

A-6 討議議事録3 (M/D3)

Minutes of Discussions
on the Preparatory Survey for
the Project for Improvement of National Road in Refugee-hosting Areas of
West Nile Sub-region, the Republic of Uganda
(Explanation on Draft Preparatory Survey Report)

With reference to the Minutes of Discussions signed among Ministry of Works and Transport (hereinafter referred to as “MOWT”), Uganda National Roads Authority (hereinafter referred to as “UNRA”), Mt. Elgon Labour-Based Training Centre (hereinafter referred to as “MELTC”) and Japan International Cooperation Agency (hereinafter referred to as “JICA”) on July 24, 2019 at Kampala and in response to the request from the Government of the Republic of Uganda dated June 26, 2020, JICA organized the Preparatory Survey Team (hereinafter referred to as the “Team”) for the explanation of Draft Preparatory Survey Report (hereinafter referred to as the “Draft Report”) for the Project for Improvement of National Road in Refugee-hosting Areas of West Nile Sub-region (hereinafter referred to as the “Project”).

As a result of the discussions, both sides agreed on the main items described in the attached sheets. JICA and the Ugandan officials acknowledge and agree that there is a possibility for these Minutes of Discussions to be signed by electronic signature, which is considered as an original signature for all purposes and has the same force and effect as an original one. The term of electronic signature includes electronically scanned and transmitted versions (e.g., via PDF) of an original signature.

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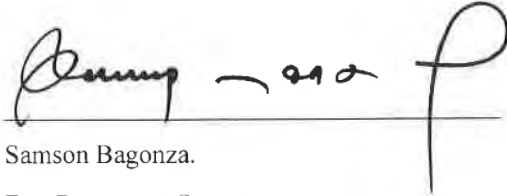
Kampala, October 16, 2020

For Japan International Cooperation Agency

For Ministry of Works and Transport



UCHIYAMA Takayuki
Senior Representative,
Uganda Office
Japan International Cooperation Agency



Samson Bagonza.
For: Permanent Secretary,
Ministry of Works and Transport
The Republic of Uganda

For Uganda National Roads Authority

For Mt. Elgon Labour-Based Training Centre



Allen C. Kagina
Executive Director,
Uganda National Roads Authority

The Republic of Uganda



Hassan Ssentamu
Principal,
Mt. Elgon Labour-Based Training Centre
Ministry of Works and Transport
The Republic of Uganda

Witness:

For Ministry of Finance



Maris Wanyera
For: Permanent Secretary / Secretary to the
Treasury,
Ministry of Finance, Planning and Economic
Development
The Republic of Uganda

ATTACHEMENT

1. Objective of the Project

The objective of the Project is to develop socio-economic infrastructure and realize smooth transport through improving the national road, a feeder road and a bridge in refugee-hosting areas of West Nile sub-region, thereby contributing to stabilization of the society and promotion of sustainable economic growth in West Nile sub-region and northern part of the Republic of Uganda (hereinafter referred to as "Uganda").

2. Title of the Preparatory Survey

Both sides confirmed the title of the Preparatory Survey as "the Preparatory Survey for the Project for Improvement of National Road in Refugee-hosting Areas of West Nile Sub-region, the Republic of Uganda."

3. Project Sites

Both sides confirmed that the sites of the Project are in Yumbe District, which is shown in Annex 1.

4. Scope of the Project

Both sides confirmed the scope of the Project as shown in Annex 1 and the below;

- (1) Improvement of B-class National Highway from Yumbe to Ure Bridge (L= 23.6 km) on the road between Yumbe and Manibe.
- (2) Construction of Koro Bridge on the Feeder Road No.2.
- (3) Improvement of the part of District Road from Yumbe to Barakala (L= approximately 4 km) on the Feeder Road No.1 by Labour Based Technology (hereinafter referred to as "LBT").

5. Responsible Authority for the Project

Both sides confirmed the authorities responsible for the Project are as follows:

- 5-1. UNRA will be the executing agency for the Project (hereinafter referred to as the "Executing Agency"). The Executing Agency shall coordinate with all the relevant authorities to ensure smooth implementation of the Project and ensure that the undertakings for the Project shall be taken care by relevant authorities properly and on time. The organization chart is shown in Annex 2.
- 5-2. The line ministry of the Executing Agency is MOWT. MOWT shall be responsible for overall coordination and monitoring of relevant agencies

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responsible for the implementation of the Project. MOWT shall be supervising the Executing Agency on behalf of the Government of the Republic of Uganda (hereinafter referred to as the "GOU").

5-3. Both sides confirmed that the organization that shall be responsible for the maintenance of the B-class National Highway and Koro Bridge components of the Project shall be UNRA.

5-4. Both sides confirmed that the organization that shall be responsible for the maintenance of the feeder road component of the Project shall be Yumbe District.

6. Contents of the Draft Report

After the explanation of the contents of the Draft Report by the Team, the Ugandan side agreed to its contents. JICA will finalize the Preparatory Survey Report based on the confirmed items. The report will be sent to the Ugandan side around February, 2021.

7. Cost Estimate

Both sides confirmed that the cost estimate including the contingency explained by the Team is provisional and will be examined further by the Government of Japan for its approval. The contingency would cover the additional cost against natural disaster, unforeseen natural conditions, etc.

8. Confidentiality of the Cost Estimate and Technical Specifications

Both sides confirmed that the cost estimate and technical specifications of the Project should never be disclosed to any third parties until all the contracts under the Project are concluded.

9. Procedures and Basic Principles of Japanese Grant

The Ugandan side agreed that the procedures and basic principles of Japanese Grant (hereinafter referred to as the "Grant") as described in Annex 3 shall be applied to the Project. In addition, the Ugandan side agreed to take necessary measures according to the procedures.

10. Timeline for the Project Implementation

The Team explained to the Ugandan side that the expected timeline for the project implementation is as shown in Annex 4. Both sides shall take the necessary steps to

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follow the agreed schedule.

11. Expected Outcomes and Indicators

Both sides agreed that key indicators for expected outcomes are as follows. The Ugandan side will be responsible for the achievement of agreed key indicators targeted in year 2027 and shall monitor the progress for Ex-Post Evaluation based on those indicators.

[Quantitative indicators]

Expected Effect	Baseline (2019)	Target Outcome (2027) <i>3 years after completion</i>
Annual Average Traffic Volume (veh/day) (B-class National Highway L=23.6km)	361	715
Passenger Volume (passengers/day) (B-class National Highway L=23.6km)	1,780	2,341
Freight (Cargo) Volume (tons/day) (B-class National Highway L=23.6km)	244	343
Average Travel Speed (km/h) (B-class National Highway L=23.6km)	45 (dry season) 10 (rainy season)	64 (dry season) 64 (rainy season)
Number of days incapable of yearly traffic (days) (New Koro Bridge)	120	0
The cumulative total of job creation by LBT on feeder road No. 1 (persons)	0	150

[Qualitative indicators]

- (1) Stimulating economic activities in West Nile Sub-region
- (2) Enhancing gender equality by utilizing LBT
- (3) Improving road maintenance capacity by utilizing LBT
- (4) Improving the lives of local residents
- (5) Promoting a dialogue between refugees and local residents

12. Ex-Post Evaluation

JICA will conduct ex-post evaluation after three (3) years from the project completion, in principle, with respect to five (5) evaluation criteria (i.e. Relevance, Effectiveness,

Efficiency, Impact and Sustainability). The result of the evaluation will be publicized. The Ugandan side is required to provide necessary support for the data collection.

13. Tax Treatment

Both sides confirmed the tax treatment for the Japanese Grant Aid Project is based on the following letters from Ministry of Finance Planning and Economic Development (MOFPED) in Uganda.

- Letter: Ref. No. TPD 130/167/01 dated 19th July 2017
- Letter: Ref. No. TPD 130/167/01 dated 6th April 2018

14. Undertakings of the Project

- 14-1. Both sides confirmed that the Ugandan side took necessary measures as undertakings of the Project as described in Annex 5 for smooth implementation of the Project. With regard to bearing of customs duties, internal taxes and other fiscal levies as stipulated in No. 10 of (2) During the Project Implementation in Annex 5, both sides confirmed that such customs duties, internal taxes and other fiscal levies, which shall be clarified in the bid documents by UNRA during the implementation stage of the Project.
- 14-2. The Ugandan side assured to take the necessary measures and coordination including allocation of the necessary budget which are preconditions of implementation of the Project. It is further agreed that the costs are indicative, i.e. at Outline Design level. More accurate costs will be calculated at the Detailed Design stage.
- 14-3. Both sides also confirmed that the Annex 5 will be used as an attachment of Grant Agreement (G/A).
- 14-4. Both sides confirmed that the GOU shall take necessary measures to ensure and maintain the general security of the Project area during the Project period. Such security measures shall reasonably reflect needs of the Consultant and the Contractor engaging in the Project, as shown in Annex 5.

15. Monitoring During the Implementation

The Project will be monitored by the Executing Agency and reported to JICA by using the form of Project Monitoring Report (hereinafter referred to as the "PMR") attached as Annex 6. The timing of submission of the PMR is described in Annex 5.

16. Definition of the Project Completion

Both sides confirmed that the definition of the term of project completion is when all

the facilities constructed and equipment procured by the Grant are in operation. The completion of the Project will be reported to JICA promptly by the Executing Agency, but in any event not later than six (6) months after completion of the Project.

17. Implementation structure of the Project and LBT

Both sides confirmed implementation structure of the Project as a whole and LBT as shown in Annex 7.

18. Environmental and Social Considerations

18-1. General Issues

18-1-1. Environmental Guidelines and Environmental Category

The Team explained that 'JICA Guidelines for Environmental and Social Considerations (April 2010)' (hereinafter referred to as the "Guidelines") is applicable for the Project. The Project is categorized as B because the Project is not considered to be a large-scale road, is not located in a sensitive area, and has none of the sensitive characteristics under the Guidelines, it is not likely to have a significant adverse impact on the environment.

18-1-2. Environmental Checklist

Both sides confirmed information on environmental and social considerations including major impacts and relevant mitigation measures are summarized in the Environmental Checklist attached as Annex 8. The Ugandan side confirmed they will inform JICA of any major changes which may affect environmental and social considerations made for the Project by revising the Checklist in a timely manner.

18-2. Environmental Issues

18-2-1. Environmental Impact Assessment (EIA)

Both sides confirmed the Environmental Impact Assessment (hereinafter referred to as "EIA") report will be approved by The National Environment Management Authority (hereinafter referred to as "NEMA"). The expected approval timing by NEMA is in December, 2020.

18-2-2. Environmental Management Plan and Environmental Monitoring Plan

Both sides confirmed environmental monitoring will be conducted by UNRA in accordance with the Environmental Management Plan (hereinafter referred to as the "EMP") and Environmental Monitoring Plan (hereinafter referred to

as the “EMoP”) described in Annex 9. Both sides further agreed that environmental mitigation measures and monitoring shall be conducted based on the EMP and the EMoP, which may be updated during the Detailed Design stage. Both sides also confirmed that the results of environmental monitoring will be provided to JICA as a part of the PMR by filling in the monitoring results reporting form for construction on a quarterly basis until the completion of the Project provided that there is no outstanding issue regarding the environmental and social considerations during operation of the Project. In case JICA finds that there is a need for improvement in a situation with respect to environmental considerations after the agreed monitoring period, JICA may request to extend the period of monitoring and reporting until JICA confirms the issues have been properly addressed in accordance with the agreement between UNRA and JICA.

18-3. Social Issues

18-3-1. Land Acquisition and Resettlement

- (1) Both sides confirmed the forty-six-point twenty-seven (46.27) hectare (ha) of land would be acquired and fifteen (15) households would be relocated due to the implementation of the Project. The content of land acquisition is shown as below;
 - (a) From Yumbe to Ure Bridge (L= 23.6 km): 43.78 ha if right-of-way (ROW)=30m is applicable.
 - (b) For Koro bridge on the Feeder Road No.2 including its approach road: 2.49 ha
 - (c) Regarding (a) above, both sides also confirmed that ROW=30m is not necessarily mandatory when land and/or object which can barely be acquired and/or transferred are found. Both sides further confirmed that UNRA would finally decide which land/object to acquire and/or transfer at the timing of the Detailed Design (D/D) on the advice of the consultant of the Project.
- (2) Such land acquisition and resettlement shall be implemented based on the (Abbreviated) Resettlement Action Plan (hereinafter referred to as the “RAP”) which was prepared in line with the Guidelines. The RAP will be approved by the Chief Government Valuer of Ministry of Lands, Housing and Urban Development by the end of December, 2020.
- (3) Both sides confirmed that land acquisition and resettlement including compensation for Project Affected Persons (hereinafter referred to as the “PAPs”) must be completed prior to the public announcement of bidding

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based on the RAP.

- (4) Both sides confirmed internal monitoring proposed in the RAP will be conducted by NEMA. UNRA agreed that progress of land acquisition and implementation of the RAP would be monitored until land acquisition and resettlement activities including livelihood restoration program are completed. UNRA will report the monitoring results to JICA on a quarterly basis as a part of the PMR. In case there is a remaining issue that needs to be addressed (e.g. insufficient restoration of livelihood of displaced the PAPs), JICA may request to extend the period of monitoring and reporting until JICA confirms the issues have been properly addressed and solved in accordance with the agreement between UNRA and JICA.

18-4. Environmental and Social Monitoring

18-4-1. Environmental Monitoring

Both sides agreed that the Ugandan side will submit results of environmental monitoring to JICA with the PMR by using the monitoring form attached as Annex 10. The timing of submission of the monitoring form is described in Annex 5.

18-4-2. Social Monitoring

Both sides confirmed that the Ugandan side will implement social monitoring about land acquisition and resettlement plan proposed in the RAP. The Ugandan side and the Team agreed that UNRA will submit results of social monitoring to JICA with the PMR by using the monitoring form attached as Annex 10.

18-4-3. Information Disclosure of Monitoring Results

Both sides confirmed it would take stipulated procedures for information disclosure. In addition, the Team requested UNRA to disclose the monitoring results to local project stakeholders, and UNRA agreed to disclose monitoring results on their website and/or in their field offices. UNRA agreed JICA's disclosure of provided monitoring results in the monitoring form attached as Annex 10 on its website.

19. Other Relevant Issues

19-1. Disclosure of Information

Both sides confirmed that the Preparatory Survey Report from which project cost

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is excluded will be disclosed to the public after completion of the Preparatory Survey. The comprehensive report including the project cost will be disclosed to the public after all the contracts under the Project are concluded.

20. Operation and Maintenance

20-1. Division of Roles

Both sides confirmed that organization in charge of operation and maintenance of each project scope is described as below;

20-1-1. Contents of Road Maintenance Work

Routine manual maintenance

Routine manual maintenance includes grass cutting, cleaning of side ditches, culverts, removal of obstructions, desilting of junctions, etc.

Routine mechanized maintenance

Repair of damaged parts, such as sealing and patching pavement, repainting pavement markings, repair of side drainages, repair of road edges, etc.

Periodic maintenance

Major repairs to be carried out after 7 to 8 years which will include resealing of the entire road.

20-1-2. Recommendations of Road Maintenance Conditions

In order to maintain of appropriate conditions, it is important to manage and maintain road facilities adequately by keeping in good conditions the pavement and other supplemental facilities thus effectively extending their life spans. The following recommendations are proposed:

- To check facilities regularly in order to control their conditions
- To clean facilities, especially the side drains and culverts
- To secure adequate budget for maintenance
- To appropriately manage their maintenance cycle, taking into account timely routine and periodic maintenance

20-2. Cooperation between UNRA and Yumbe District Local Government

Both sides confirmed that, regardless of the description above, UNRA shall support Yumbe District Local Government for operation and maintenance of District Road from Yumbe to Barakala such as technical assistance and provision

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of appropriate equipment on a temporary basis, if necessary.

20-3. Maintenance of Subsidiary Facilities

Both sides confirmed that the scope of maintenance includes not only the road or the drainage structures but also the subsidiary facilities such as the road furniture, road markings, etc.

21. Utilization of LBT

Both sides confirmed that the improvement of the part of District Road from Yumbe to Barakala (L= approximately 4 km) on the Feeder Road No.1 will be implemented by LBT and the details are described in Annex 11.

22. On-site Training for the Project

MOWT proposed that they would like the consultant and/or the contractor to accept the on-site training for young engineers of MOWT on the Project site with MOWT's expense such as salary, allowances, transportation from Kampala to the Project site, accommodation and insurance. The expected number of engineers is 2 to 3. JICA acknowledged their preference and suggested to MOWT that there is a possibility to conduct the on-site training if both MOWT and the consultant and/or the contractor are agreed.

23. Traffic Safety

Both sides confirmed that UNRA would take full care of securing traffic safety especially at the bridge section on B-class National Highway after completion of civil works when the road has been handed over for operation and maintenance. UNRA would install supplementary safety facilities after construction and handover of the project if necessary. The consultant will provide information to UNRA about additional safety facilities on the B Class National Highway, Feeder Road No. 1 and/or the Koro Bridge, if any.

End

Annex 1: Project Site

Annex 2: Organization Chart

Annex 3: Japanese Grant

Annex 4: Project Implementation Schedule

Annex 5: Major Undertakings to be taken by the Government of Republic of Uganda

Annex 6: Project Monitoring Report (template)

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Annex 7: Implementation Structure of the Project and LBT

Annex 8: Environmental Check List

Annex 9: Environmental Management Plan / Environmental Monitoring Plan

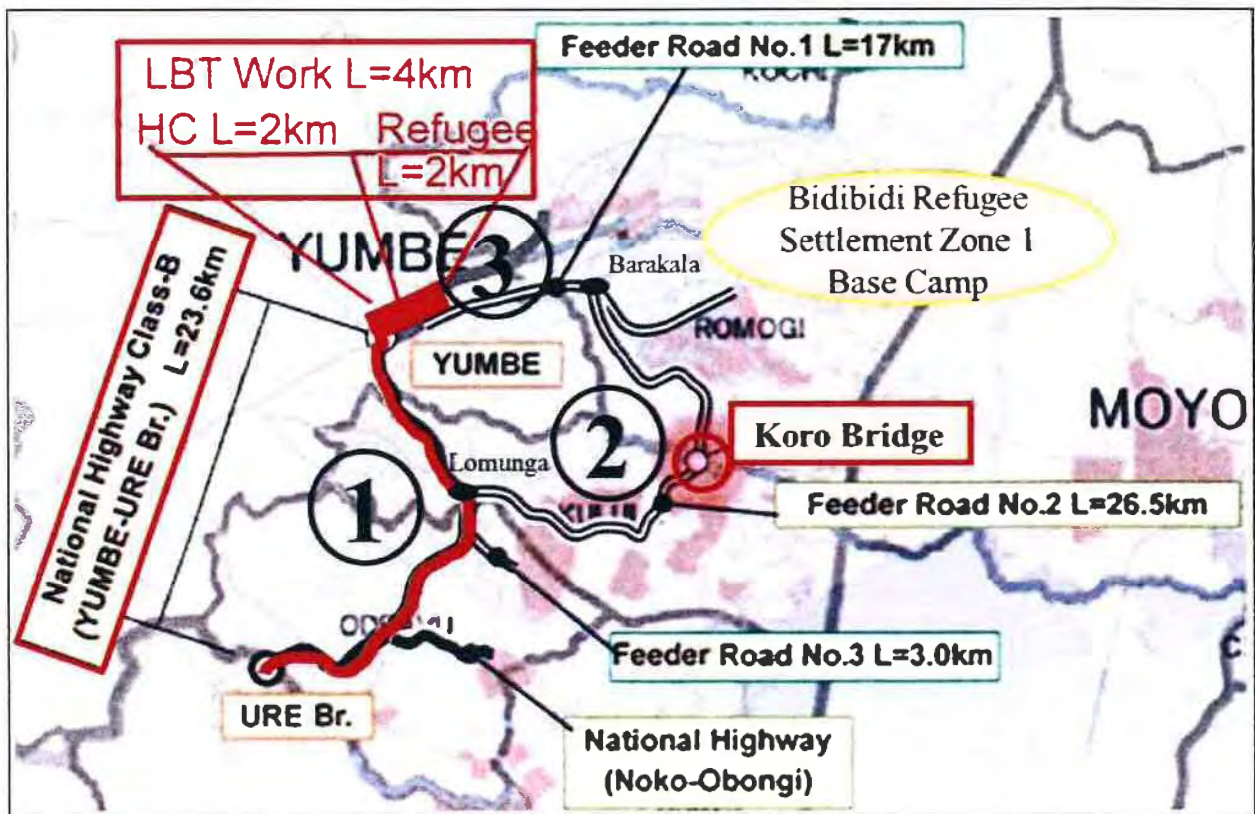
Annex 10: Environmental and Social Monitoring Form

Annex 11: Utilization of LBT

Project Location*

The scope of the Project is as follows; the part highlighted with red line, and the name of the component for each is also highlighted with red frame.

- ① Improvement of B-class National Highway from Yumbe to Ure Bridge (L=23.6 km) on the road between Yumbe and Manibe (L=77 km).
- ② Construction of Koro bridge on Feeder Road No.2 between Barakala and Lomunga (L=26.5km)
- ③ Improvement of the part of District Road from Yumbe to Barakala (approximately 4km out of 9 km) in the Feeder Road No.1 (L=17km). The construction will be utilized by LTB. The workers from a host community will be in charge of the way of two (2) km and the other (2) km) is responsible for workers from a refugee settlement.

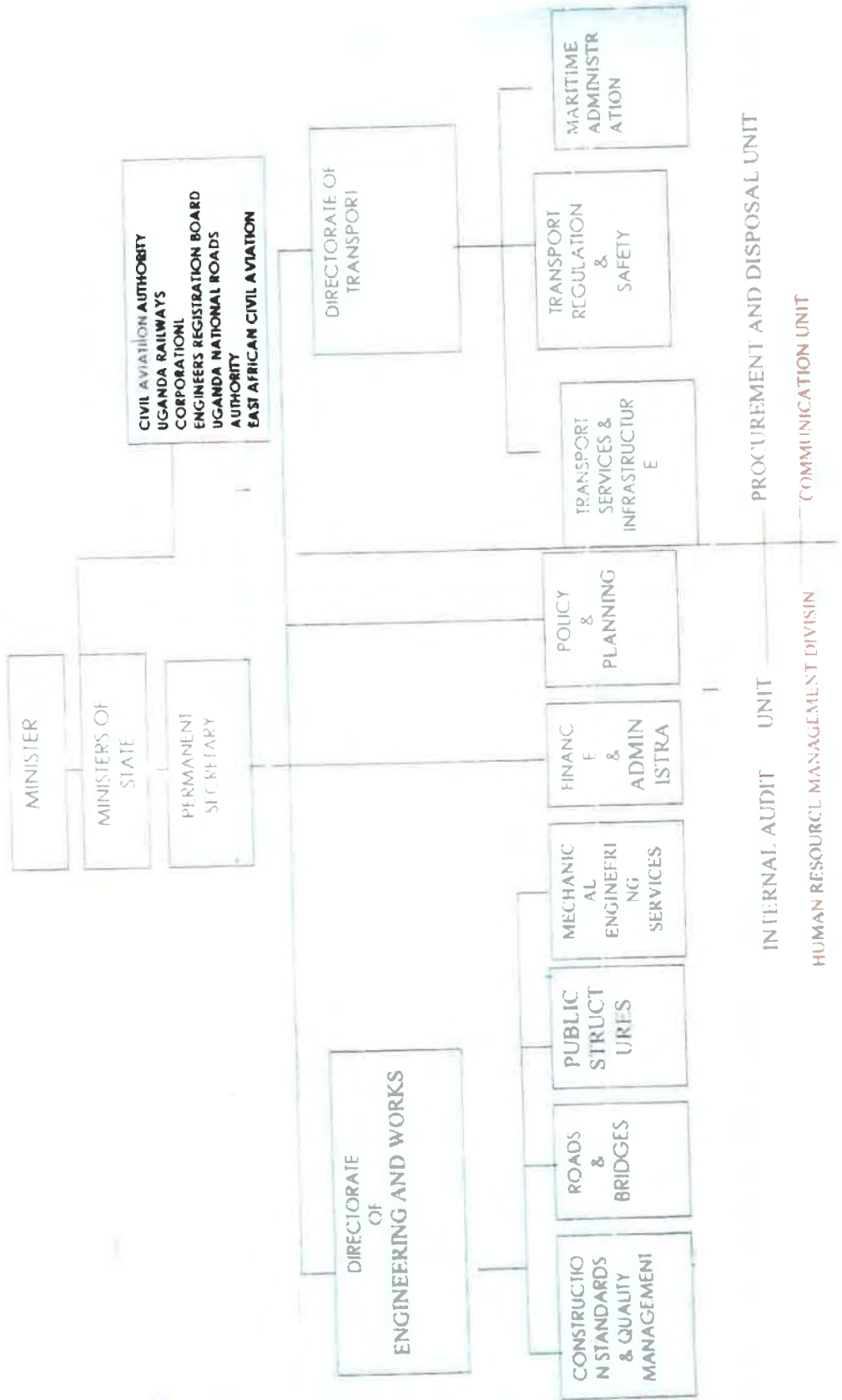


(*) The scope eventually shall be determined and reflected on the bidding document(s) based on the result of the Detailed Design (D/D).

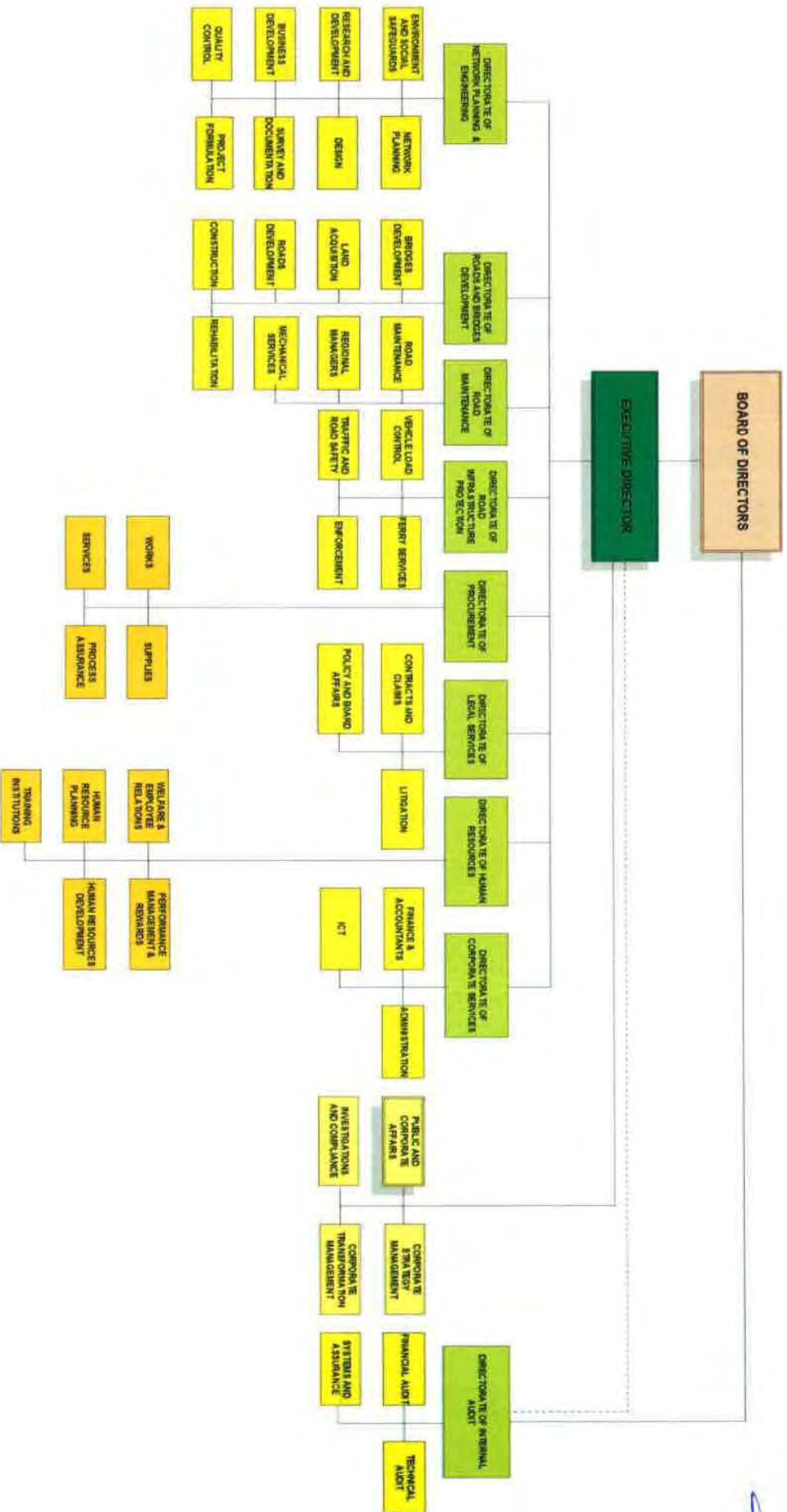
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Organization Chart

1. Ministry of Works and Transport (MOWT)



2. Uganda National Roads Authority (UNRA)



Annex 2-2

End

JAPANESE GRANT

The Japanese Grant is non-reimbursable fund provided to a recipient country (hereinafter referred to as “the Recipient”) to purchase the products and/or services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. Followings are the basic features of the project grants operated by JICA (hereinafter referred to as “Project Grants”).

1. Procedures of Project Grants

Project Grants are conducted through following procedures (See “PROCEDURES OF JAPANESE GRANT” for details):

(1) Preparation

- The Preparatory Survey (hereinafter referred to as the “Survey”) conducted by JICA

(2) Appraisal

- Appraisal by the government of Japan (hereinafter referred to as the “GOJ”) and JICA, and Approval by the Japanese Cabinet

(3) Implementation

Exchange of Notes

- The Notes exchanged between the GOJ and the government of the Recipient Grant Agreement (hereinafter referred to as the “G/A”)

- Agreement concluded between JICA and the Recipient Banking Arrangement (hereinafter referred to as the “B/A”)

- Opening of bank account by the Recipient in a bank in Japan (hereinafter referred to as “the Bank”) to receive the grant

Construction works/procurement

- Implementation of the project (hereinafter referred to as the “Project”) on the basis of the G/A

(4) Ex-post Monitoring and Evaluation

- Monitoring and evaluation at post-implementation stage

2. Preparatory Survey

(1) Contents of the Survey

The aim of the Survey is to provide basic documents necessary for the appraisal of the Project made

by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the Recipient necessary for the implementation of the Project.
- Evaluation of the feasibility of the Project to be implemented under the Japanese Grant from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.
- Estimation of costs of the Project.
- Confirmation of Environmental and Social Considerations

The contents of the original request by the Recipient are not necessarily approved in their initial form. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant.

JICA requests the Recipient to take measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the executing agency of the Project. Therefore, the contents of the Project are confirmed by all relevant organizations of the Recipient based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA contracts with (a) consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

JICA reviews the report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the feasibility of the Project.

3. Basic Principles of Project Grants

(1) Implementation Stage

1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes (hereinafter referred

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to as the "E/N") will be signed between the GOJ and the Government of the Recipient to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Recipient to define the necessary articles, in accordance with the E/N, to implement the Project, such as conditions of disbursement, responsibilities of the Recipient, and procurement conditions. The terms and conditions generally applicable to the Japanese Grant are stipulated in the "General Terms and Conditions for Japanese Grant (January 2016)."

2) Banking Arrangements (B/A) (See "Financial Flow of Japanese Grant (A/P Type)" for details)

- a) The Recipient shall open an account or shall cause its designated authority to open an account under the name of the Recipient in the Bank, in principle. JICA will disburse the Japanese Grant in Japanese yen for the Recipient to cover the obligations incurred by the Recipient under the verified contracts.
- b) The Japanese Grant will be disbursed when payment requests are submitted by the Bank to JICA under an Authorization to Pay (A/P) issued by the Recipient.

3) Procurement Procedure

The products and/or services necessary for the implementation of the Project shall be procured in accordance with JICA's procurement guidelines as stipulated in the G/A.

4) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the Recipient to continue to work on the Project's implementation after the E/N and G/A.

5) Eligible source country

In using the Japanese Grant disbursed by JICA for the purchase of products and/or services, the eligible source countries of such products and/or services shall be Japan and/or the Recipient. The Japanese Grant may be used for the purchase of the products and/or services of a third country as eligible, if necessary, taking into account the quality, competitiveness and economic rationality of products and/or services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm, which enter into contracts with the Recipient, are limited to "Japanese nationals", in principle.

6) Contracts and Concurrence by JICA

The Recipient will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be concurred by JICA in order to be verified as eligible for using the Japanese Grant.

7) Monitoring

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The Recipient is required to take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and to regularly report to JICA about its status by using the Project Monitoring Report (PMR).

8) Safety Measures

The Recipient must ensure that the safety is highly observed during the implementation of the Project.

9) Construction Quality Control Meeting

Construction Quality Control Meeting (hereinafter referred to as the "Meeting") will be held for quality assurance and smooth implementation of the Works at each stage of the Works. The member of the Meeting will be composed by the Recipient (or executing agency), the Consultant, the Contractor and JICA. The functions of the Meeting are as followings:

- a) Sharing information on the objective, concept and conditions of design from the Contractor, before start of construction.
- b) Discussing the issues affecting the Works such as modification of the design, test, inspection, safety control and the Client's obligation, during of construction.

(2) Ex-post Monitoring and Evaluation Stage

1) After the project completion, JICA will continue to keep in close contact with the Recipient in order to monitor that the outputs of the Project is used and maintained properly to attain its expected outcomes.

2) In principle, JICA will conduct ex-post evaluation of the Project after three years from the completion. It is required for the Recipient to furnish any necessary information as JICA may reasonably request.

(3) Others

1) Environmental and Social Considerations

The Recipient shall carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the Recipient and JICA Guidelines for Environmental and Social Considerations (April, 2010).

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2) Major undertakings to be taken by the Government of the Recipient

For the smooth and proper implementation of the Project, the Recipient is required to undertake necessary measures including land acquisition, and bear an advising commission of the A/P and payment commissions paid to the Bank as agreed with the GOJ and/or JICA. The Government of the Recipient shall ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the Recipient with respect to the purchase of the Products and/or the Services be exempted or be borne by its designated authority without using the Grant and its accrued interest, since the grant fund comes from the Japanese taxpayers.

3) Proper Use

The Recipient is required to maintain and use properly and effectively the products and/or services under the Project (including the facilities constructed and the equipment purchased), to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Japanese Grant.

4) Export and Re-export

The products purchased under the Japanese Grant should not be exported or re-exported from the Recipient.

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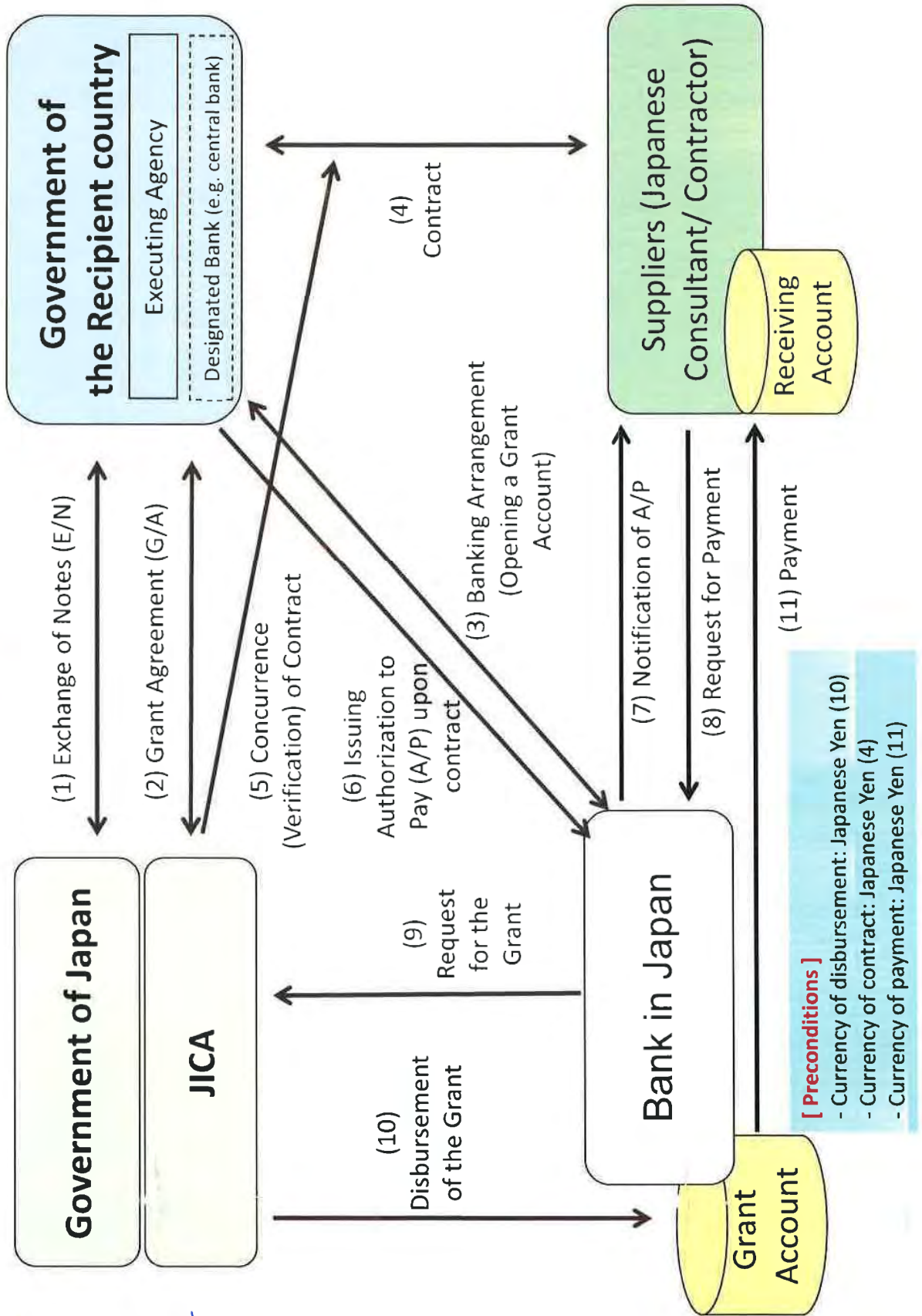
PROCEDURES OF JAPANESE GRANT

Stage	Procedures	Remarks	Recipient Government	Japanese Government	JICA	Consultants	Contractors	Agent Bank
Official Request	Request for grants through diplomatic channel	Request shall be submitted before appraisal stage.	x	x				
1. Preparation	(1) Preparatory Survey Preparation of outline design and cost estimate		x		x	x		
2. Appraisal	(2) Preparatory Survey Explanation of draft outline design, including cost estimate, undertakings, etc		x		x	x		
	(3) Agreement on conditions for implementation	Conditions will be explained with the draft notes (E/N) and Grant Agreement (G/A) which will be signed before approval by Japanese government.	x	x (E/N)	x (G/A)			
	(4) Approval by the Japanese cabinet			x				
3. Implementation	(5) Exchange of Notes (E/N)		x	x				
	(6) Signing of Grant Agreement (G/A)		x		x			
	(7) Banking Arrangement (B/A)	Need to be informed to JICA	x					x
	(8) Contracting with consultant and issuance of Authorization to Pay (A/P)	Concurrence by JICA is required	x			x		x
	(9) Detail design (D/D)		x			x		
	(10) Preparation of bidding documents	Concurrence by JICA is required	x			x		
	(11) Bidding	Concurrence by JICA is required	x			x	x	
	(12) Contracting with contractor/supplier and issuance of A/P	Concurrence by JICA is required	x					x
	(13) Construction works/procurement	Concurrence by JICA is required for major modification of design and amendment of contracts.	x			x	x	
	(14) Completion certificate		x			x	x	
4. Ex-post monitoring & evaluation	(15) Ex-post monitoring	To be implemented generally after 1, 3, 10 years of completion, subject to change	x		x			
	(16) Ex-post evaluation	To be implemented basically after 3 years of completion	x		x			

notes:

1. Project Monitoring Report and Report for Project Completion shall be submitted to JICA as agreed in the G/A.
2. Concurrence by JICA is required for allocation of grant for remaining amount and/or contingencies as agreed in the G/A.

Financial Flow of Japanese Grant (A/P Type)



Project Implementation schedule

		2021												2022												2023												2024											
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
I	Approval of Cabinet, Exchange Note, Grant Agreement	[Gantt bar: 1/2021 to 1/2022]																																															
	Detailed Design	[Gantt bar: 2/2021 to 6/2021]																																															
a	LBT advisory Committee	[Gantt bar: 3/2021 to 4/2021]																																															
	Explanation of the RAP report to local government and formulation of RAP implementation team	[Gantt bar: 3/2021 to 4/2021]																																															
n	Stakeholder meeting (37 village) for explanation about the verification of PAPs and procedure of compensation	[Gantt bar: 3/2021 to 4/2021]																																															
	Verification of PAPs and properties	[Gantt bar: 5/2021 to 8/2021]																																															
d	Notification of compensation details (delivering each individual household entitlement matrix and receiving the signature for each entitlement matrix from PAPs)	[Gantt bar: 6/2021 to 9/2021]																																															
	Announcement the payment days from UNRA, and opening the PAPs' bank account if necessary	[Gantt bar: 7/2021 to 8/2021]																																															
a	Setting the payment location, paying the compensation with PAPs' signature and witness of LC1, and District, Sub-county and parish representatives	[Gantt bar: 8/2021 to 10/2021]																																															
	Land acquisition	[Gantt bar: 9/2021 to 11/2021]																																															
c	Relocation	[Gantt bar: 10/2021 to 12/2021]																																															
	Monitoring of implementation of RAP	[Gantt bar: 11/2021 to 1/2022]																																															
q	Recording and tracking grievances	[Gantt bar: 12/2021 to 2/2022]																																															
	Tender Related Services	[Gantt bar: 1/2022 to 3/2022]																																															
u	Preparatory Work	[Gantt bar: 2/2022 to 4/2022]																																															
	Class B National Road	[Gantt bar: 3/2022 to 6/2022]																																															
t	LBT Training	[Gantt bar: 4/2022 to 5/2022]																																															
	Feeder Road No.1 By LBT Construction	[Gantt bar: 5/2022 to 8/2022]																																															
i	Bridge Work	[Gantt bar: 6/2022 to 9/2022]																																															
	Cleaning	[Gantt bar: 7/2022 to 10/2022]																																															

EG = Engineer Group (EG1: 10 persons, 1month, EG2: 10 persons, 1month)
 SOG = Social Officer Group (10 persons, 2 weeks)
 ● Defect Inspection of LBT portion

Rainy Season

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Major Undertakings to be taken by the Government of Republic of Uganda

1. Specific obligations of the Government of Uganda which will not be funded with the Grant

(1) Before the Bidding

No.	Items	Deadline	In charge	Estimated Cost	Ref.
1	To prepare the budget for LBT-related contents as following; - the LBT advisory committee	within 1 month after signing of the G/A	MOWT		
2	To open Bank Account (Banking Arrangement (B/A))	within 1 month after signing of the G/A	UNRA MOFPED/BOU (Bank of Uganda)	20,000 USD	
3	To issue the Authorization to Pay (A/P) to a bank in Japan (the Agent Bank) for the payment to the Consultant	within 1 month after signing of the contract	UNRA MOFPED/BOU		
4	To approve EIA including secure the necessary budget and fulfill the preconditions of approval of EIA.	within 1 month after signing of the G/A	UNRA NEMA		
5	To secure the necessary budget and implement land acquisition and compensation if necessary	before notice of the bidding document(s)	UNRA	2,434,000 USD	*
6	To implement social monitoring, and to submit the monitoring results to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	till land acquisition and resettlement complete	UNRA		
7	To secure and clear the following lands 1) right of way for the Project To provide guidance necessary for the selection and construction of 2) temporary construction yard and stock yard near the Project site 3) borrow pit and disposal site near the Project area	before notice of the bidding document(s)	UNRA		*
8	To submit Project Monitoring Report (with the result of Detailed Design (D/D))	before preparation of bidding document(s)	UNRA		
9	Removal of utilities 1) Water supply faucets and pipes** 2) Sign boards: 46 3) Utility poles: 38	before notice of the bidding document(s)	UNRA		*

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10	To implement RAP (livelihood restoration program)	before notice of the bidding document(s)	UNRA		*
11	To organize and chair the LBT advisory committee	During the Detailed Design (D/D) period	MOWT		*
12	To assign engineers and social workers for LBT-related contents from refugee-hosting districts of the West Nile sub-region especially from Yumbe District Local Government and to start preparing for LBT training	before the signing of the contract of the construction	MOWT		

(*) The Project will be postponed unless these items are should be completed before notice of the bidding document(s).

(**) As for water supply faucets and pipes in the Project site, it is considered that they are not necessary to remove since they are not affected by construction of the Project. However, UNRA confirms this point with water supply authority and report the result to JICA by October 30, 2020. If it is found that water supply faucets and/or pipes are needed to remove in the end, UNRA shall take necessary measure to remove them before notice of the bidding document(s).

(2) During the Project Implementation

No.	Items	Deadline	In charge	Estimated Cost	Ref.
1	To issue A/P(s) to the Agent Bank in Japan for the payment(s) to the Supplier(s)	within 1 month after signing of the contract(s)	UNRA MOFPED/BOU		
2	To bear the following commissions to the Agent Bank in Japan for the banking services based upon the B/A	during the Project			
	1) Advising commission of A/P	within 1 month after signing of the contract(s)	UNRA MOFPED/BOU		
	2) Payment commission for A/P	every payment	UNRA MOFPED/BOU		
3	To conduct the LBT training for engineers and social workers in refugee-hosting districts of the West Nile sub-region especially from Yumbe District Local Government	during the preparation works	MELTC		
4	To allocate the budget for No. 3 above	during the preparation works	MOWT		
5	To monitor and assess the performance of LBT trainees	during the construction	MELTC		
6	Site visit and monitoring by MELTC and Yumbe District Local Government on LBT site	during the construction	MOWT		

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7	To allocate the budget for No. 5 and 6 above	during the construction	MOWT		
8	To ensure prompt customs clearance and to assist the Supplier with internal transportation in the country of the Recipient	during the Project	MOWT MOFPEP UNRA		
9	To accord Japanese physical persons and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the country of the Recipient and stay therein for the performance of their work	during the Project	UNRA		
10	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the Products and/or the Services be borne by its designated authority without using the Grant.	during the Project	MOFPEP UNRA		
11	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project	during the Project	MOFPEP UNRA		
12	To notify JICA promptly of any incident or accident, which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers.	during the Project	UNRA		
13	1) To submit Project Monitoring Report	every month	UNRA		
	2) To submit Project Monitoring Report (Final).	within one month after signing of Certificate of Completion of the Work under the contract(s)	UNRA		
14	To submit a report concerning completion of the Project	within six months after completion of the Project	UNRA		
15	To take measures necessary for general security of the Project area	during the construction	The GOU		

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16	To conduct environmental monitoring in accordance with Environmental Management Plan (EMP) and Environmental Monitoring Programme (EMoP)	during the construction	UNRA		
17	To submit results of environmental monitoring to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	during the construction	UNRA		

(3) After the Project

No.	Items	Deadline	In charge	Estimated Cost	Ref.
1	To implement EMP and EMoP	for a period based on EMP and EMoP	UNRA	10,000 USD	
2	To submit results of environmental monitoring to JICA, by using the monitoring form, semi-annually - The period of environmental monitoring may be extended if any significant negative impacts on the environment are found. The extension of environmental monitoring will be decided based on the agreement between UNRA and JICA.	for three years after the Project completion	UNRA		
3	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid 1) Allocation of maintenance cost 2) Operation and maintenance (O&M) structure (Clarification of Organization in charge / responsible for the O&M) 3) Routine check / Periodic inspection	After the Project completion	UNRA/ Yumbe District Local Government	UNRA: 33,790 USD (per year) Yumbe District: 3,840 USD (per year)	

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2. Other obligations of the Government of Uganda funded with the Grant

No	Items	Deadline	Amount (Billion Japanese Yen)*
1	To construct roads and bridge - Improvement of National Highway and Feeder Road - Construction of bridge		
2	To implement detailed design, bidding support and construction supervision (Consulting Service)		
3	Contingencies		
	Total		

*The Amount is provisional. This is subject to the approval of the Government of Japan.

End




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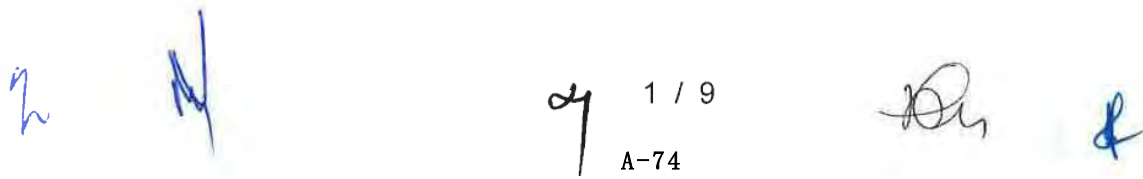
Project Monitoring Report
on
the Project for Improvement of National Road in Refugee-hosting
Areas of West Nile Sub-region
Grant Agreement No. XXXXXXXX
 20XX, Month

Organizational Information

Signer of the G/A (Recipient)	_____ Person in Charge (Designation) _____ Contacts Address: _____ Phone/FAX: _____ Email: _____
Executing Agency	_____ Person in Charge (Designation) _____ Contacts Address: _____ Phone/FAX: _____ Email: _____
Line Ministry	_____ Person in Charge (Designation) _____ Contacts Address: _____ Phone/FAX: _____ Email: _____

General Information:

Project Title	
E/N	Signed date: Duration:
G/A	Signed date: Duration:
Source of Finance	Government of Japan: Not exceeding JPY _____ mil Government of (_____): _____



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1: Project Description

1-1 Project Objective

1-2 Project Rationale

- Higher-level objectives to which the project contributes (national/regional/sectoral policies and strategies)
- Situation of the target groups to which the project addresses

1-3 Indicators for measurement of "Effectiveness"

Quantitative indicators to measure the attainment of project objectives		
Indicators	Original (Yr)	Target (Yr)
Qualitative indicators to measure the attainment of project objectives		

2: Details of the Project

2-1 Location

Components	Original <i>(proposed in the outline design)</i>	Actual
1.		

2-2 Scope of the work

Components	Original* <i>(proposed in the outline design)</i>	Actual*
1.		

Reasons for modification of scope (if any).

(PMR)

2-3 Implementation Schedule

Items	Original		Actual
	<i>(proposed in the outline design)</i>	<i>(at the time of signing the Grant Agreement)</i>	

Reasons for any changes of the schedule, and their effects on the project (if any)

--

2-4 Obligations by the Recipient

2-4-1 Progress of Specific Obligations

See Attachment 2.

2-4-2 Activities

See Attachment 3.

2-4-3 Report on RD

See Attachment 11.

2-5 Project Cost

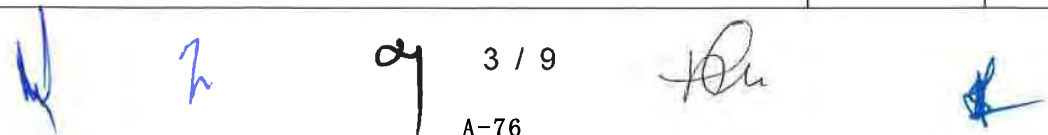
2-5-1 Cost borne by the Grant(Confidential until the Bidding)

Components	Cost (Million Yen)			
	Original <i>(proposed in the outline design)</i>	Actual <i>(in case of any modification)</i>	Original ^{1),2)} <i>(proposed in the outline design)</i>	Actual
1.				
Total				

Note: 1) Date of estimation:
 2) Exchange rate: 1 US Dollar = Yen

2-5-2 Cost borne by the Recipient

Components	Cost (1,000 Taka)			
	Original <i>(proposed in the outline design)</i>	Actual <i>(in case of any modification)</i>	Original ^{1),2)} <i>(proposed in the outline design)</i>	Actual
1.				



Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar =

Reasons for the remarkable gaps between the original and actual cost, and the countermeasures (if any)

(PMR)

2-6 Executing Agency

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

Original (at the time of outline design) name: role: financial situation: institutional and organizational arrangement (organogram): human resources (number and ability of staff):
Actual (PMR)

2-7 Environmental and Social Impacts

- The results of environmental monitoring based on Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- The results of social monitoring based on in Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- Disclosed information related to results of environmental and social monitoring to local stakeholders (whenever applicable).

3: Operation and Maintenance (O&M)

3-1 Physical Arrangement

- Plan for O&M (number and skills of the staff in the responsible division or section, availability of manuals and guidelines, availability of spareparts, etc.)

Original (at the time of outline design)
Actual (PMR)

3-2 Budgetary Arrangemen

- Required O&M cost and actual budget allocation for O&M

Original (at the time of outline design)

Actual (PMR)

4: Potential Risks and Mitigation Measures

- Potential risks which may affect the project implementation, attainment of objectives, sustainability
- Mitigation measures corresponding to the potential risks

Assessment of Potential Risks (at the time of outline design)

Potential Risks	Assessment
1. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
2. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
3. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):

Actual Situation and Countermeasures	
(PMR)	

5: Evaluation and Monitoring Plan (after the work completion)

5-1 Overall evaluation

Please describe your overall evaluation on the project.

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5-2 Lessons Learnt and Recommendations

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

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5-3 Monitoring Plan of the Indicators for Post-Evaluation

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

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Attachment

1. Project Location Map
 2. Specific obligations of the Recipient which will not be funded with the Grant
 3. Monthly Report submitted by the Consultant
- Appendix - Photocopy of Contractor's Progress Report (if any)
- Consultant Member List
 - Contractor's Main Staff List
4. Check list for the Contract (including Record of Amendment of the Contract/Agreement and Schedule of Payment)
 5. Environmental Monitoring Form / Social Monitoring Form
 6. Monitoring sheet on price of specified materials (Quarterly)
 7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR (final) only)
 8. Pictures (by JPEG style by CD-R) (PMR (final)only)
 9. Equipment List (PMR (final) only)
 10. Drawing (PMR (final) only)
 11. Report on RD (After project)

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Monitoring sheet on price of specified materials

1. Initial Conditions (Confirmed)

Items of Specified Materials	Initial Volume A	Initial Unit Price (¥) B	Initial total Price C=A×B	1% of Contract Price D	Condition of payment Price (Decreased) E=C-D	Price (Increased) F=C+D
Item 1	●●t	●	●	●	●	●
Item 2	●●t	●	●	●		
Item 3						
Item 4						
Item 5						

2. Monitoring of the Unit Price of Specified Materials

(1) Method of Monitoring : ●●

(2) Result of the Monitoring Survey on Unit Price for each specified materials

Items of Specified Materials	1st MONTH, YEAR	2nd MONTH, YEAR	3rd MONTH, YEAR	4th	5th	6th
Item 1						
Item 2						
Item 3						
Item 4						
Item 5						

(3) Summary of Discussion with Contractor (if necessary)

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Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)
(Actual Expenditure by Construction and Equipment each)

	Domestic Procurement (Recipient Country) A	Foreign Procurement (Japan) B	Foreign Procurement (Third Countries) C	Total D
Construction Cost	(A/D%)	(B/D%)	(C/D%)	
Direct Construction Cost	(A/D%)	(B/D%)	(C/D%)	
others	(A/D%)	(B/D%)	(C/D%)	
Equipment Cost	(A/D%)	(B/D%)	(C/D%)	
Design and Supervision Cost	(A/D%)	(B/D%)	(C/D%)	
Total	(A/D%)	(B/D%)	(C/D%)	

Date:

Ref. No.:

JAPAN INTERNATIONAL COOPERATION AGENCY
JICA UGANDA OFFICE

[Address specified in the Article 5 of the Grant Agreement]

Attention: Chief Representative

Ladies and Gentlemen:

NOTICE CONCERNING PROGRESS OF PROJECT

Reference : Grant Agreement, dated (signed date of the G/A), for (name of the Project)

In accordance to the Article 6 (3) of the Grant Agreement, we would like to report on the progress of the Project up to the following stages:

[Common]

- Preparation of bidding documents - result of detailed design
- Completion of final works under construction/procurement contract

[Construction]

- Monthly progress [Month/Year]

[Procurement of Equipment]

- Shipping/delivery, hand-over (take over) of equipment
- Installation works
- Operational training

- Other _____

Please see the details as per attached Project Monitoring Report (PMR).

Very truly yours,

[Signature]

[Name of the signer]

[Title of the signer]

[Name of the executing agency]

cc:

Director General

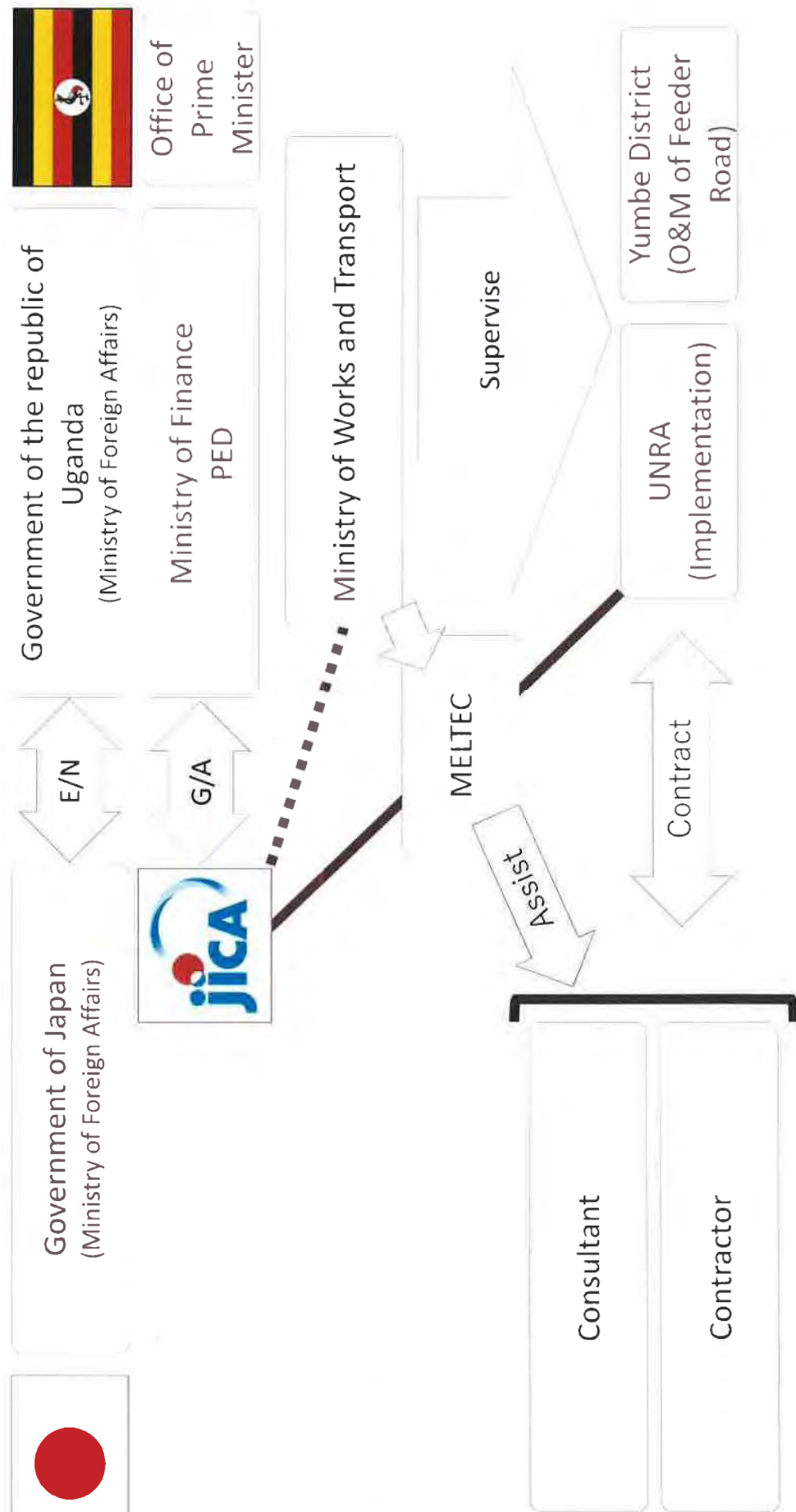
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Financial Cooperation Implementation Department
Japan International Cooperation Agency
[Address specified in the Article 5 of the Grant Agreement]

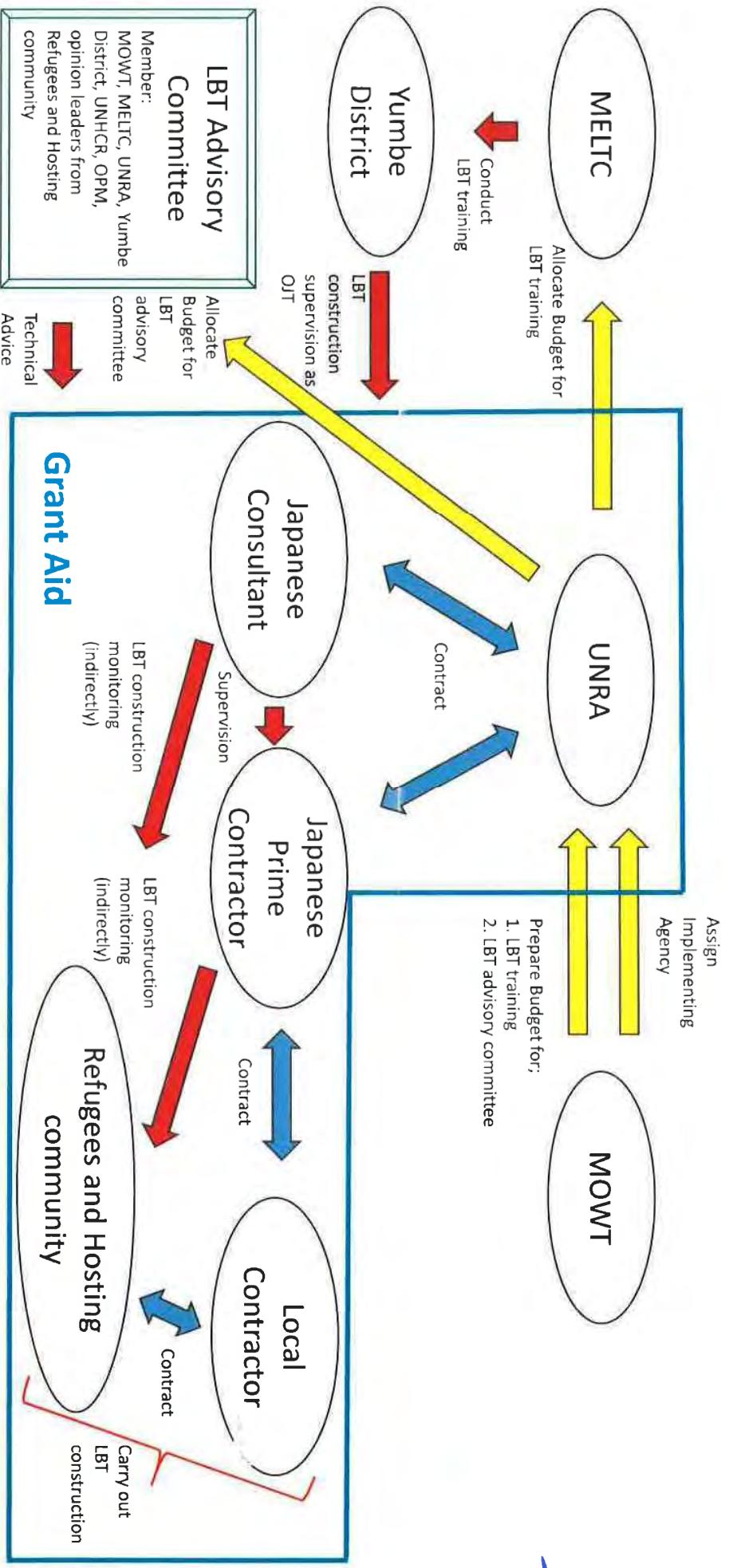


Implementation Structure of the Project

Annex 7-1



Implementation Structure of the LBT



Annex 7-2

Environmental Check List

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
1 Permits and Explanation	(1) EIA and Environmental Permits	(a) Have EIA reports been already prepared in official process? (b) Have EIA reports been approved by authorities of the host country's government? (c) Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied? (d) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government?	(a)Y (b)N (c)N (d)N	(a)EIA(ESIA) report has been prepared by conducting environmental impact assessment in accordance with Ugandan laws and JICA guideline (b)Not yet. It will be approved by December 2020 (c)EIA reports may be issued with conditions. Additional conditions will be implemented when necessary by the UNRA (d)In addition to the above EIA approval, it is necessary to obtain EIA approval for construction base camps and borrow pits
	(2) Explanation to the Local Stakeholders	(a) Have contents of the project and the potential impacts been adequately explained to the Local stakeholders based on appropriate procedures, including information disclosure? Is understanding obtained from the Local stakeholders? (b) Have the comment from the stakeholders (such as local residents) been reflected to the project design?	(a)Y (b)Y	(a)Contents of the project and the potential impacts were explained to local stakeholders at public consultation meeting, and understanding was obtained from the local stakeholders (b) Comments from the local residents were recorded in minutes of meeting and reflected to the project design
	(3) Examination of Alternatives	(a) Have alternative plans of the project been examined with social and environmental considerations?	(a)Y	(a) In the planing phase of the project, several alternatives for pavement of the target road and alternatives for the bridge structure were compared and examined from the technical and environmental and social considerations. The results of the study are described in the report
2 Pollution Control	(1) Air Quality	(a) Is there a possibility that air pollutants emitted from the project related sources, such as vehicles traffic will affect ambient air quality? Does ambient air quality comply with the country's air quality standards? Are any mitigating measures taken? (b) If air quality already exceed country's standards near the route, is there a possibility that the project will make air pollution worse?	(a)Y (b)N	(a)The traffic volume is expected to increase due to this project, but no significant increase is expected. It is assumed that the road speed will increase and the driving speed will increase and the traffic time will decrease. There is no impact on air quality by this project. (b)At the time of the survey, the air pollution along the target roads did not exceed the environmental standards.
	(2) Water Quality	(a) Is there a possibility that soil runoff from the bare lands resulting from earthmoving activities, such as cutting and filling will cause water quality degradation in downstream water areas? (b) Is there a possibility that surface runoff from roads will contaminate water sources, such as groundwater? (c) Do effluents from various facilities, such as parking areas/service areas comply with the country's effluent standards and ambient water quality standards? Is there a possibility that the effluents will cause areas not to comply with the country's ambient water quality standards?	(a)Y (b)Y (c)N	(a)There is a possibility that soil will flow from the exposed topsoil around the new Koro Bridge construction site and the downstream water area will be contaminated, but revetment work will be performed within a range of at least 30 m upstream and downstream from the bridge installation part. Therefore, the water quality of the downstream water area will not be contaminated due to soil runoff (b)Since the works and structures that affect groundwater are not assumed in this project, there is no possibility of groundwater contamination. (c)Parking / service areas are not included in the contents of this project.
	(3) Wastes	(a) Are wastes generated from the project facilities, such as parking areas/service areas, properly treated and disposed of in accordance with the country's regulations?	(a)Y	(a)Parking / service areas are not included in the contents of this project, but wastes will be generated by construction work. The wastes will be handled based on Ugandan waste management system.
	(4) Noise and Vibration	(a) Do noise and vibrations from the vehicle and train traffic comply with the country's standards?	(a)N	(a) In the baseline survey, noise exceeding Ugandan standards has already been identified, but this is due to the sounds of life and the voice of children.
3 Natural Environment	(1) Protected Areas	(a) Is the project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	(a)N	(a) The project site is not located in/around protected areas.
	(2) Ecosystem	(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)? (b) Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions? (c) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem? (d) Are adequate protection measures taken to prevent impacts, such as disruption of migration routes, habitat fragmentation, and traffic accident of wildlife and livestock? (e) Is there a possibility that installation of roads will cause impacts, such as destruction of forest, poaching, desertification, reduction in wetland areas, and disturbance of ecosystems due to introduction of exotic (non-native invasive) species and pests? Are adequate measures for preventing such impacts considered? (f) In cases the project site is located at undeveloped areas, is there a possibility that the new development will result in extensive loss of natural environments?	(a)N (b)Y (c)N (d)N (e)N (f)N	(a)The project site does not encompass primeval forests, tropical rain forests, ecologically valuable habitats. (b)In a flora and fauna survey, the survey team identified valuable species that categorixes as needed protection by ICUN. However, there are no reports of nearby nests and no nearby feeding ground, so the impact is low. (c)Valuable species were discovered, but it is evaluated that this project will not affect the ecosystem because it is the improvement of existing roads. (d)Since this project is the improvement of existing roads, it is not anticipated that traffic conditions will change significantly, so no significant impact is expected. (e)Since this project is not a new road construction, no deforestation will occur. In addition, since the materials for road improvement such as sand and gravel use local materials as much as possible, it is not expected that the ecosystem will be disrupted by the introduction of foreign species. (f)Since the project is not a road construction in an undeveloped area, the natural environment will not be significantly impaired.
	(3) Hydrology	(a) Is there a possibility that alteration of topographic features and installation of structures, such as tunnels will adversely affect surface water and groundwater flows?	(a)Y	(a) In this project, the temporary riverbank construction with sandbags will be implemented in the construction of the bridge, but since it is not a large scale, there will be no effect on the surface water flow, and there is no negative impact on groundwater.
	(4) Topography and Geology	(a) Is there any soft ground on the route that may cause slope failures or landslides? Are adequate measures considered to prevent slope failures or landslides, where needed? (b) Is there a possibility that civil works, such as cutting and filling will cause slope failures or landslides? Are adequate measures considered to prevent slope failures or landslides? (c) Is there a possibility that soil runoff will result from cut and fill areas, waste soil disposal sites, and borrow sites? Are adequate measures taken to prevent soil runoff?	(a)N (b)N (c)Y	(a) No bad geological sites on the route where landslides are likely to occur. (b) Since large-scale embankment and cut soil are not performed, no landslides occur. (c) Ensure appropriate slope of embankment and cut soil to prevent soil runoff.

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Environmental Check List (2)

Category	Environmental Item	Main Check Items	Yes Y No N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
4 Social Environment	(1) Resettlement	(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement? (b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement? (c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement? (d) Are the compensations going to be paid prior to the resettlement? (e) Are the compensation policies prepared in document? (f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, the elderly, people below the poverty line, ethnic minorities, and indigenous peoples? (g) Are agreements with the affected people obtained prior to resettlement? (h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan? (i) Are any plans developed to monitor the impacts of resettlement? (j) Is the grievance redress mechanism established?	(a)Y (b)Y (c)Y (d)Y (e)Y (f)Y (g)Y (h)Y (i)Y (j)Y	(a)With the implementation of the project, households will be relocated. Countermeasures to mitigate the impact have been considered and described in the report. However, the number of involuntary resettlement shall be minimized based on the construction area of this project. (b)At the consultation meetings, residents were explained about compensation and livelihood restoration measures before resettlement and the understandings were obtained. (c)The socio-economic survey and replacement cost survey were conducted and the survey results were analyzed, and RAP was prepared. The RAP implementation process was also considered and described in the report. (d)Compensation, land acquisition and resettlement will be completed before the construction starts. (e)Compensation policies are prepared in the report. (f)This study identified vulnerable groups in PAPs were identified, the considerations for vulnerable groups is described in report. (g)Regarding resettlement, at the consultation meetings, the residents was explained that resettlement would be completed before the start of construction, and the understandings was obtained. (h)The UNRA has a Land Acquisition Department for land acquisition and resettlement. The necessary implementation capacity and budget for RAP implementation are also confirmed. (i)Monitoring plan is described in the report. (j)Grievance redress mechanism is established and described in the report.
	(2) Living and Livelihood	(a) Where roads are newly installed, is there a possibility that the project will affect the existing means of transportation and the associated workers? Is there a possibility that the project will cause significant impacts, such as extensive alteration of existing land uses, changes in sources of livelihood, or unemployment? Are adequate measures considered for preventing these impacts? (b) Is there any possibility that the project will adversely affect the living conditions of the inhabitants other than the target population? Are adequate measures considered to reduce the impacts, if necessary? (c) Is there any possibility that diseases, including infectious diseases, such as HIV will be brought due to immigration of workers associated with the project? Are adequate considerations given to public health, if necessary? (d) Is there any possibility that the project will adversely affect road traffic in the surrounding areas (e.g., increase of traffic congestion and traffic accidents)? (e) Is there any possibility that roads will impede the movement of inhabitants? (f) Is there any possibility that structures associated with roads (such as bridges) will cause a sun shading and radio interference?	(a)N (b)N (c)Y (d)Y (e)Y (f)N	(a)This project is not a new road construction, and existing road traffic will be improved by the project. (b)There is no possibility that the project will adversely affect the inhabitants other than the target population. (c)Since there is a possibility that HIV may be introduced by workers temporarily from outside the target area of the project, mitigation measures were examined and described in the report. (d)There is a possibility that the road speed will increase due to the improvement of roads and the number of traffic accidents will increase. The design to limit the traveling speed was considered as a mitigation measure and described in the report. (e)The improvement of roads will improve the mobility of residents. (f)There is no structures causing a sun shading and radio interference.
4 Social Environment	(3) Heritage	(a) Is there a possibility that the project will damage the local archaeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?	(a)Y	(a)Religious structures are found around the project, but they will not be relocated. Potsherds of potential archeological value was also found around the target road, but the impact is low due to the improvement of the existing road without extensive excavation.
	(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	(a)N	(a)In this project, there is no area that requires special consideration for landscape, such as a landscape protected area.
4 Social Environment	(5) Ethnic Minorities and Indigenous Peoples	(a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples? (b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources to be respected?	(a)N (b)Y	(a)The impact on the culture and lifestyle of ethnic minorities and indigenous peoples in Uganda is not expected. (b)Land and resources of ethnic minorities and indigenous peoples are not in the project area.
	(6) Working Conditions	(a) Is the project proponent not violating any laws and ordinances associated with the working conditions of the country which the project proponent should observe in the project? (b) Are tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment which prevents industrial accidents, and management of hazardous materials? (c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.? (d) Are appropriate measures being taken to ensure that security guards involved in the project not to violate safety of other individuals involved, or local residents?	(a)Y (b)Y (c)Y (d)Y	(a) Comply with Uganda's laws on the working environment. (b) Implement safety measures to prevent occupational accidents. (c) Implement health and safety measures. (d) Workers such as security personnel are also managed by the contractor.
5 Others	(1) Impacts during Construction	(a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)? (b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts? (c) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts?	(a)Y (b)Y (c)Y	(a)Environmental management plan is prepared as mitigation measures for the impacts during construction. (b)The impact of the construction on the natural environment is small. In addition, mitigation measures for impacts were considered and described in the report. (c)The impact of the construction on the natural environment is small. In addition, mitigation measures for impacts were considered and described in the report.
	(2) Monitoring	(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts? (b) What are the items, methods and frequencies of the monitoring program? (c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)? (d) Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities?	(a)Y (b)Y (c)Y (d)Y	(a)Environmental monitoring plan which will be implemented by the developer was prepared in the report. (b)The monitoring plan was prepared with reference to similar cases and taking into account the characteristics of the project site and Ugandan legislation. It will be revised as necessary at the time of detailed design. (c)UNRA will implement the environmental monitoring, and personnel for environmental monitoring will be assigned. (d)Reporting on monitoring from UNRA to NEMA and frequency of reporting were described in the report.

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Environmental Check List (3)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
6 Note	Reference to Checklist of Other Sectors	(a) Where necessary, pertinent items described in the Forestry Projects checklist should also be checked (e.g., projects including large areas of deforestation) (b) Where necessary, pertinent items described in the Power Transmission and Distribution Lines checklist should also be checked (e.g., projects including installation of power transmission lines and/or electric distribution facilities)	(a)N (b)N	(a)This project does not include a large-scale logging (b)This project does not include installation of power transmission lines and/or electric distribution facilities
	Note on Using Environmental Checklist	(a) If necessary, the impacts to transboundary or global issues should be confirmed, if necessary (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming)	(a)N	(a)In this project, global warming due to greenhouse gas emissions are assumed due to operation of construction machinery during construction phase and the increase in traffic volume during operation. However, the amount of greenhouse gases emitted is not a significant effect

1) Regarding the term "Country's Standards" mentioned in the above table, in the event that environmental standards in the country where the project is located diverge significantly from international standards, appropriate environmental considerations are required to be made.
In cases where local environmental regulations are yet to be established in some areas, considerations should be made based on comparisons with appropriate standards of other countries (including Japan's experience).

2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete an item taking into account the characteristics of the project and the particular circumstances of the country and locality in which the project is located.

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Environmental Management Plan and Environmental Monitoring Plan

(1) Environmental Management Plan

As a result of the impact assessment, a significant negative impact is not expected. The expected mitigation measures necessary for the implementation of the Project are shown below.

Supervising Consultant and Contractor will control all of the activities, disclose issues and give recommendations on how to improve situation, prepare monthly, quarterly and annual environmental reports. UNRA will review the reports and instruct additional measures if necessary. These mitigation measure cost include the monitoring cost.

Table 1 Environmental Management Plan

Environmental Component	Mitigation Measure/Action	Responsible Organization	Supervision Organization
Construction Phase			
Air pollution	Periodically water down road surfaces	Contractor UNRA	UNRA
	Properly loaded haulage vehicles (avoid loading truck beds beyond capacity)		
	Locate stockpiles and materials storage areas away from populated settlements and trading centers		
	Maintain good condition of project vehicles and equipment through regular checks and servicing		
	Minimize removal of roadside vegetation especially tall leafy and dense cover that can filter airborne contaminants		
Water pollution	Collect and recycle or safely dispose of lubricants used on site	Contractor UNRA	UNRA
	Protect susceptible surfaces with mulch or fabric, and plant erodible and fresh road cuts, fills and waste dumps. surfaces as soon as possible		
	Store bitumen and fuels at designated locations adequately protected against storm water ingress, leaks and spills		
	Leave buffer zones of undisturbed vegetation between the road site and watercourse		
	Plant vegetation along roadway to minimize direct runoff into overland drainage (streams and rivers)		
Soil contamination	Collect and recycle or safely dispose of lubricants used on site	Contractor UNRA	UNRA
	Maintenance of vehicle and construction equipment so as not to leak or spill fuel, oil, or grease		
Waste	The construction waste materials, generated in this project will be reused as much as possible in this project.	Contractor	UNRA
	The waste materials and waste oil generated from construction machinery that cannot be reused will be also properly disposed at a NEMA approved disposal sites.		
Noise and Vibration	Install and maintain mufflers on equipment	Contractor Developer	UNRA
	Sensitize the local community prior to construction operations on anticipated noise nuisance		
	Leave as much vegetation along the road as possible		
Bottom Sediment	Leave buffer zones of undisturbed vegetation between the road site and watercourse	Contractor Developer	UNRA
	Plant vegetation along roadway to minimize direct runoff into overland drainage (streams and rivers)		
Ecosystem Flora	When cutting trees, minimize vegetation clearance by reconfirming whether the cutting trees are species of concern for conservation.	Contractor UNRA	UNRA
	Employ Environmental Staff on contractor team to identify species of conservation concern and ensure adherence to laws and regulations governing protection of biodiversity.		

Environmental Component	Mitigation Measure/Action	Responsible Organization	Supervision Organization
	Avoid removal of alley tree plantation or remove only one tree to avoid total loss and keep an ecosystem. If removal is unavoidable, not completely remove it, leave a portion, and implement replanting programs after construction at near schools or along roadside.		
	Fauna Replant disturbed areas along the ROW with native species to maintain ecosystem integrity. Sensitize site workers and drivers on the project's commitment to wildlife conservation through regular inductions	Contractor UNRA	UNRA
Involuntary resettlement	Ensure that all people scheduled to lose their homes or places of work to the road development are adequately compensated following the provisions of the Ugandan legal framework on land acquisition and resettlement. Ensure continuous engagement of affected people and the dissemination of information so that project activities are well understood and accepted.	UNRA	UNRA
Land Use and Utilization of Local Resources	Undertake further earthwork at the end of construction to return earthworks site as near as possible to their natural topography. Provide prompt and adequate compensation to affected people in accordance with prevailing legislation and updated compensation rates. Or alternative site to collect sand will be prepared.	Contractor UNRA	UNRA
Water Usage or water rights and rights of common	Same with the water pollution Avoid to cut the water pipe.	Contractor UNRA	UNRA
Existing Social Infrastructures and Services	Road signs and information boards is installed properly.	Contractor	UNRA
Social institutions such as social capital and local decision-making institutions	Grievance committee will solve the issues.	Grievance committee	UNRA
Local Conflict of Interests	The grievance committee handles refugee complaints too. The LBT advisory committee, which is composed of the Yumbe District Government, OPM, UNHCR, host community and refugee leaders, has gathered opinions from both the host community and refugees and consider on employment methods for LBT. The appropriate arrangement to both of them is prepared so as not to create causes of conflict.	Contractor UNRA OPM Local Government	UNRA
Cultural Heritage	Consult local community on a regular basis to determine the traditional code of conduct to be followed during project activities	Developer	UNRA
Gender	The contract with the contractor prohibits the wage difference by gender Contractors provide equal opportunity for employing women and men, and employ a certain percentage of women.	Contractor Contractor	UNRA
Infectious Diseases such as HIV/AIDS	Stringent prohibition of drug consumption Advocacy work implementation Establish communication with medical personnel of local hospital to implement measures for HIV/AIDS prevention and control	Contractor UNRA	UNRA
Working Condition	Provision of Construction safety regulations and traffic management rules	Contractor UNRA	UNRA

Environmental Component	Mitigation Measure/Action	Responsible Organization	Supervision Organization
including Occupational Safety	Safety educations are provided to construction workers. The contract with the contractor stipulates the implementation of the safety educations.		
	Construction workers put on safety equipment such as helmet and safety shoes.		
	Sign boards and road markings with a high regard for safety are placed.		
	Information such as construction plans are disclosed to the public.		
Accidents	Design pedestrian crossings, side work, and speed restriction sections	Consultant UNRA	UNRA
Global warming	Properly loaded haulage vehicles (avoid loading truck beds beyond capacity)	Consultant UNRA	UNRA
	Maintain good condition of project vehicles and equipment through regular checks and servicing		
	Minimize removal of roadside vegetation especially tall leafy and dense cover that can filter airborne contaminants		
Operation Phase			
Air pollution	Regular monitoring is carried out. In case the values get worse extremely compared to baseline survey's values and environmental standard, the reason shall be found out and necessary measures shall be taken.	UNRA	UNRA
	Line ministries and organizations are recommended to strengthen restrictions on ill-serviced vehicles.		
Accidents	Sensitization of traffic safety for residents and drivers at stakeholder consultation meetings and schools	UNRA	UNRA
Global Warming	Sensitization on maintenance of vehicle and unnecessary idling.	UNRA	UNRA
Transboundary problems	Check the status of neighboring countries, and manage refugee settlements when the inflow population increases.	OPM Local government	UNRA

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(2) Monitoring Plan

The following two years of the monitoring plan at the time of construction and operation are as follows. Details will be reviewed during detailed design. UNRA will compile the monitoring results and report to JICA quarterly during construction and semi-annually during operation.

Table 2 Monitoring Plan

Environmental Component	Monitoring Indicator	Location (same as each baseline survey)	Timeframe for Monitoring Action (Upper: Construction Phase/ 2.5 years) (Lower: Operation Phase/ 2 years)	Implementation /Responsible agency	Cost
Air quality	O3, NO2, CO, SO2, PM10, and PM2.5	The nation road 23.6km	Construction phase: Quarterly	UNRA	5,000
		The district road of feeder road 4km	Operation stage: Biannually		
		Site of new Koro Bridge			
Water Quality	DO, EC, Turbidity, TDS	Site of new Koro Bridge	Construction phase: Quarterly	UNRA	3,000
	Discharge control	In and around construction site	Construction phase: Daily (Visual observation)	Consultant/ UNRA	Included in construction cost
Soil Contamination	Oil and concrete mortar leakage	In and around construction site	Construction phase: Daily (Visual observation and review of inspection record)	Consultant/ UNRA	Included in construction cost
Wastes	Construction waste	In and around construction site	Construction phase: Daily (Visual observation and meeting with contractor)	Consultant/ UNRA	Included in construction cost
Noise & Vibration	Noise and vibration levels	The nation road 23.6km	Construction phase: Quarterly	UNRA	Included in construction cost
		The district road 4km of feeder road			
	Working hour	In and around construction site	Construction phase: Daily (Review of working record)	Consultant/ UNRA	2,000
Bottom Sediment	Same with Water quality				
Ecosystem	Tree cutting plan	-	Before construction: Once or as needed	UNRA	Included in construction cost
	Tree condition	In and around construction site	Construction phase: Monthly (Visual observation and meeting with local administration) Operation phase: Biannually (3 years)	Consultant/ UNRA	
	Briefing (endangered species) implementation	-	Construction phase: Monthly (Review of implementation record)		
Involuntary resettlement	See the section 1-3-2.				

Environmental Component	Monitoring Indicator	Location (same as each baseline survey)	Timeframe for Monitoring Action (Upper: Construction Phase/ 2.5 years) (Lower: Operation Phase/ 2 years)	Implementation /Responsible agency	Cost
Water Usage or Water Rights and Rights of Common	Handling complaints on utilization of water pipe	In and around construction site	Construction phase: For each grievance phase	Consultant/ UNRA	Included in construction cost
Existing Social Infrastructures and Services	Impact to existing road by temporary detour (Complaints handling)	In and around construction site	Construction phase: For each grievance	Consultant/ UNRA	Included in construction cost
Social institutions such as social capital and local decision-making institutions	Handling complaints on construction and workers	In and around construction site	Construction phase: For each grievance	Consultant/ UNRA	Included in construction cost
	See the section 1-3-2.				
Local Conflict of Interest	Handling complaints on the host communities and refugees	In and around construction site	Construction phase: For each grievance	Consultant/ UNRA	Included in construction cost
Cultural Heritage	Consult with local community	-	Construction phase: As needed	Consultant/ UNRA	
Gender issues	Monitoring of employee's payment record	-	Construction phase: According to the payment (1 or 2 times a month)	Consultant/ UNRA	Included in construction cost
	Monitoring employment record	-			
Infectious Diseases such as HIV/AIDS	Advocacy work implementation	-	Construction phase: Monthly (Review of schedule and implementation record)	Consultant/ UNRA	Included in construction cost
Working Condition including Occupational Safety	Briefing (safety education) implementation	-	Construction phase: Weekly (Review of implementation record)	Consultant/ UNRA	Included in construction cost
	Accident report construction cost (industrial accident)	In and around construction site	Construction phase: As needed		
Accidents	Accident report (traffic and third-party accident)	In and around construction site	Construction phase: For each accident Operation phase: For each accident	Consultant/ UNRA	Included in construction cost
Global warming	Maintenance of equipment	In and around construction site	Construction phase: Daily (Visual observation and review of inspection record)	Consultant/ UNRA	
	Sensitization on emission of greenhouse gas	In Yumbe District	Operation phase: As needed	UNRA	
Transboundary problems	Monitoring of OPM's record on Influx of refugees	-	Operation phase: Monthly	UNRA	

Source: Prepared by Survey Team

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Environmental and Social Monitoring Form

1. Environmental Monitoring Form

Monitoring Form (For UNRA, Construction stage)

1) Mitigation Measures

- Air Quality

Item (mg/m3)	Survey Point	Measured Value (Mean)	Measured Value (Max)	Baseline Value	Country's Standards	Referred International Guide lines (Japan)	Remarks (Measurement Point, Frequency, Method, etc.)
O ₃	N0305655 E0381729			0.2			-Measurement Point: Same with baseline survey -Frequency: Quarterly -Method: Same with baseline survey
	N0308448 E0378113			0.1			
	N0309148 E0377195			0.2			
	N0307013 E0373222			0.3			
	N0305364 E0369864			0.1			
	N0301349 E0369567			0.3			
	N0320827 E0377905			0.2			
	N0320863 E0377941			0.3			
NO ₂	N0305655 E0381729			0.0	0.5	0.04-0.06 ppm	
	N0308448 E0378113			0.0			
	N0309148 E0377195			0.0			
	N0307013 E0373222			0.0			
	N0305364 E0369864			0.0			
	N0301349 E0369567			0.0			
	N0320827 E0377905			0.0			
	N0320863 E0377941			0.0			
CO	N0305655 E0381729			0.0	9.0	10 ppm	
	N0308448 E0378113			0.0			
	N0309148 E0377195			0.0			
	N0307013 E0373222			0.0			

	N0305364 E0369864			0.0			
	N0301349 E0369567			0.0			
	N0320827 E0377905			0.0			
	N0320863 E0377941			0.0			
SO ₂	N0305655 E0381729			0.0	0.15	0.04 ppm	
	N0308448 E0378113			0.0			
	N0309148 E0377195			0.0			
	N0307013 E0373222			0.0			
	N0305364 E0369864			0.0			
	N0301349 E0369567			0.0			
	N0320827 E0377905			0.0			
	N0320863 E0377941			0.0			
PM _{2.5}	N0305655 E0381729			0.021	-	35µg/m ³	
	N0308448 E0378113			0.014			
	N0309148 E0377195			0.006			
	N0307013 E0373222			0.006			
	N0305364 E0369864			0.008			
	N0301349 E0369567			0.014			
	N0320827 E0377905			0.004			
	N0320863 E0377941			0.008			
PM ₁₀	N0305655 E0381729			0.125	-	0.10mg/m ³	
	N0308448 E0378113			0.012			
	N0309148 E0377195			0.017			
	N0307013 E0373222			0.012			
	N0305364 E0369864			0.013			
	N0301349 E0369567			0.02			
	N0320827 E0377905			0.010			
	N0320863 E0377941			0.015			

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- Water Quality

Item (Unit)	Measured Value (Mean)	Measured Value (Max)	Baseline Value	Country's Standards	Referred International Guide lines (Japan)	Remarks (Measurement Point, Frequency, Method, etc.)
DO (mg/l) (upstream)			8.18	-	>5	-Measurement Point: upstream and downstream from existing river bridge -Frequency: Quarterly -Method: Same with baseline survey
DO (mg/l) (downstream)			8.24			
pH (upstream)			5.52	5.5-9.5	6.5-8.5	
pH (downstream)			6.03			
EC (μS/cm) (upstream)			0.248	2500	<25	
EC (μS/cm) (downstream)			0.249			
Turbidity (NTU) (upstream)			200	25		
Turbidity (NTU) (downstream)			192			
TDS (mg/l) (upstream)			0.161	1500		
TDS (mg/l) (downstream)			0.162			

- Noise / Vibration

Item (Unit)	Survey Point	Measured Value (Mean)	Measured Value (Max)	Baseline Value	Country's Standards	Referred International Standards (Japan)	Remarks (Measurement Point, Frequency, Method, etc.)
Noise level (dB)	N0305655 E0381729			57.5	60	45-55	-Measurement Point: Same with baseline survey -Frequency: Quarterly - Method: Same with baseline survey
	N0308448 E0378113			59.6			
	N0309148 E0377195			58.5			
	N0307013 E0373222			56.2			
	N0305364 E0369864			65.1			
	N0301349 E0369567			51.2			
	N0320827 E0377905			52.2			
	N0320863 E0377941			58.1			
Vibration level (dB)	N0305655 E0381729			0.4 mm/s ²	20 mm/s ²	60 - 65	
	N0308448 E0378113			0.3 mm/s ²			
	N0309148 E0377195			1.1 mm/s ²			
	N0307013 E0373222			0.5 mm/s ²			

	N0305364 E0369864			0.4 mm/s ²			
	N0301349 E0369567			0.3 mm/s ²			
	N0320827 E0377905			0.5 mm/s ²			
	N0320863 E0377941			0.2 mm/s ²			

-Monitoring Form (For UNRA, Operation stage)

1) Mitigation Measures

- Air Quality

Item (mg/m ³)	Survey Point	Measured Value (Mean)	Measured Value (Max)	Baseline Value	Country's Standards	Referred International Guide lines (Japan)	Remarks (Measurement Point, Frequency, Method, etc.)
O ₃	N0305655 E0381729			0.2	-		-Measurement Point: Same with baseline survey -Frequency: Quarterly -Method: Same with baseline survey
	N0308448 E0378113			0.1			
	N0309148 E0377195			0.2			
	N0307013 E0373222			0.3			
	N0305364 E0369864			0.1			
	N0301349 E0369567			0.3			
	N0320827 E0377905			0.2			
	N0320863 E0377941			0.3			
NO ₂	N0305655 E0381729			0.0	0.5	0.04-0.06 ppm	
	N0308448 E0378113			0.0			
	N0309148 E0377195			0.0			
	N0307013 E0373222			0.0			
	N0305364 E0369864			0.0			
	N0301349 E0369567			0.0			
	N0320827 E0377905			0.0			
	N0320863 E0377941			0.0			
CO	N0305655 E0381729			0.0	9.0	10 ppm	
	N0308448			0.0			

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	E0378113					
	N0309148 E0377195			0.01		
	N0307013 E0373222			0.0		
	N0305364 E0369864			0.0		
	N0301349 E0369567			0.0		
	N0320827 E0377905			0.0		
	N0320863 E0377941			0.0		
SO ₂	N0305655 E0381729			0.0	0.15	0.04 ppm
	N0308448 E0378113			0.0		
	N0309148 E0377195			0.0		
	N0307013 E0373222			0.0		
	N0305364 E0369864			0.0		
	N0301349 E0369567			0.0		
	N0320827 E0377905			0.0		
	N0320863 E0377941			0.0		
PM _{2.5}	N0305655 E0381729			0.021	-	35µg/m ³
	N0308448 E0378113			0.014		
	N0309148 E0377195			0.006		
	N0307013 E0373222			0.006		
	N0305364 E0369864			0.008		
	N0301349 E0369567			0.014		
	N0320827 E0377905			0.004		
	N0320863 E0377941			0.008		
PM ₁₀	N0305655 E0381729			0.125	-	0.10mg/m ³
	N0308448 E0378113			0.012		
	N0309148 E0377195			0.017		
	N0307013 E0373222			0.012		
	N0305364 E0369864			0.013		
	N0301349			0.02		

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	E0369567						
	N0320827 E0377905			0.010			
	N0320863 E0377941			0.015			

1) Social Environment

Accidents

Monitoring Item	Monitoring Results during Report Period	Necessity of Countermeasures and Measures Taken
Accident report (traffic and third-party accident)		

Global Warming

Monitoring Item	Monitoring Results during Report Period	Necessity of Countermeasures and Measures Taken
Sensitization on emission of greenhouse gas		

Transboundary Problems

Monitoring Item	Monitoring Results during Report Period	Necessity of Countermeasures and Measures Taken
Monitoring of OPM's record on Influx of refugees		

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Monitoring Form (For Consultant, Construction Stage)

2) Mitigation Measures

- Water quality

Monitoring Item	Monitoring Results during Report Period	Necessity of Countermeasures and Measures Taken
Situation of waste water discharge		

- Waste

Monitoring Item	Monitoring Results during Report Period	Necessity of Countermeasures and Measures Taken
Construction waste disposal situation		

- Soil Contamination

Monitoring Item	Monitoring Results during Report Period	Necessity of Countermeasures and Measures Taken
Leakage status		

- Noise & Vibration

Monitoring Item	Monitoring Results during Report Period	Necessity of Countermeasures and Measures Taken
Working hours		

- Bottom Sediment

Monitoring Item	Monitoring Results during Report Period	Necessity of Countermeasures and Measures Taken
Situation of waste water discharge		

3) Natural Environment

- Ecosystem

Monitoring Item	Monitoring Results during Report Period	Necessity of Countermeasures and Measures Taken
Condition of trees		
Briefing (endangered species) implementation		

4) Social Environment

- Land Use and Utilization of Local Resources

Monitoring Item	Monitoring Results during Report Period	Necessity of Countermeasures and Measures Taken
Land utilization		
Handling complaints on utilization of land		

- Water Usage or water rights and rights of common

Monitoring Item	Monitoring Results during Report Period	Necessity of Countermeasures and Measures Taken
Water Usage		
Handling complaints on utilization of water pipe		

- Existing Social Infrastructures and Services

Monitoring Item	Monitoring Results during Report Period	Necessity of Countermeasures and Measures Taken
Impact to existing road (response to claims and		

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complains)		
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- Social Institutions Such as Social Capital and Local Decision-Making Institutions

Monitoring Item	Monitoring Results during Report Period	Necessity of Countermeasures and Measures Taken
Handling complaints on construction and workers		

- Local Conflict of Interest

Monitoring Item	Monitoring Results during Report Period	Necessity of Countermeasures and Measures Taken
Relationship with the host communities and refugees		

- Cultural Heritage

Monitoring Item	Monitoring Results during Report Period	Necessity of Countermeasures and Measures Taken
Consult with local community		

- Gender

Monitoring Item	Monitoring Results during Report Period	Necessity of Countermeasures and Measures Taken
Monitoring of employees account book		
Monitoring Employment record		

- Infectious Diseases such as HIV/AIDS

Monitoring Item	Monitoring Results during Report Period	Necessity of Countermeasures and Measures Taken
Implementation status of advocacy work		

- Working Condition

Monitoring Item	Monitoring Results during Report Period	Necessity of Countermeasures and Measures Taken
Implementation status of briefing (Safety education)		
Accident report (Occupational accident)		

- Accidents

Monitoring Item	Monitoring Results during Report Period	Necessity of Countermeasures and Measures Taken
Accident report (Traffic accident, third party)		

- Global Warming

Number of claims and complains	Content	Correspondence and result
Maintenance of equipment		

- Claims and complains regarding environmental impact

Number of claims and complains	Content	Correspondence and result

- Other issues (Free description in the following columns)

--	--	--

9  

2. Land acquisition and resettlement Monitoring Form

Preparation of resettlement sites where necessary				
No	Explanation of the site (e.g Area, no of resettlement HH)	Status Completed (Date) / Not completed	Details (e.g Site Selection, identification of candidate's sites, discussion with PAPs, Development of the site etc.)	Expected Date of Completion
1				
2				

Public consultations

No	Date	Place	Contents of the consultations / main comments and awareness
1			
2			

Resettlement Activities	Planned Total	Unit	Progress in quantity			Progress in %		Expected Date of Completion	Responsible Organization
			During the Quarter	Till the last Quarter	Up to the Quarter	Till the last Quarter	Up to the Quarter		
Preparation of the RAP									UNRA
Employment of Consultants		Man- month							
Implementatio n of the census survey (including socio- economic survey)									
Approval of RAP	Date of Approval								
Finalization of PAPs List		No. of PAPs							
Progress of compensation payment		No. of HHs							
Lot 1		No. of HHs							
Lot 2		No. of HHs							
Lot 3		No. of HHs							

Lot 4		No. of HHs							
Progress of Land acquisition		ha							
Lot 1		ha							
Lot 2		Ha							
Lot 3		Ha							
Lot 4		Ha							
Progress of Asset of replacement		No. of HHs							
Lot 1		No. of HHs							
Lot 2		No of HHs No of HHs							
Lot 3		No. of HHs							
Lot 4		No. of HHs							
Progress of Relocation of People (All lots)		No. of HHs							
Lot 1		No. of HHs							
Lot 2		No. of HHs							
Lot 3		No. of HHs							
Lot 4		ha							

End

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Utilization of LBT

1. Outline

The project will cover two LBT-related contents, which are the LBT construction and the LBT training. As for the LBT construction, LBT will be applied to a part of the construction in the Project, and refugees and residents from host community will be hired. Regarding the LBT training, it will be provided to engineers and social workers in Yumbe District Local Government.

2. Purpose

The purpose of applying LBT to the Project is summarized as below;

2-1. LBT construction

Refugees and the host community will acquire practical construction skills through LBT construction, which may lead to their future employment and community development.

2-2. LBT training

Engineers and social workers in Yumbe District Local Government will acquire comprehensive LBT skills from the planning to maintenance, which will ultimately contribute to their capacity building, and the maintenance of the feeder road after the Project.

3. Methodology

3-1. LBT construction

Utilization of LBT will be clearly stipulated as the obligation of the Japanese prime contractor in the bidding document(s). With that, the Japanese prime contractor will procure a local contractor which has official approval in LBT construction from MELTC, and that local contractor will execute the LBT construction.

3-2. LBT training

Training conducted by MELTC will be offered for engineers and social workers in Yumbe District Local Government. The cost will be borne by the Government of the Republic of Uganda through UNRA.

4. Contents

4-1. Assumed contents for the LBT construction is as follows;

- (a) Scope of work: Road improvement in a part of feeder road No. 1. Refugees and residents from host community will be engaged in 2 km by each.
- (b) Specification: To be determined by the design, but expected to be low-cost sealing
- (c) Timing: Start from January to April, 2022 (tentative)
- (d) Duration: 4 – 8 months (tentative)
- (e) Target workers: Equal number of workers between refugees and host community including youth, women, and disabled persons

1 / 3

Note: Contents stated above are subject to change.

- 4-2. Assumed contents for the LBT training is to be determined by MELTC, upon conduction of training needs assessment, and is expected to be comprised of;
- (a) Field: Road improvement, road maintenance, and social consideration
 - (b) Number of trainees: To be determined by MELTC
 - (c) Timing: When the Japanese prime contractor is doing preparation work
 - (d) Duration: To be determined by MELTC
 - (e) Location: To be determined by MELTC

Note: Monitoring and assessment will be conducted by MELTC when the actual LBT construction is ongoing under the Project, which also contributes to the quality control of LBT construction. The result of the monitoring and assessment will be reported to MOWT by MELTC.

5. Undertakings

5-1. LBT construction

Engineers and social workers in refugee-hosting districts of the West Nile sub-region especially from Yumbe District Local Government, undergoing the LBT training, will be deployed to the site as a part of LBT training to join the Japanese supervision consultant conducting supervision of construction. During that period, MELTC will monitor and assess their performance, and report the result to MOWT.

In addition, the Ugandan side, namely MOWT, will organize and chair the LBT advisory committee consisting of personnel from relevant organizations such as MELTC, UNRA, Yumbe District Local Government, The Office of the United Nations High Commissioner for Refugees (UNHCR), Office of the Prime Minister and the leader of refugee and host community. The LBT advisory committee is expected to provide technical advice on an ad-hoc basis regarding LBT especially when selecting LBT workers and determining wage rate for the LBT work. The cost will be borne by the Ugandan side through UNRA.

5-2. LBT training

The Ugandan side, namely UNRA, will bear the cost for the LBT training to engineers and social workers in refugee-hosting districts of the West Nile sub-region especially from Yumbe District Local Government.

6. LBT application to the Project

Both sides confirmed that utilization of LBT through the Project is to be implemented in accordance with the framework and methodology confirmed in the Minutes of Discussions for the Second Outline Design signed on July 24, 2019.

6-1. Further utilization of LBT

Both sides confirmed that UNRA and Yumbe District Local Government will make possible effort to improve the rest of the Feeder Road No.1 (approximately 13 km out of 17 km) by

LBT to reach Bidi Bidi Refugee Settlement Zone 1 Base Camp at its own expense. The Ugandan side confirmed that the budget for construction of the 13 km section shall be secured by UNRA (8 km) and Uganda Road Fund (5 km). In addition to this, it will be further considered to collaborate with UNHCR which has been conducting the maintenance of the Feeder Road No.1 irregularly so far.

6-2. Conditions of employment of LBT workers

Both sides confirmed that conditions of employment of LBT will be determined in bidding document(s).

6-3. Partial handover for the LBT scope and its warranty period

Both sides confirmed that the scope constructed by LBT, namely approximately 4 km out of District Road from Yumbe to Barakala (approximately 9 km), will be handed over to the Ugandan side right after construction is completed without waiting for the completion of construction of other scopes.

At the same time, for the LBT scope, warranty period is set as six (6) months after the completion of construction based on the local custom and precedents. In case defects are found, backup with resources from the other scope will be considered.

Those principles will be reflected on the bidding document(s).

6-4. Deadline for formulation of LBT Advisory Committee

Both sides confirmed that MOWT will formulate LBT Advisory Committee before notice of the bidding document(s) as stipulated in Annex 5.

6-5. Issuance of LBT certificate

Both sides confirmed that LBT Advisory Committee, led by MOWT, will issue certificate to LBT workers with favorable performance who contributed to the Project notably. The list of LBT workers with certificate will be shared with local LBT construction companies, thus those LBT workers will be prioritized when hiring as LBT workers. This is to provide refugees and persons from host community with opportunity for employment. The criteria for issuing the certificate will be advised by LBT Advisory Committee.

End

3 / 3

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THE REPUBLIC OF UGANDA

Ministry of Finance, Planning &
Economic Development
Plot 2-12, Apollo Kaggwa Road
P.O. Box 8147
Kampala
Uganda

In any correspondence on
this subject please quote No. TPD130/167/01

6th April 2018

Hon. Kazuaki Kameda,
Ambassador of Japan to the Republic of Uganda,
Embassy of Japan,
KAMPALA.

RECEIVED
12 APR 2018
JICA - UGANDA

Your Excellency,

INCOME TAX TREATMENT OF JAPANESE GRANT AID PROJECT

Reference is made to the above captioned matter and to your letter dated 11th October, 2017.

This is to reiterate Government's position on income tax treatment of Japanese grant aid projects as provided for in the Note Verbale dated 13th January 2017 and 3rd July 2017. This is therefore to affirm that PAYE, Corporate Tax and Withholding Tax will be borne by the designated project executing agency without using Japanese grants. The benefits of the above treatment shall only apply to (i) main contractors and sub-contractors that are Japanese physical persons or Japanese juridical persons controlled by Japanese physical persons and to (ii) their employees who are not citizens of Uganda.

Please accept, Your Excellency, the assurances of my highest consideration.

Matia Kasaija (MP)
MINISTER OF FINANCE, PLANNING AND ECONOMIC DEVELOPMENT

C.c: The Chief Representative,
Japan International Cooperation Agency,
Uganda Office,
KAMPALA

C.c: The Commissioner General,
Uganda Revenue Authority,
KAMPALA

Mission

"To formulate sound economic policies, maximize revenue mobilization, ensure efficient allocation and accountability for public resources so as to

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Uganda

In any correspondence on this
subject please quote No. TPD 130/167/01

THE REPUBLIC OF UGANDA

July 19, 2017

The Chief Representative,
Japan International Cooperation Agency
Uganda Office
KAMPALA

RE: TAX TREATMENT OF JAPANESE GRANT AID PROJECTS

I refer to your letter dated 22nd June, 2017 seeking to confirm the tax treatment of Japanese grant aid projects. This is a follow up on the outcome of the meetings with officials of the Tax Policy Department held at the Ministry on 4th April, 2017 and 16th May, 2017 respectively.

This is therefore to reiterate Governments commitment to the implementation of the framework agreed to between the Government of Japan and the Government of the Republic of Uganda by means of Note Verbales NV/JE/009 dated 13th January 2017, NV/JE/031/17 dated 20th February, 2017 and ASI 179/326/01 dated 23rd March, 2017.

We accordingly wish to reaffirm that the Japanese grant shall not be used to pay taxes. Taxes arising from the execution of the project shall be borne by Government of Uganda. It is also understood that the intervention on income tax (PAYE, Corporate Tax and Withholding Tax) shall only apply to Japanese main contractors and Japanese sub-contractors. The Details of the implementation arrangements are as follows:

1. Taxes on import and re-export of necessary materials and equipment
 - 1.1. Taxes on import and re-export of necessary materials and equipment for exclusive use on the Japanese Grant Aid project are exempted from import duty under the East African Community Customs Management Act 2004.
2. Taxes on purchase of any products and/or any service in the Republic of Uganda which are necessary for the Project
 - 2.1. Value Added Tax (VAT)
 - 2.11. The VAT Act deems the payment of VAT on supplies to projects financed by a foreign government through a grant, donation or loan.

Mission

"To formulate sound economic policies, maximize revenue mobilization, ensure efficient allocation and accountability for public resources so as to achieve the most rapid and sustainable economic growth and development"

- 2.12. Based on the VAT Act, VAT shall be deemed to have been paid if the supply is for use solely and exclusively for the Japanese Grant Aid Project.
 - 2.13. In case a supplier charges VAT to any products and/or any services which are for use solely and exclusively for the Japanese Grant Aid Project, URA shall refund the VAT to the contractors and sub-contractors assigned under the Japanese Grant Aid Project.
3. All taxes imposed on total income or on elements of income
 - 3.1. Pay as You Earn (PAYE)
 - 3.1.1. Based on Exchange Notes, PAYE for Japanese employees of Japanese main contractors and Japanese sub-contractors for Japanese Grant Aid Project shall be paid by the Government of Uganda executing agency.
 - 3.1.2. The procedure for payment of PAYE of eligible resident office shall be as follows: Japanese main contractors and Japanese sub-contractors shall file PAYE returns with URA and submit a copy of the returns to the executing agency notifying them to pay the taxes.
 - 3.2. Corporate Tax/ Withholding Tax
 - 3.2.1. Based on Exchange Notes, Corporate Tax of Japanese main contractors and Japanese sub-contractors for Japanese Grant Aid Project shall be paid by the executing agency.
 - 3.2.2. The procedure and tax treatment of Japanese main contractors and Japanese sub-contractors for Japanese Grant Aid project who are tax resident in Uganda shall be as follows:
 - 3.2.2.1. Japanese main contractors and Japanese sub-contractors shall file returns with URA and submit a copy of the returns to the Executing Agency notifying them to pay the taxes.
 - 3.2.3. The procedure and tax treatment of Japanese main contractors and Japanese sub-contractors for Japanese Grant Aid Project who are not tax resident of Uganda shall be as follows:
 - 3.2.3.1. Where withholding tax is due, the Executing Agency shall pay tax due to URA.
4. To ensure smooth implementation of above mentioned items, JICA and MoFPED take measures as follows:
 - 4.1 JICA and Executing Agency shall write to MoFPED informing

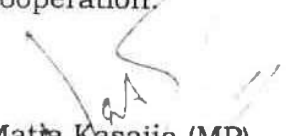
Mission

To formulate sound economic policies, maximize revenue mobilization, ensure efficient allocation and accountability for public

them of the Japanese main contractors and Japanese sub-contractors contracted to implement the Japanese Grant Aid Project.

- 4.2. The Ministry shall accordingly write to URA with a copy to JICA to confirm the Grant Aid project under implementation and Japanese main contractor and Japanese sub-contractor executing the project.
- 4.3. URA shall facilitate Japanese main contractors and Japanese sub-contractors in line with provisions 1, 2 and 3 above.
5. Any challenges that may be encountered in implementing the tax arrangements provided above shall be settled amicably between the JICA and the Ministry through mutual consultations.
6. In case of changes in relevant tax laws and regulations, the Ministry and JICA shall discuss necessary measures to take.

I hope this will facilitate the smooth implementation of the agreed programs. I also wish to ~~take~~ take this opportunity to commend you for your continued cooperation.


Matia Kasaija (MP)

MINISTER OF FINANCE, PLANNING AND ECONOMIC DEVELOPMENT

C.C. Embassy of Japan in the Republic of Uganda
KAMPALA

C.C. The Commissioner General
Uganda Revenue Authority
KAMPALA

Mission

To formulate sound economic policies, maximize revenue mobilization, ensure efficient allocation and accountability for public

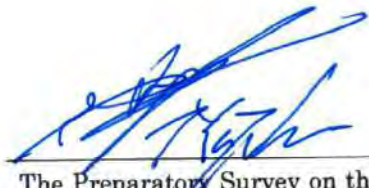
A-7 テクニカルノート1 (TN1)

Technical Note

On the Project for Improvement of National Road in Refugee-Hosting Areas of West Nile Sub Region in Republic of Uganda

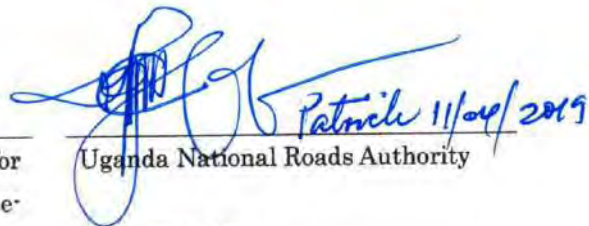
Uganda National Roads Authority (UNRA) under Ministry of Works and Transport (MOWT) of Uganda and the joint venture between Katahira & Engineers International, Eight-Japan Engineering Consultants and Ingerosec (the Consultant) for the above-mentioned survey by the Japan International Cooperation Agency (JICA), have agreed on the points listed in the annex hereto regarding the design. However, the contents of the design will be finalized after the survey team has returned to Japan through discussions with those concerned on the Japanese side, such the Head Office of JICA.

April 11, 2019
Kampala, Uganda



The Preparatory Survey on the Project for Improvement of National Road in Refugee-Hosting Areas of West Nile Sub Region in Republic of Uganda

Chief Consultant
Tsuyoshi YAMAJUKU



Uganda National Roads Authority
Head of Design
Network Planning and Engineering
Patrick Muleme

ANNEX

This survey aims to gather the information required for deciding the scope of the project and the design of the National Road and the feeder roads in refugee-hosting areas of West Nile sub region at the moment. However, the following key points related to the planning and design have been confirmed.

1. Scope of Project

- Class B National Road : L=23.6km (excluded Jure bridge, Dacha bridge and Ure bridge which UNRA has constructed and are going to construct)
- New Koro Bridge
- A feeder road (after selection)

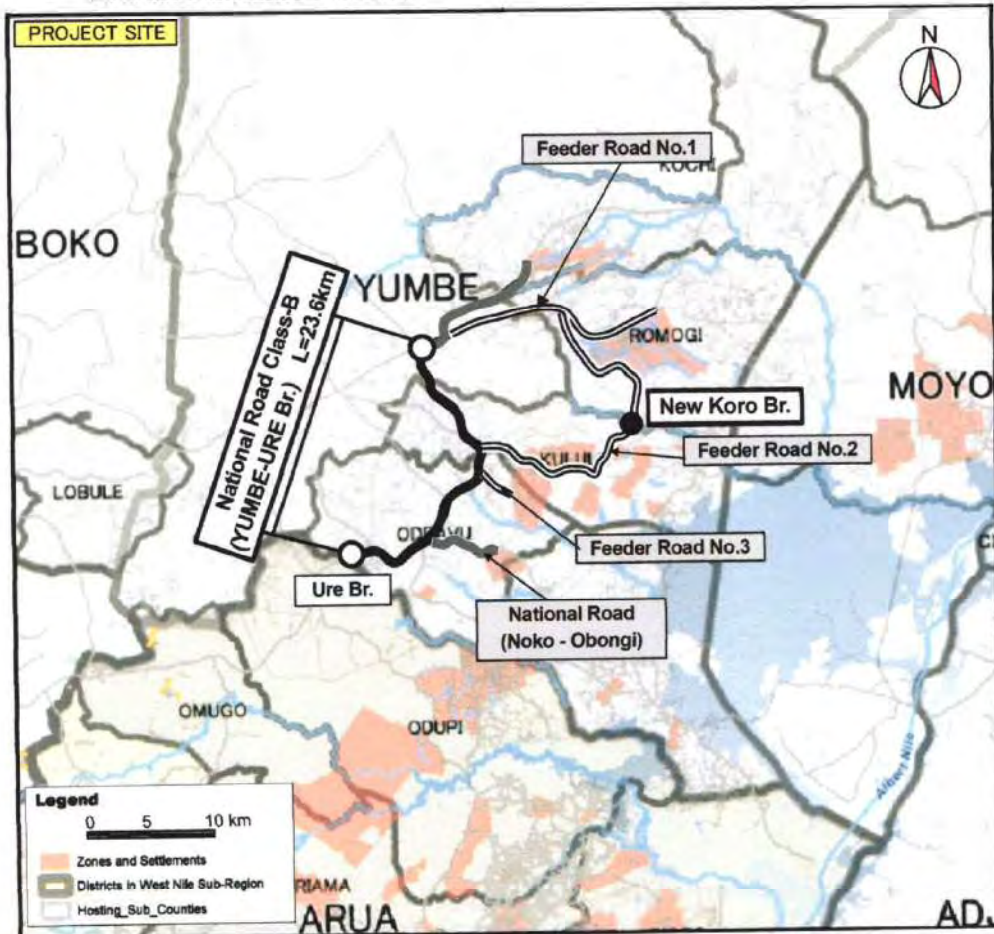


Figure1-1 Location Map

2. Road Design Standard

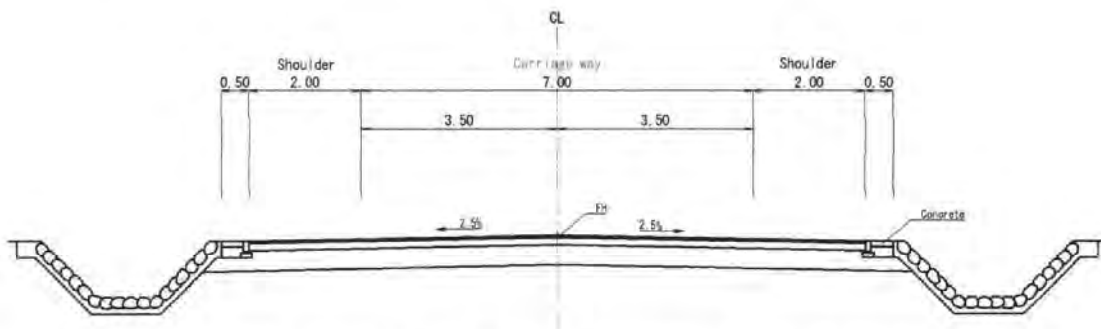
As a standard, Road Design Manual Volume I: Geometric Design (MOWT, 2010) shall be basically adopted, AASHTO and Road Ordinance in Japan shall be referred as necessary.

(1) Design Speed of Class B National Road

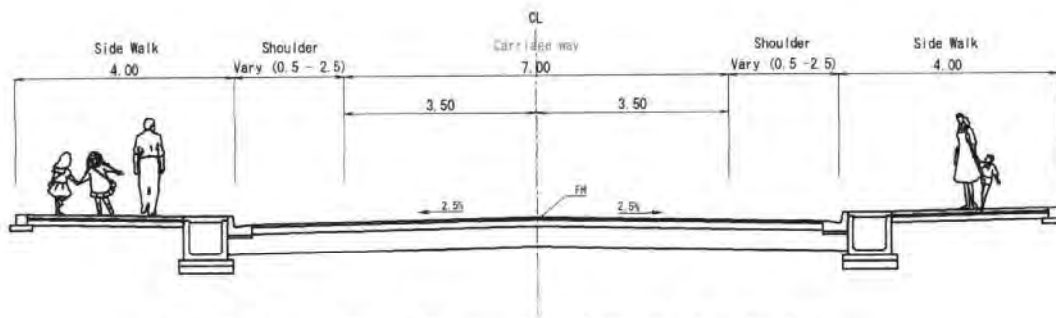
The design classification of Class B National Road shall be basically adopted with class II Paved from the Design Standard. This road passes through town, villages and rolling area, and there are some intersections of this national road and feeder roads. Therefore, design speed of 90km/h shall be basically adopted. However, the alignment of this road shall be tried to be adopted as smooth as possible.

(2) Cross Section

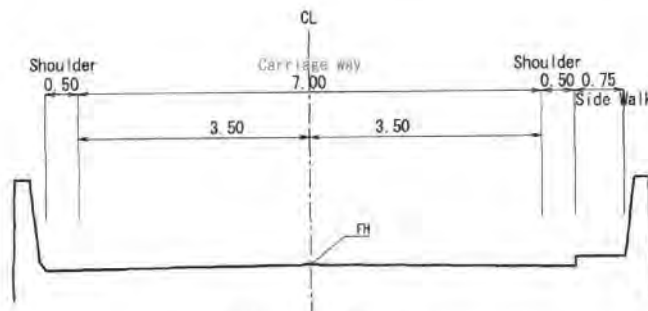
The following cross sections shall be adopted with the national road and New Koro Bridge.



General Section of Class B National Road (Yumbe-Ure Bridge)



Town Section of Class B National Road (Yumber Ure Bridge)



New Koro Bridge

Figure 2-1 Typical Cross Section (Draft)

(3) Pavement

Road Design Manual Volume III shall be basically adopted and its validity shall be verified with AASHTO.

Design duration of pavement shall be adopted 15 years after operation considering the life of pavement.

3.4. Bridge Design

(1) River Plan

Return period of river shall be basically adopted 50 year.

(2) Live Load

Bridge design shall be conducted B type live load on specifications for highway bridges in Japan comparing with BS (Euro Code) live load on Design Manual.

A-8 テクニカルノート2 (TN2)

Technical Note

On the Project for Improvement of National Road in Refugee-Hosting Areas of West Nile Sub Region in Republic of Uganda

Uganda National Roads Authority (UNRA) under Ministry of Works and Transport (MOWT) of Uganda and the joint venture between Katahira & Engineers International, Eight-Japan Engineering Consultants and Ingerosec (the Consultant) for the above-mentioned survey by the Japan International Cooperation Agency (JICA), have agreed on the points listed in the annex hereto regarding the design. However, the contents of the design will be finalized after the survey team has returned to Japan through discussions with those concerned on the Japanese side, such as the Head Office of JICA.

September 10, 2019
Kampala, Uganda



The Preparatory Survey on the Project for
Improvement of National Road in Refugee-
Hosting Areas of West Nile Sub Region in
Republic of Uganda
Chief Consultant

Tsuyoshi YAMAJUKU



Uganda National Roads Authority
Head of Design
Network Planning and Engineering

Patrick Muleme

ANNEX

This survey aims to gather the information required for deciding the scope of the project and the design of the National Road and the feeder roads in refugee-hosting areas of West Nile sub region at the moment. However, the following key points related to the planning and design have been confirmed.

1. Scope of Project

- Class B National Road : L=23.6 km (excluded Jure bridge, Dacha bridge and Ure bridge which UNRA has constructed and are going to construct)
- New Korro River Crossing Structure including the access road
- Feeder Road No.1 L= 17 km

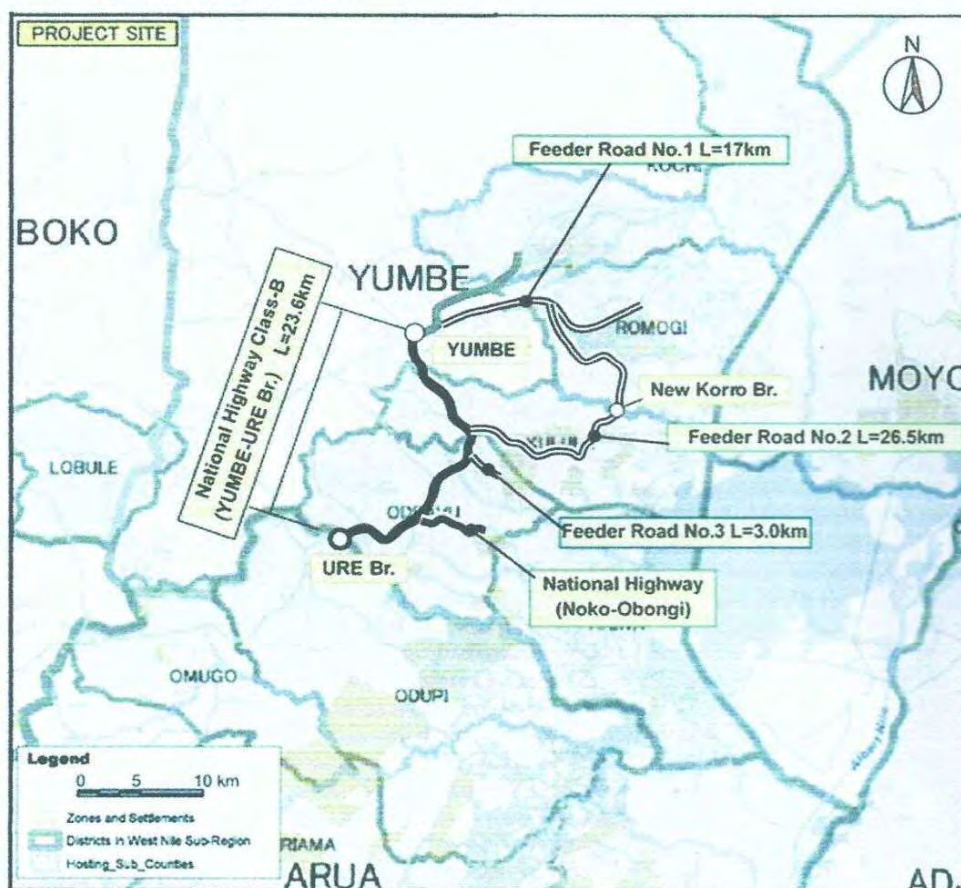


Figure1-1 Location Map

2. Road Design

2.1 Class B National Road

(1) Scope of the Road

The beginning and end points of the road improvement are shown below.

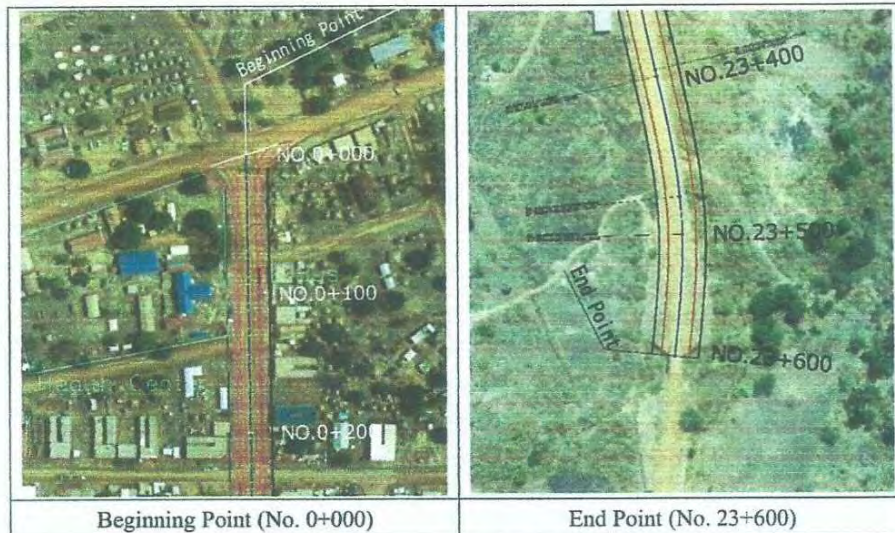


Figure2-1 Scope of Class B National Road

(2) Design Standard

As a standard, Road Design Manual Volume I: Geometric Design (MOWT, 2010) shall be basically adopted, AASHTO standard and Road Ordinance standard in Japan shall be referred to as necessary.

(3) Design Speed

The design classification of Class B National Road shall be basically adopted with I b Paved from the Design Standard. Therefore, design speed of 90km/h shall be basically adopted. However, the alignment of this road shall be tried to be adopted as smooth as possible.

(4) Expected Speed Restriction Sections

This road passes through town, villages and rolling area. In addition, it connects to some intersections of feeder roads. The expected speed restriction sections are shown below.



Table 2-1 List of Speed Restriction Sections(Draft)

Station (km)	Design Speed (km/h)	Speed Limit (km/h)	Remarks
0+000	90	50	Yumbe Town
2+900			
6+800	90	80	Unpopulated Section
6+900			
8+000	90	50	District Office
9+000			
11+600	90	80	Unpopulated Section
12+500			
13+400	50	50	Jure Br.
14+100			
15+000	90	80	Unpopulated Section
15+800			
17+300	90	50	Populated Section
18+800			
19+700	90	80	Unpopulated Section
20+200			
21+900	90	50	Populated Section
22+700			
23+600	50	50	Ure Br. (End point)

(5) Cross Section

The following cross sections shall be adopted with the Class B National Road.

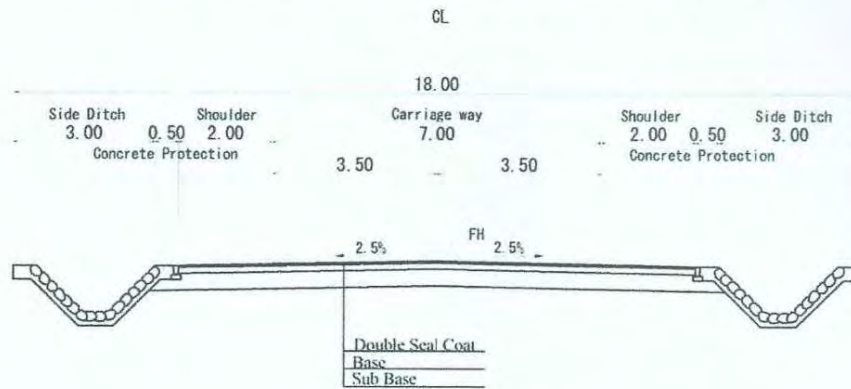


Figure 2-2 Cross Section of General Section (Rural Area No.2+0 – No.23+600)

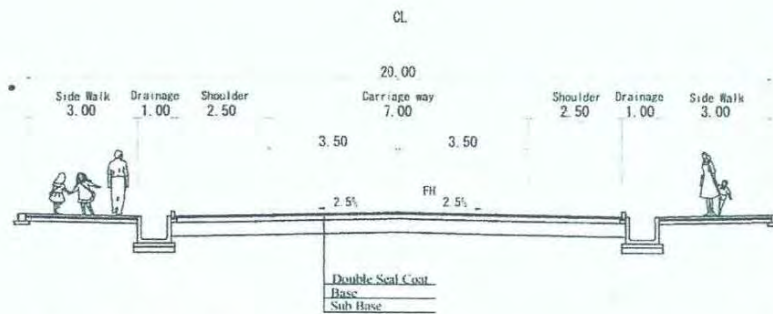


Figure 2-3 Cross Section of Yumbe Town (Urban Area: No.0+0 – No.2+0)

2.5m-shoulder of town area shall be for bus stop and parking space for cars. On the place where there are closing buildings and houses in urban area, shoulder and sidewalk width shall be reduced and then installation of drainage with cover shall be examined, if necessary.

(6) Pavement

Road Design Manual Volume III shall be basically adopted and its validity shall be verified with AASHTO.

Design duration of pavement shall be adopted 15 years after operation considering the life of pavement.

(7) Cross Walk and Speed Reduction Device

Cross Walk and Speed Reduction Device are shown below.

Table 2-2 List of Speed Restriction Sections

No.	Station (km)	Description	Remarks
1	0+060	Health Center	Yumbe Town
2	0+220	Major Junction	
3	0+485	Major Junction	
4	0+660	Major Junction	
5	0+900	Major Junction	
6	1+280	Major Junction	
7	1+660	Public Ground	
8	1+830	District Office	
9	1+980	Nursery	
10	2+460	School	
11	2+610	School	
12	6+870	Sub County Office	-
13	8+100	School	-
14	8+660	Major Junction	-
15	13+870	Sub County Office	-
16	17+505	School	-
17	18+000	Health Center	-
18	18+210	Nursery	-
19	18+600	School	-
20	20+050	Populated Area	-
21	22+390	School	-

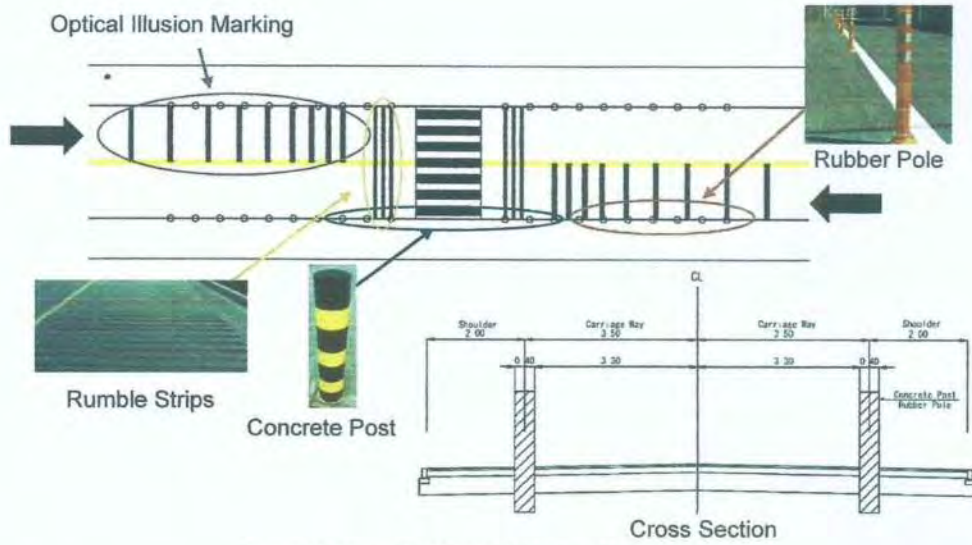


Figure 2-4 Example of Speed Reduction Device

(8) Crossed Drainage

Minimum Dimension of Crossed Drainage shall be $\phi 600$.

(9) Street light

Street light shall be planned in town area and some village area.

2.2 Feeder Road No.1

Feeder Road No.1 is consisted of district road and national road.

(1) Scope of the Road

The beginning and end points of the improvement of the road are shown below.

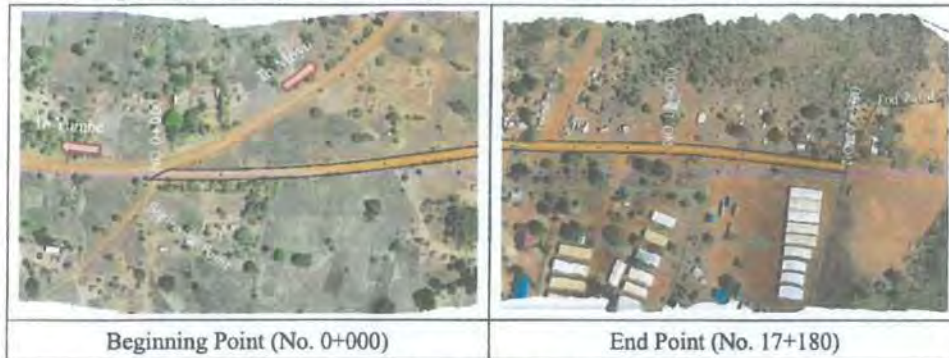


Figure 2-5 Scope of Feeder Road No.1

(2) Design Standard and Speed

Design shall not be adopted with a specific standard, and shall be done within and with correspondence to the existing road. Therefore, Design Speed corresponded to existing road horizontal and vertical alignments shall be adopted.

(3) Cross Section

The cross section of Feeder Road No.1 shall be planned within the existing road width which is a maximum of 10m.

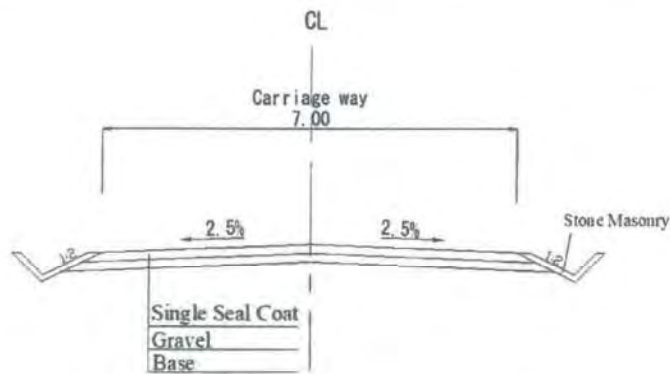


Figure 2-6 Cross Section of Feeder Road No.1

(4) Pavement

Design duration of pavement shall be adopted 5 years after operation considering LBT construction and maintenance.

7

3. River Crossing Structure Design

3.1 New Korro River Crossing Structure

(1) Scope of the River Crossing Structure



Figure 3-1 Scope of River Crossing Structure

(2) Design Standard

As standards, the following manuals shall be basically adopted,

- Road Design Manual Volume II: Drainage Design Manual (MOWT, 2010)
 - Road Design and Construction Manual Volume V: Low Volume Sealed Roads (MOWT, 2017)
- And AASHTO and Road Ordinance in Japan shall be referred as necessary.

(3) Design Speed

Design speed which is equivalent to 50km/h shall be basically adopted, but spiral curve shall not be adopted.

(4) River Plan

Return period of the river shall be basically adopted 50 years.

(5) Live Load

Bridge design shall be conducted type B live load on specifications for highway bridges in Japan comparing with BS(Euro Code) live load on Design Manual.

(6) Cross Section

The following cross sections shall be adopted with the New Korro Bridge Section.

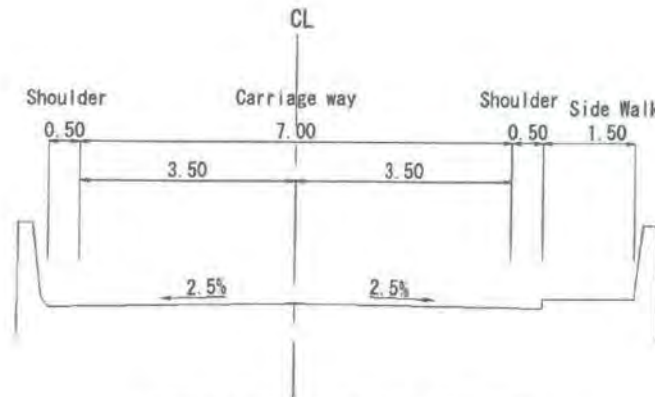


Figure 3-2 Cross Section of Bridge (Draft)



Figure 3-3 Cross Section of approach road (Draft)

(7) Land of River Crossing Structure and Access Road

As for land of Planning River Crossing Structure and access road, land acquisition shall not be conducted in accordance with local custom.

4. Introduction of Labor based Technology (LBT)

(1) LBT Introduction to Road Improvement by Japanese Grant Aid

Expected scope of LBT construction shall be as follows:

Target Area: Feeder Road1 (District Road)

Length: 4km (Host community (HC): 2km, Refugee: 2km)

Construction Items: Gravel pavement, drainage, pipe culvert etc.

Adviser: MELTC, UNRA

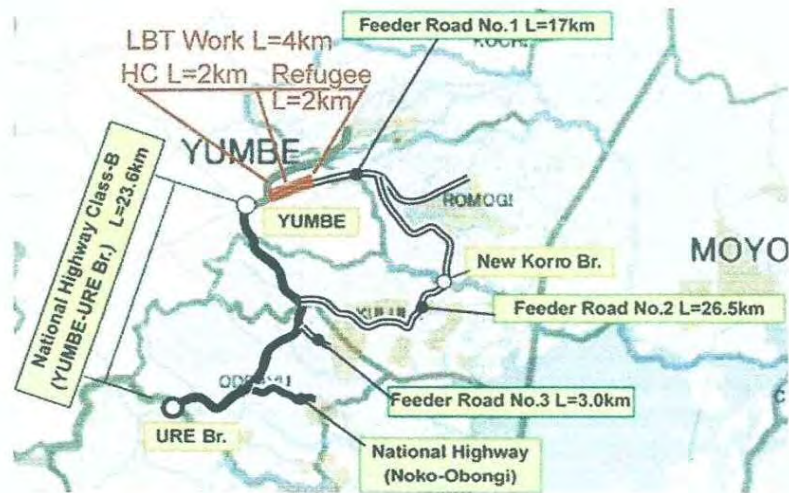


Figure 4-1 Scope of LBT Road Improvement (Draft)

A-9 参考資料/収集資料リスト

1. Road Maintenance Annual Budget of MOWT and UNRA
2. Traffic Survey Result 2018 MOYO-YUMBE, KOBOKO-YUMBE, YUMBE-MANIBE
3. UGANDA NATIONAL ROADS NETWORK, UNRA
4. REGION NORTHERN REGIONU GANDA NATIONAL ROADS NETWORK, UNRA
5. National Population and Housing Census 2014
6. GENERAL SPECIFICATIONS FOR ROAD AND BRIDGE WORKS
7. Access Roads to Bidibidi, Imvepi, Lobule, Palorinya and Rhino Camp Refugee Settlements, UNHCR
8. Northern Uganda Road Network and Infrastructure Assessment, WFP
9. ROAD DESIGN MANUAL Vol.1 to Vol.5, 2010
10. ROAD DESIGN AND CONSTRUCTION MANUAL 2018 Vol. V: Low Volume Sealed Roads
11. District Road Works 2004
12. Traffic Accident Data in Yumbe 2016-2018
13. UNRA KORRO Bridge Design Report

A-10 技術資料

- (1) 交通量調査結果
- (2) 地質調査結果
- (3) 舗装設計計算
- (4) 旅行速度

(1) 交通量調査結果

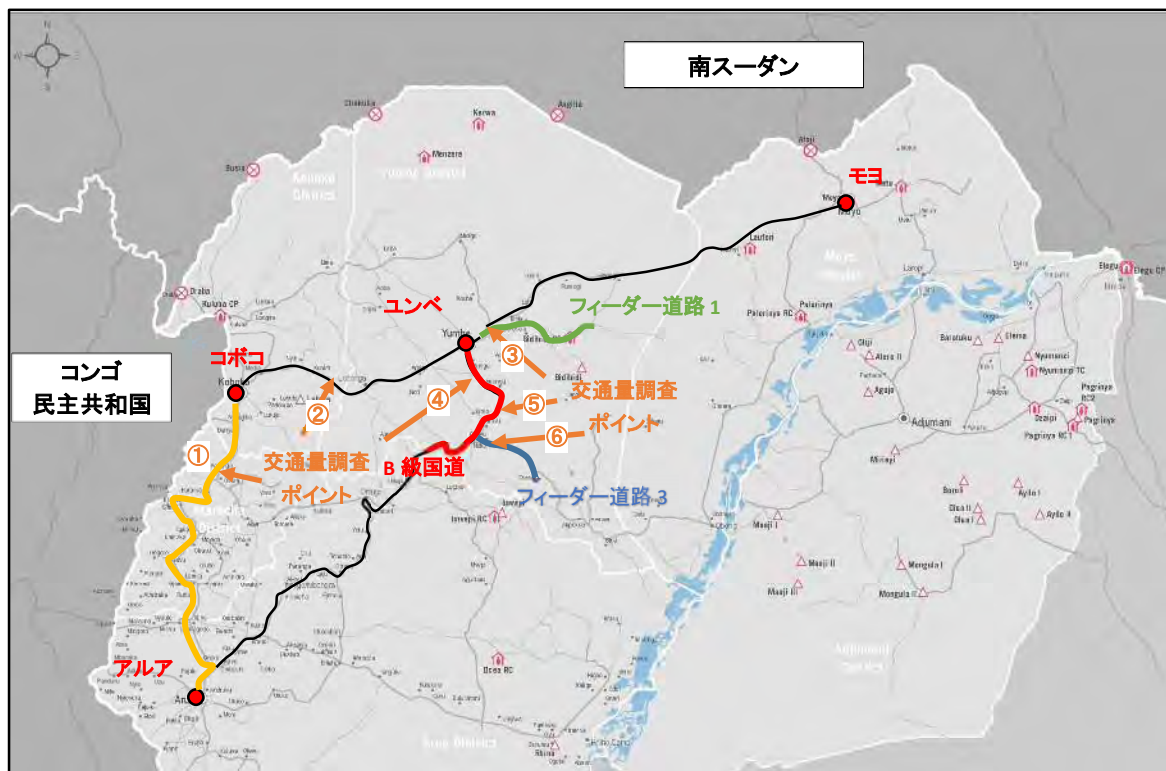


図 1 交通量調査位置図

表 1 交通量調査の概要

項目	内容
調査日	平日：2019年7月3日(水) (6:00-20:00) 14時間 休日：2019年7月6日(土) (6:00-20:00)
車種	1. 乗用車, 2. ピックアップ/4WD, 3. ミニバス, 4. ミニトラック, 5. 大型バス, 6. 2軸トラック, 7. 3軸トラック 8. 4軸以上のトラック / トレーラー, 9. オートバイ, 10. 自転車, 11. 歩行者

表 2 交通量調査結果 (2019年7月6日:平日) 単位:台数/日

地点	乗用車	ピックアップ /4WD	ミニバス	軽トラ ック	合計 (A)	大型バ ス	2軸ト ラック	3軸ト ラック	貨物・ トレー ラー類	合計 (B)	大型混 入率 (%)	車輛 合計 (A+B)	オート バイ	自転車	荷馬車	歩行者
1	562	276	45	33	916	23	45	32	50	150	14.1%	1,066	374	124	0	212
2	276	303	62	16	657	19	21	21	27	88	11.8%	745	327	122	0	89
3	380	501	299	202	1,382	52	231	243	243	769	35.8%	2,151	1,347	757	56	1,174
4	81	197	60	57	395	2	28	4	22	56	12.4%	451	1,041	597	0	926
5	60	171	62	75	368	0	11	2	5	18	4.7%	386	1,359	932	0	1,206
6	176	117	53	51	397	15	28	33	39	115	22.5%	512	571	348	11	633

表3 交通量調査結果 (2019年7月6日:休日) 単位:台数/日

地点	乗用車	ピックアップ /4WD	ミニバス	軽トラ ック	合計 (A)	大型バス	2軸ト ラック	3軸ト ラック	貨物・ トレー ラー類	合計 (B)	大型混 入率 (%)	車輛 合計 (A+B)	オート バイ	自転車	荷馬車	歩行者
1	622	319	40	33	1,015	38	29	29	56	152	13.0%	1,167	432	105	1	287
2	371	258	56	10	694	21	6	11	15	53	7.1%	747	337	210	7	11
3	174	159	66	6	404	11	96	21	28	156	27.9%	560	3,362	2,046	0	2,249
4	106	169	46	28	349	4	31	20	14	68	16.4%	417	1,374	809	0	723
5	61	91	46	17	215	0	13	6	0	18	7.8%	233	1,071	880	0	1,015
6	71	68	10	3	152	6	25	6	13	49	24.3%	201	329	328	0	569

昼夜率 (14時間交通量⇒24時間) は、UNRA 実施の過去の交通調査データおよび日本の道路構造令を参考に1.2とした。

上記の結果より、地点3に関して、平日と休日の差が約3.8倍あり、調査地点で最も差が開いている。理由として、ビディビディ地区への輸送目的の移動または、支援にあたる車両の移動が平日に当たることが挙げられる。平日及び休日の調査結果から、以下の式を用いて平均日交通量を算出した。

$$ADTT \text{ (平均日交通量)} = (\text{平日交通量調査結果} \times 5 \text{ 日} + \text{休日交通量調査結果} \times 2 \text{ 日}) / 7 \text{ 日}$$

表3 週平均交通量 単位:台数/日

地点	乗用車	ピックアップ /4WD	ミニバス	軽トラ ック	合計 (A)	大型バス	2軸ト ラック	3軸ト ラック	貨物・ トレー ラー類	合計 (B)	大型混 入率 (%)	車輛 合計 (A+B)	オート バイ	自転車	荷馬車	歩行者
1	470	234	36	27	767	22	33	25	42	122	13.7%	889	317	105	0	179
2	245	237	49	11	542	16	13	14	20	63	10.4%	605	277	103	0	75
3	267	336	195	123	921	34	160	152	153	499	35.1%	1,420	1,140	641	47	994
4	72	155	45	40	312	2	24	6	17	49	13.6%	361	880	505	0	784
5	49	123	47	49	268	0	9	3	3	15	5.3%	283	1,150	789	0	1,020
6	121	85	34	31	271	10	22	21	26	79	22.6%	350	483	294	9	536

B級国道へ転換する交通としては、競合する路線アルアーコボコーユンベの交通が考えられるが、本プロジェクトでは、ユンベーウレ橋区間 (23.6km) の整備に留まり、アルアーウレ橋区間は、整備の目途が立っておらず、路面の凸凹が大きく、現状では、雨が降るとピックアップのみ通行が可能となる。したがって、地点1、2を通過するピックアップ200台が転換するものとみなす。

(2) 地質調査結果

路床土CBR調査結果 (B級国道)



Plot 782 Kisalosal Road - Kyebando
P.O.Box 10704 Kampala, Uganda
Tel.+256 782943463
Email:rsv@rsvegroup.com

Project:- Geotechnical Investigation for Improvement of National roads in Refugee-Hosting Area of West Nile Subregion
Client:- JICA Survey Team
Location:- Yumbe District National Road Class B (Yumbe - Ure Bridge)
Sample of:- Alignment Subgrade Samples

Date:- 15/7/2019

CBR AND CLASSIFICATION SUMMARY

No	TP No	Station	Position	Field Material Description	Depth (M)	Natural Moisture (%)	% pass (mm)				LL %	PL %	PI %	LS	AASHTO Soil Class	MDD T-99 g/cm ³	OMC %	1 - Point CBR %		
							4.750	2.000	0.425	0.075								Density	CBR	Swell %
1	TP1	0+000	RHS	Reddish brown lateritic GRAVEL	0.1 - 0.4	9.1	59	45	33	20	26	14	12	6.1	A-2-6 (0)	1.740	17.0	1.731	19	0.03
2	TP2	1+000	LHS	Dark brown silty CLAY	0.1 - 0.4	8.9	93	89	71	58	45	22	23	12.1	A-7 (11)	1.780	15.8	1.780	3	1.70
3	TP3	2+000	RHS	Reddish brown gravelly clayey SAND	0.1-0.5	11.8	95	61	47	35	41	19	22	10.0	A-2-7 (2)	2.010	12.8	2.014	7	0.08
4	TP4	3+000	LHS	Dark grey to brown highly silty clayey SAND with some gravels	0.1 - 0.4	9.4	95	82	59	41	41	18	22	11.3	A-7 (4)	1.848	13.8	1.847	6	0.21
5	TP5	4+000	RHS	Reddish brown sandy GRAVEL	0.1 - 0.4	11.6	50	42	30	23	39	18	21	9.3	A-2-6 (0)	1.890	14.3	1.893	23	0.21
6	TP6	5+000	LHS	Brownish gravelly sandy clayey SILT	0.1 - 0.4	10.4	99	90	73	50	46	25	21	11.4	A-7-6 (7)	1.975	11.8	1.970	16	0.44
7	TP7	6+000	RHS	Dark brown clayey silty SAND	0.1-0.5	10.7	96	80	48	36	34	17	17	9.6	A-6 (2)	1.931	12.2	1.934	16	0.19
8	TP8	7+000	LHS	Dark brown to reddish brown clayey sandy GRAVEL	0.1 - 0.4	11.5	67	41	28	22	45	21	24	10.4	A-2-7 (0)	2.020	12.4	2.014	16	0.44
9	TP9	8+000	RHS	Dark brown to grey sandy silty clayey SAND	0.1-0.5	7.9	94	85	58	33	23	12	11	4.5	A-2-6 (0)	1.971	10.2	1.995	18	0.31
10	TP10	9+000	LHS	Reddish brown gravelly sandy CLAY	0.1-0.5	12.0	74	68	57	50	45	26	19	10.5	A-7-6 (7)	1.895	14.8	1.884	22	0.16
11	TP11	10+000	RHS	Yellowish greenish grey highly weathered Rock Material	0.1 - 0.4	8.8	79	68	42	21	25	NP	NP	3.3	A-1-b (0)	1.919	13.1	1.932	27	0.35
12	TP12	11+000	LHS	Reddish brown highly clayey SAND	0.1 - 0.4	10.1	90	52	35	29	47	24	23	11.6	A-2-7 (0)	1.962	11.1	1.943	18	0.22
13	TP13	12+000	RHS	Dark reddish brown highly sandy clayey GRAVEL	0.1 - 0.4	11.4	55	45	31	18	34	17	17	8.5	A-2-6 (0)	2.000	9.8	1.984	15	0.32
14	TP14	13+000	LHS	Reddish brown slightly clayey sandy GRAVEL	0.1 - 0.4	10.1	64	41	31	24	40	17	24	12.5	A-2-6 (0)	1.900	9.2	1.896	8	0.20
15	TP15	14+000	RHS	Reddish brown lateritic GRAVEL	0.1 - 0.4	16.2	39	24	19	16	49	28	21	11.0	A-2-6 (0)	1.820	11.6	1.826	23	0.17
16	TP16	15+000	LHS	Reddish brown highly sandy CLAY	0.1 - 0.4	14.6	95	80	61	52	43	20	23	12.5	A-7-6 (8)	1.835	15.2	1.817	10	0.15
17	TP17	16+000	RHS	Dark reddish and yellowish brown highly sandy silty CLAY	0.1 - 0.4	10.7	98	87	74	57	33	16	18	9.2	A-6 (7)	1.785	15.6	1.789	4	0.97
18	TP18	17+000	LHS	Reddish brown slightly clayey highly sandy GRAVEL	0.1 - 0.4	10.9	62	38	30	22	37	18	19	10.3	A-2-6 (0)	1.912	12.6	1.905	13	0.41
19	TP19	18+000	RHS	Dark brown and yellowish reddish brown highly sandy silty CLAY	0.1 - 0.4	9.7	91	83	71	58	42	21	21	12.1	A-7-5 (10)	1.750	16.2	1.733	15	0.15
20	TP20	19+000	LHS	Blackish brown silty clayey SAND	0.1 - 0.4	10.0	88	69	51	35	34	15	19	9.6	A-2-6 (2)	1.999	10.5	2.008	7	0.27
21	TP21	20+000	RHS	Reddish brown clayey silty SAND	0.1 - 0.4	11.4	100	98	71	48	35	16	19	10.0	A-6 (5)	1.870	15.0	1.871	4	0.93
22	TP22	21+000	LHS	Dark brown sandy clayey GRAVEL	0.1 - 0.4	9.1	32	18	12	8	29	16	13	5.9	A-2-6 (0)	2.120	9.8	2.108	24	0.34
23	TP23	22+000	RHS	Dark brown clayey silty SAND	0.1 - 0.4	11.5	97	91	70	28	19	11	9	2.6	A-2-5 (0)	2.020	10.0	2.023	23	0.30
24	TP24	23+000	LHS	Reddish brown slightly clayey sandy GRAVEL	0.4 - 0.45	9.5	71	40	31	24	43	20	23	11.8	A-2-7 (0)	1.960	12.3	1.994	16	0.15

Approved By:
Eng. Robert Tumwesige
RSV Engineering Group Ltd

路床土CBR調査結果（フィーダー道路1）



Plot 782 Kisalosal Road - Kyeabando
P.O.Box 10704 Kampala, Uganda
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Email:rsv@rsvegroup.com

Project:- Geotechnical Investigation for Improvement of National roads in Refugee-Hosting Area of West Nile Subregion
Client:- JICA Survey Team
Location:- Feeder Road No.1 (Yumbe - Bidibidi Base Camp)
Sample-of:- Alignment Subgrade Samples

Date:- 15/7/2019

CBR AND CLASSIFICATION SUMMARY

No	TP No	Station	Position	Field Material Description	Depth (m)	Natural Moisture (%)	% pass (mm)				LL %	PL %	PI %	LS	AASHTO Soil Class	MDD T-99 g/cm ³	OMC %	1 - Point CBR%		
							4.750	2.000	0.425	0.075								Density	CBR	Swell %
1	TP1	0+000	RHS	Dark brown clayey SAND	0 - 0.4	7.5	42	28	20	11	34	16	18	10.3	A-2-6 (0)	1.879	13.6	1.877	5	0.74
2	TP2	1+000	LHS	Reddish brown Clayey SAND	0.1 - 0.4	11.7	98	95	81	62	38	17	20	11.5	A-6 (10)	1.762	17.7	1.753	5	1.00
3	TP3	2+000	RHS	Reddish brown silty clayey GRAVEL	0.1 - 0.4	10.4	81	43	34	21	29	14	15	6.8	A-2-6 (0)	2.095	11.2	2.079	28	0.04
4	TP4	3+000	LHS	Dark brown gravelly silty SAND	0.1 - 0.4	8.2	99	96	72	31	19	10	9	3.5	A-2-4 (0)	2.070	8.8	2.085	25	0.18
5	TP5	4+000	RHS	Dark brown silty SAND	0.1 - 0.4	9.2	98	95	76	31	22	12	10	4.8	A-2-4 (0)	2.015	10.1	2.043	17	0.11
6	TP6	5+000	LHS	Brown highly clayey silty SAND	0.1 - 0.4	9.1	98	95	76	31	28	13	14	6.8	A-6 (0)	1.932	11.6	1.923	7	0.21
7	TP7	6+000	RHS	Dark reddish brown gravelly silty SAND	0.1 - 0.4	10.3	99	98	76	36	25	13	13	6.7	A-6 (1)	2.070	9.6	2.064	15	0.09
8	TP8	7+000	LHS	Reddish brown sandy silty CLAY	0.1 - 0.4	15.1	100	99	79	53	40	19	22	11.2	A-6 (8)	1.850	15.4	1.847	6	1.03
9	TP 9	8+000	RHS	Dark brown sandy silty CLAY	0.1 - 0.4	14.4	99	98	83	60	39	20	19	11.3	A-6 (9)	1.853	14.6	1.857	4	1.73
10	TP10	9+000	LHS	Reddish brown sandy silty CLAY	0.1 - 0.4	14.7	99	98	81	61	41	22	19	11.6	A-7-6 (9)	1.780	15.0	1.771	9	1.04
11	TP11	10+000	RHS	Yellowish rusty reddish brown sandy clayey GRAVEL	0.1 - 0.4	8.5	62	41	35	29	38	20	18	8.8	A-2-6 (0)	1.908	13.0	1.891	30	0.09
12	TP12	11+000	LHS	Dark brown to reddish brown highly sandy Gravel	0.1 - 0.4	10.5	64	46	30	19	30	15	14	7.1	A-2-6 (0)	1.950	10.6	1.941	24	0.43
13	TP13	12+000	RHS	Dark reddish brown highly sandy clayey GRAVEL	0.1 - 0.4	12.7	61	46	37	24	34	15	20	10.3	A-2-6 (0)	1.975	12.2	1.969	14	0.20
14	TP14	13+000	LHS	Reddish brown and dark brown clayey gravelly SAND	0.1 - 0.4	13.2	92	77	58	41	37	19	18	10.3	A-6 (3)	1.960	11.2	1.945	12	0.20
15	TP15	14+000	RHS	Dark reddish brown sandy GRAVEL	0.1 - 0.4	12.3	49	29	23	18	45	23	22	12.0	A-2-7 (0)	1.890	13.6	1.898	11	0.27
16	TP16	15+000	LHS	Dark brown to reddish brown clayey sandy GRAVEL	0.1 - 0.4	10.0	71	42	31	22	34	16	18	8.9	A-2-6 (0)	2.075	7.7	2.062	31	0.08
17	TP17	16+000	RHS	Reddish brown slightly sandy silty CLAY	0.1 - 0.4	14.2	100	99	90	68	48	20	28	4.8	A-7-6 (18)	1.736	17.8	1.733	3	1.04
18	TP18	17+000	LHS	Yellowish reddish brown silty GRAVEL	0.1 - 0.4	10.3	62	43	30	18	33	15	18	9.1	A-2-6 (17)	2.014	13.6	2.023	24	0.09

Approved By:
Eng. Robert Tumwesige
RSV Engineering Group Ltd

石切場 採取石 調査結果



Service Built to Perfection

Project:- Geotechnical Investigation for Improvement of National roads in Refugee-Hosting Area of West Nile Subregion
 Client:- JICA Survey Team
 Location:- Yumbe District
 Sample of:- Stone Quarry


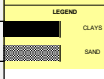
Date: 17/07/2019

Sp No	Quarry Site	Specific Gravity and Water Absorption (AASHTO T-85)				Ten Percent Finer Value			LOSS IN ABRASION AND IMPACT (ASHIOT-96)		Aggregate Crushing Value (BS 812: 1990)	Aggregate Impact Value (BS 812: 1990)	Soundness (ASHIOT-104)
		Specific Gravity (D ₂₀)	Specific Gravity (SSD)	Apparent Specific Gravity	Water Absorption (%)	TFV _{dry}	TFV _{soaked}	Ratio of TFV soaked to TFV dry	Grade of Test Sample	IAA%	ACV%	AIV%	SSS%
1	Rock City Quarry	2638	2674	2669	1.09	80.6	53.8	66.75	A	37.5	27.1	31.1	0.54
2		2645	2667	2723	1.04	85.0	56.7	66.71	A	37.3	26.8	29.6	0.58
3		2644	2672	2721	1.07	82.4	55.40	67.20	A	38.0	27	30.8	0.60
1	Wakada Quarry	2656	2671	2695	0.55	147.70	117.20	79.30	A	30.1	21.7	25.9	0.10
2		2672	2687	2711	0.51	152.30	120.50	79.12	A	28.9	20.1	24.6	0.10
3		2649	2664	2688	0.57	145.20	118.40	81.54	A	32.1	22.4	26.2	0.14
1	Yumbe Quarry	2746	2763	2796	0.64	144.50	122.40	84.70	A	34.7	24.8	26.3	0.11
2		2748	2766	2798	0.62	146.00	123.20	85.00	A	34.4	24.2	25.5	0.10
3		2746	2764	2796	0.65	143.10	120.90	84.50	A	35.0	24.9	27	0.15

Approved By:
 Eng. Robert Tumwesige
 RSV Engineering Group Ltd

ボーリング調査結果 (A1)


Sheet No.1 of 2

Client : JICA SURVEY TEAM		Contractor: 										
BORE HOLE RECORD												
PROJECT : Geotechnical Investigation for Improvement of National roads in Refugee-Hosting Area of West Nile Subregion		BOREHOLE NO : BH 1										
CLIENT : JICA SURVEY TEAM		WATER STRIKE : 4.36 m										
DRILLING METHOD : ROTARY (XY-100)		LOCATION :										
ELEVATION : 730.247 m		TEST METHOD : BS 5930:2015										
COORDINATES : 378263.6980 328816.8000		DATE : Start: 27/06/2019 & End: 28/06/2019										
Ground Water	Depth (m)	Description of the Strata Detail	Legend	Level	Samples & Tests					Remarks		
	0.00	Loose black organic silty clayey SAND		719.75							Ground Water Table Sample Types: D: Disturbed sample SCORE RUN SPT: Standard Penetration Test LEGEND CLAYS SAND	
	0.25											
	0.50											
	1.00	Medium dense dark brown silty SAND			719.25	D	1	7	9	10		19
	1.45				718.80							
	2.00				718.25							
	2.45				717.80							
	3.00	Stiff to very stiff brownish black organic sandy Clay. The sand is fine sand			717.25	D	2	7	8	9		17
	3.45				716.80							
	4.00				716.25							
	4.45				715.80							
	5.00	Medium dense grey moist clayey SAND with increasing clay content			715.25	D	4	5	7	9		16
	5.45				714.80							
	6.00	Medium dense brown with white patches fine to medium grained slightly moist sand			714.25	D	5	5	9	11		20
	6.45				713.80							
	7.00			713.25								
	7.45			712.80								
	8.00	Dense light grey with orange to black patches slightly moist Clayey SAND. The material is turning into weathered rock and was recovered as an intact core. Between 8.0-8.3m: Broken particles were recovered inform of coarse grained sand & some gravels		712.25	D	7	8	8	19	12	31	
	8.45			711.80								
	9.00			711.25								
	9.45			710.80								
	10.00	Hard light grey with orange to black patches slightly moist Sandy CLAY. The material was recovered as a completely weathered rock		710.25	D	8	9	9	14	22	36	
	10.45			709.80								
	11.00			709.25								
	11.45			708.80								
	12.00			708.25								
	12.45			707.80								
	13.00	Very dense light grey slightly moist Clayey SAND (completely weathered rock) Between 12.5-15.0m: The the sand is coarse grained		707.25	D	9	11	22	22	44		
	13.45			706.80								
	14.00			706.25								
	14.45			705.80								
	15.00			705.25								
	15.45			704.80								
					D	10	17	19	23	42		
					D	11	11	25	28	53		
					D	12	17	26	29	55		
					D	13	18	27	30	57		
					D	14	18	26	32	58		
					D	15	19	27	32	59		

Logged By: Eng. Robert Tumwesige

Checked By: Eng. Samuel Musobozi

ボーリング調査結果 (A2)

Client :		JICA SURVEY TEAM		Contractor:		 R S V ENGINEERING GROUP <small>(Pvt) Limited (Incorporated in India)</small>					
BORE HOLE RECORD											
PROJECT : Geotechnical Investigation for Improvement of National roads in Refugee-Hosting Area of West Nile Subregion				BOREHOLE NO : BH 2							
CLIENT : JICA SURVEY TEAM				WATER STRIKE : 3.6 m							
DRILLING METHOD : ROTARY (XY-100)				LOCATION :							
ELEVATION : 718.25 m				TEST METHOD : BS 5930: 2015							
COORDINATES : 378278.8000		320784.2000		DATE : Start: 26/06/2019 & End: 27/06/2019							
Ground Water	Depth m	Description of the Strata Detail	Legend	Level	Samples & Tests					Remarks	
					Depth (m)	Type	No	150	150		150
	0.00										Ground Water Table
	0.50	Loose black organic silty clayey SAND		717.75							
	1.00			717.25							
	1.45	Loose to medium dense dark brown organic clayey SAND		716.80							
	2.00			716.25							
	2.45			715.80	D	2	3	6	6	12	
	3.00	Medium dense brown fine to medium grained moist SAND		715.25							
	3.45			714.80							
	4.00			714.25							
	4.45	Loose to medium dense dark brown to brown clayey SAND		713.80							
	5.00			713.25							
	5.45			712.80	D	5	2	5	5	10	
	6.00			712.25							
	6.45			711.80	D	6	3	6	7	13	
	7.00	Stiff to hard light grey with orange patches sandy CLAY. Recovered inform of weathered rock		711.25							
	7.45			710.80	D	7	5	8	11	19	
	8.00			710.25							
	8.45			709.80	D	8	6	19	26	45	
	9.00	Dense to very dense light to yellowish grey with dark to orange patches clayey SAND. Recovered inform of intact completely weathered rock core		709.25							
	9.45	Between 8.0-9.0m: The RQD is 73% Between 9.0-10.0m: The RQD is 78% Between 10.0-11.0m: The RQD is 80%		708.80	D	9	15	21	23	44	
	10.00			708.25	D	10	15	24	28	52	
	10.45			707.80							
	11.00	Hard light grey sandy CLAY. Between 11.0-12.0m: The RQD is 86%		707.25	D	11	17	25	26	51	
	11.45			706.80							
	12.00	Very dense light to yellowish grey with dark to orange patches clayey SAND		706.25	D	12	17	21	33	54	
	12.45			705.80							

Logged By: Eng. Robert Tumwesige

Checked By: Eng. Samuel Musoboozi

ボーリングコア写真 A1 (1)

G.I FOR NATIONAL ROAD IN REFUGEE
HOSTING AREA OF WEST NILE SUB-REGION

JICA Survey Team/ Katahira
& Engineers International



Depth (m):
0.0 – 5.0



Depth (m):
5.0 – 10.0

ボーリングコア写真 A1 (2)

G.I FOR NATIONAL ROAD IN REFUGEE
HOSTING AREA OF WEST NILE SUB-REGION

JICA Survey Team/ Katahira
& Engineers International



Depth (m):
10.0 -15.0

ボーリングコア写真 A2 (1)

G.I FOR NATIONAL ROAD IN REFUGEE
HOSTING AREA OF WEST NILE SUB-REGION

JICA Survey Team/ Katahira
& Engineers International

BOREHOLE 2



BH 2 Location



**Depth (m):
0.0 – 5.0**

ボーリングコア写真 A2 (2)

G.I FOR NATIONAL ROAD IN REFUGEE
HOSTING AREA OF WEST NILE SUB-REGION

JICA Survey Team/ Katahira
& Engineers International



Depth (m):
5.0 – 10.0



Depth (m):
10.0 – 12.0

G.I FOR NATIONAL ROAD IN REFUGEE HOSTING AREA OF WEST NILE SUB-REGION

SPT PICTURE LOGS FOR BH1



PHOTO 1: Medium dense dark brown organic sand drilled from BH1 (1.0-1.45m), *SPT N=19*



PHOTO 2: Very stiff black to dark brown sandy clay with sand drilled from BH1 (2.0-2.45m), *SPT N=17*



PHOTO 3: Stiff black to dark brown sandy clay drilled from BH1 (3.0-3.45m), *SPT N=12*



PHOTO 4: Medium dense brown with white patches fine to medium grained moist sandy clay drilled from BH1 (4.0-4.45m), *SPT N=16*



PHOTO 5: Medium dense brown with white patches fine to medium grained moist sand drilled from BH1 (5.0-5.45m), *SPT N=20*



PHOTO 6: Medium dense brown with white patches fine to medium grained moist clayey sand drilled from BH1 (6.0-6.45m), *SPT N=22*

G.I FOR NATIONAL ROAD IN REFUGEE HOSTING AREA OF WEST NILE SUB-REGION



PHOTO 7: Dense brown with white patches fine to medium grained moist clayey sand drilled from BH1 (7.0-7.45m), *SPT N=31*



PHOTO 8: Dense light grey with orangey patches clayey sand turning into weathered rock drilled from BH1 (8.0-8.45m), *SPT N=36*



PHOTO 9: Dense Light grey weathered rock (recovered as clayey sand) drilled from BH1 (9.0-9.45m), *SPT N=44*



PHOTO 10: Light grey weathered rock (recovered as hard sandy clay) drilled from BH1 (10.0-10.45m), *SPT N=42*



PHOTO 11: Light grey weathered rock (recovered as clayey sand) drilled from BH1 (11.0-11.45m), *SPT N=53*



PHOTO 12: Light grey weathered rock (recovered as dense clayey sand) drilled from BH1 (12.0-12.45m), *SPT N=55*

G.I FOR NATIONAL ROAD IN REFUGEE HOSTING AREA OF WEST NILE SUB-REGION



PHOTO 13: Light grey weathered rock (recovered as dense clayey sand) drilled from BH1 (13.0-13.45m), *SPT N=57*



PHOTO 14: Light grey weathered rock (recovered as dense clayey sand) drilled from BH1 (14.0-14.45m), *SPT N=58*



PHOTO 15: Light grey weathered rock (recovered as dense clayey sand) drilled from BH1 (15.0-15.45m), *SPT N=59*

G.I FOR NATIONAL ROAD IN REFUGEE HOSTING AREA OF WEST NILE SUB-REGION

SPT PICTURE LOGS FOR BH2



PHOTO 1: Loose organic silty clayey sand drilled from BH2 (1.0-1.45m), *SPT N=8*



PHOTO 2: Medium dense dark brown organic sand with clay drilled from BH2 (2.0-2.45m), *SPT N=12*



PHOTO 3: Medium dense brown fine to medium grained moist sand drilled from BH2 (3.0-3.45m), *SPT N=16*



PHOTO 4: Medium dense dark brown moist clayey sand drilled from BH2 (4.0-4.45m), *SPT N=12*



PHOTO 5: Loose brown medium to coarse grained clayey sand drilled from BH2 (5.0-5.45m), *SPT N=10*



PHOTO 6: Stiff grey sandy clay drilled from BH2 (6.0-6.45m), *SPT N=13*

G.I FOR NATIONAL ROAD IN REFUGEE HOSTING AREA OF WEST NILE SUB-REGION



PHOTO 7: Very stiff light orangey grey sandy clay drilled from BH2 (7.0-7.45m), *SPT N=19*



PHOTO 8: Hard yellowish grey weathered rock recovered as sandy clay drilled from BH2 (8.0-8.45m), *SPT N=45*



PHOTO 9: Dense yellowish grey with black patches weathered rock recovered as clayey sand drilled from BH2 (9.0-9.45m), *SPT N=44*



PHOTO 10: Very dense yellowish grey with black patches weathered rock recovered as clayey sand drilled from BH2 (10.0-10.45m), *SPT N=52*



PHOTO 11: Hard yellowish grey with black patches weathered rock recovered as sandy clay drilled from BH2 (11.0-11.45m), *SPT N=51*



PHOTO 12: Very dense yellowish grey with black patches weathered rock recovered as clayey sand drilled from BH2 (12.0-12.45m), *SPT N=54*

Service Built to Perfection

CLIENT : JICA Survey Team

PROJECT : Geotechnical Investigation for Improvement of National roads in Refugee-Hosting Area of West Nile Subregion

LOCATION: Yumbe District

SITE: New Korro Bridge

Date: 18/07/2019

SUMMARY OF BOREHOLE SOIL CLASSIFICATION TEST RESULTS

SAMPLE LABEL	Depth (m)	% Passing BS Sieves														Atterberg limits					NMC (%)	L	Specific Gravity	USCS	REMARKS
		Sieve 20mm	Sieve 14mm	Sieve 10mm	Sieve 6.3mm	Sieve 4.75mm	Sieve 2.36mm	Sieve 2mm	Sieve 1.18mm	Sieve 0.600mm	Sieve 0.425mm	Sieve 0.300mm	Sieve 0.212mm	Sieve 0.15mm	Sieve 0.075mm	LL %	PL %	PI %	LS (%)						
BH1 (A1)	1.00 - 1.45	100	100	100	100	100	99	99	96	89	81	71	59	46	34	25.4	0.0	25.4	2.1	7	0.7	2.414	SW	Sand	
	2.0 - 2.45	100	100	100	100	100	100	100	100	95	92	87	82	73	63	29.8	16.9	12.9	5.7	17	1.0	2.650	CL	Sandy CLAY	
	3.0 - 3.45	100	100	100	100	100	100	99	99	96	94	91	88	85	77	44.0	24.0	20.0	10.0	23	1.0	2.623	CI	Sandy CLAY	
	4.0 - 4.45	100	100	100	100	100	98	97	92	79	74	69	65	59	51	34.5	21.3	13.2	7.9	20	1.1	2.614	CL	Sandy CLAY	
	5.0 - 5.45	100	100	100	100	100	97	95	86	68	56	45	35	26	18	24.2	17.4	6.8	4.3	19	0.8	2.634	SC	Calyey Sand	
	6.0 - 6.45	100	100	100	99	98	90	87	70	38	26	17	11	6	1	20.4	0.0	20.4	1.4	17	0.2	2.660	SW	Sand	
	7.0 - 7.45	100	100	100	99	97	88	85	73	58	51	44	40	37	33	41.2	20.9	20.3	8.6	15	1.3	2.620	SC	Calyey Sand	
	8.0 - 8.45	85	85	84	82	80	74	72	65	55	49	43	39	35	31	40.8	22.6	18.2	8.6	22	1.0	2.680	SC	Calyey Sand	
	9.0 - 9.45	100	100	100	100	96	92	91	86	77	72	67	61	54	45	44.8	23.8	21.0	10.7	14	1.5	2.655	SC	Calyey Sand	
	10.0 - 10.45	100	100	100	100	100	99	99	96	90	86	82	79	76	73	44.7	23.4	21.3	10.0	15	1.4	2.680	CI	Sandy CLAY	
	11.0 - 11.45	100	100	98	93	88	76	72	60	48	43	40	36	32	27	44.7	26.0	18.7	10.7	15	1.6	2.644	SC	Calyey Sand	
	12.0 - 12.45	100	100	100	100	99	93	90	78	66	60	55	50	46	41	48.3	26.8	21.5	10.7	12	1.7	2.470	SC	Calyey Sand	
	13.0 - 13.45	100	100	100	100	98	88	83	66	52	47	44	40	37	32	53.0	27.2	25.8	10.7	14	1.5	2.600	SC	Calyey Sand	
	14.0 - 14.45	100	100	100	99	97	83	78	63	52	48	44	41	38	34	49.4	28.5	20.9	10.0	14	1.7	2.618	SC	Calyey Sand	
	15.0 - 15.45	100	100	99	99	97	86	81	68	56	52	47	43	40	37	49.6	27.1	22.5	10.0	13	1.6	2.660	SC	Calyey Sand	
BH2 (A2)	1.00 - 1.45	100	100	100	100	100	99	98	95	85	80	73	62	44	30	28	0	28	1.4	12	0.6	2.496	SW	Sand	
	2.0 - 2.45	100	100	100	100	99	93	90	79	70	66	63	59	55	49	26	0	26	0.5	12	0.5	2.633	SW	Sand	
	3.0 - 3.45	100	100	100	99	99	95	93	82	61	49	38	29	21	14	20	0	20	1.4	13	0.3	2.634	SW	Sand	
	4.0 - 4.45	100	100	100	100	100	99	98	96	90	85	77	67	55	43	32.2	16.7	15.5	8.6	14	1.2	2.612	SC	Calyey Sand	
	5.0 - 5.45	100	100	100	100	100	99	99	93	75	63	49	39	30	23	27.1	15.9	11.2	5.0	19	0.7	2.611	SC	Calyey Sand	
	6.0 - 6.45	100	100	100	100	100	99	98	95	88	84	80	74	67	58	52.2	28.4	23.8	12.9	21	1.3	2.603	CH	Sandy Fat CLAY	
	7.0 - 7.45	100	100	100	100	100	98	96	93	87	84	79	74	67	58	53.1	27.1	26.0	12.1	21	1.2	2.612	CH	Sandy Fat CLAY	
	8.0 - 8.45	100	100	100	100	99	97	95	89	81	77	73	68	62	55	50.1	28.0	22.1	10.7	15	1.6	2.646	CH	Sandy Fat CLAY	
	9.0 - 9.45	100	100	100	100	100	96	94	81	61	54	48	45	41	36	47.4	25.6	21.6	10.7	14	1.6	2.678	SC	Calyey Sand	
	10.0 - 10.45	100	100	100	100	100	100	99	93	86	74	59	43	27	45.7	23.4	22.3	10.0	17	1.3	2.610	SC	Calyey Sand		
	11.0 - 11.45	100	100	100	100	99	98	97	91	80	75	70	64	57	51	49.3	26.1	23.2	12.1	17	1.4	2.675	CI	Sandy CLAY	
	12.0 - 12.45	100	100	100	100	99	95	92	83	69	65	60	55	49	43	45.4	26.3	19.1	10.0	31	0.7	2.648	CI	Calyey Sand	

Approved By:

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Eng. Robert Tumwaige
 RSV Engineering Group Ltd

(3) 舗装設計計算

土質調査 CBR試験結果一覧

()内:「舗装設計便覧」より、現況CBR≦3の場合、有効路床厚+20cm=置換改良厚とする。

STA	0+000	1+000	2+000	3+000	4+000	5+000	6+100	7+100	8+000	9+000	10+000	11+000	12+000	13+100	14+000	15+000	16+000	17+000	18+000	19+000	20+000	21+000	22+000	23+000
① CBR計算値	19.0	3.0	7.0	6.0	23.0	16.0	16.0	16.0	18.0	22.0	27.0	18.0	15.0	8.0	23.0	10.0	4.0	13.0	15.0	7.0	4.0	24.0	23.0	16.0
PI	12.0	23.0	22.0	22.0	21.0	17.0	24.0	11.0	19.0	19.0	NP	23.0	17.0	24.0	21.0	23.0	18.0	19.0	21.0	19.0	19.0	13.0	9.0	23.0
AASHTO Soil Classification	A-2-6	A-7	A-2-7	A-7	A-2-6	A-7-6	A-6	A-2-7	A-2-6	A-7-6	A-1-b	A-2-7	A-2-6	A-2-6	A-2-6	A-7-6	A-6	A-2-6	A-7-5	A-2-6	A-6	A-2-6	A-2-5	A-2-7
Usual types of significant constituent materials	Clayey sand	Clayey soils	Silty soils	Clayey soils	Clayey sand	Clayey soils	Clayey soils	Clayey sand	Clayey sand	Clayey soils	Clayey gravel and sand	Clayey gravel and sand	Clayey gravel and sand	Clayey gravel and sand	Clayey gravel and sand	Clayey soils	Clayey soils	Clayey sand	Clayey soils	Clayey sand	Clayey soils	Clayey sand	Clayey sand	Clayey sand
General rating as a subgrade	good	poor	fair	poor	good	poor	poor	good	good	fair	excellent	good	good	good	good	poor	poor	good	poor	poor	good	poor	good	good
② 原路床の平均CBR	19.0		5.3		23.0	16.0		17.0		22.0		18.2				10.0	4.0	13.0	15.0	7.0	4.0			
③ 標準偏差(σ _{n-1})	-	2.1			-	0.0		1.4		-		7.3				-	-	-	-	-	-	-	-	-
④ 瑣路床のCBR(②、③)	19.0	3.2			23.0	16.0		15.6		22.0		10.9				10.0	4.0	13.0	15.0	7.0	4.0			
合成CBR値 盛土(CBR=15)厚60cm	-		8.9														9.5							
合成CBR値 盛土(CBR=15)厚45cm	15.0					15.0							12.6			12.1		13.9	15.0	10.1				
STA.0+000	STA.1+000			STA.4+000						STA.10+000					STA.15+000	STA.16+000	STA.17+000	STA.18+000	STA.19+000	STA.20+000	STA.21+000			STA.23+600
1.0 km	1.0 km	3.0 km	3.0 km	6.0 km	6.0 km	6.0 km	5.0 km	1.0 km	1.0 km	1.0 km	1.0 km	1.0 km	1.0 km	1.0 km	1.0 km	1.0 km	1.0 km	1.0 km	1.0 km	1.0 km	1.0 km	1.0 km	1.0 km	2.6 km
距離																								

1) Class B National Road : セメント改良路盤

DBST舗装計算 15Years Sta.1+000-Sta.4+000

下層:セメント改良路盤

必要舗装構造指数

舗装構造設計区間		西ナイル道路
18kip等価単軸載荷荷重	W18	960,000
信頼性係数	R (%)	75
標準偏差	ZR	-0.674
荷重及び舗装強度の標準誤差	S0	0.45
初期供用指数	P0	4.2
終局供用指数	P1	2.5
供用指数の差 (P0-P1)	PSI	1.7
路床土CBR値 (%)	CBR	8.9
路床土復元弾性係数	MR	13,350
舗装厚に必要な目標構造指数	SN	2.491

$$\text{Log}_{10}(W_{18}) = Z_R \times S_0 + 9.36 \times \text{Log}_{10}(\text{SN} + 1) - 0.20 + \{ \text{Log}_{10} [\frac{\text{PSI}}{(4.2 - 1.5)}] / [0.40 + 1094 / (\text{SN} + 1)^{5.19}] \} + 2.32 \times \text{Log}_{10}(\text{MR}) - 8.07$$

仮計算値 log ₁₀ (W18)=	5.982
右辺計算値=	5.982

提案する新設舗装構造の構造指数

舗装構成 (新設)	排水係数 (m)	層指数 (a)	層厚 (cm)
舗装構造設計区間			西ナイル道路
DBST舗装	-	0.200	3.0
粒状上層路盤	0.9	0.140	15.0
セメント安定処理路盤	1.1	0.180	20.0
提案舗装厚の構造指数 (SN)			2.54

$$\text{SN} = a_1 \times D_1 + a_2 \times m_2 \times D_2 + a_3 \times m_3 \times D_3$$

1 inch = 2.54cm

必要構造指数SN 2.491 < 提案舗装構造指数 2.54
OK

2) Class B National Road : 碎石路盤

DBST舗装計算 15Years 下層:クラッシャーラン

必要舗装構造指数

舗装構造設計区間		西ナイル道路
18kip等価単軸載荷荷重	W18	960,000
信頼性係数	R (%)	75
標準偏差	ZR	-0.674
荷重及び舗装強度の標準誤差	S0	0.45
初期供用指数	P0	4.2
終局供用指数	P1	2.5
供用指数の差 (P0-P1)	PSI	1.7
路床土CBR値 (%)	CBR	8.9
路床土復元弾性係数	MR	13,350
舗装厚に必要な目標構造指数	SN	2.491

$$\text{Log}_{10}(W_{18}) = Z_R \times S_0 + 9.36 \times \text{Log}_{10}(\text{SN} + 1) - 0.20 + \{ \text{Log}_{10} [\frac{\text{PSI} (4.2 - 1.5)}{[0.40 + 1094 / (\text{SN} + 1)^{5.19}]}] + 2.32 \times \text{Log}_{10}(\text{MR}) - 8.07 \}$$

仮計算値 $\text{log}_{10}(W18)=$	5.982
右辺計算値=	5.982

提案する新設舗装構造の構造指数

舗装構成 (新設)	排水係数 (m)	層指数 (a)	層厚 (cm)
舗装構造設計区間			西ナイル道路
DBST舗装	-	0.200	3.0
粒状上層路盤	0.9	0.140	15.0
粒状下層路盤	0.8	0.110	45.0
提案舗装厚の構造指数 (SN)			2.54

$$\text{SN} = a_1 \cdot D_1 + a_2 \cdot m_2 \cdot D_2 + a_3 \cdot m_3 \cdot D_3$$

1 inch = 2.54cm

必要構造指数SN 2.491 < 提案舗装構造指数 2.54
OK

3) フィーダー道路：セメント改良路盤

SBST舗装計算 5Years

下層：セメント改良路盤

必要舗装構造指数

舗装構造設計区間		西ナイル道路
18kip等価単軸載荷荷重	W18	1,650,000
信頼性係数	R (%)	75
標準偏差	ZR	-0.674
荷重及び舗装強度の標準誤差	S0	0.45
初期供用指数	P0	4.2
終局供用指数	P1	2.5
供用指数の差 (P0-P1)	PSI	1.7
路床土CBR値 (%)	CBR	15.0
路床土復元弾性係数	MR	22,500
舗装厚に必要な目標構造指数	SN	2.227

$$\text{Log}_{10}(W_{18}) = Z_R \times S_0 + 9.36 \times \text{Log}_{10}(\text{SN} + 1) - 0.20 + \{ \text{Log}_{10} [\frac{\text{PSI} (4.2 - 1.5)}{[0.40 + 1094 / (\text{SN} + 1)^{5.19}]}] + 2.32 \times \text{Log}_{10}(M_R) - 8.07 \}$$

仮計算値 log10(W18)=	6.217
右辺計算値=	6.217

提案する新設舗装構造の構造指数

舗装構成 (新設)	排水係数 (m)	層指数 (a)	層厚 (cm)
舗装構造設計区間			西ナイル道路
SBST舗装	-	0.200	
粒状上層路盤	0.9	0.140	15.0
セメント安定処理路盤	1.1	0.180	20.0
提案舗装厚の構造指数 (SN)			2.30

$$\text{SN} = a_1 \cdot D_1 + a_2 \cdot m_2 \cdot D_2 + a_3 \cdot m_3 \cdot D_3$$

1 inch = 2.54cm

必要構造指数SN 2.227 < 提案舗装構造指数 2.30
OK

4) フィーダー道路：碎石路盤

SBST舗装計算 5Years

下層：クラッシャーラン

必要舗装構造指数

舗装構造設計区間		西ナイル道路
18kip等価単軸載荷荷重	W18	1,650,000
信頼性係数	R (%)	75
標準偏差	ZR	-0.674
荷重及び舗装強度の標準誤差	S0	0.45
初期供用指数	P0	4.2
終局供用指数	P1	2.5
供用指数の差 (P0-P1)	PSI	1.7
路床土CBR値 (%)	CBR	15.0
路床土復元弾性係数	MR	22,500
舗装厚に必要な目標構造指数	SN	2.227

$$\text{Log}_{10}(W_{18}) = Z_R \times S_0 + 9.36 \times \text{Log}_{10}(\text{SN} + 1) - 0.20 + \{ \text{Log}_{10} [\frac{\text{PSI} (4.2 - 1.5)}{[0.40 + 1094 / (\text{SN} + 1)^{5.19}]}] + 2.32 \times \text{Log}_{10}(\text{MR}) - 8.07 \}$$

仮計算値 log ₁₀ (W18)=	6.217
右辺計算値=	6.217

提案する新設舗装構造の構造指数

舗装構成 (新設)	排水係数 (m)	層指数 (a)	層厚 (cm)
舗装構造設計区間			西ナイル道路
SBST舗装	-	0.200	
粒状上層路盤	0.9	0.140	15.0
セメント安定処理路盤	0.8	0.180	30.0
提案舗装厚の構造指数 (SN)			2.44

$$\text{SN} = a_1 \cdot D_1 + a_2 \cdot m_2 \cdot D_2 + a_3 \cdot m_3 \cdot D_3$$

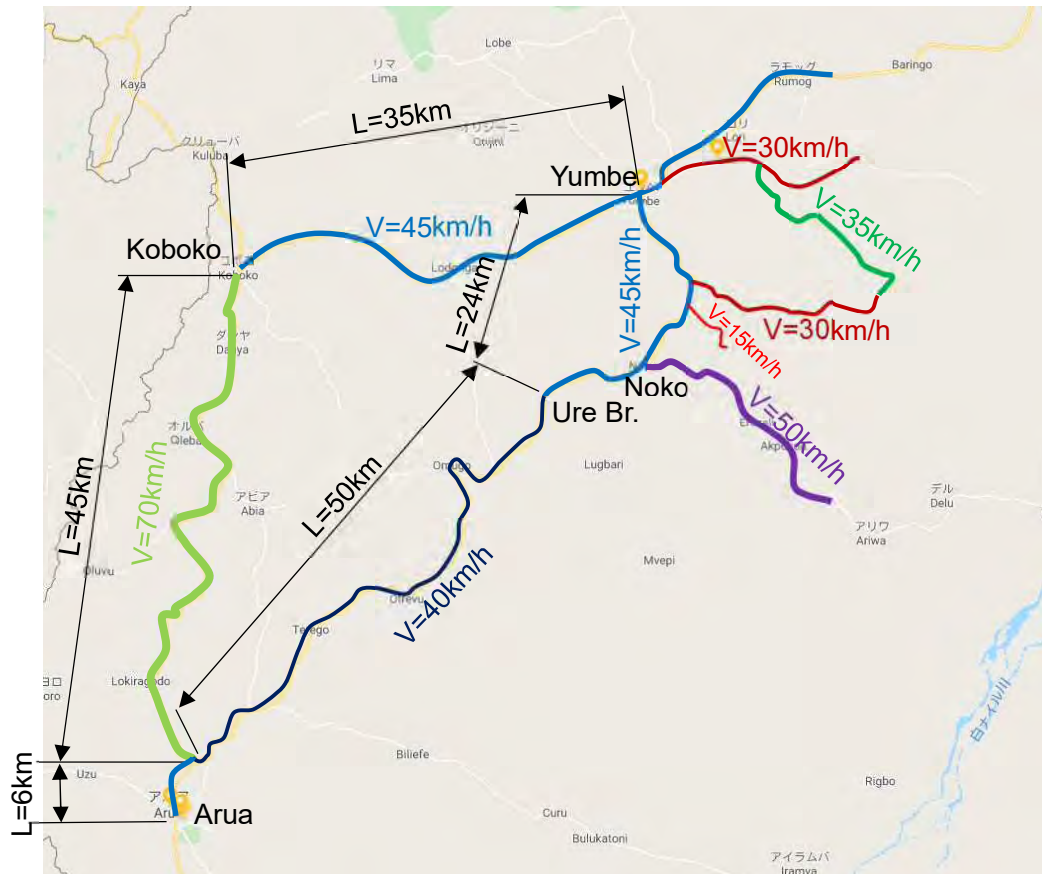
1 inch = 2.54cm

必要構造指数SN 2.227 < 提案舗装構造指数 2.44
OK

(4) 旅行速度

1) 現況

現地調査において、GPS ロガーを用いて、走行速度を計測した。実測値として、45 km/h となる。



2) 将来

事業完成後 3 年の走行速度の目標値を規制速度から算出した結果、64 km/h となった。

追加距離	区間距離 (km)	規制速度 (km/h)	所要時間 (h)
0			
2.9	2.9	50	0.058
6.8	3.9	80	0.049
6.9	0.1	50	0.002
8	1.1	80	0.014
9	1	50	0.020
11.6	2.6	80	0.033
12.5	0.9	50	0.018
13.4	0.9	80	0.011
14.1	0.7	50	0.014
15	0.9	80	0.011
15.8	0.8	50	0.016
17.3	1.5	80	0.019
18.8	1.5	50	0.030
19.7	0.9	80	0.011
20.2	0.5	50	0.010
21.9	1.7	80	0.021
22.7	0.8	50	0.016
23.6	0.9	50	0.018
		合計時間	0.371
		平均速度	63.655