

### 3 SHORT OVERVIEW OF THE LEGAL AND OF POLICY FRAMEWORK

#### 3.1 LEGAL PROCESS OF LAND ACQUISITION

Land acquisition is, mainly, ruled by the following laws:

- Ordinance 60.166 fixing the national roads' right-of-way to 2\*15m.
- Ordinance no.62-023 of 19 September 1962 on land acquisition for public utility by expropriation (DUP decree) or by amicable way.
- Law no.2005/019 dated October 17<sup>th</sup>, 2005 on land property
- Law no.2006-031 of November 24<sup>th</sup>, 2006 fixing the legal regime of the untitled private land ownership
- Decree no.63-030 of 18 January 1963 and its amendments which lay down the detailed rules for the application of the above-mentioned ordinance.

#### 3.2 JICA GUIDELINES ON RESETTLEMENT

JICA's resettlement policy is, in most points, similar to other related international donors policy. Every time involuntary resettlement occurs, the JICA policy requirements are:

- Avoid or minimize impacts as far as possible;
- Consultation with the local stakeholders (including illicit occupants), local NGOs, etc. who have views about cooperation projects;
- Payments of compensation for acquired assets at full replacement;
- Resettlement assistance to affected persons, including non-titled occupants;
- Ensure that no one is worse off as a result of resettlement and would maintain their, at least, pre-project standard of living;
- Special attention to vulnerable people/groups and ethnic minorities (if any)

#### 3.3 GAP ANALYSIS AND GAP FILLING MEASURES

There are some gaps between the Malagasy land acquisition law and JICA guidelines. The following table presents a related comparative analysis and measures adopted to fill the gaps:

TABLE 3.1 : COMPARATIVE ANALYSIS BETWEEN NATIONAL LEGISLATION AND JICA'S REQUIREMENTS

No.	JICA Guidelines	Laws of Madagascar	Gaps between JICA Guidelines and Laws of Madagascar	Resettlement Policy in the Project
1	Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives (JICA GL)	The national legislation is silent on this point	No distortion	Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives
2	When population displacement is unavoidable, effective measures to minimize impact and to compensate for losses should be taken. (JICA GL)	a) Impact minimization: No mention in the law b) Compensation: loss of assets should be compensated	Impact minimization is missing (which doesn't mean a distortion)	When population displacement is unavoidable, effective measures to minimize impact and to compensate for losses should be taken.
3	People who must be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported, so that they can improve or at least restore their standard of living, income opportunities and production levels to pre-project levels. (JICA GL)	The national legislation is silent on this point	No distortion	People who must be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported, so that they can improve or at least restore their standard of living, income opportunities and production levels to pre-project levels.
4	Compensation must be based on the full replacement cost as much as possible. (JICA GL)	Art. 28. - The expropriation indemnity is established taking into account the value of the building on the date of the public utility decree.	Distortion	Compensation must be based on the full replacement cost as much as possible.
5	Compensation and other kinds of assistance must be provided prior to displacement. (JICA GL)	The national legislation is silent on this point	No distortion	Compensation and other kinds of assistance must be provided prior to displacement.
6	For projects that entail large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public. (JICA GL)	No action plan required. However, the public should be informed	No distortion	For projects that entail large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public.
7	In preparing a resettlement action plan, consultations must be held with the affected people and their communities based on sufficient information made available to them in advance. (JICA GL)	Madagascar Environment Charter (Law no.2015-003) and Interministerial Order no.6830/2001: the affected people and related communities should be informed and associated to decision-making	No distortion	In preparing a resettlement action plan, consultations must be held with the affected people and their communities based on sufficient information made available to them in advance.
8	When consultations are held, explanations must be given in a form, manner, and	No legal mention about it but all regulatory means should be translated in Malagasy	No distortion	When consultations are held, explanations must be given in a form, manner, and language that are understandable to the affected people

No.	JICA Guidelines	Laws of Madagascar	Gaps between JICA Guidelines and Laws of Madagascar	Resettlement Policy in the Project
9	language that are understandable to the affected people. (JICA GL)	Article 13 of Decree no.63.030 and Interministerial Order no.6830/2001 related to public participation to environment and social impact assessment	No distortion	Appropriate participation of affected people must be promoted in planning, implementation, and monitoring of resettlement action plans. (JICAGL)
10	Appropriate and accessible grievance mechanisms must be established for the affected people and their communities. (JICA GL)	Grievance mechanism limited to use of Grievance books and Court Affairs	No distortion	Appropriate and accessible grievance mechanisms must be established for the affected people and their communities
11	Affected people are to be identified and recorded as early as possible in order to establish their eligibility through an initial baseline survey (including population census that serves as an eligibility cut-off date, asset inventory, and socioeconomic survey), preferably at the project identification stage, to prevent a subsequent influx of encroachers of others who wish to take advantage of such benefits. (WB OP 4.12 Para. 6)	Early census/identification of affected people; prior to public utility decree Cut-off date: after the 1 month advertisement of the list of affected people <sup>1</sup>	Minor distortion	Affected people are to be identified and recorded as early as possible in order to establish their eligibility through an initial baseline survey (including population census, and socioeconomic survey), preferably at the project identification stage. Cut-off date: after the 1 month advertisement of PAPs list. No newcomers accepted during this period or after. The advertisement list is, mainly, intended to missing people and possible faults during the census / survey
12.	Eligibility of benefits includes, the PAPs who have formal legal rights to land (including customary and traditional land rights recognized under law), the PAPs who don't have formal legal rights to land at the time of census but have a claim to such land or assets and the PAPs who have no recognizable legal right to the land they are occupying. (WB OP 4.12 Para. 15)	The law recognizes customary rights but no mention of associated advantages: Law no. 2006-031 on non-titled private lands and Law no. 62.023 - Article 20 - For unregistered and non-registered properties, owners are required to submit to the proprietor extracts from the proof of the property tax showing the inscription on this document for the two years preceding that of the public utility decree. All other interested parties are required to make themselves known within the same	No distortion	Eligibility of benefits includes, the PAPs who have formal legal rights to land (including customary and traditional land rights recognized under law), the PAPs who don't have formal legal rights to land at the time of census but have a claim to such land or assets and the PAPs who have no recognizable legal right to the land they are occupying

<sup>1</sup> In some cases, especially for inheritance, there may be a few entitled persons. If the list is not advertised, some right holders may be lost. List advertisement is a way to prevent such cases to occur.

No.	JICA Guidelines	Laws of Madagascar	Gaps between JICA Guidelines and Laws of Madagascar	Resettlement Policy in the Project
13.	Preference should be given to land-based resettlement strategies for displaced persons whose livelihoods are land-based. (WB OP4.12 Para.11)	period, failing which they may be deprived by the administration of all rights to compensation" Law no. 62.023 - Art. 44. - Compensations are, in principle, cash payments. However, any other conventional compensation is accepted.	No distortion	Preference should be given to land-based resettlement strategies for displaced persons whose livelihoods are land-based.
14.	Provide support for the transition period (between displacement and livelihood restoration). (WB OP 4.12 Para.6)	No mention about this	No distortion	Provide support for the transition period (between displacement and livelihood restoration).
15.	Particular attention must be paid to the needs of the vulnerable groups among those displaced, especially those below the poverty line, landless, elderly, women and children, ethnic minorities, etc. (WB OP 4.12 Para.8)	No mention about this	No distortion	Particular attention must be paid to the needs of the vulnerable groups among those displaced, especially those below the poverty line, landless, elderly, women and children, ethnic minorities, etc.
16.	For projects that entail land acquisition or involuntary resettlement of fewer than 200 people, abbreviated resettlement plan is to be prepared. (WB OP4.12 Para.25)	MECIE Decree: a separate RAP should be prepared for projects involving more than 500 PAPs	No distortion	For projects that entail land acquisition or involuntary resettlement of fewer than 200 people, abbreviated resettlement plan is to be prepared.

### 3.4 ELIGIBILITY POLICY. CUT-OFF DATE

For the purposes of this RAP, are eligible:

- a. Households directly or indirectly affected by the project, whether by the loss of all or part of a dwelling, land, business, a building or a given structure or by the loss of access to a source of income or a resource used as a means of livelihood.
- b. Those who have formal and legal rights to the lands in question (including customary and traditional rights recognized by applicable national laws)
- c. Households that occupy the land but do not have formal nor legal rights to land at the moment the survey starts.

#### **Eligibility deadline (Cut-off date)**

The cut-off date is November 20, 2018. Beyond this date, no new occupant can no longer be considered in the present RAP.

## 4 RESULTS OF THE CENSUS AND SURVEY

### 4.1 PROJECT OPTIONS

For each Project, 3 options have been designed. The following table summarizes the related impacts:

**TABLE 4.1 : NUMBER OF AFFECTED HOUSEHOLDS FOR THE 3 OPTIONS**

Project	Number of affected households		
	Plan-A	Plan-B	Plan-C
Mangoro Bridge	11	12	15
Antsapazana Bridge	4	2	1

Options for Mangoro: see Annex 1 : Options for the Mangoro project

Options for Antsapazana: see Annex 2 : Options for the Antsapazana project

### 4.2 IMPACT MINIMIZATION. SELECTION OF THE BEST OPTION

In preparation for this work, MAHTP and JICA prepared a list of three alternatives (Plan A, B, C) for each bridge and proceeded to their analysis to determine the most advantageous in terms of technical feasibility and environmental and social impacts.

The following tables show the alternative plan for each bridge:

As a result of the comparative analysis of the route options, Plans A for both bridges have been accepted because of their lower environmental and social impacts.

The Plans B and C for Mangoro and plans B and C for Antsapazana have been abandoned.



TABLE 4.2 : COMPARATIVE TABLE OF MANGORO BRIDGE ALTERNATIVE PLANS

Route Plan MANGORO Bridge	downstream		
	Plan A	Plan B	Plan C
Options	at 15m upstream	At 250m upstream	At 270m upstream
Locations	Right Bridge / Length=95m	Curved bridge / Length =195m	Curved bridge / Length=135m
Bridge Length	Approx. 50km/h or less	Approx. 60km/h ou moins	Approx. 50km/h or less
Nominal Speed	Right Bridge Construction	Curved Bridge Construction	Curved Bridge Construction
Construction	Forecast of 2-3 pillars under water	Forecast of 3-4 pillars under water	Forecast of 3-4 pillars under water
Outline	Road layout similar to the existing one	Improved road layout	Road layout similar to the existing one or slightly improved
Construction difficulty level	Normal	Higher than for the Plan A	Higher than for the Plan A
Social impact	5 involuntary resettlement and 4,632m <sup>2</sup> of land acquisition, total of 11 household, will be occurred, however this is the smallest number of people who affected by project, except the zero option.	8 involuntary resettlement and land acquisition, total of 12 household, will be occurred. The area of land acquisition is the much larger than plan A but smaller than plan C.	8 involuntary resettlement and land acquisition, total of 15 household, will be occurred. The area of land acquisition is the largest in alternatives.
Natural environment	Drilling and construction of structures will result in the loss of part of the riparian	Drilling and construction of structures will result in the loss of part of the riparian	Drilling and construction of structures will result in the loss of part of the riparian



	vegetation. The number of piers of new bridge is 2, which is less than the number of plan B and C.	vegetation. The number of piers of new bridge is 3 to 4, which is higher than that of Plan A.	vegetation. The number of piers of new bridge is 3 to 4, which is higher than that of Plan A.
Living environment/pollution	Since an increase of the traffic volume and the running speed are considered, noise level will be higher than current level. On the other hand, elimination of temporary stops before the bridge will reduce total emissions of exhaust gas and pollutants.	Since an increase of the traffic volume and the running speed are considered, noise level will be higher than current level. On the other hand, elimination of temporary stops before the bridge will reduce total emissions of exhaust gas and pollutants.	Since an increase of the traffic volume and the running speed are considered, noise level will be higher than current level. On the other hand, elimination of temporary stops before the bridge will reduce total emissions of exhaust gas and pollutants.
Road traffic function	Sufficient traffic capacity is ensured and smooth traffic to the Capital Antananarivo and Toamasina Port is secured.	Sufficient traffic capacity is ensured and smooth traffic to the Capital Antananarivo and Toamasina Port is secured.	Sufficient traffic capacity is ensured and smooth traffic to the Capital Antananarivo and Toamasina Port is secured.
Traffic safety	Since the bridge is newly established, there is no possibility of a third party accident due to aging or damage, and the sidewalk is sufficiently secured, so the possibility of a traffic accident is reduced.	Since the bridge is newly established, there is no possibility of a third party accident due to aging or damage, and the sidewalk is sufficiently secured, so the possibility of a traffic accident is reduced.	Since the bridge is newly established, there is no possibility of a third party accident due to aging or damage, and the sidewalk is sufficiently secured, so the possibility of a traffic accident is reduced.
Social economic activities, regional development	Smooth and safe transport promotes socioeconomic activities and regional development. Since logistics between Toamasina and Antananarivo is improved, it will contribute to the development of the whole country. In addition, local workers' income will increase due to the increase in employment opportunities of local workers and purchase of consumption logistics at the time of construction.	Smooth and safe transport promotes socioeconomic activities and regional development. Since logistics between Toamasina and Antananarivo is improved, it will contribute to the development of the whole country. In addition, local workers' income will increase due to the increase in employment opportunities of local workers and purchase of consumption logistics at the time of construction.	Smooth and safe transport promotes socioeconomic activities and regional development. Since logistics between Toamasina and Antananarivo is improved, it will contribute to the development of the whole country. In addition, local workers' income will increase due to the increase in employment opportunities of local workers and purchase of consumption logistics at the time of construction.
Project Cost	Bridge Construction: lesser Road Construction: lesser Relocation: The highest Expropriation: None Compensation: lesser Total: lesser	Bridge Construction: the highest Road Construction: High Relocation: The highest Expropriation: None Compensation: High Total: the highest	Bridge Construction: High Road Construction: the highest Relocation: None Expropriation: None Compensation: The highest Total: Relatively high



TABLE 4.3 : COMPARATIVE TABLE OF ANTSAPAZANA BRIDGE ALTERNATIVE PLANS

Route Plan ANTSAPAZANA Bridge				
		Plan A	Plan B	Plan C
Options	Replacement of the existing bridge	At 15 m downstream	At 15m downstream	
Locations	Right bridge / Length =30m	Port. draft/ Longueur=30m	Curved bridge / Length =30m	
Bridge Length	Approx. 80km/h or less	Similar to Plan A	Similar to Plan B	
Nominal Speed	Right bridge Construction No dyke required for the new road A No Diversion (dyke) during the construction works	Right Bridge Construction New Dyke L=500m No diversion required	Curved bridge Construction New Dyke L=500m No diversion required	
Construction	Layout similar to the existing one	Impacts of layout displacement for the new minimized route by choosing a larger curvature radius	<b>Potential negative friction on the Madarail side</b> Similar to plan B	
Construction Difficulty Level	Normal	Relatively high due to soft ground	Relatively high due to soft ground and the protection of Madarail's structures	
Social Impact	No involuntary resettlement will not be occurred, however land acquisition will be occurred	No involuntary resettlement will not be occurred, but land acquisition of the bridge is newly established, land acquisition	House relocation does not occur, but as a protection of Madarail's structures	



	occurred. This plan is the replacement of the current bridge and the area of land acquisition is the smallest in alternatives, but 16 month of land lease is necessary to construct temporarily detour route.	of plantation area for timber is necessary. Since the route is the longest, the land acquisition area is the largest.	of the land used as a cultivation area or a cultivation pond to be a new area occurs.
Natural environment	Due to the construction of the detour route, a part of the riparian vegetation disappears by excavation and the construction of the structure, but the detour route is removed after the operation of new bridge. It is considered that the vegetation is regenerated.	Drilling and construction of structures will result in the disappearance of wetlands and part of riparian vegetation.	Drilling and construction of structures will result in the disappearance of wetlands and part of riparian vegetation.
Living environment/pollution	Since an increase of the traffic volume and the running speed are considered, noise level will be higher than current level. On the other hand, elimination of temporary stops before the bridge will reduce total emissions of exhaust gas and pollutants.	Since an increase of the traffic volume and the running speed are considered, noise level will be higher than current level. On the other hand, elimination of temporary stops before the bridge will reduce total emissions of exhaust gas and pollutants.	Since an increase of the traffic volume and the running speed are considered, noise level will be higher than current level. On the other hand, elimination of temporary stops before the bridge will reduce total emissions of exhaust gas and pollutants.
Road traffic function	Sufficient traffic capacity is ensured and smooth traffic to the Capital Antananarivo and Toamasina Port is secured.	Sufficient traffic capacity is ensured and smooth traffic to the Capital Antananarivo and Toamasina Port is secured.	Sufficient traffic capacity is ensured and smooth traffic to the Capital Antananarivo and Toamasina Port is secured.
Traffic safety	Since the bridge is newly established, there is no possibility of a third party accident due to aging or damage, and the sidewalk is sufficiently secured, so the possibility of a traffic accident is reduced.	Since the bridge is newly established, there is no possibility of a third party accident due to aging or damage, and the sidewalk is sufficiently secured, so the possibility of a traffic accident is reduced.	Since the bridge is newly established, there is no possibility of a third party accident due to aging or damage, and the sidewalk is sufficiently secured, so the possibility of a traffic accident is reduced.
Social economic activities, regional development	Smooth and safe transport promotes socioeconomic activities and regional development. Since logistics between Toamasina and Antananarivo is improved, it will contribute to the development of the whole country. In addition, local workers' income will increase due to the increase in employment opportunities of local workers and purchase of consumption logistics at the time of construction.	Smooth and safe transport promotes socioeconomic activities and regional development. Since logistics between Toamasina and Antananarivo is improved, it will contribute to the development of the whole country. In addition, local workers' income will increase due to the increase in employment opportunities of local workers and purchase of consumption logistics at the time of construction.	Smooth and safe transport promotes socioeconomic activities and regional development. Since logistics between Toamasina and Antananarivo is improved, it will contribute to the development of the whole country. In addition, local workers' income will increase due to the increase in employment opportunities of local workers and purchase of consumption logistics at the time of construction.
Project Cost	Bridge Construction: lesser	Bridge Construction: lesser	Bridge Construction: Moderate

	Road Construction: lesser Temporary Route: High Relocation: None Expropriation: None Compensation: lesser Total: lesser	Road Construction: High Temporary Road: None Relocation: None Expropriation: None Compensation: Moderate Total: High	Road Construction: High Temporary Route: None Relocation: None Expropriation: None Compensation: High Total: the Highest
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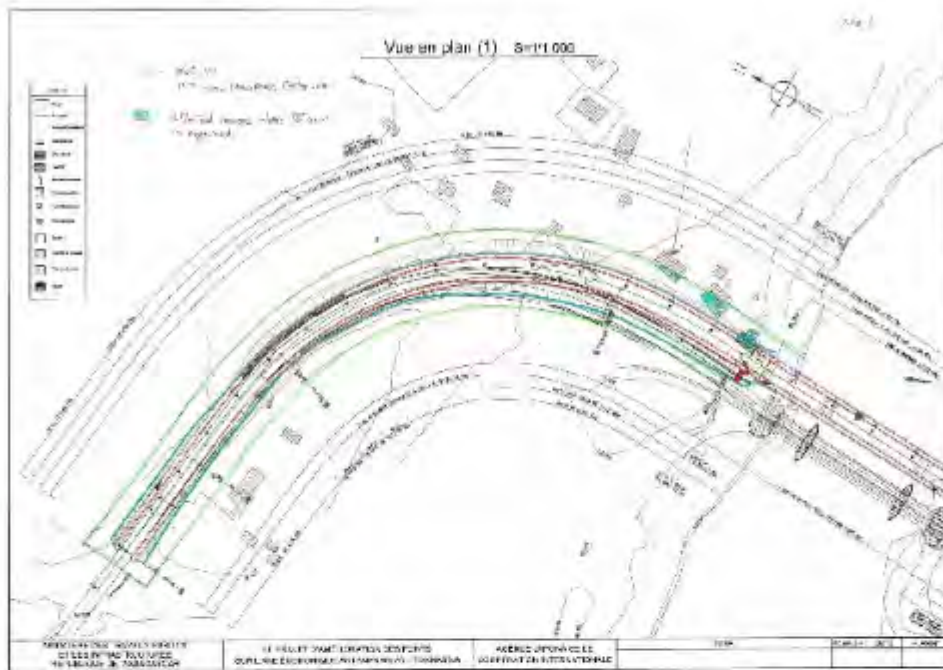


FIGURE 4.1 : FINAL LAYOUT FOR MANGORO - PART 1 (RIGHT BANK OF MANGORO RIVER)

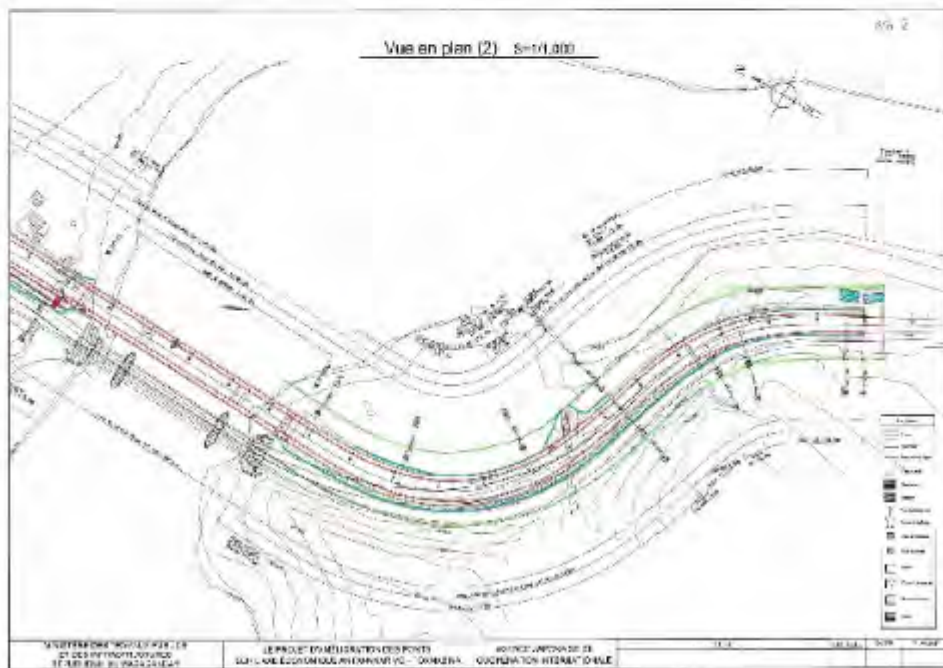


FIGURE 4.2 : FINAL LAYOUT FOR MANGORO – PART 2 (LEFT BANK OF MANGORO RIVER)

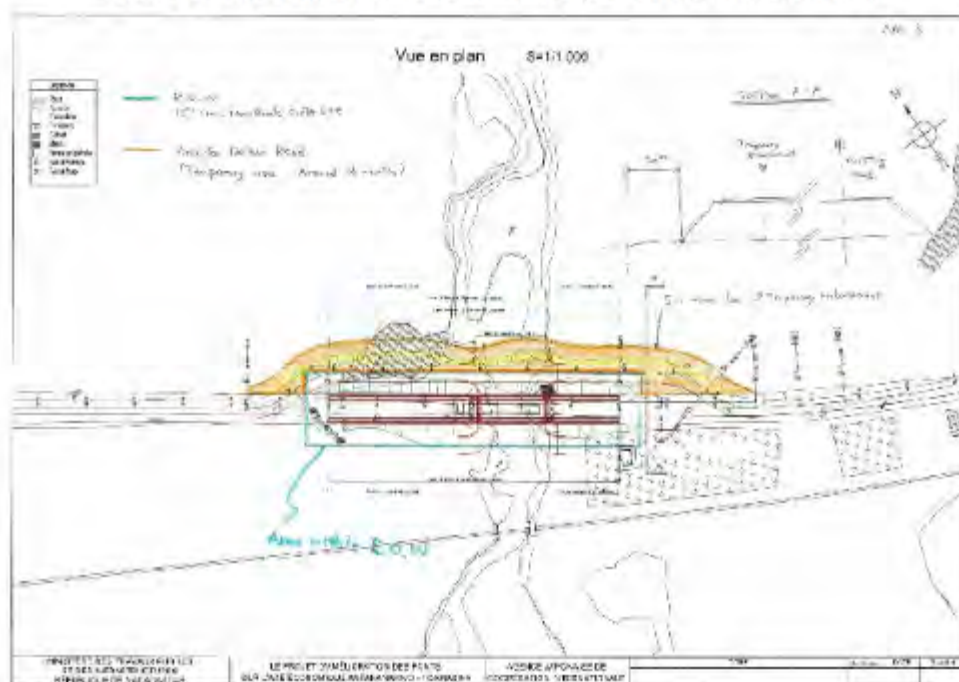


FIGURE 4.3 : FINAL LAYOUT FOR ANTSAPAZANA

#### 4.3 AFFECTED HOUSEHOLDS

11 and 4 households will be respectively impacted for the Mangoro and the Antsapazana Projects, and 5 PAUs will be relocated at Mangoro village.

Moreover, 3 community facilities (stairway) will be demolished at Mangoro/Antanjona village.

Codes have been attributed to project impacted people / communities.

Project	Initial	Option (Name of plan)	House No.
Mangoro Bridge	M	A	1 = 1 - 11
Antsapazana Bridge	A	A	1 = 1 - 4

Example:

**MA1**: Impacted household for the **M**angoro Project, **A** Option, no. **1**



TABLE 4.4 : NUMBER OF PAPS WHO REQUIRED DISPLACEMENT

Type of loss	No of PAUs			No of APs		
	Legal	Customary	Total	Legal	Customary	Total
Required for displacement						
1. HH (Structure owner on Gov. land)	0	4	4	0	24	24
2. HH (Structure on Private land)	1	0	1	4	0	4
3. HH (Tenants)	0	0	0	0	0	0
4. CBEs (Structure owner on Gov. land)	0	0	0	0	0	0
5. CBEs (Structure on Private land)	0	1	1	4	0	4
6. CBEs (Tenants)	0	0	0	0	0	0
7. Community owned structures <sup>2</sup> including physical cultural resources	0	(3)	3	4	24 <sup>3</sup>	28
Not required for displacement						
8. Land owners	3	6	9	0	12	12
9. Wage earners	0	0	0	0	0	0
Grand Total	4	11	15 <sup>4</sup>			40

Note: 2 and 5 represent the same household: house and shop impacted

TABLE 4.5 : NUMBER OF APS IN EACH PAU

PAUs	Note	Age 0-5		Age 6-10		Age11-17		Age18-25		Age26-40		Age41-59		Age60-		Total PAPs
		H	F	H	F	H	F	H	F	H	F	H	F			
MA1	Private company	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
MA2		1			1			1				1				4
MA3						1	1			1	1					4
MA4										1	1					2
MA5					1			1	1			1				4
MA6						1		1					1			3
MA7				1		1							1			3
MA8		1						1								2
MA9	Private company	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
MA10						1				1	1					3
MA11				1		1				1	1					4
AA1												1	1			2
AA2	Private company	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
AA3	Private company	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
AA4	Disputed land	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
Total		2	0	2	2	5	1	4	1	4	4	3	3	0	0	31

<sup>2</sup> Earthen staircase

<sup>3</sup> M10, M11 and Antsapazana PAPs are not concerned

<sup>4</sup> Does not include the 3 earthen staircases

#### 4.4 TYPES AND EXTENT OF IMPACTED ASSETS

##### 4.4.1 Summary of impacts

As mentioned in the table above, 15 entities will experience loss of assets and/or disturbance of economic activities. Therefore, impacts will be of diverse categories.

They are listed below:

TABLE 4.6 : TYPES, NUMBER AND EXTENT OF IMPACTED ASSETS

PAPs Code	Dwelling House (m <sup>2</sup> )	Outbuildings	Crops	Fruit and/or timber trees	Affected land area (m <sup>2</sup> )
<b>Mangoro</b>					
MA1			No	Yes	1,045
MA2			Yes	Yes	110
MA3			Yes	Yes	7
MA4			Yes	Yes	385
MA5		Toilets: 1.5m <sup>2</sup>	Yes	Yes	439
MA6	59.89		Yes	Yes	704
MA7	46		Yes	Yes	223
MA8	29.28	Toilets: 1.5m <sup>2</sup> Wood Fences: 15m 2 wooden cottages: 9.6m <sup>2</sup>	Yes	Yes	369
MA9			No	Yes	800
MA10	48		No	Yes	250
MA11	31.5		No	Yes	300
<b>Antsapazana</b>					
AA1			Yes	Yes	Within existing ROW
AA2			No	Yes	Land lease
AA3			No	Yes	Land lease
AA4			No	Yes	Within existing ROW

**Notes:**

- 3 staircases (community small infrastructures) will also be demolished
- For the new Mangoro bridge, the road's center line will be slightly moved so, there will land acquisition. The land plots may be titled or not within the new 30m right-of way.

The related land plot plans are shown below:

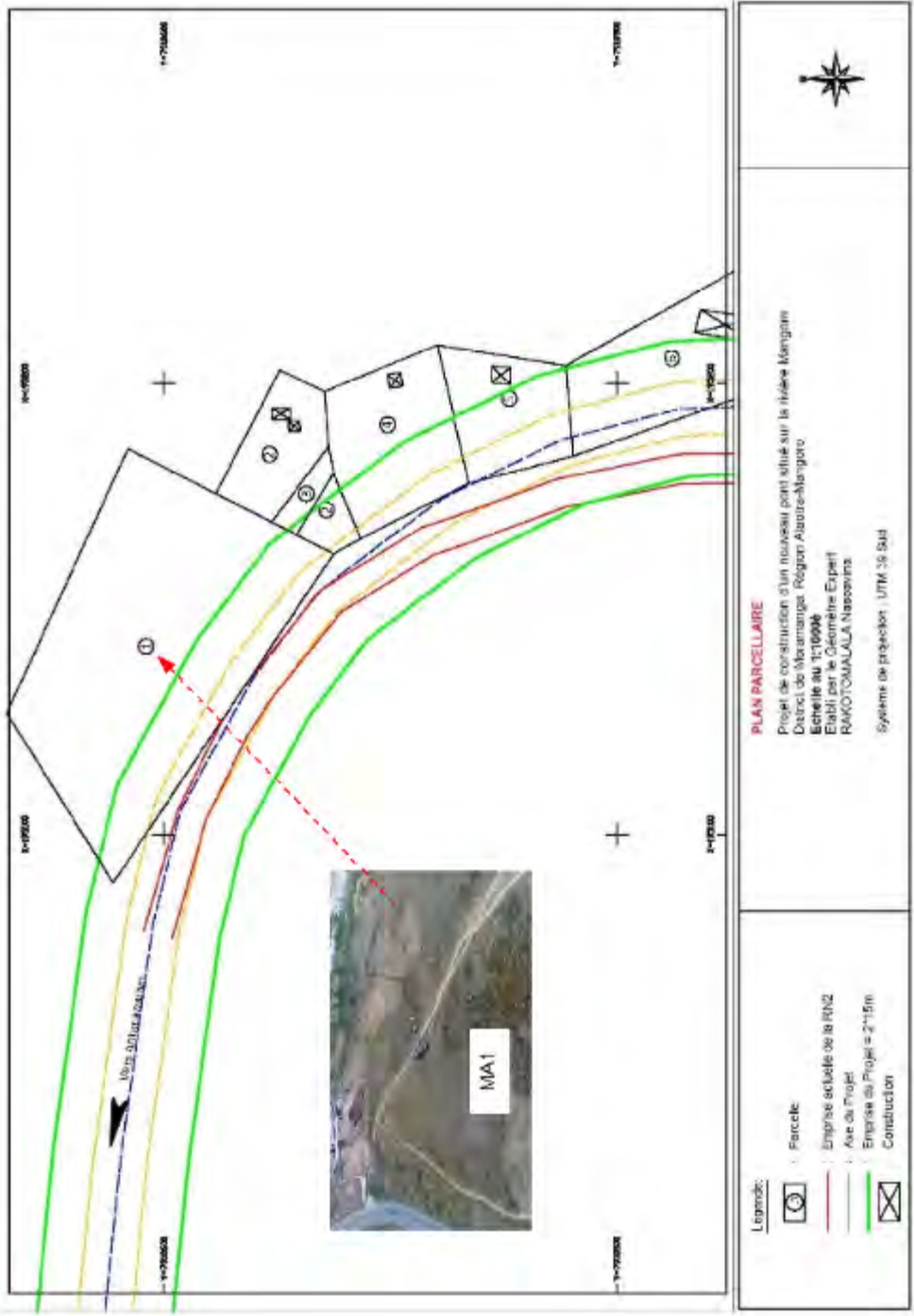


FIGURE 4.4 : LAND PLOT PLAN - MANGORO 1

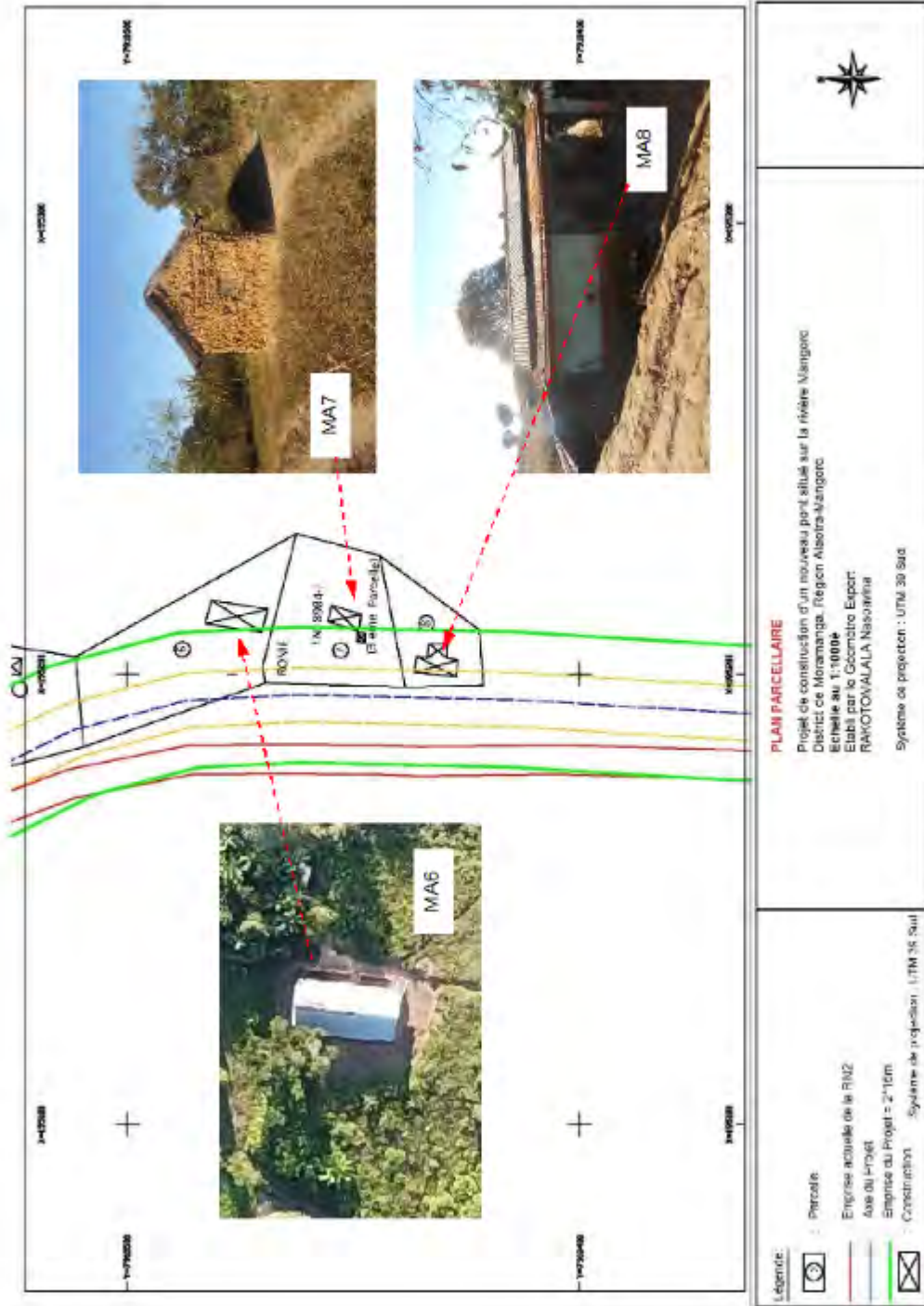


FIGURE 4.5 : LAND PLOT PLAN – MANGORO 2



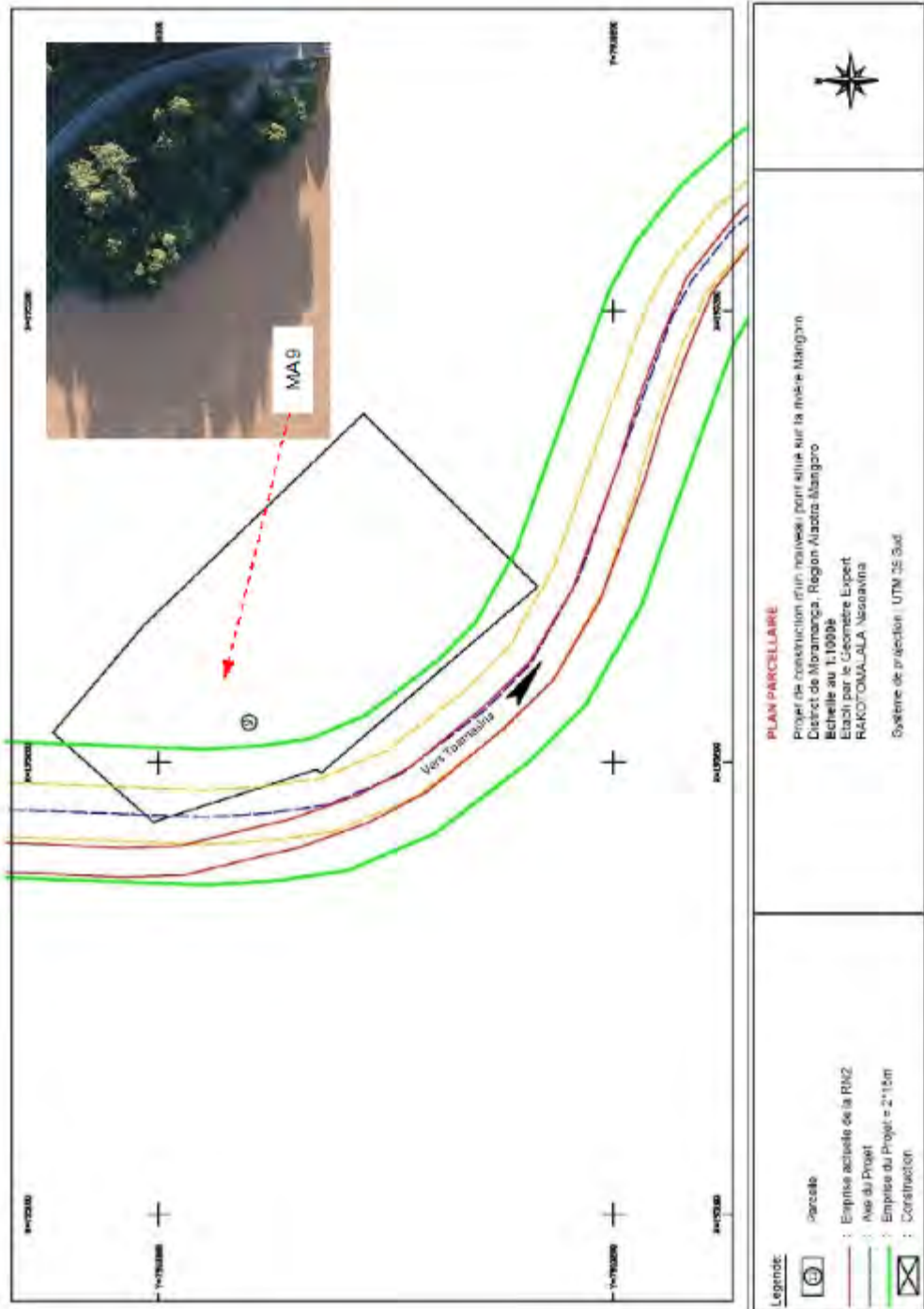


FIGURE 4.6 : LAND PLOT PLAN - MANGORO 3









As a summary, will be impacted:

- 11 households for the Mangoro Project
- 4 households for the Antsapazana Project

Types of loss:

- Houses
- Fruit trees / timber trees
- Crops
- Small community infrastructures / staircases (see photo on the right )



#### 4.4.2 Severity of impacts

In this study, severity of impact is limited to the following parameters:

TABLE 4.7: SEVERITY OF IMPACTS

Parameters	Severity	Conclusion
Land loss versus Total agricultural land holding	<25% for all PAPs Residual holding still viable	Prorated cash compensation should be enough
Loss / Disruption of income source	High for MA8 (small grocer)	Relocation operations (cash compensations, new building ...) should be completed prior to civil work kick-off Land available backwards

#### 4.5 MAIN CHARACTERISTICS OF IMPACTED HOUSEHOLDS

##### 4.5.1 General

On one hand, Antsapazana is close to the city of Moramanga, therefore, AA1 can benefit from all available facilities: education, health and others.

On the other hand, for the Mangoro PAPs, there are neither schools nor hospitals in the village. People should go to neighbouring villages or Moramanga for such purposes. Some of them are still practising traditional medicine.

However, the crop fields are all close to their village.

##### 4.5.1.1 Demographic aspects

All affected entities have been surveyed during the socioeconomic studies. In this context, it is recalled that there are 3 categories of entities that are affected:

- Households: 11
- Private companies: 4
- The population of the Mangoro/Ankarefo village: loss of 3 earth stairs that allow them access to the village from the RN2.

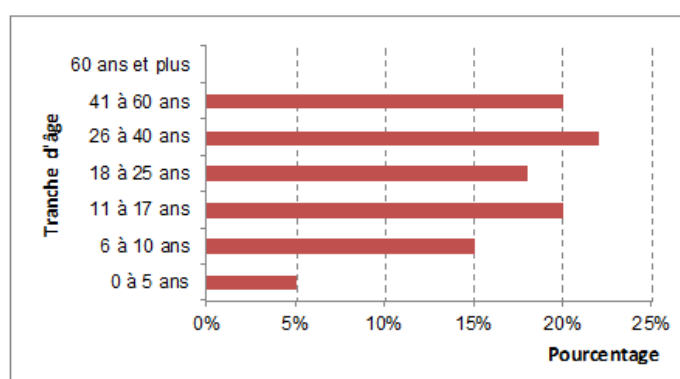
The total number of people in the affected households amounts to 31 individuals<sup>5</sup> (against 44 individuals for all the part of the village of Ankarefo that is concerned, the part of the village that is located across the RN2 is not affected). The related distribution is the following:

**TABLE 4.8: DEMOGRAPHIC FEATURES OF THE AFFECTED HOUSEHOLDS FOR THE 2 PROJECTS**

0 to 5 years old	6-10	11 to 17	18 to 25	26 to 40	41 to 60	60 years old and more
5%	15%	20%	18%	22%	20%	0%

There is no individual over 60 years among affected persons. On the contrary, the affected population is young even though there are only 5% of children less than 5 years old, which is low.

The average household size is 2.8 people, which is much lower than the average in the District of Moramanga, which is 5.1 people per household. The size of households is very low because the simple mode is equal to 2. In some cases, there is only a single major person in a household.



**FIGURE 4 : DISTRIBUTION OF INDIVIDUALS IN AFFECTED HOUSEHOLDS BY AGE**

The fraction of the labour force is 60% of the affected population.

#### 4.5.1.2 Education

The situation of education in the affected households is as follows:

**TABLE 4.9: EDUCATION IN AFFECTED HOUSEHOLDS**

Sex of household head	Education level			
	Primary	College	High school	University
Woman head of household	3	1	0	0
Male head of household	2	4	1	0
Total	5	5	1	0

All heads of affected households were at school. Then during the implementation phase, no specific measures will be required on this point of view.

Expenses related to the schooling of the children vary in very broad measures according to several parameters (number of children at school, level, other): according to surveys with households affected, costs vary from 12 000 to 500 000 MGA / year, depending on the case. The high costs relate to high school students.

<sup>5</sup> 11 households out of a total of 15 do not have land titles, and 28 peoples out of a total of 31 do not have land titles.

#### 4.5.1.3 Economic activities of households

In 45 to 90% of affected households, the other members of the family are practising other activities to earn their living.

Practised activities are diverse:

- Regular worker
- Agriculture
- Small livestock
- Small business
- Fishing.

**TABLE 4.10: ECONOMIC ACTIVITIES IN THE AFFECTED HOUSEHOLDS**

Activity of the head of household	Number
Formal worker	2
Agriculture	11
Small livestock	5
Small business	2
Fishing (in the Mangoro river)	2
Total	11 <sup>6</sup>

All households are farming, whether they are regular employees or other. Most of the household heads are practising several activities at the same time or according to the seasons.

Therefore, agriculture plays a major role in all of the affected households. Fortunately, according to the table above, parts of land that will be subject to State expropriation are only part which are less than 25% of the entire land of the concerned households. The residual holdings are, therefore, still enough to ensure their living.

#### 4.5.1.4 Situation in terms of employment. Household income

Household incomes vary in large measures:

**TABLE 4.11: ANNUAL REVENUE WITHIN AFFECTED HOUSEHOLDS**

Household activities	Mangoro/Ankarefo	Antsapazana
Merchants households	Around 12,000,000 Ar	Around 9,000,000 Ar
Non merchants households	1 – 3,000,000Ar	-
Savings	Traditional	Traditional

As a reminder, to make ends meet at the end of each month, all households PAPs are combining several activities at the same time.

#### 4.5.1.5 Land ownership and housing

All the affected households are owners. In some cases, 2 or 3 households are sharing one house.

In general, apart from impacted private companies for which all land plots are titled, only one household has a land title. All households settle for traditional occupation.

This issue has been raised during the public consultation: unit prices for titled land plots will be less than for titled ones because land titling is very expensive.

<sup>6</sup> In general, households members are practising a few activities.

#### 4.5.1.6 Water supply

As there is no borehole well in the Mangoro village: the population takes water from a well situated downstream the village. Some of them are taking water from the Mangoro river but all people are washing their clothes in this latter.

In Antsapazana, AA1 is taking water from a neighbouring water source.

#### 4.5.1.7 Household energy

Despite the fact that the villages are located in a charcoal producing area, only 2 households use it for cooking. All the others use firewood.

For lighting, all PAPs are using petrol, candles or small solar panels with 1 or 2 bulbs, depending on the case.

#### 4.5.1.8 Health care

Among the affected households, malaria remains the first dominant pathology. Other most frequent pathologies are related to:

- tooth pains
- diarrhoea
- headaches.

For treatment, 45 percent of households declared consulting a doctor. For the remaining households, self-medication and traditional methods are practiced.

### 4.5.2 **Specific characteristics**

#### 4.5.2.1 Mangoro PAPs

Except from MA9<sup>7</sup> and MA1<sup>8</sup>, all impacted households are living on agriculture, fishing and small livestock. Only MA8 is also a small grocer.

Houses are all mud made (if not mud bricks) and they are all owners. Some of them do not have a separate kitchen.

Only 2 families have toilets. All other people are defecating in the nature.

According to the results of the surveys, all households' members have been to school even though, to date, none of them have to the university.

In general, given the households size, all Mangoro PAPs live below the 2USD / day poverty line.

4 households are headed by women.

#### 4.5.2.2 Antsapazana PAPs

AA3 is a rich family who is exploiting a big restaurant in Moramanga. No land loss but land lease during the civil work for the needs of the road deviation.

AA2 is a big private company. No land loss but land lease during the civil work. Also, there will be no land loss but land lease during the civil work for the needs of the road deviation.

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<sup>7</sup> MA9 : IMRA

IMRA is a private company working on traditional pharmacy.

<sup>8</sup> MA2 : used to be a brick manufacturer. The impacted parcel is a fallow land.



AA1 is living on agriculture and commerce. This family does not usually sell timber wood. All their kids are now grown ups and the spouses are living alone. They are earning their living by means of a small grocery stall and agriculture products.

AA2: the impacted land plot is still subject to a dispute under the auspices of the Moramanga Court. Therefore, until now, no one knows yet who the owner is.

#### 4.5.3 Vulnerable groups

With reference to the results of the socioeconomic survey, 9 Mangoro PAPs out of 11 have been identified to be vulnerable households: MA2-8, MA10-11.

All efforts should be made by the GoM to ensure that the proposed Project benefits to them.

#### 4.5.4 PAPs database

On the basis of the survey sheets, an Excel file summarizing the socio-economic data has been prepared. During the implementation of the Plan, this file will be complemented with payments and other support granted to households to build the database on RAP implementation.

Generally speaking, the database contains the following data:

- Identification of the household head
- Civil status
- Education
- Health
- Expenses
- Occupations of household members
- Household income before the project
- Other socio-economic data
- Land tenure (owner, tenant)
- Photos of affected assets.

Such database will be useful during the mid-term audit and the closure audit to assess changes in the standard of living of PAPs *before, during* and *after* the implementation of the Plan.

## 4.6 PUBLIC PARTICIPATION

A series of public consultations have been organized in order to allow them to participate to decision-making. Affected populations, local authorities as well as other stakeholders have participated.

The related sessions aim to share the right information at the appropriate moment and to collect participants' issues and suggestions. 2 rural municipalities are concerned by the Projects: Ambohivary (Antsapazana Project) and Anosibe Ifody (Mangoro Project)

Methods of calculations of unit prices have also been presented and accepted.

Chronology of the public consultations is reported below:

TABLE 4.12: CHRONOLOGY OF PUBLIC CONSULTATIONS

Date	Location / Aims of the sessions	Participants		
		Men	Women	Total
<b>1<sup>st</sup> series of public consultations</b>				
During A/RAP preparation	08/15/18 <u>Location:</u> Analatsara <u>Fokontany:</u> Andranokobaka <u>Commune:</u> Ambohibary <ul style="list-style-type: none"> <li>• Beginning of information and public consultation on the project</li> <li>• Basic information on the Project</li> <li>• Project possible impacts: <ul style="list-style-type: none"> <li>- envisaged activities</li> <li>- Possible impacts</li> <li>- Environmental and social measures</li> </ul> </li> <li>• Survey and A/RAP schedule</li> <li>• Collection of participants' general concerns and suggestions</li> </ul>	28	14	42
During A/RAP preparation	08/16/18 <u>Location:</u> Antanjona <u>Fokontany:</u> Ankarefo <u>Commune:</u> Anosibe Ifody <ul style="list-style-type: none"> <li>• Beginning of information and public consultation on the project</li> <li>• Basic information on the Project</li> <li>• Project possible impacts: <ul style="list-style-type: none"> <li>- envisaged activities</li> <li>- Possible impacts</li> <li>- Environmental and social measures</li> </ul> </li> <li>• Collection of participants' general concerns and suggestions</li> </ul>	43	25	71
<b>2<sup>nd</sup> series of public consultations</b>				
Middle of A/RAP preparation	20/09/18 <u>Location:</u> Analatsara <u>Fokontany:</u> Andranokobaka <u>Commune:</u> Ambohibary <u>Place:</u> Andranokobaka Primary school <ul style="list-style-type: none"> <li>• Collection of participants' general concerns and suggestions for alternative plan</li> </ul>	16	13	29
Middle of A/RAP preparation	21/09/18 <u>Location:</u> Antanjona <u>Fokontany:</u> Ankarefo <u>Commune:</u> Anosibe Ifody <u>Place:</u> Antanjona public place <ul style="list-style-type: none"> <li>• Collection of participants' general concerns and suggestions for alternative plan</li> </ul>	14	2	16
<b>Other hearing before/during survey</b>				
Before the beginning of the survey	24/08/18 District Order no.08/2018 dated August 24, 2018 pertaining to the opening Order of the Moramanga District Chief opening the administrative <i>commodo</i> and incommdo survey relating to amicable acquisition or by way of expropriation of the various land parcels or parts of land plots necessary for the construction of the two new bridges Mangoro and Antsapazana.	Advertisement at different location to target all interested people		
10/20/18 *Cut off date	10/20/18 <u>Location:</u> Antanjona <u>Fokontany:</u> Ankarefo <u>Commune:</u> Anosibe Ifody	6	8	14

Date	Location / Aims of the sessions	Participants		
		Men	Women	Total
	PAPs from Antsapazana have been transported to the site <ul style="list-style-type: none"> <li>• Reminders</li> <li>• Summary of social impacts</li> <li>• Proposed measures</li> <li>• Survey and A/RAP schedule</li> <li>• Compensation methods chosen by affected households</li> <li>• Calculation of compensations</li> <li>• Other RAP data</li> </ul>			

The main bullet points are summarized below:

**TABLE 4.13 : MAIN ISSUES RAISED BY STAKEHOLDERS DURING CONSULTATIONS**

Questions/Issues raised. Suggestions	Response
<b>1<sup>st</sup> series of public consultations</b>	
Job creation for local youngsters	The request will be communicated to the contractant. As far as the required skills are available at the local level, recruitment will be done accordingly.
More than 80% households do not have land titles. Will this issue be considered?	The Commission will consider all types of land tenure
Humps to prevent from road accidents	Will be communicated to bridge / road designers
Extent of land acquisition	The ROW will be the same. There won't be too much land acquisition. The ROW will be delineated prior to civil work.
For crop losses: a few cultivation cycles should be considered instead of only one	Crop loss compensations will be calculated proportionally to one cultivation cycle. Prices will be based upon current market prices.
When would the civil work take place?	Probably after one year period
How about titled land parcels? Traditional occupation	A Commission will be charged to assess all impacted land plots. Titled or not. The Government cannot go against decisions of the Commission. An attested affidavit substitute declaration will be required for inheritants.
I have a titled land parcel near to the existing bridge. Will we be relocated far from our regular clients?	This fact will be considered during the studies
We have been informed that banana plants have been destroyed prior to civil work. <sup>9</sup> We are also aware of possible water pollution during the civil work.	All people who had lost crops/trees should inform the local authorities. Colas has made a few drilling holes for geotechnical studies. Measures to prevent from water pollution will be taken during the civil work. An example has been given upon people who benefited from new boreholes for similar projects
Will we be informed prior to civil work commencement?	Neighbour people will be informed prior to civil work
We have heard about traditional ceremony prior to the work. According to local habits, a <i>joro</i> is usually organized prior to work	Ceremonials for laying the first foundation stone are usually organized a few months prior to civil work. During such occasion, officials often offer one or two zebus.

<sup>9</sup> For this complain, the Coras told residents about civil work before the work, but they didn't do very well with mutual understanding. They talked after the consultation and reached the settlement.

Questions/Issues raised. Suggestions	Response
The Commission should adopt appropriate communication strategy with local people in order to prevent from misunderstandings	The surveyors are noting all your questions / suggestions. They will report to the commissioners who will decide accordingly. Therefore, you are invited to tell them all your issues.
<b>2<sup>nd</sup> public consultations. Presentation of the draft A/RAP</b>	
Will loss of earnings prior to the first fructification be taken into account?	The calculations take this aspect into account.
Case of titled land parcels? Traditional occupation?	Should the land parcel be within the current ROW, there will be no compilation for the land, titled or not. Once it is outside the current ROW, an unit price will be issued by the Land Office: compensation will be calculated accordingly. Compensation for non-titled land parcels will be less than that of titled plots as land titling is costly. <sup>10</sup>
We would request to be paid before the civil work to occur, long time enough to enable us to be prepared	All compensations should be completed prior to commencement of civil work.

<sup>10</sup> As a reminder, the process of land titling is the following :

- Topographic work (scaling in line with that of Topographic Service)
- Approval by the local Topographic Service
- Filing of the supporting documents to the local Land Office
- Verification and preparation of the land title
- Land title delivery

The whole process may take 6 months to 4 years.

The related costs are not proportional to the surface area : daily fees for the topographers + processing fees



## 5 COMPENSATIONS

### 5.1 SUMMARY OF TYPE OF LOSS

TABLE 5.1: TYPES OF LOSS – MANGORO PROJECT

PAPs Code	Land (m <sup>2</sup> )		All or part of buildings					Crops <sup>11</sup>	Timber / Fruit trees
	Affected	Total	House	Toilets	Cabin	Fences	Kitchen		
MA1	1 045	3 418							
MA2	110	588						X	X
MA3	7	95						X	X
MA4	385	898						X	X
MA5	439	651		1				X	X
MA6	704	1 107	1					X	X
MA7	369	790	1					X	X
MA8	223	379	1	1	2	15m	1	X	X
MA9	800	4 660							X
MA10	250	500	1						
MA11	300	300	1						
Community infrastructures	3 stairs								

TABLE 5.2: TYPE OF LOSS – ANTSAPAZANA PROJECT

PAPs Code	Land lease during civil work	All or part of buildings					Crops <sup>12</sup>	Timber / Fruit trees
		House	Toilets	Cabin	Fences	Kitchen		
AA1	No	No	No	No	No	No	X	X
AA2	Yes	No	No	No	No	No		X
AA3	Yes	No	No	No	No	No		X
AA4	No	No	No	No	No	No		X

### 5.2 UNIT PRICES

Given the fact there are titled land plots, a public utility decree (DUP decree) should be adopted by the Government. An amicable approach can also be adopted but this would be difficult with regards to the current socioeconomic environment.

According to the provisions of Ordinance no.62.023 and its application decree no.63.030, pursuing the adoption of a DUP decree relating to land acquisition, an Evaluation Committee (EC) called "CAE: Commission administrative d'évaluation<sup>13</sup>" should be set up to approve unit prices:

- Unit prices for crop losses include:
  - the production cost of a given crop during the last campaign
  - the cost of the investment made by the farmer to fertilize the soil and make it capable of producing at its current level (hand labor, seeds, natural fertilizer with manure, etc.)
  - for perennial crops (fruit trees, other), the calculation should include the number of years to get the tree to replace the lost production.
  - For annual or seasonal crops, the formula used for the calculation of the compensation for a monoculture parcel is:
 
$$\text{Compensation cost} = \text{area} * [(\text{Yield} * \text{Local Unit Price}) + \text{Cost of unit development}]$$
  - In case of two or three associated crop cultivation on the same crop field, the yield performance will be reduced by 30% of its value.

<sup>11</sup> See Table 5.3 for crop and timber losses in Mangoro.

<sup>12</sup> See Table 5.4 for crop and timber losses in Antsapazana.

<sup>13</sup> CAE : Administrative Evaluation Committee

- Unit prices for loss of fruit/timber trees include:
  - acquisition of a seeding plant
  - pitting (soil preparation)
  - transplantation
  - loss of earnings until first fruits (for fruit trees)
  - cost of timber trees
- Unit prices for buildings include:
  - Earthworks (site preparation)
  - Full replacement cost for different types of structures (based on the collection of information on the number and types of materials used to build different types of structures (bricks, beams, doors, etc.) at local current prices
  - Transport and delivery costs to the site
  - Current prices for construction of new buildings and structures, including the costs of the required hand labor and a margin for the contractant.
- Unit price for land/land lease
  - Unit prices for land lease used in this document are that which are currently practised in the area. In practice, it is a private negotiation between the lessee and the land owner.

Given the fact the DUP hasn't yet been adopted, standard unit prices have been used here. The quotes might be revised downwards<sup>14</sup> by the EC before the implementation.

The related details have been annexed.

### 5.3 COMPENSATION COSTS FOR FULL REPLACEMENT

Counts have been undertaken with the owners:

**TABLE 5.3 : CROP / TREE LOSSES (MANGORO BRIDGE)**

PAPs Code	Crops/Fruit trees	Number	Unit Price (Ar)	Compensation Cost (Ar)
MA2	Banana	20	26,000	520,000
	Pineapple	46	3,500	161,000
	Peach tree	7	125,000	875,000
	Orange	5	230,000	1,150,000
	Sugar cane	10	240,000	2,400,000
	Guava	1	48,000	48,000
	Bibass tree	3	80,000	240,000
	Raventsara	1	45,000	45,000
	Cassava	10	6,000	60,000
	Potato	10	1,000	10,000
MA3	Banana	8	26,000	208,000
MA4	Mango tree	5	223,000	1,115,000
	Orange Blossom	3	230,000	690,000
	Sugar cane	7	12,000	84,000
	Lychees	1	238,000	238,000
	Passion fruit	1	47,000	47,000
	Banana	10	26,000	260,000
	Bibass tree	2	80,000	160,000
	Acacia	1	15,000	15,000

<sup>14</sup> In this document, Unit Prices for land and buildings have been a bit, intentionally, overestimated in order to enable the MAHTP to have enough financial provisions.

PAPs Code	Crops/Fruit trees	Number	Unit Price (Ar)	Compensation Cost (Ar)
	Lychee	1	238,000	238,000
MA5	Bean fields	surface		60,000
	Banana	6	26,000	156,000
	Sugar cane	3	2,400	7,200
	Peach tree	2	125,000	250,000
MA6	Cassava	surface		270,000
	Bibass tree	1	80,000	80,000
	Peach tree	4	125,000	500,000
MA7	Banana	16	26,000	416,000
	Avocado	3	115,000	345,000
	Mango tree	4	223,000	892,000
	Orange Blossom	4	230,000	920,000
	Voatabia hazo	3	100,000	300,000
	Peach tree	4	125,000	500,000
	Bibass tree	3	80,000	240,000
	Khaki	2	225,000	450,000
	Pineapple	20	3,500	70,000
	Jambolan	6	68,000	408,000
	Tamarind	1	126,000	126,000
	Mandarine	2	230,000	460,000
	Oviala	4	6,000	24,000
	Raventsara	5	45,000	225,000
	MA8	Avocado	2	115,000
Pechier		5	125,000	625,000
Grapefruit		6	120,000	720,000
Jamblon tree		2	68,000	136,000
Mango tree		1	223,000	223,000
Coffee tree		1	220,000	220,000
Corrossol		2	220,000	440,000
Khaki		1	225,000	225,000
Banana		9	26,000	234,000
Voatabiahazo		2	100,000	200,000
MA9	Cypress	116	6,000	696,000
	Eucalyptus	44	18,000	792,000
	Raventsara	7	45,000	315,000
Total				20,319,200

TABLE 5.4 : CROP / TREE LOSSES (ANTSAPAZANA BRIDGE)

PAPs Code	Crops/Fruit trees	Number	Unit Price (Ar)	Compensation Cost (Ar)	
AA1	Eucalyptus	< 10c m	5	90,000 /tree	9,0000
		> 10c m	0	300,000 /tree	0
	Pinus	17	120,000 /tree	2,040,000	
	Bean Crops	150m <sup>2</sup>	600 /m <sup>2</sup>	90,000	
AA2	Eucalyptus	< 10c m	67	1206000 /tree	1,206,000
		> 10c m	5	300,000 /tree	300,000
	Pinus	15	120,000 /tree	1,800,000	
AA3	Eucalyptus	< 10c m	41	738,000 /tree	738,000
		> 10c m	7	420,000 /tree	420,000
	Pinus	21	120,000 /tree	2,520,000	
AA4	Eucalyptus	< 10c m	12	216,000 /tree	216,000
		> 10c m	0	300,000 /tree	0
	Pinus	25	120,000 /tree	3,000,000	
Total				12,420,000	

TABLE 5.5 : MANGORO PROJECT - LOSS OF LAND

PAPs Code	Affected area (m <sup>2</sup> )	Total area (m <sup>2</sup> )	Unit Price		Cost of Land acquisition (Ar)
			Titled	Non-titled	
MA1	1,045	3,418		20,000	20,900,000
MA2	110	588		20,000	2,200,000
MA3	7	95		20,000	140,000
MA4	385	898		20,000	7,700,000
MA5	439	651		20,000	8,780,000
MA6	704	1,107		20,000	14,080,000
MA7	369	790	40,000		14,760,000
MA8	223	379		20,000	4,460,000
MA9	800	4,660	40,000		32,000,000
MA10	250	500		20,000	5,000,000
MA11	300	300		20,000	6,000,000
Total					116,020,000

Titled land: 40 000Ar/m<sup>2</sup>, Nontitled land: 20 000Ar/m<sup>2</sup>

TABLE 5.6 : ANTSAPAZANA PROJECT -LAND LEASE

PAPs Code	Land lease (16 months)		
	Lease (m <sup>2</sup> )	PU (Ar/m <sup>2</sup> /year)	Amount (Ar)
AA2	1,578	600	1,262,400
AA3	1,117	600	893,600
Total			2,156,000

TABLE 5.7 : MANGORO PROJECT - LOSS OF BUILDINGS

PAPs Code	Type of materials	Dimensions of houses	UP (Ar/m <sup>2</sup> )	WC	UP (Ar/WC)	Cottage 1	Cottage 2	UP (Ar/m <sup>2</sup> )	Wood fence	UP (Ar/m)	Kitchen	UP (Ar/m <sup>2</sup> )	Cost of Buildings
MA1													
MA2													
MA3													
MA4													
MA5				1,5	150,000								225,000
MA6	Mud	59,89 m <sup>2</sup>	100,000										5,989,000
MA7	Mud	29,28 m <sup>2</sup>	100,000										2,928,000
MA8	Mud bricks	46 m <sup>2</sup>	150,000	1,5	150,000	4,36	5,2E	191,000	15	11,000	8,42	6C,00C	9,636,140
MA9													
MA1C	Mud	48 m <sup>2</sup>	120,000										5,760,000
MA11	Mud	31,5 m <sup>2</sup>	120,000										3,780,000
Community infrastructure													
Number of staircases: 3												Unit price: 250,000Ar	
Total (Ar),												28,318,140	
Total (Ar),												750,000	



#### 5.4 SUPPORT TO VULNERABLE GROUPS

- MA8 is also a small grocer. During the resettlement operations, he may experience possible loss of income / shortfall: it is proposed to support him for the equivalent of 1 week earnings, which amounts to 1/4 of his monthly earnings (survey sheet) or 129,231Ar

Additional Note: Only MA8 is concerned because, as a grocer, he may suffer financial loss of income and needs additional support.

- Resettlement operations will cause disturbance to vulnerable households. It is proposed to support for an amount of 15,000Ar each (total: 9\*15,000Ar = 135,000Ar)

During the resettlement operations, households PAPs, especially vulnerable ones, will suffer multiple disturbances such as waste of time instead of cropping in the fields, other reasons. Finally, disturbance allowances should be paid to them.

- The contractant may also help the 3 households to be relocated during their moving.

#### 5.5 RECAPITULATION

TABLE 5.8 : TOTAL COMPENSATION COSTS

Area	Resettlement compensation		Total cost
	Item	Cost (Ar)	
Mangoro	Buildings	28,318,140	165,671,571 (Ar)
	Crops/Timbers	20,319,200	
	Assistances for resettlement	264,231	
	Community infrastructure	750,000	
	Land acquisition	116,020,000	
Antsapazana	Crops/Timbers	12,420,000	14,576,000 (Ar)
	Land lease (Ar)	2,156,000 (16 months)	
Total (1USD=3,400Ar)			180,247,571 (Ar) 53,014 (USD)

#### 5.6 COMPENSATION TABLE FOR EACH PAP

TABLE 5.9 : MANGORO - COMPENSATION COST PER PAP

PAPs code	Land	Building	Crop/Timber	Total Compensation Cost (Ar)
MA1	20,900,000	0	0	20,900,000
MA2	2,200,000	0	5,509,000	7,709,000
MA3	140,000	0	208,000	348,000
MA4	7,700,000	0	2,847,000	10,547,000
MA5	8780000	225,000	473,200	9,403,200
MA6	14,080,000	5,989,000	850,000	20,919,000
MA7 (titled land plot)	14,760,000	2,928,000	5,376,000	23,064,000
MA8	4,460,000	9,636,140	3,253,000	17,349,140
MA9 (titled land plot)	32,000,000	0	1,803,000	33,803,000
MA10	5,000,000	5,760,000	0	10,760,000
MA11	6,000,000	3,780,000	0	9,780,000
Community infrastructure (Staircases)				750,000
Total	116,020,000	28,318,140	20,319,200	165,407,340

TABLE 5.10 : ANTSAPAZANA - COMPENSATION COST PER PAP

PAPs code	Compensations (Ar)	Note	
AA1	2,220,000	Trees + Crops (Bean)	Impacted land within ROW
AA2	4,568,400	Trees + Land lease (16 months)	
AA3	4,571,600	Trees + Land lease (16 months)	
AA4	3,216,000	Trees	Impacted land within ROW
Total	14,576,000	-	-

## 5.7 ENTITLEMENT MATRIX

In this study, units of entitlement eligible to receive compensation are constituted by the following impacted entities:

- Households
- Private companies
- Community

According to the results of the surveys, all impacted entities have chosen cash compensations for all kinds of impacts. The entitlement matrix is summarized below:

TABLE 5.11 : ENTITLEMENT MATRIX

Type of affected asset	Compensation Measures			
	In-kind compensation	Cash compensation based on local market price – full replacement	Other allowances	Formalities
Trees	No	Yes	No	Prior information of each impacted household before civil work
Fences	No	Yes	No	Prior information of each impacted household before civil work
Land	No	Yes: for land plots outside the 2*15m existing right-of-way		Prior information of each impacted household before occupation
Land lease	No	Loss of timber trees: Cash compensation Loss of crops (beans for AA1): Cash compensation	No	Information of land owners Negotiation of the fees with land owners
All or part of a given construction(House)	No	Yes All households have chosen cash compensation	Disturbance allowance for vendors	Information of each impacted household prior to work
	No	Yes All households have chosen cash compensation	Disturbance allowance for vendors	Written acceptance of the concerned household
Veranda (part of a house) or outbuildings	No	Yes All households have chosen cash compensation	No	Information of each impacted household prior to work

Type of affected asset	Compensation Measures			
	In-kind compensation	Cash compensation based on local market price – full replacement	Other allowances	Formalities
Building used for economic activity	No	Yes	Disturbance allowance	Notification of each impacted household and payment before work
Disruption of economic activities	No	Yes: compensation of loss of earnings	No	Notification of each impacted household and payment before work

## 6 INSTITUTIONAL FRAMEWORK

The implementation of the A/RAP will require:

- a Management Unit
- a Steering committee
- a Grievance Committee

### 6.1 MANAGEMENT UNIT

The Management Unit (MU) will be composed by:

- 1 representative of the MAHTP/Antananarivo
- 1 representative of the MAHTP/Moramanga
- 1 local specialist in socioeconomics

This person will in permanent touch with the PAPs. His/her wage will be 800 000Ar/month.

The MU will be charged to implement the A/RAP, pay the cash compensations, ensure internal monitoring and document all actions.

### 6.2 EVALUATION COMMITTEE. STEERING COMMITTEE

The Evaluation Committee will be in line with the provisions of Ordinance no.62.023 and of the requirements of JICA:

- During the evaluation of the affected assets, it is called "CAE<sup>15</sup>".
- Then, during the implementation phase, it will turn to "Steering Committee" with other possible new members.

Members will be nominated by the District Chief (for the CAE) and by the District Chief or the Ministry of Public Works for the Steering Committee.

<sup>15</sup> CAE : "Commission administrative d'évaluation". It is a Committee which will be set up with regards to the upcoming DUP decree. Its members will be charged to approve the unit prices and determine all compensations or allowances.

The different roles are compared below:

**TABLE 6.1 : ROLES OF THE EC AND OF THE STEERING COMMITTEE**

<b>Provisions of Ordinance no.62.023 of 19.09.62 relating to expropriation for public utility, amicable acquisition of real estate by the State or public authorities and of Decree 63.030</b>	<b>Requirements of the A/RAP</b>
<b>Composition of Evaluation Committee</b> Art. 7 of Decree 63.030 President : <ul style="list-style-type: none"> <li>o The head of Local Land Office</li> </ul> Members : <ul style="list-style-type: none"> <li>o The mayor or his representative</li> <li>o A representative of the Director-general of finance</li> <li>o A representative of the Ministry of Agriculture</li> </ul> Specialists may support the EC but do not have the right to vote.	<b>Composition of the Steering Committee</b> President: <ul style="list-style-type: none"> <li>o Prefect or Chief of the District</li> </ul> Members: <ul style="list-style-type: none"> <li>o Regional Director of finance and Budget or his representative</li> <li>o Head of the local Land Service or his representative</li> <li>o Regional direction of the Population or his representative</li> <li>o 2 Representatives of the civil society</li> <li>o The Mayor or his representative</li> <li>o 2 Representatives of the affected households</li> </ul>
<b>Role of the Evaluation Committee</b> Section 10 of the Ordinance 62.023 The Evaluation Committee approves the unit prices and related compensation amounts	<b>Role of the Steering Committee</b> A/RAP: <ul style="list-style-type: none"> <li>o Supervision of strategic actions</li> <li>o Deliberation on possible applications of the Management Unit concerning the enforcement of the A/RAP,</li> <li>o Approval of the communication program with affected households</li> <li>o Approval of the implementation A/RAP completion Report</li> </ul>

### 6.3 GRIEVANCE COMMITTEE

The members of the Grievance Resolution Committee will be nominated by the District Chief or the MAHTP. It will be composed by:

- Head: Representative of the District
- Members:
  - o Representative of the local Land Office
  - o The Mayor or his representative
  - o 2 representatives of traditional authorities
  - o 2 representatives of PAPs.

The grievance resolution mechanism will be the following:

TABLE 6.2 : THE GRIEVANCE RESOLUTION MECHANISM

Stage	Action	Liabilities	Observation	Timing
Stage 0	Complaints to the Fokontany or the Municipality, anonymous or not	Head of Fokontany Municipality Agent	Recording of the elements of the complaint in the registry dedicated to this effect.	1 day
Stage 1	Mediation by Elders of the Fokontany, the head of Fokontany and other neighborhood committees	Elders of the Fokontany, Chief Fokontany, president neighbourhood Committee, plaintiff(s), a representative of the Project	Minutes of mediation to be established by the Chief of Fokontany and the MU officers	1 day to 1 week
Stage 2	Mediation by the Mayor assisted by the MU	The Mayor or his representative, the plaintiff, a representative of the MU	Minutes of mediation to be prepared by the municipality with the assistance of the MU	2 days to 1 week
Stage 3	Arbitration by the GRC, assisted by the MU	The GRC that can solicitate help from anyone it deems competent to help the resolution of the dispute, the complainant, a representative of the project	Minutes of mediation to be established by the GRC supported by the MU.	3 days to 1 week
Stage 4	Court affairs A financial provision should be available by the GoM	Judge	Court decision	Prorated based

Financial provisions for the different Committees are given below:

TABLE 6.3 : BUDGET FOR THE COMMITTEES (ARIARY)

Bodies	Meetings			Transportation		Total Amount (Ar)
	Times	Members	Unit price	Members	Unit price	
Grievance Committee	4	6	30,000	6	60,000	1,080,000
Steering C	3	6	30,000	6	60,000	900,000
Evaluation C.	1	5	30,000	1	60,000	210,000
					Total:	2,190,000

#### 6.4 MONITORING AND EVALUATION

For the envisaged Projects, given the number of PAPs and the extent of the impacts, an internal Monitoring and Evaluation works could be enough. However, it is recommended to proceed to an external evaluation.

The evaluation will take place:

- In the middle of the implementation phase, and
- 1 month prior to final work.

A provision amounting to 600,000,000Ar will be necessary.

The Monitoring Plan would refer to the table below:



TABLE 6.4 : MONITORING PLAN

Items	Contents	Timing	Implementing Bodies	Responsible Bodies
Address to the PAPs	Disclosure of information such as contents of final compensation and schedule etc	After the Detailed design phase Before the construction)	MAHTP	ONE (Steering Committee)
Agreement to compensation	As soon as an agreement is reached on the payment price, confirm the signature on the payment document	After the Detailed design phase Before the construction)	MAHTP	ONE (Steering Committee)
Implementation of compensation	Confirming the implementation status (progress) of compensation	After the Detailed design phase Before the construction)	MAHTP	ONE (Steering Committee)
Implementation of relocation	Confirming the implementation status (progress) of relocation	After the Detailed design phase Before the construction)	MAHTP	ONE (Steering Committee)
Socio-economic situation	<i>Confirmation of living conditions at relocation destination</i>	After the relocation	MAHTP	MAHTP
Hearing and responding to requests and complaints from PAPs	Confirmation of discontent from residents Confirmation of implementation status of complaint handling	After the relocation	MAHTP	MAHTP

Below would the Indicators Monitoring

PLAN:TABLE 6.5 : MONITORING FOAM (IMPLEMENTATION STATUS OF RESIDENTS RELOCATION AND COMPENSATION)

(Notice of the bidding document from March 2020 and construction work from August, 2020)

Items	Expected No.	No. of progress		Percentage of progress		Completion date	Responsible Bodies
		As of the end of November 2019	As of the end of December 2019	As of the end of November 2019	As of the end of December 2019		
Address to the PAPs	15						MAHTP
Agreement to compensation	15						MAHTP
Implementation of land acquisition (Mangoro)							MAHTP
Implementation of land acquisition (Antsapazana)							MAHTP
Implementation of relocation (Mangoro)							MAHTP
Implementation of compensation (Mangoro)							MAHTP
Implementation of compensation (Antsapazana)							MAHTP

The table below would be used to monitor the implementation status of residents relocation and compensation:

**TABLE 6.6 : MONITORING FOAM (IMPLEMENTATION STATUS OF RESIDENTS RELOCATION AND COMPENSATION)**

Date	Item	Correspondence situation	Implementation result

All along the implementation phase, any complaints from PAPs should be recorded and managed in a proper way according to the table below:

**TABLE 6.7 : MONITORING FOAM (COMPLAINTS FROM PAPS)**

Date	Item	Correspondence situation	Implementation result

Indeed, the results of a given complaint / dispute should be notified to the plaintiff. All related documents should be part of the ARAP Database and should be available for free consultation.

## 6.5 IMPLEMENTATION SCHEDULE

The following implementation calendar is line with the civil work schedule:

The implementation of land acquisition, resettlement, and compensation for Project Affected Persons (PAPs) should be done before notice of bidding document.

TABLE 6.8 : IMPLEMENTATION SCHEDULE

Items	2019												2020											
	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12				
Acquisition of environmental permission	▼																							
Determination of detailed design																								
Implementation of relocation, land acquisition, and compensation																								
- Address to PAPs				▼																				
- Agreement to compensation					▼																			
- Implementation of payment of compensation fee																								
- Implementation of relocation																								
Completion of relocation, land acquisition, and compensation										▼														
Notice of the bidding document												▼												
Construction																								
Exchange of Notes (E/N)	▼																							
Grant Agreement (G/A)	▼																							

## 7 A/RAP BUDGET

TABLE 7.1 : A/RAP BUDGET

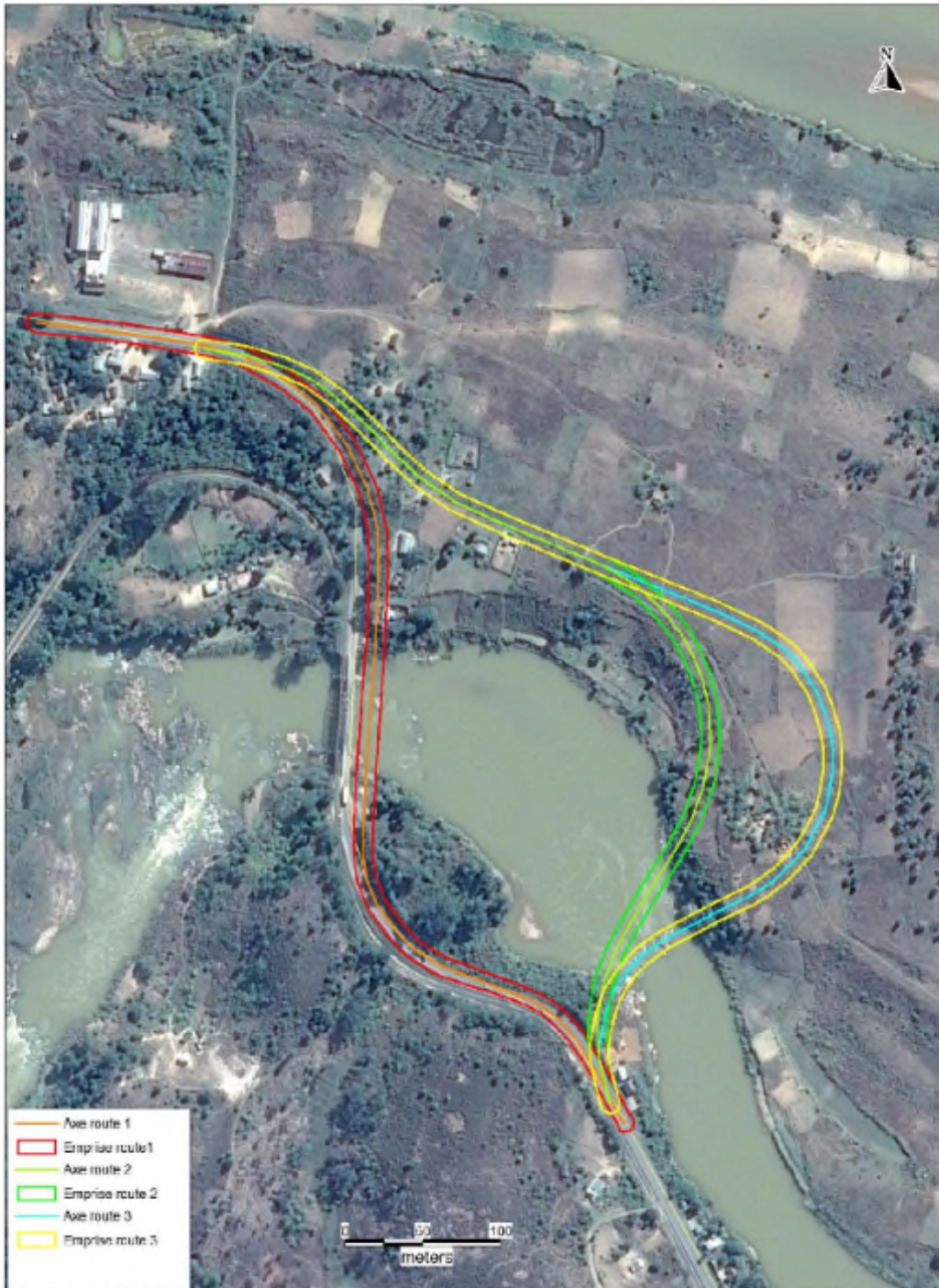
No.	ITEM	Ariary	USD	Liabilities
<b>1.</b>	<b>Compensation costs for PAPs</b>			GoM
1.1	Mangoro Project	165,407,340	43,793	
1.2	Antsapazana Project (AA1, AA4)	5,436,000	1,599	
<b>2.</b>	<b>Support costs to PAPs</b>			
2.1	Support to MA8 for possible loss of income / shortfall (small grocer)	129,231	38	GoM
2.2	Support to vulnerable households during resettlement	135,000	40	GoM
<b>3.</b>	<b>Administrative costs:</b>			
3.1	Evaluation Committee	210,000	62	GoM
3.2	Operating costs of the management unit + Grievance Committee + Steering Committee	6,780,000	1,994	GoM
3.3	Provision for possible Court affairs	1,000,000	294	GoM
3.4	Land titles modification: 2 at Mangoro	3,000,000	882	GoM
<b>4.</b>	<b>Land lease or compensation (AA2, AA3)</b>			
4.1	Compensation/Timber trees	6,984,000	2,054	GoM
4.2	Lease or compensation	2,156,000	634	GoM
<b>5.</b>	<b>Monitoring &amp; Evaluation costs</b>	60,000,000	17,647	GoM
	Grand Total	251,237,571	73,894	-

(\*): Commercial earnings: 480,000Ar/month:129,231Ar

**Annexure**



ANNEX 1 : OPTIONS FOR THE MANGORO PROJECT



## ANNEX 2 : OPTIONS FOR THE ANTAPAZANA PROJECT





## ANNEX 3 : DISTRICT ORDER



## DISTRICT DE MORAMANGA

## ARRETE N° 08/2018

**Portant ouverture d'une enquête administrative de *commodo et incommodo* relative à l'acquisition à l'amiable ou par voie d'expropriation des diverses parcelles de terrain ou parties de parcelles de terrain nécessaires à la construction des deux nouveau ponts du Mangoro et d'Antsampsazana.**

## LE CHEF DE DISTRICT DE MORAMANGA

Vu la Constitution;

Vu l'Ordonnance no.62-023 du 19 Septembre 1962 relative à l'expropriation pour cause d'utilité publique, à l'acquisition à l'amiable des propriétés immobilières pour l'Etat ou les Collectivités publiques secondaires et aux plus-values foncières, notamment en son article 4 ;

Vu la loi no.2005-019 du 17 octobre 2005 fixant les statuts des terres à Madagascar,

Vu la Loi no.2006-031 du 24 novembre 2006 fixant le régime juridique de la propriété foncière privée non titrée,

Vu la Loi no.2008-014 du 23 Juillet 2008 sur le Domaine privé de l'Etat, des Collectivités Décentralisées et des personnes morales de Droit public, abrogeant les dispositions de la Loi no.60-004 du 15 Février 1960 sur le domaine privé national

Vu la loi no.2014 - 018 régissant les compétences, les modalités d'organisation et de fonctionnement des collectivités territoriales décentralisées, la gestion de leurs propres affaires ;

Vu le Décret no.64-399 du 24 septembre 1964 modifiant certaines dispositions du Décret no.63-030 du 16 janvier 1963 fixant les modalités d'application de l'Ordonnance no.62-023 du 19 septembre 1962 ;

Vu le Décret no.2007-1109 du 18 décembre 2007 portant application de la loi N°2006-031 du 24 novembre 2006 fixant le régime juridique de la propriété foncière privée non titrée.

Vu le décret no.2017-078 du 2 Février 2017 portant nomination du Chef de District ;

Vu le Décret no.2018-529 du 4 Juin 2018 portant nomination du Premier Ministre, Chef du Gouvernement;

Vu le Décret no.2018 - 540 du 11 Juin 2018 portant nomination des membres du Gouvernement ;

**ARRÊTE :**

**Article premier :** Il est décidé l'ouverture d'une enquête administrative de *commodo et incommodo* relative à l'acquisition amiable ou par voie d'expropriation des diverses parcelles de terrain ou parties de parcelles de terrain nécessaires à la construction de deux nouveaux ponts, Mangoro et Antsampsazana, au niveau des points kilométriques PK 94+200 (Commune rurale d'Ambohibary et Commune rurale d'Anosibe Ifody, District de Moramanga) et PK 105+460 (Commune rurale d'Ambohibary, District de Moramanga)

**Article 2 :** Le Chef du Service Régional des Domaines et le Chef du Service Régional de la Topographie de la Région Alaotra Mangoro à Moramanga, la Commune rurale d'Ambohibary, la Commune rurale d'Anosibe Ifody et les Chefs des Fokontany intéressés sont chargés, chacun en ce qui les concerne, de l'application du présent Arrêté qui sera publié au Journal officiel de République de Madagascar.

Moramanga, le 24 AOÛT 2018

Copie :

- Monsieur le Ministre de la Décentralisation (pour compte-rendu)
- Monsieur le Chef de Région Alaotra Mangoro (pour compte-rendu)

## ANNEX 4 : UNIT PRICES FOR TREES / CROP LOSSES



MINISTÈRE DE L'AGRICULTURE  
ET DE L'ÉLEVAGE

SECRETARIAT GÉNÉRAL

DIRECTION RÉGIONALE DE L'AGRICULTURE ET DE L'ÉLEVAGE  
ALAOÏRA MANGORO

CIRCONSCRIPTION DE L'AGRICULTURE ET DE L'ÉLEVAGE  
MORAMANGA

**PRIX UNITAIRES DES ARBRES FRUITIERS JUSQU'À LA PREMIÈRE  
FRUITAISON ET D'AUTRES CULTURES (Ariary)**

N° 99 /18- MINAE/SG/DR AF 51/CIRAE MOR

PRODUITS	PU (Ariary)
Bananier	25000
Ananas	3500
Manguier	223000
Oranger	230000
Pamplemousse	120000
Pomme cannelle	123000
Pommier	153000
Corossolier	148000
Jacquier	148000
Kaki	225000
Caféier	220000
Caféier (Jeune plant)	14000
Tamarinier	126000
Avocatier	115000
Cocotier	180000
Grenadelle	47000
Haricot	6000000/Ha
Petit pois	6000000/Ha
Brèdes	50000/10m <sup>2</sup>
Choux	150000/10m <sup>2</sup>
Manioc	6000
Patate Douce	100000/are





Pomme de terre	120000/are
Riz	4200000/Ha
Pêcher	125000
Bibassier	80000
Goyavier	48000
Letchis	238000
Canne à sucre	240000/are
Jambonnier	68000
Voatabia hazo	100000
Vigne	65000
Ravintsara	45000

Moremanga, le 22 Octobre 2018

Le Chef Circonscription de l'Agriculture  
Et de l'Elevage



*[Handwritten signature]*

HARIMANORA Marindra

## ANNEX 5 : MINUTES. PUBLIC CONSULTATIONS

**Fitanana an-tsoratra ny fivoriam-pokonolona fampahafantarana ny**  
**Teikasa Fanavaozana Tehezana amin'ny Lalam-bokatra Antananarivo--Tommasina an'amin'ny**  
**Republikan'i Madagasikara**  
**(Tehezan'Antsapazana)**

Date: 15 Augustra 2018

Taerina: Samparana Anulatsara, Fkt Andranokoaoka

Fototra: 10:50 - 11:50 maraina

Mpanatrika: Jereo amin'ny Taratasy Tovana 1 ny lisit'ireo tonga nanatrika

**1. Tanjon'ny fivoriana**

Ny tanjon'ny fivoriana dia ny fampahafantarana sy fihainosana ny hevitrin'ny mponina mikasika ny fanavaozana ny tehezan'Antsapazana, ny mety ho vokadrasiny amin'ny tonolo iainana ary ireo fepetra hotsaina (mba hanamaivanana izany. Nomena fanazana fanatrika ireo mpiara-miombonantoka sy ny mponina eo an-toerana. Nampahafantarina tamin'ny alalan'ny taratasy sy teny nampitaona tamin'ny Tompon'andrakitrin'ny Iainana koa ireo mponina eo an-toerana (Fokontanian'Antsirihala, Analamava ary Ambohimantrika).

Mahehin'ny efepolo (40) ireo olona nanatrika ka anisan'izany ireo mponina eo an-toerana sy ireo Solontenan'ny Rafi-parjakana mahela.

**2. Fanokafana**

Andriamatoa RATIARISOA Tafita Rubard, izay Lehiben'ny Sampara-draharaha misahana ny Rulifrasa Vaventy ao amin'ny Ministeran'ny Asa Vaventy sy ny Fotedrafitrasa, no nanokatra ny fivoriana tamin'ny fiarahabana ireo mpanatrika sy fanazavana fohifohy ny tanjon'ny Teikasa sy ny fivoriana.

**3. Famelabelarana**

Nizaralo'Andriamatoa RATIARISOA Tafita Rubard roa ny famelabelarana ilay Teikasa: Ny tapany voalohany dia nianarana tamin'ny fanazavana ny kisary sy soritsoritra ny Teikasa, ary ny tapany faharoa koa dia nifantoka tamin'ny filazana ireo mety ho vokadrasin'ny Teikasa amin'ny tonolo iainana ary ireo tsilukevitra sy fepetra hotsaina mba hanamaivanana izany.

**4. Fiantaniana/vahay**

Taorian'ny famelabelarana dia nisy fotoana nannalantsy sy namalana fiantaniana izay voafetsy ao anatin'ny tabilao lila etsy ambany. Na dia maro aza ireo fiantaniana sy fianhuan-kevitra, dia tsy nisy nanobitra ilay Teikasa ireo mpanatrika rehefa voavaly avokoa izany.

**5. Famararana**

Nofanana'Andriamatoa RATIARISOA Tafita Rubard tamin'ny fanomana ireo tonga nanatrika ny fotoana.



## Famintinana ny fanontaniana/vaivo

Anarana/Andro/Alina	Fanontaniana/Fanontaniana	Vaivo
1 Ben'ny Taniàna/Ambelohibery	<ul style="list-style-type: none"> <li>➢ Fangatahana: a) Fanomezana asa ireo lanora eto an-toerana izany tay an'asa ny ankamaroany; b) Fometrahana anatin'ny fotoana fohy araka izay azo atao "casseurs de vitesse" manamorona ny tehezana hampihenana ny karam-pifamohivohizans, indriandru amin'ny RN2 sy RN44; d) Tokony ho marina sy tay hiongatra taika hanaovana fahasahiana amin'ny filazan-pansana mba isorohana ny savorevoro eo amin'ny mpiaramonina sy mpiray lova; e) Ny 80 isanjatoa/ny mporona dia tay manana "titre", ka tsara ny fahafantarana hoe hodinihana koa ny momba ozy ireo;</li> <li>➢ Mirary asa mba hotanteraka asa aman-tsara ny Tetikasa.</li> </ul>	<ul style="list-style-type: none"> <li>➢ Eo am-pandinihana ny hanatsarana amin'ny ankasapobony ny RN2 ny Fitondran-panjakana sy ny Ministeran'ny Asa Vaventy sy ny Fotodrafitrasa;</li> <li>➢ Hainpitaina amin'ny Sampandraharahan-Paritrio/ny Asa Vaventy sy ny Fotodrafitrasa ao Moramanga ilay fangatahana fometrahana "casseurs de vitesse" (Maribana anefa fa tay mety intsony ilay karazany afovohibe ireny fa miteraka lozam-pifamohivohizana);</li> <li>➢ Hodinihan'ny Kômissiônina avokoa ny tany rehetra na tay may karatany aza, any fa na ny voninkazo maniry eo aminy aza, mba fantatrin'ny mponina kosa anefa hoe tay afaka mitaky na manao fanamberam-pananana fanampiny intsony izy rehefa mofanana ilay lisitriny fananana hoperana.</li> </ul>
2 Lefitry ny Sefom-pokontanan'An-taninaka	<ul style="list-style-type: none"> <li>➢ Missotra ny Ministera sy ny JICA noho ny fiavoriana;</li> <li>➢ Mafidy ny injinieran'ny Ministera iarahay amin'ny famantarana izay vinavinana/dalana kely vakadintany indrindra;</li> <li>➢ Ny ankamarosan'ny olona dia tay manana tsy "titree" na "harnée";</li> <li>➢ Fangatahana: a) Tokony ho ny volatrin'ny voly iray mifanaisany fa tay indray mandeha ihany no tombanana; b) Tokony omena tombony amin'ny fanomezana asa ireo mponina eto an-toerana;</li> <li>➢ Mety ho firy hekitara aosa ny faritra ho potiki/ny Tetikasa: mety bahatratra 400Ha ve?</li> </ul>	<ul style="list-style-type: none"> <li>➢ Ny fananana rehetra voakasikin'ny tetikasa dia honerana avokoa rehefa avy nodinihan'ny Solontenan'ndrafiapanjakana sy mponina mihacatra ny 10 (Afaka manome sosokavitra kos isana amin'ny maha-solontenan'ny Fokontany anao);</li> <li>➢ Ekena ilay fangatahana mikasika ny fanomezana asa ary mampiantena fa hahazo asa ny mponina eto an-toerana;</li> <li>➢ Mety tay ho 400Ha no ho voakitika, saingy tay volonjy hifankaha amin'ny haben'ny tehezana/dalana (9-12 metatra aosa).</li> </ul>
3 Mponina mandray fitanontana vaolohany	<ul style="list-style-type: none"> <li>➢ Firy metatra ve ho eo ny faritra'ilay Tetikasa? Mety ho tonga hatroty an-tanàna (Anlatsean) ve?</li> </ul>	<ul style="list-style-type: none"> <li>➢ Mbaola hodinihana sy hofaritana amin'ny "piquet" ny faritra voakasikin'ny Tetikasa.</li> </ul>
4		<ul style="list-style-type: none"> <li>➢ Mba nana'ny tsiriray avy fa anjaran'ny Orinasa no manome asa fa tay ny Ministera: tokony hianatra asa isika raha te hahazo ana rahaka ny tamin'ny Tetikasa Ambatovy;</li> <li>➢ Ny faritra ambanin'ny tehezana dia an'ny "privée" fa ny faritra ambanin'ny tehezana dia niverina ho fananana/ny Province.</li> </ul>



5 Mponina nandry fitenenana faharoa	<ul style="list-style-type: none"> <li>➤ Mety rahoviana no hanomboka ny asa satria ny ankamaroanay eto dia vahiny (avy any Tamasana. Antsirabe, sma fa io varotra scribing io avokoa no nihaviany tem?</li> </ul>	<ul style="list-style-type: none"> <li>➤ Mety afaka herintsena eo ho eo ny asa no hanomboka: hampatsafanarina mialoha ianareo ary hofantatrareo koa hoo hanomboka tsy ho ela ny asa rehefa mahita bildžera sy 'engine' maromaro ianareo;</li> <li>➤ Hanomboka tsy ho ela kosa anefa ny fanadihadiana mikasika ny tantolo tanana sy ny sôsialy</li> </ul>
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Le MARC DE LA COMMUNE  
SUAVERAINE  
ANDOHARANKY



**Fitaovana an-tsoratra avy fivoriana-pokonolona fampahafantarana ny  
Teitika Fanavaozana Telezana amin'ny Lalàm-bokatra Antananarivo—Tomamisa no amin'ny  
Republikan'i Madagasikara  
(Telezan'i Mangoro)**

Daty: 16 Aogositra 2018

Toerana: Antanjoza, Fkt Ankarefo

Fotony: 2:50 – 4:30 folakandro

Mpanatrika: Jereo amin'ny Taratasy Tovana 1 ny lisitr'ireo tonga nanatrika

**1. Tanjon'ny fivoriana**

Ny tanjon'ny fivoriana dia ny fampahafantarana sy fihainoana ny hevitrin'ny mponina mikasika ny fanavaozana ny telezan'i Mangoro, ny mety ho vokadrasiny amin'ny tortolo iainana ary ireo fepetra horaisina mba hanamaivana izany. Noinana fahefana hanatrika ireo mpiara-miontonon'antoka sy ny mponina eo an-tsarana. Hita no amin'ny Taratasy Tovana 1 ny lisitr'ireo mpiara-miontonon'antoka. Nampahafantarina tamin'ny alalan'ny taratasy sy teny nampitaina tamin'ny Tanpon'andraikitrin'ny Tanàna koa ireo mponina eo an-toerana (Fekontanin'Ankarefo sy Ankarshana).

Misa fitopolo (70) eosa ireo olona nanatrika ka anisan'izany ireo mponina eo an-tsarana sy ireo Solontenan'ny Rafi-parjakana marofa.

**2. Fanokafana**

Andriamanitra RATIARISOA Tafita Riband, izay Lelhiben'ny Saampam-Dehalaha misahana ny Kalitasa Vaventy no amin'ny Ministeran'ny Asa Vaventy sy ny Fotodrafitrasa, no panokatra ny fivoriana tamin'ny fandaniana ireo mpanatrika sy fanavaozana fahifohy ny tanjon'ny Teitika sy ny fivoriana.

**3. Famelabelarana**

Nazaran' Andriamanitra RATIARISOA Tafita Riband roa ny famelabelarana ilay Teitika: Ny tapany vonohony dia niompana tamin'ny fanavaozana ny kisary sy sofitsofitrin'ny Teitika. Ny tapany faharoa kosa dia niompana tamin'ny filazana ireo mety ho vokadrasin'ny Teitika amin'ny tortolo iainana ary ireo tolokevitra sy fepetra horaisina mba hanamaivana izany.

**4. Fanontaniana/valiny**

Tanorin'ny famelabelarana dia nisy fitaovana nameritrahana sy namsisiana fanontaniana izay voafely anatin'ny tabilao hita etsy ambany. Na dia maro aza ireo fanontaniana sy fahefana-kevitra, dia tsy nisy nandritra ilay Teitika ireo mpanatrika rehefa voavaly avokas izany.

**5. Famarazana**

Nifazanan' Andriamanitra RATIARISOA Tafita Riband tamin'ny fisorana ireo mpandray anjara ny fotoana.





## Famintinana ireo fanontanianina/valiny

	Anarana/Andrikitra	Fanontanianina/Fanontanianina	Valiny
1	Ben'ny Tamésa' Anosibe Ifody	➤ Ahoana ny mikasika fitadiavun'ireo olona manana varotra madinidiana?	➤ Jerco ny "Fomba fanonerana" faha-2; hatao fanadihadiana avokoa ny zava-drehetra (nofon-tany, tany, trano, rano, sns.); ➤ Ampoisanana ny mponina mikasa izay hetsihetsy/manshirana azy araha'ireo Mpanadihady ny tontolo lajana/farahamonina satria homena larja alohan'ny fahasany, ny asa fivelomany, ary ny fifandraisany amin'ny lajana, rano, tetezana, sns ny olombelona. ➤ Ireo Mpanadihady dia hanoibana vahaolana mikasika ireo vokadrintan'ny Tetikasa izay hodinihan'ny Komisibonina avy eo; ny mponina koa dia afaka nanome sosokevitra mikasika ireo vintanina-dalan'ny Tetikasa ireo.
2	Sefom-Pokontanin' An' Karahara	➤ Mamo ahoana ny resaka asa ho an'ny tanora?	➤ Meizy afaka herintana no manomboka ny asa (rehefa mifuraha ny fanadihadiana); ➤ Hisy fandraisana mpasa hulaon'ny orinasa japona; ➤ Ny eo an-toerana no hahazo asa vokatryny izay vao ny olona ivelany rehefa tsy hita eo an-toerana izay fahaizana/trankefa ilaina (toy ny mpamily "niveleuse").
3	Mponina nandray fihenana vualahy	➤ Ahoana ny fomba fanonerana ireo tsy tsy "firde/boride" mainimolaly na solan-pangady?	➤ Vokatryny ho karazan'ny roa ny tany: Ny tsy tsy kasa-tany sy ny tsy tsy; ny tany tsy kasa-tany dia tsy maintsy hovanonitra (mila manao acte de notoriété raha mpandava); ny tany tsy tsy kasa-tany kosa dia hodinihan'ilay Komisibonina izay andrianan'ny Ben'ny Tanàna sy ny Sefom-Pokontanin'ny anjara; ➤ Tsy afaka ny handà ny fanapahan-kevitra'ny Komisibonina ny Fanjakana.
4	Ben'ny Tanànan' Ambohibary	➤ Aoka tsy hiteraka disadisa eo amin'ny mpitara-morina io resaka fanonerana sy fanadihadiana io (tokony ho marita isika voakasika ary hifampitsinjo ny mpitray lova).	
5	Mponina nandray fihenana faharoa	➤ Izaho manana tsy "firde" en akakir'ny tetezana; tsy maintsy hafindra ka ho lavitra'ny bema mihazatra izany ny tranoka?	➤ Mampahatsiahy ilay fanonerana arukarakan'ny sokajin-tany vualaza reo aloha.
6	Mponina nandray fihenana fahatelo	➤ Nahazo titra fahasimbana akakir'ny tetezana mahady izahay (akondro sy zavoka tapaka) nefa mbola tsy manomboka akury ny asa; manahy ny mikasika ny fandraisana rano (meizy haterakin'ny asa fandraisana lalina amin'ny masinina) ny mponina izay amin'ny Mangoro.	➤ Tokoany hanantona an'i Mr Roger (Chef de village) izay rehetra simba fahasimbana noho ny asa fandraisana anan'ny Colas, dia nijery izay fomba fifandraisana (ohatra: Dina) raha ilaina; ➤ Fandraisana ny unton'ilay asa fandraisana anan'ny Colas (Fizalana ny fahitry mafy ambany'ny tany itanany ny fahitry ny tetezana, ary ireo "plaques".

Anarana/Andriankira	Famontanana/Famantarana	Valiny
	<p>avokoa no maha rano fisotra, ka apetrakay eo am-pelan-d'asa' ireo Mparadihady ny tontolo talenana izay.</p>	<p>apetrany dia tay mbola fumaritara ny faritry ny Tetikasa fa fitaovam-piasana fotsiny (hary) ary fiolan-tsiny noho izany fanembantsemboana izany rahady (antony : fohy dia fohy ny fotoana ahafahany ny teknisiarilina japone mipetraka eto Madagasikara);</p> <ul style="list-style-type: none"> <li>➤ Anisan' ireo zavatra hozalahavan' ireo Mparadihady ny tontolo talenana ny mikasika ny rano; afaka manome sosokevitra azy ireo koa isan' ireo mikasika ny fantsakana solony (Ohatra: lava-drano) na zavatra hafa fa tsy maintsy misy ny valaolana;</li> <li>➤ Ohatra tetikasa fanamboarana-tetezana japone iny hafa any Toamasina izany nahazon' ny mponina lava-drano nefa niteraka savorovoro/tsy fifanajana (izay tsara sorobina amin'ny alalan' ny fitepihana sy fitantana mazava sy hentina).</li> </ul>
7	<p>Mponina nandray fitaovana fahafototra</p> <ul style="list-style-type: none"> <li>➤ Efa fantatra ve hoe iza ilay asa atao? Hampahafantarana miakoha ny fiantsambolana ny asa ve izahay?</li> </ul>	<ul style="list-style-type: none"> <li>➤ Mbola eo am-pampitahana ireo vinavinan-d'olana telo izahay saingy ufaka manome sosokevitra ny Minisiera/JICA koa isan' ireo mponina;</li> <li>➤ Mety haharitra andro maromaro ny fanalihanana; hampahafantarana miakoha ary hazonin' ny Mpanas fanalihanana tsirainy isan' ireo (Ny Sefom-pokontany/fokosolona no hampahafantarana ireo fananana ary hotoambosana amin'ny antsipirihany avokoa ny fananan' ny tsiranany avy).</li> </ul>
8	<p>Mponina nandray fitaovana fahafototra</p> <ul style="list-style-type: none"> <li>➤ Ahoana ny resaka rano raha toa ka ilay lalana voalohany (Plan A) no voafidy?</li> <li>➤ Maniry ny mba hampahafantarana faran' izay miakoha indrindra izahay naha hicochana ny disafisa (mikasika ny fandraisana ilay vola fanompana sy ny fotoana hifandrahan' herintanana eoa van mahavita tranon' rano-peta izay);</li> <li>➤ Raha toa ka ilay voalohany (Plan A) no lany, dia tokony ho tranon' biriky no hasolo ny tranonay satria ny hazo dia sarotra dia sarotra ety;</li> <li>➤ Naha izahay hoe hamono omby isan' ireo alohan' ny hantambolana ny asa, izay tokony hotsiterahana fa tsy hifanana ho hantambolana fahafototra (zava-dehibe ny resaka fiantana).</li> </ul>	<ul style="list-style-type: none"> <li>➤ Ny vato (ehizoro dia matetika apetraka telo na cfa-bolana alohan' ny fiantsambolana ny asa;</li> <li>➤ Ny fiolaham-pireneha dia manome omby rana ny mponina isan' ireo alohan' ny fotoana any ireny (Tahaka ny tsary Antsohidranitra, avy an' Antananarivo), saingy anjaran' ny vahoaka indray no misafidy izay lany ananivana azy ireo (vontona atao joro, amidy, sas);</li> <li>➤ Ho azonareo alohan' ny fiantsambolana ny asa ny volanareo;</li> <li>➤ Miankina amin'ny tombantomban' ny Kômisidiona ny fanompana ny tranon' biriky, nefa raha ny tokony ho izy dia ny sandan' ilay tranon' araka ny endriky ihany no hampahafantarana ireo vokatika (Ritso-peta = tananan-hidin' ny ritso-peta na asa; tahaka izay kasa ny tranon' biriky na tanananga); vola no hampahafantarana ireo tranon' pisanana, ka anjaran' izy ireo indray avy eo no misafidy izay lany hantambolana ilay vola (hampahafantarana tranon' pisanana na hiviadinana omby, sas);</li> <li>➤ Ny vidin' jvatra arakeliriny no hantambolana ireo fananana (ny Ben' ny</li> </ul>

	Anarana/Andrakitra	Fanontaniana/Panamazivana	Valiny
			Tandina izao mahalala hoe obatrinoena no mahavita trano ritsa-peta iray).
9	Mponina nandray fitenenana fahaenina	<ul style="list-style-type: none"> <li>➢ Tokony hanana faharetana sy halay bifinerasera amin'ny ireo mponina araovany fanadihadiana/tombantombana ilay Kômissiônina satria mety tsy hifankahazo ny resaka indrindray;</li> <li>➢ Hatsonareo in-dray na in-droa na in-telo manome ve ilay vola fanonerana mba hahafaharany manomana ny fifindrana?</li> </ul>	<ul style="list-style-type: none"> <li>➢ Horaisin'ireo Mpanao fanadihadiana an-tsontra avokoa ny fanontaniana/sosokevitranareo (Mampahafantatra ireo avy ao amin'ny Cabinet SMC), izay hanao tatitra amin'ilay Kômissiônina (Ka tokony holazainareo aminy avokoa izay manahirana anareo), fa tsy hifankahita miavantsa amin'ilay Kômissiônina tanareo; azonareo atao koa ny niresaka amin'ny Ben'ny Tanànanareo raha misy zavatra fanampiny tanareo holazaina.</li> </ul>
10	Sefom-pokontanin'Ankarefo	<ul style="list-style-type: none"> <li>➢ Ny fomban-tany dia mitaky ny famonoana omby alohan'ny fanombohana ny asa (Ankoatran'ny jety fametrahana vato fehizoro)</li> </ul>	



## FITANANA AN-TSORATRA

Daty: 20 oktobra 2018.

Toerana: Antanjoara Antivanana.

Natao ankehony ao anolo Oktobra 2018 ny fihonana mia-  
raha an'ireo fihonany fahina mihaika ny tetela  
fanamborana tetiana vavao (Antanjoara, Man-  
joro) ny tanjona ny fihonana ny fanamborana fan-  
zavana ny fihonana ny tambina ny an'ny fanja-  
hana an'ireo fananana voadona.

Kohasainana tanina'ny :

ny fihonana vavao fananana voadona : vankazo  
fihonana-ba, kanzao-ba, voly isan-ba, hanzany.  
Ny tambina'ny ny fanamborana dia miha-  
nambiny an'ny ny tomban-bidy ny fanamborana'ny  
sampa, ahafahan-ba, fanamborana.

Ny voly dia ny sampa, ahafahan'ny fanamborana  
ny ba, sampa, ahafahan'ny voly ary ny  
tanina'ny ny sampa, ahafahan'ny fanamborana-  
tanina.

Kolaza tanina'ny ba fa tambina'ny vavao  
na hatolaha ny tanina'ny ary hatolaha  
volana nitantany mialoha vavao ahafahan'ny tanina-  
tanina'ny ny mivavao indrindra vavao mivavao  
tanina-bavao.

Deha nita ny fanamborana vavao tanina'ny vavao  
hafa ny fanamborana sampa.

Fanamborana ny vavao-kintana

ba fanamborana vavao an'ny ny tomban-bidy  
ny ba fanamborana vavao fanamborana vavao  
paha vavao.





Valiny : Efa tafiditra ao anaty fihaziana ny tamban-bidy dabo igany

2. Ahoana mi-kaba ny tany manana karatany sy tany igay irita famavitisa melaly?

Valiny : Raha tafiditra ao anatin'ny velaran'ny lalam-piersona 30 m dia ity miasa karatany ny famavitisa melaly.

Raha ny velar'io 30 m ka miasa karatany na kadentia dia miasa tamban-bidy avoahan'ny fanavao tany.

Raha vidan'io fa famavitisa melaly dia bely kokoa ny tamban'ny avon'ny fanjakana satria miasa vintany ny famambonana ny karatany.

3. Tasa raha vena fotoana mieloka ny mala-badalaka ny olona.

Valiny : Vokatry avoahan'ny tamban'ny fanjakana avo avoahan'ny avo.

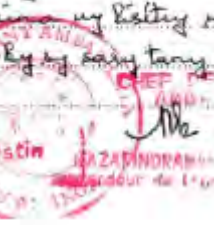
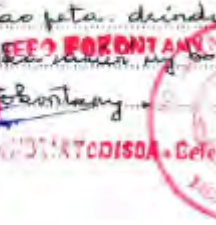
Ary ity hampiboka ato ho ato ny tetikasa fa ary avon'ny fanjara'ny taona 2019 fa fahafahany.

Ahavo fotoana h sa 5 volana ny hianany mba hianany.

Kelley ny haminana ny tamban-bidy ny fanavao igany vokatry azy lalam-piersona na hianany ny bira-ray. Ity hianany olona hanao vady avoahan'ny vintany.

Komen'ny mpanohy anjara fahafahany fihavan'ny fotoana mba hanao sonia ity fotoana na an' bira-ray ity.

Hatao fotoana diandina ny kelley ny olona vokatry ka miasa miasa ny bira-ray tany hafa hanao avon'ny fanjara.



Signature and official stamp of the FOKONTANY ANKAREFO, including the name 'CELESTIN' and 'RAZAFINDRANA'.



FICHE DE PRESENCE

N°	Anarana	Asa	Adiresy / Telefonina	Sonia
1		mpamboly	Antanjanon	<del>St</del>
2		mpamboly	Antanjanon	<del>St</del>
3		chef de village	Antanjanon	<del>St</del>
4		mpamboly	Antanjanon	<del>St</del>
5		mpamboly	Antanjanon	<del>St</del>
6		mpamboly	Antanjanon	St
7		mpamboly	Antanjanon	Berthine
8		mpamboly	Antanjanon	<del>St</del>
9		mpamboly	Antanjanon	<del>St</del>
10		chef de FET	Antanjanon	<del>St</del>
11		chef FET	Antanjanon	<del>St</del>
12		NPAMBOLY		<del>St</del>
13		mpamboly		Rafanjanon
14		mpamboly		<del>St</del>



RAZAFINDRAMANANTSO RAMPIN  
 Commandeur de l'Ordre National

## ANNEX 6 : MANGORO PROJECT – LOSS OF CROPS / TIMBER TREES

PAPs Code	Champs	Nombre de pieds	Arbres et Cultures
MA1			
MA2	Banancier	20	520 000
	Ananas	46	161 000
	Pêcher	7	875 000
	Orange	5	1 150 000
	canne a sucre	10	2 400 000
	goyave	1	48 000
	Bibasse	3	240 000
	Ravintsara	1	45 000
	Manioc	10	60 000
	Patate	10	10 000
MA3	Banancier	8	208 000
MA4	Manguier	5	1 115 000
	Oranger	3	690 000
	Canne à sucre	7	84 000
	Letchis	1	238 000
	Grenadelle	1	47 000
	Banancier	10	260 000
	Bibassier	2	160 000
	Acacia	1	15 000
	Letchis	1	238 000
MA5	Champs de haricot	Surface	60 000
	bananiers	6	156 000
	canne a sucre	3	7 200
	pêcher	2	250 000
MA6	champs de manioc	Surface	270 000
	bibassier	1	80 000
	pêcher	4	500 000
MA7	banancier	16	416 000
	avocatier	3	345 000
	manguier	4	892 000
	oranger	4	920 000
	voatabia hazo	3	300 000
	pêcher	4	500 000
	bibassier	3	240 000
	kaki	2	450 000
	ananas	20	70 000
	jambon	6	408 000
	tamarinier	1	126 000

PAPs Code	Champs	Nombre de pieds	Arbres et Cultures
	Mandarinier	2	460 000
	Oviala	4	24 000
	ravintsara	5	225 000
MA8	avocatier	2	230 000
	pêchier	5	625 000
	pamplemousse	6	720 000
	jambonnier	2	136 000
	manguier	1	223 000
	cafeir	1	220 000
	corrossol	2	440 000
	kaki	1	225 000
	bananier	9	234 000
	Voatabiahazo	2	200 000
MA9	cyprés	116	696 000
	eucalyptus	44	792 000
	ravintsara	7	315 000
MA10			
MA11			

**ANNEX 7 : PROPOSED DUP DECREE**



## NOTE DE PRESENTATION

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### CONTEXTE

La Route nationale 2 (RN2) reliant Toamasina et Antananarivo constitue un enjeu économique majeur, abstraction faite des autres aspects tout aussi importants. En effet, la majeure partie des échanges économiques nationaux en est tributaire. Cependant, mis à part les éboulements et autres dégradations récurrentes de ladite route, certains ponts constituent également des facteurs de blocage.

Afin d'assurer une meilleure fluidité du trafic (lourd et léger) sur cet axe, le Gouvernement malagasy a alors obtenu un financement de la JICA en vue de construire 2 nouveaux ponts au niveau des rivières Mangoro (PK94+200) et Antsapazana (PK105+460)

Des études technicoéconomiques ont ainsi été réalisées et ont abouti à plusieurs options pour les 2 ponts. Toutefois, du fait de l'occupation du voisinage des zones de construction, les options proposées empiètent sur des biens privés (maisons, champs, autres). Aussi, en vertu des dispositions de la législation nationale et des exigences de la JICA, la préparation d'un Plan de réinstallation s'avère requise.

Dans ce cadre, toute personne qui sera expropriée ou déplacée contre son gré ou dont les sources de revenu seront affectées devra être compensée d'une manière équitable.

Comme des parcelles titrées seront impactées, une procédure d'acquisition de terrains est nécessaire : en vertu des dispositions de l'Ordonnance 62.023, un décret y afférent devra donc être pris.

### ENVERGURE DE L'ACQUISITION DE TERRAINS

Les types d'impact identifiés sont regroupés dans le tableau suivant :

Localité	Exigences techniques	Nombre de ménages affectés	Type d'impact	Statut foncier
Pont Mangoro	Emprise : 2*15m (selon les dispositions de l'Ordonnance 60.166)	11	<ul style="list-style-type: none"> <li>• Perte de toute ou partie de champs de culture</li> <li>• Pertes de plants d'arbre</li> <li>• Pertes de maisons d'habitation / commerce</li> </ul>	<ul style="list-style-type: none"> <li>• 2 parcelles titrées</li> <li>• Toutes les autres occupations sont de type "traditionnel"</li> </ul>
Pont Antsapazana	Emprise : 2*15m (selon les dispositions de l'Ordonnance 60.166)	4	<ul style="list-style-type: none"> <li>• Perte de toute ou partie de champs de culture</li> <li>• Pertes de plants d'arbre</li> </ul>	<ul style="list-style-type: none"> <li>• 2 parcelles titrées</li> <li>• 2 autres propriétés privées non titrées</li> </ul>

Notes :

- (a) En matière de compensation, les Politiques environnementales et sociales de la JICA exigent que les occupations traditionnelles soient indemnisées d'une manière équitable afin d'éviter un appauvrissement des ménages impactés.
- (b) Pour le cas d'Antsapazana, une partie des terrains sera occupée d'une manière temporaire pour les besoins de la déviation pour environ 16 mois. Par contre, les pertes d'arbres et de cultures y afférentes seront compensées.

**DEMARCHES DEJA REALISEES**

Les procédures suivantes ont déjà été réalisées :

- Un Arrêté d'ouverture des enquêtes de *commodo* et *incommodo* a déjà été pris par le Chef de District.
- Tous les ménages impactés ont déjà été identifiés
- La liste des ménages impactés a déjà été affichée au niveau des Communes/Fokontany concernés.
- La date limite d'éligibilité a déjà été fixée.

Tous les ménages impactés ont déjà consultés et acceptent de céder les parcelles nécessaires à l'Etat.

Tel est, Son Excellence Monsieur le Premier Ministre, Mesdames et Messieurs les Membres du Gouvernement, l'objet du présent projet de Décret que nous avons, respectueusement, l'honneur de vous soumettre.

**Le Ministre de l'Aménagement du Territoire, de  
l'Habitat et des Travaux Publics**

**Hajo ANDRIANAINARIVELO**



**REPOBLIKAN'I MADAGASIKARA**  
Fitiavana - Tanindrazana - Fandrosoana  
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Ministère des Travaux Publics et des Infrastructures

**DECRET N°2019 - .....**

**déclarant d'utilité publique et classant dans le domaine public les bandes / parcelles de terrain nécessaires à la construction de deux nouveaux ponts sur la rivière Mangoro et à Antsazapana**

**LE PREMIER MINISTRE, CHEF DU GOUVERNEMENT**

Vu la Constitution ;

Vu la loi cadre n°2005-019 du 17 Octobre 2005 fixant les principes régissant les statuts des terres

Vu la loi n°2008-014 du 23 juillet 2008 sur le Domaine privé de l'Etat

Vu le décret n°2010 -233 portant application de la loi 2008-14

Vu la loi n° 2008 -013 du 23 juillet 2008 sur le domaine public

Vu le décret n°2008-1141 du 01 Décembre 2008 portant application de la loi 2008-013

Vu l'Ordonnance n°60-099 du 21 Septembre 1960 réglementant le domaine public;

Vu l'Ordonnance n°60-167 du 03 Octobre 1960 relative à l'Urbanisme;

Vu l'ordonnance n° 74-021 du 20 Juin 1974 portant refonte de l'ordonnance 62-110 du 1<sup>er</sup> octobre 1962 sanctionnant l'abus de droit de propriété et prononçant le transfert à l'Etat des propriétés non exploitées

Vu l'Ordonnance n°62-023 du 19 Septembre 1962 relative à l'acquisition amiable ou par voie d'expropriation pour cause d'utilité publique des propriétés privées au profit de l'Etat;

Vu le Décret n°63-030 du 16 Janvier 1963 fixant les modalités d'application d'Ordonnance n°62-023 du 19 Septembre 1962 susvisée ;

Vu la Loi n° 2015-052 du 3 février 2016 relative à l'Urbanisme et à l'Habitat;

Vu le Décret n°64-205 du 21 Mai 1964 fixant les modalités d'application de la Loi n°60-004 du 15 Février 1960 sus visée;

Vu le Décret n°64-291 du 22 Juillet 1964 fixant les règles relatives à la délimitation, l'utilisation, la conservation et la police du domaine public;

Vu le Décret n°64-399 du 24 Septembre 1964 modifiant certaines dispositions du Décret n°63-030 du 16 Janvier 1963 sus visé;

Vu le Décret n°2019-016 du 21 Janvier 2019 portant nomination du Premier Ministre, Chef du Gouvernement ;

Vu le Décret n°2019-026 du 24 Janvier 2019 portant nomination des Membres du Gouvernement ;

Sur proposition du Ministre de l'Aménagement du Territoire, de l'Habitat et des Travaux Publics

**en Conseil du Gouvernement**

**DECRETE**

Article premier : Est déclarée d'utilité publique les bandes ou parcelles de terrain d'environ zéro virgule cinq hectare situées dans la nouvelle emprise de la Route Nationale 2 au niveau du Pont de Mangoro et du Pont d'Antsapazana, Région ALAOTRA-MANGORO.

Article 2: A défaut d'accord amiable, est frappée d'expropriation pour cause d'utilité publique dans les conditions prévues par l'Ordonnance n°62-023 du 19 Septembre 1962 sus visée, les parties des parcelles se trouvant à l'intérieur du Plan annexé au présent Décret.

Article 3 : Le présent Décret constitue acte de cessibilité de la propriété désignée à l'Article 2 ci-dessus et, en particulier, soumet ladite propriété aux servitudes imposées à l'Article 8 de l'Ordonnance 62-023 du 19 Septembre 1962.

Article 4 : L'ensemble du domaine délimité sur les plans ci-annexés, d'une superficie d'environ un demi-hectare est intégré dans le domaine public de l'Etat.

Article 5 : En l'absence d'accord à l'amiable, ce décret vaut acte de cession.

Article 6 : Le Ministre des Finances et du Budget, le Ministre de l'Intérieur et de la Décentralisation, le Garde des Sceaux, Ministre de la Justice, le Ministre de l'Aménagement du Territoire et des Services Fonciers, le Ministre de l'Agriculture et de l'Élevage, le Ministre des Travaux Publics et des Infrastructures sont chargés, chacun en ce qui le concerne, de l'exécution du présent Décret qui sera publié au Journal Officiel de République de Madagascar.

Fait à Antananarivo, le ..... 2017

**LE PREMIER MINISTRE**  
**Chef du Gouvernement**

**NTSAY Christian**

Le Ministre de l'Intérieur et de la Décentralisation

Le Ministre de l'Agriculture, de l'Elevage et de la Pêche

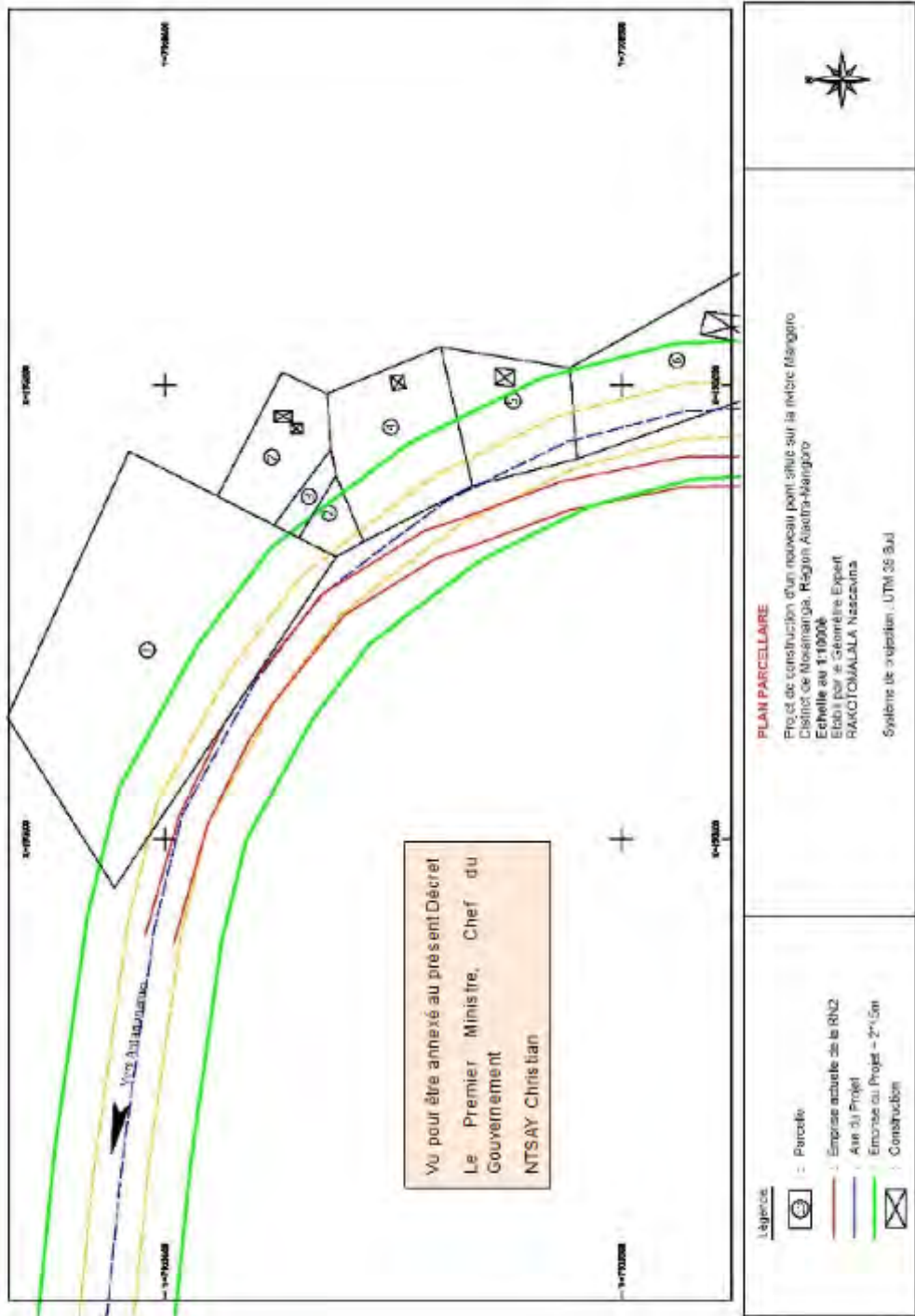
RAZAFIMAHEFA Tiaravelo  
Le Ministre de l'Economie et des Finances

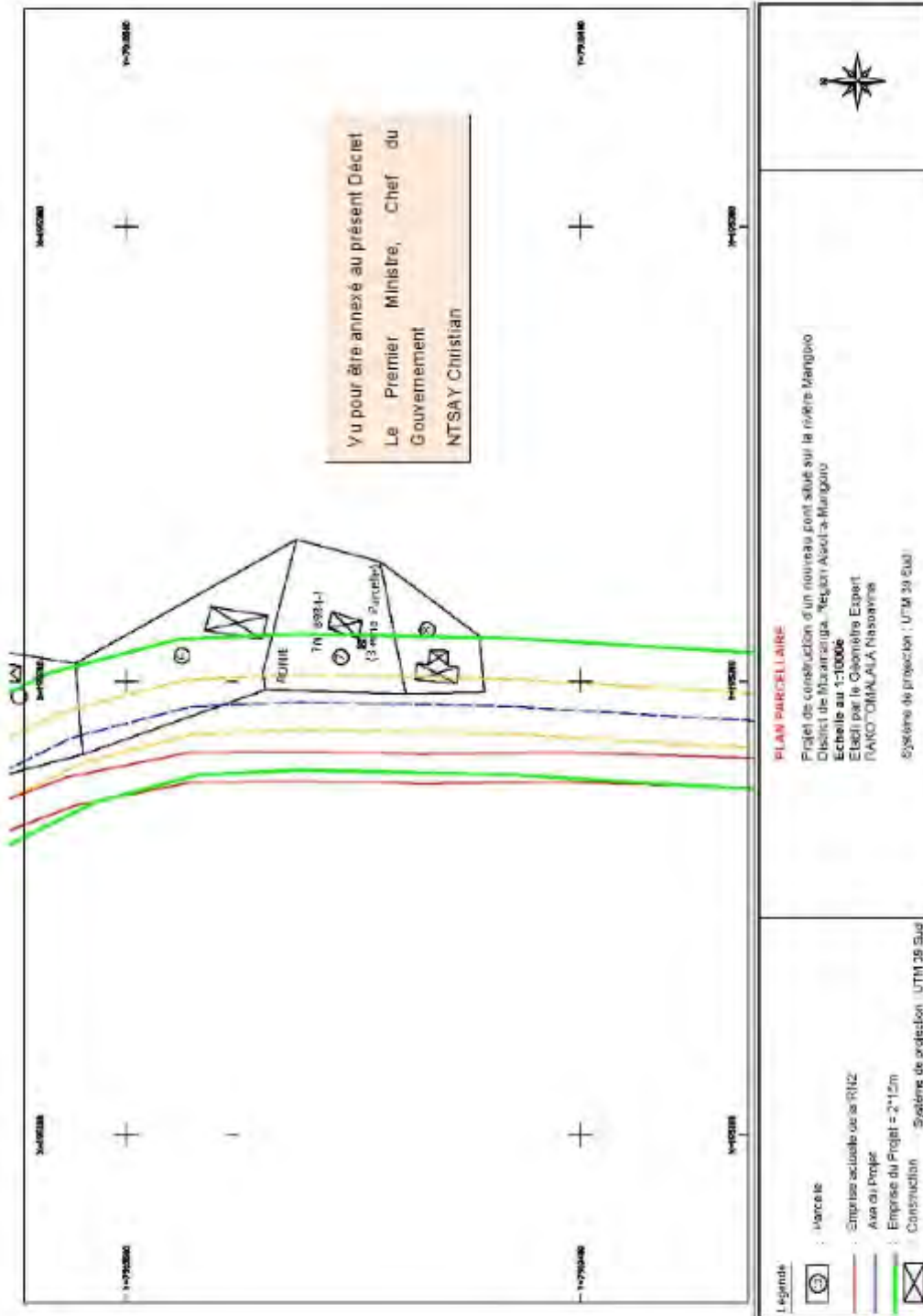
Fanomezantsoa Lucien RANARIVELO  
Le Garde des Sceaux, Ministre de la Justice

Richard RANDRIAMANDRATO

Jacques RANDRIANASOLO

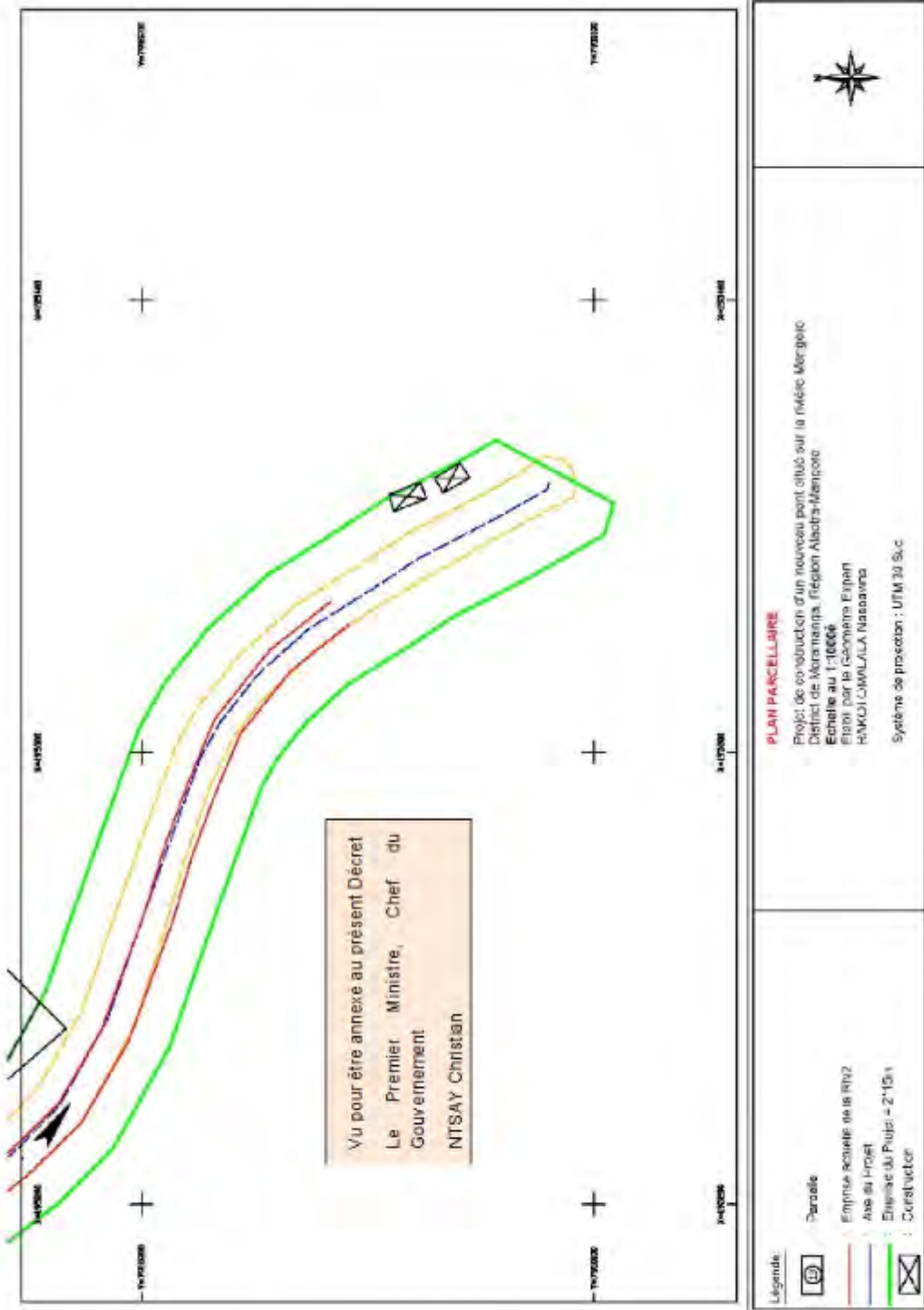
ANNEXE 1: PLAN PARCELLAIRE DES TERRAINS IMPACTES POUR MANGORO











ANNEXE 2 : PLAN DES PARCELLES IMPACTÉES POUR ANTSAPAZANA



Formulaire de Surveillance Environnementale et Sociale

La partie malgache doit soumettre les résultats de la surveillance de l'environnement à la JICA en utilisant ce formulaire de surveillance tous les trimestres dans le cadre du rapport de suivi du projet.

1. Surveillance de l'environnement

1.1. Qualité de l'air

Situations de mesure		Situation pendant la période du rapport
Situation du niveau de poussières, de suie (évaluation visuelle)		
Diagnostic de la situation concernant la mise en œuvre de mesures		
Entretiens avec les habitants locaux		

1.2. Qualité de l'eau

Paramètre	Unités	Points de l'étude (forages)		Méthode de recensement	Normes malgaches	Remarques (Conditions générales des lieux des mesures, etc.)
		Point de référence	Point d'atmosphère			
		En amont	En aval			
Turbidité	NTU			MF EN ISO 7027-1	<25	
pH (température)	pH (°C)			MF EN ISO 10523	6.0 - 9.0	
Chrome hexavalent	mg/l			Spectrométrie UV-visible	<0.2	
Nickel	mg/l			Spectrométrie UV-visible	<2.0	
Arsenic	mg/l			Spectrométrie UV-visible	<0.5	
Couleur	mg/l			MF EN ISO 7087 D	<20	
Température de l'eau	°C					
Conductivité électrique (25°C)	µS/cm			MF EN 27888	<200	
Dureté totale	g/l in CaCO <sub>3</sub>			MF T 99-003	<180.0	
Ammonium	mg/l in NH <sub>4</sub>			MF T 99-015-2	<15.0	
Nitrate	mg/l in NO <sub>3</sub>			Spectrométrie UV-visible	<20.0	
Nitrite	mg/l in NO <sub>2</sub>			MF EN 26777	<0.2	
Hydrocarbures totaux	mg/kg					
Groupes E. coli	MP/100ml			MF EN ISO 9228-3	<100	

1.3. Déchets

田中  
  


1246. 12

Situations de la mise en œuvre de l'ouvrage		Situations pendant la période du rapport	
<p>1.4. Bruit &amp; vibration (pont de Mangoro uniquement) NOTE: Laissez à partir de "1,0" pour enregistrer les résultats de l'enquête sur l'existence de nuisances (conditions générales des lieux des mesures, etc.)</p>			
Niveau de bruit (dB)	43	111.8	43
<p>1.5. Pollution des sols / sédiments</p>			
<p>Extractions et inspection pour prévenir les fuites d'huile des machines de construction</p>			
Situations de suivi		Situations pendant la période du rapport	
<p>1.6. Écosystème</p>			
<p>Confirmation visuelle des organismes aquatiques, Audition aux résidents voisins</p>			
<p>Mouvement d'excavation avant la construction</p>			
<p>Restauration de la végétation riveraine</p>			
Situations de la situation de la congestion		Situations pendant la période du rapport	
<p>1.7. Infrastructures sociales et services sociaux existants</p>			
<p>Confirmation de l'état de mise en œuvre des mesures de sécurité pendant le travail</p>			
<p>Confirmation des conditions de traitement des eaux usées et des déchets domestiques</p>			
Situations de la rouille		Situations pendant la période du rapport	
<p>1.8. Accidents de la rouille</p>			
<p>Confirmation de la mise en œuvre des mesures de sécurité pendant le travail</p>			
<p>1.9. Plaintes, etc. relatives à l'environnement du travail</p>			
Date		Situations de la mise en œuvre	
<p>Résultats de la mise en œuvre</p>			

2. Surveillance sociale

2.1. Etat de mise en oeuvre de la réinstallation des populations et de l'indemnisation

Activité	Montant alloué (en millions de dollars US)	Montant utilisé (en millions de dollars US)	Etat d'avancement	Date d'achèvement	Responsabilité Organisme
Decision finale des MP					MAHP
Démarches en faveur d' un exaucement au regard de l' indemnisation					MAHP
Acquisition de terrains (pont de Mangoro)					MAHP
Acquisition de terrains (pont d' Antapazoro)					MAHP
Réinstallation des populations (pont de Mangoro)					MAHP
Indemnisation (pont de Mangoro)					MAHP
Indemnisation (pont d' Antapazoro)					MAHP

2.2. Etat de mise en oeuvre de l'aide à la restauration des moyens de subsistance

Date	Indicateurs de mise en oeuvre	Situation de je pris en charge	Résultats de la mise en oeuvre

2.3. Plaintes émanant des habitants

Date	Contenu des plaintes	Appréciation des autorités locales	Résultats de la mise en oeuvre

Emp  
BS



(仮訳)

**Minutes of Discussions  
on the Preparatory Survey for the Project for  
Rehabilitation of Bridges on the Economic Axis Antananarivo-Toamasina  
(Explanation on Draft Preparatory Survey Report)**

With reference to the minutes of discussions signed between Ministry of Regional Development, Building, Housing and Public Works and Japan International Cooperation Agency (hereinafter referred to as "JICA") on July 6<sup>th</sup>, 2018 and in response to the request from the Government of Republic of Madagascar (hereinafter referred to as "Madagascar") dated on 28 September 2017, JICA dispatched 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 Rehabilitation of Bridges on the Economic Axis Antananarivo-Toamasina (hereinafter referred to as "the Project").

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

Antananarivo, March 15, 2019

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Kenshiro TANAKA  
Leader  
Preparatory Survey Team  
  
Japan International Cooperation Agency  
Japan

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Hajo Andrianainarivelo  
Minister  
Ministry of Regional Development, Building,  
Housing and Public Works  
Republic of Madagasca

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Richard Andriamandranto  
Minister  
Ministry of Economy and Finance  
Republic of Madagascar

## ATTACHEMENT

1. Objective of the Project  
The objective of the Project is to improve logistics situation on National Route No.2 by rehabilitation of bridges and access roads, thereby contributing to revitalization of logistics in Madagascar and neighborhood countries.
2. Title of the Preparatory Survey  
Both sides confirmed the title of the Preparatory Survey as “the Preparatory Survey for the Project for Rehabilitation of Bridges on the Economic Axis Antananarivo-Toamasina”.
3. Project site  
Both sides confirmed that the sites of the Project are in Annex 1.
4. Responsible authority for the Project  
Both sides confirmed the authority responsible for the Project is as follows:
  - 4-1. Ministère de l’Aménagement du Territoire, de l’Habitat et des Travaux Publics (hereinafter referred to as “MAHTP”) will be the responsible and executing authority for the Project. The executing authority 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 3.
  - 4-2. After the completion of the Project, MAHTP will be responsible for maintenance and management of the facilities constructed by the Project.
5. Contents of the Draft Report  
After the explanation of the contents of the Draft Report by the Team, the Malagasy side agreed its contents.
6. Cost estimate  
Both sides confirmed that the cost estimate including the contingency shown in Annex 2 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, unexpected natural conditions, etc.
7. 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.
8. Procedures and Basic Principles of Japanese Grant  
The Malagasy side agreed that the procedures and basic principles of Japanese Grant as described in Annex 4 shall be applied to the Project. In addition, the Malagasy side agreed to take necessary measures according to the procedures.
9. Timeline for the project implementation  
The Team explained to the Malagasy side that the expected timeline for the project implementation is as attached in Annex 5.
10. Expected outcomes and indicators  
Both sides agreed that key indicators for expected outcomes are as follows. The Malagasy side will be responsible for the achievement of agreed key indicators targeted in year 2025 and shall monitor the

progress based on those indicators.

[Quantitative indicators]

Index		Current Value ( as of 2018)	Design Value ( as of 2025)
Traffic Volume (vehicle/day)		2,000	3,600
Volume of Passengers (1,000 persons/year)		3,702	5,000
Volume of Cargo (1,000 tons/year)		4,509	7,500
Waiting time at approaches to a bridge (second)	Mangoro Bridge	48	0
	Antsapazana Bridge	35	0

[Qualitative indicators]

- Ensuring smooth and safe traffic flow due to improvement of road alignments
- Ensuring the safety of pedestrians due to construction of sidewalks

#### 11. Undertakings of the Project

Both sides confirmed the undertakings of the Project as described in Annex 6. With regard to exemption of customs duties, internal taxes and other fiscal levies as stipulated in (2) 5 of Annex 6, both sides confirmed that such customs duties, internal taxes and other fiscal levies, which shall be clarified in the bid documents by MAHTP during the implementation stage of the Project.

The Malagasy 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.

Both sides also confirmed that the Annex 6 will be used as an attachment of G/A.

#### 12. Monitoring during the implementation

The Project will be monitored by the executing authority and reported to JICA by using the form of Project Monitoring Report (PMR) attached as Annex 7. The timing of submission of the PMR is described in Annex 6.

#### 13. Project completion

Both sides confirmed that the Project completes 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, but in any event not later than six months after completion of the Project.

#### 14. Ex-Post Evaluation

JICA will conduct ex-post evaluation after three (3) years from the project completion, in principle, with respect to five evaluation criteria (Relevance, Effectiveness, Efficiency, Impact, Sustainability). The result of the evaluation will be publicized. The Malagasy side is required to provide necessary support for the data collection.

#### 15. Schedule of the Study

JICA will finalize the Preparatory Survey Report based on the confirmed items. The report will be sent to the Malagasy side around June 2019.

#### 16. Environmental and Social Considerations

##### 16-1 General Issues

#### 16-1-1 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 bridge project, is not located in a sensitive area, and has none of the sensitive characteristics under the “JICA guidelines for Environmental and Social Considerations (April 2010)”, hence it is not likely to have a significant adverse impact on the environment.

#### 16-1-2 Environmental Checklist

The environmental and social considerations including major impacts and mitigation measures for the Project are summarized in the Environmental Checklist attached as Annex 8. Both sides confirmed that in case of major modification of the content of the Environmental Checklist, the Malagasy side shall submit the modified version to JICA in a timely manner.

#### 16-2 Environmental Issues

##### 16-2-1 Environmental Impact Assessment (EIA)

Both sides confirmed the EIA report will be approved by Office National pour l’Environment in May 2019.

##### 16-2-2 Environmental Management Plan and Environmental Monitoring Plan

Both sides confirmed Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP) of the Project is as Annex 9, respectively. Both side agreed that environmental mitigation measures and monitoring shall be conducted based on the EMP and EMoP, which may be updated during the detailed design stage.

#### 16-3 Social Issues

##### 16-3-1 Land Acquisition and Resettlement

Both sides confirmed the 0.8 ha of land would be aquired and 28 people would be relocated/affected due to the implemenation of the Project.

Such land acquisition and resettlement shall be implemented based on the Abbreviated Resettlement Action Plan (ARAP) as Annex 10 which was prepared in line with the Guidelines and authorized by the Malagasy side in February 2019.

#### 16-4 Environmental and Social Monitoring

##### 16-4-1 Environmental Monitoring

Both sides agreed that the Malagasy side will submit results of environmental monitoring to JICA by using the monitoring form attached as Annex 11. The timing of submission of the monitoring form is described in Annex 6.

##### 16-4-2 Social Monitoring

Both sides confirmed that the Malagasy side will implement social monitoring about land acquisition and resettlement proposed in the ARAP. The Malagasy side and the Team agreed that MAHTP will submit results of social monitoring to JICA by using the monitoring form attached as Annex 11.

##### 16-4-3 Information Disclosure of Monitoring Results

Both sides confirmed that the Malagasy side will disclose results of environmental and social monitoring to local stakeholders through their website / in their field offices.

The Malagasy side agreed JICA will disclose results of environmental and social monitoring submitted by the Malagasy side as the monitoring forms attached as Annex 11 on its website.

#### 17. Other Relevant Issues

##### 17-1 Disclosure of Information

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

#### 17-2 Safety Measures

To avoid accidents on site during the implementation of the Project, the Malagasy side agreed to cause the consultant and the contractor to enforce safety measures such as setting safety assurance to the site, providing information for security control to public, and deploying adequate security personnel.

#### 17-3 Operation and Maintenance of the Facilities

The Team explained the importance of operation and maintenance of the facilities constructed by the Project considering that proper asset management impacts greatly on life-span of the facilities and its maintenance cost. The Malagasy side shall secure enough staff and budgets necessary for appropriate operation and maintenance of the facilities. The annual operation and maintenance costs and main maintenance items are shown below.

- Routine maintenance (every year)
  - Cleaning works (drainage pipe, expansion joints, bearings, side ditch, etc.)
  - Maintenance of road markings, sign boards, railings, etc.
  - Weeding and mending of slope surface and road shoulders
  - Preventive maintenance for bank protection area before rainy seasonSub total①: 5,170.88 (Thousand MGA/year)
- Periodic maintenance (every 5 year)
  - Remedial works of pavement (cracks, potholes, gaps, settlement, etc.)
  - Maintenance for structures (cracks, inclination, settlement, etc.)Sub total②: 24,460.80 (Thousand MGA/year)  
Total Cost(①+②): 29,631.68 (Thousand MGA/year)  
(Conversion into USD (MGA 1=USD 0.0003) 8,889.51 USD/year)

Annex 1 Project Site

Annex 2 Project Cost Estimation

Annex 3 Organization Chart

Annex 4 Japanese Grant

Annex 5 Project Implementation Schedule

Annex 6 Major Undertakings to be taken by the Government of Madagascar

Annex 7 Project Monitoring Report (template)

Annex 8 Environmental Check List

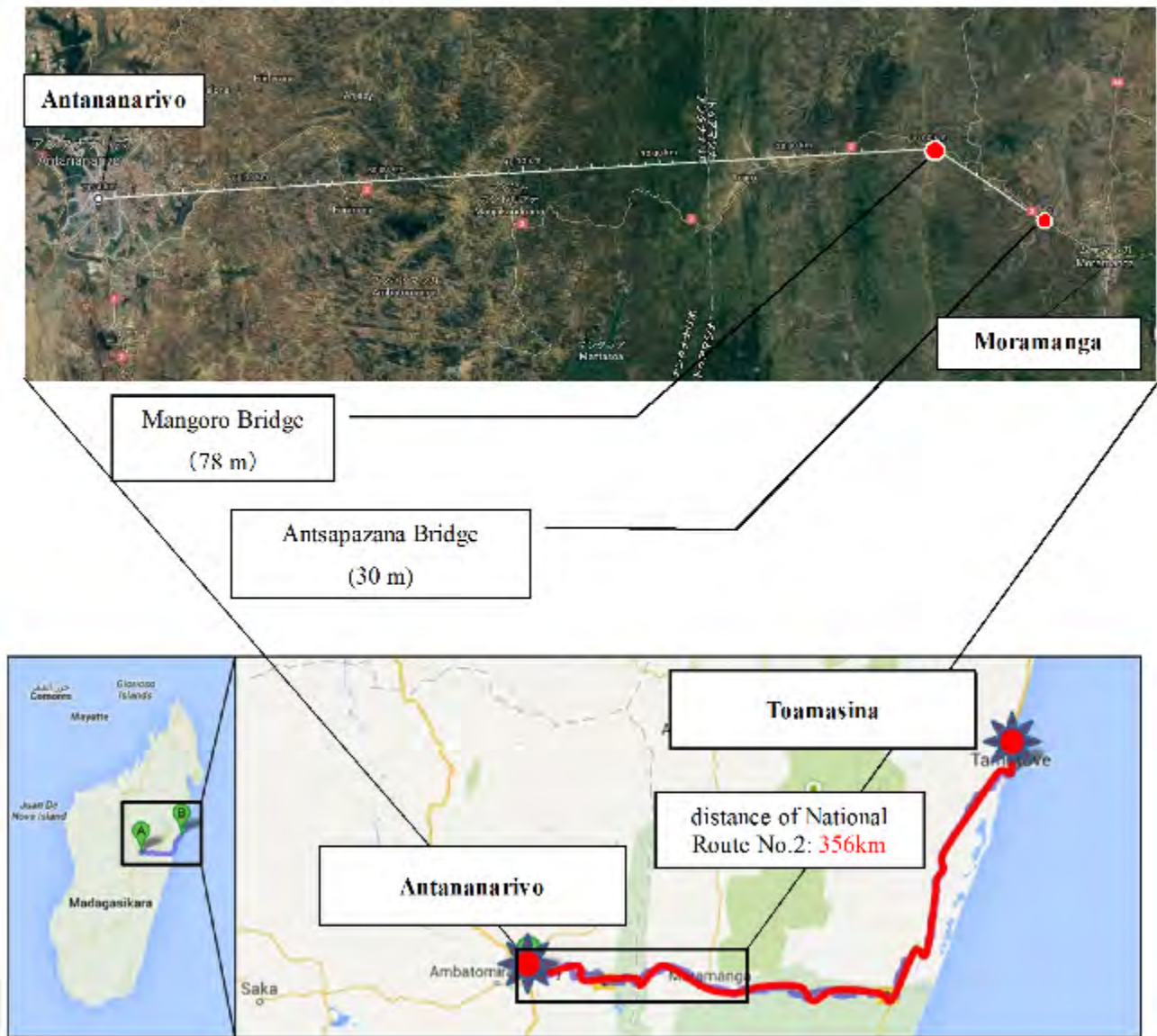
Annex 9 Environmental Management Plan/Environmental Monitoring Plan

Annex 10 Abbreviated Resettlement Action Plan

Annex 11 Environmental and Social Monitoring Form



Project Site



## Project Cost Estimate

CONFIDENTIAL

## (1) Cost borne by the Government of Japan

Total :	JPY	2,495 million
• Construction :	JPY	2,112 million
• Detailed Design and Construction Supervisory Service :	JPY	265 million
• Contingency :	JPY	118 million

## (2) Cost borne by the Government of Madagascar

Total :	USD	1,969,312
• Bank Charge (for the Consultant):	USD	2,700
• Obtaining approval on IEE/EIA from ONE :	USD	8,783
• Resettlement and Land Acquisition cost:	USD	54,630
• Secure and clear Lands:	USD	2,742
• Bank Charge (for the Contractor):	USD	17,957
• Budget for tax-exemption :	USD	1,864,500
• Environment Monitoring :	USD	18,000
Total annual maintenance cost :	USD	8,890

## (3) Cost Estimation Condition

- Estimated timing : August 2018
- Exchange rates : USD 1.00 = JPY 111.38

## (4) Others

The project is implemented in accordance with the system of Japan's Grant Aid. The above cost estimation does not assure the ceiling cost on the E/N and shall be reviewed by the Government of Japan before signing of the E/N between the two Governments. Cost borne by the Government of Madagascar is also provisional and will be assured according to progress of the Project.



**Ministry of Territorial Development of Housing and Public Works**

**DGATH : Direction General of Territorial Development and Housing**  
DDVH : Cities and Housing Development Direction  
SDPOU : Urban policy and Operations Development Department  
SH : Housing Department  
SAC : Architecture and Construction Department  
SPNV : Department Promoting New Cities  
DCPVMT : Direction of Cooperation, Planning and Valuation of the Maritime Territory  
SPTM : Maritime Territory Planning Department  
SBDTM : Database Department of Maritime Territory  
SVTM : Valuation Department of Maritime Territory  
DPT : Territorial Planning Direction  
SPTN : Coordination and Planning Department of the National Territory  
SPRL : Regional and Local Planning Department  
SOSA : Structuring Operations Department  
DPLE : Direction for the Promotion of Housing and Equipment  
SPL : Housing Promotion Department  
SOL : Housing Operations Department  
SAE : Sanitation and Equipment Department

**DGSF : General Direction of Land Departments**  
DAGFD : Direction of Support to Decentralized Land Management  
SPS : Planning and Monitoring Department  
SAGF : Land Office Support Department  
DDPF : Direction of Domains and Land Property  
SDC : Domains and Conservations Department  
SExpro : Expropriation Department  
SGO : Major Operations Department  
DETT : Studies and Topographical Works Department  
SAPLOF : Support Department for the Local Land Occupation Plan  
SEM : Studies and Methods Department  
STS : Special Works Department  
SER : Studies and Complaints Department  
SISF : Informatic Department of Land Departments  
SP : Partnership Department

**DECONCENTER Departments Of THE MINISTRY at District Level**

DLAT : Local Delegation of Territory Planning  
CIRDOMA : Land Constituency comprising Terrier Courts  
CIRTOFO : Topographic Constituency  
CIRAGFD : Support Constituency to Decentralized Land Management

**DGITP : General Direction of Public Works**  
DINFRA : Direction of Infrastructures  
SR : Roads Department  
SOA : Department of Works of art  
SCS : Control and Monitoring Department  
DER : Direction of Road Maintenance  
SPE : Maintenance Programming Department  
SSTE : Department of Supervision of Works Maintenance  
DAU : Direction of Emergency Support  
SV : Watch Department  
SCI : Department of Coordination of emergency intervention  
DEN : Direction of Studies and Standards  
SE : Studies Department  
SN : Standards Department

DAF : Financial Affairs Department  
SFB : Administrative and Financial Department  
SLP : Logistic and Heritage Department  
DSI : Information System Department  
SDMMI : Development and Maintenance of Computer Equipment Department  
SARS : Network and Site Administration Department  
DRH : Human Resources Department  
SRH : Human Resources Department  
SF : Training Department  
SMS : Medico-Social Department  
DAJ : Direction of Legal Affairs  
SLC : Legislation and Litigation Department  
SEJ : Legal Studies Department  
SDJ : Legal Documentation Department  
DAI : Direction of Audit and Inspection  
SCP : Procedure Control Department  
SAO : Organizational Audit Department  
SVCI : Watch and Intervention Department  
DPSE : Direction of Programming and Monitoring-Evaluation  
SP : Programming Department  
SSE : Monitoring-Evaluation Department  
DAP : Analyzes and Perspectives Department  
SAP : Prospective Analyzes Department  
SADT : Territorial Development Support Department  
CEEE : *Studies and Environmental Assessment Unit*  
UCSRF : Unit for Coordination and Monitoring of Land Reform  
SMR : Modernization and Restructuring Department  
SRAS : Relation with other Sectors Department  
OATF : Observatory of Territorial and Land Management  
SEC : Studies and Capitalization Department  
SIGBD : Information System and Database Management Department  
SCDI : Communication and Information Dissemination Department

## 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 “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 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 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

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).

##### 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.

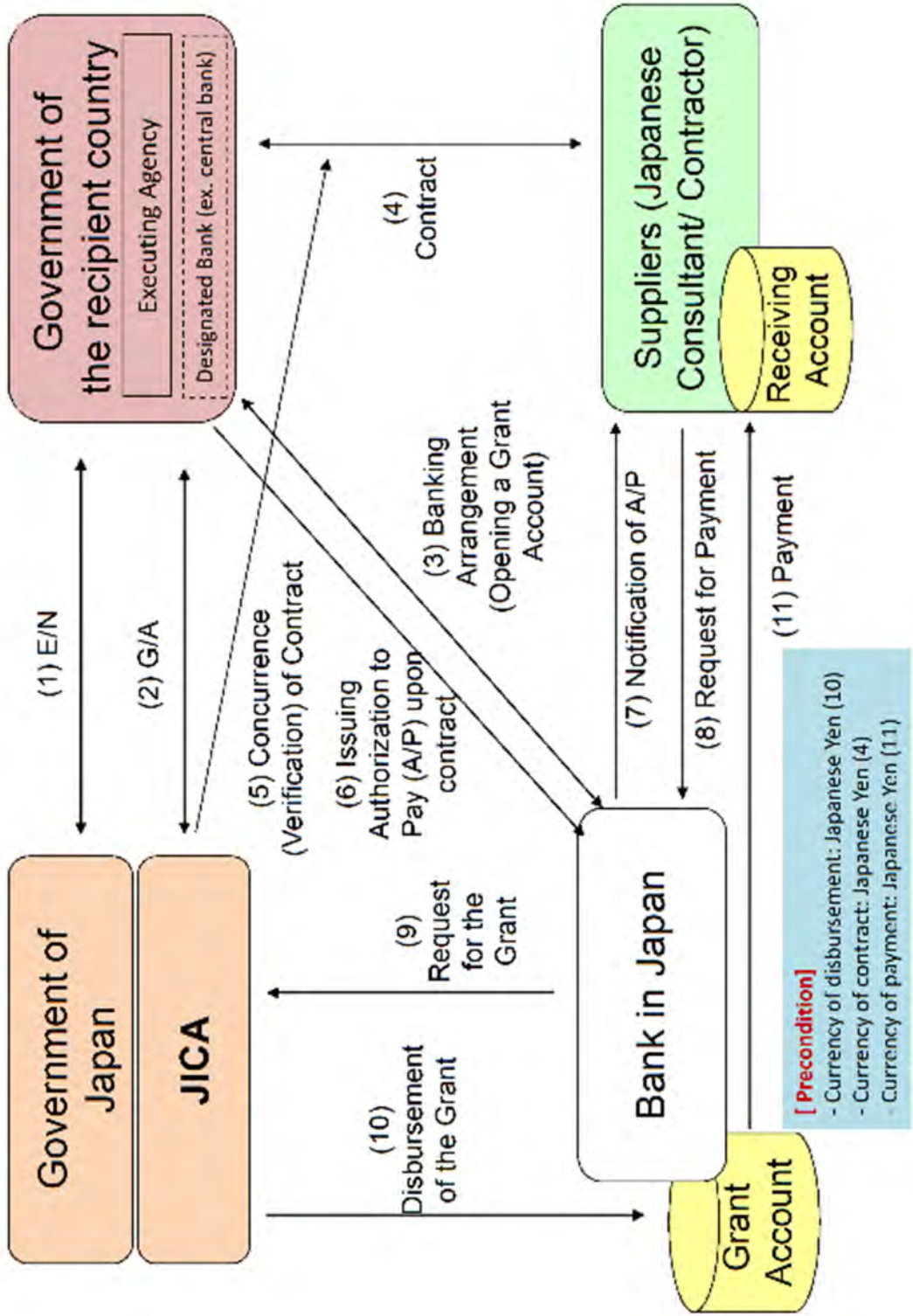
## PROCEDURES OF JAPANESE GRANT

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	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)





## Major Undertakings to be taken by the Government of Madagascar

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

## (1) Before the Bidding

NO	Items	Deadline	In charge	Estimated Cost (USD) (MGA)	Ref.
1	To open bank account (B/A)	within 1 month after signing of G/A	MAHTP	-	
2	To issue Authorization to Pay (A/P) to a bank in Japan (the Agent Bank) for the payment to the consultant	within 1 month after the signing of the contract	MAHTP/MEF	2,700.00 (9,000,000)	
3	To approve IEE/EIA (Conditions of approval should be fulfilled, if any) and secure necessary budget for implementation	by May 2019	MAHTP/ONE	8,783.00 (29,278,000)	
4	To secure necessary budget, implement land acquisition and resettlement (including preparation of resettlement sites) and compensation Project Affected Persons (PAPs) with full replacement cost in accordance with ARAP	before notice of the bidding document	MAHTP/MEF	54,630.00 (182,099,000)	
5	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	MAHTP	-	
6	To secure and clear the following land 1) the Project sites 2) temporary constructions yard and stock yards near the Project sites 3) borrow pits and disposal sites near the Project sites	before notice of the bidding document	MAHTP	2,742.00 (9,140,000)	
7	To clear, level and reclaim the sites, which will be confirmed in the draft final report.	before notice of the bidding document	MAHTP	-	
8	To obtain the planning, zoning, building permit	before notice of the bidding document	MAHTP	-	
9	To submit Project Monitoring Report (with the result of Detailed Design)	before preparation of the bidding document	MAHTP	-	

## (2) During the Project Implementation

NO	Items	Deadline	In charge	Estimated Cost (USD) (MGA)	Ref.
1	To issue A/P to a bank in Japan (the Agent Bank) for the payment to the Supplier(s)	within 1 month after signing of the contract	MAHTP/MEF	-	
2	To bear the following commissions to a bank in Japan for the banking services based upon the B/A 1) Advising commission of A/P	within 1 month after the signing of the contract	- MAHTP/MEF	- 17,957.00 (59,855,000)	



	2) Payment commission of A/P	every payment	MAHTP/ MEF	(59,855,000)	
3	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country and to assist the Supplier with internal transportation therein.		MAHTP	-	
4	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	MAHTP	-	
5	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 exempted;	during the Project	MAHTP/ MEF	1,864,500 (6,215,000,000)	
6	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project.	during the Project	MAHTP/ MEF	-	
7	1) To submit Project Monitoring Report	every month	MAHTP	-	
	2) To submit Project Monitoring Report (final)	within 1 month after signing of Certificate of Completion for the works under the contract	MAHTP	-	
8	To submit a report concerning completion of the Project	within 6 months after completion of the Project	MAHTP	-	
9	To implement ARAP (livelihood restoration program, if needed)	for a period based on livelihood restoration program	MAHTP	-	
10	To implement EMP and EMoP	during the construction	MAHTP	18,000.00 (60,000,000)	
11	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	MAHTP	-	
12	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 -Period of the monitoring may be extended if affected persons' livelihoods are not sufficiently restored. Extension of the monitoring will be decided based on agreement between MAHTP and JICA.	- until the end of livelihood restoration program (In case that livelihood restoration program is provided) - for two years after land acquisition and resettlement complete (In case that livelihood restoration program is not provided)	MAHTP	-	

(3) After the Project

NO	Items	Deadline	In charge	Estimated Cost (USD) (MGA)	Ref.
1	To implement EMP and EMoP	for a period based on EMP and EMoP	MAHTP	-	
2	To submit results of environmental monitoring to JICA, by using the monitoring form, semiannually - 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 MAHTP and JICA.	for 3 years after the Project	MAHTP	-	
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 structure 3) Routine check/Periodic inspection	After completion of the construction	MAHTP	8,890.00 (29,632,000)	

**2. Major Undertakings to be covered by the Grant Aid**

NO	Items	Deadline	Amount (Million Japanese Yen)
1	Rehabilitation of the bridges and approach roads		/
2	To implement detailed design, bidding support and construction supervision (Consulting Service)		
3	Contingencies		
	Total		2,495

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

**Project Monitoring Report**  
**on**  
**Rehabilitation of Bridges on the Economic Axis Antananarivo-  
Toamasina**  
**Grant Agreement No. XXXXXXX**  
 20XX, Month

**Organizational Information**

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

**General Information:**

<b>Project Title</b>	
<b>E/N</b>	Signed date: Duration:
<b>G/A</b>	Signed date: Duration:
<b>Source of Finance</b>	Government of Japan: Not exceeding JPY ____ mil. Government of (____):

<b>1: Project Description</b>	
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**1-1 Project Objective**

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**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

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**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		

<b>2: Details of the Project</b>
----------------------------------

**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)

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**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 <sup>1),2)</sup> <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 <sup>1),2)</sup> <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.

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

**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.)

<p><b>Original</b> (at the time of outline design)</p>
<p><b>Actual</b> (PMR)</p>



**3-2 Budgetary Arrangement**

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

<b>Original</b> (at the time of outline design)
<b>Actual</b> (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:
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:
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):
<b>Actual Situation and Countermeasures</b>	
(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)

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
1	Item 1	●●t	●	●	●	●	●
2	Item 2	●●t	●	●	●		
3	Item 3						
4	Item 4						
5	Item 5						

2. Monitoring of the Unit Price of Specified Materials

(1) Method of Monitoring : ●●

附 表 一 187

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

	Items of Specified Materials	1st month, 2015	2nd month, 2015	3rd month, 2015	4th	5th
1	Item 1	●	●	●		
2	Item 2					
3	Item 3					
4	Item 4					
5	Item 5					

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

-

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%)	

## 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) N (b) N (c) N (d) N	(a)(b)(c)(d) For this project, environmental impact assessment procedures have not been implemented so far and no EIA report has been prepared. In this survey, MAHTP, the project implementing entity, submitted an application for screening to ONE to judge necessary environmental impact assessment procedures, and as a result of the screening, it was judged that EIA was necessary. We create an EIA report using the survey results in this survey and conduct approval procedures.
	(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) Stakeholder meetings including affected residents are conducted twice in total, and contents of the project and the potential impacts, compensation policy, etc. are explained. (b) Comments from residents are reflected in the items of the environmental management plan. And monitoring is planned to be implemented in accordance with the management plan.
	(3) Examination of Alternatives	(a) Have alternative plans of the project been examined with social and environmental considerations?	(a) Y	(a) Comparative studies are made on four plans including a plan not to implement a project from the viewpoint of social and environmental considerations including aspects of safety, cost, and the like.
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) N (b) Y	(a) There are no standard relating with ambient air quality in Madagascar. (b) It is assumed that there will not be a large influence on air quality based on an assumption of the expected number of construction machines to be used. Although traffic volume increases at the time of service, it is conceivable that a congestion is eliminated and a speed of travel becomes faster thanks to the construction of an additional traffic lane (a two-way-traffic), thus deterioration of air quality does not occur. As there is no national standard value for ambient air quality, monitoring is carried out by hearing from neighboring residents.
	(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 the project will contaminate water sources, such as well water? (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) N (c) N	(a) The turbid water generated by the construction work may affect the surface water. If a large amount of fuel or oil leaks due to an accident during construction, there is a possibility of contaminating the water area. Also, at the Antsapazana bridge, soil runoff occurs due to heavy rainfall and flood in the embankment part of the detour route, and the river may be polluted. On the other hand, at the time of service, no water pollution occurs. Countermeasures for foregoing events are a construction of depositing reservoirs within the construction site for maintenance of surface water quality, a daily check of construction equipments for prevention of oil leaking, and use of tarpaulin for prevention of spill of embankment (detour) respectively. (b) No particular assumption is made. (c) No parking or service areas are planned.
	(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) N	(a) No parking or service areas are planned.
	(4) Noise and Vibration	(a) Do noise and vibrations from the vehicle and train traffic comply with the country's standards? (b) Do low frequency sound from the vehicle and train traffic comply with the country's standards?	(a) N (b) N	(a) Environmental standards for noise and vibration are not specified in the country concerned. (b) Environmental standards for low frequency sound are not specified in the country concerned.  Since there are no standards for noise and vibration, the contractor is requested to carry out construction works carefully in order to mitigate generation of noise and vibration. Additionally, daytime works is recommended in stead of nighttime works
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) There are no protected areas around the project site.
	(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 bridges and access 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	(a) N (b) N (c) N (d) N (e) N (f) N	(a) (b) (c) (d) There are no important natural environments, valuable species habitats around the project site, and no serious impact on ecosystem is feared. (e) (f) Since it is replacement of existing bridges, great impact is not assumed.

	(3) Hydrology	(a) Is there a possibility that hydrologic changes due to the installation of structures will adversely affect surface water and groundwater flows?	(a) N	(a) Because there is no obstacle to the flow of water by newly establishing / replacing the bridge, there is no particular hydrologic changes.
	(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) (b) Events affecting the terrain are not assumed. (c) On the Antsapazana Bridge, the possibility that the embankment of the detour spill by heavy rain and flooding. However, spill prevention measures are taken such as covering the embankment slope with a tarpaulin, etc.
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) At the Mangoro bridge site, although the least influential plan is adopted among alternative proposals, it is assumed that resettlement for 5 houses are demanded. There are no resettlement at Antsapazana Bridge site. For construction of Antsapazana bridge, temporarily leasing of lands for construction of a detour. (b) At the 2nd Stakeholder Meeting, explanation is made on compensation policy etc. In the EIA approval process, a committee will be set up, details of compensation to affected people will be confirmed and publicized. (c) In the process of EIA application, compensation contents are confirmed and a relocation plan is formulated. (d) It is planned to be done before construction starts. (Prior to the resettlement) (e) described in the report at the time of the EIA application process. (f) If there is concern about the impact on socially vulnerable people, a life reconstruction support plan will be formulated. (g) Notified to the affected people during the EIA application procedure, and agreed in writing before the resettlement and compensation start. (h) Based on the legal system of the country concerned and the JICA guidelines, appropriate measures are taken. (i) Described in the report at the time of the EIA application process. (j) Examined and described in ARAP, then established by MAHTP.
	(2) Living and Livelihood	(a) Where bridges and access 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 project will impede the movement of inhabitants? (f) Is there any possibility that bridges will cause a sun shading and radio interference?	(a) N (b) N (c) Y (d) N (e) N (f) N	(a) (b) There will be no major change to residents' living, land use, lifestyle measures, etc. at Mangoro bridge site because it is planned to construct new bridge in parallel with existing Mangoro bridge. There will be no major change to residents' living, land use, lifestyle measures, etc. at Antsapazana bridge site, because the bridge is replaced at the same location. (c) Since inflow of construction workers to the villages near the project sites might increase opportunities for HIV/AIDS, education for personnel involved in project should be thoroughly conducted. (d) (e) (f) The Mangoro bridge is new and the existing bridge will be replaced at the Antsapazana Bridge, but due to the provision of a detour route, adverse effects such as traffic increase, sunshine obstruction, It does not occur. In addition, by improving the sidewalks, the safety of traffic is secured more than now.
	(3) Heritage	a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?	(a) N	(a) There are no objects such as the local archeological, historical, cultural, and religious heritage in or near the project site.
	(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	(a) N	(a) Since the target bridge has not passed through the area requiring protection of the landscape, it is assumed that the influence on the landscape due to the existence of the bridge does not occur.
	(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 respected?	(a) N (b) N	(a) (b) Residents of ethnic minorities and indigenous peoples have not been confirmed at the project site and its surrounding areas.
	(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 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) (b) (c) (d) The working environment is appropriately developed based on the national legal system and international standards



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) N (c) N	(a) For items evaluated as "A -" or "B -" in the impact assessment, including noise, vibration, turbid water, dust waste, etc., the mitigation measures during construction are formulated as environmental management plans, and monitoring is carried out. (b) (c) There will be no serious adverse effect on the natural environment or social environment due to implementation of the construction work.
	(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) N	(a) For items with a potential negative impact, an environmental monitoring program will be developed and stated in the EIA report. (b) The items, methods, frequencies, etc. of the monitoring program are described in the EIA report. (c) The monitoring framework is studied in the EIA report. It is desirable to reconsider and finalize the details of it when the details of the project are determined. (d) Monitoring plan and monitoring format are specified in this report (See Table 1-20, 1-21, 1-47, 1-48, 1-49, and 1-50).
Note	Reference to Checklist of Other Sectors	(a) Where necessary, pertinent items described in the Roads, Railways and 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) Y (b) N	(a) As construction of approach roads of the bridge is planned, related items shown in "Environmental Check List for Roads" are added as follow: 2 (2) (c), 2 (3) (1), 3 (2) (f) (b) There is a low-voltage transmission line, but the line is out of the the project area.
	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) -	(a) N/A

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.

## Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP)

The Malagasy side shall conduct environmental mitigation measures and monitoring based on this Environmental Management Plan (EMP) / Environmental Monitoring Plan (EMoP). These plan may be updated during the detailed design stage.

### 1. Social and Environmental Monitoring

Item	Description	Location	Frequency	Responsibility	
				Operation	Oversight
Air Pollution	<ul style="list-style-type: none"> <li>- Visual observation of coarse particulate and ash dust.</li> <li>- State of implementation of countermeasures.</li> <li>- Hearing survey</li> </ul>	Project Area	Weekly (construction stage)	Contractor	MAHTP
			Biannually (Operation stage)	MAHTP	
Water Pollution (Surface water)	<ul style="list-style-type: none"> <li>- Measurement of turbidness, pH, and others as specified in the monitoring form (see Annex 11). at upstream and downstream of the project area</li> </ul>	Water Area (2 locations)	Bimonthly (construction stage)	Contractor	
			Biannually (Operation stage)	MAHTP	
	<ul style="list-style-type: none"> <li>- Hearing survey</li> </ul>	Project Area	Monthly (construction stage)	Contractor	
			Biannually (Operation stage)	MAHTP	
Waste Materials	<ul style="list-style-type: none"> <li>- Monitor the state of implementation of waste disposal</li> </ul>	Project Area	Weekly	Contractor	
Soil Pollution	<ul style="list-style-type: none"> <li>- Inspection/maintenance of construction equipment for prevention of oil leakage.</li> </ul>	-	Weekly		
Noise, vibration	<ul style="list-style-type: none"> <li>- Noise level measurement</li> <li>- Hearing survey</li> </ul>	Project Area	Monthly (construction stage)		
			Biannually (Operation stage)		
Bottom Sediment	<ul style="list-style-type: none"> <li>- Inspection/maintenance of construction equipment for prevention of oil leakage.</li> </ul>	-	Weekly	Contractor	

Ecosystem	- Visual confirmation of aquatic organisms, Hearing to neighboring residents	Project Area	Monthly		
	- Movement arousal before construction	Project Area	Before construction		
	- Restoration of riparian vegetation	Project Area	Before completion		
Existing Social Infrastructures and Services	- Monitoring of traffic jam situations	Project Area	Weekly		
Working Conditions	- State of implementation of safety measures - State of domestic water treatment and waste treatment	Project Area	Weekly		
Traffic Accidents	- Hearing of traffic accident situations and preventive measures based on hearing survey	-	Monthly		

## 2. Resettlement and Compensations

Item	Description	Timing	Responsibility	
			Operation	Oversight
Publicity announcement	To publicize a compensation policy and its schedule	After the Outline Design	MAHP	ONE (Steering Committee)
Consensus of compensation	To build consensus on compensation amount and conclude agreement of payment	After the Outline Design	MAHP	ONE (Steering Committee)
Implementation of compensation	To monitor progresses of compensation	After the Outline Design	MAHP	ONE (Steering Committee)
Resettlement	To monitor progresses of resettlement	After the Outline Design	MAHP	ONE (Steering Committee)
Socio-economic situation	To monitor socio-economic status of PAPs after resettlement/land acquisition(	After resettlement	MAHP	MAHP
Residents' Grievance	To monitor complaint of resident, if any To monitor state of complaint processing	After resettlement	MAHP	MAHP

ABBREVIATED RESETTLEMENT ACTION PLAN

(仏語版 M/D の Annex10 参照)

## Environmental and Social Monitoring Form

The Malagasy side shall submit results of environmental monitoring to JICA by using this monitoring form on a quarterly basis as a part of Project Monitoring Report.

### 1. Environmental Monitoring

#### 1.1. Air Quality

Monitoring Item	Unit	Survey Point		Malagasy Standard	Survey Method	Remark (Situations of survey points)
		Mangoro Bridge Upstream	Mangoro Bridge Downstream			
Coarse particulate and ash dust (visual observation)	NTU			<25	NF EM ISO 7027-1	
Monitor the state of implementation of countermeasures (if necessary)	pH(°C)			6.0-9.0	NF EM ISO 10523	
Hearing survey (Peripheral People)	mg/l			<0.2	Visible spectroscopy	

#### 1.2. Water Quality

Monitoring Item	Unit	Survey Point		Malagasy Standard	Survey Method	Remark (Situations of survey points)
		Mangoro Bridge Upstream	Mangoro Bridge Downstream			
Turbidness	mg/l			<2.0	Visible spectroscopy	
pH (Temperature)	mg/l			<0.5	Visible spectroscopy	
Chromium Hexavalent	mg/l			<20	NF EM ISO 7887-D	
Nickel	°C			-	-	
Arsenic	mg/cm			<200	NF EM 27888	
Color	g/l in CaCO			<180.0	NF T 90-003	
Water Temperature	mg/l in NH <sub>4</sub>			<15.0	NF T 90-015-2	
Electric conductivity(25°C)	mg/l in NO <sub>3</sub>			<20.0	Visible spectroscopy	
Total Hardness	mg/l in NO <sub>2</sub>			<0.2	NF EM 26777	
Ammonium	mg/kg			-	-	
Salt of nitric acid	MPP/100ml			<100	NF EM ISO 9308-3	
Nitrite salt						
Total Hydrocarbons						
Coliform group count						

#### 1.3. Waste Materials

Monitoring Item	Monitoring Result during Report Period
Monitor the state of implementation of waste disposal	

1.4. Noise & Vibration (Mangoro Bridge only) NOTE: Use from "1.9" for recording hearing investigation results

Item (unit)	Daytime	Mighttime	Baseline values at Mangoro Bridge		Local Standard	Remark (Situations of survey points)
			Daytime	Nighttime		
Noise level (dB)	Min.	43	Max	111.8		
			Min.	43	Max	106.2

1.5. Soil Pollution / Bottom Sediment

Monitoring Item	Monitoring Result during Report Period
Inspection/maintenance of construction equipment (prevention of oil leakage)	

1.6. Ecosystem

Monitoring Item	Monitoring Result during Report Period
Visual confirmation of aquatic organisms, Hearing to neighboring residents	
Movement arousal before construction	
Restoration of riparian vegetation	

1.7. Existing Social Infrastructures and Services

Monitoring Item	Monitoring Result during Report Period
Traffic jam situations	

1.8. Working Conditions

Monitoring Item	Monitoring Result during Report Period
State of implementation of safety measures	
State of domestic water treatment and waste treatment	

1.9. Traffic Accidents

Date	Situation and cause of accident	Correspondence	Result

1.10. Grievance regarding Environmental Impact

Date	Grievances	Correspondence	Result



2. Social Monitoring  
2.1. Resettlement and Compensations

Monitoring Item	Scheduled Number	Progress in number		Progress in ratio		Completion date	Responsible Agency
		As of 11. 2019	As of 12. 2019	As of 11. 2019	As of 12. 2019		
Determination of PAPs							MAHTP
Consensus of compensation							MAHTP
Land acquisition (Mangoro)							MAHTP
Land acquisition (Antsapazana)							MAHTP
Resettlement (Mangoro)							MAHTP
Compensation (Mangoro)							MAHTP
Compensation (Antsapazana)							MAHTP

2.2. Resettlement Assistance (restoration of livelihoods and living standards)

Date	Contents	Activities	Result

2.3. Residents' Grievance

Date	Grievances	Correspondence	Result



#### 4.3. テクニカルノート／覚書

### Note technique

## PROJET DE REHABILITATION DE PONTS SUR L'AXE ECONOMIQUE ANTANANARIVO – TOAMASINA EN REPUBLIQUE DE MADAGASCAR

Le Ministère des Travaux Publics et des Infrastructures en République de Madagascar (ci-après dénommé "MTPI") et la JICA (ci-après dénommée "Equipe d'Etude") ont tenu une série de réunions techniques et discuté des questions nécessaires à la planification et à la conception des installations pour ce projet. Le 14 août 2018, les deux parties se sont convenues des descriptions ci-après :

#### 1 Résultat d'analyse du trafic et prévision de la demande de trafic

##### 1.1 Etude de trafic

L'Equipe d'Etude de la JICA a réalisé une étude de trafic le 24 et le 25 juillet. Partant de l'analyse des résultats de l'étude de trafic et des données existantes sur le trafic de la RN2, le trafic journalier moyen annuel en 2018 sur le tronçon routier des ponts planifiés est d'environ 1.700 véhicules sur le Pont de Mangoro et d'environ 2.000 sur le Pont d'Antsapazana. Ceux-ci seront définis comme le volume de trafic de base pour les prévisions de la demande de trafic. Ce volume de trafic ne comprend pas piétons et bicyclettes.

Selon les résultats de l'analyse de trafic, le volume de conception est prévu dans le prochain travail. L'année cible pour la conception est 2033. Le transport ferroviaire et le transport aérien seront considérés comme les modes de transport concurrents de la RN2 au cours de l'année de conception visée. Cependant, l'autoroute entre Antananarivo et Toamasina ne devrait pas être prise en compte dans l'étude des prévisions de la demande de trafic en raison du manque de clarté sur ce projet en ce moment.

#### 2 Normes de conception des routes et ponts

Les Normes de conception utilisées pour ce projet sont les suivantes:

- Explanations and Operation for Road Structure Ordinance (2015 :JAPAN) ;
- Specifications for Highway Bridges (JAPAN) ;
- Structure Ordinance for River Management Facilities(2013 :JAPAN);



- Design Standards for Ministry of Public Works and Infrastructure (1996 :Madagascar);
- Geometric design List (MTPi);
- Manuel AASHTO etc.

### 3 Largeurs des routes et ponts

Ce Projet comprend la construction de plusieurs ponts et routes d'accès. La route du Projet comporte deux chaussées pour deux voies d'une largeur de 3,50m chacune. La largeur de la route d'accès est de 10,0m avec des bermes d'une largeur de 1,50m des deux côtés. Les ponts comportent des trottoirs, d'une largeur de 1,50m, des deux côtés des chaussées conformément aux normes malgaches. Toutefois, la largeur du pont pourrait changer suivant les résultats de l'étude de trafic et les contre-mesures des accidents de circulation.

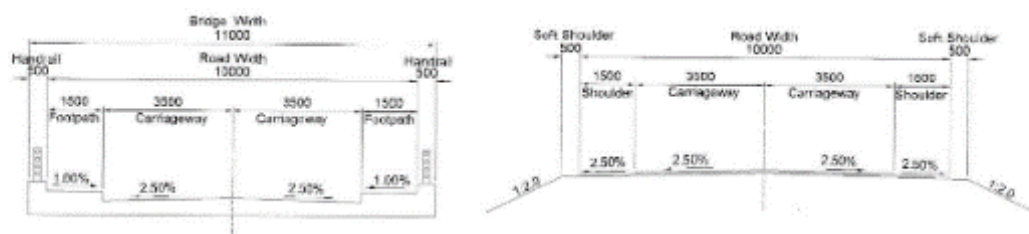


Figure1 Largeur standard (plan) (Coupe Pont - coupe courante (talus))

### 4 Planification et conception des routes

#### 4.1 Conception géométrique et vitesse nominale

La vitesse nominale du Projet qui est de 80km/h est basée sur les normes standards des routes nationales à Madagascar. Cependant, le tracé géométrique de la route d'accès existante du Pont de Mangoro permet l'équivalent de 40km/h qui est la vitesse nominale des normes des routes japonaise due aux facteurs topographiques.

Dans ce projet, la vitesse nominale de la route d'accès au Pont de Mangoro sera supérieure à 50km/h selon les normes des routes japonaises si l'on prend en compte les normes géométriques malgaches ainsi que l'amélioration de la sécurité routière (le tracé géométrique sera amélioré par rapport à celui de la route existante). En outre, dans cette conception, la largeur de la chaussée dans les courbures sera élargie pour l'amélioration de la sécurité routière pour les poids lourds tout en améliorant la distance de visibilité.

Tableau : Vitesses nominales

Désignations	Mangoro	Antsapazana
Vitesse nominale	<u>50km/h</u>	<u>80km/h</u>
Route existante	40km/h	80km/h

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#### 4.2 Structure de la chaussée

La structure de la chaussée sur la route du projet sera décidée à partir des informations ci-après:

- Les charges à l'essieu sur la RN2 ;
- Les données sur le comptage du volume de trafic ;
- Les données géologiques au niveau du site du projet.

La période de conception standard des chaussées adoptée est de 15 ans selon les normes routières à Madagascar. Cependant, une révision prenant en compte le volume du trafic de poids lourds existant, le volume prévisionnel de trafics futurs, l'entretien ainsi que l'exploitation sera proposée si besoin.

#### 4.3 Choix d'itinéraire (nouvel emplacement des ponts)

##### 4.3.1 Généralités

L'emplacement des nouveaux Ponts de Mangoro et d'Antsapazana sera décidé à partir des paramètres les plus exhaustifs des considérations ci-après :

- La faisabilité économique du Don Non-remboursable japonais;
- L'accroissement des activités économiques;
- L'amélioration effective de la sécurité routière;
- La compatibilité des conditions environnementales et sociales (conditions de réinstallation, d'expropriation et de dédommagement)

##### 4.3.2 Emplacement du Pont de Mangoro

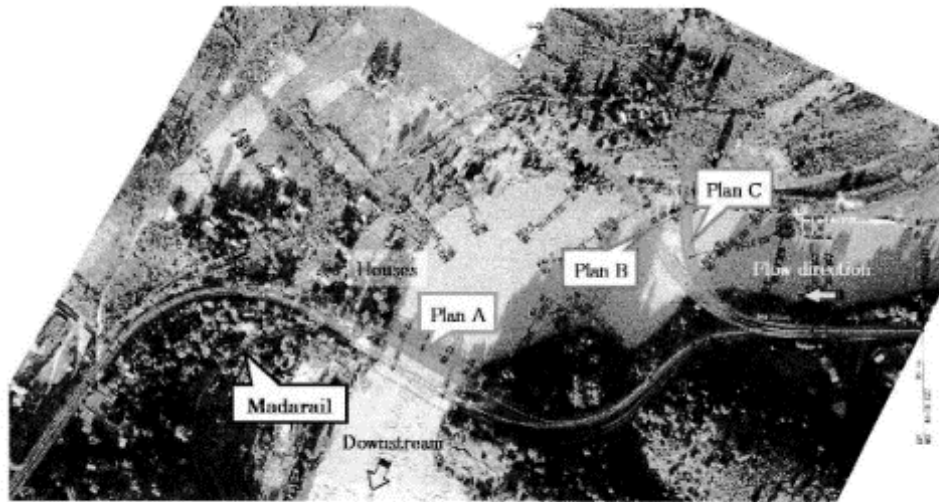
L'Equipe d'Etude de la JICA a fait part des résultats de la considération des trois itinéraires alternatives ci-dessous et a proposé le Plan A comme l'itinéraire recommandé à la suite de sa première enquête de terrain. Il a été confirmé que le MTPI n'a pas d'opinions divergentes à ce sujet (cf. pièce jointe pour plus de détails).

Plan A : Côté amont, à proximité du pont existant (itinéraire recommandé)

Plan B : Côté amont, éloigné du pont existant (A)

Plan C : Côté amont, éloigné du pont existant (B)

L'Equipe d'Etude de la JICA procédera à la vérification et à la conception du Plan A au Japon. L'Equipe d'Etude rapportera au MTPI, si besoin, toutes modifications importantes lors de cette vérification.



#### 4.3.3 Emplacement du Pont d'Antsapazana

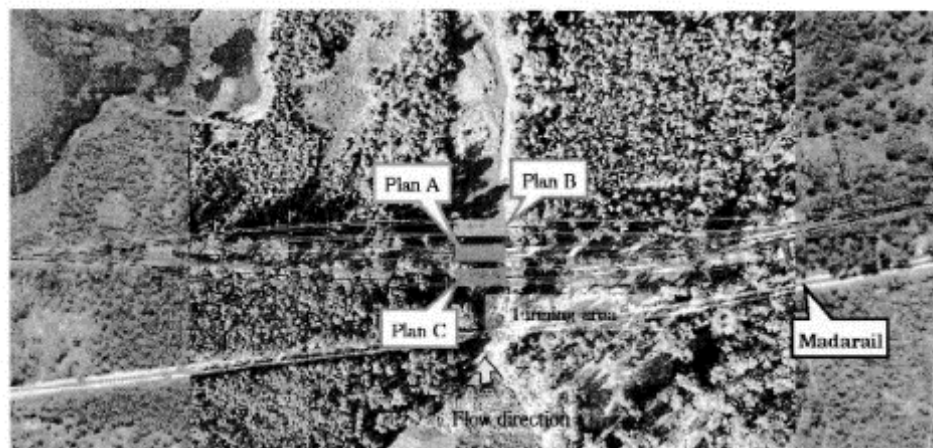
L'Equipe d'Etude de la JICA a fait part des résultats de la considération des trois itinéraires alternatives ci-dessous et a proposé le Plan A comme l'itinéraire recommandé à la suite de sa première enquête de terrain. Il a été confirmé que le MTPI n'a pas d'opinions divergentes à ce sujet (cf. pièce jointe pour plus de détails).

Plan A : Emplacement existant (plan recommandé)

Plan B : Emplacement en aval

Plan C : Emplacement en amont

L'Equipe d'Etude de la JICA procédera à la vérification et à la conception du Plan A au Japon. L'Equipe d'Etude rapportera au MTPI, si besoin, toutes modifications importantes lors de cette vérification.



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#### 4.3.4 Résumé du nouvel emplacement du pont

Tableau: Emplacement des Ponts

Désignations	Mangoro	Antsapazana
Emplacements	<u>Côté amont</u> (Approximativement à 15m) <u>[conservation du pont existant]</u>	<u>Reconstruction sur l'emplacement existant</u> <u>[enlèvement du pont existant]</u>

※Distance par rapport aux infrastructures existantes à considérer

### 5 Planification et conception des ponts

#### 5.1 Généralités

La planification et conception des ponts de ce projet se feront en prenant en compte divers points de vue tels que les aspects structurels, la constructibilité (efficacité d'exécution), l'entretien, les impacts sur les aspects sociaux et environnementaux, ainsi que l'efficience économique.

##### 5.1.1 Considérations pour les travaux d'entretien

Pour garantir la viabilité des travaux d'entretien des installations accordées dans le cadre de ce projet, une réduction ou maintien des charges des travaux d'entretien du MTPI/ARM doit être pris en considération par l'Equipe d'Etude pour la planification et la conception des nouveaux ponts de Mangoro et d'Antsapazana.

Il a été confirmé que le MTPI préférerait un pont en béton qui présenterait des avantages en termes de coûts d'entretien réduits et adaptabilité technique.

##### 5.1.2 Nombre de piles immergées

L'Equipe d'Etude effectuera une analyse des cours d'eau (écoulement nominal, niveau d'eau maximal, etc.) dont les résultats devront être pris en compte pour la détermination du nombre de piles immergées ainsi que la disposition des travées pour les ponts de Mangoro et d'Antsapazana. On notera avec attention la requête du MTPI à la partie japonaise concernant l'évitement des risques liés à la prévention de crues suite à l'augmentation du nombre de piles par rapport aux situations actuelles.

Le MTPI est l'entité en charge de l'autorisation des travaux en cours d'eau pour les ponts concernés, y compris les piles immergées, culées et protection de berges, batardeaux, etc.

##### 5.1.3 Hauteur de dégagement au-dessus du niveau d'eau maximal

Il n'y a ni règlements ni lois à Madagascar portant hauteur de dégagement qui se définit

comme un espace dégagé entre le niveau d'eau maximal et la surface inférieure de la superstructure du pont. Selon une probabilité d'occurrence adaptée à une analyse du niveau d'eau maximal, on recommande au MTPI les valeurs ci-dessous comme hauteur de dégagement (h);

Probabilité d'occurrence 1/50: h=1.5m ou plus

Probabilité d'occurrence 1/100: h=1.0m ou plus

Le MTPI a chargé l'Equipe d'Etude d'appliquer 1/100 comme probabilité d'occurrence pour l'analyse de cours d'eau de la Mangoro et de l'Antsapazana. En ce qui concerne la valeur souhaitable, le MTPI demande à l'Equipe d'Etude de choisir autant que possible une hauteur de dégagement plus grande (jusqu'à 1,5m)

#### 5.1.4 Conception parasismique

Les ponts devront être suffisamment stabilisés contre les magnitudes sismiques maximales. De telles magnitudes devront être déterminées après mûre réflexion par l'Equipe d'Etude. Le coefficient sismique attendu (au 10 août 2018) est de 0.15, lequel sera adopté pour la conception des ponts sur la RN2 (JICA). Le coefficient sismique devra être révisé.

### 5.2 Planification et conception du Pont Mangoro

#### 5.2.1 Longueur du pont

Selon la requête de Don Non-remboursable soumise par le MTPI, la longueur de pont proposée est de 100m. Des rapports correspondants établissant la base de la longueur de pont proposée sont inexistantes. La longueur du Pont de Mangoro existant est de 80m environ. La longueur du nouveau pont devra, en principe, être assez longue pour permettre une zone d'écoulement transversale nécessaire.

#### 5.2.2 Choix des types de structures

##### 5.2.2.1 Type de superstructure

Un type de superstructures devra être étudié en parallèle avec une étude de la disposition des travées qui a un lien direct avec la prévention de crues. En ce qui concerne le nouveau Pont de Mangoro, dont la longueur est de 100m environ, un pont à 3 travées (33,3m x 3) ou 4 travées (25,0m x 4) serait le choix disponible en termes de rentabilité, sachant que le Pont de Mangoro existant comporte 3 travées. En général, le prix unitaire d'une superstructure augmente lorsqu'une augmentation de la longueur de travée est nécessaire.

Plusieurs types de ponts en béton seront choisis pour une étude comparative du type de superstructure. Concernant les principaux matériaux de la superstructure pour l'étude

comparative, les ponts en béton seront utilisés pour prendre en considération les coûts et techniques d'entretien.

#### 5.2.2.2 Type d'infrastructure

Le type d'infrastructure doit être choisi en considérant minutieusement les influences des piles immergées sur l'écoulement de la rivière. Une profondeur scellée de semelle/structure de liaison en-dessous d'un lit de fleuve doit être convenablement renforcée pour éviter des situations d'instabilité de l'infrastructure due à l'érosion fluviale autour.

#### 5.2.2.3 Type de fondation

Le type de fondation doit être choisi en considérant minutieusement les conditions pédologiques, la profondeur de la nappe phréatique, l'étendue des forces de réaction nominales, l'efficacité de construction, etc.

### 5.3 Planification et conception du pont d'Antsapazana

#### 5.3.1 Longueur du pont

Selon la requête de Don Non-remboursable soumise par le MTPI, la longueur de pont proposée est de 30m. Des rapports correspondants établissant la base de la longueur de pont proposée sont inexistantes. La longueur du Pont D'Antsapazana existant est de 30m environ.

La longueur du nouveau pont devra, en principe, être assez longue pour permettre une zone d'écoulement transversale nécessaire. L'Equipe d'Etude a effectué des enquêtes de terrain, des études topographiques, des études relatives au choix d'itinéraire, ainsi qu'une estimation préliminaire de l'écoulement nominale. A la suite de ces études, la longueur de pont proposée de 30m est jugée adéquate. L'Equipe d'Etude continue les études, y compris davantage d'analyses des cours d'eau qui permettront une optimisation de la longueur des ponts.

#### 5.3.2 Choix des types de structures

##### 5.3.2.1 Type de superstructure

Un type de superstructure devra être étudié en parallèle avec une étude de la disposition des travées qui a un lien direct avec la vulnérabilité et la prévention de crues. En ce qui concerne le nouveau pont d'Antsapazana, dont la longueur est de 30m environ, un pont à travée unique (30,0m x 1) ou à 2 travées (15,0m x 2) serait le choix disponible en termes de rentabilité, sachant que le pont d'Antsapazana existant comporte une seule travée. En général, le prix unitaire d'une superstructure augmente lorsqu'une augmentation de la longueur de travée



est nécessaire.

Plusieurs types de ponts en béton seront choisis pour une étude comparative du type de superstructure. Concernant les principaux matériaux de la superstructure pour l'étude comparative, les ponts en béton seront utilisés pour prendre en considération les coûts et techniques d'entretien.

#### 5.3.2.2 Type d'infrastructure

Le type d'infrastructure doit être choisi en considérant minutieusement les influences des piles immergées sur l'écoulement de la rivière. Une profondeur scellée de structure de liaison en-dessous d'un lit de fleuve doit être convenablement renforcée pour éviter des situations d'instabilité de l'infrastructure due à l'érosion fluviale autour.

#### 5.3.2.3 Type de fondation

Le type de fondation doit être choisi en considérant minutieusement les conditions pédologiques, la profondeur de la nappe phréatique, l'étendue des forces de réaction nominales, l'efficacité de construction, etc. Etant donné la profondeur de la couche portante, la fondation sur pieux est recommandée

#### 5.3.2.4 .Démontage et mise en dépôt du pont d'Antsapazana

Le MTPI propose que le démontage et la mise en dépôt du pont d'Antsapazana existant par l'entreprise Japonaise n'est d'aucun problème si le nouveau pont est construit sur l'alignement de la route existante. Le MTPI est responsable du pont existant en cas ou le nouveau pont sera construit à côté

Le MTPI et l'équipe d'étude de la JICA , soussignés et sont d'accord sur la présente note.

Fait à Antananarivo le , 14 Août 2018

Pour le Ministère des Travaux  
Publics et des Infrastructures



RAFIRINGA Eric Arius  
Directeur Général des Travaux Publics

Pour l'équipe d'étude de JICA



Takashi MATSUO  
Co-Chief Consultant

(仮訳)

## Technical Note

### マダガスカル国 アンタナナリボ・トアマシナ間経済都市軸 橋梁整備計画準備調査

マダガスカル共和国公共事業インフラ省（以下、MTPI）と JICA 調査団（以下、調査団）は、プロジェクトの計画・設計で必要となる技術的内容に関して協議を重ね、2018 年 8 月 14 日、次に示す共通認識を構築した。

#### 1 交通需要予測

調査団が実施した交通量調査および既存交通データの分析から、橋梁断面における日平均交通量は、マングル橋で約 1,700 台、アンツァパザナ橋で約 2,000 台であることが明らかとなった。

交通分析結果を用いて将来交通量推計を実施し計画交通量を算定する。計画年次は 2033 年とする。計画年次において供用されている交通モードは、鉄道および航空と想定する。なお、現段階において高速道路計画の進捗の行方は不透明であるため、計画年次においては供用されていないと想定する。

#### 2 適用基準

適用設計基準を以下に示す。

- ・ 道路構造令の解説と運用（2015 年:日本）
- ・ 道路橋示方書（日本）
- ・ 河川管理施設等構造令（2013 年：日本）
- ・ マダガスカル国公共事業インフラ省の設計基準（1996 年）
- ・ 幾何構造一覧(MTPI)を基準とする
- ・ AASHTO 等の基準を参照する

#### 3 道路および橋梁の幅員構成

本計画の対象道路は、橋梁区間とアプローチ道路区間で構成され、車線幅はいずれも  $W=3.5\text{m}$  とし車線数は 2 車線とする。アプローチ道路区間は、路肩幅員として  $W=1.50\text{m}$  を両側に確保し、道路幅員は全幅で  $W=10\text{m}$  とする。橋梁区間については、マダガスカ

ル国の国道における橋梁部の標準幅員を踏まえて車道部の両側に歩道を設置し、歩道幅員はW=1.5mを確保する。なお、橋梁部の幅員構成に関しては、交通安全対策や交通量調査結果により、変動する可能性がある。

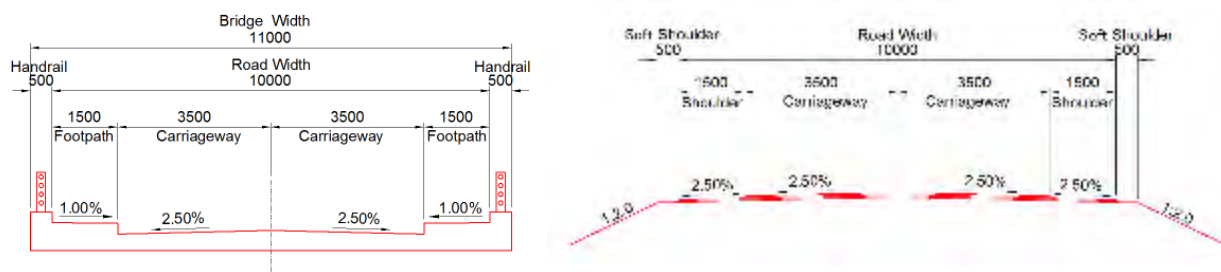


図1 標準断面図（案）（橋梁部・土工部（盛土の場合））

#### 4 道路計画・設計

##### 4.1 幾何構造および設計速度

本計画の対象道路は、マダガスカル国の整備基準に基づき設計速度は80km/hを基本とする。但し、マングル橋は、取付け道路区間における現況の設計速度が、地形上の制約により日本国の道路構造令で40km/h相当程度の線形となっている。本計画では、マダガスカル国の道路幾何構造法令を遵守した上で既存道路の走行安全性を向上することを目的とし、道路構造令における50km/h相当以上の設計速度を確保することを目標とする。

（現況の設計速度は改善）。また、曲線区間において車線幅員の拡幅を行い視認性の確保や大型車の走行性改善に配慮した設計を行う。

表 設計速度

項目	マングル	アンツァパザナ
設計速度	50km/h	80km/h
現況	40km/h	80km/h

##### 4.2 舗装構造

舗装構造は下記を踏まえて決定する。

- ・ 国道2号における大型車の軸重データ
- ・ 交通量データ
- ・ プロジェクトサイトの地質データ

舗装の設計期間は「マ」国の国道で採用されている15年を標準とする。ただし、交通状況や維持管理の実態を踏まえて検討を行い、必要に応じて提案を行う。

### 4.3 架橋位置（ルート選定）

#### 4.3.1 基本事項

マングル橋ならびにアンツァパザナ橋の架橋位置（ルート）は、下記を踏まえて総合的に比較検討し決定する。

- ・ 日本国無償資金協力として経済的に妥当であること
- ・ 整備効果
- ・ 改良線形の安全性や走行性、施工性
- ・ 環境社会への適合性（住民移転、用地取得、補償の要否等）を

#### 4.3.2 マングル橋の架橋位置

調査団は、第1回現地調査の内容を踏まえて以下の3ルート案の特徴を説明した。Plan Aを推奨案として提案し、MTPIより異存がないことを確認した。（詳細は別添資料参照）

Plan A：上流側直近架替案〔推奨案〕

Plan B：上流側別ルート新設案

Plan C：上流側別ルート新設案

調査団は、Plan Aに基づき国内解析を実施する。解析を行う過程で大きな修正が必要となる場合、調査団はMTPIに報告を行う。





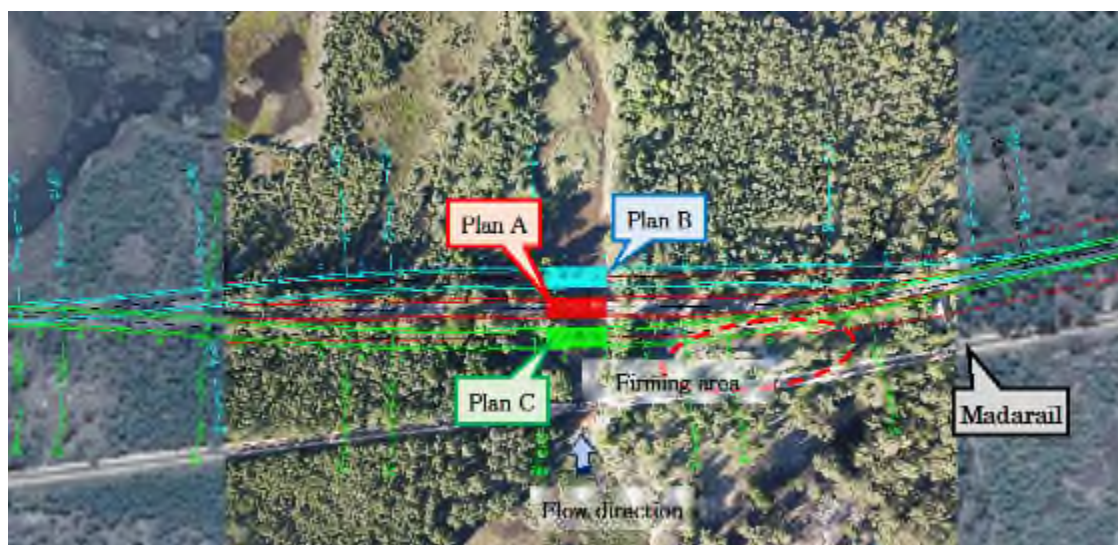
#### 4.3.3 アンツァパザナ橋の架橋位置

調査団は、第1回現地調査の内容を踏まえて以下の3ルート案の特徴を説明した。Plan Aを推奨案として提案し、MTPIより異存がないことを確認した。(詳細は別添資料参照)

Plan A : 現況位置架替案〔推奨案〕

Plan B : 下流側架替案

Plan C : 上流側架替案



調査団は、第1案に基づき国内解析を実施する。解析を行う過程で大きな修正が必要となる場合、調査団はMTPIに報告を行う。

#### 4.3.4 架橋位置のサマリー

表 架橋位置

項目	マングル	アンツァパザナ
架橋位置	<u>上流側(約15m*シフト)</u> <u>〔既設橋存置〕</u>	<u>現況位置に架け替える</u> <u>〔既設撤去〕</u>

※既設構造物との離隔について検討が必要。

### 5 橋梁計画・設計

#### 5.1 基本事項

橋梁の計画ならびに設計は、構造的、施工性、維持管理面、環境社会配慮面、ならびに経済性について総合的に検討し決定する。

### 5.1.1 維持管理への配慮

本計画における橋梁計画ならびに橋梁設計では、MTPI ならびに ARM の維持管理に関する負担（維持管理予算面および技術面）が軽減される、あるいは増加しないように配慮する。

MTPI は、維持管理費用が少なく、技術的にも対応しやすいコンクリート橋を要請している。

### 5.1.2 河川内橋脚の設置基数

調査団は河川解析（設計流量、設計水位等）を実施する。解析結果は、河川内橋脚数や支間割りの計画に用いる。MTPI は、新しいマングル橋の河川内橋脚数に関して、既存橋の橋脚数より増やすとは治水上のリスク増加に繋がると考えており、これを望んでいない。

MTPI は、本計画の対象橋梁に関する河川内工事（橋脚、橋台、護岸工、仮締切り工事等）の許可権限を有する。

### 5.1.3 桁下余裕高

マダガスカル国では、橋梁桁下面から計画高水位までの余裕高さ（桁下余裕高）に関する法令や基準はない。MTPI は桁下余裕高について次のように運用している。

生起確率が 1/50 の場合： 1.5m

生起確率が 1/100 の場合： 1.0m

MTPI は、本計画で建設する橋梁に対して、生起確率を 1/100 として河川諸元を検討することを要請している。この場合の最小桁下余裕高は 1.0m である。MTPI は、可能な範囲で桁下余裕高が 1.5m 確保されることを希望している。

### 5.1.4 耐震設計

橋梁は想定される地震力に対して安全となるように設計を行う。地震の大きさは、調査団が日本国内で検討し決定する。設計水平震度の大きさに関する 8 月 10 日時点の想定は、国道 2 号線の橋梁事業（JICA）で適用された値(0.15)としている。

## 5.2 マングル橋の計画および設計

### 5.2.1 橋長

要請された橋梁の橋長は、100m である。本橋長の妥当性について、マダガスカル側で調査は行っていないため、関連する報告書は作成されていない。既存橋の橋長は、およそ 80m である。

橋長は、必要な通水断面が確保でき、既存橋と同等以上の長さとするを基本とする。JICA 調査団は、現地踏査、測量調査等、架橋位置の検討、ならびに流出量解析の結果、橋長を 100m 程度の妥当性を確認した。調査団は、日本国内で検討を行い、橋長の精査を行う。

## 5.2.2 橋梁形式

### 5.2.2.1 上部工形式

橋梁形式は、支間割り計画とともに検討する。新しいマングル橋の支間割に関して、橋長を 100m とした場合、既往実績から 3 径間 (33.3m x 3) あるは 4 径間 (25.0m x 4) がとすることが経済的と考えられる。既存のマングル橋は 3 径間である。一般に、上部構造は支間長が長くなると、単位長さ当たりの上部工工費が高くなる。

維持管理費用や現地の技術力を考慮して、コンクリート橋を比較対象とする。橋梁形式の比較は、数種類のコンクリート橋を比較案として用いる。

### 5.2.2.2 下部工形式

下部工形式は、河川への影響を考慮して適切な形式を選定する。河床が洗掘されて橋脚が不安定とならないように、河床への根入れを適切に計画する。

### 5.2.2.3 基礎工形式

基礎工形式は、地盤の硬軟、支持層までの深さ、荷重の規模、施工性などを踏まえて適切な形式を選定する。

## 5.3 アンツァパザナ橋の計画および設計

### 5.3.1 橋長

要請された橋梁の橋長は、30m である。本橋長の妥当性について、マダガスカル側で調査は行っていないため、関連する報告書は作成されていない。既存橋の橋長は、およそ 30m である。

橋長は、必要な通水断面が確保でき、既存橋と同等以上の長さとするを基本とする。JICA 調査団は、現地踏査、測量調査等、架橋位置の検討、ならびに流出量解析の結果、橋長を 30m 程度の妥当性を確認した。調査団は、日本国内で検討を行い、橋長の精査を行う。

### 5.3.2 橋梁形式



#### 5.3.2.1 上部工形式

橋梁形式は、支間割り計画とともに検討する。新しいアンツァパザナ橋の支間割に関して、橋長を 30m とした場合、既往実績から 1 径間 (30.0m x 1) あるは 2 径間 (15.0m x 2) がとすることが経済的と考えられる。既存のアンツァパザナ橋は 1 径間である。一般に、上部構造は支間長が長くなると、単位長さ当たりの上部工工費が高くなる。維持管理費用や現地の技術力を考慮して、コンクリート橋を比較対象とする。橋梁形式の比較は、数種類のコンクリート橋を比較案として用いる。

#### 5.3.2.2 下部工形式

下部工形式は、河川への影響を考慮して適切な形式を選定する。河床が洗掘されて橋脚が不安定とならないように、河床への根入れを適切に計画する。

#### 5.3.2.3 基礎工形式

基礎工形式は、地盤の硬軟、支持層までの深さ、荷重の規模、施工性などを踏まえて適切な形式を選定する。支持層となることが見込まれる土層の深度が深いことから、杭基礎とすることが想定される。

#### 5.3.2.4 既存のアンツァパザナ橋の撤去

MTPI は、既存のアンツァパザナ橋の撤去について、架橋位置によらず、日本側で実施するよう要請する。MTPI は、撤去された橋梁上部工を再利用し、インフラ整備を推進させる。

上記内容について、MTPI と JICA 調査団はお互いに合意した。

2018 年 8 月 14 日、アンタナナリボ

Ministry of Public Works and Infrastructure

JICA Study Team

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Mr. RAFIRINGA Eric Arius

Director General of Public Works

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Mr. Takashi MATSUO

Co-Chief Consultant

(覚書)

1. 先方負事項の確認 (MD で署名した以外の内容)

**MEMORANDUM DE CONFIRMATION DES OBLIGATIONS SPECIFIQUES DES PAYS PARTENAIRES**


*Procès-verbal des discussions sur l'Etude préparatoire pour le Projet d'Amélioration des Ponts sur l'Axe économique Antananarivo – Toamasina en date du 16 juillet 2018*

**OBLIGATIONS SPECIFIQUES DU MINISTERE DES TRAVAUX PUBLICS ET DES INFRASTRUCTURES**

No.	Eléments	Processus	Calendrier de mise en œuvre	Ministères Responsables
1	Voir la possibilité de déplacement d'une installation routière connexe existante (Câble optique de communication de TELMA)	MTPI ↓ TELMA ↓ MTPI	Avant la notification d'appel d'offres aux entreprises soumissionnaires	MTPI
2	Fournir des informations en rapport aux règles générales de la circulation pendant la durée du projet	MTPI ↓ GENDARMERIE NATIONALE ↓ MTPI	Durant le projet	MTPI

L'Equipe d'Etude de la JICA et le Ministère des Travaux Publics et des infrastructures (MTPI) ont confirmé le contenu des éléments ci-dessus (processus, calendrier de mise en œuvre, ministères responsables) nécessaires au démarrage des projets futurs (avant l'appel d'offre et la mise en œuvre du projet) et confirmé par le Mémoire d'Entente que le MTPI opérera dans la sûreté et la régularité.

Fait à Antananarivo le 20 Août 2018

  
Mr. Takashi MATSUO  
Co-Chef d'Equipe des Consultants  
Etude Préparatoire  
Mission de la JICA

  
Mr. RANDRIANANDRASANA Hajaraino  
Secrétaire Général  
Ministère des Travaux Publics et des  
Infrastructures (MTPI)

2. 書類の使用言語の確認

(Mémorandum)

Langue utilisée dans chaque document


No.	Désignation	Préparé par	Langue	
			Français	Anglais
<b>I ÉTAPE DE L'ENQUÊTE PRÉPARATOIRE</b>				
1.	Rapport d'enquête de terrain	Consultant		○
2.	Projet de rapport d'enquête préparatoire (projet de rapport final) Remarque : Contenus techniques (Dessins techniques, etc.)	Consultant	○	○ (foto)
3.	Rapport d'étude préparatoire (rapport final) Note: Contenus techniques (Dessins techniques, etc.)	Consultant	○	○ (foto)
<b>II ÉTAPE DE MISE EN ŒUVRE</b>				
<b>1. Documents concernant l'Accord de services de consultance</b>				
1.1	Accord pour les services de consultance	Consultant	○	
1.2	Recommandation du consultant	JICA	○	
1.3	Documents pour l'arrangement bancaire (B/A, A/P)	Banque	○	
1.4	Documents pour le paiement	Consultant	○	
<b>2. Documents pour le Contrat avec le fournisseur</b>				
2.1	Annonce de l'appel d'offres	Consultant	○	○
<b>2.2 Documents d'appel d'offres</b>				
	Volume I Conditions d'appel d'offres et contrat	Consultant	○	○
	Partie I: Instructions aux soumissionnaires	Consultant	○	○
	Partie II: Formes d'appel d'offres	Consultant	○	○
	Partie III: Forme du contrat	Consultant	○	
	Volume II Cahier des charges	Consultant	○	○
2.3	Questions et réponses par rapport aux documents d'appel d'offres	Soumissionnaire / Consultant	○	○
2.4	Document de soumission des offres	Soumissionnaire (Entreprise prestataire)	○	○
2.5	Rapport d'évaluation des offres	Consultant	○	○
2.6	Contrat d'exécution	Entreprise prestataire	○	
2.7	Documents pour l'arrangement bancaire (B/A, A/P)	Banque	○	
2.8	Documents pour paiement	Entreprise prestataire	○	
2.9	Attestation d'achèvement	Consultant / Maître d'oeuvre	○	
2.10	Documents techniques pour approbation	Documents techniques pour approbation	○	○

Remarque : Une langue utilisée à l'étape de la mise en œuvre doit suivre celle utilisée dans l'échange de notes (E/N), indépendamment du tableau ci-dessus.

La mission JICA (l'Equipe des Consultants) et les représentants du Ministère de Travaux Publics et des Infrastructures (MTPI) ont confirmé les Langue utilisée dans chaque document ci-dessus.

Fait à Antananarivo le 20 Août 2018

  
Mr. Takashi MATSUO  
Co-Chef d'Equipe des Consultants  
Etude Préparatoire  
Mission de la JICA

  
Mr. RANDRIANANDRASANA Hajanisim  
Secrétaire Général  
Ministère des Travaux Publics et des  
Infrastructures (MTPI)

## 5. 参考資料

### 5.1. 自然環境ベースライン調査結果

# 自然環境ベースライン調査結果

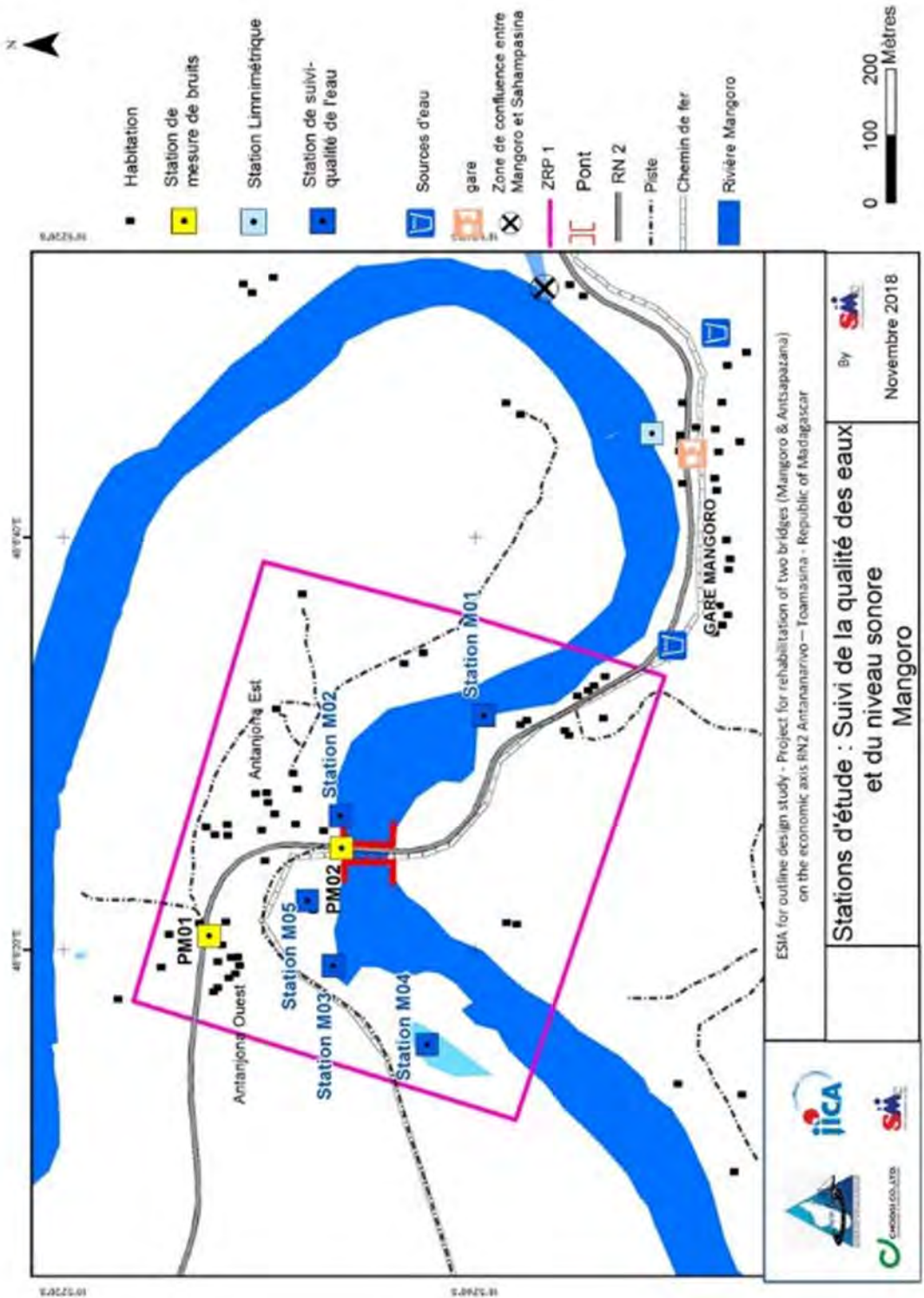
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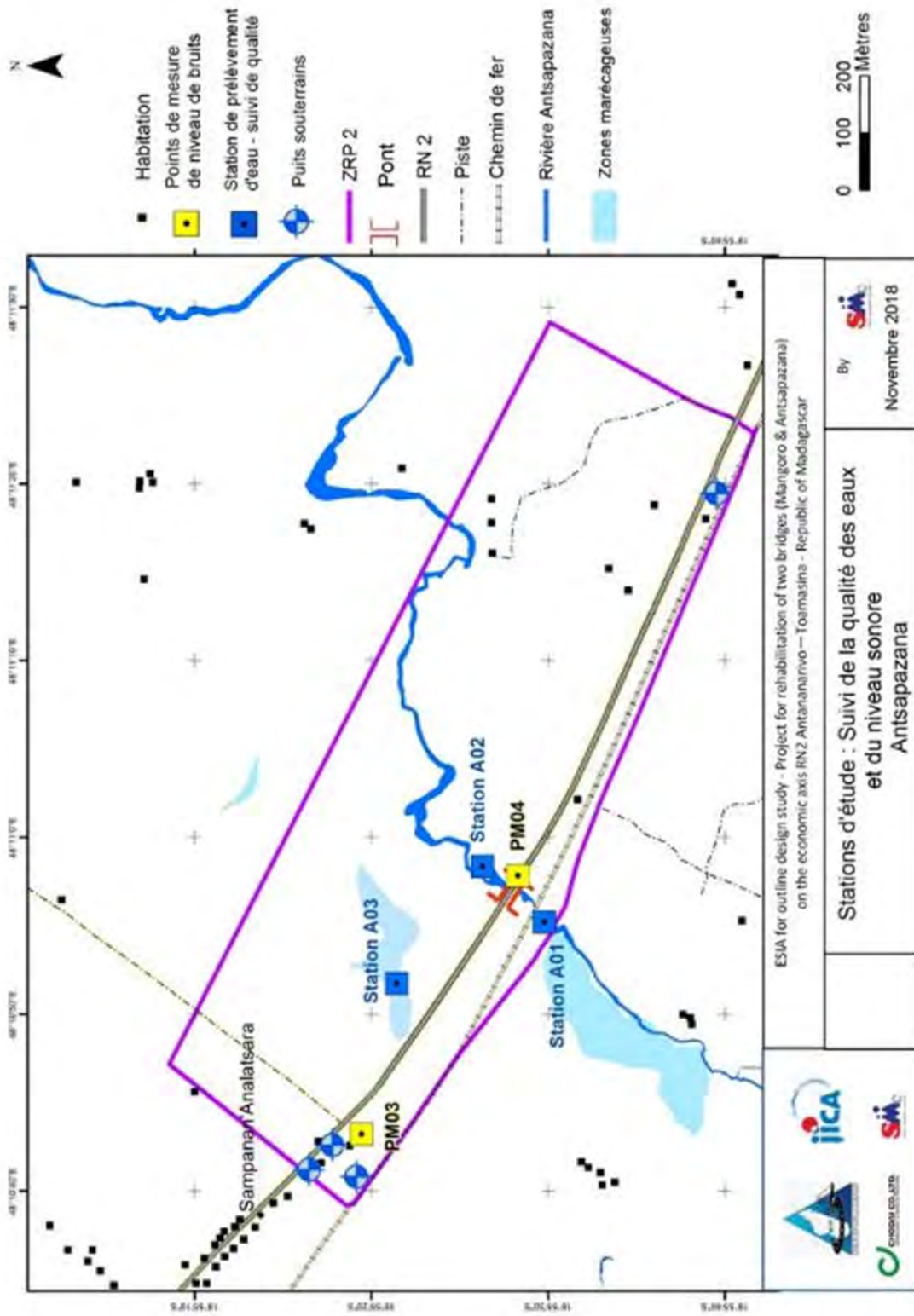


調査位置図

マングル橋



アンツァパザナ橋



## 1. 調査目的

ベースライン調査は、事業により影響を受ける可能性がある特定の環境要素の現況を把握するために実施した。

## 2. 調査項目

ベースライン調査の実施項目は、ONE による本事業の EIA のスクリーニング時において、本事業によって影響が懸念された 3 つの環境要素（騒音、水質、生態系）とした。また、スクリーニングにおいて影響は懸念されないとされた大気質についても文献による調査を実施した。

## 3. 調査結果

### 3.1. 騒音調査

事業予定地周辺における環境騒音の発生源としては、道路や鉄道の交通、人為的活動、自然の騒音（動物相、動植物、風、雨等）が挙げられる。工事中にはこれらの環境騒音に建設活動に関連する騒音が加わる。なお、建設機械から発生する騒音レベルは、工種、時期、使用重機の稼動状況により変動する。

#### 3.1.1. 測定方法

騒音の測定は、連続する 24 時間、日中（午前 6 時～午後 5 時）、夜間（午後 5 時～午後 10 時）、深夜（午後 10 時～午前 6 時）で行われ、Trotec 社の測定機器（SL 300 model）を用いて行われた。

#### 3.1.2. 測定地点

調査は事業が行われるマングル橋（以下、「マ」橋）ならびにアンツァパザナ橋（以下、「ア」橋）とその周辺地区において、各地区で保全対象（集落や自然生態系等）が近く、影響が懸念される場所において実施された。

表 3-1 測定地点及び概況

調査地区	測定地点	地点概況
「マ」橋	PM01	「マ」橋に最も近接する村（Antanjona）の公共広場
	PM02	「マ」橋近接住居前
「ア」橋	PM03	RN2 と Fasan'ny Mahery Fo 通りの交差点部（Sampananalatsara 村）
	PM04	「ア」橋端

#### 3.1.3. 測定結果

事業対象地周辺における現地調査においては、昼夜問わず 100dB 以上の最大騒音（最低は 30～44dB）が測定された。深夜に PM02 地点で最大値（123.7dB）が確認されたが、これは夜行列車

の走行に伴う振動音である。

騒音測定の結果を表 3-2～表 3-4 に示す。また、騒音が生活に与える影響及び WHO のガイドライン値を表 3-5～表 3-6 に示す。

表 3-2 測定結果 (昼間)

Receiver Location		Day time		Observations
		Min (dB)	Max (dB)	
PM01	Public square in the village of Antanjona,	30.8	109.3	The maximum is due to the passage of a double axle-truck going up the slope; The minimum of 30.8 corresponds to the ambient noise of the village and surroundings <i>Ambient temperature: between 23 and 24 ° C and calm wind (where smoke rises vertically)</i>
PM02	Mangoro Bridge entry point (Tanà to Tamatave)	43.3	111.8	The maximum is generated by the passage of a 4 axle-truck with 2 loaded containers and the resonance of the metal shock at the entrance of the bridge; The minimum of 43.3 is mainly background noise from runoff of river water <i>Ambient temperature: between 23 and 24°C and calm wind (where smoke rises vertically)</i>
PM03	RN2 and and Fasan'ny Mahery Fo road junction at Sampananalatsara village	42.1	102.7	The maximum is generated by the passing of a tanker truck at the bridge entrance to Moramanga The minimum being the ambient noise with rustle of the leaves of trees <i>Ambient temperature 23.4°C; rather calm wind (the wind tips the smoke)</i>
PM04	Antsampazana bridge exit point (Tanà to Tamatave)	35.6	109.3	The maximum is due to the passage of 3 trucks, two buses (a Sprinter Mercedes car and a Mazda minibus) to Moramanga, at the exit of the bridge, the noise seems persistent due to the existence of the turn; The minimum corresponds to the background noise in rural areas, quiet moment without passing car <i>Ambient temperature 23.6°C; rather calm wind</i>

表 3-3 測定結果 (夜間)

Receiver Location		Evening time		Observations
		Min (dB)	Max (dB)	
PM01	Public square in the village of Antanjona,	39.3	101.5	The maximum is generated by the passage of an empty truck at high speed down the slope to Moramanga; The minimum corresponds to the ambient noise of the village. <i>Ambient temperature 22.8°C and calm wind</i>
PM02	Mangoro Bridge entry point (Tanà to Tamatave)	43.0	106.2	The maximum is due to the passage of a 4-axle truck at the exit of the bridge; The minimum corresponds to the quiet moment at the bridge. <i>Ambient temperature 22.2°C; the wind is rather calm (the wind tips the smoke)</i>
PM03	RN2 and and Fasan'ny Mahery Fo road junstion at Sampananalatsara village	38.3	93.6	The maximum is given by the passage of a scooter-type motorcycle (towards Antananarivo); The minimum is a quiet moment without passing a car with rustle of leaves. <i>Ambient temperature: 22 ° C and calm wind (where smoke rises vertically)</i>
PM04	Antsampazana bridge exit point ( Tanà vers Tamatave) at 4m from the RN2	35.3	106.9	The maximum is generated by the passage of a tiller; The minimum corresponds to the ambient noise of rural areas without passing vehicles <i>Ambient temperature 22.1 ° C and calm wind (where smoke rises vertically)</i>

表 3-4 測定結果 (深夜)

Receiver Location		Evening time		Observations
		Min (dB)	Max (dB)	
PM01	Public place Antanjonan-7m de la RN2	30.8	106.2	The maximum is due to the passage of a 250cc motorcycle running down the slope The minimum is the ambient noise of the rural environment Ambient temperature between 21 and 22 ° C and the wind is rather calm (the wind inclines the smoke)
PM02	Mangoro Bridge entry point (Tana to Tamatave)	44.3	123.7	This maximum corresponds to the noise of a night train (1 locomotive with 6 tank cars) passing about 4m from the sound level meter The minimum is ambient noise without passage of car with runoff of river water and noise of nocturnal insects (cicada and cricket), continuous noise with the sound of the small waterfall in the middle of the water Ambient temperature 21.9 ° C and calm wind (smoke rises vertically)
PM03	RN2 and and Fasan'ny Mahery Fo road junstion at Sampananalatsara village	*UN	109.0	The maximum corresponds to the passage of 2 single deck trucks and a Sprinter bus which follow one another The almost unknown minimum corresponds to the background noise during night, without wind, without noise of insects Ambient temperature 16 ° C and calm wind
PM04	Antsampazana bridge exit point (Tanà vers Tamatave) at 4m from the RN2	36.0	98.5	The maximum is due to the passage of a 1 truck with 3 axles The minimum being background noise with intermittent bird whistling Ambient temperature 14, 7 ° C and calm morning wind

注) 使用機材の性能により、30dB 以下は測定不能

表 3-5 騒音が生活や健康に与える影響

No.	影響	状況
1	Discomfort caused to the conversation 会話妨害（会話に不快感を与える）	The speaker must make efforts of locution starting from 65 dBA threshold max 65dB 以上になると、聞こえにくくなる。
2	Temporary loss of hearing （一時的な難聴）	Occurring after exposure to a high level of sound from 135 dBA 最大値が 135dB の騒音があった場合
3	Permanent loss of hearing （聴覚の喪失）	When exposures are prolonged, the hair cells may have lesions starting at an equivalent sound level of 90 dBA for 8 hours. 90dB 以上の騒音が 8 時間以上続いた場合
4	Noise, stress, loss of concentration （ストレスや集中力の低下）	—

出展) Organisation Mondiale de la Santé (OMS) 1980. Critères d'hygiène de l'environnement. Le Bruit

表 3-6 WHO 環境騒音ガイドライン

用途	環境影響	L <sub>Aeq</sub> (dB)	時間 (hours)	L <sub>Amax</sub> (dB)
屋外	強い不快感	55	16	
	中程度の不快感	50	16	
屋内	会話妨害	35	16	
	睡眠妨害	30	8	45
寝室 屋外	睡眠妨害（窓開で測定した屋外値）	45	8	60
屋内 屋外	聴力損失	70	24	110



### 3.2. 水質調査

対象予定地を流れるマングル川及びアンツァパザナ川は周辺住民の生活用水の水源として使用されている。「マ」橋では橋梁の下部工、「ア」橋では迂回路の建設等のため、一定期間において河川内で作業が行われ、予定地周辺には、作業ヤード及びベースキャンプが設置されることから表流水への影響が懸念される。

#### 3.2.1. 調査方法

水試料のサンプリングは、国立環境研究センター（CNRE）の規則に従って行われた。採水されたサンプルは直ちに低温状態で、分析機関へ輸送され、表 3-7 に示す項目について分析が行われた。

表 3-7 水質調査における分析項目

項目	分析項目
地表水	濁度、pH（温度）、六価クロム、ニッケル、ヒ素、色度、水温、電気伝導率（温度補償:25°C）、全硬度、アンモニウム、硝酸塩、亜硝酸塩、全炭化水素、大腸菌群
地下水	色度、濁度、pH（温度）、六価クロム、全硬度、ニッケル、ヒ素、全リン、BOD（5日後）、塩分濃度、中和滴定、アンモニウム、硝酸塩、亜硝酸塩、水温、電気伝導率、（温度補償:25°C）

#### 3.2.2. 調査地点

地表水の調査地点は、各調査地区で橋梁の上流及び下流に数箇所設置した。また、地下水の調査地点は事業予定地に近接する集落内の井戸を対象にそれぞれ1地点とした。

調査地点及びその概況は表 3-8 に示す。

表 3-8 測定地点及び概況

調査地区	測定地点	項目	地点概況
「マ」橋	M01	地表水	マングル川左岸、「マ」橋上流
	M02	地表水	マングル川右岸、「マ」橋上流
	M03	地表水	マングル川右岸、「マ」橋下流
	M04	地表水	マングル川右岸、「マ」橋下流に位置するため池
	M05	地下水	マングル川右岸、「マ」橋下流にある私設井戸
「ア」橋	A01	地表水	アンツァパザナ川左岸、「ア」橋上流
	A02	地表水	アンツァパザナ川右岸、「ア」橋下流
	A03	地表水	マングル川左岸に位置するため池
	A04	地下水	マングル川左岸の集落にある施設井戸

## 3.2.3. 調査結果

地表水について、マングル川及びアンツァパザナ川それぞれの採水調査の結果、「マ」橋の M01 および M03、ならびに「ア」橋の A01 および A02 において濁度が、「マ」橋、「ア」橋ともに色度でマダガスカル国（以下、「マ」国）の基準値を超過していることが確認された。また、大腸菌群についても両橋（M02, M03, A02）で基準値の超過が確認された。「ア」橋周辺の溜池（A03）では、pH の基準値を満足できていないことが確認された。

詳細な現地調査結果を表 3-9～表 3-11 に示す。

表 3-9 地表水調査結果（マングル橋）

項目	単位	調査地点 <sup>注</sup>				マ国 基準	調査方法
		M01	M02	M03	M04		
濁度	NTU	31	20	29	3.7	<25	NF EN ISO 7027-1
pH（温度）	pH （°C）	6.8 (20.4)	6.8 (20.5)	7.0 (20.3)	6.9 (6.9)	6.0 -9.0	NF EN ISO 10523
六価クロム	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	<0.2	可視分光法
ニッケル	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	<2.0	可視分光法
ヒ素	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	<0.5	可視分光法
色度	mg/l	>70	70	60	30	<20	NF EN ISO 7887_D
水温	°C	19.3	19.1	19.4	19.6	-	-
電気伝導率 （温度補償:25°C）	µs/cm	20	18	16	23.0	<200	NF EN 27888
全硬度	g/l in CaCO	32	58	22	8	<180.0	NF T 90-003
アンモニウム	mg/l	<0.05	<0.05	<0.05	<0.05	<15.0	NF T 90-015- 2
硝酸塩	mg/l	0.3	0.3	0.4	0.1	<20.0	可視分光法
亜硝酸塩	mg/l	<0.1	<0.1	<0.1	<0.1	<0.2	NF EN 26777
全炭化水素	mg/kg	<LMQ		<LMQ		-	-
大腸菌群	NPP/ 100ml		700	500		<100	NF EN ISO 9308-3

注) M01, M02, M03 は河川、M04 は溜池

表 3-10 地表水調査結果（アンツァパザナ橋）

項目	単位	調査地点			マ国 基準	調査方法
		A01	A02	A03		
濁度	NTU	29	26	17	<25	NF EN ISO 7027-1
pH（温度）	pH （°C）	6.3 (20.5)	6.3 (20.2)	5.8 (20.4)	6.0 -9.0	NF EN ISO 10523
六価クロム	mg/l	<0.05	<0.05	<0.05	<0.2	可視分光法
ニッケル	mg/l	<0.05	<0.05	<0.05	<2.0	可視分光法
ヒ素	mg/l	<0.01	<0.01	<0.01	<0.5	可視分光法
色度	mg/l	>70	>70	30	<20	NF EN ISO 7887_D
水温	°C	20.5	19.7	19.4	-	-
電気伝導率 （温度補償:25°C）	µs/cm	27	15	3	<200	NF EN 27888
全硬度	g/l	24	10	16	<180.0	NF T 90-003
アンモニウム	mg/l	0.1	<0.05	0.1	<15.0	NF T 90-015-2
硝酸塩	mg/l	0.2	0.1	1.0	<20.0	可視分光法
亜硝酸塩	mg/l	<0.1	<0.1	<0.1	<0.2	NF EN 26777
全炭化水素	mg/kg		<LMQ	<LMQ	-	-
大腸菌群	NPP/ 100ml		200	<15	<100	NF EN ISO 9308-3

注) A01, A02 は河川、A03 は溜池

地下水については、「マ」橋、「ア」橋周辺の集落内にある井戸の採水を行った。その調査の結果、「マ」橋、「ア」橋ともに国内基準を満足していることが確認された。

表 3-11 地下水調査結果（マングル橋 M05 およびアンツァパザナ橋 A04）

項目	単位	調査地点		マ国 基準	調査方法
		M05	A04		
色度	mg/l	14	12	<20	NF EN ISO 7887_D
濁度	NTU	2.2	1.7	<25	NF EN ISO 7027-1
pH（温度）	pH （°C）	6.8 (20)	6.9 (20.4)	6.0 -9.0	NF EN ISO 10523
六価クロム	mg/l	< 0.05	< 0.05	<0.2	可視分光法
全硬度	g/l	0.2	0.3	<180.0	NF T 90-003
ニッケル	mg/l	< 0.05	< 0.05	<2.0	可視分光法
ヒ素	mg/l	< 0.01	< 0.01	<0.5	可視分光法
全リン	mg/l	0.01	0.04	<10.0	NF EN ISO 6878
BOD（5日後）	mg/l	0.63	0.53	<50	NF EN 1899-2
塩分濃度	mg/l	0.00	0.00	-	導電率
中和滴定	meq/l	< 0.05	< 0.05	-	NF EN ISO 9963-1
アンモニウム	mg/l	< 0.01	< 0.01	<15.0	可視分光法
硝酸塩	mg/l	0.2	0.5	<20.0	可視分光法
亜硝酸塩	mg/l	< 0.05	< 0.05	<0.2	可視分光法
水温	°C	19.9	19.6	-	-
電気伝導率 （温度補償:25°C）	µs/cm	21.0	21.0	<200	NF EN 27888

### 3.3. 生態系調査

#### 3.3.1. 調査方法

生態系の調査は、文献による調査、現地踏査、ならびに事業予定地の周辺住民へのヒアリングにより実施した。

#### 3.3.2. 調査地点

現地調査の対象は、「マ」橋ならびに「ア」橋からそれぞれ半径 500m の範囲とした。

#### 3.3.3. 調査結果

調査の結果、14 種の木本植物、17 種の草本植物、13 種の鳥類、15 種の哺乳類、2 種の爬虫類、9 種の水生動物を確認した。

「International Union for Conservation of Nature (IUCN)」のレッドリストに記載される貴重な種の直接確認はなかった。

調査結果は表 3-12～表 3-17 に示すとおりである。

表 3-12 確認種一覧（木本植物）

FAMILY	GENUS	SPECIES	M	A	NOTES
Myrtaceae (フトモモ)	<i>Eucalyptus</i> (ユーカリノキ)	<i>camaldulensis</i> ( <i>Eucalyptus camaldulensis</i> )	○		reforestation species
Myrtaceae (フトモモ)	<i>Eucalyptus</i> (ユーカリノキ)	<i>robusta</i> (オオバユーカリ)	○	○	
Pinaceae (マツ)	<i>Pinus</i> (マツ)	<i>kesyia</i> (カシヤマツ)	○	○	
Pinaceae (マツ)	<i>Pinus</i> (マツ)	<i>patula</i> (パツラマツ)	○		
Lauraceae (クスノキ)	<i>Cinnamomum</i> (クスノキ)	<i>camphora</i> (クスノキ)	○		Exist in the arboretum
Combretaceae (シクンシ)	<i>Terminalia</i> (モモタマナ)	<i>mantaly</i> ( <i>Terminalia mantaly</i> )	○		
Cupressaceae (ヒノキ)	<i>Cupressus</i> (イトスギ)	<i>lusitanica</i> ( <i>Cupressus lusitanica</i> )	○		
Anacardiaceae (ウルシ)	<i>Mangifera</i> (マンゴー)	<i>Indica</i> (マンゴー)	○	○	Fruit trees around dwellings
Rosaceae (バラ)	<i>Eriobotrya</i> (ビワ)	<i>japonica</i> (ビワ)	○		
Sapindaceae (ムクロジ)	<i>Nephelium</i> (ランブタン)	<i>litchi</i> ( <i>Nephelium litchi</i> )		○	Private plantation plot
Myrtaceae (フトモモ)	<i>Eugenia</i> ( <i>Eugenia</i> )	<i>jambolana</i> ( <i>Eugenia jambolana</i> )	○	○	In the riparian formation
Myrtaceae (フトモモ)	<i>Eugenia</i> ( <i>Eugenia</i> )	<i>Eugenia</i> sp. ( <i>Eugenia</i> 属の一種)	○		
Sapotaceae (アカテツ)	<i>Manilkara</i> ( <i>Manilkara</i> )	<i>Manilkara</i> sp. ( <i>Manilkara</i> 属の一種)	○		
Myrtaceae (フトモモ)	<i>Psidium</i> (バンジロウ)	<i>guajava</i> (バンジロウ)	○	○	Fruit trees around dwellings

M : 「マ」橋周辺地域      A : 「ア」橋周辺地域

表 3-13 確認種一覧（草本植物）

FAMILY	GENUS	SPECIES	M	A	NOTES
Asteraceae (キク)	Psiadia (Psiadia)	altissima (Psiadia altissima)	○	○	Mix up with reforestation
Rosaceae (バラ)	Rubus (キイチゴ)	malachobatus (Rubus malachobatus)	○	○	In the glades, especially around the National Road (RN2)
Aphloiaceae (Aphloiaceae)	Aphloia (Aphloia)	theiformis (Aphloia theiformis)	○		In the riparian formation
Verbenaceae (クマツツラ)	Lantana (ランタナ)	camara (シチヘンゲ)	○	○	Within glades
Zingiberaceae (ショウガ)	Aframomum (Aframomum)	angustifolium (Aframomum angustifolium)	○	○	In marshy areas
Ericaceae (ツツジ)	Erica (エリカ)	sp (エリカ属の一種)	○	○	In valleys and open spaces
Melastomataceae (ノボタン)	Clidemia (Clidemia)	hirta (アメリカクサノボタン)	○	○	In the glades, especially around the National Road (RN2)
Poaceae (イネ)	Hyparrhenia (Hyparrhenia)	rufa (ヒツパリガヤ)	○	○	Gramineous carpet between valleys and riparian formations
Poaceae (イネ)	Panicum (キビ)	maximum (ギネアキビ)	○	○	
Poaceae (イネ)	Aristida (マツバシバ)	rufescens (チガヤ)	○		
Poaceae (イネ)	Imperata (チガヤ)	cylindrica (Sporobolus africanus)	○		
Poaceae (イネ)	Sporobolus (ネズミノオ)	africanus (Sporobolus africanus)		○	In marshy areas
Dennstaedtiaceae (コバノイシカグマ)	Pteridium (ワラビ)	Pteridium sp. (Pteridium 属の一種)	○	○	
Typhaceae (ガマ)	Typha (ガマ)	angustifolia (ホソバガマ)	○	○	
Cyperaceae (カヤツリグサ)	Cyperus (カヤツリグサ)	papyrus (カミガヤツリ)		○	
Araceae (サトイモ)	Typhonodorum (Typhonodorum)	lindleyanum (マダガスカルクワズイモ)	○	○	
Poaceae (イネ)	Phragmites (ヨシ)	mauritanus (Phragmites mauritanus)	○		Along the Mangoro river

M : 「マ」 橋周辺地域

A : 「ア」 橋周辺地域

表 3-14 確認種一覧 (鳥類)

FAMILY	GENUS	SPECIES	NOTES
Plocieidae (ハタオリドリ)	Foudia (ベニノジコ)	madagascariensis (ベニノジコ)	Inventory of avifauna species using the Mc Kinon list in both sites (現地調査)
Pycnonotidae (ヒヨドリ)	Hypsipetes (クロヒヨドリ)	madagascariensis (クロヒヨドリ)	
Nectariniidae (タイヨウチョウ)	Nectarinia	souimanga	
Sturnidae (ムクドリ)	Acridotheres (ハッカチョウ)	tristis <sup>注</sup> (インドハッカ)	
Falconidae (ハヤブサ)	Falco (ハヤブサ)	newtoni (マダガスカルチョウゲンボウ)	
Psittaculidae (インコ亜科)	Agapornis (ボタンインコ)	cana (カルカヤインコ)	
Corvidae (カラス)	Corvus (カラス)	albus (ムナジロガラス)	
Meropidae (ハチクイ)	Merops (ハチクイ)	superciliosus (マダガスカルハチクイ)	
Alaudidae (ヒバリ)	Mirafra (ヤブヒバリ)	hova	
Acrocephalidae (ヨシキリ)	Nesillas (シマヨシキリ)	typical (マダガスカルシマヨシキリ)	
Tytonidae (メンフクロウ)	Tyto (メンフクロウ)	soumagnei (マダガスカルメンフクロウ)	Bibliographic Studies (文献調査)
Cisticolidae (セッカ)	Neomixis (ムシクイチメドリ)	viridis (ミドリニセムシクイチメドリ)	
Mesitornithidae (クイナモドキ)	Mesitornis (チャイロクイナモドキ属)	unicolor (クイロクイナモドキ)	

注) 移入種

M : 「マ」 橋周辺地域

A : 「ア」 橋周辺地域

表 3-15 確認種一覧 (哺乳類)

FAMILY	GENUS	SPECIES	NOTES
Cheirogaleidae (コビトキツネザル)	Cheirogaleus (コビトキツネザル)	major (オオコビトキツネザル)	Bibliographic studies. (文献調査) Source: <i>Diversity and ecology of small mammals in forest and anthropogenic habitats of Moramanga District. Tokyo M. Randriamoria</i>
Indriidae (インドリ)	Avahi (アバヒ)	Laniger (ウーリーキツネザル)	
Daubentonidae (アイアイ)	Daubentonia (アイアイ)	Madagascariensis (アイアイ)	
Eupleridae (マダガスカルマンゲース)	Galidia (ワオマンゲース)	elegans (ワオマンゲース)	
Eupleridae (マダガスカルマンゲース)	Cryptoprocta (フォッサ)	ferox (フォッサ)	
Soricidae (トガリネズミ)	Suncus (ジャコウネズミ)	Etruscus (コビトジャコウネズミ)	
Soricidae (トガリネズミ)	Suncus (ジャコウネズミ)	murinus (コビトジャコウネズミ)	
Tenrecidae (テンレック)	Tenrec (テンレック)	ecaudatus (テンレック)	
Tenrecidae (テンレック)	Microgale (オナガテンレック)	cowani (カウアンテンレック)	
Tenrecidae (テンレック)	Microgale (オナガテンレック)	majori	
Tenrecidae (テンレック)	Microgale (オナガテンレック)	pusilla (チビオナガテンレック)	
Tenrecidae (テンレック)	Microgale (オナガテンレック)	thomasi (トマスオナガテンレック)	
Muridae (ネズミ)	Rattus (クマネズミ)	rattus <sup>註</sup> (クマネズミ)	
Muridae (ネズミ)	Rattus (クマネズミ)	norvegicus <sup>註</sup> (ドブネズミ)	
Muridae (ネズミ)	Mus (ハツカネズミ)	musculus <sup>註</sup> (ハツカネズミ)	

注) 移入種

表 3-16 確認種一覧 (爬虫類)

FAMILY	GENUS	SPECIES	NOTES
Boidae (ボア)	Boa (ボア)	mandotra	Bibliographic studies. Source: Regional Environmental Scoreboard Alaotra-Mangoro. ONE (文献調査)
Chamaeleonidae (カメレオン)	Calumma (Calumma)	parsonii (パーソンカメレオン)	



表 3-17 確認種一覧（水域生息動物）

FAMILY	GENUS	SPECIES	NOTES
Anguillidae (ウナギ)	Anguilla (ウナギ)	mossambica (ウナギ)	Inventory of catches in the Mangoro River - personal survey (現地調査)
Crocodylidae (クロコダイル)	Crocodylus (クロコダイル)	nilotica (ナイルワニ)	
Parastacidae (ミナミザリガニ)	Astacoides (Astacoides)	madagascariensis (マダガスカル淡水ザリガニ)	
Penaeidae (クルマエビ)	Litopenaeus (見当たらない)	Stylirostris (見当たらない)	
Cyprinidae (コイ)	Carassius (フナ)	auratus (金魚)	Inventory through fishermen's catches in the Mangoro River (現地調査)
Cyprinidae (コイ)	Cyprinus (コイ)	carpio (コイ)	
Cichlidae (カワスズメ)	Tilapia (ティラピア)	nilotica (チカダイ)	
Cichlidae (カワスズメ)	Tilapia (ティラピア)	sp (ティラピアの一種)	
Cichlidae (カワスズメ)	Paratilapia (パラティラピア?)	sp (パラティラピアの一種?)	

### 3.4. 大気質調査

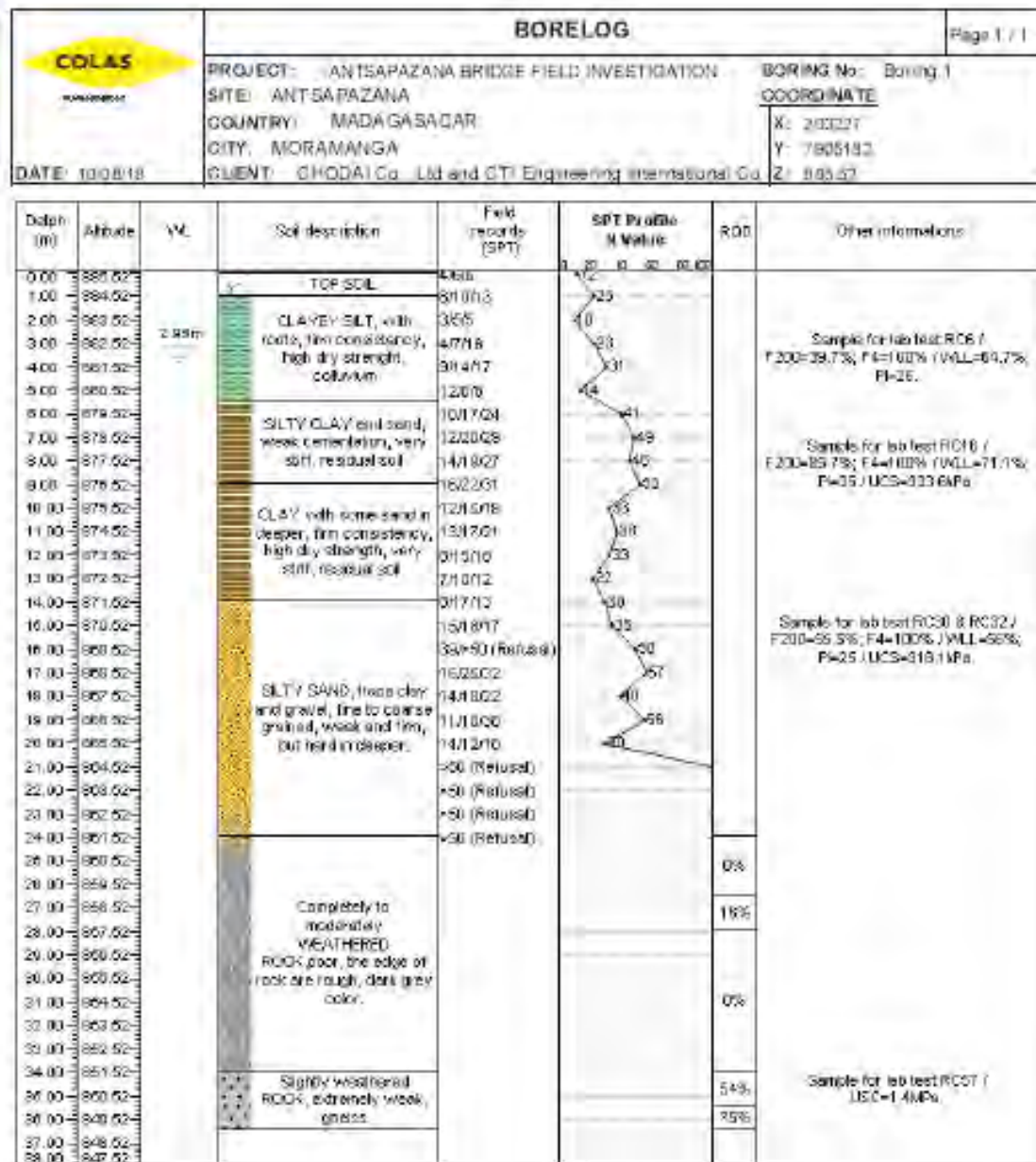
大気質調査においては、スクリーニング時に事業による影響を与える項目として挙げられていなかったことから、現地測定及び分析は行っていない。

事業予定地周辺では、交通量が少なく渋滞は発生しないこと、工場等の産業活動がないこと、山火事の発生も散発的かつ季節的であること、また、当該地域周辺は特に高い植生被覆を持つ農村地域であることから、大気の質は良いと考えられている。

当該地域と同様、農村で産業活動からの排気がほとんどない環境が広がる、マダガスカル南部に位置する農村地域 (Fort-Dauphin) で行われた大気質の調査の結果、様々な汚染物質 (CO、CO<sub>2</sub>、NO<sub>2</sub>、SO<sub>2</sub>、VOC、PAH) の濃度が低いことを示している。調査により得られた数値は、WHO の国際基準地の 20～39%未満の値であった (SENES Consultants, 2001a)。

## 5.2. ボーリング柱状図

### (1) アンツァパザナ橋



End of hole: 38.5 m

LIST OF SYMBOLS		SAMPLE TYPES	
WL: Water level	F4: Percentage of soil passing sieve No.4	SS: Split spoon	
RQD: Rock quality designation	F200: Percentage of soil passing sieve No.200	ST: Thin-walled open tube test	
U: Coefficient of uniformity	WLL: Liquid limit	RC: Core of Rock core	
Cc: Coefficient of curvature	PI: Plasticity index	USC: Uniaxial compression strength	
LITHOLOGIC PATTERNS		Drilled by:	
Silt	Sand	Weathered rock	Top soil
Clay	Gravel	Fresh rock	Peat
		Logged by:	
		FILL: GHODAI/MYANAR/CSA	

**PICTURE**

PROJECT	ANTSAPAZANA BRIDGE
BOREHOLE LOCATION	BOREHOLE No01
BOXE No	01
FROM	0,00 M
TO	3,00 M



PROJECT	ANTSAPAZANA BRIDGE
BOREHOLE LOCATION	BOREHOLE No01
BOXE No	02
FROM	3,00 M
TO	7,00 M



PROJECT	ANTSAPAZANA BRIDGE
BOREHOLE LOCATION	BOREHOLE No01
BOXE No	03
FROM	7,00 M
TO	11,00 M



PROJECT	ANTSAPAZANA BRIDGE
BOREHOLE LOCATION	BOREHOLE No01
BOXE No	04
FROM	11,00 M
TO	15,00 M



PROJECT	ANTSAPAZANA BRIDGE
BOREHOLE LOCATION	BOREHOLE No01
BOXE No	05
FROM	15,00 M
TO	19,00 M



PROJECT	ANTSAPAZANA BRIDGE
BOREHOLE LOCATION	BOREHOLE No01
BOXE No	06
FROM	19,00 M
TO	23,00 M



PROJECT	ANTSAPAZANA BRIDGE
BOREHOLE LOCATION	BOREHOLE No01
BOXE No	07
FROM	2.3,00 M
TO	2.8,00 M



PROJECT	ANTSAPAZANA BRIDGE
BOREHOLE LOCATION	BOREHOLE No01
BOXE No	08
FROM	
TO	







**PICTURE**

PROJECT	ANTSAPAZANA BRIDGE
BOREHOLE LOCATION	BOREHOLE No02
BOXE No	D1
FROM	0,00 M
TO	3,00 M



PROJECT	ANTSAPAZANA BRIDGE
BOREHOLE LOCATION	BOREHOLE No02
BOXE No	D2
FROM	3,00 M
TO	7,00 M



PROJECT	ANTSAPAZANA BRIDGE
BOREHOLE LOCATION	BOREHOLE No02
BOXE No	D3
FROM	7,00 M
TO	10,00 M



PROJECT	ANTSAPAZANA BRIDGE
BOREHOLE LOCATION	BOREHOLE No02
BOXE No	D4
FROM	10,00 M
TO	14,00 M



PROJECT	ANTSAPAZANA BRIDGE
BOREHOLE LOCATION	BOREHOLE No02
BOXE No	D5
FROM	14,00 M
TO	18,00 M



PROJECT	ANTSAPAZANA BRIDGE
BOREHOLE LOCATION	BOREHOLE No02
BOXE No	D6
FROM	18,00 M
TO	22,00 M



PROJECT	ANTSAPAZANA BRIDGE
BOREHOLE LOCATION	BOREHOLE No02
BOXE No	07
FROM	22,00 M
TO	31,00 M




PROJECT	ANTSAPAZANA BRIDGE
BOREHOLE LOCATION	BOREHOLE No02
BOXE No	08
FROM	31,00 M
TO	36,25 M













(2) マングル橋

	<b>BORELOG</b>		Page 1 / 1
	PROJECT: MANGROD BRIDGE FIELD INVESTIGATION SITE: MANGORO COUNTRY: MADAGASCAR CITY: MORAMANGA CLIENT: CHODAI Co., Ltd and CTI Engineering International Co.	BORING No: Boring 1 COORDINATE X: 195198.7 Y: 7910419 Z: 845.584	
DATE: 13/09/13			

Depth (m)	Elevation	VL	Soil description	Field records (SPT)	SPT Profile N Value	RQD	Other informations
0.00	848.58		Silty sand, fine to coarse grained abundant roots, brown to orangey, TOP SOIL	356	0		
1.00	846.58		SILTY SAND, some gravel, moist, brownish mottled yellow color, residual soil	856	40		
2.00	843.58			>50 (Refuse)		37%	
3.00	842.58	Drx				58%	
4.00	841.58					38%	
5.00	840.58		Highly to moderately WEATHERED ROCK, the edge of rock are dark grey, green			15%	
6.00	839.58					58%	
7.00	838.58					37%	
8.00	837.58						
9.00	836.58						
10.00	835.58						
11.00	834.58		FRESH ROCK, excellent, medium strong, granite (the top of massive rock are 11.50m)				
12.00	833.58					97%	Sample for lab test (RC13) UCS=45.0NPa.
13.00	832.58					98%	
14.00	831.58					99%	
15.00	830.58					99%	
16.00	829.58						

End of hole: 15.7 m

<b>LIST OF SYMBOLS</b> Vj - Water level RQD - Rock quality designation Cu - Coefficient of uniformity Cc - Coefficient of curvature F4 - Percentage of soil passing 4.75mm F200 - Percentage of soil passing sieve No. 200 WL - Liquid limit PI - Plasticity index UCS - Uniaxial compression strength	<b>SAMPLE TYPES</b> SS - Soil section S/T - Soil test report summary RC - Core / Rock sample
<b>LITHOLOGIC PATTERNS</b>  Silty  Gravel  Weathered rock  Top soil  Drx  Sand  Fresh rock  Soil	<b>Drawn by:</b> Sandrine Chodai-HARMANJIVA <b>Logged by:</b> Eng. A. GORAMANTHOA

**PICTURE**

PROJECT	MANG ORD BRIDGE
BOREHOLE LOCATION	BOREHOLE No01
BOXE No	01
FROM	0,00 M
TO	3,00 M



PROJECT	MANGORD BRIDGE
BOREHOLE LOCATION	BOREHOLE No01
BOXE No	02
FROM	3,00 M
TO	8,50 M



PROJECT	MANG ORD BRIDGE
BOREHOLE LOCATION	BOREHOLE No01
BOXE No	03
FROM	8,50 M
TO	14,50 M



PROJECT	MANGORD BRIDGE
BOREHOLE LOCATION	BOREHOLE No01
BOXE No	04
FROM	14,50 M
TO	15,10 M




PROJECT	MANG ORD BRIDGE
BOREHOLE LOCATION	BOREHOLE No01
BOXE No	
FROM	
TO	








PROJECT	MANGORD BRIDGE
BOREHOLE LOCATION	BOREHOLE No01
BOXE No	
FROM	
TO	



	<b>BORELOG</b>		Page 1 / 1
	PROJECT: MANGORO BRIDGE FIELD INVESTIGATION SITE: MANGORO COUNTRY: MADAGASCAR CITY: MORAMANGA DATE: 14/08/18 CLIENT: CHODAI Co. Ltd and STI Engineering International Co.	BORING No: Boring 2 COORDINATE X: 196191.7 Y: 191031.2 Z: 947.057	

Depth (m)	Elevation	VL	Soil description	Field records (SPT)	SPT Profile		RQD	Other information
					N	Value		
0.00	947.07		Silty sand, with gravel and cobble, TOP SOIL	5 SPT	10	10		
1.00	946.07		SILTY SAND, fine to coarse grained, moist reddish brown color, residual soil	4 SPT (Refused)	10	10		
2.00	945.07			6 SPT	10	10		
3.00	944.07		Highly to moderately WEATHERED ROCK, the edge of rock are tough, dark grey color, green	5 (16) x 50	10	10	75%	
4.00	943.07	Py					97%	
5.00	942.07							
6.00	941.07		FRESH ROCK, excellent and strong, (granite)		10	10	90%	
7.00	940.07							
8.00	939.07							
9.00	938.07							Sample for lab test: RC12 / UCS=74.4MPa
10.00	937.07							
11.00	936.07							
12.00	935.07							
13.00	934.07							
14.00	933.07							
15.00	932.07							
16.00	931.07							

End of hole: 9.75 m

<b>LIST OF SYMBOLS</b> W: Water level RQD: Rock quality designation Cu: Coefficient of uniformity Cc: Coefficient of curvature F4: (Percentage of soil passing sieve No.4) F200: (Percentage of soil passing sieve No. 200) WL: Liquid limit PL: Plasticity limit UCS: Unconfined compression strength	<b>SAMPLE TYPES</b> SS: Soil sample SPT: Soil sample from (arrow) RC: Core / Rock core
<b>LITHOLOGIC PATTERNS</b>  Sil  Sand  Weathered rock  Fresh rock  Top soil  Water  Clay  Gravel	<b>Drilled by:</b> SIVONIKA SOALAHIMANANA  <b>Logged by:</b> RY. ANDRIANANJANONJAN

**PICTURE**

PROJECT	MANGORO BRIDGE
BOREHOLE LOCATION	BOREHOLE No02
BOXE No	01
FROM	0,00 M
TO	3,00 M



PROJECT	MANGORO BRIDGE
BOREHOLE LOCATION	BOREHOLE No02
BOXE No	02
FROM	3,00 M
TO	7,10 M




PROJECT	MANGORO BRIDGE
BOREHOLE LOCATION	BOREHOLE No02
BOXE No	03
FROM	7,10 M
TO	9,75 M




PROJECT	MANGORO BRIDGE
BOREHOLE LOCATION	BOREHOLE No02
BOXE No	04
FROM	
TO	





	<b>BORELOG</b>		Page 1 of 1
	PROJECT: MANGORO BRIDGE FEED INVESTIGATION SITE: MANGORO COUNTRY: MADAGASCAR CITY: MORAMANGA CLIENT: CHODAI Co., Ltd and CITI Engineering International Co.	BORING No: Boring 3 COORDINATE X: 185198.4 Y: 7910365 Z: 838.422	
DATE: 28/03/18			

Depth (m)	Altitude	WL	Soil description	Field records (SPT)	SPT Profile N Value					RQD	Other informations	
					1	2	3	4	5			
0.00	838.42		 FRESH ROCK, excellent quality, granite (top of the massive rock is at 1.63m)							97%		
1.00	838.40										0%	
2.00	837.42										28%	
3.00	836.42										97%	
4.00	835.42										99%	
5.00	834.42										97%	
6.00	833.40									99%		
7.00	832.42											
8.00	831.42											
9.00	830.42											
10.00	829.42											
11.00	828.40											
12.00	827.42											
13.00	826.42											
14.00	825.42											
15.00	824.42											
16.00	823.42											

End of hole: 8.5 m

<b>LIST OF SYMBOLS</b> WL: Water level RQD: Rock quality designation Co: Continuity of uniformity Cc: Continuity of curvature 1-4: Symbolism of (C) pointing down (1-4) (T) (C): Percentage of (C) (pointing down) (1-200) (WL): Liquid limit (L): Plasticity index (CPT): (C) (pointing down) (1-200) (compression strength)	<b>SAMPLE TYPES</b> SPT: SPT blow count SPT: SPT blow count (analytic) RC: Core, Rock core
<b>LITHOLOGIC PATTERNS</b>  Sand  Clay  Weathered rock  Top soil  Gravel  Fresh rock  Peat	<b>Drilled by:</b> Fabrice BLOU (FAC/BLOU/FA) <b>Logged by:</b> Top: ANDRIANJANJANJAN


**PICTURE**

PROJECT	MANGORO BRIDGE
BOREHOLE LOCATION	BOREHOLE No:03
BOXE No	D1
FROM	0,00 M
TO	5,50 M








PROJECT	MANGORO BRIDGE
BOREHOLE LOCATION	BOREHOLE No:03
BOXE No	D2
FROM	5,50 M
TO	6,50 M



	<b>BORELOG</b>		Page 1 / 1
	PROJECT: MANGORO BRIDGE FIELD INVESTIGATION SITE: MANGORO COUNTRY: MADAGASCAR CITY: MORAMANGA CLIENT: CHODAI Co., Ltd and CTI Engineering International Co.	BORING No.: Boring 4 COORDINATE X: 185180.9 Y: 791055.8 Z: 835.98	
DATE: 14/08/18			

Depth (m)	Altitude	WL	Soil description	Field records (SPT)	SPT Blow Value	RQD	Other informations
0.00	837.00		FRESH ROCK, excellent quality, granite (top of massive rocks at 1.55m)			0%	
1.00	834.98						
2.00	833.00						38%
3.00	832.98						38%
4.00	831.95						100%
5.00	830.05						98%
6.00	828.98						
7.00	828.00						
8.00	827.98						
9.00	827.00						
10.00	825.00						
11.00	824.98						
12.00	823.00						
13.00	822.98						
14.00	821.00						
15.00	820.00						
16.00	818.00						

End of hole: 6 m

<b>LIST OF SYMBOLS</b> WL: Water table RQD: Rock quality designation Cu: Coefficient of uniformity Cc: Coefficient of curvature Fa: Percentage of air passing over 75µ F150: Percentage of soil passing over 150µ WLL: Liquid limit PI: Plasticity index UCCP: Unconfined compression strength	<b>SAMPLE TYPES</b> SS: Split sampler ST: Thin-walled permeability RC: Core / Rock core
<b>LITHOLOGIC PATTERNS</b>  Silt  Sand  Weathered rock  Top soil  Clay  Gravel  Fresh rock  Sand	<b>Drawn by:</b> Fanyrazafimanana MORAMANGA  <b>Logged by:</b> Fanyrazafimanana MORAMANGA




**PICTURE**

PROJECT	MANG ORD BRIDGE
BOREHOLE LOCATION	BOREHOLE No04
BOXE No	01
FROM	0,00 M
TO	4,75 M



PROJECT	MANGORO BRIDGE
BOREHOLE LOCATION	BOREHOLE No04
BOXE No	02
FROM	4,75 M
TO	6,00 M



	<b>BORELOG</b>		Page 1 / 1
	PROJECT: MANGORO BRIDGE FIELD INVESTIGATION SITE: MANGORO COUNTRY: MADAGASCAR CITY: MORAMANGA CLIENT: CHODAI Co., Ltd and C.TI Engineering International Co.	BORING No: Boring 5 COORDINATE X: 195199.4 Y: 791009.9 Z: 936.994	
DATE: 21/09/18			

Depth (m)	Altitude	V.L.	Soil description	Field records (SPT)	SPT Profile N Value					RQD	Other informations	
					0	20	40	60	80			
0.00	888.00		FRESH ROCK, excellent quality, granite (top of massive rock is at 1.00m)							81%		
1.00	887.00										82%	
2.00	886.00										85%	
3.00	885.00										82%	
4.00	884.00										85%	
5.00	883.00										88%	
6.00	882.00											
7.00	881.00											
8.00	880.00											
9.00	879.00											
10.00	878.00											
11.00	877.00											
12.00	876.00											
13.00	875.00											
14.00	874.00											
15.00	873.00											
16.00	872.00											

End of hole: 6.85 m

<b>LIST OF SYMBOLS</b> V.L. Water level RQD: Rock quality designation Cu: Coefficient of uniformity Cc: Coefficient of curvature F4: Percentage of soil passing sieve No.4 F200: Percentage of soil passing sieve No.200 V(L): Liquid limit PI: Plasticity index UCS: Unconfined compression strength		<b>SAMPLE TYPES</b> BS: Soil (bore) ST: Thin walled open (string) P: Core (Rock core)
<b>LITHOLOGIC PATTERNS</b>  ST  Sand  Weathered rock  Top soil  Clay  Gravel  Fresh rock  Water		<b>Dated by:</b> FANONJANJONJAN HARYMADISONA <b>Logged by:</b> EWA RANIVAMANTHOA

**PICTURE**

PROJECT	MANGORO BRIDGE
BOREHOLE LOCATION	BOREHOLE No05
BOXE No	01
FROM	0,00 M
TO	3,50 M



PROJECT	MANGORO BRIDGE
BOREHOLE LOCATION	BOREHOLE No05
BOXE No	02
FROM	3,50 M
TO	6,65 M



6. その他の資料・情報

6.1. 説明資料

**マダガスカル国**

**アンタナナリボ・トアマシナ間  
経済都市軸橋梁整備計画**

**説明資料**

2019年2月

株式会社 長 大  
株式会社 建設技研インターナショナル

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**目 次**

- |             |               |
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| 1. 位置図      | 7. 橋梁計画       |
| 2. プロジェクト目標 | 8. 事業実施スケジュール |
| 3. サイト状況    | 9. 調達計画及び工事数量 |
| 4. 実施体制     | 10. 先方政府負担事項  |
| 5. 対象橋梁     | 11. 安全管理情報    |
| 6. 道路計画     |               |

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# 1. 位置図



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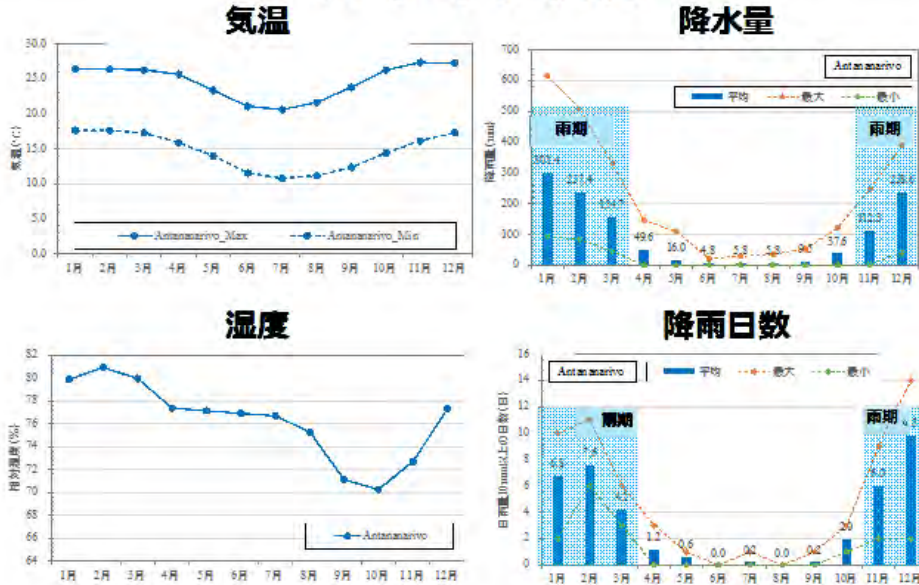
# 2. プロジェクト目標

現在の課題	<ul style="list-style-type: none"> <li>(1) 物流のボトルネックの解消             <ul style="list-style-type: none"> <li>既存のマングル橋とアンツァバザナ橋は、国道2号線上唯一の単線区間のため、<b>将来交通量に対応できない</b></li> <li><b>既存橋は、老朽化が進行している。</b></li> </ul> </li> <li>(2) 安全性の向上             <ul style="list-style-type: none"> <li>既存橋には<b>歩道が設置されておらず、危険な状態である</b></li> </ul> </li> </ul>
プロジェクト目標	<ul style="list-style-type: none"> <li>対象区間の橋梁、取付道路の整備を行うことにより、同区間における輸送能力の改善をはかり、国内及び周辺国の物流の活性化に寄与する</li> </ul>
成果	<ul style="list-style-type: none"> <li><b>マングル橋の建設</b>（既存橋の上流側に建設する）、及び<b>アンツァバザナ橋の建設</b>（既存橋と同位置に架け替え）</li> <li>上記橋梁の取付道路の建設</li> <li>本事業の対象区間の2車線化</li> </ul>

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### 3. サイト状況



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### 河川状況

**(1) 河川概要 :**

- マングル川：延長約300km、流域面積約18,000km<sup>2</sup>の大河。マングル橋上流の流域面積は約3,600km<sup>2</sup>
- アンツァバザナ川は、マングル川の支流。流域面積約500km<sup>2</sup>の大河。アンツァバザナ橋上流の流域面積は約100m<sup>2</sup>

**(2) 主な河川諸元 :**

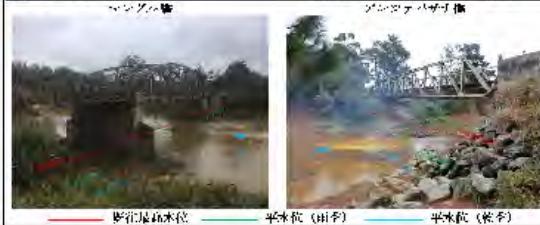
(架橋位置近傍の数値を示す)

項目	マングル橋	アンツァバザナ橋
川幅	約95m	約25m
河床勾配	1/1,100	1/450
計画対象流量	2,750 m <sup>3</sup> /s	100 m <sup>3</sup> /s
流速 (雨期最大)	5.87 m/s	2.10 m/s
雨期最大水深	9.0 m程度	2.5 m程度
乾期最大水深	4.0 m程度	1.0 m程度



**(3) 流況 :**

(2018年7月 (乾期) に撮影)



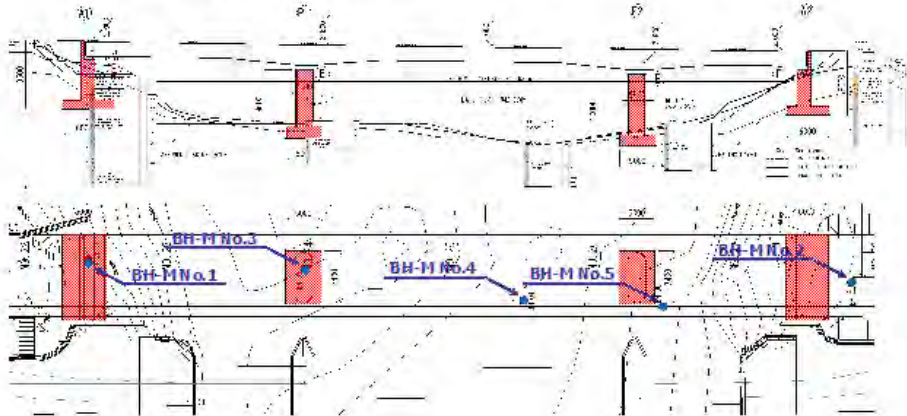
—— 湛水位 (水位)    —— 中水 (田舎)    —— 中水 (都市)

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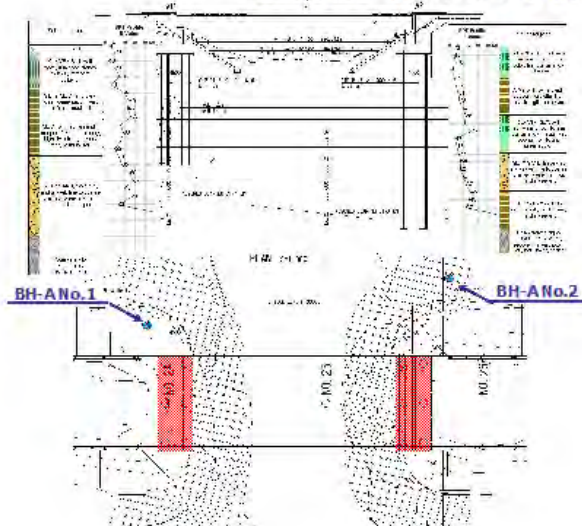
## 地質状況 (マングル橋)

- 特徴：**
- 橋台位置：表層から3～4mまでは残積土 (N<20)、これ以深に、風化岩 (花崗岩) が分布
  - 河川内：新鮮な岩が河床に分布



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## 地質状況 (アンツァパザナ)



**特徴：**

- 表層から中間層は、シルト～粘土、砂質土が堆積
- N値はバラつきがある。
- 基盤岩は、地表から25m程度の深さに分布
- 支持層
  - A1：砂質土
  - A2：粘土～砂質土

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# 4. 実施体制

MINISTRE DE L'AMENAGEMENT DU TERRITOIRE, DE L'URBANISME ET DES TRANSPORTS PUBLICS  
(国土計画、住宅・公共事業省)

国土整備・住宅・公共事業省 (MAHTP)  
の公共事業局 (DGTP) **インフラ部**  
(**DINFRA**) が設計・建設の窓口

※DERはDGTP内の維持管理部



- DGTP : 公共事業局
  - DINFRA : インフラ部
    - DER : 維持管理部
- DGTP : 公共事業局
  - DINFRA : インフラ部
    - DER : 維持管理部
- DGTP : 公共事業局
  - DINFRA : インフラ部
    - DER : 維持管理部
- DGTP : 公共事業局
  - DINFRA : インフラ部
    - DER : 維持管理部
- DGTP : 公共事業局
  - DINFRA : インフラ部
    - DER : 維持管理部

# 5. 対象橋梁

## マングル橋の概要

項目	既存橋	新橋
架橋位置	RN2: PK-94+200	既存橋の上流側
利用形態	歩行者兼用道鉄併用橋	歩車道橋
橋種	3径間鋼トラス橋	3径間連続PC箱桁橋
橋長	78.0m	102.0m
車道幅員	4.0m	3.5+3.5=7.0m
歩道幅員	なし	両側歩道 各1.5m

- ※既存橋は、鉄道橋として残置する。
- ※一般交通は、新橋建設中に既存橋を利用する。



マングル橋 (国道2号線 PK94+200) 周辺状況写真



## 5. 対象橋梁

### アンツァパザナ橋の概要

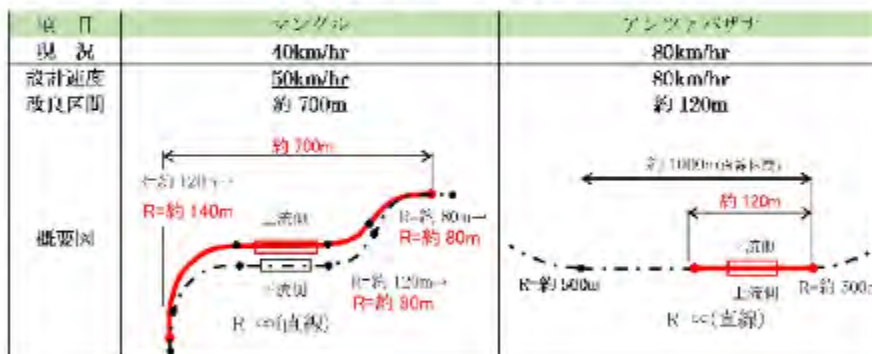
項目	既存橋	新橋
架橋位置	RN2: PK-105+460	既存橋と同位置
利用形態	歩車道橋	歩車道橋
橋種	単純鋼トラス橋	単純PC中空床版橋
橋長	30.0m	30.0m
車道幅員	4.5m	3.5+3.5=7.0m
歩道幅員	なし	両側歩道 各1.5m

※既存橋は、MAHTPが再利用する。本邦請負業者は既存橋を撤去し、MAHTPムラマンガ事務所に輸送する。  
 ※一般交通は、本邦請負業者が建設する迂回路を利用する。



## 6. 道路計画

### 架橋位置・改良区間



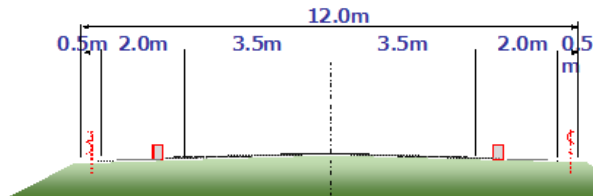
- 既存の道路
- 本事業で建設する道路

## 幅員構成

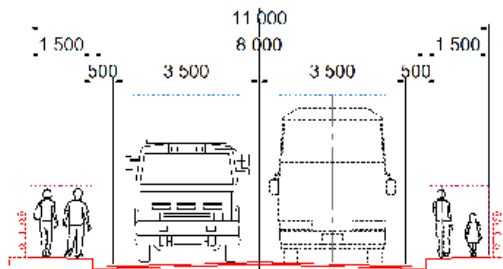
### 交通量

現況： 1,700台/日 (2018年、マングル橋)  
 2,000台/日 (2018年、アンツァバザナ橋)  
 計画： 6,240台/日 (2033年)

### 土工部



### 橋梁部

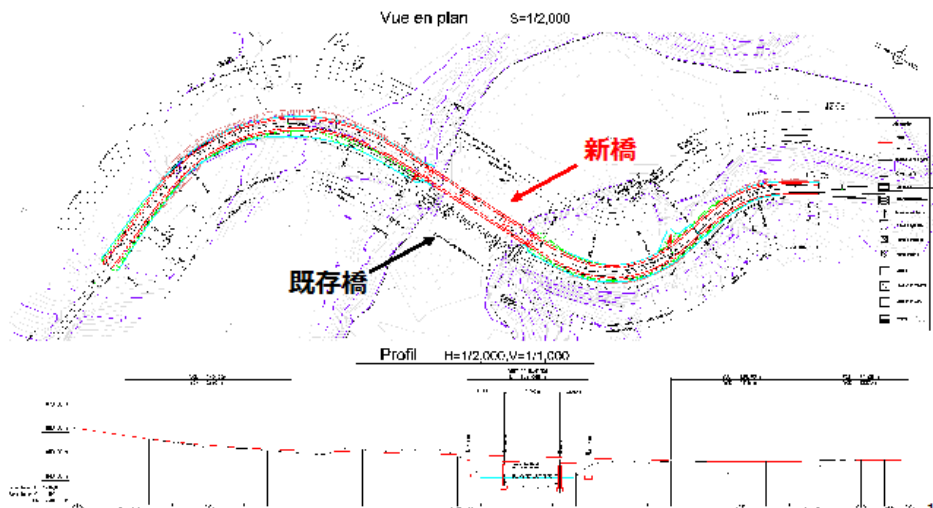


◆ 本図は、標準的な幅員構成を示す。

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## 道路線形計画

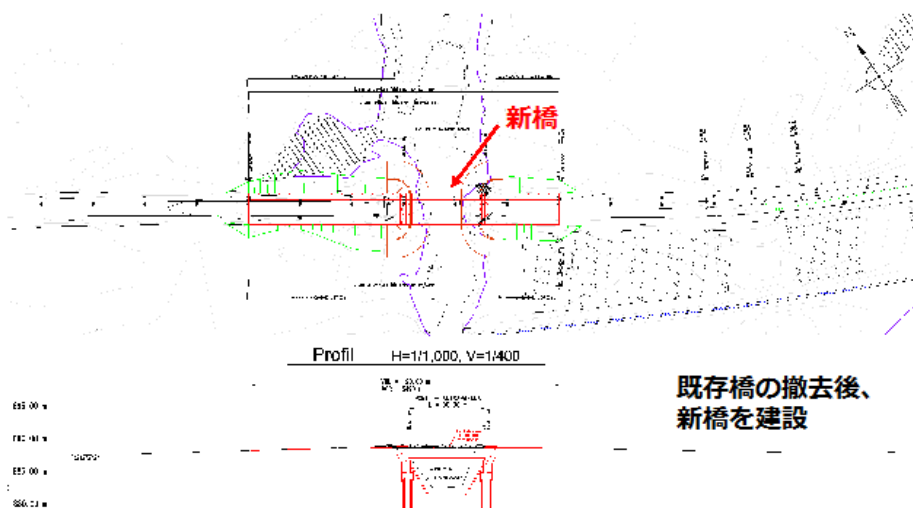
### マングル橋



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## 道路線形計画 アンツァパザナ橋



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## 7. 橋梁計画 構造形式一覧

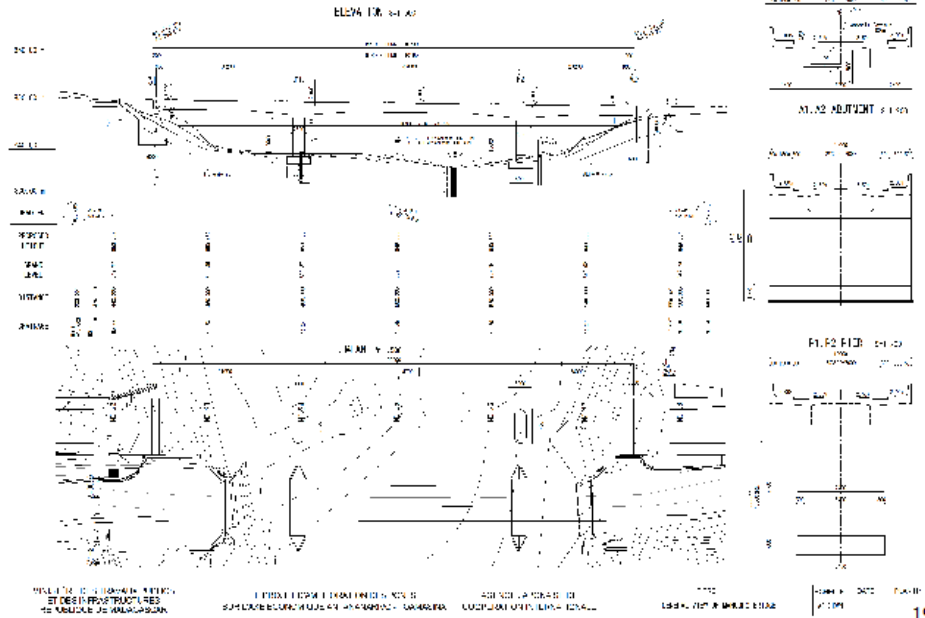
項目	マングル橋	アンツァパザナ橋
橋長	102.0m	30.0m
支間割	31.0m+47.0m+24.0m	30m
上部工形式	3径間連続PC箱桁橋	単純PC中空床版橋
橋台形式	逆T式橋台	逆T式橋台
橋脚形式	壁式橋脚	なし
基礎形式	直接基礎	場所打ち杭基礎 (杭長14.5~22.5m)
護岸工	なし	練石護岸

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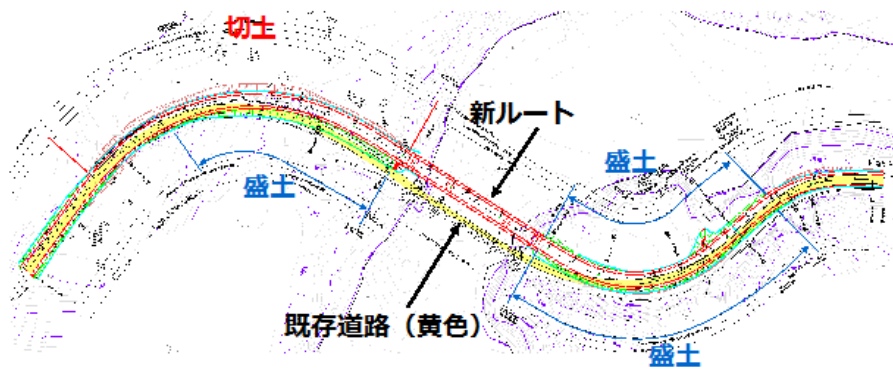
## マングル橋

GENERAL VIEW OF MANGORO BRIDGE



## マングル橋の施工

- 新ルートへの用地開拓
  - ✓ 切土:
  - ✓ 盛土:
- 既存交通の確保
  - ✓ 片側交互通行
  - ✓ 交通誘導員と安全施設の設置など



※ 本図は、切土と盛土の概略位置を示す。

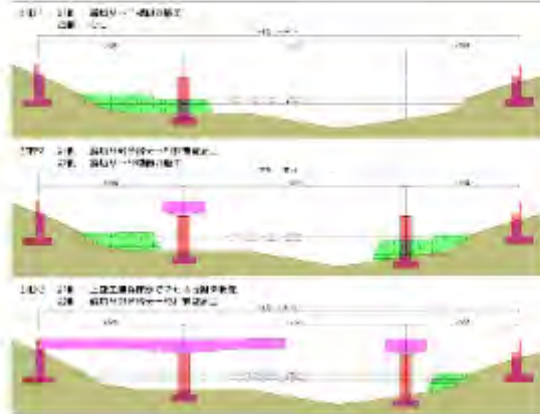
## マングル橋の施工

### 下部工の施工

- ✓ 橋脚工
  - 壁式橋脚 2基
  - 構造高 10m程度
  - 直接基礎 (支持層は岩)
- ✓ 橋台工
  - 逆T式橋台 2基
  - 構造高 9m程度
  - 直接基礎 (支持層は岩)

### 上部工の施工

- ✓ 3径間連続PC箱桁橋
  - L=102m
  - (31m+47m+24m)
  - 桁高 柱頭部 h=3.0m
  - 支間中央 h=2.0m
- ✓ 張り出し架設 (移動作業車)

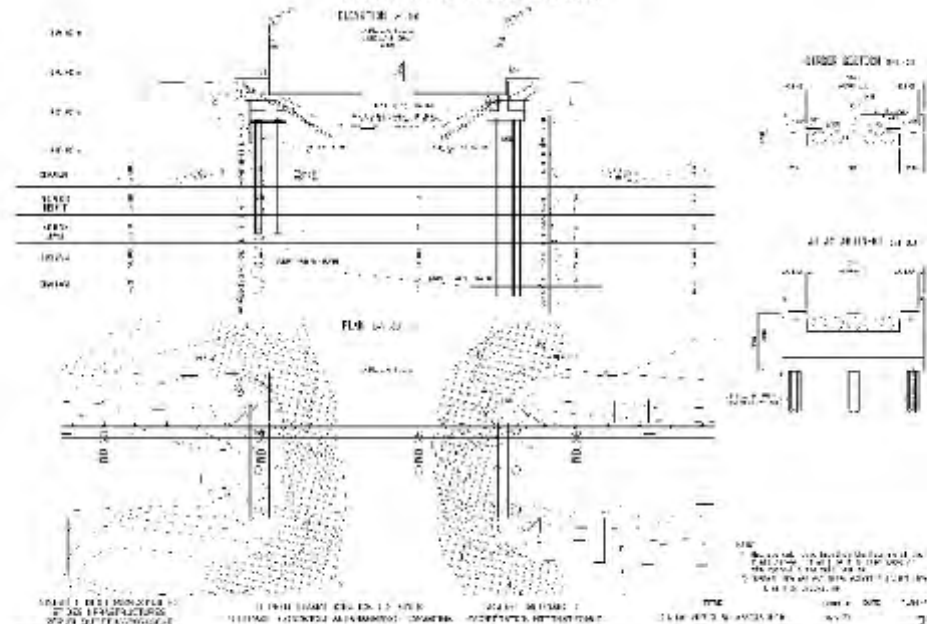


張り出し架設のイメージ

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## アンツァバザナ橋

GENERAL VIEW OF ANTSAFAZANA BRIDGE

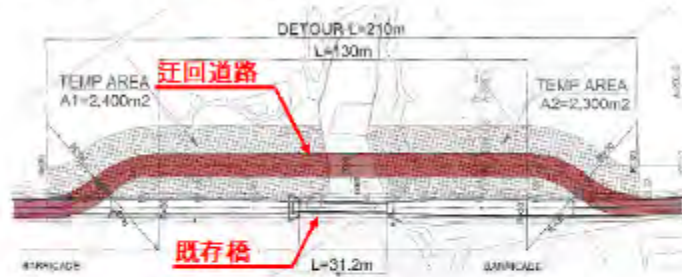


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## アンツァバザナ橋の施工 任意仮設による施工を想定

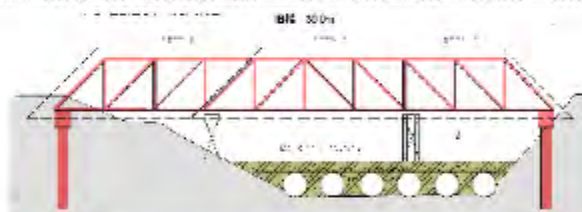
### ■ 現道の切り回し

- ✓ 迂回道路：
  - W = 3.50x2車線
  - 延長約210m
  - 盛土構造 (h=2.5m程度)
  - 碎石舗装
  - 交通誘導員と安全施設の設置



### ■ 既存橋の撤去・運搬

- ✓ 再利用を前提に解体・撤去
- ✓ MAHTPムラマンガ事務所敷地内の指定場所に運搬



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## アンツァバザナ橋の施工 MAHTPムラマンガ支局の位置図



- ✓ アンツァバザナ橋からMAHTPムラマンガ支局までの距離は、約10km



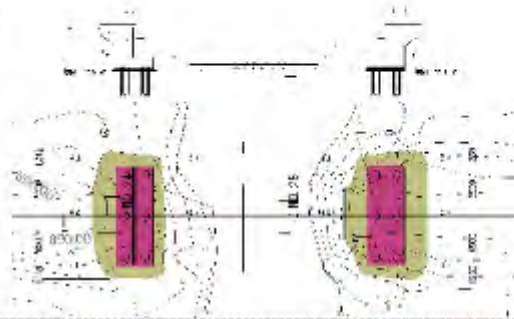
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## アンツァバザナ橋の施工

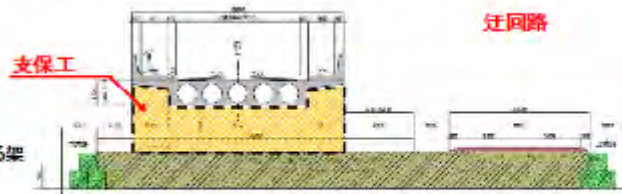
### 下部工・基礎工の施工

- ✓ 場所打ち杭基礎
  - Φ1.0m, L=14.5~22.5m
  - ベント（オールドソグ）工法
  - 杭本数 A1&A2 6本ずつ
- ✓ 逆T式橋台
  - h=5.0m, w=12.0m
  - オープン掘削



### 上部工の架設

- ✓ PC中空床版橋
  - L=30m, w=12.0m
  - 桁高 h=1.4m
- ✓ 全支保工（固定式）による架設を想定

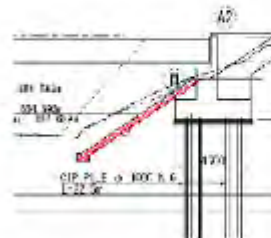


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## 護岸工

### 護岸工

- ✓ 礫石護岸
  - 勾配 1:1.5
  - 高さ 最大5m程度
  - 河床への根入れ 1.0m



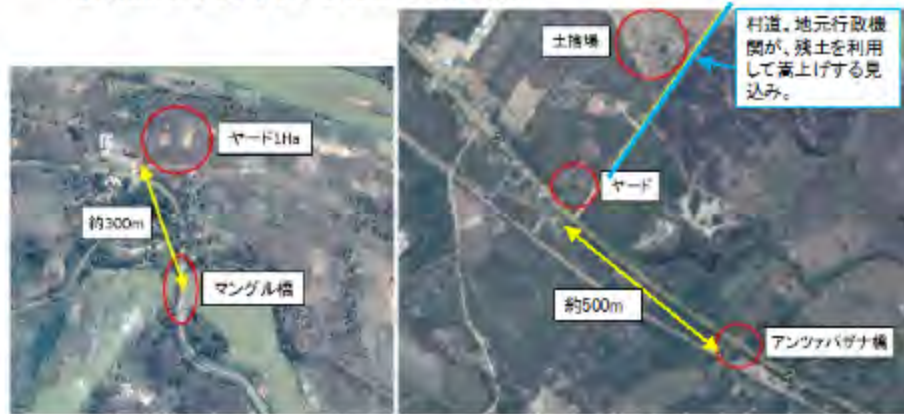
マダガスカル国における護岸工の参考事例（国道7号線バイパス）



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### キャンプヤードと土捨て場

- ・ マングル橋にメインキャンプ（事務所、宿舎、各種プラント、資機材置き場、駐機場等）、アンツァバザナ橋にサブキャンプ（簡易事務所、資機材置き場、駐機場）を想定。現地実施機関に用地確保を要請中
- ・ 土捨て場は、2橋とも同じ箇所を使用予定でアンツァバザナ橋から約1.5kmを予定（マングルから約11km）



マングル橋

アンツァバザナ橋

## 8. 事業実施スケジュール(案)

事業	2019年												2020年												2021年												2022年												
	平成31年度						令和2年度						令和3年度						令和4年度																														
事業の文脈 (ENVISIA)	ENVISIA (両季)												(両季)												(両季)																								
実施設計	現地調査												国内作業																																				
人員調達																																																	
マングル橋	準備工																																																
	仮設工																																																
	基礎工																																																
	橋梁下部工																																																
	橋梁上部工																																																
	橋面・付帯工																																																
	仮設撤去																																																
	準備工																																																
	仮設工																																																
	基礎工																																																
アンツァバザナ橋	準備工																																																
	仮設工																																																
	基礎工																																																
	橋梁下部工																																																
	橋梁上部工																																																
	橋面・付帯工																																																
準備工																																																	
仮設工																																																	
基礎工																																																	
橋面・付帯工																																																	
準備工																																																	
仮設撤去																																																	

## 9. 調達計画および工事数量

### (1) 主要建設資材

資 材	現地調達	日本調達	備考
異形棒鋼		○	
仮設鋼材		○	
PC鋼材、定着装置		○	
鋼製型枠		○	PC箱桁橋架設
土砂、骨材、路盤材	○		
セメント、混和剤	○		
アスファルト混合物	○		
瀝青安定処理材	○		
ゴム支承、伸縮装置		○	

※ 上記は、品質確保や調達の容易さを踏まえた、コンサルタントの積算上の想定。

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### (2) 主要建設機材

建設機械	規格	現地調達	日本調達
ブルドーザ	普通・15t級	○	
バックホウ	0.8m <sup>3</sup>	○	
ダンプトラック	10t	○	
タイヤローラ	8~20t	○	
ロードローラ	マカダム 10~12t	○	
トラクタショベル	1.8m <sup>3</sup>	○	
コンクリートプラント	30m <sup>3</sup> /h	○	
アシテータ	4.4m <sup>3</sup>	○	
コンクリートポンプ車	ブーム式 90~110m <sup>3</sup> /h	○	
モータグレーダ	3.1m	○	
アスファルトフィニッシャ	2.4~6.0m	○	
クローラクレーン	60~65t		○
トラッククレーン	50t	○	
ラフテレーンクレーン	25t	○	
発動発電機	各種	○	
オールケーシング掘削機	全回転型、スキッド、1500mm		○
片持架設用移動作業車	一般型、2主桁、14m以下		○
緊張ジャッキ・ポンプ	各種		○

※ 上表は、品質確保や調達の容易さを踏まえた、コンサルタントの積算上の想定。

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## 輸送経路

本邦調達資機材は、トアマシナ港から国道2号線経由で架橋位置まで輸送



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### (3) 工事数量 (マングル橋)

種別	細別	規格	単位	施工数量	備考
仮設工	土工	養土	m <sup>3</sup>	800.00	
	大型土のう		袋	1,030.00	
運送工	土工	切土	m <sup>2</sup>	7,700.00	
	路盤	盛土	m <sup>3</sup>	2,600.00	路体、路床
		下層路盤	m <sup>2</sup>	7,710.00	t=350mm
		上層路盤	m <sup>2</sup>	7,350.00	t=200mm
		懸賞安定処理	m <sup>2</sup>	7,200.00	t=100mm
	アスファルト舗装	車道・路肩、50mm x 2層	m <sup>2</sup>	6,760.00	改質
	擁壁工	重力式擁壁、1m~2m	m	10.00	
	U字削溝		m	1,150.00	
	パイプカルバート	コルゲートパイプ φ800	m	15.00	
	ボックスカルバート	B2500 x H2200	m	6.00	ウイングあり
	路側工	縁石	m	600.00	
		ガードレール	m	151.00	
橋梁下部工	土工	軟岩、硬岩	m <sup>3</sup>	2000.00	A1P1P2A2
	橋台工	逆T字式	基	2.00	
	橋脚工	壁式	基	2.00	
橋梁上部工	PC橋桁(3径間)	橋長=102m、40 N/mm <sup>2</sup>	m <sup>3</sup>	1,030.00	張出し仮設
	PC鋼材(橋)	12S15.2	t	29.00	
	PC鋼材(橋)	1528.6	t	11.00	
	ゴム支床	Bタイプ	個	8.00	
橋脚工	高麗・地盤	24N/mm <sup>2</sup> 、鉄筋構造物	m <sup>3</sup>	270.00	
	伸縮装置	伸縮量220mm	m	22.00	A1A2
	アスファルト舗装(1)	車道部、40mm x 2層	m <sup>2</sup>	820.00	
	アスファルト舗装(2)	歩道部、30mm x 1層	m <sup>2</sup>	310.00	

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### (3) 工事数量 (アンツァパザナ橋)

種別	細別	規格	単位	施工数量	備考
仮設工	迂回路	土工	m <sup>3</sup>	2,450.00	
	コルゲートパイプ	円形、1500mm	m	192.00	
	砂利舗装	t=200mm	m <sup>3</sup>	296.00	
	旧橋撤去	ポニートラス 30m	基	1.00	
道路工	土工	切土	m <sup>3</sup>	890.00	
		盛土	m <sup>3</sup>	620.00	路体、路床
	路盤	下層路盤	m <sup>2</sup>	1,240.00	t=350mm
		上層路盤	m <sup>2</sup>	1,140.00	t=200mm
		瀝青安定加理	m <sup>2</sup>	1,090.00	t=100mm
	アスファルト舗装	車道・路肩、50mm x 2層	m <sup>2</sup>	980.00	改質
	ガードレール		m	164.00	
橋梁下部工	土工	粘性土	m <sup>3</sup>	770.00	
	基礎工	場所打杭、D=1.0m、L=14.5m	本	6.00	A1
		場所打杭、D=1.0m、L=22.5m	本	6.00	A2
	橋台工	逆T字式	基	2.00	
橋梁上部工	PC中空床版橋	橋長=30m、35 N/m <sup>2</sup>	m <sup>3</sup>	310.00	場所打ち
	PC鋼材	12S15.2	t	9.00	
	ゴム支承	Aタイプ	個	4.00	
橋面工	高欄・地覆	24 N/mm <sup>2</sup> 、鉄筋構造物	m <sup>3</sup>	80.00	
	伸縮装置	伸縮量=50mm	m	22.00	A1,A2
	アスファルト舗装(1)	車道部、40mm x 2層	m <sup>2</sup>	240.00	
	アスファルト舗装(2)	歩道部、30mm x 1層	m <sup>2</sup>	90.00	
護岸工	石張工	A1,A2 両岸	m <sup>2</sup>	800.00	

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## 10. 先方政府負担事項

### (1) 我が国無償資金協力における一般事項

- 1) 日本に先方政府実施機関名義の口座開設、支払許可書 (A/P) の発行及び手続きの費用負担
- 2) 事業実施に必要な用地の確保
- 3) 橋梁建設許可の取得
- 4) プロジェクトの為に調達される製品及び役務に課される関税、通関手数料、消費税、その他諸税の支払いの免除手続きの支援
- 5) 工事関係者への現地滞在に係るビザ取得支援

※ 上記は、主なものを記述

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## 10. 先方政府負担事項

### (2) 本計画固有の事項

• EIAの実施、承認取得	2019.5
• 工事の影響を受ける施設・家屋の撤去 マングル：移転無し、アツアパザナ：民家5軒、	2020.2
• 土捨て場、および廃材処分場の提供	2020.2
• 資機材搬入路の維持管理（国道2号線）	常時
• 環境モニタリング計画の策定と承認	2019.11

※ 上記は、主なものを記述

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## 付加価値税（VAT）について

付加価値税の免税方法は還付制

施工業者が資材の内訳書及び領収書を添付した  
返金要請書をMAHTPへ提出



MAHTPが要請書内容を確認し財務省・外務省へ提出



財務省が要請内容を確認し、施工業者の銀行口座へ返金

※ 事前申請し、認められたものについては、  
VATを支払わずに購入可能

例：工事で使用する燃油を大口で購入する場合

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## 輸入品の関税率（例）について

品目	単位	関税率	付加価値税
重機	UNIT	5%	20%
重機の部品類	Kg	10%	20%
車輛	UNIT	20%	20%
セメント	Kg	10%	20%
鉄筋	Kg	10%	20%
コンクリート添加材	Kg	5%	20%
私的財貨	Kg	20%	20%
IT機器	Kg	10%	20%

※ 上記は、主なものを記述

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## 11. 安全管理情報



プロジェクト地域の危険レベル：  
『レベル1：十分注意してください』

- 凡例： ■ 「レベル1：十分注意してください。」  
 ・その国・地域への渡航、滞在は当然に危険を覚悟していただくため特別に注意が必要です。  
■ 「レベル2：不要不急の渡航は止めてください。」  
 ・その国・地域への不要不急の渡航は止めてください。渡航する場合には特別な注意を払うとともに、十分な安全対策をとってください。  
■ 「レベル3：渡航は止めてください。（渡航中止勧告）」  
 ・その国・地域への渡航は、どのような目的であれ止めてください。（場合によっては、現地に滞在している日本人の方々に対して退避の可能性や準備を促すメッセージを含むことがあります。）  
■ 「レベル4：退避してください。渡航は止めてください。（退避勧告）」  
 ・その国・地域に滞在している方は滞在地から、安全な国・地域へ退避してください。この状況では、当然のことながら、どのような目的であれ新たな渡航は止めてください。

出典：外務省海外安全ホームページ <https://www.anzen.mofa.go.jp/>

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