COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

RECORD 1961 No. 43

GARBUTT AERODROME MAGNETIC TESTS, QUEENSLAND 1961

by

A. J. Barlow

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ILLUSTRATIONS

ABSTRACT

A survey was made at Garbutt Aerodrome to find a site at which the magnetic "noise" is low enough to permit Magnetic Airborne Detector equipment to be serviced.

A recording flux-gate magnetometer was used, and the recordings showed that several of the sites tested are satisfactory.

1. INTRODUCTION

A magnetic survey of Garbutt Aerodrome at Townsville, Queensland was requested by the Department of Air. Its purpose was to select a location for the erection of a building in which to calibrate Magnetic Airborne Detector (M.A.D.) equipment.

The main requirement for the site was that the ambient magnetic "noise" should not exceed 0.3 gamma in the frequency range of 0.1 to 2 cycles per second. In addition the equipment should not be calibrated in the presence of strong 50-cycle fields.

Sites checked previously by J. Pollard (1960) of the Bureau of Mineral Resources were limited to the area in the vicinity of hangars and workshops because of the availability of power and water services. However, the magnetic noise in these areas was excessive and the sites proved to be unsuitable.

The present survey was designed to select a suitable area with regard to the magnetic requirements of the M.A.D. equipment, with only secondary consideration given to the convenience of supplying other services.

This survey was carried out by the author from 4th to 7th March 1961.

2. EQUIPMENT

The equipment used to detect the magnetic noise level was a transistor flux-gate magnetometer designed by the Bureau of Mineral Resources. The field readings were recorded on a Kelvin & Hughes Mk 5 single-channel recorder. The magnetometer was normally operated at a sensitivity of 0.4 gamma per millimeter (16 gammas full scale deflection) but in quiet locations sensitivity was increased to 0.2 gamma per millimeter enabling the character of the noise to be more readily determined. The frequency response of the equipment was flat from D.C. to approximately 10 c/s and even at 50 c/s the response was still appreciable.

3. PROCEDURE AND RESULTS

Altogether, measurements were made at eleven sites, including two of these previously checked by J. Pollard. For convenience the sites are numbered 1 to 11. The positions of Sites 1 to 10 are shown on Plate 1, and Site 11 is situated about eight miles from the aerodrome. Sites 7 and 8 correspond to Sites 1 and 3 of the previous survey (Pollard, 1960). Those sites which were considered to be likely areas for the location of the building were remeasured on different days and at different times during the day, to ensure that conditions observed would be those which could normally be expected.

A table of observed readings together with times and dates is given below. At each station, recording continued for about 15 to 20 minutes on each occasion. The noise level listed is the maximum normally-occurring noise. For the greater part of the period the noise level is somewhat lower but there were occasional single transients of not more than twice the value shown on the table.

Site 1, 3, 4, and 9 are situated on the western half of the aerodrome, away from the workshops and hangars and also farthest from the town area. Sites 5 and 6 are located on the end of the 130° runway and on a tarmac arming bay, respectively. These sites were tested to determine whether they would be suitable for pre-flight checks of the equipment in the aircraft. Sites 7 and 8 are the same as Sites 1 and 3 previously tested by Pollard. It should be noted that the noise levels are generally less than those determined by Pollard, but nevertheless the noise is much greater than the acceptable limit. Also, no account has been taken of passing motor vehicles which will cause magnetic anomalies of up to about five gammas at these sites.

Site 11 is situated near Black River about eight miles from the aerodrome. This site was checked to see whether any appreciably better results could be obtained well away from the town area. As the noise level was shown to be only a little less than at the aerodrome sites, it is apparent that the minimum natural noise level is about 0.2 to 0.3 gamma.

A Deutz 25-KVA motor-generator was run close to Site 1 during one of the readings. It was found that there was no increase of noise level except when the motor was being started.

4. CONCLUSIONS

From the table it can be seen that Sites 1, 3, 4, 5, 6, and 9 have less magnetic noise than the others. The maximum at these sites is 0.4 or, in one case, 0.5 gamma. For most of the time, therefore, the noise at these sites should not exceed the specified limit of 0.3 gamma. Site 1 has been tentatively accepted as the most suitable site because of convenience of access and proximity of services.

The test with the 25-KVA motor-generator has proved that if electric power cannot be conveniently brought to the site, the use of an auxiliary power unit will be satisfactory.

Sites 5 and 6 will be suitable for aircraft pre-flight checks, Site 5 being preferred as it is less likely to be disturbed by motor vehicles or other aircraft.

5. ACKNOWLEDGEMENTS

The author wishes to thank Squadron Leader K. Tassel and officers of the R.A.A.F. Base at Townsville for their co-operation during the survey.

6. REFERENCES

POLLARD, J.R. 1960 Garbutt aerodrome magnetic tests, Queensland 1960.

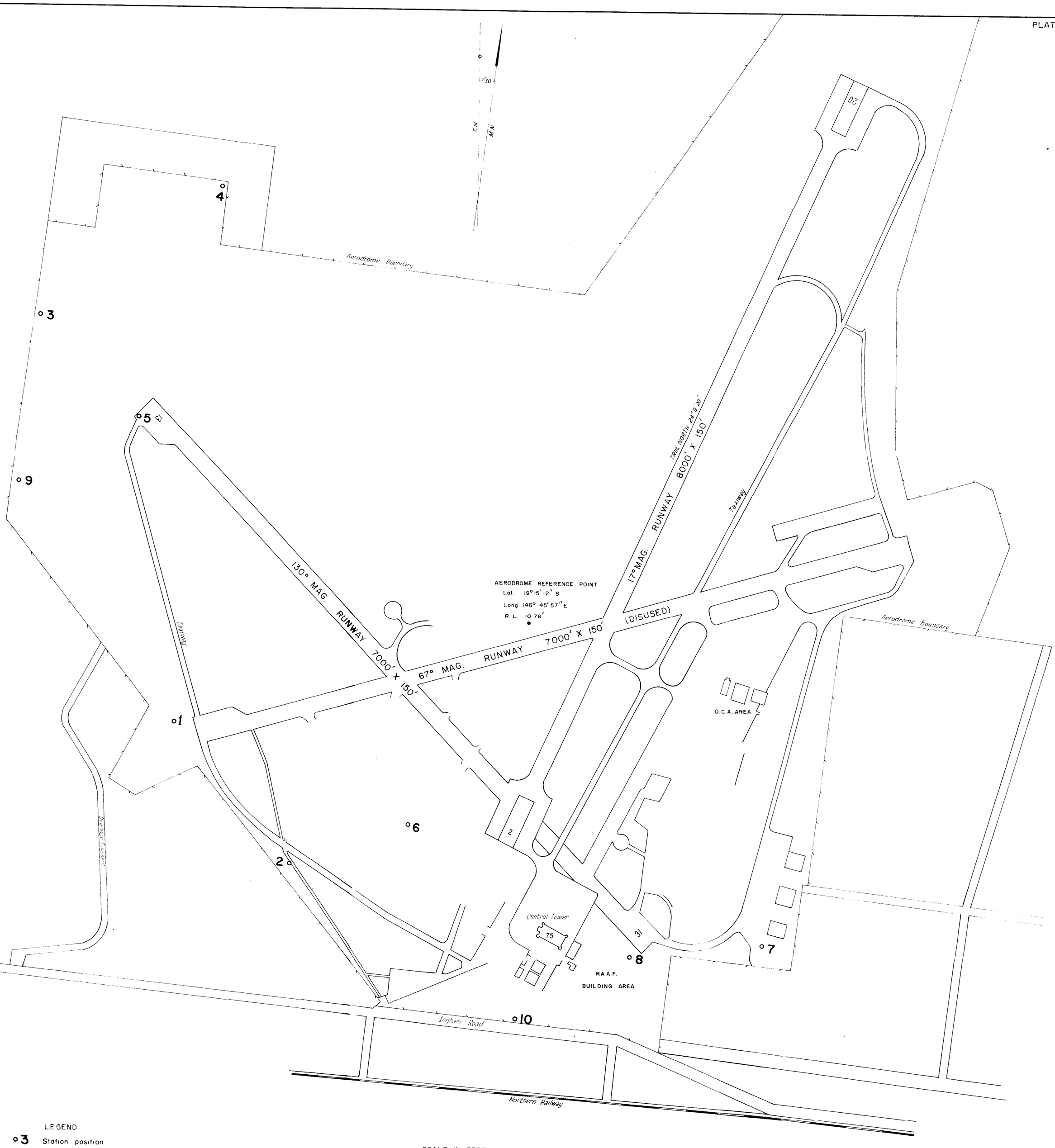
Bur. Min. Resour. Aust. Rec. 1960/95.

TABLE

Showing maximum normally-occuring magnetic "noise".

Date	4/3/61		5/3/61		6/3/61		7/3/61	
Site	Time	Max Noise (gamma)	Time	Max Noise (gamma)	Time	Max Noise (gamma)	Time	Max Noise (gamma)
1	1150	0.4	0925	0.4	0910	0.3	0940	0.3
	1430	0.4					1130	0.4
2	1210	0.6	1015	0.3	0940	0.5		
3	1540	0.2	1116	0.3			1030	0.3
4	1630	0.3	1150	0.3	1010	0.5	1115	0.3
5					1030	0.4		
6					1055	0.4		
7					1115	1.2		
8					1130 (+ strong 50-c/s noise)	4.0		
9							1050	0.4
10	1400 (+ 50-c/s noise)	0.6						
11					1305	0.25		

PLATE I



LEGEND

3 Station position

SCALE IN FEET

600 0 600 1200 1800

GARBUTT AERODROME
MAGNETIC TESTS, QLD. 1961
LOCALITY MAP

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