

NATIONAL INSTITUTE FOR RESEARCH IN NUCLEAR SCIENCE.

Rutherford Laboratory Building Committee.

Site Electrical Power
Distribution.

1. Introduction.

In RLBC/P.65 an outline was given of the need for further power capacity to meet the demand of present and projected installed plant on the Rutherford Laboratory site.

Additional transformers were proposed for sub-stations 12 and 13, additional switchgear for sub-station 13 and a new 11 KV switching sub-station near Building R.14.

These proposals have now been further developed and modified and a comprehensive plan which will provide for all the anticipated electrical power demand (except that for the possible future West Experimental Area) has been evolved. Schemes 1 to 5 below are considered to be of first priority. Three further schemes could follow as they are shown to be necessary.

2. Scheme 1 - Sub-station No. 12.

Add 1250 KVA, capacity by installing one transformer in centre bay, fed at 11 KV from a shared circuit breaker in sub-station 10, and connected to the incoming position on the existing M.V. switchboard as originally designed.

Estimated total cost - £4,500.
Projected completion date - January 1963.

3. Scheme 2. - Sub-station No. 12.

Add 500 KVA capacity by removing two existing 1000 KVA transformers in bays 1 and 3 and replacing by two 1250 KVA transformers. (The 1000 KVA transformers to be used in Schemes 4 and 5).

Estimated Total cost - £5,500.
Projected completion date - January 1963.

4. Scheme 3. - Sub-station No. 12.

Add 2500 KVA capacity by installing two 1250 KVA transformers in the space originally intended for a 11/3.3 KV transformer. The two transformers to be connected to the same H.T. feeders as those in scheme 2 respectively. Provide a new M.V. switchboard in the original 3.3 KV switch room, making allowance for later connection of a third transformer. Connect these new transformers to the new switchboard.

Estimated Total Cost - £12,000.
Projected Completion date - April 1963.

5. Scheme 4. - Experimental Area Extension.

Install one of the 1000 KVA transformers released under Scheme 2 outside but adjacent to the experimental area extension to provide a supply to the M.V. switchboard being provided therein. The H.T. side to be supplied from the same O.C.B. in Substation 10 as at present feeds Transformer 2 in Sub-station 13.

Estimated Total cost - £5,000.
Projected completion date - As for the extension.

6. Scheme 5. - Parasitic Area Extension.

Install the other 1000 KVA transformer released under Scheme 2 outside but adjacent to the parasitic area extension to provide a supply to the M.V. switchboard being provided therein. The H.T. side to be supplied from the same O.C.B. in Substation 10 as at present feeds Transformer 1 in Substation 13.

Estimated total cost - £3,500.
Projected completion date - As for the extension.

7. Scheme 6 - Sub-station No. 12.

Install the 6th 1250 KVA transformer, making provision for a 7th, at the N.W. corner of the air conditioning plant house. H.T. feed connected to the same O.C.B. in Substation 10 as transformer in Bay 2. M.V. output to be cabled to an extension of the M.V. board installed in the former 3.3. KV. switchroom under Scheme 3.

Estimated total cost - £8,000.

8. Scheme 7. -

Install a third 1000 KVA transformer in Substation 10, to be fed on the H.T. side in parallel with Transformer 2. M.V. side to be connected to an extension of the existing M.V. switchboard.

Estimated total cost - £5,500.

9. Scheme 8.

Install a third 1000KVA transformer in Substation 13. The existing 3.3 KV switchroom to be reduced in size to accommodate the new transformer. The H.T. feeder to be connected to the same breaker in Substation 10 as No. 1 Transformer in that substation. The M.V. output to be connected to an extension of the existing M.V. Switchboard.

Estimated total cost - £8,000.

10. Additional capacity now proposed.

Schemes 1 to 3 give a total capacity of 6250 KVA to meet the estimated maximum demand on Sub-station 12 of 7000 KVA given in paper RLBC/P.65 para. 5. Schemes 4 and 5 cover the short term needs in the parasitic and experimental areas stated in RLBC/P.65, para. 7.

The schematic diagram at Fig. 1, shows the existing installation and the additions now proposed.

11. Future action.

Schemes 6 to 8 could be undertaken as the demand develops. If the development of the West Experimental Area proceeds the requirements now to be covered by Schemes 4 and 5 (i.e. Experimental Area and Parasitic Area extensions) would be merged with another local sub-station. If the timing was right the 1000 KVA transformers could be used for Schemes 7 and 8 and a West Area sub-station built with 1250 KVA transformers to repeat the arrangement now proposed for Sub-station 12.

12. Recommendation.

It is recommended that schemes 1 to 5 should be authorised at a total estimated cost of £30,500 (excluding fees). A detailed breakdown of the estimate for each of these schemes is given at Appendix 1.

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February, 1962.

Appendix 1.Detailed estimates.Scheme 1.

	£
1250 KVA Transformer 11/.415 KV	1,700
Install Transformer and earth	50
H.T. Isolating Unit	300
Change C.T.s and Ammeter Scale on O.C.B.	200
H.T. Cabling, 280 yds. Supply	600
Excavate, lay, tile, backfill, joint	440
M.V. Circuit breaker.	800
M.V. Cabling	150
Allowances	260
Total	£ 4,500

Scheme 2.

	£
2 - 1250 KVA transformers 11/.415 KV	3,400
Install transformer and earth	100
2 - H.T. Isolating Units	600
Change C.T.s and Ammeter Scale on 2 O.C.B.s.	400
H.T. Cabling Supply 15 yds.	40
Install & Joint	60
M.V. Cabling	420
Break down joints and remove existing transformers	100
Allowances	380
Total	£ 5,500

Scheme 3.

	£
2 - 1250 KVA transformers 11/.415 KV	3,400
Install transformers and earth	100
H.T. Cabling 50 yds.	120
Install and joint	60
M.V. Switchboard	5,500
M.V. Cable supply. 25 yds per core x 4.	800
Install, racking, jointing	500
Protection circuits	100
Builders' work - foundations for transformers	900
Allowances	520
Total	£ 12,000

Scheme 4.

	£
Move transformer, install & earth	100
H.T. Isolating Unit	300
Change C.T.s and ammeter scale on O.C.B.	200
H.T. Cable - supply 800 yds.	1,800
Pilot cable for remote tripping supply	500
Excavate, lay, tile, backfill, joint	1,300
M.V. switchgear & cabling included within the Building Sanction	-
Earthmat	85
Transformer foundations and fencing	300
Allowances	415
Total	£ 5,000

<u>Scheme 5.</u>	£
Move transformer, install and earth	100
H.T. Isolating Unit	300
Change C.T. and Ammeter Seals on O.C.B.	200
H.T. Cable supply 600 yds.	1,350
Pilot cable for remote tripping supply	400
Excavate, lay, tile, backfill, joint - 70 yds.	205
Lay remainder of cable in excavation included in Scheme 4.	180
M.V. cabling and switchboard included in building sanction	-
Earth Mat	85
Transformer foundation and fencing	300
Allowances	380
Total	£ 3,500

<u>Scheme 6.</u>	£
1 - 1250 KVA transformer 11/ .415 KV	1,700
Install and earth	100
H.T. cable 60 yds.	150
install and joint	40
M.V. switchgear, Incoming, 2nd Bus Section	
H.H. panels	3,000
M.V. cabling, Supply 50 yds. per core x 7	800
Install	500
Builders' work. Rear screen wall, dividing wall, bases for two transformers, oil sumps	1,200
Allowances	510
Total	£ 8,000

<u>Scheme 7.</u>	£
1000 KVA transformer 11/ .415KV	1,450
Install transformer & earth	50
H.T. Isolating Unit	300
Change C.T.s and Ammeter scale on O.C.B.	200
H.T. cable supply 30 yds.	75
Install and joint	40
M.V. switchgear Incoming O.C.B. + H.H. gear	2,300
Cabling	150
Foundations and enclosure	500
Allowances	435
Total	£ 5,500

<u>Scheme 8.</u>	£
1000 KVA transformer 11/ .415 KV	1,450
Install & earth	50
H.T. Isolating unit	300
Change C.T.s & Ammeter scale on O.C.B.	200
H.T. cable to Substation 10, Supply 500yds	1,200
Excavate, lay, tile, backfill, joint	800
M.V. switchboard - New board O.B.C. + H.H. units	2,000
M.V. cabling	400
CO ₂ Installation modification	300
Builders' work - Construction of transformer chamber in 3.3 KV switchroom	900
Allowances	400
Total	£ 8,000

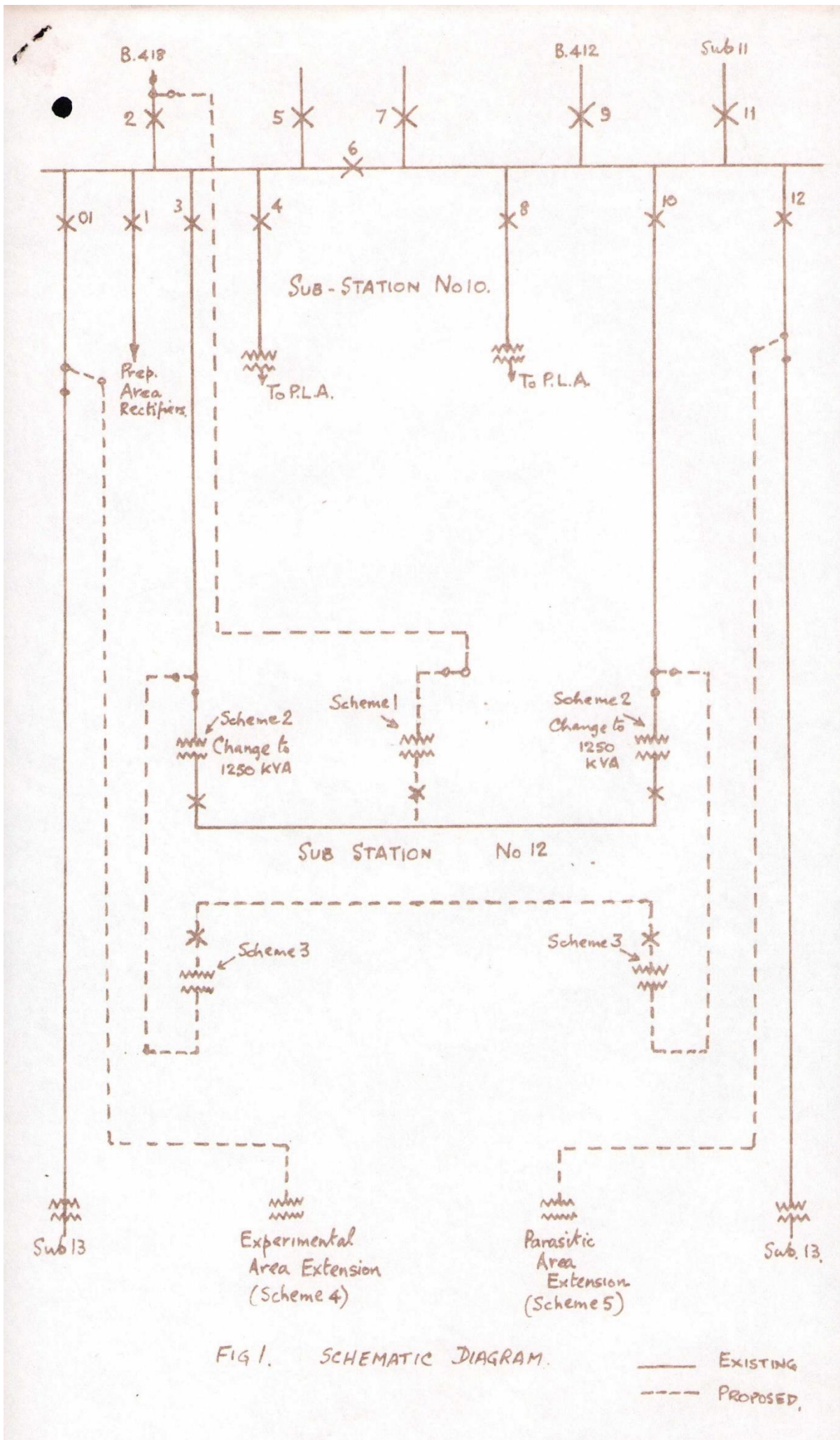


FIG 1. SCHEMATIC DIAGRAM.

— EXISTING
 - - - PROPOSED