CHAPTER 5 STATION AREA AND ITF DEVELOPMENT

5.1 Need for Station Area and ITF Development

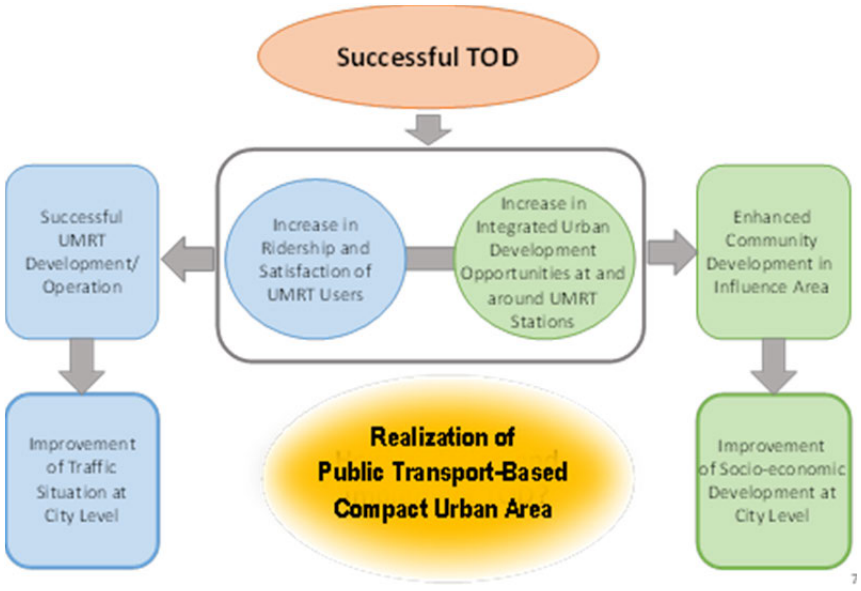
5.1.1 TOD Concept

TOD refers to the design of a compact area for mixed residential and commercial uses in order to minimize the demand for private transport and to encourage transit ridership in public transport modes whose stops are located at walking distances from each other. TOD is essential not only to the successful operation of UMRT systems, but also to the smart growth of urban areas as well as to faster socio-economic development in areas around UMRT stations. When adequately planned and implemented, TOD can have significant and positive impacts on urban traffic, land use, and the environment. TOD is thus expected to create synergy between integrated transport and urban development, establish new urban spaces, and generate activities in the influence areas of the UMRT lines. Successful TOD will lead to increased ridership and better satisfaction among UMRT users. At the same time, urban development opportunities at various levels of the UMRT influence areas are expected to increase. In this context, the objectives of TOD are summarized specifically as follows:

(i) TOD will affect the ridership of UMRT

(ii) TOD will contribute to local economic development at and around the station areas

(iii) TOD will contribute to enhancement of social and environmental condition in the influence area of UMRT (500 – 800 meter radius of station)



Source: HAIMUD2

Figure 5.1.1 Impacts and Goal of TOD

5.1.2 Objectives of Station Area and ITF Development

(1) Approach

In the urban areas of Japan, stations of railways are regarded as the ”entrance” or the “face”, the symbol of the areas, and thus, those areas have been developed with its stations. Although Ho Chi Minh City has been developed without any urban railways and their stations, it is necessary to make sure that each area will be developed in consideration of the connectivity between the new railway station and the existing public transport modes and the characteristics of the area. The construction of the railway and its stations could be an opportunity for each area to acquire its new attraction of coordination between the station and the existing facilities.

From the view point of railway enterprising by securing non-rail revenue, it is also quite important to develop station space and its surrounding area for commercial purpose. Therefore, integrated development of the stations with public lands or private lands which have potential for development is proposed to be conducted.

(2) Intermodal Transfer Improvement

Accessibility improvement by development of intermodal transfer facilities is also indispensable as a short-term measure to promote UMRT utilization. Main modes to access to station should be either public transport such as bus and taxi, or walking in general. In case of HCMC, since motorbike is a major travel mode, so motorbike parking development is indispensable by utilizing public land, private facility areas or underground space of station. In addition, traffic management measures should be applied such as restriction of car entry in the city center, Park and Ride policy to promote transfer from private vehicle to UMRT in suburban area. Since it is quite important for railway stations to have proper and sufficient amount of exits, from a view point of short-term, the exits should be constructed on public roads or lands with enough space. Upon deciding the place to construct exits, the accessibility. These two (2) points below should be well-considered, (i) to reduce the area which makes hard for passengers to walk, and (ii) to make it easy to access from all the neighborhood of the station.

(3) Development of commercial facilities in stations (Short-term)

Although it is important for railway enterprising to make efforts to increase the fare-box revenue, in many cases it is quite difficult to set the fare by market principle considering the social and economic condition of the country. As a result, many railway enterprises in the world receive public subsidy to compensate their loss. To ensure the business foundation and avoid receiving subsidy, it is necessary for a railway enterprise to secure the source of revenue other than fare box revenue (non-rail revenue). The goal shall be to contribute to the business foundation of the railway enterprise, utilizing the stations, which have a significant potential to attract people, and installing

and operating commercial facilities such as restaurants and retail stores which suit the characteristic of the area to secure non-rail revenue.

(4) Promotion of integrated development of stations with their neighbors (Mid & long-term)

To promote the effect of the Line 3A, commercial activities around the stations should be activated, and the accessibility by using other transport modes between the stations and their surrounding areas also should be secured. At the meantime, the integrated development, of a station exit such as one with small private houses or stores, or deteriorated commercial or residential buildings, which have profit for both concerns, should be conducted.

Moreover, in the case there are some public lands around the station which can be utilized for commercial purpose, they can be developed with the station and increase both fare-box revenue and non-rail revenue. The development can be conducted by the railway enterprise who are allowed to have right to develop there, or by a certain public sector itself. And it is proposed that facilities where people living around there can gather and make relationship and the local community will be activated should be installed.

Especially upon large scale integrated development, intermodal facilities to connect with other transport modes and commercial facilities should be integrated and developed as a complex facility to strengthen the function of the station and transport network of the city. Thus it is necessary to focus on these points below to promote integrated development.

(i) Redevelopment by utilizing existing public lands

(ii) Development or redevelopment by purchasing vacant lots or deteriorated building lots by the railway enterprise or other public sector in charge.

(iii) Deelopment together with private developers by alliance or co-investment

(iv) Deregulation for promotion of development by private sector

Provision of Alternative method for land acquisition and resettlement

One of major constraints to implement infrastructure development project is land acquisition and resettlement. To implement integrated urban development around station and along UMRT, new options to resettle to new land plot or apartment inside station area or new town along UMRT where both accessibility and urban service are ensured, will be given to property owners affected by UMRT development. By providing alternative methods for resettlement inside UMRT service area, land acquisition of infrastructure and consensus building among stakeholders will be promoted.

Furthermore, intermodal facilities including parking facilities will be developed inside integrated development area (private land), which are financially owed by private sector. For transport facility development, there is an advantage of integrated urban development.

In case of Japan, these integrated urban development projects are implemented as land readjustment project and urban redevelopment project, by applying to right conversion to swap original property rights to redeveloped area or facility.

(5) Demand creation measures of Japanese private railway companies

Most of railway companies in Japan have been creating demand by developing customer attracting facilities and large residential areas along their railway lines. This is the major business model which has been successful in Japan. In this business model, railway enterprise can directly gain income from what they developed as well as steady fare-box revenue from the basic demand created by the development. The consideration on levering the demand in a day and in a week. In other words, the business foundation of railway would be stabilized when the demand of the opposite direction of the peak hours, off-peak hours, and weekends, because it makes the railway assets used efficiently.

It is still unclear whether the railway enterprise in HCM City can invest or do business on urban development on their own, however, even if not, such demand creation is necessary in cooperation with private sector.

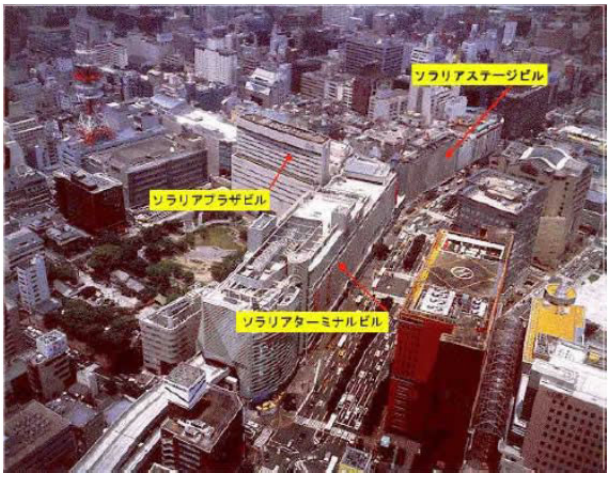
Landuse Plan of Station Area, Tsukuba Express	Station Area Development of Umeda District
 Source: UR	 Source: Hankyu Hanshin Holdings, Inc.
Redevelopment at Fukuoka Tenjin	
 Source: Nishi-Nippon Railroad Co., Ltd.	

Figure 5.1.2 Examples of Station Area Development in Japan

5.2 Planning Issues of Station Areas and Clusters along Line3A

There are various TOD potentials along UMRT Line3A based on regional and local characteristics which connects from the city center to the south-western suburban area. Since the western area along the line 3A has not been well-developed yet, it is assumed that the demand difference between both directions of the line would be large. Therefore it is quite important to formulate CBD in the western area to create the demand of the opposite direction during peak hours.

Table 5.2.1 Planning Issues and TOD Potentials along Line3A

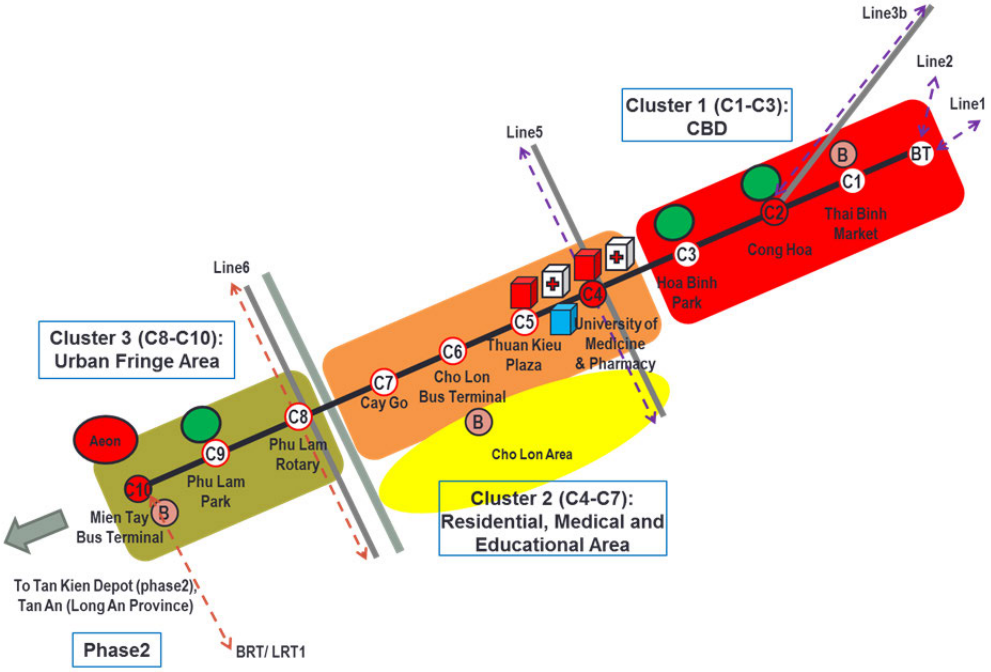
Planning Issues	TOD Potentials
• Formulate east and west backbone of city by integrated UMRT Line1 and Line3A • Extension and connection to Tan An of Long An Province • Integration with other UMRT Lines of Line 3B (at Cong Hoa), Line 5 (at Medical Univ.), Line 6 (at Phu Lam Rotary) and LRT1 (at Mien Tay Terminal) • Construction of underground stations • Integration of various types of areas such as backpackers area, educational and medical area, Cho Lon Area • Requirement/ demand of large-scale urban development including Phase2 section	• To accelerate urban development of south-western area of HCMC along UMRT Line3A • To provide feeder bus service to neighboring provinces and districts for convenient transfer and promotion of UMRT utilization • Improvement of smooth access and transfer between UMRT lines and other transports • Utilization of underground space by developing a commercial mall, connecting to urban facilities, installing parking • Promotion of integrated urban development to meet demands of station areas • Promotion of large-scale development (cf. new town, social housing, commercial complex)

Source: JICA Study Team

To study TOD impacts and formulate station area and ITF development concepts, influenced areas are divided into 3 levels including (i) cluster level including several station areas of homogenous characteristics, (ii) walking distance of each station (500m-1km radius from station), and (iii) at and around station. Among this, four (4) clusters are categorized based on socio-economic characteristics, landuse, transport accessibility, etc.

- Central Business District (CBD) cluster (C1,C2,C3): The CBD section (about 4km length) including Ben Thanh, C1,C2 and C3 stations is the core with urban services such as governmental, economic, and tourism with high-density landuse.
- Mixed use cluster (C4, C5, C6, C7): This section (about 3km length) is spread along Hong Bang Street. There are various urban facilities such as the Medical University, hospitals educational facilities, department stores. There are traditional residential and commercial areas of Cho Lon District.
- Urban fringe cluster (C8, C9, C10): The urban fringe section between the opposite side of the river and Mien Tay Terminal, the terminal station of Phase1 (about 2.3km length) is spread along Kinh Duong Vuong Street with 8 carriageways. There are few large-scale commercial and business areas and facilities, and there are potentials of high-density development along UMRT and street. Logistic services from Mekong Delta along National Highway No.1, passenger services from Mien TayTerminal to the city center are active.

- Suburban cluster (Phase2 section): Phase2 section of the south of Mien Tay Terminal (about 9km length) is covered by rural residential areas, agricultural lands and factories. There are few urban services facilities. The detailed plan of the depot surrounding area has been approved, which aims to develop mixed use sub center with residential, commercial, business facilities and universities (planned population is 81,400 in 2030).



Source: JICA Study Team

Figure 5.2.1 Clusters of Line3A

TOD will accelerate to convert balanced and mixed landuse, to promote urban redevelopment of built-up areas and to promote commercial and business activities. For this, population and employment at around stations will be increase. Without TOD, night population will be flow out because of high density of urban center and urban sprawl to suburban areas. If TOD concept is applied in line with UMRT Line3A development, new urban areas with mixed-use residential facilities will be developed by application of urban redevelopment of degraded low-rise and high dense residential areas and 30% of night population will be increased in 2030. In daytime, thanks to development of commercial and business districts and facilities between the city center and suburban areas, 70% of daytime population (employment) will be additionally increased[8].

[8] Increased population with TOD case is estimated as follows: "TOD potential area + indirectly affected area" x "increased population density". TOD potential areas are identified which JICA Study Team assumes there will be a potential for integrated development with large-scale land more than 1ha (refer to 5.3).

Table 5.2.2 Population of Station Areas with/ without TOD (500m radius from station)

		(A) Present (2013)			(B) without TOD (2030)			(C) with TOD (2030)		
		Population	Employment	Student	Population	Employment	Student	Population	Employment	Student
C01	Thai Binh Market	25,318	26,839	10,808	20,939	22,540	7,275	22,439	40,740	7,275
C02	Cong Hoa	32,959	31,643	14,626	22,939	24,978	5,683	26,439	45,978	5,683
C03	Hoa Binh Park	37,374	31,067	28,100	26,034	24,848	10,341	35,534	42,848	10,341
C04	Medical University	23,880	28,711	19,282	17,776	25,604	7,446	23,776	41,604	7,446
C05	Thuan Kieu Plaza	21,563	22,051	13,399	16,436	19,646	5,288	20,436	34,446	5,288
C06	Cho Lon	34,912	24,338	8,320	29,781	29,985	5,256	33,781	43,985	5,256
C07	Gay Go	40,168	13,880	10,064	30,247	14,036	6,287	36,247	19,036	6,287
C08	Phu Lam Rotary	32,868	12,068	7,958	27,242	12,476	5,764	34,242	21,076	5,764
C09	Phu Lam Park	23,161	15,237	7,894	19,964	15,032	6,127	28,964	24,032	6,127
C10	Mien Tay Terminal	13,009	6,897	2,457	16,424	10,648	3,043	28,424	31,648	3,043
	Total	285,212	212,731	122,908	227,782	199,793	62,510	290,282	345,393	62,510

Source: JICA Study Team

5.3 Development Concept by Station

Generally, it is necessary to install drop off & pick up space at each station to secure the minimum connectivity between the station and its surrounding area. At the stations which have enough spaces or possibility of integrated development, it is recommended to construct intermodal facilities including bus stops (or terminals), taxi pool, and possibly commercial facilities as well as drop off & pic up space. The entrances are basically planned to construct on the roads or walkways, however, integrated construction with small private house or stores should be considered when the road or the walk way is not wide enough. Direct connection could be considered when investors who have development plans or existing buildings around stations request it.

5.3.1 C1 Thai Binh Market Station

(1) Concept

Thai Binh Station will be located in the central business district cluster. Since the station is the closest to the most developed area among the stations in this cluster, it is assumed that a lot of commuters, people going shopping, tourists etc. will use the next station C0 Ben Thanh rather than this station. However, many facilities with potential of redevelopment are located in this area. This station is proposed to be a huge intermodal terminal. Integrated development with these facilities will bring benefit to both sides, railway enterprise and property owner. The railway enterprise can enhance their convenience to the passengers by providing additional entrances. The property owner can enjoy the increase of the property value and income from the rent of commercial facilities or offices. And it will bring many people to this station and its surrounding areas

(2) Integrated development with 23/9 Bus Parking

- This bus terminal is mainly used as parking lot and stop for the busses providing service for inner city. The high-level usage of this terminal can realize both intermodal function and commercial function as follows,
  - ➢ A station plaza with a bus terminal, taxi terminal, drop off & pick up space
  - ➢ A commercial building directly connecting to the station

(3) Optional proposal

- Integrated development with Thai Binh Market and the Bureau of Market Management is additionally proposed to be considered.
  Thai Binh Market: District 1 has already approved the redevelopment of Thai Binh Market. When the development proceed to the stage of implementation, direct connection to the station will be highly recommended to be secured.
  The Bureau of Market Management: Though there is no plan to redevelop the building of the Bureau of Market Management at this moment, the location and the scale of its land is one of the most suitable for integrated development with this station. It is necessary to consider such a method of development, when the building need renewal or rebuilding

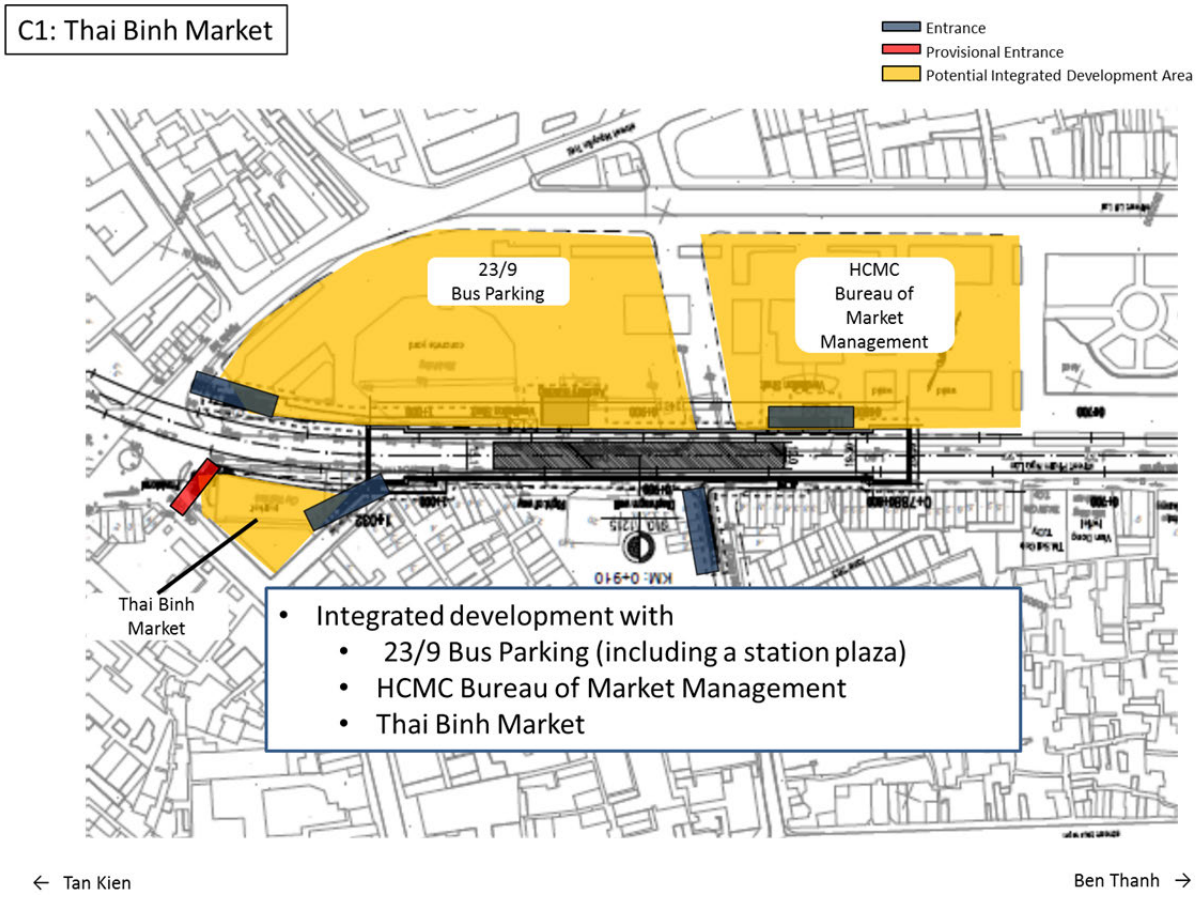


Figure 5.3.1 Development Concept of Thai Binh Market Station

5.3.2 C2 Cong Hoa - Six Way Junction Station

(1) Concept

Cong Hoa - Six Way Junction Station will be located in the central business district cluster. Since the Line 3A and 3B will connect at this station in the future, it is assumed that not only the passenger who get on and off but also those who transfer to the other line will use this station.

There will be a large areas constructed by open-cut method, it is proposed to install a parking lot for motorcycles to secure the connectivity between the railway lines and the other transport modes. It is also proposed to install underground shopping mall to increase non-rail revenue.

In addition, in consideration of the rotary close to the station, it is necessary to secure the accessibility towards the rotary.

(2) Installation of parking lot for motorcycles and underground shopping mall

- Before the commencement of Line 3B
  Since it is assumed that passenger demand won't be so high before the commencement of Line 3B, it is recommended that parking lot for motorcycles should be installed in whole open-cut constructed area, in order to increase the passenger demand with convenient transfer from motorcycles to train. The capacity of the parking lot will be approximately 780 by rough estimation.
- After the commencement of Line 3B
  Though the assumed number of boarding and alighting passenger won't be still high, it is expected that the passenger who transfer to the other line should reach a certain amount. The commercial business is supposed to be feasible after the commencement of Line 3B. The nearest part of the parking lot will be renovated to be underground shopping mall which provides varieties of service such as food & drink stands, restaurants, merchandising. The commercial area will be approximately 2,000 sqm.

(3) Additional proposal

Integrate development with Governmental Guest House will provide additional entrances to enhance the convenience of passengers, and possibly increase of non-rail revenue.

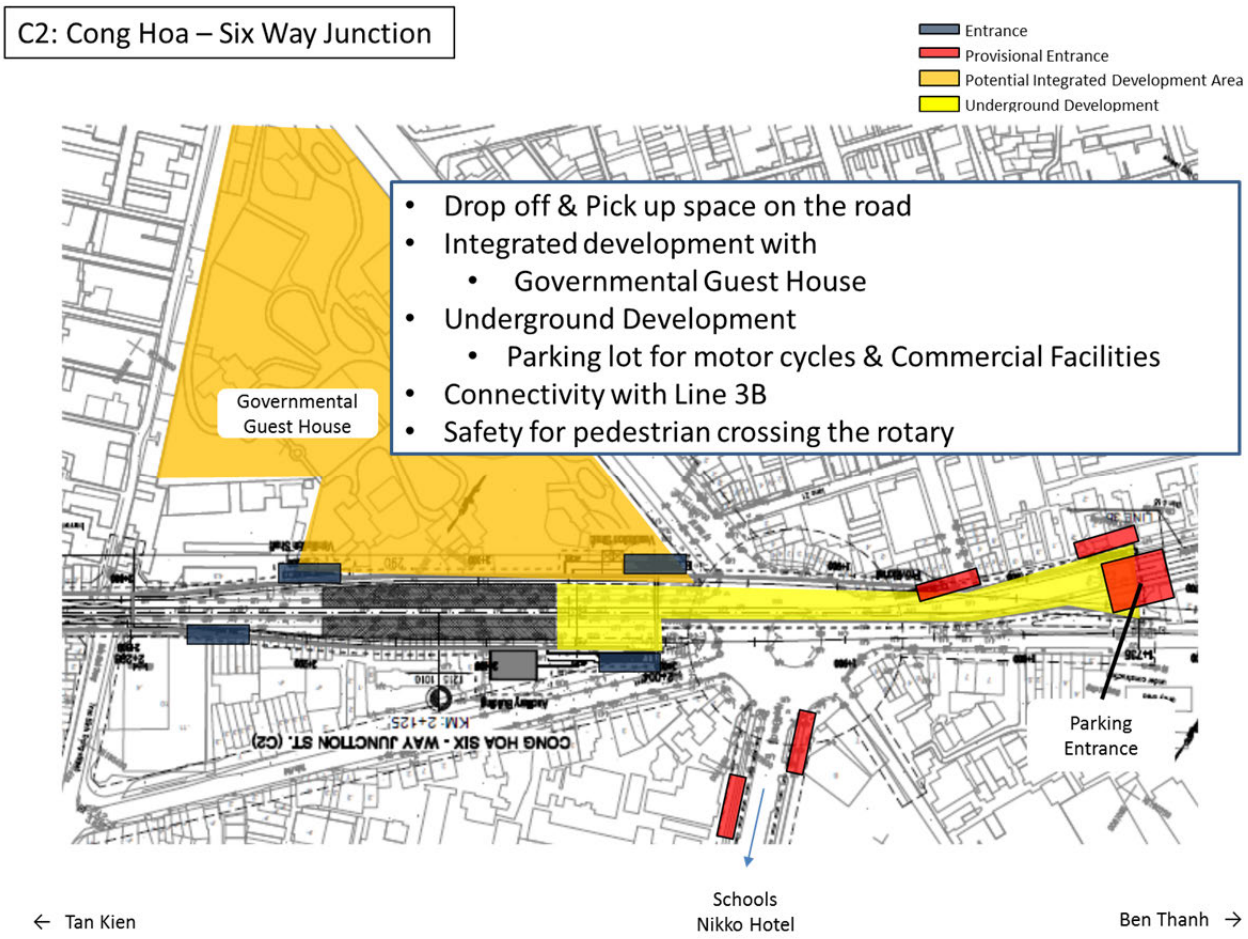


Figure 5.3.2 Development Concept of Cong Hoa – Six Way Junction Station

5.3.3 C3 Hoa Binh Park Station

(1) Concept

Hoa Binh Park Station will be located in the center business district cluster. It is assumed that many commuters and people going to shopping etc. will use this station. Moreover this area has a characteristic of “Departure place” as a residential area, as well as that of “destination” as a CBD. The accessibility to commercial facilities, office buildings and residential areas should be secured.

(2) Cooperation with the developers who have plans for redevelopment of surrounding area

- PC of District 5, Ho Chi Minh, where the station will be located, proposed that the development of the station should be integrated with the redevelopment plan around the station by SaiGon Star Infrastructure & Real Estate Investment Development Corp (SGS), the local developer. The other developer also has a development plan close to the station. There is some possibility to be requested by them to connect their buildings and the station. This kinds of request will bring benefit to both railway side and developer side. The developer owes the construction cost of the pass ways with the expectation of increasing

customers, and the railway passengers, the users of the building in the meantime, can enjoy convenience for their shopping, commuting etc.

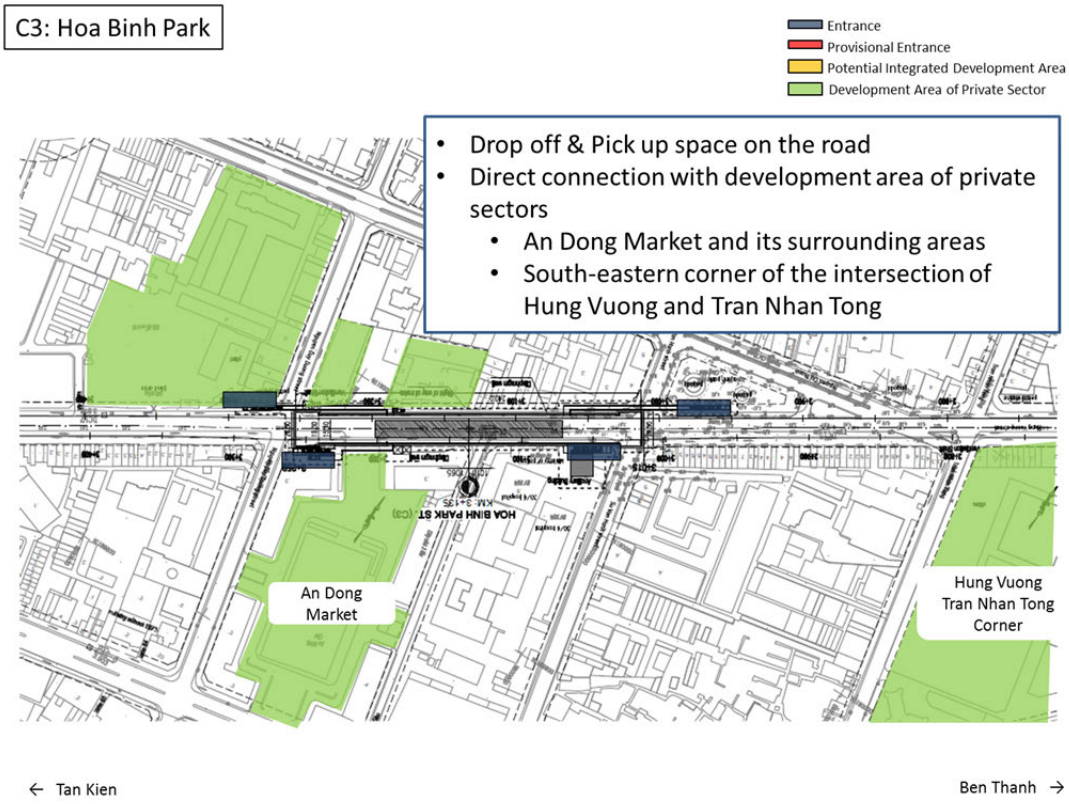


Figure 5.3.3 Development Concept of Hoa Binh Park Station

5.3.4 C4 University of Medicine and Pharmacy Station

(1) Concept

University of Medicine and Pharmacy Station will be located at the Residential, Medical and Educational Area Cluster. Various facilities such as a large scale commercial facility (Hung Vuong Plaza (Parkson Department Store)), University of Medicine and Pharmacy and its attached hospital, high school, junior high school etc. are concentrated as well as residences. Moreover this station is planned to be a connection with the line 5 and therefore the highest demand all over the line is assumed. The development of commercial facilities should be focused on as well as the accessibility to the facilities subscribed above.

(2) Integrated development with Hung Vuong Plaza

- It is necessary to develop an intermodal facility by sharing the taxi pool and the poach in front of the building.
- A large-scale underground shopping mall should be developed under the space in front of the building to provide with passengers convenient service such as food & drink stands,

restaurants, merchandising. The targets of commercial facilities should be set in consideration of the situation described above. At the meantime, the underground shopping mall itself will be utilized as the sole pass way to transfer to /from the line 5, which will contribute to increase the non-rail revenue.

(3) Optional proposal

- Security of the accessibility to University of Medicine and Pharmacy and the attached hospital should to be additionally considered. Consideration of direct connection with the facilities around the station through under passes, integrated development of entrances etc. will be highly recommended when they making plans of rebuilding.

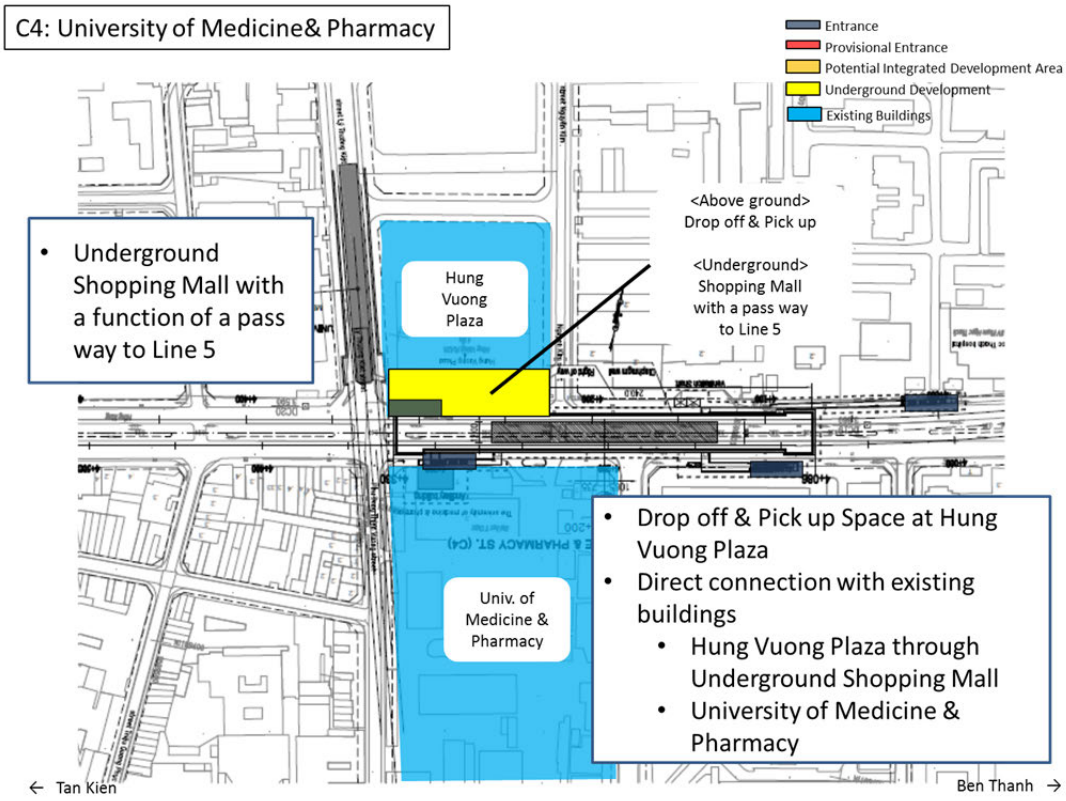


Figure 5.3.4 Development Concept of University of Medicine and Pharmacy Station

5.3.5 C5 Thuan Kieu Plaza Station

(1) Concept

Thuan Kieu Plaza Station will be located at the Residential, Medical and Educational Area Cluster. Thuan Kieu Plaza, which used to be a complex building of commercial and residential near the station, hasn't been operated for years. And the demolition has already been started to prepare for the redevelopment, however, only slight demand is forecasted for this station, therefore this station is not considered to be suitable for commercial activities at this moment. There might be a slight possibility that the demand can be higher once Thuan Kieu Plaza is redeveloped.

According to the PC of District 5, Ho Chi Minh City, there is a plan to develop an underground parking lot. Furthermore, the PC also asks to connect with 922 Trade Center, which is under construction. (It's located outside the Figure 5.3.5: 35 story commercial and residential building)

(2) Installation of an underground parking lot

- It is necessary to install an underground parking lot for motor bicycles by utilizing the area constructed by open cut method, in order to higher the passenger demand. Though another parking lot is planned to be constructed under the land of current Thuan Kieu Plaza, it will inconvenient for the passengers of Line 3A. The railway enterprise can provide with the passenger convenient parking with short walking distance. The capacity of the parking lot will be approximately 315.

(3) Integrated Development with the new redevelopment of Thuan Kieu Plaza

- It is highly recommended to consider integrated development with the newly redeveloped building of current Thuan Kieu Plaza. It will contribute to raise both the value of the building and convenience of the passengers who use there.

(4) Optional proposal

- It is additionally recommended to consider direct connection with Toa Nha Golden Plaza Residence.
- An underground shopping mall, which need to have a connection with the newly redeveloped building of current Thuan Kieu Plaza will be also additionally recommended to be install by renovating some parts of the parking lot, provided that the passenger demand goes up to the sufficient level. It is an idea to create interaction facilities of people for the purpose of recovering the reputation of this area and attraction of passengers who visit Cho Ray Hospital including securing the accessibility there.

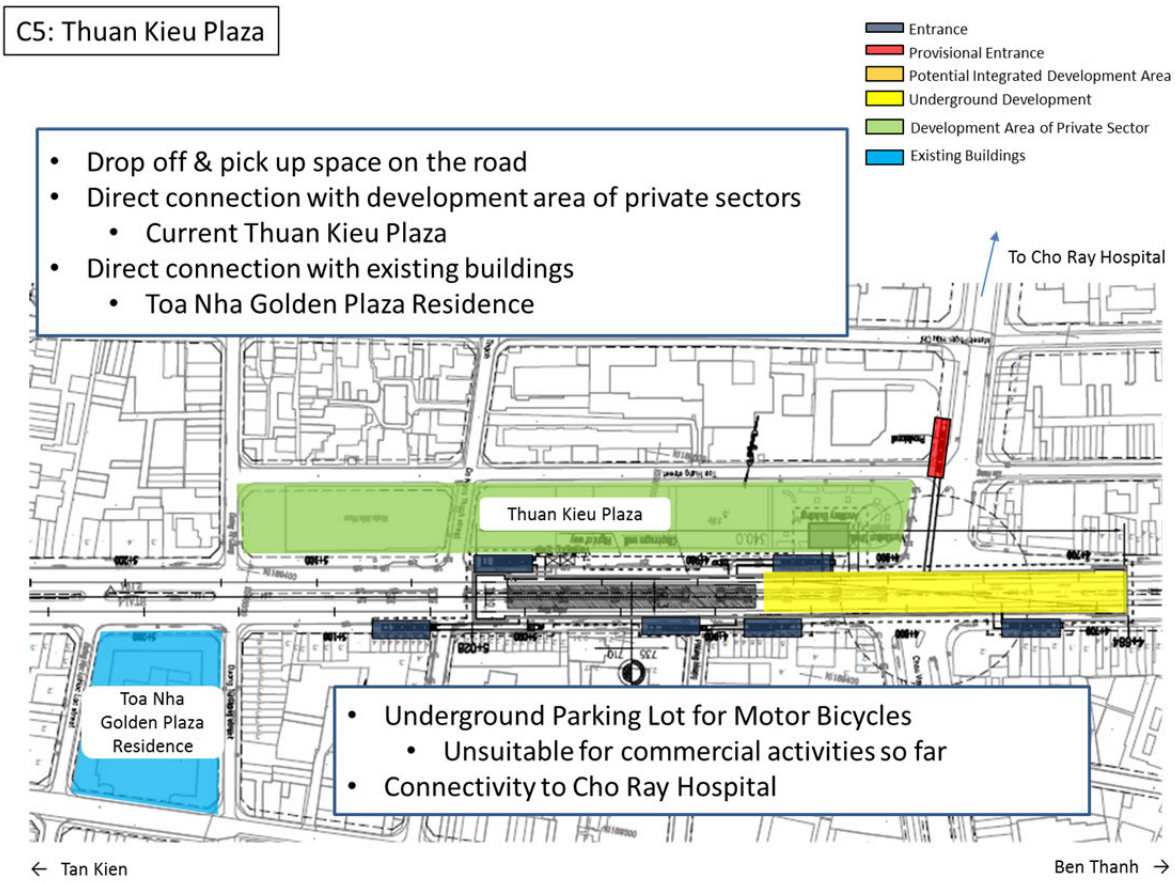


Figure 5.3.5 Development Concept of Thuan Kieu Plaza Station

5.3.6 C6 Cho Lon Bus Terminal Station

(1) Concept

Cho Lon Bus Terminal Station will be located in the Residential, Medical and Educational Area Cluster. Since there are Cho Lon Bus Terminal, Binh Tay Market, and old residential area in Cho Lon Area, near the station, it is assumed that the demand will be high as well as the stations in the Central Business District Cluster, however, there's no customer attracting facility or road wide enough. Therefore it is necessary to secure the accessibility to Cho Lon Area including Cho Lon Bus Terminal which is located in approximately 300m south of the station and take the possibility of redevelopment into account as a mid to long-term issue.

(2) Integrated development or direct connection with the neighborhood

- Currently there's no development plan or existing building which is suitable for consideration of either integrated development or direct connection with the neighborhood.

(3) Additional proposal

- Integrated development of entrances with road side facilities is additionally recommended in this area. From the view point of the convenience of pedestrian and road traffic, it is not desirable to construct entrances on the walkway.
- There is low possibility at present, however, the mid to long-term possibility to construct commercial or social service facilities, or land readjustment should be considered.

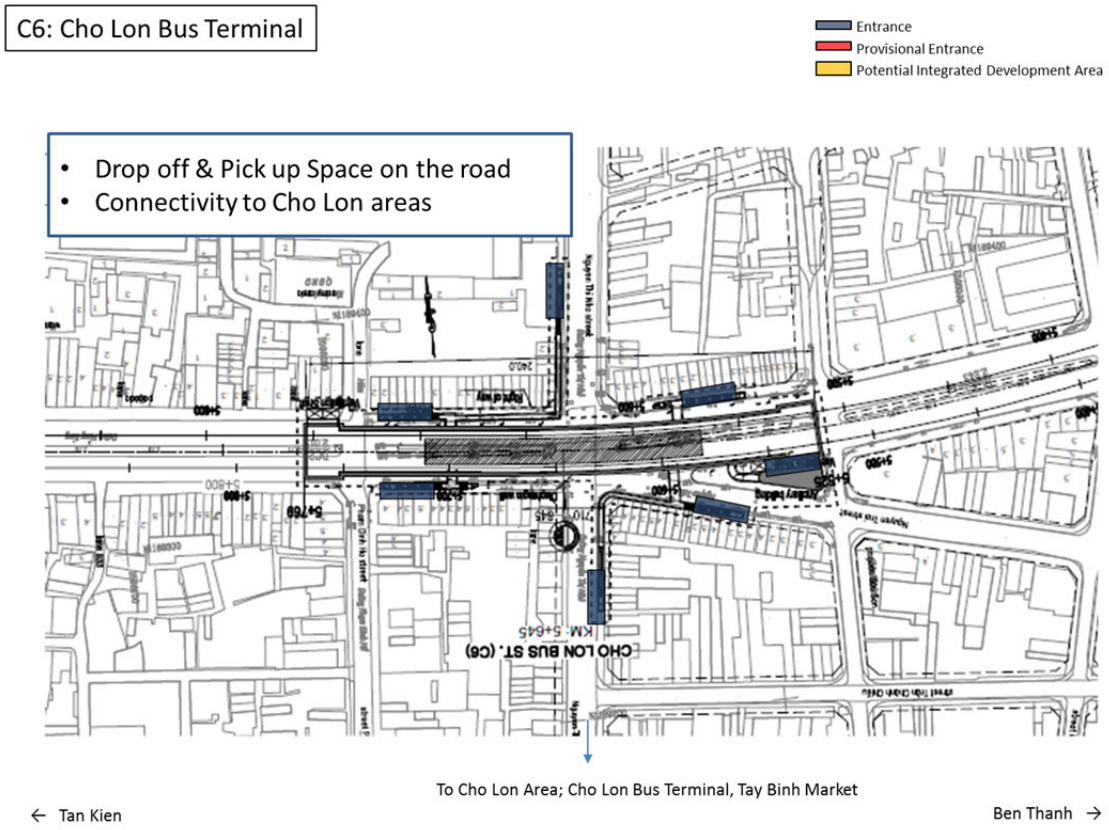


Figure 5.3.6 Development Concept of Cho Lon Bus Terminal Station

5.3.7 C7 Cay Go Station

(1) Concept

Cay Go Station will be located in the Residential, Medical and Educational Area Cluster. There are small houses concentrating and no large-scale commercial facility and office. It is assumed that the demand will consists of mainly commuters to the city center. Since the area is divided by major roads and a flyover, it is necessary to secure the accessibility to each surrounding area.

(2) Integrated development or direct connection with the neighborhood

- Currently there's no development plan or existing building which is suitable for consideration of either integrated development or direct connection with the neighborhood.

(3) Additional proposal

- Integrated development of entrances with road side facilities is additionally recommended in this area. From the view point of the convenience of pedestrian and road traffic, it is not desirable to construct entrances on the walkway.
- There is low possibility at present, however, the mid to long-term possibility to construct commercial or social service facilities, or land readjustment should be considered.

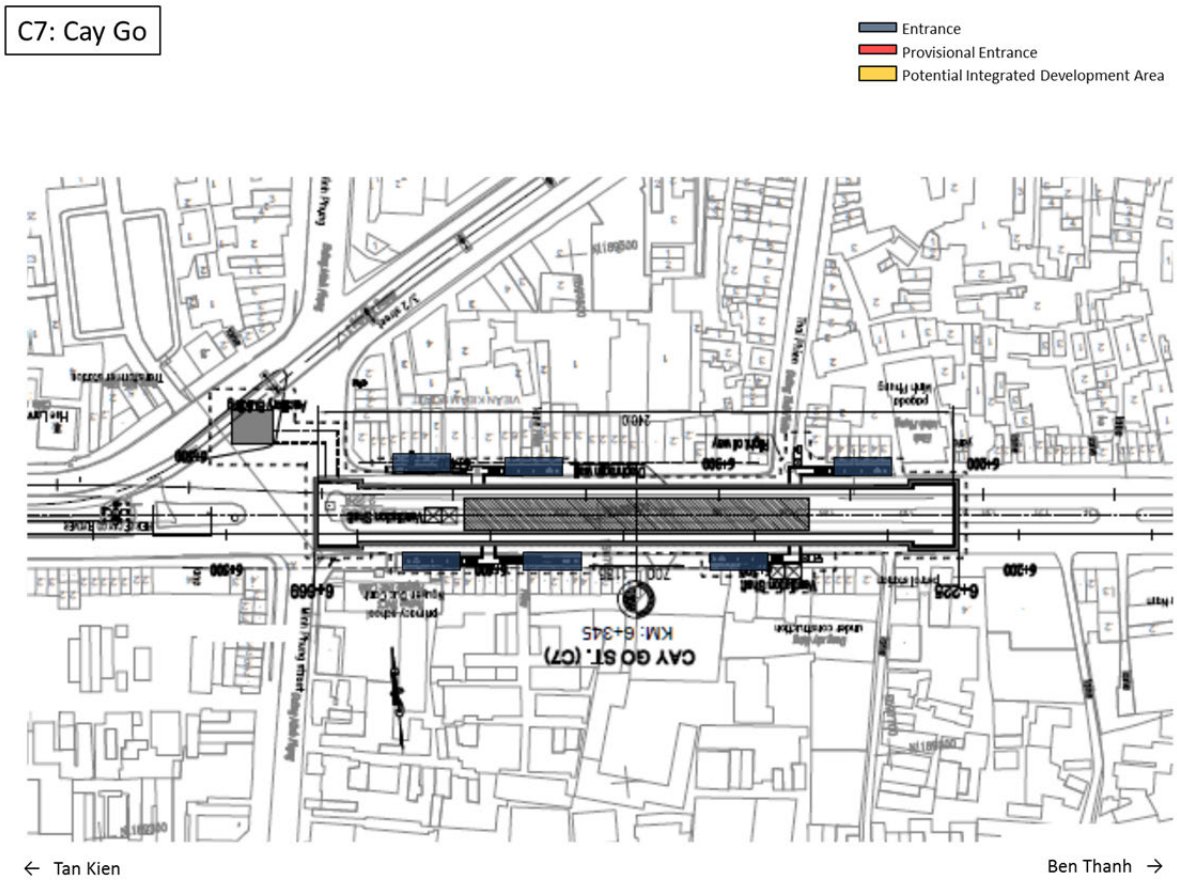


Figure 5.3.7 Development Concept of Cay Go Station

5.3.8 C8 Phu Lam Rotary Station

(1) Concept

Phu Lam Rotary Station will be located in the Urban Fringe Area Cluster. This is divided by a river from the city center, however, there is a potential to be key point of transportation because of a large intersection of several major roads and the construction of Line 6 in the future. On the other hand, there are no customer attracting facilities but only small houses, a high school and a super market, therefore it is necessary to set commercial facilities and social service facilities.

(2) Installation of underground shopping mall

- It is necessary to construct a pass way to transfer to/ from Line 6 upon its construction. By utilizing and expanding this pass way, it is recommended to install an underground shopping mall there. Since this station will be a “Departure Place” as a residential area, service which provide food or drink is considered to be suitable.

(3) Additional proposal

- Integrated development of entrances with road side facilities is additionally recommended in this area. From the view point of the convenience of pedestrian and road traffic, it is not desirable to construct entrances on the walkway. It is better to secure accessibility by integrated development of entrances with small houses or stores on the road side.
- There is low possibility at present, however, the mid to long-term possibility to construct commercial or social service facilities, or land readjustment should be considered.

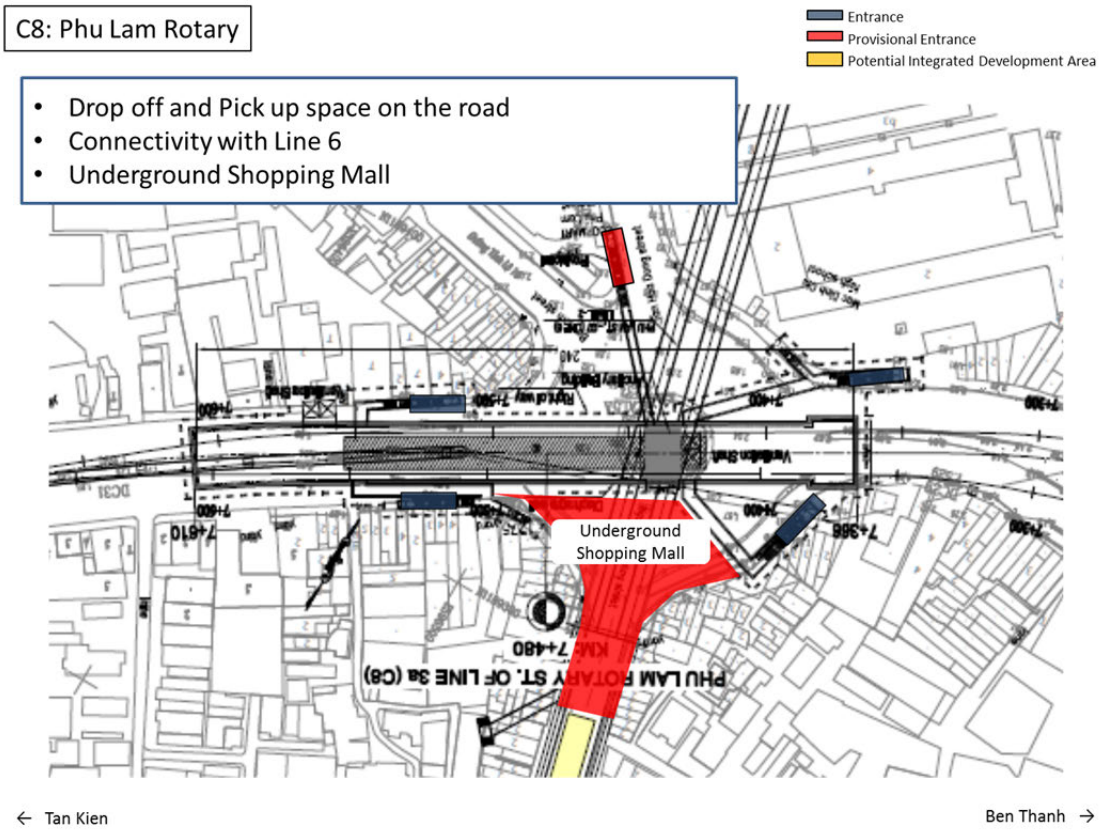


Figure 5.3.8 Development Concept of Phu Lam Rotary Station

5.3.9 C9 Phu Lam Park Station

(1) Concept

Phu Lam Park Station, which is proposed to be an elevated station, will be located in the Urban Fringe Area Cluster. Though it is assumed that the demand won't be very low, the accessibility will be disturbed by Phu Lam Park. It is necessary to construct a pedestrian deck in an east direction to secure the accessibility to the residential area beyond the park. And it is highly recommended to formulate a sub CBD combined with C10 Mien Tay Terminal Station, so that opposite flows of passengers during the peak hours can be formulated. It will make the train operation more efficient.

(2) Construction of a pedestrian deck

- It I necessary to construct a pedestrian deck to connect the station with the residential areas beyond Phu Lam Park. At the meantime, commercial facilities targeting local people should be installed on the pedestrian deck for the purpose of increasing non-rail revenue.

(3) Integrated development of Phu Lam Park

- High-level use of Phu Lam Park : Phu Lam Park, which is currently both a place for recreation of local people and a greenbelt, is also quite suitable for development. It is highly

recommended to seek for the possibility to develop a high-level used facility with current function of the park retained. It should have family-friendly and environmental-friendly concept such as play field for children, roof gardens, indoor gardens, and wall surface greening. This development will con tribute to formulate sub CBD in the western part of Ho Chi Minh City.

(4) Additional proposal

- It is additionally recommended to connect to College of Transport through the pedestrian deck.

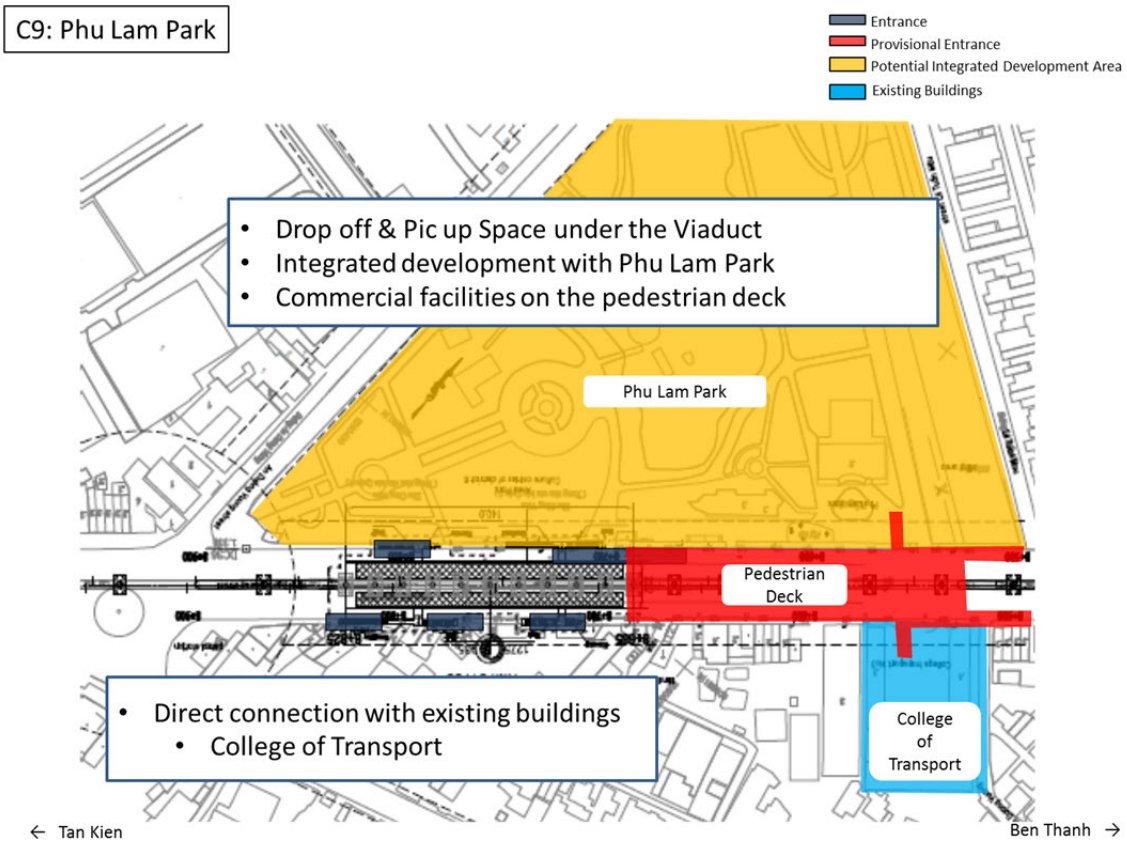


Figure 5.3.9 Development Concept of Phu Lam Park Station

5.3.10 C10 Mien Tay Terminal Station

(1) Concept

Mien Tay Terminal Station, which is proposed to be an elevated station, will be located in the Urban Fringe Area Cluster. This area is currently quite important for transportation of people and freight between Ho Chi Minh City and Mekon Delta. Since Mien Tay Terminal, which is an important hub of transportation, is planned to be partially transfer in the future, there is a good opportunity to formulate a sub CBD combined with C9 Phu Lam Park in the western part of Ho Chi Minh City. Moreover, since a tram line is planned to be operated and have a station in the current bus terminal land, the area is assumed to retain the function of transportation hub after the bus terminal transfers. It is effective to construct pedestrian decks in the east-west direction to secure the accessibility to the An Lac Market, Trieu An hospital and residential areas.

(2) Construction of pedestrian decks

- It I necessary to construct a pedestrian decks to connect the station with the residential areas, An Lac Market, Trieu An Hospital. At the meantime, commercial facilities targeting local people should be install on the pedestrian decks for the purpose of increasing non-rail revenue.

(3) Integrated development with Mien Tay Terminal

- Park & Ride facilities and complex facilities such as commercial facilities, offices etc. should be constructed to retain the function of transportation hub, aiming at formulation of a sub CBD in the western part of the city. It makes much sense that national and city government offices such as the Bureau of Market Management located near C1 Thai Binh Market take the initiative to transfer here in order to create the demand of the opposite direction during the peak hours.

(4) Additional Proposal

- Redevelopment of An Lac market cannot be avoided in the long-term. It should be redeveloped with connection to the station as a complex building with not only the function of market but also office or hotel as a part of sub CBD.

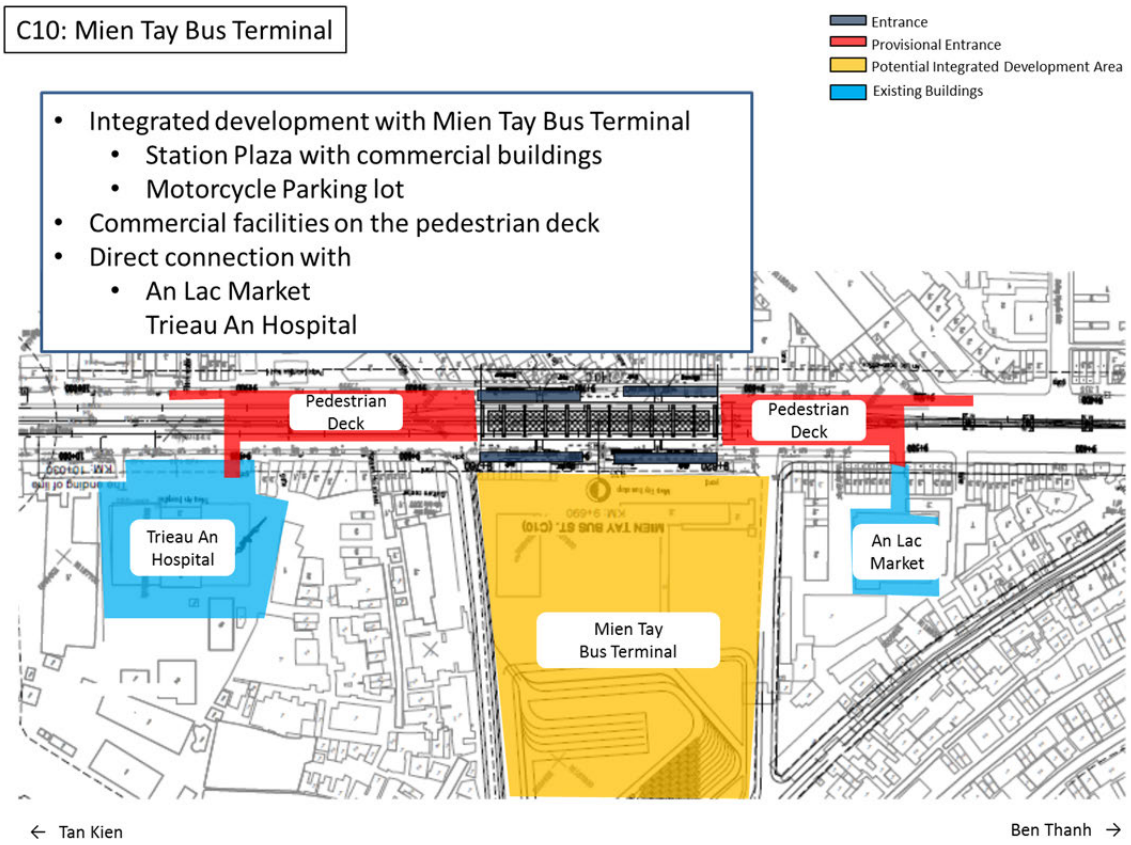


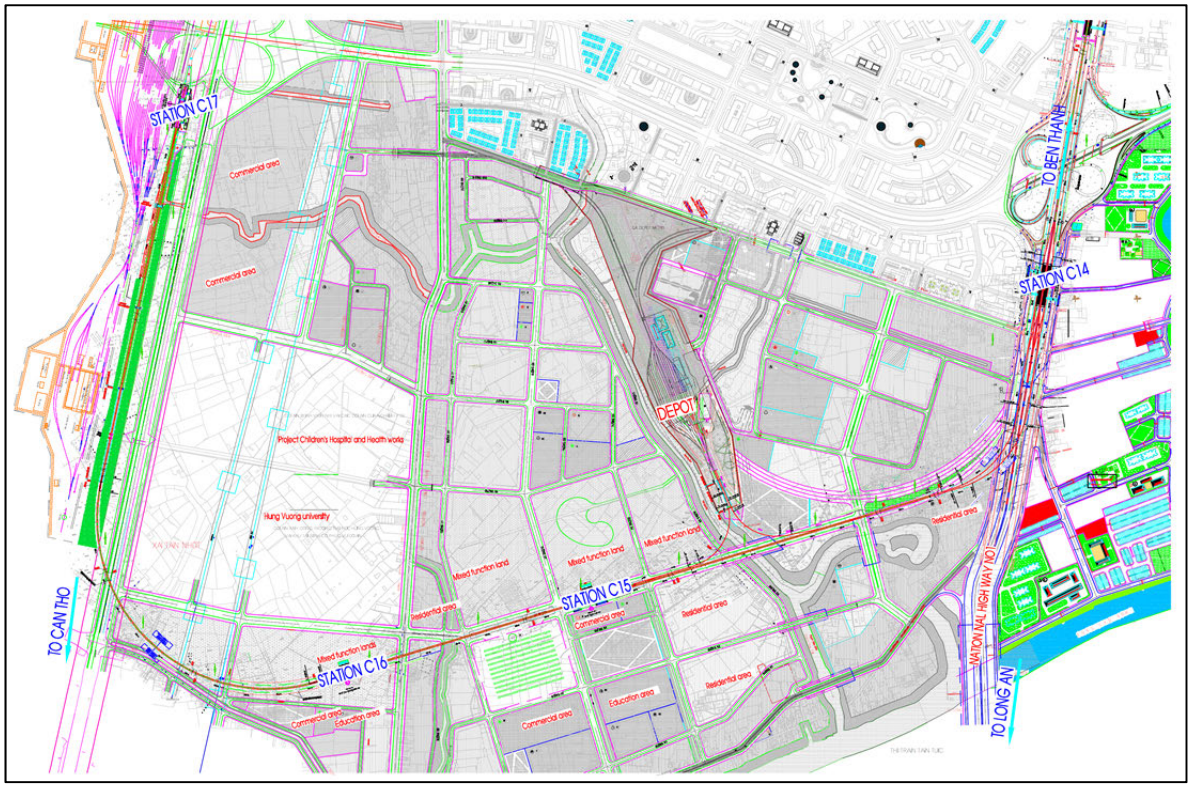
Figure 5.3.10 Development Concept of Mien Tay Terminal Station

5.3.11 Phase 2 Section

Phase 2 section includes 7 stations and the depot (about 9.3km length) from Mien Tay Terminal to the south-western suburban area. The development plan of about 200ha including the depot was approved by HCMC PC in 2013. (Decision No. 4780, 4803, 4952, 4956 / QD-UBND/ 2013). Main contents of the plan are summarized as follows:

- To promote high-density and mixed use district with services of education, culture, tourism, amenity, environment as a western sub center of the city level.
- To develop a large-scale high and mid-rise residential district where existing and new residents are mingled (planned population is 80,000).
- To develop various urban facilities such as large children's hospital (under construction), university, golf course, industrial park, handicraft clusters.

This plan seems to be too rough regarding land use plan. In order to secure the convenience of people living or visiting here, the land plan should be divided into smaller zones. Especially the areas in the approximately 500m radius need to have multiple functions such as residential area, shopping malls, amusement facilities, office etc.



Source: "Decision of Approval of the Urban Construction Detail Planning (Area Planning) scale 1/2000 of the Residential Area of Tan Kien Commune", HCMC-PC, 2013

Figure 5.3.11 Tan Kien Depot Area Development Plan

(1) Hi-Tech Healthcare Park Station

Hi-Tech Healthcare Park Station will be located in suburban area. Though several large construction projects such as Hi-Tech Healthcare Park are undergoing, the demand forecast analysis shows a quite few number of passengers.

- Construction of pedestrian decks connecting to new development area
  Subject to requests from private sector, direct connection with the station and their facilities will worth negotiating.
- Installation of commercial facilities
  Installation of commercial facilities can be considered provided that the passenger demand goes up to the sufficient level and some pedestrian decks are constructed.

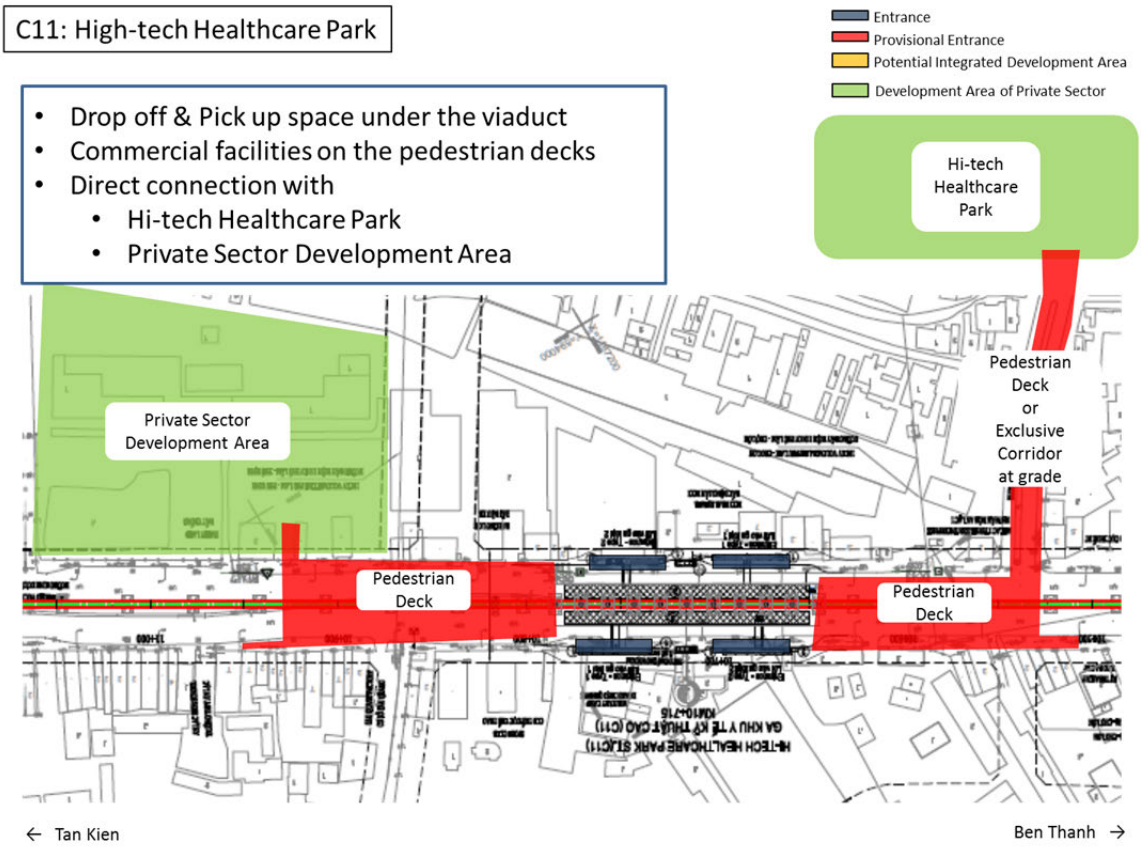


Figure 5.3.12 Development Concept of Hi-Tech Healthcare Park Station

(2) Ho Ngoc Lam Station

Ho Ngoc Lam Station will be located in suburban area. It is assumed that passenger demand will be the highest among Phase 2 stations, however there is no plan or sight of development around this station.

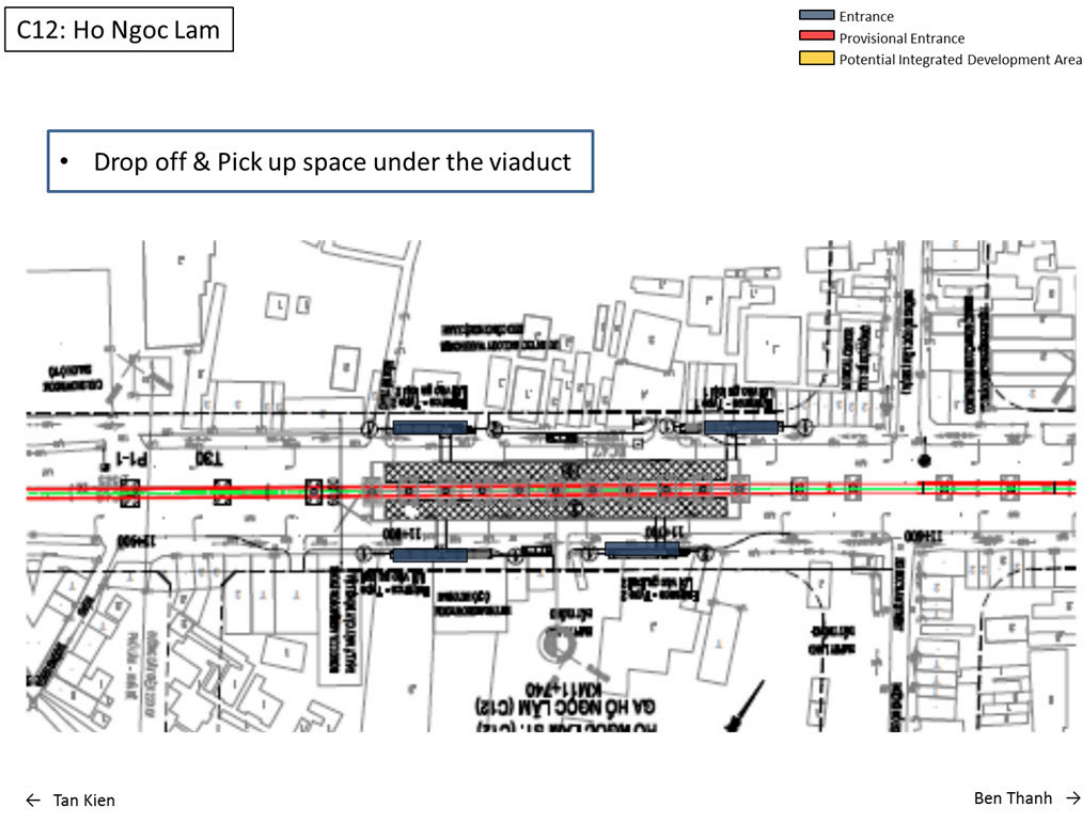


Figure 5.3.13 Development Concept of Ho Ngoc Lam Station

(3) An Lac 3way Junction Station

An Lac 3way Junction Station will be located in suburban area close to the junction of major trunk roads. This station is planned to be a connecting point with BRT. Moreover the median strip prospectively under the viaduct is wide enough to install commercial facilities with a function of a corridor connecting to C14 Hung Nhon.

- Installation of an intermodal facility
  An intermodal facility is necessary to secure the convenience of passengers who transfer to/ from BRT.
- Construction of a pedestrian deck or an exclusive corridor with commercial facilities on both sides, “Under Viaduct Shopping Corridor”
  There is a wide median strip between this station and C14 and it will be covered by the viaduct of Line 3A. Installation of commercial facilities above the median strip is highly recommended. It is expected to be one of the passenger attractions of this area as well as a physical connection between this station and C14.
- Construction of pedestrian decks which connect both side of the road
  Since National road A1, which Line 3A will run above, is quite wide, large pedestrian decks

connecting both side of the road can be constructed. Commercial facilities is recommended to be installed on the pedestrian decks.

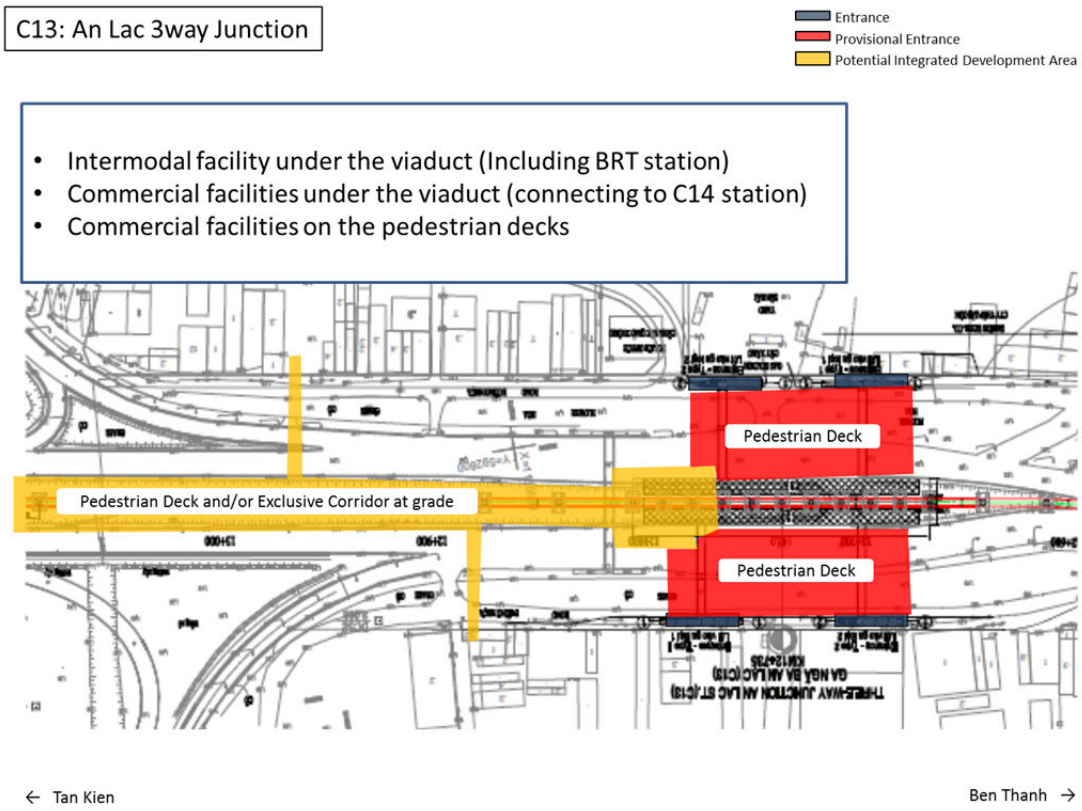


Figure 5.3.14 Development Concept of An Lac 3way Junction Station

(4) Hung Nhon Station

Hung Nhon Station will be located in suburban area close to the junction of major trunk roads. And this station will be the closest to New Mtien Tay Bus Terminal, which will be partially transferred from current Mien Tay Terminal, however it is not still in walking distance. From the view point of TOD and transportation system of Ho Chi Minh City, there should be some transport system to connect .this station and the bus terminal. In consideration of the passenger's convenience, construction of Line 3A branch line is the most suitable.

- Construction of a pedestrian deck or an exclusive corridor with commercial facilities both sides
  As described in the part of C13. Installation of "Under Viaduct Shopping Corridor" is highly recommended to be installed.
- Construction of pedestrian decks which connect both side of the road
  Since National road A1, which Line 3A will run above, is quite wide, large pedestrian decks connecting both side of the road can be constructed. Commercial facilities is recommended to be installed on the pedestrian decks.

- Construction of a branch line of Line 3A
  A branch line of Line 3A is necessary to secure convenient accessibility to New Mien Tay Terminal. It will dramatically improve the connectivity between Mekong Delta area and the city center of Ho Chi Minh City. A lot of tourists from other provinces and foreign countries can enjoy the convenient access to the area as well as the citizen of the city. In order to maximize this efficiency, direct operation from the main line will be necessary.

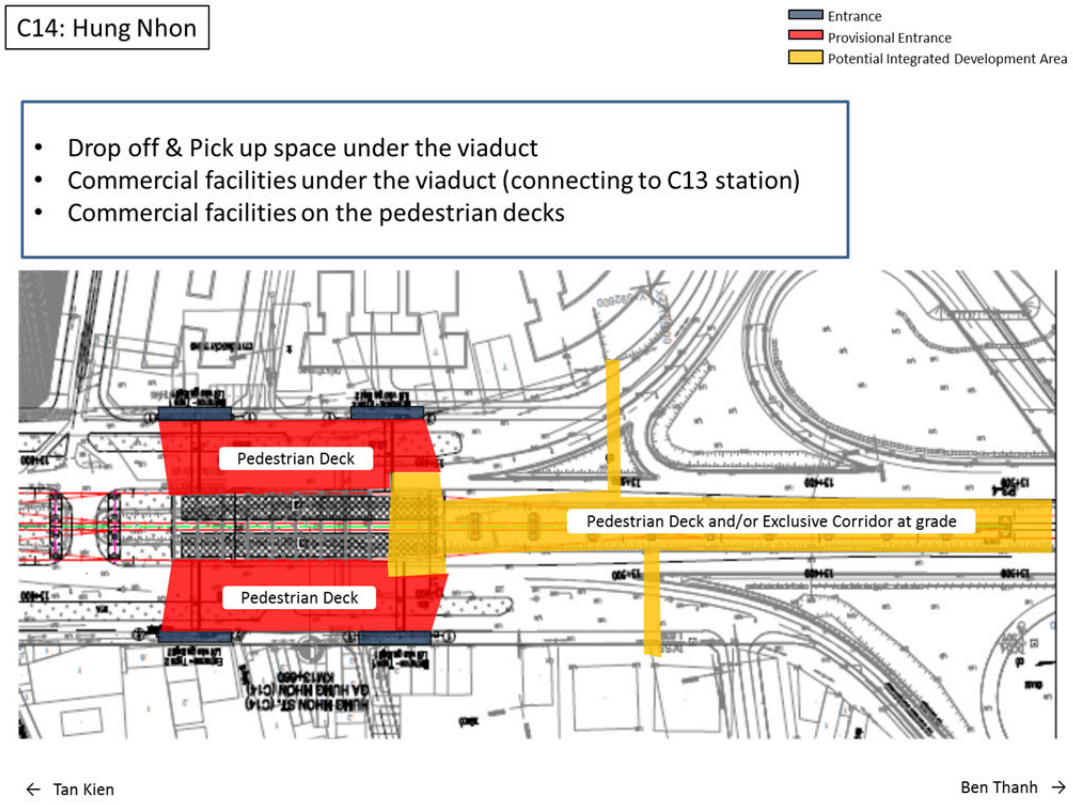


Figure 5.3.15 Development Concept of Hung Nhon Station

(5) Bau Goc Station

Bau Goc Sation will be located in suburban area close to the depot and planned new development area. Since there are majorly agricultural land around the station currently, it is recommended to construct station plazas at both side of the station to secure the convenient transfer to/from other transport modes such as bus, taxi, private vehicle.

- Construction of Station Plazas
  It is recommended that the station plazas should be composed of a bus stop, a taxy terminal, drop off & pick up spaces and parking lot for private cars and motorcycles, and commercial buildings.

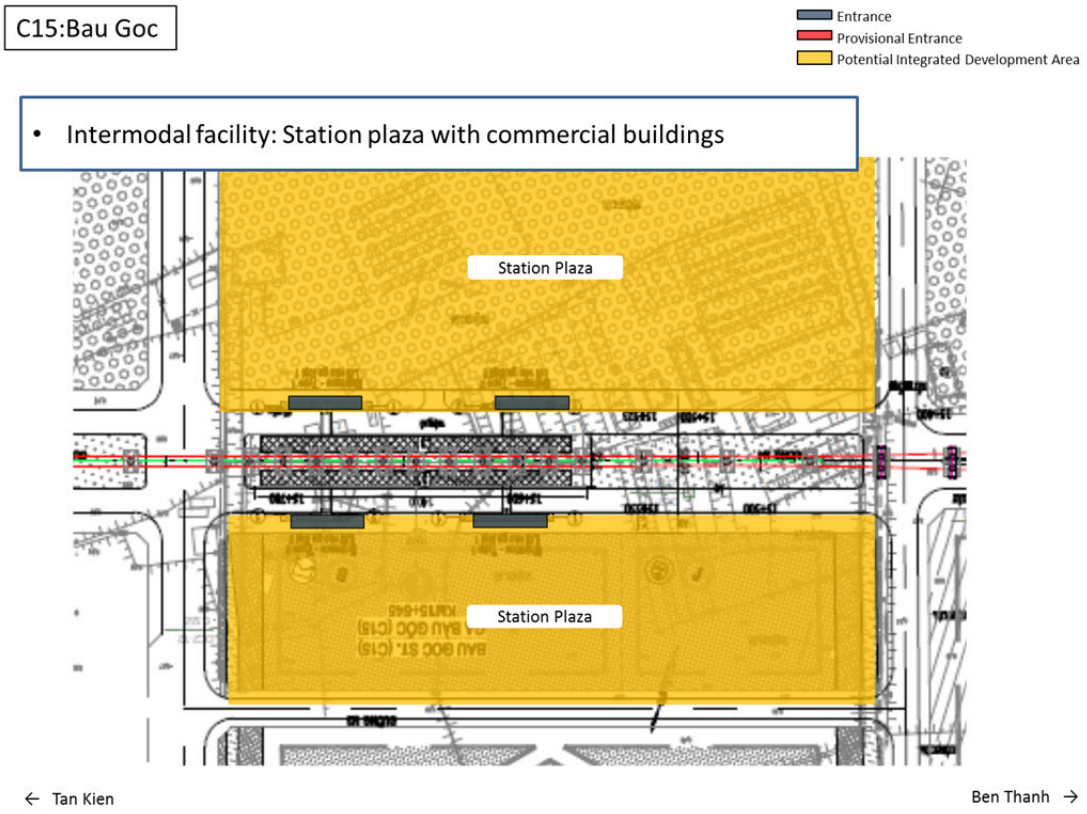


Figure 5.3.16 Development Concept Goc Station

(6) Nguyen Cuu Phu Station

Nguyen Cuu Phu Satiion will be located in suburban area close to the planned new development area. Since there are majorly agricultural land around the station currently, it is recommended to construct station plazas at both side of the station to secure the convenient transfer to/from other transport modes such as bus, taxi, private car and motorcycle.

- Construction of Station Plazas
  It is recommended that the station plazas should be composed of a bus stop, a taxy pool and stop, drop off & pick up spaces and parking lot for private cars and motorcycles, and commercial buildings.

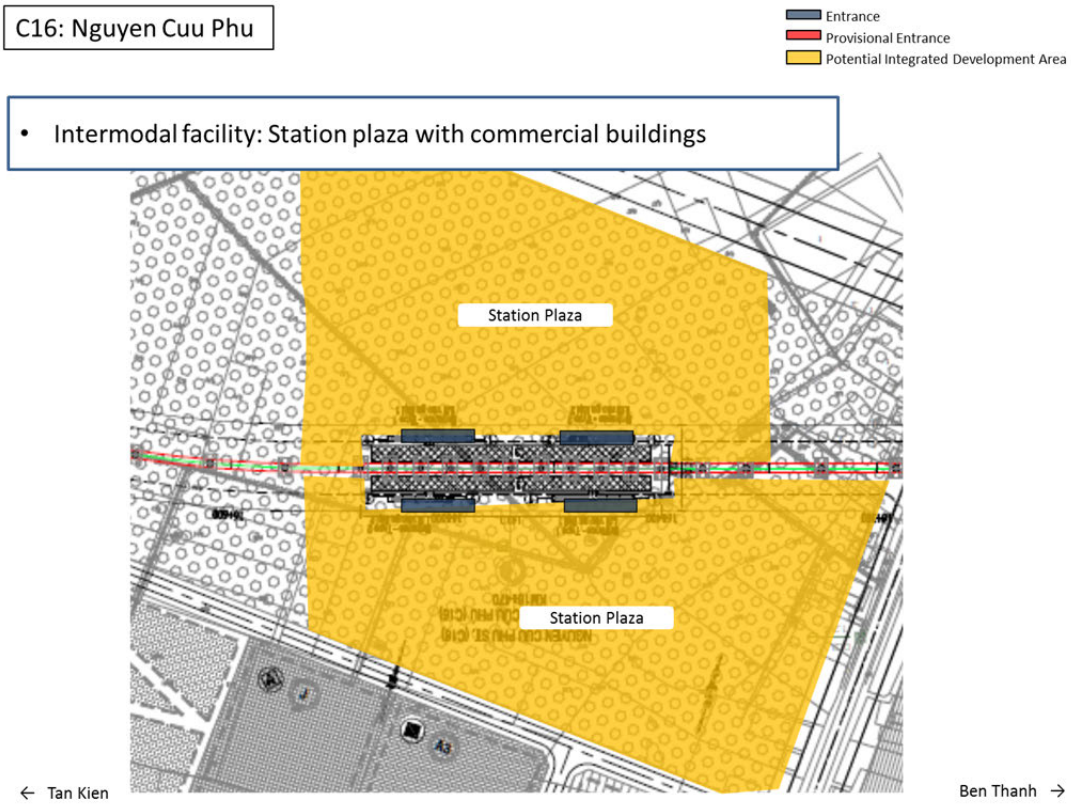


Figure 5.3.17 Development Concept of Nguyen Cuu Phu Station

(7) Tan Kien Station

Tan kien Station will be located in suburban area close to the new national railroad bound for Cam Tho under planning. Therefore it is necessary to secure the connectivity with the station of the National Railroad. Moreover since this station will be surrounded by major trunks of Ho Chi Minh City, it is recommended to construct station plazas.

- Construction of Pedestrian Deck
  Since this station will be an entrance to Can Tho area, a lot of tourists are expected to transfer here to National Railroad bound for Can Tho. Convenient connectivity between Line 3A and National Railroad station should be secured by a pedestrian deck with a seamless roof, which enable tourists with large baggage to move easily in all weather. And it is recommended to install commercial facilities on the deck targeting the tourists.
- Construction of Station Plazas
  It is recommended that the station plazas should be composed of a bus stop, a taxy pool and stop, drop off & pick up spaces and parking lot for private cars and motorcycles, and commercial facilities.

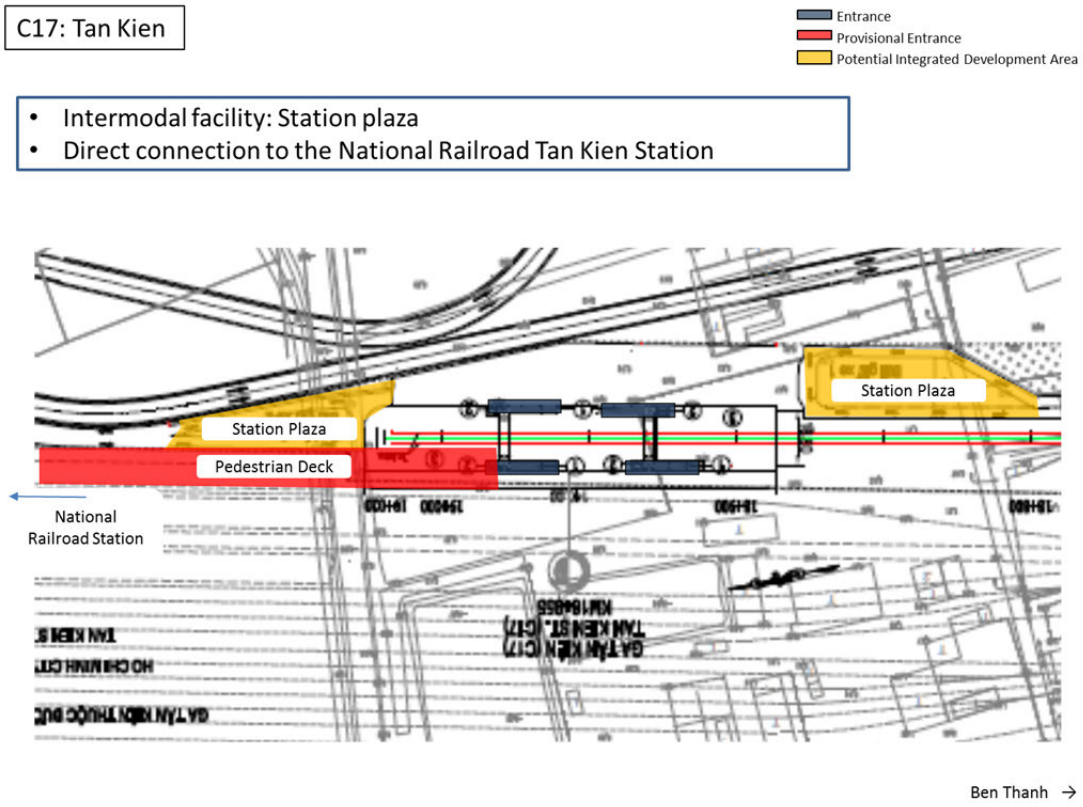


Figure 5.3.18 Development Concept of Tan Kien Station

5.4 Intermodal Facility Development Plan

5.4.1 Approaches

While the railway construction project covers only for construction of station, rail and depot basically, intermodal facilities such as station plaza, parking, drop off and pick up space are required to ensure safe and smooth access and transfer for passengers. For this, in this FS, TOD facility drawings are prepared additionally to propose these facilities to be included into FS components, and/ or to be constructed and operated by private developers.

Table 5.4.1 Proposed Intermodal Facilities

Cluster	Station	Other Line	M/C Parking	Drop off& pick up	Station Plaza	TOD Potential Area
CBD	**C1 Thai Binh Market**	Bus terminal	●	●	●	•23/9 bus parking •Thai Binh Market
	C2 Cong Hoa	Line3B	●1)	●		•Government Guest House •Underground space (C&C)1)
	C3 Hoa Binh Park			●		•An Dong Market and apartments
Mixed built-up area	**C4 University of Medical and Pharmacy**	Line5		●		•Rotary of Hung Vuong Plaza •Medical University
	C5 Thuan Kieu Plaza		●1)	●		•Thuan Kieu Plaza •Underground space (C&C)1)
	C6 Cho Lon Bus Terminal			●		•(Cho Lon bus terminal)
	C7 Cay Go					
Urban fringe	**C8 Phu Lam Rotary**	Line6		●		
	C9 Phu Lam Park			●		
	C10 Mien Tay Terminal	Bus terminal	●		●	•Mien Tay Terminal
Suburban	C11 High-Tech Medical			●		
	C12 Ho Ngoc Lam			●		
	C13 An Lac Three-way Junction	BRT		●		
	C14 Hung Nhon					•New development area around depot
	C15 Bau Goc		●		●	
	C16 Nguyen Cuu Phu		●		●	
	C17 Tan Kien		●		●	

1) Underground space will be provided after cut and cover construction.

Source: JICA Study Team

Among various ITFs, it is proposed to consider to include ITFs into FS for approval together with station facilities for effective construction and operation, especially roadside facilities for transfer, and station-adjoined facilities such as underground parking, intermodal facility under the viaduct (see Table 5.4.2).

Table 5.4.2 Proposed Intermodal Facilities to be constructed with Stations

Station	Facility	Required land	Necessity of expansion of ROW
All stations	Bus stops, drop off and pick up space	Sidewalk/ carriageway	None
C2 Cong Hoa	Underground bike parking	Underground space1)	None
C4 University of Medicine and Pharmacy	Rotary, underground mall connecting to Line5 station, underground bike parking	Rotary land in front of Huong Vuong Plaza	Required (Huong Vuong Plaza)
C5 Thuan Kieu Plaza	Underground bike parking	Underground space1)	None
C13 An Lac Three-way Junction	Intermodal facility under viaduct	Space under elevated station	None
C14 Hung Nhon			

Source: JICA Study Team

5.4.2 Feeder Bus Service Improvement

UMRT is expected to provide a high quality public transport service, but the initial network coverage will be limited. To maximize the serviceability and the operational efficiency of HCMC3A after completion of Phase 1, and thereby increase the total share of public transport, it is indispensable to build a feeder service. A variety of modes could perform feeder services for UMRT: bicycle, motorbike, private automobile, taxi, bus, walking, etc.

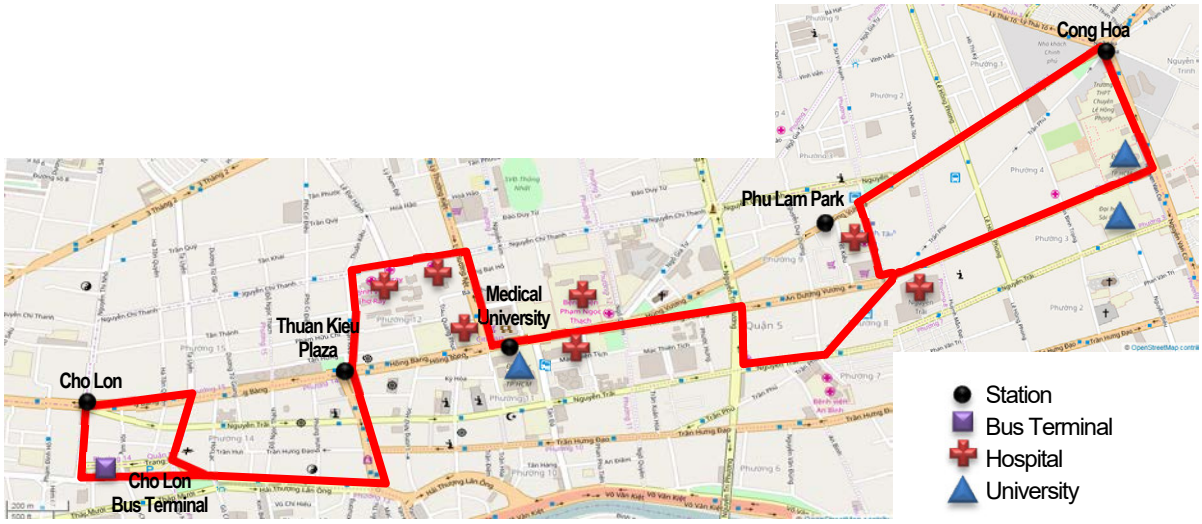
Feeder buses are operated to supplement public transport service coverage integrated with UMRT network. For this purpose, the service coverages and routes of feeder bus services are proposed based on the following criteria: (a) cover the areas where demand come from: town centers, residential areas, major urban facilities such as universities and industrial zones in order to increase patronage, (b) cover supplemental areas that are currently inconvenient to access by public transport means, (c) availability of space for bus operation (trunk roads, roadside facilities, etc.), and (d) cover the route of UMRT extension.

To expand service coverage of public transport with HCMC3A and buses, following bus services are proposed, especially Phase1 period:

(i) **Reorganization of city bus lines:** supply and demand need to be suitably adjusted by rerouting lines that would compete with the prospective UMRT extensions, connect them to UMRT stations and introducing new access lines to the stations. In line with relocation plan of Mien Tay Terminal toward south, a comprehensive bus route reorganization plan will be formulated covering the south area of HCMC.

(ii) **Development of UMRT relay bus service:** the areas to be served by UMRT after extension need be linked to the initial UMRT stations by high-quality bus service for quick transfer to and from UMRT trains. In case of HCMC3A, UMRT relay buses (express service) connecting to phase2 sections to depot area and further extension to Tan An City of Long An Province will be operated from/ to Mien Tay Terminal.

(iii) **Loop bus service:** In the built-up area, many passengers will access to stations by motorbikes. Furthermore, there are many facilities such as universities, hospitals which are located out of walking distances from station. To provide convenient access from station to these facilities and residential areas, loop bus services are provided to connect these passenger catchment areas and connect to several stations (see Figure 5.4.1).



Source: JICA Study Team

Figure 5.4.1 Proposed Loop Bus Route

5.4.3 Access Improvement Measures

Required functions and facilities for access improvement are diversified and differed by local characteristics and station types. It is necessary to formulate accessibility improvement plan not only by each station but also by UMRT corridors and network with urban structure. Based on categorization of clusters of 4 types: (i) CBD cluster (C1-C3), (ii) mixed-built up area (C4-C7), (iii) urban fringe (C8-C10), and (iv) suburban area (C11-C17), required functions, intermodal facilities and other measures for access improvement are summarized in Table 5.4.3.

Table 5.4.3 Required Functions and Facilities by Local Characteristics and Station Types

Area Type	Local Characteristics and Requirements		Prioritized Measures for Access Improvement	
	Accessibility	Land availability	Intermodal facility development	Other measures
CBD cluster	• Pedestrian is prioritized, and private car entry should be regulated and restricted.	• Land and space for development are limited in CBD and new development is restricted. • Public lands and facilities, elevated and underground space are potential areas.	• Fringe parking • Elevated walkway under viaduct • Underground walkway and parking • Drop off& pick up space along sidewalk, space under viaduct	• Traffic management (restriction of private car entry, designation of pedestrian street, etc.) • Area circulation bus services connecting station and urban facilities
Mixed built-up cluster	• Main transport modes are by walking, bicycle or motorbike. • Road widening and development are required in mid and long-term. • Traffic safety is prioritized to access from local roads to the station in short-term. • Local bus service is provided from station to urban facilities	• Land and space for development are limited in built-up area. • Integrated urban redevelopment is promoted to improve accessibility and promote economic activities.	• Motorbike parking using space under viaduct, sidewalk, public lands, etc. • Drop off& pick up space along sidewalk, space under viaduct	• Access road improvement (colored pavement for pedestrian, guard rail, etc.) • Parking management around station to ensure pedestrian space • Loop bus service to connect to neighboring urban facilities
Urban fringe cluster	• Main transport modes are by feeder bus, walking, bicycle or motorbike. • Feeder bus network is promoted to formulate transport hub and extend public transport service coverage.	• To formulate mixed use commercial area at the station, integrated development is promoted utilizing railway land, public land (bus terminal, etc.) as well as built-up area.	• Bus terminal for feeder bus • Parking space	• Feeder bus service along extension section of UMRT and neighboring towns • Integrated development to develop intermodal facilities and other services
Suburban cluster	• Road development is prioritized to ensure access road to station. • Designated lanes for bus, motorbike and bicycle in carriageway and pedestrian streets are promoted.	• Lands for intermodal facility development are ensured by extending ROW of UMRT or designating transport facility lands in new development area.	• Station plaza to provide feeder bus service and pedestrian space • Parking space for P&R	• Loop bus service connecting station and depot development areas • Environmental friendly transport (E-bus, bicycle, etc.)

Source: JICA Study Team

5.4.4 Construction of Parking Lots and Commercial Facilities combined with Underground Stations

It is difficult to acquire lands for intermodal transport facilities around the underground stations located in existing urban areas. Especially the existing urban areas along Line 3A are mixed areas of old residences, commercial facilities, offices, and cultural facilities including a number of hospitals and universities. Underground spaces need to be utilized in the city center where the land price is expensive and there are few public lands to be utilized.

The construction cost of underground facilities can be dramatically reduced when they are combined and constructed with underground stations, though they are quite costly. The underground stations of Line3A are going to be constructed by cut-and-cover method. In addition, C2 Cong Hoa Station and C5 Thuan Kieu Station are planned to have turn outs, therefore these two stations have extra underground spaces created by cut-and-cover method. Usually, such underground spaces are back-filled after the installation of turn outs, however, utilizations of the spaces of these two stations to be parking lots and commercial facilities are proposed.

It is possible for private sector to participate in the construction or operation of those facilities, both parking lots and commercial facilities, by co-development of these stations with other redevelopment projects or construction plans of underground parking lots. However, it is necessary to demarcate the border of ODA construction and construction initiated by private and to clarify the way and obligations of maintenance, as they are constructed in parallel with these underground stations to reduce construction costs.

<C2 Cong Hoa Station>

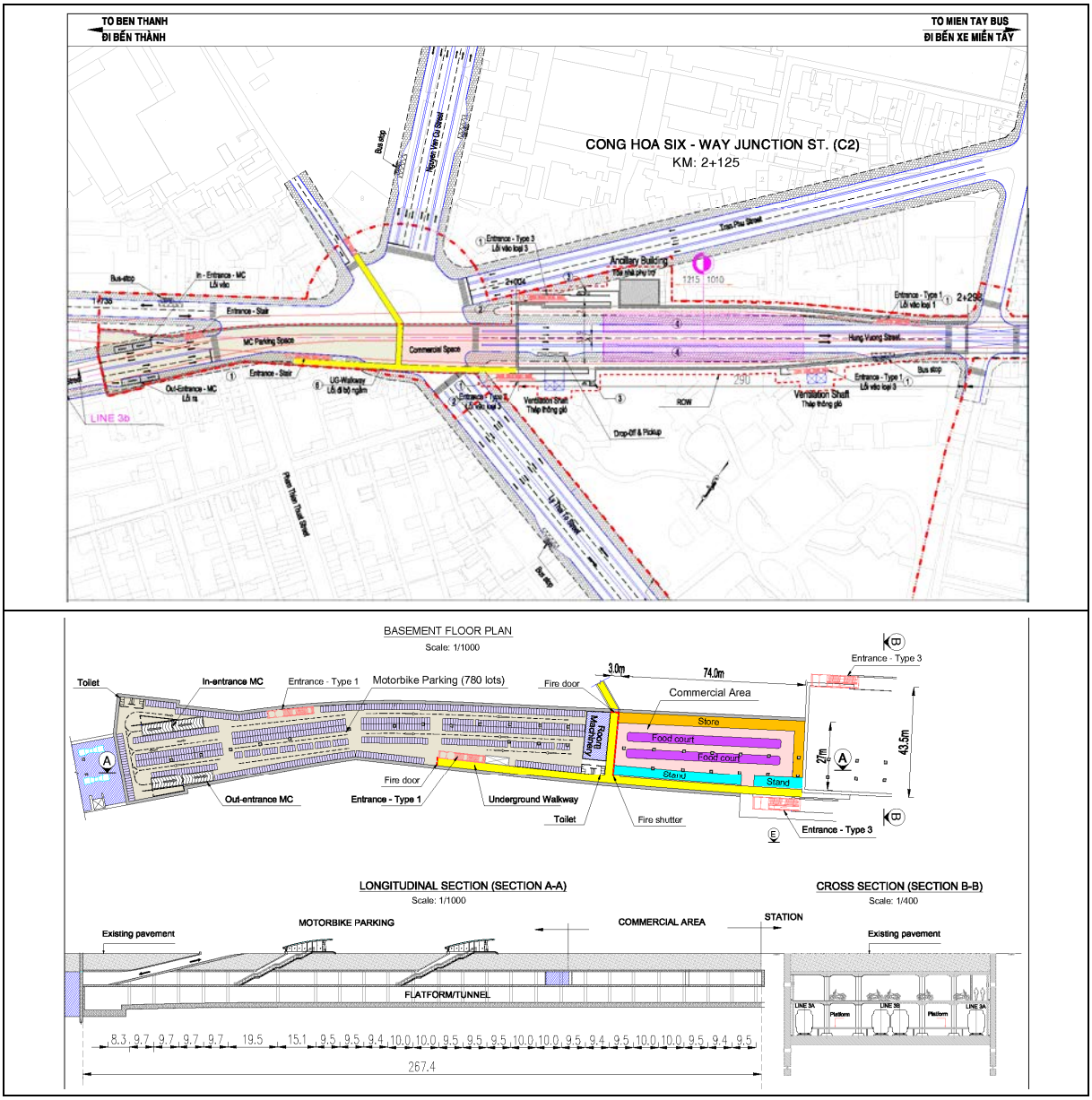
The station will be constructed underground of the rotary connecting 5 streets, where traffic is congested and pedestrians are difficult to cross. In future, the government guest house will be relocated and utilized for urban redevelopment, so it is expected various types of station users including students and visitors for shopping will use this station. For this, the underground two-wheel vehicle parking and commercial facilities are proposed (see Figure 5.4.2, Figure 5.4.3 and Table 5.4.4).

At the east of the underground station, the commercial facilities will be developed where station users and pedestrians of underground walkway are easy to stop by. Under the eastern rotary along with the underground walkway, the underground two-wheel vehicle parking (accommodating 780 motorbikes) will be developed. The motorbike users can access to it from Huong Vuong Street by motorbike and park it, then walk to station passing through the underground walkway and the shopping mall.

Rotary of Cong Hoa Station Area	Image of Underground Commercial Facility
	

Source: JICA Study Team

Figure 5.4.2 Cong Hoa Station Site Photo and Image of Underground Commercial Facility



Source: JICA Study Team

Figure 5.4.3 Layout Plan of Underground Parking and Commercial Facilities of Cong Hoa Station

Table 5.4.4 Estimated Construction Cost of Underground Parking and Commercial Facilities of Cong Hoa Station

Underground Facilities	Motorbike parking (780 vehicles)	19.6mil. VND/m^2×4,825m^2×1 floor
	Commercial facilities	19.6mil. VND/m^2×2,035m^2×1 floor
	Underground walkway (along commercial facilities)	19.6mil. VND/m^2×467m^2
	Underground walkway (expansion to south)	19.6mil. VND/m^2×204m^2
Ground Facilities	Bus bay (2 locations)	533mil. VND×2 locations
	Drop off& Pickup space (1 location)	13mil. VND/m^2×70m^2
Total Cost	Construction Cost	17.34 bil. VND
	Total Cost (construction cost, overhead, tax)	**21.98 bil. VND (app. 10 mil. USD)**

Source: JICA Study Team

<C5 Tan Kieu Station>

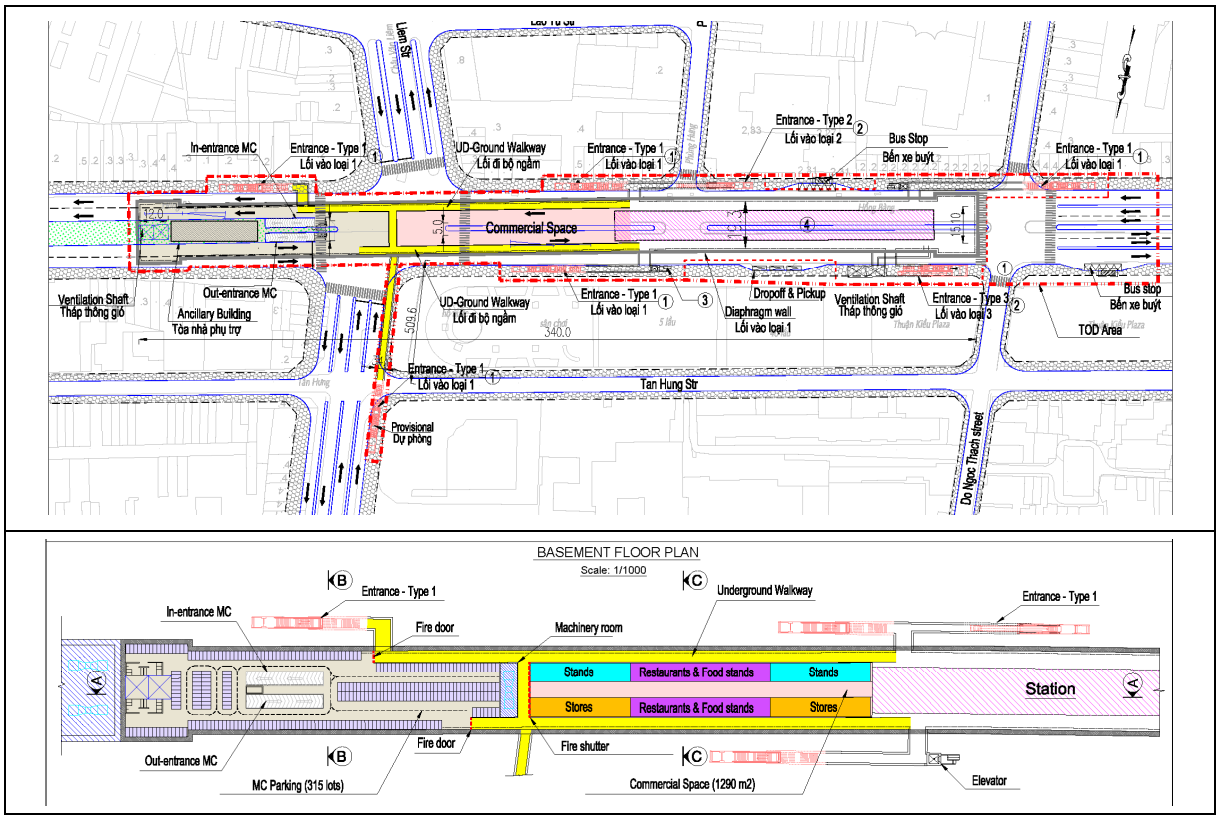
At the Tan Kieu Station are, old high-rise building (Tan Kieu Plaza) redevelopment project has been planned, including new complex and underground parking facilities. In addition, the Cho Lai General Hospital is located at 250m north of the station, where sidewalk is very narrow. For this, the underground two-wheel vehicle parking and commercial facilities are proposed (see).

The underground commercial facilities including supermarkets and retail stores for station users will be developed connecting to the redevelopment area. At the east intersection, underground two-wheel vehicle parking will be developed. It is expected to utilize this underground parking space as a shared drop off& pick up space for hospital and station users, and to extend the underground walkway connecting to Cho Lai Hospital.

C5 Rotary at Tan Kieu Station Area	Image of Underground Walkway with Retail Stores
	

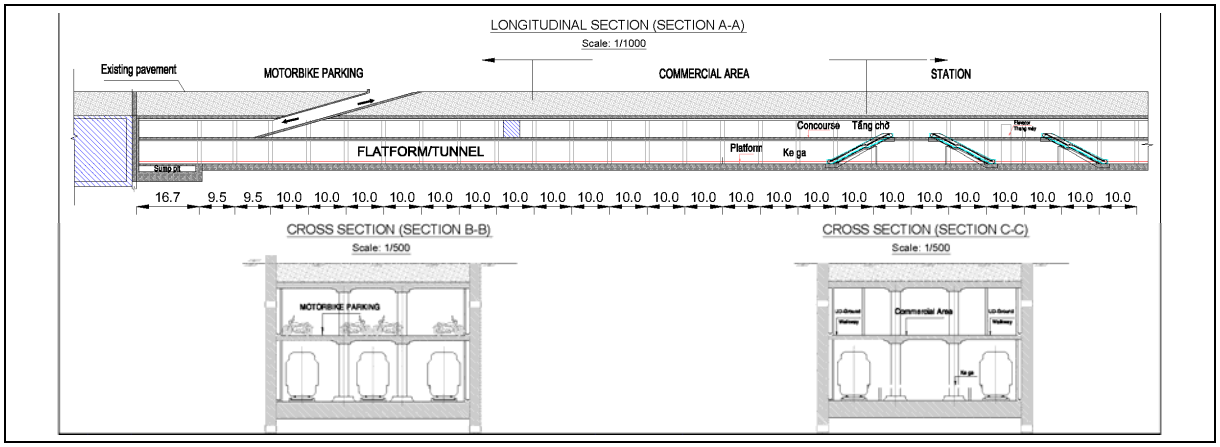
Source: JICA Study Team

Figure 5.4.4 Tan Kieu Station Site Photo and Image of Underground Shopping Mall



Source: JICA Study Team

Figure 5.4.5 Layout Plan of Underground Parking and Commercial Facilities of Tan Kieu Station



Source: JICA Study Team

Figure 5.4.6 Section Plan of Underground Parking and Commercial Facilitie of Tan Kieu Station

Table 5.4.5 Estimated Construction Cost of Underground Parking and Commercial Facilities of Tan Kieu Station

Underground Facilities	Motorbike parking (315 vehicles)	19.6mil. VND/m^2×2,000m^2×1 floor
	Commercial facilities	19.6mil. VND/m^2×1,380m^2×1 floor
	Underground walkway (along commercial facilities)	19.6mil. VND/m^2×735m^2
	Underground walkway (expansion to north)	19.6mil. VND/m^2×173m^2
Ground Facilities	Bus bay (2 locations)	533mil. VND×2 locations
	Drop off& Pickup space (1 location)	13mil. VND/m^2×70m^2
Total Cost	Construction Cost	10.75 bil. VND
	Total Cost (construction cost, overhead, tax)	**13.61 bil. VND (app. 6 mil. USD)**

Source: JICA Study Team

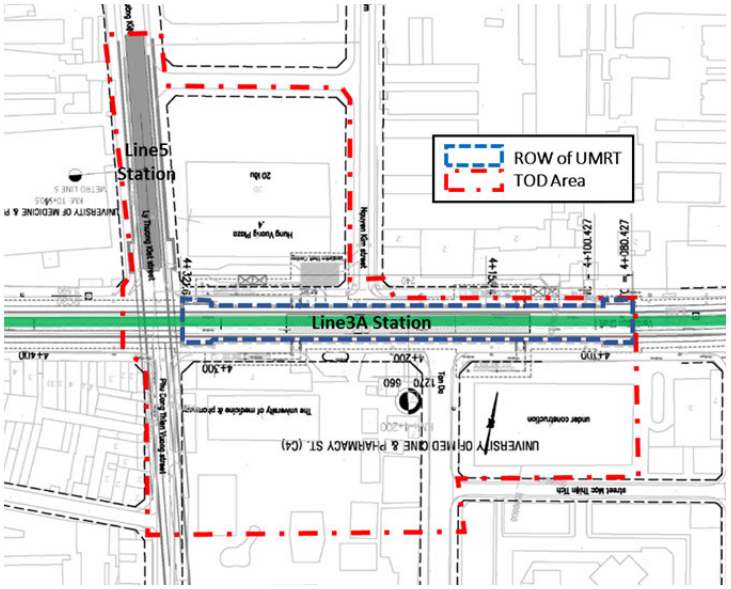
5.5 Promotion Measures of TOD

5.5.1 Governmental Policy to promote TOD and usage of urban railways

(1) Proposal on Definition of "TOD Area" in Urban Planning

It is proposed to introduce the concept of "TOD Area" to ensure provision of basic infrastructure and intermodal facilities at UMRT station area for smooth access of UMRT users and efficient operation and manage of UMRT. TOD Area is basically defined as the area including the ROW of UMRT, section of Zone Plan roads at the station area and other critical areas for development of necessary intermodal facilities.

The coverage and size of TOD area depend on characteristics of stations and necessity of projects which must be implemented in time for UMRT operation (see Figure 5.5.1). The identified TOD Area should be reflected in Zone Plan and other related plans for timely implementation in compliance with the urban planning system in Vietnam.



1) Include **ROW of UMRT**
2) Include **other transport facilities to be connected** (cf. Line5 station, bus stops)
3) Include **potential area to develop ITFs** (cf. underground space between Lin3A and Line5 station, rotary of Huong Vuong Plaza)
4) Include **potential area for integrated urban development** (cf. University of Medical and Pharmacy)

Source: JICA Study Team

Figure 5.5.1 Conditions to define TOD area (cf. University of Medical and Pharmacy Station)

In TOD area, TOD projects are prioritized with budget allocation and land preparation for public purpose, and private development is regulated to ensure appropriate TOD projects (see Table 5.5.1). Proposed regulations in TOD area are as follows:

- Designate ROW (boundary) of access roads and ITFs to ensure land and space for timely construction
- Oblige private developers to construct intermodal facilities with preferential treatment measures as conditions (cf. easing building height around station)
- Provide preferable condition for resettlement affected by UMRT development to resettle affected households into the area along UMRT to ensure accessibility to city center

Table 5.5.1 List of TOD Projects

Category	Coverage	Project	Contents
Transport improvement	Area within walking distance (500m-800m radius)	Road improvement	to improve carriageway and sidewalk condition of main trunk roads and distribution roads to ensure accessibility to the station
		Road development and widening	to develop new roads and/or widen existing roads in compliance with the Zone Plan to formulate road network around the station
		Access alley improvement	to improve condition of alleys (re-pavement, drainage, street light, road marking, etc.) to ensure accessibility from built-up areas to the station
		Intersection improvement	to improve intersection (signal, pedestrian crossing, road marking, etc.) to ensure pedestrian's safety for crossing and to manage traffic flow
	TOD Area	Priority road within TOD area	to develop roads at the station which are indispensable to access to the station
		Station plaza	to develop intermodal facilities and environmental space (pedestrian plaza, open space, etc.) in an integrated manner at the intermodal stations
		Bus terminal	to operate feeder buses including UMRT relay bus and circulating bus at the terminal stations and/ or intermodal stations
		Pedestrian crossing	to ensure safety, time-saving of pedestrian crossing of intersections
		Underground walkway	to ensure safety, time-saving of pedestrian crossing of intersections and transferring to other stations
		Underground parking facility	to develop underground parking facility where is difficult to secure at-ground space for parking in built-up areas
		Parking space	to ensure parking space for motorbikes and bicycles at the station plaza, space under the UMRT viaduct, public spaces such as roads, sidewalk space and parks
		Bus stop	to ensure smooth accessibility between UMRT station and buses near the station
		Traffic management	to install signals, pedestrian facilities, road marking, traffic signs, tactile for visually impaired person, designated lanes for motorbike, bus priority lane, etc.
Integrated urban development	Station and transport related facility	Development of space inside the station	To develop commercial and service facilities such as kiosk, café, bookstore, convenience store, etc. inside platform and concourse space mainly for UMRT users
		Development of space under the viaduct	To develop commercial and service facilities such as convenience store, supermarket, retail shops, nursery, parking, etc. under the viaduct of elevated railway mainly for UMRT users and local communities
		Development of station building	To develop the station building at and above the UMRT station to formulate a landmark of the station with distinguished urban facilities such as hotel, office, clinic, apartment, as well as public service facilities
		Development of underground facilities	To develop underground mall and parking space to promote subway use and to alleviate congestion around the station and to promote integrated development with neighboring facilities by connecting underground walkways
		Redevelopment of railway related lands	To develop VNR owned lands including depots and factories to promote integrated development to formulate a new CBD and regional center
		Redevelopment of bus terminal	To redevelop bus terminal land to improve connectivity between UMRT station and provide convenient services such as department store, hotel, etc.

Category	Coverage	Project	Contents
	Area around the station	Redevelopment of public facilities and factories	To promote redevelopment of public facilities and factories which will be relocated to develop multi-purpose complex including apartments for resettlement and public facilities
		Redevelopment of high-dense residential areas, old apartment areas	To promote improvement and redevelopment of existing residential areas and apartments by providing new apartment flats inside the project area
		Development of new towns along UMRT railway	To develop new towns with urban facilities along railway in suburban areas, with business revenues generating a capital gain that covers the cost of construction of railway and new towns and promoting UMRT ridership

Source: JICA Study Team

(2) Regulation against private vehicles and relocation of the roles of public transport modes

Measures to secure the connectivity between railway and other transport modes, and reduce the convenience of commuting by private vehicle.

- It is necessary to reduce the usage of private vehicle by regulation. For instance,
  - Traffic volume control area
  - Parking ban in the city center
  - Further regulation against driving and riding with alcohol.
  - Bus (and taxi) exclusive lane during peak hours
  - Ban on allowance for gas for private vehicle commuters
  - Allowance for fare for public transport commuters
- Relocation of the roles of public transportation such as bus and taxi. For instance
  - Both private vehicles and public transport modes are majorly placed as feeder to railways. People come to their nearest station from their place by private vehicle, bus or taxi and go by railway to their destinies.
  - Bus stops and taxi pools need to be installed near the entrances to secure the convenience of transferring passengers.
  - Drop off & Pick up space for private vehicle is necessary for each station.
  - Parking lots for motor bicycles

(3) Direct benefit for railway operators

- Railway operators should be allowed to conduct non-rail business such as development around/ inside their stations and advertising to obtain the benefit directly. Railway business and non-rail business are inseparably. Non-rail business will increase the ridership of railways and railways bring customers to non-rail business areas. Synergizing these two

businesses, unlimited number of measures to promote railway will be generated as done by Japanese railway operators.

- Since the land price of area along new railway lines tend to rise up, it is highly recommended to let the railway enterprise acquire lands in these areas as possible with enough budget. It will help the railway enterprise not only to do non-fare business but also to create further passenger demand.

(4) Negotiation framework to secure the connectivity between stations and major facilities around the station

- Direct connection between the station and major buildings around the station are beneficial to both railway enterprise and investors of the buildings, however, it's not necessary for the railway side because they would have already enough entrances to the station. Therefore, basically railway side should not request to connect with the major buildings around the station. When the investor of such buildings request to connect their buildings to the station, the conditions should be as follows,
  - The construction cost for direct connection should be owed by building investors, who request it.
  - The management of the pass way should be conducted by the building managers. Therefore they can open and close the entrances following their operating time.
  - Parking lots for motorcycle of the building should be considered to open for the railway users with priority same as the building user

5.5.2 Promotion by Railway Operator

(1) Creation and leveling of passenger demand

- Since passenger demand on urban railways on weekends and holidays tend to be lower than that of weekdays, it is necessary to create passenger attractions in the suburban area along the line in order to level the demand all over a week. For instance, amusement parks, a sport stadium and gymnasium, theaters, an aquarium etc.
- Passenger demand on the opposite direction during peak hours is tend be low, in other words, the direction bound for suburban area during the morning peak hour, the one bound for city center during the evening have lower demand than the other direction. It is necessary to formulate "destination on weekdays" such as sub CBD.
- It is recommended to acquire lands around the stations of urban fringe areas and suburban areas, before the land price rises up.

(2) Pursuit of cooperation between railway business and non-rail business

- As described above, cooperation between railway business and non-rail business are the key to success for railway enterprises. However, it's not so easy for railway operators to obtain the know-how of different fields, therefore at the early stage, most of non-fare business can be outsourced and gradually it be insourced, or railway enterprise can buy some companies with now-how of non-rail business to obtain the know-how immediately.

(3) Promotion to increase passenger demand

- At the early stage of operation, it is important to let people have good experience, impression and information on urban railway systems by advertisement, PR events etc.
  - In order to let people aware of and interested in railway systems, advertisement on mass media, web site or social networking service should be effective.
  - In order to raise demands of people, some events such as trial ride, site-visit to the depot, monitoring system by potential passengers etc. should give some good experience and information to the people.
  - Installation of solar power generation system on the roofs of the elevated stations will make a significant effect as public relations in Ho Chi Minh City, where power supply system is not reliable with frequent power cut.
  - When the people understand the advantages of urban railway by such activities, urban railway system will be one of the options to transport.

5.6 Comments and Advices from the Advisory Committee

5.6.1 Completed Activities

JICA formulated an advisory group which consists of railway operators in Japan etc. in order to receive their advices for development along the line and around the stations. After making the Inception Report, the advisory committee had several meetings with the concerned agencies of Ho Chi Minh City and conducted site survey.

(1) The 1st Advisory Committee in Japan (February 17, 2016)

- Information sharing regarding the Line 3A project and the Preparatory study.
- Information sharing regarding the direction of development of station area and intermodal facilities.

(2) The 1st Visit in Ho Chi Minh (Between March 15 and 17, 2016)

- Meeting with MAUR
- Site Survey

Figure 5.6.1 The 1st Visit to Ho Chi Minh (Meeting and Site Survey)

(3) The 2nd Visit in Ho Chi Minh (Between November 7 and 10, 2016)

- Discussion regarding the Line 3A project Phase2.
- Site Survey (Phase 2 section)
- Meeting with MAUR

5.6.2 Comments from Advisory Committee (1st Site Survey)

(1) Exit allocation to secure the accessibility

- It is important for the allocation of exits of stations to consider items shown below
- visibility
- safety when passengers go across streets
- possibility to connect with the facilities in the neighborhood etc.
- It is desirable to allow people to use freely the underground walkways even during night time to facilitate the people to move easily. In this case, it is necessary to install security doors and set security guards.

(2) Development in accordance with the characteristic of each station

- A marketing research should be conducted regarding the attribute of local people such as nationality, salary level, age and occupation, and the current situation of land use and in accordance with the result, the direction of the development and the concept of each station should be created.
- Development in accordance with the characteristic of each station can be realized along the Line 3A. The attractive and unique image of the stations themselves and their surrounding area should be created, which shall make high demand of passengers.

(3) Model Station regarding community creation

- It is recommended to make a concept of community creation at least for one station. Since stations are completely open to public and everyone can identify them as stations, stations are able to have other function rather than transport facilities. Utilizing this function, stations can provide with people the places to gather and make relationship with government or other people easily. Such community creation focusing on stations is quite common in Japan where a station are regarded as a “face” of a town, therefore, it is worth challenging to propose this idea as a new concept in Vietnam.

(4) The direction for development along the line.

- It is recommended that the redevelopment of the 23/9 Bus Terminal comes first, and then the redevelopment of Binh Tay Market comes second around the Cho Lon Bus Terminal Station by step-by-step method.
- Redevelopment in the city center especially which needs readjustment of rights is usually smaller in its scale but spends much more time and costs much higher, compared with redevelopment in suburban area.

- Considering the stage of the national growth of Vietnam, it is reasonable from the view point of costs that new large-scale residential area should be developed in the Phase 2 area to increase the quantity of house. After the city center loses the vitality and at the meantime the development of the suburban area is completed with sufficient quantity of house, the city center should be redeveloped. This was the way Japan came through. In the case of there being vacant lots around stations, the lots should be developed immediately because there are few possibilities to face the difficulty of readjustment of rights of those who concern.

(5) Method for reducing construction costs

- MAUR should be responsible to acquire the space for exits in the public lands, on the other hand developers should be responsible to use their land and owe the costs. The detailed design should be conducted considering the opinion of the developers.
- Stations are recommended to be elevated to reduce the construction and maintenance costs, to maintain easily, and to maximize the effect of the development.

5.6.3 Comments from Advisory Committee (2nd Site Survey)

(1) Promotion of usage of urban railway

- It is important to let people regard the life style taking urban railways as a brand-new and smart way and to secure the accessibility to stations.
- It is necessary to consider the measure to transfer the user of motorcycles to urban railways.
- It is necessary to secure the convenience of passengers who transfer to/from other transport modes. For instance, installation of escalators or elevators on the root of transferring is highly recommended. Transferring passengers can easily move to/from other transport modes even with large luggage. And installation of rooves (or construction of drop off and pick up spaces under the viaduct) is recommended as well. Transferring passengers avoid both strong sun shine and rain.
- It is necessary to confer with DOT to secure the accessibility with feeder service such as bus lines. Since Vietnamese people tend to avoid walking, it is the first priority to reduce the time to transfer to/ from other transport modes.
- It is recommended to consider some regulation to reduce the usage of motorcycle. For instance, ban on the allowance for gas of motorcycle.

(2) Policy for railway operation and enterprise

- Safe operations and continuous increase of passengers will realize sustainable railway business.
- Railway system is an infrastructure lasting more than 50 years or 100 years. Though the aging of Japanese population has been advancing these days, Japanese railway systems are used by elderly people and people with disasters. Long-term vision leads the Vietnamese railways to be appreciated by citizens.
- It is necessary to consider how manage their station facilities including commercial facilities such as those planned to be installed in C2 Cong Hoa Station. Especially management after operating time of commercial facilities should be considered in order to secure the safety of both passengers and commercial facilities.
- According to a normal strategy of railway business in Japan, railway operators construct their railway line in exclusive lands along major trunks and expand station areas by providing feeder bus services. The alignment of Phase 2 doesn't seems to follow such a strategy, though it is not realistic to reconsider the alignment.

(3) Promotion of TOD

- Creation of a TOD project as a pilot is supposed be efficient to promote TOD. Mien Tay Terminal might be suitable. Since revision of national laws takes much time, it is recommended that it should be implemented within the range of the city regulation. For instance, investors can obtain the benefit of deregulation of floor area ratio in its area-plan when they install a public walkway with in their land. At the meantime, appeals to the national government regarding deregulation of land use is highly expected. Assistance by concerned authority will be provided in this regard.
- Since there are already standards of design on bus rotaries and other transport facilities, Further consideration such as the connection between stations and commercial facilities, necessary land acquisition etc. should be conducted to clarify the scale of such kind of facilities.

5.7 Proposals on TOD Implementation

1) Inclusion of proposed intermodal facilities to FS for approval

As explained, some ITFs should be constructed with UMRT facilities to ensure safe access to station as well as to reduce construction costs. In case of underground facility development, a significant advantage is a reduction in the investment cost (one fourth of the construction cost in general), because the cost of excavation and temporary works can be excluded if it is constructed together with UMRT.

2) Discussion with private owners for ITF development and integrated urban development

Some stations will be located next to private facilities (cf. commercial, educational, medical facilities) which have urban development potentials. If appropriate ITFs will be developed in private land, passengers are easy to access to these facilities which are profitable for private side. For this, MAUR should discuss with these private facility owners and potential developers how to develop ITFs and urban facilities which will be profitable for both railway operators and private developers.

3) Continuation of discussion for TOD / establishment of "TOD Committee"

TOD itself is one of the measures to promote the usage of urban railways. Since participation from multiple authorities will be needed to implement TOD, it will be effective to establish an official cross functional committee lead by MAUR. Not only public sector but also private sector like professors and representatives of real estate companies, etc. should join in it. The major function will be as follows for instance,

- Revising current regulations which are currently disturbing the implementation of TOD
- Creating new regulations which will promote TOD
- Discussing negotiating flame works to secure the connectivity between stations and major facilities around the stations.
- Discussing other useful measures described in 5.5.

For this, it is necessary to set up the organizational structure which all relevant stakeholders participate in whole process of the project planning, implementation and management. The TOD Committee will be established under the management of HCMC-PC, and MAUR will lead and facilitate the committee with participation of District PC, Department of Planning and Architecture, Department of Transport, Department of Construction, Department of National Resource and Environment, Department of Finance, bus operators and so on. Main roles and responsibilities for TOD promotion are as follows:

- MAUR: overall management of TOD, expansion of ROW for TOD, coordination with private developers

- District PC: appraisal of TOD plan and projects, development control around station in compliance with TOD plan
- DPA: appraisal of Zone Plan and TOD area in line with TOD plan and projects, coordination with private developers
- DOT: development and operation of ITFs, traffic management around station
- DOC: infrastructure development
- DONRE: land allocation for TOD
- DOF: budget allocation for TOD projects
- Bus operators: feeder bus service plan and implementation

4) Proposal on implementation of pilot project with technical assistance / selection of pilot project site

For appropriate implementation of TOD, it is proposed to select a pilot project to develop ITFs and promote integrated urban development. This pilot project aims to realize materialization of TOD projects, to apply proposed institutional arrangement for TOD promotion and to involve in stakeholders from planning to implementation. Proposed pilot project sites are (i) C1: 23/9/ bus parking, (ii) C2: Government Guest House, (iii) C10: Mien Tay Terminal.

CHAPTER 6 PROJECT IMPLEMENTATION PLAN

6.1 Outline of Construction Plan

This chapter establishes project implementation plan (outline) and describes trial results of rough implementation cost.

6.1.1 Station and Cut & Cover Tunnel Construction Plan

(1) Concept

The underground section has an approximately total length of 8.2km including 8 stations, cut & cover tunnels (joint of Ben Thanh station, both sides of C2 station and C9 station side of C8 station) and u-shape retaining wall (connection to the elevated section).

C1 to C8 stations are located under congested area in downtown of Ho Chi Minh City. Hence, the following construction concept will be considered.

- Control water drawdown for minimization of ground settlement
- Control deflection of retaining wall during excavation for minimization of ground settlement
- Rigid & water tightness wall shall be applied for retaining wall.

Based on the above concept, diaphragm wall is suggested for the station and cut & cover tunnel construction. If diaphragm wall is applied, it can be designed for both of the permanent and the temporary conditions including construction loading considering the economic effectiveness.

(2) Station and Cut & Cover Tunnel Construction Plan

The typical construction methods with diaphragm wall and excavation i.e. bottom up and top down methods are introduced and compared as summarised in Table 6.1.1.

Table 6.1.1 Excavation Method Comparison

	Advantage	Disadvantage
Top down	- The risk of diaphragm wall collapse can be minimised, since it is supported by the rigid concrete slab. - The deflection of diaphragm wall is small by the rigid slab support. - In generally, construction cost is cheaper and construction schedule is shorter compared to those of the bottom up method because only minimum propping are required and additional propping may not be recurred during any stage of construction - Dry work can be done under top slab umbrella.	- Excavation work is low productivity and limited since it is carried out through slab opening. - Construction is difficult compared to that of the bottom up method. - In case of soft ground condition, it is difficult to carry out propping work since it also requires at between top slab and bottom slab.
Bottom up	- Construction is easier than that of the top down method. - Excavation work is higher productivity and workability compared with that of the top down method. - For cut & cover tunnel, in generally, the bottom up method may be adopted since the top slab position is lower than that of station.	- The risk of diaphragm wall collapse is higher than that of the top dawn method. - The deflection of diaphragm wall is larger compared to that of the top down method. - Excavation work is easily affected by rain water.

Source: JICA Study Team

From the above comparison, the top down method is recommended for the station construction and the bottom up method is suggested for the cut & cover tunnel.

According to the information from the Contractor of HCM Line 1, Ba Son station is under construction using the top down method now. Furthermore, the cut & cove tunnel of East & West High Way was also constructed using the top down method, which was supported by JICA ODA loans according the information obtained from the Engineer of the project. Hence, it concludes that the top down method can be adopted in Vietnam.

Please note that construction method for diaphragm wall with the top down method is described in detail in the attached drawings titled “PART 11: PRELIMINARY CONSTRUCTION METHODS”.

(3) Entrance Construction Plan

The shallow excavation work for station entrance, ventilation duct and ancillary building is carried out using temporary sheet piles with propping. In more details, after driving sheet piles, excavation work and propping work is carried out sequentially and then levelling and foundation work is performed for structural work namely, the bottom up method can be adopted.

Since there are many houses and stores around such station ancillary facilities, minimizing ground settlement and noise is required in the same manner with the main station construction.

Therefore, propping with pre-loading method and sheet piles using hydraulic method, which are widely adopted in Japan, are suggested.

For propping with pre-loading method, it is the method for minimizing sheet pile deflection by applying loads on the struts before excavation through hydraulic jacks on the struts. For sheet piles using hydraulic method, it is the method for controlling noise and vibration during driving and extracting sheet piles, which can be reduced noise and vibration dramatically compared to that of vibration hammer method. Those methods are used in Ho Chi Minh City in accordance with the information from the Engineer and the Contractor.

The following figures indicate propping with pre-loading and sheet piles using hydraulic method.

Source: DIWA KENKO Co.,Ltd.

Figure 6.1.1 Propping with Pre-loading Method

Source: GIKEN Ltd.

Figure 6.1.2 Sheet piles using hydraulic method (Silent Piler)

It is assumed that temporary sheet piles will be extracted after completion of main permanent work. However if no extraction is judged considering impact on adjacent structures, head of sheet piles will be cut 2.5m from the ground level referring to cut and cover station of similar projects that have about 2.5 to 3.0m earth covering although there is no regulation regarding this issue in Vietnam.

(4) Removal Plan of Cay Go Flyover

As shown in the following figure, there is an existing flyover (continuous steel box girder bridge) at the future construction site for Cay Go Station (C7). After discussion with MAUR, the option that Cay Go flyover will be removed and then reconstructed after C7 construction was adopted considering workability of construction and total cost from the alternative methods for protecting Cay Go flyover during the station construction such as stacked station, separate stations and underpinning method. It should be noted that the cost for removal and reconstruction of Cay Go flyover is not included in Total Implementation Cost (TIC) as disrobed in section 6.7 since the construction work will be carried out under the supervision of MOT and MOC but not MAUR, and therefore this section only focuses on removal method of Cay Go flyover.

The details of consideration are as follows.

- Setting removal section considering both of C7 location and continuous bridge structure
- Setting removal sequence considering the continuous bridge structure
- Minimizing the existing road influence and securing safety during the construction

Source: JICA Study Team

Figure 6.1.3 Cay Go Flyover

Please note that removal plan of Cay Go flyover considering the above consideration is indicated in detail in the attached drawings titled “PART 11: PRELIMINARY CONSTRUCTION METHODS”.

6.1.2 Tunnel Construction Plan

(1) Concept

Tunnel length by Tunnel Boring Machine (TBM) is 5.102km for eastbound (to Ben Thanh station) and 4.833km for westbound (to C10 station), which is part of 8.2km of underground section.

(2) TBM Selection

Table 6.1.2 shows general classification of shield tunnel and Table 6.1.3 indicates applicable soil conditions corresponding to each shield tunnel.

Table 6.1.2 Classification of Shield Tunnel

Type of Shield			Feature
Shield	Open type	Hand Mining Shield	It can be adjusted for rock and gravel appearance because the front of shield is opened. However, this can be applied only for the condition that the cutting face stability should be secured for a long time.
		Semi-mechanical Shield	This type can be applied for the ground securing the cutting face stability since generally the cutting face is opened widely.
		Mechanical Shield	It has turning cuter head which can continuous excavation and therefore the cutting face stability can be secured partially. But generally it is for the ground securing the cutting face stability.
	Semi Open Type	Blind Shield	The cutting face opening ratio is adjustable according to soil conditions.
	Closed Type	Earth Pressure Balance Shield(EPBS)	It can be secured the cutting face stability and minimized surrounding ground settlement through checking driving data, since it has a control system based on earth pressure to coordinate the driving speed with the rate at excavated soil intake.
		Slurry Shield	This type can improve the cutting face stability compared to EPBS and therefore it is effective for places with high groundwater pressure such as under rive and seabed. The face is completely closed, providing a high level of safety and good environmental conditions, moreover minimizing surrounding ground settlement.

Source: Standard Specification for Tunnelling-2006 Shield Tunnels by JSCE and JICA Study Team

Table 6.1.3 Applicable Soil Conditions corresponding to each Shield Tunnel

Soil Condition		N-value	Hand Mining Shield	Semi-mechanical Shield	Mechanical Shield	Blind Shield	EPBS	Slurry Shield
Soft Clay		0-5	△	×	×	○	○	○
		5-10	△	△	△	×	○	○
Stiff Clay		10-	△	△	△	×	○	○
Sand	Silt with Sand	10-15	×	×	×	×	○	○
	Loose	10-30	×	×	×	×	○	○
	Dense	30-	×	×	×	×	○	○
Gravel		40-	×	×	×	×	○	△

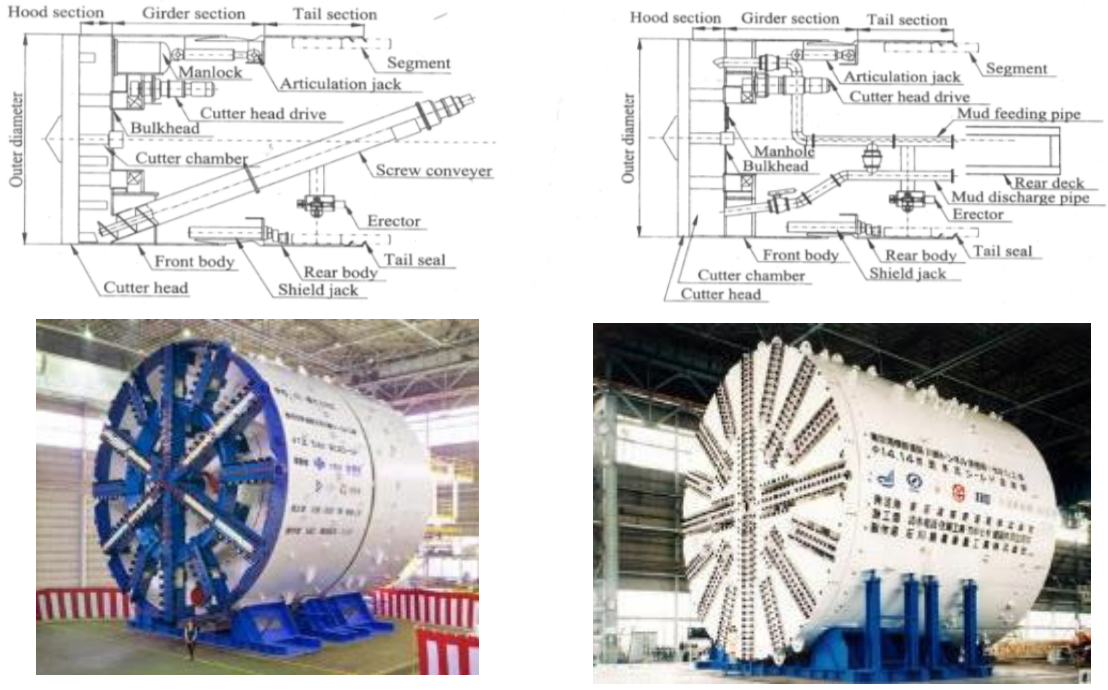
Note: ○ : Means basically applicable △ : Means necessary to study application × : Means no applicable

Source: Standard Specification for Tunnelling-2006 Shield Tunnels by JSCE and JICA Study Team

EPBS and Slurry Shield types are recommended in this project considering high groundwater (GL-1.2 to -7.0m), accumulation of soft clay and silty sand and the above tables.

(3) Comparison of EPB and Slurry Machines

Typical figures of EPB and Slurry machines are shown in the following figure.



Source: Standard Specification for Tunnelling-2006 Shield Tunnels by JSCE and JICA Study Team

Figure 6.1.4 Typical Figures of EPB and Slurry Machines

The 6.1.4 shows advantages and disadvantages for both of EPB and Slurry machine. As indicated in the table both machines have both aspects, and the Contractor decides which machine will be applied in this project considering soil conditions and construction methods.

Table 6.1.4 Salient Feature of EPB and Slurry Machines

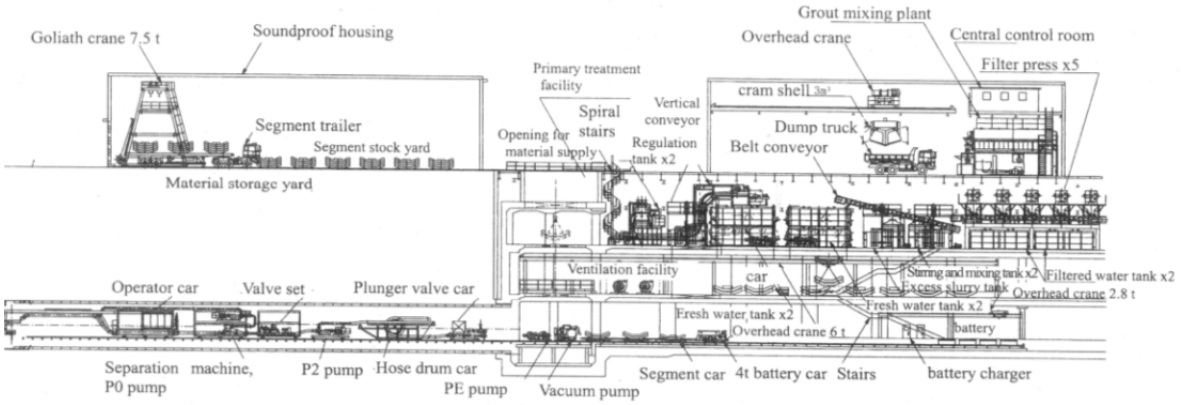
Item	EPB	Slurry	Advantage
Face stabilization for very soft soil condition	Control pressure adjusting the volume balance with controlling screw conveyor speed.	No problem for the stabilization except for shallow earth covering.	Both
High water pressure	Normally, up to 4 bars. If the water pressure is very high, some special water cut off devices shall be attached to the screw conveyor.	Normally, up to 5 bars, but it can be used up to 10 bars.	Slurry
Very high permeability soil	High experiences are required to stabilize and improve the permeability.	It is possible by feeding slurry with additives and controlling viscosity of feeding slurry.	Slurry
Boulder excavation	A big screw conveyor can discharge boulders efficiently.	It can be applied, but severe wear of cutting tools occurs compared to that of normal geological condition.	Both
Construction Equipment	In general, EPB plant system on the surface is smaller than slurry plant system.	Sufficient space is required to install slurry plant. In the case that excavated soil having high quantity of fine particle, more large space is needed for the slurry treatment plant.	EPB
Noise and vibration	Not serious problem from the devises on the surface.	Noise and vibration from the slurry treatment plant (vibration screen etc.) is necessary to minimize.	EPB

Item	EPB	Slurry	Advantage
Settlement	In early stage of development, the settlement was larger than that of slurry system, but nowadays there is no much difference between EPB and slurry systems.	The pressure control is easier than that of EPB system.	Slurry but only slightly

Source: JICA Study Team

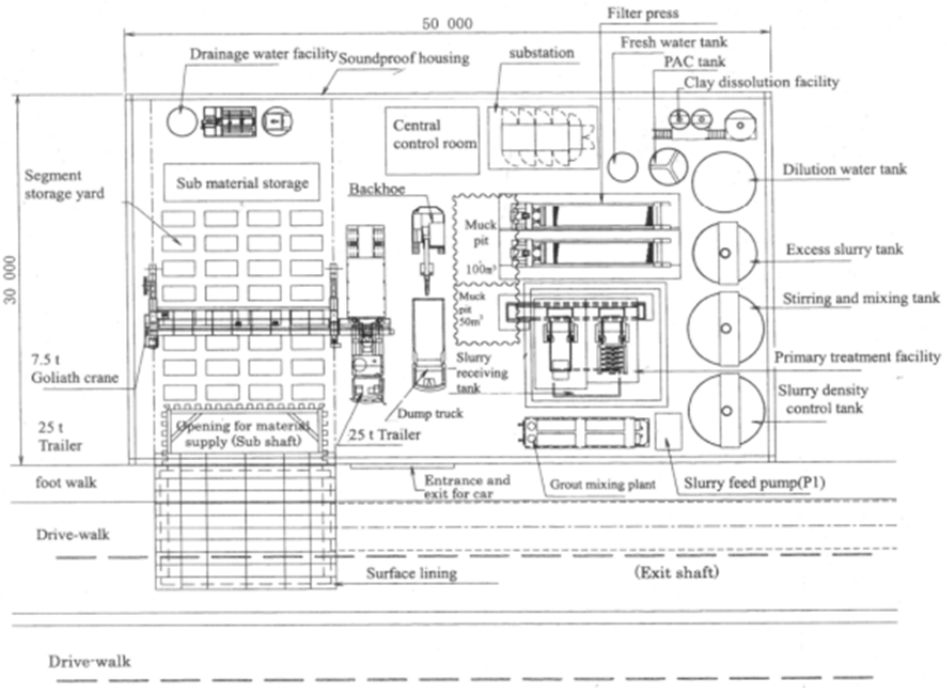
(4) Construction Equipment for Tunnel Works

Tunnel construction requires a large space for TBM operation, for instance material stock such as segments, various equipment and tanks, disposal soil pits, machine (back hoe, trucks) space and slurry plant. Figure 6.1.8 and 6.1.9 show typical tunnel operation scheme and site utilization plan respectively. The Contractor needs to keep such space at each TBM operation site. As mentioned in (1) Concept, three stations namely, C2 C5 and C8 stations are plan to launch TBM and therefore cut & covers for those stations may be utilized.



Source: Standard Specification for Tunnelling-2006 Shield Tunnels by JSCE

Figure 6.1.5 Typical TBM Operation Scheme (Slurry Machine)



Source: Standard Specification for Tunnelling-2006 Shield Tunnels by JSCE

Figure 6.1.6 Typical Tunnel Site Utilization Plan (Slurry Machine)

6.1.3 Elevated Section Construction Plan

(1) Concept

The elevated section has total length of approximately 1.7km, and viaduct and two elevated stations (C9 and C10 stations) will be constructed on Kinh Duong Vuong Street. The main viaduct is a simple PC-U girder bridge having a 35m span, but a continuous PC box girder bridge having a maximum span of 70m will be constructed on the rotary for Hau Giang Street and An Duong Vuong Street.

The elevated section will be constructed on the existing congested road without closing to traffic.

This section describes construction plan for foundations, temporary work, substructure and superstructure for simple PC-U girder bridge and continuous PC box girder bridge.

(2) Foundations And Temporary Work

Foundations of the viaduct are consist of cast- in- situ piles and pile caps (see Figure 6.1.10).For construction method for cast- in- situ piles, earth drilling method, which is widely used in Vietnam, can be adopted. This method uses bentonite slurry not casing pipe for protecting borehole from collapse and after completion of drilling, rebar cage is installed and then concrete casting with discharging bentonite slurry is carried out.

After completion of cast- in- situ piles, ultrasonic test to confirm soundness and static loading test to confirm bearing capacity will be carried out. These tests are indispensable quality control tools in Vietnam and therefore this project also needs to adopt them.

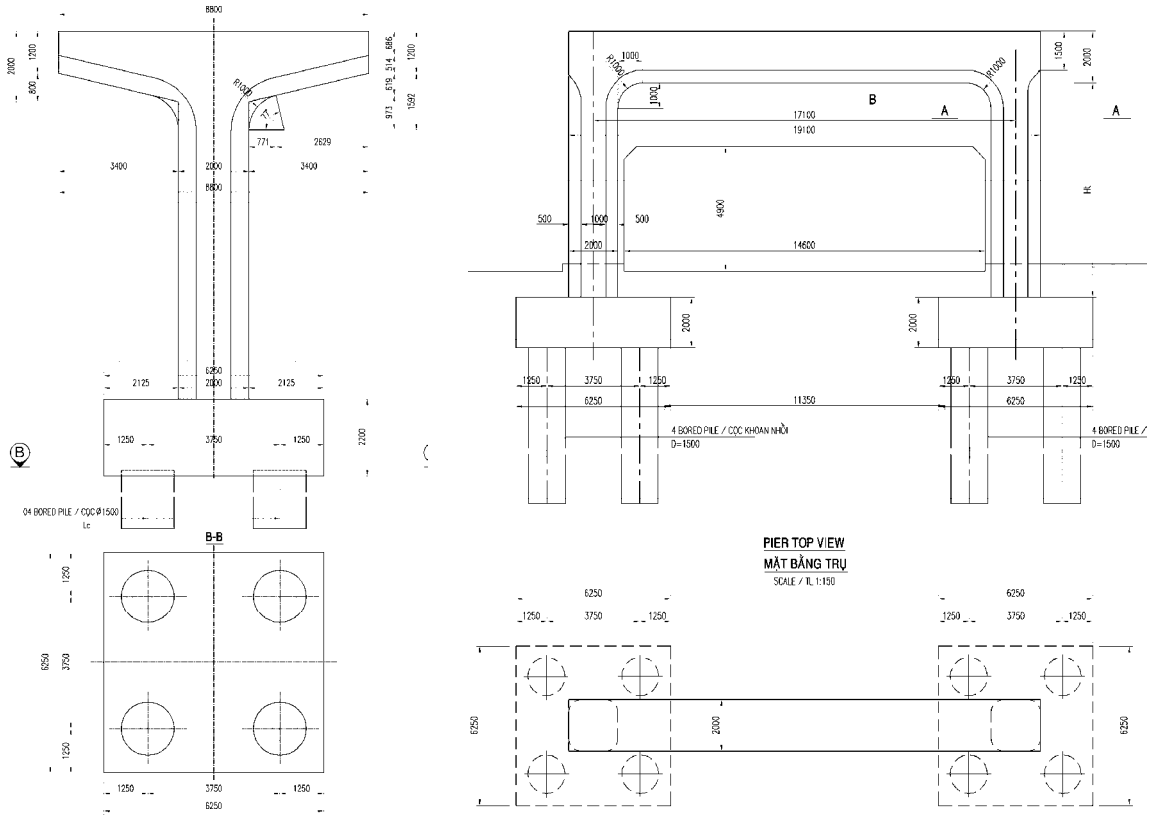
After quality confirmation of the piles, sheet pile driving and then excavation work are performed sequentially. Furthermore, propping work corresponding with excavation depth is carried out, and then levelling, pile head treatment, rebar assembling, concrete casting are performed, which is the construction sequence for piles caps.

In addition, it is highly recommended that driving and extracting sheet piles will be carried out using the hydraulic method in the same manner with the station entrance for minimizing noise and vibration.

Please note that construction method mentioned above is shown in detail in the attached drawings titled “PART 11: PRELIMINARY CONSTRUCTION METHODS”.

(3) Substructure

As indicated in Figure 6.1.10, substructure has single pier having RC column and RC column head and double piers having RC columns and RC beam.



a) Single pier b) Double piers

Source: JICA Study Team

Figure 6.1.7 Foundations and Substructure for Viaduct

It is suggested that steel formwork system that formwork, falsework and scaffolding are combined together and easily movable using crane and trailer in the site are adopted, since substructure has many similar sized members in order to ensure finishing quality on the concrete surface and shorten construction cycle time.

(4) Superstructure for Simple PC-U Girder Bridge

Superstructure work is carried out firstly, precast post-tensioned girder which was fabricated in the precast yard is transported to the site and then it is installed in the designed position. The precast girder is transported to the site using a trailer which can carry from 50 to 100 ton.

The precast girder has the following advantages compared to those of cast- in- situ concrete girder.

- Site work can be shortened and the road traffic influence can be reduced by transporting the precast girder in night time.
- The concrete quality control is easier at the fabrication yard compared with the site work.
- Labours can be reduced compared to the site work.
- It does not need to consider curing time for the concrete girder at the site since it was fabricated and cured until required strength was obtained at the fabrication yard.
- It has advantages in terms of work efficiency, productivity and quality because the same steel formwork is used for the same member.

The PC-U segment girder is installed by steel double truss gantry, steel box girder gantry, self-propelled gantry and so on. In normally, the gantry crane design is carried out installation expert of subcontractor hired by the Contractor. The following picture shows the PC-U segment girder installation using a steel box girder gantry in HCM Line 1.

Source: JICA Study Team

Figure 6.1.8 PC-U Segment Girder Installation by Steel Box Girder Gantry (HCM Line 1)

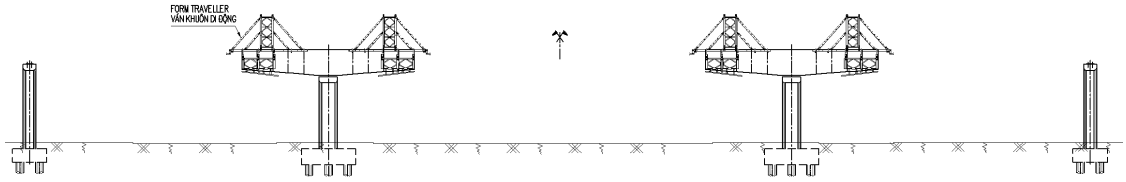
Please note that construction method mentioned above is described in detail in the attached drawings titled “PART 11: PRELIMINARY CONSTRUCTION METHODS”.

(5) Superstructure for Continuous PC Box Girder Bridge

It is suggested that the continuous PC box girder bridge, which will be constructed on the rotary for Hau Giang Street and An Duong Vuong Street, is constructed by balanced cantilever method (see Figure 6.1.12 and 6.1.13).

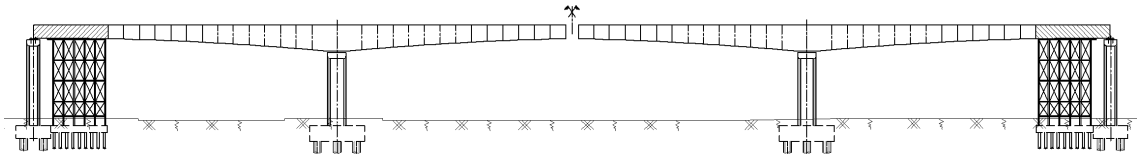
Although formwork and falsework will be set on the road, it is only partially occupied on the road, and therefore the road traffic influence can be minimized (see Figure 6.1.12-13). Furthermore, this method is used for many bridges constructed in Vietnam.

Moreover, it is recommended adopting cast- in- situ balanced cantilever method not using precast segments in this section, since the box girder dimensions vary from place to place. As a result the advantages for precast segments are reduced and the construction cost may be higher than that of the cast- in- situ method.



Source: JICA Study Team

Figure 6.1.9 Superstructure Installation by Balanced Cantilever Method-1



Source: JICA Study Team

Figure 6.1.10 Superstructure Installation by Balanced Cantilever Method-2

Please note that the cast- in- situ balanced cantilever method mentioned above is explained in detail in the attached drawings titled “PART 11: PRELIMINARY CONSTRUCTION METHODS”.

6.2 Traffic Plan and Safety Management Plan during Construction

6.2.1 Traffic Plan

(1) Concept

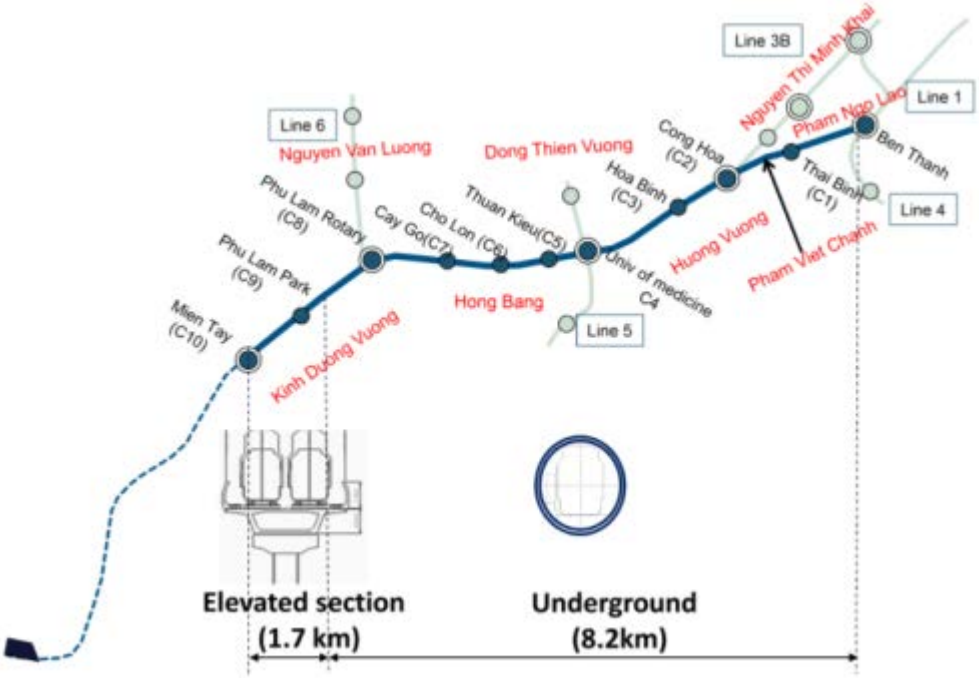
8 underground stations (C1 to C8 station) are located under the road and two elevated stations (C9 and C10 station) are constructed in the middle of the road, and therefore the proper traffic plan (diversion plan) for the station construction is required. The traffic plan during the construction is related to the station construction sequence, available land in the site, the tunnel construction sequence and utility diversion plan and so on.

Positional relationships between existing roads and stations are as follows (see Figure 6.2.1).

- Underground stations from C1 to C3 station are located under Pham Ngo Lao Street, Pham Viet Chanh Street and Hung Vuong Street sequentially from C3 station, which are relatively narrow roads and difficult for both utilization of diversion road and construction section on those roads.
- Underground stations from C4 to C8 station are mainly located under Hong Bang Street, which is wide road and having two lanes on each side, and therefore it is possible for both utilization of diversion road and construction section on the same road.
- Elevated stations at both C9 and C10 station are located in Kinh Duong Vuong, which is the widest road in this project, and hence it is possible for both utilization of traffic road and construction section on the same road.

The principles of the traffic plan are as follows.

- Minimizing the impact of existing traffic such as diversion period and reduction of lanes.
- Minimising the traffic diversion stages and achieving smooth traffic flow in the diversion.

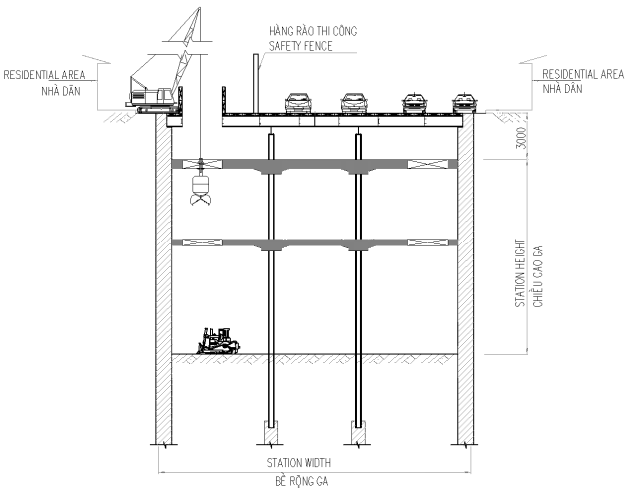


Source: JICA Study Team

Figure 6.2.1 Positional Relationships between Roads and Stations

As the results, the outline of the traffic plan considering the above issues is as follows.

- Road closing is planned for C1, C2 and C3 station, but important intersections is always maintained during the construction.
- The traffic diversion is planned for C4, C5, C6 and C7 using temporary deck (see Figure 6.2.2).
- The traffic diversion is planned for C9 and C10 station in the elevated section ensuring traffic road and construction section on the same road.



Source: JICA Study Team

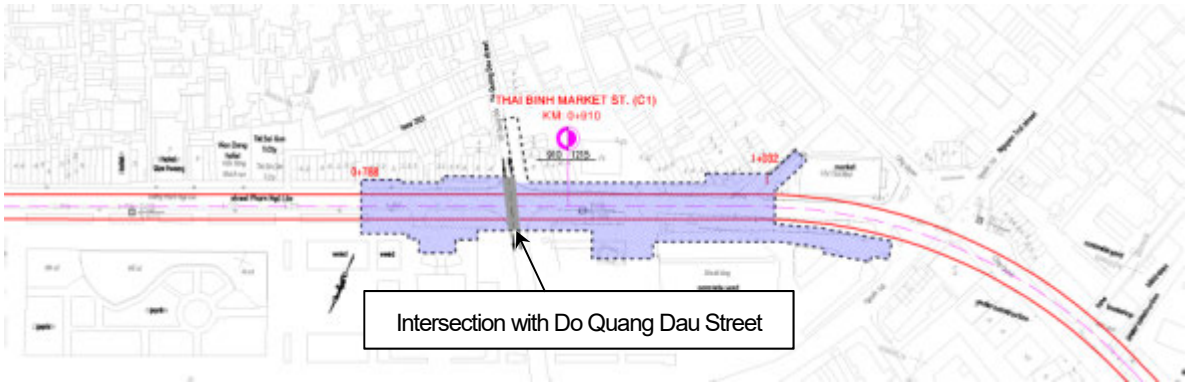
Figure 6.2.2 Traffic Diversion using Temporary Deck

Furthermore, the points to be considered for the traffic plan are as follows:

- Temporary access for residents and shops along the traffic diversion section is required.
- Traffic volume
- Transportation vehicle for heavy construction machines, equipment and materials

(2) C1 Station

Because of narrow road, Pham Ngu Lao Street is planned for closing in C1 station during the construction and the traffic is diverted to secondary road. However, intersection with Do Quang Dau Street having one lane on each side is maintained for securing the access using the temporary deck (see Figure 6.2.3). In addition, temporary accesses having a minimum 2m wide for the residents and shops are secured along C1 station.

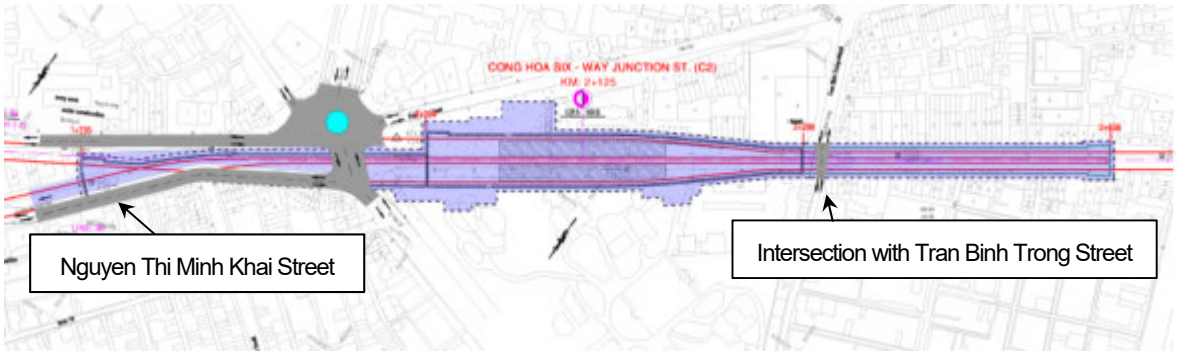


Source: JICA Study Team

Figure 6.2.3 Traffic Plan for C1Station

(3) C2 Station

Huong Vuong Street is planned for closing in C2 station during the construction and the traffic is diverted to secondary road. However, the five directions accesses from the rotary and the access to Nguyen Thi Minh Khai Street and intersection with Tran Binh Trong Street are always secured using he temporary deck (see Figure 6.2.4). In addition, temporary accesses having a minimum 2m wide for the residents and shops are secured along C2 station.

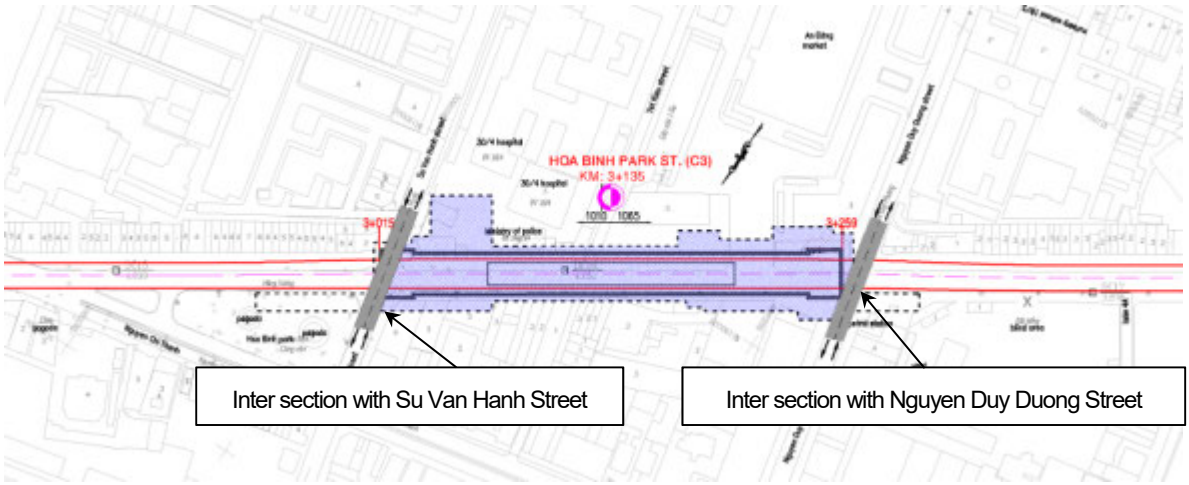


Source: JICA Study Team

Figure 6.2.4 Traffic Plan for C2 Station

(4) C3 Station

Because of narrow road compared to excavation width, Huong Vuong Street is also planned for closing in C3 station during the construction and the traffic is diverted to secondary road. However, two intersections for Su Van Hanh Street and Nguyen Duy Duong Street are maintained for securing accesses using the temporary deck (see Figure 6.2.5). Moreover, temporary accesses having a minimum 2m wide for the residents and shops are secured along C3 station.

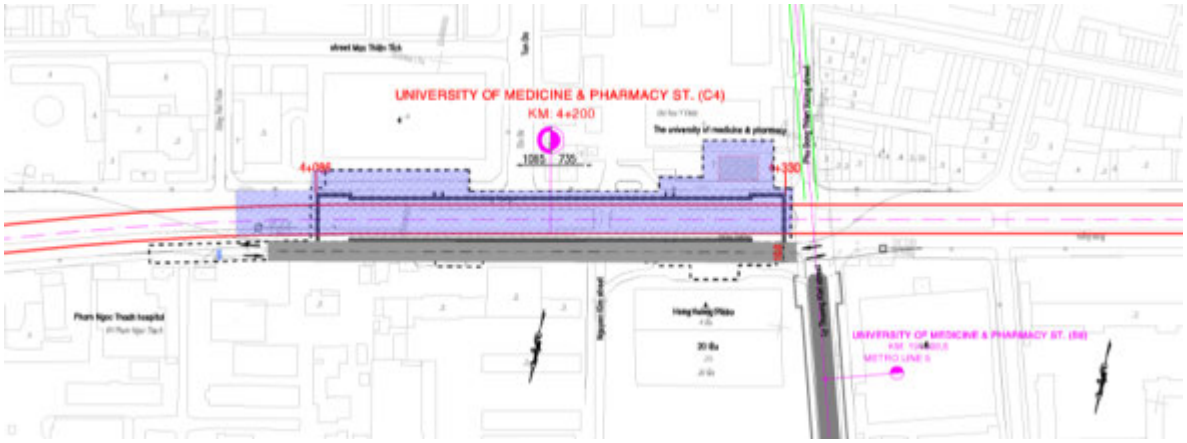


Source: JICA Study Team

Figure 6.2.5 Traffic Plan for C3 Station

(5) C4 Station

Although excavation work is required in C4 station, because of relatively wide road, Huong Vuong Street is planned for not closing and always securing the traffic using the temporary deck (see Figure 6.2.6). The traffic access is diverted in accordance with the construction progress. Furthermore, temporary accesses having a minimum 2m wide for the residents and shops are secured along C4 station.

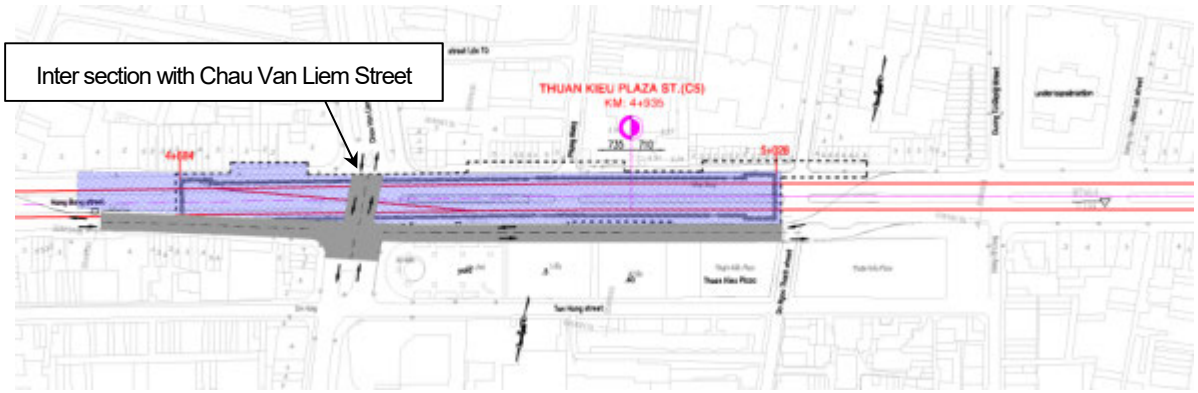


Source: JICA Study Team

Figure 6.2.6 Traffic Plan for C4 Station

(6) C5 Station

Although excavation work is required in C5 station, Hong Bang Street is planned for not closing and always securing the traffic using the temporary deck. Moreover, intersection with Chau Van Liem Street is maintained for securing the access using the temporary deck (see Figure 6.2.7).In addition, the traffic access is diverted in accordance with the construction progress and temporary accesses having a minimum 2m wide for the residents and shops are secured along C5 station.

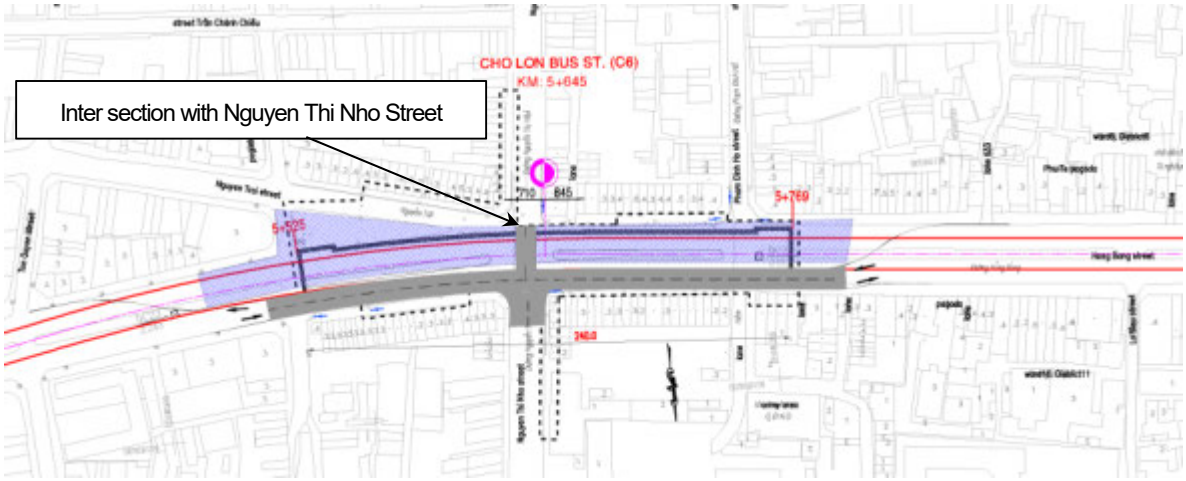


Source: JICA Study Team

Figure 6.2.7 Traffic Plan for C5 Station

(7) C6 Station

Even though excavation work is required in C6 station, Hong Bang Street is planned for not closing and always securing the traffic using the temporary deck. Furthermore, intersection with Nguyen Thi Nho Street is maintained for securing the access using the temporary deck (see Figure 6.2.8).In addition, in the same manner with the other stations, the traffic access is diverted in accordance with the construction progress and temporary accesses having a minimum 2m wide for the residents and shops are secured along C6 station.

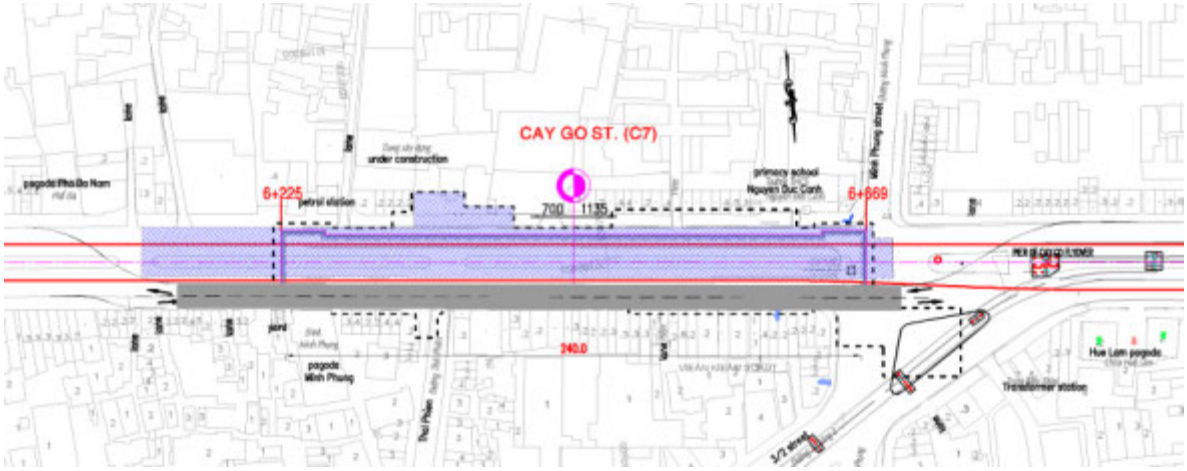


Source: JICA Study Team

Figure 6.2.8 Traffic Plan for C6 Station

(8) C7 Station

In the same manner with C6 station, although excavation work is required in C7 station, Hong Bang Street is planned for not closing and always securing the traffic using the temporary deck (see Figure 6.2.2. and 6.2.9). In the same way with the other station, the traffic access is diverted according to the construction progress and temporary accesses having a minimum 2m wide for the residents and shops are secured along C7 station.

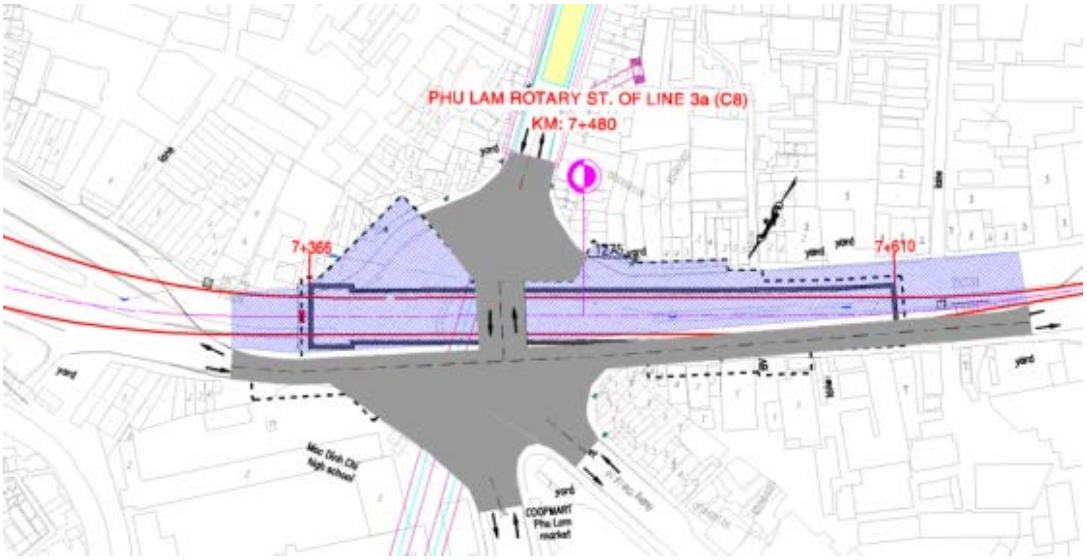


Source: JICA Study Team

Figure 6.2.9 Traffic Plan for C7 Station

(9) C8 Station

Although excavation work is required in C8 station, Kinh Duong Vuong Street is planned for not closing and always securing traffic access from Phu Lam rotary during the construction. Moreover, the traffic accesses from Kinh Duong Vuong Street and Phu Lam rotary are always ensured using the temporary deck (Figure 6.2.2 and 6.2.10). In addition, in the same manner with the other stations, the traffic access is diverted in accordance with the construction progress and temporary accesses having a minimum 2m wide for the residents and shops are ensured along C8 station.

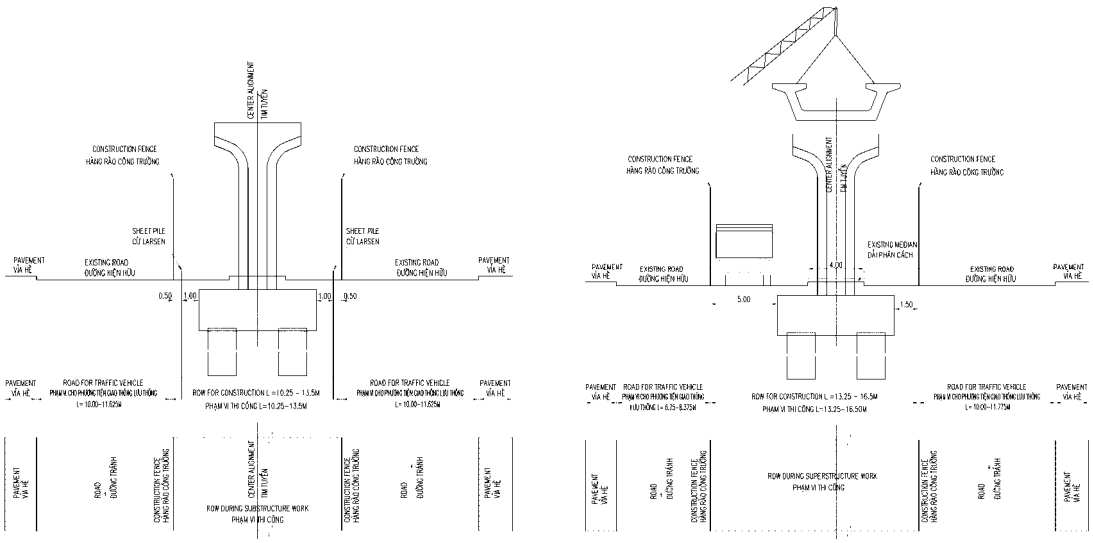


Source: JICA Study Team

Figure 6.2.10 Traffic Plan for C8 Station

(10) Elevated Section

The elevated section is located on Kinh Duong Vuong Street having wide road width, which is planned for not closing and securing the traffic access during the construction. Construction fence is installed along the elevated section between the traffic road and construction section to ensure safety at both stages of substructure and superstructure work. (see Figure 6.2.11)



a) During Substructure Work b) During Superstructure Work

Source: JICA Study Team

Figure 6.2.11 Traffic Plan for Elevated Section

6.2.2 Safety Management Plan

(1) Accident Examples in Hanoi Urban Railway Project

The safety management plan during the construction is needed to focus on protecting accidents involved in traffic vehicles and residents, since viaduct construction and underground excavation work on the road are main work in this project. The following table summarizes accident examples occurred in Hanoi Line 2 and Line 3 from 2014 to 2015.

Table 6.2.1 Accident Examples in Hanoi Urban Railway Project and Lessons Learned

Accident Examples	Causes	Lessons Learned and Future Measures
 Accidents by falling objects from cranes occurred frequently.	• Trespassing on the road by lifting objects when crane turning • No watchman when crane turning	• Marks are established on the boundary for no trespassing of a crane arm • Watchman should be available when crane turning. • Implementation of crane safety workshops on a regular basis.
 Crane with loading over turning	• Overload alarm turn off • Instability of ground states for crane setting	• Dissemination of crane operation manual • Confirmation and thoroughness for pre-operation inspection items including the ground stability confirmation

Source: JICA Study Team

Source: JICA Study Team

Figure 6.2.12 Trespassing on the Road by Lifting Objects (Hanoi Urban Railway Project)

The above accidents occurred involving in traffic vehicles and residents, and therefore it is important to make an effort for prevention of recurrence. As the results of these accidents, Vietnamese government and JICA conducted the following countermeasures.

- Establishment of “Accident Investigation Committee” by Vietnamese government and implementation of investigation to determine causes of accidents.

- Implementation of the safety seminar by JICA for related authorities in Vietnam (Figure 6.2.13)
- Commencement of safety patrol on a regular basis by related authorities

Source: JICA Study Team

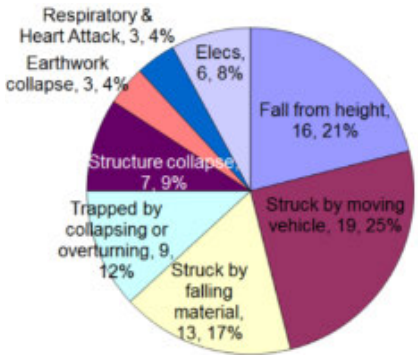
Figure 6.2.13 JICA Safety Control Seminar for Related Authorities and the Contractors in Vietnam in September 2015

In the same manner, HCM Line 3A also performs safety seminar and safety patrol with providing useful information obtained from plenty of accident analysis data by OC Global and Tokyo Metro.

(2) Safety Management Approaches in HCM Line 3A

In reference to the above accidents examples, safety management approaches in HCM Line 3A are described as follows.

1) Safety Measures Planning based on Accident statistics records in in Delhi Metro project



(1) Falling Accident (2) Construction Machinery Accident (3) Accident by Flying and Falling objects

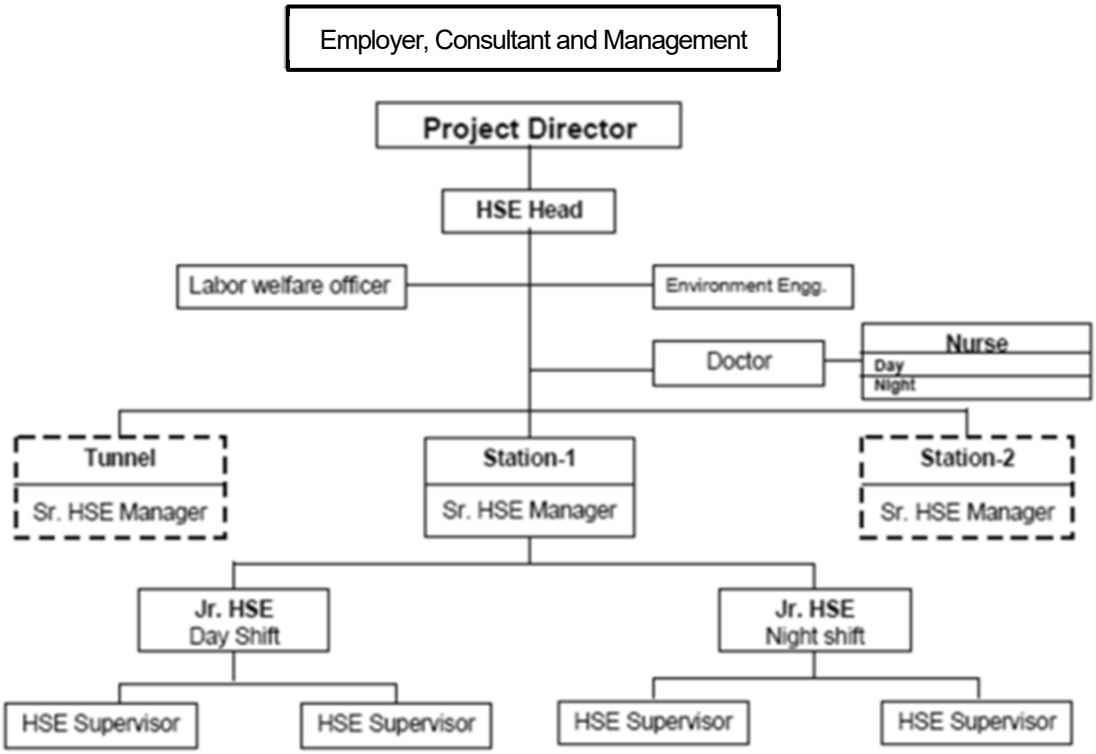
Source: JICA Study Team

Figure 6.2.14 Number of Serious Accident and Type in Delhi Metro (2000 to 2008)

As shown in Accident statistics records in in Delhi Metro of Figure 6.2.14, 60 to 70% of serious accidents are 1) falling accident, 2) construction machinery accident and 3) accident by flying and falling objects, which tendency is corresponded with the survey results conducted by Ministry of Land, Infrastructure and Transport. Hence, safety training for HCM Line 3A by the Contractor needs to focus on three serious accidents and it should be held on a regular basis as duty.

2) Support for Establishment of Practical Safety Management System

When accidents occur, understanding the situation, analysis and response influence the human life directly, and therefore proper accident responses must be manualized. Furthermore, such information should be transferred from the Contractor to the Engineer, employer and project donor straightly to always grasp the latest information that changes by the minute.



Source: JICA Study Team

Figure 6.2.15 Health, Safety and Environment Control Organization in Metro Construction for the Contractor

Figure 6.2.15 shows example of Health, Safety and Environment Control Organization in Metro Construction for the Contractor. For HCM Line 3A project, safety management organization and system are established in order to flow the above information and communication properly using IT system such as smartphone and tablet etc.

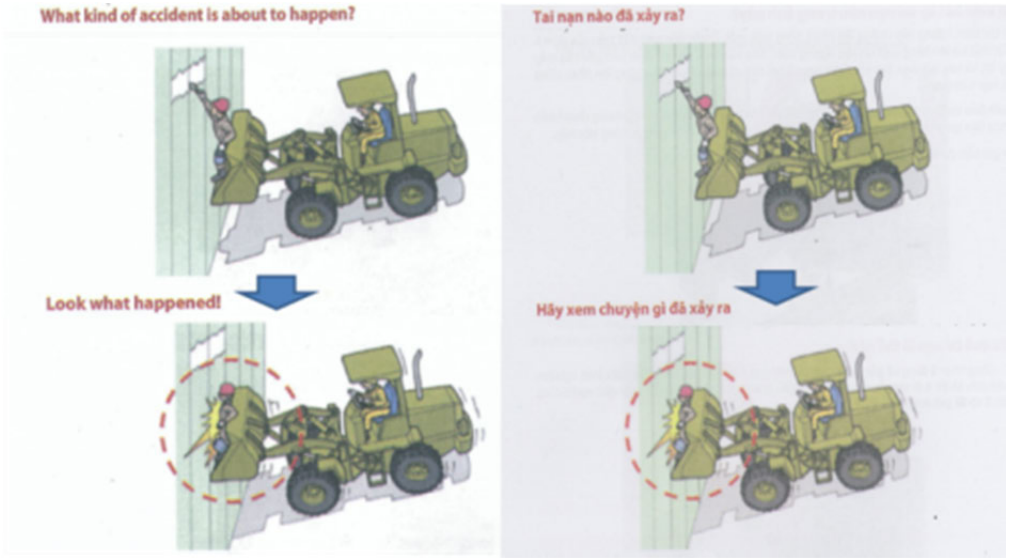
3) Practical Use of Safety Manual, Case Studies and Safety Management Guidance

The following manual prepared by JICA and MOC of Vietnam in 2012 and the following guidance issued by JICA in 2014 are guide of the safety management plan. As shown in Figure 6.2.16,

safety manual and safety case studies are edited in both English and Vietnamese for effective usage and hence these documents are included in bidding documents for the Contractor as reference to encourage compliance. In addition, it is highly recommended that the Contractor will conduct new worker safety training using these documents.

- "Safety manual" and "Safety Case Studies" issued by JICA and MOC of Vietnam in 2012
- "The guidance for ODA construction work safety management" issued by JICA in 2014

Safety Manual



English Version Vietnamese Version

Safety Case Studies

Source: MOC of Vietnam and JICA

Figure 6.2.16 Safety Manual and Safety Case Studies in both English and Vietnamese

4) Practical Use of Japanese Technology and Safety Measurement Equipment (On-Site Visualization(OSV))

OC Global has adopted OSV safety measurement equipment at metro projects conducted by Japanese loan such as Delhi Metro, Bangalore Metro and Jakarta Metro. This technology shows coloured lights (blue, yellow and red) in results of site measurement output, building inclination, deflection of earth retaining wall, which lead to early detect dangerous place in the site and enhance safety awareness of construction workers. Hence, this project will also study on

utilization of OSV equipment and it will be proposed to related authorities. In addition, this effort is introduced in JICA's website and broadcasted by TV programme of NHK broadcasting named "professional and work style" (performer is Reiko Abe, civil engineer, OC Global employee) .Moreover, OSV equipment is one of attractive safety management technologies now.

Source: JICA Study Team

Figure 6.2.17 Strut Axial Force and Inclination of Earth Retaining Wall measured by OSV in Bangalore Metro

Source: JICA Study Team

Figure 6.2.18 Measuring by OSV for Station Excavation Work in Delhi Metro

Source: JICA Study Team

Figure 6.2.19 Safety Assemblage that explains OSV technology and Evacuation action in Delhi Metro

Figure 6.2.17 indicates the OSV equipment that measures strut axial force and inclination of earth retaining wall. Figure 6.2.18 shows the OSV measurement situation in AIIMS station in Delhi Metro. Furthermore, evacuation training was carried out in AIIMS station with about 200 construction workers, which was explained about OSV coloured lights i.e. blue, yellow and red. In more details, meaning of colours, which is corresponding to each action such as normal work, caution and reporting and evacuation, are described and actual evacuation was also performed (see Figure 6.2.19).

Furthermore, in terms of the effect of safety assemblage, not only acquiring safety technology, but also improving individual safety awareness and team work of engineers and workers were confirmed according to questionnaire survey. Hence, these efforts will be adopted in the safety training of HCM Line 3A so that accidents can be protected appropriately.

6.3 Procurement and Construction Method

6.3.1 Procurement Regulation Sequence and Approval based on JICA Yen Loan

(1) Application for Procurement Procedure Regulations

The following laws and decrees describe the procurement procedure and selection method for consultants and contractors.

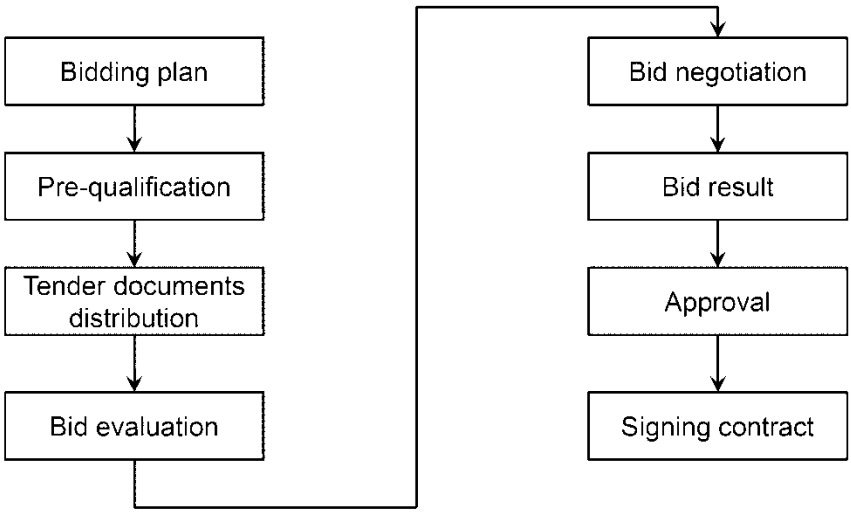
Table 6.3.1 Law and Decree for Procurement Procedure

Classification	Title	Number	Effectuation date
Law	Construction law	No. 50/2014/QH13	18 June 2014
Law	Bidding law	No. 43/2013/QH13	26 November 2013
Law	Land law	No. 45/2013/QH13	29 November 2013
Law	Building law	No. 65/2014/QH13	25 November 2014
Decree	Management of construction investment project	No. 59/2015/ND-CP	18 June 2015
Decree	About detailing the implementation of several provisions of the law on bidding regarding the selection of contractors	No. 63/2014/ND-CP	18 June 2015
Decree	Management and utilization of Official Development Assistance (ODA) and concessional loans from donors	No. 38/2013/ND-CP	23 April 2013
Decree	Guidance on projects of national significance	No. 131/2015/ND-CP	25 December 2015

Source: JICA Study Team

Bid for ODA project has to be based on JICA's guideline or other authority's guideline or provisions of international agreement contracted by Vietnamese government.

Although laws and decrees shown in Table 6.3.1 describe items for procurement in detail, this section indicates procedures from bidding plan to signing contract as follow.



Source: JICA Study Team

Figure 6.3.1 Flowchart from Bid to Signing Contract

(2) Bidding Plan

Bidding plan should satisfy legal basis, which is for contractor selection by implementing agency, and be approved by organizer in the same time with investment decision or after it. Furthermore, the bidding plan should mention number of bid package and contents clearly and include the following items.

- Bid package name
- Bid package budget
- Funding sources
- Selection form of contractors and bit system
- Bid period
- Contract form
- Contract performance period

(3) Pre-Qualification

Pre-qualification of contractors are carried out based on bid package characteristics and the criteria before bid announcement to select the Contractor who has sufficient ability and experience to be required for construction implementation. Moreover, the criteria of pre-qualification mentioned in pre-qualification documents based on JICA procurement guideline and its format, which includes technical ability, financial ability and experience criteria.

(4) Tender Documents Distribution and Preparation

Tender documents are distributed after satisfying the following conditions.

- Approval of bidding plan
- Approval of tender documents
- Public announcement of tender documents or announcement of short list of contractors who participate in the bidding

Tender documents should be prepared in accordance with JICA procurement guideline and its format and included the following items.

- Technical requirement
- Characteristics, technical parameters, technical standard, production standard, warranty period, environmental requirement, supply range determined by other necessary requirement, quantity and quality requirement for equipment and material procurement.

- Technical design including cost estimate, requirement based on the technical instruction and other necessary requirement for construction and installation package
- Financial and commercial requirements
- Cost for conducting Bid package, asking price, market price, shipping terms of materials, payment method and conditions、financial resources, bid currency, general conditions of contract and Requirements for specific conditions
- Evaluation criteria, Related legal provisions, Agreement relating to the ODA donor, Preferential condition (if any), tax, insurance and other requirements

Bid is usually carried out publicly and two bidding procedure namely, "Single-Stage Two-Envelope Bidding" and "Two-Stage Bidding" are described in accordance with "Handbook for Procurement and the Employment of Consultants under Japanese ODA Loans" as follows.

1) Single-Stage Two-Envelope Bidding

For works, machinery and equipment for which complete technical specifications are prepared in advance, a single-stage two-envelope bidding procedure should be adopted. Under this procedure, technical and financial bids are submitted simultaneously in two separate envelopes. Firstly, the technical bids are opened and reviewed to determine that they conform to the specifications. After the technical review has been completed, the financial bids of the bidders whose technical bids have been determined to conform to the technical specifications are then opened publicly, with bidders or their representatives allowed to be present.

2) Two-Stage Bidding

In the case that it may be undesirable to prepare complete technical specifications in advance or impractical turnkey contracts or contracts for large and complex plants or procurement of equipment which is subject to rapid technological advances, such as major computer systems, a two-stage bidding procedure may be adopted. Under this procedure, firstly, bidders submit technical proposals without prices based on the basis of the minimum operating and performance requirements. After technical and commercial clarifications and adjustments, followed by amended bidding documents, the bidders submit final technical bids and financial bids in the second stage.

Bid announcement is performed in case of open bid and restricted bid or competitive bidding including pre-qualification. Bid announcement should be at least 10 days before tender document distribution. Bid preparation period specifies in the JICA guideline as normally 45 days or more for normal contract of International Competitive Bidding (ICB) and normally 90days or more for large civil work or complex equipment work considering site investigation period. Furthermore, bid validity period should be a maximum of 180days from the final bidding day however, it can be extended within 30 days in accordance with the Vietnamese standards.

(5) Bid Evaluation

Bid evaluation method should be the same with evaluation standards which is written in tender documents, and therefore firstly, preliminary evaluation is carried out to eliminate invalid bid which does not satisfy requirements. In more details, the evaluation criteria should include ability, experience, technical evaluation and financial condition evaluation and the contractor who submitted the lowest financial bid among satisfied technical bids will acquire priority negotiating rights based on the JICA guideline.

(6) Bid Negotiation

Bid negotiation and finalization with successful bidder for signing contract are carried out as follows.

- Approval of bid result by project owner
- Draft contract which shows all notices of bid package
- Requirements written in tender documents
- Bid content or description of the successful bidder for the bid content(if any)
- Negotiation between bid implementation committee and successful bidder for contract and finalized items

Contract negotiation and contract finalization result are bases of the conclusion of the contract between the project owner and the contractor. In case of contract negotiation and contract finalization failing, the project owner should select the second successful bidder who submitted the second lowest financial bit and review the contents. Moreover, in case that the second successful bidder cannot be satisfied with the requirements, subsequent correspondence is reviewed and conducted according to the regulation.

(7) Approval of Bid Result

The Contractor for equipment and material procurement, construction and installation or working under EPC bid package is reviewed and proposed as successful bidder if the following requirements are satisfied.

- Bid is valid.
- Evaluating as ability and experience satisfy the requirements
- In terms of technical evaluation, satisfying requirements for scoring and evaluation systems or pass & fail evaluation standard
- Presenting the lowest financial bid on the above conditions

Bid implementation committee makes a repot regarding the bid result and submits it to the project owner for their review and decision. In addition, the bid result is submitted to examination agency

and organization and they make a report for bid result evaluation based on the report prepared by the bid implementation committee and submit to the project owner for their review and decision.

Furthermore, the project owner should review the bid result based on the report for bid result evaluation and approve it. Documents for bid result approval for successful bid should include the following contents.

- Name of successful bidder
- successful bid price
- Contract form
- Contract performance time
- Notices

In the case that successful bidder is not available, the bid result should also be mentioned this situation in approved documents of the bid result and this bid is invalid in accordance with the regulations. In addition, the bid result will report right after the decision of the bid result approval and reporting of the bid result to unsuccessful bidder is not required.

(8) Signing Contract

Signing contract is carried out after arranging the following items and documents considering the above processes mentioned from (4) to (7).

- Contract
- Contract negotiation and minutes of meeting for finalized result
- Approval decision and notice of contractor selection result
- Contract special and general provisions
- Proposal and explanation matter for bid and tender documents
- Tender document, revised bid requirements and additional matter
- Other enclosed documents

In addition, signing contract should assure the following conditions.

- Bid by selected the contractor is valid
- Technical and financial ability information for the contractor, which was updated after the signing contract and satisfied the requirements of tender documents

Furthermore, signed contract is submitted to government related authorities and then the contract executes after approval of the contract.

(9) Procurement Procedure Period in this Project

The procurement procedures in this project are summarized in the following table in accordance with related laws and regulations in Vietnam.

Table 6.3.2 Procurement Procedure Period (Law on Bidding No.43 - Article 12)

No	Procedure	Implementing agency	Approval authority	Period by Vietnam regulation
1	Bidding plan	MAUR/GC	HCMC PC/JICA	5days after submission
2	Pre-Qualification	MAUR/GC	HCMC PC/JICA	Maximum 30days after deadline
3	Tender Documents and Preparation	MAUR/GC	HCMC PC/JICA	At least 40days for preparation period of the Contractor
4	Bid Evaluation	MAUR/GC	HCMC PC/JICA	Evaluation organization 60days (+20days extension possible) Bid validity period is a maximum of 180days, extension up to 210 days possible if requires
5	Bid Negotiation	MAUR/GC	HCMC PC	
6	Approval of Bid Result	MAUR	HCMC PC/JICA	
7	Signing Contract	MAUR	HCMC PC/JICA	

Source: JICA Study Team

6.3.2 Division of Package

Non-Disclosure Information

6.3.3 Civil Procurement Plan

As shown in Table 6.3.6, in terms of civil procurement, procurement country for main materials and equipment for underground and elevated sections were reviewed respectively. Main construction materials such as cement, coarse and fine aggregates and reinforcement etc. are circulated and therefore can be procured in Vietnam. However, main station equipment such as viaduct bearing, tendon, escalator, elevator, ventilation equipment, air-conditioning equipment, fire protection equipment, etc. is acquired by offshore procurement.

Materials for temporary works and construction machine for underground and elevated structures are reviewed respectively as shown in Table 6.3.7. Special equipment such as TBM, tunnel plant equipment and settlement measuring equipment etc. should be acquired by offshore procurement. However, main heavy equipment such as grab excavator, crawler crane, earth auger, backhoe, and dump truck etc. is owned by Japanese and Vietnamese specialty contractors and hence can be procured in Vietnam. In addition, scaffolding, sheet pile, propping and steel deck etc. can be procured in Vietnam, since Japanese leasing companies who provide rental services of lightweight and heavyweight temporary materials are available in Vietnam.

Table 6.3.3 Main Materials and Equipment in Underground Structures

Items		Application of currency		Domestic procurement	
		Foreign currency	Local currency	Underground section	Elevated section
Main materials	Cement	Impossible	Possible	Possible	Possible
	Fine aggregate	Impossible	Possible	Possible	Possible
	Coarse aggregate	Impossible	Possible	Possible	Possible
	Reinforcement	Impossible	Possible	Possible	Possible
	Backfill grouting material	Possible	Impossible	Impossible	―
	Steel product	Possible	Impossible	Possible	Possible
	Viaduct bearing	Possible	Impossible	―	Impossible
	Tendon	Possible	Impossible	―	Impossible
	Waterproofing material	Possible	Impossible	Impossible	Impossible
	Paint material	Possible	Impossible	Possible	Possible
Equipment	Escalator	Possible	Impossible	Impossible	Impossible
	Elevator	Possible	Impossible	Impossible	Impossible
	Ventilation equipment	Possible	Impossible	Impossible	Impossible
	Air-conditioning equipment	Possible	Impossible	Impossible	Impossible
	Fire protection equipment	Possible	Impossible	Impossible	Impossible
	Lighting equipment	Possible	Possible	Possible	Possible

Source: JICA Study Team

Table 6.3.4 Main Cost of Temporary Works

Items	Application of currency		Domestic procurement	
	Foreign currency	Local currency	Underground section	Elevated section
Tunnel Boring Machine(TBM)	Possible	Impossible	Impossible	―
Tunnel plant equipment	Possible	Impossible	Impossible	―
Settlement measuring equipment	Possible	Impossible	Impossible	―
Grab excavator	Possible	Possible	Possible	Possible
Crawler crane	Possible	Possible	Possible	Possible
Earth auger	Possible	Possible	Possible	Possible
Generator	Possible	Possible	Possible	Possible
Backhoe	Possible	Possible	Possible	Possible
Dump truck	Possible	Possible	Possible	Possible
Rammer	Possible	Possible	Possible	Possible
Vibration roller	Possible	Possible	Possible	Possible
Portable lift	Possible	Possible	Possible	Possible
Gantry crane	Possible	Possible	Possible	Possible
Sheet pile	Possible	Possible	Possible	Possible
Propping	Possible	Possible	Possible	Possible
Steel deck	Possible	Possible	Possible	Possible
Temporary elevator	Possible	Possible	Possible	Possible
Temporary lift	Possible	Possible	Possible	Possible
Scaffolding	Impossible	Possible	Possible	Possible
Formwork	Possible	Possible	Possible	Possible

Source: JICA Study Team

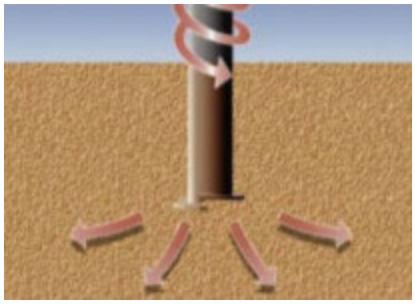
6.3.4 Railway System Procurement Plan

Non-Disclosure Information

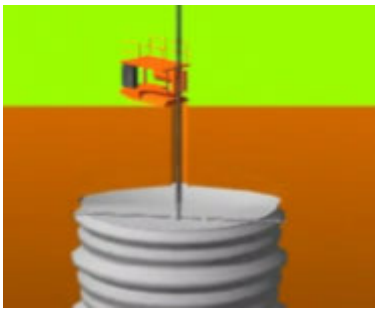
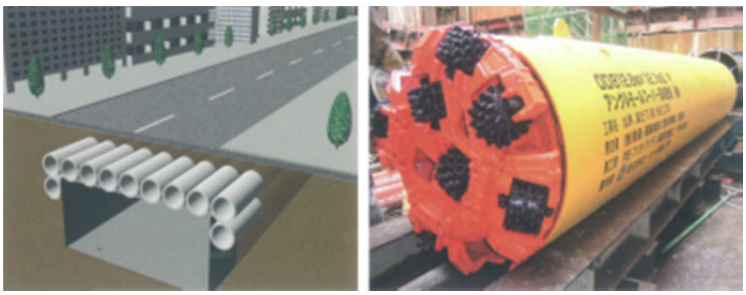
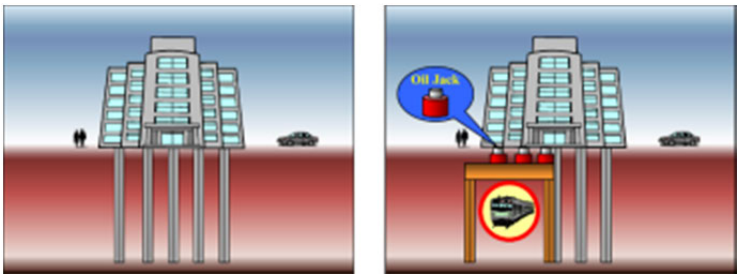
6.4 Possibility of Application of Japanese Technology

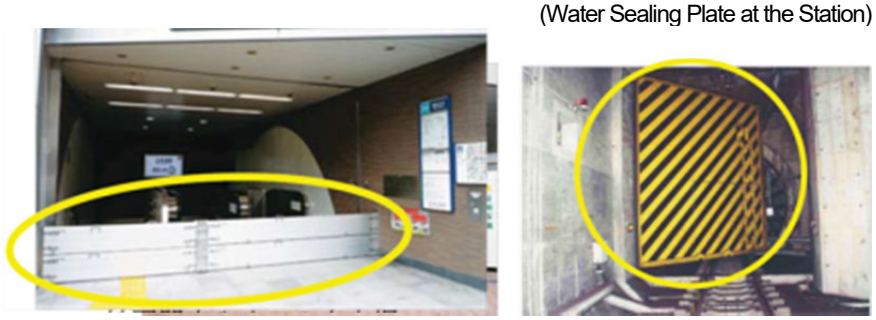
In this project, it is expected that Japanese advanced technologies and equipment are adopted in civil work and railway system. The following items of Japanese technologies are expected to use in this project, which are summarized in the following table by each category such as civil, architecture, E&M and railway system showing circumstances of advantages, basis and comparison among China, South Korea, Europe and America.

6.4.1 Civil and Architectural Structures and Station M & E System

Classification	Items	Circumstances and Comparison with Other Countries
Viaduct	Tendon	The product using steel materials, which is one of advantages of Japanese companies, is embedded in concrete and then is tensioned namely, used for prestressed concrete (PC) to enhance tensile strength, which is mainly used for viaduct superstructure. It has advantages for quality control and quality certificate using mill test certificate compared to China and South Korea.
	Rubber bearing	It is the product using special material (special rubber) which is one of advantages of Japanese companies. It is used at the supporting point where the girder is seated in the same manner with steel bearing. Furthermore, negative stiffness friction damper which can respond to the seismic force is also one of advantages of Japanese companies. Although Europe, USA and New Zealand where earthquake often happens have adopted damping rubber bearing which consist of grubber bearing and lead core, they have not developed "Super-High Damping Rubber Bearing" that has damping function by only high quality rubber, which has little environmental impacts because no use of lead and same ability with damping rubber bearing for continuous earthquakes.
	Pile in a narrow area (Press-in rotation method of steel pipe pile)	Conventional pilling methods for large diameter are mainly by cast-in situ piles and require a large stock area for excavated soil and bentonite equipment for borehole stabilization. This method is press-in rotation method of steel pipe pile having welded spiral shaped blade at the tip of the pile with zero surplus soil. Moreover, it is mainly carried out by all-around traverse machine and hence used for the case that environmental influences by industrial waste treatment and water pollution etc. should be minimized. In addition, in some cases, it may reduce number of piles for one column and cost for whole foundation work utilizing excellent bearing capacity by the blade. Although two Japanese companies have commercialized this method, companies in China, South Korea, Europe and America do not have this technology.  (Source: Nippon Steel & Sumitomo Metal)

Classification	Items	Circumstances and Comparison with Other Countries
	Launching gantry	It is a large gantry steel material used for overhanging erection of elevated girder, which is one of advantages of Japanese companies and expected that high strength and high precision steel materials are used. However, the method and materials are not Japanese own technology.  (Source: JICA Study Team)
Tunnel	Boring Machine	In Japan, tunnel methods using various shield machines are proposed and adopted under soft soil condition of urban area and limited space and condition. The tunnel work is planned in soft ground condition and directly under existing buildings in this project, and therefore it is expected that EPBS or slurry shield is adopted, which is highly advanced in Japan and German.  (Source: Shield Tunnelling Association of Japan)
	Temporary steel deck	It is used for closing the opening at open excavation section of stations, which is utilized for diversion road and working platform. The temporary steel deck which satisfies the Japanese standard is used, since safety and strength are required. However, the method and materials are not Japanese own technology.  (Source: JICA Study Team)

Classification	Items	Circumstances and Comparison with Other Countries
	Soil improvement method	The method that injecting liquid to be solidified in the ground at high speed and then mixing with soil to make solid body such as jet grouting is adopted for around TBM shafts and under excavated bottoms at stations. While urban civil works in Japan are carried out under the conditions such as soft soil and limited spaces etc., ground improvement materials and various ground improvement techniques are not well adopted in China, South Korea, Europe and America. Hence it is expected adopting this Japanese technology.  (Soil improvement image, Source: JICA Study Team)
	Pipe roof method (Neighbouring construction)	In case that RC structures such as station underpass and ventilation duct are constructed under the existing building and road, steel pipes are installed along the outside of the main structure at regular intervals in arch-shaped or columnar shaped and horizontally to secure safety excavation work of the main structure. Furthermore, it is the supplementary construction method that constructs roof and walls for preventing ground and underground utilities. Moreover, it can prevent for loosening of the ground and settlement by excavation and secure safety work in the tunnel. In addition, small diameter pipe jacking method (auger drilling steel pipe pile jacking method) that minimizes ground settlement and rebound with no vibration and noise is developed by Japanese Technology at present. This technology is highly advanced in Japan and German.  (Source: TH Pipe Roof Technical Association)
	Underpinning method (Neighbouring construction)	It is the method that constructs a new underground structure without any influence on existing underground structures. In this project, the method may be adopted in the case that a new station is constructed under existing flyover etc.  (Source: JICA Study Team)
Elevated and Underground stations	Finishing materials of station building	Roofing material using special material is one of advantages of Japanese companies, which has enough strength and is difficult to adhere dust, and therefore maintenance cost including cleaning cost can be reduced.

Classification	Items	Circumstances and Comparison with Other Countries
	Station M&E	Apparatus manufactured by Japanese companies such as elevator, escalator and ventilation fan etc. have high quality compared with those of China and South Korea, and therefore maintenance cost can be reduced.  (Source: JICA Study Team)
	Station flood control facilities	Ho Chin Minh City has occasionally flooded roads and houses by heavy rain and hence, flooded structures such as station entrance and transition from elevated to underground section are concerned. Although station entrance height is designed based on the flood height using flood probability, water sealing plate at the station entrance and watertight gate at the tunnel entrance are studied for further countermeasures. However, the method and materials are not Japanese own technology. (Water Sealing Plate at the Station)  (Watertight Door and Station Entrance Raising, Watertight Gate) (Source: Tokyo Metro)

6.4.2 M&E and Railway System

Calcification	Items	Circumstances and Comparison with Other Countries
Railway	Rail (heat-treated rail, equivalent 60kg)	It is one of steel products that Japanese companies have advantages, which has been applied special heart treatment to increase durability. Although the cost is higher about 20% to 30% compared to normal rails, durability namely, abrasion resistance property is increased as a result, cycle of rail replacement is increased about four times compared with that of normal rails. This high quality rail having quality stability and reliability is produced by high manufacturing technology and quality control system such as heat treatment technology, and hence a high evaluation is received by clients comparing products fabricated in China, South Korea, Europe and America.
	Turnout (movable nose turnout)	It is one of steel products that Japanese companies have advantages, which is for high speed operation in this project. Crossing section of normal turnout (place crossing X-shaped) is the place where rail is lost, which have been damaged by wheel and rail contact at every passing. In the case of high speed operation, the damage is increased and safety is compromised and therefore it is required for using turnout having movable nose without rail missing, which is the advantage of the Japanese product.  (Source: JICA Study Team)
Electrical equipment	Substation equipment (transformer)	It is also one of advantages of Japanese companies. This Japanese product can be considered as STEP item focusing on quality and durability since stable power supply for railway system is required. For power distribution installation, regenerative power storage system, current feeding system of double track to reduce voltage drop loss at regeneration etc. can be adopted in this project. Furthermore, electrical simulation which can be planned for feeding system plan according to train operation, which technology is superior to other counties.
Signalling equipment	Interlocking device	It is one of advantages of electrical and electronic equipment by Japanese companies. This Japanese product can be considered as STEP item focusing on quality and durability since reliability of railway systems is required.
Station equipment	AFC	It is also one of advantages of electrical and electronic equipment by Japanese companies. The Japanese product having high reliability and data processing capacity (60 people/minute at gate) can be adopted as STEP item, which cannot be produced by companies in China, South Korea, Europe and America.
	Environmental facilities	The following ecology measures of station equipment can be considered in this project. • Reduce CO_2 emissions adopting LED illumination and lighting control system • Reduce power consumption at stations adopting solar power for platform and concourse power supply However, the method and materials are not Japanese own technology.
Rolling stock	Electric Multiple-Unit (EMU)	Electric Multiple-Unit (EMU) is one of advantages of Japanese company, which is collection of electrical equipment using high quality material. For Preventing global warming, it can be reduced for operation and maintenance cost using stainless and aluminium rolling stock, and weight saving of track and equipment. Furthermore, advance technologies such as regeneration brake, energy saving function by VVVF control, noise reduction and Barrier-free measures, etc. can be adopted as one of advantages of Japanese technologies. The following circumstances are given for the reasons why Japanese EMU has advantages. 1) 20,000 cars for public and private railway companies are operated only in capital area, which lead to establish railway network system having punctuality based on suitable maintenance system, which cannot be seen in the world except Japan.

Calcification	Items	Circumstances and Comparison with Other Countries
		2) Operation issues are feedbacked in design and production of EMUs, and therefore high reliability is secured. 3) Many cars and parts are standardized considering mutual direct operation, especially in capital area, and therefore many parts are available on production line and maintenance pars can be expected to be smooth supply by adopting the same specification to each other. Focusing on the above material, method and operation scale, the Japanese product has high stability and reliability compare to other countries products such as China, South Korea, Europe and America.
Platform screen door (PSD)	Elevated stations (half screen door), Underground stations (full screen door)	PSD is installed between rail and platform to prevent falling from platform, contract accident with train and secure passenger safety. Furthermore, opening and closing of PSD is automatically controlled interlocking the door motion. In case of full screen door, it provides a comfortable platform environment by preventing intrusion of train wind and rainy wind, furthermore, it contributes to improving air conditioning efficiency. Hence, it concludes that this Japanese product can be adopted as STEP item considering quality and durability. However, the method and materials are not Japanese own technology.

6.5 Project Implementation Schedule

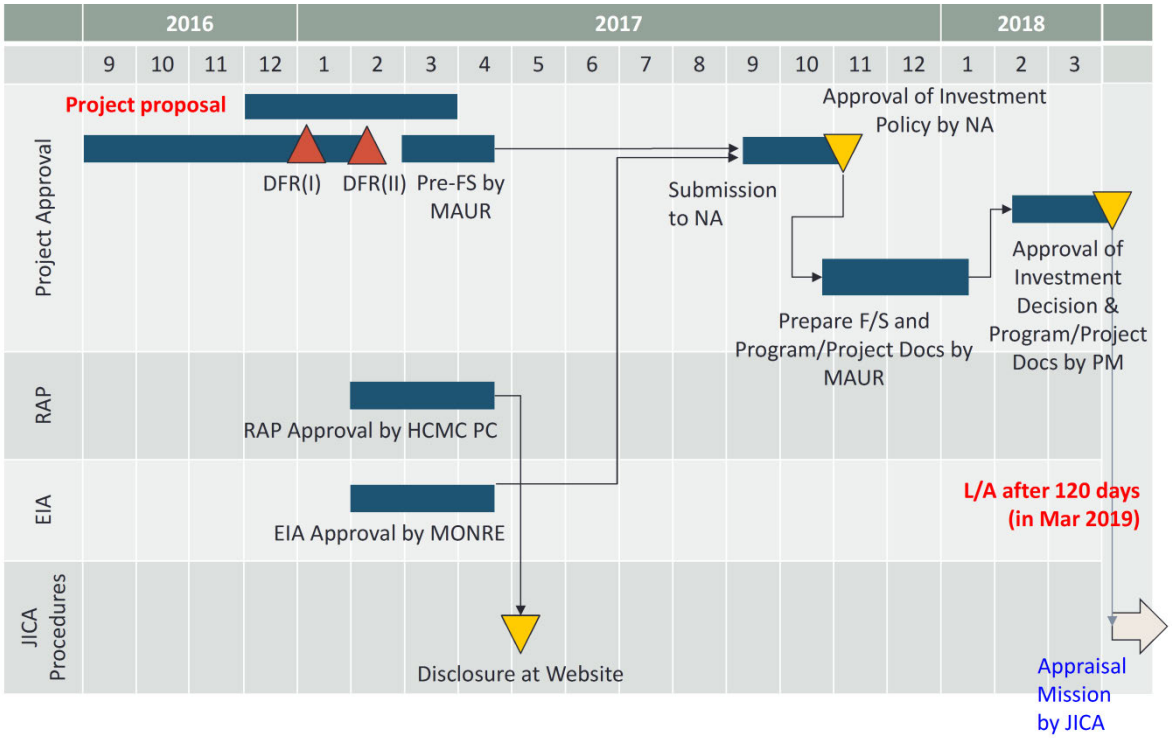
According to the law issued by national assembly ref. no. 49/2014/QH13 dated 18 June 2014, national important project having more than 10 trillion VND is required to get approval of investment policy by the national assembly after submitting Pre-F/S report to the national assembly. After that the investment is decided through approval of F/S report and programme/project documents by prime minister. The signing of yen loan agreement is after 120 days of the prime minister approval.

Critical issues for project implementation schedule are summarised as follows based on the interview of persons from Ho Chi Minh Line 1and Hanoi Line 2.

- For smooth project implementation, railway alignment and station layouts should be focused minimizing resettlement on design stage, which is one of serious problems for project delay.
- In terms of civil package scale, it is better to divide into suitable size, which Japanese medium sized contractors can join in order to encourage competition. The suitable size is about 3 to 5 km having two to three stations.
- Having compared construction schedule between elevated and underground construction, underground construction including shield tunnel is longer than that of elevated construction. Hence, the underground construction should be commenced as soon as possible because handover from the underground construction to railway system is critical pass of the whole construction schedule.
- Most projects are more than 10 trillion VND (about 50 billion yen), and therefore it is required to get approval of investment policy by the national assembly, which is only held on May and November. Hence it is required to prepare necessary documents considering this schedule. Moreover, increasing budget and total implementation cost approved by the national assembly is very difficult in the later stage, and hence it is crucial to carry out precise cost estimation in Pre-F/S report.

As shown in Figure 6.5.1, it assumes that the pre-F/S report will be submitted in May 2017 to the national assembly and the investment policy will be approved by the national assembly in November 2017, furthermore, it will be approved by the prime minister in February 2018 and then the yen loan agreement will be signed in March 2019.

In addition, the Pre-F/S report is included not only phase 1, but also phase 2 which has 9km of elevated section and is additional contract of the study team. Furthermore, EIA and RAP of phase 2 are required for approval by the national assembly and the prime minister respectively and those works will be carried out by Vietnamese side.



Note
- The project schedule in this chapter assumes national assembly approval in Nov. 2017.
- At this reporting time (Jan. 2018), the said approval was postponed by 1 year. See Chap16 for the revised schedule.

Source: JICA Study Team

Figure 6.5.1 Project Formation Schedule

After the singing yen loan agreement, consultant selection is carried out. The consultant selection, basic design and detailed design are performed sequentially and three to four years are normally required up to commencement of construction, and therefore it assumed that the commencement of construction work after bidding of contractors is in 2022 (see Figure 6.5.2). On the other hand, in case of the detailed design by JICA grant aid, it can be shorten the schedule about one year, since it is not required to wait for signing the yen loan agreement. (see Figure 6.5.3).

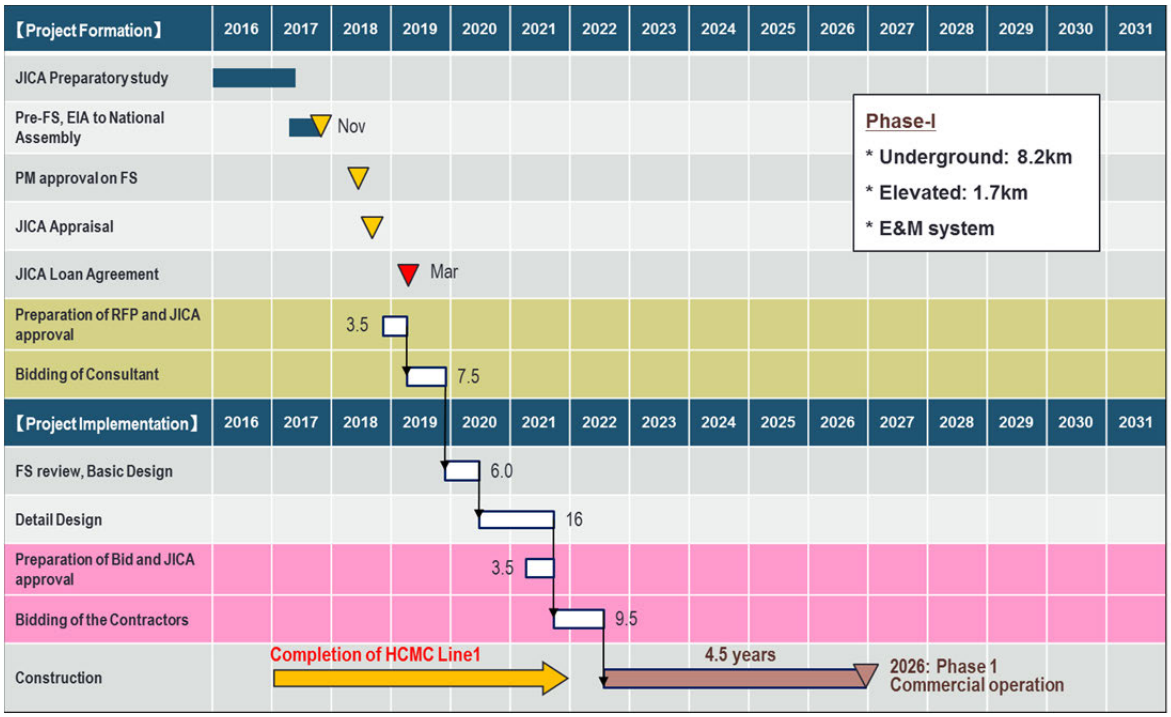
Furthermore, the construction period for HCM Line 3A phase 1, which is mainly underground civil works, seems to be 4.5 years based on the established civil work productivity referring to similar

projects(see Table 6.5.1), which is including civil works (underground and elevated section), procurement for rolling stocks and the railway system (including the detailed design by the contractor, fabrication, installation, individual functional and performance test), whole system integration, commissioning and trial running before revenue operation (see Figure 6.5.4 and 6.5.5). Moreover, defect liability period by the contractor is normally about two years after the completion of construction works or handover to the client, and maintenance work by the E&M contractor is set two years after the revenue operation.

Table 6.5.1 Civil Work Productivity

Items	Productivity	Remarks
TBM Driving Work	150m/month	Evaluated from similar projects
Track Work	450m/moth	Evaluated from similar projects
Viaduct Work (Pile length = 50m, double piers=25m span, single pier =35m span)	75m/month (double piers), 105m/month(single pier)	Evaluated from similar projects

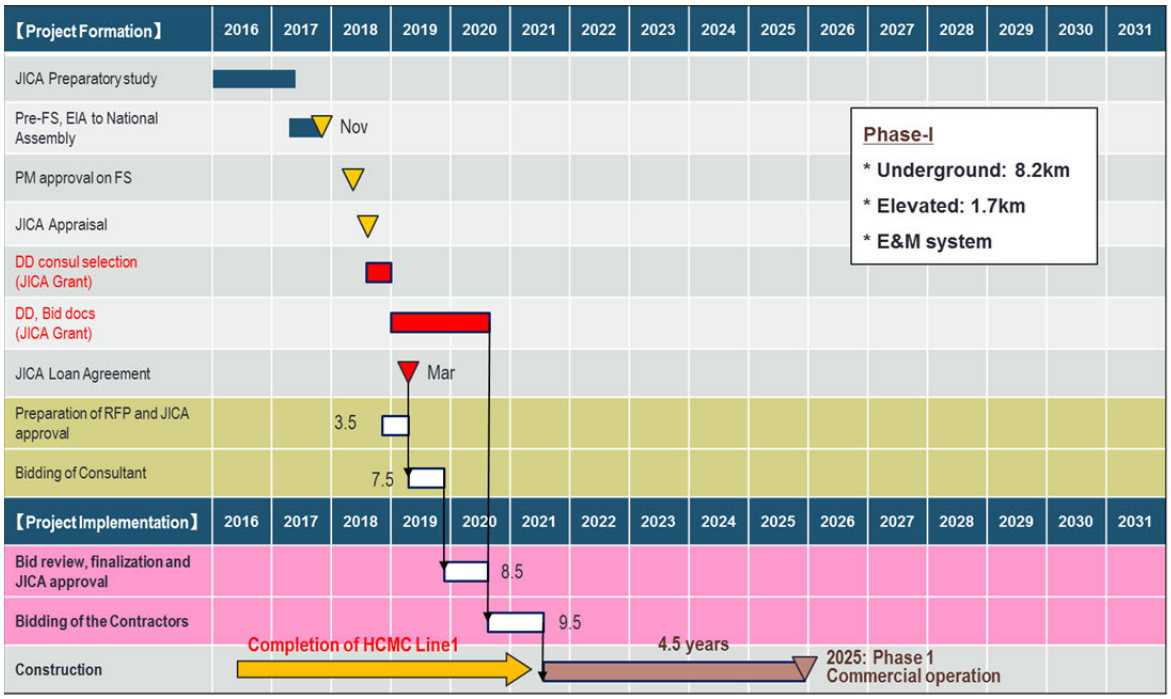
Source: JICA Study Team



Note
- The project schedule in this chapter assumes national assembly approval in Nov. 2017.
- At this reporting time (Jan. 2018), the said approval was postponed by 1 year. See Chap16 for the revised schedule.

Source: JICA Study Team

Figure 6.5.2 Project Implementation Schedule



Note
- The project schedule in this chapter assumes national assembly approval in Nov. 2017.
- At this reporting time (Jan. 2018), the said approval was postponed by 1 year. See Chap16 for the revised schedule.

Source: JICA Study Team

Figure 6.5.3 Project Implementation Schedule (In Case of Detailed Design by JICA Grant Aid)

Figure 6.5.4 Detailed Project Implementation Schedule

Non-Disclosure Information

Figure 6.5.5 Detailed Construction Schedule

Non-Disclosure Information

Based on experience on HCM Line 1 and Hanoi Line 2, it is considered that main causes for the delay in the project schedule are “delay of approval process by the Vietnamese side”, “delay of total investment cost verification”, “unsuccessful bid”, “delay of land acquisition” and “delay of bid evaluation and bid negotiation” etc., which may lead to several years delay of the project.

Measures against these delays are thought to be “shortening of the project schedule up to the Contractor bid using detailed design by JICA grant aid (see Figure 6.5.3)”, “avoiding unsuccessful bid by pre-publication of bid information and condition in a certain percentage”, “shortening construction schedule by increase of construction equipment such as TBM” etc. It is crucial that proper countermeasures are taken for the project implementation in accordance with actual conditions.

6.6 Consulting Services

Business outline of consulting services for the project implementation and outline of staffing plan are described as follows.

6.6.1 Business Outline of Consulting Services

Business outline of consulting services for HCM Line 3A project is assumed as follows. The business outline is planned based on the assumption that the basic and the detailed design, a 4.5 year supervision and a two year maintenance support are carried out by General Consultants (GC).

- Revising feasibility study and basic design of the project; Additional surveys and investigations; Supplement and improving the basic design; Calculation of the Total Investment Cost; Prepare implementation plan and tendering plan of the project; Setting up “Regulations and Technical Specifications”
- Prepare documents / pre-qualification documents / bidding documents for the underground civil works package
- Prepare technical design, cost estimates and prepare documents / pre-qualification documents / bidding documents for elevated civil works
- Prepare documents / pre-qualification documents / bidding documents for suppling and installing E&M system, rolling stock and two years maintenance package
- Assist the client in selection of contractors and suppliers
- Review and verify the technical design of underground civil package; review and verify the technical design of supplying and installing E&M system, rolling stock and two years maintenance package
- Supervision for construction, supply and installation equipment
- Commissioning and trial runs
- Environmental and social considerations and implementations
- Conducting HIV/AIDS prevention programme
- Preparation of manuals for construction, administration, operation and maintenance
- Organize public relation campaign
- Human resource training programme for the client, formulating training plan for operation unit of project
- Guide and assist the client in first two-year operation and maintenance stage
- Prepare safety documents and system safety plan, assist the client and competent authorities in submission for granting the system safety certificate
- Risk management relevant to the project

6.6.2 Study on Required Man-Months

Non-Disclosure Information

6.7 Cost Estimate for Packages and Project Total Investment

Non-Disclosure Information

6.7.1 General Conditions

Non-Disclosure Information

6.7.2 Study Results of Cost Reduction for Project Total Investment Cost

Before commencement of this study, the review of cost reduction was carried out based on terms of reference. The results are summarized in Table 6.7.20 focusing on review items, study results and how reflected to the total investment cost. It should be noted that some items should be judged by MAUR, and therefore further discussion with Vietnamese side is required to reduce the total investment cost.

Table 6.7.1 Cost Reduction Items and Achievement in this Study

Items for cost reduction	Review items that are planned in the beginning of the study	Study results and reflection to the total cost
Construction Plan and Method		
Revision from underground to elevated section	Although the F/S planned whole line as all underground section, the possibility for elevated section for 7 stations after Hoa Binh Park (C3) station is reviewed. The cost for underground section is higher about 3 to 5 times compared with that of elevated section, and therefore cost reduction effect is large.	It concludes that C9 and C10 station are elevated stations because it is difficult for elevated section until C8 station considering narrow road width and crossing canal.
Shortening project schedule until construction stage	Cost for consulting services and price escalation can be reduced by shortening project schedule until construction stage.	In section 6.5, it proposes that design work is carried out by JICA grant aid not waiting for yen loan agreement (L/A). It can be shorten the schedule about one year compared with consultant selection and design work after L/A.
Study on partial operation for countermeasure of delay opening	Station and entrance that are difficult for construction at early stage, partial opening can be consider suspending using station and entrance partially.	It will be decided after commencement of construction work considering the actual progress of land acquisition.
Review of station numbers and locations	Station distances between C4 and C5, C5 and C6 and C6 and C7 station are about only 700m, and therefore the possibility to reduce station numbers is considered.	While station locations are adjusted according to the future development plan and intersection locations, station numbers are not revised.
Construction technology		
Adaption of shield technology and soil improvement method	Adapting shield machine and soil improvement method developed by Japanese companies enable to neighbouring construction at just near buildings, and therefore optimisation of railway alignment and minimization of land acquisition can be promoted.	It is assumed to adopt shield machine and soil improvement method by Japanese technology for tunnel alignment on Cong Quynh and Pham Viet street between C1 and C2 station, and hence the shortest alignment can be selected running at just near existing buildings.
Reference to technical specifications of HCM Line 1	Design and approval periods for E & M packages can be shortened referring technical specifications of HCM Line 1.	It concludes that the same technical specifications are adopted since interoperation is planned between HCM Line 1 and 3A.
Contract method		
Discount offer from bidder for multiple bidding of civil packages	Discount offer such as reduction of management and equipment cost is accepted from the Contractor who wishes to win several civil packages.	Adaption of discount offer is mentioned in Bidding documents in case of multiple bidding of civil packages.
Division of E &M package	Division of E &M package is enhanced the competitiveness of supplier.	While E&M contract for HCM Line 1 is one package having 11 subsystem, the JST proposes adopting three packages i.e. signalling, rolling stock and other E&M package in HCM Line 3A in order to encourage competition.
Review of maintenance service	Review of five-year maintenance service by the Contractor is carried out for shorten the service period and reduction of scope of work.	It assumes that ability of maintenance staffs of HCM Line 1 will be improved at the opening of HCM Line 3A, and hence the service period is reduced from five years to two years.
Financing plan and annual budget plan		
Co-financing by multiple donors	Co-financing with ADB and/or EIB is considered such as KfW (Germany)and DGR(France).	It concludes that this project is to be applied JICA step loan, Co-financing is not adopted.
Local and foreign currency segments		
Utilization of domestic material	Cement, reinforcing bar and other general materials are procured in domestic market positively. Increasing local currency enables to reduce total construction cost.	JICA step loan requirement that "more than 30% of Japanese products in total construction cost should be adopted" and furthermore domestic materials are procured positively should be mentioned in bidding documents.
Tax and expenses by Vietnamese government		
Adaption of Local competitive Bidding (LCB) for general civil work	The possibility to order to domestic contractor for some packages is considered such as Depot and elevated section etc.	It concludes that this option cannot be adopted in this project since JICA step loan will be applied.
Expansion of tax exemption of the Contractor	Tax exemption such as personal income tax for foreign experts is applied for ODA project in currently. The possibility of expansion to other items such as corporation tax is reviewed.	It requires negotiation between Japanese and Vietnamese governments, since it is related to contents of yen loan agreement.

Source: JICA Study Team

Appendix 6.1: STEP APPLICATION

Non-Disclosure Information

Appendix 6.2: Lessons Learned from Line 1 Project

1. General

Interview survey to general consultants was conducted in order to utilize the lessons from the project of Ho Chi Min Urban Railway Line 1. Major problems of the project are summarized and shown in Table 1.

Table 1 Key Issues of Line 1 Project

Item	Background	Countermeasure
• Significant delay in approval of designs and technical specifications by the Government	• Lack in the MOT's capacity of technical assessment • Mandate to conduct 3rd party verification	• Increase in capacity of technical assessment • 3rd party verification under JICA contract
• Little interest in bids (particularly for civil packages) • Failure in procurement of contractors due to single bid	• Risk of unpaid / delayed payment by the Employer (HCMC-PC) • Unwillingness to join the bid of EPC/D&B contracts • Requirement of re-bid as per the prescription in the Procurement Law of Vietnam	• Effort of the Vietnam side to prevent overdue payment • Simple and clear documentation • Reduction in the risk of contractors • Market sounding and strategic conditions of contract • Strict use of JICA guidelines to avoid one-sided contract
• Delay in re-approval of project investment decision due to significant increase in project cost	• Significant price escalation across the world in 2007 - 2008 • Underestimate of the project cost by the local F/S (to avoid the requirement of approval from the National Assembly) • Impact of foreign currency exchange rate (high JPY and low VND)	• 3rd party verification under JICA contract • Effort of the entire Vietnamese stakeholders for timely approval from the National Assembly
• Delay in land acquisition	• Common issue among the most of ODA projects in Vietnam • Lack in land acquisition budget	• Effort of the Vietnamese side to secure sufficient budget for land acquisition (and cost estimate based on the market price) • Signing of construction contract after completion of land acquisition • Effort to minimize the requirement of land acquisition from the beginning
• Absence of O&M body • Unclear share of responsibilities between consultant and contractors on O&M personnel training and maintenance works	• No decision on the issues that O&M company must address during the design stage (in relation to operating rules of the railway system)	• Early appointment of O&M personnel by the Vietnamese side • Early preparation of operational rules • Clear demarcation of responsibilities among stakeholders based on the lessons from similar projects
• Absence of station area and bus rotary development within the scope of urban railway project	• Constraints in the authority of MAUR, i.e. their power is limited to rail facility. • Typical vertical administration structure	• Empowerment of the implementing agency or introduction of the system to improve the coordination between stakeholders • Authorization of development proposals through incorporation of such proposals to pre-F/S

Source: Based on the report prepared by the General Consultant of Line 1 Project

2. Design and Specification

- In the Line 1 project, government approvals on many designs or specifications are required due to the first introduction of urban railway in Ho Chi Min City. It took a long time to assess the fund of the third party or discussion on equality between foreign companies.
- It is necessary for a lot of structural sub systems of the 3A Line to follow structure, content or composition of systems of the Line 1 in order to make it transitional between the Line 1 and the 3A Line. Therefore, in case there is no significant problem regarding the designs or specifications, the ones introduced in the Line 1 shall be adopted.
- Nevertheless, in a part of designs or specifications, government approval assessed by third party will be required. In this case, a consultant hired by JICA will be an ideal third party to assess since Japanese railway system was introduced in the Line 1 and will be applied to the 3A Line.

3. Tender Assistance

- There happened remarkable problems of tender in Line 1 that there were many cases “No applicant” or “Only one applicant”. Only one company applied at the main tender in elevated and rolling stock civil which is most precedent. Though there was a requirement based on the Vietnamese law on tender, the company contracted finally.
- In terms of underground civil introducing one contract package, all applicants gave up the tender because of distrust to the client caused by delay of payment in other projects or challenge to a contract of design and construction package.
- Based on the fact, construction volume per a contract was made small and divided into two parts; CP1a (Ben Thanh station and an open cut tunnel between Ben Thanh station and Opera House station) and CP1b (Opera House station, Ba Son station and open cut tunnels between Opera House station and Ba Son station, and between Ba Son station and the border of CP2).
- As a result, though there was only one applicant, the client could contract with a Japanese contractor in CP1b. Then, the Pink book of FIDIC was introduced in CP1a and responsibility of designs shall be owed by the client. This enabled the client to contract with a Japanese contractor.
- In order to avoid situations “No applicant” or “Only one applicant”, various countermeasures shall be considered. To solve these problems, there can be several measures; to supply payment on time by the client, to make documents of payments easy and clear, to reduce unreasonable risks for a contractor at a tender stage, or to set an appropriate contract condition based on elaborate market research.

Table 2 Contract Packages and Bid Histories

Contract Package	Underground	Elevated and Depot	Railway Systems
Scope	Length: 2.5km Underground : 3 Stations Tunnel: Shield, Cut & Cover Others: Ventilation, ECS	Length: 17.5km Underground: 11 Stations Long-span Bridge: 5 Bridges Depot: Civil & Architecture	Track, Power, Signalling, Communication, OCC, AFC, PSD, Rolling Stock and Rail System maintenance (5 years)
Contractor	CP1 Ben Thanh–Opera House Mitsui-Sumitomo/CIENCO 4 CP1b Opera House – Ba Son Shimizu Maeda JV	CP2 Sumitomo/CIENCO 6	CP3 Hitachi
Commencement of Contract	CP1a November 2016 CP1b August 2014	CP2 July 2017	CP3 August 2013
Contract Form (FIDIC)	CP1a Construction (Pink) CP1b D&B (Silver)	CP2 D&B (Silver)	CP3 D&B (Silver)
History of Bids	1st Bid PQ: 5 groups, Main: no bidders 2nd Bid CP1a 2 bidders 2nd Bid CP1b PQ: 3groups, Main: single bid	CP2 PQ: 2 groups Main: Single bid	CP3 4 bidders

Source: Based on the report prepared by the General Consultant of Line 1 Project

4. Project Cost

- As seen in Table 3, total construction cost at the preliminary design (P/D) phase in 2019 is almost twice as much as that at the F/S phase in 2006.
- There are opinions that cost estimation at the F/S phase was optimized. In other words, since government approval is required for a project which costs more than 2 billion VDN, the F/S cost was set lower on purpose to avoid that. On the other hand, some pointed out that the period of the F/S study is short and the quality is low, and then the design and estimation has some problems due to lack of specialists in a field of underground civil or railway system in Vietnam.
- A general consultant in charge of the Line 1 listed 3 factors for the cost increase; 1) cost inflation of construction material and oil in the world and currency deflation of VND, 1) factors attributing quality of survey and design, and 3) preparation for appropriate contingency for change of scope or material cost.
- Lessons learnt from these experiences are; to conduct high quality cost estimation in F/S and preparatory survey and to grasp progress of a project based on the assumed initial schedule in order to reduce influence of cost inflation. As for the former lesson, the consultant conducted proper cost estimation based on domestic or foreign experiences of a main survey. Regarding the latter lesson, it is significant in Vietnam to make a progress of domestic approval and promote based on the project schedule.

Table 1 Comparison of Total Investment Cost (F/S and Preliminary Designs)

	2006 (F/S)	2009 (P/D)	Increase
Total Investment Cost (including land acquisition and taxes)			
JPY equivalent	126.6 billion	236.6 billion	+87%
VND equivalent	17.4 trillion	47.3 trillion	+171%
Foreign exchange rate	JPY 1 = VND 137	JPY 1 = VND 200	(46%)
Eligible Portion (including variations and price escalation)			
JPY Equivalent	104.9 billion	209.2 billion	+99%

Source: General Consultant of Line 1

Table 2 Reasons of Cost Increase and Dominancy

Reason	Dominancy (%)	
	JPY Equivalent	VND Equivalent
1. Significant price escalation of construction materials and oils across the world in 2007 - 2008 • Unit cost of concrete, steel, labor cost escalated by 1.5 – 2.0 times	20	45
2. Elaboration during study and designs	51	35
(1) Increase in ridership forecast by 30% due to alterations in MRT masterplan	(31)	(21)
• Enlargement of scales and increase of quantities in civil works and M&E equipment at underground and elevated stations		
• Enlargement of scales and increase of quantities Rolling stock, traction power, AFC, and SCADA	(19)	(13)
(2) Enhancement of safety, reliability, and user-friendliness		
• Platform screen doors (elevated)		
• Automatic Train Operation (ATO) system		
• Alteration in superstructure (for better efficiency and effectiveness)	(1)	(1)
• Increase in AFC system quantities for initial investment		
(3) Additional scope of works (change from non-eligible portion)		
• Pre-construction of Line 2 Ben Thanh Station structure (under Line 1)		
• Construction of O&M administration building and OCC building		
3. Secure of appropriate contingencies (variation and price escalation) • Contingencies for variation: F/S 11% - P/D 15% • Contingencies for price escalation: F/S 7%→P/D 32%	(29)	(20)

Source: General Consultant of Line 1

5. Land Acquisition

- Target areas of the Line 1 in Ho Chi Min City is District 1, District 2, District 9, Binh Thanh district, Tu Doc district, and Gi Anh at south east of Bing Duong province. Though land acquisition in District 1, District 9 and Binh Thanh district was conducted smoothly, there was delay in other districts. Delay mainly happened in CP2 including elevated section and rolling stock, which lasted for 20 months to take over the land.
- According to the plan at ODA conclusion, land acquisition of about 31 ha and resettlement of 140 households were to be conducted based on domestic procedures and land acquisition plan in Vietnam. As the project was made progress, volume of land acquisition (affected household or compensation cost) has increased.

- There was no answer from MAUR regarding the compensation cost and actual amount of payment. The reason is that since HCMC-PC conducted the land acquisition together with other projects (east bus terminal and Hanoi highway expansion projects), calculation of compensation only consider the Line 1 situation is difficult.

Table 3 Scale of Land Acquisition and Compensation

Area	Project Affected Household	Compensation	Key Issue
District 1	N.A	N.A	Coordination with the Ministry of Defense with regard to the acquisition of shipping yard at Ba Son station area
District 2	200	N.A	
District 9	115	VND 140 bil.	Delay in acquisition by another project (at the area to accommodate pedestrian stairway)
Binh Duong	66	N.A	Strong objection by the 2 enterprises against the compensation program prepared by Binh Duong
Thu Duc	435	N.A	Share of responsibilities between HCMC and Bin Duong
Binh Thanh	166	VND 295 bil.	

Note: "N.A" – Unable to figure the cost of Line 1 as the acquisitions were jointly executed by the other projects under HCMC-PC.
Source: Based on the information provided by MAUR

As reasons of delay of land acquisition, MAUR reported to HCMC-PC below.

- Necessity of an inquiry by HCMC-PC assessment and compensation committee because of complex confirmation process of land right.
- Late responses by staff of committee or ward in charge of land right assessment.
- A lot of difficulties to decide compensation cost.
- Long time to make a policy decision by HCMC-PC how to define limit of financial support or coordinate with the NH-1 expansion highway project in which compensation was already conducted.
- Delay of implementation of inventory survey and completion of compensation plan due to lack of corporation by local residents to the resettlement plan.
- Long time for coordination based on land management policy which is different district by district though the land owner is same

Lesson learns and reflection on the main project from the Line 1 project is shown below.

- Measures to reduce social impact should be considered when a project plan has been formulated. Some measures such as utilizing public land in order to reduce impact to residential area has been taken in this project. At the design phase, consideration to minimize social impact shall be done.

- In order to promote public participation and gain cooperation, information disclosure on land acquisition, arrangement, compensation and resettlement shall be widely implemented in this project. In this project, there has been already two meetings to residents to get various opinions from wide stakeholders. Further effort, such as announcement of resettlement plan on JICA website or active public announcement by MAUR will be crucial to get deep understanding from residents.
- Affected people shall be compensated based on reacquisition cost. Delay of land acquisition in CP2 of the Line 1 was caused by late agreement by affected people on compensation based on current condition. Therefore, compensation based on reacquisition cost is suggested and reflected on the cost estimation in this project. Compensation standard will be reinvestigated by Land Fund Development Center (LFDC) and approved by HCMC-PC. Continuous support by MAUR and the Consultant will be essential.
- Project implementation schedule should be flexible and updated based on delay of land acquisition. Though the project implementation schedule in this project is reliable enough based on experiences of Vietnam, it is necessary to check the situation properly when a problem happens in a design phase. Especially, the period to turn over land should be taken longer and the Consultant should not be into a situation at which a contractor ask penalty.

6. O&M Body

- Absence of O&M body for the Line 1 project becomes more critical problem these days, in particular with respect to the issues that “shall be addressed in coordination with the O&M company” and “shall require approval from the O&M company” as specified in the particular specifications in the contract of CP3. Absence of final decision maker (i.e. O&M company) makes the design works of railway systems difficult especially when it comes to the elements relating to the operational rules of railway service.
- MAUR, as the employer, stated that the General Consultant is responsible to act as the interim body on behalf of the O&M company for the time being, but it does not work well at this moment. PMU1 has a clear policy that the matters pertaining to operational issues will be addressed by the O&M company as the final decision maker. Under the circumstance, the contractor issues letters for every single decision to avoid the risk of re-design and / or alterations in procurement of equipment at the cost of the contractor by the intent of the employer (in return, the contractor takes actions so that any such alterations by the intent of PMU1 in the latter period will be subject to variation / extension of time).
- MAUR will develop O&M organization with the help of JICA Technical Assistance Project. Even though the O&M company will become fully operational at the time of implementation of the Line 3A project, their involvement during the design stage must be ensured by the joint effort between MAUR and the O&M company.

7. Station Area Development

- It is often pointed out that developments along the corridor, around the station area and of intermodal transfer facilities are not taken into consideration as the integral part of the Line 1 project. Aside from the unavailability of the land for such developments, constraints in the authority of MAUR, associated with typical vertical structure of public administration, significantly relates to the problem.
- Several proposals for the development of station area and intermodal transfer facilities were made in this study. In order to make them happen, Vietnamese side will be required to review the powers and responsibilities of MAUR to act as the executing body Otherwise, the system to ensure the coordination among urban planning and development stakeholders must be established (e.g. create Steering Committee with granting practical executing powers to the committee members).
- Strategic personnel exchange across MAUR, other transport and urban development stakeholders is effective to remove the barrier of vertical structure of public administration. In this connection, the Study Team proposes continuous secondment program across Department of Transport (DOT), Department of Planning and Architecture (DPA) and MAUR.

CHAPTER 7 PROJECT IMPLEMENTATION AND OPERATION & MAINTENANCE STRUCTURES

7.1 Stakeholder Analysis

7.1.1 Project Implementation Structure

MAUR will be responsible for project implementation and official coordination with line departments, HCMC-PC and JICA as the implementing agency. Project management will be jointly carried out by MAUR and the consultant hired by MAUR. MAUR will be under the supervision of the Project Steering Committee with the leadership of HCMC-PC as the chairman. Day-to-day coordination with districts and community stakeholders will be handled by MAUR.

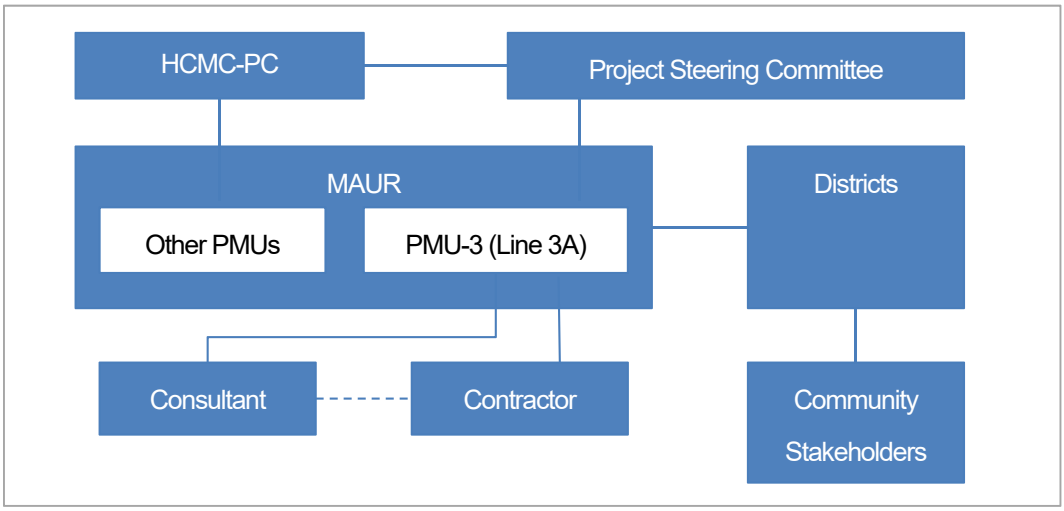


Figure 7.1.1 Project Implementation Structure

7.1.2 Project Stakeholders

Relevant key agencies of Vietnamese side who participate in the construction and operations of urban railway projects are illustrated in the following figure. The Central Government, HCM City, districts and communes will become the project stakeholders.

With reference to the case of Line 1 Project, representatives from HCMC-PC, DPI, DPA, DOT, and DONRE are proposed to be the members of the Steering Committee. MAUR as the implementing agency will act as the secretary of the said Committee.

Table 7.1.1 Project Stakeholders

Agency/Organization	Role in Project Implementation
Central Government	
MPI	Investment policy in view of sector policy and ODA application policy Approval of Total Investment Cost
MOF	Application, consultation, execution of government budget Becoming the receiving entity of ODA loan and on-lending to HCMC-PC
MOC	Responsible for construction projects including urban development and urban infrastructures Determination of quality standards, cost estimation standards, etc. for urban railway projects
MOT	Responsible for national traffic and public transport sector Determination of technical standards on traffic and E&M systems
MONRE	Determination of EIA-related standards Approval of EIA of national important projects
HCMC-PC and Line Department	
HCPC-PC	Implementation of the Project in accordance with the decision of the Prime Minister Responsible for key and important decisions of the Project
MAUR	Management of the Project as the implementing agency Procurement of consultants and contractors
DPI	Budget management of the projects under HCMC-PC
DPA	Issue of construction permits Evaluation of consistency with city planning and impact on urban landscape
DOT	Management of city's traffic and public transport sector Leading public transport networking and common ticketing
DONRE	Implementation of EIA of the project under HCMC-PC
Land Acquisition Committee	Responsible for land purchase and acquisition
District	
District-PC	Participation in coordination with community stakeholders

Source: JICA Study team

7.1.3 O&M Structure

O&M structure of the Project will consist of the Regulator, O&M Company, other relevant agencies and organizations (e.g. police, fire fighting, public utility companies etc.) and community stakeholders at the areas along the corridor. A unit to be created within MAUR will become the Regulator. With respect to the fare regulation, MOCPT or other third party entity may be responsible. The O&M Company under preparation for establishment will become the operation and maintenance body for the Project.

Table 7.1.2 O&M Stakeholders

Agency/Organization	Role in Operation and Maintenance
MAUR	Regulatory and supervisory
MOCPT (or MAUR or third party)	Fare collection
DOT	Transport networking
O&M Company	Operation and maintenance activities

7.2 Project Implementation Agency

7.2.1 Legal Status

MAUR was established as the implementation agency of urban railway projects in accordance with the decision of HCMC-PC (Decision No.119/2007/QĐ-UBND) dated on 13 September 2007.

7.2.2 Organization Structure

The organization structure of MAUR is illustrated in the following figure. MAUR has 3 departments, namely i) planning and investment / technical quality / procurement, ii) general accounting / finance & accounting / organization and training, and iii) project management / investment preparation.

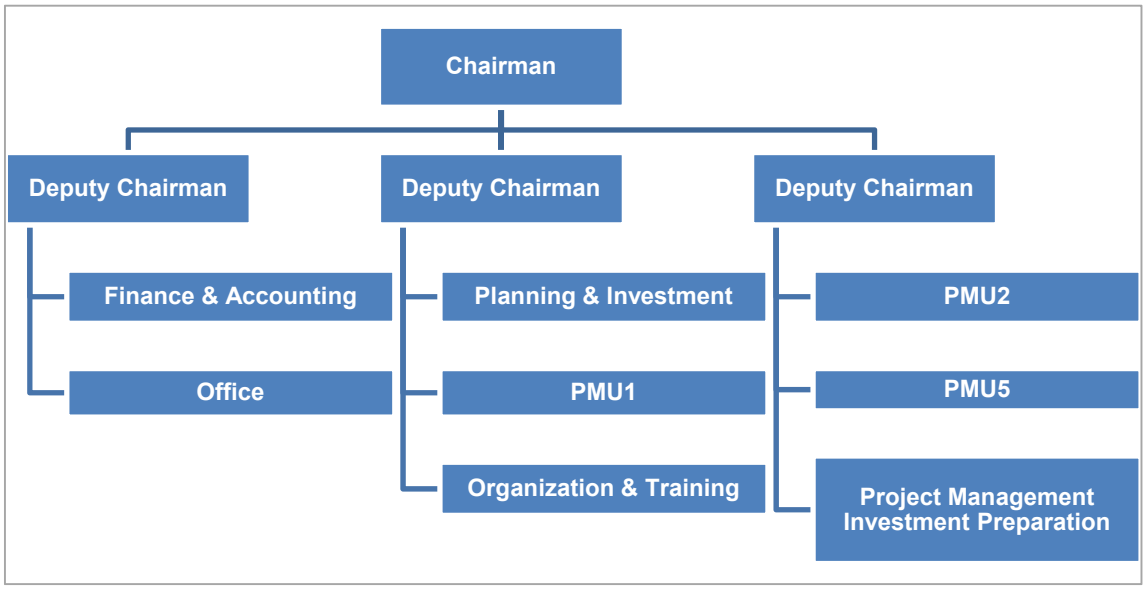


Figure 7.2.1 Existing MAUR Organization Structure

7.2.3 Manpower Profile

MAUR has a staffing strength of 229 persons, out of which 40 persons are graduates, 173 persons have university degree, 9 persons are high school graduates. Majority of the employees experienced or started experiencing ODA projects through Line 1, Line 2 and Line 5.

MAUR, as the implementing agency for urban railway projects, already created PMU1 for Line 1, PMU2 for Line 2 and PMU5 for Line 5. Once the Line 3A project is approved, a new PMU will be established as the project implementation body.

Table 7.2.1 Departmental Manpower Profile of MAUR

Division	Number of staff	
	Leaders	Officials
Finance and Accounting	2	10
Office	5	23
Planning & Investment	3	19
PMU1	4	45
Organization and Training	2	14
PMU2	4[9]	34
PMU5	2	19
Investment Preparation Project Management Unit	2	20

Source: MRUR

Table 7.2.2 Manpower Profile of Each PMU

	PMU1	PMU2	PMU5
Project Director	1	1	1
Project Management	3	3	3
Program (Schedule)	5	1	3
Contract Administration	8	12	1
Social & Environment	4	2	3
Civil (elevated)	5	5	5
Civil (underground)	5	5	5
Station (elevated)	5	5	3
Station (underground)	4	5	3
Rolling stock	1	2	1
Track work	1	2	5
Signal &communication	2	2	2
Power	1	2	2
Overhead Centenary / Third Rail	1	2	2
Operations	1	2	3
Depot & Workshop	2	2	2
AFC / Platform Doors	1	2	1
Admin / Archive	2	4	1
Site clearance	0	4	0

Source: MRUR

7.2.4 Departmental Duties

Once established, PMU for Line 3A (hereinafter referred to as "PMU-3") will hire consultant and hire contractors of all contract packages. PMU-3 will assign full-time director, engineers, accountants, social & environmental officers, and others as appropriate. Through MAUR, PMU-3 will make necessary coordination with HCMC-PC and District-PC to execute construction works, environment management, land acquisition and resettlement.

[9] Deputy General Director cum Director of PMU

See Appendix for departmental duties of PMU, finance and accounting, investment preparation, organization and training.

7.2.5 Institutional Framework

MAUR will act as the implementing agency of the Project and establish PMU within MAUR for management of the Project. Creation of PMU for ODA projects requires following steps in accordance with the relevant decision of the Prime Minister (131/2006/ND-CP, Decree on Issuance of Regulation on Management and Utilization of Official Development Assistance).

- MPI issues a notification about organization structure, functions, roles and responsibilities of the PMU
- The implementing agency issues a decision of creation of PMU after approval of relevant documents by MPI and MOT.
- MAUR hires consultants to manage the Project in compliance with the relevant laws.

7.2.6 Finance and Budget

In Vietnam, the budget for urban transport sector development accounts for 24.8% of the national budget in 2002-2010. Investment on economic infrastructure is expected to grow. In particular, weight of investments in urban transport sector will become heavier as it is defined as priority issue in the "Vietnam Transport Development Strategy". In fact, the Strategy estimated the sector development account to increase to 29.23%.

Table 7.2.3 National Budget for Transport Sector Development Account

(USD Million)	2002-2010 period		2011-2020 period		Total Period		Ave/yr.
Total	50,125	100.00%	84,352	100.00%	134,477	100.00%	7,078
Road (in which:)	15,609	31.14%	20,846	24.71%	36,454	27.11%	1,919
Expressway	3,589	7.16%	10,059	11.93%	13,648	10.15%	718
National							
Highways	8,846	17.65%	7,931	9.40%	16,778	12.48%	883
Provincial Road	3,173	6.33%	2,855	3.39%	6,028	4.48%	317
Rural Transport	5,489	10.95%	4,940	5.86%	10,428	7.75%	549
Railway (in which)	13,874	27.68%	24,973	29.61%	38,848	28.89%	2,045
Express Railway	12,944	25.82%	22,938	27.19%	35,882	26.68%	1,889
Normal Railway	930	1.86%	2,035	2.41%	2,996	2.21%	156
Maritime	1,294	2.58%	4,124	4.89%	5,418	4.03%	285
Inland Waterways	297	0.59%	286	0.34%	582	0.43%	31
Civil Aviation	1,135	2.26%	2,305	2.73%	3,440	2.56%	181
Urban Transport (HCMC and Hanoi)	12,429	24.80%	26,878	31.86%	39,307	29.23%	2,069

Source: Vietnam Transport Development Strategy up to 2020 (Ministry of Transport, 2002)

Record of HCMC-PC budgeting is published in the website of MOF but outdated. For reference, the following table shows the public debt indicators of the nation. In parallel to the increase of ODA projects, external debts are rapidly growing. Impact of the Project to the debt burden must carefully be assessed.

Table 7.2.4 Public Debt and National External Debt Indicators

Indicator	2010	2011	2012	2013	2014
Public Debt / GDP (%)	56.3	54.9	50.8	54.5	58.0
National External Debt / GDP (%)	42.2	41.5	37.4	37.3	38.3
Mid to Long Term Government External Debt Service / Export of Goods and Services (%)	3.4	3.5	3.5	4.3	4.1
Government's Outstanding Debt / GDP (%)	44.6	43.2	39.4	42.6	46.4
Government's Debt Service / Budget Revenue (%)	17.6	15.6	14.6	12.6	13.8
Contingent Liability Debt Service / Budget Revenue (%)	5.5	6.7	9.8	9.7	8.5

Source: Bulletin Public Debt, MOF

Financial statements of MAUR are not available at this moment. According to the interviews with MAUR, there is no big discrepancy between budget and disbursement amount. Remarkable increase in income and expenditure is expected due to commencement of construction works of Line 2 and implementation of Line 5 project.

7.2.7 Technical and Construction/Procurement Supervision Capacity

MAUR is increasing technical and construction / procurement supervision capacity through on-the-job training by way of implementation of Line 1, Line 2 and Line 5 projects. Also, MAUR deepens understandings of urban railway systems through various studies and technical assistance programs under JICA and ADB initiatives. Furthermore, majority of MAUR personnel experienced or start experiencing JICA ODA loans and ADB co-financing schemes through Line 1, Line 2 and Line 5 projects. Therefore, with the capacity gained, MAUR is expected to formulate and implement the Project in smooth and efficient manner.

See Appendix 2 in terms of technical and construction / procurement supervision capacity.

7.2.8 Risk Assessment

Key risks that PMU-3 may be exposed during project implementation include the following.

Table 7.2.5 Risk Assessment (Implementing Agency)

Risk	Significance	Mitigation Measure
Delay in creation of PMU may have significant impact on the overall project schedule.	Medium	The Minutes of Memorandum for ODA loan agreement ("MOM") should specify the deadline of PMU creation.
Capacity and manpower may become insufficient if experienced personnel are not assigned or work under dual assignment.	Medium	Implementation of the Project should start when the Line 1 project reaches substantial completion stage. Also, the appointment of personnel having the experience of Line 1 project should be promised by the Vietnamese side during the appraisal for loan agreement.
Institutional experience and know-how gained through the Line 1 project may not be supplied to the Project by losing experienced personnel to other entities.	Medium	Promoting such experienced personnel with priority once assigned to the second project. Also, the appointment of personnel having the experience of Line 1 project should be promised by the Vietnamese side during the appraisal for loan agreement.
Necessary coordination may not adequately be made due to insufficient liaison with the relevant authorities and stakeholders.	Medium	Operational regulations including mandates of the Project Steering Committee should be detailed and carefully designed.
Necessary manpower and other resources may not be secured if the approved budget is far below the request from the Implementing Agency.	Medium	Detailed estimates of necessary expenses should be submitted at the time of project appraisal and the Government should be urged to approve the proposed budget once justified.

7.2.9 Technical Assistance

The Project is highly complicated, involving construction of infrastructure, procurement and installation of E&M systems, commissioning and trial run, operational readiness and opening to public, operation and maintenance. In addition, the Project requires interface coordination with Line 1 for inter-operation, common ticketing with other lines, integration with station area development and intermodal transfer facilities with other modes of transport, and others. All these elements will impact on sustainability of urban railway operation and O&M company's financial healthiness. Technical capacity required for the Project is summarized in the following table, while details of the same are provided in Chapter 15.

Table 7.2.6 Technical Assistance for Implementing Agency (Preliminary Draft)

Component	Content
(1) Implementation of Line 3A project • Project approval and preparation (land acquisition etc.) • Civil works • Procurement of rolling stock and E&M systems	All elements of construction works, system procurement Elements that may influence on project progress (land acquisition etc.) Elements of safety management Relation with community stakeholders
(2) Operation of Urban Railway • Automatic fare collection system • Commissioning of O&M • Safety and security system • Marketing, community relations	Elements of operational integration with Line 1 Capacity building on O&M activities
(3) Management of Urban Railway • Organizational and institutional designs and establishment • Restructure of MAUR organization • Financial management of MAUR • Financial sustainability of the project • Capacity building of MAUR • Collaboration and integration of public transport services • Integration with urban transport and land use policies	With respect to project implementation and operation of the system, elements related to establishment of management structure on urban transport policies, service levels, financial soundness
(4) Assistance for Project Implementation • Project implementation assistance (project approval etc.) • Gender mainstreaming, labour protection, universal designs	Project implementation and policy execution (including monitoring and evaluation) TA and capacity building programs

OJT through project implementation will be carried out by the Consultant. This includes i) project management, financial management and reporting, ii) detailed designs, iii) bid document preparation and bid management, and iv) contract management. In addition, similar to the other projects, the Contractors will provide technology transfer on construction works and procurement of systems, and skill development and trainings.

Except the matters included in the technology transfer, skill development and trainings to be provided by the Consultant and Contractors, prioritized technical assistance programs are as follows.

- Know-how on affiliated business development and operation
- Gender mainstreaming, labour protection and universal designs

7.3 O&M Company

7.3.1 Legal Status

Creation of the O&M Company under MAUR was decided in December 2015 as the result of past studies below. Preparatory works for opening to public are being handled by the preparation unit within MAUR.

- "Support for Establishment of Operation and Maintenance Organization for Urban Railway in HCMC" (2011-2013)
- "Special Assistance for Project Implementation (SAPI) on Urban Railway Construction Project Line 1 (Institutional Development for Operation Management)" (till March 2016)

O&M Company will be 100% funded by HCMC-PC with the status of One Member Limited Liability Company as specified in the Company Law of Vietnam.

With respect to the asset ownership, it is proposed that O&M Company will own the entire assets through contribution in kind from HCMC-PC.

7.3.2 Organization Structure

The SAPI Study proposed 11 departments (1. Administration and legislations, 2. Human resource, 3. Training center, 4. Finance and accounting, 5. Planning and investment, 6. Material, equipment and service, 7. Business and public relations, 8. Technique, 9. Safety and operation management, 10. Operation, 11. Maintenance).

Corporate managers consist of 1 General Director (GD) and 3 Deputy Directors (1. Administration, HR and training, 2. Finance, planning and business, 3. Technique, operation and maintenance).

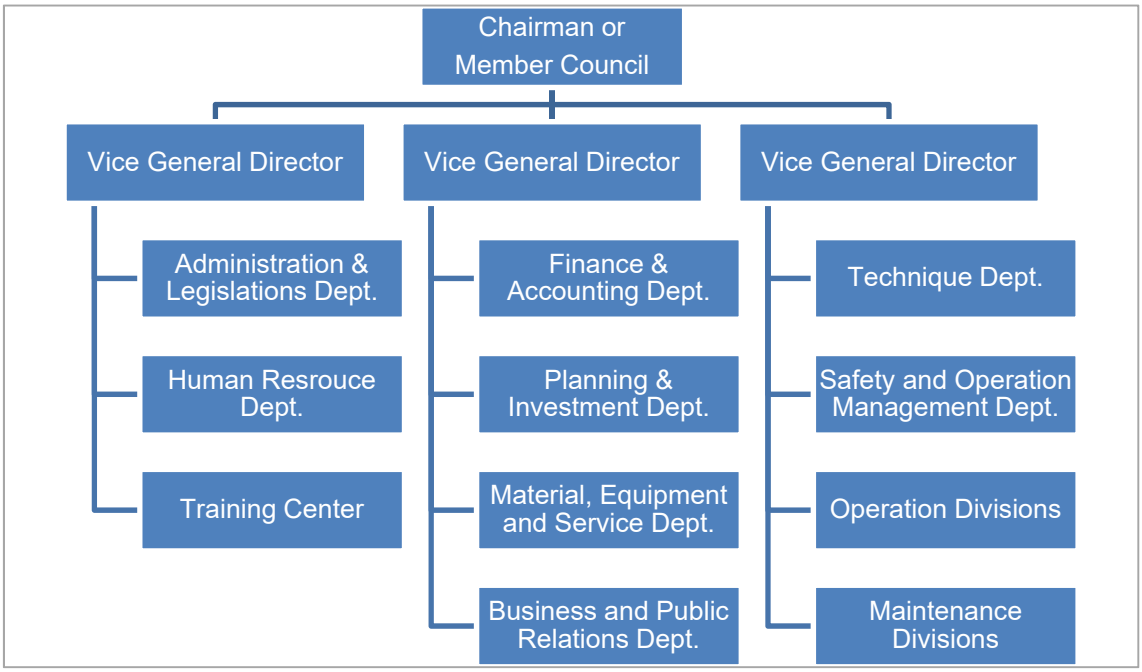


Figure 7.3.1 Organization Structure of O&M Company

7.3.3 Manpower Profile

Manpower profile of the Line 1 at the time of opening is proposed by the SAPI Study. A total of 292 persons, including 102 persons of the headquarter personnel and 292 persons of site workers, was listed. In this study, a manpower profile of Line 3A was estimated based on the operation and maintenance plans of phase 1 and phase 2 sections. Headquarter personnel of Line 3A is assumed to be zero. This is because, even though there would be a slight increase for integrated management of Line 1 and Line 3A, they will not work exclusively for Line 3A.

Table 7.3.1 Manpower Profile for Integrated Operation across Line 1 and Line 3A

	Line 1	Line 3A Phase 1	Line 3A Phase 2
Route Length (km)	19.7	9.7	19.0
Number of Stations	14	10	17
Headquarter			
Members council / Board of Directors / Supervisor	10		
Administration – Legislation Dept.	5		
Human Resource Dept.	3		
Training Center	0		
Finance – Accounting Dept.	7		
Planning – Investment Dept.	7		
Material – Equipment – Service Dept.	3		
Business – Public relation Dept.	12		
Technical Dept.	29		
Safety – Operation Management Dept.	26		
Total	102		
Operation Division	Division 1	Division 3A-1	Division 3A-2
Director	1	1	1
Drivers	56	35	85
Station staffs	156	111	189
Sub Total	**213**	**147**	**275**
Maintenance Division	Division 1	Division 3A-1	Division 3A-2
Director	1	1	1
Rolling stock maintenance staffs	15	19	41
Track maintenance staffs	15	6	13
Signal/Electric maintenance staffs	35	17	35
AFC maintenance staffs	15	11	18
Sub Total	**79**	**54**	**108**
Total (O&M Division)	**292**	**201**	**383**

Source: JICA Study team

7.3.4 Departmental Duties

Based on the result of the SAPI Study, departmental duties of the O&M Company are defined as follows.

Table 7.3.2 Departmental Duties of O&M Company

Department	Responsibility
General Administration, Legal Affairs	Administration management, external relations, legal affairs, redress grievances
Human Resource	Recruitment, HR management, training planning, welfare
Training Center	Employee training
Finance & Accounting	Finance, accounting, budget, tax, asset management
Planning & Investment	Business plan (short and long term), capital investment plan, IT system administration
Materials, Equipment & Services	Contract management, outsourcing, management/storage/settlement of materials and equipment purchase
Business Promotion & Public Relations	Business promotion, ticketing, demand stimulation, service improvement, commercial business administration
Technique	Preventive maintenance and replacement planning of rolling stock, trackwork, civil structures, electrical systems, signaling, IT etc., accident investigation, administration of technical documents
Safety and Train Operation	Timetabling, operation planning, response to accidents and failures, maintenance and improvement of safety including operation of OCC
Line 1 Operations	Train crews, station operation personnel
Line 1 Maintenance	Maintenance of rolling stock, trackwork, civil structures, communication systems, electrical systems, and AFC system

Source: JICA Study team

7.3.5 Institutional Framework

The SAPI Study and other past studies already conducted comprehensive analysis of institutional framework (See the Table below). The Project is required to comply with the local legislations. With respect to matters pertaining to the Railway Law and technical standards, those prepared for the Line 1 under JICA initiative will be applied. For this reason, the Project requires no additional legislations to be enacted.

Table 7.3.3 Institutional Framework on O&M Company

Area	Applicable Legislation, Issue
Company Formation	Procedure shall follow the detailed guideline (Resolution 102/2010ND-CP Detailed Guidelines for Implementing Some of Enterprise Law)
Railway Law and by-laws	The Railway Law specifies qualifications of specific railway personnel, including head of technical management of operations, head of technical management of railway civil works, head of safety, train controllers, and train drivers.
Technical Standard	Technical standard framework was set during the design service by the General Consultant for Line 1. Also, technical standards (mandatory specifications) for operation and maintenance were proposed under JICA study in 2015, keeping consistency with the design standards of Line 1.
Tax	O&M Company is liable to corporate tax, VAT, and fixed asset registration tax. O&M Company should be entitled for exemption of fixed asset registration tax.
Accounting	Accounting Law (03/2003/QH11) shall be applied. The accounting standard in Vietnam is in general accordance with the international accounting standard. In Vietnam, market value accounting is not applicable to asset of lands. Residual value in depreciation shall be zero. Account title is specified and ledger sheet must follow the template.
Labour law	O&M Company shall comply with the Labour Law and other by-laws.

Source: JICA Study team

Part of internal regulations and other necessary documents of the O&M companies were already prepared by the SAPI Study and other past studies. Also, remaining internal regulations will be developed under the next Technical Cooperation Project. Therefore, there is no additional organizational regulation to be developed for the Project.

Table 7.3.4 Internal Regulations Prepared by the Past Studies

Internal Regulation (in English)	(in Vietnamese)
Regulations of functions and duty of each Department	Các quy định về chức năng và nhiệm vụ của từng Phòng/Ban
Business plan	Kế hoạch Kinh doanh
Charter of O&M Company	Điều lệ Công ty VH&BT
Draft regulations for safety management system	Dự thảo các quy định về hệ thống quản lý an toàn
Payment regulation	Quy định về thanh toán
Recruitment regulation	Quy định về tuyển dụng
Reward and punishment regulation	Quy định về khen thưởng và xử phạt
Working time regulation	Quy định về thời gian làm việc
Training regulations	Quy định về đào tạo
Training Contract	Hợp đồng đào tạo
Regulation on the Job classification and job description	Quy định về phân loại nghề nghiệp và mô tả nghề nghiệp
Accounting rule	Quy tắc kế toán
Cash handling at station regulation	Quy định về xử lý tiền mặt tại ga
Material procurement regulations	Quy định về mua sắm vật tư
General Contract of Transport	Hợp đồng vận chuyển chung
Rules for the sales of discounting tickets	Các quy tắc đối với doanh thu bán vé giảm giá
Fare revision system	Hệ thống hiệu chính giá vé
Handling rule for ticket revenue	Quy tắc xử lý doanh thu bán vé
Business manner of staff for passenger	Cách thức giao thương của nhân viên với hành khách
Handling rule on the lost and found	Quy tắc xử lý hàng hóa bị thất lạc
Rule for Non Fare Business	Quy định về Kinh doanh ngoài hoạt động chạy tàu
Contract standard for lending of the buildings	Tiêu chuẩn hợp đồng cho thuê tòa nhà

7.3.6 Finance and Budget

Cash Flow Analysis of O&M Company

Premises for Balance Sheet and Cash Flow

Revenue: Fare level and ridership forecast are as per the estimates in this report. Non-fare revenue accounts for 10% of total revenue. In order to incorporate ridership risk into revenue forecast, a risk factor is considered. It started from 3% at the initial year, and was gradually increased till year 2040, or 15 years later from the commencement. for restoring to the original forecast.

Expense: The Company owns all assets including land and is responsible for depreciation expense so that replacement and reinvestment of equipment could be made at their

own expense. Additional capital expenditures on all assets except for land are recognized. Replacement costs are accounted based on the initial investment costs and inspection intervals stipulated by the Ministry of Land, Infrastructure, Transport and Tourism. Personnel cost was estimated from the staffing number by job-grade and unit cost of salary including social welfare in accordance with the local regulations. The staffing strength at the time of opening is 201 persons. The cost of headquarter-employees is assumed as common expense, and is allocated to line 1 and 3 respectively. Electrical power and other administrative costs are considered. Rate of expense for non-fare businesses is set 60%. Price escalation is considered using IMF forecast data. Escalation in power and human resource price is estimated using last 5 years average rate. Escalation in fare-level is assumed based on an average of the aforesaid 3 items: price, power, and human resource price ratio. The repayment obligation on E&M assets initial investment is retained at O&M company, and it is recognized as its liability. For the year when expenditure excess revenue, it is assumed that deficit is compensated by loan at same interest rate as consumer price index.

Dividend: Dividend is set 10% of profit after tax.

Result: Although the O&M Company faces deficit at the beginning stage, it is expected to turn a single-year profit in 2042. The operating cash flow shows negative during the first five years, and turns positive enough to cover O&M cost and E&M asset replacement fee in 2031 or 6th year. In 2048, cumulative cash flow becomes positive enough to cover its repayment obligation on the initial E&M assets. .

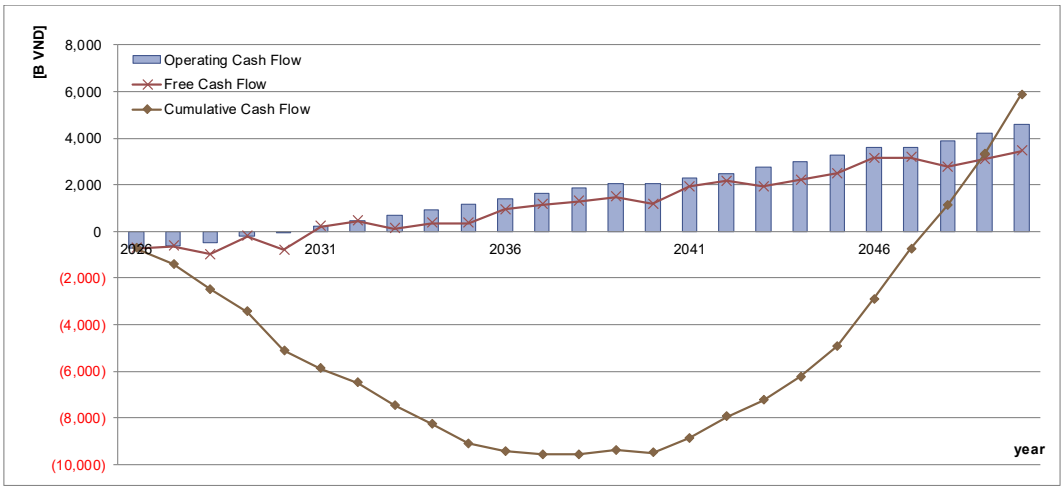


Figure 7.3.2 Cash Flow of O&M Company

7.3.7 Technical Capacity and Operation Management Capacity

With regard to the capacity building on operation and maintenance, JICA already provided technical assistance for establishment of the O&M Company and maintenance management. The assistance will be

extended till the start of commercial operation. Therefore, MAUR will equip operational readiness at the time of implementing the Project.

Operation and maintenance activities of Line 3A will be responsible by this new O&M Company. As the company will receive necessary technical assistance from JICA and also is able to experience operations of Line 2 before the Project, there is no or very little concern about the technical and operation management capacity of MAUR.

See Appendix 3 for the evaluation of technical and operation management capacity of the O&M Company.

7.3.8 Risk Assessment

Key risks that the O&M Company may be exposed to during operation and maintenance stage are as follows.

Table 7.3.5 Risk Assessment (O&M Company)

Risk	Significance	Mitigation Measure
Formation of operations unit of Line 3A is not approved in time for preparation of commercial operation.	Medium	The Minutes of Memorandum for ODA loan agreement ("MOM") should specify the deadline of O&M unit creation.
Capacity and manpower may become insufficient if experienced personnel are not assigned or work under dual assignment.	Medium	Appointment of experienced personnel for key positions should clearly be mentioned in the manpower plan.
Capacity and manpower may become insufficient if worksite personnel are not sufficiently assigned or work under dual assignment.	Medium	Recruitment schedule must be confirmed from the designed training period. Recruitment should start with sufficient provision of spare time.
Staff training does not start after recruitment of worksite personnel and cannot meet the schedule for commercial operation.	Medium	Contract of E&M system procurement should clearly specify the period to start training.
Liaison with the relevant agencies and organizations is insufficient and necessary coordination for system operation is not adequately made.	Medium	Responsibilities of coordination should be specified in the internal regulations with persons in charge. Coordination committees should be created.
Financial soundness of the O&M Company becomes worse as the decision for fare adjustment by the competent authority is not made at necessary timing.	Medium	O&M Company should be entitled to apply fare adjustment in accordance with the amount of deficit in early years of commercial operation, or receive appropriate amount of subsidy from HCMC-PC.
Slow increase of ridership due to late development of urban railway network.	Medium	O&M Company should be entitled to apply subsidy from HCMC-PC to compensate for the loss of revenue from the delays in construction schedule.
Force majeure (natural disaster, terrorism, etc.)	Medium	O&M Company should be entitled to apply subsidy from HCMC-PC.
Mobilization of large amount of expenditures to respond to serious accident.	Medium	Financial loss from accidents should be covered by insurance.
Necessary materials and equipment cannot be purchased or inspection / repairs cannot be carried out due to unapproval of budget request.	Medium	Business plan must incorporate accurate estimate of maintenance expense based on the records of Line 1 operations.

Source: JICA Study team

7.3.9 Technical Assistance

Operation and maintenance of the Line 3A system will be carried out by the new O&M Company, which is being provided with the following training, technology transfer and other programs through the Line 1 Project.

i. Staff training, technology transfer, and 5 years of maintenance service by the Contractor

ii. Training and technology transfer to the operation and maintenance personnel by GC

iii. Assistance for establishment of O&M Company, regulatory agency and capacity building by JICA Technical Cooperation

The O&M Company is expected to equip sufficient operation and maintenance capacity as JICA will continue to provide technical assistance and the Line 2 will already become operational before the opening of Line 3A system to the public. As the assistances provided by the Line 1 project have particular focus on the capacity building in terms of operation and maintenance activities, the Line 3A project should instead pay attention to the activities to enhance values of urban railway service. This may include the following (See Chapter 15 for more details):

i. Assistance to address new issues associated with implementation of Line 3A project (such as inter-operability and system integration)

ii. Assistance to enhance values of urban railway service (such as enrichment of railway business and betterment of financial soundness through the development of station area and intermodal transfer facilities)

The study team evaluated the technical and managerial capacities of the O&M Company in Attachment-3.

Appendix 7.1: Departmental Duties and Responsibilities of MAUR

PMU	Duty
Project Management	Comply with national legal system and guidelines of donor agencies to manage project implementation.
	Planning of business investment fund, management, use of funds and obtain approval of the chairperson.
	Coordination with government, city related organizations, community groups and individuals.
	Employing domestic and foreign experts and conducting education and training for each field of business management.
	Provide advice for the Chair's decision making regarding investment efficiency and economic efficiency of business,
	Give advice to related organizations about progress management and effective implementation of tasks.
	Cooperate with relevant departments to provide information and documents to support business management
	Coordinate, implement public dissemination and publicity activities for diverse stakeholders.
	Implementation of site securing procedures, construction permits, construction site preparation and other work
	Coordinate recruitment of qualified persons and experienced financial management personnel during preparation stage.
Public Procurement	Proactively take responsibility for procurement planning, tender document preparation, contractor selection.
	Upon selection of a contractor, receive advice from the chairman.
Technical design / Drawing / Evaluation and approval of other design books	Confirmation of adherence to construction contracts, related laws and regulations, and design specifications.
	Confirmation of adherence to related laws and regulations, basic design, and owner's requirements.
	Submit the design document to the competent authorities in accordance with relevant laws and regulations and receive design review.
	Explain to the chairperson the alternative plan and the design evaluation results for the competent authorities.
	Recommend specialized organizations or individual experts with qualification requirements while design review.
Quality Management	Implementation of quality control program in compliance with domestic laws with subjective role.
	Construction management is carried out, and construction is suspended temporarily if quality is not satisfactory.
	Solve problems that occurred during construction work and make relief measures.
	Supervise construction quality , construction progress and payment procedure. Resolve in case of disputes.
	Cooperate with relevant departments and be responsible for acceptance due to construction completion.
	Confirmation of construction related documents before accepting completion work.
Monitoring and Contract Management	Cooperate with departments and consultants and manage project implementation contracts.
	Perform business cost, safety, environmental hygiene management according to local laws and international standards.
	The chairperson gives advice when a problem occurs in the performance of each contract.
	Responsible for checking and together for monitoring report and investment evaluation.
Report Preparation	Make a periodical / non periodical report requested by the chairperson, related departments, and donors.
	Draw up a report of personnel structure at each business stage inside the department.

PMU	Duty
Preparation for opening	Prepare necessary work for the start of operation and maintenance.
Asset management	Manage department assets.
Others	Perform other duties determined by the Chairperson and local laws.
Finance Division / Accounts Division	Duty
Financing activity	Perform financial activities in accordance with local laws and donor provisions.
	Management of business budget distributed from city in accordance with local laws.
	Advise the Chairperson to conduct financial activities in accordance with local laws.
	Create financial statements according to requests from relevant departments.
	Teach financial activities and conduct inspections of the underlying organization. (if present)
	Adjust procurement, asset management, repair, settlement, etc and disclose financial condition.
	Provide advice on financial procedures, negotiations, signing and execution of contracts.
	Coordinate with the department in charge of projects using foreign funds, and prepare a financial plan.
Accounting activity	Manage transaction account in accordance with local laws.
	Perform tax, accounting and statistical work in accordance with local laws.
	Report inspection and audit from the audit agency to relevant organizations.
	Inventory management and assessment of assets.
	Confirm proper execution of budget and perform payment, settlement of contract.
Asset management	Perform asset management and financial accounting as determined by the chairperson.
Others	Perform other duties determined by the Chairperson and local laws.
Investment Planning Division	Duty
Business Plan	In accordance with the traffic development plan, establish overall strategy for management, construction and management of urban railway.
	Provide advice and suggestions for city urban rail development strategy.
	Perform overall plan and implementation evaluation for construction of urban railway,operation and network formation.
	Lead finance planning, monitor, inspect and evaluate.
	Consider expert appointment with qualification requirements for management and operation after the start of service.
	Establish an annual action plan and evaluate it after implementation.
	Establish fund allocation target for each division.
Report Preparation	Do specific tasks, projects, research related to urban railway improvement.
	Identify problems related to urban railway management, evaluate, analyze, and propose solutions.
	Summarize the opinions of each division regarding policy issues and report it to relevant departments.
	Authorities advise and make suggestions for issuing of legal documents, modifying and supplementing.
Business Investment	Assist with construction planning, document preparation, and negotiation with foreign investors.
	Provide advice to the Chairperson for proposing investment projects for urban transport and selecting investors.
	Participate in project formation and coordinate with donor organizations.
	Make report, regarding investment of urban railway business.

PMU	Duty
Public Procurement Monitoring and Evaluation	Preparing bid documents, implementing bids and evaluating in accordance with local laws. (excluding Line 1)
	Provide advice on decisions for bidding. (excluding line 1)
	Finalize contract terms with selector and participate in contract negotiation in accordance with local laws.
	Review the legal process of the contract.
	Inspection and report for supervision and evaluation of investment project as investment entity.
Contract Management and Supervision	Monitor construction progress and execution amount of implementation contract.
	Provide advice and problem solving measures on performance of implementation contract.
Technical Evaluation of Project	Recommend tasks, design, drawing, accumulation, business plan etc. (excluding lines 1 and 2)
Quality Control of Project (except Line 1 and Line 2)	Scrutinize and formulate quality control plan of construction work implemented by PMU.
	Evaluate the periodic inspection plan and delivery conditions created by the consultant and submit it to the PMU.
	Evaluate and report quality control of project by requests from the central government and city bureaus.
	In charge of negotiations with related organizations concerning construction quality control.
Technology research of urban railway	Propose recommendations to technical issues in consideration of quality of construction work and investment efficiency.
	Propose recommendations on economic indicators of urban railroads and applied technology selection.
Asset management	Manage department assets.
Others	Perform other duties determined by the Chairperson and local laws.
Organization Division / Training Division	Duty
Organizational System	Advice for construct of organizational structure and integration separation.
	Review, supplement, or modify internal regulations of organizations and Board of Directors.
	Participate in reorganization of organizational structure and management system.
	Perform personnel allocation of councils and working group collaborate with each department.
Employee management	Propose an annual personnel structure of each department.
	Lead and supervise personnel management and personnel assignment of departments.
Public affairs and officials	Lead recruitment activities.
	Propose an arrangement considering staff's expertise, characteristics, position.
	Adjust business assignment, appointment, dismissal, retirement, transfer etc.
	Propose staff's wage increases, salary increases, transfers, etc.
	Manage social security, health insurance, unemployment insurance, vacation, retirement allowance, etc.
	Manage and update profiles of staff, labor, etc.
	Review and evaluate the performance of staff, laborers, etc.
	Cooperate with the Chair's Office to oversee compliance with internal rules and regulations.
	Resolve issues of administrative staff may have.
	Monitor officers' retirement and annual board meetings.

PMU	Duty
Personnel planning	Establish short-term and long-term personnel plans annually.
	Teach official in charge about plan management of each department and execute plan management.
	Modify or supplement the annual plan.
	Support officers in charge of plan management.
Workshop / Training	Annual plan of training and retraining, long-term plan formulated annually.
	Collaborate with labor unions and other departments related to training and propose people to be trained.
	Propose domestic and international training institutions for business management, clerical work and urban railway management.
	Manage participation of the persons to be trained and recommend placement after training.
Internal control	Lead a survey on personnel affairs.
	Manage staff personal information and documents.
	Monitor current status of staff and support appropriate career building.
	Manage overseas travel of staff.
	Cooperate with the Chair's Office to protect public confidential information.
Personnel evaluation, recognition	Manage treatment of officers.
	Following the higher-level policy, review the composition of the list of officers.
	Make recommendations for personnel evaluation and recognition.
	Cooperate with the Finance and Accounting Department to manage financial resources relating to personnel evaluation and recognition.
	Provide expert guidance for personnel evaluation and recognition
	Cooperate with relevant departments regarding annual personnel evaluation
Publicize laws and regulations	Establish an annual education plan regarding laws.
	Lead the holding of education and training regarding laws.
Practice of Participatory Organization	Monitor and examine the practices of participating organizations.
	Collaborate with labor unions and practice of participatory type mechanism by whole organization.
	Introduce participation type organization reporting system.
Prevention of corruption	Coordinate the implementation of anti-corruption activities.
Handling complaints	Scrutinize and process of reported complaints.
Information / document management	Create or maintain statistics, information, reports, etc.
Legal document	Make recommendations on legal documents.
Employment of experts	Consider expert appointment with qualification requirement for management and administration after service starts.
Reorganization of internal procedures	Periodically report on reorganization of organization's internal procedures.
Preparation for opening of line 1	Accept donor's urban railway opening business support.
	Prepare for urban railway management.
Asset management	Manage department assets.
Training room and training arrangement	Responsible for training arrangements including assignment of training rooms.
Others	Perform other duties determined by the Chairperson and local laws.

Appendix 7.2: Evaluation of the Capacity of O&M Organization

Area	Technical Assistance provided out of this project	Evaluation
Operation		
Management Accounting/Finance Procurement General Admin. Human Resource	• Internal regulations and manuals will be prepared along with capacity building trainings under JICA Technical Cooperation Project for Line 1.	• Operational readiness will be ensured before completion of the Project. • O&M Company will be capable of operating the single line. • Capacity building is required for integral management of multiple lines. • Manpower shortage will be significant before opening of multiple lines. • Management of the multiple lines with different systems/technologies will complicate parts and equipment, expand sources of procurement, and increase the workload of warehousing / logistics.
Train Operation Station Management Safety Management	• Internal regulations and manuals will be prepared along with capacity building (for headquarters personnel) under JICA Technical Cooperation Project for Line 1. • Staff training (for worksite personnel) will be provided by the GC of Line 1. • Staff training and technology transfer will be provided by the Contractor of Line 1.	• Operational readiness will be ensured before completion of the Project. • O&M Company will be capable of operating the single line. • Manpower shortage will be significant before opening of multiple lines. • Management of the multiple lines with different systems/technologies will require harmonization of internal regulations and manuals on train operation, station management, and safety management.
Maintenance		
Civil Structure (including part of station M&E)	• Internal regulations and manuals will be prepared along with capacity building (for Headquarters personnel) under JICA Technical Cooperation Project for Line 1. • Staff training and technology transfer will be provided by the Contractor of Line 1.	• Operational readiness will be ensured before completion of the Project. • O&M Company will be capable of operating the single line. • Manpower shortage will be significant before opening of multiple lines.
E&M Systems	• Internal regulations and manuals will be prepared along with capacity building (for Headquarters personnel) under JICA Technical Cooperation Project for Line 1. • Staff training and technology transfer will be provided by the Contractor of Line 1. • 5 years maintenance service will be provided by the Contractor of Line 1.	• Operational readiness will be ensured before completion of the Project. • O&M Company will be capable of operating the single line. • Manpower shortage will be significant before opening of multiple lines.

Appendix 7.3: Cash Flow of O&M Company

Non-Disclosure Information

CHAPTER 8 ENVIRONMENTAL CONSIDERATIONS

8.1 Natural Environmental & Socio-Economic Conditions

8.1.1 Geographical Conditions and a Reserve

(1) Geographical Conditions

The Ho Chi Minh City covers about 2,094km^2 which is surrounded by Tay Ninh Province, Dong Nai Province, Ba Ria-Vung Tau Province, Long an Province and Tien Giang Province. Ho Chi Minh City (10°45'N; 106°40' E) is located about 1,730 km south of Capital Hanoi and 50km far from South China Sea which shape is slim in the north and south. District 1 is located in the center of Ho Chi Minh City.

Ho Chi Minh City is in the flooded delta area, created by Mekong River, Saigon River and Dong Nai River. The terrain has divided the delta into two distinct parts. The inner traits typical of the delta region while the rest are the sandy beaches along the coast.

Dong Nai river divides Ho Chi Minh City and Dong Nai Province. Saigon River which is a branch of Dong Nai river flows through from north to south in the center of district 1. Because the Saigon River was a geographical movement inhibiting factor, the existing block has developed mainly in the West Bank of the Saigon River. But due to the construction of bridges and tunnels crossing river recent years, the development in the eastern part of the Saigon River has also progressed.

Ho Chi Minh City is located in the transition zone between the Southeast zone and the Mekong Delta with lower terrain from north to south and from west to east. Uplands in the north - northeast and northwestern part with an average elevation of 10 - 25m, and interspersed some hills, mounds up to 32 m high. Conversely, lying areas are in the south - southwest and southeast of the city, with an average elevation of 1 m, the lowest 0.5 m. The downtown area has an average elevation of 5-10 m.

The route has an event and flat terrain, the average height is from 1.0 to 2.5m.

The terrain is not cut on whole the route. Tan Hoa Canal is the only canal crossing the route located between Cay Go Station(C7)and Phu Lam Rotary Station(C8)(Picture8.1–1).

Picture 8.1.1 Tan Hoa Canal Crossing the Route

(2) Location of a reserve in Ho Chi Minh City

Compared with the highly urbanized area of Center to Northern area of Ho Chi Minh City, there remain mangrove forest in South-east costal area..Cần Giờ Mangrove Biosphere Reserve is located in the costal district southeast of Ho Chi Minh city, about 25km far from the project area. This area was once destroyed in the Vietnam war by destruction, fire and defoliant. Nature restoration project by the government esteemed by UNESCO in MAB (Man and the Biosphere) Program . Consequently, the area was listed as a Biosphere Reserves in January 2000.

Source: JICA Study team

Figure 8.1.1 Location of the Can Gio Mangrove Biosphere Reserve in Ho Chi Minh City

8.1.2 Geological Conditions

Geological area of the Ho Chi Minh City consists of two directions of sediment which are Pleistocene and Holocene sediments exposed on the surface. Pleistocene sediment occupies a large of area of the North, Northwest and Northeast of the City. Layer of ancient alluvial sediment formed distinctive soil type is "gray soil", with more than 45,000 ha (23.4% of area of the City). In this area, there are 03 types of gray soil, which are high gray soil, gray soil with yellow red motley horizon and grey soil.

Holocene sediment is formed from a variety of origin including from the sea, gulf, river and flood land, etc., with different soil groups: marine alluvial soil, alum earth and alkaline soil. In addition, there is also a land area of sand dunes near the sea and eroded brownish yellow feralite is erosion in hilly regions.

Based on results of field survey, the layers of the route urban railway of HCMC, line 3a, phase 1 (Ben Thanh - Mien TayTerminal) is divided into 11 layers with main characteristics as follows:、Table 8.1.1.

In general, the physical characteristics of soil and rock in the survey area are quite comfortable for the designing and constructing the work.

The depth of underground water level is quite high, from GL-1.20m to -7.0m (ave. GL-3.9m)

Table 8.1.1 Geological Conditions in the project area

Layer	Depth	Thickness	Components	Distribution
Layer 1	0.8m~2.3m	1.20m~1.50m	Sand confounds dust with black grey color	distributes discontinuously
Layer 2	1.12m~7.3m	1.10m~3.30m	Gravel confounds clay with grey and red brown color	distributes discontinuously
Layer 3	0.70m~7.10m	1.20m~5.00m	sand confounds clay with yellow and brown grey color	distributes discontinuously
Layer 4	1.00m~6.40m	0.50m~2.40m	medium soft clay with yellow and brown grey color	distributes discontinuously
Layer 5	1.20m~25m	2.20m~15.50m	Inorganic dust with blue grey color	distributes discontinuously
Layer 6	-	30m~40m	sand confounds dust and clay	distributes continuously
Layer 7	4.50m~45.00m	1.00m~10.50m	medium soft clay with grey yellow color	distributes discontinuously
Layer 8	-	-	medium to high soft clay	distributes continuously
Layer 9	41.80m~43.50m	1.70m	sand confounds clay with yellow brown color	only appears in drilling holes
Layer 10	-	-	sand confounding dust interposes sand confounding clay	distributes continuously
Layer 11	52.30m~55.00m	1.40m~2.70m	medium soft clay with blue grey and yellow color	only appears in drilling holes

8.1.3 Soil and Sediment Environment

In order to assess soil quality in the project area, we have carried out the taking and analyzing samples along the route. Taking sample method is regulated in TCVN 5297-1995. Soil quality parameters are presented in below Table 8.1.2.

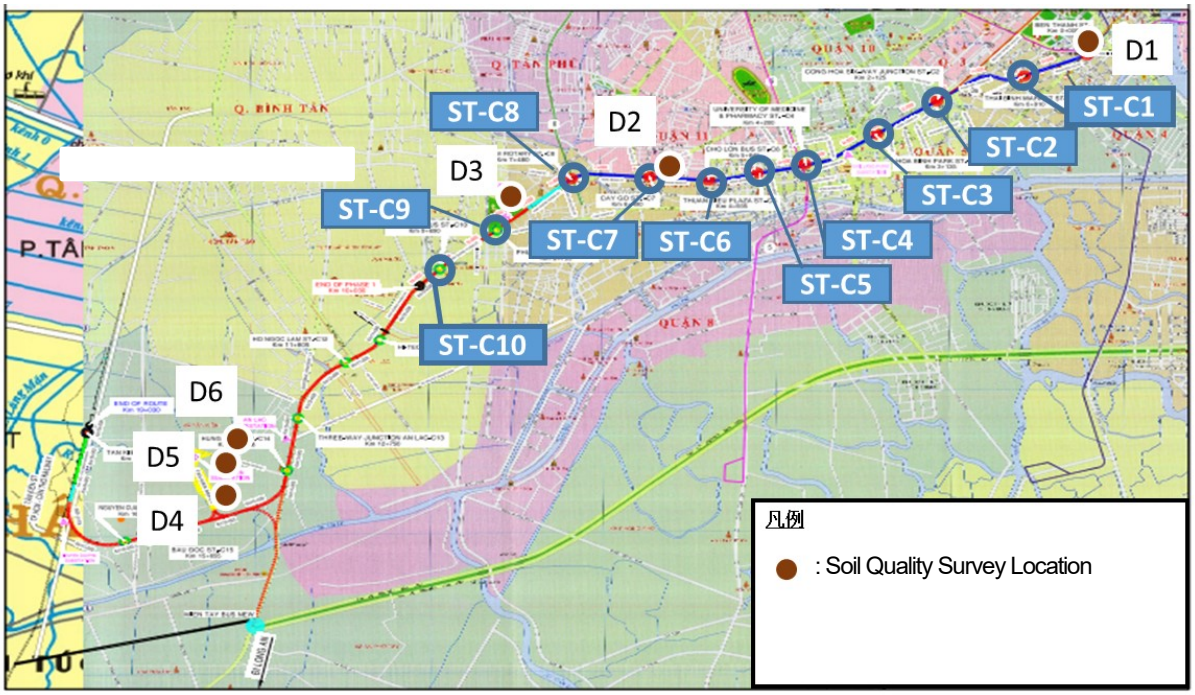
The results show that: the contents of heavy metal are in range of permitted limit in QCVN 03:2008/BTNMT, for livelihood soil.

Table 8.1.2 Results of soil quality analysis in the project area

No	Parameter	Unit	Analytical results						QCVN 03: 2008/BTNMT
			D1	D2	D3	D4	D5	D6	
1	pH	-	6.9	5.4	6.2	6.6	5.1	5.9	-
2	Total organics	%	1.98	1.63	1.64	1.48	1.13	1.14	-
3	Exchange acidity	me/100g soil	42.4	61.03	52.96	54.1	72,3	64,3	-
4	T-N	%	0.172	0.173	0.171	0.180	0.18.1-	0.179	-
5	T-P	%	0.073	0.078	0.077	0.076	0.085	0.084	0.06 - 0.1
6	Cl^-	%	0.003	0.004	0.004	0.0035	0.0041	0.0041	-
7	SO_4^{2-}	%	0.039	0.043	0.048	0.037	0.040	0.045	-
8	Cu	mg/kg soil	35.10	36.93	34.67	36.2	38.0	35.8	50
9	Zn	mg/kg soil	43.1	44.167	42.833	46.1	47.2	45.8	200
10	Cd	mg/kg soil	0.29	0.333	0.317	0.29	0.35	0.34	2
11	Hg	mg/kg soil	Trace	Trace	Trace	Trace	Trace	Trace	-
12	Pb	mg/kg soil	3.23	3.40	3.45	3.15	3.23	3.30	-
13 3	As	mg/kg soil	Trace	0.63	0.62	Trace	0.543	0.567	12
14	Organic chloride pesticide	mg/kg soil	0.043	Trace	Trace	0.040	Trace	Trace	0.5*

(*) Standard applied for agricultural soil

Source: Report on Environmental Impact Assessment of Ho Chi Minh City urban railway construction project, Line 3A (Ben Thanh - Tan Kien)



Source: JICA Study Team modified the Report on Environmental Impact Assessment of Ho Chi Minh City urban railway construction project, Line 3A (Ben Thanh - Tan Kien)

Figure 8.1.2 Sampling Location Map of Soil Quality Survey

8.1.4 Meteorological Conditions

(1) Air Temperature

Monthly, annually average temperature statistics based on observed data at the Tan Son Nhat Hydro meteorological Station, the period 2010-2014, is presented in Table 8.1.3 and Figure 8.1.3.

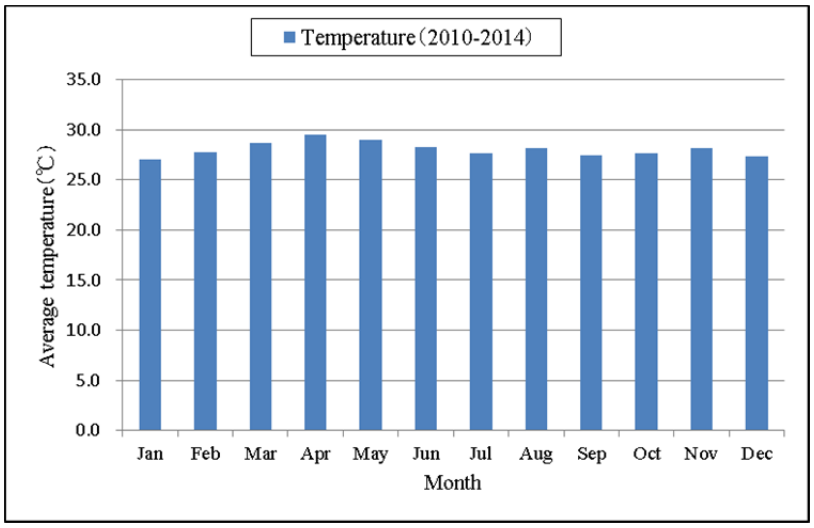
- Temperature changes in project area are not significantly different between months of the year, the highest and the lowest temperatures are 31.3℃ and 25.3℃. An average temperature in the dry season (December to April next year) is 28.1℃, while an average temperature in the rainy season (May to November) is 28.2℃.
- The annual average temperature at Tan Son Nhat Hydro meteorological stations is 28.1℃.

Table 8.1.3 Monthly, annually average temperatures in the Project area.(2010-2014)

(Unit: °C)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
2010	27.2	28.4	29.4	30.4	31.3	28.3	27.7	27.9	28.6	27.4	28.6	27.4	28.6
2011	26.9	27.6	28.3	29.0	29.4	28.5	27.9	28.5	28.1-	28.1-	28.0	27.1	28.1-
2012	27.6	28.2	29.4	29.3	29.3	28.7	28.3	29.1	26.4	28.2	28.8	29.1	28.5
2013	27.5	29.1	29.3	30.3	29.8	29.0	28.1-	28.3	27.7	27.8	28.1-	26.6	28.5
2014	26.0	25.6	27.1	28.7	25.3	27.1	26.4	27.1	26.6	26.9	27.3	26.5	26.7
Average	27.0	27.8	28.7	29.5	29.0	28.3	27.7	28.2	27.5	27.7	28.2	27.3	28.1-

Source: Data observed at Tan Son Nhat Hydro meteorological Station, 2010 - 2014.



Source: Data observed at Tan Son Nhat Hydro meteorological Station, 2010 - 2014.

Figure 8.1.3 Monthly average temperatures in the Project area(2010-2014)

(2) Air Humidity

Monthly, annually average humidity is summarized in Table 8.1.4 and Figure 8.1.4.

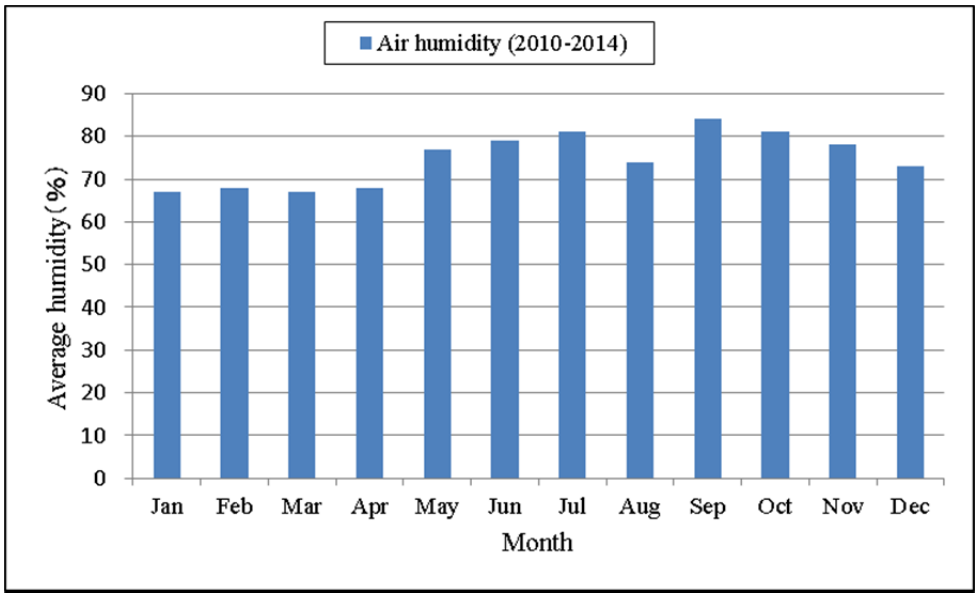
- The annually relative average humidity in the project area is 75%.
- The annually relative average humidity in the rainy season (May to November) is 77% and the dry season (December to the next April) is 69%.

Table 8.1.4 Monthly, annually average Air humidity in the Project Area(2010-2014)

(Unit: %)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
2010	71	70	66	49	69	73	80	79	77	78	-	73	65
2011	68	68	67	72	86	77	78	80	8.1-	80	77	70	75
2012	62	70	68	73	74	78	78	75	87	76	74	69	74
2013	68	61	68	69	75	79	80	80	82	82	76	72	74
2014	66	72	68	77	83	88	89	58	91	87	83	79	78
Average	67	68	67	68	77	79	8.1-	74	84	8.1-	78	73	75

Source: Data observed at Tan Son Nhat Hydro meteorological Station, 2010 - 2014.



Source: Data observed at Tan Son Nhat Hydro meteorological Station, 2010 - 2014.

Figure 8.1.4 Monthly, annually average Air humidity in the Project area(2010 - 2014)

(3) Rain fall

Monthly, annually average rainfall is summarily presented in Table 8.1.5 and Figure 8.1.5.

- The total annual rainfall in the project area is 1953mm.
- In the project area, approximately 85.6% of the annual rainfall in the rainy season from May to November, with the most rainfall in July is 347mm.

Table 8.1.5 Monthly, annually average Rainfall in the Project area(2010～2014)

(Unit: m)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2010	23	-	39	99	9	178	284	400	373	273	0	39	**1717**
2011	94	0	40	182	124	213	28.1-	244	232	233	321	7	**1971**
2012	180	49	31	144	72	270	201	113	358	434	91	25	**1968**
2013	38	1	10	18	197	173	175	261	411	407	257	31	**1979**
2014	3	6	4	89	271	285	602	243	359	188	52	14	**2116**
Average	**68**	**14**	**25**	**106**	**135**	**224**	**309**	**252**	**347**	**307**	**144**	**23**	**1953**

Source: Data observed at Tan Son Nhat Hydro meteorological Station, 2010 - 2014.

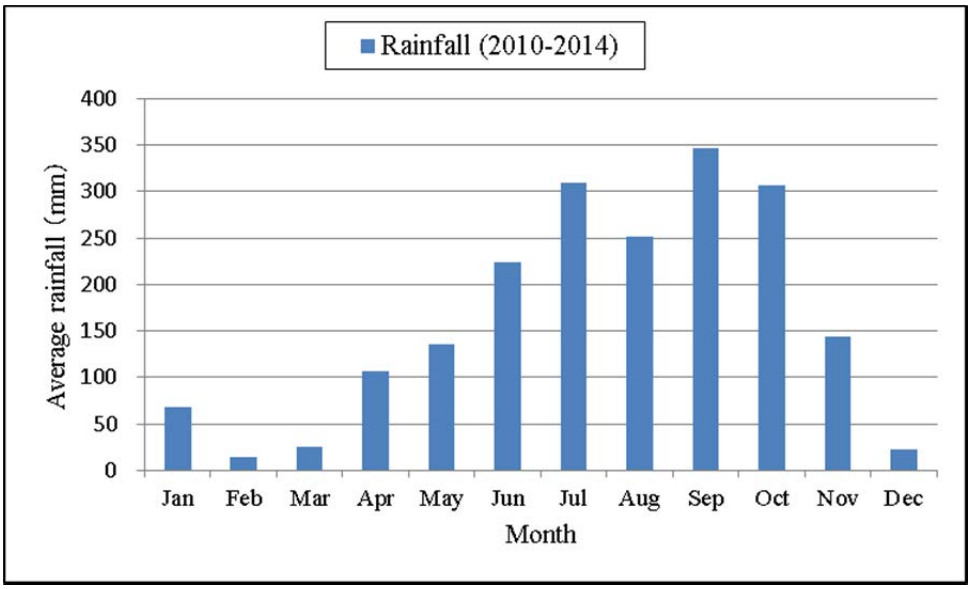


Figure 8.1.5 Monthly average total rain fall in the Project area

(4) Wind

Wind direction, wind frequency and wind speed are measured based on statistical observation data at Tan Son Nhat hydrometeorology stations, 2009- 2013 period. Monthly average wind speed in the project area is shown in table8.1-6.

- Wind prevailing direction is Southeast in dry season and West and Southwest in rainy season;
- The maximum wind speed measured at Tan Son Nhat station is 3.8 m/s in August. The average wind speed in dry season is 2.9m/s; the average wind speed in rainy season is 2.7m/s.

Table 8.1.6 Monthly average wind speed in the Project area(2009-2013)

(Unit: m/s)

City	Months												Average of Year
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Ho Chi Minh	2.3	3.1	3.6	3.3	2.5	2.7	2.9	3.8	2.7	2.2	2.2	2.0	**2.8**

Source: Data observed at Tan Son Nhat Hydro meteorological Station, 2009 - 2013.

(5) Storm

Ho Chi Minh City is belonging to the Southern provinces under less affected areas by storms and tropical depressions. However, in recent years storm and density of tropical depression and storm in the southern provinces tended to increase. In 1997, due to fluctuations by El-Nino phenomenon caused Linda Hurricane (Typhoon No. 5) landed in Ca Mau and the southern provinces in which a part of Can Gio district of Ho Chi Minh City was also affected.

(6) Flood occurrence situation

Number of rains occurred in Ho Chi Minh City area are summarized in Table 8.1.7.

Currently Ho Chi Minh City is frequently suffer from tidal flooding with amounts of rainfall increasing over the years, number of rain caused widespread flooding, although the city has carried out many measures to upgrade and renovate the drainage system ... but flooded and re-flooded locations remain no feasible indications.

Many scientists have said that typhoons tend to increase influence on the Southern region. City will have to face the huge rain chain is increasing. Increasing levels of rainfall and river water is faster than the rise of sea level. The reason is a climate change and urbanization in Ho Chi Minh City. According to Luong Van Viet MSc, Institute of Meteorology, Hydrology and Environment, said rainfall in the Northern provinces for 40 years tends to reduce but rainfall in the south increased significantly. Compared to other provinces, Ho Chi Minh City had a higher increase rainfall intensity. Rainfall is higher in central Ho Chi Minh City than neighborhood about 200mm. Focus time of rain is 13-19h of the day, so that amount of rainfall is huge in 20h.

Table 8.1.7 Number of rains occurred in Ho Chi Minh City area(2009 - 2011)

Year	Number of Rains	Number of rains caused flooding	Rain over 100mm	Rain over 90mm	Rain over 80m
2009	150	48	3	2	4
2010	150	78	1	3	2
2011	163	55	2	5	2

8.1.5 Hydrological Condition

(1) Canal and River System

Ho Chi Minh City has two major river systems which is the Saigon River and Dong Nai, in which Dong Nai River is providing the main source of surface water for living in Ho Chi Minh City, and the both rivers are receiving rainy water and waste water of the City.

Dong Nai river is the largest river of the Southeast Region, accessible to Ho Chi Minh City from Dong Nai Bridge to Soai Rap estuary, section running through the city is 90km long. The average width is 500-800m and the depth is from 10-15m in Nha Be area. Dong Nai river section which passes through City area is influenced by flood tides, water in the Dong Nai River flows with higher tides and more squeezed than Saigon River with flow of 600m^3/s. Dong Nai River is responsible for supply and drainage for a large basin area in the South East of about 23,000 km^2, including Ho Chi Minh City. Water flow in the dry season is about 75-200 m^3/s and became lower since Tri An reservoir have put into operation.

Saigon River: is also a major river of the Southeast region, originated in Loc Ninh then goes to Ho Chi Minh City from Ben Suc, it is confluent with the Dong Nai River at Cat Lai gate, this confluence

is also called Nha Be river which flowing directly into the sea with a length of about 70 km and a width of 300-400m having 570 km^2 of basin. River section flows through Ho Chi Minh City has a width of 225-370m and a depth of about 20 meters, particular the section flow through Binh Thanh District has a depth of 10-15m. Saigon River has flow at about 59.4 m^3/s in Binh Duong and about 84 m^3/s in Binh My - Ho Chi Minh City

The system of Saigon - Dong Nai Rivers also supplies sediment and nutrients for aquatic organisms. However, the current changes showed the Saigon River are affected by salinity and reduce annual innings after building Dau Tieng and Tri An reservoirs. Specifically before the construction and operation of reservoir system in flood season occurrs around September each year, the freshwater can find in the region of Binh Chanh and Nha Be, but in current flood season, freshwater only reach to river zone in Binh Thanh. And the influence of flood tides is more and more widened in the river sections in Ho Chi Minh City area.

Table 8.1.8 Outline of Main Rivers in Ho Chi Minh City area

No	River	Basin area(km^2)	Length(km)
1	Dong Nai	38,600	586
2	La Nga	4,710	272
3	Saigon	5,000	256
4	Song Be	7,650	350

Source: Report on Environmental Impact Assessment of Ho Chi Minh City urban railway construction project, Line 3A (Ben Thanh - Tan Kien)

Network of canals in Ho Chi Minh City is characterized by the Southern region, very interlaced and dense, if taking into account only particular canals in the inner city area where holds a main task of urban drainage, at present there are 5 main systems with a total length of the main canals and canals is 55,585 m and length of tributaries is 36,436 m with density of 4m/ha. These systems include:

- Nhieu Loc - Thi Nghe Canal: with a length of 9035m, has tributary irrigation canals such as: Ba Xep; Bung Binh; Mieu canal; Ong Tieu; Mieu Noi; Bui Huu Nghia; Bong Bridge; Cau Son; Pham Van Han; and Van Thanh.
- Tau Hu Canal – Doi Canal - Te Canal: with a length of 19,500m has tributary irrigation canals such as: Hang Bang; U Cay; horizontal canal No.1; horizontal canal No.2; horizontal canal No.3; Ong Nho; Xom Cui; and Ba Tang.
- Ben Nghe canal: with a length of 5,900m has two tributaries: Chong bridge and Dua bridge.
- Tan Hoa – Ong Buong - Lo Gom canal: with a length of 7,240m has tributary irrigation canals such as: Ben Trau; Dam Sen; Ba Lai; Iron Bridge; and Ruot ngua.
- Tham Luong - Ben Cat - Vam Thuan canal: with a length of 14,040 m has tributary irrigation canal such as: Rach Dua, Ong Bang, Lang canal; Ben Cat; Ong Tong; Dinh An Nhon; Ba Mien; Cau Mot; Rong Voi; and Sen canal.

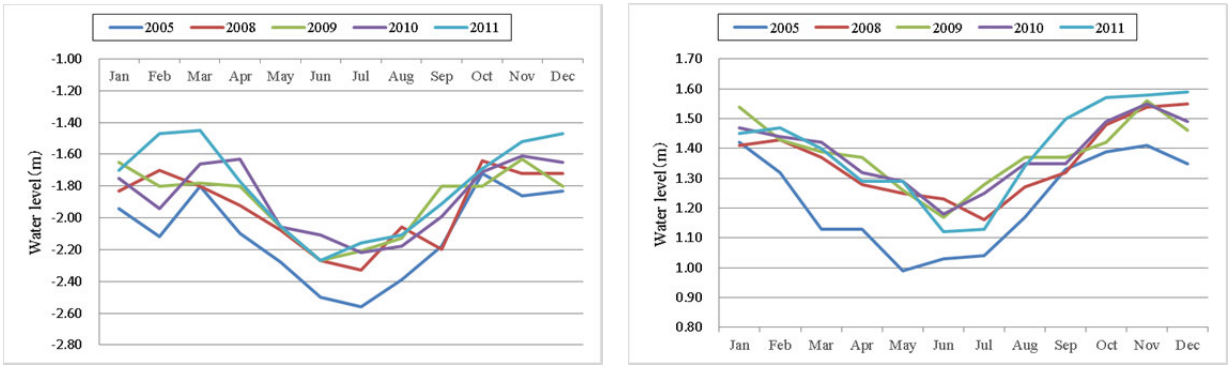
Hydrological conditions of the canals Tan Hoa, Doi, Te and Ben Nghe depends directly on the hydrological regime of Saigon River, with water levels less fluctuate from 5-10cm above water level of Saigon river.

Table 8.1.9 The Water level of the Saigon river (Phu An station)

(Unit: m)

(a)The lowest water level						(b)The highest water level					
Month	Year					Month	Year				
	2005	2008	2009	2010	2011		2005	2008	2009	2010	2011
1	-1.94	-1.83	-1.65	-1.75	-1.70	1	1.42	1.41	1.54	1.47	1.45
2	-2.12	-1.70	-1.80	-1.94	-1.47	2	1.32	1.43	1.43	1.44	1.47
3	-1.80	-1.80	-1.78	-1.66	-1.45	3	1.13	1.37	1.39	1.42	1.40
4	-2.10	-1.92	-1.80	-1.63	-1.77	4	1.13	1.28	1.37	1.32	1.29
5	-2.28	-2.08	-2.06	-2.06	-2.05	5	0.99	1.25	1.26	1.29	1.29
6	-2.50	-2.27	-2.27	-2.11	-2.27	6	1.03	1.23	1.17	1.18	1.12
7	-2.56	-2.33	-2.21	-2.22	-2.16	7	1.04	1.16	1.28	1.25	1.13
8	-2.39	-2.06	-2.13	-2.18	-2.11	8	1.17	1.27	1.37	1.35	1.34
9	-2.18	-2.20	-1.80	-1.99	-1.91	9	1.33	1.32	1.37	1.35	1.50
10	-1.72	-1.64	-1.80	-1.71	-1.69	10	1.39	1.48	1.42	1.49	1.57
11	-1.86	-1.72	-1.63	-1.61	-1.52	11	1.41	1.54	1.56	1.55	1.58
12	-1.83	-1.72	-1.80	-1.65	-1.47	12	1.35	1.55	1.46	1.49	1.59

Source: Ho Chi Minh City Statistical Yearbook 2012



Source: Ho Chi Minh City Statistical Yearbook 2012

Figure 8.1.6 (a) The lowest water level (b) The highest water level (Phu An station)

(2) Hydrological Conditions, Flooding in the Project Area

The Metro Line 3a mainly runs underground along main streets of Ho Chi Minh City like Pham Ngu Lao, Cong Quynh, Pham Viet Chanh and Hung Vuong roads which are less affected by the tide. In the rainy season, Hong Bang road in District 5 (intersection with Nguyen Thi Nho road - Thuan Kieu Plaza) is usually submerged about 0.5m deep if heavy rains occur.

Kinh Duong Vuong Street, section near the Mien Tay Terminal – Phu Lam Park is often flooded in the morning and evening when the tide goes up (flooding levels is about 0.3m) causing significant impacts to traffic operation in this area and difficulties for project's implementation phases.

8.1.6 Biological Resource and Biodiversity

(1) Reserve

Cần Giờ Mangrove Biosphere Reserve is the only reserve in Ho Chi Minh city. It has high diversity based on costal mangrove forest with 75,740ha of which 4,721ha of core area, 41,139ha of buffer area and 29,880ha of succession area. 58,000 inhabitants, with 54,000 in transition area, live in the reserve.

(2) Biological Resource and Biodiversity in Ho Chi Minh City

Ho Chi Minh City consists of 24 districts with a total area of 2,095.01 km^2 and is divided into 3 zones: (1) Hilly ecological zone - suburban district of Cu Chi, is the undulating hills, ancient alluvial soil, undeveloped industry, population density is moderate with low urbanization; (2) Urban center ecological zone - urban and suburban districts, occupy about 46% of the City area but occupy 94% of total population and most of the industrial facilities in the City; and (3) The mangrove ecosystem - Gio district, 40-50 km far from center of the City, is the coastal estuary, where topography is the lowest in the City (0,5 - 1 m) and most of the area is flooded, with 23,055 ha of mangrove forest land of which 6,161 ha of natural forest and 16,894 ha of planted forest. (HCMC DONRE,2013).

Currently, Ho Chi Minh City has 555 species of lower plants (algae) and more than 1,000 species of higher plants including coastal aquatic plants (448 species); wild higher plants (572 species). In addition, Ho Chi Minh City also has features of variety of animals, including invertebrate animals (654 species); fish (171 species); amphibians (14 species); reptiles (60 species); birds (140 species) and mammals (41 species).

Ecosystem coastal water – Can Gio mangrove forest: it is an area which concentrates major biodiversity in Ho Chi Minh City in which fauna of aquatic invertebrates have more than 700 species belonging among 44 families, 6 classes, 5 branches; the system has over 137 species belonging among 39 families and 13 orders; fauna of vertebrates have 9 amphibians, 31 reptiles, 4 mammals. Including 11 species of reptiles are listed in Vietnam's Red Book; and 130 avifauna with 47 families, 17 orders, including 51 species of waterfowl and 79 other species. (HCMC DONRE, 2013)

(3) Biological Resource and Biodiversity in the Project Area

The route Metro No.3a (Ben Thanh - Tan Kien) passes through populated areas, moreover, it mainly follows the existing route, so the biological resources and ecosystems are poor generally.

1) Animals

Most of animals are domestic with a small number. There is not any rare animal needed to be preserved in the project area.

2) Terrestrial plant ecosystems

Almost of the flora in the project area is planted trees in parks and along existing roads. There is not any rare plants needed to be preserved in the project area. But affected trees by the project will be preserved by transplantation.

3) Wetland Ecosystem

For the Canal at Ong Buong Bridge can waste water drainage for the city so the ecosystems is very poor with only small fish, frogs, clone plants and fungus. There is not any valuable ecosystem in the river.

8.1.7 Environmental Quality Survey

Environmental Center of Transport Engineering Design Inc. (TEDI) and the subcontractor - Center of Environment and Applied Ecology (CEECO) has conducted the monitoring of quality of air environment; noise; vibration; surface water environment; underground water and ecosystem at Project area in June 2016. Specifications of survey are presented in below Table 8.1.10, Table 8.1.11, Table 8.1.12 and Figure 8.1.1.

The locations selected to monitor, survey and take samples are locations of future stations area.

Environment analysis and measurement methods used in this report follows regulations of MONRE, Vietnamese standards of monitoring, analysis methods of environment data and comparison, evaluation bases on application of current national technical norms.

Because the route Metro No.3a (Ben Thanh - Tan Kien) passes through populated areas, moreover, it mainly follows the existing route, ecosystem of the project area consist of mainly terrestrial plant ecosystem including urban trees. So, we conducted the site survey, checking and identifying 100% affected trees.

Table 8.1.10 Groups, Methods and Frequency of survey

Survey Groups	Method	Frequency
Air quality	In order to assess impact of the project on air quality in the project area, air quality survey was carried out. The locations selected to monitor, survey and take samples are locations of future stations area. (C1—C10) where will be open excavation sites. More machine and vehicles for construction work will operate near the open excavation sites than other sites. We set the sampling locations along the main streets not to obstruct traffic.	1
Noise & Vibration	In order to assess impact of the project on noise and vibration in the project area, noise and vibration survey was carried out. The locations selected to monitor, survey and take samples are locations of future stations area. (C1—C10) where will be open excavation sites. More machine and vehicles for construction work will operate near the open excavation sites than other sites. We set the sampling locations along the main streets not to obstruct traffic.	1
Water quality (surface water & underground water)	In order to assess impact of the project on water quality in the project area, water quality survey was carried out. Samples of surface water are taken at lake in Phu Lam Park and Tan Hoa Canal(100 and 200 m to the both upstream and downstream), two samples (high & low tide) each locations. Samples of underground water (well water) are taken at residential area along the project which is located in communes affected by the project.	1
Ecosystem	In order to assess impact of the project on Ecosystem in the project area, flora survey was carried out. Base on design data, we conducted the site survey, checking and identifying 100% affected trees. After that we contacted and discussed with urban trees management - Ho Chi Minh City Greenery Parks Company Limited - to confirm the information of these trees.	1

Table 8.1.11 Method of Surveys

No.	Parameter	Method	Devices & Standards
Air quality			
1	Temperature	2 hours / sample within 24 hours	Equipment EM 9000
2	Air humidity		Equipment EM 9000
3	Wind speed		Equipment EM 9000
4	TSP		TCVN 5067-1995
5	PM2.5		AS/NZS 3580.9.7-2009
6	SO_2		TCVN 5971-1995
7	NO_2		TCVN 6137-2009
8	CO		52 TCN 352-89
9	HC		Chromatography method
Noise			
1	LAeq	1 hour / sample within 24 hours	TCVN7878-2:2010
Vibration			
1	Vibration acceleration	1 hour / sample within 24 hours	Equipment Rion VM-83
Water quality(*surface water*)			
1	Temperature	2 samples (high & low tide) / location	SMEWW 2550B-2012
2	pH		TCVN 6492-2011
3	DO		TCVN 7324-2004
4	TSS		TCVN 6625-2000
5	BOD_5		TCVN 6001-2:2008
6	COD		SMEWW 5220C-2012
7	NO_2^-(in N)		TCVN 6178.1-996

No.	Parameter	Method	Devices & Standards
8	NO_3^-(in N)		TCVN 6180-1996
9	PO_4^{3-}(in P)		TCVN 6202-2008
10	Manganese (Mn)		SMEWW 3111B-2012
11	Iron (Fe)		SMEWW 3111B-2012
12	Zinc (Zn)		SMEWW 3111B-2012
13	Phenol		TCVN 6216-1996
14	Total of Oil and grease		SMEWW 5520B-2012
15	Coliform		TCVN 6187-2-1996
Water quality(*underground water*)			
1	pH	1 samples / location	TCVN 6492-2011
2	Dissolved Solids		SMEWW 2540C-2012
3	hardness ($CaCO_3$)		SMEWW 2340C-2012
4	Sulfate (SO_4^{2-})		SMEWW 4500E-2012
5	Fluoride (F^-)		TCVN 6195-1999
6	Chloride (Cl^-)		TCVN 6194-1996
7	Ammonium (in N)		TCVN 5988.1-995
8	NO_3^- (in N)		TCVN 6180-1996
9	NO_2^- (in N)		TCVN 6178.1-996
10	Copper (Cu)		SMEWW 3111B-2012
11	Zinc (Zn)		SMEWW 3111B-2012
12	Manganese (Mn)		SMEWW 3111B-2012
13	Iron (Fe)		SMEWW 3111B-2012
14	Mercury (Hg)		SMEWW 3500-2012
15	Cadmium (Cd)		SMEWW 3500-2012
16	Arsenic (As)		TCVN 6182-1996
17	Chrome VI (Cr^{6+})		TCVN 7939-2008
18	Cyanide (CN^-)		SMEWW 4500D-2012
19	Phenol		TCVN 6216-1996
20	Permanganate index		TCVN 6186-1996
21	E.Coli		TCVN 6187-1-2009
22	Coliform		TCVN 6187-2-2009
Ecosystem			
1	Urban trees (Location; Species; Number of trees; height and breast high diameter)	1 survey / tree	

Source: JICA Study Team Environmental Quality Survey

Table 8.1.12 (1) Locations of Survey

No.	Symbol	Location description	Coordinates	Date
Sampling location of Air, noise and vibration				
1	KK1,O1, R1	Thai Binh Market Station	10°46'1.14"N 106°41'21.06"E	June 18, 2016
2	KK2,O2, R2	Cong Hoa Six-Way Junction Station	10°45'56.88"N 106°40'53.33"E	June 18, 2016
3	KK3,O3, R3	Hoa Binh Park Station	10°45'36.63"N 106°40'23.34"E	June 19, 2016
4	KK4,O4, R4	University of Medicine & Pharmacy Station	10°45'18.57"N 106°39'45.27"E	June 19, 2016
5	KK5,O5, R5	Cho Lon Bus Station	10°45'16.06"N 106°39'25.33"E	June 19, 2016
6	KK6,O6, R6	Thuan Kieu Plaza Station	10°45'12.89"N 106°39'1.83"E	June 19, 2016
7	KK7,O7, R7	Cay Go Station	10°45'15.67"N 106°38'36.19"E	June 20, 2016
8	KK8,O8, R8	Phu Lam Rotary Station	10°45'14.66"N 106°38'6.53"E	June 21, 2016
9	KK9,O9, R9	Phu Lam Park Station	10°44'48.57"N 106°37'31.98"E	June 21, 2016
10	KK10,O10, R10	Mien Tay Terminal Station	10°44'28.68"N 106°37'7.29"E	June 22, 2016

Source: JICA Study Team Environmental Quality Survey

Table 8.1.12 (2) Location of Survey

No.	Symbol	Location description	Coordinates	Date
Sampling location of surface water				
1	NM1-1 NM1-2	Tan Hoa Canal, way construction site 200 m to the upstream	10°45'20.19"N 106°38'6.83"E	June 22, 2016
2	NM2-1 NM2-2	Tan Hoa Canal, way construction site 100 m to the upstream	10°45'18.39"N 106°38'9.83"E	
3	NM3-1 NM3-2	Tan Hoa Canal, way construction site 100 m to the downstream	10°45'12.69"N 106°38'14.12"E	
4	NM4-1 NM4-2	Tan Hoa Canal, way construction site 200 m to the downstream	10°45'10.20"N 106°38'16.62"E	
5	NM5-1 NM5-2	Phu Lam Lake	10°44'51.68"N 106°37'30.85"E	
Sampling location of underground water				
1	NN1	103/13 Co Giang Street, District 1	10°45'45.2"N 106°41'45.1"E	June 27, 2016
2	NN2	897/62 Tran Hung Dao Street, Ward 2, District 5	10°45'12.2"N 106°40'45.5"E	
3	NN3	47/5 Phan Van Khoe Street, Ward 2, District 6	10°44'58.3"N 106°39'11.2"E	
4	NM4	75 Binh Phu Street, Ward 11, District 6	10°44'37.4"N 106°37'50.8"E	
5	NN5	95/53/10 Le Tan Be Street, An Lac Ward, Binh Tan District	10°43'24.9"N 106°36'21.9"E	

Source: JICA Study Team Environmental Quality Survey

Table 8.1.12 (3) Location of Survey

Location description	Date
Project area	July, 2016

Source:JICA Study Team Environmental Quality Survey

Air, noise and vibration measurement
(KK1,O1,R1:Thai Binh Market Station)

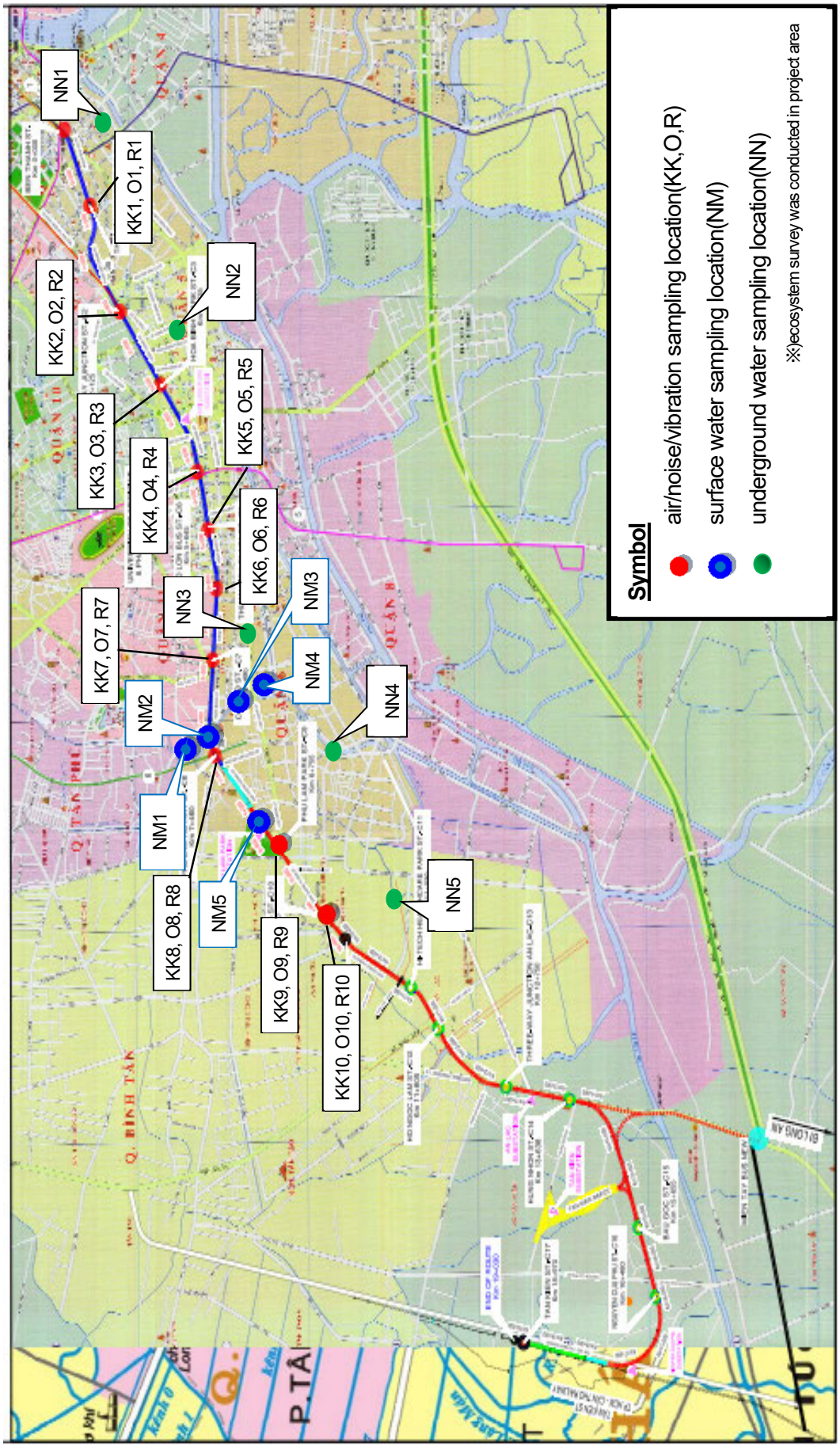
Surface water sampling
(MN2：Tan Hoa Canal, way construction site 100 m to the upstream)

Underground water sampling
(NN2：897/62 Tran Hung Dao Street, Ward 2, District 5)

Ecosystem survey
(measuring the diameter of urban tree in project area)

Source: JICA Study Team Environmental Quality Survey

Picture 8.1.2 Pictures of Surveys



Source:JICA Study Team Environmental Quality Survey

Figure 8.1.7 Location of sampling

(1) Ambient Air Quality

1) Basis of Comparison

QCVN 05:2013/BTNMT – National Technical Regulation on Ambient Air Quality

2) Assessment

Synthesis of measurement results of air quality is presented in Table 8.1.13, and demonstrated on Figure 8.1.8.

In comparison with QCVN 05:2013/BTNMT, found that:

At all the 10 monitoring locations, the average TSP concentrations in 24 hours exceeded permitted standards (200 µg/m^3) varying in the range of 220-298 µg /m^3. The cause was largely due to an effect of traffic at monitoring locations, combined with hot weather making the concentration of TSP increased and exceeded value as set forth in QCVN 05:2013/ BTNMT.

The concentration of $PM_{2.5}$ (average 24h) at the locations of C1, C2, C3 and C4 stations are lower than allowable limit. At 06 remaining locations (from C5 to C10 station), the concentration of $PM_{2.5}$ is higher than allowable limit in QCVN05:2013/BTNMT (average 24 hours). This is caused by high traffic volume in Hong Bang and Kinh Duong Vuong Street.

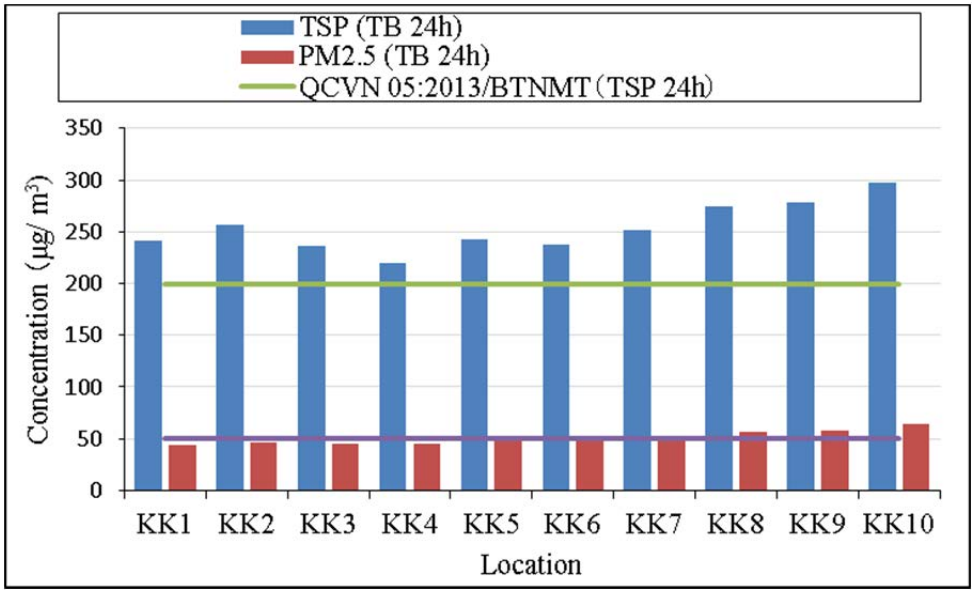
The concentration of pollutants affected by traffic such as SO_2, NO_2, CO measured in the time and at the monitoring location is relatively high. During the day traffic density on the roads is quite crowded and regularly, therefore, concentration of pollutants is high, and much higher than the night. However, all observed values are much lower than allowed values as set forth in the Regulations (QCVN 05:2013/BTNMT).

The concentration of hydrocarbon gas HC in HC gas monitoring (average in 24 hours) measured at the monitoring locations is higher than permissible limit (1500µg/m^3) as set forth in Vietnamese Regulation (QCVN 06: 2009/BTNMT - an average of 24 hours). The main reason is due to high traffic density on the roads.

Table 8.1.13 Synthesis of measurement results of air quality

No	Symbol	Location	Sampling period	Mean Concentration (µg/ m^3)					
				TSP	$PM_{2.5}$	SO_2	NO_2	CO	HC
1	KK1	Thai Binh Market Station	24h	242	44	82	101	8088	2629
2	KK2	Cong Hoa Six-Way Junction Station	24h	257	46	79	97	7350	2628
3	KK3	Hoa Binh Park Station	24h	236	45	76	94	7296	2197
4	KK4	University of Medicine & Pharmacy Station	24h	220	45	71	86	5833	2248
5	KK5	Cho Lon Bus Station	24h	243	53	74	87	6312	2341
6	KK6	Thuan Kieu Plaza Station	24h	238	52	77	84	5870	2478
7	KK7	Cay Go Station	24h	252	51	8.1-	89	6179	2556
8	KK8	Phu Lam Rotary Station	24h	275	57	88	91	7018	2823
9	KK9	Phu Lam Park Station	24h	278	58	92	98	7571	3073
10	KK10	Mien Tay Terminal Station	24h	298	64	84	91	8374	3280
QCVN 05:2013/BTNMT			**24h**	**200**	**50**	**125**	**100**	**-**	**-**
QCVN 06:2009/BTNMT			**24h**	**-**	**-**	**-**	**-**	**-**	**1500**

Source:JICA Study Team Environmental Quality Survey



Source: JICA Study Team Environmental Quality Survey

Figure 8.1.8 Contents of TSP and PM2.5 in the air

(2) Noise

1) Basis of Comparison

QCVN 26:2010/BTNMT, National Technical Regulation on Noise.

2) Assessment

Synthesis of measurement results of noisy level is presented in Table 8.1.14, and demonstrated on Figure 8.1.8.

Compare survey results with QCVN 26:2010/BTNMT found that: the value LAeq, average in 06h÷21h, measured at monitoring location is quite high, almost exceeding the permitted level as set forth in QCVN 26:2010/BTNMT, the lowest noisy level is O1 position – Thai Binh Station (67.5), the highest noise level is O9 position – Phu Lam Station (76.7). The main reason caused noise is traffic on the roads, especially a section of Kinh Duong Vuong road passing through Phu Lam park, traffic is dense, many buses and trucks travel.

At night time (21h - 06h): Noise in the break (LAeq) at the monitoring locations are higher than the allowable limit value (55 dBA) according to QCVN 26: 2010/BTNMT. The cause is mostly due to the impact from traffic activities. At night time, traffic density has decreased compared to the working time, but the impact of noise from the traffic is still very high. In addition, the noise level at the monitoring locations is also affected by the activities from machinery operation and service of local residential areas.

Table 8.1.14 Synthesis of measurement results of noisy level

(Unit: dB)

No	Symbol	Location	LAeq (06 - 21)	LAeq (21 - 06)
1	O1	Thai Binh Market Station	67.5	66.5
2	O2	Cong Hoa Six-Way Junction Station	72.9	67.7
3	O3	Hoa Binh Park Station	71.5	64.4
4	O4	University of Medicine & Pharmacy Station	70.4	64.7
5	O5	Cho Lon Bus Station	73.2	66.4
6	O6	Thuan Kieu Plaza Station	73.2	67.9
7	O7	Cay Go Station	74.5	65.4
8	O8	Phu Lam Rotary Station	69.9	63.9
9	O9	Phu Lam Park Station	76.7	66.6
10	O10	Mien Tay Terminal Station	72.6	61.4
QCVN 26:2010/BTNMT (6 - 21)			**70**	**—**
QCVN 26:2010/BTNMT (21 - 06)			**—**	**55**

Source: JICA Study Team Environmental Quality Survey

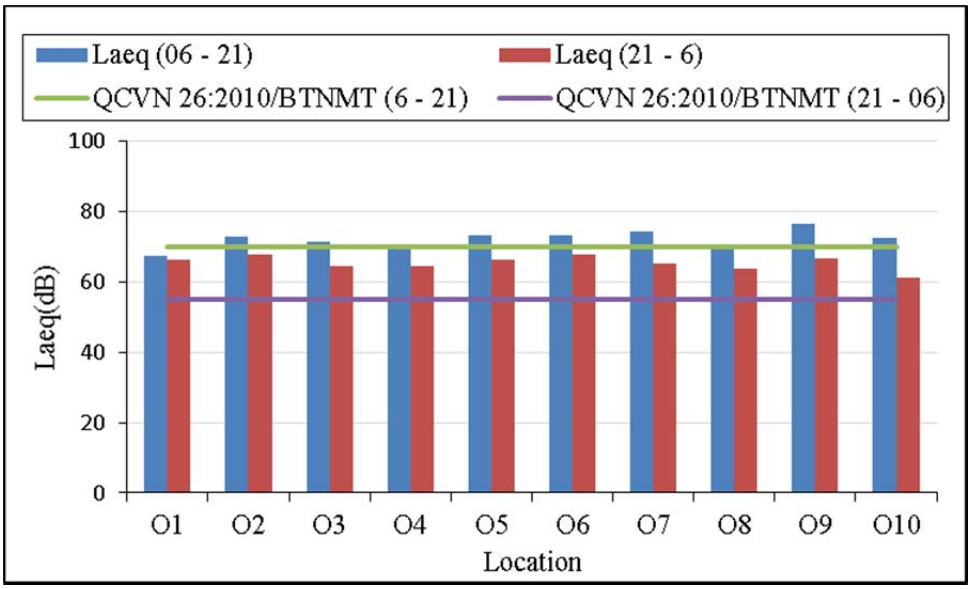


Figure 8.1.9 Current status of noisy level in Project area

(3) Vibration

1) Basis of Comparison

QCVN 27:2010/BTNMT – National Technical Regulation on Vibration.

2) Assessment

Synthesis of measurement results of vibration level is presented in Table 8.1.15, and demonstrated on Figure 8.1.10.

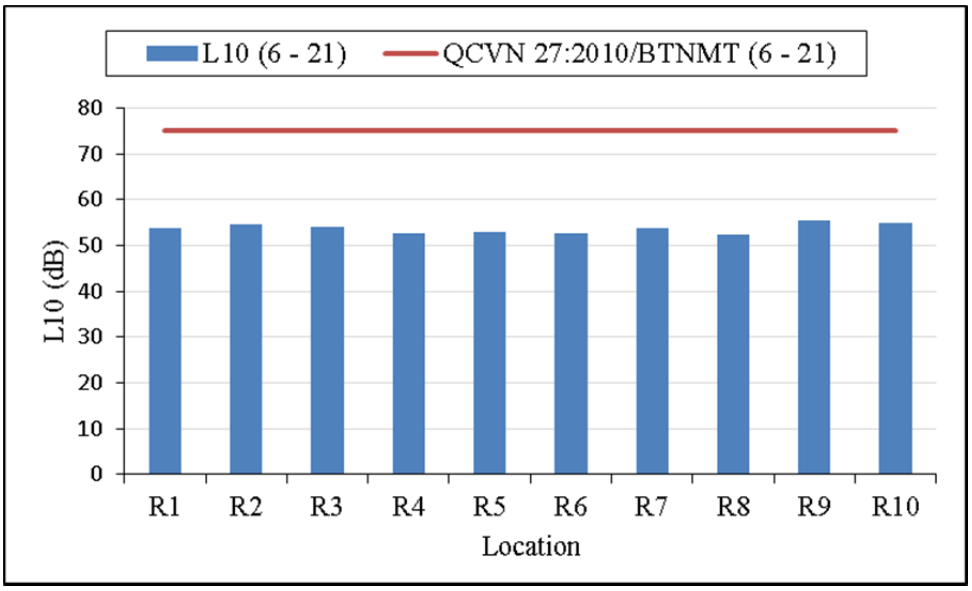
In comparison with permitted limit by QCVN 27: 2010/BTNMT, found that the vibration level L10, average in 24h, measured at monitoring locations varies from 53.7 dBA (R8) to 55.4 dBA (R9), all the values are within the allowable range as set forth in QCVN 27:2010/BTNMT. In addition to operation of vehicles on the road, at observation positions there are no any other significant sources causing vibration.

Table 8.1.15 Synthesis of measurement results of vibration level (dB)

(Unit: dB)

No	Symbol	Location	L10 (06h - 21h)	L10 (21h - 06h)
1	R1	Thai Binh Market Station	53.7	47.5
2	R2	Cong Hoa Six-Way Junction Station	54.5	47.4
3	R3	Hoa Binh Park Station	54.2	47.3
4	R4	University of Medicine & Pharmacy Station	52.8	46.3
5	R5	Cho Lon Bus Station	53	46.2
6	R6	Thuan Kieu Plaza Station	52.8	46.3
7	R7	Cay Go Station	53.8	46.8
8	R8	Phu Lam Rotary Station	52.3	46.4
9	R9	Phu Lam Park Station	55.4	48.6
10	R10	Mien Tay Terminal Station	54.9	48.8
QCVN 27:2010/BTNMT (6h - 21h)			**75**	**—**
QCVN 27:2010/BTNMT (21h - 06h)			**—**	**Base level**

Source: JICA Study Team Environmental Quality Survey



Source: JICA Study Team Environmental Quality Survey

Figure 8.1.10 Current status of vibration level in Project area

(4) Quality of Surface Water

1) Basis of Comparison

QCVN 08-MT:2015/BTNMT – National technical regulation on surface water quality.

2) Assessment

Measurement results, quality analysis of surface water are presented in Table 8.1.16.

In comparison with allowed limit as set forth in QCVN 08-MT:2015/BTNMT type B2, found that:

- For physical and chemical factors: The values are within allowable limits for type B2.
- For biochemical factors:
  - Monitoring results of BOD concentration when the tide going up and down vary in the range from 1.16 to 1.60 times higher than allowable limit. Monitoring results of COD concentration when the tide goes up vary in the range from 1.06 to 1.56 times higher than allowable limits.
  - Monitoring results of oil, grease content when the tide goes down vary in the range of 0.98.1-43 mg/l higher than allowable limits.
  - Microbiological factor (coliform): coliform monitoring results when the tide going up and down at positions vary in the range from 11,000 - 43,000MPN/100ml higher than allowable limits.
- The cause is mainly due to activities of people living around Project area discharge waste water, garbage down to the canal.

Regarding indicators NO_2, NO_3^-, PO_4^{3-}, Mn, Fe, Zn, and Phenol are less than the allowable limits.

Table 8.1.16 Synthesis of analysis results of surface water quality

No.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Parameter		Temperature	pH	DO	TSS	BOD_5	COD	NO_2^- (in N)	NO_3^- (in N)	PO_4^{3-} (in P)	Manganese (Mn)	Iron (Fe)	Zinc (Zn)	Phenol	Total of oil and grease	Coliform
Location of sampling	Symbol of sample	^0C	-	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	MPN/100mL
Tan Hoa Canal. far from construction site 200m on the upstream.	NM1-1 (high)	30.7	5.91	3.65	30	36	65	0.017	0.103	0.201	0.155	0.767	0.115	<0.005	0.72	15×10^3
	NM1-2 (low)	31.2	5.87	3.14	28	40	78	0.021	0.095	0.204	0.166	0.749	0.126	<0.005	1.34	43×10^3
Tan Hoa Canal. far from construction site 100m on the upstream	NM2-1 (high)	30.5	6.07	3.54	45	35	61	0.021	0.134	0.197	0.161	0.726	0.174	<0.005	0.86	11×10^3
	NM2-2 (low)	30.9	6.01	3.22	40	39	75	0.024	0.156	0.215	0.151	0.738	0.198	<0.005	1.43	26×10^3
Tan Hoa Canal. far from construction site 100m on the downstream.	NM3-1 (high)	30.5	5.93	3.72	26	30	56	0.015	0.086	0.193	0.174	0.656	0.098	<0.005	0.54	46×10^2
	NM3-2 (low)	31.4	5.87	3.36	31	35	63	0.019	0.107	0.224	0.168	0.701	0.109	<0.005	0.98	11×10^3
Tan Hoa Canal. far from construction site 200m on the downstream.	NM4-1 (high)	30.8	5.97	3.56	32	29	54	0.018	0.089	0.175	0.192	0.753	0.102	<0.005	0.63	7×10^3
	NM4-2 (low)	31.1	5.92	3.28	39	32	61	0.022	0.091	0.183	0.219	0.738	0.116	<0.005	1.08	21×10^3
Phu Lam Lake	NM5-1 (morning)	30.6	5.95	3.67	45	28	53	0.017	0.126	0.153	0.136	0.463	0.048	<0.005	0.71	23×10^2
	NM5-2 (afternoon)	30.9	5.91	3.31	51	31	59	0.024	0.164	0.182	0.151	0.512	0.073	<0.005	1.15	14×10^3
QCVN 08-MT:2015/BTNMT (Column B2)		-	5.5-9	≥ 2	100	25	50	0.05	15	0.5	1	2	2	0.02	1	10000

Source: JICA Study Team Environmental Quality Survey

(5) Quality of Ground Water

1) Basis of Comparison

QCVN 09-MT:2015/BTNMT - National technical regulation on ground water quality

2) Assessment

Measurement results, quality analysis of ground water are presented in Table 8.1.17.

In comparison with QCVN 09-MT: 2015/BTNMT found that: Most of the parameters are much lower than the allowable values of QCVN 09-MT: 2015/BTNMT: National technical regulation on ground water quality. Groundwater in the area of District 1 has pH lower than allowable standard (5.37) and total iron content (1.56 mg/l) is higher than remaining positions, this show that groundwater here is lightly contaminated by alum. In addition, the results also show that groundwater quality of the area is contaminated by coliform with light level (varying from 2-7 MPN/100mL), particularly exceeding values as set forth in QCVN 09-MT: 2015/BTNMT at NN3 and NN4 position. The consequences of contamination are caused by osmosis of surface water pollution due to activities of people living around project area discharge wastewater, waste down the canal.

Table 8.1.17 Synthesis of quality analysis of ground water

No.	Parameter	Unit	Results					QCVN 09-MT:2015/BTNMT
			NN1	NN2	NN3	NN4	NN5	
1	pH	-	5.37	5.79	6.05	5.61	6.18	**5.5 - 8.5**
2	Dissolved solids	mg/L	168	155	332	1250	232	**1500**
3	hardness ($CaCO_3$)	mg$CaCO_3$/L	56	52	92	402.4	120	**500**
4	Sulfate (SO_4^{2-})	mg/L	4.37	6.21	5.14	12.7	8.8.1-	**400**
5	Fluoride (F^-)	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	**1**
6	Chloride (Cl^-)	mg/L	70.9	53.2	152.4	730.3	78.5	**250**
7	Ammonium (in N)	mg/L	0.082	0.243	0.161	0.267	0.102	**1**
8	NO_3^-(in N)	mg/L	0.137	0.095	0.146	0.246	0.197	**15**
9	NO_2^-(in N)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	**1**
10	Copper (Cu)	mg/L	0.018	0.023	0.027	0.017	0.029	**1**
11	Zinc (Zn)	mg/L	0.084	0.069	0.037	0.332	0.051	**3**
12	Manganese (Mn)	mg/L	0.156	0.048	0.062	1.35	0.256	**0.5**
13	Iron (Fe)	mg/L	1.56	0.072	0.139	0.273	0.092	**5**
14	Mercury (Hg)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	**0.001**
15	Cadmium (Cd)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	**0.005**
16	Arsenic (As)	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	**0.05**
17	Chrome VI (Cr^{6+})	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	**0.05**
18	Cyanide (CN^-)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	**0.01**
19	Phenol	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	**0.001**
20	Permanganate index	mg/L	2.38	1.57	1.32	1.64	1.75	**4**
21	E.Coli	MPN/100mL	Not detected	Not detected	Not detected	Not detected	Not detected	**Not detected**
22	Coliform	MPN/100mL	Not detected	2	7	4	Not detected	**3**

Source: JICA Study Team Environmental Quality Survey

(6) Ecosystem

The route Metro No.3a (Ben Thanh - Tan Kien) passes through populated areas, moreover, it mainly follows the existing route, so the biological resources and ecosystems are poor generally. Only flora is investigated .

Flora in the project area include planting trees in parks and along existing roads. Based on the ecosystem survey results in July 2016, the trees were planted in the project area including the urban tree species such as Peltophorum pterocarpum, Dipterocarpus alatus, Mimusops elengi, Tamarindus indica, Khaya senegalensis, Lagerstroemia floribunda... These plants including newly planted trees and perennial trees. The height of the newly planted trees average about 3 meters, the height of perennial trees about 15-18m. The trees are numbered to manage and care by Ho Chi Minh City Greenery Parks Company Limited.

Urban trees in Project area may be affected by the construction of the railway station and elevated section. Results of the survey the number of affected trees are shown in the following Table 8.1.18

Table 8.1.18 Number of affected tree by the project

No.	Species	Classification (*)				Total
		Newly planted	L1 (h ≤ 10m)	L2 (10m<h≤15m)	L3 (h>15m)	
1	*Peltophorum pterocarpum*		103	7		110
2	*Erythrophleum fordii*		2			2
3	*Dipterocarpus alatus*	2	3	16	88	109
4	*Mimusops elengi*		57			57
5	*Casuarina equisetifolia*		3	1		4
6	*Khaya senegalensis*		2			2
7	*Lagerstroemia floribunda*	171	5			176
8	*Terminalia catappa*		4			4
9	Areca catechu		1			1
10	Plumeria		26			26
11	*Tamarindus indica*	52	75	1		128
12	*Tectona grandis*	4		10		14
13	*Berrya cordifolia*	2				2
14	Cassia		7			7
Total		**231**	**288**	**35**	**88**	**642**

(※Classified by Circular No. 20/2005/TT-BXD dated on December 12th by Ministry of Construction)

Source: JICA Study Team Environmental Quality Survey

Source: JICA Study Team

Picture 8.1.3 Urban trees along a street(Thai Binh Market Station(C1))

8.1.8 Social-economic conditions of affected area by the project

(1) Social-economic Conditions

Doi Moi reform program caused high economic growth rate of Vietnam (about 9%) from 1995 to 1996. After the Doi Moi reform program through the Asian finance crisis, overseas investments to Vietnam increased successively. Vietnam became a Lower Middle Income Countries in 2010 (US$1,006 < GNI per capita < US$3,975). Thereafter the economic growth rate had been once disappointed from the policy to stabilize the macro economy, it has continued economic development as a country that is growing rapidly in the ASEAN region, such as fulfilling accession to the WTO.

Agriculture, forestry, fishery, mining and light industries are the main industry of Vietnam. In contrast to the whole country, urbanization progresses in the vicinity of Ho Chi Minh City. In Ho Chi Minh City, advance of enterprises such as service industry including tourism, joint ventures with foreign-affiliated companies and factories of manufacturing industry in suburban economic zones are in progress. In 2014, unemployment rate in urban area (3.43%) is higher than rural area (1.47%) and national average (2.08%). On the other hand, GDP per capita and Economic growth rate in Ho Chi Minh City is higher than national average as follows Table 8.1.19.

Table 8.1.19 General economic status of Vietnam and Ho Chi Minh City

Economic indicator	Vietnam	Ho Chi Minh City
GDP	$ 1,878 (2014, IMF)	-
GDP per capita	$ 2,073 (2014, IMF)	$ 5,131 (2014, estimated value)
Economic growth rate	5.98% (2014, GSO)	9.6% (2014, estimated value)
Inflation rate	4.09% (2014, GSO)	-

GSO: GENERAL STATISTICS OFFICE of VIETNAM

Source: JICA Study Team

(2) Bilateral assistance between Japan and Vietnam

Since economic cooperation between Japan and Vietnam resumed in November 1992, Japan has become the largest assisting country for Vietnam. Technical Cooperation projects and Grant Aids are also being implemented, but ODA loans stand out, especially the total amount of ODA Loans reached 200 billion yen(based on exchange notes) since 2011. Table 8.1.20 shows the results of assistance to Vietnam in Japan.

Table 8.1.20 Amount of ODA from Japan to Vietnam

(Unit: ¥ 10 million)

Year	2007	2008	2009	2010	2011	2012	2013
ODA Loan	978.53	832.01	1,456.13	865.68	2,700.38	2,029.26	2,019.85
Grant Aid	21.19	26.63	35.46	35.46	55.20	17.10	8.24
Technical Cooperation	51.98	59.65	61.42	71.52	104.86	85.15	82.17

Source: Ministry of Foreign Affairs Website

Ongoing basic infrastructure projects supported by ODA Loan in Ho Chi Minh City are as follows:

- Saigon East-West Highway Construction Project
- North - South Expressway Construction Project (HCMC－Long Tanh－Dau Giay Section)
- HCMC Urban Railway Construction Project(Ben Thanh Market－Suoi Tien Section (Line 1))
- Ho Chi Minh City Water Environment Improvement Project

Ongoing railway projects supported by ODA Loan in Hanoi City are as follows:

- Hanoi City Urban Railway Construction Project (LINE 1)(Ngoc Hoi－Yen Vien)
- Hanoi City Urban Railway Construction Project (LINE 2)(Nam Thang Long－Tran Hung Dao Section)

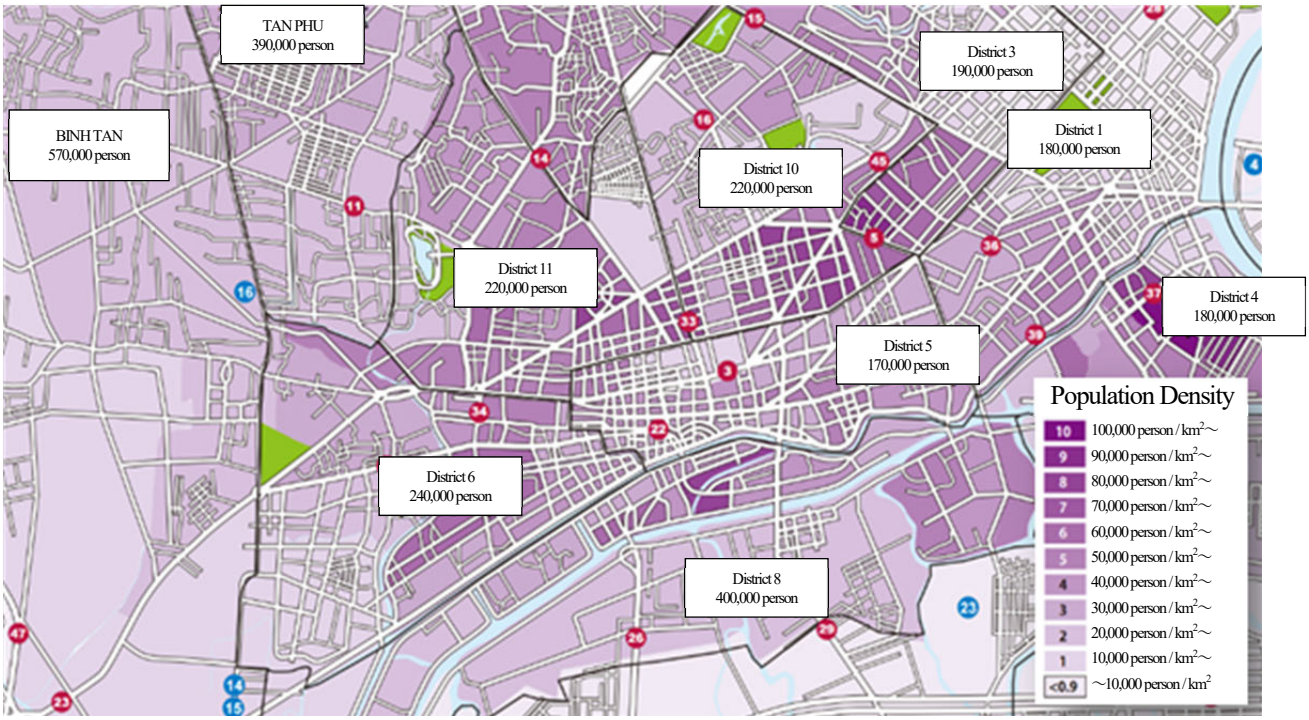
Further, in the field of railways, more supports by Japan such as Hanoi-HCMC Railway Bridges Safety Improvement Project are now underway.

(3) Population characteristics

Ho Chi Minh City is the most populous city in the country (as of 2013, according to the General Statistics Office) with rapid population growth due to the urbanization process. In year 2013, population of Ho Chi Minh City is 7.9 billion. The trend of urbanization has been taking place is expected to increase the population of the city. The population will be strongly increased at semi-urban districts and country district, which currently has a low population density and abundant land in HCMC.

The total population of Vietnam is estimated at about 92.5 million (UNFPA, 2014). Approximately 86% of the total population consists of so-called "Vietnamese". They mainly believe in Buddhism and are called Kin people. The total population of Ho Chi Minh City is estimated at about 7.98million (General Statistics Office , 2014). Population and economic activity tend to concentrate in urban area such as Hai Phong, Can Tho and Da Nang.

Metro line 3a phase 1 (Ben Thanh - Mien Tay Terminal) runs through residential areas and wards in District 1, 3, 5, 6, 10, 11 and Binh Tan district with significantly high population density. The population density along the project area ranges 10,000~50,000 person / km^2. (Figure 8.1.11)



Source: based on "The map of traffic volume and population density of HCMC new town plan (2011, JETRO Website)

Figure 8.1.11 Population and Population Density along the project area

(4) Transportation System of Ho Chi Minh City

City road network including highway managed by the central government, interprovincial and inter-district roads, urban management by the city, the total length is 3,000 km of all categories. There is

a big difference in technical condition of the road network in the region: the old road in the district formed a clear traffic network of chessboard suitable for the transport, smooth asphalt surface, drainage, lighting, sidewalks, trees complete; The roads in the new district is low compared to the tide, narrow sidewalks, no trees; roads in suburban districts mostly just be smooth plastic, low geometric standards. Most of the roads are narrow: only about 14% of road has roadway width more than 12m which can be able to organize the convenient transportation of passengers by bus; 51% of the way with a roadway width from 7m to 12m only possible for the cars including micro-bus; 35% of the remaining road roadway under 7m wide enough for two-wheel traffic.

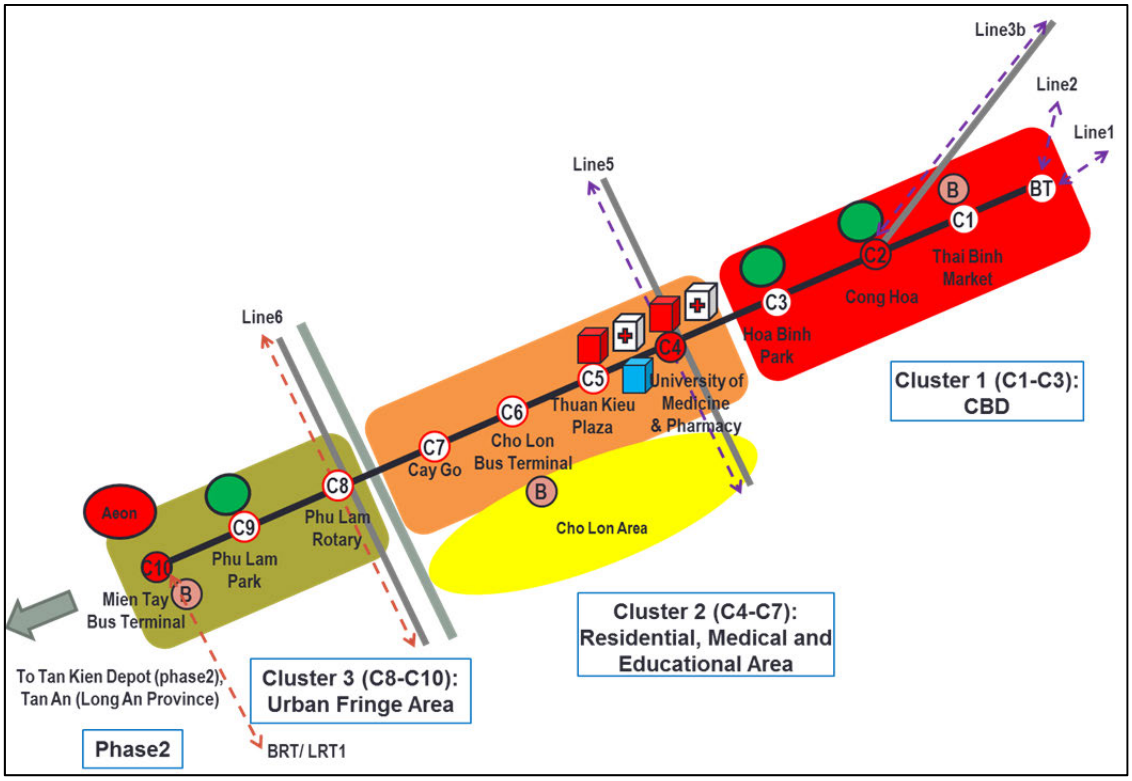
Whether bus system recently has had many improvements, use bus rapid increase but percentage share of Public transport still poor, only 3.5% of the study area. The percentage share of public transportation of taxi is also poor.

Main public transportation of intercity traffic is bus and trains. 4 intercity railways are now in operation. 6 subways are now under planning.

(5) Project Area

1) Land use

The influenced areas are divided into three clusters those are categorized based on socioeconomic characteristics, land use, transport accessibility, etc.(Figure 8.1.12)



Source: JICA Study Team

Figure 8.1.12 Clusters of Line 3A

Cluster 1 (C1 - C3) : Central Business District, CBD

- The CBD section (about 4km length) including Ben Thanh, C1,C2 and C3 stations is the core with urban services such as governmental, economic, and tourism with high-density land use.
- This cluster covers Ben Thanh Market, Hoa Binh Park, the local market, the town where travelers stay, residential area & university area.
- The most of traffic volume was occupied with tourist, market users, residents and students of university.
- Crossing the main street is difficult because the rotary has no cross-walk.

Cluster 2 (C4 - C7) : Residential, Medical and Educational Area

- This section (about 3km length) is spread along Hong Bang Street. There are various urban facilities such as the University of Medicine & Pharmacy, hospitals, department stores and traditional residential and commercial areas of Cho Lon District.
- Hong Bang Street is surrounded by many small stores and dwelling houses.
- Continual congestion around this area is caused mainly by cars and motorcycles. The most of this traffic volume is occupied with users of various urban facilities, students of university and residents.
- Partly, sidewalks are installed in the median strip, but there are few crosswalks.

Cluster 3 (C8 - C10) : Urban Fringe Area

- The urban fringe area between the opposite side of the river and Mien Tay Terminal, the terminal station of Phase 1 (about 2.3km length) is spread along Kinh Duong Vuong Street with 8 carriageways. There are few large-scale commercial and business areas and facilities, and there are potentials of high-density development along UMRT and street. Logistic services from Mekong Delta along National Highway No.1, passenger services from Mien Tay Terminal to the city center are active.
- Mid-rise commercial facilities on the road sideways, and existing urban areas spread in the walking distance. A general hospital and an AEON Mall are soon open in the area adjacent to Mien Tay Terminal.
- There are lots of bikes and motorcycles parking on the sidewalks installed along the main road. Because the insufficiency of intersections and crosswalks, it is inconvinient to cross tha main roads on foot.

Present conditions around the project area are shown as bellow : Picture 8.1.4

		
Ben Thanh Station	C1: Thai Binh market station	C1:a bus terminal adjacent to Thai Binh market station
		
C2: Cong Hoa six way junction station	C2: Guest house of Government	C3: Hoa Binh Park station
		
C4: University of Medicine & Pharmacy Station	C4: Parkson Hùng Vương Plaza	C5: Thuan Kieu Plaza Station
		
C6: Cho Lon Bus Station	C7: Cay Go Station	C8: Phu Lam Rotary Station
		
C9: Phu Lam Park Station	C9: Phu Lam Park Station	C10: Mien Tay Terminal Station

Source: JICA Study Team

Picture 8.1.4 Present conditions around the project area

2) Social Condition

Ho Chi Minh City is the most populous city in the country (as of 2013, according to the General Statistics Office) with rapid population growth due to the urbanization process. In year 2013, population of Ho Chi Minh City is 7.9 billion. The trend of urbanization has been taking place is expected to increase the population of the city. The population will be strongly increased at semi-urban districts and country district, which currently has a low population density and abundant land in HCMC.

Metro line 3a phase 1 (Ben Thanh - Mien Tay Terminal) runs through residential areas and wards in District 1, 3, 5, 6, 10, 11 and Binh Tan district with significantly high population density. The population growth rate in the region is not homogeneous in each area ranged from 0.01 to 1.2%. This is because the element of natural population growth, migration factors and settlements in the area also make the local population in the project along more difficult to control.

Table 8.1.21 Population Characteristics and Population Density in Project Area

No	District	Average Population (person)	Area(Km^2)	Population Density (person/km^2)
1	District 1	197,421	7.73	25,540
2	District 3	193,206	4.92	39,270
3	District 5	176,336	4.27	41,296
4	District 6	266,121	7,19	37,013
5	District 10	239.18	5,72	41,8.1-5
6	District 11	227.86	5,14	44,331
7	Binh Tan District	655,244	51,89	12,628

Source:Report on EIA of Ho Chi Minh City urban railway construction project, Line 3A (Ben Thanh - Tan Kien)

There are 22 communes affected by the project (Table 8.1.22). Around the project area from the Ben Than Market Station to the District 5(Cho Lon Chinatown) is particularly highly urbanized area. West side from the Cho Lon China Town, 3A Line through dense residential area from the District 5 to the Mien Tay Terminal station.

Table 8.1.22 Communes affected by the project

No.	Communes	District
1	**Phạm Ngũ Lão**	District 1
2	**Nguyễn Cư Trinh**	
3	**Phường 2**	District 3
4	**Phường 4**	District 5
5	**Phường 9**	
6	**Phường 11**	
7	**Phường 12**	
8	**Phường 14**	
9	**Phường 15**	
10	**Phường 2**	District 6
11	**Phường 6**	
12	**Phường 9**	
13	**Phường 12**	
14	**Phường 13**	
15	**Phường 14**	
16	**Phường 1**	District 10
17	**Phường 2**	
18	**Phường 1**	District 11
19	**Phường 2**	
20	**Phường 16**	
21	**Phường An Lạc**	Bình Tân District
22	**Phường An Lạc A**	

Source: Report on EIA of Ho Chi Minh City urban railway construction project, Line 3A (Ben Thanh - Tan Kien)

3) Basic Technical Infrastructures

- Health care : All of wards belong to Project area have medical aid station, especially some wards have hospital to care health for residents.
- Education facilities : Most of wards in the Project area have kindergarten, primary school, secondary school (or high school).
- Power supply : Current situation of power supply in the project area is well done, 100% of households are using electricity, which is supplied by Ho Chi Minh City Power Corporation (EVN).
- Water supply : 100% of people are full of water to use water, which is supplied by SAWACO.
- Waste management : 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. 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) Economic Condition

A rich ethnic diversity creates a picture of the diversity of many different cultures. The mixing and interference between separate cultural factors has created the most young and dynamic city of our country today. However, for each nation, each culture characteristics also determine the trend lines of the people here. For example, the Chinese prefers to live in crowded communities and their strong business is medicine, along the axis of Hung Vuong boulevard, specializes in business phone ... Trading market of Vietnam in general and HCM City in particular is still largely economic development towards small-scale household, take the road land to trade. According to the preliminary survey along the project to more than 1,000 households and business along two sides of the roads, not to mention the large corporations, commercial centers, this would be no small obstacle with the progress of the project work items. Along the proposed Metro, households located close to the main roads are mostly business households. Business characteristics of each route are listed as follows:

- Section Pham Ngu Lao road: mostly households carrying on business hotel, restaurant, car rental. Only households are located on the left side of the road from Ben Thanh Market to the Thai Binh Market, the right is the park 23/9.
- Section Cong Quynh - Pham Viet Chanh: business mainly bookstores, restaurants, medical instruments store, and other items.
- Section Hung Vuong: most of the stores in this business mainly mobile phones and devices.
- Section Hong Bang adjacent to Hung Vuong: this area mainly schools, hospitals and parks. Toward Mien Tay Terminal: it appears many stores in which the largest trade center is Hung Vuong Plaza, Thuan Kieu Plaza.
- Kinh Duong Vuong: The households living close to the Kinh Duong Vuong mainly business in the field of printing, photo, stationery.

In general, the business of trading households living close to the main route through projects is relatively stable. However, the majority of households is the individual business household, takes full advantage of the road for business or leased to another business.

5) Transportation

The network of roads in the project area is relatively complete system with a system of urban roads. All routes have been equipped with drainage systems and lighting systems. Expected route layout of urban railway 3A is the main axis linking Mien Tay Terminal and districts 1, 3, 5, 6, 11 with large

traffic flows, especially during peak hours. Public transport services mainly buses with routes originating from Mien Tay Terminal and Cho Lon area.

Fact existed for many years in Ho Chi Minh City and some other cities of the country and there is still no effective remedy which is traffic congestion in major streets and in the intersections. Along the Metro Line 3A, there are some "black spots" of traffic congestion, including:

With dense traffic density as at present, with the consciousness of people in traffic is not good, so in the course of construction, these are the special positions which should be concerned about ensuring traffic.

In addition to the "black spots" as mentioned above, the local traffic congestion at the intersection in the urban areas of Ho Chi Minh City is very unsettling. Long traffic jams for hours causing discomfort and tension in traffic, at the same time increase the amount of toxic emissions from the combustion of fuel released into the environment, make people difficult to control their work causing no small damage on economic and business environment and the living conditions of the people.

Table 8.1.23 "Black spots" of traffic congestion in the project area

No	Location	Time	Level	Note
1	In front of Ben Thanh market	17 – 20h	Usually	
2	Cong Quynh interaction	Morning and evening	Critical	
3	Nga 6 Cong Hoa	Evening	Sometimes	
4	Le Hong Phong crossroads	After working	Usually	Fence
5	Nguyen Tri Phuong crossroads	Morning	Usually	
6	Ngo Quyen crossroads	After school	Critical	
7	Nguyen Thi Nho crossroads	Morning and evening	Usually	
8	Cay Go intersection	All day	Usually	
9	Tan Hoa - Hong Bang interaction	Evening	Sometimes	Ong Buong bridge

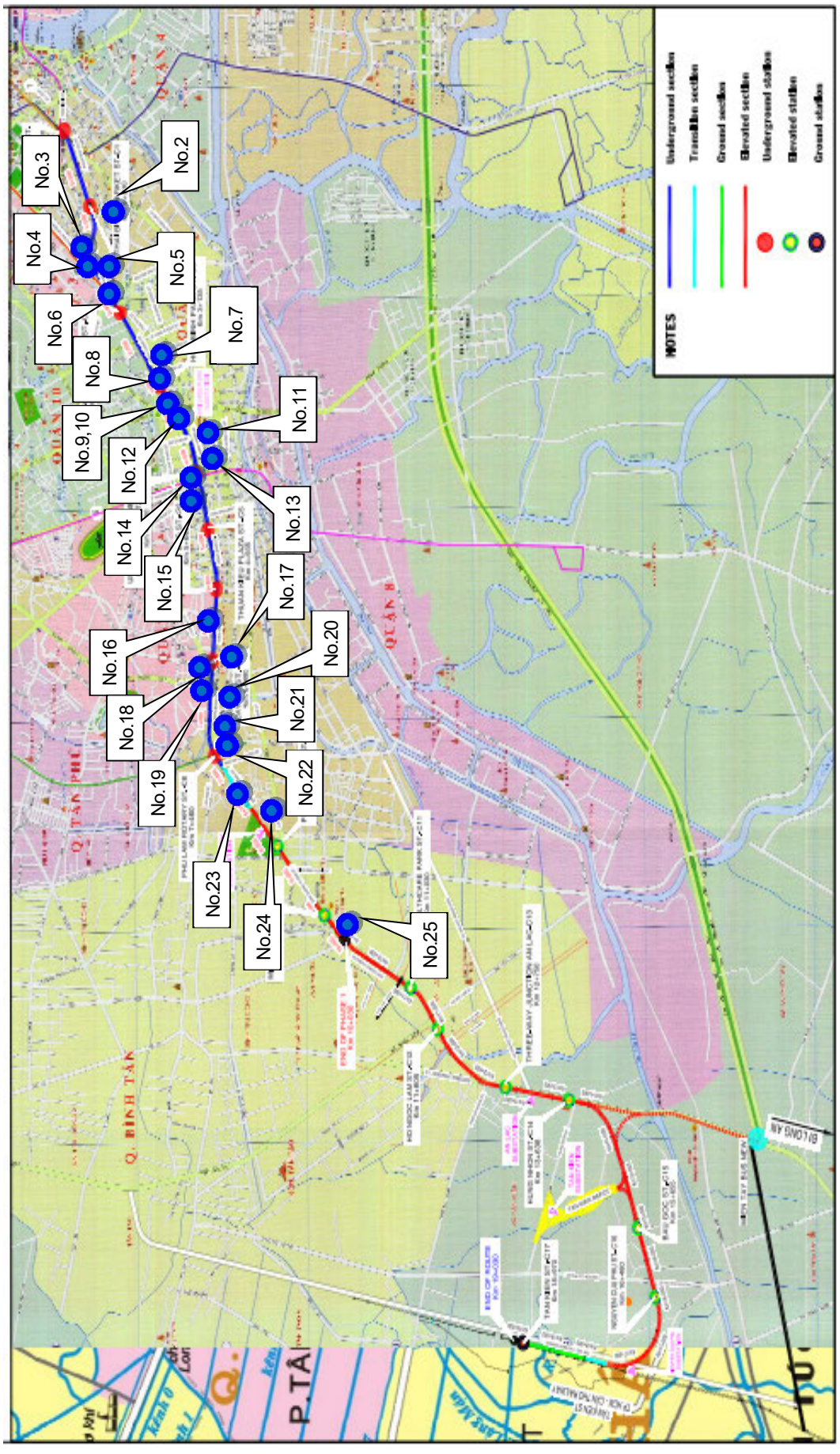
Source:Report on EIA of Ho Chi Minh City urban railway construction project, Line 3A (Ben Thanh - Tan Kien)

Source: Report on EIA of Ho Chi Minh City urban railway construction project, Line 3A (Ben Thanh - Tan Kien)

Picture 8.1.5 Pictures of traffic jam in HCMC

6) The Parties Affected by the Project

Based on the survey conducted along the Project route and study of plan of the project route, parties affected by the Project are identified and shown in following Table 8.1.24 and Figure 8.1.13.



Source: JICA Study Team modified the Report on Environmental Impact Assessment of Ho Chi Minh City urban railway construction project, Line 3A (Ben Thanh - Tan Kien)

Figure 8.1.13 The Map of The cultural, social, religious works along the Metro Line 3a

Table 8.1.24 The cultural, social, religious works along the Metro Line 3a

No	Works	Location	Side	Distance to the route (m)
1	Resident areas along the route	Along the route	Both	1~15
2	Thai Binh Market	Pham Ngu Lao Street	Left	Nearby
3	Tu Du Hospital	Cong Quynh Street	Right	60
4	HCMC Blood Transfusion Hematology Hospital	Pham Viet Chanh Street	Right	15
5	Phan Van Tri Secondary School	Pham Viet Chanh Street	Left	10
6	Thang Long Secondary School	Nguyen Thi Minh Khai Street	Right	Nearby
7	30/4 Hospital	Hung Vuong Street	Left	10
8	Jean D'ane Church	Hung Vuong Street	Right	10
9	HCMC Blood Transfusion Hematology Hospital	Hong Bang Street	Right	10
10	Pham Ngoc Thach Hospital	Hong Bang Street	Right	10
11	The University Of Medicine & Phamarcy Hospital	Hong Bang Street	Left	10
12	Hung Vuong High School	Hong Bang Street	Right	10
13	The University Of Medicine & Phamarcy	Hong Bang Street	Left	10
14	Hung Vuong Hospital	Hong Bang Street	Right	10
15	Hong Bang Secondary school	Hong Bang Street	Right	10
16	Minh Phung Pagoda	Hong Bang Street	Right	8
17	Nguyen Duc Canh Secondary School	Hong Bang Street	Left	7
18	Hue Lam Pagoda	Hong Bang Street	Right	8
19	Sung Duc Pagoda	Hong Bang Street	Right	8
20	Tuyen Lam Pagoda	Hong Bang Street	Left	10
21	Rang Dong 9B Kindergarten	Hong Bang Street	Left	12
22	Preventive Medicine Center Of District 6	Hong Bang Street	Left	7
23	Hien Linh Pagoda	Kinh Duong Vuong Street	Right	18
24	The College Of Transportation 3	Kinh Duong Vuong Street	Left	25
25	Trieu An Hospital	Kinh Duong Vuong Street	Left	40

8.2 Environmental Impact Assessment System

8.2.1 Environmental Impact Assessment

EIA has already been implemented in this project and it has been approved by DONRE in Ho Chi Minh City (Subsequently, make it the existing EIA). But the existing EIA has been two years since approval. So, EIA report needs to be recreated based on article 20 of Law on Environmental Protection.

Therefore, the preparation, review and approval procedures of the EIA report are implemented based on the flow shown in Figure 8.2.1.

(1) Basic laws and regulations in the environmental field in Vietnam

Table 8.2.1 shows the basic laws concerning environmental protection in Vietnam. Among these, the laws and regulations particularly important for the implementation of EIA will be described later.

Table 8.2.1 Basic environmental regulations

Signing date	Law number	Legal name (English name)
2010/03/18	Circular No. 08/2010/TT-BTNMT	Stipulation on the preparation of national environmental report, sectorial environmental situation report, and provincial environmental status report
2010/04/06	Circular No. 09/2010/TT-BGTVT	Stipulation on environmental protection for transportation infrastructure development projects
2011/04/14	Circular No. 12/2011/TT-BTNMT	On management codes of harmful wastes
2011/04/18	Decree No. 29/2011/ND-CP	Stipulation on strategic environmental assessment (SEA), environmental impact assessment (EIA), and environmental protection commitment (EPC) (Replaced by Decree 18/2015/ND-CP)
2011/07/18	Circular No. 26/2011/TT-BTNMT	Guiding in detail numbers of articles of Decree No. 29/2011/ND-CP dated 18 April 2011 on strategic environmental assessment (SEA), environmental impact assessment (EIA) and environment protection commitment (EPC). (Note *)
2012/03/16	Circular No. 01/2012/TT-BTNMT Replaces Circular No. 04/2008/TT-BTNMT	Regulation on setting-up, assessment, approval, inspection and certification of the implementation of detailed environmental protection project; setting-up and registration of simple environmental protection project
2013/11/14	Decree No. 179/2013/ND-CP	Decree on the sanction of administrative violations in the domain of environmental protection
2014/03/25	Decision No.25/2014/QD-TTg	Stipulation on function, responsibility, right, and organization structure of Vietnam Environmental Administration (VEA)
2014/04/29	Decree No. 35/2014/ND-CP (came into effect on 15 June 2014)	Amending and supplementing a number of articles of the Government's Decree No. 29/2011/ND-CP of stipulation on strategic environmental assessment (SEA), environmental impact assessment (EIA), and environmental protection commitment (EPC). (Replaced by Decree 18/2015/ND-CP))
2014/05/05	Circular No. 22/2014/TT-BTNMT	Providing regulations and guidelines on the implementation of Decree No. 35/2014/ND-CP dated 29 April 2014 amending and supplementing a number of articles of Decree No.29/2011/ND-CP dated 18 April 2011 providing for the strategic environmental assessments, environmental impact assessments and environmental protection commitments
2014/06/23	Law No.55/2014/QH13	Law on Environmental Protection (2nd revision) (Note*)

Signing date	Law number	Legal name (English name)
2014/08/28	Circular No.50/2014/TTLT-BTNMT-BNV	On function, responsibility, right, and organization structure of agency in charge of natural resources and environment in provinces, cities, districts.
2015/01/06	Decree No.03/2015/ND-CP	Stipulations on confirmation of damages to environment
2015/02/14	Decree No.18/2015/ND-CP	Stipulations on environmental protection masterplan, strategic environmental assessment, environmental impact assessment, and environmental protection plan. (Note *)
2015/02/14	Decree No.19/2015/ND-CP	Stipulations on the implementation of several articles of Environmental Protection Law. (Note *)
2015/4/24	Decree No. 38/2015/ND-CP	the Government on management of waste and discarded materials
2015/5/29	Circular No. 27/2015/TT-BTNMT	Strategic environmental assessment environmental impact
2015/6/30	Circular No. 36/2015/TT-BTNMT	Stipulating management of hazardous waste
2015/6/30	Circular No. 37/2014/TT-BTNMT	Guiding compensation, support and resettlement for land recovered by the State
2015/7/24	Circular No. 32/2015/TT-BGTVT	Regulations on environmental protection in traffic infrastructure development

Note * Important regulations related to Environmental Impact Assessment (EIA) of this project

Source: related national laws and regulations

(2) Law on Environmental Protection (LEP)

Law on Environmental Protection (LEP) is the basis of environmental laws including EIA in Vietnam. Subordinate laws and regulations including the detailed bylaws related to LEP are stipulated. LEP was enacted in 1993, and the first major revision was made in 2005. After that, the second revision work began in 2013 to strengthen and drastically improve the environmental measures. The revised LEP was approved (Act No. 55/2014 / QH 13) at the seventh session of the 13th Diet session dated 23 June 2014 and entered into force on January 1, 2015.

8.2.2 Environmental Impact Assessment System

APPENDIX II of Decree No.18/2015 / ND-CP shows a list of 113 projects that are obliged to implement environmental impact assessment (EIA).

Since this project falls under the National Important Project, the implementation of EIA is required and EIA approval agency becomes MONRE.

Organizations that are authorized to review and approve the EIA report are (1)Ministry of Natural Resources and Environment (MONRE), (2) institutions at the same level as central ministries and central ministries, (3) Ministry of Defense, Ministry of Home Affairs, (4) provincial province And the People's Committee (hereinafter referred to as "PC") of the Central Government Cities (Hanoi City, Ho Chi Minh City, Hai Phong City, Da Nang City, Can Tho City) (Decree No.18/2015 / ND-CP).

According to Decree 18/2015 / ND-CP, the Ministry of Natural Resources and Environment shall provide guidance on forms of application for EIA report assessment; formulation and issuance of EIA technical guidance. Existing guidance is considered to be applied to the period until this detailed guidance is created and promulgated.

The main procedures for preparing, reviewing and approving the EIA report are shown in Figure 8.2-1.

Administrative organization to review and approve the EIA report will be in charge of the entire review and approval procedure of the EIA report. The EIA approved organization will decide the establishment of the EIA report assessment council after being requested by the employer for review and approval of the EIA report (Degree No.18/2015 / ND-CP).

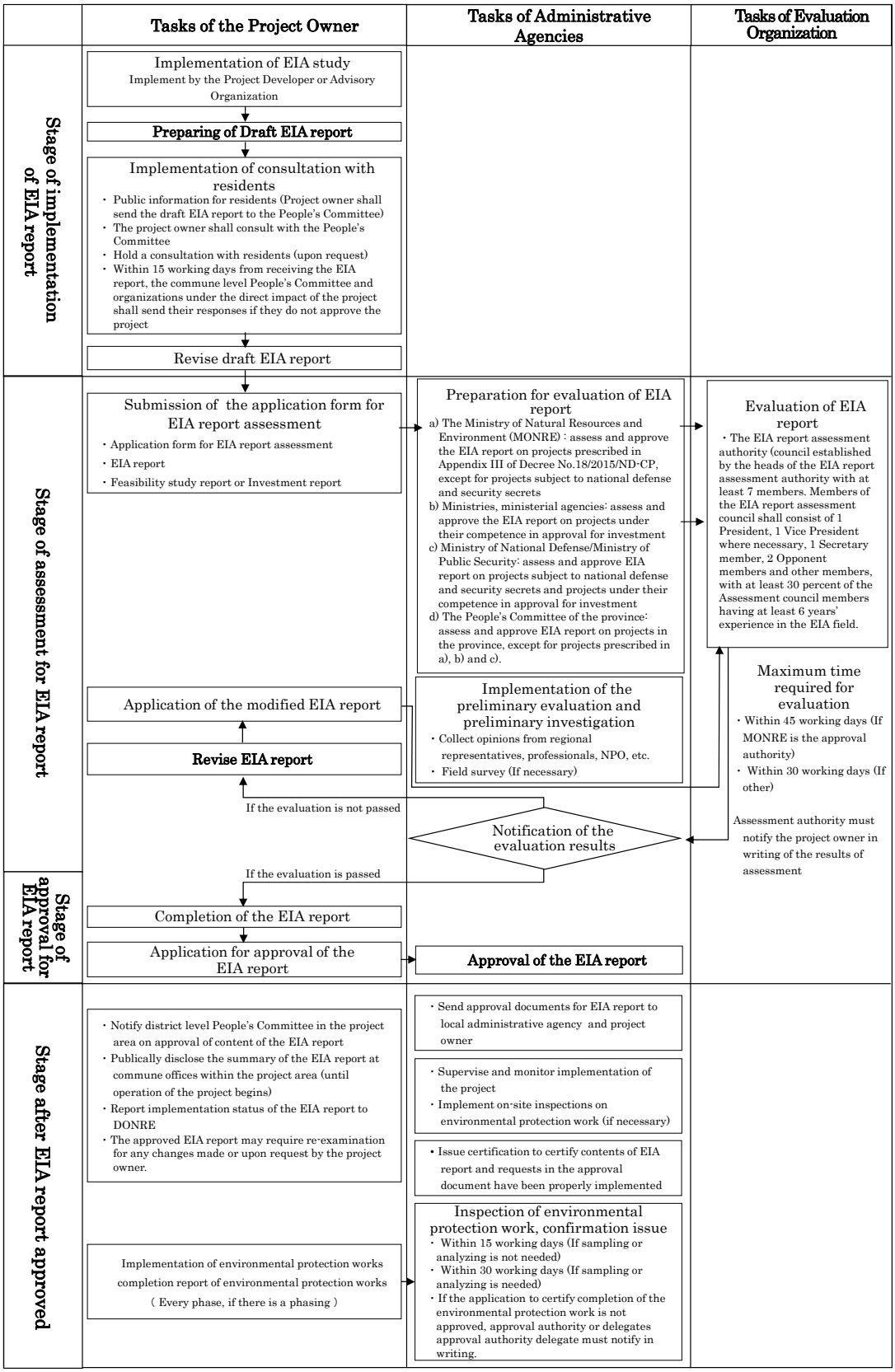
The assessment of EIA report shall be conducted by the EIA report assessment council established by the Heads of the EIA report assessment authority with at least 07 members. Members of EIA report assessment council shall consist of 01 President, 01 Vice President where necessary, 01 Secretary member, 02 Opponent members and other members, which at least 30 percent of the Assessment council members having at least 06 years' experience in the EIA field.

Within 45 working days from the date on which the satisfactory application is received regarding projects under assessment of the Ministry of Natural Resources and Environment.

The EIA approved organization notifies the employer of the result of the review of the EIA report. The employer revises the EIA report as necessary and submits it again to the EIA approval body. The EIA approval agency will issue an approval decision document on the EIA report within 15 working days.

Based on the above, regarding the EIA approval procedure of this project, MAUR (Management Authority of Urban Railways), the project executing agency, will be the agency to prepare the EIA report.

Together with the EIA report period required for review (within 45 working days), required period for revision / resubmission of EIA report (Although it is not stated in the regulations, it is assumed that it will be about 10 days from consultation with the executing agency.) and period required for approval process (within 15 working days), approximately 70 working days are required from the submission of the EIA report to the official approval.



Source: Created by the study team based on Decree No.18 / 2015 / ND-CP

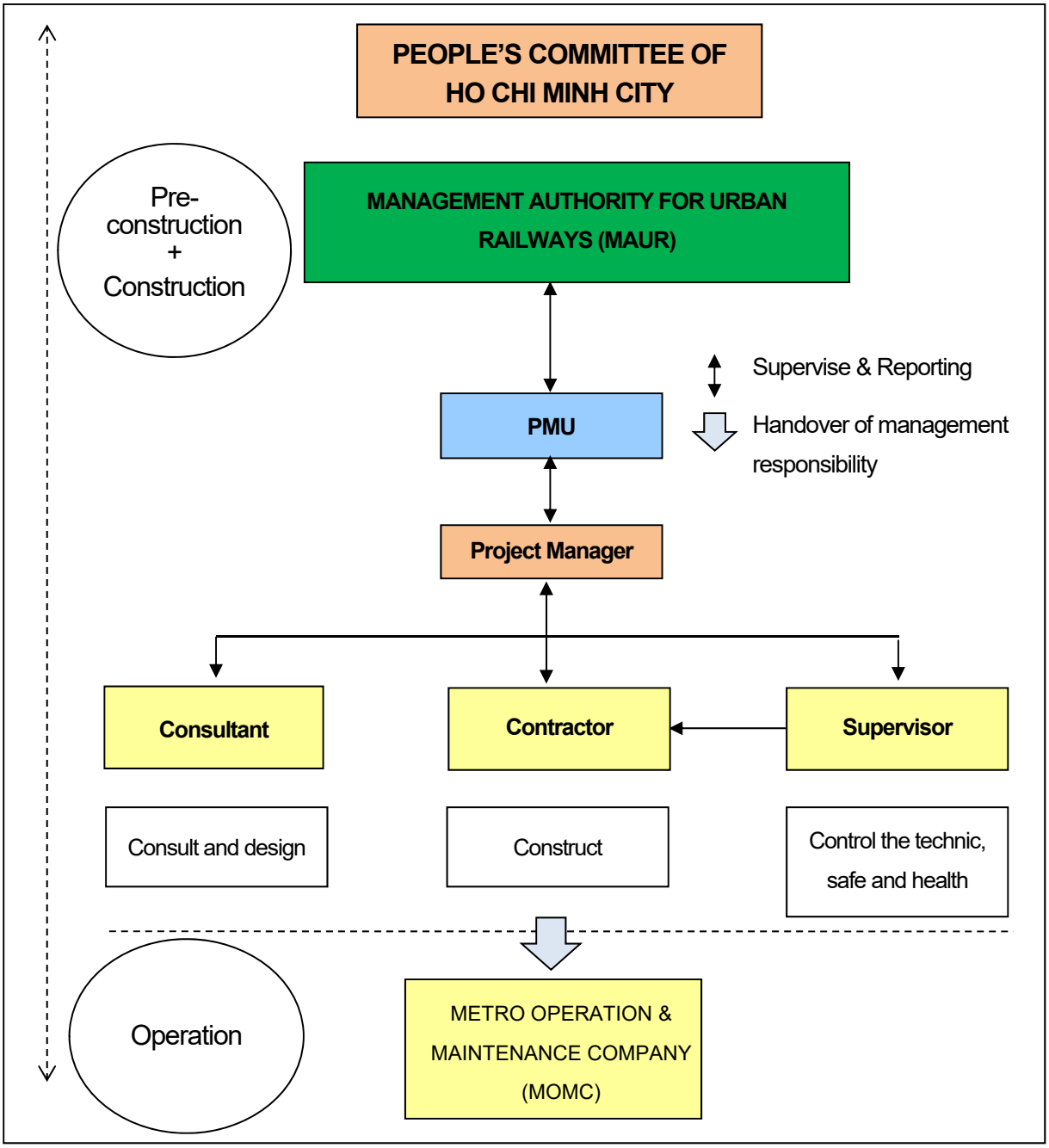
Figure 8.2.1 Procedure of preparation, review and approval of EIA report based on domestic legal system of Vietnamese country

8.2.3 Relevant organizations

(1) Relevant organizations involved in project implementation

Diagram of relevant organizations involved in project implementation is shown in Figure 8.2-2.

Ho Chi Minh City People's Committee is the organization that makes investment decisions of this project. Management authority before and during construction is MAUR (Management Authority for Urban Railway). The operator at the time of service is MOMC (METRO OPERATION & MAINTENANCE COMPANY). The operator at the time of service is MOMC (METRO OPERATION & MAINTENANCE COMPANY).

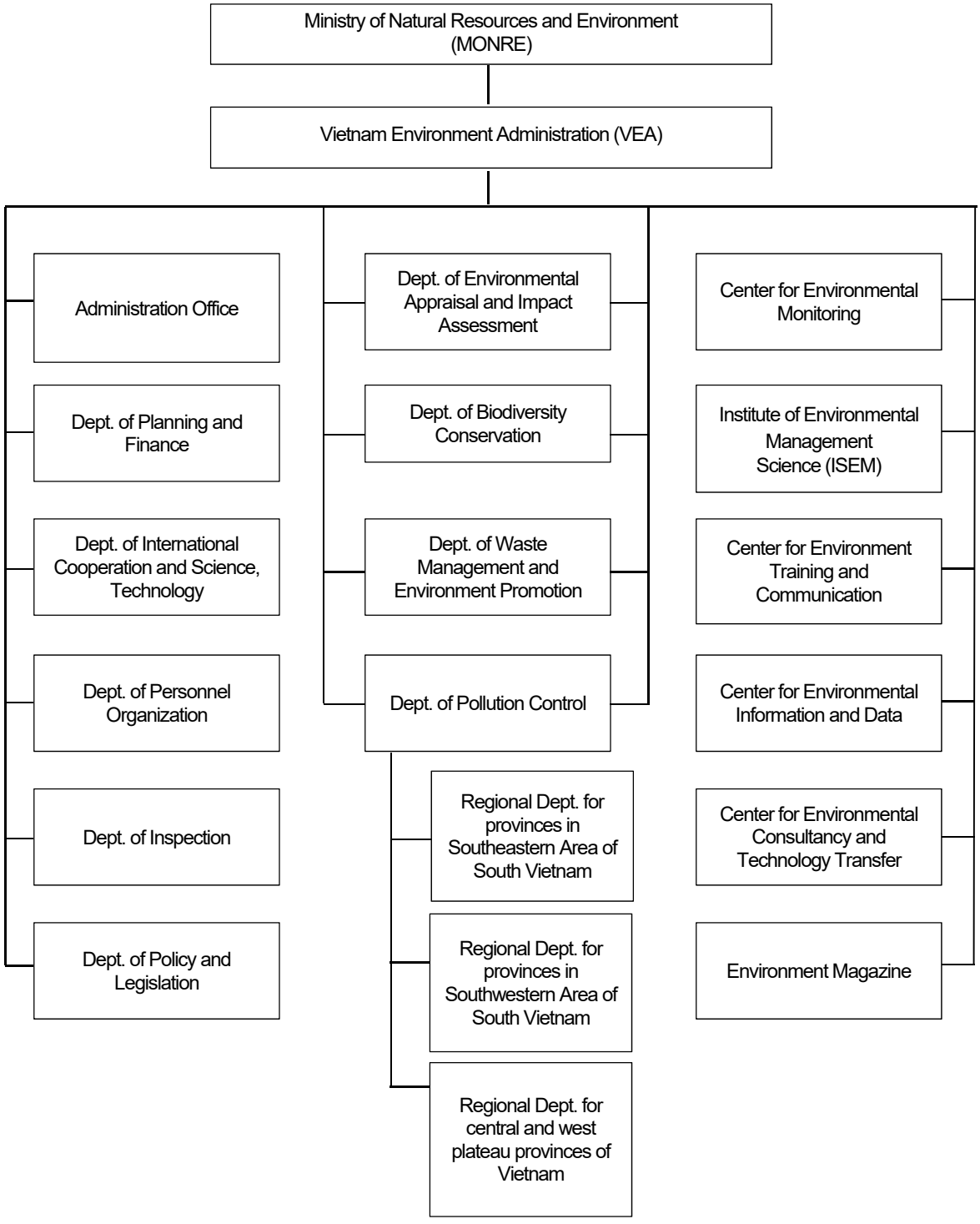


Source: Report on Environmental Impact Assessment of Ho Chi Minh City urban railway construction project, Line 3A (Ben Thanh - Tan Kien)

Figure 8.2.2 Diagram of relevant organizations

(2) EIA approval agency

Under the LEP, the EIA agencies in Vietnam is MONRE and Administrative functions concerning environmental protection are imposed on MONRE. Vietnam Environmental Administration (VEA) under the umbrella of MONRE undertakes formulation of environmental laws, regulations, strategies, plans, national goals, programs and projects. The evaluation of EIA is also under the jurisdiction of VEA. The organization chart of VEA that evaluates EIA is as shown in Figure 8.2-3.



Source: Prepared by Study Team based on VEA website

Figure 8.2.3 The organization chart of VEA that evaluates EIA under MONRE

8.3 Stakeholder Meetings

8.3.1 Legal Basis

Based on the Decree 18/2015/ND-CP, the project owner must hold stakeholder meetings (hereafter called SHM) with the People's Committee (hereafter called PC) of the affected communes, organizations, and local community in the process of preparing the EIA report as follows.

- A copy of the EIA report and a letter requesting comments are sent by the project owner to commune level PCs and organizations which may be directly affected by the project.
- Commune level PCs and organizations send the project owner comments on the EIA report within 15 business days or less after the letter requesting comments is received. No comments received will be considered as having no objection to project implementation.
- Commune level PCs and the project owner implement a SHM in cooperation. A SHM must be attended the representatives of a commune level Vietnam Fatherland Front, a local social/political organizations, labor unions, neighborhood associations, as well as the village chief. Opinions expressed by the participants must be recorded accurately.

Policy direction for social consensus in the JICA Guidelines for Environmental and Social Considerations (hereafter called JICA Guideline) are as follows:

- Projects must be adequately coordinated so that they are accepted in a manner that is socially appropriate to the country and locality in which they are planned. For projects with a potentially large environmental impact, sufficient consultations with local stakeholders, such as local residents, must be conducted via disclosure of information at an early stage, at which time alternatives for project plans may be examined. The outcome of such consultations must be incorporated into the contents of project plans.
- SHM with local residents should be implemented as necessary throughout the preparation phase and the implementation phase of the project. It is particularly desirable to implement a consultation at the time of determining the scope for the EIA, and at the time of preparing a draft EIA report.
- In preparing the EIA report, it is necessary to disclose sufficient information to the public in advance, implement SHMs with local residents etc., and prepare a memorandum of the meetings.
- Appropriate consideration must be given to vulnerable social groups, such as women, children, the elderly, the poor, and the ethnic minorities, all members of which are susceptible to environmental and social impacts and may have little access to decision-making processes within society.

8.3.2 Information described in existing EIA

According to the existing EIA report on the Line 3A (Report on Environmental Impact Assessment of Ho Chi Minh City urban railway construction project, Line 3 A (Ben Thanh – Tan Kien)), interviews were carried out with the residents within the area effected by the project, and consensus were gained from most of the parties. Moreover, a letter requesting comments concerning environmental aspects of the project were sent to 50 commune level PCs and Fatherland Front Committees, and 49 sets of comments were returned. All 49 expressed consent to the contents of the report, however they also contained requests to consider impacts on the traffic and transmission network, more attention to the underground sewage system, disclosure of information regarding hours of construction work and progress of the project to the neighboring residents, consideration towards dusts and traffic caused by the construction etc.

Resident comments in existing EIA and its response policy is shown in Table8.3.1.

Table 8.3.1 Resident comments on the project in existing EIA and its response policy

No	Name	Comments (People's Committee and Fatherland Front Committee)	Response policy
1	People's Committee of Ward Pham Ngu Lao, District 1	Agreed to the contents of the stated report. Agreed with the impacts and mitigation measures stated in the report.	—
2	People's Committee of Ward Nguyen Cu Trinh, District 1	Agreed to the contents of the stated report. Proposal to comply with the contents of the draft.	In the 2nd SHM, the Environmental Management Plan (EMP) was explained.
3	Fatherland Front Committee of Ward Nguyen Cu Trinh, District 1	■Did not receive the feedback written.	—
4	People's Committee of Ward 2, District 3	Agreed to the contents of the stated report.	—
5	Fatherland Front Committee of Ward 2, District 3	Agreed to the contents of the stated report. Proposal to comply with the mitigation measures stated in the report.	In the 2nd SHM, the Environmental Management Plan (EMP) was explained.
6	People's Committee of Ward 4, District 5	Agreed to the contents of the stated report in general. It should be noted that the construction will affect the traffic and to the medium-voltage electric grid. Need to have a fence around the open positions. Pay more attention to the construction plans to avoid impacts on underground sewers.	EIA conducted assessment and mitigation measures on the transportation by construction and the influence on the intermediate voltage transmission network. A fence around the open positions will be set up. Perform groundwater monitoring before construction, during construction, and after construction.
7	Fatherland Front Committee of Ward 4, District 5	Agreed to the contents of the stated report in general. Make sure the vibration level, flooding and the waste during the construction and operation phases. The Investors need to have other actions when problems occur.	Monitoring plan was formulated for the noise levels and waste during and after construction. EIA conducted assessment on the flooding. In the 2nd SHM, the Environmental Management Plan (EMP) was explained.

No	Name	Comments (People's Committee and Fatherland Front Committee)	Response policy
8	People's Committee of Ward 8, District 5	Agreed to the contents of the stated report.	―
9	Fatherland Front Committee of Ward 8, District 5	Agreed to the contents of the stated report.	―
10	People's Committee of Ward 9, District 5	Agreed to the contents of the stated report.	In the 2nd SHM, the Environmental Management Plan (EMP) was explained.
		Request the information about time, progress on construction for the local people.	
		Regarding the negative impact on people's daily lives, the People's Committee will work together with the project to solve it.	
11	Fatherland Front Committee of Ward 9, District 5	Agreed to the contents of the stated report.	EIA conducted assessment and mitigation measures on the influence on the intermediate voltage transmission network and the building.
		Note the high voltage system and buildings.	
12	People's Committee of Ward 11, District 5	Agreed to the contents of the stated report	―
		In the time of implementation, if any problems arise, the People's Committee of ward will cooperate with the relevant units of the project to resolve.	
13	Fatherland Front Committee of Ward 11, District 5	Agreed to the contents of the stated report	―
		The environmental impacts of project were investigated quite deep.	
		Mitigation measures to minimize adverse impacts on the environment is feasible, specific, consistent.	
14	People's Committee of Ward 12, District 5	Agreed to the contents of the stated report.	In the 2nd SHM, the Environmental Management Plan (EMP) was explained.
		The report has pointed out the negative impacts on the environment and measures to mitigate the adverse impacts.	
		Request the information about time, progress on construction for the local people. Recommend to coordinate and solve the adversely effects on the daily life of the people.	
15	Fatherland Front Committee of Ward 12, District 5	Agreed to the contents of the stated report.	In the 2nd SHM, the Environmental Management Plan (EMP) was explained.
		To ensure the approved process, limiting the possible of the impacts.	
16	People's Committee of Ward 14, District 5	Agreed to the contents of the stated report.	EIA conducted assessment and mitigation measures on the emissions, dust during transportation of raw materials. "Traffic Management Plan" was formulated to mitigate the traffic congestion. EIA conducted assessment on the park. As mitigation plan, all roadside trees will be transplanted. In the 2nd SHM, the Environmental Management Plan (EMP) was explained.
		Note to the emissions, dust during transportation of raw materials. Logical barrier to avoid a traffic jam. It also should pay attention to the systems of trees and parks. Security and order in the ward during the construction.	
		Propose to use the advanced equipment in the construction process.	
		Avoid the unnecessary arise and ensure timely of construction.	
		Recommend the investors to comply with and complete the measures and environmental protection measures.	
17	Fatherland Front Committee of Ward 14, District 5	Agreed to the contents of the stated report.	EIA conducted assessment and mitigation measures on the influence on the noise, dust, sand, and stone.
		Need to pay attention to the noise, dust, sand, stone, avoid the affecting the environment.	

No	Name	Comments (People's Committee and Fatherland Front Committee)	Response policy
18	People's Committee of Ward 15, District 5	Agreed to the contents of the stated report. Agreed to the mitigation measures.	—
19	Fatherland Front Committee of Ward 15, District 5	Agreed to the project. Noting that route through the ward is regularly flooded when it rains.	EIA conducted assessment on the flooding.
20	People's Committee of Ward 1, District 10	Agreed to the contents of the stated report. Proposal the MAUR and the construction companies to implement the measures to minimize the impacts on the environment. To ensure the progress of construction.	In the 2nd SHM, the Environmental Management Plan (EMP) was explained.
21	Fatherland Front Committee of Ward 1, District 10	Agreed to the contents of the stated report. To ensure the quality of works and completion time. Need to take measures to limit the lowest impact on the environment.	In the 2nd SHM, the Environmental Management Plan (EMP) was explained.
22	People's Committee of Ward 2, District 10	Agreed to the contents of the stated report. Note the waste water, noise, shocks to the houses of the people. Avoid the traffic congestion. Need to be fenced, accident prevention signs for people. To ensure the hygiene conditions in the project construction.	EIA conducted assessment and mitigation measures on the influence on the waste water, noise. "Traffic Management Plan" was formulated to mitigate the traffic congestion. In the 2nd SHM, the Environmental Management Plan (EMP) was explained. Monitoring plan was formulated for hygiene conditions.
23	Fatherland Front Committee of Ward 2, District 10	Agreed to the contents of the stated report. Notes to contaminated dirt, rock, sand, due to digging and drilling Note the subsidence due to underground. To choose the reasonable transport routes. Limited the transport during the peak hours. Construction the temporary noise barriers, dust barrier at the stations.	EIA conducted assessment and mitigation measures on the influence on the contaminated dirt, rock, and sand. "Traffic Management Plan" was formulated to mitigate the traffic congestion. A fence around the open positions will be set up to reduce noise and dust from construction site.
24	People's Committee of Ward 3, District 10	Agreed to the contents of the stated report. To ensure the application of mitigation measures. Execution in time and the plan will not last long.	In the 2nd SHM, not to extend the construction period as far as possible was explained.
25	Fatherland Front Committee of Ward 3, District 10	Agreed to the contents of the stated report. Minimize environmental pollution problems.	In the 2nd SHM, the Environmental Management Plan (EMP) was explained.
26	People's Committee of Ward 1, District 11	Agreed with the impacts and mitigation measures stated in the report.	—
27	Fatherland Front Committee of Ward 1, District 11	Agreed to the contents of the stated report.	—
28	People's Committee of Ward 2, District 11	Agreed to the contents of the stated report. Minimize environmental pollution problems.	In the 2nd SHM, the Environmental Management Plan (EMP) was explained.
29	Fatherland Front Committee of Ward 2, District 11	Agreed to the contents of the stated report. Suggested that the investors should have construction plans to ensure environmental quality.	In the 2nd SHM, the Environmental Management Plan (EMP) was explained.

No	Name	Comments (People's Committee and Fatherland Front Committee)	Response policy
30	People's Committee of Ward 16, District 11	Agreed to the contents of the stated report.	―
31	Fatherland Front Committee of Ward 16, District 11	Agreed to the contents of the stated report.	―
32	People's Committee of Ward 2, District 6	Agreed to the contents of the stated report. Agreed with the impacts and mitigation measures stated in the report. Should be studied and treated thoroughly the incurred unexpected that directly affect people and the environment.	In the 2nd SHM, the Environmental Management Plan (EMP) was explained. Monitoring plan was formulated for the incurred unexpected during and after construction.
33	Fatherland Front Committee of Ward 2, District 6	Agreed with the impacts and mitigation measures stated in the report. To avoid traffic congestion and pollution.	"Traffic Management Plan" was formulated to mitigate the traffic congestion. EIA conducted mitigation measures on the influence on the air pollution.
34	People's Committee of Ward 6, District 6	Agreed to the contents of the stated report. To consistency with the environmental mitigation measures as reported. Avoid using machinery noise, vibration major construction at lunchtime and after 8 pm to 5 am.	In the 2nd SHM, the Environmental Management Plan (EMP) was explained.
35	Fatherland Front Committee of Ward 6, District 6	Agreed to the contents of the stated report.	―
36	People's Committee of Ward 9, District 6	The report studied fully the impacts on the environment during construction and operation phases. The mitigation measures are well studied in the construction phase. No environmental impact study at the stations. Should focus on reducing noise during the operation of Metro routes as these are long-term effects and often.	EIA conducted assessment and mitigation measures on the influence on the noise, vibration and wastes in the station. EIA conducted mitigation measures on the influence on the noise during the operation.
37	Fatherland Front Committee of Ward 9, District 6	Agreed to the contents of the stated report. Being well shielded when no construction. Publish the information of the project for most people where the project affected the people.	SHM was conducted twice and information on the project was published.
38	People's Committee of Ward 11, District 6	Agreed to the contents of the stated report. Agreed with the impacts and mitigation measures stated in the report. Make sure the water is not contaminated, noise reduction.	EIA conducted mitigation measures on the influence on the water pollution and noise.
39	Fatherland Front Committee of Ward 11, District 6	Agreed to the contents of the stated report. Agreed with the impacts and mitigation measures stated in the report in general. Make sure the water for domestic is not contaminated. Ensure construction time, make the commitment.	EIA conducted assessment on the influence on the water pollution. In the 2nd SHM, the Environmental Management Plan (EMP) was explained.
40	People's Committee of Ward 12, District 6	Agreed to the contents of the stated report. Restrict to a minimum the impact of the project on the environment.	In the 2nd SHM, the Environmental Management Plan (EMP) was explained.

No	Name	Comments (People's Committee and Fatherland Front Committee)	Response policy
41	Fatherland Front Committee of Ward 12, District 6	Agreed to the contents of the stated report.	―
42	People's Committee of Ward, District 6	Agreed with the contents and mitigation measures stated in the report.	―
43	Fatherland Front Committee of Ward 13, District 6	Agreed to the contents of the stated report.	EIA conducted assessment and mitigation measures on the influence on the noise, vibration and wastes in the station.
		Phu Lam station will have a big impact on the environment (waste, noise...).	
		Closed station building with full customer services, limited the business around the stations.	
44	People's Committee of Ward An Lac A, Binh Tan district	Agreed to the contents of the stated report.	In the 2nd SHM, not to extend the construction period as far as possible was explained.
		To ensure compliance with the environmental impact assessment report. To ensure the application of mitigation measures. Execution in time and the plan will not last long.	
45	People's Committee of Ward An Lac, Binh Tan district	Agreed to the contents of the stated report.	In the 1st and 2nd SHM, the preparation status of the project was explained.
		Should be well prepared for the project implementation and progress of implementation.	
46	Fatherland Front Committee of Ward An Lac, Binh Tan district	Agreed to the contents of the stated report.	In the 2nd SHM, the Environmental Management Plan (EMP) was explained.
		Avoid affecting the hygiene and health of the local people.	
47	People's Committee of Ward Tân Tao A, Binh Tan district	Agreed to the contents of the stated report.	―
48	Fatherland Front Committee of Ward Tan Tao A, Binh Tan district	Agreed to the contents of the stated report.	―
49	People's Committee of Commune Tan Kien, Binh Chanh district	Agreed to the contents of the stated report.	In the 1st and 2nd SHM, the preparation status of the project was explained.
		Proposed to implement the project as fast as possible.	
50	Fatherland Front Committee of Commune Tan Kien, Binh Chanh district.	Agreed to the contents of the stated report.	―

Source:Report on EIA of Ho Chi Minh City urban railway construction project,Line 3A (Ben Thanh - Tan Kien)

8.3.3 Result of SHM

(1) 1st SHM

1) Objectives

Under the provisions of Vietnam on the environmental protection and the requirements of the JICA, The Management Authority for Urban Railways has directed the Environmental Consultant in coordination with the local authorities to hold the public consultation meetings regarding the Project.

The main objectives of these public consultation meetings are:

- To provide the affected people and local communities with basic information about the Project.
- To collect opinions of the affected people and local communities about the Project plans, particularly the impacts and measures to mitigate the environmental impacts.
- To answer inquiries of the affected people and local community regarding the environmental impacts as well as and the measures to mitigate them; To call for the active opinion contribution of the affected people and local communities, etc. to the Project.

2) Contents of Public Consultation Meetings

Stage 1 include the main contents as follows: (i) disseminating information about the Project (context, needs for the Project, etc.); (ii) explaining alternatives and forecasted impacts; (iii) collecting participants' opinions/proposals on the Project and matters regarding the environment, site clearance and resettlement; and (iv) promoting cooperation and participation of the affected people and local communities in the project implementation plans.

3) Result of Public Consultation Meetings

Public consultation meetings were held by each ward/commune at different venues and times with the participation of the local authorities, relevant organizations and affected people, including:

- Affected households/organizations by the Project;
- Representatives of ward People's Committees;
- Representatives of locally social and political organizations;

Venues, times and results of the 1st Public consultation meeting as follows (Table 8.3.2)

Table 8.3.2 Results of the 1st Public Consultation Meetings

No	District	Ward	Meeting day	Representative of stakeholders			Main opinions of stakeholders
				Male	Female	Total	
1	District 1	Pham Ngu Lao	June 21 2016	35	16	51	- Agree with conducting the SHM but Project shall minimize impacts on people livings. - During stage of station construction, the business will be affected by their income. - Replacing cost should be assess at time of compensation. - With the huge traffic volume in Thai Binh Market area, traffic congestion will increase due to C1 Station construction. - Compensation policies shall be fair, replacement cost must be equivalent to market price.
2		Nguyen Cu Trinh	June 23 2016	11	11	22	- Project should be researched to increase the depth of the railway. In this case, local people will be able to build high buildings in the future. - Project shall be assessed the impact of noise and vibration in construction and operation stages.
3	District 3	Ward 2	June 22 2016	14	6	20	- Thang Long Secondary School has plans to extend the main gate. They proposed to move the entrance of C2 station toward the ACB Bank office (beside the school in the Nguyen Thi Minh Khai Street) - Arranging the elevator to serve the elderly and disabled person.
4	District 10	Ward 1	June 13 2016	13	10	23	- The project shall be carefully studied construction plans. Using fence around station construction area for a long time will seriously affect the business of the households. Compensation and support policies should be prepared for business household. - Households want to know the starting time of construction.
5		Ward 2	June 11 2016	21	19	40	- Announced the starting time of construction soon, so that local people will have the plan for themselves. - Announced the impact assessment by noise, vibration in next SHM. Preparing of mitigation measures and support policies if it has any negative impact on living. - Establishing of grievance mechanism. - Establishing of supervision mechanism.
6	District 5	Ward 4	June 14 2016	25	18	43	- Agree with the Project's investment policy. Local people want to have fair and clearly compensation policies. - Should have policies for partial land acquisition. - Should have support for loss of business households during construction stage. - The leasing contract has the term of 3-5 years at present. If the Project do not announced the starting construction time soon, the leasing households will suffer to loss because of compensation for breaking lease contract. - Should announce the information of relevant agencies such as Project Owner, Constructor, and Supervisor Consultant... before construction. - Project owners should co-operate with local authorities for consulting the local people about the scope of safety corridor from now on. If not, from now to before the cut-off date, the local people may construct the high building on the scope of safety corridor. It will be wasteful if it is dismantled when started to construct.

No	District	Ward	Meeting day	Representative of stakeholders			Main opinions of stakeholders
				Male	Female	Total	
7		Ward 9	June 9 2016	29	29	58	- Should have mitigation measures and grievance mechanism. - Assessing the impacts on 30/4 Hospital area due to C3 Station construction and preparing mitigation measures.
8		Ward 11	June 10 2016	19	7	26	- Representative of University of medicine and pharmacy want to have meeting with Study Team to discuss in detailed of the Project. The construction of Project will be affected seriously on activities of hospital. - Business households will be affected by C4 and C5 station construction. Need to have support policies for this case. - The ticket price should be appropriate to improve the efficiency of the urban railway. - The two stations (C4, C5) are located too close together, so the negative impacts will be increased significantly. Local people want to know the compensation and support policies of Project. - Is the renovation of the old building near the station area able to happen while the starting time of construction has not occurred yet? - Proposing study of location of 2 stations (C4, C5).
9		Ward 12	June 21 2016	8	7	15	- Should have compensation and support policies. - Local people want to know starting time of Project's construction. - Reducing time of station construction. - Presenting result of impact assessment, mitigation measure in 2nd SHM
10		Ward 14	June 8 2016	21	26	47	- Should assess the impacts by vibration on the buildings along the route. - Local people worried about the impact of safety corridors of underground construction. It will effect on development of their houses.
11		Ward 15	June 8 2016	24	28	52	- Shall know compensation policies when land acquisition.
12	District 11	Ward 1	June 15 2016	17	11	28	- Agree with the Project's investment policy. - Proposed support measures such as tax reduction for business during construction stage. - Proposed during station construction, constructions in nearby area should be limited to avoid traffic jam. - Limited truck, bus and passenger car in Hong Bang Street during station construction. - Should have mitigation measures of impact on traffic and business.
13		Ward 2	June 15 2016	14	8	22	- Agree with the Project's investment policy. - Should have mitigation measures of negative impacts. - Reorganizing the traffic in nearby roads during station construction to reduce traffic jam.
14		Ward 16	June 14 2016	12	16	28	- Representative of ward's authority introduce the Sidewalks Renovation Project along Hong Bang Street in ward 16 area. Part of the funding of construction will be contributed by local people. They worried the new sidewalks will be damaged when Project's construction start. They proposed Project should discuss with District 11's authority about this project. - Should be in detail of station's design in 2nd SHM, especially land acquisition scope.

No	District	Ward	Meeting day	Representative of stakeholders			Main opinions of stakeholders
				Male	Female	Total	
15	District 6	Ward 2	June 6 2016	36	18	54	- Proposed moving the entrance of station to avoid effect on business households.
16		Ward 6	June 17 2016	16	16	32	- Proposed mitigation impact on business as tax reduction and support during station construction. Reducing time of construction to minimizing impacts.
17		Ward 9	June 18 2016	31	20	51	- Proposed study impacts on house structure during construction, compensation policies for damaged house due to Project's activities. - Announced starting time of construction soon.
18		Ward 12	June 16 2016	32	23	55	- Announced information of affected households (number, kind of household, kind of land, house, business...) in 2nd SHM
19		Ward 13	June 23 2016	27	13	40	- Agree with the Project's investment policy. - Using fence around station construction area with long time will seriously affect the business of the households. Compensation and support policies should be prepared for business household. - Announced land acquisition and resettlement policies of Project in 2nd SHM.
20		Ward 14	June 18 2016	18	4	22	- Proposed study route alignment in section from Tan Hoa Street to Ong Buong Bridge to minimizing impacts on houses. - Announced starting time of construction soon.
21	Binh Tan District	An Lac	June 22 2016	55	40	95	- Agree with the Project's investment policy and the organization of SHM - Should have mitigation measures. - Project should be comply with the commitments in environmental protection and resettlement policy.
22		An Lac A	June 20 2016	30	23	53	- Announced land acquisition and resettlement policies of Project in 2nd SHM. - Before construction, Project should be organize SHM to present the newest information of Project with local people. - Should assess impact by noise and vibration on resident area during the operation stage.

Source: EIA of Ho Chi Minh City urban railway construction project, Line 3A (Ben Thanh - Tan Kien)

(2) 2nd SHM

1) Objectives

After obtaining the results of 1st SHM, the project owner researched and provided appropriated design solutions for the project. Next, the project owner continues to carry out the 2nd SHM to present the solutions for the comments received from the 1st recording as well as answered and clarified the recommendations of the community.

2) Contents of Public Consultation Meetings

The 2nd SHM included: (i) present the detailed content about the impacts on the natural environment - society and the corresponding mitigated measures; (ii) presented the content for

implemented plan of resettlement; (iii) communicate and discuss issues of environmental protection and land acquisition of the Project (iv) answer the comments from the 1st SHM;

3) Result of Public Consultation Meetings

The 2nd SHM was held in the whole of 22 wards in the project area. Participants are similar to first time, including:

- Households / organizations affected by the project;
- Representatives from Wards People's Committee;
- Representatives of local society-political organizations ;

The schedule and outline of each meeting is shown in the Table 8.3.3

The comments from the participants in the 2nd SHM and the responses from the project side are as shown in Table 8.3.4. Contents concerning social consideration such as compensation are described in "Chapter 9 Social Considerations".

Table 8.3.3 Schedule and presentative of 2nd Stakeholder Meeting

No	District	Ward	Meeting day	Representative of stakeholders		
				Male	Female	Total
1	1	Pham Ngu Lao	Nov 29th 2016	26	22	**48**
2		Nguyen Cu Trinh	Oct 2nd 2016	9	6	**17**
3	3	2	Oct 18th 2016	28	35	**63**
4	10	1	Oct 3rd 2016	19	12	**31**
5		2	Sep 30th 2016	19	17	**36**
6	5	4	Oct 10th 2016	27	20	**47**
7		9	Oct 4th 2016	29	32	**61**
8		11	Oct 18th 2016	6	4	**10**
9		12	Oct 19th 2016	6	9	**15**
10		14	Oct 6th 2016	22	33	**55**
11		15	Oct 5th 2016	11	17	**28**
12	11	1	Oct 7th 2016	10	18	**28**
13		2	Oct 6th 2016	7	2	**9**
14		16	Oct 12th 2016	11	19	**30**
15	6	2	Oct 20th 2016	9	7	**16**
16		6	Oct 20th 2016	9	7	**16**
17		9	Oct 11th 2016	24	10	**34**
18		12	Oct 21st 2016	18	6	**24**
19		13	Oct 19th 2016	6	2	**8**
20		14	Oct 13th 2016	18	6	**24**
21	Binh Tan	An Lac	Oct 21st 2016	24	15	**39**
22		An Lac A	Oct 14th 2016	20	9	**29**

Table 8.3.4 Results of 2nd Stakeholder Meeting

No.	District	Ward	Major opinions/ comments of the stakeholders regarding resettlement	Response from MAUR, WPC and Consultant
1	1	Pham Ngu Lao	- No question about environmental issues	n/a
2		Nguyen Cu Trinh	- Agree with the presented environmental impacts and mitigation measures.	n/a
			- We recommend the Project to keep research to minimize impacts on people's living.	n/a
3	3	Ward 2	- Moving the Station C3 to center of Six Way Junction to minimize impact on residential land acquisition.	- According to the planning, the Six Way Junction station will connect two railway No.3a and No.3b. Therefore, the design must ensure the connectivity and compliance with the standards. The project recognized this opinion to continue research in the next phase of the project.
			- Agree with the presented environmental impacts and mitigation measures.	n/a
4	10	Ward1	- We recommend the Project to keep research to minimize impacts on residential land acquisition.	- The project recognized this opinion to continue research in the next phase of the project.
5		Ward 2	- Forecast of the impact caused by vibrations during the construction of underground drilling shows that there will be no impact to the surrounding buildings. However, if during the construction still influenced, how to solve?	- Measures for reducing the impact caused by vibrations during the construction phase are: Check the status quo before the construction, supervision and continuous monitoring at the construction site. If the phenomenon affected by vibrations, the construction company will immediately stop construction and applied remedies.
			- Recommend projects to strictly implement the proposed measures, to closely monitor the construction company, and coordinate with the local government to quickly resolve incurred issues.	- The project would like to acknowledge this opinion.
6	5	Ward4	- It is recommended to continue the research project regarding the location and distance of the station	- The project recognized this opinion to continue research in the next phase of the project.
			- During the process of implementation, it should be monitored the implementation of environmental protection measures.	
			- Agree with the presented environmental impacts and mitigation measures.	
7		Ward9	- After the clearance, how do remained households have to be effected in their living environment?	- There will be some negative impact on the lives of people such as dust pollution, noise pollution, traffic congestion and affect business operations. The mitigation measures of the project will be applied in order to minimize these impacts.
8		Ward11	- Agree with the presented environmental impacts and mitigation measures.	n/a
9		Ward12	- Recommend Project design studies entire 3A underground railway to get more land for transport development later.	- The project recognized this opinion to continue research in the next phase of the project.
			- The project should be noted for drainage and underground railway stations to prevent operational problems.	
			- The project should coordinate to the unit who managing the infrastructure such as electricity, water and communications to conduct synchronous execution.	
			- Agree with the presented environmental impacts and mitigation measures.	

No.	District	Ward	Major opinions/ comments of the stakeholders regarding resettlement	Response from MAUR, WPC and Consultant
10		Ward14	- Recommend the project to implement mitigated measures to the life of the people. - The Conference reached the agreement to the measures on minimizing environmental impact. Recommend the project to continue in research and improvement.	- The project recognized this opinion to continue research in the next phase of the project.
11		Ward15	- It is recommended to take measures quickly to reduce construction impacts on businesses. - The Conference reached the agreement to the measures on minimizing environmental impact. Recommend on close supervision and strict implementation of the proposed measures.	- The project recognized this opinion to continue research in the next phase of the project.
12	11	Ward1	- The Conference reached the agreement to the measures on minimizing environmental impact. Recommend the project to implement the management and supervision of the construction process.	n/a
13		Ward2	- The Conference reached the agreement to the measures on minimizing environmental impact. Recommend the project to implement the management and supervision of the construction process.	n/a
14		Ward16	- The Conference reached the agreement to the measures on minimizing environmental impact. Recommend the project to implement the management and supervision of the construction process.	n/a
15	6	Ward2	- The Conference reached the agreement to the measures on minimizing environmental impact.	n/a
16		Ward6	- The Conference reached the agreement to the measures on minimizing environmental impact.	n/a
17		Ward9	- The Conference reached the agreement to the measures on minimizing environmental impact.	n/a
18		Ward12	- The Conference reached the agreement to the measures on minimizing environmental impact.	n/a
19		Ward13	- Forecast of the impact caused by vibrations during the construction of underground drilling shows that there will be no impact to the surrounding buildings. However, if during the construction still influenced, how to solve? - The Conference reached the agreement to the measures on minimizing environmental impact.	- Measures for reducing the impact caused by vibrations during the construction phase are: Check the status quo before the construction, supervision and continuous monitoring at the construction site. If the phenomenon affected by vibrations, the construction company will immediately stop construction and applied remedies.
20		Ward14	- The Conference reached the agreement to the measures on minimizing environmental impact.	n/a
21	Binh Tan	An Lac	- Project should be noted to supervise noise due to impact during the operation phase. - The Conference reached the agreement to the measures on minimizing environmental impact.	n/a
22		An Las A	- We recommend the Project to keep research to minimize the impact caused by noise in the operation stage - The Conference reached the agreement to the measures on minimizing environmental impact.	- We noted this comment and will continue the study on this issue.

8.4 Policy Gap Analysis

Altogether, Vietnamese EIA related laws and regulations does not have a large difference comparing with JICA guidelines for environmental and social considerations, and World Bank Safeguard Policies. However, it seems that the Vietnamese system has possibilities to improve system of details of consideration on following items.

(1) Regional economy such as employment and livelihood

(2) Land use and utilization of regional resources

(3) Social organization such as social related capital and regional decision-making organizations

(4) Socially vulnerable such as poverty, ethnic minorities and others

(5) Uneven damages and benefits

(6) Gender and child's right

(7) Conflict of interest

Comparison between JICA guidelines for environmental and social considerations and Vietnamese EIA related laws and regulations is as shown in Table 8.4.1.

Table 8.4.1 Comparison between JICA guidelines for environmental and social considerations and Vietnamese EIA related laws and regulations

JICA guidelines for environmental and social considerations	Vietnamese EIA related laws and regulations	Gap mitigation plan
Underlying Principles		
1. Environmental impacts that may be caused by projects must be assessed and examined in the earliest possible planning stage. Alternatives or mitigation measures to avoid or minimize adverse impacts must be examined and incorporated into the project plan.	Concerning to installation of the strategic environmental assessment of the policy and masterplans, in previous to the F/S, system has been developed under the new environment conservation law. The target of the strategic environmental assessment are Social Economic Development Strategy, Masterplan, National Plan, Regional Development Plan, Plan by Regional Government, Important Economic Zone Plan, Interstate Plan, etc. For the F/S stage, projects which may largely impact to the environment, which is listed on the Attachment II of the Decree No. 18/2015/ND-CP, are required to conduct the EIA.	Essential items shall be studied and listed according to the process of JICA guidelines for environmental and social considerations and the EIA Report framework in World Bank's Operational Policy.
2. Such examinations must be endeavored to include an analysis of environmental and social costs and benefits in the most quantitative terms possible, as well as a qualitative analysis; these must be conducted in close harmony with the economic, financial, institutional, social, and technical analyses of projects.	Not mentioned.	Concerning to the social environmental impact, assessment on project's impact to surrounding environment and local residents and project's benefit to the transportation network through development of urban railway (resolution of traffic congestion, contribution to climate change, etc.) should be evaluated quantitatively and qualitatively.
3. The findings of the examination of environmental and social considerations must include alternatives and mitigation measures, and must be recorded as separate documents or as a part of other documents. EIA reports must be produced for projects in which there is a reasonable expectation of particularly large adverse environmental impacts.	According to the Clause 19 of the Law on Environmental Protection, 2014, and the Decree No.18/2015/ND-CP, they ruled that a project which has large impact requires the EIA Report.	In this Survey, the EIA Report will be compiled based on Vietnamese EIA related laws and regulations as well as the standard which meets the criteria and requirements of JICA guidelines for environmental and social considerations.
4. For projects that have a particularly high potential for adverse impacts or that are highly contentious, a committee of experts may be formed so that JICA may seek their opinions, in order to increase accountability.	Not mentioned.	In this Survey, further field survey and status of briefing session for residents will be monitored to secure the transparency. In case the Survey faces critical negative opinions, required correspondence will be studied.
5. When assessment procedures already exist in host countries, and projects are subject to such procedures, project proponents etc. must officially finish those procedures and obtain the approval of the government of the host country.	According to the Law on Environmental Protection, 2014, and the Decree No.18/2015/ND-CP, this Project is in need of the EIA Report. Such EIA Report should be submitted to and authorized by the environment control authority.	In this Survey, we support the implementation body compile the report which meets with criteria ruled in the Vietnamese EIA related laws and regulations, as well as support on application for the authorization.

JICA guidelines for environmental and social considerations	Vietnamese EIA related laws and regulations	Gap mitigation plan
Examination of Measures		
1. Multiple alternatives must be examined in order to avoid or minimize adverse impacts and to choose better project options in terms of environmental and social considerations. In the examination of measures, priority is to be given to avoidance of environmental impacts; when this is not possible, minimization and reduction of impacts must be considered next. Compensation measures must be examined only when impacts cannot be avoided by any of the aforementioned measures.	According to the Appendix 2.5 "Required items in the EIA Report" to the Circular No.26/2011/TT-BTNMT issued by MONRE, a study on alternative plans for project location is ruled. However, there is no rules for study on alternative plans regarding to design conditions of the road alignment. In addition, there is no sentences for a preferential study on the impact avoidance.	In this Survey, several alternatives will be studied including the facilities at stations and the structure of rail (including tunnel and elevation) as well as zero-option.
2. Appropriate follow-up plans and systems, such as monitoring plans and environmental management plans, must be prepared; the costs of implementing such plans and systems, and the financial methods to fund such costs, must be determined. Plans for projects with particularly large potential adverse impacts must be accompanied by detailed environmental management plans.	According to the Appendix 2.5 "Required items in the EIA Report" to the Circular No.26/2011/TT-BTNMT issued by MONRE, there are detailed rules of the environment control plan and the monitoring plan to be included in the EIA Report.	In this Survey, the environment control plan and the monitoring plan will be compiled and included in the EIA Report.
Scope of Impacts to Be Assessed		
1. The impacts to be assessed with regard to environmental and social considerations include impacts on human health and safety, as well as on the natural environment, that are transmitted through air, water, soil, waste, accidents, water usage, climate change, ecosystems, fauna and flora, including trans-boundary or global scale impacts. These also include social impacts, including migration of population and involuntary resettlement, local economy such as employment and livelihood, utilization of land and local resources, social institutions such as social capital and local decision-making institutions, existing social infrastructures and services, vulnerable social groups such as poor and indigenous peoples, equality of benefits and losses and equality in the development process, gender, children's rights, cultural heritage, local conflicts of interest, infectious diseases such as HIV/AIDS, and working conditions including occupational safety.	According to the Appendix 2.5 "Required items in the EIA Report" to the Circular No.26/2011/TT-BTNMT issued by MONRE, it is ruled that all assumable impacts before the construction, during the construction, and during operation should be estimated and evaluated. Concerning to the period before the construction, it is ruled that impacts related to the land acquisition and the resettlement should be evaluated. Moreover, it is ruled that all assumable impacts caused by activities during the construction period and the operation period should be estimated and evaluated.	In this survey, the EIA and resettlement related issues will be researched according to the survey items and standards of JICA guidelines for environmental and social considerations.
2. In addition to the direct and immediate impacts of projects, their derivative, secondary, and cumulative impacts as well as the impacts of projects that are indivisible from the project are also to be examined and assessed to a reasonable extent. It is also desirable that the impacts that can occur at any time throughout the project cycle should be considered throughout the life cycle of the project.	Not mentioned.	In this survey, direct and immediate impacts of the project as well as derivative and secondary impacts, accumulative impacts, and impacts from inseparable projects will be researched and studied.

JICA guidelines for environmental and social considerations	Vietnamese EIA related laws and regulations	Gap mitigation plan
Compliance with Laws, Standards, and Plans		
1. Projects must comply with the laws, ordinances, and standards related to environmental and social considerations established by the governments that have jurisdiction over project sites (including both national and local governments). They must also conform to the environmental and social consideration policies and plans of the governments that have such jurisdiction.	According to the Appendix 2.5 "Required items in the EIA Report" to the Circular No.26/2011/TT-BTNMT issued by MONRE, it is ruled that the abstract of the EIA Report should contains laws and regulations and environmental standard as an evidence of implementation of the EIA.	In this survey, the project plan will be developed complying with Vietnamese environmental laws, EIA related laws, regulations, circulars and standards.
2. Projects must, in principle, be undertaken outside of protected areas that are specifically designated by laws or ordinances for the conservation of nature or cultural heritage (excluding projects whose primary objectives are to promote the protection or restoration of such areas). Projects are also not to impose significant adverse impacts on designated conservation areas.	According to the Appendix II of the Decree No. 18/2015/ND-CP, it is ruled that all projects which use land in national park, natural preserve, preserve for world heritage, ecosystem preserve, preserve for historical cultural heritage which is designated by the government, and scenic place are required the EIA Report. Project implementation in such locations are not prohibited; however, EIA Report is required.	Concerning to the surrounding area of this project, there are no designated areas nor districts for natural preserve and cultural heritage.
Social Acceptability		
1. Projects must be adequately coordinated so that they are accepted in a manner that is socially appropriate to the country and locality in which they are planned. For projects with a potentially large environmental impact, sufficient consultations with local stakeholders, such as local residents, must be conducted via disclosure of information at an early stage, at which time alternatives for project plans may be examined. The outcome of such consultations must be incorporated into the contents of project plans. • The negotiation with the stakeholders such as local residents should be conducted throughout the period of preparation and implementation. Particularly, it is preferable that the negotiation is conducted before selection of the items for EIA and before drafting the EIA Report. • Concerning to the preparation of the environment assessment report, the negotiation with the stakeholders such as local residents should be conducted; information should be sufficiently shared in prior to the negotiation. Proceedings of the negotiation should be compiled.	According to the Decree No.18/2015/ND-CP, it is ruled that the project owner should negotiate with PC, organization, and local community for drafting the EIA Report. Process of such negotiation is also ruled. The project owner should submit a copy of the EIA Report and a letter for request on comments to the commune PC and the organization which will be directly affected by the project. The commune PC and the organization should submit written comments to the project owner within 15 business days after receive of the request letter. It is deemed that the commune PC and the organization have no objection to the project implementation if the commune PC and the organization would not submit the written comments. The project owner and the commune PC should hold conference with local residents. Such conference should be attended by representatives of Vietnam Fatherland Front representatives from regional social and governmental organization, representatives of the occupational union, representatives of the neighborhood association, and village chief. Opinions at the negotiation should be accurately recorded.	To promote understanding and participation of local residents, following methods will be adopted into this Project according to the policy of JICA guidelines for environmental and social considerations. 1) Promotion of understanding with the Project through brochure at the SHM. 2) Brief report at the SHM about the result of the natural environment survey and the survey for environmental social consideration. 3) Take 2 steps of the SHM. One for the scoping stage, and the other for the DF/R stage. 4) Promote wide participation in SHM. 5) Communication through the socio-economic survey (interview survey by visiting every house). 6) Conduct a focused group meeting with targeting on the social minorities. 7) Study on local resident's opinion to reflect such opinions to the plan.

JICA guidelines for environmental and social considerations	Vietnamese EIA related laws and regulations	Gap mitigation plan
2. Appropriate consideration must be given to vulnerable social groups, such as women, children, the elderly, the poor, and ethnic minorities, all members of which are susceptible to environmental and social impacts and may have little access to decision-making processes within society.	Not mentioned.	Collect opinions and requests from the social minorities through the SHM, the social survey and the focused group meeting; and reflect such opinions and requests to the project plan such as RAP.
Information disclosure		
• JICA discusses frameworks with project proponents etc. in order to ensure information disclosure, and comes to an agreement in an early stage of cooperation projects. • EIA reports are required to be made available to the local residents of the country in which the project is to be implemented. The EIA reports are required to be available at all times for perusal by project stakeholders such as local residents and copying must be permitted. • EIA reports (which may be referred to differently in different systems) must be written in the official language or in a language widely used in the country in which the project is to be implemented. When explaining projects to local residents, written materials must be provided in a language and form understandable to them.	• According to the Clause No. 131 of the Law on Environmental Protection, 2014, the EIA Report is included as the environment related information which should be disclosed. However, detailed guidance on disclosure process has yet to be issued. • EIA Report is generally written in Vietnamese, the official language.	Following items should be offered to the implementation body and the organization of the regional government to have appropriate information disclosure: • Proactive announcement on the project related information through mass communications. • Announce on the information disclosure at the SHM. • Disclose the EIA Report in Vietnamese and English • Disclose the result of the monitoring survey In addition, this Project is categorized to "Category A" based on JICA category. Thus, information of this project will be disclosed at JICA website when Vietnamese government authorizes this Project.
Ecosystem and bita		
1. Projects must not involve significant conversion or significant degradation of critical natural habitats and critical forests.	According to the Appendix II of the Decree No.18/2015/ND-CP, it is ruled that the project which may bring damage to forests and which may require revision of land use at forests area should compile the EIA Report and have authorization by the environment control body.	In this project, there are no important natural habitats nor important forests near the Project Site.
2. Illegal logging of forests must be avoided. Project proponents etc. are encouraged to obtain certification by forest certification systems as a way to ensure the prevention of illegal logging.	According to the Clause No. 7 "Prohibited Acts" of the Law on Environmental Protection, 2014, destruction of the natural resources and illegal cultivation are prohibited. However, there is no detailed rules on illegal logging of forests.	There are no forests near the Project Site.
Involuntary Resettlement	Refer to Section 9.2.3.	Refer to Section 9.2.3

JICA guidelines for environmental and social considerations	Vietnamese EIA related laws and regulations	Gap mitigation plan
Concern about Social Environment and Human Rights		
JICA respects the principles of internationally established human rights standards such as the International Convention on Human Rights, and gives special attention to the human rights of vulnerable social groups including women, indigenous peoples, persons with disabilities, and minorities when implementing cooperation projects.	According to Vietnamese EIA related laws and regulations, there are sentences of support to mother-child family household and sick and wounded soldiers who may be affected by land acquisition and resettlement. In addition, in the general policy of the Law on Environmental Protection, 2014, there are sentences about "Ensuring children's rights and promotion of gender equality".	EIA survey items and RAP survey items of JICA projects and ADB projects which was conducted in the past and which categorized as Category A are basically not different from JICA guidelines for environmental and social considerations. Thus, this Project will adopt similar items for the assessment. In addition, such items for the assessment can cover the requirements of Vietnamese domestic systems.
Indigenous Peoples		
Any adverse impacts that a project may have on indigenous peoples are to be avoided when feasible by exploring all viable alternatives. When, after such an examination, avoidance is proved unfeasible, effective measures must be taken to minimize impacts and to compensate indigenous peoples for their losses.	In Vietnamese EIA related laws and regulations, there is no detailed rules regarding ethnic minorities.	It seems that there is no ethnic minorities in the targeted area for this Project. In case the social survey finds residence of ethnic minorities, further survey and study will be conducted according to JICA guidelines for environmental and social considerations.
When projects may have adverse impacts on indigenous peoples, all of their rights in relation to land and resources must be respected in accordance with the spirit of relevant international declarations and treaties, including the United Nations Declaration on the Rights of Indigenous Peoples. Efforts must be made to obtain the consent of indigenous peoples in a process of free, prior, and informed consultation.	Same as above.	Same as above.
Measures for the affected indigenous peoples must be prepared as an indigenous peoples plan (which may constitute a part of other documents for environmental and social consideration) and must be made public in compliance with the relevant laws and ordinances of the host country. In preparing the indigenous peoples plan, consultations must be made with the affected indigenous peoples based on sufficient information made available to them in advance. When consultations are held, it is desirable that explanations be given in a form, manner, and language that are understandable to the people concerned. It is desirable that the indigenous peoples plan include the elements laid out in the World Bank Safeguard Policy, OP4.10, Annex B.	Same as above.	Same as above.
Monitoring		
After projects begin, project proponents etc. monitor whether any unforeseeable situations occur and whether the performance and effectiveness of mitigation measures are consistent with the assessment's prediction. They then take appropriate measures based on the results of such monitoring.	Essentiality of the environment monitoring plan is mentioned in the Clause 22 "Required contents of EIA Report" of the Law on Environmental Protection, 2014.	There is no differences from JICA guidelines for environmental and social considerations in essentiality of the environment monitoring plan.

JICA guidelines for environmental and social considerations	Vietnamese EIA related laws and regulations	Gap mitigation plan
In cases where sufficient monitoring is deemed essential for appropriate environmental and social considerations, such as projects for which mitigation measures should be implemented while monitoring their effectiveness, project proponents etc. must ensure that project plans include feasible monitoring plans.	Same as above.	The environment control plan and the environment monitoring plan should be compiled at F/S stage and D/D stage of the project plan and included in the EIA Report (or in the updated EIA Report). Additionally, the organization chart and implementation ability of the project implementation body are need to be identified. Comment on ability improvement of the environment control and monitoring are to be conducted; if required.
Project proponents etc. should make efforts to make the results of the monitoring process available to local project stakeholders.	In current Vietnamese laws and regulations, there is no detailed rules regarding the environment monitoring and disclosure of the monitoring results.	For the construction period and the operation period of this Project, disclosure of the result of the monitoring survey will be considered. Development of organization should be negotiated with the local authorities.
4. When third parties point out, in concrete terms, that environmental and social considerations are not being fully undertaken, forums for discussion and examination of countermeasures are established based on sufficient information disclosure, including stakeholders' participation in relevant projects. Project proponents etc. should make efforts to reach an agreement on procedures to be adopted with a view to resolving problems.	For the period of planning and preparation of the project, there are rules on holding the negotiation opportunity with local residents. However, for the construction period and the operation period, there is no rules on negotiation with the local residents. Meanwhile, objections against the project such as arbitration may be proceeded through steps of commune, rural district, province, and central government. Additionally, lawsuits at the court are available.	When third parties pointed out, no matter whether in the construction period or in the operation period, correspondence will be handled through the PC. Development of organization which take role of correspondence should be negotiated with the local authorities.

Source: JICA guidelines for environmental and social considerations, Vietnamese EIA related laws and regulations

8.5 Impacts (Scoping)

Environmental impacts which is estimated by implementation of project were discussed based result of field work and literature research (Existing EIA、FS report, etc). The following is the summary of the scoping results (Table 8.5.1), classified environmental impacts depending on the degree of expected impacts.

Table 8.5.1 Scoping results

Class	No	Impacts	Evaluation		Reasons for Assessment
			Before/ During construction	During operation	
Anti-pollution Measures	1	Air pollution	B-	B+	[During construction] • Dust and exhaust fumes will be generated from construction work • Temporary increase dust and exhaust fumes are expected due to operation of vehicles and construction machine. Dust will be generated when traffic jam and public work increases during construction. • Impact from dust from excavation work and soil transport. [During operation] • CO_2 and airborne pollutants are expected to decreased due to modal shift and reduce traffic congestion.
	2	Water pollution	B-	B-	[During construction] • Ground water and underground water could be contaminated by muddy water from construction work and bentonite runoff during boring. • Water area include underground water could be contaminated when large quantity oil and fuel runoff due to accidents. [During operation] • There could be impact to ground water if wastewater unprocessed property from station buildings.
	3	Waste	B-	B-	[During construction] • Oil runoff could occur from construction machine and construction waste, general waste also could occur from construction workers. • Excavation soil will be generated from tunnel construction, surplus soil is expected to disposal and reuse as ground leveling materials. [During operation] • Waste could occur form employee and users of the station.
	4	Soil pollution	B-	D	[During construction] • Soil pollution are expected from construction worker's waste and oil runoff of construction machine. [During operation] • This projects is not expected to have any impact.
	5	Noise and vibration	B-	B±	[During construction] • Noise and vibration level which occur from construction vehicles are expected to increase due to construction work. [During operation] • Noise and vibration from traveling of railway vehicle are expected. • Noise and vibration level in a periphery of a road are expected to decrease due to modal shift and reduce traffic congestion.
	6	Ground subsidence	B-	C-	[During construction] • Ground subsidence could occur due to change of underground water dynamics and topography from tunnel construction. [During operation] • Ground subsidence could occur at the tunnel section during the unpredictable period and scale.

Class	No	Impacts	Evaluation		Reasons for Assessment
			Before/ During construction	During operation	
	7	Offensive odors	D	D	[During construction] • Offensive is not expected from oil of construction machine and construction worker's waste. [During operation] • This projects is not expected to have any impact.
	8	Sediment	C-	D	[During construction] • Muddy water from construction work could have impact to bottom sediment of canal and channel. [During operation] • This projects is not expected to have any impact.
Natural Environment	9	Protected area	D	D	[During construction/ During operation] • This projects is not expected to have any impact because of Can Gio mangrove forest is located 25km far from scheduled line.
	10	Ecosystem	B-	D	[During construction] • The scheduled area and surrounded area are city (include park) which is not habitat of important animal and plants. • Logging of roadside trees could have impact to local ecosystem at the part of project area. [During operation] • This projects is not expected to have any impact.
	11	Hydrology	C-	D	[During construction] • Waste water from construction work could have impact to hydrometer of canal and channel. [During operation] • This projects is not expected to have any impact.
	12	Topography and geology	D	D	[During construction/ During operation] • There is no important topography and geology at the surrounded area of project.
Social Environment	13	Resettlement and land acquisition	A-	D	[Before construction] • Approximately 286 residents may be relocated at the station and part of scheduled line by the existing FS report. [During construction] • There is a possibility of need additional resettlement include temporary land leasing to secure the area such as construction yard. [During operation] • No resettlement is expected during operation.
	14	Poverty	C-	C-	[During construction/ During operation] • It can be difficult to livelihood rehabilitation of poor if there is no compensation for resettlement.
	15	Ethnic minorities and indigenous people	C-	C-	[During construction/ During operation] • Ethnic minorities and indigenous people have not been confirmed at the project area, however project could have impact to local area by the ethnicity due to pass through the China town of Cho Lon peripheral areas.
	16	Local economies, such as employment, livelihood, etc.	B±	B+	[Before construction] • Land acquisitions and resettlement at the project site could impact the livelihoods of residents in the site area. [During construction] • This project is expected to provide work opportunity to local residents, however, it could negative impact to small local business at the street-side. [During operation] • Improve shortening travel time and convenience of movement make a contribution to industry-boosting and economic development at the Ho Chi Minh City.

Class	No	Impacts	Evaluation		Reasons for Assessment
			Before/ During construction	During operation	
	17	Land use and utilization of local resources	B-	B+	[During construction] • Land usage will change at the project site. [During operation] • Land usage at the project area will change to the new commercial use land. • Improvement of traffic situation contribute to efficient use of local resources.
	18	Water usage	C-	D	[During construction] • Waste water from construction work could have impact to water usage of canal and channel. [During operation] • This projects is not expected to have any impact.
	19	Existing social infrastructures and services	B-	B±	[Before construction] • There is a possibility of need to protect and relocation of existing infrastructure facilities such as optical cable, utility pole and water pipe. [During construction] • Traffic jam could occur at the road around the project area and relocation work of transmission line tower, temporally. • Logging of roadside trees could occur at the part of project site. [During operation] • Access to public facilities will improve by upgrade of traffic system. • Passenger of existing transportation (public bus, bike, tricycle) could decrease by new transportation. • Improvement of social service is expected by mitigation of traffic congestion.
	20	Social institutions such as social infrastructure and local decision-making institutions	D	D	[During construction] • This project is not expected to have severe impact to local society to be considered that conduct at the developed area. [During operation] • This project is not expected to have severe impact to local society to be considered that conduct at the developed area.
	21	Misdistribution of benefits and damages	C-	D	[Before construction/During construction] • The gap could occur between PAPs, if not perform compensation fairly. [During operation] • No parties have been found to receive any special benefits from the project.
	22	Local conflicts of interest	C-	D	[During construction] • Conflicting interests between affected area and not affected area could occur about disturbing local small business during construction. • The friction between residents and construction worker could occur. [During operation] • This project is not expected to have any impact on local conflicts of interest during operation due to unaffected directly unlike construction stage.
	23	Cultural heritage and religious structure	C-	C-	[During construction/ During operation] • Cultural heritage and religious structure have not been confirmed at the project area, however there are religious structure and church at the peripheral areas.

Class	No	Impacts	Evaluation		Reasons for Assessment
			Before/ During construction	During operation	
	24	Landscape	B-	C-	[During construction] • This project is expected to have impact to landscape by transplant of roadside trees. • Landscape is damaged temporary by construction machine and temporary facilities during construction. [During operation] • This project is not expected to have any impact on landscape, because there are no landscape resources and view point at the project area. • It is hoped that new ventilating tower is designed and constructed to be in harmony and unity within the vista. • Transplant is scheduled whose amount should exceed amount of the logging trees.
	25	Gender	D	D	[During construction/ During operation] • This project is not expected to have any impact on gender.
	26	Children's rights	D	D	[During construction] • This project is not expected to have any impact on children's right because of that child labor does not occur according to the laws in Vietnam. [During operation] • This project is not expected to have any impact on children's right.
	27	Infectious diseases such as HIV/AIDS	C-	D	[During construction] • It is possible that increase the risk of HIV/AIDS infection between construction workers and persons who works for a service. [During operation] • This project is not expected to have any impact on infectious diseases such as HIV/AIDS.
	28	Working environment (including occupational safety)	B-	D	[During construction] • Dust and exhaust fumes threatens worker's health during construction. • Tunnel accident could occur during construction. • It is possible that sanitation become worth by waste from workers and construction office at the construction area. [During operation] • This project is not expected to have any impact on working environment.
The other	29	Accidents	B-	C±	[During construction] • Accidents could occur during construction work. [During operation] • Traffic accidents are expected to decrease due to modal shift and mitigation of traffic congestion. • Railway accidents could occur during operation.
	30	Trans-boundary impacts and climate change	B-	B+	[During construction] • CO_2 could occur during construction. [During operation] • Total amount of greenhouse gasses are expected to decrease due to modal shift and mitigation of traffic congestion.

A+/-: Significant positive/negative impact is expected.
B+/-: Positive/negative impact is expected to some extent.
C+/-: Impact is unknown. A further examination is needed.
D: No impact is expected. No further examination is needed.

Source: Made by JICA Study Team

8.6 TOR of Environmental and Social Conditions Study

Terms of Reference (TOR) were discussed for all social and environmental items scoring A, B or C in the scoping results. Table 8.6.1 shows Terms of Reference of Environmental and Social Considerations Study.

Table 8.6.1 TOR of Environmental and Social Considerations Study

Class	No	Assessment Items	Evaluation		Study items	Study Method
			Before/ During construction	During operation		
Anti-pollution measure	1	Air Pollution	B-	B+	1.Base line study of air quality (Temperature, humidity, TSP, PM2.5, SO_2, NO_2, CO & HC). 2.Environment standards. 3.Impacts of construction. • Exhaust gas of vehicles and construction tools.	• Conduct literature research (EIA reporrt etc). • Measurements of NO_2 around station building and paticulates. • Confirm contents of construction and methods.
	2	Water Pollution	B-	B-	1.Base line study of ground/ underground water quality. Ground water : water temperature, pH, DO, TSS, BOD_5, COD, NO_2^-, NO_3^-, PO_4^{3-}, Mn, Fe, Zn, Phenol, Oil and grease, Coliform Underground water : pH, TDS, $CaCO_3$, SO_4^{2-}, F^-, Cl^-, N, NO^{3-}, NO^{2-}, Cu, Zn, Mn, Fe, Hg, Cd, As, Cr^{6+}, CN-, Phenol, COD, E. Coli, Coliform 2.Water quality standards 3.Utilization of ground water 4.Utilization of underground water 5. Impacts of construction • Domestic waste water from workers • Waste water from construction(Volume of waste) • Impacts of rainfall. 6.Impacts during operation • Waste water from passengers	• Conduct literature research (EIA report etc). • Measurements of undergroundwater/ground water quality • Conduct local hearings. • Confirm contents of construction and methods. • Forecast waste volume used Pollution Factor(1993), WHO
	3	Waste	B-	B-	1.Impacts of construction • Domestic waste and waste water from workers • Volume of waste, type of waste during operation • Volume of waste, type of waste during operation 2. Impacts during operation • Volume of waste, type of waste from passenger • Waste disposal and methods	• Conduct literature research (EIA report etc) • Conduct local hearings • Confirm contents of construction and methods • Forecast waste volume used Pollution Factor(1993), WHO
	4	Soil Pollution	B-	D	1. Impacts of construction • Volume of waste, type of waste • Treatment and disposal of waste generated from the construction site 2. During operation • Amount and type of waste from passengers • Waste treatment, disposal method	• Conduct literature research (EIA report etc) • Conduct local hearings • Confirm contents of construction and methods

Class	No	Assessment Items	Evaluation		Study items	Study Method
			Before/ During construction	During operation		
	5	Noise and Vibration	B-	B±	1.Noise(LAeq)・vibration level, base line study 2.Environment standards 3.Location of school and hospital 4.Impacts of construction • Noise level and factor which occur from vehicles and construction tools • Vibration level and factor which occur from vehicles and construction tools 5. Impacts during operation • Noise and Vibration level which occur from railway vehicles • Control effectiveness of noise and vibration follow the modal shift	• Conduct literature research (EIA report ,report of similar case study) • Measurement of noise and vibration level around station building • Confirm contents of construction and methods • Use vibration forecast methods(modelling) • Noise level which occur from construction tools basedU.S. Environmental Protection Agency, Noise from Construction Equipment and Operation, Building Equipment and Home Appliances, NJID, 300.1, 31 December 1971 • Vibration lebel which occur from construction tools basedMinistry of Construction, Japan, 1983; Public Works Research Institute of Japan, 1979; Construction mechanization Association of Japan, 1987; EIA report of West Island Line, MTR Corporation, 2008 • Permissible limit follow the distance of impact area, impact factor and QCVN 26/2010/BTNMT (dBA)
	6	Ground Subsidence	B-	C-	1. State of ground and geology 2. Ground subsidence cause change of underground water and conduct tunnel excavation	• Conduct literature research (EIA report, report of similar case study) • Conduct local hearings • Confirm contents of construction and methods • Forecast is used “MODFLOW” and “HYDRUS” software which is include water potential and water disappear calculator
	7	~~Offensive odors~~	~~D~~	~~D~~		
	8	Sediment	C-	D	1.Distribution of river and water channel 2. Impacts of construction • Waste water from construction(Volume of waste)) • Impact of rainfall	• Conduct literature research (EIA report , report of similar case study) • Confirm contents of construction and methods

Class	No	Assessment Items	Evaluation		Study items	Study Method
			Before/ During construction	During operation		
Natural environment	9	Protected areas	~~D~~	~~D~~		
	10	Ecosystem	B-	D	1.Ecosystem base line study • Distribution and species of ecosystem(include plants and animals) such as park, ditch/ watter channel and roadside tree(number of trees) 2.Impact of construction • Location of trees, species, height, diameter and number of trees which is impacted from project	• Conduct literature research (EIA report, report of similar case study) • Inhabitation research(field searvey or interview) • Research area is mainly park , ditch and roadside trees • Conduct field survey at the project area
	11	Hydrology	C-	D	1.Distribution of river and water channels 2.Water level and state of flood frequency 3.Impact of construction • Waste water from construction(Volume of waste) • Impact of rainfall	• Conduct literature research (EIA report, report of similar case study) • Social survey(interview to community, town, local officials)
	12	Topography and geology	~~D~~	~~D~~		
Social environment	13	Resettlement	A-	D	1. Scale of resettlement (number of resettlement, land area, property, etc) 2.Resettlement action plan(RAP) 3.Maintenance plan of relocation area (Unneccessary when project guarantee to resettlement peoples by cash)	• Conduct literature research (EIA report, report of similar case study) • Survey of legal history, organization system • Census, socioeconomic survey(interview to community, town, local area about socioeconomic condition/ environmental issue/ expectation to project and research about land acquisition to household who is living within the scheduled line)Inventory of Loss, IOL • Replacement Cost Survey • Stakeholder meeting(SHM) • Focus group meeting
	14	Poverty	C-	C-	1.Living conditions of PAPs (socioeconomic, household survey)	• Social survey (interview to community, town, local area about socioeconomic condition/ environmental issue/ expectation to project) • Conduct literature research • Research of similar case
	15	Ethnic minorities and indigenous peoples	C-	C-	1. Living state of Ethnic minorities and indigenous people	• Conduct literature research (EIA report, report of similar case study) • Conduct local hearings(interview to community, town, local area about socioeconomic condition/ environmental issue/ expectation to project))

Class	No	Assessment Items	Evaluation		Study items	Study Method
			Before/ During construction	During operation		
	16	Local economies, such as employment, livelihood, etc.	B±	B+	1.Living condition of 2. State of economic activity at the local area	• Social survey (interview to community, town, local area about socioeconomic condition/ environmental issue/ expectation to project)) • Conduct literature research • Field survey • Research of similar case
	17	Land use and utilization of local resources	B-	B+	1.Land utilization among the railway line 2.State of economic activity at the local area	• Field survey(interview to community, town, local area about socioeconomic condition/ environmental issue/ expectation to project and research about project's environmental protection to household who is living within the alignmnet) • Conduct literature research • Conduct local hearings グ • Research of similar case
	18	Water usage	C-	D	1.Diffusion condition of water supply/ drainage 2.Utilization of underground water	• Field surve y • Conduct literature research • Conduct local hearings • Research of similar case
	19	Existing social infrastructures and services	B-	B+	1.State of utility installation along the scheduled line. • Existing infrustructure • Existing infrastructure requiring relocation 2. Traffic congestion situation along the railway line	• Field surve y • Conduct literature research • Conduct local hearings (interview to community, town, local area about socioeconomic condition/ environmental issue/ expectation to project) • Research of similar case
	20	~~Social institutions such as social infrastructure and local decision-making institutions~~	~~D~~	~~D~~		
	21	Misdistribution of benefits and damages	C-	D	1. Living conditions of PAPs 2. Resettlement action plan (drawing up of new) • Presence or absence of contract about compensation of execution with PAPs	• Social survey (interview to community, town, local area about socioeconomic condition/ environmental issue/ expectation to project) • Conduct literature research • Research of similar case
	22	Local conflicts of interest	C-	D	1.Population dynamics of each commune	• Conduct local hearing
	23	Cultural heritage and religious structures	C-	C-	1.Cultural heritage along the scheduled and religious structure	• Conduct literature research (EIA report, report of similar case study) • Confirm field surve y • Conduct local hearings

Class	No	Assessment Items	Evaluation		Study items	Study Method
			Before/ During construction	During operation		
	24	Landscape	B-	C-	1.Distribution of main street trees 2.Procedure of deforestation 3.State of distribution of landscape resources and view point	• Conduct literature research (EIA report, report of similar case study) • Confirm field survey • Conduct local hearings
	25	~~Gender~~	~~D~~	~~D~~		
	26	~~Children's rights~~	~~D~~	~~D~~		
	27	Infectious diseases such as HIV/AIDS	C-	D	1.Health condition of workers	• Conduct local hearings • Research of similar case • Forecast of number of construction officials
	28	Working environment (including occupational safety)	B-	D	1.Workers environment	• Conduct local hearing • Research of similar case
Others	29	Accidents	B-	C±	1.Workers accident 2.Number of traffic accident outbreaks	• Conduct literature research • Conduct local hearings • Research of similar case
	30	Trans-boundary impacts and climate change	B-	B+	1.Demand of railway utilization (number of passengers, mileage) 2.Existing transportaion facilities (share rate, number of passengers) 3. Reduction effect on volume of greenhouse gas emissions(CO_2)	• Conduct literature research • Conduct local hearings • Confirm contents of construction and methods • Demand forecast, Forecast of number of passengers, mileage • Confirm of share rate and number of passengers of the existing transportation facilities • Estimate of reduction effect on volume of greenhouse gas emissions(CO_2) by JICA Climate Fit tool

8.7 Results of Environmental and Social Considerations Study

Table 8.7.1 shows results of environmental and social considerations study that were discussed by the scoping results.

Table 8.7.1 Results of Environmental and Social Considerations Study

Impact	Results of Study (Include quantitative predictions)
Air pollution	**Before construction** The source of impact on air environment is dust, arising from demolition of houses along the Project's route and activities of leveling the site to set up station construction areas. Most of the residential houses at station areas are 1 to 5 – stores solid houses which are adjacent to each other, as well as to other houses outside the site clearance area. Therefore, dust pollution is caused in the demolition process. **During construction:** The influence of exhaust gas due to traffic congestion on roads near the construction site is expected. Therefore, it is necessary to control the occurrence of traffic congestion by managing traffic based on the Traffic Management Plan created by project owner. The Traffic Management Plan is formulated as follows at each stage of the project. FS Stage: The mission made it as part of the project plan in this survey. Construction on a narrow road sets up a detour route, construction on a wide road keeps traffic flow by placing a deck (in the case of an underground station) and so on. (See Chapter 6) Design phase: A consultant in charge of design will formulate a deeper plan to be reflected in the requirements of the owner of the construction bid book and to be executed by the contractor. Implementation design stage: Contractor will prepare plans to implement traffic management at the site at construction phase. Dust and exhaust fumes are generated from operate of construction machine, tunnel excavation work, underground station work (C1~C8) and elevated section work (C8~C10). Dust and exhaust fumes are also generated from soil transport and running construction vehicle. Light oil consumption is 9,476 ton from operate of construction machine at the underground station area, 5,086 ton from the other operate of construction are expected. 3,029,193m^3 of the total amount of soil will be generated from work of tunnel excavation, underground station and elevated section. Results of impact prediction to air pollution, TSP value is 253μg/m^3 at the 5m and 215μg/m^3 at the 10m from construction boundary are expected to exceed Vietnam standard which is 200μg/m^3 (QCVN 05:2013 & 06:2009/ BTNMT) in the dry season at the underground station construction work. SO_2, NO_2, CO, HC are below the standard in Vietnam in the dry season and rainy season. The impact from other construction work is below the standard in Vietnam in the dry season and rainy season in the all items (SPM, SO_2, NO_2、CO, HC). The impact of running construction vehicle, soil transport and exhaust fumes are below the standard in Vietnam in the both dry season and rainy season in the all items (SPM、SO_2, NO_2, CO, HC). However, it is considered that dust will be generated on a day when the wind is strong and sunny. **During operation:** According to the EIA report, a large electric-power consumption is generated during operation, however dust and exhaust fumes doesn't occur by traveling railway vehicle. It is estimated that modal shift from public transportation such as bike or car to Line 3A by effect of this railway project is bike- 142,566/day and car- 3,859/day in 2026, bike-325,967/day and car-8,823/day in 2050. Air pollution is expected to improve by mitigation of traffic congestion and reduce of exhaust fumes due to modal shift from public transportation to railway.
Water pollution	**During construction:** Water and sewage water are 100% maintained due to scheduled line is located on the center of Ho Chi Minh city. Therefore, surface water is unavailable for living water around scheduled line. Part of resident are using surface water as a living water (sprinkle water, cleaning, etc.) except for drink. Living waste water from construction worker is processing by drainage treatment system in Ho Chi Minh city due to install temporally restroom. It is estimated that living waste water is 2.8 m^3/day from worker's camp where 50 peoples are living at the each construction area. These impacts are generated at the each construction area in 24 months during construction period, and it is possible to exceed legal limits on BOD, TSS and Coliform in Vietnam. However, it is thought that impact to drainage treatment system in Ho Chi Minh city is extremely small due to number of construction worker is very small about 50 peoples. Impact to underground water by tunnel construction is small due to shield methods is adapted which is high water cutoff performance based on success in Japan, however it is possible to occur that temporal lowering of water level by excavation, and muddy water mixing to underground-water.

Impact	Results of Study (Include quantitative predictions)
	Waste water from construction work is expected to generate maximum 300L/min waste water by tunnel excavation and wall cleaning during station construction. These waste water which is included bentonite is processed to sewage treatment system in Ho Chi Minh city after that pumped up to ground and grit treating by muddy water treating plant. Sludge which is sinker is processed based on laws in Vietnam same as construction waste. Waste oil from construction work is expected to generate by project. These waste oil are temporally stored to container having no influence from rain, and processed based on ordinance of the Vietnam (Circular No.36/2015/TT-BTNMT) as a hazardous waste. However, there is a possibility that oil runoff due to rainfall, especially it is thought that there is an impact to Tan Hoa channel that cross the scheduled line. Results of impact prediction of water pollution by maintenance of construction machine, COD and SS values are expected to exceed waste water discharge standard (QVCN40/2011/BTNM) in Vietnam due to waste water from cleaning construction machine. Little impact is anticipated on the ground water, due to that Temporary lowering of water level and contamination of groundwater with turbid water by excavation can be minimize by using a mud pressure pressurized or slurry shield machine during tunnel construction based on success in Japan. However, lowering of water level and contamination of groundwater with turbid water are anticipated over the term and scale that is difficult to predict from an initial schedule at the tunnel sections. **During Operation:** This project is not expected to have impact on underground water, because of that tunnel structure is stable during operation. It is considered that main factor of water pollution is due to impact by station users' waste water. It is estimated that station users is 218,500/day in 2026 and 473,700/day in 2050, these waste water from users is 218.5 m^3/day in 2026 and 473.7 m^3/day in 2025. These waste water is processed to sewage treatment system in Ho Chi Minh city after that processed by drainage treatment system that installed each station.
Waste	**Before construction** Substances including conventional solid waste, scrap and garbage may not cause pollution, leading to the severe environmental degradation. But, if they are not collected promptly and appropriately, they may be scattered into the surrounding areas, polluting the environment, and facilitating the development of harmful organisms (rats, cockroaches, etc.). **During construction:** Waste such as trees, concrete and brick are generated by house dismantling during pre-construction stage and tree climbing during transplant of roadside trees. General waste from construction workers is expected to generate 25kg/day from worker's camp where 50 peoples are living at the each construction area. Waste oil from construction work is expected to generate by project over 600kg/year, and 7L/whenever oil exchanges. 3,029,193m^3 of the total amount of soil will be generated from work of tunnel excavation, underground station and elevated section. Surplus soil eventually is expected to generate 276,674 m^3, however part of soil is recycled by project. Waste management plan (WMP) is created in regards to these waste treatment, ordinary waste (construction waste and general waste) and hazardous waste (contaminated waste by oil) is processing based on laws in Vietnam. **During operation:** It is estimated that station users is 218,500/day in 2026 and 473,700/day in 2050, waste from these users is 3,877kg/day in 2026 and 7,770kg/day in 2025. These waste is processing by processor based on laws (Decree No.38/2015/ND-CP dated April 04th, 2015) in Vietnam.
Soil Pollution	**During construction:** Living waste water from construction worker is processing by drainage treatment system in Ho Chi Minh city due to install temporally restroom. It is estimated that living waste water is 2.8 m^3/day from worker's camp where 50 peoples are living at the each construction area. Waste oil from construction work is expected to generate by project over 600kg/year, and 7L/whenever oil exchanges. These waste oil are temporally stored to container having no influence from rain, and processed based on ordinance of the Vietnam (Circular No.36/2015/TT-BTNMT) as a hazardous waste. However, there is a possibility that oil runoff due to rainfall, especially it is thought that there is an impact to Tan Hoa channel that cross the scheduled line. Results of impact prediction of water pollution by maintenance of construction machine, COD and SS values are expected to exceed waste water discharge standard (QVCN40/2011/BTNM) in Vietnam due to waste water from cleaning construction machine. This project is expected to have impact on surrounding soil include construction site due to these impacts. **During operation:** This projects is not expected to have any impact.

Impact	Results of Study (Include quantitative predictions)
Noise/ Vibration	**Before construction:** It is expected that impact on noise arising from demolition of houses along the Project's route and activities of leveling the site to set up station construction areas. Impact noise level is determined based on source noise level demolition operations (trucks, bulldozers) is 84.8 ~ 94.2dBA. Result of forecast shows that residents living near the sites of demolition of buildings may be affected by noise levels exceeding the allowable limit from 5.5dBA to 18.1 dBA in daytime, and particularly from 20.5dBA to 33.1dBA in night-time. Residents living in the blocks nearby the demolition sites may be severely affected by excessive noise. However, this impact is limited only during the time of demolition activities, and residents living behind the blocks nearby the demolition sites may not be severely affected by excessive noise since noise will be almost mitigated by the blocks located in front of the demolition sites. **During construction:** Noise is generated mostly around the underground station (C1~C8) and around elevated section of Phu Lam Rotary (C8) ~ Mien Tay Terminal (C10). Current equivalent noise level (LAeq) is generally high at the around the underground station and elevated section, 67.5 dB ~76.7 dB in the day time, 61.4 dB～67.9 dB in the night time that values exceeds Vietnam standard (QCVN26 : 2010/BTNMT) that is 70 dB in the daytime, 55dB in the night-time at the majority of observation points. In addition to this situation, noise load increase due to operate **c**onstruction machinery, driving construction vehicles and construction causing traffic congestion. With regards to impact to residential area, results of impact prediction, LAeq is predicted to exceed environmental standard value from 0 ~9.7 dB in the daytime, 10.2 ~24.7 dB in the night-time. With regards to impact to school and hospital that is necessary of environmental consideration, results of impact prediction, LAeq is predicted to exceeds environmental standard values from 3.4 ~ 26.6 dB in the daytime, 13.4 ~ 35.6 dB in the night-time. It is necessary to make mitigation methods for these impacts. To reduce noise by fence installation at the construction area (Reducing effect: 2m fence height - 6.9 ~ 9.1 dB, 3m fence height – 10.2 ~ 13.1 dB), to schedule management that construction machine is not operated same time whenever possible and to limit the kinds of construction work that noise is loud during night-time are examined. Upper range of value which encompasses 80% of the noise (L10) is generally law at the around the underground station and elevated section, 52.3 dB ~55.4 dB in the day time, 46.2 dB～48.8 dB in the night time. With regards to impact from operation of construction machine, results of impact prediction, noise is expected to generate, max value is 73dB at the underground station, and max value is 72dB at the elevated section. With regards to impact of noise, it is thought that impact is small because of that impact of noise is satisfies mostly environment standards in Vietnam during operate the construction work. **During operation:** Noise is generated mostly around the Phu Lam Rotary (C8) ~ Mien Tay Terminal (C10) during operation. The predicted results of noise by running railway vehicle, noise is predicted to generate 72.8 dB at the 5m point from site boundary, 64.8 dB at the 10m point and 58.5 dB at the 20m point, that values exceeds Vietnam environmental standard that is 70 dB. The predicted results of vibration by running railway vehicle, vibration is predicted to generate 61.8 dB at the 5m point from site boundary, that values is satisfy Vietnam environmental standard that is 75 dB in the daytime. It is estimated that modal shift from public transportation such as bike or car to Line 3A by effect of this railway project is bike- 142,566/day and car- 3.859/day in 2026, bike-325,967/day and car-8,823/day in 2050. Noise and vibration are expected to decrease by reduce traffic congestion and decrease number of traveling vehicle in the surrounding area due to modal shift from public transportation to railway.
Ground Subsidence	**During construction:** With regards to lowering of underground-water level by tunnel construction, numerical value is calculated using MODFLOW and HYDRUS software. According to this result, lowering of underground-water level is expected under 0.2mm by the tunnel construction. It is thought that the main factors of ground subsidence are lowering of ground-water level and turbulence in soil, however lowering of ground-water level is expected under 0.2mm and it is minor impact. With regards to turbulence in soil, little impact is anticipated on the ground subsidence, due to that turbulence in soil can be minimize by using a mud pressure pressurized or slurry shield machine during tunnel construction based on success in Japan. However, ground subsidence is anticipated over the term and scale that is difficult to predict from an initial schedule at the tunnel sections. **During operation:** Lowering of ground-water level and turbulence in soil is not expected to generate due to that underground structure such as station and tunnel is stable structure. However, ground subsidence is anticipated over the term and scale that is difficult to predict from an initial schedule at the tunnel sections.
Sediment	**During construction:** Waste water from construction work is expected to generate maximum 300L/min waste water by tunnel excavation and wall cleaning during station construction. These wastewater is pumped up to the above ground part, sedimented by a mud treatment plant and then processed in sewage treatment system in Ho Chi Minh City. One portion of waste water by construction is drained to Tan Hoa channel that cross the

Impact	Results of Study (Include quantitative predictions)
	scheduled line, however, due to the draining the water after treatment and limited the amount of the drainage water, little impact is anticipated on the sediment. Amount of surface run-off due to rainfall is limited due to that fence installation around construction area at the open part of construction. Hence, little impact is anticipated on the sediment, due to the limited the impact on the draining the water from construction area to Tan Hoa channel that cross the scheduled line. **During operation:** This projects is not expected to have any impact.
Ecosystem	**During construction:** Scheduled line passes through thickly populated area of Ho Chi Minh City, most of land use are residential area, commercial area and road which is developed city area. The scheduled area and surrounded area are city which is not growing environment and habitat of important animal and plants. Inhabitation possible area of plants and animals is restricted such as park with a lot of green (Hoa Binh Park and Plum Park) and roadside tree near it. However, there is no need to modify park with a lot of green at the project site. The 642 roadside trees are affected by this project at the station construction site and elevated section. Current roadside trees height is about 3m comparatively young trees, out of 642 roadside trees, there are 88 roadside trees that the height exceeds 15m, project may have an impact to the animals (mammals, birds, and insects) that uses roadside trees as a growing environment. These roadside trees that is affected by project will be transplanted at the request of environmental conservation from local residents. **During operation:** This projects is not expected to have any impact.
Hydrology	**During construction:** Waste water from construction work is expected to generate maximum 300L/min waste water by tunnel excavation and wall cleaning during station construction. These wastewater is pumped up to the above ground part, sedimented by a mud treatment plant and then processed in sewage treatment system in Ho Chi Minh City, eventually waste water is drained to Dong Nai river. Dong Nai river width is 500 ~ 800m, water depth is 10 ~ 15m, water flow during dry season where flow is small is 75 ~ 200 m^3/ seconds at the Ho Chi Minh city. The amount of waste water by project is extremely small (maximum 0.005 m^3/ seconds) compared with flow rate of Dong Nai River, waste water by project is not expected to have impact on Dong Nai River. One portion of waste water by construction is drained to Tan Hoa channel that cross the scheduled line, however, due to the limited the amount of the waste water, little impact is anticipated on the hydrology. With regards to the flood, heavy rain during rainy season, flood is confirmed to generate about 50cm within C5 ~ C6 sections and about 30cm at high tide on the morning and evening within C8 ~ C10 section. With regards to impact to the project by the flood, inflow of rain is expected to impact at the open part, however inflow of rain is prevented to some degree by fence that installed around project area. These inflow of rain is pumped up to the above ground part, sedimented by a mud treatment plant and then processed in sewage treatment system in Ho Chi Minh City. Hence, little impact is anticipated on the hydrology. With regards to impact to the project by the flood, waste water from construction work is expected to generate maximum 300L/min waste water, and waste water is expected to increase load on the sewage treatment system in Ho Chi Minh city. Term and area in which the flood occurs are limited, it is thought that the main factor of the flood is shortage of drainage capacity caused by clogging of the garbage, and waste water from construction is drained to sewer pipe, hence its impact is small. **During operation:** This projects is not expected to have any impact.
Resettlement and land acquisition	**During construction:** Households and others affected by land, houses, etc. by the project are 449 residents, and 35 enterprises organization and 29 government-related organizations. Among them, according to Ho Chi Minh City regulations (No. 135/2007 / Q Đ-UBND), 17 households and one company will be subject to physical relocation. Regarding resettlement of residents and land acquisition, the compensation policy in line with the JICA Environmental and Social Consideration Guidelines has been formulated as RAP. **During operation:** No resettlement and land acquisition is expected during operation.
Poverty	**During construction:** As a result of the socio-economic survey, households belonging to the poor based on Ho Chi Minh city standards (Decision No. 58/2015 / QJ-UBND) were confirmed in one household (1 ward). In addition to support other than compensation, paying attention to poor households so that they can participate in the livelihood recovery program etc. according to their wishes. **During operation:** No impact on poverty is expected during operation.

Impact	Results of Study (Include quantitative predictions)
Ethnic minorities and indigenous people	**During construction/ During operation:** Ethnic minorities and indigenous people have not been confirmed at the project area. This project is not expected to have any impact on ethnicity according to social survey to local in the China town of Cho Lon areas and focus group meeting.
Local economies, such as employment, livelihood, etc.	**Before construction:** Local peoples and trader who are living in the surrounding area of scheduled line are influenced by resettlement, set back of buildings and restriction of passage. Basic plan about compensation with not only local residents but also business that receive influence from project is formulated by social consideration study. **During construction:** It could negative impact to local business at the surrounding area of scheduled line by noise and vibration during construction and restriction of passage. On the other hand, this project provide work opportunity to local residents and securing employment in compensation. **During operation:** Improve shortening travel time and convenience of movement and maintenance of traffic networks promote industry and economic development at the Ho Chi Minh City. Moreover, new business creation can be expected by increase railway passenger on the local residents.
Land use and utilization of local resources	**During construction:** Land use is restricted on the scheduled line, also affected by limitation of traffic at the surround area of scheduled line. **During operation:** Further commercial development can be expected by increase railway passenger and development of station. Promote industry and economic development can be expected by modal shift from existing traffic and mitigation of traffic congestion. On the other hand, construct of high-rise building within the limit of 30m from tunnel section is restricted. With regards to social Considerations study, basic policy on compensation for restriction of high-rise building construct has been formulated.
Water usage	**During construction:** Water and sewage water are 100% maintained due to scheduled line is located on the center of Ho Chi Minh city. Therefore, surface water is unavailable for living water around scheduled line. Wastewater is pumped up to the above ground part, sedimented by a mud treatment plant and then processed in sewage treatment system in Ho Chi Minh City. Hence, it is not expected to have any impact on the water usage of Tan Hoa channel. Part of resident are using surface water as a living water except for drink, however it is thought that impact is small because of that little impact is anticipated on the lowering of underground-water level and impact on water quality by construction of underground structure. However, lowering water level is anticipated over the term and scale that is difficult to predict from an initial schedule at the tunnel sections. Therefore, periodical monitoring and measurement of groundwater are required to identify impact by the Project. In case the impact is found, alternative water source (such as use of tap water) should be considered as a compensation; if required. **During Operation:** This projects is not expected to have any impact.
Existing social infrastructures and services	**Before construction:** Utilization of infrastructure is restricted on the part of area and time by relocation of existing infrastructure facilities such as optical cable, utility pole and water pipe. **During construction:** Traffic jam could occur at the road around the project area and relocation work of transmission line tower, temporally. Therefore, it is necessary to control the occurrence of traffic congestion by managing traffic based on the Traffic Management Plan created by project owner. The Traffic Management Plan is formulated as follows at each stage of the project. FS Stage: The mission made it as part of the project plan in this survey. Construction on a narrow road sets up a detour route, construction on a wide road keeps traffic flow by placing a deck (in the case of an underground station) and so on. (See Chapter 6) Design phase: A consultant in charge of design will formulate a deeper plan to be reflected in the requirements of the owner of the construction bid book and to be executed by the contractor. Implementation design stage: Contractor will prepare plans to implement traffic management at the site at construction phase. **During operation:** Access to public facilities will improve by maintenance of traffic network. Moreover, movement within city is expected to improve by reduce traffic congestion due to modal shift from public transportation (bus, private car and bike). Due to overlapped sections of railway section and existing public transportation are restricted and existing public transportation is used within overlapped area and station of increase passengers, there is a low probability of decrease passenger of existing transportation (public bus, bike, tricycle).

Impact	Results of Study (Include quantitative predictions)
Misdistribution of benefits and damages	**Before construction/ During construction:** Impact is anticipated on the material misdistribution of benefits and damages such as household who is directly affected to land or houses, household who is affected livelihood (business etc) for restrict of passage during construction and household who have a business chance or opportunity of employment by construction work. **During operation:** No parties have been found to receive any special benefits from the project.
Local conflicts of interest	**During construction:** Conflicting interests between affected area and not affected area could occur about disturbing local small business during construction. The friction between residents and construction worker could occur. **During operation:** This project is not expected to have any impact on local conflicts of interest during operation
Cultural heritage and religious structure	**During construction:** Cultural heritage and religious structure have not been confirmed at the project area, however it might be found undiscovered cultural heritage during excavation work This region is not directly affected by modifications, however Jean D'ane Church and Pagoda exists around the scheduled line. **During operation:** Chua Hien Linh pagoda is located elevated section (C8~C10) that is affected by running railway vehicle, however noise and vibration are small at and it is located 18m far from scheduled line. Therefore, it is thought that influence given to cultural heritage and religious is small during operation. Religious structure such as Jean D'ane Church and Pagoda is located mainly underground station section (C1 ~C8) around the scheduled line, there is no impact at this section by the noise and vibration.
Landscape	**During construction:** The 642 roadside trees are cut by this project. Out of 642 roadside trees, 88 roadside trees that the height exceeds 15m have been confirmed, project may have impact to the landscape. Landscape is damaged by fence that is installed at the construction sites, gantry that is installed at the elevated part, drill and plant that are installed at the open part of construction. **During operation:** This project is not expected to have any impact on landscape, because there are no landscape resources and view point at the project area. About new ventilating tower, elevated part and station, operate and construct will be implemented based survey and harmony and unity within the vista. It is thought that impact is small because of that landscape is improved by mitigation of the impact such as transplant, shape, sound insulation wall and height in the design phase.
Infectious diseases such as HIV/AIDS	**During construction:** Approximately twenty permanent staff and 50 temporary workers are hired in each work area, and it is considered that about 50 construction workers are engaged in construction on duty. There is a possibility that the risk of HIV / AIDS infection may increase among service workers, and local residents and construction workers due to the entry and exit of large number of workers. **During operation:** Passenger concentrate to station however, this project is not expected to have any impact on infectious diseases such as HIV/AIDS due to that it is temporally use for movement.
Working environment (including occupational safety)	**During construction:** This project is expected to have impact to working environment such as impact to worker's health by the dust and exhaust fumes, tunnel accident, car accident by construction vehicles, fire, electric shock, accidents of falling down and the others accidents. Waste from construction workers and construction office is processing based on laws in Vietnam and waste management plan (WMP) is created. **During operation:** This project is not expected to have any impact on working environment
Accidents	**During construction:** For elevated buildings, there are many fall accidents when installing concrete girder or box girder. In the construction of underground structures, there are many accidents of falling in the cut part and the transition area. A fall accident can cause not only the construction site but also a serious accident involving pedestrians and cars passing around. As for fire, there are a lot of fires derived from the fuel of construction machinery. Contact with high-voltage wires in the elevated part (C8 to C10 section), disconnection of buried cable such as water supply and sewerage and communication channel by tunnel construction, can cause not only death or injury of workers but also temporary stop of urban functions.

Impact	Results of Study (Include quantitative predictions)
	During operation: Traffic accidents are expected to decrease due to modal shift from public transportation to railway and reduce traffic congestion. Reduction of congestion due to modal shift from existing transportation to railway is expected to reduce traffic accidents. There is a possibility of occurrence of accidents during operation such as railway accident, fire and fall, electric shock etc. Railway accidents, fire, electric shock and accidents of falling down could occur during operation.
Trans-boundary impacts and climate change	**During construction:** Operation of construction machinery under construction, traveling of construction vehicles, etc., are expected to consume a total of 18,700 tons of diesel fuel, and 59,584 tons of greenhouse gases are expected to be generated. **During operation:** Demand forecast for railway use by project is estimated to be 218,500 people / day in 2026 and 473,700 in 2050, this railway user is to modal shift from existing traffic (bus, private car, motorcycle) to railway. The effect of greenhouse gas emissions reduction by the project is calculated as the difference of greenhouse gas generated by railway use, and greenhouse gas generated by the same number of railway users who are using existing traffic (buses, private cars, motorbikes). As a result of calculating the greenhouse gas reduction effect by using the project plan, the share rate of existing transportation (bus, private car, motorcycle), and the number of passengers by JICA Climate-FIT tool (version 2.0, March 2014), the effect of reducing the existing traffic (bus, private car, bike), annual greenhouse gas reductions of 6,606 tons in 2026 and 20,185 tons in 2050 are expected by modal shift from existing traffic (buses, private cars, motorcycles) to railway. The cumulative amount of greenhouse gas reductions from 2026 to 2050 by the project is expected to be 388,671 tons.

8.8 Impact Assessment

Impact assessments were discussed based on the results of scoping and TOR. Table 8.8.1 show Impact Assessment.

Table 8.8.1 Impact Assessment

Class	No.	Impacts	Impact assessment at scoping		Impact assessment based on study results		Reasons for assessment
			Before Construction/ During construction	During operation	Before Construction/ During construction	During operation	
Anti-pollution Measures	1	Air pollution	B-	B+	B-	B+	**Before construction:** The source of impact on air environment is dust, arising from demolition of houses along the Project's route and activities of leveling the site to set up station construction areas. **During construction:** Dust and exhaust fumes are generated from construction work. Dust is generated from excavation work and soil transport, also. Exhaust fumes will be generated when jam traffic and public work increases during construction. Impact of air pollution is satisfies mostly environment standards in Vietnam, prediction value of TSP is expected to exceed environment standard (QCVN 05:2013 & 06:2009/ BTNMT) in the dry season at the underground station construction work. **During operation:** Electric-power consumption is generated, however dust and exhaust fumes doesn't occur by traveling railway vehicle. Dust and exhaust fumes are expected to decrease by reduce traffic congestion due to modal shift from public transportation (bus, private car and bike) to railway.
	2	Water pollution	B-	B-	B-	B-	**During construction:** Domestic waste water from construction worker, surface-runoff mixed with oil that leaks from construction machinery, muddy water from excavation, washing water from car and surface run-off due to rainfall may affect the water quality of ground water in the surrounding area include Tan Hoa water channel. Little impact is anticipated on the ground water, due to that Temporary lowering of water level and contamination of groundwater with turbid water by excavation can be minimize by using a mud pressure pressurized or slurry shield machine during tunnel construction. However, lowering of water level and contamination of groundwater with turbid water are anticipated over the term and scale that is difficult to predict from an initial schedule at the tunnel sections. **During operation**: This project is not expected to have impact on underground water, because of that tunnel structure is stable during operation. It is considered that main factor of water pollution is due to impact by station users' waste water.

Class	No.	Impacts	Impact assessment at scoping		Impact assessment based on study results		Reasons for assessment
			Before Construction/ During construction	During operation	Before Construction/ During construction	During operation	
	3	Waste	B-	B-	B-	B-	**Before construction:** Waste such as trees, concrete and brick are generated by house dismantling during pre-construction stage and tree climbing during transplant of roadside trees. **During construction:** Waste is generated such as excavation soil, construction waste, domestic waste from construction workers and waste oil during construction work. **During operation:** General waste will be generated from user and employee at the station.
	4	Soil pollution	B-	D	B-	D	**During construction:** Waste water that contains oil from construction machinery due to rain-fall may discharge. COD and SS values is expected to exceed waste water discharge standard (QVCN40/2011/BTNM) in Vietnam due to discharged wastewater by washing construction machinery. **During operation:** This projects is not expected to have any impact.
	5	Noise and vibration	B-	B±	B-	B±	**Before construction:** It is expected that impact on noise and vibration arising from demolition of houses along the Project's route and activities of leveling the site to set up station construction areas. **During construction :** Noise and Vibration increase due to operate **c**onstruction machinery and driving construction vehicles causing traffic congestion in the surrounding area. Noise exceeds an environmental standard already (CVN26 : 2010/BTNMT) in Vietnam in the surrounding area of scheduled line at the moment, construction work is expected to increase noise further. Vibration satisfies the environmental standard (CVN26 : 2010/BTNMT) in the surrounding area of scheduled line, it thought that impact is small if vibration is increased by construction work. **During operation:** Noise and Vibration increase due to running railway vehicle in the bridge section at the surrounding area. Noise is expected to exceed the environment standard within 5m from site boundary. Impact is small that vibration is expected to satisfy the environmental standard in Vietnam. Noise and vibration are expected to decrease by reduce traffic congestion due to modal shift from public transportation (bus, private car and bike) to railway and decrease number of traveling vehicle in the surrounding area.
	6	Ground subsidence	B-	C-	C-	C-	**During construction:** Lowering of ground-water level was assumed less than 0.2 mm in the surrounding construction sections after numerical calculation about lowering of ground-water level. Little impact is anticipated on the ground subsidence, due to lowering of ground-water level is slight, and turbulence in soil can be minimize by

Class	No.	Impacts	Impact assessment at scoping		Impact assessment based on study results		Reasons for assessment
			Before Construction/ During construction	During operation	Before Construction/ During construction	During operation	
							using a mud pressure pressurized or slurry shield machine. However, ground subsidence is anticipated over the term and scale that is difficult to predict from an initial schedule at the tunnel sections. **During operation:** No lowering of ground-water level and turbulence in soil depends on underground structure are unexpected. However, ground subsidence is anticipated at the tunnel section during the unpredictable period and scale.
	7	Offensive	D	D	D	D	**During construction:** Domestic waste water and general waste from construction worker are not expected to generate offensive due to waste water processing based on laws (Decree No.38/2015/ND-CP dated April 04th, 2015) in Vietnam. **During operation:** This projects is not expected to have any impact.
	8	Sediment	C-	D	D	D	**During construction:** Sewage during excavation is grit treated by muddy water treating plant, before that draining to sewage treatment system in Ho Chi Minh city. Draining to sewage treatment system in Ho Chi Minh city when if it is drained. One portion of drains by construction is drained to Tan Hoa channel that cross the scheduled line, however, due to the draining the water after treatment and limited the amount of the drainage water, little impact is anticipated on the riverbed material. **During operation:** This projects is not expected to have any impact.
Natural Environment	9	Protected area	D	D	D	D	**During construction/ During operation:** This projects is not expected to have any impact because of Can Gio mangrove forest is located 25km far from scheduled line.
	10	Ecosystem	B-	D	B-	D	**During construction:** The scheduled area and surrounded area are city which is not growing environment and habitat of important animal and plants by results of field survey and existing data. The 642 roadside trees are transplant by this project. According to the reports, Out of 642 roadside trees, there are 88 roadside trees that the height exceeds 15m, it may impact to the animals (mammals, birds, and insects) that uses roadside trees as a growing environment. **During operation:** This projects is not expected to have any impact.
	11	Hydrology	C-	D	D	D	**During construction:** Drains during construction is grit treated by muddy water treating plant, before that draining to sewage treatment system in Ho Chi Minh city. One portion of drains by construction is drained to Tan Hoa channel, however, due to the limited the amount of the drainage water, little impact is anticipated on the riverbed material.

Class	No.	Impacts	Impact assessment at scoping		Impact assessment based on study results		Reasons for assessment
			Before Construction/ During construction	During operation	Before Construction/ During construction	During operation	
							During operation: This projects is not expected to have any impact.
	12	Topography and geology	D	D	D	D	**During construction/ During operation:** There is no important topography and geology at the surrounded area of project.
Social Environment	13	Resettlement and land acquisition	A-	D	A-	D	**Before construction/ During construction:** Households and others affected by land, houses, etc. by the project are 449 residents, and 35 enterprises organization and 29 government-related organizations. Among them, according to Ho Chi Minh City regulations (No. 135/2007 / Q Đ-UBND), 17 households and one company will be subject to physical relocation. Regarding resettlement of residents and land acquisition, the compensation policy in line with the JICA Environmental and Social Consideration Guidelines has been formulated as RAP. **During operation:** No resettlement is expected during operation.
	14	Poverty	C-	C-	B-	D	**During construction:** As a result of the socio-economic survey, households belonging to the poor based on Ho Chi Minh city standards (Decision No. 58/2015 / QJ-UBND) were confirmed in one household (1 ward). In addition to support other than compensation, paying attention to poor households so that they can participate in the livelihood recovery program etc. according to their wishes. **During operation:** No impact on poverty is expected during operation.
	15	Ethnic minorities and indigenous people	C-	C-	D	D	**During construction/ During operation:** Ethnic minorities and indigenous people have not been confirmed at the project area. This project is not expected to have any impact on ethnicity according to social survey to local in the China town of Cho Lon areas and focus group meeting.
	16	Local economies, such as employment, livelihood, etc.	B±	B+	B±	B+	**Before construction:** Local peoples and trader who are living in the surrounding area of scheduled line are influenced by resettlement, set back of buildings and restriction of passage. Basic plan about compensation with not only local residents but also business that receive influence from project is formulated by social consideration study. **During construction:** It could negative impact to local business at the surrounding area of scheduled line by noise and vibration during construction and restriction of passage. On the other hand, this project provide work opportunity to local residents and securing employment in compensation. **During operation:** Improve shortening travel time and convenience of movement and maintenance of traffic networks promote industry and economic development at the Ho Chi Minh City. Moreover, new business creation can be expected by increase railway passenger on the local residents.

Class	No.	Impacts	Impact assessment at scoping		Impact assessment based on study results		Reasons for assessment
			Before Construction/ During construction	During operation	Before Construction/ During construction	During operation	
	17	Land use and utilization of local resources	B-	B+	B-	B±	**During construction:** Land use is limited on the scheduled line, also affected by limitation of traffic at the surround area of scheduled line. **During operation:** Further commercial development can be expected by increase railway passenger and development of station. Promote industry and economic development can be expected by modal shift from existing traffic and mitigation of traffic congestion. On the other hand, construct of high-rise building within the limit of 30m from tunnel section is restricted. With regards to social Considerations study, basic policy on compensation for restriction of high-rise building construct has been formulated.
	18	Water usage	C-	D	C-	D	**During construction:** Water and sewage water are 100% maintained due to scheduled line is located on the center of Ho Chi Minh city. Therefore, surface water is unavailable for living water around scheduled line. Part of resident are using surface water as a living water except for drink, however it is thought that impact is small because of that little impact is anticipated on the lowering of underground-water level and impact on water quality by construction of underground structure. Lowering water level is anticipated over the term and scale that is difficult to predict from an initial schedule at the tunnel sections **During operation:** This projects is not expected to have any impact.
	19	Existing social infrastructures and services	B-	B±	B-	B+	**Before construction:** Utilization of infrastructure is limited on the part of area and time by relocation of existing infrastructure facilities such as optical cable, utility pole and water pipe. **During construction:** Traffic jam could occur at the road around the project area and relocation work of transmission line tower, temporally. The 642 roadside trees are transplant by this project. **During operation:** Access to public facilities will improve by maintenance of traffic network. Moreover, movement within city is expected to improve by reduce traffic congestion due to modal shift from public transportation (bus, bike and car). It is thought that impact is small that decrease passenger of existing transportation (public bus, bike, tricycle). Because overlapped sections of railway section and existing public transportation are limited, and existing public transportation is used within overlapped area which station is increase passengers.
	20	Social institutions such as social infrastructure	D	D	D	D	**During construction/ During operation:** This project is not expected to have severe impact to local society to be considered that conduct at the developed area.

Class	No.	Impacts	Impact assessment at scoping		Impact assessment based on study results		Reasons for assessment
			Before Construction/ During construction	During operation	Before Construction/ During construction	During operation	
		and local decision-making institutions					
	21	Misdistribution of benefits and damages	C-	D	B-	D	**Before construction/ During construction:** Impact is anticipated on the material misdistribution of benefits and damages such as household who is directly affected to land or houses, household who is affected livelihood (business etc.) for restrict of passage during construction and household who have a business chance or opportunity of employment by construction work. **During operation:** No parties have been found to receive any special benefits from the project.
	22	Local conflicts of interest	C-	D	B-	D	**During construction:** Conflicting interests between affected area and not affected area could occur about disturbing local small business during construction. The friction between residents and construction worker could occur. **During operation:** This project is not expected to have any impact on local conflicts of interest during operation
	23	Cultural heritage and religious structure	C-	C-	C-	D	**During construction:** Cultural heritage and religious structure have not been confirmed at the project area, however it might be found undiscovered cultural heritage during excavation work. **During operation:** Chua Hien Linh pagoda is located bridge section (C8~C10) that is affected by running railway vehicle, however noise and vibration are small at and it is located 18m far from scheduled line. Therefore, it is thought that influence given to cultural heritage and religious is small during operation.
	24	Landscape	B-	C-	B-	B-	**During construction:** The 642 roadside trees are transplant by this project. Out of 642 roadside trees, there are 88 roadside trees that the height exceeds 15m, it may impact to the landscape. Landscape is damaged by fence that is installed at the construction sites, gantry that is installed at the bridge, drill and plant that are installed at the open part of construction. **During operation:** This project is not expected to have any impact on landscape, because there are no landscape resources and view point at the project area. Impact from the newly installed station building, ventilation tower, and elevation is expected.
	25	Gender	D	D	D	D	**During construction/ During operation:** This project is not expected to have any impact on gender.

Class	No.	Impacts	Impact assessment at scoping		Impact assessment based on study results		Reasons for assessment
			Before Construction/ During construction	During operation	Before Construction/ During construction	During operation	
	26	Children's rights	D	D	D	D	**During construction/ During operation:** This project is not expected to have any impact on children's right because of that child labor does not occur according to the laws in Vietnam
	27	Infectious diseases such as HIV/AIDS	C-	D	B-	D	**During construction:** It is possible that increase the risk of HIV/AIDS infection between construction workers and persons who works for a service due to construction participant at the main construction area are about 50 peoples. **During operation:** Passenger concentrate to station however, this project is not expected to have any impact on infectious diseases such as HIV/AIDS due to that it is temporally use for movement.
	28	Working environment (including occupational safety)	B-	D	B-	D	**During construction:** This project is expected to have impact to working environment such as impact to worker's health by the dust and exhaust fumes, tunnel accident, car accident by construction vehicles, fire, electric shock, accidents of falling down and the others accidents. Waste from construction workers and construction office is processing based on laws in Vietnam and waste management plan (WMP) is created. **During operation:** This project is not expected to have any impact on working environment
The Others	29	Accidents	B-	C±	B-	C±	**During construction:** Accidents could occur during construction work such as fire electric shock and accidents of falling down and contagion of disease. There is a possibility of stop function of city, due to optical cable and wire are cut, and stop function of water and sewage by accident or construction, temporally. **During operation:** Traffic accidents are expected to decrease due to modal shift from public transportation to railway and reduce traffic congestion. Railway accidents, fire, electric shock and accidents of falling down could occur during operation.
	30	Trans-boundary impacts and climate change	B-	B+	B-	B+	**During construction:** Operation of construction machinery under construction, traveling of construction vehicles, etc., are expected to consume a total of 18,700 tons of diesel fuel, and 59,584 tons of greenhouse gases are expected to be generated. **During operation:** Total amount of greenhouse gasses are expected to decrease 6,606 ton in 2026, 20,185 ton in 2050 due to modal shift from public transportation (bus, private car and bike) to railway and reduce traffic congestion. The cumulative amount of greenhouse gas reductions from 2026 to 2050 by the project is expected to be 388,671 tons.

Source: Study team

8.9 Mitigation Plan

The mitigation plan to avoid, reduce or compensate for environmental and social impact on the items for which negative influences are expected (items B- and C-) in “8.8 Environmental Assessment”. At each stage of before construction, during construction and during operation, the contents of the mitigation plan, location, financial source, implementation body and supervisor are summarized in Table 8.9.1.

In addition, mitigation plan relating to resettlement of residents will be described in "Chapter 9 Social Consideration".

Table 8.9.1 Results of examination of mitigation plan, location, financial source, implementation body, supervisor

Environmental impact	Mitigation Plan	Location	Financial Source	Implementation body	Supervisor
[Before construction]					
Air Pollution	To control dust emissions and avoid a dust spread, watering should be conducted by using water carts, sprays and hoses during house demolition and site leveling.	House demolition area at stations, C1 - C8 The leveling location, preparing site for station, and the construction site.	MAUR (included in the project budget).	District committee for the land acquisition for compensation/ The Construction Company	MAUR / CSC / ES
	To avoid a dust spread to surrounding area, canvas textile cover should be installed to cover the house demolition area.				
	Turning off the unnecessary machine according to Vietnamese Standard 26:2010/BTNMT.				
Solid Waste	The solid waste generated by the house demolition should be collected and gathered in a temporary waste storage at the construction site. The wastes should be implemented appropriate sorting for reuse. Part of the waste are used for material of leveling or fuel.	House demolition area at stations, C1 - C8 The leveling location, preparing site for station, and the construction site.	MAUR (included in the project budget).	District committee for the land acquisition for compensation/ The Construction Company	MAUR / CSC / ES
	Competent Urban Environmental Company who contract with the Project Owner should handle, collect, sort and process the solid waste according to the Decree No. 59/2007/ND-CP and Decree No. 38/2015/ND-CP dated 24/04/2015.				
Noise and vibration	To minimize the impact of noise pollution in residential areas, demolishing works, leveling works and transportations should not conducted at night from 22.00 pm to 6.00 a.m.	House demolition area at stations, C1 - C8 The leveling location, preparing site for station, and	MAUR (included in the project budget).	District committee for the land acquisition for compensation/ The Construction Company	MAUR / CSC / ES
	Equipment should be maintenance periodically to ensure smooth operation to				

Environmental impact	Mitigation Plan	Location	Financial Source	Implementation body	Supervisor
	reduce the noise from equipment.	the construction site.			
	Avoid simultaneous operation of much construction equipment.				
	Turn off the machines when they are not in use to reduce the noise according to the Vietnamese Standard 26:2010/BTNMT				
Existing social infrastructures and social services	In the design process, relocation of infrastructure systems are planned in detail not to interrupt the production and community activities of the people.	Infrastructure systems which require displacement	MAUR (included in the project budget).	District committee for the land acquisition for compensation/ The Construction Company	MAUR / CSC / ES
	Strictly complying with design process, the relocation of the infrastructure systems (power supply, water supply, communication system) should be implemented and completed before the commencement of construction.				
	Adequate expenses of moving infrastructure systems should be included in the project budget.				
Landscape	Design of stations, ventilation tower and elevated shall be suitable with the surrounding landscape.		MAUR (included in the project budget).	MAUR	MAUR
	Develop the plan to transplant all affected street trees into the deposit site at the design stage.		MAUR (included in the project budget).	MAUR	MAUR
[During construction]					
Air pollution	Watering to the dusty area to avoid a dust spread. Spraying water in multiple times instead of once in large quantities.	Construction site and its surrounding roads	MAUR (included in the project budget).	The Construction Company	MAUR / CSC / ES
	The construction site should be separated with the urban road by the roofing iron barriers with 2～3m in height, to reduce dust spreading from the construction site.				
	Materials (soil and construction materials) to be transported should be covered to prevent a dust spread.				
	All of vehicle must be washed before leave the construction site to avoid pollution to surrounding.				
	Reduce the speed of vehicle when running in construction site, or when driving on dirty road to reducing the dust arising.				
	To avoid a dust spread, solid to				

Environmental impact	Mitigation Plan	Location	Financial Source	Implementation body	Supervisor
	be transported should be watered.				
	Turn off the machines when they are not in use according to the Vietnamese Standard 26:2010/BTNMT				
Water Pollution	Wastewater will flowed into wastewater treatment system of construction sites through the disposition and filtering area then discard into the wastewater drainage system of city.	Construction site	MAUR (included in the project budget).	The Construction Company	MAUR / CSC / ES
	Mobile toilet will be used at construction site to collecting the domestic waste. These waste from mobile toilet will be collected under economy contract with Environment company of local.				
	Waste water discharged from the concrete mixing station will be led into sediment tank, with at least 2 chambers and with sufficient capacity, to sediment the substances in waste water discharged from a mixing bath. Sludge will be collected and treated as the construction waste.				
	Install temporary drainage system prior to the construction.				
	The gutter and drainage pipe should be cleaned up periodically.				
	The drainage system during the construction should be noticed to the local residents before the commencement date. In addition, the drainage system of surrounding households should be identified; and the drainage plan should be adjusted based on such identification. Those activities should be conducted at the stage of detailed design.				
Waste	All solid waste generated in workers' accommodation area should be collected and concentrated in categorized containers.	Construction site	MAUR (included in the project budget).	The Construction Company	MAUR / CSC / ES
	Contract local waste collection and recycling companies for waste collection (incl. Hazardous waste) based on relevant laws(Decree No. 59/2007/NĐ-CP dated 09/04/2007, Decree No.38/2015/NĐ-CP, Circular No.36/2015/TT-BTNMT).				

Environmental impact	Mitigation Plan	Location	Financial Source	Implementation body	Supervisor
	The Project Owner will be responsible for managing materials and wastes generating during the construction process in compliance with a waste management plan.				
	Dustbins and temporary landfills should be prepared near the construction site to accommodate waste and disposal.				
	Install screening net to collect scattered solid wastes.				
	Waste soil should be transported to the approved landfills by local authority.				
	To prepare waste management plan.				
	To prepare report of hazardous waste management annually and to submit to Department of Natural Resources and Environment of Ho Chi Minh city before 31 January of the coming year.				
Soil pollution	Same as water pollution and waste	Construction site	MAUR (included in the project budget).	The Construction Company	MAUR / CSC / ES
Noise and vibration	Iron fence with 2 ~ 3m high should be installed to avoid noise impacting to the urban road. Iron fence can reduce noise impact on the receptors along the alignment.	Construction site	MAUR (included in the project budget).	The Construction Company	MAUR / CSC / ES
	Equipment should be maintenance periodically to ensure smooth operation to reduce the noise from equipment.				
	Avoid simultaneous operation of much construction equipment.				
	Limit construction at night time: Use only machinery and equipment which sound power levels are low in case the construction would be conducted at night. These locations must be monitored on noise and vibration frequently because of impacts on local people is over the permitted level, the noise barriers will be installed.				
	Turn off the unnecessary machine to reduce the noise according to the Vietnamese Standard 26: 2010 / BTNMT.				

Environmental impact	Mitigation Plan	Location	Financial Source	Implementation body	Supervisor
Ground subsidence	Apply advanced tunneling method with TBMs, prevent the occurrence of ground subsidence. Periodical monitoring and measurement of subsidence and groundwater level at the tunnel construction areas and incidental area are required to immediately find occurrence of the ground subsidence and reduction of groundwater level which is difficult to forecast based on the planned countermeasure.	Tunnel section and surrounding area	MAUR (included in the project budget).	The Construction Company	MAUR / CSC / ES
Ecosystem	For street trees, all street trees should be replanted to the depot site. The new street trees will be planted instead of replanted trees by project. The street tree to be newly planted after completion of construction should be selected the same kind as the existing street tree if possible (not use alien species).	Construction site	MAUR (included in the project budget).	The Construction Company	MAUR / CSC / ES
Water use	Periodical monitoring and measurement of groundwater are required to identify impact by the Project. In case the impact is found, alternative water source (such as use of tap water) should be considered as a compensation; if required.	Construction site	MAUR (included in the project budget).	The Construction Company	MAUR / CSC / ES
Existing social infrastructure and social services	The Project Owner will be responsible for managing traffic around the construction site in compliance with a traffic management plan. Traffic signs should be installed at starting points of the construction area and isle in the construction site. Cooperation of traffic inspectors will be required to usher people during peak time.	Construction site	MAUR (included in the project budget).	The Construction Company	MAUR / CSC / ES
Cultural, and religious heritages	If the underground relics and archaeological sites appears in the construction site, the construction company should temporarily stop the construction activities and separate the area. Inform local or national authorities of the Cultural Property of Viet Nam.	Construction site	MAUR (included in the project budget).	The Construction Company	MAUR / CSC / ES
Landscape	Construction activities should be completed section by section.	Construction site	MAUR (included in the	The Construction Company	MAUR / CSC / ES

Environmental impact	Mitigation Plan	Location	Financial Source	Implementation body	Supervisor
	Additionally, grounds should be recovered for daily life.		project budget).		
	Design of stations, ventilation tower and elevated shall be suitable with the surrounding landscape.				
	The new roadside trees will be planted instead of replanted trees by project.				
Spreading Disease, HIV and other Evils	Appropriate behavior for interactions with local community, and risks of communicable diseases should be educated to the workers.	Construction site	MAUR (included in the project budget).	The Construction Company	MAUR / CSC / ES
Work environment/ Incidents	The Project Owner should prepare a plan on means and equipment to address technical incidences including rescue teams, organization and response plan (team leaders and implementation order).	Construction site	MAUR (included in the project budget).	The Construction Company	MAUR / CSC / ES
	The Project Owner should determine contact addresses in emergency case, including hospitals in Ho Chi Minh City area.				
	Firefighting tools and facilities should be checked and maintained periodically.				
	The construction company should establish rules on labor safety.				
	Periodic health examinations should be provided for staffs and workers.				
Transboundary impacts and climate change	Same as air pollution	Construction site	MAUR (included in the project budget).	The Construction Company	MAUR / CSC / ES
[During operation]					
Water pollution	Manage, collect and treat wastewater and waste of each stations; prevent wastewater and waste from stations penetrating soil and polluting ground water.	All stations	MAUR	The construction company should take responsibility for the warranty period (24 months after completion of the construction). MOMC should take responsibility after the warranty period.	MAUR should take responsibility for the warranty period (24 months after completion of the construction). HCMPC / MOMC / DOT / UTMD1 should take responsibility after the
	Regularly check domestic wastewater collecting and treat system in each stations to ensure no leakage or penetration into ground water.				
	The drainage system, excluding domestic wastewater and septic tank wastewater, the remaining rainwater, firefighting water will be discharged through drainage system. Domestic wastewater				

Environmental impact	Mitigation Plan	Location	Financial Source	Implementation body	Supervisor
	from stations and on trains will be collected in a common system for treatment.				warranty period.
	Design drainage pipes lower than water pipes.				
	Regularly check the stability of works, ensure the link between the natural ground and tunnels. Discover and timely deal with weak connection to eliminate possible penetration of surface water or rainwater into ground water.	At the tunnel section			
	Gutter should be installed in the tunnel to collect wastewater from train cleaning.				
Waste	Disseminate and raise passengers' awareness of environment protection; at the same time, equip dustbins on trains and at stations.	All stations and trains	MAUR	The construction company should take responsibility for the warranty period (24 months after completion of the construction). MOMC should take responsibility after the warranty period.	MAUR should take responsibility for the warranty period (24 months after completion of the construction). HCMPC / MOMC / DOT / UTMD1 should take responsibility after the warranty period.
	The project owner should subcontract with HCMC Urban Environment Company to collect and process waste from stations.				
Noise pollution and vibration	Apply rail-welding method to reduce vibration generated from joints.	Applied to the whole line.	MAUR	The construction company should take responsibility for the warranty period (24 months after completion of the construction). MOMC should take responsibility after the warranty period.	MAUR should take responsibility for the warranty period (24 months after completion of the construction). HCMPC / MOMC / DOT / UTMD1 should take responsibility after the warranty period.
	Install wing walls on two sides of the elevated viaduct.	Elevated section (C9-C10 station)			
Ground subsidence	For the early period of the operation stage, monitoring on the ground subsidence should be conducted at the tunnel sections and their incidental sections.	Tunnel sections and their incidental sections.	MAUR	The construction company should take responsibility for the warranty	MAUR should take responsibility for the warranty

Environmental impact	Mitigation Plan	Location	Financial Source	Implementation body	Supervisor
				period (24 months after completion of the construction). MOMC should take responsibility after the warranty period.	period (24 months after completion of the construction). HCMPC / MOMC / DOT / UTMD1 should take responsibility after the warranty period.
Landscape	Design of stations, ventilation tower and elevated shall be suitable with the surrounding landscape.	All stations	MAUR	The construction company should take responsibility for the warranty period (24 months after completion of the construction). MOMC should take responsibility after the warranty period.	MAUR should take responsibility for the warranty period (24 months after completion of the construction). HCMPC / MOMC / DOT / UTMD1 should take responsibility after the warranty period.
Accidents	The level of the entrance of the subway stations should be designed to be set higher than the level of 300 year flood. In addition, water stop panels should be prepared to give an extra capacity in case of flood and high water. If flood or abnormally high water is predicted, the water stop panels should be installed at the entrance of the station by the station staff to protect the station from flood.	Whole line of the project	MAUR	The construction company should take responsibility for the warranty period (24 months after completion of the construction). MOMC should take responsibility after the warranty period.	MAUR should take responsibility for the warranty period (24 months after completion of the construction). HCMPC / MOMC / DOT / UTMD1 should take responsibility after the warranty period.
	Formation level of The portals (entrance of tunnel section access from elevated section) and ventilation opening should be higher than design water level. Retaining wall should be installed at the entrance of the tunnels. Portal sumps with catchment canals should be installed with the relevant pumping system and controls.				

Source: JICA Study Team

8.10 Environmental Monitoring Plan

8.10.1 Environmental Monitoring Plan

Environmental monitoring plan are used to ensure that all project impacts including impacts predicted in the previously covered and the additional impacts identified during construction will be controlled, feasibility of the mitigation measures to be strengthened and any opinion of the community comment will be resolved efficiently. Objectives of the plan include:

- Determine the actual extent of the impacts;
- Control impacts which are generated from construction process and mentioned in EIA report;
- Check environmental pollution standards applied to the project during constructions;
- Check and supervise implementation of environmental protection solutions during construction based on EIA report
- Suggest mitigation measures in case of unexpected impacts;
- Suggest to the Project owner to coordinate with central and local environmental organizations to solve pending issues relating to environmental protection under the scope of the Subproject;
- Assess the effect of mitigation measures in pre-construction, construction and operation stages.

Environmental monitored parameter, location, frequency, responsibility during construction and operation in this project is presented in the Table 8.10.1.

Table 8.10.1 Monitoring Plan

Impact	Monitored parameter	Location	Responsibility	Methods	Frequency (Specified continuation period during operation)
[Pre-construction stage]					
Air quality	TSP, PM2.5, NO_2, SO_2, CO, HC	(1) A1: Station C1 - Thai Binh Market (2) A2: Station C2 - Cong Hoa Six-Way Junction (3) A3: Station C3 - Hoa Binh Park (4) A4: Station C4 - University of Medicine & Pharmacy (5) A5: Station C5 - Thuan Kieu Plaza (6) A6: Station C6 - Cho Lon Bus Station (7) A7: Station C7 - Cay Go (8) A8: Station C8 - Phu Lam Rotary (9) A9: Station C9 - Phu Lam Park (10) A10: Station C10 - Mien Tay Terminal Station (1)~(10) are the same spots as the baseline survey. Monitoring is carried out in front of a special area closest to construction sites such as hospitals, schools, churches	Control: MAUR Operation: EMC (consign)	- Analysis and sampling - Confirm of dissatisfaction from local peoples - Periodic observation during construction - QCVN 05:2013/ BTNMT (Conforming to National Technical Regulation on Environmental Quality Standard of Air)	Once, before construction commence Collecting samples, 1time/2hours continuously 24 hours (each observation point)
Water pollution	Surface water Temperature, pH, DO, TSS, BOD_5, COD, Oil, Coliform bacteria	(1) SW1: Tan Hoa Canal (2) SW2: Phu Lam Lake (1)~(2) are the same spots as the baseline survey.	Control: MAUR Operation: EMC (consign)	- Analysis and sampling - Confirm of dissatisfaction from local peoples - Periodic observation during construction - QCVN 08:2008/BTNMT (Conforming to National Technical Regulation on Environmental Quality Standard of Ground Water Level B1)	Once, before construction commence Collecting samples, 1time /each observation point
	Underground water Temperature, pH, Dissolved Solids, hardness ($CaCO_3$), Sulfate (SO_4^{2-}), Fluoride (F^-), Chloride (Cl^-), Ammonium (in N), NO_3^- (in N), NO_2^- (in N), Copper (Cu), Zinc (Zn), Manganese (Mn), Iron (Fe), Mercury (Hg), Cadmium (Cd), Arsenic (As), Chrome VI (Cr^{6+}), Cyanide (CN^-), Phenol , Permanganate index , E.Coli , Coliform and groundwater level.	(1) GW1: 103/13 Co Giang Ward, District 1; (2) GW2: 897/62 Tran Hung Dao Street, Ward 2, District 5; (3) GW3: 47/5 Phan Van Khoe Street, Ward 2, District 6; (4) GW4: 75 Binh Phu Street, Ward 11, District 6; (5) GW5: 95/53/10 Le Tan Be Street, An Lac Ward, Binh Tan District. (1)~(5) are the same spots as the baseline survey.	Control: MAUR Operation: EMC (consign)	- Analysis and sampling - Confirm of dissatisfaction from local peoples - Periodic observation during construction - QCVN 08:2008/BTNMT (Conforming to National Technical Regulation on Environmental Quality Standard of Underground Water Level A)	Once, before construction commence Collecting samples, 1time at the each observation point
Waste	Waste discharged by construction work - Amount of waste generated by construction - storage, collection, transfer of soil, stone, demolished materials, materials to be disposed	Dismantling of houses, leveling work place	Control: MAUR Operation: EMC (consign)	- Examine records of waste disposer (daily) - Implementation site confirmation of waste disposal and waste collection - Conforming to laws (Decree No.38/2015/ND-CP dated April 04th, 2015)	Periodical monitoring
Noise/ Vibration	Noise (Leq), Vibration (Acceleration-Lae, Speed-Lveq)	(1) O1,R1: Station C1 - Thai Binh Market (2) O2,R2: Station C2 - Cong Hoa Six-Way Junction (3) O3,R3: Station C3 - Hoa Binh Park (4) O4,R4: Station C4 - University of Medicine & Pharmacy (5) O5,R5: Station C5 - Thuan Kieu Plaza (6) O6,R6: Station C6 - Cho Lon Bus Station (7) O7,R7: Station C7 - Cay Go (8) O8,R8: Station C8 - Phu Lam Rotary (9) O9,R9: Station C9 - Phu Lam Park (10) O10,R10: Station C10 - Mien Tay Terminal Station (1)~(10) are the same spots as the baseline survey. Monitoring is carried out in front of a special area closest to construction sites such as hospitals, schools, churches	Control: MAUR Operation: EMC (consign)	- Observe noise level at the point to be specifies - Confirm of dissatisfaction from local peoples - Noise- QCVN 26:2010/ BTNMT - Vibration- QCVN27:2010/BTNMT	Once, before construction commence Collecting samples, 1time/2hours continuously 24 hours (each observation point)
Landscape	Implementation situation of landscape design which is suitable with the surrounding landscape Formulation of transplant plan of street trees		Control: MAUR Operation: ES	- Scrutinizing the design of the station, ventilation tower, elevated - Scrutinizing the transplant plan of street trees	Once, before construction commence
Existing social infrastructure and social services	Interuption plan of existing infrustructure	In the whole areas to be interrupted	Control: MAUR Operation: ES (under the CSC)	- Examine records of facility services removal - Field work	Once, before construction commence

Impact	Monitored parameter	Location	Responsibility	Methods	Frequency (Specified continuation period during operation)
[Construction stage]					
Air quality	TSP, PM2.5, NO_2, SO_2, CO, HC	(1) A1: Station C1 - Thai Binh Market (2) A2: Station C2 - Cong Hoa Six-Way Junction (3) A3: Station C3 - Hoa Binh Park (4) A4: Station C4 - University of Medicine & Pharmacy (5) A5: Station C5 - Thuan Kieu Plaza (6) A6: Station C6 - Cho Lon Bus Station (7) A7: Station C7 - Cay Go (8) A8: Station C8 - Phu Lam Rotary (9) A9: Station C9 - Phu Lam Park (10) A10: Station C10 - Mien Tay Terminal Station (1)~(10) are the same spots as the baseline survey. Monitoring is carried out in front of a special area closest to construction sites such as hospitals, schools, churches	Control: MAUR Operation: EMC (consign)	- Analysis and sampling - Confirm of dissatisfaction from local peoples - Periodic observation during construction - QCVN 05:2013/ BTNMT (Conforming to National Technical Regulation on Environmental Quality Standard of Air)	Monthly Collecting samples, 1time/2hours continuously 24 hours (each observation point)
Water pollution	Surface water: Temperature, pH, DO, TSS, BOD5, COD, Oil, Coliform bacteria	(1) SW1: Tan Hoa Canal (2) SW2: Phu Lam Lake (1)~(2) are the same spots as the baseline survey.	Control: MAUR Operation: EMC (consign)	- Analysis and sampling - Confirm of dissatisfaction from local peoples - Periodic observation during construction - QCVN 08:2008/BTNMT (Conforming to National Technical Regulation on Environmental Quality Standard of Ground Water Level B1)	Monthly Collecting samples, 1time/ each observation point
	Underground water: Temperature, pH, Dissolved Solids, hardness ($CaCO_3$), Sulfate (SO_4^{2-}), Fluoride (F^-), Chloride (Cl^-), Ammonium (in N), NO_3^- (in N), NO_2^- (in N), Copper (Cu), Zinc (Zn), Manganese (Mn), Iron (Fe), Mercury (Hg), Cadmium (Cd), Arsenic (As), Chrome VI (Cr^{6+}), Cyanide (CN^-), Phenol , Permanganate index , E.Coli , Coliform and groundwater level.	(1) GW1: 103/13 Co Giang Ward, District 1; (2) GW2: 897/62 Tran Hung Dao Street, Ward 2, District 5; (3) GW3: 47/5 Phan Van Khoe Street, Ward 2, District 6; (4) GW4: 75 Binh Phu Street, Ward 11, District 6; (5) GW5: 95/53/10 Le Tan Be Street, An Lac Ward, Binh Tan District. (1)~(5) are the same spots as the baseline survey.	Control: MAUR Operation: EMC (consign)	- Analysis and sampling - Confirm of dissatisfaction from local peoples - QCVN 08:2008/BTNMT (Conforming to National Technical Regulation on Environmental Quality Standard of Underground Water Level A)	Monthly Collecting samples, 1time/ each observation point
	Wastewater: - Domestic waste water: collection, volume, monitoring parameter (BOD5, TSS, Coliform bacteria) - Construction waste water: volume of waste water due to tools maintenance (oil, TSS)	- Domestic waste water: worker's accommodation at the construction site - Construction waste water: construction site	Control: MAUR Operation: ES	- Examine records of domestic waste water disposer - Analysis and sampling of waste water - Conforming to QCVN 14:2008/BTNMT and QCVN 40:2011/BTNMT Unnecessary of domestic waste water monitoring in the case of portable toilet and leased residence (BOD_5, Coliform bacteria)	Periodical monitoring of waste water collection and disposal Analysis and sampling of waste water (monthly)
Waste (construction)	- Volume of waste caused of construction - Disposal soil, rock, dismantled stuff, material deposit, collection, transfer - Waste reclaimed land caused of construction which is designated area or not (Area which local organization have agreed, or not), environmental management of waste reclaimed land	Construction area	Control: MAUR Operation: ES	- Examine records of waste disposer (daily) - Implementation site confirmation of waste disposal and waste collection - Conforming to laws (Decree No.38/2015/ND-CP dated April 04th, 2015)	Periodical monitoring
Waste (workers)	- Volume of solid waste from worker - Collection schedule of solid waste from worker - Dustbin quality and capacity	Construction area	Control: MAUR Operation: ES	- Examine records of waste disposer (daily) - Implementation site confirmation of waste disposal and waste collection - Conforming to laws (Decree No.38/2015/ND-CP dated April 04th, 2015)	Periodical monitoring
Waste (hazardous waste)	- Volume of hazardous waste - Collection schedule of hazardous waste - Quality and capacity of hazardous waste container	Construction area	Control: MAUR Operation: ES	- Examine records of hazardous waste disposer - Implementation site confirmation of hazardous waste disposal and collection - Conforming to QCVN 07:2009/BTNMT and notification (Circular No.36/2015/TT-BTNMT dated June 06th, 2015)	Periodical monitoring
Soil pollution	Same as water pollution and waste				

Impact	Monitored parameter	Location	Responsibility	Methods	Frequency (Specified continuation period during operation)
Noise/ vibration	Noise (Leq), Vibration (Acceleration-Lae, Speed-Lveq)	(1) O1,R1: Station C1 - Thai Binh Market (2) O2,R2: Station C2 - Cong Hoa Six-Way Junction (3) O3,R3: Station C3 - Hoa Binh Park (4) O4,R4: Station C4 - University of Medicine & Pharmacy (5) O5,R5: Station C5 - Thuan Kieu Plaza (6) O6,R6: Station C6 - Cho Lon Bus Station (7) O7,R7: Station C7 - Cay Go (8) O8,R8: Station C8 - Phu Lam Rotary (9) O9,R9: Station C9 - Phu Lam Park (10) O10,R10: Station C10 - Mien Tay Terminal Station (1) ~ (10) are the same spots as the baseline survey. Monitoring is carried out in front of a special area closest to construction sites such as hospitals, schools, churches	Control: MAUR Operation: EMC (consign)	- Observe noise level at the point to be specifies - Confirm of dissatisfaction from local peoples - Noise- QCVN 26:2010/ BTNMT - Vibration- QCVN27:2010/BTNMT	Monthly Collecting samples, 1time/2hours continuously 24 hours (each observation point)
Ground Subsidence	- Ground subsidence - Compatible with neighborhood building	- Underground station at the construction area - Proximate building with underground station	Control: MAUR Operation: ES (under the CSC)	- Examine construction reports of contractor in accordance to the construction plan - Confirm of dissatisfaction from local peoples - Daily field work and cooperation with CSC which is responsibility of ground subsidence monitoring	Periodical monitoring
Ecosystem	Confirmation of maintenance status of surrounding street trees Confirmation of the street tree transplant status of the transplant target	All roadside trees along route (Include Pham Ngu Lao Street, Hung Vuong Street, Hong Bang Street, Kinh Duong Vuong Street)	Control: MAUR Operation: ES (under the CSC)	- Confirm that there is no damage or logging of street trees around the construction site. - Observe daily about all transplant roadside trees due to project during transplant terms - Observe interview when local peoples are dissatisfied	Periodical monitoring
	Growth situation of transplanted trees	Destination depot	Control: MAUR Operation: ES (under the CSC)	- Confirmation of the growing condition of transplanted trees	Every three months
Water use	Monitor water quality of groundwater and groundwater level in the item of water pollution				
Existing social infrastructure and social services	Traffic management plan created by project owner	Construction area	Control: MAUR Operation: ES (under the CSC)	- Scrutinizing the traffic management plan - Consult with local agencies and police. - Confirmation of the occurrence of traffic jam in the peak time of morning and evening (daily) - Scrutiny of congestion and accident records (every 6 months)	
Cultural, and religious heritages	Potential presence of undiscovered archaeological relics in construction area	Construction area	Control: MAUR Operation: ES (under the CSC)	Examining and accessing	In case of finding
Landscape	Cleaning status of construction site Landscape consideration after construction completion and planting situation of street trees	Construction area	Control: MAUR Operation: ES (under the CSC)	- Cleanup activities in affected areas - Confirmation of cleaning status (daily). - Confirm whether the landscape consideration is taken at the construction site after construction.	
Spreading Disease, HIV and other Evils	Monitoring is carried out in terms of labor environment / Incidents				
Work environment/ Incidents	Work environment and management of workers - Establish and application of labor 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, etc.). - Water supply, energy supply, hygiene, waste collecting and treating systems, toilets, wastewater, solid waste for construction sites and worker's camps. - Flood occurrence situation - Health check for workers.	Construction area/ Worker's camp	Control: MAUR Operation: ES (under the CSC)	- Facility check of worker's camps (every six months); - Examine records of heath check for workers (yearly); - Security check at worker's camps (weekly) - Examine records of incidents (every six months) - Survey and interview local community (every 6 months).	
	Worker and public safety - Quantity, quality and usage of work safety equipment; - Implementation of training.	Construction area	Control: MAUR Operation: ES (under the CSC)	- Quality and quantity checks of protection equipment (once before construction commence); - Observe daily; - Examine construction records (every 6 months).	

Impact	Monitored parameter	Location	Responsibility	Methods	Frequency (Specified continuation period during operation)
Transboundary impacts and climate change	consumption of fuel at construction site	Construction area	Control: MAUR Operation: ES (under the CSC)	- Record consumption of fuel at construction site (every day)	
[Operation stage]					
Air quality	TSP, PM2.5, NO_2, SO_2, CO, HC	(1) A1: Station C1 - Thai Binh Market (2) A2: Station C2 - Cong Hoa Six-Way Junction (3) A3: Station C3 - Hoa Binh Park (4) A4: Station C4 - University of Medicine & Pharmacy (5) A5: Station C5 - Thuan Kieu Plaza (6) A6: Station C6 - Cho Lon Bus Station (7) A7: Station C7 - Cay Go (8) A8: Station C8 - Phu Lam Rotary (9) A9: Station C9 - Phu Lam Park (10) A10: Station C10 - Mien Tay Terminal Station (1)~(10) are the same spots as the baseline survey. Monitoring is carried out in front of a special area closest to construction sites such as hospitals, schools, churches	Control: MAUR Operation: EMC	- Analysis and sampling - Confirm of dissatisfaction from local peoples - Periodic observation during construction - QCVN 05:2013/ BTNMT (Conforming to National Technical Regulation on Environmental Quality Standard of Air)	- Every six month during warranty period (in first 24 months) - Collecting samples, 1time/2hours continuously 24 hours (each observation point)
Water pollution	Surface water: Temperature, pH, DO, TSS, BOD5, COD, Oil, Coliform bacteria	(1) SW1: Tan Hoa Canal (2) SW2: Phu Lam Lake (1)~(2) are the same spots as the baseline survey.	Control: MAUR Operation: EMC	- Analysis and sampling - Confirm of dissatisfaction from local peoples - Periodic observation during construction - QCVN 08:2008/BTNMT (Conforming to National Technical Regulation on Environmental Quality Standard of Ground Water Level B1)	- Every six months during warranty period (in first 24 months) - Collecting samples, 1time/ each observation point
	Underground water: Temperature, pH, Dissolved Solids, hardness ($CaCO_3$), Sulfate (SO_4^{2-}), Fluoride (F^-), Chloride (Cl^-), Ammonium (in N), NO_3^- (in N), NO_2^- (in N), Copper (Cu), Zinc (Zn), Manganese (Mn), Iron (Fe), Mercury (Hg), Cadmium (Cd), Arsenic (As), Chrome VI (Cr^{6+}), Cyanide (CN^-), Phenol , Permanganate index , E.Coli , Coliform and groundwater level.	(1) GW1: 103/13 Co Giang Ward, District 1; (2) GW2: 897/62 Tran Hung Dao Street, Ward 2, District 5; (3) GW3: 47/5 Phan Van Khoe Street, Ward 2, District 6; (4) GW4: 75 Binh Phu Street, Ward 11, District 6; (5) GW5: 95/53/10 Le Tan Be Street, An Lac Ward, Binh Tan District. (1)~(5) are the same spots as the baseline survey.	Control: MAUR Operation: EMC	-Analysis and sampling -Confirm of dissatisfaction from local peoples -QCVN 08:2008/BTNMT (Conforming to National Technical Regulation on Environmental Quality Standard of Underground Water Level A)	- Every six months during warranty period (in first 24 months) - Collecting samples, 1time/ each observation point
	Wastewater: - Domestic waste water: collection, volume, monitoring parameter (BOD_5, TSS, Coliform bacteria)	Each station(C1～C10)	Control: MAUR (24 months after service), HCMPC / MOMC / DOT / UTMD 1 (after 24 months from service) Operation: EMC (24 months after service), MOMC (24 months after service)	- Examine records of domestic waste water disposer - Analysis and sampling of waste water - Conforming to QCVN 14:2008/BTNMT and QCVN 40:2011/BTNMT	- Periodical monitoring - Drainage sampling and analysis once every 3 months
Waste	Waste emitted by passengers / employees - Amount of solid waste from workers - Solid waste collection schedule from workers - Trash bin capacity and quality	Each station(C1～C10)	Control: MAUR (24 months after service), HCMPC / MOMC / DOT / UTMD 1 (after 24 months from service) Operation: EMC (24 months after service), MOMC (24 months after service)	- Examine records of waste disposer (daily) - Implementation site confirmation of waste disposal and waste collection - Conforming to laws (Decree No.38/2015/ND-CP dated April 04th, 2015)	- Periodical monitoring

Impact	Monitored parameter	Location	Responsibility	Methods	Frequency (Specified continuation period during operation)
Noise vibration	Noise (Leq), Vibration (Acceleration-Lae, Speed-Lveq)	(1) O1,R1: Station C1 - Thai Binh Market (2) O2,R2: Station C2 - Cong Hoa Six-Way Junction (3) O3,R3: Station C3 - Hoa Binh Park (4) O4,R4: Station C4 - University of Medicine & Pharmacy (5) O5,R5: Station C5 - Thuan Kieu Plaza (6) O6,R6: Station C6 - Cho Lon Bus Station (7) O7,R7: Station C7 - Cay Go (8) O8,R8: Station C8 - Phu Lam Rotary (9) O9,R9: Station C9 - Phu Lam Park (10) O10,R10: Station C10 - Mien Tay Terminal Station (1)~(10) are the same spots as the baseline survey. Monitoring is carried out in front of a special area closest to construction sites such as hospitals, schools, churches	Control: MAUR Operation: EMC	- Observe noise level at the point to be specifies - Confirm of dissatisfaction from local peoples - Periodic observation during construction - Noise- QCVN 26:2010/ BTNMT - Vibration- QCVN27:2010/BTNMT	- Every six months during warranty period (in first 24 months) - Collecting samples, 1time/2hours continuously 24 hours (each observation point)
Ground Subsidence	- Ground subsidence - Compatible with neighborhood building	Underground stations(C1～C8)	Control: MAUR Operation: ES (under the CSC)	- Examine construction reports of contractor in accordance to the construction plan - Confirm of dissatisfaction from local peoples - Daily field work and cooperation with CSC which is responsibility of ground subsidence monitoring	- Periodical monitoring during warranty period (in first 24 months)
Landscape	Landscape consideration after completion of construction	Station· ventilation tower · elevated section	Control: MAUR Operation: CSC	- Confirm whether the design of Station, ventilation tower and elevated section is suitable with the surrounding landscape. - Confirm whether the landscape consideration by planting street trees is taken at the construction site after construction.	- Once during warranty period (in first 24 months)
Accidents	Setting and operating safety rules - Emergency response plan created by the business operator - Equipment installation status for accidents - Training records of staff and workers - Implementation status of measures against floods Status of medical examination of staff and workers	Station and office	Control: MAUR (24 months after service), HCMPC / MOMC / DOT / UTMD 1 (after 24 months from service) Operation: EMC (24 months after service), MOMC (24 months after service)	- Confirm the site whether accident response equipment is operating normally. - Confirm the site whether accident response equipment is operating normally. - Confirm whether emergency response plan has been developed and whether employees are notified. - Confirm the installation status of measures against floods. - Investigate the occurrence of floods and strong winds. Scrutinize record of health examination implementation status.	- Every six months

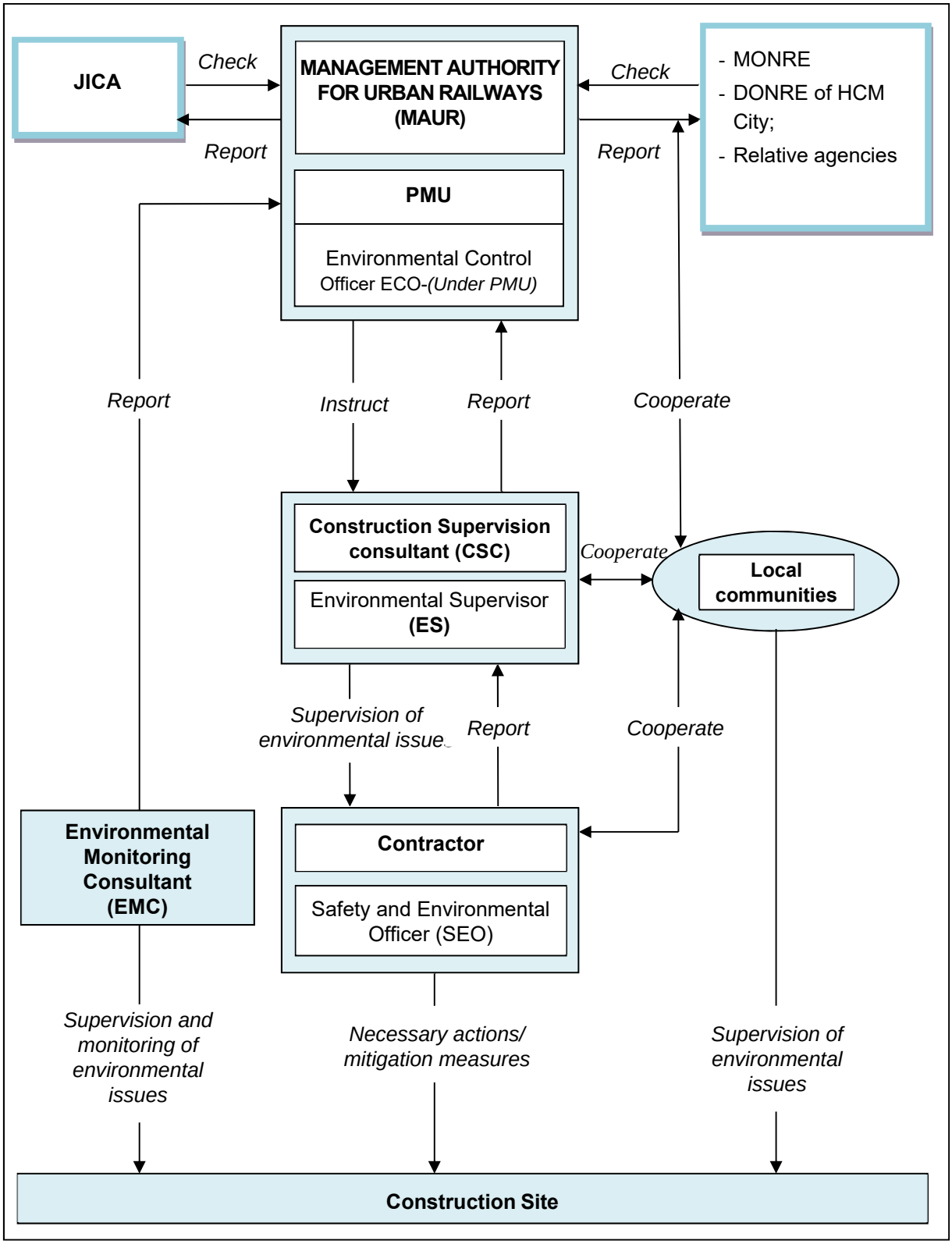
8.10.2 Reporting system of Environmental Monitoring Plan

(1) Reporting system of Environmental Monitoring Plan I preparation and construction phase of the Project

The following relevant organizations and parties with different roles and responsibilities should attend the Environmental Management Plan in preparation and construction phase of the Project:

- Sponsor: would be Japan International Cooperation Agency (JICA) as requested by Ho Chi Minh City;
- Project Owner: Management Authority for Urban Railways (MAUR)
- Administrator: Project Management Unit (PMU) (representative of the MAUR)
- Agency approving the EIA Report: Ministry of Natural Resources and Environment (MONRE)
- Department of Natural Resources and Environment (DONRE) of HCM city and relevant agencies;
- Construction supervision consultant (CSC)/Environmental Supervisor (ES)
- Environmental Monitoring Consultant (EMC)
- Construction Contractor;
- Contractor's Safety &Environmental Officer (SEO)
- Community Supervision Board

The relationship between the parties involved in environmental management of the project in preparation and construction phase in shown in the following Figure 8.10.1.



Source: Report on EIA of Ho Chi Minh City urban railway construction project,Line 3A (Ben Thanh - Tan Kien)

Figure 8.10.1 Reporting system of Environmental Monitoring Plan in preparation and construction phase of the Project

Table 8.10.2 Roles and Responsibilities of Stakeholders in Pre-construction and Construction Stages of the Project

Roles / Agency	Responsibilities
Management Authority for Urban Railways:MAUR	As the project implementation management organization, the Project Owner, Management Authority for Urban Railways (MAUR) is responsible for overall monitoring of the implementation of project, including compliance with requirements on environment. MAUR and it responsible department shall take the major responsibility for environmental activities in the period of Project implementation as stipulated in the Circular No. 32/2015/TT-BGTVT dated July 24, 2015 issued by the Ministry of Transport on environmental protection in traffic infrastructure development. Specifically, MAUR/PMU shall: - Include environmental protection commitments, waste treatment measures, measures to minimize adverse impacts on environment in the EIA report approved by competent authorities to bidding documents and contract with construction contractors. - Be responsible for organization and management of environmental protection in construction activities and shall perform the following tasks: o Preparing and approving Project EMP, and then submitting to communal people's committee which has given their opinions in EIA process for publicly issuing the EMP before commencing the construction o Giving guidance and instruction to Contractor's staff and employees on contents of EMP, waste treatment measures, and measures to minimize adverse impacts on environment with regards to the bidding package undertaken by the Contractor o Performing the following task, to organizing, supervising, urging contractor to implement methods of management. o Collection and treatment of waste (especially hazardous waste); measures to minimize dust, noise, vibration; measures to cope with incidents; occupational safety methods; o Making weekly assessment of environmental compliance made by contractor; o Preparing and saving assessment record under the form specified -Circular No. 32/2015/TT-BGTVT dated 24/07/2015 o Performing periodic environmental monitoring; summarizing, evaluating and making report on compliance with the environmental protection contents of the project according to construction schedule; submitting the report to relevant environmental protection agency under Provincial PPCs and the agency approving EIA report. o Immediately taking remedy and informing the agency approving the decision on investment in project and Communal/District PPC or the Department of Natural Resources and Environment at the project location in case of suspension of construction activities due to environmental incidents. o Keeping environmental protection records with regards to the projects; coordinating with, providing the State management agency for environmental protection with relevant information for purpose of inspecting. o Handling violations of construction contractor with regards to environmental protection in the bidding package under the terms of the contract signed.
Project Management Unit :PMU	Project Management Unit (PMU), representative of the MAUR, will be responsible for monitoring the overall project implementation, including environmental compliance of the project. PMU will have the final responsibility for environmental performance of the project during the Project's stages. The PMU is responsible for fostering effective coordination and cooperation between contractor, local authorities, and local communities during construction phase. PMB will be assisted by the environmental staff, and CSC/or field engineer. 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 MAUR and the JICA.
Environmental Control Officer (ECO) –(under MAUR)	To achieve effectiveness in the implementation process, PMU which shall appoint an ECO to address environmental issues of the Project. This ECO is responsible for helping PMU to perform the following tasks: - Considering EIA and EMP conducted by consultant; - Updating the EMP during detailed design; - Helping PMU incorporate EMPs into the detailed technical designs and civil works bidding and contractual documents;

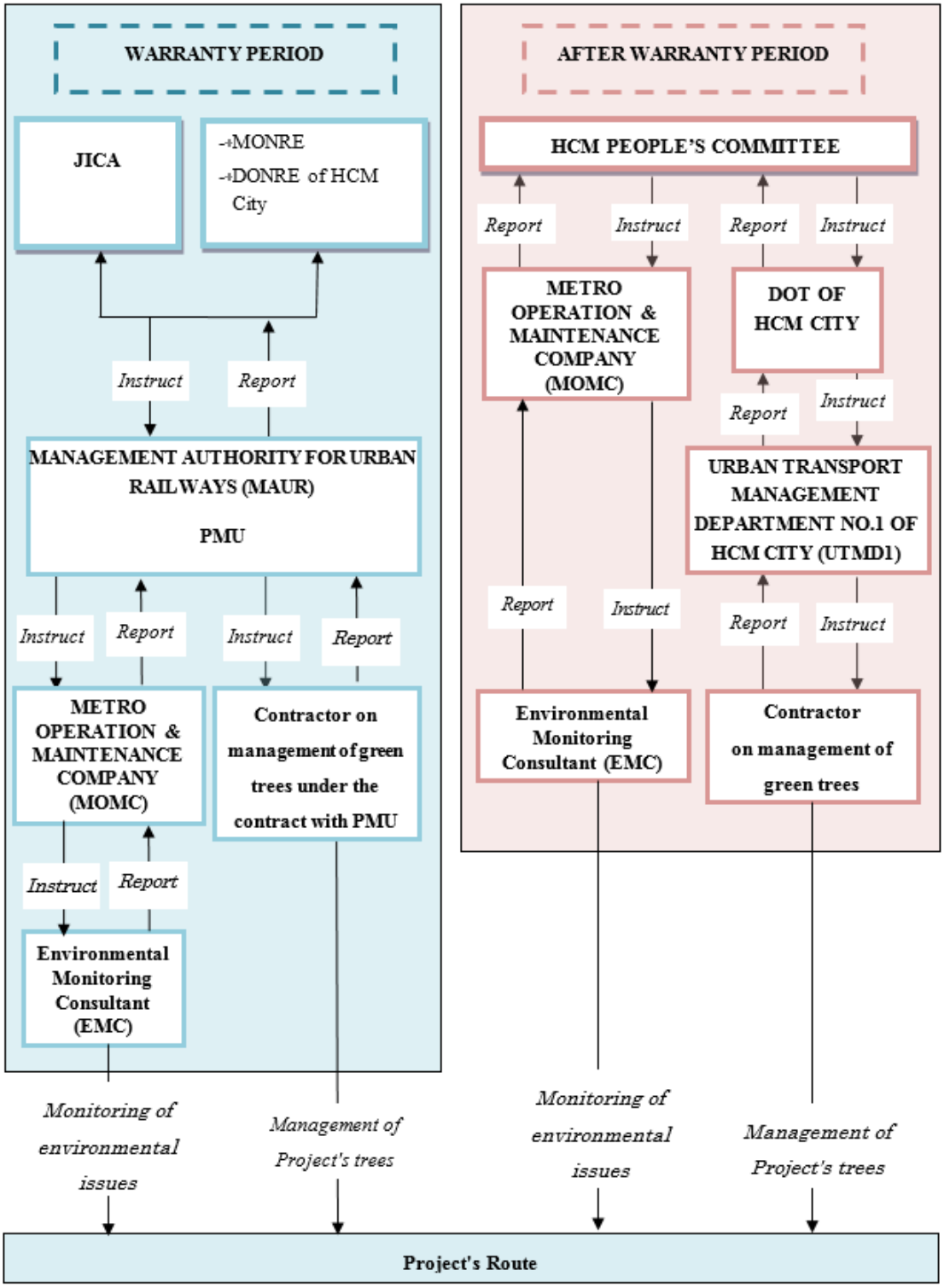
Roles / Agency	Responsibilities
	- Helping PMU incorporate responsibilities for EMP monitoring and supervision into the TORs, bidding and contractual documents for CSC/ES; - Providing relevant inputs to the consultant selection process; - Reviewing reports submitted by the Environmental Supervisor; - Directly monitoring the management, supervision and monitoring; - Conducting periodic site checks; Giving PMU on resolutions to environmental issues of the Project.
Construction supervision consultant (CSC)/ Environmental Supervisor (ES)	- Supporting PMU in establishing and operating the environmental management system; making recommendations on adjustment and enhancement of relevant parties' capacity in the process of implementation and monitoring the implementation of EMP of contractor. - CSC will be responsible for general supervision of construction activities and ensure that the Contractor complies with contractual requirements and specifications. ES belonging to CSC group will be responsible for supervising and monitoring construction activities in terms of environmental aspect and ensure that the Contractor satisfies with requirements specified in the contract signed with the project owner, in approved EIA report, as well as in EMP. - ES includes Environmental Engineers with adequate knowledge in the field of environmental protection who are responsible for fulfilling obligations and monitoring the environmental issues in construction activities of the Contractor. - Directly notifying construction units of any potential environmental issues that may hinder the progress of the Project. - Monitoring the implementation of mitigation measures by the contractor, promptly proposing and implementing additional interventions so as to complete the said mitigation measures and meet requirements on environmental protection. - Making plan to prevent and respond to environmental issues, emergencies that may occur during construction. - Requesting PMU to suspend the construction partly or wholly in case the contractor fails to meet requirements on occupational safety and environmental protection as agreed or stated in the contract. Reporting periodically on environmental monitoring results to PMU.
Environmental Monitoring Consultant (EMC)	- Periodically monitor environmental quality indicators. - Reporting periodically on monitoring results to PMU. Perform additional measurements upon request.
Construction contractor	The Contractor shall comply with all provisions on environmental protection as stipulated in the Circular No. 32/2015/TT-BGTVT dated July 24, 2015, specifically: - Construction Contractor shall comply with all provisions of law on environmental protection, standards, and environmental technical specifications and satisfy requirements on environmental protection as specified in the contract signed with PMU. - During construction, the construction contractor shall perform the following basic tasks: o Implementing requirements in EMP of the project, taking waste treatment measures, and measures to minimize adverse impacts on environment with regards to the bidding package undertaken by the Contractor. o Regularly monitoring and urging officials and employees to comply with requirements on environmental protection with regards to the bidding package in construction process; raising awareness and consciousness of environmental protection in employees. o Collecting, storing, transporting, treating or disposing solid waste (such as mud, excavated soil, refused materials, construction waste, etc.) in the right place, method and volume. o Collecting and storing household waste and hiring local environmental sanitation unit to transport and treat; or treating waste in accordance with regulations. o Collecting and storing hazardous waste and hiring licensed hazardous waste management unit to transport and treat. o Preparing toilet, waste collector and container, temporary sewage treatment works on construction sites, construction administration office and worker camps. o Taking measures to reduce dust, noise, vibration, drainage measures, and local anti-flooding measures; designing and implementing emergency response plans; ensuring traffic safety during the construction process. o Managing and maintaining technical state of construction vehicles, equipment and machines in accordance with regulations on quality, technical safety and environmental protection; complying with regulations on vehicle load; covering materials and waste, preventing them from leakage that causes environmental pollution while transporting during the construction process.

Roles / Agency	Responsibilities
	o Recovering the initial environmental state, cleaning the construction site, making clearance of river and canal beds after completing the construction. o Providing the State management agency for environmental protection with relevant information for purpose of inspecting. - Being subject to the management of ES, adjusting or strengthening measures when being required by the ES or ECO.
Local community (government, Non-governmental organizations, etc.)	Community investment monitoring is a voluntary activity performed by the residents in commune/ward under the Decision No 80/2005/QD-TTg and other relevant legal provisions, for the purpose of: Monitoring and assessing the compliance with regulations on investment management of competent investment decision authority, project owner, PMU, contractors and construction unit during the investment process (including environmental aspect); - Detecting and reporting to state competent authority on any violation of regulations on investment management (including environmental aspect) so as to promptly prevent and handle the violation, avoiding waste and loss of state capital and assets, as well as bad effect on interests of the community.

Source: Report on Environmental Impact Assessment of Ho Chi Minh City urban railway construction project,Line 3A (Ben Thanh - Tan Kien)

(2) Reporting System of Environmental Monitoring Plan in Operation Stage

Implementing System of EMP in operation stage is presented in Figure 8.10.2.



Source: Report on EIA of Ho Chi Minh City urban railway construction project,Line 3A (Ben Thanh - Tan Kien)

Figure 8.10.2 Implementing System of EMP in operation stage

Table 8.10.3 Roles and Responsibilities of Stakeholders in operation stage

Organization	Responsibilities (Environmental Aspect)
JICA	If the Project is implemented under JICA's cooperation, JICA shall follow up the implementation of environmental protection measures of the Project, and discuss with HCM PC when it needs to carry out additional cooperation for the same purpose.
Ministry of Natural Resources and Environment (MONRE) and HCM City Department of Natural Resources and Environment (DONRE)	- Guide, check the activities after appraising EIA report. - Confirm the following task o The implementation of the environmental protection facilities o Measures serving the operation stage of the project according to approved EIA report.
Department of Transport (DOT)	- Means the state management agency that manages, inspects, and develops traffic works maintenance plans of the project in operation stage after being handed over by MAUR. - The other responsibility is to select maintenance contractor and monitor maintenance activities of traffic works of the project.
Urban transport management department No.1 (UTMD1)	- After being handed over the project from MAUR, the Urban transport management department No.1 shall assist the directors of the Department of Transport to manage the urban transport infrastructure system (including bridge, road, drainage, public lighting, green park) in the areas of the district 1; 3; 4; 5; 6; 10; 11; Phu Nhuan; Tan Binh; Tan Phu; Binh Tan
Management Authority for Urban Railways (MAUR)/ Project Management Unit (PMU)	- MAUR – Project Owner is the agency, which manages the implementation of the Project, monitors and provides 24-month warranty service, including environment monitoring of the Project in operation stage.
Environmental Monitoring Consultant (EMC)	- Periodically monitor environmental quality indicators. - Periodically report the monitoring results to MAUR.
Metro operation & Maintenance Company (MOMC)	- Management and operation of metro
Contractor on management of green trees	- Management, maintenance, improvement, new construction and transplantation of Project's trees.

Source: Report on EIA of Ho Chi Minh City urban railway construction project, Line 3A (Ben Thanh - Tan Kien)

(3) Draft Monitoring Form

The draft monitoring form concerning pollution control in this project is as shown below.

[Before Construction] (Pre-construction stage)

Item (Unit)	Measure Value (Mean)	Measure Value (Max)	Country's Standards	Remarks (Measurement Point, Frequency, Method, etc.)
Air quality (Ambient air environment Measurement Value)				
TSP ($\mu g/m^3$)			200	Measurement Point: (1) KK1: Station C1 - Thai Binh Market (2) KK2: Station C2 - Cong Hoa Six-Way Junction (3) KK3: Station C3 - Hoa Binh Park (4) KK4: Station C4 - University of Medicine & Pharmacy (5) KK5: Station C5 - Thuan Kieu Plaza (6) KK6: Station C6 - Cho Lon Bus Station (7) KK7: Station C7 - Cay Go (8) KK8: Station C8 - Phu Lam Rotary (9) KK9: Station C9 - Phu Lam Park (10) KK10: Station C10 - Mien Tay Terminal Station (1)~(10) are the same spots as the baseline survey. Monitoring is carried out in front of a special area closest to construction sites such as hospitals, schools, churches Measurement Frequency:Once, before construction commence Measurement Method:Collecting samples, 1time/2hours continuously 24 hours (each observation point) Standards: Based on QCVN 05: 2013/BTNMT
$PM_{2.5}$ ($\mu g/m^3$)			50	
SO_2 ($\mu g/m^3$)			125	
NO_2 ($\mu g/m^3$)			100	
CO (mg/m^3)			-	
HC ($\mu g/m^3$)			1500	
Water Quality(Surface water Measurement Value)				
Water temperature(°C)			-	Measurement Point: (1)SW1: Tan Hoa Canal (2)SW2: Phu Lam Lake (1)~(2) are the same spots as the baseline survey. Measurement Frequency:Once, before construction commence Measurement Method:Collecting samples, 1time /each observation point Standards: Based on QCVN08-MT:2015/BTNMT
pH			5.5 - 9	
DO (mg/l)			≥ 2	
TSS (mg/l)			100	
BOD_5 (mg/l)			25	
COD (mg/l)			50	
Total of oil and grease(mg/l)			1	
Coliform (MPN/100ml)			10,000	
Water Quality(Underground water Measurement Value)				
pH			**5.5 - 8.5**	Measurement Point: (1) GW1: 103/13 Co Giang Ward, District 1; (2) GW2: 897/62 Tran Hung Dao Street, Ward 2, District 5; (3) GW3: 47/5 Phan Van Khoe Street, Ward 2, District 6; (4) GW4: 75 Binh Phu Street, Ward 11, District 6;
Dissolved solids (mg/L)			**1500**	
hardness ($CaCO_3$) ($mgCaCO_3/L$)			**500**	
Sulfate (SO_4^{2-}) (mg/L)			**400**	

Item (Unit)		Measure Value (Mean)	Measure Value (Max)	Country's Standards	Remarks (Measurement Point, Frequency, Method, etc.)
Fluoride (F^-) (mg/L)				**1**	(5) GW5: 95/53/10 Le Tan Be Street, An Lac Ward, Binh Tan District (1)~(5) are the same spots as the baseline survey. Measurement Frequency: Once, before construction commence Measurement Method: Collecting samples, 1time /each observation point Standards: Based on QCVN 09-MT:2015/BTNMT
Chloride (Cl^-) (mg/L)				**250**	
Ammonium (in N) (mg/L)				**1**	
NO_3^-(in N) (mg/L)				**15**	
NO_2^-(in N) (mg/L)				**1**	
Copper (Cu) (mg/L)				**1**	
Zinc (Zn) (mg/L)				**3**	
Manganese (Mn) (mg/L)				**0.5**	
Iron (Fe) (mg/L)				**5**	
Mercury (Hg) (mg/L)				**0.001**	
Cadmium (Cd) (mg/L)				**0.005**	
Arsenic (As) (mg/L)				**0.05**	
Chrome VI (Cr^{6+}) (mg/L)				**0.05**	
Cyanide (CN^-) (mg/L)				**0.01**	
Phenol (mg/L)				**0.001**	
Permanganate index (mg/L)				**4**	
E.Coli (MPN/100mL)				**Not detected**	
Coliform (MPN/100mL)				**3**	
Noise and Vibration					
Noise Level (dB)	Day time			70dB	Measurement Point : (1) O1,R1: Station C1 - Thai Binh Market (2) O2,R2: Station C2 - Cong Hoa Six-Way Junction (3) O3,R3: Station C3 - Hoa Binh Park (4) O4,R4: Station C4 - University of Medicine & Pharmacy (5) O5,R5: Station C5 - Thuan Kieu Plaza (6) O6,R6: Station C6 - Cho Lon Bus Station (7) O7,R7: Station C7 - Cay Go (8) O8,R8: Station C8 - Phu Lam Rotary (9) O9,R9: Station C9 - Phu Lam Park (10) O10,R10: Station C10 - Mien Tay Terminal Station (1)~(10) are the same spots as the baseline survey. Monitoring is carried out in front of a special area closest to construction sites such as hospitals,
	Night time			55dB	
Vibration Level (dB)	Day time			75dB	
	Night time			Base Level	

Item (Unit)		Measure Value (Mean)	Measure Value (Max)	Country's Standards	Remarks (Measurement Point, Frequency, Method, etc.)
					schools, churches Measurement Frequency: Once, before construction Measurement Method: Collecting samples, 1time/2hours continuously 24 hours (each observation point) Standards: QCVN 26:2010/BTNMT QCVN 27:2010/BTNMT

Monitoring Item	Monitoring Results during Report Period	Remarks (Measurement Point, Frequency, Method, etc.)
Air quality		
Confirm of dissatisfaction from local peoples		Measurement Point: Construction area Measurement Frequency: Once, before construction commence Measurement Method: Hearing to local residents
Water Quality(Surface water)		
Confirm of dissatisfaction from local peoples		Measurement Point: Construction area Measurement Frequency: Once, before construction commence Measurement Method: Hearing to local residents
Water Quality(Underground water)		
Confirm of dissatisfaction from local peoples		Measurement Point: Construction area Measurement Frequency: Once, before construction commence Measurement Method: Hearing to local residents
Noise and Vibration		
Confirm of dissatisfaction from local peoples		Measurement Point: Construction area Measurement Frequency: Once, before construction commence Measurement Method: Hearing to local residents
Waste(Construction / Workers)		
Type of waste		Measurement Point: Dismantling of houses, leveling work place Measurement Frequency: Daily Measurement Method: Examine records of waste disposer Implementation site confirmation of waste disposal and waste collection
Amount of waste		
Storage location for each type of waste		
Destination by type of waste		

Monitoring Item	Monitoring Results during Report Period	Remarks (Measurement Point, Frequency, Method, etc.)
		Standards: Decree No.38/2015/ND-CP dated April 04th, 2015
Waste(hazardous waste)		
Type of hazardous waste		Measurement Point: Dismantling of houses, leveling work place Measurement Frequency: Daily Measurement Method: Examine records of hazardous waste disposer Implementation site confirmation of hazardous waste disposal and hazardous waste collection Standards: QCVN 07:2009/BTNMT Circular No.36/2015/TT-BTNMT dated June 06th, 2015
Amount of hazardous waste		
Storage location of hazardous waste		
Destination of hazardous waste		
Landscape		
Implementation situation of landscape design which is suitable with the surrounding landscape Formulation of transplant plan of street trees		Measurement Point: n/a Measurement Frequency: Once, before construction commence Measurement Method: Scrutinizing the design of the station, ventilation tower, elevated Scrutinizing the transplant plan of street trees
Existing social infrastructure and social services		
Relocation status of existing infrastructure		Measurement Point: In the whole areas to be interrupted Measurement Frequency: Once, before construction commence Measurement Method: Examine records of facility services removal

[During Construction](Construction stage)

Item (Unit)	Measure Value (Mean)	Measure Value (Max)	Country's Standards	Remarks (Measurement Point, Frequency, Method, etc.)
Air quality (Ambient air environment Measurement Value)				
TSP ($\mu g/m^3$)			200	Measurement Point: (1) KK1: Station C1 - Thai Binh Market (2) KK2: Station C2 - Cong Hoa Six-Way Junction (3) KK3: Station C3 - Hoa Binh Park (4) KK4: Station C4 - University of Medicine & Pharmacy (5) KK5: Station C5 - Thuan Kieu Plaza (6) KK6: Station C6 - Cho Lon Bus Station (7) KK7: Station C7 - Cay Go (8) KK8: Station C8 - Phu Lam Rotary (9) KK9: Station C9 - Phu Lam Park (10) KK10: Station C10 - Mien Tay Terminal Station
$PM_{2.5}$ ($\mu g/m^3$)			50	
SO_2 ($\mu g/m^3$)			125	
NO_2 ($\mu g/m^3$)			100	
CO (mg/m^3)			-	
HC ($\mu g/m^3$)			1500	

Item (Unit)	Measure Value (Mean)	Measure Value (Max)	Country's Standards	Remarks (Measurement Point, Frequency, Method, etc.)
				(1)~(10) are the same spots as the baseline survey. Monitoring is carried out in front of a special area closest to construction sites such as hospitals, schools, churches Measurement Frequency: Once a month Measurement Method:Collecting samples, 1time/2hours continuously 24 hours (each observation point) Standards: QCVN 05: 2013/BTNMT
Water Quality(Surface water Measurement Value)				
Water temperature(°C)			-	Measurement Point: (1)SW1: Tan Hoa Canal (2)SW2: Phu Lam Lake (1)~(2) are the same spots as the baseline survey. Measurement Frequency: ・Once a month Measurement Method: Collecting samples, 1time/ each observation point Standards: QCVN 08-MT:2015/BTNMT
pH			5.5 - 9	
DO (mg/l)			≥ 2	
TSS (mg/l)			100	
BOD_5 (mg/l)			25	
COD (mg/l)			50	
Total of oil and grease(mg/l)			1	
Coliform(MPN/100ml)			10,000	
Water Quality(Underground water Measurement Value)				
pH			**5.5 - 8.5**	Measurement Point: (1) GW1: 103/13 Co Giang Ward, District 1; (2) GW2: 897/62 Tran Hung Dao Street, Ward 2, District 5; (3) GW3: 47/5 Phan Van Khoe Street, Ward 2, District 6; (4) GW4: 75 Binh Phu Street, Ward 11, District 6; (5) GW5: 95/53/10 Le Tan Be Street, An Lac Ward, Binh Tan District (1)~(5) are the same spots as the baseline survey. Measurement Frequency: ・Once a month Measurement Method: Collecting samples, 1time/ each observation point Standards: QCVN 09-MT:2015/BTNMT
Dissolved solids (mg/L)			**1500**	
hardness ($CaCO_3$) ($mgCaCO_3/L$)			**500**	
Sulfate (SO_4^{2-}) (mg/L)			**400**	
Fluoride (F^-) (mg/L)			**1**	
Chloride (Cl^-) (mg/L)			**250**	
Ammonium (in N) (mg/L)			**1**	
NO_3^-(in N) (mg/L)			**15**	
NO_2^-(in N) (mg/L)			**1**	
Copper (Cu) (mg/L)			**1**	
Zinc (Zn) (mg/L)			**3**	
Manganese (Mn) (mg/L)			**0.5**	
Iron (Fe) (mg/L)			**5**	

Item (Unit)		Measure Value (Mean)	Measure Value (Max)	Country's Standards	Remarks (Measurement Point, Frequency, Method, etc.)
Mercury (Hg) (mg/L)				**0.001**	
Cadmium (Cd) (mg/L)				**0.005**	
Arsenic (As) (mg/L)				**0.05**	
Chrome VI (Cr^{6+}) (mg/L)				**0.05**	
Cyanide (CN^-) (mg/L)				**0.01**	
Phenol (mg/L)				**0.001**	
Permanganate index (mg/L)				**4**	
E.Coli (MPN/100mL)				**Not detected**	
Domestic waste water					
BOD_5 (mg/l)				25	Measurement Point: Construction area Measurement Frequency: ・Once a month Measurement Method: monitoring of waste water collection and disposal Standards: QCVN 14:2008/BTNMT QCVN 40:2011/BTNMT Unnecessary of domestic waste water monitoring in the case of portable toilet and leased residence (BOD_5, Coliform bacteria)
TSS (mg/l)				100	
Coliform bacteria (MPN/100mL)				3	
Construction waste water					
TSS (mg/l)				100	Measurement Point: Construction area Measurement Frequency: ・Once a month Measurement Method: monitoring of waste water collection and disposal Standards: QCVN 14:2008/BTNMT QCVN 40:2011/BTNMT
Total of oil and grease (mg/l)				1	
Noise and Vibration					
Noise Level (dB)	Day time			70dB	Measurement Point: (1) O1,R1: Station C1 - Thai Binh Market (2) O2,R2: Station C2 - Cong Hoa Six-Way Junction (3) O3,R3: Station C3 - Hoa Binh Park (4) O4,R4: Station C4 - University of Medicine & Pharmacy (5) O5,R5: Station C5 - Thuan Kieu Plaza (6) O6,R6: Station C6 - Cho Lon Bus Station (7) O7,R7: Station C7 - Cay Go (8) O8,R8: Station C8 - Phu Lam Rotary (9) O9,R9: Station C9 - Phu Lam Park (10) O10,R10: Station C10 - Mien Tay Terminal Station
	Night time			55dB	
Vibration Level(dB)	Day time			75dB	
	Night time			Base Level	

Item (Unit)		Measure Value (Mean)	Measure Value (Max)	Country's Standards	Remarks (Measurement Point, Frequency, Method, etc.)
					(1)~ (10) are the same spots as the baseline survey. Monitoring is carried out in front of a special area closest to construction sites such as hospitals, schools, churches Measurement Frequency: ・Once a month Measurement Method: Collecting samples, 1time/2hours continuously 24 hours (each observation point) Standards: QCVN 26:2010/BTNMT QCVN 27:2010/BTNMT

Monitoring Item	Monitoring Results during Report Period	Remarks (Measurement Point, Frequency, Method, etc.)
Air quality		
Confirm of dissatisfaction from local peoples		Measurement Point: Construction area Measurement Frequency: Once a month Measurement Method: Hearing to local residents
Water Quality(Surface water)		
Confirm of dissatisfaction from local peoples		Measurement Point: Construction area Measurement Frequency: Once a month Measurement Method: Hearing to local residents
Water Quality(Underground water)		
Confirm of dissatisfaction from local peoples		Measurement Point: Construction area Measurement Frequency: Once a month Measurement Method: Hearing to local residents
Waste(Construction / Workers)		
Type of waste		Measurement Point: Dismantling of houses, leveling work place Measurement Frequency: Daily Measurement Method: Examine records of waste disposer Implementation site confirmation of waste disposal and waste collection Standards: Decree No.38/2015/ND-CP dated April 04th, 2015
Amount of waste		
Storage location for each type of waste		
Destination by type of waste		

Monitoring Item	Monitoring Results during Report Period	Remarks (Measurement Point, Frequency, Method, etc.)
Waste(hazardous waste)		
Type of hazardous waste		Measurement Point: Dismantling of houses, leveling work place Measurement Frequency: Daily Measurement Method: Examine records of hazardous waste disposer Implementation site confirmation of hazardous waste disposal and hazardous waste collection Standards: QCVN 07:2009/BTNMT Circular No.36/2015/TT-BTNMT dated June 06th, 2015
Amount of hazardous waste		
Storage location of hazardous waste		
Destination of hazardous waste		
Noise and Vibration		
Confirm of dissatisfaction from local peoples		Measurement Point: Construction area Measurement Frequency: ・Once a month Measurement Method: Hearing to local residents
Ground Subsidence		
Ground Subsidence		Measurement Point: Underground station at the construction area Proximate building with underground station Measurement Frequency: Daily Measurement Method: Daily field work and cooperation with CSC which is responsibility of ground subsidence monitoring Examine construction reports of contractor in accordance to the construction plan Hearing to local residents
Groundwater level		
Compatible with neighborhood building		
Confirm of dissatisfaction from local peoples		
Ecosystem		
Confirmation of maintenance status of surrounding street trees Confirmation of the street tree transplant status of the transplant target		Measurement Point: All roadside trees along route Measurement Frequency: Periodical monitoring Measurement Method: - Confirm that there is no damage or logging of street trees around the construction site. - Observe daily about all transplant roadside trees due to project during transplant terms - Observe interview when local peoples are dissatisfied
Growth situation of transplanted trees		Measurement Point: Destination depot Measurement Frequency: ・Every three months Measurement Method: Confirmation of the growing condition of transplanted trees

Monitoring Item	Monitoring Results during Report Period	Remarks (Measurement Point, Frequency, Method, etc.)
Existing social infrastructure and social services		
Traffic management plan		Measurement Point: Construction area Measurement Frequency/ Measurement Method: - Confirmation of the occurrence of traffic jam in the peak time of morning and evening (daily) - Scrutiny of congestion and accident records (every 6 months)
Cultural, and religious heritages		
Potential presence of undiscovered archaeological relics in construction area		Measurement Point: Construction area Measurement Frequency: ・In case of finding Measurement Method: Record of discovery situation. Consultation with relevant organizations.
Landscape		
Cleaning status of construction site		Measurement Point: Construction area Measurement Frequency: Daily Measurement Method: Cleanup activities in affected areas - Confirmation of cleaning status (daily). Confirm whether the landscape consideration is taken at the construction site after construction.
Landscape consideration after construction completion and planting situation of street trees		
Work environment/ Incidents		
Work environment and management of workers - 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, etc.). - Water supply, energy supply, hygiene, waste collecting and treating systems, toilets, wastewater, solid waste for construction sites and worker's camps. - Flood occurrence situation - Health check for workers.		Measurement Point: Construction area/ Worker's camp Measurement Frequency/ Measurement Method: - Facility check of worker's camps (every six months); - Examine records of heath check for workers (yearly); - Security check at worker's camps (weekly) - Examine records of incidents (every six months) - Survey and interview local community (every 6 months).
Worker and public safety - Quantity, quality and usage of work safety equipment - Implementation of training.		Measurement Point: Construction area Measurement Frequency/ Measurement Method: - Quality and quantity checks of protection equipment (once before construction commence); - Observe daily; - Examine construction records (every 6 months).

Monitoring Item	Monitoring Results during Report Period	Remarks (Measurement Point, Frequency, Method, etc.)
Transboundary impacts and climate change		
consumption of fuel at construction site		Measurement Point: Construction area Measurement Frequency: Daily Measurement Method: Record consumption of fuel at construction site

[During operation](Operation stage)

Item (Unit)	Measure Value (Mean)	Measure Value (Max)	Country's Standards	Remarks (Measurement Point, Frequency, Method, etc.)
Air quality (Ambient air environment Measurement Value)				
TSP ($\mu g/m^3$)			200	Measurement Point: (1) A1: Station C1 - Thai Binh KK1: Station C1 - Thai Binh Market (2) KK2: Station C2 - Cong Hoa Six-Way Junction (3) KK3: Station C3 - Hoa Binh Park (4) KK4: Station C4 - University of Medicine & Pharmacy (5) KK5: Station C5 - Thuan Kieu Plaza (6) KK6: Station C6 - Cho Lon Bus Station (7) KK7: Station C7 - Cay Go (8) KK8: Station C8 - Phu Lam Rotary (9) KK9: Station C9 - Phu Lam Park (10) KK10: Station C10 - Mien Tay Terminal Station (1)~ (10) are the same spots as the baseline survey. Monitoring is carried out in front of a special area closest to construction sites such as hospitals, schools, churches Measurement Frequency: ・Every six month during warranty period (in first 24 months) Measurement Method:Collecting samples, 1time/2hours continuously 24 hours (each observation point) Standards: QCVN 05: 2013/BTNMT
$PM_{2.5}$ ($\mu g/m^3$)			50	
SO_2 ($\mu g/m^3$)			125	
NO_2 ($\mu g/m^3$)			100	
CO (mg/m^3)			-	
HC ($\mu g/m^3$)			1500	
Water Quality(Surface water Measurement Value)				
Water temperature(℃)			-	Measurement Point: (1)SW1: Tan Hoa Canal (2)SW2: Phu Lam Lake (1)~ (2) are the same spots as the baseline survey. Measurement Frequency: ・Every six month during warranty period (in first 24 months) Measurement Method: Collecting samples, 1time/ each observation point Standards: QCVN 08-MT:2015/BTNMT
pH			5.5 - 9	
DO (mg/l)			≥ 2	
TSS (mg/l)			100	
BOD_5 (mg/l)			25	
COD (mg/l)			50	

Item (Unit)		Measure Value (Mean)	Measure Value (Max)	Country's Standards	Remarks (Measurement Point, Frequency, Method, etc.)
Total of oil and grease(mg/l)				1	
Coliform(MPN/100ml)				10,000	
Water Quality(Underground water Measurement Value)					
pH				**5.5 - 8.5**	Measurement Point: (1) GW1: 103/13 Co Giang Ward, District 1; (2) GW2: 897/62 Tran Hung Dao Street, Ward 2, District 5; (3) GW3: 47/5 Phan Van Khoe Street, Ward 2, District 6; (4) GW4: 75 Binh Phu Street, Ward 11, District 6; (5) GW5: 95/53/10 Le Tan Be Street, An Lac Ward, Binh Tan District (1)~(5) are the same spots as the baseline survey. Measurement Frequency: ・Every six month during warranty period (in first 24 months) Measurement Method: Collecting samples, 1time/ each observation point Standards: QCVN 09-MT:2015/BTNMT
Dissolved solids (mg/L)				**1500**	
hardness ($CaCO_3$) ($mgCaCO_3/L$)				**500**	
Sulfate (SO_4^{2-}) (mg/L)				**400**	
Fluoride (F^-) (mg/L)				**1**	
Chloride (Cl^-) (mg/L)				**250**	
Ammonium (in N) (mg/L)				**1**	
NO_3^-(in N) (mg/L)				**15**	
NO_2^-(in N) (mg/L)				**1**	
Copper (Cu) (mg/L)				**1**	
Zinc (Zn) (mg/L)				**3**	
Manganese (Mn) (mg/L)				**0.5**	
Iron (Fe) (mg/L)				**5**	
Mercury (Hg) (mg/L)				**0.001**	
Cadmium (Cd) (mg/L)				**0.005**	
Arsenic (As) (mg/L)				**0.05**	
Chrome VI (Cr^{6+}) (mg/L)				**0.05**	
Cyanide (CN^-) (mg/L)				**0.01**	
Phenol (mg/L)				**0.001**	
Permanganate index (mg/L)				**4**	
E.Coli (MPN/100mL)				**Not detected**	
Noise and Vibration					
Noise Level (dB)	Day time			70dB	Measurement Point: (1) O1,R1: Station C1 - Thai Binh Market (2) O2,R2: Station C2 - Cong Hoa Six-Way Junction (3) O3,R3: Station C3 - Hoa Binh Park (4) O4,R4: Station C4 - University of Medicine & Pharmacy
	Night time			55dB	
Vibration Level (dB)	Day time			75dB	
	Night time			Base Level	

Item (Unit)		Measure Value (Mean)	Measure Value (Max)	Country's Standards	Remarks (Measurement Point, Frequency, Method, etc.)
					(5) O5,R5: Station C5 - Thuan Kieu Plaza (6) O6,R6: Station C6 - Cho Lon Bus Station (7) O7,R7: Station C7 - Cay Go (8) O8,R8: Station C8 - Phu Lam Rotary (9) O9,R9: Station C9 - Phu Lam Park (10) O10,R10: Station C10 - Mien Tay Terminal Station (1)~ (10) are the same spots as the baseline survey. Monitoring is carried out in front of a special area closest to construction sites such as hospitals, schools, churches Measurement Frequency: ・Every six month during warranty period (in first 24 months) Measurement Method: Collecting samples, 1time/2hours continuously 24 hours (each observation point) Standards: QCVN 26:2010/BTNMT QCVN 27:2010/BTNMT

Monitoring Item	Monitoring Results during Report Period	Remarks (Measurement Point, Frequency, Method, etc.)
Air quality		
Confirm of dissatisfaction from local peoples		Measurement Point: Around the project area Measurement Frequency: ・Every six month during warranty period (in first 24 months) Measurement Method: Hearing to local residents
Water Quality (Surface water)		
Confirm of dissatisfaction from local peoples		Measurement Point: Around the project area Measurement Frequency: ・Every six month during warranty period (in first 24 months) Measurement Method: Hearing to local residents
Water Quality (Underground water)		
Confirm of dissatisfaction from local peoples		Measurement Point: Around the project area Measurement Frequency: ・Every six month during warranty period (in first 24 months) Measurement Method: Hearing to local residents
Waste (passengers / employees)		
Type of waste		Measurement Point: Each station(C1~C10)
Amount of waste		

Monitoring Item	Monitoring Results during Report Period	Remarks (Measurement Point, Frequency, Method, etc.)
Storage location for each type of waste		
Destination by type of waste		
Waste (hazardous waste)		
Type of hazardous waste		Measurement Point: Operation area Measurement Frequency: Daily Measurement Method: Examine records of hazardous waste disposer Implementation site confirmation of hazardous waste disposal and hazardous waste collection Standards: QCVN 07:2009/BTNMT Circular No.36/2015/TT-BTNMT dated June 06th, 2015
Amount of hazardous waste		
Storage location of hazardous waste		
Destination of hazardous waste		
Noise and Vibration		
Confirm of dissatisfaction from local peoples		Measurement Point: Around the project area Measurement Frequency: ・Every six months during warranty Measurement Method: Hearing to local residents
Ground subsidence		
Ground Subsidence		Measurement Point: Underground stations(C1~C8) Measurement Frequency: Daily Measurement Method: - Daily field work and cooperation with CSC which is responsibility of ground subsidence monitoring - Confirm of dissatisfaction from local peoples
Groundwater level		
Compatible with neighborhood building		
Confirm of dissatisfaction from local peoples		
Landscape		
Landscape consideration after completion of construction		Measurement Point: Station· ventilation tower · elevated section Measurement Frequency: Once during warranty period (in first 24 months) Measurement Method: - Confirm whether the design of Station, ventilation tower and elevated section is suitable with the surrounding landscape. - Confirm whether the landscape consideration by planting street trees is taken at the construction site after construction.
Accidents		
Setting and operating safety rules - Emergency response plan created by the business operator - Equipment installation status for accidents - Training records of staff and workers - Implementation status of measures against floods		Measurement Point: Station and office Measurement Frequency: Every six months Measurement Method: - Confirm the site whether accident response equipment is operating normally.

Monitoring Item	Monitoring Results during Report Period	Remarks (Measurement Point, Frequency, Method, etc.)
Status of medical examination of staff and workers		- Confirm whether emergency response plan has been developed and whether employees are notified. - Confirm the installation status of measures against floods. - Investigate the occurrence of floods and strong winds. Scrutinize record of health examination implementation status.

CHAPTER 9 SOCIAL CONSIDERATIONS

In accordance with the principal policy on land ownership in Vietnam, the land belongs to the entire people with the State acting as the owner's representative and uniformly managing the land. The State shall hand over land use rights to land users in accordance with the Land Law. Since private land ownership is not approved in Vietnam, the word "land recovery (thu hồi đất)" is often used in reference to land acquisition caused by development projects. This report principally uses the word "land acquisition", which is commonly used in relation to JICA's Environmental and Social Considerations Guidelines (2010) (hereinafter referred to as "JICA's Environmental Guidelines"), instead of "land recovery" which is the most popular term in relevant translated documents in Vietnam. Based on the principles of land policy stipulated in the Land Law and other relevant legal frameworks, a policy gap analysis between Vietnam's domestic system and JICA's Environmental Guidelines was performed by studying the legal framework, institutional framework, land acquisition procedures, etc., as detailed below.

The project will cause land acquisition and involuntary resettlement. Project affected persons (PAPs) / Project affected households (PAHs) and any other bodies, such as organizations, enterprises, etc. (hereinafter referred to as "affected bodies"), who are eligible for compensation / assistance includes three cases described as below;

- Affected bodies who have legal rights on land
- Affected bodies who does not have any legal rights on land, but they can obtain legal certificate based on domestic legal framework if they request such rights
- Affected bodies who does not have any legal rights and/or right for request on land occupied (e.g. leaseholders, business persons, workers, employees, illegal encroachers, owners of structures, etc.)

The project required land acquisition and resettlement for construction of civil works including railways, stations, and other subsidiary facilities, such as ventilation tower, transformer substation. These land acquisition and resettlement should be avoided, minimized, and mitigated by careful discussions based on JICA's Environmental Guidelines.

This chapter is based on resettlement action plan (RAP) for the project. Back data for RAP discussion is included in each appendix of the RAP.

9.1 Potential Impacts

This chapter describes resettlement impacts on households which are affected by the land acquisition of the project. During the period of alignment and design consideration, the survey tried to avoid any kind of resettlement impacts at first, and consider minimization of resettlement cases as the secondary

countermeasure to reduce the impact. As a result, appropriate mitigation measures are discussed for inevitable resettlement impacts in accordance with relevant laws, regulations, policies and guidelines. Estimated project impacts related to land acquisition and resettlement are described as below.

9.1.1 Positive impacts

This UMRT Line 3A project is to contribute to mitigate worsening traffic congestion and to reduce pollutions caused by traffic by construction of urban mass rapid transit system in place to road transport in the metropolitan of HCMC.

HCMC UMRT Line 3A is located at south-western area of the city, which connects from Ben Thanh Station of the city center, where will be an intermodal station of Line 1, 2 and 4, to the suburban area to the south-west. It is expected to contribute to expand public railway transport service between east and west areas of the City, and to increase ridership and convenience of UMRT Line 1 passengers which the Japanese Government provide technical and financial assistance. For this, the HCMC Government prioritizes the Line 3A project for implementation.

In the METROS, it is indicated that “It is highly desirable that Line 3A and Line 1 operate as an integrated line to form a public transport backbone.” UMRT and integrated urban development along Line 1 and Line 3A is indispensable to formulate an urban backbone of north-eastern and south-western areas.

For this, UMRT construction project is in compliance with development issues and policies of HCMC Government, as well as in line with the ODA orientation of the Japanese Government and JICA. Therefore, it is necessary and reasonable to implement the Line 3A project supported by JICA.

9.1.2 Adverse impacts

The construction of the 8 underground stations of the Project will be done through cut-and-cover method. Thus, the ground surface area will be cleared of all improvements, and therefore acquired by the Project for each of those underground stations.

It’s estimated that the Project will cause physical impact, in any form of land and/or property acquisition, such as house structures, on 449 households of approximate 2,425 persons, plus to 45 business enterprises and 31 governmental offices. In addition, the Project may also affect business activities of other 412 households (consisting of 110 HHs and 302 vendors) with approximate 2,225 persons, plus to 42 business enterprises and 15 governmental offices who are located surrounding the Project’s stations. Table 9.1.1 shows the summary numbers of affected households/ persons.

Table 9.1.1 Summary Numbers of the Project Affected Households/ Persons

	No. of Households and Persons		Business enterprise	Governmental office
	PAHs	PAPs		
Impact on land and/or property	449	2,425	45	31
Impact on business activity only	412	2,225	42	15
Total	**861**	**4,650**	**87**	**46**

Figure 9.1.1 shows major estimated impacts of the project.

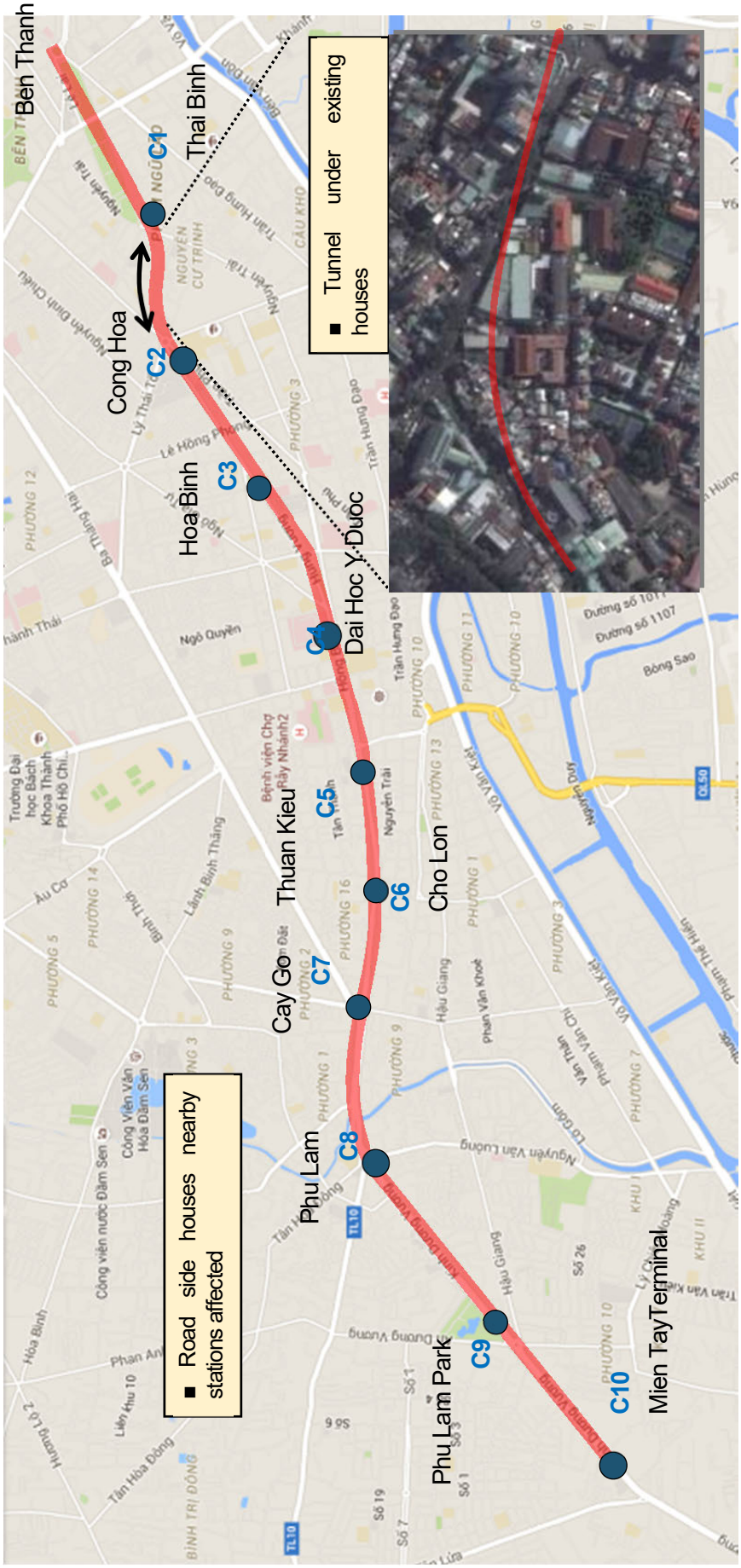


Figure 9.1.1 Estimated Resettlement Impact

9.1.3 Alternatives Considered to Avoid or Minimize Resettlement

A total of 3 route alternatives have been considered appropriately in terms of economy, construction, social and environmental impacts (Table 9.1.2). As a conclusion, Option-3 (a combination of underground and elevated structures) was selected as the best option taking into account the minimized social and environmental impacts and economy of project implementation.

Table 9.1.2 Vertical Alignment and Structure Alternatives

Option	Evaluation	Description
Option-0 No construction	×	No construction option can completely avoid land acquisition, resettlement and environmental impacts during construction such as noise and vibration. On the other hand, the increasing heavy traffic between Ben Thanh and Mien Tay and associated problems on urban environment will become even worse. Also, significant economic losses to other railway lines and social economic developments are anticipated through lowered effectiveness of urban railway network and urban development under HCMC master plan.
Option-1 All underground structures	○	Two single bored tunnels between underground stations can minimize the impact to above ground activities. Stations are constructed by open excavation with retaining wall. Application of appropriate construction plans and technics to minimize noise and vibration, surface settlement and ground water drawdown during the construction is essential. Some land acquisition is required to provide the above ground structures such as station entrances and ancillary buildings. After commercial operation begins, the Option can enjoy advantages in comparison with elevated options in terms of landscape, sunshine, noise and vibration. Also there are high potentials for economic development including integrated development with underground commercial facilities. On the other hand, disadvantage of option is construction cost. The cost for underground section is about three times higher than the cost of elevated section.
Option-2 All elevated structures	△	This Option retains serious risks of social and environmental concerns as it requires expansion of the existing narrow street in order to accommodate elevated structures at the section between C1 and C3 station. Also, this option involves resettlement of number of houses between C2 and C3 station as the alignment goes out of the existing road at very narrow and steep curvatures. Besides, landscape, noise and vibration are significant where viaduct structures are built above the narrow road. After C4 station, the road width becomes wider, making construction of the viaduct structure easy by use of center medium of roads. Relocation of overhead high power cables into underground is, where applicable, mandatory, to build the viaduct structures. Other obstructions for the construction of viaduct structures are at C7 (existing steel flyover) and C8 (existing new Ong Buong bridge). Therefore building viaduct structures in coordination with these obstructions are considered not feasible. Landscape impact is an additional negative factor of this Option.
Option-3 Combination of Underground and Elevated structures (Recommended)	◎	This Option envisages underground structure at central and sub-central districts of HCMC, i.e. from Ben Thanh (beginning point) to C8 Station, with due considerations of resettlement, landscape, and other environment issues, while viaduct structure is proposed in the remaining section as no obstructions to build elevated structures are identified. Phase 2 section of Line 3A was designed with all elevated structures in the past study. This gives another reason to build transition from underground structures to elevated structures after C8 station. Landscape impact of viaduct structures to surrounding residential buildings becomes smaller after C8 station, where road width is much wider than the same in city center. Also, wider road ease diversion of high power cable to underground level. With regard to construction cost, this Option possibly reduce about 15% of civil works cost, which derives from alterations from underground to elevated structures for 2km out of 10km in total length.

Source: JICA Study Team, 2016

9.1.4 Mechanisms Established to Minimize Resettlement

The 8 underground stations and 2 elevated stations, including the two tunnels of UMRT3a, will be constructed in turn under and above existing city roads, namely Pham Ngu Lao, Hung Vuong, Hong Bang, and Kinh Duong Vuong. Exception for both ends of the stations where escalators need to be constructed, the main body of the stations will be built within the existing planning line – a demarcated area from both edges of a road which restricts the construction of buildings even on privately-held lands for safety reasons.

A law on this road safety corridor was promulgated by Ministry of Transportation (MOT) on September 03, 2014 (Circular No. 37/2014/TT-BGTVT). Under this Circular, whenever building or renovating and upgrading existing buildings in the safety corridor, project owners must deal with the urban railway management agency and get licensing by authorized construction agency as prescribed by law.

9.2 Main Objectives of the Resettlement Action Plan (RAP)

This Resettlement Action Plan (RAP) is prepared based on both Vietnamese legal framework and the JICA's Guidelines for Environmental and Social Considerations (hereinafter referred to as "the JICA Environmental Guidelines") to fulfill any policy gaps between GOV and JICA. The RAP identifies adverse impacts such as the number of project affected persons (PAPs) due to the Project, mitigation measures, policy of compensation and other assistances for PAPs, and etc.

According to the JICA Environmental Guidelines, "7. Involuntary Resettlement of Appendix-1" shows that: “It is desirable that the Resettlement Action Plan include elements laid out in the World Bank Safeguard Policy OP 4.12, Annex A”. Standing on above mentioned points, the RAP is designed based on the following important items:

- Policies by the GOV related to land acquisition and resettlement, such as the Land Law, the Public Investment Law, and its relevant decrees and circulars;
- OP 4.12 on Involuntary Resettlement and its relevant Annex and Involuntary Resettlement Sourcebook issued by the World Bank;
- Decisions by Ho Chi Minh City People's Committee (hereinafter referred to as "HCMC-PC") on compensation, assistances and resettlement;
- Civil design of the project;
- Results of socio-economic survey and census of the PAPs;
- Results of inventory of losses (IOL) survey for land, assets attached to land and livelihoods of PAPs;
- Results of replacement cost survey (RCS);
- Results of stakeholder meeting (SHM) and focus group meeting (FGM) with PAPs;
- Results of consultations with the key stakeholders of the project; etc.

The RAP will be finally taken over to the plan of compensation, assistance and resettlement (Phương án bồi thường, hỗ trợ và tái định cư, in Vietnamese) (hereinafter referred to as "CAR Plan") after the finalization of technical designs, such as detailed design (DD), and further property survey and socio-economic surveys, such as detailed measurement survey (DMS) after the project investment decision.

9.3 Socio-Economic Studies

Socio-economic studies of the Project, including Census Survey, Socio-Economic Survey (SES), Inventory of Loss (IOL), and Replacement Cost Survey (RCS) have been implemented from the beginning of June 2016 to the middle of August 2016. Major results of each survey are presented as the follows.

9.3.1 Census Survey (Demographic Statistics of Affected Areas)

The Census Survey has been implemented based on database of the cadastral map of the Project areas, interview with the PAHs and local authorities (WPC), and the site observation. As a result, it's determined that affected persons of this Project are not only persons whose land will be physically recovered at the 10 stations and 2 sub-stations of the Project but also adjacent persons whose business may be negatively affected or interrupted during the construction and operation phases. They consist of private households, business shops, enterprises, governmental offices, and vendors. Among the PAHs, a number of them are running business shop, either by house owner or house renter. Particular numbers of those PAHs are elaborated in Table 9.3.1 and Table 9.3.2 below. Number of affected households and person are shown in Table 9.3.3.

Table 9.3.1 Numbers of land acquired households and organizations

No.	Station	District	Ward	Private households					Enterprise	Governmental office
				Total PAHs	*PAHs with business shop*		*PAHs without business shop*			
					Business shop by house owner	*Business shop by house renter*	*House owner*	*House renter for living only*		
1	C1	1	Phạm Ngũ Lão	**42**	*6*	*16*	*19*	*1*	11	1
2	C2	3	2	**14**	*3*	*11*	*0*	*0*	7	1
3	C2	5	4	**76**	*20*	*43*	*13*	*0*	4	2
4	C3		9	**55**	*12*	*9*	*30*	*4*	4	2
5	C4-5		11	**8**	*0*	*5*	*2*	*1*	4	2
6	C4-5		12	**0**	*0*	*0*	*0*	*0*	0	3
7	C5-6		14	**81**	*8*	*19*	*54*	*0*	4	1
8	C6		15	**35**	*5*	*10*	*20*	*0*	0	0
9	C6	6	2	**9**	*0*	*7*	*2*	*0*	1	0
10	C7		6	**15**	*1*	*8*	*6*	*0*	2	2
11	C8-9		12	**25**	*0*	*7*	*18*	*0*	4	7
12	C8		13	**6**	*0*	*4*	*2*	*0*	2	1
13	C8		14	**0**	*0*	*0*	*0*	*0*	0	1
14	C2	10	1	**46**	*7*	*27*	*12*	*0*	1	4
15	C6-7	11	16	**37**	*10*	*15*	*12*	*0*	1	4
Total				**449**	***72***	***181***	***190***	***6***	**45**	**31**
Portion (%)				**100%**	*16.0%*	*40.3%*	*42.3%*	*1.3%*		

Source: Census Survey, 2016

Table 9.3.2 Numbers of Affected Households and Persons

No.	Station	District	Ward	Physically relocated		Partially affected	
				Household	Person	Household	Person
1	C1	1	Phạm Ngũ Lão	0	0	42	227
2	C2	3	2	2	8	12	61
3	C2	5	4	3	16	73	389
4	C3		9	0	0	55	301
5	C4-5		11	0	0	8	45
6	C4-5		12	0	0	0	0
7	C5-6		14	0	0	81	441
8	C6		15	0	0	35	188
9	C6	6	2	0	0	9	47
10	C7		6	0	0	15	80
11	C8-9		12	3	15	22	119
12	C8		13	1	4	5	25
13	C8		14	0	0	0	0
14	C2	10	1	3	14	43	255
15	C6-7	11	16	5	26	32	174
Total				**17**	**83**	**432**	**2,352**

Table 9.3.3 Numbers of business-only affected cases

No.	Station	District	Ward	Business households	Enterprise	Governmental office	Vendor*
1	C1	1	Phạm Ngũ Lão	16	3	2	62
2	C2	3	2	16	9	1	15
3	C2	5	4	0	0	0	30
4	C3		9	12	0	0	72
5	C4-5		11	3	1	1	26
6	C4-5		12	4	7	2	13
7	C5-6		14	1	0	1	19
8	C6		15	7	0	0	3
9	C6	6	2	5	2	0	1
10	C7		6	3	3	3	10
11	C8-9		12	4	5	0	6
12	C8		13	2	6	1	2
13	C8		14	0	0	0	3
14	C2	10	1	2	0	0	10
15	C6-7	11	16	15	5	2	8
16	C10	Bình Tân	An Lạc A	20	1	2	22
Total				**110**	**42**	**15**	**302**

* including street trades (e.g soft drink, cigarette, fruit, food, lottery, electronic devices, etc.), and street services (e.g motorcycle fixer, clothes fixer, etc.)

Source: Census Survey, 2016

At the beginning of the survey, 100% of those PAPs was targeted for directly structured-interview (see Appendix 1 of the RAP, the Census Survey Form). However, a numerous house-owners and

shop/enterprise managers are actually living in different places (e.g other provinces/districts or abroad), plus to other PAPs have denied taking the interview with the survey team. For affected governmental offices, the officials said that they would just comply all activities/decisions of this governmental project, then would not need the interview. Therefore, the hearing survey could be implemented to 408 PAHs (73%), 27 enterprises (31%), and 30 vendors (11%) in total.

As a result, it's determined that the total population of 408 PAHs is 2,197 persons, making their average household size of 5.4 persons/HH. Among them, the percentage of male is 47%, lower than the percentage of female (53%).

On the ethnicity, 79.7% of the interviewed PAHs is the Kinh ethnic group, and the other 20.3% is the Chinese ethnic group, who mostly living in District 5 (Cho Lon area). The Chinese has long-time living in the area, using the mainstream Vietnamese language, having similar daily activities and socio-economic conditions to the Kinh. Therefore, they are not considered as ethnic minority (Table 9.3.4).

Table 9.3.4 Population, Sex and Ethnicity of the Affected Households

No.	District	Ward	Affected households			Affected population		
			Total PAHs	Ethnicity of HH's head		Total population	Sex	
				Kinh	*Chinese*		*Male*	*Female*
1	1	Phạm Ngũ Lão	48	*42*	*6*	240	*109*	*132*
2	3	2	10	*8*	*2*	53	*26*	*27*
3	5	4	53	*52*	*1*	270	*123*	*147*
4		9	61	*56*	*5*	319	*153*	*166*
5		11	7	*5*	*2*	23	*12*	*11*
6		12	5	*4*	*1*	29	*12*	*17*
7		14	63	*37*	*26*	317	*158*	*159*
8		15	30	*13*	*17*	168	*83*	*85*
9	6	2	5	*5*	*0*	25	*12*	*13*
10		6	13	*6*	*7*	100	*45*	*55*
11		12	21	*19*	*2*	133	*66*	*67*
12		13	3	*3*	*0*	20	*11*	*9*
13		14	1	*1*	*0*	2	*1*	*1*
14	10	1	41	*38*	*3*	227	*97*	*130*
15	11	16	34	*23*	*11*	191	*91*	*100*
16	Bình Tân	An Lạc A	13	*13*	*0*	80	*34*	*46*
Total			**408**	***325***	***83***	**2,197**	***1,033***	***1,164***
Portion (%)			100%	*79.7%*	*20.3%*	100%	*47.0%*	*53.0%*

Source: Census Survey, 2016

Regarding religion, the first majority of the PAHs stated themselves nonreligious (51.5%); second majority is Buddhist (41.9%); and a small portion of them are Christian (5.6%). In addition, it's remarkable that most of the Kinh and Chinese practice worship of ancestors as a traditional belief.

Table 9.3.5 Religion of the affected households

No.	District	Ward	Non-religionist	Buddhist	Christian	Others
1	1	Phạm Ngũ Lão	20	23	4	1
2	3	2	3	4	1	2
3	5	4	29	20	4	0
4		9	36	22	3	0
5		11	4	3	0	0
6		12	3	2	0	0
7		14	33	26	3	1
8		15	19	11	0	0
9	6	2	2	3	0	0
10		6	11	2	0	0
11		12	12	8	1	0
12		13	0	3	0	0
13		14	1	0	0	0
14	10	1	21	14	6	0
15	11	16	11	22	1	0
16	Bình Tân	An Lạc A	5	8	0	0
Total			**210**	**171**	**23**	**4**
Portion (%)			51.5%	41.9%	5.6%	1.0%

Source: Census Survey, 2016

On educational level of the head of PAH, it's noticeable that 18.8% of them have finished higher education, and other 37% have finished higher secondary (see Table 9.3.6).

Table 9.3.6 Educational attainment of heads of affected households

No.	District	Ward	Literacy	Primary[10]	Secondary[11]		Higher education[12]
					Lower secondary	Higher secondary	
1	1	Phạm Ngũ Lão	6	10	9	14	8
2	3	2	0	0	3	5	2
3	5	4	1	9	6	21	16
4		9	3	8	18	26	6
5		11	0	1	0	4	2
6		12	1	2	1	0	1
7		14	7	5	15	19	17
8		15	2	7	9	10	2
9	6	2	0	0	2	2	1
10		6	2	2	4	3	2
11		12	3	3	5	6	4
12		13	1	1	1	0	0
13		14	0	0	0	1	0
14	10	1	0	6	4	20	8
15	11	16	1	5	10	11	7
16	Bình Tân	An Lạc A	1	3	2	7	0
Total			**28**	**62**	**89**	**149**	**76**
Portion (%)			6.9%	15.3%	22.0%	37.0%	18.8%

Source: Census Survey, 2016

Regarding the question whether or not the PAHs agree with the implementation of this Project for public transport system and socio-economic development, 264 PAHs (73.1%) said “Agree”, while 52 PAHs (14.4%) said “Disagree” due to negative impacts on their business, and other 45 PAHs (12.5%) want to wait for more detailed information in design and compensation policy of the Project before saying “Agree” or “Disagree”.

[10] Primary school: The five years (6 - 11 years-old) are the only compulsory years in Vietnam
[11] Secondary school: including lower secondary lasting for four years (11 - 15 years-old), and higher secondary lasting three next years (15 - 18 years-old) until completion in the twelfth grade
[12] Higher education: Institutions of higher education can be universities, senior colleges or research institutes. Furthermore, there are junior colleges, professional secondary schools or vocational schools

Table 9.3.7 Consent of the PAHs on implementation of the Project

No.	District	Ward	Agree	Disagree	Other
1	1	Phạm Ngũ Lão	19	2	12
2	3	2	9	0	1
3	5	4	40	8	2
4		9	42	3	4
5		11	5	0	2
6		12	4	0	0
7		14	32	25	3
8		15	24	0	6
9	6	2	4	0	1
10		6	10	1	1
11		12	14	5	0
12		13	1	0	2
13		14	1	0	0
14	10	1	27	3	2
15	11	16	26	3	4
16	Bình Tân	An Lạc A	6	2	5
Total			**264**	**52**	**45**
Portion (%)			73.1%	14.4%	12.5%

In addition to the PAHs above, it's also determined by the Census Survey on 27 enterprises that the total of their employees are 757 persons, whose employment may also be affected along with their enterprise.

Table 9.3.8 Numbers of surveyed enterprises and employees

No.	District	Ward	Numbers of enterprise	Numbers of employee
1	1	Phạm Ngũ Lão	1	17
2	3	2	6	326
3	5	4	1	20
4		9	1	12
5		11	1	4
6		12	3	32
7		14	2	140
8		15	0	0
9	6	2	0	0
10		6	4	112
11		12	1	15
12		13	1	3
13		14	0	0
14	10	1	1	8
15	11	16	4	37
16	Bình Tân	An Lạc A	1	31
Total			**27**	**757**

Census Survey should be updated during the Detailed Measurement Survey (DMS) process after the project decision and/or in the case of delay of the project (e.g. resettlement has not been implemented more than 2 years after the Census Survey - World Bank's OP 4.12 case).

9.3.2 Vulnerable Group

During the Census Survey, 19 PAHs have stated themselves vulnerable households, belonging to 4 vulnerable groups such as (i) the households living under poverty line, (ii) female-headed households with dependents, (iii) households with disabled persons, and (iv) elderly households who are with no other means of support.

The definition of the “poor”, based on Decision No. 58/2015/QĐ-UBND dated 31 December 2015 of HCMC-PC on the criteria of "poor" and "close to poor" period 2016 – 2020, is household with per capita incomes of less than 21,000,000 VND/year; while the "close to poor" is defined as households with per capita incomes from 21,000,000 to 28,000,000 VND/year.

The elderly household means a household whose head or spouse or sole member is a person who is at least 62 years of age. It may include two or more persons who are at least 62 years of age living together, or one or more persons who are at least 62 years of age living with one or more live-in aides.

In addition to the vulnerable households, other 30 PAHs declared themselves as social-policy treated HHs such as families have contributed to the revolution, Vietnam heroic mother, etc. These HHs are also entitled for transportation assistance according to the local regulation (Decision No. 23/2015/QĐ-UBND of HCMC-PC, Article 35).

Data below is based on respondents’ declarations at time of census and will need to be verified / reviewed at the time of preparing the compensation, assistance, resettlement policy (herein after referred to as "the CAR policy") / the CAR plan.

Table 9.3.9 Numbers of Vulnerable and Social-Policy Treated Households

District	Vulnerable Households					Social-Policy Treated Households
	Total	The poor	Elderly HH	HH with disabled persons	Female-headed HH with dependents	
1	**1**	1	0	0	0	**1**
3	**1**	0	1	0	0	**0**
5	**9**	0	4	4	1	**18**
6	**5**	0	1	4	0	**4**
10	**2**	0	0	2	0	**5**
11	**1**	0	0	1	0	**1**
Binh Tan	**0**	0	0	0	0	**1**
Total	**19**	**1**	**6**	**11**	**1**	**30**
Portion (%)	***100%***	***5.3%***	***31.6%***	***57.9%***	***5.3%***	

Source: Census Survey, 2016

9.3.3 Socio-Economic Survey (Characteristics of Affected Household)

In addition to the Census Survey, Socio-Economic Survey (SES) has also been implemented to get more detailed on the PAHs' socio-economic characteristics. A total of 278 PAHs (68.1%), 27 enterprises and 30 vendors were interviewed, using questionnaire as quoted in Appendix 1 of the RAP.

(1) Main Occupation/ Source of Income

As a result of the Socio-Economic Survey shown in the table below, the largest source of income of the PAHs is trade and service which is accounting for 29.4%, followed by company's officer (18.9%) and governmental official (11.9%).

Table 9.3.10 Structure of Affected Households by Main Occupation/ Source of Income (%)

Occupation/ Source of Income	District							Total	Portion (%)
	District 1	District 3	District 5	District 6	District 10	District 11	Binh Tan		
Trade, service	7	9	57	17	25	12	2	**129**	46.4%
House leasing	2	2	27	3	9	3	0	**46**	16.5%
Company's officer	1	0	6	1	1	0	0	**9**	3.2%
Temporary employee	0	0	2	0	0	0	0	**2**	0.7%
Governmental official	2	0	1	0	3	0	0	**6**	2.2%
Worker	0	0	1	1	0	0	0	**2**	0.7%
Vendor	15	0	10	0	2	1	0	**28**	10.1%
Retirement	1	0	32	2	7	2	0	**44**	15.8%
Housewife	0	0	5	2	0	0	0	**7**	2.5%
Unemployment	0	0	1	0	0	0	0	**1**	0.4%
Others	1	0	2	0	1	0	0	**4**	1.4%
TOTAL	**29**	**11**	**144**	**26**	**48**	**18**	**2**	**278**	**100%**

Source: SES, 2016

(2) Main occupation/ source of income of the affected households

Regarding income, most of the PAPs have monthly income per capita less than 5,000,000 VND (72.9%).

Table 9.3.11 Distribution of PAPs by income groups (%)

District	Ward	Monthly income per capita (1,000 VND)			Total	Average income (1,000 VND/ person/ month)
		<5,000	5,000-10,000	>10,000		
1	Phạm Ngũ Lão	20	3	1	**24**	**3,560**
3	2	3	2	2	**7**	**15,190**
5	4	21	2	5	**28**	**23,850**
	9	27	5	3	**35**	**3,630**
	11	6	1	1	**8**	**4,530**
	12	1	0	0	**1**	**3,000**
	14	23	3	3	**29**	**7,180**
	15	9	3	0	**12**	**3,540**
6	2	2	0	2	**4**	**28,500**
	6	2	1	0	**3**	**4,440**
	12	7	1	1	**9**	**9,210**
10	1	28	3	4	**35**	**5,950**
11	16	4	6	3	**13**	**8,330**
Bình Tân	An Lạc A	0	1	1	**2**	**10,670**
Total		**153**	**31**	**26**	**210**	**8,690**
Portion (%)		*72.9%*	*14.8%*	*12.4%*	*100%*	

Source: SES, 2016

(3) Household Assets

Most of the surveyed PAHs have appliances that are powered by electricity such as television, refrigerator, air-conditioner and washing machine. Other electronic devices for communication and entertainment such as mobile phone and computer also appear very popular. Although motorcycle is recorded the most popular means of transportation, private car is also owned by a numerous PAHs (19.2%). It's popular that an affected household has more than 1 television, mobile phone and motorbike.

Table 9.3.12 Assets of affected households (%)

Asset	District 1	District 3	District 5	District 6	District 10	District 11	Total
1. TV	100	100	94.9	100	100	94.1	**96.4%**
2. Internet	88.9	100	80.6	100	95.7	64.7	**83.8%**
3. Motorcycle	100	100	95.9	100	100	94.1	**97.0%**
4. Electric bike	0.0	50.0	5.1	0.0	0.0	5.9	**4.8%**
5. Fixed telephone	22.2	100	60.2	87.5	63.6	76.5	**63.9%**
6. Mobile phone	100	100	98.0	100	100	100	**98.8%**
7. Gas stove	100	100	92.9	100	100	88.2	**94.6%**
8. Car	22.2	75.0	13.3	25.0	17.4	35.3	**19.2%**
9. Refrigerator	100	100	94.9	100	95.7	94.1	**95.8%**
10. Air-conditioner	88.9	100	81.6	93.8	91.3	88.2	**85.6%**
11. Computer	88.9	100	83.7	87.5	95.7	52.9	**83.2%**
12. Washing machine	100	100	88.8	93.8	100	82.4	**91.0%**
13. Others	33.3	0.0	15.8	18.8	13.0	11.8	**15.9%**

Source: SES, 2016

(4) Energy

Electric network for domestic use and for business purpose is installed in all residential areas in the districts. The SES results in 100% of the PAHs using grid electricity as source of energy for lighting. However, gas is a major source of energy for cooking.

Table 9.3.13 Energy for cooking (%)

Energy	District 1	District 3	District 5	District 6	District 10	District 11
1. Gas	100%	100%	98.0%	100%	96.0%	93.8%
2. Electricity	0.0%	0.0%	1.0%	0.0%	4.0%	6.3%
3. Others	0.0%	0.0%	1.0%	0.0%	0.0%	0.0%

Source: SES, 2016

(5) Water

It's recorded during the SES that 100% of the PAHs using piped water for bathing, washing and cleaning. For drinking, piped water is still major but bottled water is also a popular source of the PAHs.

(6) Environmental sanitation

On sanitation, the SES has determined that 100% of the PAHs using sewage toilet. It's understandable that the Project area is located in a crowded urban city.

9.3.4 Inventory of Loss (Magnitude of the Expected Loss)

The Inventory of Loss for this Project has been implemented based on cadastral map of the land acquisition areas, site survey and interview with the PAHs. Expected loss on land, structures and trees are estimated as the follows.

(1) Affected Land

Required land acquisition by the Project is described in the tables below.

1) Residential Land

Residential land is affected in the 10 planned stations of the Project with the total area of 5,878.3 m^2.

Table 9.3.14 Estimated Impact on Residential Land

No.	Station	District	Ward	Affected area (m^2)
1	C1	1	Phạm Ngũ Lão	319.0
2	C2	3	2	327.3
3	C2	5	4	1,115.4
4	C3		9	476.5
5	C4-5		11	510.8
6	C5-6		14	589.1
7	C6		15	76.7
8	C6	6	2	19.6
9	C7		6	332.7
10	C8-9		12	504.0
11	C8		13	215.9
12	C2	10	1	767.7
13	C6-7	11	16	623.7
TOTAL				**5,878.3**

Source: IOL, 2016

2) Public Land

The public land in the Project area is being used for many constructions, including governmental offices/ buildings, tree parks, and etc. It's estimated that the total area of public land to be acquired by the Project is 4,224.1 m^2.

Table 9.3.15 Estimated Impact on Public Land

No.	Station	District	Ward	Affected area (m^2)
1	C1	1	Pham Ngu Lao	9.6
2	C2	3	2	0
3	C2	5	4	287.6
4	C3		9	698.9
5	C4-5		11	903.9
6	C4-5		12	1,571.3
7	C7	6	6	20.3
8	C8-9		12	121.5
9	C8		13	138.4
10	C8		14	171.1
11	C2	10	1	266.1
12	C6-7	11	16	35.6
TOTAL				**4,224.1**

Source: IOL, 2016

(2) Affected Structures

The construction of the Project will cause acquisition of structure in the 6 districts. According to the preliminary design, a total of 305 structures with the total area of 18,672.2 m^2 would be affected (see Table 9.3.16 and Table 9.3.17 below). Among the 305 affected structures, adjacent urban

house[13] ≤ 4 floors are the first majority with the number of 145 houses (or 47.5%). Other secondary structures include guard house, mezzanine, and fence.

Table 9.3.16 Estimated Numbers of Affected Structures

(Unit: structure)

Structure		District 1	District 3	District 5	District 6	District 10	District 11	TOTAL	Portion (%)
A. House									
1	Adjacent urban house with only ground floor	3		8	2	4	2	**19**	**6.2%**
2	Adjacent urban house ≤ 4 floors	6	9	76	28	13	13	**145**	**47.5%**
3	Adjacent urban house ≥ 5 floors	10	1	21	5	8	1	**46**	**15.1%**
4	Apartment ≤ 5 floors	19		58		1		**78**	**25.6%**
B. Working house, office buildings, commercial centers									
5	Working house ≤ 5 floors	1	1	5	2	1		**10**	**3.3%**
6	Working house 15-20 floors	1						**1**	**0.3%**
C. Hotel									
7	3-star standard	1						**1**	**0.3%**
8	5-star standard			1				**1**	**0.3%**
D. Cultural and educational facilities									
9	School < 5 floors				1			**1**	**0.3%**
E. Other secondary structures				1	2			**3**	**1.0%**
TOTAL		**41**	**11**	**169**	**40**	**27**	**16**	**305**	**100%**

Source: IOL, 2016

Table 9.3.17 Estimated Areas of Affected Structures

(Unit: m^2)

Structure		District 1	District 3	District 5	District 6	District 10	District 11	Total
A. House								
1	Adjacent urban house with only ground floor	25.7		362.7	624.2	269.2	220.3	**1,502.1**
2	Adjacent urban house ≤ 4 floors	396.1	903.3	4,788.4	1,334.4	741.6	804.8	**8,968.6**
3	Adjacent urban house ≥ 5 floors	584.4	43.5	1,964.4	518.2	538.3	41.0	**3,689.8**
4	Apartment ≤ 5 floors	330.6	0.0	914.6	0.0	26.4	0.0	**1,271.6**
B. Working house, office buildings, commercial centers								
5	Working house ≤ 5 floors	0.4	0.6	1,372.2	255.8	1,064.4		**2,693.4**
6	Working house 15-20 floors	170.0						**170.0**
C. Hotel								
7	3-star standard	30.8						**30.8**
8	5-star standard			298.8				**298.8**
D. Cultural and educational facilities								
9	School < 5 floors				24.1			**24.1**
E. Other secondary structures				18.7	4.1	0.2		**23.0**
TOTAL		**1,538.0**	**947.4**	**9,719.8**	**2,760.8**	**2,640.1**	**1,066.1**	**18,672.2**

Source: IOL, 2016

[13] Adjacent urban house: A type of adjacent houses, built in the city streets, commercial areas and services in accordance with the approved plan. Adjacent urban house is not only functionated as housing but also shop-houses, office services, hostels, hotels, small production facilities, and etc ... (Decision 135/2007/QĐ-UBND of HCMC-PC).

(3) Affected Crops and Trees

According to the result of Inventory of Loss, affected trees are recorded only in the planned substations of the Project at Phu Lam Park (Ward 13, District 6). They consist of 5 papaya, 5 coconut, and 1 custard-apple trees. However, they belong to the park so no compensation is needed.

Table 9.3.18 Estimated impact on tree

District	Ward	Location	Affected tree (number)
6	13	Phu Lam Park	11

Source: IOL, 2016

9.4 Legal Framework and Policy Gaps

9.4.1 Legal Framework

The legal framework in Vietnam related to the RAP with respect to land acquisition, compensation and resettlement is based on the Constitution of the Socialist Republic of Vietnam (2013), the Land Law 2013 (revised), Law on Public Investment (2014) and other relevant decrees/guidelines. The principal legal documents applied for the RAP includes the followings:

- Constitution of Vietnam, 2013.
- The Land Law 2013 which has been effective since July 1, 2014.
- Law on Public Investment 2014 which has been effective since January 1, 2015.
- Decree No. 43/2014/ND-CP guiding in detail some articles of the Land Law 2013.
- Decree No. 44/2014/ND-CP 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. 45/2014/ND-CP dated 15 May 2014 of the Government, regulating the collection of land-use lease.
- Decree No. 47/2014/ND-CP providing compensation, support, resettlement when land is recovered by the State.
- Decree No. 16/2016/ND-CP dated 16 March 2016, on the management and use of official development assistance (ODA) and concessional loans from donors.
- Circular No. 36/2014/TT-BTNMT dated 30 June 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 30 June 2014, regulating compensation, assistance and resettlement when the State acquires land.

- Decision No. 1956/2009/QD-TTg, dated 17 November 2009, by the Prime Minister approving the Master Plan on vocational training for rural labors by 2020.
- Ordinance No. 34/2007/PL-UBTVQH dated 20 April 2007 of the National Assembly Standing Committee on the implementation of democracy in communes, wards and towns.
- Law No. 02/2011/QH1 dated 11 November 2011 of the National Assembly of the Socialist Republic of Vietnam on Complaints.
- Law No. 03/2011/QH13 dated 11 November 2011 of the National Assembly of the Socialist Republic of Vietnam on Denunciation.
- Decree No. 75/2012/ND-CP dated 3 October 2012, detailing the execution of some articles of the Law on Complaints.
- Decree No. 76/2012/ND-CP dated 3 October 2012, detailing the execution of some articles of the Law on Denunciation.
- Decision No. 52/2012/QD-TTg, dated 16 November 2012, on the support policies on employment and vocational training to farmers whose agricultural land has been recovered by the State.

In addition to the national legislation, Provincial/City People's Committees have also issued regulations on land acquisition and resettlement since they are given responsibility for planning and implementation in the province/city. For HCMC, the related regulations are as follows:

- Decision No. 23/2015/QĐ-UBND dated 15 May, 2015 issued by HCMC-PC on compensation, assistance and resettlement in HCMC;
- Decision No. 51/2014/QĐ-UBND dated 31 December, 2014 issued by HCMC-PC on land price from 2015 to 2019 in HCMC;
- Decision No. 66/2012/QĐ-UBND dated 28 December, 2012 issued by HCMC-PC and Letter No. 13410/SXD-KTXD dated 26 October, 2015 issued by HCMC Department of Construction on standard tariff on the investment capital for the construction works in HCMC;
- Decision No. 02/2015/QĐ-UBND dated 09 January, 2015 issued by HCMC-PC on crops and trees price in HCMC.

Table 9.4.1 shows most important laws and regulations structure under the Land Law relevant to land acquisition and resettlement.

Table 9.4.1 Laws and Regulations Relevant to Land Acquisition and Resettlement

Name	Enactment Year / Enforcement Year / Number	Outline / Function
Land Law	Enactment: 29 November 2013 Enforcement: 1 July 2014 Number: Law No. 45/2013/QH13	Integrated land policy of Vietnam
Decree: Detailing a Number of Articles of the Land Law	Enactment: 15 May 2014 Enforcement: 1 July 2014 Number: Decree No. 43/2014/ND-CP	Implementation guidelines for some specific clauses in the Land Law including land acquisition
Decree: Regulations on Land Price	Enactment: 15 May 2014 Enforcement: 1 July 2014 Number: Decree No. 44/2014/ND-CP	Regulations for land pricing method including land price framework, price list and other consultancy services
Decree: On compensation, support and resettlement upon land recovery by the State	Enactment: 15 May 2014 Enforcement: 1 July 2014 Number: Decree No. 47/2014/ND-CP	Regulations for land acquisition and expropriation
Stipulating the certificates of land use right, house ownership and other assets on land	Enactment: 19 May 2014 Enforcement: 5 July 2014 Number: Circular No. 23/2014/TT-BTNMT	Guidance for land use right certification by Ministry of Natural Resources and Environment (MONRE)

(1) Land Law (2013)

The Land Law (2013) prescribes the framework of land use rights, powers and responsibilities of the Government in representing the Vietnamese people and uniformly managing land, the regime of land management and use, and the rights and obligations of land users involving land. The principal framework is based on the former Land Law (2003), however, there has been some restructurings of the legal framework among other relevant laws and regulations including newly introduced regulations and decisions.

In the Land Law (2013), the land as a resource is the property of all the people and the State represents its uniformed management. This concept aims at boosting modernization and industrialization of the country through unified and effective management of the land. In addition, in matters related to real estate development and transactions including land categories and land prices, the government bears the responsibility for decision making.

Under the Land Law, land users may be allocated land or leased land, have land use rights recognized by the State, or receive transfer of land use rights in accordance with the Land Law. The land use rights are to be returned to the State for the stipulated purpose including socio-economic development for the national or public interest by the Land Law including infrastructure projects with Official Development Assistance (ODA). Such land acquisition (land recovery) concepts are elaborated in Chapter 6 of the Land Law (2013).

The Land Law also mentions land evaluation, pricing, and its publication. According to Article 33 of the Land Law, a People's Committee at provincial level shall establish a land price framework and price list (tariffs) every 5 years starting in 2015 based on the price framework provided by Ministry of Natural Resources and Environment. However, Article 114 provides the list of cases using land price table and according to that, compensation for land acquisition does not covered by the 5

years updating pricing system. Based on Provision 4 of Article 114, unit price of compensation for land acquisition is belonging to special cases and determined by independent evaluating method.

In addition to compensation for land and structures, the Land Law stipulated principles of compensation for damage to assets and damage incurred due to stopped production and business when State recovers land in Article 88, and compensation for plants and livestock in Article 90.

For special cases of compensation, assistance and resettlement, Clause 2 of Article 87 stipulated that: "For projects using loans from international or foreign organizations for which Vietnam has committed to a policy framework for compensation, support and resettlement, that framework policy shall apply."

(2) Law on Public Investment (2014)

The Public Investment Law (the Law) aims to improve the effectiveness of public investment management in line with international practices**.** The Law governs the management and use of public investment funds and state management of public investment. It also defines rights, obligations and responsibilities of agencies, units, organizations and individuals related to public investment activities.

According to the Law, public investment includes investment in socio-economic infrastructure programs and projects; investment serving activities of state agencies, non-business units, political organizations and socio-political organizations; investment in and support of the provision of public products and services; and state investment in public-private partnership projects.

The Law encourages organizations and individuals to make direct investment or investment in the form of public-private partnership (PPP) for socio-economic infrastructure and public-service provision projects. Public investment funds include funds from the state budget, funds from national and government bonds and municipal bonds, official development assistance (ODA) loans, concessional loans of foreign donors, state development investment credit, retained revenues for investment not yet included in the state budget balance and other loans borrowed by local budgets for investment purposes.

The Law creates a complete legal framework for the management of the entire public investment process, from investment decision, capital source verification to project implementation, monitoring and evaluation.

Under the Law, investment policy will be decided by the Government, for target programs, or by the Prime Minister, for other investment programs and projects as stipulated by the Government. Ministers may decide on investment policy on projects under their management. The order and procedures for decision on investment policy are clearly defined in Article 24. After obtaining decisions on investment policy, managing agencies will issue decisions on project owners and assign them to work with donors to make feasibility study reports for programs or projects and

submit them to competent authorities for decision on investment. The order of formulation and appraisal of programs and projects and decision on their investment, must comply with Article 45. The Prime Minister may decide on investment programs and projects in the areas of security, national defense and religion, and other programs and projects according to the Government's regulations. Ministers may decide on group-A, group-B and group-C investment projects under their management. The Law also establishes principles of formulation of medium-term and annual investment plans financed by ODA loans and concessional loans of foreign donor. Accordingly, these plans will be developed based on annual implementation plans of programs and projects approved by competent authorities and the schedules committed to foreign donors. These plans must satisfy the requirements specified in Article 70. The formulation, appraisal and approval of investment plans are provided in Article 71.

The duration of disbursement of funds for implementation of medium-term and annual public investment plans must comply with treaties on ODA loans and concessional loans signed with foreign donors. Foreign funds contributed to annual public investment plans may be disbursed according to the foreign donors' schedules of implementation and allocation of funds. The Ministry of Planning and Investment will take responsibility before the Government for the uniform state management of foreign ODA loans and concessional loans. The Ministry will act as a focal point for mobilization, coordination, management and use of these loans.

(3) Decree No. 16/2016/ND-CP on the management and use of official development assistance (ODA) and concessional loans from donors

This Decree provides the management and use of official development assistance (ODA) and preferential loans granted by foreign governments, international organizations, inter-government or international organizations, governmental organizations authorized by foreign governments to Vietnam.

In comparison with the earlier provision (Decree No. 38/2013/ND-CP), this Decree adds more sectors which are prioritized for using ODA loans such as execution of socio-economic infrastructure, science and technological development, environmental protection, etc. ODA loans are also used as state investment in public–private partnership (PPP) projects (Article 5).

In addition, this Decree also wholly replaces the forms relating to the proposal of programs and projects funded by ODA loans.

(4) Decree: Detailing a Number of Articles of the Land Law (No. 43/2014/ND-CP)

This Decree covers and describes some specific articles of the Land Law as shown below:

- The system of land management office
- Land use plan

- Land acquisition, land distribution, land lease, change of land purpose
- Land registration, land use right, ownership of properties on the land
- Land use framework
- Land management and administrative procedures

(5) Decree: Regulations on Land Price (No. 44/2014/ND-CP)

The Decree defines the determination of land price based on the Land Law as shown below:

- Land price determination method, such as the sales comparison approach, income approach, discount cash flow method, etc.
- The land price framework managed by MONRE is the basis for the land price tariff determined by a People's Committee at the provincial level
- Consultancy services for land price determination

However, these land pricing system is not applicable to land acquisition by the State based on e), 4, of Article 114 of the Land Law, where "Specific land price" are defined. Based on this regulation under the new Land Law (2013), the most important function of this Decree in terms of resettlement is Section 3: Specific Land Price in Chapter 2, which shows the measures for evaluate and calculate compensation amount.

Other regulations or administrative decisions related to resettlement plan to be issued by HCMC-PC in relation to the Land Law (2013), and its relevant decrees and circulars.

(6) JICA's Policy on Involuntary Resettlement

The policy provisions on involuntary resettlement of JICA are shown in the JICA Environmental Guidelines. And item 3 of Article 2.6 in this guideline describes that "JICA confirms that projects do not deviate significantly from the World Bank's Safeguard Policies". Therefore, the main documents relevant to the land acquisition and resettlement of the Project are:

- JICA Guidelines for Environmental and Social Considerations (2010)
- The World Bank's Safeguard Policies (Operational Policy / Bank Policy 4.12 and its Annex in particular)
- Involuntary Resettlement Sourcebook (the World Bank)

Item 2 of Article 1.6, "Requirement of project proponents" of the JICA Environmental Guidelines describes that involuntary resettlement in case of Category A project must be fulfill Article 7, "Involuntary Resettlement" of Annex 1 "Environmental and social consideration required for intended project": "It is desirable that the resettlement action plan include elements laid out in the World Bank Safeguard Policy, OP. 4.12, Annex A".

JICA's fundamental policy on involuntary resettlement is as following:

Table 9.4.2 JICA's Policy on Involuntary Resettlement

I. The Government of recipient country will use the Project Resettlement Policy (the Project Policy) for a JICA's project specifically because existing national laws and regulations have not been designed to address involuntary resettlement according to international practice, including JICA's policy. The Project Policy is aimed at filling-in any gaps in what local laws and regulations cannot provide in order to help ensure that PAPs are able to rehabilitate themselves to at least their pre-project condition. This section discusses the principles of the Project Policy and the entitlements of the PAPs based on the type and degree of their losses. Where there are gaps between the recipient country legal framework for resettlement and JICA's Policy on Involuntary Resettlement, practicable mutually agreeable approaches will be designed consistent with Government practices and JICA's Policy.

II. Land acquisition and involuntary resettlement will be avoided where feasible, or minimized, by identifying possible alternative project designs that have the least adverse impact on the communities in the project area.

III. Where displacement of households is unavoidable, all PAPs (including communities) losing assets, livelihoods or resources will be fully compensated and assisted so that they can improve, or at least restore, their former economic and social conditions.

IV. Compensation and rehabilitation support will be provided to any PAPs, that is, any person or household or business which on account of project implementation would have his, her or their:
- Standard of living adversely affected;
- Right, title or interest in any house, interest in, or right to use, any land (including premises, agricultural and grazing land, commercial properties, tenancy, or right in annual or perennial crops and trees or any other fixed or moveable assets, acquired or possessed, temporarily or permanently;
- Income earning opportunities, business, occupation, work or place of residence or habitat adversely affected temporarily or permanently; or
- Social and cultural activities and relationships affected or any other losses that may be identified during the process of resettlement planning.

V. All affected people will be eligible for compensation and rehabilitation assistance, irrespective of tenure status, social or economic standing and any such factors that may discriminate against achievement of the objectives outlined above. Lack of legal rights to the assets lost or adversely affected tenure status and social or economic status will not bar the PAPs from entitlements to such compensation and rehabilitation measures or resettlement objectives. All PAPs residing, working, doing business and/or cultivating land within the project impacted areas as of the date of the latest census and inventory of lost assets(IOL), are entitled to compensation for their lost assets (land and/or non-land assets), at replacement cost, if available and restoration of incomes and businesses, and will be provided with rehabilitation measures sufficient to assist them to improve or at least maintain their pre-project living standards, income-earning capacity and production levels.

VI. PAPs that lose only part of their physical assets will not be left with a portion that will be inadequate to sustain their current standard of living. The minimum size of remaining land and structures will be agreed during the resettlement planning process.

VII. People temporarily affected are to be considered PAPs and resettlement plans address the issue of temporary acquisition.

VIII. Where a host community is affected by the development of a resettlement site in that community, the host community shall be involved in any resettlement planning and decision-making. All attempts shall be made to minimize the adverse impacts of resettlement upon host communities.

IX. The resettlement plans will be designed in accordance with recipient country's Involuntary Resettlement Policy and JICA's Policy on Involuntary Resettlement.

X. The Resettlement Plan will be translated into local languages and disclosed for the reference of PAPs as well as other interested groups.

XI. Payment for land and/or non-land assets will be based on the principle of replacement cost.

XII. Compensation for PAPs dependent on agricultural activities will be land-based wherever possible. Land-based strategies may include provision of replacement land, ensuring greater security of tenure, and upgrading livelihoods of people without legal land titles. If replacement land is not available, other strategies may be built around opportunities for re-training, skill development, wage employment, or self-employment, including access to credit. Solely cash compensation will be avoided as an option if possible, as this may not address losses that are not easily quantified, such as access to services and traditional rights, and may eventually lead to those populations being worse off than without the project.

XIII. Replacement lands, if the preferred option of PAPs, should be within the immediate vicinity of the affected lands wherever possible and be of comparable productive capacity and potential14. As a second option, sites should be identified that minimize the social disruption of those affected; such lands should also have access to services and facilities similar to those available in the lands affected.

XIV. Resettlement assistance will be provided not only for immediate loss, but also for a transition period needed to restore livelihood and standards of living of PAPs. Such support could take the form of short-term jobs, subsistence support, salary maintenance, or similar arrangements.

XV. The resettlement plan must consider the needs of those most vulnerable to the adverse impacts of resettlement (including the poor, those without legal title to land, ethnic minorities, women, children, elderly and disabled) and ensure they are considered in resettlement planning and mitigation measures identified. Assistance should be provided to help them improve their socio-economic status

XVI. PAPs will be involved in the process of developing and implementing resettlement plans.

XVII. PAPs and their communities will be consulted about the project, the rights and options available to them, and proposed mitigation measures for adverse effects, and to the extent possible be involved in the decisions that are made concerning their resettlement.

XVIII. Adequate budgetary support will be fully committed and made available to cover the costs of land acquisition (including compensation and income restoration measures) within the agreed implementation period. The funds for all resettlement activities will come from the Government.

XIX. Displacement does not occur before provision of compensation and of other assistance required for relocation. Sufficient civic infrastructure must be provided in resettlement site prior to relocation. Acquisition of assets, payment of compensation, and the resettlement and start of the livelihood rehabilitation activities of PAPs, will be completed prior to any construction activities, except when a court of law orders so in expropriation cases. (Livelihood restoration measures must also be in place but not necessarily completed prior to construction activities, as these may be ongoing activities.)

XX. Organization and administrative arrangements for the effective preparation and implementation of the resettlement plan will be identified and in place prior to the commencement of the process; this will include the provision of adequate human resources for supervision, consultation, and monitoring of land acquisition and rehabilitation activities.

[14] Agricultural land for land of equal productive capacity means that the land provided as compensation should be able to produce the same or better yield the AP was producing on his/her land prior to the project. The production should be in the planting season immediately following the land acquisition. It can be for a future period if transitional allowance equal to the household's previous yield is provided to the AP household while waiting for the land to get back to the same productivity as the previous land.

XXI. Appropriate reporting (including auditing and redress functions), monitoring and evaluation mechanisms, will be identified and set in place as part of the resettlement management system. An external monitoring group will be hired by the project and will evaluate the resettlement process and final outcome. Such groups may include qualified NGOs, research institutions or universities.

Cut-off-date of Eligibility

The cut-off-date of eligibility refers to the date prior to which the occupation or use of the project area makes residents/users of the same eligible to be categorized as PAPs and be eligible to Project entitlements. The Cut-off dates for titleholders will be the date of notification under the Land Acquisition Act and for non-titled holders will be the beginning date of the population census; 14 June, 2016. This date is disclosed to each affected community by the relevant local governments. The establishment of the eligibility cut-off date is intended to prevent the influx of ineligible non-residents who might take advantage of Project entitlements.

Principle of Replacement Cost

All compensation for land and non-land assets owned by households/shop owners who meet the cut-off-date will be based on the principle of replacement cost. Replacement cost is the amount calculated before displacement which is needed to replace an affected asset without depreciation and without deduction for taxes and/or costs of transaction as follows:

For example:

a. *Productive Land (agricultural, aquaculture, garden and forest) based on actual current market prices that reflect recent land sales in the area, and in the absence of such recent sales, based on recent sales in comparable locations with comparable attributes, fees and taxes or in the absence of such sales, based on productive value;*
b. *Residential land based on actual current market prices that reflect recent land sales, and in the absence of such recent land sales, based on prices of recent sales in comparable locations with comparable attributes; fees and taxes.*
c. *Existing local government regulations* for compensation calculations for building, crops and trees will be used where ever available.*
d. *Houses and other related structures based on actual current market prices of affected materials;*
e. *Annual crops equivalent to current market value of crops at the time of compensation;*
f. *For perennial crops, cash compensation at replacement cost that should be in line with local government regulations, if available, is equivalent to current market value given the type and age at the time of compensation.*
g. *For timber trees, cash compensation at replacement cost that should be in line with local government regulations, if available, will be equivalent to current market value for each type, age and relevant productive value at the time of compensation based on the diameter at breast height of each tree.*

9.4.2 Policy Gap Analysis

Policy gaps related to land acquisition and resettlement were analyzed by comparing the JICA Environmental Guidelines and the Vietnam's legal system. Referring to past projects in Vietnam, key gaps or notable points were discussed.

As stipulated in the Clause 2, Article 87 of the Land Law, the project is one of the special cases and committed policy between GOV and development partners, JICA Environmental Guidelines in this case, shall apply principally.

Table 9.4.3 shows the result of the gap analysis concerning land acquisition and resettlement and the countermeasures written on this table will be applied for the Project.

Table 9.4.3 Policy Gap Analysis between JICA Guidelines and Vietnamese Country System

No.	(A) JICA Guidelines for Environmental and Social Considerations with World Bank Safeguard Policy	(B) Vietnamese Law & Regulations	Gaps between (A) and (B)	Countermeasures for filling gaps
1.	Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives.	N/A	This item is not completely covered by Vietnamese legal system	Based on the JICA Environmental Guidelines, land acquisition and resettlement shall be avoided and/or minimized during alignment decision process, structure planning, and any other discussion related to resettlement impact.
2.	When population displacement is unavoidable, effective measures to minimize impact and to compensate for losses should be taken.	N/A	This item is not covered by Vietnamese legal system	
3.	People who must be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported, so that they can improve or at least restore their standard of living, income opportunities and production levels to pre-project levels.	Clause 1 of Article 83 of the Land Law stipulated that all land users whose land is recovered (acquired) are considered for receiving State support which includes the measures for stabilizing their livelihoods, production and development. Article 85 of the Land Law stipulates that "in the concentrated resettlement areas, infrastructure must be developed synchronously, ensuring construction standards and regulations and conformity with the conditions, customs and practices of each region and area".	This item is not covered fully by Vietnamese country system. Clause 1 of Article 83 of the Land Law mentions assistance by the Government for livelihood stability and Article 85 of the Land Law requires providing basic infrastructure in resettlement sites. However, it is not regulated or stipulated that PAPs can improve or at least restore their standard of living, income opportunities and production levels to pre-project levels.	Based on the JICA Environmental Guidelines, RAP secures "improve or at least restore their standard of living, income opportunities and production levels to pre-project levels" by using appropriate entitlement matrix.
4.	Compensation must be based on the full replacement cost as much as possible.	[Land] Compensation principle on land is written in Article 74 of the Land Law and stated that "specific land price" is applied to calculate the compensation amount. Specific land price is defined in Article 114 and Clause 4 e) of Article 114 of the Land Law states it is used as a basis for compensation amount when State recovers (acquired) land. For agricultural land which was used before July 01, 2004, of which land users are households and individuals directly engaged in agricultural production but have not been granted a certificate or not being eligible to be granted a certificate of land use right and ownership of houses and other land attached assets under the Land Law, Clause 2 of Article 77 of the Land Law states that the compensation must be made for	[Land] It is not clear whether the expression "Market Price" has the same meaning as "replacement cost" under the JICA Environmental Guidelines. In addition, eligibilities on farming land are different in some cases stipulated in Article 77 of the Land Law [Structure] It is not clear whether the expression "equivalent to the value of new construction..." has the same meaning of "replacement cost" under the JICA Environmental Guidelines	Replacement Cost Survey (RCS) was conducted based on the standard of the JICA Environmental Guidelines (the World Bank's definition and level of standards). The result is compared with the government's official unit price for determining validity. The result shall be respected for future CAR Plan in Vietnamese domestic procedures. If there are cases stipulated in Clause 2 of Article 77 or Clause 2 of Article 89 of the Land Law, compensation and assistance should be given by using concept of the JICA Environmental Guidelines.

No.	(A) JICA Guidelines for Environmental and Social Considerations with World Bank Safeguard Policy	(B) Vietnamese Law & Regulations	Gaps between (A) and (B)	Countermeasures for filling gaps
		the land area which is actually used and does not exceed the agricultural land allocation quota prescribed in Article 129 (e.g. Not exceeding 02 hectares for each type of land). [Structures] Clause 1 and Clause 3 of Article 89 of the Land Law specifies that "the compensation amount is equivalent to the value of new construction facilities with equivalent technical standards prescribed by specialized law". However, the case of Clause 2, PAPs except the cases illustrated in Clause 1 does not mention dearly "compensation by replacement cost". In addition, business/production loss and other properties such as plants and livestock are stipulated in the Land Law, however, it is not dearly mentioned "compensation by replacement cost".		
5.	Compensation and other kinds of assistance must be provided prior to displacement.	Article 74 of the Land Law stipulated that "The compensation when State recovers land must be made in a democratic, impartial, equal, public, timely and lawful manner".	Based on practical procedures in district level, there is no significant gap, however, the word "timely" is not clear if the timing is before/after compensation.	Based on the JICA Environmental Guidelines, compensation, assistance, and relocation site have to be done and prepared prior to displacement.
6.	For projects that entail large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public.	There is no system to prepare resettlement action plan at the time of pre-feasibility study or environmental review by development partners. Land Acquisition Plan is prepared based on the Land Law and other related decrees and circulars after the decision of land acquisition (recovery).	This item is not covered fully by Vietnamese country system.	The RAP is developed with sufficient adherence to the JICA Environmental Guidelines.
7.	In preparing a resettlement action plan, consultations must be held with the affected people and their communities based on sufficient information made available to them in advance.	Article 69 of the Land Law specifies public consultation at planning and implementation stage.	No significant gaps	Not required
8.	When consultations are held, explanations must be given in a form, manner, and language that are understandable to the affected people		Language using for the consultations are not specified in the Vietnamese legal system	Based on the JICA Environmental Guidelines, consultations have to be implemented in understandable language
9.	Appropriate participation of affected people		This item is not covered by the	Based on the JICA Environmental

No.	(A) JICA Guidelines for Environmental and Social Considerations with World Bank Safeguard Policy	(B) Vietnamese Law & Regulations	Gaps between (A) and (B)	Countermeasures for filling gaps
	must be promoted in planning, implementation, and monitoring of resettlement action plans.		Vietnamese legal system in monitoring stage	Guidelines, in case of the Category A projects, stakeholder meetings are organized at least two times, at the time of the draft scoping and at the time of draft reporting, supplemented by focus group meetings as parts of public participation in planning stage. In addition to above mentioned meetings, the RAP proposed promotion of public participation in monitoring stage as well as implementation stage.
10.	Appropriate and accessible grievance mechanisms must be established for the affected people and their communities.	N/A	This item is not covered by the Vietnamese legal system	Based on the JICA Environmental Guidelines, Grievance Redress Mechanism is planned in the RAP.
11.	Affected people are to be identified and recorded as early as possible in order to establish their eligibility through an initial baseline survey (including population census that serves as an eligibility cut-off date, asset inventory, and socioeconomic survey), preferably at the project identification stage, to prevent a subsequent influx of encroachers of others who wish to take advance of such benefits.	After project approval by the Government followed by the decision of land acquisition by the People's Committee, a detailed measurement survey (DMS) is implemented.	At the early stage, or during F/S period before the project officially certified, a cut-off date is not clearly declared. The time of land acquisition decision was recognized as practical cut-off-date in past cases.	Based on the JICA Environmental Guidelines, the cut-off date is explained at the 1st time stakeholder meetings.
12.	Eligibility of benefits includes, the PAPs who have formal legal rights to land (including customary and traditional land rights recognized under law), the PAPs who don't have formal legal rights to land at the time of census but have a claim to such land or assets and the PAPs who have no recognizable legal right to the land they are occupying.	Article 82 of the Land Law stipulates that illegal land use can be recovered by the State without compensation. Clause 2 of Article 92 of the Land Law stipulates illegal land attached assets can be acquired without compensation. Clause 2 of Article 77 of the Land Law, the Government does not compensate land users who violate land legislation, elaborated in Article 64 of the Land Law, and owners of illegally established land attached assets, and unregistered land users of agricultural land after 1 July 2004. Article 88 and 92 of the Land Law does not allow	This item has gaps regarding the eligibility of legal rights and illegal cases. In addition, it is not sure that the Clause 1 a) of Article 83 of the Land Law: "When State recovers land, in addition to receiving compensation in accordance with this Law, land users shall also be considered for receiving support from the State;" can apply to informal PAPs in terms of assistance even in the case that they does not have eligibility for compensation.	Based on the JICA Environmental Guidelines, appropriate entitlements are discussed in the RAP for both formal and informal cases. In principle, both formal and informal settlers are eligible for compensation and other conditions, including assistances, rights to relocate to the resettlement site, etc.

No.	(A) JICA Guidelines for Environmental and Social Considerations with World Bank Safeguard Policy	(B) Vietnamese Law & Regulations	Gaps between (A) and (B)	Countermeasures for filling gaps
		compensation for non-legitimate owner of the land attached assists. Article 94 and 157 of the Land Law covers compensation for the damage caused by limited land use and damage on land attached assets in case of restrictions due to establishment of safety corridors, but only for legally recognized land users.		
13.	Preference should be given to land-based resettlement strategies for displaced persons whose livelihoods are land-based.	Article 74 of the Land Law mentions the "land for land" compensation in principle. In the case of relocation site preparation, Article 85 of the Land Law describes the introduction of necessary infrastructure and considerations on harmonization with surrounding communes.	This item has no significant gaps.	PAPs shall be given compensation options based on the RAP to select "land for land" of "cash for land".
14.	Provide support for the transition period (between displacement and livelihood restoration).	Article 84 of the Land Law covers some kinds of assistance for business disturbance and income restoration. However, unregistered owners of commercial structures/business for the cost of re-establishing their business activities, net income loss during the transition period, and cost of transferring and re-installing plant, machinery, etc. are not eligible for compensation.	Non-registered cases and transition period are not covered by the domestic legal systems.	The RAP may cover the non-registered cases and compensation for temporary business disturbance, income restoration at the early stage, or any other allowance are considered.
15.	Particular attention must be paid to the needs of the vulnerable groups among those displaced, especially those below the poverty line, landless, elderly, women and children, ethnic minorities etc.	There is no clear description of special considerations for socially vulnerable groups except Article 27 of the Land Law regarding land use fee and land allocation.	This item is not covered by the Vietnamese legal system	Based on needs assessment through stakeholder meetings, socio-economic surveys, focus group meetings etc., special considerations for vulnerable groups, such as households headed/with woman, handicapped, elderly, poor, and etc., are discussed and reflected in the RAP.
16.	For projects that entail land acquisition or involuntary resettlement of fewer than 200 people, abbreviated resettlement plan is to be prepared.	There is no requirement for preparing an abbreviated RAP at the level required under the JICA Environmental Guidelines.	This item is not covered by the Vietnamese legal system	Based on the JICA Environmental Guidelines, the abbreviated RAP shall be prepared under the stipulated conditions
17.	Internal and external monitoring system must be established and implemented properly	Article 13 of the Land Law covers general monitoring and evaluation, but not particularly resettlement.	This item is not covered by the Vietnamese legal system	Based on the JICA Environmental Guidelines, a monitoring framework composed by internal monitoring, external monitoring, and evaluation is established in the RAP.

9.5 Institutional Framework

Organizations related to land acquisition and resettlement are principally under the umbrella of HCMC-PC. During the preparing phases before obtaining project investment decisions, MAUR plays a single coordination body to prepare and promote necessary processes including the RAP. After the project investment decision, in the phase of implementation, local PCs, relevant departments, and established specific committees under HCMC-PC function as implementation bodies. These relevant organizations have some experiences and capacities on land acquisition and resettlement under ODA loans, such as JICA and the World Bank. However, this project would be the first case between new legal framework of the Land Law, Public Investment Law, and other relevant laws and regulations as well as JICA's Environmental Guideline (2010). Therefore, mutual understandings and frequent confirmation should be promoted during the whole project processes from survey and design phase to implementation and monitoring phases.

9.5.1 Ho Chi Minh City's People Committee (HCMC-PC)

HCMC-PC is the principal authority at the provincial level. HCMC-PC will take responsibilities as follows:

(1) Reviewing the RAP and approving it after the draft final RAP have got agreement from JICA;

(2) Issue Decision on the project's land acquisition and allocate the land to the project for its implementation;

(3) Responsible for the final decision on compensation unit costs, assistances, and on supporting policies for PAPs, poor and vulnerable affected groups, in accordance with the RAP approved;

(4) Direct relevant agencies in solving unsolved complaints/grievances of PAPs on compensation, assistance and resettlement in accordance with its competency;

(5) Timely provide necessary budget for resettlement implementation;

(6) Ensure that the project's resettlement activities would be carried out in compliance with policies and provisions of the RAP approved.

9.5.2 Management Authority Of Urban Railways (MAUR)

MAUR was established in accordance with the Decision No.119/2007/QĐ-UBND dated September 13, 2007 of the HCMC-PC with the functions as an implementing agency of the urban railway projects.

The MAUR's responsibilities will include the following:

(1) Cooperate and organize for implementation and internal monitoring of the project resettlement activities. Sign contracts with relevant organizations/agencies for implementation of certain specific resettlement works. Preparing the CAR plan in accordance with provisions of the approved the RAP. Submit them to HCMC-PC for approval and to JICA for concurrence before implementation.

(2) Adhere preparation of resettlement dwelling fund to organize and remove PAPs to new relocation sites, or ask HCMC-PC to arrange relocation for PAPs. Pay cost of project's resettlement infrastructure development and dwellings in resettlement sites in accordance with existing regulations.

(3) Prepare resettlement cost estimate to submit to Department of Finance (DOF) and DPC for approval. After 5 days receiving decision on the resettlement cost estimate, allocate the budget to concerned agencies.

(4) Provide all project related materials, documents required for District's Compensation and Site Clearance Committees (DCSCCs) implementation of compensation, assistance and resettlement of PAPs.

(5) Guiding all resettlement activities of the project in accordance with its policies and directives.

(6) Checking approved compensation unit prices for land, structures and other assets. In case there exist a considerable gap between them and the market ones, MAUR will cooperate with DOF and other line departments, submitting recommendations to HCMC-PC for review and amendment of them, following the rules of the RAP.

(7) Prepare adequate and timely resettlement budget for preparation works as well as for delivery of compensation, assistance and resettlement to PAPs. Cooperate with DCSCCs to directly deliver compensation payment and allocate dwellings to PAPs.

(8) Establishing and managing standardized PAPs databases for each component, as well as for the Project as a whole. The PAPs database should be kept updated and be accessible to all concerned parties.

(9) Prepare plan for ongoing internal monitoring to supervise implementation of project resettlement activities and compliance of its resettlement policies provisions.

(10) Recruiting, supervising, and acting upon the recommendations of the external monitoring organization.

(11) Cooperating fully with the external monitoring organization.

(12) Reporting periodically on resettlement activities to JICA.

9.5.3 Ho Chi Minh City's Compensation Appraisal Council (HCMC-CAC) (Hội đồng thẩm định bồi thường Thành phố Hồ Chí Minh)

The HCMC-CAC is established by the HCMC-PC for following responsibilities (Decision No. 51/2011/QĐ-UBND):

(1) Appraisal: land price for calculating compensation and assistance when the State recovers land; investment costs on the remaining land of the absence of adequate records and vouchers for a value greater than 500 million VND; housing and residential land price to serve resettlement of projects invested by the State budget as directed by HCMC-PC.

(2) Evaluation of CAR Plan for cases related land acquisition from two districts or higher. Appraisal of beneficiaries for compensation and assistance regarding land, property and other forms of assistance under the provisions of law.

(3) To advise the HCMC-PC about guidelines and policies related to the implementation of compensation, support and resettlement; to propose the HCMC-PC solving problems arising which are not mentioned or mentioned contradictorily/ unclearly in the law.

(4) To guide and support the DPC, the Project Investor to implement the provisions of the current law on compensation, support and resettlement; to guide the specific process and procedures to cater to the CAR plan's evaluation; to rise and submit the HCMC-PC for consideration and decision on problems which are beyond the competence of departments and DPC.

(5) To evaluate directly some specific profiles in case of necessity, under the direction of HCMC-PC on land legislation; buildings, other structures and adoption rates of compensation, assistance and resettlement under the approved CAR Plan.

(6) To carry out other duties or specific tasks as directed by the HCMC-PC.

9.5.4 District's People Committees (DPC)

DPCs are responsible for:

(1) Overall management of compensation, assistance and resettlement implementation within their respective competent boundaries. Establish DCSCCs and its working group for compensation, assistance and resettlement

(2) Appraisal and approval of compensation options for PAPs of their respective districts

(3) Issuing regulations and procedures of solving administrative matters related to the project resettlement and compensation implementation. Assign tasks, responsibilities of districts departments, Ward People's Committees (WPCs) and working staff engaged in project's resettlement implementation,

(4) Approve resettlement and land acquisition implementation costs in accordance with its competences

(5) Solve grievance and accuse raised by PAPs in accordance with its competent power.

9.5.5 District's Compensation and Site Clearance Committees (DCSCCs) (Ban Bồi thường Giải phóng Mặt bằng Quận)

District's Compensation and Site Clearance Committee (DCSCC) is established by its DPC, in order to assist the DPC in organization and implementation of compensation and site clearance activities within the districts.

The DCSCCs are responsible for:

(1) Planning and implementing all daily resettlement activities of the subproject within their districts

(2) Carry out project information dissemination and dissemination of information on project's compensation, assistance and resettlement policies, its schedule, organization, and implementation; mobilize PAPs and concerned parties to participate in resettlement implementation

(3) Review and confirm about legality of land use rights, houses, structures and other affected properties

(4) Review and submit to DPC for approval compensation, rehabilitation options of PAPs within their district

(5) Receiving grievances and appointing inspectors to redress PAPs grievances on resettlement policies and entitlements;

(6) Paying special attention to the needs and demands of vulnerable groups;

(7) Cooperating fully with the external monitoring organization. Receive and review recommendations of the IMO and take adequate corrective actions, if necessary, ensuring that the PAPs could be able restoring their prior-project living standards.

9.5.6 Ward's People Committee

WPCs are responsible for followings:

(1) Participate as member of DCSCCs. Assign concerned ward officials/professionals to participate all resettlement activities in its ward;

(2) Checking and affirming the legality status of affected land, houses, structures and other assets/losses (origins, original date of land use, status of house/structures and land use) of organizations, individuals located in project recovered areas, within respective competences, serving as basis for preparation of compensation and resettlement options;

(3) Organize administrative implementation measures for DMS or confirm on land acquisition based on existing land and properties management documents to provide basis for project developer to prepare compensation and resettlement options applied for cases when PAPs refuse to numerate their loses by themselves;

(4) Organize administrative measures for implementation of land acquisition in accordance with functions commissioned or delegated by the Chairman of DPC;

(5) Implement and solve issues related to compensation and resettlement in accordance with WPC competences.

Polices of affected wards

- Organize for confirmation on residency and number of HH's members;
- Ensure social security throughout the project's resettlement implementation;
- Consolidate report and report to DCSCCs on case violating state orders.

9.6 Compensation Policy, Eligibility and Entitlement

9.6.1 Compensation Policy

Principle policy on land acquisition and involuntary resettlement is based on the JICA Environmental Guidelines. PAPs who have assets within or reside within the area of project land-take before the cut-off date are entitled to compensation for their losses. Those who have lost their income and/or subsistence will be eligible for livelihood rehabilitation assistance based on the criteria of eligibility defined by the project in consultation with the PAPs.

- The compensation rates will be determined based on the results of independent appraisal of the land/crops/assets (associated with the land) in a timely and consultative manner. All fees and taxes on land and/or house transfers will be waived or otherwise included in a compensation package for land and structures/or houses or businesses. The local authorities will ensure that PAP choosing relocation on their own, obtain, without additional costs, the necessary property titles and official certificates commensurate with similar packages provided to those who choose to move to the project resettlement sites
- Land will be compensated “land for land”, or in cash, according to PAP’s choice whenever possible. The choice of *land for land* must be offered to those loosing 30% or more of their productive land. If land is not available, the MAUR must assure itself, that this is indeed the case. Those loosing 30% or more of their land will have to be assisted to restore their livelihood. The same principles apply for the poor and vulnerable people losing 10% or more of their productive landholding.
- PAPs who prefer “cash for land” will be compensated in cash at the full replacement cost. These PAPs will be assisted in rehabilitating their livelihoods and making their own arrangements for relocation.
- Compensation for all residential, commercial, or other structures will be offered at the replacement cost, without any depreciation of the structure and without deduction for salvageable materials. Structures shall be evaluated individually. Any rates set by category of structure must use the highest value structure in that group (not the lowest).
- PAPs will be provided with full assistance (including a transportation allowance) for transportation of personal belongings and assets, in addition to the compensation at replacement cost of their houses, lands and other properties.

- Compensation and rehabilitation assistance must be provided to each PAP at least 30 days prior to the taking of the assets for those who are not to be relocated and 60 days for those who will have to be relocated. Exceptions should be made in the case of vulnerable groups who may need more time.
- Financial services (such as loans or credits) will be provided to PAPs if necessary. The installment amounts and the schedule of payments will be within the repayment capacity of PAP.
- Additional efforts, such as economic rehabilitation assistance, training and other forms of assistance, should be provided to PAPs losing income sources, especially to vulnerable groups, in order to enhance their future prospects toward livelihood restoration and improvement.
- The previous level of community services and resources, encountered prior to displacement, will be maintained or improved for resettlement areas

9.6.2 Eligibility Criteria

Based on JICA's principle policy, PAPs who are eligible for compensation/assistance are defined as below:

a) PAPs who has legal rights on their land

b) PAPs who does not have legal rights on their land, however, their rights will be certified according to legal framework of their country if they claim their rights

c) PAPs whose legal rights on their land and their right of claim are not confirmed (e.g. lessee, tenant, worker, employee, illegal occupants, other building owner, etc.).

Persons covered under (a) and (b) are provided compensation at full replacement costs for the land they lose, payment for non-land assets they own and necessary assistance in cash or in-kind. Persons covered under (c) are provided compensation at full replacement cost for non-land assets they own and resettlement assistance, in lieu of compensation for the land they occupy, and other assistance, as necessary, to achieve the objectives set out in this policy provided that they occupy the project area prior to the cut-off date of the Project.

9.6.3 Cut-off-date

For this Project, the cut-off date is defined as the date when the *land acquisition notification* (*"Thông báo thu hồi đất"*) for the Project is declared by HCMC-PC, following the *Project Approval Decision* (*"Quyết định Phê duyệt Dự án"*) by Prime Minister. Persons who occupy the project site after the cut-off date will not be eligible for compensation and relocation assistance.

9.6.4 Entitlement

Based on the resettlement policy gap analysis and field surveys, PAPs' eligibility has been discussed as the entitlement matrix in Table 9.6.1.

Table 9.6.1 Entitlement Matrix

Impacts	Eligible Persons / Level of Impact	Entitlements	Implementation Arrangements
1. Residential land	**1.1 Marginal loss** (i.e., land is still viable for use and not requiring relocation) The remaining area is > 36 m^2 or < 36 m^2 *(*)* and the PAP does NOT want to relocate *(* : Based on Decision No. 135/2007/QĐ-UBND of HCMC-PC)*	1) Cash compensation at replacement cost to the legal and legal-realizable land users; 2) A financial assistance of an agreed amount to the land users not having recognizable land use right.	- Affected household to be notified at least 180 days before land acquisition - The owner of land will hand over the land within 20 days from the date of compensation
	1.2 PAPs physically relocated The remaining area is ≤ 36 m^2 *(*)* and the PAP wants to relocate *(* : Based on Decision No. 135/2007/QĐ-UBND of HCMC-PC)*	1.2.1 Legal / legal-realizable land users - The PAPs may choose to either receive compensation at full replacement cost to relocate themselves or to be provided a land plot in a resettlement site or apartment prepared by the Project. They will have full land title or apartment ownership without any cost. - The process of compensation for a plot/apartment for legal and legalizable PAPs at the resettlement site will be as follows: ➢ If the selling cost of minimum plot(s)/apartment at the new site is more than the value of the affected residential land, PAPs receive new plot/apartment at no additional cost; ➢ If the plot(s)/apartment at the new site is equal the value of affected residential land, PAPs receive new plot/apartment at the new site without any balance; ➢ If the plot(s)/apartment at the new site is less than the value of affected residential land, PAPs will receive plot/apartment and the difference in cash. 1.2.2 PAPs who do not have formal, or customary rights to the affected land:[15] - An identified financial assistance of agreed amount will be provided. If the PAP has no place to move, the following options will be provided and the PAP can either pay in installment to buy or rent it for living 1) an apartment in the resettlement site 2) a land plot to build a house by themselves - In case the relocated PAP belongs to poor or vulnerable groups or HHs, the project will provide assistance to ensure that the PAP is able to relocate and re-establish them to a new site.	- Affected household to be notified at least 180 days before land acquisition - The owner of land will hand over the land within 20 days from the date of compensation - Resettlement site and/or cash compensation/ assistance process are elaborated in the chapter of resettlement site in the RAP

[15] PAPs without formal / customary rights were not observed during the census survey. This policy will apply for the cases if such PAPs are observed after design changes in the future processes.

Impacts	Eligible Persons / Level of Impact	Entitlements	Implementation Arrangements
2. Commercial land	Legal / legal-realizable land owners	Cash compensation at full replacement cost. The amount is free land administration, certification, and registration costs.	
3. Houses/ Structures	**3.1. Partial impact:** Unaffected portion of the house is still viable for use	1) Cash compensation at full replacement cost for affected portion as newly built houses/ structures. Depreciation of houses/ structures should not be taken into account. 2) Allowance will be given, if necessary, to enable PAPs to restore it to former or better conditions. 3) If PAPs have to temporarily move to rebuild/reconstruct their houses, they will receive a house rental allowance for 1-3 months in recognition of the time needed to rebuild/reconstruct their houses with transportation allowance.	Calculate compensation amount based on replacement cost and actual affected area
	3.2. Full impact (i.e., house is partially acquired by the Project but no longer viable for continued use or the entire structure is acquired).	3.2.1 Owner of House/Structure 1) Compensation in cash for entire affected structures and other fixed assets will be provided with full replacement cost for materials and labor cost, regardless of whether or not they have title to the affected land or permit to build the affected structure. Depreciation of structures and assets should not be taken into account. 2) Transportation allowance is provided. 3) Any investments such as facilities for agriculture and fish cultivation, structures, trees, crops etc. made on the land by the PAPs will be compensated at their full replacement cost. 3.2.2 Tenants of Houses/Structures 1) The tenants of state or organization's houses will be provided with transportation allowance for moving their assets. They will also be assisted in identifying alternative accommodation. 2) The tenants who are leasing a private house for living purposes will be provided with transportation allowance for moving their assets. They will also be assisted in identifying alternative accommodation.	Calculate compensation amount based on replacement cost and actual affected area
4. Crops and Trees, aquaculture products	Owners regardless of tenure status	Compensation in cash will be paid to the PAPs, who cultivate the land, at full replacement cost in local markets to ensure the compensation is sufficient to replace the lost standing crops, trees or aquaculture products.	PAPs will be given notice several months in advance. Crops grown after issuance of the deadline will not be compensated.
5. Public structures/ Facilities	Owner of the affected structures/ Facilities	Either in: 1) cash compensation to cover the cost of restoring the affected facilities, or 2) in kind compensation based on the price fixed by the government between responsible organization (e.g. DCSCC) and owners of assets.	Displacement will be carried out by the owners prior to the commencement of construction.

Impacts	Eligible Persons / Level of Impact	Entitlements	Implementation Arrangements
6. Loss of Income and Business	**6.1 Marginal impacts** (Owner of the affected business and employees)	PAPs losing income and/or business/productive assets due to land acquisition will be compensated as below: 1) Compensation or assistance in cash equivalent to 30% of their actual annual income: (a) For licensed businesses, the amount will be based on their average yearly income declared with the taxation agency over the previous three years, and (b) For unregistered affected businesses but have made their tax obligations, the amount will be calculated by 50% comparing to registered business cases. 2) Employees who are affected by acquisition of residential/commercial land, public land or land of enterprises: Allowance equivalent to the minimum salary as per the provincial regulations to affected employees during the transition period for a maximum of 6 months, and will be assisted in finding alternative employment. 3) PAPs are entitled to take part in Income Restoration Program	PAPs will be given priority for business relocation at conveniently located in order to maximize their benefit from business opportunities.
	6.2 Severe impacts (Relocating shop owners)	6.2.1 Legal / legal-realizable shop owners The project will assist to find alternative site with local advantage and physical attributes similar to the land lost with easy access to customers' base, satisfactory to the PAP, or compensation in cash for the affected land and attached structures at replacement cost, plus transportation allowance for movable attached assets. All relevant taxes will be waived or otherwise included in the compensation package. 6.2.2 Shop owner with temporal / leased right The tenants who are leasing a shop for business purposes will be provided with transportation allowance for moving their assets. They will also be assisted in identifying alternative place for their business. - Both of above two cases are entitled to take part in Income Restoration Program	
7. Allowances /Assistance Targeted to Vulnerable Households	Affected vulnerable groups regardless of severity of impacts including tenant, vendors and etc. The vulnerable groups were defined as in Glossary	Landless households Assistance through the following provision that PAP can either pay in installment to buy or rent it for living 1) an apartment in the resettlement site 2) a land plot to build a house by themselves Other vulnerable groups Whether they have to be relocated or not, (female headed households with dependents, households with disabled persons, elderly without any source of support, ethnic minority households, social policy households, vendors) will get the same support given to poor households in accordance with the HCMC-PC. - These households are entitled to take part in Income Restoration Program	Allowance for households as per Government regulation (social policy households, heroic mothers, wounded, dead soldiers). If the household eligible to more than one additional support allowance for the vulnerable people, only one package with the highest value will be applied

Impacts	Eligible Persons / Level of Impact	Entitlements	Implementation Arrangements
8. Other Allowances/ Assistances	Loss of land and non-land assets	Incentive Bonus All PAPs who vacate the affected land immediately after receiving compensation and allowances will be given an additional incentive allowance of 7.5 – 15 mil VND. Other Allowances 1) The relocating households with children who are going to schools will be supported with 1-year tuition as regulated by the Ministry of Education 2) Based on the actual situation of the locality, HCMC-PC Chairman issues other allowances to ensure accommodation and livelihood restoration for PAPs, if needed.	
9. Temporary impacts	Temporary loss of land and assets	1) Compensation for all damaged or lost assets, including trees, crops at full replacement cost 2) Rental in cash for the land acquired at a rate which will be not less than the net income that would have been derived from the affected property during disruption 3) Restoration of the land within 3 months after use: The contractor is expected to return the land in its original condition within 3 months of the termination of the civil works. 4) For business disturbance due to temporary impacts, compensation and assistance should be discussed based on "7. Loss of Income and Business" in this table depending on the situation and degree of impacts.	If the quality of land is radically changed when returned to PAPs, requiring PAPs to change in the types of land use; then PAPs should be compensated for all estimated cost of losses.
10. Any other impacts that may be identified during implementation	Individuals, organizations in the project area	1) Entitlements to compensation and other assistance would be provided in accordance with the compensation policy. 2) Secondary impacts on production and business or PAPs isolated from access to resources temporarily have to be compensated and supported in accordance with the RAP.	In case of impacts on livelihoods of PAPs, the contractors, construction units have to agree with the households on payment for disruption of business.

9.7 Valuation of and Compensation for Losses

Replacement Cost Survey (RCS) in and vicinity of the project sites has been implemented from June to August, 2016. It's recorded that real estate market in the area is very active. Calculation of the full replacement cost is based on the following factors:

(1) the fair market price;

(2) transaction costs;

(3) the benefit generation interest;

(4) cost for changes and recovery; and

(5) other appropriate payments, if any.

This will be achieved through empirical surveys of the market and/or such other factors as productive capacity, equivalent attributes, value of replacement asset, disadvantage of the PAPs, etc. Simultaneously the unit prices are to be evaluated and compared with unit price legislated by HCMC-PC. RCS determines compensation unit cost/ average cost for different types of damages, such as affected land, architecture objects, and fruit trees and crops on the land as follows:

- Determine land price at the same time with RCS's survey.
- Determine materials price and labor cost of constructing houses and architectural projects at the same time with RCS's survey.
- Determine current prices of trees and crops at the same time with RCS's survey.
- Decide options of replacement cost for land, assets, tree, and crops at the same time with RCS's survey.

Replacement cost survey report is shown in appendix 2 of the RAP.

9.7.1 Land

Replacement cost for the residential land was calculated based on market transaction of similar transaction cases in and vicinity of the project area. If the result from RCS is higher than government price which is indicated in Decision No. 51/2014/QD-UBND regarding land price of HCMC in the period 2015-2019, price of replacement cost will be applied.

Table 9.7.1 Replacement Cost Price List of Residential Land

(Unit: 1,000 VND/m^2)

No.	Location		HCMC-PC's price*	Market price	Proposed compensation price
	District	Street			
1	1	Pham Ngu Lao	57,600	320,200	320,200
2		Do Quang Dau	39,600	272,300	272,300
3	3	Nguyen Thi Minh Khai	66,000	255,700	255,700
4	5	Nguyen Trai	41,800	229,800	229,800
5		Nguyen Thi Nho	26,000	102,200	102,200
6		Hong Bang	42,600	154,900	154,900
7		Hung Vuong	39,600	171,000	171,000
8	6	Hong Bang	24,300	101,100	101,100
9		Nguyen Van Luong	23,300	68,700	68,700
10		Kinh Duong Vuong	18,400	69,400	69,400
11	10	Hung Vuong	38,000	130,500	130,500
12	11	Hong Bang	24,300	110,000	110,000
13		Nguyen Thi Nho	24,300	104,200	104,200

* Decision No. 51/2014/QD-UBND regarding land price (2015-2019) in HCMC

Source: RCS, 2016

9.7.2 Structures

The RCS team has referred to constructors in HCMC and interviewed PAPs. There have not been observed big differences in the price of construction among wards and districts.

Construction unit price is in a range of 4,500,000 – 5,800,000 VND/m^2 (depending on the type of material used) which is all-in-one price including construction material and labor cost. This price is not significantly different in comparison to prices promulgated in Decision No. 66/2012/QD-UBND dated 28/12/2012 of HCMC-PC and Letter No. 13410/SXD-KTXD dated 26/10/2015 of HCMC Department of Construction.

Table 9.7.2 Result of Architectural Price Survey

No.	Structure			Unit	HCMC-PC's price*	Replacement cost	Proposed compensation price
A. House							
1	3.1	Adjacent urban house with only ground floor	1. Reinforced concrete frame and roof; painted brick wall; ceramic tiled background or equivalent types	VND/m^2	4,771,255	4,800,000	4,800,000
2	3.2		2. Reinforced concrete frame; tiles roof; plaster ceiling, painted brick wall, ceramic tiled background or equivalent types.	VND/m^2	4,069,938	4,200,000	4,200,000
3	3.3		3. Reinforced concrete frame; tin roof; plaster ceiling, painted brick wall, ceramic tiled background or equivalent types.	VND/m^2	3,633,052	3,700,000	3,700,000
4	3.6		6. Wooden pillars; tin roof, paneled or plaited bamboo ceiling; plywood or corrugated walls; smooth cement floor.	VND/m^2	1,552,095	1,700,000	1,700,000
5	4.1	Adjacent urban house ≤ 4 floors	1. Reinforced concrete frame, ground and roof; painted brick wall; ceramic tiled background or equivalent types.	VND/m^2	4,656,285	4,900,000	4,900,000
6	4.2		2. Reinforced concrete frame and ground; tiles roof; plaster ceiling, painted brick wall, ceramic tiled background or equivalent types	VND/m^2	4,483,830	4,500,000	4,500,000
7	4.3		3. Reinforced concrete frame and ground; tin roof; plaster ceiling, painted brick wall, ceramic tiled background or equivalent types.	VND/m^2	4,311,375	4,400,000	4,400,000
8	5.1	Adjacent urban house ≥ 5 floors	1. Reinforced concrete frame, ground and roof; painted brick wall; ceramic tiled background or equivalent types	VND/m^2	5,173,650	5,300,000	5,300,000
9	5.3		2. Reinforced concrete frame and ground; tiles roof; plaster ceiling, painted brick wall, ceramic tiled background or equivalent types	VND/m^2	4,943,710	5,000,000	5,000,000
10	6.1	Apartment ≤ 5 floors	1. Reinforced concrete frame, ground and roof; painted brick wall; ceramic tiled background or equivalent types.	VND/m^2	5,449,578	5,600,000	5,600,000
11	6.2		2. Reinforced concrete frame and ground; tiles or tin roof; plaster ceiling, painted brick wall, ceramic tiled background or equivalent types	VND/m^2	5,047,183	5,100,000	5,100,000
B. Working house, office buildings, commercial centers							
12	12	Working house ≤ 5 floors		VND/m^2	5,346,570	5,500,000	5,500,000
13	15.1	Working house 15-20 floors	1. No basement	VND/m^2	6,139,932	6,200,000	6,200,000
C. Hotel							
14	20.1	3-star standard	1. No basement	VND/m^2	6,254,912	6,300,000	6,300,000
15	22.1	5-star standard	1. No basement	VND/m^2	7,381,716	7,400,000	7,400,000
D. Cultural and educational facilities							
16	24.1	School < 5 floors	School < 5 floors	VND/m^2	5,910,136	6,000,000	6,000,000
E. Other structures							
17	35.1	Guard house	1. Reinforced concrete frame and roof; painted brick wall; ceramic tiled background.	VND/m^2	5,116,165	5,200,000	5,200,000
18	37.1	Mezzanine	1. Mezzanine	VND/m^2	2,874,250	2,900,000	2,900,000
19	40.3	Fence	3. Reinforced concrete pillars; 10cm brick wall with 0,24m height; on the iron B40 frame	VND/m^2	549,436	600,000	600,000

*: Decision No. 66/2012/QD-UBND and Letter No. 13410/SXD-KTXD

Source: RCS, 2016

9.8 Resettlement Measures

9.8.1 Compensation for land

The households and business enterprises affected by the loss of land are entitled to be compensated at full replacement cost. Affected public lands, include land for park, governmental offices/buildings, and etc. do not require compensation. The land losses mentioned above include both entire and partial losses. Those experiencing entire loss of land consist of 17 private households, 1 business enterprise and 1 governmental office.

9.8.2 Compensation for structures

To serve initial planning purposes in this phase of the Project, it has been assumed that all affected structures are entitled for compensation at full replacement cost. The correct and actual compensation entitled to the affected households will be determined during the updating of the resettlement plan with the detailed measurement survey (DMS) implementation. During the DMS, the DCSCC will determine and classify the entitlements of the affected structures.

Affected structures that include 19 adjacent urban houses with only ground floor, 145 adjacent urban houses ≤ 4 floors, 46 adjacent urban houses ≥ 5 floors, 78 apartments ≤ 5 floors, 10 working houses ≤ 5 floors, 1 working house 15-20 floors, 1 three-star standard hotel, 1 five-star standard hotel, 1 school < 5 floors, and 3 other secondary structures are to be compensated at full replacement cost. The secondary structures include guard house, mezzanine, and fence.

9.8.3 Assistances/Allowances

According to the Project's Resettlement Policy Framework, a number of cash allowances will be provided to the affected people, based on the type and severity of impacts.

(1) Rental allowance for displaced households

Rental allowance will be provided for 17 displaced households for a period of 6 months if their replacement house are not prepared adequately before their relocation (Article 28, Decision 23/2015/QĐ-UBND).

(2) Displacement/Transportation allowance

Based on Article 28, Decision 23/2015/QĐ-UBND, displaced house-owners and house-renters for business will be provided allowance to transport their personal. Unit cost of this allowance is 6,000,000 VND/HH. Persons to be displaced from rental accommodation will be notified of the need to relocate 3-6 months in advance.

(3) Allowance for loss of income and business

Allowance for loss of income and business will be in conformity with locality's actual conditions. The inventory of losses conducted to prepare the initial resettlement action plan estimated households, enterprises, and employees which will be affected either permanently or temporarily. During updating of the resettlement action plan, the precise impacts and entitlements for these persons and entities will be updated and confirmed.

9.8.4 Resettlement Plan Updating and Implementation

(1) Detailed Measurement Survey (DMS) and RAP updating

MAUR will work with DCSCC of each district and their Ward Working Teams in the project area to conduct the DMS to each PAP. Based on the results of the DMS, MAUR will update the resettlement plan and securing the concurrence of JICA prior to its implementation. Payment of compensation and allowances to PAPs is implemented only after JICA and HCMC-PC have agreed on the updated resettlement plan. The MAUR will also be responsible for disclosing the updated resettlement plan to the PAPs which will include (i) compensation, relocation and rehabilitation options; (ii) DMS results; (iii) replacement cost; (iv) entitlements and special provisions; (v) grievance procedures; (vi) implementation schedule; (vii) displacement schedule; and (viii) basis of resettlement plan polices. Copies of the updated resettlement plan in Vietnamese will be made available in relevant local government offices. The updated resettlement plan will be uploaded on the JICA website.

(2) Temporary Impacts

To avoid or minimize temporary impacts during the construction, following provisions will be included in the contract for civil works: (i) contractor to pay rent for any land required for construction work space outside the demarcated construction limit or ROW; (ii) to the extent possible, only idle land will be used as construction work space to avoid disruption to households and business establishments; and (iii) temporary use of land will be restored or improved compared to its pre-Project condition.

(3) Unforeseen Impacts

Any newly PAP that will emerge due to changes in Project design or alignment prior to or even during construction works are entitled to the same entitlements as those of the other PAPs.

9.9 Resettlement Arrangements

9.9.1 Entitlement for Relocation

Based on Decision No. 135/2007/QĐ-UBND issued by HCMC-PC, the PAHs whose remaining land area is less than 36 m^2 could choose either keep staying at their original places (on-site relocation) or shifting to other places. However, the house on land area of less than 15 m^2 is only allowed for renovation, repair following existing status, but not new construction. The house on land area of from 15 m^2 to 36 m^2 is allowed for renovation, repair following existing floors or new construction with 2 floors at maximum.

According to the IOL, a total of 17 affected households and 1 enterprise will have remaining land area less than 15 m^2, and other 45 PAHs will count for those with remaining land area of 15 – 36 m^2 (Table 9.9.1).

Table 9.9.1 Numbers of the relocated households

No.	District	Ward	Remaining land area is less than 15 m^2		Remaining land area is from 15 - 36 m^2	
			Households	Enterprise	Households	Enterprise
1	1	Phạm Ngũ Lão			1	
2	3	2	2		3	
3	5	4	3	1	19	
4		15			1	
5	6	2			1	
6		12	3		4	
7		13	1		1	
8	10	1	3		9	
9	11	16	5		6	
	TOTAL		**17**	**1**	**45**	**0**

9.9.2 Strategy of Relocation

Among the 62 relocated households, 6 HHs are running business shop on their own as a main source of income, and other 25 business shops are being operated by house renters. Thus, relocation strategy for the Project will be diverse based on their living and economic status as the follows:

(1) For relocating households who do not run business:

The relocating households will either (i) receive compensation at full replacement cost to relocate themselves or (ii) request the DPCs and the DCSCCs to prepare suitable places for them. For the option (ii), the relocating households could be shifted to apartment at Saigon Locomotive Factory in Ward 11 of District 3. The proposal on construction investment of this apartment was approved by the HCMC-PC via Decision No. 2426/QĐ-UBND, dated 16 May 2016. This apartment is constructed for the relocating households of HCMC UMRT Line 2 Project (Ben Thanh – Tham Luong), as well as contributing house fund for resettlement programs in HCMC. The apartment is

going to be constructed from 2016 to 2018 on a surface land area of 7,000 m^2, and consists of two 25-story blocks.

The location of the Saigon Locomotive Factory resettlement apartment is only several kilometers away the UMRT Line 3A, as described in Figure 9.9.1 below.

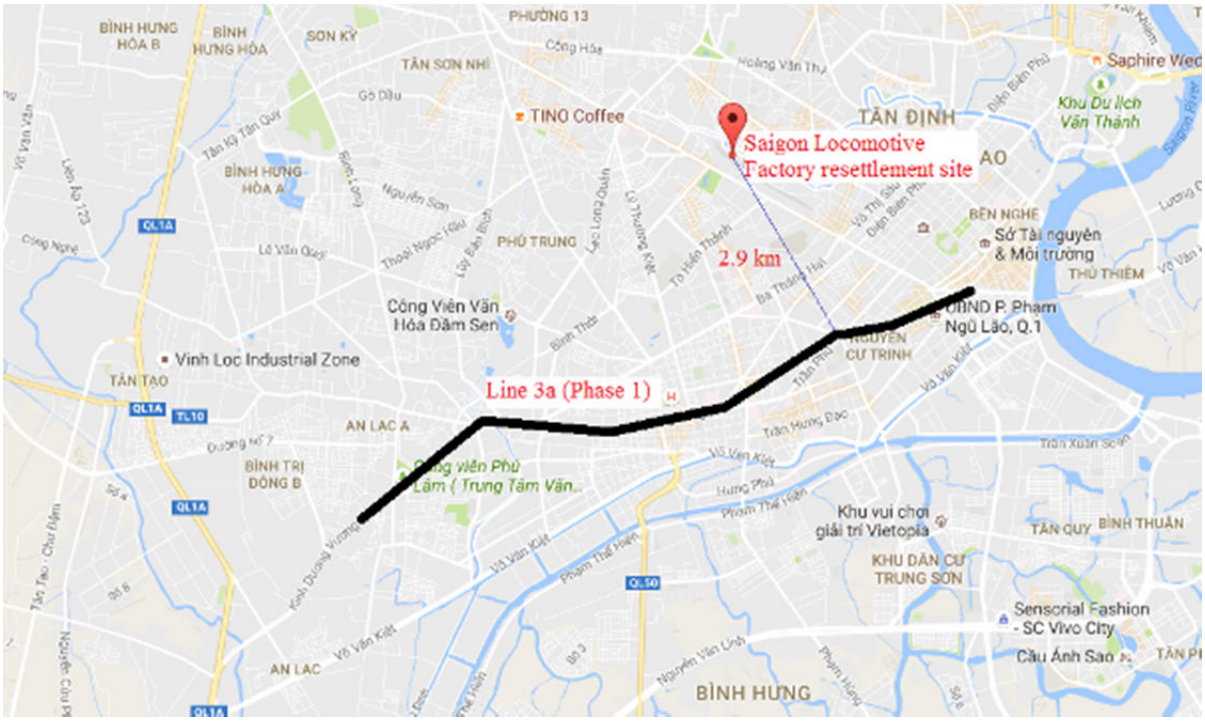


Figure 9.9.1 Location of Saigon Locomotive Factory resettlement site

In case the relocating households shift to the relocation site being prepared by the HCMC-PC, following principles will be applied:

(i) If the selling cost of minimum plot(s) at the relocation site is more than the value of the affected residential land, PAPs receive new plot at no additional cost.

(ii) If the plot(s) at the relocation site is equal to the value of affected residential land, PAPs receive new plot at the new site without any balance.

(iii) If the plot(s) at the relocation site is less than the value of affected residential land, PAPs will receive plot and the difference in cash.

(2) For relocating households who run business:

Before or during the DMS, the DPCs and the DCSCCs will review the land-use situation of the locality and find out if any area that is available and suitable for business owners to transfer and re-establish their business. In the consultations during the DMS, the DPC and DCSCC will introduce to the business owners to consider moving there. The DPC will assist and facilitate the renting procedures. If the business owners can find another suitable place, they can select themselves.

9.10 Community Participation

During the survey, stakeholder consultation meetings (SHMs) have been conducted with aim to collect information and opinion from the residents nearby planned project sites. The process may reduce or eliminate potential negative impacts of the Project for the local residents and prepare in advance to deal with the remaining impact caused by the Project preparation, implementation and operation. Main objectives of the SHMs are:

(1) Dissemination of information on the Project plan, EIA, and RAP to PAPs and local communities.

(2) Collection of opinions and comments of the PAPs and local communities on the Project plan, particularly on the proposed impact mitigation measures.

(3) Promotion of the active participation of the PAPs and local communities into the Project implementation from the early stage of the Project planning.

(4) In particular, promoting the participation of the PAPs and local communities into the tasks relating to compensation, resettlement, and land clearance for the Project.

(5) Ensuring the accountability of the tasks relating to land acquisition, compensation, resettlement, and livelihood restoration.

According to the JICA Environmental Guidelines, it is required to organize 2 times of SHM for a Category A project as this Project. The first SHM, which is conducted at the time of discussing draft scoping document according to EIA preparation, should include the following items: (i) dissemination of information on the Project (background, development needs, etc.); (ii) explanation on anticipated impacts; (iii) collection of participants' opinions/comments on the Project. The second SHM, which is conducted at the time of draft survey report with the results of scoping, should have the following items: (i) explanation on mitigation measure; (ii) promotion of public participation into the Project implementation; (iii) explanation of compensation policy.

MAUR and local people's committee cooperate with local consultant which has enough experiences on stakeholder meeting considered appropriate facilitation to provide friendly atmosphere for participants to let them raise their honest opinion.

Each stakeholder meeting were informed before its organized day with enough duration and wider target including commuter/student from outside, vulnerable groups, and etc. are invited. Therefore, the main group of participants of the SHM is possible project affected persons. Vulnerable groups, such as women, Hoa (Chinese) ethnic, tenant also joined the SHMs. Leaflet in Vietnamese for the stakeholder meeting is shown in appendix 4 of the RAP.

9.10.1 The First Stakeholder Meeting

The first SHM was organized at 22 wards in June 2016. In a SHM, firstly the project outlines including purposes, benefit, planned affected area, expected negative impacts are explained to the participants in terms of EIA and RAP and followed by questions and answer session. At the same time, participants were informed about the timing of the census survey, socio-economic survey and IOL following the SHM.

The schedule and outline of each meeting is shown in the tables below.

Table 9.10.1 Schedule and Participant of the First Consultation Meeting

No	District	Ward	Meeting day	Representative of stakeholders		
				Male	Female	Total
1	1	Pham Ngu Lao	June 21, 2016	35	16	**51**
2		Nguyen Cu Trinh	June 23, 2016	11	11	**22**
3	3	2	June 22, 2016	14	6	**20**
4	10	1	June 13, 2016	13	10	**23**
5		2	June 11, 2016	21	19	**40**
6	5	4	June 14, 2016	25	18	**43**
7		9	June 9, 2016	29	29	**58**
8		11	June 10, 2016	19	7	**26**
9		12	June 21, 2016	8	7	**15**
10		14	June 8, 2016	21	26	**47**
11		15	June 8, 2016	24	28	**52**
12	11	1	June 15, 2016	17	11	**28**
13		2	June 15, 2016	14	8	**22**
14		16	June 14, 2016	12	16	**28**
15	6	2	June 6, 2016	36	18	**54**
16		6	June 17, 2016	16	16	**32**
17		9	June 18, 2016	31	20	**51**
18		12	June 16, 2016	32	23	**55**
19		13	June 23, 2016	27	13	**40**
20		14	June 18, 2016	18	4	**22**
21	Binh Tan	An Lac	June 22, 2016	55	40	**95**
22		An Lac A	June 20, 2016	30	23	**53**
Total				508	369	877

Table 9.10.2 Major Dialogues in the First Stakeholder Meeting Regarding Resettlement Issues

No	District	Ward	Major opinions/ comments of the stakeholders regarding resettlement	Response from MAUR, WPC and Consultant
1	1	Pham Ngu Lao	- During the construction phase of the Project, income of the business HHs may be affected severely. Therefore, mitigation measures must be studied and implemented. - Replacement cost should be applied at time of compensation.	- This issue is a must-have part of the resettlement plan (RP) of the Project. - Yes, it will. This is a compensation policy of the Project, following the JICA Guideline
2		Nguyen Cu Trinh	- The railway should be deep enough so that local people could upgrade their building (higher) on the underground segments. - Will houses on the underground segments be affected and/or displaced by the presented construction methodology?	- This opinion has been recorded for further study. - This issue is being studied for final conclusion as soon as possible.
3	3	2	- How many households will be affected by the Project? - Thang Long Secondary School has plan to extend the main gate. Therefore, it's proposed to move the entrance of station C2 toward the ACB Bank office (beside the school in Nguyen Thi Minh Khai Street) - To arrange the elevator to serve the elderly and disabled person.	- The number of the Project's affected households will be surveyed after this SHM. The result will be presented in the 2nd SHM. - These 2 comments have been recorded and to be studied by the Study Team. - Each station will equip barrier free facilities such as elevator
4	10	1	- The Project's construction plan should be carefully studied. Using fence around station construction area for a long time will seriously affect the business of the HHs. Compensation and support policies should be prepared for business HHs. - Local people want to know the starting time of construction.	- Fence may be used during construction of stations. However, the detailed design will decide how to use the fence and for how long. The project upon its regulations will have to prepare compensation and support policies to compensate for loss causing during its preparation, construction and operation. - In this stage, we cannot tell exactly the time the project will start. It is necessary to have more studies as well as to pass processes to approve the project.
5		2	- To announce the starting time of construction soon, so that local people will have plan for themselves. - Will the project support/compensate to business households due to interruption of business during construction? - How can local people participate and monitor the implementation of the project?	- This opinion is recorded. - The PAPs will get compensation and/or assistance for their losses. - RAP will be disclosed at Ward PC for local people to get information and monitor.
6	5	4	- Agree with the Project's investment policy. Local people want to have fair and clearly compensation policies. - Should have policies for partially affected land. - Should have support for loss of business households during construction stage. - The leasing contract lengths 3-5 years from now. If the Project does not announce when it starts, owners will be suffered from loss due to breaking of leasing contract. - Disclose contacts of project investor and relevant agencies for necessary cases. - Project owners should co-operate with local authorities for consulting the local people about the scope of safety corridor from now on. If not, from now to before the cut-off date, the local people may construct the high building within safety corridor. It will be wasteful if it is dismantled when started to construct.	- The Project noted this opinion. - The Project is conducting surveys to estimate loss of land, house and structures of local people. Then compensation/support policies will be developed. The results will be disclosed in the next meeting. - All losses causing by the Project will be compensated. Supportive plan is under consideration and will be announced in the next meeting. - More information will be provided in the next SHM. - This opinion has been recorded.

No	District	Ward	Major opinions/ comments of the stakeholders regarding resettlement	Response from MAUR, WPC and Consultant
7		9	- The Project should carefully study environmental and social impacts. It is necessary to have contact list of relevant agencies so that local people can contact if needed. - How long does the construction work take and from when? And during the construction, will traffic be affected? - Should have mitigation measures and grievance mechanism. - Assessing the impacts on 30/4 Hospital area due to Station C3 construction and preparing mitigation measures.	- We noticed your opinion and comments. Regarding the impacts, several surveys are being conducted and their results will be informed in the next meeting. - According to the current design, fence will be used during construction so traffic will be temporary affected. Based on the existing design, total length of construction will be about 5 years but we do not know when the project will start since it needs time for preparation activities. - We noted the comment in the meeting minute for further consideration.
8		11	- Representative of University of Medicine and Pharmacy want to have meeting with the Study Team to discuss in detailed about the design of the Project. Currently there have been some construction works within hospital's area. It is afraid that the implementation of the MRT project will affect hospital's structure. - Business households will be affected by construction of stations C4 and C5. Need to have support policies for this case. - The two stations (C4, C5) are located too close together, so the negative impacts will be increased significantly. Local people want to know the compensation and support policies of Project. - Will the old apartments of the Project's safety corridors be renovated/ rebuilt?	- The Project will set up a meeting with the hospital. Regarding hospital's construction works, it will be followed guidance of the HCMC's PC on construction management. - The Project has recorded the comments in the meeting minute. - Repair/rebuild of the old building in the area will follow the state and local regulations. The Project also recognized the potential risk, however it will be studied more in later stage.
9		12	- Will the project compensate for temporary loss of business during construction of the stations? - Local people want to know when the Project will start construction works. - Need reduce construction duration to minimize economic loss. - Present results of impact assessment and propose mitigation measure in the 2nd consultation meeting.	- The project will develop compensation and support policies for any loss of local people. Currently, the social consultants are preparing the RAP and social survey which includes entitlement of affected people. Results will be disclosed during the second consultation meeting. - The project is in the initial stage to consider its feasibility. It needs to be adjusted and approved by authorized agencies and JICA; - The team noted your opinions into the meeting minute and also in the resettlement plans.
10		14	- During construction of the underground works, a safety corridor will be established as said. It may cause difficulties for movement of people and interrupt business activities.	- The Project realizes the impacts and will find the reasonable ways to mitigate the impacts during preparation and construction period.
11		15	- Please provide more detailed information on land acquisition, compensation and support policies.	- In the second community consultation meeting, draft RAP (with information on Project's affected scale, impacts and compensation, support policies, etc.) will be announced detailed.
12	11	1	- The Project should have mitigation measures for impacts on traffic and business, such as tax reduction, during construction stage.	- All loss will be appropriately compensated and assisted as the Project's policy, including compensation on income loss for business HHs.
13		2	- Should have mitigation measures for negative impacts. - The Project is consented and supported by the local people.	- These comments are recorded.

No	District	Ward	Major opinions/ comments of the stakeholders regarding resettlement	Response from MAUR, WPC and Consultant
14		16	- Provide in detail the design of stations in 2nd community consultation meeting, as well as land acquisition scope.	- The Study Team will present design of the station and land acquisition scope in 2nd community consultation meeting.
15	6	2	- Change the station's entrance to avoid impacts on business households.	- This comment is recorded. The Team is studying more on the impacts and mitigation measures.
16		6	- Mitigation measures on business such as tax reduction and support provision during station construction should be provided. Reducing time of construction to minimize impacts. - How much land will be recovered?	- This comment is recorded. - Land acquisition area will be announced after the Inventory of Loss is completed.
17		9	- To carry out more studies on mitigation measures for housing during construction, as well as compensation policies for damaged house. - Announce starting time of construction soon.	- Mitigation measures and compensation policies will be presented more details in 2nd consultation meeting - This comment is recorded
18		12	- The project should disclose information of affected households about: number, type of affected household and land, structure, etc…	- Those information will be disclosed in 2nd consultation meeting.
19		13	- Agree with the Project's investment policy. - Using fence around construction area long time will seriously affect the business. Compensation and support policies should be prepared for business household.	- This comment is recorded. - Compensation and support policies for household (number, type of affected household and land, structure , etc.) will be announced in the 2nd consultation meeting.
20		14	- Should study more for the section from Tan Hoa Street to Ong Buong Bridge to minimize impacts on houses. - Can local people build house during the Project's construction stage?	- This comment is recorded - Yes, but with satisfaction to the laws (37/2014/TT-BGTVT)
21	Binh Tan	An Lac	- The Project should comply with the commitments in environmental protection and resettlement policy.	- Yes, the Project will.
22		An Lac A	- Will any households be displaced by the Project in the Ward? If Yes, where to relocate, and how much is the compensation price? - Before construction, Project should organize consultation meetings to update the latest information of Project to local people.	- According to current design of the Project, there will be no displaced household in An Lac A ward. - Yes, the Project will. It's also a policy of the Project.

Minutes and some photos of the meetings are provided in Appendix 3 of the RAP.

9.10.2 The Second Stakeholder Meeting

After receiving the comments in the 1st public consultations, MAUR has studied EIA and RAP, and provided the project design solutions accordingly. After that, MAUR carries out the 2nd public consultation for explanation of the measures to implement the comments gained from the 1st stakeholder meeting including questions such as, relocation in the section of TBM, compensation for partial affected properties, number of households affected, etc., and also to answer and clarify the communities' requests.

The schedule and outline of each meeting is shown in the table below.

Table 9.10.3 Schedule and Participant of the Second Consultation Meeting

No	District	Ward	Meeting day	Representative of stakeholders		
				Male	Female	Total
1	1	Pham Ngu Lao	Nov 29th 2016	26	22	48
2		Nguyen Cu Trinh	Oct 2nd 2016	9	6	17
3	3	2	Oct 18th 2016	28	35	63
4	10	1	Oct 3rd 2016	19	12	31
5		2	Sep 30th 2016	19	17	36
6	5	4	Oct 10th 2016	27	20	47
7		9	Oct 4th 2016	29	32	61
8		11	Oct 18th 2016	6	4	10
9		12	Oct 19th 2016	6	9	15
10		14	Oct 6th 2016	22	33	55
11		15	Oct 5th 2016	11	17	28
12	11	1	Oct 7th 2016	10	18	28
13		2	Oct 6th 2016	7	2	9
14		16	Oct 12th 2016	11	19	30
15	6	2	Oct 20th 2016	9	7	16
16		6	Oct 20th 2016	9	7	16
17		9	Oct 11th 2016	24	10	34
18		12	Oct 21st 2016	18	6	24
19		13	Oct 19th 2016	6	2	8
20		14	Oct 13th 2016	18	6	24
21	Binh Tan	An Lac	Oct 21st 2016	24	15	39
22		An Lac A	Oct 14th 2016	20	9	29
Total				358	308	668

Table 9.10.4 Major Dialogues in the Second Stakeholder Meeting Regarding Resettlement Issues

No	District	Ward	Major opinions/ comments of the stakeholders regarding resettlement	Response from MAUR, WPC and Consultant
1	1	Phạm Ngũ Lão	- To clarify the details of affected land plot and households in the ward. - Note the level of support for business-affected households to satisfactory. - Shift the location of station toward park to reduce land and house land acquisition.	- Sliding back the map and details about the affected land plots and households. - The project recognized this opinion. Compensation, support and resettlement policy is still in the discussion stage and will be agreed with the people affected later.[16] - We thank you and record your opinion in the minutes.
2		Nguyễn Cư Trinh	- Why is not the depth of the railway increased so that people can build more housing floor in the future? -	- The depth of the railway has been designed according to the survey results and technical standards. It is an inevitable impact that some households may not build more housing floor in the future. The project recognized this opinion to continue research in following phases, such as detailed design of the project.
3	3	2	- To clarify the details of affected land plot and households in the ward	- Sliding back the map and details about the affected land plots and households
4	10	1	- Note the level of support for business-affected households to satisfactory. - Please provide the design drawings and list of affected land plots to affected households.	- The project recognized this opinion. Compensation, support and resettlement policy is still in the discussion stage and will be agreed with the people affected later. - Design drawings, a detailed list of the affected land plot and households were shown as above. However, it could not be provided officially because it has not been approved yet.
5		2	- (no question about resettlement issues)	- n/a
6	5	4	- Currently, can we build or fix our house? - The project should pay attention to business affected households. - In case my remaining land area is too small and I want to move, then how?	- Currently, the city government has no land acquisition notice so it still be able to build, repair of buildings normally as prescribed. - Restated compensation and support policies for business affected households. - If the remaining land area is too small, the project will acquire entire land area and relocate your household.
7		9	- To clarify the details of affected land plot and households in the ward - We recommend the Project to keep research to minimize the scope of land acquisition, and offer the best safeguard policies to those affected, helping them recover life as soon as possible.	- Sliding back the map and details about the affected land plots and households. - We thank you and record your opinion.

[16] During the Detailed Measurement Survey (DMS) and compensation negotiation stage, MAUR and relevant authorities shall discuss specific conditions of compensation, assistance, and resettlement with PAPs.

No	District	Ward	Major opinions/ comments of the stakeholders regarding resettlement	Response from MAUR, WPC and Consultant
8		11	- In case 3 adjacent houses were affected by the withdrawal of a part of house, then how to solve? - After recovering, can people start their reconstruction or must wait for the project's construction?	- In case the withdrawal cause affects to the whole structure, the project will pay compensation and assistance to repair, restore the entire structure. - After the hand over, people can deploy reconstruction, and not depending on the construction of the project.
9		12	- (no question about resettlement issues)	- n/a
10		14	- (no question about resettlement issues)	- n/a
11		15	- For the affected apartment, will house be demolished by the people or projects? - The construction of project may make my house can not be leased out, then how to resolve?	- The demolition of buildings located within the area of land acquisition will be done by the project. - Households will be supporting for the lost leasing-income.
12	11	1	- (no question about resettlement issues)	- n/a
13		2	- (no question about resettlement issues)	- n/a
14		16	- Will the acquired land be returned to the people after the construction of the station is finished? - Can people build house after the construction project is finished? - If the remaining area is small, can it be continued using?	- The acquired land is not refundable but will make sidewalks and roadways. - In areas outside the scope of the construction ban (under the provisions of safe corridors for underground works), the construction shall be implemented normally in accordance with local regulations. - If remaining area is smaller than the provisions of the city, it will be recovered entirely.
15	6	2	- Land acquisition area is small, but entire structure will be affected, then how to solve? - How will business affected households be resolved? - How much is compensation price?	- In case the withdrawal cause affects to the whole structure, the project will pay compensation and assistance to repair, restore the entire structure. - Business affected households will receive assistance for their damages. - Compensation price is replacement cost, consisting of market prices and taxes/charges as prescribed.
16		6	- We recommend the project to continue research on the escalator positions to minimize the impact on people's houses. - Will the acquired land be returned to the people after the construction of the station is finished? - We recommend the project to keep research to minimize the scope of land acquisition, and offer the best safeguard policies to those affected, helping them recover life as soon as possible.	- We thank you and record your opinion in the minutes. - The acquired land is not refundable but will make sidewalks and roadways. - We thank you and record your opinion in the minutes.
17		9	- (no question about resettlement issues)	- n/a

No	District	Ward	Major opinions/ comments of the stakeholders regarding resettlement	Response from MAUR, WPC and Consultant
18		12	- Is the presented land acquisition area final yet?	- The existing calculation is temporary to serve preparation of the project. Only once the final design is approved, detailed measurement survey will be implemented.
19		13	- The project should pay attention to business affected households and employees.	- Restated compensation and support policies for business affected households and employees.
20		14	- The project should research support policy for households to be limited to construction due within the safety corridor of the railway.	- We noted this comment and will continue the study on this issue.
21	Bình Tân	An Lạc	- (no question about resettlement issues)	- n/a
22		An Lạc A	- (no question about resettlement issues)	- n/a

Minutes and some photos of the meetings are provided in Appendix 3 of the RAP.

9.10.3 Focus Group Meeting (FGM)

To follow-up and supplement the field surveys, focus group meeting (FGM) was conducted for specific group of the PAPs. In this project, a meeting with Chinese (Hoa in Vietnamese) residents has been conducted in Ward 14 of District 5. In fact, the Chinese community has lived in the area for hundreds years with the population of up to 400,000 persons (General Census on Population, 2009). Therefore, they are commonly considered similar to the Kinh, but not ethnic minority. Results of the FGM are described in Table 9.10.5.

Table 9.10.5 Focus group meeting with Chinese residents

Date and Time	Number of participants	Result of the FGM
25 July 2016, 14h00 – 16h00	15	i. The Project may cause many difficulties to their business, transportation, environment, and spiritual life. ii. The planning location of the entrance gate in Nguyen Thi Nho Street may particularly obstruct transportation of 2 HHs nearby who have personal vehicles. The participants did not provide requests on mitigation measures for the impacts, but request to change the project's design to avoid the impacts. Study team replied that following phases, such as detailed design, will consider and discuss this issue. iii. There is no remarkable difference in term of socio-economic and religious characters between those Chinese and Kinh. In fact, they are more advantageous in business as they speak 2 languages.

9.10.4 Consultation with vendors

During the SES, 30 vendors surrounding the Project's stations have been consulted in person about their household characteristics and business activities. As a result, the vendors have stated that vending is the main income source of 26 households among them (or 86.7% of the total), with the average monthly income of 15.3 million VND/vendor (equivalent to 686 USD). In which, 21 vendors may have to relocate their business due to the land acquisition of the Project but only 13 of them (61.9%) believe that they could re-establish their business in other places. Other vendors said that they will need support either on capital for investing new business or vocational training and job searching, and etc. Therefore, vendors with appropriate conditions can join in the income restoration program as described in No. 8 of entitlement matrix. General need assessment of those vendors is presented in Table 9.10.6 below.

Table 9.10.6 Need assessment of the affected vendors

Need of vendors	Investment capital for new business	Vocational training	Job searching	New place for business setting	Compensation for the impact
Quantity	13	1	3	6	10
Portion (%)	39.4%	3.0%	9.1%	18.2%	30.3%

9.10.5 Consultation with households in TBM section

In TBM section at Nguyen Cu Trinh Ward of District 1, the railway does not run under existing roads like other sections, but private houses and other buildings. Although the technical design has been revised to avoid or mitigate any adverse impacts to the above households (e.g increase of the railway depth), there might still be problems during the construction and operation of the railway. Therefore, consultation with the households in this section has been carried out, in addition to the 2 stakeholder consultation meetings for Nguyen Cu Trinh Ward.

A total of 7 households has been consulted. In which, 4 households said that they would have no problems for the railway go through under their houses/buildings. The other 3 households responded that they would not feel so easy, as they concerned that their houses might be either affected by vibration causing to housing damage or restricted for higher construction in the future due to limited depth of fundament. One household suggested that the Project should announce the regulation on parameters of housing construction in the area as soon as possible so that they could prepare themselves for future development.

9.10.6 Information Disclosure and Public Information

Information disclosure regarding the Project is an important part of the Project preparation and implementation to ensure that the PAPs are timely and fully informed of land acquisition, compensation and resettlement. This will also enable the PAPs to participate in and express their desires on resettlement policy and programs. Representatives of the District People's Committee (DPC) and the Ward People's Committee (WPC) in the project area, and leaders of the communities shall co-ordinate with MAUR to implement information disclosure and public information appropriately.

The drafted RAP should be disclosed on the website of related PC (Vietnamese version) as well as JICA's website (English version). Following document in implementation stage, such as the Decision on CAR Plan Approval must be disclosed publicly at WPC and public places of the residential area where the land is recovered. RPF also will be disclosed at local people's committee. The Decision on CAR Plan Approval will also be sent to each PAH respectively, which specify the amount of compensation, assistance, or relocation arrangement (if any), time, place for payment of the compensation and assistance; time of resettlement land or house allocation (if any), and time of hand-over the recovered land to the Project (Land Law 2013, Article 69).

The agencies and individuals affected by land acquisition and resettlement, the representative of People's Committees (PCs), mass organizations such as Farmer Association, Women Association, local Vietnam Fatherland Front of the affected wards in the Project site shall participate in the public information meeting during the land acquisition processes such as Detailed Measurement Survey (DMS), negotiation and compensation, and resettlement.

The PAPs may ask for information about compensation policy anytime without having to wait for the public information campaign. PAPs may take part in the planning process and assist the project owner

and PCs in conducting public consultation, inform them of issues relating to compensation, assistance and resettlement (CAR) that are under concern of PAPs through communication channels (such as telephone or letter to the WPC and Consultant office, etc.)

9.11 Grievance Redress Mechanism (GRM)

9.11.1 General Mechanism

Agencies in charge of implementing the procedure for handling grievance during compensation and land acquisition in the project affected areas should be established as Grievance Redress Committee (GRC). Depending on the functions and tasks at each level, the mechanism for handling complaints by PAPs will be regulated in accordance with legal documents promulgated by the State. Detailed procedures on handling grievances will be established for the Project to ensure that PAPs have the opportunity to present their complaints about compensation and resettlement.

This mechanism will be designed to be simple, understandable, quick and fair. Handling complaints at each Project level will facilitate the smooth implantation of the Project. PAPs who do not agree with the decision on compensation, assistance and resettlement are entitled to raise complaints based on the legal regulations. Handling grievances against compensation, assistance, land acquisition and resettlement decisions and with the responsibility for resolving complaints, and validation and settlement procedures shall be implemented based on relevant laws, such as Land Law, Complaint Law, Administrative Litigation Law and other related Decrees and regulations.

While awaiting settlement of the grievance, PAPs must follow the decision on land acquisition and hand over land on schedule in accordance with the plan decided by competent state agencies. Grievances against administrative decisions on land management shall comply with regulations and laws.

9.11.2 Procedure for resolving grievance

Procedure for resolving grievance of the PAPs will comply with the Complaint Law (2011) as the follows:

(1) First Stage – At DPC

Within 90 days of receiving the decision on compensation, assistance and resettlement, the aggrieved PAPs have a right to lodge a formal complaint in writing regarding the decision. The DPC has a maximum of 45 days following the receiving date of the complaint to resolve the case and provide a formal decision. The DPC is responsible for documenting and keeping file of all complaints that it handles.

(2) Second Stage – At the HCMC-PC

If after 45 days the aggrieved PAPs do not hear from the DPC, or if they are not satisfied with the decision taken on their complaint, the PAPs are entitled bring the case in writing to the HCMC-PC for solution. The HCMC-PC has a maximum of 60 days to resolve the case and provide a formal decision.

(3) Third Stage – The court of law arbitrates

If after 60 days following the lodging of the complaint with the HCMC-PC, the aggrieved PAPs do not hear from the PPC, or if they are not satisfied with the decision taken on their complaint, the case may be brought to a court of law for adjudication. Decision by the court will be final.

The Environment and Resettlement Team of MAUR will develop and maintain a database of complaints received related to UMRT3a which will contain the following information: nature of the complaint, source and date of receiving complaints, name and address of complainant, action taken, and current status.

PAPs who submit a formal grievance at the level of DPC or HCMC-PC are not required to pay administrative fees associated with the submission or processing of the complaint.

9.12 Income Restoration Program

9.12.1 Background

The World Bank Policy[17] and JICA Guidelines[18] indicate that displaced persons should be assisted in their efforts to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.

Among affected persons, those will be relocated, lose business setting or those will lose at least 30%[19] or more of their productive land, should are considered as severely affected households (SAH) who need more assistance in term of provision/consultation of livelihood alternatives to cover the loss of income during and after the construction of the project. Additionally, other people who on account of their position in society and/or their physical and economic situations are less capable of re-establishing themselves than the others and, therefore, face greater risks of impoverishment including tenant, vendors, and etc., if they need. These people are those who fall in any of the groups of vulnerable households although they are severely affected by the project or not, they need to be taken into consideration in any rehabilitation plan. Draft TOR of income restoration program is shown in appendix 6 of the RAP.

[17] Referred to the World Bank's policies in involuntary resettlement (OP 4.12)
[18] Referred to the JICA's Guideline 2010.
[19] Following Article 19, Item 3, Point a of the Decree 47/2014/ND-CP dated 15 May, 2014 by the Government of Vietnam.

9.12.2 Strategy, Objectives and Beneficiaries of the Income Restoration Program

This IRP is additional to the compensation and assistance, which will be provided to the PAHs under the RAP for the project. The overall strategy of the IRP is to stabilize the livelihood activities or sources of sustenance of the severely affected and vulnerable households among the PAHs by focusing on diversified activities to bring immediate income so that they will be able to produce for their basic needs and long-term livelihood management capacity.

The objectives of the IRP are to (a) find and allocate source of finance to the PAPs with difficult social – economic situation and other vulnerable households; (b) create career opportunities through vocational training and job creation to PAPs in labor-age; (c) provide technical advice or/and small business/service facilitation for those who want to venture into business. It should also include capacity-building interventions for local authorities/responsible agencies and mass organizations in program management and implementation.

It's planned that a total of 45 business households whose land loss of greater than 30% and 19 vulnerable households will be beneficiaries of the IRP.

9.12.3 Needs Assessment on Income Restoration

On the needs assessment on income restoration during the SES, up to 54% of the PAPs have stated that they would respond to the question *"What kind of support do you demand the Project regarding relocation and/or income restoration?"* only in the detailed design stage of the Project, when they get final confirmation on their loss. On the other hand, other PAPs said that they would need "Capital", "New place for business setting", and etc. (see Table 9.12.1 and Table 9.12.2).

Table 9.12.1 Needs Assessment of PAPs with acquired land

Needs of PAP	District 1	District 3	District 5	District 6	District 10	District 11	Total
Not at all	0.9%		0.9%		2.7%		**4.4%**
Not yet decided	1.8%	1.8%	31.0%	5.3%	7.1%	7.1%	**54.0%**
Capital	0.9%	0.9%	12.4%	5.3%	0.9%	7.1%	**27.4%**
Job searching			2.7%				**2.7%**
New place for business setting	2.7%	1.8%	4.4%		0.9%		**9.7%**
Others			0.9%			0.9%	**1.8%**
Total	**6.2%**	**4.4%**	**52.2%**	**10.6%**	**11.5%**	**15.0%**	**100%**

Source: SES, 2016

Table 9.12.2 Needs Assessment of PAPs with affected business

Needs of PAP	District 1	District 3	District 5	District 6	District 10	District 11	Binh Tan District	Total
Not at all	1.0%	2.1%	2.1%	1.0%	2.1%	1.0%		**9.3%**
Not yet decided	3.1%	2.1%	10.3%	6.2%	5.2%	7.2%	1.0%	**34.0%**
Capital	1.0%	3.1%	6.2%	5.2%	7.2%		1.0%	**23.7%**
Job searching		2.1%	2.1%					**2.1%**
New place for business setting	3.1%	2.1%	14.4%	2.1%	5.2%		1.0%	**26.8%**
Total	**8.2%**	**11.3%**	**35.1%**	**14.4%**	**19.6%**	**8.2%**	**3.1%**	**100%**

Source: SES, 2016

9.12.4 Income Restoration Policy for Affected Persons under Vietnamese Policy

(1) Decision 156/2006/QD-UBND (also called Fund 156)

The Decision has been issued by the HCMC-PC in 2006 for *"Establishment of a Fund to support households whose land/assets acquired for development projects in HCMC*". Fund 156 is built upon the contributions of development and investment projects. Following the policy, new development/investment projects contribute 5% whereas on-going projects contribute 2% of their total budgets for land clearance and compensation to the Fund. The Fund provides:

- Exemption from tuition and training fees for school pupils, vocational college and university students, and working-age laborers of PAHs who require vocational training. In particular: secondary school pupils are exempted from tuition fees for a maximum of 3 years; vocational college and university students have 50% of their tuition fees paid for a maximum of 3 years; working-age laborers are provided with a vocational training course (from a variety of professional specializations) valued at 3 million VND, and an allowance of 200,000 VND per person per month, within a 6-12 month course.
- Finance for the purposes of job creation and income restoration: each PAP can borrow a maximum 10,000,000 VND and each household can borrow up to 30,000,000 VND (AHs with a laborer who has exported abroad can borrow a maximum 50,000,000 VND/AH) per loan period from 24 to 36 months, with 0.17% monthly interest (2% annually).

(2) Other Regulations Regarding Income Restoration:

- Decision 1956/QD-TTg, issued on November 27, 2009 by the Prime Minister, on the provision of vocational training to rural laborers created opportunities for a majority of rural people.
- Decision 295/QD-TTg issued on February 26, 2010 by the Prime Minister provided similar opportunities to women in vocational training and job creation.

- The Land Law 2013 and afterwards regulation Decree 47/2014/NĐ-CP dated May 15, 2014 (Article 19 and 20) specifies in detail support, allowances and programs for PAHs who have agriculture-based affected incomes.
- Decision 63/2015/QĐ-TTg (active form 1st February 2016) on vocational and job creation policies for labors with land recovered to the development projects.

9.12.5 Proposed Income Restoration Activities

Following the government's policies in compensation and assistance, cash allowances are paid directly to PAHs. Experience suggests that, improper usage of cash allowances (otherwise intended for life stabilization or/and for occupational changes) will push PAHs, especially the vulnerable HHs into difficult situations, especially for those with loss of productive land. To avoid such an outcome, a specific plan of livelihood rehabilitation, based on government regulations and cover the real need of PAHs, should be prepared.

This IRP suggests that PAPs who meet requirements of Government's regulations such as Fund 156, should apply for their entitlement. The project will partly support its severely affected and vulnerable households (SAVHs) in recovering their income as prior project. Different activities of the IRP will focus to: (i) small-scale business models for SAVHs who want to change their income generation activities due to an interruption of the previous applications; and (ii) organize supplementary vocational training courses for working-age labours together with consulatation and job creation activities.

(1) Small-Scale Business Activities

This activity should be placed in high consideration of the rehabilitation plan. It is to meet the needs of affected people and to follow the orientation of Ho Chi Minh City for transferring economic structure into industrial and business/service promotion. Following activities are proposed:

Table 9.12.3 Small-Scale Business Activites

Models of small business/service	Market demand	Requirement for HHs
Tailor	Large, can provide products to some garment companies in the areas	Some basic skills, can be learnt by themselves or take short training course at vocational center.
Beauty shop	Large, at residential areas	Commercial places, openers may have skill before or can be trained in any shop/vocational training center.
Food/coffee shop	Large, serve to large number of workers	Commercial places, existing experience is better but it can be trained also
Motor repairing shop	Large	Commercial places, can be learnt from existing shops or take short training course at vocational center.

(2) Supplementary Trainings and Job Consultation

PAPs who are not beneficiaries of Fund 156 (those without LURC or certificate of city permanent citizen, etc.,) will be provided free training courses as per their need and following governmental regulations.

9.12.6 Organization and Implementation of the IRP

(1) Management Authority for Urban Railways (MAUR)

The MAUR is the Project Executing Agency and has overall responsibility to the Vietnam Government and JICA in the design, finance and implementation of the IRP. MAUR will prepare an income restoration program as well as quarterly progress and evaluation reports. The preparing of IRP will coincide with the DMS activities to ensure that the updated RP will include appropriate IRP for the affected households as per the results of the consultations with them.

(2) District People's Committee

The DPC will be responsible for the coordination and implementation of the IRP within their respective districts. The DPC will provide support to the IRP preparers and implementers through: a) assignment of personnel tasked to assist the IRP preparers and implementers in their work; and b) coordinate with the concerned WPC and PAHs for the various IRP planning, demonstrations and implementation activities.

(3) Ward People's Committee (WPC)

The WPC will be responsible for the coordination and implementation of the IRP within their respective districts. The WPC will provide support to the IRP preparers and implementers through: a) assignment of personnel tasked to assist the IRP Preparers and implementers in their work; and b) coordinate with the concerned PAHs for the various IRP planning, demonstrations and implementation activities.

9.12.7 Estimated Budget for IRP

Total estimated budget for this IRP is 2,626 million VND (equivalent to 118 thousand USD). This amount in the table is based on assumptions and changeable in following detailed discussion stages.

Table 9.12.4 Estimated budget for IRP

No	Item of expenditure	Quantity	Unit price (Mil VND)	Total (Mil VND)
I	**Direct investment to HHs**			
1	Displaced households with loss of business/ service land and business/service setting	10	40	400
2	Partially PAHs with severe loss of business/service setting	31	40	1,240
3	Vulnerable HHs	19	20	380
	Sub-total			***2,020***
II	**Implementation and Management Cost (10%)**			**202**
III	**Contingency cost (20%)**			**404**
	Total cost			**2,626**

9.13 Organizational Responsibilities

The overall responsibility for preparing land acquisition and resettlement belongs to the MAUR, under HCMC-PC. As an implementing body, the MAUR shall be responsible for managing preparatory activities, such as field surveys, stakeholder meetings, and developing the RAP during the survey period. Other relevant bodies, especially PCs at the local level (district, ward, etc.) also have important roles to implement and promote surveys with appropriate participation of local people.

After the RAP preparation process, the draft RAP will be initially reviewed by the MAUR assisted by Department of Natural Resources and Environment (DONRE) in HCMC, which is a regional organization of the central ministry, MONRE. Based on the results of review and comments from DONRE, HCMC-PC will issue the approval decision on the RAP.

Once the RAP is approved and the project enters the implementation stage after the investment policy approval and the project investment decision by the Prime Minister, working groups such as the District Compensation and Site Clearance Committees (DCSCCs) take over activities in the field such as detailed measurement survey (DMS). The results are approved by the Compensation, Assistant and Resettlement Committees formed by HCMC-PC and DONRE prepares the decisions of land acquisition approved by the HCMC-PC in the following implementation steps.

Based on the Land Law (2013), Public Investment Law (2014), and other relevant decree and circulars, procedures of land acquisition and resettlement are mainly divided into four stages described as below.

Stage-1: "Investment Policy Approval" is the first preparation phase which covers the pre-F/S survey with EIA report preparation. In addition, the RAP is required not due to domestic legal system but JICA's Environmental Guidelines.

Stage-2: "Program/Project Investment Decision" covers F/S report following the results of Investment Policy Approval and Resettlement Policy Framework (RPF) is developed based on the RAP prepared in former phase. RPF will be prepared by MAUR and submitted to Prime Minister for approval.

Stage-3: Public Investment Plan is prepared based on F/S report and land acquisition notification is issued by a competent organization. After the notification, detailed measurement survey (DMS) is implemented to prepare the CAR Plan.

Stage-4: Plans prepared in the previous phase is implemented in parallel with preparation for construction.

During the Stage-1 and Stage-2, the MAUR will prepare Resettlement Policy Framework (RPF) in Vietnamese complying with the approved RAP in English for domestic procedures for investment policy approval and project investment decision. RPF should be submitted to JICA for reviewing and confirming identification with the RAP.

After the project investment decision (Stage-3 and 4), HCMC-PC will issue land acquisition notice followed by necessary field works such as DMS. Based on the results of the surveys, the plan of compensation, assistance and resettlement (CAR Plan) is developed. Once again the CAR Plan should be submitted to JICA for reviewing and confirming deification with the RAP and other relevant documents.

Figure 9.13.1 below gives a flow chart of land acquisition and resettlement by each phase and responsible parties.

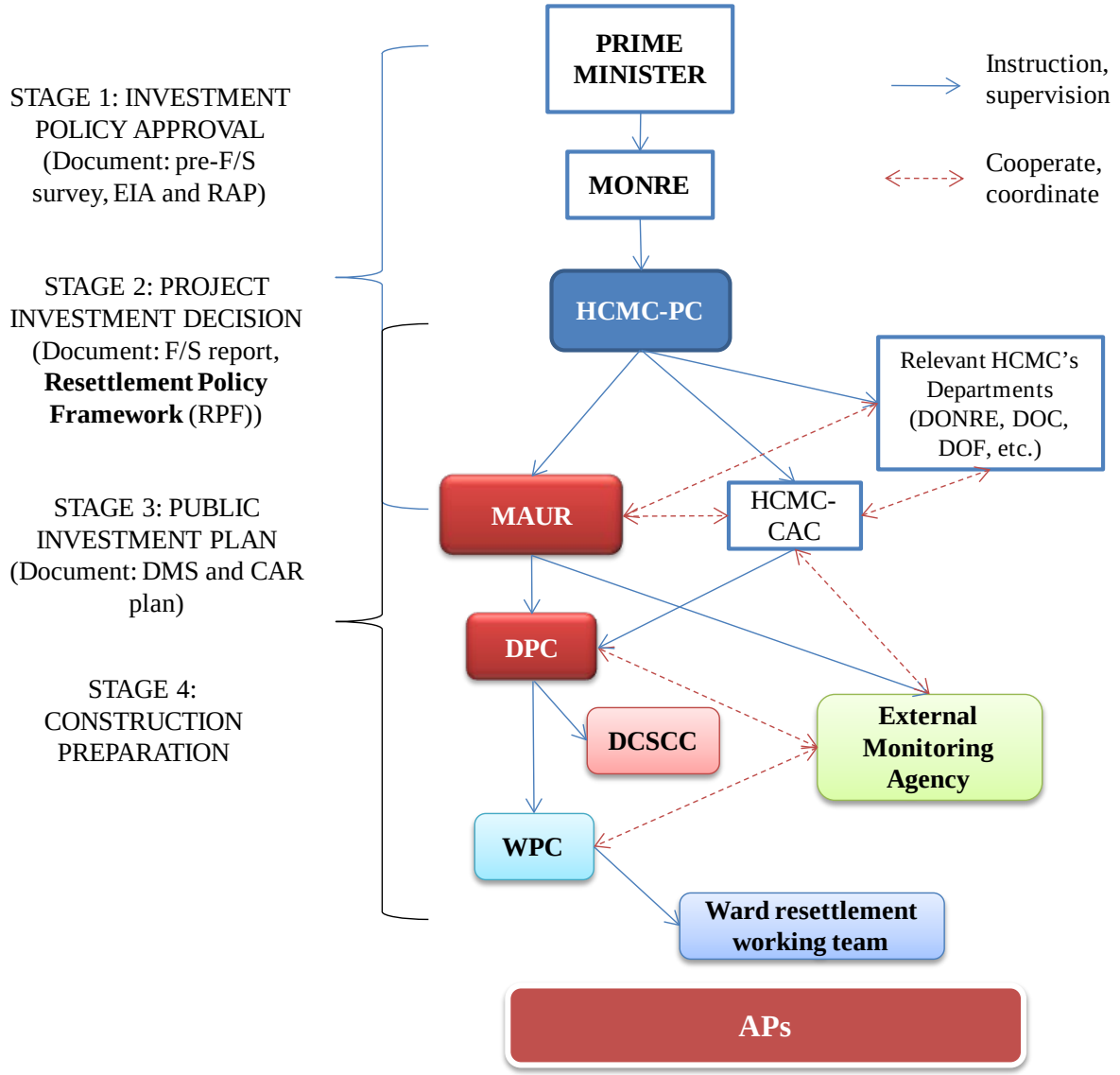


Figure 9.13.1 Flow chart of procedures of land acquisition and resettlement

The Project is required to comply with not only Vietnamese laws and regulation but also the JICA Environmental Guidelines, therefore the CAR policy and plan shall be reflected the contents of the RAP and submitted to JICA for concurrence.

Table 9.13.1 shows the general flow of land acquisition and resettlement in Vietnam based on Land Law (2013).

Table 9.13.1 Flow of Land Acquisition and Resettlement based on the Land Law

Steps	Outline
1. Land Acquisition Notice (Decision of Land Acquisition)	Based on Article 66 of the Land Law, the People's Committee at the provincial level decides on land acquisition and issues a notice followed by public information by the media and local People's Committees. Beforehand, DONRE's evaluation letter of land use needs has to be approved by the People's Committee.
2. Cadastral Survey and Detailed Measurement Survey (DMS) Implementation	Based on documents on land acquisition issued by the Provincial People's Committee, People's Committees at the local level associated with other relevant authorities such as DONRE direct and manage necessary surveys including cadastral surveys, Detailed Measurement Surveys, etc. for fixing entitlement conditions.
3. Planning, Evaluation, and Approving the General Plan on Land Acquisition and Resettlement	According to the results of field and document surveys in the previous step, the People's Committee develops a general plan for land acquisition and resettlement by asking opinions from the public at public meetings. Opinions are recorded for discussing measures to be reflected in the land acquisition plan.
4. Land Acquisition Plan and Public Disclosure	The People's Committee at the provincial level issues a decision of land acquisition letter associated with relevant authorities. The decision shall be disclosed at local commune offices. In parallel with these activities, landmarks for clearance areas are marked, compensation rates are determined, and necessary documentation and budgetary processes are prepared.
5. Compensation	Based on Article 93 of the Land Law, compensation shall be made within 30 days after the issuance of the decision on land acquisition.
6. Land Clearance and Hand Over	The acquired land will be handed over to the project owner through the People's Committee.

Once Program/Project Investment Decision is completed and land acquisition notice is issued, preparation and implementation of resettlement activities are commenced under competent agencies in local project site level. Based on fundamental law and regulations under central government, each level of people's committee also issued their own guidelines to implement land acquisition.

9.14 Implementation Schedule

The RAP will be updated following detailed design. All resettlement activities will be coordinated with the civil works schedule. Land acquisition and relocation of affected households cannot commence until the updated RAP has been reviewed and approved by HCMC-PC and JICA. MAUR will not allow construction activities in specific sites until all resettlement activities have been satisfactorily completed, agreed rehabilitation assistance is in place, and that the site is free of all encumbrances.

Table 9.14.1 Implementation Schedule

No.	Item	1st year				2nd year				3rd year	
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
I	**Project Implementation**										
1	Detailed Design										
2	Construction Work										
II	**Land Acquisition and Resettlement**										
3	Updating Census Survey										
4	Updating Socio-Economic Survey (SES)										
5	Updating Replacement Cost Survey (RCS)										
6	Detailed Measurement Survey (DMS)										
7	Stakeholder Consultation Meetings										
8	Income Restoration Program										
9	Land clearance										
III	**Monitoring**										
12	Internal monitoring										
13	External monitoring										

9.15 Monitoring and Evaluation

Resettlement implementation will be monitored and evaluated to ensure appropriateness of activities in the RAP by both internal and independent external monitoring agencies. These monitoring activities will determine the Project's actual progress, the possibility of its success, and any difficulties arising, and facilitate adjustments to the Project implementation as soon as possible.

Monitoring objectives are:

(i) Verifying whether the project activities comply with the plan and are completed efficiently regarding quantity, quality and time.

(ii) Covering issues that arise during the Project implementation, proposing resolving countermeasures pursuant to the policy framework, and protecting the interests of affected households.

(iii) Assessing if the RAP activities meet the Project's objectives and purposes or not, and in which level these goals are reached.

9.15.1 Internal Monitoring (IM)

Internal monitoring (IM) of the RAP implementation is the main responsibility of the executing agency (or Internal Monitoring Agency: IMA) in coordination with district and ward PCs. Remarkable findings through IM shall be recorded in regular monitoring reports before being submitted to HCMC-PC and JICA. The objectives of IM are:

1) Reviewing relevant information on land acquisition and resettlement to find out if the activities are being implemented in accordance with the RAP.

2) Checking that the RAP is being implemented in accordance with the approved design; technical assistance, relocation, payment, support and allowances are guaranteed; and entitlements to allowances for the recovery of income sources are implemented.
3) Ensuring the RAP implementation costs are paid on time by the MAUR and DCSCCs.
4) Recording, monitoring and resolving complaints in a timely and efficient manner.

The MAUR will submit its internal reports on the RAP implementation as part of the regular reports they are required to submit to JICA. Internal monitoring reports will include the following information:

(1) The number of PAPs according to types of impact, and the components and conditions for compensation, relocation and recovery of income for each one.
(2) Money distributed for activities or compensation and money disbursed for each activity.
(3) Final resolutions of complaints and outstanding issues needing resolutions from management agencies at all levels.
(4) Issues arising during the RAP implementation including grievances
(5) Update the RAP Schedule.

9.15.2 External Monitoring (EM)

An External Monitoring Agency (EMA) will be employed by the MAUR to monitor and evaluate the RAP implementation in coordination with IM. EMA should be selected from institutes, research agencies, non-governmental organizations, or any other independent bodies, and they would be specialized in social science and resettlement.

The general objective of independent monitoring is to independently review the results of resettlement and periodically supply the findings to the MAUR. The IMA will provide information about PAPs including living standard and job changes, income and occupation restoration, social foundations, effectiveness, impacts and the sustainability of characteristics, benefits, and necessary mitigation measures (if any). This information will teach strategic lessons for policy and planning in the next period.

In addition to reviewing information provided in assessment and internal monitoring reports by the MAUR, the IMA will conduct a random survey every six months. The survey sample may cover 100% of the physically displaced households, and at least 10% of the remaining households under the RAP in order to:

1) Determine if procedures for affected household and PAPs participation, compensation and assistance are implemented based on the RAP.
2) Review the process of project implementation, consultation and information dissemination, and etc.

3) Gather quantitative indicators of the Project's socio-economic effects on PAPs.
4) Propose modifications to the RAP implementation, if necessary, to achieve the principles and objectives of the Policy Framework.
5) Determine PAP satisfaction with various aspects of the RAP, the operation of the complaint mechanism and the speed of complaint resolution.
6) Survey trends in living standards record any potential issues regarding recovering living standards.
7) Review internal monitoring reports

The IMA must report their findings every three (3) months during first two (2) years, then (or in case, the land acquisition and compensation is basically completed) it might be changed to every six (6) month for remaining time, the report will be discussed with the MAUR prior to submitting to JICA.

Draft TOR of IMA is shown in appendix 5 of the RAP.repla

A sample of monitoring form is given as the follows:

Name of person in charge and filling this monitoring form:_____

Date of filling this monitoring form:_____

A. Public Consultations

No.	Date	Place	Contents of the consultation / main comments and answers
1			
2			
3			
4			
5			
6			

B. Resettlement Activities

Activities	Planned Total	Unit	Progress in Quantity			Progress in %		Expected Date of Completion	Responsible Organizations
			During the Quarter	Till the Last Quarter	Up to the Quarter	Till the Last Quarter	Up to the Quarter		
Approval of RAP									
RAP disclosure on JICA Website									
Approval of resettlement policy framework (RPF)									
Approval of Investment Policy									
Budget securing for resettlement activities									
Approval of Project Investment Decision									
Land acquisition declaration by HCMC-PC									
Approval of plan of compensation, assistance and resettlement									
Contract with External Monitoring Agency		MM							
Establishment of necessary organizations									
Income Restoration Program (IRP) preparation									
Income Restoration Program (IRP) implementation									
Detailed Measurement Survey (DMS)									
Finalization of PAPs List based on DMS		Number of PAPs							
Calculation of compensation amount									

Activities	Planned Total	Unit	Progress in Quantity			Progress in %		Expected Date of Completion	Responsible Organizations
			During the Quarter	Till the Last Quarter	Up to the Quarter	Till the Last Quarter	Up to the Quarter		
Negotiation and compensation		**Number of PAPs**							
Lot 1		Number of PAPs							
Lot 2		Number of PAPs							
Lot 3		Number of PAPs							
Grievance Redress		**Number of cases**							
Lot 1		Number of cases							
Lot 2		Number of cases							
Lot 3		Number of cases							
Site clearance		**Number of cases**							
Lot 1		Number of cases							
Lot 2		Number of cases							
Lot 3		Number of cases							

9.15.3 Socio-Economic Survey and Detailed Measurement Survey (DMS)

Socio-economic survey and DMS will be required after land acquisition notice is issued by HCMC-PC. EMA will monitor the activities implemented by local authorities to confirm appropriate procedures following the RAP and other regulations including the Vietnamese legal framework and the JICA Environmental Guidelines.

9.15.4 Reporting

The EMA will be required to submit the findings of the periodical monitoring every 6 months. These monitoring reports shall be submitted to the MAUR, and the MAUR will submit to JICA.

The report should contain (i) progress of the RAP implementation; (ii) deviations, if any, from the provisions and principles of the RAP; (iii) identification of problem issues and recommended solutions so that implementing agencies are informed about the ongoing situation and can resolve problems in a timely manner; and (iv) progress of the follow-up of problems and issues identified in the previous report.

9.15.5 Evaluation

Evaluation is an assessment of the RAP implementation. The IMA will conduct an assessment of the progress during the period and the timing of 6-12 months after the completion of all resettlement activities. Questions for the assessment will be based on the Project databases and sample questions that were used in the socio-economic surveys and monitoring surveys.
If this evaluation indicates that any PAPs have not recovered their living standard properly based on RAP and/or original livelihood restoration programs, supplemental livelihood restoration programs shall be discussed to continue to assist their livelihood. In addition, independent monitoring, as a part of external monitoring, will make an assessment of the resettlement process and impact 6 to 12 months after completion of all resettlement activities, using these questions and samples were used in monitoring activities.

9.16 Cost and Budget

9.16.1 Budgeting

Budget for implementation of actions in the RAP shall be secured as a part of the Government's counter-part fund. HCMC-PC will provide this counter-part fund for compensation and resettlement in appropriate fiscal year to implement each activity according to the RAP. The cost regarding land acquisition and resettlement is included in the total investment amount for the Project.

9.16.2 Cost for Land Acquisition and Resettlement

The estimated resettlement cost based on field surveys includes:

(1) Compensation cost for land and assets affected including incentive bonus

(2) Assistances for specified cases

(3) Resettlement site preparation

(4) Expected surveys in following stages such as Detailed Measurement Survey (DMS)

(5) Administrative costs including management cost, cost of public information and consultation

(6) Internal and external monitoring

(7) Income restoration program

(8) Contingency cost of about 10% of the total cost

Total cost for land acquisition and resettlement of the Project is estimated 1,275,100,029,000 VND (equivalent to 57,138,377 USD, with rate 1 USD ~ 22,316 VND) based on the results of field surveys including replacement cost survey which provides unit price for compensation.

Table 9.16.1 shows the summary of figures on estimated compensation and resettlement implementation costs of the Project. The complete breakdown of cost estimation is shown in the Appendix-4 of the RAP.

Table 9.16.1 Estimated Cost for Land Acquisition and Resettlement

No.	Items	Unit	Quantity	Amount (VND)
1	**Compensation for land**			**866,921,370,000**
	Residential land	m^2	5,897.2	866,921,370,000
2	**Compensation for structures**			**93,947,660,000**
	A. House	m^2	15,432.1	75,429,920,000
	B. Working house, office buildings, commercial centers	m^2	2,863.4	15,867,700,000
	C. Hotel	m^2	329.6	2,405,160,000
	D. Cultural and educational facilities	m^2	24.1	144,600,000
	E. Other secondary structures	m^2	23.0	100,280,000
3	**Allowances**			**16,197,300,000**
3.1	***Rental allowances for displaced households***	***HH***	**11**	***660,000,000***
3.2	***Displacement/transportation allowance***			***72,000,000***
	Relocated house-owners	HH	11	66,000,000
	Relocated house-renters for business	HH	1	6,000,000
3.3	***Allowance for loss of income and business***			***11,578,800,000***
a	Entirely affected			
	House owners	HH	11	330,000,000
	Shop owners	HH	11	110,000,000
	Employees	person	35	844,800,000
b	Partially affected			
	Shop owners	HH	242	1,210,000,000
	Employees	person	757	9,084,000,000
3.4	***Allowance for vulnerable groups and social policy treated HHs***	***HH***	31	***294,000,000***
3.5	***Incentive bonus***			***3,592,500,000***
	Entirely affected	HH	11	165,000,000
	Partially affected	HH	457	3,427,500,000
4	**Income restoration program**			**2,626,000,000**
	SUB-TOTAL 1 (direct costs)			**979,692,330,000**
	External monitoring and evaluation (lump sum)			1,500,000,000
	Cost contingencies (15% of direct costs)			146,953,849,500
	Administrative costs (15% of direct costs)			146,953,849,500
	SUB-TOTAL 2			**295,407,699,000**
	GRAND TOTAL (VND)			**1,275,100,029,000**
	(USD, rate 1 USD ~ 22,316 VND)			**57,138,377**

CHAPTER 10 GENDER CONCERNS AND UNIVERSAL DESIGNS

10.1 Gender Concerns and Protection of Disadvantaged

10.1.1 Background

The Government of Japan adopted the Development Cooperation Charter by the Cabinet in February 2015, focusing on promotion of women's participation and Japan's commitment to further encourage participation of women at every phase of development cooperation and be more proactive in ensuring that women share equitably in the fruits of development. Recognizing the importance of women's empowerment, Japan is strengthening partnership with international society and cooperation to development countries.

JICA has been working on gender mainstreaming efforts on an organization basis in order to address the gender concerns in JICA projects and programs. Views of gender equality are fully incorporated in the goals and activities of the project/program designs.

The Government of Vietnam developed gender-related policies and institutions, including Law on Gender Equality (2006) and National Strategy for Gender Equality (2011-2020), and has recently been exercising gender mainstreaming efforts.

10.1.2 Objective

In accordance with the gender-related initiatives in Vietnam and Japan, the Project shall make the best of gender mainstreaming efforts to maximize project effects and sustainability of the urban railway sector. As is generally known, female and male have different transport needs, travel behaviors, accessibilities, and abilities to pay. The Project must promote the use of the services, maximize the benefit of all passengers, promote employment of women, enhance accessibility to medical and educational opportunities, and mitigate potential negative impacts through understanding the said differences and adequately react in the designs of the Project and services. With respect to gender concerns and protection of disadvantaged, continuous activities throughout the Project, ranging from designs, construction, to operation.

The Objective of this chapter is to understand the current situation and issues need to be addressed, and develop actions plans on this subject along with the Project.

10.1.3 Methodology

This study began with literature/various statistics reviews and captured the present status of the gender concerns in the project locations through the interviews at stakeholder meetings. Lastly, the Study Team prepared action plans based on the gained information.

[Literature]

- Country Gender Profile: Vietnam Final Report, 2011 (JICA)
- Proposed Multi-tranche Financing Facility: Ho Chi Minh City Urban Mass Rapid Transit Line 2 – Investment Program (ADB)
- Barrier Free in Vietnam, 2014 (T. Ueno, Doctor Thesis, University of Tokyo)
- Poverty Profile: Vietnam, 2012 (JICA)

[Statistics]

- The Global Gender Gap Report (2015) (World Economic Forum)
- General Statistics Office of Vietnam
- United Nations Human Settlements Programme: UN-Habitat

[Stakeholder Meeting for the Project]

- Attendance of wide range of people, including females, along the corridor and vicinities to the stakeholder meetings was encouraged with the help of concerned districts and communes.

10.2 Gender Concerns and Mainstreaming

10.2.1 Target Groups and Objective

The objective of this gender mainstreaming is to carry out the Project by paying attention to the regional attributes, social and cultural backgrounds of female dwellers at the project locations (particularly at poverty area) as part of the project stakeholders.

10.2.2 Policy and Legal Framework

(1) Policy Framework

In 2002, the Prime Ministerial Decision 19/2002/QD-TTg on “National Strategy for the Advancement of Women in Viet Nam by 2010” was issued. The overall objective of this national strategy is to raise the quality of women’s material and spiritual life, to create all conditions for the effective exercise of women’s fundamental rights, as well as for the promotion of their role in all political, economic, cultural and social domains. This strategy has five priority objectives, including i) labour and employment, ii) education, iii) health care, iv) politics, economy and society, and v) public agencies, with quantitative targets.

Additionally, Resolution No.57/NQ-CP on the “Programme of Action to 2020 was initiated to implement the Politburo’s Resolution No.11-NQ/TW on women’s mobilization during the period of accelerating national industrialization and modernization”. The Department of Gender Equality in

MOLISA and other ministries developed the "National Strategy on Gender Equality (2011-2020)" and obtained approval from the Prime Minister in December 2012 (Decision No.2351/QD-TTg).

The "National Socio-Economic Development Plan (SEDP)" indicates a course of action on prospective economic growth and social development. Gender equality is an integral part of SEDP which sets gender indicators regarding agriculture, employment, environment management, health and education. SEDP, action plans for the advancement of women and Millennium Development Goals (MDGs) are constantly revised to keep them consistent with each other.

(2) Legal Framework

The government of Viet Nam enacted the Law on Gender Equality in 2006. The law stipulates: 1. Participation in politics and decision making; 2. Equal opportunity in economic activities; 3. Equal opportunity in labour participation; 4. Equal opportunity in education and vocational training; 5. Equal access to science and technology; 6. Equal participation in culture and sports; 7. Health care; and 8. Equality between husbands and wives. The government also issued three decrees on the implementation of the Law on Gender Equality (refer to the list of gender-related laws and regulation).

The Law on Labour reviewed in 2002 revised social security and salaries for women. At present, the difference in the retiring age (60 for men and 55 for women) is under discussion because this difference makes it more difficult for women than for men to be promoted higher positions.

Table 10.2.1 List of Legislations on Gender Concerns

Name	Year	Outline
Constitution	1992	Constitution of Vietnam
Law on Gender Equality	2006	Achieving gender equality in all fields, such as politics, economy, education and health care.
Decree No.70/2008/ND-CP	2008	Guideline on implementation of articles of law on gender equality.
Decree No.48/2009/ND-CP	2009	Definition of measures to ensure gender equality.
Decree No.55/2009/ND-CP	2009	Penalties for administrative violation of gender equality
Resolution No.57/NQ-CP	2009	Programme of Action to 2020 to implement the Politburo Resolution No.11-NQ/TW on"The advancement of women in the process of national industrialization and modernization"
Circular No.191/2009/TT-BTC issued by Ministry of Finance	2009	Guide to budget management and spending for gender equality and advancement of women.
Decision No.1855/QD-TTg	2009	Strengthening of committees for advancement of women at the provincial and district level.
Decree No.56/2009/ND-CP	2009	Assistance for the development of small and medium sized businesses (including support for female workers).

10.2.3 Institutional and Organizational Framework

In 2008, the Department of Gender Equality was set up under MOLISA as an entity to develop and implement gender-related policies. The National Committee for the Advancement of Women

(NCFAW) under the Department has been continuing its efforts as an advisory body to promote efforts to eliminate gender discrimination among government ministries.

Table 10.2.2 Gender Related Public Agencies and Organizations

Name	Field and Initiative
Public Agency	
Department of Gender Equality, MOLISA	Gender policies and institutions Development of gender strategies and promotion of gender mainstreaming
DOLISA	Local agency under MOLISA
Vietnam Women's Union	Gender equality, economic empowerment of women Enlightenment and supportive actions for gender mainstreaming and gender equality
General Statistics Office of Vietnam	Gender statistics Socio-economic statistics
Committee for Ethnic Minorities	Ethnic minorities and gender concerns Development of policies and strategies on ethnic minorities
Committee	
National Committee for Advancement of Women	Gender mainstreaming, Convention on the Elimination of all forms of Discrimination Against Women (CEDAW), gender equality, advisory on gender mainstreaming

10.2.4 Current Situations

(1) General Profile

General indicators on gender concerns in Vietnam are illustrated in the following table.

Table 10.2.3 General Indicators on Gender Concerns in Vietnam

Indicator		Indicator	
Gender development index	0.732/rank91	Gini index	37.8%
Gender empowerment index	0.554/rank62	Life expectancy (Male / Female)	76.8/72.9
Gender inequality index	0.530/rank58	Adult literacy rate (Male / Female)	95.8%/91.4%
Female population (Urban)	52.1%	Sex ratio at birth (Male : Female)	110.5: 100
Women in decision-making (Parliament)	26%	Labour indicator (Male / Female)	81%/78%
Women in decision-making (Ministers)	4.00%	Retirement age (Male / Female)	60/55

(2) Status in the Project Location

Following status was identified through the second stakeholder meeting.

- Socially disadvantaged including females, students and workers travelling from outside of the project area to inside were encouraged to participate in the stakeholder meetings. Gender balance of the participants was well maintained, i.e. 508 males and 369 females for the first SHM and 358 males and 308 females for the second SHM.
- Although no particular opinions were made with regard to gender concerns, the meeting received requests for providing lifts at stations as a way to protect the benefit of disadvantaged (mobility impaired).

10.2.5 Needs of Women

(1) Demand of Women Passengers

Demand of women passengers were estimated with the following formula by use of women ratio identified through socio-economic surveys along the corridor (2,197 samples), long-term estimates20 of women population by district level published by General Statistics Office of Vietnam (GSO), and the result of traffic demand forecast.

(Women passengers in peak hour) = (Women ratio along the corridor in 2016) / (Women ratio in HCMC in 2016) x (Women ratio in HCMC in respective years) x (ridership as per demand forecast)

(2) Result of Estimate

According to the result of demand forecast, congestion ratio inside train reaches 84% to 91%, which would probably be uncomfortable environment for some female passengers. As the general statistics show majority of future population along the corridor (i.e. 53%) is women, demand of women to use the service is expected to be high once the system becomes operational.

This will remain unchanged unless population profiles along the corridor will face significant changes.

Therefore, introduction of women-only car should be considered if the operational cost is acceptable, implementation capacity is sufficient, and social acceptance is well recognized.

Table 10.2.4 Estimate of Women Rate

Year	Peak Hour Demand (pax./peak hour)	Congestion Ratio	Peak Hour Women Demand (pax./peak hour)	Women Passenger Ratio
2013	-	-	-	53.1%
2016	-	-	-	53.0%
2026	11,100	84%	5,862	52.8%
2030	19,800	84%	10,453	52.8%
2040	22,300	91%	11,786	52.9%

10.2.6 Case Study

Cases of HCMC Line 1 and Line 2 were studied as comparable projects. Also, study was extended to Nhat Tan Bridge Construction Project and Delhi Metro Project as good practices in Vietnam and overseas. The results are summarized as follows (See Appendix).

HCMC Line 1 Project (JICA)

- HIV/AIDS prevention activities for construction workers are performed by the Contractors.
- Female construction workers are hired.

[20] 53% according to GSO

HCMC Line 2 Project (ADB)

- Set women employment target and applied labour standards with provisions of gender mainstreaming
- Perform facility and equipment designs incorporating the needs of women
- Set capacity building target in relation to participation of women and gender mainstreaming
- Comply with gender equality in resettlement and developed anti-trafficking programs

Delhi Metro Project (JICA)

- Women-only Car: Introduced at the leading car of every train since 2010
- Sally Guard: Providing protection blush to avoid trapping of sally (traditional female clothes) into escalator
- Safety: Provided CCTV cameras and emergency call unit to allow troubled passengers including women to immediately communicate with train drivers. Also, station operation personnel and telephone communicators are instructed to respond to such calls, giving it a first priority.
- Enlightening Activities: Conducting site tours for women passengers to explain their activities including orientation on how to use emergency call units
- Promotion of Women Employment and Development of Working Environment: Introduced child-care leaves, child-care facilities, women dormitories, and a designated committee to handle complains from women employees and thereby improving working environment and promote women employment

Japanese Railway Companies

- Lead cars of every trains are provided for exclusive use by women, infants, elderly, etc. during morning rush hours
- Tokyo Metro, for instance, provided 2 wheelchair spaces per train, but will change to free space at each car to allow use of baby strollers.
- The Kanto District Private Railways Association promotes understanding and cooperation of ordinary passengers on safety use of baby strollers including boarding and alighting with strollers through joint campaigns with child-care associations.
- Many companies develop their own action plans in response to the enactment of “Law to Promote Women in Workplace”. This includes conduct of seminars to build corporate cultures, improvement of working environment, increase of women employment ratio, promotion of women employees to managerial positions, etc.
- Recent records of women employment rate in Japanese railway companies are summarized in the following table. Japanese railway companies adopt night shift at worksites, which used to

prohibit female workers. This was the reason of low women employment. After amendment of the Labor Law, female workers are permitted to work in night shifts. This led the companies to assign female workers at the worksites equipped with bed rooms, rest rooms, showers and other necessary facilities for women.

Table 10.2.5 Women Employment Rate of Japanese Railway Companies (2015)

	Tokyo Metro	Tokyu	Hankyu	Nishi-Nippon	JR East
Male	8,768	3,676	3,679	3,607	53,769
Female	358	626	361	550	5,558
Female Rate	4.0%	14.6%	8.9%	13.2%	9.4%

10.2.7 Proposal

(1) General

In designing of facilities and equipment, gender equality and promotion of women employment will be considered. This includes access and use of services, acquisition of necessary resources, enjoyment of equal opportunity, participation in decision making process, etc.

Also, equal compensation and special consideration for women-led families will be incorporated in the RAP. In particular, women-led families must be entitled for priority compensation in terms of income recovery.

The O&M Company must set up a target of women employment rate. Salary scale shall be equal between male and female employees in line with the Law on Gender Equality and in compliance with the relevant regulations on salary (See Appendix). Based on the reviews, women employment target of the O&M Company is set 20%.

(2) Implementation Structure

Gender Focal Point (GFP) will be specified at the implementing agency and responsible for supervisory and reporting activities. With the structure in the following table, GFP will promote equal participation and provide venues for women to voice their concerns.

Table 10.2.6 Implementation Structure of Gender Mainstreaming

Agency / Organization	Role	Responsibility
MOLISA	Policy making	Policy making, instruction to DOLISA
DOLISA	Policy & supervision	National and regional policy review, confirmation of consistency with policy guidance
MAUR	Secretary	Act as Secretary, appointment of GFP, periodical report
O&M Company	Service delivery	Promotion of women employees, development of working environment, promotion of women's roles
GC	Design and construction supervision	Design and construction supervision services Incorporation of feedbacks to designs and works
Contractors and suppliers	Construction and procurement	Technical designs, construction, installation Incorporation of feedbacks to designs and works
NCAW	Independent check	Independent checks, evaluations

(3) Action Plan

The proposed Gender Action Plan (GAP) includes the following: (See Appendix)

- Set women employment target and applied labour standards with provisions of gender mainstreaming
- Perform facility and equipment designs incorporating the needs of women
- Set capacity building target in relation to participation of women and gender mainstreaming
- Comply with gender equality in resettlement, develop anti-trafficking programs, and develop HIV/AIDS prevention programs

GAP shall be embodied in the project designs and monitoring frameworks.

10.3 Protection of Other Disadvantaged

10.3.1 Target Group and Objective

Other disadvantaged who need protection include poverty, labour, and factory workers. Also, the Project requires HIV/AIDS prevention activities.

10.3.2 Policy and Legal Framework

The Government introduced social support system for disadvantaged, i.e. orphans, elderly, people with disabilities, HIV positive patients, in 2007 and expanded social security to provide basic public services to the disadvantaged areas and sectors. In the meantime, immigrants without resident registration from other province have limited accesses to the public services.

With respect to labour policy, the Government enacted "Amendatory Labour Law" and "Employment Law" in 2013 and 2015, respectively, and strengthened protection of the rights of labours. With the

enactment of "Law on Industrial Health and Safety" in 2015, comprehensive legal frameworks on industrial health and safety in Vietnam have been established.

With regard to anti-infection, the Government issued the "National Strategy Plan on HIV/AIDS Prevention and Control by 2010" in 2004, and enacted the "Law on HIV/AIDS Prevention and Control" in 2007. The government is working on awareness-raising programmes and the provision of services for people infected with HIV.

10.3.3 Institutional and Organizational Framework

MOLISA takes the initiative on labour protection and poverty reduction, while the Ministry of Health is the relevant agency in terms of anti-infection.

Table 10.3.1 Relevant Agencies and Organizations on Labour Protection, Poverty Reduction and Anti-Infection

Name	Field and Initiative
Public Agency	
MOLISA	Policies and strategies for labour protection and poverty reduction Development of legislations on labour protection and poverty reduction
DOLISA	Local agency under MOLISA
Ministry of Health	Anti-infection for family in poverty HIV/AIDS prevention

10.3.4 Current Situation

(1) Poverty

In Vietnam, 29.6% of whole population lives in urban areas as of 2009. Along with the growth of urban population, housing cost has been increasing and making poverty groups more difficult to live in the city. Infrastructure development is far behind the speed of population growth. According to the statistics from UN Human Inhabitant Program, 40% of city dwellers live in the slum area. Poverty rate in urban area shows remarkable decrease, yet rapid urbanization continues to generate new types of poverty groups in cities.

According to GSO, the national poverty rate fell from 58.1% in 1993, to 37.4% in 1998 and to 19.5% in 2004. Urban areas shows far lower rate than national average, but there are still many households below the poverty line. In particular, immigrants without resident registration from other province and workers of informal sectors have limited accesses to the public services.

(2) Labour and Factory Workers

Vietnam has been increasing employment generation thanks to the rapid economic growth. Meanwhile, 76.7% of the total labour population (2007) is not covered by social security. Out of 46 millions of employments, 11 millions or 23.5% of total working population are workers of informal

sectors. Vietnam characteristically has strength in industrial sector. 43% of workers in informal sectors engage in manufacturing and construction industries, which occupies larger share than any other industries.

(3) HIV and AIDS

It is estimated that the number of people living with HIV in Vietnam was about 243,000 in 2009 and this figure should increase if HIV tests becomes more popular. Infected people were mainly drug users (20.27%) and sex workers (3.12%) in 2008. Most of those infected are men (85%), 1 out of 10 are at the age under 19, over half are young twenties. Majority of HIV patients are men, while there is a concern about the spread of infection among women. Pre-marital sex and low rate of contraceptive use are the drivers for HIV infection of female.

10.3.5 Case Study

(1) Poverty

In Vietnam, any of large infrastructure projects are believed to contribute indirect poverty reduction through socio-economic benefits generated from the project implementation. Negative impacts of land acquisition and resettlement for construction works are mitigated with compensation and income recovery measures to poverty areas and groups.

(2) Labour and Factory Workers

Any of large infrastructure ODA projects in Vietnam, including HCMC Line 1, Line 2, Hanoi Line 2, Line 3, HCMC East-West Highway, Nhat Tan Bridge, required compliance to the Labour Law, due actions for Industrial Health and Safety, educations and trainings of site workers in the construction contract. In addition, enlightening activities and capacity building programs were offered through technical assistance in several cases.

(3) HIV and AIDS

Any of large infrastructure ODA projects in Vietnam, including HCMC Line 1, Line 2, Hanoi Line 2, Line 3, HCMC East-West Highway, Nhat Tan Bridge, required HIV/AIDS prevention programs in the construction contract. In addition, enlightening activities and capacity building programs were offered through technical assistance in several cases.

10.3.6 Needs of Disadvantaged

Poverty line of HCMC was revised from VND 500,000/person/month in 2004-2010 to VND 1,000,000/person/month in 2009. As significant negative impacts on poverty groups are anticipated during land acquisition and construction works, income recovery measures must be taken as appropriate.

Construction workers may include immigrants from other provinces as the industry is more likely to accept workers in informal sectors. There is an undeniable threat of being exposed to illegal working conditions. Also, as the Project involves large construction works in the country having a fear of HIV spread, proactive education and preventive activities for construction workers will be necessary.

10.3.7 Proposal

(1) General

Protection of Poverty Groups

Negative impacts during land acquisition and resettlement as well as construction works shall be mitigated by ensuring compensation for poverty areas/groups in particular and income recovery measure.

Protection of Labour and Workers

Compliance to the Labour Law, response to the requirements of industry health and safety, educations and trainings of workers shall be specified in the construction contracts. In addition, enlightening activities and capacity building programs should be performed by the contractors.

HIV/AIDS Prevention

Enlightening activities, educations on HIV/AIDS prevention, workshops, distribution of condoms, treatment of sexual infections, counseling, etc. shall be conducted in the course of the Project. It is necessary not only to specify the requirement of HIV/AIDS prevention in the construction contract, but also to seek cooperation from the Government, private sectors and others as appropriate. Also, capacity building on relevant agencies should be performed.

(2) Implementation Structure

Under the contract with MAUR, the Consultant shall specify the requirements in the construction contracts during design stage and supervise the activities of contractors on labour protection and anti-infection.

Table 10.3.2 Implementation Structure of Labour Protection, Poverty Reduction and Anti-Infection

Agency/Organization	Role	Responsibility
MOLISA	Policy guidance	
DOLISA	Policy, supervision	Review of national and regional policies Confirmation of consistency with policies
MAUR	Secretary	Act as secretary, appointment of focal person, periodical report
GC	Design, supervision	Supervision of contractors' labour protection and anti-infection activities

(3) Action Plan

Action plan for labour protection, poverty reduction and anti-infection include the following:

- Specify the requirements of labour protection and anti-infection in the construction contract
- Ensure compensation for poverty groups and income recovery measures during resettlement
- Contractors shall fully comply with the Labour Law and the Law on Industrial Health and Safety during construction works.
- Contractors shall perform HIV/AIDS prevention programs during construction works
- Conduct enlightening activities and capacity building programs on labour protection, poverty reduction and anti-infection

The above shall be embodied in the project designs and monitoring frameworks.

10.4 Universal Designs

10.4.1 Target Group and Objective

The Objective is to design the public transport facilities ensuring user-friendliness to all people regardless of with or without disabilities, age, gender, race, etc.

10.4.2 Policy and Legal Framework

(1) Policy Framework

Protection of rights for people with disabilities is a priority issue in the laws and policies of Vietnam. Supporting people with disabilities is an integral part of the country's sustainable development strategy. Also, in February 2014, Vietnam approved ratification of the "Treaty on Rights of People with Disabilities" adopted by the United Nations. The Government is required to practice the requirements specified in the Article 9 "Accessibility" and the Article 20 "Mobility of Individuals" to comply with the said treaty.

(2) Legal Framework

Law on People with Disabilities

In accordance with the constitution (1992), the Law specifies the rights and obligations of households, society, the nation and people with disabilities.

Implementation Rules under Laws on People with Disabilities

Chapter 3 prescribes the responsibilities of each department. Sub-article 4 of Article 16 prescribes the requirement of meeting the needs of people with disabilities by the Ministry of Construction, the Ministry of Transportation, and each relevant ministry.

Law on Disabilities

In June 2010, "Resolution on Disabilities" was amended and promulgated as a new law. Sub-article 8 of Article 2 defines the term of barrier free in Vietnamese. Chapter 7 prescribes the detailed objects to introduce barrier free. With respect to the barrier free of public transportation, Sub-article 1 of Article 41 mandates supply of priority seats for people with disabilities and supportive equipment for boarding and alighting from/to rail cars.

By-laws and guidelines for implementation of certain articles of Law on Disabilities

By-laws under the Law on Disabilities. The Article 14 provides the gradual goals in 2015, 2020 and 2025 and clearly defines the method of barrier free introduction to public transportation including buses and trains.

Approval of Proposal for Supporting People with Disabilities (2012-2020)

The Prime Minister approved the proposal of MOLISA and issued as a decision. The gradual goals specified in the above by-laws are defined with details.

Technical Standards and Norms for Guaranteeing Accessibility of People with Disabilities

The Ministry of Construction determined a range of technical standards and norms in January 2002. In relation to this, the Ministry issued "Norms of construction works to ensure accessibility of people with disabilities" and "Houses and public facilities / roads and pedestrians / houses – principles for norms of construction works to ensure accessibility of people with disabilities". These decisions cover the particulars of dimensions, angles etc. of the tools for barrier free designs in the buildings.

Table 10.4.1 Legal Framework on Universal Designs

Name	Year	Outline
Constitution	1992	Constitution
Treaty on Rights of People with Disabilities	2007	International treaty on rights of people with disabilities
Resolution on Disabilities	1998	Responsibility of households, society and the nation Rights and obligations of people with disabilities
	1999	Implementation rules under Resolution on Disabilities
Law on Disabilities	2010	Amended the Resolution to a new law
No. 28/2012/ND-CP	2012	By-laws and regulations to execute certain part of articles under the Law on Disabilities
No. 1019/QD-TTg	2012	Approval of MOLISA proposal to support people with disabilities (2012-2020)
No. 01/2002/QD-BXD	2002	Technical standards and norms to ensure accessibility of people with disabilities

10.4.3 Institutional and Organizational Framework

MOLISA is responsible for policy guidance on disabilities. Also, the National Coordinating Council on Disability (NCCD) and the non-profit Vietnam Assistance for the Handicapped (VNAH) work in this field. Each ministry and department takes their roles in the infrastructure development.

Table 10.4.2 Agencies and Organizations on Universal Designs

Name	Field and Initiative
Public Agency	
MOLISA	Policy guidance on disabilities
DOLISA	Local agency under MOLISA
Council	
NCCD	Designated organization to protect benefits of people with disabilities, policy guidance on disabilities
Non-profit Organization	
VNAH	Community development assistance with inclusive approach
Other DPOs	Promotion of activities, promotion of health and welfare, participation in social activities

10.4.4 Current Situation

In Vietnam, number of disabled persons over 5 years old reaches 670 millions, which accounts for 7.8% of total population, out of which 5-15 years, 16-59 years, and over 60 years occupy 17.9%, 32.6%, and 49.5% of total disabled persons in the country, respectively. In particular, ratio of disabled persons in the age band of over 60 years account for 46.5% or nearly half of population. The reasons for developing disabilities include inborn impaired (35.8%), acquired disease (32.34%), war injury (25.56%), and traffic accident (3.49%). As the characteristic of Vietnam, war victims show high percent of the disabilities.[21]

10.4.5 Case Study

HCMC Line 1 (JICA)

- The Employer's Requirement of the construction contract mandates barrier free designs in general accordance with the barrier free guidelines of Japan (See Appendix).

Hanoi Line 2 (JICA)

- The Employer's Requirement of the construction contract mandates barrier free designs in general accordance with the barrier free guidelines of Japan.

[21] Source: Poverty Reduction of Disabled persons – Livelihood of Disabled Persons in Developing Countries, Asian Economic Research Institute

- The General Consultant organized coordination meetings with DOLISA and DPOs (physical disabilities and sight disabilities) and jointly reviewed the barrier free design principles, guidelines used, and implementation structure of barrier free activities.
- The Consultant proposed construction site visit (x1), attendance to procurement and installation (x1), test walk before commercial operation (x1), service level inspection (x1) with participation of these organizations and DPOs.

Japanese Railway Companies

- Proactively work on introduction of barrier free in accordance with the Barrier Free New Law
- Conduct periodical CS survey and take CS improvement measures
- Provide skill development and trainings on barrier free to the employees
- Expand the stations equipping barrier free facilities, e.g. elevators and platform screen doors (albeit large constraints for introduction to old stations)
- Prepare and distribute barrier free handbook[22] to customers as part of public relations

Public Bus in HCMC

- First-ever non-step buses (2 nos., made in Korea) are in operation
- Effectiveness is not certain given the number of users and present status along the route

10.4.6 Needs of People with Disabilities

In Vietnam, disability rate is higher than other countries particularly due to the existence of disabled soldiers for the Vietnam War. Introduction of universal designs to the Project is meaningful not only the number of people with disability but also compliance to the "Treaty on Rights of People with Disabilities".

[22] http://www.tokyometro.jp/safety/barrierfree/pdf/barrierfree.pdf

10.4.7 Proposal

(1) General

- Circulation Planning: The station design introduced the reasonable circulation for any passengers regardless of gender, age and with or without disabilities can use the facilities in a safe and comfortable manner. (See Appendix)
- Station Equipment Plan: Rest rooms, lightening, security, disaster prevention, and other equipment designs are based on the universal design concept. (See Appendix)
- Universal Design Activities: The Project introduces universal designs in the designs of facilities and equipment. Also, a series of universal design activities will be performed throughout the Project.

(2) Implementation Structure

A Universal Design Focal Point (UDFP) shall be specified in the implementing agency and the person will be responsible for supervisory and reporting. Also, UDFP will promote the coordination meetings with DPOs and receive feedbacks during design, construction supervision and operation stages.

Table 10.4.3 Implementation Structure on Universal Designs

Agency/Organization	Role	Responsibility
MOLISA/NCCD	Policy Guidance	
DOLISA	Policy, Supervision	Review of national and regional policy Confirmation of consistency with policies
MAUR	Secretary	Act as secretary, appointment of UDFP, periodical reporting
GC	Design, Supervision	Design and construction supervision Incorporation of feedbacks
DPOs	Review, Inspection	Design review, feedback

(3) Action Plan

Universal Design Action Plan (UDAP) of the Project includes the following:

- Develop design standard manuals by enhancing the employer's requirement of Line 1 (at the beginning of designs)
- Design facilities and equipment, complying with universal design standards
- Conduct design reviews and feedbacks by relevant agencies / organizations and DPOs
- Setup target benchmark for capacity building on universal designs
- Conduct test walks and feedbacks prior to the commencement of commercial operation
- Develop and enhance design standard manuals and action manuals for the O&M company

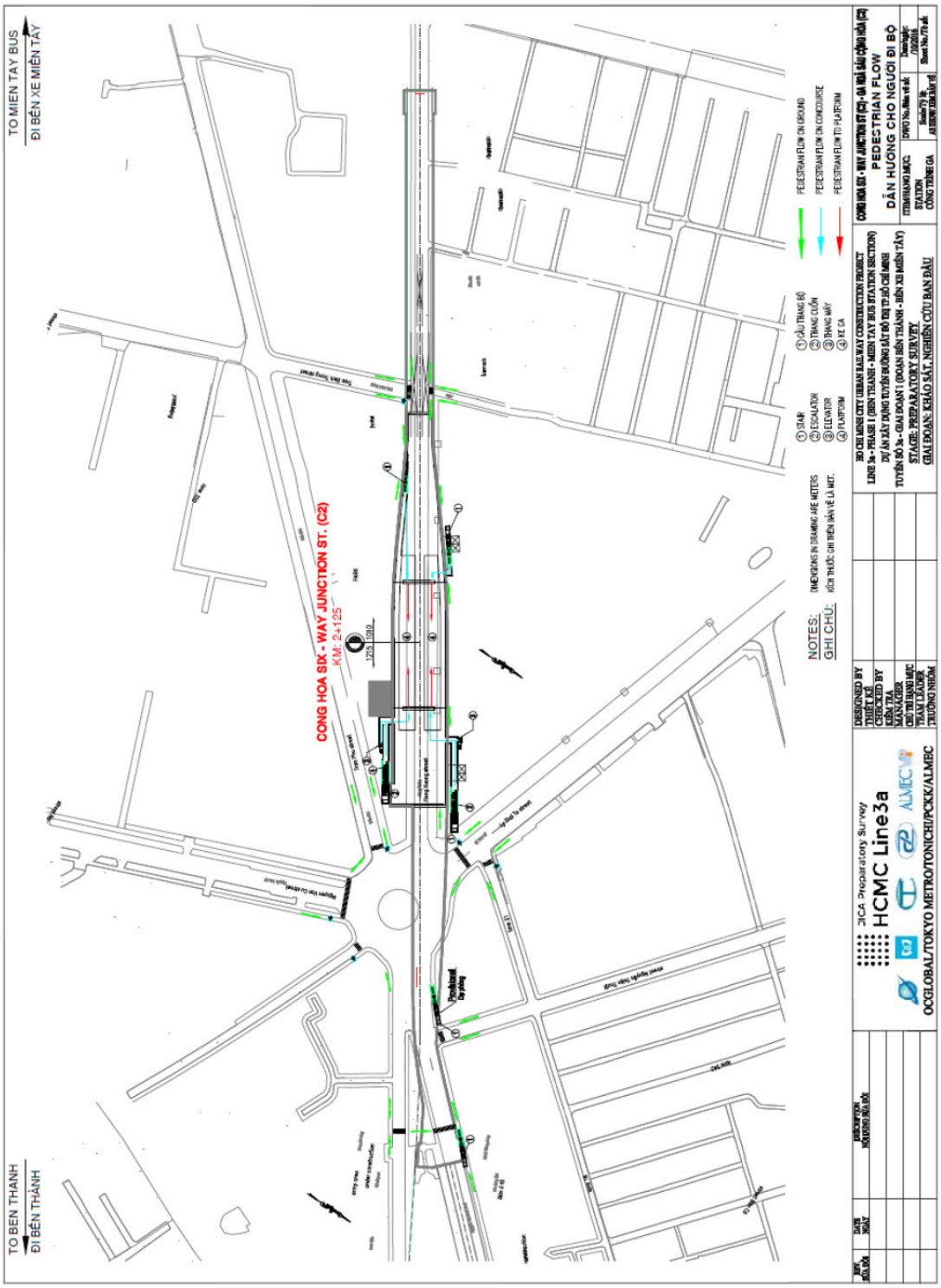
- Prepare and distribute universal design handbook for users
- Develop quality control program on service for people with disabilities

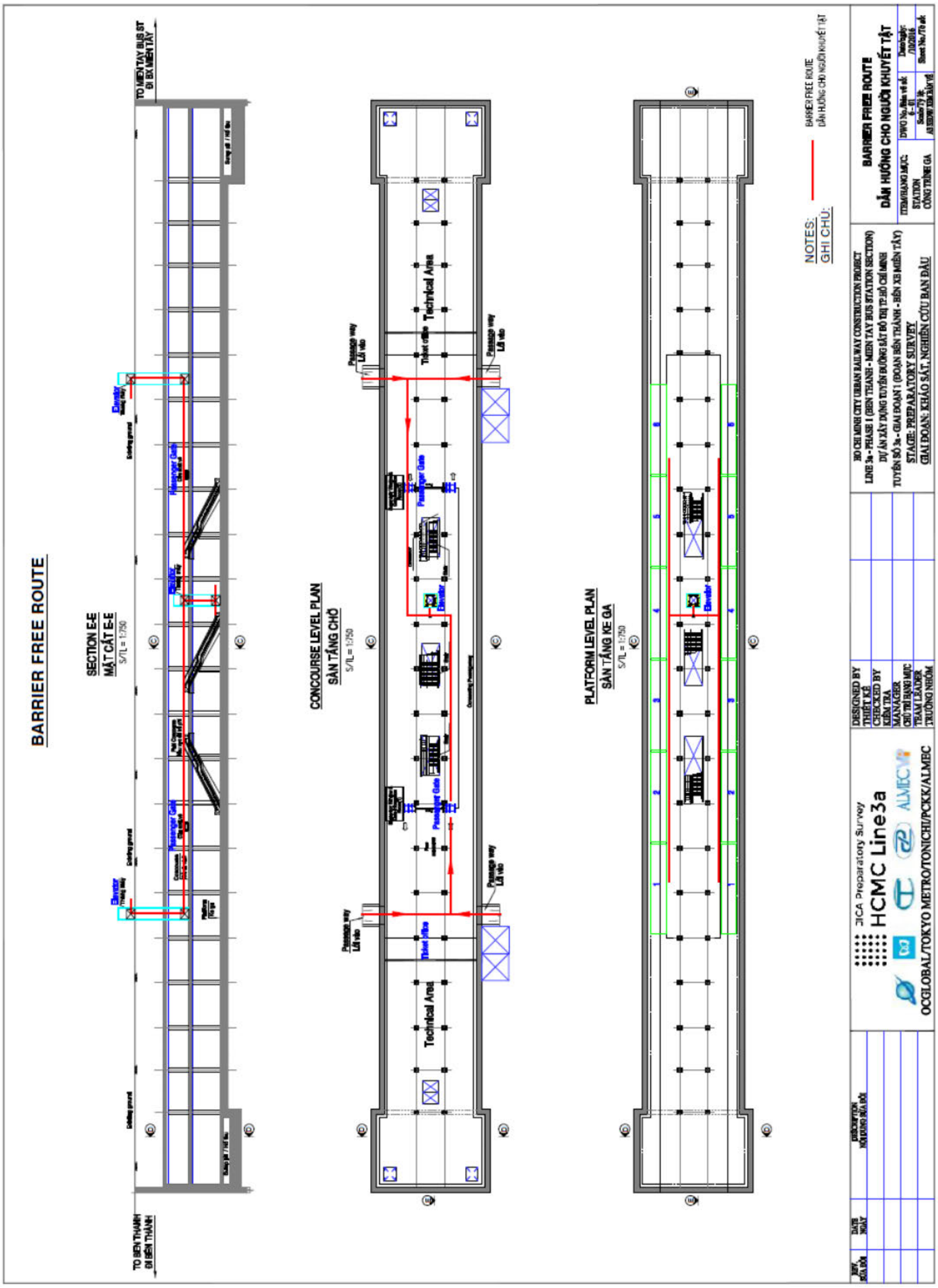
The UDAP shall be embodied in the project designs and monitoring frameworks.

Appendix 10.1: Gender Mainstreaming and HIV/AIDS Prevention Programs of Other Projects

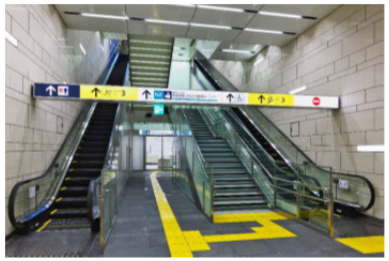
	HCMC Line 1 (JICA)	HCMC Line 2 (ADB)	Hanoi Nhat Thanh Bridge Construction (JICA)	Delhi Metro (JICA)
Gender Mainstreaming				
General Consideration	YES	YES	YES	YES
Gender Action Plan	NO	YES	NO	NO
Prioritized Compensation for Women-led Families	YES	YES (with compensation target)	YES	NO
Women-only Car	NO	NO	N/A	YES (at lead coach)
Educational Activity	YES	YES (with capacity building)	YES	YES (site visits and tours)
Promotion of Women Employment	NO	YES (with employment target)	NO	YES (improvement of work conditions)
Special Care for Safety of Women Passengers	NO	NO	NO	YES (provision of sally guard)
HIV/AIDS Prevention				
Mandating by Construction Contract	YES	YES	YES	YES
Educational Activity (General)	YES	YES	YES	YES
Educational Activity for Labors	YES	YES	YES	YES
Workshop	Unknown	YES	Unknown	YES
Distribution of Condoms	Unknown	YES	Unknown	YES
Treatment of Sexual Disease	Unknown	To be provided	Unknown	Unknown
Counseling	Unknown	To be provided	Unknown	Unknown

Appendix 10.2: Typical Passenger Flows at Stations of Line 3A




BARRIER FREE ROUTE
SECTION E-E
MẶT CẮT E-E
CONCOURSE LEVEL PLAN
SÀN TẦNG CHỜ
PLATFORM LEVEL PLAN
SÀN TẦNG KE GA
Technical Area
NOTES:
GHI CHÚ:
BARRIER FREE ROUTE
DẪN HƯỚNG CHO NGƯỜI KHUYẾT TẬT
HCMC Line3a

Appendix 10.3: Major Universal Design Facilities (Station Equipment)

			
Lift Transparent, space for wheelchair circling, User-friendly operation panel	Escalator Tactile, double rails, visible boarding & landing points, multilingualization	Slope Gap elimination, grippy floor, double rails, visible boarding & landing points	Multi-functioned Toilet Supporting wheelchair users and Ostomate
			
Fare Gate Widened gate	Braille inside train For identification of boarding point	Audible Announcement At gates, lifts and escalators	Hand Rails Double rails, visible edge of stairs
			
Inclined Vending Machine For wheelchairs, aged and foreigners	Tactile Warning and guiding tiles	Braille inside station Fare table, floor guide, etc.	Signage, etc. Station numbering, pictograms

Source: Tokyo Metro

Appendix 10.4: Job Categories and Wage Level of Women Employees

[Approach]

- Job Category: Men and women shall be able to work in equal conditions for any jobs and sites at the Headquarter and worksites.
- Wage Level: As public entity, wage level shall follow the local regulation regardless of the gender of employees.

[Wage Scale]

- Wage scale of public entity is determined, regardless of gender, as illustrated in the following table (as of this reporting period).

Position / Title	Salary Level											
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
(in VND per month)												
Managing Staff												
Chairman, Members' Council	8,169,000	8,526,000										
Council Member	7,318,500	7,665,000										
General Director	7,822,500	8,169,000										
Vice-General Director	7,318,500	7,665,000										
Chief Accountant	6,972,000	7,318,500										
Main Engineer	4,200,000	4,546,500	4,893,000	5,239,500	5,586,000	5,932,500						
Engineer	2,457,000	2,782,500	3,108,000	3,433,500	3,759,000	4,084,500	4,410,000	4,735,500				
Operations and Maintenance												
Trains Driver	4,672,500	5,113,500	5,586,000									
Car Repairman	1,869,000	2,205,000	2,604,000	3,066,000	3,622,500	4,273,500	5,040,000					
Train Conductor	1,732,500	2,184,000	2,751,000	3,328,500								
Civil Engineer	1,848,000	2,173,500	2,562,000	3,003,000	3,538,500	4,158,000	4,882,500					
Electrical Engineer	1,869,000	2,205,000	2,604,000	3,066,000	3,622,500	4,273,500	5,040,000					
Mechanical Engineer	1,869,000	2,205,000	2,604,000	3,066,000	3,622,500	4,273,500	5,040,000					
Administrative												
Administrative Staff	2,457,000	2,782,500	3,108,000	3,433,500	3,759,000	4,084,500	4,410,000	4,735,500				
Technician	1,890,000	2,089,500	2,289,000	2,488,500	2,688,000	2,887,500	3,087,000	3,286,500	3,486,000	3,685,500	3,885,000	
Correspondence Clerk	1,417,500	1,606,500	1,795,500	1,984,500	2,173,500	2,362,500	2,551,500	2,740,500	2,929,500	3,118,500	3,307,500	3,496,500
Supporting Staff / Clerk	1,050,000	1,239,000	1,428,000	1,617,000	1,806,000	1,995,000	2,184,000	2,373,000	2,562,000	2,751,000	2,940,000	3,129,000

[Legal Basis]

Circular No. 10 / 2012 / TT-BLDTBXH dated April 26th 2012 on guidance for execution of general minimum salary level for State-Owned sole member limited liability companies

Decree No. 205 / 2004 / ND-CP dated December 4th 2004 of the GOV on the salary level system and salary benefits in State-Owned companies

Decree No. 47/2016/NĐ-CP dated May 26th 2016 of the GOV on the minimum salary level

Circular No. 05/2016/TT-BXD dated March 10, 2016 by the Ministry of Construction on guidance for determination of labor unit price in management of work construction investment expenditures

Appendix 10.5: Gender Action Plan (GAP)

Output	Activity / Strategy	Performance / Target Indicators	Time Frame
Design Stage Planning and designing of gender action programs for entire implementation period	- Appoint a Gender Focal Point (GFP) in MAUR responsible for oversight and reporting against the GAP - Gather baseline sex-disaggregated data and gender analytical information - Facilitate the equal participation and consultation of women affected by and participating in the program - Gender Action Plans (GAPs) developed and updated	- GFP appointed in MAUR and reports periodically on progress with GAP implementation. - Preparatory reports include reference to sex-disaggregated data and gender analytical information - Number of women's representatives and groups consulted during preparatory surveys, assessments and design - GAP developed and updated	
Construction Stage Infrastructure designs and construction, ensuring women's equal access and benefits	- Civil and architectural works designed and constructed in consultation with women and with gender-specific features - Establish targets for female employment generation and regulate adherence to gender-specific core labor codes - Identify potential negative impacts through awareness and information campaigns to construction workers and general public - Ensure that affected women-only families are prioritized through RAP implementation	- Gender-specific physical design features - 20% of jobs generated by civil works are filled by women. - All construction contracts for civil works include gender-specific core labor codes. - Information and awareness campaigns developed and delivered with gender-related content - 100% affected women-only families access equal compensation and livelihood restoration support	
E&M Systems and Rolling Stock Procurement Stage E&M system / rolling stock designs and procurement, ensuring women's equal access and benefits Women mainstreaming for O&M activities	- E&M systems and rolling stock equipment designed with gender-specific features e.g. women's only cars, child and aged-seating, space for strollers - Establish targets for female employment generation from new E&M systems and rolling stock equipment e.g. maintenance and operations staff, ticketing staff, station attendees and supervisors	- Gender-specific physical design features evident in newly E&M systems and rolling stock equipment - 20% of jobs generated by E&M systems and rolling stock equipment are filled by women	
Capacity Building Stage Promotion of the role of women in the transport sector, ensuring the participation of women transport sector staff in capacity development activities	- Provide gender awareness and GAP implementation training for HCMC-PC and MAUR staff - Include all MAUR female members as participants in capacity development activities	- Gender awareness and GAP implementation training materials developed - Training delivered with records of attendees - Number of female participants per capacity development activity	
Pre-opening and Operation Stage Promotion of the role of women in the O&M entity, ensuring the participation of women transport sector staff in O&M activities	- Develop internal rules and support programs for female mainstreaming in the O&M entity and create an appropriate corporate culture - Introduce, implement, and upgrade gender-specific services	- Rate of women in decision making in the O&M entity - Rate of female employees in the O&M entity - Rate of female resignees in the O&M entity - Average wage level by gender in the O&M entity - Result of periodical customer satisfaction surveys - Result of periodical mystery shopper surveys	

Appendix 10.6: Universal Design Action Plan (UDAP)

Output	Activity / Strategy	Performance / Target Indicators	Time Frame
Design Stage Planning and designing of universal design action programs for entire implementation period	- Appoint an Universal Design Focal Point (UDFP) in MAUR responsible for oversight and reporting against the UDAP - Develop Universal Design Standard Manual of MAUR by enhancing Barrier Free Guideline specified in the Employer's Requirement of Line 1 - Universal Design Action Plans (UDAPs) developed and updated	- UDFP appointed in MAUR and reports periodically on progress with UDAP implementation. - Universal Design Standard Manual developed - Number of representatives of disabled persons and organizations (MOLISA, DPOs) consulted during preparatory surveys, assessments and design - Feedback records after design reviews - UDAP developed and updated	
Construction Stage Infrastructure designs and construction, satisfying the policy and objectives of universal designs	- Civil and architectural works designed and constructed in consultation with disabled persons and with universal design features - Identify potential negative impacts through awareness and information campaigns to disabled persons and general public	- Universal design features - All construction contracts for civil works include universal design requirements. - Information and awareness campaigns developed and delivered with universal design content - Number of site visits by MOLISA and DPOs - Feedback records after site visits	
E&M Systems and Rolling Stock Procurement Stage E&M system / rolling stock designs and procurement, satisfying the policy and objectives of universal designs Disabled persons mainstreaming for O&M activities	- E&M systems and rolling stock equipment designed with universal design features e.g. wheelchair space inside cars, audible announcements, braille, etc. - Establish targets for customer satisfaction, e.g. number of complaints, user-friendliness, service performance of station staff	- Universal design features evident in newly E&M systems and rolling stock equipment - Number of site visits by MOLISA and DPOs - Feedback records after site visits - Targets for customer satisfaction	
Capacity Building Stage Promotion of universal designs in the transport sector through UD activities of the Project	- Provide gender awareness and UDAP implementation training for HCMC-PC and MAUR staff - Include all concerned MAUR members as participants in capacity development activities	- Awareness and UDAP implementation training materials developed - Training delivered with records of attendees - Number of participants per capacity development activity	
Pre-opening and Operation Stage Promotion of universal designs in the transport sector, through UD activities in the O&M entity.	- Develop and upgrade design standard manual and UD activity manual for MAUR - Prepare and distribute Universal Design Handbook - Quality control on customer service on disabled persons (PDCA cycle management)	- Test walk in pre-opening period - Feedback for service improvement by MOLISA & DPO - UD activity manual - Record of service improvement for disabled persons - Result of periodical customer satisfaction surveys - Result of periodical mystery shopper surveys	

CHAPTER 11 CLIMATE CHANGE MITIGATION MEASURES

11.1 Greenhouse Gas Emission Reduction

11.1.1 Data Collection for Estimate of Reduction in GHG Emission

The project, through construction of an underground and elevated railway in the urban area of Ho Chi Minh City (HCMC), is considered effective in promoting the modal shift from existing transportation of motorbikes, cars, busses etc., to Mass Rapid Transit (here after referred to as MRT), and thus contributing to the mitigation of congestion and the improvement of air pollution, as well as reduction of greenhouse gas (GHG) emission.

(1) Methodology for Estimate of GHG Emission Reduction

CDM methodology ACM0016 is a dominant methodology used to estimate GHG emission reduction associated with modal shift from existing transport modes such as motorbikes, cars and busses etc., to a MRT. However, the methodology for calculation of emission reduction in ACM0016 is complex, arduous to project owners, and as Japan is not partaking in the second commitment period of Kyoto Protocol, the study team has decided not to employ ACM0016 in this report.

Therefore, estimation of GHG emission reduction by the project, was based on the methodology described in the "Railway (Passenger) / Modal Shift" of "JICA Climate-FIT Ver. 2.0 (March 2014)" (here after referred to as JICA Climate-FIT), a simplified methodology to CDM with the same principle. Main points of difference between CDM methodology and JICA Climate-FIT are shown in Table 11.1.1

Table 11.1.1 Main Points of Difference Between the CDM method and the JICA Climate-FIT

Item	CDM Methodology	JICA Climate-FIT
Transport System	The entire MRT system	Rapid railway (underground and elevated)
GHG emission factor	CO_2, CH_4	CO_2 Only
Emission reduction by technological progress	Considered as a coefficient (Coefficient = 0.99/year)	Not considered
Indirect project emissions	Considers use of stations etc., by passengers associated with the new railway	Not considered
GHG emission reduction by reduced congestion and thus increased speed of travel	Considered	Not considered
CO_2 emission factor of a passenger car & taxi	Function of speed	Not dependent on speed
Change in load factor of old busses and taxis	Considered	Not considered
Power	Internal combustion & electricity	Electricity

Source: JICA Study Team (Prepared based on the JICA Climate-FIT for Mitigation)

In the methodology for "Railway (Passenger) / Modal Shift" by JICA Climate-FIT, CO_2 emission reduction by introduction of the new railway is determined as the differences between the baseline emission caused by continued use of existing transportation (buses, cars, motorbikes etc.,) and the project emission resulting from the modal shift of exiting transportation to the railway.

$$ER_y = BE_y - PE_y$$

ER_y : GHG emission reduction through the project in year y (t-CO_2e/y)

BE_y : GHG emission from baseline scenario in year y (t-CO_2e/y)

PE_y : GHG emission from project scenario in year y (t-CO_2e/y)

Overview of the methodology for estimation of the baseline emission and the project emission in JICA Climate-FIT is as follows.

1) Applicable Projects

The project is applicable to "Traffic and Transportation / Railway (Passenger) / Modal Shift" in JICA Climate-FIT.

Table 11.1.2 Overview of Applicable Projects

Applicable Project	Overview
Traffic and Transportation / Railway (Passenger) / Modal Shift	Passenger modal shift from existing transportation modes (e.g. buses, private car, taxi, motorbike) to MRT (Mass Rapid Transit), railway, monorail, LRT (Light Rail Transit), BRT (Bus Rapid Transit) and trunk bus.

Source: "JICA Climate-FIT Version 2.0, March 2014"

2) Area of Project Activities Subject to Calculation (Project Boundary)

Boundary of project activities subject to calculation is defined as the range of activities in Phase 1 of the Line 3A in the project (not including mode of transportation between the point of departure to the place of embarkation, and from the place of disembarkation to the destination).

3) Impacts Outside (Leakage) the Area of Project Activities (Project Boundary)

In JICA Climate-FIT, as a part of the lifecycle of a railway project, production and transportation of raw materials, energy consumption during construction of related facilities and rolling stocks are expected as a leakage however, these are considered negligible in comparison to the GHG emission reduction resulting from the implementation of the project, and thus ignored.

Potential leakage with regards to the project lifecycle is neither included in consideration in the CDM methodologies regarding MRT (ACM0016, AM0031 etc.).

4) Baseline Emission

(a) Basic Principle for Baseline Emission

Baseline emission is the emission resulting from the same number of people as passengers of the project travelling by existing transport modes (transport mode i).

(b) Calculation of Baseline Emission

Baseline emission is calculated by the annual passenger kilometer covered by the railway (or the number of passengers multiplied by the average trip distance) multiplied by the CO_2 emission factor per passenger kilometer of existing transport modes (transport mode i).

The calculation formula is as follows.

$$BE_y = \sum_i \left(BPKM_y \times MS_{i,y} \times EF_{PKM,i} \right)$$
$$= \sum_i \left(P_y \times BTDP_y \times MS_{i,y} \times EF_{PKM,i} \right)$$

$BPKM_y$: Passenger kilometer by MRT etc., in year y (passenger-km/y)

P_y : Number of passengers transported by MRT etc., in year y (passenger/y)

$BTDP_y$: Average trip distance of passengers by MRT etc., in year y (km)

$MS_{i,y}$: Share of passengers by transport mode i in year y (%)

$EF_{PKM,i}$: CO_2 emission factor per passenger kilometer for transport mode I (t-CO_2/passenger-km)

$EF_{PKM,i}$ was calculated based on CO_2 emission factor per kilometer travelled by an existing transport mode (transport mode i) prior to the implementation of the project, and the average occupancy rate, using the following formula.

$$EF_{PKM,i} = \frac{EF_{KM,i}}{OR_i}$$

$EF_{PKM,i}$: CO_2 emission factor per passenger kilometer for transport mode I (t-CO_2/passenger-km)

$EF_{KM,i}$: CO_2 emission factor per kilometer for transport mode I (t-CO_2/ km)

OR_i : Average occupancy rate if transport mode i (passenger/vehicle)

5) Project Emission

(a) Basic Principle for Project Emission

As the project, Line 3A Phase 1, is powered by electricity, the project emission is calculated by multiplying the annual electricity consumption of the railway by CO_2 emission factor of the electricity.

(b) Calculation of Project Emission

The project emission is determined by multiplying the annual electricity consumption of the railway after implementing the project by the CO_2 emission factor of the electricity.

The calculation formula is as follows.

$$PE_y = EC_{PJ,y} \times EF_{elec}$$

$EC_{PJ,y}$: Annual electricity consumption associated with the operation of MRT etc., in year y (MWh/y)

EF_{elec} : CO_2 emission factor of the electricity (t-CO_2/MWh)

$EC_{PJ,y}$ was determined based on the project activity (number of passengers/load factor x distance travelled) in vehicle-kilometer/year, the rate of electricity consumed by operation of the railway (MWh/vehicle-kilometer), and the CO_2 emission factor of electricity (tCO_2/MWh), using the following formula.

$$PE_y = \frac{P_{PJ,y} \times TD_{PJ}}{OC_{PJ}} \times SFC_{PJ} \times EF_{elec} EF_{elec}$$

$P_{PJ,y}$: Annual number of passengers for the project (passenger/y)

TD_{PJ} : Average distance of trips taken by passengers (km)

OC_{PJ} : Load factor for the project (passenger/vehicle)

SFC_{PJ} : The rate of electricity consumption for the project (MWh/vehicle-km)

EF_{elec} : Emission factor of the electricity used by the project activities (tCO_2/MWh)

(2) Data Used for Estimation of the GHG Emission Reduction

1) Baseline Emission

For estimating baseline emission of the project, values given by results of the demand forecast and existing studies as shown in Table 11.1.3 were used.

Table 11.1.3 Data Used for Baseline Emission (Line 3A Phase 1 (C1-C10 Section))

Data		2026	2030	2040	2050	Remark
Py: Number of annual project passengers (million passenger/year)		79.75	125.63	145.45	172.90	Number of annual passengers is given by multiplying a day's passenger number (passenger/day) for C0-C10 from the demand forecast by 365 days. Increase in the number of passengers is expected for 2030 onwards, due to the opening of Phase 2 (C11-C17 Section).
BTDPy: Average distance travelled by the project's passengers (km)		5.4	7.1	7.4	7.2	Data from the demand forecast (C0-C10 Section)
MSi,y : Share of the Transport Mode i (%)	Motorbike (Gasoline)	89.8				Source: FEASIBILITY STUDY REPORT Project:HCMC Urban Railway Construction Project, Line 3A: Ben Thanh-Tan Kien(Ben Thanh- Ben xe Mien Tay Section)
	Car (Gasoline)	3.3				
	Bus (Diesel)	1.2				
ORi: Average occupancy rate for Transport Mode i (passenger/vehicle)	Motorbike (Gasoline)	1.37				Data from the demand forecast
	Car (Gasoline)	1.86				
	Bus (Diesel)	23.4				
$EF_{KM,i}$: CO_2 emission factor per kilometer for Transport Mode i (tCO_2/vehicle-km)	Motorbike (Gasoline)	0.000034695				Calculated by multiplying 1) The rate of fuel consumption by Transport Mode i (ℓ/vehicle-km) by 2) CO_2 emission factor of the fuel used by Transport Mode i (tCO2/ℓ)
	Car (Gasoline)	0.00018504				
	Bus (Diesel)	0.0007983				
1) The rate of fuel consumption by Transport Mode i (ℓ/vehicle-km)	Motorbike (Gasoline)	0.015				Index value by METROS Study
	Car (Gasoline)	0.08				
	Bus (Diesel)	0.3				
2) CO2 emission factor of the fuel used by Transport Mode i (tCO_2/ℓ)	Motorbike (Gasoline)	0.002313				Value specified by the JICA Climate-FIT
	Car (Gasoline)	0.002313				
	Bus (Diesel)	0.002661				

Note: The proportion of gasoline and diesel fuelled vehicles within existing transport mode i (motorbike, car, bus) were set at 100% gasoline fuelled for motorbikes and cars, and 100% diesel fuelled for buses based on the study by METROS.

Source: Prepared by the Study Team

2) Project Emission

For estimating the project emission, values based on results of the demand forecast and existing studies as shown in Table 11.1.4 were used.

Table 11.1.4 Data used for Project Emission (Line 3A Phase 1 (C1-C10 Section))

Data Used	2026	2030	2040	2050	Remark
$P_{PJ,y}$: Number of annual project's passengers (Mil. passenger/year)	79.75	125.63	145.45	172.90	Number of annual passengers is given by multiplying the daily number of passenger (passenger/day) for C0-C10 section from the demand forecast by 365 days. Increase in the number of passengers is expected for 2030 onwards, due to the opening of Phase 2 (C11-C17 Section).
TD_{PJ}: Average distance travelled by the project passengers (km)	5.4	7.1	7.4	7.2	Data from the demand forecast (C0-C10 Section)
OC_{PJ}: Load Factor of the project activity (passenger/vehicle)	794	747	826	862	Calculated by dividing the number of annual project passengers by the planned number of trains for C0-C10 section in the train operation plan.
SFC_{PJ}: the rate of electricity consumption by the project activities (MWh/vehicle-km)	0.01629				Estimated based on the assumption of the unit electricity consumption of the train per ton kilometer as 48.4 (Wh/ton km), and the weight of the six-car trains as 336.51 (ton/vehicle).
EF_{elec} : Emission factor of the electricity used for the project activities (t-CO_2/MWh)	0.5408				Value publicized by the Government of Vietnam http://www.noccop.org.vn/Data/vbpq/Airvariable_Idoc_59vnBao%20cao%20EF%202010.pdf

Source: Prepared by the Study Team

11.1.2 Estimate of the GHG Emission Reduction

GHG emission reduction for the project was estimated using the JICA Climate-FIT. The results are shown in Table 11.1.5, 11.1.6 and Figure 11.1.1.

Yearly estimated values for 2026 to 2050 were calculated based on the trend of the results estimated for 2026, 2030, 2040 and 2050.

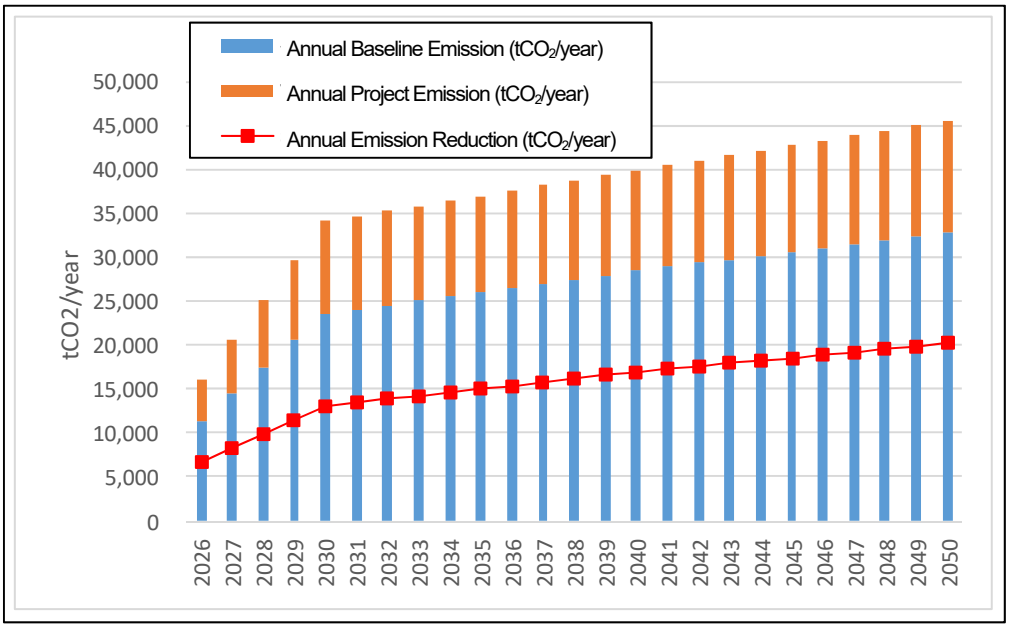
As the section of the route subject to estimation is unchanged (Phase 1, C1-C10 Section) for 2026 to 2050,the annual baseline emission and the annual emission from the project activities increase in correlation with the increase in the number of annual passengers and the average distance travelled by a passenger.

The annual emission reduction for the project is increased from 6,606 ton in 2026 to approximately triple at 20,185 ton in 2050 due to the increase in the number of annual passengers and the average distance travelled by a passenger. The total emission reduction for 25 years between 2026 and 2050 is 388,671 ton, giving an annual average of 15,547 ton.

Table 11.1.5 Result of the Estimated GHG Emission Reduction (Line 3A Phase 1 (C1-C10 Section))

	2026	2030	2040	2050
BEy: Annual Baseline Emission (t-CO_2/year)	11,384	23,579	28,452	32,907
PEy: Annual Project Emission (t-CO_2/year)	4,778	10,520	11,480	12,723
ERy: Annual Emission Reduction (t-CO_2/year) = BEy – PEy	6,606	13,059	16,973	20,185

Source: Prepared by the Study Team



Source: Prepared by the Study Team

Figure 11.1.1 Result of the Estimated GHG Emission Reduction (Line 3A Phase 1 (C1-C10 Section))

Table 11.1.6 Result of the GHG Emission Reduction Estimated by Trend for 2026 to 2050

	Annual Baseline Emission (tCO_2/year)	Annual Project Emission (tCO_2/year)	Annual Emission Reduction (tCO_2/year)
2026	11,384	4,778	6,606
2027	14,433	6,214	8,219
2028	17,482	7,649	9,833
2029	20,530	9,084	11,446
2030	23,579	10,520	13,059
2031	24,066	10,616	13,451
2032	24,554	10,712	13,842
2033	25,041	10,808	14,233
2034	25,528	10,904	14,625
2035	26,016	11,000	15,016
2036	26,503	11,096	15,407
2037	26,990	11,192	15,799
2038	27,478	11,288	16,190
2039	27,965	11,384	16,581
2040	28,452	11,480	16,973
2041	28,898	11,604	17,294
2042	29,343	11,728	17,615
2043	29,789	11,853	17,936
2044	30,234	11,977	18,257
2045	30,680	12,101	18,579
2046	31,125	12,226	18,900
2047	31,571	12,350	19,221
2048	32,016	12,474	19,542
2049	32,462	12,598	19,863
2050	32,907	12,723	20,185
total	659,026	270,355	388,671
ave.	26,361	10,814	15,547

Source: Prepared by the Study Team

11.2 Registration to the Clean Development Mechanism (CDM)

As of September 2016, 9 projects based on the CDM Methodologies ACM0016 in relation to MRT are registered to CDM as shown in Table 11.2.1. However, no new registration for CDM projects based on CDM methodologies ACM0016 has been made since March 2013.

Moreover, the methodology for calculation and monitoring of the emission reduction in ACM0016 is complex and arduous to project owners. Furthermore, as Japan is not partaking in the second commitment period of Kyoto Protocol, there is no merit in registering the project as a CDM project.

As such, the project will not be formed or registered as a CDM project.

Table 11.2.1 State of Registration for CDM Projects based on the CDM Method ACM0016

Registered	Project title	Host Parties	Other Parties	Methodology	Emission reduction (tCO_2/year)	Ref. No.
2011/5/30	BRT Lines 1-5 EDOMEX	Mexico	Switzerland Portugal	ACM0016	145,863	3869
2011/6/30	Metro Delhi, India	India	Switzerland	ACM0016	529,043	4463
2011/8/10	BRT Metrobus Insurgentes, Mexico	Mexico	Spain	ACM0016 ver. 2	46,544	4945
2011/10/4	Mumbai Metro One, India	India	Switzerland	ACM0016 ver. 2	195,547	4670
2012/9/12	Metro Line 12, Mexico City	Mexico	Switzerland	ACM0016 ver. 2	136,983	5735
2012/9/24	BRT Metrobus 213, Mexico	Mexico	Switzerland	ACM0016 ver. 3	134,601	7235
2012/11/22	Modeshift of passengers from private vehicles to MRTS for Gurgaon metro	India	Switzerland	ACM0016 ver. 2	105,863	6430
2012/12/19	LRT System in Tunis	Tunisia		ACM0016 ver. 3	29,193	7574
2013/2/25	Guiyang MRTS Line I Project	China		ACM0016 ver. 3	335,188	8149

Source: United Nations Framework Convention of Climate change HP (http://cdm.unfccc.int/Projects/projsearch.html)

11.3 Track Record of Japan's Initiative & Relationship with this Project

11.3.1 Track Record of Japan's Initiative in the Field of Climate Change

Japan provides technologies, systems, infrastructure and funding to developing countries, contributing to the reduction of greenhouse gas emissions. Japan advocates and promotes a bilateral credit system (JCM) that accounts for part of its reduction as a reduction in Japan. As of January 2016, Japan has agreed with 16 countries on JCM implementation and Vietnam has also agreed on July 2, 2013. In JCM, a joint bilateral committee discusses rules, guidelines, methodologies and project registration. The results of JCM are validated and verified by a third party organization. As of March 2016, the six methodologies shown in Table 11.3.1 are approved for Vietnam. Also, four projects shown in Table 11.3.2 are registered.

Table 11.3.1 Approval Methodology of JCM with Vietnam

Methodology No.	Methodology Name
VN_AM001	Transportation energy efficiency activities by installing digital tachograph systems
VN_AM002	Introduction of Room Air Conditioners Equipped with Inverters
VN_AM003	Improving the energy efficiency of commercial buildings by utilization of high efficiency equipment
VN_AM004	Anaerobic digestion of organic waste for biogas utilization within wholesale markets
VN_AM005	Installation of energy efficient transformers in a power distribution grid
VN_AM006	Introduction of air conditioning system equipped with inverters

Source: JCM Homepage (http://gec.jp/jcm/jp/about/index.html)

Table 11.3.2 JCM Equipment Auxiliary Projects with Vietnam

No.	Project name	Methodology No.
VN001	Eco-Driving by Utilizing Digital Tacograph System	VN_AM001_Ver1.0
VN002	Promotion of green hospitals by improving efficiency / environment in national hospitals in Vietnam	VN_AM002_Ver1.0
VN003	Low carbon hotel project in Vietnam: Improving the energy efficiency of commercial buildings by utilization of high efficiency equipment	VN_AM003_Ver1.0
VN004	Introduction of amorphous high efficiency transformers in power distribution systems in the southern part of Viet Nam	VN_AM005_Ver1.0

Source: JCM Homepage(http://gec.jp/jcm/jp/about/index.html)

11.3.2 Relationship with this Project

This project is a project to be undertaken by ODA. As the significance of ODA, this project shows the attitude of Japan striving to solve the global problem including climate change, and it has significance to increase the sense of trust and presence in the international community. In response to the Paris Agreement being in force, Japan announced its support for developing countries to be 1.3 times as much as the current together with public and private sectors in 2020. This project can contribute to the achievement. Reduction of greenhouse gas emissions by this project (about 13,000 ton CO_2 in 2030) contributes to the reduction target of greenhouse gas emissions in Vietnam based on the Paris Agreement.

In the future, if this project is certified as a JCM project, part of the reduction amount may be posted on the Japanese side.

CHAPTER 12 PROJECT EVALUATION

12.1 Financial Analysis

12.1.1 General

The purpose of financial analysis is to examine the financial viability of the Project from the viewpoint of the implementing body. This analysis is performed based on estimation in terms of revenue, construction costs, operation and maintenance costs, and replacement and reinvestment costs. Additionally, financial conditions of required funds were assumed. As the first step of financial analysis, cashflow analysis was performed based on the assumption on the fund raising plan in terms of revenue, construction costs, and operation and maintenance costs.

12.1.2 Key Assumptions

Key assumptions of the financial analysis are set up and shown below:

- Project life is construction period and 40 years after completion of the works. The residual value is assumed zero.
- The base year for the price is September 2016. The exchange rate is 1 VND = 0.00461 JPY.

12.1.3 Financial Arrangements

In this financial evaluation, the following conditions for financing are assumed.

- The Project is funded by JICA.
- The annum interest rate is 0.10%. The period of redemption of the loans provided by JICA shall be a period not exceeding forty years including the ten years grace period by using Special Terms for Economic Partnership (STEP) of Japanese ODA Loans scheme.
- The loan ratio funded by JICA for the entire project is about 85%. The remaining ratio of 15% represents project management fee, contingency, price escalation, land acquisition and compensation expenses, VAT during construction , etc.

12.1.4 Cost of the Project

(1) Cost of the Project

The summary of estimated cost of the project is shown in Table 12.1.1.

Table 12.1.1 Estimated Cost of the Project

Non-Disclosure Information

(2) Operation and Maintenance Costs

The operation and maintenance cost is shown in the table below. Only the operation and maintenance cost of the Line 3A, not including the cost of Line 1, is included.

Personnel costs: Assuming that the headquarter personnel belong to Line 1, only the personnel expenses of the worksites of Line 3A are posted. Unit price of personnel cost is in accordance with the latest regulations in Viet Nam prescribed by job category.

Energy costs: Electricity consumption associated with traction power is calculated based on the operation plan. The electricity consumptions of the stations (the average consumption per station at the underground station and the elevated station) and the Depot (consumption per site) are estimated as per the project designs.

Material cost: Material costs associated with civil structure maintenance, E&M equipment maintenance, and rolling stock maintenance are set at 0.1%, 0.5%, and 1.5% / year of initial investment costs, respectively.

Insurance / taxes: 3% of the total of personnel expenses, power fuel costs and equipment cost.

Other expenses: 5% of the total of personnel expenses, power fuel costs and equipment cost.

Table 12.1.2 Operation and Maintenance Costs

Non-Disclosure Information

(3) Replacement and Reinvestment Costs

Replacement / reinvestment costs for railway system and rolling stocks are shown in the table below. The railway system renewal cost is respectively calculated as 10% of the initial investment cost in the 10th year and in the 20th year from the start of service. Also, the additional procurement cost for the necessary number of rolling stocks is calculated based on the operation plan.

Table 12.1.3 Update and Reinvestment Costs

Non-Disclosure Information

12.1.5 Revenues

(1) Fare Level

According to the report of the METROS survey, the fare of Line 3A is set at VND 20,000 + 1,000 / km at the start of operation (see attached document: sensitivity analysis of fare level).

(2) Estimated Fare Revenues

Based on the results of the transport demand forecast and the assumed fare level, fare revenues are estimated. For the estimation of annual revenues, the daily revenues are converted to annual revenues by multiplying by the total number of days (365). The annual fare revenue is summarized in Table 12.1.4.

(3) Non-Fare Revenues

The non-fare revenue is assumed 10% of fare revenues. The non-fare revenues include the income from advertisement, space rent at stations, underground bike parking, and sales of access right to station from peripheral commercial facilities, etc.

Table 12.1.4 Estimated Revenues

In million JPY, constant 2016 prices

Items / Year	2026	2030	2040	2050
Assumption on Metro Fare	9,191	17,214	19,068	23,089
Related Revenues	1,021	1,913	2,119	2,565
TOTAL	10,212	19,126	21,186	25,655

Source: JICA Study Team

12.1.6 Cash Flow Analysis

(1) Financial Internal Rate of Return

Based on the estimated revenues and costs, the financial internal rate of return (FIRR) indicates 7.27%. FIRR of the Project is a relatively low number since the capital-intensive underground section is the majority of the entire stretch. Notwithstanding the projected rate of return, this project is an economic infrastructure development with a high public nature, and it is necessary to judge the project ability together with the economic internal rate of return.

Table 12.1.5 Cash Flow

Non-Disclosure Information

(2) Transition of Financial Cash Flow

The transition of financial cash flow of entire period of the project is shown in Figure 12.1.1.

As soon as opening in 2026, the balance of the single year will be in surplus. Consequently, cumulative balance will be surplus in 2039. Although the railway management itself can expect a steady profitability from the position as the extension business of Line 1, it was confirmed that the burden of construction cost is large.

Non-Disclosure Information

Figure 12.1.1 Financial Cash Flow

(3) Sensitivity Analysis

The results of FIRR sensitivity analysis are summarized in Table 12.1.6. Decrease in revenue, particularly as the number of passengers after opening is lower than assumed, greatly affects the financial internal rate of return. To increase the income by taking measures to evoke passenger demand and proactively engaging related businesses will be important to ensure financial healthiness.

Table 12.1.6 Sensitivity Analysis of Financial Evaluation

Case	FIRR
Base Case	7.27%
Initial investment cost and replacement/ reinvestment cost + 10%	6.61%
Operation and maintenance cost + 10%	7.17%
Revenue (fare and non-fare revenue) – 10%	6.44%

Source: JICA Study Team

12.2 Economic Analysis

12.2.1 General

From the viewpoint of measuring the economic effect on the whole country or region, the economic benefit by urban rail transportation was estimated, and the difference between the case of “with Project” and “without Project” as social benefit was compared. The method of analysis was evaluated by economic internal rate of return (EIRR) using a general cost benefit analysis method to measure social net present value.

12.2.2 Key Assumption

The following key assumptions are made:

- The quantitative assessment criteria (Cut-off Rates) of investment adequacy in economic analysis is 8% which is equal to the cost of capital in Viet Nam and the social discount rate commonly used by the World Bank, JICA, etc.
- The benefits of each year are reduction value of time travel cost (TTC), vehicle operating cost (VOC), and CO_2 emission.
- The cost each year converts "project cost" & "replacement / reinvestment cost" into economic cost.
- The benefits and costs of economic evaluation exclude the effect of price escalation and taxes (VAT, import duties).

12.2.3 Economic Cost of the Project

The economic costs are determined by deducting all taxes and price contingencies included in the financial cost and by applying the Standard Conversion Factor (SCF) to the unskilled labor component of investment cost. Economic costs are estimated to be equivalent to about 85% of financial cost. The conversion factor applied to the operating and maintenance (O&M) costs are also 85%.

12.2.4 Economic Benefits

(1) Travel Time Cost Saving

The benefits of the Project assume savings in travel time cost. This means the time saved for passengers who shifted from other modes to the Line 3A. The cost value of savings in travel time is calculated by multiplying the time saved by service usage by the value of time. The value of time was set based on the METROS survey.

(2) Vehicle Operation Cost Saving

The benefits of the Project assume reduction value of vehicle operating cost. This means the reduction value of vehicle operating cost who shifted from other modes to the Line 3A. The reduction of vehicle operating cost is converted into monetary value by multiplying the reduction amount of travel distance by the unit price of travel cost. The vehicle operating cost value was set based on the METROS survey.

Table 12.2.1 Savings of Travel Time Cost and Vehicle Operating Cost

In million JPY per year

Item / Year	2026	2030	2040	2050
Saving of Travel Time Cost	1,077	6,131	10,001	20,131
Saving of Vehicle Operating Cost	645	4,950	8,632	19,025
TOTAL	1,722	11,081	18,632	39,156

Source: JICA Study Team

(3) The Value of Reduction in CO_2 Emission

The value of reduction in CO_2 emission was calculated using calculated in the previous section and the monetary conversion unit per ton of CO_2 emission. 10,600 yen (2006 price) of monetary conversion unit per ton of CO_2 emissions is used.

Table 12.2.2 The Value of Reduction in CO_2 Emission

In million JPY per year

Item / Year	2026	2030	2040	2050
Value of Reduction in CO_2 emission	71	141	184	218

Source: JICA Study Team

12.2.5 Results of Economic Evaluation

(1) Economic Internal Rate of Return

The economic analysis for the base case yields an EIRR of 9.65%. This indicates that the project is economically viable and exceeds the project adoption criteria of Vietnam. The results of the economic analysis and the computation of the EIRR、NPV and B/C are in Table 12.2.3.

Table 12.2.3 Economic Internal Rate of Return

Indicator	Unit	Value
EIRR	%	9.65
NPV	JPY Million	25,034
B/C	-	1.69

Source: JICA Study Team

Table 12.2.4 Evaluation of Economic Costs and Benefits

Non-Disclosure Information

(2) Transition of Economic Cost Benefit Flow

The transition of economic cost benefit flow is shown in the table below. High economic benefits are expected throughout the project life.

Non-Disclosure Information

Figure 12.2.1 Cash Flow of the Economic Valuation

(3) Sensitivity Analysis

The results of sensitivity analysis are summarized in Table 12.2.5.

Table 12.2.5 Sensitivity Analysis of Economic Evaluation

Case	EIRR
Base Case	9.65 %
Initial investment cost and replacement/ reinvestment cost + 10%	9.10 %
Operation and maintenance cost + 10%	9.56%
Benefits (savings in passenger travel time cost, reduction value of vehicle operating cost, the value of CO_2 emission reduction) – 10%	8.96%

Source: JICA Study Team

12.3 Operation and Effect Benchmark

The proposed Operation and Effect Indicators include availability ratio, mileage, number of trains per day, ridership, reduction in journey time, reduction of GHG emission, accident rate during construction, number of socially vulnerable and female passengers. For the quantitative indicator, we set the target value for the target year targeted at 2 years after completion, along with the reference value.

Table 12.3.1 Operation and Effect Benchmark

Indicator	Base line (2016)	Target Value (2028) 2years after completion
Availability Ratio (%)	N/A	93%
Number of Trains (#/day)	N/A	485
Mileage (km/day)	N/A	23,422
Ridership (pax./day)	N/A	274,700
Journey Time (Ben Thanh – Mien Tay Terminal) (mins.)	32	19
Journey Time (Suoi Tien – Mien Tay Terminal) (mins.)	83	49

Source: JICA Study Team

12.4 Qualitative Effect

Qualitative effects of the Project include:

- Traffic alleviation, improvement of traffic conditions, relief of traffic pollution,
- Reduction in GHG emissions, mitigation of climate change, improvement of living environment by reducing air pollution and noise,
- Improvement of convenience by more efficient and punctual railway transportation in the area,
- Improvement of the city's investment climate, promotion of redevelopment along the corridor, development of peripheral regional economy, and;
- Generation of employment opportunities (including promotion of gender equality), etc

CHAPTER 13 RISK ASSESSMENT

13.1 Implementation Structure

A new PMU will be created as an implementation body of the Project. As MAUR already established the PMUs for Line 2 and Line 5 Project, the personnel of PMU Line 1 may be transferred to the new PMU when the Line 1 Project is substantially completed. The following describes the assessment of risks pertaining to implementation structure.

- Delay in creation of PMU may have significant impact on the overall project schedule. The Minutes of Memorandum for ODA loan agreement ("MOM") should specify the deadline of PMU creation to help reduce the risk.
- Capacity and manpower may become insufficient if experience personnel are not assigned or work under dual assignment. Implementation of the Project should start when the Line 1 project reaches substantial completion stage to help reduce the risk. Also, the appointment of personnel having the experience of Line 1 project should be promised by the Vietnamese side during the appraisal for loan agreement.
- Institutional experience and know-how gained through the Line 1 project may not be supplied to the Project by losing experienced personnel to other entities. Promoting such experienced personnel with priority once assigned to the second project should help reduce the risk. Also, the appointment of personnel having the experience of Line 1 project should be promised by the Vietnamese side during the appraisal for loan agreement.
- Necessary coordination may not adequately be made due to insufficient liaison with the relevant authorities and stakeholders. Operational regulations including mandates of the Project Steering Committee should be detailed and carefully designed to help reduce the risk.
- Necessary manpower and other resources may not be secured if the approved budget is far below the request from the Implementing Agency. Detailed estimates of necessary expenses should be submitted at the time of project appraisal and the Government should be urged to approve the proposed budget once justified.

13.2 Operation and Maintenance Structure

As of December 2016, 1 year after the HCMC-PC's approval of the creation of O&M Company (Dec. 2015), there is little progress on setting up O&M organization. Therefore, the assessment below is based on the various interviews and the result of financial analysis of the O&M Company.

- According to the cash flow analysis of the O&M Company, the cash flow of the O&M Company remains to be deficit till 2028 but stays at single-year profit from the 1st year of commercial operation. The cash flow turns negative at the time of replacement and

reinvestment of E&M systems or rolling stock around 2040. If the actual ridership is maintained at the level of traffic forecast, the company can financially be independent without subsidy. Otherwise, replacement and reinvestment at the cost of the company will be difficult. Taking into account the financial outcomes of Line 1 before starting operation of Line 3A, HCMC-PC should consider financial support mechanism to ensure financial healthiness of the company.

- Capacity of the O&M personnel will heavily depend on the skill development and training under Line 1 Project and experience of the Line 1 operation and maintenance activities. Risks pertaining to O&M capacity should not be high as the proceeding Line 1 has both elevated and underground sections as Line 3A, majority of technical specifications of railway systems for Line 3A are the same as Line 1to ensure inter-operability, etc. On the other hand, capacity of personnel management and safety management may become the key risk factors as Line 3A requires inter-operation with Line 1, more complicated train control, and expanded maintenance works.

13.3 Preparation of F/S and EIA

As of December 2017, preparation of both F/S ("Pre-F/S" to be precise according to the local regulation) and EIA was completed. These documents will be used for application of investment policy approval in 2018. Risks related to F/S and EIA as the application documents to the National Assembly are as follows:

- F/S is required for project approval according to the Law on Public Investment, the Construction Law, and Decision on Application and Management of ODA Loan. Although the latest decision (issued on 2 May 2016) attaches the table of contents of the said F/S, details of the contents are unknown as there is no preceding case. The Project may delay due to late approval by the National Assembly for not precisely understanding the requirements in the F/S.
- At the time of application to the National Assembly for investment policy approval, EIA must have been approved by MONRE. The investment policy approval may not be issued within 2018 due to late approval of EIA.

13.4 Risk Control Sheet

The Study Team summarized the points to note in the project implantation and prepared the Risk Control Sheet using the JICA format (Appendix 13.1).

13.5 Way Forward

The project stakeholders shall carefully manage the risks by use of this sheet throughout the project, beginning with project appraisal, during implementation and preparation for commercial operation, and at the operation stage. Once the Loan Agreement is reached, MAUR and consultants will be required

to periodically update the sheet, share the observed potential risks with JICA as the donor agency, and take appropriate actions to manage the risks.

Appendix 13.1: Risk Control Sheet

Potential Project Risk	Approach/Check Target	Assessment Factor	Risk Management
1. Stakeholder Risk			
Commitment to the project implementation (Policy Priority, Commitment for Support including Expenditures) Maintainability of policy priority after the change of the Government **[Relations of the Project to the Development Policy]**	Ensure that the Government designates as the high priority project. Ensure commitment to the development strategy by high level officials	- Posted in the development plans, etc. - Allocation of budget during project formulation stage - Coordination among stakeholders during project design stage	The Government listed up the Project in the urban railway masterplan giving high priority. The Government seeks timely approval of the Project from the National Assembly. Once approved by the National Assembly, the Project is on the track as per the general practice in Vietnam.
	Ensure that the policy priority and commitment to the project implmenetation remain unchanged regardless of the change in the Government, etc.		Once approved by the National Assembly, commitment to the project implementation remains unchanged. Timely acquisition of the project approval from the National Assembly is the key to reduce the risk.
	Check factors that potentially cancel or increase motivation for project implementation by local and international perceptions (either positive or negative)		By contributing traffic alleviation and economic growth with modern technologies, the Project is most likely to receive positive response from home and abroad. This will lead the motivation for project implementation.
Consistency to the needs of the general public Potential conflict with established interest groups **[Relations of the Project to the Development Policy]**	Check if massive campains against project implementation by residents, media, or other stakeholders including the government of neighboring country may possibly be launched	- Records of stakeholder meetings during project formulation stage - Consistency to the needs of stakeholders	Despite the concerns of land acquisition, tree removal, noise and vibration, etc., heavy opposition by the stakeholders in SHM were not observed. Such risks will be addressed by introduction of appropriate construction methods aiming to minimize the negative impacts.
	(If high risk is recognized) Ensure risk management actions, including appropriate public relations strategy, are prepared		The NGO opposing to tree removal was already identified. Transplanting was proposed instead of cutting off trees along the corridor. The same was explained during SHM. Media relations will be handled by the responsibility of MAUR.
	Check if the Project may possibly be exposed to political interruption by imparing the interest of particular established groups with political influencing powers		The Project will cause some negative impacts on the competitive modes of transport, including buses and taxies along the line. Sales of motorbike may be influenced by the modal shift. The scale of the impact is not large. Unlikely to be exposed to heavy opposition. Explanation to the stakeholders with the result of traffic forecast will help reduce the risk.
2. Executing Agency Risk			
2.1 Capacity Risk			
Granting adequate resource and powers to the implementing agency (MAUR) **[Implementing Agency - Financial Capacity]**	Ensure that the implementing agency is equiped with sufficient manpower and financial resources Check if the implementing agency is empowered for necessary decision making in a timely manner	- Interviews with Donors, Consultants, Contractors - Review of various studies - Preceeding similar projects (particularly Line1) - History and progress of other donor projects in similar nature	The Project is the extension of the on-going urban railway project under JICA STEP scheme. Despite some delays in decision making by the Government, the preceding project generally runs smooth.
			As the Project is given with the highest priority amongst planned infrastructure projects in the city, budget for the implementation is likely to be secured as appropriate.

Reliability of fiancial management and procurement process Technical capacity of managerial units Practical application of concerned regulations including independence from political pressures **[Implementing agency - Technical Capacity]**	Check if the necessary regulations and by-laws on public procurement, etc. are effective and in place Check if the concensus building process required by JICA, etc. is embodied in the framework	-Review of the past studies on public procurement and financial management - Rate of job transfer of concerned department personnel - Skill development and training for new recruitees - Presense of internal audit deparment and its functions		No statutory mechanism for tunneling under buildings. This will be addressed by the direct negociation on compensation. As the personnel involved in the on-going project will continue to engage in the Project, they have good appreciation of the already established process.
	(Contrary to the above) Check if there is any risk of suspension/substantial delays, e.g. re-tendering, due to (unreasonably) strict conditions beyond JICA procurement guidelines set out by the local regulations	- Consultation with Local General Accounting Office, Donors, Consultants, Contractors - Past records of critical delays and frauds in comparable public procurements (includng ODA)		The on-going project experienced re-tendering and major delays. By mindful preparation of tender documents and advance provision of information based on the lessons learned, such risks can to be reduced.
				Seminars on procurement and financial management plus training of project implementation staff by JICA and consultants from preparatory stage till the beginning of the project implementation will be effective. Also, advisory service by inhouse expert dispatched by JICA will help reduce the risk.
				Confirmation of internal approval procedures and exhibition of actual days spent for approval at monitoring meetings with high level officials (such as HCMC-PC) will be effective. Proactive efforts to streamline complex procedures and empowerment of project management unit (PMU) will help reduce the risk.
Reliability of self-financing capacity Reliability of financial management capacity **[Implementing Agency - Financial Capacity]**	Check if the agency can arrange self-financing part of expenditures or/and budget of O&M cost or surely granted by the Government. If borrowing is necessary, check if the agency can promptly arrange the required amount.	- Confrimation of the initial budget and disbursement rate - Presense of interim review system at the mid term of fiscal year - Presense of flexible budget re-allocation according to the actual records		Self-financing portion is likely to be arranged taking into account the financial capacity of HCMC. The cashflow estimate shows O&M cost can be recovered by fare revenue and non-fare revenue. In the event of substantial loss in O&M, necessary financial support from the city is highly expectable.
	(Contrary to the above) Check if there is any risk of delays in project approval by the Government due to the need for full-financing of the project at once (as the prerequisite for the approval by the National Assembly)	- Confirmation of the budget prospects of the entire Government (through review of micro-economy reports by IMF, etc.)		No possibility of full-finacing according to the preceding cases in the country.
2.2 Governance Risk				
Liaison across concerned departments, complex implementation structure **[Implementing Agency - Implementing Structure, O&M Structure]**	Check if the share of responsibilities on various decision making and coordination schemes for project implementation between relevant agencies including high power authorities	- Periodical confirmation of liaison systems and inter-ministerial coordination results		As the project in the same nature is in progress, share of responsibilities and collaborative stucture is already developed and running. Notwithstanding the alterations of approving procedures on social & environmental impact assessment, the details are well understood among responsible persons in MAUR.
		- Identification of key points about inter-ministerial meetings on development master plans where the Project is positioned. - Positive or negative impacts of the Project on the goals and objectives of other ministries		The Project is, as the backborne for economic development of the city, an integral part of the city development programs. Also, by the environmental-friendly nature of the Project, it will have positive impacts to other ministries in general.

Delay in approval of borrowing decisions by the National Assembly **[Implementation Schedule]**	Check if there is any risk of delays in approval of E/N, L/A decisions due to lack in coordination between the Government and the Assembly, constraints associated with local regulations, and others	- Review of past cases including other donor projects - Extent of the political confrantation between the present ruling and opposition parties	As the experinece of other projects in HCMC shows, the Project is unlikely to face with substantial delays for such reasons.
2.3 Fraud & Corruption Risk			
Appropriateness and effectiveness of financial and pcocurement management rules and regulations, etc. **[Procurement and Construction Methods]**	Check if necessary institutional systems for project implementation, including procurement, financial management, and anti-corruption, are sufficiently developed Check if the institutional systems of accountability, including accounting inspection and disclosures, are sufficiently developed Should the risk of institutional inadequecy is high, check if supplemental measures, such as external audits, are taken as appropriate	- Review of evaluation of public financial systems, etc. - Interview with Donors, Contractors, and Consultants	As the preceding project is on-going, necessary intititutions for project implementation are already in place.
	Check if the past projects (including other donor projects) in similar nature faced with significant delays or other problems during implementation		The preceding project encountered significant delays due to strict bid conditions. As the project stakeholders broadly share the lesson, reasons and resolutions, the Project is unlikely to repeat the same problem.
3. Project Risk			
3.1 Design Risk			
Technology to be adopted for the Project Adoption of unreasonably high technology **[Scope of the Project]** **[Implementing Agency - Capability for implementation of the technology]**	Ensure that the technology to be adopted is not very complicated. Ensure that all the necessary components are properly incorporated to achieve the Development effects. (including cooperation with other Donors)	Previous adoption of the same technology in other public works. Proposed technology assumes certain changes of current rules/system.	Same technology has beens adopted in on-going project, thus no technical difficulty is foreseen. There is no law to cover the problems caused by tunnel construction under existing houses. Compensation for this matter including claims during construction stage is to be resolved through negotiation with the house owner.
	Check if adoption of unnecessarily high technology increases the fare and/or maintenance cost.		Project cost has been reduced through various cost down ideas. Technology adopted for the Project is maintained at reasonable level. Fare and maintenance cost are expected to be within proper range.
			Adequate amount of contingency should be included because the Works will be carried out in unforeseeable underground space.
Adequate scope of the Project **[Scope of the Project]**	Ensure that all the necessary components (includind software) are properly incorporated to achieve the purpose of the Project. Check if Development effect can be affected when some component not included in the Assistance is not implemented.	Confirmation of the written commitment of the government in the Development plan etc. to the implementation of relating projects and complementary policy.	Preparation for the establishment of the operation and maintenance system is not sufficient. Proper plan and preparation (training) for the operation and maintenance of multiple lines is inevitable. Implementation of technical professionals is inevitable. Introduction of common ticket is recommended.
		Confirmation of the contents of main subjects and implementation schedule shown in the assistance strategy plan of other Donors.	Each Donor is financing for F/S and implementation of the Prohect, but not for soft component. Assistance from JICA enables implementation of balanced and effective improvement of the urban infrastructure.

Reliability of the monitoring system for the Project **[Implementing Agency - Organization for Implementation of the Project]**	Check if the problem is not recognised or neglected because the status of the implementation of the Project (budget, work) is not timely and/or properly understood.	Confirmation of the arrangement for clarification of the responsibility for the management of the Project (setting up of PIU etc.) Confirmation of PIU staffs project management experience in a similar size of project.	On-going project is being implemented, and the monitoring system for the project seems to be well established.
	Check if the fund can be misused due to insufficient monitoring.	Confirmation of current monitoring mechanism and etc. for budget control applied to public works.	There has been occurred no financial problems in budget control etc. so far in on-going project, and the monitoring mechanism for the project seems to be properly established.
Inadequate procurement package Insufficient capability of the Contractor **[Procurement, Construction Method]**	Check if there are too many procurement packages.	List of registered contractors for government works such as pre-investigation for the Project. Work experience of the contractor.	Hearing to the contractors has been carried out. Each procurement package is well prepared to be proper type and size, taking into consideration that this project is an extention of on-going project.
	Check if capable bidders may not bid because the adjustment cost among the contractors is too high or low.	Study about contract packages introduced for previous Assistance Projects.	Ditto
Increase of Project cost due to external causes **[Project cost and finance plan]**	Check if the Project cost may increase due to the change of international market situation and/or exchange rates etc.	Hearing from a contractor working for similar Project about actual situation and possible problems in future.	Project cost increase due to the infration in Viet Nam is anticipated. Appropriate infration rate and contingency should be considered for this problem.
Decrease of demands due to external causes **[Neccessity of the Project]**	Check if the demand for the service may suddenly decrease due to the change of foreign market condition because the customer for the service is too much limited.	Confirmation of the prospects of other project implemented by others, if the demand for that project is affected by same factors with this project.	Population will be increasing in future as well, and high demand for the Project is expected even taking into consideration the improvement of other transportation tools. Considering similar cases in other countries, the chance of demand increase is rather high.
		Hearing from international organization etc. about the factors which are used for estimation of the demand for the Project at F/S atage.	Master plan for urban development and improvement of transportation system tends to be over estimated, and it is difficult to implement the project as planned. In case the actual demand turns short implementtion of the project can be flexibly adjusted i.e. modification of the procurement shedule of rolling stock at bid preparation stage etc.
			Pre-opening promotion activities is to be supported by the procurement consultant so that the utilization rate can be increased.

				Pre-opening promotion activities is to be supported by the procurement consultant so that the utilization rate can be increased.
3.2 Program/Donor Risk				
Improvement of relationg projects **[Scope of the Project]**	Check if the project effect can be reduced due to delay of other projects not covered by the Assistance (including changes in policy or rules), when the effect is estimated on the assumption that such other projects are implemented in accordance with the plan.	Extent of mutual dependence among projects. When the construction work itself is also involved, the critical path must be precisely checked.		Demand of this project assumes no effect from other projects not covered by the Assistance, therefore there is no risk for shortage of demand.
				Implementation of TOD improves the demand and convenience of the user. Positive implementation through the negotiation among the stake holders (land owner, developer, implementing Agency) is expected.
				Positive correspondence to the intermediate review. Plenary meetings are to be arranged for portfolio meeting so that the progress of the implementation of relating polocy and project can be monitored, and that necessary actions can be determined and confirmed at high level.
Cooperation with relevant Donor etc, **[Correspondence of other assistant organization]** **[Cooperation with other Donor etc.]**	Check if the communication system for timely share of information and discussion about the problem regarding the polocy of relevant sector and implementation of the project.	Check the contents of the medium term strategy of the Donor regarding cooperation with others and budget for such cooperation. Check if there was a case where a donor disagreed with similar project including the case in other countries.		Positive arrangement for negotiation meeting for adjustment among donors. The process of JICA side is to be explained to donors as well in the presence the implementing agency. Donors for other lines are ADB, EIB, Spain, Korea and etc. The donors meeting is not regularly held at this moment, and joint meeting with stakeholders is to be timely arranged for the consistent and effective improvement of the railway system.
3.3 Delivery Quality Risk				
Measurability of Project Effect **[Project Effect]**	Check if the necessary data for operation and effect benchmarking is available and source of the data is specified as appropriate	Review of measurement structure of other projects and content of data collection by statistics office, etc.		Necessary data for benchmarking operation & effect index can be made avaiable without much effort as far as the operating entity adequately manages operational data.
Sustainability of Project Effect **[Operation & Maintenance Strucuture]**	Check if the responsibilities of O&M is clearly determined. Check if the plans of facility operation & maintenance plans are, from the technical perspective, adequately designed. Check if the budget for the O&M activities is sufficiently allocated. Check the backgrounds of budget insufficiency (e.g. reasonably low fare price) if applicable.	Interview with contractors and experts, etc. to understand the current capacity of O&M planning, budgetting, inspection & repair works		O&M structure needs to be designed and established for the on-going project. As the entity is under preparation for its establishment, technical assistance and capacity buidling will be much needed to help develop the appropriate O&M plans with sufficient budget.

				Prior to the completion of the works, practical measures to address financial inability, if applicable, should be developed by technical assistance, capacity building and procurement consultancy.
				With respect to the fare policy, donors across different transport projects should organize coordination meetings and jointly request adoption of adequate fare price to the Government
Impact of Natural Disaster, etc. on the Project Implentation Impact of Security Issues, etc. on the Project Implementation **[Need for project] [Miscellaneous Points to Note]**	Check the possibility of project suspension / delays due to the impact of natural disasters at the project site	Project designs in F/S Stage incorporating the records of natural disasters		As the project site is in HCMC, large-scale natural disasters, such as tsunami, catastorophic floods, earthquakes, are unlikely to take place.
	Check the possibility of project delays due to strikes / demonstrations, anti-government activities, etc.	Record of publicity / public consultations on the project to the key stakeholders in the project area		The city's political situation is stable. Risks of demonstrations and terrorism are relatively low.
Inadequate and Unrightful Use of the Project **[Project Effect]**	Check if the Project is used in unrightful / illegal, and/or inadequate ways. (e.g. for military purpose)	Review of the monitoring structures and facility operations of the past completed projects (including maintenance purposes)		By nature of urban railways, the Project is unlikely to be used in inadequate and unrightful ways. The risk will becom even lower by conduct of monitoring and post evaluations.
Escallation of Maintenance Cost by Inappropriate Use of the Facility **[Operation & Maintenance Structure]**	Check the possibility of maintenance cost escallation and/or shortening of project life due to inappropriate use of the facilities.	Review of development plans in the transport sector and subjects of policy improvement prescribed in the assistance strategies of other donors		Possibility of maintenance cost increase by unjust use by the passengers (e.g. eating and driking inside trains, graffiti and wreking) and accidents (e.g. falles of passengers to the track) is recognized. Public Relations, educational campaigns, protective actions, monitoring schemes, etc. should be programed and implemented.
Possibility of Eccentric Distribution of Benefits to Particular Groups Small Range of Beneficiaries **[Project Effect]**	Check if the Project effect will be delivered to particular groups	Review of the records of publicity / promulgations about the project to the stakeholders		All residents along the corridor will be benefited. Economic activities will be stimulated with traffic alleviation and travel time saving. Assessment of project benefits and proactive consultations with local communities and other stakeholders from the beginning of the Project will help reduce the risk.
	Ensure no paricular social groups (e.g. female, ethnic minorities, native tribes, etc.) are excluded from beneficiaries / receive negative impact			Risk of such exclusion or negative impact to particular groups is low. Strict assessment of benefit distribution, such as identification of project effect by visiting project site including the final beneficiaries, should be undertaken.

CHAPTER 14 MISCELLANENOUS STUDIES

14.1 Procedures for ODA Project Appraisal

14.1.1 General Flow

Necessary approvals for project approvals include “Program/Project Investment Policy” (PPIP) and “Program/Project Investment Decision” (PPID). Current study particularly aims to obtain the approvals on PPIP.

- The Project is categorized as the “National Important Project” under the Law on Public Investment which requires approval of PPIP from the National Assembly. Application for this approval shall be made with pre-F/S, certification documents of EIA, and documents related to financial portfolio of the Project.
- The Project EIA shall be re-approved by MONRE.
- The “Resettlement Policy Framework” (RPF), which is equivalent to RAP in Vietnam, requires Prime Minister’s approval via MONRE. Unlike EIA, RPF is unnecessary for the approval of PPIP.
- After approval of PPIP, PPID shall be approved by the Prime Minister. This requires full-scale F/S report, which may be prepared and updated during the detailed design.
- L/A could be reached only after the approval of PPID (implicitly understood from the law).
- The FR, EIA and RAP of this study will become the basis for the pre-F/S, local EIA, and local RPF in Vietnam, respectively.

14.1.2 Program/Project Investment Policy

The procedure for project approval is specified in the Law on Public Investment (No. 49/2014/QH13), where public investments are categorized by budget and nature. According to this law, the Project is defined as the “National Important Project” (NIP). The pre-F/S of NIP requires approval of PPIP by the National Assembly after examination of the council, which is to be organized by the Prime Minister.

In addition to pre-F/S, it is understood certification of EIA provides necessary basis for approval of PPIP according to the Law on Protection of Environment and Natural Resources. Although “Decision on Application and Management of ODA Loan (No. 16/2016/ND-CP) rephrased to PPIP, this is, in fact, identical to the investment policy under the Law on Public Investment.

14.1.3 Program/Project Investment Decision

Once PPIP approval is made, NIP shall obtain PPID by the Prime Minister. This approval will be made to the bunch of documents ("Van Kien" in Vietnamese) including F/S report to be prepared based on the already approved pre-F/S. The Prime Minister issues PPID upon acceptance of these documents.

14.1.4 Resettlement Policy Framework

Procedures for resettlement in Vietnam in the case of Japanese ODA loan projects include the following steps.

i. Prepare RAP under preparatory survey
ii. Approve RAP in Vietnam and disclose at JICA website after review and confirmation by JICA
iii. Prepare RPF and approve it as per the local procedure

RPF does not directly relate to the procedures for PPIP and PPID. In fact, "Decision on Application and Management of ODA Loan" specifies the period of RPF preparation and approval at "preparatory stage for PPID", but this does not meet the schedule of RAP preparation and requirement of donor agencies. Therefore, RAP shall be prepared and approved by Vietnamese side at early stage of project preparation and disclose at the website of the donor, albeit this is not defined anywhere in the legal framework in Vietnam.

The above procedures are illustrated in the flowchart below.

14.2 Co-Financing with ADB

According to the "Follow-up Measures of the Partnership for Quality Infrastructure" issued by MOF of Japan in November 2015, collaboration with the Asian Development Bank (ADB) is one of the pillars aside from the speed-up and expansion of JICA assistance programs. Meeting this policy guidance, JICA and the Study Team held a meeting with ADB in April 2016 to seek the possibility of co-financing the Project.

14.2.1 Possibility of Co-Financing the Project

Following was confirmed through the meeting with ADB.

- Vietnam will graduate from the Asian Development Fund (ADF) 5 years later and shift to the loan receiving country using Ordinary Capital Resources (OCR) for lending. ADB remains interested in the lending for large infrastructure projects in Vietnam.
- In judgement of participation in a certain project as the donor agency, ADB needs to carefully review the amount of lending programs for other projects and sectors. Co-financing will

become difficult if the lending program of ADB does not really meet the timing of JICA's loan agreement for the Project.

- According to the ADB's general procedures of project appraisal, "Project Preparation Technical Assistance" (PPTA), "Small-Scale Technical Assistance" (SSTA) shall be carried out before appraisal mission.
- According to the record of ADB's assistance in Vietnam, there is a clear demarcation between ADB and bi-lateral donors, i.e. ADB is responsible for civil works and bi-lateral donors are responsible for procurement of rolling stock and railway systems. This scheme will be applicable for future co-financing with JICA if that in fact occurred.
- ADB expects JICA's initiative on the detailed design stage if co-financing with JICA happens. This is because most of the ADB projects in Vietnam face significant delays during that stage. By the leadership of JICA having the experience of preceding Line 1 project, ADB would be benefited by reducing the impact of project delays.

14.2.2 Guidelines of Each Donor

Following was confirmed through the meeting with ADB.

- Guidelines and L/A procedures of each donor will be used for co-financing projects as appropriate. Loan agreements will be made individually by procurement package in the case of co-financing.
- In the event of co-financing by procurement package, each guidelines for social & environmental safeguards and procurement guidelines will be used for each package. If the consultant works for whole contract packages, their services will become complex as different guidelines are used for each package.
- Therefore, coordination and integration between different guidelines will not be required. Meanwhile, consultants must comprehend each guideline to perform their services.

14.3 System Safety Certification

14.3.1 Background and Objective

In Vietnam, there is the process that the Ministry of Transport Science and Technology Department the secretariat has prepared and coordinated ministerial ordinances in order to unify the scheme on safety management and certification of the railway systems in the country.

This Ministerial ordinance on Safety Certification for City Railway Systems defines the inspection, verification and validation on the system safety at the time of newly establishment or renewal, and regular/periodic certification procedure on urban railway safety management system . It is considered that a certification body will be the VR, Vietnam Register, who certifies the shipping.

In Vietnam, application of RAMS is considering under the Ministerial ordinance on Safety Certification for City Railway Systems (No. 16/2016/TT-BGTVT). Based on this point, the aim of this re-entrustment of investigation is to investigate and organize the impact on Japanese companies when Vietnam introduces the RAMS as a system standard, and to examine policies and measures in this project.

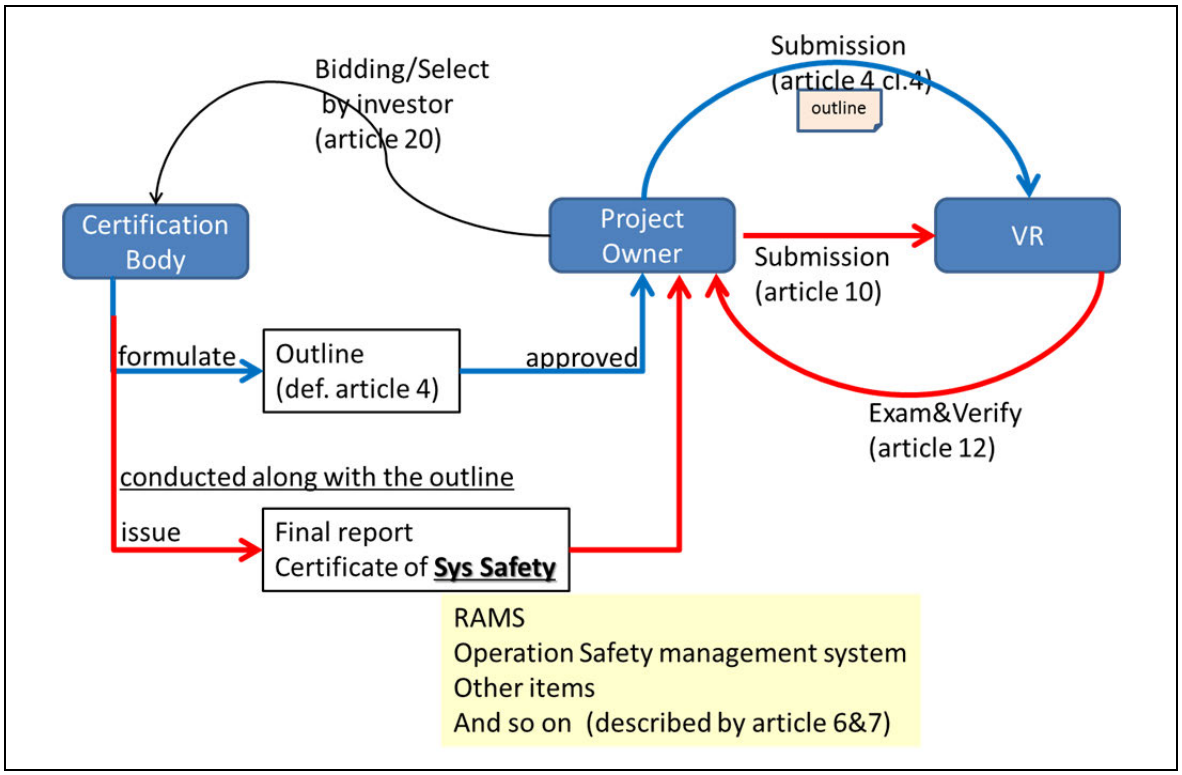
14.3.2 Progress and Current Status of RAMS Certification in Vietnam

(1) Legal Basis

Ministerial ordinance on Safety Certification for City Railway Systems (No. 16/2016/TT-BGTVT) dated on 30 June 2016.

(2) System Safety Certification Scheme

With regard to the process for getting certification, the certification body, which selected by bidding, makes the outline(which described at Article 4(3)) firstly, and the assessment and certification of system safety are carried out based on the outline, which is approved by the investor, and shall be dispatched to the Vietnam Register.



Source: Mitsubishi Research Institute

Figure 14.3.1 System Safety Certification Procedure

The scope of the circular is stated at the article 6(new system) and 7(upgrading) as follows;

- Assess reliability, availability, maintainability and safety of following systems: vehicle types, train control signalling system, motive power supply system. (RAMS)

- Assess risks of passenger evacuation measures in case of emergency; risks of controlling smoke, heat escape and ventilation in tunnels.
- Assess electromagnetic compatibility. (EMC)
- Assess system integration.
- Assess trial operation of the system.
- Assess operation safety management system.（SMS）
- Other items at the request of the investor.

(3) Applicable Project

Regarding the project which will be subject to the circular; (Article23 Transitional provisions)

- For urban railway routes that have been constructed with the outline approved before the effective date of this Circular, implementation of the approved tasks shall be continued but the examination and verification of system safety dossiers shall be carried out in accordance with provisions set out hereof.
- For urban railway routes that have been constructed without the outline approved before the effective date of this Circular, the investor shall formulate the operation safety management system which should be certified (by the certification body) as conformable with the safety management standards approved by competent authorities.
- The regulation shall be applied to the Project.

(4) Comparison of Safety Assessment between Vietnam and EU

Through interviews with VR and confirmation with European consultants who assisted the formulation of this ministerial ordinance, the ordinance is created while referring to the European framework, being meant to be in the same framework as Europe's basically.

However, the major different point between Europe and Vietnam is that it is possible to select a certification body by the discretion of an applicant in Europe, but in Vietnam it is necessary to select it by tender.

To decide a certification body by tender could be a rational framework from the viewpoint of securing of independency and economic efficiency for cost control. However, for example, in the case of extending the current project, there is a possibility that the certification body could not be fully evaluated in the description of only differences. Therefore, it may be necessary to have documents and explanations both on the base project and extension part, and certain plans (devices) on creating a tender specification can be needed.

14.3.3 Impacts and Actions Required for Application of RAMS

(1) Period and Cost for System Certification

System Safety Certification

- According to Japanese Supplier A, the cost will be increased 30% in the case that RAMS certification is required even though the Japanese certification body, NTSEL is available.
- And according to Japanese Supplier B, they have already cooperated with a foreign certification body and might not need additional cost.
- Considering the situation that certification body will be selected by bidding and cost for certification will be suppressed, Certification cost will be expected about 10% of E&M.

Operation Safety Management System Certification

- The project owner shall formulate the SMS which should be certified (by the certification body) before putting into operation.
- According to interview with VR, they said that VR don't have enough experience and knowledge about SMS currently. The interview result indicates that the period and cost will be increased to explain to or convince VR.
- Based on the expertise of European certification bodies, it will take 1-1.5 year and JPY 100 million to get SMS.

(2) Influence of Competitiveness with Foreign Companies

- Regarding European companies, they have to consider risks which are related to the Vietnamese environment and so on, but they are basically used to RAMS certification then the period and cost will not be increased.
- Concerning Chinese companies, they largely surpass Japanese companies in getting IRIS (International Railway Industry Standard) certification which include RAMS (Japan:11 cases, China:621 cases). From that point of view, the period and cost for China companies will not be increased.
- Considering above, It is important and essential for Japanese railway industry to take measures to reduce the cost and period concerned with RAMS.

(3) Proposal

Considering that cost reduction related to RAMS certification will strengthen the competitiveness of Japanese companies and certification body are decided by tender, countermeasures given below are considered to be effective:

- Prepare an Outline sample templates required for the System Safety Certification.
- Present document examples to be prepared in each phase.
- Indicate points to be noted in Audit when applying to a certification.

In addition, by confirming the above three points in the next phase to VR and others, it is possible to assume in advance how many or much documents should be prepared and to avoid a large cost escalation.

Considering the situation that VR don't have enough experience and knowledge about SMS, technical assistance and capacity building in the field will be much needed.

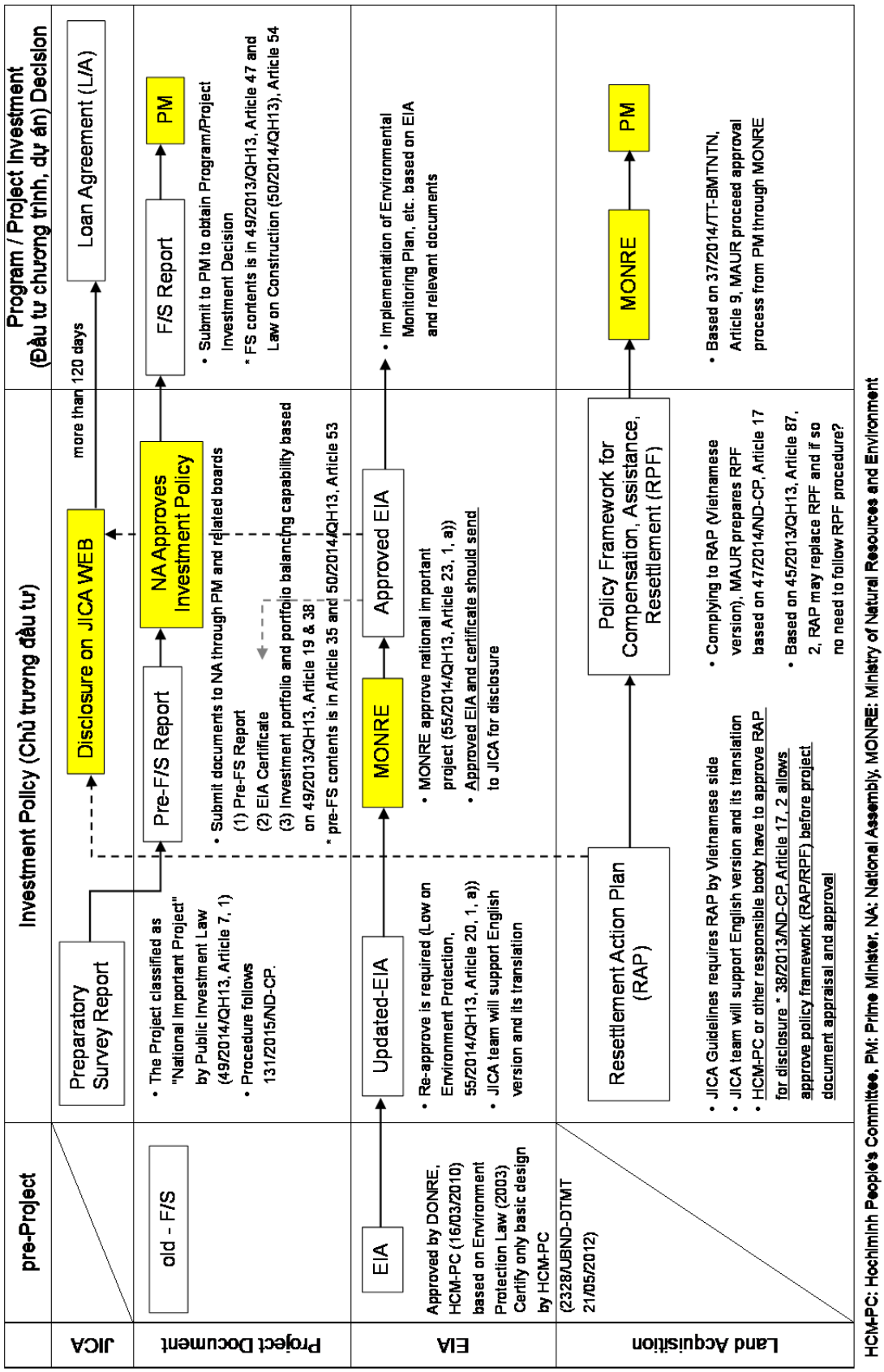


Figure 14.3.2 Procedure for Project Approval

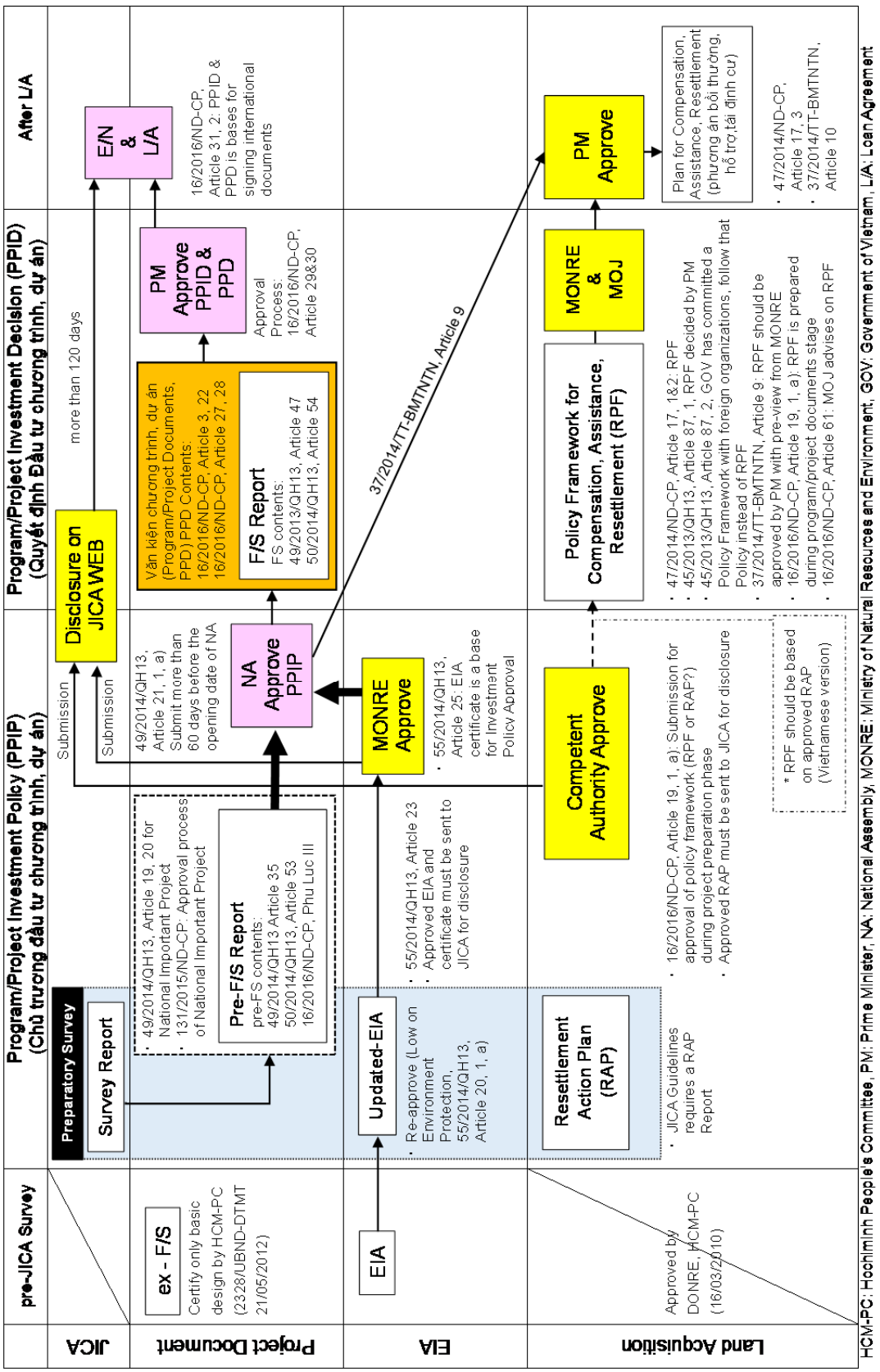


Figure 14.3.3 Revised Procedure for Project Approval

CHAPTER 15 CAPACITY BUILDING AND TECHNICAL ASSISTANCE PROGRAMS

15.1 Framework for Capacity Building and Technical Assistance

At the time of implantation of the Project, ranges of capacity building and technical assistance for the Line 1 project had already completed. Therefore, programs for the Project should focus on the activities to enhance values of urban railway service and associated area development along the corridor, encompassing 3 pillars, namely “Establishment of integrated management structure for urban railway network”, “Enhancement of the functions of station areas”, and “Improvement of urban railway services”.

15.2 Capacity Building Programs

The proposed capacity building programs consists of 3 packages, namely “Capacity building for O&M personnel”, “Capacity building for regulatory personnel” and “Capacity building for urban planning and redevelopment personnel”.

15.2.1 Capacity Building for O&M Personnel

(1) Objective

The objective of this program is to ensure successful integrated operation management and maintenance with Line 1 through capacity building of O&M personnel across the lines.

(2) Implementation Structure

Working closely with the O&M Company to be created as the counterpart agency, this program aims to build capacity of the O&M personnel and accomplish the above objective.

(3) Activities

Activities of this program include:

- Enhance passenger service capacity of station operation personnel
- Build train control and inter-operation capacity of OCC controllers
- Build train inter-operation / driving capacity of train drivers
- Build general overhaul capacity of rolling stock personnel

15.2.2 Capacity Building for Regulatory Personnel

(1) Objective

The objective of this program is to establish an appropriate regulatory structure of urban railway network in HCMC through capacity building of the regulator and regulatory personnel.

(2) Implementation Structure

Working closely with the regulatory agency (to be identified) and HCMC-PC as the counterpart agencies, this program aims to build capacity of the regulatory personnel and accomplish the above objective.

(3) Activities

Activities of this program include:

- Assist institutional designs of regulatory and supervisory systems
- Conduct case studies for regulatory and supervisory personnel
- Pay particular focuses on fare adjustment, safety management, and system certification

15.2.3 Capacity Building for Urban Planning and Redevelopment Personnel

(1) Objective

The objective of this program is to build capacity for urban planning and redevelopment implementation at district level in HCMC through consolidations of relevant institutions and capacity building of the concerned entities and personnel.

(2) Implementation Structure

Working closely with DPA and HCMC-PC as the counterpart agencies, this program aims to build capacity of the urban planning and redevelopment personnel and accomplish the above objective.

(3) Activities

Activities of this program include:

- Joint works by forming Joint Coordination Committee (JCC) and taskforces (on institutional framework and urban development institutions)
- Provide technical assistance, verification, and monitoring of urban planning and redevelopment implementation along with the Project
- Hold seminars, workshops and study tours

15.3 Technical Assistance Programs

The proposed technical assistance programs consists of 3 packages, namely “System integration and operation assistance”, “Station area and ITF development assistance” and “Universal designs introduction assistance”.

15.3.1 System Integration and Operation Assistance

(1) Objective

The objective of this program is to establish efficient integrated management system across Line 1 and Line 3A through technical assistance for system integrations and network operation by coordinating the interface between the lines.

(2) Implementation Structure

Working closely with the O&M Company to be established and HCMC-PC as the counterpart agencies, and liaison with MAUR and the IC Card Issuing entity, this program aims to develop integrated systems and operations across different lines.

(3) Activities

Activities of this program include:

- Develop common ticketing system and operation guidelines
- Develop integrated operation control center and operation guidelines
- Develop integrated maintenance system and maintenance guidelines

15.3.2 Station Area and ITF Development Assistance

(1) Objective

The objective of this program is to provide the Japanese experience and know-how to the station area and ITF development along with the Project and, at the same time, promote the market entry of Japanese developers to the TOD projects.

(2) Implementation Structure

Working closely with MAUR and HCMC-PC as the counterpart agencies, this program aims to assist station area and ITF development along with the Project.

(3) Activities

Activities of this program include:

- Assist preparation of concept designs at each station and development plans of public facilities including station plaza
- Form an advisory group consisting of Japanese railway operators and developers to jointly work on concept designs
- Ensure consistent and coherent assistance, ranging from basic designs, cost estimate, bid documentation, to implementation

15.3.3 Universal Design Introduction Assistance

(1) Objective

The objective of this program is to provide the Japanese experience and know-how to universal designs along with the Project and thereby disseminate the philosophy of universal designs with an emphasis on gender equality to urban railway sector in Vietnam.

(2) Implementation Structure

Working closely with MAUR and HCMC-PC as the counterpart agencies, and also liaison with the Gender Equality Office of MOLISA, as the national machinery, and DOLISA, as the regional machinery for protecting people with disabilities, this program aims to assist introduction of universal designs.

(3) Activities

Activities of this program include:

- Develop design standard manuals by enhancing the employer's requirement of Line 1 (at the beginning of designs)
- Design facilities and equipment, complying with universal design standards
- Conduct design reviews and feedbacks by relevant agencies / organizations and DPOs
- Setup target benchmark for capacity building on universal designs
- Conduct test walks and feedbacks prior to the commencement of commercial operation
- Develop and enhance design standard manuals and action manuals for the O&M company
- Prepare and distribute universal design handbook for users
- Develop quality control program on service for people with disabilities

CHAPTER 16 TOWARD APPROVAL OF PROJECT INVESTMENT POLICY

16.1 Objective

It was made clear in the course of this Survey that the Project failed to obtain the approval of investment policy from the National Assembly within 2017. Therefore, both MAUR and JICA confirmed to delay the project appraisal schedule and seek the approval from the National Assembly next year.

In light of the change in project schedule, this chapter explains the adjustments of the results of this survey. In other words, the contents of earlier chapters remain unchanged unless such adjustments are specified in this chapter.

16.2 Summary of Adjustments

The adjustments due to delay in project formulation schedule is summarized in the following table.

Along with the said delay, the entire project schedule, including the timing of loan agreement, commencement of construction works, and system commissioning, must be pushed back by 1 year. While no particular adjustments are made in the project designs, investment cost of the Project increases by the influence of exchange rate and price escalations. Impact on the project effects, such as economic and financial indicators, is little enough. Details of the adjustments are provided from 16.3.

Table 16.2.1 Summary of Adjustments

Category	Before/After Adjustment	Section	Adjustment
Project Formulation Schedule	Before	6.5	Investment policy approval on Nov. 2017, L/A after 3Q 2018
	After	16.3	Investment policy approval on Nov. 2018, L/A after 3Q 2019
Demand Forecast	Before	3.2	Daily ridership 218,500, PHPDT 12,000 (in 2026)
	After	16.4	Daily ridership 244,700, PHPDT 13,500 (in 2027)
Project Designs	Before	4.1	Year of opening 2026 (project designs as specified in Chap 4)
	After	16.5	Year of opening 2027 (no adjustments except opening year)
Project Implementation Schedule	Before	6.5	Construction period July 2020 – December 2026
	After	16.6	Construction period July 2023 – December 2027
Cost Estimate	Before	6.7	Total investment cost JPY 199 Bil. (STEP loan conditions)
	After	16.7	Total investment cost JPY 201 Bil. (STEP loan conditions)
Project Effect	Before	12.1/2	FIRR 7.27%、EIRR 9.65%
	After	16.8	FIRR 7.60%、EIRR 9.55%

Source: JICA Study Team

16.3 Project Formulation Schedule

This section describes the adjustments of the project formulation schedule (till the Loan Agreement), which was earlier designed in "6.5 Project Implementation Schedule".

16.3.1 Premise

Premises for the project formulation schedule are as follows:

- The Project will obtain investment policy approval by the National Assembly in November – December 2018.
- At least 90 days will be required to obtain investment policy (pre-F/S) approval by HCMC-PC.
- At least 95 days will be required to obtain investment policy (pre-F/S) approval by the Central Government as prescribed in the relevant decree.
- Applications to the Regulatory Body of the National Assembly shall be made at least 60 days before the opening day of the National Assembly.
- EIA shall be approved by MONRE prior to the above application to the National Assembly.

16.3.2 Milestones

The following table shows the milestones toward investment policy approval in 2018. The largest concern is about the Project Proposal, which is yet to be approved as of December 2017. The following step, namely review of the pre-F/S by the appraisal body at HCMC-PC, can start only after the said approval. Project stakeholders must, therefore, extend continuous follow-up actions for timely approval.

Table 16.3.1 Milestones toward Investment Policy Approval

	Milestone	Responsibility	Period
1	Approval of Project Proposal by the Prime Minister (PM)	MPI	Immediate
2	Submission of Pre-F/S to the Central Government / PM	HCMC-PC	February 2018
3	Submission of Pre-F/S to the National Assembly	MPI	June 2018
4	Approval by the National Assembly (Investment Policy Approval)	National Assembly	November – December 2018

Note:

- Approval of Project Proposal (PP) by PM is the prerequisite for Pre-F/S submission to the Central Government / PM.
- Also, approval of PP by PM is the prerequisite for EIA submission to MONRE.
- The above milestone considers submission of pre-F/S to the National Assembly 4 months (120 days) before the opening day (around 20 October). This includes minimum requirements of 95 days plus some spare time.
- The above milestone considers assessment of pre-F/S by the appraisal council at the Central Government for 4 months (120 days). This includes ordinary period of 90 days plus some spare time.

Source: JICA Study Team

16.3.3 Action Plan

This section provides time-bound action plan toward investment policy approval, indicating the responsible entity with timelines.

Table 16.3.2 Milestones toward Investment Policy Approval

No.	Document	Procedure	Responsibility	Due
1	Project Proposal	Approval of PP by PM	MPI	Immediate
2	Pre-F/S	Submission of Pre-F/S to Central Government / PM	HCMC-PC	Feb. 2018
		Submission of Pre-F/S to National Assembly	MPI	Jun. 2018
		Approval by National Assembly (investment policy approval)	National Assembly	Nov. – Dec. 2018
3	Resettlement Action Plan (RAP)	Submission of RAP to HCMC-PC	MAUR	Feb. 2018
		Approval of RAP by HCMC-PC	HCMC-PC	Jun. 2018
4	Environmental Impact Assessment (EIA)	Submission of EIA to MONRE	MAUR	Feb. 2018
		Approval of EIA by MONRE	MONRE	Jun. 2018

Source: JICA Study Team

16.3.4 Monitoring

The following table shows the monitoring template for MAUR to report the progress to JICA on the monthly basis after this survey is completed. As confirmed at the wrap-up meeting, MAUR will be responsible for the periodical reporting to JICA.

Table 16.3.3 Progress toward Investment Policy Approval (Monitoring Template)

No.	Document	Procedure	Responsibility	Period
1	Project Proposal	Approval of PP by PM	MPI	
2	Pre-F/S	Submission of Pre-F/S to Central Government / PM	HCMC-PC	
		Submission of Pre-F/S to National Assembly	MPI	
		Approval by National Assembly (investment policy approval)	National Assembly	
3	Resettlement Action Plan (RAP)	Submission of RAP to HCMC-PC	MAUR	
		Approval of RAP by HCMC-PC	HCMC-PC	
4	Environmental Impact Assessment (EIA)	Submission of EIA to MONRE	MAUR	
		Approval of EIA by MONRE	MONRE	

Source: JICA Study Team

16.4 Demand Forecast

This section describes the adjustments of demand forecast, which was earlier provided in “3.2 Demand Forecast”.

The revised forecast is illustrated in the following table, where both daily ridership and PHPDT in the year of opening increase approximately 12% from the past estimate along with economic and

population growth etc. As the year of opening of Phase 2 section remains 2030, the ridership forecast in 2030 onwards is subject to no adjustment.

Table 16.4.1 Demand Forecast (Adjusted)

Year		2027	2030	2040	2050
Section		C0-C10	C0-C17	C0-C17	C0-C17
No. of Boarding Passenger (Pax/day)	C0-C10	244,700	344,200	398,500	473,700
	C11-C17	-	60,600	77,000	87,600
	Total	244,700	404,800	475,500	561,300
PPHPD (Perk rate 12%) (Pax/Hour/Dir.)		13,500	19,300	22,100	25,000
Off Peak Hour Line Volume (5%) (Pax/Hour/Dir.)		5,600	8,000	9,200	10,400
Pax km (Pax km / day)		1,456,543	2,750,746	3,330,325	3,848,330
Ave. Travel Dist. (km)		5.7	6.8	7.0	6.9
Fare Revenue (million VND/day)		6,369	9,635	11,300	13,322

Note: Adjustments are underlined.

Source: JICA Study Team

16.5 Project Designs

This section describes the adjustment of project designs, which were earlier provided in “Chapter 4 Project Designs”. Outlines of the project designs after adjustments are illustrated hereunder.

Table 16.5.1 Project Features (Adjusted)

Item	F/S	This study
Section	Starting point : Ben Thanh Station* Ending point : Mien Tay Terminal Station	
Total length**	Double track with about 9.9 km	Double track with about 9.9 km
Underground section	9.9km	8.2 km
Elevated section	-	1.7 km
Number of stations	10 stations	10 stations
Underground station	10 stations	8 stations
Elevated station	-	2 stations
Average interval	970 m	970 m
Demand forecast	In opening year of 2015	In opening year of 2027
Daily average ridership	127,000	244,700
PHPDT	5,800	13,500
Operation hours	5:00 - 23:00	5:00 - 23:30
Operation interval	In opening year of 2015	In opening year of 2027
Peak hour	11 trains/hour	14 trains/hour
Off peak	5 trains/hour	6 trains/hour
Location of Depot		
Phase 1	Common use of Suoi Tien Depot of Line 1	
Phase 2	Tan Kien Depot of Line 3A	

Note:

* Ben Thanh Station, which will be constructed under Line 1 Project, is not counted. Scope of the Line 3A Project includes the works to provide physical connection to Line 1 system.

** The length is the distance between the beginning and the end of the Project.

Source: JICA Study team

Increase in the congestion rate with the higher ridership in the year of opening does not require any changes in the transportation plan.

Table 16.5.2 Transportation Plan (Adjusted)

			Base Case (C0 - C10)	3A Extension Case (C0 - C17)	
			2027	2030	2040
C0 Ben Thanh～C1 Thai Binh	Daily Line Volume (Passengers)		244,700	404,800	475,500
	Peak time	Peak Hour Peak Direction Traffic	13,500	19,300	22,100
		Number of Trains/Hour	14	25	26
		Headway	0:04:20	0:02:25	0:02:20
		Transport Capacity (Passengers)	13,188	23,550	24,492
		Congestion rate (%)	102%	82%	90%
	Off-peak time	Peak Hour Peak Direction Traffic	5,600	8,000	9,200
		Number of Trains/Hour	6	12	12
		Headway	0:10:00	0:05:00	0:05:00
		Transport Capacity (Passengers)	5,652	11,304	11,304
		Congestion rate (%)	99%	71%	81%
Operating hours			5:00～23:30		

Source: JICA Study team

As above, no adjustment is required in the transportation plan in the Section 4.5. Also, taking into account the time to capture potential demand*[23], changes in the number of station boarding and alighting passengers should not impact on the project designs. Therefore, the remaining project designs (i.e., 4.7 Depot and Maintenance Facilities, 4.8 Electrical Systems, 4.9 Mechanical Systems, 4.10 Signaling Systems, 4.11 Telecommunication Systems, and 4.12 Automatic Fare Collection System) remain unchanged from Chapter 4.

16.6 Project Implementation Schedule

This section describes the adjustments of the project implementation schedule (after the Loan Agreement), which was earlier designed in “6.5 Project Implementation Schedule”. The entire project schedule is pushed back by 1 year along with the delay in investment policy approval.

- By this adjustment, smooth transition from the opening of Line 1 to construction works of Line 3A will be made difficult. It means the resources of Line 1 project, e.g. personnel, labors, equipment and materials, will be unable to use for Line 3A project.
- Even if the commencement of the construction works of Phase 2 is pushed back along with the adjustment of Phase 1 schedule, the Phase 2 section with the Tan Kien Depot will become

[23] “Demand Capture” – The actual ridership tends to become much lower than the forecast in the early years after opening due to insufficient capture of the potential demand. Key factors for demand capture include growth of the areas along the corridor, change in land use, restructure of transport network, customers’ awareness of new transit service, and habit of using the existing transport service, etc. (Source: A Study on demand capture of newly opened railway line (Niikura, Doi, Hyodo, Iwakura, 2005))

operational within 2030. Therefore, depot maintenance capacity (see 4.7.2) and stabling capacity (see 4.7.3) will expand before it reaches critical limit.

- In the case the Project applies STEP loan with the detailed design service by JICA grant, project schedule will be shortened by 1 year. This will enable the commissioning of Line 3A within 2026.

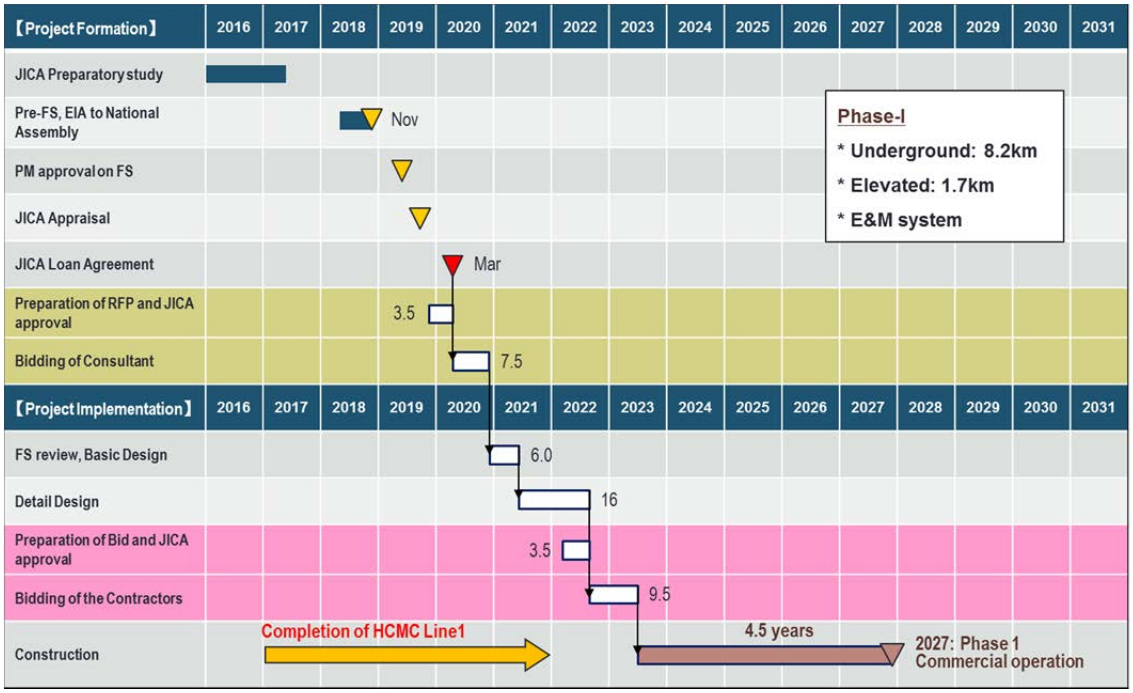


Figure 16.6.1 Project Implementation Schedule (Adjusted)

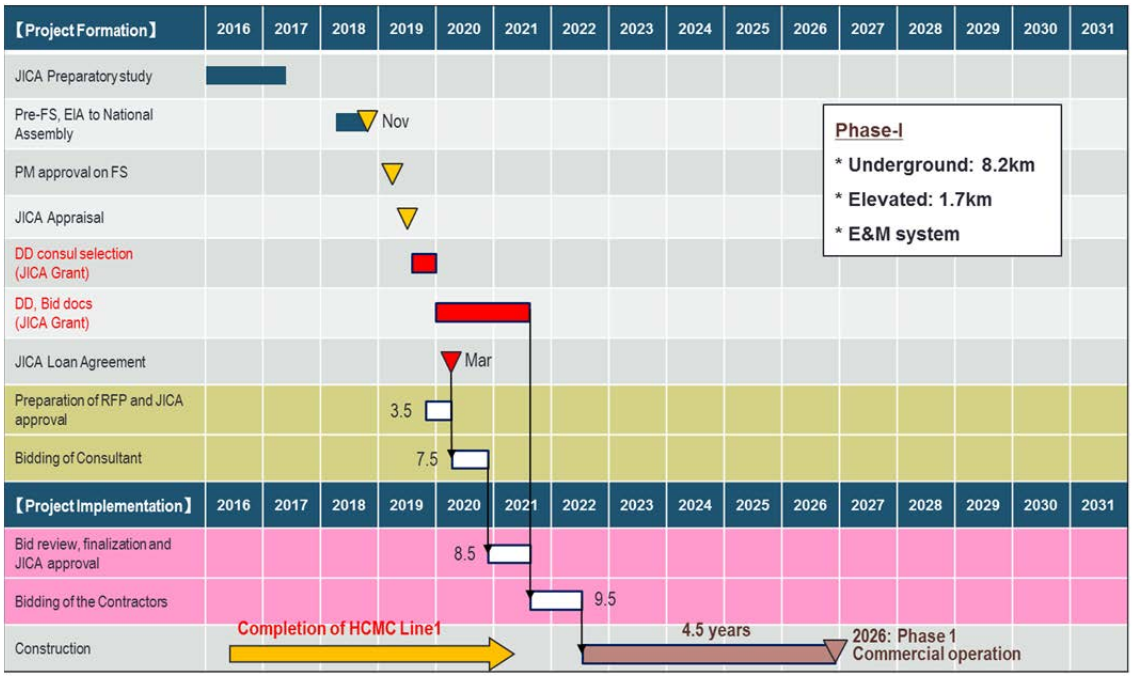


Figure 16.6.2 Project Implementation Schedule (In Case of Detailed Design by JICA Grant Aid) (Adjusted)

16.7 Project Cost Estimate

Non-Disclosure Information

16.8 Project Evaluation

16.8.1 Financial Analysis

The result of financial analysis affected by one year delay of project schedule is explained below. It is finally clarified that this delay will have little effect on project evaluation.

(1) Financial Internal Rate of Return

FIRR of the project is estimated as 7.60%.

Table 16.8.1 Result of Financial Analysis

Non-Disclosure Information

(2) Transition of Financial Cash Flow

The transition of financial cash flow of entire period of the project is shown in Figure 16.8.1.

Non-Disclosure Information

Figure 16.8.1 Financial Cash Flow

(3) Sensitivity Analysis

The results of FIRR sensitivity analysis are summarized in Table 16.8.2.

Table 16.8.2 Sensitivity Analysis of Financial Evaluation

Case	FIRR
Base Case	7.60%
Initial investment cost and replacement/ reinvestment cost + 10%	6.93%
Operation and maintenance cost + 10%	7.50%
Revenue (fare and non-fare revenue) – 10%	6.75%

Source: JICA Study Team

16.8.2 Economic Analysis

The result of economic analysisaffected by one year delay of project schedule is explained below. It is finally clarified that this delay will have little effect on project evaluation.

(1) Economic Internal Rate of Return

EIRR of the project is estimated as 9.55%.

Table 16.8.3 Economic Internal Rate of Return

Indicator	Unit	Value
EIRR	%	9.55
NPV	JPY Million	23,612
B/C	-	1.94

Source: JICA Study Team

Table 16.8.4 Result of Economic Analysis

Non-Disclosure Information

(2) Transition of Ecnocomic Cash Flow

The transition of financial cash flow of entire period of the project is shown in Figure 16.8.2.

Non-Disclosure Information

Figure 16.8.2 Economic Cash Flow

(3) Sensitivity Analysis

The results of sensitivity analysis are summarized in Table 16.8.5.

Table 16.8.5 Sensitivity Analysis of Economic Evaluation

Case	EIRR
Base Case	9.55
Initial investment cost and replacement/ reinvestment cost + 10%	9.00
Operation and maintenance cost + 10%	9.46
Benefits (savings in passenger travel time cost, reduction value of vehicle operating cost, the value of CO_2 emission reduction) – 10%	8.86

Source: JICA Study Team

CHAPTER 17 CONCLUSIONS AND RECOMMENDATIONS

17.1 Conclusions

Conclusions of this study are summarized as follows:

(1) Travel demand in HCMC has increased significantly during the last decade from 11.5 million person trips/day in 2002 to 16.7 million in 2013. The trend is that people prefer private transport and are gradually shifting to the use of Car. This may lead to more serious traffic congestions.

(2) HCMC Line 3A is located at south-western area of the city, which connects from Ben Thanh Station of the city center, where will be an intermodal station of Line1, 2 and 4, to the suburban area to the south-west. It is expected to contribute to expand public railway transport service between east and west areas of the City, and to increase ridership and convenience of Line1 passengers which the Japanese Government provide technical and financial assistance. For this, the HCMC Government prioritizes the Line3A project for implementation.

(3) In the approved plan, one of the major objectives is to develop urban railways in the city which promote modal shift from private vehicle to public transport, and specific targets for urban railway project implementation are indicated. This Line3A project is to contribute to mitigate worsening traffic congestion and to reduce pollutions caused by traffic by construction of urban mass rapid transit system in place to road transport in the metropolitan of HCMC.

(4) The ridership estimated for years 2027, 2030, 2040 and 2050 are shown in the succeeding tables. The number of boarding passengers per day in 2026 is 244,700 and will become 422,300 in 2030 since the rail will extend to C11-C17 section. In 2050, it will reach 560,700 passengers per day. PPHPD in 2027 and 2050 are 13,500 and 26,400, respectively.

(5) Many of the passengers come from Line 1 and directly go through Line3A as the entire operating line. The station with the highest number of two-way passengers per day in 2027, except for Ben Thanh Station, is C8 Phu Lam Rotary with over 25,000 passengers for each boarding and alighting. The second is C10 Hoa Binh with over 18,000 passengers per boarding and alighting likewise.

(6) A combination of underground and elevated structure was selected as the best option, which envisages underground structure from Ben Thanh to C8 Station, with due considerations of resettlement, landscape, and other environment issues, while viaduct structure is proposed in the remaining section as no obstructions to build elevated structures are identified. With 2km stretch of elevated section out of a total 10km route length, the selected option can reduce construction cost by 15% compared to all underground option. MAUR and the Study Team reached agreement with the selected option during the study period. With respect to a high

power voltage line lying along the elevated section, ENV supported the proposal for relocation of the utility.

(7) Outline specifications of E&M systems and rolling stock are designed based on those of Line 1 as inter-operation between Line 3A and Line 1 is envisaged. Advantages of this standardization include: Human errors due to difference in specifications will be avoided as handling by train operation and maintenance personnel will be standardized. Maintenance and procurement costs will be reduced by maintenance standardization. Total number of rolling stock will be reduced by common use of spare trains between Line 1 and Line 3A.

(8) According to the train operation diagram developed based on the ridership forecast, Stabling, inspections and repairs requirements of a total of Line 1 and Line 3A will reach beyond the capacity of Line 1 depot in 2030. It means the Line 3A and Line 1 will share the Line 1 depot in early years, while development of additional depot upon extension of Phase 2 of Line 3A must be completed within 2030.

(9) With respect to AFC integration, the services at the 2nd quadrant are assumed with two options, but final conclusion is yet to be made: 1) MRT card issuing and ownership of fare are under MAUR, and 2) those are under MRT company. On those conditions, the functions to be covered by the AFC system at the upper level are: card management, blacklist management, revenue management, statistics management, clearing between entities. The upper level systems are assumed to be accommodated at the server room inside the depot. Integration with other modes of transport is assumed to use IP-VPN method in accordance with the practice in Japan. Economic value of the introduction of the upper system is estimated to be + USD 7 million after reduction of maintenance cost for 5 years.

(10) In study of TOD impacts and formulate station area and ITF development concepts, influenced areas are divided into 3 clusters, namely CBD cluster, mixed use cluster, and urban fringe cluster. If TOD concept is applied in line with Line3A development, new urban areas with mixed-use residential facilities will be developed by application of urban redevelopment of degraded low-rise and high dense residential areas and 30% of night population will be increased in 2030. In daytime, thanks to development of commercial and business districts and facilities between the city center and suburban areas, 70% of daytime population (employment) will be additionally increased

(11) The proposed traffic management plan is as follows:

1) Closed to vehicular traffic at C1, C2 and C3 Stations, except important intersections
2) Secure detour routes by use of temporary decks at underground stations, i.e. C4, C5, C6, and C7 Stations
3) Maintain vehicular traffic on road at all times at elevated stations, i.e. C9 and C10 Stations

(12) Safety training by the contractors of the Project will pay particular attentions to the top 3 accidents, namely “fall accidents”, “construction equipment accidents”, and “accidents due to the object coming flying, dropping”. The contractors are obliged to conduct periodical training sessions. Taking advantage of the recent communication tools, the project stakeholders will jointly develop safety management structure and systems. Also, “Safety Manuals” and “Accident Case Studies” developed by the joint effort of JICA and the Ministry of Construction of Vietnam will be utilized to improve safety management.

(13) The construction period of Phase 1, Line 3A, which involves underground civil works in majority of the total project length, was estimated to be about 5 years. Also, the Total Investment Cost of the Project was estimated in accordance with the Vietnamese standards and the records of Line 1.

(14) MAUR will be responsible for project implementation and official coordination with line departments, HCMC-PC and JICA as the implementing agency. Project management will be jointly carried out by MAUR and the consultant hired by MAUR. MAUR will be under the supervision of the Project Steering Committee with the leadership of HCMC-PC as the chairman. Day-to-day coordination with districts and community stakeholders will be handled by MAUR.

(15) MAUR is increasing technical and construction / procurement supervision capacity through on-the-job training by way of implementation of Line 1, Line 2 and Line 5 projects. Also, MAUR deepens understandings of urban railway systems through various studies and technical assistance programs under JICA and ADB initiatives. Furthermore, majority of MAUR personnel experienced or start experiencing JICA ODA loans and ADB co-financing schemes through Line 1, Line 2 and Line 5 projects. Therefore, with the capacity gained, MAUR is expected to formulate and implement the Project in smooth and efficient manner.

(16) Creation of the O&M Company under MAUR was decided in December 2015 as the result of past studies below. Preparatory works for opening to public are being handled by the preparation unit within MAUR. With the assumption that the headquarter personnel is hired through Line 1, the total staffing strength of Line 3A was estimated as 201 persons. Operation and maintenance activities of Line 3A will be responsible by this new O&M Company. As the company will receive necessary technical assistance from JICA and also is able to experience operations of Line 2 before the Project, there is no or very little concern about the technical and operation management capacity of MAUR.

(17) Necessary approvals for project approvals include “Program/Project Investment Policy” (PPIP) and “Program/Project Investment Decision” (PPID). Application for PPIP shall be made with pre-F/S, certification documents of EIA, and documents related to financial portfolio of the Project. Vietnam regulation specifies the period of RPF preparation and approval at “preparatory stage for PPID”. RAP shall be prepared and approved by Vietnamese side at early stage of project preparation and disclose at the website of the donor.

(18) With respect to gender concerns and protection of disadvantaged, the proposed "Gender Action Plan (GAP)", "Action plan for labour protection, poverty reduction and anti-infection", and "Universal Design Action Plan (UDAP)" shall be embodied in the project designs and monitoring frameworks.

(19) Reduction in greenhouse gas emission by the Project per year is 5,085 tons in the opening year and reaches to 13,304 tons or 2.6 times of the initial year of operation in 2050 as the ridership increases. A total reduction for 25 years till 2050 is 270,540 tons, which is equal to average of 10,822 tons per year.

(20) According to the result of economic and financial analysis, EIRR and FIRR of the base case account for 9.65% and 7.60%, respectively.

(21) At the time of implantation of the Project, ranges of capacity building and technical assistance for the Line 1 project had already completed. Therefore, programs for the Project should focus on the activities to enhance values of urban railway service and associated area development along the corridor, encompassing 3 pillars, namely "Establishment of integrated management structure for urban railway network", "Enhancement of the functions of station areas", and "Improvement of urban railway services".

17.2 Recommendations

Recommendations from the study results are as follows:

(1) Signalling system should be fully identical to Line 1 to ensure fully integrated operation and maintenance management across Line 1 and Line 3A. In fact, this will be the most economic option as it can avoid loading of two different signals onboard.

(2) Introduction of OSV (On-site Visualization) system is highly recommended. OSV, a new instrumentation and measurement scheme, indicates output value of the measurement at site, inclination of buildings, displacement of earth retaining by color patterns (Blue, Yellow, Red). The system proved usefulness for early recognition of dangerous locations of the site and increasing workers' awareness of safety.

(3) It is ideal if construction start of the Project is around the time of Line 1 opening to the public. This will allow the Line 1 contractors to join the bid of the Project and reduce concerns of single bid. In the event Line 1 contractors win the bid, they can continue the works without demobilization of their resources. It means price competitiveness of the bid will be improved.

(4) It takes 3-4 years for loan agreement, selection of consultant, basic designs, detailed designs, bidding till commencement of construction works. In the meantime, if the consultant of this study continues to carry out detailed design without break under the contract with JICA, 1 year could be saved. This could become an effective choice as many projects in Vietnam delay due to time consuming procedures for PPIP and PPID.

(5) For the matters of gender concerns, protection of labours, poverty reduction, anti-infection and universal designs, focal points should be specified in the implementing agency and the person(s) will be responsible for supervisory and reporting. Also, the focal points will promote the coordination meetings with DPOs and receive feedbacks during design, construction supervision and operation stages.

(6) Delay in creation of PMU may have significant impact on the overall project schedule. The Minutes of Memorandum for ODA loan agreement ("MOM") should specify the deadline of PMU creation to help reduce the risk.

(7) Capacity and manpower may become insufficient if experience personnel are not assigned or work under dual assignment. Implementation of the Project should start when the Line 1 project reaches substantial completion stage to help reduce the risk. Promoting such experienced personnel with priority once assigned to the second project should help reduce the risk. Also, the appointment of personnel having the experience of Line 1 project should be promised by the Vietnamese side during the appraisal for loan agreement.

17.3 Way Forward

The expected project schedule after this report is as follows:

- Submission of documents for PPIP from HCHC-PC to the Central Government Feb. 2018
- Approval of PPIP Nov. 2018
- JICA Fact Finding Mission Aug. 2019
- JICA Appraisal Mission Oct. 2019
- ODA Loan Agreement Mar. 2020
- Approval of PPID During D/D