Chapter 6 Strategies for Urban Development and Housing Development in Antananarivo Agglomeration

6.1 Urban Development Strategies for Antananarivo Agglomeration

6.1.1 Overall Issues on Urban Development of Antananarivo Agglomeration

The overall issues on urban development and housing are as follows:

- Population is rapidly increasing in Antananarivo Agglomeration. It is necessary to accommodate the increasing population and economic activities.
- In Antananarivo Agglomeration, economic sectors have not been sufficiently developed so that it cannot generate enough employment opportunities for the large number of population.
- Housing provision is inadequate in terms of quantity and quality, compared with the rapid population growth in Antananarivo Agglomeration.
- Many urban functions and population are over concentrated within CUA. As a result, serious traffic congestion disrupts economic and social activities in Antananarivo.
- Basic infrastructure and services for supporting life are insufficient outside CUA.
- The logistics function in Antananarivo Agglomeration is inefficient so that it cannot support development of the economic sectors.
- In Antananarivo Agglomeration, land for manufacturing and logistics industries is lacking inside and outside CUA.

6.1.2 Overall Objectives for Urban Development of Antananarivo Agglomeration

The overall objectives for urban development for Antananarivo Agglomeration are as follows:

- To enhance the sustainability of Antananarivo Agglomeration in terms of functionality, environment and resilience
- To develop competitive and vibrant economic sectors for providing the residents of Antananarivo Agglomeration with enough employment opportunities
- To enhance the healthy and resilient residential environment and urban amenity for making life enjoyable for the people in Antananarivo Agglomeration
- To enhance the urban mobility of passengers by forming a north-south Transit-Oriented Development Corridor (TOD Corridor) based on an urban railway in connection with bus services
- To improve the logistics function not only within Antananarivo Agglomeration, but also between Antananarivo Agglomeration and other regional cities including Toamasina Agglomeration
- To maintain the identity of Antananarivo Agglomeration by conserving the landscape, reflecting the identity

6.1.3 Overall Strategies for Urban Development of Antananarivo Agglomeration

In response to the overall issues and objectives on urban development for Antananarivo Agglomeration, overall strategies are formulated by restructuring the urban structure as follows:

- To strengthen urban centre functions within CUA, especially those of accommodating the headquarters of international, regional and national corporations and organizations
- To develop new urban centres outside CUA and to provide basic infrastructures, such as electricity, water supply and access roads, in areas outside of CUA, in order to promote suburbanization outside CUA
- To strengthen the radial road capacities connecting the inside of CUA and the outside of CUA in order to promote diffusion of population and urban functions to the outside of CUA within Antananarivo Agglomeration
- To construct an Outer Ring Road for strengthening the connectivity with Toamasina Port and for creating enough land for attracting industries and logistics facilities along the sections of the Outer Ring Road near the National Road No.2
- To form a Transit-Oriented Development (TOD) Corridor along an urban railway line and a high-standard 6-lane road in the north-south direction, connecting urban centres between Ambodifasina and Tanjombato
- To locate major urban railway stations in good connection with bus terminals in urban centres in the north-south TOD Corridor for the purpose of facilitating easy transfer of public passenger transportation
- To improve the high-density residential environment within CUA by inserting local roads with gutters and providing water supply infrastructure
- To enhance the water retarding capacity of urban areas of CUA by maintaining and constructing water retarding ponds and by enforcing land use regulations
- To selectively conserve wetland paddy fields by rehabilitating irrigation facilities for agricultural fields

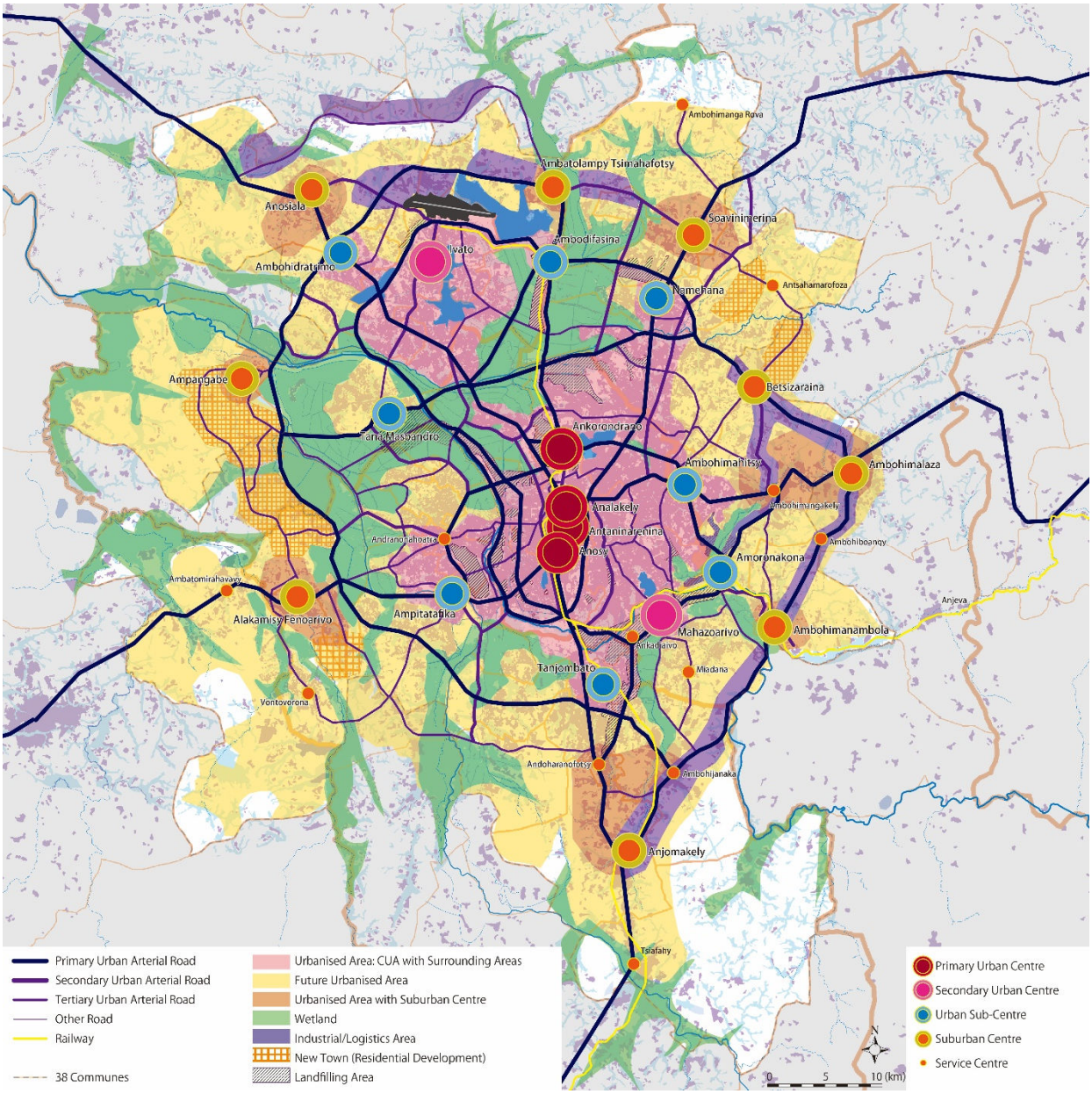
6.1.4 Future Urban Structure for Antananarivo Agglomeration

Based on the selected growth scenario in Section 5.2, the future urban structure of Antananarivo Agglomeration is prepared..

(1) Selected Future Urban Structure for Antananarivo Agglomeration

Figure 6.1.1 illustrates the selected future urban structure for Antananarivo Agglomeration for 2038, five years beyond the target year of 2033. It reflects the overall development scenario and strategies for Antananarivo Agglomeration.

The urban structure is composed by different types of urban centres, roads, and railway lines. It also shows general land use direction containing urbanised areas, wetlands and industrial areas.



Source: JICA Study Team

Figure 6.1.1 Future Urban Structure for Antananarivo Agglomeration

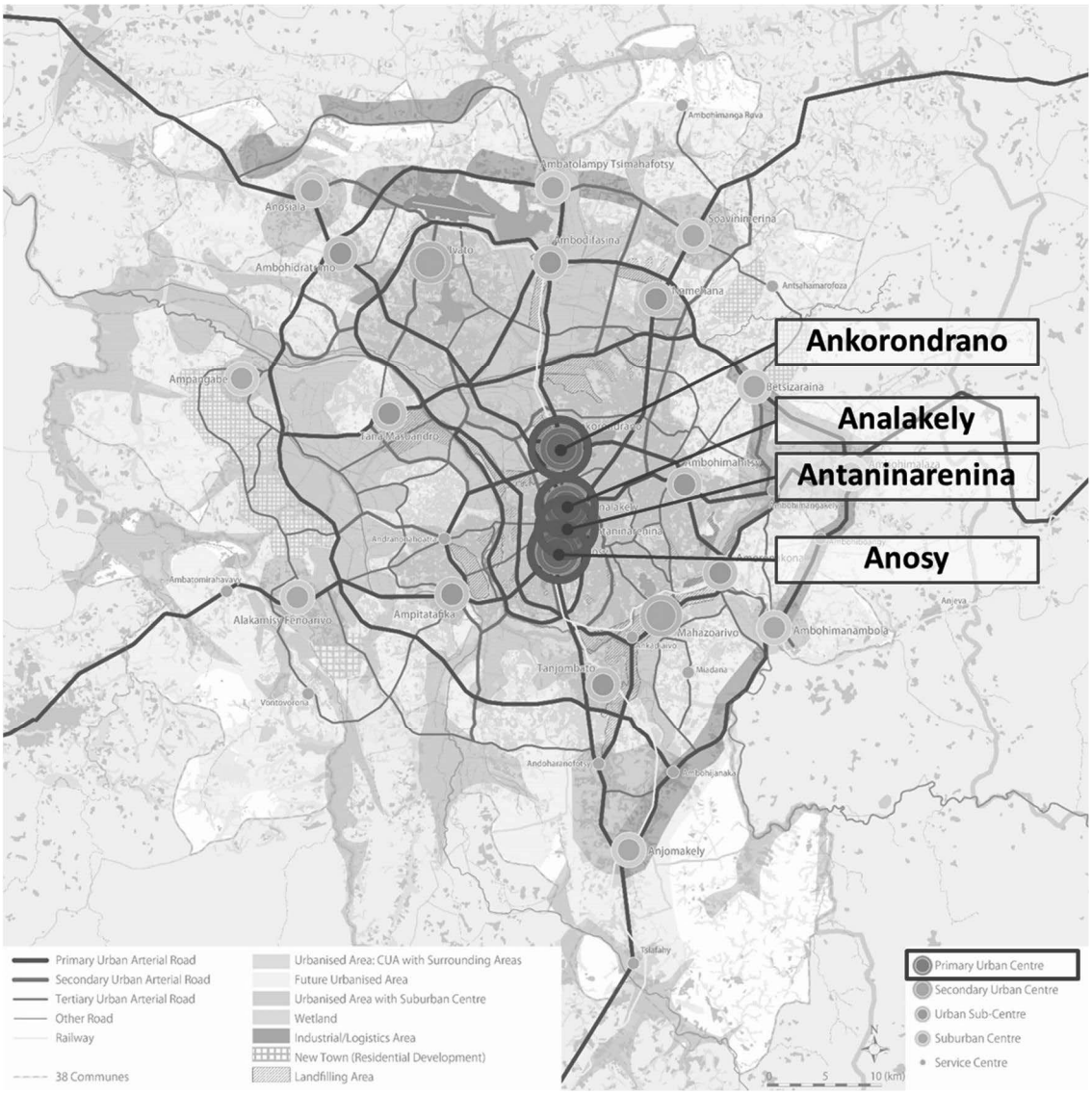
(2) Elements Composing the Urban Structure for Antananarivo Agglomeration

1) Urban Core (Primary Urban Centres)

The Primary Urban Centre is to have governmental administration, business, commercial, financial, health and educational functions of the national importance and Antananarivo Agglomeration-wide importance. It should have business functions by accommodating corporate headquarters.

Antananarivo City has four primary urban centres. The primary urban centres are specialized in different matters. Out of them, three primary urban centres have been substantially developed. They are Antaninarenina Primary Urban Centre for politics and finance, Anosy Primary Urban Centre for government administration and Analakely Primary Urban Centre for commerce. In addition, at present, a new Primary Urban Centre for business is emerging in the Ankorondrano Area.

The Urban Core for Antananarivo Agglomeration is composed of these four primary urban centres.



Source : JICA Study Team

Figure 6.1.2 Urban Core for Antananarivo Agglomeration

2) Secondary Urban Centres

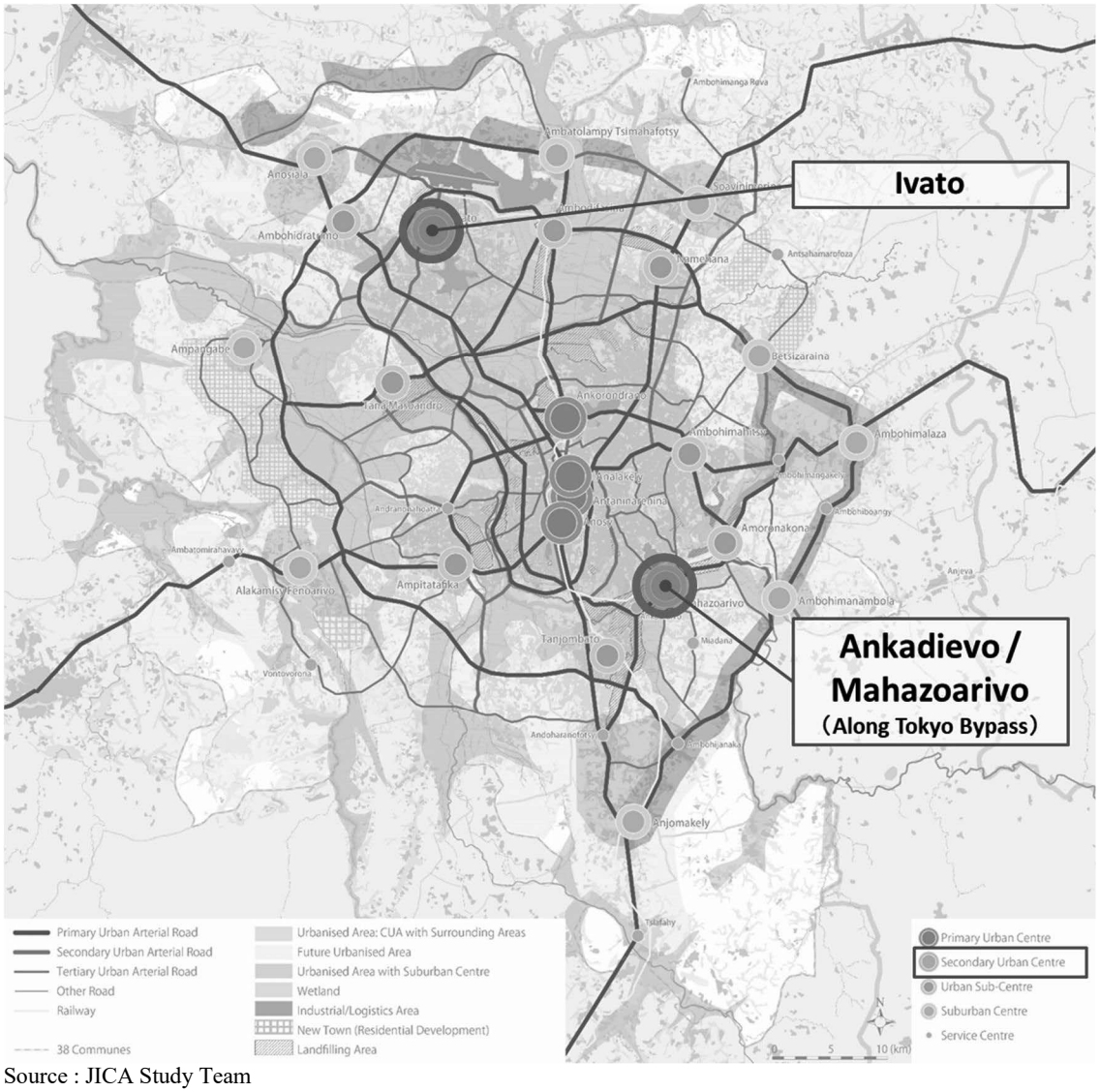
The Secondary Urban Centre is to have governmental administration, business, commercial, health and educational functions of Antananarivo Agglomeration-wide importance.

In addition to the primary urban centres, there are two potential secondary urban centres in Antananarivo Agglomeration. One is located in the Ivato Area, and the other is in the Ankadievo/Mahazoarivo Area, along the Tokyo Bypass connecting the National Road No.2 and National Road No.7.

The Ivato Area has accumulated commercial shops, restaurants and hotels taking advantage of the vicinity to the International Airport. On the other hand, Ankadievo/ Mahazoarivo Area is characterized by good accessibility by Tokyo Bypass, and relatively abundant land along the road. The government has a plan to relocate some central government offices from CUA to Ankadievo/ Mahazoarivo Area.

These secondary urban centres have the capabilities of spontaneous accumulation of private businesses because of good accessibility to the Urban Core (the four primary urban centres).

However, these two secondary urban centres do not have the potentialities to obtain such high levels of urban functions as Antaninarenina's politics and finance, Anosy's government administration, Analakely's commerce and Ankorondrano's private business, which compose the urban core for the Antananarivo Agglomeration.



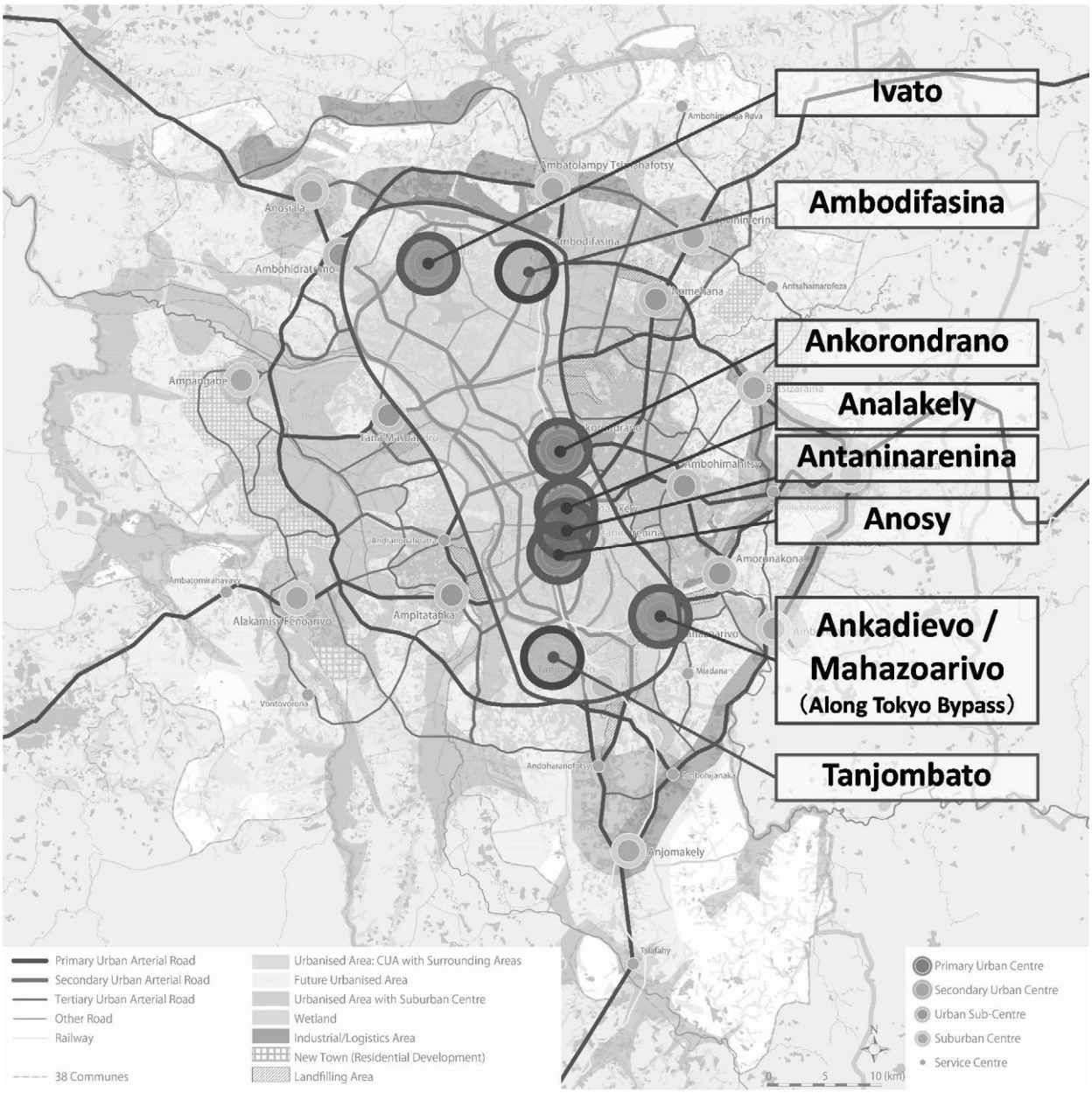
Source : JICA Study Team

Figure 6.1.3 Secondary Urban Centres for Antananarivo Agglomeration

3) Urban Central Axis

Primary urban centres and secondary urban centres have different types of urban functions. It is necessary for government officers, business people and ordinary citizens to make frequent trips among these different urban centres for doing their business. Therefore, it is necessary to strongly connect these centres by arterial roads and urban rail in the future.

The areas to be supported by the strong connectivity among primary and secondary urban centres compose an urban central axis, which is shown in Figure 6.1.4.



Source : JICA Study Team

Figure 6.1.4 Urban Central Axis for Antananarivo Agglomeration

4) Urban Rail Axis

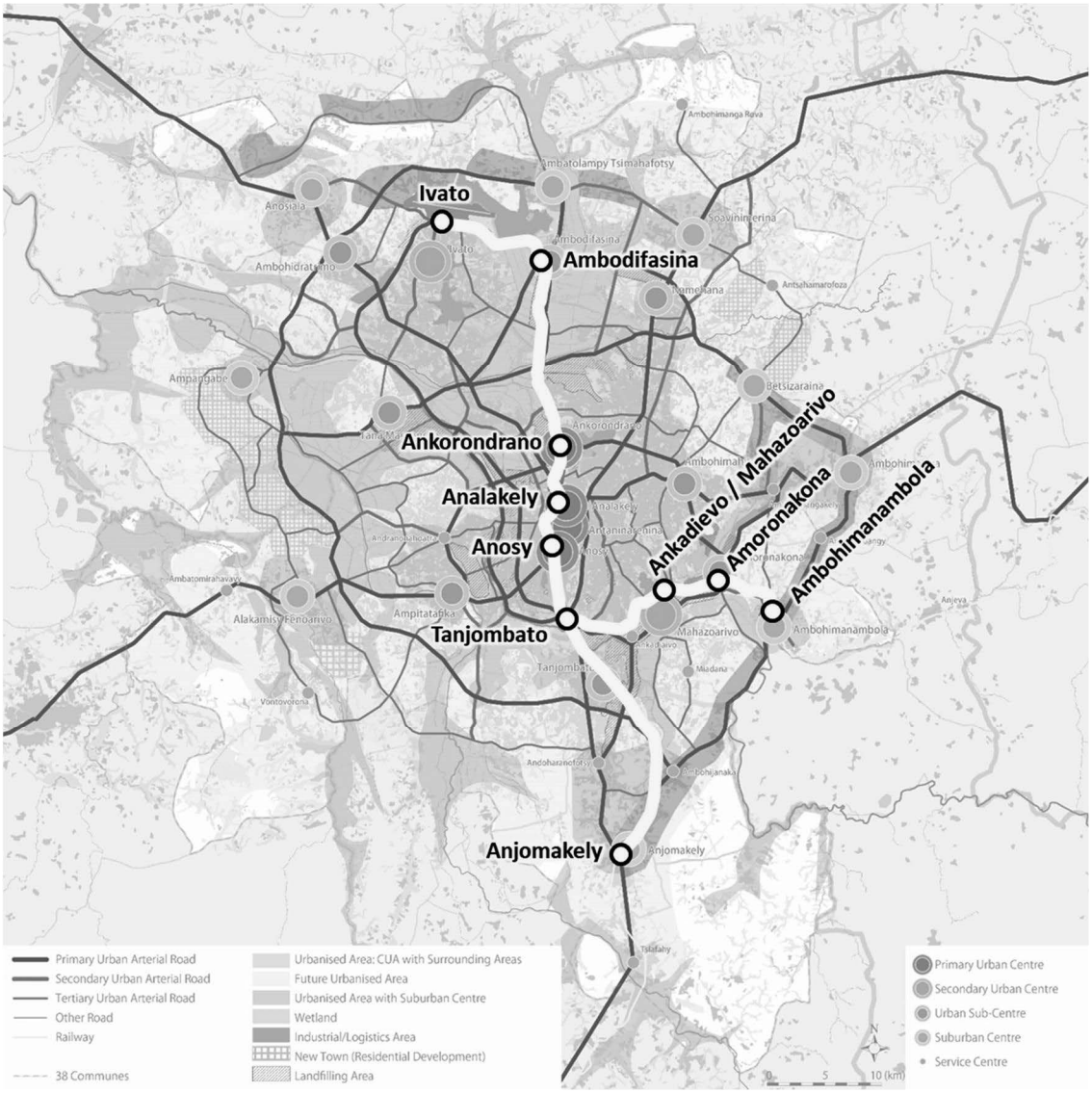
Antananarivo Agglomeration has an existing railway which connects Antananarivo with Toamasina, as well as with Antsirabe. By utilising the existing rail section within Antananarivo Agglomeration and by adding a new rail section between Ankorondrano and Ivato Airport, an urban railway should be established. This urban railway is to serve "the urban central axis" connecting the primary and secondary urban centres.

This urban rail axis is to be developed together with road development. At the early stage of the urban railway development, the existing single track of railway between Tanjombato and Ankorondrano will be transformed from freight transport to passenger transport.

In the long term, the above urban railway is to be upgraded to connect other urban centres, namely Amoronakona Urban Sub-Centre, Ambohimanamboka Suburban Centre, and Anjomakely Suburban Centre. This additional railway connection is to serve suburbanisation.

Transit-Oriented Development Corridor (TOD Corridor)

This urban railway and high-standard 6-lane road are to compose a Transit-Oriented Development Corridor connecting Ambodifasina with Tanjombato in the north-south direction. Those urban centres in the TOD Corridor will have major railway stations in combination with bus terminals. In the TOD Corridor including urban centres, mid-rise development is to be promoted.



Source : JICA Study Team

Figure 6.1.5 Urban Rail Axis for Antananarivo Agglomeration

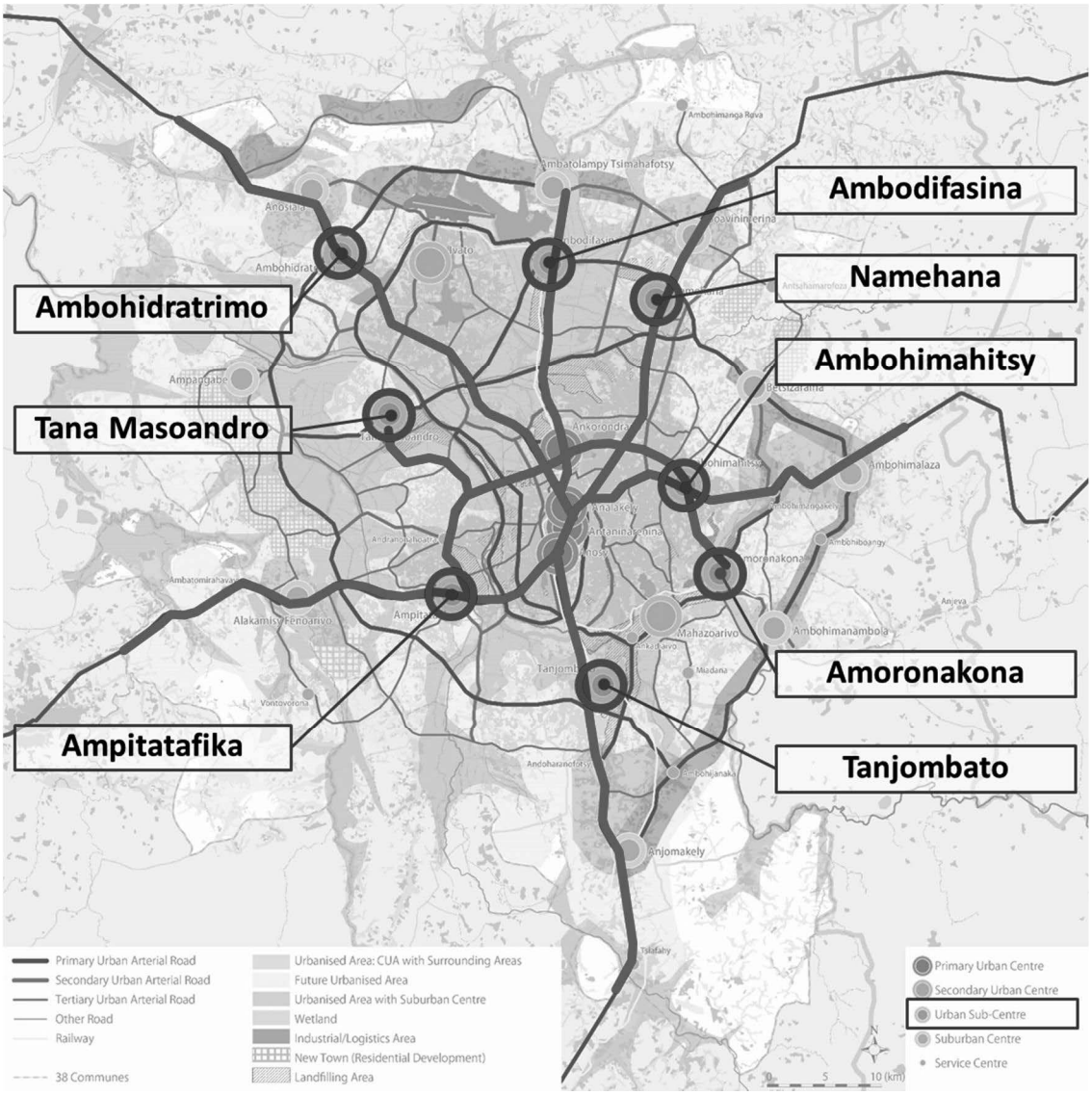
5) Urban Sub-Centres

The Urban Sub-Centre is the third-level urban centre for Antananarivo Agglomeration. It will have governmental administration, business, commercial, health and educational functions of suburban importance outside CUA.

The Urban Sub-Centres shown in Figure 6.1.6 are basically located in seven radial roads connecting the Urban Core. They are located just outside CUA. Five out of the eight Urban Sub-Centres, namely Namehana, Ambohidratrimo, Ambohimahitsy, Ampitatafika and Tanjombato, have developed spontaneously. The remaining three Urban Sub-Centres, namely Ambodifasina, Tana-Masoandro and Amoronakona, are new ones which are to be developed in the future.

These Urban Sub-Centres outside CUA are important in providing services for suburban residential areas.

In the five Urban Sub-Centres which have already developed, shops and offices have been scattered haphazardly, resulting in congestion. Therefore, it is necessary to take measures to solve congestion and improve urban amenities in those Urban Sub-Centres.



Source : JICA Study Team

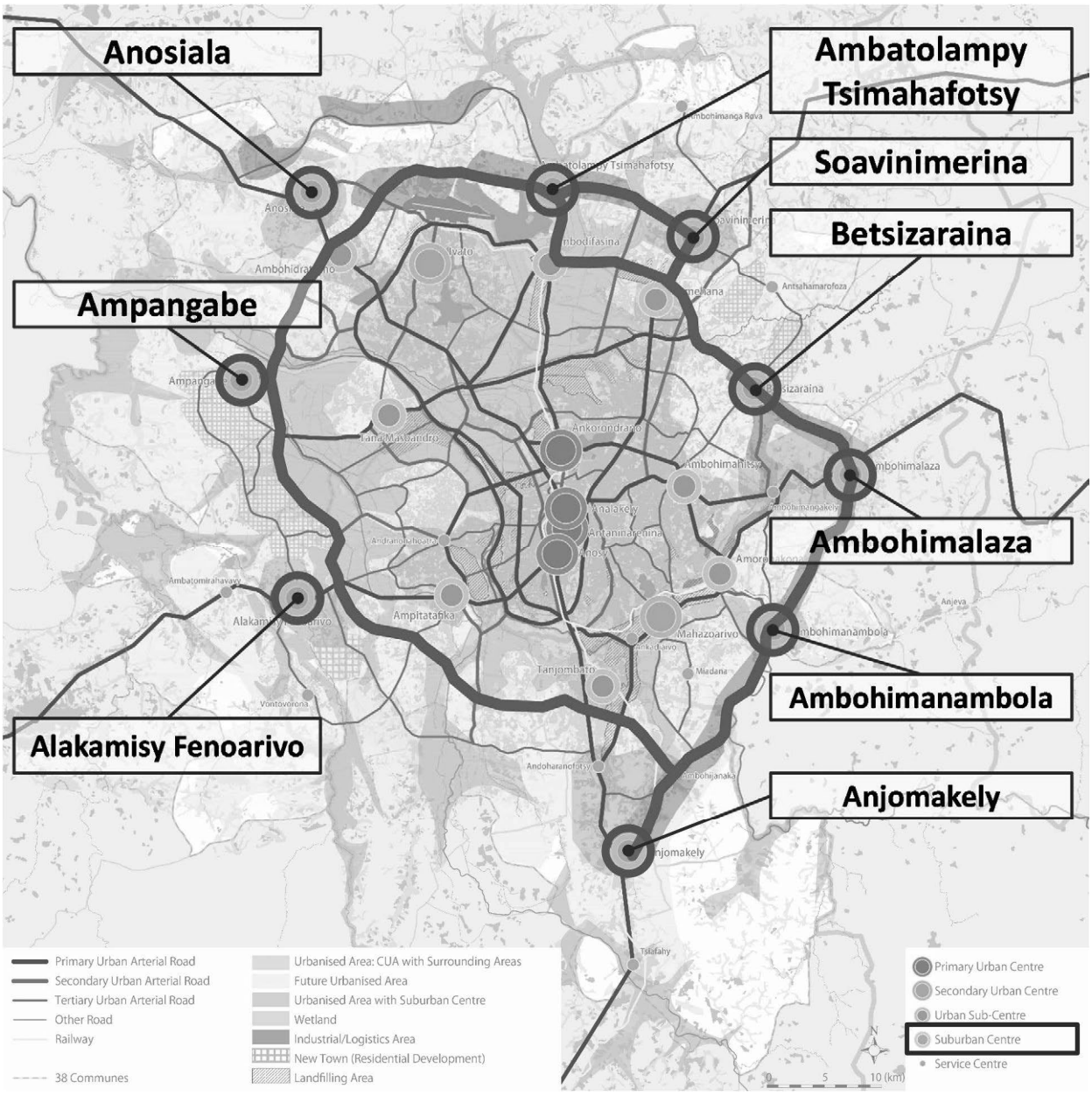
Figure 6.1.6 Urban Sub-Centres for Antananarivo Agglomeration

6) Suburban Centres

The Suburban Centre is to have the fourth-level urban centres for Antananarivo Agglomeration. They are to have governmental administration and commercial functions for providing services to suburban areas outside the Outer Ring road. They should also have agricultural markets which collect agricultural products from suburban and rural areas for wholesale and retail purposes.

The Suburban Centres shown in Figure 6.1.7 are located at the outskirts of urbanized areas of the agglomeration. They have relatively weak power of spontaneous economic development. Therefore, it is necessary to implement projects for developing land and providing infrastructure for the Suburban Centres.

At the same time, it is necessary to construct the Outer Ring Roads which connects radial national roads for the purpose of making hubs of radial roads and Outer Ring Roads near the Suburban Centres. In this way of making hubs, the Suburban Centres could attract more consumers and traders for shopping and doing business.



Source : JICA Study Team

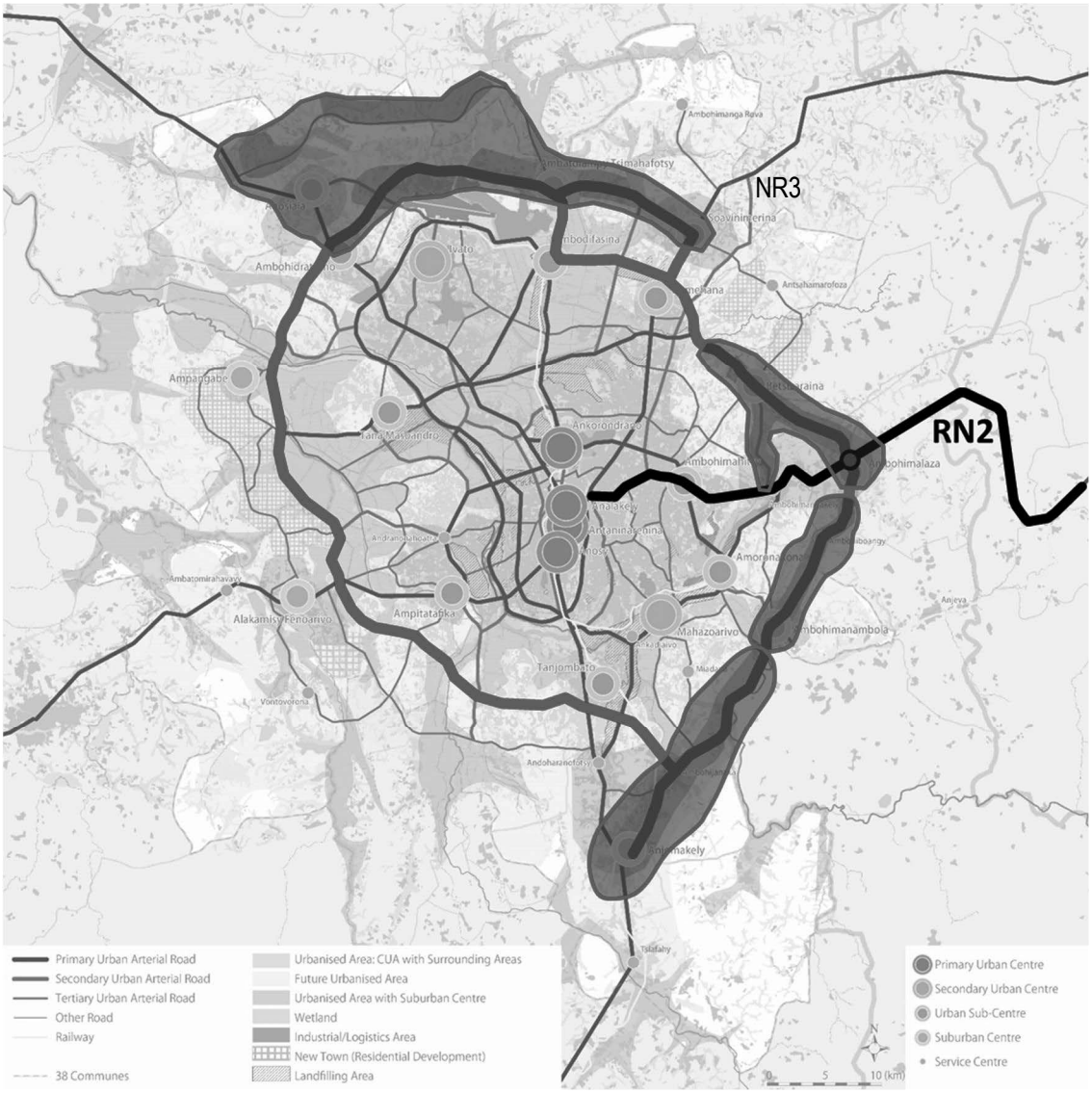
Figure 6.1.7 Suburban Centres for Antananarivo Agglomeration

7) Industrial and Logistics Areas along the Outer Ring Road

The construction of the Outer Ring Roads could create lands for accommodating economic sectors including industries and logistics facilities along the roads.

In Antananarivo Agglomeration, it is important to locate such lands for industries and logistics facilities along the Outer Ring Road sections of good connection with the National Road No. 2.

On the other hand, the road section of the Outer Ring Road between the No.2 Airport Access Road (north-south direction) and the National Road No. 3 is one of the good candidate places in which to start the Motorway between Antananarivo and Toamasina.



Source : JICA Study Team

Figure 6.1.8 Industrial and Logistics Areas along the Outer Ring Road

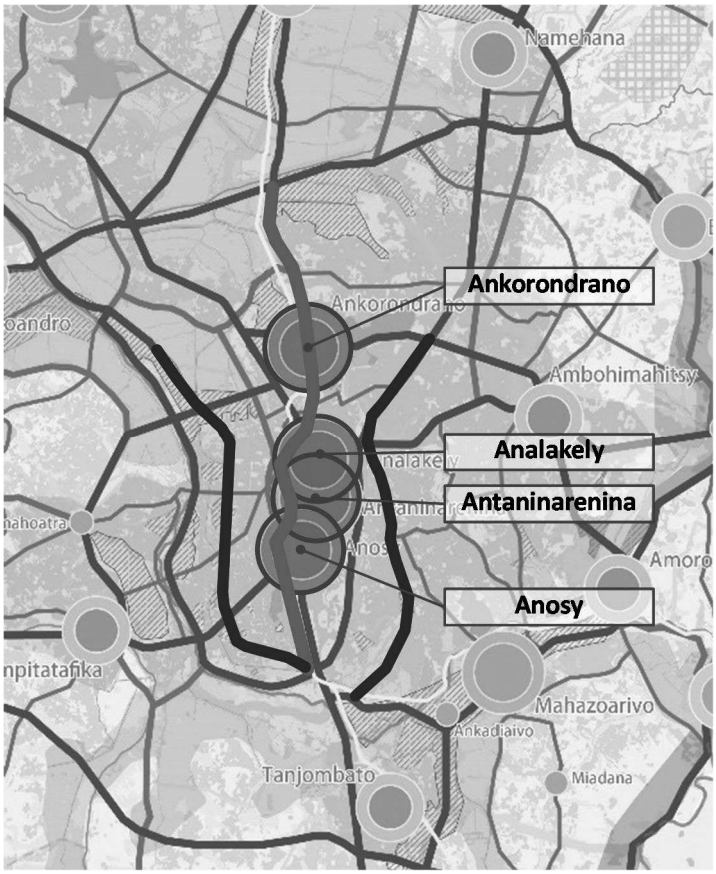
8) Strengthened North-South Roads for Primary Urban Centres

The four Primary Urban Centres could play their effective roles if good mobility among those centres is secured in the Urban Core. For this purpose, it is necessary to enhance the north-south mobility by developing the three north-south roads in the Urban Core, as shown in Figure 6.1.9.

For this purpose, it is necessary to consider the construction of a high-standard road (which is to have 6-lane carriageway and/or of an elevated structure) on the red-colour route along a canal (See Figure 6.1.9). This red colour route should be a public transportation axis, which have a strong public transportation function to be supported by Bus Rapid Transit or Urban Railway.

Transit-Oriented Development Corridor (TOD Corridor)

The north-south 6-lane road between Ambodifasina and Tanjombato, through Ankorondrano, Analakely, Antaninarenina and Anosy, is to be a main corridor of Transit-Oriented Development (TOD), where an Urban Railway Line is established in the north-south direction. Main railway stations are to be located in those urban centres, where at the same time, main bus terminals are established for facilitating passenger exchanges between railway and bus services. In the TOD Corridor including urban centres, mid-rise development is to be promoted.



Source : JICA Study Team

Figure 6.1.9 North-South Roads for Primary Urban Centres

9) Three East-West Roads Connecting to the Urban Central Axis

The three East-West Roads shown in Figure 6.1.10 could play roles of connecting the eastern area and the western area with the Urban Central Axis. Those who get the Urban Central Axis from the eastern areas or the western area could easily get access to various areas within the Antananarivo Agglomeration.

It is necessary to consider the development of high-standard east-west roads for the purpose of accommodating the operation of BRT (Bus Rapid Transit).

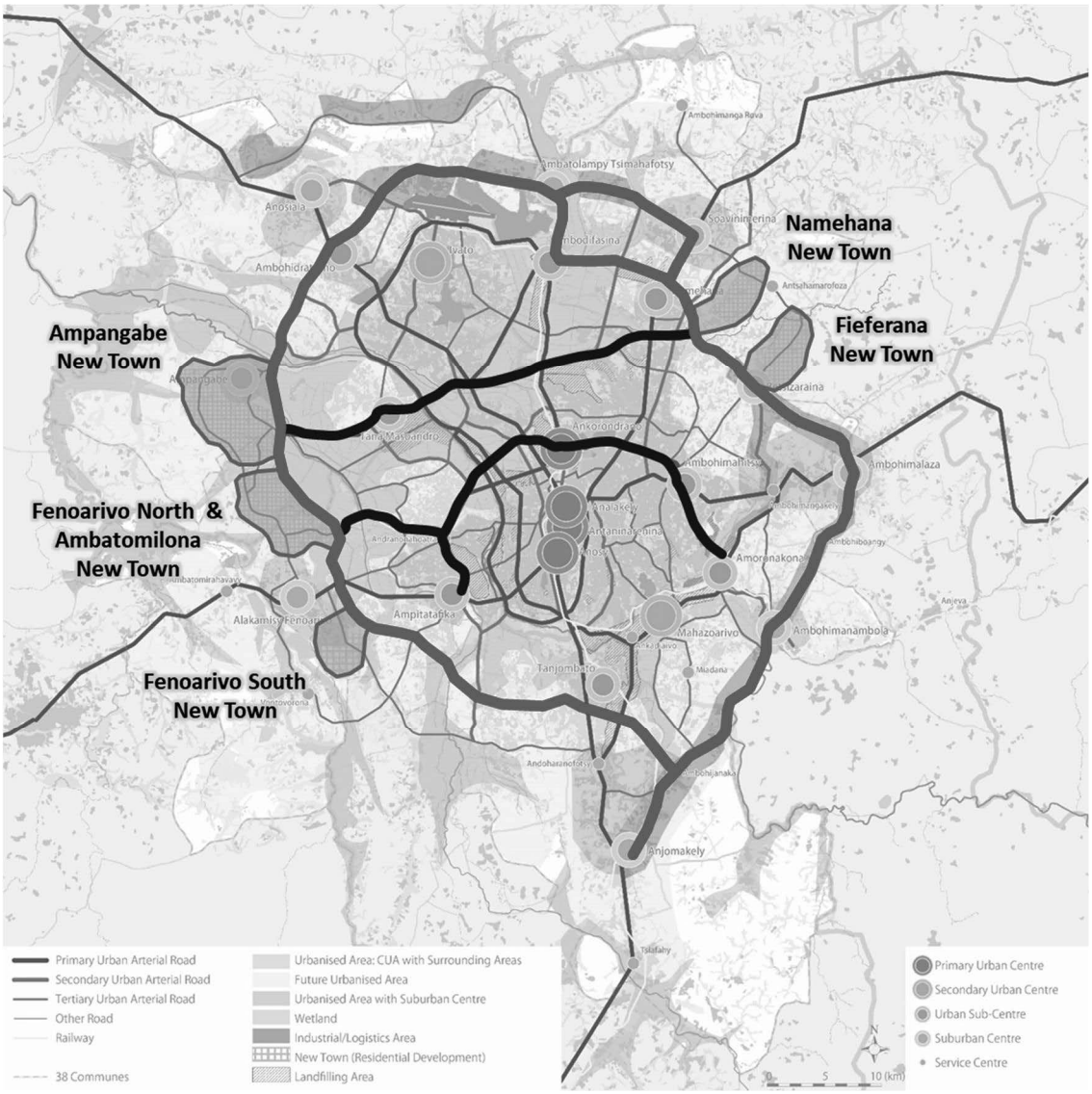
Source : JICA Study Team

Figure 6.1.10 East-West Roads Connecting to the Urban Central Axis

10) New Towns

Housing supply needs to be promoted in order to accommodate the rapid population growth. Therefore, new towns are proposed in the western area of the Antananarivo Agglomeration, where vacant lands are still available.

The new towns are constructed along the Outer Ring Road. At the same time, they are connected with the East-West Roads to serve accessibility to the Urban Core. As mentioned above, BRT is proposed, and it secures public transport for citizens who are living the new towns.



Source : JICA Study Team

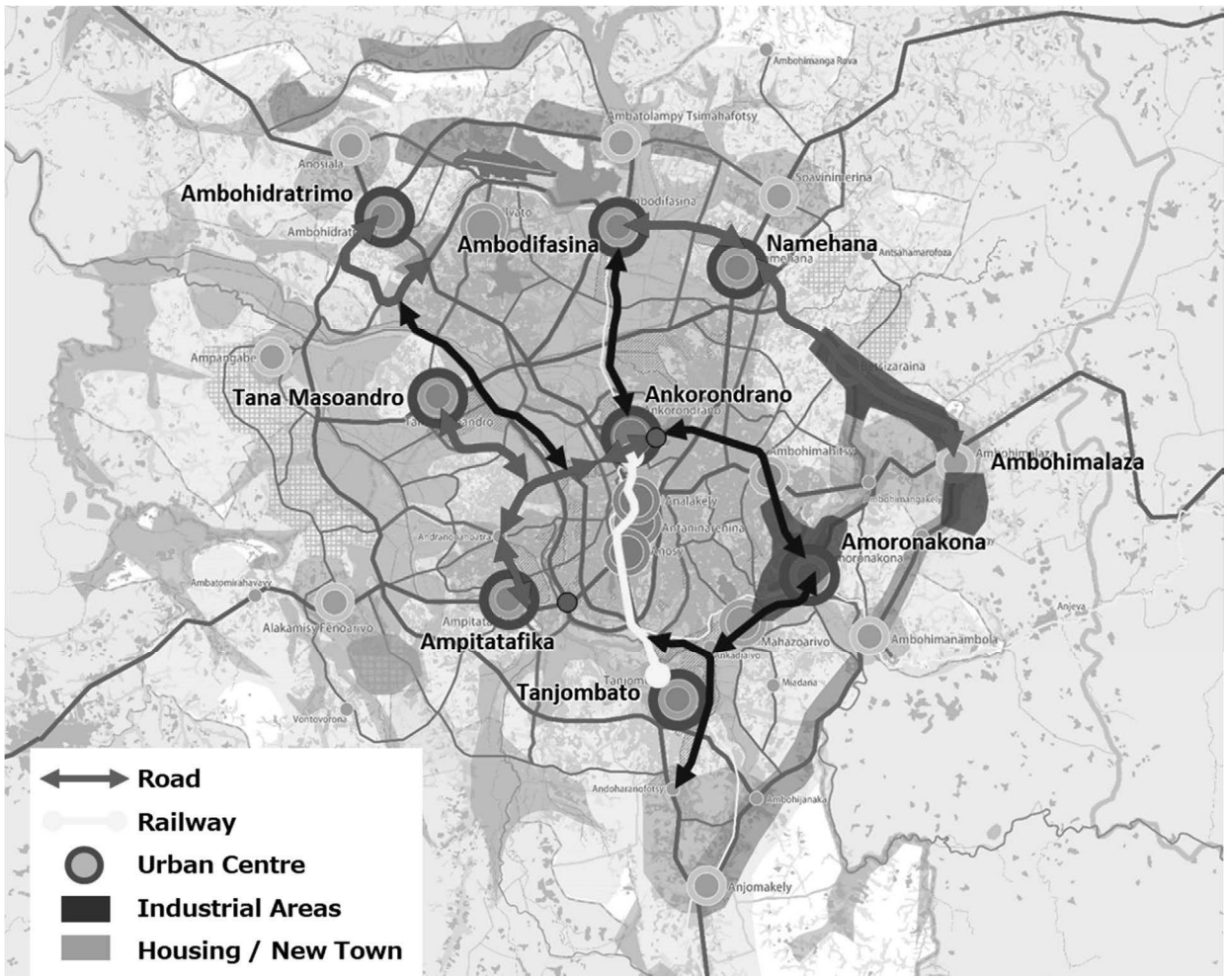
Figure 6.1.11 New Towns for Antananarivo Agglomeration

6.1.5 Phased Urban Development for Antananarivo Agglomeration

The selected Growth Scenario C has the following phased development pattern:

(1) Phase 1: 2019~2023

- To attract investment in light industry and promote industrial development, in addition to the existing textile industry, utilizing the existing infrastructure, the current workforces, and already available business support services
- To conduct rezoning to mixed development areas including industry along the Tokyo Boulevard.
- To create land for industrial development by constructing the Outer Ring Road between NR No.2 and NR No. 3
- To make a strong effort to develop Urban Sub-Centres which are located just outside CUA and currently developing, because they have a strategic location by construction of new roads
- To develop roads which will ease traffic congestion on the existing radial roads for strengthening the connectivity between the inside of CUA and the outside of CUA
- To develop a new Primary Urban Centre in Ankorondrano to enhance advanced business support functions of Antananarivo Agglomeration

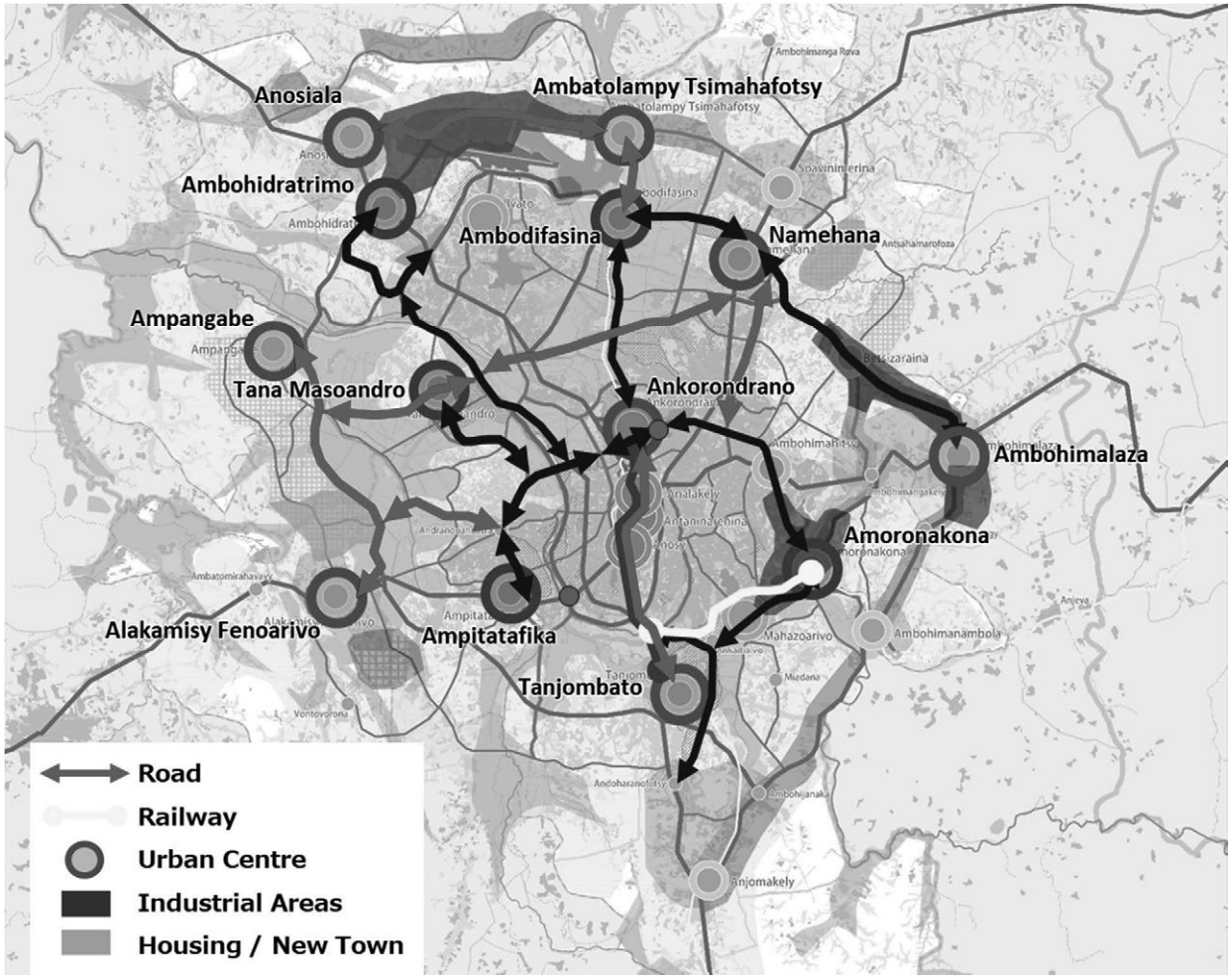


Source: JICA Study Team

Figure 6.1.12 Development of Antananarivo Agglomeration in Phase 1 (2019-2023)

(2) Phase 2: 2024~2028

- To construct the Outer Ring Road from the north of Ivato Airport to NR4 and develop the area for industry and logistics along the Outer Ring Road, and to attract light industries and logistics facilities
- To promote suburban development by improving the connectivity between CUA and outside CUA by constructing part of the Outer Ring Road, and developing Suburban Centres
- To develop a new town in the northern area of Alakamisy Fenoarivo Suburban Centre by constructing a bypass road parallel to NR1 and a western part of the Outer Ring Road
- To disperse road traffic by developing 4-lane roads connecting NR3, Tsarasaotra Road, NR4 and Bypass Road of NR4 in east-west direction, and to promote development of the suburban areas

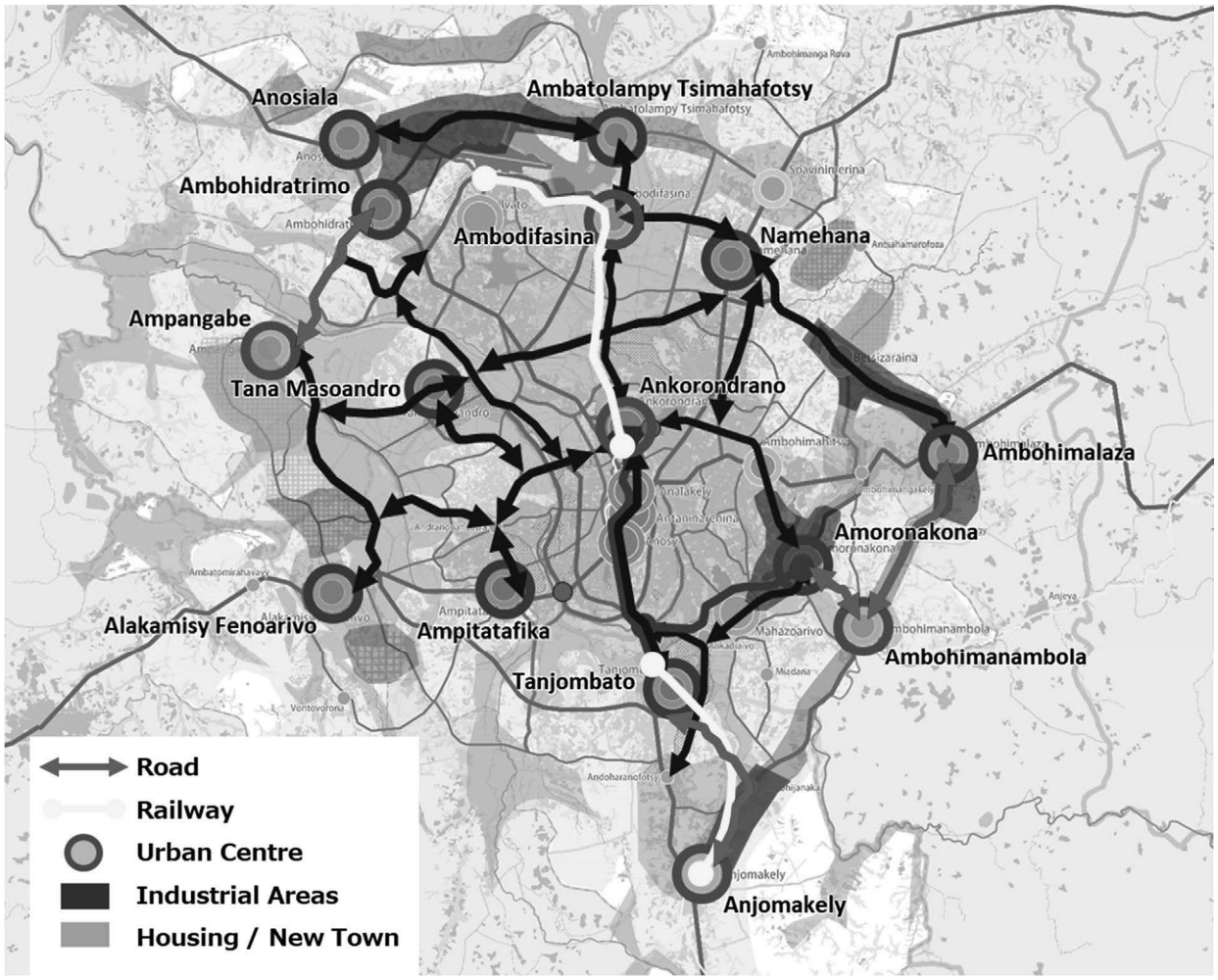


Source: JICA Study Team

Figure 6.1.13 Development of Antananarivo Agglomeration in Phase 2 (2024-2028)

(3) Phase 3: 2029~2033

- To construct the north-western part of the Outer Ring Road outside CUA linking NR1 and NR4 and to promote development of suburban areas by new town development
- To generate land for industrial and logistics use by developing a bypass road of NR7 in the south of the outside of CUA. This area has access to the urban railway.
- The expansion of the urban area is expected by development of urban centers in the suburban area near the industrial area

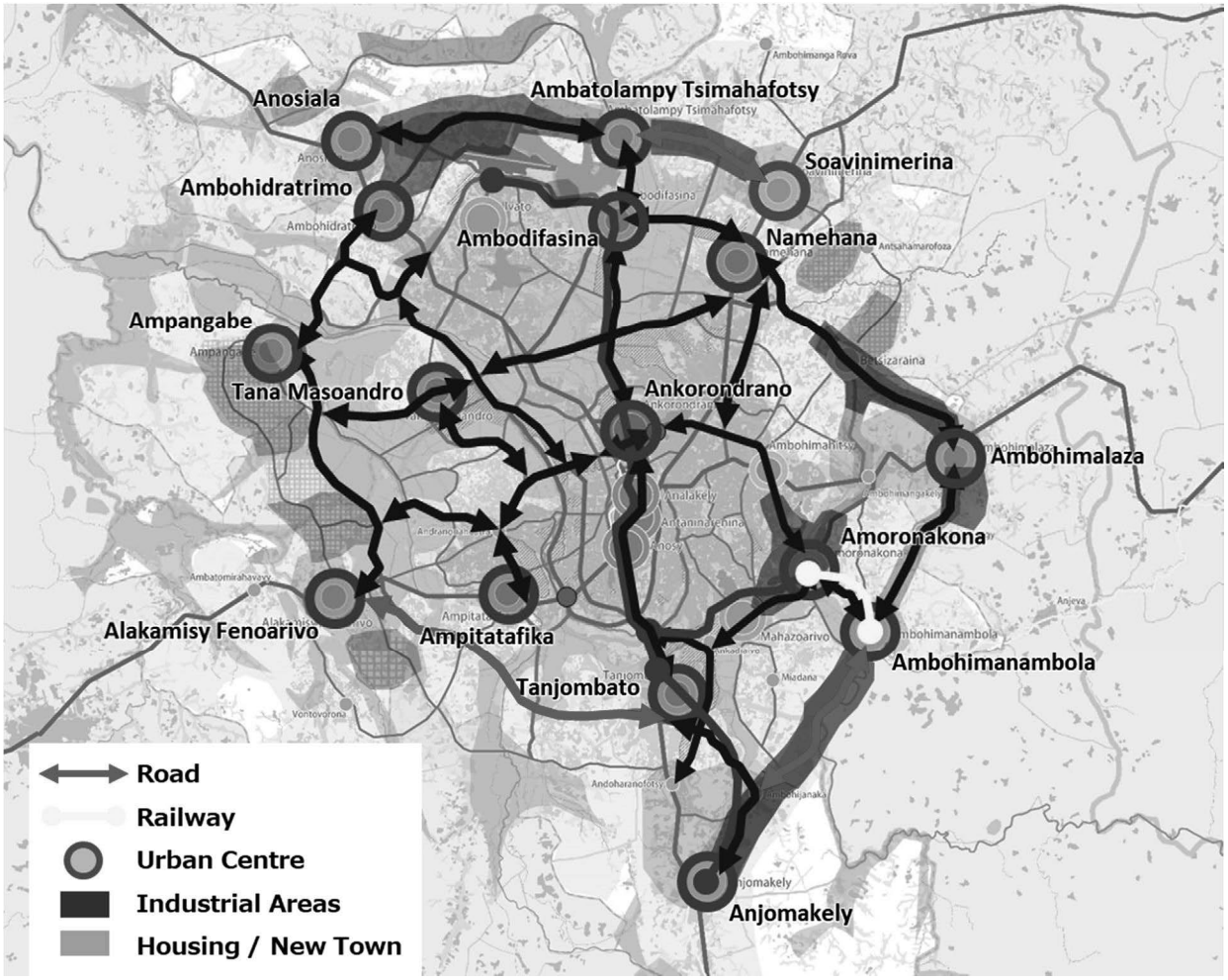


Source: JICA Study Team

Figure 6.1.14 Development of Antananarivo Agglomeration in Phase 3 (2029-2033)

(4) Phase 4: 2034~2038

- To create additional land for industry and logistics facilities by constructing remaining sections of the Outer Ring Road in the southeast, southwest and northeast areas outside CUA and to promote investment to industries
- The expansion of the urban area is expected by developing Suburban Centers in the suburban areas near the industry area, while attracting industries



Source: JICA Study Team

Figure 6.1.15 Development of Antananarivo Agglomeration in Phase 4 (2034-2038)

6.2 Strategies for Urban Centre Development in Antananarivo Agglomeration

6.2.1 Objectives for Promotion of Urban Centre Development in Antananarivo Agglomeration

The objectives for promoting urban centre development in Antananarivo Agglomeration are as follows:

- To improve the overall efficiency of urban functions of Antananarivo Agglomeration
- To decentralize the urban functions concentrated in CUA to other centres outside CUA in Antananarivo Agglomeration
- To provide necessary lands for large-scale schools, large-scale hospitals, retention ponds, urban parks and infrastructure to support the increasing population

6.2.2 Strategies for Promotion of Urban Centre Development in Antananarivo Agglomeration

The following strategies are determined for promoting urban centre development in Antananarivo Agglomeration:

- To provide good road access between urban centres to support the strong connectivity between urban centres and the efficient mobility within Antananarivo Agglomeration
- To develop the designated urban centres by phase concurrently with the phased development of urban arterial roads
- To expand the areas of existing centres by following designated land use zoning regulations related to existing urban centres
- To locate major railway stations in connection with bus terminals in urban centers in the north-south Transit-Oriented Development Corridor (TOD Corridor) connecting Ambodifasina with Tanjombato

6.2.3 Programmes and Projects for Promotion of Urban Centre Development in Antananarivo Agglomeration

The projects for promoting urban centre development in Antananarivo Agglomeration are listed below by phase. The project profiles for projects from A-C-01 to A-C-17 can be found in Section 6.5.1.

Phase 1 2019-2023

- [A-C-01] Project for Promotion of Development of Ankorondrano Primary Urban Centre Phase 1
- [A-C-02] Project for Promotion of Development of Ambodifasina Urban Sub-Centre
- [A-C-03] Project for Promotion of Development of Namehana Urban Sub-Centre Phase 1
- [A-C-04] Project for Promotion of Development of Amoronakona Urban Sub-Centre
- [A-C-05] Project for Promotion of Development of Tanjombato Urban Sub-Centre Phase 1
- [A-C-06] Project for Promotion of Development of Ampitatafika Urban Sub-Centre
- [A-C-07] Project for Promotion of Development of Tana-Masoandro Urban Sub-Centre
- [A-C-08] Project for Promotion of Development of Ambohidratrimo Urban Sub-Centre

Phase 2 2014-2028

- [A-C-09] Project for Promotion of Development of Ankorondrano Primary Urban Centre Phase 2
- [A-C-10] Project for Promotion of Development of Namehana Urban Sub-Centre Phase 2

- [A-C-11] Project for Promotion of Development of Tanjombato Urban Sub-Centre Phase 2
- [A-C-12] Project for Promotion of Development of Ambatolampy Tsimahafotsy Suburban Centre
- [A-C-13] Project for Promotion of Development of Anosiala Suburban Centre
- [A-C-14] Project for Promotion of Development of Ampangabe Suburban Centre
- [A-C-15] Project for Promotion of Development of Alakamisy Fenoarivo Suburban Centre
- [A-C-16] Project for Promotion of Development of Ambohimalaza Suburban Centre

Phase 3 2029-2033

- [A-C-17] Project for Promotion of Development of Ankorondrano Primary Urban Centre Phase 3
- [A-C-18] Project for Promotion of Development of Ambohimanambola Suburban Centre
- [A-C-19] Project for Promotion of Development of Anjomakely Suburban Centre on NR7

Phase 4 2034-2038

- [A-C-20] Project for Promotion of Development of Anosy Avaratra Suburban Centre

6.3 Housing Development Strategies in Antananarivo Agglomeration

6.3.1 Objectives for Housing and Residential Area Development in Antananarivo Agglomeration

Based on the analysis of the current situation and discussion of the issues related to the sector, the objectives for housing and residential area development in Antananarivo Agglomeration are proposed as follows:

Objective 1: To improve the living condition of high-density residential areas in CUA by:

- Improving basic infrastructure and services (road, water supply, sanitation, waste collection, open space, etc.)
- Decreasing risks of disasters such as inundation and fire
- Improving housing stocks
- Securing land ownership

Objective 2: To develop residential areas together with basic infrastructure and services in suburban communes by:

- Developing new residential areas with basic infrastructure in new towns in suburban areas
- Improving and expanding residential areas around suburban centres and developing basic infrastructure and public services

Objective 3: To promote affordable housing provision for middle- and low-income households

- Promoting subdivision development by the private sector, specifying the areas to be developed in PUDé
- Developing and implementing incentives and financial scheme for housing provision in the National Housing Policy

Objective 4: To stimulate real estate market and nurture the housing industry for housing and residential area development

6.3.2 Strategies for Housing and Residential Area Development in Antananarivo Agglomeration

The strategies below are identified to achieve the objectives for housing and residential development.

(1) Strategy 1: To Promote Improvement of High-Density Informal Settlement Areas by Delineating Settlement Improvement Areas as Action Areas in PUDi

This strategy is to identify the areas to be improved under the programmes and projects for informal settlement improvement, and delineate them as action areas in PUDi. These areas will be the site of settlement improvement projects. These areas can be delineated into several categories, depending on potential development schemes, necessary interventions, and intended land use.

For improvement of informal settlements and promotion of residential area and infrastructure development, detailed urban plan (PUDé) can also be used as a tool. Though an overall strategy indicating the basic direction for development is important for settlement improvement to clarify what type of residential areas should be developed, detailed plans are also required to identify necessary interventions, such as what type of basic infrastructure and facilities are to be developed, where they should be located, etc. PUDé can be used to integrate informal settlements and extended areas into the urban fabric of the agglomeration by promoting development of connecting infrastructure.

(2) Strategy 2: To Improve High-Density Informal Settlements in CUA by Opening the Settlement Areas through Construction of Local Roads and Footpaths

This strategy aims to improve the condition of informal settlements with high density in CUA by opening them through construction of local roads. Although Lalankely Project contributed to improvement of informal settlements, there are still many high-density fokontany in CUA without sufficient road access to the inner parts of the settlements. Construction of local roads passable by car is a key step to improvement of the informal settlements, since this will help people's day-to-day mobility as well as increase business opportunities and reduce risks of disasters (such as fire by allowing the access of fire trucks and ambulance cars to the inner parts of the settlements). Construction of local roads and footpaths can also promote upgrading and legalisation of housing stocks because the requirement for frontal road in construction permit procedure will be satisfied, and obtaining the permit becomes easier. Moreover, water standpipes and drainage are more likely to be constructed along the wider road. In short, construction of local roads can become catalysts to the improvement of informal settlements in terms of disaster risks, housing stocks, and development of basic infrastructure.

(3) Strategy 3: To Develop Residential Areas in New Towns by Site and Service Scheme[1]

This strategy aims to develop new residential areas as part of new towns in the suburban areas, by applying site and service scheme. For development of plots for residential use with necessary basic infrastructure and services, relatively large vacant plots should be identified for the site and service scheme as part of a new town development plan. Within the area of a new town, large plots of land owned by the government or by a single entity will be selected and delineated in the plan for the application of the scheme to facilitate implementation. Residential development is supposed to target not only low-income households but also medium- and high-income families, and the areas should have some commercial and industry uses for creation of a vibrant neighbourhood and for cost recovery. The involvement of private sectors is encouraged.

[1] Site-and-Service scheme is an approach which has been considered in many developing countries to provide housing for the poor. In this scheme plot of land is provided, either on ownership or land lease tenure, along with basic essential infrastructure. Since it is not possible in many developing countries (where the urban population is growing rapidly) to provide fully serviced affordable housing for all low-income families, such scheme is implemented in order to solve the problem on squatter settlements.

(4) Strategy 4: To Encourage Involvement of Private and Nonprofit Sectors in Affordable Housing Provision

The private and nonprofit sectors should take more active role in the provision of affordable housing and rehabilitation of low-quality housing stocks. This strategy promotes the involvement of and partnerships with the private and nonprofit sectors by providing incentives and facilitating planning and coordination with the community. The potential areas to be developed for subdivision, for example, will be specified in PUDé of the suburban centre and new town plan.

The potential actors of the private and nonprofit sectors may include developers who are interested in redevelopment of urban centre or vacant land, and NGOs willing to contribute to affordable housing development.

(5) Strategy 5: To Streamline the Construction Permit Approval Procedure

In order to develop quality housing stocks and activate the real estate market and housing sector, the procedure for construction permit approval and land use zoning systems should be simplified and streamlined. The procedure should be easy enough to be understandable not only to government officials and developers but also to ordinary citizens. A campaign for awareness raising on obtaining a construction permit and/or opening a temporary one-stop shop at the target neighbourhoods of Lalankely or PRODIUR Projects, for example, are also suggested as strategy.

6.3.3 Programmes and Projects for Housing and Residential Area Development in Antananarivo Agglomeration

In order to implement the housing development strategies described in Section 6.3.2, the following projects should be implemented:

- Project for Local Road Development and Improvement of Informal Settlements in CUA Project for Development of New Towns for Housing Provision in Suburban Areas
- Project for Institutional Building and Capacity Building for Construction Permit Procedure

Among these projects, the following projects their project profiles can be found in Section 6.6.3.

- Project for Local Road Development and Improvement of Informal Settlements in CUA
- Project for Development of New Towns for Housing Provision in Suburban Areas

On the other hand, Project for Institutional Building and Capacity Building for Construction Permit Procedure is integrated as part of the component for Capacity Development for Communes in Utilization of Land Use Zoning Regulations, which is in Project for Capacity Development for Promotion and Coordination of Implementing the PUDi (Urban Development Master Plan) of Antananarivo Agglomeration described in Section 6.6.1.

(1) Project for Local Road Development and Improvement of Informal Settlements in CUA

The objective of this project is to develop local roads and to improve highly congested informal settlements in CUA. This project will consist of two components of basic infrastructure development, i.e., local roads and other infrastructure (water supply, drainage, open space, etc.), and housing and regulation component.

In the component of infrastructure development, local roads which are passable by car will be developed to open informal settlement with high density population, and this can be done by going through the process of land acquisition. Along with road construction, open space such as pocket park, playground, and small gathering space will be developed, utilising vacant plots and wetlands. Water supply improvement, including standpipe development and extension of piped water supply to individual households, and drainage construction will be designed depending on the needs of community by extending the networks of these utilities along the constructed roads.

The housing and regulation component aims to improve housing by deregulating land use and building permit requirements (such as the regulation on the minimum lot size, frontal road, and

width and other design of local road) with the completion of construction of local roads and open space. This intends to stimulate upgrading and replacing of precarious houses and legalisation of structure and land tenure which will produce good quality housing stocks in the settlement. Moreover, models of affordable houses (which are simply designed to be built by nonprofessionals; these are also disaster resilient) will be proposed for low-income households. On the other hand, housing financing scheme such as low-interest mortgage will be developed for middle-income families for their housing construction needs. As part of the component, cadastral maps will be updated for the clarification of land tenure for roads and infrastructure development as well as housing development. It is recommended that the potential site be specified as the special area for settlement improvement in PUDi.

(2) Project for Development of New Towns for Housing Provision in Suburban Areas

In order to accommodate the future population of Antananarivo Agglomeration, several new towns are planned for establishment in suburban communes. The objective of this project is to develop residential areas with basic infrastructure in new towns in the suburban areas through the application of site and service scheme. By applying a site and service scheme, plots for residential use and basic infrastructure (such as roads, water and power supply, and sanitation as well as schools and health centres) will be developed in advance.

Under the scheme, residential areas will be developed for a diverse mix of households, including low-income households who have migrated from the urban centre of CUA, and middle- and upper-class households, and will include areas for commercial and light industry use in order to develop a vibrant community with work place. However, the main target beneficiaries of the project are low-income families.

The project will start with the planning phase to examine an appropriate design of the scheme and feasibility of the project. A possibility to invite the private sector shall be also explored for development of PPP. For the project site, relatively large plots of land should be acquired first by identifying underutilised government lands or privately owned lands by a small number of owners.

This project can be implemented as part of a new town development project or a separate component to develop one or several plots of the new towns.

(3) Project for Institutional Building and Capacity Building for Construction Permit Procedure

A simple and streamlined procedure for construction permit approval should be developed for speeding up the construction process and activation of real estate and housing markets. Because the current construction permit approval procedure is too cumbersome and slow, many houses and buildings are constructed without permits. Thus, this project aims to develop the procedure for construction permit approval that will be understandable to ordinary citizens, construction industry, and government officials; and to conduct capacity building training for the technical officials of communes and the central government agencies, and professionals and experts from the construction industry. The component for awareness raising will be included also in this training.

6.4 Strategies for Development of Open Space in Antananarivo Agglomeration

6.4.1 Objectives for Development of Open Space in Antananarivo Agglomeration

The objectives for development of open space in Antananarivo Agglomeration are as follows:

- To maintain the function of existing open space facilities in Antananarivo Agglomeration
- To secure lands to provide necessary urban parks and sports facilities for the increasing urban population of Antananarivo Agglomeration

6.4.2 Strategies for Development of Open Space in Antananarivo Agglomeration

The following strategies are determined for developing open space in Antananarivo Agglomeration:

- Provision of Urban Parks and Sports Facilities by Securing Lands in Newly Developing Urban Centres
  - To utilize lands to be newly developed by land filling in wetlands for provision of urban parks and sports facilities in urban centre development
  - To prepare a development plan for urban parks in accordance with urban centre development
  - To prepare a development plan for sports facilities
- Provision of Waterfront Parks surrounding Retention Ponds
  - To develop waterfront parks surrounding retention ponds which are to be developed for improving drainage capacity in urban areas
- Securing of Lands for Provision of Urban Parks by Land Use Zoning Plans
  - To secure lands in the areas categorized as Green Space and Pubic Parks in the land use zoning plan
- Management of Existing Urban Parks and Sports Facilities
  - To rehabilitate and improve facilities of existing urban parks and sport facilities
  - To protect existing open space facilities from emerging development pressure and changing them to other land uses
- Securing of Small Parks in Subdivisions
  - To secure lands for urban pocket parks when developing a subdivision residential area
  - To develop urban pocket parks as part of informal settlement upgrading project or when redeveloping a high-density residential area

6.4.3 Programmes and Projects for Development of Open Space in Antananarivo Agglomeration

Some actions necessary for development of open space in Antananarivo Agglomeration need to be implemented together with other urban development projects such as development of retention pond and upgrading of informal settlement. Such actions are integrated into the following projects of other sectors:

- Provision of Urban Parks and Sports Facilities by Securing Lands in Urban Centres
  - Projects for promoting urban centre development in Antananarivo Agglomeration (A-C-01 to A-C-17)
- Provision of Waterfront Park surrounding Retention Ponds
  - Programme for Development of Retention Ponds and Waterfront Parks for Disaster Risk Reduction (A-G-01 to A-G-04)
- Securing of Lands for Provision of Urban Parks by Land Use Zoning Plans
  - Project for Capacity Development for Promotion and Coordination of Implementing the PUDi of Antananarivo Agglomeration
- Securing of Small Parks in Subdivisions
  - Project for Local Road Development and Improvement of Informal Settlements in CUA

Other projects for development of open space in Antananarivo Agglomeration are listed below.

- Project for Formulation of Development Plan for Urban Parks
- Project for Formulation of Development Plan for Sports Facilities

6.5 Strategies for Historical Area Preservation in Antananarivo Agglomeration

6.5.1 Objective for Historical Area Preservation in Antananarivo Agglomeration

The following objectives are determined for preserving the historical areas in Antananarivo Agglomeration:

- To promote the preservation of the value of the historical heritage designated in the ZPPAUP zones.
- To preserve the value of historical heritage not only in ZPPAUP but also other heritages in Antananarivo Agglomeration.

6.5.2 Strategies for Histrorical Area Preservation in Antananarivo Agglomeration

In order to preserve the historical heritage, the following strategies should be realised to address the issues mentioned above.

- To sort out the information about the situation of historic buildings and landscape to clarify what should be preserved.
- To raise people's awareness about the heritage preservation
- To establish a firm system to monitor the situation of compliance of the preservation regulation
- To establish an incentive system for those who are restricted in their right to use their property and have to comply with the preservation regulations; such incentives are usually provided by the government to promote the preservation

6.5.3 Programmes and Projects for Historical Area Preservation in Antananarivo Agglomeration

The projects for historical area preservation in Antananarivo Agglomeration are as follows:

- Project for Preservation of Historical Sites under ZPPAUP
- Project for Preservation of Historical Sites in Antananarivo Agglomeration

The project profile of Project for Preservation of Historical Sites under ZPPAUP can be found in Section 6.6.3.

6.6 Profiles of Priority Projects for Urban Development in Antananarivo Agglomeration

6.6.1 Capacity Development for Promotion and Coordination for Implementing the PUDi (Urban Development Master Plan) of Antananarivo Agglomeration

The first set of actions necessary for implementing the PUDi is "Project for Capacity Development for Promotion and Coordination of Implementing the PUDi (Urban Development Master Plan) of Antananarivo Agglomeration."

This Project is composed of the following two components:

- Capacity Development for Communes in Utilization of Land Use Zoning Regulations
- Implementation of Pilot Project for Development of Urban Centres

(1) Capacity Development for Communes in Utilization of Land Use Zoning Regulations

1) Objectives of the Project Component

Overall Objectives

- To become able to coordinate and promote the integrated development delineated by the PUDi (urban development master plan)
- To become able to play their own roles in a proper manner for coordination and promotion for implementation of the PUDi

Individual Objectives

- To become able to enforce land use regulation and architectural regulation, especially in the following aspects:
  - Not to issue construction permits on the lands for arterial roads planned in the PUDi
  - To monitor and prevent illegal construction on the lands for arterial roads planned in the PUDi
  - Not to give permits of land filling in the wetlands which should have water retention function delineated in the PUDi
  - To monitor and prevent illegal land filling in the wetlands which should have water retention function delineated in the PUDi
- To become able to coordinate and promote the implementation of priority projects for the following types of infrastructures:
  - Urban Arterial Roads
  - Urban Railway
  - Water Supply
  - Power Supply

2) Targets of Capacity Development

- MAHTP, Central Government Ministry
- SRAT, a Regional Agency of the Central Government Ministry, which is in charge of Territorial Development
- Urban Commune of Antananarivo
- Communes outside the Urban Commune of Antananarivo
- Private Developers

3) Description of Project Component

This project component is composed of the following steps:

- To study the present situation
- To design a revised system of utilization of land use zoning regulations
- To design a set of training modules for the revised system of utilization of land use zoning regulations
- To conduct training sessions for target personnel and organizations

4) Cost and Duration for Project Component

- 2 million USD for 3 years

(2) Implementation of Pilot Projects for Development of Urban Centres

1) Objectives of Implementation of Pilot Project

- To become able to coordinate and promote the implementation of projects of urban centre development covering the following aspects:
  - Formulation of PUDé (detailed urban plans)
  - Construction of infrastructures, such as local roads and electricity distribution
  - Construction of water retention ponds and water front parks surrounding the ponds

- Development of multi-modal public transportation terminals for urban railway, bus and taxi be

2) Target Areas of Pilot Projects

The target areas of the pilot projects are as follows:

- Ankrondryano Primary Urban Centrer
- Ambodifasina Urban Sub-Centre
- Namehana Urban Sub-Centre
- Ampitatafika Urban Sub-Centre

3) Targets of Capacity Development by Implementing Pilot Projects

- MAHTP, Central Government Ministry
- SRAT, a Regional Agency of the Central Government Ministry, which is in charge of Territorial Development
- Urban Commune of Antananarivo
- Communes outside the Urban Commune of Antananarivo
- Private Developers

4) Description of Project Component

The project component is composed of the following steps:

- To review the present situation
- To design the system of coordination and promotion for implementation of urban centre development projects
- To prepare training modules for the system of coordination and promotion for implementation of urban centre development projects
- To conduct training sessions for target personnel and organizations

5) Cost and Duration of Project Component

- 2 million USD and 2 years

6.6.2 Profiles of Priority Projects for Promotion of Development of Urban Centres in Antananarivo Agglomeration

(1) [A-C-01] [A-C-09] [A-C-17] Project for Promotion of Development of Ankorondrano Primary Urban Centre Phase 1, 2, 3

1) Objectives

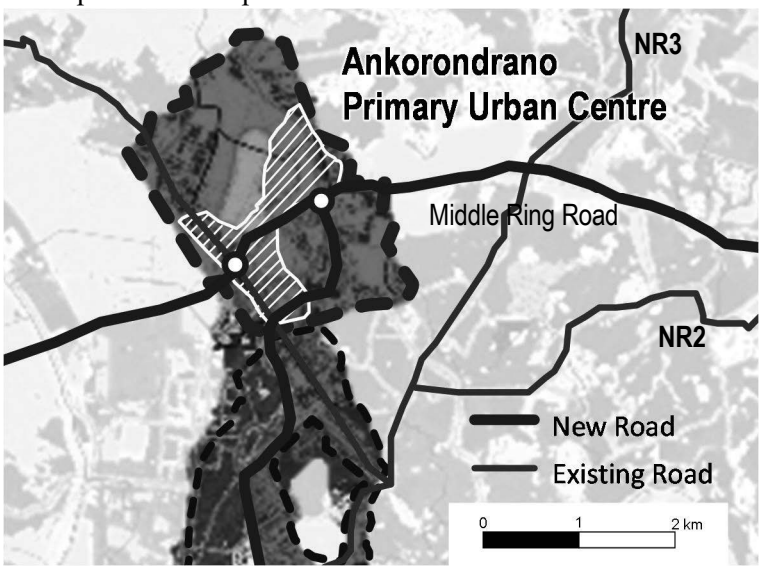
- To develop an urban core to support central economic functions
- To establish east-west connection and north-south connection for the overall agglomeration through Ankorondrano Primary Urban Centre
- To construct a water retention pond to improve inundation risk of Ankorondrano Primary Urban Centre and its surrounding areas

2) Project Description

- Open-up lands by relocation of the existing oil tanks and filling wetland
- Land fillings in wetlands (60 ha for Phase 1, 50 ha for Phase 2, and 50 ha for Phase 3ha) and securing lands for not only commercial and residential areas, as well as for public facilities by issuing “Arrete”.
- Constructing the new urban core with business parks, shopping centres, and other urban

functions such as large-scale schools and hospitals.

- Construction of major roads and flyover (grade separated junction)
- Construction of multimodal terminal for public transport (railway, taxi be, and taxi brousse)
- Construction of public parks and water detention ponds.
- Development of infrastructure (Electricity, water supply, and drainage)
- Promotion of private development



Source: JICA Study Team

Figure 6.6.1 Location of Ankorondrano Primary Urban Centre

3) Expected Benefits

In Ankorondrano Primary Urban Centre, more commercial and business activities will be accumulated. It enforces the economic activities with the existing urban centre, or Anosy, Antaninarenina, Analalely, and forms the urban core. The road structure proposed by the urban structure of TaToM and effective transport system including urban rail will improve accessibility to Ankorondrano Primary Urban Centre from all areas of Antananarivo Agglomeration. At the same time, new urban living environment with apartment type of residences and public spaces including water detention ponds and parks provide is created. Thus, Ankorondrano Primary Urban Centre will be the centre of economic activates of the nation, and provide urban services for all as the capital city of Madagascar.

4) Executing Agency and Related Institutes

- MAHTP, Ministry of National Education and Technical and Vocational Education, Ministry of Public Health, and JIRAMA
- CUA

5) Estimated Project Cost

- 153 million USD
  - Phase 1 [A-C-01]: 54 million USD
  - Phase 2 [A-C-09]: 43 million USD
  - Phase 3 [A-C-17]: 44 million USD

The estimated cost includes cost for necessary land fill and construction of tertiary and local roads which are necessary to formulate the commercial areas of the urban centre, public facilities and public parks.

6) Implementation Schedule

- 15 years (Construction of infrastructure and urban facilities)

7) Necessary Actions for Implementation / Critical Factor

- Approval of Land filling and Environmental impacts by land filling
- Securing land for public facilities
- Construction of basic infrastructure including tertiary and local roads
- Relocation of the oil tank and local residents

8) Related Plans and Projects

- [A-R-01] Project for Construction of 4-lane Road between Ankorondrano and Andranonahoatra (Northern Road Section between NR4 and NR1) (Part of the Middle Ring Road including a Bridge crossing the Ikopa River)
- [A-R-02] Project for Construction of 4-lane Road between Ampitatafika and Andranonahoatra (Southern Section between NR4 and NR1) (Part of the Middle Ring Road)
- [A-R-03] Project for Construction of Primary Arterial Road between NR4 and Hydrocarbon Road within Ankorondrano Primary Urban Centre
- [A-R-04] Project for Construction of a Flyover at Ankorondrano Intersection of Hydrocarbon Road and Marais Masay Road
- [A-G-01] Ankorondrano Lake and Waterfront Park Development Project
- [A-R-10] Project for Construction of Over Canal Road between Tanjombato and Ankorondrano
- [A-F-01] Urban Railway

9) Social and Environmental Impacts

There are environmental impact by land filling wetland

- There are social impact by relocation

(2) [A-C-02] Project for Promotion of Development of Ambodifasina Urban Sub-Centre

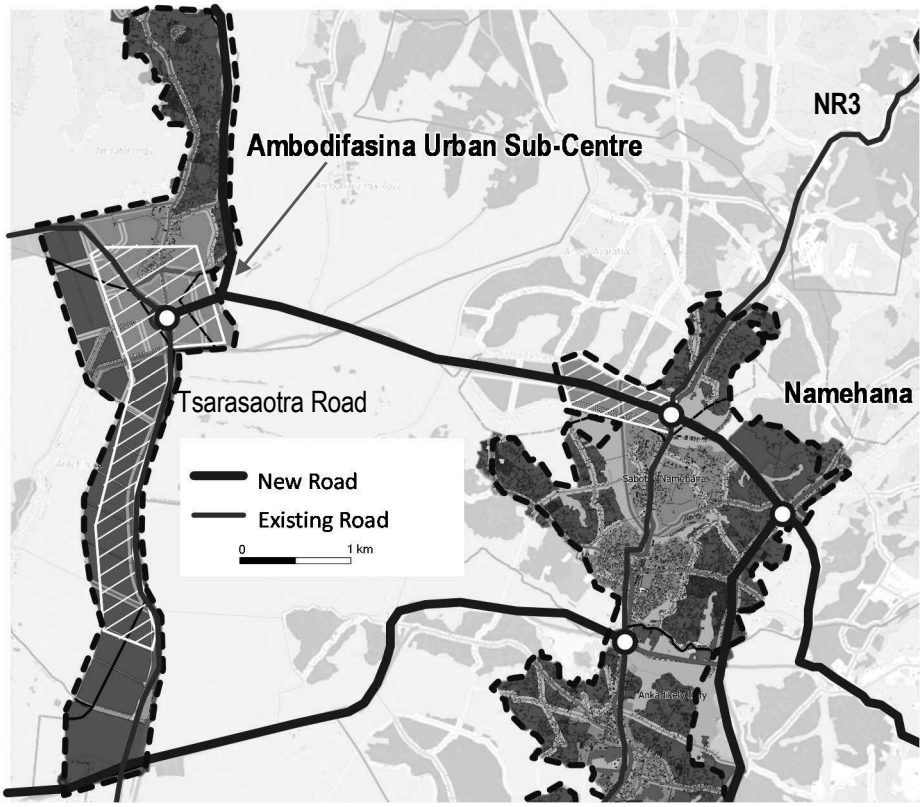
1) Objectives

- To distribute urban functions outside CUA for supporting urban residents and businesses and provide facilities to cater for regional needs
- To provide better living conditions to increase the capacity of housing units
- To promote transit-oriented development
- To promote private development

2) Project Description

- To formulate a PUDé in order to create the Urban Sub-centre and guide urban developments. The target area is the new developable lands
  - To identify tertiary roads to connect other urban centres and local roads to promote urban development.
  - To formulate detailed land use zoning and regulations.
- Land fillings in wetlands (140 ha) and securing lands for not only commercial and residential areas, as well as for public facilities by issuing “Arrete”.
- Construction of basic infrastructure such as roads, water supply, and electricity supply, and drainage
- Construction of a complex public facility based on transport functions in the idea of TOD.

- Station of Urban Rail and Bus Terminal (terminal for taxi be and taxi brousse)
- Market and commercial facilities
- Other public facilities (library, community centre, etc.)
- Construction of new district health centre



Source: JICA Study Team

Figure 6.6.2 Location of Ambodifasina Urban Sub-Centre

3) Expected Benefits

By constructing the Ambodifasina Urban Sub-centre, new commercial, business, residential, and public facilities are constructed outside of CUA. It will mitigate congestion from CUA. It contributes to provide places for economic activities and regional services for residents living in the northern part of Antananarivo Agglomeration. As the result, the development of the urban sub-centre will improve the quality of life.

4) Executing Agency and Related Institutes

- MAHTP, Ministry of National Education and Technical and Vocational Education, and JIRAMA
- Ambatolampy Rural Commune, Antehiroka Rural Commune, Sabotsy Namehana Rural Commune, and Ambohimanga Rural Commune

5) Estimated Project Cost

- 86 million USD

Note: The estimated cost include; cost for land fill and construction of Tertiary and Local roads which need to formulate the commercial areas of the Centre, the public facility, and public parks.

6) Implementation Schedule

- 12 month (Formulation of PUDé)
- 5 years (Construction of infrastructure and urban facilities)

7) Necessary Actions for Implementation / Critical Factor

- Approval of Land filling and Environmental impacts by land filling
- Securing land for public facilities
- Construction of basic infrastructure including tertiary and local roads in terms of budget

8) Construction of Related Plans and Projects

- [A-R-05] Project for Construction of Ambodifasina – Namehana Section of the Outer Ring Road between Tsarasaotra Road and NR3
- [A-R-13] Project for Construction of Extension of Tsarasaotra Road between Ambodifasina Urban Sub-Centre and Ambatolampy Tsimahafotsy Suburban Centre
- [A-H-01] Project for Development of Social Housing Area in Ivato East
- Urban Railway
- New District Health Centre Development Project (Phase II and Phase III)

9) Social and Environmental Impacts

There are environmental impact by land filling wetland.

(3) [A-C-03] [A-C-10] Project for Promotion of Development of Namehana Urban Sub-Centre

1) Objectives

- To distribute urban functions outside CUA for supporting urban residents and businesses and provide facilities to cater for regional needs
- To provide better living conditions to increase the capacity of housing units
- To promote urban development including TOD
- To promote private development

2) Project Description

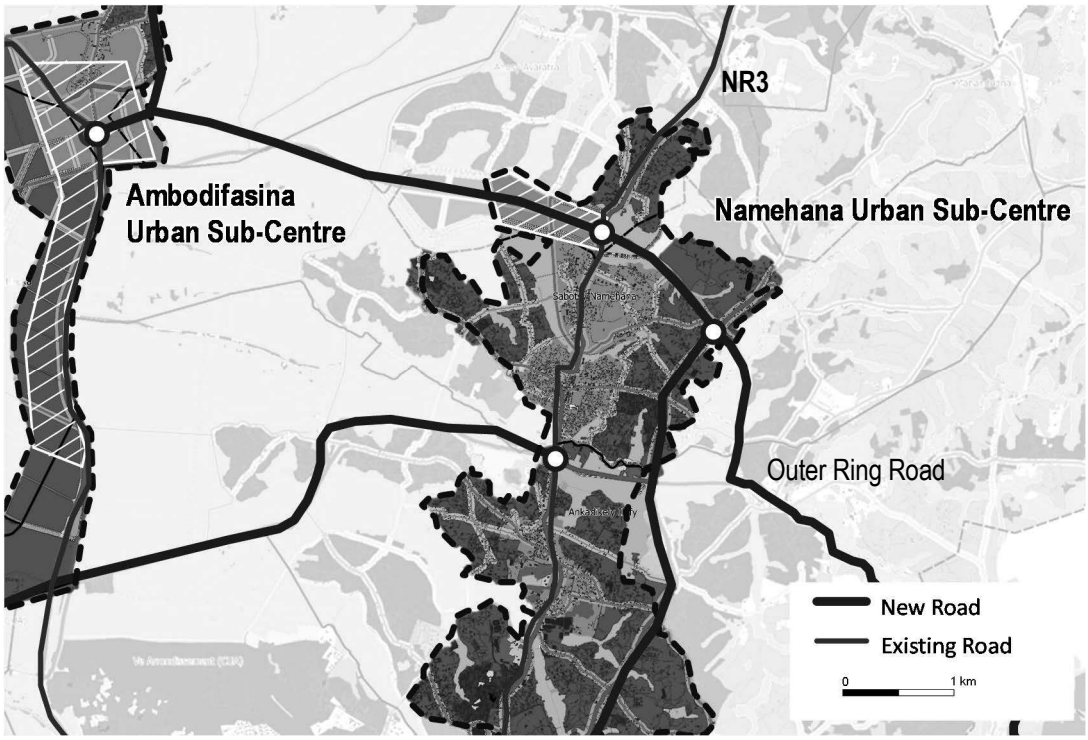
- To formulate a PUDé in order to create the Urban Sub-centre and guide urban developments. The target areas are the existing urbanized areas and the new developable lands by land filling.
  - To identify tertiary roads to connect other urban centres and local roads to promote urban development.
  - To formulate detailed land use zoning and regulations.

<u>New Development Area</u>

- Land fillings in wetlands (45 ha for Phase 1 and 45 ha for Phase 2) and securing lands for not only commercial and residential areas, as well as for public facilities by issuing “Arrete”.
- Construction of basic infrastructure such as roads, water supply, and electricity supply, and drainage
- Construction of urban sub-center education hub development

<u>Existing Urbanised Area</u>

- Redevelopment of the market and the terminal of taxi be and taxi brousse for a complex public facility
  - Bus terminal (terminal for taxi be and taxi brousse)
  - Market and commercial facilities
  - Regional government offices
  - Other public function (library, community centre, etc.)
- Expansion of existing district hospital in Namehana Sub-Centers



Source: JICA Study Team

Figure 6.6.3 Location of Namehana Urban Sub-Centre

3) Expected Benefits

By constructing the Namehana Urban Sub-centre, new commercial, business, residential, and public facilities are constructed outside of CUA. It will mitigate congestion from CUA. It contributes to provide places for economic activities and regional services for residents living in the north-eastern part of Antananarivo Agglomeration. As the result, the development of the urban sub-centre will improve the quality of life.

4) Executing Agency and Related Institutes

- MAHTP, Ministry of Public Health, Ministry of National Education and Technical and Vocational Education, and JIRAMA
- Sabotsy Namehana Rural Commune

5) Estimated Project Cost

- 70 million USD
  - Phase 1 [A-C-03]: 35 million USD
  - Phase 2 [A-C-10]: 35 million USD

The estimated cost includes cost for land fill and construction of tertiary and local roads needed for formulating the commercial areas of the urban centre, the redevelopment of the existing market, and public parks.

6) Implementation Schedule

- 12 month (Formulation of PUDé)
- 10 years (Construction of infrastructure and urban facilities)

7) Necessary Actions for Implementation / Critical Factor

- Approval of Land filling and Environmental impacts by land filling
- Securing land for public facilities

- Construction of basic infrastructure including tertiary and local roads in terms of budget
- Relocation for redevelopment of the existing urbanised area

8) Related Plans and Projects

- [A-R-05] Project for Construction of Ambodifasina – Namehana Section of the Outer Ring Road between Tsarasaotra Road and NR3.
- [A-R-06] Project for Construction of Ambohimalaza - Namehana Section of the Outer Ring Road between NR3 and NR2
- [A-R-11] Project for Construction of Bypass Road of NR3 (between the Outer Ring Road and the Middle Ring Road)
- [A-R-14] Project for Construction of East-West Primary Arterial Road between NR3 and Bypass Road of NR4
- [A-H-04] Project of New Town Development for Housing Provision in Suburban Areas Phase 2 (Namehana New Town)
- Expansion of Existing District Hospitals in Namehana and Tanjombato Sub-Centers and (Phase II)
- Urban Sub-Center Education Hub Development Project (Phase II)

9) Social and Environmental Impacts

There are environmental impact by land filling wetland and social impact by relocation.

(4) [A-C-04] Project for Promotion of Development of Amoronakona Urban Sub-Centre

1) Objectives

- To distribute urban functions outside CUA for supporting urban residents, businesses, and industries, and provide facilities to cater for regional needs.
- To promote urban development including TOD to provide better access to the primary, secondary and other urban centres
- To provide better living conditions to increase the capacity of housing units
- To promote private development

2) Project Description

- Re-zoning of PUDé Bypass in order to accommodate industrial activities and create the Urban Sub-centre, guide urban developments
- Land fillings in wetlands (50 ha) and securing lands for not only commercial and residential areas, as well as industrial areas, by issuing “Arrete”.
- Construction of basic infrastructure such as roads, water supply, and electricity supply, and drainage
- Construction of the Multi-modal Cargo Terminal
- Securing land and implementation of station area development (TOD)
  - Station for urban rail and bus terminal (terminal for taxi be and taxi brousse)
  - Commercial facilities
  - Other public function (library, community centre, clinic, etc.)

3) Expected Benefits

By constructing the Amoronakona Urban Sub-centre, new commercial, business, residential, and public facilities are constructed outside of CUA. It will mitigate congestion from CUA. It contributes to provide places for economic activities and regional services for residents living in

the south-eastern part of Antananarivo Agglomeration. As the result, the development of the urban sub-centre will improve the quality of life.

4) Executing Agency and Related Institutes

- MAHTP, Ministry of Industry, Trade and Handicrafts , JIRAMA
- Ambohimangakely Rural Commune,

5) Estimated Project Cost

- 38 million USD

The estimated cost includes cost for land fill and construction of tertiary and local roads needed for formulating the commercial areas of the urban centre, the development of TOD, and public parks.

6) Implementation Schedule

- 6 month (Revision of PUDé Bypass)
- 5 years (Construction of infrastructure and urban facilities)

7) Necessary Actions for Implementation / Critical Factor

- Approval of Land filling and Environmental impacts by land filling
- Securing land for public facilities
- Construction of basic infrastructure including tertiary and local roads in terms of budget

8) Related Plans and Projects

- [A-I-01] Project for Rezoning to Mixed Development Areas which allow Clean Light Industries along the Tokyo Boulevard
- [A-F-01] Project for Development of Multi-Modal Cargo Transport Terminal in Amoronakona for Antananarivo Agglomeration
- [A-R-21] Project for Construction of Primary Arterial Road between Ambohimanambola – Amoronakona
- Urban Rail

9) Social and Environmental Impacts

There are environmental impact by land filling wetland.

(5) [A-C-05] [A-C-11] Project for Promotion of Development of Tanjombato Urban Sub-Centre

1) Objectives

- To distribute urban functions outside CUA for supporting urban residents and businesses and provide facilities to cater for regional needs
- To promote urban development including TOD
- To provide better living conditions to increase the capacity of housing units
- To promote private development

2) Project Description

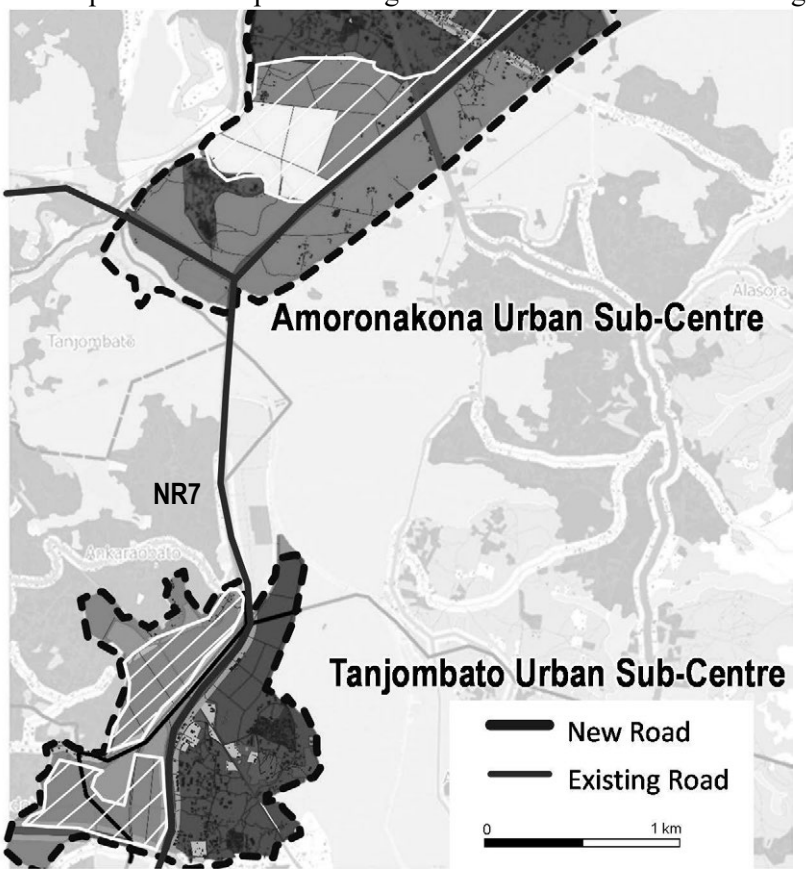
- Rezoning of the PUDé Bypass and formulation of new PUDé to cover the existing urbanised areas for Tanjombato Sub-urban Centre
  - ➢ To identify tertiary roads to connect other urban centres and local roads to promote urban development.
  - ➢ To formulate detailed land use zoning and regulations.
  - ➢ To convert the existing industrial areas to business/commercial areas.

New Development Area

- Land fillings in wetlands (40 ha for Phase 1 and 40 ha for Phase 2) and securing lands for not only commercial and residential areas, as well as for public facilities by issuing "Arrete".
- Construction of basic infrastructure such as roads, water supply, and electricity supply, and drainage
- Securing land and implementation of station area development (TOD)
  - Station for urban rail and bus terminal (terminal for taxi be and taxi brousse)
  - Commercial facilities
  - Other public function (library, community centre, clinic, etc.)
- Construction of urban sub-centre education hub

Existing Urbanised Area

- Construction of tertiary or local road for connection to the new development area.
- Promotion of private development along the arterial road and on the exiting industrial areas.



Source: JICA Study Team

Figure 6.6.4 Location of Tanjombato Urban Sub-Centre

3) Expected Benefits

By constructing the Tanjombato Urban Sub-centre, new commercial, business, residential, and public facilities are constructed outside of CUA. It will mitigate congestion from CUA. It contributes to provide places for economic activities and regional services for residents living in the southern part of Antananarivo Agglomeration. As the result, the development of the urban sub-centre will improve the quality of life.

4) Executing Agency and Related Institutes

- MAHTP, Ministry of Industry, Ministry of Public Health, and JIRAMA
- Tanjombato Rural Commune, Ankaraobato Rural Commune, Andoharanofotsy Rural Commune, Ambohijanaka Rural Commune

5) Estimated Project Cost

- 60 million USD
  - Phase 1 [A-C-05]: 30 million USD
  - Phase 2 [A-C-11]: 30 million USD

The estimated cost includes cost for land fill and construction of tertiary and local roads needed for formulating the commercial areas of the urban centre, the development of TOD, and public parks.

6) Implementation Schedule

- 12 month (Formulation of PUDé)
- 10 years (Construction of infrastructure and urban facilities)

7) Necessary Actions for Implementation / Critical Factor

- Approval of Land filling and Environmental impacts by land filling
- Securing land for public facilities
- Construction of basic infrastructure including tertiary and local roads in terms of budget
- Relocation for redevelopment of the existing urbanised area

8) Related Plans and Projects

- [A-R-10] Project for Construction of Over Canal Road between Tanjombato and Ankorondrano
- Urban Rail
- Expansion of Existing District Hospitals in Tanjombato Sub-Centers and (Phase II)

9) Social and Environmental Impacts

There are environmental impact by land filling wetland and social impact by relocation.

(6) [A-C-06] Project for Promotion of Development of Ampitatafika Urban Sub-Centre

1) Objectives

- To distribute urban functions outside CUA for supporting urban residents and businesses and to provide facilities to cater for regional needs
- To provide better living conditions to increase the capacity of housing units
- To promote private development

2) Project Description

- To formulate a PUDé in order to create the Urban Sub-centre and guide urban developments. The target areas are the existing urbanized areas and the new developable lands by land filling.
  - To identify tertiary roads to connect other urban centres and local roads to promote urban development.
  - To formulate detailed land use zoning and regulations.

<u>New Development Area</u>

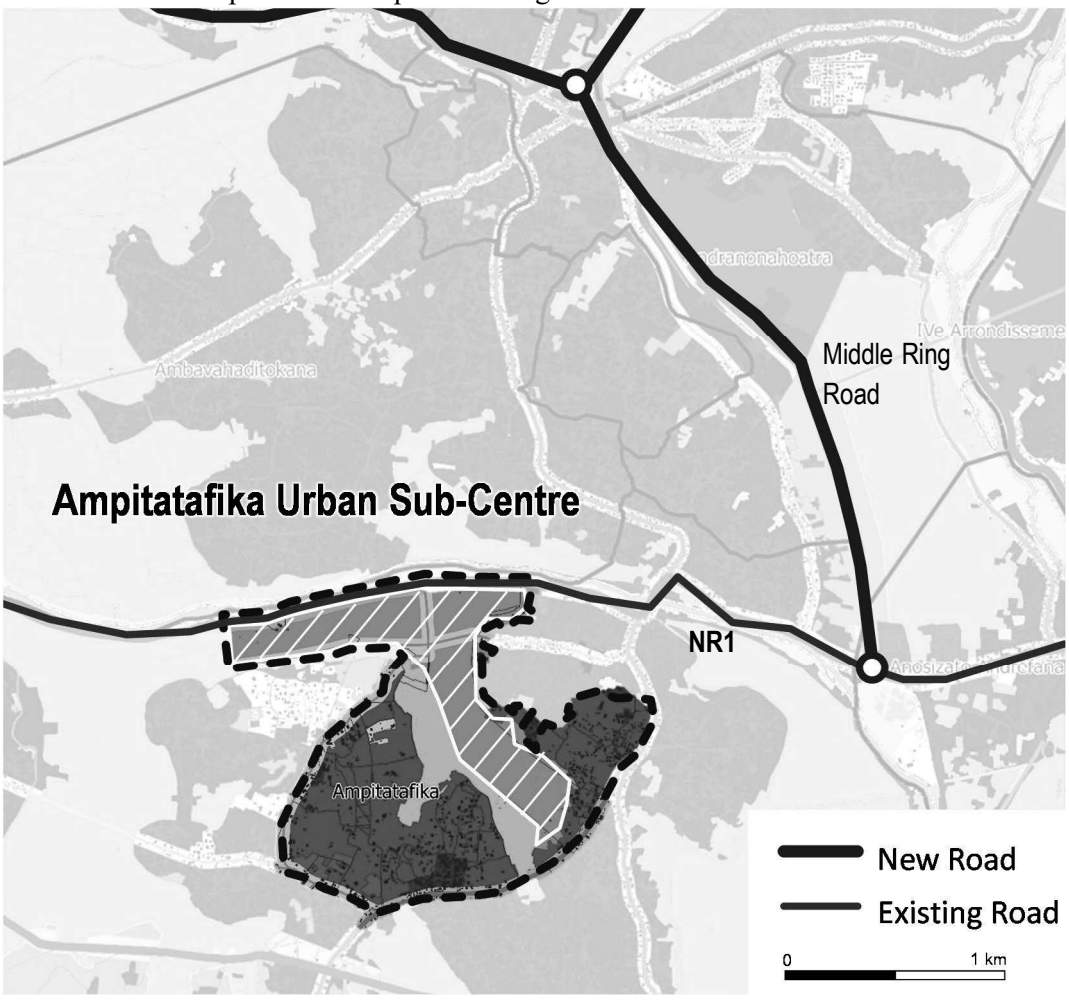
- Land fillings in wetlands (80 ha) and securing lands for not only commercial and residential

areas, as well as for public facilities by issuing "Arrete".

- Construction of basic infrastructure such as roads, water supply, and electricity supply, and drainage
- Construction of a complex public facility based on transport functions in the idea of TOD.
  - Bus terminal (terminal for taxi be and taxi brousse)
  - Market and commercial facilities
  - Other public facilities (library, community centre, clinic, etc.)

Existing Urbanised Area

- Promotion of private developments along the arterial roads



Source: JICA Study Team

Figure 6.6.5 Location of Ampitatafika Urban Sub-Centre

3) Expected Benefits

By constructing the Ampitatafika Urban Sub-centre, new commercial, business, residential, and public facilities are constructed outside of CUA. It will mitigate congestion from CUA. It contributes to provide places for economic activities and regional services for residents living in the western part of Antananarivo Agglomeration. As the result, the development of the urban sub-centre will improve the quality of life.

4) Executing Agency and Related Institutes

- MAHTP, JIRAMA
- Ampitatafika Rural Commune, Anosizato Andrefana Rural Commune, Andranonahoatra

Rural Commune.

5) Estimated Project Cost

- 57 million USD

The estimated cost includes cost for land fill and construction of tertiary and local roads needed for formulating the commercial areas of the urban centre, public facilities, and public parks.

6) Implementation Schedule

- 12 month (Formulation of PUDé)
- 5 years (Construction of infrastructure and urban facilities)

7) Necessary Actions for Implementation / Critical Factor

- Approval of land filling and Environmental impacts by land filling
- Securing land for public facilities
- Construction of basic infrastructure including tertiary and local roads in terms of budget
- Relocation for redevelopment of the existing urbanised area

8) Related Plans and Projects

- [A-R-02] Project for Construction of 4-lane Road between Ampitatafika and Andranonahoatra (Southern Section between NR4 and NR1) (Part of the Middle Ring Road)

9) Social and Environmental Impacts

There are environmental impact by land filling wetland and social impact by relocation.

(7) [A-C-07] Project for Promotion of Development of Tana Masoandro Urban Sub-Centre

1) Objectives

- To distribute urban functions outside CUA for supporting urban resident, businesses, administrative function and provide facilities to cater for regional needs
- To provide housing unit to accommodate increasing population
- To create new jobs to support economic growth of Madagascar
- To provide spaces for international convention and exhibition
- To promote private development

2) Project Description

- To formulate a PUDé in order to create the Urban Sub-centre and guide urban developments.
  - To identify tertiary roads to connect other urban centres and local roads to promote urban development.
  - To formulate detailed land use zoning and regulations.
- Land fillings in wetlands (280 ha) and securing lands for not only commercial and residential areas, as well as for public facilities by issuing “Arrete”.
- Construction of basic infrastructure such as roads, water supply, and electricity supply, and drainage
- Construction of urban sub-centre education hub
- Promotion of private developments

3) Expected Benefits

By constructing the Tana-Masoandro Urban Sub-centre, new commercial, business, residential, and public facilities are constructed outside of CUA. It will mitigate congestion from CUA. It contributes to provide places for economic activities and regional services for residents living in

the south-eastern part of Antananarivo Agglomeration. As the result, the development of the urban sub-centre will improve the quality of life. At the same time, Tana-Masoandro Urban Sub-centre will be a part of the national capital as it is intended to construct central government offices.

4) Agency and Related Institutes

- MAHTP, Ministry of Industry, Trade and Handicrafts, Ministry of Public Health, Ministry of National Education and Technical and Vocational Education, JIRAMA
- Ambohitrimanjaka Rural Commune, Ankadimanga Rural Commune, Fiombonana Rural Commune

5) Estimated Project Cost

- 199 million USD

The estimated cost includes cost for land fill and construction of tertiary and local roads needed for formulating the urban centre.

6) Implementation Schedule

- 12 month (Formulation of PUDé)
- 5 years (Construction of infrastructure and urban facilities)

7) Necessary Actions for Implementation / Critical Factor

- Approval of land filling and environmental impacts by land filling
- Securing land for public facilities
- Construction of basic infrastructure including tertiary and local roads in terms of budget
- Relocation for redevelopment of the existing urbanised area

8) Related Plans and Projects

- [A-R-08] Project for Construction of Primary Arterial Road between Tana-Masoandro and Andranonahoatra
- [A-R-16] Project for Construction of Primary Arterial Road between Bypass Road of NR4 and Ampangabe Suburban Centre (through Tana-Masoandro Urban Sub-Centre)

9) Social and Environmental Impacts

There are environmental impact by land filling wetland.

(8) [A-C-08] Project for Promotion of Development of Ambohidratrimo Urban Sub-Centre

1) Objectives

- To distribute urban functions outside CUA for supporting urban residents and businesses and to provide facilities to cater for regional needs
- To provide better living conditions to increase the capacity of housing units
- To promote private development

2) Project Description

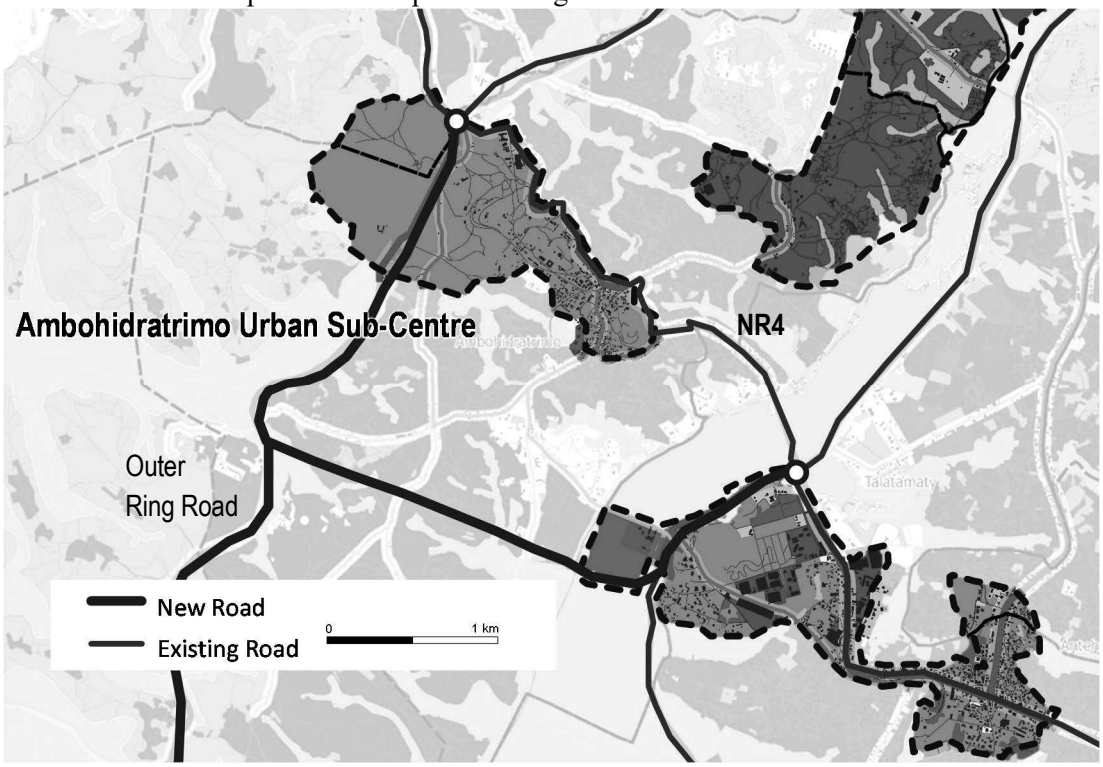
- To formulate a PUDé in order to create the Urban Sub-centre and guide urban developments. The target areas are the existing urbanized areas and the new developable lands.
- To identify tertiary roads to connect other urban centres and local roads to promote urban development.
  - ➢ To formulate detailed land use zoning and regulations.

New Development Area

- Land fillings in wetlands (5 ha) and securing lands for not only commercial and residential areas, as well as for public facilities by issuing "Arrete".
- Construction of basic infrastructure such as roads, water supply, and electricity supply, and drainage
- Construction of a complex public facility based on transport functions in the idea of TOD.
  - Bus terminal (terminal for taxi be and taxi brousse)
  - Market and commercial facilities
  - Other public facilities (library, community center, clinic, etc.)

Existing Urbanised Area

- Redevelopment of the existing market with commercial facilities
- Redevelopment of regional and local government offices.
- Preservation of the old town and historical monument.
- Promotion of private developments along the arterial roads



Source: JICA Study Team

Figure 6.6.6 Location of Ambohidratrimo Urban Sub-Centre

3) Expected Benefits

By constructing the Ambohidratrimo Urban Sub-centre, new commercial, business, residential, and public facilities are constructed outside of CUA. It will mitigate congestion from CUA. It contributes to provide places for economic activities and regional services for residents living in the north-western part of Antananarivo Agglomeration. As the result, the development of the urban sub-centre will improve the quality of life.

4) Executing Agency and Related Institutes

- MAHTP, JIRAMA
- Ambohidratrimo Rural Commune

5) Estimated Project Cost

- 16 million USD

The estimated cost includes cost for land fill and construction of tertiary and local roads needed for formulating the commercial areas of the urban centre, public facilities, and public parks. Only minimum landfills are counted as it has been already undertaking.

6) Implementation Schedule

- 12 month (Formulation of PUDé)
- 5 years (Construction of infrastructure and urban facilities)

7) Necessary Actions for Implementation / Critical Factor

- Approval of land filling and environmental impacts by land filling
- Securing land for public facilities
- Construction of basic infrastructure including tertiary and local roads in terms of budget
- Relocation for redevelopment of the existing urbanised area

8) Related Plans and Projects

- [A-R-07] Project for Construction of Bypass Road of Ambohidratrimo Urban Sub-Centre
- [A-R-19] Project for Construction of Ambohidratrimo – Ampangabe Section of the Outer Ring Road (Western Part)

9) Social and Environmental Impacts

There are social impact by relocation.

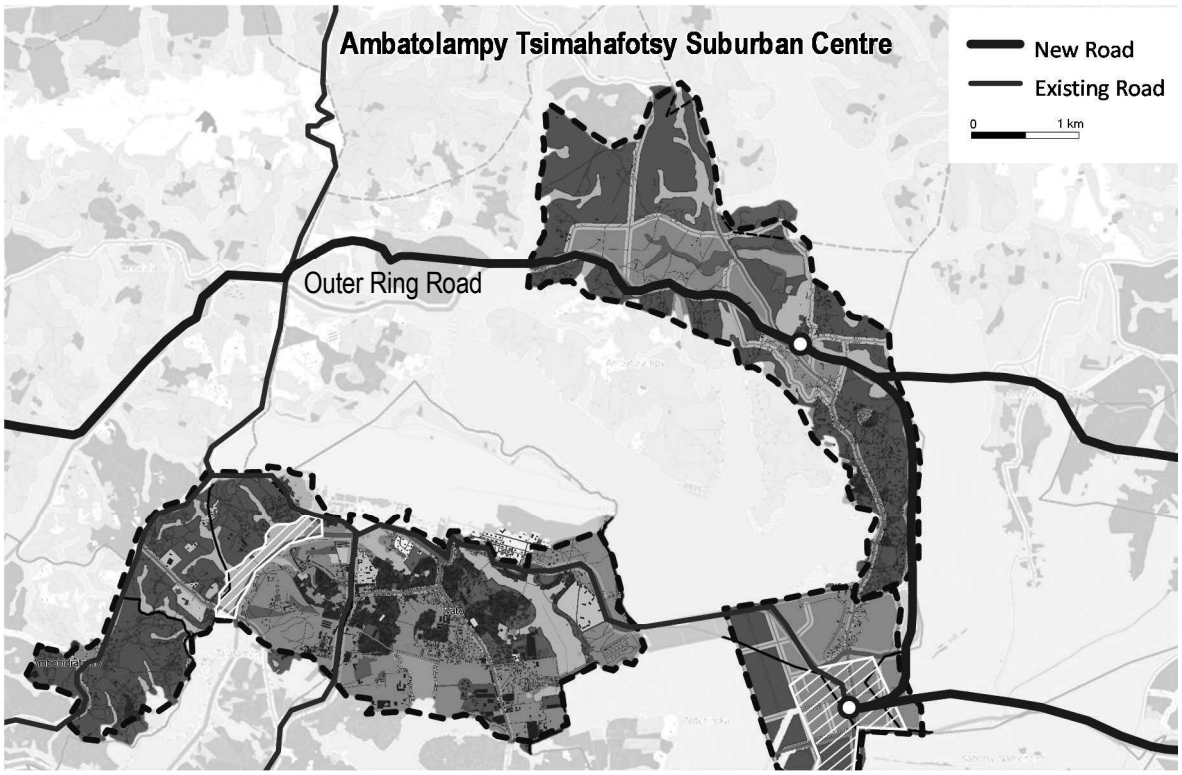
(9) [A-C-12] Project for Promotion of Development of Ambatolampy Tsimahafotsy Suburban Centre

1) Objectives

- To distribute urban functions outside CUA for supporting suburban residents, businesses, and industries.
- To provide better living conditions to increase the capacity of housing units.

2) Project Description

- To formulate a PUDé in order to create the suburban centre and guide developments.
  - To identify tertiary roads to connect other urban centres and local roads to promote development.
  - To formulate detailed land use zoning and regulations.
- Construction of basic infrastructure such as roads, water supply, and electricity supply, and drainage
- Construction of a complex public facility.
  - Bus terminal (terminal for taxi be)
  - Market and commercial facilities
  - Other public facilities for community (sports facilities, clinic, etc.)



Source: JICA Study Team

Figure 6.6.7 Location of Ambatolampy Tsimahafotsy Suburban Centre

3) Expected Benefits

By constructing the Ambatolampy Tsimahafotsy Suburban Centre, new commercial, business, residential, and industrial facilities are expected to be constructed. It contributes to provide places for economic activities and regional services for residents living in the northern suburbs of Antananarivo Agglomeration.

4) Executing Agency and Related Institutes

- MAHTP, MICA, JIRAMA
- Ambatolampy Rural Commune
- Private Sectors

5) Estimated Project Cost

- 12 million USD

The estimated cost includes cost for necessary land fill and construction of tertiary and local roads needed for formulating the commercial areas of the urban centre, public facilities, and public parks.

6) Implementation Schedule

- 12 month (Formulation of PUDé)
- 5 years (Construction of infrastructure and urban facilities)

7) Necessary Actions for Implementation / Critical Factor

- Construction of basic infrastructure including tertiary and local roads in terms of budget
- Land preparation as some areas are on hills.
- Environmental concerns as the area has still many undeveloped lands which has natural environment and intended to create industrial area nearby.

8) Related Plans and Projects

- [A-R12] Project for Construction of Anosiala - Ambatolampy Tsimahafotsy Section of the Outer Ring Road (Northern Part)
- [A-R-13] Project for Construction of Extension of Tsarasaotra Road between Ambodifasina Urban Sub-Centre and Ambatolampy Tsimahafotsy Suburban Centre
- [A-R-23] Project for Construction of Ambatolampy Tsimahafotsy-Anosy Avaratra Section of the Outer Ring Road (between Tsarasaotra Road And NR3)
- [A-I-04] Project for Development of Industrial and Logistics Area along the Northern Part of the Outer Ring Road (between Anosiala and Ambatolampy Tsimahafotsy)
- [A-I-06] Project for Developing Industrial and Logistics Areas along Ambatolampy Tsimahafotsy - Anosy Avaratra Section of the Outer Ring Road by Providing Access Roads, Water and Electricity

9) Social and Environmental Impacts

There are possible environmental impacts.

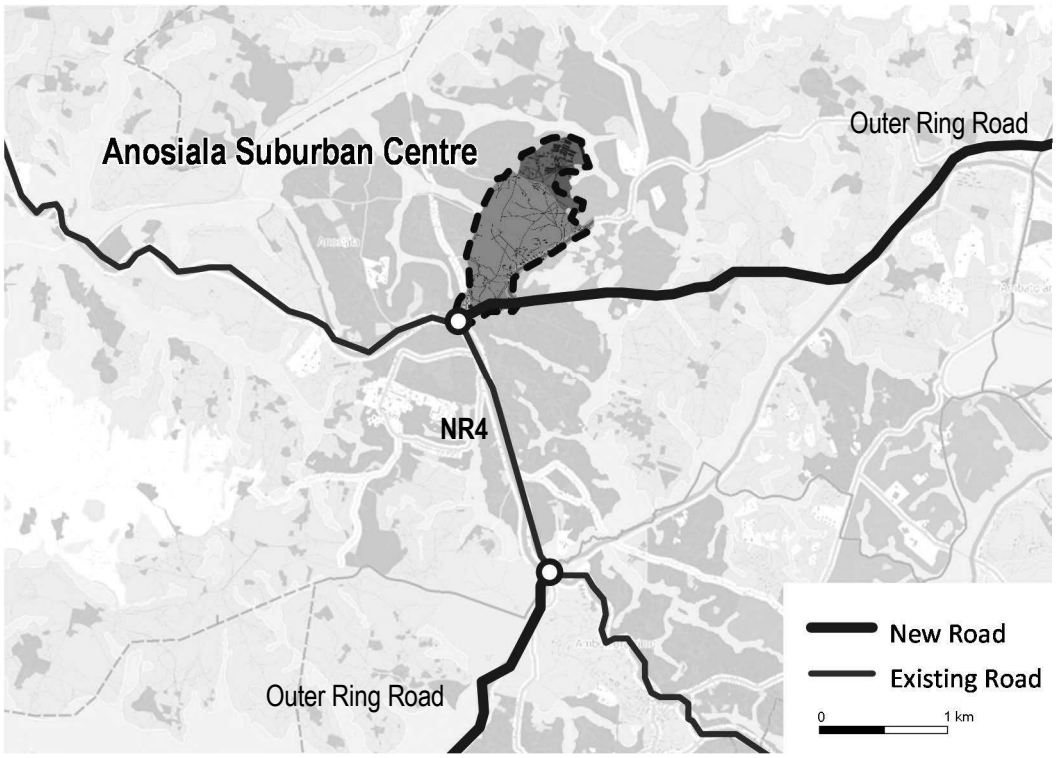
(10) [A-C-13] Project for Promotion of Development of Anosiala Suburban Centre

1) Objectives

- To distribute urban functions outside CUA for supporting suburban residents, businesses, and industries.
- To provide better living conditions to increase the capacity of housing units

2) Project Description

- To formulate a PUDé in order to create the suburban centre and guide developments.
  - To identify tertiary roads to connect other urban centres and local roads to promote development.
  - To formulate detailed land use zoning and regulations.
- Land fillings in wetlands (5 ha) and securing lands for not only commercial and residential areas, as well as for public facilities by issuing “Arrete”.
- Construction of basic infrastructure such as roads, water supply, and electricity supply, and drainage
- Construction of a complex public facility.
  - Bus terminal (terminal for taxi be and taxi brousse)
  - Market and commercial facilities
  - Other public facilities for community (sports facilities, clinic, etc.)



Source: JICA Study Team

Figure 6.6.8 Location of Anosiala Suburban Centre

3) Expected Benefits

By constructing the Anosiala Suburban Centre, new commercial, business, residential, and industrial facilities are expected to be constructed. It contributes to provide places for economic activities and regional services for residents living in the north-western suburbs of Antananarivo Agglomeration.

4) Executing Agency and Related Institutes

- MAHTP, MICA, JIRAMA
- Anosiala Rural Commune
- Private Sectors

5) Estimated Project Cost

- 16 million USD

The estimated cost includes cost for necessary land fill and construction of tertiary and local roads needed for formulating the commercial areas of the urban centre, public facilities, and public parks.

6) Implementation Schedule

- 12 month (Formulation of PUDé)
- 5 years (Construction of infrastructure and urban facilities)

7) Necessary Actions for Implementation / Critical Factor

- Construction of basic infrastructure including tertiary and local roads in terms of budget
- Land preparation as some areas are on hills.
- Environmental concerns as the area has still many undeveloped lands which has natural environment and intended to create industrial area nearby.

8) Related Plans and Projects

- [A-R12] Project for Construction of Anosiala - Ambatolampy Tsimahafotsy Section of the Outer Ring Road (Northern Part)
- [A-I-04] Project for Development of Industrial and Logistics Area along the Northern Part of the Outer Ring Road (between Anosiala and Ambatolampy Tsimahafotsy)

9) Social and Environmental Impacts

There are possible environmental impacts.

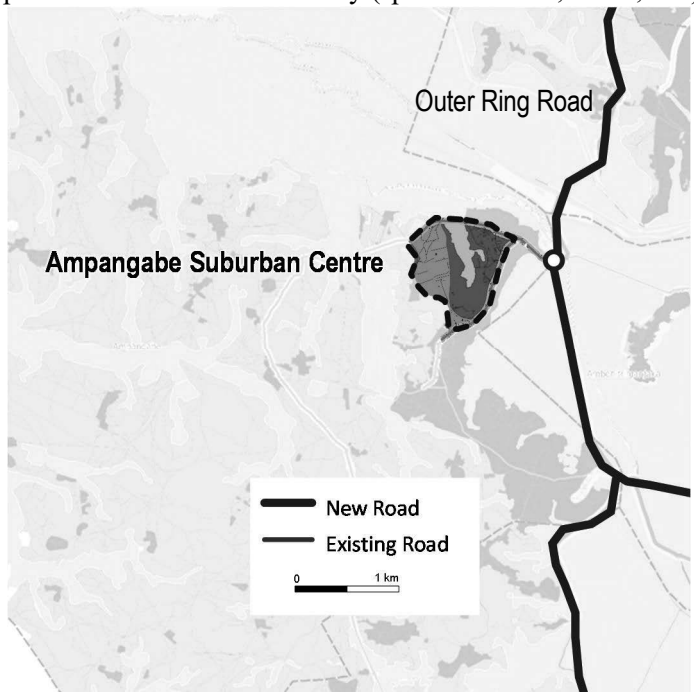
(11) [A-C-14] Project for Promotion of Development of Ampangabe Suburban Centre

1) Objectives

- To distribute urban functions outside CUA for supporting suburban residents and businesses.
- To provide better living conditions to increase the capacity of housing units

2) Project Description

- To formulate a PUDé in order to create the suburban centre and guide developments.
  - To identify tertiary roads to connect other urban centres and local roads to promote development.
  - To formulate detailed land use zoning and regulations.
- Land fillings in wetlands (5 ha) and securing lands for not only commercial and residential areas, as well as for public facilities by issuing "Arrete".
- Construction of basic infrastructure such as roads, water supply, and electricity supply, and drainage
- Construction of a complex public facility.
  - Bus terminal (terminal for taxi be and BRT)
  - Market and commercial facilities
  - Other public facilities for community (sports facilities, clinic, etc.)



Source: JICA Study Team

Figure 6.6.9 Location of Ampangabe Suburban Centre

3) Expected Benefits

By constructing the Ampangabe Suburban Centre, new commercial, business, and residential functions are expected to be constructed. It contributes to provide places for economic activities and regional services for residents living in the western suburbs of Antananarivo Agglomeration.

4) Executing Agency and Related Institutes

- MAHTP, MICA, JIRAMA
- Ampangabe Rural Commune
- Private Sectors

5) Estimated Project Cost

- 13 million USD

The estimated cost includes cost for necessary land fill and construction of tertiary and local roads needed for formulating the commercial areas of the urban centre, public facilities, and public parks.

6) Implementation Schedule

- 12 month (Formulation of PUDé)
- 5 years (Construction of infrastructure and urban facilities)

7) Necessary Actions for Implementation / Critical Factor

- Construction of basic infrastructure including tertiary and local roads in terms of budget

8) Related Plans and Projects

- [A-R-16] Project for Construction of Primary Arterial Road between Bypass Road of NR4 and Ampangabe Suburban Centre (through Tana-Masoandro Urban Sub-Centre)
- [A-R-17] Project for Construction of Alakamisy Fenoarivo - Ampangabe Section of the Outer Ring Road (Western Part)
- [A-H-5] Project of Development of New Town Development for Housing Provision in Suburban Areas Phase 3 (Ampangabe New Town)

9) Social and Environmental Impacts

Few social and environmental impacts are expected.

(12) [A-C-15] Project for Promotion of Development of Alakamisy Fenoarivo Suburban Centre

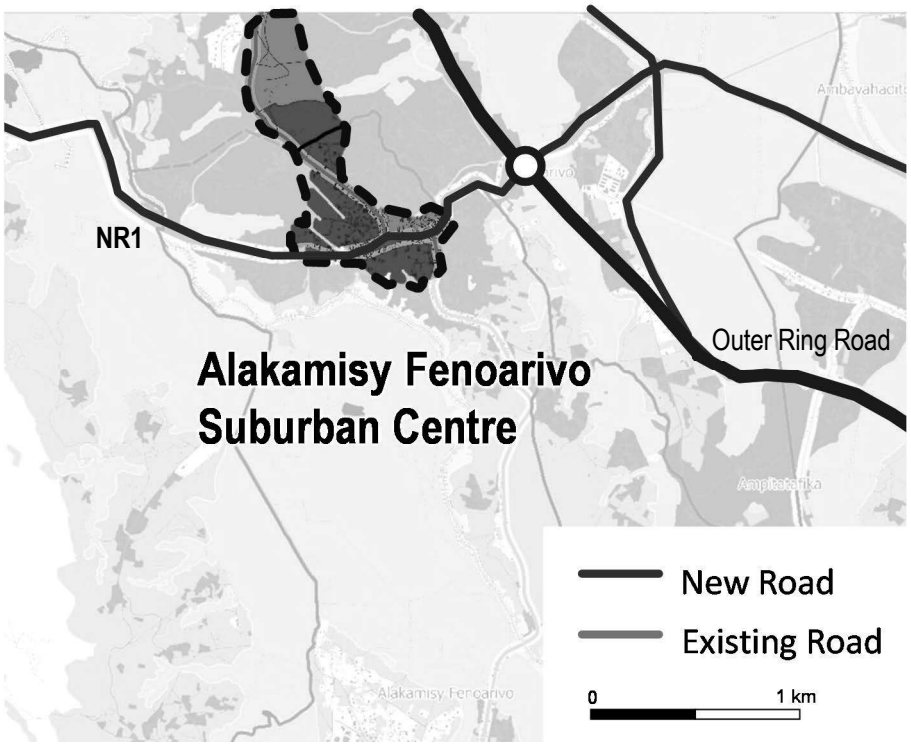
1) Objectives

- To distribute urban functions outside CUA for supporting suburban residents and businesses.
- To provide better living conditions to increase the capacity of housing units

2) Project Description

- To formulate a PUDé in order to create the suburban centre and guide developments for both the existing urbanised area and the new development areas.
  - To identify tertiary roads to connect other urban centres and local roads to promote development.
  - To formulate detailed land use zoning and regulations.
- Land fillings in wetlands (5 ha) and securing lands for not only commercial and residential areas, as well as for public facilities by issuing “Arrete”.
- Construction of basic infrastructure such as roads, water supply, and electricity supply, and drainage
- Redevelopment of the existing market in Alakamisy Fenoarivo for a complex public facility.

- Bus terminal (terminal for taxi be and BRT)
- Market and commercial facilities
- Other public facilities for community (sports facilities, clinic, etc.)



Source: JICA Study Team

Figure 6.6.10 Location of Alakamisy Fenoarivo Suburban Centre

3) Expected Benefits

By constructing the Alakamisy Fenoarivo Suburban Centre, new commercial, business, and residential functions are expected to be constructed. It contributes to provide places for economic activities and regional services for residents living in the western suburbs of Antananarivo Agglomeration.

4) Executing Agency and Related Institutes

- MAHTP, MICA, JIRAMA
- Alakamisy Fenoarivo Rural Commune, and Fenoarivo Rural Commune
- Private Sectors

5) Estimated Project Cost

- 16 million USD

The estimated cost includes cost for necessary land fill and construction of tertiary and local roads needed for formulating the commercial areas of the urban centre, public facilities, and public parks.

6) Implementation Schedule

- 12 month (Formulation of PUDé)
- 5 years (Construction of infrastructure and urban facilities)

7) Necessary Actions for Implementation / Critical Factor

- Construction of basic infrastructure including tertiary and local roads in terms of budget

8) Related Plans and Projects

- [A-H-02] Project for New Town Development for Housing Provision in Suburban Areas Phase 1 (Fenoarivo South)
- [A-R-17] Project for Construction of Alakamisy Fenoarivo - Ampangabe Section of the Outer Ring Road (Western Part)
- [A-R-25] Project for Construction of Alakamisy Fenoarivo-Andoharanofotsy Section of the Outer Ring Road (between NR1 and NR7)

9) Social and Environmental Impacts

Few social and environmental impacts are expected.

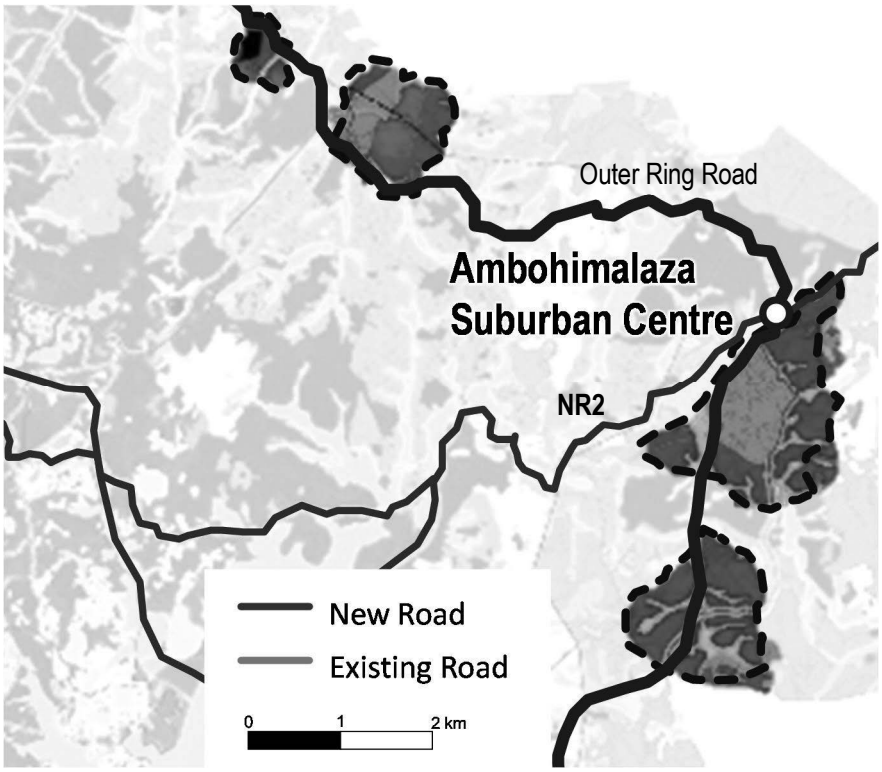
(13) [A-C-16] Project for Promotion of Development of Ambohimalaza Suburban Centre

1) Objectives

- To distribute urban functions outside CUA for supporting suburban residents, businesses, and industries.
- To provide better living conditions to increase the capacity of housing units.

2) Project Description

- To formulate a PUDé in order to create the suburban centre and guide developments.
  - To identify tertiary roads to connect other urban centres and local roads to promote development.
  - To formulate detailed land use zoning and regulations.
- Land fillings in wetlands (5 ha) and securing lands for not only commercial and residential areas, as well as for public facilities by issuing “Arrete”.
- Construction of basic infrastructure such as roads, water supply, and electricity supply, and drainage
- Construction of a complex public facility.
  - Bus terminal (terminal for taxi be)
  - Market and commercial facilities
  - Other public facilities for community (sports facilities, clinic, etc.)



Source: JICA Study Team

Figure 6.6.11 Location of Ambohimalaza Suburban Centre

3) Expected Benefits

By constructing the Ambohimalaza Suburban Centre, new commercial, business, residential, and industrial facilities are expected to be constructed. It contributes to provide places for economic activities and regional services for residents living in the northern suburbs of Antananarivo Agglomeration.

4) Executing Agency and Related Institutes

- MAHTP, MICA, JIRAMA
- Ambohimangakely Rural Commune, and Ambohimalaza Rural Commune
- Private Sectors

5) Estimated Project Cost

- 12 million USD

The estimated cost includes cost for necessary land fill and construction of tertiary and local roads needed for formulating the commercial areas of the urban centre, public facilities, and public parks.

6) Implementation Schedule

- 12 month (Formulation of PUDé)
- 5 years (Construction of infrastructure and urban facilities)

7) Necessary Actions for Implementation / Critical Factor

- Construction of basic infrastructure including tertiary and local roads in terms of budget
- Land preparation as some areas are on hills.
- Environmental concerns as the area has still many undeveloped lands which has natural environment and intended to create industrial area nearby.

8) Related Plans and Projects

- [A-R-06] Project for Construction of Ambohimalaza - Namehana Section of the Outer Ring Road between NR3 and NR2
- [A-I-02] Project for Development of Industrial and Logistics Areas in the Southern Area of Ambohimalaza
- [A-I-03] Project for Development of Industrial and Logistics Areas along Ambohimalaza - Sabotsy Namehana Section of the Outer Ring Road by Providing Access Roads, Water and Electricity
- [A-R-18] Project for Construction of Ambohimalaza – Ambohimanambola Section of the Outer Ring Road (Eastern Part)

9) Social and Environmental Impacts

There are possible environmental impacts

6.6.3 Profiles of Priority Projects for Housing and Residential Area Development in Antananarivo Agglomeration

(1) Programme for New Town Development for Housing Provision in Suburban Areas of Antananarivo Agglomeration

1) Rational

The population in Antananarivo Agglomeration is expected to be about 1.9 times by 2033. Currently, housing provision in the Agglomeration almost totally depends on households or individuals' efforts, since there are few subdivision development and housing provision by the private developers. Moreover, houses are being built in areas where infrastructures such as roads, water supply, sewage and drainage, have not been developed. The housing provision for middle- and low-income households are not enough in the suburban areas. As a result, low-income households are forced to live in disaster-prone areas and encroachment of the wetland has been progressing in the Agglomeration. In order to fulfil the housing needs of the future population, it is necessary to develop residential areas with basic infrastructure for low and middle income households in the suburban areas.

2) Objectives

- To develop new towns in the District of Atsimondrano in the western area of Antananarivo Agglomeration and District of Avaradrano in the eastern area in order to accommodate the increasing future population in Antananarivo Agglomeration
- To increase residential area development including development of basic infrastructure by the private and public sectors for middle- and low-income households

3) Project Description

The programme is composed of the following projects for new town development in suburban areas:

Phase 1: 2019-2023

- Project for Development of Fenoarivo South New Town (140 ha)

Phase 2: 2024-2028

- Project for Development of Fenoarivo North New Town (440 ha)
- Project for Development of Namehana New Town (200 ha)

Phase 3: 2029-2033

- Project for Development of Ampangabe New Town (390 ha)
- Project for Development of Fieferana New Town (180 ha)

The methodology of housing provision is "site and service" scheme based on the following stages:

- Land development together with provision of basic infrastructure including road, water supply, drainage and sewerage systems
- Development of residential areas targeting middle- and low- income households

4) Expected Benefits

The future residents of Antananarivo Agglomeration will be significantly benefitted by development of residential areas and housing provision of middle- and low-income households. In particular, middle- and low-income households will be able to enjoy better living environment with good sanitation and less disaster risks. The housing stock will be increased and backlog of necessary housing will be declined by the project. This project is also expected to mitigate congestion of CUA by promoting the development of new towns in suburban areas.

5) Executing Agency and Related Institutes

- MAHTP
- Ministry of Social Affairs
- JIRAMA
- Related local governments

6) Estimated Project Cost

Costs for land development and basic infrastructure provision are as follows:

- 42 million USD for Project for Development of Fenoarivo South New Town (140 ha)
- 132 million USD for Project for Development of Fenoarivo North New Town (440 ha)
- 60 million USD for Project for Development of Namehana New Town (200 ha)
- 117 million USD for Project for Development of Ampangabe New Town (390 ha)
- 54 million USD for Project for Development of Fieferana New Town (180 ha)

7) Implementation Schedule

Phase 1: 2019-2023

- Fenoarivo South New Town

Phase 2: 2024-2028

- Fenoarivo North New Town
- Namehana New Town

Phase 3: 2029-2033

- Ampangabe New Town
- Fieferana New Town

8) Necessary Actions for Implementation / Critical Factor

- Land acquisition
- Infrastructure development
- Private sector involvement

9) Related Plans and Projects

- Project for Promotion of Development of Namehana Urban Sub-Centre

- Project for Promotion of Development of Alakamisy Fenoarivo Suburban Centre
- Project for Construction of Ambohimalaza - Namehana Section of the Outer Ring Road between NR3 and NR2
- Project for Construction of Alakamisy Fenoarivo - Ampangabe Section of the Outer Ring Road (Western Part)
- Project for Construction of Ambohidratrimo – Ampangabe Section of the Outer Ring Road (Western Part)
- Project for Construction of Alakamisy Fenoarivo-Andoharanofotsy Section of the Outer Ring Road (between NR1 and NR7)

10) Social and Environmental Impacts

The projects are likely to have minimal environmental and social impacts.

Figure 6.6.12 Location Proposed for Development of New Towns

(2) Project for Local Road Development and Improvement of Informal Settlements in CUA

1) Rational

Many of residential areas in CUA are highly congested and lack sufficient basic infrastructure such as roads, drainage and water supplies. Informal settlements have been often formed in disaster-prone low land areas, by encroaching wetland. The residents are suffered not only from disaster risks of flooding and fire, but also from health risks. Meanwhile, a lack of road prevents residents from obtaining a building permit, because it is one of the requirements for approval of the permit. The fact that residents build their houses without building permits makes the enforcement of the land use regulations significantly difficult.

In order to improve the highly congested residential areas in Antananarivo, AFD has been implementing "The Project of Improvement and Sanitation of Priority Neighbourhoods in the Agglomeration of Antananarivo" or Lalankely Project Phase I and Phase II. As part of Phase III Project, the World Bank has launched Integrated Urban Development and Resilience Project (PRODUIR), including components of improvement of drainage and sanitation infrastructure, road and social service infrastructure in flood prone areas, enhancement of urban management

capacities on land management and revenue mobilization, emergency responses to disasters, and formulation of PUDé in CUA and adjacent communes. Considering the future population growth in Antananarivo Agglomeration by 2033, this kind of efforts for settlement improvement needs to be continued and expanded throughout the Agglomeration.

2) Objectives

- To assist the PRODUIR Project by the World Bank, which aims to improve living environment of highly congested residential areas in CUA, and surrounding three communes, by developing and basic infrastructure and public facilities such as roads, water supply, parks and open space, and community centres and by providing technical assistance for urban management

3) Project Description

- To develop basic infrastructure and public facilities such as road, water supply, and drainage, parks and open space, and community centres for the improvement of living environment of congested built-up areas and informal settlements in Arrondissement I and IV of CUA, and the communes of Bemasoandro, Andranonahotra, and Anosizato Andrefana, as part of the PRODUIR Project by the World Bank
- To provide technical assistance for the improvement of building permit process in CUA and surrounding communes

4) Expected Benefits

The project will benefit the residents in high congested residential areas and informal settlements in Arrondissement I and IV of CUA, and the communes of Bemasoandro, Andranonahotra, and Anosizato Andrefana by improving the basic infrastructure and public facilities. They will be able to have better access to road and clean water supply and enjoy healthy living conditions with less disaster risk.

5) Executing Agency and Related Institutes

- MAHTP, CUA, Communes of Bemasoandro, Andranonahotra, and Anosizato Andrefana, JIRAMA, AGETIPA

6) Estimated Project Cost

- USD 12 million

7) Implementation Schedule

Implementation schedule will be determined in coordination with the PRODUIR Project (on-going until February 2023)

8) Necessary Actions for Implementation / Critical Factor

- Land acquisition
- Community involvement

9) Related Plans and Projects

- Ankazomanga Atsimo Lake and Waterfront Park Development Project
- Andavamamba Anatihazo II Lake and Waterfront Park Development Project
- South East Plain Retention Ponds and Waterfront Parks Development Project
- South West Plain Retention Ponds and Waterfront Parks Development Project

10) Social and Environmental Impacts

The project might have adverse impact on the communities because of relocation.

Figure 6.6.13 Location of Target Areas of PRODIUR

6.6.4 Profiles of Projects for Preservation of Historical Areas in Antananarivo Agglomeration

(1) Project for Preservation of Historical Sites under ZPPAUP

1) Rationale

The rich architectural, urban and landscape heritage of Antananarivo on the hill where Rova (Queen's Palace) is located, is part of the identity of the residents of Antananarivo. Such heritage area also attracts domestic and foreign tourists visiting Antananarivo.

In order to preserve such areas, there is an order to preserve heritage areas in Antananarivo called *Order No. 515 - CUA/DS/DPUD/SPF 09 c*reating and preserving the Secured Area and Area of Protection of Architectural Heritage, Urban and Landscaping (ZPPAUP: *Zone de Protection du Patrimone Architectural, Urbain et Paysager*).

However, it has been difficult to protect such historical areas part of ZPPAUP due to financial situation of the building owners, lack of

- No clear information is sorted and maintained as database of the historic buildings and landscape which are regulated by the ZPPAUP
- Although the regulations are stipulated for each of the 13 zones, monitoring system does not seem to be functional and buildings that do not comply with the regulation area found.

Incentives such as financial and technical support are not well prepared, although for heritage preservation, incentives usually should be provided by the government because the development or construction right are restricted for the private owners in the preservation area

2) Project Description

A project for preservation of historical area is composed of the following:

- To establish a database of the historic buildings and landscape by listing up historic buildings with the explanation of historic values and location map, based on the academic survey on historic values of buildings and landscape, and categorizing the historic buildings according to

the degree of the architectural values.

- To promote public relations about the heritage preservation by preparing materials such as pamphlet about the heritage preservation, or conduct the heritage building tours, open-house activities, etc. so that the citizens understand the historic values of architecture and landscape in Antananarivo
- To establish an incentive and support system to provide a favourable treatment on taxes related to land or buildings, subsidies for the preservation work and materials, and technical support.

3) Expected Benefits

Aesthetic, amenity and asset values of the areas of the ZPPAUP will be raised by the preservation. In addition, the preserved heritage buildings and landscape would vitalize more economic activities by attracting the citizens and visitors.

4) Executing Agency and Related Institutes

- CUA

5) Estimated Project Cost

- 0.2-0.5 million USD

6) Implementation Schedule

- Survey and study of the historical heritage and landscape
- Establishment of database of the historical heritage and landscape
- Designation of the historical heritage
- Determination of incentives and subsidies

7) Necessary Actions for Implementation / Critical Factor

- Survey and listing-up of heritage buildings and landscape
- Preparation and authorization of guidelines
- Determination and authorization of incentives and subsidies and procurement of financial source
- Consensus of the citizen on the preservation as their rights are restricted

8) Related Plans and Projects

- Development projects related to the 13 zones of the ZPPAUP

9) Social and Environmental Impacts

- Restriction on usage of private properties in the ZPPAUP zones
- Improvement of landscape and amenity in the ZPPAUP zones
- Increase in asset values and economic activities in or near in the ZPPAUP zones

Chapter 7 Land Use Framework, Land Use Policy and Land Use Zoning Regulations for Antananarivo Agglomeration

7.1 Land Use Framework for Antananarivo Agglomeration

7.1.1 Present Land Use Framework for Antananarivo Agglomeration

The majority of Antananarivo Agglomeration is non-urbanized with only 20% of the land use in Antananarivo Agglomeration used as urbanized area. These urbanized areas are concentrated in CUA and its surrounding communes closer to CUA.

While three fourths of residential areas in Antananarivo Agglomeration are located outside of CUA, industrial areas and other urbanized areas such as commercial and administration areas are concentrated in CUA compared to residential areas.

The wetland (including paddy field) or water body in Antananarivo Agglomeration has an important role as flood control basin during the rainy season. Although this wetland is assumed to be decreasing, there is still over 30% of the land in Antananarivo Agglomeration remaining as wetland. According to the Integrated Sanitation Programme of Antananarivo (PIAA: *Programme Intégré d'Assainissement d'Antananarivo*) conducted with the fund of AFD, it is necessary to maintain at least 15km^2 of wetland excluding the existing water bodies in CUA.

Table 7.1.1 Present Land Use Framework of Antananarivo Agglomeration (2017)

	Residential Areas	Industrial Areas	Other Urbanized Areas	Urbanized Areas	Wetland including Wetland Paddy Areas	Other Non-Urbanized Areas	Non-Urbanized Areas	Total
Antananarivo Agglomeration	139.70 km^2	4.81 km^2	25.53 km^2	170.04 km^2	244.97 km^2	352.98 km^2	597.95 km^2	767.99 km^2
CUA	36.20 km^2	1.98 km^2	9.66 km^2	47.85 km^2	26.86 km^2	9.23 km^2	37.10 km^2	84.94 km^2
Outside of CUA	105.50 km^2	2.83 km^2	15.87 km^2	122.20 km^2	217.11 km^2	343.74 km^2	560.85 km^2	683.05 km^2

Source: JICA Study Team

While one fourths of residential areas in Antananarivo Agglomeration are in CUA, approximately half of the population in Antananarivo Agglomeration lives in CUA. Therefore, the population density of residential areas is almost three times larger in CUA compared to the communes outside of CUA.

Table 7.1.2 Population Density within Residential Areas in Antananarivo Agglomeration (2017)

	Residential Areas (km^2)	Population (persons)	Gross Population Density of Residential Areas (person/km^2)
Antananarivo Agglomeration	139.70	2,558,245	18,312.4
CUA	36.20	1,275,207	35,226.7
Outside of CUA	105.50	1,250,178	11,850.0

Source: JICA Study Team

7.1.2 Future Land Use Framework for Antananarivo Agglomeration

(1) Residential Areas

The future population increase of Antananarivo Agglomeration needs to be accommodated by expansion of residential areas and densifying (verticalisation of residential buildings in) some of the residential areas close to primary and secondary urban centres and urban sub-centres.

In order to accommodate the increasing population of Antananarivo Agglomeration, the total surface area for residential use needs to double in the next 15 years. This residential areas need to be accommodated especially in area outside of CUA, and at least 118km^2 of land needs to be developed for residential usage.

Although the area necessary to be increased to accommodate the demand of housing need in CUA is much smaller compared with outside of CUA, possible land for development in CUA is limited. Therefore, in CUA, besides verticalisation of buildings, areas which are currently used for manufacturing or any other usage which does not need to be in the city centre should be encouraged to be relocated to areas outside of CUA or to be changed to mixed usage zoning area.

Table 7.1.3 Increase of Population and Residential Area within Antananarivo Agglomeration

	2017			2033		
	Residential Areas (km^2)	Population (persons)	Gross Population Density of Residential Areas (person/km^2)	Residential Areas (km^2)	Population (persons)	Gross Population Density of Residential Areas (person/km^2)
Antananarivo Agglomeration	139.70	2,558,245	18,312.4	291.26	4,151,469	14,253.5
CUA	36.20	1,275,207	35,226.7	51.42	1,763,099	34,288.2
Outside CUA	105.50	1,250,178	11,850.0	238.84	2,388,370	9,999.9

Source: JICA Study Team

Table 7.1.4 Increase of Residential Area by Area in Antananarivo Agglomeration

	2017	2033	2017-2033	2017-2033
	Residential Areas (km^2) [A]	Residential Areas (km^2) [B]	Increase of Residential Area (km^2) [C]=[B]-[A]	Increase (%) [D]=[C]/[A]
Antananarivo Agglomeration	139.70	291.26	151.56	108.49%
CUA	36.20	51.42	15.22	42.04%
Outside of CUA	105.50	238.84	133.34	126.39%

Source: JICA Study Team

However, in CUA the value of land is higher compared with the other 37 communes of Antananarivo Agglomeration and should be utilised for other usages, too. In addition, higher buildings will be permitted in commercial zones. Therefore, the surface area of residential area for CUA in above tables include zoning such as commercial area which allows residential usage.

(2) Industrial Area

The economic active population in Antananarivo Agglomeration in 2033 is assumed to become approximately 2.1 million (see Table 7.1.5). The future vision of Antananarivo Agglomeration aims to develop its economy dynamically by attracting investment to various economic sectors including manufacturing. Therefore, it is important to prepare necessary land for manufacturing in Antananarivo Agglomeration to support this economic growth.

Table 7.1.5 Increase of Economic Active Population in Antananarivo Agglomeration

	1993	2018	2023	2028	2033
Population	1,116,000	2,558,245	3,022,647	3,547,471	4,151,467
Annual Growth Rate	-	3.37%	3.39%	3.25%	3.19%
Economic Active Population	491,040	1,227,958	1,481,097	1,738,261	2,075,734
EAP/Population	44%	48%	49%	49%	50%

Source: JICA Study Team

The growth scenario for Antananarivo Agglomeration aims to attract manufacturing industries such as textile, agro-processing and light industry. Due to the existing economic infrastructure and labour force in Antananarivo Agglomeration, such industries have the potential to develop efficiently utilising foreign investment. Therefore, the economic framework for Antananarivo Agglomeration is set to achieve a high growth in the secondary sector, with the contribution of secondary sector to GRDP increasing almost four times in 19 years from 2014.

Table 7.1.6 Changes in Contribution of Secondary Sector in Antananarivo Agglomeration's GRDP

	GRDP (MGA Billion, at 2007 constant prices)	Share of Secondary Sector (%)	Amount of Secondary Sector in GRDP (MGA Billion)	Annual Growth Rate (%)
2014 (Actual)	7,235	19.2	1,389	-
2023 (Projected)	13,005	18.7	2,432	6.42
2028 (Projected)	19,626	19.4	3,807	9.38
2033 (Projected)	30,941	20.4	6,312	10.64

Source: JICA Study Team

In 1993, approximately 15% of residents in CUA were engaged in manufacturing activities. The necessary land for manufacturing is calculated for three cases, the first assumption that 15% of economic active population in 2033 will be engaged in manufacturing sector and the second and third assumption that 12.5% and 10% of economic active population in 2033 will be engaged in manufacturing sector, respectively. In 2017, it is assumed that the industry area in Antananarivo Agglomeration had the density of 275 worker/ha. As the manufacturing process becomes mature, this density shall decrease. Therefore, the necessary area for 2033 in Table 7.1.7 uses 200 workes/ha.

Table 7.1.7 Necessary Area for Manufacturing in Antananarivo Agglomeration in 2033

	Case 1 (High)	Case 2 (Medium)	Case 3 (Low)
Economically Active Population	2,075,734	2,075,734	2,075,734
Share of EAP Engaged in Manufacturing	15%	12.5%	10%
Economically EAP Engaged in Manufacturing	311,000	260,000	208,000
Necessary Area for Manufacturing	1,555 ha	1,300 ha	1,040 ha

Source: JICA Study Team

The current industrial areas in Antananarivo Agglomeration account for 482 ha. Even for the low case almost 5 km^2 of land is necessary to be developed for manufacturing by 2033. However, taking in consideration of factories currently in CUA and Tanjombato which will have higher land value in the future, land for such factories to be relocated should also be prepared. Therefore, approximately 1,500 ha of land should be prepared for manufacturing by 2033.

(3) Future Land Use Framework for Antananrivo Agglomeration

The future land use framework for Antananarivo Agglomeration for short, medium and long term is shown in Table 7.1.8.

For the utilisation of land in CUA, it is necessary for residential buildings to coexist with commercial activities. Therefore, although the residential area in the land use framework for CUA shows more than 60% of the land in CUA to be used for residential, not all residential areas are purely for residential purpose but will be situated in commercial area too.

Table 7.1.8 Future Land Use Framwork for Antananarivo Agglomeration

	2018		2023		2028		2033	
	Area (km²)	Share (%)	Area (km²)	%	Area (km²)	%	Area (km²)	%
CUA	84.94	100.0	84.94	100.0	84.94	100.0	84.94	100.0
Residential Area	36.20	42.6	41.61	49.0	46.28	54.5	51.42	60.5
Industrial Area	1.98	2.3	1.98	2.3	1.49	1.7	0.99	1.2
Other	46.76	55.1	41.35	48.7	37.17	43.8	32.53	38.3
Outside CUA	683.05	100.0	683.05	100.0	683.05	100.0	683.05	100.0
Residential Area	69.30	10.2	127.69	18.7	196.06	28.7	239.44	35.1
Industrial Area	2.84	0.4	6.00	0.9	10.20	14.9	14.40	2.1
Other	610.91	89.4	549.36	80.4	476.79	69.80	429.21	62.8
Antananarivo Agglomeration	767.99	100.0	767.99	100.0	767.99	100.0	767.99	100.0
Residential Area	105.50	13.7	169.30	22.0	242.34	31.6	290.86	37.9
Industrial Area	4.82	0.6	7.98	1.0	11.69	1.5	15.39	1.7
Other	657.67	85.6	587.71	76.5	513.96	66.9	461.74	60.1

Source: JICA Study Team

7.2 Land Use Policies for Antananarivo Agglomeration

7.2.1 Land Use Policies by Land Use

(1) Policy on Residential Land Use

- At present, inside CUA, high-density and middle-density residential areas are extensive.
- In the future, high and mid-density residential areas will be further expanded and the height of residential buildings will be increased.
- At present, outside CUA, low-density residential areas are widely spreading.
- In the future, outside CUA, the development of middle-density residential areas including middle-rise mid-density residential areas, will be promoted along the radial roads and in the surrounding of urban sub-centres.
- At present, outside 8-10 km radius from the city centre (outside the planned Outer Ring Road), low-density residential areas are mostly spreading in suburban and rural contexts.
- In the future, outside the Outer Ring Road, the development of low-density residential areas is promoted. Outside the Outer Ring Road, in some areas, the development of new towns accommodating middle-rise mid-density residential areas is promoted in order to accommodate increasing low and middle income populations.

(2) Policy on Commercial Land Use

- At present, within CUA, commercial areas including office areas are mostly located along major roads.
- In the future, within CUA, commercial areas including office areas will be expanded along newly constructed major roads, as well as in existing commercial centres, such as Analakely and Ankorondrano. More height of commercial buildings will be allowed in commercial areas.
- At present, just outside CUA, there are some commercial areas which have spontaneously developed along the radial national roads, including Tanjombato (on NR7), Amtitatafika (NR1), Ambohidratrimo (NR4) and Sabotsy Namehana (NR3).
- In the future, outside CUA, the commercial function of these existing commercial areas will be upgraded to be “Urban Sub-Centres”, the area size of these existing commercial areas will be expanded, and their building height will be increased, in respond to planned development of arterial road network.

- At present, outside 8-10 km radius from the city centre (outside the planned Outer Ring Road), there is little commercial accumulation, while there are some spontaneously developed commercial areas.
- In the future, around the planned Outer Ring Road, suburban centres will be developed in order to accommodate not only commercial/office areas, but also other urban functions.

(3) Policy on Industrial Land Use

- At present, industrial areas are located along the radial national roads near CUA's boundaries and further beyond CUA's boundaries. Urbanization has expanded so as to surround those existing industrial areas.
- In the future, those existing industrial areas will be transformed to commercial/office and residential areas under a mixed land use category.
- In the future, industrial areas will be largely expanded in suburban areas along the planned Outer Ring Road, which could have good connection to Toamasina Port through the existing NR2 and/or through the prospective Antananarivo-Toamasina Expressway. These

(4) Policy on Conservation Areas (Non-Development Areas)

- At present, wetlands including irrigated paddy fields are supposed to be protected from any development without government permission. However, road development and residential area development have been done under the government permission of wetland land filling.
- In the future, conservation of wetlands will be done in order to maintain the water retention capacity of 15 million m3 within CUA, in accordance with PIAA's Drainage Master Plan.
- In the future, there are many planned urban development in association with land filling in wetlands, and there is also possibility of spontaneous land filling in wetland. It will be necessary to strictly control the volume of wetland land filling by two methods. The one is land use zoning regulation, which is shown in the land use zoning plan of PUDi. The other is to construct water retention ponds in certain urban areas under high urbanization pressure.
- Outside CUA, there are wide areas under threats of inundation from heavy rainfall and flooding of rivers. In the future, land filling in wetlands outside CUA will be limited to the cases of high necessity, especially for development of urban sub-centres and construction of major roads.

(5) Policy on City Parks

- Although the urban population has been rapidly increasing, there are no many formal city parks and sports grounds in Antananarivo Agglomeration. At present, there are still many non-built-up lands, where people can enjoy playing. As the population increases and urban areas expand, these non-built-up lands would decrease rapidly. Moreover, it seems that there are no official development plans for city parks and sports grounds.
- In the future, the demand for city parks and sports grounds will increase largely. Therefore, potential lands for city parks and sports grounds are designated by the revised PUDi. Such potential lands include 1) areas surrounding water retention ponds, 2) unused lands in highly populated areas, and 3) forested lands in suburban areas.

7.3 Land Use Zoning Regulations for Antananarivo Agglomeration

7.3.1 Proposal of a Common Land Use Zoning System for Urban Areas in Madagascar

In CUA, a very high percentage (over 90%) of buildings has not obtained construction permits. In recent years, around 500 construction permission applications were submitted per year; however, about 300 construction permits were issued. This might be partly because the existing Land Use Zoning System is not easy to use, not only for applicants to prepare and submit construction permission applications, but also for Communes and MAHTP to check and issue construction permits.

In most PUDi, the description of land use zoning regulations is lengthy to read and understand. There are some differences in land use zoning regulations between one PUDi and another PUDi, although those differences are not so large and meaningful. If any PUDi always use the same land use zoning system, it would be convenient for both applicants and communes.

Therefore, considering the land use zoning regulations which have been used for various PUDi, and also considering physical features of urban areas and social characteristics of urban communities in Madagascar, one land use zoning system is created as a Common Land Use Zoning System. The land use zoning categories and regulations of the Common Land Use Zoning System were adopted in the fomulation of PUDis for Antananarivo Agglomeration and Toamasina Agglomeration.

7.3.2 Major Changes of Land Use Zoning System for Antananarivo Agglomeration

Major changes proposed for creating the Common Land Use Zoning System is as follows:

(1) No Use of Extension Zone

In most cases, PUDi of Madagascar largely divide the planning area of PUDi into “developed zones” and “extension zones.” Different land use zoning categories are put to “developed zones” and “extension zones.”

However, in “developed zones,” reconstruction of existing buildings and construction of buildings in vacant lands could happen, and such constructions also need to comply with proper land use zoning regulations.

Therefore, it is necessary to apply the same land use zoning regulations for guiding both developed zones and extension zones.

(2) Allowing of Smaller “Minimum Lot Sizes”

In PUDi2004 for Antananarivo Agglomeration, relatively large “minimum lot sizes” are applied to most land use zoning categories. Moreover, the new urban planning law of Madagascar stipulates that the minimum lot size should be more than 150 m^2. As a result, it is not possible for many small land owners to obtain construction permits in accordance with PUDi 2004. That is, the current minimum lot sizes specified by PDUi are obstacles for construction permission.

It is considered that toward the future, land parcels available for many households are becoming smaller and smaller. It is necessary to reduce “minimum lot sizes” as much as possible within the range where the residential environment does not deteriorate, so that many could construct houses and buildings in compliance with the official land use zoning regulations.

When many obtain construction permits for their houses and buildings in compliance with the land use zoning regulations, PUDi becomes able to guide many houses and buildings for the purpose of creating a better built environment in the city.

(3) Provision of Larger "Height Regulations"

In PUDi 2004 for Antananarivo Agglomeration, G+2 for high-density residential areas, G+3 for suburban residential areas, and G+5 for special cases are usual height regulations. As seen in PUDi 2004 for Antananarivo Agglomeration, the limitation of building heights is generally lower than those found in other countries. Moreover, the new urban planning law limits the maximum building height (H) to the width (L) of the road where the building is located.

In the future, more 4-lane arterial roads are constructed and urban centres will be established. It is necessary to allow higher buildings for commercial use and apartment use than before.

It is recommended that the maximum building height should be two times higher than the road width where the building is located, especially in commercial use zones in Primary Urban Centres, Secondary Urban Centres, Urban Sub-Centres and Suburban Centres.

(4) Detailed Categories for Residential Zones

Land use zoning regulations are a useful tool to guide land use and built environment of certain areas to desirable situation.

Three different types of density (height density, mid density, and low density) residential zones are set for the Common Land Use Zoning System. For each density type, two categories are set for guiding different features of built environment.

(5) Two Different Types of Commercial Zones

In the Common Land Use Zoning System, three different types of commercial zones are set. The first is "Commercial Corridor Zone." The second is "Commercial Centre Zone."

Commercial Corridor Zones are applied along 2-lane and 4-lane Urban Arterial Roads for accommodating large commercial buildings. The height of the buildings will be regulated by the road width, based on the Urban Planning and Housing Law 2015.

Commercial Centre Zones have two different types of land use zone depending on characteristics of urban centres. The one is "Primary Commercial Centre Zone." The other is "Commerical Centre Zone." These two categories have requirements to be satisfied so that the maxium heights of the building regulation can be applied, as shown in Section 7.3.5.

7.3.3 Land Use Zoning System for Antananarivo Agglomeration

(1) Large Categories of Land Use Zones

The Common Land Use Zoning System is composed of the following land use zones:

- Residential Zone
- Commercial Zone
- Industrial Zone
- Facility Zone
- Non-Development Zone

Different land use zoning categories (land use zones) are set as a tool for guiding land use and built environment toward better or desired situation.

(2) Detailed Categories of Land Use Zones

For each detailed category of land use zones, the following features are specified for guiding land use and built environment:

- Minimum Lot Size
- Building Coverage Ratio (BCR)
- Building Height, and

- Permissible Use and Non-Permissible Uses

7.3.4 Minimum Lot Size, Building Coverage Ratio and Building Height Regulated by Land Use Zoning Categories for Development

(1) Residential Zones

Table 7.3.1 Detail of Categories for Residential Zones

Residential Zones	Minimum Lot Size, Building Coverage Ratio (BCR), Maximum Building Height	Major Features of the Zone Remark for Zoning Application
Very Low-Density Residential	• Minimum Lot Size: 500 m² • BCR: 40% • Maximum Height: G+2 (10m)	• Very low density and well developed residential areas • 500 m² of "minimum lot size" as specified in PUDi2004 is maintained for "Very Low-Density Residential Zone."
Low-Density Residential	• Minimum Lot Size: 300 m² • BCR: 50% • Maximum Height: G+2 (10m)	• Low density residential areas, which are mostly located in suburban areas • A smaller "minimum lot size" of 300 m² is applied for "Low-Density Residential Zone."
Mid-Density Residential	• Minimum Lot Size: 150 m² • BCR: 50% • Maximum Height: G+3 (13m)	• Mid-density residential areas, where middle-sized houses are located • 150 m² of "minimum lot size" is applied for "Mid-Density Residential Zone."
Mid-Rise Residential	• Minimum Lot Size: 150 m² • BCR: 60% • Maximum Height: G+3 (13m) --- • Minimum Lot Size: 300 m² • BCR: 40% • Maximum Height: G+6 (23m)	• Mid-density and mid-rise residential areas, where the construction of mid-rise residential buildings including apartments is promoted • "Mid-Rise Residential Zone" is set for enabling the construction of apartment buildings.
High-Density Residential	• Minimum Lot Size: 150 m² • BCR: 70% • Maximum Height: G+3 (13m)	• High density residential areas, where small-sized buildings are densely located • "High-Density Residential Zones" are applied to areas that are of extremely high density. Most of these areas require project-based residential environmental improvement, for example, putting small walkways and drainage.

Source: JICA Study Team

(2) Commercial Zones

Table 7.3.2 Details of Categories for Commercial Zones

Commercial Zones	Minimum Lot Size, Building Coverage Ratio (BCR), Maximum Building Height	Major Features of the Zone Remark for Zoning Application
Commercial Corridor	• Minimum Lot Size: 200 m² • BCR: 70% • Maximum Height: G+4 (16m) --- • Minimum Lot Size: 300 m² • BCR: 50% • Maximum Height: G+6 (23m)	• Commercial corridors to be developed along Urban Arterial Roads • "Commercial Corridor Zones" are applied along 2-lane and 4-lane Urban Arterial Roads for accommodating large commercial buildings. The height of the buildings will be regulated by the road width, based on the Urban Planning and Housing Law 2015.

Commercial Centre (before the requirement for urban centres is satisfied)	• Minimum Lot Size: 200 m² • BCR: 70% • Maximum Height: G+4 (16m)	• Commercial areas to be developed in Urban Sub-Centres and Suburban Centres • Commercial Centre Zones are applied to Urban Sub-Centres and Suburban Centres. • The regulations of Commercial Centre Zones are fully applied when the requirement for urban centres is satisfiled.
Commercial Centre	• Min. Lot Size: 200 m² • BCR: 70% • Maximum Height: G+4 (16m)	
	• Minimum Lot Size: 300 m² • BCR: 50% • Maximum Height: G+6 (23m)	
Primary Commercial Centre (before the requirement for urban centres is fulfilled) *	• Minimum Lot Size: 200 m² • BCR: 70% • Maximum Height: G+6 (23m)	• Commercial areas to be developed in Primary Urban Centres and Secondary Urban Centres • Primary Commercial Centre Zones are applied to Primary Urban Centres and Secondary Urban Centres. • The regulations of Primary Commercial Centre Zones are fully applied when the requirement for urban centres is satisfied.
Primary Commercial Centre*	• Minimum Lot Size: 200 m² • BCR: 70% • Maximum Height: G+6 (23m)	
	• Minimum Lot Size: 500 m² • BCR: 50% • Maximum Height: G+9 (33m) • *When Development Permission is obtained: G+19	

Notes: The regulations of "Primary Commercial Centre Zone" and "Commercial Centre Zone" will be fully applied when necessary requirements for certain urban centres are fulfilled. Details of the requirements are descripted in Section 7.3.5.
Source: JICA Study Team

(3) Industrial Zones

Table 7.3.3 Details of Categories for Industrial Zones

Industrial Zones	Minimum Lot Size, Building Coverage Ratio (BCR), Maximum Building Height	Major Features of the Zone Remark for Zoning Application
Mixed Development	• Min. Lot: 700 m² • BCR: 50% • Max. Height: G+9 (33m) • *Evaluation and Planning Permission: 20m	• "Mixed Development Zone" is applied to existing industrial areas and industrial parks for accommodating commercial and office land use. • The application of "Mixed Development Zone" enables the transformation of existing industrial areas and industrial parks to mixed use areas of commercial-office buildings and industrial factories.
Industry	• Min. Lot: 900 m² • BCR: 50% • Max. Height: G+3 (13m)	• Industrial Zones are new development areas for relatively large-scale industries. • The Industrial Zones are to be designated for dedicated use for industries.

Source: JICA Study Team

7.3.5 Requirements for Applying Regulations of Commercial Centre Zones

In the Antananananarivo PUDi 2019, "Primary Commercial Centre Zones" and "Commercial Centre Zones" are applied to the Urban Centres shown in the Antananarivo Future Structure for 2033. The urban centres will become economic centres of Antananarivo Agglomeration, and these zoning categories allow relatively mid-rise and high-rise commercial buildings for large-scale commercial activities (including offices) to be developed in the designated areas.

However, such large-scale commercial activities will require new arterial roads to effectively support the mobility of people and cargo coming in and out of the urban centres. Without such new

arterial roads, the current road system will soon reach its traffic capacity, causing a heavy traffic congestion and creating a large economic loss for the entire agglomeration. Before allowing the buildings to be developed to the maximum size regulated in each commercial zone regulation, it is necessary for urban centres to satisfy certain conditions, including construction of new arterial roads supporting the urban centres.

Therefore, until such arterial roads with a large capacity are constructed, each commercial zones will have a different set of regulations, which are shown in Table 7.3.2.

The required conditions of arterial road construction for different urban centres are listed in Table 7.3.4 through Table 7.3.7. Once the requirements are fulfilled, the regulations shown in Table 7.3.2 will be applied.

Table 7.3.4 Requirements for Fully Applying the Regulations of "Primary Commercial Centre Zone" to Primary Urban Centres

Primary Urban Centre	Requirements
Ankorondrano	Completion of the Middle Ring Road or Completion of the North South Road
Analakely	Completion of East-West Road Connection to ease the traffic concentration to NR1
Antaninarenina	Completion of East-West Road Connection to ease the traffic connection to ease the traffic concentration to NR1
Anosy	Completion of East-West Road Connection to ease the traffic concentration to NR1

Table 7.3.5 Requirements for Applying "Primary Commercial Centre Zone" Category to Secondary Urban Centres

Secondary Urban Centre	Requirements
Ambohimahitsy	Completion of the Middle Ring Road supported by AFD
Ivato	Western Bypass (Ivato - Ambohitrimanjaka - Village Artisanale) along NR4 and Tsarasaotra Road

Table 7.3.6 Requirements for Applying "Commercial Centre Zone" Category to Urban Sub-Centres

Urban Sub-Centre	Requirements
Tanjombato	Completion of Widening of the Southern Bypass to 4-lane Roads and Widening of the Tokyo Boulouvard to 4-Lane Road
Ampitatafika	Completion of Ankorondrano-Ampitatafika Road Section of the Outer Ring Road
Sabotsy Namehana	Comletion of East-West Road Section of the Outer Ring Road or Bypass Road for NR3 Bypasss Road
Ambohidratrimo	Western Bypass (Ivato - Ambohitrimanjaka - Village Artisanale) along NR4
Ambohimahitsy	Completion of the Middle Ring Road supported by AFD
Mahazoarivo	Competion of Widening of Tokyo Boulvard to 4-lane Road and a Radial Road

Table 7.3.7 Requirements for Applying the Regulations of "Commercial Centre Zone" to Suburban Centres

Suburban Centre	Requirements
Anosiala	Completion of part of the Outer Ring Road (One Road Section connecting Two Radial Roads)
Ambatolampy Tsimahafotsy	Completion of part of the Outer Ring Road (One Road Section connecting Two Radial Roads)
Soavinimerina	Completion of part of the Outer Ring Road (One Road Section connecting Two Radial Roads)
Betsizaraina	Completion of part of the Outer Ring Road (One Road Section connecting Two Radial Roads)
Ambohimalaza	Completion of part of the Outer Ring Road (One Road Section connecting Two Radial Roads)
Ambohimanambola	Completion of part of the Outer Ring Road (One Road Section connecting Two Radial Roads)
Anjomakely	Completion of part of the Outer Ring Road (One Road Section connecting Two Radial Roads)

Alakamisy Fenoarivo	Completion of part of the Outer Ring Road (One Road Section connecting Two Radial Roads)
Ampangabe	Completion of part of the Outer Ring Road (One Road Section connecting Two Radial Roads)

7.3.6 Facility Zones

Facility Zones have the following 4 categories of land use zones:

- Administrative and Public Facility Zone
- Solid Waste Facility Zone
- Cemetry
- Military zone

In the Administrative and Public Facility Zones, the construction of facilities, such as administrative facilities, sports facilities, airport and ports, logistic facilities, educaitonal facilities and municipal facilities, is allowed.

7.3.7 Non-Development Zones

In Non-Development Zones, there are the following seven categories of land use zones:

- Wetland
- Forest
- Green Space and Public Parks
- Steep Land (more than 20 degrees)
- Perimeter of Protection (Coastal Strips and Riserves along Rivers)
- Waterbodies

In these categories of Non-Development Zones, the construction of buildings are not allowed.

Since neigher development nor buildings are allowed in Non-Development Zones, no Minimum Lot Sizes, no Building Coverage Rations, no Building Heights and no Permissible Use and Non-Permissible Use are designated for Non-Development zones.

In the designated wetlands including paddy fields, no land filling is allowed and no construction of buildings are allowed.

7.3.8 Permissible Use and Non-Permissible Uses for Land Use Zones

Permissible use and non-permissible use are designated for each land use zone. The following tables enable the comparison of different land use zones in terms of permissible use and non-permissible use.

Table 7.3.8 Permissible Use and Non-Permissible Use for Residential Zones (1)

Zoning Category		Very Low Density Residential	Low Density Residential	Mid Density Residential	Mid-Rise Residential Area	High Density Residential
Permissible Uses						
House	Detached House	OK	OK	OK	OK	OK
	Townhouse (Terrace House)		OK	OK	OK	OK
	Apartment (Height: G+5 and more)				OK	
Commercial and Business Facilities	Store, Restaurant, or Office (maximum floor area 50m²)		OK	OK	OK	OK
	Store, Restaurant, or Office (maximum floor area 400m²)				OK	
	Store, Restaurant, or Office (Not Specified Above) *Commercial/ Office Complx, Supermarket, Shopping Mall					
Special Commercial Facilities	Casino, Gambling Facilities, Entertainment Business, etc.					
	Concert Hall, Music Club, Night Club, Karaoke, Theater, etc.			OK * maximum floor area 50m²	OK * maximum floor area 100m²	OK * maximum floor area 50m²
Hotel and Accommodation	Hotel, Inn			OK * maximum floor area 400m²	OK * maximum floor area 400m²	OK * maximum floor area 400m²
	Etablissement d'hébergement		OK	OK	OK	OK
Industrial Facilities	Factory, Industrial Establishment					
	Workshop (Wood Workshop, Repair Workshop, Craft Workshop) without Environmental concerns			OK * maximum floor area 50m²	OK * maximum floor area 50m²	OK * maximum floor area 50m²
Warehouse	Warehouse with Environmental Concerns					
	Warehouse without Environmental Concerns			OK * maximum floor area 50m²	OK * maximum floor area 50m²	OK * maximum floor area 50m²
Government / Public Facilities	Major Government Facilities (National Governent, City Hall, Court, etc.)					
	Local Government Facilities (Small Government Office, Fokontany Office)	OK	OK	OK	OK	OK
	Assembly Hall, Community Facilities	OK * maximum floor area 400m²	OK * maximum floor area 400m²	OK * maximum floor area 400m²	OK * maximum floor area 400m²	OK * maximum floor area 400m²
	Public Market			OK * maximum floor area 400m²	OK * maximum floor area 400m²	OK * maximum floor area 400m²
Health Facilities	Hospital					
	Clinic (Maximum floor area 400m²)	OK	OK	OK	OK	OK
Educational Facilities	Nursery, Kindergarten	OK	OK	OK	OK	OK
	School (Elementary, Junior High, High School)	OK	OK	OK	OK	OK
	University and College		OK with Acess Road	OK with Acess Road	OK with Acess Road	
Transport Facilities	Bus Stop	OK	OK	OK	OK	OK
	Bus Terminal, Major Transport Facilities					
Cultural Facilities	Library	OK * maximum floor area 400m²	OK * maximum floor area 400m²	OK * maximum floor area 400m²	OK * maximum floor area 400m²	OK * maximum floor area 400m²
	Museum				OK * maximum floor area 400m²	OK * maximum floor area 400m²
Sports Facilities	Stadium, Arena, Large Sports Facilities					
	Small Gymnasium (maximum floor area: 400m²)	OK	OK	OK	OK	OK
	Sports Field	OK	OK	OK	OK	OK
	Swimming Pool	OK	OK	OK	OK	OK
Other Facilities	Recreation Facilities, Theme Park					
	Religious Facilities	OK	OK	OK	OK	OK
	Cemetery	OK	OK	OK	OK	OK
	Park	OK	OK	OK	OK	OK
	Utility (JIRAMA Public Water pump, etc.)			OK * maximum floor area 100m²	OK * maximum floor area 100m²	OK * maximum floor area 100m²
	Establishment for Agricultural Activities	OK	OK	OK	OK	OK
Other Facilities not Specified above						

Table 7.3.9 Permissible Use and Non-Permissible Use for Commercial Zone

Zoning Category		Commercial Corridor	Commercial Centre	Primary Commercial Centre
Permissible Uses				
House	Detached House	OK	OK	OK
	Townhouse (Terrace House)	OK	OK	OK
	Apartment (Height: G+5 and more)	OK	OK	OK
Commercial and Business Facilities	Store, Restaurant, or Office (maximum floor area 50m²)	OK	OK	OK
	Store, Restaurant, or Office (maximum floor area 400m²)	OK	OK	OK
	Store, Restaurant, or Office (Not Specified Above) *Commercial/ Office Complx, Supermarket, Shopping Mall	OK	OK	OK
Special Commercial Facilities	Casino, Gambling Facilities, Entertainment Business, etc.	OK	OK	OK
	Concert Hall, Music Club, Night Club, Karaoke, Theater, etc.	OK	OK	OK
Hotel and Accommodation	Hotel, Inn	OK	OK	OK
	Etablissement d'hébergement	OK	OK	OK
Industrial Facilities	Factory, Industrial Establishment			
	Workshop (Wood Workshop, Repair Workshop, Craft Workshop) without Environmental concerns	OK * maximum floor area 400m²		
Warehouse	Warehouse with Environmental Concerns			
	Warehouse without Environmental Concerns	OK * maximum floor area 400m²	OK * maximum floor area 400m²	OK * maximum floor area 400m²
Government / Public Facilities	Major Government Facilities (National Governent, City Hall, Court, etc.)	OK	OK	OK
	Local Government Facilities (Small Government Office, Fokontany Office)	OK	OK	OK
	Assembly Hall, Community Facilities	OK	OK	OK
	Public Market	OK	OK	OK
Health Facilities	Hospital	OK	OK	OK
	Clinic (Maximum floor area 400m²)	OK	OK	OK
Educational Facilities	Nursery, Kindergarten	OK	OK	OK
	School (Elementary, Junior High, High School)	OK	OK	OK
	University and College	OK	OK	OK
Transport Facilities	Bus Stop	OK	OK	OK
	Bus Terminal, Major Transport Facilities	OK	OK	OK
Cultural Facilities	Library	OK	OK	OK
	Museum	OK	OK	OK
Sports Facilities	Stadium, Arena, Large Sports Facilities	OK	OK	OK
	Small Gymnasium (maximum floor area: 400m²)	OK	OK	OK
	Sports Field	OK	OK	OK
	Swimming Pool	OK	OK	OK
Other Facilities	Recreation Facilities, Theme Park	OK	OK	OK
	Religious Facilities	OK	OK	OK
	Cemetery	OK	OK	OK
	Park	OK	OK	OK
	Utility (JIRAMA Public Water pump, etc.)	OK	OK	OK
	Establishment for Agricultural Activities	OK		
Other Facilities not Specified above				

Table 7.3.11 Permissible Use and Non-Permissible Use for Industrial Zone

Zoning Category		Mixed Development	Industry
Permissible Uses			
House	Detached House	OK	
	Townhouse (Terrace House)	OK	
	Apartment (Height: G+5 and more)	OK	
Commercial and Business Facilities	Store, Restaurant, or Office (maximum floor area 50m²)	OK	OK
	Store, Restaurant, or Office (maximum floor area 400m²)	OK	OK
	Store, Restaurant, or Office (Not Specified Above) *Commercial/ Office Complix, Supermarket, Shopping Mall	OK	
Special Commercial Facilities	Casino, Gambling Facilities, Entertainment Business, etc.	OK	
	Concert Hall, Music Club, Night Club, Karaoke, Theater, etc.	OK	
Hotel and Accommodation	Hotel, Inn	OK	
	Etablissement d'hébergement	OK	
Industrial Facilities	Factory, Industrial Establishment	OK	OK
	Workshop (Wood Workshop, Repair Workshop, Craft Workshop) without Environmental concerns	OK	OK
Warehouse	Warehouse with Environmental Concerns	OK	OK
	Warehouse without Environmental Concerns	OK	OK
Government / Public Facilities	Major Government Facilities (National Goverment, City Hall, Court, etc.)	OK	OK
	Local Government Facilities (Small Government Office, Fokontany Office)	OK	OK
	Assembly Hall, Community Facilities	OK	
	Public Market	OK	
Health Facilities	Hospital	OK	OK
	Clinic (Maximum floor area 400m²)	OK	OK
Educational Facilities	Nursery, Kindergarten	OK	
	School (Elementary, Junior High, High School)	OK	
	University and College	OK	
Transport Facilities	Bus Stop	OK	OK
	Bus Terminal, Major Transport Facilities	OK	
Cultural Facilities	Library	OK	
	Museum	OK	
Sports Facilities	Stadium, Arena, Large Sports Facilities	OK	
	Small Gymnasium (maximum floor area: 400m²)	OK	
	Sports Field	OK	OK
	Swimming Pool	OK	
Other Facilities	Recreation Facilities, Theme Park	OK	
	Religious Facilities	OK	OK
	Cemetery	OK	OK
	Park	OK	OK
	Utility (JIRAMA Public Water pump, etc.)	OK	OK
	Establishment for Agricultural Activities		
Other Facilities not Specified above		OK	OK

7.3.9 Comparison of Major Zoning Categories between Antananarivo PUDi 2004 and PUDi 2019 for Antananarivo Agglomeration

Major regulations of Land Use Zones are compared between Antananarivo PUDi 2004 and PUDi 2019 for Antananarivo Agglomeration, as shown in Table 7.3.12 to Table 7.3.14.

Table 7.3.12 Comparison of Residential Zones between Antananarivo PUDi 2004 and PUDi 2019

Residential Zones in Antananarivo PUDi 2004		Residential Zones in Antananarivo PUDi 2019	
Zoning Category	**Minimum Lot Size / BCR / Height**	**Zoning Category**	**Minimum Lot Size / BCR / Height**
Urbanisable and Future Expansion	• Min. Lot Size: 500 m² • BCR: Max 50% • Height: G+3 (16m)	Very Low Density Residential	• Min. Lot Size: 500 m² • BCR: 40% • Height: G+2 (10m)
Urbanisable and Densify	• Min. Lot Size: 300 m² • BCR: Max 70% • Height: G+3 (14m)	Low Density Residential	• Min. Lot Size: 300 m² • BCR: 50% • Height: G+2 (10m)
Reconstruction and Dedensifying	• Min. Lot Size: 175 m² • BCR: Max 70% • Height: G+2 (12m)	Mid Density Residential	• Min. Lot Size: 150 m² • BCR: 50% • Height: G+3 (13m)
		Mid Density Residential	• Min. Lot Size: 150 m² • BCR: 60% • Height: G+6 (23m) *
			• Min. Lot Size: 300 m² • BCR: 40% • Height: G+6 (23m)
		High Density Residential	• Min. Lot Size: 150 m² • BCR: 70% • Height: G+3 (13m)

Table 7.3.13 Comparison of Commercial Zoning Categories Between Antananarivo PUDi 2004 and PUDi 2019

Commercial Zones in Antananarivo PUDi 2004		Commercial Zones in Antananarivo PUDi 2019	
Zoning Category	**Min. Lot / BCR / Height**	**Zoning Category**	**Min. Lot / BCR / Height**
Upper Old Town to Preserve	• Min. Lot Size: 500 m² • BCR: Max 50% • Height: G+3 (16m)	Commercial Corridor	• Min. Lot Size: 200 m² • BCR: 70% • Max. Height: G+4 (16m)
City Centre	• Min. Lot Size: 300 m² • BCR: Max 70% • Height: G+3 (14m)		• Min. Lot Size: 300 m² • BCR: 50% • Max. Height: G+6 (23m)
Development Pole	• Min. Lot Size: 175 m² • BCR: Max 70% • Height: G+2 (12m)	Commercial Centre (before requirement is fulfilled)	• Min. Lot Size: 200 m² • BCR: 70% • Max. Height: G+4 (16m)
		Commercial Centre	• Min. Lot Size: 200 m² • BCR: 70% • Max. Height: G+4 (16m)

			• Min. Lot Size: 300 m² • BCR: 50% • Max. Height: G+6 (23m)
		Primary Commercial Centre (before requirement is fulfilled)	• Min. Lot Size: 200 m² • BCR: 70% • Max. Height: G+6 (23m)
			• Min. Lot Size: 200 m² • BCR: 70% • Max. Height: G+6 (23m)
		Primary Commercial Centre *	• Min. Lot Size: 500 m² • BCR: 50% • Max. Height: G+9 (33m) • *When Development Permission is obtained: G+19

Table 7.3.14 Comparison of Industrial Zone between Antananarivo PUDi 2004 and PUDi 2019 for Antananarivo Agglomeration

Industrial Zones in Antananarivo PUDi 2004		Industrial Zones in Antananarivo PUDi 2019	
Zoning Category	**Minimum Lot Size / BCR / Height**	**Zoning Category**	**Minimum Lot Size/ BCR / Height**
Equipment and Economic Active Zone	• Min. Lot Size: Not Specified • BCR: Max 45% • Height: G+5 (20m)	Mixed Development	• Min. Lot Size: 700 m² • BCR: 50% • Height: G+9 (33m)
		Industry	• Min. Lot Size: 900 m² • BCR: 50% • Height: G+3 (13m)

7.3.10 Parking Lot Provision in Land Use Zoning Regulations

One parking lot **each should be installed for every** 200m² of the gross floor area of one residential unit. This regulation should be applied to all types of Residential Zones. On the other hand, one parking lot each should be installed for every 400m² of the gross floor area of commercial buildings in all types of Commercial Zones. These parking lot regulations are integrated in the regulations for each land use zone.

7.3.11 Urban Prescriptions for Each Land Use Zone

Urban prescriptions for each land use zone are given in the tables below.

Table 7.3.15 Urban Prescriptions for Residential Zones in Antananarivo Agglomeration

Residential Zones	**Minimum Lot Size, BCR, Maximum Building Height**	**Urban Prescriptions**
Very Low Density Residential	• Minimum Lot Size: 500 m² • BCR: 40% • Maximum Height: G+2 (10m)	• Other use buildings and land uses should be strictly excluded by enforcing the commercial permission system • Dividing of existing large parcels into smaller parcels should be strictly prohibited for inheritance or for selling properties.

Low Density Residential	• Minimum Lot Size: 300 m² • BCR: 50% • Maximum Height: G+2 (10m)	• It is necessary to secure lands for constructing local roads, urban parks and local public facilities, such as secondary and senior high schools and clinicks/hospitals. • Formulation of detailed urban plans (PUDe) is recommended.
Mid-Density Residential	• Minimum Lot Size: 150 m² • BCR: 50% • Maximum Height: G+3 (13m)	• It is necessary to secure lands for constructing local roads, urban parks and local public facilities, such as primary schools and clinics. • Enforcement of the construction permission system is required for maintaining a better built environment.
Mid-Rise Residential	• Minimum Lot Size: 150 m² • BCR: 60% • Maximum Height: G+3 (13m) • Minimum Lot Size: 300 m² • BCR: 40% • Maximum Height: G+6 (23m)	• Construction of apartment buildings should be promoted. • It is necessary to secure lands for construction of local roads, urban parks and local public facilities.
High-Density Residential	• Minimum Lot Size: 150 m² • BCR: 70% • Maximum Height: G+3 (13m)	• Construction of footpaths and drainage channels is essential in these high density residential areas by promoting the implementation of projects with assistance of development partners. • The construction permission system should be enforced not to increase the density of buildings and not to deteriorate the living environment

Table 7.3.16 Urban Prescriptions for Commercial Zones in Antananarivo Agglomeration

Commercial Zones	**Minimum Lot Size, BCR, Maximum Building Height**	**Urban Prescriptions**
Commercial Corridor	• Minimum Lot Size: 200 m² • BCR: 70% • Maximum Height: G+4 (16m) • Minimum Lot Size: 300 m² • BCR: 50% • Maximum Height: G+6 (23m)	• It is necessary to install the number of parking lots in comply with the parking lot regulations for Commercial Corridor Zones.
Commercial Centre (before the requirement for urban centres is satisfied)	• Minimum Lot Size: 200 m² • BCR: 70% • Maximum Height: G+4 (16m)	• It is essential to construct new arterial roads or upgrade existing arterial roads to strongly support the accessibility to urban centres, especially commercial centre areas.
Commercial Centre	• Min. Lot Size: 200 m² • BCR: 70% • Maximum Height: G+4 (16m) • Minimum Lot Size: 300 m² • BCR: 50% • Maximum Height: G+6 (23m)	
Primary Commercial Centre (before the requirement for urban centres is fulfilled) *	• Minimum Lot Size: 200 m² • BCR: 70% • Maximum Height: G+6 (23m)	• It is essential to construct new arterial roads or upgrade existing arterial roads to strongly support the accessibility to urban centres, especially commercial centre areas. • It is also essential to develop public transits in addition to arterial roads for strengthen the accessibility to Primary Urban Centres and Seconodary Urban Centres, especially to commercial centre areas.
Primary Commercial Centre*	• Minimum Lot Size: 200 m² • BCR: 70% • Maximum Height: G+6 (23m) • Minimum Lot Size: 500 m² • BCR: 50%	

	• Maximum Height: G+9 (33m) • *When Development Permission is obtained: G+19	

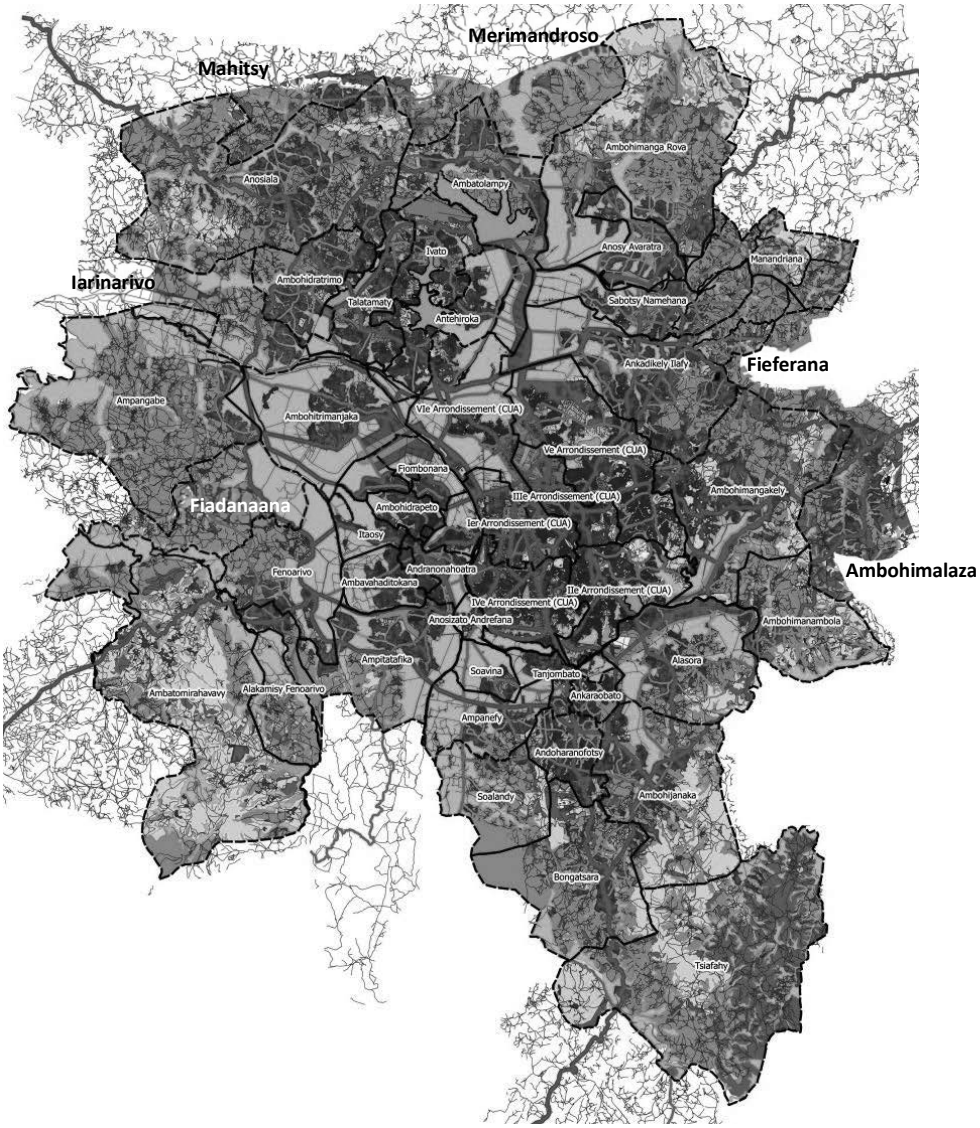
Table 7.3.17 Urban Prescriptions for Industrial Zones in Antananarivo Agglomeration

Industrial Zones	**Minimum Lot Size, BCR, Maximum Building Height**	**Urban Prescriptions**
Mixed Development	• Min. Lot: 700 m^2 • BCR: 50% • Max. Height: G+9 (33m) • *Evaluation and Planning Permission: 20m	• "Mixed Development Zone" is a transformation zone from industrial areas to mixed use of industries, commercial and residentials. Therefore, it is necessary to keep residential areas away from industries within the zone. • Securing of lands for urban parks is necessary.
Industry	• Min. Lot: 900 m^2 • BCR: 50% • Max. Height: G+3 (13m)	• The construction permission system should be enforced for "Industry Zones," so that no other use buildings are not developed. • Access roads, electricity and water supply are essential for promoting investment to "Industry Zones."

7.3.12 Land Use Zoning Plan for Antananarivo Agglomeration

The land use zoning plan for Antananarivo Agglomeration was prepared for the area covering not only 38 communes of Antananarivo Agglomeration, but also part of the following six neighbouring communes:

- Merimandroso Rural Commune
- Mahitsy Rural Commune
- Iarinarivo Rural Commune
- Fiadanana Rural Commune
- Ambohimalaza Rural Commune
- Fieferana Rural Commune



Source: JICA Study Team

Figure 7.3.1 Area Covering Land Use Zoning Plan for Antananarivo Agglomeration 2019-2033

The land use zoning plan for Antanaarivo Agglomeration 2019-2033 is shown in Figure 7.3.2 through Figure 7.3.15.

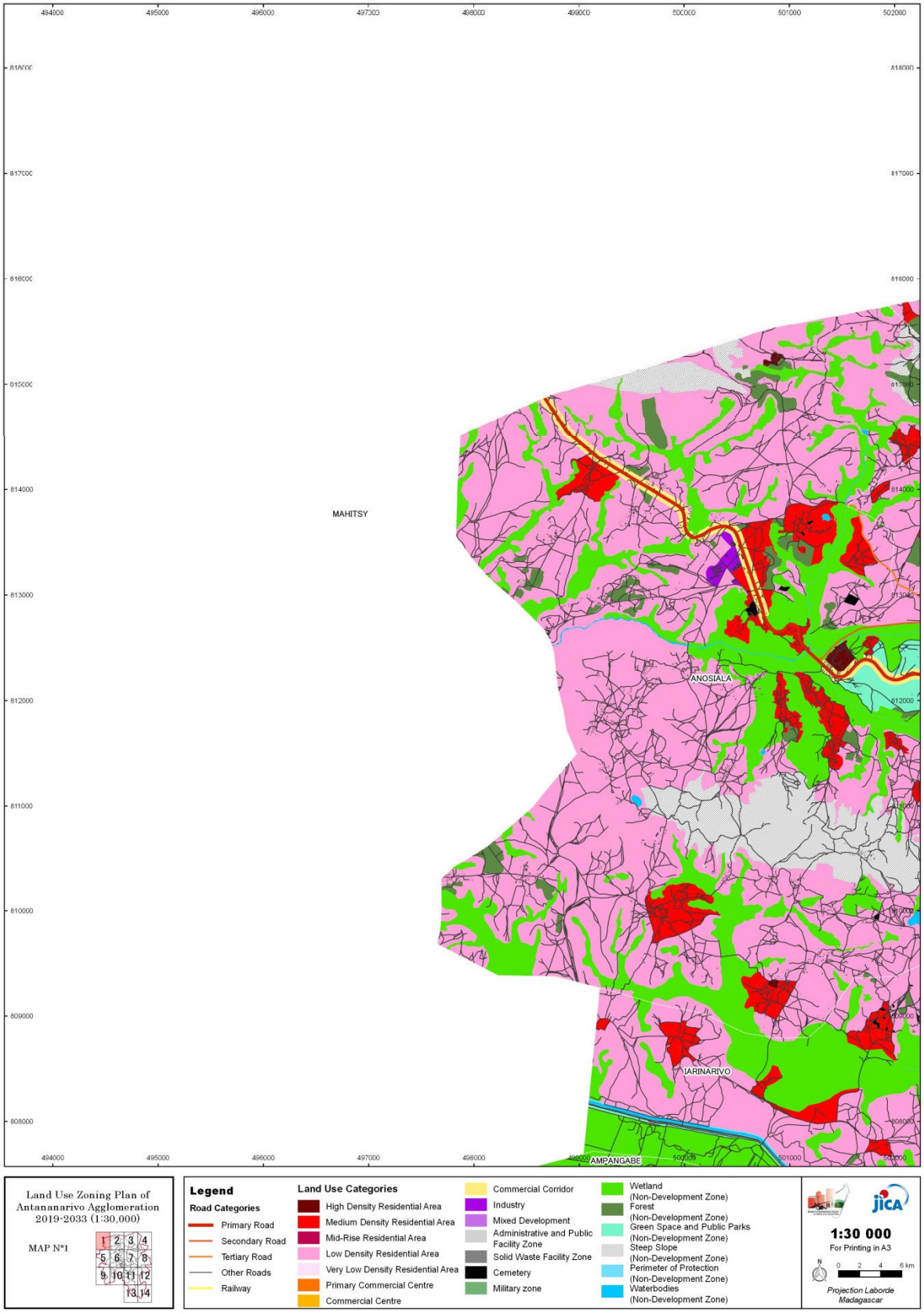


Figure 7.3.2 Land Use Zoning Plan for Antananarivo Agglomeration 2019-2033 (1)

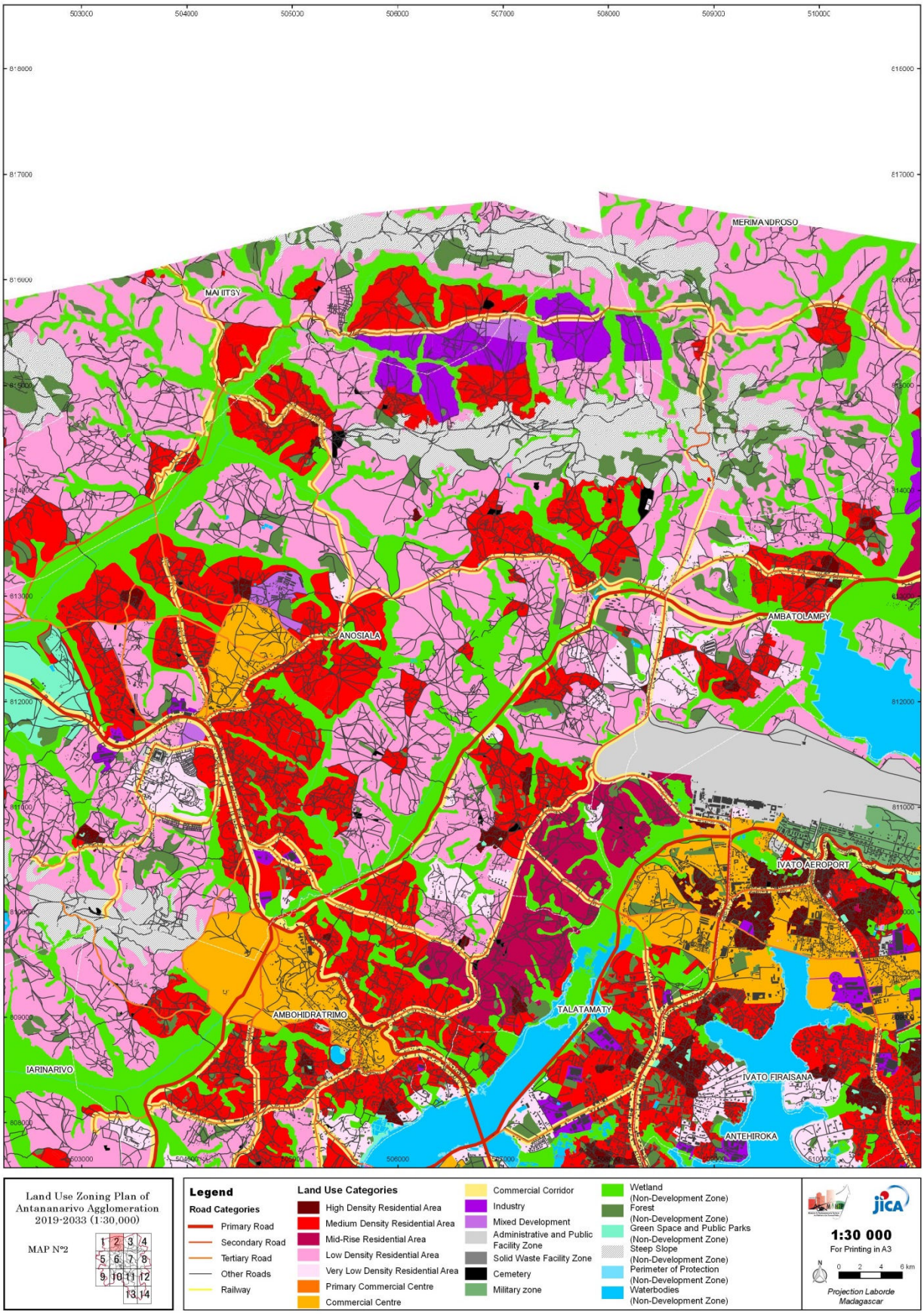


Figure 7.3.3 Land Use Zoning Plan for Antananarivo Agglomeration 2019-2033 (2)

Figure 7.3.4 Land Use Zoning Plan for Antananarivo Agglomeration 2019-2033 (3)

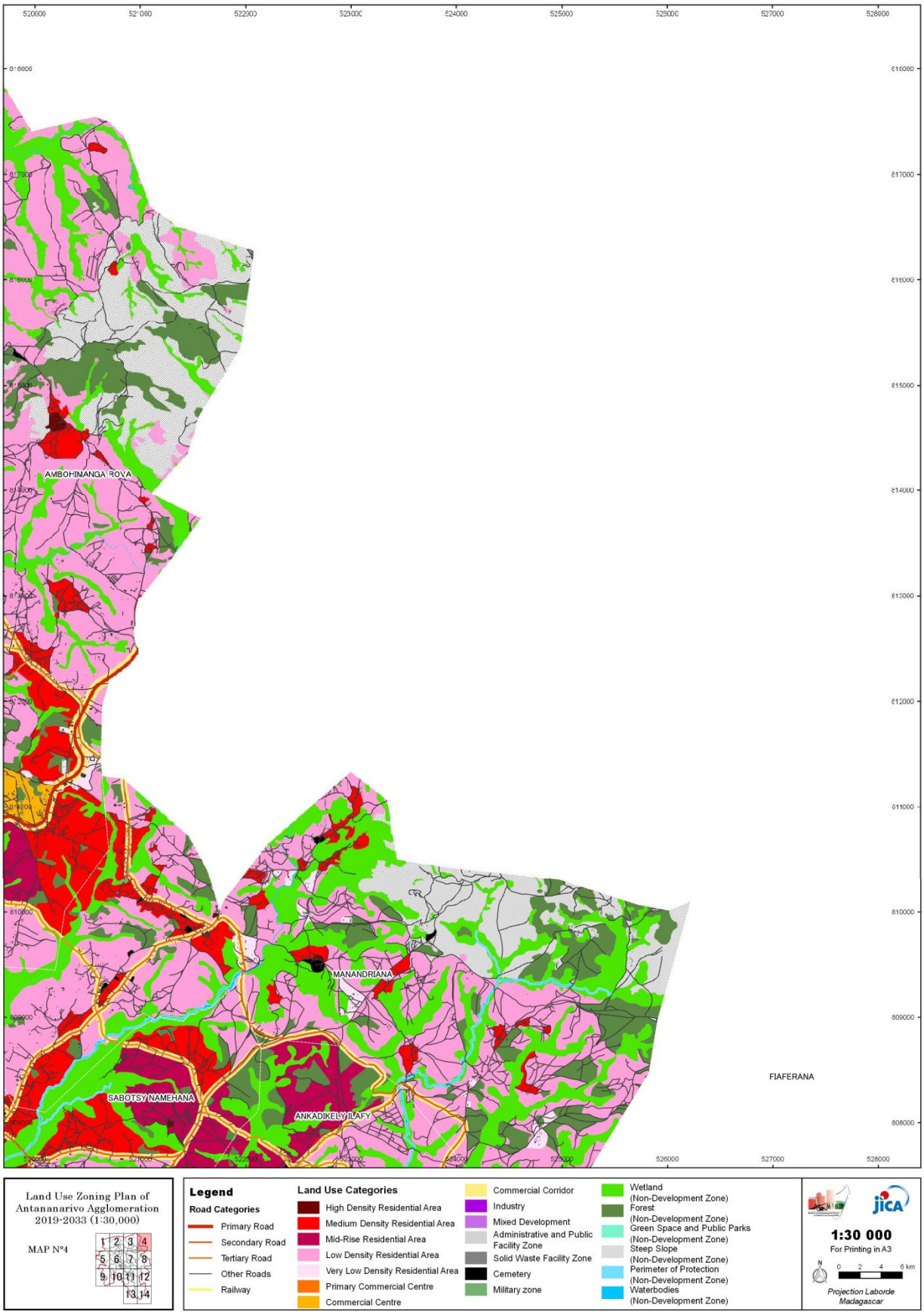


Figure 7.3.5 Land Use Zoning Plan for Antananarivo Agglomeration 2019-2033 (4)

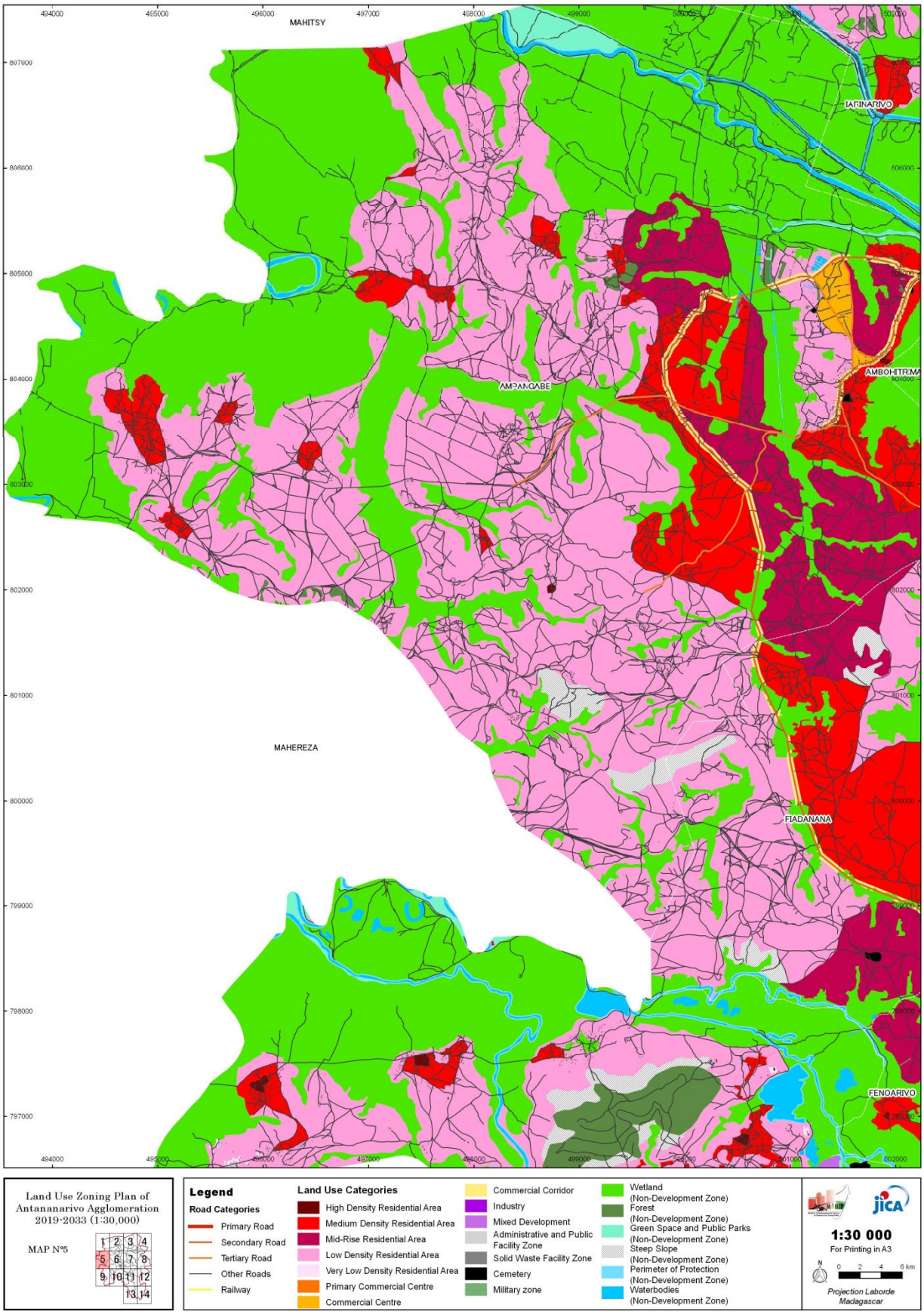


Figure 7.3.6 Land Use Zoning Plan for Antananarivo Agglomeration 2019-2033 (5)

Figure 7.3.7 Land Use Zoning Plan for Antananarivo Agglomeration 2019-2033 (6)

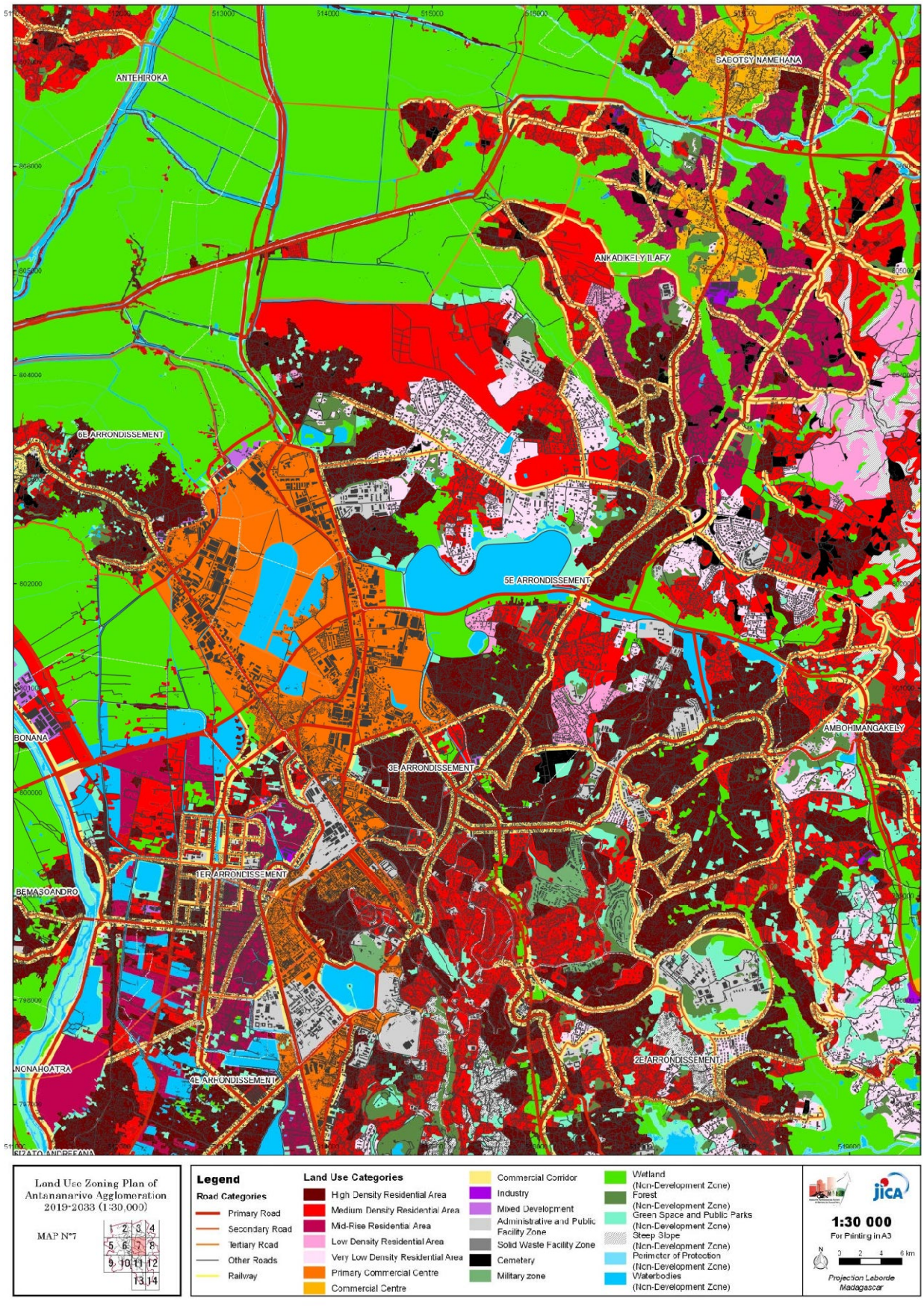


Figure 7.3.8 Land Use Zoning Plan for Antananarivo Agglomeration 2019-2033 (7)

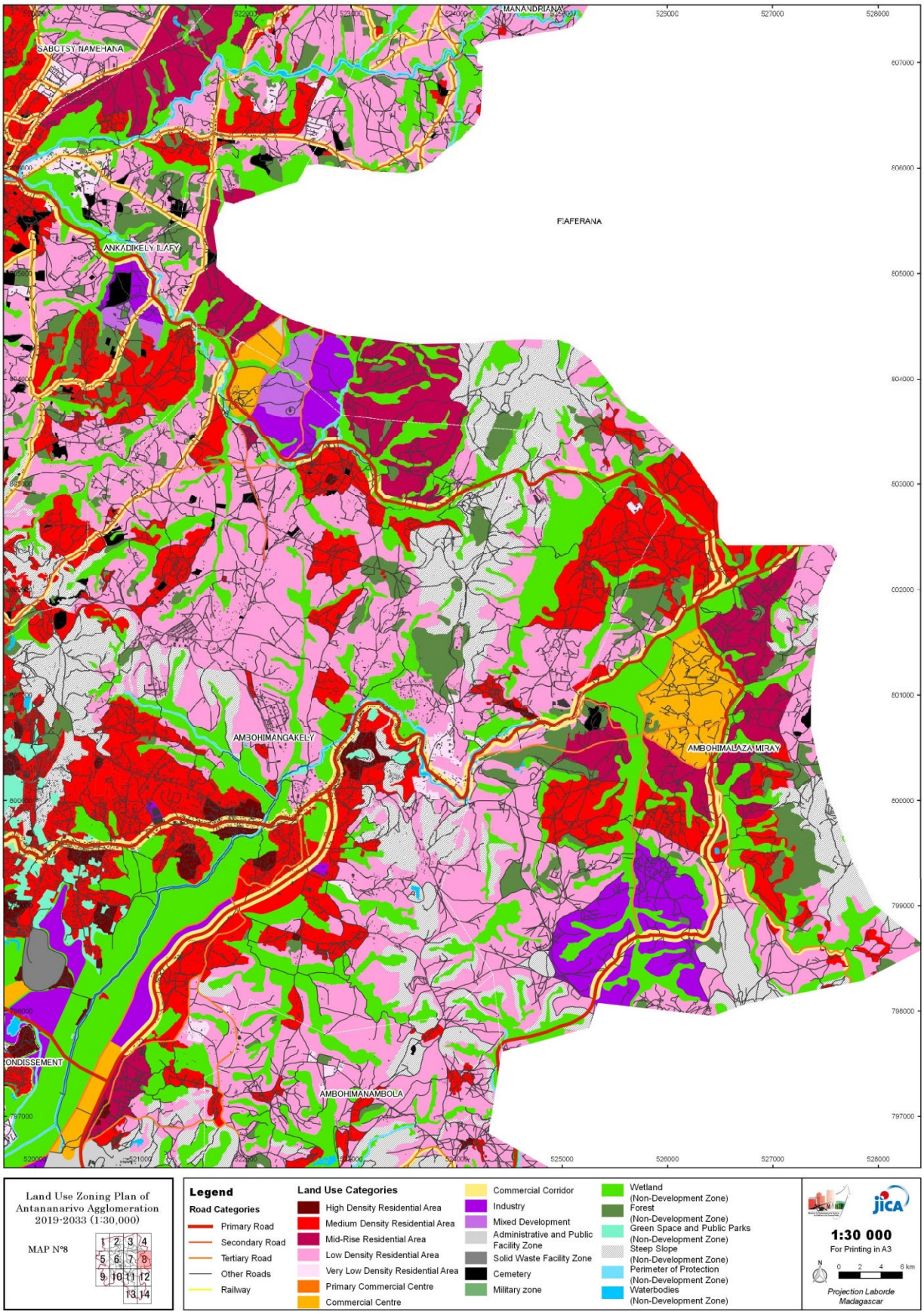


Figure 7.3.9 Land Use Zoning Plan for Antananarivo Agglomeration 2019-2033 (8)

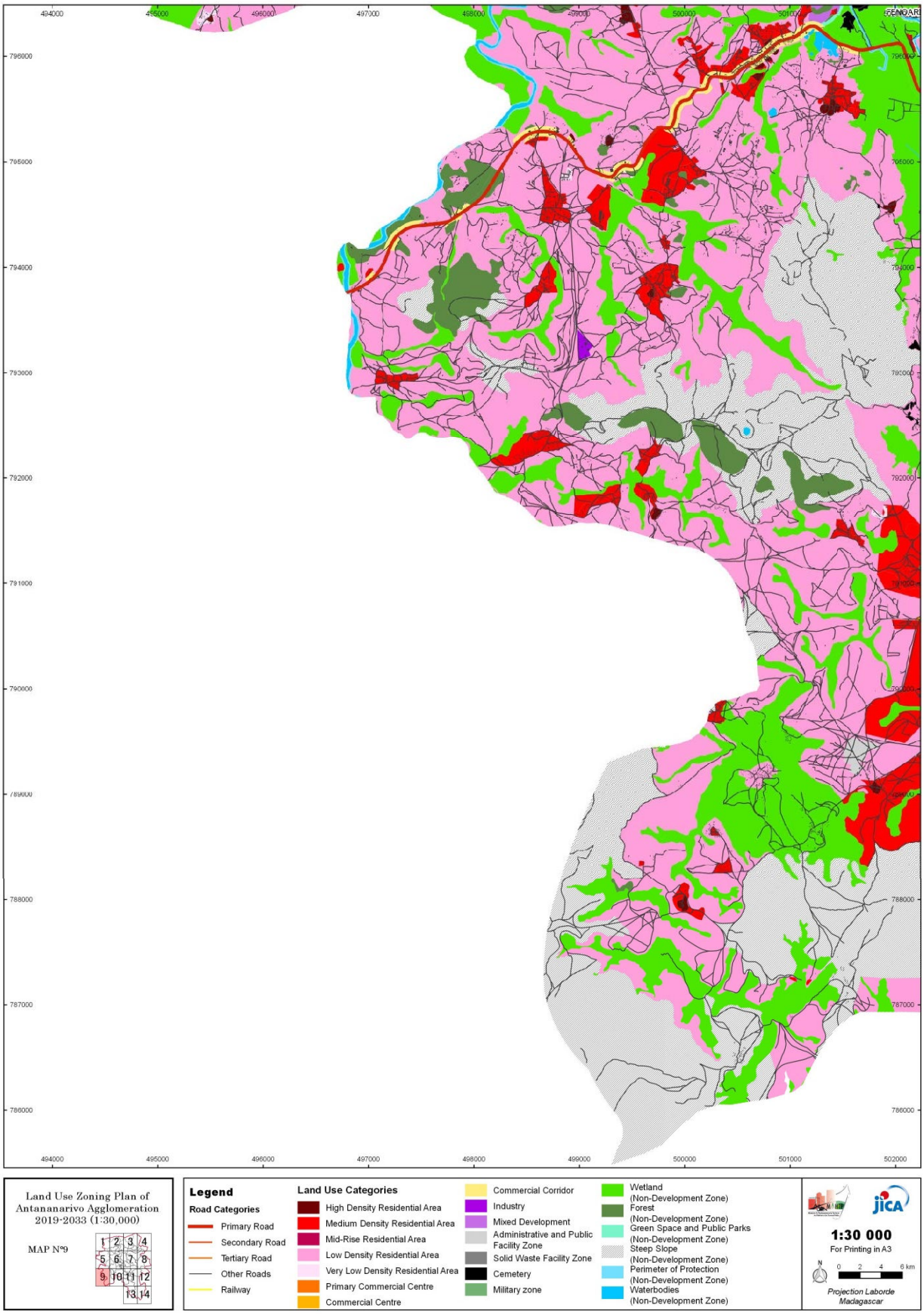


Figure 7.3.10 Land Use Zoning Plan for Antananarivo Agglomeration 2019-2033 (9)

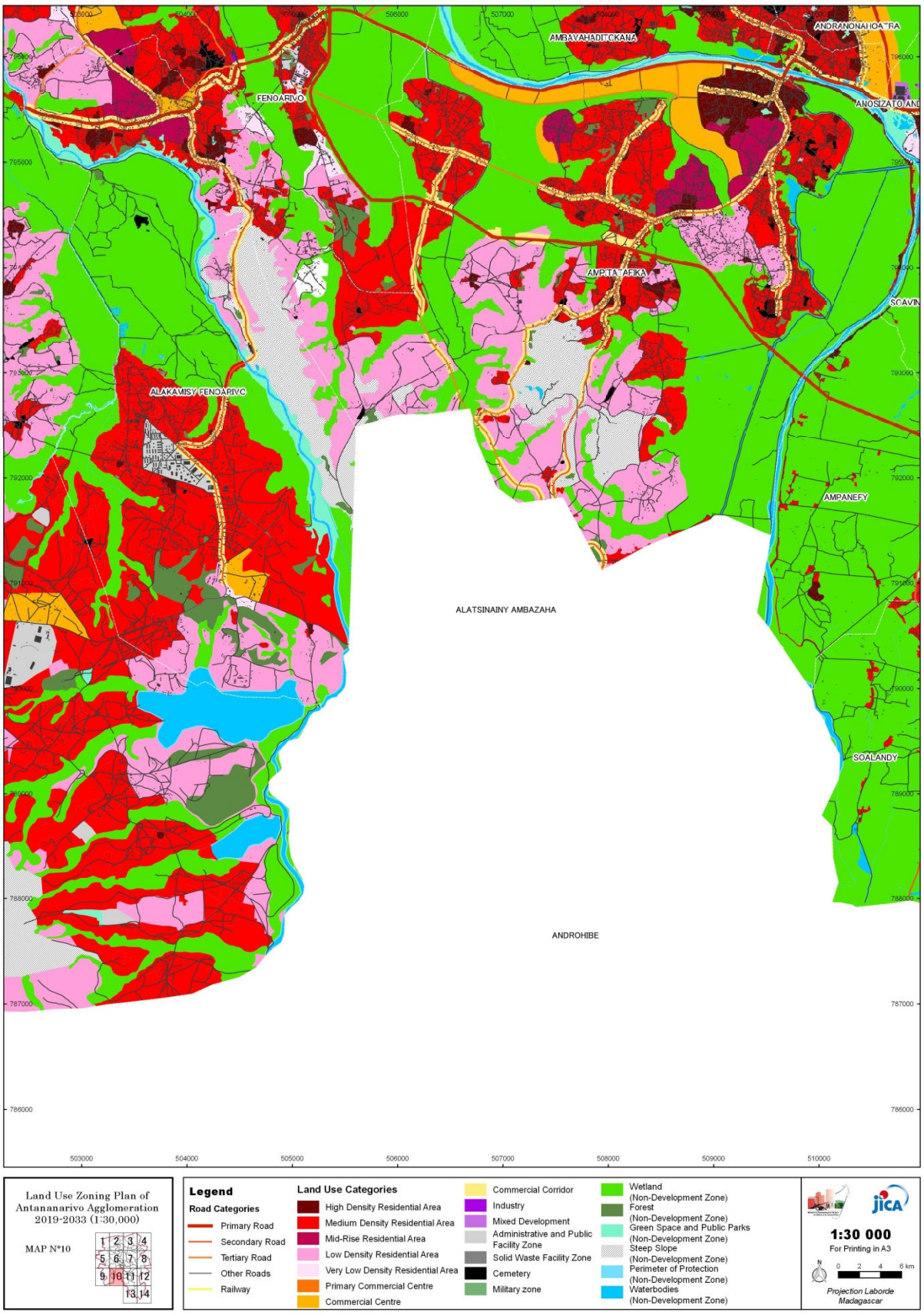


Figure 7.3.11 Land Use Zoning Plan for Antananarivo Agglomeration 2019-2033 (10)

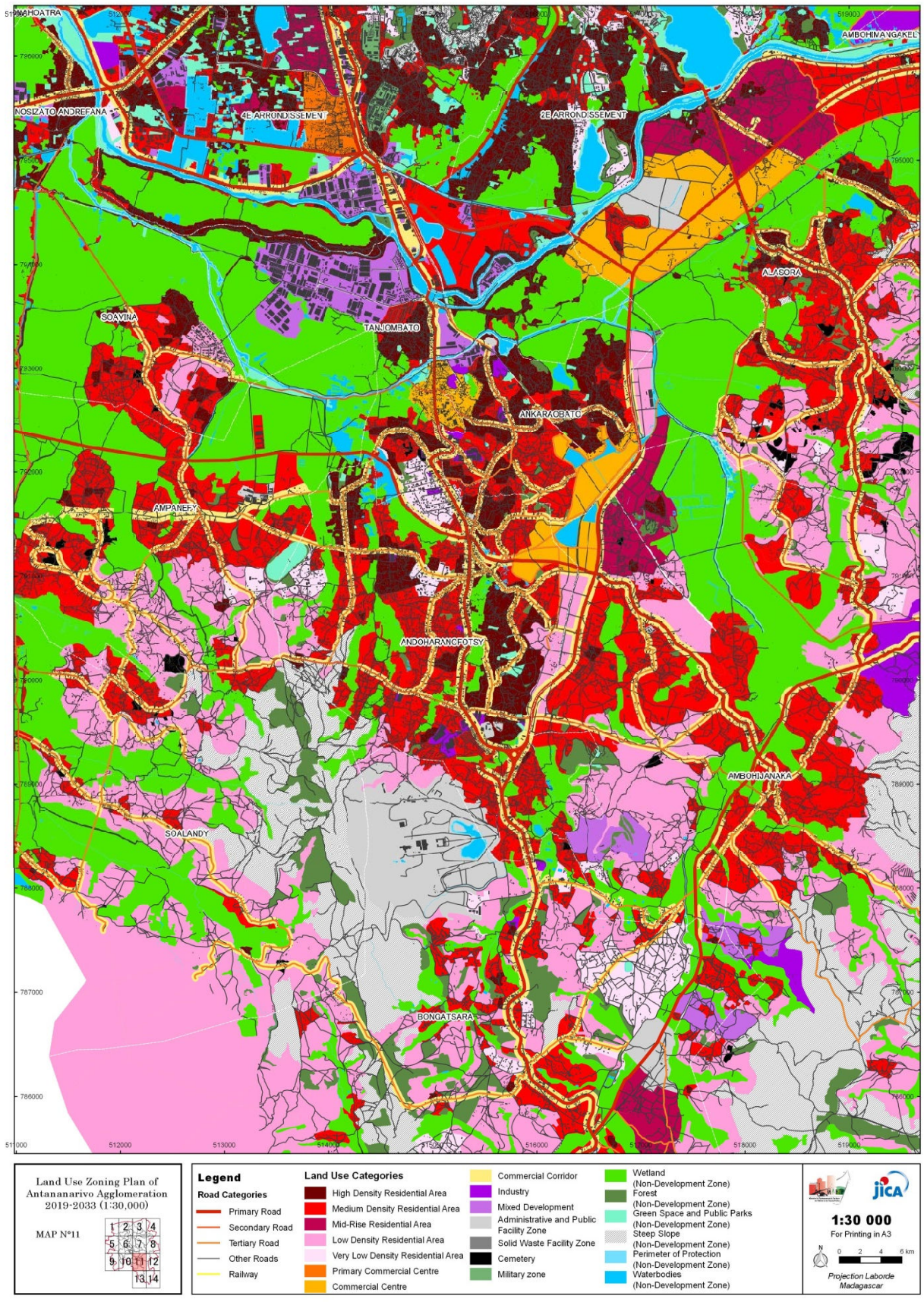


Figure 7.3.12 Land Use Zoning Plan for Antananarivo Agglomeration 2019-2033 (11)

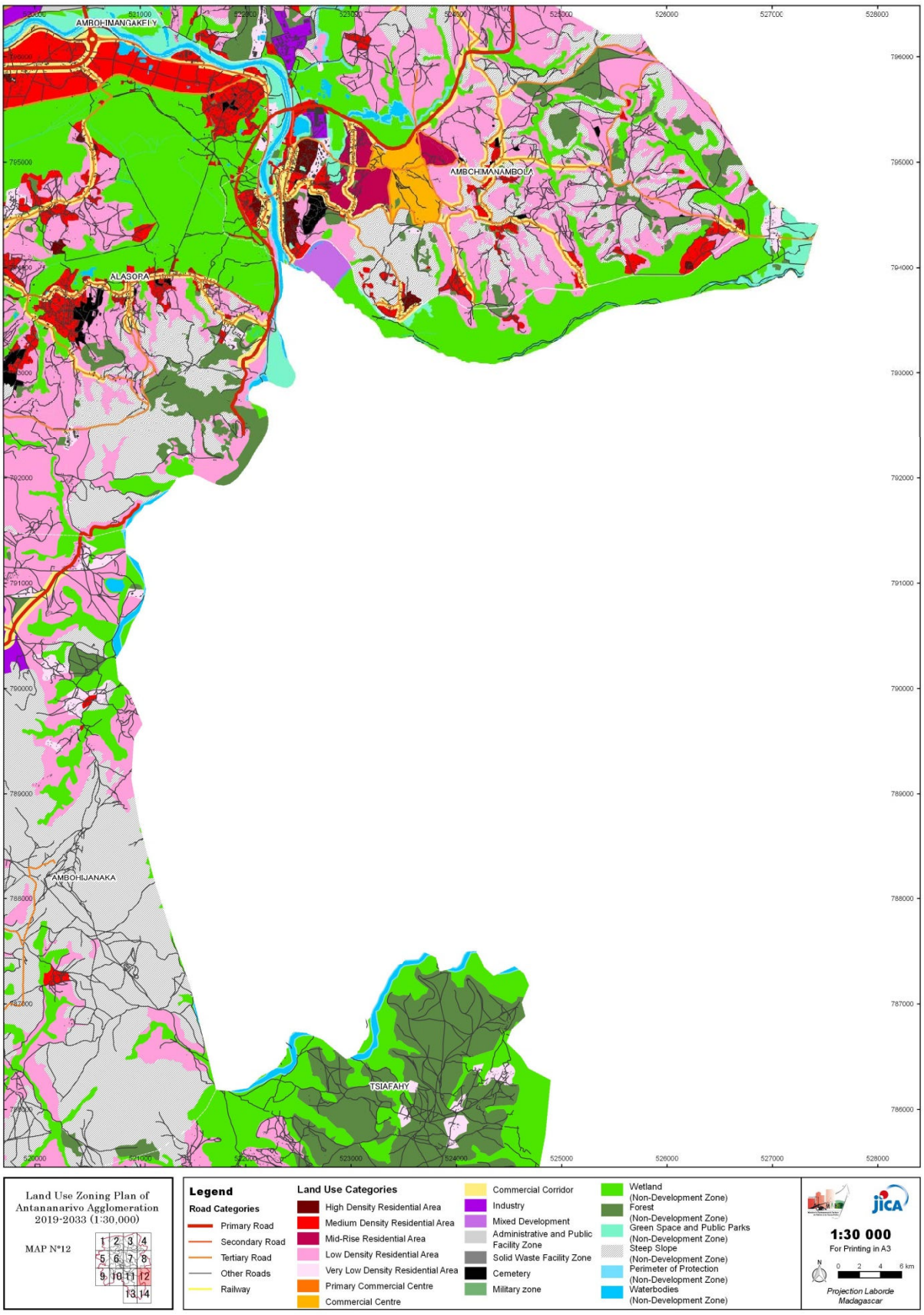


Figure 7.3.13 Land Use Zoning Plan for Antananarivo Agglomeration 2019-2033 (12)

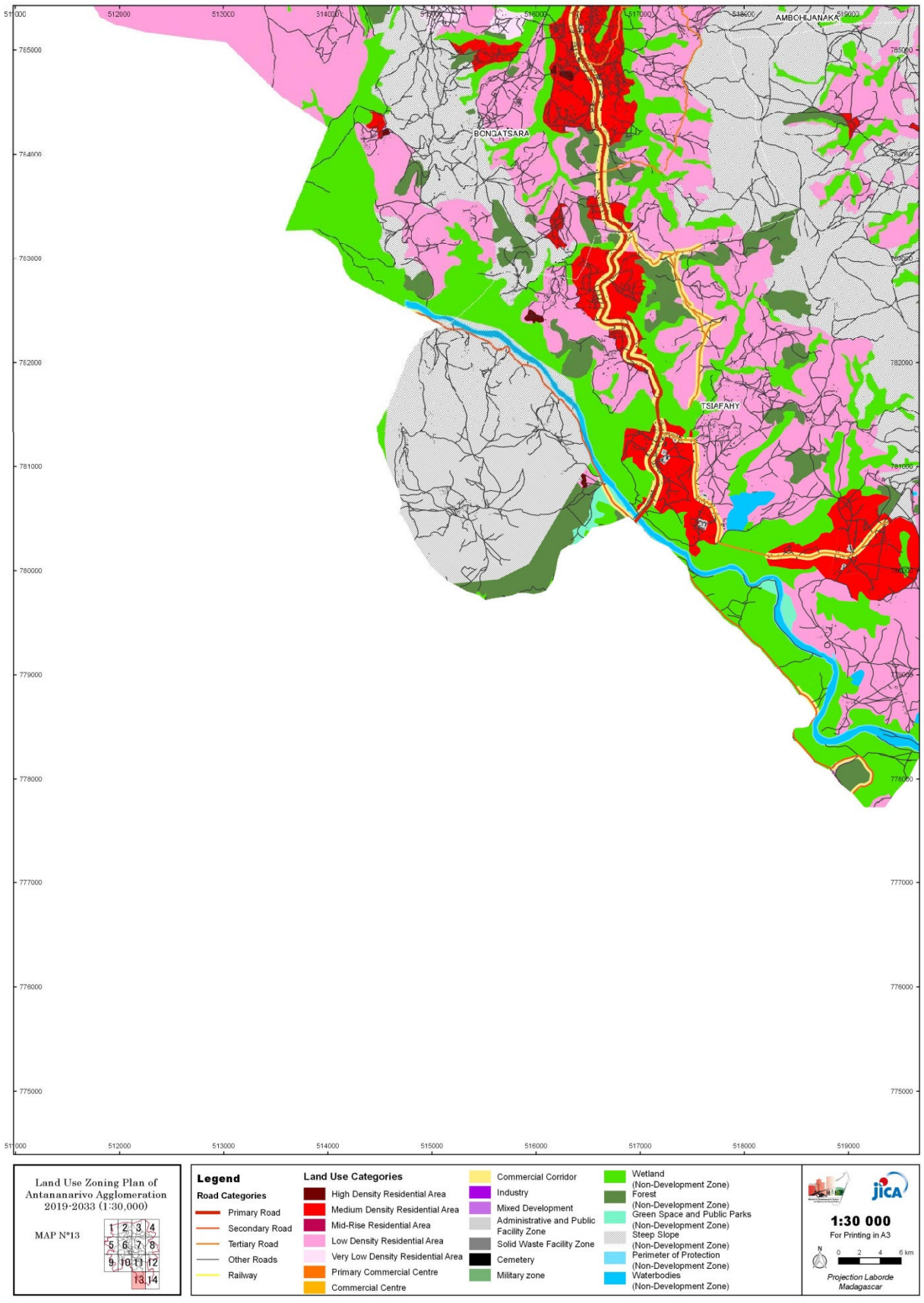


Figure 7.3.14 Land Use Zoning Plan for Antananarivo Agglomeration 2019-2033 (13)

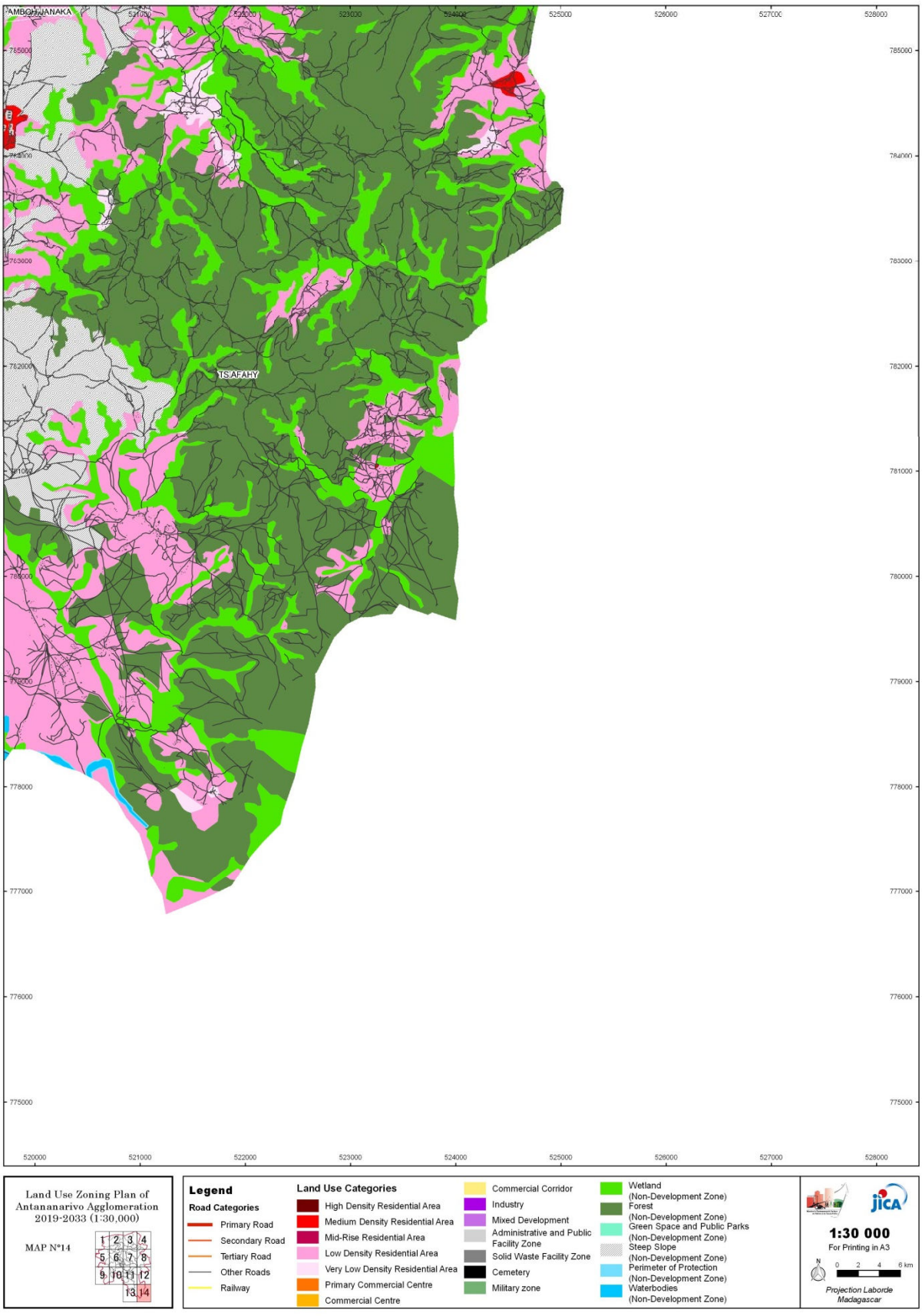


Figure 7.3.15 Land Use Zoning Plan for Antananarivo Agglomeration 2019-2033 (14)

7.4 Right of Way and Alighment of Buildings for Antananarivo Agglomeration

7.4.1 Construction Permission, Right of Way and Alighment

The Right of Way of urban roads and alighment of buildings are also important regulations to designate where to allow the construction of buildings.

7.4.2 Right of Way (ROW)

The Right of Ways (ROWs) are determined depending on different numbers of lanes by the government as shown in Table 7.4.1. The land designated by the ROW is the area allocated for the construction of roads. As a result, within the ROW, the new construction and reconstruction of buildings are prohibited.

Table 7.4.1 Size of Right of Way depending of Number of Lanes

Size (m) of Right of Way (ROW) from the Centre Line of the Road	Number of Lanes
15 m	6-lane Road
10 m	4-lane Road
5 m	2-lane Road

7.4.3 Alighnment

The Alighment lines are determined to show where to allow the construction of buildings from perspectives of maintaining a good building landscape and reserving land for other infrastructure. Different lengths between the boundary of ROW and the Alignment should be specified differently in the mid and high-density suburban areas and the low-density urban areas.

Table 7.4.2 Alignmenst to be Set for Low-Density Suburban Areas

Length (m) between the Boundary of the ROW and Alignment	Alignment (m) From the Centre Line of the Road	Size (m) of Right of Way (ROW) from the Centre Line of the Road	Number of Lanes
5 m	20 m	15 m	6-lane Road
2 m	12 m	10 m	4-lane Road
2 m	7 m	5 m	2-lane Road

Table 7.4.3 Alignments to be Set for the Mid and High-Density Urban Areas

Length (m) between the Boundary of the ROW and Alignment	Alignment (m) From the Centre Line of the Road	Size (m) of Right of Way (ROW) from the Centre Line of the Road	Number of Lanes
0 m	15 m	15 m	6-lane Road
0 m	10 m	10 m	4-lane Road
0 m	5 m	5 m	2-lane Road