

資 料

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1. 調査団員・氏名

1-1 現地調査時（平成 18 年 7 月 29 日～平成 18 年 8 月 27 日）

- (1) 総括：喜多村裕介（JICA パプアニューギニア事務所所長）
- (2) 計画管理：今井健（JICA 無償資金協力部業務第一グループ運輸交通・電力チーム副主任）
- (3) 業務主任/橋梁計画：森雅彦（株式会社長大）
- (4) 橋梁設計 I / 自然条件調査 I：安井淳治（株式会社長大）
- (5) 施工計画/積算：米田信夫（株式会社長大（日本技術開発株式会社））
- (6) 橋梁設計 II：井出孝（株式会社長大（日本技術開発株式会社））
- (7) 自然条件調査 II：高上顕（株式会社長大）

1-2 概要説明時（平成 19 年 2 月 4 日～平成 19 年 2 月 7 日）

- (1) 総括：喜多村裕介（JICA パプアニューギニア事務所所長）
- (2) 計画管理：今井健（JICA 無償資金協力部業務第一グループ運輸交通・電力チーム副主任）
- (3) 業務主任/橋梁計画：森雅彦（株式会社長大）
- (4) 橋梁設計 I / 自然条件調査 I：安井淳治（株式会社長大）

2. 調査行程

2-1 現地調査時（平成 18 年 7 月 29 日～平成 18 年 8 月 27 日）

- ・平成 18 年 7 月 29 日～平成 18 年 9 月 3 日

マーカム橋緊急改修計画 現地調査スケジュール案(現地調査)

Date and Time	総括 (JICA・PNG事務所長)	計画管理 (JICA・無償部)	業務主任/ 橋梁計画	橋梁設計1/ 自然条件調査1 (水理・水文)	施工計画/積算	橋梁設計2 (自社負担)	自然条件調査2 (地形・地質) (自社負担)
	喜多村 裕介	今井 健	森 雅彦	安井 淳治	米田 信夫	井出 孝	高上 謙
1 2006.07.29 Sat	移動 日本-PNG						
2 2006.07.30 Sun	移動 日本-PNG						
3 2006.07.31 Mon	PNG側表敬						
4 2006.08.01 Tue	JICA事務所表敬/PNG側表敬						
5 2006.08.02 Wed	インゼプションレポート説明/ヒアリング/資料収集						
6 2006.08.03 Thu	移動 ポートモリスビー						
7 2006.08.04 Fri	移動 日本-PNG ポートモリスビーレイ		現地調査 (マーカム橋)	現地調査 (マーカム橋)	現地調査 (マーカム橋)	現地調査 (マーカム橋)	協議/ヒアリング/ 資料収集
8 2006.08.05 Sat	現地調査(マーカム橋)		移動 レイ-ポートモリスビー				
9 2006.08.06 Sun			協議				協議
10 2006.08.07 Mon			協議/署名				協議
11 2006.08.08 Tue			PM: 大使館報告				PM: 大使館報告
12 2006.08.09 Wed	移動 PNG - ダンザニア		協議/ヒアリング/資料収集				協議/ヒアリング/資料収集
13 2006.08.10 Thu			移動 ポートモリスビー				移動 ポートモリスビー
14 2006.08.11 Fri			現地調査 (マーカム橋)	現地調査 (マーカム橋)	現地調査 (マーカム橋)	現地調査 (マーカム橋)	現地調査 (マーカム橋)
15 2006.08.12 Sat							
16 2006.08.13 Sun							
17 2006.08.14 Mon							
18 2006.08.15 Tue							
19 2006.08.16 Wed					移動 レイ-ポートモリスビー		
20 2006.08.17 Thu					ヒアリング/ 資料収集		
21 2006.08.18 Fri							
22 2006.08.19 Sat							
23 2006.08.20 Sun							
24 2006.08.21 Mon							
25 2006.08.22 Tue			移動 レイ-ポートモリスビー	移動 レイ-ポートモリスビー			
26 2006.08.23 Wed							
27 2006.08.24 Thu			協議/ヒアリング/ 資料収集				
28 2006.08.25 Fri			協議/ヒアリング/ 資料収集				
29 2006.08.26 Sat			協議/ヒアリング/ 資料収集				
30 2006.08.27 Sun			移動 PNG-日本				
31 2006.08.28 Mon							
32 2006.08.29 Tue							
33 2006.08.30 Wed							
34 2006.08.31 Thu							
35 2006.09.01 Fri							
36 2006.09.02 Sat						移動 レイ-ポートモリスビー	
37 2006.09.03 Sun						移動 PNG-日本	

移動

現地調査(マーカム橋)

ポートモリスビー

2-2 概要説明時（平成19年2月1日～平成19年2月8日）

マーカーカム橋緊急改修計画 現地調査スケジュール(概要書説明)

Date and Time			総括 (JICA・PNG事務所 長)	計画管理 (JICA無償部)	業務主任/ 橋梁計画	橋梁設計/ 自然条件調査
			喜多村 裕介	今井 健	森 雅彦	安井 淳治
1	2007.2.01	Thu			移動 日本-PNG	
2	2007.2.02	Fri	団内打合せ		DOW概要書の説明/協議、団内打合せ	
3	2007.2.03	Sat			資料収集、情報収集	
4	2007.2.04	Sun		移動 日本-PNG		
5	2007.2.05	Mon		DOW概要書の説明/協議		
6	2007.2.06	Tue	DNPM、DOW 概要書の説明/協議			
7	2007.2.07	Wed	DNPM、DOW とM/D署名			
8	2007.2.08	Thu		移動 レイハ	移動 PNG-日本	

移動
 ポートモレスビー

3. 関係者（面会者）リスト

(1) 在パプアニューギニア日本国大使館

花形 莞司	特命全権大使
川口 三男	参事官
大形 幸樹	一等書記官

(2) JICA パプアニューギニア事務所

喜多村 裕介	所長
糸山 大志	所員
Mr. Tony Ombo	現地所員

(3) 国家計画・モニタリング省 (Department of National Planning and Monitoring :DNPM)

Ms. Ulato Avei	Deputy Secretary
Mr. Roland Katak	Assistant Director
Mr. Mosilayola Kwayaila	Assistant Director
Mr. Karl Soprl	Assistant Director
Mr. Willie Koi	Senior Aid Coordinator
Mr. Noel Geti	Senior Aid Coordination Officer
Ms. Jenny Tummer	Program Officer
Ms. Bther Pdouf	Assistant Program Officer
岡部 浩一	Project Formulation Advisor

(4) 公共事業省 (Department of Works :DOW)

Mr. Roy Harry Mumu	Deputy Secretary
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Mr. Ken Saville	First Assistant Secretary
Mr. Mekelen Silip	Assistant Secretary
Mr. Michel Sirabis	Assistant Secretary
Mr. Andrew Buna	Assistant Secretary
Mr. Morea M. Igo	Assistant Secretary
Mr. Charles Kiki	Project Engineer
Mr. Bob M.R. Dalymple	Majyk Enterprises Ltd.

(5) 公共事業省モロベ州レイ支所 (DOW Morobe Province Lae Office)

Mr. John Wakma	Provincial Works Manager
Mr. Ruben Tara	Provincial Civil Engineer
Mr. Nako Yarmuk	Senior Supervisor
Mr. Harry Aope	Surveyor
Mr. Nakogamo	

(6) Australian Agency for International Development (AusAID)

Dr. Les Holland	Senior Policy Advisor/Program Director
Mr. Charles Vee	Senior Program Officer

4. 討議議事録 (M/D)

4-1 現地調査時 (平成 18 年 8 月 8 日)

**Minutes of Discussions
on the Basic Design Study
on the Project for the Urgent Rehabilitation of Markham Bridge
in the Independent of Papua New Guinea**

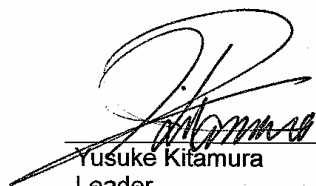
Based on the result of the Preliminary Study which was held on August 2005, the Government of Japan decided to conduct a Basic Design Study on the Project for the Urgent Rehabilitation of Markham Bridge (hereinafter referred to as "the Project"), and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").


JICA sent to the Independent of Papua New Guinea (hereinafter referred to as "PNG") the Basic Design Study Team (hereinafter referred to as "the Team"), headed by Mr. Yusuke Kitamura, Resident Representative, JICA PNG Office, and is scheduled to stay in the country from July 30 to August 27, 2006.


The Team held discussions with the officials concerned from the Government of PNG and conducted a field survey in the study area.

In the course of the discussions and the field survey, both sides confirmed the main items described in the attached sheets.

Port Moresby, August 8, 2006


Yusuke Kitamura
Leader
Basic Design Study Team
JICA


Ulato Avei
Deputy Secretary
Department of National Planning and
Monitoring
PNG


Roy Mumu
Deputy Secretary
Department of Works
PNG

ATTACHMENT

1. Objective of the Project

The objective of the Project is to undergo urgent rehabilitation of Markham Bridge.

2. Project Site

The Project site is in Huon District about 15km from Lae Port along Lae-Wau Road in Morobe Province, as shown in Annex-1.

3. Responsible and Implementing Organization

- The responsible and implementing agency is Department of Works.
- The organization of the Department is shown in Annex -2.

4. Items Requested by the Government of PNG

As the result of discussions, requested components were confirmed as below:

- Rehabilitation of the substructure
- Rehabilitation of the superstructure
- Repair of approach road pavement
- Enforcement of the bank protection on the Lae side

The final components of the Project will be decided after further studies, and JICA will assess the appropriateness of the request and will report to the Government of Japan.

5. Japan's Grant Aid Scheme

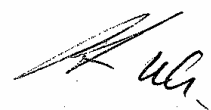
The PNG side understands the Japan's Grant Aid scheme explained by the Team, as described in Annex-3.

6. Environmental and Social Considerations

The Team explained the outline of JICA Environmental and Social Considerations Guideline (hereinafter referred to as "the JICA Guideline") to the PNG side. The PNG side took the JICA Guideline into consideration, and shall complete the necessary procedures.

7. Schedule of the Study

- (1) The consultants will proceed to further studies in PNG by August 27, 2006.
- (2) JICA will prepare the draft report and dispatch a mission to PNG in order to explain its contents after receiving the official documents mentioned at clause 8 (2) of this



attachment.

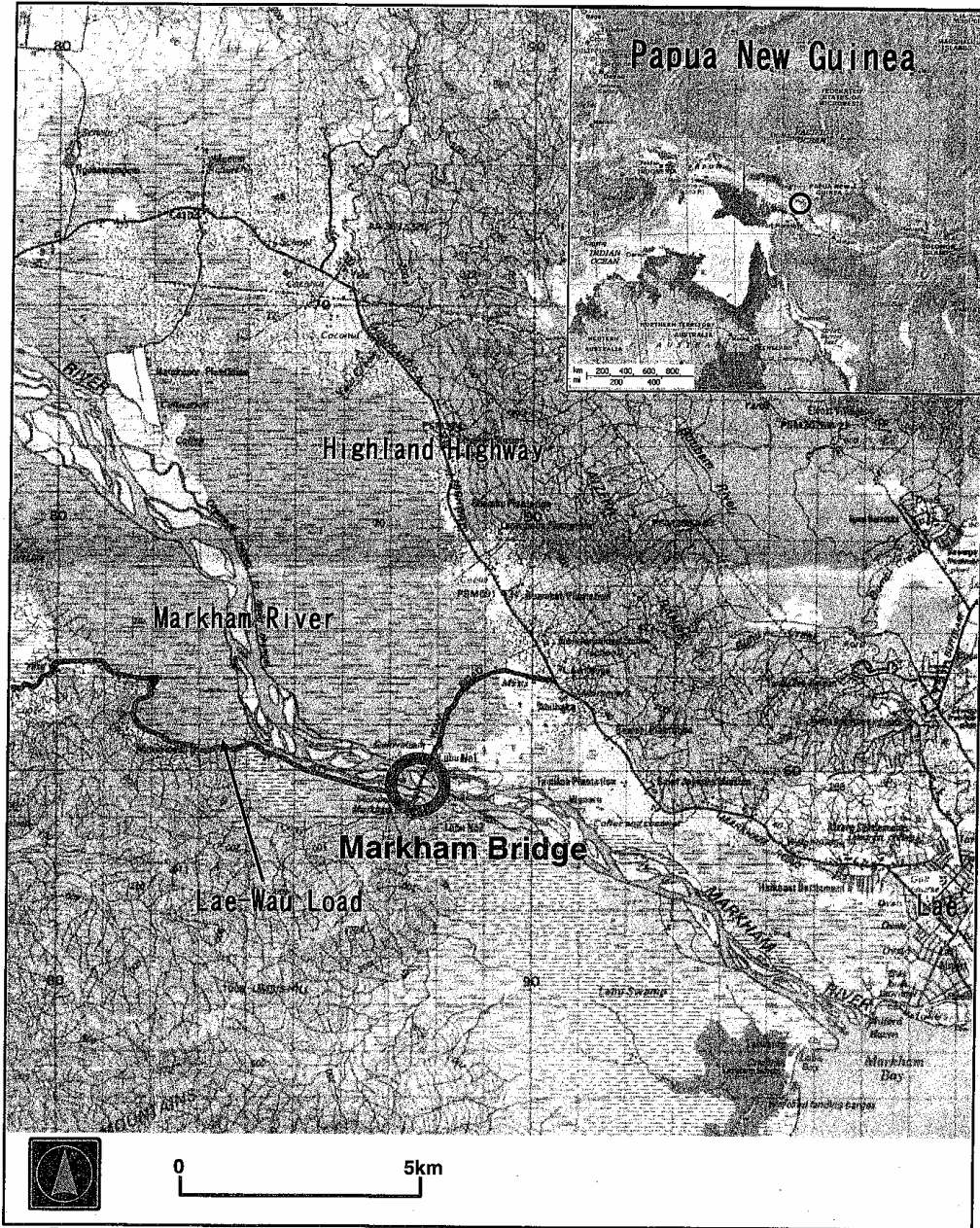
- (3) When the contents of the report are accepted in principle by the Government of PNG, JICA will complete the final report and send it to the Government of PNG by March 2007.

8. Other Relevant Issues

- (1) The PNG side should secure the necessary land for the Project, including coverage of expenses to be borne from the procedures and response to the local residents.
- (2) The PNG side agreed that it would implement the following articles by November 30, 2006, and inform the results of the Japanese side in writing by the same date.
 - ① Completion of the expropriation and/or land lease rights of the necessary land for the Project.
 - ② Making an agreement in writing on that the local residents in the Project area will cooperate for the smooth implementation of the Project.
 - ③ Setting up a coordination committee with the concerned parties (local government, police, DOW, and the local residents, etc.), and formulating daily as well as emergency security measures adequately responsible to the sudden change of security situation.
- (3) The PNG side will answer to the Questionnaire in writing, which the Team handed to the PNG side, by August 21, 2006.

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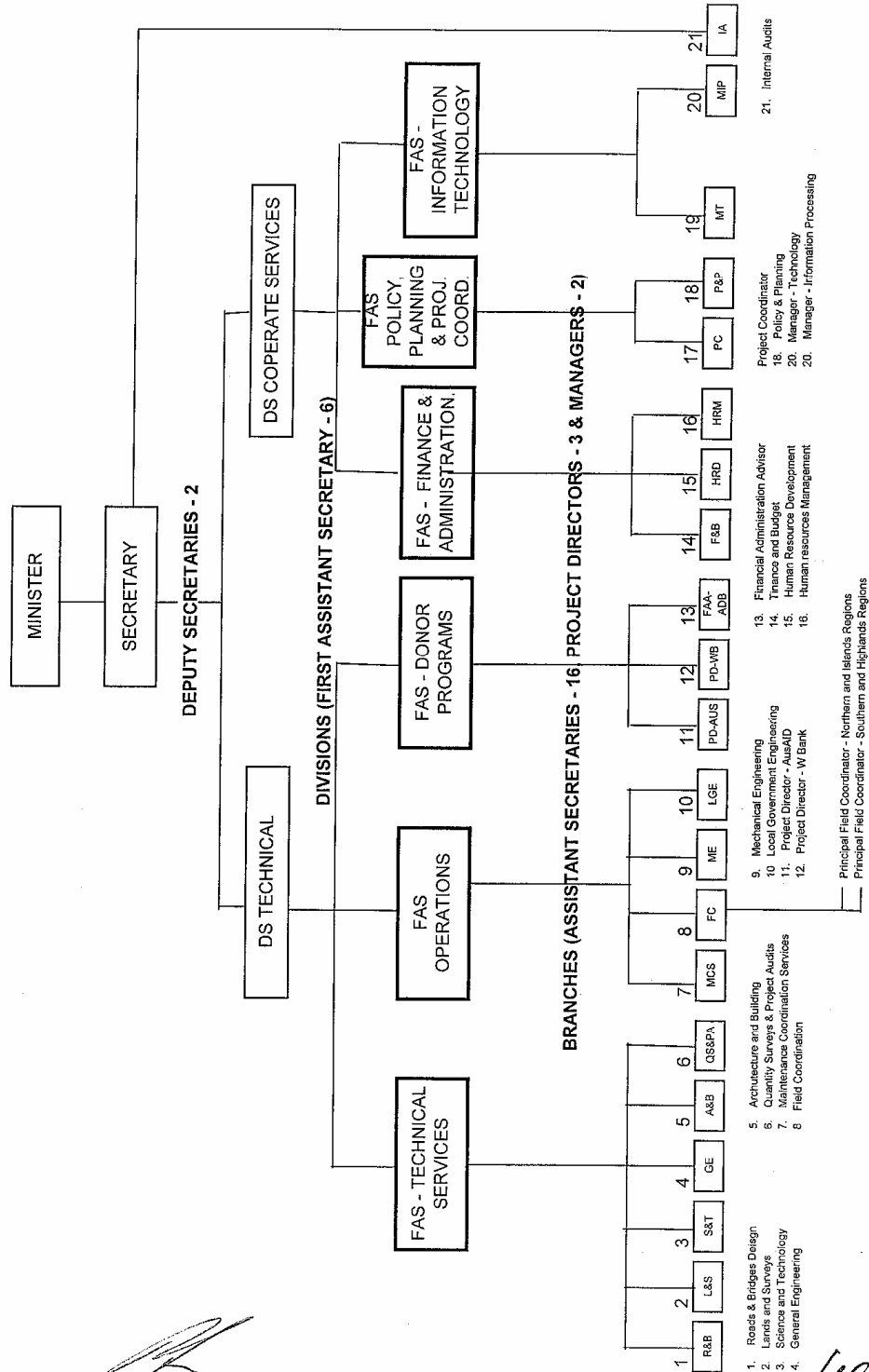
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Site Map

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DEPARTMENT OF WORKS TOP ORGANISATION STRUCTURE

Annex - 2



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JAPAN'S GRANT AID SCHEME

The Grant Aid scheme provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

1. Grant Aid Procedures

Japan's Grant Aid Scheme is executed through the following procedures.

Application	(Request made by a recipient country)
Study	(Basic Design Study conducted by JICA)
Appraisal & Approval	(Appraisal by the Government of Japan and Approval by Cabinet)
Determination of Implementation	(The Notes exchanged between the Governments of Japan and the recipient country)

Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study), using Japanese consulting firms.

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Scheme, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes (E/N) signed by the Governments of Japan and the recipient country.

Finally, for the smooth implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

2. Basic Design Study

1) Contents of the Study

The aim of the Basic Design Study (hereinafter referred to as "the Study"),

conducted by JICA on a requested project (hereinafter referred to as "the Project"), is to provide a basic document necessary for the appraisal of the Project by the Government of Japan. The contents of the Study are as follows:

1. Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation.
2. Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, social and economic point of view;
3. Confirmation of items agreed upon by both parties concerning the basic concept of the Project.
4. Preparation of a basic design of the Project.
5. Estimation of cost of the Project.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even through they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

2) Selection of Consultants

For smooth implementation of the Study, JICA uses registered consulting firms. JICA selects firms based on proposals submitted by interested firms. The firms selected carry out a Basic Design Study and write a report, based upon terms of reference set by JICA.

The consulting firms used for the Study are recommended by JICA to the recipient country to also work on the Project's implementation after the Exchange of Notes, in order to maintain technical consistency.

3. Japan's Grant Aid Scheme

1) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

2) "The period of the Grant Aid" means the one fiscal year which the Cabinet approves the project for. Within the fiscal year, all procedure such as exchanging of the Notes,



concluding contracts with consulting firms and contractors and final payment to them must be completed.

However, in case of delays in delivery, installation or construction, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

- 3) Under the Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However, the prime contractors, namely consulting, contracting and procurement firm(s), are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

- 4) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability of Japanese taxpayers.

- 5) Undertakings required to the Government of the recipient country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as the following:

1. To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the Project,
2. To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites,
3. To secure buildings prior to the procurement in case the installation of the equipment,
4. To ensure all the expense and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid,
5. To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the verified contracts,
6. To accord Japanese nationals, whose services may be required in connection with supply of the products and services under the Verified contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.



6) "Proper Use"

The recipient country is required to operate and maintain the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

7) "Re-export"

The products purchased under the Grant Aid should not be re-exported from the recipient country.

8) Banking Arrangement (B/A)

- a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the verified contracts.
- b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an Authorization to Pay (A/P) issued by the Government of recipient country or its designated authority.

9) Authorization to pay (A/P)

The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions to the Bank.



Major Undertaking to be taken by Each Government

NO	Items	To be covered by Grant Aid	To be covered by Recipient side
1	To secure land		●
2	To clear, level and reclaim the site when needed		●
3	To construct gates and fences in and around the site		●
4	To construct the parking lot	●	
5	To construct roads		
	1) Within the site	●	
	2) Outside the site		●
6	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities		
	1) Electricity		
	a. The distributing line to the site		●
	b. The drop wiring and internal wiring within the site	●	
	c. The main circuit breaker and transformer	●	
	2) Water Supply		
	a. The city water distribution main to the site		●
	b. The supply system within the site (receiving and elevated tanks)	●	
7	To bear the following commissions to a bank of Japan for the banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
8	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country		
	1) Marine(Air) transportation of the products from Japan to the recipient country	●	
	2) Tax exemption and customs clearance of the products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	●	
9	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●

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[Signature]

10	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract		●
11	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid		●
12	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities as well as for the transportation and installation of the equipment		●

(B/A: Banking Arrangement, A/P: Authorization to Pay)



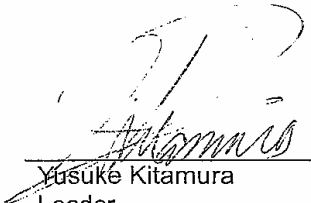

**Minutes of Discussions
on the Basic Design Study
on the Project for the Urgent Rehabilitation of Markham Bridge
in the Independent State of Papua New Guinea
(Explanation on the Draft Report)**

In August, 2006, Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched a Basic Design Study Team on the Project for the Urgent Rehabilitation of Markham Bridge (hereinafter referred to as "the Project") to the Independent State of Papua New Guinea (hereinafter referred to as "PNG") and through discussion, field survey, and technical examination of the results in Japan, JICA prepared a draft report of the study.

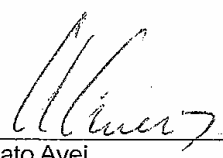
In order to explain and consult the Government of PNG on the components of the draft report, JICA sent to PNG the Draft Report Explanation Team (hereinafter referred to as "the Team"), headed by Mr. Yusuke Kitamura, Resident Representative, JICA PNG Office and is scheduled to stay in the country from February 2 to 8, 2007.

As a result of discussions, both sides have confirmed the main items described in the attached sheets.

Port Moresby, February 7, 2007

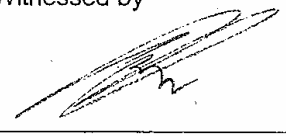


Yusuke Kitamura
Leader
Draft Report Explanation Team
JICA



Ulato Avei
Deputy Secretary
Department of National Planning and
Monitoring
the Independent State of Papua New Guinea

Witnessed by



Roy Mumu
Deputy Secretary Technical
Department of Works
the Independent State of Papua New Guinea

ATTACHMENT

1. Components of the Draft Report

The PNG side agreed and accepted in principle the components of the Draft Report explained by the Team.

2. Japan's Grant Aid Scheme

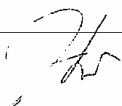
The PNG side reconfirmed the Japan's Grant Aid scheme and the necessary measures to be taken by the PNG side as explained by the Basic Design Study Team in August 2006 and described in the Annex 3 of the Minutes of Discussions signed by both sides on August 8, 2006.

3. Schedule of the Study

JICA will complete the Final Report in accordance with the confirmed items and send it to the PNG side before the end of April 2007.

4. Other Relevant Issues

- 4-1. Both sides reconfirmed the necessary land for the Project near Markham Bridge has been secured as informed on the letter issued by the PNG side dated on November 24, 2006. (See Annex-1)
- 4-2. Both sides reconfirmed that the PNG side set up the coordination committee with the concerned parties (local government, police, DOW, and the local residents, etc.), and formulating daily as well as emergency security measures adequately responsible to the sudden change of security situation as informed on the letter issued by the PNG side dated on November 24, 2006. (See Annex-1)
- 4-3. The PNG side confirmed that the following undertakings should be taken by the PNG side at its own expenses.
 - (1) To accelerate all the necessary procedures for the Project such as the custom clearance, exemption, etc.
 - (2) To issue the construction permit ion by December 2007.
 - (3) To construct small buildings for police at the Project site.





DEPARTMENT OF WORKS
LAE

P.O.Box 636, Lae, Morobe Province, Papua New Guinea. Ph 675 4723143, Fax 675 4723153

FACSIMILE TRANSMISSION

Reg.No.	LF24/06	Time Sent	Operator	MP
To	JICA ADVISOR NATIONAL PLANNING OFFICE	From	J.WAKMA	
Fax No.	321 2679	Authorized	<i>Ch</i>	
Attn:	MR. OKABE	File Ref.		
cc		Date	24 TH / 11 / 06	
		No.of Page	②	
SUBJECT	INFORMATION REQUESTED FOR MARKHAM BRIDGE REHABILITATION PROJECT -- MOROBE PROVINCE			

Dear Sir,

Please find attached is the information you requested relating to the proposed rehabilitation of the Markham Bridge. If you need additional information please let me know as soon as possible.

The attachments comprises :

1. Reply to letter from Chodai Company in Japan
2. Community Consultative Committee members name list
3. Memorandum of Agreement between Local Communities and various Government Agencies

Kind Regards,

.....
John Wakma
Provincial Works Manager (Morobe)



**DEPARTMENT OF WORKS
LAE**

P.O.Box 636, Lae, Morobe Province, Papua New Guinea. Ph 675 4723143, Fax 675 4723153

FACSIMILE TRANSMISSION

Reg.No.	LF237/06	Time Sent	11:49 am.	Operator	MP
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To	CHODAI CO.; LTD	From	John Wakma
Fax No.	81 29 855 2221	Authorized	
Attn:	Mr. Akira Takaue	File Ref.	20-42-04
	International Division	Date	20 th /11/06
		No.of Page	2 incl. this page

SUBJECT	MARKHAM BRIDGE REHABILITATION WORKS LAND ACQUISITION FOR CONSTRUCTION YARD
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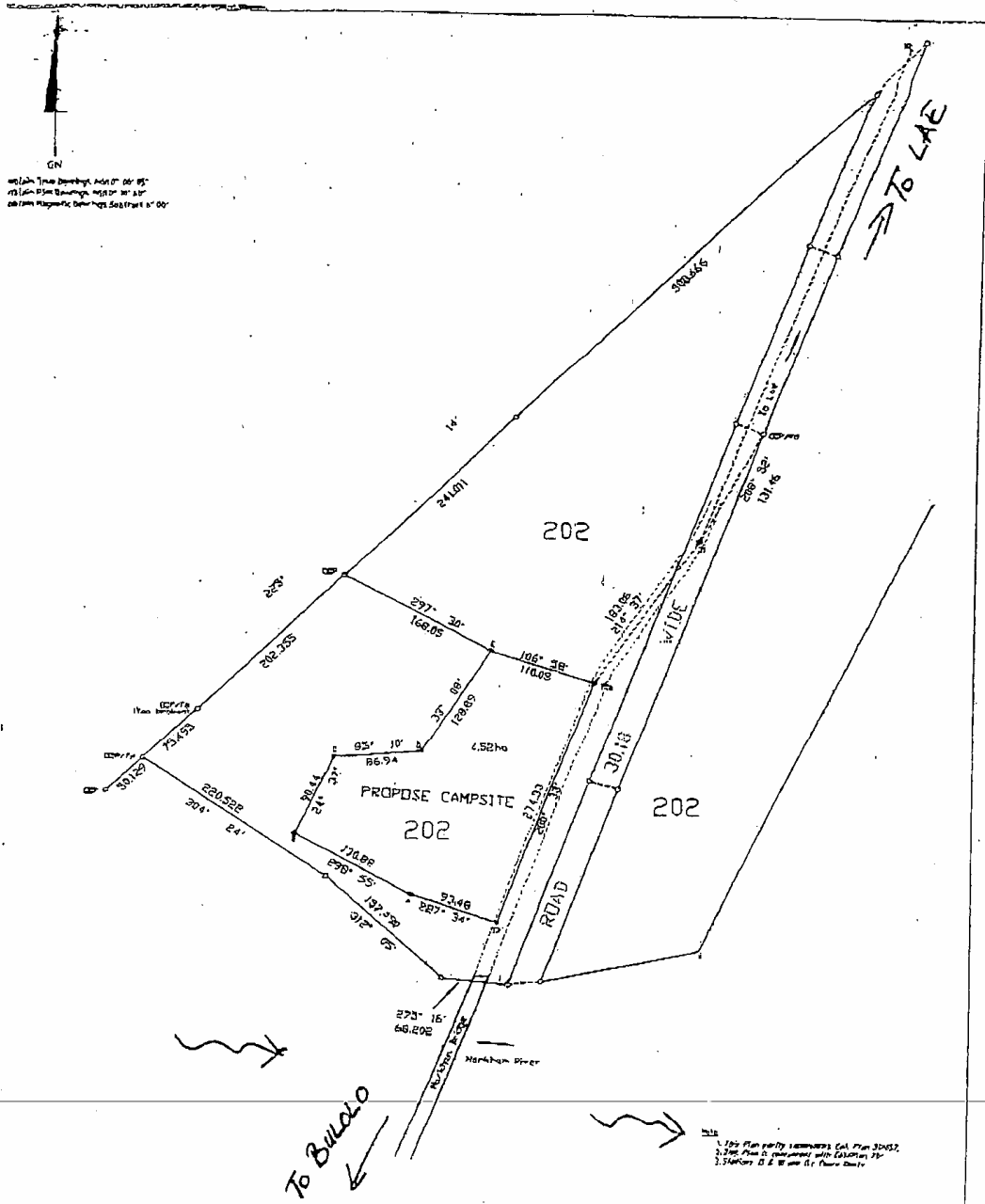
Dear Mr. Takaue,

In response to your fax message dated 13th November 2006, I have the following information for regarding the proposed construction yard.

We are pleased to advice and confirm to you that the proposed construction yard is confirmed as a State Land described as "Portion 202" which is owned by the Government of Papua New Guinea. *Refer map attached for your information.* We look forward to the earliest implementation of the bridge rehabilitation works.

Best Regards,

John Wakma
Provincial Works Manager
Department of Works
Morobe Province
Lae



1. This Plan party submitted on 14/01/2012
 2. This Plan is submitted with Extension 20
 3. Station D & E were in the Chain Class

<p>SURVEY OF MARKHAM BRIDGE CAMPSITE PORTION 202</p> <p>Adjoining of LAE (NE) Fourth of MARKHAM</p>		
<p>Zone: 55</p> <p>Class of Survey: RURAL CLASS ONE</p> <p>Cat. No.</p>	<p>Scale: 1:1000</p> <p>Date: 14/01/2012</p>	

Jhr

1/11



**DEPARTMENT OF WORKS
MOROBE PROVINCIAL OFFICE**



Date : 17/11/06
Our Reference : 42-32-CO1
Action Officer : Harry Aope
Designation : Provincial Surveyor
Your Reference : **Rehabilitation of Markham Bridge**

P O Box 636, Lae
Morobe Province
Papua New Guinea
Phone 472 6320
Fax 472 3153

To Whom It May Concern:

**REHABILITATION OF MARKHAM BRIDGE
COORDINATING COMMITTEES**

Please be informing that the Memorandum of Understanding (MOU) will be ready on Wednesday 22nd November 2006 for signing.

If you see your name on the list please do come to the Department of Works office Lae and sign the MOU and you become a Coordinating committee for the Rehabilitation of Markham Bridge for the duration of the project.

Any queries or changes to the names on the list due to some unforeseen reason please inform the writer before Wednesday 22nd November 2006 for finalizing.

- | | |
|------------------------|--|
| (1) Yasom Panjil | Waril Clan Yalu |
| (2) Mike David | Waril Clan Yalu |
| (3) Siling Sagaling | Woman Rep Yalu |
| (4) Gelindge Gedisa | Poseika Labu |
| (5) Guling Poponi | Lupu Labu |
| (6) Gelindge Kepuctong | Labu Butu Labu |
| (7) Tom Philemon | Gabensis |
| (8) Kesip Yasasa | Youth Rep |
| (9) Thompson Jim | Yasua (Settler) |
| (10) Sam Ruben | Yasua (Settler) |
| (11) Elaing Ipako | Woman Rep Labu |
| (12) Nelson Boas | Potsie |
| (13) Micheal Simeon | Janzam |
| (14) John Aris | Lands Division-Provincial Government |
| (15) Simon Yipam | Police - Rural Patrol Sector |
| (16) Yawing Bom | Councillor - Ward 5 Wampar LLG |
| (17) Tom Daniel | Village Magistrate - Ward 5 Wampar LLG |
| (18) Ruben Tara | DOW-Provincial Civil Engineer |
| (19) Harry Aope | DOW Surveyor |
| (20) Awagia Tom | Pastor-Lutheran Mission |

Your participation and cooperation will be greatly appreciated

Yours faithfully

Harry Aope
Coordinator

(1)



PROJECT FOR THE REHABILITATION OF MARKHAM BRIDGE

MEMORANDUM OF AGREEMENT

This Memorandum Of Agreement herein referred to as **MOA** has been signed between the Department of Works herein referred to as **DoW**, Royal Papua New Guinea Constabulary herein referred to as the **Police**, the Morobe Provincial Government herein referred to as **MPA**, the Department of Lands herein referred to as **Lands** all representing the **State** or National Government and Waril Clan, Pusika Labubutu, Lupu, Gabensis Village, Yalu and all representing Local **Clans** and the Markham Bridge Settlement comprising the **Community Coordination Committee** for the smooth implementation of the Markham Bridge Rehabilitation Project herein referred to as **The Project**.

THE PROJECT

The Project is funded through a generous Grant Aid from the Government of Japan through the Japanese International Cooperation Agency JICA.

AGREEMENT

We (whose name appear on the list attached), representing the above parties hereby agree that **The Project** will be implemented without any unnecessary interruptions to the contractor due to such factors as land disputes, crop compensations, gravel royalties, employment, provision of social services, or similar issues. We agreed that if any such issues arise, those issues shall be immediately brought to the attention of relevant agencies or Government Departments such as DoW, Lands, Police, MPA etc, to resolve. We further agreed that this Committee will ensure that members of our respective clans & settlements are made aware of this MOA and that any breach of this MOA will be referred to appropriate Law Enforcement Agencies.

We acknowledge that we represent our respective clans and communities and hereby agree and undertake to abide by the above Agreement. And as a sign of our agreement and consent have caused our signatures to be signed below on the date shown.

Dated This *Thursday* the *23rd* day of *November* 2006
(Day) (Date) (Month)

At the Department of Works Conference Room in Lae; Morobe Province.

Markham Bridge Rehabilitation Project

Memorandum Of Agreement For Local Community & State

**Markham Bridge Rehabilitation Project
Community Coordinating Committee**

Name	Clan / Group / Community	Signature
SILING SAGALANG	WOMAN REP (YALU)	
NAIKR DAVID	WARIL CLAN (YALU)	
YACOM PANLIL	WARIL CLAN (YALU)	
TOM DANIEL	VILLAGE MAGISTRATE	
TOM PHILEMON	GARDNER'S GUARD BURNON ROMBON 40	
NELSON BOAS	BOASOM ROMBON CLAN	
PHILIPSON JIMI	COMMUNITY REP. (YALU/ROMBON)	
SAM RUBEN	SPEAKERMAN (YASUA)	
KRSIP YASUA	YOUTH REP (YASUA)	Kelabasan.
GULING ROMBON PUPUN!	DRACK OFFICER LUBU	
MICHAEL SIMON	OROGRENAN CLAN	
YANJING BOM	WARD (FIVE) KOMBALIG MARKHAM BRIDGE (COUNSELLOR)	
ELAING IPAKO	WOMAN REP. LXEU BUTU.	
GELINDE GIDISA.	LAND MEDIATOR.1 PUSICA LAPU	
REUBEN. TARA	PCE - DOW	
HARRY ADPE	DOW PROVINCIAL SURVEYOR	
SIMON TIPAM	RURAL POLICE COMMANDER	
JOHN ACLA	LAND OFFICER PROVINCIAL GOVT	
GRINDE KIPUTING	LASUBUN VILLAGE COURT MAGISTRATE	
ANTOCHA JOM	PASTOR / LUTHERAN MISSION	

Markham Bridge Rehabilitation Project

Memorandum Of Agreement For Local Community & State

5. 事業事前計画表（基本設計時）

1. 案件名
パプアニューギニア独立国 マーカム橋緊急補修計画基本設計調査
2. 要請の背景（協力の必要性・位置付け）
<p>パプアニューギニア独立国（以下「パ」国という）は、中央部の急峻な山脈や南部の広範な湿地帯など多様な地勢を反映し人口および経済活動が散在している。また、首都と地方都市は海運、空路のみで結ばれ、国家経済を支えるための骨格となる全国的道路網が未だに構築されていない。そのため、「パ」国政府は、国家運輸開発計画(2001-2010)を策定し、立ち遅れている道路交通輸送インフラの改善・維持管理を国家開発の重点分野としている。</p> <p>道路、橋梁整備に対する投資は、過去5年予算不足により十分に行われず、今後5年間は少ない予算を有効に活用するために、インフラの新設よりも既設のインフラの補修、維持管理に財源を優先配分することとしている。</p> <p>マーカム橋が位置するワウ道路は、主要産物の運搬を担う産業道路であるとともに、沿線の約20万人にとって州都レイに至る唯一の生活道路である。このワウ道路が不通となった場合には、沿線地域は陸の孤島となり日常生活物資の供給が止まるだけでなく医療・教育施設へのアクセス、産業活動も停止して経済的に大きな打撃を受けることになる。</p> <p>また、「パ」国政府は、将来的にはこのワウ道路を経て首都ポートモレスビーとレイを結ぶ主要幹線道路建設の計画を持っており、これが実現すれば同道路の重要性はさらに高いものとなる。</p> <p>マーカム橋は2004年3月の洪水でP3橋脚が大きく沈下し、また取付道路の一部も決壊して、一時は車両による通行が不可能な状態となった。「パ」国政府は、早急に同橋を復旧させるために2004年8月に4基の仮設橋脚を設けるとともに取付道路決壊部に仮橋を設置して応急処置を施したものの、このまま放置すると危険であると「パ」国政府は判断し、2005年5月、マーカム橋架け替えに関し、我が国に対して無償資金協力を要請してきた。2005年7月～8月にかけて予備調査団を派遣した結果、現時点においてマーカム橋を架け替える緊急性・必要性は認められないものの、同橋梁の緊急的な補修工事として、橋脚及び手すり・ガードレールの補修等を実施することは必要性・緊急性があると判断された。</p> <p>マーカム橋の恒久的な補修は緊急を要するが、「パ」国政府独自の予算により行うことは予算不足の関係で極めて困難である。本プロジェクトは、既設のマーカム橋が今後少なくとも20年は所要の機能を果たすことのできる補修、補強を行い、地域経済の活性化や沿線住民の生活安定に資するものである。</p>
3. プロジェクト全体計画概要
(1) プロジェクト全体計画の目標
ワウ道路がマーカム川を渡河する箇所での安全で安定的な交通が確保される。 裨益範囲：モロベ州ワウ道路沿線の各地域（主要都市プロロ、ワウ等） 裨益人口：約200,000人
(2) プロジェクト全体計画の成果

- ア ワウ道路のマーカム橋既設橋の恒久的な補修がなされる。
- イ AusAID が実施したレイ側護岸工が洗掘に対し強化される。
- ウ マーカム橋レイ側取付道路が整備される。

(3) プロジェクト全体計画の主要活動

- ア 洪水により損傷したマーカム橋の恒久的な補修を実施する。
- イ 橋梁および取付道路の盛土区間を保護するための護岸工、排水工、舗装工を実施する。
- ウ 道路・橋梁の維持管理体制を整える。

(4) 投入（インプット）

- ア 日本側（=本案件）：無償資金協力 6.12 億円
- イ 「パ」国側：
 - ・ 本無償資金協力案件の実施に係わる負担額 : 0.02 億円
 - ・ 本無償資金協力案件対象施設の改修後の維持管理経費 : 0.03 億円
(年間換算)

(5) 実施体制

主管官庁：公共事業省（DOW）
 実施機関：公共事業省（DOW）

4. 無償資金協力案件の内容

(1) サイト

「パ」国モロベ州ワウ道路マーカム川渡河地点

(2) 概要

本無償資金協力により整備される施設はマーカム橋の以下の 5 構造物である。

番号	構造物名	内容	改修方法
1	橋台	レイ側 A1 橋台	鋼管杭、底版新設
2	橋脚	P1～P4 4 基	既設撤去、鋼管杭基礎・躯体新設
3	上部工	全長 560m	鋼桁、高欄再塗装、一部補修
4	護岸	鋼矢板基礎 73.2m	鋼矢板設置、ブロック連結
5	取付道路	道路延長 50m	舗装、法面保護、排水工

(3) 相手国側負担事項

- ・ レイ側上流側の工事用地の購入
- ・ 警察官詰め所の建設

(4) 概算事業費

概算事業費 6.14 億円（無償資金協力 6.12 億円、「パ」国負担 0.02 億円）

(5) 工期
詳細設計、入札期間を含め約 20 ヶ月（予定）

(6) 貧困、ジェンダー、環境及び社会面の配慮
特になし。

5. 外部要因リスク（プロジェクト全体計画の目標達成に関して）

- ・ 「パ」国内の政情・治安が悪化しない。
- ・ 想定外の自然災害が発生しない。（施工時の大規模な洪水等）

6. 過去の類似案件からの教訓の活用

2006 年までに実施された我が国による無償資金援助である「ハイランド橋梁改修計画 Phase I」において、住民対応等に係る問題が生じ、Phase II の工事は着工直前に中断となる事態が発生している。

7. プロジェクト全体計画の事後評価に係る提案

(1) プロジェクト全体計画の目標達成を示す成果指標

成果指標	2006 年時点	2010 年計画
構造物の安定性向上	仮設橋脚基礎杭の支持力安全率が 2 となっている。	新設橋脚基礎杭の支持力安全率が 3 となり、安全性が改善される。
洪水に対する橋梁耐力の向上	10 年降雨確率水位（水位 EL = 11. 18m）規模の洪水で橋梁に損傷が生じる可能性が高い。	100 年降雨確率水位（水位 EL = 11. 58m）の洪水でも耐えられる構造となる。

(2) その他の成果指標
特になし。

(3) 評価のタイミング
2009 年 3 月（施設完成直後）

6. 参考資料／入手資料リスト

番号	名称	形態	オリジナル・ コピー	発行機関	発行 年
1	The Medium Term Development Strategy	図書	コピー	Department of National Planning and Monitoring	2004
2	Review of National Transport Development Plan 2001-2010	図書	コピー	Department of Transport	2005
3	Basic Design Study Report on the project for rehabilitation of bridge on the Highlands Highway Draft Final Report	図書	コピー	JICA 日本工営	2004
4	Human Development Report 2005	図書	コピー	Papua New Guinea	2005
5	Economic and Development Plicies	図書	コピー	HON, BART PHILEMON, MP Minister for Finance and Treasury	2006
6	Department of Works and Implementation Program and Project	図書	コピー	Department of Works	2006
7	VAT for Businesses in PNG	図書	オリジナル	Internal Revenue Commission	2000
8	A Guide to Value Added Tax	図書	オリジナル	Internal Revenue Commission	-
9	Department of Works Top Organization Structure	表	コピー	Department of Works	2006
1 0	Road Materials Resource Study and Gravel Pit Inventory 4Copies	図書	コピー	Department of Works	-
1 1	Equipment Hire Price	図書	コピー	Department of Works	-
1 2	Haes Monthly Rainfall Readings	表	コピー	Wein BORE Weather Attendant	2005
1 3	Earthquake Engineering for Bridges In Papua New Guinea	図書	コピー	Department of Transport Works and Supply	1976
1 4	Road Maintenance Specifications(Draft)	図書	コピー	Department of Works	2006
1 5	Specification for Road and Bridge Works	図書	オリジナル	Department of Works	1995
1 6	Road Design Manual	図書	オリジナル	Department of Works	1994
1 7	Flood Estimation Manual	図書	オリジナル	Department of Environment and Conservation Bureau of Water Resources	1990
1 8	パプアニューギニアの過去の地震被害	表	コピー	-	2004
1 9	Good Procurement Manual	図書	コピー	Department of Works	2005
2 0	Morobe Province Map 1:263000	地図	オリジナル	National Mapping Bureau	1977
2 1	Wau Map (Sheet 8283) 1:100000	地図	オリジナル	National Mapping Bureau	-

2 2	Nadzab Map (Sheet 8284) 1:100000	地図	オリジナル	National Mapping Bureau	-
2 3	Sarawaget Map (Sheet 8285) 1:100000	地図	オリジナル	National Mapping Bureau	-
2 4	Aseki Map (Sheet 8183) 1:100000	地図	オリジナル	National Mapping Bureau	-
2 5	Wasus Map (Sheet 8184) 1:100000	地図	オリジナル	National Mapping Bureau	-
2 6	Kaiapit Map (Sheet 8185) 1:100000	地図	オリジナル	National Mapping Bureau	-
2 7	Saidor Map (Sheet 8186) 1:100000	地図	オリジナル	National Mapping Bureau	-
2 8	Kinantu Map (Sheet 8085) 1:100000	地図	オリジナル	National Mapping Bureau	-
2 9	Dumpu Map (Sheet 8086) 1:100000	地図	オリジナル	National Mapping Bureau	-
3 0	Markham Geological Map (Sheet SB55-10) 1:250000	地図	オリジナル	Department of National Resources	1989
3 1	Markham Geological Explanatory Notes	図書	コピー	Department of National Resources	1976
3 2	Markham Bridge Repair	図書	コピー	Nawae Construction Pty Ltd. Abergeldie Civil Infrastructure	2004
3 3	Markham Bridge Piling Records	図書	コピー	Independent Geosciency Pty Ltd.	2004

7. その他の資料・情報

7-1 交通量調査結果

交通量調査は、下記の要領で実施し、表に示す結果を得た。

実施日：2006年8月15日（火）

場所：マーカム橋レイ側橋詰め

実施時間：午前6時から午後6時まで12時間

天候：雨時々曇

① レイからワウへ向かう車両

種別	06:00	08:00	10:00	12:00	14:00	16:00	合計
	-08:00	-10:00	-12:00	-14:00	-16:00	-18:00	
トレーラー	0	2	0	1	0	2	5
トラック	7	12	8	14	23	23	87
バス	0	0	1	1	0	0	2
乗用車	7	7	10	12	17	14	67
オートバイ	0	0	0	0	0	2	2
車両合計	14	21	19	28	40	41	163
歩行者・自転車	1	4	6	25	8	34	78

② ワウからレイへ向かう車両

種別	06:00	08:00	10:00	12:00	14:00	16:00	合計
	-08:00	-10:00	-12:00	-14:00	-16:00	-18:00	
トレーラー	1	1	0	0	1	2	5
トラック	6	21	18	12	10	23	90
バス	0	0	0	1	1	0	2
乗用車	5	15	10	9	6	15	60
オートバイ	0	1	0	1	0	0	2
車両合計	12	38	28	23	18	40	159
歩行者・自転車	26	5	6	19	11	15	82

③ 両方向合計

種別	06:00	08:00	10:00	12:00	14:00	16:00	合計
	-08:00	-10:00	-12:00	-14:00	-16:00	-18:00	
トレーラー	1	3	0	1	1	4	10
トラック	13	33	26	26	33	46	177
バス	0	0	1	2	1	0	4
乗用車	12	22	20	21	23	29	127
オートバイ	0	1	0	1	0	2	4
車両合計	26	59	47	51	58	81	322
歩行者・自転車	27	9	12	44	19	49	160

橋詰めにおいて待ち時間が生じたケース

322 台中 35 台（待ち時間が生じる確率約 11%）

待ち時間：10 秒～130 秒（平均待ち時間：43 秒）

7-2 測量調査結果

本調査では、マーカム橋周囲の地形状況を把握するために道路測量と河川測量を実施した。これらの測量には、トータルステーション・GPS 測量機器を使用して実測した。

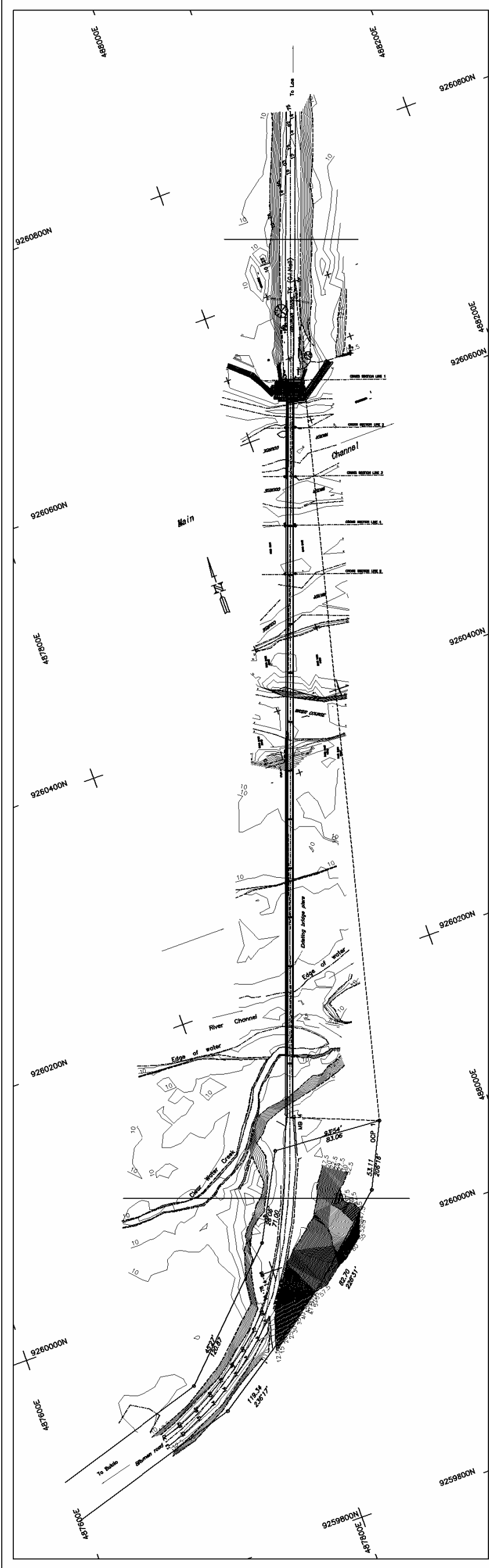
各架橋地点には、基準点となる仮ベンチマークを調査団の指示のもと設置した。ベンチマークは見通しが良く、不動な場所に設置・埋設した。（写真-1）。ベンチマークの座標一覧を表-1 に示す。



写真-1 ベンチマーク（レイ側、STN. 8）

Station	East	North	EL
STN.6	487843.05	9260109.06	15.19
STN.8	488053.84	9260670.08	15.19
TK	488074.32	9260705.36	15.44
BM4	487854.52	9260104.82	15.69
OCP1	487915.94	9260079.75	28.48

測量の成果を図-1 に示す。



DATUM	-33	Existing Road		Centreline		Existing Road		Centreline	
EXIST.LEVEL	CHAINAGE	Existing	Centreline	Existing	Centreline	Existing	Centreline	Existing	Centreline
13.70	0.00	13.70	13.70	13.70	13.70	13.70	13.70	13.70	13.70
13.72	0.00	13.72	13.72	13.72	13.72	13.72	13.72	13.72	13.72
13.74	0.00	13.74	13.74	13.74	13.74	13.74	13.74	13.74	13.74
13.76	0.00	13.76	13.76	13.76	13.76	13.76	13.76	13.76	13.76
13.78	0.00	13.78	13.78	13.78	13.78	13.78	13.78	13.78	13.78
13.80	0.00	13.80	13.80	13.80	13.80	13.80	13.80	13.80	13.80
13.82	0.00	13.82	13.82	13.82	13.82	13.82	13.82	13.82	13.82
13.84	0.00	13.84	13.84	13.84	13.84	13.84	13.84	13.84	13.84
13.86	0.00	13.86	13.86	13.86	13.86	13.86	13.86	13.86	13.86
13.88	0.00	13.88	13.88	13.88	13.88	13.88	13.88	13.88	13.88
13.90	0.00	13.90	13.90	13.90	13.90	13.90	13.90	13.90	13.90
13.92	0.00	13.92	13.92	13.92	13.92	13.92	13.92	13.92	13.92
13.94	0.00	13.94	13.94	13.94	13.94	13.94	13.94	13.94	13.94
13.96	0.00	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96
13.98	0.00	13.98	13.98	13.98	13.98	13.98	13.98	13.98	13.98
14.00	0.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00
14.02	0.00	14.02	14.02	14.02	14.02	14.02	14.02	14.02	14.02
14.04	0.00	14.04	14.04	14.04	14.04	14.04	14.04	14.04	14.04
14.06	0.00	14.06	14.06	14.06	14.06	14.06	14.06	14.06	14.06
14.08	0.00	14.08	14.08	14.08	14.08	14.08	14.08	14.08	14.08
14.10	0.00	14.10	14.10	14.10	14.10	14.10	14.10	14.10	14.10
14.12	0.00	14.12	14.12	14.12	14.12	14.12	14.12	14.12	14.12
14.14	0.00	14.14	14.14	14.14	14.14	14.14	14.14	14.14	14.14
14.16	0.00	14.16	14.16	14.16	14.16	14.16	14.16	14.16	14.16
14.18	0.00	14.18	14.18	14.18	14.18	14.18	14.18	14.18	14.18
14.20	0.00	14.20	14.20	14.20	14.20	14.20	14.20	14.20	14.20
14.22	0.00	14.22	14.22	14.22	14.22	14.22	14.22	14.22	14.22
14.24	0.00	14.24	14.24	14.24	14.24	14.24	14.24	14.24	14.24
14.26	0.00	14.26	14.26	14.26	14.26	14.26	14.26	14.26	14.26
14.28	0.00	14.28	14.28	14.28	14.28	14.28	14.28	14.28	14.28
14.30	0.00	14.30	14.30	14.30	14.30	14.30	14.30	14.30	14.30
14.32	0.00	14.32	14.32	14.32	14.32	14.32	14.32	14.32	14.32
14.34	0.00	14.34	14.34	14.34	14.34	14.34	14.34	14.34	14.34
14.36	0.00	14.36	14.36	14.36	14.36	14.36	14.36	14.36	14.36
14.38	0.00	14.38	14.38	14.38	14.38	14.38	14.38	14.38	14.38
14.40	0.00	14.40	14.40	14.40	14.40	14.40	14.40	14.40	14.40
14.42	0.00	14.42	14.42	14.42	14.42	14.42	14.42	14.42	14.42
14.44	0.00	14.44	14.44	14.44	14.44	14.44	14.44	14.44	14.44
14.46	0.00	14.46	14.46	14.46	14.46	14.46	14.46	14.46	14.46
14.48	0.00	14.48	14.48	14.48	14.48	14.48	14.48	14.48	14.48
14.50	0.00	14.50	14.50	14.50	14.50	14.50	14.50	14.50	14.50
14.52	0.00	14.52	14.52	14.52	14.52	14.52	14.52	14.52	14.52
14.54	0.00	14.54	14.54	14.54	14.54	14.54	14.54	14.54	14.54
14.56	0.00	14.56	14.56	14.56	14.56	14.56	14.56	14.56	14.56
14.58	0.00	14.58	14.58	14.58	14.58	14.58	14.58	14.58	14.58
14.60	0.00	14.60	14.60	14.60	14.60	14.60	14.60	14.60	14.60
14.62	0.00	14.62	14.62	14.62	14.62	14.62	14.62	14.62	14.62
14.64	0.00	14.64	14.64	14.64	14.64	14.64	14.64	14.64	14.64
14.66	0.00	14.66	14.66	14.66	14.66	14.66	14.66	14.66	14.66
14.68	0.00	14.68	14.68	14.68	14.68	14.68	14.68	14.68	14.68
14.70	0.00	14.70	14.70	14.70	14.70	14.70	14.70	14.70	14.70
14.72	0.00	14.72	14.72	14.72	14.72	14.72	14.72	14.72	14.72
14.74	0.00	14.74	14.74	14.74	14.74	14.74	14.74	14.74	14.74
14.76	0.00	14.76	14.76	14.76	14.76	14.76	14.76	14.76	14.76
14.78	0.00	14.78	14.78	14.78	14.78	14.78	14.78	14.78	14.78
14.80	0.00	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80
14.82	0.00	14.82	14.82	14.82	14.82	14.82	14.82	14.82	14.82
14.84	0.00	14.84	14.84	14.84	14.84	14.84	14.84	14.84	14.84
14.86	0.00	14.86	14.86	14.86	14.86	14.86	14.86	14.86	14.86
14.88	0.00	14.88	14.88	14.88	14.88	14.88	14.88	14.88	14.88
14.90	0.00	14.90	14.90	14.90	14.90	14.90	14.90	14.90	14.90
14.92	0.00	14.92	14.92	14.92	14.92	14.92	14.92	14.92	14.92
14.94	0.00	14.94	14.94	14.94	14.94	14.94	14.94	14.94	14.94
14.96	0.00	14.96	14.96	14.96	14.96	14.96	14.96	14.96	14.96
14.98	0.00	14.98	14.98	14.98	14.98	14.98	14.98	14.98	14.98
15.00	0.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00

Existing Road & Bridge Centreline
 SCALES HOR 1 : 1500 VER 1 : 750

ASSOCIATED DRAWINGS		REVISIONS		DATE		DATE		DATE		DATE		DATE		DATE		DATE	
NUMBER	DETAILS	NUMBER	DETAILS	NUMBER	DETAILS	NUMBER	DETAILS	NUMBER	DETAILS	NUMBER	DETAILS	NUMBER	DETAILS	NUMBER	DETAILS	NUMBER	DETAILS
TITLE: CONTOUR & DETAIL SURVEY OF MARKHAM RIVER BRIDGE SITE & LONGITUDINAL SECTION MOROBE PROVINCE																	
CLIENT: CHODAI CO.LTD																	
VERT. DATUM		MEAN SEA LEVEL		ORIGIN		PSM 14021		CONTOUR INTERVAL		0.5m		SCALE		1:1500		COMPI. FILE	
HORIZ. DATUM		GRID NORTH (AGD 86)		ORIGIN		PSM 14021		JOB No.		PLAN No.		REV.		SHEET		OF SHEETS	
PROJECT SURVEYOR: M.T.BANICINDO DRAWN: E.LAWI CHECKED: DATE APPROVED: DATE BRANCH: PORT MORESBY PHONE: 258522 FAX: 258613 HEAD OFFICE: PNG SURVEY, HAUS, WAKABE RD., GOROKA N.C.D. ADDRESS: P.O. BOX 372 PORT MORESBY, PAPUA NEW GUINEA.																	

图-1 測量成果

7-3 地質調査結果

地質調査は、橋台、橋脚の基礎工の検討、支持層の検討及び確認に必要な地質・地層状況を把握するために、ボーリング掘削、標準貫入試験、土質資料採取及び室内試験を実施した。これらの試験により、基本設計に必要な土質断面図、土質柱状図、土質室内試験結果が収集された。レイ側橋台下流側で1箇所、P3橋脚仮設橋脚上で1箇所の計2箇所に掘削機械を設置し、調査を行った。調査の状況及び地質サンプルを写真-2、写真-3、写真-4に示す。また、地質縦断面図を図-2に示す。



写真-2 レイ側橋台調査状況

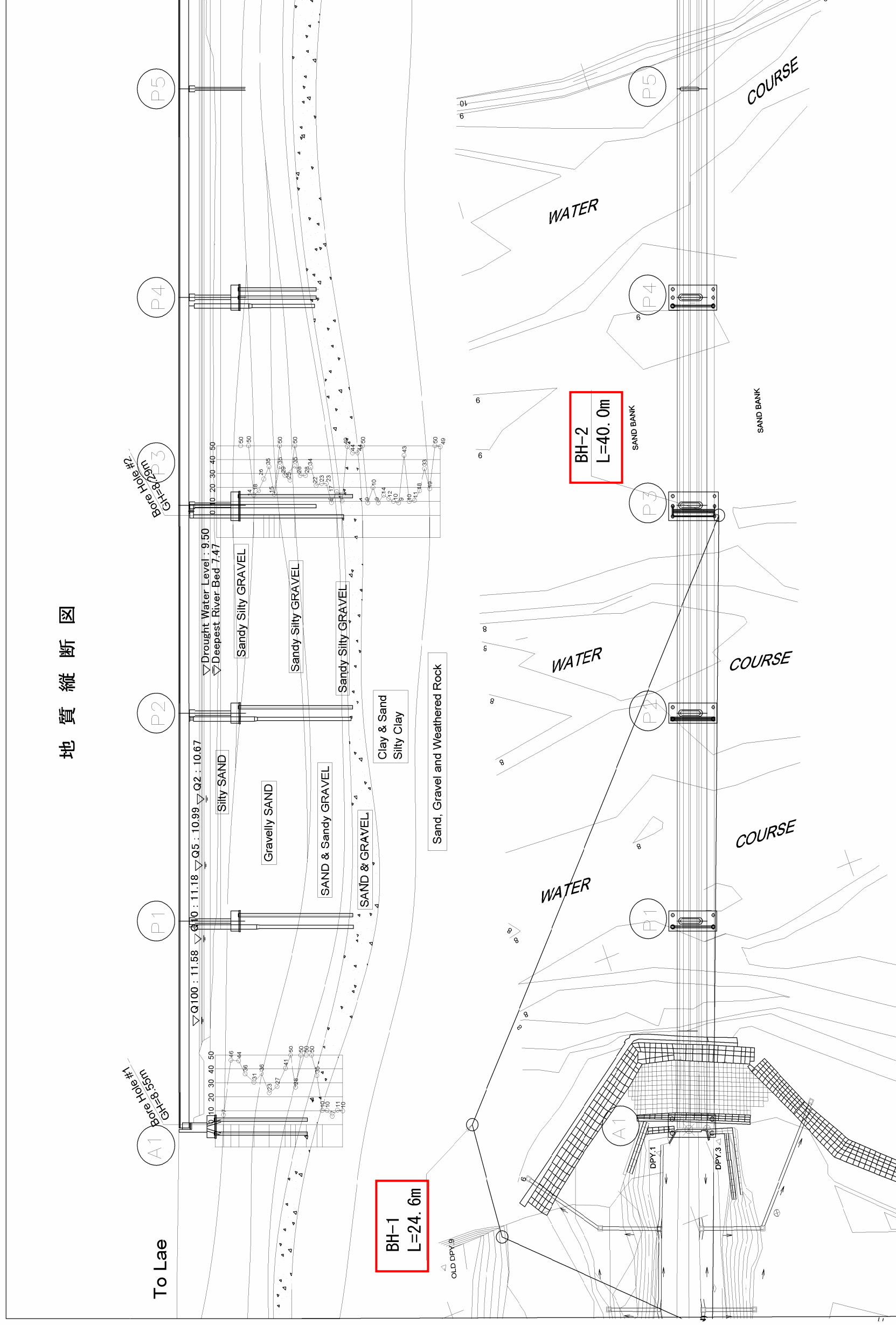


写真-3 P3橋脚調査状況



写真-4 レイ側橋台サンプル

<地質縦断面図>



地質縦断面図

図-2 地質縦断面図