

Djiboutian Road Agency
Ministry of Equipment and Transport
The Republic of Djibouti

THE PROJECT FOR UPGRADING OF NATIONAL ROAD ROUTE 1 IN THE REPUBLIC OF DJIBOUTI

PREPARATORY SURVEY REPORT

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**JAPAN INTERNATIONAL COOPERATION AGENCY
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Summary

1 General Conditions of the Republic of Djibouti

Djibouti is a small country covering an area of 23,200 km² (approx. 1.3 times the Shikoku Island Area) with a population of 993,000 (2017, Direction de la Statistiques et des Etudes Démographiques: DISED). While it is strategically situated for marine transportation connecting Europe with the Middle East and Asia through the Red Sea and is also geopolitically critically located as a gateway to inland East Africa connecting Africa and the Middle East coastal countries, After the civil war lasting more than 10 years has ended in 2001, Djibouti has maintained political stability, which is a factor of stability of African Corner. French and US forces are stationed for regional stability and antiterrorism policy and it has also drawn attention from the international community as a base for antipiracy measures in waters off the coast of Somalia. Japanese self-defense forces have been also conducting anti-piracy operations with Djibouti as their base since 2009.

The majority of the national land is covered by desert and agriculture is underdeveloped. Livestock farming by nomads is traditional and noncommercial and the country has little resources of underground water. The development of primary and secondary industries lags behind and the tertiary industry accounts for 77.4% of GDP (2013, ADB). The nation depends mainly on income from transportation and port services for exports of Ethiopia, services and lease fees related to French and US forces and foreign assistance.

Table 1 shows the GDP trend. Investment from Gulf countries and China is on the rise and infrastructure development, which includes opening of the passenger and freight railway connecting Addis Ababa of Ethiopia with Djibouti City and the Doraleh container terminal, has been in progress to serve as the distribution base of Africa.

Table 1 GDP Trend

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Nominal GDP (Million Djiboutian franc)	150,658	174,801	186,449	200,578	220,222	240,569	258,658	282,228	306,896	335,669
Real GDP * (Million Djiboutian franc)	85,601	90,571	95,127	98,444	102,843	107,822	113,213	120,006	127,807	136,114
GDP growth rate (%)	5.08	5.81	5.03	3.49	4.47	4.84	5.00	6.00	6.50	7.00
Inflation rate (%)	4.97	11.96	1.67	3.95	5.07	3.74	2.40	2.94	2.10	3.00

Source: International Monetary Fund, "World Economic Outlook Database 2018"

Note: *: The base year of real GDP is 1990. 1 Djiboutian franc = JPY0.68

While the economy grows at a solid rate as described above, rural areas are not benefited by the growth and thus the wealth gap between the capital of Djibouti City and rural areas has increased remarkably. In addition, drought damage repeated by the impacts of climate change lowered the agricultural and livestock farming productivity and the living environment is further worsening in rural areas and population flow into the capital is accelerating. As a result, the population in suburban areas is

surging and workforce has become saturated to cause competition and the unemployment rate is further rising.

2 Background and Outline of the Project

Djibouti with a population of about 993,000 (2017, DISED) is a geopolitically important country facing the Gulf of Aden at the inlet of the Red Sea. With Ethiopia continuing economic growth at an annual rate of 10% these days in the hinterland, Djibouti Port supports the central government finance by its port revenue and acts as a start point of Djibouti Corridor, the physical distribution network toward Ethiopia. Djibouti Port functions as a gateway of the region.

Of four axes of the Five-year Plan “Strategy of Accelerated Growth and Promotion of Employment (2015 – 2019) (hereinafter referred to as “SCAPE”), which is the implementation strategy of the national development plan of Djibouti, the “Economic Growth through Economic Infrastructure Development and Strengthening of Competitive Power of Private Sector” was highlighted as the first axe. And the highlighted vital strategy in the transport sector included promotion of development of highly competitive international physical distribution network and improvement of domestic transport network to promote domestic regional development and disparity adjustment. However, the pavement ratio of 1,194 km national road is only 43% (source: Preparatory Survey Report for “Road Management Equipment Development Project (2016).” SCAPE considers it important issues to enhance the pavement ratio and to improve the road conditions.

National Road Route 1 (hereinafter referred to as “RN1”) of Djibouti is the most vital trunk road in length of 219 km connecting Capital Djibouti in which Djibouti Port is located to Galafi on the border to Ethiopia, though which more than 90% of import cargoes of Ethiopia pass (source: Data Collection Survey for Djibouti Corridor report (2017). RN1 is an arterial road of Djibouti Corridor. Though RN1 is entirely paved, there are excessively increasing number of pot holes, shoulder damage, break-away of pavement, etc., which are due to increase in passing vehicles by two times (as estimated by ADR from the customs information) at Galafi on the border during 4 years from 2013 to 2017. In particular, around Galafi, traffic congestion occurs that is caused by customs clearance services. Large trucks are to run over the pavement edges to avoid stopped vehicles, accelerating shoulder damages. This in turn requires time for passage and results in failure of securing the safe traveling of large trucks. In this context, the Project to improve the bottleneck section of RN1 that plays a nucleus role in Djibouti’s international physical distribution network may be positioned as contributing to strengthening of the international physical distribution as intended by SCAPE.

In response to the above situation, the Government of Djibouti issued, in December 2017, an official request for the Grant Aid for the improvement of RN1 to Japan.

3 Overview of the Survey Result and Project Contents

JICA dispatched a survey team to Djibouti from March 16 to May 2 in 2018 as a first survey and from 18 October to 29 October as a second survey for confirming the contents of the road improvement request, and also field survey was conducted on the target area where the Djiboutian Road Agency under the Ministry of Equipment and Transport, the Implementing Agency, carries out road upgrading in their

own budget. Analysis based on the field survey results, rough design and initial estimation cost were conducted after returning in Japan.

However, a request for withdrawal or a change in the target section of the Project have delivered to Japan by the government of Djibouti during the domestic analysis in the survey. As a result of consultations with the Djibouti government, the request section was to be implemented by Japan as originally planned, however the Ministry of Foreign Affairs of Japan canceled the survey preparatory for "The Project for Upgrading if National Road Route 1 in the Republic of Djibouti" and have been decided to implement it as the economic decided to implement in social development plan. In response to this, JICA prepared a draft report summarizing the results of the survey and conducted an explanation in Djibouti.

The Project will be undertaken for the 20.69 km target section (see the location map in the first page) from the point of the Ethiopia border toward Yoboki. Within the target section, the existing ford-crossing structure that has caused flooding during rain to make passage impossible will be renewed to box culvert structures and, in addition, various ancillary facilities will be provided to ensure the traffic safety, achieving the high-level international trunk road enabling all-weather travelable road. It is expected that the passengers and cargoes increase, the required traveling time will be reduced, the period when the traffic is impossible is eliminated, and the safe traffic space is secured in the target area.

Table 2 shows the outline of input of the Project.

Table 2 Outline of the Input of the Project

Item	Input
Road improvement with hot mix asphalt (excluding the area around the border)	20,275m
Road improvement near the border facilities by cement concrete pavement	415m
Development of the river-crossing structure (box culvert) of wadi	7 points
Development of the stormwater drainage facilities (box culvert)	33 point
Development of ancillary facilities, such as signs, guard rails, road marking, etc.	1 set

Source: Prepared by the Survey Team

4 Project Schedule and Project Cost Estimation

The Project requires 27 months including bidding, construction supervision starting from implementation design, based on the Guidelines for the Japanese Grants.

The expenses of Japan side is closed due to the confidential.

Noted that these project schedule and cost estimation is not confirmed by JICA.

Table 3 Initial Cost Estimation

Item	Approx. project cost (USD)
Charges for opening of bank account	36,000

Note : [Exchange rate] 1 USD = JPY109.22

5 Project Evaluation

(1) Relevance

Japan has established the following fields for special assistance in Djibouti with the major objective to contribute to strengthening of infrastructures and the economic society for regional stabilization.

- . Development of the economic and social infrastructure for sustainable growth
- . Fostering human resources firmly supporting socioeconomic development
- . Strengthening the efforts for regional stabilization

The Project is deemed to harmonize with Japan’s policy for assistance to Djibouti, meeting the requirement of above I. In addition, as the technical training included in the soft component of the Project will contribute to developing capacity of personnel for management and maintenance of equipment, it meets the above II, as well.

Among the target roads, RN1 is ranked the most important by the Djibouti Government demanding stable trade with neighboring Ethiopia, and road improvement is requested to ensure efficient and stable traffic. Other national roads are regarded as important by both central and regional governments as they contribute to stable logistic network connecting major cities in the country. As for Djibouti City Roads, improvement and maintenance of main roads is needed to mitigate recent increasing congestion and to enhance serviceability.

As such, improvement and maintenance of the target roads is urgent and prioritized by the Djibouti Government, hence it is concluded that the Project is relevant.

(2) Effectiveness

Expected quantitative effects of the road improvement works in the Project are summarized in the table 4 below.

Table 4 Quantitative Effects of Road Improvement

	Indicator	Current Value (Year 2018)	Target Value (Year 2024)
1	No. of passengers	50 passengers/day ¹	90 passengers/day ²
2	Cargo volume	32,900 tons/day ³	37,900 tons/day ⁴
3	Average time required in non-congested condition for the target 20 km	About one hour ⁵	20 minutes ⁶
4	Frequency of road blocks due to flooding of wadi	10 times/year ⁷	0 times/year

Remarks ¹ The current value has been established on the basis of field survey and hearing result.

² The target value is calculated by assuming 10 % for annual growth rate.

³ The current value is based on the AADT in 2018, 940 truck/day, and the cargo volume is calculated by assuming 35 tones per one truck.

⁴ The target value is based on the AADT in 2024, 1,083 truck/day, and the cargo volume is calculated by assuming 35 tones per one truck.

⁵ The current value is based on actual travel time.

⁶ Established based on the average speed of 60km

⁷ Established on the basis of results of hearing from ADR

Among the indicators shown above, indicators “1” and “2” can be measured in the target year by the implementing organization that conducts traffic survey, and “3” can be measured by running actually over the target section. The indicator “4” can be confirmed by the implementing organization that

performs hearing to staff of the Dikhil Maintenance Base and residents along the road.

In addition to the quantitative effects listed above, various qualitative effects are expected such as smoothing of cargo transportation, improvement of traveling performance, traffic safety measures, improvement of access to social services of medical and education etc.

Noted that above project evaluation items are not confirmed by Djibouti government.

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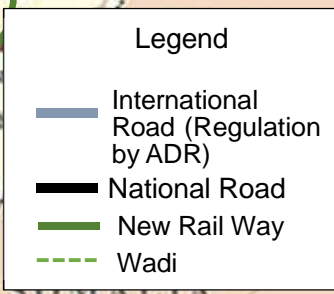
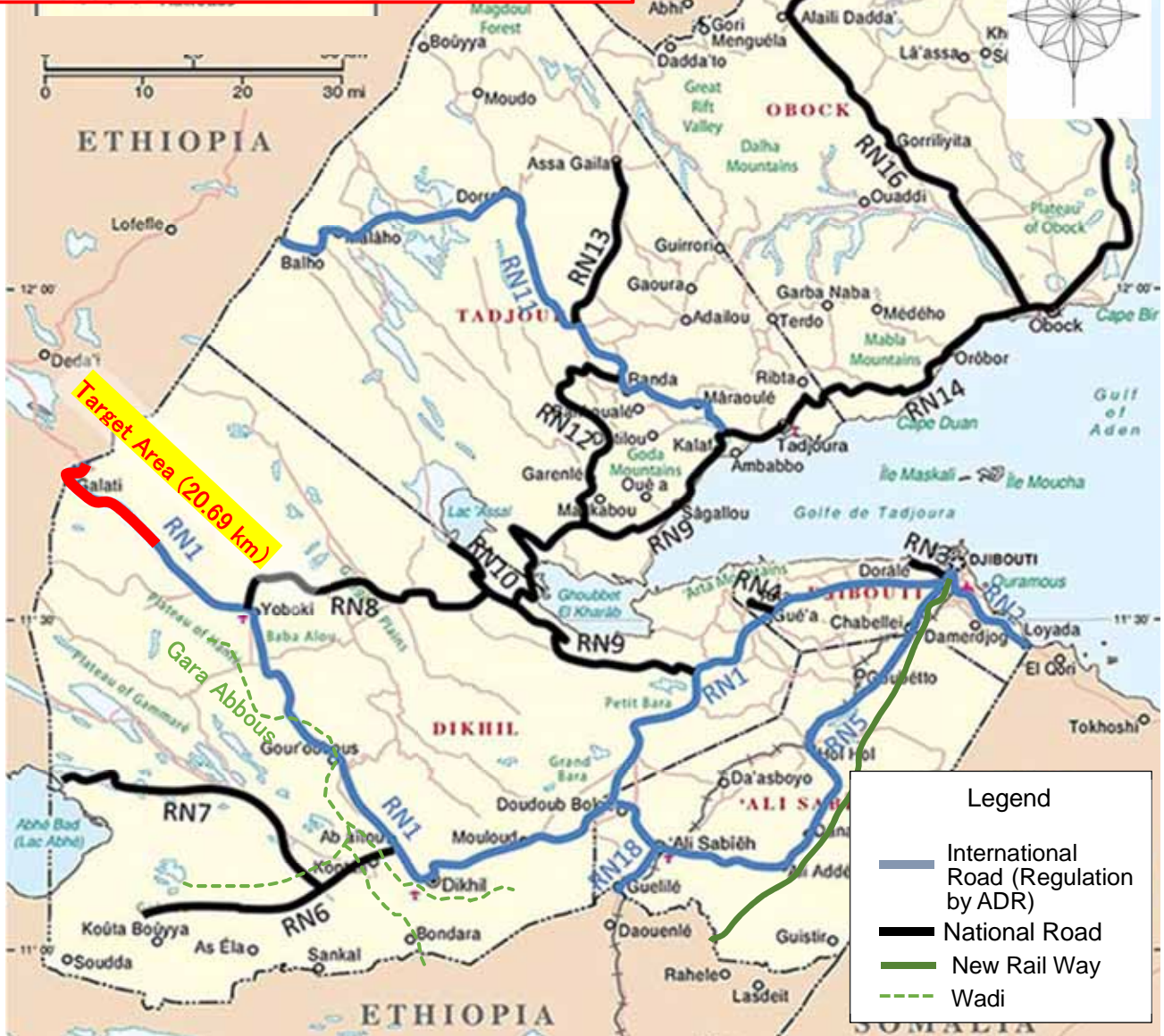
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Perspective



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ABBREVIATIONS

ADR	Agence Djiboutienne des Routes
AfDB	African Development Bank
DBST	Double Bituminous Surface Treatment
DEDD	Direction de l'Environnement et du Développement Durable
DJF	Djibouti Franc
EU	European Union
GDP	Gross Domestic Product
IMF	International Monetary Fund
INDS	Initiative Nationale pour le Développement Social
IOM	International Organization for Migration
JICA	Japan International Cooperation Agency
MET	Ministère de l'Équipement et des Transports
NEXCO	Nippon Expressway Company Limited
OECD	Organization for Economic Cooperation and Development
PAID	Port of Djibouti
ROW	Right of Way
SCAPE	Strategy of Accelerated Growth and Promotion of Employment
UNDP	United Nations Development Programme
UNECA	United Nations Economic Commission for Africa
UNFPA	United Nations Population Fund
WFP	World Food Programme
WTO	World Trade Organization

CHAPTER 1

BACKGROUND OF THE PROJECT

Chapter 1 Background of the Project

1-1 Current Conditions and Issues in the Sector

1-1-1 Current Conditions and Issues

Of the total road length (approx. 1,806km) in the Republic of Djibouti (herein after referred to as Djibouti), the paved road accounts for mere 43% (approx. 778 km). The pavement ratio is low with the national road at 48% and city road at 33%. It has become a factor of hindering national and regional economic growth, improvement of people’s quality of life and access to social services. It also expands the regional gap and hinders social stability, creating a disincentive for domestic and overseas companies to make investments.

The Agence Djiboutienne des Routes (herein after referred to as ADR), is responsible for road maintenance and repair work to solve this problem. However, technical and financial shortage concerning road maintenance and repair is remarkable and road maintenance work is delayed. Table 1-1.1 shows the total road length by road type (national road and city road) under the jurisdiction of the ADR.

Table 1-1.1 Total Road Length under the Jurisdiction of the ADR (As of April 2018)

Pavement type	Road Length (km)			Ratio
	National Road	City Road	Total	
Asphalt Pavement	574	204	778	43%
Macadamized Pavement	619	409	1,028	57%
Total	1,193	613	1,806	100%

Source: ADR

Table 1-1.2 and Table 1-1.3 show the total length of roads under the jurisdiction of the ADR by pavement type

Table 1-1.2 Total Highway Length under the Jurisdiction of the ADR (As of April, 2018)

Road designation	National Roads (km)					
	Asphalt pavement			Unpaved	Total length	Pavement ratio (%)
	Good	Fair	Total			
RN 1	98.0	121.0	219.0	0.0	219.0	100.0%
RN 2	27.0	0.0	27.0	0.0	27.0	100.0%
RN 3	15.0	0.0	15.0	0.0	15.0	100.0%
RN 4	8.0	0.0	8.0	0.0	8.0	100.0%
RN 5	0.0	17.0	17.0	48.0	65.0	26.0%
RN 6	0.0	0.0	0.0	75.0	75.0	0.0%
RN 7	0.0	0.0	0.0	68.0	68.0	0.0%
RN 8	0.0	0.0	0.0	29.0	29.0	0.0%
RN 9	0.0	122.0	122.0	0.0	122.0	100.0%
RN 10	0.0	0.0	0.0	16.0	16.0	0.0%
RN 11	94.0	0.0	94.0	30.0	124.0	75.8%
RN 12	0.0	0.0	0.0	15.0	15.0	0.0%
RN 13	0.0	0.0	0.0	33.0	33.0	0.0%
RN 14	62.0	0.0	62.0	0.0	62.0	100.0%
RN 15	0.0	0.0	0.0	102.0	102.0	0.0%
RN 16	0.0	0.0	0.0	115.0	115.0	0.0%
RN 17	5.0	0.0	5.0	0.0	5.0	100.0%
RN 18	0.0	0.0	0.0	88.0	88.0	0.0%
RN 19	9.0	0.0	9.0	0.0	9.0	100.0%
Total of National Roads	318.0	256.0	574.0	619.0	1,193.0	48.1%

Source: ADR

Table 1-1.3 Total City Road Length under the Jurisdiction of the ADR (As of April, 2018)

Region designation		City Roads (km)			
		Asphalt pavement	Unpaved	Total	Pavement Ratio (%)
City	District				
Djibouti	Ras Dika	38.79	7.30	46.09	84.2%
	Boulaos	114.38	156.17	270.55	42.3%
	Balbala	35.97	213.27	249.24	14.4%
	subtotal	189.14	376.74	565.88	33.4%
Ali Sabieh		3.78	8.55	12.33	30.7%
Dikhil		0.81	6.67	7.48	10.8%
Arta		4.24	6.60	10.84	39.1%
Tadjourah		3.80	3.69	7.49	50.7%
Obock		2.83	4.88	7.71	36.7%
Outside Djibouti subtotal		15.46	30.39	45.85	33.7%
City Road Total		204.60	408.13	612.73	33.4%

Source: ADR

National Route 1 (herein after referred to as RN1) which is the route covered by the Project, is the most important arterial road connecting 219 km from the capital Djibouti where the Djibouti Port is located to Garafī with the Ethiopian border, where more than 90% of imported goods in Ethiopia pass through (Source: “Report of the data collection survey for Djibouti corridor, 2017”). Although all of the NR1 has been paved so far, damage such as pot holes and road shoulder, peeling of

pavement are remarkably proceeding, since the number of vehicles passing through the Garafi border, which is the border with Ethiopia, has doubled in the four years from 2013 to 2017 (estimated by the road authorities from customs information). Especially in the vicinity of Garafi, where traffic conjunction occur due to customs duties, it is accelerating damage to the shoulder by large vehicles passing through the edge of pavement avoiding stopped vehicles, requiring further time to travel, not secured safe driving.

Under such circumstances, upgrade of NR 1 is regarded as an urgent task for the Government of Djibouti. It not only contribute to improving domestic accessibility, it secure stable distribution of Ethiopia, which is the major and important country of trade with for Djibouti.

1-1-2 Development plan

The Government of Djibouti started preparing "Vision Djibouti 2035" from 2011, and the following four items were set as main pillars.

- Good governance
- Competitiveness, diversified economy and balanced development of national land
- Expansion of social progress, development of human capital based on equal opportunities, national capacity building and utilization
- Regional integration and international cooperation of Djibouti

It is also a result of a participatory approach to the development and formulation of "Vision Djibouti 2035" through discussions between representatives of community organizations, universities, NGOs and others. Thus, [Strategy of Accelerated Growth and Promotion of Employment hereinafter referred to as SCAPE] has been formulated. The contents include the first medium-term plan focused on the operation of the target period from 2015 to 2019.

SCAPE has set ten goals with 2019 as the target year.

1. Accelerate growth: Successfully complete the double digit growth of a bet with a real GDP growth of around 10% per year over the 2015-2019 period and a 6% increased income per capita between 2015 and 2019.
2. Reduce unemployment: Bring the unemployment rate to 38% in 2019 due to the global growth momentum, the development of new sectors, the intensification of vocational training and promoting direct action to support employment. Reducing unemployment rate to 38.
3. Limit the extreme poverty: Alleviating extreme poverty, with a targeted level to decrease it by 20% in 2019, relying in particular on the promotion of economic activities in the interior regions where the incidence is at its highest point.
4. Create the conditions of a regional hub: Accelerate the development of economic infrastructure, through major investment projects, to sit in the long term, Djibouti's position as a regional hub and area of attraction for foreign direct investment.
5. Better educate and train: Achieve by 2019 the goal of universal primary education and have subsystems for vocational training and higher education for efficient and in tune with labor market needs.
6. Ensure wide spread coverage of health care essentials: Achieving wide spread population

coverage for essential health care, strengthen the quality and effectiveness of the public health system, and lower by more than 15%, 25% and 30% the maternal, new-born and infant mortality.

7. Reduce inequality and gender: Promote gender equality by primarily acting on reducing women inequality in education (with a target of reaching a 100% girls/boys parity in primary schools, up to 85% in middle and high schools and women literacy rate of more than 60% by 2019).
8. Resolve the question of water: Addressing the issue of chronic water supply deficit at the national level based on large investment projects (desalination of sea water, interconnection with Ethiopia, development drilling for the northern regions) in order to have a water supply access of more than 85% by 2019.
9. Combat precarious housing: Ensuring the demolition of precarious housing (target zero slums) and giving priority to housing needs of the households with incomes that fall below 150,000 Djibouti francs, based on a formed institutional and regulatory framework and an active housing policy.
10. Prepare to climate change: Prevent, by adapted strategies based especially on strengthening the resilience of local populations, the risks associated with climate change and mainstreaming of this topic in different sectorial policies.

In addition, the following policies have been set for road sector.

Expected results: Strengthening the national highway network to meet passenger and logistics needs.

Target value: Increase Asphalt pavement rate of national highway network from 41% to 82% by 2019 and increase the percentage of roads with good pavement status from 36% to 82% in 2019.

Strategic direction: maintenance of the national highway network to meet demand and strengthen domestic traffic with four priorities:

- Expansion and restoration of asphalt road network
- Development of road network structure and system development
- Improvement of road maintenance
- Improvement of road maintenance financing

Furthermore, SCAPE's contribution to the transport sector is indispensable to ensure Djibouti's position as the first port for neighboring Ethiopia by maintaining and strengthening the logistics system.

The target section of National Route 1 development project according to the Project is consistent with the development plan launched by the government of Djibouti.

1-1-3 Social and Economic Conditions

(1) General Conditions of the Republic of Djibouti

Djibouti is a small country covering an area of 23,200 km² (approx. 1.3 times the Shikoku Island Area) with a population of 993,000 (2017, Direction de la Statistiques et des Etudes

Démographiques: DISED). While it is strategically situated for marine transportation connecting Europe with the Middle East and Asia through the Red Sea and is also geopolitically critically located as a gateway to inland East Africa connecting Africa and the Middle East coastal countries, After the civil war lasting more than 10 years has ended in 2001, Djibouti has maintained political stability, which is a factor of stability of African Corner. French and US forces are stationed for regional stability and antiterrorism policy and it has also drawn attention from the international community as a base for antipiracy measures in waters off the coast of Somalia. Japanese self-defense forces have been also conducting anti-piracy operations with Djibouti as their base since 2009.

The majority of the national land is covered by desert and agriculture is underdeveloped. Livestock farming by nomads is traditional and noncommercial and the country has little resources of underground water. The development of primary and secondary industries lags behind and the tertiary industry accounts for 77.4% of GDP (2013, ADB). The nation depends mainly on income from transportation and port services for exports of Ethiopia, services and lease fees related to French and US forces and foreign assistance.

Table 1-1.4 shows the GDP ratio by industry. Trade with Ethiopia and port business are in good condition and its economy has been relatively strong.

Table 1-1.4 GDP Ratio by Industry

		2008	2013
Primary Industry	Agriculture, forestry, fisheries and hunting	3.5	3.6
Secondary Industry	Mining	0.3	0.3
	Manufacturing	3.5	3.2
	Electricity, gas and water	4.3	5.1
	Construction	12.1	11.1
	Total of secondary industry	20.2	19.7
Tertiary Industry	Wholesale, retail, auto-repair shops, hotel and restaurant	19.3	22.6
	Transportation, warehousing and telecommunications	32.0	27.6
	Finance, real estate, rental and corporate services.	8.5	8.6
	Public services	15.5	17.8
	Other services	1.0	0.8
	Total of tertiary industry	76.3	77.4
Total		100.0	100.0

Source: AfDB, OECD, UNDP, UNECA "African Economic Outlook 2017"

Table 1-1.5 shows the GDP trend. Investment from Gulf countries and China is on the rise and infrastructure development, which includes opening of the passenger and freight railway connecting Addis Ababa of Ethiopia with Djibouti City and the Doraleh container terminal, has been in progress to serve as the distribution base of Africa.

Table 1-1.5 GDP Trend

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Nominal GDP (Million Djiboutian franc)	150,658	174,801	186,449	200,578	220,222	240,569	258,658	282,228	306,896	335,669
Real GDP * (Million Djiboutian franc)	85,601	90,571	95,127	98,444	102,843	107,822	113,213	120,006	127,807	136,114
GDP growth rate (%)	5.08	5.81	5.03	3.49	4.47	4.84	5.00	6.00	6.50	7.00
Inflation rate (%)	4.97	11.96	1.67	3.95	5.07	3.74	2.40	2.94	2.10	3.00

Source: International Monetary Fund, "World Economic Outlook Database 2018"

Note: *: The base year of real GDP is 1990. 1 Djiboutian franc = 0.68 yen

While the economy grows at a solid rate as described above, rural areas are not benefited by the growth and thus the wealth gap between the capital of Djibouti City and rural areas has increased remarkably. In addition, drought damage repeated by the impacts of climate change lowered the agricultural and livestock farming productivity and the living environment is further worsening in rural areas and population flow into the capital is accelerating. As a result, the population in suburban areas is surging and workforce has become saturated to cause competition and the unemployment rate is further rising.

Table 1-1.6 shows the national fiscal revenues and expenditures. Revenue depends on grants from foreign countries which represents 1.5% of total revenues, and in recent years budget deficits continued to account for around 50% of revenues.

Table 1-1.6 Fiscal Revenues and Expenditures of Djibouti

(Unit: million Djiboutian franc)

	2014	2015	2016
Revenues and donations	87,326	114,222	109,424
Tax Revenues	52,600	61,779	63,349
Direct Tax	22,941	26,724	26,541
Indirect and other taxes	29,660	35,055	36,808
Indirect tax	26,485	31,280	31,948
Other taxes	3,175	3,775	4,860
Non-tax domestic revenues	8,684	13,037	11,777
Non-tax overseas revenues	12,843	18,286	19,285
Donations	13,199	21,120	15,013
Development projects	9,521	8,474	6,500
Financial support	3,678	12,646	8,513
Annual Expenditures	114,392	180,805	162,750
Current expenditures	64,566	70,685	81,607
Salary, etc.	29,561	31,023	34,212
Salary	26,432	27,748	30,846
Housing allowance	3,129	3,275	3,366
Goods and services	20,245	22,999	27,702
For civilian budget	16,577	19,055	22,789
For military budget	3,668	3,944	4,913
Maintenance	1,456	1,320	1,403
Transfer	10,955	12,239	12,767
Interest rate payment	892	1,747	4,630

Current expenditures with overseas funds	1,456	1,357	893
Investment	49,827	110,120	81,143
Investment with domestic fund	19,368	30,704	15,188
Investment with overseas fund	30,459	79,416	65,955
Donations	9,521	8,474	6,500
Loans	3,767	5,377	5,943
Fiscal Revenues and Expenditures (including donations)	-27,066	-66,582	-53,326

Source: International Monetary Fund (2013.3) "Djibouti: Sixth Review under the Extended Credit Facility Arrangement and Request for Waivers of Nonobservance of Performance Criteria—Staff Report"
Note: 1 Djiboutian franc = 0.61 yen (As of May 2018)

(2) Politics and Administration

Djiboutian politics and administration are led by the president with a five-year term. The state government is comprised of 17 ministries with the Prime Minister at its top. Djibouti is sectioned into six administrative regions and the President appoints governors to assign them to each region and they carry out local administration as state organizations.

The National Assembly of Djibouti consists of 65 members elected from each region. In addition, each region also has regional assembly consisting of members elected by regional residence and the chair is selected by the members. The regional assembly performs part of local administration entrusted by the governor. It issues residence certificate and poverty certificate and manages family registration of birth, death and marriage, etc. Garbage collection and treatment, construction permit, market management, and management of public land are also supposed to be entrusted with the regional government. However, partly because each region does not have their own fiscal revenues and distribution of funds from the state government is limited, such duties are performed by the national government in reality.

Table 1-1.7 Administrative Regions and Population (2016)

Region	Area (km ²)	Regional population (person)	State/Regional Capital	Population of State/regional Capital (person)
Djibouti	500	576,686	Djibouti City (capital)	576,686
Arta	1,100	51,418	Arta City	16,088
Ali Sabieh	1,800	105,491	Ali Sabieh City	46,030
Dikhil	7,200	107,917	Dikhil City	30,193
Tadjourah	7,000	105,194	Tadjourah City	17,980
Obock	5,600	45,929	Obock City	14,202
Total	23,200	992,635	Total	701,180

Source: 2017 Direction de la Statistique et des Etudes Démographiques of the Ministère de l'Economie et des Finances (DISED)

Note: The value of the future population at the time of population and housing census (RGPH 2009) conducted in 2009

(3) Social Status of Roadside Community

1) Status of the Resident Life

Dikhil Region has a population of about 108,000, of which about 30,000 live in Dikhil City. The target areas, Yoboki and Galafi, have a population of about 6,000. Along the target road, there are

restaurants, stores and rest areas for drivers, which are major revenue sources for regional residents. Nomads also live in the hinterland outside the towns and they form small communities in areas where there are wells and schools. Hanlé Community in Yoboki District is situated 2 kilometers away from RN 1 and they irrigate field with well water to grow dates, mango and tomato and ship part of the produce to the town.

Though RN 1 may function mainly as an economic corridor, it is the transportation route of backup materials and serves as the lifeline for local residents for doctors to visit to see them and transport emergency patients. There are no accommodation facilities for visitors and visitors may find it severe to stay in terms of the safety.

2) Educational Facilities

The educational facilities around the target section include elementary schools, one in each of Galafi Community and Yoboki Community near the border. As of April 2018, there are about 200 pupils in Galafi and about 400 pupils in Yoboki. There is one junior high school with about 300 pupils in Yoboki.

3) Medical Care Facilities

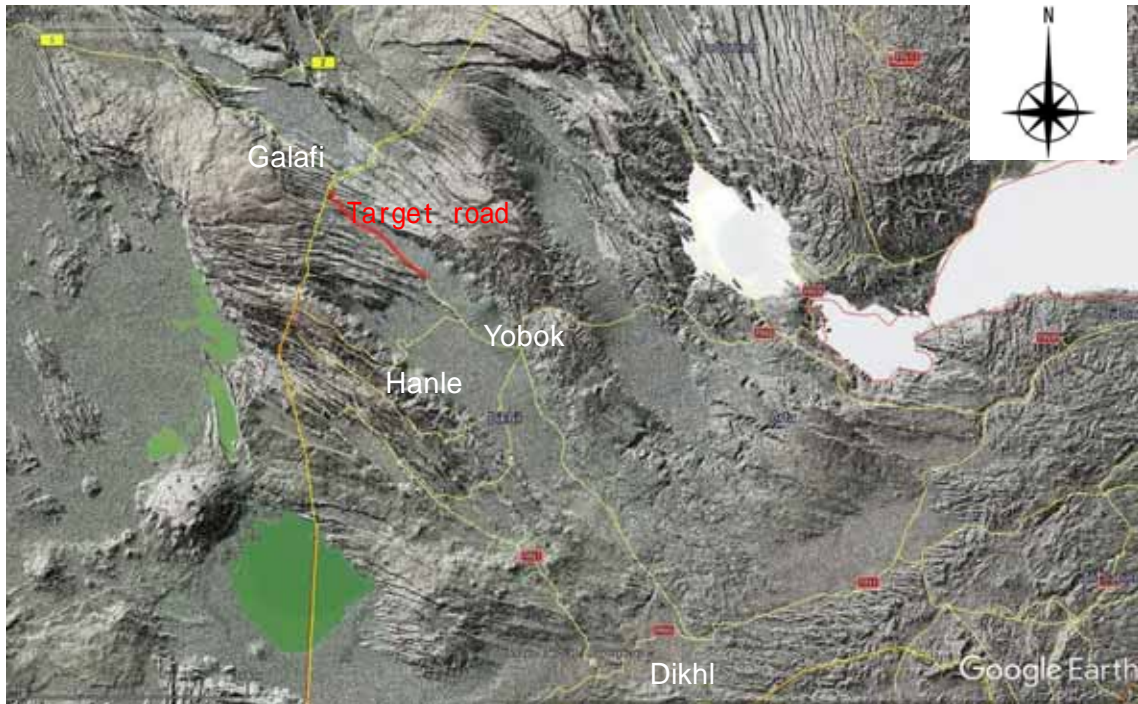
As regards the health and medical care system, there is no medical care facilities in Galafi. In Yoboki, there is a clinic, but no doctor. This clinic is operated by two nurses. Because of lack of facilities and equipment for medicines and beds, any patient requiring treatment are to be transported to the hospital in Dikhil City.

4) Infrastructural Facilities

Telecommunication environment along the target section is poor as a whole though varying depending on the time and location. As regards the electric power situation, the low-voltage distribution line is provided in Yoboki near the Project site and in Galafi City on the border to Ethiopia. However, the areas along the RN1 is not electrified and without streetlights.

1-1-4 Natural Conditions

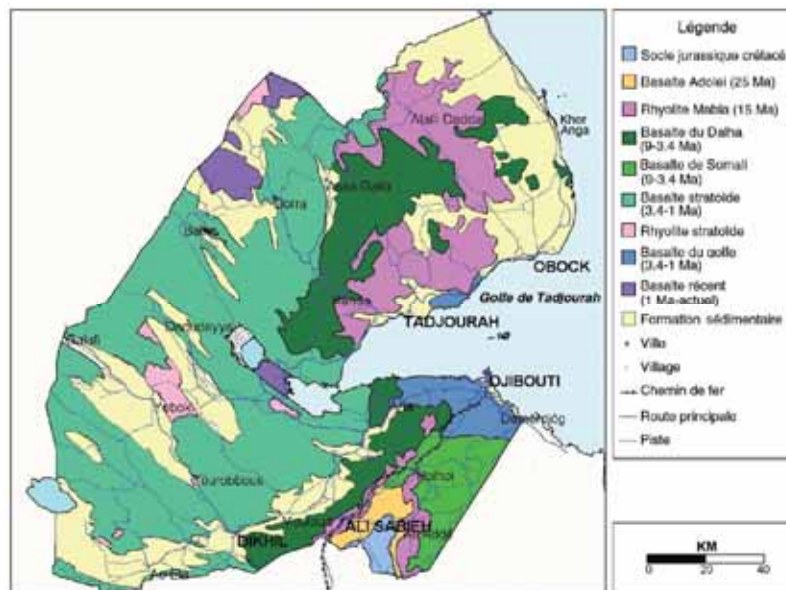
The topographical outline of Djibouti is shown in Figure 1-1.1. The target road is located at the west end of Djibouti and near the border to Ethiopia, and runs through the northern area of collapse plain (Hanle plain) in the northwest to southeast direction. The topography of Djibouti is characterized by the lava plateau and the collapse plain. Except for the coastal area, the rainfall within Djibouti is mostly evaporated or infiltrated into the ground in the inland collapse plain and does not flow into the Red Sea and the Gulf of Aden. The collapse basin has Lake Assal (elevation -157 m) in the middle of the country and Lake Abbe in the mountainous district of the border to Ethiopia, both of which are famous as saline lakes.



Source: Prepared by the Survey Team using the ALOS30m mesh topographical data (Google Earth data used for the roads and boundary)

Figure 1-1.1 Topography Outline of Djibouti

The geology around Djibouti is shown in Figure 1-1.2. Djibouti is located in the African Great Rift Valley and most of the land consists of basalt lava gushing out during the Pliocene to Pleistocene (1 to 4 Ma). Lava formed a plateau on the western part of the country and was tilted and divided by the northwest – southeast normal fault to form a collapse plain. This collapse plain has accumulation of lacustrine and aeolian deposits.



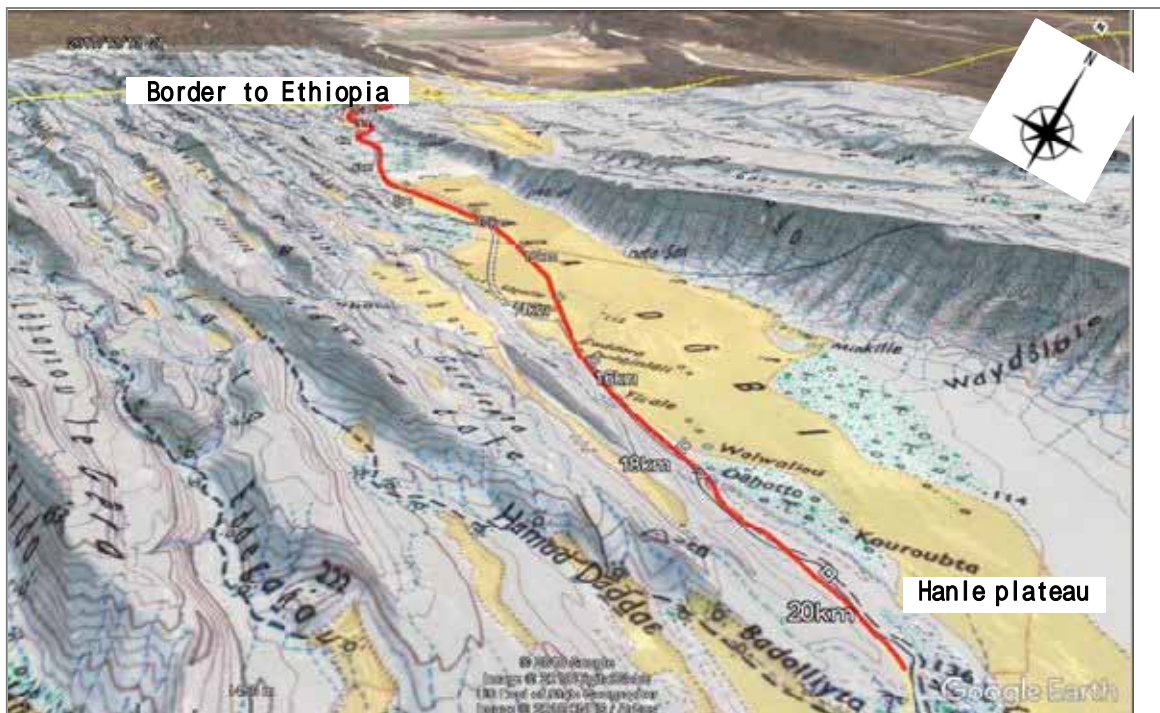
Source: WIKIMEDIA COMMONS

Figure 1-1.2 Geology around Djibouti

The climate of Djibouti is roughly divided into dry and rainy seasons. The dry season (May to September) has high temperature and low humidity while the rainy season (October to April) has low temperature and high humidity. Annual rainfall is extremely small at around 150 mm throughout the year. Since 2007, the annual rainfall has been around 50 mm, indicating the trend toward draught. The temperature varies from 25 to 35 °C, and the lowest during the December to January period. On the other hand, the temperature continues to exceed 30 °C for days and may reach 50 °C. The humidity is high at 70% or more during the October to May period and low at 45 to 55% during the June to August period.

1-1-4-1 Topography

Figure 1-1.3 shows the outline of topography of the target road. The target road traverses longitudinally the southwest edge of the Hanle plain (a boundary to the basalt lava plateau) and crosses the plain at about 3 km before the border to Ethiopia and passes through the transverse valley on the northern side. The largest wadi along the target road is the Galafi wadi at 4 km point.

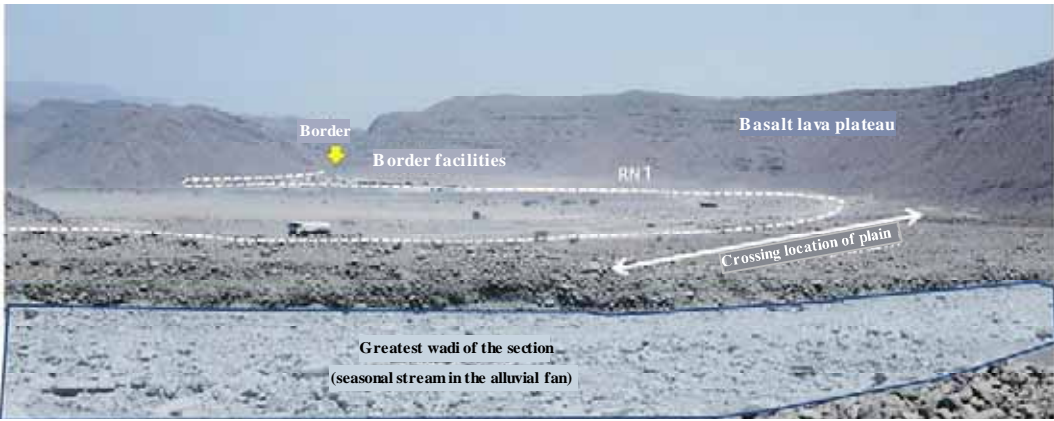

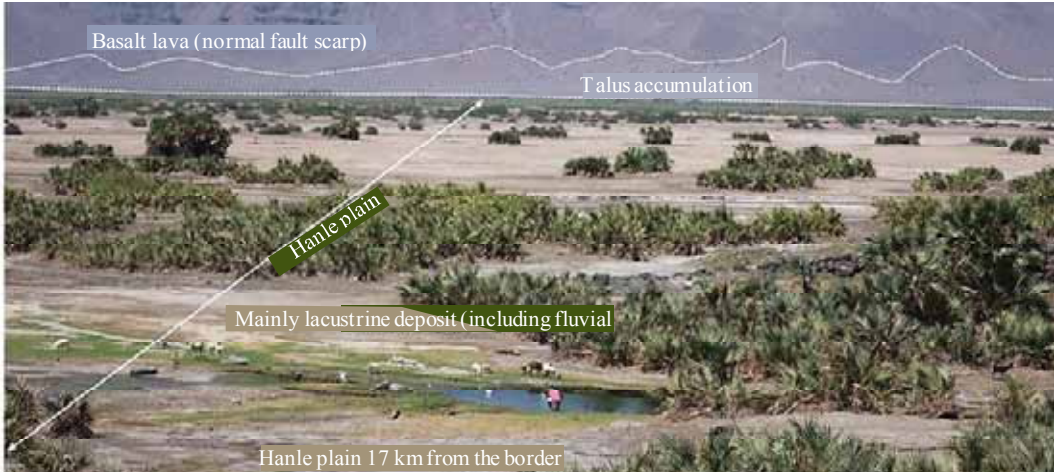


Source: IGN France prepared the aerial view of the 1/100,000 topographic map published in 1950 by using Google Earth (the target road added with a red line)

Figure 1-1.3 Topography Outline of the Target Road

Table 1-1.8 shows the topographic classification and the photo of the site state. The geology around the target road includes the gentle hillside mainly of alluvial fan from Galafi wadi for a distance of 7 km from the border and the Hanle plain without undulation for a distance from a 7 km point to 15 km point. The section from a 15km point to the start point is located on the boundary to the basalt plateau on the southeast side and passes through the boundary slope with the basalt plateau.

Table 1-1.8 Geological Classification of Target Road (Shown with Reference to the Border)

Section	Geological classification	Remarks
Section for 7 km from the border	Mainly alluvial fan (Gentle hill slope)	0 to 1km: Passing through the bottom of traverse valley 1 to 3km: Boundary to the basalt plateau on the north side 3 to 4km: Plain crossing section 4 to 7km: Alluvial fan from Galafi wadi
7h to 15km section	Hanle plain	Flat section without undulation
15km to start point section	Mainly the slope on the boundary with the basalt plateau	Bedrock section, talus accumulation slope High fills due to passage of small wadi and undulating slope
		As viewed at a 4km point from the border toward the border to Ethiopia. Gravel field originating from Alluvial fan spreading in the neighborhood. The section up to the border facilities at Galafi includes the section to cross the plain.
		As viewed from a 4 km point from the border toward the southeast side (start point). In the surrounding, the gravel field originating from alluvial fan spreads. The plain is viewed, which is located between basalt lava plateau.
		Hanle plain 17 km from the border. Lacustrine sand to silt make up the surrounding area. A small pond may be detected infrequently. Vegetation may be often observed in locations where groundwater exists.



Road passing through the basalt hilly terrain 20 km from the border. Being located on the slope, the road has bedrock distributed on the left side of the photo while high fills developed on the right side..

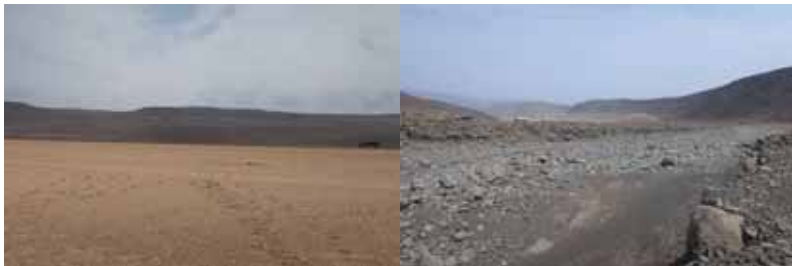
Source: Prepared by the Survey Team




1-1-4-2 Geology

(1) Outline of Geology

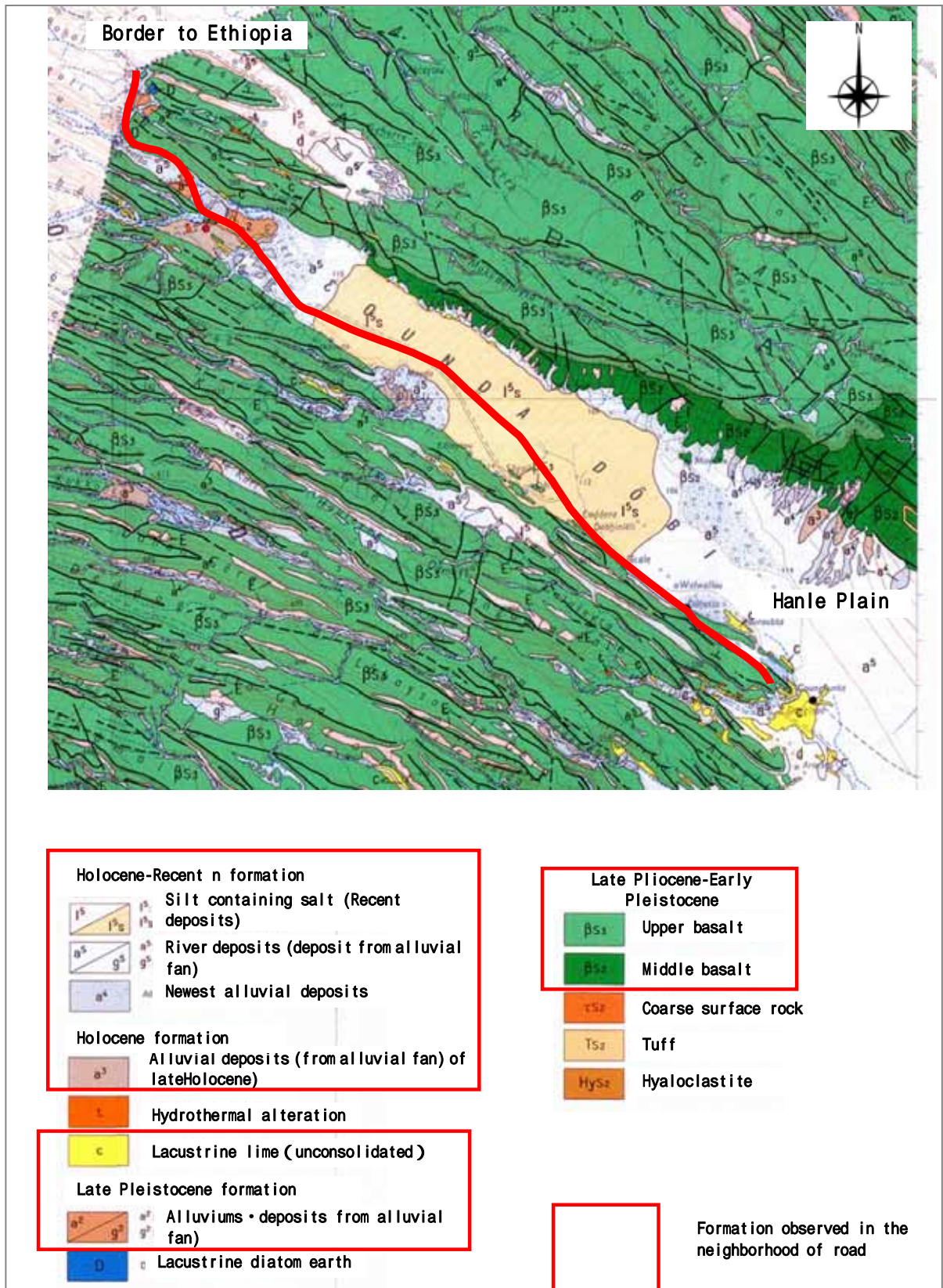
Figure 1-1.4 shows the geological map of the target area and Table 1-1.9 summarizes the geological characteristics. The geology around the target road comprises basalt lava (upper and middle basalt lavas) gushed during 1 - 4 Ma (Late Pliocene – Early Pleistocene) and the sedimentary layer formed after Late Pleistocene). The lava plateau is tilted stepwise by many normal faults in the northwest – southeast direction, with basalt lava exposed directly. In the collapse depression, deposit formed after Late Pleistocene is observed widely distributed. The road traverses mainly the plain section longitudinally, so that alluvial ground and deposit from alluvial fan are observed, the section through basalt lava is limited to the section around Galafi and to the southwest section. The deposit originating from alluvial fan around wadi is classified according to the vertical relationship of lacustrine white deposits (lime and shells) and their distribution elevation. The deposit originating from alluvial fan before the last glacial stage (Pleistocene) is distributed around the Galafi wadi 4.0 km from the border.

Table 1-1.9 Geological Characteristics around the Target Road

Geological classification	Characteristics and typical photo
<p>Holocene-Recent Fluvial • lacustrine silt</p> <p>Holocene-Recent Alluvial fan deposit</p>	 <p>Left ; Lacustrine silt to fine sand layer (widely distributed around the middle of target road and containing salt)</p> <p>Right ; Deposit at Galafi wadi 4.0 km from the border (Formed by relocation of terraced deposit from alluvial fan)</p>

<p>Holocene Lacustrine lime (containing shells)</p>		<p>Lacustrine lime exposed in wadi at a point (community) 5.5 km from the border. Characteristic layer in white, which is extremely fragile and presents issues to solve for use as foundation of structures. (This is not observed directly below the road.)</p>
<p>Late Pleistocene Deposit originating from alluvial fan</p>		<p>Terraced deposit originating from alluvial fan exposed in the side wall of Galafi wadi 4.0 km from the border. Average gravel diameter is around 30 cm (maximum 1.3 m). Though slightly compacted, this is readily eroded. (Promising materials for road construction)</p>
<p>Late Pliocene- early Pleistocene Upper basalt lava</p>		<p>Basalt lava in the mountainous area on the southwest side, 6.0 km from the border. One of quarrying sites used for road construction in 2002. (The surrounding area has been prepared for the work camp site.) (Promising materials for road construction)</p>

Source: Prepared by the Survey Team

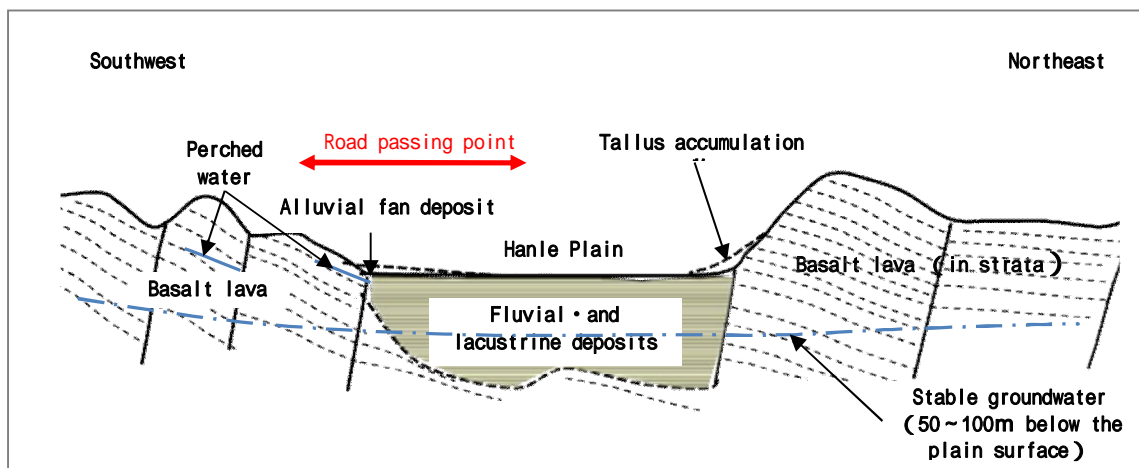


Source: Prepared from the 1/100,000 geological map published by Bureau de Recherche Géologique et Minière (BRGM) in 1995

Figure 1-1.4 Geological Map of the Target Area (1/100,000)

(2) Geological Structure and Groundwater



Figure 1-1.5 shows an image of geological structure in the longitudinal direction of the target road. Since the rainfall around the target road is extremely small, water to be used depends on the groundwater and the small amount of spring water from the skirts of a mountain. At 4 km from the border, the deep well was dug, with water directed to the border facilities at Galafi and the community 5.5 km from the border (see Table 1-1.10). Groundwater in the neighbourhood is at 50 m depth in the plain. Generally, groundwater in the Hanle plain area has the electric conductivity of around $3000\mu\text{S}/\text{cm}$, indicating higher chloride concentration. It is known that the deep wells in the target area has lower chloride concentration than other wells in the neighborhood because of mixing of surface water (rainwater origin) from the wadi. In the plain, there are old shallow wells and spring water from the skirts of a mountain, providing small amount of perched groundwater. As the plain is partially flooded (see Table 1-1.10, Photo 2) for a few days after rainfall, fluvial and lacustrine deposits of the plain form the ground that does not allow easy infiltration in the depth direction.



Source: Prepared by the Survey Team

Figure 1-1.5 Image of Geological and Groundwater Structures of Target Area (Southwest – Northeast Section)

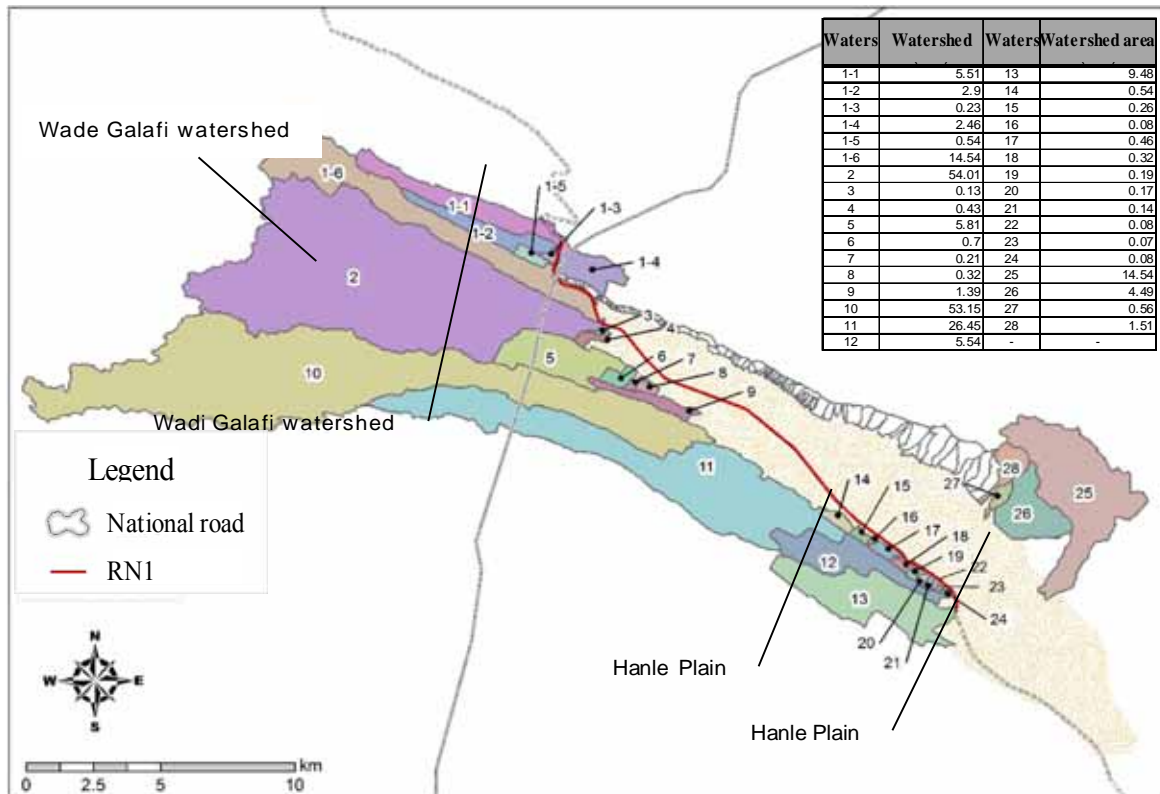
Table 1-1.10 Groundwater State in the Site

	
<p>Photo 1) Deep well 4.1km from the border Distributes water to the border facilities at Galafi and the community in the east. The well was dug with the Italian fund in 1990: the depth 138m, the pumping discharge rate 13m³/hour, EC 1350 ~ 1626μS/cm, temperature 42° C, groundwater level GL-53m. The water of this well has the lowest electric conductivity among deep wells in Hanle Plain and used for drinking. Mixing of surface water dilutes dissolved ion (mainly sodium chloride).</p>	<p>Photo 2) Flooded state of plain section after rainfall (8 km from the border). The plain was flooded for a few days due to spring water from the skirts of mountains.</p>

Source: Prepared by the Survey Team

1-1-4-3 State of Wadi

The target sector of the Project has small wadis crossing the national road. For the major wadi, the northwest section of the target section is located in the catchment. The watershed division map of the wadi concerned is shown in Figure 1-1.6. The wadi with the largest watershed area is Wadi Galafi.



Source: Prepared by the Survey Team

Figure 1-1.6 Wadi Water Shed Division Map for the Target Section of the Project

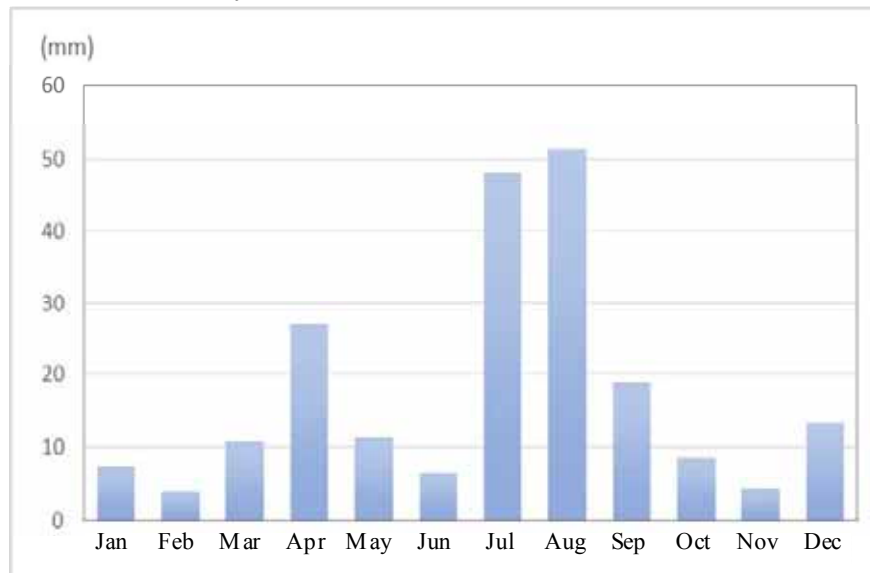


Source: Prepared by the Survey Team

Figure 1-1.7 State of Wadi Crossing the Road

The wadi at the section start point and its end point flows down according to the terrain of valley, reaching the national road. The wadi in the middle flows down to the Hale Plain, but its channel is broken up to cross RN1. The field survey confirmed that the road pavement at points where wadi crosses the road is heavily damaged. This is because the road longitudinal alignment of the section descends according to the terrain, with water flowing when there is flowing water in wadi, regardless of the scale of flooding.

The meteorological characteristics of Djibouti, that is, the small rainfall, is applicable without exception to the target wadi area. The annual rainfall of Wadi Galafi is around 200 mm (according to the satellite rainfall data summary for 2000 to 2013). The rainfall there tends to increase in the rainy season (July and August). In certain years, the maximum rainfall may occur in April. The daily rainfall exceeds 5 mm in an average of 10 days a year. Besides, the rainfall occurrence frequency is also considered to be extremely small.



Source: Prepared by the Survey Team from GsMap (JAXA) data

Figure 1-1.8 Monthly Rainfall in the Wadi Galafi Watershed (Average of 2000 to 2013)

This survey has been intended to confirm the rainfall waveform by time using the satellite rainfall data. The rainfall pattern showed almost no rainfall continuing for one day or more, but showed

frequent short-term rainfall for less than half a day. The maximum hourly rainfall is less than 10 mm.

Under the given rainfall conditions, the peak flow of major wadis in the Project is expected to be around 6m³/sec-59m³/sec as the historical maximum in past 18 years.

Table 1-1.11 Assumed Flow of Wadi

Watershed No.	Historical maximum flow m ³ /sec	Watershed No.	Historical maximum flow m ³ /sec
11	6.43	13	9.8
12	1.91	14	1.05
13	0.16	15	0.51
14	1.66	16	0.26
15	0.37	17	0.9
16	17.01	18	0.63
2	58.15	19	0.37
3	0.07	20	0.33
4	0.8	21	0.23
5	10.1	22	0.18
6	1.31	23	0.14
7	0.4	24	0.16
8	0.6	25	15.58
9	2.52	26	8.62
10	51.47	27	1.08
11	25.97	28	2.91
12	5.75	-	-

Source: Prepared by the Survey Team

For the flow calculation of the target wadi, refer to the Appendix 7-3 Hydraulic/river analysis results.

1-1-4-4 Candidate Location of Material Quarrying, and the Work Base

Figure 1-1.9 shows the candidate locations of material quarrying and candidate locations for work base and well construction while Table 1-1.12 shows the conditions for selection of candidate location for quarrying. Road improvement requires 100,000 to 200,000 m³ pavement materials. Except for fine sand silt of plain field, the target road area has the bedrock of basalt lava and alluvial deposits (hard gravels and sand gravels), which is made from hard basalt. It is proposed therefore to quarry the materials in the neighborhood and use them for banking material and aggregate (asphalt concrete).

Because materials are found abundantly in the neighborhood and these materials are not so much different in terms of quality, three candidate areas have been selected by taking into account social conditions and the quarrying results in the past.

- Candidate 1 ; Southwest slope (basalt lava and alluvial fan deposits) 6 km from the border
This was prepared as a base for the work and will be a promising candidate site as a base in the Project. Deep well will be constructed while securing the distance (500 m or more) not affecting the existing deep wells.
- Candidate 2 ; Northeast slope (basalt lava and talus deposits) around 13 km from the border
Northeast slope almost in the middle of work section, located remote also from the community. Similar basalt lava in terms of materials
- Candidate 3 ; Alluvial deposit 4 km from the border
It is not known whether quarrying was made here in the past. As gravels of alluvial deposit is

used, hard materials can be quarried than rock bed mountainous areas. Depending on the crushing equipment, boulders will have to be screened because of the maximum gravel diameter (about 1000 mm) and the uniaxial compressive strength (about 100 Mpa).

Table 1-1.12 Conditions to Select the Candidate Material Quarrying Location

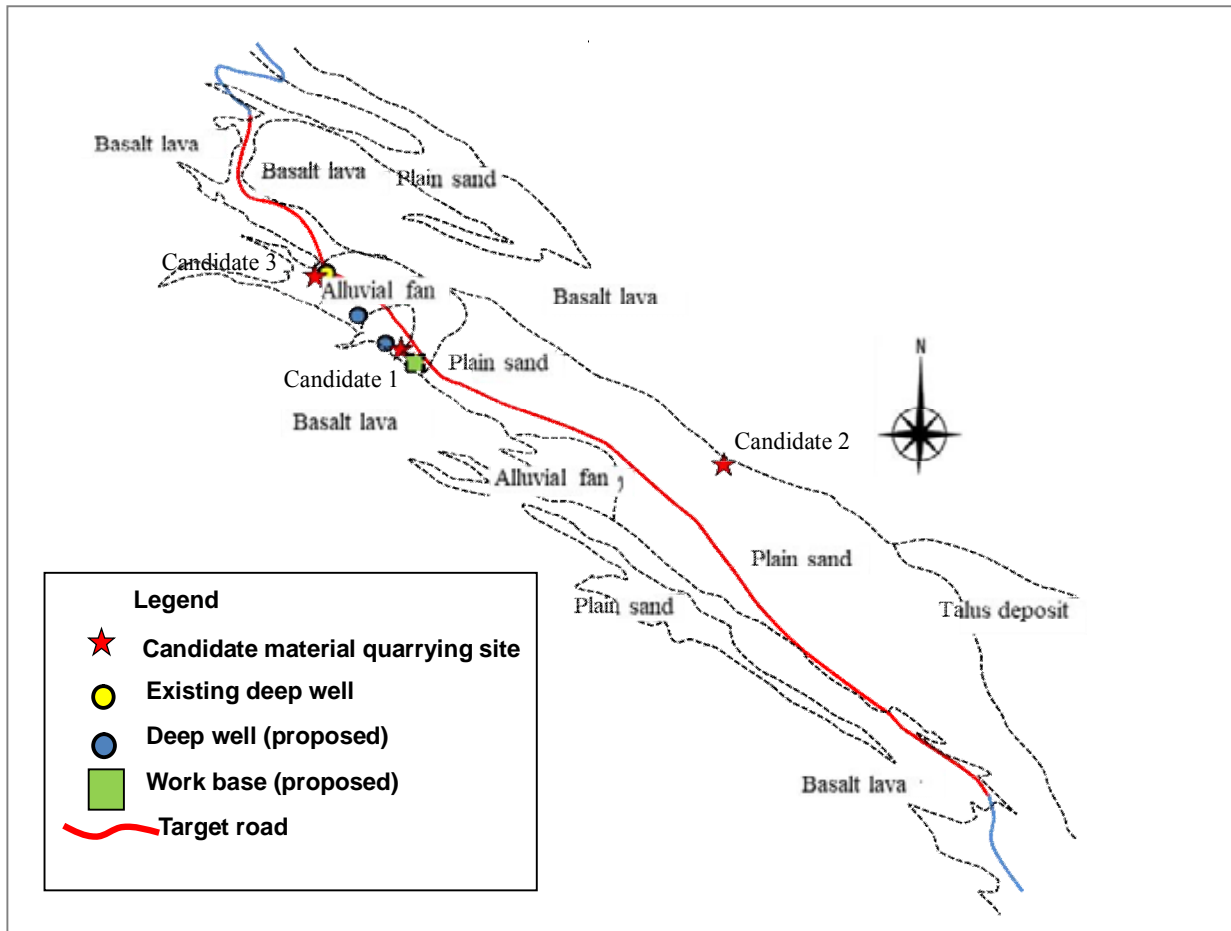
Conditions	Conditions for Selection
Social	<p>To avoid the border interference territory</p> <ul style="list-style-type: none"> • To avoid the interference territory zero to 2 km from the border <p>To avoid the communities and the settled areas</p> <ul style="list-style-type: none"> • To avoid the area around the Galafi border facilities 2 km from the border • To avoid the alluvial fan deposits (with communities) 5 km from the border • To avoid the alluvial fan deposits (with settled areas) 10 km from the border • To avoid northeast and southwest basalt plateau (with settled area) 16 to 20km from the border
Experiences in the past	<p>The target road was improved during a period from 1992 to 2002, and the material quarrying site in those years is left. This site is considered the most minor in terms of impact on society and nature because the site has once been used for quarrying.</p>

Note) The material quarried in the 3 candidate sites will be checked in terms of quality by the laboratory soil test (abrasion loss test). The amount of available materials is expected to be 300,000 m³ or more on all candidate sites, so that the candidate site may prove satisfactory as an independent material quarrying site.

Promising candidate locations for the work base and deep well construction are shown in Figure 1-1.9.

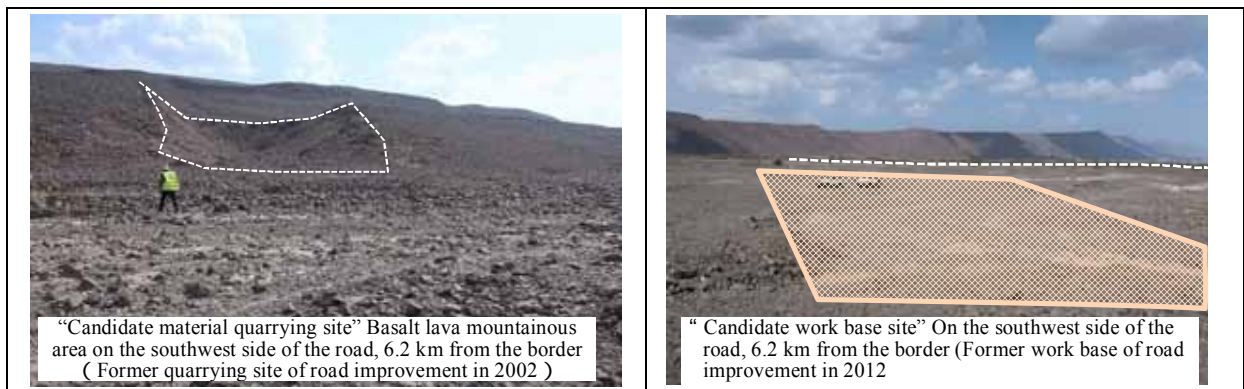
The work base was selected at a point that is slightly close to the community 5 km from the border and that has once been used for road works in the past. These locations are located at the end of alluvial fan and safe even in the case of landslide disasters because there is no new flood plain deposits.

Groundwater is generally salinity. Accordingly, the location was selected, which is recharged with much amount of surface water and does not affect any existing deep wells (that is, 500 m or more from the existing well). The well construction site was selected at the stable plateau in the alluvial fan without topographic alteration, such as wade.



Source: Prepared by the Survey Team

Figure 1-1.9 Candidate Locations of Material Quarrying and Work Base and Well Construction



Source: Prepared by the Survey Team

Figure 1-1.10 Candidate Locations for Material Quarrying (Candidate 1) and Work Base

1-1-4-5 Survey of Natural Conditions

(1) Topographic Survey

1) Survey Objective

This survey was conducted to understand the information on the topography, wadi, and planimetric features necessary for road design.

2) Survey Method

To shorten the survey period, the aerial photograph was taken with drone. The data taken in this manner was corrected with reference to the established reference point and plotted into the 3D contour map.

3) Survey Location and Range

The 22 km section, on RN1, from the border to Ethiopia was selected as a target and the survey was made basically over a range 25 m or more on both sides of center line. For a part of major points, the survey range was expanded.

4) Survey Items

Table 1-1.13 shows the survey items and their details.

Table 1-1.13 Survey Items

Item	Details • Quantity
Plan • preparation • data collection	
Survey with established reference point	20 or more concrete-made reference points established
Topographic survey	L=22km W=50m or more (25 m or more from the center of existing road) * For a part of major points, the range was expanded.
Survey on existing planimetric feature	Buildings • structures • culvert, etc.,
Data processing • 3D contour mapping	Topographic contours, 0.5 m interval
Preparation of the report	

Source: Prepared by the Survey Team

5) Survey Results

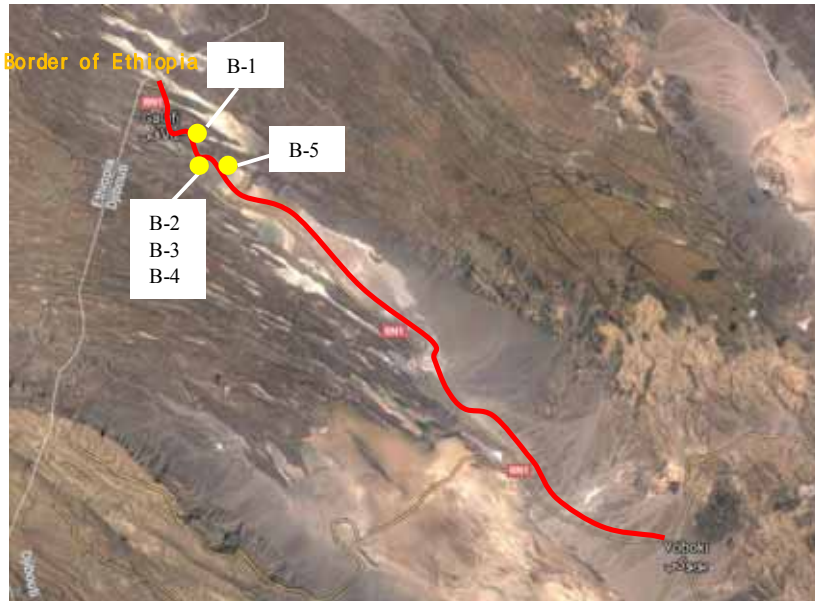
The resulting contour map is shown in the plan view of Appendix 8 “Outline design drawings.”

(2) Boring Survey

The boring survey was conducted to determine the appropriateness of the foundation ground for three large river-crossing structures. Boring was done at five points with a total length of 50 m. In addition to boring, the standard penetration test was conducted. But the frequency of penetration was fewer than initially planned because of geological nature; debris flow deposit (boulder layer). Positions and quantities of the boring survey are shown in Table 1-1.14 and Figure 1-1.11.

Table 1-1.14 Position and Quantity of Boring Survey

Name	North Latitude	East Longitude	Length (m)	SPT
B-1	11°42'40.08"N	41°50'45.83"E	10.0	
B-2	11°42'15.66"N	41°50'57.05"E	10.0	1
B-3	11°42'15.40"N	41°50'57.47"E	10.0	
B-4	11°42'15.11"N	41°50'57.83"E	10.0	
B-5	11°41'52.38"N	41°51'32.45"E	10.0	3
Total			50.0	4



Source: Prepared by the Survey Team

Figure 1-1.11 Location of Boring Survey

As a result of drilling survey of five holes, it was observed that the ground of these five locations consisted of gravel layer including basalt boulder and did not contain white silt layer (less consolidated lacustrine deposits). Except for the surface layer (loose range) of debris flow deposit, a box culvert foundation was judged to be designed as spread foundation type.

(3) Material Test

For the road materials of subgrade, subbase and aggregate, the laboratory soil test was recommissioned locally for evaluation, in addition to the simple dynamic cone penetration test conducted by the survey team.

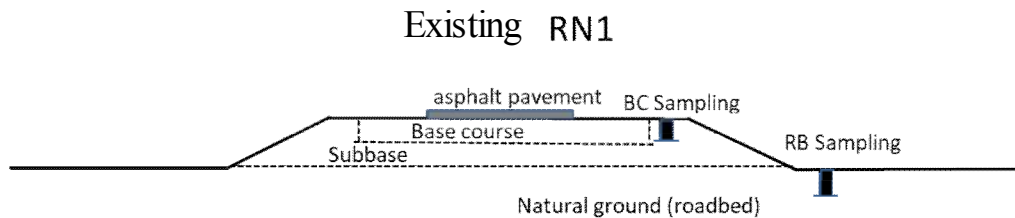
- Subgrade ; Subgrade soil was sampled on the road side and subject to the grain size analysis, liquid plasticity test, compaction test, and CBR test.
- Existing subbase ; The existing subbase material was sampled and subject to the grain size analysis, liquid plasticity test, compaction test, and CBR test.
- Raked gravel ; Raked gravel material was sampled around the old material quarrying site of the existing road and subject to the grain size analysis, liquid plasticity test, compaction test, and CBR test.
- Aggregate and subbase material ; Basalt (debris flow deposit) was sampled mainly from the old

material quarrying site of the existing road and subject to the grain size analysis, liquid plasticity test, and abrasion resistance test.

As a result of laboratory soil test, both subgrade and subbase showed that the alluvial fan deposits in the site and deposits making up the existing plain were gravelly soil with a wide grain size range. It was also confirmed that the materials are free from problem and the clay content and water content of the material was low. The CBR characteristics were determined to be CBR at >20% for the subgrade and >40% for the existing road subgrade and raked gravel. Abrasion of aggregate was confirmed to be 15% or less.

As is known from the above, CBR for the subgrade was reviewed in line with the local test (simple penetration test) conducted every 500 m. It was confirmed that the subgrade of existing road and raked gravel had a sufficient strength as the subbase course. Moreover, the materials for base course and aggregate have high abrasion resistance and are of satisfactory characteristics.

Figure 1-1.12 shows positions of the existing road and material test sampling, Table 1-1.15 shows list of the quantity laboratory soil test results, and Figure 1-1.13 shows the grain size distributions.

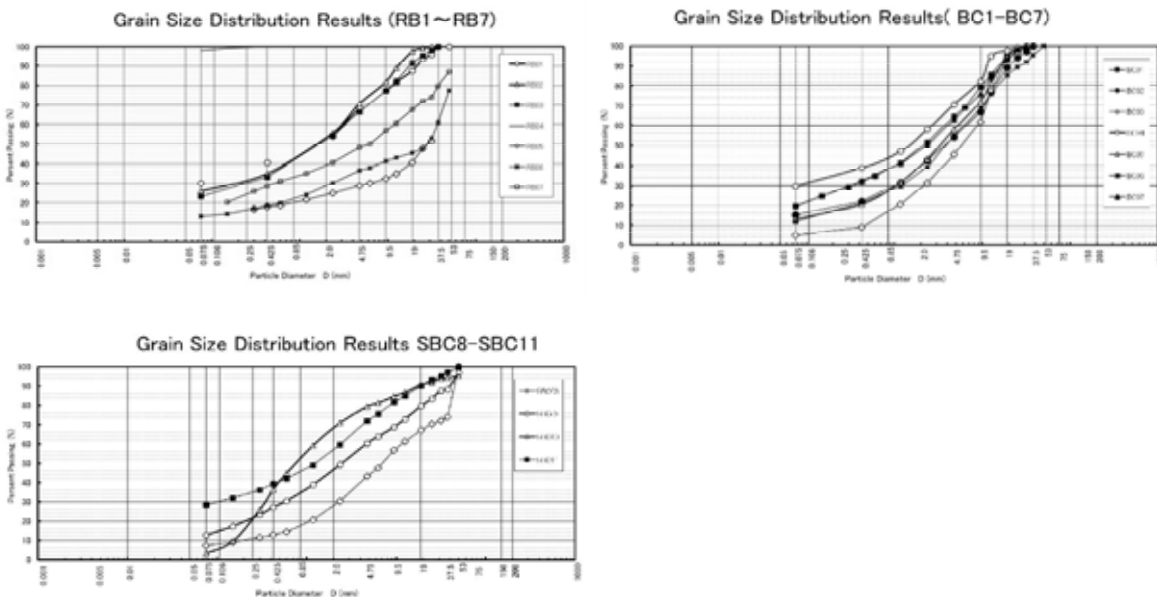


Source: Prepared by the Survey Team

Figure 1-1.12 Positions of the Existing Road and Material Test Sampling

Table 1-1.15 List of the Results and Quantity of Laboratory Soil Test Result

Material Sampling and Laboratory test															
Class	Name	Position		Classification	DCP	Particle size		Liquid limit test Plastic limit test(-0.4mm)		Compaction test		CBR test Three point method		Abrasion test	
		Nothing	Easting			-0.075mm	-2.36mm	LL	PL	wopt%	dmax (g/cm3)	%	%		
Subgrade (roadside of existing road)	RB01	11° 37'39.06"N	41° 56'49.28"E	Hanle plan deposit		30.0	54.1	31	21.8	9.1	2.100	23.0	-		
	RB02	11° 38'30.13"N	41° 55'46.57"E	Hanle plan deposit		25.9	55.9	23.5	19.4	7.8	2.145	33.0	-		
	RB03	11° 39'21.08"N	41° 55'56.05"E	Hanle plan deposit		23.3	54.4	NP	NP	6.8	2.359	73.0	-		
	RB04	11° 40'26.62"N	41° 53'54.33"E	Hanle plan deposit (windblown silt)		97.9	100.0	32	19.8	15.0	1.910	22.0	-		
	RB05	11° 40'56.77"N	41° 52'38.04"E	Fan deposit		12.9	25.0	NP	NP	8.6	2.238	52.0	-		
	RB06	11° 41'59.91"N	41° 51'26.51"E	Fan deposit		13.5	30.2	27.5	18.8	8.3	2.230	42.0	-		
	RB07	11° 42'43.93"N	41° 50'44.66"E	Fan deposit		19.8	40.6	NP	NP	8.4	2.200	47.0	-		
Subbase materials of existing road	BC01	11° 37'38.81"N	41° 56'49.04"E	Existing road bed BC		19.8	51.4	NP	NP	7.0	2.160	53.0	-		
	BC02	11° 38'29.93"N	41° 55'46.32"E	Existing road bed SBC		15.0	42.5	NP	NP	7.6	2.160	51.5	-		
	BC03	11° 39'21.00"N	41° 55'55.94"E	Existing road bed SBC		4.8	31.2	NP	NP	6.1	2.145	46.0	-		
	BC04	11° 40'26.46"N	41° 53'54.25"E	Existing road bed BC		29.8	57.9	NP	NP	8.8	2.245	73.5	-		
	BC05	11° 40'56.56"N	41° 52'37.96"E	Existing road bed SBC		13.0	43.2	NP	NP	7.4	2.145	54.0	-		
	BC06	11° 41'59.85"N	41° 51'26.42"E	Existing road bed SBC		11.8	39.1	NP	NP	7.3	2.239	64.0	-		
	BC07	11° 42'44.00"N	41° 50'44.80"E	Existing road bed SBC		19.6	49.9	NP	NP	5.6	2.158	48.0	-		
Raked gravel materials	SBC08	11° 42'7.52"N	41° 51'20.89"E	Fan deposit		7.4	30.4	NP	NP	9.8	2.120	47	-		
	SBC09	11° 41'26.62"N	41° 51'41.26"E	Fan deposit		12.7	49.3	NP	NP	7.9	2.234	60	-		
	SBC10	11° 41'54.72"N	41° 51'46.44"E	River deposit		3.3	70.9	NP	NP	7.8	2.070	42.5	-		
	SBC11	11° 40'20.09"N	41° 55'8.12"E	Talus cone deposit		28.3	59.5	NP	NP	8.7	2.270	69.5	-		
Crusher-run	Ma01	11° 42'13.92"N	41° 50'57.42"E	Fan deposit		-	-	NP	NP	-	-	-	-	9.4	
	Ma02	11° 41'27.09"N	41° 51'38.47"E	Fan deposit		6.1	24.3	NP	NP	-	-	-	-	-	
	Ma03	11° 41'24.58"N	41° 51'35.27"E	Talus/Basalt		10.4	34.2	NP	NP	-	-	-	-	-	
	Ma04	11° 42'12.55"N	41° 50'53.89"E	Fan deposit		-	-	NP	NP	-	-	-	-	13.9	
	Ma05	11° 40'14.39"N	41° 55'12.81"E	Talus/Basalt		-	-	NP	NP	-	-	-	-	14.8	
	Ma06	11° 40'14.07"N	41° 55'15.32"E	Talus/Basalt		14.3	43.2	NP	NP	-	-	-	-	-	
Total					0	24		24		18		18		3	3



Source: Prepared by the Survey Team

Figure 1-1.13 Grain Size Distributions

1-1-5 Environmental and Social Considerations

1-1-5-1 Environmental Impact Assessment

1-1-5-1-1 Outline of the Project Components Causing Impact on the Environment and Society

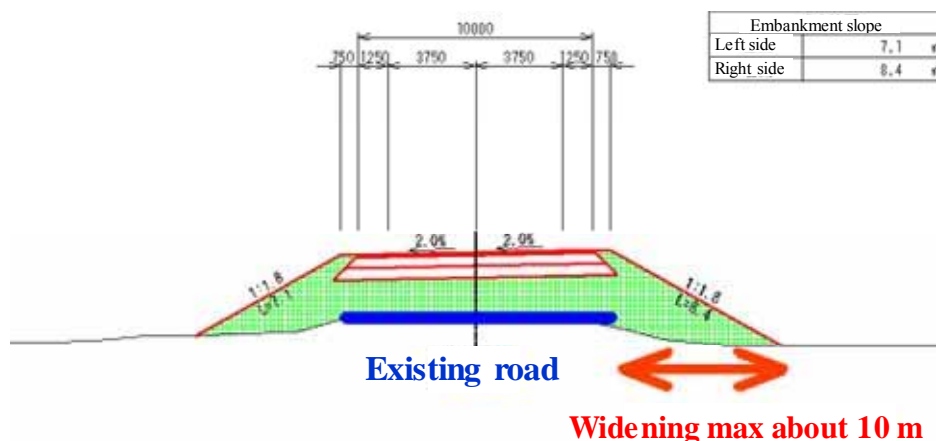
The Project is to improve the existing RN1 of 20.69 km, which is located in Galafi in the west of Dikhil Region in Djibouti and connects Yoboki to southeast of Ethiopia. The target section was constructed as a part of RN1 in 1970s and improved under assistance of the World Bank in 2003. At present, the road is suffering heavy damage. The Project plans overall repair of the road pavement, widening about 2 m from existing 9.5 m to proposed 11.5 m, and modification of alignment partially around the river-crossing structures. For a part of sections, widening of maximum 10 m on one side, including the slope, is expected because banking for embankment is made.

Table 1-1.16 shows outline of the work and Figure 1-1.14 shows the proposed sectional view.

Table 1-1.16 Outline of the Work

Outline of the work	Improvement of carriageway with hot mix asphalt pavement Improvement of roads near the border by cement concrete pavement Improvement of the river-crossing structure at the wade crossing point Improvement of the road drainage facilities Improvement of the safety facilities, such as guard rails, road marking				
Cross section	Carriageway width : 3.75m Shoulder width : 1.25m Soft shoulder: 0.75m Road width: 11.5m				
Pavement plan	Layer	Material	Quality standard	Thickness (cm)	
				Start to PK200 PK210 to End	PK200 ~ 210
	Surface	Hot asphalt mixture	Modified asphalt to be used	5	5
	Binder	Hot asphalt mixture	Modified asphalt to be used	7	7
	Base	Mechanical stabilized crushed stone	Modified CBR 80 or more	30	45
	Subbase	Surplus gravelly soil	Modified CBR 30 or more	50	50
Structure plan	River-crossing structure at wadi: 7 points, Drainage crossing structure: 33 points				
Border facilities plan	Waiting lane Concrete pavement near the border facilities				

Source: Prepared by the Survey Team



Source: Prepared by the Survey Team

Figure 1-1.14 Proposed Sectional View

In the targeted improvement section, the work will totally be executed within the existing road site, excluding a part of alignment modification points, storage of equipment related to the construction work, and installation of a temporary office. Considering locational conditions that all of surrounding lands are vacant lands without owner and some are public lands, no negative environmental and social impacts on the surrounding are expected during work and after road opening for service. Since there are communities without land ownership, each at the point close Galafi on the border and at a point of 4 km from the Galafi start point, it is essential to minimize the impact of work land through environmental and social considerations. The figure shows the location map of the Grant Aid Project.



Source: Prepared by the Survey Team

Figure 1-1.15 Location Map of the Grant Aid Project

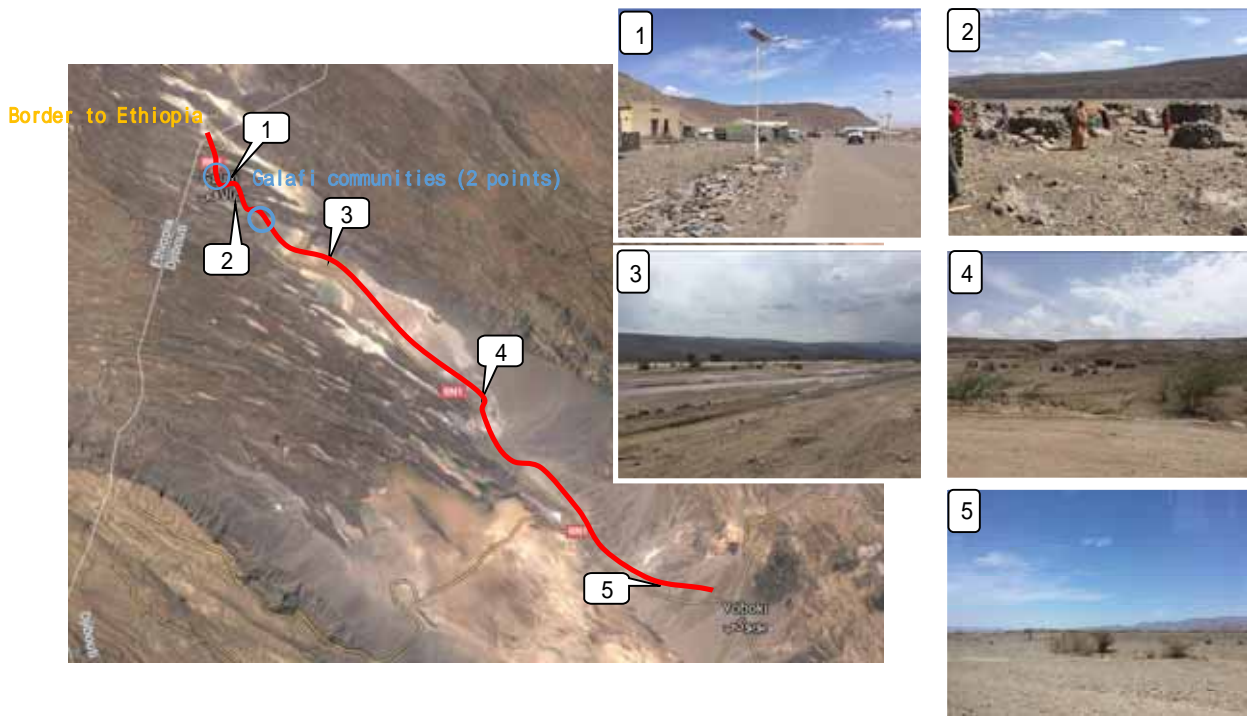
1-1-5-1-2 Basic Environmental and Social State

As shown in the location map of the Project of the above section, the scope of RN1 improvement includes the work on the existing road from Galafi on the border to Ethiopia in the west of Dikhil Region to a point around Yoboki 20 km in the southeast direction of Dikhil Region. The site is located in the northern part of Hanle Plain and consists geologically of basalt lava for the most part. The temperature varies between 25 and 35 every year and the annual rainfall is extremely small at about 150 mm throughout the year. It is difficult to grow crops and no intensive utilization of land, such as agriculture and livestock farming, is undertaken though vegetation unique to the arid zone, such as acacia, is observed here and there on the desert with gentle slope. In the rainy season, wadi (seasonal stream) appears, causing flooding temporarily.

The population of the target area of the Project, Yoboki and Galafi, is 6,000 including nomads leading a nomadic existence. The living zone of nomad spreads deep in the hinterland outside the community, and nomads moves to carry on livestock farming and to find out pasture. In many cases, nomads build a camp mainly in locations where there are schools or wells. There are restaurants, stores and rest areas for drivers along the road, which are principal sources of income for regional

residents. Although RN1 is characterized mainly as an economic corridor, it is also the transportation route of backup materials and serves as the lifeline for local residents for doctors to visit to see them and transport emergency patients.

The figure below shows the current state along the RN1.



1. Galafi community 2. Galafi community 3. Roadside desert 4. Nomad dwelling 5. Roadside desert

Source: Prepared by the Survey Team

Figure 1-1.16 Current State Along the RN1

As shown in the figure above, the survey showed that, in the above work section, there are dwellings and communities including the two settlement points of around 300 close to Galafi on the border and one nomad village of several households in the proximity. All of houses are located at a few-meters distance from the road. Residents living on the roadside are originally nomads and part of them are settled. They operate restaurants and shops mainly for truck drivers, which are their principal source of income. Residents continuing the nomadic life also coexists with the existing RN1.

The target RN1 is the major international economic corridor connecting to Djibouti Port, a vital trade entrance for Ethiopia, which has the large vehicles traffic volume exceeding 1000 vehicles/day/direction at present. The traffic volume shows an increasing tendency at a rate of 10% a year. Improvement of the existing road of the Project will cause increase in the traffic volume from the present level, which may cause deterioration of the surrounding environment and thus negative impact on the houses and communities.

The Project is expected to widen the road by about 2 m from the present 9.5 m to the proposed 11.5 m. The Project also includes the plan of raising the road in a part of the target section, which is

expected to use the land of maximum 10 m on one side. Since the land around the target road is totally government-owned, there is no need of land acquisition. The Project involves improvement of the existing road. Accordingly, there is no significant impact on the nomad communities living in the vacant area in the neighborhood. Hearing from the Direction of Environment and Sustainable Development conducted along with the reconnaissance survey proved that there is no rare animals and plants around RN1 of the Project, there is no migratory route for birds, and there is no sanctuary related to any animals and plants at all.



Source: Prepared by the Survey Team

Figure 1-1.17 Landscape Along RN1

Underground utilities in the road area include groundwater pumping facilities near Galafi on the border, water supply pipes to supply water to neighboring villages, and telecommunication cables. However, they are distanced more than ten meters from the improvement area and will not present much hindrance to the work. However, the work is executed in the vicinity of underground utilities, so that ADR, the Project implementing agency, must explain and negotiate the contents of the design and work with the Ministry of Agriculture, Fisheries, Livestock and Water Resources and the Djibouti Telecom, namely the administrators of underground facilities, for their approval before starting the work.

1-1-5-1-3 Systems and Organizations Considering Environment and Society of Recipient Country

(1) Legal System Related to Environmental and Social Considerations

In Djibouti, the Ministerial Order on Revision of the Environment Impact Evaluation Procedure (Décret n°2011-029/PR/MHUEAT portant révision de la procédure d'étude d'impact environnemental) (hereinafter called Ordinance No. 2011-029) was established in 2011 on the basis of the Environmental Act (Loi n°51/AN/09/6ème L portant Code de l'Environnement) enacted in 2009. The Ordinance, together with other environment related laws, establishes the framework for existing environment management. However, for the emission and discharge standards related to air quality, water quality, noise and vibration, etc., the international standard of WHO, etc, is basically applied as required.

In Djibouti, the projects that are obliged to undertake the environmental impact evaluation are established while being classified into the projects covered by the simple environmental impact evaluation (étude d'impact environnemental sommaire) and those covered by the detailed environmental impacts evaluation (étude d'impact environnemental détaillée) in the attachment to the Ordinance No. 2011-129.

The legal systems related to environmental and social conditions are shown below. (For the legal systems related to land acquisition, refer to the 'Legal Framework related to Land Acquisition' described later.)

Table 1-1.17 Legal System Related to Environmental and Social Considerations of Djibouti

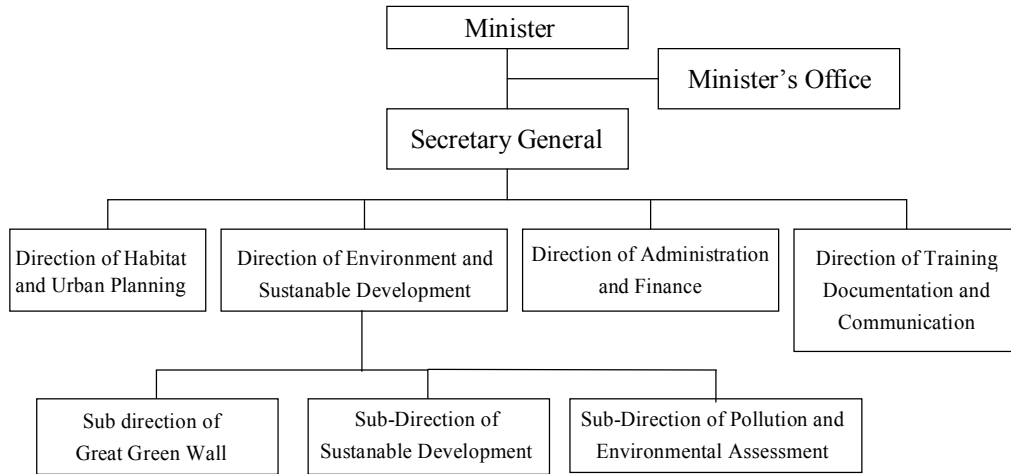
Class	Laws
Laws	Environmental Law No.51/2009 Loi n°51/AN/09/6ème L portant code de l'environnement
	Establishing terrestrial and marine protected areas Law No.45/2004 Loi n°45/AN/04/5ème L portant création des aires protégées terrestres et marines
	Mining Law No.66/1994 Loi n° 66/AN/94/3L sur le code minier
	Revising the environmental impact assessment procedure Decree No.29/2011 Décret n°2011-029/PR/MHUEAT portant révision de la procédure d'étude d'impact environnemental
Ordinances	Transport of dangerous products Decree No.212/2003 Décret n°2003-0212/PRE/MHUEAT portant réglementation du transport des produits dangereux
	Protection of biodiversity Degree No.65/2004 Décret n°2004-0065/PR/MHUEAT portant protection de la biodiversité
	National Commission for Sustainable Development Decree No.92/2004 Décret n° 2004-0092/PR/MHUE portant création de la commission nationale du développement durable (CNDD)
	Environmental Impact Assessments Decree No.11/2001 Décret n° 2001-0011/PR/MHUE sur les études d'impact sur l'environnement

Source: Direction of Environment and Sustainable Development

Note that, in the table above, the "Law Concerning Land and Marine Sanctuaries" is the only one law in Djibouti that specifies the areas to be protected: Day Forest, Mabla Forest, Lake Abbe, and Lake Assal are four areas designated as reserves and protected by laws. Note however that these reserves are remote from the Project and the above law will not be applied to the Project.

(2) Organizations Related to Environmental and Social Considerations

In Djibouti, the environmental administration is integrated, on both national and regional levels, to MHUE (Ministère de l'Habitat, de l'Urbanisme et de l'Environnement), and DEDD (Direction de l'Environnement et du Développement Durable) is in charge of practical services. The organizational structure of MHUE is shown below:



Source: MHUE

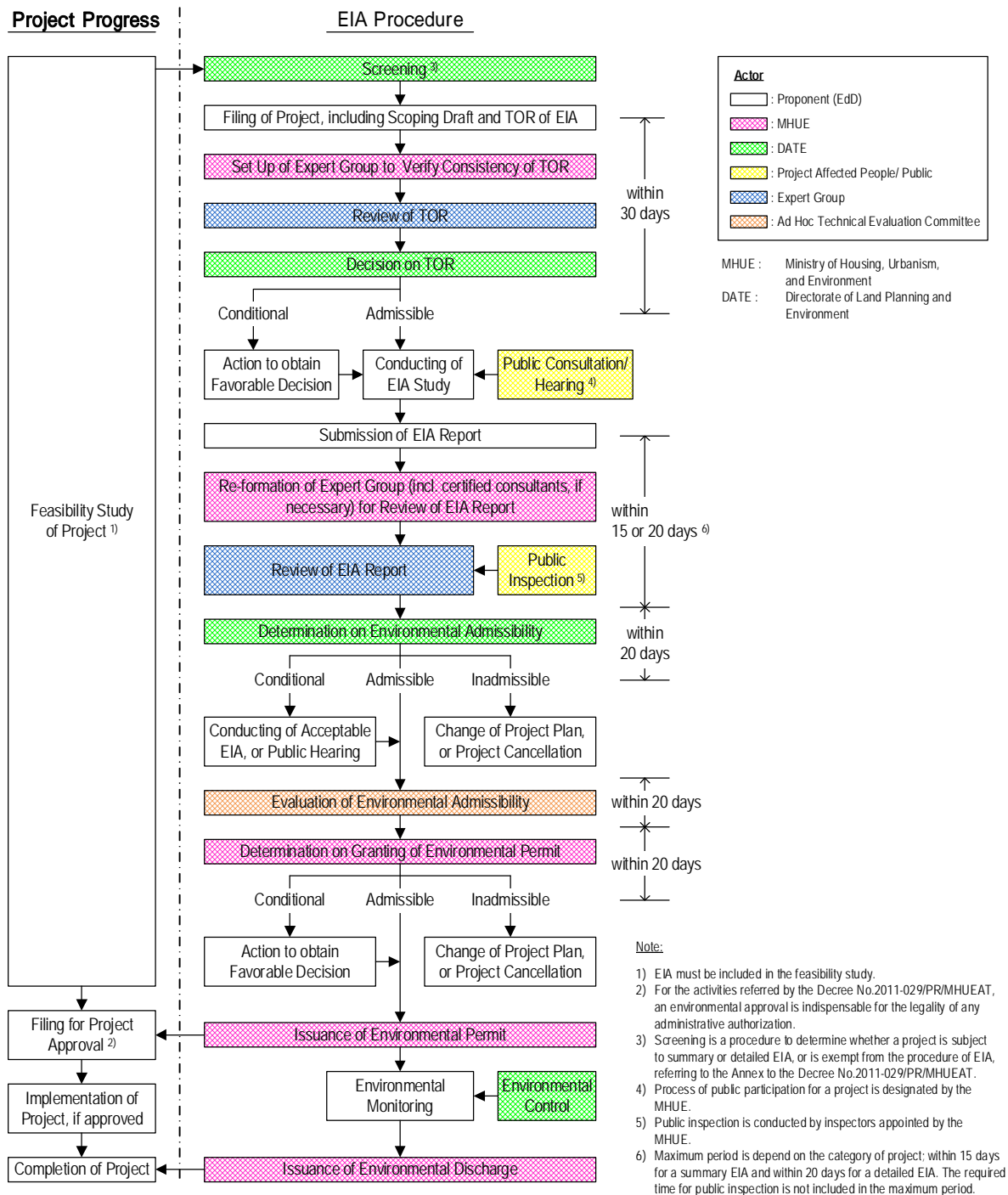
Figure 1-1.18 Organizational Structure of MHUE

(3) Environmental Impact Evaluation Procedure

As described above, the projects obliged to implement the environmental impacts are classified into the projects for simplified environmental impact evaluation and those for detailed environmental impact evaluation in the attachment to the Ordinance No. 2011-029. Regarding the road, only the regular maintenance with material of the road in the rural area (Entretien périodique (avec rapport de matériaux) des routes en zone rurale) is taken as a target of simplified environmental impact evaluation, but no description is contained concerning new construction or repair of the roads. In this way, the stipulation contains ambiguities here and there.

For the inquiry made by the survey team on the necessity of environmental impact evaluation concerning this road improvement work, the authority agreed that there are ambiguities in the description of the law and explained that the necessity of implementing the environmental impact evaluation should be determined not only by the project content and scale, but also from the overall viewpoint by taking into account the social impact and location. Then at a later date, it is received that the Project was not required an environmental impact assessment for the upgrading existing road, and the document that referred to the construction permit could be issued in a few days based on an application letter from ADR. The application letter for environmental impact assessment related to the Project has been issued from ADR on October 25, 2018, addressed to DEDD.

The figure below shows the flow of the procedure of implementing the environmental impact evaluation of Djibouti. Note that the EIA procedure is not necessary in the Project.



Source: Prepared by the Survey Team on the basis of Ordinance No.2011-029

Figure 1-1.19 Environmental Impact Evaluation Implementation Flow

Generally, after screening by DEDD, maximum 30 days will be required for the operator to submit the necessary documents including TOR, etc. for environmental impact evaluation to the competent authority and to obtain approval of TOR, and maximum 80 days for the operator who has conducted the environmental impact evaluation to submit the report and to obtain the environmental clearance. Note that practically such period could be much longer because such number of days do not include the time for addition due to return when TOR modification is required or the time required for inspection of the environmental impact evaluation report is not included,

(4) System of the Implementing Agency (ADR) related to Environmental and Social Considerations

The Project implementing organization, ADR, has no section in charge of environmental and social considerations and the Design Section is in charge. ADR is a relatively new organization established in November 2013. In the projects undertaken by ADR in the past, the consultant employed by the donor undertook the environmental and social considerations. Where implementation of environmental and social considerations is required in the Project undertaken by ADR, it is considered difficult to take necessary measures within ADR because of less experience with these considerations. It is necessary therefore to take measures such as outsourcing the service or to forming a working group comprising persons experienced in such considerations from government organizations or local governments. Note that government organizations include Ministry of Equipment and Transport that is a competent authority above ADR, central government authorities such as Direction of Environment and Sustainable Development, and Bureau of National Property, and local government organizations such as the Government of Dikhil Region.

As of 2018, there is no certification system for private consultants to implement the environmental impact evaluation survey. During hearing at Direction of Environment and Sustainable Development, it was reported that the private consultants capable of implementing the environmental impact evaluation survey exist in Djibouti, in which only a few have ever implemented evaluation according to the Environmental Impact Evaluation Guideline of World Bank, etc.

1-1-5-1-4 Comparative Review of Alternative Plans

The Project covers improvement of the existing road and is not expected to include substantial alignment and structural modification. Accordingly, comparative review with alternative plans is limited to zero option (no project implementation).

Table 1-1.18 Comparative Review of Alternative Plans

Item	Project implementation	No project implementation
Natural environment	No impact on natural environment because the target road wayside is an Acacia-dappled desert without rare animals and plants	-
Social environment	No relocation necessary though two communities exist along the target road; buildings are distanced more than 10 meters from the road	RN1 is not a community road, but used for backup materials supply, visit of doctors to patients or transport of emergency patient. At present, because of heavy damages to the road surface, the transport speed is substantially suppressed. High-risk situation, such as delay in transport by vehicle in case of emergency, etc. continues.
Economy	For the economy of Djibouti, the principal source of income is the tertiary industry centering around the trading services. Improvement of RN1, the important physical distribution route connecting the neighboring country, Ethiopia, to Djibouti Port to ensure smooth physical distribution presents substantial positive effects on the economy of Djibouti.	RN1 is the major route connecting the neighboring country, Ethiopia, to Djibouti Port, with the number of large trucks exceeding 1000 vehicles/day. At present, because of heavy damage to the road surface, the traveling speed is substantially suppressed, with overturn accident occurring frequently. Such economic loss will continue if the Project is not implemented.
Recommended optimum plan and justification	The Project with almost no impact on the natural and social environment while contributing greatly to economic growth. It is recommended to implement the Project.	No implementation of the Project not recommended because RN1 becomes a factor hindering the development of industry supporting the country.

Source: Prepared by the Survey Team

1-1-5-1-5 Scoping

As shown in Table below, 30 impact items were set according to the JICA Guidelines for Environmental and Social Considerations (April 2010). A scoping plan was prepared jointly by ADR and the Survey Team.

Table 1-1.19 Scoping Plan

Class		Evaluation		Reason for evaluation		
		Before work During work	In service			
Reason for social environment	1	Land acquisition, resettlement	D	D	The road is provided totally within the existing road land, so that acquisition of land from the private land is totally unnecessary. No relocation of resident at all.	
	2	The poor	D	D	The poor exists around the target area, but not so much exposed to the impact because the Project is improvement of the existing road.	
	3	Ethnic minorities and indigenous people	D	D	No ethnic minorities and indigenous people live in and around the target area.	
	4	Regional economy, such as employment, means of living, etc.	D	D	Being improvement of the existing road, the Project will exert almost no negative effect on the regional economy.	
	5	Land utilization and utilization of regional resources	D	D	Being improvement of the existing road, the Project will exert almost no adverse effects on the existing land utilization or utilization of regional resources.	
	6	Water use	C	D	Groundwater is used temporarily during work, but it is not known how much such use exerts effects. The possibility of affecting the water use in the neighborhood during use is not considered.	
	7	Existing social infrastructure and social services	B-	D	During work: Temporary traffic regulation (bypassing or alternating traffic) is assumed. In service: The work that may exert adverse effect on the social infrastructure or social service in the service state is not considered.	
	8	Social capital and social organization. such as regional decision-making organization, etc.	D	D	There is no social capital or social organizations, such as regional decision-making organization in and around the target area.	
	9	Uneven distribution of damage and benefit	D	D	Improvement and existence of the road are considered not presenting uneven damage and benefits to the surrounding area.	
	10	Conflict of interest within the region	D	D	Improvement and existence of the road are considered not presenting conflict of interests in the surrounding area.	
	11	Cultural heritage	D	D	No cultural heritage in and around the target area	
	12	Landscape	D	D	No aesthetic landscape and tourist sites in and around the target area. No landscape requiring conservation	
	13	Gender	D	D	It is almost inconceivable that improvement and existence of the road exert negative effect on the gender.	
	14	Children's rights	D	D	It is almost inconceivable that improvement and existence of the road exert negative effect on the children's rights.	
	Natural environment	15	Infectious disease such as HIV/AIDS, etc.	D	D	It is almost inconceivable that improvement and existence of the road promote spreading of infectious disease. Influx of workers from other districts is considered limited because the construction work is not large in scale and local workers are employed.
		16	Work environment (including occupational safety)	B-	B-	During work: Consideration necessary concerning the work environment of construction workers. In service: Consideration necessary concerning safety measures during periodic inspection.
17		Protected areas	D	D	No natural reserves in and around the target area	
18		Ecosystem	D	D	Almost no effect on the ecosystem because of desert spreading mostly in and around the target area, in which there is no rare animals and plants.	

Class		Evaluation		Reason for evaluation	
		Before work During work	In service		
	19	Hydrology	D	D	It is inconceivable that improvement and existence of the road cause changes in the flow and river bed of the rivers.
	20	Topography and geology	D	D	There will be almost no effect on the topography and geology because large-scale banking or cutting is not proposed.
Pollution control	21	Air pollution	B-	C	During work: Temporary deterioration of air quality may be considered due to construction work. In service: The improved road causes increase in the traffic volume, resulting in increase in the exhaust gas and thus possible adverse effects on the air quality. Note that, even at present, there is certain traffic volume, so that the expected adverse effects would be limited. However the magnitude of the impact is unknown.
	22	Water pollution	C	D	During work: The possibility of water pollution due to oil leakage from the construction machinery cannot be denied, but the degree and range of effects would be limited because the construction work is not large. In service: Existence of improved road would not cause water pollution.
	23	Waste	B-	D	During work: Generation of construction wastes expected In service: No wastes generated by the existence of improved road
	24	Soil contamination	C	D	During work: The possibility of soil contamination due to oil leakage from the construction machinery cannot be denied, but the degree and range of effects would be limited because the construction work is not large. However the magnitude of the impact is unknown. In service: No soil contamination by the existence of improved road
	25	Noise and vibration	B-	C	During work: Noise and vibration expected due to operation of the construction machinery. The degree and range of effects is limited because no large-scale work is proposed. In service: Improved road causes increase in the traffic volume, possibly resulting in increase in noise and vibration. Note that, even at present, there is certain traffic volume, so that the expected adverse effects would be limited.
	26	Subsidence	D	D	It is inconceivable that improvement and existence of the road cause ground subsidence,
	27	Odor	D	D	It is inconceivable that improvement and existence of the road cause offensive odor.
	28	Sediment	D	D	It is inconceivable that improvement and existence of the road cause adverse effects on the bed materials.
Others	29	Accident	B-	C	During work: Considerations must be taken to prevent accident during entry/exit of vehicles related to the work. In service: Improvement of the road causes increase in the traffic volume, and the possibility of increase in accidents cannot be denied. Currently, turnover accidents occur frequently because of worsened road state, so that road improvement may contrarily reduce the number of accidents. However the magnitude of the impact is unknown.
	30	Cross-border effects and climate change	D	D	It is inconceivable that improvement and existence of road causes cross-border effects. The effects related to climate change is almost inconceivable.

Ranking

A+/-: Significant positive/negative effects possible

B+/-: Not significant, but certain degree of positive/negative effects possible

C: Degree of effects not known. (Further survey is necessary. The degree of effects is identified in the course of survey.)

D: Effects not assumed

Source: Prepared by the Survey Team

The effects of the Project implementation was evaluated by classifying them into A+/- (Significant positive/negative effects possible), B+/- (Not significant, but certain degree of positive/negative effects possible), C (Degree of effects not known), and D (Effects not assumed). The above effects

were judged to be ‘Not significant, but certain degree of positive/negative effects possible’ and ‘Degree of effects not known’ in terms of nine items (1. water use, 2. existing social infrastructure and services, 3. work environment, 4. air pollution, 5. water pollution, 6. waste, 7. soil contamination, 8. noise and vibration, and 9. accident).

1-1-5-1-6 TOR for Environmental and Social Considerations Survey

For eight environmental items judged to be ‘Not significant, but certain degree of positive/negative effects possible’ and ‘Degree of effects not known’ in the scoping plan, the contents and method of environmental and social considerations survey were surveyed as shown in the table below.

Table 1-1.20 TOR for Environmental and Social Considerations Survey

Environmental Items	Survey Items	Survey Method
Water use	(1) Effects of water intake for the work on water resources (2) Domestic use state of groundwater	(1) a) Hearing from organizations concerned, b) survey of existing data (2) a) Site reconnaissance and hearing, b) survey of existing data
Existing social infrastructure and social services	(1) Confirmation of the effects caused by road improvement work (2) Well and water pipes installation state for domestic water supply, and measures to be taken, such as relocation, etc.	(1) a) Confirmation of the current use of road, b) work contents, work method, period, position, range, etc. c) site reconnaissance and hearing (1) a) Confirmation of current use of wells and water supply pipes, b) road design, work contents, range, c) site reconnaissance and hearing
Work environment (including occupational safety)	(1) Occupational safety measures in the construction site (2) In-service occupational safety measures (periodic inspection and maintenance)	(1) a) Occupational safety examples in the construction site of similar structure, b) Verification of bylaw and the occupational safety guideline of ADR (2) Verification of the occupational safety related bylaw and occupational safety guideline of ADR
Air pollution	(1) Confirmation of the effects caused by road improvement work	(1) a) Confirmation of the work content, work method, period, position, and range, b) confirmation of the type, operating position, operating period, etc. of construction machinery
Water pollution	(1) Groundwater quality (2) Groundwater domestic use state	(1) a) Hearing from organizations concerned, b) survey of existing data (2) a) Site reconnaissance and hearing, b) survey of existing data
Waste	(1) How to deal with construction wastes	(1) a) Hearing from organizations concerned, b) similar case surveys
Soil contamination	(1) Measures to prevent oil leakage during work	(1) a) Confirmation of the work contents, work method, period, position, range, b) Confirmation of the type, operating position, and operating period of construction machinery
Noise and vibration	(1) Distance from the source to the residential place (2) Confirmation of the effects by the road improvement work	(1) Site reconnaissance and hearing (2) a) Confirmation of the work contents, work method, period, position, range, b) Confirmation of the type, operating position, and operating period of construction machinery
Accident	(1) Distribution state of various facilities, such as residential place, hospitals, schools, and traffic state of surrounding roads. (2) Accident preventive measures, such as ban on access. etc. when the facilities are put into service	(1) Site reconnaissance (2) Confirmation of the work contents, location, etc. of guard rail, caution signs,

Source: Prepared by the Survey Team

1-1-5-1-7 Results of Environmental and Social Considerations Survey

The results of environmental and social consideration survey conducted in the site according to scoping are shown in the table below:

Table 1-1.21 Results of Environmental and Social Considerations Survey

Environmental Item	Results of Survey
Water use	Communities around the target area draw up groundwater partially for domestic use. As a result of hearing from Ministry of Agriculture, Fisheries, Livestock Farming, and Water Resources in charge of managing the wells, water supply from the neighboring wells is possible at a rate of 30 m ³ /h. Water necessary for the work will be supplied from the deep well to be newly drilled on about 3 km distanced from the well for the community close to the border. It is important to measure a groundwater level baseline of community well before the construction and monitor the groundwater level during the construction to keep the effects on the surrounding communities minimum. In addition, if the community well suffered water depletion, suspend construction work and consider another way of water supply.
Existing social infrastructure and social services	Since the traffic flow may be affected during road improvement, it is necessary to take measures, such as provision of a detour, etc. The detour route which total length is 21.66 m and one lane on one side will be installed along the target road, and since target road and all the surroundings are all national owned land, there is no privately owned land therefore environmental impact is hardly expected.
Work environment (including occupational safety)	In addition to the measures to ensure safety in the road improvement site, it is necessary to take safety measures related to in-service periodic inspection and maintenance of the road.
Air pollution	No large-scale work is assumed for road improvement, and fine dust is normally observed because this area is arid. Besides there is no facilities requiring specific considerations, such as a hospital, etc. in small communities found here and there in the neighborhood. Therefore, air pollution as an effect of fine dust from the work is expected to be small. It is essential however to take measures to keep minimum the effects on the surrounding communities during positioning of operating construction machinery and storage of equipment and machines.
Water pollution	There is no river or freshwater lake with running surface water in the neighborhood of the target area. Though surface water may flow into wadi temporarily during rainfall in the rainy season, the field survey and hearing from the Direction of Environment and Sustainable Development did not confirm the use of such surface water for domestic water and agricultural water. Considering the scale and contents of road improvement, it is almost inconceivable that the Project causes deterioration of water quality of surface found here and there temporarily.
Wastes	No large scale work is assumed. Wastes are expected to occur due to road improvement, such as wastes like asphalt removed from existing road pavement.
Soil contamination	Since no large scale work is assumed, serious soil contamination is not conceivable. However, due care must be taken to handle oil leakage or waste oil treatment for construction machinery.
Noise and vibration	Since small communities are found here and there in the neighborhood, due care must be taken to keep minimum the noise and vibration of construction machinery, such as a drilling machine, etc.
Accident	It is necessary to take the accident preventive measures around small communities during work so that no unauthorized person enter the site. It is also essential to take in-service measures against traffic accident because the traffic volume may increase after improvement of the road.

Source: Prepared by the Survey Team

1-1-5-1-8 Impact Evaluation

The table below shows the evaluation results of environmental impact on the basis of above environmental and social considerations survey.

Table 1-1.22 Scoping Plan and Survey Results

Class		Impact Evaluation During Scoping		Impact Evaluation based on Survey Results		Reason	
		Before Work During Work	In Service	Before Work During Work	In Service		
Social environment	1	Land acquisition, resettlement	D	D	N/A	N/A	
	2	The poor	D	D	N/A	N/A	
	3	Ethnic minorities • indigenous people	D	D	N/A	N/A	
	4	Regional economy, such as employment, means of living, etc.	D	D	N/A	N/A	
	5	Land utilization and utilization of regional resources	D	D	N/A	N/A	
	6	Water use	C	D	B-	D	During work: According to hearing on the data of the well water amount in the neighborhood of target area, water necessary for the work is available sufficiently from a new deep well. Besides the new deep well is positioned on the downstream side of groundwater direction, the possibility of causing groundwater depletion during work is small. Anyway due care must be taken to keep the effects minimum. In service: No effect assumed
	7	Existing social infrastructure and social services	B-	D	B-	D	During work: Temporary traffic regulation (bypassing or alternating traffic) is assumed during road improvement. In service: No effect assumed
	8	Social capital and social organization. such as regional decision-making organization, etc.	D	D	N/A	N/A	
	9	Uneven distribution of damage and benefit	D	D	N/A	N/A	
	10	Conflict of interest within the region	D	D	N/A	N/A	
	11	Cultural heritage	D	D	N/A	N/A	
	12	Landscape	D	D	N/A	N/A	
	13	Gender	D	D	N/A	N/A	
	14	Children’s rights	D	D	N/A	N/A	
	15	Infectious disease such as HIV/AIDS, etc.	D	D	N/A	N/A	
	16	Work environment (including occupational safety)	B-	B-	B-	B-	During work: Due care necessary on work environment of workers In service: Due care necessary on occupational safety during periodic inspection
Natural environment	17	Protected areas	D	D	N/A	N/A	
	18	Ecosystem	D	D	N/A	N/A	
	19	Hydrology	D	D	N/A	N/A	
	20	Topography and geology	D	D	N/A	N/A	
o n	21	Air pollution	B-	C	B-	D	During work: During road improvement, it is necessary to consider suppression of fine dust and

Class		Impact Evaluation During Scoping		Impact Evaluation based on Survey Results		Reason	
		Before Work During Work	In Service	Before Work During Work	In Service		
						exhaust gas emission from operating construction machinery, etc. In service: At present, certain amount of fine dusts are observed because of arid character of the place and the traffic amount of 1000 vehicles/day or more, so that the effect of road improvement is limited.	
	22	Water pollution	C	D	D	N/A	During work: Though surface water may flow into wadi in the neighborhood of target area temporarily during rainfall in the rainy season, the use of such surface water could not be confirmed. Since no large-scale work is assumed for road improvement, it is almost inconceivable that the Project causes deterioration of water quality of surface found here and there temporarily.
	23	Waste	B-	D	B-	N/A	During work: It is expected that construction waste such as asphalt and concrete by removing of existing road is produced, thus it is necessary to dispose them in place along the target section designated by ADR them appropriately, after crushing them at the construction site. (Specific place is designated by ADR after D / D)
	24	Soil contamination	C	D	B-	N/A	During work: Soil contamination possible due to oil leakage from the construction machinery. It is necessary to take measures, such as periodic inspection, etc.
	25	Noise and vibration	B-	C	B-	N/A	During work: Noise and vibration expected from the operating construction machinery. It is necessary to use the equipment with small noise or to select the appropriate work hours.
	26	Subsidence	D	D	N/A	N/A	
	27	Odor	D	D	N/A	N/A	
	28	Sediment	D	D	N/A	N/A	
Others	29	Accident	B-	C	B-	B-	During work: Due care must be taken to prevent entry of residents into the work site and to prevent accident of work-related vehicles In service: Traffic safety measures are necessary because the traffic accident may increase due to increase in the traffic volume and in the traveling speed.
	30	Cross-border effects and climate change	D	D	N/A	N/A	

Ranking

A+/-: Significant positive/negative effects possible

B+/-: Not significant, but certain degree of positive/negative effects possible

C: Degree of effects not known. (Further survey is necessary. The degree of effects is identified in the course of survey.)

D: Effects not assumed

Source: Prepared by the Survey Team

1-1-5-1-9 Costs for Mitigation Measures and Implementation of such Mitigation Measures

Cost distribution for mitigation measures and implementation of such mitigation measures is shown in the table below.

Table 1-1.23 Cost for Mitigation Measures and Implementation of Mitigation Measures

No	Impact Item	Mitigation Measures (Draft)	Implementing Agency	Responsible Organization	Cost
1	Water use	During work: Developing a new deep well about 3 km distance from the community, Measuring deep well water level before construction, Periodic monitoring of well water level. If community well suffered water depletion, suspend construction work and consider another way of water supply.	Contractor/ ADR	ADR	Included in the total project cost
2	Existing social infrastructure and social services	During work: Securing the traffic flow by providing detour during road improvement	Contractor	ADR	ditto
3	Work environment (including occupational safety)	During work: Provision of safety equipment such as helmet and/or barricade to prevent work accident, safety training for workers In service: Provision of safety equipment to prevent work accident, training for workers by means of periodic inspection and maintenance manual	Contractor/ ADR	ADR	Included in the total project cost, and the annual facilities administration costs of ADR
4	Air pollution	During work: Reduction of fine dusts by periodic water spraying around the community (approximately three times a day), by providing protective sheet. Reduction of nitrogen oxide generation by efficient operation of construction machinery	Contractor	ADR	Included in the total project cost
5	Waste	During work: It is expected that construction waste such as asphalt and concrete by removing of existing road is produced, thus it is necessary to dispose them in place along the target section designated by ADR them appropriately, after crushing them at the construction site. (Specific place is designated by ADR after D / D)	Contractor	ADR	ditto
6	Soil contamination	During work: Work around community to be executed only in daytime. Periodic maintenance and inspection of heavy machinery and office vehicles	Contractor	ADR	ditto
7	Noise and vibration	During work: Periodic maintenance and inspection of heavy machinery and office vehicles	Contractor	ADR	ditto
8	Accident	During work: Guard staffs to be deployed at the entrance/exit of trucks and work-related vehicles into ordinary road In service: Guard rail and caution signs to be installed	Contractor/ ADR	ADR	ditto

Source: Prepared by the Survey Team

1-1-5-1-10 Environmental Management Plan, Monitoring Plan

The Project is to improve the existing road and no large-scale work is expected. But such effect is limited. To mitigate the impacts on the existing social infrastructure and services during work, to ensure thorough execution of safety measures in the work site, and to suppress generation of air pollution and wastes, it is essential that the construction agreement documents contain adequately the specifications of work method and the items of monitoring to be undertaken with the responsibility of the contractor. It is also essential to establish the construction management system ensuring reliable monitoring.

The monitoring plan of the Project is shown below.

Table 1-1.24 Monitoring Plan

Environment Item	Item	Location	Frequency	Method	Responsible Organization
[During work]					
Approval and license, explanation to local residents	Comments from the government agency and residents and communities	Communities around the target area, and work site	Once/month	Hearing	ADR
Water use	Water level of groundwater	Work site	Once/month	Simple measuring instrument, hearing	ADR
Existing social infrastructure and services	Traffic flow	Work site	Once/month	Visual method and hearing	Contractor
Work environment	Implementation status of Safety measures	Work site	Once/month	Hearing	Contractor
Air pollution	Implementation status of Suppression of fine dusts (water spraying three times a day)	Work site on the underground line	Twice/month	Visual method and hearing	Contractor
Waste	Waste treatment status	Work site	Twice/month	Hearing	Contractor
Soil contamination	Implementation status of Waste soil treatment	Work site	Twice/month	Hearing	Contractor
Noise and vibration	Noise	Residential area around work site on the underground line	Twice/month	Simple measuring instrument, hearing	Contractor
Accident	Implementation status of Traffic safety measures	Entry/exit of work-related vehicles to the ordinary road	Twice/month	Visual method and hearing	Contractor
[In service]					
Work environment	Safety measures	Target road	Twice/year	Hearing	ADR
Accident	Installation condition of Safety measures	Target road	Twice/year	Visual method and hearing	ADR

Source: Prepared by the Survey Team

1-1-5-1-11 Consultation among Stakeholders

Consultation was made among Dikhil Governor, Yoboki village chief, and Survey Team on April 25 2018, where the Project contents were shared. Full cooperation was provided for the Project, including explanation to local residents, securing of waste disposal site, etc. Communication to residents was determined to be done by the Dikhil Governor and Yoboki village chief. Discussions were held several times between Ministry of Habitat, Urban Planning, and Environment and Ministry of Agriculture, Fisheries, Livestock Farming, and Water Resources to share the Project contents and exchange opinions. They presented no particular objections and were cooperative.

On the basis of above review items and the latest local situation, ADR decided the design policy. At a time of the second field survey of the Project preparatory survey, that is, when DFR presented explanation and discussion, the final design and specifications of the Project were provided to ADR. Before work start, ADR should explain the Project outline, project validity, results of study of alternative plans, expected negative effects, etc. for environmental and social consensus building. It is recommended to hold the stakeholder meeting to establish the Project implementation system, Major stakeholders are as follows.

Table 1-1.25 Major Stakeholders of the Project

Major stakeholders	
Central government agencies	ADR (Ministry of Equipment and Transport) Ministry of Agriculture, Fisheries, Livestock Farming, and Water Resources Ministry of Habitat, Urban Planning, and Environment
Related organization	Telecommunication Corporation Dikhil Governor, Yoboki village chief

Source: Prepared by the Survey Team

1-1-5-2 Land Acquisition and Resettlement

1-1-5-2-1 Necessity of Land Acquisition and Resettlement

As described in 1-1-5.4 “Comparative review of alternative plans” and 1-1-5.5 “Scoping,” the Project does not require acquisition from private land at all because the partial widening of the road as well as access road for the work site and construction equipment storage are all within the premises of the existing road or government-owned land. Since there is no buildings in the vicinity of the target road, there is no possibility of residents relocation at all.

1-1-5-2-2 Legal Framework concerning Land Acquisition

The land of Djibouti is roughly classified into the registered land (*terres immatriculées*) and unregistered land (*terres non immatriculées*). The former is the land owned by individual persons, legal entities, or the government while the latter is vacant lands without owners (*terres vacantes et sans maître*). The latter is considered belonging to the nation. The registered land is the one transferred from the country and is thus provided with permanent ownership. The authority of the land management is assigned to the Department of domains and land retention (*Direction des domaines et de la conservation foncière*), Ministry of Budget, which is in charge of management of registered land, management of national land including vacant land, and oversees lotting-out and registration. Note that mapping of registered land for management is made only for urbanized areas in Djibouti City.

Unregistered land may include those whose possessory right is temporary assigned to the individual person or legal entities by the local government (Prefecture). The ownership of such land with approved temporary possessory right is after all in the hand of government, and no permanent structure can be constructed there. Since the temporary possessory right can be assigned independently by the prefectural authorities without making inquiry to the central government agencies, so that the Department of domains and land retention cannot grasp the state of such assignment. Though the Prime Minister’s Office instructed the local authorities to stop such assignment of temporary possessory right in 1997, such assignment is still under way customarily. Note that temporary possessory right is allowed on condition that the approved structure is installed within three months.

When ADR is to acquire the easement of any unregistered land (national land) for road, ADR must first check at the local authorities for the land with temporary possessory right, perform compensation if there is any possessor, and apply to the Department of domains and land retention. In response to application from ADR, the Bureau drafts the Executive Order concerning assignment

of the easement and presents it before discussions in the Prime Minister’s Office. The draft finally becomes effective after signature by the President. On the other hand, for expropriation of registered land, ADR will prepare the inventory of lands concerned and apply for land expropriation to the Bureau. In response to application from ADR, the Bureau drafts the Executive Order and presents it before discussions in the Prime Minister’s Office. The draft finally becomes effective as the Executive Order concerning land expropriation after signature by the President. Land expropriation can now be implemented. According to the Bureau, about one month will be necessary, in the case of acquisition of easement, from application to the effectuation of the Executive Order and about one month will be necessary, in the case of acquisition of private land, from application to the effectuation of the Executive Order.

The land acquisition related legal system of Djibouti is shown below.

Table 1-1.26 Land Acquisition related Legal System of Djibouti

Class	Laws
Laws	Fixing the procedures for the application of the laws relating to land tenure Law No.178/1991 Loi n° 178/AN/91 2eL fixant les modalités d’application des lois relatives au régime foncier
	Organization of land ownership Law No.177/1991 Loi n° 177/AN/91 2eL portant organisation de la propriété foncière
	Organization of the private domain of the State Law No.173/ 1991 Loi n° 173/AN/91 2eL portant organisation du domaine privé de l’État
	Regulating expropriation for public purposes Law No.172/1991 Loi n° 172/AN/91 2eL réglementant l’expropriation pour cause d’utilité publique
	Fixing and organizing the public domain Law No.171/1991 Loi n° 171/AN/91 2eL portant fixation et organisation du domaine public
Bylaws	Defining the attributions and the composition of the National Commission of the Property Ownership Bylaw No.469/2012 Arrêté n°2012-0469/PR/SECL définissant les attributions et la composition de la Commission nationale de la Propriété Foncière
	Final concession of all the subdivisions of the capital Bylaw No.500/2010 Arrêté n°2010-0500/PR/MEFPCP relatif à la concession définitive de l’ensemble des lotissements de la capitale

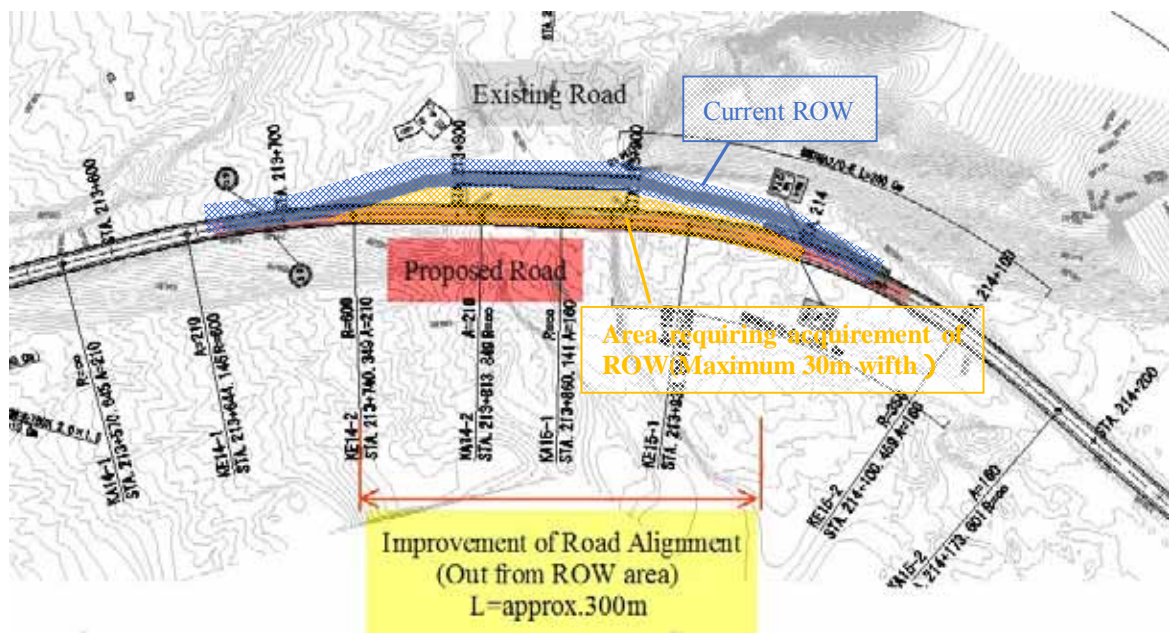
Source: Prepared by the Survey Team

1-1-5-2-3 Scale and Scope of Land Acquisition and Resettlement

Though the road width is not to be stipulated legally, ADR plans to set the basic width of the Project to 11.5 m. The existing right-of-way (ROW) has a width of a total 50 m, 25 m from the road centerline on one side, and most of the sections for road improvement of the Project fall within this scope. For the section (PK213+740 to PK214+040) about 300 m from the end point at Galafi (PK 217+890) up to to 3.85km to 4.15km points, the alignment is proposed to be improved along with new construction of river-crossing structure, so that maximum about 30 m width in this section will be out of ROW. Namely, ADR must request assignment of easement of this section to the Bureau, It is already confirmed that there is no resident around the section for which the easement must be assigned newly. Prior to application, ADR should ask Prefectures of Djibouti and Dikhil to confirm that no temporary possessory right is assigned to the above land. Later on, ADR is to execute the procedure of acquiring the easement for the required section by requesting by writing the Bureau. This procedure must be taken by commencement of the work.

The location requiring acquirement of the easement by taking procedure to the Bureau is shown

below.



Source: Prepared by the Survey Team

Figure 1-1.20 Section Requiring Acquisition of the Easement for ROW in the Project

1-1-5-2-4 Others

(1) Complaint Handling Mechanism

When the residents or communities around the target road present complaint during implementation of the Project, ADR, the implementing Agency, should identify the appropriate person in charge of complaint prior to construction to ensure rapid handling acceptable to the affected residents.

The complaint handling procedure must be thoroughly communicated to enable quick response to complaining affected residents. (For example, if the notice letter is handed over to illiterate person, a reliable intermediary should explain details orally). The person in charge of complaint handling is obliged to inform his own name and address to all affected residents and take, with his responsibility, appropriate measures for any complaint from affected residents.

The residents and communities lodge a complaint against ADR, if they have any complaint during implementation of the Project. The implementing Agency should identify the detail of complaint as soon as it accepts and conduct a study on the solution, after verifying a fact and cause. When a solution issued by the person in-charge of complaint is agreed by the residents or communities, implement the solution and verify result. On the other hand, if the residents and communities are not satisfied with the solution given by the person in-charge of complaints, the affected residents or communities can lodge a complaint in court.

(2) Proposed Monitoring Form

For the monitoring items needed in the Project, ADR should report the monitoring results periodically on the basis of report from the contractors during the work period and by implementing, with its responsibility, environmental measurement, hearing, etc. when the Project is put into service.

The in-service report period will be one year after opening for service.

The proposed monitoring form related to the Project is shown below.

[During work]

1) Approval and license, explanation to residents

Monitoring item	State during report period
Response to comments from residents and communities	
Response to comments from government agencies	

2) Water use (groundwater)

Monitoring item (unit)	Baseline	Measurement	Remarks (Measurement location, frequency, method)
Water amount supplied from the well of village and communities (- m)			
Monitoring item	State during report period		
Response to comments from residents and communities			

3) Existing social infrastructure and services (traffic flow)

Monitoring item	State during report period
Traffic regulation, deployment of staff, etc. at the road crossing point during work	
Response to comments from residents and communities	

4) Work environment (safety measures)

Monitoring item	State during report period
Safety measures, work accident in the work site	
Response to comments from the field workers	

5) Air quality (implementation status of suppression of fine dusts)

Monitoring item	State during report period
Suppression of fine dusts at work site by water spraying three times a day at construction site)	
Response to comments from residents and communities	

6) Waste

Monitoring item	State during report period
Construction wastes (including construction waste soil) disposal process based on EMP	

7) Soil contamination (implementation status of soil contamination treatment)

Monitoring item	State during report period
Periodic inspection of construction machinery	
Waste oil treatment	

8) Noise and vibration (noise)

Item (unit)	Measured value (average)	Measured value (maximum)	Local standard	Referenced international standard (WHO)	Remarks (measurement location, frequency, method)
Noise (dB)	50dB	70dB	70dB	70dB	

Monitoring item	State during report period
Response to comments from residents and communities	

9) Accident (implementing status of traffic safety)

Monitoring item	State during report period
Traffic safety measures at entry/exit of work-related vehicles to the ordinary road	
State of traffic accident attributed to the work	

[In service]**1) Work environment (safety measures)**

Monitoring item	State during report period
Safety training to periodic inspection and maintenance workers	
Accident occurrence state during periodic inspection and maintenance	

2) Accident (installation condition of safety equipment)

Monitoring item	State during report period
Safety measures in the transmission facilities (guard rail, caution sign)	
Event of entry of unauthorized personnel	

(3) Environment Check List

The following environment check list has been prepared jointly by ADR and the Survey Team.

Noted that it is not confirmed by JICA and ADR on content of 1-1-5 Environmental and Social Consideration.

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)N (b)- (c)- (d)N	(a) Preparation of EIA is not required by the regulation of Djibouti. IEE will be prepared if MHUE judged it necessary. Implementing agency (ADR) need to confirm whether IEE is required or not for MHUE on document soon after the design and construction method are clarified. (b) N/A (c) N/A (d) Nothing is required.
	(2) Explanation to the Local Stakeholders	(a)N (b)N	(A) Local stakeholders meeting will be conducted by the implementing agency (ADR) before or during design period. (B) Comments from local stakeholders will be taken into account in the design. It has already explained for prefectural governor and village leader on the project and there was no objection or comment for the project.
	(3) Examination of Alternatives	(a)N	(a) There is no alternative plan because the project is just improving the existing road and bridge.
2 Pollution Control	(1) Air Quality	(a)N (b)N	(a) It is expected to increase the traffic volume and also increase pollutant emissions by road improvement, however the amount of them are assumed small thus it is not expected over environmental standards. In addition, the target roads are located out of urban area, therefore impact for neighborhood residents is small. (b) There is no industrial area along the target road.
	(2) Water Quality	(a)N	(a) Although it is expected filling soil at some section, impact by soil runoff is not expected since target road locate in flat area.
		(b)N	(b) It is not expected contaminate water sources, such as groundwater by the project.
		(c)N	(c) There are no plan to construct parking area and service area.
(3) Wastes	(a)N	(a) There are no plan to construct parking area and service area.	
(4) Noise and Vibration	(a)N	(a) Level of noise and vibration is not expected significantly over national standard. Also target road locate out of urban area, thus impact is expected small. The implementing agency (ADR) will monitor if needed.	
(1) Protected Areas	(a) Is the project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	(a)N	(a) The target road is not located in protected area.

7. 道路/Road

Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
(2) Ecosystem	<p>(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)?</p> <p>(b) Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions?</p> <p>(c) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem?</p> <p>(d) Are adequate protection measures taken to prevent impacts, such as disruption of migration routes, habitat fragmentation, and traffic accident of wildlife and livestock?</p> <p>(e) Is there a possibility that installation of roads will cause impacts, such as destruction of forest, poaching, desertification, reduction in wetland areas, and disturbance of ecosystems due to introduction of exotic (non-native invasive) species and pests? Are adequate measures for preventing such impacts considered?</p> <p>(f) In cases the project site is located at undeveloped areas, is there a possibility that the new development will result in extensive loss of natural environments?</p>	<p>(a)N</p> <p>(b)N</p> <p>(c)N</p> <p>(d)N</p> <p>(e)N</p> <p>(f)N</p>	<p>(a) The target road does not pass ecological sensitive area.</p> <p>(b) The target road does not pass protected or valuable species.</p> <p>(c) Adverse impact on the ecosystem is not expected.</p> <p>(d) It is not expected disruption of migration route and habitat fragmentation of wildlife and livestock.</p> <p>(e) It is not expected deforestation, desertification and disturbance of ecosystem etc.</p> <p>(f) The target road is not located in the undeveloped areas.</p>
(3) Hydrology	<p>(a) Is there a possibility that alteration of topographic features and installation of structures, such as tunnels will adversely affect surface water and groundwater flows?</p>	<p>(a)N</p>	<p>(a) It is not expected a large amount of water use by the project.</p>
(4) Topography and Geology	<p>(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?</p> <p>(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?</p> <p>(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?</p>	<p>(a)N</p> <p>(b)N</p> <p>(c)N</p>	<p>(a) There is no soft ground around the target road.</p> <p>(b) The target road locate in flat area, slope failures and landslides are not expected.</p> <p>(c) Soil runoff is not expected by the project.</p>

7. 道路/Road

Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
(1) Resettlement	<p>(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement?</p> <p>(b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement?</p> <p>(c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement?</p> <p>(d) Are the compensations going to be paid prior to the resettlement?</p> <p>(e) Are the compensation policies prepared in document?</p> <p>(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?</p> <p>(g) Are agreements with the affected people obtained prior to resettlement?</p> <p>(h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan?</p> <p>(i) Are any plans developed to monitor the impacts of resettlement?</p>	<p>(a)N</p> <p>(b)-</p> <p>(c)-</p> <p>(d)-</p> <p>(e)-</p> <p>(f)-</p> <p>(g)-</p> <p>(h)-</p> <p>(i)-</p>	<p>(a) Involuntary resettlement and land acquisition are not expected since it is existing road improvement project.</p> <p>(b) N/A</p> <p>(c) N/A</p> <p>(d) N/A</p> <p>(e) N/A</p> <p>(f) N/A</p> <p>(g) N/A</p> <p>(h) N/A</p> <p>(i) N/A</p>
(2) Living and Livelihood	<p>(a) Where roads are newly installed, is there a possibility that the project will affect the existing means of transportation and the associated workers? Is there a possibility that the project will cause significant impacts, such as extensive alteration of existing land uses, changes in sources of livelihood, or unemployment? Are adequate measures considered for preventing these impacts?</p> <p>(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?</p> <p>(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?</p> <p>(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)?</p> <p>(e) Is there any possibility that roads will impede the movement of the inhabitants?</p> <p>(f) Is there any possibility that structures associated with roads</p>	<p>(a)N</p> <p>(b)N</p> <p>(c)N</p> <p>(d)N</p> <p>(e)N</p> <p>(f)N</p>	<p>(a) It is not expected that significant negative impact caused by target road improvement sub-projects.</p> <p>(b) It is not expected adverse impact to the living conditions.</p> <p>(c) It is not expected immigration workers from outside in the sub-projects.</p> <p>(d) It is not expected adverse impact such as traffic congestion and accidents.</p> <p>(e) It is not expected to affect the movement of inhabitants.</p> <p>(f) The sub-projects are road improvement, so it is not expected new sun shading</p>
(3) Heritage	<p>(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?</p>	<p>(a)N</p>	<p>(a) There is no local archeological, historical, cultural, and religious heritage around the target road.</p>
(4) Landscape	<p>(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?</p>	<p>(a)N</p>	<p>(a) It is not expected adverse impact to landscape.</p>

± Social Environment

7. 道路/Road

Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
4 Social Environment	(5) Ethnic Minorities and Indigenous Peoples	(a) Y (b) Y	(a) It is not expected negative impacts on the culture and lifestyle of ethnic minorities and indigenous people. (b) The negative impacts on the rights of land and resources, etc. are not expected.
	(6) Working Conditions	(a) N (b) Y (c) Y (d) Y	(a) All the plan, design and construction are considered with respecting relevant laws of Djibouti. (b) The implementing agency (ADR) is responsible for measures of safety consideration and a contractor also has to be taken into consideration. (c) Implementing agency (ADR) and contractor will consider and take measures of intangible measures such as safety and health program and training for workers. (d) Implementing agency (ADR) and contractor will consider the allocation of appropriate security guard.
	(1) Impacts during Construction	(a) Y (b) Y (c) Y	(a) The implementing agencies (ADR) and contractors will take mitigation measure against pollution. (b) It is not expected negative impact for the natural environment. The implementing agencies (ADR) will set adequate measure to reduce impact, if needed. (c) It is not expected negative impact for social environment. The implementing agencies (ADR) will set adequate measure to reduce impact, if needed.
5 Others	(2) Monitoring	(a) Y (b) Y (c) Y (d) Y	(a) Monitoring plan have been developed. The implementing agency (ADR) will implement it during construction. (b) Monitoring plan and sheet have been prepared. The implementing agency (ADR) and contractor will update them if necessary. (c) The implementing agency (ADR) and contractor will establish the monitoring system before start construction. (d) Reporting of the method, frequency, etc. will be decided before start construction.
	Reference to Checklist of Other Sectors	(a)- (b)-	(a)- (b)-
6 Note	Note on Using Environmental Checklist	(a)-	(a)-

1-2 Background and Outline of Grant Aid

Djibouti with a population of about 993,000 (2017, DISED) is a geopolitically important country facing the Gulf of Aden at the inlet of the Red Sea. With Ethiopia continuing economic growth at an annual rate of 10% these days in the hinterland, Djibouti Port supports the central government finance by its port revenue and acts as a start point of Djibouti Corridor, the physical distribution network toward Ethiopia. Djibouti Port functions as a gateway of the region.

Of four axes of the Five-year Plan “Strategy of Accelerated Growth and Promotion of Employment (2015 – 2019) (hereinafter referred to as “SCAPE”), which is the implementation strategy of the national development plan of Djibouti, the “Economic Growth through Economic Infrastructure Development and Strengthening of Competitive Power of Private Sector” was highlighted as the first axe. And the highlighted vital strategy in the transport sector included promotion of development of highly competitive international physical distribution network and improvement of domestic transport network to promote domestic regional development and disparity adjustment. However, the pavement ratio of 1,194 km national road is only 43% (source: Preparatory Survey Report for “Road Management Equipment Development Project (2016).” SCAPE considers it important issues to enhance the pavement ratio and to improve the road conditions.

RN1 of Djibouti is the most vital trunk road in length of 219 km connecting Capital Djibouti in which Djibouti Port is located to Galafi on the border to Ethiopia, though which more than 90% of import cargoes of Ethiopia pass (source: Data Collection Survey for Djibouti Corridor report (2017). RN1 is an arterial road of Djibouti Corridor. Though RN1 is entirely paved, there are excessively increasing number of pot holes, shoulder damage, break-away of pavement, etc., which are due to increase in passing vehicles by two times (as estimated by ADR from the customs information) at Galafi on the border during 4 years from 2013 to 2017. In particular, around Galafi, traffic congestion occurs that is caused by customs clearance services. Large trucks are to run over the pavement edges to avoid stopped vehicles, accelerating shoulder damages. This in turn requires time for passage and results in failure of securing the safe traveling of large trucks. In this context, the Project to improve the bottleneck section of RN1 that plays a nucleus role in Djibouti’s international physical distribution network may be positioned as contributing to strengthening of the international physical distribution as intended by SCAPE.

In response to the above situation, the Government of Djibouti issued, in December 2017, an official request for the Grant Aid for the improvement of RN1 to Japan.

In response to the request, Japan International Cooperation Agency conducted the preparatory survey for Grant Aid.

1-3 Trends of Japanese Assistance

(1) Japan’s Assistance Policy

Djibouti is strategically situated for marine transportation connecting Asia, Africa and Europe. Even in the unstable African Corner, it has maintained stability since the peacebuilding in 2001 and it has good foreign relations with Japan and other countries. The Djibouti Port is also one of the main

distribution bases in East Africa to Ethiopia and South Sudan and other neighboring nations and the country plays a critical role for continuing a steady economic growth in East Africa that promotes economic integration and partnership. Japan regards ODA to the country is significant as it will help solve the various domestic challenges, promote stability and development, and contribute to stable development of international economy including East Africa and Japan.

As the country is a distribution base in East Africa and actively tackling such international challenges as antipiracy measures. Japan takes the following three areas as the focal areas:

- I. Economic and social infrastructure development for sustainable growth.
- II. Capacity building to support economic and social development.
- III. Promotion of efforts for regional stability.

The Project coincides with “I. Economic and social infrastructure development for sustainable growth” among the three focal areas mentioned above.

(2) Related Assistance Plans by Japan

Table 1-3.1 below provides a summary of past projects similar to the Project.

Table 1-3.1 Similar Projects Implemented by Japan.

Project Title	Fiscal Year (Project Cost)	Implementing Agency	Project Summary	Note
Road Equipment improvement Project of Djibouti (tentative title) (ordinary grant aid)	Fiscal Year 1993 (About 6.2 billion yen)	Ministry of Public Works · Urban Planning and Housing	Procurement of road maintenance equipment (bulldozers, wheel loaders, motor graders, tire rollers, vibratory rollers, water trucks, dump trucks, concrete mixers, etc.)	Subjects for road maintenance equipment: Maintenance and management of roads implemented by the Public Works Bureau, improvement of gravel roads, maintenance of drainage and sewerage paths in urban areas
Road Equipment improvement Project of Djibouti (tentative title) (ordinary grant aid)	Fiscal Year 1996 - 1998 (About 20.6 billion yen)	Ministry of Public Works · Urban Planning and Housing	Road maintenance (RN1 and RN2) Procurement of equipment for road maintenance (vibrating rollers, watering cars, workshop tools, supplementary parts)	Total extension of roads to be improved (13.63 km [RN1: 5.1 km, RN2: 8.53 km])
The Project for Improvement of Road Management Equipment (ordinary grant aid)	Fiscal Year 2015 (About 1.239 billion yen)	Facilities Department of Transportation and Road Bureau	Road maintenance equipment (Bulldozer, Excavator, Wheel loader, Motor grader, Asphalt finisher, Dump truck, Asphalt plant etc.) and Workshop equipment (Electric welding machine, Alternator · Starter testing machine etc.)	Road maintenance equipment subject: road maintenance and implementation of road stations and gravel pavement road maintenance

Source: Prepared by the Survey Team

1-4 Assistance Trends of Other Donors

The donor activities in the road and transportation fields related to this program are as follows.

Table 1-4.1 Activities of International Organizations and Other Donors
(Roads and Transport Areas)

Organization	Target Area	Summary
World Bank	Djibouti city	Infrastructure renovation project including roads in District 7 in Djibouti City. It is currently underway to be completed by 2019.
EU	RN (Arta - Mouloud)	Road renovation project of 52 km section from Arta to Mouloud (branch point with RN5) along RN1. The project has been completed in 2015. As the RN1 section is the most recently renovated part, it is a section where the pavement situation is good within the national highway of 219 km.
Kuwait	RN 11	This road is parallel to the north side of RN1, and this project is positioned as an international trunk road leading to Ethiopia. Currently it is in the planning stage, design section, time, project cost etc. are undecided yet.
China	Southern Djibouti	The railway train connecting the Ethiopian capital Addis Ababa and Djibouti. It has already started operation in February 2018.

Source: ADR

CHAPTER 2

CONTENTS OF THE PROJECT

Chapter 2 Contents of the Project

2-1 Basic Concept of the Project

2-1-1 Superior Objective and Project Goals

RN1 of Djibouti is the most vital trunk road in length of 219 km connecting Capital Djibouti where Djibouti Port is located to Galafi on the border to Ethiopia, and it is the main artery of Djibouti corridor where more than 90% of import cargoes from Ethiopia pass (Source: Data Collection Survey for Djibouti Corridor report 2017). Though RN1 is entirely paved, there are excessively increasing number of pot holes, shoulder damage, releveling of pavement, etc., which are due to increase in passing vehicles by two times (as estimated by ADR from the customs information) at Galafi on the border during 4 years from 2013 to 2017. In particular, around Galafi, traffic congestion occurs that is caused by customs clearance services. Large trucks are to run over the pavement edges to avoid stopped vehicles, accelerating shoulder damages. This in turn requires time for passage and results in failure of securing the safe traveling of large trucks.

The Government of Djibouti has developed a long-term development plan, “Vision Djibouti 2035,” and a medium-term plan, SCAPE, covering the period from 2015 to 2019. The latter plan proposes development of a competitive international physical distribution network for the transport and traffic sector, aiming at increasing the national road asphalt paving rate up to 82% by 2019. In this context, the Project to improve the bottleneck section of RN1 that plays a nucleus role in Djibouti’s international physical distribution network may be positioned as contributing to strengthening of the international physical distribution as intended by SCAPE.

To contribute to achieving the superior objective, the Project aims at smoothing of the traffic in the surrounding area of the border and at improvement of accessibility to the outside of the region by undertaking the road improvement of the particularly damaged portion near the border within 100 km section from Dikhil to the border to Ethiopia in RN1 where pavement is being increasingly damaged.

2-1-2 Outline of the Project

To achieve the above Project goals, the Project will be undertaken for the 20.69 km target section (see the location map in the first page) from the point of the Ethiopia border toward Yoboki. Within the target section, the existing ford-crossing structure that has caused flooding during rain to make passage impossible will be renewed to box culvert structures and, in addition, various ancillary facilities will be provided to ensure the traffic safety, achieving the high-level international trunk road enabling all-weather travelable road. It is expected that the passengers and cargoes increase, the required traveling time will be reduced, the period when the traffic is impossible is eliminated, and the safe traffic space is secured in the target area.

Table 2-1-1 shows the outline of input of the Project.

Table 2-1.1 Outline of the Input of the Project

Item	Input
Road improvement with hot mix asphalt (excluding the area around the border)	20,275m
Road improvement near the border facilities by cement concrete pavement	415m
Development of the river-crossing structure (box culvert) of wadi	7 points
Development of the stormwater drainage facilities (box culvert)	33 point
Development of ancillary facilities, such as signs, guard rails, road marking, etc.	1 set

Source: Prepared by the Survey Team

2-2 Outline Design of the Japanese Assistance

2-2-1 Design Policy

(1) Basic Policy

For the target road section, about 20 km will be covered by the Project, with sections established according to two conditions as follows:

- The end point of development section will be a point on the border to Ethiopia.
- The start point of development section will be established at a 20 km point along the existing road from the above end point. This point will be set within a straight section allowing safe transition.

On the basis of conditions described above and after negotiation with the Djiboutian counterpart, the basic policy will be to undertake the improvement of existing road within the above section, with the Project start point at 20.69 km from the point on the border to Ethiopia toward Yoboki. (For the result of alignment comparison with the new route, see 2-2-4-2 Facilities Plan (1) Alignment plan).

For the road structure of the target section, the hot mix asphalt pavement generally employed due to construction material procurement and construction situations in Djibouti will be chosen. Note that, in certain sections passing through the border facilities, the concrete pavement proving highly resistive against static load to be applied repeatedly on the pavement surface will be used. This is because wheel action, etc. is normally observed while large vehicles are running with low speed or are stopped during traffic congestion by vehicles waiting for customs clearance. It is also planned to introduce the refuge lane for certain section causing traffic congestion in the neighborhood of the customs office, thereby mitigating traffic congestion.

(2) Policy Concerning natural Environmental Conditions

The Republic of Djibouti in which the Project is to be implemented has two seasons: the dry season from May to September and the wet season from October to April. Since the annual rainfall is extremely small at about 150 mm, project implementation is considered not much affected even in the wet season. On the other hand, the June – August period is the intensely hot season causing

execution of the construction work in the extremely severe environment in the area concerned. Therefore, it is essential to establish a construction plan while taking into account decrease in the construction speed, restriction of the work contents, etc. Table 2-2.1 shows the monthly mean temperature data.

Table 2-2.1 Monthly Mean Temperatures

Unit : °C

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean max. temperature	29.8	31.0	32.2	34.2	38.2	41.7	43.9	43.3	39.3	35.1	32.2	30.7
Mean min. temperature	21.6	22.5	24.0	25.5	27.1	29.4	31.2	30.7	28.9	25.7	23.1	21.7
Mean temperature	25.1	25.6	27.0	28.8	31.0	33.6	36.0	35.1	32.6	29.3	26.9	25.6

Source : Data of the National Meteorological Observatory in Djibouti Airport (2002 to 2012)

(3) Policy concerning Construction/Procurement Situations

Djibouti has no standard concerning the road design, so that the Project will apply the Japanese standard respectively to the geometric design, pavement design, drainage design, and structural design. For the type of signs and road markings, the French standards as employed conventionally will be followed.

Concerning the situations of procuring construction equipment and materials in Djibouti, leasing companies and market are extremely limited. It is a common practice to import the construction equipment and materials from foreign countries (Europe and America, Dubai, Ethiopia, China, etc.) for each project. Accordingly, the construction equipment and materials will be planned while taking into account the possibility of local procurement and the procurement costs.

There are no accommodation facilities for the Japanese and third-country work staffs to live in the neighborhood of the site. Before commencement of the work, it is necessary to consider establishing the work camp complete with the accommodation facilities and other living environment. Moreover, there is no medical facilities around the site, and the nearest hospital is within Dikhil City. The system must therefore be established to ensure the minimum first-aid and emergency transport of patients in case of medical crisis and injured personnel.

(4) Policy on the Operation and Maintenance

The Dikhil Compound of ADR (Direction des Travaux) is in charge of the maintenance of the target section. This base is about 80 km distanced from the start point of the target section, and it will take about four hours one way due to poor road conditions. The policy will basically focus on mitigation of the maintenance burden after road development as much as practicable.

In the context of mitigating the burden of maintenance, the policy to be taken into account in design of various facilities will be as follows:

To prevent early deterioration and damage of pavement, the road design involves establishment of the pavement composition on the basis of survey results on the axle load. To improve the resistance against fluidity, wear, and raveling, and to enhance adhesion to aggregates, and deflection traceability, on the other, the road surface design uses modified asphalt to achieve the pavement superior in durability.

For a part of section passing through the border facilities, substantial reduction of the maintenance cost will be attempted by employing a concrete pavement (maintenance free for 50 years) highly resistive against static load.

In the river-crossing structure design, the box culvert bottom plate is provided with the grade enough to prevent accumulation of soils and steel pipes will be arranged to the front of its bulkhead to protect is from direct collision of flowing stones, minimizing the impact on the structure.

(5) Policy concerning the Grade of the Facilities

The international physical distribution network superior in serviceability and durability will be established while securing the sufficient width and pavement compositions and by taking into account the significance of RN1, impact of damage, traffic characteristics comprising mainly large cargoes, etc.

(6) Policy concerning the Construction/Procurement Methods, and Construction Schedule

The policy concerning the construction and procurement methods and the construction schedule of the Project is shown below:

- To construct a detour so as to construct the target road without affecting the traffic flow of the existing road using materials available in the field, and to ensure safe, adequate and economic construction.
- To prepare a construction plan by taking construction materials readily procured locally in the neighborhood of target area into account.
- To establish an efficient construction schedule by considering the scope of the work to enable easy material procurement and simultaneous construction, in addition to the construction plan schedule for early commencement.
- To plan the facilities that do not require any special construction machinery or technology will be planned by taking into account the maintenance capability of recipient country.
- To thoroughly consider the social environment and securing of the traffic safety for development of a construction plan.

Among work materials described above, those procurable locally will be water and crushed stone. The following points will be taken into account on the basis of situations around the target area and the contents of the work.

As the target area is the arid desert area except for certain flooded areas, groundwater will be taken for water used during construction by drilling wells newly. This plan will have to include such well drilling work in the entire process.

Concerning crushed stones, locally-available materials (surplus gravelly soil) determined to be good quality will be used for roadbed and subbase materials to reduce the cost and to shorten the construction schedule.

2-2-2 Basic Plan

2-2-2-1 Overall Plan

The overall layout plan based on the above policies is described below.

(1) Scope of the Project

The scope of the Project covers the 20.69 km section from the border. Specifically, this is 20.69 km section from the concrete pile which shows the actual border position located within the border buffer zone between two countries, toward Yoboki up to area around the Djiboutian Telecom steel tower. It has been agreed with ADR that the boundary concrete pile at the end point was established at PK217 + 890 after calculation of the distance such that observation points were consistent with existing kiloposts in the EU-backed section. The (concrete made) kiloposts, each corresponding to these points, were arranged every 1 km.



Source: Prepared by the Survey Team

Figure 2-2.1 Section covered by the Project

(2) Design Standard

Djibouti has no standard for the road design. Therefore, in the Project, the Japanese standards applies basically to the geometric design, pavement design, drainage design, and structural design. Note that, for the signs and road markings, the French standard commonly employed locally applies. For the cross-section composition, the designs will be established so that the consistency with the sections adjacent to the target section of the Project is ensured.

- Road geometric design : Japanese standard (Road Structure Ordinance)
- Pavement design : Japanese standard (Guideline for Pavement Design and Construction, Handbook for Pavement Design, etc.)
- Drainage design : Japanese standard (Guideline for Drainage Work)
- River-crossing structures : Japanese standard (Guideline for Culvert Work)
- Guardrails: EU standard. Japanese standard for installation conditions (Standard and Explanation of Guardrail Installation)
- Signs and road markings : French standard. Japanese standard for installation conditions (Standard and Explanation of Road Signs Installation)

(3) Road Geometric Design

The design speed is basically 80 km/h, but will be reduced to 50 km/h for the hilly 5 km section around the border. This is because the existing alignment of this section includes relatively small curve radius without any spiral curves and because the vehicles are to be stopped finally at the border facilities. The major road geometric design elements of the Project are shown in Table 2-2.2.

Table 2-2.2 Major Road Geometric Design Elements

Item	Unit	RN 1	
		General (PK197+200 to PK212+890)	Around the Border (PK212+890 to PK217+890)
Design speed	km/h	80	50
Minimum curve radius	m	280	100
Maximum grade	%	4	6
Minimum grade	%	0.3	0.3
Minimum vertical curve radius	Convex	m	3,000
	Concave	m	2,000
Carriageway cross slope	%	2.0	2.0
Shoulder cross slope	%	2.0	2.0
Maximum superelevation	%	10	10
Minimum stopping sight distance	m	140	65
Minimum passing sight distance	m	350	200
Limit curve radius allowing omission of spiral curve	m	900	350

Source: Prepared by the Survey Team

2-2-2-2 Road Plan

(1) Horizontal and Vertical Alignment Plans

1) Horizontal Alignment

In order to minimize interference with existing facilities, such as roadside houses and underground utilities, and the work volume, the horizontal alignment will basically follow the existing road alignment. However, for the area around Galafi Wadi about 4 km from the border, the alignment will be shifted slightly by taking into account the river-crossing structure position.

For the section of about 5 km from PK205 to 210 as shown in Figure 2-2.2, the road runs on the flat land and has no wayside obstructions. Pavement of the existing road is maintained in a relatively satisfactory state. Therefore, the existing road may be used as a detour during the construction and a new road may be planned beside the existing one. For this 5 km section, two proposals have been compared and studied as shown in the comparison table of Table 2-2.3. The first proposal of constructing the planned road over the existing one and of constructing the temporary road on the side of the planned road is considered superior in terms of drainage, landscape, maintenance, and work costs.



Source: Prepared by the Survey Team

Figure 2-2.2 Section for Comparison

Table 2-2.3 Comparison Table of Road Construction Methods (PK205 ~ 210)

	Proposal 1	Proposal 2
Standard section		
Outline	<ul style="list-style-type: none"> ➤ Planned road to be constructed over the existing one ➤ Temporary road for use during work to be provided on the side of existing road 	<ul style="list-style-type: none"> ➤ Planned road to be constructed on the side of the existing one ➤ The existing road to be repaired and used as a bypass during work
Construction period	<ul style="list-style-type: none"> ✓ 1 month for construction of temporary road + 6 months for construction of planned road (including removal of existing culvert) = 7 months 	<ul style="list-style-type: none"> ✓ 6.5 months for construction of planned road (including repair of the existing road) + 0.5 months for removal of existing culvert) = 7 months
Drainage	<ul style="list-style-type: none"> ✓ No particular problem 	<ul style="list-style-type: none"> ✗ The existing culvert under the existing road may possibly become a bottleneck for drainage if not removed after construction of the existing road.
Landscape	<ul style="list-style-type: none"> ✓ No particular problem 	<ul style="list-style-type: none"> ✗ Old road left after construction of planned road may not be acceptable in terms of landscape.
Traffic capacity	<ul style="list-style-type: none"> ✓ Traffic capacity enough to meet the traffic volume with two lanes in 20 years is ensured. 	<ul style="list-style-type: none"> ✓ Traffic capacity enough to meet the traffic volume with two lanes in 20 years is ensured.
Maintenance	<ul style="list-style-type: none"> ✓ Maintenance will have to cover two lanes, so that the maintenance cost will be equivalent to that of Proposal 2. 	<ul style="list-style-type: none"> ✓ Old road will not be used after construction of the planned road. Maintenance will have to cover two lanes, so that the maintenance cost will be equivalent to that of Proposal 1.
Construction cost	<ul style="list-style-type: none"> ✓ [Main line/1km] 1) Roadbed embankment work: $1,600\text{m}^3 \times \text{¥}244 = \text{¥} 400,000$ 2) Subbase course: $2,000\text{m}^2 \times \text{¥}3,470 = \text{¥} 7 \text{ million}$ 3) Base course: $10,000\text{m}^2 \times \text{¥}1,457 = \text{¥} 14.6 \text{ million}$ 4) Binder course: $10,000\text{m}^2 \times \text{¥}1,863 = \text{¥}18.6 \text{ million}$ 5) Surface course: $10,000\text{m}^2 \times \text{¥}1,388 = \text{¥}13.9 \text{ million}$ 	<ul style="list-style-type: none"> ✗ [Main line /1km] 1) Roadbed embankment work: $9,000\text{m}^3 \times \text{¥}244 = \text{¥}2.2 \text{ million}$ 2) Subbase course: $10,000\text{m}^2 \times \text{¥}3,470 = \text{¥} 34.7 \text{ million}$ 3) Base course: $10,000\text{m}^2 \times \text{¥}1,457 = \text{¥} 14.6 \text{ million}$ 4) Bindr course: $10,000\text{m}^2 \times \text{¥}1,863 = \text{¥} 18.6 \text{ million}$ 5) Surface course: $10,000\text{m}^2 \times \text{¥}1,388 = \text{¥}13.9 \text{ million}$

	Proposal 1	Proposal 2
	[Detour/1km] 1) Macadam: $9,000\text{m}^2 \times ¥1,695 = ¥15.3 \text{ million}$ Total ¥63.5 million/km (1.0) Total construction cost for 21km: ¥1.33 billion (1.0)	[Partial repair of existing road/1km] 1) Macadam: $3,000\text{m}^2 \times ¥1,695 = ¥5 \text{ million}$ Total ¥89 million/km (1.4) Total construction cost for 21km: ¥1.46 billion (1.1)
Evaluation	✓ Determined to be superior to Proposal 2 from overall viewpoint	✗ Determined to be inferior to Proposal 1 from overall viewpoint

Source: Prepared by the Survey Team

2) Vertical Alignment

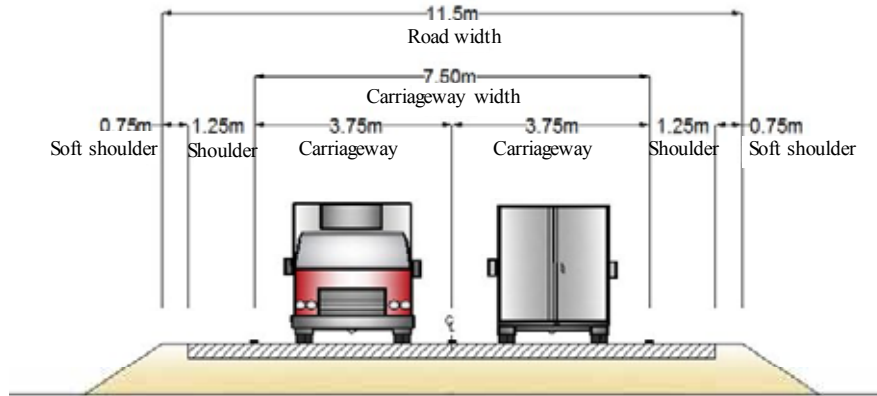
For vertical alignment, slight raising fill will be made from the existing road level by taking into account the following points:

- Basically, the pavement of existing road will be used as the subbase course, and the proposed level will be set in such a manner that the required pavement thickness is secured over existing pavement.
- The vertical alignment will be established so that the required covering can be secured over the crossing culvert to be installed.
- The existing road partially structured as a ford crossing type will be changed to cross the river through culvert, and the proposed level is planned correspondingly. Note that the river-crossing structure of the ford-crossing section will be detailed in 2-2-2-4, River Structure Plan.
- When the vertical alignment of existing road does not comply with the geometric design standard, the former will be reviewed till it complies with the latter.

(2) Composition of Cross Section

The target section of the Project will have the carriageway width of 3.75 m (equivalent to the special value of Type 1, Road Structure Ordinance) by taking into account 1) large trucks occupying most of vehicles running through this section and 2) conformity with the adjacent sections (design completed). For the shoulder, the width of 1.25 m will be planned to allow parking of disabled cars there while ensuring traffic of large vehicles in both directions while considering harmonization with the above adjacent sections (the road width: 10.0 m). Note that the required soft shoulder with the width of 0.75 m will be added for protection at the pavement end and in the space of road facilities.

The composition of typical cross section based on the above description is shown in Figure 2-2.3.



Source: Prepared by the Survey Team

Figure 2-2.3 Typical Cross Section

2-2-2-3 Pavement Plan

(1) Design Period, Reliability

The design period for pavement is often set at 15 years in the African region. Considering the importance of the road concerned, however, the design period will be 20 years as generally employed for trunk roads in Japan and the reliability will be 90% according to the similar policy.

(2) Design Traffic Volume

The study conducted 24-hour traffic counts on two weekdays and a weekend by categorizing the vehicles into eight types. Table 2-2.4 shows the result of the traffic counts.

Table 2-2.4 Traffic Survey Result (As of May, 2018)

Survey Date	Direction	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	Type 7	Type 8	Total
		Full-trailer	Semi-trailer	Full-Trailer (tanker)	Semi-trailer (tanker)	Heavy truck	Light truck	Bus	Car	
May 2	To Ethiopia	395	329	205	53	26	34	7	95	1,144
	To Djibouti	259	239	155	33	20	31	10	91	838
May 3	To Ethiopia	335	312	238	49	17	33	11	143	1,138
	To Djibouti	162	165	131	32	18	22	6	94	630
May 4	To Ethiopia	239	227	257	60	13	24	12	98	930
	To Djibouti	219	218	137	34	17	30	8	115	778
Percentage by vehicle type		29%	27%	21%	5%	2%	3%	1%	12%	100%

Source: Prepared by the Survey Team

The above survey was conducted at the intersection of NR1 and NR5, between Dikhil and Djibouti City. As a result, although buses and passenger cars hardly use the target section they accounted for 13% of the traffic counted. Therefore, only Type 1 to Type 6 vehicles, excluding buses and cars, are considered as the target section traffic.

Moreover, ADR provided the traffic data (daily traffic of the past three months, monthly traffic of the past two years) based on the fee collected from trucks using NR1. The data are used to adjust the traffic counts for daily as well as seasonal variations to obtain the annual average daily traffic

(AADT). As Table 2-2.5 shows, the AADT of the trucks per direction is estimated at 940.

Table 2-2.5 Average Annual Daily Traffic (AADT) of Trucks

Survey date	Daily Truck Traffic (from the survey)		Daily Adjustment Factors		Monthly Adjustment Factors		Average Annual Daily Traffic (AADT per direction)		
	To Ethiopia (1)	To Djibouti (2)	To Ethiopia (3)	To Djibouti (4)	To Ethiopia (5)	To Djibouti (6)	To Ethiopia (1)*(3)*(5)	To Djibouti (2)*(4)*(6)	Average
May 2 (Wed)	1042	737	0.87	1.46	0.99	0.94	894	1011	952
May 3 (Thu)	984	530	0.87	2.16	0.99	0.94	850	1073	962
May 4 (Fri)	820	655	1.04	1.51	0.99	0.94	840	927	907
									940

Source: Prepared by the Survey Team

Regarding the traffic growth rate, both the truck traffic using the NR1 and the GDP of Ethiopia were growing at about 10% on average in the past ten years. It is, however, unlikely that the similar high growth rate will be maintained in the next 20 years. The IMF forecast Ethiopia's GDP growth rate to be 8.17% on average until 2023, and the truck traffic is assumed to grow at this rate of AADT in 2018 ($940 \times 8.17\% = 76.8$) in the future.

In addition, since the railway service which started in 2018 is expected to significantly affect the NR1 traffic, an interview was conducted with the Ethiopian Railway Corporation on the future cargo operation plans. According to the interview and documents provided, the company has a plan to gradually increase the freight train frequency from the current 1 round-trip per day to 5 round-trips per day by 2023, and to 19 round-trips per day in the long term. Each train is estimated to carry cargo equivalent to that of 53 trucks, and considering this the future truck traffic is forecast as shown in Table 2-2.6.

Table 2-2.6 Truck Traffic Forecast Reflecting Rail Share

Year	Daily truck traffic (per direction)	Rail transport		Daily truck traffic adjusted for rail share (per direction)
	Trucks/day	Round-trips/day	Number of equivalent truck	Trucks/day
2018	940	1	53	940
2019	1,017	1.5	80	937
2020	1,094	2	106	988
2021	1,170	3.5	186	984
2022	1,247	4	212	1,035
2023	1,324	5.5	292	1,032
2024	1,401	6	318	1,083
2025	1,478	7.5	398	1,080
2026	1,555	8	424	1,131
2027	1,631	9.5	504	1,127
2028	1,708	10	530	1,178
2029	1,785	11.5	610	1,175
2030	1,862	12	636	1,226
2031	1,939	13.5	716	1,223
2032	2,016	14	742	1,274
2033	2,092	15.5	822	1,270
2034	2,169	16	848	1,321

2035	2,246	17.5	928	1,318
2036	2,323	18	954	1,369
2037	2,400	19	1,007	1,393
2038	2,477	19	1,007	1,470
2039	2,553	19	1,007	1,546
2040	2,630	19	1,007	1,623
2041	2,707	19	1,007	1,700

Source: Prepared by the Survey Team

Considering 2021 as the service commencement year, the result shows that the truck traffic after 20 years, i.e., in 2041, will be 1700 truck per day. Since passenger car equivalent is assumed to be 3.0 as most of the truck is full-trailer or semi-trailer, AADT of passenger car unit is about 10,000 in both directions, which means that this road will be reaching full of traffic capacity for two-lane road in 2041.

(3) Wheel Load

The study carried out axle load surveys for two weekdays, 12 hours each day. The survey targeted the six types of the trucks described above, and about 16% of the trucks bound for Ethiopia were randomly selected for the survey. Table 2-2.7 shows the survey result.

Table 2-2.7 Axle Load Survey Result

Wheel load (t)	Number of wheels by vehicle type						Total
	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	
	Full-trailer	Semi-trailer	Full-Trailer (tanker)	Semi-trailer (tanker)	Heavy truck	Light truck	
0-1	0	0	0	0	0	0	0
1-2	0	1	0	0	1	4	6
2-3	4	21	0	0	10	2	37
3-4	58	75	17	2	2	0	154
4-5	49	45	12	1	0	1	108
5-6	119	78	24	5	1	0	227
6-7	138	91	49	6	0	1	285
7-8	42	37	8	1	0	1	89
8-9	1	9	2	0	0	0	12
9-10	0	1	1	0	0	0	2
Total	411	358	113	15	14	9	920

Source: Prepared by the Survey Team

The above daily distribution based on the sample survey is converted into that of the AADT by applying scale factors for each truck type shown in Table 2-2.8. The average annual daily wheel load distribution is shown in Table 2-2.9.

Table 2-2.8 Scale Factor by Vehicle Type

Vehicle type	Scale factor by vehicle type						Average
	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	
	Full-trailer	Semi-trailer	Full-Trailer (tanker)	Semi-trailer (tanker)	Heavy truck	Light truck	
Scale factor	5.3	4.9	11.9	20.2	4.7	9.5	6.2

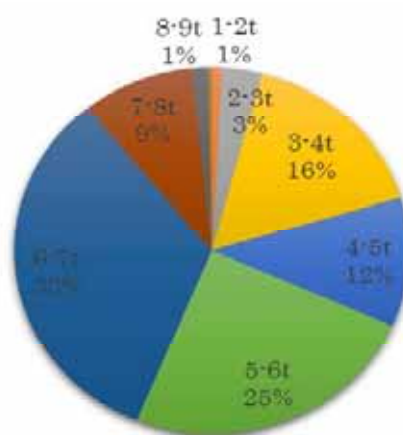
Source: Prepared by the Survey Team

Table 2-2.9 Average Annual Daily Wheel Load Distribution

Wheel load (t)	Number of wheels by vehicle type						Total
	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	
	Full-trailer	Semi-trailer	Full-Trailer (tanker)	Semi-trailer (tanker)	Heavy truck	Light truck	
0-1	0	0	0	0	0	0	0
1-2	0	5	0	0	5	38	48
2-3	21	103	0	0	47	19	190
3-4	306	369	202	40	9	0	926
4-5	259	221	142	20	0	9	651
5-6	628	384	285	101	5	0	1,403
6-7	728	448	581	121	0	9	1,887
7-8	222	182	95	20	0	9	528
8-9	5	44	24	0	0	0	73
9-10	0	5	12	0	0	0	17
Total	2,169	1,761	1,341	302	66	84	5,723

Source: Prepared by the Survey Team

Figure 2-2.4 shows distribution of wheel load calculated from result of the axle load survey. The axle-load limit in Djibouti is 12 t (6 t each wheel), and the number of the wheels that exceed this limit accounted for 44% of the total. Table 2-2.10 shows the distribution of the current equivalent 5 t wheels, including the overloaded wheels. The result shows that the number of the equivalent 5 t wheels is about twice of the actual, and it is taken into account for the pavement design.



Source: Prepared by the Survey Team

Figure 2-2.4 Wheel Load Distribution

Table 2-2.10 Number of Equivalent 5 to Wheels

Wheel load (t)	Representative wheel load value (t)	Number of wheels counted		5 t conversion factor	Number of equivalent 5 t wheels	
		(wheels/day/direction)	(%)		(wheels/day/direction)	(%)
0-1	0.5	0	0.0%	0.0001	0.0	0.0%
1-2	1.5	48	0.8%	0.0081	0.4	0.0%
2-3	2.5	190	3.3%	0.0625	11.9	0.1%
3-4	3.5	926	16.2%	0.2401	222.3	1.9%
4-5	4.5	651	11.4%	0.6561	427.1	3.7%
5-6	5.5	1,403	24.5%	1.4641	2,054.1	17.7%
6-7	6.5	1,887	33.0%	2.8561	5,389.5	46.4%
7-8	7.5	528	9.2%	5.0625	2,673.0	23.0%
8-9	8.5	73	1.3%	8.3521	609.7	5.3%
9-10	9.5	17	0.3%	13.0321	221.5	1.9%
Total		5,723	100%		11,609.6	100%

Source: Prepared by the Survey Team

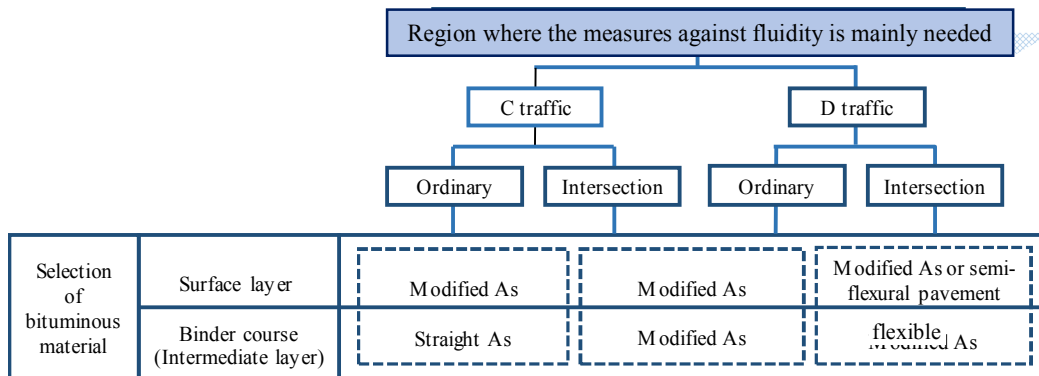
(4) Road Surface Design

For the asphalt pavement to be provided to the roads in the tropical countries like the target region, any structural damage such as rutting produced by flow (surface damage) may occur. Also observed in many cases are traffic of overloaded trucks, excessive speed down due to overloading, etc., which tend to accelerated damage to the asphalt pavement more than expected.

Considering the regional and traffic characteristics for the target section, it is essential to select the asphalt materials (selection of bituminous materials, with/without modifier) that are capable of resisting flow rutting. The materials to be selected should be determined while referring to the case of employing the design standard of Japan 1) and the case of employment of the empirical formula 2) shown below.

1) In Case of Employing the Japanese Design Standard

According to Figure 2-2.5 that shows the pavement type selection flow in the Road Design Procedure of the Kanto Regional Development Bureau, MLIT, the road concerned may be classified as the region requiring measures against plastic flow and as D Traffic, Ordinary Section, so that application of modified asphalt is considered necessary for the surface and binder course.



Source: Road Design Procedure of the Kanto Regional Development Bureau, MLIT

Figure 2-2.5 Flow to Select the Measure against Plastic Flow

2) In Case of Employing the Empirical Formula

When an empirical formula is to be used, the plastic deformation resistance is used as a basis for required performance and the number of wheel passes for plastic deformation (dynamic stability: DS) will be established as a performance index according to the traffic conditions. The target DS of asphalt mixture necessary for the road concerned is calculated as follows:

$$DS = 0.679 (Y \cdot Tr \cdot W \cdot V \cdot Ct / D) \quad (\text{Handbook for Pavement Design 2006})$$

Where DS: Target DS (times/mm)

Y: In-service period (days) = 3650 days (10 years: service life of asphalt pavement)

Tr: Large vehicles traffic volume (vehicles/day) = 1223 vehicles/day (Traffic volume in 10 years after opening for service)

W: Wheel load correction factor (1.0 when the number of heavy vehicles is small; 2.0 when it is large, and 3.0 when it is extremely large)

* Since large vehicle ratio is 100% in target section, it's assumed as extremely large

V: Traveling speed correction factor (0.4 for ordinary sections and 0.6 for intersections)

Ct: Temperature correction factor

$$* \log (Ct) = 0.0003216T^2 + 0.01537T - 2.080$$

T: $1.1t \times 1.5 + 0.17 \exp(0.126t)$, in which t is the annual mean temperature = 29.7°

(Calculated based on data of the National Meteorological Observatory in Djibouti Airport (2002 to 2012))

D: Rutting depth (mm) = 40mm (from the data of pavement inspection procedure of the Kinki Regional Development Bureau, MLIT)

The result of determining the target DS by reflecting the conditions of target section in the above formula is shown below:

$$\bullet \text{ Target DS} = 0.679 \times (3650 \times 1223 \times 3.0 \times 0.4 \times 0.128 / 40) = 3883 \text{ (times/mm)}$$

The calculated target DS is difficult to realize solely by applying the straight asphalt and may require application of a modified asphalt highly effective in plastic flow resistance as shown in Tables 2-2-11 and 2-2-12.

Table 2-2.11 Guideline for the Target DS Value for each Bituminous Material

For realization of the DS value of 3,000 times/mm, modified asphalt is mandatory. The DS value of 1,500 times/mm is substantially difficult to realize when the straight asphalt is used. It is considered that realization of this value is difficult unless conditions, such as aggregates, etc. are met. For other roads, securing of the DS value of 500 times/mm is stipulated, which may be said to be the minimum required performance of the asphalt mixture.

Source: Study for Management and Supervision of Road Pavement Works in Developing Countries, 2016 Handbook for Management and Supervision of Road Pavement works (draft), page 53, JICA

Table 2-2.12 Target Value of Dynamic Stability (DS) for Surface Mixtures (times/mm)

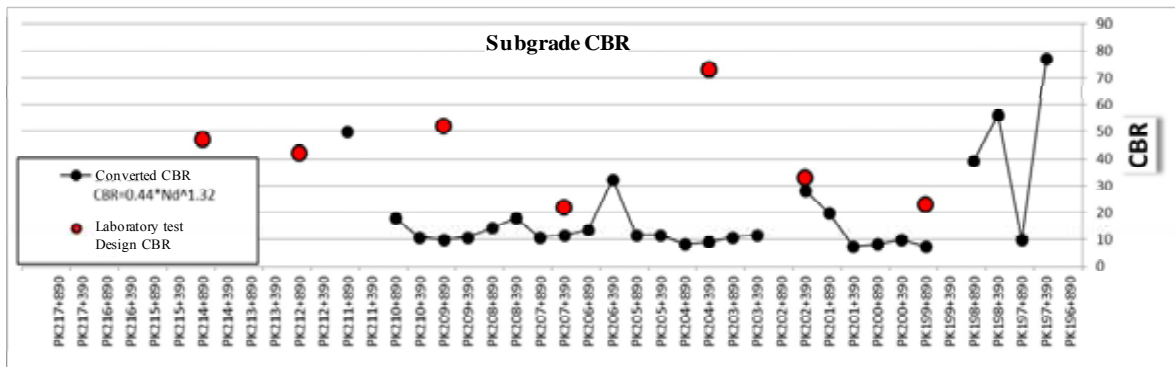
Traffic classification		Dynamic stability target value (times/mm)	Asphalt used
Light to medium traffic	Less than 5,000 vehicles/day/one way	800	Straight asphalt
Heavy traffic	5,000 vehicles or more/day/one way	3,000 or more	Modified asphalt

Note) Traffic volume is the volume of large vehicles in the first year
 Source: NEXCO Design Standard, Vol, 1 Pavement

In view of the consequences of review on the case 1) of employing the Japanese design standard and the case 2) of employing the empirical formula, modified asphalt will be the major asphalt material for the target road. Note that the performance test will be implemented in the stage of mixing design as proposed in the Handbook (draft) for Road Pavement Design in the Preparatory Survey, the 2015 Report (separate) of Study for Pavement Design Standard Application in Developing Countries (Project Study).

(5) Design CBR of Subgrade

The design CBR of subgrade has been reviewed while referring to the estimate from the laboratory CBR test and handy cone penetration test and to the grain size characteristics. Figure 2-2.6 shows the plot diagram of the distance and subgrade CBR.

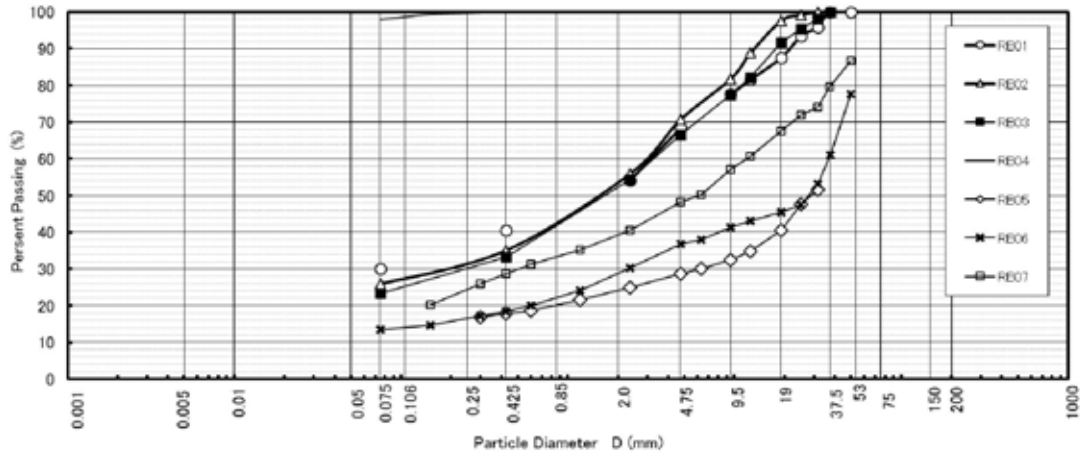




Source: Prepared by the Survey Team





Figure 2-2.6 Distribution of the Distance and Subgrade CBR

- Laboratory CBR test of subgrade was implemented at seven points, with the resulting CBR ranging from minimum 20% to maximum 74%.
- CBR estimated from the handy dynamic cone penetration test performed at a 500m interval ranged from minimum 7% to maximum 80% and fell in general within a range of 10 to 20.
- Grain size characteristics of subgrade differed in grain size distribution between the plain section and the alluvial fan area. It was confirmed that the soil is rudaceous mixed with fine fractions and sand and that the grain size range is generally wide (good grain size distribution). (Figure 2-2.7)

Grain Size Distribution Results (RB1~RB7)



Sample No	Nothing ※	Easting ※	
RB01	11°37'39.06"N	41°56'49.28"E	Talus deposit
			
RB02	11°38'30.13"N	41°55'46.57"E	Hanle plan deposit
			
RB03	11°39'21.08"N	41°55'6.05"E	Hanle plan deposit
			

RB04	11°40'26.62"N	41°53'54.33"E	Hanle plan deposit
			
RB05	11°40'56.77"N	41°52'38.04"E	Hanle plan deposit
			
RB06	11°41'59.91"N	41°51'26.51"E	Fan deposit
			
RB07	11°42'43.93"N	41°50'44.66"E	Hanle plan deposit
			

Source: Prepared by the Survey Team

Figure 2-2.7 Grain Size Distribution and Test Sample of Subgrade

It was confirmed that the subgrade contains hard gravels of basalt, is made up from sandy to rudaceous soils with satisfactory grain size distribution, and is free from distribution of soils presenting troubles, such as heavily weathered soil or altered clay.

Regarding CBR to be used for design, CBR determined in the laboratory is known to show higher values than that determined in the site in the case of clayey to rudaceous soils containing less clay (Report Vol. 10, No.9, 1971 of the Port and Harbor Research Institute). Therefore such CBR value was determined to be used as reference and CBR for design was set while referring to the common CBR values (Table 2-2.13) obtained through estimation from the handy dynamic cone penetration test and on the basis of grain size characteristics.

Table 2-2.13 Typical CBR of Sandy Soil

Class	Soil	Dry density	Optimum moisture content	Compression test result (strain (5))		CBR range
				At 140 kPa point	At 350 kPa point	
SW	Sand and rudaceous sand with satisfactory grain size distribution, almost no fine grain content	1.8-2.1	16-9	0.6	1.2	20-40
SP	Sand with poor grain size distribution	1.6-1.9	21-12	0.8	1.4	10-40
SM-SC	Intermediate between SM and SC	1.8-2.0	16-11	0.8	1.6	10-40
SM-SC	Silty sand and soil-silt mixture	1.8-2.1	15-11	0.8	1.4	5-30
SC	Clayey sand, sand-clay mixture	1.7-2.0	19-11	0.1	2.2	5-20

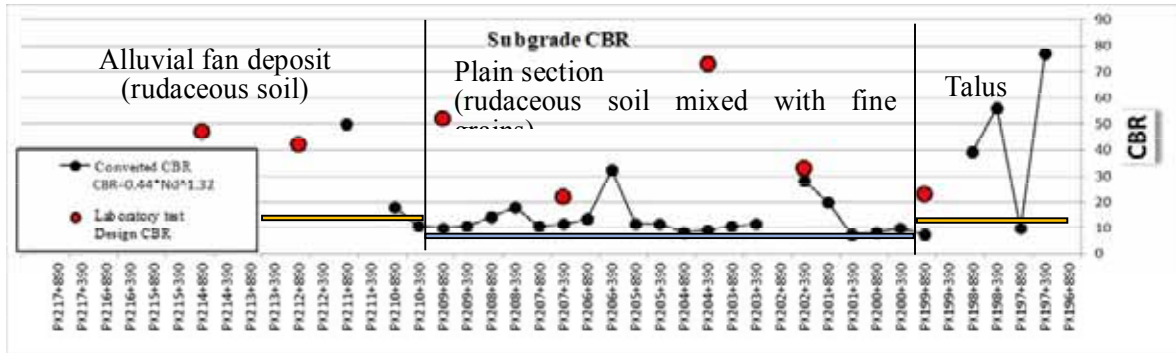
S. Sakajo, T. Nishioka (Kiso-jiban Consultants Co., Ltd.) and M. Kamimura (Something Co., Ltd.), P. Jorgpradit, S. Youcuai (King Mongkut's University of Technology), Wanchai Teeparaksa (Chulalongkon University)
:CBR and Sweden Sounding Test results for various sandy soils

Source : The 43rd Conference on Geotechnics (original Manfred R.Hausmann,1990)

The CBR value can be expected to be 10 to 40 because the subgrade soil of the site is equivalent to rudaceous sand (equivalent to SW) or SM-SC. The design CBR was set to be the value obtained by deducting the standard deviation from the mean CBR value after classification into the section of plain sand and that of alluvial fan and talus deposits and removal of abnormal CBR values as converted from the handy penetration test. In consequence, CBR for rudaceous soil abounding in sand and silt (the plain section) was set to 8% and that for the gravel section abounding in gravels at start and end points was set to 12%.

Design CBR set value

- Start point to PK200 : CBR=12 (Rudaceous soil consisting mainly of deposits at mountain foot and talus)
- PK200 to PK210 : CBR=8 (Plain section: Rudaceous soil containing mixture of silt and sand)
- PK210 to End point : CBR=12 (Rudaceous soil consisting mainly of alluvial fan deposit)



Source: Prepared by the Survey Team

Figure 2-2.8 Setting the Subgrade CBR

(6) Pavement Composition

3) Asphalt Pavement

The thickness design of asphalt pavement employs the following equation:

$$H = 28.0N^{0.1} / \text{CBR}^{0.6}$$

$$T_A = 3.84N^{0.16} / \text{CBR}^{0.3}$$

Where

H: Pavement thickness (cm)

TA: Required thickness when the pavement thickness is designed totally with hot asphalt mixture (cm)

N: The number (wheel passes/one direction) when the total passing-wheel load during the service period is converted to the 5t wheel load

The equation shown below is used to determine the 5t converted number of wheel passes N from the axle load survey results described in (3):

$$a_i = (P_i / 5)^4$$

The number of 5t converted wheel passes for 20 years is determined as follows:

$$N = N_5 \times \alpha \times 365 \times 20$$

Where a_i : Ratio of the P_i wheel load damaging the pavement. The 5t wheel load is assumed to be 1.

P_i : Measured wheel load

N_5 : Number obtained by converting the total passing-wheel load to the 5t wheel load at measured point (passes/day • one direction)

α : Increasing rate of the traffic volume in ten years

Table 2-2.14 shows the calculation results for pavement composition when CBR was changed from 4 to 12 under the design condition this time and Table 2-2.15 shows the pavement composition that was employed.

Table 2-2.14 Pavement Composition according to CBR

		CBR=4	CBR=6	CBR=8	CBR=10	CBR=12
Design period	Years	20	20	20	20	20
Traffic volume at start of service (2021)	vehicles/day	984	984	984	984	984
Traffic volume in 10 years (2031)	vehicles/day	1223	1223	1223	1223	1223
Mean number of axles of a vehicle		5.63	5.63	5.63	5.63	5.63
Intensity factor at conversion to 5t value		2.03	2.03	2.03	2.03	2.03
No. of wheel passes as converted to 6t value in 20 years	N=	102,036,076	102,036,076	102,036,076	102,036,076	102,036,076
Design CBR of subgrade		4	6	8	10	12
Pavement thickness (cm)	H=	78	61	51	45	40
TA	TA=	49	43	40	37	35
Pavement composition (cm)	Surface, binder course (asphalt)	1.00	12	12	12	12
	Base course (crushed stone for mechanical stabilization)	0.35	56	46	45	36
	Subbase course (surplus gravelly soil)	0.25	70	60	50	50
	Total thickness		138	118	107	98

Source: Prepared by the Survey Team

Table 2-2.15 Pavement Composition to be Employed

Layer	Material	Quality standard	Thickness (cm)	
			Start to PK200 PK210 to End	PK200 ~ 210
Surface	Hot asphalt mixture	Modified asphalt to be used	5	5
Binder	Hot asphalt mixture	Modified asphalt to be used	7	7
Base	Mechanical stabilized crushed stone	Modified CBR 80 or more	30	45
Subbase	Surplus gravelly soil	Modified CBR 30 or more	50	50

Source: Prepared by the Survey Team

Note that crusher run is normally used for the subbase course. However, considering the capacity of asphalt plant and the construction process this time, production of gigantic amount of crushed stones enough for pavement of base course, subbase course, and detour for the construction is difficult. Accordingly, gravelly soil that is available locally will be applied as it is to the subbase course. Such gravelly soil has been confirmed to have the modified CBR of 30 or more in the modified CBR test. Since this gravel ensures the bearing capacity equivalent to the crusher run, the T_A equivalent conversion factor was set to 0.25 for evaluation.

4) Concrete Pavement

1. Subgrade

For the subgrade of the section to be paved with concrete (near the border facilities), the design CBR will be set to 12 on the basis of CBR test results.

2. Base/Subbase

The base and subbase courses are critical portions to disperse the traffic load transmitted from the concrete slab and to transmit such dispersed load to the subgrade, so that it must have a sufficient bearing capacity and must be highly durable.

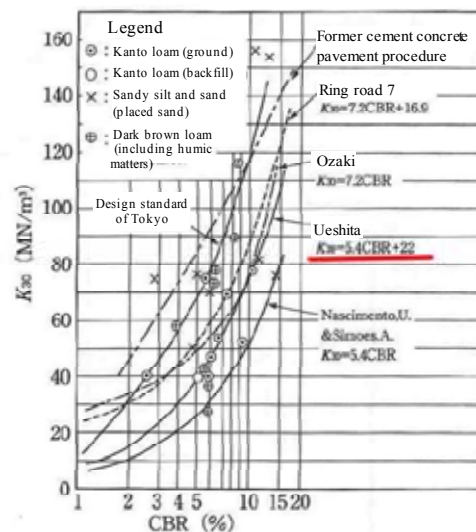
According to the Pavement Design Handbook (p151 Feb. 2006), the required bearing capacity factor of base/subbase with ordinary concrete pavement is 200 MPa/m or more. The composition of base and subbase is to be determined from the base/subbase design curve in such a manner that the required subbase K value is obtained.

Table 2-2.16 Type of Concrete Pavement and the Required Bearing Capacity Factor of base/Subbase

Item		Required bearing capacity factor on the subbase surface (K_{30})	
Traffic volume classification		N_1-N_4	N_5-N_7
Design traffic volume (vehicles/day · direction)		$T < 250$	250 T
Type of pavement	Ordinary concrete pavement	150MPa/m or more	200MPa/m or more
	Continuous reinforced concrete pavement		200MPa/m or more
	Roller compacted concrete pavement	200MPa/m or more	200MPa/m or more
[Note]			
1. The bearing capacity factor measurement method is as described in the Pavement Test Method Handbook, 1-4-2 Plate Loading Test.			
2. The value was obtained from the test using a loading test with the bearing capacity factor of K_{30} and the diameter of 30 cm.			
3. The bearing capacity factor of K_{75} determined with the 75 cm dia. loading plate is converted to the K_{30} value by using the equation, $K_{75} = K_{30}/2.2$.			

Source: Pavement Design Handbook, February, 2006, the Japan Road Association, P.151

For the subgrade of the target section, the subgrade design bearing capacity factor (K_{30}) calculated from the CBR results while referring to the graph of Figure 2-2.9 is $K_{30} = 5.4 \times (12) + 22 = 87$.

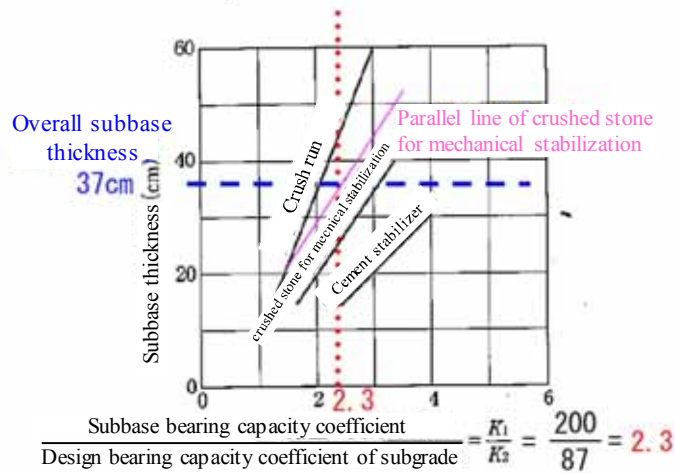


Source: Pavement Survey and Test Method Handbook. June, 2007, the Japan Road Association, P. [1]-203

Figure 2-2.9 CBR VS K_{30} for the Subgrade

In order to set the subbase course with a thickness of 20 cm (the maximum thickness of one layer) with crusher run and to set the bearing capacity factor of subbase to 200 MPa/m, the overall base/subbase thickness must be 37 cm as shown in Figure 2-2.10.

- Subbase course thickness = 20cm
- Base course thickness = 37 (overall base/subbase thickness) - 20 = 17 → 20cm (roundup every 5cm)



Source: Concrete Pavement Guidebook 2016, March 2016, the Japan Road Association, P.27

Figure 2-2.10 Subbase Thickness Design Curve

3. Design of the concrete slab thickness

In Japan, the empirical design method is often employed. In the Project, however, the theoretical design method will be employed because 1) the result of axle load survey on the target section cannot be reflected and 2) the design conditions is restrictive in the empirical method. Table 2-2.17 shows the result of review on the concrete slab thickness according to the theoretical design method. With the concrete slab thickness set at 30 cm, the degree of fatigue is satisfactory at $(F_d) < 1.0$.

Table 2-2.17 Calculation Results for Concrete Slab Thickness Design

Design conditions	
Design service life	20 (Year)
Subbase bearing capacity coefficient k75	200 (MPa/m)
Elastic modulus E	28000 (MPa)
Poisson ratio ν	0.2 (-)
Linear expansion coefficient α	0.00001 ($^{\circ}\text{C}$)
Concrete flexural strength	4.4 (MPa)
Concrete slab thickness h	0.3 (m)
Slab thickness: compatible with	0.15m, 0.20m, 0.23m, 0.25m, 0.28m and 0.30m
* Enter the measured slab thickness when K20 Cell shows "Measurement".	
Type of concrete	1
(1): NC (2): CRCP (3) PCCP	
Stress calculation position	3
(1) Free edge (2) Longitudinal joint (3) Transverse joint or transverse cracking	
Reliability	7
(1): 50% (2): 60% (3) 70% (4): 75% (5) 80% (6): 85% (7): 90%	
Joint interval	7
(1) 5.0m or less (2) 6.0m (3) 7.5m (4) 8.0m (5): 10.0m (6): 12.5m (7): 5.0m	
shoulder	1
(1) Sufficient shoulder (2) Shoulder width of around 0.5 m	
Lane number / direction	1
Width of lane	2
Select only in the case of one lane in one direction Assumed area	
(1) 3.25m (2) 3.75m (1) 4.50m	
Assumed area	2
(1) Urban (2) Suburban	
Fatigue curve	1
(1) Temperature difference small, (2) Temperature difference large, (3) Measurement	
Failure probability P _f	0
(1) Experimental equation (2) Empirical equation	
For experimental equation only	

C_w	$(\Delta\text{temp}>0)$	$(\Delta\text{temp}<0)$
	0.98	0.95

C_L	1.38	C_i	1.00
γ_R	1.80		

Traveling position	Frequency of traveling
15 cm	0.5
45 cm	0.46
75 cm	0.02
105 cm	0.02

Traveling position	Reduction factor
15 cm	1.00
45 cm	0.2
75 cm	0.1
105 cm	0.01

Ratio of large vehicles	
$\Delta\text{temp}>0$	0.60
$\Delta\text{temp}<0$	0.40

Temperature difference	Occurrence frequency
19°C	0
17°C	0
15°C	0.007
13°C	0.025
11°C	0.053
9°C	0.08
7°C	0.115
5°C	0.14
3°C	0.21
1°C	0.37
-1°C	0.48
-3°C	0.38
-5°C	0.12
-7°C	0.02
-9°C	0

Load (kN)	Daily traffic volume
9.8	0
19.6	48
29.4	190
39.2	926
49.0	651
58.8	1403
60.6	1887
78.4	528
88.2	73
98.0	17
107.8	0
127.4	0
147.0	0

FD =	0.872
------	-------

- * 1. For the temperature difference of the target area, "Small" (Temperature Small: 22°, Large:30°), was chosen because the monthly mean temperature difference (maximum – minimum) is around 13°.
- 2. The reliability is set to 90% similarly to the case of asphalt section.

Table 2-2.18 shows composition of the concrete pavement to be employed.

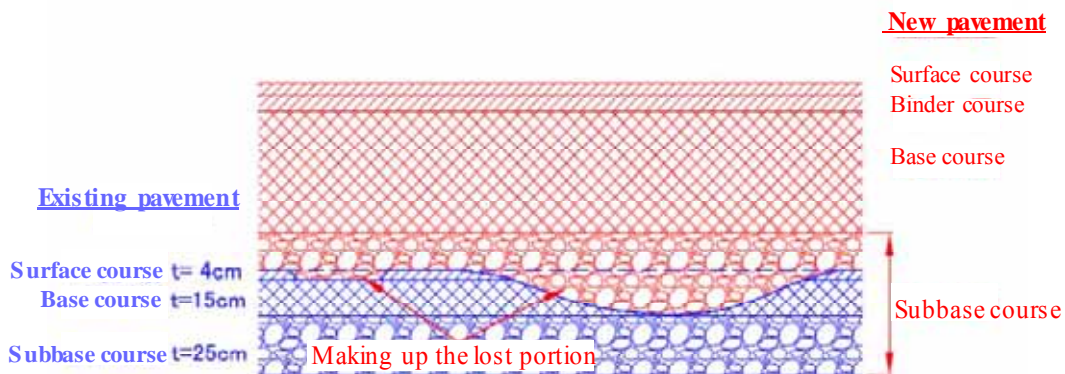
Table 2-2.18 Concrete Pavement Composition to be Employed

Layer	Material	Quality standard	Thickness (cm)
Surface	Concrete slab	Flexural strength 4.4 MPa	30
Base	Mechanical stabilized crushed stone	Modified CBR 80 or more	20
Subbase	Surplus gravelly soil	Modified CBR 30 or more	20

Source: Prepared by the Survey Team

(7) Utilization of the existing pavement

Though mostly heavily damaged, the existing pavement will be used as subbase course because of deficient subbase materials as described above and for reduction of the construction period and costs. In this case, the residual strength of the existing pavement will be calculated with the coefficient equivalent to that of surplus gravelly soil used for subbase course by assuming the coefficient from the surface course to the subbase course at around 0.25. Since the existing pavement is 44 cm from the surface course to subbase course, the planned subbase thickness will be provided over the existing pavement to make up for the deficient thickness. Any pot hole or any portion lost due to breakaway will be filled up with surplus gravelly soil. Figure 2-2.11 shows an image of providing the pavement over the existing one.



Source: Prepared by the Survey Team

Figure 2-2.11 Paving Image (for CBR = 6)

2-2-2-4 Structure Plan

(1) Design Conditions

1) Design Load

The live load and the load model are to be based on the axle load survey results in the site. According to the axle load survey results, the applicable wheel load will be the maximum value in the 95% confidence interval while the load model will be the full-trainers (six axles) that are the major local traffic mode.

2) Width

The width of the river-crossing section will be the same as set in the standard cross-section diagram.

3) Clearance and Minimum Internal Height

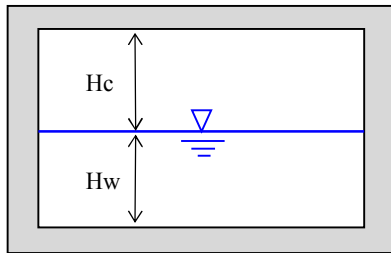
The dimensions (pier height and internal height) of river-crossing structures will be determined while taking into account the clearance for soil sedimentation after completion.

Table 2-2.19 Bridge structure and the clearance of box culvert structure:

Flow (m ³ /sec)	Less than 200	200 or more less than 500	500 or more less than 2000	2000 or more less than 5000	5000 or more less than 10000	10000 or more
Clearance (m)	0.6	0.8	1.0	1.2	1.5	2.0

Source: "Explanation • Government Ordinance for Structural Standard for River Administration Facilities, et., Feb. 2000, Japan River Association, P115

Remarks: Basically, the allowance appropriate for the flow rate will be chosen and elevated, as required, according to the significance or natural conditions of the Project site.



Hw: Water depth

Hc: Clearance

Remarks: Clearance to be secured under the pier girder

Source: Prepared by the Survey Team

Figure 2-2.12 Setting the Clearance (Box culvert, bridge)

(2) Classification of Planned Portions of Structures

For selection of the type of river-crossing structures, the structure is classified into three groups as shown in Table 2-2.20 according to the existing wadi size, existing structures and surrounding environment. A structural type will be chosen for each group. Note that pipe culverts designed with consideration to facilitate the workability will all be designed with a box shape because the necessary precast products are not available locally. The minimum section of a box culvert will be 1 m x 1 m to facilitate the workability of maintenance.

Table 2-2.20 Classification of Structures

Class 1	Class 2 (existing structure)	Group
River-crossing structure	Ford crossing (large scale)	Group 1 (1 location)
	Ford crossing (small scale)	Group 2 (6 locations)
Crossing drainage	Culvert structure	Group 3 (33 locations)

Note: Wadi located 4.038 km from the border of Group 1 is classified separately because it is the largest in scale in the target area of the Project.

Source: Prepared by the Survey Team

Photos of typical site state of each group are as shown in Figure 2-2.13.



Source : Prepared by the Survey Team

Figure 2-2.13 Photos of Typical Site State of each Group

4) River-crossing Structure Type of Group 1

Group 1 is a ford-crossing structure with the current length of 100 m, with the concrete slab with the width of 20 m and the difference in elevation of 5 m provided on the downstream side. For selection of the type of river-crossing structure of the location concerned, improvement of the road alignment is considered because the survey point is located at the crest of longitudinal alignment of the road and the section is steep and has the small horizontal curve radius, Accordingly, the review of the river-crossing structure should be made to select the applicable structure type on the basis of alignment review results and to select the optimum plan by taking into account the structural characteristics, constructability, water flow, etc. From the results shown in Table 2-2.21 shown below, “Case-2 Box culvert (improved)” will be employed for the structure at the location concerned.



Table 2-2.21 Comparison of Structure Type (Group 1)

Proposals to be compared	Case-1: Box culvert	Case-2: Box culvert (improved)	Case-3: Bridge
Outline	<ul style="list-style-type: none"> • Ordinary box culvert structure • Internal height to be established by taking into account the water depth and clearance 	<ul style="list-style-type: none"> • Structure with intermediate walls reduced by increasing the crossing span above the case of box culvert of Case-1 • Internal height to be established by taking into account the water depth and clearance 	<ul style="list-style-type: none"> • Prestressed concrete bridge having three spans determined from the structure size • Clearance to be secured below the girder of substructure • Pile foundation type determined from the ground conditions
Outline view	<p>L=81.5m</p>	<p>L=81.6m</p>	<p>L=81.6m</p>
Longitudinal alignment of the road	More gentle than the current state	More gentle than the current state	Steep gradient than the current state
Total width detrimental to flow	$\Sigma W = 8.5m$	$\Sigma W = 5.4m$	$\Sigma W = 5.0m$
Approx. construction cost (percentage)	¥50 million (1.0) Concrete volume 1,183m ³	¥53 million (1.1) Concrete volume 1,249m ³	¥412 million (8.3)
Ranking	[Selected]		
Measures against flow and deposit of crushed stones (Common to all cases)	<ul style="list-style-type: none"> • The river bed will be protected with concrete to prevent deposit of crushed stone, etc. • To prevent deposit of crushed stones, etc. at the downstream end of the structure, concrete protection will be provided to the river bed of the 10 m section from the downstream end of the structure. • To prevent damage to the intermediate concrete wall to which crushed stone flowing along water flow clash, the surface protection with steel fence will be provided on the upstream side of concrete wall. • The internal height of Case-1 and Case-2 and the pier height of Case-3 will be established by taking into account the clearance determined from the water level, surrounding crushed stone size, and flowrate (and will be elevated depending on the characteristics of wade concerned). 		

5) Study on the Possibility of Reducing the Group 1, Costs

The study has been made to check for the possibility of further cost-down by reducing the channel width relative to the proposed box culvert improvement that is selected. The box culvert adjusted to the current channel width requires a structure comprising nine consecutive boxes, which offers sufficient margin in terms of internal space section because the water depth in boxes is around 20 cm. The study has also been made on a case in which the channel width is reduced to one third to make up three consecutive boxes. As shown in Table 2-2.22, the case of employing three consecutive boxes causes comparatively high construction costs including construction of revetment. There are other demerits in this option in addition to the above cost increase. In consequence, the box culvert comprising nine consecutive boxes was employed without reducing the channel width.

Table 2-2.22 Results of the Study on the Possibility of Cost Reduction of Group 1

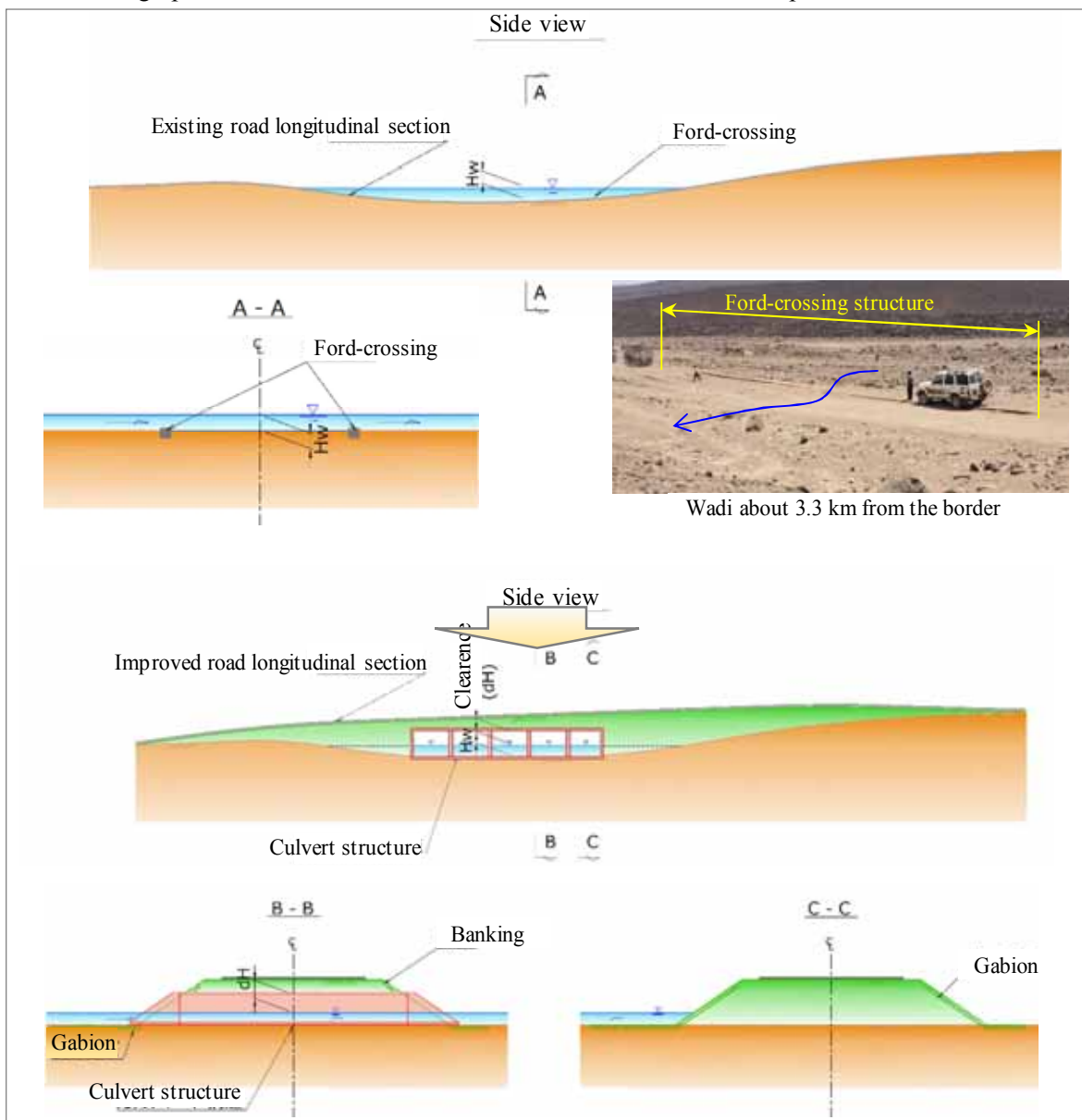
Proposals to be compared	Box culvert comprising nine consecutive boxes	Box culvert comprising three consecutive boxes
Outline	<ul style="list-style-type: none"> Channel width with nine consecutive boxes 72.3m Revetment to be provided only to the portion where boxes have been installed 	<ul style="list-style-type: none"> Box culvert reduced to three consecutive boxes to reduce the channel width to 23.7m Banking on the revetment and on its back necessary to ensure smooth transition of channel width
Horizontal arrangement		
Structure	<ul style="list-style-type: none"> Box culvert comprising nine consecutive boxes Upstream side revetment: Mattress basket 10m×9 stages Downstream side revetment: Mattress basket 10m×10 stages Bed protection: Mattress basket 73.3m×8 rows 	<ul style="list-style-type: none"> Box culvert comprising three consecutive boxes Upstream side revetment: Mattress basket 10m×9 stages Downstream side revetment: Mattress basket 10m×10 stages Bed protection: Mattress basket 25.1m×8 rows Upstream side training dike : h=3.0m×400m Downstream side training dike h=3.0m×100m
Water depth	• 0.4m	• 0.7m
Features	○ Stable because the existing flow section is secured	<p>Long revetment necessary to minimize turbulence of flow because the channel width is reduced to one third.</p> <p>Checking for box overturn necessary because of increase in water depth and flow velocity</p> <p>Large sized boulders movable more readily due to increase in the water depth and flow velocity</p>
Approximate construction costs	¥65 million	¥ 78 million
Ranking	○[Selected]	

Source: Prepared by the Survey Team

6) Structure Type of Group 2

In Group 2, the existing structure is of a ford-crossing type, allowing water to flow into the existing road during rainfall (the structure designed longitudinally to be lower than front and rear portions of the road), often leading to regulation of vehicle traffics. In addition, there is also a concern about the safety. As shown in Figure 2-2.14, the river-crossing structure type of this group will be improved in terms of road alignment and modified to enable all-weather traffic by arranging culvert structure.

The wadi section will be provided with the mattress baskets to provide slope protection and to prevent scouring upstream and downstream sides of the culvert installation portion.



Source: Prepared by the Survey Team

Figure 2-2.14 River-crossing Structure of Road Alignment Improvement Plans of Group 2

7) Structure of Group 3

The existing state of Group 3 includes arrangement of box culvert or pipe culvert. The field survey is confirmed to show damage to the concrete members of existing facilities. In addition, the inlet and outlet are also confirmed to be blocked due to collapse of surrounding road slopes. Considering that the length of existing river-crossing facilities may become insufficient in the course of improvement of the road width, it is planned to conduct total replacement of the existing structure. The installation position and the size of planned culvert are to be equivalent or more to the existing ones, which is actually determined from the results of hydraulic simulation using the satellite data of topography (horizontal two-dimensional unsteady flow calculation).

Similarly to the case of Group 2, gabion is to be provided for slope protection and prevention of scouring on both upstream and downstream sides of culvert installation.

8) List of Structure Plans

The list of structure plans for the target section is shown in Table 2-2.23 below.

Table 2-2.23 List of Structure Plans

Measurement point	Current state				Plan	
	Structure type	Sectional size B×H,φ(mm)	Length L(m)	Necessity of new construction or reconstruction of channel structures	Planned structure No.	Sectional dimensions B×H(m) - consecutive number
197+484.800	Pipe culvert	1000	9.8	Insufficient length, lots of damages	Box-1	1.0 x 1.0 - 1
197+792.900	Pipe culvert	800	11.0	Insufficient length, lots of damages	Box-2	1.0 x 1.0 - 1
198+019	Pipe culvert	800	9.7	Insufficient length, lots of damages	Box-3	1.0 x 1.0 - 1
198+269.500	Pipe culvert	800	11.0	Insufficient length, lots of damages	Box-4	1.0 x 1.0 - 1
198+485.200	Pipe culvert	800	11.0	Insufficient length, lots of damages	Box-5	1.0 x 1.0 - 1
198+692.900	Pipe culvert	800	9.7	Insufficient length, lots of damages	Box-6	1.0 x 1.0 - 1
198+863.900	Box culvert	1000×1000 (two consecutive boxes)	11.0	Insufficient length, lots of damages	Box-7	1.5 x 1.0 - 1
199+279.100	Pipe culvert	1000 (two consecutive boxes)	15.0	Insufficient length, lots of damages	Box-8	1.5 x 1.0 - 1
200+376.500	Pipe culvert	600	8.4	Insufficient length, lots of damages	Box-9	1.0 x 1.0 - 1
201+030	No existing facilities	-	-	-	Box-10	1.0 x 1.0 - 1
201+942.900	Pipe culvert	600	8.7	Insufficient length, lots of damages	Box-11	1.0 x 1.0 - 1
202+800	Pipe culvert	600	9.5	Insufficient length, lots of damages	Box-12	1.0 x 1.0 - 1
204+585	No existing facilities	-	-	-	Box-13	1.5 x 1.0 - 1
205+700	No existing facilities	-	-	-	Box-14	2.0 x 1.0 - 1
207+020	No existing facilities	-	-	-	Box-15	1.0 x 1.0 - 1
207+560	No existing facilities	-	-	-	Box-16	1.5 x 1.0 - 1
208+156	No existing facilities	-	-	-	Box-17	2.0 x 1.0 - 1
208+790.600	Pipe culvert	600	9.5	Insufficient length, lots of damages	Box-18	1.0 x 1.0 - 1
209+191.600	Pipe culvert	600	9.2	Insufficient length, lots of damages	Box-19	1.0 x 1.0 - 1
209+592	No existing facilities	-	-	-	Box-20	2.0 x 1.0 - 1
209+828	No existing facilities	-	-	-	Box-21	2.0 x 1.0 - 1
210+140	No existing facilities	-	-	-	Box-22	2.0 x 1.0 - 1
210+738	No existing facilities	-	-	-	Box-23	1.0 x 1.0 - 1
211+125	No existing facilities	-	-	-	Box-24	1.0 x 1.0 - 1
211+250	No existing facilities	-	-	-	Box-25	2.0 x 1.0 - 2
211+872.400	Box culvert	2000×1500	8.4	Insufficient length, lots of damages	Box-26	2.0 x 1.5 - 1
211+992	Ford crossing	-	10.0	Not appropriate for ford crossing	Box-27	2.0 x 1.0 - 1
212+288	Ford crossing	-	10.0	Not appropriate for ford crossing	Box-28	2.0 x 1.0 - 1
212+550	Ford crossing	-	10.0	Not appropriate for ford crossing	Box-29	1.5 x 1.0 - 1
212+753.700	Box culvert	1000×800	10.0	Insufficient length, lots of damages	Box-30	1.0 x 1.0 - 1
212+819	Pipe culvert	600(two consecutive boxes)	8.8	Insufficient length, lots of damages	Box-31	1.0 x 1.0 - 1
213+126.700	Pipe culvert	600	9.0	Insufficient length, lots of damages	Box-32	1.0 x 1.0 - 1
213+355.100	Pipe culvert	600	9.0	Insufficient length, lots of damages	Box-33	1.0 x 1.0 - 1
213+411.300	Pipe culvert	600	9.0	Insufficient length, lots of damages	Box-34	1.0 x 1.0 - 1
213+514.700	Box culvert	2000×1500	10.0	Insufficient length, lots of damages	Box-35	3.0 x 2.0 - 2
213+852	Ford crossing	-	10.0	Not appropriate for ford crossing	Box-36	7.5 x 3.7 - 9
214+675	Ford crossing	-	10.0	Not appropriate for ford crossing	Box-37	3.5 x 2.0 - 2
214+760	Ford crossing	-	10.0	Not appropriate for ford crossing	Box-38	3.5 x 2.0 - 6
216+765	Ford crossing	-	10.0	Not appropriate for ford crossing	Box-39	2.0 x 1.5 - 1
217+875.400	Pipe culvert	800	9.0	Insufficient length, lots of damages	Box-40	1.0 x 1.0 - 1

*1: The internal section and length of the plan may be subject to change depending on the measurement results data and the longitudinal alignment plan.

*2: Black letters indicate relocation while the blue letters indicate new construction.

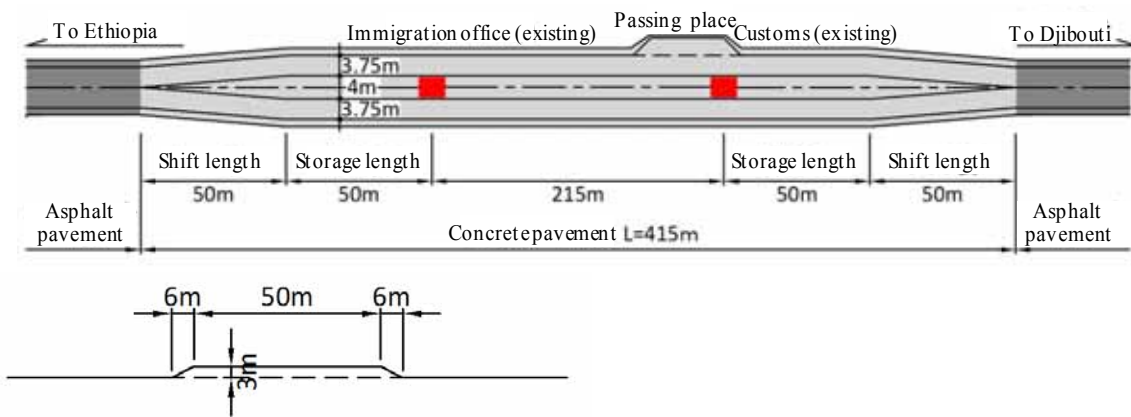
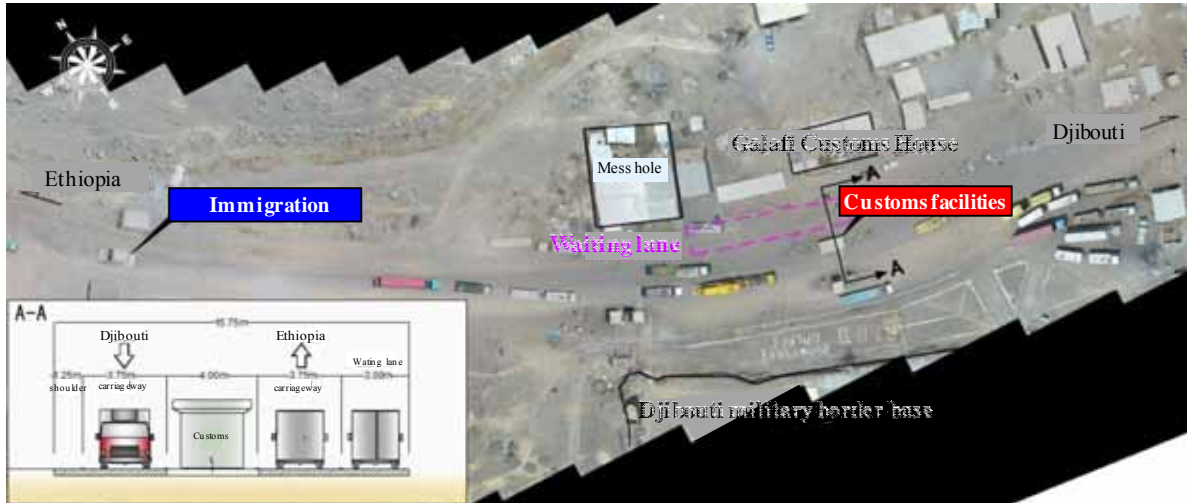
Source: Prepared by the Survey Team

2-2-2-5 Border Facilities Plan

At the border facilities, constant congestion is not observed at present, but congestion as follows may occur:

- Congestion caused by about three vehicles a day that have to park for extended period of time due to human error or trouble in terms of the operation system
- Congestion occurring when the handling capacity on the border is exceeded by vehicle convoy onrushing toward the border facilities after having waited for passages due to road flood and accident
- Congestion caused by troubles occurring in the facilities on the Ethiopian side of the border

In view of these situations, a waiting lane will be provided at locations passing the customs facilities on the border to mitigate congestion caused by waiting vehicles. The waiting lane for customs facilities will be provided for the traffic toward Ethiopia only, with the width of 3.0 m and the length of 50 m enough for two full-trailers to park. (See Figure 2-2.15)



Horizontal dimensions of the passing place

Source: Prepared by the Survey Team

Figure 2-2.15 Road Plan for Facilities on the Border

Since heavy damage is inflicted due to acceleration/deceleration and slow-down of large vehicles in the area around border facilities, the concrete pavement having the durability under static load will be provided to the 415 m section including the shift length as shown in Figure 2-2.15. For the design of concrete slabs, the theoretical design method in which the actual value from the axle survey is reflected will be employed. For the design of subbase thickness, the subbase curve method will be employed, which is to determine the required subbase bearing capacity factor from the subgrade and traffic conditions.

The concrete pavement composition established by above design methods is shown below. (For details, refer to 2-2-2-3 Pavement Design, (6) Pavement Composition);

- Concrete slab: 30cm
- Base course (Crushed stone for mechanical stabilization): 20cm
- Subbase course (crushed stone): 20cm

2-2-2-6 Ancillary facilities

(1) Guard Rail

The guard rail for vehicles will be provided in the following locations where departure of vehicles to the outside of the road presents the high degree of risk and where such departure is highly possible while ensuring conformity with EU-assistance section and referring to Guide Fence Installation Standard and Explanation of Japan.

- Section where culverts have been installed
- Outer portion of sharp curve sections (superelevation 6% or more)
- High embankment sections (road side height 4 m or more)

Considering the local availability, the type of guard rail will be BMSNA2/C of EU standard similarly to the EU-assistance section.

(2) Signs

The speed limit signs for the design speed will be provided at an interval of 800 m while referring to the Road Signs Installation Standard and Explanation of Japan. Note that actual provision of signs will be performed after consultation with the competent transport police, etc.

(3) Kilometer Posts

The concrete kilometer posts similar to those used in the EU-assistance section will be provided at a 1 km interval.

(4) Drainage Facilities

The target section runs mostly through the desert area, so that road surface drainage will be discharge of stormwater to the roadside as is the case of the existing roads. For the section where the roadside is inclined toward the road to allow stormwater to collect to the toe of embankment slope, concrete will be placed to prevent scouring of the toe of slope.

2-2-3 Outline Design Drawings

The basic design drawings based on the basic plan and design conditions are shown in Appendix 8 Outline Design Drawings. List of drawings is shown in Table 2-2.24.

Table 2-2.24 List of Drawings

No.	DRAWING TITLE
1	LOCATION MAP
2 – 3	TYPICAL CROSS SECTION (1), (2)
4 – 19	PLAN & PROFILE (1) ~ (16)
20 – 123	CROSS SECTION (1) ~ (104)
124 – 125	STANDARD DRAWING OF BOX CULVERT (1), (2)
126	GENERAL DRAWING OF BOX CULVERT(Box-36 at PK213+843)
127	STANDARD DRAWING OF GAURDRAIL
128	STANDARD DRAWING OF FOOT STRUCTURE OF SLOPE
129	STANDARD DRAWING OF PK POST

2-2-4 Implementation Plan

2-2-4-1 Implementation Policy

(1) Basic Points until the Selection of the Contractor

The Project is of a Grant-in-Aid which starts through the decision by the Japanese Government Cabinet Meeting, and the conclusions of the Exchange of Notes (the E/N) and the Grant Agreement (the G/A) between the Japanese Government and the Djibouti Government for implementation of the Project.

The Consultant shall make a contact of a detailed design and a supervision of the Project between the Djibouti Government after the conclusions of E/N and G/N, and shall start the detailed design works. The Consultant shall make the documents such as design description documents, specifications, cost estimation and necessary documents for the contract, and shall select the Contractor by the implementation of bidding.

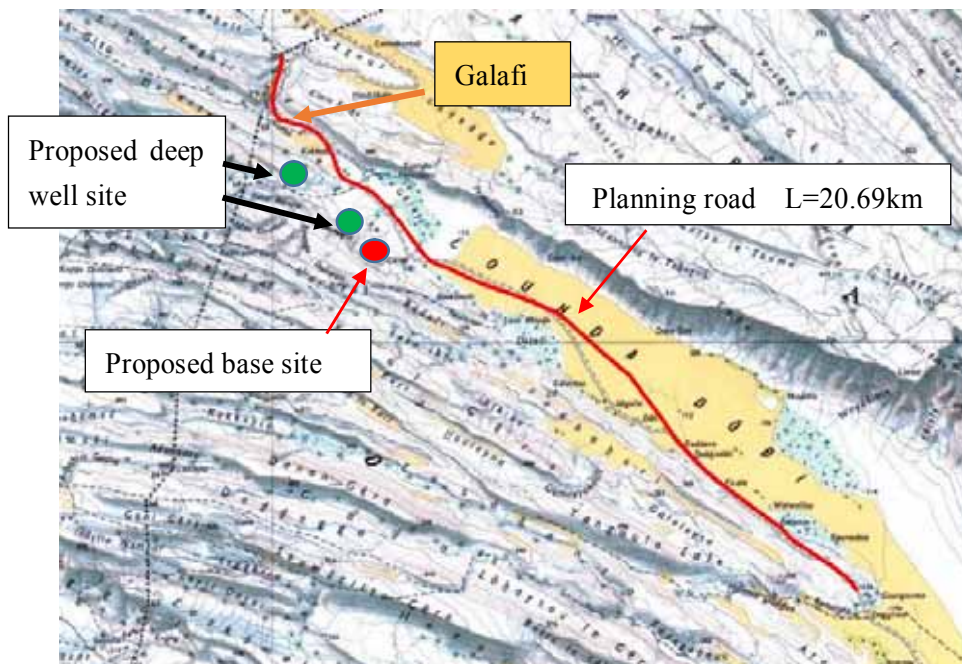
The bidding shall be processed through the necessary procedures for bidding and examination under the approval of the Djibouti Government.

(2) Basic Policy for Construction

Considering the Gant-in-Aid project, the basic policies for construction are proposed to be as shown below.

- Construction methods and procedures shall be determined in considerations of a desert terrain and harsh weather in site, natural conditions such as a short-term inundation accompanied by them, and current conditions of road pavements, passage for big vehicles and traffic accidents.

- The facilities shall be arranged properly for facilitating the construction in site, keeping safety during works by avoiding the danger accompanied by the short-term inundation.
- Main construction machines shall be procured and imported from Japan or Ethiopia from preventing high prices of machines in the Djibouti
- Almost construction materials are to be procured in the city of Djibouti except natural resources which can be obtained in site. A safety plan of transportation shall be checked before transportation for the materials delivered on field.
- Construction of a new road by one side traffic regulation is considered to be difficult in an existing road because of the degradation of pavements due to passage of big vehicles. Induction of big vehicles through a detour is useful, and the construction plan has to include it and improve safety sufficiently.
- A construction base for the offices of the Contractor and the Consultant shall be planned at the place where safety from inundation, comfort and flatness can be secured. A proposed site at present is a flat land of 300m square on the west side of the road and in the direction of 4.5km south-east from Garafi.
- Deep wells for the base are planned a little north of the base. Other proposed area for a construction well is planned about 2km from the base. If the quantity of water is not enough, a new potential point has to be looked for in the direction of a beginning point of the road.



Source: Prepared by the Survey Team

Figure 2-2.16 Planning Road and Proposed Base Site

(3) Taking Advantage of the Djibouti Consultants and Contractors, and Those Methods

1) Construction Consultant

According to the Chamber of Commerce, there are 17 local consultants and more in the Djibouti. Most companies except 3 companies have only a small number of engineer working there. And the most consultants work for architectural design work and supervision of the buildings, so the number of civil engineers is few because of a few number of the consultants in civil field, or because they have to hold the civil and architectural works concurrently.

There are various size of local consultants in the architectural field. Sometimes the contractors enter into the consultant field. In civil engineering field, there is no local consultant who majors for road and structure design. Most companies continue their architectural works until civil works come.

There are 2 local consultants majoring for water-related works, but those companies are of small scale.

There are cases that the contractors enter into the surveys such as geological survey, measuring survey or traffic analysis. Some contractor has laboratory of their own, but most contractors don't have it. However the tests done on the private laboratories cannot be approved by the government authorities, so every contractor or consultant has to entrust the test to the Central Laboratory delivering the survey materials.

2) The Contractor

According to a registered list of the Djibouti Chamber of Commerce, 89 contractors are listed, but it is estimated that there are many unlisted contractors. The contractors of large scale are of Italy origin, Yemen origin and so on. There are contractors of Djibouti origin, however the scales of most those contractors range from middle to small. Furthermore, the several contractors originated from China enter into railway business, hotel business and so on. Sometimes foreign contractors enter into the construction business for a limited period targeting the intended project.

Main business of the contractors is a construction of buildings, but every contractors deal with road projects.

Table 2-2.25 Types of the Contractors (as of April, 2018)

Foreign-owned		COSMEZZ, HAWKS, VEZI etc.
Local	Group	GSK Group, AL-GAMIL Group, Halt Group, Inmaa Group etc.
	Independent	Nalco, ALDHAFRA. O'CON s.a.r.l. etc.
Chine-owned		CCECC, CHEC, CSCEC, Sinoma etc.

Source: Prepared by the Survey Team

The Large medium-contractors have construction machines, but the local artisanal contractors allocate the construction machines to the necessary works through borrowing and lending of the machines. Construction of arterial roads are done by the large-medium-contractors financed from

the foreign donors.

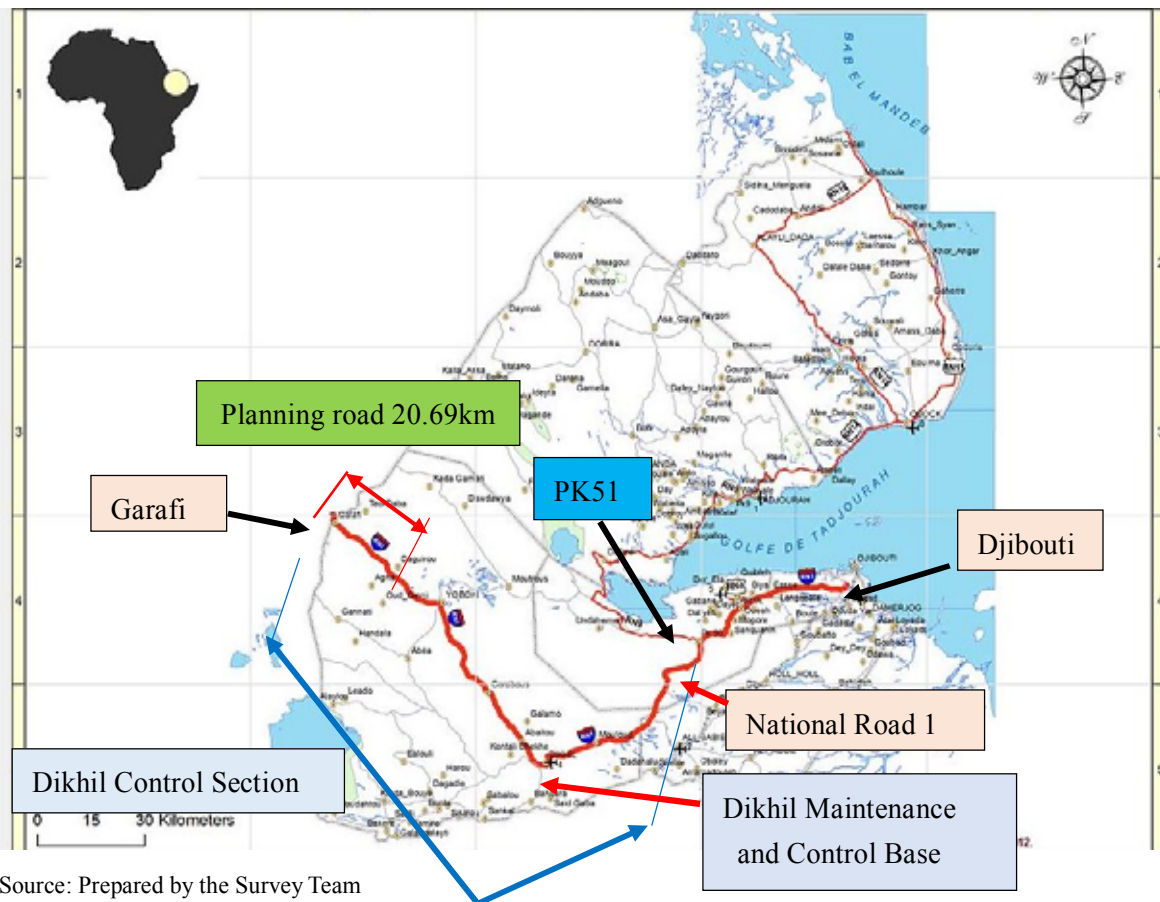
Based on these situations, local subcontractors also seem to have an enough capacity to cooperate with the Project since there are many experienced contractors in road projects. So that the consultant can select the experienced engineers for supervision works even though the number is few.

(4) Roll of Dispatched Engineers

Since the engineers working for ADR (Agence Djiboutienne des Routes) are almost young, the necessity of training and education by the dispatched engineers from Japan would be increasing. Necessary engineering field has wide ranges of technologies, so the dispatch of engineering in every field from designing to construction of road is to be expected.

(5) Implementation System of ADR

The Project is administrated by ADR under the jurisdiction of MET (Ministre de l'Equipment et des Transport) as mentioned on Figure 2-1.1. Main implementation department of the Project is the Construction Department among 3 departments in ADR. Dikhil Maintenance and Control Base is in charge of the National Route between PK51, which is a junction of National Road 1 and 9, and Dikhil adding a route between Dikhil and Garafi. And all the road sections for maintenance are under control of its Dikhil Maintenance and Control Base.



Source: Prepared by the Survey Team

Figure 2-2.17 Dikhil Control Section and Planning road in National Route 1

2-2-4-2 Implementation Conditions

The Contractor shall pay attention to the points as shown below.

(1) Observance of the Labor Law

In the Djibouti, the Contractor has to obey the Labor Law which prescribes a 48 hours of labor for workers in a week, a minimum monthly payment of 35,000DJF (US\$200) and holidays. In intense heat period from June to August, the Contractor has to rethink of the conditions such as working time considering labor environment and social customs.

(2) Consideration Items at Works

1) Construction Methods

- Construction on intense weather in summer must be done considering the local conditions.
- Asphalt and concrete scraps which breaks out by breaking existing roads shall be transferred to the appointed places by ADR along the construction sections and shall be landfilled there.
- At the beginning of construction, almost two wells would be dug around a planning road section and necessary water quantity would be acquired there. The permission of Ministry of Agriculture to start digging wells must be obtained beforehand. Those two places was selected at the places where does not influence to other wells. However, if the wells do not satisfy the enough quantity of water, other place has to be surveyed with a trial digging.
- In order to progress the construction smoothly without affected by weather, and shorten the construction period as possible, the construction sections are divided into mutually independent sections.
- An asphalt plant and a crusher plant have to be set up at places where avoids flood plain areas, and at high hills where flood does not affect. Waste water from plants and drainage from the Contractor's camp must be treated and drained to the appropriate places.
- The construction has to be done with no damage to an existing water and communication pipes of the residents.
- A large structure at about 4km point from the border, must be done inducing flood water by summer sudden rain without damage to the structure under construction.
- Utilize transceiver when contacting between the construction base, the sites and the vehicle which are carrying the materials.
- Concrete placing is done when temperature goes down at morning or evening, because the concrete placed at high temperature tends to raise the temp. of concrete, increases of unit quantity of water, decays the workability and slump, hastens the condensation of concrete, decreases the long strength and so on. Under 25 degrees of temperature shall be taken as a guide. Measures to keep out the heat would be to cover the sheet on the storage facilities such as miscellaneous materials and aggregates, and to decrease the temperature sprinkling on them. It is desirable to use cold water.
- Diversion number of times of plywood form shall be maximum 4 imagining the usage of undercoat and top paints of synthetic resins on plywood, and considering permeability.

However, since a common size of culvert is uniformly 1.0m*1.0m, the use of steel form is desirable.

- Compaction with water shall be adopted because of using sandy soil to backfill soil. Spreading depth shall be basically around 30cm.

2) Traffic Regulation

- Traffic regulation in construction shall be approved by ADR with a drawing of regulation plan, and construction starts. Implementation of traffic regulation include notification signboards, protective cones, an induction display machine etc. Traffic guards shall be allocated on both sides of construction sites, and make an effort to avoid accident and induce vehicles appropriately
- Detours in construction shall be consist of gravel pavement considering the trafficability and reducing the vibration due to large vehicles.

3) Work Environment

- Designated base shall be made because of protecting requisite minimum of living environment for the Contractor, the Consultant and employed local workers from harsh local natural conditions. The base is set up on the plateau in the south-west side of Garafi for safety. This is an area of 300m square that suggests a demolished site for collection of crushed stones. It is easy to protect workers there.
- Since there is no appropriate medical facilities around the base, a system for first aid measures (resident medical staff) would be required.
- A local working hour is 9 hours of 6:00~12:00 and 15:00~18:00 from Saturday to Wednesday, and 7 hours of 6:00~13:00 on Thursday. Friday is a holiday.
- Since a temperature exceeds 40 at maximum at noon, and it exceeds 30 even at minimum in the intense heat period of June to August, a working hour in the season is totally 5 hours: 3 hours from 6:00~9:00 and 2 hours from 16:00~18:00.
- Working hours in the Djibouti being 48 hours in a week as same as in Japan, construction plan must be made in compliance with the law.
- Harsh natural conditions require a rest for supervisors to keep and control health.
- National holidays in the Djibouti are as follows. They are used for determination of non-working days. These days move depending on years, so they are put in the construction plan.
- Construction in the intense heat period of summer requires setting of tents, making environment for workers to rest, provide them with water and cookies, and physical fitness maintenance.

Table 2-2.26 National Holidays in 2018

Date	Weekday	Holiday Name	Holiday Type
Jan. 1	Monday	New Year	Public Holiday
Mar. 20	Tuesday	March Equinox	Season
Jun. 15	Friday	Eid al-Fitr	Public Holiday
Jun. 21	Thursday	June Solstice	Season
Jun. 27	Wednesday	Independence Day	Public Holiday
Aug. 22	Wednesday	Eid al-Adha	Public Holiday
Aug. 23	Thursday	Eid al-Adha	Public Holiday
Aug. 24	Friday	Eid al-Adha	Public Holiday
Sep. 12	Wednesday	Muharram	Public Holiday
Sep. 23	Sunday	September Equinox	Season
Dec. 21	Friday	December Solstice	Season

Source: Prepared by the Survey Team

2-2-4-3 Scope of Works

The items below show the outline of each burden matter for Japan and the Djibouti Governments in implementation of the Project.

(1) Work Scope undertaken by Japan Side

1) Road Construction Works

Earth works, road bases, base courses, surface courses, drainages, structures across rivers, accessories (facilities for security, guide signboard etc.), carriage markings, temporary works, well digs, water supply works, detours, construction of a base camp and material plants works involved in the road improving works of an existing road along a targeted section of 20.69km.

2) Procurement of Labors, Construction Machines and Materials

Procurement of necessary labors, construction machines and materials involved in the road construction.

3) Safety Measures

Safety control and measures involved in the implementation of construction.

4) Consultant Works

Detailed design, making of bidding and contract documents, assistant of bidding and supervision of works.

Education toward other party institutions in each construction stage (OJT)

(2) Work Scope undertaken by Djibouti Side

1) Procuring of Sites

Right of way, sites for detours, necessary site for a construction base camp shown in the construction plan, disposal sites for scraps originated from construction, procurement of the sites for asphalt plants and crusher plants necessary for the product of aggregates, sites for well and approval of drilling.

2) Maintenance and repair of detours, roads and incidental facilities

Maintenance of the constructed roads and incidental facilities not attributable to construction personnel, general vehicles accident processing and road repair after accidents and floods etc.

3) Custom Clearance and Exemption

Provision of convenience for implementing custom clearance and exemption in the Djibouti based on a construction machine and material list which was made before starting of construction.

4) Counterpart

Relative cost for nominated counterparts stay and transportation expenses of counterpart staff.

5) Others

Provision of convenience for the entry, staying and departure of the persons who work for the Project. Monitoring of the environment and expenses required rather than those of grand aid by Japan.

2-2-4-4 Consultant Supervision

(1) Basic Policy for Supervision

For the sake of achievement of the objects shown in the design documents of road pavements and their accompanying works based on the contract conditions before construction, the supervisors do control the construction with a schedule for keeping necessary items and qualities within the construction period, and also keeping safety of the construction. The details are as follows.

1) Process Management

Compare the schedule with actual process in the period, survey the cause if there are differences and get rid them off for the smooth progress of construction.

2) Control of Finished Shapes

Control the finished shapes measuring directly and correctly, make control charts, and correct them based on the evaluation of data if there are problems. And take photos in each stage, and confirm the finished shapes and quantities which cannot confirm after completion.

3) Quality Control

Conduct appropriately the physical and chemical tests based on the quality control standards, find the problems and improvement methods with the results, and control to keep good quality.

4) Cost Management

Compare economically a scheduled cost calculated at making up the implementation budget with an actual cost already happened, confirm the progress of construction (progress rate), and control the cost not to be over the scheduled cost.

5) Safety Control

Take site conditions into account, plan and improve safety construction system and environment, reform the problems if any, and instruct and control the system not to be involved in the accidents.

(2) Points to Note in Supervision

Points to note in supervision are as follows.

- Most of all the vehicles passing on the existing road are large ones, the road pavement condition is not good, and fall accidents are shown frequently. So the appropriate traffic regulation is necessary for the safe passage of those vehicles even in inducing large vehicles into detours.
- The supervisors have to be made doubly sure of the heat measures especially in summer, consider the physical conditions and health cares of workers and their supervisors, and avoid an unreasonable progress.
- Safety checks have to be done mainly on the appropriate allocation of flaggers, the clear indication of off-limit area, the confirmation of black spots when operating the construction machines, the danger such as worker's involvement in machines, the obstacles in a rail, the safety confirmation by watching the front, and the execution of safety education for workers.

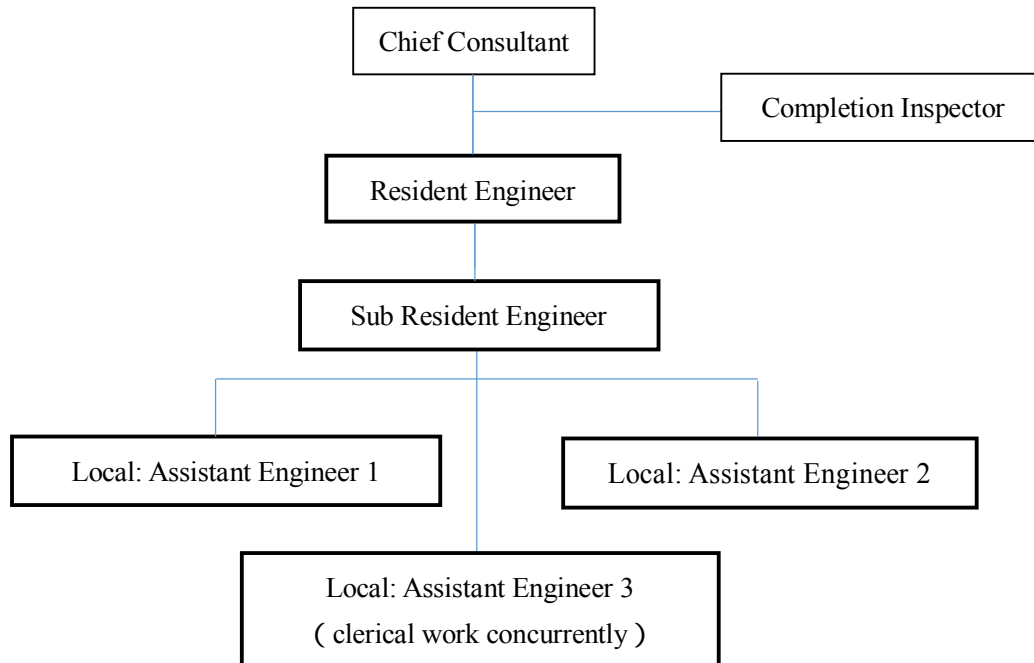
(3) Supervision System

A chief of supervisors has to enter into the site before start of construction, adjust the schedule with the relative organizations including the Contractor before starting, and make a system that can start the supervision appropriately. On the basis, resident supervisor has to enter into the Djibouti one month later of the contract, and after that sub-supervisor enters into there for employing local engineers, set up the consultant office, and star the works.

After inspecting by a completion inspector at the completion of construction, and if passed the inspection, the completion is to be accomplished.

Table 2-2.27 Supervisors in Charge and Their Rolls

Person in Charge		Roll
Japanese Engineers	Chief Consultant	Over roll management Adjustment between each organization before and after construction
	Completion inspector	Inspection of completion of the construction at the completion
	Resident engineer	Site resident supervisor in charge
	Sub resident engineer	Site sub resident supervisor
Local Engineers	Assistant engineer 1	Assistant work of supervision
	Assistant engineer 2	Assistant work of supervision
	Assistant engineer 3	Assistant work of supervision (clerical work concurrently)



Note: The bold frame above figure indicates engineer who resides on-site.

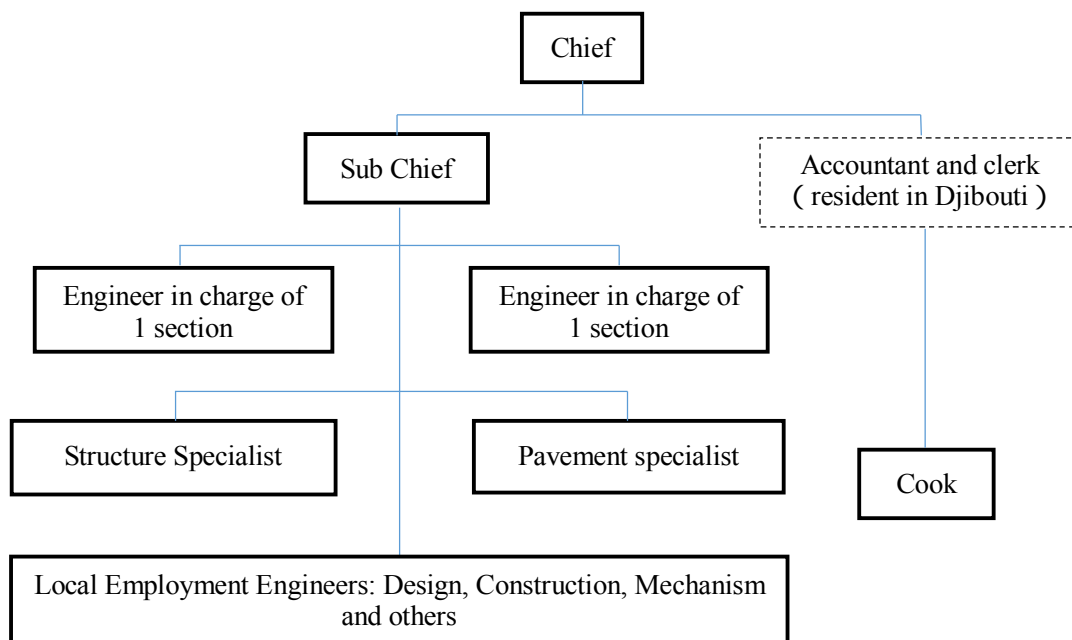
Source: Prepared by the Survey Team

Figure 2-2.18 Supervision Structure

(4) Supervision System of the Contractor

Table 2-2.28 Contractors in Charge and Their Rolls

Person in Charge		Roll
Japanese Engineers	Chief	As a general manager of construction, adjusts with the government offices, consultants, local stake holders and subcontractors, and implements process management, cost management, quality control and safety control. Be witness at the inspection after 1 year of completion.
	Sub chief	With attention from a chief, indicate to engineers in charge and local engineers of the construction, and execute the works. Sometimes negotiate on the behalf of chief.
	Engineer in charge of 1 section	Execute the construction work of the 1st section, and be in charge of quality control and finished shapes. Simultaneously, make as-build drawings of the 1st section.
	Engineer in charge of 2 section	Execute the construction work of the 2nd section, and be in charge of quality control and finished shapes. Simultaneously, make as-build drawings of the 2nd section.
	Special engineer for structure construction	Instruct and supervise the subcontractor as a specialist of form, re-bar and concrete placing.
	Special engineer for pavement construction	Instruct and supervise the subcontractor as a specialist of pavement.
	Accountant and clerk	Take in charge of accounting, internal and external business. Stay in the Djibouti City, but go to site in need.
Local Engineers	Engineer in charge of design, construction, clerical work, and control work of camp and materials.	Local engineers consist of several engineers who are in charge of miscellaneous works such as making design documents, conducting and controlling construction works, doing paper works and foreign negotiations, controlling machines and materials, observing weather and so on.
	Guard	Guard of the construction camp.



Source: Prepared by the Survey Team

Figure 2-2.19 Supervision System of the Contractor

2-2-4-5 Quality Control Plan

(1) Trial Test

In construction of banking, roadbed, base course, surface course, structure across the river, detour and so on, the tests and measures for quality control must be conducted for each target item. The Project is classified into a large-scale construction, so 2 periodic inspections must be conducted during the construction period.

Trial tests has to be conducted based on Japanese JIS standard. Diversion number of times of form, temperature in construction and so on, have to achieve prescribed quality with working standard rules.

A pavement area exceeds 10,000m², so test schedule will be made as a medium-scale construction or more.

Table 2-2.29 Content of Trial Batch Test (medium-scale construction or more)

Items	Trial Test	Quality control		Finished shape control
		Plant control	Others	
Implementation Period	Before construction At change of material	At product of a mixture	At construction	
Method	Test report or implementation of test	Extractive test such as particle size, quantity of asphalt and so on, and trial test led by JIS	Test, measures	

Source: Paving Construction Handbook (Japan Road Assoc.) Extraction of the contents of the medium-class construction Content of Trial Batch Test (medium-scale construction or more)

The trial test is intended for confirming whether using materials and construction methods are appropriate. It is done before construction start. In the Project, it is done aiming at necessary items for construction.

The items of trial test is according to the quality test items at construction. The Project area is known as harsh heat area, so it is important to catch the influences of heat to construction.

- Judge whether using materials is appropriate
- Catch the values beforehand necessary for control and inspection.
- Confirm the performance of mainly using construction machines
- Implement a test construction depending on the case. It enables us to make a work standard.

(2) Periodic Inspection of Asphalt Plant

Even an asphalt plant is a target of periodic inspection. Target values of inspection are as follows.

Table 2-2.30 Target Values at Periodic Inspection of Asphalt Plant

Inspection items		Target value
Weighing Machine	1/2 or less of weight	1 scale or within $\pm 0.5\%$ of weight
	1/2 or more of weight	2 scales or within $\pm 1\%$ of weight
Thermo-meter	Gap between a standard temperature	Within $\pm 5^{\circ}\text{C}$
	Time lag	Within 6 minutes
Amount of discharge of asphalt		Within $\pm 1\%$

Source: Paving Construction Handbook (Japan Road Assoc.)

(3) Trial Construction

A trial construction enables us to spread the roadbed material and mixtures, compact them, confirm the quality and workability, and make a work standard for each work. Also it enables to set a control limit and frequency. The trial construction shall be done using a part of actual site, and shall be appropriate to the construction.

Items in the trial construction are as follows.

Table 2-2.31 Example of Items Studied in the Trial Construction (Asphalt Pavement)

Study Items	Content
Confirmation of construction machine	Proper or improper of leveling machine etc.
	Selection of compaction machine, combination etc.
Confirmation of mixture	Particle size, asphalt volume etc.
	Workability, material separation etc.
Disposal limit of mixture	Lower limit of temperature of mixture etc.
Leveling conditions	Extra banking volume etc.
Compacting conditions	Mixture temperature, order of rolling compaction, number of times, velocity etc.

Source: Paving Construction Handbook (Japan Road Assoc.)

(4) Control of Finished Shapes of Pavement

Control of finished shapes is the confirmation whether finished shapes satisfies the design documents, and inspection items are basic heights, widths and thickness.

Table 2-2.32 Reference Example of Items for Control of Finished Shapes, Frequencies and Standard Limits of Control

Type of Works	Items	Frequency	Standard Limit of Control
Subgrade	Basic height	Every 40m	$\pm 5\text{cm}$ or less
	Width	Every 40m	-10cm or more
Sub Base Course	Basic height	Every 20m	$\pm 4\text{cm}$ or less
	Thickness	Every 20m	-4.5cm or more
	Width	Every 40m	-5cm or more

Adjustment of particle size		Thickness	Every 20m	-2.5cm or more
		Width	Every 100m	-5cm or more
Base Course	Cement and Lime stable processing	Thickness	Every 20m	-2.5cm or more
		Width	Every 100m	-5cm or more
	Bitumen stable processing	Thickness	Every 1,000m	-1.5cm or more
		Width	Every 100m	-5cm or more
	Cement and Bitumen stable processing	Thickness	Every 20m	-3cm or more
		Width	Every 40m	-5cm or more
Concrete slab		Thickness	Every 100m	-0.8cm or more
		Width	Every 40m	-2.5cm or more
		Flatness	Every carriageway All extension	2.4mm or less
Base /Surface heating asphalt mixture		Base thick.	Every 1,000m ²	-0.9cm or more
		Surf. thick	Every 1,000m ²	-0.7cm or more
		Width	Every 100m	-2.5cm or more
		Flatness (surface)	Every carriageway All extension	2.4mm or less

Source: Paving Construction Handbook (Japan Road Assoc.)

(5) Quality Control Items and Frequency

Example of quality control items, frequency and control limit/reference are as follows.

Table 2-2.33 Quality Control Items, Frequency and Control Limit/ Reference Example – 1

Work Items		Construction scale of items, Inspection status		Frequency of inspection	Standard control limit	Inspection method	
		Medium or more	Small				
Subbase Course	Moisture content PI Particle size	△	—	When abnormality was found by inspection		Pavement Inspection Handbook	
	Degree of compaction	○	△	Once per 1,000m ²	93% or more of maximum dry density		
	Plow flooring	○	—	At all times		Visual observation	
Adjustment of particle size	Moisture content PI	△	△	When abnormality was found by inspection		Pavement Inspection Handbook	
	Particle	2.36 mm	○	—	1 ~ 2 times /day		±15% or less
		75 μm		—	1 ~ 2 times /day		±6% or less
	Degree of compaction	○		Once per 1,000m ²	93% or more of maximum dry density		

Base Course	Cement and Lime Stable Process	Particle	2.36 mm	○	—	1 ~ 2 times /day	±15% or less	
			75 μm		—	1 ~ 2 times /day	±6% or less	
		Content of cement and lime	Periodic inspection		—	1 ~ 2 times /day	±1.2% or less	
			Amount of use	○	○	At all times		
		Degree of compaction		○		Once per 1,000m2	93% or more of basic dry density	Pavement Inspection Handbook
	Moisture content				When abnormality was found by observation			
	Cement Lime Stable Process	Content of cement	○	○	1 ~ 2 times /day		Confirmation of amount of use	
		Content of asphalt emulsion	○	○	1 ~ 2 times /day			
		Density (degree of compaction)	○		Once per 1,000m2	93% or more of basic dry density	Pavement Inspection Handbook	
		Content of water	○		1 ~ 2 times /day			
	Bitumen Stable Process	Temperature	○	○	At all times		Thermometer	
		Particle	○	—	Printing record : All or extraction/ Sieve analysis 1 ~ 2 times /day	In case of printing record [Note] Reference In case of sieve analysis 2.36mm±15% or less 75 μm±6% or less	Pavement Inspection Handbook	
		Amount of asphalt	○		Printing record : All or extraction/ Sieve analysis 1 ~ 2 times /day	In case of printing record [Note] Reference In case of sieve analysis - 1.2% or less		
		Degree of compaction	○		Once per 1,000m2	93% or more of basic dry density		

Source: Paving Construction Handbook (Japan Road Association)

Table 2-2.34 Quality Control Items, Frequency and Control Limit/ Reference Example – 2

Work Items		Construction scale of items, Inspection status		Frequency of inspection	Standard control limit	Inspection method	
		Medium or more	Small				
Concrete Slab	Particle size, Unit volume mass	○	△	Once or once a day per fine aggregate 300m ³ , coarse aggregate 500m ³	—	JISA1102 JISA1104	
	Surface water on fine aggregate	○	△	2 per day	—	JISA1111	
	Consistency	○	○	2 per day	Within design	JISA1101	
	Air content	○	○	2 per day	Within design	JISA1128	
	Concrete temperature	○	○	At measuring consistency	—	Thermometer	
	Concrete strength	○	○	2 per day	Design strength or more	JISA1132 JISA1106 JISA1108	
Surface and Base Courses	Heating asphalt mixture	Appearance	○	○	At all times	Observation	
		Temperature	○	○	At all times	Thermometer	
		Particle	○	△	Printing record : All or extraction/ Sieve analysis 1 ~ 2 times /day	In case of printing record [Note] Reference In case of sieve analysis 2.36mm±15% or less 75 μm±5% or less	Pavement Inspection Handbook
		Content of asphalt	○	△	Printing record : All or extraction/ Sieve analysis 1 ~ 2 times /day	In case of printing record [Note] Reference In case of extraction analysis - 0.9% or less	
		Degree of asphalt	○	△	Once per 1,000m ²	93% or more of basic dry density	

Legend ○ : Inspection at periodic interval or at all times is desirable.

△ : Inspection at abnormal status or when needed.

Source: Paving Construction Handbook (Japan Road Association)

(6) Quality Control Inspection of Concrete Structure

Inspections are to be implemented by checking whether the concrete structures satisfy the required performances set at the beginning, and the completed structures are acceptable. JIS or the methods approved by Japan Society of Civil Engineers shall be standard for site inspection methods and

regulations. These costs include in common temporary expense ratio.

1) Standard Values of the Structure across River

The quality for the structures across river in the Project adopts the quality conditions as shown below as “Inland reinforcing structure.”

Table 2-2.35 Quality Conditions of Concrete (Proposed values)

Item	Standard
Design Strength (N/mm ²)	24
Slump (cm)	8.0~12.0
Content of Air (%)	4.0~4.5
Maximum Cement Ratio (%)	55
Maximum Size of Coarse Aggregate (mm)	25
Minimum Unit Cement Content (kg/m ³)	300~330
Type of Re-bar	SD345 or equivalent

Reference Source: “Construction Technology” (Economic Research Association)

2) Inspection Items at Acceptance of Concrete

Items for inspections at acceptance of concrete are as follows.

Table 2-2.36 Items for Inspections at Acceptance of Concrete

Inspection Item	Inspection Method	Inspection Standard
Trial mix	Commission to the Central Laboratory	Once before construction starts
Slump Test	JIS A1101	At unloading, once per day or once per 50m ³
Measurement of Content of Air	JIS A1106, JIS A1108, JIS A1128	At unloading, once per day or once per 50m ³
Chloride Total Amount Regulation	Improvement of durability of concrete	Once per day
Measurement of Unit Water Volume		Once per day or once per 50m ³
Concrete Compressive Strength Test	JIS A 1108	At unloading, once per day or once per 50m ³ . Test pieces are $\sigma 7 \times 3pc$, and $\sigma 28 \times 3pc$

Source: Prepared by the Survey Team

3) Quality Inspection Control of Structure across the River

Items for Quality Inspection Control of Structure across the river are as follows.

Table 2-2.37 Items for Quality Inspection Control of Structure across the River

Item		Quality Control	Inspection
Concrete performance		Control of construction performance of concrete (slump or slump flow etc.) Control of hardened concrete performance (control of unit amount of water, water-cement ratio and strength characteristics etc.)	Inspection of mixture design Inspection of concrete at unloading Inspection of hardened concrete
Construction of Concrete	Re-bar	Control of processing and arrangement of re-bars (quantity, position, space, degree of fixing etc.)	Confirmation of works whether they are done as designed.
	Form and Timbering	Control of arrangement of form and timbering (Arrangement accuracy, degree of strength etc.)	
	Carrying and Placing	Control of supply time of fresh concrete (carrying, conditions of concrete placing machine, preparation, control of placing speed etc.)	
	Compaction	Control of vibration and their preparation (confirmation of whether compaction works are done evenly and enough)	
	Finish	Control of a finish time, conditions of finishing machines, and preparation etc.	
	Curing	Control of moist curing method and its period.	Confirmation of temp. and curing period.
Performance of Structure	Finish Condition	Positions and sizes of members, flatness, appearance, defects status	Inspection of finish shape Visual inspection Non-destructive inspection
	Durability Performance	Control of concrete quality, control of construction, covering performance and thickness of completed structure	

Source: "Quality assurance and improvement of concrete structure guideline (Plan)"
(Chugoku Regional Development Bureau, Japan)

4) Inspection Result of Finished Shape

Finished shapes of structures across the river have to be within below values after inspection.

Table 2-2.38 Control Values of Finished Shape

Basic height	±30mm
Thickness	—20mm
Inner width	—30mm
Inner height	±30mm
Extension	—200mm

Source: Ministry of Land, Infrastructure and Transport of Japan

2-2-4-6 Procurement Plan

(1) Procurement Policy

1) Materials

In Djibouti City, there are many materials used and necessary for road pavement works and

structure across the river works, and they are already imported and distributed widely in the market. So it is possible to procure those materials in the Djibouti because they are stored in the warehouses for construction machines and materials of the Contractors and the sellers. Almost of materials can be obtained easily except special street lights and such.

Water of fine quality which don't contain too much salt will be obtained by digging wells and pumping up of ground water in site. Aggregates necessary for road works are obtained by setting up a crusher plant or an asphalt plant in hill area rich in basalt and widely spread around the both sides of the road.

Procurement of materials are obtained by transport from Djibouti City. However the road from Dikhil to site is a harsh bumpy road, and many accidents are shown there, so a safety transport route shall be considered enough.

2) Construction Machine

All main construction machines can be procured in the Djibouti, however their costs are comparatively expensive that it requires to determine procurement country after comparing costs with imported equipment from Japan or Ethiopia. (See Table 2-2.40 for procurement country of main construction machines)

3) Labor

Employment in the Djibouti takes priority for the purpose of creature of job opportunity, activation of local economy as the result, and improvement of technical level of local engineers and labors. However some Japanese special engineers will be dispatched in the engineering field that is difficult for local engineers to reach.

(2) Procurement Classification

Most main materials are imported from neighborhood countries such as Egypt, Pakistan, Qatar, Turkey, Dubai, China, India and so on, and are distributed in the market except aggregates and cement (medium quality) The interview to construction officials shows that 90% of imported civil materials is via Dubai. However there is the case of the direct import from the countries of origin of the executives (Italy, France and so on). There are tools of MAKITA made in Japan. In addition, signals and street lights are imported directly by the government itself not by way of private contractors. In this case, a private company assembles them, and they are constructed by ADR.

Table 2-2.39 Procurement Classification of Main Materials

Material	Procurement Classification			Remarks
	Djibouti	Japan	Third Country	
Bituminous material	●			
Aggregate for pavement	●			
Cement	●		●	Pakistan
Aggregate for concrete	●			

Concrete block	●			
Re-bar, iron wire	●			
Wood (plywood, squared timber, Plate)	●			
Fuel (gasoline, diesel, light oil)	●			
Oils and fats	●			
Paint (paint, section line)	●			
Shaped steel, steel pipe, steel plate	●			
Guardrail	●			

Source: Prepared by the Survey Team

Crushed rocks and soils for pavement and concrete works are carried into the site from a crusher plant set up in the raw ore collection area which are several hundred meters from the road construction site.

(3) Construction Machine

Construction machines necessary for road construction is procured as a lease because that construction companies and construction machine rental companies hold them. Furthermore, if the subcontractor cooperates with these private companies, it is possible to procure most of the construction machines. However, the lease fees of necessary main machines proved to be relatively expensive as 5~10 times than the equipment ownership cost in Japan, most of them are to be imported from Japan or Ethiopia.

Auxiliary machines are to be procured in the Djibouti because of less influences to cost, and easy repair in there. Trucks are also to be procured in the Djibouti because of abundance of them though high prices.

Classification of procurement assumption of main construction machines are as shown in Table 2-2.40.

Table 2-2.40 Classification of Procurement Assumption of Main Construction Machines

Name of Machines	Standard and Specification	Supply Country		
		Djibouti	Third country	Japan
Asphalt plant	Performance : 60t/h, batch type		●	
Concrete plant				●
Bulldozer	3t, 10t, 15t, 21t with ripper			●
Backhoe	0.11m ³ , 0.45m ³ , 0.80m ³ bucket		●	
Power shovel		●		
Belt conveyor		●		
Truck crane	4t, 15t, 21t hanger	●		
Tire roller	8t~20t			●
Load roller	8t~10t tandem and macadam type			●
Large breaker				●

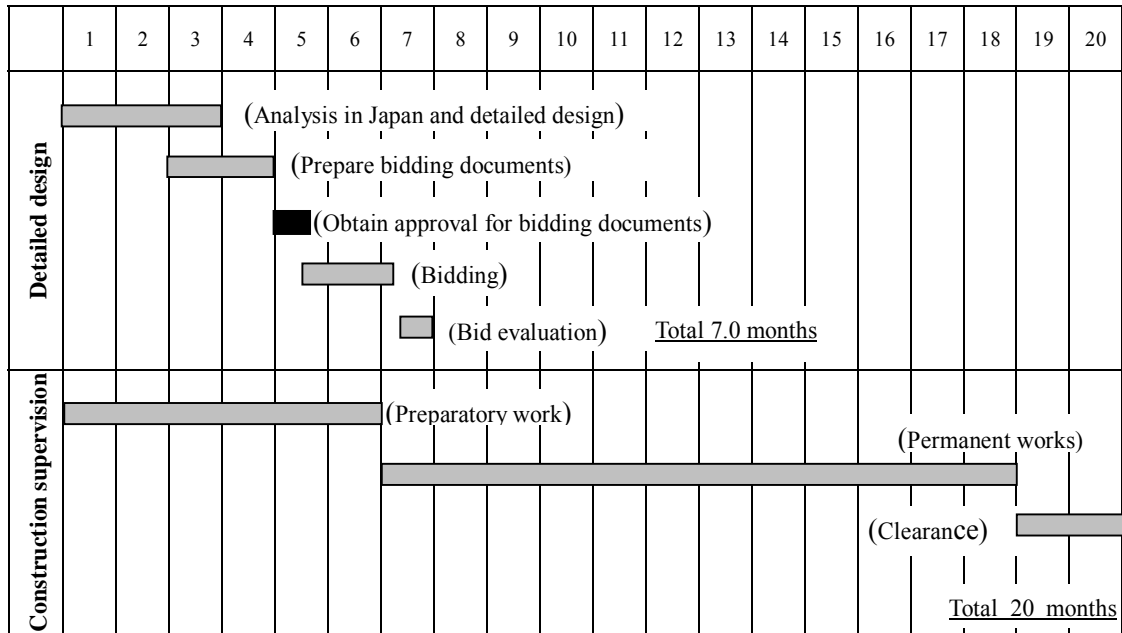
Concrete crusher			•	
Crawler drill	10t	•		•
Asphalt finisher	2.4~6.0m			•
Mortar mixer	0.1m ³	•		
Concrete mixer	0.25m ³ , 0.50m ³	•		
Agitator car	9.0m ³ , 4~6m ³	•		
Concrete pump car	28m, 90~110m ³ per minute			•
Tamper	60~100kg			•
Vibration roller	6~7.5t, 8~10t			•
Hand roller	600kg			•
Electric air compressor	0.7kW, movable type	•		
Electric welder	300A	•		
Concrete cutter		•		
Motor grader	Blade, 3.1~3.4m			•
Asphalt Distributor	0.2~2.0t/m ²	•		
Engine sprayer		•		
Movable mixer		•		
Movable asphalt plant		•		
Truck	10t	•		
Truck with crane	2.9~4.9t	•		
Dump truck	4t, 10t		•	
Water tank car	3,000, 10,000 liters	•		
Rough terrain crane	Maximum load 25 ~ 30t			•
Shot blast		•		
Water truck		•		
Fuel tank	5,000 liters	•		
Water tank	3,800m ³ , 10.000m ³	•		
Generator	For construction 150kVA, for well (40kVA)	•		
Well drilling machine	12inch		•	
Pump for well	18.5kW, 25Hp		•	
Crusher plant	Performance : 300t/hr		•	

Source: Prepared by the Survey Team

2-2-4-7 Implementation Schedule

The implementation schedule for the detailed design and procurement supervision to be conducted by the Japanese side is shown below.

Table 2-2.41 Implementation Schedule



2-3 Obligations of Recipient Country

Following the conclusion of the E/N and the G/A, the Djibouti side will implement the following tasks based on cooperation of the responsible agency and each implementing agency.

1) Before construction

- Following conclusion of the E/N and the G/A, immediately open an account with a Japanese bank. Moreover, the Djibouti side will bear any costs incurred in opening the account.
- Secure the necessary land for the Project before public notice of Pre-Qualification
- Clarify environmental procedure before public notice of Pre-Qualification
- Secure land for temporary yard (for bypass, asphalt • concrete • crushed stone plants, construction camp, waste disposal generated by the construction, well drilling and drilling permission)
- Acquire a permission for construction around Ethiopian border

2) During construction

- Customs clearance, tax exemption for equipment and materials and Japanese nationals related to the Project
- Environmental monitoring of the Project
- With respect to the Project officials (Japanese and third country nationals), such as ensuring the entry to Djibouti, stay therein and safety.
- Maintenance and repair of bypasses not attributable to caused by the construction (Accident treatment of general vehicles and road repair after accidents, road repair after flooding etc.)

3) In service

- Maintenance of constructed roads and incidental facilities

2-4 Project Operation Plan

Road maintenance after completion of the project will be undertaken mainly by the Dikhil Maintenance Base under ADR. Though daily and ad-hoc maintenance will be implemented directly by this base, the large-scale maintenance will be done by the Direction des Etudes of ADR. The maintenance work will be executed under direct management by the Dikhil Maintenance Base or will be outsourced to private contractors according to the Maintenance Plan of the Entire Djibouti.

The Dikhil Maintenance Base has procured the necessary road maintenance equipment according to the “The Project for Improvement of Road Management Equipment” of the 2015 Japanese Grant Aid, which can be applied to maintenance of this Project section. The base has more than 30 staffs. In this way, the base is complete with the manpower and equipment necessary for maintenance of the target road.

Note that the start point of the target section is remote (about 80 km) from the Dikhil Maintenance Base. Though the time is required for accessing due to poor road situations, and maintenance tends

to be insufficient. In the future, the road improvement project for this 80 km section will be implemented under assistance from donors, which is expected to improve the access to the target section. ADR is also planning to establish newly the maintenance base in Yoboki close to the target section, and the maintenance system will be strengthened.

2-5 Project Cost Estimation

2-5-1 Initial Cost Estimation

(1) Japan Side

This chapter is closed due to the confidential.

(2) Djibouti Side

The expenses to be borne by the Djibouti side are shown below.

Approximate project cost About JPY 4 million (USD 36,000)

Item	Approx. project cost (USD)
Charges for opening of bank account	36,000

(3) Conditions of Cost Estimation

1. Time of estimation : April 2018
2. Exchange rate : 1 USD = JPY109.22
3. Implementation : Implementation period is to be the implementation scheme shown in period
2-2-4-7 Implementation schedule
4. Others : The cost is estimated on the basis of the grant aid scheme of the Government of Japan.

Note that these estimated project costs is not confirmed by JICA.

2-5-2 Operation and Maintenance Cost

Major maintenance services necessary for the facilities developed by the Project are daily and periodic maintenance services shown in Table 2-5.1, and the maintenance cost (as converted to the annual mean) is estimated to be about USD 86,000 (equivalent to about Djibouti Franc 15 million). This accounts for 3.8% of the mean budget for ADR maintenance services for past five years, which is considered not presenting much problem for the government of Djibouti.

Table 2-5.1 Maintenance Details and Costs

								((Unit: USD)
Item	Frequency	Details	Specification	Unit	Unit price (USD)	Quantity	No. of times	Cost
Daily maintenance	Once a year	Pavement repair	1% of pavement area	m ²	21.0	2047.8	10	430,032
	Subtotal-I Total of ten years =							430,032
Periodic maintenance	Once every five years	Subbase repair	2% of pavement area	m ²	9.6	4176.7	2	79,775
		Overlay	2% of pavement area	m ²	34.3	4095.6	2	280,627
		Repair of structures	1% of structures	m ³	958.1	36.0	2	68,984
	Subtotal-II Total of ten years =							429,386
Total of daily and periodic maintenances III (= I + II) =								859,417
Operation and maintenance cost			10% of III	One set		-		85,942

Exchange rate : US\$1 = Djibouti franc178.0 (as of April 2018)

Source : Prepared by the Survey Team

CHAPTER 3

PROJECT EVALUATION

Chapter 3 Project Evaluation

3-1 Preconditions

The precondition for implementation of the Project is to that Djibouti performs the following services under her responsibility:

- To secure the land for road construction
- To secure temporary yard land (yards for the asphalt plant, concrete plant, crushed stone plant; construction equipment storage yard, camp for those concerned), and to provide such land for free
- To negotiate with the Bureau of Environment and Sustainable Development concerning simple environment evaluation procedure, acquisition of license as required, etc.
- To take measures to enable exemption and customs clearance of equipment and materials for the Project and rapid transport within the country
- To bear corporate taxes, domestic taxes and other fiscal levies which may be imposed in Djibouti with respect to those utilizing the Japanese grant aid
- To take legal measures and work permit necessary for Japanese citizens and personnel from third countries to be engaged in the Project to enter Djibouti and stay there
- To bear all the expenses, other than those covered by the Grant, among those necessary for the implementation of the Project
- To bear banking service fees for the bank account to be opened in Japan in relation to the Project

3-2 Necessary Inputs by Recipient Country

The Government of Djibouti shall be responsible for the following items to achieve the overall plan of the Project:

- Adequate operation and maintenance of the target sections of RN1 which will be constructed by the Project
- Arrangement of manpower and budget necessary for above operation and maintenance

3-3 External Conditions

Djibouti had the military conflict with her neighboring country, Eritrea, through border dispute. At present, the relationship between two countries appears to be stable without particular issues. Djibouti is now in an important position as an anchorage site for ships from Germany, Italy, and other western countries, and US Armies, French Armies, China Armies, and Self-Defense Forces of Japan are stationed here to cope with pirates in the Somalia sea area.

With this background, the important external conditions for efficient realization and continuation of the Project is continuing stability of the security situation within Djibouti and in relation with surrounding countries.

3-4 Project Evaluation

3-4-1 Relevance

Japan has established the following fields for special assistance in Djibouti with the major objective to contribute to strengthening of infrastructures and the economic society for regional stabilization.

I. Development of the economic and social infrastructure for sustainable growth

II. Fostering human resources firmly supporting socioeconomic development

III. Strengthening the efforts for regional stabilization

The Project is deemed to harmonize with Japan’s policy for assistance to Djibouti, meeting the requirement of above I.

RN1 is ranked the most important by the Djibouti Government demanding stable trade with neighboring Ethiopia, and road improvement is urgently demanded to ensure efficient and stable traffic.

As such, rehabilitation of the targeted section on RN1 is urgent and prioritized by the Djibouti Government for sustainable development of the country, hence it is concluded that the Project is relevant.

3-4-2 Effectiveness

(1) Quantitative Effects

Expected quantitative effects of the road improvement works in the Project are summarized in the table below.

Table 3-4.1 Quantitative Effects of Road Improvement (Draft)

	Indicator	Current Value (Year 2018)	Target Value (Year 2024)
1	No. of passengers	50 passengers/day ¹	90 passengers/day ²
2	Cargo volume	32,900 tons/day ³	37,900 tons/day ⁴
3	Average time required in non-congested condition for the target 20 km	About one hour ⁵	20 minutes ⁶
4	Frequency of road blocks due to flooding of wadi	10 times/year ⁷	0 times/year

Remarks ¹ The current value has been established on the basis of field survey and hearing result.

² The target value is calculated by assuming 10 % for annual growth rate.

³ The current value is based on the AADT in 2018, 940 truck/day, and the cargo volume is calculated by assuming 35 tones per one truck.

⁴ The target value is based on the AADT in 2024, 1,083 truck/day, and the cargo volume is calculated by assuming 35 tones per one truck.

⁵ The current value is based on actual travel time.

⁶ Established based on the average speed of 60km

⁷ Established on the basis of results of hearing from ADR

Among the indicators shown above, indicators “1” and “2” can be measured in the target year by the implementing organization that conducts traffic survey, and “3” can be measured by running actually over the target section. The indicator “4” can be confirmed by the implementing organization that performs hearing to staff of the Dikhil Maintenance Base and residents along the road.

(2) Qualitative Effects

Expected qualitative effect as the result of road improvement by this Project is summarized in the table below

Table 3-4.2 Qualitative Effects of Road Improvement

Current Status and Problems	Countermeasures to be taken under the Project	Effect and Degree of Improvement
1. RN1 (Yoboki -- Galafi) RN1 is the international freight route connecting the inland East African countries and overseas countries, with Djibouti port acting as a hub port. At present, deterioration is observed to progress over the entire target section, causing substantial disruption in the traveling safety and rapidity.	Road improvement work will be done over the entire target section, such as widening of carriageway, replacement of the asphalt pavement, etc.	Effective in smoothing of cargo transport, improvement of traveling performance, and traffic safety measures such as reduction of accidental overturn for RN1 supporting the trading services of Djibouti major industry.
2. The target section is important as a route for transport of cargoes from all over Dikhil Region to Dikhil and Djibouti cities while securing access for emergency medical care. Deterioration of road surface prevents rapid running of vehicles.	Road improvement work will be done over the entire target section, such as widening of carriageway, replacement of the asphalt pavement.	Effective in providing access for emergency medical care from all over Dikhil Region to Dikhil City and Djibouti city, securing of stable cargo transport, etc.
3. Severe disruption of smooth transport occurs due to road block by flooding of several wadis and accidental overturn of vehicles.	All of ford-crossing types in target section will be structurally modified to culvert types allowing all-year traffic.	Effective in smoothing of cargo transport, improvement of traveling performance, and traffic safety measures such as reduction of accidental overturn for RN1 supporting the trading services of Djibouti major industry.

Judging from the analysis presented in this Chapter 3-4 Project Evaluation, it is concluded that the Project is relevant and is expected to be effective.

APPENDICES

APPENDIX 1

MEMBER LIST OF THE STUDY TEAM

1. Member List of the Study Team

[First Field Survey]

Name	Work Assignment	Position
Kenshiro TANAKA	Mission Leader / Planning Management	Japan International Cooperation Agency (JICA)
Isao TAKAHASHI	Chief Consultant/ Road Planner1	Yachiyo Engineering Co., Ltd.
Masatsugu KOMIYA	Deputy Chief Consultant/ Road Planner2	Yachiyo Engineering Co., Ltd.
Kiyotaka MIYAKE	Road, Pavement Design	Yachiyo Engineering Co., Ltd.
Omer Mohamed ESMAEL	Road, Pavement Design Assistant/Traffic Demand Forecasting	Yachiyo Engineering Co., Ltd.
Jihoon LEEM	River Crossing Structure, Drainage Design 1	Yachiyo Engineering Co., Ltd.
Toyohiro TAKAGI	Procurement/ Construction Planning/ Cost Estimation	Yachiyo Engineering Co., Ltd.
Hisashi FURUICHI	Natural Conditions Survey (Geology)	Yachiyo Engineering Co., Ltd.
Maiko TAKAHASHI	Natural Conditions Survey (Hydrology)/River Analysis	Yachiyo Engineering Co., Ltd.
Aya HARAGUCHI	Environmental and Social Considerations	Yachiyo Engineering Co., Ltd.
Makoto MURATA	River Crossing Structure, Drainage Design 2	Yachiyo Engineering Co., Ltd.
Ryoichi FUKUDA	Interpreter (French)	Yachiyo Engineering Co., Ltd.

[Additional Field Survey]

Name	Work Assignment	Position
Kiyotaka MIYAKE	Road, Pavement Design	Yachiyo Engineering Co., Ltd.
Jihoon LEEM	River Crossing Structure, Drainage Design 1	Yachiyo Engineering Co., Ltd.
Hisashi FURUICHI	Natural Conditions Survey (Geology)	Yachiyo Engineering Co., Ltd.

[Second Field Survey]

Name	Work Assignment	Position
Isao TAKAHASHI	Chief Consultant/ Road Planner1	Yachiyo Engineering Co., Ltd.
Masatsugu KOMIYA	Deputy Chief Consultant/ Road Planner2	Yachiyo Engineering Co., Ltd.
Kiyotaka MIYAKE	Road, Pavement Design	Yachiyo Engineering Co., Ltd.
Ribiere Kevin	Interpreter (French)	Yachiyo Engineering Co., Ltd.

APPENDIX 2

STUDY SCHEDULE

2. Study Schedule

First Field Survey Schedule

Day	Date	JICA			Consultant										Accommodation				
		Mission Leader / Planning Management	Chief Consultant / Road Planner 1	Deputy Chief Consultant / Road Planner 2	Road, Pavement Design	Road, Pavement Design Assistant / Traffic Demand Forecasting	River Crossing Structure, Drainage Design 1	Procurement / Construction Planning / Cost Estimation	Natural Conditions Survey (Geology)	Natural Conditions Survey (Hydrology) / River Analysis	Environmental and Social Considerations	River Crossing Structure, Drainage Design 2	Interpreter (French)						
		Kenshiro TANAKA	Isao TAKAHASHI	Masatsugu KOMIYA	Kiyotaka MIYAKE	Omer Mohamed ISMAEL	Jhoon L EEM	Toyohiro TAKAGI	Hisaichi FURUICHI	Makoto TAKAHASHI	Aya HARAGUCHI	Makoto MURATA	Yoshiaki FUKUDA						
1	16-Mar-18	Fri	Narita to Addis Ababa by flight ET673 (20:10-07:40(+1))	Narita to Doha by flight QR807 (22:20-04:45(+1))												Narita to Doha by flight QR807 (22:20-04:45(+1))			
2	17-Mar-18	Sat	Addis Ababa to Djibouti by flight ET 362 (9:45-11:00)	Doha to Djibouti by flight QR1437 (20:10-00:35(+1))												Doha to Djibouti by flight QR1437 (20:10-00:35(+1))			
3	18-Mar-18	Sun	9:00 Courtesy call on JICA Dh branch Office 10:00 Meeting with ADM (MET/Ministry of Equipment and Transport) discussion on inception Report 13:00 Meeting with vice-minister of ADM (MET) 16:00 Courtesy call on Japanese Embassy	Djibouti (00:35) 9:00 Courtesy call on JICA Djibouti Office 10:00 Meeting with ADM (MET/Ministry of Equipment and Transport) discussion on Inception Report 15:00 Meeting with vice-minister of ADM (MET) 16:00 Courtesy call on Japanese Embassy												Djibouti (00:35) Same as Chief Consultant			
4	19-Mar-18	Mon		6:30 Move to the Site Field Survey												Same as Chief Consultant		Data Collection in Djibouti	Same as Chief Consultant
5	20-Mar-18	Tue		Move to Djibouti Internal Meeting												Same as Chief Consultant		Data Collection in Djibouti Internal Meeting	Same as Chief Consultant
6	21-Mar-18	Wed		9:30 Road Department (MD Meeting) 11:00 Courtesy call on Bilateral Cooperation (Ministry of Foreign Affairs)												Data Collection in Djibouti Meeting with Subcontractor		9:00 Road Department (MD Meeting) 12:00 Signing of M/D (M/D report to Japanese Embassy)	Same as Chief Consultant
7	22-Mar-18	Thu		9:00 Road Department (MD Meeting) 12:00 Signing of M/D												9:00 Road Department (MD Meeting) 12:00 Signing of M/D (M/D report to Japanese Embassy)		17:00 Meeting With local agent	Same as Chief Consultant
8	23-Mar-18	Fri		Field Survey (Surrounding road in Djibouti)												Same as Chief Consultant			Same as Chief Consultant
9	24-Mar-18	Sat	Djibouti to Addis Ababa by flight ET365 (19:05-20:15)	Classification of Data												Doha to Djibouti by flight QR1437 (20:10-00:35(+1))		Classification of Data	Same as Chief Consultant
10	25-Mar-18	Sun	Addis Ababa to Narita by flight ET672 (23:35-20:35(+1))	9:00 Meeting with ADR 11:00 Meeting with Local agent 13:00 Meeting with local agent	Djibouti (00:35) 9:00 local agent 11:00 Meeting With local agent 13:00 Meeting With local agent Data Collection in Djibouti											Narita to Addis Ababa by flight ET673 (21:25-07:45)		9:00 Meeting with ADR 11:00 Meeting With local agent 13:00 Meeting With local agent Data Collection in Djibouti	Same as Chief Consultant
11	26-Mar-18	Mon		Data Collection in Djibouti Meeting With local agent												Arrival in Addis Ababa (07:45)		Data Collection in Djibouti Meeting With local agent	Move to the Site
12	27-Mar-18	Tue		8:00 Meeting with JICA Djibouti Office Internal Meeting												Data Collection in Djibouti Classification of Data		Data Collection in Djibouti Classification of Data	Same as Chief Consultant
13	28-Mar-18	Wed		8:30 Meeting with JICA Djibouti Office Data Collection in Djibouti												Data Collection in Addis Ababa		11:00 Meeting With local agent Data Collection in Djibouti	Same as Chief Consultant
14	29-Mar-18	Thu		9:00 Meeting with vice-minister of ADM (MET) 10:30 Meeting with local agent 15:00 Meeting with JICA Djibouti Office 17:30 Meeting with ADR	Djibouti to Doha by flight QR1438 (00:50-05:55) 9:00 local agent 10:30 local agent 15:00 Meeting with JICA Djibouti Office											Data Collection in Addis Ababa		9:00 Meeting with local agent 10:30 Meeting With local agent 15:00 Meeting with JICA Djibouti Office 15:00 Meeting with JICA Djibouti Office	Same as Chief Consultant
15	30-Mar-18	Fri		Internal Meeting												Addis Ababa to Djibouti by flight QR1437 (20:10-00:35)		Internal Meeting	Same as Chief Consultant
16	31-Mar-18	Sat		9:00 Meeting With local agent Internal Meeting												Narita to Doha by flight QR807 (22:20-04:45(+1))		9:00 Meeting With local agent Internal Meeting	Same as Chief Consultant
17	1-Apr-18	Sun		9:00 Meeting with ADR Data Collection in Djibouti												Doha to Narita by flight QR806 (02:20-18:40)		9:00 Meeting with ADR Data Collection in Djibouti	Same as Chief Consultant
18	2-Apr-18	Mon		6:00 Meeting with JICA Djibouti Office Meeting With local agent												6:00 Meeting with JICA Djibouti Office Meeting With local agent		Internal Meeting	Same as Chief Consultant
19	3-Apr-18	Tue		Field Survey												Field Survey (Drone Survey, River Crossing Structure Survey, Road Survey)		Field Survey (Drone Survey, River Crossing Structure Survey, Road Survey)	Same as Chief Consultant
20	4-Apr-18	Wed		Field Survey												Field Survey (Drone Survey, River Crossing Structure Survey, Road Survey)		Field Survey (Drone Survey, River Crossing Structure Survey, Road Survey)	Same as Chief Consultant
21	5-Apr-18	Thu		Field Survey												Field Survey (Drone Survey, River Crossing Structure Survey, Road Survey)		Field Survey (Drone Survey, River Crossing Structure Survey, Road Survey)	Same as Chief Consultant
22	6-Apr-18	Fri		Classification of Data												Classification of Data		Classification of Data	Same as Chief Consultant
23	7-Apr-18	Sat		Classification of Data												Classification of Data		Classification of Data	Same as Chief Consultant
24	8-Apr-18	Sun		9:00 Meeting with ADR Meeting with JICA Djibouti Office												Meeting with ADR		Hearing from Ministry of Agriculture, CERD 16:00 National Property Department	Same as Chief Consultant
25	9-Apr-18	Mon		Meeting with ADR												Meeting with ADR Traffic volume		Meeting with ADR Traffic volume	Same as Chief Consultant
26	10-Apr-18	Tue		Meeting with ADR												Meeting with ADR Traffic volume		Meeting with ADR Traffic volume	Same as Chief Consultant
27	11-Apr-18	Wed		Meeting with ADR												Meeting with ADR Djibouti Port		Meeting with ADR Traffic volume	Same as Chief Consultant
28	12-Apr-18	Thu		Meeting with ADR												Meeting with ADR Traffic volume		Meeting with ADR Traffic volume	Same as Chief Consultant
29	13-Apr-18	Fri		Classification of Data												Classification of Data		Classification of Data	Same as Chief Consultant
30	14-Apr-18	Sat		Classification of Data												Classification of Data		Classification of Data	Same as Chief Consultant
31	15-Apr-18	Sun		Meeting with ADR												Data Collection in Djibouti		Data Collection in Djibouti	Same as Chief Consultant
32	16-Apr-18	Mon		Meeting with ADR												Preparation of Report Meeting with ADR		Data Collection in Djibouti Meeting with Subcontractor	[Djibouti (00:35)] Move to the Site
33	17-Apr-18	Tue		Field Survey Meeting with local agent												Preparation of Report Meeting with ADR		Field Survey (River Crossing Structure Survey) Field Survey (Peripathal Survey)	Same as Chief Consultant
34	18-Apr-18	Wed		Meeting With local agent												Djibouti to Doha by flight QR1438 (00:50-05:55) Meeting with Subcontractor		Field Survey (River Crossing Structure Survey) Field Survey (River Crossing Structure Survey)	Same as Chief Consultant
35	19-Apr-18	Thu		Meeting with ADR												Doha to Narita by flight QR806 (02:20-18:40) Traffic volume Survey Confirm the site		Field Survey (River Crossing Structure Survey) Field Survey (River Crossing Structure Survey)	Same as Chief Consultant
36	20-Apr-18	Fri		Preparation of Report Internal Meeting														Preparation of Report Internal Meeting	Same as Chief Consultant
37	21-Apr-18	Sat		Preparation of Report Internal Meeting														Preparation of Report Internal Meeting	Same as Chief Consultant
38	22-Apr-18	Sun		Preparation of Report Meeting with ADR												Preparation of Report Meeting with ADR		Meeting with Subcontractor	Preparation of Report Meeting with ADR
39	23-Apr-18	Mon		Meeting with JICA Djibouti Office Meeting with ADR												Data Collection in Addis Ababa		Preparation of Report Meeting with ADR	Same as Chief Consultant
40	24-Apr-18	Tue		Report to Road Department												Data Collection in Addis Ababa		Preparation of Report Meeting with ADR	Same as Chief Consultant
41	25-Apr-18	Wed		Report to Road Department												Data Collection in Addis Ababa		Meeting with ADR	Same as Chief Consultant
42	26-Apr-18	Thu		Report of Survey to JICA Djibouti Office Report to Japanese Embassy												Data Collection in Addis Ababa		Meeting with ADR	Same as Chief Consultant
43	27-Apr-18	Fri		Classification of Data												Data Collection in Addis Ababa		Classification of Data	Same as Chief Consultant
44	28-Apr-18	Sat		Djibouti to Doha by flight QR1438 (00:50-05:55)														Classification of Data	Same as Chief Consultant
45	29-Apr-18	Sun		Doha to Narita by flight QR806 (02:20-18:40)														Classification of Data	Same as Chief Consultant
46	30-Apr-18	Mon																Meeting with Subcontractor	Same as Chief Consultant
47	1-May-18	Tue																	
48	2-May-18	Wed																	

First Field Survey Schedule (Additional survey)

Day	Date		Consultant			Accomodaion
			Road, Pavement Design	River Crossing Structure, Drainage	Natural Conditions Survey (Geology)	
			Kiyotaka MIYAKE	Jihoon LEEM	Hisashi FURUICHI	
1	26-May-18	Sat	00:01 Haneda 06:00 Doha 18:55 23:50 Djibouti			Djibouti
2	27-May-18	Sun	Courtesy call on JICA Djibouti Office Meeting with ADR			Djibouti
3	28-May-18	Mon	Data Collection in Djibouti Meeting with ADR and Subcontractor			Djibouti
4	29-May-18	Tue	Data Collection in Djibouti Meeting with ADR and Subcontractor			Djibouti
5	30-May-18	Wed	Field Survey	Data Collection in Djibouti	Field Survey	MIYAKE・FURUICHI:Yoboki LEEM: Djibouti
6	31-May-18	Thu	Field Survey	Data Collection in Djibouti	Field Survey	Djibouti
7	1-Jun-18	Fri	Classification of Data			Djibouti
8	2-Jun-18	Sat	Classification of Data			Djibouti
9	3-Jun-18	Sun	Data Collection in Djibouti Meeting with ADR and Subcontractor			Djibouti
10	4-Jun-18	Mon	Data Collection in Djibouti Meeting with ADR and Subcontractor			Djibouti
11	5-Jun-18	Tue	Data Collection in Djibouti Meeting with ADR and Subcontractor			Djibouti
12	6-Jun-18	Wed	Data Collection in Djibouti Meeting with ADR and Subcontractor			Djibouti
13	7-Jun-18	Thu	Report of Survey to JICA Djibouti Office Meeting with Subcontractor 18:00 Djibouti 23:05 Doha			Airplane
14	8-Jun-18	Fri	02:20 Doha 18:40 Narita			

Second Field Survey Schedule

Date		Planned Activities	
		Takahashi	Komiya / Miyake / Kevin (Interpreter)
1	18 th Oct. (Thu)	Leave Japan	
2	19 th Oct. (Fri)	23:50 Arrival in Djibouti (by QR1437)	
3	20 th Oct. (Sat)	Preparation of Seminar	15:00 Move to Dikhil (Stay in Dikhil)
4	21 st Oct. (Sun)	- Meeting with ADR	Site survey at target section on RN1 (Dikhil Galafi Djibouti) 18:00 Back in Djibouti
5	22 nd Oct. (Mon)	- Meeting with JICA Djibouti Office - Meeting with ADR	
6	23 rd Oct. (Tue)	- Meeting with ADR	
7	24 th Oct. (Wed)	- Technical Seminar	
8	25 th Oct. (Thu)	- Courtesy call on authority concerned (Ministère des Affaires Etrangères et de la Coopération Internationale) - Reporting to Embassy of Japan - Meeting with ADR	
9	26 th Oct. (Fri)	Supplemental survey	
10	27 th Oct. (Sat)	Ditto	
11	28 th Oct. (Sun)	- Meeting with ADR - Reporting to JICA Djibouti Office 18:20 Leave Djibouti (by QR1440)	
12	29 th Oct. (Mon)	Back in Japan	

APPENDIX 3

LIST OF PARTIES CONCERNED IN THE RECIPIENT COUNTRY

3 List of Parties Concerned in the Recipient Country

<u>Name of Organization</u>	<u>Position</u>
Ministère de l'Équipement et des Transports	
Mr. Mohamed Abdoukader Moussa Helem	Minister
Mr. Said Nouh Hassan	Secretary General
Agence Djiboutienne de la Route	
Mr. Osman Houssein Bouraleh	Acting Director General
Mr. Salah Ibrahim Osman	Director of Study
Mr. Ahmed Adem Obsieh	Director of Works
Ms. Nouna Ahmeh houbah	Director of Finance
Mr. Abdillohi Aden	Manager of Service Programmation
Mr. Mohamehman Aden	Manager of Topography
Mr. Hamza Kalil	Civil Engineer
Ministère des Affaires Étrangères et de la Coopération Internationale	
Mr. Yachin Houssein Douale	Director for Bilateral Relations
Ministère du Budget	
Direction Générale des Douanes et Droits Indirects	
Mr. Abdourahman Aouad Izzi	Deputy Director General
Direction des domaines et de la conservation foncière	
Mr. Houssein Mahamoud Barreh	Director
Direction des Impôts	
Mr. Seid Guelleh Darar	Director of Tax Administration
Ministère de l'Économie des Finances, Chargé de l'Industrie	
Mr. Nouh Omar Miguil	Secretary General
Mr. Mehdi Ismail Darar	Deputy Director of the External Finance
Ministère du Travail Chargé de la Réforme de l'administration	
Agence Nationale de l'Emploi, de la Formation et de l'Insertion Professionnelle	
Ms. Mouna Mohamed	Director of Service

**Derection de l'Environnement et of Environment and sustainable development (DEDD),
Ministère de l'Agriculture, de l'Élevage et de la Mer**

Mr. Mohamed Ali Houssein Secretary General

Ministre de l'Agriculture, de la Pêche, de l'Elevage et des Ressources Halieutiques

Mr. Tabarek Mohamed Ismael Minister's Advisor

Mr. Saleh Daoud Saleh Head of Technical Department

Mr. Said Kaireh Youssouf Hydrogeologist Engineer

Centere d'Études et de Recherches de Djibouti

Mr. Mohamed Jalludin Director General

Mr. Abdourahman Daher Meraneh Director of Institute of Life Sciences

Mr. Antoine Marie Caminiti Geologist Exploration

Mr. Mohamed Osman Aweleh Director of the Institute of Earth Sciences

Préfet de la Région de Dikhil

Mr. Mohamed Cheiko Hassan Prefect of the Dikhil region

Embassy of Japan

Mr. Koji Yonetani Ambassador Extraordinary and Plenipotentiary

Mr. Takanari Kakuda Councilor

Mr. Yuji Namba In Charge of Economy and Development Cooperation

Mr. Soya Otani In Charge of Political Affair and Culture

JICA Djibouti Office

Mr. Toru Togawa Resident Representative

Mr. Koji Ohashi Project Formulation Advisor

Ms. Yuki Goudiaby Project Formulation Advisor

APPENDIX 4

MINUTES OF DISCUSSIONS

**Procès-verbal des discussions
sur l'Etude préparatoire pour le Projet
d'Amélioration de la route nationale 1**

En réponse à la requête du Gouvernement de la République de Djibouti (ci-après dénommé « Djibouti »), l'Agence Japonaise de Coopération Internationale (ci-après dénommée « la JICA ») a dépêché une équipe d'étude préparatoire pour la conception générale (ci-après dénommée « l'Equipe ») du Projet d'Amélioration de la route nationale 1 (ci-après dénommé « le Projet ») à Djibouti. L'Equipe a tenu une série de discussions avec les fonctionnaires du Gouvernement de Djibouti et a mené une étude sur le terrain. Au cours des discussions, les deux parties ont confirmé les principaux points décrits dans les fiches jointes.

Fait à Djibouti, le 22 mars 2018

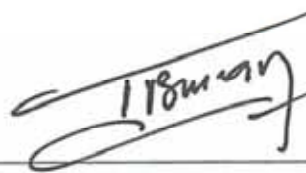


Kenshiro TANAKA

Chef

Equipe d'Etude préparatoire

Agence Japonaise de Coopération Internationale



Osman Houssein Bouraleh

Directeur Général P. I

Agence Djiboutienne des Routes

Ministère de l'Equipement et des Transports

République de Djibouti

Témoigné par :



Yacin Houssein Doualé

Directeur des Relations Bilatérales

Ministère des Affaires Etrangères et de la

Coopération Internationale

République de Djibouti



Saïd Nouh Hassan

Secrétaire Général

Ministère de l'Equipement et des Transports

République de Djibouti

DOCUMENT ATTACHE

1. Objectif du Projet

Le Projet a pour objectif d'améliorer le transport et la logistique ainsi que la sécurité routière de la route nationale 1 (Galafi - Yoboki) en mettant à niveau l'alignement horizontal à une voie en deux sens, contribuant ainsi à la croissance économique de Djibouti.

2. Titre de l'Etude préparatoire

Les deux parties ont confirmé le titre de l'étude préparatoire comme étant « l'Etude préparatoire pour le Projet d'Amélioration de la route nationale 1 ».

3. Site du Projet

Les deux parties ont confirmé qu'une section d'environ 20 km de la route nationale 1 entre Yoboki et Galafi fait l'objet du Projet, ce qui est indiqué à l'Annexe 1. L'Equipe a proposé que le point de départ du site soit Galafi (frontière). Les détails des composantes du Projet seront déterminés à travers l'étude préparatoire.

4. Autorité responsable du Projet

Les deux parties ont confirmé que les autorités responsables du Projet sont les suivantes :

4-1. L'Agence Djiboutienne des Routes (ADR) sera l'Agence d'exécution du Projet (ci-après dénommée « l'Agence d'exécution »). L'Agence d'exécution doit coordonner toutes les autorités compétentes pour assurer la mise en œuvre harmonieuse du Projet et veiller à ce que les engagements du Projet soient pris en charge par les autorités compétentes de manière appropriée et à temps.

4-2. « Le Ministère de l'Equipment et des Transport » est chargé de superviser l'Agence d'exécution au nom du Gouvernement de Djibouti. Les organigrammes sont présentés à l'Annexe 2.

5. Eléments demandés par le Gouvernement de Djibouti

5-1. A la suite de discussions, les deux parties ont confirmé que l'élément demandé par le Gouvernement de Djibouti est d'améliorer la route à une voie en deux sens entre Galafi et Yoboki y compris les installations supplémentaires indiquées à l'Annexe 1. La largeur de voie ainsi que la spécification technique seront fixées par l'étude en prenant en compte l'évolution du trafic.

5-2. La JICA évaluera la faisabilité de l'élément demandé ci-dessus au moyen de l'étude préparatoire et en rendra compte au Gouvernement du Japon. L'étendue finale du Projet sera décidée par le Gouvernement du Japon.

6. Procédures et principes de base du Don du Japon

6-1. La partie djiboutienne a convenu que les procédures et les principes de base du Don du Japon tels que décrits aux Annexes 3, 4 et 5 seront appliqués au Projet.

En ce qui concerne le suivi de la mise en œuvre du Projet, la JICA demande à la partie djiboutienne de soumettre un rapport de suivi du Projet à la JICA en utilisant le formulaire de « Project Monitoring Report » (PMR) en anglais joint en Annexe 6.

6-2. La partie djiboutienne a convenu de prendre les mesures nécessaires, telles que décrites à l'Annexe 7, pour la mise en œuvre harmonieuse du Projet. Le contenu de l'Annexe 7 sera élaboré et affiné au cours de l'Etude préparatoire et approuvé dans la mission envoyée pour l'explication de l'avant-projet du rapport d'Etude préparatoire.

Le contenu de l'Annexe 7 sera mis à jour au fur et à mesure de l'avancement de l'Etude préparatoire et sera finalement utilisé comme document attaché à l'Accord de Don.

7. Calendrier de l'Etude

L'Equipe poursuivra la première enquête de terrain à Djibouti jusqu'au 28 avril 2018. L'Equipe a expliqué le calendrier provisoire de l'étude préparatoire comme suit :

7-1. L'Equipe mènera la deuxième enquête de terrain à Djibouti de la fin mai au début juin 2018.

7-2. L'Equipe préparera un avant-projet du rapport de l'étude préparatoire en français et présentera son contenu vers octobre 2018.

7-3. Si la partie djiboutienne accepte le rapport et les engagements pour le Projet, la JICA finalisera le rapport et l'enverra à Djibouti vers fin décembre 2018.

7-4. Le calendrier ci-dessus est provisoire et sujet à changement.

8. Considérations environnementales et sociales

8-1. La partie djiboutienne s'est engagée à prendre dûment en compte les considérations environnementales et sociales avant, pendant et après la mise en œuvre du Projet, conformément aux Lignes directrices relatives aux

considérations environnementales et sociales de la JICA (avril 2010).

8-2. Le Projet est classé dans la catégorie « B » selon les considérations suivantes :

Le Projet n'est pas considéré comme étant un projet routier à grande échelle, n'est pas situé dans une zone sensible et ne présente aucune des caractéristiques sensibles en vertu des Lignes directrices relatives aux considérations environnementales et sociales de la JICA (avril 2010). Il est donc peu susceptible d'avoir un impact négatif significatif sur l'environnement. Les Lignes directrices peuvent être téléchargées à l'adresse URL suivante.

http://www.jica.go.jp/english/our_work/social_environmental/guideline/pdf/guideline100326.pdf

La partie djiboutienne s'est engagée à mener les procédures nécessaires concernant l'évaluation environnementale (y compris les réunions des parties prenantes, l'Evaluation de l'impact sur l'environnement (EIE) / l'Etude environnementale préliminaire (EEP) et la communication environnementale, etc.) et de faire un rapport d'EIE/EEP du Projet. L'approbation de l'EIE/EEP doit être reçue de la part des autorités responsables et soumise à la JICA vers février 2019.

8-3. Pour le Projet qui entraînera une réinstallation involontaire, la partie djiboutienne s'est engagée à préparer un Plan d'Action de Réinstallation (PAR) / un Plan d'Action Abrégé de Réinstallation (PAAR) et à le rendre accessible au public. En outre, la partie djiboutienne s'est engagée à fournir aux personnes affectées une compensation suffisante et/ou un soutien suffisant en temps opportun conformément au PAR/PAAR, et ce en se basant sur les Lignes directrices relatives aux considérations environnementales et sociales de la JICA (avril 2010).

9. Autres questions pertinentes

9-1.

L'Equipe a expliqué la méthode à utiliser pour mener l'étude préparatoire en se référant au rapport de commencement élaboré par l'Equipe. La partie djiboutienne a compris son explication et a accepté la méthode.

9-2.

La partie djiboutienne devra, à ses frais, fournir à l'Equipe les éléments suivants en coopération avec les autres organisations concernées :

- 1) Données et informations nécessaires à l'étude préparatoire ;
- 2) Réponses au questionnaire soumis par l'Equipe ;

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- 3) Personnes homologues chargées du Projet ;
- 4) Autorisations pour entrer dans des propriétés privées et des endroits restreints et pour prendre des photos ;
- 5) Informations de sécurité en temps opportun ;
- 6) Autorisations de mener des activités de terrain telles que le levé topographique, le levé géotechnique, les considérations environnementales et sociales, l'enquête sur le volume de trafic, à effectuer par des firmes d'experts-conseils locaux confiés par l'Equipe, ainsi que cartes d'identité pour les membres desdites firmes ;
- 7) Autorisations d'activités (le levé topographique, l'étude sur la situation actuelle de la route existante) autour de l'enceinte de l'installation frontalière de Galafi ;
- 8) Mesures pour assurer la sécurité du trafic pendant l'enquête sur le terrain en coopération avec les autorités compétentes telles que la gendarmerie, et
- 9) Un local servant de bureau pour l'Equipe.

Annexe 1 Site du Projet

Annexe 2 Organigramme

Annexe 3 Don du Japon

Annexe 4 Procédure de la coopération financière non remboursable du Japon

Annexe 5 Financement de la coopération financière non remboursable du Japon

Annexe 6 Project Monitoring Report (template)

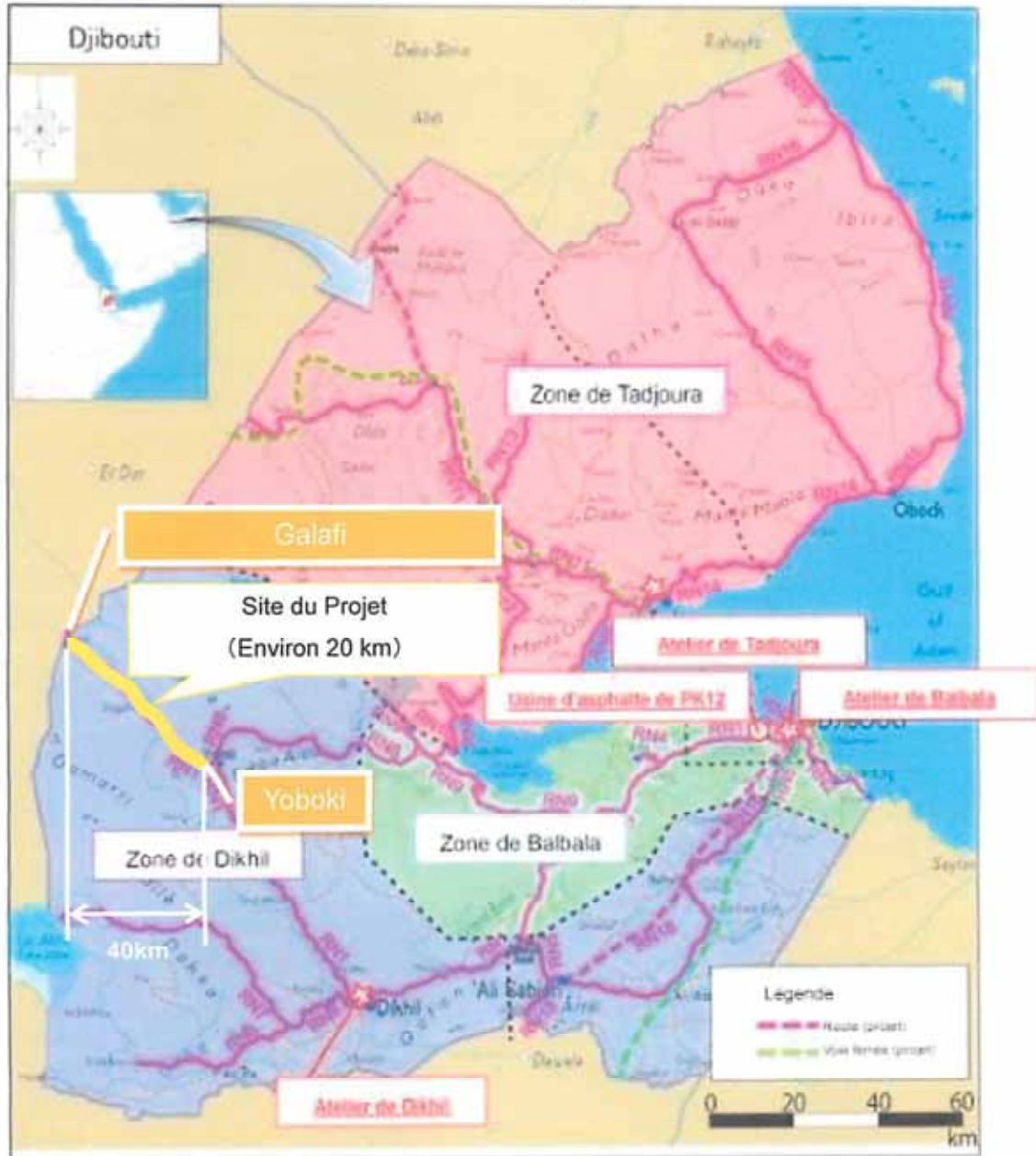
Annexe 7 Principaux engagements à prendre par le Gouvernement de Djibouti

Annexe 8 Langues utilisées dans chaque document

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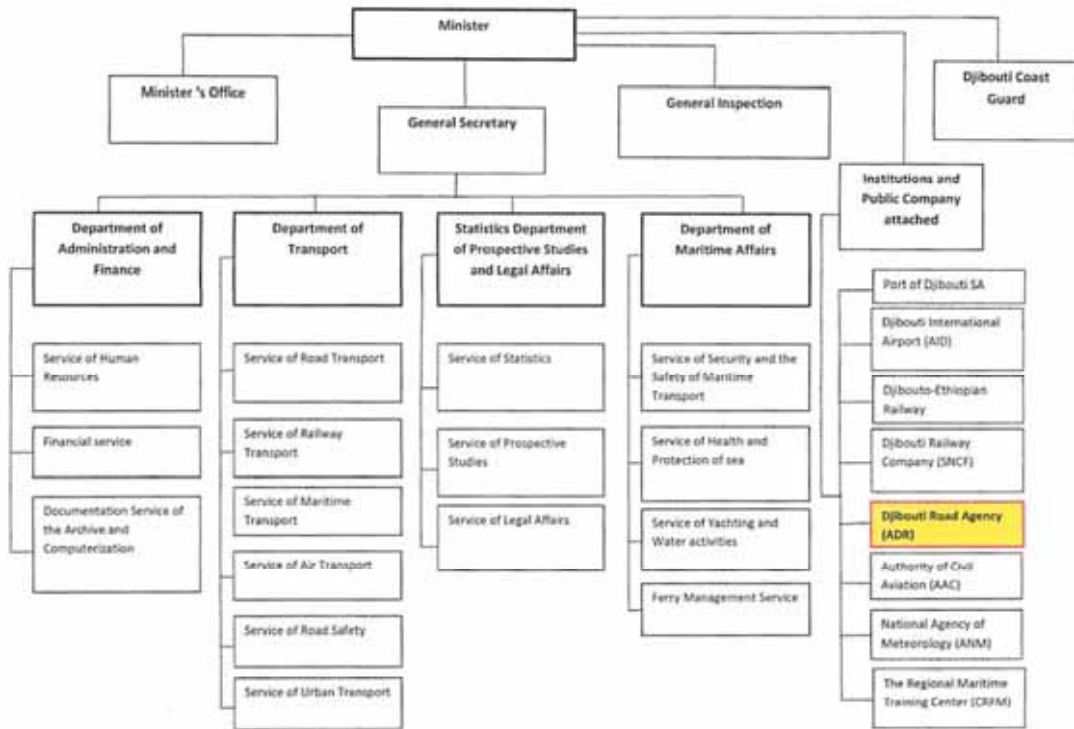
Site du Projet



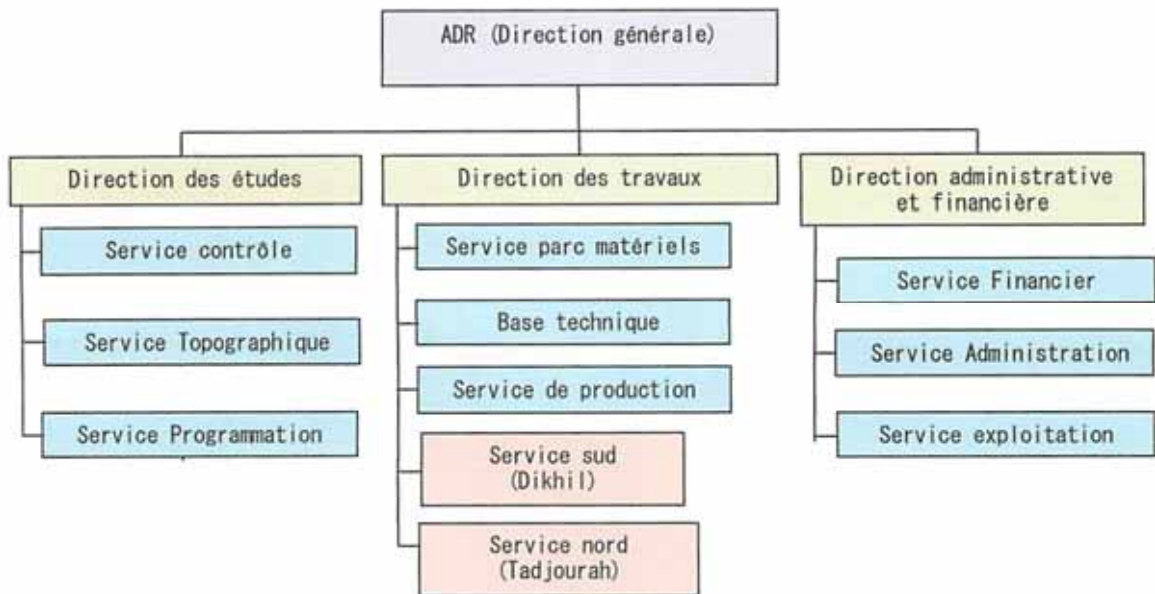
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Organigramme



Ministère de l'Équipement et des Transports



Agence Djiboutienne des Routes

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DON DU JAPON

Le Don du Japon est un fonds non remboursable fourni à un pays bénéficiaire (ci-après dénommé « le Bénéficiaire ») pour acheter les produits et/ou services (services d'ingénierie et transport des produits, etc.) en vue de son développement économique et social, conformément aux lois et règlements applicables au Japon. Ci-après, les caractéristiques de base des Dons pour les Projets administrés par la JICA (ci-après dénommés « Dons pour les Projets »).

1. Procédures des Dons pour les Projets

Les Dons pour les Projets sont effectués selon les procédures suivantes (voir « PROCEDURES DU DON DU JAPON » pour plus de détails) :

(1) Préparation

- L'Etude préparatoire (ci-après dénommée « l'Etude ») menée par la JICA

(2) Evaluation ex-ante

- Evaluation ex-ante par le Gouvernement du Japon (ci-après dénommé « GDJ ») et la JICA, et Approbation par le Cabinet japonais

(3) Mise en œuvre

Echange de Notes (ci-après dénommé « l'E/N »)

- Les Notes échangées entre le GDJ et le Gouvernement du Bénéficiaire

Accord de Don (ci-après dénommé « l'A/D »)

- Accord conclu entre la JICA et le Gouvernement du Bénéficiaire

Arrangement bancaire (ci-après dénommé « l'A/B »)

- Ouverture d'un compte bancaire par le Gouvernement du Bénéficiaire dans une banque au Japon (ci-après dénommée « la Banque ») pour recevoir le Don

Travaux de construction/approvisionnement

- La mise en œuvre du projet (ci-après dénommé « le Projet ») sur la base de l'A/D

(4) Suivi et Evaluation ex-post

- Suivi et Evaluation à la suite de l'étape de mise en œuvre

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2. Etude préparatoire

(1) Contenu de l'Etude

Le but de l'Etude est de fournir les documents de base nécessaires à l'évaluation ex ante du Projet faite par le GDJ et la JICA. Le contenu de l'Etude est le suivant :

- Confirmation de l'arrière-plan, des objectifs et des effets du Projet ainsi que des capacités institutionnelles des organismes compétents du Gouvernement du Bénéficiaire nécessaires à la mise en œuvre du Projet.
- Evaluation de la faisabilité du Projet à mettre en œuvre dans le cadre du Don du Japon d'un point de vue technique, financier, social et économique.
- Confirmation des points convenus entre les deux parties concernant le concept de base du Projet.
- Préparation de la conception générale du Projet.
- Estimation des coûts du Projet.
- Confirmation des Considérations environnementales et sociales.

Le contenu de la demande originale du Gouvernement du Bénéficiaire n'est pas nécessairement approuvé dans sa forme initiale. La conception générale du Projet est confirmée sur la base des lignes directrices du Don du Japon.

La JICA demande au Gouvernement du Bénéficiaire de prendre les mesures nécessaires pour accomplir son autonomie dans la mise en œuvre du Projet. Ces mesures doivent être garanties même si elles ne relèvent pas de la compétence de l'Agence d'exécution du Projet. Par conséquent, le contenu du Projet est confirmé par tous les organismes compétents du Gouvernement du Bénéficiaire sur la base des procès-verbaux des discussions.

(2) Sélection des Consultants

Pour une mise en œuvre harmonieuse de l'Etude, la JICA conclut des contrats avec un/des cabinet(s) de consultants. La JICA sélectionne un/des cabinet(s) sur la base des propositions soumises par les cabinets intéressés.

(3) Résultat de l'Etude

La JICA passe en revue le rapport sur les résultats de l'Etude et recommande au GDJ d'approuver la mise en œuvre du Projet après avoir confirmé la faisabilité du Projet.

3. Principes de base des Dons pour les Projets

(1) Etape de mise en œuvre

1) L'E/N et l'A/D

Après que le Projet soit approuvé par le Cabinet du Japon, l'E/N sera signé entre le GDJ et le Gouvernement du Bénéficiaire pour établir un gage d'assistance, qui sera suivi de la conclusion de l'A/D entre la JICA et le Gouvernement du Bénéficiaire pour définir les articles nécessaires, conformément à l'E/N, pour mettre en œuvre le Projet, telles que les conditions de versement, les responsabilités du Gouvernement du Bénéficiaire et les

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conditions d'approvisionnement. Les termes et conditions généralement applicables au Don du Japon sont stipulés dans les « Conditions générales applicables au Don du Japon (janvier 2016) ».

2) Arrangements bancaires (A/B) (Voir « Flux financiers du Don du Japon (type A/P) » pour plus de détails)

- a) Le Gouvernement du Bénéficiaire devra ouvrir un compte ou faire en sorte que son autorité désignée ouvre un compte au nom du Bénéficiaire à la Banque, par principe. La JICA versera le Don du Japon en yen japonais afin que le Gouvernement du Bénéficiaire puisse couvrir les obligations contractées en vertu des contrats vérifiés.
- b) Le Don du Japon sera versé lorsque les demandes de paiement seront soumises par la Banque à la JICA en vertu d'une autorisation de paiement (A/P) délivrée par le Gouvernement du Bénéficiaire.

3) Procédure d'approvisionnement

Les produits et/ou les services nécessaires à la mise en œuvre du Projet seront approvisionnés conformément aux Directives de l'approvisionnement de la JICA, comme stipulé dans l'A/D.

4) Sélection des Consultants

Afin de maintenir une cohérence technique, le(s) cabinet(s) de consultants qui aura(ont) mené l'Etude sera(ont) recommandé(s) par la JICA au Gouvernement du Bénéficiaire pour continuer à travailler à la mise en œuvre du Projet après l'E/N et l'A/D.

5) Pays d'origine éligibles

Dans le cadre de l'utilisation du Don du Japon versé par la JICA pour l'achat de produits et/ou de services, les pays d'origine éligibles desdits produits et/ou services seront le Japon et/ou le Bénéficiaire. Le Don du Japon peut être utilisé pour l'achat des produits et/ou services d'un pays tiers éligible, si nécessaire, compte tenu de la qualité, de la compétitivité et de la rationalité économique des produits et/ou services nécessaires pour atteindre l'objectif du Projet. Toutefois, les principaux entrepreneurs, à savoir les entreprises de construction et d'approvisionnement et le principal cabinet de consultants, qui concluent des contrats avec le Gouvernement du Bénéficiaire, sont limités en principe aux « ressortissants japonais ».

6) Contrats et non-objection de la JICA

Le Gouvernement du Bénéficiaire conclura des contrats libellés en yen japonais avec des ressortissants japonais. Ces contrats doivent avoir obtenu l'avis de non-objection de la JICA en vue d'être confirmés comme éligibles à l'utilisation du Don du Japon.

7) Suivi

Le Gouvernement du Bénéficiaire est tenu de prendre l'initiative de suivre attentivement l'avancement du Projet afin d'assurer sa mise en œuvre, initiative faisant partie intégrante de ses responsabilités dans l'A/D, et de présenter régulièrement à la JICA sa situation en utilisant le formulaire de « Project Monitoring Report » (PMR) en anglais.

8) Mesures de sécurité

Le Gouvernement du Bénéficiaire doit s'assurer que la sécurité est respectée avec la plus grande rigueur pendant la mise en œuvre du Projet.

9) Réunion de contrôle de la qualité de la construction

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Une réunion de contrôle de la qualité de la construction (ci-après dénommée la « Réunion ») sera organisée pour l'assurance de la qualité et la mise en œuvre harmonieuse des Travaux à chaque étape des Travaux. Les participants de la Réunion seront composés du Gouvernement du Bénéficiaire (ou l'Agence d'exécution), du Consultant, de l'Entrepreneur/du Fournisseur et de la JICA. Les fonctions de la Réunion sont les suivantes :

- a) Partager des informations sur l'objectif, le concept et les conditions de conception de la part de l'Entrepreneur, avant le démarrage de la construction.
- b) Discuter des questions touchant les Travaux, telles que la modification de la conception, essai, inspection, contrôle de sécurité et obligation du Client pendant la construction.

(2) Etape de suivi et d'évaluation ex-post

- 1) Après l'achèvement du Projet, la JICA continuera de rester en contact étroit avec le Gouvernement du Bénéficiaire afin de s'assurer que les réalisations du Projet sont utilisées et maintenues correctement pour atteindre les résultats attendus.
- 2) En principe, la JICA procédera à une évaluation ex-post du Projet au bout de trois ans à compter de la date d'achèvement. Le Gouvernement du Bénéficiaire doit fournir tous les renseignements nécessaires que la JICA peut raisonnablement demander.

(3) Autres

1) Considérations environnementales et sociales

Le Gouvernement du Bénéficiaire doit examiner attentivement les incidences environnementales et sociales du Projet et se conformer aux réglementations environnementales du Gouvernement du Bénéficiaire et aux Lignes directrices relatives aux considérations environnementales et sociales de la JICA (avril 2010).

2) Principaux engagements à prendre par le Gouvernement du Bénéficiaire

Pour assurer la mise en œuvre harmonieuse du Projet, le Gouvernement du Bénéficiaire est tenu d'entreprendre les mesures nécessaires, y compris l'acquisition des terrains, et de régler à la Banque la commission pour notification de l'A/P et la commission de paiement comme convenu avec le GDJ et/ou la JICA. Le Gouvernement du Bénéficiaire veillera à ce que les droits de douane, les taxes intérieures et les autres prélèvements fiscaux pouvant être appliqués au Gouvernement du Bénéficiaire concernant l'achat de produits et/ou services soient exemptés ou supportés par son autorité désignée sans utiliser le Don ni ses intérêts courus, puisque les fonds du Don proviennent des contribuables japonais.

3) Utilisation adéquat

Le Gouvernement du Bénéficiaire est tenu de conserver et d'utiliser correctement et efficacement les produits et/ou services entrant dans le cadre du Projet (y compris les installations construites et l'équipement acheté), d'affecter le personnel nécessaire pour son exploitation et sa maintenance et enfin de supporter toutes les dépenses autres que celles couvertes par le Don du Japon.

4) Exportation et réexportation

Les produits achetés dans le cadre du Don du Japon ne doivent ni être exportés ni réexportés du pays Bénéficiaire.

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PROCEDURES DU DON DU JAPON

Etapes	Procédures	Remarques	Gouvernement du Bénéficiaire	Gouvernement du Japon	JICA	Consultants	Entrepreneurs	Correspondant bancaire
Requête officielle	Demande de Don par voie diplomatique	La demande doit être soumise avant l'étape de l'évaluation ex-ante.	x	x				
1. Préparation	(1) Etude préparatoire Préparation de la conception générale et estimation des coûts		x		x	x		
2. Evaluation ex-ante	(2) Etude préparatoire Explication du projet de conception générale, y compris l'estimation des coûts, les engagements, etc.		x		x	x		
	(3) Accord sur les conditions de mise en œuvre	Les conditions seront expliquées avec les projets de Notes (E/N) et d'Accord de Don (A/D) qui seront signés avant l'approbation par le Gouvernement du Japon.	x	x (E/N)	x (A/D)			
	(4) Approbation par le Cabinet japonais			x				
3. Mise en œuvre	(5) Echange de Notes (E/N)		x	x				
	(6) Signature de l'Accord de Don (A/D)		x		x			
	(7) Arrangement Bancaire (A/B)	Nécessité d'informer la JICA	x					x
	(8) Passation du contrat avec un consultant et émission de l'Autorisation de Paiement (A/P)	La non-objection de la JICA est requise	x			x		x
	(9) Plan détaillé (P/D)		x			x		
	(10) Préparation des dossiers d'appel d'offres	La non-objection de la JICA est requise	x			x		
	(11) Appel d'offres	La non-objection de la JICA est requise	x			x	x	
	(12) Passation du contrats avec contractant/fournisseur et émission d'une A/P	La non-objection de la JICA est requise	x				x	x
4. Suivi et évaluation ex-post	(13) Travaux de construction/approvisionnement	La non-objection de la JICA est requise pour une modification majeure de la conception et la modification des contrats.	x			x	x	
	(14) Certificat d'achèvement		x			x	x	
4. Suivi et évaluation ex-post	(15) Suivi ex-post	À mettre en œuvre généralement 1, 3, 10 ans après l'achèvement, sous réserve de modifications	x		x			
	(16) Evaluation ex-post	À mettre en œuvre essentiellement 3 ans après l'achèvement	x		x			

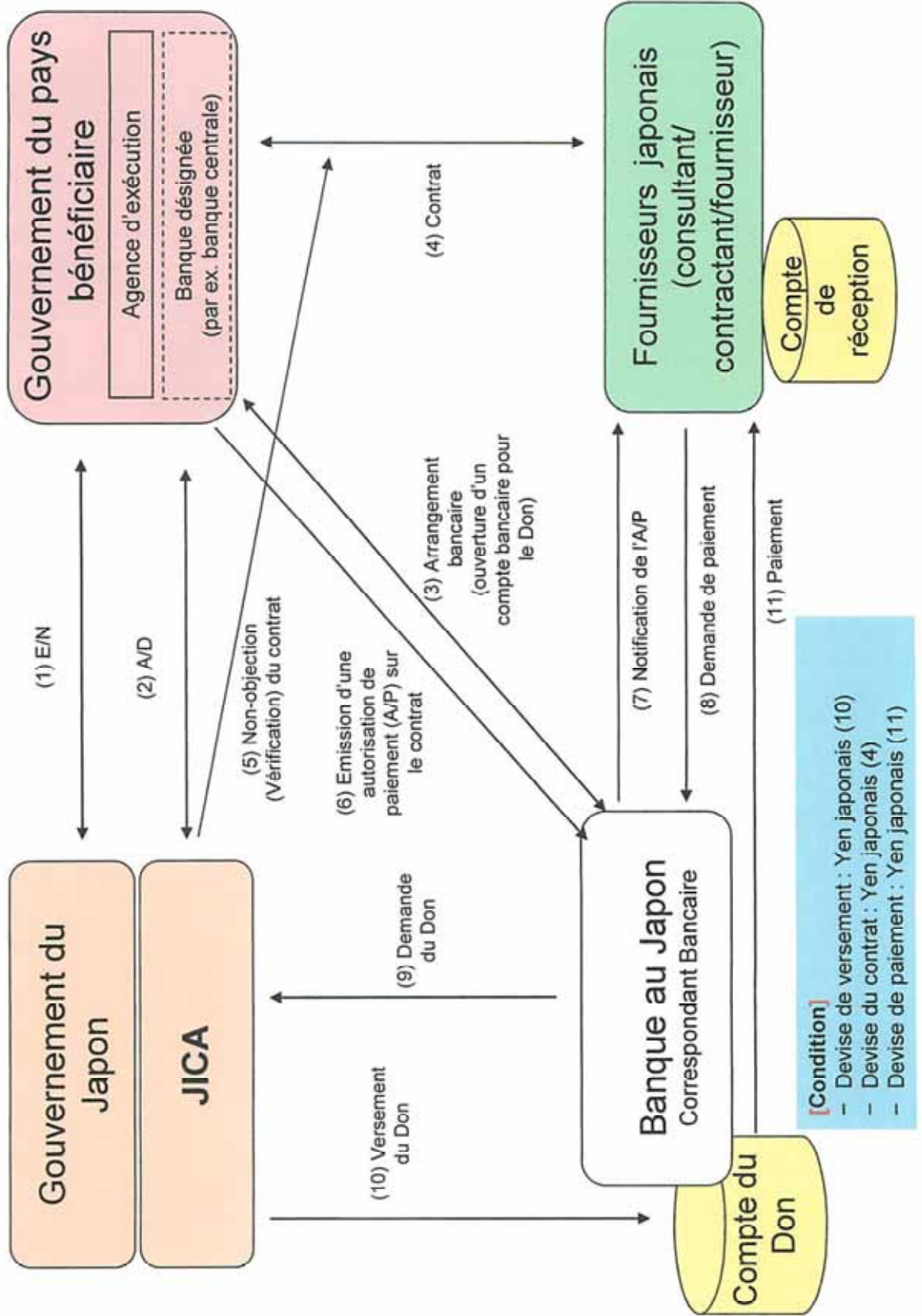
notes :

1. Le Project Monitoring Report (PMR) en anglais et le Rapport d'achèvement du Projet doivent être soumis à la JICA comme convenu dans l'A/D.
2. La non-objection de la JICA est requise pour l'attribution du don pour le montant restant et/ou les imprévus comme convenu dans l'A/D.

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Flux financiers du Don du Japon (type A/P)



[Condition]

- Devise de versement : Yen japonais (10)
- Devise du contrat : Yen japonais (4)
- Devise de paiement : Yen japonais (11)

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Rapport de Suivi du Projet
pour
le Nom de projet
Accord de Don No. XXXXXXXX
Mois 20XX

Information sur l'organisation

Signataire l'A/D (Bénéficiaire)	de <u>Personne en charge (Service)</u> Coordonnées <u>Adresse:</u> <u>Téléphone/FAX:</u> <u>Email:</u>
Organisme d'exécution	<u>Personne en charge (Service)</u> Coordonnées <u>Adresse:</u> <u>Téléphone/FAX:</u> <u>Email:</u>
Ministère compétent	<u>Personne en charge (Service)</u> Coordonnées <u>Adresse:</u> <u>Téléphone/FAX:</u> <u>Email:</u>

Informations générales :

Titre du projet	
E/N	Date de signature: Durée:
A/D	Date de signature: Durée:
Source de financement	Gouvernement du Japon: Montant n'excédant pas JPY <u>millions</u> Gouvernement du (_____): _____

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1: Description du projet

1-1 Objectif du Projet

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1-2 Fondement du Projet

- Objectif global auquel le projet contribue (politiques et stratégies nationales/régionales/sectorielles)
- Situation des groupes ciblés par le Projet

--

1-3 Indicateurs pour les mesures pour «l'Efficacité»

Indicateurs quantitatifs relatifs aux mesures de réalisation pour les objectifs du Projet		
Indicateurs	Initial (Année)	Cible (Année)
Indicateurs qualitatifs relatifs aux mesures de réalisation pour les objectifs du Projet		

2: Détails du projet

2-1 Emplacement du projet

Composants	Initial <i>(Proposé lors de la conception générale)</i>	Actuel
1.		

2-2 Etendue des travaux

Composants	Initial* <i>(Proposé lors de la conception générale)</i>	Actuel*
1.		

Raisons de modification de l'étendue (s'il y a lieu).

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(RSP)

2-3 Calendrier d'exécution

Désignation	Original		Actuel
	(Proposé lors de la conception générale)	(Au moment de signature de l'A/D)	

Raisons de modification de calendrier, et leurs répercussions sur le projet (s'il y a lieu)

2-4 Mesures à prendre par le Bénéficiaire

2-4-1 Avancement d'exécution des obligations spécifiques

Voir la pièce jointe 2.

2-4-2 Activités

Voir la pièce jointe 3.

2-4-3 Rapport sur le "Procès-Verbal"(PV)

Voir la pièce jointe 11.

2-5 Coût du projet

2-5-1 Coût couvert par le Don (confidentiel jusqu'à l'appel d'offres)


Composantes			Coût (Millions de yen japonais)	
	Initial (Proposé lors de la conception générale)	Actuel (en cas de modification)	Initial ^{1),2)} (Proposé lors de la conception générale)	Actuel
1.				
Total				

Note: 1) Date d'estimation:

2) Taux de change: 1 Dollar US = Yens japonais

2-5-2 Coût pris en charge par le Bénéficiaire

Composantes			Coût (Djibouti franc)	
	Initial (Proposé lors de la conception générale)	Actuel (en cas de modification)	Initial ^{1),2)} (Proposé lors de la conception générale)	Actuel
1.				

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Note: 1) Date d'estimation:
2) Taux de change : 1 Dollar US =

S'il y a un écart important entre le montant initialement prévu et le montant actuel, indiquez la(les) raison(s), les mesures prises (si elles sont prises).

(RSP)

2-6 Organisme d'Exécution

- Son rôle, situation financière, capacité, recouvrement des coûts etc.,
- Organigramme incluant le service en charge de l'exécution et le nombre d'employés.

Initial : (au moment de la conception Générale) Nom: Rôle: Situation financière: Structure institutionnelle et organisationnelle (organigramme): Ressources humaines (nombre de l'effectif et ses compétences):
Actuel (RSP)

2-7 Impacts environnemental et social

- Les résultats du suivi environnemental sont tels qu'ils sont présentés en Pièce Jointe 5 conformément au Calendrier 4 de l'A/D.
- Les résultats du suivi social sont tels qu'ils sont présentés en Pièce Jointe 5 conformément au Calendrier 4 de l'A/D.
- L'information sur les résultats divulgués du suivi environnemental et social aux parties prenantes locales, le cas échéant.

3: Exploitation et Maintenance (E&M)

3-1 Système structurelle pour l'E&M

- Plan d'exploitation et de maintenance (le nombre et la compétence du personnel de la direction/section responsable, la disponibilité de mode d'emploi et de manuels, la disponibilité de pièces de rechange, etc.)

Initial (au moment de la conception générale)
Actuel (RSP)

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3-2 Coût et budget de l'E&M
- Coût requis de l'E&M et allocation du budget réel pour l'E&M.

Initial (au moment de la conception générale)
Actuel (RSP)

4: Risques potentiels et mesures d'atténuation

- Les risques potentiels qui pourraient affecter la mise en œuvre, les résultats et la durabilité du projet
- Mesures d'atténuation à prendre contre les risques potentiels

Evaluation des risques potentiels (au moment de la conception générale)

Risques potentiels	Evaluation
1. (Description du risque)	Probabilité: Elevée/Moyenne/Basse
	Impact: Elevé/Moyenne/Bas
	Analyses de probabilité et d'impact:
	Mesures d'atténuation:
	Action Durant la mise en œuvre :
	Plan de contingence (éventuellement):
2. (Description du risque)	Probabilité: Elevée/Moyenne/Basse
	Impact: Elevé/Moyenne/Bas
	Analyses de probabilité et d'impact:
	Mesures d'atténuation:
	Action durant la mise en œuvre :
	Plan de contingence (éventuellement):
3. (Description du risque)	Probabilité: Elevée/Moyenne/Basse
	Impact: Elevé/Moyenne/Bas
	Analyses de probabilité et d'impact:
	Mesures d'atténuation:

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	Action durant la mise en œuvre :
	Plan de contingence (éventuellement):
Problèmes actuels et mesures prises	
(RSP)	

5: Evaluation lors de l'achèvement du Projet et plan de suivi

5-1 Evaluation générale

Décrivez votre évaluation générale sur le projet

5-2 Leçons tirées et recommandations

Veillez décrire les leçons tirées de l'expérience du projet, qui pourraient être utilisées dans le cadre de l'assistance future ou des projets similaires, et des recommandations qui pourraient être utiles pour réaliser les effets et l'impact attendus du projet, et pour assurer sa durabilité.

5-3 Plan de suivi relatif aux indicateurs pour la post-évaluation

Veillez décrire les méthodes de suivi, la (les) section(s) ou le (les) département(s) en charge du suivi, la fréquence, et la durée du suivi des indicateurs mentionnés à l'alinéa 1-3.

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Pièces jointes

1. Carte de localisation du Projet
2. Obligations spécifiques du Bénéficiaire qui ne seront pas couvertes par le Don
3. Rapport mensuel soumis par le Consultant
Annexes - Photocopie du Rapport d'Avancement de Contractant (s'il y en a)
-Liste des membres du Consultant
- Liste des principaux personnels du Contractant
4. Check-list pour le Contrat (y compris le document concernant l'amendement du contrat/ Accord et le calendrier de paiement)
5. Formulaire du suivi environnemental/Formulaire du suivi social
6. Fiche de suivi sur les prix des matériels spécifiés (Trimestriel)
7. Rapport sur la proportion des approvisionnements (pays bénéficiaire, Japon et pays tiers) (seulement le RSP final)
8. Photos (en format JPEG sous CD-ROM) (seulement le RSP final)
9. Liste des équipements (seulement le RSP final)
10. Plan de conception (seulement le RSP final)
11. Document du procès-verbal (après le projet)

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Fiche de suivi sur les prix des matériels spécifiés

1. Conditions initiales (Confirmé)

Articles des matériels spécifiés	Volume initial A	Prix unitaire initial (Yen japonais) B	Prix total initial C=A×B	1% du prix contractuel D	Condition de paiement	
					Prix (réduit) E=C-D	Prix (additionné) F=C+D
1 Article 1	●●●	●	●	●	●	●
2 Article 2	●●●	●	●	●		
3 Article 3						
4 Article 4						
5 Article 5						

2. Suivi du prix unitaire des matériels spécifiés

(1) Méthode de suivi : ●●

(2) Résultat de l'Etude de suivi sur le prix unitaire pour chaque matériel spécifié

Articles des matériels spécifiés	1er ●mois, 2015	2ème ●mois, 2015	3ème ●mois, 2015	4ème	5ème	6ème
1 Article 1						
2 Article 2						
3 Article 3						
4 Article 4						
5 Article 5						

(3) Résumé de la discussion avec le Contractant (si nécessaire)

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Rapport sur la proportion des approvisionnements (pays bénéficiaire, Japon et pays tiers)
(Dépenses réelles respectives de construction et d'équipement)

	Approvisionnement local (Pays bénéficiaire) A	Approvisionnement à l'étranger (Japon) B	Approvisionnement à l'étranger (Pays tiers) C	Total D
Coût de construction	(A/D%)	(B/D%)	(C/D%)	
Coût direct de construction	(A/D%)	(B/D%)	(C/D%)	
Autres	(A/D%)	(B/D%)	(C/D%)	
Coût d'équipement	(A/D%)	(B/D%)	(C/D%)	
Coût de conception et de surveillance	(A/D%)	(B/D%)	(C/D%)	
Total	(A/D%)	(B/D%)	(C/D%)	

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Principaux engagements à prendre par le Gouvernement de Djibouti

1. Obligations spécifiques du Gouvernement de Djibouti qui ne seront pas financées par le Don**(1) Avant l'appel d'offres**

N°	Eléments	Date butoir	En charge	Coût estimé	Réf.
1	Ouvrir un compte bancaire (Arrangement Bancaire A/B)	Dans un délai d'un mois après la signature de l'A/D			
2	Emettre une autorisation de paiement (A/P) auprès d'une banque au Japon (le Correspondant Bancaire) pour le paiement au consultant	Dans un délai d'un mois après la signature du contrat			
3	Approuver l'EEP/EIE (les conditions d'approbation doivent être remplies, le cas échéant) et prévoir le budget nécessaire à la mise en œuvre.	Dans un délai d'un mois après la signature de l'A/D			
4	Prévoir le budget nécessaire et mettre en œuvre l'acquisition de terrains et la réinstallation (notamment la préparation des sites de réinstallation), et une compensation avec l'intégralité des coûts de remplacement conformément au Plan d'Action de Réinstallation (PAR)	Avant la notification du dossier d'appel d'offres	ADR		
5	Mettre en œuvre un suivi social et soumettre les résultats du suivi à la JICA tous les trimestres, à l'aide du formulaire de suivi, dans le cadre du « Project Monitoring Report » (PMR) en anglais	Jusqu'à la finalisation de l'acquisition du terrain et de la réinstallation.	ADR		
6	Garantir et défricher les terrains suivants 1) emprise routière pour le Projet 2) chantier de construction et lieux de stockage du matériel temporaires à proximité de la zone du Projet 3) déviation pour la route existante 4) carrière de sable et décharge à proximité de la zone du Projet	Avant la notification du dossier d'appel d'offres	ADR		
7	Obtenir le permis d'urbanisme, de zonage et de construire	Avant la notification du dossier d'appel d'offres	ADR		
8	Défricher, niveler et réhabiliter les sites, à confirmer dans l'avant-projet du rapport final	Avant la notification du dossier d'appel d'offres	ADR		
9	Soumettre le « Project Monitoring Report » (avec les résultats de la conception détaillée)	Avant la préparation du dossier d'appel d'offres	ADR		

ADR : Agence Djiboutienne des Routes

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(2) Durant la mise en œuvre du Projet

N°	Éléments	Date butoir	En charge	Coût estimé	Réf.
1	Emettre l'A/P auprès de la banque au Japon (le Correspondant Bancaire) pour le(s) paiement(s) du(des) Fournisseur(s)	Dans un délai d'un mois à compter de la signature du(des) contrat(s)			
2	Prendre en charge les commissions suivantes versées à la banque au Japon pour les services bancaires basés sur l'A/B	Durant le Projet			
	1) Commission pour notification de l'A/P	Dans un délai d'un mois à compter de la signature du(des) contrat(s)			
	2) Commission de paiement de l'A/P	À chaque paiement			
3	Assurer un déchargement et un dédouanement rapides aux ports de débarquement dans le pays du Bénéficiaire et aider le(s) Fournisseur(s) à l'égard du transport intérieur				
4	Accorder aux personnes physiques japonaises et/ou aux personnes physiques des pays tiers dont les services seront nécessaires à la fourniture des Produits et des Services, les facilités nécessaires pour leurs entrées et séjours au pays du Bénéficiaire effectuer leur travail	Durant le Projet	ADR		
5	Assurer que les droits de douane, les taxes intérieures et autres charges fiscales qui pourraient être imposés au pays du Bénéficiaire en rapport avec l'achat des Produits et/ou des Services seront exonérés	Durant le Projet			
6	Supporter tous les frais nécessaires, autres que ceux couverts par le Don, à la mise en œuvre du Projet	Durant le Projet	ADR		
7	1) Soumettre le « Project Monitoring Report »	Mensuellement	ADR		
	2) Soumettre le « Project Monitoring Report » (final)	Dans un délai d'un mois après la signature du certificat d'achèvement des travaux prévus au(x) contrat(s)	ADR		
8	Soumettre un rapport portant sur l'achèvement du Projet	Dans les six mois suivant l'achèvement du Projet	ADR		
9	Prendre les mesures nécessaires pour la sécurité de construction - Contrôle de la circulation	Durant la construction	ADR		
10	Mettre en œuvre le PGE (Plan de gestion environnementale) et le PSE (Plan de suivi environnemental)	Durant la construction	ADR		
11	Soumettre les résultats du suivi environnemental à la JICA, en utilisant le formulaire de suivi, chaque trimestre, dans le cadre du Project Monitoring Report	Durant la construction	ADR		

12	Mettre en œuvre le PAR (programme de rétablissement des moyens de subsistance, si nécessaire)	Durant une période basée sur le programme de rétablissement des moyens de subsistance	ADR		
13	Mettre en œuvre un suivi social, et soumettre les résultats du suivi à la JICA, en utilisant le formulaire de suivi, chaque trimestre, dans le cadre du « Project Monitoring Report » - La période de suivi pourra être prorogée si les moyens de subsistance des personnes affectées n'ont pas été suffisamment rétablis. L'ADR et la JICA décideront d'un commun accord si la période de suivi doit être prorogée.	-Jusqu'à la fin du programme de rétablissement des moyens de subsistance (Si un programme de rétablissement des moyens de subsistance est prévu)	ADR		

(3) Après le Projet

N°	Eléments	Date butoir	En charge	Coût estimé	Réf.
1	Mettre en œuvre le PGE et le PSE	Durant une période basée sur le PGE et le PSE	ADR		
2	Soumettre les résultats du suivi environnemental à la JICA, en utilisant le formulaire de suivi, chaque semestre - La période de suivi environnemental pourra être prorogée si un impact négatif significatif sur l'environnement est décelé. L'ADR et la JICA décideront d'un commun accord si la période de suivi doit être prorogée.	Pendant trois ans après le Projet	ADR		
3	Entretien, et utiliser de manière adéquate et efficace les installations construites et les équipements fournis dans le cadre du Don du Japon 1) Imputation des frais d'entretien 2) Structure de fonctionnement et d'entretien 3) Contrôle de routine/inspection périodique	Après achèvement de la construction	ADR		

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2. Autres obligations du Gouvernement de Djibouti financées par le Don

N°	Eléments	Date butoir	Montant (en millions de yen)*
1	Construire des routes - Amélioration de la route nationale 1		/
2	Mettre en œuvre le plan détaillé, le soutien pour les appels d'offres et la supervision de la construction (Services fournis par le Consultant)		
3	Imprévus		/
	Total		XXX

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Langues utilisées dans chaque document

N°	Article	Rédacteur	Langue	
			Français	Anglais
I	ETAPE DE L'ETUDE PREPARATOIRE			
1.	Rapport de l'Etude sur le terrain	Consultant		<input type="radio"/>
2.	Avant-projet du Rapport de l'Etude préparatoire (avant-projet du Rapport final) Note : Les parties techniques. (Technical Drawings, etc.)	Consultant	<input type="radio"/>	<input type="radio"/> (Note)
3.	Rapport de l'Etude préparatoire (Rapport final) Note : Les parties techniques. (Technical Drawings, etc.)	Consultant	<input type="radio"/>	<input type="radio"/> (Note)
II	ETAPE DE MISE EN ŒUVRE			
1.	Documents connexes à l'Accord de consultation			
1.1	Accord de consultation	Consultant	<input type="radio"/>	
1.2	Recommandation du Consultant	JICA	<input type="radio"/>	
1.3	Documents connexes à l'arrangement bancaire (B/A, A/P)	Banque	<input type="radio"/>	
1.4	Demande de paiement	Consultant	<input type="radio"/>	
2.	Documents connexes au Contrat d'exécution			
2.1	Avis d'appel d'offres dans le journal	Consultant		<input type="radio"/>
2.2	Documents d'appel d'offres			
	Volume I : Conditions de l'appel d'offres et Contrat	Consultant		<input type="radio"/>
	Partie I : Instructions aux soumissionnaires	Consultant		<input type="radio"/>
	Partie II : Formule de l'appel d'offres	Consultant		<input type="radio"/>
	Partie III : Formule du Contrat	Consultant	<input type="radio"/>	
	Volume II Spécifications	Consultant		<input type="radio"/>
2.3	Questions et réponses concernant les documents d'appel d'offres	Soumissionnaire/Consultant		<input type="radio"/>

2.4	Documents de soumission	Soumissionnaires (Fournisseur)		<input type="radio"/>
2.5	Rapport d'évaluation des soumissions	Consultant	<input type="radio"/>	<input type="radio"/>
2.6	Contrat d'exécution	Fournisseur	<input type="radio"/>	
2.7	Documents connexes à l'arrangement bancaire (B/A, A/P)	Banque	<input type="radio"/>	
2.8	Demande de paiement	Fournisseur	<input type="radio"/>	
2.9	Certificat d'achèvement	Consultant/Pays concerné	<input type="radio"/>	
2.10	Documents techniques pour approbation	Fournisseur		<input type="radio"/>

Note: A language used at the implementation stage shall follow the one used in the Exchange of Notes (E/N) regardless of the above table.

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Principaux engagements à prendre par le Gouvernement de Djibouti

1. Obligations spécifiques du Gouvernement de Djibouti qui ne seront pas financées par le Don

(1) Avant l'appel d'offres

N°	Eléments	Date butoir	En charge	Coût estimé	Réf.
1	Ouvrir un compte bancaire (Arrangement Bancaire A/B)	Dans un délai d'un mois après la signature de l'A/D			
2	Emettre une autorisation de paiement (A/P) auprès d'une banque au Japon (le Correspondant Bancaire) pour le paiement au consultant	Dans un délai d'un mois après la signature du contrat			
3	Approuver l'EEP/EIE (les conditions d'approbation doivent être remplies, le cas échéant) et prévoir le budget nécessaire à la mise en œuvre.	Dans un délai d'un mois après la signature de l'A/D			
4	Prévoir le budget nécessaire et mettre en œuvre l'acquisition de terrains et la réinstallation (notamment la préparation des sites de réinstallation), et une compensation avec l'intégralité des coûts de remplacement conformément au Plan d'Action de Réinstallation (PAR)	Avant la notification du dossier d'appel d'offres	ADR		
5	Mettre en œuvre un suivi social et soumettre les résultats du suivi à la JICA tous les trimestres, à l'aide du formulaire de suivi, dans le cadre du « Project Monitoring Report » (PMR) en anglais	Jusqu'à la finalisation de l'acquisition du terrain et de la réinstallation.	ADR		
6	Garantir et défricher les terrains suivants 1) emprise routière pour le Projet 2) chantier de construction et lieux de stockage du matériel temporaires à proximité de la zone du Projet 3) déviation pour la route existante 4) carrière de sable et décharge à proximité de la zone du Projet	Avant la notification du dossier d'appel d'offres	ADR		
7	Obtenir le permis d'urbanisme, de zonage et de construire	Avant la notification du dossier d'appel d'offres	ADR		
8	Défricher, niveler et réhabiliter les sites, à confirmer dans l'avant-projet du rapport final	Avant la notification du dossier d'appel d'offres	ADR		
9	Soumettre le « Project Monitoring Report » (avec les résultats de la conception détaillée)	Avant la préparation du dossier d'appel d'offres	ADR		

ADR : Agence Djiboutienne des Routes

(2) Durant la mise en œuvre du Projet

N°	Éléments	Date butoir	En charge	Coût estimé	Réf.
1	Emettre l'A/P auprès de la banque au Japon (le Correspondant Bancaire) pour le(s) paiement(s) du(des) Fournisseur(s)	Dans un délai d'un mois à compter de la signature du(des) contrat(s)			
2	Prendre en charge les commissions suivantes versées à la banque au Japon pour les services bancaires basés sur l'A/B	Durant le Projet			
	1) Commission pour notification de l'A/P	Dans un délai d'un mois à compter de la signature du(des) contrat(s)			
	2) Commission de paiement de l'A/P	À chaque paiement			
3	Assurer un déchargement et un dédouanement rapides aux ports de débarquement dans le pays du Bénéficiaire et aider le(s) Fournisseur(s) à l'égard du transport intérieur				
4	Accorder aux personnes physiques japonaises et/ou aux personnes physiques des pays tiers dont les services seront nécessaires à la fourniture des Produits et des Services, les facilités nécessaires pour leurs entrées et séjours au pays du Bénéficiaire effectuer leur travail	Durant le Projet	ADR		
5	Assurer que les droits de douane, les taxes intérieures et autres charges fiscales qui pourraient être imposés au pays du Bénéficiaire en rapport avec l'achat des Produits et/ou des Services seront exonérés	Durant le Projet			
6	Supporter tous les frais nécessaires, autres que ceux couverts par le Don, à la mise en œuvre du Projet	Durant le Projet	ADR		
7	1) Soumettre le « Project Monitoring Report »	Mensuellement	ADR		
	2) Soumettre le « Project Monitoring Report » (final)	Dans un délai d'un mois après la signature du certificat d'achèvement des travaux prévus au(x) contrat(s)	ADR		
8	Soumettre un rapport portant sur l'achèvement du Projet	Dans les six mois suivant l'achèvement du Projet	ADR		
9	Prendre les mesures nécessaires pour la sécurité de construction - Contrôle de la circulation	Durant la construction	ADR		
10	Mettre en œuvre le PGE (Plan de gestion environnementale) et le PSE (Plan de suivi environnemental)	Durant la construction	ADR		
11	Soumettre les résultats du suivi environnemental à la JICA, en utilisant le formulaire de suivi, chaque trimestre, dans le cadre du Project Monitoring Report	Durant la construction	ADR		

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12	Mettre en œuvre le PAR (programme de rétablissement des moyens de subsistance, si nécessaire)	Durant une période basée sur le programme de rétablissement des moyens de subsistance	ADR		
13	Mettre en œuvre un suivi social, et soumettre les résultats du suivi à la JICA, en utilisant le formulaire de suivi, chaque trimestre, dans le cadre du « Project Monitoring Report » - La période de suivi pourra être prolongée si les moyens de subsistance des personnes affectées n'ont pas été suffisamment rétablis. L'ADR et la JICA décideront d'un commun accord si la période de suivi doit être prolongée.	-Jusqu'à la fin du programme de rétablissement des moyens de subsistance (Si un programme de rétablissement des moyens de subsistance est prévu)	ADR		

(3) Après le Projet

N°	Eléments	Date butoir	En charge	Coût estimé	Réf.
1	Mettre en œuvre le PGE et le PSE	Durant une période basée sur le PGE et le PSE	ADR		
2	Soumettre les résultats du suivi environnemental à la JICA, en utilisant le formulaire de suivi, chaque semestre - La période de suivi environnemental pourra être prolongée si un impact négatif significatif sur l'environnement est décelé. L'ADR et la JICA décideront d'un commun accord si la période de suivi doit être prolongée.	Pendant trois ans après le Projet	ADR		
3	Entretien, et utiliser de manière adéquate et efficace les installations construites et les équipements fournis dans le cadre du Don du Japon 1) Imputation des frais d'entretien 2) Structure de fonctionnement et d'entretien 3) Contrôle de routine/inspection périodique	Après achèvement de la construction	ADR		

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2. Autres obligations du Gouvernement de Djibouti financées par le Don

N°	Eléments	Date butoir	Montant (en millions de yen)*
1	Construire des routes - Amélioration de la route nationale 1		/
2	Mettre en œuvre le plan détaillé, le soutien pour les appels d'offres et la supervision de la construction (Services fournis par le Consultant)		
3	Imprévus		/
	Total		XXX

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Langues utilisées dans chaque document

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2.	Avant-projet du Rapport de l'Etude préparatoire (avant-projet du Rapport final) Note : Les parties techniques. (Technical Drawings, etc.)	Consultant	<input type="radio"/>	<input type="radio"/> (Note)
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1.3	Documents connexes à l'arrangement bancaire (B/A, A/P)	Banque	<input type="radio"/>	
1.4	Demande de paiement	Consultant	<input type="radio"/>	
2.	Documents connexes au Contrat d'exécution			
2.1	Avis d'appel d'offres dans le journal	Consultant		<input type="radio"/>
2.2	Documents d'appel d'offres			
	Volume I : Conditions de l'appel d'offres et Contrat	Consultant		<input type="radio"/>
	Partie I : Instructions aux soumissionnaires	Consultant		<input type="radio"/>
	Partie II : Formule de l'appel d'offres	Consultant		<input type="radio"/>
	Partie III : Formule du Contrat	Consultant	<input type="radio"/>	
	Volume II Spécifications	Consultant		<input type="radio"/>
2.3	Questions et réponses concernant les documents d'appel d'offres	Soumissionnaire/Consultant		<input type="radio"/>


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2.4	Documents de soumission	Soumissionnaires (Fournisseur)		<input type="radio"/>
2.5	Rapport d'évaluation des soumissions	Consultant	<input type="radio"/>	<input type="radio"/>
2.6	Contrat d'exécution	Fournisseur	<input type="radio"/>	
2.7	Documents connexes à l'arrangement bancaire (B/A, A/P)	Banque	<input type="radio"/>	
2.8	Demande de paiement	Fournisseur	<input type="radio"/>	
2.9	Certificat d'achèvement	Consultant/Pays concerné	<input type="radio"/>	
2.10	Documents techniques pour approbation	Fournisseur		<input type="radio"/>

Note: A language used at the implementation stage shall follow the one used in the Exchange of Notes (E/N) regardless of the above table.

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**Minutes of Discussions
on the Preparatory Survey for the Project for
Upgrading of National Road Route 1**

In response to the request from the Government of Republic of Djibouti (hereinafter referred to as “Djibouti”), Japan International Cooperation Agency (hereinafter referred to as “JICA”) dispatched a preparatory survey team for the outline design (hereinafter referred to as “the Team”) of the Project for Upgrading of National Road Route 1 (hereinafter referred to as “the Project”) to Djibouti. The Team held a series of discussions with the officials of the Government of Djibouti and conducted a field survey. In the course of the discussions, both sides have confirmed the main items described in the attached sheets.

Djibouti, 22nd March, 2018

Kenshiro TANAKA

Leader

Preparatory Survey Team

Japan International Cooperation Agency

Osman Houssein Bouralrh

Directeur General a.i.

Agence Djiboutienne des Routes

Ministère de l'Équipement et des Transports

Republic of Djibouti

In Witness whereof,

Yacin Houssein Doualé

Directeur des Relations Bilatérales

Ministère des Affaires Etrangères et de la

Coopération Internationale

Said Nouh Hassan

Secrétaire Général

Ministère de l'Équipement et des Transports

ATTACHMENT

1. Objective of the Project

The objective of the Project is to improve transportation and logistics as well as traffic safety of National Road Route 1 (Galafi - Yoboki) by improving a two-way traffic road and horizontal alignment, thereby contributing to economic growth of Djibouti.

2. Title of the Preparatory Survey

Both sides confirmed the title of the preparatory survey as “the Preparatory Survey for the Project for Upgrading of National Road Route 1”

3. Project Site

Both sides confirmed that the site of the Project is approx. 20km section of National Road Route 1 between Galafi and Yoboki shown in Annex 1. The Team proposed that the starting point of the site is the Galafi border, and details of the Project component will be determined through the preparatory survey.

4. Responsible Authority for the Project

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

- 4-1. The “Agence Djiboutienne des Routes (ADR)” will be the executing agency for the Project (hereinafter referred to as “the Executing Agency”). The Executing Agency shall coordinate with all the relevant authorities to ensure smooth implementation of the Project and ensure that the undertakings for the Project shall be managed by the relevant authorities properly and on time.
- 4-2. “Ministère de l’Equipment et des Transports” shall be a responsible ministry for supervising the Executing Agency on behalf of the Government of Djibouti. The organization charts are shown in Annex 2.

5. Items Requested by the Government of Djibouti

- 5-1. As a result of discussions, both sides confirmed that the item requested by the Government of Djibouti is improvement of the two-way traffic road between Galafi and Yoboki including supplemental facilities shown in Annex 1. The road width and technical specifications will be fixed though the study of traffic demand.
- 5-2. JICA will assess the feasibility of the above requested item through the

preparatory survey and will report the findings to the Government of Japan. The final scope of the Project will be decided by the Government of Japan.

6. Procedures and Basic Principles of Japanese Grant

6-1. The Djiboutian side agreed that the procedures and basic principles and basic principles of Japanese Grant as described in Annex 3, Annex 4 and Annex 5 shall be applied to the Project.

As for the monitoring of the implementation of the Project, JICA requires Djiboutian side to submit the Project Monitoring Report, the form of which is attached as Annex 6.

6-2. The Djiboutian side agreed to take the necessary measures, as described in Annex 7, for smooth implementation of the Project. The contents of the Annex 7 will be elaborated and refined during the preparatory survey and be agreed in the mission dispatched for explanation of the draft preparatory survey report.

The contents of Annex 7 will be updated as the preparatory survey progresses, and eventually, will be used as an attachment to the Grant Agreement.

7. Schedule of the Preparatory Survey

The Team will continue the first field survey in Djibouti until 28th April, 2018. The Team explained the tentative schedule of the preparatory survey as follows:

7-1. The Team will conduct the second field survey in Djibouti from the end of May to early June, 2018.

7-2. The Team will prepare a draft preparatory survey report in French and explain its contents in Djibouti around October, 2018.

7-3. If the Djiboutian side accepts the report and the undertakings for the Project, JICA will finalize the report and send it to Djibouti around the end of December, 2018.

7-4. The above schedule is tentative and subject to change.

8. Environmental and Social Considerations

8-1. The Djiboutian side confirmed to give due environmental and social considerations before and during implementation, and after completion of the Project, in accordance with the JICA Guidelines for Environmental and Social Considerations (April, 2010).

8-2. The Project is categorized as “B” from the following considerations: The project is not considered to be a large-scale road, is not located in a sensitive area, and

has none of the sensitive characteristics under the JICA Guidelines for Environmental and Social Considerations (April, 2010), it is not likely to have a significant adverse impact on the environment. The guidelines can be downloaded at the following URL.

http://www.jica.go.jp/english/our_work/social_environmental/guideline/pdf/guideline100326.pdf

The Djiboutian side confirmed to conduct the necessary procedures concerning the environmental assessment (including stakeholder meetings, Environmental Impact Assessment (EIA) / Initial Environmental Examination (IEE) and information disclosure, etc.) and make EIA/IEE report of the Project. The EIA/IEE approval shall be received from the responsible authorities and submitted to JICA by February, 2019.

- 8-3. For the Project that will result in involuntary resettlement, the Djiboutian side confirmed to prepare a Resettlement Action Plan (RAP) / Abbreviated Resettlement Action Plan (ARAP) and make it available to the public. In addition, the Djiboutian side confirmed to provide the affected people with sufficient compensation and/or support in accordance with RAP/ARAP, which is consistent with the JICA Guidelines for Environmental and Social Considerations (April, 2010), in a timely manner.

9. Other Relevant Issues

- 9-1. The Team explained a method of the preparatory survey based on an inception report submitted by the Team. The Djiboutian side understood the contents and accepted the method.
- 9-2. The Djiboutian side shall, at its own expense, provide the Team with following items;
- 1) Necessary data and information for the preparatory survey,
 - 2) Answers to the questionnaire submitted by the Team,
 - 3) Counterpart personnel,
 - 4) Permissions for entering private properties and restricted places and for taking photographs,
 - 5) Security information in a timely manner,
 - 6) Permissions of conducting field activities, such as a topographic survey, geotechnical investigations, environmental and social considerations, a traffic volume survey, etc., by local consulting firms entrusted by the Team and issuing identification cards for members of the said firms,

- 7) Permissions of field activities (topographic survey and field survey on current road conditions) around premises of the Galafi border,
- 8) Securing traffic safety through the field survey in cooperation with relevant authorities (e.g. gendarmerie, etc.), and
- 9) An office space for the Team.

Annex 1 Project Site

Annex 2 Organization Chart

Annex 3 Japanese Grant

Annex 4 Procedures of Japanese Grant

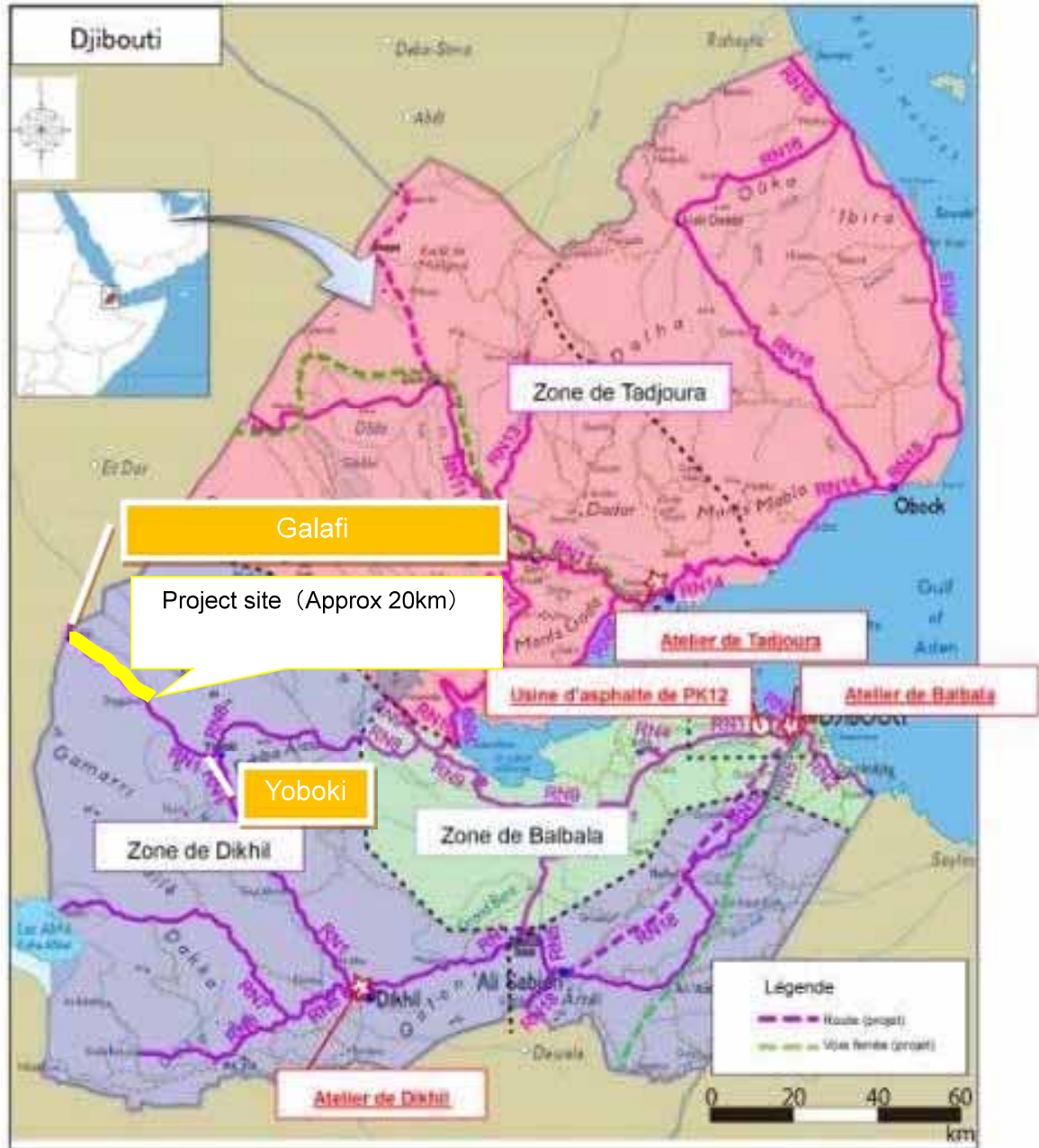
Annex 5 Financial Flow of Japanese Grant

Annex 6 Project Monitoring Report (template)

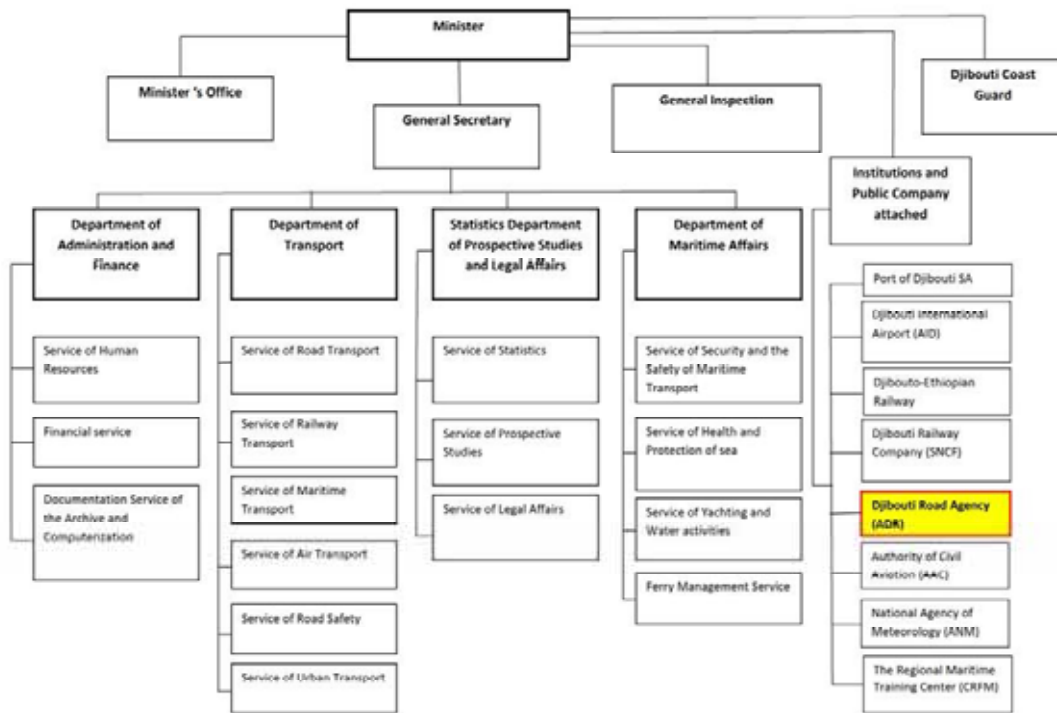
Annex 7 Major Undertakings to be taken by the Government of Djibouti

Annex 8 Language used in each Document

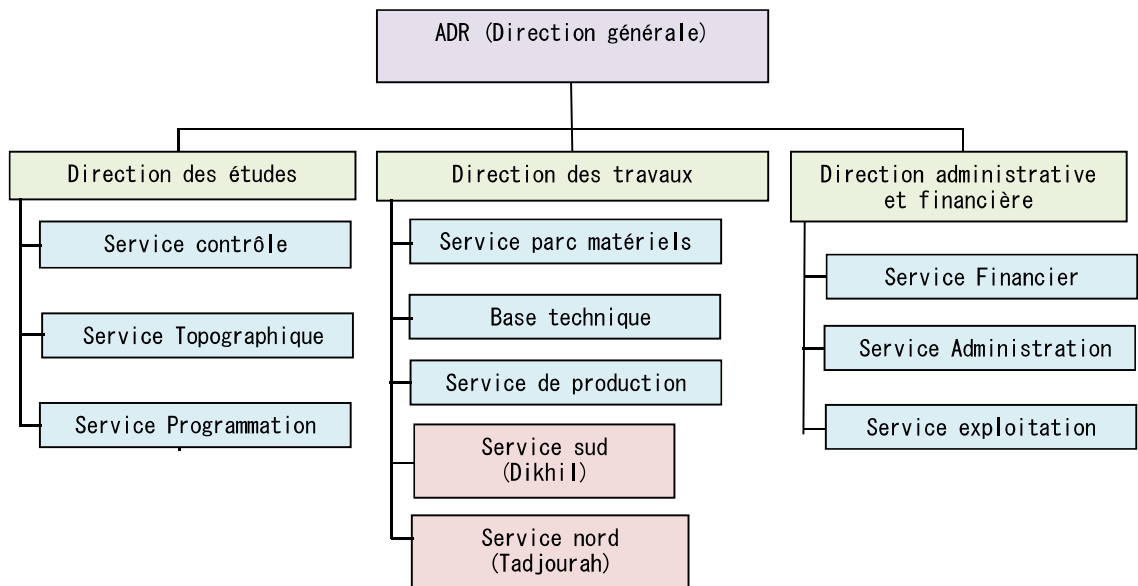
Project Site



Organization Chart



Ministère de l'Équipement et des Transports



Agence Djiboutienne des Routes (ADR)

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.

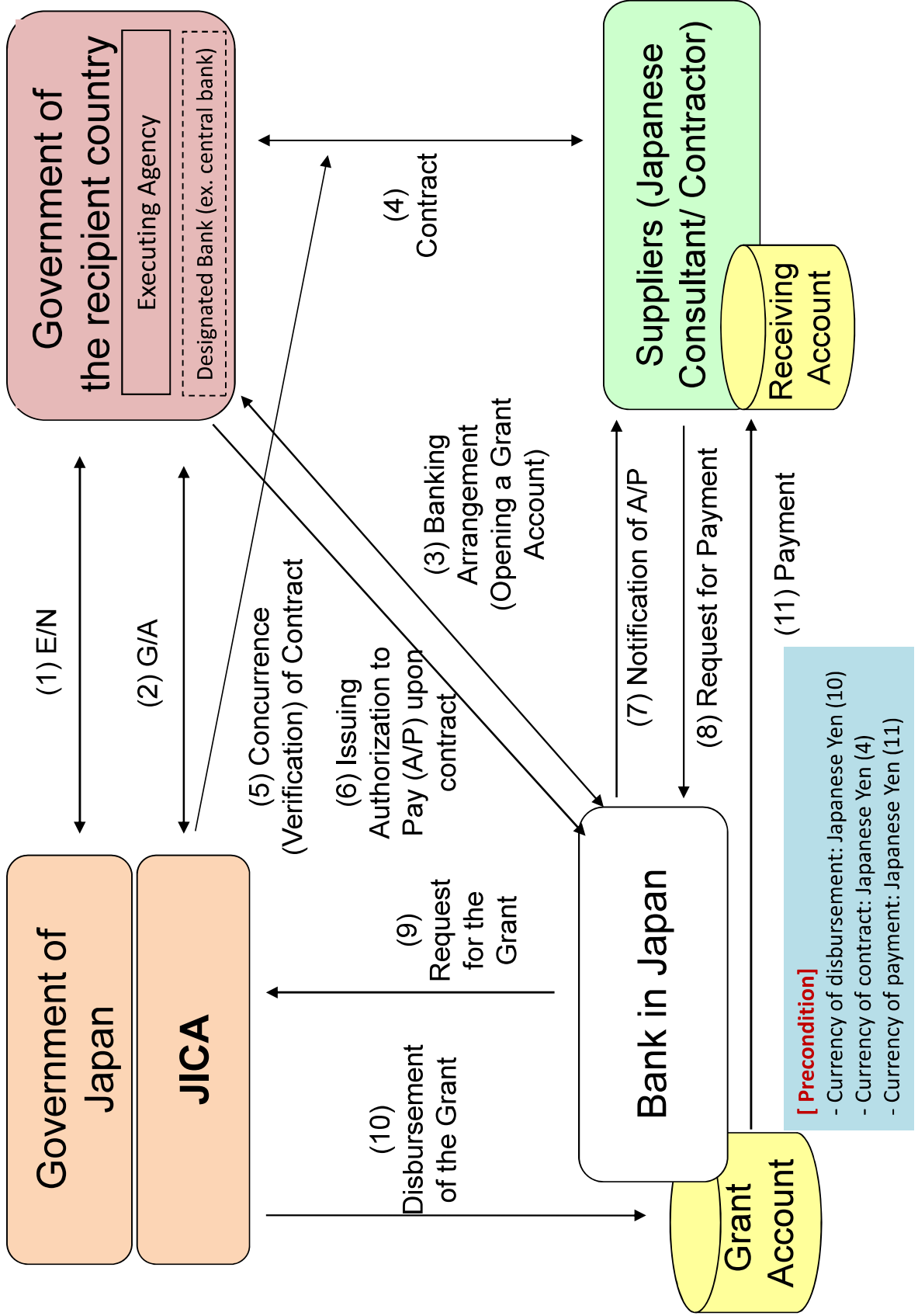
PROCEDURES OF JAPANESE GRANT

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)



Project Monitoring Report
on
Project Name
Grant Agreement No. XXXXXXXX
20XX, Month

Organizational Information

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

General Information:

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

1: Project Description	
-------------------------------	--

1-1 Project Objective

--

1-2 Project Rationale

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

--

1-3 Indicators for measurement of “Effectiveness”

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

2: Details of the Project

2-1 Location

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

2-2 Scope of the work

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

Reasons for modification of scope (if any).

<i>(PMR)</i>

2-3 Implementation Schedule

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

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

--

2-4 Obligations by the Recipient

2-4-1 Progress of Specific Obligations

See Attachment 2.

2-4-2 Activities

See Attachment 3.

2-4-3 Report on RD

See Attachment 11.

2-5 Project Cost

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

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

Note: 1) Date of estimation:

2) Exchange rate: 1 US Dollar = Yen

2-5-2 Cost borne by the Recipient

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

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

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

(PMR)

2-6 Executing Agency

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

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

2-7 Environmental and Social Impacts

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

3: Operation and Maintenance (O&M)

3-1 Physical Arrangement

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

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

3-2 Budgetary Arrangement

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

Original (at the time of outline design)

Actual (PMR)

4: Potential Risks and Mitigation Measures

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

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

Potential Risks	Assessment
1. (Description of Risk)	Probability: High/ Moderate/ Low
	Impact: High/ Moderate/ Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
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):
Actual Situation and Countermeasures (PMR)	

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

5-1 Overall evaluation

Please describe your overall evaluation on the project.

--

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.

--

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.

--

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)

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%)	

Major Undertakings to be taken by the Government of Djibouti

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

(1) Before the Bidding

No.	Items	Deadline	In charge	Cost	Ref.
1	To open Bank Account (Banking Arrangement (B/A))	within 1 month after signing of the G/A			
2	To issue the Authorization to Pay (A/P) to a bank in Japan (the Agent Bank) for the payment to the Consultant	within 1 month after signing of the contract			
3	To approve IEE/EIA (Conditions of approval should be fulfilled, if any) and secure the necessary budget for implementation of countermeasures obligated in the IEE/EIA.	within 1 month after signing of the G/A			
4	To secure the necessary budget and implement land acquisition and resettlement (including preparation of resettlement sites), and compensation with full replacement cost in accordance with RAP	before notice of the bidding document(s)	ADR		
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	ADR		
6	To secure and clear the following lands 1) right of way for the Project 2) temporary construction yard and stock yard near the Project area 3) diversion route for the existing road 4) borrow pit and disposal site near the Project area	before notice of the bidding document(s)	ADR		
7	To obtain the planning, zoning, building permit	before notice of the bidding document(s)	ADR		
8	To clear, level and reclaim the sites, which will be confirmed in the draft final report	before notice of the bidding document(s)	ADR		
9	To submit Project Monitoring Report (with the result of Detailed Design (DD))	before preparation of bidding document(s)	ADR		

Note: ADR: Agence Djiboutienne des Routes

(2) During the Project Implementation

No.	Items	Deadline	In charge	Cost	Ref.
1	To issue A/P(s) to the Agent Bank in Japan for the payment(s) to the Supplier(s)	within 1 month after signing of the contract(s)			
2	To bear the following commissions to the Agent Bank in Japan for the banking services based upon the B/A	during the Project			
	1) Advising commission of A/P	within 1 month after signing of the contract(s)			
	2) Payment commission for A/P	every payment			
3	To ensure prompt unloading and customs clearance at the ports of disembarkation in the country of Recipient and to assist the Supplier with internal transportation therein				

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	ADR		
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			
6	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project	during the Project	ADR		
7	1) To submit Project Monitoring Report	every month	ADR		
	2) To submit Project Monitoring Report (Final).	within one month after signing of Certificate of Completion of the Work under the contract(s)	ADR		
8	To submit a report concerning completion of the Project	within six months after completion of the Project	ADR		
9	To take necessary measure for safety construction - traffic control	during the construction	ADR		
10	To implement Environmental Management Plan (EMP) and Environmental Monitoring Programme (EMoP)	during the construction	ADR		
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	ADR		
12	To implement RAP (livelihood restoration program, if needed)	for a period based on livelihood restoration program	ADR		
13	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 ADR and JICA.	- until the end of livelihood restoration program (In case that livelihood restoration program is provided)	ADR		

(3) After the Project

No.	Items	Deadline	In charge	Cost	Ref.
1	To implement EMP and EMoP	for a period based on EMP and EMoP	ADR		
2	To submit results of environmental monitoring to JICA, by using the monitoring form, semi-annually - The period of environmental monitoring may be extended if any significant negative impacts on the environment are found. The extension of environmental monitoring will be decided based on the agreement between ADR and JICA.	for three years after the Project	ADR		
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	ADR		

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

No.	Items	Deadline	Amount (Million Japanese Yen)*
1	To construct roads - Upgrading of national road route 1		/
2	To implement detailed design, bidding support and construction supervision (Consulting Service)		
3	Contingencies		
	Total		XXX

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

Language used in each Document

No	Item	Prepared by	Language	
			French	English
I	PREPARATORY SURVEY STAGE			
1.	Field Survey Report	Consultant		○
2.	Draft Preparatory Survey Report (Draft Final Report) Note: Technical contents (Technical Drawings, etc.)	Consultant	○	○ (Note)
3.	Preparatory Survey Report (Final Report) Note: Technical contents (Technical Drawings, etc.)	Consultant	○	○ (Note)
II	IMPLEMENTATION STAGE			
1.	Documents for the Agreement for Consulting Services			
1.1	Agreement for Consulting Services	Consultant	○	
1.2	Recommendation of Consultant	JICA	○	
1.3	Documents for Banking Arrangement (B/A, A/P)	Bank	○	
1.4	Documents for Payment	Consultant	○	
2.	Documents for the Contract with Supplier			
2.1	Tender Announcement	Consultant		○
2.2	Tender Documents			
	Volume I Tender Conditions and Contract	Consultant		○
	Part I : Instructions to Tenderers	Consultant		○
	Part II : Forms of Tender	Consultant		○
	Part III : Form of Contract	Consultant	○	
	Volume II Specifications	Consultant		○
2.3	Questions and Answers to Tender Documents	Tenderer/ Consultant		○
2.4	Document of Submissions of Tenders	Tenderer (Contractor)		○
2.5	Tender Evaluation Report	Consultant	○	○
2.6	Contract for execution	Contractor	○	
2.7	Documents for Banking Arrangement (B/A, A/P)	Bank	○	
2.8	Documents for Payment	Contractor	○	
2.9	Completion Certificate	Consultant/Buyer	○	
2.10	Technical Documents for Approval	Contractor		○

Note: A language used at the implementation stage shall follow the one used in the Exchange of Notes (E/N) regardless of the above table.

APPENDIX 5

SOFT COMPONENT (TECHNICAL ASSISTANCE) PLAN

**L'Etude Préparatoire pour le Projet
D'Amélioration de la route nationale 1 en
République de Djibouti**

Notes Techniques

Le 26 Avril 2018

**YACHIYO ENGINEERING CO., LTD.
TOKYO, JAPAN**

<p>Préparé et soumis par</p> <p><i>for 高橋久士</i></p>	<p>Confirmé par</p> <p><i>Osman</i></p>
<p>Isao Takahashi Chief Consultant Social and Economic Infrastructure Department International Division Yachiyo Engineering Co., Ltd. Tokyo, Japan</p>	<p>Osman Houssein Bouraleh Directeur Général P.I Agence Djiboutienne des Routes (A.D.R) Ministère de l'Équipement et des Transports République de Djibouti</p>

**L'Etude Préparatoire pour le Projet
D'Amélioration de la route nationale 1 en République de Djibouti**

Notes techniques

Préface

Concernant Les discussions et les notes qui ont eu lieu et convenues entre le Ministère de l'Équipement du Transport ainsi que L'Agence Djiboutienne des Route et JICA le 22 mars 2018, l'équipe de JICA ont établis une étude de la route nationale a Galafi dans la région de Dhikil. L'équipe a entrepris des pourparlers des détails supplémentaires du projet avec les officiels de L'ADR.

À la suite du sondage et de la discussion, l'équipe a précisé les détails des éléments techniques suivants

1. Partie Ciblé
2. Normes de conception applicables
3. Représentation d'une coupe transversale
4. Le concept des éléments géométriques
5. Le type de la chaussée
6. Structure et Conceptualisation de l'oued
7. Modèle du système de drainage
8. Modèle de formalisation autour du poste des douanes

En d'autres termes tous les études et les données dans ce document vont être soumis et décidés après plusieurs consultations et d'études supplémentaires par le Gouvernement du Japon et ses personnes autorisées.

1. Partie Ciblée

- ✓ Point de départ : Frontière de Galafi (voir Figure-1)
- ✓ Fin de la section : approx. 20.5~20.8 km de la frontière (voir Figure-2)
NB : Des changements seront nécessaires a la fin de la section, après les résultats du sondage de la topographie.



Figure-1 Point de Dé



Figure-2 Fin de la Section

2. Normes de conception applicables

L'absence de normes propres à l'ADR incite l'utilisation des normes japonaises pour les concepts cités ci-dessous

- ✓ Conception Géométrique
- ✓ Modèle de la chaussée; Le concept d'AASHTO (Association Américaine des Autoroutes D'États et du Transport) sera appliqué à moitié indispensablement
- ✓ Concept drainage
- ✓ Types de Structures comportant les normes de plans

3. Représentation d'une coupe transversale

La section suivante sera appliquée comme une section transversale de la voie

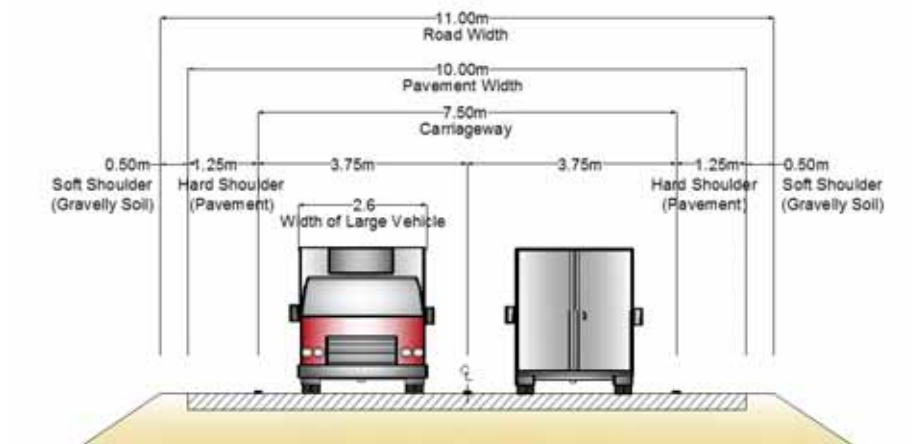


Figure-3 Représentation d'une coupe transversale pour la route ciblé

- ✓ Route-largeur de la voie; 3,75m, la largeur maximale de la voie au Japon et en France en ne tenant pas compte des véhicules poids lourds qui occupent plus 90% du Trafic. Les ajustements pour les connections des sections sont considéré aussi.
- ✓ Bande d'arrêt d'urgence-largeur de la bande d'arrêt d'urgence; 1.25 en respectant l'espace pour le stationnement des voitures en panne (la composition sera la même que la voie).
- ✓ Accotement-largeur de l'accotement; 0.5 est établis a l'extérieur de la bande d'arrêt d'urgence pour protéger la chaussée des dégradations

NB ; Un stationnement d'urgence sera suggérer pour la sécurité du le trafic

4. Le concept des éléments géométriques

La vitesse de conception serait essentiellement de 80 km / h, tandis que les 5 derniers kilomètres jusqu'à la frontière seraient de 50 km / h, compte tenu de la topographie variable et de l'arrêt au poste de contrôle frontalier. Les éléments géométriques de chaque section sont indiqués dans le tableau ci-dessous :

Table-1 Concept des éléments géométriques

Concept d'élément	Unité	RN1	
		PK199-PK214	PK214-PK219 (Partie près de la frontière)
Vitesse	Km/h	80	50
Rayon de la courbe minimale horizontale (Voulue)	M	280	100
Rayon de la courbe minimale horizontale (imperatif)	M	230	80
Maximum de l'inclinaison longitudinal (voulue)	%	4	6
Maximum de l'inclinaison longitudinal (imperatif)	%	7	9
Inclinaison minimal longitudinal	%	0.3	0.3
Rayon de la courbe longitudinal	M	2,000	700
Courbe Transversal chute	%	2.5	2.5
Courbe transversal accotement	%	4	4
Surélévation maximal	%	10	10
La distance min de visibilité d'arrêt	M	140	65
Distance min de visibilité de doublage	M	350	200

5. Le concept de la chaussée

(1) Volume de la circulation

Les données suivantes vont anticiper le volume du trafic dans le futur :

- ✓ Données du trafic enregistrés aux péages de RN1
- ✓ Données sur Circulation et la cadence au port
- ✓ Données du Chemins de fer
- ✓ Etude du volume de la circulation a faire de la section ciblé par l'Équipe
- ✓ Etude sur la charge par essieu

(2) Période de modélisation

Compte tenu de l'importance des routes, 20 années de conception seront appliquées à la route nationale et du corridor international de Djibouti.

6. Structure et Conceptualisation de l'oued

1) Concept général de la structure de l'oued

- ✓ La structure qui permet de traverser l'oued est infranchissable durant la crue donc celle-ci ne sera pas appliquée dans la partie cible pour des raisons de sécurité de circulation et d'accessibilité durant l'année entière.
- ✓ Les structures existantes de traversées de l'oued seraient améliorées par rapport à la structure de type dalot avec une modification de l'alignement longitudinal en considérant le jeu déterminé en fonction de la quantité d'eau qui coule (voir la figure 4).

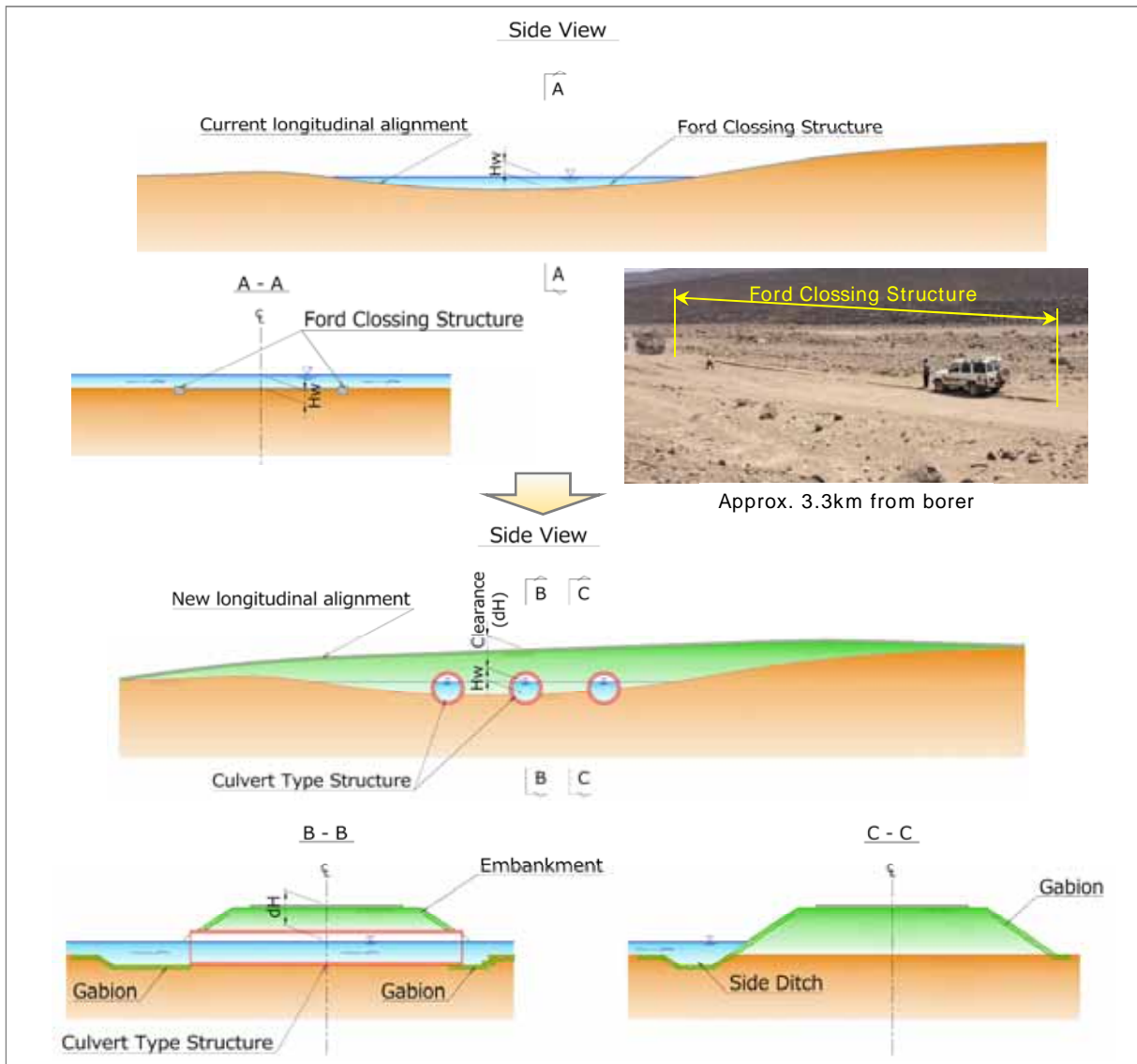


Figure-4 Design Concept of Existing Ford Crossing Structure

2) Proposition de structure pour une grande échelle de l'oued près de Galafi

L'oued situé à 4 km de la frontière, est le plus grand oued dans la section ciblé. Non seulement le volume d'eau, mais la possibilité d'apport rocheux doivent être examinés de près lors de la conception d'une structure de cette section. C'est un point de différence par rapport aux autres sections d'oued.

Dans cette section, compte tenu de l'alignement défavorable de la route existante, une contre-mesure complète incluant l'ajustement de l'alignement est nécessaire, de sorte que l'examen de l'alignement soit précédé avant la sélection du type de structure.

Table-2 Comparaison d' Alignement routier




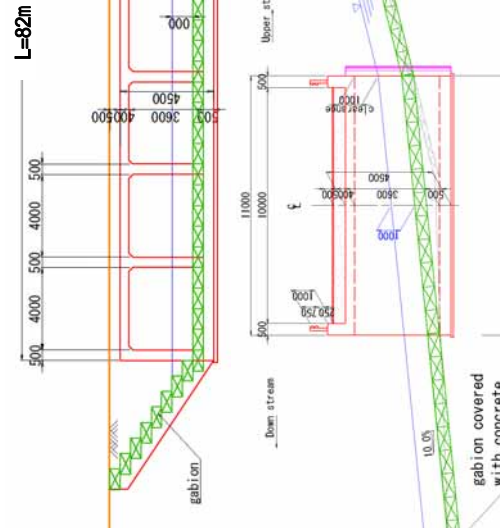
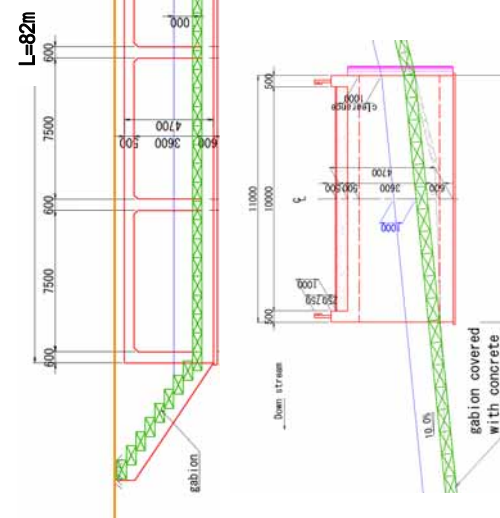
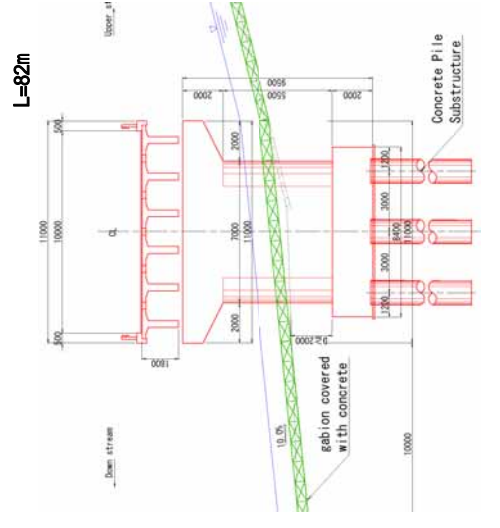
Option d'alignement	Plan du Modèle
<p><u>Alignement original</u> (Plan d'itinéraire original)</p> <ul style="list-style-type: none"> · Nécessité d'une route de déviation pendant la construction (médiocre) · Nécessaire de la voie d'escalade en raison d'une pente longitudinale raide : env. 7% (médiocre) · Longue structure, mais installée sur la zone de l'oued stablement formée (Juste) 	
<p><u>Alternative A</u> (Environ 25m de distance de l'itinéraire original)</p> <ul style="list-style-type: none"> · Pas besoin de détournement (Bon) · Pente longitudinale douce : env. 4% (Moyen) · Longue structure, mais installée sur la zone de l'oued stablement formée (Juste) <p><u>Suggestion de l'ingénieur</u></p>	
<p><u>Alternative B</u> (Alignement passant par la section étroite de l'oued)</p> <ul style="list-style-type: none"> · Pas besoin de détournement pendant la construction (Bon) · Pente longitudinale douce : env. 3% (Moyen) · Minimiser la longueur de la structure, mais installé sur un flux instable en aval de la zone de l'oued (médiocre) 	

Table-3 Comparaison de genre de structure

Alternatives	Alternative -1 : Dalot	Alternative -2 : Structure hybride (Modèle de dalot et pont)	Alternative -3 : Pont
Idee General	Structure normale du dalot · La hauteur intérieure du dalot assure le niveau d'eau et le dégagement (= 1.0m)	Espacement plus long des dalots, structure hybride entre le pont et le dalot · Le type de sous-structure est répandue fondation	Ponts en béton précontraint (3 travées) · Comme on suppose que la couche de support est profonde, le type de sous-structure est une fondation de pieu
Schematique			
Alignement Vertical	Pas plus raide que l'alignement actuel	Pas plus raide que l'alignement actuel	Plus raide que l'alignement actuel
Largeur de blocage contre le débit d'eau	$\Sigma W = 8.5m$	$\Sigma W = 5.4m$	$\Sigma W = 5.0m$
Coût (ratio)	\$0.50million (1.0)	\$0.53million (1.1)	\$4.12 million (8.3)
Evaluation	Δ	Proposition de l'ingénieur	Δ
Contre-mesures contre la chute des pierres	- Couvrir le lit de la rivière avec du béton pour éviter l'accumulation de pierres (le gradient du lit de la rivière est de 10%, la vitesse d'écoulement est de 15 m / s ou plus) · Afin d'éviter l'accumulation de pierres dans la partie aval, couvrir le lit de la rivière avec 10m de béton à partir de l'extrémité de la sortie · Afin d'éviter d'endommager le mur intermédiaire par de la pierre concassée, une protection avec une plaque d'acier sera appliquée · La hauteur interne de Case-1, Case-2 est déterminée par le niveau d'eau, la taille de la pierre et le dégagement		

Note) L'équipe as propose l'Alternative-2, d'après les résultat de l'analyse des données collectées au cours du levé, qui sont le calcul hydronique, les données pluviométriques et les données géologiques.

7. Concept de conception du système de drainage

- ✓ Modèle de fossé latéral : Modèle de maçonnerie en pierre
- ✓ Caniveau pour une surface plane : Installation canalisation à intervalles réguliers

8. Modèle de formalisation autour du point de contrôle frontalier

Dans la section qui entoure le point de contrôle frontalier, on observe une file d'attente de camions en attente d'une autorisation à un rythme lent.

- ✓ Type de chaussée : La chaussée de béton de ciment serait provisoirement considérée
- ✓ Longueur de la section : Envi. 500m de long

Au sujet de la composition des voies de cette zone, l'équipe est seulement en mesure de procéder à la conception dans la zone de compétence ADR. Dans cette condition, la figure 5 montre la proposition provisoire de l'équipe concernant la composition des voies sur la zone frontalière. Cependant, ce plan est assujéti à des modifications après la conclusion des réunions des autorités concernées.

Note: Après la discussion avec le Département des douanes et des impôts indirects, du Ministère du budget, en présence de l'ADR, l'Équipe prendra en compte une éventuelle mesure contre les embouteillages occasionnels causés au point de contrôle douanier de la frontière Galafi.

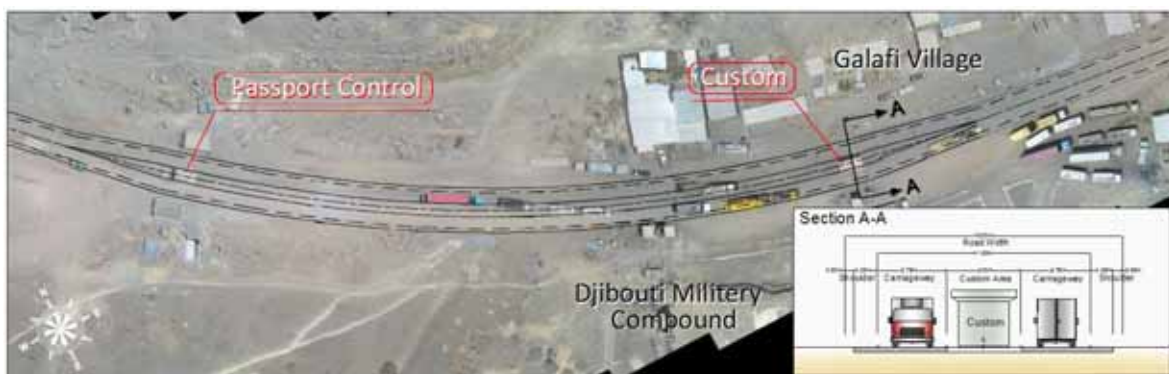


Figure-5 Plan à la frontière (Tentative)

**PREPARATORY SURVEY
FOR
THE PROJECT
FOR
UPGRADING OF NATIONAL ROAD ROUTE 1**

TECHNICAL NOTE

26th April 2018

**YACHIYO ENGINEERING CO., LTD.
TOKYO, JAPAN**

Prepared and submitted by <i>for 吉野工業</i>	Confirmed by 
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PREPARATORY SURVEY
FOR
THE PROJECT FOR UPGRADING OF NATIONAL ROAD ROUTE 1

Technical Note

Preface

Based on the Minutes of Discussions agreed between Ministry of Equipment and Transport, Djiboutian Road Agency (hereinafter referred to as “ADR”) and JICA on 22th March, 2018 (hereinafter referred to as “the Minutes of Discussions”), the JICA Survey Team (hereinafter referred to as “the Team”) of the above captioned Survey conducted a field survey along National Road Route 1 in Galafi, Dikhil Region. Moreover, the Team discussed details of proposed project with concerned officials of ADR.

As a result of the survey and discussion, the Team specified details of technical items on this document

1. Target Section
2. Applicable Design Standards
3. Typical Cross Section
4. Geometric Design Elements
5. Pavement Design Elements
6. Design Concept of Wadi Structure
7. Design Concept of Drainage System
8. Design Concept around the Border Checkpoint

However, all the items and components described in this document will be decided after further studies in Japan and consultations with the concerned officials of the Government of Japan.

1. Target Section

- ✓ Beginning point: Galafi border (refer to Figure-1)
 - ✓ End point: Approx. 20.5~20.8 km from border (refer to Figure-2)
- Note) Exact end point would be fixed considering horizontal and longitudinal alignment after result of topographic survey



Figure-1 Beginning Point



Figure-2 End Point

2. Applicable Design Standards

Since ADR doesn't have own standards, Japanese standards would be generally applied for the following designs.

- ✓ Geometric Design
- ✓ Pavement Design (AASHTO, American Association of State Highway and Transportation, will be partially applied as necessary)
- ✓ Drainage Design
- ✓ Structure Design including Standard Drawings

3. Typical Cross Section

The following cross section would be applied as typical cross section:

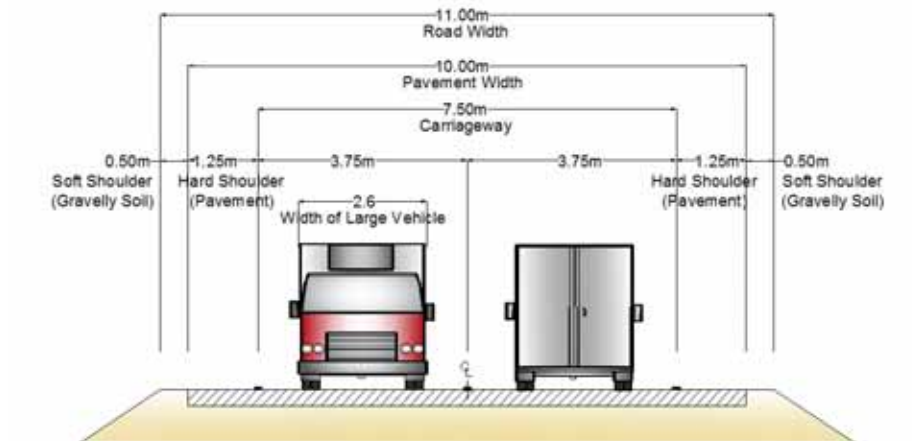


Figure-3 Typical Cross Section for Target Road

- ✓ Carriageway - width of lane: 3.75m, maximum width of lane in Japan as well as France excluding exceptional case taking account of heavy vehicles which occupy more than 90 % of the traffic. It is also considered the adjustment with connecting section for route consistency.
- ✓ Hard Shoulder - width of hard shoulder: 1.25m, taking account of parking space for broken-down cars observed often. Pavement composition of hard shoulder would be same with carriageway pavement.
- ✓ Soft Shoulder - width of soft shoulder: 0.5m, is applied on outside of the hard shoulder in order to protect pavement from the damage.

Note: Emergency parking area would be considered for traffic safety

4. Geometric Design Elements

The design speed would be basically 80km/h, while approximately last 5km until the border would be 50km/h taking account of rolling topography and stopping at border checkpoint. The geometric elements for each section are shown in the table below:

Table-1 Geometric Design Elements

Design Element	Unit	RN1	
		PK199-PK214	PK214-PK219 (Section near Border)
Design Speed	km/h	80	50
Min. Horizontal Curve Radius (desirable)	M	280	100
Min. Horizontal Curve Radius (absolute)	M	230	80
Max. Longitudinal Gradient (desirable)	%	4	6
Max. Longitudinal Gradient (absolute)	%	7	9
Min. Longitudinal Gradient	%	0.3	0.3
Longitudinal Curve Radius	M	2,000	700
Normal Cross fall	%	2.5	2.5
Shoulder Cross fall	%	4	4
Maximum Superelevation	%	10	10
Min. Stopping Sight Distance	M	140	65
Min. Passing Sight Distance	M	350	200

5. Pavement Design Elements

(1) Traffic Volume

The future traffic volume will be forecasted using the following data:

- ✓ Traffic Data recorded in tollgate on RN1
- ✓ Traffic and Throughput Data recorded in ports
- ✓ Railway Data
- ✓ Traffic Volume Survey to be done at the target section by the Team
- ✓ Axle Load Survey

(2) Design Period

Taking account of significance of road, designated National Road and international corridor in the Djibouti, **20 years** of design period would be applied.

6. Design Concept of Wadi Structure

1) General concept of wadi structure

- ✓ Ford crossing structure which is impassable during overflowing water would be not applied on the target section for securing safety traffic and accessibility of road in the whole year.
- ✓ Existing ford crossing structures would be improved to culvert type structure with modification of longitudinal alignment considering the clearance determined according to the amount of flowing water (refer to Figure-4).

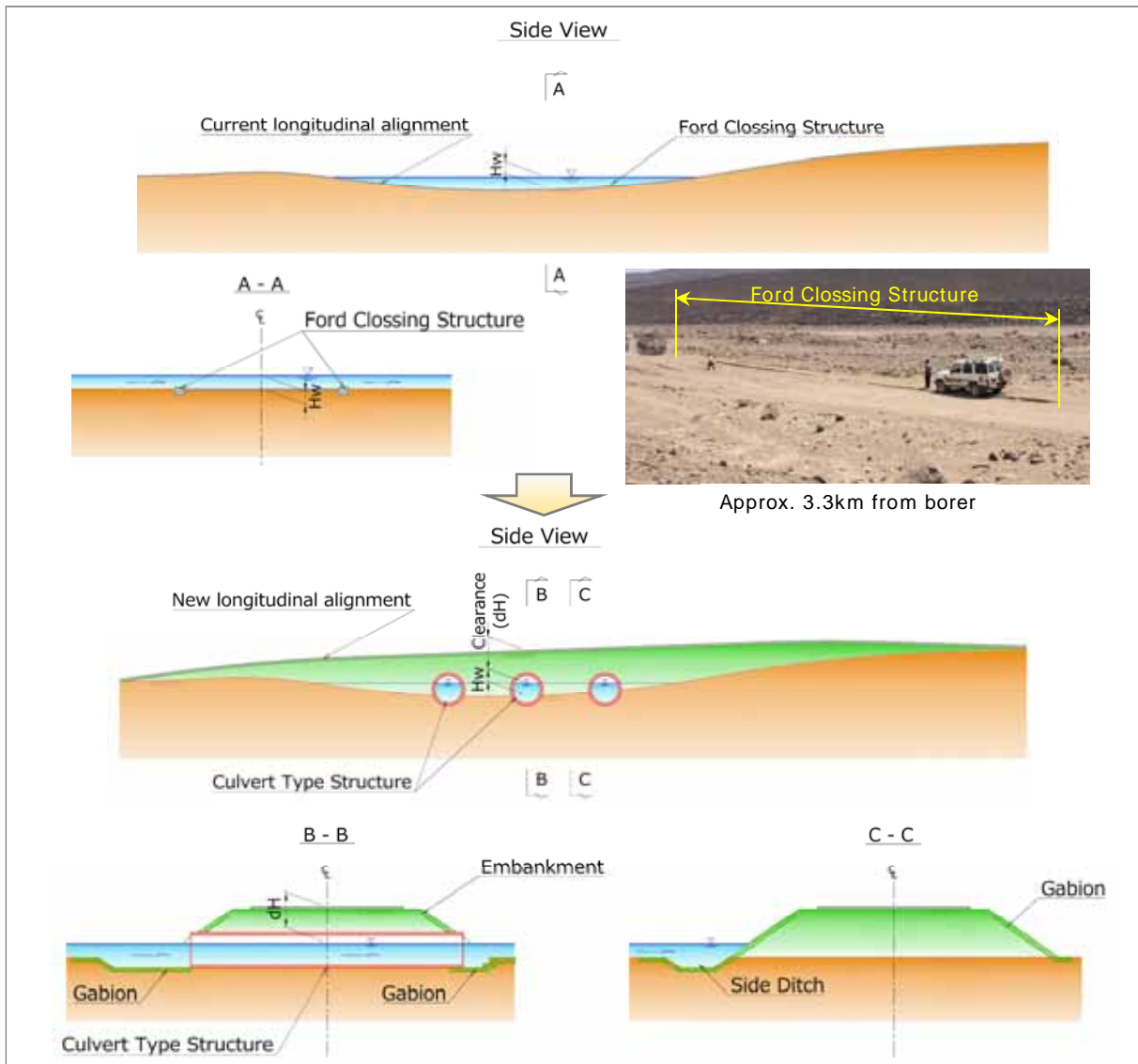


Figure-4 Design Concept of Existing Ford Crossing Structure

2) Structure proposal for a large scale of the wadi near Galafi

The wadi, 4km apart from the border, is the largest scale wadi in the target section. Not only water volume, but possibility of rock flow shall be closely examined when designing a structure of this section, and that is difference point compared with other wadi sections.

In this section, since considering the adverse alignment of the existing road, comprehensive countermeasure including adjustment of alignment is required, so that alignment review shall be preceded before selection of structure type.

Table-2 Comparison of Road Alignment




Alignment Options	Conceptional Plan
<p><u>Original Alignment</u> (Original route plan)</p> <ul style="list-style-type: none"> • Necessity of a diversion route during construction (<u>Poor</u>) • Necessary of climbing lane due to a steep longitudinal slope: approx. 7% (<u>Poor</u>) • Long structure length, but installed on the stably formed wadi area (<u>Fair</u>) 	
<p><u>Alternative A</u> (Approx. 25m apart from Original route)</p> <ul style="list-style-type: none"> • No need diversion (<u>Good</u>) • Gentle longitudinal slope : approx. 4% (<u>Fair</u>) • Long Structure length, but installed on the stably formed wadi area (<u>Fair</u>) <p style="text-align: center;"><u>Engineer`s Proposal</u></p>	
<p><u>Alternative B</u> (Alignment passing through narrow wadi section)</p> <ul style="list-style-type: none"> • No need diversion during construction (<u>Good</u>) • Gentle longitudinal slope: approx. 3% (<u>Fair</u>) • Minimize structure length, but installed on unstable down stream of wadi area (<u>Poor</u>) 	

Table-3 Comparison of Structure Type

Alternatives	Alternative -1 : Box Culvert	Alternative -2 : Hybrid Structure (Mixed concept of Box Culvert and Bridge)	Alternative -3 : Bridge
Outline	<ul style="list-style-type: none"> • Normal box culvert structure • The inside height of the box culvert ensures the water level and clearance (=1.0m) 	<ul style="list-style-type: none"> • Longer spacing form box culvert, hybrid structure between bridge and box culvert • Substructure type is spread foundation 	<ul style="list-style-type: none"> • Prestressed concrete bridges (3 span) • Since it is assumed that the support layer is deep, the substructure type is a pile foundation
Outline Figure			
Vertical Alignment	Not steeper than current alignment	Not steeper than current alignment	Steeper than current alignment
Blockage Width against Water Flow	ΣW = 8.5m	ΣW = 5.4m	ΣW = 5.0m
Cost (ratio)	\$0.50million (1.0)	\$0.53million (1.1)	\$4.12 million (8.3)
Evaluation	Δ	Engineer's Proposal	Δ
Countermeasures against Stone Flowing Down	<ul style="list-style-type: none"> • Covering the riverbed with concrete to avoid accumulation of stones (River bed gradient is 10%, flow velocity is 15 m/s or more) • In order to avoid accumulation of stones in the downstream part, covering the riverbed with 10m concrete from end of outlet • In order to prevent damage to the intermediate wall by crushed stone, protection with a steel plate would be applied • Internal height of Case-1, Case-2 is determined by water level ,stone size and clearance 		

Note: Alternative-2 is proposed by the Team based on a result from analysis of collected data during survey, which are hydronic calculation, rainfall data, geological figures, etc.

7. Design Concept of Drainage System

- ✓ Type of Side Ditch : Stone masonry type
- ✓ Culvert for flat area: Pipe culvert installation at regular intervals

8. Design Concept around the Border Checkpoint

In the section around the border checkpoint, queue of trucks waiting for custom clearance and slow movement of trucks are observed.

- ✓ Type of Pavement: Cement concrete pavement would be tentatively considered
- ✓ Length of the Section: Approx. 500m long

About the lane composition of this area, the Team is only able to proceed the design within ADR jurisdiction area. Under this condition, Figure-5 shows the Team's tentative proposal of lane composition on the border area. However, this plan is subject to modified depends on the result of relevant authorities meeting.

Note: According to the discussion with Customs and Indirect Taxes Department, Ministry of Budget, in the presence of ADR, The Team will take into account a possible measure against occasional traffic congestion caused at the custom check-point of Galafi border. within a practicable manner of the project.



Figure-5 Plan on Border Area (Tentative)

APPENDIX 6

OTHER RELEVANT DATA

(FIELD SURVERY REPORT)

Information on Tax Exemption in (Republic of Djibouti)

[Sheet 1 Tax with respect to corporate income \(Corporate Tax \)](#)

[Sheet 2 Tax with respect to personal income \(Personal Income Tax \)](#)

[Sheet 3 Indirect taxes such as Value Added Tax \(VAT\)](#)

[Sheet 4 Custom Duties and related fiscal charges with respect to the import and/or re-export of materials and equipment](#)

[Sheet 5 Other taxes or fiscal charges](#)

Followings are JICA internal use ONLY

Person in charge in JICA office (Name, Name of the office, E-mail)

Sheet 1 Tax with respect to corporate income (Corporate Tax)

[Points of Attention]
[Reference]

Items	Exemption	How to exempt	Applicable Law	rate(%)	How to calculation	Necessary Information	Previous Results, Lessons and Learned, etc
Issuance of NIF(numero d' identification fiscal Not applied exemption (by Tax Office interview)	-	-	Général des Impôts (General Tax Code)	-	-	Organization in charge : Tax Office (under the Ministry of the Budget) Procedure : A company to be registered fill in the application form and submit it to the tax office with the E/N. The E/N could facilitate the procedure.	
Corporate Tax for foreign companies	Exempt(Advanced)		Général des Impôts (General Tax Code)	25% of the profit or 1% of the turn over whichever higher	-	Organization in charge : Tax Office (under the Ministry of the Budget) Procedure : Precondition:Exemption for foreign company's corporate tax is agreed between donor and implementing agency. A foreign company must gain the NIF(numero d' identification fiscal) An the implementing agency issue the tax exemption request letter with the E/N to the External Directorate of the Ministry of Economy and Finance, which directs the Tax Office to process the exemption. The Ministry of Economy and Finance instract to organization in charge (tax office) and facilitate the procedure.	
Corporate Tax for local companies	Exempt(Advanced) Exempt(borne by the Recipient) Reimburse		Général des Impôts (General Tax Code)	25% of the profit or 1% of the turn over whichever higher	-	Organization in charge : Tax Office (under the Ministry of the Budget) Procedure : Precondition:Exemption for local company's corporate tax is agreed between donor and implementing agency.According to the interview for tax office, basically local company is charged the corporate tax thus clarification as exempted item in E/N is important. A local company must gain the NIF(numero d' identification fiscal) An the implementing agency issue the tax exemption request letter with the E/N to the External Directorate of the Ministry of Economy and Finance, which directs the Tax Office to process the exemption. The Ministry of Economy and Finance instract to organization in charge (tax office) and facilitate the procedure.	

Sheet 2 Tax with respect to personal income (Personal Income Tax)

[Points of Attention]
[Reference]

Items	Exemption	How to exempt	Applicable Law	rate(%)	How to calculation	Necessary Information	Previous Results, Lessons and Learned, etc
Income tax for foreigner		Exempt(Advanced)	Général des Impôts (General Tax Code)	-	-	<p>Organization in charge : Agence Nationale de l'Emploi de la Formation Et de l'insertion Professionnelle:ANEFIP</p> <p>Precondition:Exemption for foreigner's income tax is agreed between donor and implementing agency.</p> <p>A foreign employee apply a work permission to ANEFIP.(Employment contract, employment declaration, work permission application form, CV, passport copy and certification photograph attached)</p> <p>An the implementing agency issue the tax exemption request letter with the E/N to the External Directorate of the Ministry of Economy and Finance, which directs the Tax Office to process the exemption.</p> <p>The Ministry of Economy and Finance instruct to organization in charge (ANEFIP) and facilitate the procedure.</p>	
Income tax for Djiboutian			Général des Impôts (General Tax Code)	-	-	<p>Organization in charge : Agence Nationale de l'Emploi de la Formation Et de l'insertion Professionnelle:ANEFIP</p> <p>Precondition:Exemption for foreigner's income tax is agreed between donor and implementing agency.According to interview for Ministry of Economic and Finance, basically Local employee has to pay the income tax which varies by the level of income</p> <p>A local employee apply a work permission to ANEFIP.(Employment contract, employment declaration, work permission application form, CV, passport copy and certification photograph attached)</p> <p>An the implementing agency apply the tax exemption request letter with the E/N to the External Directorate of the Ministry of Economy and Finance, which directs the Tax Office to process the exemption.</p> <p>The Ministry of Economy and Finance instruct to organization in charge (ANEFIP) and facilitate the procedure.</p>	

Exempt(Advanced)
Exempt(home by the Recipient)
Reimburse

(Sheet3) indirect tax etc (such as VAT, Commercial Tax)

[Points of Attention]
[Reference]

Items	Exemption	How to exempt	Applicable Law	rate(%)	How to calculation	Necessary Information	Previous Results, Lessons and Learned, etc
VAT for foreign / local company	-	Reimburse	Général des Impôts (General Tax Code)	10%	-	<p>Organization in charge : Tax Office</p> <p>Procedure :</p> <p>Precondition:Exemption for foreign company's corporate tax is agreed between donor and implementing agency. A foreign and local company must gain the NIF(numero d' identification fiscal) An the implementing agency issue the tax exemption request letter with the E/N to the External Directorate of the Ministry of Economy and Finance, which directs the Tax Office to process the exemption. Reimburse request should be carried out once every 3 months, 6 months or a year through the implementing agency. The Ministry of Economy and Finance instract to organization in charge (tax office) and facilitate the procedure.</p>	

-
Exempt(Advanced)
Exempt(borne by the Recipient)
Reimburse

(Sheet4) Duties etc.

Items	Exemption	How to exempt	Applicable Law	rate(%)	How to calculation	Necessary Information	Previous Results, Lessons and Learned, etc
Import and expoer		Exempt (Advanced)	Journal Officiel (Loi n°40/AN/11/ 6ème L portant création d'un Code de Douanes)	Depend on items	-	<p>Organization in charge : Tax Office</p> <p>Procedure :</p> <p>Precondition: Tax exemption is agreed between donor and implementing agency. An the implementing agency apply the tax exemption request letter with the E/N to the External Directorate of the Ministry of Economy and Finance, which directs the Tax Office to process the exemption. The Ministry of Economy and Finance announce the tax exemption in advance to the Tax office. An the implementing agency submit 1. list of temporally imported equipment, 2. list of imported material prepared by donor. If the equipment is to be sold locally after use, then it would be subject to tax after considering the depreciation.</p>	There was no particular problem by ADR's past projects (Interviewed on April 22, 2018)

-
 Exempt(Advanced)
 Exempt(borne by the Recipient)
 Reimburse

(Sheet 5) Other taxes and levies

[Points of Attention]
[Reference]

Items	Exemption	How to exempt	Applicable Law	rate(%)	How to calculation	Necessary Information	Previous Results, Lessons and Learned, etc
Fuel Tax		Exempt (Advanced)	Journal Officiel (Loi n°40/AN/11/06ème L portant création d'un Code de Douanes)	Depend on types (Super, Petrole, Gasoil)	In case of Gasoil (Diesel) 1. TIC: 23% 2. Surcharge Tax: 6% 3. Imported Tax: 10% 4. Contribution of Union African: 0.2% 5. Royalty: 18.23FD/Liter 6. VAT: 10%	Organization in charge : Tax Office Procedure : Precondition: Tax exemption is agreed between donor and implementing agency. An the implementing agency apply the tax exemption request letter with the E/N to the External Directorate of the Ministry of Economy and Finance, which directs the Tax Office to process the exemption. The Ministry of Economy and Finance announce the tax exemption in advance to the Tax office. The Contractor submits specified fuel list to the Tax office and Custom office. The fuel for the construction will be directly distributed from the distributor company which is located on import-free zone of the Djibouti port.	There was no particular problem by ADR's past projects (Improvement of RNI funded by EU)

Exempt(Advanced)
Exempt(borne by the Recipient)
Reimburse