# Part 2

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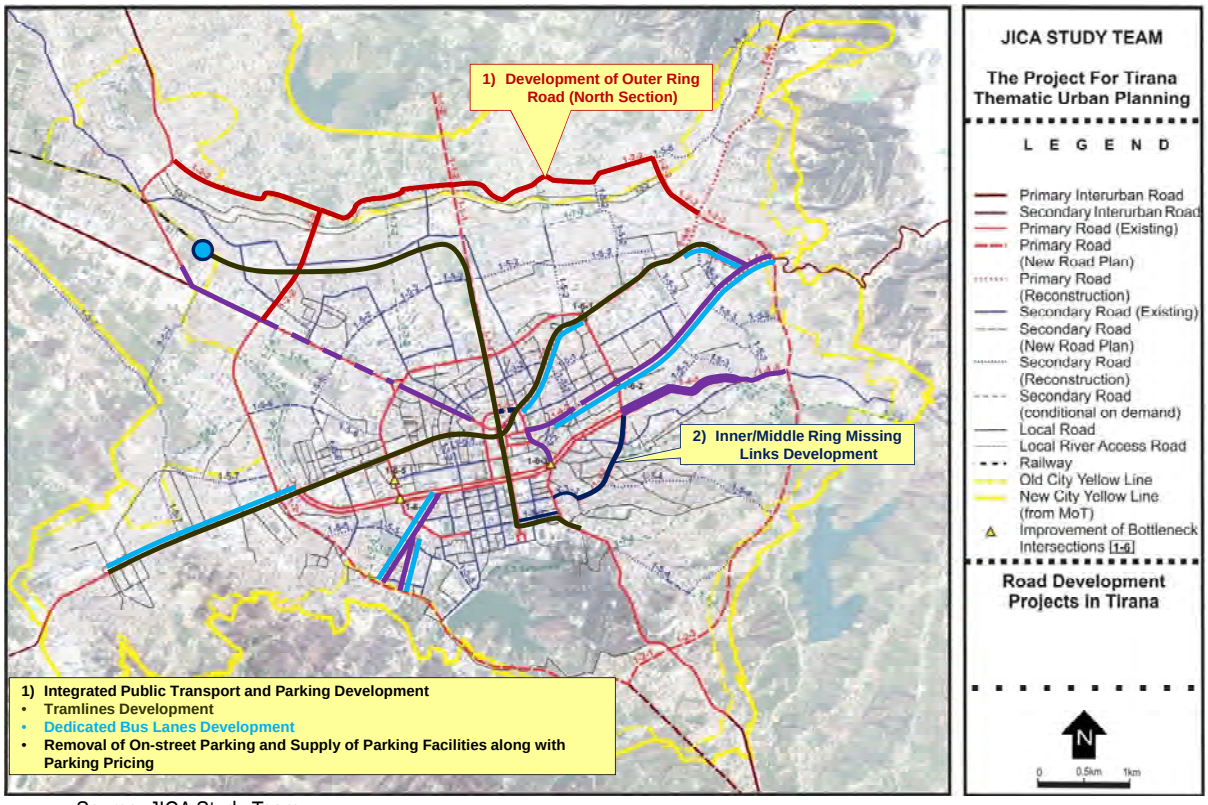
## Sector Action Plans

# 11. Action Plan for Road and Urban Transportation

## 11.1 General

In this chapter, implementation plans are studied and formulated for the three priority projects in the road and urban transportation sector; namely, 1) Outer Ring Road (North Section), 2) Inner/Middle Ring Missing Links Development, and 3) Integrated Public Transport and Parking Development Projects. Locations of these three priority projects are presented in Figure11.1.1.




Source: JICA Study Team

**Figure11.1.1 Location of Three Priority Projects in Road and Urban Transportation Sector**

### (1) Outer Ring Road (North Section) Project

- RUT-1-2-2: Development of Outer Ring Road - North Section

Since traffic demand on the east section of the Outer Ring Road is expected to be small, only the north section is focused on for a priority project.

### (2) Inner/Middle Ring Missing Links Development Project

- RUT-1-3-1: Development of Inner Ring Road
- RUT-1-3-3: Development of Middle Ring Road

The above ring road projects, which form the structure of the strategic road network, are combined as a missing link development project.

### (3) Integrated Public Transport and Parking Development Project

There are three subprojects that are closely related to each other and thus need to be evaluated together as one project package.

**1) Tramlines Development**

- RUT-3-1-1: East-West (Kinostudio-Kombinat) Tramline Development
- RUT-3-1-2: North-South (Student City-Intermodal Terminal) Tramline Development

In order to develop the above two tramlines of which passenger demand volumes are expected to be large, it is necessary to secure the ROW of the tramlines and the existing road capacity as well as to relocate the existing Tirana station as shown below.

- RUT-1-4-1: Development of Radial Road: Dibra Road
- RUT-1-4-4: Development of Radial Road: Aleksander Moisiu Road
- RUT-1-4-7: Development of Radial Road: Kavaja Road
- RUT-3-3-1: Relocation of Tirana Railway Station

**2) Dedicated Bus Lanes Development**

- RUT-2-2-1: Development of Dedicated Bus Lanes
- RUT-3-2-1: Restructuring City/Commune Bus Lines

Development of the bus lines along with dedicated bus lanes will practically realize a BRT-like operation. Hence, it should be promoted as another key project for public transport development. In addition, it is necessary to secure the ROW of the dedicated bus lanes and the existing road capacity, and thus the following radial road development projects should also be included in the priority project package.

- RUT-1-4-2: Development of Radial Road: Hoxha Tahsim & Xhanfize Keko Road
- RUT-1-4-3: Development of Radial Road: Komuna e Parisit & Medar Shtylla Road

**3) Removal of On-street Parking and Supply of Parking Facilities along with Parking Pricing**

Removal of on-street parking from the above-listed radial roads is essential to recover the original capacity of the primary roads and to realize the development of tramlines and dedicated bus lanes. In order to prepare for that, the following development of parking facilities should also be necessary to accommodate the on-street parking that is to be cleared.

- RUT-2-3-1: Development of Parking Facilities/Parking Information System
- RUT-2-3-2: Parking Pricing System in CBD

## 11.2 Outer Ring Road (North Section) Project

### (1) Main Objectives

The north section of the Outer Ring Road (total length: 21.43km) is expected to be effective in dispersion of the traffic over the entire road network in Tirana and alleviation of the traffic congestion. It is also an important freight corridor of Tirana, which is located on Pan-European Transport Corridor VIII.

Construction of the northern section of the Outer Ring Road would bring an opportunity to develop the northern part of the city along the Tirana River, enhancing its image and integration into the urban structure, while significantly expanding the supply of land that is suitable for development.

### (2) Subprojects/Components

- New Construction: 2.19km
- Reconstruction: 5.89km
- Project Length: 8.08km (excluding the Tirana River access roads)

### (3) Time Horizon for Completion

- Preparation: 1 year
- Main Work: 4 years (2015-2018)

### (4) Project Location or Coverage Area

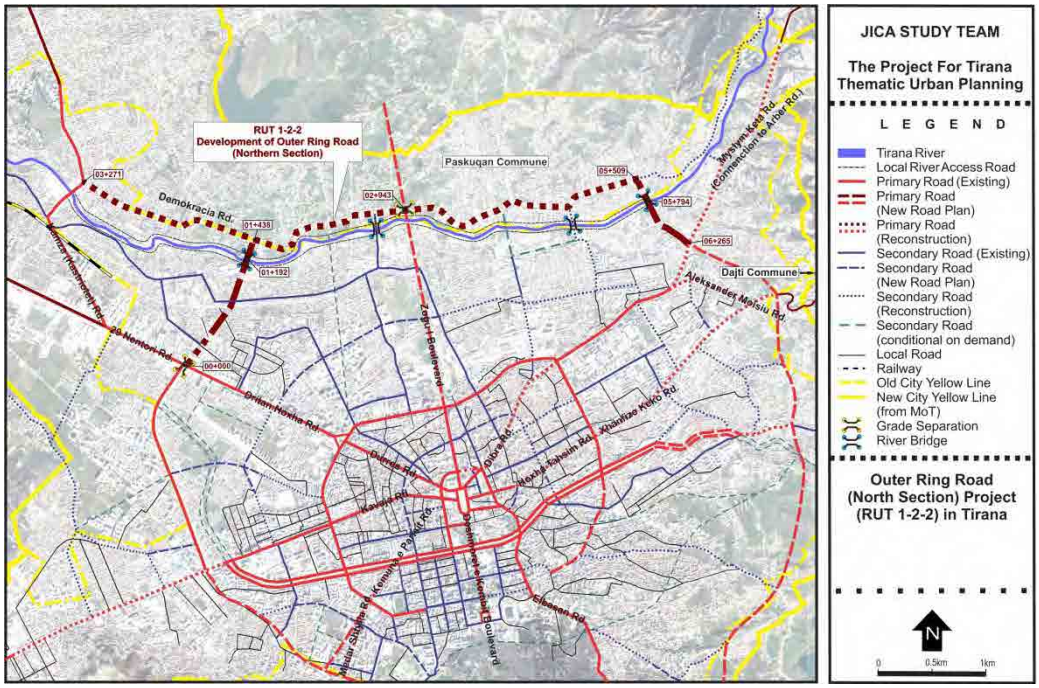
Northern extension of the Tirana Outer Ring Road is connected to the west by the existing Outer Ring Road. In the east it is connected by the new east section of Outer Ring Road. It also connects with major primary roads such as Tirana Main (Zogu I) Boulevard and Arber Road, which will serve as a gateway to northeastern Albania and Macedonia. For coverage area, Paskuqan Commune can be considered as the boundary to the north, Kamza Municipality as the boundary to the north-west and Dajti Commune as the boundary to the east.

### (5) Investment Cost and Resource Allocation

- Project Cost: 18,304.2 million ALL (12,108.6 million ALL for the Outer Ring Road (north section) and 6,195.6 million ALL for the access roads along the Tirana River)
- Operation and Maintenance: 38.7 million ALL/year (21.6 million ALL/year for the Outer Ring Road (north section) and 17.1 million ALL/year for the access roads along the Tirana River)
- Resources from the Municipality of Tirana or from the Central Government will be allocated for the required civil works, and resources from the Central Government will be allocated for land expropriation.

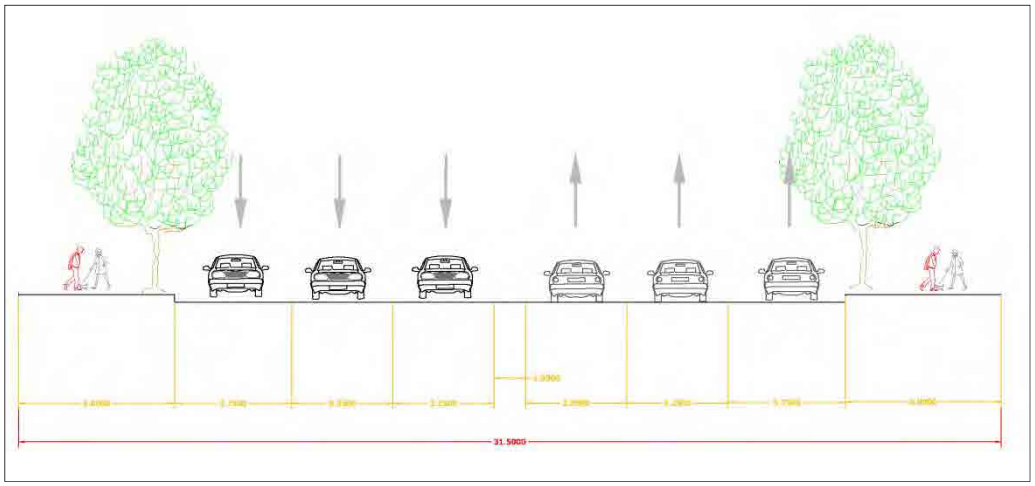
### (6) Project Concept

- Primary road with 6 traffic lanes
- Along with the rehabilitation of the Tirana River, access roads are also to be constructed utilizing the embankment of the river.



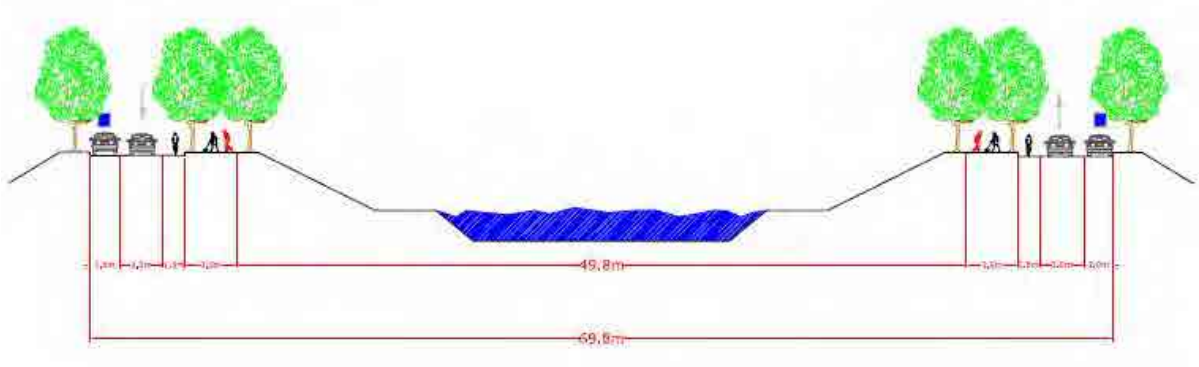

Source: JICA Study Team

**Figure11.2.1 Outer Ring Road (North Section) Project (RUT 1-2-2) Location**



Source: JICA Study Team

**Figure11.2.2 Typical Outer Ring Road (North Section) Cross Section**



Source: JICA Study Team

**Figure11.2.3 Typical Cross Section of an Access Road along the Tirana River**

## 11.3 Inner/Middle Ring Missing Links Development Project

### (1) Main Objectives

This priority project includes a missing link development of the Tirana Inner Ring Road (total length: 1.78km), which will provide smooth accessibility to the center of Tirana and support the project for the pedestrian streets/Traffic Cell System inside Inner Ring Road. This will also serve as an extension of the existing Tirana Middle Ring Road (total length: 9.48km), which functions as the primary and secondary ring roads passing through the southeastern part of Tirana, where the current land use development is not associated with a suitable and functional road network. Such a ring road system smoothly disperses and induces external and internal trips to recover urban functions in the urban center.

### (2) Subprojects/Components

- RUT-1-3-1: Development of Inner Ring Road
  - New Construction: 0.13km
  - Reconstruction: 0.13km Project Length: 0.26km
- RUT-1-3-3: Development of Middle Ring Road
  - New Construction: 0.96km
  - Reconstruction: 0.96km Project Length: 1.92km

### (3) Time Horizon for Completion

- RUT-1-3-1: Development of Inner Ring Road

  Preparation: 6 months Main Work: 2 years (2013-2014)
- RUT-1-3-3: Development of Middle Ring Road

  Preparation: 1 year Main Work: 2 years (2014-2015)

### (4) Project Location or Coverage Area

Tirana Inner Ring Road (missing link) is connected to Dibra Road as a boundary to the east, and it is connected to Zogu I Boulevard as a boundary to the west. Meanwhile, the missing southeastern part of Tirana Middle Ring Road connects Arkitekt Kasemi Road and Abdyl Frasheri Road in the south of the Lana River, splitting at Elbasan Road and continuing up to Tirana Main (Deshmoret e Kombit) Boulevard.

### (5) Investment Cost and Resource Allocation

- RUT-1-3-1: Development of Inner Ring Road

  Project Cost: 627.2 million ALL

  Operation and Maintenance: 0.7 million ALL/year
- RUT-1-3-3: Development of Middle Ring Road

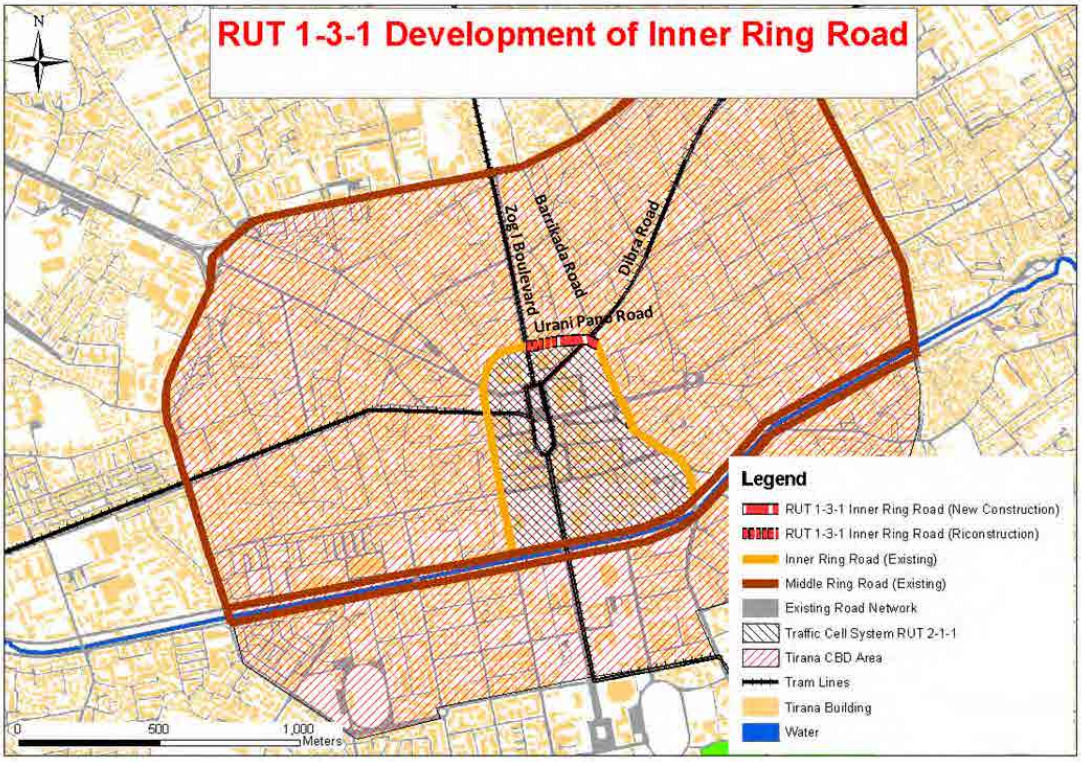
  Project Cost: 1,879.1 million ALL

  Operation and Maintenance: 4.3 million ALL/year

Resources from the Municipality of Tirana will be allocated for the required civil works, and resources from the Central Government will be allocated for land expropriation.

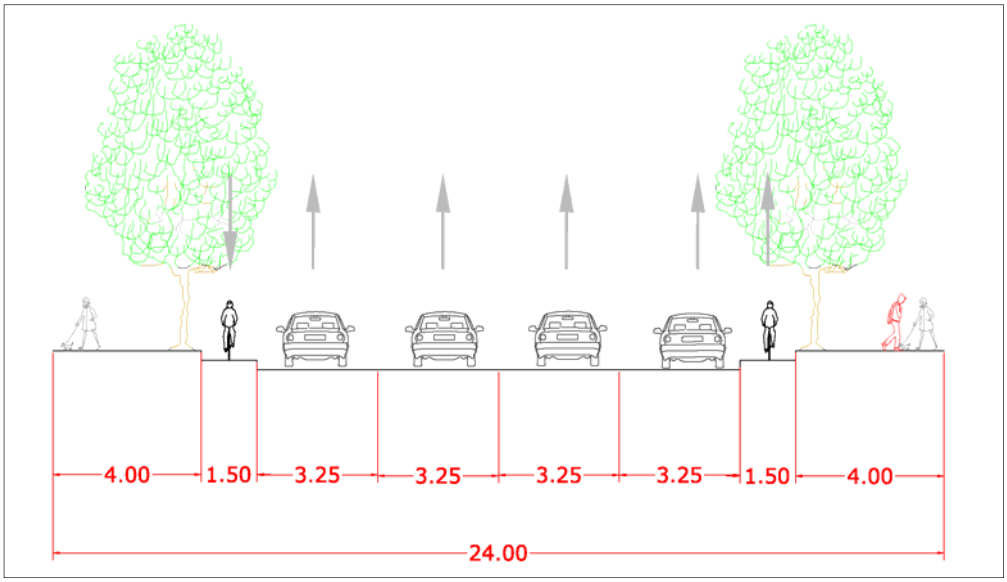
### (6) Project Concept

- RUT-1-3-1: Development of Inner Ring Road
  - Primary one-way road with 4 traffic lanes (counterclockwise direction)




Source: JICA Study Team

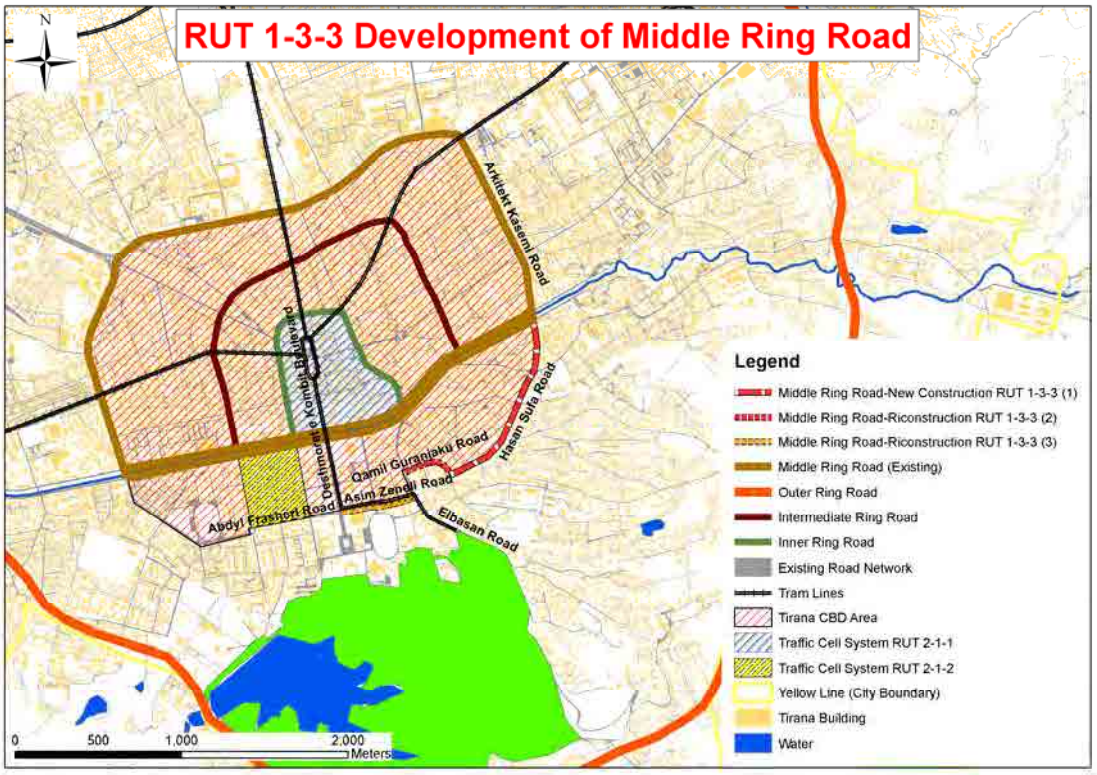
**Figure11.3.1 Inner Ring Road Project (RUT 1-3-1) Location**




Source: JICA Study Team

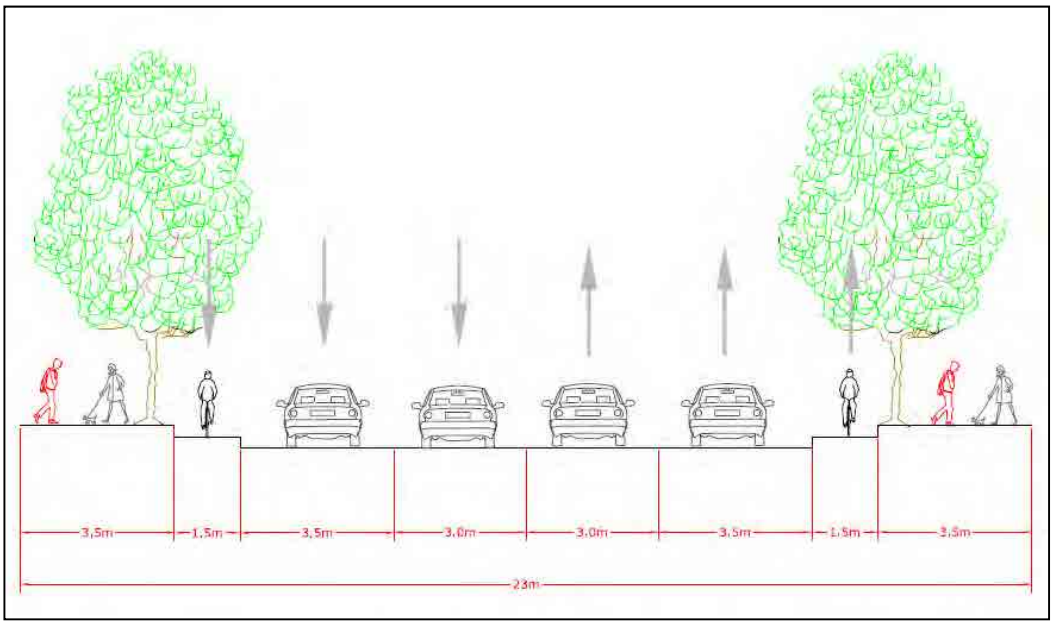
**Figure11.3.2 Typical Primary Road Cross Section (RUT 1-3-1)**

- RUT-1-3-3: Development of Middle Ring Road
  - Primary road (H. Sufa Road) with 4 lanes
  - Secondary road (Qemal Guranjaku Road) with 2 lanes
  - Secondary road (Asim Zeneli Road) with 2 tram lanes



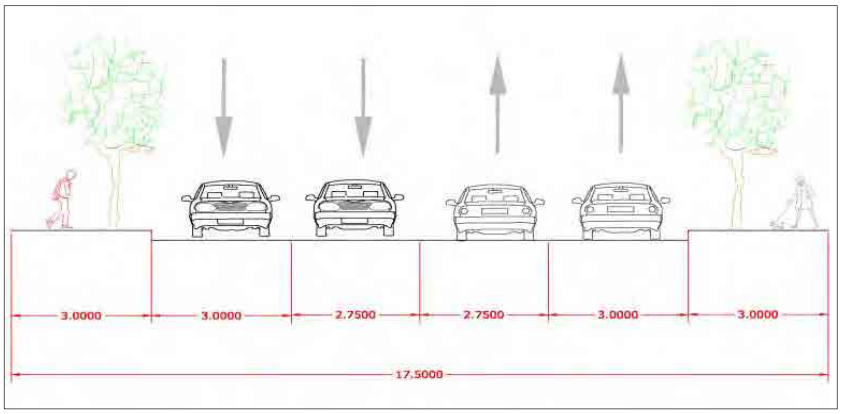

Source: JICA Study Team

**Figure 11.3.3 Middle Ring Road Project (RUT 1-3-3) Location**



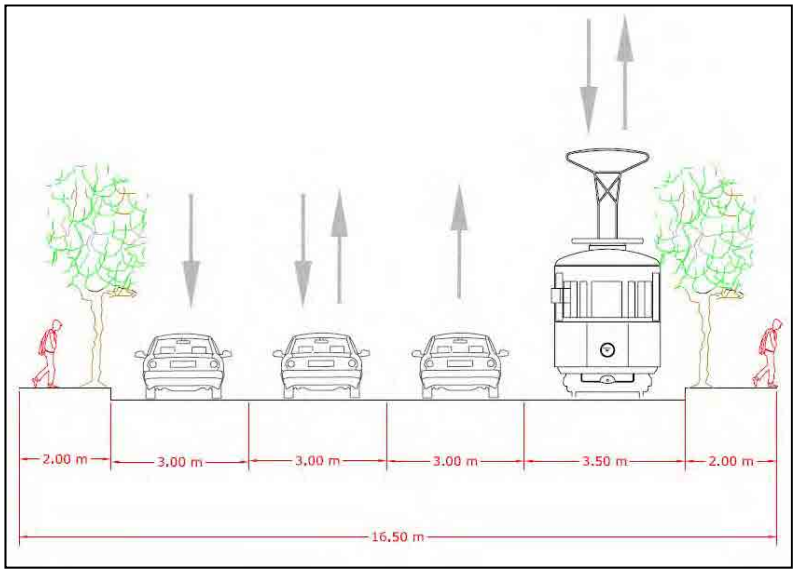

Source: JICA Study Team

**Figure11.3.4 Typical Primary Road Cross Section (RUT 1-3-3 (1), H. Sufa Road)**




Source: JICA Study Team

**Figure11.3.5 Typical Secondary Road Cross Section (RUT 1-3-3 (2), Qemal Guranjaku Road)**




Source: JICA Study Team

**Figure 11.3.6 Typical Secondary Road Cross Section (RUT 1-3-3 (3), Asim Zeneli Road)**

## 11.4 Integrated Public Transport and Parking Development Project

There are three subprojects that are closely related to each other and thus need to be evaluated together as one project package.

### (1) Main Objectives

Under the current situation of a transportation system in Tirana that consists of bus transport and private vehicular traffic, the main objective of this priority project is to establish a public transport network and to drastically improve the level of service by clearing on-street parking from the primary roads inside the CBD to secure enough space for ROW of a mass transit system such as tramlines and dedicated bus lanes as a base of a BRT (bus rapid transit). Furthermore, it aims to promote the usage of public transport through efficient TDM (transportation demand management) such as a parking pricing system.

### (2) Subprojects/Components

#### 1) Tramlines Development

- RUT-3-1-1: East-West (Kinostudio-Kombinat) Tramline Development

Tramline Construction: 9.5km Project Length: 9.5km

- RUT-3-1-2: North-South (Student City-Intermodal Terminal) Tramline Development

Tramline Construction: 7.2km Project Length: 7.2km

- RUT-1-4-1: Development of Radial Road: Dibra Road

Reconstruction: 1.26km Project Length: 1.26km

- RUT-1-4-4: Development of Radial Road: Aleksander Moisiu Road

Reconstruction: 0.92km Project Length: 0.92km

- RUT-1-4-7: Development of Radial Road: Kavaja Road

Reconstruction: 0.45km Project Length: 0.45km

- RUT-3-3-1: Relocation of Tirana Railway Station

Railway track to be demolished (old Tirana Station – new Tirana Station): 4.3km

**2) Dedicated Bus Lanes Development**

- RUT-2-2-1: Development of Dedicated Bus Lanes

Dedicated Bus Lane Construction: 22.9km Project Length: 22.9km

- RUT-3-2-1: Restructuring City/Commune Bus Lines

New Bus Lines: 4 lines

Restructured Bus Lines: 11 lines Total: 15 lines

- RUT-1-4-2: Development of Radial Road: Hoxha Tahsim & Xhanfize Keko Road

Reconstruction: 3.06km Project Length: 3.06km

- RUT-1-4-3: Development of Radial Road: Komuna e Parisit & Medar Shtylla Road
  - New Construction: 0.60km
  - Reconstruction: 1.06km Project Length: 1.66km

**3) Removal of On-street Parking and Supply of Parking Facilities along with Parking Pricing**

- RUT-2-3-1: Development of Parking Facilities/Parking Information System
  - New Parking Facilities: 16 locations
  - Additional Parking Capacity: 7,500 vehicles
- RUT-2-3-2: Parking Pricing System in CBD

### (3) Time Horizon for Completion

**1) Tramlines Development**

It will take about 8 years (2013-2020) to complete works of all the components in the

subproject for tramlines development. It should start with development of the relevant radial roads and relocation of Tirana railway station in order to secure enough space for construction of the tramlines. Detailed schedule of each project component is presented below.

- RUT-3-1-1: East-West (Kinostudio-Kombinat) Tramline Development

  Preparation: 1 year Main Work: 4 years (2014-2017)

- RUT-3-1-2: North-South (Student City-Intermodal Terminal) Tramline Development

  Preparation: 1 year Main Work: 4 years (2017-2020)

- RUT-1-4-1: Development of Radial Road: Dibra Road

  Preparation: 6 months Main Work: 3 years (2013-2015)

- RUT-1-4-4: Development of Radial Road: Aleksander Moisiu Road

  Preparation: 1 year Main Work: 2 years (2016-2017)

- RUT-1-4-7: Development of Radial Road: Kavaja Road

  Preparation: 6 months Main Work: 3 years (2013-2015)

- RUT-3-3-1: Relocation of Tirana Railway Station

  Preparation: 1 year Main Work: 2 years (2014-2015)

**2) Dedicated Bus Lanes Development**

It will take about 12 years (2013-2024) to complete works of all the components in the subproject for dedicated bus lanes development. It should start with development of the relevant radial roads in order to secure enough space for construction of the dedicated bus lanes. Since operation of some bus lines should start after the completion of the Outer Ring Road, it will be completed later than the other two subprojects. Detailed schedule of each project component is presented below.

- RUT-2-2-1: Development of Dedicated Bus Lanes

  Preparation: 1 year Main Work: 7 years (2014-2020)

  Stage I (2014-2015): Durres, 29 Nentori and George W. Bush Roads

  Stage II (2015-2016) (concurrently with RUT 1-4-3): Komuna e Parisit, Medar Shtylla and Tish Dahia Roads

  Stage III (2016-2017) (concurrently with RUT 1-4-2): Hoxha Tahsim, Xhanfize Keko and Sotir Caci Roads

  Stage IV (2018-2020) (concurrently with RUT 1-4-5): Ali Shefqeti Road

- RUT-3-2-1: Restructuring City/Commune Bus Lines

  Preparation: 6 months Main Work: 8 years (2013-2014, 2018-2019, 2021-2024)

  Stage I (2013-2014): Kristal, Kopshti Zoologjik, Lapraka, Student City, Mihal

Grameno, Institut-Uzina Traktori

Stage II (2018-2019) (on completion of RUT 3-1-1): Linza, Paskuqan, Porcelan, Kashar, Tufina, Peza-Ndroq-Vaqarr

Stage III (2021-2022) (on completion of RUT 3-1-2): Vora, Tirana e Re, Sauk-Ibe-Baldushk

Stage IV (2023-2024) (on completion of Outer Ring Road): Outer Ring, Opposite Tirana e Re

- RUT-1-4-2: Development of Radial Road: Hoxha Tahsim & Xhanfize Keko Road

Preparation: 1 year Main Work: 3 years (2015-2017)

- RUT-1-4-3: Development of Radial Road: Komuna e Parisit & Medar Shtylla Road

Preparation: 1 year Main Work: 3 years (2014-2016)

**3) Removal of On-street Parking and Supply of Parking Facilities along with Parking Pricing**

It will take about 9 years (2013-2021) to complete works of all the components in the subproject for removal of on-street parking and supply of parking facilities along with parking pricing. Detailed schedule of each project component is presented below.

- RUT-2-3-1: Development of Parking Facilities/Parking Information System

Preparation: 6 months Main Work: 9 years (2013-2021)

- RUT-2-3-2: Parking Pricing System in CBD

Preparation: 1 year Main Work: 3 years (2014-2016)

## (4) Project Location or Coverage Area

The coverage area should be the whole Tirana metropolitan area including the city of Tirana and the surrounding communes to enhance the convenience of public transport and promote the usage. For intermodality, Skanderbeg Square shall be designated as the main transfer nodes between the two tramlines as well as between connecting bus lines and the tramlines. As for transfer between private transport modes and the tramlines, terminals of Kinostudio, Kombinat, Intermodal Terminal, and Student City shall be designated as the major stations for Park & Ride system.

## (5) Investment Cost and Resource Allocation

**1) Tramlines Development**

Total project cost of a subproject of the tramlines development is estimated at around 31,325.2 million ALL. Detailed cost of each project component is presented below.

- RUT-3-1-1: East-West (Kinostudio-Kombinat) Tramline Development

Project Cost: 13,384.2 million ALL

Operation and Maintenance: 249.3 million ALL/year

- RUT-3-1-2: North-South (Student City-Intermodal Terminal) Tramline Development

  Project Cost: 10,965.1 million ALL

  Operation and Maintenance: 181.8 million ALL/year

- RUT-1-4-1: Development of Radial Road: Dibra Road

  Project Cost: 1,293.2 million ALL

  Operation and Maintenance: 3.4 million ALL/year

- RUT-1-4-4: Development of Radial Road: Aleksander Moisiu Road

  Project Cost: 1,174.2 million ALL

  Operation and Maintenance: 2.5 million ALL/year

- RUT-1-4-7: Development of Radial Road: Kavaja Road

  Project Cost: 2,170.8 million ALL

  Operation and Maintenance: 6.7 million ALL/year

- RUT-3-3-1: Relocation of Tirana Railway Station

  Project Cost: 2,337.7 million ALL

Since the tramlines will be constructed either on the roads or on the existing railway tracks, no cost for land expropriation is assumed. Thus, the private sector is responsible for the initial investment including construction, signaling system, and rolling stock. Operation and maintenance may be supported by the Municipality of Tirana or the central government (i.e., the public sector) as a subsidy.

As for the road development project, resources from the Municipality of Tirana will be allocated for the required civil works, and resources from the central government will be allocated for land expropriation. Meanwhile, the resources for the relocation of Tirana Railway Station will be from the central government or Albanian Railways (HSH).

**2) Dedicated Bus Lanes Development**

Total project cost of a subproject of the dedicated bus lanes development is estimated at around 7,398.4 million ALL. Detailed cost of each project component is presented below.

- RUT-2-2-1: Development of Dedicated Bus Lanes

  Project Cost: 695.2 million ALL

  Operation and Maintenance: 30.1 million ALL/year

- RUT-3-2-1: Restructuring City/Commune Bus Lines

  Project Cost: 3,734.9 million ALL

- RUT-1-4-2: Development of Radial Road: Hoxha Tahsim & Xhanfize Keko Road

  Project Cost: 2,639.9 million ALL

Operation and Maintenance: 8.2 million ALL/year

- RUT-1-4-3: Development of Radial Road: Komuna e Parisit & Medar Shtylla Road

Project Cost: 328.4 million ALL

Operation and Maintenance: 4.4 million ALL/year

Since the dedicated bus lanes will be constructed on the roads, no cost for land expropriation is assumed. Thus, the private sector is responsible for the initial investment including new bus fleet. Operation and maintenance may be supported by the Municipality of Tirana (i.e., the public sector) as a subsidy.

As for the road development project, resources from the Municipality of Tirana will be allocated for the required civil works, and resources from the central government will be allocated for land expropriation.

**3) Removal of On-street Parking and Supply of Parking Facilities along with Parking Pricing**

Total project cost of a subproject of removal of on-street parking and supply of parking facilities along with parking pricing is estimated at around 11,932.7 million ALL. Detailed cost of each project component is presented below.

- RUT-2-3-1: Development of Parking Facilities/Parking Information System

Project Cost: 11,624.2 million ALL

Operation and Maintenance: 496.4 million ALL/year

- RUT-2-3-2: Parking Pricing System in CBD

Project Cost: 308.5 million ALL

Operation and Maintenance: 213.5 million ALL/year

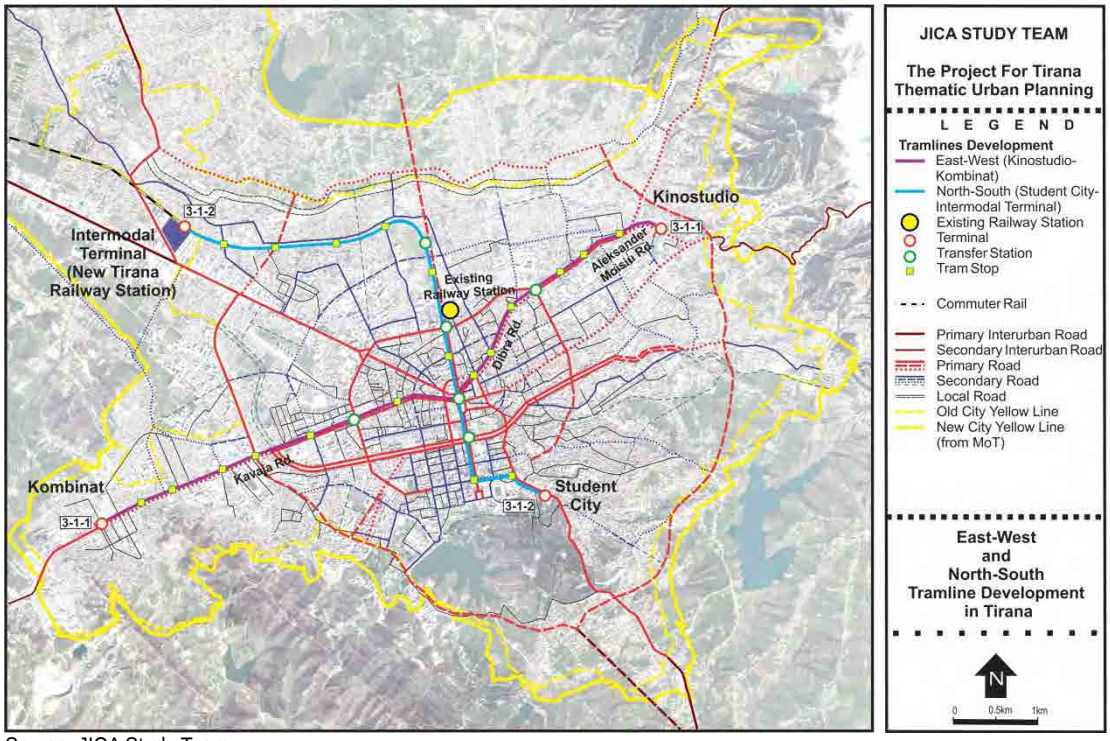
While the private sector is responsible for the investment for construction of the parking facilities, resources from the Municipality of Tirana will be allocated for the cost of the parking information system and the parking pricing system. It should also be noted that the parking pricing system is expected to bring about considerable revenue for other infrastructure investment.

## (6) Project Concept

**1) Tramlines Development**

Two tramlines of east-west (Kinostudio-Kombinat) and north-south (Student City-Intermodal Terminal) lines are planned to serve as the core axes of the public transport network. New, comfortable, safe, and air-conditioned trams will be operated at least at the same intervals as the currently operated bus lines, namely, 4-7 minutes to avoid long waiting time. Assuming the commercial speed of about 20km/h, required size of the rolling stock is 11 trams for the east-west line and 8 trams for the north-south line. A common flat tariff of 60 Lek is also assumed with free transfers with buses.

Above all, the tramline terminal stations should serve as gateway stations to the CBD. Hence, attention should be paid to intermodal transfer functions between different transport modes. For this, it is highly necessary to provide car and bicycle parking facilities (i.e., Park & Ride system) especially to restrict the flow of private vehicles into the CBD through the parking pricing system and to promote use of the tramlines.



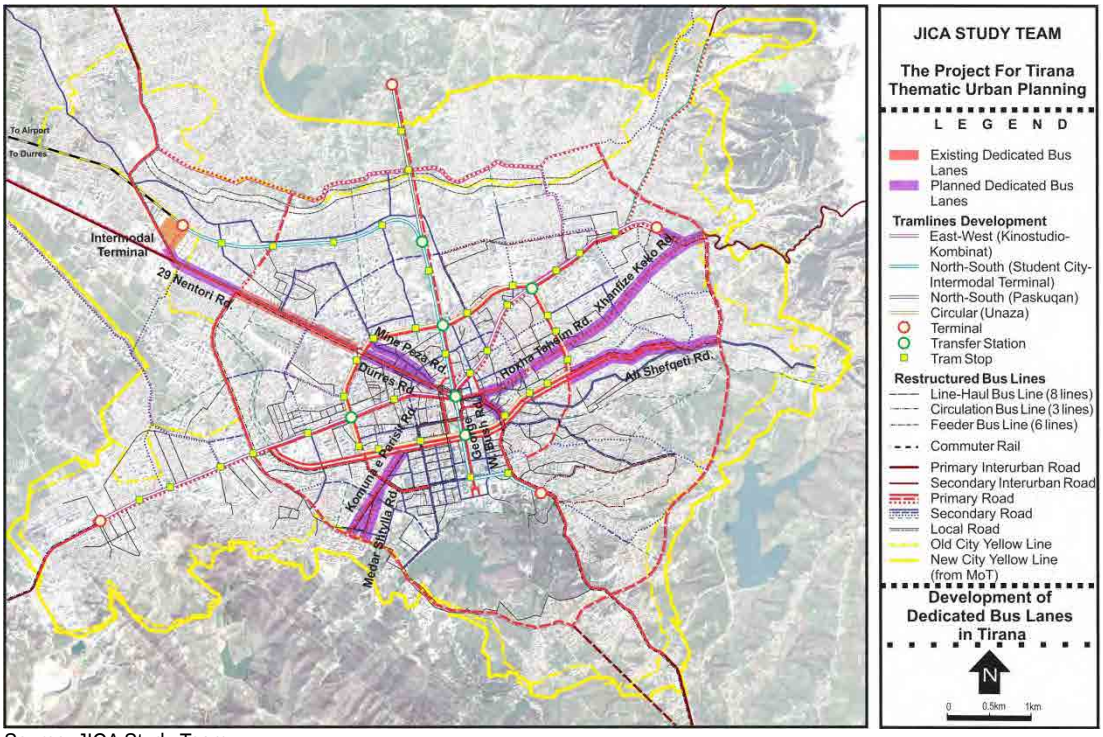

Source: JICA Study Team

**Figure11.4.1 Tramlines Development (RUT 3-1-1, 3-1-2) Location**

Since there is no integrated intercity bus terminal yet in Tirana, integration of the intercity and international bus and van lines into one terminal with proper facilities is highly necessary. Thus, the new Intermodal Transportation Terminal should be developed in the location where the existing Tirana railway station is to be relocated (approx. 85,000m$^2$), as planned by the Municipality. New Tirana railway station will be connected to the tramline and the intercity and city bus lines for smooth transfer, this subproject includes relocation of Tirana railway station along with removal of the railway tracks between the old and new stations only.

**2) Dedicated Bus Lanes Development**

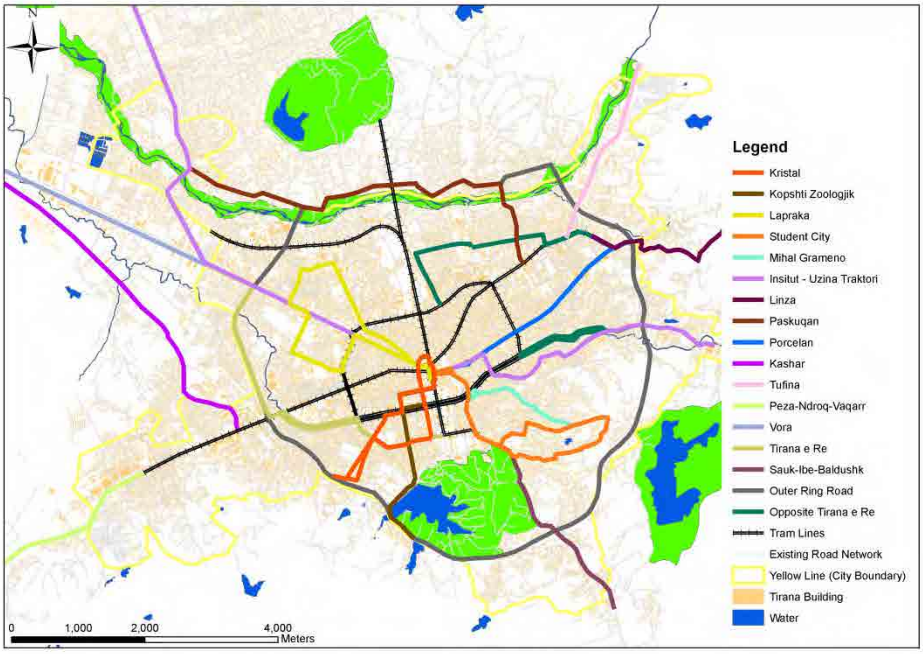
The current partial dedicated bus lanes will be extended more continuously on the urban primary roads to form a continuous, smooth network for buses, thereby serving as a bus rapid transit (BRT). It should be noted that the dedicated bus lane development is mainly for the line-haul type bus lines connecting the city center to the suburbs through the radial roads. By securing a relatively high operating speed, time schedule can also be foreseen, consequently reducing the waiting time and attracting more passengers.




Source: JICA Study Team

**Figure11.4.2 Dedicated Bus Lanes Development (RUT 2-2-1) Location**

When the dedicated bus lanes and tramlines have been introduced as a core public transport system, the current bus route structure shall be redesigned in a hierarchical manner and in light of existing and future passenger demand patterns, core public transport system of the city, and coverage of population of the Tirana metropolitan area. Furthermore, new air-conditioned buses shall be invested to the restructured bus lines as presented in Table11.4.1.




Source: JICA Study Team

**Figure11.4.3 Restructured City/Commune Bus Lines (RUT 3-2-1) Location**

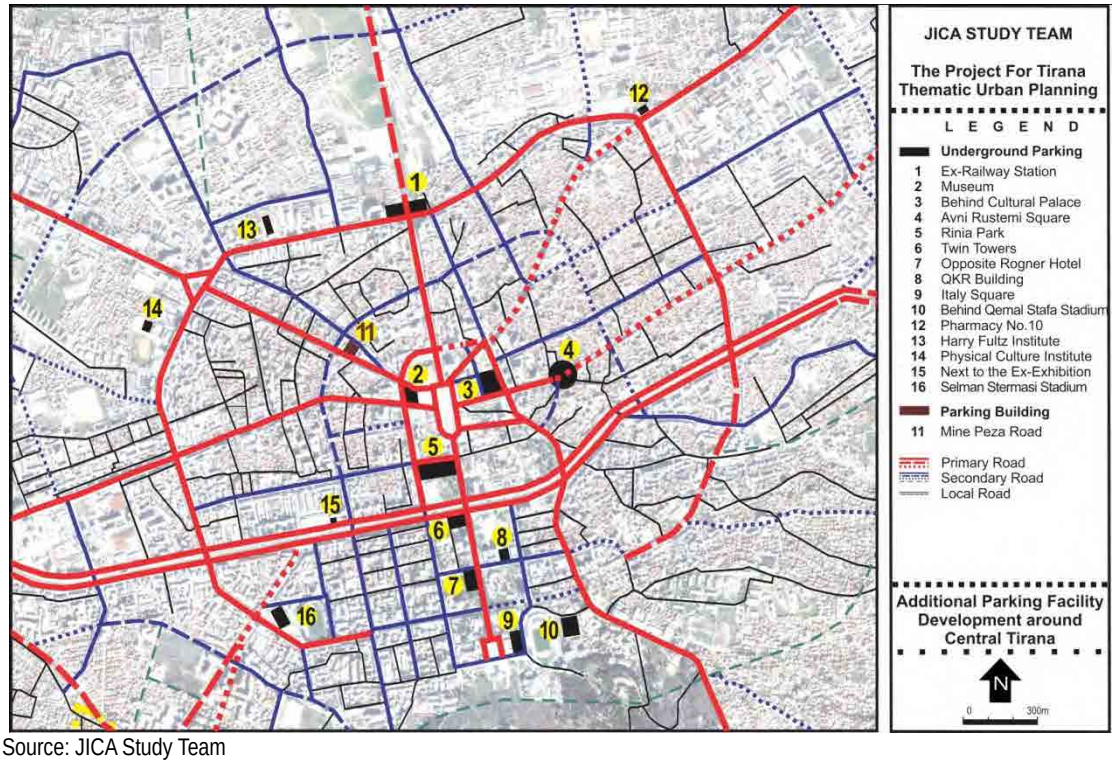
**Table11.4.1 Number of New Buses for Each Bus Line**

| Bus Line | No. of Buses | Bus Line | No. of Buses | Bus Line | No. of Buses |
|---|---|---|---|---|---|
| Kristal | 13 | Linza | 10 | Vora | 19 |
| Kopshti Zoologjik | 12 | Paskuqan | 16 | Tirana e Re | – (30 old) |
| Lapraka | 17 | Porcelan | – (10 old) | Sauk-Ibe-Baldushk | 10 (17 old) |
| Student City (new) | 15 | Kashar | 14 | Outer Ring (new) | 35 |
| Mihal Grameno (new) | 9 | Tufina | – (6 old) | Opposite Tirana e Re (new) | 23 |
| Institut-Uzina Traktori | 10 (25 old) | Peza-Ndroq-Vaqarr | 23 | | |

Source : JICA Study Team

### 3) Removal of On-street Parking and Supply of Parking Facilities along with Parking Pricing

Additional parking facilities shall be constructed in the CBD to clear away the current on-street parking from the primary and secondary roads to utilize the road space for public transport and bicycles while maintaining the same traffic capacity. Particularly around the Inner Ring corridor area in which most of the roads are converted to be pedestrian streets, additional parking facilities are proposed mostly as underground parking. Furthermore, a parking information system shall be provided to smoothly guide car users to the most appropriate public and private parking lots along with parking availability information through information devices such as parking information signboards.




Source: JICA Study Team

**Figure11.4.4 Parking Facilities Development (RUT 2-3-1) Location**

Parking vehicles, whether they may be located on or off street, shall be charged some

money. Thus, a parking pricing system shall be introduced and utilized as an effective TDM policy. As the parking fees become higher, it will eventually deter private vehicles from entering the CBD and shift to public transportation, and this situation can be relatively easily controlled. Initial pricing level is based on the commonly implemented current parking fee of 100 Lek per hour.

## 11.5 Economic and Financial Analysis

### (1) Financial Analysis

Financial analysis of the two tramline development projects (East-West Line: RUT 3-1-1 and North-South Line: RUT 3-1-2) is carried out in this section by comparing respective financial costs and revenues of With the Project Case and Without the Project Case.

**1) Basic Assumptions**

**Project Period**

The project period is 30 years after the project completion, namely from 2014 to 2047 (for RUT 3-1-1) and from 2017 to 2050 (for RUT 3-1-2), including the construction period of 2014-2017 (for RUT 3-1-1) and 2017-2020 (for RUT 3-1-2).

**Price Basis and Exchange Rate**

The base year of the project is 2012. All costs and revenues are expressed at the price level of 2012.

Exchange rates used are 1 Lek = JPY 0.788 = Euro 0.007 = USD 0.009, which are prevailing rates at the time of the Study.

**Contingencies**

Physical contingency of 10% is included in the analyses. The price contingency is not included.

**Taxes**

For the financial analysis, the value added tax (VAT) of 20% is included while corporate tax is excluded.

**Target Financial Internal Rate of Return (FIRR) on Project**

The target FIRR of the projects varies depending on the investment share among different investors with different expected rate of return for the project.

**Table11.5.1 Target FIRR by Investors**

| | |
|---|---|
| Public | 0.0% |
| Foreign Private Investor | 7.0% |
| Local Private Investor | 13.5% |
| Co-investment by private sector (Foreign Investors 60% and Local Private 40%) | 9.6% |

Source : JICA Study Team

**2) Financial Project Revenue**

The tariff for one-way travel, regardless of the distance, is estimated at 60 Lek.

**Table11.5.2 Tariff Revenues of Tramlines**

[Unit: million Lek/year]

| | 2018 | 2021 | 2030-2050 |
|---|---|---|---|
| East West Line | 4,255 | 4,794 | 6,412 |
| North South Line | - | 1,764 | 2,597 |

Source : JICA Study Team

**3) Financial Evaluation**

Profitability of both East-West and North-South Lines is high enough to invite private investment. If the two tramlines are co-developed, it will generate 23.0% FIRR, which is also high enough to attract private investment.

**Table11.5.3 FIRR of Tram Development Projects**

| | FIRR |
|---|---|
| East West Line | 26.1% |
| North South Line | 15.2% |
| Two Lines Combined | 23.0% |

Source : JICA Study Team

## (2) Economic Analysis

Economic analysis of the three Priority Projects is carried out in this section. The above analyzed two tramlines are part of Priority Project 3.

**1) Target Economic Internal Rate of Return (EIRR)**

In addition to above mentioned basic assumptions for the financial analysis of tramlines, the following assumption is applied to the economic analysis of the three priority projects.

The project sets the target EIRR at 10%. That is to say, if the project's EIRR is greater than 10%, the project is economically feasible and should bring net benefits to the regional economy.

**2) Economic Benefits**

The study considers reduction in travel time and travel costs for passengers of both road and public (i.e., trams and buses) transportation between With the Project Case and Without the Project Case as economic benefit items of each priority project.

**3) Economic Evaluation**

EIRR of all three priority projects is above the target rate of 10%. It therefore could be concluded that all three priority projects should bring sufficient net economic benefits to the region.

**Table11.5.4 Summary of Economic Evaluation for Three Priority Projects**

| | EIRR |
|---|---|
| PP 1 | 52.1% |
| PP 2 | 29.3% |
| PP 3 | 16.8% |

Source : JICA Study Team

## 11.6 Environmental Considerations

### (1) Recommended Mitigation Measures

#### 1) Mitigation Measures at Pre-construction Stage

Mitigation measures for the adverse impacts for land / issues, social infrastructure, vulnerable or ethnic minorities and cultural heritage will be required at this stage. Preparation of RAP (Resettlement Action Plan) and implementation of appropriate compensation, protection or measures in case of damage of such social infrastructure or cultural heritage in tender documents will be necessary.

#### 2) Recommended Mitigation Measures at Construction Stage

Adverse impacts of pollution such as hazards, air/water pollution, and noise which are estimated by construction works should be mitigated at this stage. Appropriate measures such as preparation of construction manual or environmental monitoring for these impacts should be prepared for pollution control.

#### 3) Recommended Mitigation Measures at Operation Stage

Mid- to long-term strategy for reduction of greenhouse gas (GHG) emission, traffic volume, and air pollution should be established.

### (2) Environmental Management and Monitoring Plan

#### 1) Environmental Management Plan

Project proponents should prepare social environmental management plans on RAP and social livelihood rehabilitation program especially for Roma people who may be affected by the projects. Action plans for controlling GHG emission and air pollution should be prepared.

#### 2) Environmental Monitoring Plan

The monitoring of progress on the land expropriation and resettlement should be carried out at pre-construction stage. The monitoring on mitigation measures for the vulnerable people and the mitigation on protection of the cultural and historical sites also should be carried out at this stage. At construction stage, the mitigation for the pollution control of air, traffic, water pollution, and noise should be monitored. At operation stage, the mitigation measures of air pollution, global warming and noise should be monitored.

### (3) Recommended TOR for Environmental Process for Proposed Plans

This sector includes the road development projects with two or more lanes which should require a preparation of Profound EIA (Environmental Impact Assessment) in accordance

with the Albanian EIA legislative system. Therefore, TOR (Terms of Reference) for preparation of Profound EIA should be prepared on the assumption that Profound EIA is required.

## 11.7 Recommendations for Actions

Out of the projects that have been proposed as a master plan in this Study, action plans are formulated for the three priority projects in the road and urban transportation sector; namely, (1) Outer Ring Road (North Section), (2) Inner/Middle Ring Missing Links Development, and (3) Integrated Public Transport and Parking Development Projects.

### (1) Significance of Proposed Priority Projects

Among the above three priority projects, Priority Projects (1) and (2) are considered as highly important actions in order to enhance the functions for handling the through traffic flow (especially through Priority Project (2)) and for supporting the polycentric urban structure (especially through Priority Project (1)) by completing the Inner, Middle, and Outer Ring corridors in Tirana, which have been formed through the major radial and ring road network. The three major ring corridors should also help to define the concept of "traffic cell" and transportation prioritization plans.

For Priority Project (1), namely, the north section of the Outer Ring Road, a primary road with 6 traffic lanes is to be constructed. In addition, along with the rehabilitation of the Tirana River, access roads are also to be constructed utilizing the embankment of the river under this priority project. Meanwhile, for Priority Project (2), a primary one-way road with 6 traffic lanes (counterclockwise direction) is to be constructed to complete the Inner Ring Road, while a primary road with 4 lanes and a secondary road with 4 lanes (or 3 traffic lanes and 1 tram lane) where the road width is narrow are to be constructed to complete the Middle Ring Road.

On the other hand, Priority Project (3) is a public transport development project. Under the current situation of a transportation system in Tirana that consists of bus transport and private vehicular traffic, it aims to establish a public transport network and to drastically improve the level of service by clearing on-street parking from the primary roads inside the CBD to secure enough space for ROW of a mass transit system such as tramlines and dedicated bus lanes as a base of a BRT. Furthermore, it aims to promote the shift of usage from increasing private vehicles to public transport through a parking pricing system. Priority Project (3) consists of the following three subprojects.

- **Two tramlines** of east-west (Kinostudio-Kombinat) and north-south (Student City-Intermodal Terminal) lines shall be developed to serve as the core axes of the public transport network. Required size of the rolling stock is 11 trams for the east-west line and 8 trams for the north-south line in order to achieve operation that is at least at the same intervals as the currently operated bus lines, namely, 4-7 minutes with a commercial speed of about 20km per hour. A common flat tariff of **60 Lek** is also assumed with free transfers with buses. The existing Tirana railway station is to be relocated to the new Intermodal Transportation Terminal as planned by the Municipality. This subproject only includes relocation of Tirana railway station along with removal of the railway tracks between the old and new stations for development of the north-south tramline. Above all,

at the tramline terminal stations that will serve as gateway stations to the CBD, car and bicycle parking facilities (i.e., Park & Ride system) shall be provided especially to restrict the flow of private vehicles into the CBD through the parking pricing system and to promote use of the tramlines instead.

- The current partial **dedicated bus lanes** shall be extended more continuously on the urban primary roads to form a continuous, smooth network for buses in order to serve as a BRT by securing a relatively high operating speed. When the dedicated bus lanes and tramlines have been introduced as a core public transport system, the current bus route structure shall be redesigned in a hierarchical manner along with an investment of new air-conditioned buses.
- Last but not least, **additional parking facilities** shall be constructed in the CBD to clear away the current on-street parking from the primary and secondary roads to utilize the road space for public transport and bicycles while maintaining the same traffic capacity. Particularly around the Inner Ring corridor area in which most of the roads are converted to be pedestrian streets, additional parking facilities shall be constructed along with a parking information system. Then, a parking pricing system shall be introduced and utilized as an effective **TDM** policy. Initial pricing level is based on the commonly implemented current parking fee of **100 Lek** per hour.

Since the above three subprojects are closely related to each other, they need to be studied together as one project package under Priority Project (3).

### (2) Project Feasibility

Regarding the total cost of the three priority projects, Priority Projects (1), (2), and (3) have been estimated at 18,304 million Lek (about 128.13 million EUR), 2,506 million Lek (about 17.54 million EUR), and 50,656 million Lek (about 354.59 million EUR), respectively. Economic benefit was analyzed targeting at the Tirana Metropolitan Area, and the EIRR has been estimated at around 52% for Priority Project (1), 29% for Priority Project (2), and 17% for Priority Project (3). Since the benefit-cost ratio is considered to be high, those three priority projects are worth implementing in the short term.

Meanwhile, considerable revenues are also expected in Priority Project (3), and the FIRR is as high as around 23%, should the two tramlines be co-developed. This implies that the investment by the private sector is also feasible.

### (3) Social and Environmental Considerations

Regarding the impact of the three priority projects on the environment and society, recommended mitigation measures necessary at pre-construction stage are for land issues, social infrastructure, vulnerable or ethnic minorities and cultural heritage. Preparation of RAP and implementation of appropriate compensation, protection or measures in case of damage of such social infrastructure or cultural heritage in tender documents will also be necessary. Furthermore, recommended mitigation measures at operation stage should include establishment of middle- to long-term strategy for reduction of GHG (greenhouse gas) emission, traffic volume and air pollution.

In addition, this sector includes the road development projects with two or more lanes which should require preparation of Profound EIA in accordance with the Albanian EIA legislative system. Therefore, TOR for Profound EIA should be prepared on the assumption that a Profound EIA is required.

### (4) Pursuance of Public Private Partnership

As for the financial outlook, while the Municipality of Tirana has a limited source of budget for implementing Priority Project (3), this project is expected to generate great revenue. Therefore, it is worth while studying a case in which the implementing organization is an independent entity from the Municipality of Tirana. That is, use of PPP, or cooperation with the private sector, is a possibility.

### (5) Organization for Coordinated Transportation Policies

As a basic premise of the project, it is essential to provide public transport systems by means of which people can travel comfortably, thereby being likely to impose increasing burden of transportation cost, especially, on a relatively lower-income group. On the other hand, if the project aims to alleviate congestion, car traffic inflows into the CBD should be controlled with introduction of a considerably expensive parking charge system. If revenues from parking pricing are utilized for the construction and/or improvement of public transport systems, both policies of park pricing and public transportation costing will be socially justifiable with citizens' consensus. Thus, a public organization would be necessary to seek for such rational and socially justifiable transportation polices under good coordination among three parties, namely, government authorities, public transport operators and citizens.

# 12. Action Plan for Solid Waste Management Plan

## 12.1 Priority Projects of ISWM Plan

The Priority Projects were selected from among the plans, programs and projects formulated in the ISWM Plan based on the screening criteria set by the elements for "urgency", "compliance" and "effects" which are attributed to each project. Followings are the list of selected Priority Projects for Tirana Municipality ISWM Plan.

(1) Illegal Dump Site Clean-up Project
(2) Separate Waste Collection and Transportation Services
(3) Introduction of 3R Programs
(4) Organic Waste Treatment Project
(5) Waste to Energy Project
(6) Waste Disposal Facilities Expansion Project
(7) Organizational Strengthening
(8) Monitoring and Evaluation Strengthening
(9) Financial Strengthening
(10) Raising Public Awareness Programs

Following sections presents the outline of respective Priority Project.

## 12.2 Illegal Dump Site Clean-up Project

### (1) Objectives of the Project

The Project is aiming at clean-up discarded waste at the public lands to mitigate the risks of environmental deterioration and maintain cleanliness and beautification of the capital city of Albania.

### (2) Project Location or the Covered Area

The Project covers clean-up of discarded waste in the public land of Municipality of Tirana (MOT) and start with the identified 46 open dump sites with the waste amount of 16,000 m3. Figure 12.2.1 shows the locations of typical illegal dumpsites.

### (3) Components and Contents of the Project

The Project is comprised of the following major activities.

- Survey of illegal open dump site,
- Determine the objective dumping areas to clean-up within the fiscal year,
- Prepare the specifications, tender document, open tender and contract for the clean-up work,
- Execute the clean-up work by the contracted service provider(s),
- Place waste bins at or nearby the cleared open dump site to carry out regular collection service,

- Monitor and inspect performance of the clean-up work,
- Prepare the budget for clean-up project to be implemented in the next fiscal year.


Source: JICA Study Team

**Figure 12.2.1 Typical Open Dump Sites for Clean-up Project**

### (4) Implementation Schedule of the Project

The Project shall be completed in 3 years as show in Table 12.2.1.

**Table 12.2.1 Implementation Schedule of Clean-up Project**

| Action Plans | | | Urgent and Short-term Period | | | | | Mid-term Period | | | | | Long-term Period | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 |
| SWM-1 | Waste Collection and Transportation Plan | | | | | | | | | | | | | | | | |
| | SWM-1-2 | Survey of Illegal Dump Site and Preparation of Clean-up project | | | | | | | | | | | | | | | |
| | SWM-1-3 | Implementation of Illegal Dump Site Clean-up Project through Contract | | | | | | | | | | | | | | | |

Source: JICA Study Team

## 12.3 Separate Waste Collection and Transportation Services

### (1) Objectives of the Project

Introduction of separate collection is aiming at strengthen the recovery of recyclable materials for reuse and recycling and contribute for saving resources and reduction of residual waste amount for final disposal in addition to the expansion of collection service area.

### (2) Project Location or the Covered Area

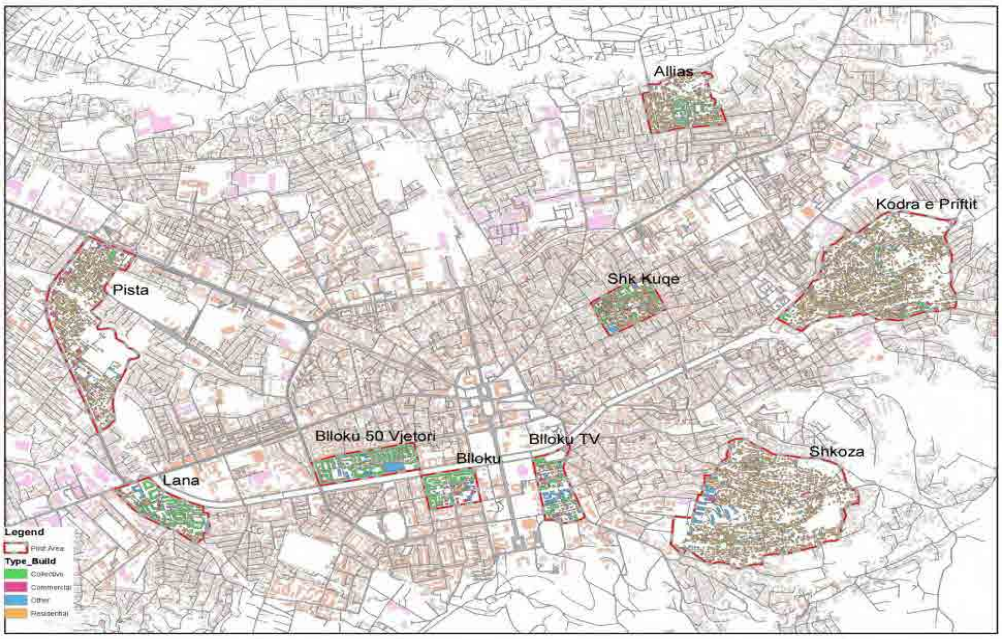
The Project is started at the pilot study areas and expands to the entire area of MOT in collaboration with the 3R activities. Figure 12.3.1 shows the proposed candidate pilot study areas including three types of towns, namely, 1) detached house area, 2) apartment building area and 3) commercial area.

### (3) Components and Contents of the Project

The Project is comprised of the following major activities.

- Study the method for separate collection and expansion of the service areas for practicing at the pilot study areas to decide the best model for implementing the project,

- Study the method for separate collection of special waste for practicing at the pilot study areas to find the best model for implementing the project,
- Implement the separate collection for general municipal waste and special waste and expansion of service area at the pilot study areas for experimenting and establishing the best method.




Source: JICA Study Team

**Figure 12.3.1 Candidate Areas for Pilot Study**

### (4) Implementation Schedule of the Project

The pilot study shall be practiced during the first two years in 2013-2014 and the separate collection and expansion of the service areas shall be carried out continuously as shown the the following Table 12.3.1.

**Table 12.3.1 Implementation Schedule of Separate Waste Collection**

| Action Plans | Urgent and Short-term Period | | | | | Mid-term Period | | | | | Long-term Period | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 |
| SWM-1 Waste Collection and Transportation Plan | | | | | | | | | | | | | | | |
| SWM-1-4 Implementation of Pilot Study for Improvement of Waste Collection Service | | | | | | | | | | | | | | | |
| SWM-1-4-1 Study for Expansion of Service area by 3-bins System | | | | | | | | | | | | | | | |
| SWM-1-4-2 Study of Separate Waste Collection for Special Wastes | | | | | | | | | | | | | | | |
| SWM-1-4-3 Implementation of Separate Collection at the Pilot Study Areas | | | | | | | | | | | | | | | |
| SWM-1-5 Operation of Separate Collection by 3-bins System | | | | | | | | | | | | | | | |

Source: JICA Study Team

## 12.4 Introduction of 3R Programs

### (1) Objectives of the Project

The 3R activities is carried out to recover the recyclable materials in municipal waste for reuse and recycling to contribute for saving the finite natural resources, minimizing discharge of waste and reducing the cost burden of MOT in solid waste management services.

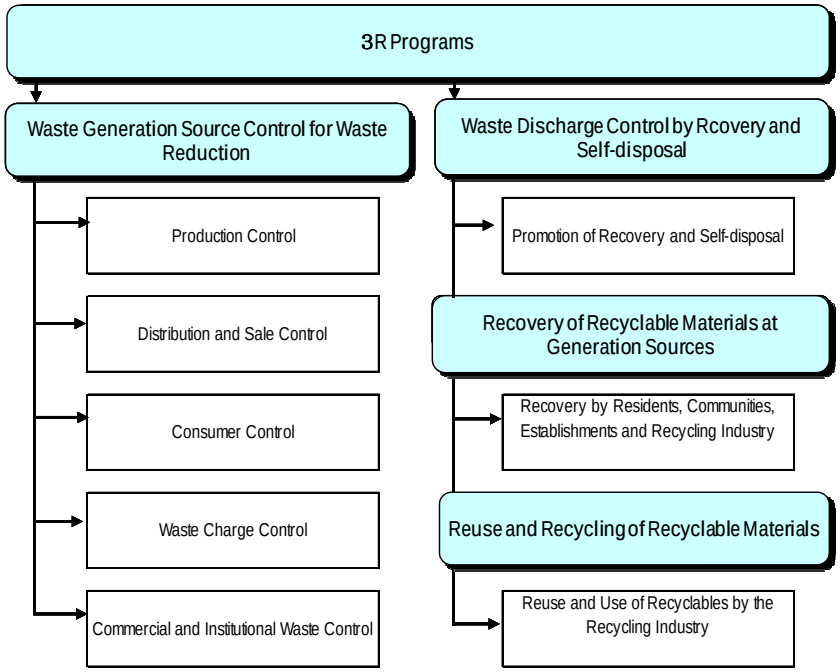
### (2) Project Location or the Covered Area

This Project is carried out in parallel with the Project for introducing the separate collection and transportation at the pilot study areas and expand to the entire area of MOT.

### (3) Components and Contents of the Project

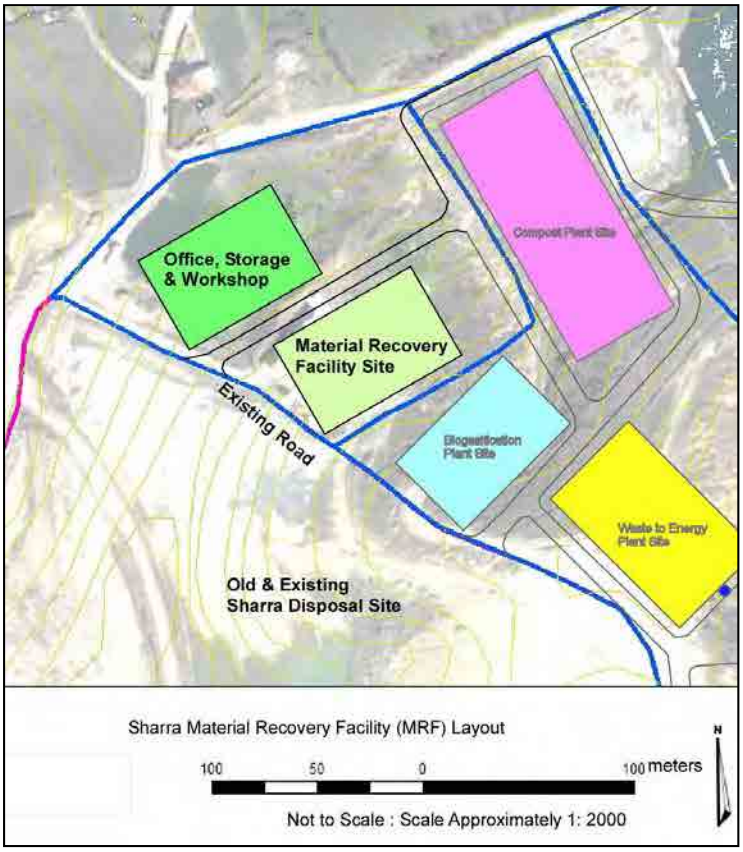
The Project is comprised of the following major activities.

- Study the method for promoting Waste Generation Source Control, Waste Discharge Control, Recovery of Recyclable Materials and Reuse and Recycling of Recyclable Materials and practice at the pilot study areas for experiment, (See Figure 12.4.1 for the programs to compose the 3R Program.)
- Dissemination of the good practices model(s) to the neighbouring areas and to the entire area of MOT,
- Construct the Central Material Recovery Facilities at Sharra and operate and maintain the facilities for secondary sorting and recovery, (See the site shown in Figure 12.4.2)




Source: JICA Study Team

**Figure 12.4.1 Components of 3R Programs**




Source: JICA Study Team

**Figure 12.4.2 Proposed Layout of Central MRF and Office Building**

### (4) Implementation Schedule of the Project

The 3R Programs shall be commenced in the beginning of 2014 and carried out continuously thereafter as shown in Table 12.4.1.

**Table 12.4.1 Implementation Schedule of 3R Programs**

| Action Plans | Urgent and Short-term Period | | | | | | | | | Mid-term Period | | | | | Long-term Period | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 |
| SWM-2 Waste Minimization Plan (3R Plan) | | | | | | | | | | | | | | | |
| SWM-2-2 Implementation of 3R Activities | | | | | | | | | | | | | | | |
| SWM-2-2-1 Promotion of Waste Generation Source Control | | | | | | | | | | | | | | | |
| SWM-2-2-2 Promotion of Waste Discharge Control | | | | | | | | | | | | | | | |
| SWM-2-2-3 Promotion of Recovery of Recyclable Materials | | | | | | | | | | | | | | | |
| SWM-2-2-4 Promotion of Reuse and Recycling of Recyclable Materials | | | | | | | | | | | | | | | |
| SWM-2-2-5 Construction of Central Material Recovery Facilities at Sharra | | | | | | | | | | | | | | | |
| Civil Work | | | | | | | | | | | | | | | |
| Building Work | | | | | | | | | | | | | | | |
| Mechanical & Electrical Works | | | | | | | | | | | | | | | |
| Engineering Design and Construction Supervision | | | | | | | | | | | | | | | |
| SWM-2-2-6 Operation of Central Material Recovery Facilities at Sharra | | | | | | | | | | | | | | | |

Source: JICA Study Team

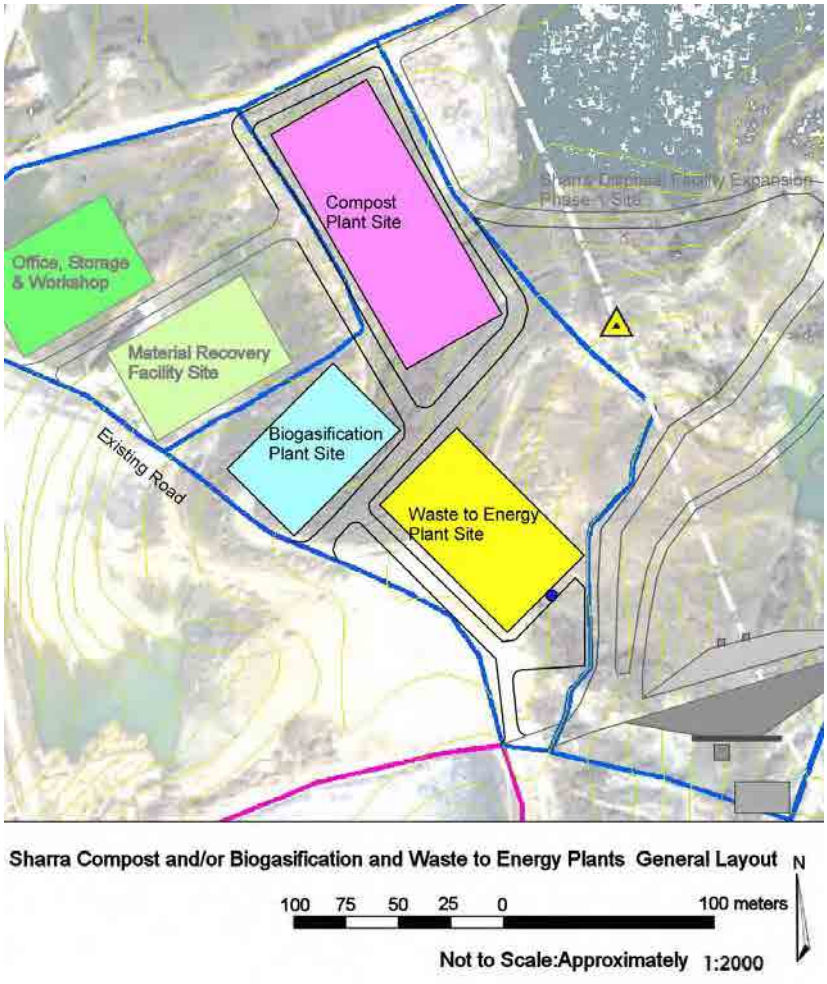
## 12.5 Organic Waste Treatment Project

### (1) Objectives of the Project

The Project is aiming at utilizing organic waste for the potential resources for biomass recycling and reducing the ration of organic waste to landfill less than 35% to comply with the EU Directives.

### (2) Project Location or the Covered Area

Home composting and community composting will be carried out initially at the pilot study area and expanded to the entire area of MOT. The construction site of the Central Compost Plant and/or Central Biogasification Plant is proposed at the neighboring area of the existing Sharra disposal site as shown the layout in Figure 12.5.1.




Source: JICA Study Team

**Figure 12.5.1 Proposed Construction Site of Compost and/or Biogasification Plants**

### (3) Components and Contents of the Project

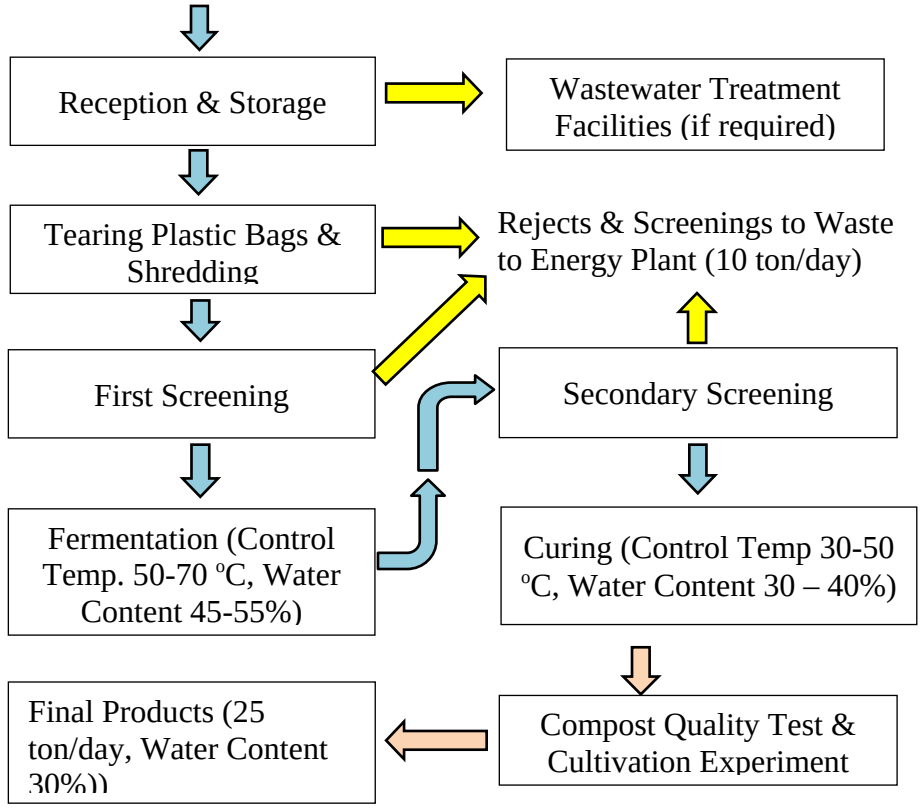
The Project is comprised of the following major activities.

- Organize the home composting and community composting groups in the pilot study areas to practice pilot composting by the guidance and instruction of MOT,
- The good practices of composting method shall be disseminated to the neighbouring areas and to the entire area of MOT,
- Construct and operate the pilot compost and/or biogasification plants (1 ton/day each) by MOT to examine the appropriate procedures for the central plant(s),
- Preparation of tender for engineering service contract and/or the contract for design-build and operation and maintenance of the central plant(s) through the options of implementing

agency by MOT and/or by the private sector through Contract-out or BOO or BOT or BTO contract or other means,

- Tender and contract for the engineering design and/or the construction work of the central plant(s),
- Implementation of phased construction work for the central compost plant (50 ton/day x 2 plants) and/or the biogasification plant (50 ton/day x 2 plants) and construction supervision by MOT,
- Operation and maintenance of the pilot and central plants,
- Regular monitoring and inspection for operation of the plants,

Following Figure 12.5.2 shows the proposed treatment flow of central composting plant.




Source: JICA Study Team

**Figure 12.5.2 Proposed Central Compost Plant Process Flow (50 ton/day)**

### (4) Implementation Schedule of the Project

Following Table 12.5.1 shows the implementation schedule of organic waste treatment Project. The pilot scale composting is scheduled to start operation in 2014, the first phase composting and biogasification plants are schedule to start operation in 2017 and the second phase plants are scheduled to start operation in 2022.

**Table 12.5.1 Implementation Schedule of Organic Waste Treatment Project**

| Action Plans | | | | Urgent and Short-term Period | | | | | Mid-term Period | | | | | Long-term Period | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 |
| SWM-3 | Intermediate Treatment Plan | | | | | | | | | | | | | | | | | |
| | SWM-3-2 | Implementation of Organic Waste Treatment Plan | | | | | | | | | | | | | | | | |
| | SWM-3-2-1 | Organizing Home Composting and Community Composting Groups | | | | | | | | | | | | | | | | |
| | SWM-3-2-2 | Implementation of Pilot Project of Home and Community Composting | | | | | | | | | | | | | | | | |
| | SWM-3-2-3 | Expansion of Home Composting and Community Composting | | | | | | | | | | | | | | | | |
| | SWM-3-2-4 | Selection of Large Waste Generation Source of Biodegradable Waste | | | | | | | | | | | | | | | | |
| | SWM-3-2-5 | Construction of Pilot Scale Compost Plant | | | | | | | | | | | | | | | | |
| | | | Civil Work | | | | | | | | | | | | | | | |
| | | | Building Work | | | | | | | | | | | | | | | |
| | | | Mechanical & Electrical Works | | | | | | | | | | | | | | | |
| | | | Engineering Design and Construction Supervision | | | | | | | | | | | | | | | |
| | SWM-3-2-6 | Operation and Maintenance of Pilot Scale Compost Plant | | | | | | | | | | | | | | | | |
| | SWM-3-2-7 | Construction of Central Compost and/or Biogasification Plant | | | | | | | | | | | | | | | | |
| | | | Civil Work | | | | | | | | | | | | | | | |
| | | | Building Work | | | | | | | | | | | | | | | |
| | | | Mechanical & Electrical Works | | | | | | | | | | | | | | | |
| | | | Engineering Design and Construction Supervision | | | | | | | | | | | | | | | |
| | SWM-3-2-8 | Operation and Maintenance of Central Compost and/or Biogasification Plant | | | | | | | | | | | | | | | | |

Source: JICA Study Team

## 12.6 Waste to Energy Project

### (1) Objectives of the Project

The Project is aiming at reducing the volume for landfill, stabilizing the landfill waste and convert waste to electricity for maximizing the recovery and recycling ratio to comply with the final target level of 75% set in the National Waste Management Plan.

### (2) Project Location or the Covered Area

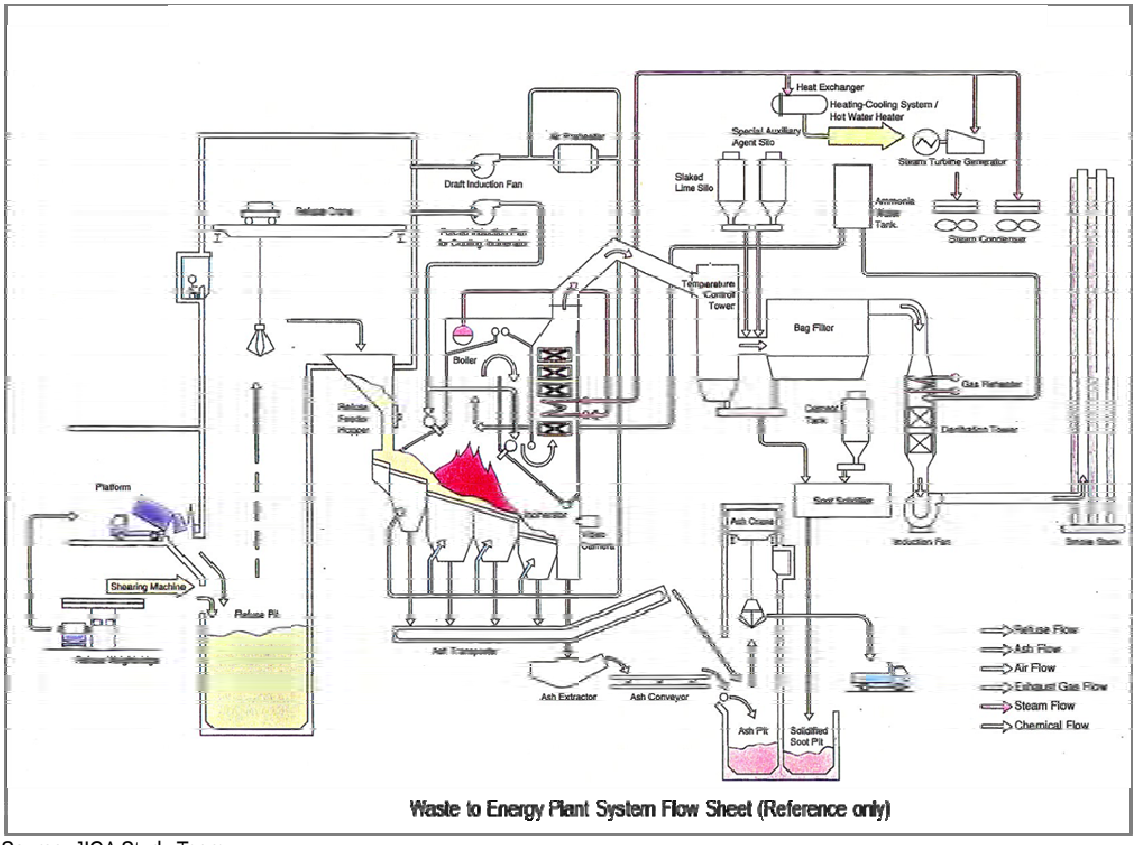
The waste to energy plant site is proposed to allocate between the Sharra waste disposal site Phase 1 and the site of central compost plant and/or biogasification plant as shown in Figure 12.6.1.

### (3) Components and Contents of the Project

The Project is comprised of the following major activities.

- Decide the method for development of the waste to energy facilities by the option of implementation agency with MOT and/or with private sector
- Preparation of the tender document for engineering service contract and/or the contract for design-build and operation and maintenance of waste to energy plant through the options of Contract-out or BOO or BOT or BTO contract or other means,
- Tender and contract for the engineering design and/or the construction, operation and maintenance work of waste energy plant,
- Implementation of construction work by the contractor and construction supervision by MOT,
- Operation and maintenance of the waste to energy plant,
- Regular monitoring and inspection for operation and maintenance of the plant,

The typical process flow of waste to energy plant (360 ton/day) is illustrated and shown in Figure 12.6.1 for reference.




Source: JICA Study Team

**Figure 12.6.1 Waste to Energy Plant Process Flow (360 ton/day)**

### (4) Implementation Schedule of the Project

Table 12.6.1 shows the implementation schedule of Waste to Energy Project. The Project shall be commenced in 2014, complete the construction work by the end of 2018 and commence operation and maintenance from the beginning of 2019.

**Table 12.6.1 Implementation Schedule of Waste to Energy Project**

| Action Plans | | | Urgent and Short-term Period | | | | | Mid-term Period | | | | | Long-term Period | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 |
| SWM-3 | Intermediate Treatment Plan | | | | | | | | | | | | | | | | |
| | SWM-3-4 | Implementation of Waste to Energy Plan | | | | | | | | | | | | | | | |
| | SWM-3-4-1 | Selection of Construction Site and Procurement | | | | | | | | | | | | | | | |
| | SWM-3-4-2 | Construction of Waste to Energy Plant | | | | | | | | | | | | | | | |
| | | Civil Work | | | | | | | | | | | | | | | |
| | | Building Work | | | | | | | | | | | | | | | |
| | | Mechanical & Electrical Works | | | | | | | | | | | | | | | |
| | | Engineering Design and Construction Supervision | | | | | | | | | | | | | | | |
| | SWM-3-4-3 | Operation and Maintenance of Waste to Energy Plant | | | | | | | | | | | | | | | |

Source: JICA Study Team

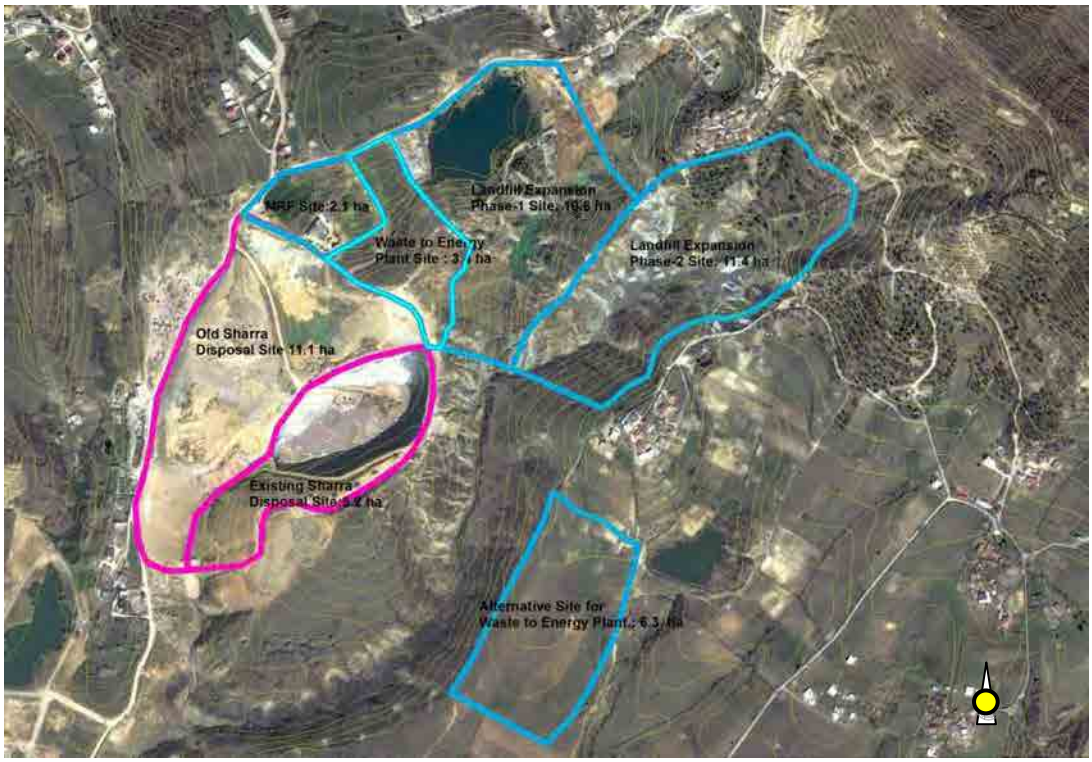
## 12.7 Waste Disposal Facilities Expansion Project

### (1) Objectives of the Project

The Project is aiming at securing a modern sanitary landfill after the end-of-life of existing Sharra disposal facilities. The waste disposal facilities shall have enough storage volume to receive the residual waste hauled from MOT and the communes currently disposing waste at the existing Sharra disposal facilities.

### (2) Project Location or the Covered Area

The proposed construction site locates at the adjacent area of existing Sharra disposal site as shown in Figure12.7.1.




Source: JICA Study Team

**Figure 12.7.1 Allocation of Sites for Development of SWM Facilities at Sharra**

### (3) Components and Contents of the Project

The Project is comprised of the following major activities.

- Decide the method for the development of waste disposal facilities by the option of implementing agency with MOT and/or with private sector
- Preparation of the tender document for engineering service contract and/or the contract for design-build and operation and maintenance of the waste disposal facilities through the options of Contract-out or BOO or BOT or BTO contract or others,
- Tender and contract for the engineering design and/or the construction work of waste disposal facilities,
- Implementation of construction work by the contractor and construction supervision by MOT,
- Operation and maintenance of the waste to energy plant,
- Regular monitoring and inspection for the operation of waste to energy plant,

Figure 12.7.2 shows the general layout of the proposed expansion of Phase 1 waste disposal facilities to be constructed in Sharra.

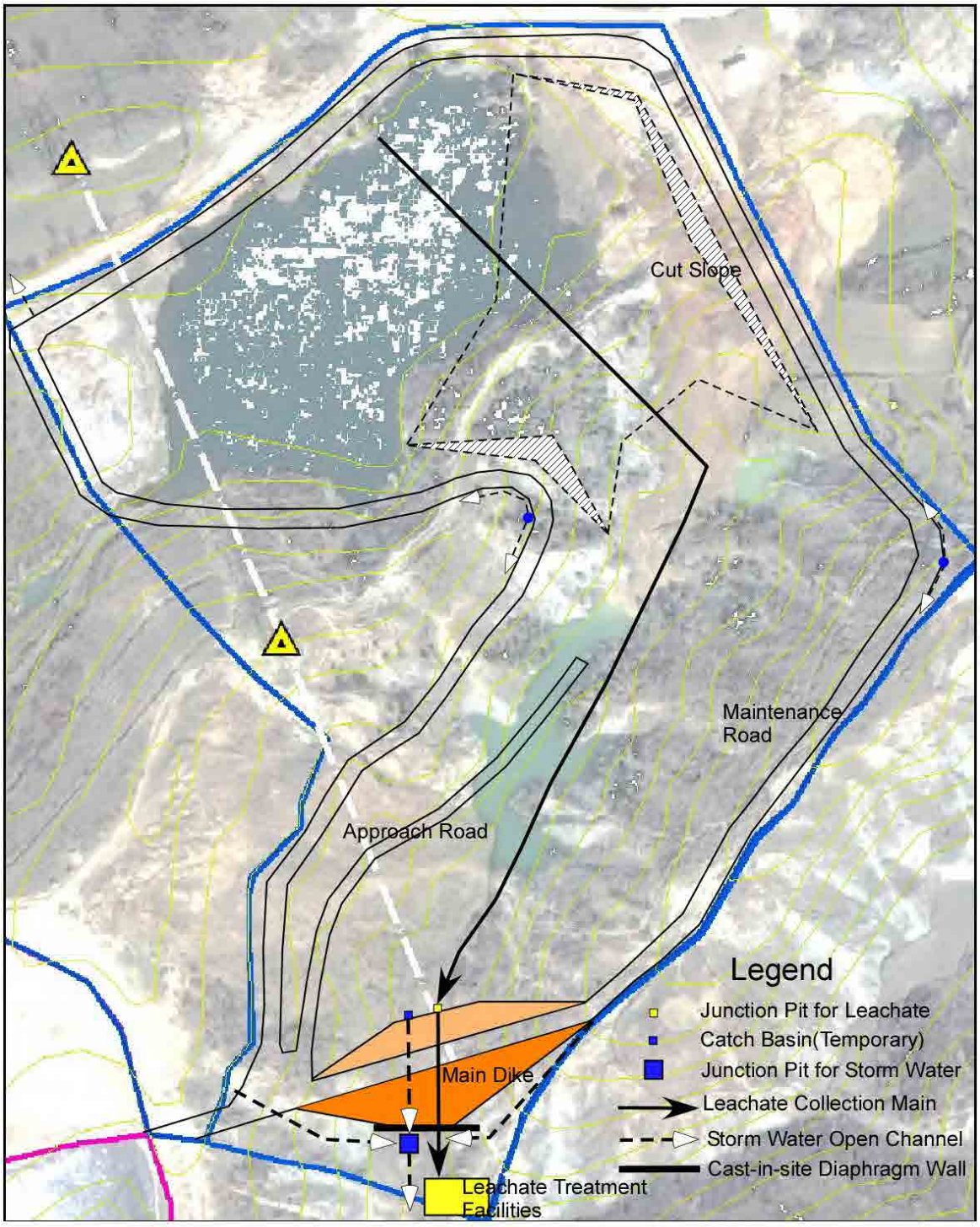
### (4) Implementation Schedule of the Project

Following Table 12.7.1 shows the implementation schedule of Waste Disposal Facilities Expansion Project Phase 1. The Project shall be commenced in 2013, finish constructing by the end of 2016 and start operation at the new landfill site in 2017. The existing Sharra landfill site shall be closed in 2017 upon commencement of landfill at the new site.

**Table 12.7.1 Implementation Schedule of Waste Disposal Facilities Expansion Project**

| Action Plans | Urgent and Short-term Period | | | | | Mid-term Period | | | | | Long-term Period | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 |
| SWM-4 Waste Disposal Plan | | | | | | | | | | | | | | | |
| SWM-4-2 Coordination with Regional Waste Disposal Plan | ■ | ■ | | | | | | | | | | | | ■ | ■ |
| SWM-4-3 Selection of Construction Site and Procurement | | ■ | ■ | | | | | | | | | | | | ■ |
| SWM-4-4 Implementation of Waste Disposal Project | | | | | | | | | | | | | | | |
| SWM-4-4-1 Construction of Sanitary Landfill | | | | | | | | | | | | | | | |
| Civil Work | | | ■ | ■ | ■ | | | | | | | | | | |
| Building Work | | | ■ | ■ | ■ | | | | | | | | | | |
| Mechanical & Electrical Works | | | | ■ | ■ | | | | | | | | | | |
| Engineering Design and Construction Supervision | | ■ | ■ | ■ | ■ | | | | | | | | | | |
| SWM-4-4-2 Operation and Maintenance of Sanitary Landfill | | | | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| SWM-4-4-3 Closure of Existing Landfill | | | | | | | | | | | | | | | |
| Civil Work | | | | | ■ | | | | | | | | | | |

Source: JICA Study Team




Source: JICA Study Team

**Figure 12.7.2 Sharra Waste Disposal Facilities General Layout Plan (Phase-1)**

## 12.8 Organizational Strengthening

### (1) Objectives of the Project

The Project is aiming at organizing the Project Task Team to take initiatives and responsibilities for implementing the plans, programs and projects formulated in the Tirana Municipality ISWM Plan.

### (2) Project Location or the Covered Area

The staff of the Project Task Team shall be appointed basically from the staff of MOT and the specialists may be recruited from the external resources.

### (3) Components and Contents of the Project

The Project is comprised of the following works.

- Establish the Project Task Team and recruit the staff from the staff of MOT and external resources,
- Conducting orientation of the contents of the ISWM Plan to the staff of the Project Task Team and the staff of relevant sectors,
- Prepare the implementation plan of the respective Priority Project,
- Formulation, updating and revision of the ISWM Plan as required,
- Documentation for obtaining the official approval for implementing the priority projects,
- Organize and propose the project management unit(s) for each priority projects to supervise the activities,
- Evaluation of performance and target level of each plan and program formulated in the ISWM Plan

### (4) Implementation Schedule of the Project

Table 12.8.1 shows the implementation schedule of Organizational Strengthening in the field of solid waste activities of MOT. The Project Task shall be organized in the beginning of 2013 and the Project Task Team shall take initiatives continuously for implementation of the priority projects through the master plan period.

**Table 12.8.1 Implementation Schedule of Organizational Strengthening**

| Action Plans | | | Urgent and Short-term Period | | | | | Mid-term Period | | | | | Long-term Period | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 |
| SWM-5 | Institutional Capacity Development Plan | | | | | | | | | | | | | | | | |
| | SWM-5-1 | Establishment of Project Task Team and Implementation of Priority Projects | | | | | | | | | | | | | | | |
| | SWM-5-1-1 | Recruiting the Task Team Staff | ■ | | ■ | | ■ | ■ | | | | | | | | | |
| | SWM-5-1-2 | Orientation of Action Plans of ISWM Plan, Modification and Finalization | ■ | ■ | | | | | | | | | | | | | |
| | SWM-5-1-3 | Preparation of Implementation Plan of the Priority Projects | | ■ | ■ | | | | | | | | | | | | ■ |
| | SWM-5-1-4 | Budgeting for Implementation of the Priority Projects | | ■ | ■ | | ■ | ■ | | ■ | ■ | ■ | | ■ | | ■ | ■ |

Source: JICA Study Team

## 12.9 Monitoring and Evaluation Strengthening

### (1) Objectives of the Project

The Project is aiming at strengthen the capabilities for monitoring, reporting and regular evaluation of the SWM activities through collecting, accumulating and analyzing the baseline data and information related with SWM activities including the public awareness data and

information, waste amount and composition, in addition to preparation of monthly and annual activity reports.

### (2) Project Location or the Covered Area

The Project shall be carried out for the staff of MOT in charge of SWM services especially for the staff of Project Task Team.

### (3) Components and Contents of the Project

The Project is comprised of the following major activities.

- Record and gather all the data and information of SWM activities,
- Preparation of monthly/annual reports for evaluating the performance of the SWM activities,
- To conduct the survey and analysis for the no. of dwellers, awareness to waste, opinion, income level, willingness to pay, etc. of the waste generators, and
- To conduct and analyse waste amount and composition for domestic waste and commercial, business and institutional waste.

### (4) Implementation schedule of the Project

Table 12.9.1 shows the implementation schedule for Monitoring and Evaluation Strengthening. The tasks shall be started immediately in 2013 to prepare the monthly and annual reports and conduct the first surveys for public awareness and waste amount and composition. This shall be conduct at least once in five years and as required.

**Table 12.9.1 Implementation Schedule of Monitoring and Evaluation Strengthening**

| Action Plans | | | Urgent and Short-term Period | | | | | Mid-term Period | | | | | Long-term Period | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 |
| SWM-5 | Institutional Capacity Development Plan | | | | | | | | | | | | | | | | |
| | SWM-5-5 | Survey of Baseline Data for Performance Indicators and Reporting | | | | | | | | | | | | | | | |
| | SWM-5-5-1 | Preparation of Monthly and Annual Report | | | | | | | | | | | | | | | |
| | SWM-5-5-2 | Public Awareness/Opinion Survey on SWM Activities | | | | | | | | | | | | | | | |
| | SWM-5-5-3 | Domestic Waste Amount and Composition Survey | | | | | | | | | | | | | | | |
| | SWM-5-5-4 | Commercial/Business Waste Amount and Composition Survey | | | | | | | | | | | | | | | |

Source: JICA Study Team

## 12.10 Financial Strengthening

### (1) Objectives of the Project

The Project is aiming at establishing a vital SWM financial capacity through fulfilling a series of tasks for minimizing the cost, allocating sufficient budget, maximizing recovery of waste fee, setting a fair waste tariff, practicing a transparent and independent account system.

### (2) Project Location or the Covered Area

The Project is implemented to the staff related with financial management, the Project Task Team, and the managerial staff of MOT.

### (3) Components and Contents of the Project

The Project is comprised of the following major activities.

- Preparation to separate revenue and expenditures of SWM services from other account of MOT to establish the independent SWM account
- To conduct cost calculation for waste collection, intermediate waste treatment and waste disposal respectively,
- Study the waste tariff system and determine the sound waste fee and tariff,
- Implement and establish an independent, transparent SWM account system

### (4) Implementation Schedule of the Project

Table 12.10.1 shows the implementation schedule of Financial Strengthening programs. The Programs shall be commenced immediately in 2013 and carry out continuously through the master plan period.

**Table 12.10.1 Implementation Schedule of Financial Strengthening**

| Action Plans | | | Urgent and Short-term Period | | | | | Mid-term Period | | | | | Long-term Period | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 |
| SWM-6 | Financial Strengthening Plan | | | | | | | | | | | | | | | | |
| | SWM-6-3 | Implementation of Financial Strengthening Plan | | | | | | | | | | | | | | | |
| | | SWM-6-3-1 Preparation of Separate SWM Account | | | | | | | | | | | | | | | |
| | | SWM-6-3-2 Preparation and Establishment of Sound Waste Tariff System | | | | | | | | | | | | | | | |
| | | SWM-6-3-3 Implementation and Establishment of Sound SWM Account | | | | | | | | | | | | | | | |

Source: JICA Study Team

## 12.11 Raising Public Awareness Programs

### (1) Objectives of the Project

The Project is aiming at raising the public awareness of all the stakeholders to promote participating to the SWM activities based on the roles and responsibilities imposed to each waste generator or the stakeholder.

### (2) Project Location or the Covered Area

The Programs are targeted to carry out for the waste generators and the stakeholders in the entire area of MOT and also disseminate the information to the country.

### (3) Components and Contents of the Project

The Project is comprised of the following major activities.

- Prepare the method of public information for SWM activities and implement the activities through mass-media, public hearing, distributing leaflets, etc.
- Preparation of the contents, curriculum and teaching materials and implementation of school education,
- Preparation of the contents and teaching materials for non-formal education and implementation of the education to the community groups and the commercial, business and institutional establishments,
- Prepare and implement the community involvement activities for 3R activities and separate collection,

### (4) Implementation Schedule of the Project

Table 12.11.1 shows the implementation schedule of Raising Public Awareness Programs. The Program shall be commenced in 2013 for public relation plan. The education programs and

community involvement shall be commenced from the beginning of 2014 and continue the activities throughout the master plan period.

**Table 12.11.1 Implementation Schedule of Raising Public Awareness Programs**

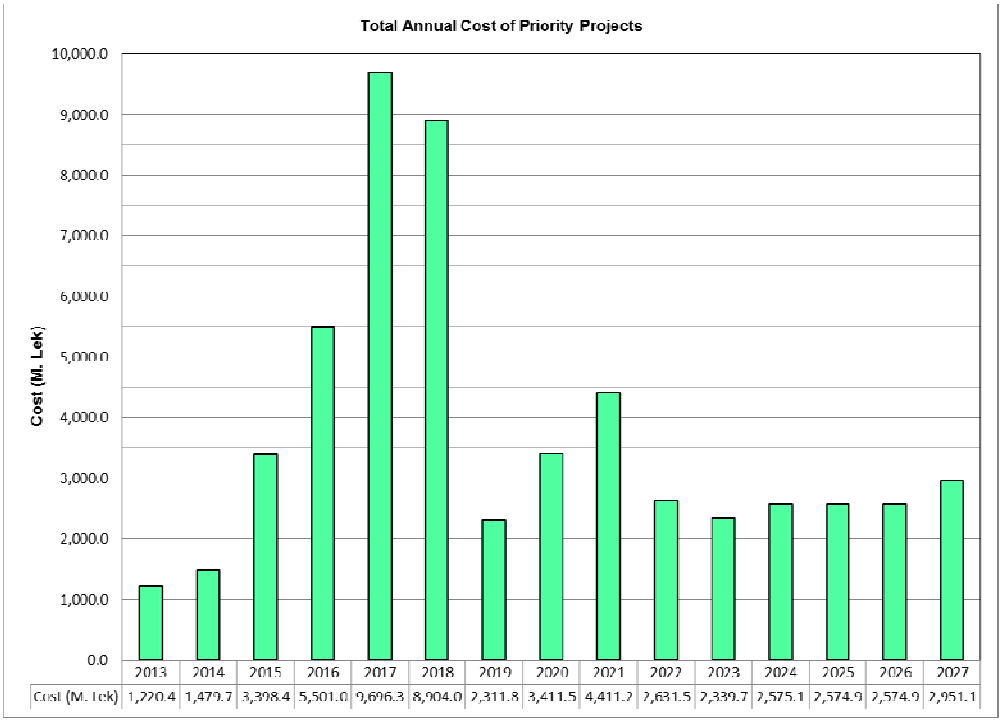
| Action Plans | | | Urgent and Short-term Period | | | | | Mid-term Period | | | | | Long-term Period | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 |
| SWM-7 | Raising Public Awareness Plan | | | | | | | | | | | | | | | | |
| | SWM-7-2 | Implementation of Raising Public Awareness Plan | | | | | | | | | | | | | | | |
| | | SWM-7-2-1 Implementation of Public Relation Plan | | | | | | | | | | | | | | | |
| | | SWM-7-2-2 Implementation of School Education Plan | | | | | | | | | | | | | | | |
| | | SWM-7-2-3 Implementation of Non-formal Education Plan | | | | | | | | | | | | | | | |
| | | SWM-7-2-4 Implementation of Community Involvement Plan | | | | | | | | | | | | | | | |

Source: JICA Study Team

## 12.12 Cost of Priority Projects

### (1) Annual Cost

Figure 12.12.1 shows the annual cost estimated for the sum of investment, operation and maintenance costs. The total cost of the Priority Projects is estimated at 55,981 Million Lek for the period from 2013 to 2017. The land cost and administration cost of MOT are not included in the cost estimates. The annual costs ranges from the minimum at 1,220 Million Lek in 2013 and the maximum at 9,700 Million Lek in 2017 due to the peak period of construction work. In average, the cost is estimated at 3,730 Million Lek per year.




Source: JICA Study Team

**Figure 12.12.1 Trend of Annual Cost for Implementation of Priority Projects**

### (2) Summary of Priority Project Cost

Table 12.12.1 shows the total cost of each Priority Project grouped into i) illegal dump site clean-up project, ii) separate waste collection service, iii) material recovery facilities, iv)

composting and biogasification plants, v) waste to energy plant and vi) expansion of waste disposal facilities. The cost of separate waste collection and transportation service is estimated the highest cost at 22,700 Million Lek (41 %) followed by the waste to energy project cost at 21,600 Million Lek (39%).

**Table 12.12.1 Summary of Priority Project Cost**

| Summary-1 : Summary of Priority Project Cost (M. Lek) | | MOT | External Source | Total | Percentage (%) |
|---|---|---|---|---|---|
| SWM 1-3 | Illegal Dump Site Clean-up Project | 150.0 | 0.0 | 150.0 | 0.3 |
| SWM 1-5 | Waste Collection and Transportation Service | 22,699.4 | 0.0 | 22,699.4 | 40.5 |
| SWM 2-2 | Material Recovery Facilities at Sharra | 123.3 | 82.1 | 205.4 | 0.4 |
| SWM 3-2 | Composting and Biogasification Project | 2,595.4 | 7,088.8 | 9,684.2 | 17.3 |
| SWM 3-4 | Waste to Energy Project | 4,453.2 | 17,138.0 | 21,591.2 | 38.6 |
| SWM 4-4 | Waste Disposal Facilities Expansion Project | 570.5 | 1,080.5 | 1,651.0 | 2.9 |
| Total | | 30,591.8 | 25,389.3 | 55,981.1 | 100.0 |

Source: JICA Study Team

### (3) Investment, Operation and Maintenance Costs

Table 12.12.2 shows cost breakdown for the investment at 46,240 Million Lek (83%), the maintenance cost 5,400 Million Lek (10%), the operation and the engineering cost in the range of 2,130 – 2,210 Million Lek (4% approximately)

**Table 12.12.2 Investment, Operation and Maintenance Cost**

| Summary-2: Summary of Investment, Operation and Maintenance Cost (M. Lek) | MOT | External Source | Total | Percentage (%) |
|---|---|---|---|---|
| Investment Cost | 23,062.6 | 23,179.5 | 46,242.1 | 82.6 |
| Engineering Cost | 0.0 | 2,209.8 | 2,209.8 | 3.9 |
| Operation Cost | 2,130.1 | 0.0 | 2,130.1 | 3.9 |
| Maintenance Cost | 5,399.1 | 0.0 | 5,399.1 | 9.6 |
| Total | 30,591.8 | 25,389.3 | 55,981.1 | 100.0 |

Source: JICA Study Team

### (4) Waste Collection, Intermediate Treatment and Waste Disposal Costs

Table 12.12.3 shows a breakdown cost of intermediate treatment and 3R activities estimated at 31,480 Million Lek(56%), the waste collection and transportation cost at 22,850 Million Lek (41%) and the waste disposal cost at 1,700 Million Lek (3%).

**Table 12.12.3 Waste Collection, Intermediate Treatment and Waste Disposal Cost**

| Summary-3: Summary of Waste Collection, Intermediate Treatment and Waste Disposal Costs (M. Lek) | MOT | External Source | Total | Percentage (%) |
|---|---|---|---|---|
| Waste Collection and Transportation Cost | 22,849.4 | 0.0 | 22,849.4 | 40.8 |
| 3R & Intermediate Treatment Cost | 7,171.9 | 24,308.8 | 31,480.7 | 56.3 |
| Waste Disposal Cost | 570.5 | 1,080.5 | 1,651.0 | 2.9 |
| Total | 30,591.8 | 25,389.3 | 55,981.1 | 100.0 |

Source: JICA Study Team

### (5) Integrated Solid Waste Management Cost per Ton

Table 12.12.4 total cost and handling waste amount during the period of 2013-2027. From the relations between the cost and waste amount, the unit cost is estimated at 4.300 Lek/ton, 17,500 Lek/ton and 800 Lek/ton respectively for the services of waste collection, intermediate treatment and waste disposal. And the average unit cost for all the activities is estimated at 10,600 Lek/ton.

**Table 12.12.4 Waste Collection, Intermediate Treatment and Waste Disposal Cost**

| Item | Total Cost (M. Lek) | Annual Waste Amount (M. ton) | Unit Cost (Lek/ton) |
|---|---|---|---|
| Waste Collection and Transportation Cost | 22,849 | 5.3 | 4,300 |
| 3R & Intermediate Treatment Cost | 31,481 | 1.8 | 17,500 |
| Waste Disposal Cost | 1,651 | 2.1 | 800 |
| Total/Average | 55,981 | 5.3 | 10,600 |

Source: JICA Study Team

## 12.13 Implementing Agency

The executing agency or implementing agency and the relevant organization are proposed for the respective project or program as shown in Table 12.13.1. The Project Task Team proposed to organize under the Directorate of Waste Management shall take initiatives for implementing all the Priority Projects. The organizations listed in the Relevant Organization in the table stand for the organizations required to obtain approval, permission or coordination, operation and maintenance of the facilities/system.

**Table 12.13.1 Executing Agency and Relevant Organization**

| Code | Project Title | Executing Agency | Relevant Organizations |
|---|---|---|---|
| SWM 1-3 | Illegal Dump Site Clean-up Project | Directorate of Waste Management, MOT | Waste Collection Service Provider(s) or MOT Waste Management Enterprise or the Contractor for Clean-up Work |
| SWM 1-5 | Separate Waste Collection and Transportation Services | Directorate of Waste Management, MOT | Waste Collection Service Provider(s), MOT Waste Management Enterprise, Recycling Industry, Mini-municipalities |
| SWM 2-2 | Introduction of 3R Programs | Directorate of Waste Management, MOT | Waste Collection Service Provider(s), MOT Waste Management Enterprise, Recycling Industry, Community Groups, Mini-municipalities, Ministry of Environment, Forest and Water Administration- MoEFWA (EIA), Vaqarr Commune (Construction Permit) |
| SWM 3-2 | Organic Waste Treatment Project | Directorate of Waste Management, MOT | Contractors of Construction Wok and for Operation & Maintenance Work, MOT Waste Management Enterprise, MoEFWA (EIA), Vaquar Commune (Construction Permit) |
| SWM 3-4 | Waste to Energy Project | Directorate of Waste Management, MOT | Contractors of Construction Wok and for Operation & Maintenance Work, MoEFWA (EIA), Vaqarr Commune (Construction Permit) |
| SWM 4-4 | Waste Disposal Facilities Expansion Project | Directorate of Waste Management, MOT | Contractors of Construction Wok and for Operation & Maintenance Work, MoEFWA (EIA), Vaqarr Commune (Construction Permit) |
| SWM 5-1 | Organizational Strengthening | Directorate of Waste Management, MOT | MOT Council, Ministry of Local Government |

| | | | |
|---|---|---|---|
| SWM 5-5 | Monitoring and Evaluation Strengthening | Directorate of Waste Management, MOT | Mini-municipalities, MOT |
| SWM 6-3 | Financial Strengthening | Directorate of Strategic Planning, Directorate of Waste Management, MOT | Ministry of Finance, Ministry of Public Works and Transport |
| SWM 7-2 | Raising Public Awareness Programs | Directorate of Waste Management, MOT | Mini-municipalities, MoEFWA, Ministry of Education (MoE) |

Source: JICA Study Team

## 12.14 Financial and Economic Analysis

### (1) Basic Assumptions

**Project Case**

The new sanitary landfill will be constructed in 2016 to start operation in 2017. The landfill facilities will be expanded from 2026. The compost facilities as well as the waste incineration and power generation plant will be constructed in the period of 2015-2018. Sales of compost and electricity will start in 2017 and 2019 respectively.

**Project Evaluation Period**

The project life is 34 years from 2013 to 2046, including the construction period of 2013-2018 and evaluation period of 2017-2046.

**Other Factors**

The base year of the project is 2012 and all costs and revenues are estimated by the price level of 2012. Physical contingency of 10% is included in the financial analyses. The price contingency is not expected. The value added tax (VAT) of 20% and respective import duties are included while corporate tax is excluded. The target financial rate of return (FIRR) is set at the level indicated in Table 12.14.1.

**Table 12.14.1 Target FIRR by Investors**

| | |
|---|---|
| Local Private Investor | 13.5% |
| Foreign Private Investor | 7.0% |
| MOT | 0.0% |
| Co-investment<br>(MOT 10%, Foreign Investors 72% and Local Private 18%) | 7.5% |

Source: JICA Study Team

### (2) Financial Investment Costs

The initial investment costs of the project are as shown in Table 12.14.2.

**Table 12.14.2 Initial Investment Costs**

(Million Lek)

| | |
|---|---|
| Land | 1,449 |
| Civil Work | 2,967 |

| | |
|---|---|
| Building | 443 |
| Machinery and Equipment, Etc. | 13,323 |
| Total | 18,182 |
| Consulting Service (10%) | 1,673 |
| VAT (20%) | 3,681 |
| Base Cost | 23,536 |
| Physical Contingency (10%) | 2,354 |
| Total Financial Investment Cost | 25,889 |

Source: JICA Study Team

### (3) Operation and Maintenance Costs

Financial operation costs are shown in Table 12.14.3.

**Table 12.14.3 Annual Operation & Maintenance Costs in 2028-2046**

(Million Lek)

| | |
|---|---|
| Administrative Cost | 43.0 |
| Utilities & Cover Soil | 8.8 |
| Fuel | 167.4 |
| Maintenance | 603.4 |
| Operation & Maintenance of the MOT Enterprise & WM Directorate | 1,892.3 |
| Total | 2,714.9 |

Source: The Study Team

### (4) Financial Project Revenues

**Revenues from Waste Collection and Disposal**

The following Table 12.14.4 shows the cash income forecast for 12 months of 2012, which is made based on half-year result of 2012. Waste tariff revenue from 2013 onwards is forecast in line with the population growth.

**Table 12.14.4 Waste Tariff Cash Income for 2012**

(1,000 Lek)

| | 2010 Actual | 2011 Actual | 2012 Actual (HH to June 30, Business to July 20) | 2012 Estimate |
|---|---|---|---|---|
| HH | 68,838 | 49,004 | 173,561 | 364,477 |
| Business entities | 401,670 | 397,815 | 400,000 | 450,000 |
| Restaurants | 19,302 | 18,580 | | |
| Total | 489,810 | 465,399 | 573,561 | 814,477 |

Source: MOT and JICA Study Team

**Other Revenues**

It is assumed that the project will generate by-products of electricity and compost, which are expected to be sold in the market. Sales income of power and compost are summarized in the Table 12.14.5.

**Table 12.14.5 Sales Revenues of Power and Compost**

(Million Lek)

| | 2017 | 2019 | 2022-2046* |
|---|---|---|---|
| Compost | 38 | 38 | 74 |
| Electricity | 0 | 55 | 504 |

*2024-2046 in case of compost
Source: JICA Study Team

## (5) Financial Evaluation

**Result of FIRR**

As shown in Table 12.14.6, the computed FIRR is negative at the present tariff of 417 Lek (Case 1, however, it will improve to 7.5% (=the weighted target FIRR of investors including MoT and foreign/local private investors) if the households' monthly tariff is raised to 951 Lek as in Case 2.

**Table 12.14.6 FIRR Summary of Project**

| | Initial Investment Cost (Mill. Lek) | | | | MOT Subsidy to cover uncollected tariff revenue (2017-2046) | Monthly Tariff of HH in 2017 | Target FIRR of Investors | Project FIRR |
|---|---|---|---|---|---|---|---|---|
| | Total | MOT | Foreign Investors | Local Investor | | | | |
| Case 1: Present Tariff | 25,889 | 25,889 | | | 25,889 | 417 | - | Deficit |
| Case 2 : Breakeven Tariff | 25,889 | 2,589 | 18,640 | 4,660 | 52,060 | 951 | 7.5% | 7.5% |

Source: JICA Study Team

## (6) Assumptions for Economic Analysis

**Adjustment to Economic Costs and Benefits**

The present project costs and benefits for economic analysis exclude the value added tax (VAT) of 20% and import duties and other government fees on diesel oil (66.6%).

**Target Economic Internal Rate of Return (EIRR)**

The project sets the target EIRR at 10%. That is to say, if the project's EIRR is greater than 10%, the project is considered to bring net benefits to the regional economy, or is economically feasible.

**Economic Evaluation**

EIRR of the project is computed at 26.3% which is higher than the target rate of 10%. It therefore could be concluded that the project will be economically feasible.

## (7) Conclusions and Recommendation

The project will be financially feasible to be implemented as a PPP scheme if the household tariff is increased from the present 417 Lek to 951 Lek, and those of other types of users are assumed to increase at the same rate as that of households.

Whilst, the project will bring sufficient economic net benefits to the region as its EIRR is 26.3%,

comfortably exceeding the target rate of 10%.

Based on the findings above, the following are recommendations in implementing the project:

- MOT should improve the waste collection rate, especially that of households (currently 50%), before implementing this project under a PPP scheme. MOT will, otherwise, have to compensate the large loss.
- It is recommended that the monthly tariff of households be increased from the present 417 Lek to 951 Lek, based on the assumption that the present tariff structure among all users (households, private enterprise, and public institutions) is equitable.

## 12.15 Environmental Considerations

### (1) Recommended Mitigation Measures

**Mitigation Measures at Pre-construction Stage**

The proposed Priority Projects of ISWM Plan include the construction work of central material recovery facilities, compost and/or biogasification plants, waste to energy plant, and final disposal facilities. The construction sites of these facilities are proposed at the adjacent area of the existing Sharra disposal facilities. The sites belong to administration area of Vaqar Commune and MOT shall procure the site in consultation with Vaqar Commune. There is no residential house within the proposed construction site. However, in the course of land procurement, MOT shall take due consideration for appropriate compensation measures as required to the neighboring houses and for the land owners.

In addition, the Profound Environmental Impact Assessment and/or Preliminary Environmental Impact Assessment, depend on the type and scale of the facilities, shall be carried out in accordance with the requirements of the Law on Environmental Impact Assessment and the relevant laws and regulations. The assessment report shall be submitted to the MoE for approval.

**Mitigation Measures at Construction Stage**

The elements of environmental impacts which are deemed to cause of adverse impacts to air, water, noise, odor, etc. shall be mitigated by means of the engineering design and construction method. Appropriate measures shall be taken through preparation and implementation of the construction plan for management and monitoring for these impacts. In addition, the Environmental Management and Monitoring Plan prepared and approved in conjunction with the Environmental Impact Assessment shall be executed to manage and mitigate each environmental impact in accordance with the approved procedures.

**Mitigation Measures at Operation Stage**

As well as the procedures taken during the construction stage, the mitigation measures shall be taken to the environmental impacts during the operation and maintenance stage. In addition to the procedures stated in the Environmental Management and Monitoring Plan, the operators shall follow the procedures of the operation and maintenance manual not only to operate the facilities effectively but also to mitigate the environmental impacts.

Appropriate mitigation measures for the adverse impact on the vulnerable or ethnic minorities

whose livelihood may be affected by the operation of the material recovery facilities, intermediate treatment facilities or final disposal facilities.

### (2) Environmental Management and Monitoring Plan

**Environmental Management Plan**

The development of SWM facilities is assumed to cause of environmental deterioration if the counter measures are not taken appropriately. Air pollution and water pollution will be the important issues among the several elements against the environmental impacts cause by intermediate treatment facilities and waste disposal facilities.

The social issues for relief of the socially vulnerable are assumed in all sectors caused by implementation of the projects. The project proponents should prepare the programs for relief of the socially vulnerable people such as the programs for livelihood support program especially for *Roma* people. Increase of waste fee in future will affect the household budget. The measures are required for setting an appropriate waste tariff and consideration of socially vulnerable people who will not be affordable to pay.

**Environmental Monitoring Plan**

At pre-construction stage, the monitoring should be carried out for procurement of the project site and the compensation for the residents of the affected areas and for the land owners. At construction stage, the outcome of mitigation measures for pollution control related with air, surface water, groundwater and noise should be monitored. At operation stage, the working environment for operation of the solid waste management facilities should be monitored. The pollution control measures for operation of the facilities should be monitored for exhaust gas from the waste to energy plant, wastewater and noise from the intermediate treatment facilities, and landfill gas control, leachate treatment facilities and offensive odor especially at the final disposal facility.

### (3) Recommended TOR for Environmental Process for Proposed Plans

The proposed projects include development of the waste to energy plant exceeding the capacity of 50 ton/day and new development of waste disposal facilities with the incoming waste amount exceeding 50 t/day. In Albanian environmental EIA legislative system, the Profound EIA is required for the waste to energy plant. Meanwhile, the Preliminary EIA is required for the waste disposal facilities. Therefore, TOR for preparation of EIA should be prepared for each kind of the EIA required.

## 12.16 Recommendations and Conclusions

### (1) Significance for Implementation of the Plans and Projects

The significance or the rationale for implementing the Tirana Municipality ISWM Plan and the Priority Projects are summarized as follows.

- Fulfilling the responsibilities to comply with the required target level stated in the Law, relevant national waste strategies and plans and the EU directives.

- Accomplish the modernization of urban infrastructures of the municipality of Tirana for the capital of Albania,
- Fulfilling the reduction of negative legacy to the future generations,

### (2) Expected Outcomes of Priority Projects

The visible changes and the basic upgrading in SWM activities are realized through implementation of the Priority Projects as summarized in the followings.

- Clean-up of discarded waste bring about beautification of the town,
- Separate collection increase recovery of more recyclable materials,
- Expansion of waste collection service maintain cleanliness of town,
- 3R save the natural resources and establish the sound resource recycling society,
- Organic waste treatment improve the odour problem and convert waste to useful products,
- Organic waste treatment realize the EU target of 35% to landfill,
- Waste to energy plant reduce landfill volume and recover sufficient electricity,
- Waste to energy plant achieve the recovery and recycling target level at 75% stated in the National Waste Management Plan,
- Expansion of disposal facilities can secure the final destination of residual waste after the end-of-life of the existing Sharra disposal site,
- Project Task Team promote implementation of the ISWM Plan,
- Baseline data required for evaluation of SWM are secured and analysed,
- Independent accounting strengthen the financial capacity on SWM,
- Raising public awareness promote participation of stakeholders to the SWM activities,

### (3) Participation of Private Sector to the SWM Services

There are several options for involvement of private sector to implement the Priority Projects. In every option of private sector involvement must reduce the cost burden of the MOT in SWM services. The options of private sector involvement shall be required to discuss and study repeatedly to decide the best options with reference to the proposals recommended in the preceding sections and the following discussion and study points.

- Separate service for waste collection, composting and biogasification plant, waste to energy plant and waste disposal respectively by individual private contractor or combination of more than one service,
- Integrate all the services into one private contractor,
- Build and own by MOT and recruitment of operation and maintenance staff
- Build and own by MOT and contract-out operation and maintenance to the private contractor(s),
- Implement the concession contract by BOO or BOT or BTO
- Decide the contract period of concession contract,
- Decide the method of payment, for examples, by Fixed Price or Fixed Price plus Incentive Fee or Cost plus Incentive Fee or Cost plus Fixed Fee,
- Roles and activities of MOT Waste Management Enterprise and restructure if required,

- Potential/interesting local companies for the SWM service contract,
- Potential/interesting overseas companies for the SWM services contract,

### (4) Principles of Cost-sharing

Under the circumstance of increasing SWM cost in future, the MOT shall realize the rationalize of SWM activities by reducing the cost and increasing the income in accordance with the cost-sharing principles summarized in the followings.

- Establishment of independent SWM account for evaluation financial status,
- Setting a fair waste tariff for domestic and commercial & business wastes,
- Determination of waste fee with reference to the result of unit cost calculation,
- Tipping fee shall be introduced for the direct hauling vehicles to the landfill site,
- Beneficially pay principle (BPP) shall be applied basically to set the waste fee and the tariff,
- The waste fee and tariff shall be set at an appropriate level in consideration of the willingness to pay, affordability to pay, income level of the waste generators, and step-wise increase of waste fee,
- The waste fee and tariff shall be set at an appropriate level considering the public service shall not be a profit-oriented business,

### (5) Important Issues for Implementing the Priority Projects

There are several important issues to overcome in the course of implementation of the Priority Projects as shown the major items in the followings. .

- Organize the Project Task Team in 2013 and commence the tasks immediately,
- Organize the community groups and stakeholders for their participation to the SWM activities,
- Acquisition of site at Sharra for the integrated waste management facilities,
- Allocation of sufficient budget for implementation of the ISWM Plan,

### (6) Conclusions

The MOT is responsible for realizing the Tirana Municipality ISWM Plan to comply with the requirements stated in the Laws and the superordinate strategies and plans. And therefore, the raising public awareness programs shall be started immediately through disclosing the ISWM Plans to the public and/or conducting the public hearing for implementing the projects to obtain support from the society. Considering the current fragile financial status, the alternative financial sources from the external source(s) such as the project loan, subsidy from the central government and/or investment from the private sector will be the appropriate solutions to secure financial sources. Implementation of the Tirana Municipality ISWM is a prerequisite for upgrading the SWM system and the outcomes will accomplish the modernization of urban infrastructures required for accession to the EU member country.

# 13. Action Plan for Water Supply System Development

## 13.1 Action Plan

### (1) Basic Policy for Selection of Priority Project

Establishment of stable water supply system is indispensable and urgent issues for the sustainable development of Tirana Municipality. The water supply system is required to provide safe water constantly for 24 hours. Priority projects are proposed here to resolve the issues of the current water supply system of Tirana Water Supply and Sewerage Company (UKT), implementing agency for water supply to Tirana Municipality and surrounding areas. Basic policy for prioritization is shown below.

- Selection of quick-impact project whose effects emerge in short term as the priority projects.
- Excluding the promising projects that UKT is implementing currently or is planning to implement soon.

### (2) Selection of Priority Project

Priority projects include (1) Expansion of Bovilla WTP and laying of additional raw water main to utilize overflow water of Bovilla dam, (2) Energy saving plan to reduce power cost which account for one fourth of total UKT O&M cost, (3) NRW reduction plan, (4) Introduction of pipeline mapping system to help O&M work for water distribution network and (5) Capacity development for strengthening of UKT organization.

Construction of water distribution reservoirs, main transmission/distribution pipe installation, and water meter installation/replacement work are excluded from the priority projects since UKT has already started these projects as the urgent projects.

Table 13.1.1 shows short-term, middle-term and long-term implementing schedule and project cost.

### (3) Outline of Priority Project

Outline of selected 8 priority projects are summarized in Table 13.1.1.

**Table 13.1.1 Objective and Contents of the Priority Projects**

| Code | Project Title | Objective and Contents of Work |
|---|---|---|
| WS 1-1 | Utilization of Overflow Water of Bovilla Dam | Increase additional intake flow from Bovilla Dam by the amount of 20 Million cubic meter per year. Branching work of the existing raw water mains (Dia. 900mm) at the outlet from the Dam. |
| WS 1-2 | Laying additional Raw Water Mains between Bovilla Dand and Bovilla WTP | Convey additional flow of 20 Million cubic meter or 1.03 $m^3$/sec from Bovilla Dam to Bovilla WTP. Installation of additional raw water mains Dia. 800 mm and 10.5 km long along with the route of the existing raw water mains. |
| WS 2-1 | Expansion of Purification Capacity of Bovilla WTP | Increase the purification capacity of Bovilla WTP by the capacity to treat the additional flow of 1.03 m3/sec. Construction of one series of water purification process including chemical sedimentation basin and rapid sand filters. |
| WS 4-7 | Introduction of Pipe Mapping System | Pipeline information shall be integrate to make use of the information for repair, replacement and maintenance purposes. To install pipeline GIS mapping system at the Bovilla WTP or at the UKT Heaf office. |
| WS 5-1 | Reduction of Non-revenue Water | To reduce the non-revenue water amount to increase the income for stabilizing the financial condition of waterworks. The plan shall be prepared by the proposed NRW management team to carry out the survey and study at the isolated water service block of the pilot project area and practice the learned model in the entire water service area. |
| WS 6-1 | Installation of Mini-hydro Equipment on the Raw Water Mains | To reduce the electricity cost paid to the electric company by installation of self-power generation facilities. Install mini-hydro power generation equipment for the capacity of 200 kW on the raw water mains from the Bovilla Dam. |
| WS 6-2 | Installation of Solar Panels at the Bovilla WTP | To reduce the electricity cost paid to the electric company by installation of self-power generation facilities. Installation of solar panels at the open space of Bovilla WTP for example on the top slab of clear water tank, etc. |
| WS 7-1 | Capacity Development of UKT Staff | To enhance the capabilities of the staff for upgrading overall services of the waterworks. Dispatch the staff of Engineers Department, Finance Department, etc to the JICA training course to learn the modern technology and management practices and apply the learned knowledge for the service of water by UKT |

Source: JICA Study Team

### (4) Cost of the Project

The total cost of waste supply action plan is estimated at 3,480.0 Million Lek as shown together with the breakdown in Table 13.1.2.

**Table 13.1.2 Costs of the Priority Projects**

| Code | Project Title | Project Cost (M. Lek) |
|---|---|---|
| WS 1-1 | Utilization of Overflow Water of Bovilla Dam | 84.0 |
| WS 1-2 | Laying additional Raw Water Mains between Bovilla Dand and Bovilla WTP | 1,080.0 |
| WS 2-1 | Expansion of Purification Capacity of Bovilla WTP | 1,890.0 |
| WS 4-7 | Introduction of Pipe Mapping System | 3.0 |
| WS 5-1 | Reduction of Non-revenue Water | 83.0 |
| WS 6-1 | Installation of Mini-hydro Equipment on the Raw Water Mains | 262.0 |
| WS 6-2 | Installation of Solar Panels at the Bovilla WTP | 76.0 |
| WS 7-1 | Capacity Development of UKT Staff | 2.0 |
| Total | | 3,480.0 |

Source: JICA Study Team

## (5) Items to be considered in implementation

Following points shall be considered prior to implementing priority projects

- Annual overflow volume of Bovilla dam is 20,000,000$m^3$, according to haring from UKT staff. This number has to be checked before commencement of the project, and dimension of conveyance pipe and expansion volume of Bovilla dam have to be precisely decided.
- Prior to the introduction of mapping system, UKT has to conduct detailed research and survey of pipe specification (material, diameter, age, location and leakage record) including valves and fire hydrant.
- Mini-hydro power generation system to be installed in the existing 900mm raw water main is proposed due to its quick-impact effect as the first priority project. And the total output power of 411kw can be produced by the systems with the additional installation of the same system in the proposed 800mm raw water main, enables more cost reduction.
- At present Japanese maker of auto water quality measuring system can't provide such equipment due to the procedure of acquiring certification. Since monitoring and management of water quality data like residual chlorine, turbidity and water pressure at the control center of UKT or Bovilla Water Treatment Plant (WTP) is useful for precise distribution control and improvement of service level, introduction of auto water quality measurement system should be considered in near future.

## Table 13.1.3 Implementing Schedule of Priority Project

| Proposed Projects/Programs | | Short term period | | | | | Mid term period | | | | | Long term period | | | | | Project Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | (Million Lek) |
| **WS-1: Water Resource Development** | | | | | | | | | | | | | | | | | |
| WS-1-1 | Utilization of overflow water of Bovilla dam as new water resource | | | | | | ■ | ■ | | | | | | | | | 84 |
| WS-1-2 | Construction of conduit pipeline between Bovilla dam and Bovilla WTP | | | | | | ■ | ■ | ■ | ■ | | | | | | | 1,080 |
| **WS-2: Construction of Treatment Facility** | | | | | | | | | | | | | | | | | |
| WS-2-1 | Increasing of Bovilla WTP | | | | | | | | ■ | ■ | ■ | | | | | | 1,890 |
| **WS-3: Construction of Reservoirs** | | | | | | | | | | | | | | | | | |
| WS-3-1 | Construction of new tank of Gurore/Kinostudio(15,000m3) | ■ | | | | | | | | | | | | | | | 350 |
| WS-3-2 | Construction of new tank of Yzberishit(8,000m3) | | ■ | | | | | | | | | | | | | | 200 |
| WS-3-3 | Construction of new tank of Pupils' City(8,000m3) | | | ■ | | | | | | | | | | | | | 200 |
| WS-3-4 | Construction of new tank of Kombinat(3,000m3) | | | | ■ | | | | | | | | | | | | 90 |
| WS-3-5 | Construction of new tank of Kozer-Kamza(2,000m3) | | | | | ■ | | | | | | | | | | | 70 |
| **WS-4: Construction of Transmission Pipeline and Distribtuion System** | | | | | | | | | | | | | | | | | |
| WS-4-1 | Transmission pipeline from Bovilla WTP D=1000×3000m | | | ■ | | | | | | | | | | | | | 1,148 |
| WS-4-2 | Transmission pipeline between Yzberisht and Yrshek reservoirs D=700×3000m | | | | ■ | | | | | | | | | | | | 303 |
| WS-4-3 | Transmission pipeline between Yzberisht and Konbinat reservoirs D=500×3000m | | | | | ■ | | | | | | | | | | | 143 |
| WS-4-4 | Transmission pipeline between Nxenesve and Yzberishit reservoirs D=800×3500m | | | | | | ■ | | | | | | | | | | 435 |
| WS-4-5 | Construction of additional distribution mains D=300～500 L=20000m | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | 945 |
| WS-4-6 | Installation of automatic measurement facilities of portable water such as residual chlorine concentration | | | | | | | | | | ■ | ■ | | | | | - |
| WS-4-7 | Introduction of pipe mapping system | | | | | | | | ■ | ■ | | | | | | | 3 |
| **WS-5: Reduction of Non-Revenue Water** | | | | | | | | | | | | | | | | | |
| WS-5-1 | Reduction of Non-Revenue Water | | | | ■ | | | | | | | | | | | | 83 |
| WS-5-2 | Installation and replacement of water meters | ■ | ■ | ■ | ■ | | | | | | | | | | | | 250 |
| **WS-6: Energy Saving Consideration** | | | | | | | | | | | | | | | | | |
| WS-6-1 | Installation of mini-hydro generating system | ■ | ■ | | | | | | | | | | | | | | 262 |
| WS-6-2 | Installation of solar- panel generating system | | | ■ | ■ | | | | | | | | | | | | 76 |
| **WS-7: Enhancing of capacities of sector work force and finance** | | | | | | | | | | | | | | | | | |
| WS-7-1 | Enhancing capacity building of UKT | | | | | ■ | | | | | | | | | | | 2 |
| Total | | | | | | | | | | | | | | | | | **7,614** |

※ Porject that has already been planned and/or to be implimented by UKT

Project terms include one year of consulting and design

Source: JICA Study Team

## 13.2 Financial and Economic Analysis

### (1) Financial Analysis

**Basic Assumption**

The construction period is assumed in the period from 2014 to 2022 and the evaluation period of the project is set in 2013-2051. Other basic conditions are assumed the same with that of the sewerage and drainage project.

**Project Revenue**

The income generated from the project is estimated as shown in Table 13.2.1.

**Table 13.2.1 Project Revenue**

(M. Lek)

| Item | 2022 | 2030-2051 |
|---|---|---|
| Water Tariff from Households | 312 | 1,076 |
| Water Tariff from Other Users | 491 | 1,652 |
| Other Revenues | 12 | 42 |
| Total | 815 | 2,770 |

Source: JICA Study Team

**Financial Evaluation**

Considering the scheduled increase of water charge in 2014, the FIRR of the project is estimated at 65. 6% as shown in Table 13.2.2.

**Table 13.2.2 Estimated FIRR**

| Evaluation Case | Initial Investment Amount (MN Lek) | Monthly Tariff by HH in 2022 (Lek) | FIRR |
|---|---|---|---|
| Case 1 (present tariff) | 3,953 | 745 | 20.4% |
| Case 2 (scheduled increase in 2014) | 3,953 | 1,188 | 65.6% |

Source: JICA Study Team

### (2) Economic Analysis

**Basic Assumption**

The affordability to pay for the water supply project is applied at 4% to the disposal income as well as the level commonly used at the international financing agencies. Other assumptions for economic evaluation are applied with the same conditions with that of the waste management project.

**Economic Evaluation**

EIRR of waste supply project is out of the computation range. Assuming the discount rate at 10%, the ENPV and B/C is estimated at 11,704 M. Lek and at 4.7. The output values are far exceeding at 0 and 1 and the project is regarded feasible in the point of economic evaluation.

## 13.3 Environmental Considerations

### (1) Recommended Mitigation Measures

**Mitigation Measures at Pre-construction Stage**

The proposed projects will require the project land for water pipelines and pumping stations. The projects will require land acquisition to secure these project areas. The land acquisition should be proceeded including appropriate compensation measures for the land owners. The identification of these utilities before construction will be needed to be reflected on the tender documents or contract documents of those construction works.

**Mitigation Measures at Construction Stage**

Adverse impacts of pollution such as hazard, air / water pollution, noise which are estimated by construction works should be mitigated at this stage. Appropriate measures such as preparation of construction manual or environmental monitoring for these impacts should be prepared.

**Recommended Mitigation Measures at Operation Stage**

Implementation of monitoring the processed water, noise due to operation of pumping stations and appropriate treatment and disposal for treated sludge at the facilities should be conducted.

### (2) Environmental Management and Monitoring Plan

**Environmental Management Plan**

The future raising of tariffs on water supply service will affect the household budget. The management program toward setting of appropriate tariff and consideration of vulnerable people who will not be affordable to pay.

**Environmental Monitoring Plan**

At pre-construction stage, the monitoring should be carried out for the securement of the project land and the compensation for the land owners. At construction stage, the social facilities (utilities) such as electric line, roads, telephone lines which will be affected by the construction should be monitored for commencement of the construction works. Pollution control for drawdown of groundwater, water pollution and noise also should be monitored. At operation stage, water quality after the treatment should be monitored. Noise also should be monitored for the operation of pump.

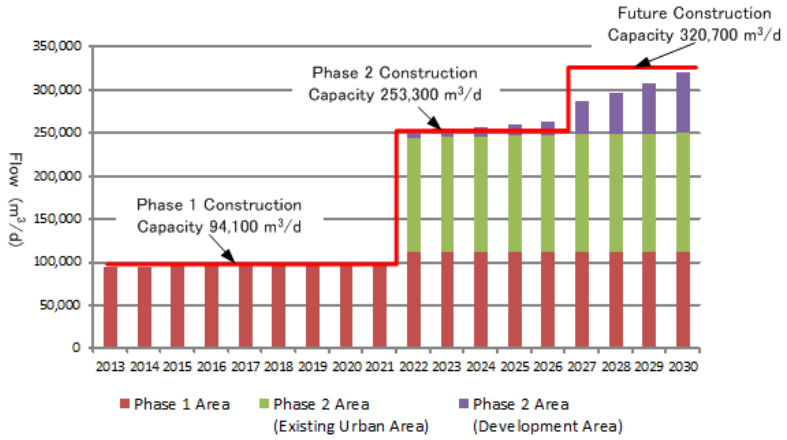
### (3) Recommended TOR for Proposed Plans

The proposed projects in this sector will develop water supply facilities with their capacity exceeding 50,000 $m^3$/day which should require Profound EIA in Albania EIA legislative system. Therefore, the TOR assumes that the proposed projects will require Profound EIA.

# 14. Action Plan for Sewerage and Drainage System Development

## 14.1 Selection of Priority Project

Kashar Sewer District Phase II project is selected as priority project among six projects listed in Table 7.7.1. In case of financial/economical evaluation, however, evaluation period extends up to 2051 and expansion project conducted for the increase of the population during this evaluation period shall be taken into consideration. Actually, expansion project is scheduled from 2024 to 2026 to meet the projected volume in 2030 as is shown in Figure 14.1.1.




Source: JICA Study Team

**Figure 14.1.1 Staged Construction Plan**

As an initial investment of the project, construction cost of Kashar Sewer District Phase II project is allocated between 2016 and 2021 and Kashar Expansion project cost is allocated between 2024 and 2026.

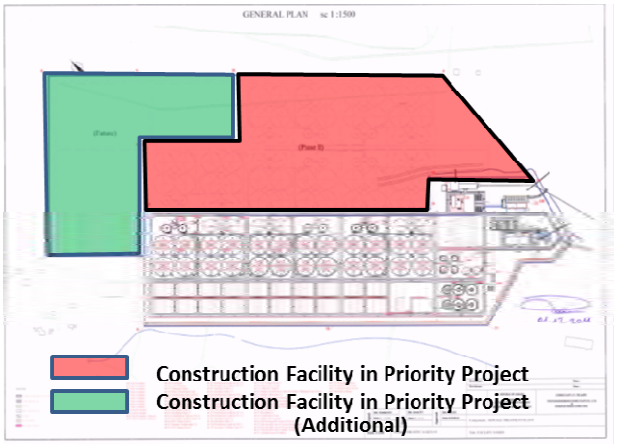
## 14.2 Priority Project Component and Staged Development

Project component is listed in Table 14.2.1 and service area, treatment plant location and layout figure of Trunk Main Sewer are shown, respectively, in Figure 14.2.1, 14.2.2 and 14.2.3.

**Table 14.2.1 Component of Priority Project**

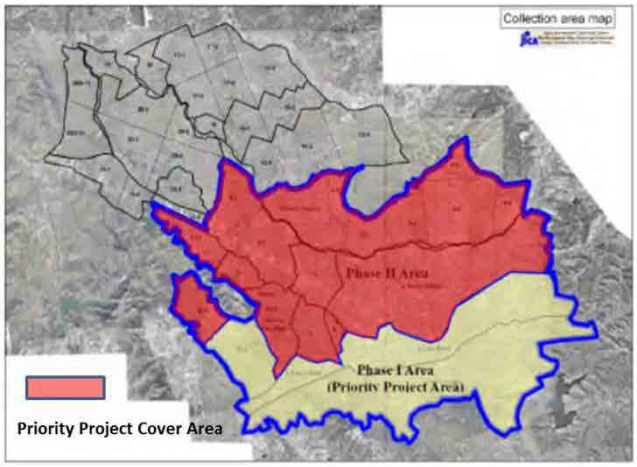
| | Kashar SD Phase 2 Project | Kashar SD Expansion Project |
|---|---|---|
| Kashar Sewage Treatment Plant | Expansion volume; 159,200 $m^3$/d (Daily Maximum) | Expansion volume; 67,400 $m^3$/d (Daily Maximum) |
| Kashar Pump Station | Kashar PS 141 $m^3$/min (Hourly Maximum) | Kashar PS Expansion 65 $m^3$/min (Hourly Maximum) |
| Trunk Main Sewer | Trunk Main Sewer 250mm – 2,000mm 10.3km ( including 2.9 km x 2 pipes of 1,000mm Force Main) | Trunk Main Sewer (Force Main) 1,000mm 2.9km |
| Main & Branch Sewer | Main & Branch Sewer 200mm – 600mm 79.6 km | - |
| Land Area | 18.0 ha | 11.3 ha |

Source: JICA Study Team



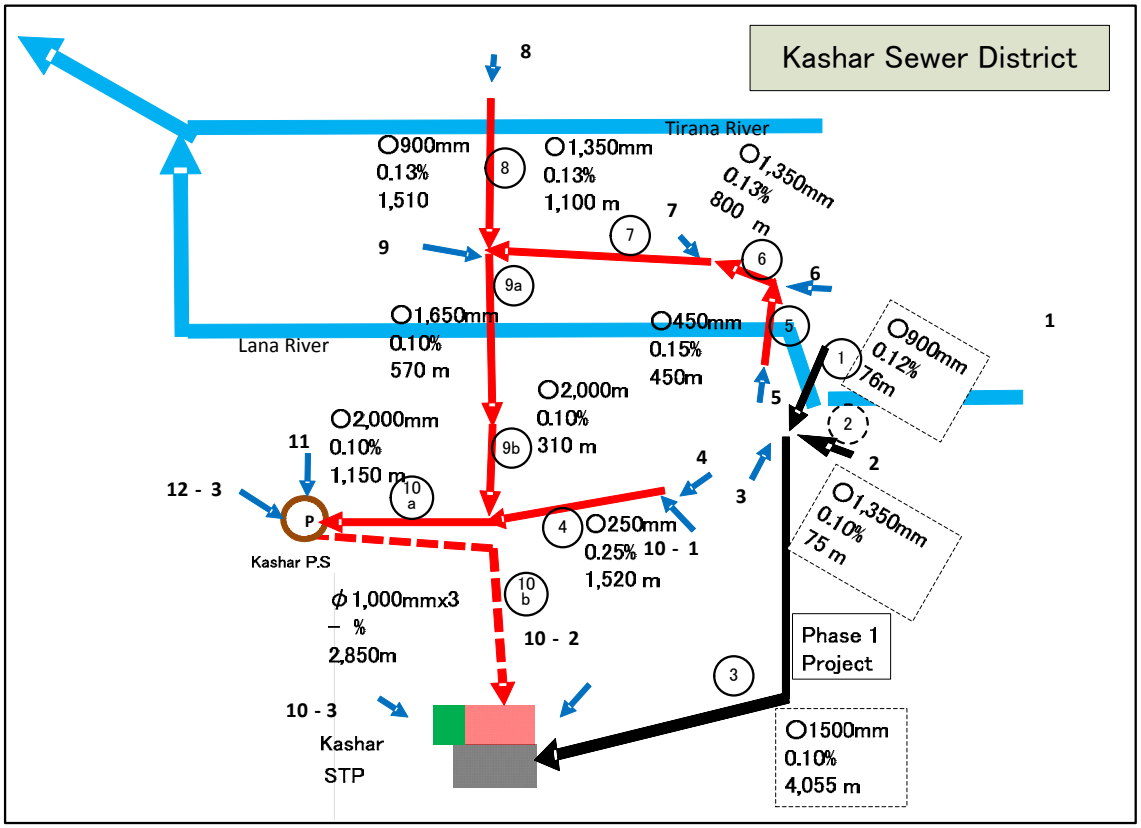

Source: JICA Study Team

**Figure 14.2.1 Priority Project Area**




Source: JICA Study Team

**Figure 14.2.2 Treatment Site**




Source: JICA Study Team

**Figure 14.2.3 Trunk Main Sewer Layout**

## 14.3 Construction Cost of Priority Project

Direct construction cost for two projects are shown in Table 14.3.1

**Table 14.3.1 Construction Cost of Priority Project**

Unit; Million Lek

| Component | Kashar 2nd Phase | | | Kashar Expansion project | | | Project Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | FC | LC | Total | FC | LC | Total | FC | LC | Total |
| Direct Construction Cost | | | | | | | | | |
| Trunk Sewer | 2167 | 272 | 2,439 | 101 | 13 | 114 | 2,268 | 285 | 2,553 |
| Main Sewer | | 1748 | 1,748 | | | 0 | 0 | 1,748 | 1,748 |
| Kashar PS | 328 | 298 | 626 | 299 | 26 | 325 | 627 | 324 | 951 |
| Kashar STP | 2626 | 2598 | 5,224 | 1,114 | 911 | 2,025 | 3,740 | 3,509 | 7,249 |
| Total of Direct Construction Cost | 5,121 | 4,916 | 10,037 | 1,514 | 950 | 2,464 | 6,635 | 5,866 | 12,501 |

Source: JICA Study Team

## 14.4 Transformation to "Sewage Collection Project" and "Sewage Treatment Project" for Financial and economic Evaluation

For the economic and financial analysis, (1) Sewage Collection Project and (2) Sewage Treatment Project are created focusing on, respectively, "collection" and "treatment". Construction (Investment) cost of each component is allocated to two projects as is shown in Table 14.4.1.

**Table 14.4.1 Allocation of Construction Cost to Both Projects**

| | | Sewage Collection | Sewage Treatment | Total | Remarks |
|---|---|---|---|---|---|
| Kashar STP | Phase II Project | 0 | 5,224 | 5,224 | |
| | Expansion Project | 0 | 2,025 | 2,025 | |
| Kashar Pump Station | Phase II Project | 213 | 413 | 626 | Collection : Treatment = 0.34 : 0.66 |
| | Expansion Project | 325 | | 325 | |
| Trunk Main Sewer | Phase II Project | 829 | 1,610 | 2,439 | Collection : Treatment = 0.34 : 0.66 |
| | Expansion Project | 114 | | 114 | |
| Main & Branch Sewer | Phase II Project | 1,748 | 0 | 1,748 | |
| | Expansion Project | | | 0 | |
| Total | Phase II Project | 2,790 | 7,247 | 10,037 | |
| | Expansion Project | 439 | 2,025 | 2,464 | |
| | Total | 3,229 | 9,272 | 12,501 | |
| STP site | Phase II Project | 0 | 90 | 90 | |
| | Expansion Project | 0 | 57 | 57 | |
| Capacity Building | Phase II Project | 21.8 | 87.3 | 109.1 | Collection : Treatment = 0.2 : 0.8 |
| | Expansion Project | | | | |
| Total | Phase II Project | 2,812 | 7,424 | 10,236 | |
| | Expansion Project | 439 | 2,082 | 2,521 | |
| | Total | 3,251 | 9,506 | 12,757 | |

Source: JICA Study Team

In the table above, Trunk Main Sewer and pump station cost in Phase II project is allocated to both project in proportion to the percentage of the new customer from whom new sewage tariff is expected as the resource for collection project, and existing customer whose living area is already sewered and produce no increase in sewage tariff. Table 14.4.2 shows the allocation rate.

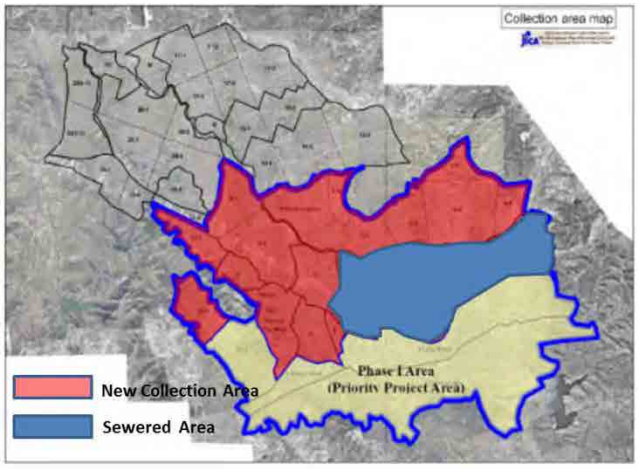
**Table 14.4.2 Allocation Percentage**

| Classification | Contents | Population | Percentage |
|---|---|---|---|
| Collection Project | Number of New customer connected to sewer in 2022 (sewage tariff can be newly obtained from them.) | 156,369 | 34% |
| Treatment Project | Number of existing customer within sewered area in 2022 (no additional tariff is available for them) | 302,558 | 66% |
| Trunk Main and Kashar PS works for both projects and cost is divide to each project with above ratio | | | |

Source: JICA Study Team

## 14.5 Outline of Sewage Collection Project and Its Evaluation

This project consists of, mainly, pipe installation works over the red area in following Figure 14.5.1.




Source: JICA Study Team

**Figure 14.5.1 Sewage Collection Area**

Collection area is 2,464 ha and service (collection) population is increase from the 2022 to 2030 as is shown in Figure 14.5.2

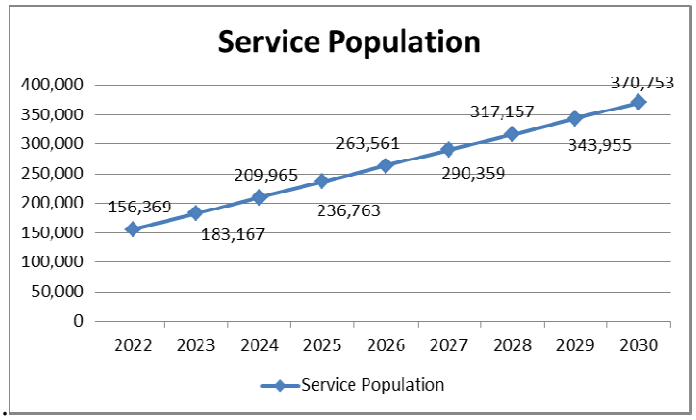



**Figure 14.5.2 Increase of Service Population**

Construction cost and capacity building cost for this project is summarized as shown in Table 14.5.1. Part of Trunk Main Sewer cost and pump station cost is included in this collection project. FIRR and EIRR is summarized as shown in Table 14.5.2

**Table 14.5.1 Investment Cost**

in Million Lek

| | Initial Investment (2016 to 2021) | Expansion stage (2024 to 2026) | Total |
|---|---|---|---|
| Main & Branch sewer 0.3m to 0.6m L=79.6km | 1,748 | - | 1,748 |
| Part of Trunk Main Sewer 0.25m to 2.0m L=10.3km | 829 | 114 | 943 |
| Part of Kashar PS Q=141m$^3$/min (Initial stage) Q=206 m$^3$/min (Final stage) | 213 | 325 | 538 |
| (sum) | (2,790) | (439) | (3,229) |
| Capacity Building | 21.8 | - | 21.8 |
| (Total) | 2,811.8 | 439 | 3,250.8 |

*O&M cost in 2022 is 42.9 Million Lek and gradually increase to 2030.
Source: JICA Study Team

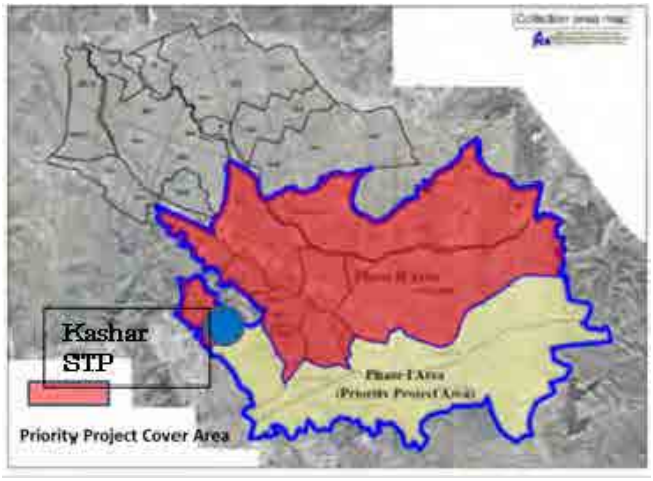
**Table 14.5.2 Investment Cost**

| | FIRR | EIRR |
|---|---|---|
| Sewage Collection Project | 7.4% | 15.4% |

Source: JICA Study Team

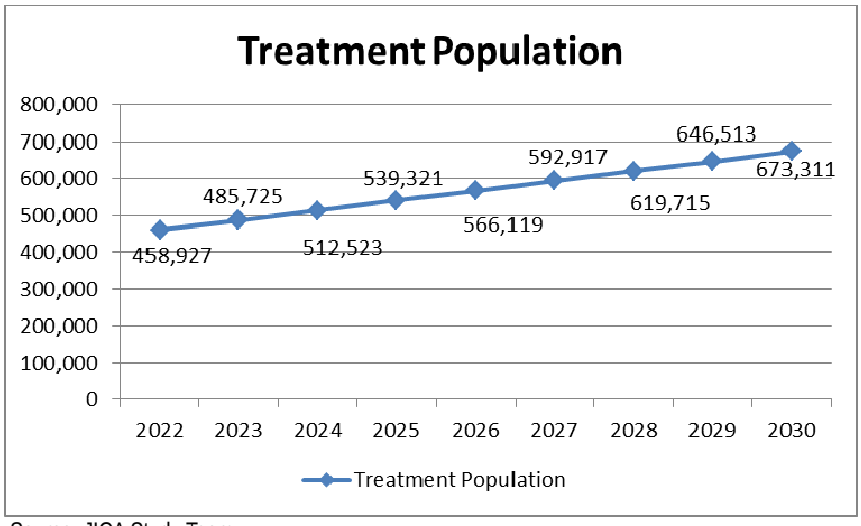
## 14.6 Outline of Sewage Treatment Project and Its Evaluation

This project consists of, mainly, STP construction works. Sewage to be treated in STP comes from not only sewage collection project area but also already sewered area where new tariff collection does not occur. Service area is total Kashar Phase II area and coverage is 3,885 ha in Figure 14.6.1. Service population increases as shown in Figure 14.6.2.




Source: JICA Study Team

**Figure 14.6.1 Service Area for Kashar STP Phase II Facilities**




Source: JICA Study Team

**Figure 14.6.2 Increase of Treatment Population**

Construction cost and capacity building cost for this project is summarized as shown in Table 14.6.1. Part of Trunk Main Sewer cost and pump station cost is included in this collection project. FIRR and EIRR is summarized as shown in Table 14.6.2.

**Table 14.6.1 Investment Cost**

in Million Lek

| | Initial Investment (2016 to 2021) | Expansion stage (2024 to 2026) | Total |
|---|---|---|---|
| Kashar STP Capacity<br>Phase II : 159,200m$^3$/d<br>Expansion : 226,600m$^3$/d | 5,224 | 2,025 | 7,249 |
| Part of Trunk Main Sewer<br>0.25m to 2.0m L=10.3km | 1,610 | - | 1,610 |
| Part of Kashar PS<br>Q=141m$^3$/min (Initial stage)<br>Q=206 m$^3$/min (Final stage) | 413 | - | 413 |
| (sum) | (7,247) | (2,025) | (9,272) |
| Capacity Building | 87.3 | - | 87.3 |
| Land Cost | 90 | 57 | |
| Total | 7,424.3 | 2,082 | 9,506.3 |

*O&M cost in 2022 is 137 Million Lek and gradually increase to 2030.
Source: JICA Study Team

**Table 14.6.2 Investment Cost**

| | FIRR | EIRR |
|---|---|---|
| Sewage Treatment Project | - | 12.4% |

*It is assumed that there is no financial revenue for the sewage treatment project.
Source: JICA Study Team

## 14.7 Environmental Consideration

The Kashar Phase II project is the environment improvement project same as the Phase I project and the same procedure as Phase I is required. Submission of an Environmental Impact Assessment (EIA) report is indispensable, including the following aspects:

### (1) Recommended Mitigation Measures

**Mitigation Measures at Pre-construction Stage**

The proposed projects will require the project land for sewer lines and pumping stations. The projects will require land acquisition to secure these project areas. The land acquisition should be proceeded including appropriate compensation measures for the land owners. The identification of these utilities before construction will be needed to be reflected on the tender documents or contract documents of those construction works.

**Mitigation Measures at Construction Stage**

Adverse impacts of pollution such as hazard, air / water pollution, noise which are estimated by construction works should be mitigated at this stage. Appropriate measures such as preparation of construction manual or environmental monitoring for these impacts should be prepared.

**Mitigation Measures at Operation Stage**

Establishment of preventive measures or emergency response plans for the events of system malfunction should be prepared. Pollution control measures for solid waste (sludge), noise and offensive odor should be prepared.

### (2) Environmental Management and Monitoring Plan

**Environmental Management Plan**

The project proponents should prepare appropriate compensation measures for the land owners who will be affected by the project land for securement of the lands for the sewage treatment facility and pumping stations. The future raising of tariffs on the sewerage service will affect the household budget. The management program toward setting of appropriate tariff and consideration of vulnerable people who will not be affordable to pay.

**Environmental Monitoring Plan**

At pre-construction stage, the monitoring should be carried out for the securement of the project land and the compensation for the land owners. At construction stage, the social facilities (utilities) such as electric line, roads, telephone lines which will be affected by the construction should be monitored for commencement of the construction works. Pollution control for air, water pollution and noise also should be monitored. At operation stage, water quality after the treatment should be monitored. Noise also should be monitored for the operation of pump.

### (3) Recommended TOR for Proposed Plans

The proposed projects in this sector will develop sewerage facilities with its service population exceeding 150,000 which shall require Profound EIA in Albania EIA legislative system. Therefore, the TOR assumes that the proposed projects will require Profound EIA.

## 14.8 Recommendation

The on-going Kashar Phase I project is funded by Japanese Official Development Assistance (ODA) program and the Phase II project is the expansion project of same Sewer District. Therefore, it is desirable to facilitate the next phase, being financed by JICA to complete the Kashar Sewer District development, based on the progress of the Phase I project. Future expansion should be reviewed after the completion of the Phase I project.

From the technical side, preparation for stricter discharging standard of Nitrogen and Phosphate anticipated from EU directives is recommended. It is also recommended for UKT staff to join the JICA training on sewerage management and Sewerage facility Operation and Maintenance (O&M).

# 15. Step Forward

This report addresses basic development directions of major infrastructure sectors and priority actions to be taken for assuring the sustainable and balanced growth of the Tirana Metropolitan Area targeting the year 2027, based on a long-term perspectives, or two decades ahead.

***A Thematic Plan,*** including Land Use Plan, Road and Transportation Development Plan, Solid Waste Management Plan, Water Supply System Development Plan, and Drainage and Sewerage Systems Development Plans have been drafted herewith, however, the plan, as whole, is still subject to further coordination with the New Regulatory Plan which is now being finalized by MOT though public hearing sessions. All proposals and recommendations in this report should be clarified to be accorded with the final regulatory plan, if is necessary.

Action Plans for priority projects/programs are profiled in the separate volume titled "General Profile of Priority Projects", indicating technical information necessary for preparation of the project execution. Three (3) elements are clearly depicted, namely:

1. Specific Tasks: **What, where and how** will be done and by **whom**?
2. Time Horizon: **When** will be done, targeting the time **when** the completion shall be?
3. Resource Allocation: **What** funds and inputs shall be prepared, available or considerable?

The implementing body or the responsible authority is requested to carefully review the project profile so that those may become good and useful guidelines for the project implementation.

In parallel with the planning work, a ***Strategic Environmental Assessment*** was conducted in compliance with the new Regulatory Planning Law. However, a more enhanced participatory approach should be employed to elaborate the planned project by stakeholders before the implementation of the project.

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