PROVINCIAL PEOPLE'S COMMITTEE OF DAKLAK

ASIAN DEVELOPMENT BANK

SECONDARY CITIES DEVELOPMENT PROJECT
BUON MA THUOT SUBPROJECT

ENVIRONMENTAL MANAGEMENT PLAN
CIVIL WORK PACKAGE BMT2

(FINAL DRAFT REPORT)

July 2015

SECONDARY CITIES DEVELOPMENT PROJECT
BUON MA THUOT SUBPROJECT

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ENVIRONMENTAL MANAGEMENT PLAN

FOR

PACKAGE BMT 2
TRAN QUI CAP URBAN ROAD SUBCOMPONENT

ABBREVIATIONS

ADB	Asian Development Bank
AH	Affected Household
BOD	Biological Oxygen Demand
CEMP	Contractor's EMP
COD	Chemical Oxygen Demand
CPC	Commune People Committee
CSC	Construction Supervision Consultant
DoNRE	Department of Environment and Natural Resources
DoT	Department of Transport
EIA	Environment Impact Assessment
EMC	Environmental Monitoring Consultant
EMP	Environment Management Plan
ES	Environmental Staff
FS	Feasibility Study
GoV	Government of Viet Nam
H	Hour
IEE	Initial Environmental Examination
NOL	No Objection Letter
O&M	Operation and Maintenance
O&M/R	Operation & maintenance/ repair
PMU	Buon Ma Thuot City projects Management Unit
PMU/DAKURENCO	DakLak Urban Environmental Company
PPC	Provincial People Committee
QCVN	National Technical Standards
RAP	Resettlement Action Plan
ROW	Rights of Way
SCDP	Secondary Cities Development Project
SPS	Social Policy Safeguard
SWTP	Solid Waste Treatment Plant
TSP	Total Suspended Particles
UXO	Unexploded Ordinance
VOC	Volatile Organic Compounds

Contents

WEIGHTS AND MEASURES

cm	Centimetter
m	Metter
km	Kilometre
m^2	Square metter
m^3	Cubic metter
ha	Hectare

CURRENCY EQUIVALENTS
(As of 1 July 2015)

Currency unit	–	Vietnamese Dong (D)
$1.00	=	D21,830

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I. INTRODUCTION

A. Project Overview

1. The Secondary Cities Development Project (SCDP or, the "Project") set up objectives to address the development issues of Buon Ma Thuot (Dak Lak Province), Ha Tinh (Ha Tinh Province) and Tam KY (Quang Nam Province) to develop these cities as regional economic growth centers to foster balanced regional development. The project will enhance implementation of the *Government of Viet Nam (GoV) policy context* with specific reference to: (i) the overarching policies contained in the Socio-Economic Development Strategy (SEDS) 2011-2020 and the Socio-Economic Development Plan (SEDP) 2011-2015; (ii) the sector policies contained in Orientation Plans relevant to this Project, and other recent policy advice and guidelines on climate change resilience and green city development for instance. The selected subprojects considered the policies and sector priorities contained in the *Asian Development Bank (ADB) Country Partnership Strategy (2012-2015)*. The subprojects are also aligned to other ADB priorities in terms of climate change considerations, social inclusion and stakeholder participation. At a local level the individual Project subcomponents are in compliance with the relevant *Master Plans* in each of the cities.

2. The selected subprojects are prepared to ensure compliance with the needs of climate change and disaster management. Here, emphasis is placed on better flood protection measures in Ha Tinh and Tam Ky, where new and upgraded flood dykes in Tam Ky will be in compliance with the climate resilience standards of the Ministry of Agriculture and Rural Development (MARD). Similarly, new road construction in Tam Ky (Dien Bien Phu Road), once fully completed, will contribute significantly to the city's capability to evacuate the coastal populations in the event of tidal inundation. Further innovations incorporating provision for better environmental planning and technologies will be considered and incorporated in the detailed design of each subproject.

3. Each of the subprojects includes a subcomponent for capacity building, geared mainly to the consulting services in project management and technical support to the PMUs. It will also strengthen the Women's' Unions (WU) in each of the cities to design and deliver training and awareness programs and to deliver projects across the wider community.

4. Buon Ma Thuot subproject consists of three components (i) Solid waste management, (ii) Urban roads improvement and (iii) Capacity building and implementing support, and each component will deliver the following outputs:

(i) Component 1: Solid Waste Management
- Output 1.1: improved solid waste disposal
- Output 1.2: remediated open dumpsite
- Output 1.3: a pilot project for community waste at source segregation and a supporting information and education campaign;

(ii) Component 2: Urban Road Development
- Output 2.1 improved/complete major roads

(iii) Component 3: Capacity Building and Subproject Implementation Support
- Output 3.1: increased efficiency and management capacity of relevant government
- Output 3.2: agencies in project management, particularly in financial management, procurement, project performance monitoring and evaluation

5. Under the solid waste management component, a part of phase 1 of City's SWTP in Hoa Phu commune is proposed to be constructed and the existing dumpsite in Cu EBur commune will be closed. The urban road component will focus on improving and widening Tran Qui Cap and Mai Thi Luu roads.

6. Currently, except the EIA of closure of existing dumpsite in Cu EBur commune has not been prepared, the approvals of the remaining three EIAs of urban roads and Hoa Phu SWTP have been done. Concretely, the EIA of Tran Qui Cap, Mai Thi Luu Urban Road subcomponent was approved at Decision No. 1144/QD-UBND dated 17 June 2013 and the EIA of Hoa Phu SWTP subcomponent was also approved by DaKLAK PPC on June 06, 2014 at Decision No.1213/QĐ-UBND.

7. Thus, four separate subcomponent EMPs that include EMP of Tran Qui Cap Urban Road Subcomponent (under the package of BMT2); EMP of Mai Thi Luu Urban Road (package of BTM3); EMP of Hoa Phu SWTP (Package of BMT1A) and EMP of Cu EBUR dumping site closing (Package of BMT1B) will be updated and submitted as separate documents to ADB.

8. This document is the update of EMP of Tran Qui Cap Subcomponent package (BMT2)

B. Subproject description

9. The subproject includes three main working items (i) road, (ii) bridge and drainage system.

1. Road

10. The route that starts at the intersection with Nguyen Van Cu road at km 0+000 in Tan Lap ward, then goes through Tu An ward and its ending point links to Mai Thi Luu road at section km3+943.43 in Ea Tam ward. Its layout is presented in the Figure 1.

Figure 1: Position of Tran Qui Cap road

11. The whole route has 18 intersections with other roads. These are shown in Table 1.

Table 1: Intersection points between Tran Qui Cap road and others

No	Location	Intersection	Width of roads intersect with TQC (m)	Radius (R) of intersection point (m)	Roads intersect with Tran Qui Cap (TQC)
1	Km0+00	T- Junction	32	R1=23, R2=20	Nguyen Van Cu road
2	Km0+70.26	Unbalance intersection	4	R=5	Village road
3	Km0+292.7	T- Junction	18	R1=28, R2=14	Planned road
4	Km0+434.96	Unbalance intersection	4	R=5	Village road
5	Km0+519.74	Unbalance intersection	4	R=5	Village road
6	Km0+559.74	Unbalance intersection	24	R=25	Hung Vuong road
7	Km0+700	T- Junction	18	R1=199, R2=13	Planned road
8	Km1+152.1	T- Junction	14	R=20	Planned road
9	Km1+287.44	T- Junction	10	R1=12, R2=19	Ong Giam pond side road
10	Km1+375	T- Junction	6	R1=19, R2=6	Ong Giam pond side road
11	Km1+523.43	T- Junction	3	R=5	Village road
12	Km1+727.81	T- Junction	8.5	R=8	Small road
13	Km2+143.43	T- Junction	4	R=5	Village road
14	Km2+318.43	Intersection	21	R=15	Planned road
15	Km2+475.43	Intersection	21	R=15	Planned road
16	Km3+330.43	Intersection	12	R=12	Planned road
17	Km3+380.43	Intersection	12	R=12	Planned road
18	Km3+755.78	Intersection	15	R=15	Planned road

Source: Detailed design document, DakLak Environmental and Urban LtC, 2015

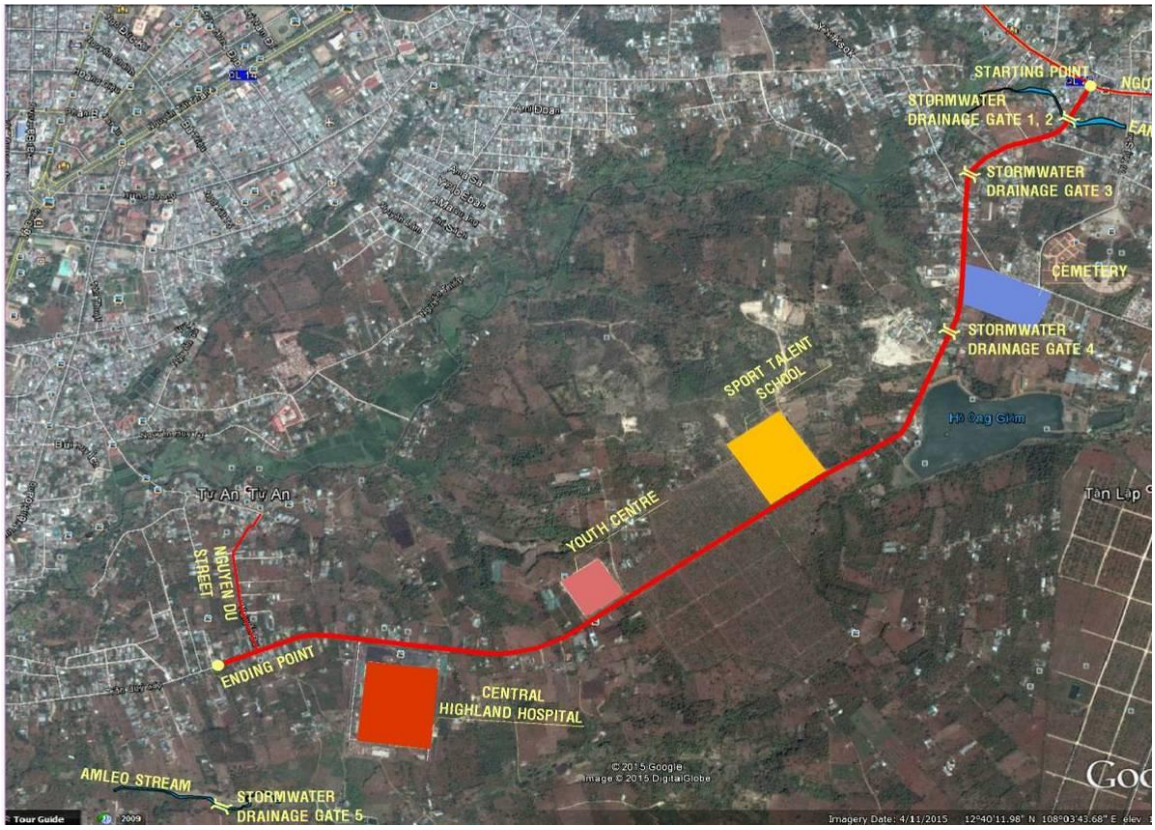
12. The route passes through three wards of Tan Lap, Tu An and Ea Tam of Buon Ma Thuot city. Moderate to high density residential areas is found from Km 0+00 to km 2+627.91, which is the residential block No. 7, the police's collective houses in Tan Lap ward. From Km 2+ 627.91 to km 3+800.00 belongs to Tu An ward and its density is found very low to low. Moderate density of the population living along the rest length of road is the territory of residential blocks of 2, 4, 6 and 7 and Mduk village of Ea Tam ward.

13. Trading, there are more than 100 households being trading with small scale, which accounts about one third of the affected households living along the route (SES, April 2015).

14. Traffic: The result of traffic survey conducted by the EMP updating consultant in April, 2015 revealed that the density of traffic in the road is relatively high with various kinds of transportation means. Average each hour in daily time, there are 65 motorcycles, 06 trucks, 05 agrimotors, 04 bicycles and 03 cars which passé through the road.

15. Cultural heritage and public buildings: The route passes by Tan Lap Cemetery and Daklak Martyr Cemetery. Besides, several significant buildings situated along the road including the Sport Talent School, the Youth Center, the Central Highland Hospital. The road layout with its related physical culture resources is shown in Figure 2.

Figure 1: The layout of Tran Qui Cap road and its specific sites



16. Ea Cam, Ea Nao, EaMleo Streams are situated within the subcomponent area. They are small streams with significantly changeable flows as per different seasons. Most streams are dried or no flow during the dry season and is polluted by garbage and sewage discharged directly from households surrounding the streams. The water source of the streams are mainly used for irrigating the fields in the basin. There is no significant ecosystem forming from the streams but some small rice fields are formed along the stream (Figure 3).

Figure 2: *Rice fields formed along the downstream*

17. Ong Giam pond is located on the left side of the road at km 1 + 100 to km1 + 374.05 in Tan Lap ward. The lake has a water surface area of about 5-6 hectare about 1-2m deep. The lake is protected by the plantations and natural grass surrounding therefore the quality of the water seems to be good with green color. Lake serves as a reservoir to keep water during the dry season, which contributes to air conditioning, creating the environmental landscaping in the area. Also the lake is being serving as an attractive place for tourism, providing fishing services and aquacultural breeding. Ong Giam Lake is valuable in terms of ecology, economy and tourism, which needs to be protected (Figure 4).

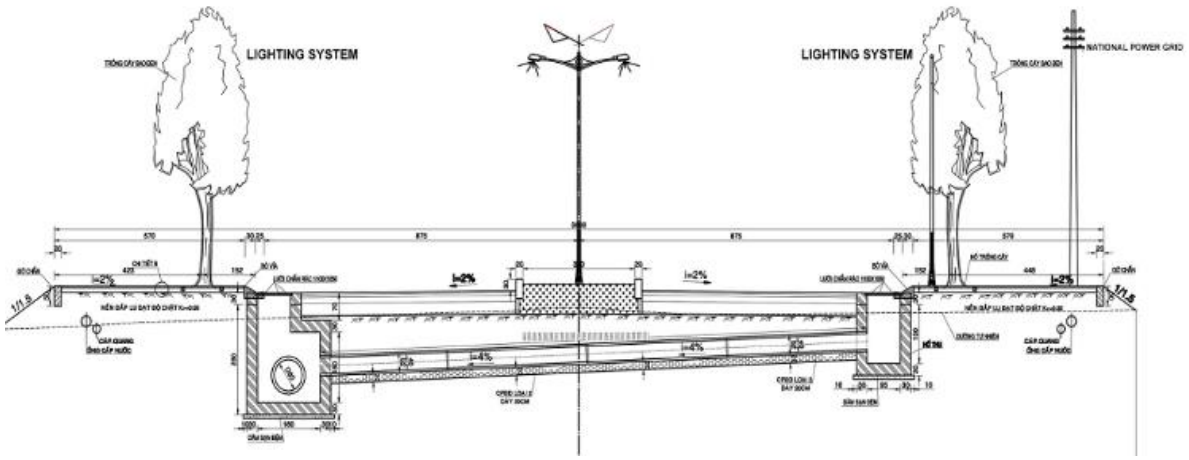
Figure 3: *Ong Giam Lake*

18. The proposed road is a two-way road, each side has 7 m wide and a central divider width of 4m; the total length of road is 3,943km with its embankment width of 24m. The sidewalk is 3m wide, which will be covered by concrete with Terrazzo tiles and square tree pots of 1.20 m x 1.20 m located at the middle of sidewalk are designed. The traffic light pots are set along the median line. The linear drainage system with centrifugal pipe diameter of 80-150cm while the cross drainage system with round pipe diameter of 40cm. The main technical specifications of the road are summarized in Table 2 and the cross layout of the road is at Figure 2.

Table 2: Summary of the subcomponent work

No.	Technical parameters	Unit	Quantity
1	Length of proposed road	M	3,943
2	Designed speed	km/h	50
3	Width of subgrade	M	24.0
	- width of road	M	14.0
	- width of median line	M	4.0
	- width of sidewalks	M	3*2=6
4	Radius of minimum curving line	M	1,000
5	Radius of maximum curving line	M	3,500
6	Average linear slop	%	2.05
7	Maximum linear slop	%	6%
8	Horizontal slop	%	2
9	Other parameters		
	- Ddrainage system culverts/pipes	Feature	Ageless
	- Road surface structure	Level	High level: A1
10	Designed load		HL93 & H10

Figure 4: Horizontal layout of proposed Tran Qui Cap Road



Source: Detailed design document, DakLak Environmental and Urban Company, 2015

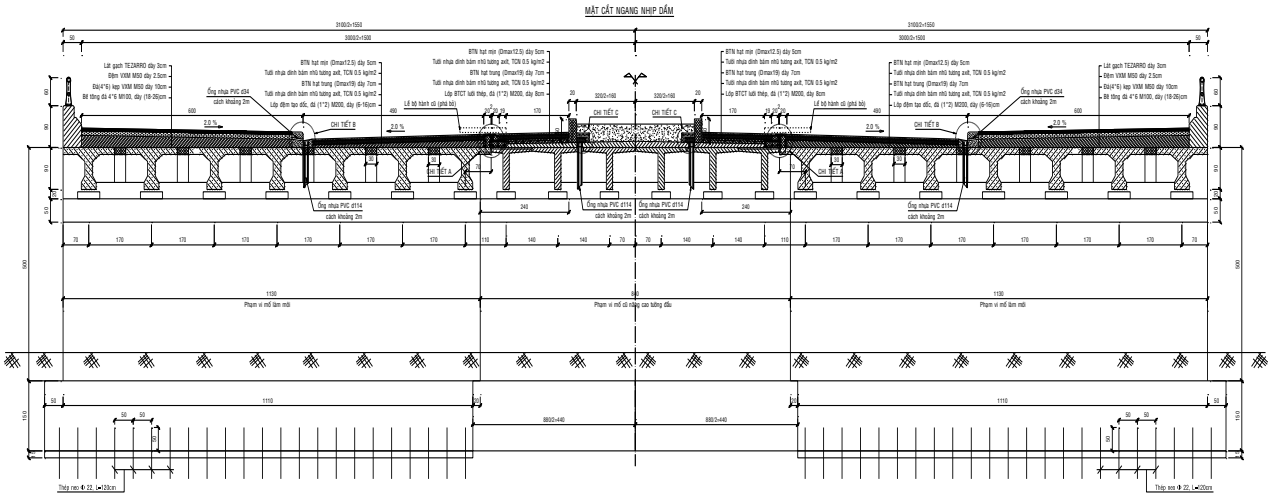
2. Bridge

19. At km 0+143 of the route is the location of 7 Block bridge with reinforced concrete structure about 9m long, which crosses Ea Cam stream flowing through Tan Lap ward. Ea Cam stream is about 3m wide, of a high slope with small flow in summer time. Both banks are encroached by domestic vegetables such as bananas, cassavas and wild grasses, which make the mainstream narrower. The water is a little bit turbidity but less polluted, which is more suitable for irrigation purposes. The status of stream is presented in Figure 6

***Figure 5**: Status of Ea Cam Stream*

20. The bridge will be upgraded and widened to 24 m wide, which is one span of 12m supported by 16 main beams. The beam is T form with normal reinforced concrete, and has designed load of HL93. (Figure 7).

Figure 6: Cross face of seven Block Bridge

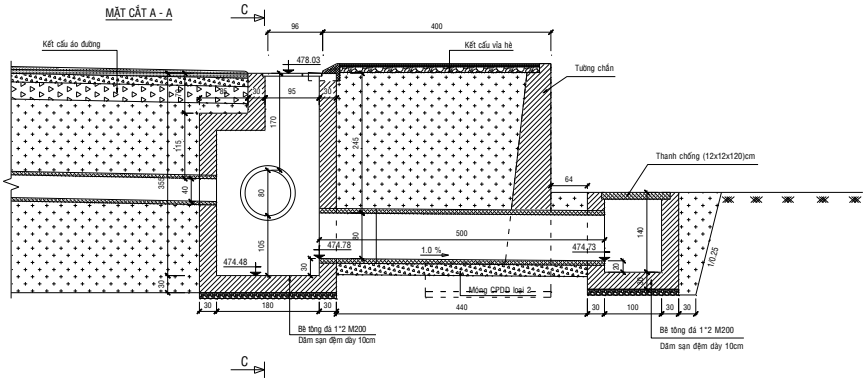


3. Drainage system

21. The drainage system consists of the linear and cross pipes. The linear pipe is installed under the roadway at both sides to collect storm water from the road surface and sidewalks then discharge collected water into the five drainage gates that link with the existing streams of Ea Mleo, and Ea Cam through the proposed open canals or box culverts. The specific positions and structures of drainage gates are described as follows:

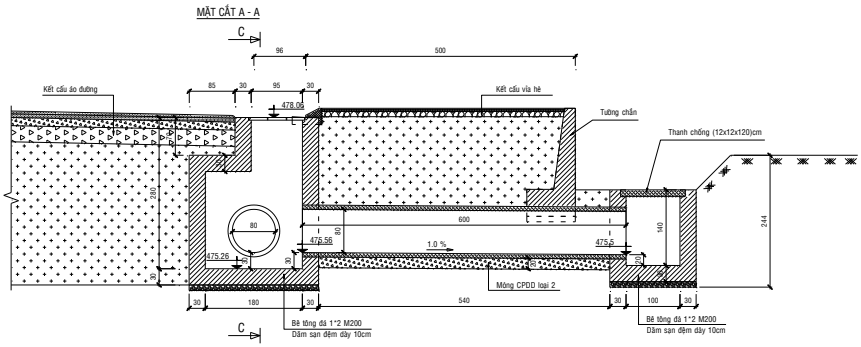
- Gate No1 that is located on the right of route near the abutment of 7 Block Bridge (km 0+143) will discharge storm water through round drain structures with diameter of 80 cm to Ea Cam stream. (Figure 8)

Figure 7: *Detailed structure of Gate No1*



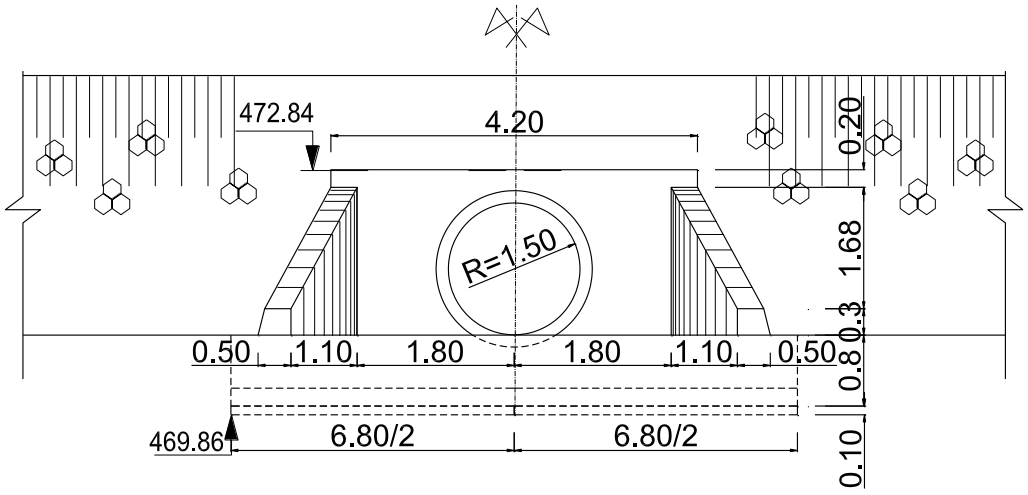
- Gate No. 2 that is situated on the right of route also beside the abutment of 7 Block Bridge will discharge water through a round drain structure with diameter of 80cm to the Ea Cam stream (Figure 9)

Figure 8: *Detailed structure of Gate No 2*



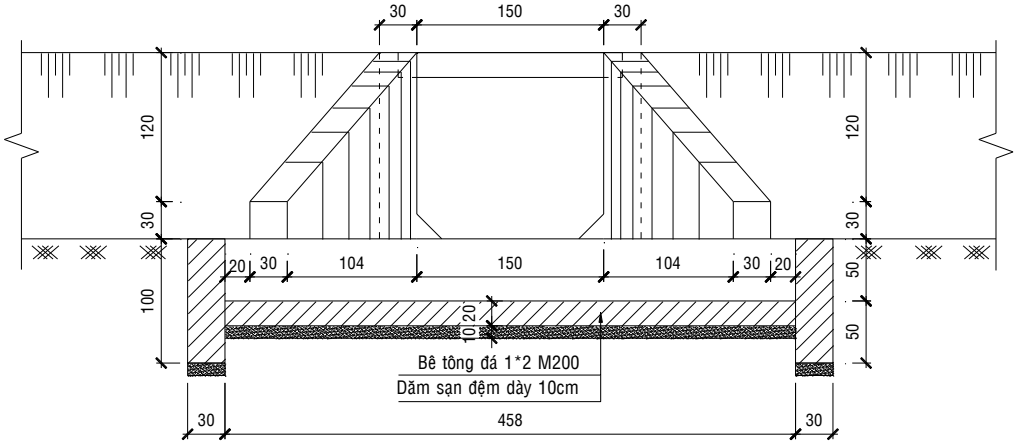
- Gate No.3 is located at km 0 +462.99 connecting to a round concreted drain structure with diameter of 1.50m, length of 168m installed underground and discharges water to the downstream of Ea Cam stream (Figure 10);

Figure 9: *Cross face of drainage gate No 3*



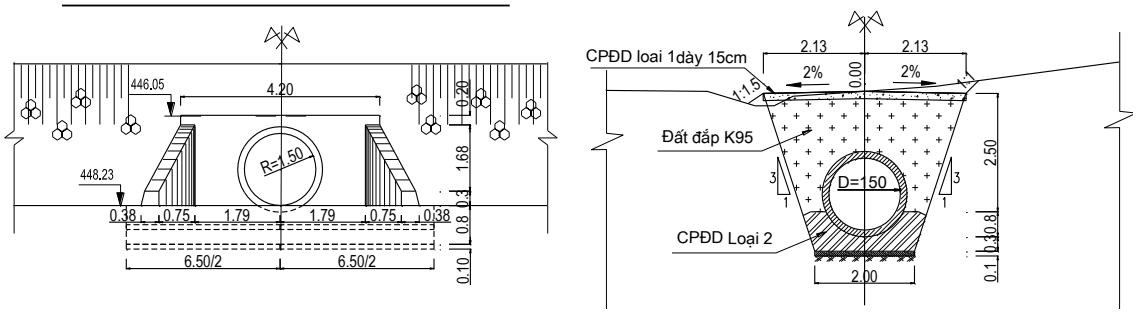
- Gate No.4 is situated at Km 1+144.65 linking to the reinforced open culvert with its width of 150cm and its height of 150cm, length of 476.07m discharging water to a small existing canal linking with Ea Nao stream. (Figure 11)

Figure 10: *Cross face of drainage gate No 4*



- Gate No 5 is located at km 3+942 linking with a reinforced round structure with its diameter of 150cm, length of 450m installed underground, which will discharge water to the downstream of EaMleo stream (Figure 12);

Figure 11*:* *Cross face of drainage gate No 5*



C. Related Materials, Fuel, Disposals and Machines

1. Construction Materials and Disposals

22. Summary of materials will be supplied to sites for the construction of the road is in Table 3;

Table 3: Main kinds of materials to site for construction of the road

No	Materials	unit	Quantity
1	Excavated land	m^3	119,812.30
2	Land for leveling the road (form borrow pits)	m^3	62,907.80
3	Dismantled quantity	m3	7,797.435
4	Mediate Asphalt (BTNC25)	ton	11,127.20
5	Grained asphalt (BTNC15)	ton	8,114.40
6	Macadam (class 2, Dmax=37.5mm)	m^3	62,963.78
7	Macadam (class 1, Dmax=25mm)	m^3	15,171.21
8	Concrete max 150,200,250,350)#, stone(1x2,2x4,4x6)	m^3	8,633.66
9	Yellow sand	m^3	284.19
10	Asphalt	Kg	59,214.30

No	Materials	unit	Quantity
11	Round iron	Ton	254.14
12	Section iron	Ton	94.9
13	Quantity of concrete waste for disposal	m^3	156.15
14	Quantity of used asphalt waste for disposal	m^3	2,007.07

Source: the investment project document, 2013

23. According to the Survey Profile of construction materials quarries by the detailed designer, sources of construction materials include sand, leveling soil, stone materials, which are extracted from mines in the area surrounding construction area and transported to the site by 10-ton trucks. Location of quarries and transport routes are described in the Table 4.

Table 4: Construction Material Demand and Its Sources

Parameter	Soil and Sand Quarries		
	Soil mine	**Sand mine**	**Rock and** stone
Location	Hoe Phi commune, BT city	Quinn Ngoc commune, Kong Ana district	Hoe Phi commune, BT city
Transport distance	26 Km	32.5 Km	26 Km
Quality	Qualified	Qualified	Qualified
Operation condition	Operating	Operating	Operating
Exploitation capacity	> 1,000,000 m^3	> 100,000 m^3	> 100,000 m^3
Exploitation by the subproject	40.000 m^3	13.000 m^3	70.000 m^3
License	Managed by CPC	Managed by private company	Decision No.1185/QD-UBND issued by DakLak

Source: Detailed designing consultant

2. Sites for Disposals

24. The quantity of debris and waste of asphalt that is estimated to be 1,949.36m^3 will be used for filling back the borrow site in Hoa Phu commune to rehabilitate the environment (*Decision No. 1287/QD-UBND issued by Daklak PPC on 27 May 2010*)

3. Mobilized Machines

25. List of equipments and machines used for construction of subcomponent is in Table 5.

Table 5: List of machines mobilized to site

No	Machines	No	machines
1	Bulldozers 110cv	18	Air compressor 600m^3/ h
2	Bulldozers 140cv	19	Spreading machine CPĐD 50-:-60m^3/h
3	Leveling machines 110cv	20	Spreading machines 130-:-140CV
4	Cranes 10Ton	21	Asphalt spreading truck
5	Chain cranes 16 Ton	22	Hammers 1.2 ton
6	Excavators 1.6m^3	23	Paint cooker YHK3A
7	Excavators 0.80m3	24	Paint striping machine YHK10A
8	Toad compactors	25	Slot cutter MCD

No	Machines	No	machines
9	Vibration rollers 25ton	26	Welder 23 KW
10	Rollers 10ton	27	Lorry 2.5 ton
11	Compactors 16 ton	28	Excavator 1.6m^3
12	Sanders	29	Electric winch
13	Curling breakers	30	Stick Vibrator 1KW
14	Various clicks	31	Concrete mixer 100L
15	Trucks 7 ton	32	Concrete mixer250L
16	Trucks 10 ton	33	Compactor 1.0KW
17	Water sprinkler me		

Source: the investment project document, 2013

4. Fuels

26. Fuel that will be supplied for the operation of machines at site is estimated that the quantity of diesel and petrol is about 502,880.40 litters and 12,496.77 litters respectively.

D. Construction schedule

27. Total construction time will be around 18 months.

E. Main Activities relevant to environmental aspect

(i) Pre-construction activities:
(a) Detailed design
(b) Land clearance mostly residential land

(ii) Construction activities:
(a) Setting worker's camps
(b) Gathering workers, materials, machines and equipment
(c) Dismantling, excavating, widening and leveling the existing road
(d) Installation of drainage system
(e) Construction of 7 Block bridge
(f) Concreted pavement
(g) Installation of light system
(h) Asphalt road trimming;
(i) Construction of access roads for households living at section of high elevation
(j) Road surface completion
(k) Sand back filling;
(l) Site rehabilitation

(iii) *Activities during Operational Phase:*
(a) Road and bridge maintenance and operation activities;
(b) Operation of the drainage system

F. Reviewing and updating from IEE of the subcomponent

Table 6: Reviewing and updating from IEE of the project

Major environmental impact consideration	Included in IEE report	Update status in EMP
Pre-construction phase		

Major environmental impact consideration	Included in IEE report	Update status in EMP
Inadequate incorporation of climate change and seismicity in design	Yes	Yes
Inadequate attention on the impacts of roads local hydrology	Yes	Yes, updated
Inadequate consideration of sustaining flow of sustaining river/stream	Yes	Yes, updated
Inadequate attention on potential unsustainable supply of gravel, sand, soil; or unsustainable extraction of these materials to meet construction demand	Yes	Yes, updated
Displacement of people, loss of assets & income	Yes	Yes, updated
Construction phase		
Dust/suspended particles	Yes	Updated for more detail information
Gas emissions	Yes	Updated for more detail information
Noise/vibration	Yes	Updated for more detail information
Use of hazardous substances and hazardous waste disposal	No	Yes, updated
Impacts associated with quarrying for construction aggregates (dust, noise, vibration, visual impact on landscape, groundwater/surface water contamination, traffic, smoke, accidents, etc)	Yes	Updated for more detail information
Generation of spoils/solid wastes	Yes	Updated for more detail information
Surface water quality	No	Yes, updated
Contamination of agricultural land	No	Yes, updated
Physical Cultural Resources	No	Yes, updated
Traffic & road blocking	Yes	Updated for more detail information
Access blocking	Yes	Updated for more detail information
Local flooding due to obstructed surface drainage or damage to existing drainage channel	Yes	Updated for more detail information
Accidental damage to utilities, resulting in service interruptions	Yes	Updated for more detail information
Disruption of socio-economic activities	Yes	Updated for more detail information
Accidental damage to properties/structures	Yes	Updated for more detail information
Community health and safety hazard	Yes	Updated for more detail information
Workers' health & safety hazard	Yes	Updated for more detail information
Operation phase		
Unsustained efficiency of operation due to inefficient O&M/R	Yes	Updated for more detail information
Damages during seismic or extreme weather events	Yes	Yes

G. EMP Aims and Structure

28. This Environmental Management Plan (EMP) has been prepared to document the environmental management commitments and obligations that will be implemented throughout the pre-construction, construction and operational phases of the Subproject. The EMP specifies the commitments and obligations, documents the responsibilities and timing for implementation and provides detailed costs estimates for implementation.

29. The EMP has been structured in accordance with the ADB's Environmental Assessment Guidelines (2009) as follows:

(i) Section 1 Introduction

(ii) Section 2 provides a summary of the potential environmental impacts due to subproject's activities based on the findings of the IEE and environmental assessment documents as Vietnam Government's requirements.

(iii) Section 3 describes the proposed mitigation measures

(iv) Section 4 describes the proposed environmental monitoring measures

(v) Section 5 describes the Public Consultation Process and Information Publicity

(vi) Section 6 describes the proposed institutional strengthening and training activities

(vii) Section 7 describes the responsibilities and authorities for implementation of mitigation and monitoring requirements

(viii) Section 8 provides a description of the responsibilities for reporting and review

(ix) Section 9 guidelines on procurement noted in environment part.

(x) Section 10 contains the detailed cost estimates

(xi) Annex

Annex 1: present the proposed environmental reporting formats

Annex 2: contains the cost estimates for environmental monitoring

II. SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS

30. Study and assessment of environmental impacts have predicted a series of potential impacts due to the Subcomponent activities. Selection of the potential impacts for assessment is based on analyzed impacts in IEE report which prepared during FS preparation, site investigation, discussions with PMU/DAKURENCO, Provincial DONRE and reference to the relevant documents including ADB's Environmental Impact Assessment Guidelines (2009), the Detail Design Report, the environmental impact assessment report specifically prepared for the Subcomponent and references. Table 7 below provides a summary of potential environmental impacts that can be occurred due to the Subcomponent's activities which are described in detailed in the environmental assessment report.

Table 7: Summary of Potential Environmental Impacts

Potential Environmental Impacts	Significance of Impacts	Discussion of Impacts
Pre-construction phase		
Inadequate incorporation of climate change and seismicity in design	Moderate negative	Inadequate incorporation of climate change and seismicity in design would pose to several unexpected results such as: completed works unable to cope during extreme weather events & earthquakes non-sustainability of completed facility & effectiveness of its services during its intended life span;
Inadequate attention on the impacts of roads local hydrology	Minor Negative	Tran Qui Cap urban road is proposed to be upgraded and enlarged on its existing base with its leveling following the city's master plan of transportation. Inadequate attention on the impacts of roads local hydrology may lead to local flooding, soil erosion and sedimentation.
Inadequate consideration of sustaining flow of streams	Minor Negative	Several small streams such as Ea Cam, Ea Nao, Ea Mleo are serving both drainage and irrigation in the subcomponent area. An inadequate consideration of sustaining flow of streams would influence the movement of natural fish and irrigation in dry season. Of the streams mentioned above, the flow of Ea Cam stream may be affected during period of constructing the 7 Block Bridge at km 0+143 of the route, other streams that are situated from 50 to 100 meters from the road will receive and discharge storm water from the road to the downstream and its lower basins. No construction activities would influence their flows.

Potential Environmental Impacts	Significance of Impacts	Discussion of Impacts
Inadequate attention on potential unsustainable supply of gravel, sand, soil; or unsustainable extraction of these materials to meet construction demand	Moderate Negative	Inadequate attention on potential unsustainable supply of gravel, sand, soil; or unsustainable extraction of these materials to meet construction demand would lead to affecting on construction schedule and inconsistent quality of suppliers, illegal suppliers and environmental issues/risks related to uncontrolled mine exploitation such as dust, noise, traffic problems, accidents…
Displacement of people, loss of assets & income	Moderate negative	Beside the public land is being used for the existing road, constructing the subcomponent will acquire 69,619m^2 of land and impact 1,627 persons of 345 households, of which three households have to relocate. However, of the acquired land, there is more than 90% agricultural land and the remaining is the residential land, the impact is considered to be moderate.
Construction phase		
Dust/suspended particles and gas emissions	Moderate Negative	Dust/ suspended particles are mainly generated from dismantling, excavating, leveling and movements of vehicles in the construction sites. As mentioned above, the dismantled, excavated and level quantities are about 7,797.435m^3, 119,812.30m^3 and 62,907.70 m^3 respectively. The main source of pollution on ambient air quality will be dust. According to the Assessment of Sources Air, Water and Land Pollution: a Guide for Rapid Source Inventory Technique and Their Use in Formulating Environmental Control Strategy – Part 1 (WHO, 1993), dust generated in the construction site is mainly due to excavation activities, loading and unloading material/waste activities and material/waste transport vehicles, and the sensitive receptors located within 100 meters downwind from construction site could be affected. Gases emissions mainly come from vehicles and trucks carrying materials/ disposals in/out of sites, and operation of construction machines. Most of the machines will use diesel and petrol as fuels for operation so their exhausted gases may contain toxic gases such as NO2, SO2, CO.

Potential Environmental Impacts	Significance of Impacts	Discussion of Impacts
		The main sensitive receptors could be impacted as follows: - Residential block No. 7, the police's collective houses in Tan Lap ward; - Residential blocks of 2, 4, 6 and 7 and Mduk village of Ea Tam ward. - Several buildings are located along the road as Highland Hospital, Sport school for the talented; Youth Culture Center. - Road users and workers at sites;
Noise and Vibration	Moderate – Negative	The main construction machines and equipment that will be mobilized to sites include excavators, bulldozer, cranes, chain cranes, rollers, trucks, hammers, concrete mixing machinery, electric generator, which is stated in Table 5. The noise and variation levels depends on kind of equipment and actual construction activities undertaken on site as well as the operating time and number of machines operating at the same time, same space. The following construction activities will need to be carefully monitored: - Concrete mixing activities - noise levels over 90 dBA at 15m from source - The pile driving activities – noise level over 105 dBA in less than 15m from source - Excavation, Leveling and Compaction noise level 97 – 98 dBA at <15 m from source; and, - Electric generator – The noise level of 82 dBA at 15 m. Based on the main activities of the subcomponent it is estimated that at the location within 20m from the source noise levels of most construction machinery and equipment will exceed the permitted limits during the period from 6h to 18h (the noise level ranges from 62.5 to 73.5 dBA). It means that any sensitive objects, which located within the distance of 20 m from construction, could be affected by noise from construction machineries. Thus residential block No. 7, the police's collective houses in Tan Lap ward; residential

Potential Environmental Impacts	Significance of Impacts	Discussion of Impacts
		blocks of 2, 4, 6 and 7 and Mduk village of Ea Tam ward, the Highland Hospital, Youth Culture center and Sport School for Talented should be considered to be mitigated during construction phases.
Exploitation of soil, sand, stone and asphalt concrete for construction material	Minor Negative	Commonly, exploring and processing soil, sand, stone and asphalt concrete for construction materials would generate much dust, toxic gases and wastewater, which causes negative impacts on environment. However, according to the detailed design document prepared by the designing consultant, contractors will contract with legal companies/agencies (Hoang Nam Company for examples) as material suppliers to sites and the material supplying companies will bear all responsibilities for environmental protection related to the process of exploitation and transportation to sites. Nevertheless, their environmental safety compliance should be monitored during construction phase.
Use of hazardous substances and hazardous waste disposal	Moderate negative	Hazardous substances could be listed in TCVN 5507:2002 as petrol, fuels, paints… that will be used during construction phase. Toxic waste are mostly oil contaminated waste as regulated in the Circular No. 12/2011-BTNMT dated on 14/04/2011 of MONRE, they include boxes, cans contain petrol, fuels, paints and discharged oils. This kind of waste need to be collected, transported, and treated to avoid polluting air, water and soil quality in the surrounding areas.
Generation of spoils/solid wastes	Minor moderate e Negative	Solid waste from construction activities includes: i) Construction refuse such as soil, sand, stone, iron scraps, debris with the estimated quantity of 720m^3, which are usually non-toxic; ii) Domestic waste and garbage such as organic waste, paper, carton box, fecal waste generated from workers' camps (about 40kg per day coming from 50 workers/day mobilized to work at site at the peak construction time). This kind of waste need to be collected, classified, transported, and treated to avoid polluting air, water, soil quality and landscapes in the surrounding areas (Decree 59/2007/ND-CP);

Potential Environmental Impacts	Significance of Impacts	Discussion of Impacts
Surface water quality	Moderate negative	Water quality of surrounding areas would be affected by the subcomponent construction activities. Runoff water can wash wastes from workers 'camps, construction sites to water body nearby and deteriorate its quality. Construction activities at 7-block bridge would also affect the water quality of stream that it crosses due to residue of cements, soils, sand, rocks dropping to the water. The sensitive receptors that need to be protected and monitored include: - Ong Giam lake is located on the left side of the road at section from km 1+100 to km1+374.05 in Tan Lap ward. - Ea Cam stream runs across the route at km 0+143 (7 Block bridge) and Ea Nao, Ea Mleo streams located about 50- 100 meters around the route will see on storm water during the operation phase from the route through the open channels and culvert box.
Agricultural land impacts	Moderate negative	There are several paddy fields located the downstream of drainage gates and along the open and box culverts for discharging storm water from the route. It would be affected with contaminated runoff water, wastes directly generated from activities of constructing the open and box culverts along the fields. Runoff water washes wastes such as soil residue, sand, stone, garbage, nylon, cement bags from construction site to the fields, which is able to make the land contaminated. The land is potential to be contaminated with construction materials such as cements, sand, stones, cement bags because they may be scattered into the surrounding environment during the time of constructing drainage system.
Physical cultural resources	Minor negative	Human relics may be found when constructing the road especially the site near Tan Lap Cemetery; Workers probably visiting Daklak Martyr Cemetery at noon time may litter and destroy its landscape;
Traffic & road blocking	Moderate Negative	Traffic disturbance could be potential impacted on both regular travelers on the road and those who live beside the road during the construction period, the route will be narrower, even though blocked due to soil excavation, operation of transport vehicles, construction

Potential Environmental Impacts	Significance of Impacts	Discussion of Impacts
		machines and equipment near the transport routes, especially when construction of 7 Block Bridge the route will be blocked at km 0+143 for a period, Travelers will have to use alternative ways to avoid blocking.
Access blocking	Moderate Negative	Access blocking may occur for those who are living beside the road because the road embankment is about 1-5.5 m tall and located adjacent to villagers' houses, concretely: 61 houses on the right of the road and 12 houses on the left of the road may be difficult in having access to the road, which needs to prepare side roads for them to access the road safely.
Local flooding due to obstructed surface drainage or damage to existing drainage channel	Minor Negative	Local flooding due to obstructed surface drainage or damage to existing drainage channel would occur because the existing drainage system will be totally rebuilt and also construction materials wastes may cause obstruction to the drainage system. The water may run freely to lower areas because of its slops, which may cause local flooding; however, it is assessed to be a minor negative impact because there are several small streams running across the site so they can receive and discharge storm water into water body.
Accidental damage to utilities, resulting in service interruptions	Moderate Negative	Accidental damage to utilities, resulting in service interruptions would probably happen because the investigation has shown that both sides of the existing road are the installed water supplying pipes and telephone cables. If contractors have an inadequate collaboration with the related agencies to investigate, the status carefully prior to construction, the service interruption will probably be occurred. The impact is considered moderate and mitigated.
Disruption of socio-economic activities	Moderate Negative	There are about 100 small traders along the road and their activities may be affected due to impediments from construction activities such as fencing, barriers, access-blocking ect. It is necessary that both technical options and environmental impact mitigation measures should be properly implemented to avoid and minimize the impacts to acceptable levels.

Potential Environmental Impacts	Significance of Impacts	Discussion of Impacts
Community health and safety hazard	Moderate Negative	The key environmental issues would affect the safety and health of communities include social relation between locals and workers, risks of community accidents and health effects due to air contamination. The social issues probably appear when workers are mobilized to sites, setting up worker camps, which would lead to social disturbance because conflicts may occur between the locals and the workers and transmission social diseases such as HIV/AIDS increase; risks of community accidents may increase because of the fact that many kinds of operation machines and equipments would be mobilized to site and the construction activities such as excavating, dismantling, leveling, gathering materials, temporary storing of disposals would happen, which is potential risks of accidents; community health may be affected because the ambient air at sites may be contaminated with dust/suspended particles, gas emissions from operation machines. Time of community rest and relaxation both at noon and nighttime may be interfered with noise and vibration from machine operation.
Workers' health & safety hazard	Moderate Negative	The key environmental issues influencing worker's health and safety hazard are labor accidents, social disease HIV/AIDS and other infected disease transmission related to worker's camp hygienic sanitation, and using alcohol within working time. Labor accident is one of the concerning issues. Commonly, to reduce social impacts caused by migrant workers, local laborers would be recruited for simple works and most of them are farmers or free laborers with an inadequate awareness on labor safety. Transmission of HIV/AIDS is one of the other potential risks for migrant workers because of their behaviors and inadequate awareness on safety in sexual activities; besides several common diseases such as diarrhea, fever would be resulted from living in unhygienic workers' camps. Those who use alcohol when working may lose control their behavior, which would lead to negative impacts on their health and labor safety. In sum, there are many potential risks for workers in general and for local workers in particular in terms of labor accidents, HIV/AIDS transmission, other infected diseases and other adverse effects on health & safety, mitigation measures should be strictly carried out and monitored to protect and save their lives.

Potential Environmental Impacts	Significance of Impacts	Discussion of Impacts
Site clearance and environmental rehabilitation when civil works completed	Moderate negative	A risk of traffic accident occurs at the end of construction phase when all items such as traffic lights, site clearance have not been fully completed but travelers may travel on the road because they do not know if the road is allowed to be used or not.
Operation phase		
Unsustained efficiency of operation due to inefficient O&M/R	Moderate negative	Unsustained efficiency of operation due to inefficient O&M/R would lead to reducing lifetime of the road and risks of traffic accidents increase, public complaint appears;
Damages during seismic or extreme weather events	Moderate negative	Damages during seismic or extreme weather events may occur, which needs assessing and repairing in time to prevent further induced damages;

III. MITIGATION MEASURES

31. Mitigation measures proposed for negative impacts identified in Table 6 will be summarized in Table 7 below. Mitigation measures for construction phase shall be included in the bidding documents for the Contractor to implement. The related costs that would be borne by the Contractor are not presented in this table - these costs will become part of the civil works contracts.

Table 8: Summary of the proposed mitigation measures

Sub-component activities	Potential impacts	Proposed Mitigation Measure	Responsibility	Cost Estimate
Pre-construction phase				
Detailed design				
Inadequate incorporation of climate change and seismicity in design	Completed works unable to cope during extreme weather events &	▪ Design to seismic design criteria as regulated in Viet Nam ▪ Take the necessary geo-technical & geological investigations for basis in detailed design	Detailed designer	Included in designing contract cost

Sub-component activities	Potential impacts	Proposed Mitigation Measure	Responsibility	Cost Estimate
	earthquakes	▪ Use of materials with high resistance to dry conditions as appropriate;		
Inadequate attention on the impacts of roads on local hydrology	Local flooding, soil erosion and sedimentation	▪ Take adequate capacity of drainage system into account during detailed design; ▪ Strengthen sections with erosion potential, especially areas close to water bodies such as near Ong Giam Pond, both sides of 7 Block bridge crossing Ea Cam stream, downstream of drainage gates;	Detailed designer	Included in designing contract cost
Inadequate consideration of sustaining flow of sustaining streams	Impact on breeding of natural fishes, irrigation activities	▪ Take technical measures of executing the foundation of bridge without influencing the flow of Ea Cam stream into consideration in detailed design.	Detailed designer	Included in designing contract cost
Inadequate attention on potential unsustainable supply of gravel, sand, soil; or unsustainable extraction of these materials to meet construction demand	Illegal material suppliers; Uncontrolled quality of supplied materials; Incompliance of environmental safeguard at borrow pits.	▪ Prepare a Subcomponent Aggregates Management Plan (AMP), confirming location of sources, estimating supply of, & demand for, aggregates during construction, linked to cut-&-fill management plan. This will form basis for Contractor's AMP. ▪ Specify in bidding documents Contractor's obligation to obtain aggregates only from quarries & crushing plants still operating within allowed extraction threshold as per environmental permit.	Detailed designer	Included in designing contract cost
Land acquisition	Displacement of people, loss of assets & income	▪ Strictly follow the approved RAP ▪ Design Environmental friendly measures	PMU/ DAKURENCO	Included in RP
Construction phase				
- Excavation; Transportation; - Load/unload materials; - Disposals/wastes - Operation of all	Dust and exhaust generation	▪ All excavated soil should be reused for leveling low areas where applicable; ▪ Excavated areas at site will be watered to maintain certain moisture levels, and to prevent or minimize dust dispersion.	Contractor	Included in construction contract cost

Sub-component activities	Potential impacts	Proposed Mitigation Measure	Responsibility	Cost Estimate
machineries/equipment using fossil energy as fuels		▪ The watering activities have been proposed at least once per day during the rainy season and twice a day during the dry season in the working areas. It is also required that a continuously observation of the surrounding sensitive receptors to be carried out to identify whenever arising dust from site surface for additional watering in the above areas; ▪ Provision of the wall/fence in some sensitive sites if required by local people or community authorities, included: o Residential areas of Block 2, 4, 6 and 7;, o Police collective houses of Tan Lap ward; o Mduk village of Ea Tam ward; o Central Highland Hospital; o Sport School for the Talented, Youth Culture Centre. ▪ The construction machineries and equipment have to comply with Decision No. 249/2005/QĐ-TTg dated 10/10/2005 of Prime minister, Regulation on Emission roadmap for road transportation vehicles ▪ Cover the material storage, setting up appropriate of mobilize material to the site to ensure that material will not obstruct at the site and release dust; ▪ All material/waste storage shall be located at least 50 meters from any households and sensitive areas as mentioned above. ▪ Trucks carrying construction waste are covered. All trucks used should have well fitted bodies and not be overtopped in loading to avoid soil scattering. ▪ Provision of wheel-wash stations at the ingress/ egress points at all construction sites to clean construction vehicles moving out of the construction site from depositing soil dust on public		

Sub-component activities	Potential impacts	Proposed Mitigation Measure	Responsibility	Cost Estimate
		road ▪ Speeds shall be limited when the trucks pass residential areas to constrain dust flying in the wind, which affect health and daily activities of the people living along the roads. Speed limitation signs shall be adequately installed within construction site and its regulation shall be reminded to each driver by contractor. ▪ Soil scattered on the paved road and public road shall be removed immediately. ▪ Turn off machines when non-working; ▪ Prioritize to use grid power/renewable energies instead of fossil energy using generators		
- Operation of construction machineries such as cranes, chain cranes, excavator, rollers, hammers, power generators… - Movement of vehicles/trucks	Noise /vibration	▪ Use modern and new construction machines and equipment to meet standards of exhaust, noise, and vibration as regulated by the Government. The Contractor needs to submit the Engineer documents proving that all construction vehicles, equipment, and machines are checked and meet requirements concerning noise and vibration generation of the current Vietnam standards as QCVN 26: 2010 for noise level and QCVN 27:2010 for vibration emitted by construction works; ▪ All noise and vibration generation activities shall be restricted to the hours of 22h – 06h in residential areas such as: Residential areas of Block 7, police collective houses of Tan Lap ward, residential areas of blocks of 2, 4, 6 and 7, Mduk village of Ea Tam ward; ▪ All noise and vibration generation activities shall be restricted to the hours of 07h – 17h when constructing near the Sport School for the Talented, the Youth Culture Centre; ▪ All noise and vibration generation activities shall be restricted in 24h when constructing near the Central Highland Hospital.	Contractor	Included in construction contract cost

Sub-component activities	Potential impacts	Proposed Mitigation Measure	Responsibility	Cost Estimate
		▪ In case that, noise generation equipment need to run during night time and holiday time nearby the above sensitive objects, the detail schedule will be considered and approved by SC before could be applied. ▪ Local communities should be informed about construction schedules and time through informal public consultation or any local people meetings and notice board; ▪ Strictly implementing noise control measures as noted above through sampling and taking adequate corrective actions if needed;		
Use of hazardous substances and hazardous waste disposal	Air, soil and water contamination	▪ The storage area for all hazardous substances are located away from any water bodies in the subcomponent area such as Ong Giam Pond, Ea Cam stream, irrigation canals to avoid the leakage to water bodies ▪ Ensure that safe storage of fuel, other hazardous substances are agreed by PMU/DAKURENCO and have necessary approval/permit from DONRE and local authorities; ▪ Equipment/vehicle maintenance and refuelling areas will be confined to the area in a specialised designed site to contain spilled lubricants and fuels; ▪ Fuel and other hazardous substances shall be stored in areas provided with roof as stated in TCVN 5507:2002- *Hazardous chemicals − Code of practice for safety in production, commerce, use, handling and transportation*; ▪ Segregate hazardous wastes (oily wastes, fuel drums) and ensure that storage, transport and disposal shall not cause pollution; ▪ Ensure all storage containers are in good condition with proper labelling; ▪ Collected, transported and treated by contract with company	Contractor	Included in construction contract cost

Sub-component activities	Potential impacts	Proposed Mitigation Measure	Responsibility	Cost Estimate
		which has a work permit for treating hazardous waste disposal according to the Circular No. 12/2011/TT-BTNMT on 14 April, 2011 of MONRE.		
Inappropriate soil pit practices and concrete station operation	Soil erosion, vegetation clearance and runoff water at soil pit	▪ Prioritize the use of existing soil pit sites with suitable materials and update the list of soil pit monthly and report to PMU/DAKURENCO and minimize impacts on other local resources; ▪ Procure materials only from DONRE authorized soil pit and borrow sites; ▪ Extraction of sand and gravel in river beds shall be prohibited except: (i) where this is no technically and economically feasible alternatives and (ii) provided specific mitigation measures are implemented to minimize impact on river morphology, water quality (e.g., turbidity) and aquatic ecosystems (e.g., reduced extraction during fish spawning period); ▪ Checking the environmental protection commitment documents of soil pit, asphalt concrete stations since the Project will purchased construction material and hot concrete from these areas; ▪ Monitoring the implementation of environmental protection measures at the soil pit and concrete stations; ▪ Supervision the responsibility of environmental recovery activities at the soil pit areas and concrete stations.	Contractor	Included in construction contract cost
Inappropriate construction waste management	Sludge and solid waste, waste water spreading to surrounding area, causing soil and surface water contamination	▪ All solid waste should be reused for leveling low areas where applicable; ▪ Construction waste shall be transported by adequate manners to Hoa Phu borrow pit/quarries to rehabilitate the environment in compliance with Decision No. 1287/QD-UBND issued by Daklak PPC on 27 May 2010 on approval of environmental rehabilitation project;	Contractor	Included in construction contract cost

Sub-component activities	Potential impacts	Proposed Mitigation Measure	Responsibility	Cost Estimate
		▪ Equip dustbins and mobility septic tanks to work sites (it is proposed that there will be 4 dustbins and 2 mobility septic tanks provided at each construction site) ; ▪ Domestic waste and garbage from worker camps need to be collected by hygienic manner through service provision of DAKURENCO; ▪ Disposal of solid wastes into canals, stream, other watercourses, agricultural field and public areas shall be prohibited; ▪ Burning of construction and domestic wastes shall be prohibited; ▪ Toxic waste, if any, need to be collected, transported and treated according to Circular No. 12/2011-BTNMT dated on 14/04/2011 of MONRE ▪ Before construction is completed, the contractor will move all construction wastes and unused materials from the site; ▪ Providing environmental protection measures at the soil disposal location in the Hoa Phu borrow pit sites include leveling, temporary drainage during rainy time, boundary edge provision, plantation and environmental recovery.		
Construction activities and worker camp establish on sites…	Water quality impacts	▪ Worksite, camps, material storage areas and load/unload construction material/waste activities must be located far from watercourse to ensure that materials will not be disposed into water, such as: - Ong Giam Pond - Ea Cam, Ea Nao and Ea Mleo streams ▪ Excavation activities of drain items must be scheduled to avoid rainy to reduce suspended maters in runoff water entering the surrounding water bodies; ▪ Provide adequate facilities in the site including latrines,	Contractor	Included in construction contract cost

Sub-component activities	Potential impacts	Proposed Mitigation Measure	Responsibility	Cost Estimate
		holding areas and garbage cans. Waste from latrines will be collected and treated properly through an economic contract with local environmental co-operatives/companies. ▪ Cover material storage areas when raining is needed. Temporary storage of construction and domestic waste on the sites will be no longer than 24 hours. ▪ The placement of washing instruments/vehicles next to the water bodies, existing canals (identified in Water quality impact section) will not allowed avoiding the leaching of waste, sludge, soil and oil contaminated water and maintenance activities will be banned on the sites in all construction drains; ▪ Equipping the dustbins and mobility septic tanks to work sites (it is proposed that there will be 4 dustbins and 2 mobility septic tanks provided at each construction site)		
Wastes from working sites and worker's camps	Agricultural soil impacts	▪ Materials of stones and sand are also temporarily stored on a nylon canvas to prevent them from being scattered into paddy fields along the proposed drainage canals/culverts; ▪ Providing the temporary irrigation canals or drainage canals during construction phases if any interventions will be made on these canals to ensure the water flows on all cultivation areas ▪ Appropriate management of water pollution sources from construction activities to ensure that the construction will not pollute water and soil on all cultivation areas; ▪ Reinstate road surface and fix up damages caused to irrigation canals, water supply/drainage canals; ▪ All activities of contractor only allow within the acquired land areas	Contractor	Included in construction contract cost
All construction	Cultural heritage	▪ Where grave is found during construction, coordinate with	Contractor	Included in construction

Sub-component activities	Potential impacts	Proposed Mitigation Measure	Responsibility	Cost Estimate
activities	impacts	local authorities to arrange for relocation and mapping the location of the grave before and after relocation; ▪ Halt construction activities, protect the site and inform construction supervision for guidance if artifacts are found at construction site. ▪ Ensure not to cause any impact on environmental landscape, trees and any disturbance related to religious activities of locals (Tan Lap Cemetery, Daklak martyrs Cemetery);		contract cost
Movements of construction vehicles/equipment in narrow access roads; Roadside parking of construction vehicles and equipment; Stockpiling of aggregates, excavated soils, spoils within access road ROW;	Traffic & road blocking	Place sign boards at the main intersections of the route with other roads to direct traffic means to slow down its speed before approaching the route, such as: - Intersection with Nguyen Van Cu street at km 0+ 000 of the route; - Intersection with Hung Vuong road at km 0+559.74 of the route - T- Junction with Ong Giam pond side roads at km 1+ 287.44 and km 1+ 375 - Intersection with YNue road near the end of the route; - And several T- Junctions with village roads if necessary; ▪ Inform the community about construction time and schedule through informal public consultation or any local people meetings and notice board; ▪ The Contractor must always maintain security fences for the construction sites which are close to residential areas and Highland Hospital, Sport Talented School and Youth Culture Center, if needed. The fences must define clearly the site. ▪ Post traffic flags/light signal during entire working hours and night time. ▪ Regulating the transport vehicle speed will not be over 20km when passing the route ▪ Provide safe pedestrian access especially those who lives		

Sub-component activities	Potential impacts	Proposed Mitigation Measure	Responsibility	Cost Estimate
		closed to the road at positions differing heights of more than 1m from their houses to road.(82 households living closed to the road) ▪ Store excavated materials without obstructing traffic flow & safe access by affected communities. ▪ Parking of construction vehicles and equipment should be managed; ▪ When 7 Block Bridge is being constructed, a signal board showing alternative ways to travellers has to be installed at both starting and ending points of the road. ▪ Providing alternaltive access for HHs, areas which will be blocked and Reinstate the affected access routes as before project condition when construction activities completed		
Construction of pavements	Access blocking	▪ At least one week prior to access blocking, notify the affected properties. Work together and agree with property owners and village authorities for the alternative access and parking areas. ▪ Provide safe access to blocked properties (82 households living beside the road) ▪ Providing alternaltive access for HHs, areas which will be blocked and Reinstate the affected access routes as before project condition when construction activities completed	Contractor	Included in construction contract cost
Obstructed/damaged drainage water flow	Localized flooding and insanitation condition	▪ Setting up appropriate construction schedule at the site to avoid rainy season from May to November, especially for excavation activities; ▪ Provision supplemental temporary drainage plans in the construction site to ensure the quickly respond in case of heavy rain, other unforeseen drainage issues and avoid obstructing water in surrounding areas and construction sites; ▪ Providing the temporary drainage canals during construction phases if any interventions will be made on these canals to ensure the water flows; and requirement on Reinstate the	Contractor	Included in construction contract cost

Sub-component activities	Potential impacts	Proposed Mitigation Measure	Responsibility	Cost Estimate
		affected canals/drainages since civil work completed; ▪ Supplemental temporary drainage plans must be revised and approved by DAKURENCO, and Construction Supervision before construction works started.		
Excavation activities and transportation	Damage to utilities, and service interruptions	▪ Collaborate with relevant competent agencies to investigate the site and set up an action plan to avoid any service interruption if possible, if not avoidable, time of interruption is the shortest and locals are informed; ▪ Record the status of the existing houses, properties, roads and canals before construction and make proper compensation for the damages if any. ▪ All public facilities should be fully compensated as its origin after completion of construction works; ▪ Any public utilities which used by contractors need to obtain approval from local authorities.	Contractor	Included in construction contract cost
Construction activities	Disruption of socio-economic activities	▪ Traders should be consulted to come up with the best mitigation measures to be applied to reduce negative impact on trading before construction ▪ Gathering materials to sites without blocking access roads to trading shops;	Contractor	Included in construction contract cost
Concentration of workers and Construction activities;	Community health and safety hazard	▪ Construction workers who are not local people must register temporary residents and obtain temporary residential certificate from local authority ▪ Use as many local workers as possible in order to reduce the migrant workers at sites; ▪ Educate workers on appropriate behaviour for interactions with local community and risks of communicable diseases ▪ Develop leaflets on propagandizing the ways of prevention and avoidance of the social diseases HIV/AIDS for both workers and host communities; ▪ Contractor shall readily provide and maintain lights, protection fences, signboards and wardens where necessary	Contractor	Included in construction contract cost

Sub-component activities	Potential impacts	Proposed Mitigation Measure	Responsibility	Cost Estimate
		as requested by the Engineer or local authorities. ▪ Excavated pond will be dewatered and fenced to reduce high risk for local peoples; ▪ Construction materials shall be stored tidily at the required locations. ▪ The local people shall not be allowed in high-risk areas (excavation sites and areas where heavy equipment is in operation); ▪ All construction activities generating dust/gas emissions, noise and vibration at sites adjacent to residential areas of Block 7, police collective houses of Tan Lap ward, residential areas of blocks of 2, 4, 6 and 7, Mduk village of Ea Tam ward; Central Highland Hospital, Sport School for the Talented, Youth Culture Centre should be strictly controlled to ensure air ambient quality at site to be within the limits against QCVN 05/2013/BTNMT and noise not to exceed 55dBA at boundary of any residential area between 6h and 21h00 and 45 dBA between 21h00 and 06h00;		
Poor management at worksites and worker's camps;	Workers' health & safety hazard	▪ Worker camps should be located at high and ventilated places with provisions of separate dustbins, hygienic toilets; avoiding places high potential of landslides and flash flooding. ▪ Constructor needs to work with DAKURENCO/PMU to establish labor safe regulations on the sites required by law and by good engineering practice, which include electric safety, operating equipment -general safety requirements, general safety requirements. ▪ Workers shall be provided with appropriate personal protective equipment (PPE) such as safety shoes, hard hats, safety glasses, ear plugs, gloves, etc. at no cost to the employee.. ▪ A first aid kit will be provided at each construction site to	Contractor	Included in construction contract cost

Sub-component activities	Potential impacts	Proposed Mitigation Measure	Responsibility	Cost Estimate
		ensure patients can receive first aid timely before transporting them to the medical station/hospital ▪ It is mandatory for workers to attend training courses on labor safety before they are recruited to work for the project; ▪ Supervise period on compliance to labor safe measures of workers at project sites. ▪ Contractors ensure to provide safe drinking water to workers for daily uses. ▪ Construction site shall be provided with toilet/sanitation facilities; ▪ In case of finding UXO, immediately to inform competent agency for solving; ▪ Using alcohol within working time both at camps and sites must be banned;		
Environmental rehabilitation	Traffic accident	▪ Before construction is completed, the contractor will move all construction wastes and unused materials from the sites to approved sites ▪ Ensure all construction items including traffic safety facilities/securities have entirely completed under supervision of competent agency prior to lifting up all barriers and allowing a normal traffic;	Contractors	Included in construction contract cost
Operation phase				
Inefficient O&M/R	Unsustained efficiency of operation	Sufficient budget and technical capacity for operation, maintenance and repair.	Operator unit	Included in operation cost
Natural hazard without timely repaired	Damages during seismic or extreme weather events	After every seismic or extreme weather event, conduct engineering investigation of built structures & implement corrective measures immediately.	Operator unit	Included in operation cost

IV. ENVIRONMENTAL MONITORING

32. The environmental monitoring plan for the EMP is provided in Table 9. The monitoring plan focuses on all three phases (pre-construction, construction, post-construction operation) of the subcomponent and consists of environmental indicators, the sampling locations & frequency, method of data collection, responsible parties, and estimated costs. The purpose of the monitoring plan is to determine the effectiveness of the impact mitigations, and to document any unexpected positive or negative environmental impacts of the subproject.

Table 9*: Environmental Performance Monitoring*

Mitigation Measure	Monitoring parameters	Location	Method	Frequency	Responsibility	Cost
Pre-construction phase						
DAKURENCO to carry out full EIA as requested by Vietnam regulation and obtain environmental approval from local authorities	Environmental certifications issued by local authority		Check document	Once, before construction phase	Environmental monitoring consultant	In a contract between PMU and EMC
Inadequate incorporation of climate change and seismicity in design						
▪ Design to seismic design criteria as regulated in Viet Nam ▪ Undertake the necessary geo-technical & geological investigations for basis in detailed design ▪ Use of materials with high resistance to dry conditions, as appropriate	Including and considering of environmental and technical standards in the design documents Check with technical parameters		Check documents	Once, before construction phase	Environmental monitoring consultant	In a contract between PMU and EMC
Inadequate attention on the impacts of roads local hydrology						
▪ Take capacity of drainage system into consideration in detailed design ▪ Strengthen sections with erosion potential, especially areas close to water bodies such as	Including and considering of environmental and technical		Check documents	Once, before construction phase	Environmental monitoring consultant	In a contract between PMU and EMC

Mitigation Measure	Monitoring parameters	Location	Method	Frequency	Responsibility	Cost
near Ong Giam Pond, both sides of 7 Block bridge crossing Ea Cam stream, downstream of drainage gates	standards in the design documents Check with technical parameters					
Inadequate consideration of sustaining flow of sustaining streams						
▪ Take technical measures of executing the foundation of bridge without influencing the flow of Ea Cam stream into account in detailed design.	Including and considering of environmental and technical standards in the design documents Check with technical parameters		Check documents	Once, before construction phase	Environmental monitoring consultant	In a contract between PMU and EMC
Borrow pits/quarries						
▪ Prepare a Subcomponent Aggregates Management Plan (AMP), confirming location of sources, estimating supply of, & demand for, aggregates during construction, linked to cut-&-fill management plan. This will form basis for Contractor's AMP. ▪ Specify in bidding documents Contractor's obligation to obtain aggregates only from quarries & crushing plants still operating within allowed extraction threshold as per environmental permit.	Selected Contractor its CEMP, their performance compliance;		Verifying existence of CEMP. Evaluating CEMP against EMP.	Once prior to mobilization	Environmental monitoring consultant	In a contract between PMU and EMC
Compensation and resettlement						
▪ Strictly follow the approved RAP	Compensation	In the sub	Survey by	Before	RAP monitoring	In a

Mitigation Measure	Monitoring parameters	Location	Method	Frequency	Responsibility	Cost
▪ Design Environmental friendly measures	progress and satisfaction of affected persons Properly relocation of all affected facilitates	project areas	questionnaires and direct interview	construction phase	consultant	separated contract between PMU and RAP monitoring consultant
Construction phase						
At the pre-mobilization meeting with contractors and DAKURENCO will underscore the need for contractors to understand and adhere to EMP (additional copies in Vietnamese to be provided at that time)	Confirm that contractor understands the environmental responsibility and has the technical capacity to undertake the work	Once per contractor before contractor mobilization	Direct interview	4 weeks before contractor starts	PMU/DAKURENCO, Environmental Monitoring Consultant	In a contract with PMU/DAKURENCO
Dust and exhaust generation						
All excavated soil should be reused for leveling low areas where applicable;	Check with reuse of construction waste at the site Volume of reused soil	In all construction sites	Observation and interview worker	Every week	CSC and EMC	In a contract with PMU
Excavation at site will be watered to maintain certain moisture levels, and to prevent or minimize dust dispersion. The watering activities have been proposed at least once per day during the rainy season and twice a day during the dry season in the working areas. It is also required that a continuously observation of the surrounding sensitive receptors to be carried out to identify whenever arising dust from	Frequency of watering on excavation surface; spraying responsibility; Effect of water spraying and number of roads	In all construction sites	Observation and interview worker and public consultation	Every week	CSC and EMC	In a contract with PMU

Mitigation Measure	Monitoring parameters	Location	Method	Frequency	Responsibility	Cost
site surface for additional watering in the above areas; police collective houses of Tan Lap ward, residential areas of blocks of 2, 4, 6 and 7; Mduk village of Ea Tam ward; Central Highland Hospital, Sport School for the Talented; Youth Culture Centre.	sprayed					
The construction machineries and equipment have to comply with Decision No. 249/2005/QĐ-TTg dated 10/10/2005 of Prime minister, Regulation on Emission roadmap for road transportation vehicles	Check with register document of vehicles	In all construction sites	Observation and document reviewing	Every 3 months	CSC and EMC	In a contract with PMU
Cover the material storage, setting up appropriate of mobilize material to the site to ensure that material will not obstruct at the site and release dust;	Availability of cover methods of material/waste storage, mitigation practice at the sites and dust level generation	In all construction sites	Observation, public consultation and interview worker	Weekly	CSC and EMC	In a contract with PMU
All material/waste storage shall be located at least 50 meters from any households and sensitive areas as mentioned above.	Location of material/waste storage areas in comparison with surrounding residential areas, performance of mitigate at the sites	In all construction sites	Observation and public consultation	Every week	CSC and EMC	In a contract with PMU
Trucks carrying construction waste are covered. All trucks used should have well fitted bodies and not be overtopped in loading to avoid soil scattering.	Covering status of transportation vehicles; soil scattering condition; dust	In all construction sites	Observation and public consultation	Every week	CSC and EMC	In a contract with PMU

Mitigation Measure	Monitoring parameters	Location	Method	Frequency	Responsibility	Cost
	generation;					
Provision of wheel-wash stations at the ingress/ egress points at all construction sites to clean construction vehicles moving out of the construction site from depositing soil dust on public road	Number, locations of wheel-wash stations; Performance of contractors	In all construction sites	Observation, public consultation and interview worker	Weekly	CSC and EMC	In a contract with PMU
Speeds shall be limited when the trucks pass residential areas to constrain dust flying in the wind, which affect health and daily activities of the people living along the roads. Speed limitation signs shall be adequately installed within construction site and its regulation shall be reminded to each driver by contractor.	Speed of vehicles on construction site and city roads; speed limited signs installation; availability of regulation on speed from contractor	In all construction sites	Observation and public consultation and document inspection in cooperation with transport inspectors (DoT)	Every week	CSC and EMC	In a contract with PMU
Soil scattered on the paved road and public road shall be removed immediately.	Soil scattering and response of contractors	Along the transportation routes	Observation and public consultation	Weekly	CSC and EMC	In a contract with PMU
Turn off machines when non-working	Operating machines at sites	All working sites	Observation and worker Interview	Weekly	CSC and EMC	In a contract with PMU
Prioritize to use grid power/renewable energies instead of fossil energy using generators	Sources of powers being used at sites	All working sites	Observation and worker Interview	Weekly	CSC and EMC	In a contract with PMU

Mitigation Measure	Monitoring parameters	Location	Method	Frequency	Responsibility	Cost
Noise /vibration						
Use modern and new construction machines and equipment to meet standards of exhaust, noise, and vibration as regulated by the Government. The Contractor needs to submit the Engineer documents proving that all construction vehicles, equipment, and machines are checked and meet requirements concerning noise and vibration generation of the current Vietnam standards as QCVN 26: 2010 for noise level and QCVN 27:2010 for vibration emitted by construction works;	Current status of machines, equipment, and vehicles used for construction; Quality certification of machines; noise level generation	In all construction sites	Observation and public consultation	Every week	Construction Supervision Consultant (CSC); Environmental Monitoring Consultant (EMC)	In a contract with PMU
All noise and vibration generation activities shall be restricted to the hours of 22h – 6h in residential areas such as: Residential areas of Block 7, police collective houses of Tan Lap ward, residential areas of blocks of 2, 4, 6 and 7, Mduk village of Ea Tam ward;	sleeping/relaxation time; construction activities at the mentioned time; availability of unacceptable noise level;	Construction sites near the residential areas	Observation and public consultation, worker interview	Every week	CSC and EMC	In a contract with PMU
All noise and vibration generation activities shall be restricted to the hours of 7h – 17h when constructing near the Sport School for the Talented, the Youth Culture Centre;	Working time of student and staff; construction activities at the mentioned time; availability of unacceptable noise level;	Construction sites near the schools and Cultural Center	Observation and interview managers/student of the school and Center	Every week	CSC and EMC	In a contract with PMU
All noise and vibration generation activities shall be restricted in 24h when constructing near the Central Highland Hospital,	Hospital in operation needs to be quiet all times	Construction sites closed to the	Observation and interview managers/p	Every week	CSC and EMC	In a contract with PMU

Mitigation Measure	Monitoring parameters	Location	Method	Frequency	Responsibility	Cost
		hospital	atients in hospital			
In case that, noise generation equipment need to run during night time and holiday time nearby the above sensitive objects, the detail schedule will be considered and approved by SC before could be applied.	Noise generation equipment at the nigh time, location and SC agreement	In all constructi on sites	Observation and documents review	Every week	CSC and EMC	In a contract with PMU
Local communities should be informed about construction schedules and time through informal public consultation or any local people meetings and notice board	Meeting minutes Notices Information dissemination methods	In all constructi on sites	Observation and public consultation	Every week	CSC and EMC	In a contract with PMU
Strictly implementing noise control measures as noted above through sampling and taking adequate corrective actions if needed	Monitoring activities, frequencies, results; Any addition actions	In all constructi on sites	Observation and documents review	Every week	CSC and EMC	In a contract with PMU
Use of hazardous substances and hazardous waste disposal						
The storage area for all hazardous substances are located away from any water bodies in the subcomponent area such as Ong Giam Pond, Ea Cam stream, irrigation canals to avoid the leakage to water bodies	Location of hazardous substances storage area; Distance to water bodies	In all constructi on sites	Observation and document inspection		CSC and EMC	
Ensure that safe storage of fuel, other hazardous substances are agreed by PMU/DAKURENCO and have necessary approval/permit from DONRE and local	Status of hazardous storage	In all constructi on sites	Observation and document	Every week	CSC and EMC	In a contract with PMU

Mitigation Measure	Monitoring parameters	Location	Method	Frequency	Responsibility	Cost
authorities			inspection			
Equipment/vehicle maintenance and refuelling areas will be confined to areas in a specialized designed site to contain spilled lubricants and fuels;	Status of hazardous storage and fuel filling activities	In all construction sites	Observation and document inspection	Every week	CSC and EMC	In a contract with PMU
Fuel and other hazardous substances shall be stored in areas provided with roof as stated in TCVN 5507:2002- Hazardous chemicals − Code of practice for safety in production, commerce, use, handling and transportation;	Status of hazardous storage	In all construction sites	Observation and document inspection	Every week	CSC and EMC	In a contract with PMU
Segregate hazardous wastes (oily wastes, fuel drums) and ensure that storage, transport and disposal shall not cause pollution;	Status of containers	In all construction sites	Observation and document inspection	Every week	CSC and EMC	In a contract with PMU
Ensure all storage containers are in good condition with proper labelling;	Status of containers	In all construction sites	Observation and document inspection	Every week	CSC and EMC	In a contract with PMU
Collected, transported and treated by contract with company which has a work permit for treating hazardous waste disposal according to the Circular No. 12/2011/TT-BTNMT on 14 April, 2011 of MONRE.	Status of hazardous waste collected, transported and treated	In all construction sites	Observation and document inspection	Every week	CSC and EMC	In a contract with PMU
Inappropriate soil pit practices and concrete station operation						
Prioritize the use of existing soil pit sites with suitable materials and update the list of soil pit monthly and report to PMU/DAKURENCO and minimize impacts on other local resources;	Operation status Documents, reports	Soil pit Asphalt concrete	Observation interview worker, public	monthly	CSC and EMC	In a contract with PMU

Mitigation Measure	Monitoring parameters	Location	Method	Frequency	Responsibility	Cost
	Approval letter, operation License,	Sand mines	consultation Document review			
Procure materials only from DONRE authorized soil pit and borrow sites;	Environmental Approval Letters from relevant local authorities	Soil pit Asphalt concrete Sand mines	Document review	Once at the beginning of the civil construction phase	CSC and EMC	In a contract with PMU
Extraction of sand and gravel in river beds shall be prohibited except: (i) where this is no technically and economically feasible alternatives and (ii) provided specific mitigation measures are implemented to minimize impact on river morphology, water quality (e.g., turbidity) and aquatic ecosystems (e.g., reduced extraction during fish spawning period);	Appropriate locations of sand supply sources The technical and economic specifications of supply sources	Soil pit Sand mines	Observation public consultation Document review	Once at the beginning of the civil construction phase	CSC and EMC	In a contract with PMU
Checking the environmental protection commitment documents of soil pit, asphalt concrete stations since the Project purchased construction material and hot concrete from these areas;	Environmental Approval Letters from relevant local authorities	Soil pit Asphalt concrete Sand mines	Document review	Once at the beginning of the civil construction phase	CSC and EMC	In a contract with PMU
Monitoring the implementation of environmental protection measures at the soil pit and concrete stations;	Performance of environmental protection measures Appropriate measures Effectiveness of implemented measures	Soil pit Asphalt concrete Sand mines	Observation public consultation Document review	Monthly	CSC and EMC	In a contract with PMU

Mitigation Measure	Monitoring parameters	Location	Method	Frequency	Responsibility	Cost
Supervision the responsibility of environmental recovery activities at the soil pit areas and concrete stations.	Performance and effectiveness of environmental recovery activities	Soil pit Asphalt concrete Sand mines	Observation public consultation Document review	Monthly	CSC and EMC	In a contract with PMU
Inappropriate construction waste management						
All solid waste should be reused for leveling low areas where applicable;	Check with waste reuse for leveling at the site	In all construction sites	Observation and public consultation	Every week	CSC and EMC	In a contract with PMU
Construction waste shall be transported by adequate manners to Hoa Phu borrow pit to rehabilitate the environment in compliance with Decision No. 1287/QD-UBND issued by Daklak PPC on 27 May 2010 on approval of environmental rehabilitation project;	Permission status, checking documents/permission letters	Hoa Phu commune	Observation and public consultation	Every week	CSC and EMC	In a contract with PMU
Equip dustbins and mobility septic tanks to work sites (it is proposed that there will be 4 dustbins and 2 mobility septic tanks provided at each construction site) ;	Number of dustbins and mobility septic tanks at work site	In all construction sites	Observation and public consultation	Every week	CSC and EMC	In a contract with PMU
Domestic waste and garbage from worker camps need to be collected by hygienic manner through service provision of DAKURENCO;	Check with waste generation, collected, transported and treated manners and documents	In all construction sites	Observation and public consultation	Every week	CSC and EMC	In a contract with PMU
Disposal of solid wastes into canals, stream, other watercourses, agricultural field and public areas shall be prohibited;	Inspection of any dumping of solid wastes into canals, stream,	In all construction sites	Observation and public consultation	Every week	CSC and EMC	In a contract with PMU

Mitigation Measure	Monitoring parameters	Location	Method	Frequency	Responsibility	Cost
	other watercourses, agricultural field and public areas					
Burning of construction and domestic wastes shall be prohibited;	Check with any Burning of wastes	In all construction sites	Observation and public consultation	Every week	CSC and EMC	In a contract with PMU
Toxic waste, if any, need to be collected, transported and treated according to Circular No. 12/2011-BTNMT dated on 14/04/2011 of MONRE	Status of hazardous waste collected, transported and treated	In all construction sites	Observation and document inspection	Every week	CSC and EMC	In a contract with PMU
Before construction is completed, the contractor will move all construction wastes and unused materials from the site;	All construction sites,	In all construction sites	Observation and public consultation	Every week	CSC and EMC	In a contract with PMU
Providing environmental protection measures at the soil disposal location in the Hoa Phu borrow pit include leveling, temporary drainage during rainy time, boundary edge provision, plantation and environmental recovery.	Check with mitigation measure performance at the disposal location	Hoa Phu commune borrow pit	Observation and local people interview	Once when construction activities started	CSC and EMC	In a contract with PMU
Water quality impacts						
Worksite, camps, material storage areas and load/unload construction material/waste activities must be located far from watercourse to ensure that materials will not be disposed into water, such as: - Ong Giam Pond - Ea Cam, Ea Nao and Ea Mleo streams	Check with the location of worksites, load construction material areas at the worksites	In all construction sites	Observation and interview worker	Every week	CSC and EMC	In a contract with PMU
Excavation activities of drain items must be scheduled to avoid rainy to reduce suspended maters in runoff	Construction schedules and	In all constructi	Review Document	Every week	CSC and EMC	In a contract with PMU

Mitigation Measure	Monitoring parameters	Location	Method	Frequency	Responsibility	Cost
water entering the surrounding water bodies;	performance of contractors during rainy times	on sites	and interview worker			
Provide adequate facilities in the site including latrines, holding areas and garbage cans. Waste from latrines will be collected and treated properly through an economic contract with local environmental co-operatives/companies	latrines, holding areas, garbage cans at the sites and waste collection	In all constructi on sites	Observe and interview worker	Every week	CSC and EMC	In a contract with PMU
Cover material storage areas when raining is needed. Temporary storage of construction and domestic waste on the sites will be no longer than 24 hours.	Temporary storage of waste on the sites, performance of contractors during rainy times	In all constructi on sites	Observe and interview worker	Every week	CSC and EMC	In a contract with PMU
The placement of washing instruments/vehicles next to the water bodies, existing canals (identified in Water quality impact section) will not allowed avoiding the leaching of waste, sludge, soil and oil contaminated water and maintenance activities will be banned on the sites in all construction drains;	Installation place and the operation of washing instruments/vehicl es	In all constructi on sites	Observe and interview worker	Every week	CSC and EMC	In a contract with PMU
Equipping the dustbins and mobility septic tanks to work sites (it is proposed that there will be 4 dustbins and 2 mobility septic tanks provided at each construction site)	Number of dustbins and mobility septic tanks at work site	In all constructi on sites	Observation and public consultation	Every week	CSC and EMC	In a contract with PMU
Agricultural land impacts						
Materials of stones and sand are also temporarily stored on a nylon canvas to prevent them from being scattered into paddy fields along the proposed drainage canals/culverts;	Scattering of material, waste in the surrounding area	In all constructi on sites	Observation and interview local people	Every week	CSC and EMC	In a contract with PMU

Mitigation Measure	Monitoring parameters	Location	Method	Frequency	Responsibility	Cost
Providing the temporary drainage canals during construction phases if any interventions will be made on these canals to ensure the water flows on all cultivation areas	Effect on drainage canals, movement of flow Temporary canal provision	In all construction sites	Observation and worker interview, public consultation	Weekly	CSC and EMC	In a contract with PMU
Appropriate management of water pollution sources from construction activities to ensure that the construction will not pollute water and soil on all cultivation areas	Waste water management manners	In all construction sites	Observation and worker interview, public consultation	Weekly	CSC and EMC	In a contract with PMU
Reinstate road surface and fix up damages caused to irrigation canals, water supply/drainage canals	Reinstate of affected road side facilities and irrigation/drainage canals	In all construction sites	Observation and interview local people	Monthly	CSC and EMC	In a contract with PMU
All activities of contractor only allow within the acquired land areas	Layout of site Activities of contractors Scattering of waste in the surrounding areas	In all construction sites	Observation and worker interview, public consultation	Weekly	CSC and EMC	In a contract with PMU
Cultural heritage impacts						
Where grave is found during construction, coordinate with local authorities to arrange for relocation and mapping the location of the grave before and after relocation;	Check any cases and performance of contractors	In all construction sites	Observation and public consultation and document review	Weekly	CSC and EMC	In a contract with PMU

Mitigation Measure	Monitoring parameters	Location	Method	Frequency	Responsibility	Cost
Halt construction activities, protect the site and inform construction supervision for guidance if artifacts are found at construction site.	Check any cases and performance of contractors	In all constructi on sites	Observation and public consultation and document review	Weekly	CSC and EMC	In a contract with PMU
Ensure not to cause any impact on environmental landscape, trees and any disturbance related to religious activities of locals (Tan Lap Cemetery, Daklak martyrs Cemetery);	Check performance of contractors	Tan Lap Cemetery, Daklak martyrs Cemetery) ;	Observation and public consultation	Weekly	CSC and EMC	In a contract with PMU
Traffic & road blocking						
Place sign boards at the main intersections of the route with other roads to direct traffic means to slow down its speed before approaching the route, such as: - Intersection with Nguyen Van Cu street at km 0+ 000 of the route; - Intersection with Hung Vuong road at km 0+559.74 of the route - T- Junction with Ong Giam pond side roads at km 1+ 287.44 and km 1+ 375 - Intersection with YNue road near the end of the route; - And several T- Junctions with village roads if necessary;	Status of sign boards and method to direct traffic means at the construction sites	In all constructi on sites and sensitive receptors	Observation and public consultation	Every week	CSC and EMC	In a contract with PMU
Inform the community about construction time and schedule through informal public consultation or any local people meetings and notice board;	Informing actions; understandings from local residents to the information	In all constructi on sites	Observation and public consultation	Every week	CSC and EMC	In a contract with PMU

Mitigation Measure	Monitoring parameters	Location	Method	Frequency	Responsibility	Cost
The Contractor must always maintain security fences for the construction sites which are close to residential areas and Highland Hospital, Sport School for the Talented and Youth Culture Center, if needed. The fences must define clearly the site boundaries	Available of fences and suitability of fence application	Sensitive receptors	Observation ,interview managers/students	Every week	CSC and EMC	In a contract with PMU
Install traffic poles/lines with flags/lights surrounding construction sites during entire working hours and nigh time.	Availabilities of traffic poles/lines with flags/lights surrounding sites	In all construction sites	Observation and public consultation	Every week	CSC and EMC	In a contract with PMU
Regulating the transport vehicle speed will not be over 20km when passing the route	Status of regulation and notices Speed of transport vehicles	In all construction sites	Observation and public consultation	Every week	CSC and EMC	In a contract with PMU
Provide safe pedestrian access especially those who lives closed to the road at positions differing heights of more than 1m from their houses to road.	Status of access roads at necessary places along the route	All construction sites	Observation and public consultation	Every week	CSC and EMC	In a contract with PMU
Store excavated materials without obstructing traffic flow & safe access by affected communities.	Status of storing materials/wastes at sites	In all construction sites	Observation and public consultation	Every week	CSC and EMC	In a contract with PMU
Parking of construction vehicles and equipment should be regulated	Status of parking at sites	In all construction sites	Observation and public consultation	Every week	CSC and EMC	In a contract with PMU
When 7 Block Bridge is being constructed, a signal board showing alternative ways has to be installed at the intersection of Nguyen Van Cu street;	Availability of sign board directing alternative ways if the route totally blocked	Nguyen Van Cu street, Vo Thi Sau street	Observation and public consultation	Every week	CSC and EMC	In a contract with PMU

Mitigation Measure	Monitoring parameters	Location	Method	Frequency	Responsibility	Cost
Access blocking						
At least one week prior to access blocking, notify the affected properties. Work together and agree with property owners and village authorities for the alternative access and parking areas	Informing actions; understandings from local residents to the information	In all construction sites	Observation and public consultation	Every week	CSC and EMC	In a contract with PMU
Provide safe access to blocked properties for 82 households living very closed to the road;	Availability of access road to blocked properties	In all construction sites	Observation and public consultation	Every week	CSC and EMC	In a contract with PMU
Localized flooding and insanitation condition						
Setting up appropriate construction schedule at the site to avoid rainy season, especially for excavation activities;	Construction schedule in comparison with rainy season in the area	In all construction sites	Document review and observation	Every week	CSC and EMC	In a contract with PMU
Provision supplemental temporary drainage plans in the construction site to ensure the quickly respond in case of heavy rain, other unforeseen drainage issues and avoid obstructing water in surrounding areas and construction sites;	Supplemental temporary drainage plans preparing and implementing	In all construction sites	Document review and observation	Once before construction start	CSC and EMC	In a contract with PMU
Providing the temporary irrigation canals or drainage canals during construction phases if any interventions will be made on these canals to ensure the water flows;	Intervention actions on existing canals Availability of temporary irrigation canals	In all construction sites	Document review and observation	Once before construction start	CSC and EMC	In a contract with PMU
Supplemental temporary drainage plans must be revised and approved by DAKURENCO, and	Supplemental	In all	Document	Every week	CSC and	In a contract

Mitigation Measure	Monitoring parameters	Location	Method	Frequency	Responsibility	Cost
Construction Supervision before construction works started.	temporary drainage plans preparing and implementing	constructi on sites	review and observation		EMC	with PMU
Damage to utilities, and service interruptions						
Collaborate with relevant competent agencies to investigate the site and set up an action plan to avoid any service interruption if possible, if not avoidable, time of interruption is the shortest and locals are informed;	Availability of records on results of investigating public services near the route and implementing plan	In all constructi on sites	Document review, observation and public consultation	Every week	CSC and EMC	In a contract with PMU
All public facilities should be fully compensated as its origin after completion of construction works;	Status of compensating damages or repairs and restorations	In all constructi on sites	Document review, observation and public consultation	Every week	CSC and EMC	In a contract with PMU
Compensate for repairing any damages caused by construction;	Status of damages by chance and responding to the damage	In all constructi on sites	Document review, observation and public consultation	Every week	CSC and EMC	In a contract with PMU
Record the status of the existing houses, properties, roads and canals before construction and make proper compensation for the damages if any.	Records of status of houses and its related properties	In all constructi on sites	Document review and observation	Every week	CSC and EMC	In a contract with PMU
Any public utilities which used by contractors need to obtain approval from local authorities.	Approval documents	In all constructi on sites	Document review and observation	Every week	CSC and EMC	In a contract with PMU

Mitigation Measure	Monitoring parameters	Location	Method	Frequency	Responsibility	Cost
Disruption of socio-economic activities						
Traders should be consulted to come up with the agreed mitigation measures to reduce the negative impacts on trading before construction	Informing actions; understandings from local residents to the information	In all construction sites	Observation and public consultation	Every week	CSC and EMC	In a contract with PMU
Gathering materials to sites without blocking access roads to trading shops;	Availability of access road to shops	In all construction sites	Observation and public consultation	Every week	CSC and EMC	In a contract with PMU
Community health and safety hazard						
Construction workers who are not local people must register temporary residents and obtain temporary residential certificate from local authority	Status of workers: Registration to local authorities and conflicts available in the areas between local residents and workers	In all construction sites	Observation and public consultation	Every week	CSC and EMC	In a contract with PMU
Use as many local workers as possible in order to reduce the migrant workers at sites;	Number of local workers at sites		Document review and observation	Every week	CSC and EMC	In a contract with PMU
Educate workers on appropriate behavior for interactions with local community and risks of communicable diseases	Understandings of workers on local cultures and behaviors; time of training held by construction contractor;	In all construction sites	Observation and public consultation	Every week	CSC and EMC	In a contract with PMU
Develop leaflets on propagandizing the ways of prevention and avoidance of the social diseases HIV/AIDS for both workers and host communities;	Availability of leaflets and method of		Document review and	4 weeks before	CSC and EMC	In a contract with PMU

Mitigation Measure	Monitoring parameters	Location	Method	Frequency	Responsibility	Cost
	information dissemination		observation	worker mobilization		
Contractor shall readily provide and maintain lights, protection fences, signboards and wardens where necessary as requested by the Engineer or local authorities.	Keep light on during the night time	In all construction sites	Observation and public consultation	Every week	CSC and EMC	In a contract with PMU
Excavated pond will be dewatered and fenced to reduce high risk for local peoples	Any excavated open ponds Performance of contractors	In all construction sites	Observation and public consultation	Weekly	CSC and EMC	In a contract with PMU
Construction materials shall be stored tidily at the required locations.	Management of materials and location of storage areas	In all construction sites	Observation and public consultation	Every week	CSC and EMC	In a contract with PMU
The local people shall not be allowed in high-risk areas (excavation sites and areas where heavy equipment is in operation);	Provision of any warning signals in the sites	In all construction sites	Observation and public consultation	Every week	CSC and EMC	In a contract with PMU
All construction activities generating dust/gas emissions, noise and vibration at sites adjacent to residential areas of Block 7, police collective houses of Tan Lap ward, residential areas of blocks of 2, 4, 6 and 7, Mduk village of Ea Tam ward; highland hospital, sport talent school, youth culture centre should be strictly controlled to ensure air ambient quality at site to be within the limits against QCVN 05/2013/BTNMT and noise not to exceed 55dBA at boundary of any residential area between 06h and 21h00 and 45 dBA between 21h00 and 06h00;	Status of samplings and experiment analysis on air quality; and technical measures on noise and vibration parameters at sites	near the residential areas and sensitive buildings	Check regular environmental effect monitoring reports;	Every three months	Environmental monitoring consultant	In a contract with PMU

Mitigation Measure	Monitoring parameters	Location	Method	Frequency	Responsibility	Cost
Workers' health & safety hazard						
Temporary worker camps at sites should be located at high and ventilated places with provided separate dustbins, hygienic toilets; avoiding places high potential of landslides and flash flooding.	Locations of worker's camps and availabilities of facilities	All constructi on sites	Observation and worker interview	Once before civil work starts	EMC	In a contract with PMU
Constructor need to work with DAKURENCO/PMU to establish labor safe regulations on the sites required by law and by good engineering practice, which include: electric safety, operating equipment -general safety requirements, general safety requirements	Safety measures Relevant standards Performance of contractors	In all constructi on sites	Observation and public consultation	Every week	CSC and EMC	In a contract with PMU
Workers shall be provided with appropriate personal protective equipment (PPE) such as safety shoes, hard hats, safety glasses, ear plugs, gloves, etc. at no cost to the employee..	Equipment available; percent of workers equipped with;	In all constructi on sites	Observation and worker interview	Every week	CSC and EMC	In a contract with PMU
A first aid kit will be provided at each construction site to ensure patients can receive first aid timely before transporting them to the medical station/hospital	Availability of first aid kit Accessibility of workers Any accident cases	In all constructi on sites	Observation and worker interview	Every week	CSC and EMC	In a contract with PMU
It is mandatory for workers to attend training courses on labor safety before they are recruited to work for the project;	Number, type and frequency of safety training Attendance of workers	In all constructi on sites	Observation and worker interview	Every week	CSC and EMC	In a contract with PMU
Supervise period on compliance to labor safe measures of workers at project sites	Availability of the facilities; requirement of local residents;	In all constructi on sites	Observation and worker interview	Every week	CSC and EMC	In a contract with PMU

Mitigation Measure	Monitoring parameters	Location	Method	Frequency	Responsibility	Cost
	dangerousness status					
Contractors ensure to provide safe drinking water to workers for daily uses.	Water source provided to the sites; water quality status	In all construction sites	Observation and worker interview	Every week	CSC and EMC	In a contract with PMU
Construction site shall be provided with toilet/sanitation facilities;	Sanitation manner/facilities available	In all construction sites	Observation and public consultation	Every week	CSC and EMC	In a contract with PMU
In case of finding UXO, immediately to inform competent agency for solving;	Number of findings UXO and process of solving the issues	In all construction sites	Observation and public consultation	Every week	CSC and EMC	In a contract with PMU
Using alcohol within working time both at camps and sites must be inhibited	Availability of labor regulation	In all construction sites	Observation and public consultation	Every week	CSC and EMC	In a contract with PMU
Environmental rehabilitation						
Before construction is completed, the contractor will move all construction wastes and unused materials from the sites to approved sites	Clearance activities	Worksites, and disposal location	Observation and public consultation	Once before hand over	CSC and EMC	In a contract with PMU
Ensure all construction items including traffic safety facilities/securities have entirely completed under supervision of competent agency prior to lifting up all barriers and allowing a normal traffic;	Availability of Traffic safety security	All construction road	Observation and check with competent agency	Once before hand over	CSC and EMC	In a contract with PMU
Operation phase						
Provide sufficient budget and technical capacity for operation, maintenance and repair.	Maintenance activities in all construction	In all construction sites	Observation and public consultation	Quarters	Environmental staffs of Operator Units	Operation cost

Mitigation Measure	Monitoring parameters	Location	Method	Frequency	Responsibility	Cost
	items					
After every seismic or extreme weather event, conduct engineering investigation of built structures & implement corrective measures immediately.	Maintenance activities in all construction items	In all constructi on sites	Observation and public consultation	After any event occurs	Environmental staffs of Operator Units	Operation cost

Table 10: *Monitoring of environmental impacts* [1]

Mitigation Measures	Monitoring parameters	Location	Method	Frequenc y	Responsibility	Cost
Pre-construction phase						
No need to implement monitoring except for land acquisition and resettlement monitoring. Monitoring requirements relate to resettlement is provided in Resettlement Action Plan of Subproject.						
Construction phase						
Monitoring of suspended dust and noxious fumes	TSP, NO_2, CO, SO_2 and meteorological indicators	At intersection with Nguyen Van Cu road At the gate of Sport School At intersection with Y Nue road	Take air sample for analysis and compare result with related Vietnam Standards QCVN 05:2013/BTNMT	Every quarter in 18 months	PMU/ Environmental Monitoring Consultant	As specified in Annex 2
Monitoring of noise	Leq, L50 and Lmax	As the same ambient air monitoring locations as above	Measure at site and compare results with relevant	Every quarter in 18 months	PMU/ Environmental Monitoring Consultant	As specified in Annex 2

[1] Environmental effects monitoring is conducted to estimate the impacts of the sub-project on ambient environmental conditions

Mitigation Measures	Monitoring parameters	Location	Method	Frequency	Responsibility	Cost
			standards (QCVN 26: 2010)			
Monitoring of vibration	Acceleration Speed Frequency	As the same ambient air monitoring locations as above	Measure at site and compare results with relevant standards (QCVN 27: 2010)	Every quarter in 18 months	PMU/ Environmental Monitoring Consultant	As specified in Annex 2
Surface water quality	pH, TSS, DO, COD, BOD 5,ammonium (NH 4) by N, nitrite, nitrate (NO 3 -), Phosphate, Floating oil Coliform	At Ea Cam stream (Coordinate VN2000: X= 1402863; Y=453603; At Ong Giam pond (Coordinate VN2000: X= 1401679; Y=453191); At Ea Mleo stream (Coordinate VN2000: X=1400 443 ; Y=449 529);	Take water sample for analysis and compare result with related Vietnam Standards (QCVN 08:2008/BTNMT)	Every quarter in 18 months	PMU/ Environmental Monitoring Consultant	As specified in Annex 2

Note: Monitoring requirements related to resettlement are provided in Resettlement Plan of Sub-project.

V. PUBLIC CONSULTATION PROCESS AND INFORMATION PUBLICATION

Activity	Participant	Expected Result	Schedule	Cost
Pre-construction phase				

Consult local managerial levels about conditions of construction sites	PMU/DAKURENCO local affected people, local authorities and relevant agencies	Information about the potential impacts on environment and proposed mitigation measures	During design updating period	Under these Sub-project, costs are covered in the survey cost
Construction phase				
Disseminate information to local community via public loudspeakers, announcements on newspapers	Community, PMU/DAKURENCO, local environmental officers, Contractors	Informing communities about construction activities, works schedules, potential negative impacts on environment, environmental management measures and how to use the community grievance line	During the construction phase	Covered by the counterpart fund (PMU/DAKURENCO is responsible for payment). Estimated costs for four times of publication through louder speakers and in the newspapers is: VND 24.000.000
Community redress mechanism is established by the PMU/DAKURENCO.	Community, PMU/DAKURENCO, Contractors	PMU/DAKURENCO and Contractors shall have to reply to all complaints, questions or concerns of local communities, faculties and students about the works.	During the construction phase	

VI. INSTITUTIONAL STRENGTHENING AND TRAINING

A. Activities during construction phase

33. Experiences in other projects in Vietnam indicate that appointment of an Environmental Staff (ES) whose role is to monitor and coordinate environmental management activities with the Project activities would be beneficial.

34. Environmental staff should be assigned by the PMU/DAKURENCO to be responsible for co-ordination of environmental activities of all components of the subproject. It is therefore proposed that such a position should be mobilized at the PMU/DAKURENCO. The main activities of this Environmental Specialist would be as follows:

    (i) To ensure that the PMU/DAKURENCO are in compliance with the guidelines included in the Sub-projects' Environmental Management Plans

    (ii) To ensure that all the involved parties will prepare and submit environmental monitoring reports to PMU/DAKURENCO. These environmental reports shall be maintained and consolidated for submission to ADB and other authorities on request.

    (iii) To act as the liaison between DONRE and other governmental authorities in terms of environmental issues

    (iv) To ensure that all environmental considerations will be the PMU/DAKURENCO's fully understand their roles in integrating environmental concerns into procurement processes.

35. The Environmental Staff shall be trained with environmental qualifications and having experience in the environmental sector. Dependent on his/her skills, the assigned ES can be further trained by attending external training events. Expenses for these training activities are taken from the overall environmental management budget allocated for the Sub-project. An on-the-job training will be provided to the ES by the international and national Environmental Specialists at the initial implementation stage.

B. Activities during operational phase

36. Building of suitable capacities for Owners of infrastructure works is very important to continuously act environmental management during operation phase. However, all these items under this civil package are small scale and with lower environmental sensitivity, environmental issues can be implemented by the existing staff.

VII. RESPONSIBILITIES AND AUTHORITIES FOR IMPLEMENTATION OF MITIGATION MEASURES AND MONITORING REQUIREMENTS

Agency	Responsibilities for implementation of environmental management
PMU/DAKURENCO	Overall responsibility for EMP implementation during the pre-construction and construction phases; Ensure that contract documents include environmental requirements; Ensure that sufficient funds are available in project budget for EMP implementation; Undertake inspections and monitoring of environmental issues during construction phase; Assist Contractors in EMP implementation; Make environmental report to summarize sub-project activities as required; Allocate adequate resources for environmental requirements; Periodical reports send to ADB as well as DaKLak DONRE;
Environmental Monitoring Consultant	Assist PMU/DAKURENCO in grafting: (i) environmental mitigation measures in the contract with Construction Contractor; (ii) environmental compliance criteria in the contract with Construction Supervision Consultant (CSC) to ensure Contractor and CSC's responsibility and their participation in the Environmental Monitoring System. Periodical implementation of compliance monitoring to CSC and Construction Contractor by checking documentation and field site survey;
Design consultant	Ensure that all designs and contract documents comply requirements under EMP; Ensure that construction supervision activities are incorporated with environmental issues;
Construction Supervision Consultant	Periodical implementation of onsite compliance monitoring to Construction Contractor; Periodically complete snapshot reports on site EMP and send to Environmental Monitoring Consultant as well as PMU/DAKURENCO, giving proposals for improvement.
Construction contractor	Prepare detailed Site EMP (SEMP) to meet general requirements in EMP and train workers in environmental issues. Fulfill assigned tasks under the SEMP and other issues related to EMP of the Sub-component. If the Contractors find that mitigation measures in SEMP have been ineffectively implemented, they should recommend new or improved mitigation measures. Allocate adequate resources to meet the requirements and obligations of Sub-component's EMP. The Site EMP must be approved by the Monitoring Engineer and PMU/DAKURENCO's environmental team before construction commencement.
DakLak DONRE	Provide consultancy service and inform the sub-project about any

Agency	Responsibilities for implementation of environmental management
	violation related to environmental management and protection policy of Vietnam, and provide technical support as required during Sub-project implementation.
Works Ownership and Operation Unit	Be responsible for environmental activities in operation phase including EMP implementation during operation Undertake inspections and monitoring of environmental issues during operation
Buon Ma Thuot city Level Environment Staff[2]	Provide consultants and support as requested during the process of sub-project implementation. Implement monitoring and reporting as internal requirements.

VIII. MECHANISM OF INCOMPLIANCE REDRESS

37. A compliance framework, based on the environmental requirements established by the EMP and Environmental Specifications included in bidding documents, will be strictly enforced by Supervision engineers. The minor infringements will be identified as an incident which causes temporary but reversible damage, where the contractor will be given a reasonable period of time to remediate the problem and to restore the environment. If restoration is done satisfactorily during this period, no further actions will be taken. If it is not done during this period, the PMU/DAKURENCO will immediately arrange for another contractor to do the restoration, and deduct the cost from the offending contractor's next payment. The major infringements will be identified as an incident where there is long-term or irreversible damage, there will be a financial penalty in addition to the cost for restoration activities. To minimize the damage, the restoration activities will be implemented without delay.

38. The compliance framework will be applied as follows:

- The CSC will identify or be notified of an infringement (community member, local government)
- The CSC in consultation with the EMC will assess whether it is a minor or major infringement.
- For minor infringements:
    - The EMC will establish the required mitigation measures, and the time, which is a maximum of five days to remedy the situation.
    - The EMC will review the recommendation and confirm (i) the level of infringement (minor/major); (ii) the mitigation measures; and (iii) the mitigation time. If they do not agree, they will work with the PMU/DAKURENCO to reach mutually acceptable recommendations.
    - The Contractor will be informed of the infringement, the required mitigation measures, and time for resolution.
    - The Contractor shall remedy the infringement in accordance with the recommendations within the agreed time.
    - The EMC shall confirm the infringement is satisfactory remedied in the time.
    - If the infringement is not satisfactorily remedied in the time, the CSC shall inform the EMC and the PMU/DAKURENCO. The PMU/DAKURENCO shall immediately arrange for a separate contractor to undertake the necessary

[2] Environmental Protection Law and regulations related to enhance roles of District level by taking part in verifying documents of "Commitment to environmental protection" and continuously monitor environmental aspects.

works and the cost of this shall be deducted from the next payment to the offending contractor.

- For major infringements:
  - The CSC shall immediately inform the PMU/DAKURENCO and the EMC of the incident
  - The PMU/DAKURENCO shall inform the appropriate provincial authorities if appropriate
  - The PMU/DAKURENCO, in consultation with the CSC, EMC and other provincial authorities as appropriate, shall agree upon mitigation and clean up measures to be undertaken immediately by the contractor or by specialists to be procured at the contractor's expense. To minimize the environmental impacts the restoration activities should be completed within ten days.
  - The Project Office shall apply a financial penalty, not to exceed 1% of the contract cost, for each major infringement, in addition to any costs associated with the infringement not borne by the contractor.

IX. RESPONSIBILITIES FOR REPORTING AND REVIEW

Subproject phases	**Type of report**	**Frequency**	**Responsibility**	**Submitted to whom**
Pre-construction phase	No report is required.			
Construction phase	Site Environmental Performance Report indicating the compliance with Site EMP (Refer to Annex 1 for content)	Quarterly	Civil Works contractor	PMU/ DAKURENCO
	EMP Compliance Report indicating the compliance with sub-component's EMP (Refer to Annex 1 for content)	Quarterly during construction time depending on construction duration	EMC	PMU/ DAKURENCO
	The Sub-component's Environmental Report describing overall sub-component environmental performance and EMP compliance (Refer to Annex 1 for content)	Twice a year during construction time and the completion of work construction	PMU/ DAKURENCO	ADB, DONRE,

Subproject phases	Type of report	Frequency	Responsibility	Submitted to whom
Operation phase	EMP Compliance Report: Work operation must be in compliance with sub-component's EMP commitments.	Once a year for the first two years of operation. Ongoing frequency is to be determined basing on evaluation results after 2 years.	Work management and operation unit	ADB, DONRE

X. ENVIRONMENTALLY RESPONSIBLE PROCUREMENT PLAN

A. Procurement of Equipment for EMP Implementation

39. No purchase of equipment for EMP implementation is needed.

B. Integration of Environmental Considerations into the Procurement/Bidding Process

40. Procurement for civil works and equipment and vehicle for the Sub-component will be carried out in accordance with Procurement Guidelines (2007). A combination of International Competitive Bidding, National Competitive Bidding, Shopping and Direct Purchasing/ Contracting methods will be implemented depending on costs and work items/ equipment being procured. The method for ensuring integration of environmental considerations into each of these procurement processes are described below.

International Competitive Bidding / National Competitive Bidding [3]		**Shopping Procedure [4]**	
Steps in Procurement Process [5]	***Integration of Environmental Considerations***	***Steps in Procurement Process***	***Integration of Environmental Considerations***
1. Draft bidding documents prepared by PMU/ DAKURENCO	*PMU/DAKURENCO incorporates relevant environmental requirements from EMP and standard environmental bidding clauses into draft bidding documents.*	1. Draft submission requirements of quotations as well as specifications prepared for utilities/ goods supply.	*PMU/DAKURENCO incorporates relevant environmental requirements from EMP and standard environmental bidding clauses into draft requirement of quotation submission.*
2. Draft bidding	*ADB verifies that environmental*	2. Draft requirement	*ADB verifies that environmental*

[3] Competitive bidding applied for high cost items.
[4] Shopping is a procurement method based on comparison of price quotations from several suppliers or contractors. It is generally used for lower cost items.
[5] Above procurement method applied for the first NCB only, it is not necessary for ADB submission with the following NCB.

International Competitive Bidding / National Competitive Bidding [3]		Shopping Procedure [4]	
Steps in Procurement Process [5]	***Integration of Environmental Considerations***	***Steps in Procurement Process***	***Integration of Environmental Considerations***
documents submitted to ADB/PPC	*requirements adequately and appropriately incorporated into bidding documents.*	submitted to ADB/Provincial People's Committee, cc.	*requirements adequately and appropriately incorporated.*
3. PMU/ DAKURENCO issues bidding documents, receives and evaluates bids. PMU prepares bid evaluation report and submit to ADB/ PPC.	*PMU's bid evaluation process includes consideration of environmental criteria*	3. Quotations are submitted and evaluated. Bid evaluation report must be submitted to ADB.	*PMU's bid evaluation process includes consideration of environmental criteria*
4. ADB issues NOL	*ADB verifies that environmental requirements have been considered in evaluation process*	4. ADB issues NOL	*ADB verifies that environmental requirements have been considered in evaluation process*
5. Contract awarded	*PMU prepares draft contract that contains relevant environmental requirements/specifications*	5. Contract awarded	*PMU prepares draft contract that contains relevant environmental requirements/specifications*

XI. PRELIMINARY COST ESTIMATES FOR ENVIRONMENTAL MONITORING

4. This section provides cost estimate for EMP implementation, including costs for mitigation measures, environmental monitoring. Costs for implementation of other project components (e.g. resettlement monitoring) will be not presented here.

A. During the construction phase

Mitigation implementation

5. All mitigation measures that belong to the Contractor's responsibilities shall be implemented by the Contractor. The costs are included in the contract between Construction Contractor and PMU/DAKURENCO.

Monitoring environment quality (see Annex 2 for details)

6. The Employer's representative (PMU/DAKURENCO) shall bear all costs for environmental monitoring during the construction phase, including site survey, sample taking and analysis, and preparing reports. The fund for this task is covered by the sub-project loan. If the PMU do not have sufficient capacity of environmental monitoring, the PMU can assign the full or partial task under a lump sum contract for monitoring activities called Environmental Monitoring Consultant.

Community consultation and information publication

7. The PMU bear costs for these activities and the funds are covered by the project loan.

B. During the operation phase

8. During the operation and maintenance phase, the works operation and management unit will provide budget for implementing mitigation measures. Therefore, no cost estimate for environmental monitoring during the operation and maintenance phase is not included in this EMP.

Summary of expenditures for EMP implementation:

9. Costs for implementation of the sub-projects EMP include:

(i) Costs for implementation of mitigation measures during the construction phase will be the responsibility of the Contractor. These costs are included in the contract between Construction Contractor and the PMU/DAKURENCO.

(ii) Costs for implementation of the environmental supervision and monitoring program during the construction phase include costs of labor, sample taking and analysis, report preparation, and other expenses: VND 327,851,920 (including public consultation cost, see Annex 2 for details)

(iii) Costs for community consultation and information publication: pre-construction phase has implemented and included in the cost of EPC report; cost for community consultation and information in the construction phase is estimated at VND 24,000,000 and will be covered in the direct cost of EMP.

XII. APPENDIX

A. Appendix 1: Formats for environmental reporting

1. SITE ENVIRONMENTAL PERFORMANCE REPORT (SEPP)

Introduction and Project Review

Name of sub-project:	
Location of sub-project:	
Reporting period:	
Last report date:	
Key sub-project activities since last report:	

Summary of Compliance with Site EMP Requirements

Site EMP Requirements	*Compliance Attained (Yes, No, Partial*	*Comments on Reasons for Non-Compliance*	*Issues for Further Action*
1.			
2.			
3.			

Environmental monitoring results

Monitoring Parameters	*Comparison to Relevant Standards/ Criteria*	*Comments on Incidences of Exceeded*	*Issues for Further Action*
1.			
2.			
3.			

Issues for further action

Issue	*Cause*	*Required Action*	*Responsibility*	*Timing*	*Resolution*
Old issues from previous reports					
1.					
2.					
New issues from this Report					
1.					
2.					

Appendix

1. Correspondences
2. Monitoring results
3. Ect.

2. EMP COMPLIANCE REPORT – CONSTRUCTION

Introduction and Project Review

Name of sub-project:	
Location of sub-project:	
Reporting period:	
Last report date:	
Key sub-project activities since last report:	

Summary of Contractor's site environmental performance report

Report No. and Date	*Key issues Raised in Report*	*Comments on How Issues are addressed*	*Issues for Further Action*
1.			
2.			
3.			

Compliance with sub-component EMP

Sub-Project EMP Requirements	*Compliance Attained (Yes, No, Partial)*	*Comments on Reasons for Non-Compliance*	*Issues for Further Action*
1.			
2.			
3.			

Environmental inspection and monitoring results

Monitoring Parameters	*Comparison to Relevant Standards/ Criteria*	*Comments on Incidences of Exceeded*	*Issues for Further Action*
1.			
2.			
3.			

Issues for further action

Issue	*Cause*	*Required Action*	*Responsibility*	*Timing*	*Resolution*
Old issues from previous reports					
1.					
2.					
New issues from this Report					
1.					
2.					

Appendix
1. Correspondences
2. Monitoring results
3. Ect.

3. SUB-PROJECT ENVIRONMENTAL REPORT – CONSTRUCTION COMPLETION

Introduction and Project Review

Name of sub-project:	
Location of sub-project:	
Reporting period:	
Last report date:	
Key sub-project activities since last report:	

Summary of Compliance EMP report

Report No. and Date	*Key Issues Raised in Report*	*Comments on How Issues are addressed*	*Issues for Further Action*
1.			
2.			
3.			

Issues for further action

Issue	*Cause*	*Required Action*	*Responsibility*	*Timing*	*Resolution*
Old issues from previous reports					
1.					
2.					
New issues from this Report					
1.					
2.					

Summary of sub-project environmental performance and recommendations/lesions learned
1._____
2._____
3._____

Appendix
1. Correspondences
2. Monitoring results
3. Ect.

4. EMP COMPLIANCE REPORT – OPERATION

Introduction and Project Review

Name of sub-project:	
Location of sub-project:	
Reporting period:	
Last report date:	
Key sub-project activities since last report:	

Compliance with sub-project EMP

Sub-project EMP Requirements	*Compliance Attained (Yes, No, Partial*	*Comments on Reasons for Non-Compliance*	*Issues for Further Action*
1.			
2.			
3.			

Environmental inspection and monitoring results

Monitoring Parameters	*Comparison to Relevant Standards/ Criteria*	*Comments on Incidences of Exceeded*	*Issues for Further Action*
1.			
2.			
3.			

Issues for further action

Issue	*Cause*	*Required Action*	*Responsibility*	*Timing*	*Resolution*
Old issues from previous reports					
1.					
2.					
New issues from this Report					
1.					
2.					

Appendix

1. Correspondences
2. Monitoring results
3. Ect.

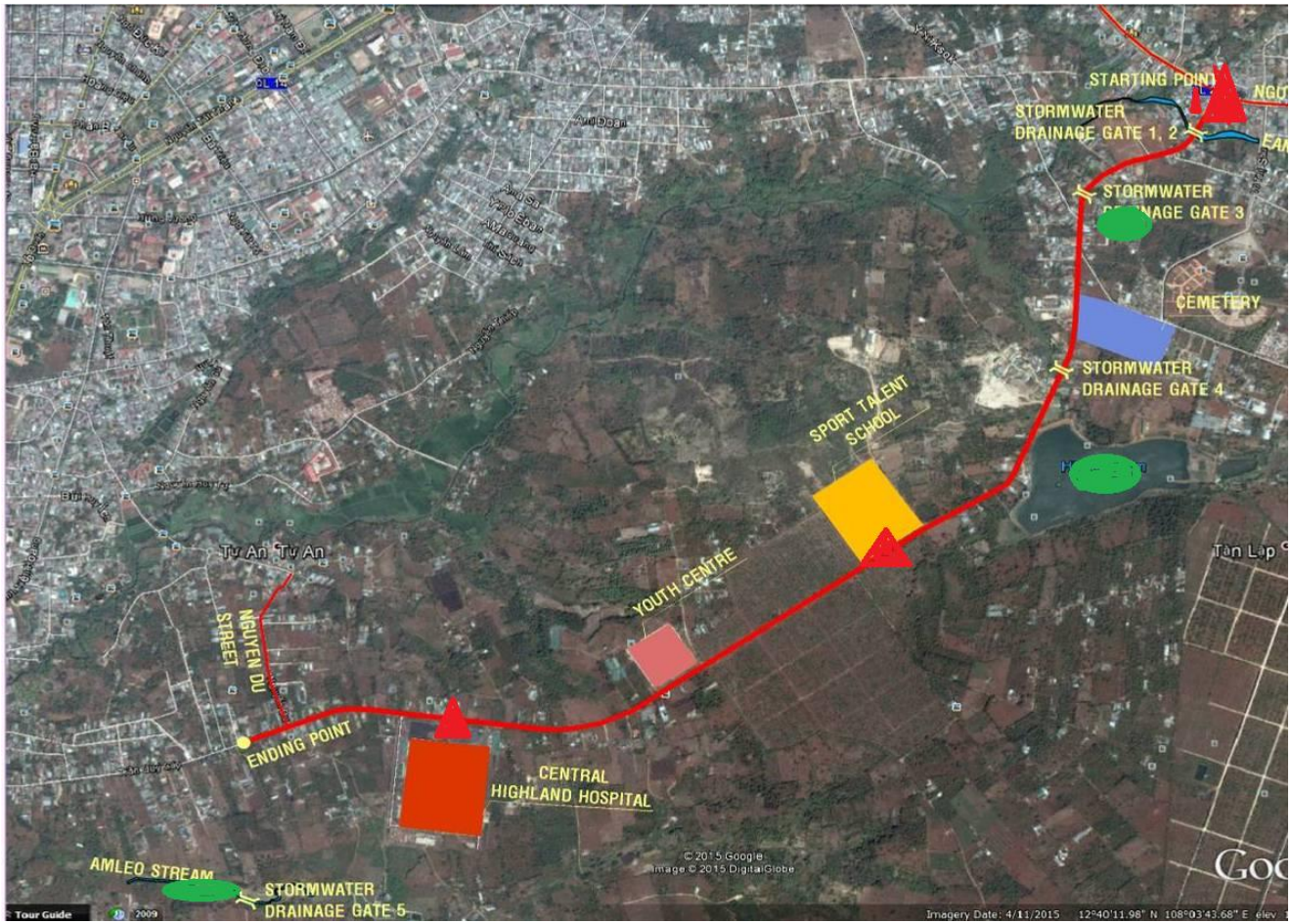
B. Appendix 2: Cost estimation for environmental supervision monitoring – civil work package BMT2

A	Cost estimation for a monitoring time						
A1	**Analysis in Laboratory**	**Criteria**	**Unit price**	**No. of location**	**No of sample**	**Amount**	**Reference**
	Air quality	TSP	700,000	3	6	12600000	Circular *No 08/2014/TT-BTC dated 15/01/2014*
		CO	140,000	3	6	2520000	
		NO2	140,000	3	6	2520000	
		SO2	140,000	3	6	2520000	
		Air temperature (^{0}C)	56,000	3	6	1008000	
		Moisture	56,000	3	6	1008000	
		Wind velocity, wind direction	56,000	3	6	1008000	
		Sub Total			6	0	
	Noise	Leq	73,000	3	6	1314000	
		L50	224,000	3	6	4032000	
		Lmax	420,000	3	6	7560000	
		Subtotal			6	0	
	Vibration	Acceleration	40,000	3	6	720000	
		Speed	720,000	3	6	12960000	
		Frequency	720,000	3	6	12960000	
		Subtotal			6	0	
	Water quality	Temperature	4,000	3	6	72000	
		pH	56,000	3	6	1008000	
		TSS	80,000	3	6	1440000	

		DO	104,000	3	6	1872000	
		COD	120,000	3	6	2160000	
		BOD_5	200,000	3	6	3600000	
		Amoni (NH4) to N	150,000	3	6	2700000	
		Clorua (Cl-)	70,000	3	6	1260000	
		Nitrit (NO2-)	100,000	3	6	1800000	
		Nitrat (NO3-)	140,000	3	6	2520000	
		Floating oil	400,000	3	6	7200000	
		E.Coli	112,000	3	6	2016000	
		Coliform	103,000	3	6	1854000	
		Subtotal				***92,232,000***	
		Total A1					
A2		**Item**	**Price/day**	**days**	**person**	**amount**	
	Equipment Rental/Quick analysis	Take sample for water surface and measure at site	500,000	3	2	3000000	Estimated based on market price
		Take air sample/ measure noise + microclimate	1,000,000	3	2	6000000	
		Other equipment	500,000	3	2	3000000	
		Total A2				**12000000**	
	Total A					**104,232,000**	
	Total cost for environmental monitoring (including 8 times)						
B		**Item**	**Price**	**Unit**	**No. Month**	**amount**	
	Wage for environmental	Team leader	18,000,000	month	2	36000000	219/2009/TT-BTC

	specialists	Consultants	12,000,000	month	3	36000000	
		Management cost	50% of net consultant wage			36000000	957/QĐ-BXD
		Travel cost	lump sum			30,000,000	
	Total B					138,000,000	
C	**Public consultant**					5,000,000	
D	**Contact and stationery cost**					5,000,000	
E	**Translating, Printing and copy**		**Price**	**Unit**	**No**		
			3,120,000	Reports	6	18720000	
F	**TOTAL**					**270,952,000**	
G	**Contingency cost (10% of (total cost and management cost**		**= F x 0.1**			**27,095,200**	
H	**Total cost before VAT**		**= F+G**			**298,047,200**	
I	**VAT (10% of cost before VAT)**		**=Hx0.1**			**29,804,720**	
	TOTAL		**= H+I**			**327,851,920**	
	TOTAL IN USD					**15,018.441**	

C. Appendix 3: Environmental quality monitoring locations



Air sampling position

Water sampling position