AM ALLOCATION STUDY FOR EAST LEBANON

APRIL 1979

ELDER ENGINEERING LIMITED

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AM ALLOCATION STUDY - EAST LEBANON

1-INTRODUCTION:

This study was undertaken for High Adventure Ministries, to help in selecting transmitting facilities for a new station at Rashayya, in East Lebanon.

2-PURPOSE:

To select a combination of frequency, transmitter power and antenna height, which would operate from a specific site near Rashayya and optimize (a) daytime groundwave coverage of East Lebanon and northern Israel, (b) nighttime skywave coverage of Jerusalem and vicinity. Budgetary restrictions limit power to 50 kW or less and mast height to 300'.

3-GROUND CONDUCTIVITY:

The American University's Area Handbook for Lebanon was studied, to obtain general information concerning agricultural productivity (soil fertility) and elevations in mountainous areas. From this, the provisional ground conductivity map of Figure 1 was prepared, for use in predicting groundwave coverage. The assumed conductivity values are believed to be realistic but somewhat conservative. This could only be confirmed by actual propagation tests or measurements which would take considerable time and effort in the circumstances. If the actual conductivity values prove to be twice those assumed for example, the 5 mV/m contour will extend 30%-40% further and the 0.5 mV/m contour 40%-60% further than predicted.

4-STATUS OF THE MF BAND IN EUROPE:

A chaotic situation has developed in the MF broadcasting band throughout the European Zone, during the past 30 years. Scarcity of vacant channel assignments and increased demand has led to widespread derogation of the 1948 Copenhagen Plan. To overcome interference and/or maintain service, some countries now use transmitters with super-powers of up to 2000 kW. Monte Carlo and Luxemburg are two of the few remaining skywave services. This contrasts sharply with the situation in North America where the ceiling power is 50 kW except in Mexico, engineering criteria is still respected and clear channels are still useable.

The 1975 Geneva Conference was intended to restore some order. However, the resulting Plan includes over twice as many stations are are currently in operation, and three times the gross power. One result is that nighttime skywave interference in Middle Eastern countries will increase by an average of 5 db (77%).

Some more detailed comments by a member of the EBU's staff in Brussels follow.

> "It was the aim of the Geneva Conference to take equal account of the rights of all countries, whether small or large, and to meet the requirements of all those countries as far as possible. This objective is laid down also in the preamble to the Geneva Final Acts. A close look at the ground-wave coverage obtained by individual countries reveals that the objective is far from having been attained.
>
> 3.2.3 Sky-wave coverage
>
> As has already been mentioned, the Geneva Conference abandoned sky-wave coverage as a planning objective. Is this then, the end of long-distance coverage on MF? If one considers the usable field-strengths attained and compares them with the

planning objectives, it may be deduced that long ranges will no longer be possible if the Geneva Plan is to be implemented in full.

However, this deduction is not entirely correct, because firstly, all coverage calculations have been made for statistical annual mean values and the sky-wave is of course subject to considerable fluctuation and, secondly, those calculations were based on an agreed standard of quality (an RF protection ratio of 27 dB) whereas, in practice, those listeners who are interested in listening to such transmissions might well do so under far worse conditions.

In any case, an analysis of the situation as it is today shows that, under those conditions, even at present sky-wave coverage should no longer be possible. In practice, however, we find that this is not so although admittedly the technical quality is bad.

4. Prospects

Is it likely that the increased powers provided for in the Geneva Plan will be fully implemented? This cannot be excluded with any degree of certainty, at least as far as some countries are concerned. Thus, for instance, it is known that the German Democratic Republic and Czechoslovakia, as well as Saudi Arabia, are already engaged in putting the planned increases in power into effect. This applies in particular to the megawatt transmitters in those countries.

Furthermore, the question arises as to whether the provisions of the Geneva Plan will be exceeded in the same way as those of the Copenhagen Plan. This is not likely to be the case, because in general the Geneva Plan fully reflects the representations of the signatory countries concerning the development of their LF/MF broadcasting networks over the period of its validity.

Some exceptions must, however, be pointed out. For example, Iraq did not participate in the Geneva Conference and therefore the Conference had to make assumptions on the basis of the requests made by that country; these still have to be coordinated, according to Resolution No. 3, by November 1978. Among them is a 2000-kW transmitter giving a radiated power of 10 MW in the direction of North Africa, and the coordination will therefore not be an easy task."

Many conference delegates of countries which signed the Regional Agreement, deposited statements for inclusion in the Final Protocol, two of which are of special interest:

#26 For Lebanon

Since the usable field strength resulting from the interference which may be caused to all the frequencies assigned to Lebanon in the Plan is very high, the Lebanese Administration reserves the right to take all useful and indispensable measures to improve the protection of its broadcasts.

#51 For the State of Israel

Due to a number of aggravating factors and special conditions Israel is up to this date far from being adequately covered by its broadcasting services.

It is apparent that a further severe and unacceptable degradation of broadcast coverage in Israel must unfortunately be expected from the Plan.

Due to a shortage of time and other reasons, it was impossible to exploit in full the negotiating procedure, in order to eliminate or alleviate incompatibilities even of the most severe nature.

Notwithstanding the procedure adopted for modifications of the requirements submitted, further increases of interference have been introduced up to the final stages of the Conference.

In many cases no reduction of interference could be achieved even from planned or unregistered frequency and power requirements – even to existing and registered frequency assignments.

The Administration of Israel regretfully cannot agree to the requirements identified by frequency and, in brackets, country symbol and number of requirement: 576(BUL-2858,SDN-1645); 657 (ARS-7151,TUR-7231); 711(EGY-2645,UKR-5842); 738(OMA-0090,ALG-6887); 846 (IRQ-0547, I-3672, TUR-3075); 882 (YUG-214905, EGY-7509, ARS-4319); 1 026 (IRN-2725); 1 170 (ARS-8754, URS-583403, BLR-583401, UAE-0140); 1 359 (IRQ-0551); 1 368 (IRN-2749). These represent Israel's reservations only to the severest interference contributions, and only as regards the most vital of existing services.

Thus, it is obvious that further negotiations are indispensable and that corresponding modifications will have to be effected. Such modifications regarding the above list and other requirements of Israel will have to be introduced in order to make the Plan acceptable to its Administration. It therefore welcomes the "Recommendation concerning improvements to the Plan" (Recommendation No. 1) and will follow the procedure laid down therein.

The signature of the Delegation of Israel must therefore be considered *ad referendum* and it fully reserves the position of its Administration as the final approval of the Agreement.

> Pending such approval, Israel will endeavour to follow the principles laid down in the Agreement and will do its utmost to safeguard the recognized rights of other administrations concerned. However, in view of the facts outlined above, it reserves the right to take any measures it considers necessary to secure adequate coverage of its broadcasting services."

Frequency changes required for existing stations under the Geneva Plan (1975) were scheduled to take place on November 23, 1978. Most countries complied. (In many cases the change was only 1 kHz). Exceptions included Egypt, Greece, Israel, Syria, Jordan and Lebanon, which may have changed subsequently.

The foregoing background information is included to indicate some of the difficulties and uncertainties involved in obtaining a frequency for the proposed station.

5-EXPLANATIONS OF SOME TECHNICAL TERMS:

(Propagation, service and signal levels)

The goal was to select one or more frequency on which cochannel and adjacent channel groundwave interference is low and nighttime skywave interference is moderate, both in Lebanon and Israel. If this interference limited broadcast quality signal level to 0.5 mV/m (54 dbu) rural daytime and to 5 mV/m (74 dbu) at night, the goal would have been fully achieved. The average night limitation in the near East is presently 84 dbu.

Groundwave propagation produces fairly constant signal levels and signal to noise ratios. Skywave propagation is variable. Calculated signal levels are based upon approximate

statistical estimates and a signal to noise ratio of 26 db in North America (27 or 30 db in the EBU Zone). In many cases satisfactory reception extends well beyond the calculated limitation contour. Occasionally it is possible at signal levels that are only 20% or 30% of the limitation value.

6-FREQUENCY SEARCH:

A systematic though brief search of the whole band from 531 to 1602 kHz was carried out. Initial attention focussed on about 580 and 948 kHz based upon monitoring in Northern Israel which indicated that these channels are relatively free from interference. Detailed information was obtained from Station Lists and the Final Acts (of the 1975 Plan) published by the ITU in Geneva – see Tables 1 and 2 for typical, relevant data.

The present and future assignments in Lebanon, Israel and Syria were given special consideration. Those near Rashayya are shown on Figure 2. One that is unoccupied might be used pro tem, to minimize interference complaints from other countries.

The five frequencies shown in Table 3 were selected for further consideration. All apparently meet the foregoing objectives. Our first and second preferences are 549 and 949 kHz. No matter what frequency is used initially, a change may prove necessary later so that provision should be made to facilitate this.

7-INTERNATIONAL RECOGNITION:

It is most unlikely that any of the frequencies would be recognized internationally for the proposed station. 549 kHz would most closely comply because it is now internationally accepted for use very near Rashayya and is presumably still not in operation. However, the Lebanese Government would probably object, so that notification of the proposed 949 kHz assignment would be rejected.

Similarly an unoccupied frequency that is assigned to a nearby community in Israel or Syria might be used. However, the station could not receive international recognition from IFRB and EBU until at least:

(1) East Lebanon gains membership in the International Telecommunication Union.

and (2) Proposes a change or new frequency assignment.

and (3) Seeks agreement of all the administrations having an assignment in accordance with the 1975 Agreement in the same or an adjacent channel which is considered to be affected.

Further details are contained in the Final Acts of the Regional Administrative LF/MF Broadcasting Conference.

8-GROUNDWAVE SERVICE CONTOUR COVERAGE:

This is compared on Figures 3(1-3) for powers of 25 and 50 kW on or about 549, 949 and 1500 kHz.

A 0.5 mV/m should generally provide satisfactory daytime reception in rural areas and smaller communities.

On 549 kHz daytime reception may be possible in or near Jerusalem. Nighttime service is severely restricted — nominally to the night limitation signal strength, though in practice, (5 mV/m or) weaker signals may suffice, as previously noted.

9-MAST HEIGHT:

A height of 300' would provide satisfactory horizontal radiation efficiency and base operating impedance on any of the frequencies selected. However, to maximize the skywave signal in Jerusalem an electrical height of 250° would be necessary (see Figure 4-2). This is 1200' at 549 kHz or 450' at 1475 kHz, neither of which is economically feasible. However, a somewhat smaller height increase might be advantageous compromise at the higher frequency, if it is ever used. In this case an extended ground system would be required.

10-NIGHT SKYWAVE COVERAGE:

Noisy, intermittent skywave reception may be possible in Jerusalem, depending upon propagation conditions at the time, the mast height and frequency that are selected and the rate of implementation of the 1975 Plan. (Interference limitations will increase as more stations and higher powers commence operating; the value on 549 kHz may increase from 5 to 20 mV/m, for example).

Assuming a 300' mast on 549 kHz, the median skywave signal at Jerusalem would approximate 2 mV/m for 25 kW or 3 mV/m

for 50 kW. 25 kW might suffice but 50 kW would be a definite asset in overcoming interference.

With a 470' mast on 1475 kHz, the median signal in Jerusalem and vicinities would be 3.5 or 5 mV/m, for 25 or 50 kW.

11-CONCLUSIONS AND RECOMMENDATIONS:

We have investigated various frequencies and other factors in this short study, in order to obtain efficient transmitting facilities and adequate coverage. The resulting service can quickly be assessed by feedback from listeners. If nighttime reception is inadequate or becomes so, another frequency should be chosen and test transmissions made on it. Table 3 should be helpful in this respect.

J. Gordon Elder

J. Gordon Elder, P. Eng.

19th April 1979

UNION EUROPEENNE DE RADIODIFFUSION
CENTRE TECHNIQUE
AVENUE ALBERT LANCASTER, 32
BRUXELLES

STATIONS DE RADIODIFFUSION EN ONDES KILOMETRIQUES ET HECTOMETRIQUES

(Situation du spectre au 1er mai 1978)

ZONE EUROPEENNE

EUROPEAN BROADCASTING UNION
TECHNICAL CENTRE
AVENUE ALBERT LANCASTER, 32
BRUXELLES

LF AND MF BROADCASTING STATIONS

(Conditions in the spectrum on 1st May 1978)

EUROPEAN AREA

LEGENDE

PUISSANCE

- Egale ou supérieure à 100 kW
- Inférieure à 100 kW
- Inférieure à 10 kW
- Inférieure à 1 kW
- Puissance inconnue
- Emission de brouillage dans le canal

La lettre S indique que plusieurs stations d'un même pays partagent le même canal. La puissance mentionnée est la somme des puissances de ces stations ; le pays est désigné par son symbole dans la Liste internationale des fréquences de l'U.I.T.

Les stations mentionnées dans les bandes rouges utilisent un canal qui n'a pas été assigné à leur pays par le Plan de Copenhague (1948).

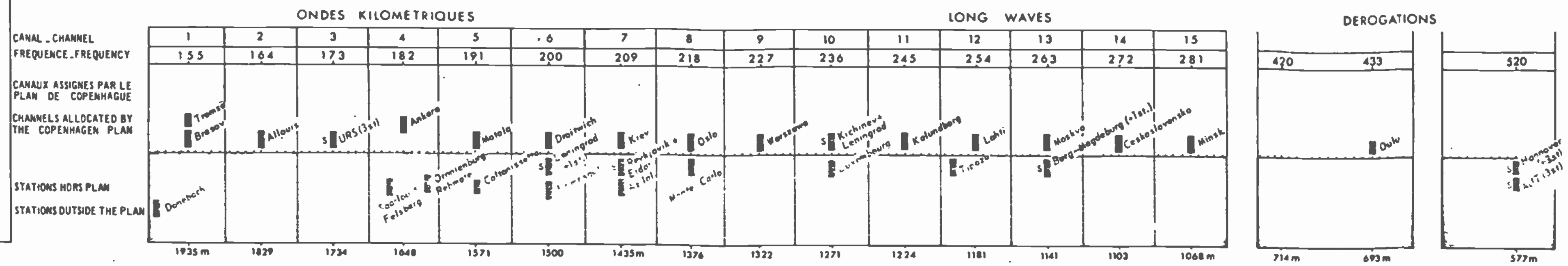
LEGEND

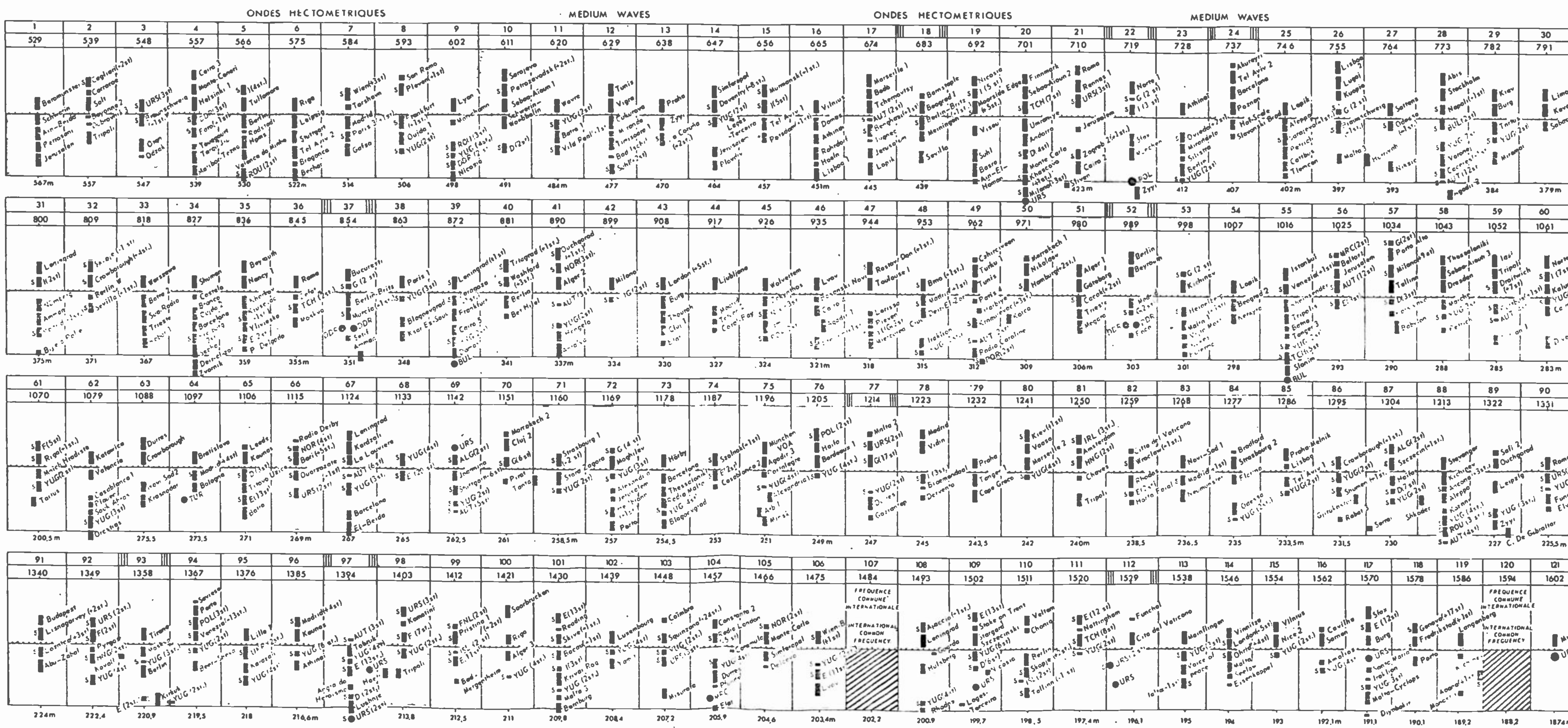
POWER

- Not less than 100 kW
- Less than 100 kW
- Less than 10 kW
- Less than 1 kW
- Unknown
- Jamming transmission in the channel

The letter S indicates that several stations in the same country share the same channel. The power shown is the sum of the powers of these stations ; the country is designated by the appropriate symbol in the I.T.U. International Frequency List.

The stations within the red area operate in channels that were not assigned to their countries by the Copenhagen Plan (1948).





	1	2	3	4		5	6	7	8	9	10	11	12	13	14	15
1	549	LES TREMBLES	ALG	00W37	35N17	D 9	600	29.9				A	268	4	0000—2400	
2	(3)	DIRIYAH	ARS	46E37	24N39	C10	1	0.4				A	107	4	0300—2300	
3		DUBA	ARS	35E36	27N25	C 9	2000	41.0	296	350—250	25.0	B		4	0300—1600	
4		GIZAN	ARS	42E31	16N52	C 9	1000	35.0	120	220— 80	15.0	B		4	1500—0300	
5		S CUMNOCK NSW	AUS	148E42	32S46	A20	50	17.6				A	198	4	1900—1400	
6		S GRAFTON NSW	AUS	153E07	29S29	A20	50	17.4				A	152	3	1900—1400	
7		S MINSK	BLR	27E34	53N56	A16	1000	32.1				A	257	4	0000—2400	
8		S SANMING	CHN	117E36	26N14	A20	100	22.1				A	240	4	2000—1800	
9		S ZHANGZHOU	CHN	117E40	24N30	A20	100	22.1				A	240	4	2000—1800	
10		S BAYREUTH	D	11E30	50N00	D 9	200	23.6				A	200	4	0000—2400	
11		S RECKLINGHAUSEN	D	07E25	51N45	D 9	100	20.4	55	200—270	12.0	B		4	0000—2400	
12		S ALMANSA	E	01W06	38N52	D 9	0.3	−5.2				A	50	5	0000—2400	19
13		S BAZA	E	02W46	37N29	D 9	0.3	−5.2				A	50	5	0000—2400	19
14		S BEJAR	E	05W46	40N23	D 9	0.3	−5.2				A	50	5	0000—2400	19
15		S CD REAL	E	03W56	38N59	D 9	0.5	−3.0				A	50	4	0000—2400	19
16		S CUENCA	E	02W08	40N04	D 9	0.5	−3.0				A	50	5	0000—2400	19
17		S LOGRONO	E	02W30	42N26	D 9	20	13.4				A	96	4	0000—2400	19
18		S MALAGA	E	04W29	36N38	D 9	20	13.0				A	40	5	0000—2400	19
19		S OVIEDO	E	05W52	43N23	D 9	100	20.4				A	127	5	0000—2400	19
20		S POZOBLANCO	E	04W51	38N23	D 9	0.3	−5.2				A	50	5	0000—2400	19
21		S TORTOSA	E	00E31	40N49	D 9	0.5	−3.0				A	50	4	0000—2400	19
22		S VALLADOLID	E	04W43	41N39	D 9	1	0.0				A	50	4	0000—2400	19
23		ASSAB	ETH	42E46	13N01	C 9	50	17.4				A	137	3	0400—2300	
24		OYEM	GAB	11E36	01N40	C 9	20	13.4				A	100	5	0400—2400	
25		BIKANER	IND	73E22	28N01	A20	300	26.9				A	275	4	0300—0900	25
26		RANCHI	IND	85E23	23N23	C 9	200	25.1				A	275	3	0000—2400	
27		TINNEVELLY	IND	77E44	08N44	C 9	300	26.9				A	275	3	0300—1000	25
28		RAMALLAH	JOR	35E13	31N55	A20	20	13.6				A	220	5	0300—2300	
29		SEOUL	KOR	126E59	37N32	C10	5	7.4				A	90	4	0000—2400	
30		TELZNOUB	LBN	35E46	33N39	A20	100	25.0	210	297—352	1.0	B		4	0300—2400	16
31		BATU MELINTANG	MLA	101E44	05N43	A20	5	7.0				A	61	5	2200—1700	
32		KUCHING	MLA	110E20	01N33	A20	20	13.4				A	137	5	2200—1600	
33		UBURKHANGAI	MNG	102E20	46N20	A18	10	10.6				A	200	5	2200—1500	
34		KANO	NIG	08E33	12N03	C 9	50	17.4				A	125	4	0500—2300	
35		BASILAN CITY	PHL	121E58	06N42	C 9	5	7.4				A	136	3	2100—1600	
36		NAHA	RYU	127E42	26N10	A15	10	10.4				A	107	4	0000—2400	
37		KRABI	THA	98E55	08N33	A20	10	10.0				A	30	3	0000—2400	
38		LAMPANG	THA	99E31	18N17	A20	500	30.0	350			B		5	0000—2400	
39		S ROVNO	UKR	26E14	50N39	A16	150	23.9				A	257	4	0000—2400	
40		S SIMFEROPOL	UKR	34E03	44N58	A16	100	22.1				A	257	4	0000—2400	
41		S ALMA ATA	URS	77E02	43N15	A16	1000	34.0	340	150—180	25.0	B		4	0000—2400	
42		S DUCHANBE	URS	68E49	38N34	A16	50	19.1				A	257	4	0000—2400	
43		S IAKUTSK	URS	129E42	61N51	A16	50	19.1				A	257	5	0000—2400	
44		S KALININGRAD	URS	20E30	54N45	A16	25	16.1				A	257		0000—2400	
45		S KICHINIOV	URS	28E52	47N00	A16	1000	33.0	90	200—210	24.0	B		4	0000—2400	
46		S KIROVOBAD	URS	46E21	40N39	A16	65	20.2				A	257	4	0000—2400	
47		S LENINGRAD	URS	30E00	59N44	A16	100	22.1				A	257	4	0000—2400	
48		S MAGADAN	URS	151E50	59N40	A16	500	29.1				A	257	5	0000—2400	
49		S MOSKVA	URS	37E08	55N54	A16	100	22.1				A	257	4	0000—2400	
50		S NOVOKUZNETSK	URS	87E07	53N45	A18	150	23.9				A	257	4	0000—2400	
51		S SVOBODNYI	URS	128E00	51N30	C 9	150	23.9				A	257	4	0000—2400	
52		S TIUMEN	URS	65E30	57N02	A18	150	23.9				A	257	4	0000—2400	
53		S UKHTA KAR	URS	31E09	65N11	A16	20	15.1				A	257	4	0000—2400	
54		S URGHENTCH	URS	60E20	41N40	A18	150	23.9				A	257	4	0000—2400	

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	945	FARAH	AFG	62E08 32N23	C 9	10	10.4				A	60	4	0100—2000	
2	(47)	LUANDA	AGL	13E14 08S48	C10	1	0.4				A	65	3	0500—2400	
3		GURIAT	ARS	37E25 31N25	C 9	1000	36.0	270	10—170	15.0	B		4	0000—2400	24
4		CHARLEVIL QLD	AUS	146E00 27S00	A20	5	7.4				A		2	1900—1400	
5		MEEKATHARRA WA	AUS	118E30 27S00	A20	10	12.1				A		4	2100—1600	
6		S AIHUI	CHN	127E20 50N18	A20	20	13.6				A	90	4	2000—1800	
7		S ANHUA	CHN	111E13 28N22	A20	10	10.6				A	90	4	2000—1800	
8		S ANSHAN	CHN	122E58 41N07	A20	10	10.6				A	90	4	2000—1800	
9		S ANXI	CHN	95E32 40N30	A20	5	7.6				A	90	4	2000—1800	
10		S BEIAN	CHN	126E40 48N18	A20	1	0.6				A	90	4	2000—1800	
11		S BO XIAN	CHN	115E46 33N53	A20	5	7.6				A	90	4	2000—1800	
12		S CHANGSHA SHI	CHN	112E45 28N09	A20	50	17.6				A	90	4	2000—1800	
13		S CHU XIAN	CHN	118E18 32N19	A20	10	10.6				A	90	4	2000—1800	
14		S CHUXIONG	CHN	101E28 25N02	A20	20	13.6				A	90	5	2000—1800	
15		S DEZHOU	CHN	116E17 37N27	A20	20	13.6				A	90	4	2000—1800	
16		S ERGUNE ZUOQI	CHN	121E30 50N50	A20	10	10.6				A	90	4	2000—1800	
17		S FUSHUN SHI	CHN	123E53 41N51	A20	5	7.6				A	90	4	2000—1800	
18		S FUXIN SHI	CHN	121E38 42N02	A20	20	13.6				A	90	4	2000—1800	
19		S HABAHE	CHN	87E03 48N04	A20	10	10.6				A	90	4	2000—1800	
20		S HARBIN	CHN	126E52 45N49	A20	20	13.6				A	90	4	2000—1800	
21		S HUAINAN	CHN	117E00 32N41	A20	5	7.6				A	90	4	2000—1800	
22		S JIAMUSI	CHN	130E30 46N40	A20	20	13.6				A	90	4	2000—1800	
23		S JIANCHANG	CHN	119E48 40N49	A20	20	13.6				A	90	4	2000—1800	
24		S JIAYUGUAN	CHN	98E12 39N50	A20	5	7.6				A	90	4	2000—1800	
25		S JINGDONG	CHN	100E45 24N24	A20	5	7.6				A	90	5	2000—1800	
26		S JINGSHAN	CHN	113E06 31N02	A20	20	13.6				A	90	4	2000—1800	
27		S JIXI	CHN	130E58 45N18	A20	20	13.6				A	90	4	2000—1800	
28		S KUNMING	CHN	102E50 25N10	A20	50	17.6				A	90	5	2000—1800	
29		S LANZHOU	CHN	103E50 36N02	A20	20	13.6				A	90	4	2000—1800	
30		S LEIYANG	CHN	112E51 26N25	A20	10	10.6				A	90	4	2000—1800	
31		S LIAOCHENG	CHN	115E58 36N26	A20	10	10.6				A	90	4	2000—1800	
32		S LINTAN	CHN	103E21 34N42	A20	5	7.6				A	90	4	2000—1800	
33		S MANZHOULI	CHN	117E30 49N28	A20	20	13.6				A	90	4	2000—1800	
34		S MINQIN	CHN	102E58 38N36	A20	20	13.6				A	90	4	2000—1800	
35		S MOHE	CHN	122E10 53N21	A20	20	13.6				A	90	4	2000—1800	
36		S NINGYUAN	CHN	111E59 25N35	A20	10	10.6				A	90	4	2000—1800	
37		S ONGNIUD QI	CHN	118E54 42N55	A20	20	13.6				A	90	4	2000—1800	
38		S PUER	CHN	101E02 22N57	A20	20	13.6				A	90	5	2000—1800	
39		S QIANYANG	CHN	110E09 27N20	A20	10	10.6				A	90	4	2000—1800	
40		S QIQIHAR	CHN	123E58 47N18	A20	10	10.6				A	90	4	2000—1800	
41		S RAOHE	CHN	134E00 46N40	A20	20	13.6				A	90	4	2000—1800	
42		S RUSHAN	CHN	121E29 36N53	A20	20	13.6				A	90	4	2000—1800	
43		S SHAN XIAN	CHN	116E05 34N48	A20	5	7.6				A	90	4	2000—1800	
44		S TAXKORGAN	CHN	75E08 37N42	A20	10	10.6				A	90	4	2000—1800	
45		S TENGCHONG	CHN	98E20 25N00	A20	20	13.6				A	90	5	2000—1800	
46		S TIANSHUI SHI	CHN	105E30 34N30	A20	10	10.6				A	90	4	2000—1800	
47		S TONGLING	CHN	117E47 30N57	A20	5	7.6				A	90	4	2000—1800	
48		S URUMQI SHI	CHN	87E30 43N35	A20	100	22.0	140	290— 10	16.0	B		4	2000—1800	
49		S WEIXI	CHN	99E12 27N10	A20	10	10.6				A	90	5	2000—1800	
50		S WENSHAN	CHN	104E15 23N22	A20	5	7.6				A	90	5	2000—1800	
51		S WUFENG	CHN	110E40 30N12	A20	25	14.6				A	90	4	2000—1800	
52		S XIANNING	CHN	114E17 29N52	A20	10	10.6				A	90	4	2000—1800	
53		S XIAOYI	CHN	111E48 37N07	A20	10	10.6				A	90	4	2000—1800	
54		S XIN XIAN	CHN	112E40 38N25	A20	10	10.6				A	90	4	2000—1800	

	1		2	3	4		5	6	7	8	9	10	11	12	13	14	15
1	945	S	YANGCHENG	CHN	112E25	35N29	A20	10	10.6				A	90	4	2000—1800	
2	(47)	S	YONGSHUN	CHN	109E51	29N00	A20	10	10.6				A	90	4	2000—1800	
3		S	YUNLONG	CHN	99E19	25N56	A20	5	7.6				A	90	5	2000—1800	
4		S	ZHONGDIAN	CHN	99E37	27N45	A20	5	7.6				A	90	5	2000—1800	
5		S	ZHUANGHE	CHN	123E01	39N41	A20	10	10.6				A	90	4	2000—1800	
6		S	ZIBO	CHN	118E03	36N48	A20	5	7.6				A	90	4	2000—1800	
7		S	ZUOQUAN	CHN	113E22	37N05	A20	10	10.6				A	90	4	2000—1800	
8			GALLE	CLN	80E12	06N05	A10	10	10.4				A	50	5	0000—1800	
9			MINDELO	CPV	24W59	16N53	A18	10	10.0				A	40	6	1900—2400	
10			ADIUGRI	ETH	38E49	14N54	C 9	100	22.1				A	170	3	0400—2100	
11			TOULOUSE	F	01E20	43N21	D 9	300	26.9				A	132	3	0000—2400	
12			MESSOLGION	GRC	21E33	38N22	C 9	10	10.4				A	65	4	0400—2400	
13			AGARTALA	IND	91E23	23N50	A20	300	26.9				A	160	3	0300—0900	25
14			AURANGABAD	IND	75E18	19N54	A20	300	26.9				A	160	3	0300—1000	25
15			KAVARATHY I	IND	72E42	10N36	A20	300	26.9				A	160	4	0300—1000	25
16			ROURKELA	IND	85E00	22N12	A20	100	22.1				A	160	4	0000—2400	
17			MARIVAN	IRN	46E10	35N33	A20	20	13.4				A	79	3	0200—2100	
18			HIKONE	J	136E10	35N15	A15	1	0.6				A	108	5	0000—2400	
19			MURORAN	J	140E59	42N19	A15	3	7.0	20			B		5	0000—2400	
20			TOKUSHIMA	J	134E35	34N04	A15	5	9.0	250			B		5	0000—2400	
21			WEONJU	KOR	127E56	37N23	C10	10	10.6				A	110	6	0000—2400	
22			HYESAN	KRE	128E12	41N24	A16	1	0.0				A	30		2000—1800	16
23			GREENVIL	LBR	09W02	05N01	A20	10	10.4				A	76	5	0500—2400	
24		S	JOHORE BAHRU	MLA	103E45	01N27	A20	50	19.1				A	150	5	2200—1700	
25		S	TRONOH	MLA	100E59	04N23	A20	100	22.1				A	150	5	2200—1700	
26			GOUNDAM	MLI	03W40	16N25	C 9	10	12.1				A	158		0600—2400	
27			ABEOKUTA	NIG	03E18	07N10	C 9	10	10.6				A	100	4	0400—2300	
28			SOKOTO	NIG	05E18	12N57	C 9	50	17.6				A	100	4	0500—2300	
29			GISBORNE	NZL	178E04	38S42	A20	5	7.4				A	50	5	0000—2400	
30			COTABATO CITY	PHL	124E14	07N13	C 9	5	7.4				A	79	3	2100—1600	
31			ROXAS CITY	PHL	122E45	11N34	C 9	1	0.4				A	79	3	2100—1600	
32			MIERCUREA CIUC	ROU	25E48	46N23	A20	15	12.4				A	105	5	0000—2400	
33			ABU HAMED	SDN	33E08	15N30	A20	100	23.4				A	205	3	0500—1600	24
34			GIZO	SLM	156E50	08S06	A20	10	12.1				A		1	1900—1200	
35			S TOME	STP	06E45	00N21	A20	5	7.4				A	80	3	0000—2400	16
36			KOUMRA	TCD	17E33	08N55	C 9	5	7.4				A			0400—2300	
37			CHOMUTOV	TCH	13E24	50N28	A20	1	0.4				A	60	5	0000—2400	
38			VARNSDORF	TCH	14E36	50N54	A20	1	0.4				A	60	5	0000—2400	
39			JOHNS CORNER	TGK	35E12	08S20	C 9	50	17.4				A	77	4	0300—2100	
40			PAVLODAR	URS	76E57	52N18	A18	50	21.0	320	120—160	7.0	B		4	0000—2400	
41			RIGA	URS	24E00	56N55	A16	50	20.4				A	220	4	0000—2400	
42			ROSTOV NA DONU	URS	39E43	47N12	A16	300	27.7	60	180—300	12.7	B		4	0000—2400	
43			TAICHET	URS	98E01	55N57	A18	50	20.4				A	220	4	0000—2400	

	1		2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	954		CHARTERSTRS QL	AUS	146E18 20S06	A20	5	7.4				A		3	1900—1400	
2	(48)		SYDNEY NSW	AUS	151E04 33S51	A20	5	9.1				A	145	4	0000—2400	
3			PNT DELGADA	AZR	25W40 37N45	A20	10	10.4				A	60	4	0000—2400	
4			PHNOM PENH	CBG	104E55 11N34	C10	1	0.4				A	80	3	0000—2400	
5		S	DANBA	CHN	101E53 30N53	A20	20	13.6				A	90	4	2000—1800	
6			HAIKOU	CHN	110E15 20N02	A20	30	15.4				A	90	4	2000—1800	
7			JIANHE	CHN	108E45 26N39	A20	5	7.6				A	90	5	2000—1800	
8		S	NEIJIANG SHI	CHN	105E15 29N39	A20	20	13.6				A	90	4	2000—1800	
9		S	SHIMIAN	CHN	102E27 29N12	A20	10	10.6				A	90	4	2000—1800	
10			TIANJIN	CHN	117E09 39N09	A20	50	17.6				A	90	4	2000—1800	
11			VALENCIA	E	00W20 39N25	D 9	20	13.4				A	80	4	0000—2400	19
12			LONDON MEDWAY	G	00E32 51N22	A20	1	0.4				A	60	3	0000—2400	
13			IRAKLION	GRC	25E07 35N20	C 9	20	13.4				A	65	5	0400—2400	
14			DHARMSALA	IND	76E15 32N12	A20	300	26.9				A	160	3	0300—0900	25
15			NAJIBABAD	IND	78E12 29N24	A20	200	25.1				A	160	3	0300—0900	25
16			NAJIBABAD	IND	78E12 29N24	A20	100	22.0	25	245—275	13.0	B		3	0900—0300	
17			PONDICHERRY	IND	79E54 12N00	A20	300	26.9				A	160	3	0300—1000	25
18			KENDARI	INS	122E36 03S57	A18	10	10.4				A	78	5	2100—1600	
19			HAIFA	ISR	35E03 32N49	D 9	100	23.0				A	157	3	0000—2400	18/TUR 33
20			TOKYO	J	139E40 35N48	A15	100	22.1				A	129	4	0000—2400	
21			KISUMU	KEN	34E45 00S05	C 9	100	22.1				A	130	4	0000—2400	
22			UNRYUL	KRE	125E10 38N30	A16	1	0.0				A	30		2000—1800	
23			BEYROUTH	LBN	35E29 33N54	A20	10	10.4				A	65	4	0300—2400	16 24
24			SANOKOLE	LBR	08W43 07N22	A20	10	10.4				A	79	5	0500—2400	
25			KUCHING	MLA	110E20 01N33	A20	10	12.1				A	137	5	2200—1500	
26			ARWAIHER	MNG	102E20 46N20	A18	5	7.6				A	120	5	2200—1500	
27			ATAR	MTN	13W03 20N31	B20	20	13.4				A	79		0600—2400	24
28			ENUGU	NIG	07E28 06N27	C 9	10	10.4				A	80	4	0500—2300	
29			HAMILTON	NZL	175E21 37S53	A20	2	3.4				A	50	3	0000—2400	
30			GWADAR	PAK	62E30 25N10	A20	10	10.4				A	78	4	0000—2000	
31			ILIGAN CITY	PHL	124E14 08N13	C 9	1	0.4				A	78	3	2100—1600	
32			VALENZUELA BUL	PHL	120E58 14N40	C 9	10	10.4				A	78	3	0000—2400	
33			AL ARISH	QAT	51E04 26N03	D 9	750	37.0	280	310—240	26.0	B		5	0300—2100	24
34			DEIR EZ ZOR.	SYR	40E12 35N25	C 9	60	17.8				A	33	2	0300—2400	
35			FADA	TCD	21E35 17N11	C 9	10	12.1				A			0500—2300	
36		S	BRNO	TCH	17E08 49N23	C 9	750	32.2				A	184	4	0000—2400	
37		S	KARLOVY VARY	TCH	12E52 50N15	C 9	30	15.2				A	60	5	0000—2400	
38		S	OSTRAVA	TCH	18E12 49N48	C 9	50	17.6				A	100	5	0000—2400	
39		S	PLZEN	TCH	13E23 49N45	C 9	60	18.4				A	100	4	0000—2400	
40		S	BANGKOK	THA	100E36 13N55	A20	5	7.0				A	36	2	0000—2400	
41		S	CHANDHABURI	THA	102E06 12N36	A20	5	7.4				A	42	3	0000—2400	
42		S	MAHA SARAKHAM	THA	103E18 16N10	A20	1.1	0.8				A	75	3	0000—2400	
43		S	NAKHON SAWAN	THA	100E18 15N16	A20	5	7.4				A	60	2	0000—2400	
44		S	PHITSANULOK	THA	100E22 16N49	A20	5	7.4				A	45	2	0000—2400	
45		S	UDON THANI	THA	102E48 17N23	A20	5	7.4				A	78	3	0000—2400	
46			TRABZON	TUR	39E46 40N59	D 9	300	26.9				A	157	3	0200—2300	18/ISR
47			ARALSK	URS	61E41 46N45	A18	150	26.7	30	150—260	15.7	B		4	0000—2400	
48			BIKIN	URS	134E14 46N49	C 9	50	17.6				A	90	4	0000—2400	

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1476	BEGA NSW	AUS	149E51 36S42	A20	5	7.4				A	37	4	1900–1400	
2	(106)	ROMA QLD	AUS	148E49 26S34	A20	5	7.4				A	52	2	1900–1400	
3		WIEN BISAMBERG	AUT	16E23 48N19	D 9	1200	34.2				A	120	4	0000–2400	
4		BUJUMBURA	BDI	29E30 03S25	C 9	1	0.4				A	51	4	0300–2400	
5		BEIJING	CHN	116E27 39N57	A20	20	13.4				A	50	4	2000–1800	
6		HUANGSHI	CHN	115E06 30N13	A20	10	10.4				A	50	4	2000–1800	
7		WENCHENG	CHN	120E06 27N47	A20	200	23.0	210	340– 80	19.0	B		4	2000–1800	
8		MPIAKA BRAZZA	COG	15E18 04S15	A20	50	19.1				A	102		0000–2400	
9		COTONOU	DAH	02E28 06N22	C10	50	17.4				A	51	4	0500–2400	
10		S BARCELONA	E	02E10 41N25	D 9	25	14.4				A	40	5	0000–2400	19
11		S CEUTA	E	05W20 35N55	D 9	5	7.4				A	40	4	0000–2400	19
12		S LERIDA	E	00E40 41N35	D 9	5	7.4				A	40	5	0000–2400	19
13		S PENARROYA	E	05W15 38N20	D 9	5	7.4				A	40	4	0000–2400	19
14		S SANTANDER	E	03W50 43N30	D 9	5	7.4				A	40	5	0000–2400	19
15		S SORIA	E	02W30 41N45	D 9	5	7.4				A	40	5	0000–2400	19
16		S TOLEDO	E	04W00 39N50	D 9	5	7.4				A	40	4	0000–2400	19
17		S UBEDA	E	03W20 38N00	D 9	5	7.4				A	40	4	0000–2400	19
18		S ZAMORA	E	05W45 41N30	D 9	5	7.4				A	40	4	0000–2400	19
19		S ASSWAN	EGY	32E57 24N04	D 9	10	12.1				A	100	3	0000–2400	
20		S ASYUT	EGY	31E04 27N11	D 9	10	12.1				A	100	3	0000–2400	
21		S KENA	EGY	32E43 26N10	D 9	10	12.1				A	100	3	0000–2400	
22		ASMARA	ETH	38E56 15N21	C 9	10	10.4				A	50	3	0400–2100	
23		KINDIA	GUI	13W15 10N02	C 9	100	20.4				A	51	4	0000–2400	
24		BHADRAVATI	IND	75E36 13N53	A20	20	15.1				A	105	3	0300–1000	25
25		JAIPUR	IND	75E50 26N54	A20	20	16.0	150	325–335	0.0	B		4	0000–2400	
26		ROURKELA	IND	85E00 22N12	A20	20	15.1				A	105	4	0300–0900	25
27		VARANASHI	IND	83E00 25N20	A20	20	15.1				A	105	3	0300–0900	25
28		SURAKARTA	INS	110E50 07S32	A18	50	19.1				A	100	5	2200–1700	
29		SANANDAJ	IRN	47E00 35N20	A20	20	13.4				A	51	3	0100–2200	
30		IIDA	J	137E51 35N30	A15	0.5	–0.9				A	102	5	0000–2400	
31		OZU	J	132E34 33N31	A15	0.1	–9.4				A	74	5	0000–2400	
32		MILYANG	KOR	128E45 35N23	C10	1	0.6				A	80	4	0000–2400	
33		KUJANG	KRE	126E02 39N51	A16	1	0.4				A	30		2000–1800	16
34		TUARAN	MLA	116E11 06N11	A20	600					B		5	2200–1700	
35		ALTAI	MNG	96E10 46N30	A18	5	10.4				A	120	5	2200–1500	
36		JOAO BELO	MOZ	33E38 25S02	C10	10	10.4				A	54	4	0400–2200	
37		POTISKUM	NIG	11E02 11N50	C 9	50	19.1				A	100	4	0500–2300	
38		AUCKLAND	NZL	174E46 36S57	A20	5	10.0	70	180–300	3.0	B		3	0000–2400	
39		SARGODHA	PAK	73E00 32N00	A20	10	10.4				A	51	3	0000–2000	
40		CAL MINDORO	PHL	121E10 13N24	C 9	5	7.6				A	63	3	0000–2400	
41		BIHARAMULO	TGK	31E30 03S00	C 9	20	15.1				A	107	4	0300–2100	
42		MAHENGE	TGK	36E42 06S42	C 9	20	16.4				A	134	4	0300–2100	
43		LAMPHUN	THA	99E02 18N34	A20	100	22.1				A	108	5	0000–2400	
44		DUBAI	UAE	55E16 25N14	C 9	600	29.9				A	100	5	0200–2100	
45		LVOV	UKR	24E00 49N50	A16	120	24.2				A	120	4	0400–1700	2/0104/3009
46		LVOV	UKR	24E00 49N50	A16	120	24.2				A	120		0530–1500	2/0110/3103
47		BAKU	URS	49E45 40N24	A16	25	17.4				A	120	4	0000–2400	
48		VLADIVOSTOK	URS	131E53 43N07	C 9	100	24.0	80	260–270	10.0	B		4	0000–2400	
49		ZAMBEZI	ZMB	23E07 13S32	A20	10	12.1				A	103	4	0200–2100	

1485 kHz (107) Canal pour émetteurs de faible puissance – voir l'appendice 1
Low-power channel – see Appendix 1
Canal para transmisores de baja potencia – véase el apéndice 1

TABLE 3

SELECTED FREQUENCIES

kHz	APPROX. ESTIMATED PRESENT NIGHT LIMITATION mV/m	APPROX. MILES TO CONTOUR ON BEARING 200° 5 m V/m 25 kW	50 kW	.5 mV/m 25 kW	50 kW
525[1]±	—	—	—	—	—
549[2]	5	33	40	130	150
675[3]	26	—	—	—	—
949[4]	—	14	18	60	70
1476	10	9	11	37	45
1485[5]	(5)	—	—	—	—

NOTE

1 - 525 kHz below the standard band, which now begins at 531 kHz; some receivers would not tune sufficiently low. The night limitation on 531 kHz is 100 mV/m from a Jerusalem station.

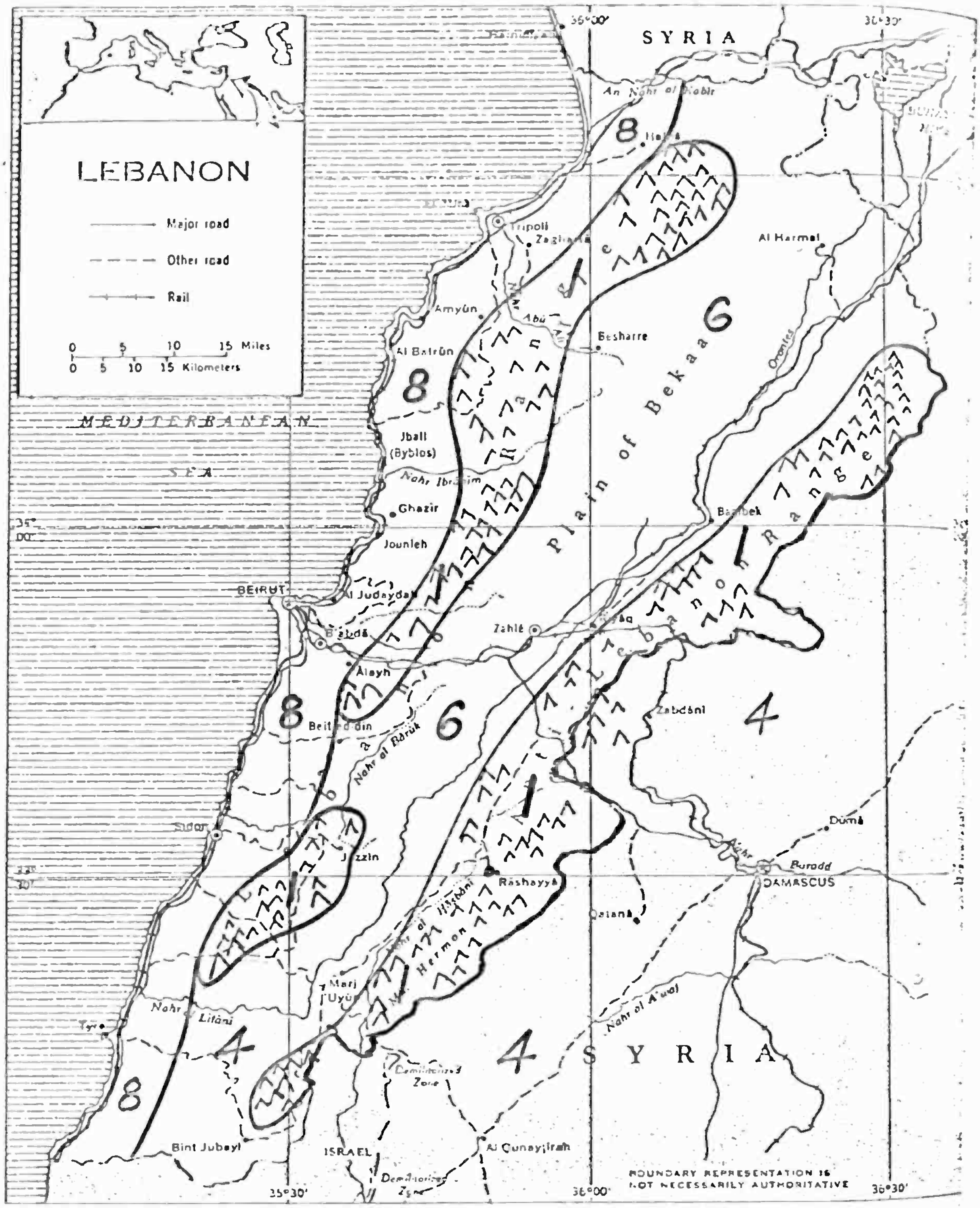
2 - Now allocated to Telznoub, Lebanon approx. 12 miles north east of Rashayya at a maximum power of 100 kW.

3 - 675 kHz might be used temporarily until the proposed Ben Hilel station is ready to commence operation, provided that the 200 kW Jerusalem station has already moved from 674 kHz to its newly assigned frequency of 711 kHz.

4 - 949 kHz is a mid-channel and not a recognized carrier frequency. The night limitation on 945 and 954 kHz are approximately 25 and 37 mV/m, respectively.

5 - An international common frequency restricted to power of 1 KW or less.

FIGURE 1



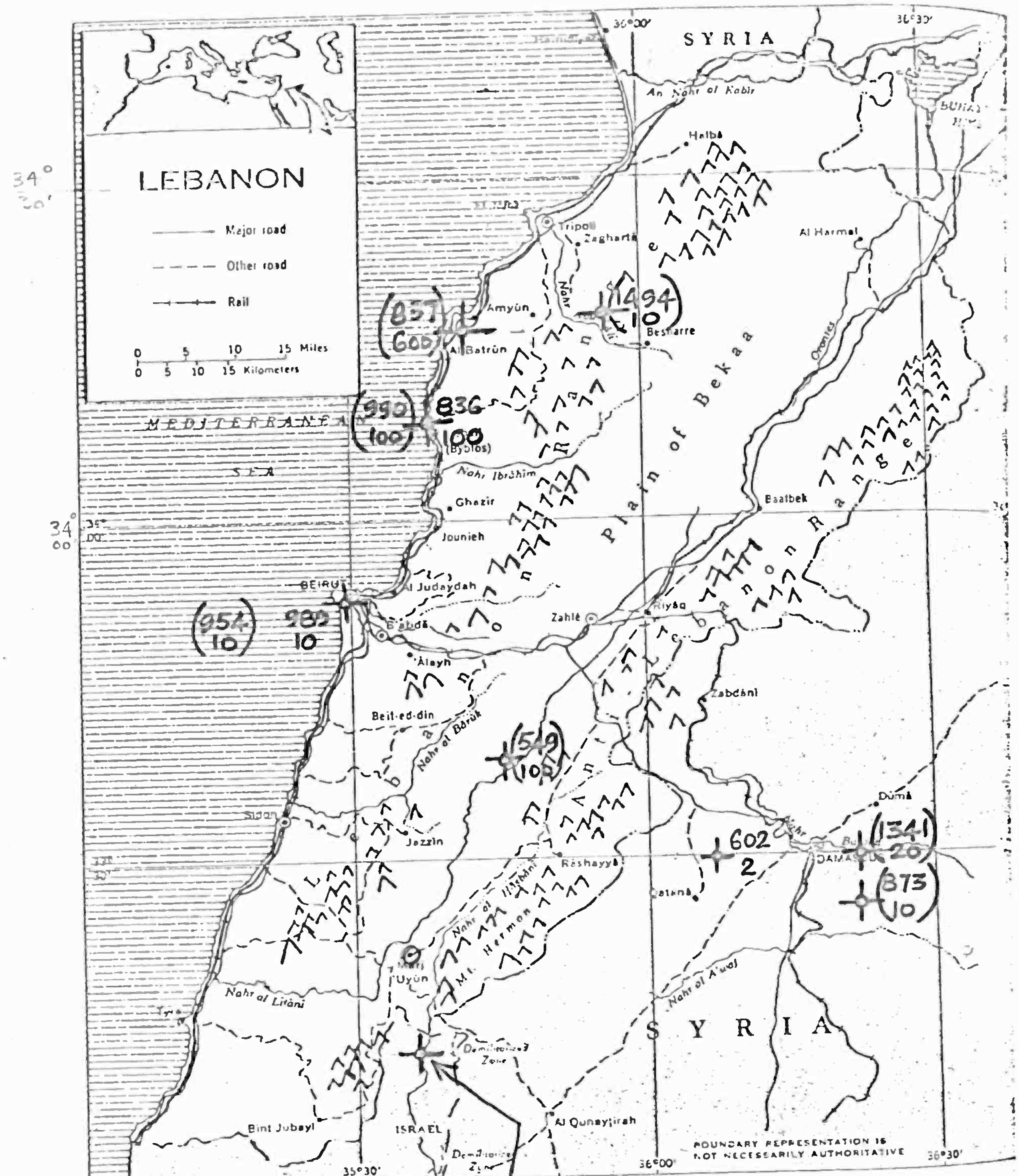
264 ◇ LEBANON

Conductivity values in millimhos/m

PROVISIONAL GROUND CONDUCTIVITY
MAP OF LEBANON

E.E.L. APRIL 1979

FIGURE 2

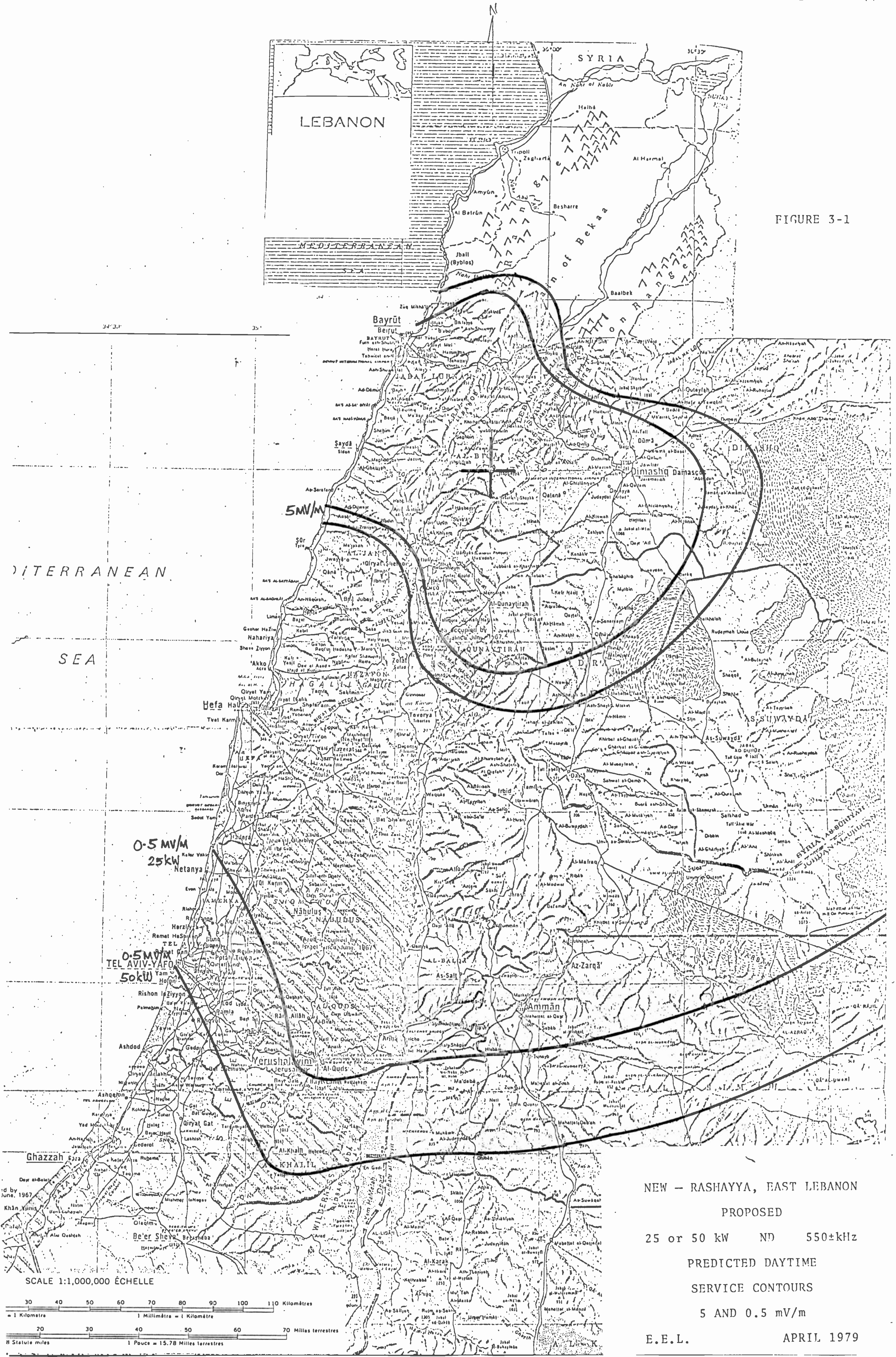


	kHz	kW
PRESENT IN USE	881	.05
	1079	1
	1493	1
(BEN HILEL)		
1975 PLAN	675	400
	882	5
	1089	1
	1278	5

PRESENT AND PROPOSED MF BROADCAST ASSIGNMENTS IN THE NEA INCLUDING KHz & KW (1975 PLAN IN BRACKETS)

EEL. APRIL 1979

FIGURE 3-1



NEW – RASHAYYA, EAST LEBANON

PROPOSED

25 or 50 kW ND 550±kHz

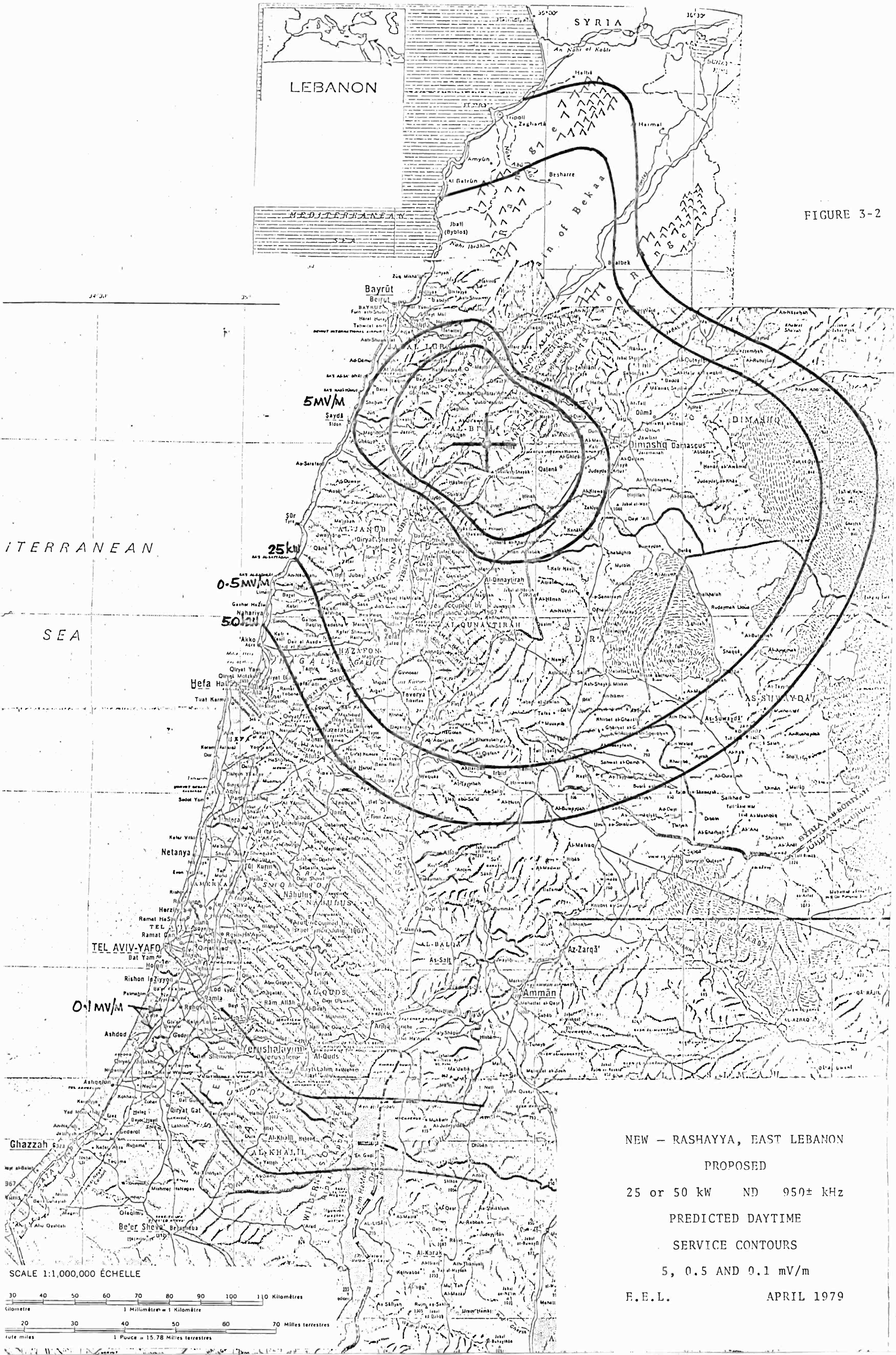
PREDICTED DAYTIME

SERVICE CONTOURS

5 AND 0.5 mV/m

E.E.L. APRIL 1979

FIGURE 3-2



NEW – RASHAYYA, EAST LEBANON

PROPOSED

25 or 50 kW ND 950± kHz

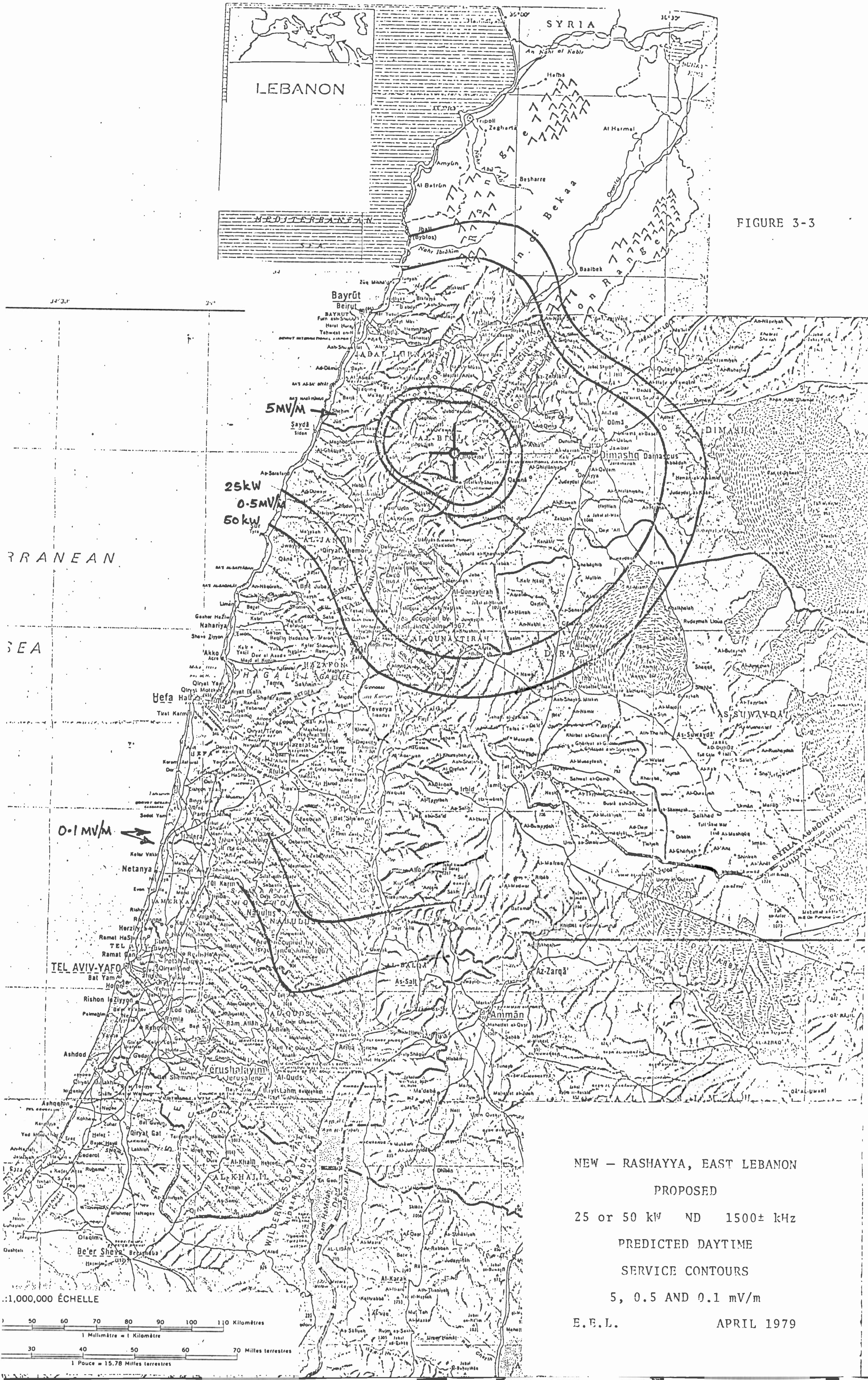
PREDICTED DAYTIME

SERVICE CONTOURS

5, 0.5 AND 0.1 mV/m

E.E.L. APRIL 1979

FIGURE 3-3



NEW – RASHAYYA, EAST LEBANON

PROPOSED

25 or 50 kW ND 1500± kHz

PREDICTED DAYTIME

SERVICE CONTOURS

5, 0.5 AND 0.1 mV/m

E.E.L. APRIL 1979

Copies to

ELDER ENGINEERING INC. MEMO

From Gordon Elder Date January 27, 1989

To Paul Hunter

Subject Your Request for Information re Phasor Schematic and Parts List for the South Lebanon Radio Station

I was delighted to hear from you last week and interested to learn a little about recent developments, including the short wave stations in Southern California and Guam.

After a thorough search, I found the SouthLebanon phasor schematic and parts list in our files, copies attached. You noted that the transmitting facilities will be relocated across the border, presumably for security and/or a more reliable electrical supply.

The 200' masts are presently about 500' apart. Reducing the spacing to 250' would produce very little reradiation on 684 kHz by the 945 kHz radiator and vice versa. If desired, you might reduce the spacing even more. I recommend 150' as a minimum.*

Tee network designs are attached for both stations. Approximate values are shown for optional pass reject filters, though these seem to be quite unnecessary. They would also reduce the impedence bandwidth.

Please give by kindest regards to Charbel and to George Otis.

* 200' would be safer