

アフリカ
開発銀行

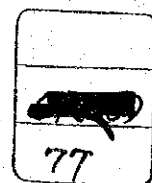
スーダン
民主共和国

スーダン国道路建設計画調査

プロGRESS レポート I

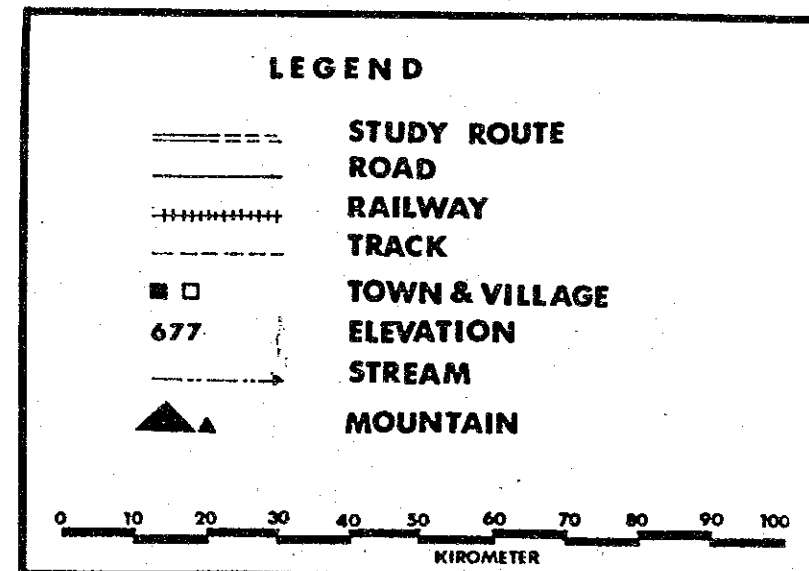
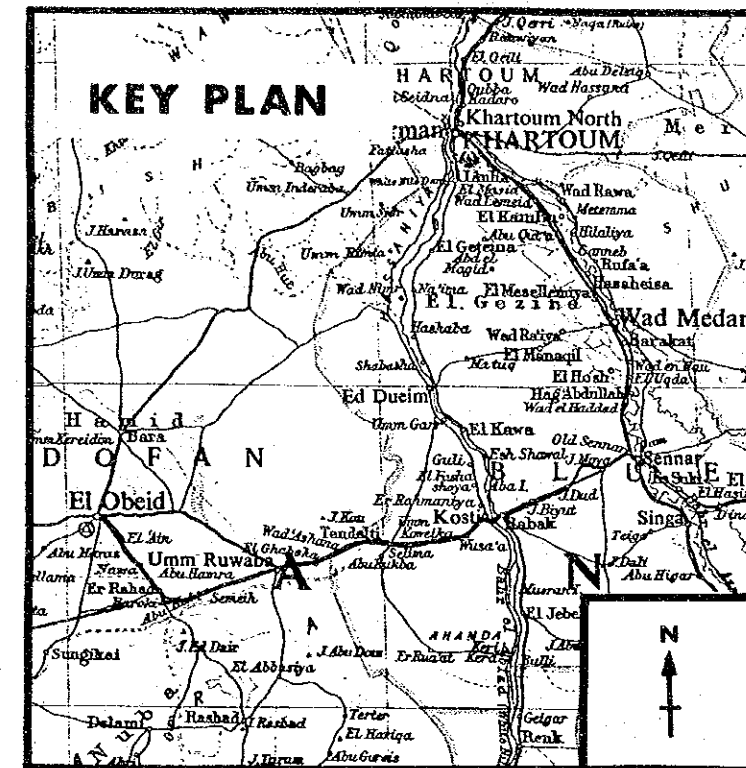
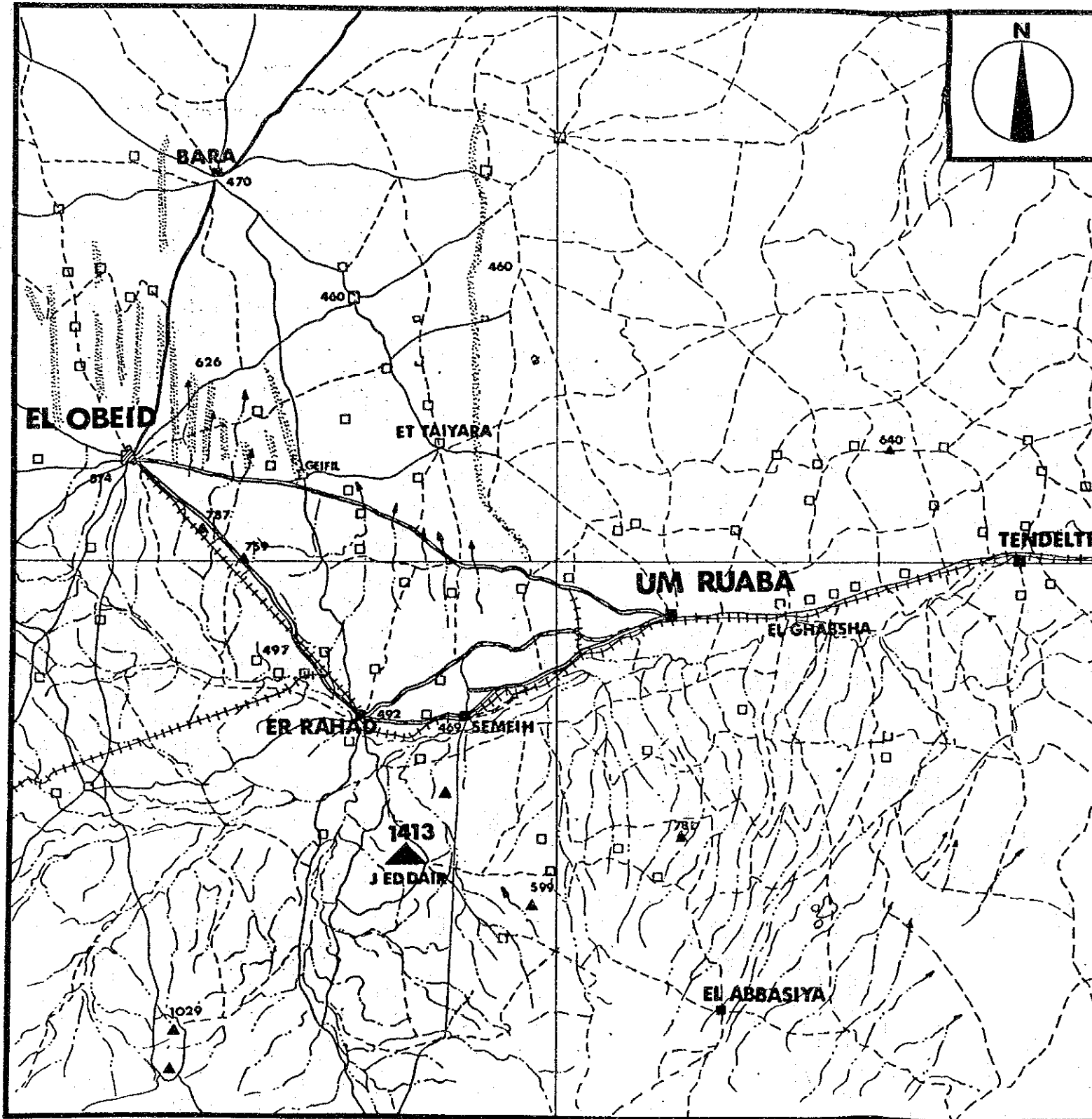
昭和52年4月

国際協力事業団



国際協力事業団	
受入 月日 '84. 8. 23	415
登録No. 13623	614
	SDF

LOCATION MAP OF ROAD PROJECT (EL OBEID — UM RUWABA)



JICA LIBRARY



目 次

	頁
1. 調査団の現地到着	1
2. 調査作業準備	2
2.1 現地事務所と宿泊施設	2
2.2 車輛	2
2.3 航空測量	3
2.4 カウンターパートの構成人員	3
3. 行動記録	4
3.1 第1回 現地政府との打合せ会議(3月31日)	4
3.2 現場踏査	4
3.3 第2回 現地政府との打合せ会議(4月14日)	4
3.4 地上測量	5

付 属 書 類

- I. 対象道路の関係地図
- II. 第1回会議議事録(3月31日)
- III. 第2回会議議事録(4月14日)
- IV. EL OBEID, UM RUABA 間の道路計画
予備調査: 回廊決定
- V. 調査作業行程

1. 調査団の現地到着

調査団は下記の4組に分かれ、それぞれ現地入りした。

1) 第1班 (1977年3月18日カルツ-ム着)

富安 健 : 土質、道路担当

大徳 吉明 : 測量担当

2) 第2班 (3月29日カルツ-ム着)

奥田 敬朝 : 団長

堀江 照彦 : 副団長、交通経済担当

西川 晴巳 : 道路構造(橋梁)担当

大橋 邦男 : 交通調査担当

栗田 幹男 : 測量担当

3) 第3班 (4月20日カルツ-ム着)

宮川 正孝 : 水文調査担当

市原 隆一 : 地質、骨材担当

山崎 正枝 : 農業経済担当

尚最後の班は1977年5月3日にカルツ-ム到着の手定で、メンバーは下記の通りである。

谷口 邦夫 : 単価、積算担当

岩田 鎮夫 : 交通経済担当

2. 調査作業準備

才1班は才2班の到着以前に道路橋梁公団並びに国防省測量部と打合せ、下記の通り調査の準備を完了した。

2.1 現地事務所と宿泊施設

スーダン政府からカルツームに於て適当な事務所の斡旋を受け3月末より約3.5ヵ月間借り上げた。

また調査現場では、短期間事務所として使用するのに適した家屋はなく、KORDOFAN県のコミショナーのレストハウスを調査団及びカウンターパートの宿泊場所として提供を受けた。4月18日以降使用可能となる。

2.2 車輜

国際協力事業団 供与の4台の車輜は3月末までに到着せず、3週間遅れの4月20日に、カルツームに到着した。1台はカルツームに残り、他の3台は、4月25日にEL OBEIDに向けて出発した。

またEL OBEIDでは、4月初めから別の車輜1台を借り上げて使用している。

2.3 航空測量

航空写真の撮影飛行は、ヨーロッパからパイロットが帰ってくる4月24日以降になる予定である。尚、航空写真撮影を行なう地域は、下記の通りである。Annex Iの地図は、航空測量の対象地域を示すものである。

(1) EL OBEID - ER RAHAD 間

延長 81 km

幅 5.7 km

(2) ER RAHAD - UM RUABA 間

それぞれ、南から北に 67 km, 51 km, 51 km の長さをもつコースで相互に重複しながら3回の撮影飛行を行ない、その撮影総幅は 14.1 km になる。

2.4 カウンター・パートの構成人員

道路橋梁公団 (RBPC) と測量部から派遣されるカウンター・パートは下記の通りである。

道路 (3月中旬より) ----- 1名

測量 (4月初旬より) ----- 1名

経済 (4月中旬より) ----- 1名

3. 行動記録

3.1. 第1回 現地政府との打合せ会議

会議は国家計画省 (MONP) より運輸通信局長を含む3名並びに RBPC より2名の係官が出席し、調査団員との間で3月31日に国家計画省会議室で行なわれた。

同会議の主要議題は、国際協力事業団から提出したインセプション・レポートに関する討議である。

同会議の議事録は Annex II として添付してある。

3.2. 現場踏査

現場踏査は4月3日から11日までの間行なわれ、チャーター機による現場視察は4月13日に行なわれた。これらの現場踏査の目的は調査の主眼をどの回廊に置くかの決定を下すことであつた。

現場踏査結果の概要をまとめたレポートを4月14日スーダン政府に提出し、第2回打合せ会議の資料とした。

3.3. 第2回 現地政府との打合せ会議

第2回目の打合せ会議は4月14日にRBPCの会議室にて国家計画省の局長を除いた第1回目と同じメンバーで開かれ、そこで回廊決定の現場

踏査結果に関する概要をとりまとめたレポートが調査団より提出された。その中で調査団は鉄道と平行して走る ER RAHAD 経由のルートに調査の重点を置くことを recommend している。

その理由は経済開発の潜在的可能性は南部回廊に沿った地域に大きくあり、また道路建設用の材料も北部ルートに比べ、近くにある為である。Annex III は 4月14日の打合せ会議の議事録である。また、Annex IV は現場踏査結果の概要をとりまとめたレポートである。

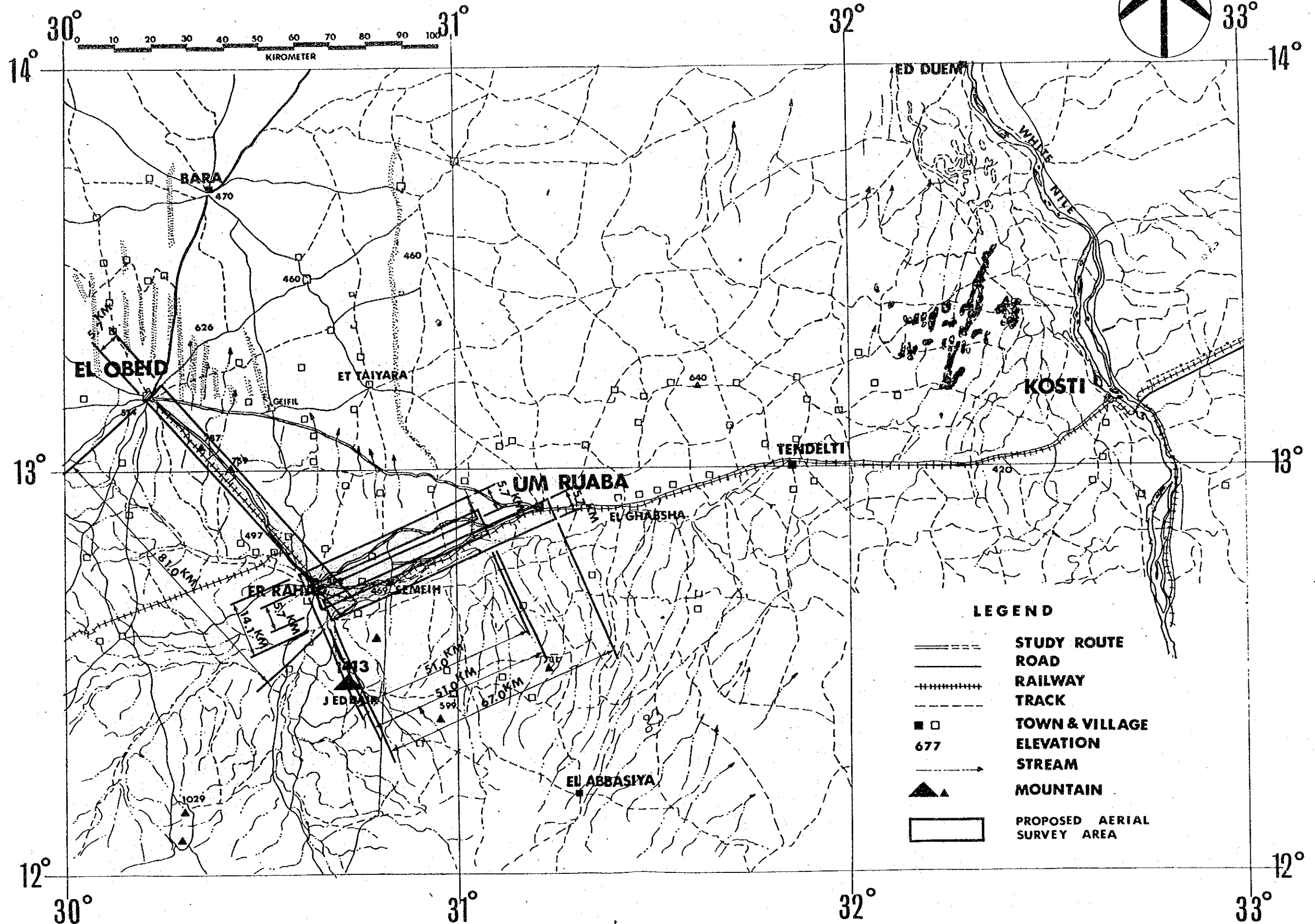
3.4. 地上測量

現場での航空写真の撮影目標は 4月17日から 23日の間に決定される。

尚、多角測量は当初の予定より約 2週間遅れ 4月8日に開始された。

AERIAL SURVEY AREA

ANNEX - I



(Annex II)

Minutes of the Meeting on March 31

A meeting was held with those attendants written below to discuss the Inception Report of the feasibility and preliminary engineering study of road project, El Obeid - Um Ruaba in the central Sudan.

Attendants: Shown in the annex
Date: 31st March, 1977
Place: Ministry of National Planning

The study team added the supplementary explanation of the work programme written in the Inception Report. The Sudanese Government Staff made some advice and comments on the Report and agreed to commence the study in the project area. The minutes of the meeting are as follows:-

1. Ministry of National Planning will give comments later since the Report arrived in his hand the day before and has had no time to read through.
2. MONP finds the Inception Report is actually a proposal of the study and understands the programme of the study.
3. RBPC advises that the alternative plans to be evaluated should include
 - 1) different design standards
 - 2) staged construction
 - 3) optimum construction time and
 - 4) methods of implementation
4. MONP will provide "the new six-year plan" and other economic data.
5. The Sudanese Government agreed to commence the study as proposed by the Inception Report. The next meeting will be held on April 14 to decide the corridor between El Obeid and Um Ruaba in which the most of the study should be concentrated.

Adam Ibrahim Eliman
Ministry of National Planning

Noritomo Okuda
Japan International
Cooperation Agency

El Mahdi Abdelrahman Elsheikh
Roads & Bridges Public Corporation.

The Attendants of the Meeting

1. Adam Ibrahim Eliman
Director for Transport and Communications Sector,
Ministry of National Planning
2. Abdelrahman Mohamed Hassan
Senior Inspector,
Transport and Communications Sector,
MONP
3. Mohammed M. Alim
Assistant Inspector,
Transport and Communications Sector,
MONP
4. El Mahdi Alrahman Elsheikh
Acting Director,
Project Dep.,
Roads & Bridges Public Corporation
5. Shams Eldin Elfaki
Projects Engineer,
Project Dept.,
RBPC
6. Kurihara H. JICA Coordinator
7. Okuda N. JICA Team Leader
8. Horie T. JICA Deputy Leader Economist
9. Nishikawa H. JICA Highway Engineer
10. Tomiyasu T. JICA Soil Engineer
11. Ohashi K. JICA Traffic Engineer
12. Otoku Y. JICA Chief Surveyor
13. Kurita M. JICA Surveyor

Minutes of the Meeting on April 14

A meeting was held to discuss the Initial Findings of the Road Project between El Obeid and Um Ruaba.

Date : April 14, 1977

Place : Roads and Bridges Public Corporation

1. The JICA Road Study Team submitted a report which includes the findings of the reconnaissance trip during April 4-11 in the project area. Also, the Team presented the maps marked with these findings and a set of photos taken during the trip.
2. The Team recommended the studies in the second stage should be concentrated on a route parallel to the railway passing through Er Rahad, since this route will support the regional development more effectively than the other one straightly linking El-Obeid and Um Ruaba.
3. After raising some questions, the staff of the Sudanese Government accepted the recommendation and agreed the proposed plan of the operations in the field. The requested the process of the corridor determination should be written more detailed in the feasibility study report.
4. The result of the meeting together with a copy of the findings of the reconnaissance trip will be reported to the Director General, RBPC and other officials in the Sudanese Government. While, the report will be sent to JICA for its authorization.

5. The attendants of the meeting:

Abdelrahman Mohamed Hassan	MONP
Mohamed M. Alim	MONP
El Mahdi Abdelrahman	RBPC
Shams Eldin Elfaki	RBPC

Kurihara H.	JICA
Okuda N.	JICA Team
Horie T.	JICA Team
Nishikawa H.	JICA Team
Tomiyasu T.	JICA Team
Ohashi K.	JICA Team

El Mahdi Abdelrahman Elsheiki
Acting Director, Project RBPC

Horie T.
Acting Leader,
JICA Road Study Team

The Initial Findings of the Road Project
Between El Obeid and Um Ruaba:
Determination of Corridor

I. Introduction

- I-1. The JICA study team of the Road between El Obeid and Um Ruaba entered El Obeid on April 3. With the cooperation of the commissioners office and the counter parts of RBPC, the mission could have reconnaissance trip during april 5 to 9 on the roads in the project area. These are the findings of the team.
- I-2. The following chapters include the findings in the economy of the area, engineering and soil conditions of the roads. A map with some remarks and a set of photo pictures taken during the trips are prepared separately.
- I-3. By reviewing these observations, the team considers that the following studies in preliminary engineering and economic feasibility should be concentrated in the southern corridor passing through Er Rahad.

II. General

II-1 According to the information given by the Northern Kordofan Province Commissioner's Office, the growth of population in these three towns is higher than that in the Sudan as a whole. Each urban area plays an important function as economic, social and administration center of the region. At present these are the estimated population in towns.

El Obeid 90,000

Um Ruaba 30,000

Er Rahad 20,000

In addition to these people, there would be the habitants of approximately 100,000 who live in the area of the influence of the project.

II-2. Two different types of cultivation are seen in the area: the traditional cultivation and the irrigated field production. The traditional cultivation means the rain-fed growing of crops. This method is applied in the most part of the area along the routes between El Obeid and Um Ruaba. The exception is the cultivated field utilizing the water of Kabu Habl river and Er Rahad dam. This field covers the area around Er Rahad and extends along the railway on its southern side.

II-3. The topography of the area is flat plain and gently sloped hills covered mostly by fine sand and partly by laterite and clay soil. Streams have no water in dry season. An earth road in the area is the multiple tracks on which a vehicle driver is quite free to choose any trail. Engineered works are not observed on the roads.

III. Terrain and Soil of the Existing Roads

A. The Northern Corridor

III-1. The area is covered mostly by flat plain and partly by gentle hills. The road passes through many dried streams (wadis). At present there are no structures. The road is virtually unengineered earth tracks. Many lines of wheel trace are observed in the width ranging 50 m to more than 200 m. The reconnaissance trip registered the length of 125 km with four hour's drive passing by the villages of Um Shigil, Shamagatta and Um Gezira.

III-2. Fine sand and laterite are seen on the surface along the road. Nearly 20 km away from El Obeid there are some rocky hills. It seems they are suitable as quarries. Except this district, it is likely that no rocky hills locate in the area near the road. The water for road construction, either from a river or a dam is not available. All streams are dried up.

B. The Southern Corridor: El Obeid and Er Rahad

III-3. The terrain is flat between the two cities. The existing tracks cross various kind of dried streams. There is one structure: an irish bridge on an earth road 15 km from El Obeid. The tracks runs on either side of the railway. It is observed the railway formation is in average one metre higher than the ground level. The length of the existing road is about 70 km with two and half hours drive, passing through El Ain and Nawa.

III-4. There are rocky hills called Kordofan hills El Ain hills which locate about 15 km and 20 km distance respectively on the road from El Obeid. On the southern side of the railway, the soil is mostly yellowish clay. On the other side the soil is fine sand and laterite. All streams keep no water.

C. The Southern Corridor: Um Ruaba and Er Rahad

III-5. The existing route closely parallel to the railway runs in flat terrain. There is no structure on the existing route. In average the railway formation is one metre higher than the ground level. It takes two and half hours in driving the length of 70 km passing by the railway station of Abu Hamra and Semeih.

- III-6. The representative soils are black cotton clay or peat and yellowish clay. There is a rocky hill north to the rail station of Semeih. Also another hills of Jebel Dair were found about 25 km south from Er Rahad. The Er Rahad Dam seems to have sufficient quantity of water that part of it can be used for road construction.
- III-7. The other route runs through the hills with gentle slopes, parting from the rail lines 10 km away at mid point between the two cities. It is said large vehicles run through this section in the rainy season, while the route close to the railway becomes hardly possible to serve for vehicles. The length of this section is again 70 km, passing through the village of Um Sereiha.
- III-8. The land is covered by fine sand mostly and laterite partly. No rocky hills are found along this route. Streams and oases are dried up in these months.

IV Economy.

A. The Northern Corridor.

IV-1. There are several villages along the existing route. The largest is about 500 houses, while the smallest is around 50 houses. There are also ten temporary villages which, being vacant, are used in the seasons of seeding and harvesting.

IV-2. It is observed major crops in the area are sesame, durra, and groundnuts. Other products are karkadeh, gum arabic, and charcoal. People keep many animals.

IV-3. Surplus products are marketed to adjacent towns such as El Obeid by means of animal transport and trucking middle men. The marketing of crops can be seen during three months after the harvest time.

IV-4. During the reconnaissance trips of four hours from El Obeid to Um Ruaba, the number of encountered vehicles are less than five. It is estimated the daily traffic volume on this route is less than 30 in these months before the rainy season.

B. The Southern Corridor: El Obeid - Er Rahad.

IV-5. There are several small villages along the road between the two cities. The population of each village is likely to be smaller than that of a village along the rail between Um Ruaba and Er Rahad. Also there are some seasonal villages.

IV-6. No irrigation system is applied for the cultivation of field except the area in the vicinity of Er Rahad. Production, marketing and livelihood of the people are the same as those in the Northern Corridor.

IV-7. There are a few bus services between these cities. Daily traffic on the section is estimated at 150.

C. The Southern Corridor: Um Ruaba - Er Rahad

C-1 The Road Adjacent to the Railway

IV-8. There are three villages along the rail lines between Um Ruaba and Er Rahad: Um Dam, Abu Hamra, and Semeih. Each has more than 500 houses. The last two villages have railway station respectively.

IV-9. The area south to the railway has been developed for the production of vegetables, fruits, and cotton by extending the irrigation system from the Er Rahad reservoir. The Province plans further extension of the system. On the northern side of the railway, the field is cultivated by traditional method.

IV-10. Most vehicles run through this road in dry season, while in the rainy season they divert to the road mentioned in the following C-2. Daily traffic volume on this section is estimated 150 in the months before the rainy season.

C-2 The Road of Um Ruaba - Um Sereiha - Er Rahad.

IV-11. The other route scarcely used by vehicles in the dry season passes through the plain, parting approximately ten km from the rail on its mid point between the two cities. Along the road there are a few small villages. The present status is similar to the area along the northern corridor. People's livelihood depends on the traditional rain-fed farming.

IV-12. Daily traffic volume on this section is less than ten in dry season. During the rain fall period the road is passable only by large trucks. However, other roads linking with this section are difficult to drive because of the rain, the traffic volume would be small.

V. Conclusion


- V-1. Reminding the facts in the southern corridor that quarries and water for the use in road construction are easier to approach, that it has several rail-stations through which the transportation of materials and equipment is more convenient, it is considered the road construction in the southern route will be easier and the cost will be not expensive.
- V-2. Reminding the facts that the southern corridor has larger population, that there is higher possibility in agriculture development by utilizing the water of Er Rahad reservoir, that Er Rahad has been recognized recently its important position as a junction both in rail and road, and that this corridor is closer to the Nuba mountain area which has plenty of agricultural development potential, it is considered that it will have larger economic effects for the region if the road is improved in the southern corridor.
- V-3. It is proposed the economic and preliminary engineering studies together with aerial photo-taking should be conducted in the southern corridor: the El Obeid - Er Rahad - Um Ruaba route.



PROGRESS OF WORK

	MARCH			APRIL			
	18	25	1	8	15	22	29
Team Manager OKUDA			↓ 29	3	10	↑	
Economist HORIE			↓				
Agronomist YAMAZAKI						↓ 20	
Road Eng. I NISHIKAWA			↓ 29		*		
" II TOMIYASU	↓				*		
Traffic Eng. OHASHI			↓		*		
Hydrologist MIYAKAWA						↓ 20	
Geologist ICHIHARA						↓	
Surveyor OTOKU	↓						
" KURITA			↓ 29				

NOTE: ↓ Arrive at Khartoum
 ↑ Leave from Khartoum
 * Field observation by air taxi

 In project area

