

# ROYAL AUSTRALIAN SURVEY CORPS

## REPORT ON OPERATION

# HOT LAND



**4 Fd Svy Sqn**

**KIMBERLEYS-WA**

**1975**



AMENDMENT SHEET

OP HOT LAND

SEP - OCT 75

4 FD SVY SQN

Amdt No	Amdt Entered	Amdt No	Amdt Entered

ROYAL AUSTRALIAN SURVEY CORPS  
4 FD SVY SQN

OPERATION "HOT LAND" 1975

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PROJECT REPORT

OPERATION HOT LAND

- References:
- A. Department of Defence (AO) A474/1/2 Pt 1 dated 31 Oct 74.
  - B. HQ FF Comd 788/K1/27 dated 24 Dec 74.
  - C. HQ 4 FF Gp 788/KS2/11 dated 30 Jul 75.

General

1. Between 2 Sep 75 and 8 Oct 75, 4 Fd Svy Sqn was engaged in mapping tasks in the vicinity of Derby, WA. The operation was aimed at upgrading the standard of vertical (VC) and horizontal control (HC) in the area to enable production of 22, 1:50,000 map sheets covering the proposed YAMPI TRAINING AREA.

Tasking

2. The area of operations extended well beyond the YAMPI TRAINING AREA and in fact 12, 1:250,000 sheets were controlled by APR and HC identents were obtained over 4, 1:250,000 sheet areas. The following tasks were allocated and tackled in the order of priority:

- a. Targetting:
  - (1) VC.
  - (2) HC.
- b. APR.
- c. Ident photography.
- d. Level connections APR.
- e. HC Observations.

An extensive program of road classification was carried out separately from the tasks listed above.

Operational Results

3. Targetting. The targetting program was carried out primarily in the 1:250,000 sheet areas of YAMPI, DERBY, CHARNLEY and LENNARD RIVER. A total of 34 vertical control and 43 horizontal control stations were panelled. Of the original program 6 vertical control and 4 horizontal control stations could not be found. A report on this part of the operation is contained in Annex B.

4. APR. The area of primary interest in the operation covered the four 1:250,000 sheets mentioned in para 3. above. To control these sheets it was necessary to carry the profile runs through to the sea to the north and west of these sheets. As a result, nine sheets were covered by APR profiles. A further 3 sheets were profiled to the south ~~at~~ of the operational area to make full use of aircraft time and the prevailing good weather conditions. In all 12, 1:250,000 sheets were profiled by 7,400 km of flight times. A report on this part of the operation is contained in Annex C.

/RC-10 Photography

5. RC-10 Photography. The RC-10 camera was used in two roles, firstly to record continuous 60% overlap photography of the APR flight lines and secondly to obtain supplementary photographic identifications of horizontal and vertical control stations. Photographic coverage was obtained for all APR flight lines and all horizontal and vertical control stations panelled. A report on this part of the operation is contained in Annex D.
6. Establishment of New Horizontal Control Stations. The original proposal planned for the establishment of 12 new horizontal control stations. The program was amended during the operation and only 7 stations were established of which 2 were controlled by field observations. A report on this aspect of the operation is contained in Annex E.
7. Road Classification. The road classification program covered an area of 14, 1:250,000 map sheets extending from Derby, down the coast to Port Hedland and Marble Bar. In all 75, 1:100,000 map sheets were classified to military specifications. A report on this part of the operation is contained in Annex F.
8. Annotation. Towards the end of the operation an annotation program covering the military training area was commenced. An engine failure in the Pilatus Porter aircraft halted this task just as the job was started and consequently the annotation program was abandoned.
9. Aircraft Support. There were three aircraft in support of the operation.
  - a. Civil Charter - Queen Air. This aircraft was fitted with the APR and RC-10 camera. Serviceability throughout the operation was good and the experience and interest of both the civilian pilot and Army co-pilot added significantly to the successful completion of the APR program. Of the 100 flying hours allocated, 92.2 hours were used, an additional 26.6 hours ferry time were not held against task hours.
  - b. LOH - 162 Recce Sqn. The LOH was employed on panelling tasks in the eastern part of the area of operations and also in station establishment and traversing operations along the north edge of the CHARNLEY 1:250,000 sheet. Serviceability of the aircraft was generally good which was fortunate as operating in remote areas with a single aircraft has a number of inherent dangers. Two engine transmission failure warnings towards the end of the trip prompted cancellation of the traversing operations mentioned above. The full 100 hrs of aircraft time allocated was used.
  - c. Pilatus Porter. The Porter aircraft was tasked primarily to support the road classification program. In this role it was employed both to fly personnel over the areas of interest and also to transport them to the various Roads Dept and Shire Council Offices from which classification data was obtained. When not engaged in road classification tasks the aircraft was used on reconnaissance and general support tasks. Serviceability was good until the end of the operation when the aircraft suffered an engine failure at take-off. Delay in the supply of a spare part caused cancellation of a proposed annotation program and the aircraft took no further part in the operation. Of the 80 hours allocated, only 59.3 hours were used.

Administration

10. Manning. The outline organisation of 4 Fd Svy Sqn (-) is shown diagrammatically in Annex A to this report. The force consisted of 22 RA Svy personnel and 19 from other supporting arms:

a. Officers. The following officers were employed on Op HOT LAND:

(1)	RA Svy	Maj J. Gruszka	OC
		Lt P.M. Bion	Ops Offr
		2Lt K.J. Paul	Admin Offr
(2)	A Avn	Capt C. Galvin	173 Gen Spt Sqn F/W Pilot
		Lt L. Hummerston	173 Gen Spt Sqn F/W Pilot
		Lt R.C. Williams	162 Recce Sqn R/W Pilot
		2Lt I. McCallum	173 Gen Spt Sqn Queen Air Pilot
		2Lt I.S. Hendrick	162 Recce Sqn R/W Pilot

b. Civilians. Mr J. Jones from Island Air was pilot of the Queen Air aircraft.

c. Other Ranks. A total of 19 RA Svy ORs were employed in the operation along with supporting elements of RAEME, RA Sigs and 16 AD Regt (Lt).

At the conclusion of the operation 5 Tpt & Mov Gp provided one OR to assist in the extraction from Derby.

11. Allowances. The following allowances were paid:

a. District Allowance: \$1.02 per day.

b. Separation Allowance: \$1.00 per day to all married members after a 15 day qualifying period.

12. Health. Since Main Base was located in a close proximity to the Derby District Hospital, no field medical support was required. Generally, the health of personnel on Op HOT LAND was good. The support provided by Derby Hospital was excellent, this included the use of their facilities and technical equipment for APR operations.

13. Morale. The morale was quite high throughout the operation. All members responded well to the hot, dry conditions encountered. Again, as in the past, the two cooks did a magnificent job. Their food preparation and presentation was continually of a high standard.

14. Discipline. No situations arose which required formal disciplinary action.

15. Visitors. From the 15-16 Sep, Brigadier D. Willett arrived and inspected both 4 Fd Svy Sqn (-) and the proposed YAMPI SOUND Training Area.

/Canteen

16. Canteen. As main base was located in Derby, only a small unit canteen was planned. The function of this canteen was solely to supply canned beer after stand-down. A loan fund was established by unit members to purchase the initial stocks of beer. This fund was supplemented by Regimental Funds and a cash advance of \$100 from the Survey Amenities Fund. Soft drinks were also purchased after a dispensing machine was made available at no cost from a local source. This facility was for convenience and no profit was earned.

#### Logistics

#### 17. Rations.

- a. In general, the rationing system functioned very smoothly. Supplies were purchased from the different contractors in Derby, consistent with their stocks held. All food items were readily available.
- b. Based on the Jun 75 prices, an entitlement of \$2.60 per day per man was allocated for rations. However in September, the most daily used items showed an increase in price of 13% on the June costing. Subsequently, an overspend of approximately 6% was encountered.

18. Main Base. WAPET PTY LTD had made available, free of charge, two disused buildings in Derby to accommodate the force. Element of 22 Const Sqn RAE provided support in establishing base camp. At the completion of the Op, the buildings and grounds were returned to their original condition. All non-returnable building materials were donated to the local missions.

19. Forward Base. A forward base of short duration was established at the Mt House Station. Living quarters and facilities for seven personnel were made available by the station at no charge.

#### 20. Stores.

- a. Supply. The assistance given to this unit by 41 Sup Bn during the preparations for Op HOT LAND was outstanding. Of the 237 indents placed, all but 4 were filled by the date of departure. In addition, many queries were answered and much useful information received. Apart from a few exceptions, the quantity of stores taken to Derby proved to be adequate.
- b. Serviceability. Generally, equipment serviceability was good. The exception to this being Tellurometers. To overcome this problem, two of the Tellurometers were repaired locally by the RAEME Mech. This then enabled measuring to continue.

#### 21. Vehicles

- a. The vehicles supporting the operation filled the role satisfactorily in both quantity and service.
- b. Vehicles employed were:
  - 3 x Truck Carryall,  $\frac{3}{4}$  Ton GS TOPO.
  - 1 x Truck,  $\frac{1}{4}$  Ton CL.
  - 1 x Automobile Sedan, 5 seater CL.
  - 3 x Trailer Cargo,  $\frac{1}{2}$  Ton GS.

/c. No field recovery

- c. No field recovery action was necessary during the Operation. Repairs required were of a minor nature, mainly contributed by generator failure and one broken drive shaft.

22. POL. No difficulty was encountered in procuring bulk aviation fuels, however additional drummed AVTUR was in short supply from the contract BP agent and some had to be purchased out of contract from the Mobile Depot. No problems were encountered when the POL account was finalised.

POL used:

AVTUR - 3,000 galls Bulk, 1,540 galls Drummed.

AVGAS - 3,350 galls Bulk.


MT GAS -1,170 galls.

#### Communications

23. Six PRC-F1 radios were taken to Derby of which five operated satisfactorily throughout the trip. These radios were used to maintain communications between the main base, the survey field party and the support aircraft. Sitrep times of 0800 and 1630 hours daily were planned for the start of the operation, however these timings proved extremely unsatisfactory. Acceptable reception could generally only be obtained between 0900 and 1500 and consequently Sitrep timings was changed to 1200 hours.

24. Rear link communications were provided by a telephone installed at the Derby base camp and daily access to the Telex run by the AIR TRAFFIC GROUP of the Dept of Transport at Derby Airport. Signals were despatched at 1500 hours daily via the COMCEN PERTH.

1 Dec 75

  
J. GRUSZKA  
Maj  
OC

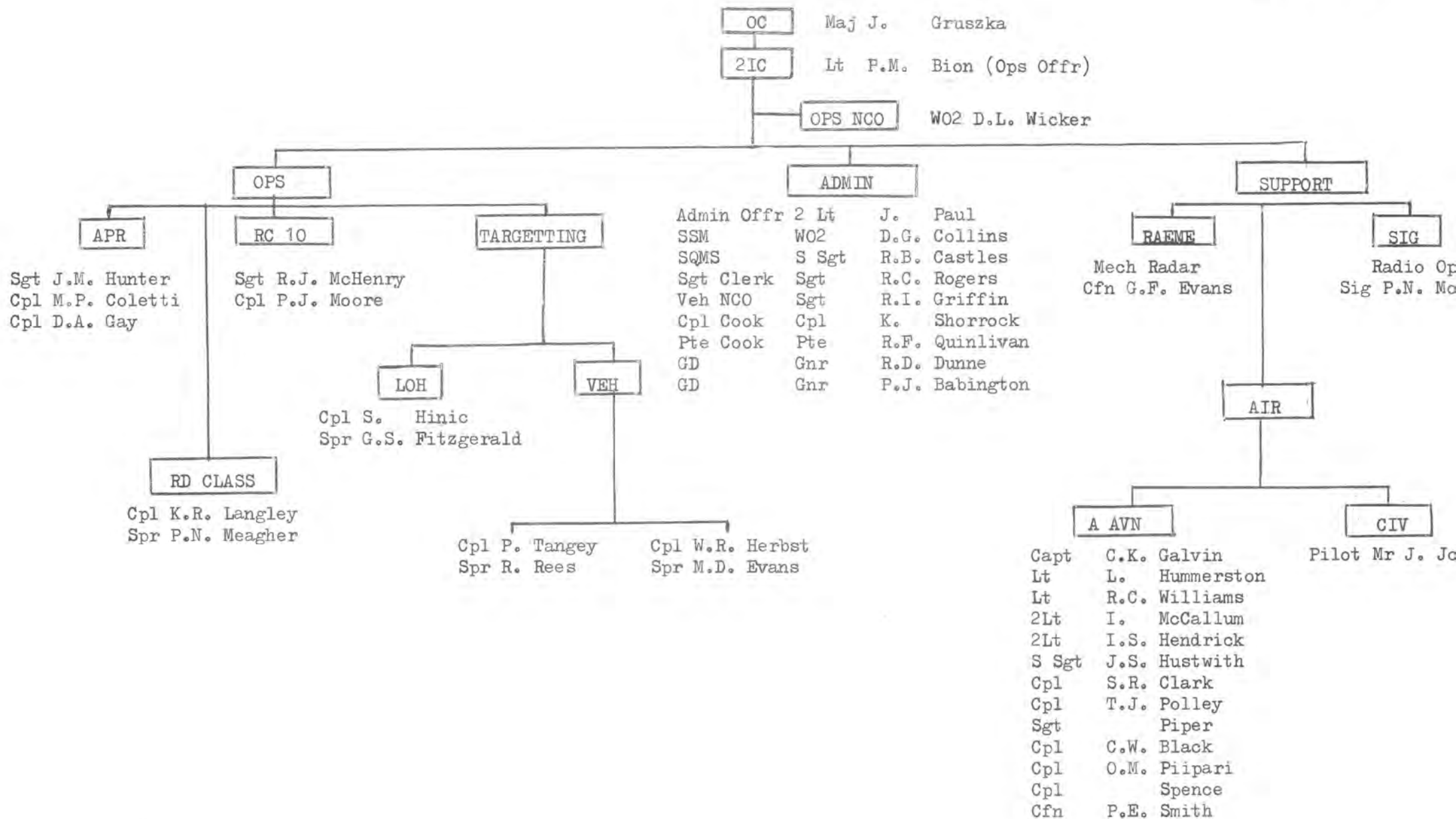
Annexes: A, B, C, D, E, F.

DISTRIBUTION

		<u>Reg Nos</u>
Dept of Defence (Army Office)	(5)	1 - 5
- Incl 3 for DSVY		
Field Force Command	(3)	6 - 8
4 Field Force Group	(2)	9 - 10
Army Survey Regiment	(2)	11 - 12
WRE Salisbury	(1)	13
School of Military Survey	(4)	14 - 17
1 Fd Svy Sqn	(1)	18
2 " " "	(1)	19
5 " " "	(1)	20
8 " " "	(1)	21
162 RECCE Sqn	(1)	22
173 Gen Spt Sqn	(1)	23
<u>Internal</u>		
OC 4 Fd Svy Sqn	(1)	24
4 Fd Svy Sqn Library	(6)	25 - 30

OP HOTLAND  
ORGANIZATION 4 FD SVY SQN

ANNEX A TO  
PROJECT REPORT  
OP HOTLAND



TARGETTING

Task

1. Task was to carry out panelling of bench marks and existing horizontal control points for APR operation and updating of photo indents for aerotriangulation.

2. Personnel Involved and Support

a. Vehicle Parties (Landrover  $\frac{3}{4}$  Ton GS)

Cpl P. Tangey	Party 1
Spr R. Rees	Party 1
Cpl W. Herbst	Party 2
Spr M. Evans	Party 2

b. LOH

Cpl S. Hinic	<u>Pilots:</u> Lt R. Williams
Spr G. Fitzgerald	2Lt I. Hendreiles <i>ick</i>

Operational Procedure

3. Vehicle

- a. The targetting by vehicles was commenced on 6 Sep and completed on 12 Sep 75.
- b. It consists<sup>ed</sup> of two parties working out of Derby but provisions and bedding were carried, there-by enabling the parties to remain out over night where required.
- c. Panelling of vertical control points was carried out in Derby, Fitzroy Crossing and Mt House area. Targetting and updating of station summaries of horizontal control points accessible by vehicle was also undertaken.
- d. When black plastic panels were used, it was found that due to the dryness of the area, panels were covered by dust very quickly and had to be photographed as soon as possible after laying. It was observed that dust affected the clarity of black panels more so than white ones.

4. LOH

- a. This aspect was carried out in two phases. Phase one was started on 9 Sep and was based out of Derby. A total of 12 points were successfully panelled and station summaries updated.

/b. Phase two

- b. Phase two was started 16 Sep, using Mt House Homestead as forward base. A total of 19 points were done and 4 had to be aborted because they could not be located. This phase was completed on 20 Sep 75.
  - c. Due to the ruggedness of terrain and position of the stations, it was found impossible to lay all panels in a cross configuration, and on C77 only one arm of a panel could be laid.
- d. Results of the task are set out in Appendices 1 - 3.

Observations and Recommendations

6. Observation. The camera operator had difficulties in picking up black panels on the red soils, but the panels appeared clearly on photography.

Recommendation. That the black panels be only used on light sandy soils and a combination of black and white panels be used for red soils. The panel size to remain the same, ie, 6m x 2m arms.

Observation. Communication between the camera aircraft and ground was not possible because of incompatible radios being used.





Recommendation. That on future trips a radio compatible with the PRC F1 be fitted to the Queen Air.

HORIZONTAL CONTROL TARGETTING





















APPENDIX 1 TO  
ANNEX B TO  
PROJECT REPORT  
OF HOTLAND

Station	Panel Shape/Colour	Panel Size Metres	Orientation of Panel	Height of Photography Feet	CPE No Photo No	Panel Identified	Remarks
✓ AMY ✓	White	East Arm 6 x 2 West Arm 3 x 2		12,000	27504/92-94	OK	Panel shape due nature of terrain.
BOLD ✓	W	Arms 6 x 2		12,000	27508/248-250	OK - Poor	" " " " " "
✓ BROOME ✓	W	Arms 6 x 2	North	12,000	27508/242-244	OK	
✓ CAROLINE ✓	W	Arms 6 x 2	317° 135° 225°	12,000	27508/254-256	OK	" " " " " "
✓ CLIFTON ✓	W	Arms 6 x 2	11° 129° 202°	12,000	27508/257-259	OK	" " " " " "
C68 ✓	W	Arms 6 x 2	11° 97° 194° 279°	10,000	27513/151-153	<del>Not Found (NF)</del> Poor	May be on negatives. Found
C69	W	Arms <sup>s</sup> 6 x 2	0° 79° 157°	12,000	27511/156-158 27513/148-150	NF	Shape due to nature of terrain. May be on negatives.
✓ C76 SHEBA ✓	W	Arms 6 x 2	North	12,000	27510/07-09	OK	
C77	W	Arms 6 x 2	104°	12,000	27511/152-155	<del>NF</del> - Poor	Shape due to nature of terrain. <i>FN</i>
C80 ✓	W	Arms 6 x 2	132° 298°	12,000	27508/260-262 27510/01-03	OK	" " " " " "
✓ C85 HOUSE ✓	W	Arms 6 x 2	10° 147° 276°	12,000	27508/251-253	OK	Shape due to excessive clearing.
C88 FRANK ✓	W	Arms 6 x 2	14° 124° 309°	10,000	27513/154-156	Poor - <del>NF</del>	Shape due to nature of terrain.
✓ C92 SYNNOT ✓	W	Arms 6 x 2	North	10,000	27519/146-148	OK	
✓ C93 HART ✓	W	Arms 6 x 2	0° 96° 234°	12,000	27508/190-193	OK	Shape due to nature of terrain.
✓ C99 ✓	W	Arms 6 x 2	11° 117° 180° 284°	10,000	27523/114-116	OK	" " " " " "
✓ C101 DAGLISH ✓	W	Arms 6 x 2	0° 92° 180° 248°	10,000	27523/111-113	OK	Shape due to excessive clearing.
✓ DIVIDE ✓	W	Arms 6 x 2	48° 220° 315°	10,000	27523/117-119	OK	Shape due to nature of terrain.
HERBERT ✓	W	Arms 6 x 2	30° 105° 183° 284°	12,000	27508/239-241	OK	" " " " " "
H48 ✓	W	Arms 6 x 2	196° 332°	12,000	27504/101-103	OK	" " " " " "

Station	Panel Shape/Colour	Panel Size Metres	Orientation of Panel	Height of Photography Feet	CPE No Photo No	Panel Identified	Remarks
L1 ✓	⊕ W	Arms 6 x 2	North	12,000	27504/95-100	OK	
NELLIE ✓ X	⊕ W	Arms 6 x 2	96° 180° 292°	12,000	27504/86-88	OK	Shape due to nature of terrain.
✓ NORTH ✓	⊕ W	Arms 6 x 2	31° 121° 211° 301°	10,000	27510/10-12	OK	" " " " " "
✓ ORD ✓	⊕ W	Arms 6 x 2	68° 180° 264° 332°	12,000	27508/245-247	OK	" " " " " "
✓ PACKHORSE ✓	⊕ W	NE Arm 4 x 2 Others 6 x 2	51° 135° 219°	7-10,000	27523/120-125	NF	" " " " " "
✓ PITTARD ✓	⊕ W	Arms 6 x 2	6° 105° 196° 287°	12,000	27510/04-06	OK	" " " " " "
✓ RO04 ✓	⊕ W	Arms 6 x 2	North	12,000	27505/209-211	OK	
✓ RO06 ROUND ✓	⊕ W	Arms 6 x 2	96° 180° 348°	12,000	27505/206-208	OK	Shape due to nature of terrain.
✓ RO99 MARMION ✓	⊕ W	Arms 6 x 2	North	12,000	27505/212-214	OK	
✓ R102 HAWKSTONE ✓	⊕ W	NNE Arm 6 x 2 NNW Arm 5 x 2	15° 322°	12,000	27505/215-216	OK	Shape due to nature of terrain.
✓ R162 BEER ✓	⊕ W	Arms 6 x 2	0° 84° 180° 270°	12,000	27504/89-91	OK	
✓ S071 FRASER ✓	⊕ W	Arms 6 x 2	North	12,000	27510/247-252	OK	Shape due to nature of terrain.
✓ S074 OODINJIL ✓	⊕ W	Arms 6 x 2	North	12,000	27505/203-205	OK	
S114 STOKES ✓	⊕ W	Arms 6 x 2	North	12,000	27505/197-199	OK	
S118 TORMENT ✓	⊕ W	Arms 6 x 2	North	12,000	27505/200-202	NF	
S302 ✓	⊕ W	Arms 6 x 2	North	12,000	27511/168-171	OK	
S303 ✓ X	⊕ W	Arms 6 x 2	North	10,000	27514/215-217	Poor	S arm draped over cliff.
✓ S304 X X	⊕ W	Arms 6 x 2	North	10,000	27504/81-83	OK	
✓ S305 X	⊕ W	Arms 6 x 2	North	10,000	27523/222-224	OK	
✓ S306 X	⊕ W	Arms 6 x 2	34° 124° 214° 304°	10,000	27523/101-103	OK	<del>Shape due to nature of terrain.</del>

Station	Panel Shape/Colour	Panel Size Metres	Orientation of Panel	Height of Photography Feet	CPE No Photo No	Panel Identified	Remarks
✓ S307 ✖	 W	Arms 6 x 2	18° 117° 206° 294°	10,000	27523/104-107	OK	Shape due to nature of terrain.
✓ S308 ✖	 W	Arms 6 x 2	North	10,000	27523/108-110	OK	
✖ T097 ✖	 W	Arms 6 x 2	17° 218° 300°	12,000	27507/142-143	<del>NE</del> OK	Shape due to nature of terrain.
✓ WILSON ✓	 W	Arms 6 x 2	North	12,000	27511/159-162	OK	
Stations Not Found							
C70							
C71							
C95 MATHEW							
C100							

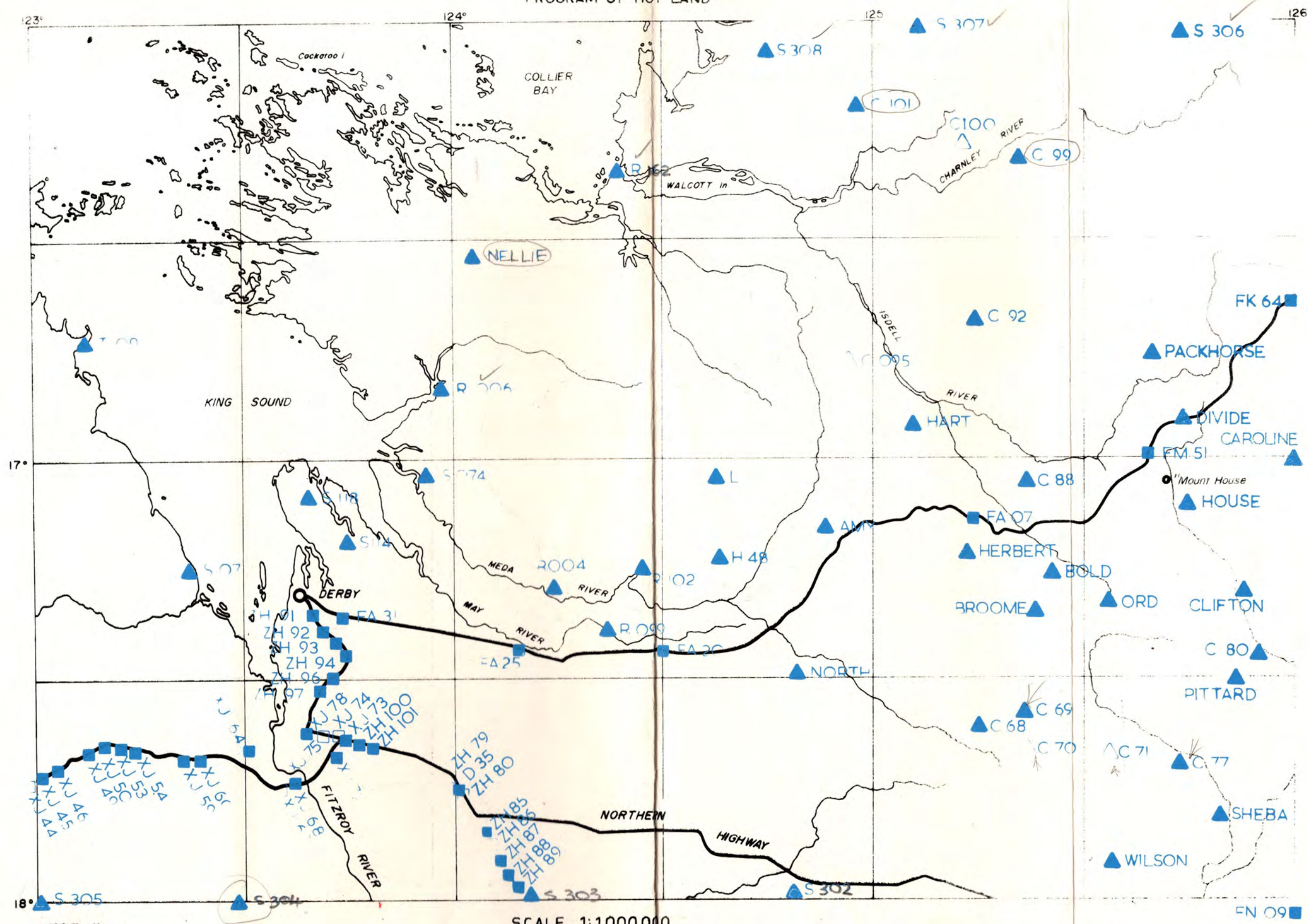
VERTICAL CONTROL TARGETTING

Station	Panel Shape/Colour	Panel Size Metres	Orientation of Panel	Height of Photography Feet	CPE No Photo No	Panel Identified	Remarks
D35 (ECCE Panels)	 Black	N Arm 4 x 2 Others 6 x 2	0° 120° 240°	12,000	27505/117-139	OK	Shape due to shortage plastic ECCE - BM - 1.43 metres
FA07 (ECCE Panels)	 White	Arms 6 x 2	North	10,000	27499/92-93	OK	Laser Pt ECCE - BM + 1.68 m
FA20	 W	Arms 6 x 2	North	10,000	27508/28-29	OK	" "
FA25	 W	Arms 6 x 2	North	No Ident Laser Point Only			
FA31	 B	Arms 6 x 2	39° 129° 219° 309°	12,000	27505/191-196	OK	Shape due proximity of road.
FK64	 W	Arms 6 x 2	North	10,000	27513/66-68	OK	Laser Pt
FO44	 W	Arms 6 x 2	North	12,000	27511/163-167	OK	" "
FM51	 W	Arms 6 x 2	North	10,000	27514/168-169	OK	" "
FNO9	 W	Arms 6 x 2	North	10,000	27500/15-16	OK	" "
XJ45	 W	Arms 6 x 2	230° 270° 300°	12,000	27505/01-05	OK	Shape due proximity of road.
46	 W	Arms 6 x 2	North	12,000	27505/01-05	OK	
49	 W	Arms 6 x 2	North	12,000	27498/01-83	OK	
50	 B	Arms 6 x 2	North	12,000	27498/01-83	OK	
53	 B	Arms 6 x 2	North	12,000	27498/01-83	OK	
54	 B	Arms 6 x 2	43° 150° 299°	12,000	27498/01-83	OK	Shape due proximity of road.
59	 B	Arms 6 x 2	14° 314° 344°	12,000	27498/01-83	OK	" " " " "
60	 B	Arms 6 x 2	North	12,000	27498/01-83	OK	
64	 W	Arms 6 x 2	26° 56° 356°	12,000	27498/01-83	OK	Shape due proximity of road.
68	 B	Arms 6 x 2	22° 52° 82°	12,000	27505/155-160	OK	" " " " "
72	 W	Arms 6 x 2	76° 169° 254° 349°	12,000	27505/161-163	OK	" " " " "

Station	Panel Shape/Colour	Panel Size Metres	Orientation of Panel	Height of Photography Feet	CPE No Photo No	Panel Identified	Remarks
XJ73 X	⊥ B	Arms 6 x 2	North	12,000	27505/140-154	OK	
78 X	⊥ B	Arms 6 x 2	North	12,000	27505/140-154	OK	
ZH85 X	⊥ B	Arms 5 x 2	North	12,000	27505/117-139	OK	Substitute for ZH86.
87 X	⊥ B	Arms 6 x 2	North	12,000	27505/117-139	OK	
✓ 88 X	⊥ B	Arms 6 x 2	0° 90° 180°	12,000	27505/117-139	OK	
89 X	⊥ B	Arms 6 x 2	North	12,000	27505/117-139	OK	
✓ ZH91 (ECCE X Panels)	✱ B	Arms 6 x 2	67° 157° 247° 337°	12,000	27505/164-190	OK	ECCE - BM Nil diff ht.
✓ 92 X	✱ B	Arms 6 x 2	51° 141° 231° 321°	12,000	27505/164-190	OK	
✓ 93 X	✱ B	Arms 6 x 2	39° 129° 219° 309°	12,000	27505/164-190	OK	
✓ 94 X	✱ W	Arms 6 x 2	79° 169° 259° 349°	12,000	27505/164-190	OK	
✓ 96 X	✱ B	Arms 6 x 2	22° 112° 202° 292°	12,000	27505/164-190	OK	
✓ 97 X	✱ B	Arms 6 x 2	62° 152° 242° 332°	12,000	27505/164-190	OK	
100 (ECCE X Panels)	✱ B	Arms 6 x 2	12° 101° 191° 281°	12,000	27505/140-154	OK	ECCE - BM Nil diff ht.
✓ 101 X	✱ W	Arms 6 x 2	39° 129° 214° 304°	12,000	27505/140-154	OK	

Station	Panel Shape/Colour	Panel Size Metres	Orientation of Panel	Height of Photography Feet	CPE No Photo No	Panel Identified	Remarks
Stations Not Found							
XJ44							
67							
74							
75							
ZH79							
80							Substituted by D35, a Wapet Gravity Survey Mark.
86							Substituted by ZH85, approx 2 miles NW of ZH86 along road.

TARGETING AND PHOTOGRAPHY  
PROGRAM OF HOT LAND



- LEGEND :-
- VC. STATION NOT FOUND.
  - VC STATION PANELLED & PHOTOGRAPHED.
  - △ HC STATION NOT FOUND
  - ▲ HC STATION PANELLED & PHOTOGRAPHED

SCALE 1:1,000,000

■ FO 44

AIR PROFILE RECORDING

General

1. The Queen Air aircraft VH-RUU with APR and RC 10 camera equipment fitted arrived at Derby on 6 Sep 75 after repairs to the APR had been carried out at WRE Salisbury. A test flight was made on 9 Sep 75 and operations commenced 10 Sep 75, carrying through until 29 Sep 75. Film storage and processing facilities were provided by the Radiology Department at the Derby Hospital for the duration of the trip.
2. Generally, the aircraft crew consisted of two pilots, one APR operator and one RC 10 operator, on six profiles an extra APR operator was aboard the aircraft on the job training of a refresher nature and on another three profiles an opportunity was taken to introduce the equipment to a new operator.
3. Task. The APR was employed to acquire vertical control information by flying North/South profiles at intervals of 22½ minute longitude and 30 minute intervals latitude. Four map areas had to be profiled (Charnley, Derby, Lennard River, Yampi) extension of the profile runs through to the coast in the North and West for control of the observation network, resulted in the additional areas of Broome, Camden Sound, Montague Sound, Prince Regent and Pender, being profiled. At completion of this initial task approval was given for profile data to be acquired for the additional areas at La Grange, Mt Anderson and Noonkanbah.
4. Of 53 profiles shown, 35 were used, the 18 rejected profiles were not used for reasons set out below:

Failures and Reasons

Equipment	Weather	Operator Error
1. Water cooling unit burnt out.	1. Four runs aborted due to cloud.	1. Magnetic tape not run up to BOT on two occasions.
2. Camera motor burnt out.	2. Two runs reflown due to excessive cloud.	2. UV chart recorded left in the standby posn.
3. Film fogged on two lines.		3. Two runs reflown due to poor exposure of 70 mm film.
4. Aircraft power fluctuations.		
5. Aircraft HF radio failure.		
6. Pilots display of BRU failed.		

The attached RAEME technician carried out repairs to the cooling unit, camera and pilots display, rapidly and efficiently.

5. Profiles were flown at 10,000' ASL in such a way as to minimise unproductive flying. On completion of flying, film was developed, chart records broken out and magnetic tapes packaged and despatched to WRE.

6. A summary of the flight lines and the control is contained in Appendices 1-2.

Observations and Recommendations

7. Observation. There is a requirement for five outlets in the aircraft internal communication system, the current set up is also prone to failure.

Recommendation. That five outlets be available inside the aircraft and that they be fully serviced.

8. Observation. Lack of air to ground communications caused an unnecessary waste of manpower on a couple of occasions.

Recommendation. A HF radio compatible with the PRC F7 be installed in the aircraft for air to ground communications.

9. Observation. The APR navigation sight is becoming dirty and difficult to see through.

Recommendation. That the navigation sight be cleaned each time it is fitted to the aircraft. Also fitting of a yellow filter to both viewer and camera may improve navigation and quality of film in areas of considerable haze.

10. Observation. A spare take off spool for the chart recorder would save time when changing UV charts during profiling, hence reducing data loss on the UV chart.

Recommendation. That a spare take off spool for the chart recorder be obtained.

11. Observation. Use of 50' long film and the availability of only two cassettes, meant that day light loading of film was sometimes necessary, to make full use of aircraft flying time.

Recommendation. That 100' thin base film be used in future and that a further two cassettes be obtained. This would greatly improve the endurance of APR operations away from the base.

12. Observation. The two film cassettes presently held by the Army are faulty, the felt light seals have worn and caused fogging on two films during the operation.

Recommendation. The cassettes be inspected for repair or modification.

13. Observation. The long period between APR operations by each squadron is leading to a situation where consumables held by a squadron could deteriorate with age before use.

Recommendation. To eliminate wastage of consumables, 2 Fd Svy Sqn as holding unit for the equipment should be the sole indenting unit for consumables. These could then be supplied with the equipment when required by other units.

/14. Observation

14. Observation. The present layout of the circuit breakers can lead to errors in the order in which the individual items are switched on.

Recommendation. The circuit breakers be arranged in the order in which they are used.

15. Observation. The bank angle unit on/off switch is poorly located at the back of the equipment away from the APR operator.

Recommendation. That the on/off switch be incorporated in the Gyro circuit breaker.

16. Observation. The pilots BRU display is not zeroed.

Recommendation. That the display be zeroed to the BRU.

17. Observation. The light emitting diodes (LED) on data monitor of tape recorded is inoperative most of the time, thus it is impossible to monitor height information being recorded on the magnetic tape.

Recommendation. That equipment be repaired before the next operation.

18. Observation. Contact prints and enlargements of the 70 mm film using Ilford Ilfobrom IB2IP Glossy Single Weight Paper deteriorate (buckle and roll up) under field conditions.

Recommendation. That Ilford Ilfospeed 2IM Glossy Medium Weight Paper be used, it is a plastic base paper which eliminates the above problems.

19. Observation. The use of the RAAF developing tank is ideal for processing the 70 mm film, however, the tank is larger than required.

Recommendation. That the loan of the RAAF developing tank becomes a permanent arrangement or that a tank is made for Corps own use, using the same basic design as the RAAF tank but reduced in size to handle 70 mm film only.

20. Observation. Contact prints of the 70 mm film are not suitable for use in field identification of profile crossing points. An enlargement of 3 to 4 times was used during the operation and proved very successful.

Recommendation. That an enlarger with 70 mm carriage be purchased and be provided with the equipment for future operations.

21. Observation. The pinch roller in the tape recorder if left in the operating position when not in use will result in a flat spot on the roller which may cause irregularities in the movement of the tape past recording head. Also the mercury lights in the chart recorder have their life reduced by incorrect procedures when turned on.

Recommendation. That these points be emphasised on future APR courses.

22. Observation. Although signals were received from WRE acknowledging the arrival of the magnetic tapes there was generally no statement on the condition of the data.

Recommendation. That in future operations the magnetic tape processing authority be requested for a statement of the condition of the data in order that reflaying of lines if necessary can be carried out as quickly as possible.

23. Observation. The computing facilities of WRE which are currently used by the Corps will not be available after May 76. At present WRE hold 2,400 ft storage tapes holding data from the equipment trials held in Adelaide in 1973 through to Op HOTLAND results. Each tape holds data from only one 600' tape used in the aircraft, thus three quarters of the storage tape is unused, the wasted storage space is even greater if the aborted or rejected lines are taken into account.

Recommendation. That action be taken to provide an alternate computing facility prior to 1976 operations and that the present storage tapes be edited for removal of useless data and compaction of storage space.

APR SUMMARY OF DATA

APPENDIX X 1  
ANNEX C TO  
PROJECT REPORT  
OF HOTLAND

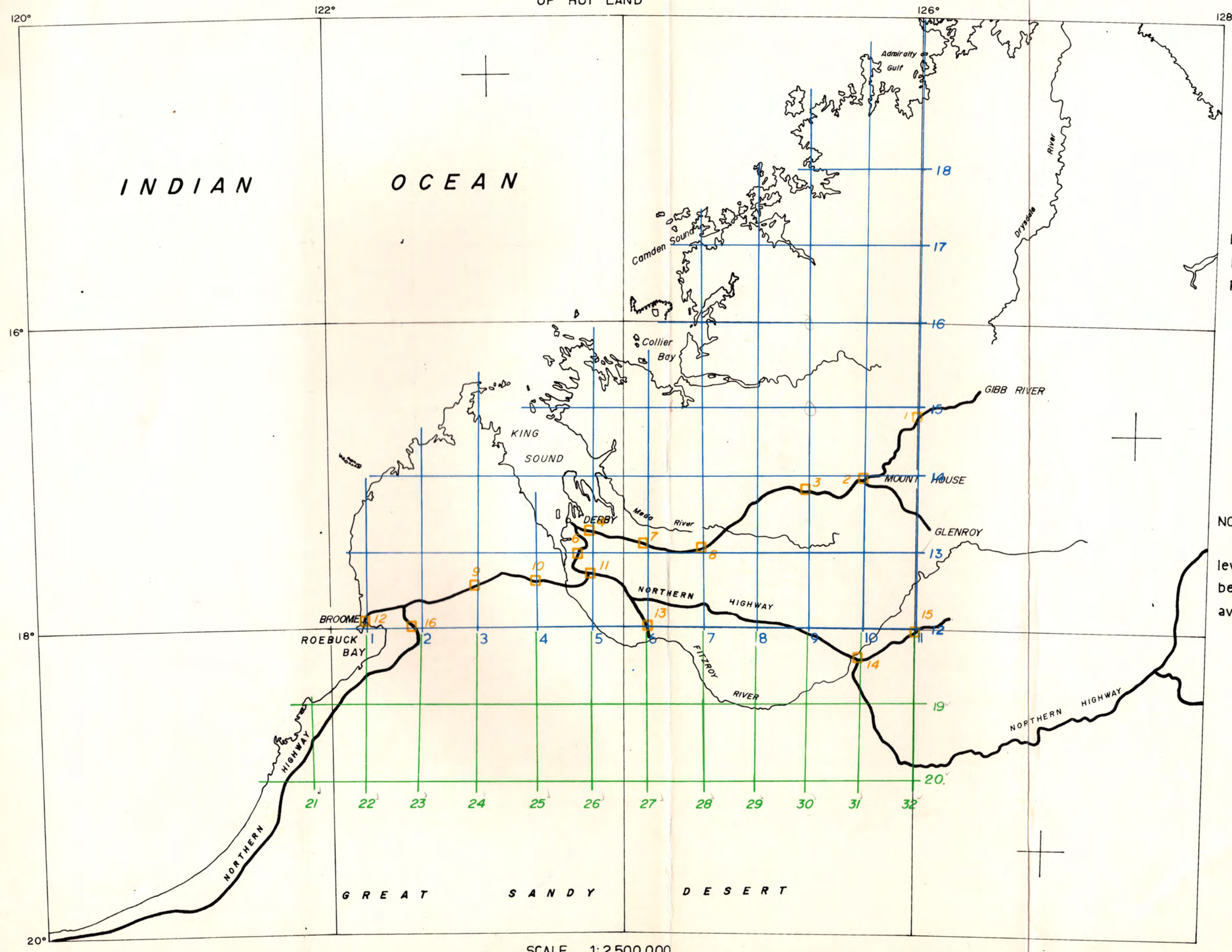
APR Run	Film Title	DATUM POINT DATA				AHD CONNECTION			Remarks
		Pt No	Photo	Time <u>h</u> <u>m</u> <u>s</u>	Ht Datum Pt	To Pt	Ht (m)	Photo	
HL 001/14A	CPE 27501 001 - 095	2	076	00 52 51.8	335.4 m	FM 51	335.7	076	
HL 002/08	CPE 27501 096 - 198	-							
HL 003/9A	CPE 27499 001 - 100	3	093	02 36 09.0	268.3	FA 07	267.8	093	
HL 006/12	CPE 27500 001 - 135	13	072	01 05 59.3	48.2	ZH 89	50.7	072	
		15	015	00 22 50	148.1	FN 09	147.6	015	
		16	126	01 45 41.8	6.4	XT 174	8.0	1.26	
HL 008/14B	CPE 27500 173 - 203								
HL 010/03	CPE 27505 055 - 116	9	102	01 34 56.9	108.8	XJ 45	108.6	102	
HL 013/04	CPE 27504 045 - 084	10	070	01 16 06.1	9.8	XJ 59	8.2	070	
HL 014/5A	CPE 27507 001 - 044	4	008	00 15 49.9	11.5	FA 31	6.3	008	
		11	019	00 21 54.1	39.1	XJ 73	28.2	019	
HL 015/06	CPE 27507 045 - 112	7	071	00 18 49.5	24.4	FA 25	24.3	071	
		13	050	00 05 43.0	55.9	ZH 89	50.7	050	
HL 016/5B	CPE 27507 118 - 141								
HL 019/18	CPE 27508 143 - 189								
HL 021/16	CPE 27510 013 - 068								

APR Run	Film Title	DATUM POINT DATA				AHD CONNECTION			Remarks
		Pt No	Photo	Time <u>h</u> <u>m</u> <u>s</u>	Ht Datum Pt	To Pt	Ht (m)	Photo	
HL 023/01	CPE 27510 168 - 197	12	196	02 35 16.4	13.7	XT 193	4.6	196	
HL 024/02	CPE 27510 198 - 243								
HL 026/11	CPE 27513 001 - 147	1	078	00 50 26.3	417.9	JK 64	418.6	078	
		15	140	01 20 28.6	148.1	FN 9	147.6	140	
HL 027/17	CPE 27514 001 - 076								
HL 028/10	CPE 27514 077 - 214	2	168	02 36 41.8	335.9	FM 51	335.7	168	
		14	213	03 06 13.1	106.2	FO 44	110.7	213	
HL 030/07	CPE 27519 007 - 103	8	080	00 55 41.0	45.2	FA 20	45.6	080	
HL 031/9B	CPE 27519 104 - 145	3	145	01 59 38.6	271.5	FA 07	267.8	145	
HL 033/19	CPE 27519 149 - 288								
HL 034/23	CPE 27518 001 - 050								
HL 035/22	CPE 27518 051 - 090								
HL 036/21	CPE 27518 091 - 111								
HL 037/20	CPE 27518 112 - 258								
HL 038/32	CPE 27518 259 - 296								



APR OPERATIONS  
OP HOT LAND

APPENDIX 2 TO  
ANNEX C TO  
REPORT ON  
OP HOT LAND



LEGEND:-  
PROFILE CONTROL  
POINTS □

NOTE:-  
Details of sea  
level connections will  
be forwarded as  
available .

SCALE 1:2,500,000

RC-10 CAMERA OPERATIONS

Task

1. Operation HOTLAND RC 10 mission commenced on 9 Sep 75 and concluded on 29 Sep 75 with Camera No 1236 being fitted to Queen Air VH RHU. Personnel involved were:

Camera Operators	-	Sgt R.J. McHenry	RA Sv
		<del>Pte</del> Cpl P.J. Moore	RA Sv
Pilots	-	Mr J. Jones	
		2Lt A. McCallum	A AVN
Camera Technician	-	Cfn G. Evans	RAEME

Both pilots were extremely helpful and willing and due to their experience, helped the task flow smoothly. Cfn Evans showed a willingness to work and displayed his skills adequately by keeping both the RC 10 and laser operational.

2. Operational Procedure. RC 10 photography was to be taken during HOTLAND for vertical and horizontal control identification and for APR backup photography. In general the flying was to be done at two levels, 10,000 ft for APR runs and 12,000 ft for control ident, weather permitting. The APR photography was done as a continual run whilst the ident photography was done as a series of three exposures over the point. All photography was done with 60% overlap with the exception of the vertical control idents close to Derby which were done in a continual run along the road at 80% overlap. The APR runs were flown NS-EW and the ident photography was flown in any direction as the points were located. Both black and white plastic panels were initially used to determine their acceptability. HOTLAND photographic sorties began with vertical control point idents followed by APR backup and horizontal ident photography as points were panelled.

Observations and Recommendation

3. Observation. An aerial on the underside of VH-RHU shows up on the photography and a small loss of detail in one corner per photograph is incurred.

Recommendation. The aerial should be relocated.

4. Observation. Levelling of the camera was made impossible at times due to the attitude of the aircraft and camera in flight with the aircraft power setting at 60%.

Recommendation. Camera mount and MF2 mount should be redesigned to allow adequate levelling adjustment.

5. Observation. The seal between the filter and the lens cone allowed dust to accumulate on the inside of the filter thus requiring frequent cleaning.

Recommendation. The seal should be replaced.

/6. Observation

6. Observation. Cassette No 1551 is faulty and requires a special loading and unloading technique.

Recommendation. Repair or replace the cassette.

7. Observation. Having only one spare cassette was a problem due to the length of laser lines and the fact that darkroom facilities in other areas were limited and having no spare spools led to film wastage.

Recommendation. Four cassettes and three spare spools should be sent with the equipment.

8. Observation. Camera vacuum was above 600 for the initial test flight but on the first mission flown (Msn 31) it dropped to 410 and remained around that level. The "O" ring seal was changed but no improvement followed. All subsequent photography was taken with insufficient vacuum.

Recommendation. A complete annual overhaul of the equipment at the very least is required.

9. Observation. Condensation caused the film to stick to the focal plane frame after a descent for refuelling on the latter part of the trip.

Recommendation. In areas of high humidity where this problem may occur, numerous blank transports should be taken and the camera opened after landing to unstick the film, otherwise on pressing 'Release' the feed spool unwinds and the film is not taken up.

10. Observation. Black panels were found to show up well on RC 10 photography, however, they were extremely difficult to locate from the air in the area of this operation.

Recommendation. Black plastic only to be used where absolutely essential, eg, pure sand.

11. Observation. Because of the harshness of the terrain some panel shapes other than 'X' or 'Y' were used and this caused some trouble in identifying the target point.

Recommendation. Wherever possible an 'X' or 'Y' should be used to panel a station even if a greater panelling time is required or the panel is eccentric. When panelling vertical control, it should be pointed out that panels only have to be on a point of equal elevation.

12. Observation. NF2 navigation sight was difficult to see through and not as clear as it should be.

Recommendation. NF2 optics require a complete internal cleaning.

13. Observation. Communications between the aircraft and base/ground parties would be an advantage.

Recommendation. Compatible to PRC F1 be fitted to survey aircraft.

TRAVERSING OPERATIONS

Task

1. To establish additional control points along the southern edge of the Derby and Larnard River 1 : 250,000 and the northern edge of the Yampi and Clarnley 1 : 250,000.

2. Personnel Involved

a. Southern PCPs

- (1) Party 1 Cpl P. Tangey  
Spr G. Fitzgerald
- (2) Party 2 WO2 D. Wicker  
Cpl D. Gay
- (3) Party 3 Cpl W. Herbst  
Spr M. Evans

b. Northern Traverse

- (1) Party 1 Cpl S. Hinic  
Spr R. Rees
- (2) Party 2 Cpl P. Tangey  
Spr G. Fitzgerald
- (3) Party 3 Cpl R. Langley  
Spr M. Evans

3. Support was one LOH for northern traverse and two landrovers  $\frac{3}{4}$  ton GS for southern traverse.

Operational Procedure

4. Southern Traverse

- a. Phase 1 was started on 16 Sep and stations Erskine, Mt Wynne and S302 were occupied. In the triangle formed by these stations all angles were observed but due to faulty EDM equipment not all distances were successfully measured. However, because of the strength of the triangle the observations performed were considered sufficient to give the accuracy required for a PCP.
- b. Because of atmospheric conditions trig heighting was unsuccessful. A height by spirit levelling was carried in from an APR crossing. This method was possible because of flatness of terrain.

/c. Phase 2

- c. Phase 2 was started on 21 Sep and stations Erskine, Mt Wynne and S303 were occupied. Because of shorter lines and successful EDM measures, the task was completed to full second order specifications in a minimum of time. Due to the flatness of terrain, station S303 was heighted by spirit levelling from a bench mark in the vicinity.

5. Northern Traverse

- a. Phase 1 was started on 21 Sep and station S306, S307, S308 were selected and intervisibly proven. The traverse was hampered by the excessive and unexpected amount of clearing on S306 which took three days, this was overcome by starting the traverse from the western end.
- b. Problems were first encountered when the ground mark on R104 Mt Page was not found. *Tellurimeter* measurements between R105 and S308 were unsuccessful because of faulty EDM equipment.
- c. Attempt was made to complete the traverse from the other end but when this was attempted the helicopter went U/S. At this stage time was running out so stations were established but not connected by a traverse. Stations were panelled and photographed on 29 Sep 75.

6. A plan of the traverse operations is contained in Appendix 1.

Observations and Recommendation

7. Observation. The PRC F1 radio is not suitable for night operations, which is an essential part of traversing.

Recommendation. That VHF radios be taken out on future operations to save problems of no communications and/or the confusion resulting from poor communications.

8. Observation. The "Solo" chain saw proved to be totally unsuitable for clearing tasks, its serviceability was very poor.

Recommendation. That an alternative chain saw be found to replace the present equipment.

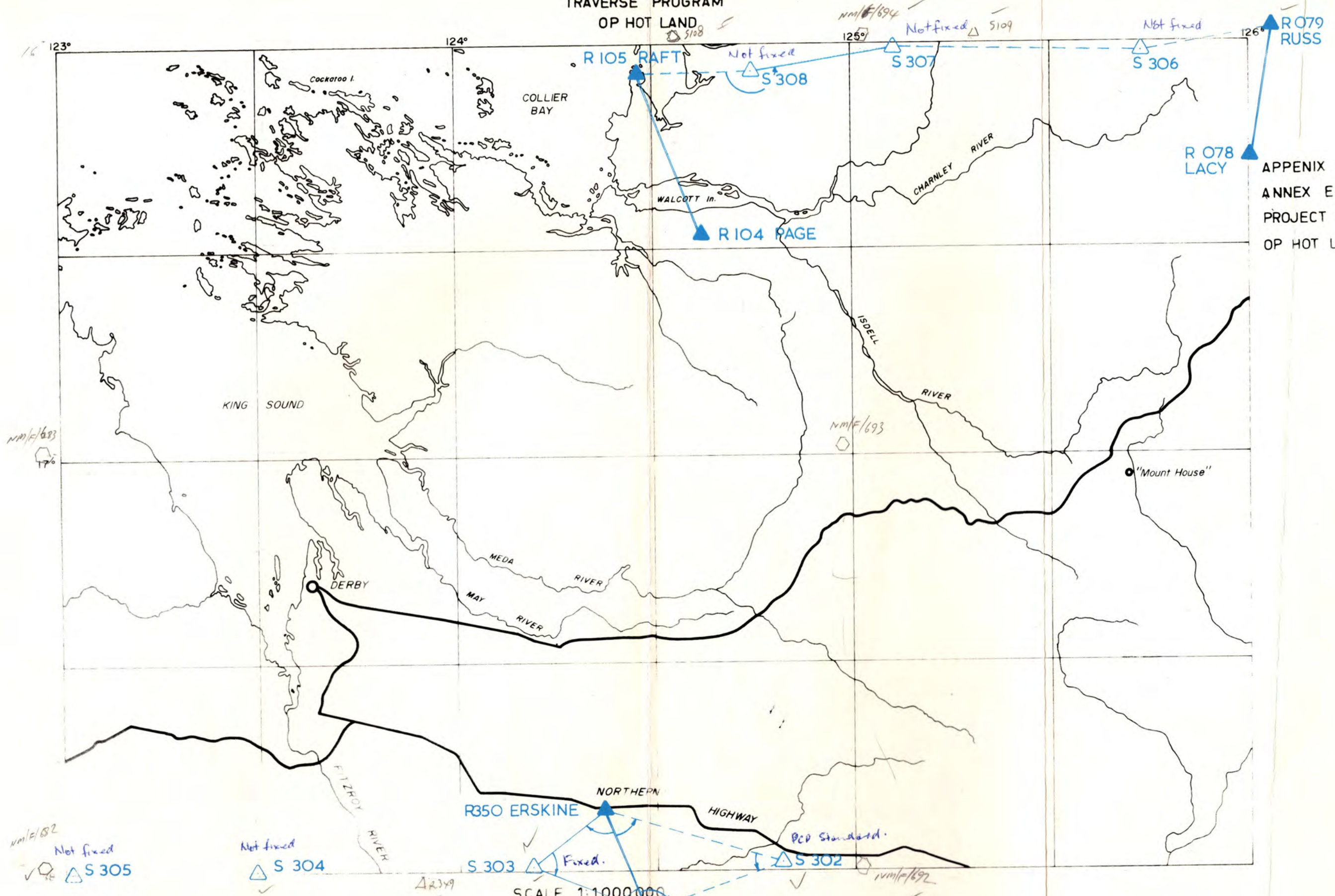
9. Observation. The rock drills provided were of soft metal construction and useless.

Recommendation. That tungsten tipped rock drills only be taken on field operations.

10. Observation. The T2 theodolite legs were cumbersome in the LOH aircraft and dangerous if the aircraft were to get into difficulties.

Recommendation. That sliding legs, as used with the WILD T2-E be obtained for future airborne operations.

TRAVERSE PROGRAM  
OP HOT LAND



APPENIX 1 TO  
ANNEX E  
PROJECT REPORT  
OP HOT LAND

LEGEND:-

- △ NEW STATIONS ESTABLISHED
- ▲ FIXED STATIONS
- DISTANCE MEASURED
- KNOWN LINES
- ∠ OBSERVED ANGLES

SCALE 1:1,000,000

ROAD CLASSIFICATION OPERATION

Task

1. The task was to classify roads to military specifications in the 1 : 100,000 map areas shown in Appendix 1.

2. Personnel Involved

Cpl K.R. Langley RA Svy

Spr P.N. Meagher RA Svy

Capt C. Galvin Pilatus Porter Pilot

Lt L. Hummerston Pilatus Porter Pilot

3. Transport for task was provided by one landrover  $\frac{3}{4}$  ton GS and one Pilatus Porter with 80 hours allocated.

Operational Procedure

4. As 60% of the information was provided by local shire and West Australian Department of Main Road Offices, the area was divided into four sections, the centres being Derby, Broome, Port Hedland and Marble Bar, where these offices are located.

5. Initial action on moving into a sector was the interviewing of the relevant officers, eg, Shire Clerks, Surveyors and Engineers.

6. Information gained from these interview<sup>s</sup>~~ers~~ was verified and anomalies were clarified from the air.

7. On return to Derby, at the completion of the information gathering phase, three coloured coded copies of each map area were prepared and all edge joins were effected where adjoining maps were available.

Comments on Operation

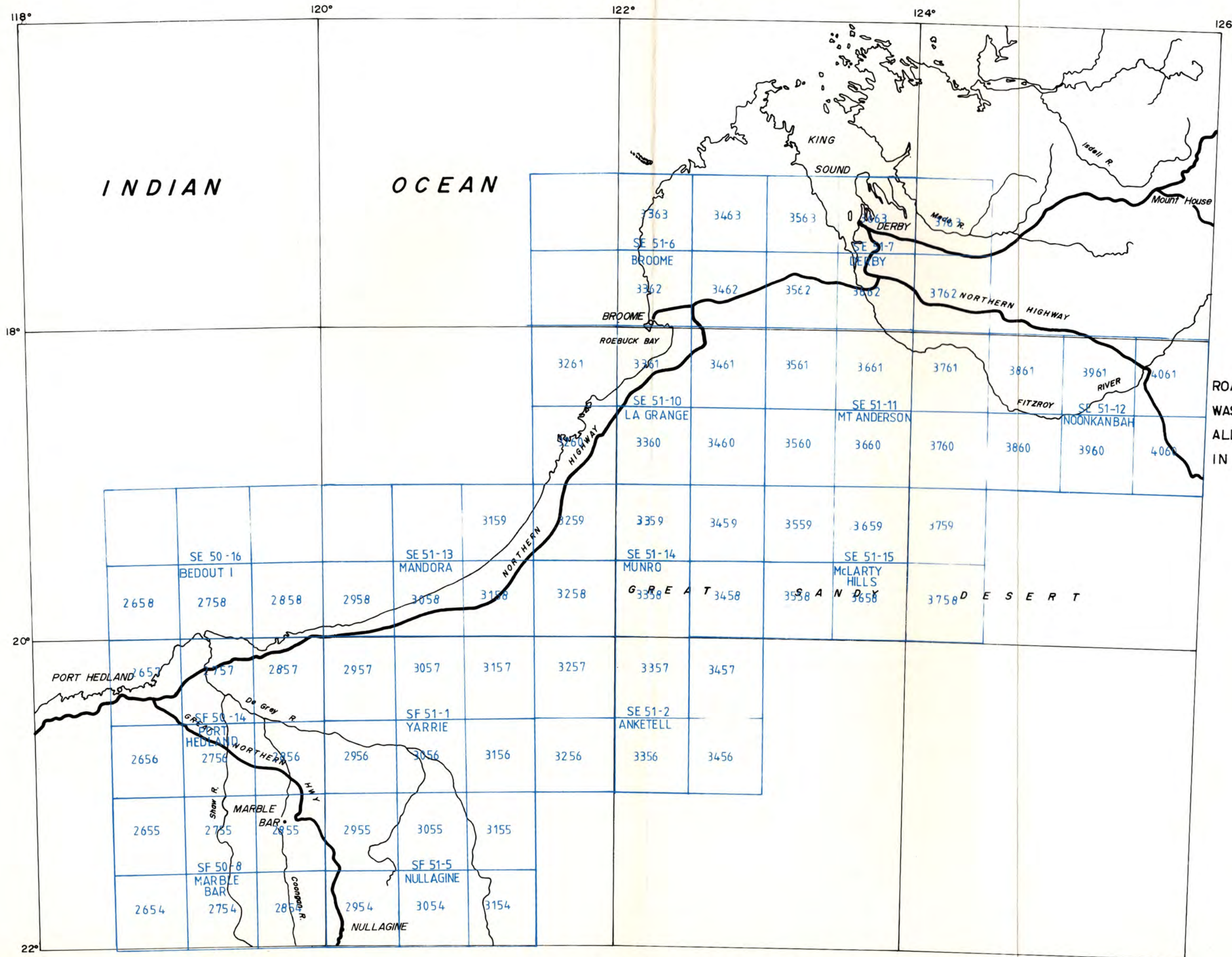
8. National Mapping dyelines were generally difficult to read because of the poor quality of the copies and difficulty was experienced when effecting edge joins of these sheets.

9. The only discrepancy which could not be resolved on RA Svy published maps was the edge join between Pender 1 : 100,000 and Joelaenga 1 : 100,000, ie, two have sealed roads (17° 00' Lat and 122° 39' Long, 17° 00' Lat 122° 45' Long) shown on Pender where in fact two have unsealed roads as shown on Joelaenga.

10. Special mention must be made of the great assistance rendered by the various bodies, who provided enough information to enable the task to be completed using only 24 hours of the 80 aircraft hours allocated. Their help in arranging transport and introductions in different centres also saved time and expense.

ROAD CLASSIFICATION PROGRAM

APPENDIX 1 TO  
ANNEX F TO  
PROJECT REPORT  
OF HOTLAND



ROAD CLASSIFICATION  
WAS COMPLETED IN  
ALL 1:100 000 AREAS  
IN THIS PLAN .