

Republic of Côte d'Ivoire
Ministry of Construction, Housing, Sanitation and Urban Development (MCLAU)



SCHEMA
DIRECTEUR
d'URBANISME
du GRAND
ABIDJAN

REPUBLIC OF COTE D'IVOIRE
THE PROJECT FOR THE DEVELOPMENT OF THE URBAN MASTER
PLAN IN GREATER ABIDJAN (SDUGA)
FINAL REPORT



VOLUME I
INTRODUCTION AND SUMMARY

MARCH 2015

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

Oriental Consultants Global Co., Ltd.

Japan Development Institute

International Development Center of Japan

Asia Air Survey Co., Ltd.

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- A RESPONSES OF JICA STUDY TEAM TO "SUMMARY OF RECOMMENDATIONS AND COMMENTS / VALIDATION OF THE SDUGA" PREPARED BY CI'S WORKING GROUP

Abbreviations

English		French	
AAD	Abidjan Autonomous District	DAA	District Autonome d'Abidjan
AAGR	Average Annual Growth Rate	TCAM	Taux de Croissance Annuel Moyen
AFD	French Agency for Development	AFD	Agence Française de Développement
AfDB	African Development Bank	BAD	Banque Africaine de Développement
AGEPE	Agency for Studies and Employment Promotion	AGEPE	Agence d'Etudes et de Promotion de l'Emploi
AGEROUT E	Road Management Agency	AGEROUTE	Agence de Gestion des Routes
AGETU	Urban Transport Agency	AGETU	Agence des Transports Urbains
ANDE	National Environmental Agency	ANDE	Agence Nationale de l'Environnement
ATC	Area Traffic Control	ATC	Système de Contrôle de la Circulation
AUPA	Agency of Urban Planning and Exploration in Abidjan	AUPA	Agence d'Urbanisme et de Prospection d'Abidjan
BNETD	National Bureau of Technical Studies and Development	BNETD	Bureau National d'Etudes Techniques et de Développement
BOAD	West African Development Bank	BOAD	Banque Ouest Africaine de Développement
BRT	Bus Rapid Transit	BRT	Transit Rapide par Bus
CAS	Country Assistance Strategy	CAS	Stratégie d'Aide-Pays
CBD	Central Business District	CA	Centre d'Affaires
CCT	Centre of Cartography and Remote Sensing	CCT	Centre de Cartographie et de Télédétection
CHU	University Hospital	CHU	Centre Hospitalier Universitaire
CI	Côte d'Ivoire	CI	Côte d'Ivoire
DTC	Directorate of Topographic Survey and Mapping	DTC	Direction de la Topographie et de la Cartographie
DVD	Digital Video Disc	DVD	Digital Video Disc
ECOWAS	Economic Community of West African States	CEDEAO	Communauté Economique des Etats de l'Afrique de l'Ouest
EIA	Environmental Impact Assessment	EIE	Etude d'Impact Environnemental
EIS	Environmental Impact Statement	CIE	Déclaration d'Impact Environnemental
EP	Environmental Permit to Operate	PE	Permis Environnemental d'Exploitation
ESIA	Environmental and Social Impact Assessment	EIES	Etude d'Impact Environnemental et Social
EU	European Union	UE	Union européenne
FAO	Food and Agriculture Organization of the United Nations	FAO	Organisation des Nations Unies pour l'Alimentation et l'Agriculture
FCFA	African Financial Community Franc	FCFA	Francs de la Communauté Financière Africaine
FDI	Foreign Direct Investment	IDE	Investissements Directs Etrangers
GAUDSS	Greater Abidjan Urban Development Spatial Strategy	SSAUGA	Stratégie Spatiale d'Aménagement Urbain du Grand Abidjan
GDP	Gross Domestic Product	PIB	Produit Intérieur Brut
GIS	Geographic Information System	SIG	Système d'Information Géographique
GNI	Gross National Income	RNB	Revenu National Brut

Abbreviations

English		French	
GPS	Global Positioning System	GPS	Système de Positionnement Global
GRDP	Gross Regional Domestic Product	PIB Régional	Produits Intérieurs Bruts Régionaux
HIPC	Heavily Indebted Poor Countries	POTE	Pays Pauvres Très Endettés
HIS	Household Interview Survey	HIS	Enquête Ménages Déplacements
ICT	Information and Communications Technology	TIC	Technologies de l'Information et de la Communication
IEE	Initial Environmental Examination	EI	Examen Environnemental Initial
IMF	International Monetary Fund	FMI	Fonds Monétaire International
INS	National Statistic Office	INS	Institut National de la Statistique
IS	Impact Statement	CI	Déclaration d'Impact
ITS	Intelligent Transportation Systems	STI	Systèmes de Transport Intelligents
JCC	Joint Coordination Committee	CCM	Comité de Coordination Mixte
JICA	Japan International Cooperation Agency	JICA	Agence Japonaise de Coopération Internationale
JST	JICA Study Team	JST	Mission d'Etude de la JICA
K-Economy	Knowledge Economy	K-Economie	Economie Basée sur le Savoir
MCLAU	Ministry of Construction, Housing, Sanitation and Urban Development	MCLAU	Ministère de la Construction, du Logement, de l'Assainissement et de l'Urbanisme
MEMIS	Ministry of State, Ministry of Interior and Security	MEMIS	Ministère d'Etat, Ministère de l'Intérieur et de la Sécurité
MEMPD	Ministry of State, Ministry of Planning and Development	MEMPD	Ministère d'Etat, Ministère du Plan et du Développement
MICE	Meetings, Incentives, Conferences/Conventions and Exhibitions/Events	MICE	Réunions, Incentives, Conférences / Conventions et Expositions / Evénements
MIE	Ministry of Economic Infrastructure	MIE	Ministère des Infrastructures Economiques
MINAGRA	Ministry of Agriculture and Animal Resources	MINAGRA	Ministère de l'Agriculture et des Ressources Animales
MINESUD D	Ministry of Environment, Urban Safety and Sustainable Development	MINESUDD	Ministère de l'Environnement, de la Salubrité Urbaine et du Développement Durable
MNPD	Ministry of National Planning and Development	MEMPD	Ministère d'Etat, Ministère du Plan et du Développement
MPEA	Master Plan of Extended Areas	PDZE	Plan Directeur des Zones d'Extensions
MT	Ministry of Transport	MT	Ministère du Transport
MTPCPT	Ministry of Public Works, Construction, Post and Telecommunication	MTPCPT	Ministère des Travaux Publics, Construction, Postes et Télécommunication
PDF	Portable Document Format	PDF	Portable Document Format
PIDA	Programme for Infrastructure Development in Africa	PIDA	Programme de Développement des Infrastructures en Afrique
PPP	Public-Private Partnership	PPP	Partenariat Public-Privé

Abbreviations

English		French	
PUD	Urban Master Plan	PUD	Plan d'Urbanisme Directeur
PUd	Detailed Urban Plan	PUd	Plan d'Urbanisme de détail
RDRP	Relaunching Development and Reducing Poverty	(No Abbreviations)	Relance du Développement et de Réduction de la Pauvreté
RISP	Regional Integration Strategy Paper for West Africa	RISP	Programme d'Appui à l'Intégration Régionale pour l'Afrique de l'Ouest
ROW	Right of Way	ROW	Emprise de Voie
SDU	Urban Master Plan	SDU	Schéma Directeur d'Urbanisme
SDUGA	Urban Master Plan for Greater Abidjan	SDUGA	Schéma Directeur d'Urbanisme du Grand Abidjan
SEA	Strategic Environmental Assessment	EES	Evaluation Environnementale Stratégique
SITARAIL	International Company of African Rail Transport	SITARAIL	Société Internationale de Transport Africain par Rail
SODEFOR	Association for the Development of Forests	SODEFOR	Société pour le Développement des Forêts
SOTRA	Abidjan Transport Company	SOTRA	Société des Transports Abidjanais
SRTM	Shuttle Radar Topography Mission	SRTM	Mission de Topographie Radar Shuttle
SWOT	Strengths, Weaknesses, Opportunities and Threats	SWOT	Forces, Faiblesses, Opportunités et Menaces
TAZ	Traffic Analysis Zone	TAZ	Zones d'Analyse du Trafic
TOD	Transit-Oriented Development	TOD	Développement Orienté sur le Transit
UEMOA	West African Economic and Monetary Union	UEMOA	Union Economique et Monétaire Ouest-Africaine
UN	United Nations	ONU	Nations Unies
UNESCO	United Nations Educational, Scientific and Cultural Organization	UNESCO	Organisation des Nations Unies pour l'Education, la Science et la Culture
US/USA	United States of America	US/USA	États-Unis d'Amérique
US\$/USD	United States Dollar	US\$/USD	Dollar US
WB	World Bank	BM	Banque Mondiale
WD	Working Days Required for Review	JT	Jours de travail requis pour examen

Japan International Cooperation Agency (JICA)

Ministry of Construction, Housing, Sanitation and Urban Development (MCLAU)

The Project for the Development of
the Urban Master Plan in Greater Abidjan
in the Republic of Côte d'Ivoire (SDUGA)

Final Report

March 2015

Executive Summary

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1.0 Overview of the Project

Executive Summary

1.1 Project Objectives

The principal objective of the Project is to formulate the urban master plan for the “Greater Abidjan Area”. The plan should be sustainable and in line with the National Development Plan. This can be achieved by:

- (1) Analyzing and evaluating the Master Plan approved in 2000,
- (2) Formulating a revised Urban Master Plan for Greater Abidjan (SDUGA) with the target year of 2030, including Urban Transport Master Plan, and
- (3) Identifying high priority projects in the transport sector
- (4) Preparing topographic maps to provide basic geographic information for Urban Master Plan and Transport Master Plan formulation for Greater Abidjan
- (5) Strengthening of capability profile of counterparts through the Project

The target year for the master plans is set 2030 and the intermediated planning years are set 2020 and 2025. The target year of the detailed master plan of Extended Area is set 2025 through the discussion with MCLAU and approved by JCC (Joint Coordination Committee).

1.2 Study Area and Planning Area of Greater Abidjan

The “Study Area” for the Project is the Greater Abidjan Area consisting of such administrative units as the Abidjan Autonomous District (13 communes) and 6 surrounding communes, which is in total 19 communes and un-urbanized sous-prefectures as shown in Figure 1.1 (total area: 431,063 ha).

Within the Study Area of Greater Abidjan, the “Planning Area” is defined as the area delineated by such geographical features as rivers, mountains and roads which are considered most likely limit of area for the urban master planning, and shown by the red dotted line in Figure 1.1 (total area: 349,202 ha).



Source: JICA Study Team

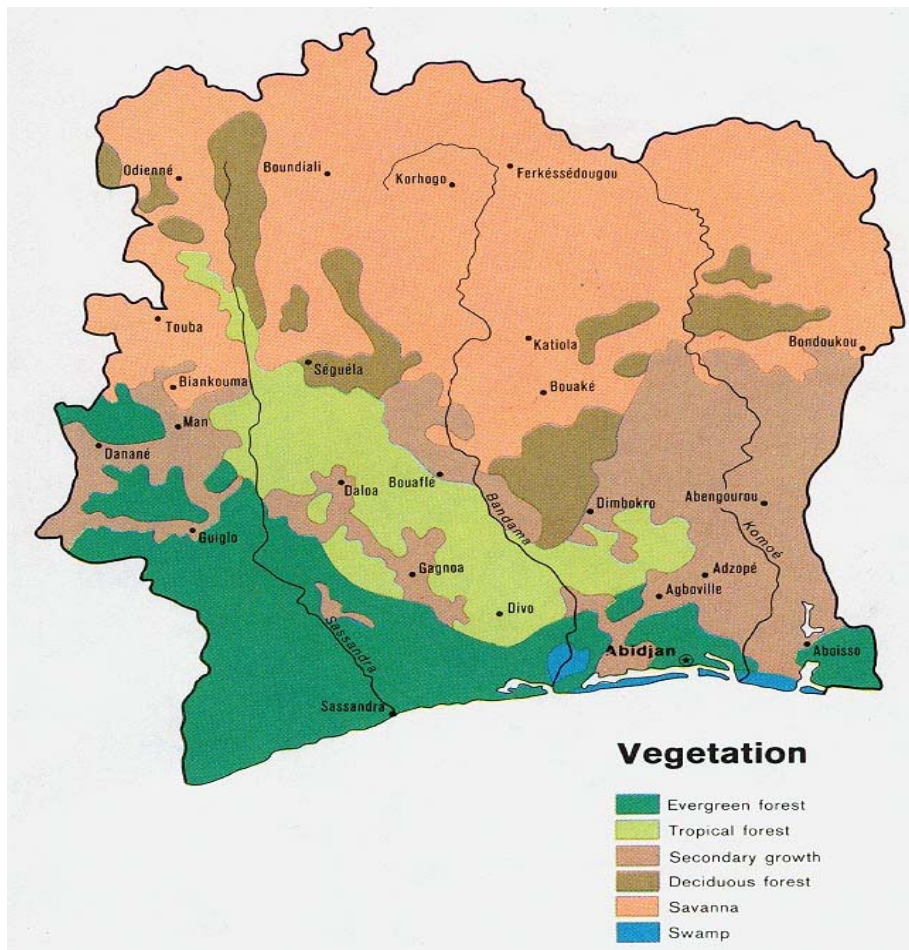
Figure 1.1 Study Area and Planning Area for the Project

1.3 Current Conditions

(1) Geography

Cote d'Ivoire has a land area of 322,000 km². It has an east-west coastal line of 515 km with many lagoons, especially in its eastern part. Abidjan has grown as a port town along one of the lagoons. The country is surrounded by Ghana, Burkina Faso, Mali, Guinea and Liberia.

The lands are mostly flat nation-wide. Vegetation ranges from tropical rain forests in the south to savannah in the north. With plenty of precipitation, the southern part is advanced in tropical export agriculture, food production and forestry, while dry land crops such as cotton and cashew nut, as well as livestock, are the main productive activities in the northern part. There are four major rivers, all from north to south, including Komoe River, Bandama River, Cavalla River, and Sassandra River. Komoe River flows into the sea at Grand Bassam as shown in Figure 1.2.



Source: University of Texas (FAO)

Figure 1.2 Vegetation of Cote d'Ivoire

(2) Population

The national population growth was very rapid at 4.2% a year during the 30-year period from 1955 to 1985 but it is steadily slowing down from 3.4% a year (1988-1998) to 2.6% a year (1998-2014). The current Census found the national population to be 22,671,000 persons in 2014.

Abidjan is by far the largest city in Cote d'Ivoire. According to the 1998 Census, the Greater Abidjan territory had 3,386,000 people, and it grew at 2.7% a year to reach 5,054,000 people in 2014. This implies that the Greater Abidjan population accounts for 22.3% of the national population in 2014.

(3) Economy

According to the World Bank data, the national GDP amounts to US\$ 24,680 million and per capita GNI amounts to US\$ 1,220 in 2012 (Atlas method and PPP based). The per capita GNI is comparable to the average of Sab-Saharan Africa being US\$ 1,345 in the same year. The largest source of GDP in 2011 is services (51%) followed by agriculture (22%), manufacturing (19%) and mining (8%). The fastest growing sector is mining, petroleum in particular.

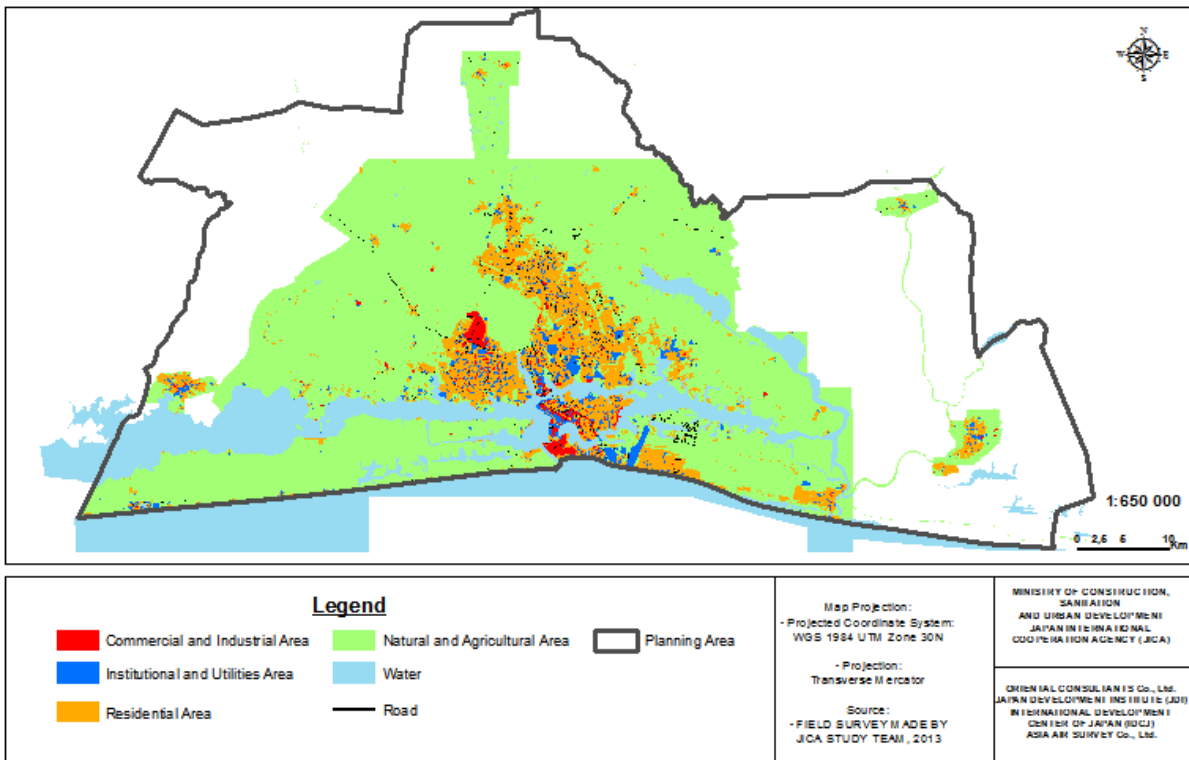
Mineral fuels are an emerging leading sector with a proven reserve of petroleum being about one million barrels and natural gas being about one trillion cubic feet. The petroleum and the natural gas exist mainly offshore from Dabou.

Cote d'Ivoire is competitive not only in oil in Africa but also in a variety of products in the western Africa region. Cote d'Ivoire has a large surplus in exports with all of its neighboring countries. It is a regional hub. Basically, it exports plenty of industrial goods to and imports agricultural and resource products from neighboring countries.

(4) Existing Land Use

The total area of the land, which the present land use was specified, measures about 189,000 hectare, and occupies about 54% of the Greater Abidjan whole area (about 349,000 hectare).

The ratio of a developed area and an undeveloped area in Greater Abidjan is 1 to 3. The developed area is divided into 60% of a residential area, 16% of an institutional/utility area, 6% of a commercial/industrial area, and 18% of other areas as shown in Figure 1.3.



Source: JICA Study Team

Figure 1.3 Current Land Use Map

1.4 Review of Master Plan 2000

Realization of the Master Plan 2000, even partially, has been severely disrupted by economic, political and social factors both within Cote d'Ivoire and across West Africa. This has resulted in the delay or non-implementation of: (a) projects that were identified for short and medium term implementation; (b)

social housing and investment in social infrastructure to keep pace with population growth; and (c) formulation of detailed master plans to guide development control. In consequence: illegal occupation of land has occurred to meet the demand for residential premises; there is a need to rehabilitate existing community facilities; and road, public transit, sanitation, drainage and waste management infrastructure require urgent upgrading.

A notable absence in the Master Plan 2000 are land use policies to guide desired actions. There is also a need to clearly define the organizations and stakeholders responsible for implementation of the policies and the role of communes in development control to ensure that projects are realized in a timely and coordinated manner.

1.5 Socio-Economic Framework

(1) Prospects of Economic Growth in Greater Abidjan

Based on the review of the PND and its performance, the economic prospects of the country and Abidjan, and implications for the national and international economy for Abidjan, the annual rate of economic growth of Greater Abidjan (GRDP) is assumed for the short-term to be about 10% being the same target rate of the “Triumph of the Elephant” scenario of the ongoing PND and, for the long-term to be about 6.3% on average being the same target rate of “Awaking of the Elephant” scenario of PND.

(2) Population

The total national population grew at a very high rate of 4.2% a year for 30 years from 1955 to 1985. This is due to rapid migration from surrounding countries. The population growth, however, slowed down with an end of a migration rush and a greatly fluctuating national economy in the early 1980s till early 2000s. At present, the growth rate is steady down to 2.6% a year on average during 1998-2014.

Based on the observation above, the national population is assumed to grow at a moderate speed as projected by United Nations as shown in Table 1.1 below.

Table 1.1 Future Population of Cote d'Ivoire

Year	Total population (‘000 persons)	Growth Rate* (% p.a.)
2014	22 671**	-
2015	23 211	2.38
2020	25 904	2.22
2025	28 783	2.13
2030	31 841	2.04

*UN Population Division, World Population Prospects, The 2012 Revision; **INS 2014 Census Result

The population has been concentrated in Abidjan Autonomous District (or Greater Abidjan). In 2014, AAD population is 4,395,000 persons and Greater Abidjan (Study Area) population is 5,054,000 persons, which represent 20.8% and 22.3% of the national total population, respectively.

MNPD anticipates Abidjan will not expand further in population and urban area, but will be developed as a competitive city against other African cities in trade, industries, tourism, education and infrastructure. Consequently, Abidjan would remain as a major growth pole of Western Africa as well as Cote d'Ivoire.

Having in mind the current trends and the government intention above, the future population growth rate of Greater Abidjan was assumed to remain unchanged and estimated for both its Study Area and Planning Area as presented as shown in Table 1.2.

Table 1.2 Greater Abidjan Population Projection for Study Area and Planning Area

Year	Study Area		Planning Area	
	Population (000 persons)	Growth Rate (% p.a.)	Population (000 persons)	Growth Rate (% p.a.)
1998	3 386	-	3 309	-
2014	5 054	2.68	4 968	2.72
2020	5 922	2.68	5 836	2.72
2025	6 758	2.68	6 675	2.72
2030	7 712	2.68	7 634	2.72

Sources: INS 1998 and 2014 Census, JICA Study Team

(3) Employment in Greater Abidjan

Total Employment

Based on the Census data and the UN projections, the future economically active population or the population over 15 years old was estimated at 66.2% (3,289,000 employments) in 2014 and 69.7 % (5,322,000 persons) in 2030 over the total population of Greater Abidjan. Meanwhile, the nation-wide employment survey of Agence d'Etudes et de Promotion de l'Emploi (AGEPE) in 2012 finds that a labor force participation ratio is 56.9 % against the population aged 15 and over. Assuming this ratio remain unchanged in future, the total employment in Grater Abidjan was estimated at 3,028,000 persons in 2030 as shown in the most right column of Table 1.3.

Employment by Industrial Sector

Estimation of the current employment by industrial sector was based on the 2013 HIS results and also the total employment as estimated above. The future employment by industrial sector in Greater Abidjan is derived from the development potentials identified for each commune/sous-prefecture for employment and the implementation plan of the land use framework for the target years 2020, 2025 and 2030, and the results are shown in Table 1.3.

Table 1.3 Estimated Future Employment by Industrial Sector in Greater Abidjan

(Unit: 1,000 persons)

Year	Primary Industry	Secondary Industry	Tertiary Industry	Total
2014	144 (7.7 %)	602 (32.2 %)	1 126 (60.2 %)	1 871 (100.0%)
2020	121 (5.4 %)	733 (32.7%)	1 388 (61.9 %)	2 242 (100.0%)
2025	107 (4.1 %)	860 (33.0%)	1 639 (62.9 %)	2 606 (100.0%)
2030	94 (3.1 %)	1 005 (33.2%)	1 929 (63.7 %)	3 028 (100.0%)

Source: JICA Study Team

2.0 Urban Master Plan and Other Project Related Tasks

Executive Summary

2.1 Key Planning Issues

2.1.1 Urban Planning and Land Use Planning Issues

There are four key issues in urban planning for Greater Abidjan. They are:

- 1) Managing pressure for urbanization;
- 2) Planning for population growth;
- 3) Competing land uses, and
- 4) Creating a land use framework that will attract private sector development and Foreign Direct Investment

Among others, land use planning issues are identified as follows:

- Status of 2000 Master Plan
- Accommodating projected future population
- Current pressure for urban development
- Degraded Environmental Quality
- Employment
- Development Control

2.1.2 Current Status of Master Plan 2000

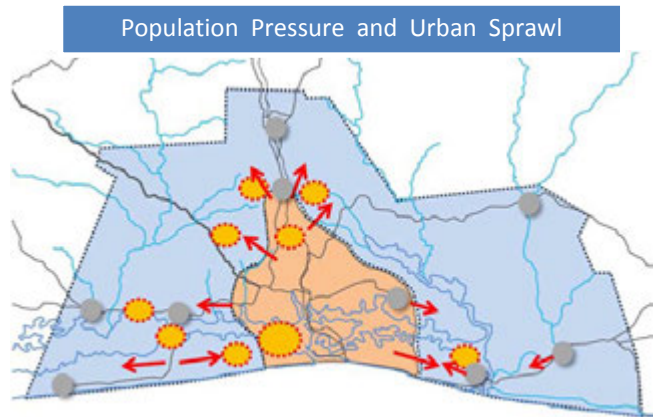
The Master Plan 2000 in general is behind its planned targets, especially:

- Strategic housing, employment, utility and transport projects are delayed;
- Uneven distribution of completed projects;
- Major road network and public land reserves illegally occupied;
- Urban expansion areas only partially developed; and
- Inadequate implementation structure in place.

2.1.3 Population Pressure and Urban Sprawl

The population of Greater Abidjan is projected to grow from 5.0 million in 2014 to 7.6 million in 2030 at an average annual growth rate (AAGR) of 2.72% for the area of 3,500 Km².

Dramatic population increase since 1998 census was found in Abobo, Yopougon, Port-Bouet and Cocody, totaling almost 1.2 million persons. High AAGR of between 4.7% and 12.4% were forecast for existing urban centers and peripheral areas of Plateau, Port-bouet and Yopougon. One third of Abidjan population, i.e. some 1.5 million persons, lives in informal settlements as seen in the figures below.



2.1.4 Degraded Environmental Quality

As the consequences of urban sprawl, such urban problems as listed below have been taking place.

- Shortfall and inequitable distribution of community facilities
- Inadequate housing supply leading to individual property densification and illegal settlements
- Under capacity utilities provision
- Major employment area in south of city causing traffic congestion and long distance commutes
- Increased urbanization of cheaper agricultural land at urban edge

These problems which remain unsolved at present will lead to the degradation of environmental quality by such a form as:

- Loss of natural forest and biodiversity assets
- Low quality living, plan and work environment
- Increased noise and air pollution
- Proliferation of bad neighbour development
- Threats to health and safety
- Reduced food and potable water security



2.2 Vision

The vision for Greater Abidjan is founded on the principles of Sustainable Development and it intends to contribute to strengthening the economy of Côte d'Ivoire through improved economic infrastructure, and enriching the quality of life through the provision of adequate social infrastructure and urban amenities. It is a major development initiative for national economic growth to support the achievement of Cote d'Ivoire as an 'emerging economy' as set out in RDRP National Development Plan. The land use planning vision is to enable Greater Abidjan to become the premier economic centre of West Africa.

Establish a balanced economic growth area that provides quality living environments and clean industry employment areas; with conserved and enhanced agricultural and natural landscapes that also provide the ideal setting for tourists.

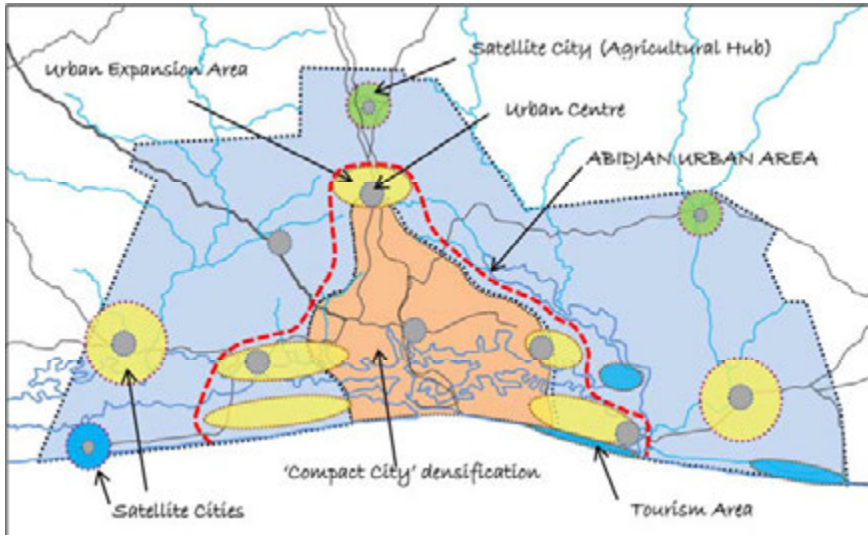
2.3 Spatial Strategy

2.3.1 Spatial Growth Scenarios

In order to achieve the sustainable development of Greater Abidjan, smart growth agenda is set up as described below:

- 1) Establish Compact City initiatives to combat expensive and destructive urban sprawl; through the provision of a range employment opportunities near to residential areas
- 2) Promote Transit Oriented Development (TOD), by giving precedence to public and green transport over private vehicle use.
- 3) Promote public health and quality of life by:
 - i. Creating a sense of identity and ownership for residents through community, supported with place building
 - ii. Distributing public facilities equitably
 - iii. Providing a choice of housing for all income groups
- 4) Preserve and enhance natural and cultural resources

Six spatial growth scenarios for Greater Abidjan were generated and evaluated to meet the criteria for smart growth agenda described above. As the consequence of comparative analysis of pros and cons of the respective scenarios, an optimized scenario (Scenario 7: Compact City plus Satellite City concept) was synthesized to suit the development of Greater Abidjan as shown in Figure 2.1.



Source: JICA Study Team

Figure 2.1 Scenario 7 (Optimized Spatial Growth Scenario)

2.3.2 Main Growth Components

The urban development is guided by such growth components as Urban Center Hierarchy, Strategic Transport Network and Employment Centers as shown in Figure 2.2.

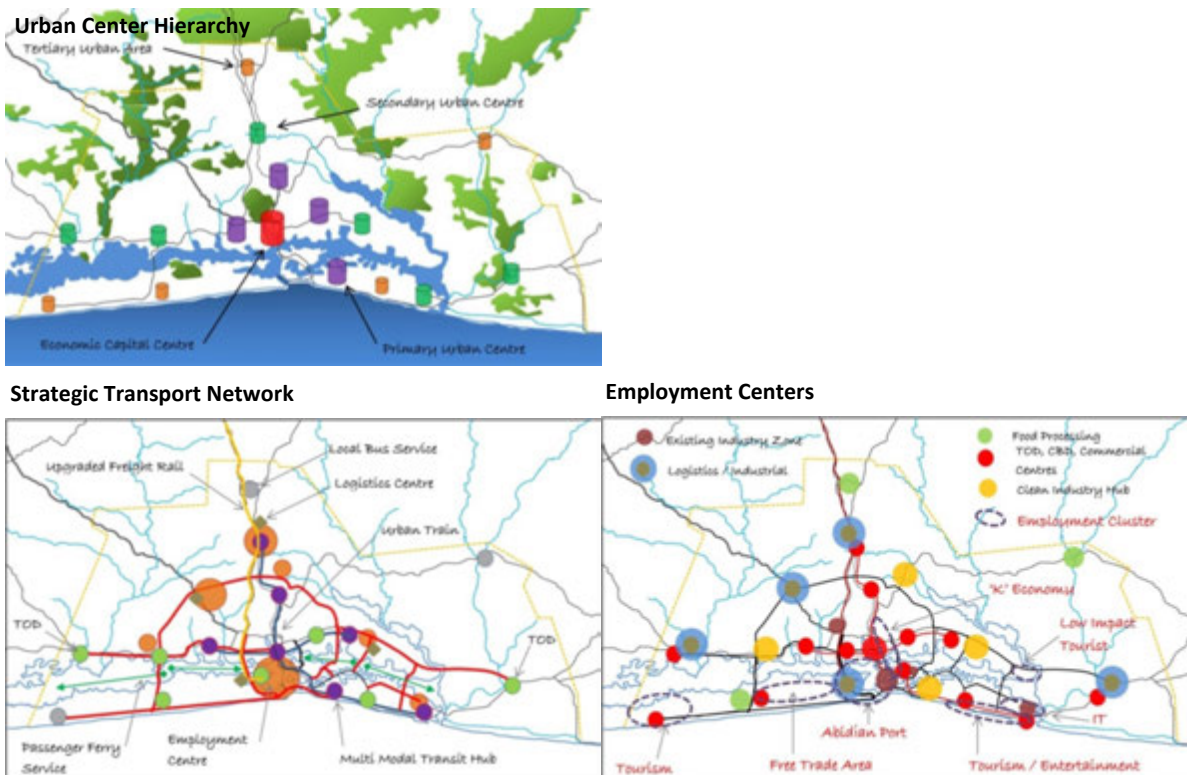
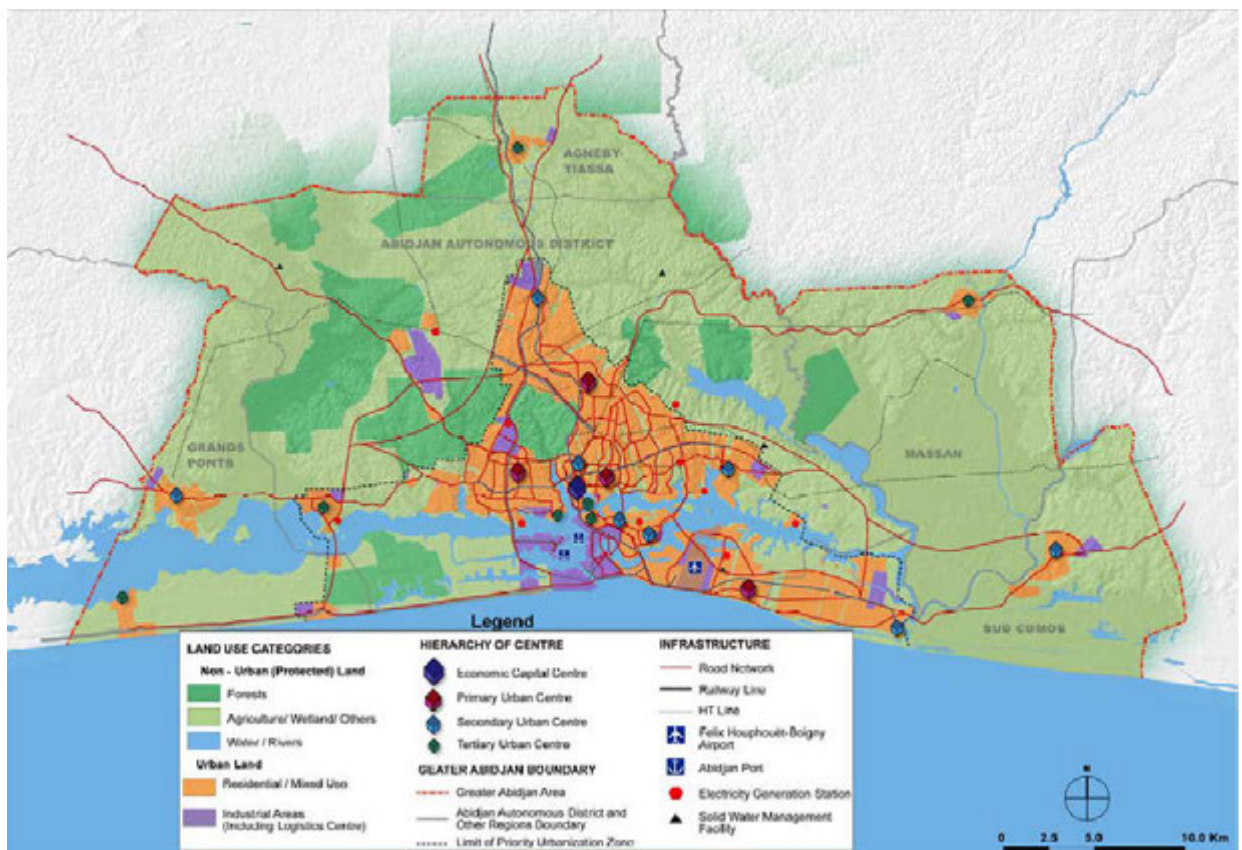


Figure 2.2 Main Growth Components

2.3.3 Spatial Strategy

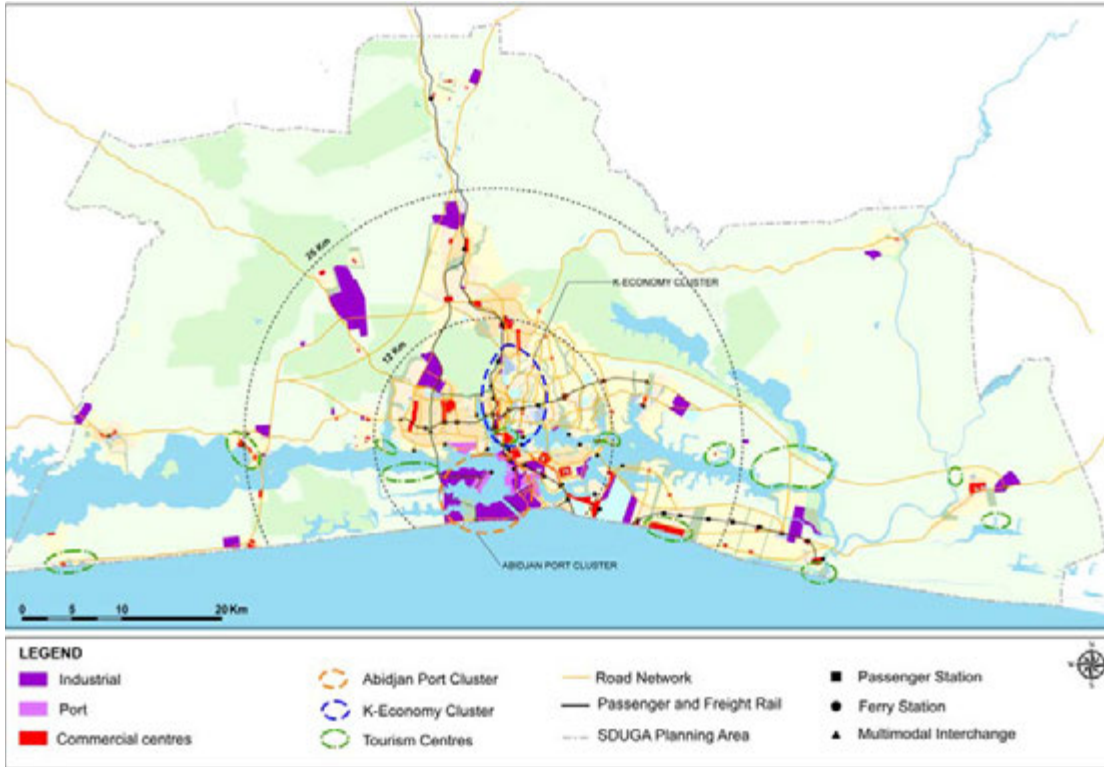
The Greater Abidjan Urban Development Spatial Strategy 2030 sets out the development framework for the Greater Abidjan area. It is an advisory and guidance document that sets the integrated physical plan for sustainable development to the areas that will be subject to accelerated growth arising from the increase population and stimulated by infrastructure, industrial and land development.

The main components of the strategy are “Protected Land, Developed Land, Compact Urban Centers, Urban and Rural Development, Hierarchy of Urban Centers and Employment Clusters” as presented in Figure 2.3. Among others, the Employment Clusters are further categorized into Industrial Cluster, Knowledge Economy Cluster, Urban Center Mixed Development Cluster, Tourism and Recreation Open Space as shown in Figure 2.4.



Source: JICA Study Team

Figure 2.3 Greater Abidjan Urban Development Spatial Strategy 2030



Source: JICA Study Team

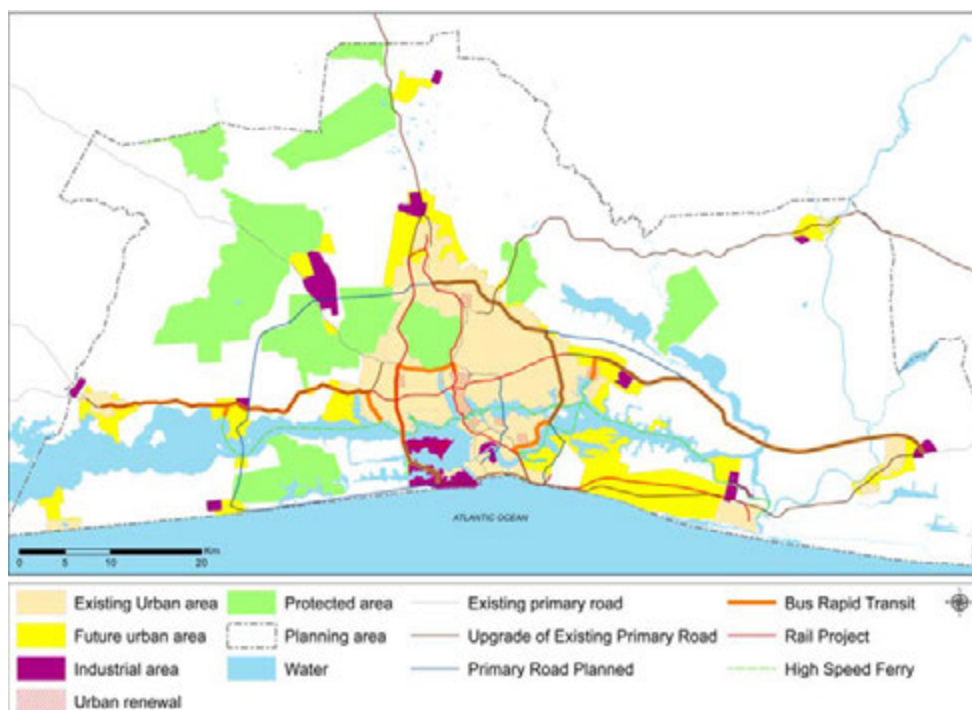
Figure 2.4 Employment Clusters

2.4 SEA for Spatial Growth Scenarios

The JICA Study Team conducted SEAs for 7 Spatial Growth Scenarios plus “Zero-Option” in order to assure from the environmental viewpoint the most suitable Spatial Growth Scenario. As the consequence, the Growth Scenario 7 proved to be a most preferable scenario for which the urban master plan can be pursued.

2.5 Implementation Strategy

The proposed implementation strategy for the Greater Abidjan Urban Development Spatial Strategy (GAUDSS) is illustrated in Figure 2.5 through the main future urban expansion areas and the major transport infrastructure projects to be implemented over the 2015 to 2030 plan period. The plan shows the existing urban area (built or land already provided with basic utility infrastructure), future expansion areas, existing and proposed industrial areas, urban renewal areas, protected land and future strategic road and public transport projects.



Source: JICA Study Team

Figure 2.5 Implementation Strategy 2015-2030

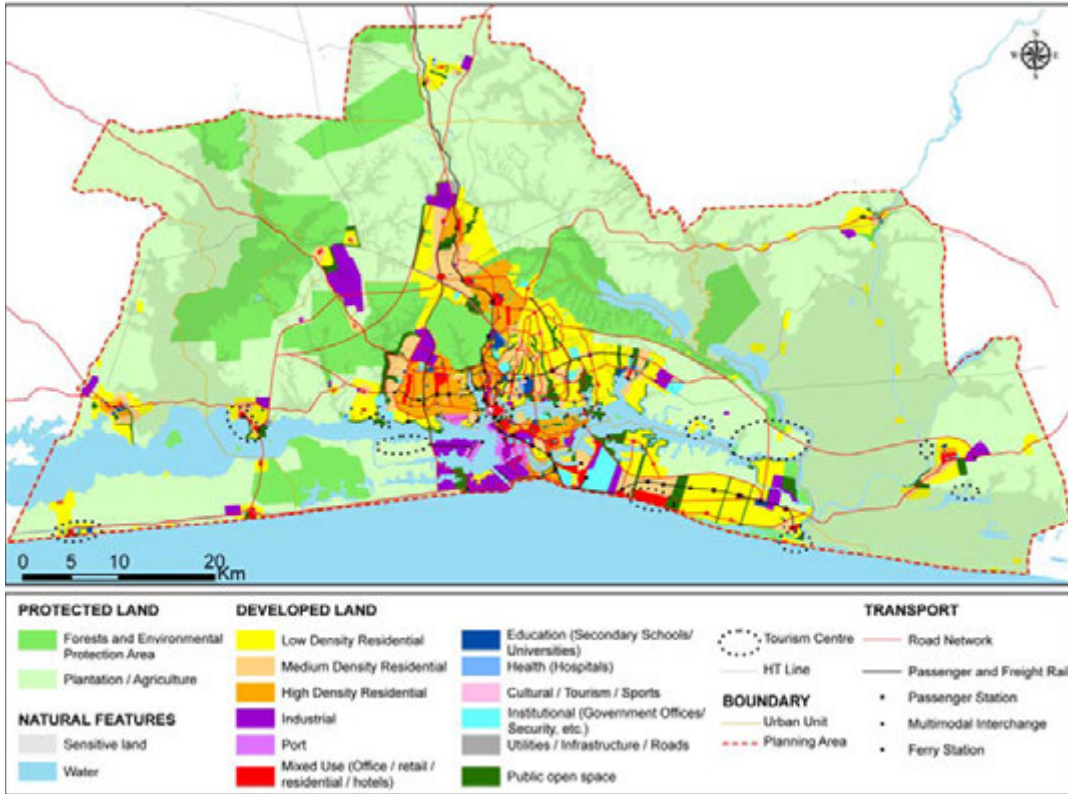
Urban expansion directed by compact city principles to meet the population growth is calculated to result in an increase of the existing urban area, currently some 44,000ha by 23,200ha. The urban area will total some 67,200ha approximately 19.2% of the entire Greater Abidjan area, an increase from the current 12.7%.

2.6 Land Use Framework Plan

The plan, Figure 2.6, shows the major land uses and densities of compact development that directs the Spatial Growth Strategy, to support population growth. The plan is not a detailed site by site of all the land uses within Greater Abidjan, as site selection of future land uses shall be elaborated after approval of the SDUGA.

Major and strategic existing and proposed land extensive uses are shown in the Land Use Framework for Urban Units. These include, amongst others, the existing major public secondary and tertiary education establishment, hospitals, cultural and sports facilities, Government offices, security and public facilities. In addition major committed public facilities are included where details of the sites have been given to the JICA Study Team.

The plan will act as a broad guide for the more detailed urban planning and development control documents (PUD's, public works budgets, zoning regulations, etc.) to be completed by Government to fulfil statutory Master Plan requirements.



Source: JICA Study Team

Figure 2.6 Greater Abidjan Land Use Framework

2.7 Implementation

Government Agencies, ministries, regions and communes will play a key role in implementing policy actions that will require the need for effective coordination and focusing of the delivery effort. In order to implement the Urban Master Plan 2030 a number of key Government Actions are required. First is the high level approval and adoption of the Urban Master Plan 2030. Second is the revision of Detailed Master Plans (PUD's) and their supporting regulations. And third, an integrated planning governance structure is required to implement the Urban Master Plan 2030 and carry forward the programme of plan-making and regulatory control updating for statutory approval.

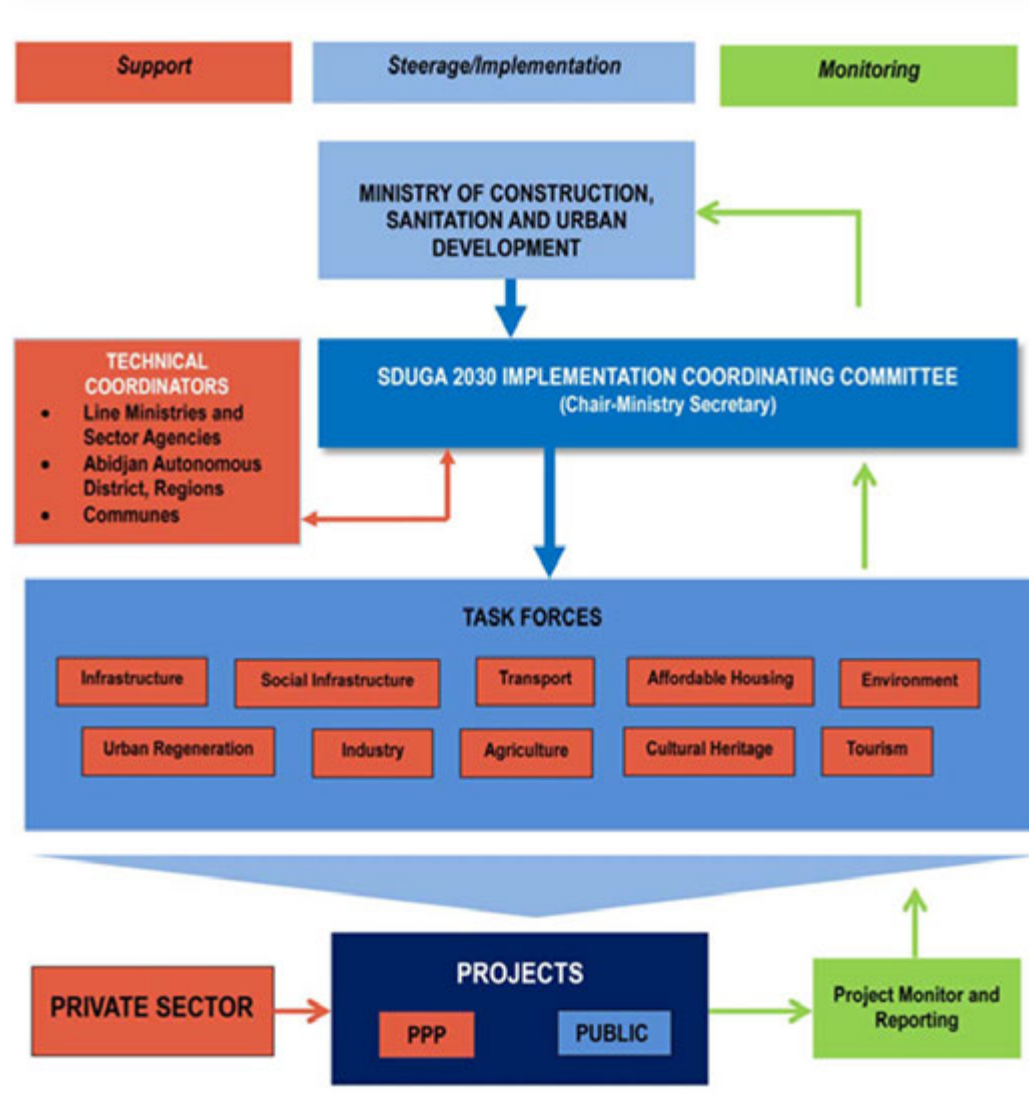
The Law of Decentralizing Local Governments 2003 has widened the responsibility of 'plan making' to guide future land uses and development control. Decentralization has broadened this responsibility so that the MCLAU, Regions and Communes, in total 25 entities are empowered to make development master plans.

The implementation structure will therefore need to incorporate the legal mandates of the relevant 'plan making' authorities as well as a coordination system that assigns equal responsibility to implement an integrated Master Plan. This will involve governance bodies, ministries and other government agencies responsible for project implementation.

The adoption and implementation of the Urban Master Plan 2030 and the roll out of its vision, objectives and policies to key Ministry and Agency stakeholders and the private sector will be supported through a wide range of governance initiatives.

An Implementation Coordinating Committee will be established and managed by the MCLAU, in accordance with its legal and wider role as strategic planning authority, to bring together the planning requirements in a sub-regional context, oversee the implementation of the SDUGA Master Plan 2030, guide policy and policy actions, and to report to Government annually, see Figure 2.7.

The Implementation Coordinating Committee will be guided by a clearly structured sequence of plans and supporting policies; Spatial Strategy, Implementation Strategy, Urban Unit Land Use Framework, Land Use Policies and selected Extended Area Master Plans.



Source: JICA Study Team

Figure 2.7 Greater Abidjan Implementation Process through Governance

2.8 Master Plan of Extended Areas (MPEA)

The Master Plan of extended areas (MPEA) is a framework, as an exemplar of a Detailed Urban Plan (PUD) which is a mid- and long-term statutory framework for guiding the development and redevelopment of land. It is also an opportunity for the JICA Study Team to provide integrated planning approaches by conducting a draft of a detailed urban plan. So this is the final step that shows the planning strategy proposed by the JICA Study Team, following the Urban Master Plan of Greater Abidjan.

In accordance with the agreements between JICA with MCLAU, the JICA Study Team produced proposed drafts of master plans for Bonoua and Attinguié areas. Details are included in Volume 2 of the Report.

3.0 Urban Transport Master Plan

Executive Summary

3.1 Significant Transport Issues

(1) Road

The District of Abidjan is now covered by almost 1800 km of roads, of which 850 km are paved, with major arterial roads such as boulevards, avenues and highways running through most of the communes. Two bridges across Ebrié Lagoon link the northern residential areas of Cocody, Yopougon or Abobo and the southern industrial zone spreading from Treichville to Petit-Bassam. The road network is characterized by deteriorated road surfaces, missing links and insufficient capacity. Traffic congestion can be seen all over the road network during peak hours and nothing has been done to change this trend. Many road projects have been planned for years but have yet to be implemented, putting further pressure on the existing road network.

Furthermore, the road network has been mainly developed without any consideration of public transport. Although public transport has been declining in recent years, the main objective of the Master Plan 2030 is to restore the credibility of public transport lost during the last ten years. In order to integrate public transport into the road network, and in particular a mass-transit system, the first step is to secure sufficient space for both road users and public transport facilities along the targeted roads. The ROW width will be estimated based on the type of public transport that will be selected.

Since the primary urban roads connect the major industrial areas in Abidjan, they also serve as freight transportation corridor. This results in a traffic mix with many slow, heavy vehicles on the existing primary urban roads. Such a burden should be alleviated by providing alternative roads for both trucks and passenger vehicles.

(2) Traffic Control and Management

Traffic conditions in Abidjan have already reached an intolerable level and the congestion is serious and widespread. Demand exceeds capacity at many intersections, causing severe congestion for many hours of the day. To alleviate the congestion, traffic management measures have been applied with limited success so far. Traffic management is becoming increasingly important in urban areas where scarce road space is already occupied by vehicles. Measures to enhance the attractiveness of public transport are also a part of traffic management to improve overall efficiency, such as upgrading traffic signal control, implementing traffic information systems and traffic management on highways, controlling overloaded vehicles, and enforcing traffic regulations. Parking management, priority treatment for public transport, and traffic safety are also important measures that could be considered.

(3) Public Transport

A key issue at present is that the public transport service is provided largely by the informal sector. Bus

services are concentrated on routes originating from suburban areas and ending in several city terminals such as Adjamé or the Plateau. The informal sector, consisting of Gbaka, meter taxis, Woro-Woro and inter-communal taxis currently accounts for 85% of public transport trips and has grown at the expense of the formal sector.

In terms of urban transportation, priority must be given to the mobility of people not cars. In that context, public transportation should be given priority over private vehicles to secure smoother travel for those who use public transportation. After investigating people's travel demand and its forecast, land use plans, and development directions in Greater Abidjan, a new rail-based mass transit system is a recommendation of this study for the high-capacity public transport corridors.

At present, there is an under-utilization of the water system in Abidjan as a provision of public transport. Of the public transport passengers carried daily by SOTRA, less than 5% use the waterways of Abidjan. With full public transport integration, local services in the communes west of Plateau could feed to the waterways and link to fast efficient water-based public transport. The waterfront would then see improvement of significant renewal. These water terminal stations then have the potential for urban renewal and transit-orientated development.

3.2 Planning Objectives and Strategies

(1) Goals of Transportation System Development

Based on the vision and planning objectives for development of Greater Abidjan, as well as the planning issues associated with the urban transportation sector, three main goals of transportation system enhancement in Abidjan have been identified, which are efficiency, equity and better environment.

In order to achieve the above-mentioned three main goals of transportation system development in Abidjan, four major urban transportation objectives have been targeted, which are the enhancement of road network capacity that supports economic activities, the promotion of public transport use, the intermodal development/transit-oriented development and the realization of an environmentally sound transportation system.

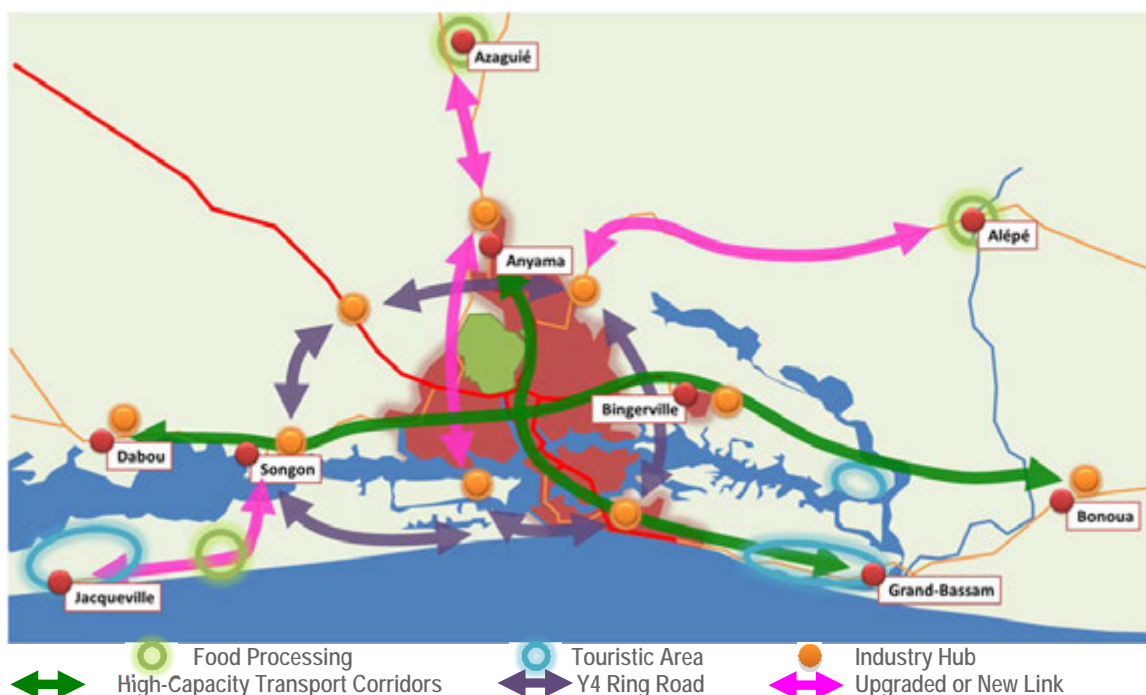
(2) Strategic Transport Network Structure

The road network structure will have to be expanded in order to provide alternatives for drivers and relieve the roads surrounding the Plateau and Adjame. The first step will be the construction of the outer ring road and the inner ring road that will be connected to all major radial roads. The primary road network will thus change from the current concentric road network, to a new radial-concentric road network that will allow transit traffic to avoid the city center and provide fast and reliable connection between the suburban activity areas.

In order to develop a transport master plan consistent with the vision of the urban master plan, the Strategic Transport Network Structure has been defined with the aim of developing infrastructures to support the port of Abidjan, allowing efficient cargo transport for industrial growth, increasing touristic potential with convenient access, providing reliable access for agricultural activity, a modern transport reflecting the preeminent financial and business position in West Africa, promoting public transport use by constructing new transport infrastructure, and improving the quality of life for its citizens

As a result of this analysis, the following strategic transport network structure is proposed (Figure 3.1), based on the construction of new roads to connect major activities (industrial, touristic, food processing)

areas and the implementation of a mass-rapid transit system that would provide a stress-free and reliable public transport system.



Source: JICA Study Team

Figure 3.1 Strategic Transport Structure

3.3 Transport Demand Forecast

The first detailed transport demand forecast model for the Greater Abidjan has been developed based on extensive eleven transport-related surveys undertaken in 2013. Among a series of these surveys, Household Interview Survey (HIS) is a “backbone” of the model development consisting of interviews involving 20,000 households within the Study area. Each member of the household was asked a series of questions relating to household characteristics, personal characteristics and travel characteristics. In addition, the remaining surveys were conducted to validate/adjust the established model, such as traffic count in the screen lines. The collected data have been developed into the transport-modeling database.

The key overall statistics are provided in the Table 3.1 for the intermediate years of 2020 and 2025 and the target year of 2030 in which all the completed projects are included in the modeling network. Remedial effect of the transport master plan can be captured in vehicle kilometers (veh-km), vehicle hours (veh-hr) and average speed of travel. To calculate the rate of reduction of these indicators from the “do-nothing” case to the Master Plan case, veh-km shows a reduction of 1.9%, 6.8% and 2.7% in 2020, 2025 and 2030, respectively, while veh-hr shows 20.7%, 36.2% and 45.2% respectively. Significant impact is also reflected in 23.0%, 45.3% and 76.7% increase of average vehicle speed.

The estimated transport demand in 2030 is illustrated in Figure 3.2. In the “do-nothing” case in 2030, there are significantly more red links in the network, which exhibit high volume to capacity ratios (V/C ratio over 1.3) with slow travel speed along those links. Compared to the result of the do-nothing case,

links with brown color (V/C ratio less than 0.8) increase excluding some major routes in the Master Plan case. This results from dispersing transport demand into expanded links.

Table 3.1 Key Model Results for Intermediate Years

Measure	Year: 2020		Year: 2025		Year: 2030	
	Do Nothing	With M/P	Do Nothing	With M/P	Do Nothing	With M/P
Vehicle Kilometers of Travel (Million)	16.2	15.9	22.0	20.5	29.9	29.1
Vehicle Hours of Travel (Million)	0.58	0.46	0.94	0.60	1.55	0.85
Average Network Vehicle Speed	28.2	34.7	23.4	34.0	19.3	34.1
% Public Transport of Mechanized Person Trips	50.1	50.4	51.9	53.2	54.0	55.4
Rail Mass Transit Boarding (Million)	-	-	-	3.21	-	4.63
Average Person Travel Speed	24.0	26.0	17.0	31.3	13.0	31.1

Source: JICA Study Team



Source: JICA Study Team

Figure 3.2 Estimated Transport Demand in 2030 (Left: Do Nothing Case/ Right: Master Plan Case)

3.4 Road Development Plan

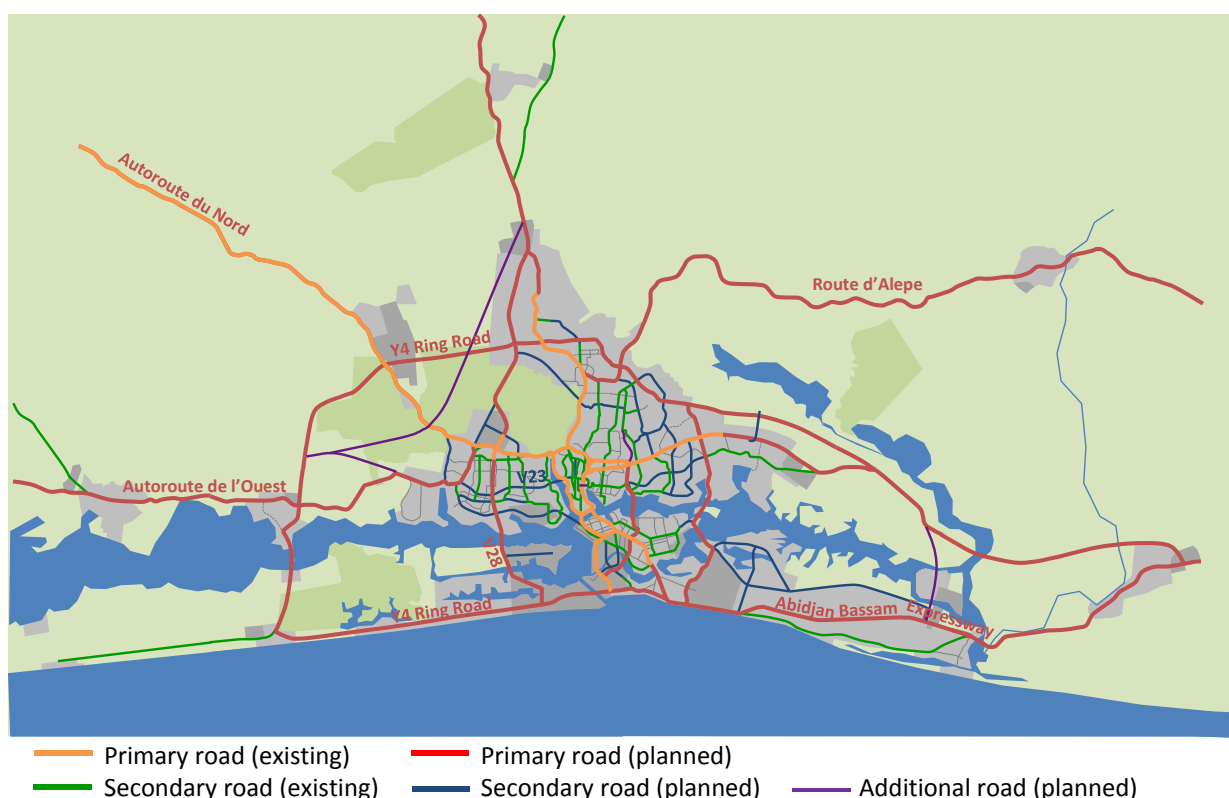
The current road classification in Cote d'Ivoire is a jurisdictional system rather than a functional classification. Thus, from road-planning and engineering viewpoints, it is necessary to clarify the functional classifications and road hierarchy system for the Greater Abidjan area. A clear, functional road hierarchy system consisting of primary roads, secondary roads and local roads has been proposed with specific characteristics and functions (Figure 3.3).

Policy measures will have to be taken to provide safe and efficient access to urban centers and sufficient capacity to meet the demand from population and employment growth. It will consist in the upgrade and improvement of roads, the construction of new arterial roads, in the improvement of intersections, in the road maintenance and the monitoring of road safety and the implementation of pedestrian crossings.

All the road infrastructures that are deemed necessary in the Greater Abidjan area in order to sustain urban development have been identified and listed in a long list and regrouped by area. Traffic demands have been evaluated with the traffic model that has been prepared for the year 2030 and project profiles have been prepared to provide a more detailed description of the various projects. One of the major road projects is the Y4 Ring Road which is expected to enhance the function of the road network by

eliminating vehicle flow through urban areas and also by dispersing traffic coming into the urban center of Plateau and Adjame.

Three parallel arterial roads have been planned in the Bingerville area and also in the Bassam area to support the urban development that is expected to occur in the 2015-2020 and 2020-2025 periods respectively. In Yopougon, construction of major arterial roads, such as the Voie V28 or Voie V23, or bridges, such as the 4th and 5th bridges, have also been planned to connect the Commune with the rest of Great Abidjan.



Source: JICA Study Team

Figure 3.3 Future Road Network

The upgrade/widening of roads connecting the satellite towns of Azaguie and Alepe have also been considered to help the development of those outer communes. In Cocody, existing roads should also be upgraded or extended, such as the Boulevard Latrille, to connect the new residential areas with adequate road infrastructures.

Many road projects have been considered in the vicinity of the Port to ameliorate the efficiency of cargo transport. In particular, the Vridi Bridge and the Yopougon-Treichville Tunnel will allow truck drivers to avoid the congested roads of Plateau.

One of the most urgent issues to reduce traffic congestion in Greater Abidjan is the improvement of intersections. Traffic surveys analysis has shown that most of the intersections surveyed need urgent improvement. Flyovers or underpasses can be built on the main road corridors to the city center in order to alleviate congestion by minimizing the conflicts of traffic movements by providing grade separation.

3.5 Traffic Control and Management Development

(1) Traffic Control System

As the number of automobiles is rapidly increasing in Abidjan, traffic congestion is also getting more and more serious. In light of this situation, it has become important to identify the bottlenecks responsible for traffic congestion using intelligent transportation systems (ITS), and to disperse traffic through optimal traffic signal control and the provision of traffic information. Introduction of a comprehensive traffic information system is most highly recommended. Effective use of traffic information is increasingly becoming more important for heavily congested road networks.

Damage to road structures and serious incidents due to overloaded vehicles are serious problems all over the world, and ITS is utilized to enhance the control of overloaded vehicles.

(2) Parking System Development

Under the situation of increasing automobiles and continuing reliance on private vehicles, it is essential to increase parking capacity in Abidjan, especially in the CBD (i.e., Plateau). Some parking inside buildings is managed by the private sector and public parking is managed by Abidjan Autonomous District (AAD). On-street parking should be removed or tightly controlled, to be replaced by the space for the ROW of public transport, private vehicles, and pedestrians.

(3) Introduction of a Pricing Policy in the CBD

Road pricing is one of the main road transportation control measures to alleviate traffic congestion and reduce air pollution. It mainly charges passenger car users passing through designated roads, in order to minimize unnecessary utilization of passenger cars and divert users to public transport. It also has an important objective to specify the revenues collected from road pricing as the funds for transportation system improvement. In the case of Abidjan, it is relatively easy to apply road pricing in the CBD (i.e., Plateau) as it is surrounded by the lagoon and there are a limited number of entry roads.

As an alternative to the above-mentioned road pricing, parking vehicles, whether they may be located on- or off-street, should be charged a fee, which is also expected to bring about considerable revenue for infrastructure investment. Furthermore, as the parking fees become higher, it will eventually deter private vehicles from entering the CBD and prompt them to shift to public transportation. Thus, this situation can be relatively easily controlled. This concept is called parking pricing and is often utilized as an effective transportation demand management (TDM) policy.

(4) Public Transport Support System

In the context of urban transportation, public transport should be given priority over private vehicles to secure smoother travel for those who use public transport within the limited road space. Hence, the current partial dedicated bus lanes should be extended more continuously on the urban arterial roads to form a continuous, smooth network for buses, thereby serving like a BRT.

(5) Pedestrian Facilities for Better Environment

Pedestrian facilities, especially along the busy main roads in the city, are insufficient in number. In order to reduce accidents involving pedestrians and to ensure safety, more pedestrian facilities such as crosswalks, pelican crossings, and pedestrian bridges/underpasses should be provided. In addition,

narrow or poorly maintained sidewalks along the urban roads need to be improved, since sidewalks of good quality will enhance not only pedestrian safety but also the urban amenity and environment.

3.6 Public Transport Development Plan

The SDUGA public transportation proposals will promote the following key initiatives in attempt to change this trend namely:

- Promotion of High Capacity Transit Corridors;
- An enhanced bus system; and
- A review of the informal public transport sector.

There are eight proposed high capacity corridors, which are shown for the inner part of Abidjan in Figure 3.4. The appropriate technology for the Blue and the Red Lines is rail. They will cross at the station nominated as Central. Both the Purple and the Green Lines will make use of the currently underutilized Lagoon System.

The trigger for the upgrading of public transport services in Abidjan is the introduction of the high capacity transit corridors. Without these services there will be little incentive for public transport improvement. At the same time, the introduction of bus rapid transit (BRT) and bus with high level of service (BHLS) and the purchase of additional SOTRA buses will improve the status of SOTRA.

The key planning issue for public transportation in Abidjan is that the informal sector plays a leading role at the expense of the formal sector. At present, local transportation is in the hands of the informal sector. It is envisaged with the introduction of the high capacity transit corridors that the role of the remaining informal sector will change to one of support for the formal sector. All high capacity corridor stations will provide full integration of all local modes.



Source: JICA Study Team

Figure 3.4 Detail of Abidjan High-Capacity Corridors

3.7 Freight Transport Development Plan

The proposed truck route system will rely on newly built roads, such as the Y4 Rind Road, the Vridi Bridge, the Yopougon-Treichville Tunnel or the Voie V28. These new road infrastructures will increase logistic options for transporters and economic competitiveness/attractiveness of industrial sites in Greater Abidjan. However, they are just one component of the overall freight distribution plan, as it is important to reduce the amount of goods and freight transported by road through urban centers. A modal shift to rail should be encouraged through the provision of an upgraded freight rail system linked to logistic centers, as shown in Figure 3.5.



Source: JICA Study Team

Figure 3.5 Integrated Freight Distribution Plan

It is also necessary to improve and develop a freight rail network that will serve the port traffic not only in Cote d'Ivoire but also to and from the adjacent inland countries. Also, a container marshalling yard, and a freight station near the existing port and its expansion area is needed to revitalize the operation of freight trains that cater for the freight railway traffic.

As a new port location is planned in Ile Boulay, the introduction of a new freight railway route is proposed in this study. This plan aims at not only supporting the new port development but also connecting port freight with inland industrial zones, such as Yopougon district, and integrating with the freight transport network center in Anyama.

In Abidjan, particularly around the Port of Abidjan, on-street parking of trucks has been causing a serious traffic problem, occupying road space and thus reducing the traffic capacity of the road. Thus, it is obvious that more facilities for truck parking and customs procedures are needed. A new logistic park

is currently being planned along Autoroute du Nord, outside Yopougon and current parking and other ancillary facilities, such as customs for heavy goods vehicles and logistic vehicles in Gonzagueville, Yopougon and Attécoubé, shall be eventually relocated outside the urban area perimeter of towns, namely, Anyama, Bonoua and Dabou. This will also help to reduce the number of heavy vehicles circulating inside the city.

3.8 Environmental Considerations for Urban Transport Master Plan

The urban master plan and the urban transport master plan are fully supportive of each other and hence indivisible. In general, therefore, the examination of options for the urban transport plan is not carried out apart from the urban master plan within the same study. The planning objectives and strategies for the urban transport master plan were evaluated from the environmental viewpoints.

Goals of the transport system development lie in the 1) efficiency, 2) equity and 3) better environment. Efficient transport is able to reduce travel time and distance, which in turn can reduce, 1) volume of air pollutants, 2) volume of greenhouse gases, 3) problems of noise/vibration, and 4) traffic congestion and obstacles to smooth economic activities. These will lead to improved quality of life and economic growth conditions.

Equity means that all members of the society, including the socially vulnerable should enjoy the improved transport system. All members also should not have any inconveniences caused by urban transport development. Some people will be impacted by the increase of air pollution, noise/vibration, involuntary resettlement, social damages to their life and livelihood. Careful correspondence with these people should be ensured at the Feasibility Study (FS) stage of each project.

The reduction of air pollution, noise/vibration and traffic accidents provides a better environment.

In order to achieve the above-mentioned goals of transport system development, the urban transport objectives, such as 1) enhancement of road network capacity that supports economic and social activities, 2) promotion of public transport use, 3) intermodal development/transit-oriented development, and 4) realization of an environmentally sound transport system, are evaluated. Likewise, in order to achieve the objective of the urban transport development, a strategic transport network structure, including 1) a radial concentric road network, and 2) an integrated transport network structure, is evaluated.

3.9 Project Identification and Prioritization

All the prospective development projects that have been proposed in the Urban Transport Master Plan are listed along with the proposed period of implementation. A total of 118 projects have been set forth to be included in a long list. The total amount of investment for the listed projects is estimated at around 8.9 trillion FCFA or 13.5 billion Euros. Details of these projects are presented as Project Profiles in the Appendix F of Volume 3.

Economic analyses of the proposed 118 projects in the long list have been conducted. Since there are so many projects to be tested, the road projects, except for intersection improvement projects, have been sorted into 28 groups for simplicity. Projects in each group have similarities in terms of location, continuity, function, development period, and so on. Some projects that will attract attention are placed in a group with few other projects for more precise analysis. Along with 10 public transport projects, the total number of project groups to be tested is 38.

The proposed 118 projects in the long list are evaluated in terms of priority. Although the most crucial criterion is the economic feasibility of the investment as mentioned in the previous section, it is not an easy task to economically evaluate all the projects over different transport sub-sectors. Moreover, economic feasibility is not the only criterion to determine the project priority. Besides economic feasibility, there should be several other viewpoints for evaluation such as existing development policies, consistency in the development orders of relevant projects and consideration of the natural and social environments.

Thus, six items, namely, coherence with visions, urgency, necessity, implicit feasibility, social acceptance, and investment efficiency have been set forth as evaluation criteria for project prioritization, as presented in Table 3.2. Then, the projects are evaluated and scored through a multi-criteria analysis based on those quantitative and qualitative criteria. It is assumed that projects with higher total scores shall be prioritized.

Table 3.2 Evaluation Criteria

Evaluation Criteria	Note
Coherence with Visions	<p>Although all proposed projects must be relevant to the visions and urban planning objectives for developing Greater Abidjan, the projects listed in the PND (national development plan), in the Master Plan 2000, or in the priority projects of the Abidjan Autonomous District to achieve the visions should be given priority. Moreover, the project that matches with the preferred growth scenario in SDUGA, namely, “Compact City plus Satellite City” concept should also be given priority.</p> <p>➔ Add 1 point if the project is included in the PND, in the Master Plan 2000, or in the priority projects of the AAD, respectively; add 1 point if the project is expected to contribute to TOD, development of the primary roads or the links between the urban satellite centers, or enhancement of the transport capacity of the north-south or east-west axes in the District of Abidjan. Up to 2 points in total.</p>
Urgency	<p>Projects that are expected to contribute to urgent transportation issues should be given priority.</p> <p>➔ Add 1 point if the project is intended directly for the urgent transportation issues discussed in “4. Significant Transport Issues,” etc. of Part 5 of this report. Also add 1 point if the government has somehow shown some intention of urgently implementing the project by asking any donors, releasing any TORs, and so on. Up to 2 points in total.</p>
Necessity	<p>All proposed projects are considered based on the needs of the citizens. However, projects that can more widely and more greatly respond to people’s needs may be given priority. As a proxy for the population of beneficiaries, future transportation demand (in 2030) for each project may be used.</p> <p>➔ Add 1 point if, for roads, the future traffic volume on the project site is over 10,000 PCU/direction/day (or total inflow of 40,000 PCU/day at intersections); add 1 point if, for public transport, the future peak sectional passenger volume on the project site is over 10,000 persons/direction/hour; add 2 points if the future volume is more than double of these standard values. For other projects, though the demand cannot be estimated, the number of beneficiaries can be considered as large enough; hence, add 1 point evenly to each project.</p>
Implicit Feasibility	<p>Socioeconomic, technical and institutional feasibilities need to be considered for prioritization because these factors are closely related to the implementability and sustainability of a project. This criterion is not necessarily tangible but implicit. For example, projects that are expected to bring about benefit not only in Greater Abidjan but also in the wider region of West Africa, or projects for which economic benefit will apparently surpass the cost may be given priority.</p> <p>➔ Add 1 point if the project is expected to bring benefit for West Africa through the improvement of the regional freight transport (i.e., international freight routes to/from the Port of Abidjan); add 1 point if the cost of infrastructure development is relatively low (less than 10 billion FCFA), totaling up to 2 points.</p>

Source: JICA Study Team

Table 3.2 Evaluation Criteria (cont'd)

Evaluation Criteria	Note
Social Acceptance	<p>Projects that are accepted by all people have a great potential for prompt implementation. In the IEE (initial environmental examination), projects that are classified as Category I (almost no impact) or Category II (minimum negative impact) should be given priority.</p> <p>➔ Add 2 points if the project is classified as Category I or 1 point if the project is classified as Category II as a result of IEE (for details, see "Appendix E: Initial Environmental Evaluation of Proposed Projects for Transport Sector" of Volume 3 of this report).</p>
Investment Efficiency	<p>Investment efficiency of a project can be measured by an indicator of a benefit-cost ratio. Projects which are expected to bring a great economic benefit per unit cost of investment should be given priority.</p> <p>➔ Add 2 points if the project has a very high benefit-cost ratio (over 10.0) or 1 point if the project has a high benefit-cost ratio (over 5.0) as a result of the economic analysis of the group that the project belongs to. For intersection improvement projects and traffic control and management projects, though the economic analyses were not conducted, these projects are essentially supposed to bring relatively great benefit compared to the input of the cost; hence, add 1 point evenly to each project.</p>

Source: JICA Study Team

Through the above-mentioned scoring method based on those criteria, projects that scored 6 or more have been selected as priority projects. As a result, 51 projects (excluding those that are already under construction) have been selected as a short list.

These priority projects are to be noted as projects that should be urgently undertaken with special, strategic attention. The total amount of investment for the short-listed projects is estimated at around 4.8 trillion FCFA or 7.4 billion Euros, accounting for about 54% of the total amount of the projects to be implemented by 2030 in the SDUGA Long List.

3.10 Priority Project Packages

Projects with relatively high scores in the Multi-Criteria Analysis, using the six items of evaluation criteria, are grouped into the nine project packages for further feasibility studies (F/S) as presented in Table 3.3. These project packages indicate directions for development of the urban transport sector and may help to clarify the relevance among the component projects in each package and hence to select the projects for further F/S. Approximate development schedules for projects under each project package are presented in Table 3.3.

3.11 High Priority Projects for Further Studies

For the final selection of project(s) for the F/S within the framework of SDUGA, the following three conditions have been considered for the projects on the short list:

- Whether the project has been relatively highly prioritized as a result of the multi-criteria analysis, namely with a high score of 7 points or more;
- Whether the project is represented as the main target of the project package discussed in the previous chapter and thus likely to fulfill the theme of the package; and
- Whether the project is a lead project in the project package with an implementation period (including survey, design, expropriation, and construction) actually scheduled to start immediately, that is, from 2015 or 2016 at the latest.

Table 3.3 Priority Project Packages

Proposed Projects	Short-term						Mid-term					Long-term				
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
1 Development of Water Bus Transport and Enhancement of Intermodality with Road Transport																
T-4-2 Water Bus - Attécoubé to Treichville																
T-4-1 East – West High Speed Ferry Service (Songon - Grand Bassam)																
V-3-2 Development of BaARN - Aérocity Area																
V-7-6 Development of CeARN - Grand-Campement Arterial Road																
2 Development of on the North-South Transport Corridor																
V-7-7 Development of CeARN - Upgrade of Felix Houphouët Boigny Bridge																
T-1-1 North-South Rail Project-Stage 1 Anyama to Airport																
V-5-5 Development of AbARN - Widening of the Autoroute d'Abobo																
3 Development of on the East-West Transport Corridor																
V-4-1 Development of YoARN - Voie V23 - Parkway Section																
V-6-5 Development of CoARN - Boulevard de France Redressé																
V-6-8 Development of CoARN - Widening of the Boulevard de la Corniche																
V-2-3 Development of BiARN - Widening of the Route de Bingerville																
V-4-2 Development of YoARN - Voie V23 - 5th Bridge Section																
V-2-2 Development of BiARN - Extension of the Boulevard François Mitterand																
T-1-3 East – West Rail Project (Yopougon to Bingerville)																
V-3-4 Development of BaARN - Widening of the Route de Bonoua																
4 Development of Various Infrastructures Supporting the Port of Abidjan																
F-2-1 Metropolitan Logistic Center Development																
V-7-4 Development of CeARN - Vridi Bridge																
V-4-8 Development of YoARN - Voie V28 - 4th Bridge																
V-4-13 Development of YoARN - Central Road of Boulay Island																
V-4-9 Development of YoARN - Voie V28 - Southern Section																
5 Development of Roads Serving Newly Developed Area in Cocody																
V-6-6 Development of CoARN - Widening of the Boulevard Latrille																
V-6-9 Development of CoARN - Widening of the Boulevard Altoban																
V-6-10 Development of CoARN - Widening of the Boulevard de la 7e Tranche																
6 Improvement of the Bottleneck Intersections																
V-8-1 Intersection Improvement - Solibra (Treichville)																
V-8-5 Intersection Improvement - Siporex (Yopougon)																
V-8-9 Intersection Improvement - St Jean (Cocody)																
V-8-11 Intersection Improvement - CHU Treichville (Treichville)																
V-8-14 Intersection Improvement - Williamsville (Adjamé)																
V-8-15 Intersection Improvement - Carrefour de la Vie (Cocody)																
V-8-2 Intersection Improvement - Mairie d'Abobo (Abobo)																
V-8-16 Intersection Improvement - Carrefour de L'Ecole Nationale de Police (Cocody)																
7 Transportation Control Measures (TCM)																
G-1-1 Development of Area Traffic Control System																
G-1-3 Development of Urban Traffic Information System																
G-6-1 Pedestrian Facility Development for Better Environment																
G-5-1 Development of Overloaded Truck Control System																
G-3-1 Development of Parking Facilities/Parking Information System																
G-5-3 Supporting System for Control of Illegal Parking																
8 Operational Support for Bus Transport																
G-2-1 Development of Dedicated Bus Lanes																
G-1-2 Development of Public Transport Priority System																
T-3-1 Development/Improvement of Intermodal centers at Adjame, and Central/Southern Plateau																
9 Development of Outer Ring Road as part of Abidjan-Lagos Corridor																
V-1-7 Development of Y4 Ring Road - Aérocity Section																
V-1-5 Development of Y4 Ring Road - François Mitterand / Riviera 6 Section																
V-1-4 Development of Y4 Ring Road - Abobo Baoulé / François Mitterand Section																
V-1-3 Development of Y4 Ring Road - Pk18 to Abobo Baoulé Section																
V-1-6 Development of Y4 Ring Road - Desirée Island Bridges Section																
V-4-10 Development of YoARN - Autoroute de l'Ouest																
V-1-2 Development of Y4 Ring Road - Autoroute du Nord / Pk18																
V-1-1 Development of Y4 Ring Road - Songon / Autoroute du Nord Section																
V-2-1 Development of BiARN - Bingerville Northern Bypass																
V-1-8 Development of Y4 Ring Road - Canal de Vridi Section																
V-1-9 Development of Y4 Ring Road - Jacquévillie Section																

Source: JICA Study Team

The answers to the above could be clearly determined, and priority projects that meet each condition are checked in the corresponding column. Thus, priority projects that have cleared all these three conditions are listed as high-priority projects as follows:

- V-1-5: Development of Y4 Ring Road - François Mitterrand / Riviera 6 Section,
- V-1-6: Development of Y4 Ring Road - Desirée Island Bridges Section,
- V-1-7: Development of Y4 Ring Road - Aérocity Section,
- V-6-5: Development of CoARN - Boulevard de France Redressé,
- V-6-6: Development of CoARN - Widening of the Boulevard Latrille,
- V-7-4: Development of CeARN - Vridi Bridge,
- V-7-7: Development of CeARN - Upgrade of Felix Houphouet Boigny Bridge,
- V-8-1: Intersection Improvement - Solibra (Treichville),
- V-8-5: Intersection Improvement - Siporex (Yopougon),
- V-8-9: Intersection Improvement - St Jean (Cocody),
- V-8-11: Intersection Improvement - CHU Treichville (Treichville),
- V-8-14: Intersection Improvement - Williamsville (Adjamé),
- G-2-1: Development of Dedicated Bus Lanes,
- G-3-1: Development of Parking Facilities/Parking Information System,
- T-4-2: Water Bus - Attecoube to Treichville, and
- F-2-1: Metropolitan Logistic Center Development.

The above 16 projects have been identified as the most urgent projects to be subjected to feasibility studies.

3.12 Implementation Program

The preliminary cost of the Master Plan for the urban transport sector has been estimated taking into account the above-mentioned implementation schedule of the proposed projects. Fund requirements for the Master Plan are summarized, including capital investment costs and operation and maintenance costs during the period from 2015 to 2030. An amount of 12.9 trillion FCFA is required for the period between 2015 and 2030 in market prices of July 2014 including inflation, of which 8.9 trillion FCFA and 4.0 trillion FCFA are required for the investment and for the operation and maintenance, respectively. The public transport development including the urban rail development has the highest cost amounting to 6.5 trillion FCFA, or 50% of the total cost. The road development requires 5.8 trillion FCFA. Road and public transport developments together with traffic control and management account for 97% of the total cost. From the viewpoint of the timing of cost distribution, 23%, 45% and 32% of the total cost need to be allocated in the short-term period until 2020, the medium-term period (2021-2025) and the long-term period (2026-2030), respectively.

Taking into consideration the private sector involvement, the funding allocation for the Master Plan is estimated by the public/private sectors. Total Master Plan cost amounts to 12.9 trillion FCFA, of which 6.6 trillion FCFA, or 51% of the total cost, could be reduced from the total cost burden with the introduction of private initiative development. Consequently, the funding requirements of the public sector for the implementation of the Master Plan are estimated at 6.3 trillion FCFA at 2014 market prices including inflation for the period 2015-2030. Among others, the funding requirements of the central government for the Master Plan are estimated at 6.2 trillion FCFA, or 48% of the total cost.

Japan International Cooperation Agency (JICA)
Ministry of Construction, Housing, Sanitation and Urban Development (MCLAU)

The Project for the Development of
the Urban Master Plan in Greater Abidjan
in the Republic of Côte d'Ivoire (SDUGA)

Final Report

March 2015

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1.0 Introduction

1.1 Project Background

After independence in 1960, the Republic of Côte d'Ivoire (hereinafter called Côte d'Ivoire) achieved an average annual GDP growth rate of 8%, a period referred to as the “Ivorian Miracle”, which was supported by the significant growth of the City of Abidjan as the political and economic center of Côte d'Ivoire. However, since the late 1990s Abidjan has been unable to manage its population increase, acquire needed capital investments, and execute urban development functions due to the political and the socio-military crisis. This further aggravated the typical problems that modern cities face, such as disorderly land use, lack of livelihood infrastructure and insufficient public investment. At present, the disorderly development of Abidjan is an impediment to the recovery of Côte d'Ivoire and the stability of the region.

Modern city planning for Abidjan has a long history. From 1928 until just before independence, four city development plans were formulated to cope with the city's growth. During the 2000s, the population nearly doubled, as a result, the number of urban poor significantly increased and the urban built-up area expanded in a disorderly fashion from an area of 500km² to 750km². The latest urban development plan was formulated in 1994 and approved in 2000 (hereinafter called Master Plan 2000) and has a target year of 2015; however, this plan encounters difficulties in developing the city environment as planned in an orderly fashion.

After the election in 2010, the Ouattara Administration came to power and set the political agenda for the reconstruction of the country under the National Development Plan (PND, Plan National de Développement). It is necessary for the future development of Côte d'Ivoire to analyze and evaluate the latest urban development plan approved in 2000 with a view to solve the said problems by addressing precepts. Within this context, there is an urgent necessity to formulate an updated urban development plan that takes into full account the present prevailing conditions and to conduct feasibility studies of priority projects.

1.2 Project Objectives

The principal objective of the Project is to formulate the urban master plan for the “Greater Abidjan Area”. The plan should be sustainable and in line with the National Development Plan. This can be achieved by:

- (1) Analyzing and evaluating the Master Plan approved in 2000,
- (2) Formulating a revised Urban Master Plan for Greater Abidjan (SDUGA) with the target year of 2030, including Urban Transport Master Plan, and

- (3) Identifying high priority projects in the transport sector
- (4) Preparing topographic maps to provide basic geographic information for Urban Master Plan and Transport Master Plan formulation for Greater Abidjan
- (5) Strengthening of capability profile of counterparts through the Project

The target year for the master plans is set 2030 and the intermediated planning years are set 2020 and 2025. The target year of the detailed master plan of Extended Area is set 2025 through the discussion with MCLAU and approved by JCC (Joint Coordination Committee).

1.3 Scope of Work and Schedule of Project Implementation

This scope of work is basically defined in accordance with the Record of Discussions (R/D) as signed by JICA and the Ministry of Construction, Sanitation and Urban Planning of Côte d'Ivoire (hereinafter referred to MCLAU) in October 2012. The major work items covered in the scope of work are listed and implemented as shown in Table 1.1.

Table 1.1 Scope of Work and Outline Schedule of Project

Phase	Major Tasks
Phase 1 (March 2013 ~ December-2013)	<ul style="list-style-type: none"> • Submission and Discussion of Inception Report (April 2013) • Analysis and evaluation of the Master Plan 2000 • Digital Topographic Mapping for Urban Planning • Analysis of Current Conditions • Transport-Related Surveys (Home Interview Survey and other related surveys) • Formulation of Urban Master Plan for Greater Abidjan: <ul style="list-style-type: none"> Analysis and Identification of Issues Setting of Socioeconomic Framework Setting of Development Vision Formulation of Land Use Plan (not including Detailed Urban Plans) • Formulation of Transport Master Plan for Greater Abidjan: <ul style="list-style-type: none"> Setting of Directions of Greater Abidjan Transport Development for Transport Master Plan Preparation • 1st Stakeholder Meeting (October 2013) • Submission and Discussion of Progress Report (December 2013)
Phase 2 (December 2013 ~ June 2014)	<ul style="list-style-type: none"> • Compiling All the Study Results to Date • Formulation of Urban Master Plan for Greater Abidjan: <ul style="list-style-type: none"> Formulation of Land Use Framework Plan Formulation of Master Plan of Extended Areas • Formulation of Transport Master Plan for Greater Abidjan: <ul style="list-style-type: none"> Transport Modeling and Future Demand Forecast Formulation of Basic Guidelines/Policies Formulation of the "Master Plan for Urban Transport Sector" Implementation Planning Selection (Final) of High Priority Projects • 1st Training in Japan (January 2014) • Submission and Discussion of Interim Report (June 2014) • 2nd Stakeholder Meeting (June 2014)

Phase	Major Tasks
Phase 3 (June 2014 ~ March 2015)	<ul style="list-style-type: none"> • *Elaboration and Modification of Master Plan Projects and Priority Projects in Transport Sector • 2nd Training Course in Japan (July 2014) • Preparation of Draft Final Report and Final Report
	<ul style="list-style-type: none"> • Submission and Discussion of Draft Final Report (October 2014)
	<ul style="list-style-type: none"> • Submission of Final Report (March 2015)

Note*: Feasibility study for the high priority project selected in Phase 2 study was originally included in the scope of work and once agreed among the project related agencies in Phase 2 stage. However, the study could not pursue, since the overall consent at the inter-ministerial meeting on the selected project could not be reached at the beginning of Phase 3, eventually. Therefore, the transport master plan and priority projects identified in Phase 2 have been modified and elaborated during Phase 3 stage.

1.4 Study Area and Planning Area of Greater Abidjan

The “Study Area” for the Project is the Greater Abidjan Area consisting of such administrative units as the Abidjan Autonomous District (13 communes) and 6 surrounding communes, which is in total 19 communes and un-urbanized sub-prefectures as shown in Talbe1.2 and Figure 1.1 (total area: 431,063 ha).

Within the Study Area of Greater Abidjan, the “Planning Area” is defined as the area delineated by such geographical features as rivers, mountains and roads which are considered most likely limit of area for the urban master planning, and shown by the red dotted line in Figure 1.1 (total area:349,202 ha).

Table 1.2 Names of Communes in the Study Area

Abidjan Autonomous District (AAD)	10 Central Communes	Northern Abidjan	II. Cities in the peripheral area	Abobo Attecoube Yopougon
		Southern Abidjan	I. Existing central cities	Adjame Plateau Cocody
				Koumassi Marcory Treichville
	II. Cities in the peripheral area	Port-Bouet		
3 Communes incorporated into AAD after 2001			III. New cities	Bingerville Anyama Songon
	6 Expanded Communes		IV. Cities of 6 expanded communes	Alepe Dabou Jacqueville Bonoua Grand-Bassam Azaguie
Areas intervening among 6 expanded communes			V. Non-urban area	No specific town is considered at present.



Source: JICA Study Team

Figure 1.1 Study Area and Planning Area for the Project

1.5 Organization of Project Implementation

The Project is implemented under the general responsibility of MCLAU and under the system as shown in Table 1.3 and Figure 1.2.

Table 1.3 Related Agencies and Their Functions

Name	Agencies	Function
General Project Manager	MCLAU (Minister/Deputy Minister)	Assuming the final responsibility for the Project.
Project Implementing Manager	MCLAU (Director of Urban Planning Dept.)	Daily management for implementing the Project.
Project Implementing Units (Counterparts and JICA Study Team)	Counterparts: MCLAU (Urban Planning Dept. and DTC), Ministry of Transport (AGETU), Ministry of Economic Infrastructure (AGEROUTE), Ministry of Environment, Urban Safety and Sustainable Development (MINESUDD) National Environment Agency (ANDE), and Abidjan Autonomous District (DAA) JICA Study Team	Implementing the Project.
Steering Committee	Presidential Office, Prime Minister's Office and related governmental ministries	Making the final decision for the Project. Basically, the Committee determines the urban plan based on the final products of the Project after its completion. The Committee also addresses any important problems that may occur.
Joint Coordination Committee (JCC) (Monitoring/Assessment Committee)	Counterpart members, Ministry of Interior and Security (MEMIS), Ministry of Planning and Development (MEMPD), National Bureau of Technical Studies and Development (BNETD), Representatives from relevant 19 Communes, Representatives from relevant 4 Regions, and JICA Office in Côte d'Ivoire	Responsible for the progress control and evaluation of the Project.

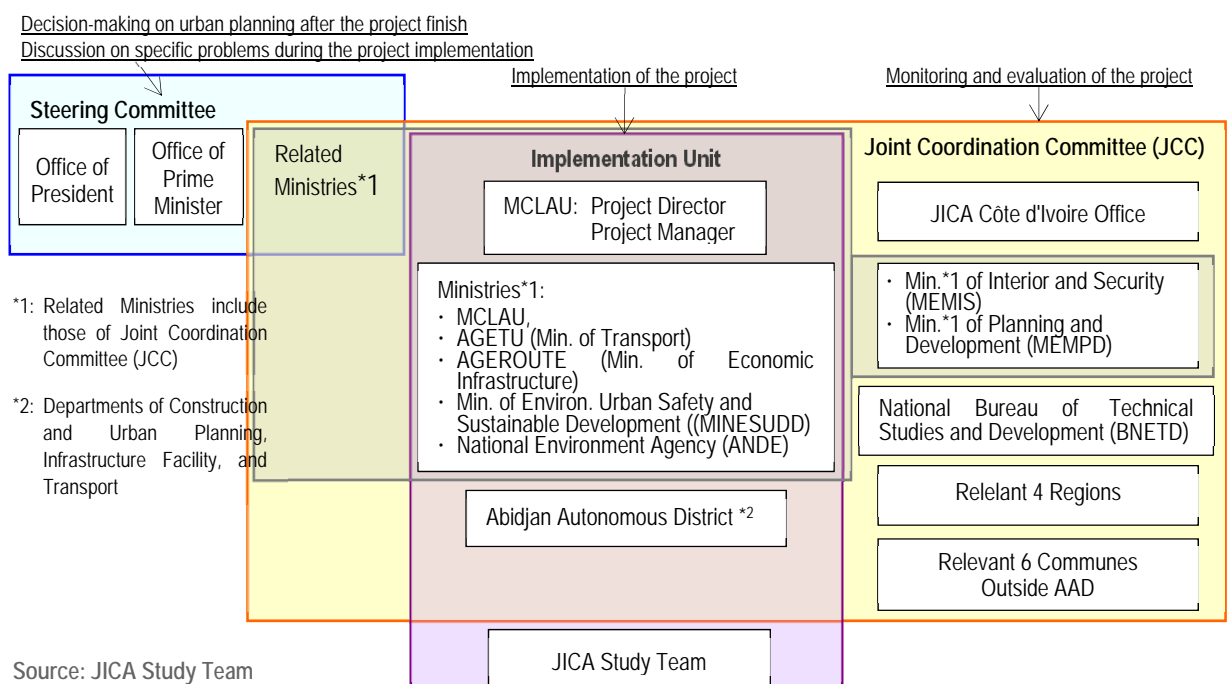


Figure 1.2 Project Organizational Structure

2.0 Urban Master Plan and Other Project Related Tasks

2.1 Urban Master Plan 2030

This summary focuses on the proposals of the Greater Abidjan Urban Master Plan 2030 which has been prepared in tandem and fully integrated with the Urban Transport Master Plan that forms a self-contained part of the Final Report.

The Côte d'Ivoire planning law defines the requirements for a Schema Directeur. The Urban Master Plan prepared by the JICA Study Team is formulated with due consideration of the requirements for the plan as set out under that law. The Urban Master Plan therefore, provides an urban planning framework to guide the MCLAU in fulfilling their statutory responsibility to prepare the final Schema Directeur for Greater Abidjan. In addition the Urban Master Plan includes two items beyond those defined in the law. These items are considered essential to achieve sustainable urban development for Greater Abidjan over the master plan period. One is a comprehensive set of land use sector policies to unify the actions of the many stakeholders and thus ensure a fully integrated master plan. The other is an implementation framework that takes account of the statutory decentralization responsibilities of all stakeholders, enacted since the Master Plan 2000, to enable full coordination in plan making, funding, implementation of projects and development control.

The Greater Abidjan Urban Master Plan 2030 under the SDUGA Study comprises the following, as set out in the Inception Report and subsequently agreed with MCLAU:

- Spatial Strategy 2030
- Implementation Strategy 2015 – 2030
- Land Use Framework 2030 - for 10 Urban Units, including the expansion areas
- Land Use Sector Policies for Greater Abidjan - 190 no.
- Detailed Urban Plans for 2 suburban growth areas, including land use zoning guidelines.

2.2 Current Conditions

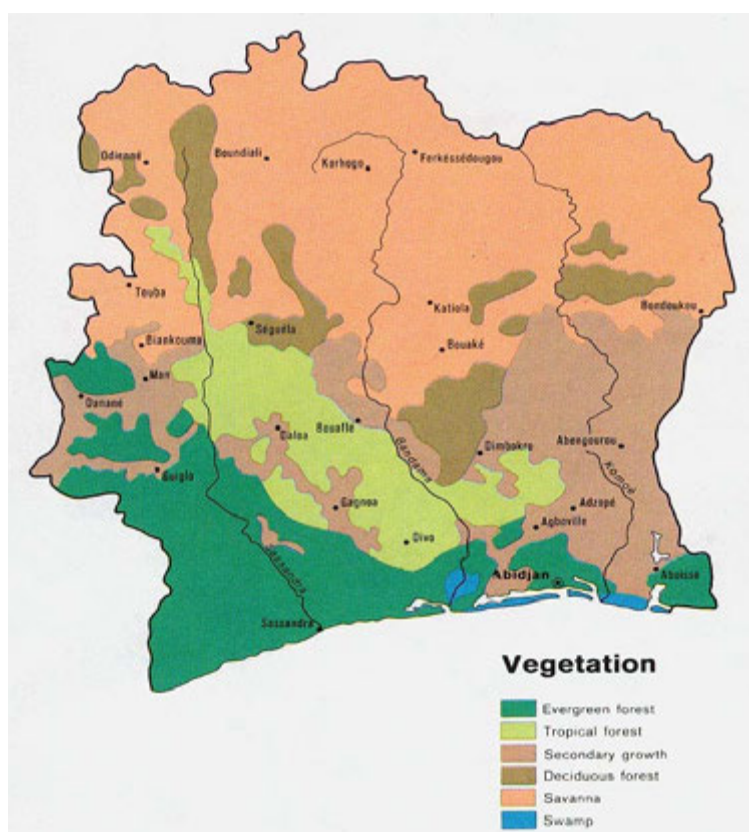
2.2.1 Natural, Social and Economic Conditions

(1) Geography

Cote d'Ivoire has a land area of 322,000 km². It has an east-west coastal line of 515 km with many lagoons, especially in its eastern part. Abidjan has grown as a port town along one of the lagoons. The country is surrounded by Ghana, Burkina Faso, Mali, Guinea and Liberia. The distance by road from

Abidjan is 560 km to Accra of Ghana, 1114 km to Ouagadougou of Burkina Faso, 1113 km to Bamako of Mali, 1589 km to Conakry of Guinea and 993 km to Monrovia of Liberia.

The lands are mostly flat nation-wide. Vegetation ranges from tropical rain forests in the south to savannah in the north. With plenty of precipitation, the southern part is advanced in tropical export agriculture, food production and forestry, while dry land crops such as cotton and cashew nut, as well as livestock, are the main productive activities in the northern part. There are four major rivers, all from north to south, including Komoe River, Bandama River, Cavalla River, and Sassandra River. Komoe River flows into the sea at Grand Bassam as shown in Figure 2.1.



Source: University of Texas (FAO)

Figure 2.1 Vegetation of Cote d'Ivoire

The national land includes agricultural lands representing about 20% coverage, the permanent meadows and pastures about 40 %, and forestry lands about 33%. Cote d'Ivoire once had the largest forest cover among Western African countries, but the forest has rapidly been shrinking, from about 12.2 million ha to 9.5 million ha during the period 1990-2000, according to the FAO.

(2) Population

According to the 2014 Census, the national population is found to be 22,671,000 in 2014. The population growth was very rapid at 4.2% a year during the 30-year period from 1955 to 1985. At present, the growth rate is slowing down from 3.4% a year (1988-1998) to 2.6% a year (1998-2014).

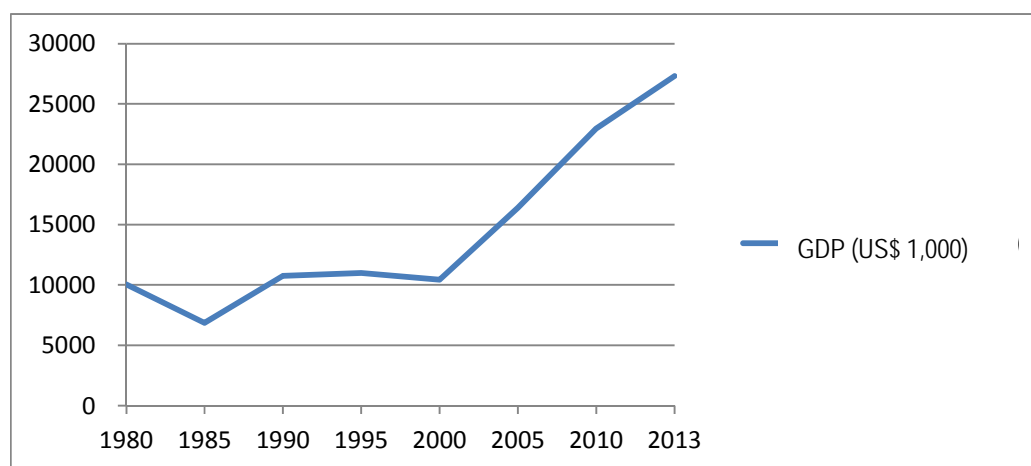
A rapid population increase in the past has been caused by a flux of migration from surrounding countries. About a half of the migrants were absorbed in agriculture and the remaining half in the urban informal sector, particularly in Abidjan¹. However, since the early 1990s up to until recently, the rapid immigration slowed down due to a fluctuating national economy and a declining income differential between Cote d'Ivoire and neighboring countries.

Abidjan is by far the largest city in Cote d'Ivoire. According to the 1998 Census, the Greater Abidjan territory had 3,386,000 people, and it grew at 2.7% a year to reach 5,054,000 people in 2014. This implies that the Greater Abidjan population accounts for 22.3% of the national population in 2014.

(3) Economy

According to the World Bank data, the national GDP amounts to US\$ 24,680 million and per capita GNI amounts to US\$ 1,220 in 2012 (Atlas method and PPP based). The per capita GNI is comparable to the average of Sab-Saharan Africa being US\$ 1,345 in the same year.

Despite fluctuations associated with socio-military conflicts in the past, the national economy has continuously been expanding in the long term when measured in US dollars at current prices, as shown in Figure 2.2. In the 2000s, the national economy apparently began to grow steadily. The growth dropped in 2011 largely due to socio-military conflicts. After the current administration started full-fledged operation, the growth picked up rapidly, mainly with the recovery of FDIs, public investments, and oil production, as well as the institutional reform of cocoa.



Source: IMF

Note: GDP 2013 is an estimate by IMF

Figure 2.2 Gross Domestic Products of Cote d'Ivoire at current prices

The largest source of GDP in 2011 is services (51%) followed by agriculture (22%), manufacturing (19%) and mining (8%). The fastest growing sector is mining, petroleum in particular. The proportion of the services has kept increasing. Cote d'Ivoire ranks the seventh in the service GDP per capita among Sub-Saharan countries, after South Africa, Namibia, Angola, and Capo Verde. These are all mining-based or trade-based countries.

¹ International Organization for Migrations, Migration en Cote d'Ivoire: Profile National 2009.

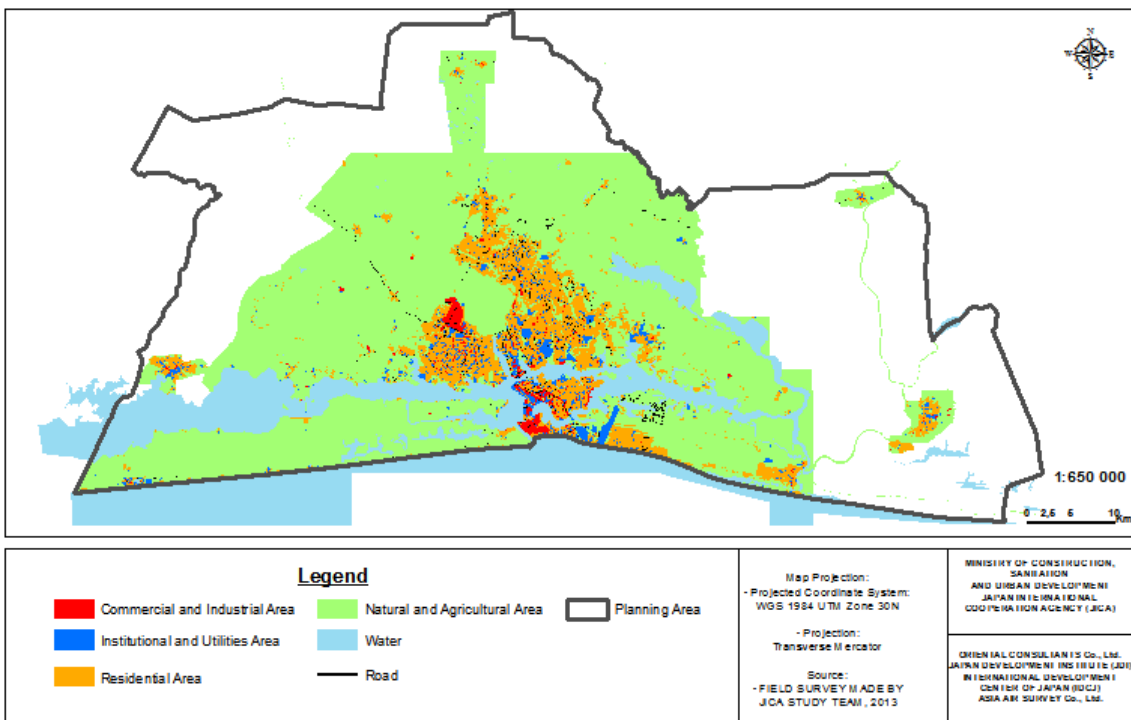
Cote d'Ivoire has world-wide competitiveness, but only in a limited number of products such as mineral fuels, cocoa and cashew nuts. Regarding other agricultural products such as rubber, palm oil and coffee, Cote d'Ivoire has been competitive to a limited extent due to a limited level of processing and quality.

Mineral fuels are an emerging leading sector with a proven reserve of petroleum being about one hundred million barrels and natural gas being about one trillion cubic feet. The petroleum and the natural gas exist mainly offshore from Dabou. With a refinery in Abidjan, which is the third largest after Lagos and Port Sudan, Cote d'Ivoire exports energy to European countries, USA and many African countries including Nigeria, Ghana, Mali, Burkina Faso, Benin and Togo.

Cote d'Ivoire is competitive not only in oil in Africa but also in a variety of products in the western Africa region. Cote d'Ivoire has a large surplus in exports with all of its neighboring countries. It is a regional hub. Basically, it exports plenty of industrial goods to and imports agricultural and resource products from neighboring countries.

2.2.2 Existing Land Use

The current land use maps were created using the simplified digital base maps as elaborated on in “Chapter 3 - Digital Topographic Mapping” of this report, and the results of the field survey were compiled digitally and the current land use maps were created (See Figure 2.3 and Appendices).



Source: JICA Study Team

Figure 2.3 Current Land Use Map

The total area of the land, which the present land use was specified, measures about 189,000 hectare, and occupies about 54% of the Greater Abidjan whole area (about 349,000 hectare). The area of each land use classification is shown in Table 2.1.

The ratio of a developed area and an undeveloped area in Greater Abidjan is 1 to 3. The developed area is divided into 60% of a residential area, 16% of an institutional/utility area, 6% of a commercial/industrial area, and 18% of other areas.

Table 2.1 Land Area by Land Use Category

	Former AAD (10 Communes)		3 communes/sous- prefectures which have later joined AAD		6 communes/sous- prefectures outside the present AAD		Greater Abidjan (Total)	
	ha	%	ha	%	ha	%	ha	%
Developed Land	29,827	60.73%	8,335	8.29%	6,224	15.95%	44,386	23.52%
Residential Areas	18,956	38.59%	4,034	4.01%	3,435	8.80%	26,425	14.01%
Informal Settlement	2,819	5.74%	37	0.04%	0	0.00%	2,856	1.51%
Low Density Residential Area	8,552	17.41%	3,538	3.52%	2,868	7.35%	14,957	7.93%
Medium Density Residential Area	3,068	6.25%	358	0.36%	476	1.22%	3,901	2.07%
High Density Residential Area	4,517	9.20%	102	0.10%	91	0.23%	4,710	2.50%
Commercial and Industrial Areas	2,366	4.82%	206	0.20%	137	0.35%	2,708	1.44%
Industry	1,433	2.92%	152	0.15%	46	0.12%	1,631	0.86%
Commercial/Office	933	1.90%	54	0.05%	91	0.23%	1,077	0.57%
Institutional and Utilities Areas	5,370	10.93%	941	0.94%	797	2.04%	7,108	3.77%
Health	265	0.54%	38	0.04%	62	0.16%	365	0.19%
Education	1,217	2.48%	250	0.25%	334	0.86%	1,801	0.95%
Government Offices	349	0.71%	50	0.05%	60	0.15%	459	0.24%
Sports and Tourism	301	0.61%	55	0.05%	23	0.06%	378	0.20%
Transport	625	1.27%	13	0.01%	5	0.01%	644	0.34%
Security	769	1.57%	63	0.06%	28	0.07%	860	0.46%
Utilities	102	0.21%	35	0.04%	21	0.05%	158	0.08%
Cultural	506	1.03%	107	0.11%	144	0.37%	757	0.40%
Cemeteries	207	0.42%	62	0.06%	78	0.20%	347	0.18%
Roads	1,030	2.10%	267	0.27%	42	0.11%	1,339	0.71%
Other Land Use Areas	3,135	6.38%	3,155	3.14%	1,855	4.75%	8,145	4.32%
Other	3,135	6.38%	3,155	3.14%	1,855	4.75%	8,145	4.32%
Non Developed Land	19,290	39.27%	92,204	91.71%	32,798	84.05%	144,292	76.48%
Natural and Agricultural Areas	19,290	39.27%	92,204	91.71%	32,798	84.05%	144,292	76.48%
Agriculture	10,258	20.89%	46,613	46.36%	17,389	44.56%	74,260	39.36%
Forest	4,624	9.41%	27,823	27.67%	10,019	25.68%	42,466	22.51%
Grassland	3,669	7.47%	16,995	16.90%	4,153	10.64%	24,817	13.15%
Riparian Land	738	1.50%	769	0.76%	1,230	3.15%	2,737	1.45%
Other Natural and Agricultural Areas	1	0.00%	5	0.00%	7	0.02%	12	0.01%
Total	49,117	100.00%	100,539	100.00%	39,022	100.00%	188,678	100.00%

Source: JICA Study Team

2.2.3 Land Use Planning and Management Institutions

(1) Legislation Related to Urban Planning

The following three legislations are closely related to urban planning, land use and their management.

- Law No 62-253, 31 July 1962 concerning urban planning
- Decree No 2005-261, 21 July 2005 fixing the manner of application of urban planning and housing matters according to governmental transfer
- Order No 2151, 19 August 1985 fixing the procedure for approval of urban planning master plan

(2) Related Plans and Procedures

Defined in the Legal System

The urban master plan (PUD: Plan d'urbanisme directeur) and detailed urban plan (PUD: Plan d'urbanisme de detail) are defined in the law No. 62-253 with their planning contents. These plans consist of spatial drawings and texts, which include spatial regulations to be applied to their planning area.

The urban master plan will be effectuated, after approval, as ministerial decree of MCLAU. For approval of the urban master plan, consultations with relative administrative organizations and public hearings are required.

For approval of the detailed urban plan, consultation with related administrative organizations and public hearings are required. After approval of the detailed urban plan, it will be effectuated as ministerial ordinance of MCLAU.

A schematic urban master plan is prepared independent of the above mentioned legislative frame. There isn't any law, which defines planning contents to be included for the schematic urban master plan (SDU: Schema Directeur d'Urbanisme), except its approval procedure in the order No. 2151/MTPCPT, 19 August 1985. The schematic urban master plan will become effective as a decree.

Not Defined in Legal System

The "Abidjan Strategy Plan" was formulated in October 2007 by Abidjan district under the Ministry of Interior. The plan treats urban planning matters, which are expected to be realized between 2008-2018, such as urban infrastructure, transport, parks/ gardens, etc. Also, more developed human resources and financial matters for implementation of the plan are studied. And priorities of several investment programs are defined.

However the plan is not fully equivalent to urban master plans, but it is well worth consideration as a realization master plan for urban planning matters.

(3) Issues on urban planning and its management

The study examined the current situation and identified issues in urban planning and its management for Greater Abidjan area by considering six categories of work related to urban planning and development by administrative organizations.

- Coordination
- Survey and research
- Planning
- Establishing a legal system
- Controlling
- Realizing

Coordination

Corresponding to administrative decentralization and administrative structure change, Abidjan Autonomous District has taken initiative on coordination among related organizations for urban planning and development. Their coordination with ministries is considered well organized, but there is still much room for improvement on coordination with local municipalities (communes). Finance for

development is a big issue for communes to handle, and its coordination assistance seems necessary. Furthermore, coordination between private developers and investors, which are to be considered as possible stakeholders, is important.

Survey and research

Surveys, which were conducted for the Master Plan 2000 and Abidjan Strategy Plan (2008-2018), include appropriate contents, but their descriptions are too simple, and it is not certain whether it was caused by lack of resources or too much summarizing. And it is considered that there is still much room for improvement on sharing and disclosure of related information.

Planning

A systematic planning process is defined with legal background, and it is appropriately managed. The urban plans and regulations differ from commune to commune, and it seems that they are not based on a unified spatial management system. Detail plans were studied for only five areas, although many housing estate plans were prepared. For housing estate plans, insufficient consideration on realization of public infrastructure was a serious problem for many years. Introduction of an approved estate developer system is expected to resolve this matter.

Establishing a legal system

There are very few specific or urgent matters in need of improvement with the legal frame on urban planning in Cote d'Ivoire. However legal measures regulating inappropriate residential areas should be considered, which would promote improvement and a transition to an appropriate urban planning system.

Controlling

For spatial control according to urban master plans, it is necessary to resolve the shortage of capable staff and the shortage of finance for management. Making use of community organizations and residents for this purpose is well worth consideration.

Realizing

For accelerating urban development, partnerships between private companies, the residents and public organizations is an important step. In order to guide the projects for public benefit, assistance and guidance for project realization by administrative organizations are expected.

In many housing development sites, construction of public infrastructure and public facilities are delayed. Introduction of an approved estate developer system and formulation of the Abidjan Strategy Plan in recent years are expected to solve this unbalanced development. But there still remain financial resource issues for future implementation of facilities. And improvement in inadequately developed areas should be also considered along with the financial aspects.

2.2.4 Environmental Considerations for Urban Master Plan

2.2.4.1 Current Environmental Conditions

(1) Climate

The climate in Greater Abidjan area is humid with high temperatures that are relatively uniform throughout the year, annual average is 26.4 C, and average minimum is 22.1 C. The annual precipitation ranges between 1,540 and 3,040 mm with an average of about 2,000 mm. It can be classified as having 4 seasons: 1) long rainy season from March to July with precipitation up to 700 mm, 2) short dry season from August to September, 3) short rainy season during October and November, and 4) long dry season from December to March.

(2) Topography

The topography of the Greater Abidjan area consists of four topographic elements which succeed each other from north to south. In the north, a line of low plateaus is observed in two areas, one is around 100 meters, and the other is between 40 and 50 m. These areas are incised deeply by valleys. At the foot of the low plateaus, there is a localized floodplain around the lagoon Ebrie or the barrier.

(3) Vegetation

In the highlands, the climax vegetation was Avodire (African satinwood, the smooth-textured decorative whitish to pale yellow wood of a large tropical West African tree (*Turraeanthus africana*) of the mahogany family used for cabinetmaking. Today all plant formations have been destroyed by urbanization and deforestation. On the coastal strip, coconut took over the marshy forests in areas not yet built up. In the highlands, the primary forest has been replaced by degraded secondary forests that are now supporting agro-industry plantations and areas of food crops.

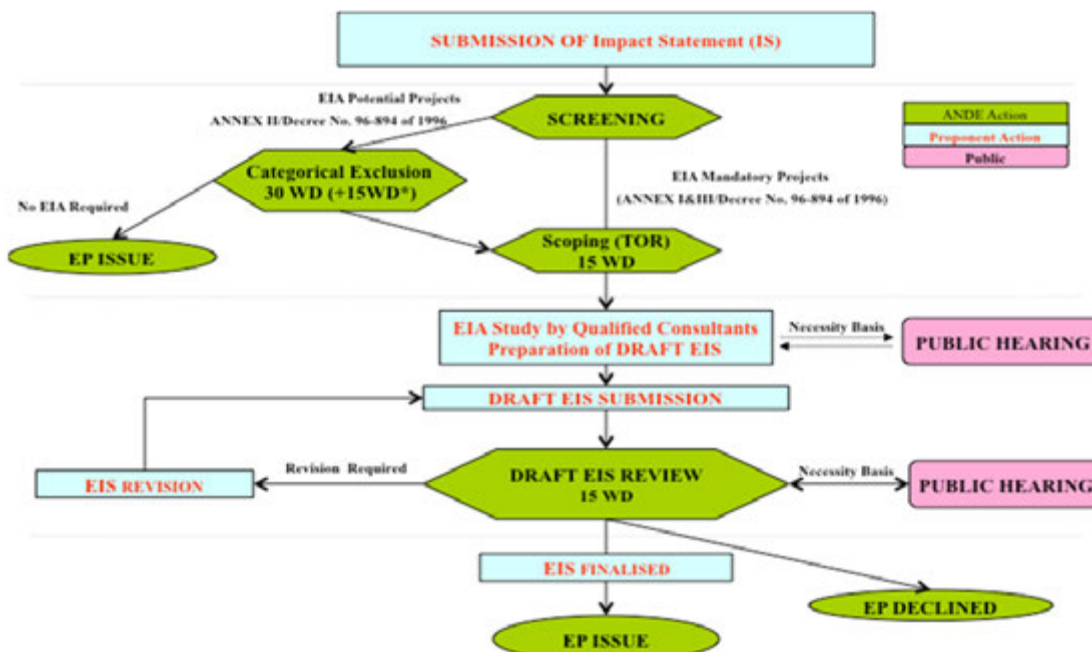
(4) Natural Disaster

Natural catastrophes are, by definition, natural events causing loss of life, destruction of livelihoods, loss of economic production of equipment and environment. They are not directly caused by human actions and interventions but these are factors promoting and aggravating their impact. The most frequently observed natural disasters in Côte d'Ivoire are: 1) floods caused by heavy rains, 2) movements or landslides and rockslides, 3) bushfires (forest fires), and 4) drought.

2.2.4.2 Legal Framework for Environmental and Social Considerations

(1) Legal Frameworks for Environmental Clearance

The proponent/owner of the project is required to prepare an impact statement (IS), and an inventory of the effects of the project/activities. General procedures of the Ivorian environmental and social impact assessment (ESIA) are shown below.



IS (Impact statement): inventory of the effects of project/activities

EIA: ENVIRONMENTAL IMPACT ASSESSMENT EIS: ENVIRONMENTAL IMPACT STATEMENT

EP: ENVIRONMENTAL PERMIT to OPERATE WD - WORKING DAYS REQUIRED FOR REVIEW

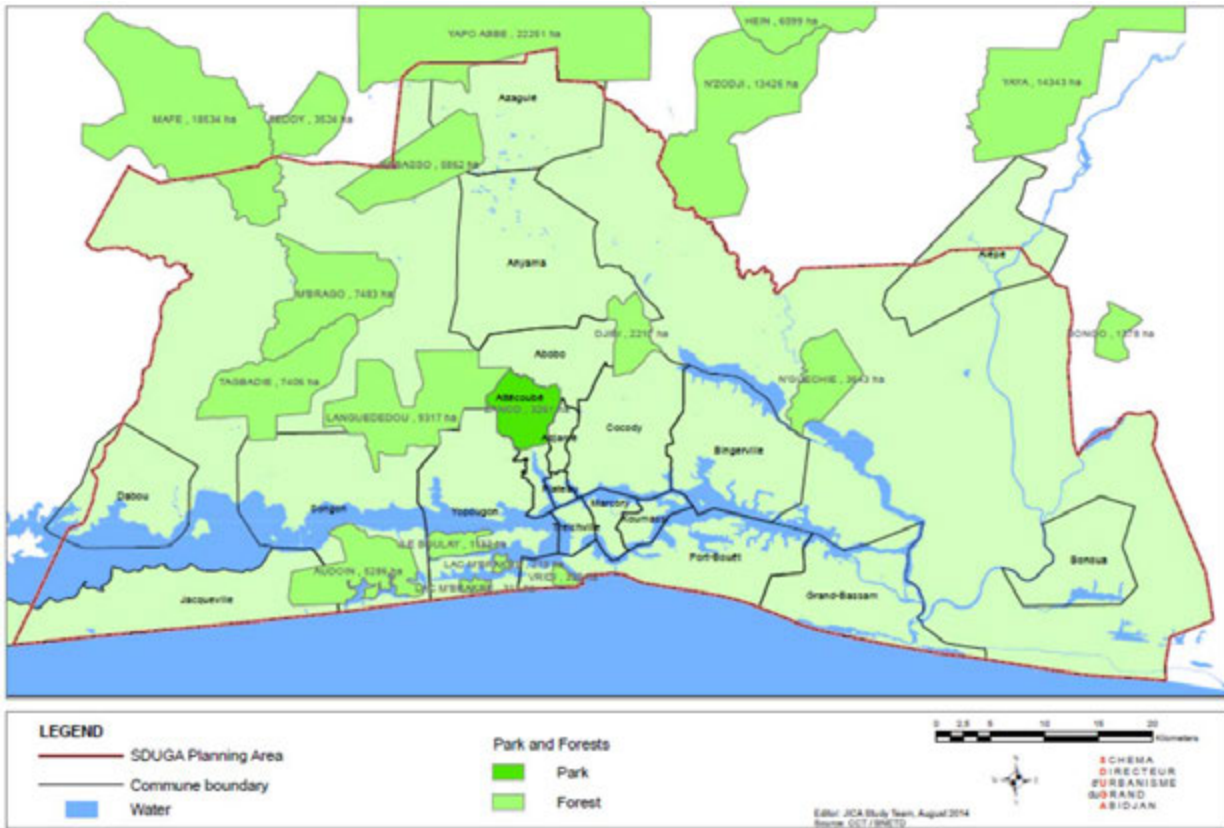
* Additional 15 days might be added if ANDE requires

Source: ANDE, Decree No. 96-894 of 08 November 1996, Order No. 00972 of 14 November 2007

Figure 2.4 ESIA Procedure in Cote d'Ivoire

(2) National Parks and Nature Reserves/Forest Reserve

The locations of National Parks and National Reserves/ Reserved Forests and number of Area (ha) are shown in Figure 2.5. The national park is keeping its forest, however reserved forests are already changed other land use such as land for agriculture.



Source: Summary of Decree regarding some Reserved Forest (Recapitulatif d'Arrete de Classement de Certaines Forêts), SODEFOR direction Technique (Application Date of Decree by SODEFOR (Arrete de Mis A La Disposition de La SODEFOR): L'arrete collectif No 33/MINAGRA du 13 fevrier 1992)

Figure 2.5 Location Map of National Park/Reserved Forest

2.3 Review of Master Plan 2000

The overall plan is well considered but is behind the targets set for the completion of major public strategic development and infrastructure projects. The major reason is the socio-military crisis and lack of funding. However, of equal concern is that the plan lacked clear policy direction for coordinating the many implementing agencies of the decentralized government structure.

- Strategic housing, employment, utility and transportation projects delayed.
- Uneven distribution of completed projects.
- Major road network and public land reserves illegally occupied.
- Urban expansion areas only partially developed.
- Inadequate implementation structure in place.

A brief on the evaluation of the Master Plan 2000 is as follows.

In terms of overall spatial growth and development objectives, the Master Plan 2000 reflects many of the proposals set out for the earlier 1985 Master Plan for Abidjan, although expanded to include the outlying settlements of Anyama, Bingerville, Grand Bassam and Songon and the objectives fine-tuned towards sustainable growth for the city. There is a definite continuity in the strategic planning direction for Abidjan, for example the proposal for the Voie Triomphale through Plateau district as a major urban renewal intervention was formulated in the 1960s. It can therefore be assumed that Government is consistent in their commitment to the realization of the goals and main drivers for the future development of Greater Abidjan as set out in the Master Plan 2000. This is clearly apparent in that for the past decade the Master Plan 2000 has directed strategic transport and utility planning, the expansion of residential areas in peripheral areas, and the development of the new port through both the reservation of land and the implementation of key projects where possible.

Realization of the Master Plan 2000, even partially, has been severely disrupted by economic, political and social factors both within Cote d'Ivoire and across West Africa. This has resulted in the delay or non-implementation of: (a) projects that were identified for short and medium term implementation; (b) social housing and investment in social infrastructure to keep pace with population growth; and (c) formulation of detailed master plans to guide development control. In consequence: illegal occupation of land has occurred to meet the demand for residential premises; there is a need to rehabilitate existing community facilities; and road, public transit, sanitation, drainage and waste management infrastructure require urgent upgrading.

The main strategic proposals of the Master Plan 2000 are still relevant today and will have to be addressed in the future plan for the city. A major thrust of the Master Plan 2000 was the expansion of the urban area by providing serviced land at the peripheral communes. To some extent the Master Plan 2000 sought to balance this spread of the urbanized area with the densification of 10 commune urban centres that form the core of city. Only minimal success has occurred in the latter case. Although densification through the subdivision of private plots across all of the 10 communes has shown that this is where accommodation is demanded. Both spatial growth dynamics will require strong policy guidance to ensure efficient use of infrastructure and curtail urban sprawl.

The underlying strategies for Abidjan's future development stem from best practice planning concepts current in the 1980s and 1990s. The future Master Plan will be required to take these forward together with current planning concepts attuned to sustainable development, such as: the commitment of Cote d'Ivoire to instigate EIA and SEA approval for new developments, compact city and Transit Oriented Development (TOD), employment clusters, the Government's National Plan 2010-2015, Government's commitment to poverty alleviation, Ministries policies for future development and growth, and up-to-date planning standards that reflect density and land value constraints on land availability for providing community facilities.

A major stumbling block is the difficulty in implementing the proposals of the Master Plan. A notable absence in the Master Plan 2000 are land use policies to guide desired actions. There is also a need to clearly define the organizations and stakeholders responsible for implementation of the policies and the role of communes in development control to ensure that projects are realized in a timely and coordinated manner.

2.4 Socio-Economic Framework

2.4.1 Introduction

In the planning of the Greater Abidjan, the socio-economic framework analysis focuses on the magnitude and speed of urbanization and spatial development in the context of national and international economic perspectives.

2.4.2 Development Perspectives of Cote d'Ivoire and Greater Abidjan

(1) National Development Plan (PND) 2012-2015

PND does not give explicit descriptions on Abidjan; however, it is apparent that Abidjan is going to play a leading role in strengthening competitiveness and diversifying the structure of the national economy. A solid, sustainable and environmentally friendly growth is exactly the desirable direction for the development of Abidjan. The cross-cutting issues raised in PND are all crucial to the development of Abidjan, especially the obstacles to transport, land registration and property, human resource development and damaged infrastructures. Likewise, a series of the policies to integrate different regions and people are an important premise to discourage Abidjan from expanding at an unmanageably fast speed and encourage regions is benefitted from the development of Abidjan. In this way, development of Abidjan is for the people not only in Abidjan but in all of Cote d'Ivoire.

(2) Economy and Urbanization of Cote d'Ivoire and Abidjan

The GDP of Cote d'Ivoire has steadily expanded in the past 30 years in terms of US dollars at current prices, in spite of occasional socio-economic conflicts. Major factors to this long term growth have been 1) Continued export of major cash crops, 2) Production and refinement of petroleum, 3) Supply of services and products to Western African countries, and 4) The service sector, which supports factors 1), 2) and 3) above, i.e. transport, distribution, communications, repair, finance, construction, etc. Cote d'Ivoire has a relatively large proportion of the service sector in GDP among African countries.

A key to the above factors to develop the national economy has been the Abidjan Port. The port handles the largest volume of bulk and general cargo in Africa and the second largest volume of container cargo.

The economic structure has naturally associated itself with a large degree of urbanization. The proportion of the urban population in Cote d'Ivoire has increased from 28% to 51% during the period 1970-2010, compared to 20% to 36% during the same period on average in the whole of Africa (Estimated by UN Population Division). The urban concentration is remarkable particularly in Abidjan.

The fast urbanization in the past has been contributed by a large amount of immigration from surrounding countries. About half of the migrants are supposed to have been absorbed into agriculture and the remaining half into the urban informal sector, particularly in Abidjan.

The urban space of Great Abidjan has been expanding. However, the expansion is likely to bring about the reduction of good agricultural lands and undermine national food security. A compact city is not only an important issue for a sustainable environmental and efficient urban management, but also for national food security. It is now worth making various efforts toward achieving the concept of a compact city, since the influx of a migration rush has finished.

2.4.3 Future Socio-Economic Framework

(1) Prospects of Economic Growth in Greater Abidjan

Based on the review of the PND and its performance, the economic prospects of the country and Abidjan, and the implications for the national and international economy for Abidjan, the annual rate of economic growth of Greater Abidjan (GRDP) is assumed for the short-term to be about 10% being the same target rate of the “Triumph of the Elephant” scenario of the ongoing PND and, for the long-term to be about 6.3% on average being the same target rate of “Awaking of the Elephant” scenario of PND.

(2) Population

Population of Cote d’Ivoire

The total national population grew at a very high rate at 4.2% a year for 30 years from 1955 to 1985. This is due to rapid migration from surrounding countries. The population growth, however, slowed down with an end of a migration rush and a greatly fluctuating national economy in the early 1980s till early 2000s. At present, the growth rate is steady down to 2.6% a year on average during 1998-2014.

Immigration is unlikely to increase as fast as before, due to the possible introduction of the policy to manage immigration and a declining income gap between Cote d’Ivoire and neighboring countries. To be an emerging country, the current national development plan (PND 2013-15) emphasizes advanced productive base and a broad range of middle income people, rather than an economy based on continuous input of unskilled labor.

Based on the observation above, it is assumed that the national population will grow at a moderate speed as projected by United Nations, and which was adopted as shown in Table 2.2 below.

Table 2.2 Future Population of Cote d’Ivoire

Year	Total population ('000 persons)	Growth Rate* (% p.a.)
2014	22 671**	-
2015	23 211	2.38
2020	25 904	2.22
2025	28 783	2.13
2030	31 841	2.04

Source: *UN Population Division, World Population Prospects, The 2012 Revision; **INS 2014 Census Result

Population of Greater Abidjan

The population has been concentrated in Abidjan Autonomous District (or Greater Abidjan). In 2014, AAD population is 4,395,000 persons and Greater Abidjan (Study Area) population is 5,054, 000 persons, which represent 20.8% and 22.3% of the national total population, respectively. The urban primacy, in terms of the relative proportion of the primate city in the national total population, has been increasing in many African cities, including Abidjan.

The Ministry of National Planning and Development (MNPD) in particular, intends to encourage the rural areas to attract investments and promote employment, thereby discouraging Abidjan from urban expansion beyond the current government capacity to manage. This intention is reflected in a series of sector policies under the PND 2012-15, though it does not explicitly provide a regional decentralization

policy. Thus, one can reasonably assume that the government will make every possible effort to manage the speed of urbanization so that it can maintain a balanced national development.

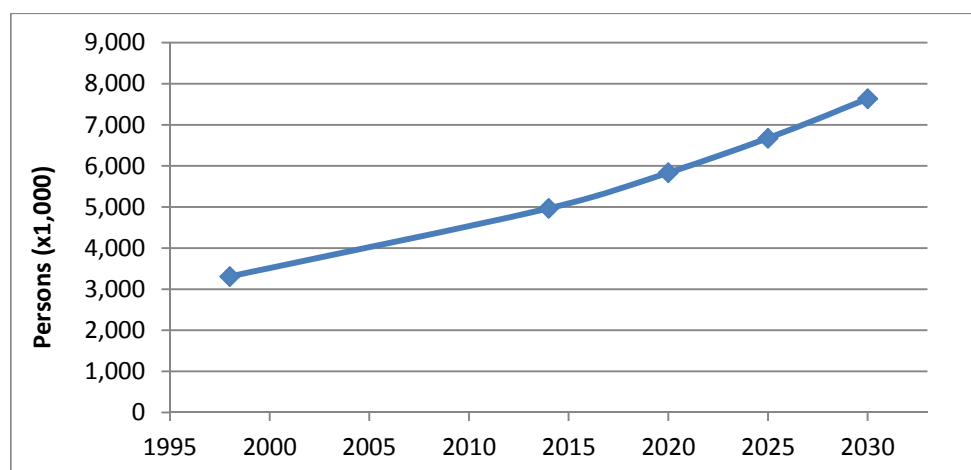
At the same time, MNPD perceives that Abidjan has been taking a large chunk of benefits from national economic expansion, while it has been faced by many urban problems. These problems are detrimental to not only Abidjan but also to the rest of the country. It is therefore conceivable that MNPD anticipates Abidjan will not further expand in population and urban area, but will be developed as a competitive city against other African cities in trade, industries, tourism, education and infrastructure. Consequently, Abidjan would remain as a major growth pole of Western Africa as well as Cote d'Ivoire.

Having in mind the current trends and the government intention above, the future population growth rate of Greater Abidjan was assumed to remain unchanged as presented in Table 2.3 and Figure 2.6.

Table 2.3 Greater Abidjan Population Projection for Study Area and Planning Area

Year	Study Area		Planning Area	
	Population (000 persons)	Growth Rate (% p.a.)	Population (000 persons)	Growth Rate (% p.a.)
1998	3 386	-	3 309	-
2014	5 054	2.68	4 968	2.72
2020	5 922	2.68	5 836	2.72
2025	6 758	2.68	6 675	2.72
2030	7 712	2.68	7 634	2.72

Sources: INS 1998 and 2014 Census, JICA Study Team



Source: JICA Study Team

Figure 2.6 Greater Abidjan Population Projection for Planning Area

(3) Age Structure, Number of Households and Students in Greater Abidjan

Given the target population of Greater Abidjan as reported in Table 2.3, the age structure of the population, the number of households, and the number of students are estimated with reference to the 1998 and 2014 Censuses, UN population projections and analysis results of Home Interview Survey

(HIS) which was conducted in 2013 by the JICA Study Team. The estimation results are presented in Table 2.4 through Table 2.6.

Table 2.4 Age Breakdowns for Greater Abidjan Population Projection

(x1000persons)

Year	0-4	5-19	20-64	65+	Total
2014	535	1 769	2 610	55	4 968
2020	603	2 028	3 140	66	5 836
2025	658	2 302	3 637	77	6 675
2030	717	2 632	4 193	92	7 634

Sources: Based on Estimates of United Nations for age breakdowns using medium fertility rates, JICA Study Team for population control totals

Table 2.5 Greater Abidjan Households Projection (Planning Area)

Year	Households (000 households)	Household Size
1998	675	5.01
2014	1 174	4.23
2020	1 427	4.09
2025	1 677	3.98
2030	1 973	3.87

Sources: HIS by JICA Study Team for 2013; INS 1998 Census for 1998

Table 2.6 Greater Abidjan Student Enrollment Projection (Planning Area)

Year	Students (000persons)
2014	1 308
2020	1 541
2025	1 773
2030	2 053

Source: JICA Study Team

(4) Employment in Greater Abidjan

Total Employment

Based on the Census data and the UN projections, the future economically active population or the population over 15 years old are estimated at 66.2% in 2014 and 69.7% in 2030 over the total population of Greater Abidjan. Meanwhile, the nation-wide employment survey of Agence d'Etudes et de Promotion de l'Emploi (AGEPE) in 2012 finds that a labor force participation ratio is 56.9 % against the population aged 15 and over. Assuming this ratio remain unchanged in future, the total employment in Greater Abidjan was estimated at 3,028,000 persons as shown in the most right column of Table 2.7.

Employment by Industrial Sector

Estimation of the current 2014 employment by industrial sector was based on the HIS results and the total employment presented in Table 2.7.

The future employment by industrial sector in Greater Abidjan is based on the development potentials identified for each commune/sub-prefecture for employment and also the implementation plan of the land use framework for the target years 2020, 2025 and 2030, and the results are shown in Table 2.7.

Table 2.7 Estimated Future Employment by Industrial Sector in Greater Abidjan

(unit: 1,000 persons)

Year	Primary Industry	Secondary Industry	Tertiary Industry	Total
2014	144 (7.7 %)	602 (32.2 %)	1 126 (60.2 %)	1 871 (100.0%)
2020	121 (5.4 %)	733 (32.7%)	1 388 (61.9 %)	2 242 (100.0%)
2025	107 (4.1 %)	860 (33.0%)	1 639 (62.9 %)	2 606 (100.0%)
2030	94 (3.1 %)	1 005 (33.2%)	1 929 (63.7 %)	3 028 (100.0%)

Source: JICA Study Team

2.5 Vision, Goals and Objectives

The Greater Abidjan area is intended to contribute to strengthening the economy of Côte d'Ivoire through improved economic infrastructure, and enriching the quality of life in Greater Abidjan through the provision of adequate social infrastructure and urban amenities. It is a major development initiative for national economic growth to support the achievement of Cote d'Ivoire as an 'emerging economy' as set out in National Development Plan (PND). The land use planning vision is to enable Greater Abidjan to become the premier economic centre of West Africa.

Establish a balanced economic growth area that provides quality living environments and clean industry employment areas; with conserved and enhanced agricultural and natural landscapes that also provide the ideal setting for tourists.

The Greater Abidjan Urban Master Plan proposes an integrated sustainable approach, built upon the opportunities provided by the expansion of the port, recent strategic infrastructure provision and the incorporation of satellite towns within the Greater Abidjan area, to accelerate economic growth and social development in order to create a high quality environment within the urban areas and agricultural hinterland of Abidjan city for local and foreign businesses and investment.

The achievement of the Greater Abidjan Urban Master Plan will require the concerted efforts of both government and private sector actors in various fields.

Any vision for Greater Abidjan must have as an implicit aim; to function as the main economic driver of Cote d'Ivoire. The supporting development goals for Greater Abidjan Urban Master Plan to direct sustainable balanced population and economic growth are shown in Table 2.8.

Table 2.8 Development Goals

Goal	Rationale
<ul style="list-style-type: none"> • To establish a unique Greater Abidjan identity as the economic hub of West Africa 	Government direction to become an emerging economy.
<ul style="list-style-type: none"> • To enable clean industry expansion so that will become a significant engine for economic growth. 	Government direction for economic growth.
<ul style="list-style-type: none"> • To create high quality living and working environments for residents, investors and visitors. 	Provide a better quality of life for residents and attract FDI.
<ul style="list-style-type: none"> • To provide a full range of community facilities for the benefit of residents and workers. 	Fundamental requirement for good governance.
<ul style="list-style-type: none"> • To attract foreign and local investment through smart land use planning supported by adequate road and utility infrastructure. 	Engender confidence in private sectors investors.
<ul style="list-style-type: none"> • To direct urban growth and unlock value through the densification of existing urban centres. 	Requirement of the 2000 Schema Directeur and Smart Growth.
<ul style="list-style-type: none"> • To provide a wider choice of housing for all income groups. 	Requirement of the 2000 Schema Directeur and Smart Growth.
<ul style="list-style-type: none"> • To raise the aesthetic and green quality of urbanised areas. 	Engender citizen and government responsibility towards the city and attract investors.
<ul style="list-style-type: none"> • To promote the coexistence of nature in all its facets - water, greenery and biodiversity, with urban areas. 	Fundamental requirement of sustainable development.
<ul style="list-style-type: none"> • To utilise natural landscape areas as a component of a Greater Abidjan wide open space and recreation framework. 	Utilizing natural assets to redress shortfall in open space.
<ul style="list-style-type: none"> • To promote the development of an efficient and comprehensive public transport system linking road, rail ferries as the main modes of transport. 	Requirement of the 2000 Schema Directeur and Smart Growth.

Source: JICA Study Team

The strategic planning objectives to support the vision and goals reflect the guiding principles. These strategic planning objectives are shown in Table 2.9.

Table 2.9 Strategic Planning Objectives

Strategic Planning Objectives	GP1 EnV	GP2 Sus	GP3 EcD	GP4 QLM	GP5 CPP	GP6 OPI	GP7 Ide	Rationale
• Provide a sustainable working, living, leisure and business environment throughout the Greater Abidjan area.		•	•	•				Basis for an integrated urban development master plan.
• Develop compact human settlements to combat low density urban sprawl and provide communities where people live are close to employment clusters.		•			•			Underlying requirements for smart growth and compact city development.
• Provide a hierarchy of urban centres that enable integrated land use planning of contiguous Local Authorities areas.		•			•			Organizing spatial distribution of commercial/TOD centres and equitable distribution of community facilities.
• Ensure the functional and equitable distribution of urban centres and social infrastructure.		•		•				Fundamental requirement of good governance.
• Designate and implement areas for Knowledge, High Technology and Healthcare clusters.			•	•				Moving employment and industry up the value chain.
• Encourage and facilitate waterfront development associated with the Ebrie Lagoon and the Atlantic Ocean.	•			•		•	•	Capturing the high value, tourist and recreation potential of waterfront property.
• Initiate and implement the rehabilitation of thalwegs upon removal of illegal settlements.	•			•		•		Eliminating the environmental and health risks of natural and manmade hazards.
• Ensure adequate land is identified for the timely relocation of informal settlement inhabitants to low cost public housing and/or serviced land that are close to centres of employment.		•			•	•		Controlling and mitigating the spread of informal settlements due to redevelopment for essential infrastructure.
• Conserve and enhance agricultural land for sustainable development of agri-business enterprises.	•	•				•		Protecting local food security.
• Protect and enhance wetlands and natural forest areas to enrich biodiversity, and provide recreation and tourism uses.	•	•				•	•	Fundamental requirement of sustainable development.
• Establish a high quality and integrated public transport network throughout the Greater Abidjan with links to wider area.				•	•			Requirement of the 2000 Schema Directeur and smart growth.
• Provide a comprehensive upgraded road and network to link urban centres.				•	•			Requirement of the 2000 Schema Directeur and compact city development.
• Land use and development to be determined by the availability of appropriate services and infrastructure, including transportation infrastructure.		•				•		Key to successful, cost efficient and coordinated implementation.
• Develop mixed-use, mixed density centres as Transit Oriented Development (TOD) based on public transit system to achieve balanced growth and patterns of movement.		•		•	•			Basis of compact city development.
• Redevelop existing older industrial areas as clean industry cluster zones.	•	•	•					Requirement of sustainable urban development and growth and to attract FDI.

Legend of Columns for SDUGA Guiding Principles:

GP1 EnV	–	Environmental Values	GP5 CPP	–	Connectivity of People and Places
GP2 Sus	–	Sustainability	GP6 OPI	–	Ownership in Planning and Implementation
GP3 EcD	–	Economic Development	GP7 Ide	–	Identity
GP4 QLM	–	Quality of Life, Modernity			

2.6 Spatial Strategy

2.6.1 Spatial Growth Scenarios

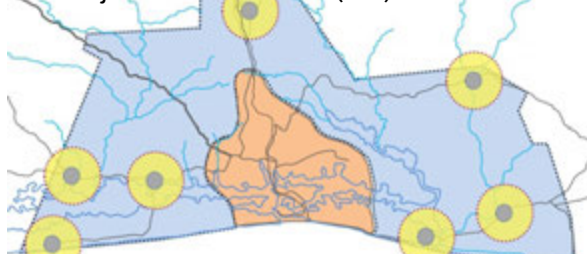
Smart growth agenda for Greater Abidjan was described as follows:

- 1) Establish Compact City initiatives to combat expensive and destructive urban sprawl; through the provision of a range employment opportunities near to residential areas
- 2) Promote Transit Oriented Development (TOD), by giving precedence to public and green transport over private vehicle use.
- 3) Promote public health and quality of life by:
 - i. Creating a sense of identity and ownership for residents through community, supported with place building
 - ii. Distributing public facilities equitably
 - iii. Providing a choice of housing for all income groups
- 4) Preserve and enhance natural and cultural resources

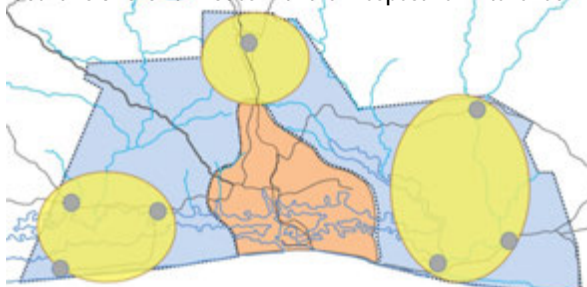
Six Spatial Growth Scenarios

Six spatial growth scenarios for Greater Abidjan were generated and evaluated to meet the criteria for smart growth agenda described above.

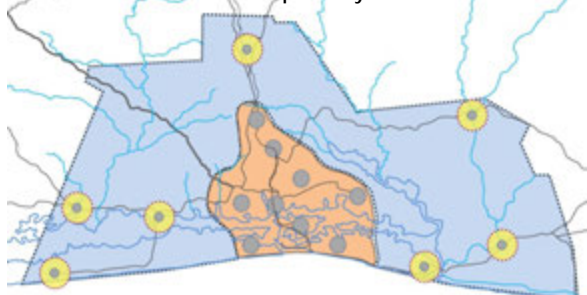
Scenario 1: Self-Contained six communes independent from Abidjan Autonomous District (AAD)



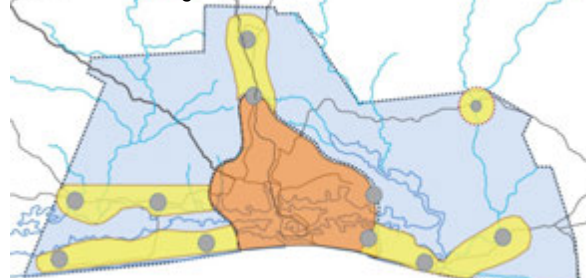
Scenario 3: Growth Nodes with their respective hinterlands



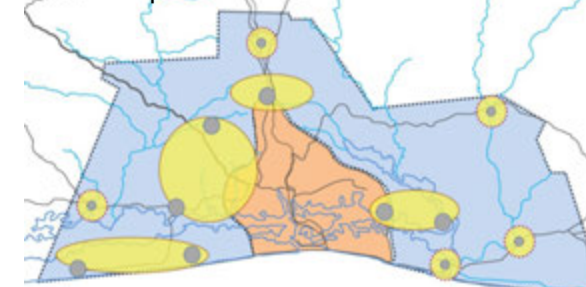
Scenario 5: AAD to be a Compact City



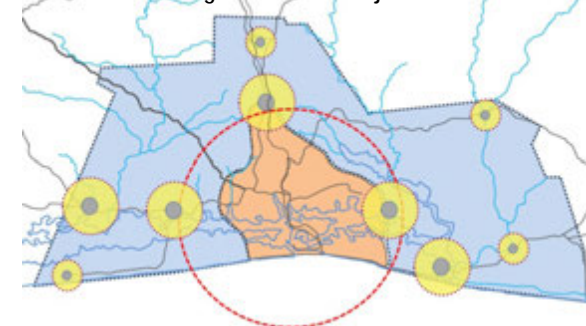
Scenario 2: Three growth corridors from AAD



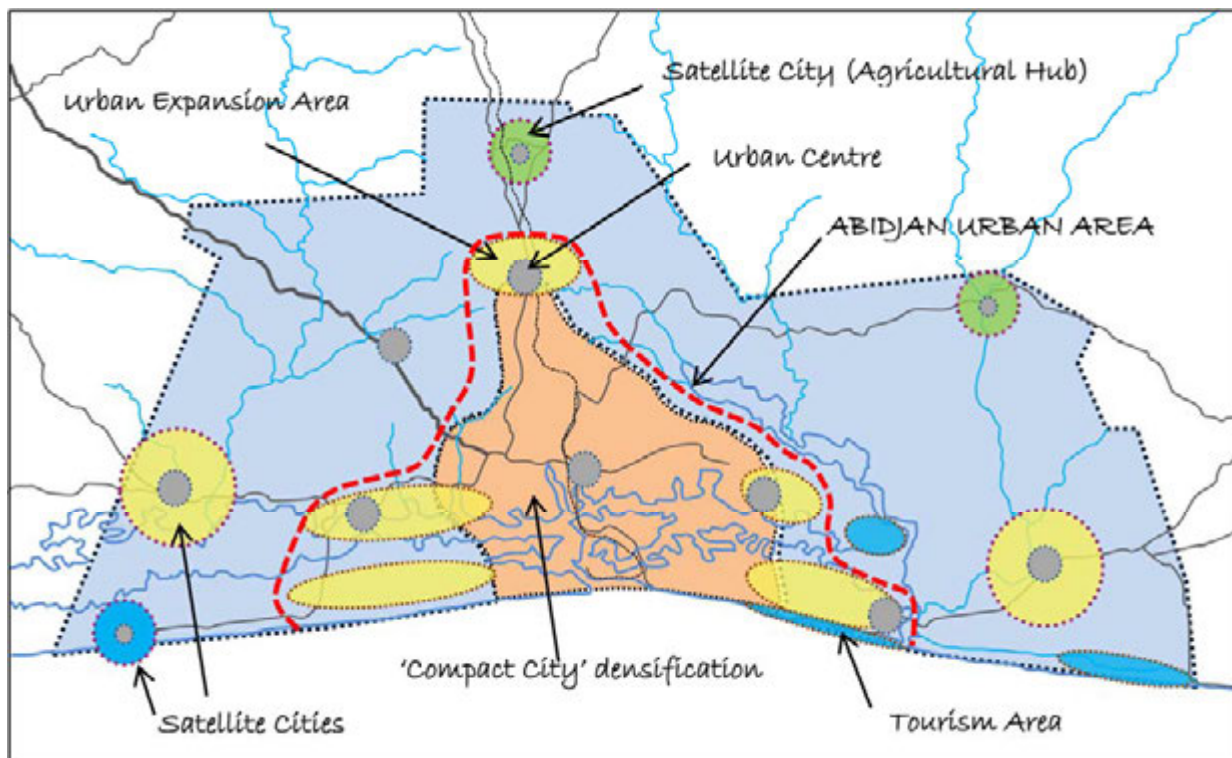
Scenario 4: Expansion of AAD



Scenario 6: Fulfilling the Greater Abidjan Master Plan 2000



As the consequence of comparative analysis of pros and cons of the respective scenarios, an optimized scenario (Scenario 7: Compact City plus Satellite City concept) was synthesized to suit the development of Greater Abidjan as shown in Figure 2.7.



Source: JICA Study Team

Figure 2.7 Scenario 7 (Preferred Spatial Growth Scenario)

2.6.2 Spatial Strategy

The Greater Abidjan Urban Development Spatial Strategy 2030 sets out the development framework for the Greater Abidjan area. It is an advisory and guidance document that sets the integrated physical plan for sustainable development to the areas that will be subject to accelerated growth arising from the increase population and stimulated by infrastructure, industrial and land development. The main components of the strategy are explained below.

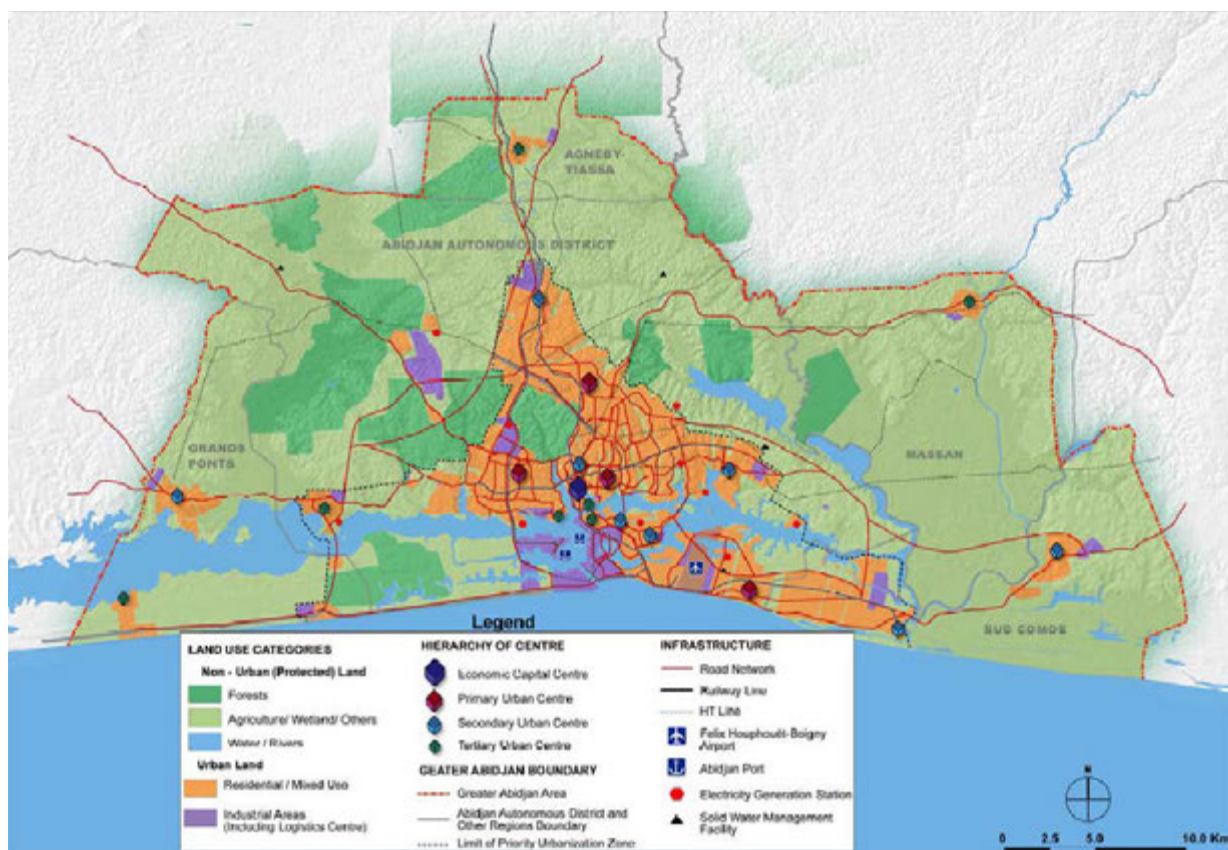
The Greater Abidjan Urban Development Spatial Strategy 2030 (GAUDSS 2030), Figure 2.8, also provides a roadmap for future investment in the area helping guide Government stakeholders and service providers in carrying out their sectorial plans and programmes, and providing more consistency for developers and investors.

Two key recommendations to help implement the GAUDSS 2030 are:

- Implement and enforce the protection of the natural river valley (thalweg) drainage system that flows to the major rivers and Ebrie Lagoon, which will act as a green buffer / separator between open space and conserved landscapes, and the urbanized areas of towns and settlements.

- Establish a 'SDUGA 2030 Implementation Coordinating Committee' with technical coordinators from key implementation stakeholders to direct and guide the plan to fruition.

The major components of the Spatial Strategy are described below.



Source: JICA Study Team

Figure 2.8 Greater Abidjan Urban Development Spatial Strategy 2030

Protected Land

Protected land use categories are land considered not suitable for urban development in the GAUDSS 2030 period. Protected land use includes land that forms part of the natural storm water drainage system, rural production or other non-urban values and include agricultural areas, natural resources, flood water management, ecologically significant areas and inter-urban breaks.

Developed Land

Developed land use categories are land considered potentially suitable for urban development. This includes existing urban areas, rural settlements and sites that can accommodate a variety of urban uses such as housing, industry, business, community facilities, tourism activities, sport, recreation and open space.

Compact Urban Centres

In accordance with the strategic planning objectives, the existing and proposed development areas will be consolidated into a hierarchy of contiguous and clearly structured urban forms. This hierarchical structure promotes mixed uses, mixed density centres and enables more efficient and equitable use of the investments in transportation and utility infrastructure.

A hierarchy of mixed use centres through the redevelopment of existing town and settlement centres will optimize accessibility by promoting transit-oriented and mixed density development in locations that are currently served by a variety of public transport and utility networks.

Urban and Rural Development

The total area included within the boundary of Greater Abidjan is 3,846 km². Of this almost 77% is rural in character, supporting agriculture and gazetted natural forest areas. This percentage also includes the inland waters and lagoons; the majority of which lie in rural areas and support local and commercial fishing. The spatial strategy is based upon consolidating population growth predominantly within existing urban communities, defined urban expansion areas, and existing or future employment clusters.

The majority of this future growth will be located within the urban conurbation of Abidjan. That includes the 10 heavily urbanized communes and parts of Anyama, Bingerville, Songon and Grand-Bassam. In general the extent of the conurbation extends between 20 and 35 kilometers from centre of Abidjan.

Over the short term, growth outside the Abidjan conurbation will develop at a more modest level focused on the future satellite towns in rural areas. Over the medium to longer term land extensive development will be attracted to these rural settlements.

The protection of wetlands, agricultural land and the biodiversity of the natural water catchment system will contribute towards a high quality of environment to these satellite urban centres which are inevitable. It is important to ensure that the social and economic life of these satellite urban centres, and the needs of their residents, is supported by employment opportunities, community facilities and complementary services.

Hierarchy of Urban Centres

The urban centre hierarchy adopted under the GAUDSS 2030 is formulated to capture and direct the opportunities from accelerated growth through:

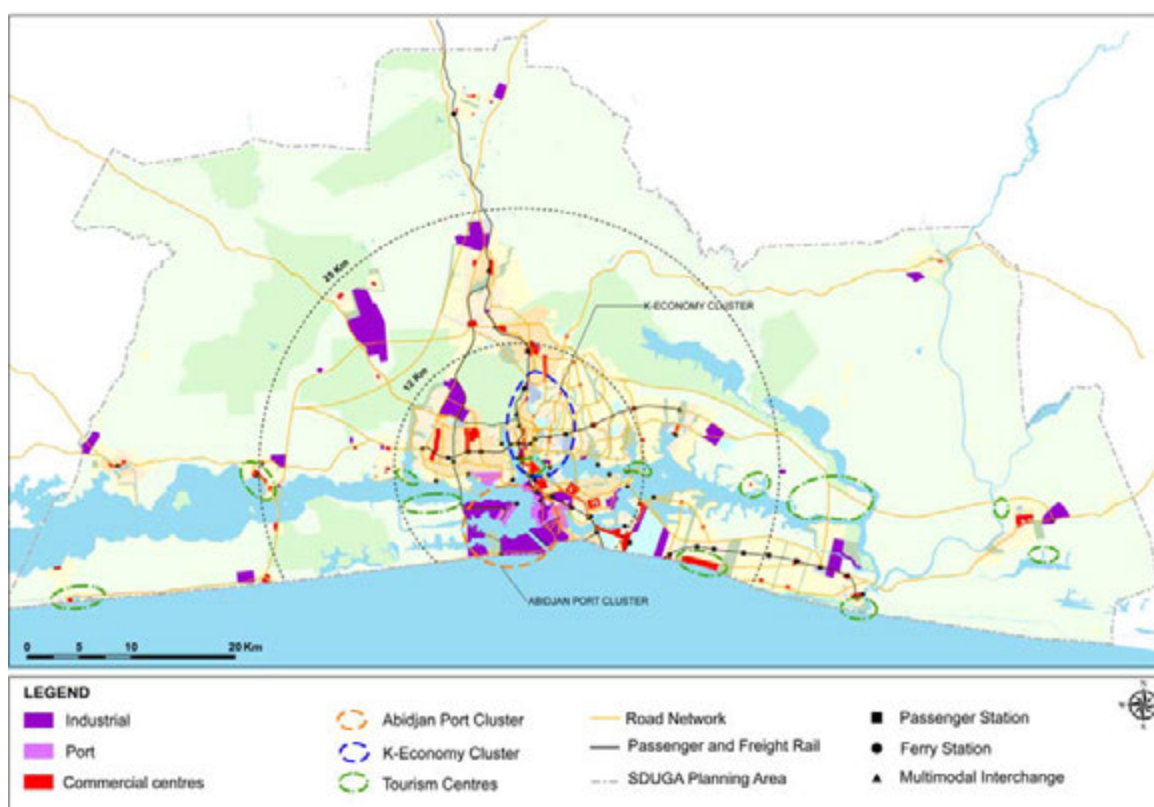
- Concentrated Growth Areas; areas targeted for future large scale high (or medium) density development to promote economic growth at a sub-regional scale. They are the focus of urban renewal within the older urban areas of Abidjan city.
- Specific Development Clusters; land uses to be located in a designated area and thus benefit from the synergy of packaging together similar and complementary development i.e., port development, industry, tourism, knowledge economy, Advanced Technology and IT.
- Service Centres; town centres that provide the basic civic administration, retail and social infrastructure for the surrounding residential population catchment.

Employment Clusters

In line with the compact development principles for sustainable growth new employment is focused into clusters that are located where possible in proximity to existing or future residential development. These take four forms;

1. future green industry clusters complementing and upgrading existing industries and complexes,
2. knowledge and health services clusters,
3. tourist zones, and
4. commercial / business mixed use urban centre renewal.

Figure 2.9 shows the main employment clusters within three zones; 12km (major existing employment centres), 25km (proposed new industrial / logistic centers), suburban (satellite towns), that take account of; the local resident population centres, links to strategic road, rail and public transit networks, existing or committed industries, and proposed urban renewal and TOD.



Source: JICA Study Team

Figure 2.9 Employment Clusters

Industrial Clusters; will be the primary manufacturing based target to capture the economic development potential that will arise with the completion of the strategic road and rail networks, port expansion and new industrial zones. Traditional industrial areas, zones and estates will be adequately serviced with infrastructure to enable growth. Land use zoning will enable the expansion of these areas including the opportunity to provide worker housing. Future industries to be located in these areas are to

be 'green' non-polluting (including light industrial) and complement any existing industries, which themselves are to be upgraded to green status over the Strategy period.

Knowledge Economy Clusters (K-Economy Clusters); are the employment focus for the Government's vision of an economy based on providing value added and advanced technologies and services such as:

- Petrochemicals
- Electronics
- Biotechnology
- Nanotechnology
- IT and Business Processing Outsourcing Sectors
- Business Parks
- Higher Education Campuses including Foreign Universities and International Schools
- Health Services by Private Sector

Urban Centre Mixed Development Clusters; hand-in-hand with urban renewal and TOD employment clusters will be provided in mixed use development for:

- Retail and commercial including; Big Box retail, shops in Town Centres
- Service industries
- Public offices and community facilities
- Logistics
- Regional Offices of Private Companies
- Hotels, Leisure and Entertainment

Tourism; GAUDSS 2030 promotes the development of tourist facilities and attractions for domestic and international tourists, and highlights the main clusters of tourism development. In this respect the entire Greater Abidjan area is seen as a major resource upon and around which a new and significant international destination can be built. The Tourist Zones for both domestic and international tourism will include;

- lagoon and the Atlantic Ocean waterfront areas
- and more active theme parks and water sports areas
- rural homestay, ecotourism and cultural sites
- the Grand- Bassam UNESCO World Heritage site and rehabilitated heritage areas
- inner city hotels, MICE and exhibition centres
- festival and cultural event venues – urban and rural

Recreation Open Space

The spatial strategy for open space promotes the preparation of 'Green-Blue Plan'. The major components of which should be:

- Water areas – lagoons, ocean frontage, rivers and lakes
- Greenways – river valley (thalweg) parks, parkways alongside strategic roads and parkland between major residential neighbourhoods
- City Parks – the upgrading of existing city parks to meet modern day lifestyle recreation requirement for families, the disabled, aged and active recreation users
- Pedestrian routes – the major mode of movement throughout Greater Abidjan is walking
- Neighbourhood Parks - a full range of landscaped active and passive open spaces
- Forest Parks – existing gazetted forest areas and the Banco National Park

2.7 SEA for Spatial Growth Scenarios

The JICA Study Team analysed 7 Spatial Growth Scenarios. In order to assure the most Spatial Growth Scenario, SEAs for these scenarios and the “Zero-Option” were implemented. The evaluation items are as follows:

- **Solution to existing problems**
 - Disorderly land use
 - Absolute lack of living infrastructure
 - Lack of public investment
 - Sharp increase of population
 - Huge number of urban poor
 - Disorderly expansion of AAD
- **Environmental aspects**
 - Pollution
 - Air Quality/ Offensive odors
 - Water Quality
 - Waste
 - Noise/ Vibration
 - Natural Environment
 - Protected Area/ Ecosystem
 - Hydrosphere
 - Topography/ Geology
 - Social Environment
 - Resettlement
 - Living/ Livelihood Condition
- **Economic/ Financial Aspects**
 - Development/ Maintenance/ operation cost
 - Economic revitalization
 - Contribution to national economy

The outline of the average points is shown in Table 2.10. Since Scenario 7 (Combination with compact city and satellite cities) obtained the highest points, it was selected as the most preferred spatial growth scenario for the Greater Abidjan Urban Master Plan.

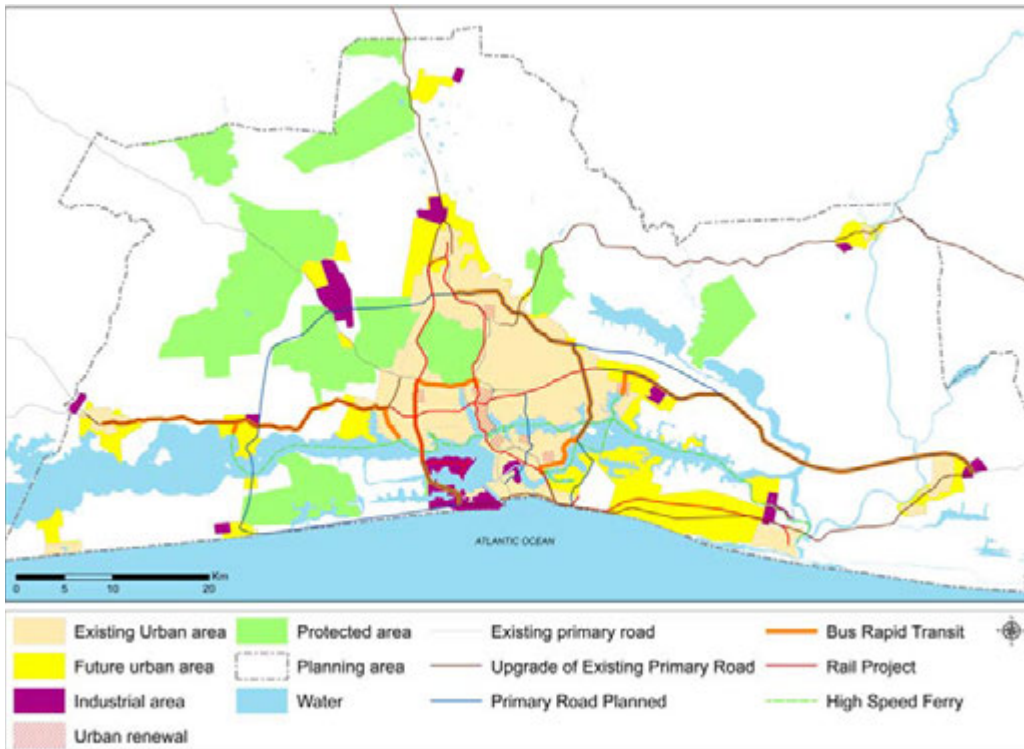
Table 2.10 Outline of Average Points

Point	ZERO Option:	Scenario 1 Self-Contained six communes independent from AAD	Scenario 2 Three growth corridors from AAD	Scenario 3 Growth Nodes with their respective hinterlands	Scenario 4 Expansion of AAD	Scenario 5 AAD to be a Compact City	Scenario 6 Fulfilling the Greater Abidjan Master Plan 2000	Scenario 7 Combination with compact city and satellite cities
Solution of Existing Problems	-3.00	0.33	0.00	1.67	0.50	-0.33	0.83	1.67
Environmental Aspects	-2.61	0.67	0.11	-1.39	-2.17	1.94	-0.86	-0.67
Economic/ Financial Aspects	-3.00	-0.33	-0.33	1.00	1.33	-2.33	1.33	1.67
Grand total	-2.87	0.22	-0.07	0.43	-0.11	-0.24	0.44	0.89

Source: JICA Study Team

2.8 Implementation Strategy

The proposed implementation strategy for the GAUDSS is illustrated in Figure 2.10 through the main future urban expansion areas and the major transport infrastructure projects to be implemented over the 2015 to 2030 plan period. The plan shows the existing urban area (built or land already provided with basic utility infrastructure), future expansion areas, existing and proposed industrial areas, urban renewal areas, protected land and future strategic road and public transport projects.



Source: JICA Study Team

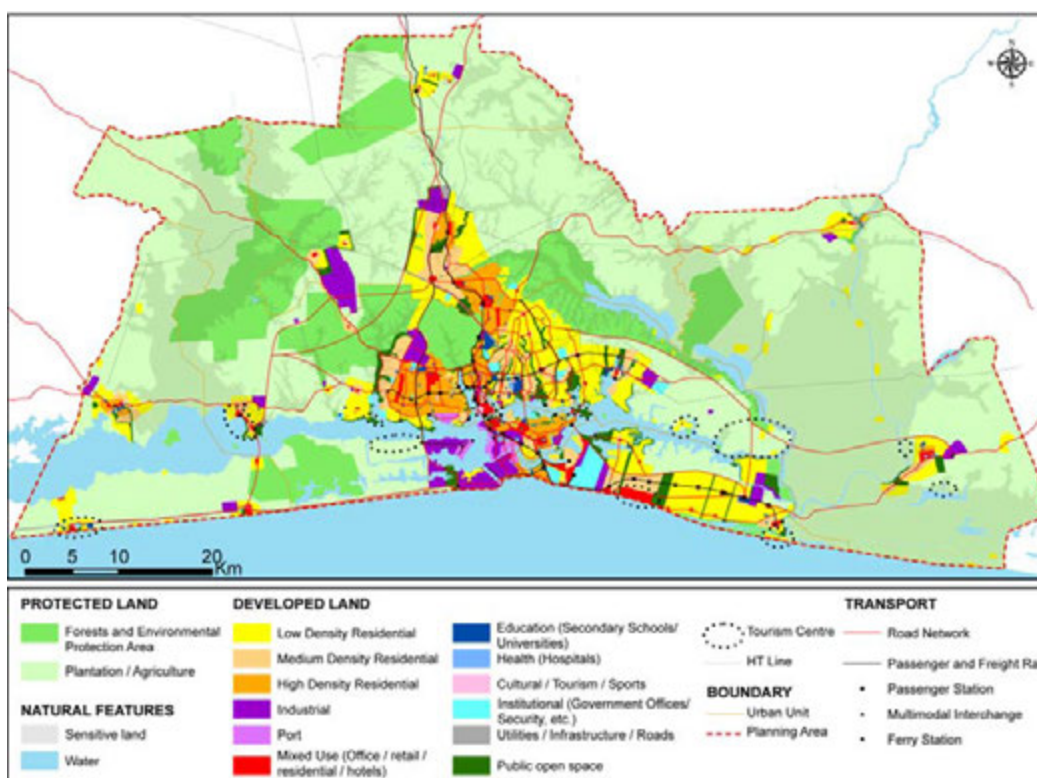
Figure 2.10 Implementation Strategy 2015-2030

Urban expansion directed by compact city principles to meet the population growth is calculated to result in an increase of the existing urban, currently some 44,000ha by 23,200ha. The urban area will total some 67,200ha approximately 19.2% of the entire Greater Abidjan area, an increase from the current 12.7%.

2.9 Land Use Framework Plan

The plan, Figure 2.11, shows the major land uses and densities of compact development that directs the Spatial Growth Strategy, to support population growth. The plan is not a detailed site by site of all the land uses within Greater Abidjan, as site selection of future land uses shall be elaborated after approval of the SDUGA. Major and strategic existing and proposed land extensive uses are shown in the Land Use Framework for Urban Units. These include, amongst others, the existing major public secondary

and tertiary education establishment, hospitals, cultural and sports facilities, Government offices, security and public facilities. In addition major committed public facilities are included where details of the sites have been given to the JICA Study Team. The plan will act as a broad guide for the more detailed urban planning and development control documents (PUD's, public works budgets, zoning regulations, etc.) to be completed by Government to fulfil statutory Master Plan requirements. Details of the Land Use Framework Plan are described on an Urban Unit basis in the individual Urban Unit Development sections of this Report.



Source: JICA Study Team

Figure 2.11 Greater Abidjan Land Use Framework

Table 2.11 sets out the overall land use budget for 2030, with reference to Protected Land and Developed Land. The land use budget for developed land sets out totals for residential areas and activity areas (industry, port and mixed use development). The total for community facilities and infrastructure is a combination of large community sites and utility sites as indicated on the plan, smaller current sites, and all future sites. As such there will be double counting as these smaller current sites are included in the residential and mixed development areas budgets. Therefore an accurate overall total is not shown as the JICA Study Team was unable to acquire a comprehensive audit of all existing facilities.

Table 2.11 Broad Land Use Budget 2030

LAND USE	Ha
Forests and Environmental Protection Areas	56,832
Plantations / Agriculture	223,316
Habitats	
Residential – High Density (> 220 p/p/h)	8,433
Residential – Medium Density (> 70;< 221 p/p/h)	9,287
Residential – Low Density (< 71p/p/h)	27,181
Activities	
Industrial	7,830
Port	990
Mixed Use (Office, Retail, Residential, Hotels)	2,984
Equipments	
Community Facilities and Infrastructure	49,328*

Note:* Some of this land requirement is included within Habitats

Source: JICA Study Team

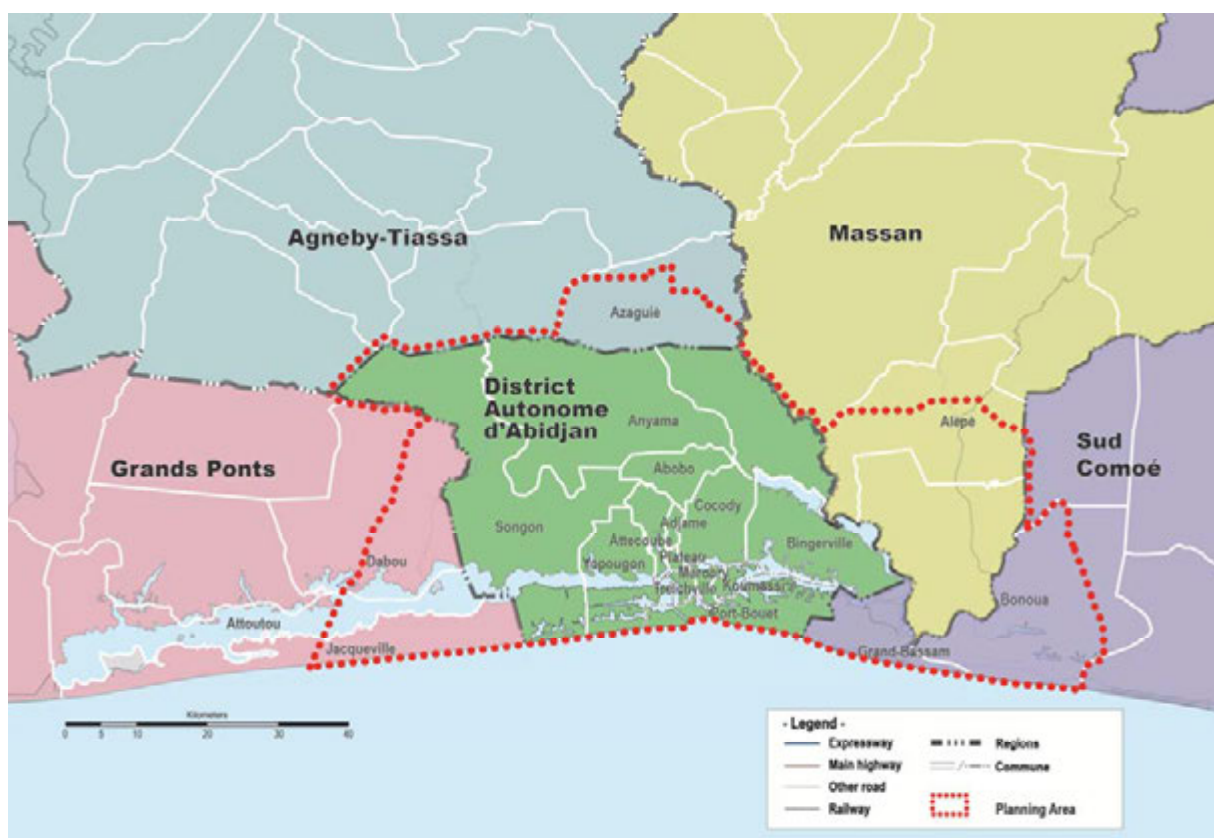
The Master Plan 2000 organized the spatial development within a series of Urban Units. The logic of this spatial grouping, which takes into account, historical urbanization, the interconnected provision of road, utility and social infrastructure, is adopted for the Greater Abidjan Urban Development Spatial Strategy 2030. The six original urban units are expanded and modified to the following ten units, which include all of the communes of Abidjan Autonomous District, the five communes that now lie within the expanded Greater Abidjan area, and a Special Function Area that is the Port of Abidjan. The proposed development strategies and land use framework for each Urban Unit are described in detail within this Report.

2.10 Implementation

Government Agencies, ministries, regions and communes will play a key role in implementing policy actions that will require the need for effective coordination and focusing of the delivery effort. In order to implement the Urban Master Plan 2030 a number of key Government Actions are required. First, the high level approval and adoption of the Urban Master Plan 2030, which is fundamental to the plan's status and credibility within the development planning process. Second, the revision of Detailed Master Plans (PUD's) and their supporting regulations; which are necessary to direct sustainable growth and give physical expression to the plans. And third, an integrated planning governance structure is required to implement the Urban Master Plan 2030 and carry forward the programme of plan-making and regulatory control updating for statutory approval.

The Law of Decentralizing Local Governments 2003 has widened the responsibility of 'plan making' to guide future land uses and development control. The Master Plan 2000 was formulated under the auspices of the Ministry of Construction (subsequently the MCLAU). Decentralisation has broadened this responsibility so that the MCLAU, Regions and Communes, in total 25 entities are empowered to make development master plans.

The Greater Abidjan area in itself is a notional boundary that encompasses a zone subject to varying levels of urbanization influenced by the Abidjan urban conurbation. This 'zone of influence' has been recognised in previous master plans for Abidjan and has progressively expanded since the 1960's. Taking the 'Place De La Republique' in Plateau as the centre of Abidjan, the current extent of the Greater Abidjan area stretches from the centre some 52 kilometres to the west, 61 kilometres east, and 42 kilometres north. The Greater Abidjan Master Plan 2030 area, see Figure 2.12, includes one entire region, the Abidjan Autonomous District, which accounts for 54.6% of the total area (210,052ha); and parts of four other regions – Grand Ponts 11.5% (44,396ha), Agneby-Tiassa 5.5% (21,101ha), Massan 16.5% (63,285ha) and Sud Comoé 11.9% (45,769ha). Within this Greater Abidjan area there lies entirely or in part 19 communes.



Source: JICA Study Team

Figure 2.12 Regional and commune governance areas within Greater Abidjan

The implementation structure will therefore need to incorporate the legal mandates of the relevant 'plan making' authorities as well as a coordination system that assigns equal responsibility to implement an integrated Master Plan. This will involve governance bodies, ministries and other government agencies responsible for project implementation. The future development of the city will require both the development of discrete projects, for public purpose to local communities, as well as those with a regional influence to stimulate economic growth.

The adoption and implementation of the Urban Master Plan 2030 and the roll out of its vision, objectives and policies to key Ministry and Agency stakeholders and the private sector will be supported through a wide range of governance initiatives.

Government guidance

This will involve the government providing:

- Spatial planning direction for the private sector development through land use zoning.
- Pump priming through utility and road infrastructure to attract private sector investment.
- Land development policies and actions to ensure sustainable development.

Creating a competitive land market

Government will raise the value of land by:

- Up-zoning of land to increase the gross saleable or leasable built up area.
- Introducing an incremental scale of land taxation to finance public works.

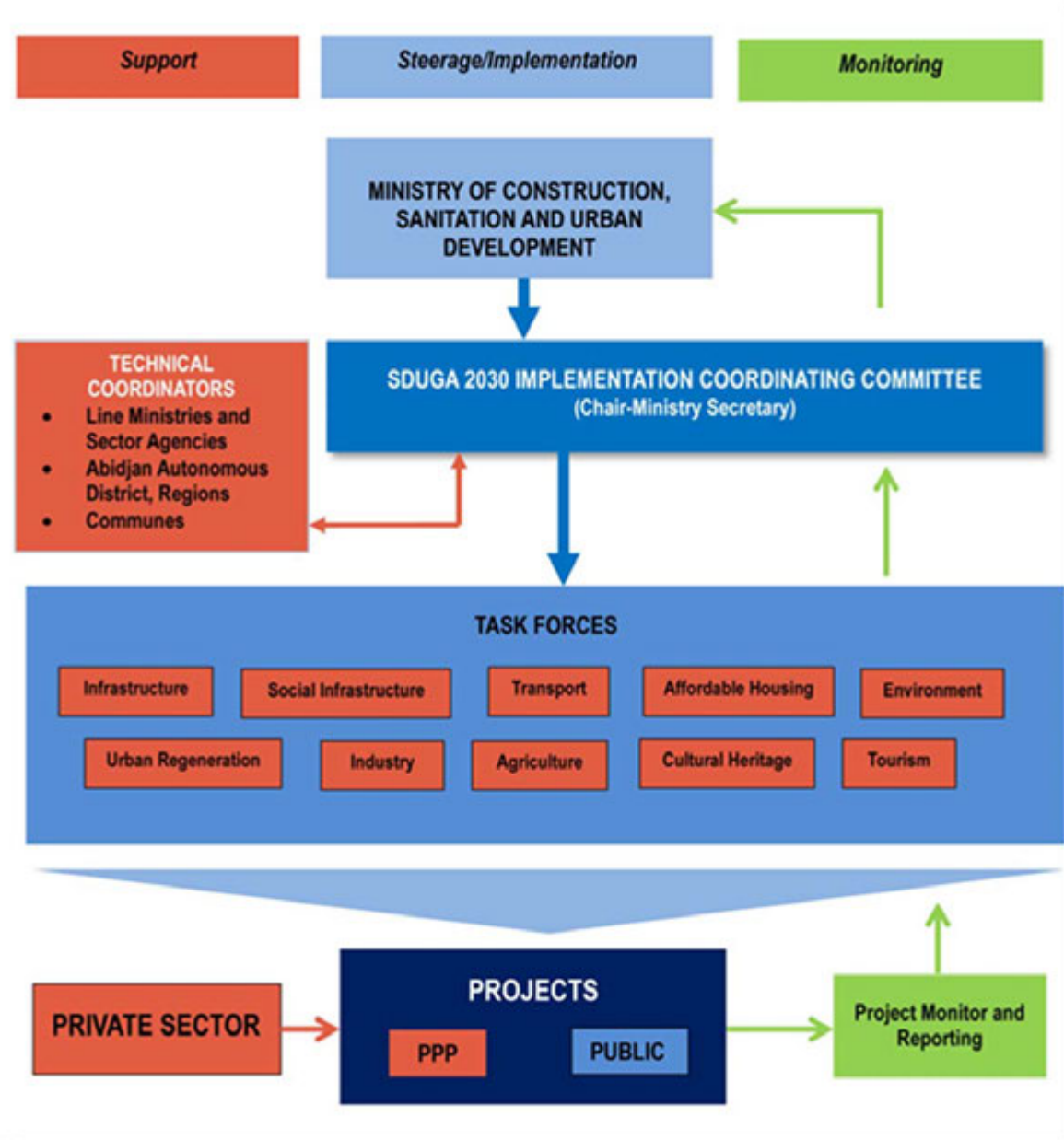
Bringing stakeholders together

Government will:

- Promote PPP for the development of public land and infrastructure provision.
- Facilitate and coordinate urban renewal and revitalization projects by the private sector.
- Encourage local economic development through land assembly and land readjustment.

An Implementation Coordinating Committee will be established and managed by the MCLAU, in accordance with its legal and wider role as strategic planning authority, to bring together the planning requirements in a sub-regional context, oversee the implementation of the SDUGA Master Plan 2030, guide policy and policy actions, and to report to Government annually, see Figure 2.13.

The Implementation Coordinating Committee will be guided by a clearly structured sequence of plans and supporting policies; Spatial Strategy, Implementation Strategy, Urban Unit Land Use Framework, Land Use Policies and selected Extended Area Master Plans.



Source: JICA Study Team

Figure 2.13 Greater Abidjan Implementation Process through Governance

2.11 Master Plan of Extended Areas (MPEA)

2.11.1 Introduction

Definition and Objectives

The Master Plan of extended areas (MPEA) is a framework, as an exemplar of a Detailed Urban Plan (PUD) which is a mid- and long-term statutory framework for guiding the development and redevelopment of land. It is also an opportunity for the JICA Study Team to provide integrated planning approaches by conducting a draft of a detailed urban plan. So this is the final step that shows the planning strategy proposed by the JICA Study Team, following the Urban Master Plan of Greater Abidjan.

The objectives of the Master Plan for extended area are to be used by cities/sub-prefectures as reference for preparing legal PUD, and to be used by MCLAU as reference for preparing new regulations for PUD after the completion of the SDUGA project.

Subject Areas

Based on the conclusions of the urban analysis, 6 extended areas are experiencing various stages of formal and informal urban growth and should be considered for PUD. These corridors are 1) Bingerville – Eloka, 2) Anyama – Azaguié, 3) Yopougon – Attinguié, 4) Grand Bassam – Bonoua, 5) Abobo – Alépé, and 6) Songon – Dabou.

These 6 areas require more detailed plans due to the pressure of urban growth both now and anticipated in the future. In accordance with the agreements between JICA with MCLAU, the JICA Study Team is to produce proposed drafts of master plans for at least two growth corridors. Thus, based on the conclusions of urban analyses made during the study, the JICA Study Team has identified among others Bonoua as an area of rapid urban growth for years to come. In addition, to meet the dynamics of urbanization that will be generated by the creation of the new Attinguié industrial area, this area has also been identified as an area with great potential for growth.

2.11.2 Urban Growth Management for Suburban Areas

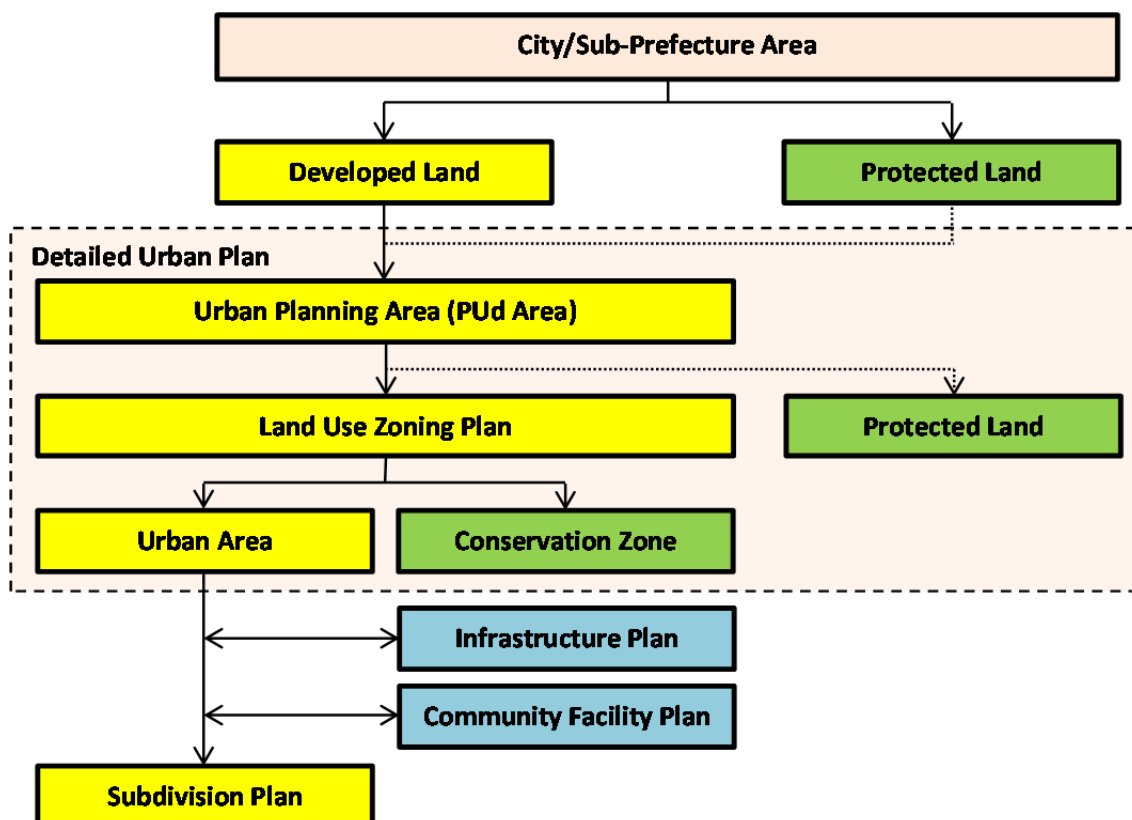
It is necessary to manage urban growth in rural areas for the following objectives:

- Protect the natural environment and resources, and preserve agricultural land in protected land
- Create better and more attractive environments for residents and businesses in the industrial areas by providing appropriate basic infrastructure and services
- Make a compact conurbation area

Future urban area's boundaries should be set in order to manage urban growth in rural areas, specified in a detailed urban plan (PUD) on the 1:10,000 scale simplified digital base maps created by this project.

Outside the urban area's boundaries, rural-agricultural-natural environments should be conserved for rural life including agricultural production and natural environments. Therefore, as well as the preparation and approval of subdivision plans which should be strongly restricted, principally no urban development should be allowed. Within the urban area's boundaries, provision of urban infrastructures/services should be implemented with high priority. (See Figure 2.14.)

In this study, the JICA Study Team set the tentative boundaries between developed land and protected land, and the urban area and the conservation zone in the urban planning area.



Source: JICA Study Team

Figure 2.14 Basic Policy of Developable Land

2.11.3 General Land Use Zoning and Guidelines

All land, at least within the urban area, should be divided into zones, of which the acceptable use and form are prescribed. The JICA Study Team proposes fourteen general classifications of land use zoning as listed below:

- Low density residential zone
- Medium density residential zone
- High density residential zone
- Mixed commercial and residential zone
- Commercial / office zone
- Light industrial zone
- Industrial zone
- Educational zone
- Health zone
- Government office zone
- Religious zone

- Utilities / transport / security / military zone
- Public open space / recreation / sports / tourism zone
- Conservation zone

The classifications of the above-stated land use zoning being minimum and general, it is desirable to be prescribed as universal zoning classification applicable to the whole country. The zoning guidelines of the above-stated land use zones are shown in Table 2.12 and Table 2.13.

Table 2.12 Proposal for General Land Use Zoning Guidelines (1)

Land Use Zones		Description
Residential zones	Low Density Residential zone	<ul style="list-style-type: none"> • Major use : detached houses • Population density : 69 people per hectare or less • Housing density : 17 units per hectare or less • In order to maintain the spacious living environment, the land uses permitted are limited extremely and the requirements for plot size or building height are set up strictly.
	Medium Density Residential zone	<ul style="list-style-type: none"> • Major use : detached houses, low-rise collective houses • Population density : 70-219 people per hectare • Housing density : 18-56 units per hectare • Since the land uses permitted are slightly expanded from the low density residential zone, facilities indispensable to the daily life of a local community can be built.
	High Density Residential zone	<ul style="list-style-type: none"> • Major use : mid-to-high-rise flats or apartments • Population density : 220 people per hectare and over • Housing density : 57 units per hectare and over • This zone requires adequate parking facilities, public transport facilities and public open spaces. • The units at ground floor level only may be used for small-scale offices and shops, providing service for a local community.

Source: JICA Study Team

Table 2.13 Proposal for General Land Use Zoning Guidelines (2)

Land Use Zones		Description
Commercial zones	Mixed Commercial and Residential zone	<ul style="list-style-type: none"> Major use : mid-to-high-rise flats or apartments, shops, commercial offices The main activity in this zone is shopping for daily necessities by residents living in the vicinity. Some commercial uses are prohibited to protect minimal residential environment. The areas such as railway station vicinities, city centres in smaller cities, areas along a trunk road will be zoned as this land use zone.
	Commercial / Office zone	<ul style="list-style-type: none"> Major use : shops, shopping malls, markets, business offices, restaurants, banks, hotels, amusement facilities, mixed commercial and office The catchment area spreads through a wider area than that of mixed commercial and residential zones. According to the attraction of the city and the character of an urban centre, adequate breadth and density should be ensured. This zone requires adequate parking facilities, public transport facilities and public open spaces.
Industrial zones	Light Industrial zone	<ul style="list-style-type: none"> Major use : small-scale factories, low-pollution industries, facilities of service industries Hazardous industries and industries bringing about environmental deterioration should be strictly prohibited. The industries that have little environmental impact may be located abutting on residential or commercial zones
	Industrial zone	<ul style="list-style-type: none"> Major use : general industries, warehousing facilities, lorry parks Any industry can locate in this zone. Access and egress are strictly controlled and a green buffer zone should be set up adjacent to other zones
Educational zone		<ul style="list-style-type: none"> Land in this zone is intended to be used for the teaching or training of persons to improve their knowledge and develop their skills, and research into specialized fields. Educational facilities to be located in this zone range from Nursery, Primary and Junior High schools, Senior High Schools, Vocational/Technical Schools and Colleges to Polytechnics and Universities. Permitted uses and prohibited uses vary by the types of educational facilities.
Health zone		<ul style="list-style-type: none"> Land in this zone is intended to be used to provide facilities for health services at all levels of health care ranging from clinics to hospitals. Permitted uses and prohibited uses vary by the types of health facilities.
Government office zone		<ul style="list-style-type: none"> Government offices and related business of the executive, legislature, Judiciary and all other organization and agencies of government, operating at national, regional and city level
Religious zone		<ul style="list-style-type: none"> Religious facilities such as places of worship, churches, mosques and facilities for other religious beliefs
Utilities/transport/ security/military zone		<ul style="list-style-type: none"> Utilities : utility sites (water and sewerage, gas, telephone), power plants and substations, solid waste disposal sites, cemeteries, areas of mining activities Transport : airports, sea ports, railway stations, bus stations, water bus stations, logistics centres, warehouses, lorry parks Security/Military : police service, fire service, emergency service, prisons and correctional service, and military facilities including barracks
Public open space / recreation / sports / tourism zone		<ul style="list-style-type: none"> Public open space : parks and gardens, play areas for children, and open areas for buffers between industrial and other land use activities Recreation : recreational, leisure, entertainment and culture facilities for residents of the area Sports : sports grounds, stadium, golf course, sports clubs, camping grounds, etc. Tourism : historic and cultural sites, recreational, leisure and entertainment facilities and accommodation for tourists and visitors
Conservation zone		<ul style="list-style-type: none"> Land in the conservation zone is intended to be retained in its natural or modified state for conservation purposes. It includes forest land, land within the immediate vicinity of water bodies such as the seas, lagoons, lakes and rivers, main drainage system including rivers, streams and canals, and land reserved for flood protection, such as spill areas, watershed protection areas, and riparian area including marsh and swamp. Development in conformity with the intent of the zone will be permitted.

Source: JICA Study Team

2.11.4 Master Plan of Bonoua Urban Planning Area

For achieving the vision and land use framework identified for Greater Abidjan and tackling the planning issues in Bonoua, the following objectives are set:

- Enhance the existing primary urban centre
- Define and encourage the neighbourhood urban centres
- Promote the development of regional industrial clusters
- Encourage residential densification in existing urban areas that are accessible to services and are efficiently served with utilities and infrastructure
- Promote the provision of new residential areas that are spacious and leafy, and can be adequately served with roads and utilities
- Protect natural environment and resources, and good agricultural land in rural areas
- Utilize the environment of lush greenery and water courses for people's lives
- Promote recreational and leisure activities for residents and visitors
- Organize the hierarchy of roads within the commune of Bonoua and improve the road network including the A100 bypass
- Promote Transit Oriented Development (TOD) by strengthening the road network and public transport
- Development for multi-modal intersection



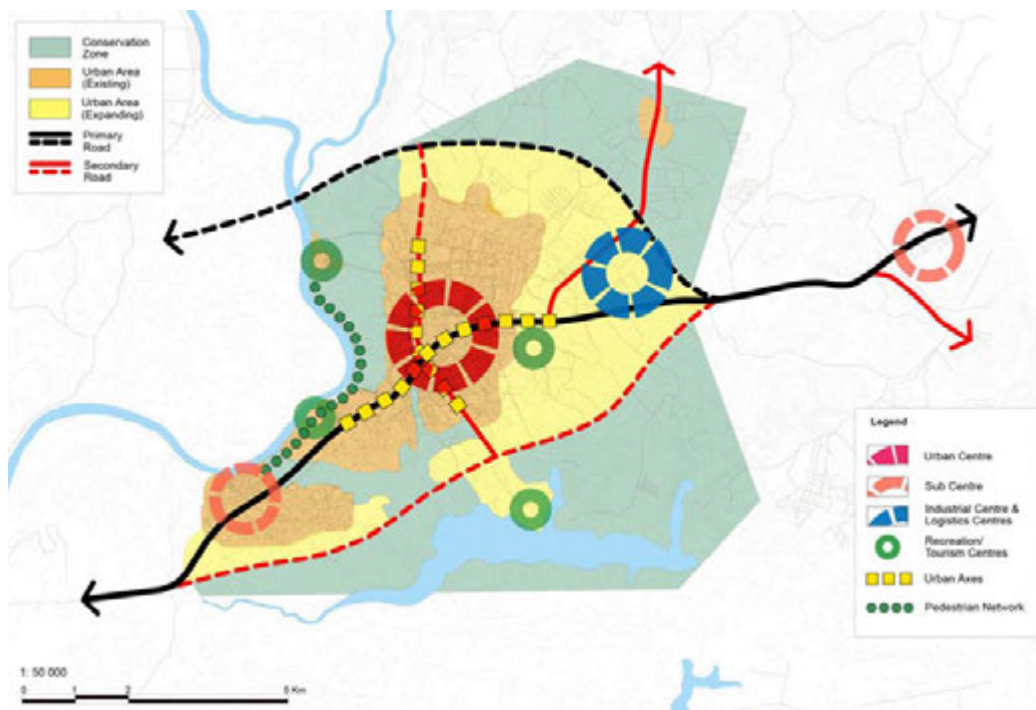
Source: JICA Study Team

Figure 2.15 Location and Roads Map of Bonoua

Bonoua Commune is defined as a centre with the following features in the Urban Master Plan for Greater Abidjan:

- satellite city with urban expansion areas
- secondary urban centre: TOD centre, public facilities serving 70,000 – 100,000 residents
- major urban and logistics centre
- agricultural hub

In order to advance toward the above centre, the urban functions need to be strengthened as shown in Figure 2.16.

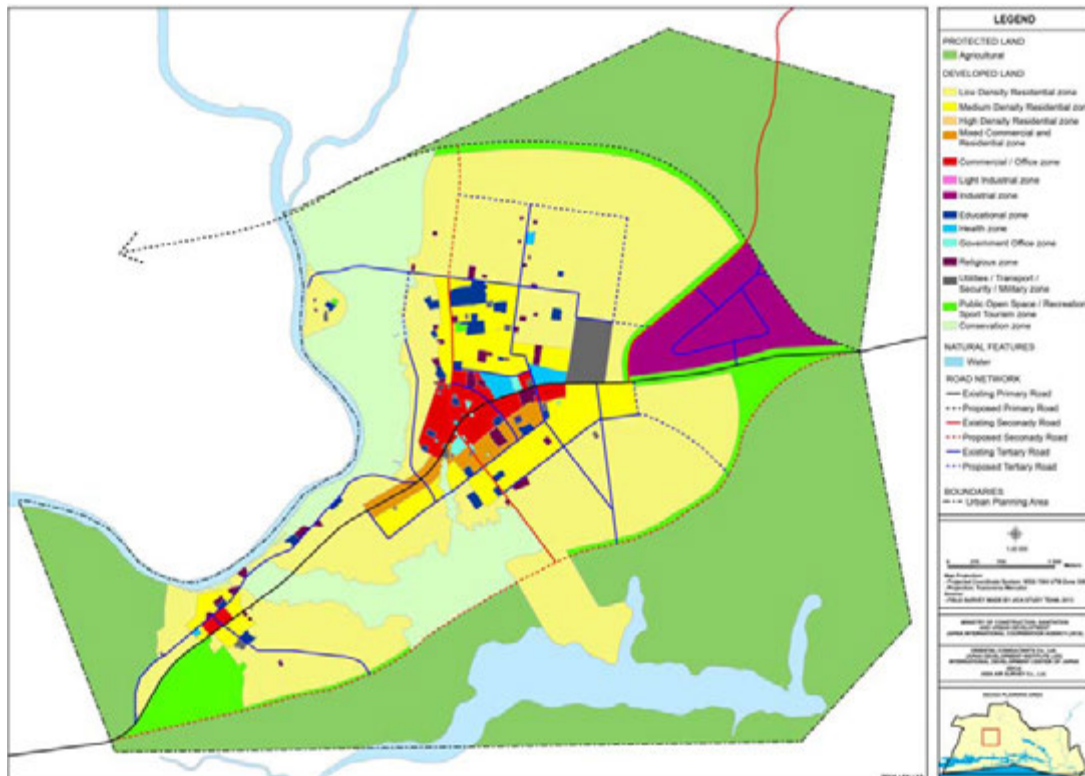


Source: JICA Study Team

Figure 2.16 Diagram of Spatial Development Framework for Urban Planning Area of Bonoua

In accordance with the following policies, a land use zoning plan covering urban areas in Bonoua is prepared as shown in Figure 2.17.

- Existing urban centre areas will be allocated for commercial/office zones.
- Land adjacent to the commercial/office zones and along the A100 road will be allocated for mixed commercial and residential zones. The existing town centre of Yao and a new sub centre in the northern expansion area will be also allocated for mixed commercial and residential zones.
- The rest of the existing urbanized area will be allocated for a medium density residential zone.
- Suburban areas in the existing urban area and urban expansion areas will be zoned to a low density residential zone.
- The existing institutional land use including education, health, government offices, and religious facilities should be maintained in principle without any change. The same applies to land to be used for utilities/transport/security/military.
- Land near the intersection of the existing A100 road with its northern bypass will be allocated for the industrial zone, and a green buffer zone will be set up between industrial and other land use zones. Land along the A100 road will be allocated for light industrial zone.



Source: JICA Study Team

Figure 2.17 Land Use Zoning Plan for Urban Area of Bonoua

2.11.5 Master Plan of Attinguié Urban Planning Area

For achieving the vision and land use framework identified for Greater Abidjan and tackling the planning issues in Attinguié, the following objectives are set:

- In order to protect the natural environment and resources, and preserve agricultural land in protected land, control development in developed land should be isolated from agglomerated developed land and centred on the massive industrial zone
- Guide well-ordered effective development of the Attinguié industrial zone and the logistics centre coupled with the interchange of the northern highway and Y4 ring road as a major employment cluster
- Provide the industrial zone with adequate transportation and utility infrastructure, appropriate accommodations and housing, and community facilities
- Protect three traditional villages adjacent to the industrial zone - Attinguié, Akoupé-Zeudji and Allokoi - and their sites of religious, cultural and historic significance
- Promote valid allocation of land resources and rational land use by readjusting the village subdivision plans based on the estimate of the future population, sustaining a sound harmony with the natural environment and agriculture which is a chief industry of the villages
- Promote the provision of new residential areas within the villages that are spacious and leafy, and can be adequately served with roads and utilities
- Upgrade the social infrastructure to ensure that adequate community facilities are available to all residents in rural villages

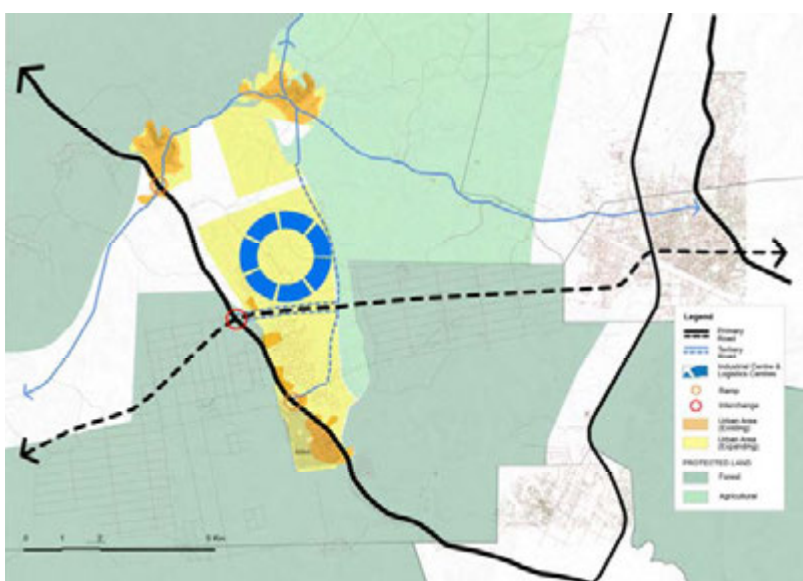
- Locate a site for public housing with adequate utility provision and community facilities, including education and health, for the proposed population and with convenient living environments



Source: JICA Study Team

Figure 2.18 Location and Roads Map of Attinguié

In this study, the JICA Study Team set the tentative boundaries between developed land and protected land, and the urban area and the conservation zone in the urban planning area of Attinguié as shown in Figure 2.19.



Source: JICA Study Team

Figure 2.19 Diagram of Spatial Development Framework for Urban Planning Area of Attinguié

In accordance with the following policies, a land use zoning plan covering the developed land in Attinguié is prepared, as shown in Figure 2.20.

- An Attinguié industrial zone and logistics center will be allocated for the industrial zone so that various kinds of industrial activities can be carried out.
- Green buffer zones should be set up between industrial and other land use zones as public open space/recreation/sports/tourism zones in order to clearly separate the industrial zone from its surrounding area.
- Land along the Northern Highway in Attinguié Village and Allokoi Village should be allocated as public open space 100-meters wide.
- Land along the Northern Highway, adjacent to the industrial zone, will be allocated as light industrial zone, which is already partially used for industrial/transport/utilities use.
- Establishment of a residential township that should include social housing, located on the north side of the industrial zone, will be proposed.
- The existing institutional land use, including education, health, government offices, and religious facilities, should be maintained, in principle, without any change. The same applies to land to be used for utilities/transport/security/military.
- The existing center area of the villages will be allocated as a mixed commercial and residential zone.
- The rest of the existing urban areas will be allocated as a medium-density residential zone or a low-density residential zone.
- Urban areas in the villages should be expanded in the opposite direction from the forests and environmental protected area, and zoned as a low-density residential zone or a light industrial zone.



Source: JICA Study Team

Figure 2.20 Land Use Zoning Plan for Urban Area of Attinguié

2.11.6 Actions Program

In order to implement the master plan for the extended areas, the necessary actions are listed and programmed. The actions approaching from four dimensions below are proposed in concert with the implementation scenarios of spatial development of SDUGA 2030;

- Preparation of the PUD,
- Development of the diverse centres,
- Development of residential land,
- Provision of infrastructure such as transport infrastructure, community facilities, and utilities.

2.12 Digital Topographic Mapping for Urban Planning

The following mapping activities were implemented to provide fundamental information for land use planning, with the objective of contributing to the urban master plan in the Greater Abidjan:

- Data collection and assessment of the existing maps (1:5,000 and 1:50,000 scale)
- New map production - 1:10,000 topographic maps (Simplified Digital Base Map)
- Map compilation - 1:10,000 topographic maps (Simplified Digital Base Map) and 1:100,000 topographic maps (Wide-Area Simplified Digital Base Map) using existing maps

Originally this work was planned to create 1:10,000 scale simplified digital base maps for Greater Abidjan covering an area of 750 km² in order to support the formulation of the Urban Master Plan. However, during the first meeting with the counterpart agency, a discrepancy was discovered concerning the size of the Greater Abidjan area. After several official meetings, an agreement was reached on a final total mapping area of approximately 2,150 Km².

Existing 1:5,000 scale maps covering an approximate area of 1,380 Km² (the “Blue Area”) were used without updates. Outside of this area, new 1:10,000 scale simplified digital base maps with an approximate area of 770 Km² (the “Red Area”) were created using the latest satellite imagery.

The digital data of the 1:10,000 scale simplified digital base maps and the 1:100,000 scale wide-area simplified digital base maps were stored on DVD and attached to the Progress Report. Print-ready raster data maps for both 1:10,000 and 1:100,000 scales were produced in PDF format for enabling viewing and printing using PDF software. In addition to the digital products, the following output paper maps were delivered.

- 1:10,000 scale simplified digital base maps (73 sheets x 2 sets = 146 sheets)
- 1:100,000 scale wide-area simplified digital base maps (1 sheet x 6 sets = 6 sheets)

2.12.1 Assessment of Collected Data

Both the existing 1:5,000 and 1:50,000 scale maps were originally produced using conventional mapping methods in the 1980s. The mapping results were being maintained in the form of “paper products”. The paper products were afterwards digitalized thanks to the rapid development of IT technology in recent years. However, the accuracy remains the same as those of the 1980s. Recently, thanks to the increased demand for map information for various purposes, a part of the map data were updated using only 2D-dementional features by simply overlaying satellite imagery based on the 1980s maps. On the other hand, for 1:50,000 scale map data, some of the data were retrieved from a smaller scale map of 1:200,000, which is an unusual way for map compilation. As a result, data positional

accuracy may vary in different locations, due to the use of different data sources, methodologies, time frame and accuracy level verification especially in the Blue Area and in the portions between the Blue and the Red Areas.

2.12.2 Assessment of Created Data

In the Red Area, ortho-rectified images were produced by an adjustment of the results of the GPS survey, while in the Blue Area, the ortho images were oriented based on the control points obtained from the existing topographic maps. Accuracy level checking of height information in both areas was conducted using SRTM-3.

As a result of the data assessment, different specifications (such as satellite sensors, observation timing, survey method for ground control points, field identification survey and a combination of the existing map data usage) between the Red and the Blue Areas affect multiple locations provoking discrepancies. Consequently, the topographic maps in two areas produced in this work have different accuracy as well as inconsistent data of uncertain origin.

It is therefore, implied that the products of this work should be used solely for the specific purpose of the urban master plan. Given the above mentioned reasons, the final products will not be suitable for future updates or studies. The creation of comprehensive new and accurate digital data is therefore, strongly recommended in order to harmonize all the data and to have up-to-date high quality digital mapping data.

2.13 Stakeholder Coordination

2.13.1 General

A Stakeholder Coordination task is defined along two different levels. One is the Upper-level Coordination with the Project Implementation Organization, which includes key ministries and agencies, Abidjan Autonomous District the communes within Greater Abidjan, and also the International Donor Community who should be well informed about the Project for future technical and financial assistance for the execution of the projects identified, in particular, by the proposed transport master plan.

The other is the coordination with a much wider range of people concerned about the Project and participating in the Stakeholder Meetings.

The stakeholder coordination aims, i) to disseminate the Study objectives, contents and progress, ii) to collect information on the on-going and new plans and projects and iii) to receive comments and exchange views on either the process or products accrued from the Project implementation.

The Study Team pays due attention to the urban planning and urban transport planning, related plans regarding the development plans by municipalities, the investment plans by the private sector and the assistance projects by other donors. Those plans and projects are considered to formulate the strategy for setting up the development vision in this Study, which is to be fully considered. The priority projects as proposed in this Study will not duplicate, compete against or conflict with those plans and projects. The international donors have also been reviewing and developing new projects related to Abidjan on new urban transport systems. In order to get the greatest benefit out of the information from the international donors on policies and direction of assistance and projects under deliberation, the Study Team has continued its utmost efforts to exchange information with those stakeholders.

It is intended, through the Stakeholder Coordination, to optimize the benefits and minimize the negative impacts derived from the actual project execution in the future.

2.13.2 Upper-level Coordination

The coordination works are implemented mainly through the group meetings with JCC, Counterparts and also through individual meetings with the key ministries and agencies. For the coordination among the members of JCC or Counterparts, each group alone holds member meetings as required by the initiative of MCLAU.

Key Stakeholder Ministries and Agencies of Cote d'Ivoire are as follows:

- Presidential/Prime Minister Office (Présidence/Primature)
- Ministry of Construction, Housing, Sanitation and Urban Planning (MCLAU)
- Ministry of Economic Infrastructure (MIE)
- Ministry of Transport (MT)
- Ministry of Planning and Development (MEMPD)
- Ministry of Interior and Security (MEMIS)
- Ministry of the Environment, Urban Safety and Sustainable Development (MINESUDD)
- Agency of Urban Transport Management (AGETU)
- Agency of Road Management (AGEROUTE)
- National Environmental Agency (ANDE)
- National Bureau of Technical Studies and Development (BNETD)
- Abidjan Autonomous District (DAA)
- Communes in DAA(13 nos.) and Greater Abidjan (6 nos. outside DAA)
- Regions (4 Regions outside DAA but relevant to Greater Abidjan)

Note: Abbreviation in () is French

International development agencies have been quite active starting with AFD, EU, WB, AfDB and others. However, Cote d'Ivoire has just recently completed its HIPC (Highly Indebted Poor States)/PPTE Debt Relief agreement, which was signed in June 2012. As a result, the country has freed-up resources, particularly for social and welfare development, such as health, education, and other social services. This focus on the social agenda is also supportive in responding to urgent needs for rehabilitation of infrastructure and restoring social cohesion after the 10 years of internal crisis of the country.

AfDB adopted its new Country Partnership Strategy in December 2013 and WB has already launched its CAS process cycle. Both agencies seem to highlight urban and infrastructure issues.

It should also be noted that a few regional initiatives have also been undertaken during the last few years at AfDB, ECOWAS, UEMOA. PIDA - Programme for Infrastructure Development in Africa and RISP - Regional Integration Strategy Paper for West Africa are representative ones. Both IDB and BOAD have also been active in their lending activities on infrastructure projects in Cote d'Ivoire in recent years.

Key International Donor Community includes:

- WB/BM - World Bank
- AfDB/BAD - African Development Bank
- EU/UE – The European Union
- AFD - Agence Française de Développement
- IDB - Islamic Development Bank

- ECOWAS/CEDEAO – Economic Community of West African States
- BOAD – Banque Ouest Africaine de Développement

2.13.3 Stakeholder Meetings

The first stakeholder meeting was held on the 31st of October, 2013 with nearly 200 participants from central and local government agencies, international donors, universities, semi-governmental organizations, local experts, and journalists.

The meeting was divided into two sessions, one was the plenary session in the morning to present an overview of the SDUGA project and practice of the digital topographic mapping, and the other was the group discussion in the afternoon to present the progress on the Greater Abidjan urban master plan and the transport master plan separately.

The second stakeholder meeting was held on the 24th of June, 2014 having more than 200 participants from various organizations and individuals similar to those in the previous stakeholder meeting in October 2013. The meeting was composed of three sessions, namely the plenary session, Group Discussion session and Closing session.

The plenary session consisted of Speeches, General Presentation of the Project and Questions/Answers. The General Presentation included such major subjects as “Overview of the Project”, “Socio-Economic Framework”, “Urban Master Plan for Greater Abidjan”, and “Transport Master Plan for Greater Abidjan”.

The Group Discussion was divided into three groups, which included Group A: Urban Planning, Group B: Urban Transport Planning and Group C: Transport Demand Analysis and Modeling.

At the closing session, moderators/recorders of the respective discussion groups presented their summary reports to the audience of the plenary meeting.

All the remarks that were provided by various stakeholders participated in the 1st and 2nd Stakeholder Meetings formed a common platform for the JICA Study Team to share the existing problems and issues, and consequently to elaborate urban and transport master plans for the Greater Abidjan as presented in this report.

2.14 Technical Transfer Program

2.14.1 Knowledge Sharing Workshop

The objectives of the knowledge sharing workshops which were agreed to are to provide technical transfer by the JICA Study Team and to improve the involvement of the Ivorian counterpart officials. Five workshops were held in Phase 1 and 2 as follows.

Table 2.14 Knowledge Sharing Workshop

Date	Participants	Purpose
2013-04-19	MCLAU, AGETU, Abidjan District, JICA, JICA Study Team	Introduction on urban planning system in Japan
2013-05-08	MCLAU, MINESUDO, ANDE, AGETU, AGEROUTE, Abidjan District, JICA, JICA Study Team	Acknowledgement of the general concept of SEA and application of SEA on SDUGA Introduction of SEA in Cote d'Ivoire Confirmation of the application of SEA on SDUGA Introduction of good practices and trend of urban development
2013-05-28	MCLAU, AGETU, Abidjan District, JICA, JICA Study Team	Presentation and discussion on transport planning and transport-related surveys
2013-09-13	JICA, JICA Study Team	Introduction of international stakeholders' strategy and projects for Côte d'Ivoire
2014-02-06	MCLAU, AGETU/MT, MIE, AGEROUTE, MINESUDD, Abidjan Autonomous District, JICA, JICA Study Team	Presentation by the JICA Study Team and questions & answers on the transport survey result Reporting on training in Japan by the Sub-director of Urban Planning, MCLAU and discussion

2.14.2 Counterpart Training in Japan

Counterpart training in Japan was carried out twice, once in January and once in July, 2014 with the following objectives.

- To study the measures and policies regarding urban development and transport under the Master Plan in Japan
- To acquire the knowledge for promoting the approach of Transit Oriented Development (TOD) in which Japan has abundant experience
- To discuss the urban development master plan for Greater Abidjan based on urban development in Japan, and reflect the conclusions of the discussions in this project
- To strengthen the skill levels of key persons who will implement the SDUGA

The first course of training in Japan was conducted from January 20, 2014, to January 29, 2014 (10 days), excluding the travel time between Côte d'Ivoire and Japan with the participation of the six trainees. The second course was conducted from July 7, 2014, to July 16, 2014 (10 days) with the participation of the six trainees.

The programs of training in Japan are introduced in Volume 2, Part 4, Section 2.2.

2.14.3 SDUGA Database GIS Training Workshop

The objectives of the GIS Training Workshop were to provide knowledge of the SDUGA Database and to improve overall knowledge in GIS and GIS skills.

The GIS Training Workshop was scheduled to cover five days, with a session held every morning. Due to the request from participants and their desire to cover more topics, the fifth day contained an additional afternoon session. So in total, the GIS Training Workshop contained six sessions over five days. The topics covered in the 5-day workshop were as follows:

- Day 1: Introduction to SDUGA Database, GIS, QGIS, and Basic Mapping
- Day 2: Basic Mapping and Basic Windows Operation
- Day 3: Basic Mapping
- Day 4: Basic Mapping and Advanced Mapping
- Day 5: Advanced Mapping, Tabular Data, Raster Data, GPS, and 3D

Participants in the training workshops joined from three counterpart agencies. The workshop enjoyed a high level of attendance from the participants, with all 7 of the original participants attending all 5 days of the workshop. One participant attended for only one day on Day 3.

2.14.4 Transport Modelling Workshop

The objectives of the Transport Modelling Workshop were to provide knowledge of transport modelling and to provide SDUGA database to the Ivorian government.

The Transport Modelling Workshop contained five sessions over four days. The topics covered in the 4-day workshop were as follows:

- Day 1: Introduction to Transport Modelling, Transport Survey and JICA STRADA
- Day 2: Trip Generation
- Day 3: Trip Distribution
- Day 4: Trip Modal Split, Traffic Assignment and Project Evaluation

Participants in the training workshops joined from three counterpart agencies. All 5 of the original participants attended all 4 days of the workshop.

2.15 SDUGA Database

The SDUGA Database, a spatial database, was created to support the SDUGA Project. The objectives for the development of the SDUGA Database is to provide spatial and quantitative base data to the planning process for the SDUGA Project, and to be a repository for spatial data containing the maps and plans of the SDUGA Urban Master Plan, Urban Transport Master Plan, and the Master Plan of Extended Areas at scales of 1:100,000 for planning area and 1:10,000 for central urban areas.

The original scope of works for the SDUGA Project was to use the existing data sets available in the governmental agencies of Cote d'Ivoire, such as the CCT and INS, to update those data using satellite imagery and ground surveys, and to finally generate plans based on the updated, current condition data.

Below are the tasks performed in the creation of the SDUGA Database.

1. Collect existing spatial data and hardcopy maps from sources in Cote d'Ivoire, such as CCT, INS, SOTRA, etc. and digitize or convert them into a useable format for the planning process.
2. Define coverages and boundaries, which include the SDUGA Study Area, the SDUGA Planning Area, survey areas, INS Zones, and Traffic Zones.
3. Generate base maps based on the requirements of the survey teams and planners.

4. Update the base maps with current condition data from satellite imagery, surveys, and other sources.
5. Generate current condition base maps based on the requirements of the planners; this includes the creation of the Digital Topographic data as described in Volume 2 Part 1.
6. Perform spatial analysis on the current condition data based on the requirements of the planners.
7. Digitise future plan data into the SDUGA Database based on outputs from the planners.
8. Generate SDUGA plans based on directions from the planners.

From the tasks, the outputs for the SDUGA Database were the various themes of data that were collect or created. These include the following:

- Base Data:
 - Natural Features: water, coastline, rivers, forests, etc.
 - Administrative Boundaries: sub-prefecture, commune, ville, quartier, etc.
 - Policy: protected forest, reserved land, sensitive land, etc.
- Current Conditions: current land use, current road network, etc.
- Planning/Scope Areas: SDUGA Planning Area, urban units, and traffic zones
- Future Forecast Data: demographic data
- Master Plan Data: future land use framework, proposed roads, proposed transit stations, etc.

From data above data of the SDUGA Database, all necessary maps and plans are generated for the reports and documents of the SDUGA Project.

The SDUGA Database was sufficient to support the planning process for the SDUGA Project; however, any future work using the GIS data should consider the scope of the data and its limitations. Further work may be needed to have up-to-date high quality digital mapping data for use in other fields, in particular the need to validate and update the administrative boundaries and to resolve the discrepancies in the digital topographic data regarding different accuracies (refer to section on Mapping and the Red and Blue areas). As a result, without updates, the data in the SDUGA Database is recommended solely for the purpose of the urban master planning process.

2.16 Recommendations

The JICA Study Team shaped the responses to the government's comments on the Draft Final Report (which the JICA Study Team received on 20th of December, 2014) and officially made a reply to the government on 19th and 22nd of January, 2015 (See Volume 1, Appendix A). Many of those comments were not issues that could be solved in the Urban Master Plan 2030 for Greater Abidjan (SDUGA 2030), but the task that should be addressed by the bodies concerned after the approval of SDUGA 2030.

Implementation methods of the Urban Master Plan 2030 for Greater Abidjan (SDUGA 2030) are proposed in Chapter 8 of Part 2 and Chapter 4 of Part 3 in Volume 2. The following tasks and the processes were wrapped up as the recommendations in consideration of the comments made by the government.

First Step <Approval>

1. High level approval and adoption of the Urban Master Plan 2030 for Greater Abidjan (SDUGA 2030)
2. Notifying the public through the gazette and a newspaper of national circulation
3. Organising the implementation coordinating committee for the SDUGA 2030

Second Step <Implementation>

4. Reviewing and Renewing the existing zoning guidelines and planning standards that are consistent with the SDUGA 2030
5. Preparing Detailed Urban Plans (PUD) of all the communes in Greater Abidjan, in particular for the areas under strong development pressure, in good coordination with stakeholders to promote the provision of community facilities
6. Encouraging the private sector to invest by reference to the SDUGA 2030 and the PUDs
7. Closely coordinating with the National Development Plan for the next period and sector master plans at the national/regional level
8. Pushing ahead with the provision of public infrastructure including utility infrastructure in collaboration with donor agencies
9. Monitoring and evaluating the progress of the implementation of the SDUGA 2030

Third Step <Review/Revision>

10. Reviewing the socio-economic framework, land use framework plan and transport demand forecast at an appropriate timing, three or five years later for instance, based on the complete data of the 2014 Population Census
11. Revising the SDUGA 2030, if the need arises as a consequence of the review

The comments which were discussed by the government on urban planning and major infrastructure development fall into four main concerns, namely, (1) 2014 census, (2) expansion of Abidjan Port and development of Boulay Island, (3) additional development plans and projects, and (4) institutional issues. The JICA Study Team made recommendations on each concern as remarked below.

(1) 2014 census

The 2014 Census result was only made available at the last moment of finalising the study report, that is, January 2015. JICA Study Team compared the census result with the JICA Study Team's estimate on the population in 2013. The comparison revealed that the JICA Study Team's estimate is higher than the census result by 5.7% for AAD and 12.5% for Greater Abidjan. Since the AAD population dominates (93%) the total GA population, the impact, in terms of agglomeration of such difference, against the urban planning process was considered very limited.

However, when looking at the population by commune/sous-prefecture, there were some areas that showed a significant difference in population size. Therefore, reviewing and updating of the socio-economic framework were undertaken for both current conditions and future estimates of population by commune/sous-prefecture in Greater Abidjan.

This review work was confined only to the commune/sous-prefecture population but not extended to more detailed data, such as quartier population, household size, or employment by industrial sector. Therefore, these detailed data required for the planning process were inevitably dependent upon the sampled Home Interview Survey conducted by JICA Study Team in May, 2013.

Thus, it is necessary, after the completion of the 2014 census analysis, to review in 3~5 years time the Socio-Economic Framework, Land Use Budget and Transport Demand Forecast, and eventually revise the SDUGA 2030.

(2) Expansion of Abidjan Port and Development of Boulay Island

The JICA Study Team recommends discussing the above issue with all the relevant stakeholders including local municipalities, based on a draft master plan of future Abidjan Port expansion that should provide a justification of land use prepared by PAA, in order to determine the direction of the total land use framework for Boulay Island, and to finalise the detailed urban plans of Commune Yopougon and Commune Port-Bouët. It is considered urgent for them to prepare their PUDs, since the construction bid for the 4th Bridge was already approved by the Government.

(3) Additional Development Plans and Projects

Various development plans and projects, which were agreed on within the directly concerned organisations, were introduced to JICA Study Team through intensive discussions at the government Working Group. These plans were requested as the comment to be reflected in the Final Report. However, the following plans and projects listed in the comments should remain pending and could not be fully reflected in the land use framework drawings, because there wasn't enough time for the JICA Study Team to obtain the details of the subject plans and projects. Therefore, it is recommended to examine the consistency between the proposed SDUGA 2030 and the plans and projects listed below, when preparing their relevant PUDs.

- Development of Cocody Bay
- Development project in Marcory/Biétry/Boulevard de Marseille
- Aero city/exhibition centre
- Olympic Village and other major sports facilities
- Slaughterhouse in Anyama
- Several projects of waste treatment centres
- Equipment on the Tête d'Ours near the airport area
- Creation of additional cemeteries on the outskirts of Greater Abidjan

(4) Institutional Issues

The JICA Study Team emphasises the importance of the following three institutional issues:

- Although the government suggested in their comments to shift the proposed industrial areas of Bingerville and Jacquerville somewhere, it should remain pending and thus it is not fully reflected in the land use framework drawings, because there wasn't enough time for the JICA Study Team to obtain and examine their details within the very limited time before the deadline of Final Report submission.

The local government should propose and determine actual locations and boundaries of developed land/protected land and land use zones including industrial zones mentioned above in the studies of PUDs, respecting the drawings of the land use framework plans proposed by the JICA Study Team. Additionally, it should be mentioned that the locations of industrial zones should be combined with free-trade zones, according to the investment law, in order to promote investment into industrial zones.

- Development regulations in the protected lands should be set as a statutory framework after discussing with all the relevant stakeholders. The planning requirements should be definitely laid down in each land use zone as a statutory framework.
- Preparation of Detailed Urban Plans (PUDs) should be hastened in the areas where the development pressure is increasing or is expected to increase resulting from SDUGA/SDTU, for instance, such the area between Port-Bouet and Grand Bassam.

3.0 Urban Transport Master Plan

3.1 Significant Transport Issues

3.1.1 Road

The District of Abidjan is now covered by almost 1800 km of roads, of which 850 km are paved, with major arterial roads such as boulevards, avenues and highways running through most of the communes. Two bridges across Ebrié Lagoon link the northern residential areas of Cocody, Yopougon or Abobo and the southern industrial zone spreading from Treichville to Petit-Bassam. The road network is characterized by deteriorated road surfaces, missing links and insufficient capacity. Traffic congestion can be seen all over the road network during peak hours and nothing has been done to change this trend. Many road projects have been planned for years but have yet to be implemented, putting further pressure on the existing road network.

Furthermore, the road network has been mainly developed without any consideration of public transport. Although public transport has been declining in recent years, the main objective of the Master Plan 2030 is to restore the credibility of public transport lost during the last ten years. In order to integrate public transport into the road network, and in particular a mass-transit system, the first step is to secure sufficient space for both road users and public transport facilities along the targeted roads. The ROW width will be estimated based on the type of public transport that will be selected.

Since the primary urban roads connect the major industrial areas in Abidjan, they also serve as freight transportation corridor. This results in a traffic mix with many slow, heavy vehicles on the existing primary urban roads. Such a burden should be alleviated by providing alternative roads for both trucks and passenger vehicles.

3.1.2 Traffic Control and Management

Traffic conditions in Abidjan have already reached an intolerable level and the congestion is serious and widespread. Demand exceeds capacity at many intersections, causing severe congestion for many hours of the day. To alleviate the congestion, traffic management measures have been applied with limited success so far. Traffic management is becoming increasingly important in urban areas where scarce road space is already occupied by vehicles. Measures to enhance the attractiveness of public transport are also a part of traffic management to improve overall efficiency, such as upgrading traffic signal control, implementing traffic information systems and traffic management on highways, controlling overloaded vehicles, and enforcing traffic regulations. Parking management, priority treatment for public transport, and traffic safety are also important measures that could be considered.

3.1.3 Public Transport

Currently, public transport in Abidjan principally operates on only two rights of way, namely that of the road and that of the lagoon and currently attracts around nine million boardings each day. In Abidjan, both the formal and informal sector operates on both rights of way.

The policies that need adoption must be guided to provide a comprehensive and integrated public transport network that is convenient, user-friendly and accessible to all income groups to serve all urban centers, both district and neighborhood, whilst providing access to local community facilities, employment centers, leisure sites and tourism sites. To this end, the JICA Study Team has proposed to promote key initiatives in relation to public transport such as promotion of high-capacity public transport corridors, enhancement of bus system and review of informal public transport sector.

A key issue at present is that the public transport service is provided largely by the informal sector. Bus services are concentrated on routes originating from suburban areas and ending in several city terminals such as Adjamé or the Plateau. The informal sector, consisting of Gbaka, meter taxis, Woro-Woro and inter-communal taxis currently accounts for 85% of public transport trips and has grown at the expense of the formal sector.

As observed in many metropolitan areas, road traffic demand overwhelmingly exceeds the capacity of the road network, causing chronic traffic congestion, especially in and around the Central Business District, which in Abidjan is in effect the commune of the Plateau. In terms of urban transportation, priority must be given to the mobility of people not cars. In that context, public transportation should be given priority over private vehicles to secure smoother travel for those who use public transportation. After investigating people's travel demand and its forecast, land use plans, and development directions in Greater Abidjan, a new rail-based mass transit system is a recommendation of this study for the high-capacity public transport corridors.

The existing railway system provides inter-regional freight and passenger railway services, which connects between Cote d'Ivoire and Burkina Faso. This service currently attracts around 100,000 passengers per year. This is on average less than 500 passengers per day and the number of passengers has been in decline since 2008. To gain a competitive position in the long distance transport market, railway should upgrade its facilities and equipment to enable high-speed and frequent train operation. This direction is desirable, but this obviously requires a huge investment cost. Within the framework of this project, the important feature of the existing rail service is that it provides a potential alignment for urban rail through the center of Abidjan.

At present, there is an under-utilization of the water system in Abidjan as a provision of public transport. Of the public transport passengers carried daily by SOTRA, less than 5% use the waterways of Abidjan. The Ministry of Transport has opened entry to the market of lagoon transport services to private companies since early 2014. This liberalization of the lagoon transport market is expected to change the current situation of water bus services provided with a limited coverage by SOTRA as the sole formal operator and traditional boat services by informal operators. With full public transport integration, local services in the communes west of Plateau could feed to the waterways and link to fast efficient water-based public transport. The waterfront would then see improvement of significant renewal. These water terminal stations then have the potential for urban renewal and transit-orientated development. The SDUGA proposes a major upgrade of the existing lagoon transport service with the main east-west axis operating from Bingerville to Songon.

3.1.4 Freight Transport

Road freight transport is the main means of cargo transport inside Greater Abidjan. However, during the last fifteen years, the socio-military crisis has disrupted the road freight transport industry, which is now characterized by informal and disordered operation of road freight transport. Furthermore, lack of control by public authorities, increase of racketeering and corruption, deterioration of road conditions, high prices in freight transport and overloading are other issues that have made road freight transport become a liability to the Ivorian economy, causing significant shortfalls for the state and carriers.

The rail freight transport has also been impacted by the socio-military crisis. Railway freight volumes transported by SITARAIL that was showing a steady growth trend since 1995 and reached their highest volume, i.e., 1 million tons, in 2001, have dropped drastically to almost 200 thousand tons while railway assets, such as track and equipment suffered damages. In this regard, it is urgent for SITARAIL to improve its railway facilities significantly.

The urban train project assumes coexistence with current freight railway services and use of the same railway track facilities. Thus, it will be necessary to adjust the train operation schedule to accommodate both freight trains and passenger trains, to upgrade freight railway facilities and electrify them as well and to settle issues regarding sharing the track access charge and the cost of track maintenance.

3.1.5 Analysis of the Transport Sector in Greater Abidjan

Based on the discussion of the problems and issues faced by each sub-sector of urban transport in Greater Abidjan, a SWOT analysis was done. The SWOT analysis model was conducted to determine how the study area positioned its transport sector. The SWOT analysis model is expected to provide policymakers the opportunity to maintain, build and leverage its strengths, prioritize and optimize its opportunities, remedy its weaknesses and counter its threats in order to achieve a more robust urban transportation network. The result of the analysis is shown in Figure 3.1.

	Helpful In Achieving Progress	Harmful In Achieving Progress
Internal in Origin	<p>Strengths</p> <ul style="list-style-type: none"> • Increase of mobility brought about by upgrade of roads and upgraded bus fleet and facility • Expected revenue from parking fees and highway tolls due to growing parking and traffic demand • Informal sector of Gbaka and Woro-Woro ensures maximum flexibility in service • Relatively large mode share of public transportation • Potential for capacity expansion of the existing bus system (New buses will likely immediately increase bus ridership) • Relatively longer acceptable walk distance for a tropical region • Improvement of intermodal facilities such as in Adjame • Existing hard/soft technology in conventional railway • Existing railway line on the major travel axis of the metropolitan area • High-density sprawl areas have strong need of high-capacity public transport systems. 	<p>Weaknesses</p> <ul style="list-style-type: none"> • Poor road infrastructure in many parts of Greater Abidjan • Lack of a functional hierarchy of the roads resulting in mixed traffic • Traffic concentration into Plateau and congestion on radial roads and bridges • Decreasing road capacity in Plateau, often caused by traffic disorder and roadside parking due to insufficient parking space • Public and private vehicle drivers not observing traffic rules. Lack of traffic monitoring/enforcement systems. • Insufficient network coverage of conventional bus services • Lack of intermodal/transfer facilities and services • Low level of bus services such as overloading, slow speed and insecurity. Even “Express” bus is not providing express service. • Non-existence of high-capacity routes such as rail or BRT • No priority given to public transportation • Decreasing number of bus and rail passengers (Bus passengers have declined by 40% over the last ten years)
External in Origin	<p>Opportunities</p> <ul style="list-style-type: none"> • Low proportion of car transport (Hence easier to maintain high public transport mode) • Relatively low popularity of 2-wheel vehicles, comparing with Asian region • Development of new public water transport to enhance east-west connectivity • Increase in social housing to the east of the city along major road (add better PT route) • Creation of new industrial centers to the west of the city and elsewhere • Linkage with Abidjan Port and its potential development 	<p>Threats</p> <ul style="list-style-type: none"> • Increasing number of automobiles and private vehicle trips • Many work trips must pass through Plateau to travel from low income residential areas in the north to workplaces in the south/west • Urban sprawl will not produce high ridership corridors needed for either rail or bus mass transit • Urban development structure depends on use of private vehicles • Impediments in bureaucracy, corruption and gap between the rich and the poor • Lack of stable electric power supply

Source: JICA Study Team

Figure 3.1 SWOT Analysis of Transport Sector in Greater Abidjan

3.2 Planning Objectives and Strategies

3.2.1 Goals of Transportation System Development

Based on the vision and planning objectives for development of Greater Abidjan, as well as the planning issues associated with the urban transportation sector, three main goals of transportation system enhancement in Abidjan have been identified, which are efficiency, equity and better environment.

In order to achieve the above-mentioned three main goals of transportation system development in Abidjan, four major urban transportation objectives have been targeted, which are the enhancement of road network capacity that supports economic activities, the promotion of public transport use, the intermodal development/transit-oriented development and the realization of an environmentally sound transportation system.

3.2.2 Strategic Transport Network Structure

The new strategic transport network structure proposed will not only take into account the existing situation of land use and the current transportation needs of Abidjan, but also evaluate the future transportation demands in line with the forecast urban development.

As well as tackling a number of other issues, the new strategic transport structure proposes a number of measures - primarily with a focus on public transport and on developing the road network. Proposed measures include: 1) construction of a radial-concentric road network with the construction of an outer ring road (Y4 Ring Road) and an inner ring road (Third Bridge, Vridi Bridge, Voie V28) to which the major interurban roads will be connected; and 2) building an integrated public transport system. The latter includes the construction of a north-south and east-west high-capacity transport system in addition to a BRT or BHLS system that will extend the public transport network to the outer communes of Greater Abidjan.

The road network structure will have to be expanded in order to provide alternatives for drivers and relieve the roads surrounding the Plateau and Adjame. The first step will be the construction of the outer ring road and the inner ring road that will be connected to all major radial roads. The primary road network will thus change from the current concentric road network, to a new radial-concentric road network that will allow transit traffic to avoid the city center and provide fast and reliable connection between the suburban activity areas.

3.2.3 Integrated Transport Network Structure

In order to develop a transport master plan consistent with the vision of the urban master plan, the Strategic Transport Network Structure has been defined with the aim of developing infrastructures to support the port of Abidjan, allowing efficient cargo transport for industrial growth, increasing touristic potential with convenient access, providing reliable access for agricultural activity, a modern transport reflecting the preeminent financial and business position in West Africa, promoting public transport use by constructing new transport infrastructure, and improving the quality of life for its citizens

As a result of this analysis, the following strategic transport network structure is proposed (Figure 3.2), based on the construction of new roads to connect major activities (industrial, touristic, food processing) areas and the implementation of a mass-rapid transit system that would provide a stress-free and reliable public transport system.



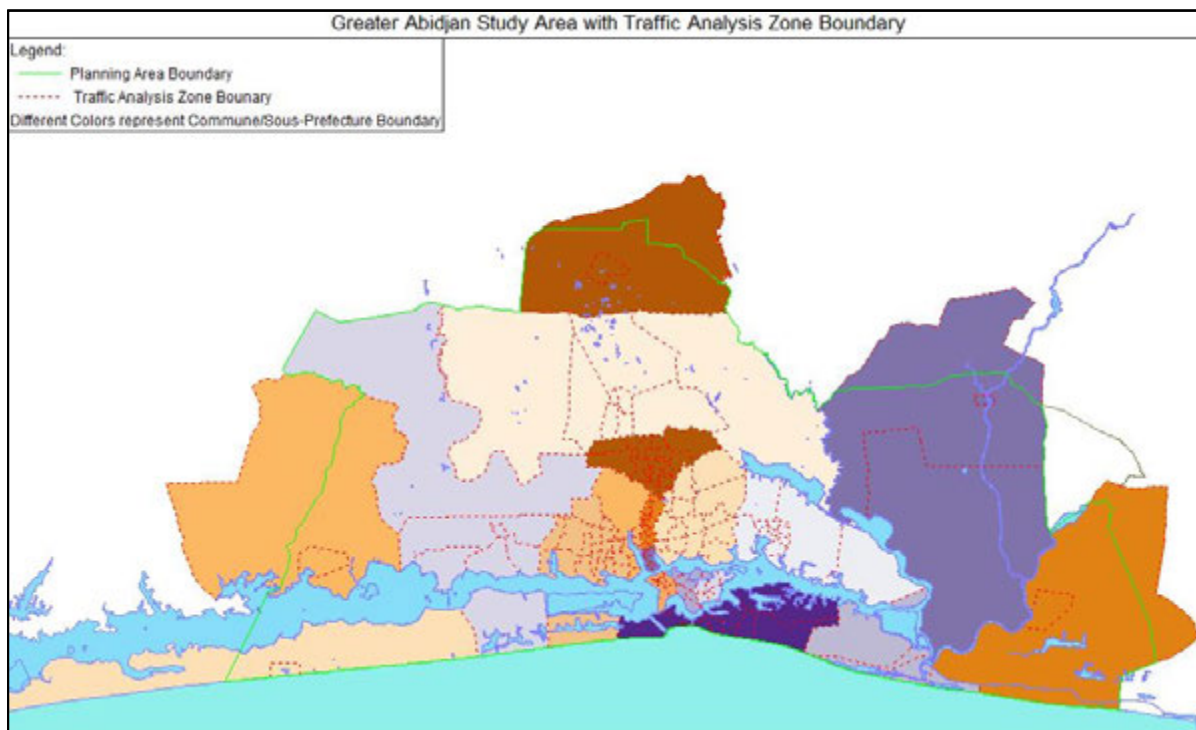
Source: JICA Study Team

Figure 3.2 Strategic Transport Structure

3.3 Transport Demand Forecast

3.3.1 Network Development

The Study area for the transport model extends beyond the Abidjan Autonomous District (AAD) to include parts or all of the communes of Grand Bassam, Jacquville and the Sub-Prefectures of Alepe, Oghlawapo, Azaguie, Bonoua and Dabou. The detailed breakdown of the transportation analysis zone (TAZ) system is presented in Figure 3.3, showing the study area and the planning area boundary.



Source: JICA Study Team

Figure 3.3 The Internal Traffic Zone System for the Study Area

There is a single master network for the study area that contains all known projects. The network in 2013 contains approximately 9,000 links extending over roughly 3,000 link kilometers. The 2013 public transport network includes major public transport routes².

3.3.2 The Steps of the Transport Model

Trip Generation: The trip generation is in two parts namely the origin or production of the trip and the destination or attraction of the trip. The production is linked to households which for this purpose are split into four economic activity classes. The attractions are linked to employment and student enrolments.

Trip Distribution: The person trip distribution for inter zone travel is developed around the Gamma Function as the friction factors for the Gravity Model in the estimate of distribution.

Mode Choice Model: The mode choice models are applied separately to different segments of the travel market as each segment has its own characteristics and range of choices. The mode split model is a four level hierarchical mode split. For each of the four trip purposes and four economic activity classes, there are four logit curves giving a total of 64 curves. At the detailed level the allocation of modes is achieved within the public transport assignment as a single trip may have different modal legs.

² In some cases it was necessary to reverse estimate the Gbaka network from the origin and destination data of the SDUGA home interview survey.

Additional Trip Tables: There are three different sources of trips outside the traditional four step model namely commercial vehicles, trips external to the study area and the special generator of the airport. These are estimated in the base year and projected to the future horizons.

Assignment Module and Base Year Calibration: The assignment module combines the impact of all previous steps in the model. After assignment to the road network and the public transport network, the results are compared across modes. Across the three principal modes of walk, public and private movements, the model replicates the existing situation within 9.7%. In comparison across eight screen lines, the vehicular traffic is replicated within 1.0%. In the principal sub public transport modes of Bus (SOTRA), Gbaka and Woro-Woro, the model replicates the existing situation within 4.0%.

3.3.3 Indicative Future Year Results

The key overall statistics are provided in the Table 3.1 for the intermediate years of 2020 and 2025 and the target year of 2030 in which all the completed projects are included in the modeling network. Remedial effect of the transport master plan can be captured in vehicle kilometers (veh-km), vehicle hours (veh-hr) and average speed of travel. To calculate the rate of reduction of these indicators from the “do-nothing” case to the Master Plan case, veh-km shows a reduction of 1.9%, 6.8% and 2.7% in 2020, 2025 and 2030, respectively, while veh-hr shows 20.7%, 36.2% and 45.2% respectively. Significant impact is also reflected in 23.0%, 45.3% and 76.7% increase of average vehicle speed.

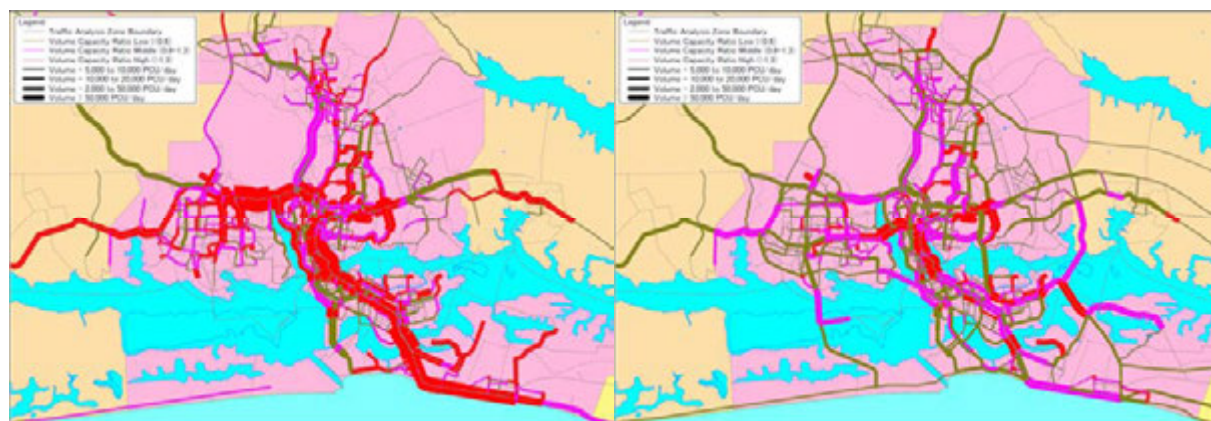
The estimated transport demand in 2030 is illustrated in Figure 3.4. In the “do-nothing” case in 2030, there are significantly more red links in the network, which exhibit high volume to capacity ratios (V/C ratio over 1.3) with slow travel speed along those links. Compared to the result of the do-nothing case, links with brown color (V/C ratio less than 0.8) increase excluding some major routes in the Master Plan case. This results from dispersing transport demand into expanded links.

Table 3.1 Key Model Results for Intermediate Years

Measure	Year: 2020		Year: 2025		Year: 2030	
	Do Nothing	With M/P	Do Nothing	With M/P	Do Nothing	With M/P
Vehicle Kilometers of Travel (Million)	16.2	15.9	22.0	20.5	29.9	29.1
Vehicle Hours of Travel (Million)	0.58	0.46	0.94	0.60	1.55	0.85
Average Network Vehicle Speed	28.2	34.7	23.4	34.0	19.3	34.1
% Public Transport of Mechanized Person Trips	50.1	50.4	51.9	53.2	54.0	55.4
Rail Mass Transit Boarding (Million)	-	-	-	3.21	-	4.63
Average Person Travel Speed	24.0	26.0	17.0	31.3	13.0	31.1

Note: “Do Nothing” is the case without transport master plan and M/P is the case with transport master plan

Source: JICA Study Team



Source: JICA Study Team

Figure 3.4 Estimated Transport Demand in 2030 (Left: Do Nothing Case/ Right: Master Plan Case)

3.3.4 Transport Surveys and Recommendation

The first detailed transport demand forecast model for the Greater Abidjan has been developed based on extensive eleven transport-related surveys in 2013 (Table 3.2). Among a series of these surveys, Household Interview Survey (HIS) is a “backbone” of the model development consisting of interviews involving 20,000 households within the Study area. Each member of the household was asked a series of questions relating to household characteristics, personal characteristics and travel characteristics. In addition, the remaining surveys were conducted to validate/adjust the established model, such as traffic count in the screen lines. The collected data have been developed into the transport-modeling database.

Table 3.2 Eleven Transport-Related Surveys

Transport Survey	Type of Survey	Purpose
1) Household Interview Survey (HIS)	- Interview	- To obtain trip information within TAZ system
2) Activity Diary Survey	- Interview	- To validate/adjust trip rates from HIS
3) Cordon Line Survey	- Interview - Count	- To obtain trip matrices in external zones of study area
4) Screen Line Survey	- Count	- To validate estimated OD matrices by north-south and east-west screen line count results
5) Intersection Traffic Volume Survey	- Count	- To evaluate traffic congestions at major intersections
6) Public Transport OD Interview Survey	- Interview - Count	- To obtain trip information of public transport passengers
7) Parking Facility Survey	- Interview - Count	- To evaluate congestion at major parking facilities
8) Transportation Opinion Survey	- Interview	- To obtain stated-preference on new mass-transit system
9) Travel Speed Survey	- Recording	- To evaluate travel speed at major corridors
10) Cargo Transport Survey	- Interview - Count	- To obtain trip information of cargo trucks
11) Road Inventory Survey	- Measurement	- To build road network with related information

Source: JICA Study Team

This transportation database needs continual updating and further expanding, such as, for example, a detailed internal roadside interview survey inside the Greater Abidjan. The recommendation is for a home of this transport model in the form of the Development of Transport Planning Center of Excellence (Project Code: O-1-4). This center could also be developed into a regional training center.

Based on the result of the transport demand forecast, the following measures are recommended for the development of an urban transport master plan for Greater Abidjan:

- Enhancement of the north-south and east-west corridors crossing the center of Abidjan;
- Ensuring that there is a bypass route choice which avoids concentration of the traffic into the center of Abidjan, which will also contribute to reducing the impact of cargo transport not only in terms of traffic volume but also environmental load; and
- Implementing transport policy, such as road pricing at some specific entrance points to the city center to avoid through traffic by cargo carriers and to enhance the usage of the bypass routes.

3.4 Road Development Plan

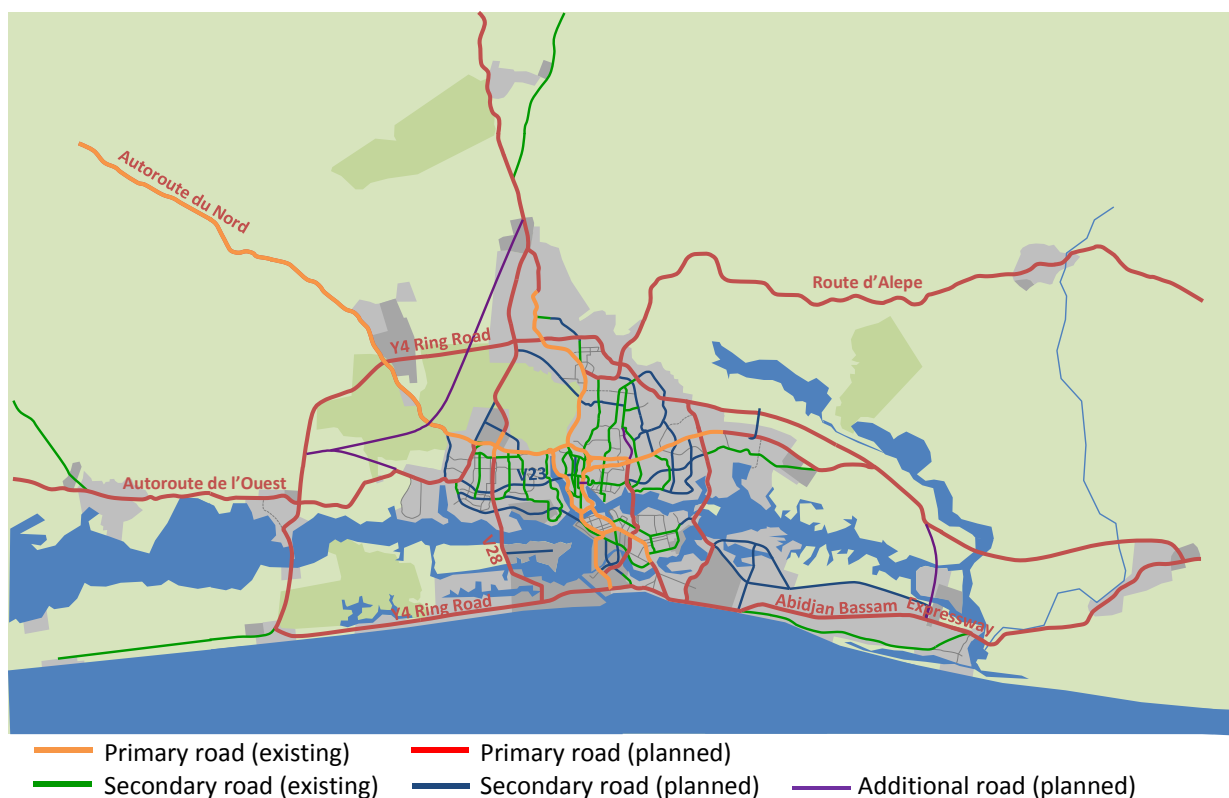
Abidjan District faces the major problems of modern day cities, namely traffic congestion, which affects all the major arterial roads. As the key to solving traffic congestion is encouraging public transport, the road development plan have been thought so as to integrate proper public transportation from the earliest stage of the project, by securing sufficient right-of-way to provide sufficient spaces for bus lanes and public transport facilities.

New road infrastructures have also be considered in Greater Abidjan as the urban development is currently being slowed by a lack of infrastructure. Those new infrastructures will be used as an urban tool to organize urbanization.

However, the traditional approach of addressing traffic demand by constructing more road infrastructure to cope with the increasing demand failed to address the problem because demand keeps increasing and authorities find it difficult to secure financial resources and land spaces for the expansion of its network. The size of those infrastructures will be limited as past experiences have shown that the increase of infrastructure capacity tends to also increase traffic demand, as those new roads become a temptation for people having sufficient financial resources to own a car and to utilize the newly created road spaces, which, as a result, does not ameliorate traffic flow.

3.4.1 Principal Policy Measures for Road Development

The current road classification in Cote d'Ivoire is a jurisdictional system rather than a functional classification. Thus, from road-planning and engineering viewpoints, it is necessary to clarify the functional classifications and road hierarchy system for the Greater Abidjan area. A clear, functional road hierarchy system consisting of primary roads, secondary roads and local roads has been proposed with specific characteristics and functions (Figure 3.5).



Source: JICA Study Team

Figure 3.5 Future Road Network

Policy measures will have to be taken to provide safe and efficient access to urban centers and sufficient capacity to meet the demand from population and employment growth. It will consist in the upgrade and improvement of roads, the construction of new arterial roads, in the improvement of intersections, in the road maintenance and the monitoring of road safety and the implementation of pedestrian crossings.

3.4.2 Road Development Projects

All the road infrastructures that are deemed necessary in the Greater Abidjan area in order to sustain urban development have been identified and listed in a long list and regrouped by area. Traffic demands have been evaluated with the traffic model that has been prepared for the year 2030 and project profiles have been prepared to provide a more detailed description of the various projects.

One of the most urgent issues to reduce traffic congestion in Greater Abidjan is the improvement of intersections. Traffic surveys analysis has shown that most of the intersections surveyed need urgent improvement. Flyovers or underpasses can be built on the main road corridors to the city center in order to alleviate congestion by minimizing the conflicts of traffic movements by providing grade separation.

3.4.3 Implementation Schedule of Road Projects

As the implementation timing of each road project should be consistent with the forecast urban development, an analysis has been carried out for each 5-year period from 2015 up to 2030 to ensure that sufficient road projects have been planned to support urban development.

3.4.3.1 Short-Term Road Development Plan (2015-2020)

During this period, the urban development will mainly focus on the urban renewal of Plateau, Adjame and Treichville; the creation of industrial zones in Attinguie, Anyama, Grand-Bassam and Vridi Port; and the provision of public transit: north to south by urban rail, BRT to Abobo and Cocody, high-speed ferry west to east along Ebrie Lagoon.

The road network development will concentrate on the widening of arterial roads in Cocody such as the Boulevard Latrille or d'Attoban, the upgrade of the east-west road corridor with the construction of Voie V23 or the upgrade of Boulevard de la Corniche and the implementation of arterial roads in Bassam area. The first section of the Y4 Ring Road between the route N'Dotre and the Boulevard Mitterrand will also be implemented during this period.

3.4.3.2 Medium-Term Road Development Plan (2020-2025)

During this 5-year period, urban growth should be concentrated along the Bingerville corridor in the East and the Songon corridor in the West. Urbanization is also expected to take place in the surrounding area of the industrial area of Attinguie. Other urban developments are also projected, such as the urban renewal to Abobo, Marcory, Koumassi and Bingerville, the creation of industrial zones in Dabou, Bingerville, Bonoua, and the expansion of the Abidjan Port and the provision of public transit: urban rail extended to Grand-Bassam, BRT to link Cocody with Koumassi and provision of the western freight rail route to Abidjan Port expansion.

To support the urban development of Bingerville, Bonoua and Songon, primary roads such as the Extension of Boulevard Mitterrand, the section of Y4 Ring Road connecting Songon and the IZ of Attinguie will be constructed between 2020 and 2025. Bridges connecting the Ile Boulay and Yopougon, or Cocody, Koumassi and Port Bouet will also be implemented during this period.

3.4.3.3 Long-Term Road Development Plan (2025-2030)

During the 2025-2030 period, the focus of growth will be concentrated at the satellite towns of Alepe, Azaguie, Jacquerville and a new area west of the Abidjan Port extension. In addition, the urban renewal of Yopougon center, the creation of industrial zones in Ako-Brake, Alepe, Azaguie and Abreby/Ambroise are expected to be implemented.

The Route d'Alepe, the south-west section of Y4 Ring Road running through Ako-Brake and the route de Bonoua will be upgraded during this period to support the development of those satellite towns. Upgrade of roads inside of Yopougon will also be carried out as part of the urban renewal.

3.5 Traffic Control and Management System

3.5.1 Traffic Control System

3.5.1.1 Area Traffic Control (ATC) System

As the number of automobiles is rapidly increasing in Abidjan, traffic congestion is also getting more and more serious. In light of this situation, it has become important to identify the bottlenecks responsible for traffic congestion using intelligent transportation systems (ITS), and to disperse traffic through optimal traffic signal control and the provision of traffic information.

3.5.1.2 Development of Urban Traffic Information System

Although TCMs cannot entirely eliminate traffic congestion, they will surely help to reduce it if properly implemented. Introduction of a comprehensive traffic information system is most highly recommended. Effective use of traffic information is increasingly becoming more important for heavily congested road networks. Most traffic data is collected through vehicle detectors installed by the government (traffic/road administrators). On the other hand, dissemination of traffic information has become easy with the proliferation of ICT (Information & Communication Technology).

The traffic information and control system should be applied to the expressway network in Greater Abidjan. The highway traffic control center also consists of various sophisticated equipment for traffic surveillance, information processing, and information dissemination. The system collects, processes and dispatches real-time traffic information to expressway users. An organization staffed with trained personnel is also essential to effectively operate the system. The first step will include installation of CCTV cameras and variable-message signboards (VMS) as well as development of a traffic control room. Meanwhile, the second step will include development of an en-route real-time travel-time information system to assist in route choice, including alternative ordinary roads.

3.5.1.3 Electronic Toll Collection

Many countries have introduced ETC (Electronic Toll Collection) systems for expressways and toll roads. The advantage of shorter travel time on expressways is negated by the wasted time at tollgates. ETC automatically collects tolls from moving vehicles passing through the gate so that they will not need to stop at the gate for payment. Thus, the transaction time is much shorter and turnover is much higher than manual collection.

3.5.1.4 Overloaded Truck Control System

Damage to road structures and serious incidents due to overloaded vehicles are serious problems all over the world, and ITS is utilized to enhance the control of overloaded vehicles.

3.5.2 Parking System Development

Under the situation of increasing automobiles and continuing reliance on private vehicles, it is essential to increase parking capacity in Abidjan, especially in the CBD (i.e., Plateau). Some parking inside buildings is managed by the private sector and public parking is managed by Abidjan Autonomous District (AAD). On-street parking should be removed or tightly controlled, to be replaced by the space

for the ROW of public transport, private vehicles, and pedestrians. A rough analysis of the total parking demand and supply in Plateau, particularly in the most intensively developed zones, was made based on the findings from the Parking Facility Survey and additional building survey, which reports the total daily parking demand of around 52,000 vehicle-hours in Plateau, as of 2013.

Construction of fringe parking facilities is also critical for facilitating intermodality between private vehicles and public transport systems throughout Greater Abidjan. New parking facilities should be developed in the major intermodal nodes, namely, the transfer points between arterial roads and high-capacity corridor (i.e., BRT, railway, or lagoon transport) stations to promote Park & Ride, which provides parking lots for private car users to transfer to public transport, especially at the proposed intermodal transportation terminals outside the urban area.

3.5.3 Introduction of a Pricing Policy in the CBD

Road pricing is one of the main road transportation control measures to alleviate traffic congestion and reduce air pollution. It mainly charges passenger car users passing through designated roads, in order to minimize unnecessary utilization of passenger cars and divert users to public transport. It also has an important objective to specify the revenues collected from road pricing as the funds for transportation system improvement. In the case of Abidjan, it is relatively easy to apply road pricing in the CBD (i.e., Plateau) as it is surrounded by the lagoon and there are a limited number of entry roads. Taking the entire area of Plateau as a restricted area, entering vehicles are charged a fee. The existing two bridges connecting Plateau and Treichville will also be charged for road pricing.

Road pricing can also help to reduce the volume of heavy vehicles by charging those who are passing Plateau and diverting them to other routes to/from the Port of Abidjan such as the 3rd Bridge, and other planned bridges crossing the lagoon. Above all, after the Third Bridge and Vridi Bridge (Project Code: V-7-4) have been constructed in the short term (i.e., by 2020), it will be possible to motivate heavy vehicles to avoid passing through Plateau even if the route via Plateau is the shortest to the destination by adjusting bridge tolls and road pricing charges on these two routes. Furthermore, Abidjan Autonomous District currently intends to propose a regulation that heavy vehicles must not pass the General de Gaulle Bridge and Boulevard in order to control the volume of heavy vehicles to/from the port. Thus, it should also be noted that traffic monitoring equipment for road pricing may also help to exercise control the entry of heavy vehicles on the General de Gaulle Bridge.

As an alternative to the above-mentioned road pricing, parking vehicles, whether they may be located on- or off-street, should be charged a fee, which is also expected to bring about considerable revenue for infrastructure investment. Furthermore, as the parking fees become higher, it will eventually deter private vehicles from entering the CBD and prompt them to shift to public transportation. Thus, this situation can be relatively easily controlled. This concept is called parking pricing and is often utilized as an effective transportation demand management (TDM) policy. However, consideration must be given to the fact that business and commercial activities along the roads, especially in the CBD, may also benefit or suffer from any action or decision. Providing sufficient nearby off-street parking facilities (as mentioned above), as well as common on-street loading/unloading zones, should also be the basis for this system.

3.5.4 Public Transport Support System

In the context of urban transportation, public transport should be given priority over private vehicles to secure smoother travel for those who use public transport within the limited road space. Hence, the

current partial dedicated bus lanes should be extended more continuously on the urban arterial roads to form a continuous, smooth network for buses, thereby serving like a BRT. It should be noted that the dedicated bus lane development is mainly for the feeder-type bus lines serving the high-capacity corridor stations (including high-speed ferry stations), while some line-haul type bus lines will also utilize dedicated bus lanes along the radial roads. By securing a relatively high operating speed, the time schedule can also be foreseen, consequently reducing the waiting time and thereby attracting more passengers.

3.5.5 Pedestrian Facilities for Better Environment

According to the Household Interview Survey (HIS), the most preferred mode of transport by the citizens in Greater Abidjan is “on foot.” However, pedestrian facilities, especially along the busy main roads in the city, are insufficient in number. In order to reduce accidents involving pedestrians and to ensure safety, more pedestrian facilities such as crosswalks, pelican crossings, and pedestrian bridges/underpasses should be provided. In addition, narrow or poorly maintained sidewalks along the urban roads need to be improved, since sidewalks of good quality will enhance not only pedestrian safety but also the urban amenity and environment.

3.5.6 Traffic Control and Management Projects

3.5.6.1 Short Term (2015-2020)

For the short term, most of the traffic control and management projects that are considered as priority and could be relatively easily implemented, such as those for development of a traffic control system, have been proposed. Other urgent transportation control measures, such as development of dedicated bus lanes, parking facilities, pedestrian safety facilities and an overloaded truck control system, have also been prioritized as short-term projects.

3.5.6.2 Medium Term (2021-2025)

There are several traffic control and management projects that are expected to bring about full benefit only after completion of the road or public transport infrastructures, such as bus location and information systems, a common fare system for public transport, illegal parking control support and road management and maintenance systems. Thus, those projects are scheduled in the medium term. Development of some projects also has a prerequisite of an “advanced” system in the society, such as cooperation with a bank payment system and legislation for penalties regarding traffic violations, including illegal parking.

3.5.6.3 Long Term (2026-2030)

Though most of the traffic control and management projects in Abidjan will be developed in the medium term, the remaining projects such as development of electronic toll collection and road pricing systems have been scheduled in the long term. Since they are considered to bring about significant impact on people’s travel behavior, completion of all the transport projects will be necessary before implementation of these projects. Moreover, a comprehensive electronic vehicle registration database is also essential not only for Abidjan but also for the entire country. Thus, these projects should be studied and planned well in advance for smooth implementation.

3.6 Public Transport Development Plan

The SDUGA public transportation proposals will promote the following key initiatives in attempt to change this trend namely:

- Promotion of High Capacity Transit Corridors;
- An enhanced bus system; and
- A review of the informal public transport sector.

The Public Transport Sector Map that depicts the future public transport system is shown later.

3.6.1 Transit Demand in 2030

By 2030, the anticipated population growth of Greater Abidjan will result in an increase of nearly 60% over the 17 year period from 2013. The number of mechanized person trips³ will almost double in number over the same period. There are significant people living adjacent to major corridors.

Corridor Population: In the identified high capacity transit corridors namely the north-south corridor henceforth referred to as the Blue Line, the water west-east Corridor henceforth referred to as the Purple Line and the central west-east Corridor henceforth referred to as the Red Line, there are 1.4, 0.6 and 0.9 million people living with 1 kilometer of the proposed respective alignments.

Fare Structure: The current fare structure on the public bus system varies from the low flat fare of 200 FCFA for the normal bus to 1,000 FCFA for 5 kilometer trip via taxi. In between, a similar trip on Gbaka and Woro-Woro will cost 200 and 150 FCFA respectively. After some consideration, the reference fare for the high capacity transit corridors is proposed as a boarding fare of 300 FCFA plus 30 FCFA per kilometer.

Demand on High Capacity Corridors in 2030: The highest demand is on Phase 1 of the Blue Line that is expected to attract in excess of 2,371,000 passenger boardings per day as seen in Table 3.3⁴.

In terms of fare sensitivity, boarding fare of 400 FCFA plus 30 FCFA per kilometer, a fare increase of 22% for a 5 kilometer trip, the number of passenger boardings on for example the Blue Line is expected to decrease by 9%.

³ Mechanized person trips include all person trips except walk trips.

⁴ These passenger forecasts also include the impact of "Ramp Up" phenomena. "Ramp Up" is the phenomena whereby transport models tend to over-estimate new high order transport especially in the early years of operation. The passenger boardings include interchange passengers. At present only the forecast for Blue Line Phase 1 is available for other than the year 2030.

Table 3.3 Estimated 2030 Passenger Boardings on the High Capacity Corridors

Transit Line	Brief Description of Corridor	Project Code	Year	Daily Passenger Boardings	Maximum Load (Passengers per Hour per Direction-pphpd)
Blue Line Phase 1	Rail - Anyama to Grand Bassam	T-1-1	2025	1,835,600	51,000
			2030	2,371,300	72,200
Blue Line Phase 2	Rail - Airport to Grand Bassam	T-1-2	2030	382,200	25,100
Red Line	Rail - Western Yopougon to Bingerville	T-1-3	2025	1,404,400	55,900
			2030	1,864,400	68,600
Purple Line	High-Speed Ferry- Songon to Bingerville	T-4-1	2020	437,000	15,000
			2025	598,000	23,000
			2030	622,000	26,000
	High-Speed Ferry- Bingerville to Airport and Grand Bassam	T-4-1	2020	60,100	2,600
			2025	186,200	10,400
			2030	299,100	16,800
Green Line	Water Bus - Attecoube to Treichville	T-4-2	2020	407,600	20,200
			2025	461,300	24,000
			2030	430,400	21,800
BRT	Brake Industrial Estate to Adjame	T-2-1	2025	95,700	10,500
			2030	97,800	9,400
	Abobo to Koumassi Phase 1	T-2-2	2020	26,700	2,200
			2025	133,300	6,500
			2030	147,700	6,800
	Abobo to Koumassi Phase 2	T-2-3	2025	173,000	5,300
2030			288,600	11,500	
BHLS	Bonoua to Bingerville	T-2-4	2030	121,700	7,700
	Dabou to Western Yopougon	T-2-5	2030	242,500	11,300

Source: JICA Study Team

3.6.2 High Capacity Transit Corridors

There are eight proposed high capacity corridors. These corridors are shown for the inner part of Abidjan in Figure 3.6 and mentioned earlier. The appropriate technology for the Blue and the Red Lines is rail. They will cross at the station nominated as Central. Both the Purple and the Green Lines will make use of the currently underutilized Lagoon System. The Key multi modal locations are depicted in Table 3.4.

HIGH CAPACITY PUBLIC TRANSPORT ROUTES IN PLANNING AREA



Source: JICA Study Team

Figure 3.6 Detail of Abidjan High-Capacity Corridors

Table 3.4 Key Multi Modal Locations

Transit Line		Multi-Modal Stations	International Terminals	Park-and-Ride Locations
Blue Metro		Anyama, Abobo, North Adjamé, Adjamé, Central, South Plateau, Koumassi and Grand Bassam	Abobo, North Adjamé and South Plateau	Anyama, Abobo, Koumassi and Grand Bassam
Red Metro		West Yopougon, Central Yopougon, Central, East Cocody and Bingerville	-	West Yopougon, East Cocody and Bingerville
Purple High-Speed Ferry		Songon, South Plateau and Koumassi	South Plateau	Songon
Green Water Bus		Central and South Plateau	South Plateau	-
BRT	Brake Industrial Estate to Adjame	Adjame, Central Yopougon	-	Adjame
	Abobo to Koumassi	Abobo, East Cocody and Koumassi	Abobo	Abobo, East Cocody and Koumassi
BHLS	Bonoua to Bingerville	Bonoua and Bingerville	-	Bonoua and Bingerville
	Dabou to West Yopougon	Dabou, Songon and West Yopougon	-	Dabou, Songon and West Yopougon

Source: JICA Study Team

3.6.3 Transportation Upgrade

The key planning issue for public transportation in Abidjan is that the informal sector plays a leading role at the expense of the formal sector.

Local Transportation: At present, local transportation is in the hands of the informal sector. It is envisaged with the introduction of the high capacity transit corridors that the role of the remaining informal sector will shift to feeder minibus service to provide the access to high-capacity corridors.

Modal Integration: All high capacity corridor stations will provide full integration of all local modes.

Transport Administration: There is a need for the establishment of a public transport administration, management and a regulator. The Abidjan Urban Planning Agency (AUPA), part of the AAD is likely to play a key role.

A Demonstration Project: A demonstration project is suggested in the commune of Yopougon. The purpose of this project is to focus travelers away from the Informal Sector. The access from Yopougon at present to the eastern part of the city is via a single narrow corridor. The reason for a demonstration project to focus on Yopougon is two- fold namely it will continue to hold a high proportion of the population of the AAD in future. At the same time, it will be beneficial of the most likely first high capacity transit corridor, the Purple Line. SOTRA services will focus on this Purple Line Corridor as an alternative to taking people to the eastern part of the city via the narrow northern corridor.

3.6.4 Project Development Timeline

The Project Timeline for the implementation of key public transport projects is given Table 3.5⁵.

⁵ Preliminary costing of these projects is included in the project profile sheet of which there is one for every project.

Table 3.5 Proposed Implementation Schedule⁶

Project		Category	Project Code	Implementation Period
Rail	Blue Line Phase 1 (Anyama to Airport)	Infrastructure	T-1-1	2017 to 2021
	Blue Line Phase 2 (Airport to Grand Bassam)	Infrastructure	T-1-2	2026 to 2029
	Red Line (West Yopougon to Bingerville)	Infrastructure	T-1-3	2021 to 2023
Water	Purple Line (Songon to Bingerville, Airport and Grand Bassam)	Infrastructure	T-4-1	2017 to 2019
	Green Line (Attecoubé to Treichville)	Infrastructure	T-4-2	2017 to 2019
BRT	Brake Industrial Estate to Adjame	Infrastructure	T-2-1	2022 to 2025
	Abobo to Koumassi Phase 1	Infrastructure	T-2-2	2018 to 2020
	Abobo to Koumassi Phase 2	Infrastructure	T-2-3	2022 to 2025
BHLS	Bonoua to Bingerville	Infrastructure	T-2-4	2026 to 2029
	Dabou to West Yopougon	Infrastructure	T-2-5	2026 to 2029
Purchase of Additional SOTRA Buses		Infrastructure	T-2-6	2016 to 2018
Pilot Project of Communal Transport		Humanware	T-2-7	2016 to 2018
Development/Improvement of Intermodal Centers		Humanware	T-3-1	2019 to 2021
Reorganization of SOTRA Bus Services		Humanware/Software	O-2-1	2017 to 2021

Source: JICA Study Team

The trigger for the upgrading of public transport services in Abidjan is the introduction of the high capacity transit corridors. Without these services there will be little incentive for public transport improvement. At the same time, the introduction of BRT and BHLS and the purchase of additional SOTRA buses will improve the status of SOTRA.

3.7 Freight Transport Development Plan

3.7.1 Major Truck Routes

The efficient movement of goods is vital to the economic development and growth of not only Greater Abidjan but also to Cote d'Ivoire as a whole. Currently, the two cargo transport corridors are oriented in the northwest direction along the Autoroute du Nord, heading towards the northern part of the country, and in the west direction with the Route de Dabou. Inside the district, all truck traffic going to and from Abidjan Port and the related industrial area must funnel through the Plateau and the two bridges crossing the lagoon, resulting in many negative impacts such as air pollution, slowdown of traffic on urban roads, increase in the risk of accidents, damage to the road pavement and noise pollution.

Considering the above, it is necessary to establish appropriate truck routes to facilitate safe and efficient trucking inside the Greater Abidjan area, ensuring that mobility for all roadway users is preserved, that freight and goods can move safely and efficiently and that the economy of Abidjan continues to grow. The future truck route system proposed is aiming at minimizing the impacts of trucks on sensitive land uses such as residential areas, widespread deterioration of the local road system as a result of heavy truck traffic and traffic hazards.

To implement such a truck route system, regulations have to be implemented to prevent trucks from entering the city center and to proceed only over established truck routes. Trucks entering the Abidjan District would be able to deviate only at the intersection of the street nearest to the destination point.

⁶ Preliminary costs of these projects are included in the project profile sheet of which there is one for each project.

Upon leaving the destination point, the truck should be forced to take the shortest permissible route to the truck route.

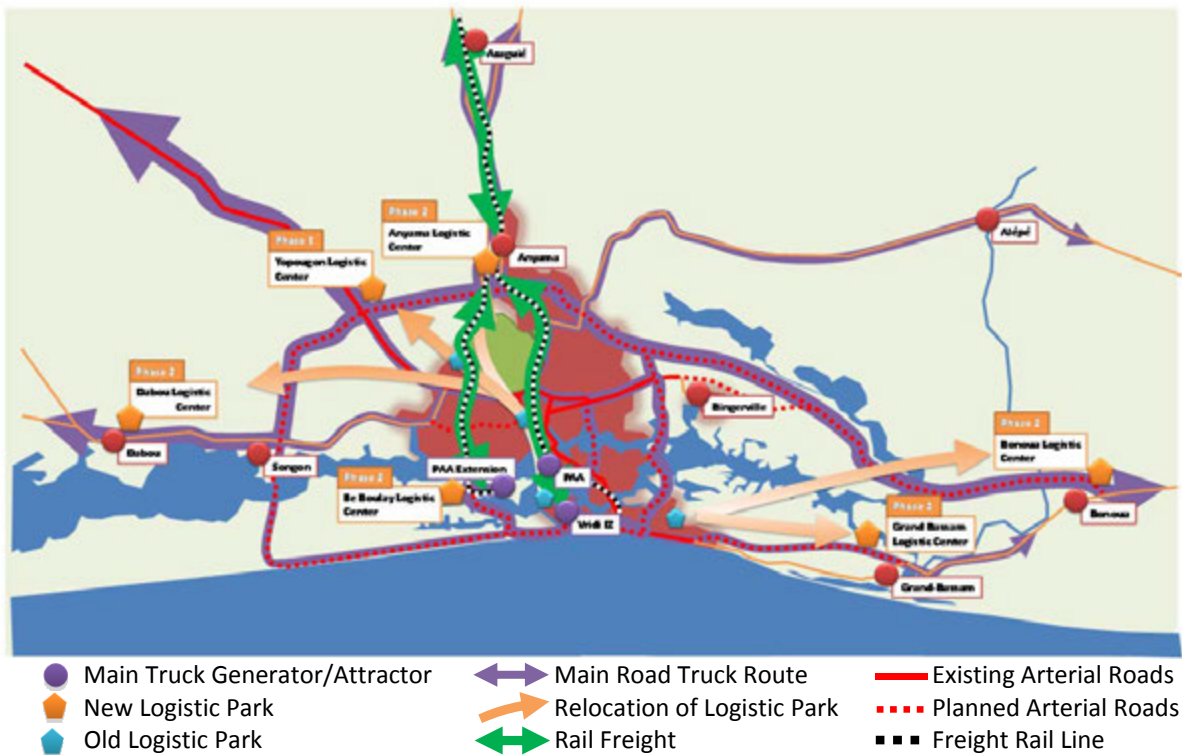
3.7.2 Truck Traffic To/From the Ports

The biggest traffic generator is the Autonomous Port of Abidjan and the traffic at the port is expected to grow rapidly in accordance with the recovery and growth of the economy of the country. To integrate a large volume of freight from other regions or foreign countries into a logistics center in the region, close connection, provided not only by road but also by rail, will be necessary. Those areas will have to be efficiently served by appropriate transport means to maintain their competitiveness and attract investment in the future. New access roads, such as the Vridi Bridge, the Vridi-Bietry Bridge, the Vridi Northern Bypass or the Treichville-Yopougon Tunnel will have to be built to ameliorate the efficiency of road cargo transport and reduce traffic congestion inside the industrial areas.

A study using the transport model has been specifically carried out to assess the impact of those new road infrastructures serving the Port, along with the implementation of truck restriction on the Plateau road network. The most efficient implementation scenario from the point of economic benefits is the one with the construction of the Vridi Bridge and the improvement of Pierre et Marie Curie Road, to provide a direct access from the Vridi Industrial Zone to the 3rd Bridge. The results of the model also show that the implementation of a significant transport policy for removal of heavy trucks from the Plateau should have a positive impact on the road conditions around the Plateau and the construction of the tunnel will remove the necessity of the truck traffic going through the two existing bridges.

3.7.3 Future Freight Distribution Plan

The proposed truck route system will rely on newly built roads, such as the Y4 Rind Road, the Vridi Bridge, the Yopougon-Treichville Tunnel or the Voie V28. These new road infrastructures will increase logistic options for transporters and economic competitiveness/attractiveness of industrial sites in Greater Abidjan. However, they are just one component of the overall freight distribution plan, as it is important to reduce the amount of goods and freight transported by road through urban centers. A modal shift to rail should be encouraged through the provision of an upgraded freight rail system linked to logistic centers, as shown in Figure 3.7.



Source: JICA Study Team

Figure 3.7 Integrated Freight Distribution Plan

It is also necessary to improve and develop a freight rail network that will serve the port traffic not only in Cote d'Ivoire but also to and from the adjacent inland countries. Also, a container marshalling yard and a freight station near the existing port and its expansion area is needed to revitalize the operation of freight trains that cater for the freight railway traffic.

As a new port location is planned in Ile Boulay and the introduction of a new freight railway route is proposed in this study. This plan aims at not only supporting the new port development but also connecting port freight with inland industrial zones, such as Yopougon district, and integrating with the freight transport network center in Anyama.

The proposed freight route is a single-track line with a length of around 24 km connecting the new port and Anyama freight terminal. To handle cargo unloaded in the new port, a railway depot not only for railway function but also for freight service function is proposed.

In Abidjan, particularly around the Port of Abidjan, on-street parking of trucks has been causing a serious traffic problem, occupying road space and thus reducing the traffic capacity of the road. Thus, it is obvious that more facilities for truck parking and customs procedures are needed. A new logistic park is currently being planned along Autoroute du Nord, outside Yopougon and current parking and other ancillary facilities, such as customs for heavy goods vehicles and logistic vehicles in Gonzagueville, Yopougon and Attécoubé, shall be eventually relocated outside the urban area perimeter of towns, namely, Anyama, Bonoua and Dabou. This will also help to reduce the number of heavy vehicles circulating inside the city.

3.8 Environmental Considerations for Urban Transport Master Plan

3.8.1 General

The urban master plan and the urban transport master plan are fully supportive of each other and hence indivisible. In general, therefore, the examination of options for the urban transport plan is not carried out apart from the urban master plan within the same study. The planning objectives and strategies for the urban transport master plan were evaluated from the environmental viewpoints in this section.

3.8.2 Environmental Evaluation of Goals of Transport System Development

Goals of the transport system development lie in the 1) efficiency, 2) equity and 3) better environment. Efficient transport is able to reduce travel time and distance, which in turn can reduce, 1) volume of air pollutants, 2) volume of greenhouse gases, 3) problems of noise/vibration, and 4) traffic congestion and obstacles to smooth economic activities. These will lead to improved quality of life and economic growth conditions.

Equity means that all members of the society, including the socially vulnerable should enjoy the improved transport system. All members also should not have any inconveniences caused by urban transport development. Some people will be impacted by the increase of air pollution, noise/vibration, involuntary resettlement, social damages to their life and livelihood. Careful correspondence with these people should be ensured at the Feasibility Study (FS) stage of each project.

The reduction of air pollution, noise/vibration and traffic accidents provides a better environment.

3.8.3 Environmental Evaluation of Objectives of Urban Transport Development

In order to achieve the above-mentioned goals of transport system development, the urban transport objectives, such as 1) enhancement of road network capacity that supports economic and social activities, 2) promotion of public transport use, 3) intermodal development/transit-oriented development, and 4) realization of an environmentally sound transport system, are prepared.

Enhancement of Road Network Capacity that Supports Economic and Social Activities:

- The development and improvement of the road network leads to reduction of air pollution and noise/vibration problems and contributes to reduction of greenhouse gas emission. These improve the environmental condition in the whole Abidjan area.
- Some areas that face roads to be expanded or newly developed will worsen air pollution, noise/vibration problems and will cause some inconveniences to lives and livelihoods. The examination of alternatives and mitigation measures should be carried out at the FS stage.
- The establishment of multi-core and integrated urban sub-centers, an increase of road network, introduction of Traffic Control Managements (TCMs) and a functional goods distribution system lead to smooth traffic flow and reduction of traffic time and distance. These improve the environment by reduction of air/noise/vibration pollution and greenhouse gas emission and activation of economic and social activities.

- These have may require land acquisition and involuntary resettlement. The efforts to minimize impacts by land acquisition and resettlement. An adequate Resettlement Action Plan (RAP) should be prepared at the FS stage.

Promotion of Public Transport Use:

- The improvement of bus transport and introduction of Bus Rapid Transit (BRT) provide a better environment. It will cause almost no problems in resettlement. Therefore, the enhancement of the bus transport system is a desirable policy.
- Some people such as Woro-Woro/Gbaka drivers will lose their employment, if a new bus transport system is introduced. An inclusive job-sharing system should be examined.
- Introduction of a rail-based system is one of the most desirable policies from the environmental viewpoint. The existing railway passes near national park area and heavily populated districts. Impacts to the park and the residents should be examined at the FS stage.

Intermodal Development/Transit-Oriented Development:

- It is favorable from the environmental viewpoint. It leads to smooth traffic flow and reduction of traffic time and distance.

Realization of an Environmentally Sound Transport System:

- Introduction of TCMs and enhancement of traffic safety is a desirable policy for environmental protection.

3.8.4 Environmental Evaluation of Strategic Transport Network Structure

In order to achieve the objective of the urban transport development, a strategic transport network structure, including 1) a radial concentric road network, and 2) an integrated transport network structure, is proposed.

Radial Concentric Road Network:

- The concentration of traffic in the city center is the most serious concern for air/noise/vibration pollution and traffic congestion. The passing of heavy vehicle traffic in the city center is also a very serious problem as it generates pollution and congestion at the two bridges.
- The construction of the outer ring road Y4 will increase ability to avoid pollution and social inconvenience in the city center, and to create smooth traffic flow in the entire area of Abidjan.
- The environmental consideration should be required at the area along rehabilitated roads and newly developed roads at the FS stage.

Integrated Transport Network Structure:

(1) Development of infrastructures to support the Port of Abidjan

- The development of Abidjan's port is an indispensable issue and fundamentals to Abidjan city development to activate economic growth, to create job opportunities, and to improve lives and livelihoods, etc.

- The master plan for port development of existing and newly developed ports in Abidjan should be studied with consideration of alternatives and zero option. The examination of the location of ports including areas facing the ocean.
- In case of development with dredging of the lagoon and bridge construction development across the lagoon, a detailed survey of water quality and bottom materials, including heavy metals, should be implemented at the FS stage.

(2) Effective cargo transport for industrial growth

- To avoid traffic congestion and passage of trucks in the city center, a logistics location outside of the city center is favorable from the environmental viewpoint.
- Some developments will require land acquisition and resettlements. The detailed survey should be carried out at the FS stage.

3.9 Project Identification and Prioritization

3.9.1 SDUGA Long List

All the prospective development projects that have been proposed in Part 6 Urban Transport Master Plan are listed in Table 3.6 and Table 3.7 (for road sector) and Table 3.8 (for other sectors) along with the proposed period of implementation. A total of 118 projects have been set forth to be included in a long list. The total amount of investment for the listed projects is estimated at around 8.9 trillion FCFA or 13.5 billion Euros. Details of these projects are presented as Project Profiles in Appendix F of Volume 3.

Table 3.6 SDUGA Project Long List (Road Sector: V-1 to V-5)

Proposed Projects		Short-term					Mid-term					Long-term					
		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
V	Road Development Plan																
V-1	Development of Y4 Ring Road																
V-1-1	Development of Y4 Ring Road - Songon / Autoroute du Nord Section																
V-1-2	Development of Y4 Ring Road - Autoroute du Nord / Pk18																
V-1-3	Development of Y4 Ring Road - Pk18 to Abobo Baoulé Section																
V-1-4	Development of Y4 Ring Road - Abobo Baoulé / François Mitterand Section																
V-1-5	Development of Y4 Ring Road - François Mitterand / Riviera 6 Section																
V-1-6	Development of Y4 Ring Road - Desirée Island Bridges Section																
V-1-7	Development of Y4 Ring Road - Aérocity Section																
V-1-8	Development of Y4 Ring Road - Canal du Vridi Section																
V-1-9	Development of Y4 Ring Road - Jacquerville Section																
V-2	Development of Bingerville Area Road Network (BiARN)																
V-2-1	Development of BiARN - Bingerville Northern Bypass																
V-2-2	Development of BiARN - Extension of the Boulevard François Mitterand																
V-2-3	Development of BiARN - Widening of the Route de Bingerville																
V-2-4	Development of BiARN - Bingerville BHLS Road																
V-3	Development of Bassam Area Road Network (BaARN)																
V-3-1	Development of BaARN - Abidjan-Bassam Expressway (under construction)																
V-3-2	Development of BaARN - Aérocity Area																
V-3-3	Development of BaARN - Bassam Northern Bypass																
V-3-4	Development of BaARN - Widening of the Route de Bonoua																
V-4	Development of Yopougon Area Road Network (YoARN)																
V-4-1	Development of YoARN - Voie V23 - Parkway Section																
V-4-2	Development of YoARN - Voie V23 - 5th Bridge Section																
V-4-3	Development of YoARN - Voie V2																
V-4-4	Development of YoARN - Voie V6																
V-4-5	Development of YoARN - Voie V9																
V-4-6	Development of YoARN - Yopougon Industrial Zone Arterial Road																
V-4-7	Development of YoARN - Voie V28 - Northern Section																
V-4-8	Development of YoARN - Voie V28 - 4th Bridge																
V-4-9	Development of YoARN - Voie V28 - Southern Section																
V-4-10	Development of YoARN - Autoroute de l'Ouest																
V-4-11	Development of YoARN - Yopougon Western Bypass																
V-4-12	Development of YoARN - Widening of the Voie V1																
V-4-13	Development of YoARN - Central Road of Boulay Island																
V-4-14	Development of YoARN - Widening of Siporex-Sable Link																
V-5	Development of Abobo Area Road Network (AbARN)																
V-5-1	Development of AbARN - Extension of Q1																
V-5-2	Development of AbARN - Western Abobo Bypass																
V-5-3	Development of AbARN - Extension of Voie N'Dotre																
V-5-4	Development of AbARN - Widening of the Route d'Alépé																
V-5-5	Development of AbARN - Widening of the Autoroute d'Abobo																
V-5-6	Development of AbARN - East-West Abobo-Cocody Link																

Source: JICA Study Team

Table 3.7 SDUGA Project Long List (Road Sector: V-6 to V-9)

Proposed Projects		Short-term					Mid-term					Long-term				
		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
V	Road Development Plan															
V-6	Development of Cocody Area Road Network (CoARN)															
V-6-1	Development of CoARN - Extension of Boulevard Latrille															
V-6-2	Development of CoARN - Voie Y3															
V-6-3	Development of CoARN - Old Y4 Alignment															
V-6-4	Development of CoARN - Extension of the Boulevard de France															
V-6-5	Development of CoARN - Boulevard de France Redressé															
V-6-6	Development of CoARN - Widening of the Boulevard Latrille															
V-6-7	Development of CoARN - Widening of the Rue des Jardins															
V-6-8	Development of CoARN - Widening of the Boulevard de la Corniche															
V-6-9	Development of CoARN - Widening of the Boulevard Attoban															
V-6-10	Development of CoARN - Widening of the Boulevard de la 7e Tranche															
V-7	Development of Central Area Road Network (CeARN)															
V-7-1	Development of CeARN - Voie Triomphale															
V-7-2	Development of CeARN - 3rd Bridge (under construction)															
V-7-3	Development of CeARN - Widening of the Boulevard de Marseille															
V-7-4	Development of CeARN - Vridi Bridge															
V-7-5	Development of CeARN - Vridi Northern Bypass															
V-7-6	Development of CeARN - Grand-Campement Arterial Road															
V-7-7	Development of CeARN - Upgrade of Felix Houphouet Boigny Bridge															
V-7-8	Development of CeARN - Upgrade of General de Gaulle Bridge															
V-7-9	Development of CeARN - Vridi-Bietry Bridge															
V-7-10	Development of CeARN - Yopougon-Treichville Tunnel															
V-8	Intersection Improvement															
V-8-1	Intersection Improvement - Solibra (Treichville)															
V-8-2	Intersection Improvement - Mairie d'Abobo (Abobo)															
V-8-3	Intersection Improvement - Banco (Abobo)															
V-8-4	Intersection Improvement - Palais des Sports (Treichville)															
V-8-5	Intersection Improvement - Siporex (Yopougon)															
V-8-6	Intersection Improvement - Kenaya (Yopougon)															
V-8-7	Intersection Improvement - Sapeur Pompiers (Yopougon)															
V-8-8	Intersection Improvement - Samake (Abobo)															
V-8-9	Intersection Improvement - St Jean (Cocody)															
V-8-10	Intersection Improvement - Palmeraie (Cocody)															
V-8-11	Intersection Improvement - CHU Treichville (Treichville)															
V-8-12	Intersection Improvement - Inchallah (Koumassi)															
V-8-13	Intersection Improvement - Zoo (Adjamé-Cocody)															
V-8-14	Intersection Improvement - Williamsville (Adjamé)															
V-8-15	Intersection Improvement - Carrefour de la Vie (Cocody)															
V-8-16	Intersection Improvement - Carrefour de L'Ecole Nationale de Police (Cocody)															
V-8-17	Intersection Improvement - Carrefour de Marcory (Marcory)															
V-8-18	Intersection Improvement - Carrefour Orca (Cocody)															
V-9	Development of Additional Roads															
V-9-1	Development of an Alternative Road to the Route de Dabou															
V-9-2	Development of an Alternative Connection between Autoroute du Nord - Carrefour Thomasset															
V-9-3	Development of an Elevated Road over Cocody Bay															
V-9-4	Development of a Northern Extension of the 3rd Bridge															
V-9-5	Development of a Connection Road between Boulevard Mitterand and Grand Bassam															

Source: JICA Study Team

Table 3.8 SDUGA Project Long List (Other Sectors)

Proposed Projects		Short-term					Mid-term					Long-term				
		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
G	Traffic Control and Management Plan															
G-1	Development of Traffic Control System															
G-1-1	Development of Area Traffic Control System															
G-1-2	Development of Public Transport Priority System															
G-1-3	Development of Urban Traffic Information System															
G-2	Development of Public Transportation System															
G-2-1	Development of Dedicated Bus Lanes															
G-2-2	Implementation of Transportation IC-Card System															
G-2-3	Development of Bus Operation Monitoring and Control System															
G-2-4	Development of Public Transportation Operation Information Provision System															
G-3	Parking System Development															
G-3-1	Development of Parking Facilities/Parking Information System															
G-4	Development of Expressway System															
G-4-1	Development of Highway Traffic Control System															
G-4-2	Development of Electronic Toll Collection System															
G-5	Traffic Enforcement Assistance															
G-5-1	Development of Overloaded Truck Control System															
G-5-2	Development of Road Pricing System															
G-5-3	Supporting System for Control of Illegal Parking															
G-6	Traffic Safety Assistance															
G-6-1	Pedestrian Facility Development for Better Environment															
G-7	Road Management															
G-7-1	Development of Road Surface Condition Survey System															
G-7-2	Management System of Information on Road Maintenance Works															
G-7-3	Development of Asset Management System															
T	Public Transport Development Plan															
T-1	Commuter Rail Development															
T-1-1	North-South Rail Project-Stage 1 Anyama to Airport															
T-1-2	North-South Rail Project-Stage 2 Airport to Grand-Bassam															
T-1-3	East - West Rail Project (Yopougon to Bingerville)															
T-2	Bus Transportation Development															
T-2-1	Development of BRT Service: Adjamé - Braké Industrial Zone															
T-2-2	Development of BRT Service: Abobo - Koumassi Phase 1															
T-2-3	Development of BRT Service: Abobo - Koumassi Phase 2															
T-2-4	Development of BHLS Service: Bingerville - Bonoua															
T-2-5	Development of BHLS Service: Yopougon - Dabou															
T-2-6	Purchase of Additional Buses for SOTRA															
T-2-7	Pilot project of communal transport															
T-3	Intermodal Transportation Terminal Development															
T-3-1	Development/Improvement of Intermodal centers at Adjame, and Central/Southern															
T-4	Water-based Transportation Development															
T-4-1	East - West High Speed Ferry Service (Songon - Grand Bassam)															
T-4-2	Water Bus - Attecoubé to Reichville															
F	Freight Transport Development Plan															
F-1	Railway Transport Services															
F-1-1	Developing Direct Container Freight Loading & Unloading System															
F-1-2	New Freight Railway Connecting to Western Part of Abidjan Port															
F-2	Truck Transport Services															
F-2-1	Metropolitan Logistic Center Development															
O	Organizational and Institutional Arrangements															
O-1	Establishment of Agency/Commission															
O-1-1	Establishment of Road Projects Implementation Commission															
O-1-2	Establishment of ITS Cote d'Ivoire															
O-1-3	Establishment of Clearing House Organization															
O-1-4	Development of Transport Planning Centre of Excellence															
O-2	Public Transport Services															
O-2-1	Reorganization of SOTRA Bus Services															

Source: JICA Study Team

3.9.2 Economic Analysis

Economic analyses of the proposed 118 projects in the long list have been conducted. Since there are so many projects to be tested, the road projects, except for intersection improvement projects, have been sorted into 28 groups for simplicity as shown in Table 3.9. Projects in each group have similarities in terms of location, continuity, function, development period, and so on. Some projects that will attract attention are placed in a group with few other projects for more precise analysis. Along with 10 public transport projects, the total number of project groups to be tested is 38.

Table 3.9 Project Groups to be Tested for Economic Analysis

Group	Code	Group	Code	Group	Code
1	V-1-1, V-1-2	14	V-5-1, V-5-2, V-5-6	27	T-2-2
2	V-1-3, V-1-4	15	V-5-3, V-5-5	28	T-2-3
3	V-1-5, V-1-6, V-1-7	16	V-5-4	29	T-2-4
4	V-1-8, V-4-7, V-4-8, V-4-9 V-4-13	17	V-6-1, V-6-2, V-6-3, V-6-4, V-6-5, V-6-6, V-6-7, V-6-8	30	T-2-5
5	V-1-9	18	V-7-1	31	T-4-1
6	V-2-1, V-2-2, V-2-3, V-2-4	19	V-7-3, V-7-5, V-7-9	32	T-4-2
7	V-3-2, V-3-3, V-3-4	20	V-7-4, V-7-6	33	V-6-9, V-6-10
8	V-4-1, V-4-2	21	V-7-7, V-7-8	34	V-9-1
9	V-4-3	22	V-7-10	35	V-9-2
10	V-4-4	23	T-1-1	36	V-9-3
11	V-4-5, V-4-6	24	T-1-2	37	V-9-4
12	V-4-10, V-4-14	25	T-1-3	38	V-9-5
13	V-4-11, V-4-12	26	T-2-1		

Source: JICA Study Team

3.9.3 Multi-Criteria Analysis

The proposed 118 projects in the long list are evaluated in terms of priority. Although the most crucial criterion is the economic feasibility of the investment as mentioned in the previous section, it is not an easy task to economically evaluate all the projects over different transport sub-sectors. Moreover, economic feasibility is not the only criterion to determine the project priority. Besides economic feasibility, there should be several other viewpoints for evaluation such as existing development policies, consistency in the development orders of relevant projects and consideration of the natural and social environments.

Thus, six items, namely, coherence with visions, urgency, necessity, implicit feasibility, social acceptance, and investment efficiency have been set forth as evaluation criteria for project prioritization, as presented in Table 3.10. Then, the projects are evaluated and scored through a multi-criteria analysis based on those quantitative and qualitative criteria, as shown in Table 3.11 (for road sector) and Table 3.12 (for other sectors). It is assumed that projects with higher total scores shall be prioritized.

Table 3.10 Evaluation Criteria

Evaluation Criteria	Note
Coherence with Visions	<p>Although all proposed projects must be relevant to the visions and urban planning objectives for developing Greater Abidjan, the projects listed in the PND (national development plan), in the Master Plan 2000, or in the priority projects of the Abidjan Autonomous District to achieve the visions should be given priority. Moreover, the project that matches with the preferred growth scenario in SDUGA, namely, “Compact City plus Satellite City” concept should also be given priority.</p> <p>➔ Add 1 point if the project is included in the PND, in the Master Plan 2000, or in the priority projects of the AAD, respectively; add 1 point if the project is expected to contribute to TOD, development of the primary roads or the links between the urban satellite centers, or enhancement of the transport capacity of the north-south or east-west axes in the District of Abidjan. Up to 2 points in total.</p>
Urgency	<p>Projects that are expected to contribute to urgent transportation issues should be given priority.</p> <p>➔ Add 1 point if the project is intended directly for the urgent transportation issues discussed in “4. Significant Transport Issues,” etc. of Part 5 of this report. Also add 1 point if the government has somehow shown some intention of urgently implementing the project by asking any donors, releasing any TORs, and so on. Up to 2 points in total.</p>
Necessity	<p>All proposed projects are considered based on the needs of the citizens. However, projects that can more widely and more greatly respond to people’s needs may be given priority. As a proxy for the population of beneficiaries, future transportation demand (in 2030) for each project may be used.</p> <p>➔ Add 1 point if, for roads, the future traffic volume on the project site is over 10,000 PCU/direction/day (or total inflow of 40,000 PCU/day at intersections); add 1 point if, for public transport, the future peak sectional passenger volume on the project site is over 10,000 persons/direction/hour; add 2 points if the future volume is more than double of these standard values. For other projects, though the demand cannot be estimated, the number of beneficiaries can be considered as large enough; hence, add 1 point evenly to each project.</p>
Implicit Feasibility	<p>Socioeconomic, technical and institutional feasibilities need to be considered for prioritization because these factors are closely related to the implementability and sustainability of a project. This criterion is not necessarily tangible but implicit. For example, projects that are expected to bring about benefit not only in Greater Abidjan but also in the wider region of West Africa, or projects for which economic benefit will apparently surpass the cost may be given priority.</p> <p>➔ Add 1 point if the project is expected to bring benefit for West Africa through the improvement of the regional freight transport (i.e., international freight routes to/from the Port of Abidjan); add 1 point if the cost of infrastructure development is relatively low (less than 10 billion FCFA), totaling up to 2 points.</p>
Social Acceptance	<p>Projects that are accepted by all people have a great potential for prompt implementation. In the IEE (initial environmental examination), projects that are classified as Category I (almost no impact) or Category II (minimum negative impact) should be given priority.</p> <p>➔ Add 2 points if the project is classified as Category I or 1 point if the project is classified as Category II as a result of IEE (for details, see “Appendix E: Initial Environmental Evaluation of Proposed Projects for Transport Sector” of Volume 3 of this report).</p>
Investment Efficiency	<p>Investment efficiency of a project can be measured by an indicator of a benefit-cost ratio. Projects which are expected to bring a great economic benefit per unit cost of investment should be given priority.</p> <p>➔ Add 2 points if the project has a very high benefit-cost ratio (over 10.0) or 1 point if the project has a high benefit-cost ratio (over 5.0) as a result of the economic analysis of the group that the project belongs to. For intersection improvement projects and traffic control and management projects, though the economic analyses were not conducted, these projects are essentially supposed to bring relatively great benefit compared to the input of the cost; hence, add 1 point evenly to each project.</p>

Source: JICA Study Team

Table 3.12 Multi-Criteria Analysis of SDUGA Projects (Other Sectors)

Proposed Projects		Total Cost (million FCFA)	Annual OM (million FCFA)	Coherence with Visions	Urgency	Necessity (Future Demand)	Implicit Feasibility	Social Acceptance (EE)	Investment Efficiency (B/C Ratio)	Total score							
G	Traffic Control and Management Plan																
G-1	Development of Traffic Control System																
G-1-1	Development of Area Traffic Control System	58,704	2,935	1	MP2000	1	Traffic control	1	0	2	Category 1	1	6				
G-1-2	Development of Public Transport Priority System	5,598	280	0		1	Bus priority	1	1	Low Cost	2	Category 1	1	6			
G-1-3	Development of Urban Traffic Information System	1,401	70	0		1	Traffic control	1	1	Low Cost	2	Category 1	1	6			
G-2	Development of Public Transportation System																
G-2-1	Development of Dedicated Bus Lanes	9,824	491	1	MP2000	1	Bus priority	1	1	Low Cost	2	Category 1	1	7			
G-2-2	Implementation of Transportation IC-Card System	2,050	103	0		0		1	1	Low Cost	2	Category 1	1	5			
G-2-3	Development of Bus Operation Monitoring and Control System	9,988	499	0		0		1	1	Low Cost	2	Category 1	1	5			
G-2-4	Development of Public Transportation Operation Information Provision System	2,484	124	0		0		1	1	Low Cost	2	Category 1	1	5			
G-3	Parking System Development																
G-3-1	Development of Parking Facilities/Parking Information System	4,263	213	1	PND	2	Traffic control	Govt/Intention	1	1	Low Cost	2	Category 1	1	8		
G-4	Development of Expressway System																
G-4-1	Development of Highway Traffic Control System	21,202	1,060	0		1	Traffic control	1	0		2	Category 1	1	5			
G-4-2	Development of Electronic Toll Collection System	21,506	1,075	0		0		1	0		2	Category 1	1	4			
G-5	Traffic Enforcement Assistance																
G-5-1	Development of Overloaded Truck Control System	1,912	96	0		2	Traffic control	Govt/Intention	1	1	Low Cost	2	Category 1	1	7		
G-5-2	Development of Road Picing System	1,686	84	0		0		1	1	Low Cost	2	Category 1	1	5			
G-5-3	Supporting System for Control of Illegal Parking	810	41	0		1	Traffic control	1	1	Low Cost	2	Category 1	1	6			
G-6	Traffic Safety Assistance																
G-6-1	Pedestrian Facility Development for Better Environment	2,347	117	0		1	Traffic control	1	1	Low Cost	2	Category 1	1	6			
G-7	Road Management																
G-7-1	Development of Road Surface Condition Survey System	1,609	80	0		0		1	1	Low Cost	2	Category 1	1	5			
G-7-2	Management System of Information on Road Maintenance Works	1,161	58	0		0		1	1	Low Cost	2	Category 1	1	5			
G-7-3	Development of Asset Management System	1,600	80	0		0		1	1	Low Cost	2	Category 1	1	5			
T	Public Transport Development Plan																
T-1	Commuter Rail Development																
T-1-1	North-South Rail Project Stage 1 Anyama to Airport	753,843	59,953	2	PND	MP2000	2	Mass transit	Govt/Intention	2	72,200	0	0	Category 5	0	Low	6
T-1-2	North-South Rail Project Stage 2 Airport to Grand-Bassam	1,316,811	105,345	1	Compact		1	Mass transit		2	25,100	0	0	Category 4	0	Low	4
T-1-3	East - West Rail Project (Yopougon to Bingerville)	1,637,963	130,827	2	PND	MP2000	2	Mass transit	Govt/Intention	2	68,600	0	0	Category 4	0	Low	6
T-2	Bus Transportation Development																
T-2-1	Development of BRT Service: Adjamé - Brake Industrial Zone	65,172	4,556	1		MP2000	1	Mass transit		0	9,400	0	2	Category 1	0	Medium	4
T-2-2	Development of BRT Service: Abobo - Koumassi Phase 1	36,621	2,560	2	PND	MP2000	1	Mass transit		0	6,800	0	2	Category 1	0	Low	5
T-2-3	Development of BRT Service: Abobo - Koumassi Phase 2	37,666	2,629	1		MP2000	1	Mass transit		1	11,500	0	1	Category 2	0	Medium	4
T-2-4	Development of BRTS Service: Bingerville - Bonoua	40,741	2,851	0		0		0	7,700	0	1	Category 2	0	Medium	1		
T-2-5	Development of BRTS Service: Yopougon - Dabou	28,774	2,014	0		0		1	11,300	0	2	Category 1	1	High	4		
T-2-6	Purchase of Additional Buses for SOTRA	127,961	8,957	0		1	Bus transport		1	0	2	Category 1	1	4			
T-2-7	Pilot project of communal transport	31,990	2,239	0		1	Bus transport		1	0	1	Category 2	1	3			
T-3	Intermodal Transportation Terminal Development																
T-3-1	Development/Improvement of Intermodal centers at Adjamé, and Central/Southern	2,661	168	1	PND		2	AVD	Govt/Intention	1	1	Low Cost	2	Category 1	1	7	
T-4	Water-based Transportation Development																
T-4-1	East - West High Speed Ferry Service (Songon - Grand Bassam)	66,244	4,637	2	PND	MP2000	2	Water transport	Govt/Intention	2	26,000	0	0	Category 3	0	Medium	6
T-4-2	Water Bus - Allécoube to Treichville	45,369	3,176	2	PND	MP2000	2	Water transport	Govt/Intention	2	21,800	0	1	Category 2	0	Low	7
F	Freight Transport Development Plan																
F-1	Railway Transport Services																
F-1-1	Developing Direct Container Freight Loading & Unloading System	24,805	1,984	0		1	Port Related		1	1		West Africa	2	Category 1	1	5	
F-1-2	New Freight Railway Connecting to Western Part of Abidjan Port	192,395	15,386	1		MP2000	1	Port Related		1	1		West Africa	0	Category 4	1	4
F-2	Truck Transport Services																
F-2-1	Metropolitan Logistic Center Development	25,954	1,945	1	PND		2	Truck routes	Govt/Intention	1	1		West Africa	2	Category 1	1	7
O	Organizational and Institutional Arrangements																
O-1	Establishment of Agency/Commission																
O-1-1	Establishment of Road Projects Implementation Commission	897	63	0		0		1	1	Low Cost	2	Category 1	1	4			
O-1-2	Establishment of ITS Cole d'Ivoire	666	47	0		0		1	1	Low Cost	2	Category 1	1	4			
O-1-3	Establishment of Clearing House Organization	419	29	0		0		1	1	Low Cost	2	Category 1	1	4			
O-1-4	Development of Transport Planning Centre of Excellence	916	64	0		0		1	1	Low Cost	2	Category 1	1	4			
O-2	Public Transport Services																
O-2-1	Reorganization of SOTRA Bus Services	1,174	82	0		1	Bus transport		1	1	Low Cost	2	Category 1	1	5		

Source: JICA Study Team

3.9.4 Priority Projects

Through the above-mentioned scoring method based on those criteria, projects that scored 6 or more have been selected as priority projects. As a result, 51 projects (excluding those that are already under construction) have been selected and presented as a short list in Table 3.13.

These priority projects are to be noted as projects that should be urgently undertaken with special, strategic attention. The total amount of investment for the short-listed projects is estimated at around 4.8 trillion FCFA or 7.4 billion Euros, accounting for about 54% of the total amount of the projects to be implemented by 2030 in the SDUGA Long List.

Table 3.13 Priority Projects (Short List)

Sector	Code	Project	Executing Schedule			Cost Estimate (Million FCFA)	
			Short -2020	Medium -2025	Long -2030		
Road Development Plan							
	V-1-1	Development of Y4 Ring Road - Songon / Autoroute du Nord Section	■	■		52,607	
	V-1-2	Development of Y4 Ring Road - Autoroute du Nord / Pk18	■			44,842	
	V-1-3	Development of Y4 Ring Road - Pk18 to Abobo Baoulé Section	■			201,356	
	V-1-4	Development of Y4 Ring Road - Abobo Baoulé / François Mitterand Section	■			212,731	
	V-1-5	Development of Y4 Ring Road - François Mitterand / Riviera 6 Section	■			57,703	
	V-1-6	Development of Y4 Ring Road - Desirée Island Bridges Section	■	■		447,505	
	V-1-7	Development of Y4 Ring Road - Aérocity Section	■			8,247	
	V-1-8	Development of Y4 Ring Road - Canal du Vridi Section		■	■	187,148	
	V-1-9	Development of Y4 Ring Road - Jacquerville Section		■	■	96,172	
	V-2-1	Development of BiARN - Bingerville Northern Bypass		■		29,934	
	V-2-2	Development of BiARN - Extension of the Boulevard François Mitterand	■	■		163,284	
	V-2-3	Development of BiARN - Widening of the Route de Bingerville	■			8,777	
	V-3-2	Development of BaARN - Aérocity Area	■			6,780	
	V-3-4	Development of BaARN - Widening of the Route de Bonoua			■	83,787	
	V-4-1	Development of YoARN - Voie V23 - Parkway Section	■			12,559	
	V-4-2	Development of YoARN - Voie V23 - 5th Bridge Section	■			242,588	
	V-4-8	Development of YoARN - Voie V28 - 4th Bridge	■	■		54,739	
	V-4-9	Development of YoARN - Voie V28 - Southern Section		■	■	6,300	
	V-4-10	Development of YoARN - Autoroute de l'Ouest	■			29,962	
	V-4-13	Development of YoARN - Central Road of Boulay Island	■			4,726	
	V-5-5	Development of AbARN - Widening of the Autoroute d'Abobo	■	■		25,355	
	V-6-5	Development of CoARN - Boulevard de France Redressé	■			7,614	
	V-6-6	Development of CoARN - Widening of the Boulevard Latrille	■			14,904	
	V-6-8	Development of CoARN - Widening of the Boulevard de la Corniche	■			7,003	
	V-6-9	Development of CoARN - Widening of the Boulevard Attoban	■			4,415	
	V-6-10	Development of CoARN - Widening of the Boulevard de la 7e Tranche	■	■		6,173	
	V-7-4	Development of CeARN - Vridi Bridge	■			86,626	
	V-7-6	Development of CeARN - Grand-Campement Arterial Road		■		9,885	
	V-7-7	Development of CeARN - Upgrade of Felix Houphouet Boigny Bridge	■			17,384	
	V-8-1	Intersection Improvement - Solibra (Treichville)	■			16,630	
	V-8-2	Intersection Improvement - Mairie d'Abobo (Abobo)	■	■		9,667	
	V-8-5	Intersection Improvement - Siporex (Yopougon)	■			6,894	
	V-8-9	Intersection Improvement - St Jean (Cocody)	■			5,924	
	V-8-11	Intersection Improvement - CHU Treichville (Treichville)	■			4,357	
	V-8-14	Intersection Improvement - Williamsville (Adjame)	■			12,146	
	V-8-15	Intersection Improvement - Carrefour de la Vie (Cocody)	■			9,393	
	V-8-16	Intersection Improvement - Carrefour de L'Ecole Nationale de Police (Cocody)	■	■		13,340	
Traffic Control and Management Plan							
	G-1-1	Development of Area Traffic Control System	■			58,704	
	G-1-2	Development of Public Transport Priority System	■			5,598	
	G-1-3	Development of Urban Traffic Information System	■			1,401	
	G-2-1	Development of Dedicated Bus Lanes	■			9,824	
	G-3-1	Development of Parking Facilities/Parking Information System	■			4,263	
	G-5-1	Development of Overloaded Truck Control System	■			1,912	
	G-5-3	Supporting System for Control of Illegal Parking		■		810	
	G-6-1	Pedestrian Facility Development for Better Environment	■			2,347	
Public Transport Development Plan							
	T-1-1	North-South Rail Project-Stage 1 Anyama to Airport	■	■		753,843	
	T-1-3	East - West Rail Project (Yopougon to Bingerville)	■	■		1,637,963	
	T-3-1	Development/Improvement of Intermodal centers at Adjame, and Central/Southern Plateau	■	■		2,661	
	T-4-1	East - West High Speed Ferry Service (Songon - Grand Bassam)	■			66,244	
	T-4-2	Water Bus - Attecoube to Treichville	■			45,369	
Freight Transport Development Plan							
	F-2-1	Metropolitan Logistic Center Development		■		25,954	
Note: ■ Construction Work						Total	4,826,350
■ Preparation							

Source: JICA Study Team

3.10 Priority Project Packages

Projects with relatively high scores in the Multi-Criteria Analysis, using the six items of evaluation criteria, are grouped into the following nine project packages for further feasibility studies (F/S):

- Development of Water Bus Transport and Enhancement of Intermodality with Road Transport,
- Development of the North-South Transport Corridor,
- Development of the East-West Transport Corridor,
- Development of Various Infrastructures Supporting the Port of Abidjan,
- Development of Roads Serving Newly Developed Area in Cocody,
- Improvement of the Bottleneck Intersections,
- Transportation Control Measures (TCM),
- Operational Support for Bus Transport, and
- Development of Outer Ring Road as part of Abidjan-Lagos Corridor.

These project packages indicate directions for development of the urban transport sector and may help to clarify the relevance among the component projects in each package and hence to select the projects for further F/S. Approximate development schedules for projects under each of the above-mentioned project package are presented in Table 3.14.

Table 3.14 Priority Project Packages

Proposed Projects		Short-term					Mid-term					Long-term				
		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
1	Development of Water Bus Transport and Enhancement of Intermodality with Road Transport															
	T-4-2 Water Bus - Attecoube to Treichville															
	T-4-1 East - West High Speed Ferry Service (Songon - Grand Bassam)															
	V-3-2 Development of BaARN - Aérocity Area															
	V-7-6 Development of CeARN - Grand-Campement Arterial Road															
2	Development of on the North-South Transport Corridor															
	V-7-7 Development of CeARN - Upgrade of Felix Houphouet Boigny Bridge															
	T-1-1 North-South Rail Project-Stage 1 Anyama to Airport															
	V-5-5 Development of AbARN - Widening of the Autoroute d'Abobo															
3	Development of on the East-West Transport Corridor															
	V-4-1 Development of YoARN - Voie V23 - Parkway Section															
	V-6-5 Development of CoARN - Boulevard de France Redresse															
	V-6-8 Development of CoARN - Widening of the Boulevard de la Corniche															
	V-2-3 Development of BiARN - Widening of the Route de Bingerville															
	V-4-2 Development of YoARN - Voie V23 - 5th Bridge Section															
	V-2-2 Development of BiARN - Extension of the Boulevard François Mitterand															
	T-1-3 East - West Rail Project (Yopougon to Bingerville)															
	V-3-4 Development of BaARN - Widening of the Route de Bonoua															
4	Development of Various Infrastructures Supporting the Port of Abidjan															
	F-2-1 Metropolitan Logistic Center Development															
	V-7-4 Development of CeARN - Vridi Bridge															
	V-4-8 Development of YoARN - Voie V28 - 4th Bridge															
	V-4-13 Development of YoARN - Central Road of Boulay Island															
	V-4-9 Development of YoARN - Voie V28 - Southern Section															
5	Development of Roads Serving Newly Developed Area in Cocody															
	V-6-6 Development of CoARN - Widening of the Boulevard Latrille															
	V-6-9 Development of CoARN - Widening of the Boulevard Altoban															
	V-6-10 Development of CoARN - Widening of the Boulevard de la 7e Tranche															
6	Improvement of the Bottleneck Intersections															
	V-8-1 Intersection Improvement - Solibra (Treichville)															
	V-8-5 Intersection Improvement - Siporex (Yopougon)															
	V-8-9 Intersection Improvement - St Jean (Cocody)															
	V-8-11 Intersection Improvement - CHU Treichville (Treichville)															
	V-8-14 Intersection Improvement - Williamsville (Adjamé)															
	V-8-15 Intersection Improvement - Carrefour de la Vie (Cocody)															
	V-8-2 Intersection Improvement - Mairie d'Abobo (Abobo)															
	V-8-16 Intersection Improvement - Carrefour de L'Ecole Nationale de Police (Cocody)															
7	Transportation Control Measures (TCM)															
	G-1-1 Development of Area Traffic Control System															
	G-1-3 Development of Urban Traffic Information System															
	G-6-1 Pedestrian Facility Development for Better Environment															
	G-5-1 Development of Overloaded Truck Control System															
	G-3-1 Development of Parking Facilities/Parking Information System															
	G-5-3 Supporting System for Control of Illegal Parking															
8	Operational Support for Bus Transport															
	G-2-1 Development of Dedicated Bus Lanes															
	G-1-2 Development of Public Transport Priority System															
	T-3-1 Development/Improvement of Intermodal centers at Adjame, and Central/Southern Plateau															
9	Development of Outer Ring Road as part of Abidjan-Lagos Corridor															
	V-1-7 Development of Y4 Ring Road - Aérocity Section															
	V-1-5 Development of Y4 Ring Road - François Mitterand / Riviera 6 Section															
	V-1-4 Development of Y4 Ring Road - Abobo Baoulé / François Mitterand Section															
	V-1-3 Development of Y4 Ring Road - Pk18 to Abobo Baoulé Section															
	V-1-6 Development of Y4 Ring Road - Desirée Island Bridges Section															
	V-4-10 Development of YoARN - Autoroute de l'Ouest															
	V-1-2 Development of Y4 Ring Road - Autoroute du Nord / Pk18															
	V-1-1 Development of Y4 Ring Road - Songon / Autoroute du Nord Section															
	V-2-1 Development of BiARN - Bingerville Northern Bypass															
	V-1-8 Development of Y4 Ring Road - Canal du Vridi Section															
	V-1-9 Development of Y4 Ring Road - Jacquville Section															

Source: JICA Study Team

3.11 High Priority Projects for Further Studies

For the final selection of project(s) for the F/S, the following three conditions have been considered for the projects on the short list:

- Whether the project has been relatively highly prioritized as a result of the multi-criteria analysis, namely with a high score of 7 points or more;
- Whether the project is represented as the main target of the project package discussed in the previous section and thus likely to fulfill the theme of the package; and
- Whether the project is a lead project in the project package with an implementation period (including survey, design, expropriation, and construction) actually scheduled to start immediately, that is, from 2015 or 2016 at the latest.

The answers to the above could be clearly determined, and priority projects that meet each condition are checked in the corresponding column, as shown in Table 3.15. Thus, 16 priority projects that have cleared all these three conditions are listed as high-priority projects as follows:

- V-1-5: Development of Y4 Ring Road - François Mitterrand / Riviera 6 Section,
- V-1-6: Development of Y4 Ring Road - Desirée Island Bridges Section,
- V-1-7: Development of Y4 Ring Road - Aérocity Section,
- V-6-5: Development of CoARN - Boulevard de France Redressé,
- V-6-6: Development of CoARN - Widening of the Boulevard Latrille,
- V-7-4: Development of CeARN - Vridi Bridge,
- V-7-7: Development of CeARN - Upgrade of Felix Houphouet Boigny Bridge,
- V-8-1: Intersection Improvement - Solibra (Treichville),
- V-8-5: Intersection Improvement - Siporex (Yopougon),
- V-8-9: Intersection Improvement - St Jean (Cocody),
- V-8-11: Intersection Improvement - CHU Treichville (Treichville),
- V-8-14: Intersection Improvement - Williamsville (Adjamé),
- G-2-1: Development of Dedicated Bus Lanes,
- G-3-1: Development of Parking Facilities/Parking Information System,
- T-4-2: Water Bus - Attecoube to Treichville, and
- F-2-1: Metropolitan Logistic Center Development.

The above 16 projects have been identified as the most urgent projects to be subjected to feasibility studies. They are basically independent unless they are from the same project package. On the other hand, at least one project has been selected as a high-priority project from each project package; hence, selection of a project for further studies out of those high-priority projects will depend on toward which development direction (i.e., goal of project package) the government of Cote d'Ivoire is seeking the most as the first step.

Table 3.15 Selection of High-Priority Projects in SDUGA

Proposed Projects		Total Cost (million FCFA)	Relatively High Score (7 or more)	Main Target of Package	Lead Project of Package
1	Development of Water Bus Transport and Enhancement of Intermodality with Road Transport	128,278			
	T-4-2 Water Bus - Attecoube to Treichville	45,369	+	+	+
	T-4-1 East - West High Speed Ferry Service (Songon - Grand Bassam)	66,244		+	+
	V-3-2 Development of BaARN - Aérocity Area	6,780			+
	V-7-6 Development of CeARN - Grand-Campement Arterial Road	9,885			
2	Development of on the North-South Transport Corridor	796,581			
	V-7-7 Development of CeARN - Upgrade of Felix Houphouet Boigny Bridge	17,384	+	+	+
	T-1-1 North-South Rail Project-Stage 1 Anyama to Airport	753,843		+	
	V-5-5 Development of AbARN - Widening of the Autoroute d'Abobo	25,355		+	
3	Development of on the East-West Transport Corridor	2,163,574			
	V-4-1 Development of YoARN - Voie V23 - Parkway Section	12,559		+	+
	V-6-5 Development of CoARN - Boulevard de France Redressé	7,614	+	+	+
	V-6-8 Development of CoARN - Widening of the Boulevard de la Corniche	7,003	+	+	
	V-2-3 Development of BiARN - Widening of the Route de Bingerville	8,777	+	+	
	V-4-2 Development of YoARN - Voie V23 - 5th Bridge Section	242,588		+	
	V-2-2 Development of BiARN - Extension of the Boulevard François Mitterand	163,284	+		
	T-1-3 East - West Rail Project (Yopougon to Bingerville)	1,637,963		+	
	V-3-4 Development of BaARN - Widening of the Route de Bonoua	83,787			
4	Development of Various Infrastructures Supporting the Port of Abidjan	178,344			
	F-2-1 Metropolitan Logistic Center Development	25,954	+	+	+
	V-7-4 Development of CeARN - Vridi Bridge	86,626	+	+	+
	V-4-8 Development of YoARN - Voie V28 - 4th Bridge	54,739	+	+	
	V-4-13 Development of YoARN - Central Road of Boulay Island	4,726		+	
	V-4-9 Development of YoARN - Voie V28 - Southern Section	6,300			
5	Development of Roads Serving Newly Developed Area in Cocody	25,492			
	V-6-6 Development of CoARN - Widening of the Boulevard Latrille	14,904	+	+	+
	V-6-9 Development of CoARN - Widening of the Boulevard Altoban	4,415		+	
	V-6-10 Development of CoARN - Widening of the Boulevard de la 7e Tranche	6,173		+	
6	Improvement of the Bottleneck Intersections	78,351			
	V-8-1 Intersection Improvement - Solibra (Treichville)	16,630	+	+	+
	V-8-5 Intersection Improvement - Siporex (Yopougon)	6,894	+	+	+
	V-8-9 Intersection Improvement - St Jean (Cocody)	5,924	+	+	+
	V-8-11 Intersection Improvement - CHU Treichville (Treichville)	4,357	+	+	+
	V-8-14 Intersection Improvement - Williamsville (Adjame)	12,146	+	+	+
	V-8-15 Intersection Improvement - Carrefour de la Vie (Cocody)	9,393	+	+	
	V-8-2 Intersection Improvement - Mairie d'Abobo (Abobo)	9,667	+	+	
	V-8-16 Intersection Improvement - Carrefour de L'Ecole Nationale de Police (Cocody)	13,340	+	+	
7	Transportation Control Measures (TCM)	69,437			
	G-1-1 Development of Area Traffic Control System	58,704		+	+
	G-1-3 Development of Urban Traffic Information System	1,401		+	+
	G-6-1 Pedestrian Facility Development for Better Environment	2,347			+
	G-5-1 Development of Overloaded Truck Control System	1,912	+		+
	G-3-1 Development of Parking Facilities/Parking Information System	4,263	+	+	+
	G-5-3 Supporting System for Control of Illegal Parking	810			
8	Operational Support for Bus Transport	18,083			
	G-2-1 Development of Dedicated Bus Lanes	9,824	+	+	+
	G-1-2 Development of Public Transport Priority System	5,598		+	
	T-3-1 Development/Improvement of Intermodal centers at Adjame, and Central/Southern Plateau	2,661	+	+	
9	Development of Outer Ring Road as part of Abidjan-Lagos Corridor	1,368,208			
	V-1-7 Development of Y4 Ring Road - Aérocity Section	8,247	+	+	+
	V-1-5 Development of Y4 Ring Road - François Mitterand / Riviera 6 Section	57,703	+	+	+
	V-1-4 Development of Y4 Ring Road - Abobo Baoulé / François Mitterand Section	212,731		+	+
	V-1-3 Development of Y4 Ring Road - Pk18 to Abobo Baoulé Section	201,356		+	+
	V-1-6 Development of Y4 Ring Road - Desirée Island Bridges Section	447,505	+	+	+
	V-4-10 Development of YoARN - Autoroute de l'Ouest	29,962			
	V-1-2 Development of Y4 Ring Road - Autoroute du Nord / Pk18	44,842	+	+	
	V-1-1 Development of Y4 Ring Road - Songon / Autoroute du Nord Section	52,607	+	+	
	V-2-1 Development of BiARN - Bingerville Northern Bypass	29,934	+		
	V-1-8 Development of Y4 Ring Road - Canal du Vridi Section	187,148		+	
	V-1-9 Development of Y4 Ring Road - Jacquerville Section	96,172		+	

Source: JICA Study Team

3.12 Implementation Program

3.12.1 Master Plan Costs

The preliminary cost of the Master Plan for the urban transport sector has been estimated taking into account the above-mentioned implementation schedule of the proposed projects. Fund requirements for the Master Plan are summarized, including capital investment costs and operation and maintenance costs during the period from 2015 to 2030. An amount of 12.9 trillion FCFA is required for the period between 2015 and 2030 in market prices of July 2014 including inflation, of which 8.9 trillion FCFA and 4.0 trillion FCFA are required for the investment and for the operation and maintenance, respectively. The public transport development including the urban rail development has the highest cost amounting to 6.5 trillion FCFA, or 50% of the total cost. The road development requires 5.8 trillion FCFA. Road and public transport developments including traffic control and management account for 97% of the total cost.

From the viewpoint of the timing of cost distribution, 23%, 45% and 32% of the total cost need to be allocated in the short-term period until 2020, the medium-term period (2021-2025) and the long-term period (2026-2030), respectively.

The share of the Master Plan cost accounts for 5.3% of the GRDP of the Greater Abidjan⁷ throughout the period from 2015 to 2030. The cumulative GRDP is estimated at 246 trillion FCFA at 2014 constant prices for the period from 2015 to 2030 based on the socioeconomic framework assumed in this Study.

3.12.2 Funding Allocation

Taking into consideration the private sector involvement, the funding allocation for the Master Plan is estimated by the public/private sectors. Total Master Plan cost amounts to 12.9 trillion FCFA, of which 6.6 trillion FCFA, or 51% of the total cost, could be reduced from the total cost burden with the introduction of private initiative development. Consequently, the funding requirements of the public sector for the implementation of the Master Plan are estimated at 6.3 trillion FCFA at 2014 market prices including inflation for the period 2015-2030. Among others, the funding requirements of the central government for the Master Plan are estimated at 6.2 trillion FCFA, or 48% of the total cost.

3.13 Recommendations

3.13.1 General

The Study team received comments on the contents of the Draft Final report from the CI side, and the Study team tried to reflect all the comments in the Final Report. While some of the comments have been fully accommodated to the report, other comments correspond to further studies such as master plan studies in other sectors, PUD/PUd by each commune, F/S, and so on. Thus, as part of the responses to the comments from the CI side, this chapter describes several pending issues as recommendations.

As a general issue for formulation of the transport master plan of SDUGA, while the current laws and regulations in the urban transport sector were reviewed, further improvements on the present situation of

⁷ Source: National Institute of Statistics

the laws and regulations were not proposed as part of SDUGA. Among others, laws and regulations on the following aspects were not discussed:

- Planning, construction, management, and operation including concession agreements for the urban transport facilities;
- Implementation of the projects for specific transport modes including Gbaka, Woro-Woro, and meter taxis; and
- Control of traffic for the improvement of safety and mitigation of air pollution and noise.

Thus, the Study team recommends another study to cover these issues and propose relevant laws and regulations in order to clear the concerns for realization and to proceed with the implementation of SDUGA urban transport master plan.

3.13.2 Road and Logistic Planning

3.13.2.1 Additional Road Projects

As for the additional road projects of which alignments were given to the Study team in the course of finalizing the SDUGA urban transport master plan, only those which the CI side clearly insisted (i.e., V-9-1 to V-9-5) have been incorporated into the master plan without studying the details. While the Study team did their best to make a fair evaluation and prioritization on all the projects, those additional projects are still subject to further technical studies to determine the road class, the number of lanes, cross sections, alignments, intersection types, and so on. Among others, the following projects have revealed peculiar issues as below:

- The alignments of V-9-1 and V-9-2 have very rough, rolling terrains in a mountainous area, thereby causing large earth fills and cuts, which will be about 20 meters high, or many bridges. V-9-1 seems particularly unrealistic without seriously looking into the topography;
- V-9-3 is planned to connect to the road in front of the cathedral, that is, to the short section between the interchange and the junction. Drastic change in the existing road structure may be necessary in terms of the traffic flow; and
- V-9-4 is also planned to connect close to the existing interchange, the structure of which also may need to be changed to another type including bridge ramps. Furthermore, the road structure planned on a thalweg (Gobeles valley) may technically induce a higher construction cost.

The above issues need to be solved before fully adopting those additional projects into the urban transport master plan including roads and public transport.

3.13.2.2 Freight Rail and Port Development

In the urban transport master plan, introduction of a new freight railway (F-1-2) has been proposed. This project aims at not only supporting the new development of the western part of Abidjan Port but also connecting port freight with inland industrial zones such as Yopougon and integrating it with the metropolitan logistic center in Anyama. Thus, it has been scheduled for the medium term in accordance with this new port development. However, there is uncertainty about the implementation deadline for the port's extension on Boulay Island. Furthermore, the main relevant markets for the freight rail transport such as container terminals, refineries, and cement factories are likely to remain in the existing port area in Treichville and Port Bouët.

On the other hand, the development of ore export could lead to the saturation of not only the existing ore terminal but also the new terminal planned in the short term and designed to export a few million tons of ore a year. Thus, it will be necessary to create a new ore terminal on Boulay Island, which is designed to export tens of millions of tons of ore per year, requiring an efficient railway and a terminal, which will constitute a core asset for the development of the mining sector in Côte d'Ivoire, as well as a bulk terminal, which could also be used to import clinker, particularly for CIMAF (Ciments de l'Afrique), a cement factory in Yopougon.

While the above-mentioned future perspectives are not certain yet, the Study team recommends conducting another study on the port development master plan and having it formulated and authorized first of all. The Study team then recommends a further study, possibly a feasibility study, on this new freight rail project including discussions on these issues with all the relevant agencies when reviewing SDUGA at a later stage. Then it will become necessary to take precautions for reserving some land for this new freight railway.

3.13.3 Public Transport Planning

3.13.3.1 High-Capacity Corridors

In the transport master plan of SDUGA, all the high-capacity transit corridors have been proposed. Some corridors have been nearly finalized in terms of the route or alignment selection before the completion of the F/S. Meanwhile, other corridors have no definite route or alignment along with the location of the stations yet. While the transport master plan indicated the details of each high-capacity transit corridor for project profiling including cost and demand as well as for project prioritization, more precise routes or alignment selection along with location of the stations should be further studied and determined in the subsequent F/S.

Among others, regarding the second phase of the Blue Line (T-1-2), which includes an extension from the airport to Grand Bassam, the Study team proposed an intermediate axis between the northern coast and the Abidjan – Bassam Highway with further nine stations. However, an F/S or a further study should be carried out soon as part of the study on the Detailed Urban Master Plan (PUD) of the area of Port-Bouët – Grand Bassam to compare several routing options. The route and stations serving Grand Bassam including VITIB (Village of Information Technology and Biotechnology) and downtown should be specified. Attention should also be paid to the issue of coastal erosion on the section of the airport – Gonzagueville, where the extended Blue Line and the highway are very close to the sea and hence some protection works need to be planned in the study.

3.13.3.2 Water-Based Transport

In the transport master plan, two water-based transport development projects were proposed: namely, water bus transport serving north-south of Plateau (T-4-2), which has been designated as a priority project, and an east-west high speed ferry service (T-4-1). Since preliminary investigations on the physical characteristics of the locations of lagoon stations or piers suggest that there are no engineering problems, these projects may be promptly implemented at a relatively lower cost. Thus, both projects have been scheduled for the short term.

On the other hand, there will be many existing and planned bridges crossing the lagoon axes: namely, Jacquville Bridge, the Fourth (or Boulay Island) Bridge, Felix Houphouët Boigny Bridge, General de Gaulle Bridge, the Third (Henri Konan Bédié) Bridge, Desirée Island Bridge, etc. on the east-west

lagoon axis, and the Fifth Bridge on the north-south lagoon axis. Thus, for the actual implementation of the water bus development projects, clearance under those bridges must be taken into account to ensure the navigation on these lagoon axes. The Study team recommends studying these issues in the subsequent F/S, for example, leaving the possibility of revising the urban transport master plan in terms of the bridge design.

While only two water-based transport projects have been proposed in the transport master plan, the Government of CI is also interested in developing water-based transport across Koumassi Dyke; however, a significant hydraulic structure would be required, allowing the navigation of water buses between the two lagoons. Furthermore, development plans of the Autonomous Port of Abidjan (PAA) should also be taken into account to meet the compatibility with the regulation of navigation in the port area. For example, between the Container Terminals (1 or 2) and Azito (north bank of the Fourth bridge), PAA plans a transport system of several shuttle boats carrying heavy weights or barges carrying containers per day per direction, with a possibility of developing a custom area or a “dry port” in Azito or at Yopougon logistic center (PK 24), which is favorably viewed by the General Directorate of Customs. Due consideration must be paid in order to avoid the conflict in the navigation between the passenger and freight transport services on the lagoon.

Hence, the Study team recommends conducting a comprehensive study on the water-based transport that will cover all the above issues with a view to formulating a master plan in the water-based transport sector. The lagoon service scheme that is being studied by BNETD may be in the same direction toward this recommendation. Meanwhile, it is also necessary to conduct another study on the port development master plan and to have it formulated and authorized, as mentioned earlier.

3.13.3.3 Bus Transport

Regarding the conventional bus services, SOTRA’s bus network is expected to focus on the line-haul type bus lines that will support the operations of the high-capacity transit corridors through the multiplier effect rather than to compete with each other; thus, it will continue to play an important role in the urban public transport in Abidjan. Though a clear picture of restructuring SOTRA’s future bus network, including locations of the depots, was not presented in SDUGA, several dedicated bus lanes were proposed on the roads with available ROW as well as with frequent bus services to form a more continuous network. Based on the urban transport master plan, SOTRA is making its own action plan to implement the proposals. SOTRA will establish the vision of its development in accordance with SDUGA, namely, as the “Plan SOTRA 2030,” which could be formulated by itself or by another institute of technical studies. SOTRA is also looking into a possibility of operating the feeder minibuses to enhance the usage of the high-capacity transit corridors.

Furthermore, during the period of 1985-1990, SOTRA had a fleet of 1,200 buses which served about 40% of the total motorized trips. As such, SOTRA envisages increasing its fleet from 500 (operational) buses in 2014 to 700 in 2015, 2,000 in 2020, and 3,000 in 2030. Meanwhile, the necessary number of buses presented earlier in Section 5.3.3 of Part 6 of this report is only an indicative figure based on the travel demand forecast model. Thus, as for the detailed improvement plans of the bus transport including all of the above issues, the Study team recommends conducting another master plan study for improving the road-based public transport system including feeder minibuses, BRT, and BHLS based on SDUGA.

Japan International Cooperation Agency (JICA)
Ministry of Construction, Housing, Sanitation and Urban Development (MCLAU)

The Project for the Development of
the Urban Master Plan in Greater Abidjan
in the Republic of Côte d'Ivoire (SDUGA)

Final Report

March 2015

Volume I –Introduction and Summary

Appendices

Appendix A

(12 pages)

Responses of JICA Study Team to “Summary of
Recommendations and Comments / Validation of the
SDUGA” Prepared by CI’s Working Group

RESPONSES OF JICA STUDY TEAM TO "SUMMARY OF RECOMMENDATIONS AND COMMENTS / VALIDATION OF THE SDUGA" PREPARED BY CI'S WORKING GROUP

A. SDUGA/ Urban Planning

NO	DISCUSSION POINTS	RECOMMENDATIONS	OBSERVATIONS	JICA STUDY TEAM RESPONSES
1	<p>Demographic growth forecast At the start of the study, recent demographic data were not available. The JICA project team requested them from the INS. The 2014 RGPH took place 15 months after the start of SDUGA studies. A significant difference is found between the demographic data obtained before the 2014 RGPH and those of the 2014 RGPH.</p>	<p>Take into account the results of 2014 RGPH: <u>Process of consideration of the 2014 RGPH results:</u> • Step 1 by an expert (evaluation of the impact of the new data on the findings of SDUGA and ETDS: conclusions are not impacted, conclusions are somewhat impacted, conclusions are heavily impacted and require an update of figures & analyses) • 2nd full update of parts of studies requiring an update.</p>	<p>Demographic data from the 2014 RGPH are provided to the project team that started the analyses; the JICA project team will provide the results of these analyses in January 2015.</p>	<p>The demographic data of the 2014 RGPH (Population Census) was made available in January 2015 for Greater Abidjan area in such a detail as population by commune/sub-prefecture. Accordingly, the population estimated for the year 2013 in the Draft Final Report was replaced with the 2014 Census result. The Socio-Economic Framework analysis presented in Chapter 2 of Volume II (Urban Master Plan for GA) of Draft Final Report was fully reviewed and updated, based on the 2014 Census results. Since the 2014 census data other than the population by commune/sub-prefecture of GA have not become available to date, such data as household numbers and employment by industrial sector were derived from the sampled Home Interview Survey, which was conducted by JST in 2013. It is recommended, therefore, to review again the Socio-Economic Framework, after the analysis of the 2014 Census data is completed by INS. This review work should be undertaken together with the review of SDUGA in 3~5 years later.</p>
2	<p>Proposed optimised spatial growth scenario (Scenario 7) This scenario calls for the isolated development of satellite towns (Jacqueville, Dabou Azaguié, Alépé and Bonoua) and promotes densification of intramural Abidjan to make it compact.</p>	<p>The JICA project team will have to indicate which public investment policy to put in place for this scenario and state the incentives for private investment. It will have to indicate how to slow the development of the transition zones between the compact urban areas and satellite cities: which settlements to allow and which to prohibit.</p>		<p>[Public investment policy] JST indicated a public investment policy of the urban transport sector, but has to leave the creation of those other sectors to the respective sectors. [Incentives for private investment] JST recommends phased development strategies on land use in the future, and which eventually should be a basis to guide and/or stimulate the incentive of the private sector to invest as planned in the land development in the future. JST will recommend in the "Recommendations" of the Final Report that land use zoning should be proposed when preparing PUD, and the planning requirements should be definitely laid down in each land use zone as a statutory framework. Additionally, it will be mentioned that the location of industrial zones should be considered combined with designation of free-trade zones according to the investment law in order to promote investment into industrial zones. [How to slow the development of the transition zones] The following are needed to keep the protected land use between the compact urban areas and satellite cities: - Actual boundaries of the protected lands have to be determined in the studies of PUD, respecting the rough drawings in the land use framework plans. - Development regulations in the protected lands have to be set after discussions with all the relevant stakeholders.</p>
3	<p>Urban expansion area between Port-Bouet and Grand-Bassam This area is experiencing strong real estate pressure. Additionally, there are planned road infrastructures which impose a new structure. The area includes two parts: the part between the Abidjan-Bassam road and the sea and the part going from the Abidjan-Bassam road to the Ebrié lagoon (mainland). <u>The many advantages of the area:</u> • Located near the airport and the employment areas of southern Abidjan • Good road access (depending on the status of highway or urban expressway which will eventually be given to the highway currently under construction), future accessibility by the #1 Urban Train of Abidjan Anyama - Port-Bouet to be extended up to Grand-Bassam,</p>	<p>A detailed plan should be developed urgently to enable the control of the development of this area.</p>		<p>JST will state that in the "Recommendations" of the Final Report. As recommended by CI side, the area between Port-Bouet and Grand Bassam, where the development pressure is increasing, should be provided with PUD as soon as possible. This is to be stated in the Final Report.</p>

NO	DISCUSSION POINTS	RECOMMENDATIONS	OBSERVATIONS	JICA STUDY TEAM RESPONSES
	<ul style="list-style-type: none"> • good constructability (upon infill of the low-lying central areas) • Outstanding quality of the landscape on the edge of the lagoon (many coves and capes are still preserved, topographic relief) • opportunity to develop multi-purpose channels (drainage, navigation, landscape); <p><u>possible urban functions:</u></p> <ul style="list-style-type: none"> • preservation of natural areas of any value (to be identified) and landscapes bordering the lagoon • Recreation (public park, sports) • tourism (business hotel and luxury holidays) • university (American-type university town, probably more attractive on such a site than on the site of Adjaké mentioned), research and study centres • various tertiary activities (usually no industries) • high- and medium-class housing, low-income housing (on either side of the extended #1 Urban Train of Abidjan) <p><u>Road services:</u></p> <p>Many decisions remain to be taken: status of the highway Abidjan - Grand Bassam (highway or expressway, free or with a -temporary?-toll; exchangers: density, levelled or stacked, side road)</p> <p>Need (in addition to the rehabilitated coastal road)/priority of a second north structuring road (between the North of the Airport and the VITIB), functional and spatial complementarities between the 3 axes.</p> <p><u>Servicing of the #1 Urban Train of Abidjan:</u></p> <p>The choice of its route (and the right-of-way to reserve for future implementation) should be made soon: along the highway, along the second structuring road to the north, or a third independent route.</p>			
4	<p>Enhancement Strategy Boulay Island</p> <p>The SDUGA plans to split the island in two: one part assigned to the Autonomous Port of Abidjan (PAA) and the other to residences and various occupations.</p> <p>During the discussions, three major ideas emerged:</p> <ul style="list-style-type: none"> • Book the whole island for the future extension of the PAA: <p>This is the position of the Port Authority. It supports its request by a presentation of the land situation of the Port which has lost its tax base on the side of Yopougon and the fact that the Port will have no other spaces for its future expansion.</p> <p>A letter was written to the Minister in charge of urban planning to reiterate their request;</p> <ul style="list-style-type: none"> • allocate part of the island to the PAA and the rest of the island to other uses (this is the option of SDUGA) • keep the insular nature of the island without immediate occupations (Moroccan proposal). 	<p>➤ A detailed urban plan should be developed and shared by all stakeholders, organising the optimal land use mix (PAA extension, associated logistics and industrial zone, free zone, conventional urban planning, recreation areas, ...), knowing that the idea of keeping the insular nature of the island (idea the Moroccan team) is not compatible with, at its eastern end, the presence of the most favourable site for the extension of the PAA and knowing that the PAA recently requested that the entire island be reserved for its development,</p> <p>➤ It will be necessary to:</p> <ul style="list-style-type: none"> • Have the necessary studies and funding at the beginning of the development: the bridge over the lagoon (4th bridge) and the associated urban channel in Yopougon, but also the structuring roads and the various networks (water, electricity, telecommunications, ...) on the island. The entry price is not limited to the cost of the fourth bridge; the hidden costs should be expressed and the corresponding funding should be mobilised before the first development expenses can be reliably engaged, • Develop a system ensuring the effectiveness of the control of the land (and thus avoid unplanned occupation). The best way to control land use is likely in the short term to defer the realisation of access routes to the island until the large operators are ready to implant their activities there, • Probably wait for an important "trigger," such as the effective extension of the PAA to the east of the island (the horizon where it is needed and funded) or the actual 	<p>The Ministers' Council of November 19th, 2014 adopted a decree ratifying the loan agreement for the construction of the bridge Boulay Island-Yopougon</p> <p>The participants unanimously emphasised the risks of uncontrolled development of the island if the bridge is built without meeting the conditions of consistent development.</p> <p>It should be noted that there are still preserved mangrove areas to the west of the island, whose destruction would be environmentally damaging and would also expose us to strong international criticism: a quantitative and qualitative diagnosis of these mangroves should be quickly realised and protective measures adapted to the retained plan of general development of the island should be adopted.</p>	<p>Similar to comment No.21, JST will recommend discussing with all the relevant stakeholders and determining the future land use plan of Boulay Island which takes into account preserving mangrove areas, after PAA indicates the port extension plan and its justifications. It is considered urgent, since the construction fund for the 4th Bridge was already approved by the Government, to prepare the PUD of Commune Yopougon in collaboration with such stakeholders as PAA, and to finalise the future land use plan of the Island.</p>

NO	DISCUSSION POINTS	RECOMMENDATIONS	OBSERVATIONS	JICA STUDY TEAM RESPONSES
		installation of some large traders that would specifically need to implant their activities there.		
5	<p>Development of Cocody Bay The SDUGA does not contain any proposal on the development of Cocody Bay. However, two projects were discussed:</p> <ul style="list-style-type: none"> ✓ One, presented to the Government and supported by a committee of specific control. Reminders of the various components of the project: <ul style="list-style-type: none"> • Development of the Gourou watershed upstream of the Indénié Crossing, to prevent flooding of the crossing and massive inflows of solid materials in the Bay of Cocody, a key to allow for the lasting success of downstream projects • drainage and development of the Indénié Crossing, • development of the northern part (and the northeastern part?) of Cocody Bay created by filling the lagoon, to develop public facilities (such as an exhibition centre?) and/or a public park, • dredging of the southern part of Cocody Bay to facilitate the evacuation of Guru Basin waters and restore its inland lagoon character (and possibly creating a marina) • a road link between the Boulevard de la Cathédrale in the Plateau and the Boulevard de France in Cocody, necessary exchangers on either side of Cocody Bay and the viaduct crossing, • works and measures to ensure the gradual pollution clean-up of the Ebrié lagoon (including the 2 or 3 additional openings to the sea) ✓ The other, with two variants, presented by Architect Guillaume Koffi. This development project, which is equally as interesting, does not have any support from the authorities. 	The JICA project team shall review the consistency of this development idea with the SDUGA (land use) and the SDTU (link between the Boulevard de la Cathédrale and the Boulevard de France);	The project has already been presented to the Government.	JST will add the link between the Boulevard de la Cathédrale and the Boulevard de France to the future road network. Since the proposed land use on the shore of Cocody Bay (a marina and an urban park) are consistent with the future land use framework plan, the JST will recommend reviewing and accepting the development of Cocody Bay when preparing PUD.
6	<p>Consideration of the proposed transfer of the capital city to Yamoussoukro The question of the transfer of the capital city was raised. The JICA project team said it did not take into account the transfer of the capital city to Yamoussoukro because no information has been obtained on either the effectiveness or the period of this transfer.</p>			This critical issue has to be taken into account at a later stage when an authorised plan of Yamoussoukro is made available in future.
7	<p>Management of urban land (reserves for equipment) The fact is that the reserves for road infrastructure and those for equipment are almost fully occupied by people.</p>	The JICA project team should indicate how to ensure the sustainable enforcement of a right-of-way reserved for future structuring projects.		JST will recommend the necessity to prepare a statutory framework to protect the right-of-way from illegal occupation and also indicate general counter measures in the “Recommendations” of the Final Report.
8	<p>Need for updating planning regulations The existing regulations are no longer respected by people. In addition, they are developed in their majority for over thirty years without review.</p>	A regulatory study should be conducted immediately after the approval in order to adapt the general regulations and specific regulations for each zone, neighbourhood or street, taking into account the changes in the actual applications.		JST will indicate in the “Recommendations” of the Final Report that a regulatory study should be undertaken to effectively control the land development.
9	<p>Audoin Protected Forest The Town and village communities noted that the reserve for the protected forest follows the boundaries of the forest in the colonial period, when part of it was removed from the status of “protected forest.” A working session was organised by the Planning Division on December 3rd, 2014 to clarify this matter. Attendants to the meeting were: representatives of the Planning Division, of the Ministry of Water Resources and Forests, of Jacqueville, and the JICA Project Team. Representatives of the Ministry of Water Resources and Forests</p>	The outline of the Audoin protected forest in SDUGA is correct and should not be changed.	The process for the removal of the protection status has been exposed. People can take steps in the relevant divisions to this effect if they so wish.	Noted.

NO	DISCUSSION POINTS	RECOMMENDATIONS	OBSERVATIONS	JICA STUDY TEAM RESPONSES
	<p>indicated that:</p> <ul style="list-style-type: none"> ✓ The limits of the protected forest shown in SDUGA are correct; ✓ The status of protected forest was never removed. 			
10	<p>Beautification of the City The issue was not addressed in the SDUGA. But during the discussion it was agreed that:</p> <ul style="list-style-type: none"> ✓ The urban image of the metropolitan area has deteriorated; ✓ The entrances to the city are not developed; ✓ The main arteries of the city are covered with precarious occupations and craftsmen; 	<p>The JICA project team will make specific proposals on the issue of the beautification of the city such as:</p> <ul style="list-style-type: none"> • The cleaning of the facades of large buildings along main roads: encourage/require the owners to take action, encourage homogeneity; • Regulations on the installation of billboards; • Construction and maintenance of roads and pavements in a consistent fashion, • The installation of electric poles and street furniture: improve the aesthetics and homogenise (burying power lines or prevent concrete poles in high stakes sectors) 	<p>Guillaume KOFFI volunteered to submit a proposition for the beautification of the city.</p>	<p>The policies associated with the beautification of the city are stated in Part 2, Chapter 7, Section 7.9. The JST will recommend formulating specific measures, based on the policies after the SDUGA study.</p>
11	<p>Development Project Marcory / Biétry / Boulevard de Marseille The City Council presented a very ambitious project to develop their Commune.</p> <ul style="list-style-type: none"> • The project presentation by the City of Marcory on the northern part of the Boulevard de Marseille within the municipality ("The World Stroll") appeared both interesting (for the aspects of redevelopment of banks and of its landscaping components, recreation, restaurants, shops) and potentially self-fundable (thanks to a luxury housing component) • dredging lagoon sand necessary to backfill the bank would simultaneously allow for digging a channel promoting the renewal of the waters of the Biétry lagoon whose quality is highly threatened (and probably deteriorating rapidly from year to year), subject of course to making a significant hydraulic opening to the right of the Kumasi dyke (hence the need for two bridges: VGE boulevard and #1 Urban Train Abidjan) • the project could be a design contest - realisation as a Public Private Partnership on the basis of specifications setting out the general objectives of the project and site constraints but allowing maximum design freedom (the Mayor of Marcory was invited to approach the PPP Committee) • the project could be an example regarding the possibility of lagoon banks redevelopment, • the issue of the southern part of the Boulevard de Marseille is different (private use of the edges of the lagoon is legal and Old): the proposed 2x2-lane boulevard rebuilt along the lagoon presented by BNETD is thus debatable. 	<p>This project shall be better structured and the Municipal Council shall forward it to the JICA project team for further analysis and consideration in the SDUGA if possible</p>	<p>An MIE road project to expand the Boulevard de Marseille occupies the same space as the Marcory project. Arbitration is expected to retain the project to be included in the SDUGA.</p>	<p>JST will recommend that proposed project should be reviewed when preparing PUD in the "Recommendations" of the Final Report.</p>
12	<p>Issue of constructions started and remaining unfinished for a long duration The question is not mentioned in the SDUGA, but it was raised during the discussion:</p> <ul style="list-style-type: none"> • the problem is unanimously considered serious: the city is ugly and there is a major unnecessary capital expenditure, • among the possible solutions: verify the effectiveness of the availability of project funding before issuing building permits, • Problem for private and public investors (building near the Ministry of Interior, building of the Coffee-Cocoa Council building near the Place de la République): such cases of unfinished public buildings should be inventoried and for each of them, a clear choice should be made (completion by the same public client if it has the us and means for it, sale in current conditions, partnership with a 			<p>It is difficult for JST to review the issue and propose fundamental solutions. The local governments have to take into account the issues individually in preparing PUD.</p>

NO	DISCUSSION POINTS	RECOMMENDATIONS	OBSERVATIONS	JICA STUDY TEAM RESPONSES
	private investor with valuation of the public contribution in shares in the capital of the asset management company, ...).			
13	Village VRIDI AKO This village is situated on the coastal strip west of Vridi channel. The 2000 SDU ignored its existence and included it in the PAA extension area. The community submitted to the Minister for Urban Development the question of the survival of their village. A tour led by the Director of Urbanism revealed the existence of this village. It covers discontinuously an area of about 150 ha.	The town shall be maintained at this location. The management plan must enable the densification of this residential area which will eventually ensure the diversity of the port area. A surface area of 200 ha will help in ensuring the natural growth of this village.		JST will change the land use framework 2030 for Urban Unit 7 to omit Vridi Ako village from the PAA extension area.
14	General issues of lagoons • significant handicap (isolation/separation from nearby areas) but great opportunities (lagoon transport, living/leisure environment, image: "pearl of the lagoons")	<ul style="list-style-type: none"> • Need for a policy of development of the banks (publicly accessible areas/private areas, public facilities/individual homes of high standing, ...) • Need for a water quality restoration policy (in relation to the overall project "Development of Cocody Bay," based on the results of the current study ARTELIA on behalf of the Moroccan team) • Creation of a bridge to the right of the Kumasi dyke would improve water renewal in the Biétry Lagoon. 		General development policies associated with lagoons are stated in Chapters 6 & 7 of Part 2. After approval of SDUGA, sufficient discussions with all the relevant agencies based on the results of the current studies are needed in order to set up the concrete and technical policies.
15	National Park of Banco Forest The Sagbé triangle is incorporated into the National Park.	<ul style="list-style-type: none"> • the northern park fence is to be completed quickly (Japanese funding in principle), • #1 Urban Train of Abidjan (in its own site, impassable) will serve as a natural barrier to the east of the park: the issue of access to the corridor of very high voltage lines by CI - Energies and CIE technical teams will need to be addressed (only from the northwest end if possible, in order to avoid having to make a costly crossing of the #1 Urban Train of Abidjan to its southeast end). 		OIPR should get something done so as to conserve the park. The issue of a crossing function over the #1 Urban Train of Abidjan has to be considered in the preliminary design study of #1 Urban Train.
16	South Shore of Aghien lagoon • This unspoilt area shall be protected for two reasons: preserving the water quality of the lagoon (potential reservoir for the drinking water supply of the metropolitan area) and quality of sites, landscapes and (to be evaluated) natural environments, • The question is how best to protect this area: by making it a protected forest, by implanting an activity respecting and enhancing the site (American-type university town mentioned above or other).		The majority of this bank was the subject of several subdivisions and contains many real estate and village projects. The delimitation of the protection zone must take into account these _____ A draft study of the C2D area is ongoing.	Actual boundaries of the protected lands have to be determined in the studies of PUD, respecting the rough drawings in the land use framework plans proposed by JST.
17	Aérocité / Exhibition Centre • Future Aérocité project details to be set based on the latest developments, • Area intended to be served by a scenario of the route of the #1 Urban Train of Abidjan (from a station located in the vicinity of the possible site of the Exhibition Centre) • other sites are possible for the Exhibition Centre (in the northern part of the backfilled Cocody Bay, for example; see above).			For details, coordination between Aérocité and #1 Urban Train of Abidjan is needed.
18	Problems of light industrial areas Pavements and other areas of the public domain are occupied by artisans of all kinds	Consider the fact that most craftsmen need to settle close to their customers; with the exception of a few large light industrial parks concentrated with several dozens of acres, numerous small light industry areas (1 hectare or less) should be preferred.		It is difficult for JST to propose fundamental solutions to the problem. The JST recommends considering land use concepts according to road classification and each cross-section type when updating planning regulations. The JST also recommends examining whether the existing light industrial areas should be left as is or should be relocated to designated tourist areas.

NO	DISCUSSION POINTS	RECOMMENDATIONS	OBSERVATIONS	JICA STUDY TEAM RESPONSES
19	Industrial Zones The SDUGA includes the various industrial areas of the 2000 SDU.	Shift the industrial area to the edge of the Bingerville palm tree plantations on Elokoi road. The site is now overtaken by many developments. In addition, this area will not be developed in the coming years, the PK24 area being the priority.	Arbitration is expected on the location of the industrial area of Jacqueline. Village communities and the town recommended keeping the old site therefore SDUGA projected the area on the access road of the city, anything that will facilitate its accessibility.	[Industrial area of Bingerville] JST will mention it as pending issues in the "Recommendations" of the Final Report. [Industrial area of Jacqueline] JST will mention it as pending issues in the "Recommendations" of the Final Report.

B. SDUGA/SDTU- LARGE STRUCTURING EQUIPMENT

NO	DISCUSSION POINTS	RECOMMENDATIONS	OBSERVATIONS	JICA STUDY TEAM RESPONSES
20	Airport Felix Houphouet Boigny International Airport occupies an area of 3,700 hectares, including 3,400 hectares of dry land and is declared of Public Use (DUP) (Decree No. 2010-189 of 17 June 2010). More than two thirds of the reserve is occupied by people. This illegal occupation seriously threatens the Aérocity project and the extension of the airport in the coming decades. The SDUGA maintains the planned Airport limits. In the debates, two major options emerged: 1. Maintain the airport in its initial boundaries of 3700 ha under the DUP to allow the onsite implementation of the two terminals and two runways as provided in the Aérocity development project proposed by AERIA. In this case, an eviction of a population estimated to around 50,000 people will be required. 2. Limit the airport to its area not occupied by people, change the zoning of the densely occupied part of the airport right-of-way and seek a second site for a second airport in Abidjan		Arbitration is expected. It seems important to consider conducting a study to identify a preferred site in the northern part of the future expansion area of Greater Abidjan.	It is difficult for JST to conduct the arbitration and draw a conclusion in the current SDUGA study. A separate study must be required to examine the revision of the current airport expansion plan or development of a second international airport in Abidjan.
21	Autonomous Port of Abidjan (PAA) In order to maintain the status of the PAA as the "heart and soul" of the Ivorian economy, SDUGA provides for the maintenance of all land reserves previously defined. However, the reserve near Yopougon is occupied due to approved subdivisions. The Port Authority requires a significant real estate area for its future development.	<ul style="list-style-type: none"> • The AAP should develop a long term strategic plan to legitimise its reservation requests (all of Boulay Island); • The port area (Locodjoro) and associated industrial area in the southeast of Yopougon should be kept for the implementation of any economic activities; • A strategy for the rapid purging of customary rights should be defined to help ensure the safeguarding of reserves. 	Arbitration is expected. Which site shall be reserved: the East of Boulay Island, the entire Island, or some other site?	As stated in the previous comment No. 4, JST will recommend in the Final Report discussing the comment issue with all the relevant stakeholders and determining the future land use plan of Boulay Island which take into account preserving the mangrove areas, after PAA indicates the port extension plan and its justifications.
22	Freight and logistics centres (F-2-1): The SDUGA plans for four (04) new freight centres and logistics which are: <ul style="list-style-type: none"> • North Highway: proven relevance; its attractiveness will be increased due to the realisation of the great ring road, • Route d'Adzopé: relevance to be evaluated (smaller hinterland, potential overlap with the previous one, doubtful value of the connection of the cargo centre with the railway line), • Coastal Route: relevance to be evaluated (smaller hinterland, potential overlap with the Northern Highway) • Ghana Road: proven relevance. 	The SDUGA shall retain two additional freight centres and logistics <ul style="list-style-type: none"> • North Highway at PK 24, it shall be consolidated with the Route d'Adzopé and the coastal road; • Route du Ghana shall be brought closer to Abidjan, if possible, at the intersection of the large ring road on the Abidjan - Lagos axis. Land availability shall be checked against existing conditions. 		<ul style="list-style-type: none"> - The proposed logistic centre on the Route d'Adzopé is considered as an important intermodal logistic terminal which will be connected directly to the port expansion area in Boulay Island via the new freight railway. Thus, it cannot be consolidated with the one on Autoroute du Nord. - The logistic centre in Bonoua (on Route du Ghana) is proposed to relocate the existing logistic park in Gonzaqueville toward the suburbs. While its function as customs for the cargos from the port as well as an integrated terminal for the agricultural products in its vicinity should remain in Bonoua, the Study team has added another logistic centre in Grand Bassam (F-2-1) following the request from the Ivorian side (Part 6, Sec.6.4.1 (4)).

NO	DISCUSSION POINTS	RECOMMENDATIONS	OBSERVATIONS	JICA STUDY TEAM RESPONSES
23	<p>Major sports facilities SDUGA kept the existing sports facilities. The CAN 2021 Preparatory Committee and the Ministry in charge of sports have been invited to make a presentation on the facilities projected under this continental sports event. Based on their presentations, there will be two stadiums in Abidjan:</p> <ul style="list-style-type: none"> • Houphouët-Boigny Stadium: could be subject to rehabilitation/extension (from 28,000 to 40,000 seats) including the creation of car parking lots not essential as part of the CAN 2021, required as part of the rehabilitation for the Jeux de la Francophonie (to be confirmed); • Olympic Anyama/Ebimpé Stadium (60,000 seats): favourable site (near the popular towns of Abobo and Yopougon, relatively good accessibility, started based on Chinese funding, serviced by Anyama South Station of the #1 Urban Train of Abidjan (30 minutes of walking to the stadium, shuttle buses will be needed in addition), also serviced by the road Yopougon – Thomas Crossing (towards Agboville and Adzopé) set as a 2 x 2 lanes road (current route to the East of the stadium) or realised as a new route of 2 x 2 lanes (west of the stadium), and • Associated Olympic Village: ambitious project (267 hectares requested) of a longer term, whose future right-of-way to reserve will depend on the implantation of short-term projects (stadium and above-mentioned roads) <p>Other sports facilities have been mentioned namely:</p> <ul style="list-style-type: none"> • Four training stadiums for CAN 2021 (Sports Park, Sol Béni, Stadium of the University of Cocody, Stadium Bingerville) • Other stadiums (Grand-Bassam, Koumassi, Yopougon, to be confirmed) • Basketball Arena (Washington area, to be confirmed). 	The SDUGA shall include these various sports on the urban unit drawings.	The Basketball Arena shall not be localised in the Washington area, as mentioned by the Ministry in charge of Sports, because this space is being developed by the Ministry of Urban Development to receive the headquarters of companies and state institutions. The Basketball Arena may be built in the Olympic Village of Ebimpé.	JST includes the planning site of Olympic Anyama/Ebimpé Stadium on the future land use framework plan for Urban Unit 3. The JST will mention the Associated Olympic Village as pending issues in the “Recommendations” of the Final Report.
24	<p>Anyama Slaughterhouse A slaughterhouse is planned for Anyama and will eventually replace that of Port-Bouët.</p>	The SDUGA should take into account the equipment and include it on the Urban Unit 3 drawings? It will also have to show the connection of this equipment to the line Abidjan - Ouagadougou - Kaya and indicate its impact on existing slaughterhouses.		The new slaughterhouse site in Anyama should be indicated on the Urban Unit 3 drawings. A study of slaughterhouse development is out of the scope of work for SDUGA.
25	<p>Waste Treatment Centres The Ministry of the Environment mentioned solid waste treatment centre projects in the area of the SDUGA. Two private Sanitary Landfills (CET) are planned in Attiékoï (36km on the road to Alépé) and Kossihouen (50km on the North Highway). Public CETs are considered at the 24 PK of the North Highway, on the road to Dabou (Songon) Bingerville and Bonoua.</p>	These sites should be clearly defined and validated by ESIA's so that the SDUGA can take them into account.	Arbitration is expected for the positioning of a CET on 100ha at PK24 in the reserve declared of public use and which covers 940 ha. (possible location and compatibility)	JST will recommend in the “Recommendations” of the Final Report that proposed projects should be reviewed when preparing PUD and taken into account at a later stage when reviewing SDUGA.
26	<p>Great cultural facilities The Ministry for Culture presented the major projects:</p> <ul style="list-style-type: none"> • Museum and National Library: This equipment is threatened by the Voie Triomphale and its current ROW (120m or 70m). The Ministry of Culture requests a reduction of the road to 45m to allow for the maintenance of the equipment at its current location and allow its renovation. • Library of the African Renaissance: site was recently assigned (site of the current Division of Exams and Contests in Plateau), choice of concept to stabilise (the concept of a virtual library of arts and cultures such as developed in the presidential program), • House of African and World Music (private project) 	The SDUGA will have to clarify the ROW of the Voie Triomphale in order to determine if this equipment is to be kept there. The SDUGA will have to place the equipment on the Tête d’Ours near the airport area on the edge of the lagoon and propose an access way.		[Widening of Voie Triomphale] Refer to Comment no.29. [Equipment on the Tête d’Ours] JST will recommend placing it on the PUD drawings.

NO	DISCUSSION POINTS	RECOMMENDATIONS	OBSERVATIONS	JICA STUDY TEAM RESPONSES
27	<p>Cemeteries The SDUGA proposes keeping existing cemeteries and proposes the creation of additional cemeteries in the outskirts of Greater Abidjan.</p>	<p>The SDUGA shall review existing cemeteries (Kumasi, Williamsville, Abobo and Yopougon) and highlight the degree of saturation. This will allow for an assessment of the need for new cemeteries. In addition, the new cemetery site in Bingerville should be moved away from or be isolated from the new industrial zone planned nearby.</p>		<p>JST will mention the need of new cemeteries as pending issues in the “Recommendations” of the Final Report.</p>

C. SDUGA/SDTU - ROAD PROJECTS

NO	DISCUSSION POINTS	RECOMMENDATIONS	OBSERVATIONS	JICA STUDY TEAM RESPONSES
28	<p>Y4 Road (V-1-1 ~ V-1-7): The SDUGA modified the former route (SDU 2000) of this Road in its section from Port-Bouët in Cocody. BNETD was asked to make a comparative study of the two routes. After the presentation of BNETD’s analysis and of the debates that followed, the following options were agreed upon:</p> <ul style="list-style-type: none"> • A mixed option "blue" (in the North) - Kumasi - "red" (in the South), through the Tête d’Ours (to preserve the Tête de Chien and prepare a new access point for the coastal strip Port-Bouët - Grand Bassam), with a reduced cross-section (for the 19,000 vehicles/day announced by Oriconsul), • the "red" option (for Abatta and Ile Désirée) which can be reserved for a more distant future (a diagnosis of the natural environment of Ile Désirée will nevertheless be necessary prior to confirming the feasibility of this option) 	<p>The SDUGA shall propose:</p> <ul style="list-style-type: none"> • A cross-section of this road and the ROW to be provided for all sections of this road; • An interchange method (stacked interchange, uneven interchange). 		<ul style="list-style-type: none"> - A standard cross section in each section and ROW (right-of-way) have been added in the project profile. Further details shall be studied in another study such as the FS (feasibility study) - As a basic rule, not only on the ring road (Y4) but also in general, all the crossroads between primary roads or between primary and secondary roads should be developed as grade separations. This point has been mentioned in the Final Report (Part 6, Sec.3.2.3).
29	<p>Voie Triomphale in Plateau: This road was projected for the first time in the Master Plan developed by the Abidjan SETAP in 1960. Reflecting the will of President Houphouët who wanted a monumental way ... Decree No. 81.394 dated June 10, 1981 to declare the public use of this road and its environment. The wish to complete this road was reaffirmed by a communiqué from the Cabinet on July 19, 1995 ...The communiqué states that the final project starts at the Presidency of the Republic, goes through Plateau and Adjamé, and then reaches the plaza named « of the Provinces » of Abobo over a width of 120 metres, covering an area of 1314 ha. The SDUGA retains this road but to the centre of Adjamé. Opinions on this issue were very divergent during debates.</p>	<p>The SDUGA will examine:</p> <ul style="list-style-type: none"> • the possibility of extending the road to the north up to the North Highway (land feasibility, feasibility of a new interchange) • the update of the 1960s concept (see the DU for documentation) (number of lanes of traffic, space for a TCSP, optimisation of the cross-section), consistent with the plan of Southern Plateau (Boulevard de la République) • the width of the ROW to reserve to adapt accordingly, reasonably taking into account constraints of existing facilities (water towers, Museum, National Library, ...): 70/45 m; • the feasibility conditions to be examined (e.g. as part of a large self-funded project of land development of space currently occupied by the Galliéni Camp and railway ROWs after moving these activities). 	<p>Arbitration is expected on this road whose realisation is more for a political will than for a traffic need.</p>	<p>Following the existing plan and request from the Ivoirian side, the Study team has taken the Voie triomphale as a wide symbolic boulevard. Hence, before studying its economic feasibility, the Study team has proposed this road with signalised intersections along with a relatively low design speed regardless of its large width. While it is such a special road, it is also one of the urban roads. That is, in terms of the functional classifications of roads, it should function as a secondary road rather than a primary road which is supposed to connect to the major transport infrastructure such as the port and the airport. Thus, the Study team did not assume a connection to Autoroute du Nord or passage of heavy vehicles and through traffic.</p>
30	<p>Road section Abobo - North Cocody - structuring road network of Cocody</p> <ul style="list-style-type: none"> • Road section under development by MIE in the context of the PRICI between North Cocody and Abobo at the interchange servicing Abobo – Banco station. • Road section between North Cocody and Abobo at the Abobo South (University) TUA#1 station evaluated at the preliminary level by the BNETD. • Plan of making the SOTRA bus feeder lines for the TUA#1. • Extension of the third bridge, north of the Boulevard Mitterrand, by using the natural Gobeles valleys to implement a great, necessary 	<p>The SDUGA / SDTU shall indicate and take into account these road sections after updating the SDTU studies (circulation on the 2 sections) and in association with the SOTRA to analyse the relevance of providing two SOTRA bus feeder lines for the TUA#1. Further studies.</p> <ul style="list-style-type: none"> • The project team must decide on this idea which Bouygues has apparently studied 		<ul style="list-style-type: none"> - The Study team has revised the public transport network and incorporated many new feeder bus lines serving the north-south and east-west urban rail stations into the network in order to revise the demand forecast and reflect it in the Final Report. - As for the extension of the Third Bridge, a new project (V-9-4) has been added to the Final Report as planned by BNETD.

NO	DISCUSSION POINTS	RECOMMENDATIONS	OBSERVATIONS	JICA STUDY TEAM RESPONSES
	North-South road which is needed for easier access to the northern neighbourhoods of Cocody. This route was planned in the 1985 structure plans of Abidjan.			
31	<p>Vridi Bridge (V-7-4, V-7-9) The SDUGA proposes a route that allows linking the Rue Pierre et Marie Curie to the 3rd bridge, while the former route has been planned to link the Boulevard du Canal to the Carrefour Solibra (SDU 2000). After the debates, the intervention of the Port Authority, and a comparative analysis, the SDU 2000 route was deemed more relevant.</p>	<p>The JICA project team shall consider this decision regarding the bridge. The development project of the Carrefour SOLIBRA should take this choice into account (Port movements - Vridi Bridge - Boulevard du Canal - Boulevard VGE - 3rd bridge and return must be treated to ensure better flow).</p>		<p>The location of the Vridi bridge has been proposed after a series of scientific comparisons and analyses in SDUGA. Nevertheless, following the request from the Ivorian side, the Study team has included both Vridi-Bietry Bridge (V-7-9) and Vridi Bridge (V-7-4) in the Final Report. As for the correction of the alignment of Vridi-Bietry Bridge (V-7-9) obtained through BNETD, it has been reflected in the Final Report.</p>
32	<p>Dabou Highway (V-4-10) The SDUGA plans for a highway following the existing road. • the issue of its design is complex: several needs shall be met (transit, local servicing, development of real estate development area, ...) in a constrained environment (current tortuous road route, no ROW reserved, difficult crossing of Yopougon, ...) • meeting the needs of transit and proximity servicing on the same route would probably lead to a scenario of 2 x 3 channels + sideways, highly invasive both in Yopougon and in dense areas of Songon, • achieving ambitious works while maintaining traffic is particularly difficult (security, fluidity), as shown by the experience of the Grand Bassam highway, • the difficulties of crossing the Agnéby valley are undoubtedly shared by all options (except for the questions about preservation of natural areas, to be clearly identified).</p>	<p>There will be a need to initiate studies in a very "open" approach, without presupposing a choice of route, with the ability to consider the option of a split: new route north of the built areas, directly connected to the North Highway by the West ring road, performing the functions of transit and long-term development of new development areas and leading directly to the coastal road, or development of the existing route with the concept of urban structuring of agglomerations encountered (Yopougon Songon, Dabou) without cutting them in two.</p>		<p>While the Study team considers that only the road widening will be sufficient, the team will check again the future traffic demand in each section. Since BHLS does not take a dedicated lane from the road, widening of the existing road should be sufficient. Detailed study including the alternative routes shall be possible in the subsequent feasibility study. Meanwhile, as for the plan of a new alternative road to Dabou diverting at Songon and connecting directly to the west section of Y4, it has been added as a new project (V-9-1) to the Final Report as planned by BNETD.</p>
33	<p>Connection Boulevard de la Cathédrale / Boulevard de France This connection is presented as part of the development of the Bay of Cocody.</p>	<p>The team JICA project shall examine the priority of such a connection, the relevance of its inclusion in the SDTU.</p>		<p>The Study team has received the development plan of Cocody Bay, and has added this connecting bridge as a new project (V-9-3) to the Final Report.</p>
34	<p>Sub-lagoon Treichville – Yopougon link (V-7-10): The SDUGA plans for the construction of a tunnel connecting Treichville to Yopougon in the long term. This lagoon crossing was found pertinent but not a priority due to its cost (1,300 billion FCFA).</p>	<p>Give priority to opening up Yopougon and setting up a network with the 5th Abidjan bridge (V-4-2) (Banco Bay) and the Grande Voie Yopougon - Boulay Island – coastal way - Vridi Canal - Port-Bouët (V-4-1, V-4-8, V-4-9, V-1-8)</p>		<p>Development of the route of 5th bridge - Grande Voie Yopougon - Boulay Island - coastal way - Vridi Canal - Port-Bouët has also already been proposed in SDUGA. The main purpose of the development of the tunnel connecting Treichville to Yopougon is to reduce the traffic burden on the existing first and second bridges that connect to Plateau, and it will not much affect the traffic demand and the priority of this route. Furthermore, as the Study team assumes no public transport lines through this tunnel, no impact on the urban train is foreseen. The Study team has mentioned these points in the Final Report (Part 6, Sec.6.2.5 (6)).</p>
35	<p>Construction of a second lane on the road Yopougon-Industrial Zone - Carrefour Thomasset (towards Agboville to the northwest and Adzopé to the northeast) The project team has proposed the upgrade of this important axis road to 2 x 2 lanes (exit north of Abidjan, servicing West Abobo and Anyama, servicing the Olympic Stadium of Anyama / Ebimpé). Other options are proposed by the BNETD as part of a study on behalf of the MIE. The BNETD proposes, among other things, a new route for 2 x 2 lanes between a new interchange on the North Highway just after the "corridor" and the Carrefour Thomasset, which would also service the Olympic Stadium of Anyama / Ebimpé from the west. This new interchange could also start from the new highway to Dabou. The large ring road could be closed from the North to PK 24 of the</p>	<p>A thorough study of the geometric feasibility is needed to help validate these options.</p>		<p>The Study team has obtained the alignment of this new road by BNETD, and has incorporated it into the Final Report as a new project (V-9-2).</p>

NO	DISCUSSION POINTS	RECOMMENDATIONS	OBSERVATIONS	JICA STUDY TEAM RESPONSES
	North Highway, the road Dabou - Sikensi naturally playing a complementary role of closing between the North Highway and the coastal road.			
36	Structuring road network in Yopougon: The proposals of SDUGA-SDTU on the Yopougon structuring network are generally validated.	The JICA project team shall: <ul style="list-style-type: none"> • Pair the East-West axis "5th bridge" to the Abidjan Urban Train #2, likely to be extended westward to the Route de Dabou (which will require complex right-of-way freeing) • extend the North-South V28 axis to Azito and Ile Boulay • extend the 2 x 2 lane- North-South axis all the way to Locodjoro, • extend the North-South routes to the lagoon towards the lagoon service stations (access for Sotra buses) and split the Locodjoro road (south of the "5th Bridge" axis) • plan to build the east-west V4 axis (in the South of Yopougon) only as a 2 x 1 lane road at first (linked to the deferred sub-lagoon link Treichville - Yopougon). 		The Study team has taken these comments and plans by BNETD into account to modify SDUGA, especially the relevant project profiles. Further details could be studied in the subsequent feasibility studies.
37	Closing to the East of the large ring road This East ring road is an extension of the Boulevard Mitterrand. The SDUGA-SDTU plans to make it end in Bonoua. Following debates, it was agreed that it should end in Grand Bassam instead of Bonoua (this scenario improves the quality of the network, putting Grand Bassam in the position of intersection, avoiding duplication between the Grand Bassam and Bonoua sectors and the risk of uncontrolled development on the east bank of the Comoé).	Two options shall be compared by the project team: <ul style="list-style-type: none"> • through Eloka, with an approach of maintaining the insular character of the Vitré Island and of preserving its potential natural areas (to be informed) • more likely, by Vitré Island, with an approach of development of the island proposed by Oriconsul; study to be conducted in connection with that of the Abidjan - Lagos Highway (logical continuation by Moossou and Bonoua of the Abidjan - Grand Bassam Highway or using some other route ?).		The Study team compared and studied the two options, and the team has proposed keeping the original option that will go through Eloka due to the following reasons: <ul style="list-style-type: none"> - It is more easily realised in terms of land acquisition because it will not go through Vitré Island, which includes a natural preservation area. - Since it will function as one of the trunk roads of the country with considerable traffic, it is preferable not to go through Grand Bassam, which is a great tourist site designated as a World Heritage Site. - This option will enable Bonoua to function as part of Greater Abidjan in an integrated fashion in terms of the road network connection. - It will also function as a northern bypass of Bonoua. Though the Study team has added the above explanations in the Final Report (Part 6, Sec.3.4.2 and Sec.6.4.1 (3)), the option of going through Vitré Island has also been added as a new project (V-9-6) to the Final Report as planned by BNETD.
38	Control of air pollution and other nuisances (Insecurity) related to road transport in Greater Abidjan	Check with the Ministries of Transport and of Environment for a proposal: <ul style="list-style-type: none"> • of applicable regulations: sufficient or to improve? • of enforcement of regulations. 		Though legislation and regulation matters are basically out of the scope of work for SDUGA, the Study team has proposed another study to cover these issues and indicated them in the "Recommendations" of the Final Report (Part 7, Sec.6.1).

D. SDTU- TCSP (Exclusive transport, for instance, a bus lane or tram lane on a road)

NO	DISCUSSION POINTS	RECOMMENDATIONS	OBSERVATIONS	JICA STUDY TEAM RESPONSES
39	Validation of the network structure of the lecture TCSP in "Cross of Lorraine" shape consisting of: <ul style="list-style-type: none"> • the North-South Abidjan Urban Train #1 (TUA 1 T-1-1) land axis, on a route already finalised; perpendicular to Koumassi Dyke, if one wanted to establish effective communication between the two lagoons, a significant hydraulic structure would be required, allowing the navigation of water buses, • the East-West Abidjan Urban Train #2 (TUA 2 T-2-5), where applicable according to the route proposed by Oriconsul (the prefeasibility study in completion phase having confirmed the quality of this choice), 			Though the Study team could not obtain the details of these comments by the deadline, the team took them into account to reflect them in the project profiles of the Final Report. However, the Study team proposed no water transport lines across Koumassi Dyke. As for other the detailed comments on the water transport such as the clearance under the planned bridges, the Study team has proposed reflecting on them when another study is made on the water transport, in the "Recommendations" of the Final Report (Part 7, Sec.6.3.2).

NO	DISCUSSION POINTS	RECOMMENDATIONS	OBSERVATIONS	JICA STUDY TEAM RESPONSES
	<ul style="list-style-type: none"> the East-West lagoon axis (Yopougon – Plateau Lagoon / TUA 1 - Bingerville), taking into account the necessary connections with the north-south crossings (Jacqueville bridge, Boulay Island bridge, Plateau Lagoon Station / TUA 1, de Gaulle Bridge, Henri Konan Bédié bridge, Y4 bridge, bridge of the large ring road Vitré - Grand-Bassam), the lagoon's north-south axis (Yopougon / TUA 2 - Plateau Lagoon / TUA 1 - Marcory Canal / TUA 1 – Koumassi Dyke / TUA 1), priority lagoon axes where appropriate completed (eventually) by an axis Bingerville - Koumassi - Koumassi Dyke (creating a bridge perpendicular to the dam of Koumassi would ensure continuity between this axis and the previous North-South axis) , lagoon service scheme being finalised by the BNETD, PAA's opinion to be requested on the above servicing scenario (feasibility of a lagoon station near the ore terminal, compatibility with the regulation of navigation in port waters), Oriconsul's observations on the said servicing pattern to be collected, final servicing pattern to be taken into account in the SDTU. 			
40	<p>Reserve of right-of-way to be planned for The debates on this issue have focused on how to define, materialise and enforce right-of-way in practice; regarding the case of the extension of the TUA 1 (T-1-2) to Grand Bassam, three options are available:</p> <ul style="list-style-type: none"> along the Abidjan - Grand Bassam Highway under construction, on the intermediate axis proposed by Oriconsul (with the effect of creating a third nuisance lane but perhaps better service to the residential areas and/or employment areas) along the north road axis; 	<p>A feasibility study to be carried out as part of the detailed urban planning study of the area of Port-Bouet - Grand Bassam to compare these 3 options (note the poor constructability of certain areas with depressions/wetlands). Specify the route and stations servicing Grand Bassam (VITIB and Downtown). Attention also to the issue of coastal erosion on the section airport - Gonzagueville where the extended TUA 1 and the highway are very close to the sea: protection works are probably to be planned for SDUGA (2030). .</p>		<p>About the extension route of the north-south Urban Train to Grand Bassam (T-1-2), the Study team has explained and added in the Final Report why this route has been decided in the course of the Study (Part 6, Sec.5.3.2). However, since SDUGA has shown only an indicative alignment, an F/S or a further study should be carried out soon as part of the study on the Detailed Urban Master Plan (PUd) for the area of Port-Bouet – Grand Bassam to compare several routing options. It has been mentioned in the “Recommendations” of the Final Report (Part 7, Sec.6.3.1).</p>
41	<p>Other issues related to the masterful network of TCSP</p> <ul style="list-style-type: none"> connections between axes, policy of development of activities around the main stations; prioritisation of implementations: the beginning of the TUA 2 to provide the service of Yopougon seems more urgent than that of the extensions of the TUA 1 (or even its Anyama – Abobo section); additional systems and networks (BRT, others). 			<p>The Study team has added an explanation on the enhancement of intermodality of the high-capacity corridors in more detail in the Final Report (Part 6, Sec.5.4.3 and Sec.5.4.4). The extension of the north-south Urban Train to Grand Bassam (T-1-2) has been shifted to the long term (Part 6, Sec.5.6.2). Further explanations on BRT, BHLS, and dedicated bus lanes (G-2-1) have been added in the Final Report (Part 6, Sec.5.3.3).</p>
42	<p>Level of the overall goal of developing modern public transport (TUA 1 and 2 lagoon axes, SOTRA and possibly other modern lines of passenger transportation):</p> <ul style="list-style-type: none"> The Oriconsul proposals lead to a share of the informal sector (woro-woros and gbakas) of 54% (excluding taxis: 6%) of motorised transport, to the detriment of the formal modern sector using higher capacity cleaner, and safer vehicles. This share is unanimously deemed largely insufficient: SOTRA is planning to respond on the proposals of creation of bus lanes made by Oriconsul, SOTRA intends on distinguishing four land networks in the medium term (not counting the water bus network): feeder network to TUA 1 and 2 and the lagoon lines, core networks, local networks (in the communes of Cocody, Yopougon, Koumassi and Abobo) and networks related to satellite towns (internal networks and connections with Abidjan Centre, to be confirmed by the Sotra) 	<ul style="list-style-type: none"> Oriconsul must specify the structuring assumptions used (including the route of bus lanes, the SOTRA [or similar] bus park, the daily bus mileage ...) and propose more ambitious scenarios or draft scenarios it is essential that the SOTRA establishes the vision of its development on the horizon of SDUGA (2030), the "Plan Sotra 2030," which it could establish itself or have a BET established (financed by the study funding), the Sotra bus fleet could go from 500 (operational) buses in 2014 to 700 in 2015, 2,000 in 2020 and 3,000 in 2030: Oriconsul shall study this development scenario (it should be noted that in the years 1985-1990, Sotra had a fleet of 1200 buses and accounted for about 40% of the agglomeration's motorised travel). 		<p>More discussions on the dedicated bus lanes have been added to enhance the usage of bus transport (Part 6, Sec.5.3.3). Since Gbaka and Woro-Woro shall function as feeder modes of transport that will complement the high-capacity public transport network, these feeder mode shares will remain to a certain extent as the high-capacity public transport will be utilised. However, in order to avoid a wrong impression that the informal transport modes will continue operating in the future, these two modes have been integrated into a “minibus” as a new feeder mode of transport (Part 6, Sec.2.8.2 and Sec.5.4.2). (Woro-Woro will not continue operation in future as it is inefficient and simply worsening the traffic congestion.) As for the additional information and plans of SOTRA, the Study team has taken them into account to modify or add to the Final Report as well as the project profile. Meanwhile, as for the detailed improvement plans of the bus transport including BRT and BHLS, the team has proposed another master plan study for improving the road-based public transport system based on SDUGA. It has been mentioned in the “Recommendations” of the Final Report (Part 7, Sec.6.3.3). The Study team has also added the forecast of the number of necessary</p>

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				buses and minibuses in the urban transport master plan (Part 6, Sec.5.3.3 and Sec.5.4.2).
43	<p>Anyama / Île Boulay Railway (F-1-1):</p> <ul style="list-style-type: none"> • there is uncertainty about the implementation deadline for the PAA extension on Boulay Island • the main relevant markets for rail transport are likely to remain in the centre of the metropolitan area (container terminals, refinery, cement factories) • however, the development of ore traffic (Ivory Coast, Burkina Faso and Mali) could lead to the saturation of the existing ore terminal and of the new terminal planned in the short term (wharves 14, 15 and 15bis), designed to export a few million tons of ore a year and make it necessary to create a new ore terminal on Boulay Island, designed to export tens of millions of tons of ore per year (requiring an efficient railway and terminal constituting a key asset for the development of the mining sector in Côte d'Ivoire), bulk terminal, which could also be used to import clinker (for the CIMAF cement factory Yopougon in particular) • it is thus necessary to take the precaution of reserving some land, which requires the completion of a feasibility study by the BNETD or another BET. 			The Study team recommends discussing with all the relevant agencies and studying these issues at a later stage when reviewing SDUGA, after the port development master plan has been formulated and authorized. The team has mentioned this in the “Recommendations” of the Final Report (Part 7, Sec.6.2.2).
44	<p>Ferry System</p> <ul style="list-style-type: none"> • The SDUGA / SDTU includes a project of high-speed ferry system connecting the multimodal stations of Songon, Plateau Sud and Koumassi (T-4-1) • The PAA plans a system between the Container Terminals (1 or 2) and Azito (north bank of the fourth bridge (V-4-8)), several shuttles (ten?) per day per direction, carrying heavy weights (ferries) or containers (barges), with the possibility of a custom area in Azito or at the Industrial Zone of PK 24 ("dry port") viewed favourably by the General Directorate of Customs. 	<ul style="list-style-type: none"> • pre-feasibility study to be conducted by the PAA or a BET for itself (to be confirmed by the PAA) • 2 options: call for expressions of interest then call for tender, protocol of agreement with a private partner spontaneously offering its services to develop its project. 	<ul style="list-style-type: none"> • The service could be provided by a private agent 	As in Comment no. 43, the Study team basically recommends studying these issues at a later stage when reviewing SDUGA, after the port development master plan has been formulated and authorized. As for the lagoon transport projects that are proposed in the short term, PAA’s plan of the freight shuttle across the lagoon has been mentioned in the “Recommendations” of the Final Report as an issue to be considered (Part 7, Sec.6.3.2).