PEOPLE'S COMMITTEE OF HO CHI MINH CITY
URBAN-CIVIL WORKS CONSTRUCTION INVESTMENT MANAGEMENT AUTHORITY OF HO CHI MINH CITY

ENVIRONMENTAL MANAGEMENT PLAN

HO CHI MINH CITY GREEN TRANSPORT DEVELOPMENT PROJECT

(Final)



CENTRE FOR ASSISTING COMMUNITY SUSTAINABLE DEVELOPMENT

TRANSPORT ENGINEERING DESIGN INC

HO CHI MINH CITY, JANUARY 2015

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PROJECT OWNER
URBAN-CIVIL WORKS CONSTRUCTION INVESTMENT MANAGEMENT AUTHORITY OF HO CHI MINH CITY

ON BEHALF OF THE ASSOCIATION
CENTRE FOR ASSISTING COMMUNITY SUSTAINABLE DEVELOPMENT
DIRECTOR

Ho Ngoc Hai

HO CHI MINH CITY, JANUARY 2015

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ABBREVIATIONS

BRT	Bus Rapid Transit
CSC	Construction Supervision Consultant
CNG	Compressed natural gas
DONRE	Department of Natural Resources and Environment
MONRE	Ministry of Natural Resource and Environment
EIA	Environmental Impact Assessment
ECO	Environmental Control Officer of GTP PMU
EMP	Environmental Management Plan
ES	Environmental Supervisor
HH	Household
HCMC-GTP	Ho Chi Minh City Green Transport Development Project
HSET	Health; Safety; Environment Transportation
IEMC	Independent Environmental Monitoring Consultant
MRT	Metropolitan Rapid Transit
OP	Operational Policy
O&M	Operation and Maintenance
GTP PMU	HCM City Green Transport Project Management Unit
SEMP	Site Environmental Management Plans
SEO	Safety and Environment Officer
UBND	People's Committee
UCCI	Urban-civil Works Construction Investment Management Authority of Ho Chi Minh City
WB	World Bank

I. INTRODUCTION

"Ho Chi Minh Green Transport Development Project" hereinafter referred to as the "Project" funded by the World Bank (WB) will be implemented in twenty wards/communes of the seven districts of Ho Chi Minh City. The Project's activities are the construction of the BRT line on the Vo Van Kiet – Mai Chi Tho Boulevard, including the construction activities of the infrastructure for operating the BRT line; supplementary construction of the technical infrastructure such as BRT stations, terminals, parks for bicycles and motorbikes; supplementary construction of the transportation infrastructure to facilitate access to the BRT services such as the footbridges, sidewalk improvement; and public spaces such as parks, squares and landscape. These activities may cause negative impacts on the local environment and communities during pre-construction, construction, and operation phases.

An environmental screening was undertaken in line with the World Bank safeguards policy requirements and it showed that the World Bank's policies on Environmental Assessment (OP 4.01) and Involuntary Resettlement (OP 4.12) would be triggered for the Project. The implementation of the Project would mainly cause land acquisition, increase dust generation, air pollution, domestic wastes, and traffic safety. However, these impacts are assessed to be small to moderate, temporary, localized, and can be mitigated with available mitigation measures. Therefore, the Project is classified as B environmental category and eligible for funding by the World Bank.

According to Vietnam's environmental impact assessment regulation, the Project is subject to prepare an EIA for submission to the Ho Chi Minh City Department of Natural Resource and Environment for appraisal and approval. The EIA report was approved by Ho Chi Minh City Department of Natural Resource under the Decision No. 1524/QD-TNMT-CCBVMT on December 30, 2014. This EMP is a part of the Project's EIA report, which is one of the important documents to meet the requirements of OP 4.01 of the World Bank

The main purpose of the EMP is to ensure that the mitigation measures to minimize the impacts proposed in the EIA of the project are implemented. The main contents of the EMP include a summary of the impacts of the project, the mitigation measures, monitoring and implementation during the construction and operation stages of the project to eliminate, compensate, or minimize to the extent possible the negative impacts on the environment and society. The EMP also includes a monitoring program during the construction stage, the role of the relevant stakeholders, reporting procedures, capacity building, and implementation and budget.

The EMP will also assist the relevant stakeholders in managing the environmental issues of the Project: (a) The UCCI - to manage and implement the EMP; (b); Construction Supervision Consultants – to ensure that the EMP is properly implemented; (c) Independent Environmental Monitoring Consultant – Carry out periodical monitoring the effectiveness of EMP implementation by different stakeholders; and (d) Contractors – to develop and implement the project site-specific EMP implementation plan.

II. POLICY, REGULATION AND INSTITUTIONAL FRAMEWORKS

2.1. Government's Environmental Regulations

The following national laws and regulations are applied for the subproject:

Law

- The Law on Environmental Protection No. 55/2014/QH13 adopted by the Thirteenth National Assembly of Socialist Republic of Vietnam in the seventh session on June 23,

2014 coming into effect on January 1, 2015;

- The Law on Land No. 45/2013/QH13 adopted by the thirteenth National Assembly of Socialist Republic of Vietnam in the sixth session on November 29th, 2013 coming into effect on January 01st, 2014;
- The Law on fire prevention and fire fighting No. 27/2001/QH10 adopted by the tenth National Assembly of Socialist Republic of Vietnam in the ninth session on June 29th, 2001 coming into effect on October 04th, 2001;
- The Law on Biological Diversity No. 20/2008/QH12 adopted by the twelfth National Assembly of Socialist Republic of Vietnam in the fourth session on November 13th, 2008 coming into effect on July 01st, 2009;
- Law on Water Resources No. 17/2012/QH13 adopted by the thirteenth National Assembly of Socialist Republic of Vietnam in the third session on June 21st, 2012 coming into effect on January 01st, 2013;
- The Law No.10/2012/QH13 on Labour Code adopted by the thirteenth National Assembly of Socialist Republic of Vietnam in the third session on June 18th, 2012 coming into effect on May 01st, 2013;
- The Law on Construction No. 16/2003/QH11 adopted by the eleventh National Assembly of Socialist Republic of Vietnam in the fourth session on November 26th, 2003 coming into effect on July 01st, 2004;
- Law on inland waterway navigation No. 23/2004/QH11 adopted by the eleventh National Assembly of Socialist Republic of Vietnam in the fifth session on June 15, 2004 coming into effect on January 01st, 2005;
- The Law on Road Traffic No. 23/2008/QH12 adopted by the twelfth National Assembly of Socialist Republic of Vietnam in the fourth session on November 13th, 2008 coming into effect on July 01st, 2009;
- Law No. 38/2009/QH12 on amending and supplementing a number of articles of the Law concerning capital construction investment adopted by the twelfth National Assembly of Socialist Republic of Vietnam in the fifth session on June 19th, 2009 coming into effect on August 01st, 2009;

Decree

- Decree 29/2011/ND-CP dated on April 18, 2011 of the Government regulating on strategic environmental assessment, environmental impact assessment, environmental protection commitment;
- Decree No. 59/2007/ND-CP dated on April 09th, 2007 on Solid waste management issued by the Vietnam Government;
- Decree No. 113/2010/ND-CP providing for the determination of environmental damage issued by the Vietnam Government on December 03rd, 2010;
- Decree No. 117/2009/ND-CP dated on December 31, 2009 of the Government on the handling of law violations in the domain of environmental protection;
- Decree No. 201/2013/ND-CP dated on November 27, 2013, detailing the implementation a number of articles of the Law on Water Resources;
- Decree No.43/2014/ND-CP dated on May 15, 2014 of the Government guiding in detail

some articles of Land Law 2013;

- Decree No.44/2014/ND-CP dated on May 15, 2014 of the Government provides on method to determine land price; make adjust land price brackets, land price board; valuate specific land price and land price consultancy activities;
- Decree No. 47/2014/ND-CP dated on May 15, 2014 of the Government regulating compensation, support, resettlement when land is recovered by the State.

Circular

- Circular No. 26/2011/TT-BTNMT dated on July 18, 2011 detailing a number of articles of Decree No. 29/2011/ND-CP of April 18, 2011 of the Government on environmental assessment the strategic environmental impact assessment, environmental protection commitment;
- Circular No. 12/2011/TT-BTNMT dated on April 14, 2011 providing regulations on hazardous waste management;
- Circular No. 28/2011/TT-BTNMT dated on August 01, 2011 of Ministry of Natural Resources and Environment providing guidelines on technical process of surrounding air environment monitoring and noise;
- Circular No. 29/2011/TT-BTNMT dated on August 01, 2011 of Ministry of Natural Resources and Environment regulating on environment monitoring of the continental surface water;
- Circular No. 30/2011/TT-BTNMT dated on August 01, 2011 of Ministry of Natural Resources and Environment regulating on environment monitoring of the ground water;
- Circular No. 36/2014 / TT-BTNMT dated June 30, 2014, regulating method of valuation of land; construction, land price adjustment; specific land valuation and land valuation advisory;
- Circular No. 37/2014/TT-BTNMT dated on June 30, 2014 regulating compensation, assistance and resettlement when the State acquires land.

Decision

- Decision No. 3733/2002/QD-BYT dated on October 10, 2002 of the Ministry of Health promulgating 21 labour hygiene standards, 05 principles and 07 labour hygiene measurements;
- Decision No. 1956/2009/QD-TTg, dated November 17 2009, by the Prime Minister approving the Master Plan on vocational training for rural labours by 2020;
- Decision No. 35/2010/QD-UBND dated on May 28, 2014 regulating compensation, assistance and resettlement issued by HCMC People's Committee;
- Decision No. 52/2012/QD-TTg, dated on November 16 2012 on the support policies on employment and vocational training to farmers whose agricultural land has been recovered by the State;
- Decision No. 66/2012/QD-UBND dated on December 28, 2014 on the price of house and assets on land.

Environmental Standards and National Technical Regulations

- QCVN 06:2009/BTNMT: National technical regulation on some harmful substances in the

ambient air environment;

- QCVN 05:2013/BTNMT: National technical regulation on ambient air quality;
- QCVN26:2010/BTNMT, National technical regulation on noise;
- QCVN 27:2010/BTNMT: National technical regulation on vibration;
- QCVN 08:2008/BTNMT, National technical regulation on surface water quality;
- QCVN 09:2008/BTNMT, National technical regulation on ground water quality;
- QCVN 14:2008/BTNMT, National technical regulation on domestic water;
- QCVN 40:2011/BTNMT: National technical regulation on industrial wastewater;
- TCVN 6696:2009 – Solid wastes – Sanitary landfill – General requirements to the environmental protection;
- QCVN 07:2009 National Technical Regulation on Hazardous Waste Thresholds;
- QCVN 25:2009 – National Technical Regulation on Wastewater of the Solid Waste Landfill Sites;
- TCVN 6156:1996: Pressure vessels - Safety engineering requirements of erection, use, repair. Testing method
- TCVN 6292:1997: Gas cylinders - Refillable welded steel gas cylinders;
- TCVN 6294-1997: Gas cylinders – Welded carbon steel gas cylinders – Periodic inspection and testing ;
- TCVN 6295-1997: Gas cylinders - Seamless gas cylinders - Safety and performance criteria;
- TCVN 6008-2010: Pressure equipment - Welds - Technical requirements and testing methods;
- TCVN 7472-2005: Welding - Fusion - welded joints in steel, nickel, titanium and their alloys (beam welding excluded) - Quality levels.
- TCVN 7222:2002 – General environmental requirements for central domestic (municipal) wastewater treatment plants;
- QCXDVN 01:2008/BXD – Vietnam Building Code – Regional and Urban Planning and Rural Residential Planning;
- QCVN 07:2010/BXD Vietnam Building Code – Urban Engineering Infrastructures.

2.2. World Bank (WB) Safeguard Policies Apply to the Project

The environmental and social screening according to the criteria described in the Bank's policy on environmental assessment has been carried out, and the result shows that the WB policies on Environmental Assessment (OP 4.01) and Involuntary Resettlement (OP/BP 4.12) are triggered for this project. The project has also to comply with the WB's requirements on public consultation and Policy on Access to Information. The implementation of the policy on Involuntary Resettlement (OP/BP 4.12) is addressed in the Resettlement Policy Framework (RPF) and the Resettlement Plan (RP) of this project.

Environmental Assessment (OP/BP 4.01):

The overarching objective of this policy is to ensure that World Bank-financed projects are environmentally sound and sustainable, and to improve decision-making by promoting integration of environmental and social criteria into the project decision-making process. The project will have some potential negative socio-environmental impacts associated with the construction of the BRT infrastructure and other non-motorized transport infrastructure to facilitate access to the BRT services under Component 1 of the proposed project. Therefore, this policy is triggered.

Overall, the proposed project will bring about long-term environmental benefits and positive impacts to the lives of the people in Ho Chi Minh City, reduce traffic safety risks and emissions from private vehicles. The potential negative impacts of the civil works during construction are known including generation of noise, dust, solid waste, traffic and social disturbance, and at a moderate level. Increased noise level and traffic safety risks would be the main concerns during operation phase. As these negative impacts during construction are known, mostly localized and manageable, while the impacts during operation phase would be mostly address through design solutions and operational rules, the project has been classified as a category B project for Environment.

As required by OP 4.01 and the government EA regulation, the project has prepared an Environmental Impact Assessment (EIA) and an EMP that meet the Government's and the World Bank's safeguards requirements. By the project appraisal, the draft EIA and EMP were disclosed locally at the project sites and at the Bank's InfoShop in Washington DC on October 22, 2014 as required by OP 4.01 and the Bank's policy on access to information. The final project EIA and EMP were disclosed locally at the project sites on January 16, 2015, and at the Bank's InfoShop and the Vietnam Development Information Center on February 6, 2015.

Involuntary Resettlement (OP/BP 4.12)

The policy aims to avoid involuntary resettlement to the extent feasible, or to minimize and mitigate its adverse social and economic impacts. It promotes participation of displaced people in resettlement planning and implementation, and its key economic objective is to assist displaced persons in their efforts to improve or at least restore their incomes and standards of living after displacement. The project would be mainly utilizing land of an area recently acquired for infrastructure development. However, it is estimated that additional land acquisition may be required, which will be determined by the technical design during the project preparation. Therefore, this policy is triggered. As required by the policy, a Resettlement Policy Framework (RPF) and a Resettlement Action Plan (RAP) have been prepared for the project. By appraisal, the project has prepared and disclosed the final RPF and RAP locally at the project sites on January 16, 2015, and at the Bank's InfoShop in Washington DC on December 17, 2014.

World Bank Group Environmental, Health, and Safety Guidelines

World Bank-financed projects should also take into account the World Bank Group Environmental, Health, and Safety Guidelines[1] (known as the "EHS Guidelines"). The EHS Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice.

The EHS Guidelines contain the performance levels and measures that are normally acceptable to the World Bank Group and are generally considered to be achievable in new facilities at reasonable costs by existing technology. The environmental assessment process may recommend alternative (higher or lower) levels or measures, which, if acceptable to the

[1]The EHS Guidelines can be consulted at www.ifc.org/ifcext/enviro.nsf/Content/EnvironmentalGuidelines.

World Bank, become project- or site-specific requirements. This project should conform to these Guidelines.

III. PROJECT DESCRIPTION

3.1. Objectives of the Project

The BRT investment on VVK-MCT route is an important step of the direction for priority of public transport development, especially bus service in Ho Chi Minh City. The completed VVK-MCT BRT route will help to solve some basic problems of the city public transport.

General objectives:

- Contributing to improvement of service efficiency and development of public passenger transport system of the city:
  - + The HCMC-GTP contributes to restructuring the existing bus services of the city, coordinating with the metro network to form a mass, rapid transit system which play an important role to create good conditions for economic - social growth of HCMC.
  - + The BRT provides a safer, more convenient and effective public transport system combined with the land use plans and proposal aims of the metro lines; the BRT will attract more people to use the public transport systems at the first go-off on the VVK-MCT route and then the others and reduce the number of personal vehicles as well as traffic congestion in the city.
- Contributing to urban development, renovation, environmental protection and living quality enhancement for the city people:
  - + The operation of HCMC-GTP contributes to reorganizing the urban face along the line by applying the transport oriented planning solution to achieve the objective of rehabilitation of the urban area along the BRT.
  - + The use of compressed natural gas (CNG) bus contributes to solving exhaust gases from vehicles, especially motorcycles, which are the main causes of air and noise pollution in Ho Chi Minh City. Currently, the use of two-wheel vehicles is still popular. Personal vehicles continue to increase, with a rate of 6-7%. These traffic related factors generate a large amount of NO_2, CO_2 and hydrocarbons emissions.
  - + The Project creates favourable conditions to attract passengers to the BRT Line. Thus personal transportation will also decrease, suitable for carbon emissions reduction purpose of the city by enhancing methods in public transport services and reduce personal transport as well as develop sustainably.
  - + In addition, the project also creates good conditions for the city such as: the building of infrastructure can give an impulse to the country demand and development of some related industries; connection to functional areas, resident areas and remote areas in the city; improving operating effectiveness of the transport system; promoting economic development by rapid, convenient transport service; and enhancing investment environment.

Specific objectives:

- When completed, the HCMC-GTP shall contribute to providing in the city with a new form of public passenger transport along Vo Van Kiet – Mai Chi Tho corridor with shorter travel time, more convenient and safer service. Implementation of the BRT as well as the works along the route also contribute to urban renovation, environment protection and enhancing living quality of the people.

- Besides, the implementation of Component 2 shall contribute to fully completing the institutional framework, operating and managing model of the city public transport system; training for strengthening capacity of concerned agencies, and implementation of the studies to create premise to develop other BRT routes and contribute to the development of intelligent, integrated public transport systems for the entire city in the future.

3.2. Scope of the Project

The project includes the following components:

Component 1: Bus Rapid Transportation (BRT) corridor development

Constructing a BRT route on the Vo Van Kiet – Mai Chi Tho corridor (VVK-MCT) (with the length of about 23 km) and supporting infrastructures such as bus stations, terminals, depot and a modern management system. These include BRT vehicle investment and operation items, initially proposed to use compressed natural gases (CNG).

Component 2: Institutional strengthening

This component includes technical support and capacity building for state management staff and public transport system operation staff; integrated planning for land use and transport planning, intelligent integrated ticketing system, and traffic control centre.

3.3. Project Location

Trunk line on the Vo Van Kiet and Mai Chi Tho Boulevard

- Start point : An Lac Roundabout (Tan Binh District)
- End point: Rach Chiec Terminal
- Length of route : 23 km.

Facilities works on the route

- 28 BRT stations along the route: are located in the median of the main road. Rach Chiec Terminal is located at the Rach Chiec Sport Zone;
- Technical Facility Thu Thiem;
- Rach Chiec Terminal is located at the Rach Chiec Sport Zone;
- An Lac turn round: In the initial stage of the Project, it is the end point of the BRT route when the New Mien Tay Bus Station has not yet under construction and operation. An Lac will not be a terminal, but just a U-turn point, so the BRT will not park here. The U-turn will be arranged in the areas of existing median.

Project passes through the territories of twenty wards/communes of the seven districts of Ho Chi Minh City as follows:

- Urban District 1: Wards of Cau Kho, Cau Ong Lanh, Co Giang and Nguyen Thai Binh;
- Urban District 2: Wards of An Loi Dong, An Phu, Binh Khanh and Thu Thiem;
- Urban District 5: Wards of 1, 5, 6, 10 and 13;
- Urban District 6: Wards of 1, 3, 7 and 10;
- Urban District 8: Ward 16;

- Binh Tan Urban District: An Lac Ward;
- Binh Chanh: Tan Kien Commune.

Location of the subproject is illustrated in the figure below:

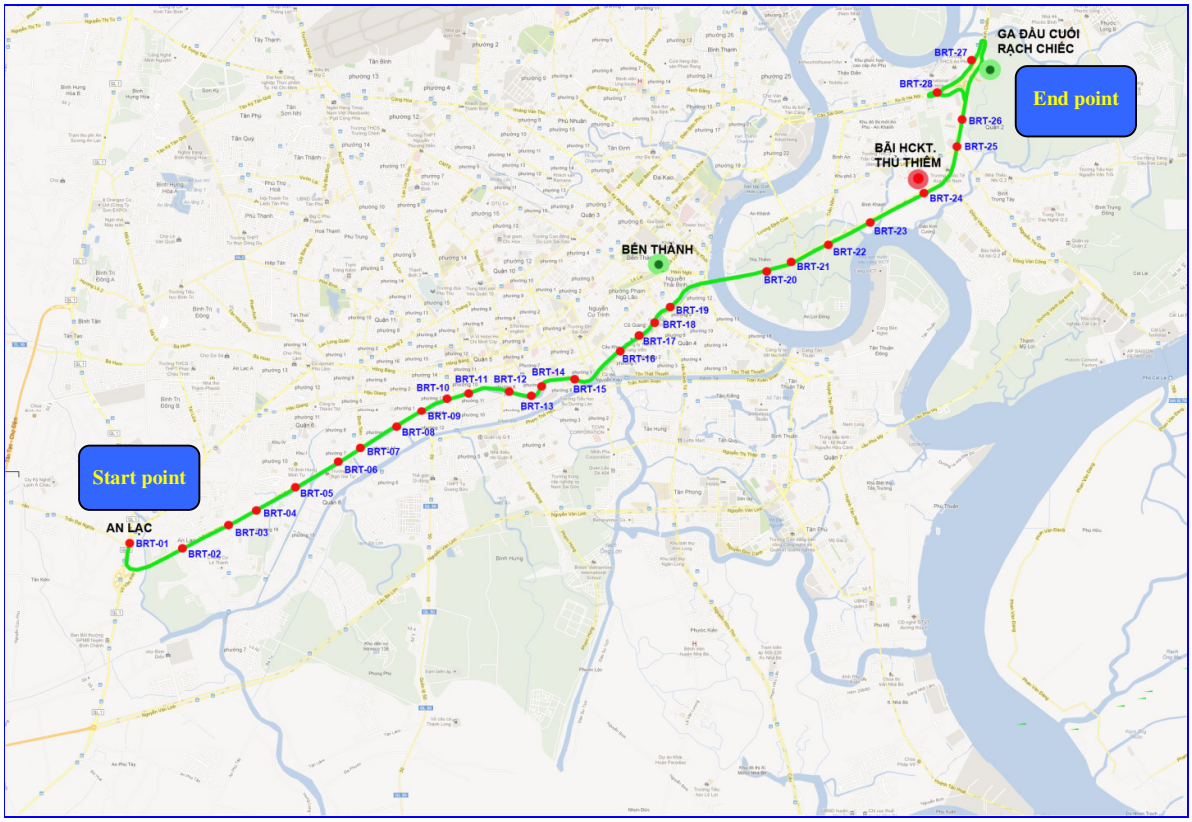


Figure 3.1: Location of the Project

3.4. Work Items of BRT Line

3.4.1. Major Work Items

The BRT has a total length of 23 km, including the following major items: (i) 28 BRT stations; (ii) Foot bridges: construction of new 07 locations at the BRT stations, 01 location crossing over canal, and 06 existing foot bridges need to improve; (iii) Private parking areas: 09 locations (with a total area of 7,879 m^2); (iv) Technical Facility Thu Thiem with an area of 10,000 m^2; (v) Terminal is located at the Rach Chiec Sport Zone with an area of 5,600 m^2;

3.4.2. Scale

3.4.2.I. Scale of BRT Cross Section

The BRT line is located at the two medians with the following cross section:

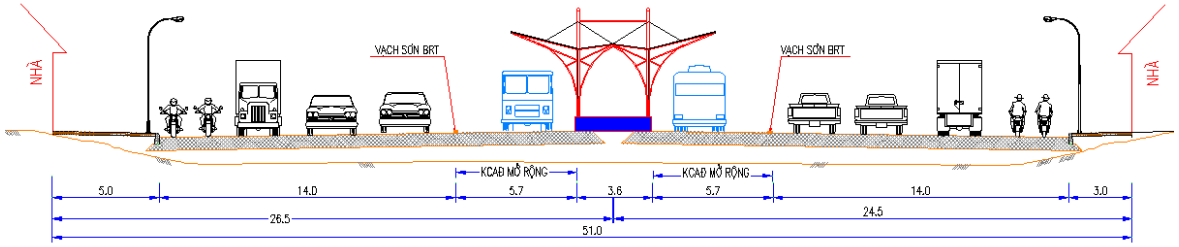


Figure 3.2. Cross section of segment from An Lac Roundabout to NH 1A – Vo Van Kiet Boulv Interchange

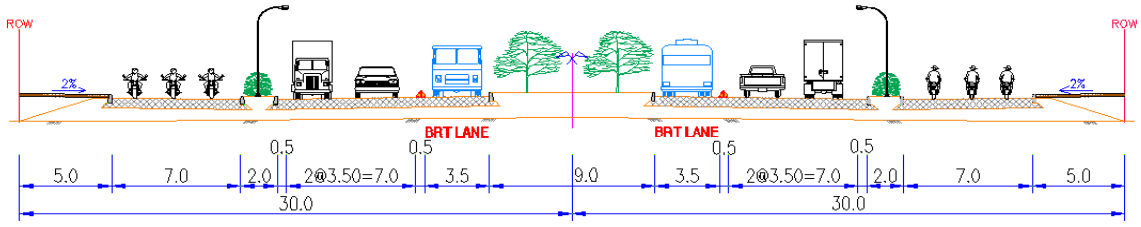


Figure 3.3. Cross Section of NH1A – Lo Gom Bridge

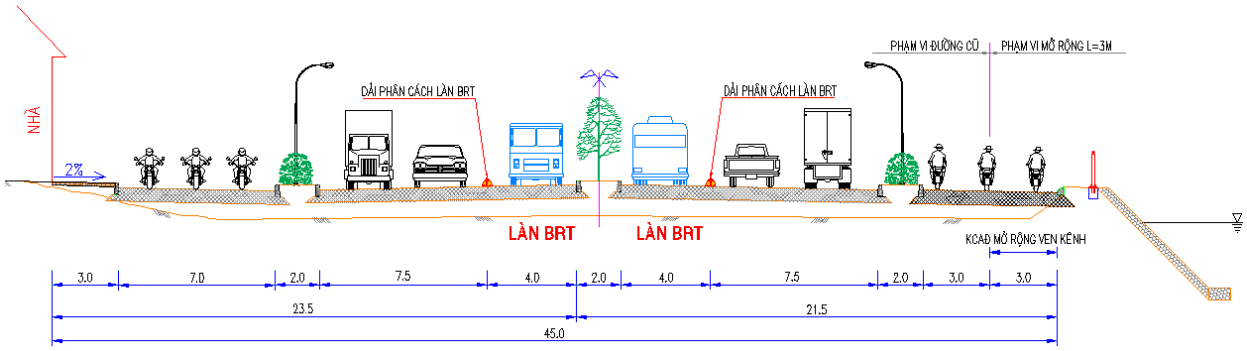


Figure 3.4. Cross Section of Lo Gom Bridge – Thu Thiem Tunnel

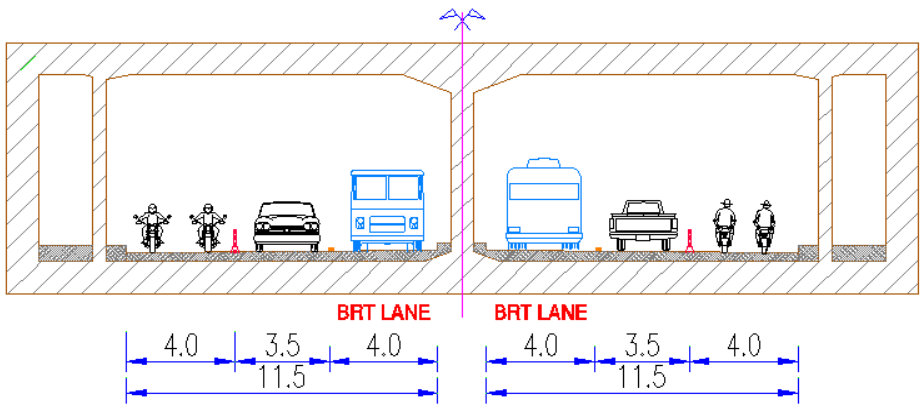


Figure 3.5. Cross Section of Thu Thiem Tunnel

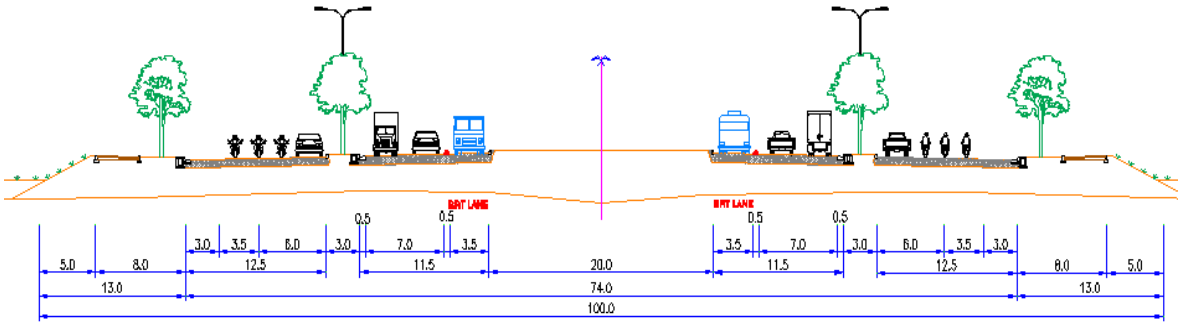


Figure 3.6. Cross Section of Thu Thiem Tunnel – Cat Lai Interchange

3.4.2.2. BRT Station

Arranging station with closed type; the length of platform is 30 m; the access area including exit and entrance; shape of station including access area, payment area, platform area and auxiliary area.

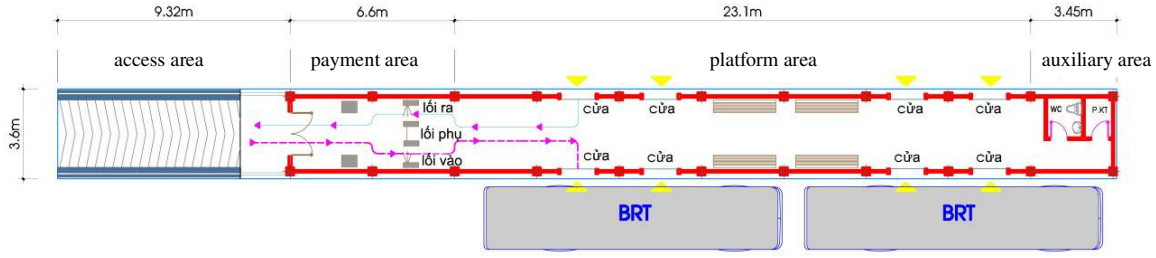


Figure 3.7. Areas of the BRT Station

3.4.2.3. Interchange Station with Rach Chiec MRT Station

The BRT will interchange with the proposed MRT at Rach Chiec. Figure 3.8 shows the proposed general MRT station arrangements.

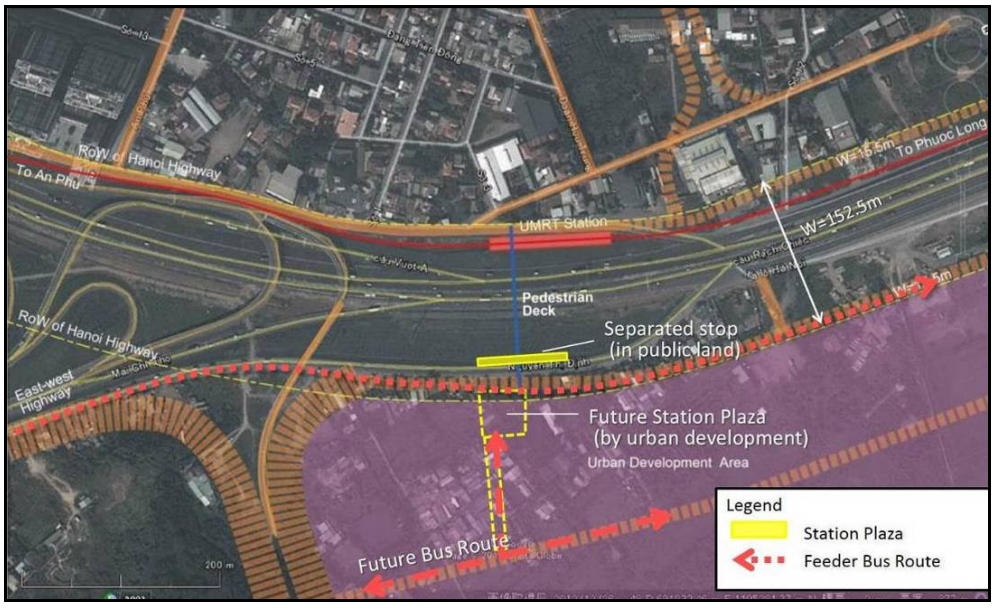


Figure 3.8. Station Arrangemnt at the MRT Station

The BRT station is able to be located underneath the MRT station with access between the two achieved via escalators/lifts.

3.4.2.4. Rach Chiec Terminal

Rach Chiec Terminal includes a traffic area and a station building.

Table 3.1. Functional Areas at the Rach Chiec Terminal

No	Functional Areas	Area (m^2)
1	Terminal building	310
2	Landscape & green	990
3	Internal road, parking and transport service	4.300
	Total	**5.600**

Source: FS Report

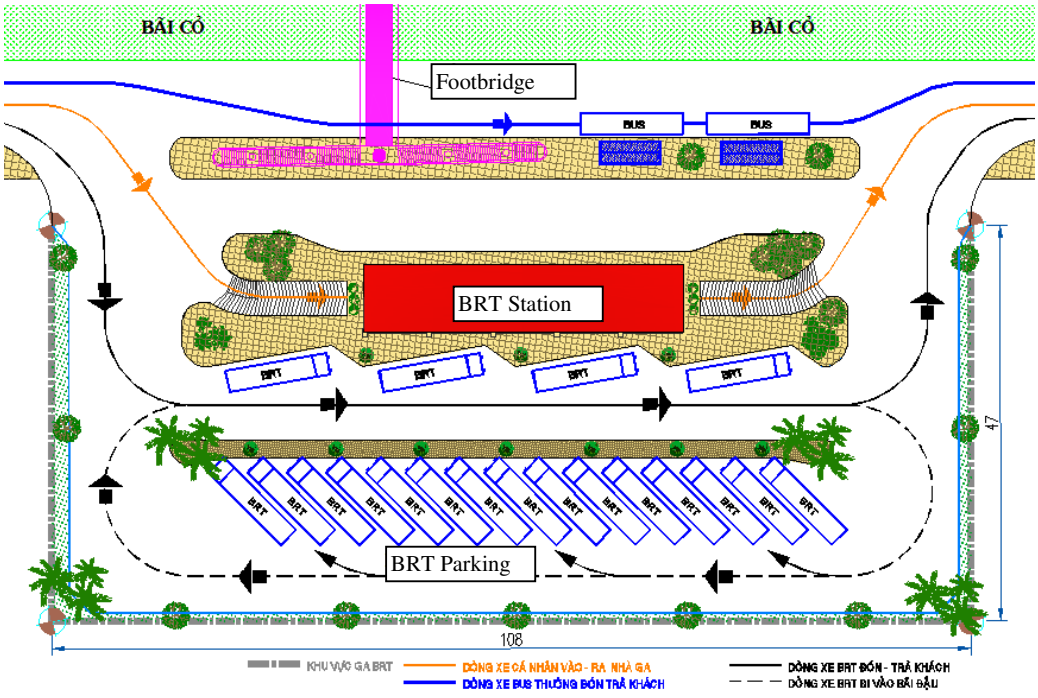


Figure 3.9. Funtional Master Plan of Terminal

3.4.2.5. Technical Facility Thu Thiem

The expected capacity to serve the BRT and urban buses is 30 vehicles with an area of about 1.0 ha, including the items shown in Table 3.2.

Table 3.2. Functional Areas of the Technical Facility

No	Functional Areas	Area (m^2)
1	Operation, office building, storage, environmental and technical supporting area	1,800
2	Maintenance, washing, refuelling area,	1,760

No	Functional Areas	Area (m^2)
3	Land for landscape	1,830
4	Land for traffic	1,250
5	Parking, transport service	3,360
	Total	**10,000**

Source: FS Report

Figure 3.10. Master Plan of Thu Thiem Technical Facility

3.4.2.6. Clearance and Resettlement

The Project will be built on the existing Vo Van Kiet - Mai Chi Tho Boulevard, in which terminal will be built at the Rach Chiec Sport Zone and Thu Thiem Technical Facility. According to the project resettlement action plan (RAP), the Project will affect land and properties at a small scale, and the number of the affected households is not significant.

Specifically, construction of the Thu Thiem Technical Facility of the Project will acquire 17,771 m^2 agricultural land. There are 3 households and 2 private companies will be affected by project. Among the affected HHs, 3 households will be affected by acquisition of agricultural land with a production area of 400 m^2/a total area of 5,200 m^2; 1206 trees and 300 m^2 crops will be affected. These households are affected by a small percentage livelihoods but no households will be relocated or need the income restoration program. Two private companies whose agricultural land was uncultivated and was not used will be acquired.

The Project will use an area of 0.58 ha of Rach Chiec Complex Sport Centre project for constructing Rach Chiec Terminal Station. The affected land is consisted mainly of agricultural land (5,800 m^2, occupying 95% of the total affected land area) and other 221 m^2 is residential land. There are 12 HHs affected by the project. 4 HHs are partially affected, and 8 HHs are entirely affected (4 HHs need relocating).

Moreover, on the whole route, approximately 267,650 m^2 of public land that will not be used on in a short time due to the temporary requisition of the construction process of the project items.

The Project Resettlement Policy ensures that the affected HHs will be appropriately compensated and provided with other assistance according to Vietnamese regulations on compensation and resettlement, as well as OP 4.12 on Involuntary Resettlement by the World Bank and Resettlement Policy Framework of the Project.

3.5. Organization of the Project Implementation

3.5.1. Quantity

Construction of the BRT line on the Vo Van Kiet – Mai Chi Tho Boulevard (with an estimated length of 23 km) and supporting infrastructures such as stations, terminals, technical facility and a modern management system. The detail quantity of the work items is presented in the following table:

Table 3.3. Summary of the Main Quantity

No	Items	Unit	Volume
I	**Road**		
1	Excavation soil	m^3	15,772
2	Filling soil	m^3	44,495
3	Material demand		
	- Asphalt concrete	m^3	1,295
	- Filling sand	m^3	43,748
	- Filling soil (re-used material)	m^3	747
	- Aggregate base	m^3	4,829
	- Cohesive soil	m^3	391
	- Geotextile filter fabric	m^2	46,446
II	**Architecture**		
1	Excavation soil	m^3	6,647
2	Filling soil	m^3	2,636
3	Material demand		
	- Sand	m^3	1,067
	- Cement	kg	809,158
	- Reinforcement	kg	465,000
	- Stone	m^3	1,812
III	**Flyover**		
1	Excavation soil	m^3	2,060
2	Filling soil	m^3	1,442
3	Concrete	m^3	1,796
IV	**Thu Thiem Technical Facility**		
1	Excavation soil	m^3	6,647
2	Filling soil	m^3	2,636
V	**Rach Chiec Terminal**		
1	Excavation soil	m^3	11,038
2	Filling soil	m^3	15,389
3	Soil mixing pile	m	17,414

Source: FS Report

3.5.2. Material Supply Plan

The Project will be expected to purchase materials from the business companies in the Ho Chi Minh City or neighbouring provinces.

If the materials will be bought at the borrow pits, quarries and other material sources, the contractor shall require these companies submit the certificate for environmental protection commitment for these borrow pits, quarries, and other material sources when construction starts.

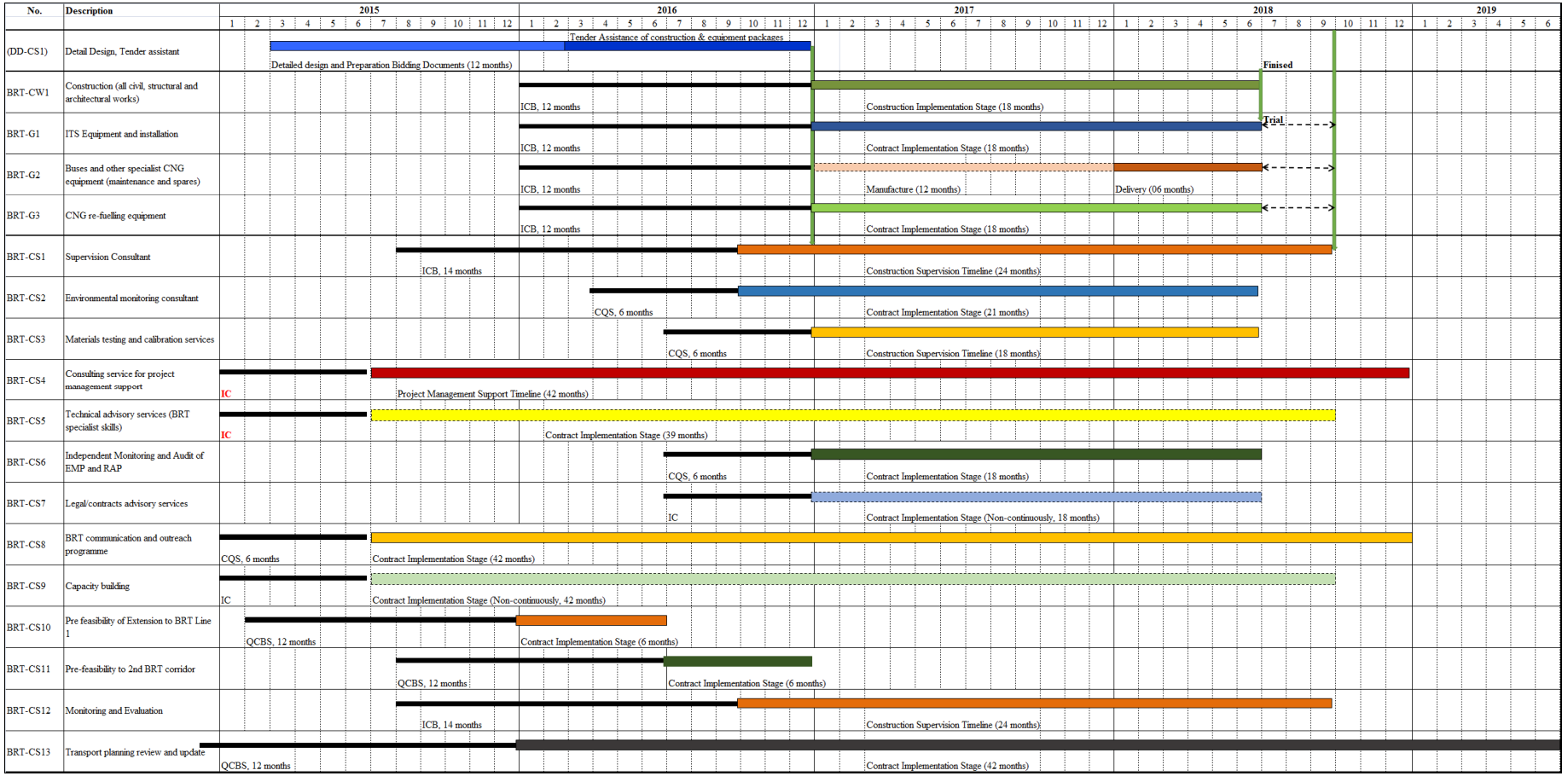
3.5.3. Spoil Treatment Plan

Spoil (construction waste) on site needs to be transported to Da Phuoc disposal site that was approved by the waste discharge certificate No. 6420 /UBND-DTMT dated on September 28, 2007 of Ho Chi Minh City People's Committee on the plan of waste mud dumping of the ODA projects in the area of Ho Chi Minh city. This disposal site was planned by the city and its activities comply with the current environmental management regulations. The transport road is mainly along the Vo Van Kiet – Mai Chi Tho Boulevard. The contractor will be required to work and to reach an agreement with local authorities regarding disposal before starting construction.

3.5.4. Project Implementation Schedule

Project’s general implementation schedule is shown in below table.

Table 3.4. Project Implementation Schedule



Source: FS Report

3.5.5. Total Project Cost

The Project uses ODA loan from the International Bank for Reconstruction and Development (IBRD) of the World Bank (WB).

- Total Project cost: **175,310,500 USD**
- In which:
  - + Counter-part capital: 33,026,700 USD
  - + WB loan: 142,283,800 USD

IV. PROJECT ENVIRONMENTAL BACKGROUND

4.1. Natural Conditions

The Project's area is located in Ho Chi Minh City; therefore, it has features of the topographical condition, geological and hydrological climate of the City.

4.1.1. Geography, Topography and Geology Characteristics

Geography

The Project area passes through the Binh Chanh rural district, Binh Tan urban district, and urban districts of 5, 6, 8, 1 and 2 of the Ho Chi Minh City, along the existing Vo Van Kiet - Mai Chi Tho Boulevard (or East-West Boulevard). The Project coordinates are 10°43' – 10°48' northern latitude and 106°36' – 106°45' eastern longitude.

Topography

HCM City belongs to a transitional region between the south-eastern and Mekong Delta regions. The general topography is that HCM City terrain gets lower from north to south and from east to west. There are three types of terrain. The high terrain lies in the northern-north-eastern area and part of the northwester. This is the bending terrain with an average height of 10-25 meters and interspersed some hills with the highest at 32 meters. The depression terrain lies in the southern-south-western and south-eastern part the average height is in the range of 0.5 to 2 meters. The medium-height terrain lies in the centre of the city. The average height is in the range of 5-10 meters.

Geology

Soil of Ho Chi Minh City was formed upon two sediment classes: Pleistocene and Holocene. Pleistocene sediment (ancient alluvial sediment) covers most of the northern, north-western and north-eastern parts of the city. The sediment class has developed into grey soil, with more than 45,000 hectares (make up 23.4% of the city's total soil area). There are three types of grey soil: highlands grey soil, grey soil with red and yellow-speckled layers, and gley grey soil. The Holocene sediment (new alluvial sediment) had its origin in coastal areas, bays, riverbeds and alluvial plains and consequently formed different types of soil. Specifically, alluvial soil makes up 15,100 hectares or 7.8% of the total area; aluminium soil is 40,800 hectares or 21.2%; and alkaline soil is 45,500 hectares or 23.6%. The remaining area, 400 hectares or 0.2%, is made of sandy soil near the ocean and yellow-brown feralite soil on hills that have eroded.

4.1.2. Meteorology

Temperature

The average temperature of the Ho Chi Minh City is about 28.14 ^{0}C. The highest monthly average temperature is about 29.44 ^{0}C in April; the lowest monthly average temperature is about 26.7 ^{0}C in January.

Rainfall

The rainy season in Ho Chi Minh City usually lasts from May to November and dry season from December to April; the average annual rainfall in Ho Chi Minh City is about 1,900 mm. Annual big rainfall concentrates in July, August, September, October and November, in which, big rainfall months can up to 400 mm (in August 2010). While in the dry season, rainfall is very low, especially in January to March, it is almost no rain. Prolonged heavy rain is that caused flooding in low-lying locations where there are poor drainage systems at depth of 20-80 cm.

Humidity

The average humidity in Ho Chi Minh City is about 75%; the average humidity is about 80% and 70% in the rainy season and in the dry season respectively.

Wind, Storm Conditions

In the dry season, wind direction is East-Southeast wind (it is also known as "chuong" wind). In the rainy season, it is West-Southwest wind. The average wind speed is about 3 – 4m/s, wind is often strong in the afternoon. The strong wind will affect tide levels and impact on the increase of salty penetration in the Ho Chi Minh City. However, the storms rarely happen in Ho Chi Minh City, the weather only affected by tropical depression.

Thermal Radiation

The total solar radiation on daily average in the year in Ho Chi Minh City is 365.5 Calories/cm^2. The total solar radiation in dry season is about 100 calories/cm^2/day higher than rainy season and the maximum solar radiation in day is about 0.8 - 10 calories/cm^2/minute during 10a.m – 2p.m.

Sunny Hours

Total number of hours of sunshine in recent years has tended to decrease, in which in the last year, Ho Chi Minh City had 1892.9 hours of sunshine less almost 200 hours than the year 2011 and less 110 hours than the year 2009 & 2008. The lowest hours of sunshine falls on December and January, in which the lowest number of sunshine is recorded as 90.5 hours (in December 2005) and most recently is 116.9 hours (in September 2009) and 120.1 hours (in January/2011).

4.1.3. Hydrology

The project area runs along the East-West corridor with the quite dense network of rivers. By way from An Lac Roundabout to Rach Chiec Terminal, the BRT line runs parallel to and crosses many canals. Table 4.1 presents the network of rives/canals in Project area.

Table 4.1. The network of rives/canals in Project area

No	Name of River/Canal	Location	Description
1	Nuoc Len Canal	Runs parallel to the BRT line from An Lac	Cross section is 35m in average width; the length is 850m; located in distance of 3-5m far

No	Name of River/Canal	Location	Description
		Roundabout to Nuoc Len Bridge	from the left side of Vo Van Kiet road
2	Nuoc Len Canal	Nuoc Len Bridge cross over the route.	Cross section is 35m in average width; the canal is used for irrigation purpose. There is no water traffic on the canal and there are many water hyacinths in the Nuoc Len Canal.
3	Rach Cay Canal	Rach Cay Bridge cross over the route	Cross section is 30m in average width
4	Ruot Ngua Canal	Runs parallel to the BRT line from Rach Cay Bridge to Lo Gom Bridge	Cross section is 35m in average width; the length is 850m; located in distance of 12m far from the right side of Vo Van Kiet road.
5	Lo Gom Canal	Lo Gom Bridge cross over the route	Cross section is 70m in average width. Canal is currently receiving city's wastewater; there are activities of the cargo boat, fruit on the canal.
6	Ben Nghe Canal – Tau Hu Canal – Lo Gom Canal	Runs parallel to the BRT line from Lo Gom Bridge to Thu Thiem Tunnel.	Cross section is 45m in average width; the length is 9500m, located in distance of 5-10m far from the right side of Vo Van Kiet road. Tau Hu - Ben Nghe – Lo Gom canals are currently receiving wastewater from the households as well as units of production and service business in the project area and common areas located in the basin because they are located in the downstream of Sai Gon River, and they are influenced by the flood-tide. There are activities of the cargo boat, fruit.
7	Sai Gon River	At the Thu Thiem Tunnel	Cross section is 275m in average width; Sai Gon River receives rainwater and wastewater of city.
8	Ca Tre Lon Canal	Runs parallel to section from Thu Thiem Tunnel to Kenh 2 Bridge.	Cross section is 30m in average width; canal is located in distance of 150-200m far from Vo Van Kiet road.
9	Canal No2	Kenh 2 Bridge cross over the route	Cross section is 50m in average width. The canal is used for irrigation purpose. There is no waterway on the canal
8	Ca Tre Lon Canal	Ca Tre Lon Bridge cross over the route	Cross section is 35m in average width, the canal is used for irrigation purpose. There is no waterway on the canal; there are many water hyacinths in the Ca Tre Lon Canal.
10	Ca Tre Nho Canal	Ca Tre Nho Bridge cross over the route	Cross section is 30m in average width; the canal is used for irrigation purpose. There is no waterway on the canal, there are many water hyacinths in the Ca Tre Lon Canal.
11	Rach Chiec Canal	180m far from Rach Chiec Terminal	Cross section is 06m in average width.

4.2. Environmental Baseline Data

The Project has taken samples and analyzed the quality of the physical environment in the Project area (including quality of air, noise, vibration, surface water, underground water). The results of these measurements serve as the baseline for identifying and evaluating the components of the physical environment in the Project area.

Locations of Sampling Measuring Environmental Quality are presented in the Table 4.1 and illustrated in the Figure 4.1.

Table 4.1. Locations of Sampling Measuring Environmental Quality in the Project Area

No	Location	Sign	Coordinate	Parameters
I.	**Air, noise, vibration**			
1	Mien Tay Moi bus station area	KK1, O1, R1	10°41'22.93"N; 106°35'43.54"E	- Air quality: Temperature, humidity, wind speed, wind direction, air pressure; PM10, TSP, CO, NO_2, SO_2; - Noise level: Leq (dBA), - Vibration level: Laeq (dB)
2	Resident area of Ward 3 (Cross between 2 streets: Vo Van Kiet and Pham Phu Thu)	KK2 O2, R2	10°44'28.72"N; 106°38'43.94"E	
3	Hospital for tropical diseases – Vo Van Kiet	KK3 O3, R3	10°45'8.04"N; 106°40'40.08"E	
4	Residential area near Ong Lanh Bridge	KK4 O4, R4	10°45'45.85"N; 106°41'49.53"E	
5	AIS International School Vietnam – Mai Chi Tho	KK5 O5, R5	10°47'14.50"N; 106°44'57.24"E	
6	End point of the Project, near Rach Chiec Bridge	KK6 O6, R6	10°48'7.95"N; 106°45'14.02"E	
II.	**Surface water**			
1	Kenh 2 Canal	NM1; NM6	10°46'26.10"N 106°43'28.90"E	- Temperature, pH, turbidity, conductivity, DO, TSS, COD, BOD_5, total oil.
2	Lo Gom Canal	NM2; NM7	10°44'3.48"N; 106°38'3.76"E	
3	Ruot Ngua Canal	NM3; NM8	10°43'48.65"N; 106°37'39.03"E	
4	Ca Tre Nho Canal	NM4; NM9	10°46'51.53"N; 106°44'17.55"E	
5	Nuoc Len Canal	NM5; NM10	10°43'7.03"N; 106°36'15.01"E	
III.	**Ground water**			
1	Residential area near Lo Gom Canal	NN1	10°44'6.23"N; 106°38'6.18"E	- Temperature, pH, conductivity, turbidity, salinity, DO, hardness, total suspend, COD, Fe and As; Coliforms, E.Coli.
2	Residential area near Nuoc Len Canal	NN2	10°43'9.46"N; 106°36'17.6"E	
3	Residential area of ward No.7 of urban district No.6	NN3	10°44'19.29"N; 106°38'27.40"E	
4	Residential area of An Lac Ward of Tan Binh urban district	NN4	10°43'6.64"N; 106°36'11.41"E	
5	Residential area of ward No.10 of urban district No.6	NN5	10°44'3.18"N; 106°38'0.82"E	

Figure 4.1. Environmental Quality Survey Locations

4.2.1. Air Environment Quality, Noise and Vibration

Air environment quality

Analysis results of air environment parameters of PM10, TSP, CO, SO_2, NO_2 are lower than Allowable Limit of National Technical Regulation on Ambient Air Quality – QCVN 05:2013/BTNMT in many time, so the air environment quality in the Project area is good.

Noise and Vibration

Basically, the analysis results of noise and vibration at locations along the Project route are lower than allowable limit of National Technical Regulation on Noise – QCVN 26:2010/BTNMT, and limit of vibration standard – QCVN 27:2010/BTNMT.

4.2.3. Surface Water Quality

Surface water quality

The analysis results of surface water quality in the project area show that the project area is being polluted surface water on indicators such as dissolved oxygen (DO), and especially coliform and E.coliform. There is only a number of samples analyzed at ebb tide had coliform and E.coliform concentrations within Allowable Limit, the remainder is over threshold from 2-40 times under columns B in QCVN 08: 2008 / BTNMT.

Ground Water Quality

Most parameters of the existing ground water quality assessment in the Project area are lower than the Allowable Limit of QCVN 09:2008/BTNMT, however the ground water in Ward 7 (NN3) and Ward 10 (NN5) – District 6 is polluted by coliform and E.coliform and higher than the Allowable Limit of QCVN 09:2008/BTNMT many times.

4.3. Socio-economic Status of the Project Area

4.3.1. Population

According to the Report on the environmental survey results, the population density in the area is about 2,195/km^2, 8.5 times higher than the average population density in the country (257/km^2) and lower than the average population density in Ho Chi Minh City (3,401/km^2). In the communes/wards, the average family side is 4 persons/household. Proportion of the average female population is about 52%, higher than the national average (50.84%); the natural population growth rate is 0.6%.

The living standard in the Project area is rather good with about 30% of rich households, 50% of well-off households, 18% of the medium households and about 2% of poor households. The households living along the project mainly do business, services with advantages of the side of the road. The average income reaches 2-10 million/person/month.

According to the consultation of 50 questionnaires of people living along the Project's route, almost people are living in a long time. On average each household have 4-5 people, which mostly are in working age (80%). The living conditions of these households are quite good. 100% of households have electricity supply and tap water or well water. 100% of households have sanitary standard. Almost these households' currently houses are high-rise buildings with strong structure.

4.3.2. Socio-economic Conditions

In the Project area, the main occupation is commercial and service (70%), next is public servant and freelance (15%), traditional production (10%), agriculture (5%) (District 8 and Binh Chanh district). People living in these wards/communes take advantage of houses

closing at the road, or near the market, companies or enterprise, etc., many types of commerce that is concentrate in the central squares as district 1, 5 and 6. Average income of wards/communes is about 2,500,000 VND/monthly/person *(source: Report on environmental survey results).*

The economical features along route of the Project are multiform; including many occupation such as business, freelance, civil servant, etc. *Business* is focus (80%), with many types as restaurants, hotel, inn, café, groceries, building material shop, and telephone repairing shop, etc. These households have high income, approximate 5 to 10 million VND/month. *(Source: Report on environmental survey results).*

4.3.3. Traffic Condition

The survey data of traffic volume shows that, traffic volume along Vo Van Kiet and Mai Chi Tho route is relatively high, in which the motorcycle volume still predominates. Traffic jam occurs locally at some intersections during peak hours.

Single bus route (39) works along the route. This bus route operates between Mien Tay Bus Station and Ben Thanh with a frequency of 15 minutes/trip. In addition, there are many routes connecting with Vo Van Kiet – Mai Chi Tho route.

4.3.4. Infrastructure

The health system: All of communes/wards in Project area have medical stations, and some wards also have hospitals to care heath. The proportion of health care units per 1,000 people of the commune/ward is averaging 0.05, lower than proportion of national health care unit per 1,000 people (0.16).

Education: All of the communes/wards in the Project area have kindergarten, primary school, secondary school (or high school). The proportion of schools per 1,000 people of the commune/ward is average of 0.2 – 0.5 which is lower than proportion of the national schools per 1,000 people (0.47).

Electric supply: the electric system in the Project area is good. 100% households are using electricity.

Water supply: 100% people have freshwater for living; the water is supplied from sources as Sawaco Company, wells and from the rain.

4.3.5. Current situation of waste management

Currently, there are two collection systems of domestic garbage that are public collection system and private collection system in Ho Chi Minh City.

The public garbage collection system consists of public service companies in districts. This system undertakes sweeping the entire street cleaning, garbage collection at markets, agencies and public works, and performs domestic garbage collection for approximately 30% of households in the area and then brings to transfer stations or directly to landfills. Some units contract with the Urban Environmental Company to transport garbage in the area.

The private garbage collection system consists of individual waste collectors, collectors unions and environment sanitation cooperatives. Private collectors collect garbage primarily (in the form of contractual agreements under the management of the Ward People's Committee) of approximately 70% of households in the area and the family firms. Private garbage collection system is responsible for cleaning up garbage in the alley, then gathering trash along the way to pick-up area or feeder trash and garbage transfer for transporting garbage units.

4.3.6. The historical Monuments, Cultural Heritage

Along the route of the project, there are cultural and historical monuments such as Traditional House of Ward 1, district 5, Saint Giuse Church in Ward 5, district 5. However, these historical monuments would be affected by the project construction activities. The rehabilitation of existing roads, constructing flyovers can *generate* dust and noise; however it is far from the location of cultural monuments, and therefore these traditional houses will not be affected and damaged.

Figure 4.2. Sensitive Objects along the Project Route

No	Sensitive Objects	Location
1	**School** - Primary school of Kim Dong (Ward 3, District 6) - Kindergarten Rang Dong (Ward 1, District 6) - Hong Bang International University (Ward 6, District 5) - Dang Tran Con Secondary school (District 8) - Ham Tu Primary school (Ward 1, District 5) - Chuong Duong Primary school (Cau Kho Ward, District 1) - Australia International School AIS (District 2) - Vietnam International school ACG (District 2)	Located along the Mai Chi Tho – Vo Van Kiet route, 50 – 100m far from the edge.
2	**Hospital** - Hospital for tropical diseases - Psychiatric Hospital - Orthopaedics Hospital - Hospital of District 4	Located along the Mai Chi Tho – Vo Van Kiet route, 30 – 70m far from the edge.
3	**Spirit Works** - Thien Hau Pagoda (Cau Ong Lanh Ward, District 1) - Minh Dang Quang Pagoda (Near Cat Lai Interchange)	Located along the Mai Chi Tho – Vo Van Kiet route, 30 – 100m far from the edge.
4	**Public area** - Dai The Gioi Water Park	Located along the Mai Chi Tho – Vo Van Kiet route, 50 m far from the edge.

V. POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS

5.1. Positive Impacts

This project will create many positive impacts according to its positive objectives that include improving public passenger transport of urban area; controlling the increase of private vehicles; improving urban environmental quality; improving quality of public service in the local; improving quality of lives for people living along project corridor. The positive impacts of the project could be summarized as follows:

- The appropriation matching between objectives of project with priorities of national, transportation as well as Ho Chi Minh strategies;

- Separate public passenger transportation from other vehicles to increase and manage travel time as well as enhance reliability of public services because of efficient bus systems, low operational cost, less waiting time for passengers and reduce subsidies;
- Ensure that public passenger transportation will serve rapid, reliable and appropriate services at all places on corridor with modern BRT stations, modern fare collection and control system that people prefer as better alternative rather than using private vehicles;
- The BRT system could be more preferred than motorcycle for people living in this corridor. This will help reduce greenhouse gases and air pollution. Moreover low emission BRT could increase quality of environment in corridor, the green BRT design could create public green space as well as using solar energy and storm water as environmental solutions; Developing the friendly transport mode with environment; Help to reduce traffic conflict and accident on corridor.

5.2. Negative Impacts

The implementation of the project would mainly cause land acquisition, increase dust generation, air pollution, domestic waste, and health and safety issues. Site investigation and document review were conducted for identifying and assessing these potential negative impacts, including consultation with the local communities and affected people.

The potential negative impacts of the project are identified in table 5.1 and could be minimized by applying the proposed mitigation measures developed for the project, which are described in Table 6.1. The negative impacts of project could be summarized as follows:

- Narrow the existing road and if the BRT and its services do not attract enough passenger moving from private vehicles, the traffic congestion and traffic conflict could be worse on this corridor;
- Potential increase in traffic accident especially at existing intersections, the BRT stations and access roads to stations;
- Operational safety for compressed gas both in the BRT buses and in gas charging station. Any incident of this system could have negative impacts on society and environment;
- Potential increase in environmental issues such as waste generation and social evils at the BRT stations, footbridges, terminal if no proper measures for management and operation.
- Increase in other negative impacts on environment during construction and operation stages.

Table 5.1. Potential Negative Impacts of the Project

No	Impacts/ Issues	Impact Description	Location / Affected Object	Significance of impacts	Impact duration
I	**Pre-construction stage**				
1	Permanently and temporarily acquired land	▪ Project requires acquisition of 1.77 ha of agricultural and productive land for construction of Rach Chiec Terminal and Thu Thiem Technical Facility. In which, there are 3 households and 2 private company will be affected by project. Among affected HHs, there are 3 households will be affected agricultural land with production area of 400 m^2/a total area of 5,200 m^2, 1,206 trees and 300 m^2 crops will be affected. These households are affected a small percentage livelihoods but no households will be relocated or need the income restoration program.	▪ Resident at the construction area of Thu Thiem Depot.	Small	Long-term
		▪ Project will use the area of 0.58 ha of Rach Chiec Complex Sport Centre project for constructing Rach Chiec Terminal Station. The affected land is consisted mainly of agricultural land (5,800 m^2, occupies 95% of total affected land area) and other 221 m^2 is residential land. There are 12 households affected by the project. 4 HHs are partially affected, and 8 HHs are entirely affected (4 HHs need relocating).	▪ Resident at the construction area of Rach Chiec Terminal.	Small	Long-term
		▪ In the whole of route, it is approximately 267,650 m^2 of public land that will not be used on a short time due to the temporary requisition of the construction process of the project items.	▪ At the construction area of footbridges, bridge crossing over canal. ▪ At the construction area of private parking areas, BRT stations	Small	Short-term

No	Impacts/ Issues	Impact Description	Location / Affected Object	Significance of impacts	Impact duration
			along the road. ▪ At the construction area of Thu Thiem Technical Facility and Rach Chiec Terminal.		
		▪ Conflicts within communities and between communities and authorities in case of unsatisfactory compensation and assistance in land acquisition (amount, method and timing).	▪ Resident at the construction area of Thu Thiem Technical Facility and Rach Chiec Terminal.	Moderate	Short-term
2	Worker and public Safety	▪ Workers and local people may have injury due to explosion and accident from searching and removing/destroying unexplored ordinances (UXO).	▪ Resident surrounds the construction area of Rach Chiec Terminal and Thu Thiem Technical facility. ▪ Workers at the construction site.	Moderate	Short-term
3	Interruption of utility services	▪ The impact on underground technical infrastructures will be on the sidewalk where construction of the footbridges accessing to the BRT stations and construction of Rach Chiec Terminal and Thu Thiem Technical Facility occur. The affected underground facilities include i) Water supply system; ii) Drainage system; iii) Power supply system; iv) Information system. However, the underground technical infrastructures on the Vo Van Kiet - Mai Chi Tho Boulevard were already in the technical pipeline along the route and most construction items are located in the central	▪ Resident and other objects along the route	Small	Short-term

No	Impacts/ Issues	Impact Description	Location / Affected Object	Significance of impacts	Impact duration
		area of the route, excavation volume will not so much, thus the interruption of utility service is expected to be small and need to survey and investigate underground works in the project area prior to construction.			
II	**Construction stage**				
1	Dust generation/ Air pollution	▪ Earthworks and excavation activities at the BRT stations, Rach Chiec terminal and Thu Thiem Technical Facility will generate dust. ▪ The amount of dust generated from these activities depends on volume of digging and filling, and also depends on the number of machines and trucks working on site. However, the construction activities for the BRT project are not too much and concentrated on constructions of footbridges, bus stations..., and thus the amount of dust and exhausted gas will not too much. Compared with QCVN 05:2013/BTNMT, dust and exhausted gas generated from these activities and from machines at the construction sites, are lower than the allowable limit, meaning that the Project's activities would cause small to moderate air pollution.	▪ Resident surrounds the footbridges, Rach Chiec Terminal and Thu Thiem Technical Facility. ▪ Resident, schools, hospitals, etc. along the route, along the transportation roads.	Moderate	Short-term
		▪ Transportations of material and waste will moderately affect people along corridor by dust and drop materials because this is high density of inhabitant as well as high traffic density.			
		▪ Activities of concrete mixing stations: Currently the project has no plans to construct the concrete mixing stations, thereby concrete for the project can be supplied from two main sources i) purchased from the existing concrete mixing stations in the project area; ii) construct its own concrete mixing stations for			

No	Impacts/ Issues	Impact Description	Location / Affected Object	Significance of impacts	Impact duration
		project. In the case of construction of concrete mixing stations, two stations are expected to construct at the Thu Thiem Technical Facility and Rach Chiec Terminal. At the BRT stations, it is not necessary to construct the concrete mixing stations at the BRT stations because their structures are mainly steel and the demand of concrete is not large. ▪ For a mixing station with capacity of about 30m^3/h, the operation of the mixing station will be able to generate dust exceeds the allowable limit of QCVN 05: 2013/BTNMT at a distance of about 20 meters from the site.			
2	Impacts from noise and vibration	▪ Operating the construction machines, vehicles will cause the noise. ▪ In the daytime, sensitive objects along Project corridor including resident areas, schools, government offices, local markets that close to the project area in scope of 64m will be affected by the noise level higher than allowable limit of QCVN 26/2010/BTNMT from 2.9 to 7.8dBA when using the machines with high source noise level. ▪ In the daytime, sensitive objects along Project corridor including resident areas, schools, government offices, local markets that close to the project area in scope of 32m will be affected by the noise level higher than allowable limit of QCVN 26/2010/BTNMT from 7.9 to 16.9dBA when using the machines with low sources noise level.	▪ Resident, schools, hospitals, etc. along the route, along the transportation roads, along the access roads to Rach Chiec Teminal and Thu Thiem Technical Facility.	Moderate	Short-term
		▪ For a mixing station with capacity of about 30m^3/h, the operation of the mixing station will generate noise pollution at a distance of about 45 meters (in day-time) and 90 meters (in			

No	Impacts/ Issues	Impact Description	Location / Affected Object	Significance of impacts	Impact duration
		night-time).			
3	▪ Surface water pollution from excavation and filling activities, worker's camp and construction equipment.	▪ Wastewater from construction machines and equipment maintenances containing organic substances, oil and insoluble matters that are not controlled will pollute the surrounding water sources in Project area. It is estimated that if the maintenance activity would be implemented periodically, so the volume of water supply for this activity will include: i) equipment maintenance activity needing $2m^3$ of water per day; ii) machine cleaning needing $5m^3$ and iii) cooling needing $4m^3$. Because the number of construction machines are not many and mobilized for a short time on the site, the discharge of wastewater from them and equipment is not significant. ▪ Runoff water on the construction site contains high concentration of suspend solid and leakage oil from machine that lead to increasing the concentration of pollution matters such as: SS, COD, oil in the surrounding water sources. ▪ Wastewater from worker's camps contains organics easy to decompose, so if this kind of wastewater is directly discharged into the environment it would make the receiving water sources polluted.	▪ At the canals, drainage system along the route. ▪ Surrounding worker's camps.	Small	Short-term
4	Drainage and sedimentation	▪ The drainage system on Vo Van Kiet and Mai Chi Tho Boulevards could be affected by material spill into the drainage system affecting the drainage and causing local congestion; ▪ Lacking of control of the temporary material yards in the Project area may be lead to erosion and sedimentation problems.	▪ Drainage system along the route. ▪ Resident surrounds the temporary material yards.	Moderate	Short-term

No	Impacts/ Issues	Impact Description	Location / Affected Object	Significance of impacts	Impact duration
5	Solid waste	▪ Solid waste includes construction solid waste and domestic solid waste. ▪ Construction solid waste includes waste soil and waste rock. They will be reused for ground levelling other components within the project and the remaining will be dumped at landfill (Da Phuoc Landfill). These are non-hazardous wastes but it need to be handled to avoid impacts on air, water qualities, and big dirty masses in the project area. ▪ Domestic waste and rubbish (domestic solid waste) generated from worker' camp that contain organic wastes such as rubbish, paper, carton box, etc and other wastes. The average generation volume of the domestic solid waste is about 0.3 kg/person/day. This domestic waste will be collected to avoid environmental pollution. Due to the volume of this kind of waste is not big, they can be collected into the rubbish collection system along the Project.	▪ At the construction sites and worker's camps.	Moderate	Short-term
6	Hazardous wastes	▪ Other wastes as waste batteries, accumulators, plastic cores contain printing ink… generated with small volume (estimate about 3 kg/month), but not directly at the construction sites, almost at the construction management offices and repair workshops. These wastes will be gathered on the spot, and are treated by Environment Unit of City as regulation in procedure and function on hazardous waste treatment. ▪ The waste oil and oil-containing wipers from periodical oil change also identified as hazardous wastes. The amount of waste oil is estimated that: i) the amount of oil discharged each time is 07 litters; and ii) frequency of maintenance is 117 shifts. ▪ The amount of hazardous wastes is not much, but they could	▪ At the areas of material and equipment storages, equipment maintenance.	Moderate	Short-term

No	Impacts/ Issues	Impact Description	Location / Affected Object	Significance of impacts	Impact duration
		cause adverse impacts to the environment, insanitary, source of diseases on the site. Therefore, it is necessary to collect, transport and treat appropriately.			
7	Demage to community and existing local roads	▪ The activities of transportation vehicles of materials, waste and fresh concrete (if any) could create degradation of the transportation roads, the risks and secondary impacts on local communities	▪ Along the waste and material transportation roads	Moderate	Short-term
8	Interruption of production and business activities	▪ In the project area, there are about 70% of the residents living from business and services. The Project activities may impact including dust, noise and to other construction activities, etc. that would cause interruption of the production and business activities leading to income reduction of agencies and individuals on the route.	▪ Agencies and individuals living from business and services on the route	Small	Short-term
9	Worker and public Safety	▪ Workers and local people could be at risk if they travel around or closed to construction sites, or fall to the open pit, buried in the material, etc.	▪ At the construction area.	Moderate	Short-term
10	Traffic safety and congestion	▪ Encroachment of road surface would cause high risk of traffic congestion. ▪ Operation of the construction equipment will cause traffic conflict between construction equipment and traffic vehicles. ▪ High risk of traffic congestion and accident at the intersections	▪ At the construction area.	Moderate	Short-term
11	Communication with local communities	▪ Lack of communication and consultation with local communities can lead to an opposition to the Project delays in the construction process, increased costs and unsatisfactory solutions.	▪ Communities and local authorities along the route.	Moderate	Short-term

No	Impacts/ Issues	Impact Description	Location / Affected Object	Significance of impacts	Impact duration
12	Workforce management	Worker concentration will cause the following impacts: ▪ Increased demand for infrastructure and utilities. ▪ Pollution caused by waste and domestic wastewater. ▪ Increase risk of communicable diseases, such as malaria, HIV/AIDS, etc threaten health of workers and local people. ▪ Affect local social secure, increase crime rate, drug use, prostitution, social conflict, etc.	▪ Communities and local authorities along the route.	Moderate	Short-term
13	Cultural impacts	▪ Most components of the project are developed on existing Vo Van Kiet and Mai Chi Tho Boulevards, but Rach Chiec Terminal and Thu Thiem Technical Facility are new constructions. There is no any grave or underground archaeological works expected to be discovered in those new construction areas.	▪ At any location in the project area if cultural work findings.	Moderate	Short-term
14	Flooding and climate change	▪ Construction activities could cause to localized flooding because of interruption of water flow and floodwater in the local area. However, almost construction activities of the project are not in flooding area or near important watercourses hence it will not significantly impact on general flood area and partial flood area in the local. ▪ According to the results of site survey and assessment a, it is shown that flood situation could impact on project implementation, specially: i) The intersection of An Duong Vuong street & Vo Van Kiet Boulevard is usually flooded because of combination impacts of heavy rain and high tide that requires to be considered for construction; ii) The area of Thu Thiem Technical Facility is located in low-lying area of Saigon	▪ In the whole of construction area	Small	Short-term

No	Impacts/ Issues	Impact Description	Location / Affected Object	Significance of impacts	Impact duration
		river basin. The surrounding area usually flooded that requires considerations during construction period.			
III	**Operation stage**				
1	Dust and exhaust gases generation	▪ The operation of the BRT line on the Vo Van Kiet – Mai Chi Tho Boulevard could increase air pollutant concentration, however, still be under thresholds of technical regulations. ▪ Emission and dust generation from the BRT line operation create impacts on public health of nearby households and traffic participants.	▪ Residents along the route.	Small	Long-term
2	Solid waste (rubbish)	▪ The amount of rubbish generated in 2020 at the stations/Rach Chiec Terminal and Thu Thiem Technical Facility are approximately 95 kg / day and 11.5kg / day respectively. Although, a major component of this waste is organic matter, it could arise issues of environmental sanitation and disease.	▪ At the stations, Rach Chiec Terminal and Thu Thiem Technical Facility.	Moderate	Long-term
3	Hazardous waste	▪ The hazardous waste is generated mainly from the operation and maintenance of vehicles in Thu Thiem Technical Facility. They include wasted battery, tires, oily waste etc. causing negative impacts on environment quality as well as public health.	▪ At the Thu Thiem Technical Facility.	Moderate	Long-term
4	Wastewater	▪ Wastewater generated from the operation of stations, terminal, technical facility includes domestic wastewater, wastewater from bus washing and water runoff. ▪ Domestic wastewater: the survey results indicate that the effluent from septic tank is still polluted by BOD, COD etc. compared with National technical regulations of QCVN	▪ At the stations, Rach Chiec Terminal and Thu Thiem Technical Facility.	Moderate	Long-term

No	Impacts/ Issues	Impact Description	Location / Affected Object	Significance of impacts	Impact duration
		14:2008 of MONRE. ▪ Wastewater from bus washing and repairing (only generated from Thu Thiem Technical Facility): concentration of pollutant substances in this type of wastewater is relatively high as soap, dirt, and oil-containing, so there are necessary measures to control and treat before discharging to general drainage system. ▪ Water runoff: This kind of wastewater generated because of storm water at Thu Thiem Technical Facility and Rach Chiec Terminal. The main content of this wastewater is suspended solids that are taken during runoff. It needs to collect to general drainage system to avoid affect on the surrounding watercourses. ▪ Wastewater will: i) cause pollution of surface water quality in surrounding areas; ii) impact on soil quality; iii) impact on environmental hygiene condition in surrounding areas.			
5	Traffic safety and congestion	▪ The potential of traffic accident and congestion could occur because of following reasons: i) The narrowing of the road on Vo Van Kiet – Mai Chi Tho corridor; ii) operation of the BRT with prioritized traffic lights causing congestion at the intersections, especially on the roads intersect with Vo Van Kiet – Mai Chi Tho Boulevard; iii) Designing traffic lights applied to the many positions of the approach area to the terminal, stations at positions.	▪ Along the road, at the intersections, stations and terminal.	Moderate	Long-term
6	Social security and evils	▪ The unprotected and managed BRT stations could be good place for homeless, unemployment people gathering as well as concentration of social evils as robbery, prostitution and drugs, etc. and may cause unsafe and insecure for passengers and communities surrounding area, especially during the night-time	▪ Passengers and communities surrounding the BRT station, footbridges	Moderate	Long-term

No	Impacts/ Issues	Impact Description	Location / Affected Object	Significance of impacts	Impact duration
		if the measures to ensure security is not strictly carried out. In addition, many objects are taking advantage of the areas of crowed people for robbery, etc.	and terminal.		
7	Risk of fire and explosion	▪ During operation process, at the BRT stations, Rach Chiec Terminal, Thu Thiem Technical Facility and on the BRT vehicles can occur risk of fire; especially electrical problems can cause fire. ▪ If the fire incident is not controlled, it will cause the serious damage to property, environment and human life. Therefore, preventing and fighting fire is very important in order to ensure fire accident do not occur and can response promptly.	▪ At the BRT station, Rach Chiec Terminal, Thu Thiem Technical Facility and on the BRT vehicles	Significant	Long-term
8	Risk from operating CNG supply system	▪ According to the study results from America, the reason of fire and explosion are: i) from failing of equipment at fuel station and equipment of BRT; ii) leakage of gases; iii) accident with other vehicles; iv) fire but not from CNG as well as mistake from operators (including drivers). In which the reasons caused by failing of equipment is highest (38%) then followed by accident with other vehicle (21%). Leakage of CNG counted for 12% of reasons. Hence, it requires highly and carefully considerations of safety during design, selection material, setting, using and maintaining system.	▪ Surrounding fuel supply station.	Moderate	Long-term
IV	**Environmental Incidents**				
1	Fire and explosive incident during construction phase	Fire and explosion incidents could occur during transporting and storing fuel, or because of unsafe use of the temporary electric generation system, causing loss of life and property during construction. The reasons of fire and explosion are as following: ▪ The temporary material storages serving the construction,	▪ In the whole of construction area	Moderate	Short-term

No	Impacts/ Issues	Impact Description	Location / Affected Object	Significance of impacts	Impact duration
		machinery and technical equipment (paint, gasoline, DO oil, FO oil, etc.) are the source of fire and explosion. When the incident occurs, it can cause damage to people, economy and environment; ▪ Using the temporary power supply systems for machinery, construction equipment can cause electric shock, electrical leakage, fire, explosion, causing economic damage or accident at work; ▪ Using of heating equipment could cause fire, burns or accidents if no preventive measures.			
2	Storm and flood during construction	▪ Although frequency of tropical storm that reach Ho Chi Minh City is 1/10[2] compared to other coastal areas, but tropical storms could reach City and cause to many consequences and adversely increase floods that are currently impacts on its citizens as well as project area.	▪ Along the route	Moderate	Short-term

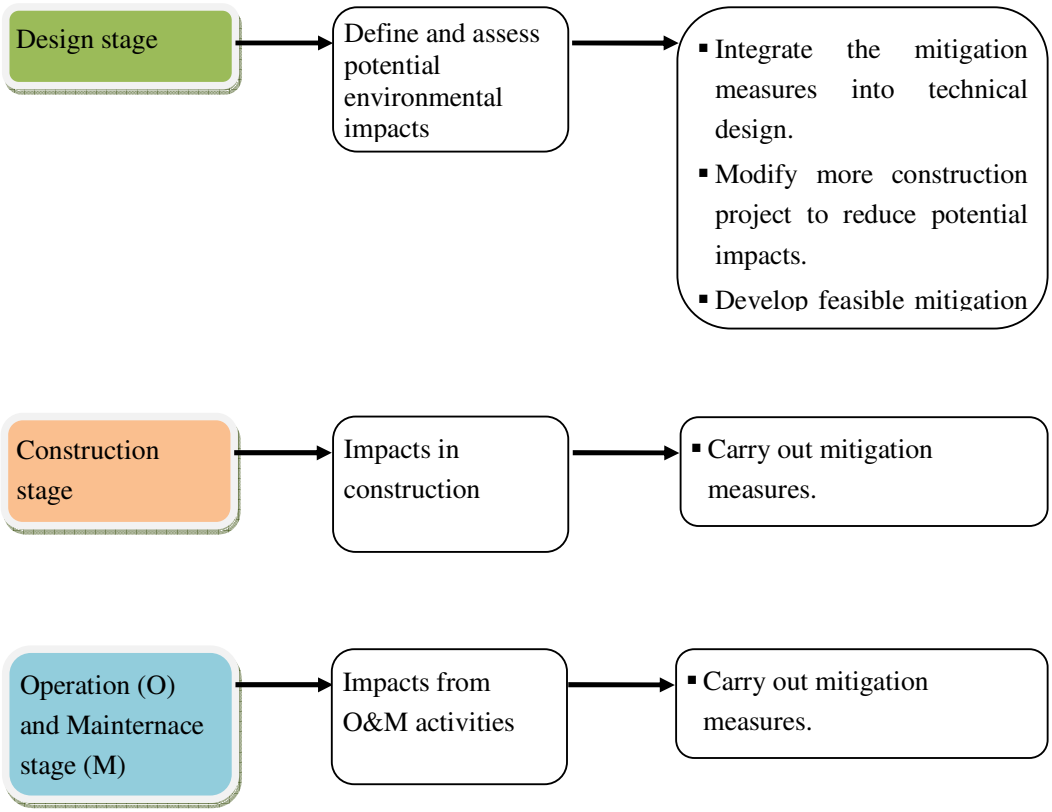
[2] According to the evaluation of the cooperation program on the evaluation study of the adaptability to climate change of Ho Chi Minh City between Ho Chi Minh City DONRE and the Asian Development Bank (ABD), 2010

VI. MITIGATION MEASURES

6.1. General Principles

Mitigation measures will be selected to be suitable with road segments, project alternatives, and stakeholder capacity. These include both managerial and technical methods. In general, negative impacts could be mitigated by:

- Implementing the plan of mitigation measures onsite. It must be established by the related stakeholders before the construction.
- Providing suitable construction alternatives to reduce environmental impacts in the design stage. It is supported by the budget of the project and included in the construction contract.



Design stage

The design of transportation and infrastructure systems must follow the criteria:

- Environmental factors and related issues need to be incorporated into the design and planning of the project. The detail design needs to reduce negative impacts to the environment by taking advantage of available resources and site selection to reduce any disturbance to the environment and human.
- According to Vietnamese construction technical guidelines and regulation, the construction project must:
  + Not cause negative environmental impacts. Technical parameters on environmental protection must be monitored.
  + Protect natural, historical and cultural heritages.

+ Ensure to use of natural resources appropriately and sustainably.
+ Respect local culture and religions.
+ All of these issues must be discussed with stakeholders and incorporated in the final design.

Construction stage

In the construction stage, all construction activities must follow appropriate technical guidelines, and bidding documents.

Operation stage

In the operation stage, project performance indicators, management system must be monitored thoroughly.

6.2. Mitigation Measures

The mitigation measures of general impacts related to Project's activities are presented in the table 6.1 and the site-specific mitigation measures are presented in the table 6.2 and appendix 1.

Table 6.1. Mitigation Measures of General Impacts related to Project's Activities

TT	Environmental and Social Issues	Mitigation Measures	Vietnam Code/Regulation	Responsibility	Verification to determine effectiveness of measures
I	**Pre-construction stage**				
1	Permanently and temporarily acquired land	Land acquisition and resettlement will comply with approval Resettlement Policy Framework (RPF) and Resettlement Action Plan (RAP) approved by HCM City People's Committee, specifically: ▪ Land compensation by market's price; ▪ Households support; ▪ Agricultural land support for residential area; ▪ Support for career change and facilitating job searching; ▪ To be recruited for the Project.	▪ Law on Land No. 45/2013/QH13; ▪ Decree No. 43/2014/ND-CP; ▪ Decree No. 44/2014/ND-CP; ▪ Decree No. 47/2014/NĐ-CP; ▪ Circular No. 36/2014/TT-BTNMT; ▪ Circular No. 37/2014/TT-BTNMT; ▪ Decision No. 35/2010/QD-UBND; ▪ Decision No.52/2012/QD-TT; ▪ Decision No. 66/2012/QD-UBND.	▪ Compensation, support and resettlement councils of District No.2 ▪ GTP PMU	Supervision reports of GTP PMU and Independent resettlement monitoring consultant
2	Worker and public Safety	▪ Train workers on occupational safety regulations and provide sufficient protective clothing for workers in accordance with applicable Vietnamese laws. ▪ Prepare and implement action plan to cope with risk and emergency. ▪ Prepare emergency aid service at construction site.	▪ Circular No. 22/2010/TT-BXD dated on December 03, 2010 of MOC on labor safety in work construction ▪ Instruction No.02/2008/CT-BXD dated on March 27, 2008 on reorganizing and	▪ Contractor implementing the package of searching and removing/ destroying unexplored	Implementation report supervision reports of GTP PMU

TT	Environmental and Social Issues	Mitigation Measures	Vietnam Code/Regulation	Responsibility	Verification to determine effectiveness of measures
		▪ Install fences, barriers, dangerous warning/prohibition site around the construction area which showing potential danger to public people. ▪ The contractor shall provide safety measures as installation of fences, barriers warning signs, lighting system against traffic accidents as well as other risk to people and sensitive areas. ▪ To ensure the safety of people and equipment involving construction and operation of the project, PMU will be responsible for unexploded ordnance clearance, which is expected to be implemented at the same time of the land acquisition program. This is a special task which shall be done by the military agency only. Clearance of unexploded ordnance shall be made before commencement of construction works to avoid dangerous situations.	strengthening the measures to ensure labor safety, labor sanitation of constructional units ▪ Decision No. 96/2006/QD-TTg dated on May 04, 2006, on management and implementation of removing/destroying bomb, mine and unexplored ordnance.	ordinates (UXO) ▪ GTP PMU	
3	Interruption of utility services	▪ Planned and unplanned interruptions to water, gas, power, internet services: the Contractor must undertake prior consultation and contingency planning with local authorities about the consequences of a particular service failure or disconnection. ▪ Coordinate with relevant utility providers to establish appropriate construction schedules. ▪ Provide information to affected households on working schedules as well as planned disruptions (at least 2 days	▪ Decree No. 167/2013/ND-CP dated on November 12, 2013, regulations on sanction of administrative violation in social security, order and safety, prevention and fighting of social evils, fire and domestic violence	▪ Contractor ▪ GTP PMU/ CSC	Supervision reports of GTP PMU and CSC

TT	Environmental and Social Issues	Mitigation Measures	Vietnam Code/Regulation	Responsibility	Verification to determine effectiveness of measures
		in advance). ▪ The contractor should ensure alternative water supply to affected residents in the event of disruptions lasting more than one day. ▪ Any damages to existing utility systems of cable shall be reported to authorities and repaired as soon as possible.			
II	**Construction stage**				
1	Dust generation/ Air pollution	▪ The Contractor is responsible for compliance with relevant Vietnamese legislation with respect to ambient air quality. ▪ The Contractor shall ensure that the generation of dust is minimized and shall implement a dust control plan to maintain a safe working environment and minimize disturbances for surrounding residential areas/dwellings. ▪ The Contractor shall implement dust suppression measures (e.g. use water spraying vehicles to water roads, covering of material stockpiles, etc.) as required. ▪ Material loads shall be suitably covered and secured during transportation to prevent the scattering of soil, sand, materials, or dust. ▪ Exposed soil and material stockpiles shall be protected against wind erosion, and the location of stockpiles shall take into consideration the prevailing wind directions and locations of sensitive receptors.	▪ QCVN 06:2009/BTNMT. National technical regulation on hazardous substance in ambient air; ▪ TCVN 6438-2005: Road vehicles Maximum permitted emission limits of exhaust gas; ▪ Decision No. 249/2005/QĐ-TTg setting the roadmap for application of emission standards to road motor vehicles. ▪ Decision No. 49/2011/QD-TTg of September 01, 2011 prescribing the roadmap for the application of the exhaust standards to	▪ Contractor	▪ Supervision reports of CSC ▪ Supervision and monitoring reports of GTP PMU

TT	Environmental and Social Issues	Mitigation Measures	Vietnam Code/Regulation	Responsibility	Verification to determine effectiveness of measures
		▪ Transport and construction vehicles shall abide by the Standard TCVN 6438-2005 with respect to maximum exhaust fumes allowed and Decision No. 249/2005/QD-TTg setting the roadmap for application of emission standards to road motor vehicles. ▪ There should be no burning of waste or construction materials (eg. bitumen etc.) on site. ▪ Concrete mixing stations should be far from water courses, residential areas and sensitive objects ▪ It is necessary to implement the environmental sanitation at least once per day during the rainy season and twice a day during the dry season in the concrete mixing stations.	manufactured, assembled and imported cars and motorcycles.		
2	Impacts from noise and vibration	▪ The contractor is responsible for compliance with the relevant Vietnamese legislation with respect to noise and vibration. ▪ All vehicles must have appropriate "Certificate of conformity from inspection of quality, technical safety and environmental protection" following Decision No. 31/2011/QD-BGTVT; to avoid exceeding noise emission from poorly maintained machines. ▪ Try to keep noise generating activities to a minimum. ▪ Restrict all operations that result in undue noise disturbance to local communities and/or dwellings to daylight hours on weekdays.	▪ QCVN 26:2010/BTNMT: National technical regulation on noise ▪ QCVN 27:2010/BTNMT: National technical regulation on vibration	▪ Contractor	▪ Supervision reports of CSC ▪ Supervision and monitoring reports of GTP PMU

TT	Environmental and Social Issues	Mitigation Measures	Vietnam Code/Regulation	Responsibility	Verification to determine effectiveness of measures
		▪ Use temporary noise barriers to minimize the noise caused by the construction equipment. ▪ Provide ear pieces to workers who must work with highly noisy machines such as piling, mixing, etc., for noise control and workers protection. ▪ Maintain the construction equipment in its best operating conditions and lowest noise levels possible. ▪ In sensitive areas (including residential neighbourhoods, hospitals, rest homes, schools, etc.) more strict measures may need to be implemented to prevent undesirable noise levels. ▪ To the extent possible, night-time operations shall be kept to a minimum and banned near sensitive receptors. ▪ Operation schedule of the mixing station must be carefully considered to avoid rest times of local people.			
3	Surface water pollution	▪ The Contractor must be responsible for compliance with the relevant Vietnamese legislation relevant to wastewater discharges into watercourses. ▪ Planning reasonable construction schedule to avoid the rainy season. ▪ The Contractor shall submit a method statement to the ECO/ES detailing how wastewater would be collected from all wastewater generating areas, as well as storage and disposal methods.	▪ QCVN 08:2008/BTNMT: National Technical Standard on surface water Quality. ▪ QCVN 14:2008/BTNMT: National technical regulation on domestic wastewater. ▪ QCVN 40:2011/BTNMT	▪ Contractor	▪ Supervision reports of CSC ▪ Supervision and monitoring reports of GTP PMU

TT	Environmental and Social Issues	Mitigation Measures	Vietnam Code/Regulation	Responsibility	Verification to determine effectiveness of measures
		▪ Portable or constructed toilets must be provided on site for construction workers. Wastewater from toilets as well as kitchens, showers, sinks, etc. shall be discharged into a conservancy tank for removal from the site or discharged into existing sewerage systems; there should be no direct discharges to any water body. ▪ Domestic sewage from site office and toilets shall either be collected by a licensed waste collector or treated by on-site treatment facilities. Discharge of treated wastewater must comply with the discharge limit according to the National Technical Regulation on Domestic Wastewater QCVN 14:2008/BTNMT. ▪ Runoff from fuel depots/workshops/ machinery washing areas and concrete batching areas shall be collected into a conservancy tank and disposed off at a site approved by the ECO/ES.	National technical regulation on industrial wastewater. ▪ TCVN 7222: 2002: General environmental requirements for central domestic (municipal) wastewater treatment plants.		
4	Drainage and sedimentation	▪ The Contractor shall follow the detailed drainage design included in the construction plans, to ensure drainage system is always maintained cleared of mud and other obstructions. ▪ To avoid sediment-laded runoff that could adversely affect watercourses, install sediment control structures where needed to slow or redirect runoff and trap sediment until vegetation is established. Sediment control structures could include sediment catchment basins, straw bales, protection system of storm drain inlet, etc.	▪ TCVN 4447:1987: Earth works-Codes for construction ▪ Circular No. 22/2010/TT-BXD dated on December 03, 2010 of MOC on labor safety in work construction ▪ QCVN 08:2008/BTNMT – National technical regulation on quality of	▪ Contractor	▪ Supervision reports of CSC ▪ Supervision reports of GTP PMU

TT	Environmental and Social Issues	Mitigation Measures	Vietnam Code/Regulation	Responsibility	Verification to determine effectiveness of measures
		▪ Areas of the site not disturbed by construction activities shall be maintained in their existing conditions.	surface water		
5	Solid waste	▪ At all places of work, the Contractor shall provide litterbins, containers and refuse collection facilities. ▪ Before construction, all necessary waste disposal permits or licenses must be obtained. ▪ When possible, the spoil will be recycled for levelling. ▪ Measures shall be taken to reduce the potential for litter and negligent behaviour with regard to the disposal of all refuse. At all places of work, the Contractor shall provide litterbins, containers and refuse collection facilities. ▪ Solid waste may be temporarily stored on site in a designated area approved by the Construction Supervision Consultant and relevant local authorities prior to collection and disposal through a licensed waste collector (for example Ho Chi Minh City Environmental Company – CITENCO). Waste storage containers shall be covered, tip-proof and weatherproof. ▪ No burning, on-site burying or dumping of solid waste shall occur. ▪ If not removed off site, solid waste or construction debris shall be disposed of only at sites identified and approved by the Construction Supervision Consultant and included in the solid waste management plan. Under no circumstances shall the contractor dispose of any	▪ Decree No. 59/2007/ND-CP on solid waste management. ▪ QCVN 07:2010/BXD Vietnam Building Code – Urban Engineering Infrastructures.	▪ Contractor	▪ Supervision reports of CSC ▪ Supervision reports of GTP PMU

TT	Environmental and Social Issues	Mitigation Measures	Vietnam Code/Regulation	Responsibility	Verification to determine effectiveness of measures
		material in environmentally sensitive areas, such as in areas of natural habitat or in watercourses. ▪ Solid waste shall be transported to the approved refuse disposal site in covered containers or trucks. ▪ Collection and disposal of solid waste shall be coordinated with local authorities.			
6	Hazardous wastes	▪ All hazardous and chemical waste (including bitumen, disposable lubricating oil, mineral oil, organic solvent, acid and alkali, oil paint etc.) shall be properly stored, handled and disposed of in accordance with the environmental standard, regulation and management policies of MONRE, and the producers of the chemicals. ▪ Hazardous waste shall be stored separately from other waste and warning signs shall be posted. ▪ Used oil and grease shall be removed from site and sold to an approved used oil recycling company or disposal at an approved hazardous waste site. ▪ Used oil, lubricants, cleaning materials, etc. from the maintenance of vehicles and machinery shall be collected in holding tanks and removed from site by a specialized oil recycling company for disposal at an approved hazardous waste site. ▪ Appropriate communication and training programs should be put in place to prepare workers to recognize	▪ QCVN 07:2009/BTNMT , National Technical Regulation on Hazardous Waste Thresholds ▪ Circular No. 12/2011/TT-BTNMT on management of hazardous substance.	▪ Contractor	▪ Supervision reports of CSC ▪ Supervision reports of GTP PMU

TT	Environmental and Social Issues	Mitigation Measures	Vietnam Code/Regulation	Responsibility	Verification to determine effectiveness of measures
		and respond to workplace chemical hazards. ▪ Prepare and initiate a remedial action following any spill or incident. In this case, the contractor shall provide a report explaining the reasons for the spill or incident, remedial action taken, consequences/damage from the spill, and proposed corrective actions.			
7	Demage to community and existing local roads	▪ Agreements with local authorities in advance using the road to transport; ▪ Periodic maintenance the road or public facilitates to ensure the movement and usage of local people; ▪ After the end of construction activities, any affected roads will be reinstated, clean and hand over to local authorities.	▪ Law on traffic and transportation No. 23/2008/QH12 ▪ Law on construction No. 50/2014/QH13 ▪ Circular No. 39/2011/TT-BGTVT of May 18, 2011 on the management and protection of road infrastructure facilities (chapter VI).	▪ Contractor	▪ Supervision reports of CSC ▪ Supervision reports of GTP PMU
8	Interruption of production and business activities	▪ Apply the mitigation measures for Dust generation/ Air pollution and noise (see items of No.1 and No.2 in above).	▪ QCVN 06:2009/BTNMT. National technical regulation on hazardous substance in ambient air; ▪ TCVN 6438-2005: Road vehicles Maximum permitted emission limits of	▪ Contractor	▪ Supervision reports of CSC ▪ Supervision reports of GTP PMU

TT	Environmental and Social Issues	Mitigation Measures	Vietnam Code/Regulation	Responsibility	Verification to determine effectiveness of measures
			exhaust gas; ▪ Decision No. 249/2005/QĐ-TTg setting the roadmap for application of emission standards to road motor vehicles. ▪ Decision No. 49/2011/QD-TTg of September 01, 2011 prescribing the roadmap for the application of the exhaust standards to manufactured, assembled and imported cars and motorcycles.		
9	Worker and public Safety	▪ Training workers on occupational safety regulations and provide sufficient protective clothing for workers in accordance with applicable Vietnamese laws. ▪ Prepare and implement action plan to cope with risk and emergency. ▪ Preparation of emergency aid service at construction site. ▪ Provide ear pieces to workers who must work with highly noisy machines such as piling, mixing, etc., for noise control and workers protection. ▪ During demolition of existing infrastructure, workers and the public must be protected from falling debris by	▪ Circular No. 22/2010/TT-BXD dated on December 03, 2010 of MOC on labor safety in work construction. ▪ Instruction No. 02/2008/CT-BXD dated on March 27, 2008 on reorganizing and strengthening the measures to ensure labor safety, labor sanitation of constructional units.	▪ Contractor	▪ Supervision reports of CSC ▪ Supervision reports of GTP PMU

TT	Environmental and Social Issues	Mitigation Measures	Vietnam Code/Regulation	Responsibility	Verification to determine effectiveness of measures
		measures such as chutes, traffic control, and use of restricted access zones. ▪ Install fences, barriers, dangerous warning/prohibition site around the construction area which showing potential danger to public people. ▪ The contractor shall provide safety measures as installation of fences, barriers warning signs, lighting system against traffic accidents as well as other risk to people and sensitive areas.			
10	Traffic safety and congestion	▪ Before construction, carry out consultations with local government and community and with traffic police. ▪ Installation of lighting at night must be done if this is necessary to ensure safe traffic circulation. ▪ Place signs around the construction areas to facilitate traffic movement, and provide safety advice and warning. ▪ Maintain a supply for traffic signs (including paint, easel, sign material, etc.), road marking, and guard rails to maintain pedestrian safety during construction. ▪ Employing safe traffic control measures, including road/canal signs and flag persons to warn of dangerous conditions. ▪ Avoid material transportation for construction during rush hour.	▪ Law on traffic and transportation No. 23/2008/QH12 ▪ Law on construction No. 50/2014/QH13. ▪ Circular No. 22/2010/TT-BXD dated on December 03, 2010 of MOC on labor safety in work construction ▪ Circular No. 39/2011/TT-BGTVT of May 18, 2011 on the management and protection of road infrastructure facilities (chapter VI).	▪ Contractor	▪ Supervision reports of CSC ▪ Supervision reports of GTP PMU

TT	Environmental and Social Issues	Mitigation Measures	Vietnam Code/Regulation	Responsibility	Verification to determine effectiveness of measures
11	Communication with local communities	▪ Maintain open communications with the local government and concerned communities; the contractor shall coordinate with local authorities (leaders of local wards or communes, leader of villages) for agreed schedules of construction activities at areas nearby sensitive places or at sensitive times (e.g., religious festival days). ▪ Copies in Vietnamese of EIA/EMP and of other relevant environmental safeguard documents shall be made available to local communities and to workers at the site. ▪ Disseminate project information to affected parties (for example local authority, enterprises and affected households, etc) through community meetings before construction commencement. ▪ Provide a community relations contact from whom interested parties can receive information on site activities, project status and project implementation results. ▪ Inform local residents about construction and work schedules, interruption of services, traffic detour routes and demolition, as appropriate. ▪ Notification boards shall be erected at all construction sites providing information about the project, as well as contact information about the site managers, environmental staff, health and safety staff, telephone numbers and other contact information so that any	▪ Decree No. 167/2013/ND-CP dated on November 12, 2013, regulations on sanction of administrative violation in social security, order and safety, prevention and fighting of social evils, fire and domestic violence ▪ Decree No. 81/2013/ND-CP dated on July 19, 2013, detailing a number of articles of and measures to implement the Law on Handling of Administrative Violations	▪ Contractor.	▪ Supervision reports of CSC ▪ Supervision reports of GTP PMU

TT	Environmental and Social Issues	Mitigation Measures	Vietnam Code/Regulation	Responsibility	Verification to determine effectiveness of measures
		affected people can have the channel to voice their concerns and suggestions.			
12	Workforce and worker' camp management	*Workforce management:* ▪ Workforce includes all personnel hire by the Contractors to implement Project's items. The workers shall, whenever possible, rent houses near construction site. Otherwise, suitable accommodations shall be provided for the workforce. ▪ The Contractors shall: i) Give priority to hire local labor for the works; ii) Engineers and workers shall register their temporary residence with the local authority; iii) Provide work safety training to those local labors upon their hiring; iv) The construction workers and staff shall need to have appropriate certificates as required (for example, health checks, labor contracts, insurance, occupational safety training, etc.); v) Provide education classes on HIV and sexually transmitted diseases; vi) Ensure adequate use of resources and proper waste management. *Worker's camp management:* ▪ Site offices, camps, depots and particularly storage areas for diesel fuel and bitumen shall not be located in appropriate areas approved by ECO and not affected to watercourses, and be operated so that no pollutants enter watercourses. Camp areas shall be located to allow	▪ Law on traffic and transportation No. 23/2008/QH12 ▪ Law on construction No. 50/2014/QH13. ▪ Circular No. 22/2010/TT-BXD dated on December 03, 2010 of MOC on labor safety in work construction ▪ Circular No. 39/2011/TT-BGTVT of May 18, 2011 on the management and protection of road infrastructure facilities (chapter VI).	▪ Contractor	▪ Supervision reports of CSC ▪ Supervision reports of GTP PMU

TT	Environmental and Social Issues	Mitigation Measures	Vietnam Code/Regulation	Responsibility	Verification to determine effectiveness of measures
		effective natural drainage. ▪ The workforce shall be provided with safe, suitable and comfortable accommodations. They have to be maintained in clean and sanitary conditions ▪ Potable water safe for human consumption shall be provided for at camps, site offices, and other areas ▪ A method shall be established for storing and disposing of all solid wastes generated by the worker's camp. If applicable, kitchen wastes shall be disposed into soak pits. ▪ Separate and adequate lavatory facilities (toilets and washing areas) shall be provided for the use of male and female workers. Toilets must be provided at all construction camp areas where there will be a concentration of labor. A temporary septic tank shall be installed for the disposal of domestic wastes. ▪ A medical and first aid facilities and first aid boxes shall be provided for all workers. ▪ Some security measures shall be put into place in the construction area such as adequate, day-time and night-time lighting; a perimeter security fence; fire fighting equipment and portable fires extinguishers. ▪ Areas where construction activities are prohibited should be referred to as "no-go areas". Entry into these areas by any person, vehicle or equipment without the ECO's			

TT	Environmental and Social Issues	Mitigation Measures	Vietnam Code/Regulation	Responsibility	Verification to determine effectiveness of measures
		written permission should result in a penalty.			
13	Cultural impacts	*Implementation of chance find procedures as follows:* If the Contractor discovers archaeological sites, historical sites, remains and objects, including graveyards and/or individual graves during excavation or construction, the Contractor shall: ▪ Stop the construction activities in the area of the chance find. ▪ Delineate the discovered site or area. ▪ Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be arranged until the responsible local authorities or the Department of Culture and Information takes over. ▪ Notify the Construction Supervision Consultant who in turn will notify responsible local or national authorities in charge of the Cultural Property of Viet Nam (within 24 hours or less). ▪ Relevant local or national authorities would be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures. This would require a preliminary evaluation of the findings to be performed. The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage; those include the aesthetic, historic,	▪ Law on cultural heritage No. 28/2001/QH10 ▪ Law No. 32/2009/QH12 on amending and supplementing a number of articles of the Law on Cultural Heritages. ▪ Decree No. 98/2010/ND-CP detailing a number of articles of the law on cultural heritage and the law amending and supplementing a number of articles of the Law on Cultural Heritage.	▪ Contractor	▪ Supervision reports of CSC ▪ Supervision reports of GTP PMU

TT	Environmental and Social Issues	Mitigation Measures	Vietnam Code/Regulation	Responsibility	Verification to determine effectiveness of measures
		scientific or research, social and economic values. ▪ Decisions on how to handle the finding shall be taken by the responsible authorities. This could include changes in the layout (such as when finding an irremovable remain of cultural or archaeological importance) conservation, preservation, restoration and salvage. ▪ If the cultural sites and/or relics are of high value and site preservation is recommended by the professionals and required by the cultural relics authority, the Project's Owner will need to make necessary design changes to accommodate the request and preserve the site. ▪ Decisions concerning the management of the finding shall be communicated in writing by relevant authorities. ▪ Construction works could resume only after permission is granted from the responsible local authorities concerning safeguard of the heritage.			
14	Flooding and climate change	▪ Appropriate arrange of construction site to ensure the height and distance from high flooding risk areas. ▪ Consider the flooding history in the project area to schedule excavation works avoiding rainy season and flooding and flood-tide from July to December. ▪ It is necessary to restore the environmental conditions to the excavation and filling areas as soon as possible, limited to exposed soil for a long time.	▪ Circular No. 22/2010/TT-BXD dated on December 03, 2010 of MOC on labor safety in work construction ▪ Circular No. 39/2011/TT-BGTVT of May 18, 2011 on the management and protection of road infrastructure facilities	▪ Contractor	▪ Supervision reports of CSC ▪ Supervision reports of GTP PMU

TT	Environmental and Social Issues	Mitigation Measures	Vietnam Code/Regulation	Responsibility	Verification to determine effectiveness of measures
		▪ Build and maintain temporary drainage ditches within and surrounding construction sites to ensure surface runoff is drained efficiently. ▪ Prevent the material storage at the high potential flooding, specially at the intersection between Vo Van Kiet and An Duong Vuong street.	(chapter VI).		
III	**Operation stage**				
1	Dust and exhaust gases generation	▪ Controlling the emission from vehicles: It is necessary to comply with existing regulations on verifying and checking environment and safety ▪ Periodically carrying out surface cleaning at Rach Chiec Terminal and Thu Thiem Technical Facility to control secondary dust generation. ▪ Tree should be planted to create the environmental landscape on the stations, footbridge, parking areas, Rach Chiec Terminal and Thu Thiem Technical Facility.	▪ QCVN 06:2009/BTNMT. National technical regulation on hazardous substance in ambient air; ▪ TCVN 6438-2005: Road vehicles Maximum permitted emission limits of exhaust gas; ▪ Decision No. 249/2005/QĐ-TTg setting the roadmap for application of emission standards to road motor vehicles. ▪ Decision No. 49/2011/QD-TTg of September 01, 2011 prescribing the roadmap for the application of the exhaust standards to	▪ Management and Operation Centre of Public Transport (MOCPT)	Supervision and monitoring reports of GTP PMU (during warranty period) and specialized units under the People's Committee of Ho Chi Minh City

TT	Environmental and Social Issues	Mitigation Measures	Vietnam Code/Regulation	Responsibility	Verification to determine effectiveness of measures
			manufactured, assembled and imported cars and motorcycles.		
2	Solid waste (rubbish)	▪ Garbage bin: need to meet the requirement of Ministry of Construction QCVN 07:2010/BXD and daily clean. ▪ Waste trolley: will also meet the requirements of: i) the volume will be 250-660 litre; ii) material by heavy metal or composite; iii) daily clean. ▪ Waste transport and treatment: It is necessary to propose the feasible, economic and environmental hygiene measures for transporting and treating the solid waste. ▪ Assign staffs: the professional staffs need to be assigned to ensure the sanitation condition ▪ Budget: the budget for this activities need to ensure for running the system.	▪ Decree No. 59/2007/ND-CP on solid waste management. ▪ QCVN 07:2010/BXD Vietnam Building Code – Urban Engineering Infrastructures.	ditto	ditto
3	Hazardous waste	▪ The list and amount of hazardous waste are indentified in accordance with circular No. 12/2011/TT-BTNMT ▪ Storage of hazardous waste must in the places which facilitated with: i) roof; ii) concrete ground and water resistant;; iii) edge around the storage areas; iv) away from water bodies and high fire risk areas. ▪ Weekly records on volume of generated hazardous waste.	▪ QCVN 07:2009/BTNMT , National Technical Regulation on Hazardous Waste Thresholds ▪ Circular No. 12/2011/TT-BTNMT on management of hazardous substance.	ditto	ditto

TT	Environmental and Social Issues	Mitigation Measures	Vietnam Code/Regulation	Responsibility	Verification to determine effectiveness of measures
		▪ Sign contact with company which has a work permit to treat hazardous waste.			
4	Wastewater	*For design:* Wastewater treatment system will be carefully evaluated for each type of waste water flows ▪ For runoff water (rainy water): this kind of wastewater is considered as polluted and could directly discharge into general drainage system. ▪ For domestic wastewater: Septic tank is built in accordance with existing standards. Wastewater must discharge into septic tank before discharging into general drainage system of Thu Thiem Technical Facility and Rach Chiec Terminal. The quality of wastewater from this flow need to meet the requirements on QCVN 14 : 2008/BTNMT – National standard for domestic wastewater ▪ For wastewater from vehicle maintain and hygiene activities: This kind of wastewater must collect into a technical manhole for treatment before discharging into general drainage system. The quality of wastewater from this flow need to meet the requirements on QCVN 40:2011/BTNMT – National standard for industrial wastewater. *For operation the system:* ▪ Regularly remove the sludge from septic tank and manholes;	▪ QCVN 14:2008/BTNMT: National technical regulation on domestic wastewater. ▪ QCVN 40:2011/BTNMT National technical regulation on industrial wastewater. ▪ TCVN 7222: 2002: General environmental requirements for central domestic (municipal) wastewater treatment plants.	ditto	ditto

TT	Environmental and Social Issues	Mitigation Measures	Vietnam Code/Regulation	Responsibility	Verification to determine effectiveness of measures
		▪ Regularly carry out the cleaning the drainage to ensure water flow. ▪ Allocating adequate budget for operating the wastewater treatment system			
5	Traffic safety and congestion	▪ Place trafic sign at the intersections and at the bus stop stations. ▪ Appropriately operation of priority signal lights and traffic signal light. ▪ Coordinate with traffic police groups along the BRT route for managing in traffic during rush hours. ▪ Design of traffic signal system on the route and at the entrance area of Ga Rach Terminal, Thu Thiem Technical Facility to meet the national standards. ▪ Coordinate with local authorities or seek resources to implement measures to improve the awareness of traffic participants on the route.	▪ Law on traffic and transportation No. 23/2008/QH12 ▪ Law on construction No. 50/2014/QH13. ▪ Circular No. 22/2010/TT-BXD dated on December 03, 2010 of MOC on labor safety in work construction ▪ Circular No. 39/2011/TT-BGTVT of May 18, 2011 on the management and protection of road infrastructure facilities (chapter VI).	ditto	ditto
6	Social security and evils	▪ Develop the systems of surveillance cameras in the BRT station and Rach Chiec Terminal to observe, monitor and respond to various types of social evils arising at these areas. ▪ Assigning the safeguards to ensure the social security at	▪ Decree No. 167/2013/ND-CP dated on November 12, 2013, regulations on sanction of administrative violation in social security, order and safety, prevention	ditto	ditto

TT	Environmental and Social Issues	Mitigation Measures	Vietnam Code/Regulation	Responsibility	Verification to determine effectiveness of measures
		the station, Rach Chiec Terminal and Thu Thiem Technical Facility. ▪ Coordinate with local authorities in control social evils, issues at the public areas such as: BRT station, footbridges, Rach Chiec Terminal and Thu Thiem Technical Facility.. ▪ Raising awareness on social awareness and responsibility of the officers and traffic participants. ▪ Training for drivers and conductors to have good behaviour with passenger and increase awareness and social responsibility for drivers.	and fighting of social evils, fire and domestic violence ▪ Decree No. 81/2013/ND-CP dated on July 19, 2013, detailing a number of articles of and measures to implement the Law on Handling of Administrative Violations		
7	Risk of fire and explosion	Carrying out the measures of preventing and fighting fire are including: ▪ Arranging equipment for preventing and fighting fire. ▪ Training for the preventing and fighting fire. ▪ Coordinate with unit of preventing and fighting fire and local health units ready to respond to emergency incidents of fire occurred.	▪		
8	Risk from operating CNG fuel supply system	▪ For ensuring operation safety of fuel supply system, it is necessary to pay attention the following issues: ▪ Pay attention to safety requirement ▪ Equipment operation and management	▪ The Law on fire prevention and fire fighting No. 27/2001/QH10. ▪ TCVN 6156:1996: Pressure vessels - Safety engineering	ditto	ditto

TT	Environmental and Social Issues	Mitigation Measures	Vietnam Code/Regulation	Responsibility	Verification to determine effectiveness of measures
		▪ Warning equipment need to appropriately operation. ▪ Maintenance process of gas storage equipment. ▪ Education and training for staffs who will be in charge of operation, maintenance, repair of all pressure equipment and who is new. ▪ Carry out the periodic equipment verification	requirements of erection, use, repair. Testing method. ▪ TCVN 6292:1997: Gas cylinders - Refillable welded steel gas cylinders. ▪ TCVN 6294-1997: Gas cylinders – Welded carbon steel gas cylinders – Periodic inspection and testing. ▪ TCVN 6295-1997: Gas cylinders - Seamless gas cylinders - Safety and performance criteria. ▪ TCVN 6008-2010: Pressure equipment - Welds - Technical requirements and testing methods. ▪ TCVN 7472-2005: Welding - Fusion - welded joints in steel, nickel, titanium and their alloys (beam welding excluded) - Quality levels.		
IV	**Environmental Accidents**				

TT	Environmental and Social Issues	Mitigation Measures	Vietnam Code/Regulation	Responsibility	Verification to determine effectiveness of measures
1	Fire and explosive accident during construction stage	▪ Applying the standards for fire prevention in design of temporary works. Arranging the warehouses is reasonable, proper in technical requirements, convenient for the fire ▪ Fire fighting equipment (fire extinguisher, CO_2 scuba) are equipped on the warehouses. The workers should be provided training on fire and explosion prevention and management on the sites. ▪ Provide the protective equipment for worker	▪ The Law on fire prevention and fire fighting No. 27/2001/QH10; ▪ Law on Environment protection No. 52/2005/QH11.	▪ Contractor	▪ Supervision reports of CSC ▪ Supervision reports of GTP PMU.
2	Storm and flood during construction	▪ The contractors must build up an emergency rapid response plan in case of accidents, work collapse, hazardous substance/ waste leak out to surrounding areas…	▪ Law on Water Resources No. 17/2012/QH13	ditto	ditto

The mitigation measures along the alignment are described in the following table and Appendix 1.

Table 6.2. Site-specific Mitigation Measures

No	Station	Sensitive Area or Activity	Mitigation Measures		Responsibility	Verification to determine effectiveness of measures
1	Km0+000 – Km5+000	▪ The route passes through Nuoc Len Bridge (Nuoc Len Canal), Rach Cay Bridge (Ruot Ngua Canal) and Lo Gom Bridge (Lo Gom Canal). ▪ On the right of route, there is lotus pond area nearby the sidewalk at Km2+500. ▪ On the two side of the road, there are residential areas of An Lac Ward (Binh Tan District), Ward 16 (District 8), Ward 10 and 7 (District 6). ▪ There is pedestrian flyover No.2 on the route. ▪ Vo Van Kiet - Ho Hoc Lam Intersection regularly occurs flooding due to heavy rain and high tide.	▪ It should be pay attention to prevent dust, noise, mud when construction is nearby residential area. ▪ Ensure traffic safety (installation of fence and warning sign, traffic instruction, etc) around construction area. ▪ Wastewater, solid waste, spoil… should be controlled to avoid effect on surface water sources by pollution (Nuoc Len, Ruot Ngua, Lo Gom canals and lotus pond area). ▪ Arranging pump if flooding occurs; installation of warning signs.	▪ QCVN 06:2009/BTNMT ▪ TCVN 6438:2005 ▪ QCVN 26:2010/BTNMT ▪ Decree No. 59/2007/ND-CP ▪ QCVN 07:2009/BTNMT ▪ Circular No. 12/2011/TT-BTNMT ▪ QCVN 08:2008/BTNMT ▪ QCVN 14:2008/BTNMT ▪ QCVN 40:2011/BTNMT ▪ Circular No.	▪ Contractor	▪ Supervision reports of CSC ▪ Supervision and monitoring reports of GTP PMU

No	Station	Sensitive Area or Activity	Mitigation Measures		Responsibility	Verification to determine effectiveness of measures
				22/2010/TT-BXD; ▪ Circular No. 39/2011/TT-BGTVT		
2	Km5+000 – Km11+000	▪ Tau Hu Canal is on the right of the route ▪ On the left of the route, there are dense residential areas of Ward 3, 1 (District 6); Ward 13, 10, 6, 5 and 1 (District 5). ▪ The other objects: Kim Dong Primary School, Ham Tu Primary School, Hospital for tropical diseases, Psychiatric Hospital, Hoa Binh Market, Warehouse 252, etc. ▪ There are some pedestrian flyovers on the route.	▪ It should be pay attention to prevent dust, noise, mud when construction is nearby residential area, hospital, school, etc. ▪ Ensure traffic safety (installation of fence and warning sign, traffic instruction, etc) around construction area. ▪ Wastewater, solid waste, spoil… should be controlled to avoid effect on surface water sources by pollution.	ditto	ditto	ditto
3	Km11+000 – Km 17+000	▪ Tau Hu is on the right of the route, the route pass through Kenh 2 Canal (Kenh 2 Bridge). ▪ On the left of the route, there are dense residential areas of Cau Ong Lanh, Nguyen Thai Binh, Co Giang	▪ It should be pay attention to prevent dust, noise, mud when construction nearby residential area, offices. ▪ Ensure traffic safety (installation of fence and	ditto	ditto	ditto

No	Station	Sensitive Area or Activity	Mitigation Measures		Responsibility	Verification to determine effectiveness of measures
		wards, Thu Thiem Urban Area Plan (Thu Thiem and An Loi Dong wards). ▪ Other objects: Offices are next to the alignment (Viet Nam State Treasury, Vietcom Bank, Vietcombank, etc). ▪ There are some pedestrian flyovers on the route.	warning sign, traffic instruction, etc) around construction area. ▪ Wastewater, solid waste, spoil should be controlled to avoid effect on surface water sources by pollution.			
4	Km17+000 – Ending Point	▪ The route passes through Ca Tre Lon Canal (Ca Tre Lon Bridge), Ca Tre Nho Canal (Ca Tre Bridge). ▪ Dense residential areas are located at the intersection with Luong Dinh Cua Street; some small shops are located along the route at section from Km20 – Km22. ▪ Most land of An Khanh, Binh Khanh and An Loi Dong wards had been acquired for Thu Thiem Urban Area Project. ▪ There are many trucks on the route.	▪ It should be pay attention to prevent dust, noise, mud when construction is nearby residential areas. ▪ Ensure traffic safety (installation of fence and warning sign, traffic instruction, etc) around construction area. ▪ Wastewater, solid waste, spoil should be controlled to avoid effect on surface water sources by pollution.	ditto	ditto	ditto

VII. Monitoring Program

7.1. Objectives

It is essential to design the monitoring program and monitoring frequency appropriately to be able to demonstrate both the overall performance of the project works as well as the short-term impacts due to peak construction activities. More specifically, as the integral and critical part of the EMP, the environment-monitoring program should have the following objectives:

- Determine the actual extent of the impacts.
- Control impacts which are generated from construction process and mentioned in the EIA/EMP report.
- Check and supervise implementation of environmental protection solutions during construction based on EIA/EMP report.
- Suggest mitigation measures in case of unexpected impacts.
- Suggest to the Project Owner to coordinate with central and local environmental organizations to solve any pending issues that might arise relating to environmental protection under the scope of the project.
- Assess the effect of mitigation measures in pre-construction, construction and operation stages.

7.2. Monitoring Content

The environmental monitoring program will be implemented during construction and operation process at 4 levels:

- Monitoring project completion indicator
- Monitoring the level of compliance with mitigation measures
- Community-based Monitoring
- Monitoring environmental parameters

Details of the monitoring program proposed are presented below.

7.2.1. Indicators of project completion

A system of monitoring indicators is proposed to assess the performance at some project stages. These indicators which represent the characteristics of project activities are easy to collect and analyze based on the experience gained from these similar WB-funded infrastructure projects in Vietnam. On the basis of original targets, socio-economic, environmental, sustainable development indicators, etc of the project will be set.

These indicators will be established in the Project manual. The main environmental indicators related to the investment efficiency of the Project include, but not limited, to the following issues:

- Level of sanitation improvement
- Level of living standard improvement

This monitoring will be implemented after Project completion. PMU, through technical consultants, will collect and analyze these types of data to issue periodic reports of project completion

7.2.2. Indicators of implementation of mitigation measures

The monitoring roles of construction contractors, ES, IEMC are clearly defined in their TOR and contract documents, which are approved by the World Bank. ES is responsible for preparing and submitting every six months reports, which address environmental issues, actions and updated monitoring results to GTP PMU for reviewing environmental issues and mitigation measures. GTP PMU prepare and submit six three months reports to WB. GTP PMU's reports will include:

- The list of priorities identified in the previous monitoring report.
- The mitigation measures implemented by construction contractor to address issues arisen.
- The unresolved issues, proposal of appropriate remedial measures and explanation of unexpected events.

Table 7.1. Mitigation Measures Monitoring Program

No	Impact	Monitored parameter	Monitored point	Monitoring method	Timing/ frequency of monitoring	Responsibility	Verification
I	**Pre-construction stage**						
1	Permanently and temporarily acquired land	Land acquisition land compensation payment	Area to be acquired	▪ Examine records of land acquisition execution and compensation. ▪ Survey and interview local people.	During period of compensation and land acquisition.	GTP PMU and Independent resettlement monitoring consultant	Monitoring reports of GTP PMU and Independent resettlement monitoring consultant
2	Worker and public Safety	Safety on the construction site	Construction area of Rach Chiec Terminal and Thu Thiem Depot.	▪ Examine records of UXO clearance work ▪ Field survey	Once, before construction commence	GTP PMU /CSC	Monitoring reports of GTP PMU /CSC
3	Interruption of facility services	Kế hoạch gián đoạn. Interuption plan	In the whole areas to be interrupted	▪ Examine records of facility services removal ▪ Field survey	Once, before construction commence	GTP PMU /CSC	Monitoring reports of GTP PMU /CSC
II	**Construction stage**						
1	Dust generation/ Air pollution	▪ Dust concentration in sensitive areas. ▪ Cover for material/ waste during transportation process. ▪ Parameters of air quality	Project area (esspecially areas with excavation and filling and waste/ material storage), transportation roads.	▪ Observe daily by CSC; ▪ Monitoring air quality (every 6 months by IEMC)		GTP PMU /CSC/ IEMC	Monitoring reports of GTP PMU /CSC/ IEMC
2	Impacts from noise and vibration	▪ Noise, virbration caused by equipment; ▪ Response from resident to noise during	At the resiential areas	▪ Observe daily by CSC; ▪ Monitoring noise and vibration (every 6 months by IEMC); ▪ Interview local people in cases of		GTP PMU /CSC/ IEMC	Monitoring reports of GTP PMU /CSC/ IEMC

No	Impact	Monitored parameter	Monitored point	Monitoring method	Timing/ frequency of monitoring	Responsibility	Verification
		construction		complaints.			
3	Surface water pollution	▪ Installation and operation of wastewater collecting and treating systems for construction sites and worker's camps ▪ Installation of mobile toilets on sites. ▪ Collection and treatment of hazardous substances ▪ Parameters of surface quality	▪ At the sources of surface water ▪ at the worker' camp.	▪ Observe daily by CSC; ▪ Monitoring surface water quality (every 6 months by IEMC); ▪ Interview local people in cases of complaints.		GTP PMU /CSC/ IEMC	Monitoring reports of GTP PMU /CSC/ IEMC
4	Drainage and sedimentation	▪ Sedimentation control system	At the culvert locations	▪ Observe daily by CSC; ▪ Supervise every 6 months by IEMC;		GTP PMU /CSC/ IEMC	Monitoring reports of GTP PMU /CSC/ IEMC
5	Solid waste	▪ Solid waste collection schedule ▪ Location of refuse disposal sites ▪ Quantity of rubbish bins, container of hazardous waste ▪ Site clean-up schedule	Constructiont area and worker' camp.	▪ Observe daily by CSC; ▪ Examine construction records and field survey (every 6 months by IEMC)		GTP PMU /CSC/ IEMC	Monitoring reports of GTP PMU /CSC/ IEMC
6	Hazardous wastes						
7	Demage to community and existing local roads	▪ Traffic flow ▪ Road condition ▪ Repair roads after use (if required)	Along the transport roads	▪ Observe daily by CSC; ▪ Examine construction records of the compensation for damage of existing local roads (every 6 months by IEMC) ▪ Field survey of existing local roads (every		GTP PMU /CSC/ IEMC	Monitoring reports of GTP PMU /CSC/ IEMC

No	Impact	Monitored parameter	Monitored point	Monitoring method	Timing/ frequency of monitoring	Responsibility	Verification
				6 months by IEMC).			
8	Worker and public Safety	▪ Quantity, quality and usage of work safety equipment; ▪ Implementation of training	Constructiont area	▪ Quality and quantity checks of protection equipment (once before construction commence); ▪ Observe daily by CSC; ▪ Examine construction records (every 6 months by IEMC).		GTP PMU /CSC/ IEMC	Monitoring reports of GTP PMU /CSC/ IEMC
9	Traffic safety and congestion	▪ Traffic safety system; ▪ Construction schedule	Constructiont area	▪ Consult with local authority and police; ▪ Examine records of traffic congestion and traffic incidents (every 6 months by IEMC).		GTP PMU /CSC/ IEMC	Monitoring reports of GTP PMU /CSC/ IEMC
10	Communication with local communities	▪ Implementation of Information dissemination; ▪ Implementation of providing environmental safeguard documents	Project area	▪ Checking the information disclosure by the relevant documents	▪ Before construction commence and during construction	GTP PMU /CSC/ IEMC	Monitoring reports of GTP PMU /CSC/ IEMC
11	Workforce and worker ‘camp management	▪ Establish and application of labour working and living policies ▪ Amount and frequency of conflicts within workers and between workers and local people ▪ Rate of crime and social evil (drug use, prostitution, gambling,…) ▪ Water supply, energy supply, hygiene, waste collecting and treating	Worker ‘camp	▪ Facility check of worker’s camps (monthly by CSC and every six months by IEMC); ▪ Examine records of heath check for workers (yearly); ▪ Security check at worker’s camps (weekly by CSC) ▪ Examine records of incidents (every six months by IEMC); ▪ Survey and interview local community (every 6 months by IEMC)		GTP PMU /CSC/ IEMC	Monitoring reports of GTP PMU /CSC/ IEMC

No	Impact	Monitored parameter	Monitored point	Monitoring method	Timing/ frequency of monitoring	Responsibility	Verification
		systems, toilets, wastewater, solid waste for construction sites and worker's camps; ▪ Health check for workers					
12	Cultural impacts	▪ Change find procedure	Constructiont area	▪ Examining and accessing	In case of finding	GTP PMU /CSC	Monitoring reports of GTP PMU /CSC
13	Flooding and climate change	▪ Flooding and climate change response plan.	Constructiont area	▪ Examining and accessing	In case of risk	GTP PMU /CSC	Monitoring reports of GTP PMU /CSC
14	Restoration of affected areas	▪ Conditions of affected areas after construction stage ▪ Site clean-up effectiveness ▪ Create lanscape temporarily acquired areas	Project area, construction sites and temporarily acquired areas	▪ Observe daily affected areas during site recovery period. ▪ Field survey and work records examination (at the end of site recovery period)		GTP PMU /CSC	Monitoring reports of GTP PMU /CSC
IV	**Operation stage**						
1	Dust and exhaust gases generation	▪ Dust concentration in sensitive areas. ▪ Environmental sanitation	Along the project route, stations, technical facility and Rach Chiec Teminal.	▪ Checking and accessing ▪ Monitoring air quality	Every six moths	▪ The GTP PMU will be responsible for monitoring the warranty period; ▪ After warranty period, the specialized	Monitoring reports of GTP PMU and specialized units under the People's Committee of Ho Chi Minh City
2	Solid waste (rubbish)	▪ Solid waste collection schedule ▪ Works, environmental sanitation equipment	Along the project route, stations, technical facility and Rach Chiec Teminal.	▪ Checking and accessing	Every six moths		
3	Hazardous waste						
4	Wastewater	▪ Wastewater collecting and treating works ▪ Parameters of wastewater	Along the project route, stations, technical facility and	▪ Checking and accessing ▪ Monitoring	Every six moths		

No	Impact	Monitored parameter	Monitored point	Monitoring method	Timing/ frequency of monitoring	Responsibility	Verification
			Rach Chiec Teminal.	wastewater quality		units of the city people's committee are responsible for monitoring.	
5	Traffic safety and congestion	▪ Traffic safety equipment	Along the project route, stations, technical facility and Rach Chiec Teminal.	▪ Checking and accessing	Every six moths		
6	Social security and evils	▪ Plan of ensuring social security and evils	Along the project route, stations, technical facility and Rach Chiec Teminal.	▪ Checking and accessing	Every six moths		
7	Risk of fire and explosion	▪ Arranging the equipment response to accidents; ▪ Prepare emergency response plan.	At the BRT station, Rach Chiec Terminal, Thu Thiem Technical Facility and on the BRT vehicles	▪ Observing and and accessing	Every six moths		
8	Risk from operating fuel supply system	▪ Maintenance the protection and warning equipment ▪ Training records of officers and workers	Fuel supply station	▪ Observing and and accessing	Every six moths		
V	**Environmental Accidents**						
1	Fire and explosive accident during construction stage	▪ Arranging the equipment response to accidents; ▪ Prepare emergency response plan.	Constructiont area	▪ Checking and accessing	During construction	GTP PMU /CSC	Monitoring reports of GTP PMU /CSC
2	Storm and flood during construction						

7.2.3. Community-based monitoring

Community-based monitoring is a voluntary activity of people living in commune/ ward areas. Community Supervision Board will be established by Decision No. 80/2005/QD-TTg and others relevant regulations. Community Supervision Board will be responsible for:

- Monitoring and assessing the observance of investment management regulations by agencies competent to decide on investment, investors, project management unit, contractors and project-implementing units in the investment process (including environmental issues);
- Detecting and recommending to the competent state agencies on violations of regulations on investment management (including environmental issues) so as to promptly prevent and handle acts that violate regulations, cause wastage and/or loss of state capital and properties or infringe the interests of the community

7.2.4. Environmental Quality Monitoring Indicators

The environmental quality-monitoring program would be conducted in two project stages: construction and operation stages (a year when the project first came into operation). IEMC is responsible for the environmental quality-monitoring program periodically. The environmental monitoring program is summarized in the Table 7.3. The monitoring locations are presented in the Table 7.2 and illustrated in the Figure 7.1.

To implement adequate and effective monitoring of the Project impacts (both positive and negative) and to avoid misspending, the monitoring program (including the monitoring locations) will be updated/adjusted in accordance with actual construction and Project progress in detailed design and construction stages.

Table 7.2. Environmental Quality Survey Locations

No	Location	Sign	Construction stage	Operation stage	Coordinate
I	**Air, Noise and Vibration**		**6 locations**	**8 locations**	
1	NH1A Interchange	KK1, O1, R1	x	x	10°43'9.46"N 106°36'2.79"E
2	Resident area of Ward no.3	KK2, O2, R2	x	x	10°44'28.72"N; 106°38'43.94"E
3	Hospital for tropical diseases	KK3, O3, R3	x	x	10°45'8.04"N; 106°40'40.08"E
4	Resident area near Ong Lanh Bridge	KK4, O4, R4	x	x	10°45'45.85"N; 106°41'49.53"E
5	Vietnam AIS International School	KK5, O5, R5	x	x	10°47'14.50"N; 106°44'57.24"E
6	Ha Noi Boulevard – Mai Chi Tho road Interchange - near Rach Chiec Bridge	KK6, O6, R6	x	x	10°48'7.95"N; 106°45'14.02"E
7	Thu Thiem Technical Facility	KK7, O7, R7		x	$10^0$78’89 N, $106^0$74’52 E
8	Rach Chiec Terminal	KK8, O8, R8		x	$10^0$81’16” N, $106^0$75’76” E
II	**Surface water**		**5 locations**		
1	Nuoc Len Canal	Nm1	x		10°43'7.03"N; 106°36'15.01"E
2	Ruot Ngua Canal	Nm2	x		10°43'48.65"N;

No	Location	Sign	Construction stage	Operation stage	Coordinate
					106°37'39.03"E
3	Lo Gom Canal	Nm3	x		10°44'3.48"N; 106°38'3.76"E
4	Ca Tre Lon Canal	Nm4	x		10°46'43.19"N 106°44'1.82"E
5	Ca Tre Nho Canal	Nm5	x		10°46'51.53"N; 106°44'17.55"E
III	**Industrial wastewater**			**2 locations**	
1	Entrance of industrial wastewater treatment system at Thu Thiem Technical Facility	Ntcn1		x	
2	Exit of industrial wastewater treatment system at Thu Thiem Technical Facility	Ntcn2		x	
IV	**Domestic wastewater**			**2 locations**	
1	Exit of domestic wastewater treatment system at Thu Thiem Technical Facility	Ntsh3		x	
2	Exit of domestic wastewater treatment system at Rach Chiec Terminal	Ntsh4		x	

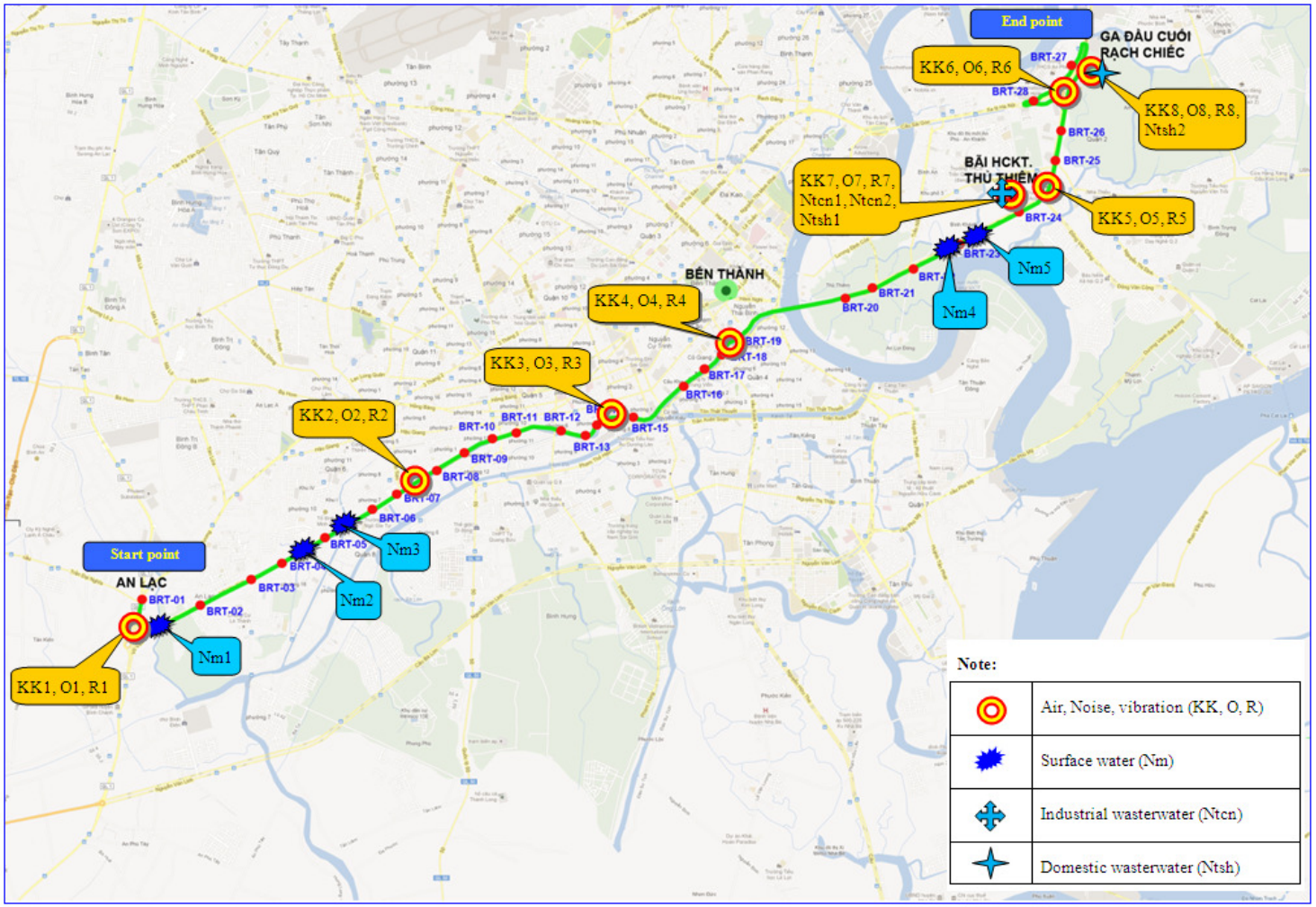


Figure 7.1. Locations of Environmental Quality Monitoring

Table 7.3. Environmental Monitoring Requirements

No	Monitoring items	Stage	
		Construction	Operation
I	**Monitoring air quality**		
1	Monitoring parameter	TSP, PM10	TSP, PM10, CO, SO_2, NO_2
2	Monitoring frequency	Measure once every 06 months, 01 location/day, measure eight times /day	
3	Frequency of taking samples	06 locations x 8 samples x 4 turns (2 years as expected)	08 locations x 8 samples x 1 year x 2 turns
4	Standard for comparison	QCVN 05:2013/ BTNMT	
II	**Monitoring noise, vibration**		
1	Monitoring parameter	Noise (Leq), Vibration (Laeq)	
2	Monitoring frequency	Measure once every 06 months, 01 location/day, measure fifteen times /day, 3 samples/time	
3	Frequency of taking samples	6 locations x 15 times x 3 samples x 4 turns (2 years as expected)	08 locations x 15 times x 3 samples x 2 turns
4	Standard for comparison	QCVN 26:2010/ BTNMT (noise) and QCVN 27:2010/BTNMT (vibration)	
III	**Surface water quality**		
1	Monitoring parameter	Temperature, pH, turbidity, DO, COD, BOD_5, TSS, E.Coli and Coliform.	
2	Monitoring frequency	Measure once every 06 months; 01 sample/ location Measure 01 time/day	
3	Frequency of taking samples	5 locations x 01 sample x 4 turns (2 years as expected)	
4	Standard for comparison	QCVN 08:2008/ BTNMT	
III	**Industrial wastewater**		
1	Monitoring parameter		pH, COD, BOD_5, TSS, oil
2	Monitoring frequency		Measure once every 06 months; 01 sample/ location Measure 01 time/day
3	Frequency of taking samples		2 locations x 01 sample x 1 year x 2 turns
4	Standard for comparison		QCVN 40:2011/ BTNMT
IV	**Domestic wastewater**		
1	Monitoring parameter		pH, BOD_5, TSS, TS, N-NH_4^+, tổng P (PO_4^{3-}), Coliform.
2	Monitoring frequency		Measure once every 06 months; 01 sample/ location Measure 01 time/day
3	Frequency of taking samples		2 locations x 01 sample x 1 year x 2 turns
4	Standard for comparison		QCVN 14:2008/ BTNMT

7.3. Monitoring Report System

In order to exchange information effectively, establish a database for monitoring the implementation of mitigation measures, and create an effective implementation of EMP, it is essential to adopt a system of standard report at all levels of management as shown in the table below.

Table 7.4. System of Environmental Monitoring Report

No.	Issues to be reported	Monitoring at 1st level	Monitoring at 2nd level (One duplicate must be sent to DONRE of Ho Chi Minh City)	Monitoring at 3rd level
	Construction stage			
1	Implement mitigation measures on site in accordance with the EMP and contract clauses	**Implemented by:** Contractor **Frequency of report submission:** Monthly **Report sent to:** GTP PMU	**Implemented by:** GTP PMU **Frequency of report submission:** once every six months **Report sent to:** UCCI	**Implemented by:** UCCI **Frequency of report submission:** once every six months **Report sent to:** WB
2	Monitoring and supervision of the EMP compliance in accordance with the contract clauses	**Implemented by:** Environmental Supervisor (ES)/ Construction Supervision Consultant (CSC) **Frequency of report submission:** once every six months **Report sent to:** GTP PMU	**Implemented by:** GTP PMU **Frequency of report submission:** once every six months **Report sent to:** WB	
3	Periodical monitoring and supervising of environmental issues	**Implemented by:** Independent Environmental Monitoring Consultant (IEMC) **Frequency of report submission:** once every six months **Report sent to:** GTP PMU	**Implemented by:** GTP PMU **Frequency of report submission:** once every six months **Report sent to:** WB	
4	Community monitoring of EMP implementation	**Implemented by:** Community Supervision Board. **Frequency of report submission:** In cases of reflection/complaints.	**Implemented by:** Local authority at ward/commune level. **Frequency of report submission:** In cases of reflection/complaints.	

No.	Issues to be reported	Monitoring at 1st level	Monitoring at 2nd level (One duplicate must be sent to DONRE of Ho Chi Minh City)	Monitoring at 3rd level
		Send report to: Local authority at ward/commune level.	**Send report to:** GTP PMU, competent authorities	
	Operation stage (during warranty period)			
1	Periodical monitoring and supervising of environmental issues		**Implemented by:** Independent Environmental Monitoring Consultant – (IEMC) **Frequency of report submission:** once every six months **Report sent to:** GTP PMU	
2	Monitoring and supervision of the EMP compliance in accordance with the contract clauses	**Implemented by:** ES/CSC **Frequency of report submission:** once every six months **Report sent to:** GTP PMU		
3	Local environmental monitoring	**Implemented by:** Local authority at ward/commune level. **Frequency of report submission:** once every six months **Report sent to:** Local authority at district level.	**Implemented by:** Local authority at district level. **Frequency of report submission:** once every six months **Report sent to:** DONRE	**Implemented by:** DONRE **Frequency of report submission:** annually **Report sent to:** Ho Chi Minh City People's committee

7.4. Environmental Management System

7.4.1. Stakeholders' Responsibilities for EMP Implementation

Environmental management plan during pre-construction and construction stages requires the involvement of several stakeholders and agencies, each with different roles and responsibilities including:

- World Bank (WB): Sponsor;
- Project owner: Urban-civil Works Construction Investment Management Authority of Ho Chi Minh City/ HCM City Green Transport Project Management Unit;
- The agency approved Environmental impact assessment report: Department of Natural Resource and Environment of Ho Chi Minh City;
- Construction Supervision Consultant (CSC)/ Environmental Supervisor (ES);
- Independent Environmental Monitoring Consultant (IEMC);
- Contractor; and
- Local communities;

The roles and responsibilities of these parties with respect to environmental management are described in the bellow figure.

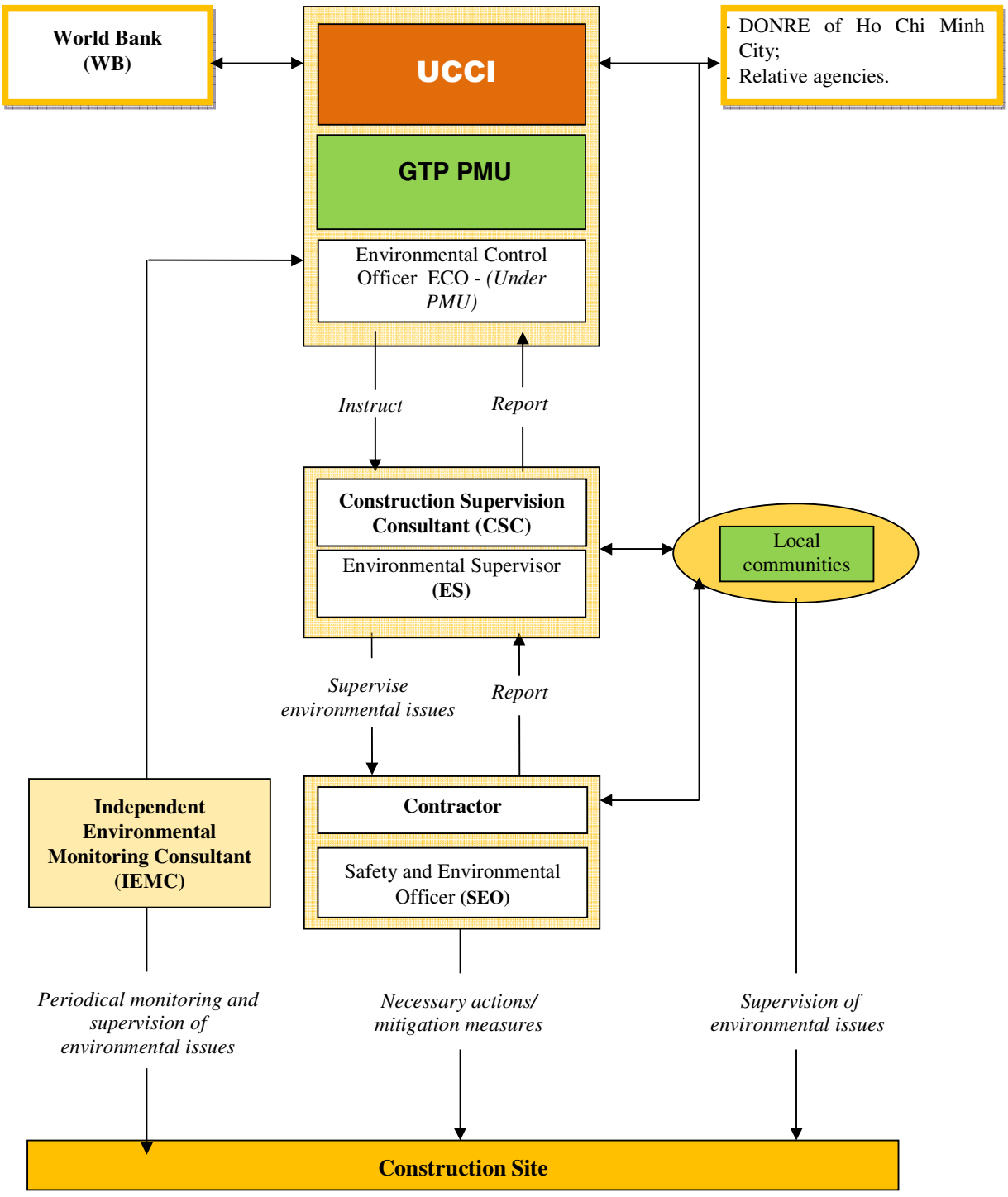


Figure 7.2. Environmental Management System of the Project

Specific responsibilities of the stakeholders are presented in the following table.

Table 7.5. Roles and Responsibilities of Stakeholders in Pre-construction and Construction Stages of the Project

Concerned Agencies	Role/Responsibility
Urban-civil Works Construction Investment Management Authority of Ho Chi Minh City (UCCI) / HCM City Green Transport Project Management Unit (GTP PMU)	- UCCI, the Project implementing agency, will be responsible for overseeing the project implementation. - GTP PMU, representative of the UCCI, will be responsible for monitoring the overall project implementation, including environmental compliance of the project. GTP PMU will have the final responsibility for environmental performance of the project during the Project's stages. - Specifically the PMU will: (i) closely coordinate with local authorities in the participation of the community during project preparation and implementation; (ii) monitor and supervise EMP implementation including incorporation of EMP into the detailed technical designs and bidding and contractual documents; (iii) ensure that an environmental management system is set up and functions properly; (iv) be in charge of reporting on EMP implementation to the UCCI and the World Bank. - In order to get effectiveness in the implementation process, GTP PMU will appoint an Environmental Control Officer to help with the environmental aspects of the project.
Environmental Control Officers – ECO - *(Under GTP PMU)*	- GTP PMU will appoint ECO to help to solve Project's environmental issues, to supervise the implementation of the WB's safeguards policies and Vietnamese regulations during the stages of the Project. Specifically, ECO will be responsible for: i) reviewing the subproject EIA/EPC and EMPs prepared by consultants to ensure quality of the documents; ii) helping GTP PMU incorporate EMP into the detailed technical designs and civil works bidding and contractual documents; iii) helping GTP PMU incorporate responsibilities for EMP monitoring and supervision into the TORs, bidding and contractual documents for CSC and IEMC; iv) providing relevant inputs to the consultant selection process; v) reviewing reports submitted by the CSC and IEMC; vi) conducting periodic site checks; vii) advising the GTP PMU on solutions to environmental issues of the project; and viii) preparing environmental performance section on the progress and review reports to be submitted to the UCCI and the World Bank.
Construction Supervision Consultant (CSC)/ Environmental Supervisor (ES)	- The CSC will be responsible for routine supervising and monitoring all construction activities and for ensuring that Contractors comply with the requirements of the contracts and the EMP. The CSC shall engage sufficient number of qualified staff (e.g. Environmental Engineers) with adequate knowledge on environmental protection and construction project management to perform the required duties and to supervise the Contractor's performance. - The CSC will also assist the GTP PMU in reporting and maintaining close coordination with the local community.
Independent Environmental Monitoring Consultant (IEMC)	- IEMC will, under the contract scope, provide support to GTP PMU to establish and operate an environmental management system, offers suggestions for adjusting and building capacity for relevant agencies during project implementation and monitor the Contractor's EMP implementation in both construction and operation stages. IEMC will also be responsible to support GTP PMU to prepare monitoring reports on EMP implementation. - Carrying out periodical supervision and monitoring of environment, preparing periodical monitoring reports and submitting to GTP PMU and carrying out

Concerned Agencies	Role/Responsibility
	supplementary measurements when required. - The IEMC shall have extensive knowledge and experience in environmental monitoring and auditing to provide independent, objective and professional advice on the environmental performance of the project.
Contractor	- Based on the approved EMP, the Contractor is responsible for establishing a site-specific EMP for each construction site area, submit the plan to GTP PMU and CSC for review and approval before commencement of construction. In addition, it is required that the Contractor get all permissions for construction (traffic control and diversion, excavation, labor safety, etc.) before civil works following current regulations. - The contractor is required to appoint a competent individual as the contractor‘s on-site Safety and Environment Officer (SEO) who will be responsible for monitoring the contractor‘s compliance with health and safety requirements, the EMP requirements, and the environmental specifications. - Take actions to mitigate all potential negative impacts in line with the objective described in the EMP. - Actively communicate with local residents and take actions to prevent disturbance during construction. - Ensure that all staff and workers understand the procedure and their tasks in the environmental management program. - Report to the GTP PMU on any difficulties and their solutions. - Report to local authority and GTP PMU if environmental accidents occur and coordinate with agencies and keys stakeholders to resolve these issues.
Ho Chi Minh City People’s committee	- Implement or may assign its professional environmental protection agency to carry out: i) Inspecting and certifying the application of environmental protection works and measures for Project operation; ii) Inspecting the application of environmental protection measures in the investment preparation and project construction phases when necessary. - Shall detail the inspection and certification of application of environmental protection works and measures for project operation; and formulate and promulgate specialized technical guidelines for such inspection and certification.
Department of Natural Resources and Environment (DONRE) of Ho Chi Minh City	On behalf of Provincial People’s Committee to carry out the state management of natural resources and environment. DONRE will be responsible for: i) Supervising the implementation of the EMP; ii) Following applicable laws, regulations and standards; iii) Coordinating the environmental protection missions among concerned departments; and iv) Checking and supervising construction, completion and operation of environment treatment facilities.
HCMC Department of Transport	HCMC Department of Transport is a specialized agency under HCMC PC, providing advisory services and support to HCMC PC in performing state management functions in terms of transport (roadway, inland waterway), urban technical infrastructure (water supply and drainage, green tree park and lighting, urban parking areas) in the city and performing other mandates and authorities as authorized by HCMC PC and in accordance with the laws. HCMC Department of Transport play a member role of Steering Committee of “Ho Chi Minh City Green Transport Development” to perform the key taks as follows: i) Participate in and coordinate closely with the donors and central

Concerned Agencies	Role/Responsibility
	agencies during project implementation; ii) Monitor, check, urge, and timely deal with the difficulties and problems arising during project implementation; iii) Provide direction in performing professional tasks, ensuring timely completion of the project.
Local communities (e.g., local authorities, NGOs)	Community-based monitoring is a voluntary activity of people living in commune/ ward areas. Community Supervision Board will be established by Decision No. 80/2005/QD-TTg and others relevant regulations. Community Supervision Board will be responsible for: - Monitoring and assessing the observance of investment management regulations by agencies competent to decide on investment, investors, project management unit, contractors and project-implementing units in the investment process (including environmental issues); - Detecting and recommending to the competent state agencies on violations of regulations on investment management (including environmental issues) so as to promptly prevent and handle acts that violate regulations, cause wastage and/or loss of state capital and properties or infringe the interests of the community

Preparation of studies during project implementation:

- Component 1 of the project involves technical assistance (TA) for preparation of prefeasibility analysis of additional BRT lines and/or other follow-up investments. Although the TA activities themselves do not have direct adverse environmental or social impacts, the outcomes of TA support may have significant environmental and social implications going forward, entailing risks and potentially inducing adverse impacts. Therefore, implementation of these TA activities must comply with applicable Bank safeguards policies. The GTP PMU need to follow the Interim Guidelines on the Application of Safeguard Policies to Technical Assistance (TA) Activities in Bank-Financed Projects and Trust Funds Administered by the Bank and seek guidance from the Bank safeguards specialists early in the process.

In the operation stage:

During the operation stage, environmental management institutions are under the project operating agency and environmental management agencies in the local, they are as follows:

- BRT route management agency: Assignment of Management and Operation Centre for Public Transport (MOCPT)
- BRT Business Unit: MOCPT will establish a BRT Business. The BRT Business Unit would consist of four sections: BRT Operations, BRT System and Infrastructure, Commercial Management, Business Development
- Saigon Bus: In early stage of BRT, Saigon Bus is suggested to be the operator with the main functions including: Positively contribute on design and construction of the BRT; Start to prepare for BRT operation – purchasing vehicles, operating procedure, quality plan, information management and support system, etc. and Implement managing the operation of BRT when it will be put in to operation.
- Department of Natural Resources and Environmental in District level and Department of Natural Resources and Environment of Ho Chi Minh City will be responsible state management, inspection and monitoring of environmental issues in the project area.

7.4.2. Environmental Compliance Framework

7.4.2.1. Environmental Duties of the Contractor

The contractor firstly shall adhere to minimize the impact that may be result of the project construction activities and secondly, apply the mitigation measures under EMP to prevent harm and nuisances on local communities and environment caused by the impacts in construction and operation stages.

Remedial actions that cannot be effectively carried out during construction should be carried out on completion of the works (and before issuance of the acceptance of completion of works)

The duties of the Contractor include but not limiting to:

- Compliance with relevant legislative requirements governing the environment, public health and safety;
- Work within the scope of contractual requirements and other tender conditions;
- Organize representatives of the construction team to participate in the joint site inspections undertaken by the ES;
- Carry out any corrective actions instructed by the ECO and ES;
- In case of non-compliances/discrepancies, carry out investigation and submit proposals on mitigation measures, and implement remedial measures to reduce environmental impact;
- Stop construction activities, which generate adverse impacts upon receiving instructions from the ECO and ES. Propose and carry out corrective actions and implement alternative construction method, if required, in order to minimize the environmental impacts; Non-compliance by the Contractor will be cause for suspension of works and other penalties until the non-compliance has been resolved to the satisfaction of the ECO and ES.

Detailed Environmental specifications for Contractors are included in Appendix 3.

7.4.2.2. Contractor's Safety and Environment Officer (SEO)

The contractor shall be required to appoint a competent individual as the Contractor‘s on-site safety and environment officer (SEO). The SEO must be appropriately trained in environmental management and must possess the skills necessary to transfer environmental management knowledge to all personnel involved in the contract. The SEO will be responsible for monitoring the contractor‘s compliance with the EMP requirements and the environmental specifications. The duties of the SEO shall include but not be limited to the following:

- Carry out environmental site inspections to assess and audit the contractors' site practice, equipment and work methodologies with respect to pollution control and adequacy of environmental mitigation measures implemented;
- Monitor compliance with environmental protection measures, pollution prevention and control measures and contractual requirements;
- Monitor the implementation of environmental mitigation measures;
- Prepare audit reports for the environmental monitoring data and site environmental conditions;
- Investigate complaints and recommend any required corrective measures;

- Advise the contractor on environment improvement, awareness and proactive pollution prevention measures;
- Recommend suitable mitigation measures to the contractor in the case of non-compliance. Carry out additional monitoring of noncompliance instructed by the ECO/ES;
- Inform the contractor and ECO/ES of environmental issues, submit contractor's EMP Implementation Plan to the ECO/ES, and relevant authorities, if required;
- Keep detailed records of all site activities that may relate to the environment.

7.4.2.3. Independent Environmental Monitoring Consultant (IEMC)

In order to minimize the environmental impacts during construction stage of the Project, the Project owner shall ensure that environmental quality monitoring requirements are established for the project. An Independent Environmental Monitoring Consultant (IEMC) appointed by GTP PMU shall carry out the monitoring.

EIMC will be responsible for carrying out environmental sampling, monitoring and marking report during all stages of the Project. Environmental quality monitoring will be report periodically to GTP PMU (every 06 months in construction stage and in operation stage).

IEMC will also supply specialized assistance to GTP PMU and ECO in environmental matters.

7.4.2.4. Environmental Supervision during Construction

During construction stage, a qualified Construction Supervision Consultant (CSC) reporting to the GTP PMU shall carry out the environmental supervision. The CSC is responsible for inspecting, and supervising all construction activities to ensure that mitigation measures adopted in the EMP are properly implemented, and that the negative environmental impacts of the Project are minimized. The CSC shall engage sufficient number of Environmental Supervision Engineers with adequate knowledge on environmental protection and construction project management to perform the required duties and to supervise the Contractor's performance. Specifically ES will:

- Review and assess on behalf of the GTP PMU whether the construction design meets the requirements of the mitigation and management measures of the EIA and EMP,
- Supervise site environmental management system of contractors including their performance, experience and handling of site environmental issues, and provide corrective instructions;
- Review the EMP implementation by the contractors, verify and confirm environmental supervision procedures, parameters, monitoring locations, equipment and results;
- Report EMP implementation status to GTP PMU and prepare the environmental supervision statement during the construction stage; and
- Approve invoices or payments.

Terms of reference for the Environmental Supervisor (ES) and Construction Supervision Consultant (CSC) are included in Appendix 2.

7.4.2.5. Compliance with Legal and Contractual Requirements

The constructions activities shall comply not only with contractual environmental protection and pollution control requirements but also with environmental protection and pollution

control laws of the Socialist Republic of Viet Nam.

All the works method statements submitted by the Contractor to the ECO for approval shall also be sent to the ES to see whether sufficient environmental protection and pollution control measures have been included.

The ES shall also review the progress and program of the works to check that relevant environmental laws have not been violated, and that any potential for violating the laws can be prevented.

The Contractor shall copy relevant documents to the SEO and the ES. The document shall at least include the updated work progress report, the updated work measure, and the application letters for different license/permits under the environmental protection laws, and all the valid license/permit. The SEO and the ES shall also have access, upon request, to the Site Log-Book.

After reviewing the documents, the SEO or the ES shall advise the ECO and the contractor of any non-compliance with the contractual and legislative requirements on environmental protection and pollution control for them to take follow-up actions. If the SEO or the ES concludes that the status on license/permit application and any environmental protection and pollution control preparation works may not comply with the work measure or may result in potential violation of environmental protection and pollution control requirements, they shall advise the Contractor and the ECO accordingly.

7.4.2.6. Environmental Claims and Penalty System

In the compliance framework, if non-compliance with environmental regulations are discovered by ECO/CSC/ES/EMC during the site supervision, 2% values of interim payment of the contractor of this month will be held back. The Contractor will be given a grace period (determined by CSC/ES) to repair the violation. If the Contractor performs the repairs within the grace period (confirmed by CSC/ES), no penalty is incurred and keeping money will be pay. However, if the Contractor fails to successfully make the necessary repairs within the grace period, the Contractor will pay the cost for a third party to repair the damages (deduction from keeping money).

In case of EMC/CSC/ES not detected of non-compliance with environmental regulations of the contractor, they will be responsibility payment to repair the violation.

7.5. Capacity Building and Training

A key component of EMP success depends of effective capacity building, the training of staff and all others involved in the EMP, including the environmental control officers of PMU, the safety and environmental officers of contractor, construction supervision consultant (environmental supervisor), environmental monitoring consultant. All relevant stakeholders should undergo general environmental awareness training and training about their responsibilities under the EMP. The training should ensure that they understand their obligation to exercise proper environmental management during project implementation.

Records of all training should be maintained and include: who was trained; when the person was trained; the name of the trainer; and a general description of the training content to provide evidence for auditing/inspection purposes.

The following training shall be considered for each organization.

7.5.1. HCM City Green Transport Project Management Unit (GTP PMU) - Project Owner

The Project will appoint the Environmental Control Officers – ECO to supervise the preparation, implementation and monitoring of the EMP. The ECO shall be provided with enough technical and financial resources to complete this supervision role; external resources or contractors may be required. Specific training program to ECO should be provided as follows:

- Principles and procedures for environmental impact assessment;
- Fundamentals of environmental management;
- Compliance assessment, monitoring and follow-up;
- Environmental audits;
- Social impact assessment and public consultation; and
- Should be further trained on environmental management process in project and implementation methods (from preparation stage of bidding documents, bid evaluation, contract signing, monitoring implementation and acceptance works, etc.);
- Should increase awareness on critical roles of EMS;
- Should provide with more knowledge/legal regulations related to penalty for violations on the environment;
- Should be provided with treatment solutions for arising problems on sites.

7.5.2. Construction Supervision Consultant (CSC) /Environmental Supervisor (ES) and Independent Environmental Monitoring Consultant (IEMC)

The Environmental Monitoring Consultant shall be trained to ensure the contractor's compliance with EMP requirements. The training certificates shall be maintained including attendance and specific course, for inspection. Specific training to the for ES and IEMC should be as follows:

- Principles and procedures for environmental impact assessment.
- Fundamentals of environmental management.
- Training on monitoring procedure of SEMP.
- Compliance assessment, monitoring and follow-up.
- Training on response to emergency environment.
- Environmental parameter sampling procedures.
- Monitoring construction activities, etc.

7.5.3. Community Supervision Board

- Should be trained on community monitoring.
- Should be provided with rights and responsibilities in environmental management (as well as legal regulations.).
- Should be provided with clear simple methods which will be applied during project implementation process.

- Increase the awareness of community on environmental management generally and potential impact of the project in particular.
- Continuously utilize project information and important points in EMS as well as operation regime.

7.5.4. Construction Contractor

The construction contractor shall have Safety and Environmental Officer (SEO) trained to ensure contractor compliance with EMP requirements. The construction contractor shall maintain training certificates including attendance and specific course, for inspection. Specific training to the construction contractors should be as follows:

- To be educated with environmental protection law, concentrating on contents relating to the role of locality and community supervision;
- To be aware of environmental management process following requirements of WB's safeguard policies (for example, implementation of HSET - Heath, Safety, Environment and Transportation).
- Environmental management process should be made clear and aware before, during and after construction.

7.6. Estimated Budget for EMP Implementation

7.6.1. Estimated Budget for Implementing Mitigation Measures of the Contractor

Subject to the provisions in Vietnam laws, construction contractors must ensure to comply with four HSET criteria, including: Health, Safety, Environment and Transportation.

The cost for the organization, training, communication, procurement and operation of equipment, work force deployment, etc. for the implementation of mitigation measures in and out of the site has been integrated in the construction package (which is regulated in item no.3, article no.6 of Circular no.04/2010/TT-BXD dated on May 26, 2010 issued by Ministry of Construction). The construction contractor will be responsible for research, plan and provide estimates for these activities. This will be one of the criteria to assess the capacity of the construction contractor as well as the basis for assessing the compliance of the construction contractor.

In case of violations, the Project Owner can impose penalties or hire another unit to participate in solving arising problems.

7.6.2. Estimated Budget for Monitoring EMP Implementation of the Contractor

The cost for the CSC to supervise EMP implementation in accordance with the EMP and the subproject bidding and contractual documents is integrated in the contract package with the CSC. Potential bidder for this package will be responsible to study environmental management requirements of the EIA and EMP to prepare and offer cost estimation for EMP supervision during the construction. It is considered as one of the criteria for assessing the capability of the potential CSC in supervising EMP implementation.

7.6.3. Estimated Budget for the Environmental Monitoring Program Implemented by Environmental Monitoring Consultant (IEMC)

GTP PMU shall sign a contract with IEMC. IEMC shall implement assignments of all project components according to the TOR. The budget for IEMC included in the Project management budget.

IEMC shall implement environmental monitoring and supervision periodically during construction and operation stages.

Based on the TOR for IEMC and above-mentioned monitoring program (table 7.3), the estimated budget for implementing this program is presented in table 7.6 and 7.7.

Table 7.6. Estimated Budget for Periodical Supervision of Environment

Unit: VND

No	Items	Unit	Quantity	Unit Price	Amount
I	**Construction stage**				**137,600,000**
1	Independent Environmental Supervisor (1 person, in 24 months, every 6 months, 1/2 month/once)	month	24	31,500,000	63,000,000
2	Other cost				74,600,000
II	**Operation stage**				**68,800,000**
1	Independent Environmental Supervisor (1 person, in 12 months, every 6 months, 1/2 month/once)	month	3	31,500,000	31,500,000
2	Other cost				37,300,000
	Total				**377,800,000**

Note:

Other costs include cost for making report, travelling cost, taxable income, VAT tax, etc.

- Cost for monitoring EMP implementation are included in the cost of project management which is regulated in paragraph no.3.5, item no.3, article no.4 of Circular no.04/2010/TT-BXD dated on May 26, 2010 issued by Ministry of Construction

Table 7.7. Estimated Budget for the Monitoring Program Implementation

Unit: VND

No	Items	Construction stage (within 24 months as expected)		Operation stage (12 month)		Total Amount
		Location	Cost	Location	Cost	
1	Air quality	6	53,760,000	8	86,912,000	140,672,000
2	Noise	6	80,640,000	8	53,760,000	134,400,000
3	Vibration	6	75,600,000	8	50,400,000	126,000,000
4	Surface water	5	17,160,000			17,160,000
5	Industrial wastewater			2	3,872,000	3,872,000
6	Domestic wastewater			2	2,984,000	2,984,000
7	Other cost		325,492,227		208,691,085	534,183,312
	Total		**552,652,227**		**406,619,085**	**959,271,312**

Note: Other costs include taxable income, VAT tax, cost for report preparation etc.

7.6.4. Estimated Budget for Implementation of Capacity Building and Training

Based on above-mentioned capacity building and training program (item 7.5), the estimated budget for implementing this program is presented in following table.

Table 7.8. Estimated Budget for Implementation of Capacity Building and Training

No	Subject to be trained	Number of trainees	Cost	Source of cost
1	Environmental Control Officer (ECO) of GTP PMU	6 persons x 4 times (turns)	6 x 4 times (turns) x 1,000,000VND / person = 24,000,000 VND	Project owner (GTP PMU)
2	Environmental Supervisor (ES) and Independent Environmental Monitoring Consultant (IEMC)	3 persons x 4 times (turns)	3 x 4 times (turns) x 1,000,000VND / person = 12,000,000 VND	Project owner (GTP PMU) This cost included in the contract signed with ES and IEMC
3	Community Supervision Board	1 person/ communes x 20 communes x 4 times (turns)	1 x 20 x 4 times (turns) x 1,000,000VND / person = 80,000,000 VND	Project owner (GTP PMU)
	Sub-Total (1-3)		**= 116,000,000 VND**	
4	Safety and Environment Officer (SEO) of the contractor	6 persons x 4 times (turns)	6 x 4 times (turns) x 1,000,000VND / person = 24,000,000 VND	Paid by contractor This cost is included in the construction cost.
	Total (1-4)		**= 140,000,000 VND**	

7.6.5. Total Estimated Budget for EMP Implementation

Apart from costs, which have been calculated in relevant packages/contracts, one more cost element will be required for EMP implementation as follows:

Table 7.9. Total Estimated Budget for EMP Implementation

Unit: VND

No	Content	Cost
1	Estimated budget for periodical supervision of environment	377,800,000
2	Estimated budget for the monitoring program implementation	959.271.312
3	Estimated budget for implementation of capacity building and training	116,000,000
	Sub-Total (1 – 3)	**1.453.071.312**
4	Contingency (10%)	145.307.131
	Total (1 – 4)	**1.598.378.444**
	Total (1 – 4) equal to USD	**75.006**

Exchange Rate dated on October 06, 2014 of Vietcom Bank: 1USD = 21,310 VND

Total Estimated Budget for EMP Implementation is **1,598,378,444 VND (75,006 USD).**

The above cost rate is estimated based on current unit price and Consultant's experiences. Because the project will be implemented several years, price fluctuation will be unavoidable. A contingency amount should be prepared for any unavoidable price or cost increase during project implementation.

VIII. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

8.1. Public Consultation

8.1.1. Objectives

According the safeguard policy of World Bank (OP 4.01), the Project shall organize public consultation and disclosure of information on the project to the local communities.

The main objectives of the public consultation and disclosure include:

- Disseminate Project's information;
- Make mention of environmental and social impacts that generate from the Project;
- Collect environmental information of Project area;
- Determine the environmental issues that will be affected during Project's implementation process
- Collect opinions and comments of the Project-affected-people and local communities on the potential impacts and proposed mitigation measures to raise the effect of EIA and EMP.

8.1.2. Results of Public Consultation Meetings

Participants

- Representatives of the local units and organizations such as the representative of department of the People's Committee, civil group, veterans associations, women's groups, youth groups, elder associations, etc;
- Residential representatives in project area.

Time

Public consultation according to the WB requirements was held from July 14, 2014 – August 15, 2014. Time and participants are presented in the following table:

Table 8.1 – Public Consultation Schedule of Project

Date/moth	Time	Place	Number of Participants	Remark
14/7/2014	14h – 15h30	Thu Thiem Ward People's Committee, Urban District No.2	07	
15/7/2014	9h – 10h30	Binh Khanh Ward People's Committee, Urban District No.2	12	
	14h – 15h00	An Loi Dong Ward People's Committee, Urban District No.2	07	
	15h30 – 16h30	Sai Gon Water Supply Incorporation (SAWACO)	06	
16/7/2014	9h – 10h30	Hospital for Tropical Disease	05	
	15h – 16h30	Ho Chi Minh City Urban Drainage Company Ltd. (UDC)	03	
17/7/2014	9h – 10h30	Urban District No.6 People's	26	No7, No3,

Date/moth	Time	Place	Number of Participants	Remark
		Committee		No1 Wards
	14h – 15h30	Rail - Road traffic Police department, Ho Chi Minh City Police	11	
18/7/2014	9h30 – 10h30	Ho Chi Minh City Electricity Corporation (EVN-HCM)	10	
	14h -15h00	An Lac Ward People's Committee, Urban District Binh Tan	28	
	15h – 16h30	Meeting room of Ward No.6 of Urban district No.5	50	
19/7/2014	8h – 10h	People's Committee, Urban District No.28	32	P.7, P.16,
21/7/2014	14h-15h00	Tan Kien Commune People's Committee, Binh Chanh Rural District	17	
15/8/2014	8h – 9h	People's Committee, Urban District No.1	14	

Results of Public Consultation Meetings

- ***Opinions of Local People's Committees:*** All localities in Project area have been consulted and agreed with Project's objectives, they also worried about environmental protection and traffic safety during Project implementation.
- ***Opinions of community representatives:*** Representatives of local communities, local organizations worried about the environmental issues occurring in Project area, and interested in access issues, operation of the BRT, as well as the issues of traffic safety during construction stage of the Project.
- ***Comments of Project affected agencies:*** the Project alignment impact on the activities of agencies such as road traffic police on the East - West, Boulevard electrical infrastructure network (Ho Chi Minh City Electricity Corporation) and urban drainage network (UDC & SAWACO). All these agencies have been consulted about the potential environmental and social impacts of the Green Transport Project. They agreed with the Project implementation, and were willing to cooperate to facilitate Project implementation, as well as reminders of the issues related to underground infrastructure (SAWACO, UDC, EVN), and also concerned the current traffic condition on the East - West Boulevard.
- ***Feedback and commitment of Project owner on the proposals and recommendations of the agencies were consulted:*** Team of consultation implementation explained the purpose and details of the Project is to clarify the concerned issues by consulted objects, as well as the integration of these issues into the project design. In addition, Project owner's representative committed to interest in and implement the traffic safety issues and environmental protection in the construction and operation stages of Ho Chi Minh Green Transport Development Project.

8.2. Disclosure of the EMP

- The draft EIA and EMP in Vietnamese was disclosed in the country at GTP PMU, as well as in at the 38 agencies (rural districts/ urban districts/communes/wards and relative agencies) in Project area. The disclosure summary of the draft EIA and EMP in the in the project districts, wards and other places is presented in the table 8.2. The final EIA and EMP in Vietnamese were locally disclosed at all the project sites on January 16, 2015.
- The draft EIA and EMP in English was sent to the Vietnam Development Information Center at 63 Ly Thai To street, Hanoi City for disclosure of information on October 22, 2014. The final EIA and EMP in English were also disclosed at the Infoshop of the World Bank on February 6, 2015.

Table 8.2. Disclosure Summary Table of the draft EIA and EMP in the Project Districts, Wards and Other Places

No	Agencies		Time of Disclosure
A	**7 Districts**		
1	People's Committee of Urban District 1		24- Oct -2014
2	People's Committee of Urban District 2		24- Oct -2014
3	People's Committee of Urban District 5		24- Oct -2014
4	People's Committee of Urban District 6		27- Oct -2014
5	People's Committee of Urban District 8		27- Oct -2014
6	People's Committee of Binh Tan Urban District		27- Oct -2014
7	People's Committee of Binh Chanh Rural District		27- Oct -2014
B	**20 Wards/Communes**		
1	Cau Kho Ward	District 1	24- Oct -2014
2	Cau Ong Lanh Ward		27- Oct -2014
3	Co Giang Ward		24- Oct -2014
4	Nguyen Thai Binh Ward		27- Oct -2014
5	An Loi Đong Ward	District 2	27- Oct -2014
6	An Phu Ward		24- Oct -2014
7	Binh Khanh Ward		27- Oct -2014
8	Thu Thiem Ward		27- Oct -2014
9	Ward 1	District 5	24- Oct -2014
10	Ward 5		24- Oct -2014
11	Ward 6		24- Oct -2014
12	Ward 10		27- Oct -2014
13	Ward 13		27- Oct -2014
14	Ward 1	District 6	24- Oct -2014
15	Ward 3		27- Oct -2014
16	Ward 7		27- Oct -2014
17	Ward 10		27- Oct -2014
18	Ward 16	District 8	27- Oct -2014
19	An Lac Ward	Binh Tan Urban District	27- Oct -2014
20	Tan Kien Commune	Binh Chanh Rural District	27- Oct -2014
C	**11 Other Agencies**		
1	Department of Transport – HCM City		23- Oct -2014
2	Department of Architect and Planning – HCM City		23- Oct -2014
3	Department of Planning and Investment– HCM City		23- Oct -2014
4	Department of Construction– HCM City		23- Oct -2014
5	Railway and Road Traffic Police Division – HCM City Public Security		23- Oct -2014
6	Police Department of Environmental Crime Prevention (PC49) –		23- Oct -2014

No	Agencies	Time of Disclosure
	HCM City Public Security	
7	Management and operation center of public passenger transport (under Ho Chi Minh City's Department of Transport)	23- Oct -2014
8	Saigon River Tunnel Management Center (under Ho Chi Minh City's Department of Transport)	27- Oct -2014
9	Sai Gon Bus Company	27- Oct -2014
10	Petrovietnam Southern Gas Joint Stock Company	24- Oct -2014
11	Department of Natural Resources and Environment – Ho Chi Minh City	23- Oct -2014

APPENDIX

Appendix 1. Specific Impacts, Location and Proposed Mitigation Measures for Each Route Segment

1. Km0+000 – Km5+000

An Lac Roudabout

ATTENTION IN OPERATION PHASE

- Management waste, social security, social evil at the station along the route.
- The risk of collision and unsafe traffic.

ATTENTION IN CONSTRUCTION STAGE

- It should be pay attention to prevent dust, noise, mud when construction is nearby residential area.
- Ensure traffic safety (installation of fence and warning sign, traffic instruction, etc) around construction area.
- Wastewater, solid waste, spoil… should be controlled to avoid effect on surface water sources by pollution (Nuoc Len, Ruot Ngua, Lo Gom canals and lotus pond area).
- Arranging pump if flooding occurs; installation of warning signs.

CURRENT STATUS

- The route passes through Nuoc Len Bridge (Nuoc Len Canal), Rach Cay Bridge (Ruot Ngua Canal) and Lo Gom Bridge (Lo Gom Canal).
- On the right of route, there is lotus pond area nearby the sidewalk at Km2+500.
- On the two side of the road, there are residential areas of An Lac Ward (Binh Tan District), Ward 16 (District 8), Ward 10 and 7 (District 6).
- There is pedestrian flyover No.2 on the route.
- Vo Van Kiet - Ho Hoc Lam Intersection regularly occurs flooding due to heavy rain and high tide.

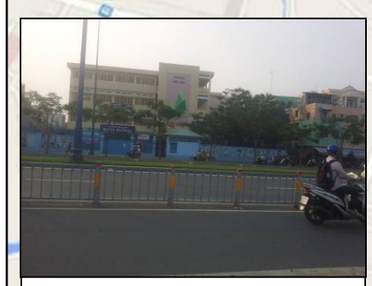
Nuoc Len Bridge

Lotus Pond

Rach Cay Bridge

Lo Gom Bridge

2. Km5+000 – Km11+000



Kim Dong Primary School

Warehouse No. 252

CURRENT CONDITION

- Tau Hu Canal is on the right of the route
- On the left of the route, there are dense residential areas of Ward 3, 1 (District 6); Ward 13, 10, 6, 5 and 1 (District 5).
- The other objects: Kim Dong Primary School, Ham Tu Primary School, Hospital for tropical diseases, Psychiatric Hospital, Hoa Binh Market, Warehouse 252, etc.
- There are some pedestrian flyovers on the route.

BRT station

Hospital for tropical diseases

Ham Tu Primary School

6+000

7+000

8+000

9+000

10+000

11+000

Cha Va Flyover

Tau Hu Canal

Nguyen Tri Phuong Flyover

Chu Y Flyover

ATTENTION IN CONSTRUCTION STAGE

- It should be pay attention to prevent dust, noise, mud when construction is nearby residential area, hospital, school, etc.
- Ensure traffic safety (installation of fence and warning sign, traffic instruction …) around construction area.
- Wastewater, solid waste, spoil… should be controlled to avoid effect on surface water sources by pollution.

ATTENTION IN OPERATION PHASE

- Management waste, social security, social evil at the stations along the route.
- The risk of collision and unsafe traffic.

Hoa Binh Market and residential area of ward 5, district 5

Psychiatric Hospital

3. Km11+000 – Km 17+000

ATTENTION IN CONSTRUCTION STAGE

- It should be pay attention to prevent dust, noise, mud when construction nearby residential area, offices.
- Ensure traffic safety (installation of fence and warning sign, traffic instruction, etc) around construction area.
- Wastewater, solid waste, spoil should be controlled to avoid effect on surface water sources by pollution.

ATTENTION IN OPERATION PHASE

- Management waste, social security, social evil at the station along the route.
- The risk of collision and unsafe traffic.

CURRENT CONDITION

- Tau Hu is on the right of the route, the route pass through Kenh 2 Canal (Kenh 2 Bridge).
- On the left of the route, there are dense residential areas of Cau Ong Lanh, Nguyen Thai Binh, Co Giang wards, Thu Thiem Urban Area Plan (Thu Thiem and An Loi Dong wards).
- Other objects: Offices are next to the alignment (Viet Nam State Treasury, Vietcom Bank, Vietcombank, etc).
- There are some pedestrian flyovers on the route.

Ong Lanh Flyover

HCM State Treasury

Offices

Thu Thiem Church

Kenh 2 Bridge

Tau Hu Canal

BRT Station

Calmette Flyover

Thu Thiem Tunnel

Thu Thiem Urban Area Plan

BRT Station

4. Km17+000 – Ending point

CURRENT CONDITION

- The route pass through Ca Tre Lon Canal (Ca Tre Lon Bridge), Ca Tre Nho Canal (Ca Tre bridge).
- Dense residential areas are located at the intersection with Luong Dinh Cua Street; Some small shops are located along the route at section from Km20 – Km22.
- Most land of An Khanh, Binh Khanh and An Loi Dong wards had been acquired for Thu Thiem Urban Area Project.
- There are many trucks on the route.

ATTENTION IN CONSTRUCTION STAGE

- It should be pay attention to prevent dust, noise, mud when construction is nearby residential areas.
- Ensure traffic safety (installation of fence and warning sign, traffic instruction, etc) around construction area.
- Wastewater, solid waste, spoil should be controlled to avoid effect on surface water sources by pollution.

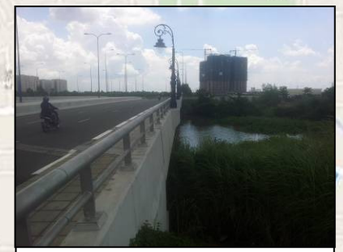
Minh Dang Quang Pagoda

RACH CHIEC TERMINAL

Construction Area of Depot

Location of Rach Chiec Terminal

Ca Tre Lon Bridge



Ca Tre Nho Bridge

Lexington Building Project

THU THIEM DEPOT

BRT Station

ATTENTION IN OPERATION PHASE

- Management waste, social security, social evil at the station along the route, terminal, depot and transfer station at the Rach Chiec MRT station.
- The risk of collision and unsafe traffic.

Appendix 2. Term of Reference for Construction Supervision Consultant (CSC)

General

In order to prevent harm and nuisances on local communities, and to minimize the impacts on the environment during the construction of the work items under BRT line, a Project EMP has been prepared and should be adhered to the Contractors and his employee.

The Construction Supervision Consultant is to provide professional technical services ("the Services") to help ensure effective implementation of Project EMP.

Scope of Service:

The general services to be provided by the CSC are to inspect, monitor the construction activities to ensure that mitigation measures adopted in the EMP are properly implemented, and that the negative environmental impacts of the subproject are minimized.

On behalf of the GTP PMU, the CSC will conduct the following tasks:

- Conduct regular site inspections;
- Review the status of implementation of environmental protection measures against the EMP and contract documents;
- Review the effectiveness of environmental mitigation measures and Project environmental performance;
- As needed, review the environmental acceptability of the construction methodology (both temporary and permanent works), relevant design plans and submissions. Where necessary, the CSC shall seek and recommend the least environmental impact alternative in consultation with the designer, the Contractor(s), and GTP PMU;
- Verify the investigation results of any non-compliance of the environmental quality performance and the effectiveness of corrective measures; and
- Provide regular feedback audit results to the contractor's Chief Engineer according to the environmental stipulation and site-specific mitigation measures;
- Provide regular feedback audit results to the contractor's Chief Engineer according to the noncompliance procedures of EMP.
- Instruct the Contractor(s) to take remedial actions within a specified timeframe, and carry out additional monitoring, if required, according to the contractual requirements and procedures in the event of non-compliances or complaints;
- Instruct the Contractor(s) to take actions to reduce impacts and follow the required EMP procedures in case of non-compliance / discrepancies identified.
- Instruct the Contractor(s) to stop activities which generate adverse impacts, and/or when the Contractor(s) fails to implement the EMP requirements / remedial actions.
- **For contracts that Site Environmental Management Plan (SEMP) are required,** the CSC shall provide the final review and recommend clearance of all Site Environmental plans which may affect the environment. These include, but are not limited to: borrow pits and disposal sites, worker's camp plans. The CSC will review and approve the SEMP presented by the Contractors. Where these plans are found not to comply with the EMP, EIA or RAP, the CSC shall work with the GTP PMU and Contractor to establish a

suitable measures or remediation.

- **Addressing Complaints:** Complaints will be received by the Contractor's Site Office from local residents with regard to environmental infractions such as noise, dust, traffic safety, etc. The Contractor's Chief Engineer or his deputy, and the CSC shall be responsible for processing, addressing or reaching solutions for complaints brought to them. The CSC shall be provided with a copy of these complaints and shall confirm that they are properly addressed by the Contractors in the same manner as incidents identified during site inspections.
- **Confirmation for Monthly Payments**: The CSC shall confirm the monthly payments for environmentally related activities implemented by the Contractor.
- **Report**: the CSC shall prepare the following written reports:
  + Bi-weekly report of non-compliance issues
  + Summary monthly report covering key issues and findings from reviewing and supervision activities
  + At the end of the subproject, the CSC shall prepare a final report summarizing the key findings from their work, the number of infringements, resolutions, etc. as well as advice and guidance for how such assignments should be conducted in the future.

Appendix 3. Environmental Specifications for the Contractor

The environmental management requirements in construction of the BRT have been established and presented clearly in the EMP and EIA of the HCMC GT Project. The Contractor needs to carefully read and fully understand all requirements included in the contractor's bid: (i) 28 BRT stations; (ii) Foot bridges: construction of new 07 locations at the BRT stations, 01 location crossing over canal (BRT17) and 06 existing foot bridges need to improve; (iii) Private parking areas: 09 locations; (iv) Technial Facility Thu Thiem with an area of 10,000m^2; (v) Terminal is located at the Rach Chiec Sport Zone with an area of 5,600m^2 of the project.

I. Overview

In order to avoid negative effects into the environment and local community, as well as minimizing damaging impacts to the environment during the construction and operation stages of the Project, the Contractor and workers are required to observe the mitigation measures as mentioned below:

- "Environmental Management Plan for the Project".
- The technical specifications, procedures and the most popular practices are presented in this appendix.

II. Overall requirements of Contractor for environmental management

Contractor need, in in line with the requirements of the EMP, to include, but not limited the following responsibilities:

- Be in compliance with the current national legal regulations on environmental management.
- Work in scope of requirements in the contract and the conditions in the bidding documents.
- Assign the representative of the construction team to participate in the site inspection operations by the GTP PMU, CSC or the DONRE as well as implement all corrective actions to overcome the environmental issues as guidance provided by the Construction Supervision Consultant (CSC).
- Provide and update information for GTP PMU about any activities, assignments that can contribute or continue to cause the significant harmful impacts into the environment.
- In case of instruction by the CSC and GTP PMU, the Contractor must stop the construction activities that causes adverse impacts, also propose and conduct the environmental remedial actions and implementation other construction methods (if required) to minimize the negative environmental impacts.
- Establish and maintain an Environmental and Safety Unit, which consists of Construction team leader or Vice- team leader and Safety and Environmental Officer (SEO) with the purpose of receiving and dealing with the complaints, objections, argument and displeased of the local community caused by the construction operation. SEO is responsible to record all of complaints, resolve methods and results into the complained register. The register need to keep at the construction office and available for review by the supervision engineer and GTP PMU.

III. Responsibilities of Contractor in EMP implementation

The construction Contractor has responsibility in compliance with the technical specifications of the EMP of the Project and national environmental management regulations, including but not limited the following items:

i) The mitigation measures presented in relevant section of the EMP *(Item 6.2. Mitigation Measures)* and prepare budget for implementing the mitigation measures.

ii) Based on EMP, Contractor developed a detail Site Environmental Management Plan for addressing the construction related impacts. The SEMP includes the following components:

- Management for worker camps;
- Management of the overall construction operation;
- Management and storage of construction materials;
- Solid waste and wastewater management;
- Management and mitigation of noise and dust;
- Management and mitigation of impacts to vegetation;
- Plan for environmental landscape restoration;
- Healthy and safety ensuring plan at the construction;
- Control of Soil erosion and sedimentation;
- Safety plan during the construction stage and training for workers about environmental management and community relations;
- Rules and regulations about living activities of staffs and workers at the construction sites;
- Emergency Problem Treatment Plan;
- Management and Monitoring Plan for Report Process.

The detail measure of plan need to satisfy the following requirements: to implement the particular mitigation measures: who implement (people, team, etc), how to implement (labours, machines, equipment, etc.) and the cost. This plan shall be completed and submitted to the CSC for review and approval before start of the construction. The Contractor will:

a) Ensure that at least one supervisor is available in compliance with EMP before and during the construction time.

b) Ensure that all of the construction activities will be approved in document of the relevant authorities.

c) Ensure that all of staff and workers understand through their process and duties.

d) Be in compliance with requirements about the environmental management monitoring and reporting in EMP and inform to GTP PMU about the difficulties and solutions.

e) Inform to the local authority and GTP PMU in case of environmental problems and co-ordinate with the relevant institutions and stakeholders for resolving.

IV. Safety and Environmental Officer of Contractor

Each contractor will nominate a Safety and Environmental Officer (SEO) to work full-time at the construction site. Requirements for a SEO include an undergraduate degree in

Environmental Major, at least 3 years of working experience in environmental management, training and monitoring at the infrastructure construction project. Additionally, SEO should have a good knowledge about Vietnamese Environmental Legal Regulations and has participated to the labor safety and sanitation training class that organized by Department of Labour- Invalids and Social Affairs and have the labor safety and sanitation certificate.

SEO have the responsibilities for implementing and managing EMP of Contractor. Tasks of SEO will include, but not limit the following activities:

i) Training and developing environmental awareness for workers of Contractor within 2 weeks after the contractor is mobilized. The training is repeating every six months. The additional trainings will be implemented under the guidance of Environmental Supervision Engineer.

ii) Conduct the internal environmental monitoring at the site to check the construction activity implementation of contractors, equipment and implementation methods to manage the environmental pollution and evaluate the efficiency of the mitigation measures into the environmental impacts.

iii) Internal monitoring the implementation of environmental mitigation measures and in compliance of contractors with the environmental protection measures to prevent and control pollution; the committed requirements in the contract; guidelines of the contractor(s) on environmental improvement, environmental awareness and also proactive measures to prevent pollution.

iv) Conduct an investigation and propose the mitigation measures for the contractor(s) in case of incompliance/ infringe the EMP; monitoring and implementing the environmental mitigation measures.

v) Evaluate the success of the EMP implementation to estimate effectively the cost and adequacy of the implemented mitigation measures.

vi) Survey after receiving the complaint, thence evaluate and select the corrective actions.

vii) Conduct the additional monitoring activities, based on the concrete guidelines of the monitoring engineer and/ or GTP PMU; and

viii) Contact and implement all activities under the co-ordination or guidance of the Contractor Leader, Environmental Supervision Engineer, Supervision Engineer, GTP PMU, representatives of the provincial environmental management offices, local authority about all of environmental problems if necessary.

ix) Establish the regularly reports for the environmental implementation of the civil works package.

x) All of the internal monitoring as well as other activities of SEO should be documented and updated frequently in the environmental implementation monitoring diary of Contractor. This diary is used for normally checking by the CSC to evaluate the effectiveness of mitigation and the work of SEO.

V. Monitoring the environmental implementation of Contractor

The GTP PMU will sign a contract with the Consultant to carry out the task of CSC. The CSC will apply the environmental monitoring activities of the Project as indicated in Appendix 2. The environmental monitoring engineer of construction/execution monitoring Consultant is responsible to monitor daily the implementation of measures, in order to minimize environmental impact and safety of the Contractor. The construction monitoring Consultant will carry out the following main tasks:

- Before the construction stage, make sure that all of the compensation process for land, works on land and relocation and/ or recovery/ donation of land as well as the clearance of landmines and UXO have been completed.
- Review and approve the SEMP for implementing the EMP by Contractor before the construction operation.
- During the construction process, monitoring closely the compliance with implementing of the environmental and safety mitigation measures.
- Confirm the compliance with the EMP of Contractor and check any negative effect or damage caused by the contractor. If necessary, establish a request statement for contractor to compensate/ restore the construction site, as provided in the contract. The implementation of environmental management issues of the Contractor shall be mentioned in the progress report of the projects.

VI. Compliance Framework

a) The contractors are not allowed to implement the construction activities, including preparation of construction within the project scope in advance the detail SEMP for implementation of the EMP are reviewed and approved by the construction supervision consultant and Environmental Control Officer of GTP PMU.

b) The GTP PMU is mandatory the Contractor in compliance with the contract provision including compliance with EMP and the detail implementation plan of EMP. In case of incompliance with EMP, GTP PMU will require the Contractor to bring out the suitable measures.

c) In order to ensure in compliance with the environmental standards of the Project, GTP PMU is allowed to hire the third party to solve the problems in case the Contractor could not implement the remedies on time, leading to the negative effects into the environment, as follow:

- For small infringements (such as minor impact/ damage, temporary and repairable), GTP PMU or the representative of GTP PMU (the CSC) will notify the Contractor to correct the problems as required in the EMP within 48 hours after receiving the official report. If the mistakes are satisfactorily repaired during that time, no more action should be undertaken. Supervision consultants have the right to extend more 24 hours in the limited time for recovery, under the conditions that the Contractor has implemented activities but not completed the prescribed time, due to irresistible conditions that mentioned in the contract.
- For major violations, it is required about 72 hours for repairing, the GTP PMU through the CSC will announce the violation and require the Contractor to rectify the problems within the prescribed time by their budget. If the Contractor fails to complete corrective work according to the specified time, they will be punished by financial punishment (*cost punishment* is calculated by the cost of remedying damage)
- According to the evaluation of the CSC, if the Contractor fails to resolve the problems in environmental management or the contractor conducts repairing unsatisfactorily within the specified period of time (48 hours or 72 hours), the GTP PMU have the capacity to arrange for another contractor (third-party) to implement the suitable measures and deduct money for this task from the contract with the contractor in the next payment.