

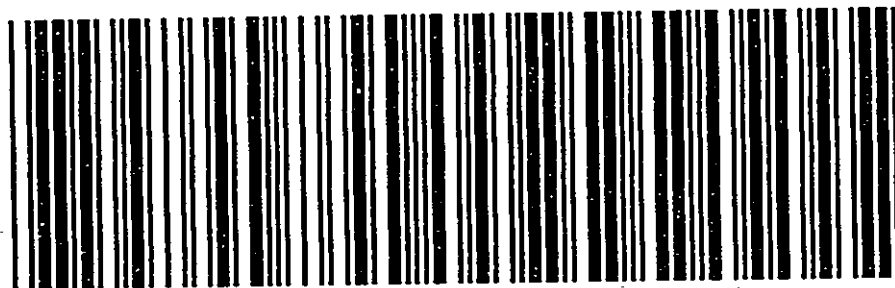
AWM52

Australian Military Forces, Army headquarters,  
formation and unit diaries, 1939-1945

**1/5/52**  
**FORCES**

New Guinea Force Adjutant  
General Branch (NG Force  
AG Branch)

1942, Port Moresby to Buna



1/5/52-0022

HQ, PAF 1 AUSST CORPS TPS.

REC/GO 10/421.

TO C. E. H. G. F.  
FROM C.E. 1 AUSST CORPS TPS.

22 NOV 1942

RECEIVED
2045
26 NOV 1942
FILE NO. CE/N 3487/11
C.E. 1 AUSST CORPS.

ROUTE HIOLO - MAORO.

Report on Condition of Work at 6 NOV 42 on Mule Track and Rd.

REF: UTMME 1" = 1 MILE (with additional information as given by 2 Svy Sec from air photographs.)

PART I. GENERAL.

1. SMITHY AND GRADING.

(1) The route has been completely covered by Svy pty and the graded line for Mule Track has been placed. (Route shown on map attached.) This line incorporates grades for short distances as steep as 1/5 - 1/6 to reduce distance. Total distance from OMBERS CR - MAORO as estimated = 34 miles. (17 1/2 miles traversed (compass and chain) 16 miles estimated.)

(2) Grades from 4 - 11 miles are suitable for Jeeps. Section from 11 m. to MAORO would require regrading for any type of veh rd.

2. TRAVERSING.

Mule track has been traversed and marked with blases in miles and 1/2 miles up to 17 1/2 miles. Mileages refer to OMBERS CR as zero.

3. MULE TRACK.

Track is complete and passable to 14 miles. A further 1 mile has been partially constructed but rock outcrops have NOT yet been removed. This section would, therefore, be dangerous for mules to attempt to pass.

4. ROAD

Rd has been constructed to 5.5 miles, of which 3 miles are passable and capable of use by Jeeps in all weather and F.W.V. vehs under dry conditions.

PART II. SECTIONAL.

1. HIOLO - OMBERS CR.

Although this section was originally CEM 307'S 113' responsibility (10 AUG - 14 SEP), during the second phase of construction (7 OCT 42 - 6 NOV 42) this section was responsibility of CEM 7 AUSST DIV and is, therefore, NOT included in this report.

2. OMBERS CR - 3 MILES.

This section of the rd has been graded, roughly rounded and corduroyed as far as 2 1/2 miles. As far as possible, trees have been cleared for 20 ft from centre line, on each side of road.

To assist in preserving the corduroy and to prevent its early decay, the corduroy has been covered for about 1 1/2 miles with clay. It has been found that surface corduroy

SEEN  
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CE  
SORE  
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under changing conditions of saturation and dryness will deteriorate rapidly.

From  $2\frac{1}{2}$  to 4 miles, only patches of corduroy have been laid although log drains and surface drains had been constructed. This section finishes on No. 3 Saddle, used at the end of the period as a Jeep Head for supplies and stores.

3. 3 MILES -  $3\frac{1}{2}$  MILES.

This has been cut roughly to rd section by bull-dozer but is NOT trafficable under all conditions.

4.  $3\frac{1}{2}$  MILES - 14 MILES.

(1) This section is passable to loaded mules but requires daily maintenance for the clearing of landslides, and fallen trees and draining of accumulated water. It will be necessary, therefore, for a maintenance party to proceed ahead of loaded mules when the track is resumed.

(2) Local features in this section are as follows:

- $4\frac{1}{8}$  - Base Mule Camp.
- $4\frac{3}{8}$  - Plentiful supply of water (approx 40 g.p.h. under driest conditions)
- $4\frac{5}{8}$  -  $5\frac{1}{8}$  Sideling section (no possibility of by passing rd machinery.)
- $5\frac{3}{8}$  - 6 Sideling section with 3 large faces of rock.
- 6 -  $7\frac{3}{8}$  Easy sideling section over SMITHS SADDLE. Considerable drainage trouble resulting in very boggy track. Several points for by passing machinery.
- $6\frac{3}{8}$  - Mule Camp No. 2. Ample Water Available.
- $7\frac{5}{8}$  -  $10\frac{3}{8}$  Steady upward grade. Steep sideling section.
- $8\frac{1}{8}$  Plentiful water supply. Site of Jeep bridge (50% complete; requires roadbearers and decking).  
Mule Camp No. 3.
- $10\frac{3}{8}$  -  $10\frac{5}{8}$  Track coincides with ridge.
- $10\frac{5}{8}$  -  $11\frac{1}{8}$  Sideling section, steady upward grade. Section from  $7\frac{3}{8}$  -  $11\frac{1}{8}$  rises from 2000 ft to 3000 ft, i.e. average of  $5\frac{3}{8}$
- $11\frac{1}{8}$  - 14 From  $11\frac{1}{8}$  local heights vary between 2000' and 3500'. Steep sideling section touching ridges at low points only. Local rises and falls.  
Water frequent in many small streams.  
No opportunity of by passing rd machinery on ridges.

5. HIDDEN SADDLE (14 m.) - PEPUPI SADDLE (17 $\frac{1}{2}$  m.)

Sideling section - Two faces of rock  
No bypassing rd machinery.  
This section by passes RAT country - peak of 4000 ft.

6. PEPUPI SADDLE - XIAS SADDLE. (approx 2 miles.)

Approx 50% ridge, 50% sideling.  
Little rock.





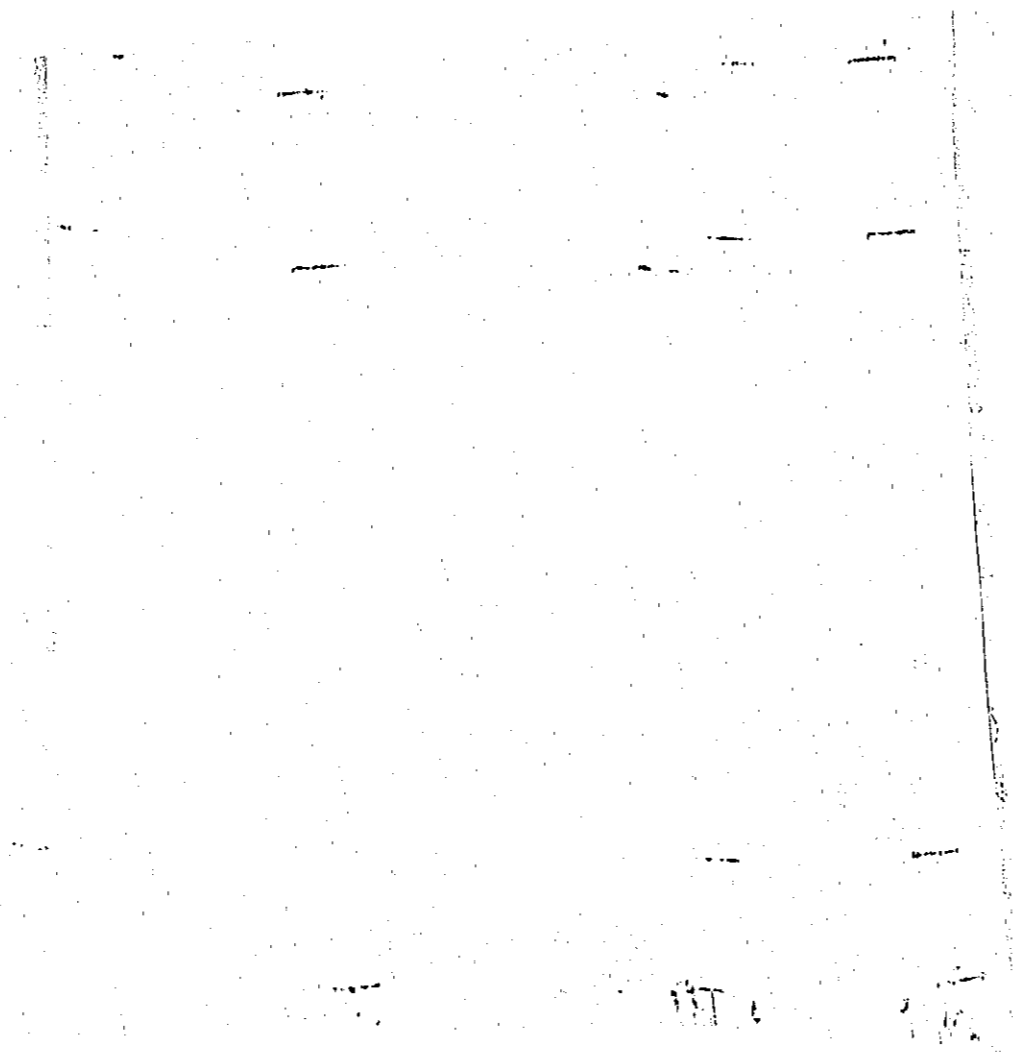
APPENDIX II  
REPORT REC/GO 10/421

ROADS  
SCALE 1:50,000  
DATE 1941  
SHEET NO. 10  
SHEET NO. 24

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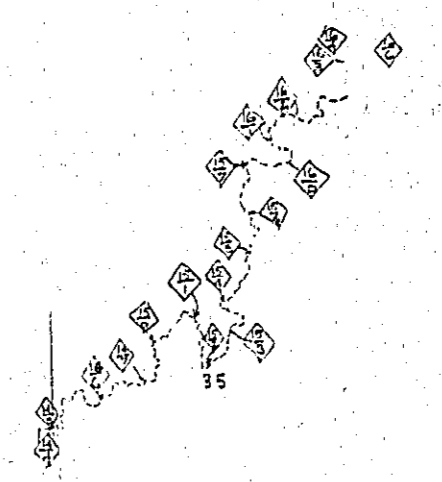


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APPENDIX I TO REPORT WRC/40 10/421

ROADS  
 JEEP & MULE TRACK TRANVERSE  
 PA I MAP MASSIVE ALBERTA  
 CRE DUN DEWY R A S  
 DUN RIN IUSTICATES  
 Scale 100:1 CAS 1023



TO  
FROM

C. E. N. G. F.  
CRE 1 AUST CORPS TPS

14 NOV 42.

MULE TRACK AND RD - OWERS CNR - NAORO.

1. TABLE OF DISTANCES (REF UBERI, 1" = 1 Mile)

	D I S T A N C E S.						
	Sidelong		Ridge		Rock	Total.	
	Miles	Yds.	Miles	Yds.	Yds.	Miles	Yds.
OWERS CNR - 4 m.	-	-	4.0	7040		4.	7040
4 m. - HIDDEN SADDLE	9.5	16700	0.75m	1320	400	10.45	18420
HIDDEN SADDLE -							
RETURN SADDLE	2.75	4850	-	-	100	2.81	4950
RETURN SADDLE -							
XMAS SADDLE	1.0	1760	0.87m	1540	50	1.90	3350
XMAS SADDLE -							
NOEL RIDGE	2.25	3960	-	-	200	2.56	4160
NOEL RIDGE -							
CAMP 9	1.5	2640	-	-	25	1.51	2665
CAMP 9 -							
MAGULI SADDLE	3.0	5280		300	100	3.24	5680
MAGULI SADDLE -							
PYRAMID SPUR	1.0	1760	0.5 m	880	200	<del>1.61</del>	<del>2840</del>
PYRAMID SPUR -							
FOOT OF SPUR	1.0	1760	2.0 m	3520	50	<del>3.04</del>	<del>5330</del>
FOOT OF SPUR -							
NAORO	-	-	2.0 m	3520	-	2.0	3520
TOTAL	22.0	38710	10.12	<del>11080</del> 18120	1125	<del>31.5m</del>	<del>55165</del> 57955
Distance of Mule Track reqd.	12.5	22010	3.35	6240	725	16.5m	28975
Distance of rd (net location) reqd plus 10% increase due to reduction of grades and resultant increase in length around spurs, etc.	<del>3.7m</del>		<del>11080</del>	<del>1125</del>		23.2	40911x 625 11080x 1197x 30.2m 53188

2. ESTIMATION FOR MULE TRACK.

Assume av slope of 1:1. Width of cut in sideling = 4 ft.

A. ASSUMPTIONS AND RATES.

(1) Tree Clearing and Grubbing.

Sideling - distance cleared = 12 ft. min.  
Ridge " " = 6 ft. min.

In average local jungle 2 men will clear and grub a strip, 6' wide, 50 yds long. / day

i.e. Rate = 25 yds/man/day, for ridge.  
and 12.5 yds/man/day for sideling.

(2) Rock Clearing.

Two men can be expected to clear 1 c yd of rock/day, (hand drilling).

On 4 ft track there is approx 1 c yd/yd run of track.

i.e. Rate = 0.5 yds/man/day.

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(3) Excavation of Soil.

Two men can be expected to cut and clear 10 c yds/day.  
On 4 ft track at 1 c yd/yd run.

Rate = 5 yds/man/day.

(4) Track Maintenance (limited).

Two men can be expected to trim batters, construct minor drains and carry out limited clearing on 20 yds of mule track.

Rate = 10 yds/man/day.

B. CALCULATIONS.

(1) NET TIME.

	Length yds.	Rate Yds/ Man/day.	Man Days
Tree clearing and grubbing.	22010	25.0	880
(ridge)	6240	12.5	500
Rock blasting	725	0.5	1450
Excavation	22010	5.0	4402
Track maintenance	28975	10.0	2897
Total			10129

(2) TIME LOST.

Moving Camp.

Move once every 2 miles = 8 days.

Heavy rain - av loss 1 hr/day = 1 day in 8  
Rest and hygiene = 1 day in 14  
Contingencies (5%) = 1 day in 20

Assuming 2/1 AUST PIR BN as at present constituted,  
with 560 working men.

Net time required = 29 days 1  
Time lost = 8 + 5 + 2 + 2 = 15  
Total time = 44 days.

3. ESTIMATION FOR A JEEP RD USING MANUAL LABOUR.

Assume an absolute min rd width of 6 ft and sidelong slope of 1:1.

∴ Vol soil/yd run = 2 c yds/yd run.

(1) Tree Clearing and Grubbing.

As for mule track but widths as follows:

Sideling 14 ft min. - Rate = 29.2 yds/man/day.  
Ridge 8 ft min. 16.7 yds/man/day.

(2) Rock Blasting.

Rate = 0.25 yds/man/day

(3) Excavation of Soil.

Rate = 2.5 yds/man/day.



(4) Rd Maintenance.

Owing to absolute min of cut and necessity for cutting corduroy and constructing jeep bridges in place of minor mule bridges, rate will be increased.

2 men can be expected to carry out these works and do minor clearing for 10 ft each side of rd on 5 yds/day.

Rate = 2.5 yds/man/day.

B. CALCULATIONS.

(1) NET TIME.

	Length Yds.	Rate Yds/ Man/day.	Man Days
Tree clearing and scrubbing. (Ridge).	40911 11080	29.2 16.7	1400 600
Rock excavation	1197	0.25	4800
Soil excavation	40911	2.5	16350
Track maintenance	55168	2.5	21220
Total			44450

Assuming same tps available as for mule track.

Net time = 120 days  
 Time lost  
 Moving Camp = 15  
 Rain = 15  
 Rest &  
 Hygiene = 9  
 Centing. = 6 45  
 Total Time = 165 days.

4. ESTIMATION FOR A JEEP RD USING PLANT AND MAN LABOUR.

(1) Limiting factor will be the possibility of using more than one machine in the forward cut. This has been possible in 5 places up to 4 miles, but from 9 miles onwards, one machine only can operate forward.

(2) Can expect a dozer of type D6 with a blade 6' x 2' to handle on level going 1 1/2 c yds/min.

On Sideling (1:1) this would be reduced by 50%

i.e. Daily Rate = 1/2 x 60 x 12 c yds. (for 12 hr day.)  
 = 540 c yds.

(3) Completed width (min) of rd when machine cut cannot be less than 8 ft as footing must be sufficient to allow machine to operate.

Ant Spoil/yd run = 3.55 c yds.

∴ One machine can be expected to cut  $\frac{540}{3.55} = 152$  yds/day (12hrs)

From experience it has been found that the following delays occur.

Heavy Rain - average 1 hr per day.  
 Breakdown - " " " " " (worn machines but good order)  
 i.e. Total length per day would be reduced to  $\frac{450}{3.55}$   
 = 125 yds/day

Total distance Sideling = 40911 yds  
 ∴ Time = 327 days. plus 5% for contingencies unforeseen.  
 = 354 days.

All other work can be computed within this time.

(4) Clearing and Grubbing.

Width of clearing reqd on sideling = 18 ft min.  
 Rate = 17 yds/man/day  
 " " " " " " = 12 ft min.  
 Rate = 25 " / "  $\frac{1}{2}$  "

(5) Rock Clearing. (8 ft width)

3.55 c yds/yd run of road  
 Rate = 0.14 yds per day.

(6) Rd maintenance.

To construct min drains, log culverts (est 1 per 50 yds) clear trees 20 ft each side of rd and corduroy sufficient to enable jeeps to pass it has been found that on an average

Rate = 1 yd/man/day.

B. CALCULATIONS.

	Length Yds.	Rate Yds/Man/day.	Man Days	Days	n
Rd Clearing and grubbing (Sideling)	40911	17.0	2510	252	10
(Ridge)	11080	25.0	440	"	2
Rock excavation	1197	0.14	8500	"	34
Rd maintenance	55188	1.0	53188	"	211
Total			64438		257

In 354 days Delays =  
 Moving Camp = 15 )  
 Rain (1/8) = 44 )  
 Rest & Hygiene 1/14 = 25 )  
 Cont. 1/20 = 18 ) 102

Total = 257 working men.

354 - 102

Allowable time ∴ = 252

*Beedmore*  
 .....Lt. Col.  
 CNE + AUST CORPS TPS.

Engineers Survey Party  
NAURO Section.

CRE 12 Aust. Works  
N.G.F.

Report - Period 5 Oct / 1 Nov.  
PART - FROM CRE 12 Aust Works

1. Left mainly Murray Barracks 10.30 hrs 5 Oct.  
Reached NAURO 1100 hrs 7 Oct. Bin
2. Contacted <sup>cc</sup> A <sup>cc</sup> Y, Pioneer (Batt) - Capt Wilson  
Together went over work done previously 7 & 8 Oct.
3. Completed blazing & grading track from NAURO (2200ft)  
onto Maguli Range (4000 ft.) 9, 10 & 11 Oct
4. Two days spent in trying for easier track onto  
range. 12 & 13 Oct.  
Decided to continue with original route.
5. 14 & 15 Oct Recce. and preliminary blazing  
track on along "Maguli Range" to first  
rise of about 500ft where present blaze  
commenced.
6. 16 to 19 Oct. Returned to report to CRE <sup>Col. T.P.</sup> camp  
& pick up instruments.  
During which time S/Sgt Walter completed grading  
along ridge
7. Three days recce over remainder of Maguli Range.  
20 to 22 Oct
8. Two days with Capt Wilson discussing and  
inspecting route & possible deviations etc

Cont.

- 25 to 28 4 days back over very severe and rough country to find most likely route for track.
10. 29 + 30 Two days with CRE Lps Ips and Herit Owens inspecting country from various vantage points on Maguli Range.
11. 31 Oct + 1 Nov Return to CRE who H.Q. upon receipt of order from CE.

Remarks: CE visited NAURO 19 Oct. inspected portion of track complete. Did not see CE as I was just returning from CRE Camp Lps H.Q.

CRE Camp Lps traversed country 29 + 30 Oct decided the most difficult and advisable if possible to link up with other end of road with mule track only owing to ruggedness of country. Remarkable progress very good and reconnaissance work quite thorough in such rough country.

Signed

Cliff Martin Hunt.

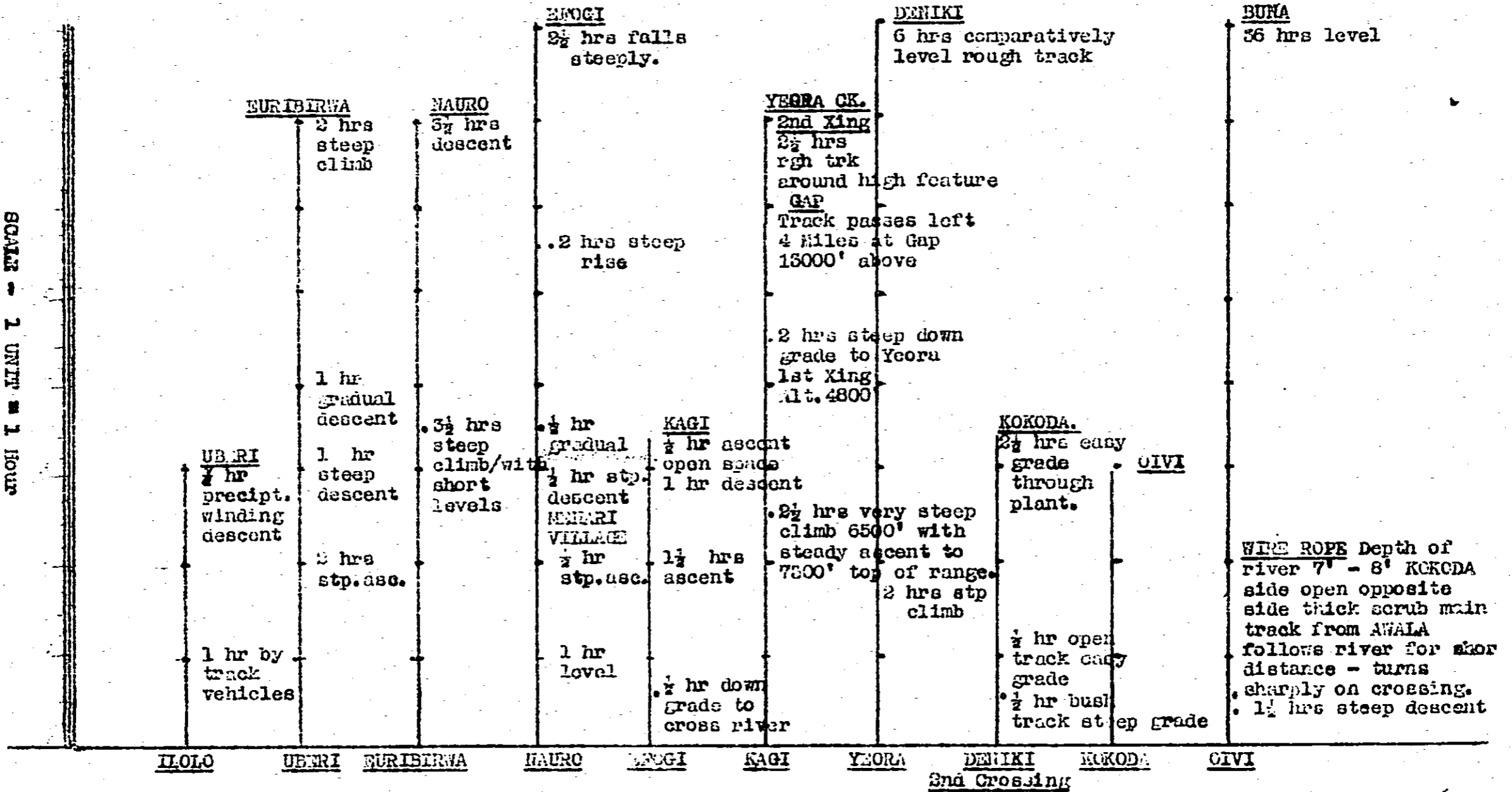
All on wrong track  
Owens Original track, which will have to be used as Martins route impassable in reasonable time, led east by 4 mile past Jap camp before turning South.

Jan 4

TRACK APPRECIATION

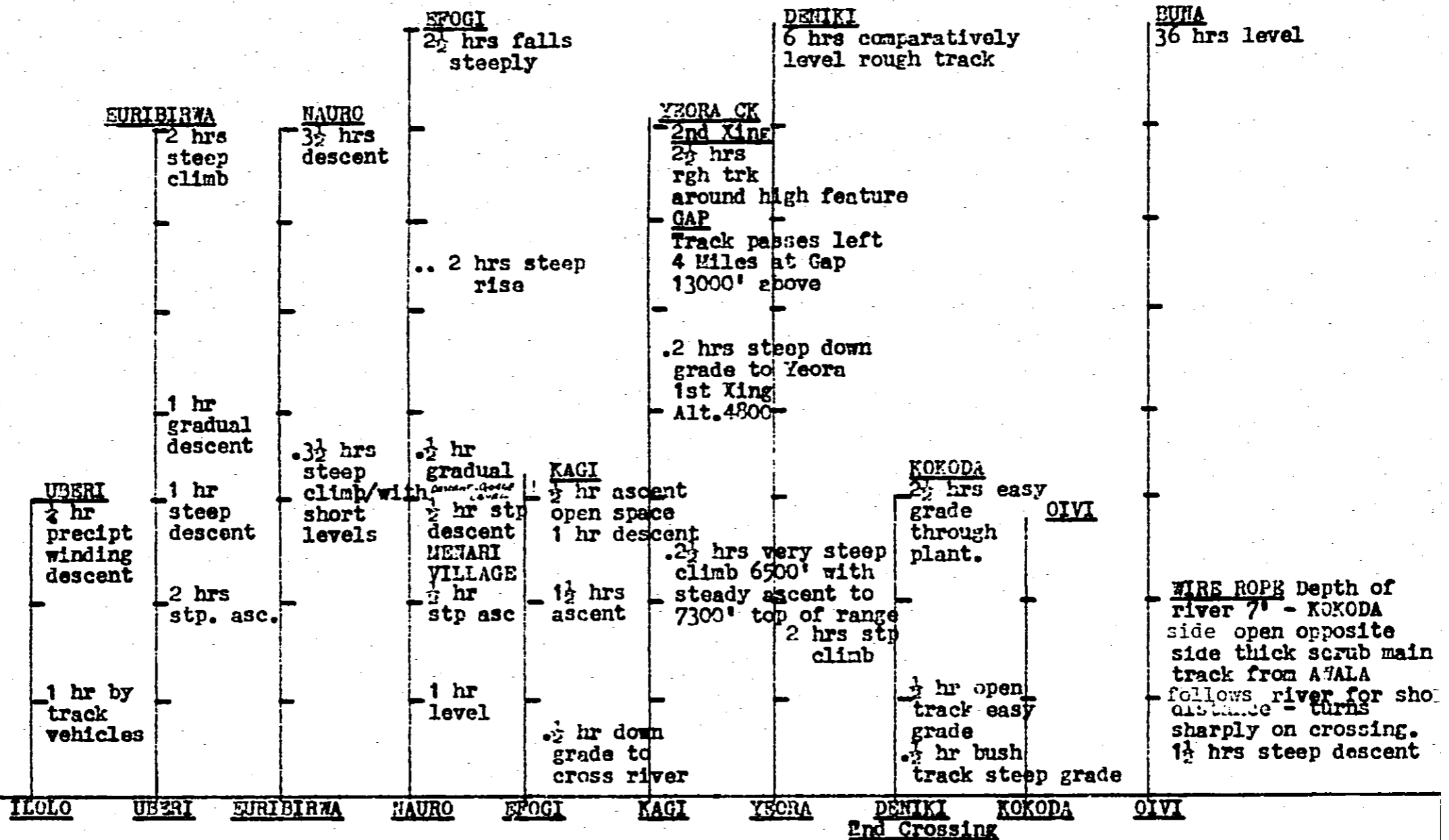
ILOLO - KOKODA - BURIA

SCALE - 1 UNIT = 1 HOUR



TRACK APPRECIATION ILOLO - KOKODA - BUNA

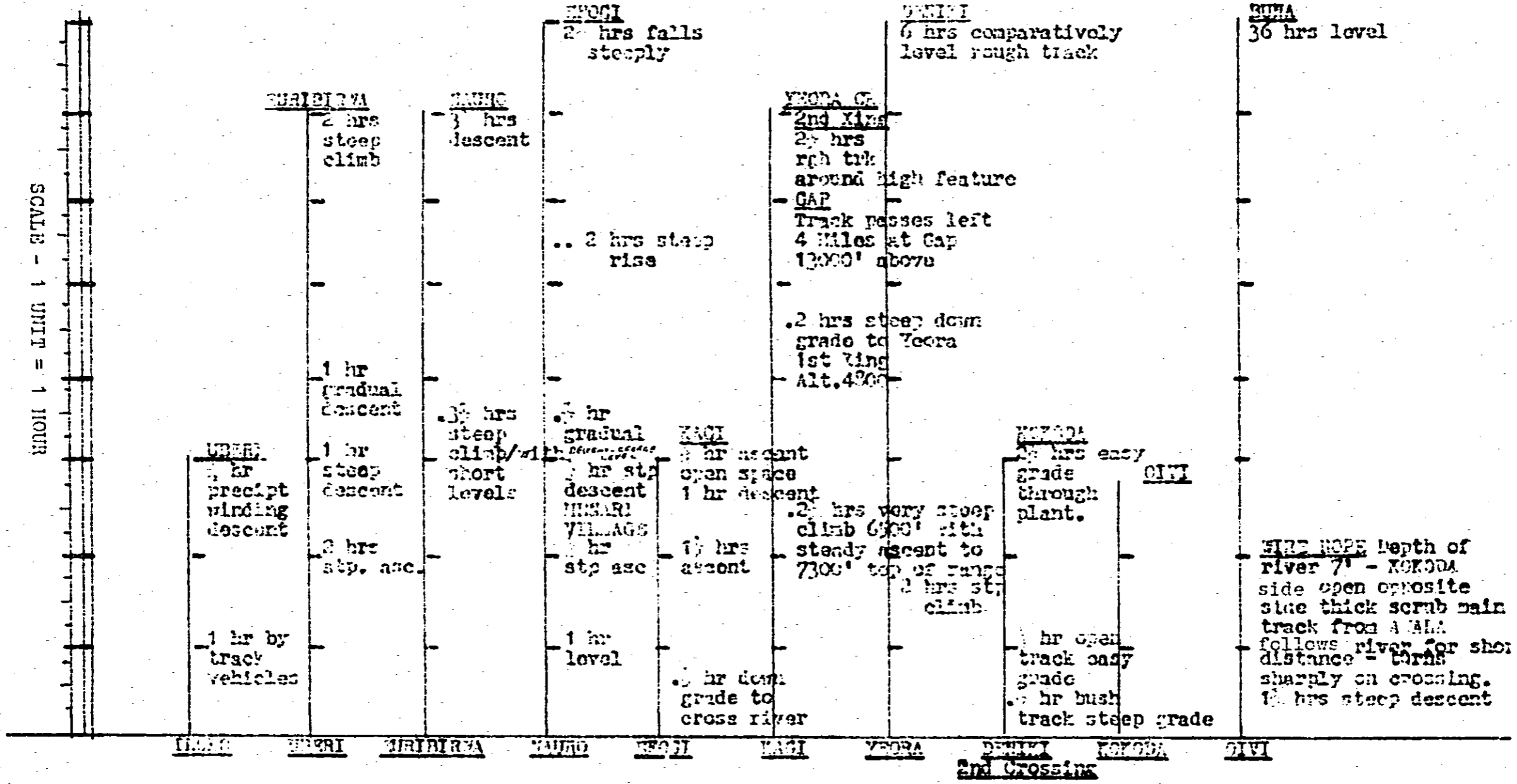
SCALE - 1 UNIT = 1 HOUR



End Crossing

TRACK APPRECIATION      ILOLO - KOKODA - BUNA

SCALE - 1 UNIT = 1 HOUR

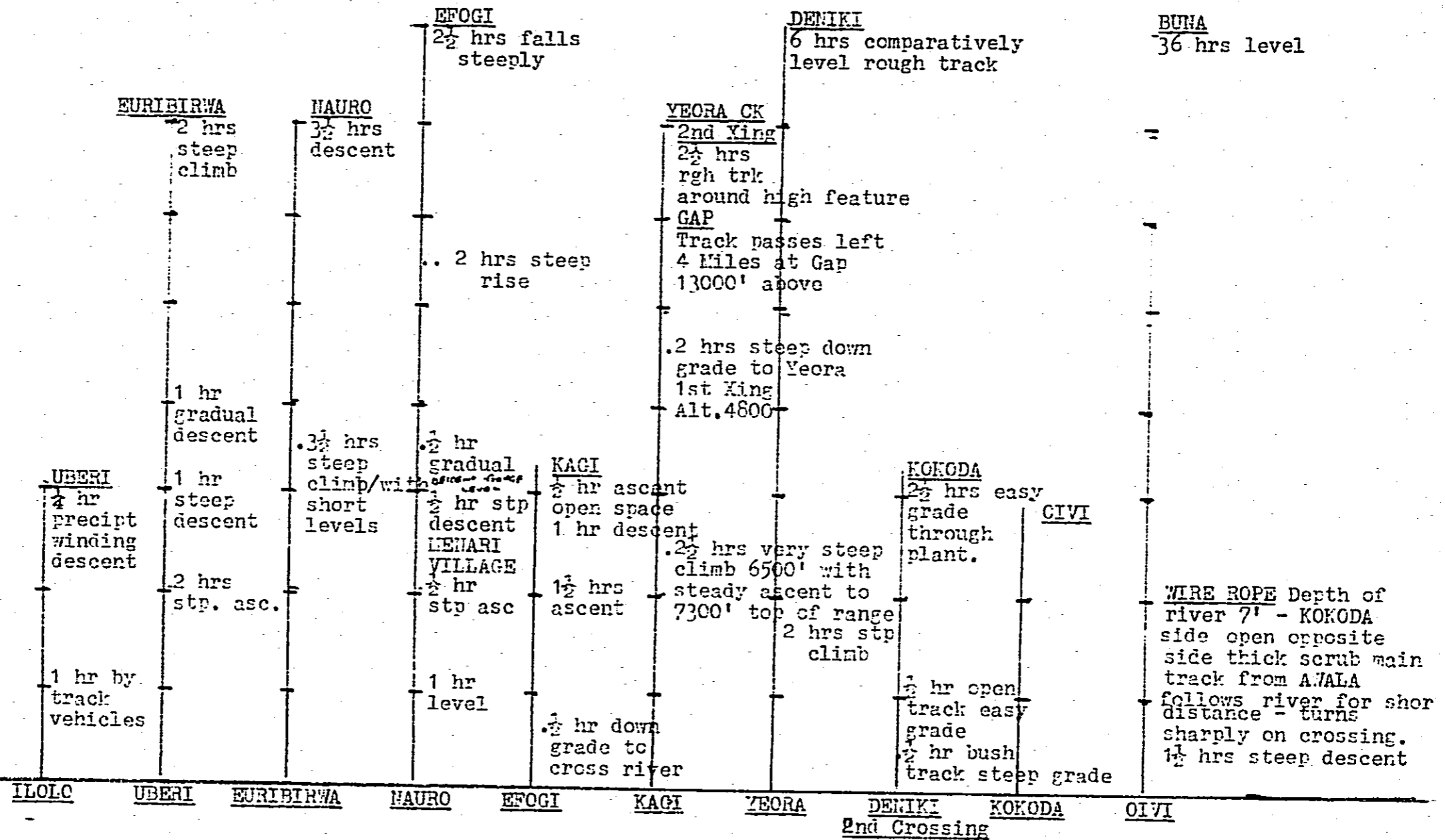


FIRE ROPE Depth of river 7' - KOKODA side open opposite side thick scrub main track from A.M.A. follows river for short distance - turns sharply on crossing. 12 hrs steep descent

End Crossing

TRACK APPRECIATION ILOLO - KOKODA - BUNA

SCALE - 1 UNIT = 1 HOUR





Copy/SMC

KOKODA ROAD (BROWN RIVER) RECCE - 21/6/42 - 9/7/42.  
BY Lieut. OWERS.

The patrol left H.Q. NGF and proceeded to the Brown River via Goal Gardens going east of Mt Lawes and West of Mt Keith Little.

The Brown was crossed at KAROOMA to contact natives but from information received the patrol, having obtained a local guide, recrossed the Brown to the left bank and followed an old pad upstream on river flats almost to Elebe where the country becoming too rough for horse travel, the Light Horse turned back to pick up further rations, a rendezvous being fixed at that point for one week hence.

The unmounted party crossed to the right bank of the Brown at Elebe and continued on that side till 30/6/42.

The country throughout was rough and in places precipitous. There are very few river flats (and these are only small) along the Brown above Elebe and as a track had to be cut progress was limited to a maximum of five miles per day.

A good pad was struck on 29/6/42 and though leading away from the river it was followed and eventually led to No. 5 Spotting Station on the 30 mile ring.

Although the old surveyed route is shown continuing along the right bank of the Brown for a further five miles above this point it was decided that the country on the left bank could be no worse than that already traversed, the Brown was crossed and two days spent pushing up the left bank.

From a base below Tamala this hill and Onginumu were scaled for observation purposes and the patrol then returned to S.S. No. 5 and observation party proceeding up the Boduva and Manari pad en route.

A day was spent at the wireless station while an observation party proceeded to Beabio where excellent views of the country were obtained up the Brown headwaters to the Gap. This day (5/7/42) natives who had been sent back to the rendezvous with Light Horse returned with Stores.

Instead of returning by the same route it was decided to view the country between the Brown and the Goldie Rivers by returning by an old pad to Ioribaiwa on the Kokoda Road. This route gives observation of the alternative location shown on old survey plan.

Two days sufficed to reach Ioribaiwa along this pad which in places coincided with the 30 mile ring survey line, and a further two days brought the patrol to NGF HQ.

The full surround took 19 days and the mileage covered in that time was approximately 140 miles.

TOPOGRAPHY.

The country from the Goldie River to the Brown River is flat traversed by a long low saddle which joins Mt Lawes and Mt Keith Little.

River flats continue on each side of the Brown to one mile below Elebe.

From Elebe the country is rough and broken with many steep sided gullies and razor back spurs and as far as Tamala is of schist formation. If the country were cut landslides would be most probable.

The Brown river at Elebe has a volume of about 4,000 cubic feet per second being 150' wide 8' at its deepest and flowing at five feet per second. Flood rise is 8' and it has been known to flood the flats 15' above its normal level.

(2)

Above Elebe gorges commence on the river and in places the banks are precipitous and above the suspension bridge, which is of cane, the river is a series of cascades.

A crossing within five miles of the bridge would still necessitate a bridge of over one hundred feet.

#### ROAD LOCATIONS.

A road route with suitable grades could be located up the Brown River to the Gap.

The old route shown following the right bank of the Brown should not be considered. The country on both sides of the river is similar and obviating bridging the Brown is a major consideration. The route should follow the left bank of the river to a graded line from the Gap which is the main grade controlpoint.

In locating it would be necessary to commence grading at the gap on maximum allowable grades down to the Brown and then follow the river closely to the river flats below Elebe.

This section of about 50 miles (Elebe to the Gap) would be in steep broken country with slopes generally of the order  $35^{\circ}$  -  $50^{\circ}$  and in places precipitous.

Due to the sinuosity of the Brown the mileage of this route would be much longer than appears from plans and would be approximately (Goal Gardens to the Gap) 70 miles.

From Elebe to Goal Gardens the location could follow the old route west of Mt Keith but consideration should be given to the possibility of a location to the east of that mountain. This is shown as alternative on plan herewith.

I must stress the ruggedness of the country from Elebe to the Gap. Although not entered the country from Tamala to the Gap was well observed from Onginumie and Udeber and further views were obtained on the route from suspension bridge to Ioribaiwa.

#### NATIVES.

Three populated native villages were passed through en route and in each there was much illness and sores. At Eloilogo there were eight fairly new graves.

Information was brought to the patrol by a native village constable that the natives of Udebor were hostile to the white men at No. 5 Spotting Station. A warning was sent back immediately and the patrol returned through the Station three days later.

The natives from Edebor were working about the Station and after interrogation it was decided to arrest the supposed leader of the unrest. The witness for the prosecution reversed his testimony inside an hour so he, too, was arrested. Both were brought in and handed over to the police at Bushitabu.

The eighteen natives with the patrol did their job well but were very slow and held up progress considerably.

#### RATIONS.

The rations were carried throughout but seemed to be meagre and were necessarily augmented with birds, fish and native foods.

The Light Horse Section did good work in getting rations dumped at Lighthorse H.Q. to Elebe.

#### DISCIPLINE.

I must comment most favourably on the conduct and behaviour of the three men who accompanied me on the reconnaissance - Ptes McDougall and

(3)

Kluck of the Defensive Platoon and Pte Howard of ANGAU.

(Signed) H. Owers, Lieut.

111

## Notes on Kakoda Rd Location

Work on the preliminary location of the Kakoda Rd has been to date mainly reconnaissance.

The location followed the mule track from Flolo to and along the main spur overlooking Ubini from the south and here the first major problem presented itself.

Ubini is on the main tributary of the Golden River and is situated some 1000' lower than the surrounding hills which are of conglomerate formation with cliffs varying in height to 300'.

A graded line was probed into Ubini but as it entailed six hairpin bends on steep country and traversed a dozen or more steep sided boulder filled gullies road construction would be most difficult and would take at least three months work into Ubini.

Adding to this the result of recess by my party to the north of Ubiini and of recess by the Mfec. Unit which was investigating the problem of continuing the Nfulu tracks through to Lonibaiwa, a problem which they found unsolvable in that direction, the necessity of by-passing Ubiini became evident.

As shown on the attached map several lines were reconnoitred as far as Manari but the time factor forbade further work towards Efoqi & Kagi. Enough information was gained, however, definitely to form the opinion that the line above Ubiini must be continued on a rising grade throughout to Kagi avoiding the big rises & falls which occur on the existing track and by-passing all intermediate stations. An idea of the rises & falls between stations can be gained from the time-height section attached hereto.

The location as outlined will be very approximately as shown by dash dot line on the plan going around

the headwaters of both the Goldie and the Naoro.

Other locations at first thought possible are shown in pencil lines on plan but in my opinion, without further intense recess, any line dropping into the Naoro must be scrapped as Naoro is at an altitude of 2200' and Kagi is at 6000' and this rise is in rough steep country with heavy side slopes and fringed with innumerable creeks and gullies. Another line considered was via Jawarene through Kaitaki & Itiki but this would be longer and as Jawarene is at an altitude of only 800' all the rise to Kagi is still to be surmounted.

The altitude of the location at present above Ubini is 2100' on a main top.

In all the country investigated, except where cliffs occur, the main tops & spurs give the best lines to follow and this will be adhered to as far as possible on the proposed line to Kagi.

The sections Kagi - The Gap and The Gap - Koboda remain at the moment a closed book. I have not entered this country and have had no technical reports on it but from lay hearsay it is steeper and more rugged country than the Ubi - Kagi section. Accepting this as true and from my knowledge of the latter section road construction will be a major engineering operation.

I intend commencing the Ubi - Kagi line, as outlined above, immediately, running it on grade. Actually, a party should reconnoitre the route first but lack of personell forbids this. To the present I have had one field hand and one assistant with a little knowledge of location whom I used on small recess. The latter has been recalled and the total survey party now consists of myself a field hand and ten natives. This to locate and survey for construction some eighty miles of road through rough broken mountainous country where any of a dozen possible

routes or deviations could be more economically used both as to time and labour is technically incorrect.

While I am sanguine of results along the proposed line it could quite possibly lead to an impasse and this combined with good fast work by the Spec. construction unit might lead to miles of useless road being constructed. More survey and recces parties whilst not entirely obviating this possibility would reduce it to a minimum.

Since existing maps are misleading and dangerous to use, being no more than compilations of amateur-made sketches, close recces are essential and two more survey parties (men who can sensibly use an Abney level would suffice) and three recces parties could be profitably placed immediately.

An aerial survey would be the ideal but even aerial photographic strips over the country



locked out on the plan would be of infinite value.

At the moment, not having passed over the route itself to Kagi and knowing nothing of the country Kagi-Koboda, any conjecture of mine as to the total time of construction would be of no value; but as the length will approximate to seventy miles through rough broken mountainous country with steep sidelings and in many places rock formations to work construction must be both hazardous and lengthy.

In conclusion, a route can be found and a road can be constructed but the time factor is a bogey which can only be realized by an intimate knowledge of the country with which we must deal.

Robert Lieut.

13<sup>th</sup> - 8 - 1942

UBIR!