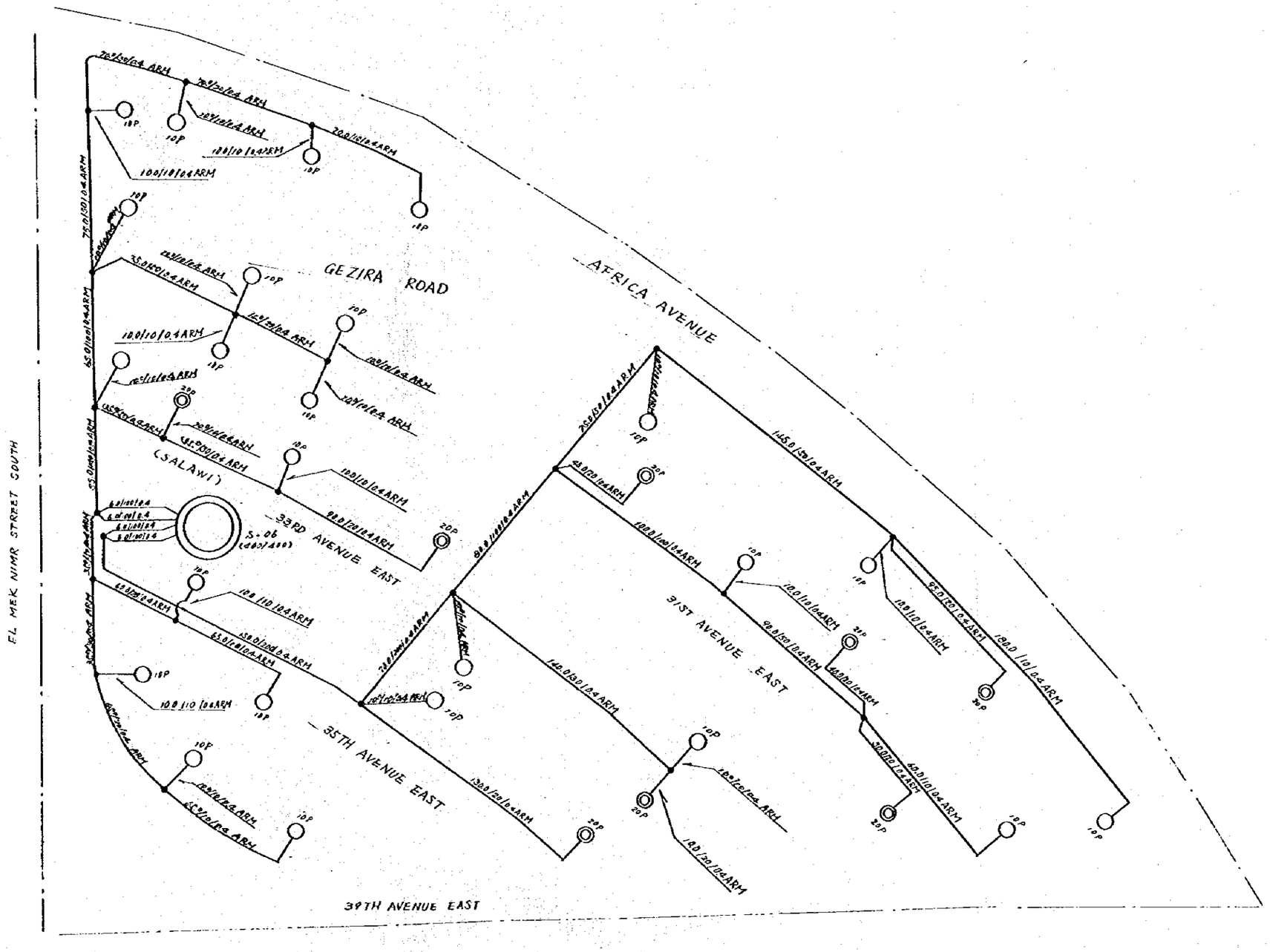

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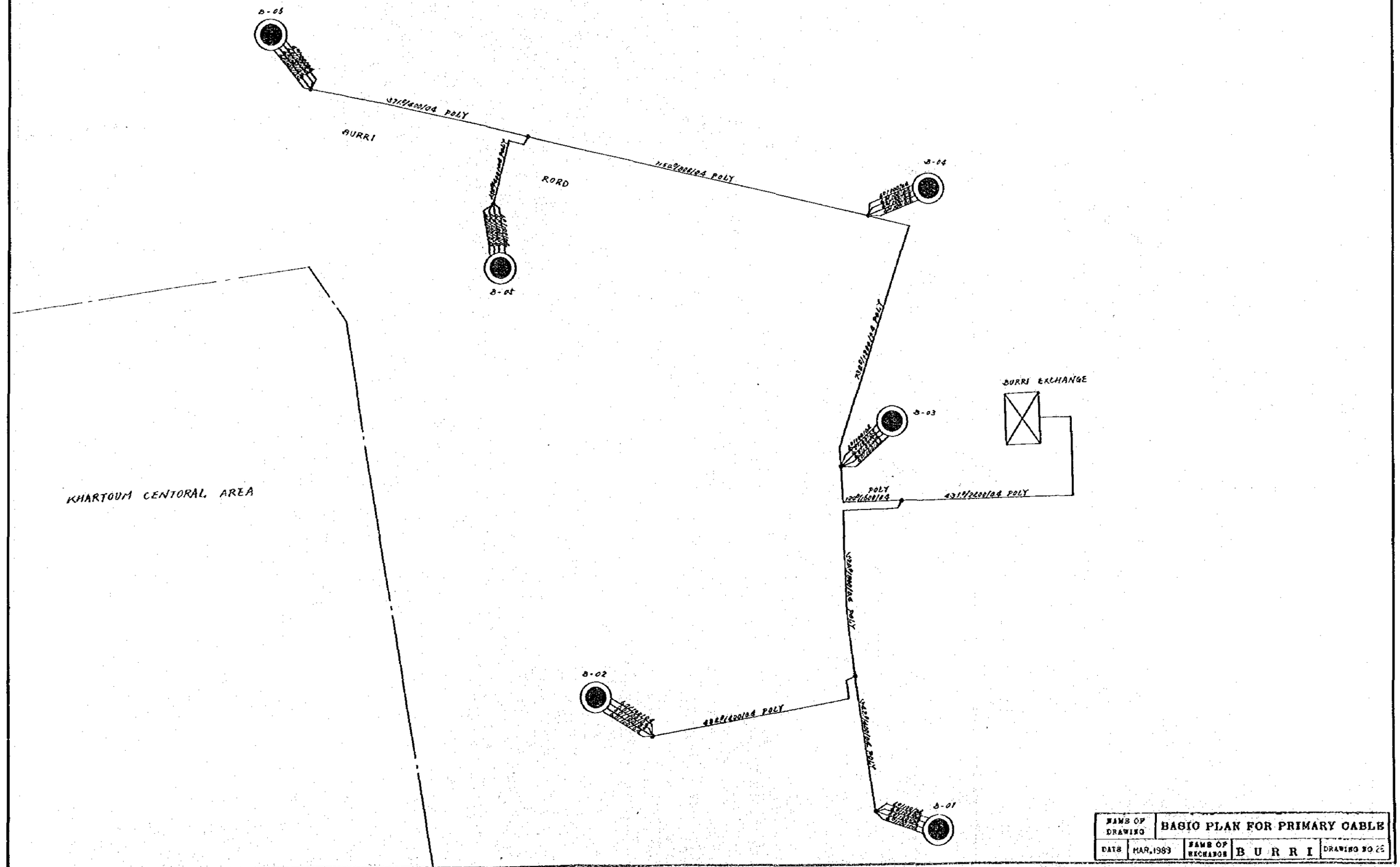

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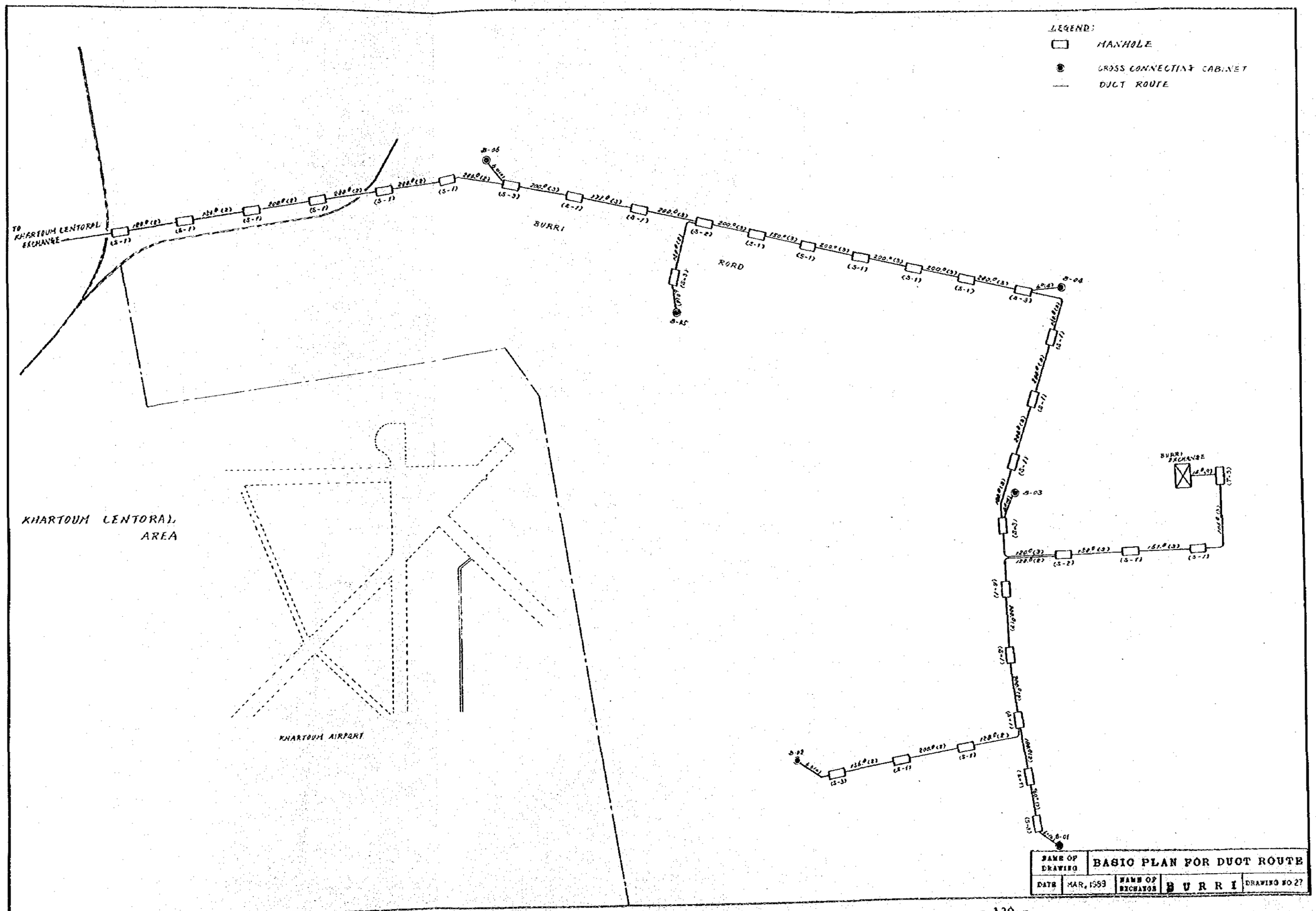
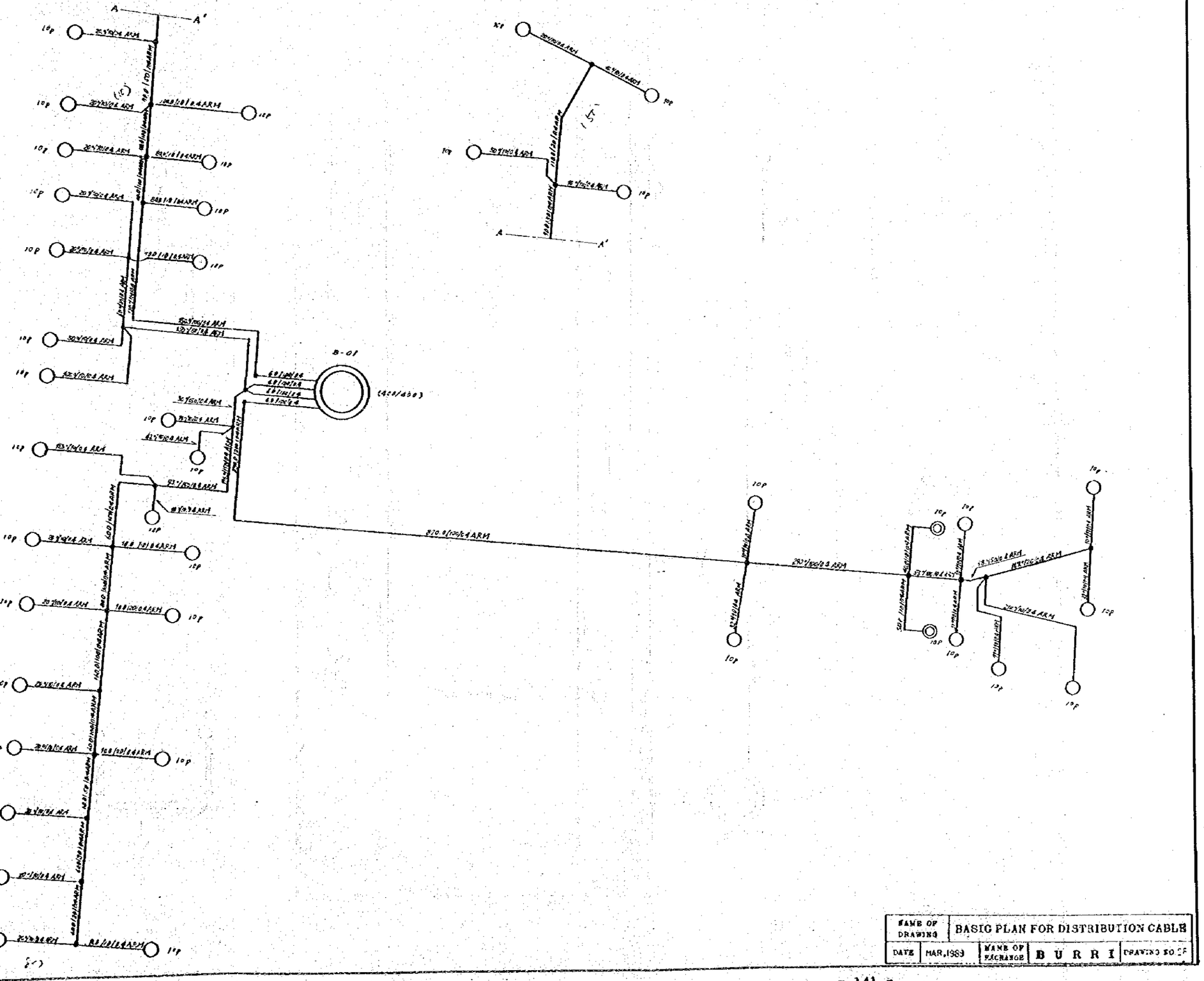
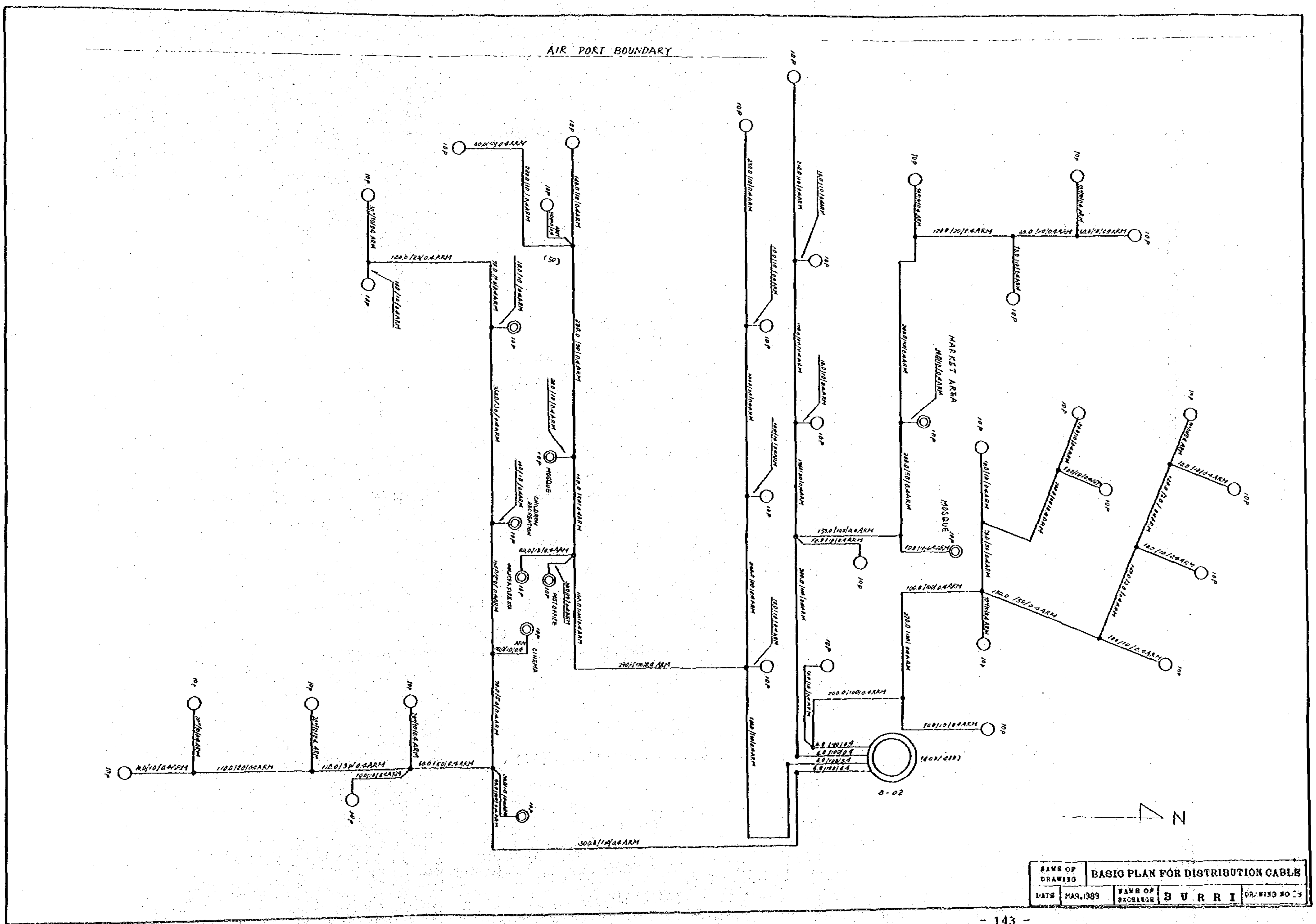
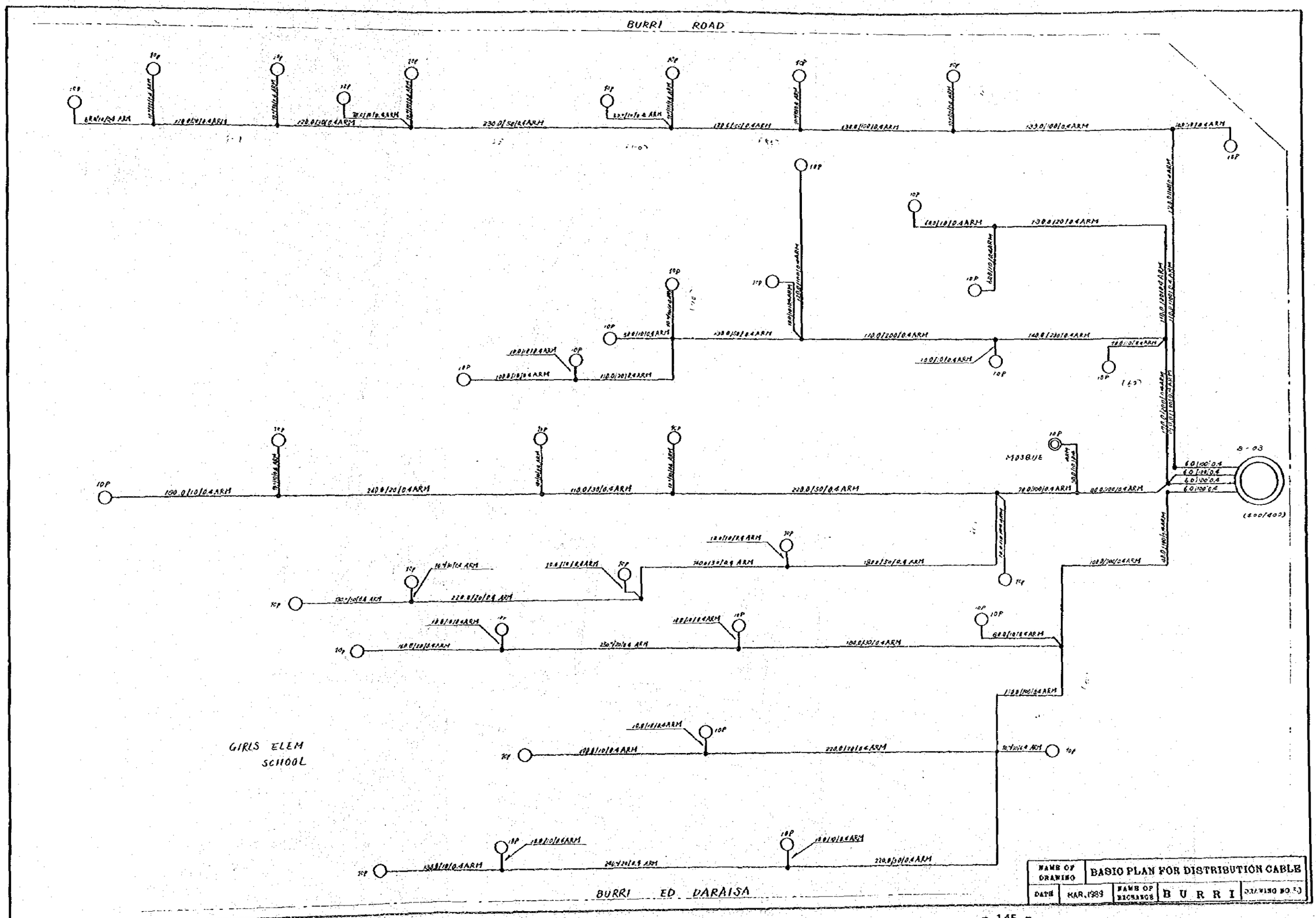

LEGEND:
MANHOLE
CROSS CONNECTING CABINET
DUCT ROUTE
TO KHARTOUM CENTORAL EXCHANGE
BURRI
RURD
KHARTOUM CENTORAL AREA
KHARTOUM AIRPORT
BURRI EXCHANGE
B-01
B-02
B-03
B-04
B-05
B-06
NAME OF DRAWING
BASIC PLAN FOR DUCT ROUTE
DATE
MAR, 1989
NAME OF EXCHANGE
B U R R I
DRAWING NO 27



NAME OF DRAWING	BASIC PLAN FOR DISTRIBUTION CABLE		
DATE	MAR, 1989	NAME OF EXCHANGE	B U R R I


AIR PORT BOUNDARY
MARKET AREA
MOSQUE
MOSQUE
CINEMA
POST OFFICE
B-02
N
NAME OF DRAWING
BASIC PLAN FOR DISTRIBUTION CABLE
DATE
MAR.1989
NAME OF EXCHANGE
B U R R I


BURRI ROAD
GIRLS ELEM SCHOOL
MOSQUE
B - 03
(400/400)
NAME OF DRAWING
BASIC PLAN FOR DISTRIBUTION CABLE
DATE
MAR. 1989
NAME OF EXCHANGE
B U R R I
DRAWING NO.
BURRI ED. DARAISA

SABIA NO.5

BLUE NILE

POLICE TRAINING COLLEGE

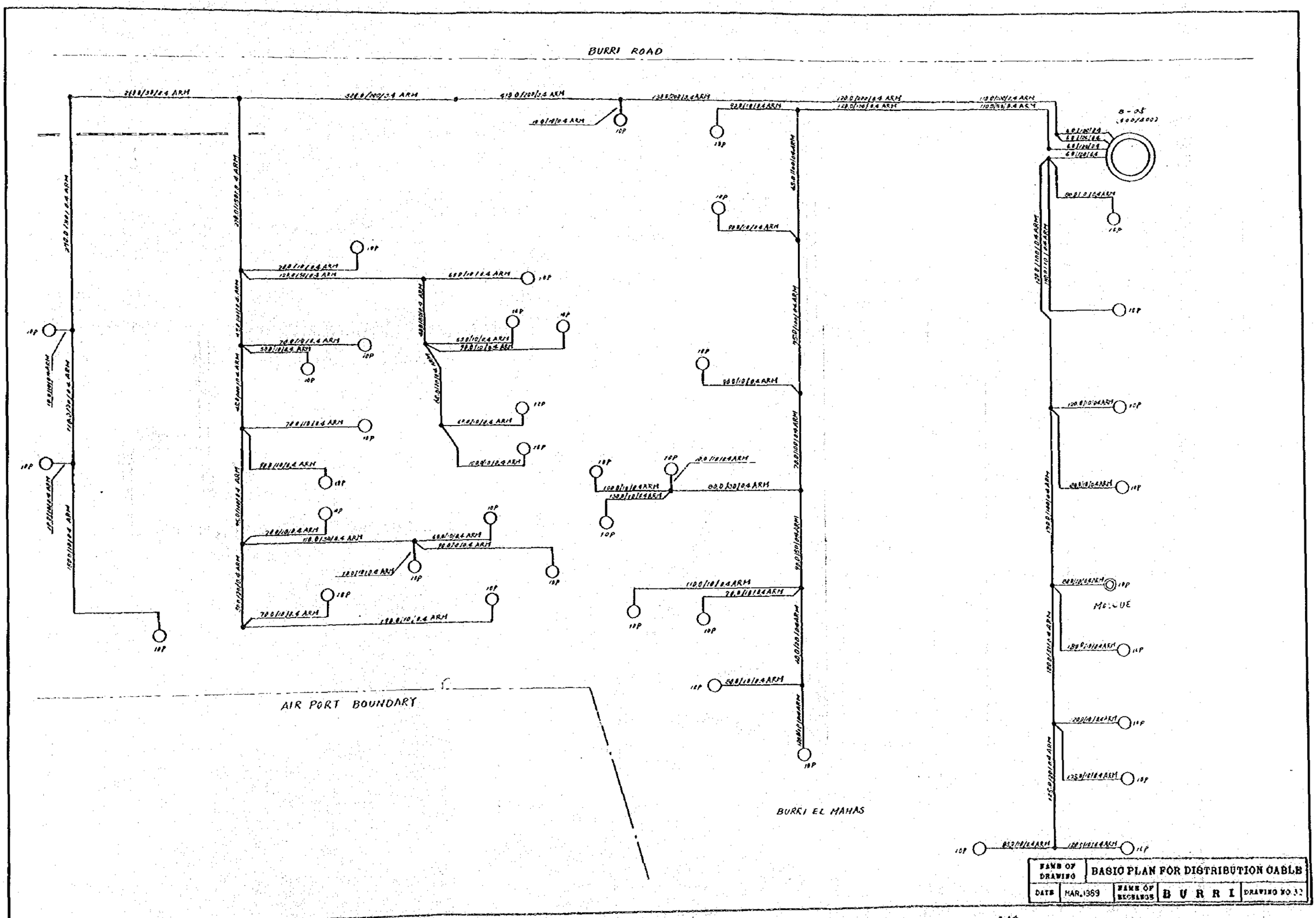
BURRI EL LAMAB

BURRI EXCANGE

B - 04

BURRI ROAD

NAME OF DRAWING	BASIC PLAN FOR DISTRIBUTION CABLE				
DATE	MAR, 1989	NAME OF EXCHANGE	B U R R I	DRAWING NO. 51	


BURRI ROAD
AIR PORT BOUNDARY
BURRI EL MAHAS
MOSQUE
B - 05
NAME OF DRAWING
BASIC PLAN FOR DISTRIBUTION CABLE
DATE
MAR. 1969
NAME OF HOUSING
B U R R I
DRAWING NO. 32

ESH. SHUHADA BRIDGE

BURRI POWER STATION & WATER WORKS

SAQIA

PINK PALACE

POLICE TRAINING COLLEGE

EL GEISH IRING ROAD

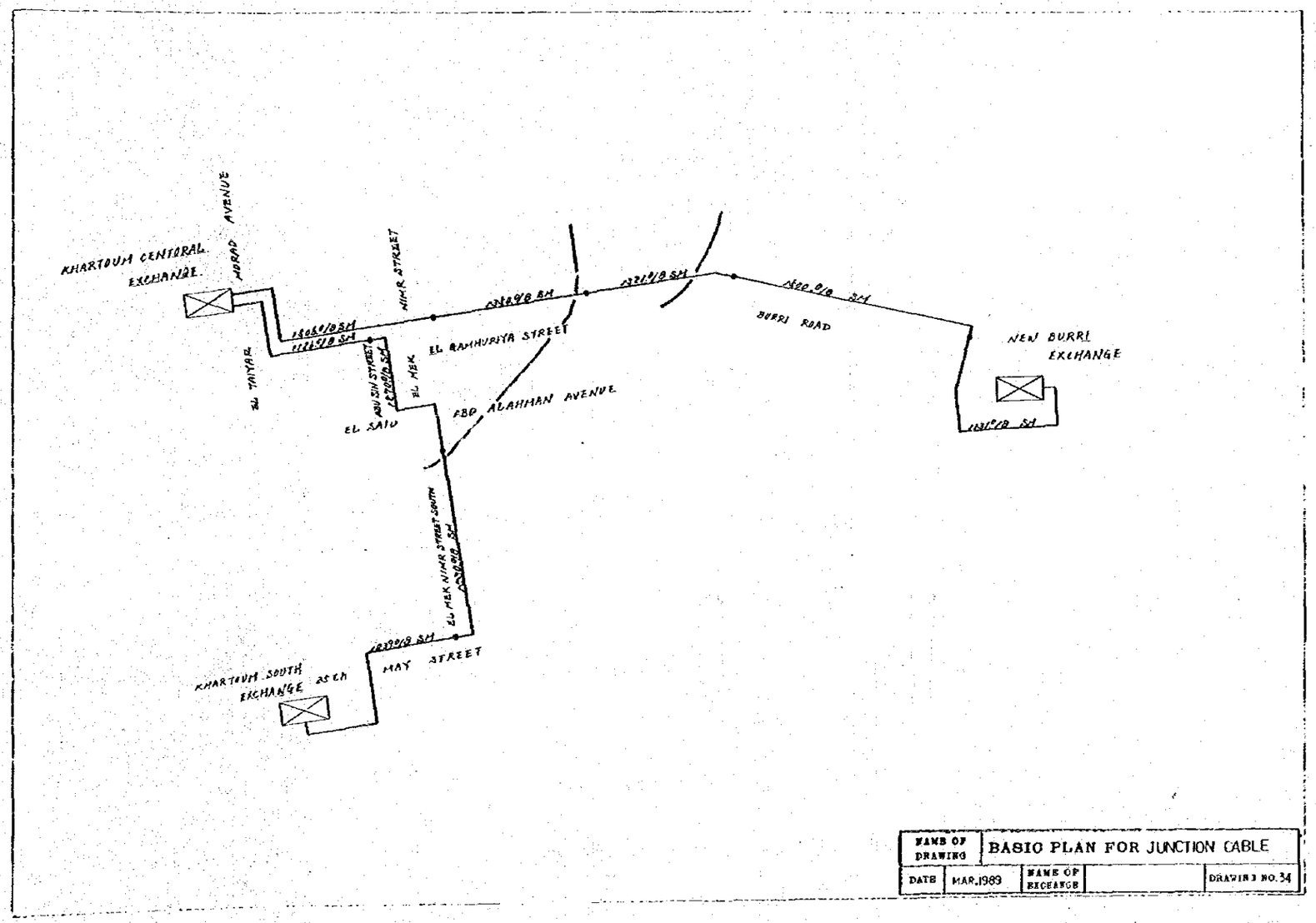
NAFAG BURRI

CEMETERY

B-06

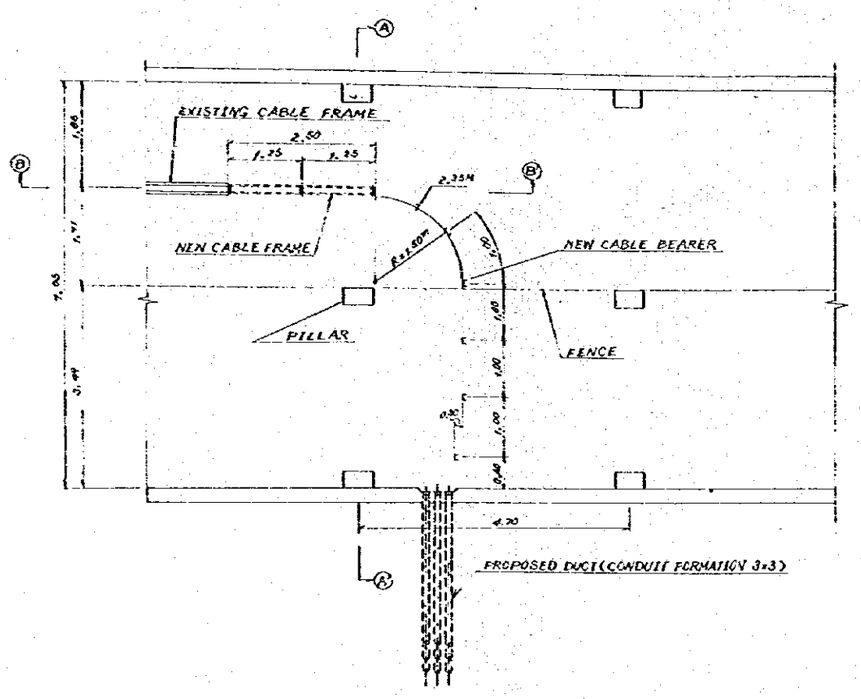
BURRI ROAD

NAME OF DRAWING	BASIC PLAN FOR DISTRIBUTION CABLE				
DATE	MAR, 1989	NAME OF EXCHANGE	B U R R I	DRAWING NO.	55

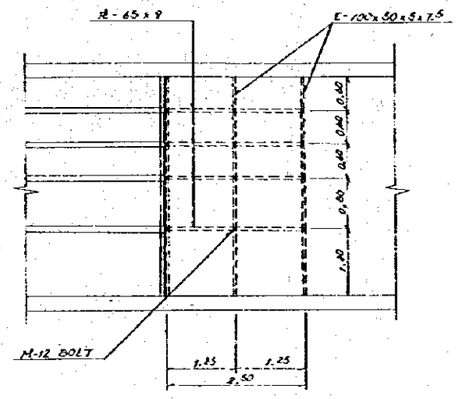


NAME OF DRAWING	BASIC PLAN FOR JUNCTION CABLE			
DATE	MAR.1989	NAME OF EXCHANGE		DRAWING NO. 34

BUILT-UP FRAME DRAWING (KHARTOUM CENTRAL EXCHANGE)



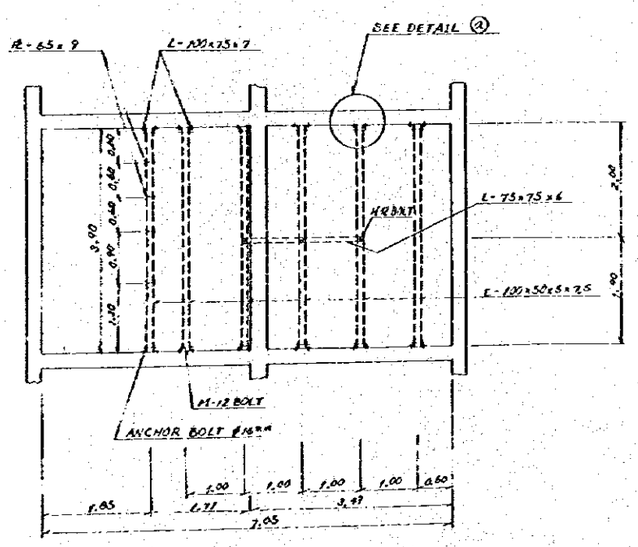
PLAN VIEW S=1:50



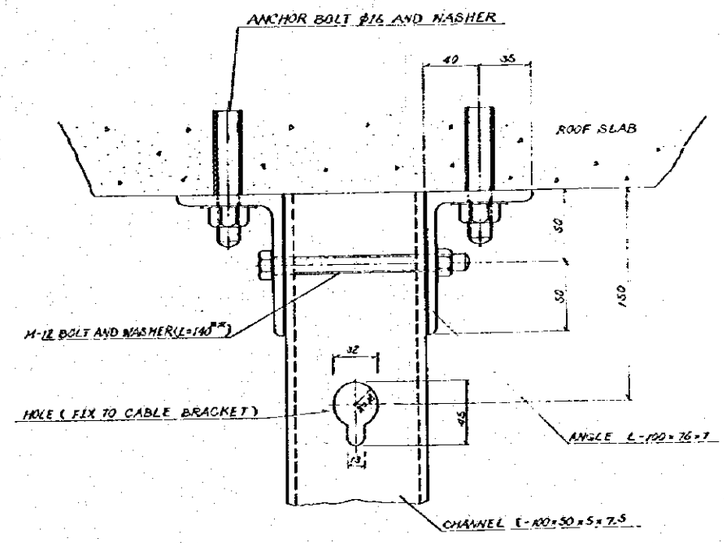
SECTION VIEW Ⓑ~Ⓑ S=1:50

REMARKS

NUMBER OF CHANNEL	L-100×50×5×7.5 — 8
TOTAL LENGTH	3.90m × 8 = 31.20m
NUMBER OF ANGLE	L-100×75×7 — 32
TOTAL LENGTH	0.05m × 32 = 1.60m
NUMBER OF ANGLE	L-75×75×6 — 1
TOTAL LENGTH	2.10m × 1 = 2.10m
NUMBER OF STEEL PLAT	R. 65×9 — 8
TOTAL LENGTH	2.60m × 8 = 20.80m
NUMBER OF M-12 BOLT AND WASHER	— 47
NUMBER OF ANCHOR BOLT	φ16mm — 32



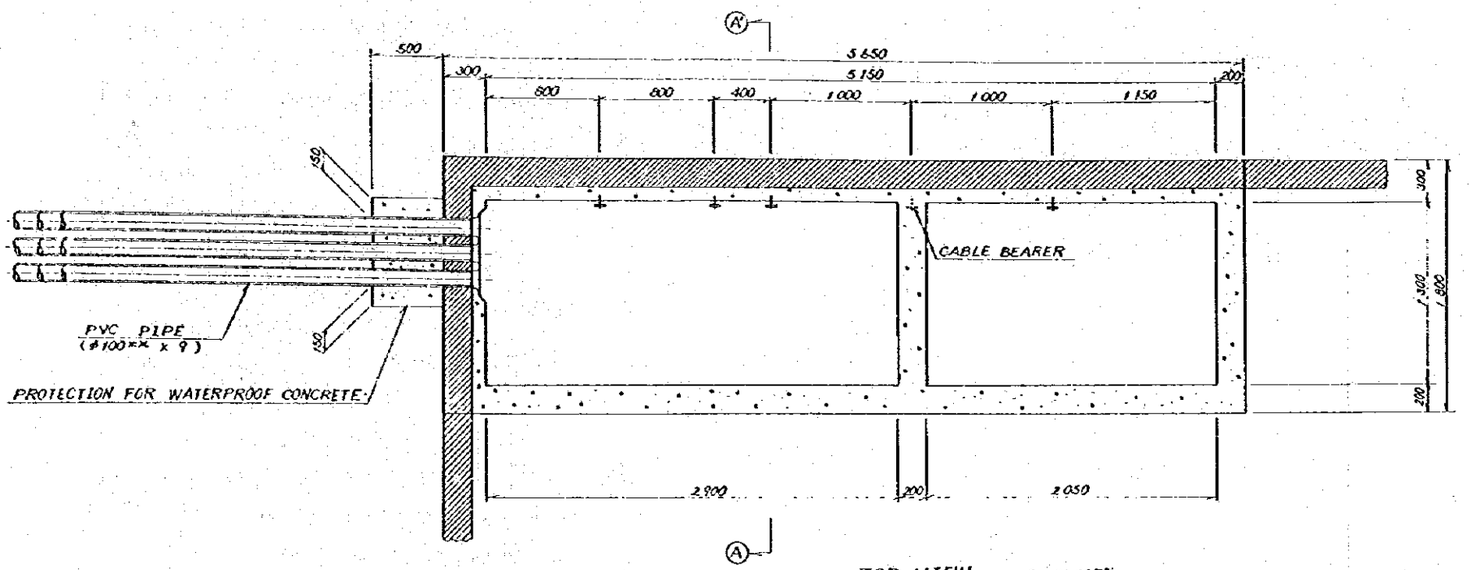
SECTION VIEW Ⓐ~Ⓐ S=1:50



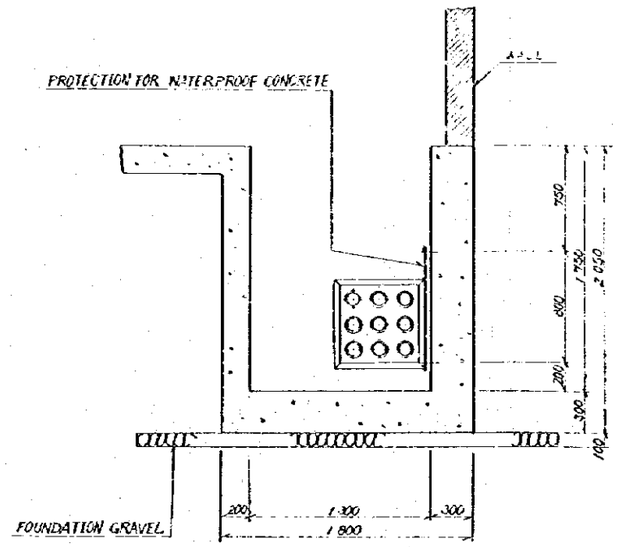
DETAIL Ⓐ S=1:2

NAME OF DRAWING	BASIC PLAN FOR BUILT-UP FRAME			
DATE	MAR, 1989	NAME OF EXCHANGE	KHARTOUM CENTRAL	DRAWING NO. 55

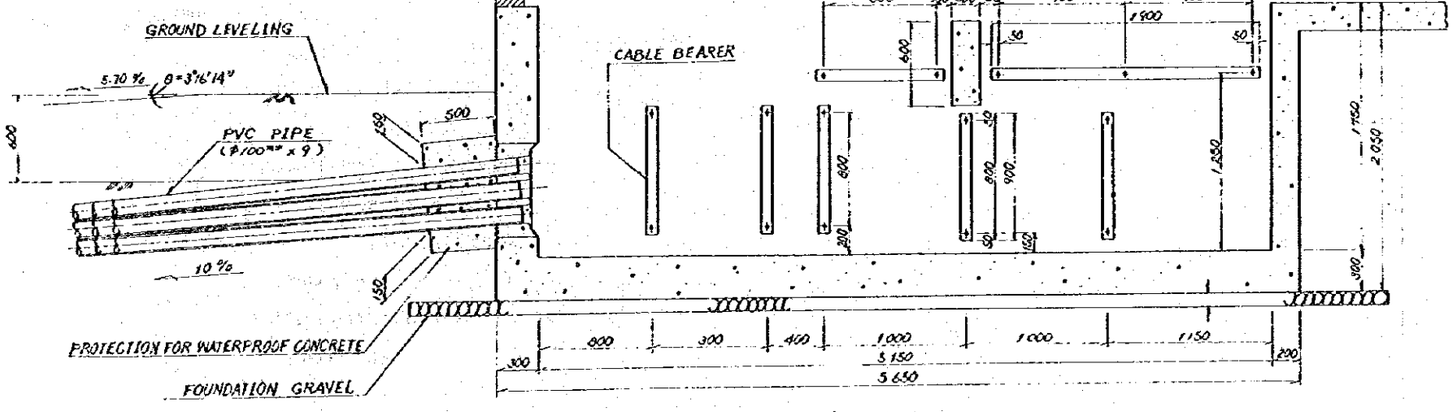
TRENCH IN THE EXCHANGE DETAIL DRWING
(BURRI EXCHANGE)



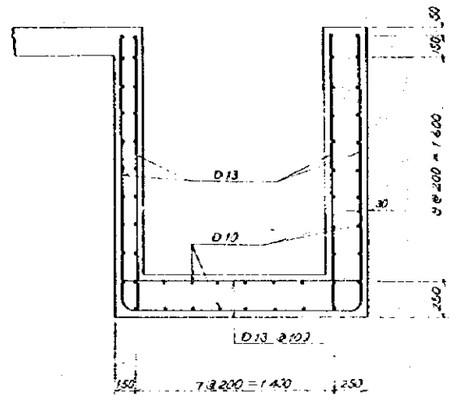
TOP VIEW S = 1 : 20ᵐᵐ



SECTION VIEW Ⓐ ~ Ⓐ' S = 1 : 20ᵐᵐ



SIDE VIEW S = 1 : 20ᵐᵐ



BAR ARRANGEMENT DRAWING S = 1 : 30ᵐᵐ
(SECTION Ⓐ ~ Ⓐ')

REMARKS

QUANTITY OF CONCRETE

(5.65 x 1.80 x 0.30) + (5.65 x 1.75 x 0.30) +
(5.65 x 1.75 x 0.20) + (1.30 x 1.75 x 0.20) +
(1.30 x 1.75 x 0.30) + (1.30 x 0.80 x 0.20) = 9.29 m³

QUANTITY OF FOUNDATION GRAVEL

6.85 x 3.00 x 0.10 x 1.05 = 2.16 m³

QUANTITY OF REINFORCTING BAR

Ⓐ 5.68 x 57 = 323.76ᵐ (D 13)
Ⓑ 5.68 x 57 = 323.76ᵐ (D 13)
Ⓒ 2.37 x 8 x 2 = 37.92ᵐ (D 13)
Ⓓ 1.97 x 8 x 2 = 31.52ᵐ (D 13)
Ⓔ 3.00 x 8 x 2 = 48.00ᵐ (D 10)
Ⓕ 3.34 x 10 x 2 = 66.80ᵐ (D 10)
Ⓖ 5.00 x 10 x 2 = 100.00ᵐ (D 10)
Ⓗ 3.00 x 20 x 2 = 120.00ᵐ (D 10)
Ⓘ 1.74 x 10 x 2 = 34.80ᵐ (D 10)

D10 369.60ᵐ x 0.560 kg/m = 206.976 kg
D13 716.96ᵐ x 0.995 kg/m = 713.375 kg

NAME OF DRAWING	BASIC PLAN FOR TRENCH IN THE EXCHANGE			
DATE	MAR, 1989	NAME OF EXCHANGE	B U R R I	DRAWING NO. 36

Drawing No. 37 - Drawing No. 50

Switching System and

Transmission System Schematic Diagram

Abbreviation of Exchange Name

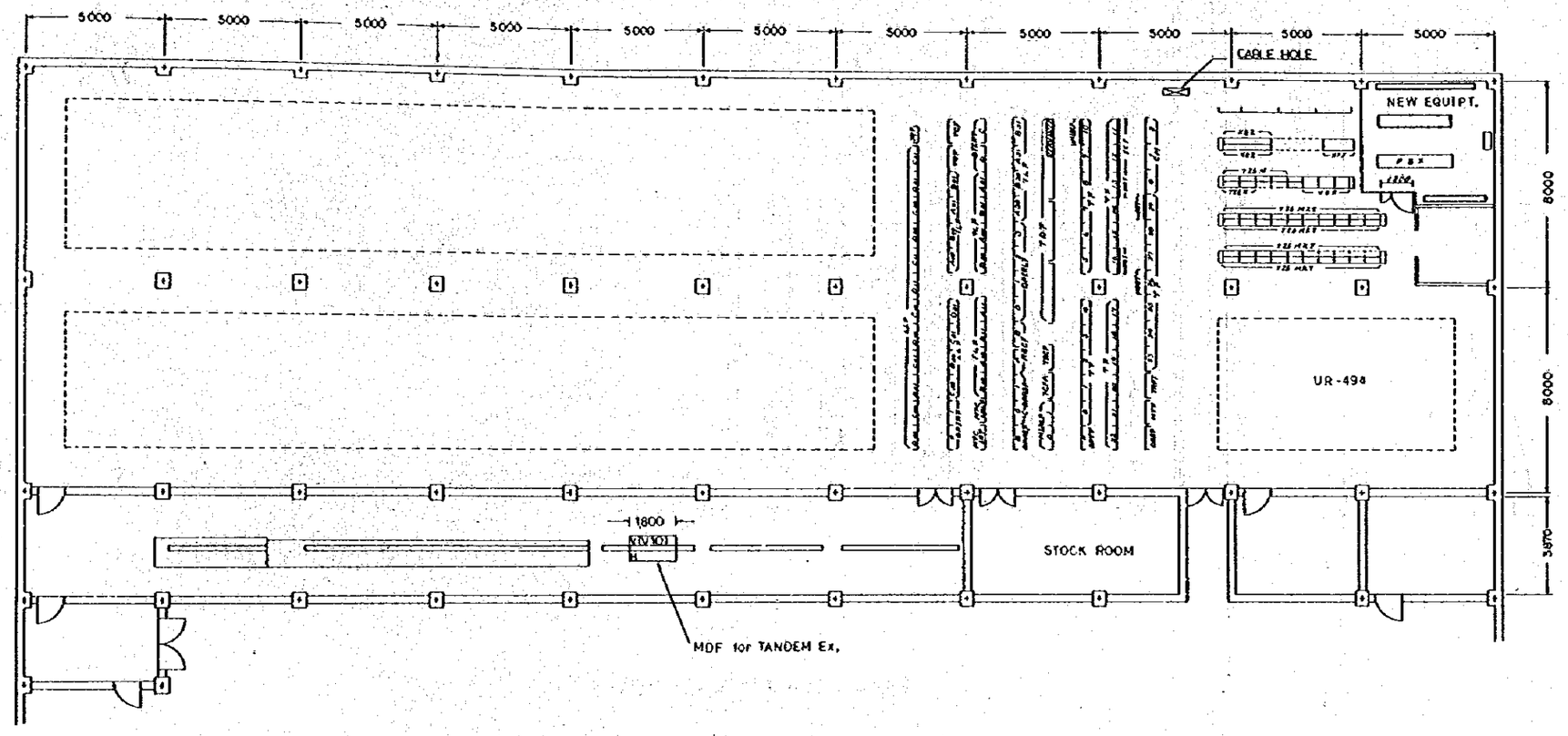
MH	:	Mahadia Exchange
OM	:	Omdurman Exchange
SH	:	Shambat Exchange
KN	:	Khartoum North Exchange
BR	:	Burri Exchange
KC	:	Khartoum Central Exchange
KS (I)	:	Khartoum South Existing Exchange
KS (II)	:	Khartoum South Proposed Exchange
KE	:	Khartoum Extension Exchange
CTN/CTX	:	National/International Exchange
TDM	:	Tandem Exchange

Special Number Services

90	:	Enquiry
91	:	Complaints
92	:	Line Test Desk
93	:	National Trunk Booking
94	:	Faultman Line
95	:	International Trunk Booking
96	:	Emergency
98	:	International Reservation
999	:	Emergency

Legend

DP	:	Dial Pulse Signaling
MFC	:	Multi Frequency Code
LOC	:	Local Traffic
SPL	:	Special Number Traffic

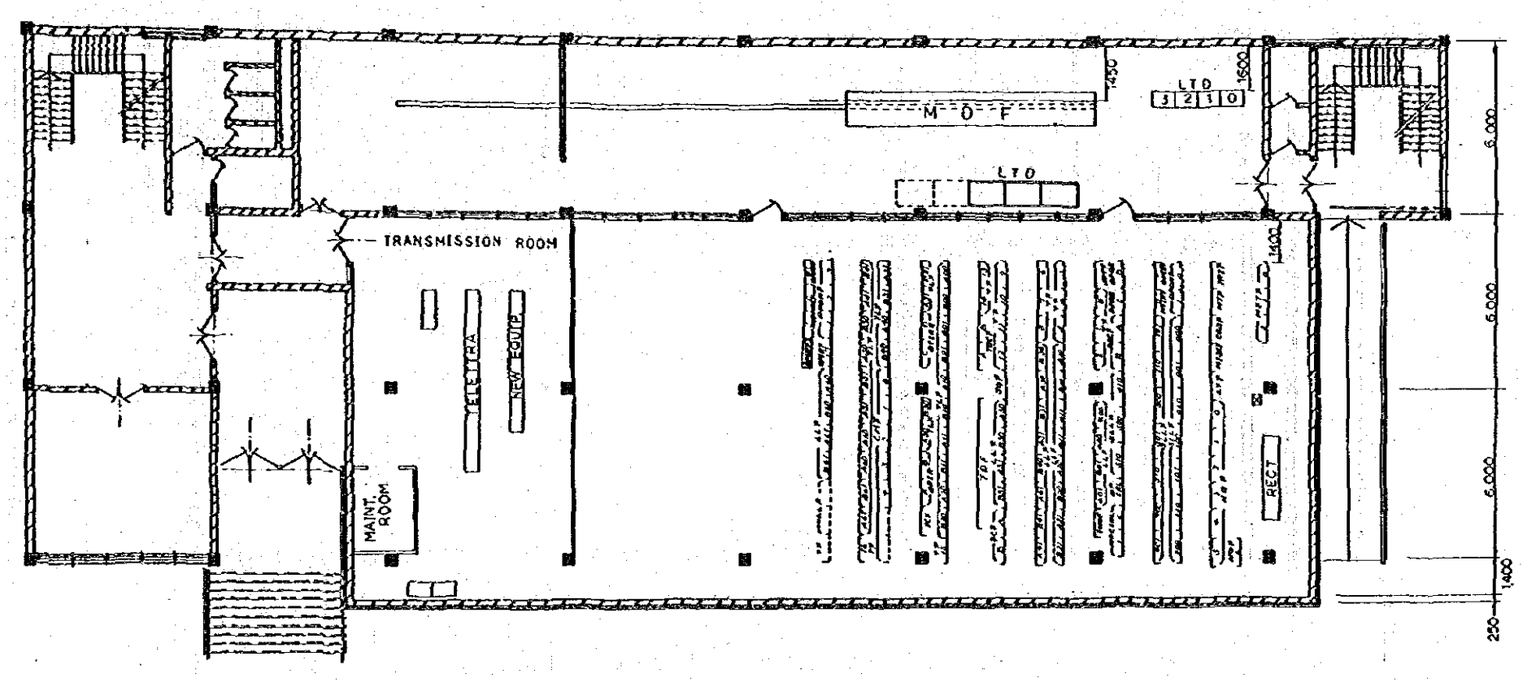


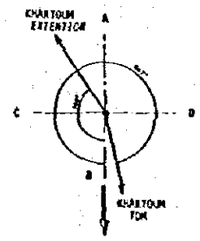
NOTE:

▨ : Expansion Frame of TDF

▩ : Modifin8 Frame

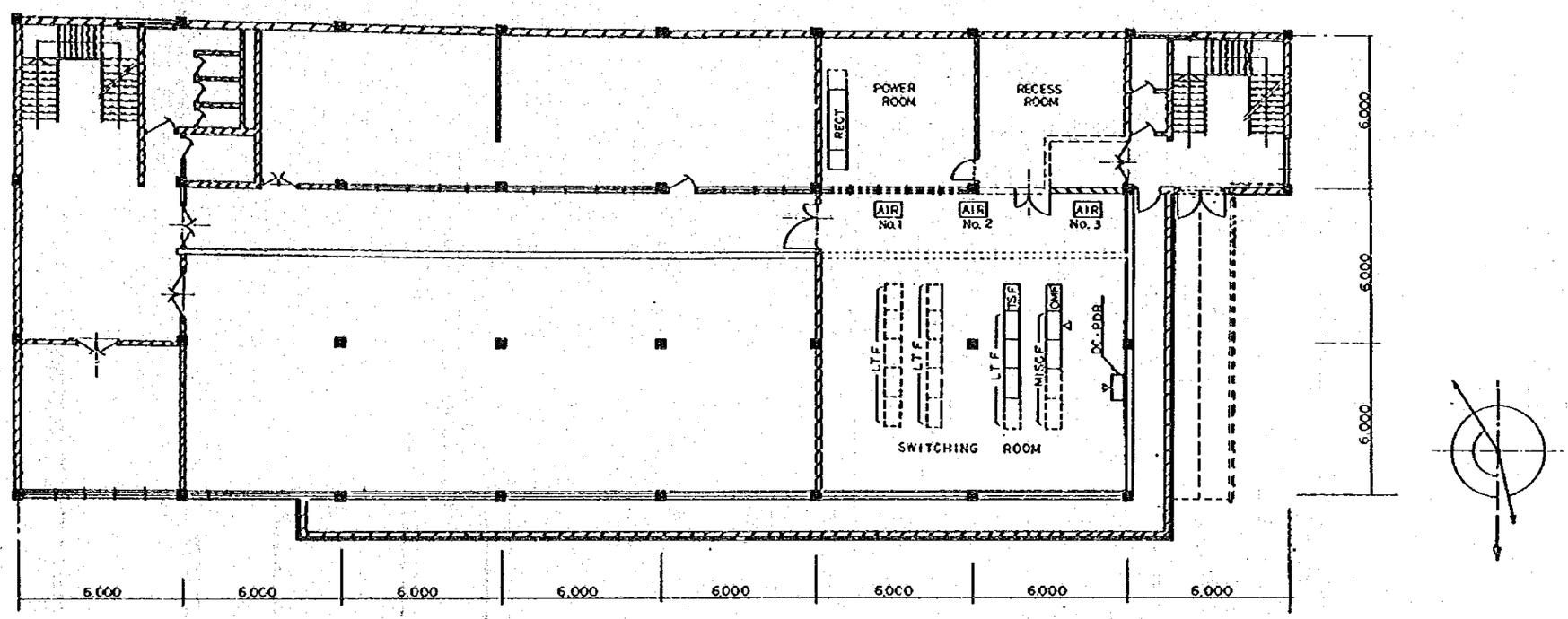
NAME OF DRAWING	FLOOR LAYOUT PLAN				
DATE	Mar, 1989	NAME OF EXCHANGE	Khartoum-Tandem	FIG	37



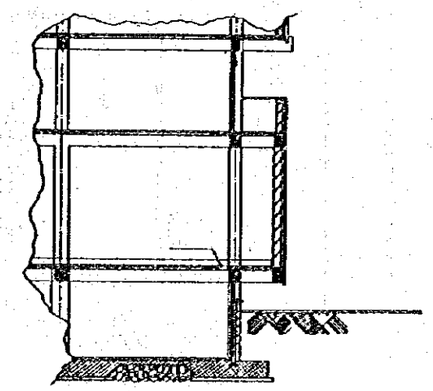


GROUND FLOOR LAYOUT PLAN

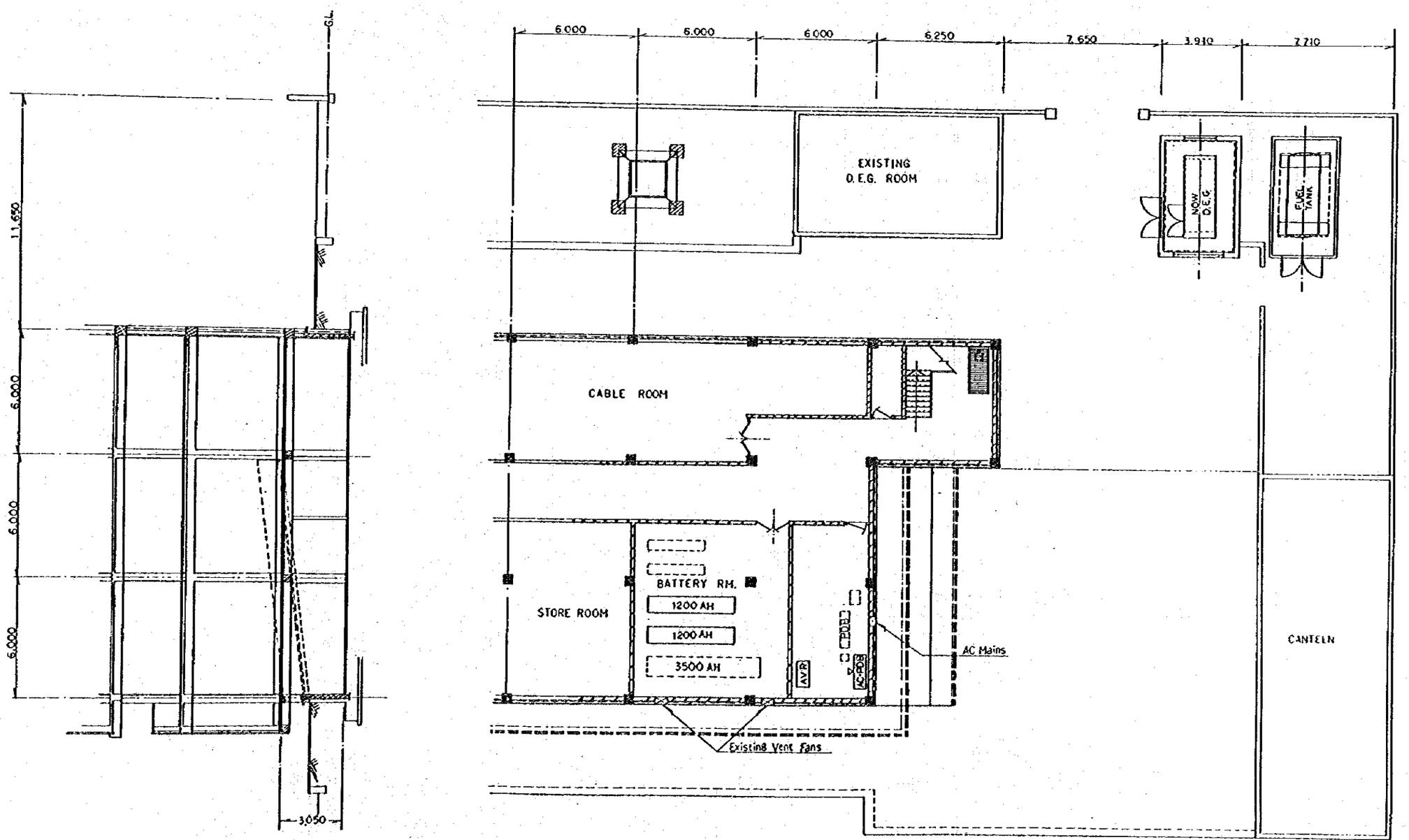
NAME OF DRAWING	FLOOR LAYOUT PLAN				
DATE	MAY, 1989	NAME OF EXCHANGE	Khartoum-South	FIG	38



FIRST FLOOR LAYOUT PLAN

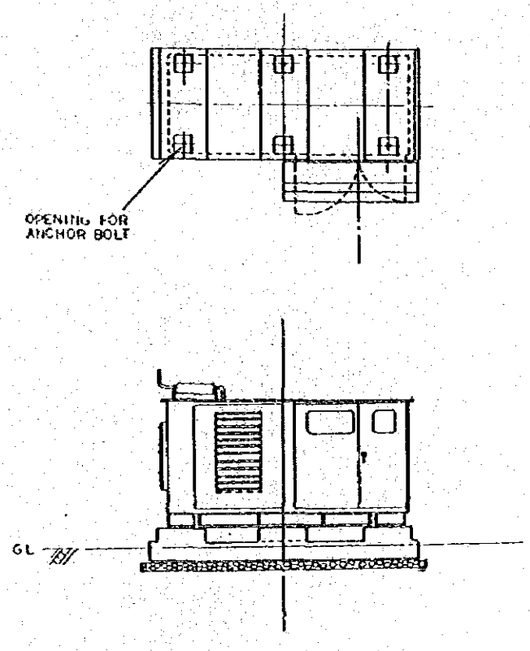


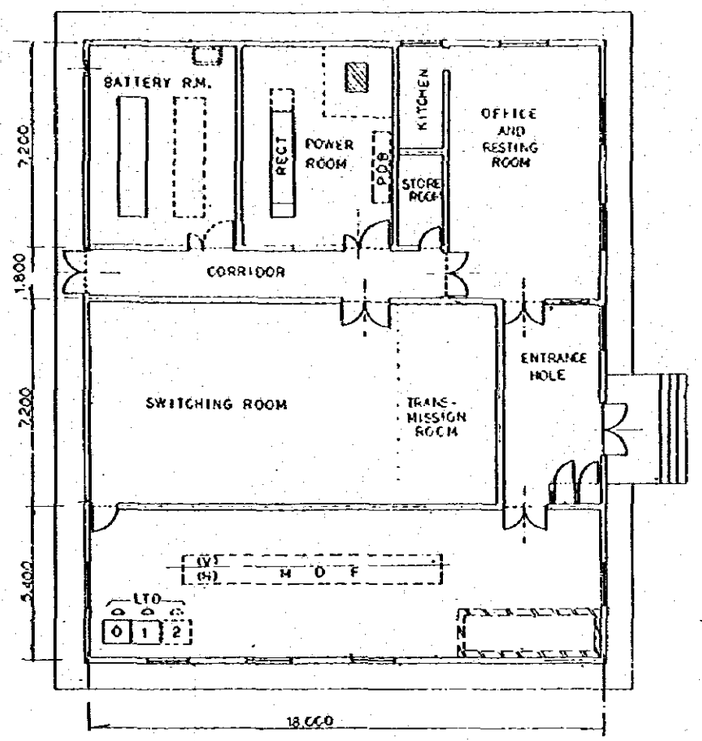
NAME OF DRAWING	FLOOR LAYOUT PLAN				
DATE	Mar, 1989	NAME OF EXCHANGE	Khartoum-South	FIG	39



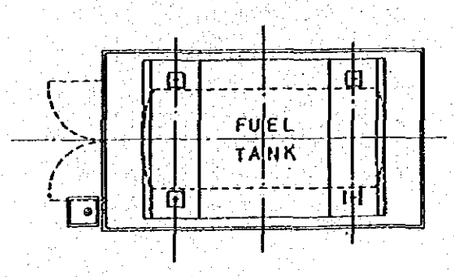
NAME OF DRAWING	FLOOR LAYOUT PLAN				
DATE	MAR. 1989	NAME OF EXCHANGE	Khartoum-South	FIG	40

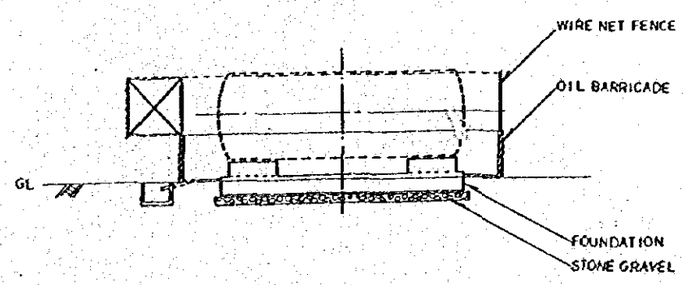
FOUNDATION PLAN OF E/G ENCLOSURE



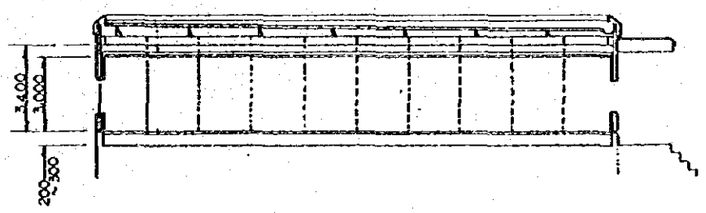


FOUNDATION PLAN OF FUEL TANK



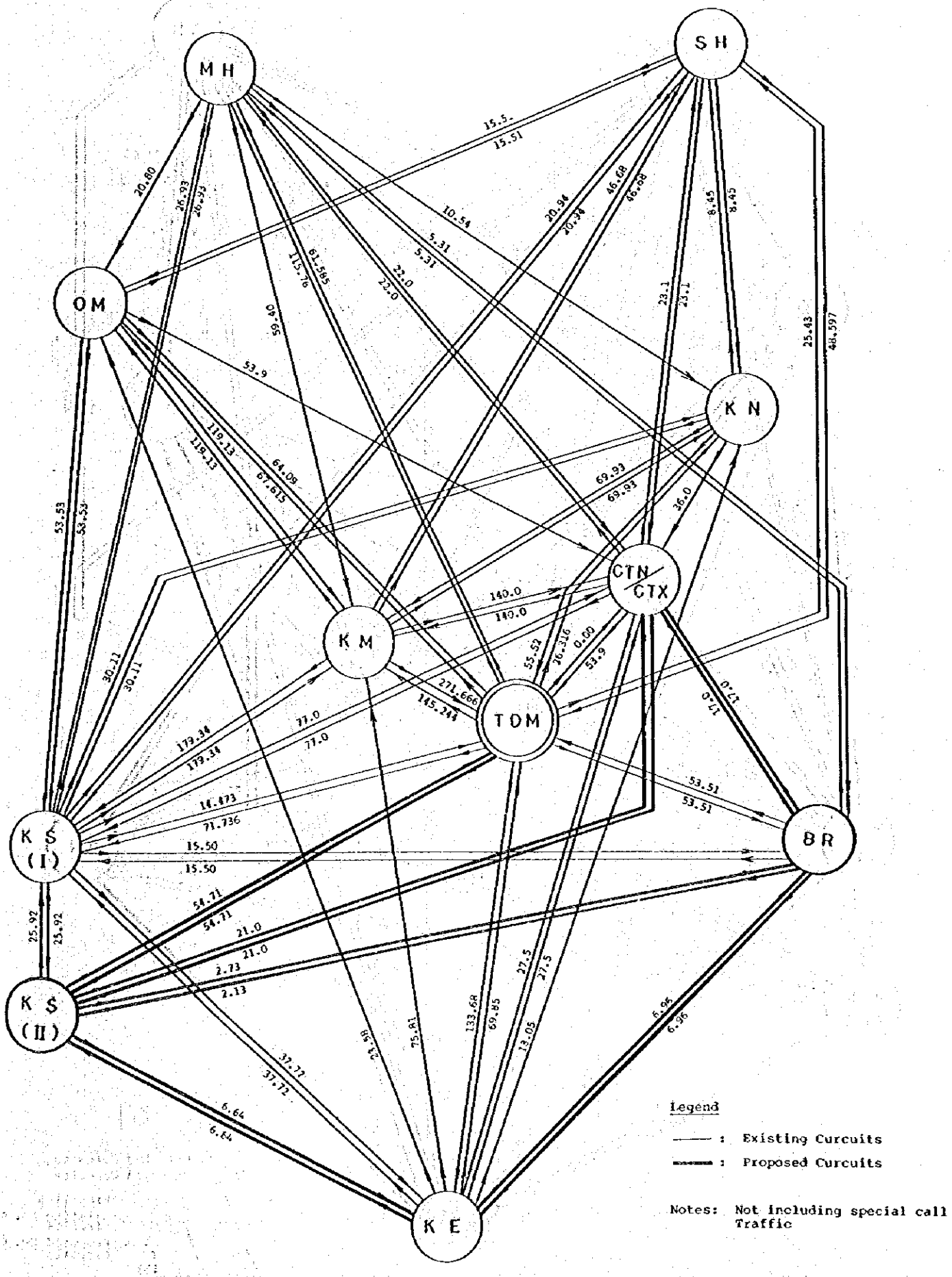


FLOOR LAYOUT PLAN

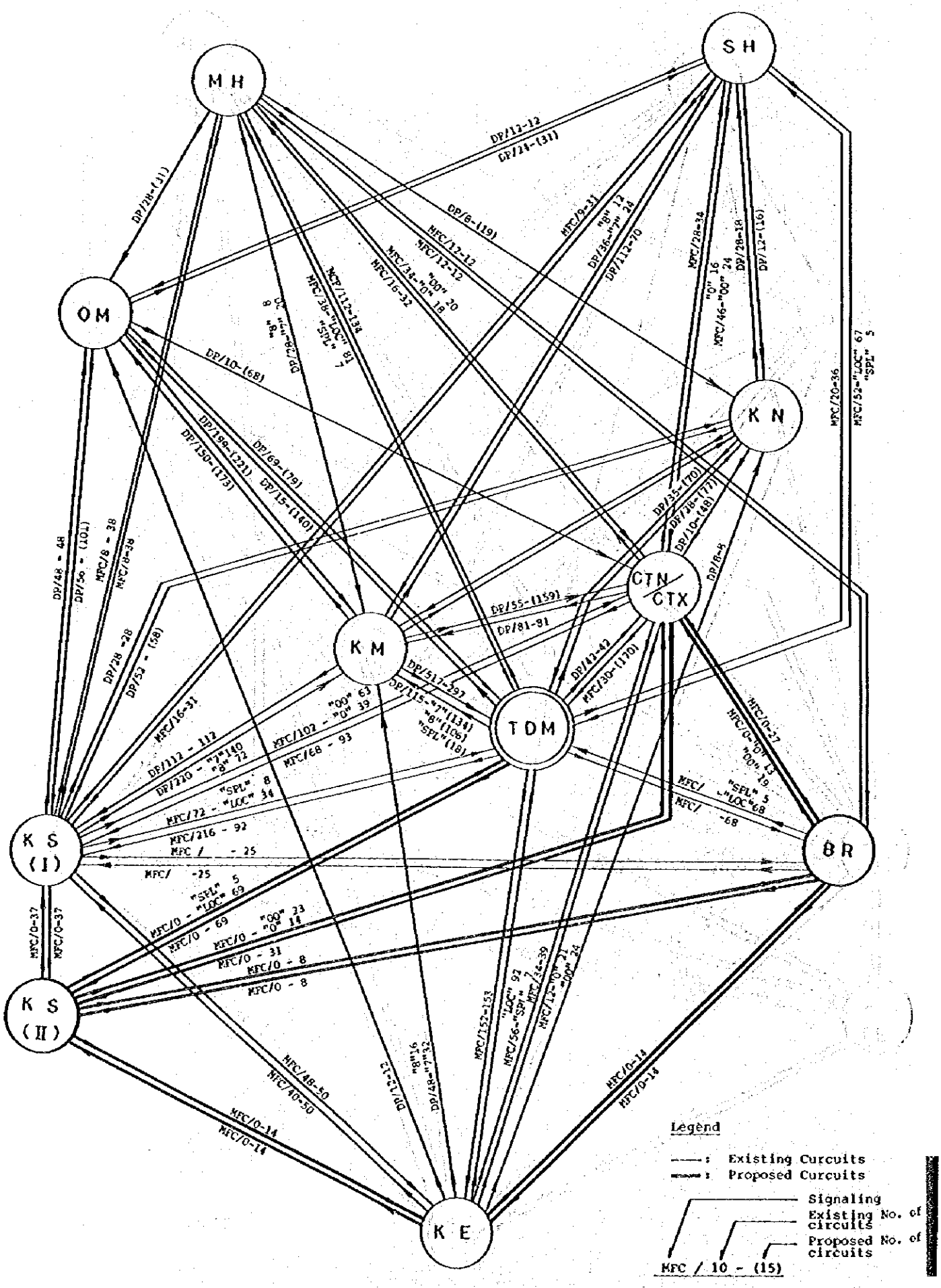


SIDE VIEW

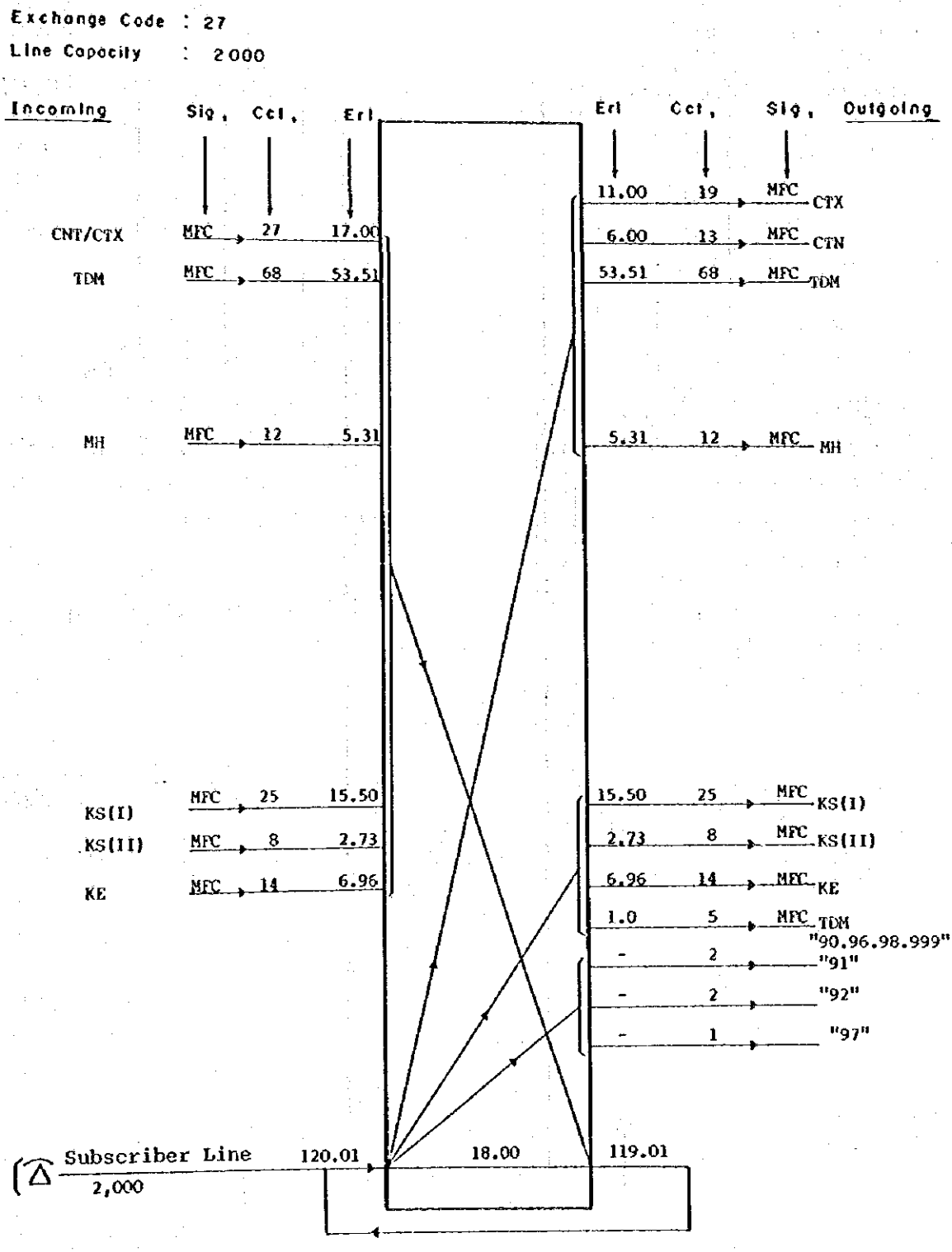
NAME OF DRAWING	FLOOR LAYOUT PLAN		
DATE		NAME OF EXCHANGE: BURRI	FIG 41



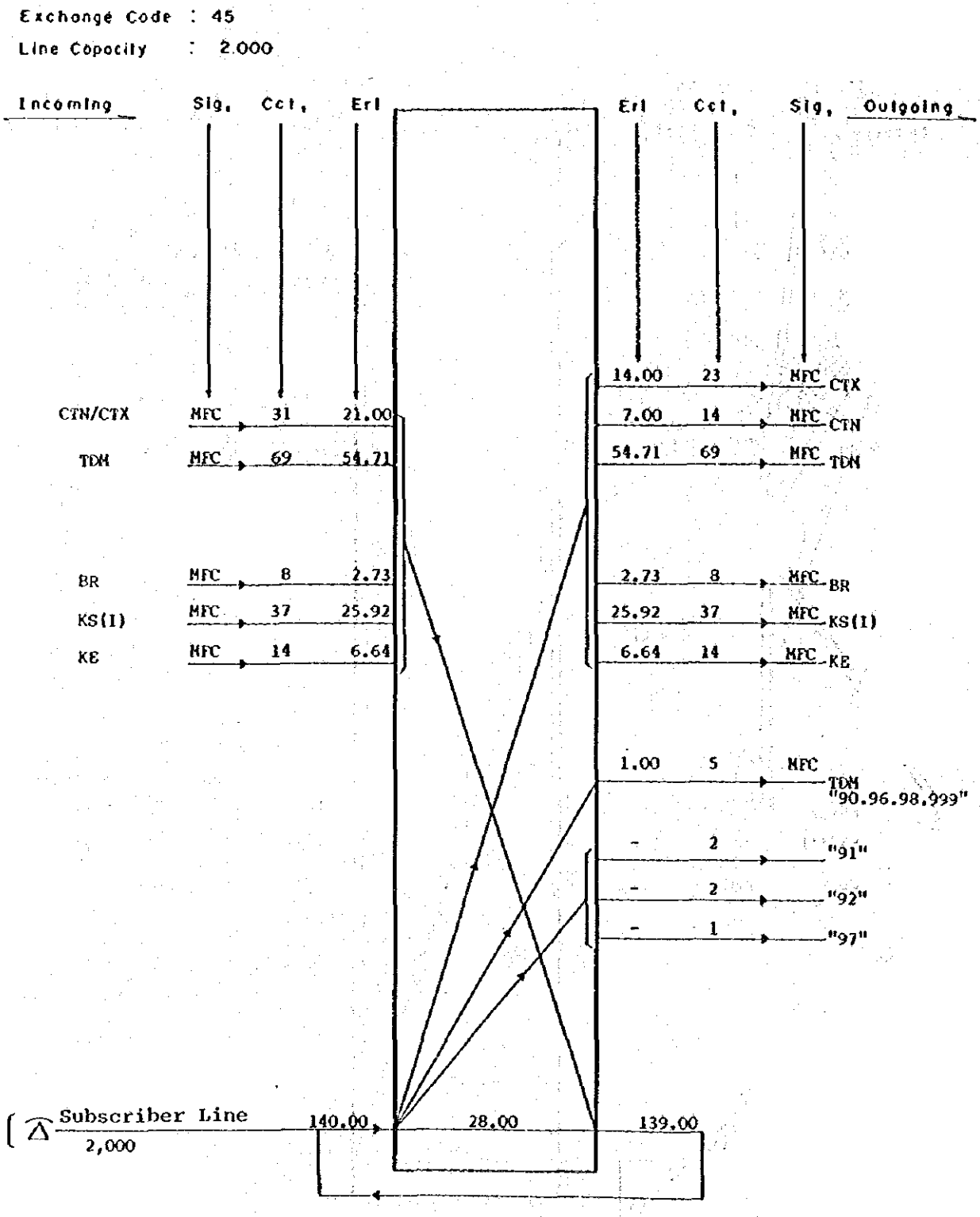
Drawing No.42 Traffic Distribution in Khartoum Multi Exchange Area



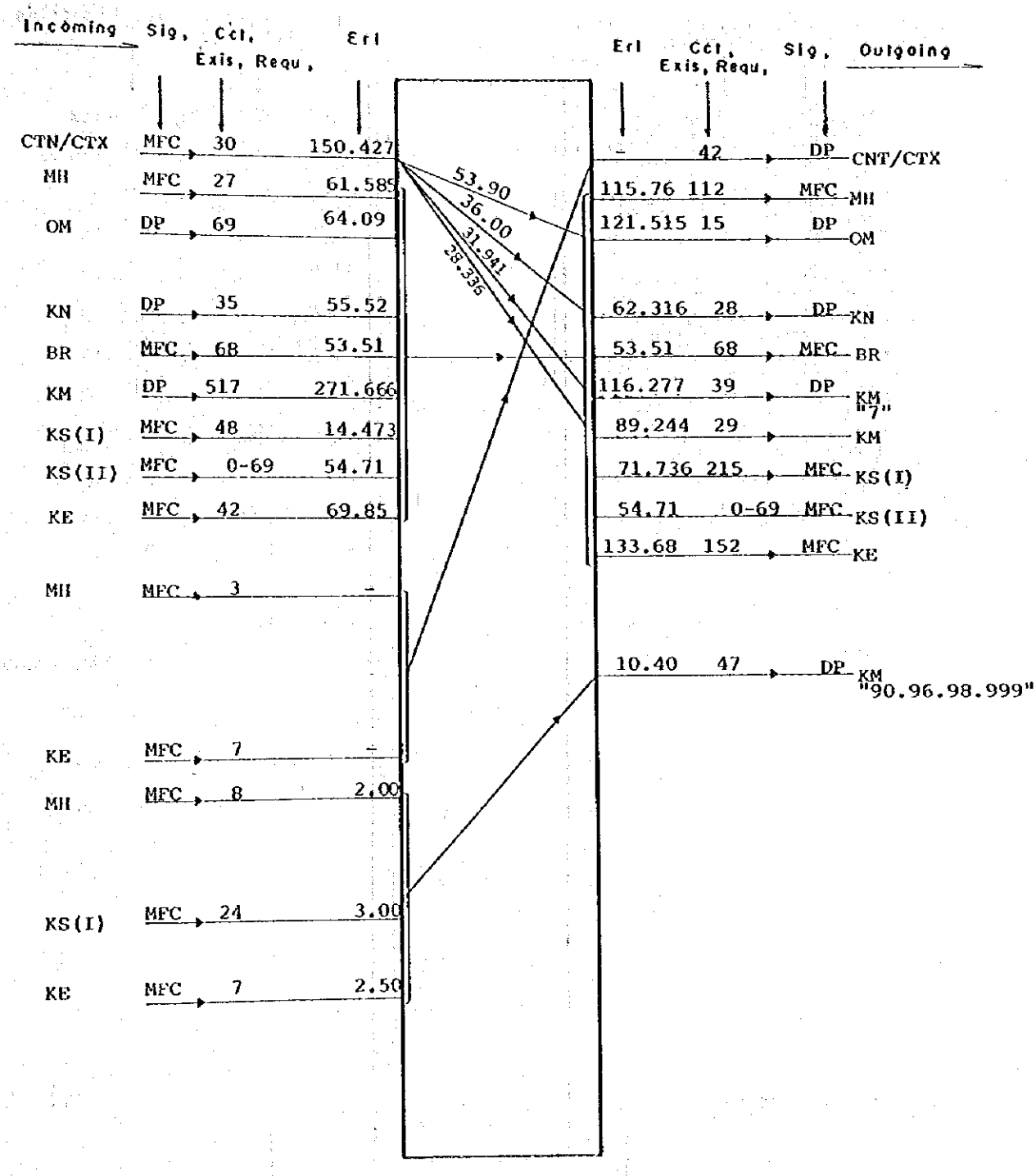
Drawing No.43 Junction curcuits Diagram in Khartoum Multi Exchange Area



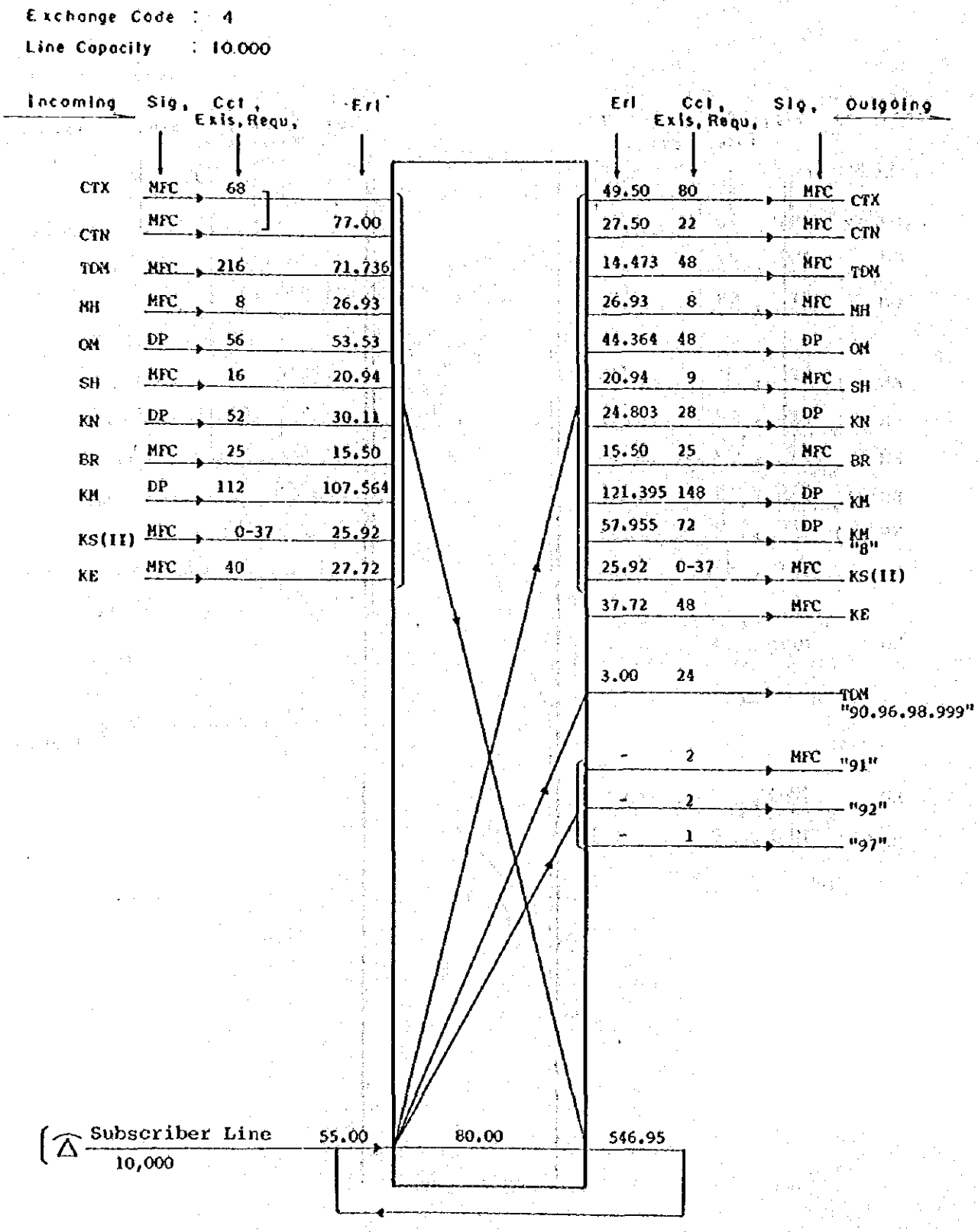
Drawing No.44 Trunking Diagram of BURRI Exchange



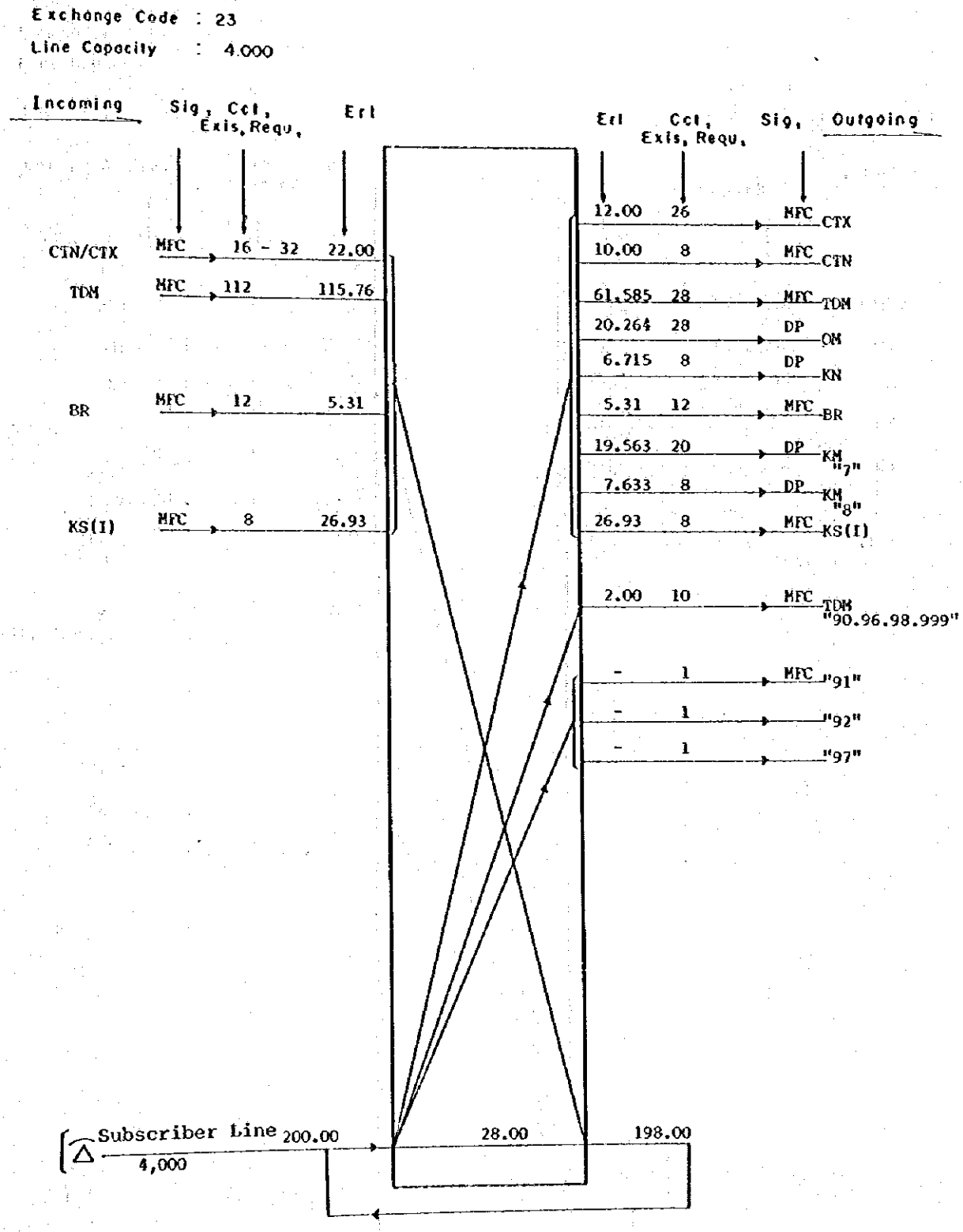
Drawing No.45 Trunking Diagram of KTM-SOUTH(II) Exchange



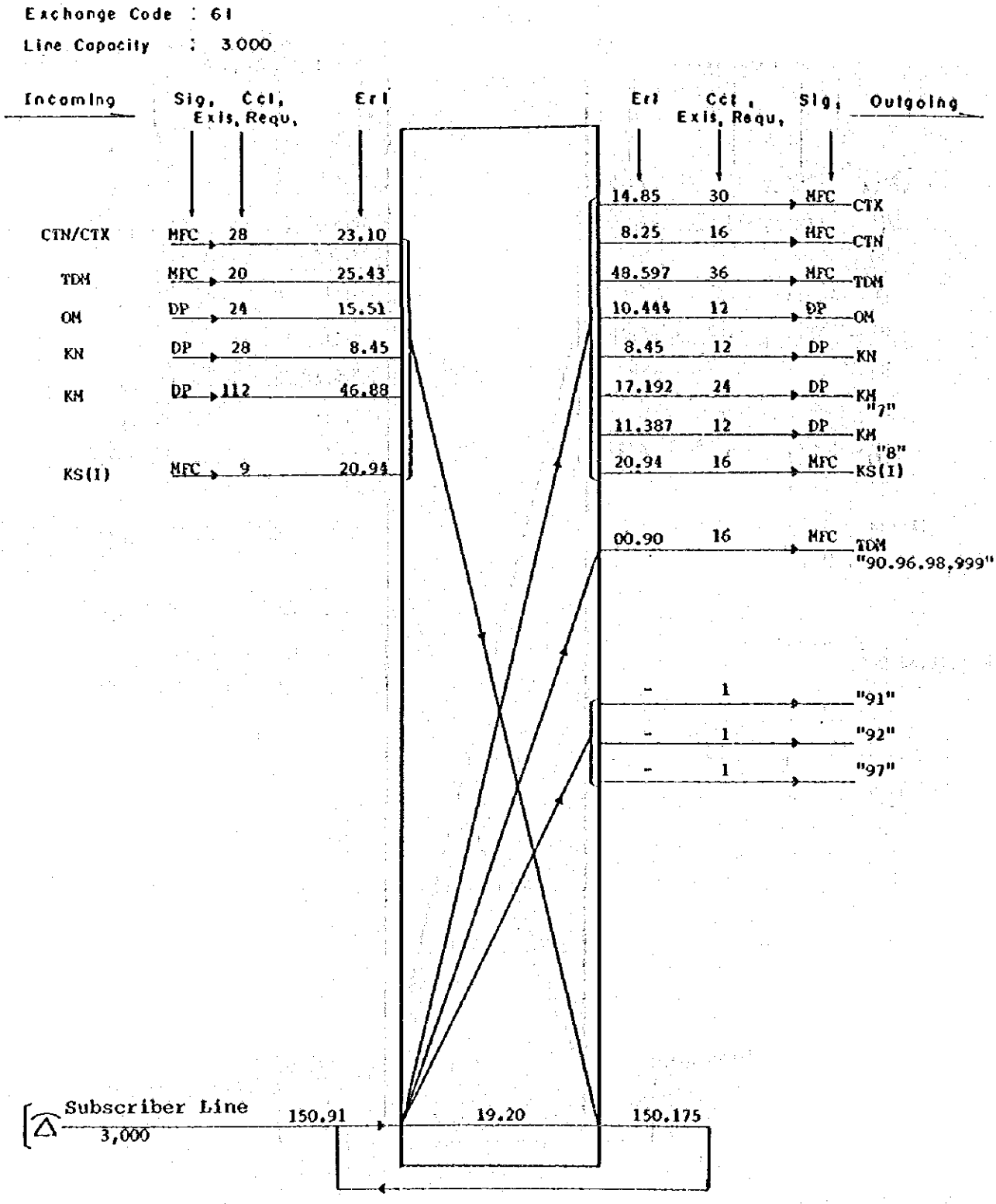
Drawing No.46 Trunking Diagram of KHARTOUM TDM Exchange



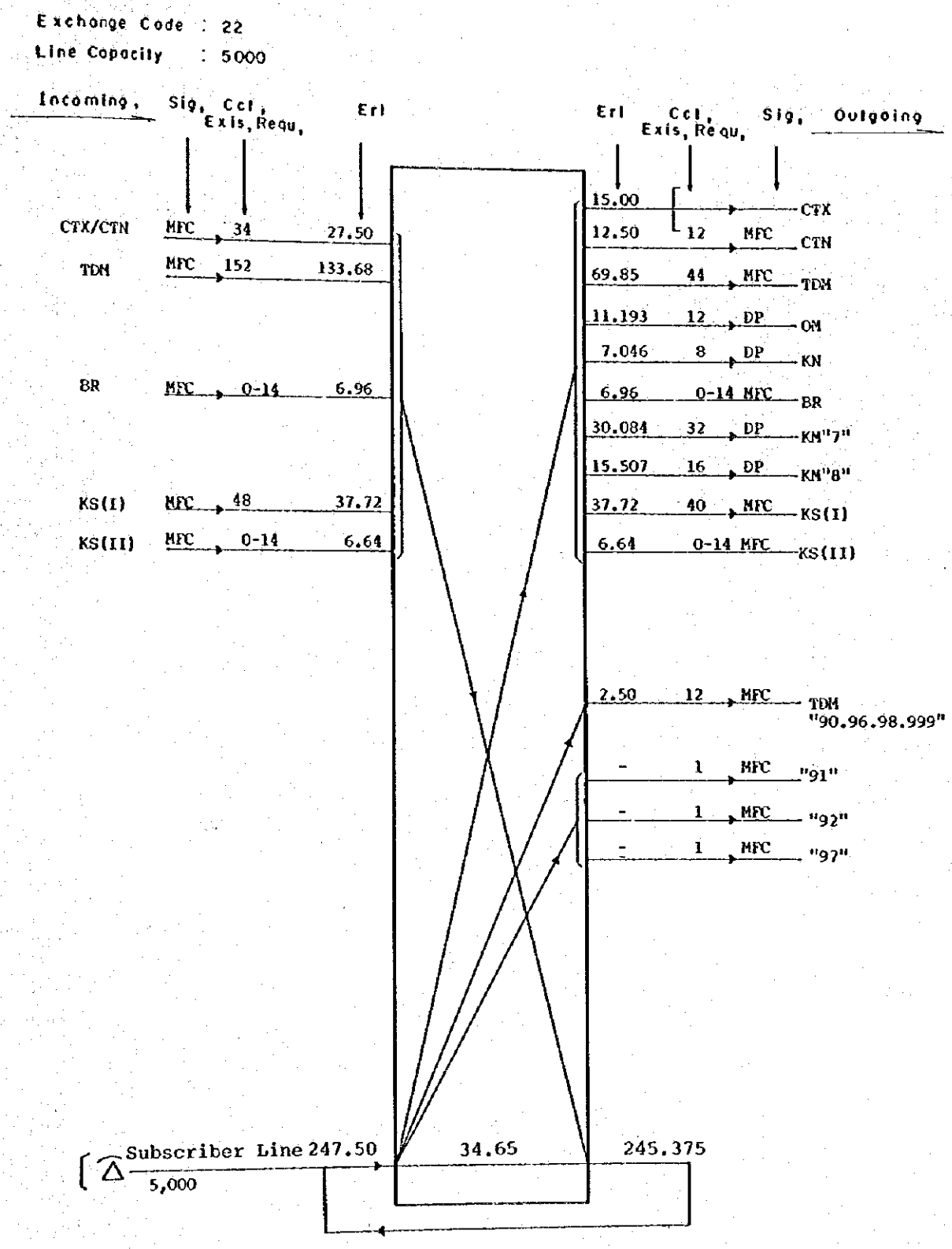
Drawing No.47 Trunking Diagram of KTM-SOUTH(I) Exchange



Drawing No.48 Trunking Diagram of MAHADIA Exchange



Drawing No.49 Trunking Diagram of SHAMBAT Exchange



Drawing No.50 Trunking Diagram of KTM-EXTENSION Exchange

ANNEX

ANNEX 1 MINUTES OF DISCUSSIONS, 1988

MINUTES OF DISCUSSIONS
ON
THE REHABILITATION PROJECT
OF
TELEPHONE NETWORK IN KHARTOUM, THE REPUBLIC OF THE SUDAN

In response to the Request of the Government of the Republic of the Sudan, the Government of Japan has decided to conduct a basic design study on "the Rehabilitation Project of Telephone Network in Khartoum" (hereinafter referred to as "the Project"), and entrusted a study to the Japan International Cooperation Agency (JICA). JICA sent the basic design study team (hereinafter referred to as "the Team") headed by Mr. Satoru ITOH, Special Advisor for International Cooperation, Ministry of Posts and Telecommunications, to the Sudan from 26th November to 25th December, 1988.

The Team had a series of discussions on the Project with the officials concerned of the Government of the Republic of the Sudan headed by Mr. Awad Elkarim Widaa, Director of General, Sudan Telecommunications Public Corporation and conducted a field survey in Khartoum area.

As a result of the discussions, both parties 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.

Khartoum, 8th December, 1988

Mr. Satoru Itoh
Leader,
Basic Design Study Team,
JICA

Mr. Mohamed Kheir El-Zubeir
Acting Undersecretary for Planning,
Ministry of Finance and
Economic Planning

9/12/88

Mr. Awad Elkarim Widaa
Director of General,
Sudan Telecommunications Public Corporation

- ATTACHMENT -

1. The objective of the Project is to execute rehabilitation work of the telephone network in Khartoum.

2. The Sudan Telecommunications Public Corporation shall be an executing and coordinating body for the Project.

3. The requests made by the Government of the Sudan are as follows:

   (1) Rehabilitation of Cable Network for following areas
      a. Khartoum Central East Area including Khartoum Airport amd HAI AL NATTAR.
      b. Khartoum-2 Area.
   (2) Installation of Junction Network between Khartoum Central and Khartoum South.
   (3) Installation of Junction Network between Khartoum Central and Burri.
   (4) Installation of Digital Local Exchanges in Two Areas ;
      a. Burri Area — equal or more than 2,000 Lu.
      b. Khartoum South Area — equal or more than 2,000 Lu.
   (5) Installation of Cable Network in Burri Area.

   note : the rehabilitation area of Burri may be subjected to changes in accordance with the result of the Project study.

4. The Team will convey the intention of the Government of the Republic of the Sudan to the Government of Japan that the latter will take the necessary measures to cooperate in implementing the Project within the scope of the Japanese economic cooperation in grant form.

5. The proposed areas of the Project are shown in Annex I. The number given to each area shows the order of priority.

6. The Sudanese side has understood the Japan's grant aid system, explained by the Team, which includes a principle of the use of a Japanese consulting firm and a Japanese general contractor for the execution of the Project.

7. The government of the Republic of the Sudan will take the necessary measures as listed in Annex II on condition that the Grant Aid by the Government of Japan shall be extended to the Project.

ANNEX II

Required Arrangement to be taken by
the Government of the Republic of the Sudan

1. To provide data and information necessary for detailed design.

2. To secure land necessary for establishment of Burri exchange.

3. To construct gates and fences in and around the Burri exchange site.

4. To provide the space necessary for such construction as temporary offices, working areas, stock yards and other.

5. To provide necessary permission, licence and other authorizations for carring out the Project.

6. To provide facilities for distributing line of electricity, the city water distribution main to Burri exchange site and security.

7. To bear advising commission of Authorization to Pay (A/P) and payment commission to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement (B/A).

8. To ensure prompt unloading, tax exemption and customs clearance at the port of disembarkation in the Sudan and prompt internal transportation therein of the products purchased under the Grant.

9. To exempt Japanese nationals engaged on the Project from customs duties, internal taxes and other fiscal levies which may be imposed in the Sudan with respect to the supply of the products and services under the verified contracts.

10. To accord without delay to Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contract such facilities as may be necessary for their entry into the Sudan and stay therein for the performance of their work.

11. To maintain and use properly and effectively the facilities constructed and equipment purchased under the Grant.

12. To coordinate with the inhabitants living in the Project areas on any related matters which may arise during the implementation of the Project.

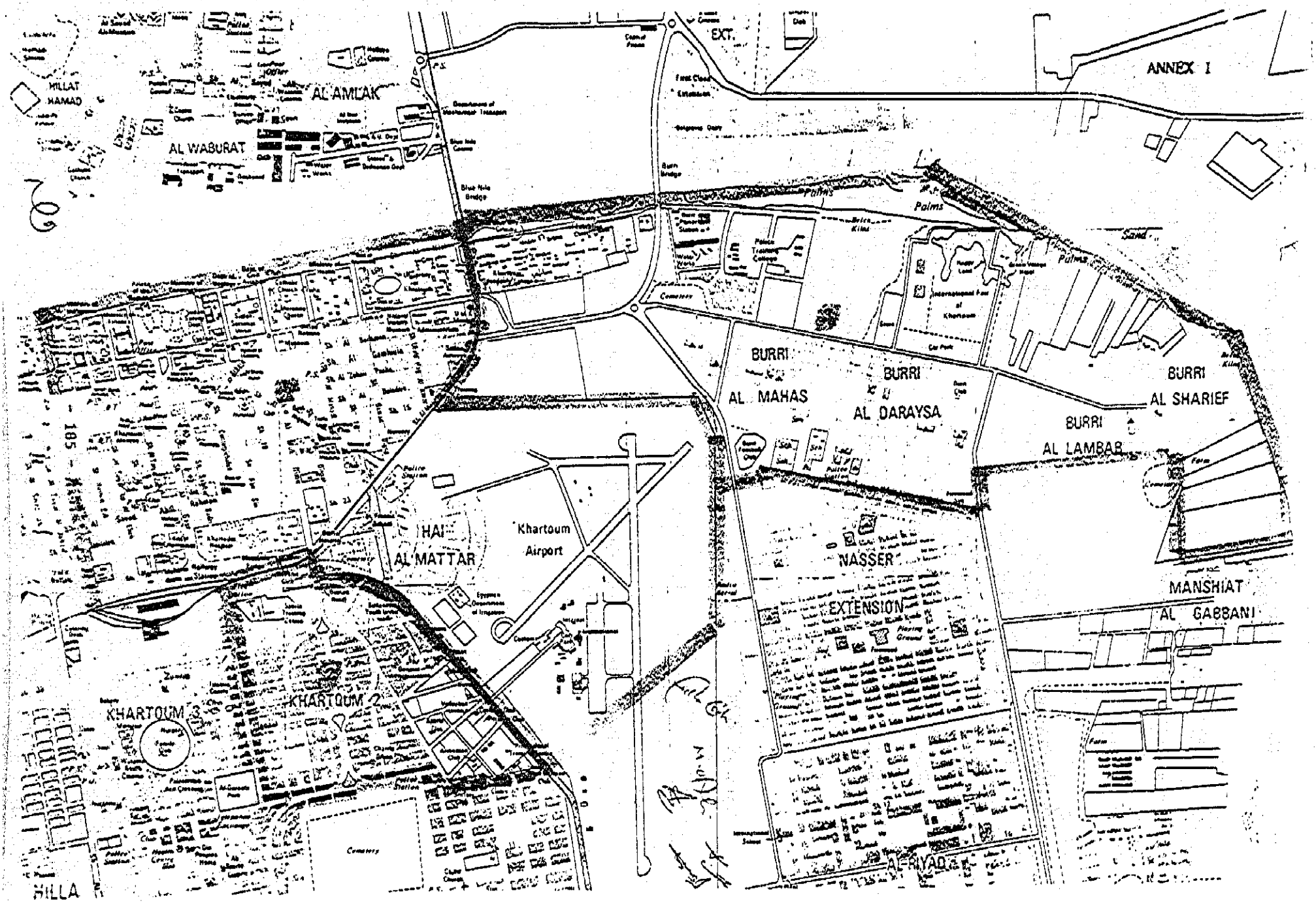
13. To bear all the expenses, other than those to be borne by the Grant, necessary for construction of facilities as well as for the transportation and installation of the equipment.

14. To execute the following works:

(1) Removal works of existing faulty/deteriorated facilities, if necessary, after the transfer of working lines.

(2) Rehabilitation works of internal wires of subscriber premises.

(3) Rehabilitation works of internal wires of PBXs (Private Branch Exchange).


ANNEX I
EXT.
AL AMLAK
AL WABURAT
MILLAT HAMAD
Palms
Sand
BURRI
AL MAHAS
BURRI
AL DARAYSA
BURRI
AL SHARIEF
BURRI
AL LAMBAB
HAI
AL MATTAR
Khartoum
Airport
NASSER
EXTENSION
MANSHIAT
AL GABBANI
KHARTOUM 3
KHARTOUM 2
AL-RIYAD
HILLA

ANNEX 2 MEMBER LIST OF STUDY TEAM

Name	Duty in Charge	Affiliated to
Satoru ITOH	Team Leader	Special Advisor for International Cooperation Ministry of Posts & Telecommunications
Yoichi TAKAHASHI	Specialist for Telecommunications Standard	Senior Manager in Charge of Overseas Technical Cooperation International Cooperation and Planning Group, International Affairs Department, Nippon Telegraph and Telephone Corporation
Makoto KASHIWAYA	Project Coordinator	Second Basic Design Study Division, Grant Aid Planning & Survey Department, Japan International Cooperation Agency (JICA)
Tatsuya MIMA	Project Manager Network	Assistant to General Manager Telecommunications Division, The Nippon Telecommunications Consulting Co., Ltd. (NTC)
Yoshihide HIRATA	Outside Plant	Senior Staff Engineer, Telecommunication Division, NTC
Tatsuo SEKI	Transmission	Senior Staff Engineer, Telecommunication Division, NTC
Teruhiro TAHARA	Civil Work	Staff Engineer, Telecommunication Division, NTC
Hirotsugu HAMADA	Switching	Staff Engineer, Telecommunication Division, NTC

ANNEX 3 ITINERARY OF STUDY TEAM (Nov. 26, 1988 - Dec. 25, 1988)

NOV 26 (Sat) :	Leaving Tokyo for Frankfurt.
NOV 27 (Sun) :	Staff meeting.
NOV 28 (Mon) :	Discussion with KfW (at Frankfurt).
NOV 29 (Tue) :	Leaving Frankfurt for Khartoum. Arrival in Khartoum.
NOV 30 (Wed) :	Courtesy visits to Japanese Embassy, Ministry of Finance and Economic Planning (MOFEP) and Ministry of Communications (MOC)
DEC 1 (Thu) :	Courtesy visits to STPC and World Bank. Discussion with STPC on Inception Report.
DEC 2 (Fri) :	Staff meeting and field survey.
DEC 3 (Sat) :	Discussion with STPC on the request from the Government of the Sudan. Field survey for Khartoum Central area. Collection of data.
DEC 4 (Sun) :	Discussion with STPC on the request from the Government of the Sudan. Field survey for Khartoum Central area. Collection of data.
DEC 5 (Mon) :	Field survey for Khartoum South area. Discussion with STPC on the Request from the Government of the Sudan.
DEC 6 (Tue) :	Discussion with STPC on draft Minutes of Discussion. Field survey for Khartoum Central area. Collection of data.
DEC 7 (Wed) :	Discussin with STPC on draft Minutes of Discussion. Fiedl survey for Khartoum Central area. Collection of data.
DEC 8 (Thu) :	Discussion with MOC and STPC on draft Minutes of Discussion. Signing of Minutes of discussion, and report to Japanese Embassy. Field survey for Khartoum Central area. Collection of data.

DEC 9 (Fri) : 3 members leaving Khartoum for Tokyo.
Staff meeting on basic design policy.
Field survey for Khartoum South area.

DEC 10 (Sat) : Field survey for Khartoum South area.
Discussion with STPC on technical standards.
Assortment of data.

DEC 11 (Sun) : Field survey for Khartoum South area.
Assortment of data.

DEC 12 (Mon) : Transmission Engineer arrival in Khartoum.
Discussion with STPC on technical standards.

DEC 13 (Tue) : Field survey for Burri area.

DEC 14 (Wed) : Field survey for Burri area.

DEC 15 (Thu) : Field survey for Burri area.

DEC 16 (Fri) : Staff meeting on basic design policy.
Field survey for Burri area.

DEC 17 (Sat) : Discussion with officials concerned on Burri exchange building.
Survey for junction cable route between Central Exchange and South Exchange.

DEC 18 (Sun) : Discussion with STPC for design policy.
Survey for junction cable route between Central Exchange and Burri Exchange site.

DEC 19 (Mon) : Discussion with STPC on construction standard.
Preparation of study results report.

DEC 20 (Tue) : Discussion with STPC on study results report implementation schedule.

DEC 21 (Wed) : Report to MOTC on study results.

DEC 22 (Thu) : Report to STPC and to Japanese Embassy on study results.

DEC 23 (Fri) : Leaving Khartoum for Tokyo.

DEC 24 (Sat) : Via Frankfurt.

DEC 25 (Sun) : Arrival in Tokyo.

ANNEX 4 NAMES OF OFFICIALS INVOLVED

Ministry of Finance and Economic Planning:

Dr. A. M. A. Elobodi	Acting First Undersecretary for Planning
Dr. Mohamed Kheir El-Zubear	Acting Undersecretary for Planning
Mr. Hashim Mohamed Zain	Assistant Undersecretary/Planning
Mr. Salah Omer	Assistant Undersecretary
Mr. Abdd Rahim Ahamel Ibrahim	Director of Transportation and Communications and Storage Sector
Mr. Salih Mohamed Bilal	Dep. Director of Transportation Sector
Mr. Abdelhafiez Mohed Ahmed	Senio Inspector
Mr. Mohamed Saeid	Inspector
Mr. Ismail Yousif Ahmed	Transportation and Communications Sector/MFEP-Planning

Ministry of Communication

Mr. Abdel Wahab Gamal	Executive Director

Sudan Telecommunications Public Corporation (STPC)

Mr. Awad Elkarim Widaa	Director General
Mr. Awad Babiker	Director of Planning
Mr. Abdalla Said Aburaida	Director of Technical Division
Mr. Mohsin Abu Aburas	Director of Personnel
Mr. Almed El Amin	Director of Finance
Mr. Ibrahim Hamad Elmansour	Director of Training
Mr. Gaafar Bakheit Elsayed	Director of Traffic & Sales
Mr. Mohamed Osman	Khartoum Regional Director
Mr. Fathi Osman Ali	Director of Outside Plant
Mr. Samir Mitri	Switching Manager
Mr. Mohed Khalil Elsiddig	Deputy Director of Traffic & Sales
Mr. Abdulla Defalla	Statistic Section
Mr. Awadalla O. Abdelsamad	Head, Fault Analysis & Statistics Section, Test Repair and Maintenance Centre (TRM)
Mr. Ramadan N. Elgamri	Director, TRM Centre
Mr. Mohamed Osman Ahmed	PCM Engineer TRM Centre
Mr. Mohamed Elhasan Hamid	Khartoum South Manager

Mr. Mukhtar Abdalla Mukhtar	Test Desk, Khartoum Central
Mr. Galal Abdel Mageed	Technical Manager, Khartoum South

National Capital Commissional Rate of Engineering Affairs Road and Bridge Department

Mr. Osman Mohamed Yahia	Senior Engineer
Mr. Mhogli Ahmed Musa	Engineer

National Urban Water Corporastion

Mr. Abu Bakr El Siddig Abd Alla	Khartoum Area Manager, Civil Enginner

National Electricity Corporation

Mr. Mohamed Yousif Ali	Director of Khartoum District
Mr. Mohamed Elkhalifa	Technical Service

The Bank of Sudan

Mr. Babiker Abdullai	Manager

Department of Census

Mr. Ibrahim Abbas S. Elnasr	Deputy Director Census

World Bank

Mr. Aftab Raza	Acting Res. Representative Senior Country Agriculture Officer
Mr. Mohamed Ibrahim	Operator Officer

Kreditanstalt fur Wiederaubau(KfW)

Mr. Michael Wenzel	Diplom Kaufmann
Mr. Friedrich W. Kramer	

Federal Republic of Germany, Germany Agency for Technical Coóperation (GTZ)

Mr. Peter T. Wilde	Senior Advisor, Project Manager STPC

Deutsche Telepost Consulting Gmbh (DETECON)

Mr. Freimuth GIESE, Dipl.-Ing	Project Manager
Mr. Walter Senger	Cable Maintenance

Embassy of Japan in the Sudan

Mr. Hikaru Oka	Ambassador Extraordinary and Plenipotentiary
Mr. Akihisa Tanaka	Councilor
Mr. Toshio Kaneko	First Secretary
Mr. Yoshihiko Sato	Second Secretary

Consulate General of Japan in Frunkfurt

Mr. Makoto Omori	Consul

ANNEX 5 LIST OF COLLECTED DATA

1. Internal Trade Statistics and Price Indices, 1980 - 1981
2. Household Income and Expenditure Survey, 1978 - 1980
3. National Income at Current and Constant Prices, 1979/80 - 1983/84
4. Statistical Abstract, 1985
5. Foreign Trade Statistics, 1985
6. Sudan Tourism Guide, 1987 - 1988
7. Economic Development Urbanization and Induced Migration
8. Sudan in Africa
9. Sudanese Businessman Directory
10. The Flow of International News into Sudan
11. Memorandum and Recommendation of President of The International Development Association
12. Estimated Project Costs Financing Plan
13. Emergency Flood Reconstruction Project
14. Sudan Population Sensus 1983 by Province
15. Ministry of Foreign Affairs Khartoum, 1983
16. Request for Economic AID, 1983
17. International Symposium on The Role of Telecommunications in Socio Economic Development
18. Technical Specifications of Material
19. Technical Specifications of Services
20. Fault Analysis Khartoum Area, (Aug to Nov 1988)
21. International Tariff
22. Economic Recovery Credit (ERC) Telecommunications Mission Aide Memoire
23. Emergency Flood Reconstruction Program
24. Information Training
25. International Outgoing Telex Traffic, 1987
26. State of Telephone Exchange per Region
27. Exchange Statement of Equipments Summary
28. Automatic Exchange Capacity Schedule
29. International Telephone Traffic, 1987
30. Local Cable Networks (Primary and Secondary Cable)
31. D.P Record
32. List of Demand Survey for Offices
33. Standard Manhole

34. Plant Records (Switching)

35. Plant Records (Transmission)

36. Electricity Tariff as, 1988

    Heavy Industrial Big Agricultural and Bulk

37. Electricity Tariff as from Feb/1988 Temporary Supplies Tariff

38. Electricity Tariff as from Feb/1988 Commercial Tariff

39. Water Tariff

40. Quotation of Rates for Transportation of Equipments, and Materials from Port Sudan to Khartoum

    Taha Elroubi Transport Co., Ltd. Dec/1988

    Contomichalos, Sons and Co., Ltd. Dec/1988

41. Price of Screened Gravel and Sand for Concrete

    Taha and Yahia Elroubi Mining Co., Ltd. Dec/1988

42. Price of Precast Concrete

    Nile Precast Concrete Co., Ltd. Dec/1988

43. Price of Materials

    Abdelrahman Fattouta Exports Imports and General Contractors

    Dousif Mohamed El Ashi and Sons Co., Ltd.

    United Engineering Services, Dec/1988

44. Worker Wage

    Abdelrahman Fattouta Exports Imports and General Contractors

    Dousif Mohamed El Ashi and Sons Co., Ltd.

    United Engineering Services, Dec/1988

45. Equipment and Hire Charges

    ACT Holdings Co., Ltd. Dec/1988

46. Quotation for Civil Works

    Sudanese Construction Company, Dec/1988

47. General Information

    Abdelrahman Fattouta Exports Imports and General Contractors Dec/1988

MINUTES OF DISCUSSIONS
THE DRAFT FINAL REPORT OF THE BASIC DESIGN STUDY
ON
THE REHABILITATION PROJECT OF
TELEPHONE NETWORK
IN
KHARTOUM, THE REPUBLIC OF THE SUDAN

In response to the request of the Government of the Republic of the Sudan for Grant Aid for the Rehabilitation Project of Telephone Network in Khartoum (hereinafter referred 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 Republic of the Sudan the study team headed by Mr. SATORU ITOH, Special Advisor for International Cooperation, Communications Policy Bureau, Ministry of Posts and Telecommunications, from November 26th to December 25th, 1988.

As a result of the study, JICA prepared a draft final report and dispatched a draft final report explanation team to explain and discuss it from March 19th to March 30th, 1989.

Both parties had a series of discussions on the report and 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.

Khartoum, March 27, 1989

Satoru Itoh

Mr. SATORU ITOH
Leader,
Basic Design Study Team
JICA

Dr. A. M. A. ELOBODI
Acting First Undersecretary for Planning
Ministry of Finance and Economic Planning

Mr. AWAD ELKARIM WIDAA
Director General,
Sudan Telecommunications Public Corporation

ATTACHMENT

1. The Sudanese side has principally agreed to the basic design proposed in the Draft Final Report.

2. The Sudanese side has understood Japan's grant aid system and confirmed that the necessary measures will be taken by the Sudanese side as shown in Annex-1 which are manifested in the ANNEX II of THE MINUTES OF DISCUSSIONS on the Project signed on 8th December 1988, including some additional required arrangement shown in Annex-2.

3. The Sudanese side ensures the provision of necessary budget for the adequate personnel services, maintenance and operation expenses of the telephone exchanges.

4. The Final Report (15 copies in English) on the Project will be submitted to the Sudanese side by the end of May, 1989.

Required Arrangement to be taken by the Government of the Republic of the Sudan

1. To provide data and information necessary for detailed design.

2. To secure land necessary for establishment of Burri exchange.

3. To construct gates and fences in and around the Burri exchange site.

4. To provide the space necessary for such construction as temporary offices, working areas, stock yards and other.

5. To provide necessary permission, licence and other authorizations for carrying out the Project.

6. To provide facilities for distributing line of electricity, the city water distribution main to Burri exchange site and security.

7. To bear advising commission of Authorization to Pay (A/P) and payment commission to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement (B/A).

8. To ensure prompt unloading, tax exemption and customs clearance at the port of disembarkation in the Sudan and prompt internal transportation therein of the products purchased under the Grant.

9. To exempt Japanese nationals engaged on the Project from customs duties, internal taxes and other fiscal levies which may be imposed in the Sudan with respect to the supply of the products and services under the verified contracts.

10. To accord without delay to Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contract such facilities as may be necessary for

their entry into the Sudan and stay therein for the performance of their work.

11. To maintain and use properly and effectively the facilities constructed and equipment purchased under the Grant.

12. To coordinate with the inhabitants living in the Project areas on any related matters which may arise during the implementation of the Project.

13. To bear all the expenses, other than those to be borne by the Grant.

14. To execute the following works:

    (1) Removal works of existing faulty/deteriorated facilities, if necessary, after the transfer of working lines.

    (2) Rehabilitation works of internal wires of subscriber premises.

    (3) Rehabilitation works of internal wires of PBXs (Private Branch Exchange).

Additional Required Arrangement to be taken by the Government of the Sudan

1. To carry out the plumbings from the main water pipe to the building to be constructed by this project in Burri area.

2. Withdrawal of the existing switching equipment, related frames and wires which are faulty and not used in Khartoum tandem exchange.

3. Installation of Interface Switching Equipment

   The installation and testing of the interface switching equipments and associated components, which are to be supplied by this project for the following three existing exchanges, shall be done by Sudanese side.

   - Khartoum Extension exchange
   - Mahadia exchange
   - Shamabat exchange

4. Jumpering Work in Khartoum Central Exchange

   The jumpering works in the following existing exchanges shall be done by Sudanise side.

   - Jumpering works in UR-49a of Khartoum Central exchange
   - Jumpering works in CTN/CTX

5. Modification of Existing Building Facilities in Khartoum South Exchange

   Relating the above works, replacement of the existing power cables connected to the existing equipments will be done by Sudanese side.

ANNEX 7 ITINERARY OF STUDY TEAM (Mar. 19, 1989 - Mar. 30, 1989)

MAR 19 (Sun)	:	Leaving Tokyo for Khartoum.
MAR 20 (Mon)	:	Via Paris.
MAR 21 (Tue)	:	Arrival in Khartoum. Courtesy visits to Japanese Embassy, Ministry of Finance and Economic Planning (MOFEP) and STPC
MAR 22 (Wed)	:	Discussion with STPC on draft basic design study report
MAR 23 (Thu)	:	Discussion with STPC on draft Minutes of Discussion
MAR 24 (Fri)	:	Staff meeting
MAR 25 (Sat)	:	Discussion with MOFEP on draft basic design study report and Minutes of Discussion
MAR 26 (Sun)	:	Discussion with STPC on draft Minutes f Discussion
MAR 27 (Mon)	:	Signing of Minutes of Discussion and reporting for Japanese Embassy
MAR 28 (Tue)	:	Leaving Khartoum for Tokyo
MAR 29 (Wed)	:	Via Paris
MAR 30 (Thu)	:	Arrival in Tokyo

JICA