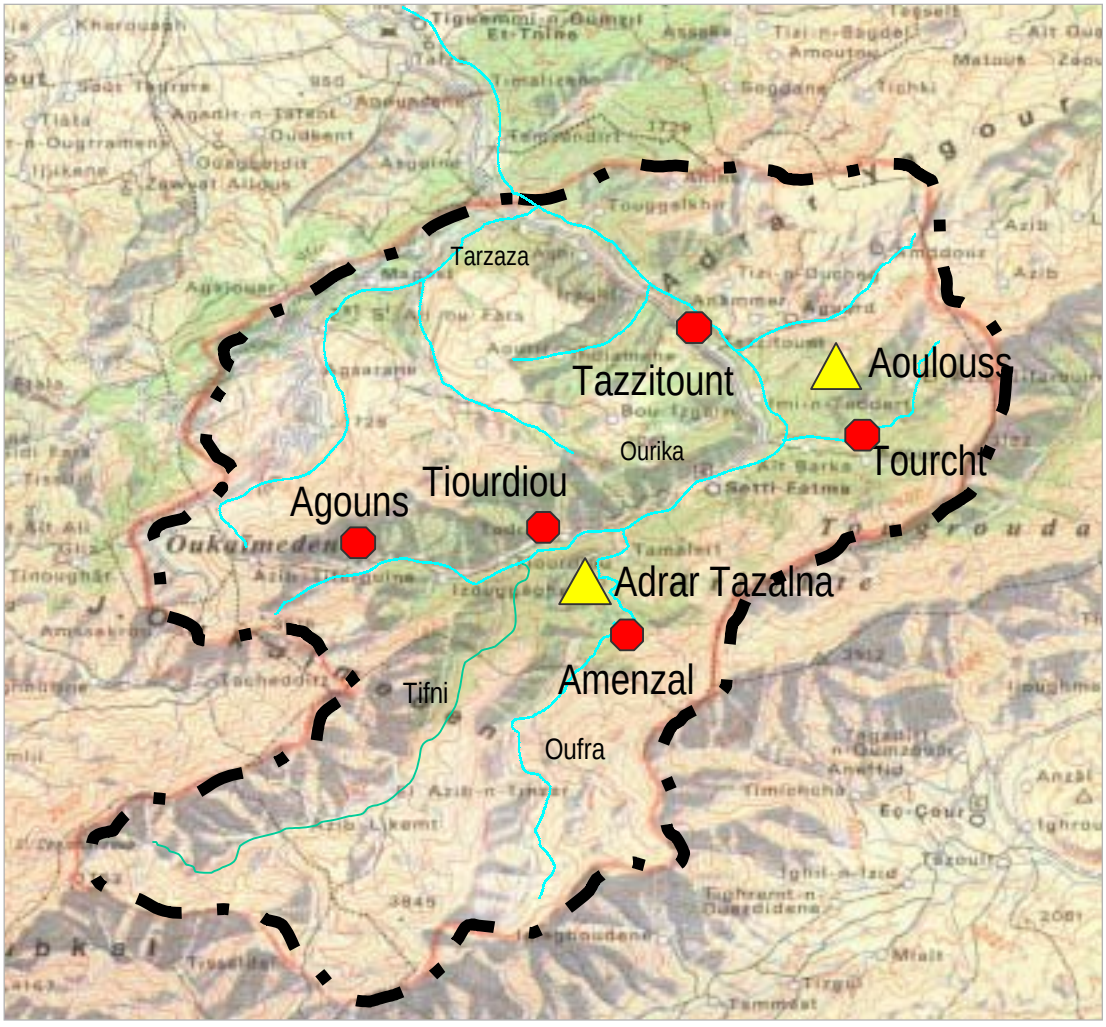
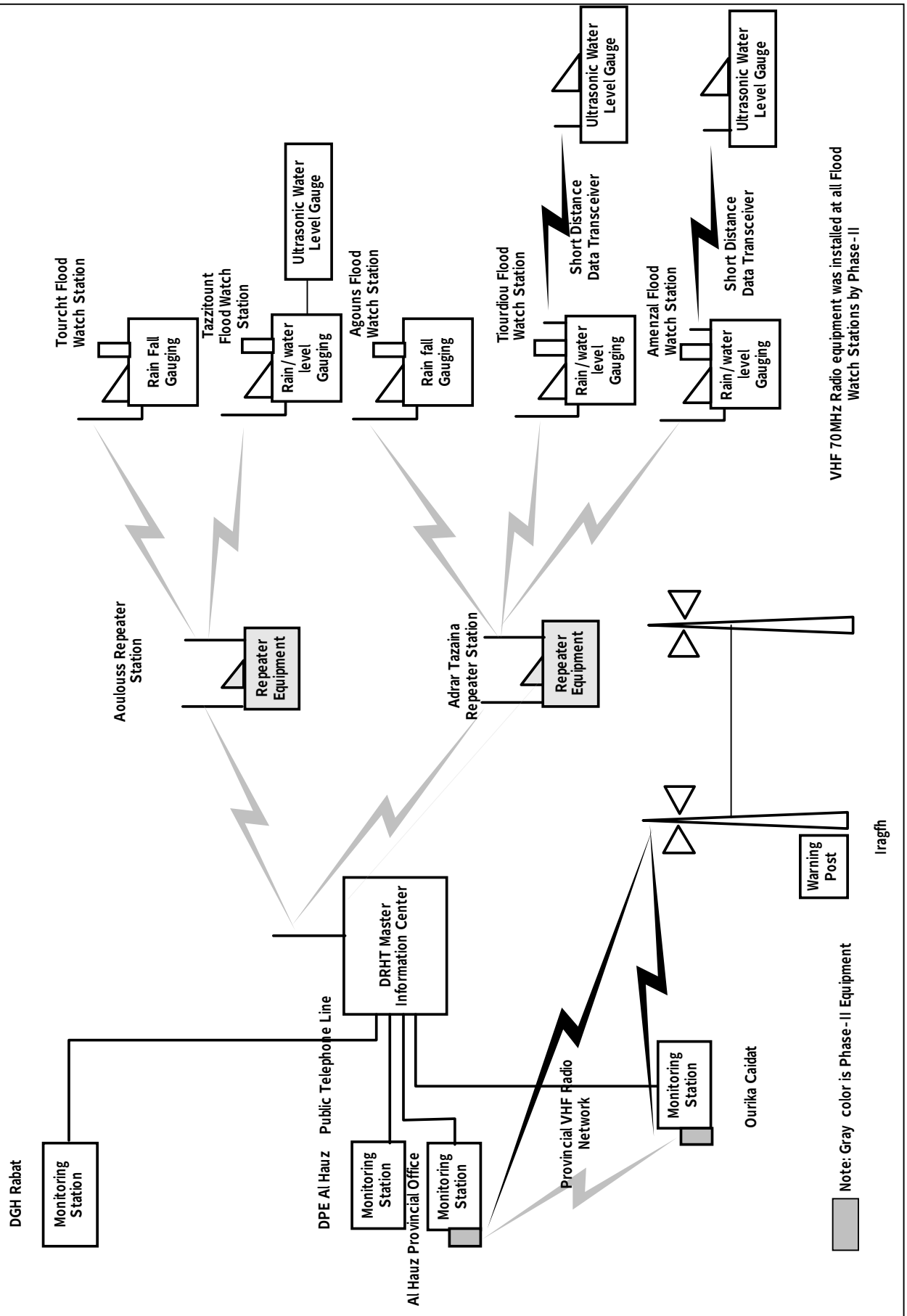
FIGURES



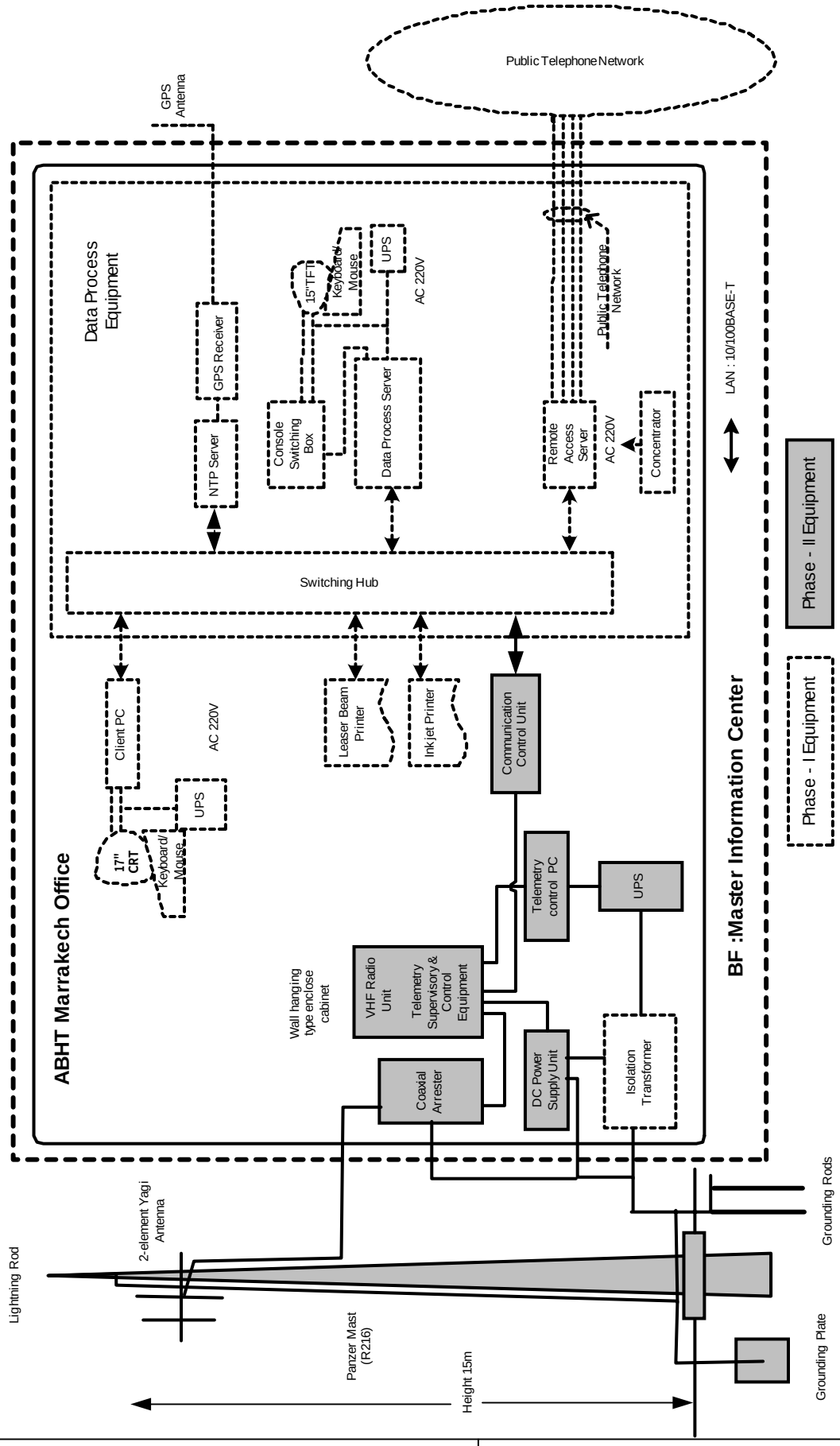
Flood Watch Station

Repeater Station

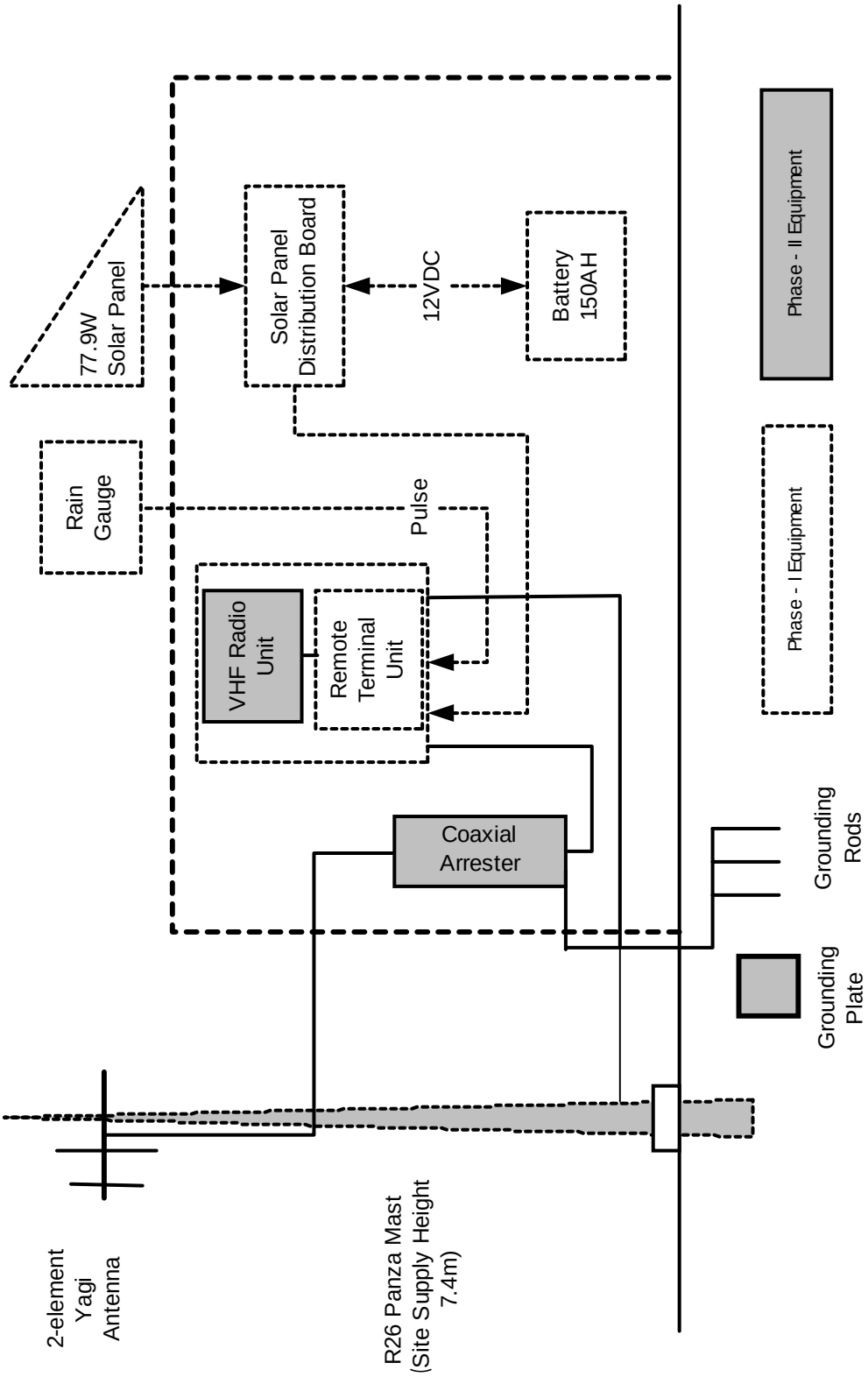
THE MASTER PLAN STUDY ON FLOOD FORECASTING AND WARNING SYSTEM FOR ATLAS REGION IN THE KINGDOM OF MOROCCO	Fig. I.1.1 LOCASION MAP OF HYDROLOGICAL STATION



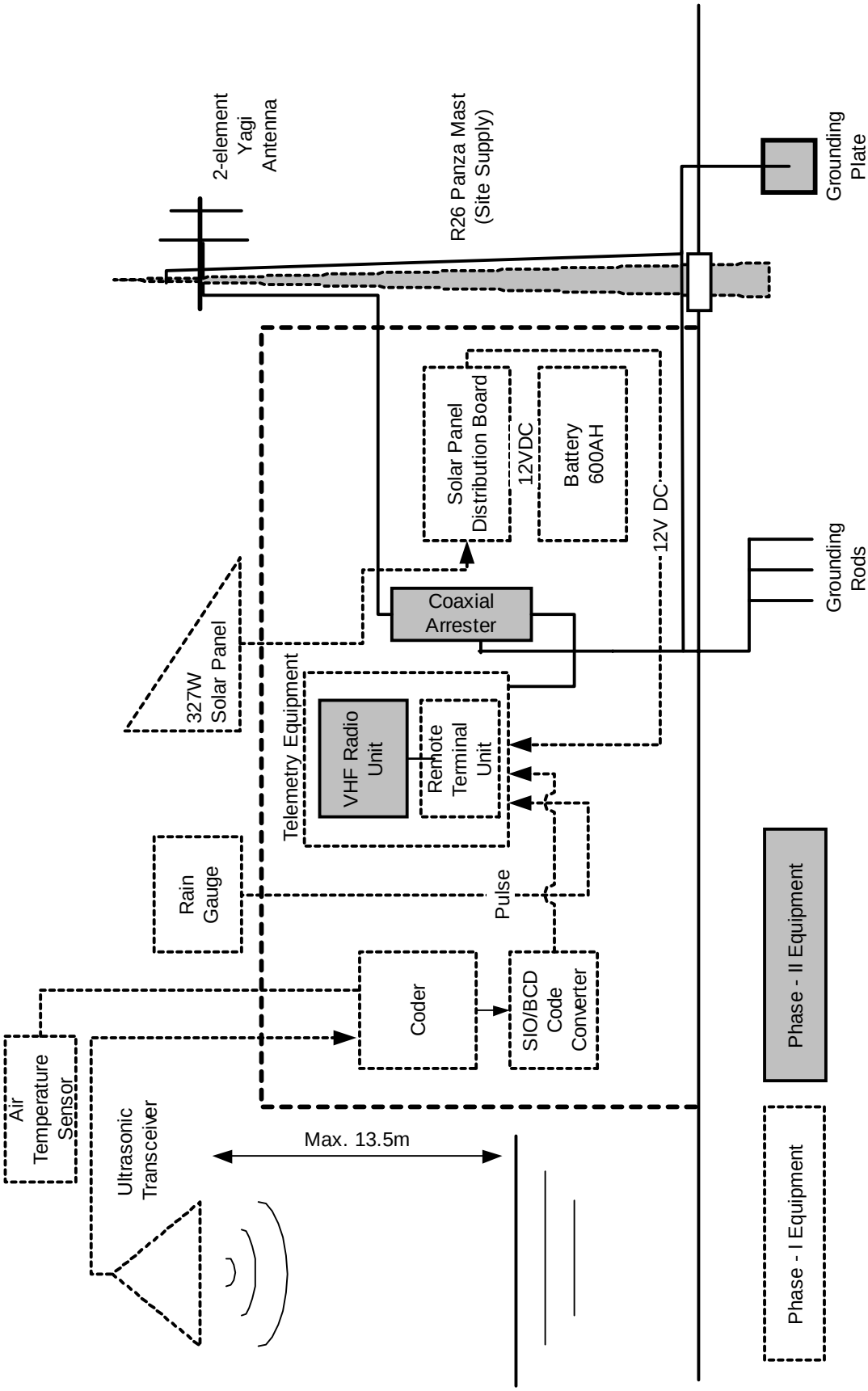
THE MASTER PLAN STUDY ON FLOOD FORECASTING AND WARNING SYSTEM FOR ATLAS REGION IN THE KINGDOM OF MOROCCO	Fig.I.1.2 CONCEPTUAL SYSTEM DIAGRAM OF PILOT PROJECT



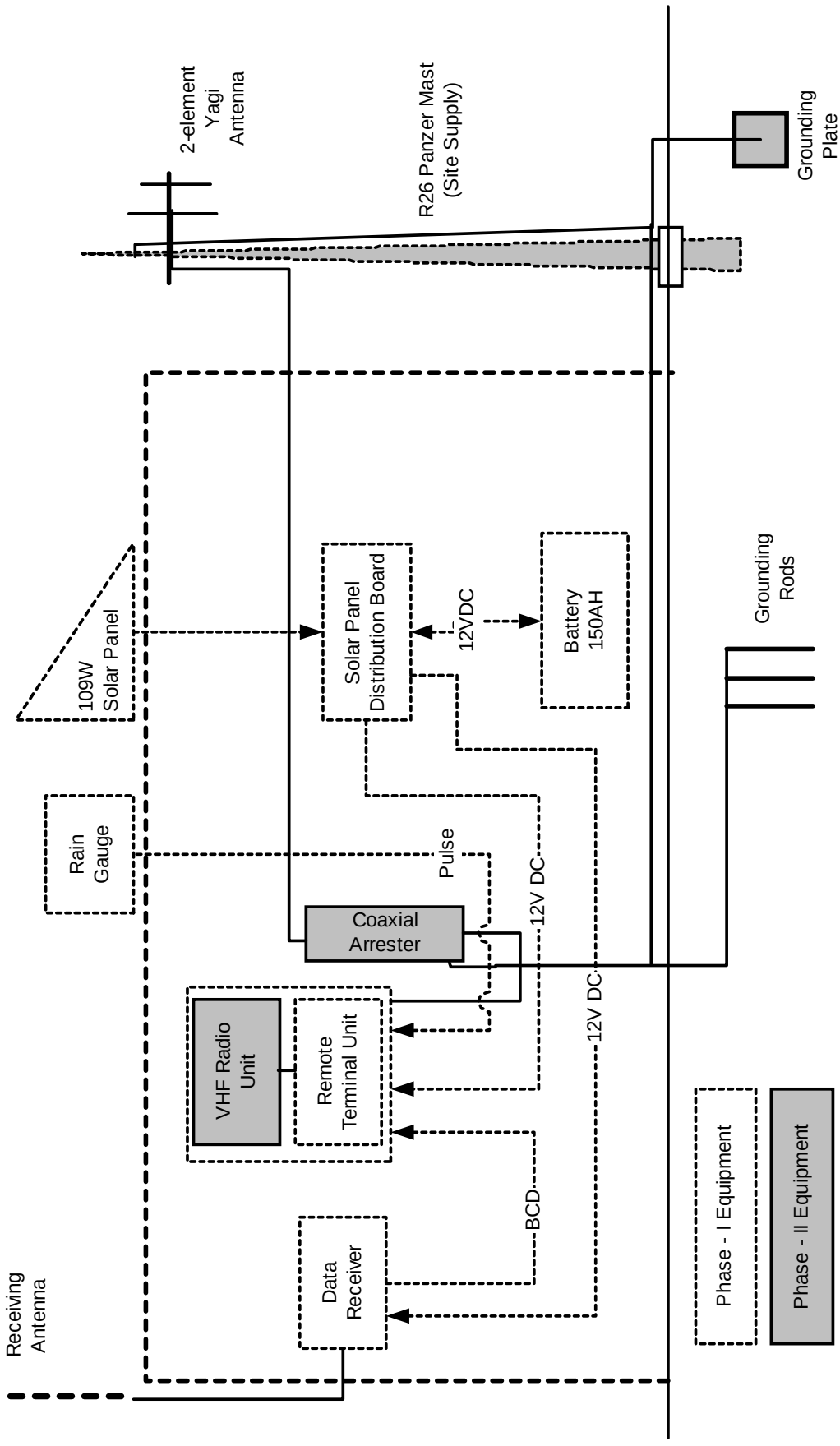
THE MASTER PLAN STUDY ON FLOOD FORECASTING AND WARNING SYSTEM FOR ATLAS REGION IN THE KINGDOM OF MOROCCO	Fig.I.1.3 BLOCK DIAGRAM FOR TELEMETRY SUPERVISORY & CONTROL AND DATA PROCESSING EQUIPMENT



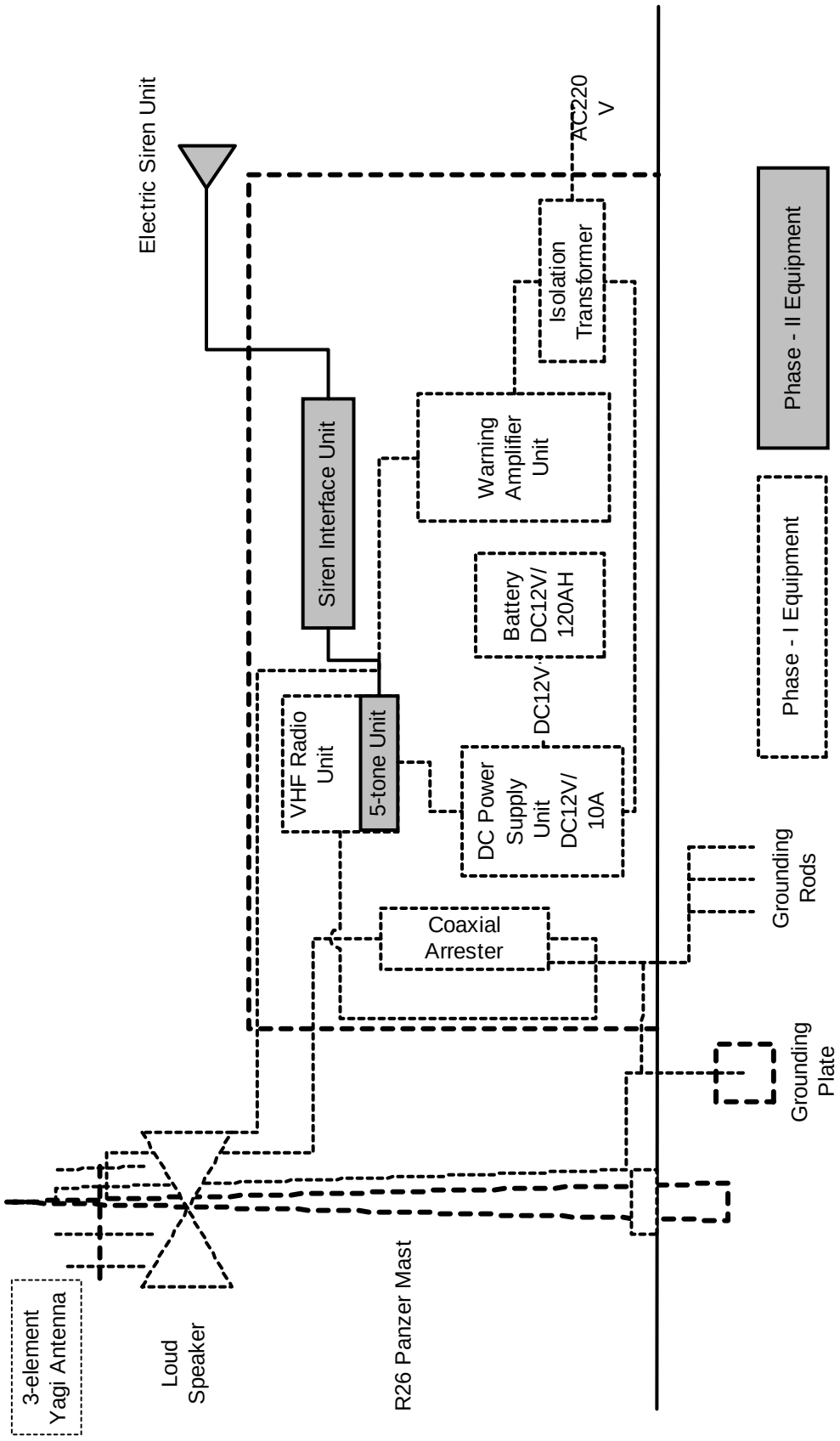
THE MASTER PLAN STUDY ON FLOOD FORECASTING AND WARNING SYSTEM FOR ATLAS REGION IN THE KINGDOM OF MOROCCO	Fig.I.1.4 BLOCK DIAGRAM FOR RAINFALL GAUGING STATION (AGOUNS , TOURCHT)



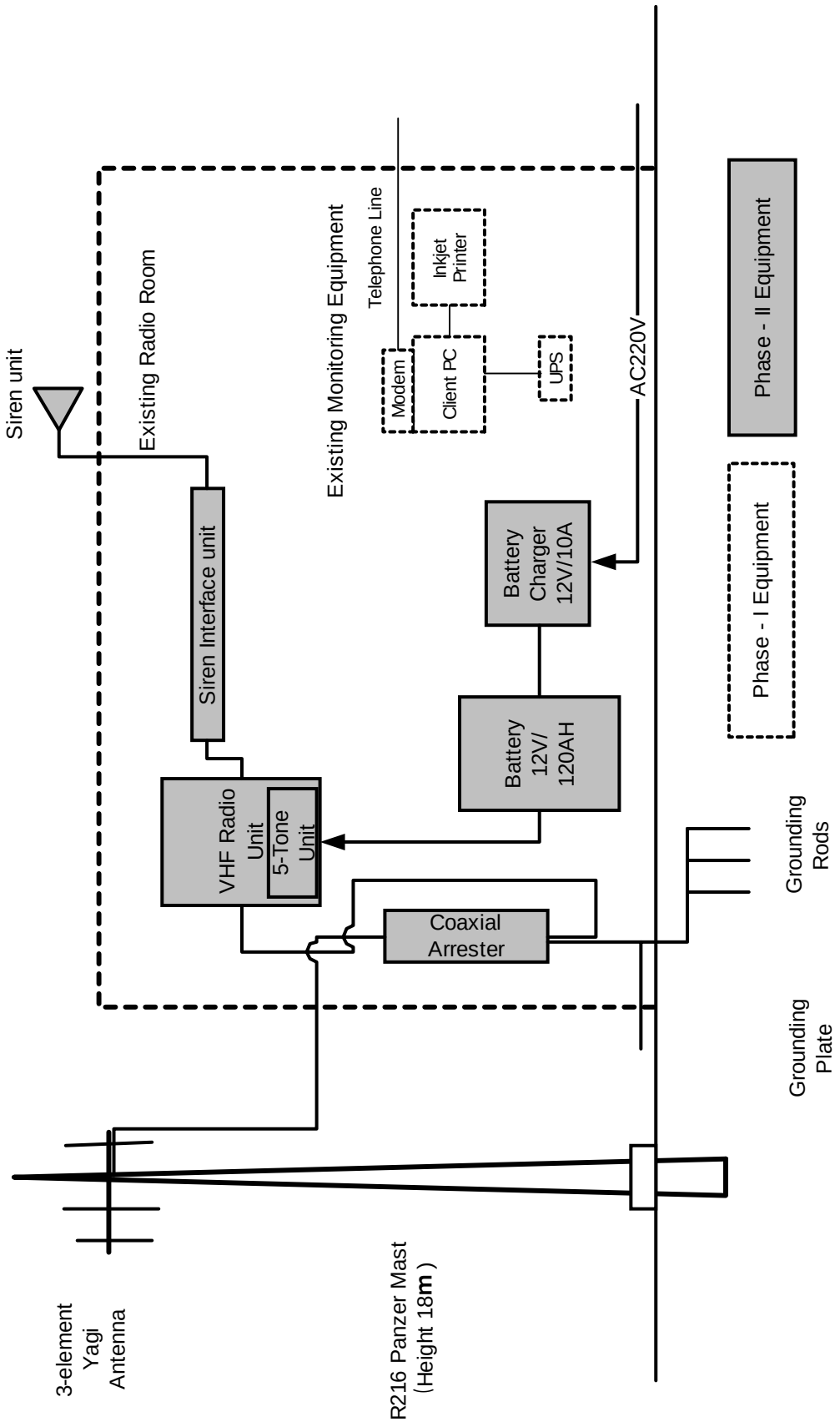
THE MASTER PLAN STUDY ON FLOOD FORECASTING AND WARNING SYSTEM FOR ATLAS REGION IN THE KINGDOM OF MOROCCO	Fig.I.1.5(1/2) BLOCK DIAGRAM FOR RAINFALL AND WATER LEVEL GAUGING STATION (NON-SEPARATE) (TAZZITOUNT)



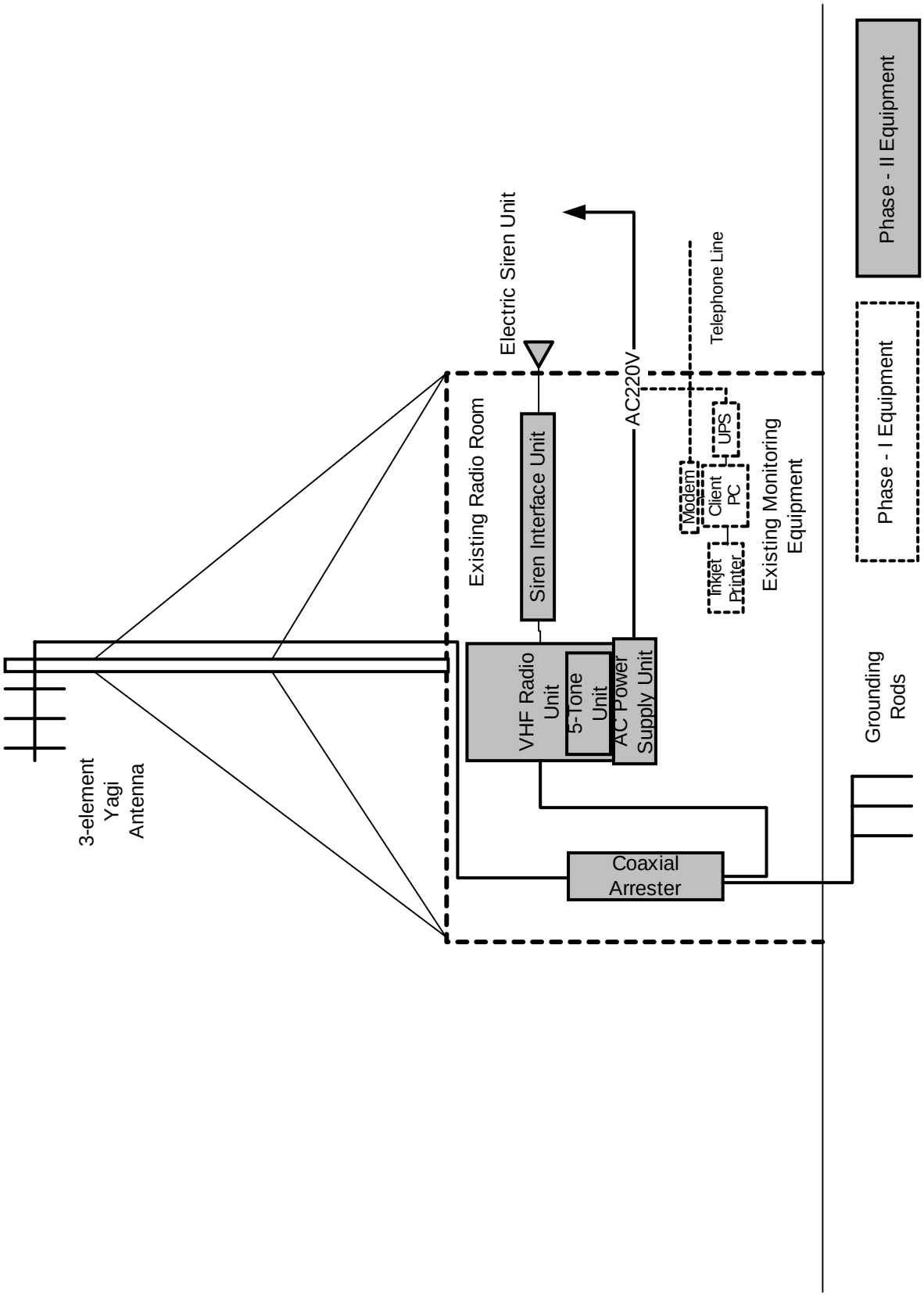
THE MASTER PLAN STUDY ON FLOOD FORECASTING AND WARNING SYSTEM FOR ATLAS REGION IN THE KINGDOM OF MOROCCO	Fig.I.1.5(2/2) BLOCK DIAGRAM FOR RAINFALL AND WATER LEVEL GAUGING STATION (SEPARATE) (TIOURDIOU, AMENZAL)



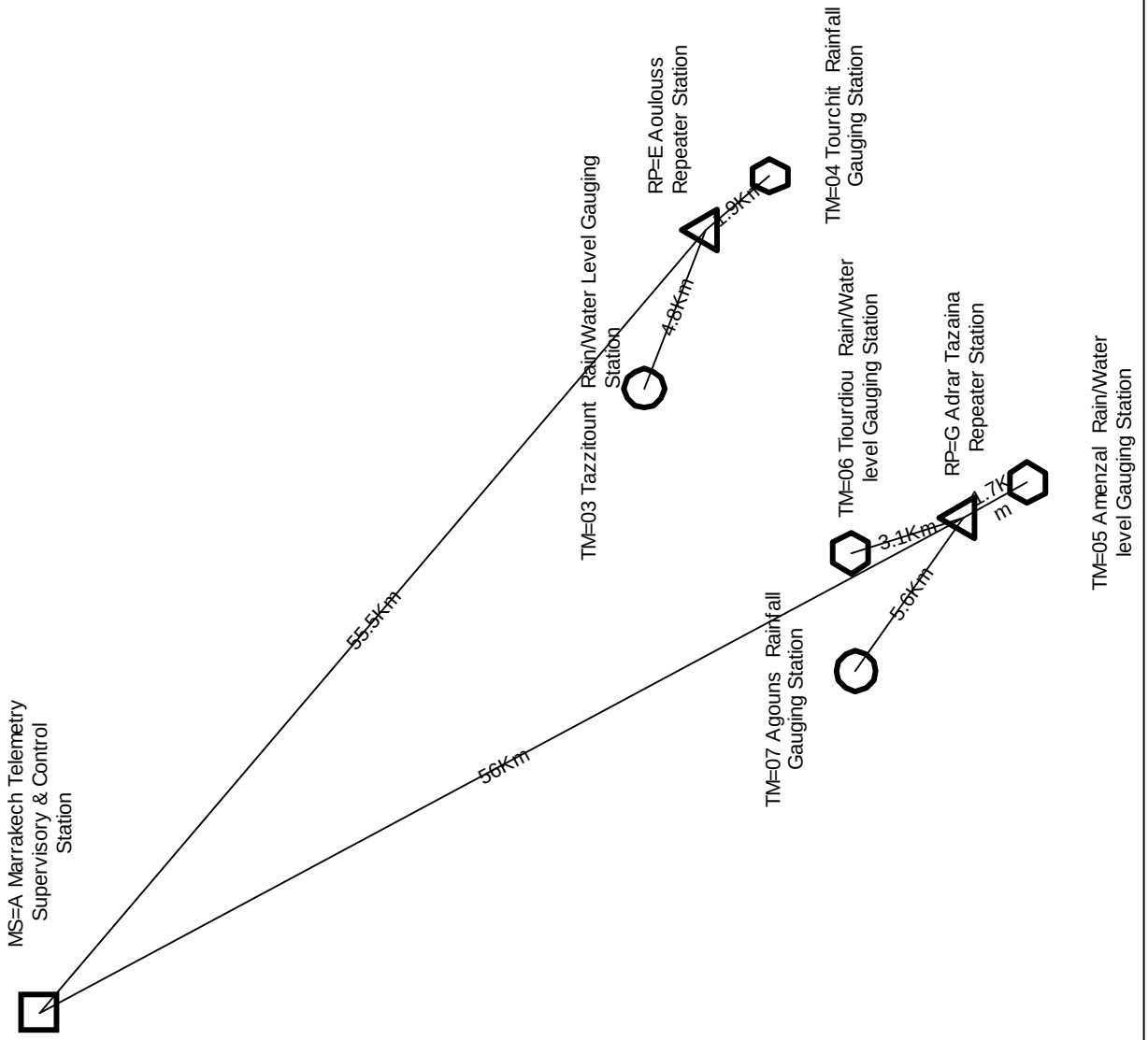
THE MASTER PLAN STUDY ON FLOOD FORECASTING AND WARNING SYSTEM FOR ATLAS REGION IN THE KINGDOM OF MOROCCO	Fig.I.1.6(1/3) BLOCK DIAGRAM FOR WARNING RADIO STATION (IRAGHF WARNING POST)



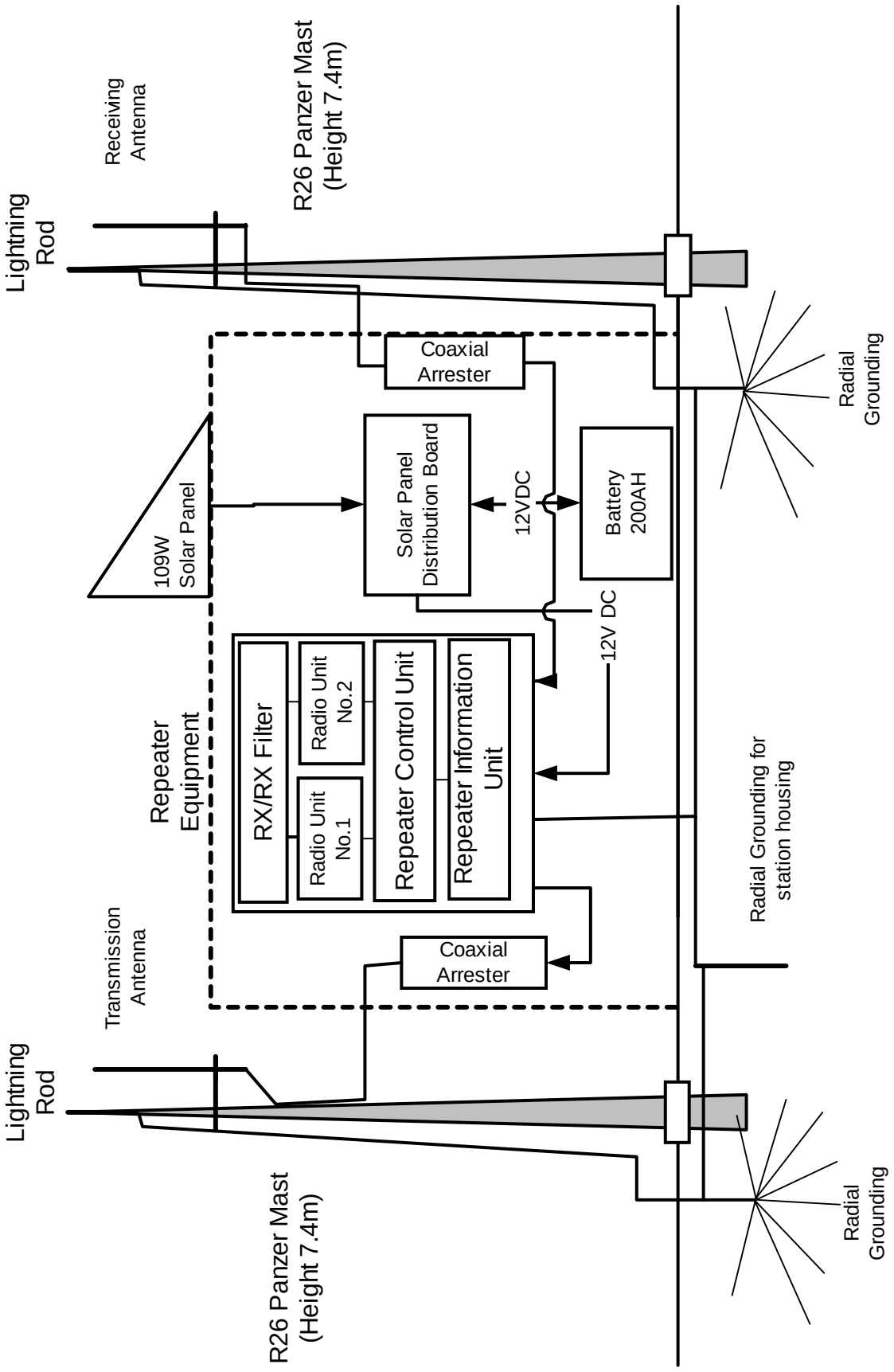
THE MASTER PLAN STUDY ON FLOOD FORECASTING AND WARNING SYSTEM FOR ATLAS REGION IN THE KINGDOM OF MOROCCO	Fig.I.1.6(2/3) BLOCK DIAGRAM FOR WARNING RADIO STATION (OURIKA CAIDAT)



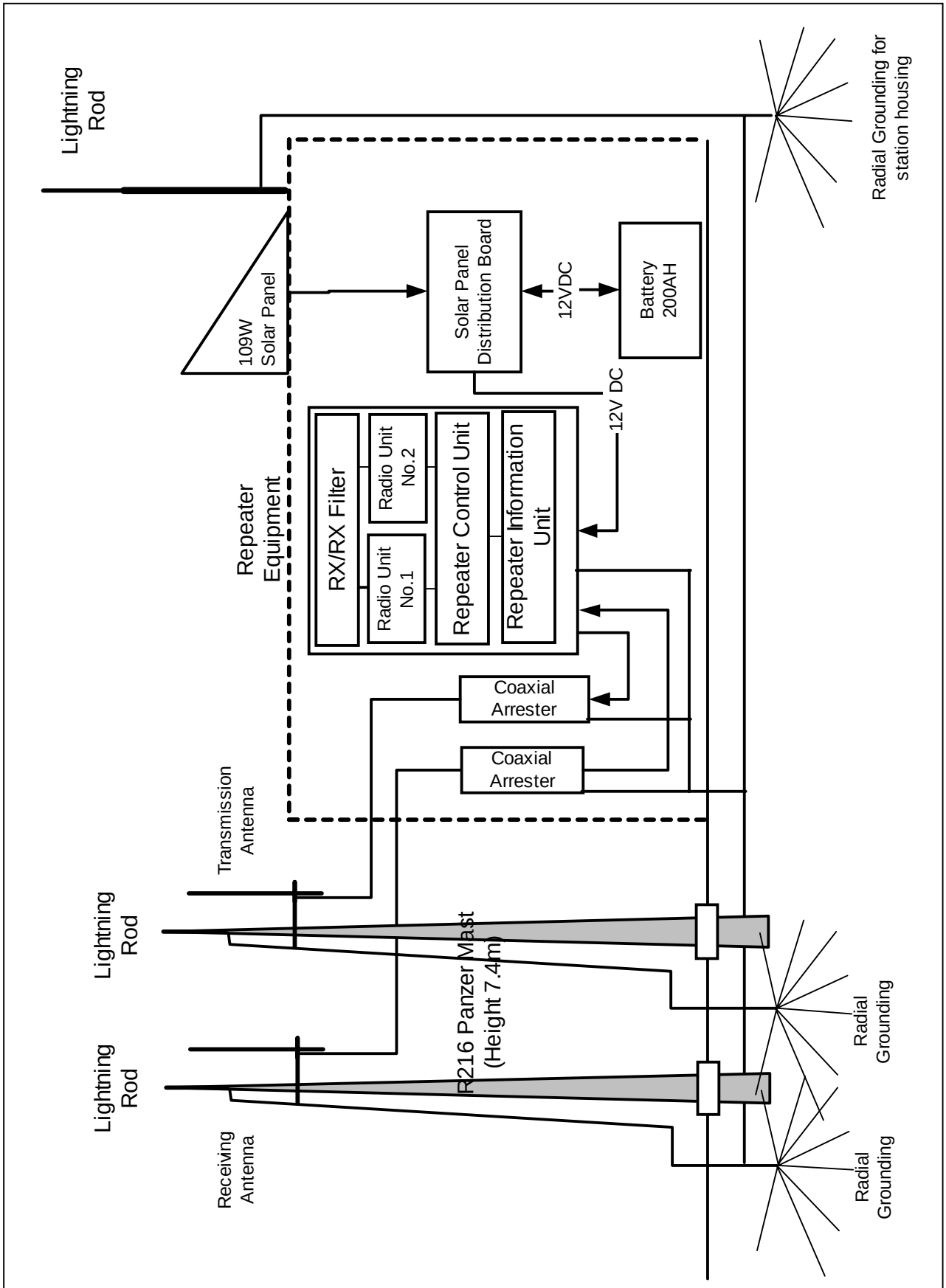
THE MASTER PLAN STUDY ON FLOOD FORECASTING AND WARNING SYSTEM FOR ATLAS REGION IN THE KINGDOM OF MOROCCO	Fig.I.1.6(3/3) BLOCK DIAGRAM FOR WARNING RADIO STATION (PROVINCIAL OFFICE)



THE MASTER PLAN STUDY ON FLOOD FORECASTING AND WARNING SYSTEM FOR ATLAS REGION IN THE KINGDOM OF MOROCCO	Fig.I.2.1 VHF RADIO NETWORK DIAGRAM



THE MASTER PLAN STUDY ON FLOOD FORECASTING AND WARNING SYSTEM FOR ATLAS REGION IN THE KINGDOM OF MOROCCO	Fig.I.2.2 BLOCK DIAGRAM FOR REPEATER STATION (AOULOUSS)



THE MASTER PLAN STUDY ON FLOOD FORECASTING AND WARNING SYSTEM FOR ATLAS REGION IN THE KINGDOM OF MOROCCO	Fig.I.2.3 BLOCK DIAGRAM FOR REPEATER STATION (ADRAR TAZAINA)

APPENDIX J

OBSERVATION FACILITY

THE MASTER PLAN STUDY ON
FLOOD FORECASTING AND WARNING SYSTEM
FOR ATLAS REGION IN-FHE KINGDOM OF MOROCCO

APPENDIX J OBSERVATION FACILITY

TABLE OF CONTENTS

LIST OF FIGURES

CHAPTER 1. LAWS AND REGULATIONS

1.1 Laws and Regulations

The Ministry in charge of Territory Development, Environment, Town Planing and Housing has laws to control design and construction of buildings which are equivalent to the building laws in Japan. Prior to actual construction work of a building after it‘s design, architect and structural engineer have to submit the drawings to the prefecture to obtain approval before commencement of construction work.

These laws in Morocco set force various standards and rules with a view to preserving a reasonable living environment. These standards and rules include the restriction of certain types of buildings, the minimum distance between a building and a road, the size of car park depending on the purpose of use and size of a building, the effective open area of rooms, rules relating to evacuation at the time of fire or earthquake and other safety aspects and those applicable to schools, commercial facilities, public halls, offices and car parks, etc.

The contents of the preliminary design of the public FFWS facilities have to conform to these laws and the relevant standards in Morocco in order that the planning and design principles for such facilities are in line with the spirit of the law and standards.

The Ministry of Interior stipulated activity and reward for architects and structural engineers. Even in the public sectors and agencies have to ask architects and structural engineers designing buildings to be constructed in Morocco. Procedure from design of building to construction are as follows;

1) Client both of public and private sectors ask to a architect to design and to make drawings for the planned building.

2) If the building to be constructed in Agadir city, the Client shall also ask to structural investigation to a structural engineer. If the building to be constructed in other than Agadir city, it is no need to ask seismic design to the structural engineer.

3) Architect shall submit drawings to prefecture to get approval

4) Architect select contractor by open tender

5) Client contract with successful tenderer to construct the building

6) Architect supervise the construction work to assure the quality of workmanship of the contractor.

CHAPTER 2. DESIGN STANDARDS

2.1 Design Standards

Design Standards for structural design of buildings are based on French standards which are Norme Francaise(NF). There are some minor earthquakes in Morocco except Agadir city. Agadir had a big earthquake in 1960. Almost all buildings except two (2) was fallen out and destroyed. After that all buildings to be constructed in the city shall investigated with the structural design of frames and foundations by the registered structural engineer.

CHAPTER 3. LAND EXPROPRIATION - DAHIR OF MAY 5TH 1982, PROCEDURE

There are two ways of land expropriation to be used for the purpose of public welfare. One is a administrative phase and the other is a judiciary phase. Each detail procedures are described below.

3.1 The Administrative Phase

(1) Propositions

(a) Preparation note

(b) Draft expropriation decree that determines the areas liable to be expropriated. In case it determines the properties, it shall bear value of a transfer act that shall have a two-years effect as from its publication in the official bulletin.

(c) Land parcel plans + location plans

(d) List of properties and property holders

(e) Land registration certificates

sending to the central services for study and preparation of the inquiry.

(2) Administrative Inquiry

(a) It begins with the publication in the official bulletin of the draft expropriation decree and its large publicity.

At the head office of the local authority of the location place

Notification of the landowners who have a two-month deadline counting from the publication of the project in the official bulletin to present their observations. At the expiry of this deadline, the interested who did not reveal their identity shall be deprived of their rights.

(b) Registration of the project at the land registration office for the parcels registered or pending registration.

(c) Registration of the project at the clerk‘s office at the court of first instance.

(3) Final Decree

After the inquiry, the central services shall draft the final decree by developing a presentation sheet which relates the results of the inquiry and a final draft decree which shall be sent for signature by: the Minister of Public Works(Minister of Equipment), the Minister of Interior, the interested Ministers in case the land parcels shall fall under their domain.

After the signature, the decree shall be published in the official bulletin.

(4) Summons to the Evaluation Committee

(5) Attempt at an Amiable Agreement

3.2 The Judiciary Phase

The jurisdictional control procedure shall give guarantees to the private property. It is exclusively concerned with the external regularity of the various administrative acts and would never allow the pronouncing of the annulment thereof (no appeal).

(1) Taking of Possession

The administration may take possession of land parcels through the court (the emergency judge) in return for the payment or the deposit of the indemnification suggested during the attempt at an amiable agreement.

(2) Property Transfer

The expropriator shall submit an introductory petition to the administrative court (the expropriation judge) of the location place of the expropriated parcels, the judge cannot refuse the transfer of property or the property rights unless he identifies a formal irregularity in the procedure.

(3) Determination of the Indemnification

(a) It shall be decided by the judge who pronounces the transfer of the property

(b) It may be the subject of an appeal by the landowner*

Note: This procedure has been effective until 1998. There might be some recent modification. But until end of December 2000, there is no modification.

EXPROPRIATION – DAHIR OF MAY 5th 1982
PROCEDURE

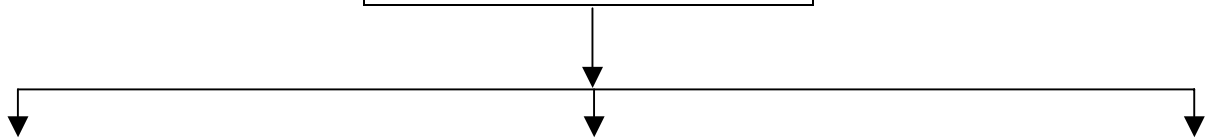
THE ADMINISTRATIVE PHASE

1 – Propositions:	2 – Administrative inquiry	3 – Final decree	4- Summons to the evaluation committee	5- Attempt at amiable agreement
- Preparation note - Draft expropriation decree as transfer act to be published in the Official Bulletin - Property documents	- Draft decree publication & notification to * Local authority * Landowners (valid observations within 2 Months) - Registration at the land registry - Registration at the Court of First Instance	- Drafting of final decree by central services - Signature by * Minister of Interior * Concerned Ministers - Publication in the Official Bulletin		

EXPROPRIATION – DAHIR OF MAY 5th 1982

PROCEDURE

THE JUDICIARY PHASE



1- Possession Taking	**2 – Property transfer**	**3 – Determination of the indemnification**
- Land expropriation by emergency judge ruling against indemnification (Suggested in the amiable agreement)	- Petition to the Administrative Court (Annulment for formal irregularity only)	- Fixed by the judge who pronounces the transfer - Landowner can lodge can appeal

CHAPTER 4. FACILITY DESIGN FOR PILOT PROJECT

4.1 Facility Design for Pilot Project

The facilities to be constructed around the Ourika River Basin as a pilot project are as follows;

a) Storage House for Flood Water Level Observation Equipment

b) Transmission Arrangement from river to existing Observatory

c) Foundation of Mast for Telecommunication Relay Antenna

d) Storage House for Data Transmission Equipment

e) Foundation of Concrete Pole for Alarm Speaker

Drawing List and Drawings are attached Fig.J.4.1 to J.4.5.

CHAPTER 5 FACILITY DESIGN FOR MASTER PLAN

5.1 Facility Design for Master Plan

The facilities to be constructed as a Master Plan Project are as follows;

a) Observer's House

b) Storage House for Flood Water Level Observation Equipment

c) 15m Tower for Telecommunication Relay Antenna(1/2)

d) 15m Tower for Telecommunication Relay Antenna(2/2)

e) Foundation of Mast for Telecommunication Relay Antenna

f) Storage House for Data Transmission Equipment

g) Storage House for Alarm Speaker Equipment

Drawing List and Drawings are attached Fig.J.5.1 to J.5.7.

CHAPTER 6 COST ESTIMATION

6.1 Pilot Project

1) Storage House for Flood Water Level Observation Equipment

2.6m x 2.6m x 2places = 13.52m^2

13.52m2 x 2,500DH/m^2 = 33,800DH

2a) Attach Ultra sonic water level gauge to steel pipe φ216.3x5.8 fixed on Roof of storage house

Steel Pipe φ216.3x5.8 30.1kg/m x 8mx1.1x 2places = 0.53ton

0.53ton x 20,000DH/ton = 10,600DH

2b) Attach Ultra sonic water level gauge to steel pipe φ101.6x3.2 fixed with concrete pole

Steel Pipe φ101.6x3.2 7.76kg/m x 7m x 1.2 = 0.07ton

0.07ton x 20,000DH/ton = 1,400DH

Reinforcing bar 1.44m3 x 0.05ton/m^3 =0.072ton

0.072 x 5,000DH/ton = 360DH

Concrete 1.2m x 1.2m x 1.0m = 1.44m3

1.44m3 x 2,500DH/m^3 = 3,600DH

3a) Foundation of Mast for Telecommunication Relay Antenna (20m height)

Reinforcing bar 8.82m3 x 0.05ton/m3 x 2 = 0.45ton

0.45 x 5,000DH/ton = 2,250DH

Concrete 2.1m x 2.1m x 1.0m x 2 = 8.82m3

8.82m3 x 2,500DH/m^3 = 22,050DH

3a) Foundation of Mast for Telecommunication Relay Antenna (30m height)

Reinforcing bar 19.22m3 x 0.05ton/m^3 x 2 = 0.97ton

0.97x 5,000DH/ton = 4,850DH

Concrete 3.1m x 3.1m x 1.0m x 2 =19.22m^3

19.22m3 x 2,500DH/m^3 = 48,050DH

4) Storage House for Data Transmission Equipment

5.6m x 5.6m x 3places = 94.08m^2

94.08m^2 x 2,500DH/m2 = 235,200DH

5) Foundation of Concrete Pole for Alarm Speaker

Reinforcing bar 1.0m3 x 0.05ton/m^3 = 0.05ton

0.05 x 5,000DH/ton = 250DH

Concrete 1.0m x 1.0m x 1.0m = 1.0m^3

1.0m^3 x 2,500DH/m^3 = 2,500DH

Total of Pilot Project = 364,910DH

6.2 Master Plan

1) Observer's House

8.6m x 8.6m x 14places = 1,035.44m^2

1,035.44m^2 x 2,500DH/m^2 = 2,588,600DH

2) Storage House for Flood Water Level Observation Equipment

2.6m x 2.6m x 12places = 81.12m^2

81.12m^2 x 2,500DH/m^2 = 202,800DH

3) Attach Ultra sonic water level gauge to steel pipe φ216.3x5.8 fixed on Roof of storage house

Steel Pipe φ216.3x5.8 30.1kg/m x 8m x 1.1 x 12places = 3.18ton

3.18ton x 20,000DH/ton = 63,600DH

4) Steel tower at Ukaimedan for Telecommunication Relay Antenna

Steel L-100x100x13 (3.752x8+(1.75+1.5+1.25+1.0))x4x19.1/1,000 = 1.00ton

L-90x90x13 3.752x8x17.0/1,000 = 0.52

L-75x75x9 ((4.25+4.14+4.04+3.95)x8+(2.47+2.12+1.77+1.41)x2)x 9.96/1,000 = 1.46

(Platform)

L-75x75x9 (3.0x20+1.2x16+1.41x8)x9.96/1,000 = 0.91

Checkered plate (3.0x3.0-1.0x1.0)x26.76/1,000 = 0.22

Total 4.11ton

4.11ton x 1.2 = 4.94ton

4.94ton x 20,000DH/ton = 98,800DH

Reinforcing bar 12.25m3 x 0.05ton/m^3 x 1 = 0.62ton

0.62 x 5,000DH/ton = 3,100DH

Concrete 3.5m x 3.5m x 1.0m x 1 = 12.25m^3

12.25m^3 x 2,500DH/m^3 = 30,625DH

* Foundation of Mast for Telecommunication Relay Antenna (20m height)

Reinforcing bar 61.74m3 x 0.05ton/m^3 = 3.09ton

3.09 x 5,000DH/ton = 15,450DH

Concrete 2.1m x 2.1m x 1.0m x 7x2 = 61.74m3

61.74m3 x 2,500DH/m^3 = 154,350DH

* Foundation of Mast for Telecommunication Relay Antenna (30m height)

Reinforcing bar 38.44m^3 x 0.05ton/m^3 = 1.93ton

1.93x 5,000DH/ton = 9,650DH

Concrete 3.1m x 3.1m x 1.0m x 2 x 2 = 38.44m^3

38.44m3 x 2,500DH/m^3 = 96,100DH

5) Storage House for Data Transmission Equipment

5.6m x 5.6m x 6places = 188.16m^2

188.16m^2 x 2,500DH/m^2 = 470,400DH

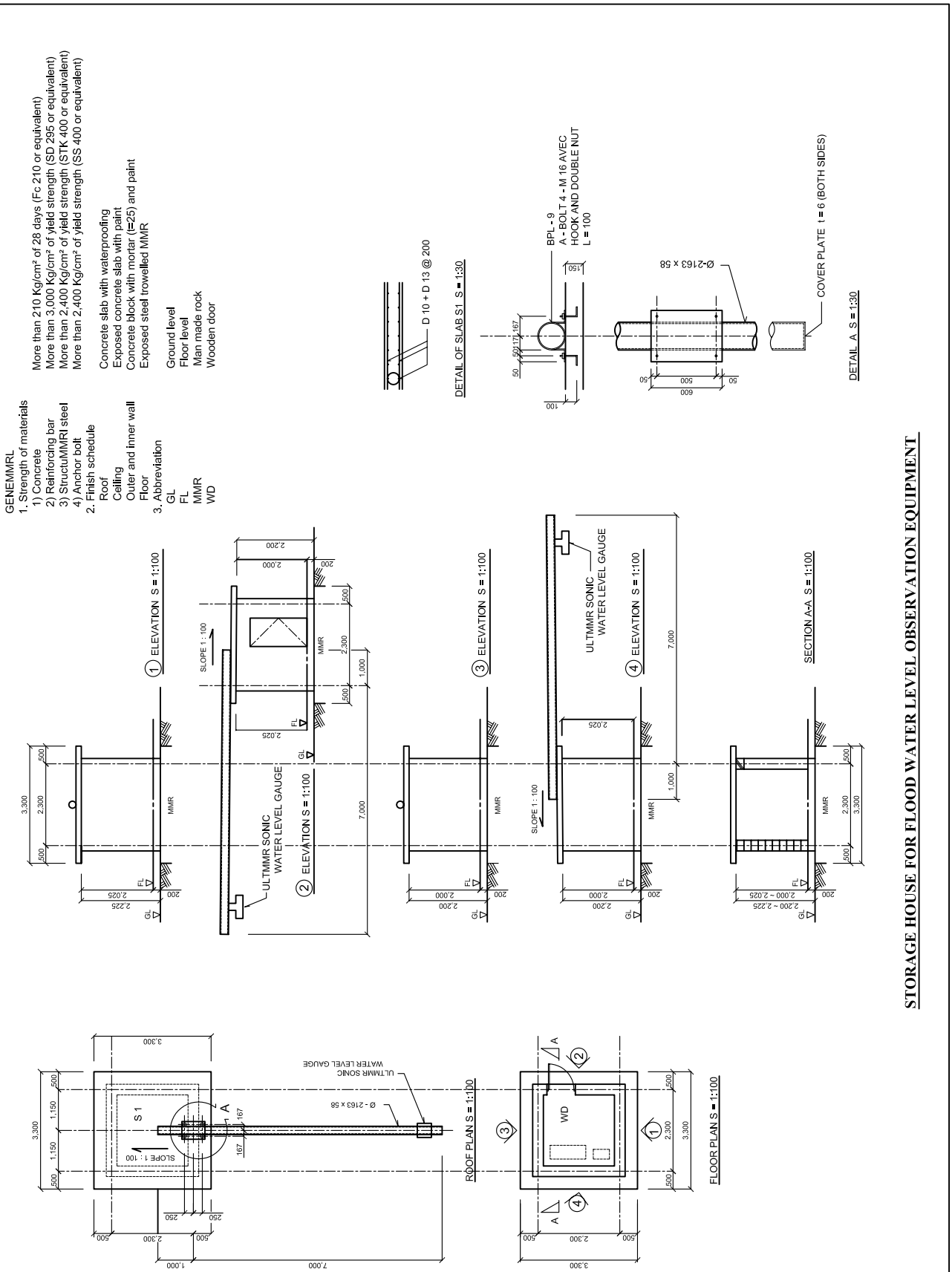
6) Storage House for Alarm Speaker Equipment

2.6m x 2.6m x 17places = 114.92m^2

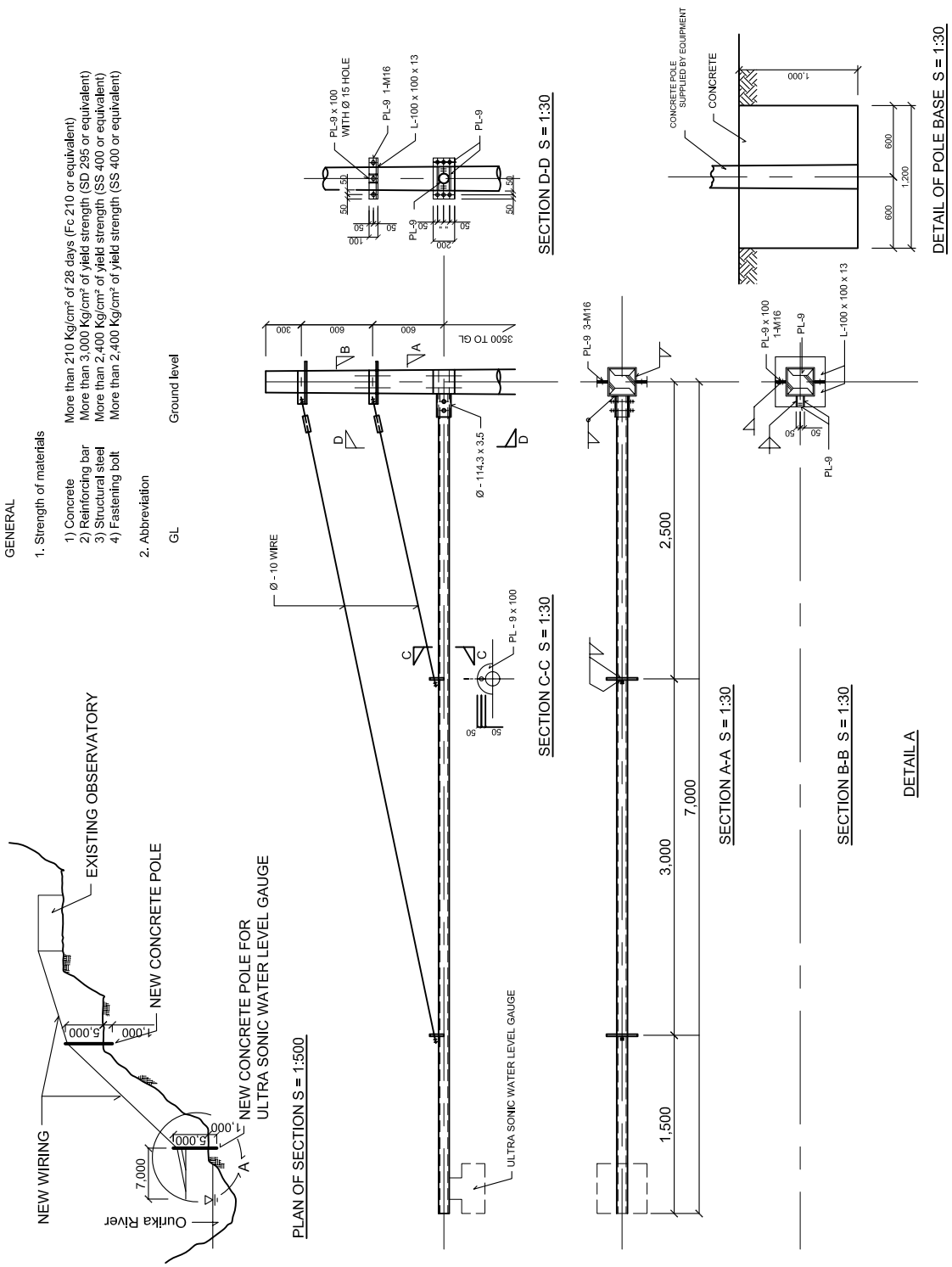
114.92m^2 x 2,500DH/m^2 = 287,300DH

Total of Master Plan	=	4,020,775DH
Pilot project	=	364,910DH
Grand TOTAL		**4,385,685DH**

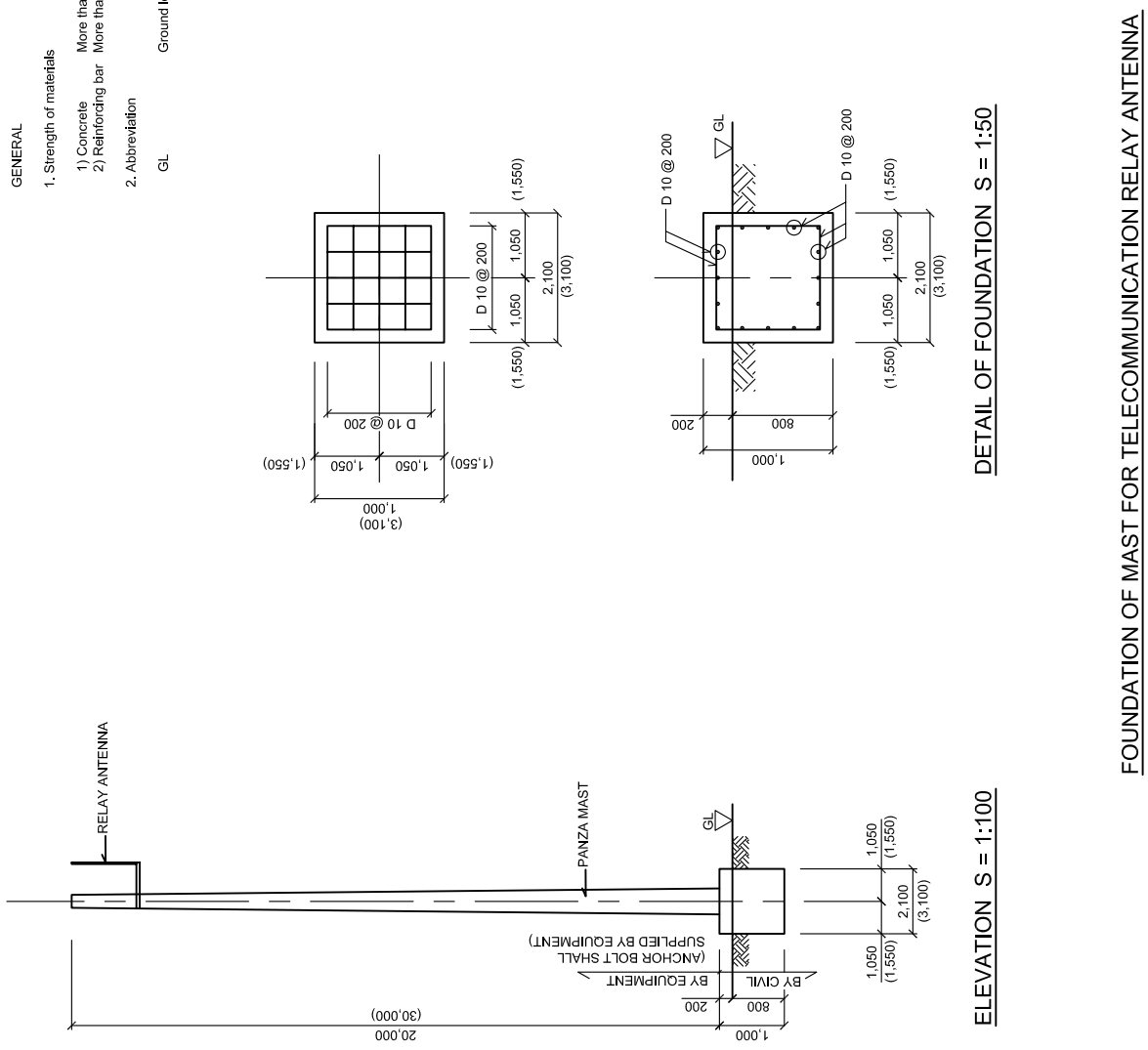
FIGURES



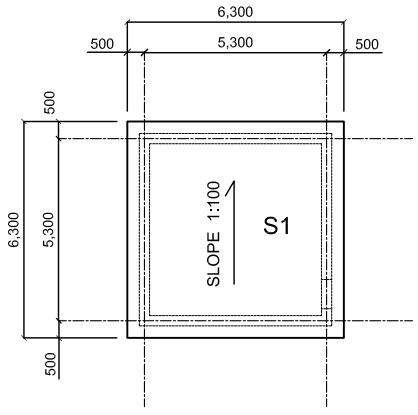
THE MASTER PLAN STUDY ON FLOOD FORECASTING AND WARNING SYSTEM FOR ATLAS REGION IN THE KINGDOM OF MOROCCO	Fig. J.4.1 STORAGE HOUSE FOR FLOOD WATER LEVEL OBSERVATION EQUIPMENT



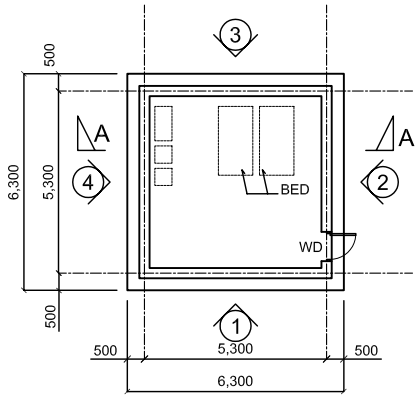
THE MASTER PLAN STUDY ON FLOOD FORECASTING AND WARNING SYSTEM FOR ATLAS REGION IN THE KINGDOM OF MOROCCO	**Fig. J.4.2 TRANSMISSION ARRANGEMENT FROM RIVER TO OBSERVATORY**



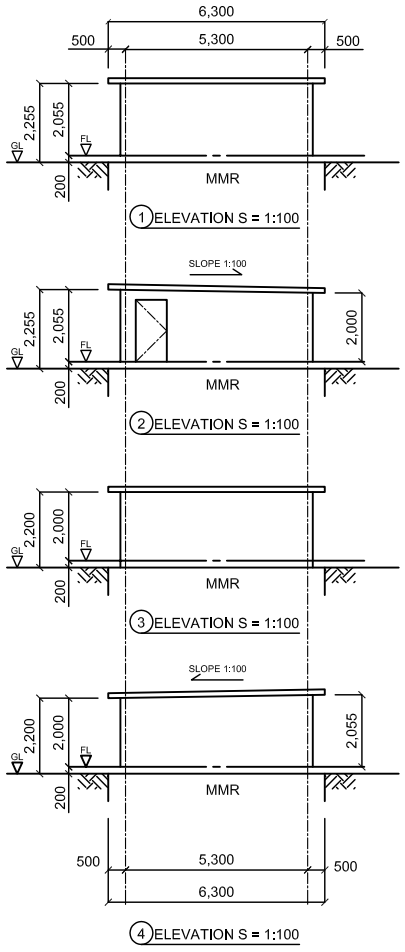
THE MASTER PLAN STUDY ON FLOOD FORECASTING AND WARNING SYSTEM FOR ATLAS REGION IN THE KINGDOM OF MOROCCO	**Fig. J.4.3 FOUNDATION OF MAST FOR TELECOMMUNICATION RELAY ANTENNA**



ROOF PLAN S = 1:100



GROUND FLOOR PLAN S = 1:100

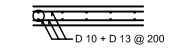


GENERAL

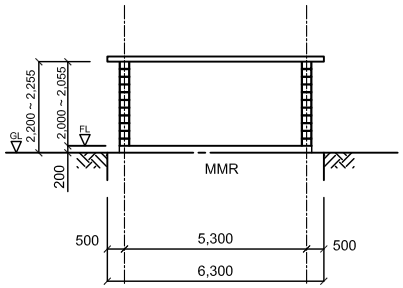
1. Strength of materials
   1) Concrete — More than 210 Kg / cm² of 28 days (Fc 210 or equivalent)
   2) Reinforcing bar — More than 3,000 Kg / cm² of yield strength (SD 295 or equivalent)

2. Finish schedule
   Roof — Concrete slab with waterproofing
   Ceiling — Exposed concrete slab with paint
   Outer and Inner wall — Concrete block with mortar (t = 25) and paint
   Floor — Exposed steel trowelled MMR

3. Abbreviation
   GL — Ground level
   FL — Floor level
   MMR — Man made rock
   WD — Wooden door



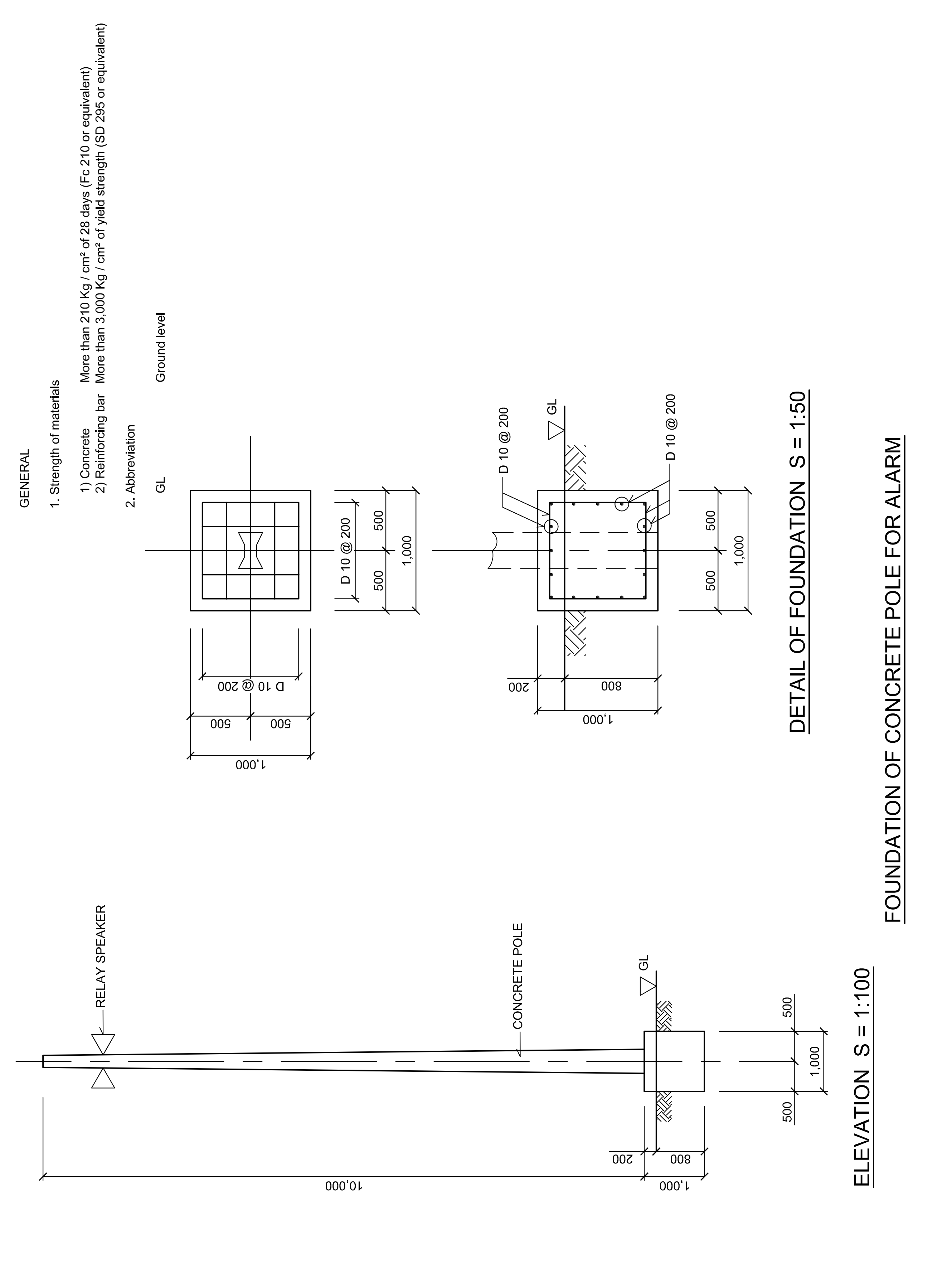
DETAIL OF SLAB S1 S = 1:30



SECTION A-A S = 1:100

STORAGE HOUSE FOR DATA TRANSMISSION EQUIPMENT

Fig. J.4.4 STORAGE HOUSE FOR DATA TRANSMISSION EQUIPMENT



THE MASTER PLAN STUDY ON FLOOD FORECASTING AND WARNING SYSTEM FOR ATLAS REGION IN THE KINGDOM OF MOROCCO	Fig. J.4.5 FOUNDATION OF CONCRETE POLE FOR ALARME