Republic of Côte d'Ivoire

Ministère de la Construction, du Logement e de l'Urbanisme (MCLU)

District Autonome d'Abidjan (DAA)

Autorité de la Mobilité Urbaine dans le Grand Abidjan (AMUGA)

The Project for the Operationalization of Urban Master Plan in Greater Abidjan

Final Report

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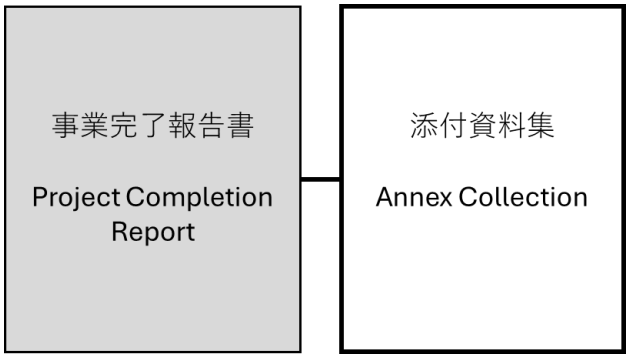

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Abbreviations

AAD	Abidjan Autonomous District
AFC	Automatic Fare Collection
AfDB	African Development Bank
AGEROUTE	Road Management Agency
AMI	Expression of Interest (EOI)
AMUGA	Urban Mobility Authority in Greater Abidjan
ANAGED	National Waste Management Agency
ANC	Africa Nation Cup
ANO	Notice of Non-Objection (NNO)
BNETD	National Office for Technical Studies and Development
BNF	Banco National Forest
BOM	Bus Operation Management
BRT	Bus Rapid Transit
CBD	Central Business District
CCTV	Closed-Circuit Television
CES	Floor Area Ratio
CNTIG	National Committee for Remote Sensing and Geographic Information
CoFaMiSu	Implementation Facilitation and Monitoring Committee
COJO	Validation Committee (in each Project)
COS	Building Area Ratio
CUC	Central Urban Core
DAA	Abidjan Autonomous District
DAGRU	Directorate of Addresses, Urban Management and Restructuring
DAO	Call for Tender
DDPE	State Public Domain Directorate
DFRC	The Directorate of Fauna and Hunting Resources
DGMP	Director General for Public Procurement
DGPRE	Directorate of Water Resources Management and Protection
DGTTC	General Directorate of Land Transport and Traffic
DGUF	Directorate of Addresses, Urban Management and Restructuring
DGURE	Director General of Urbanization and Real Estate
DIPPN	Diagnostics and Improvement Plans for Precarious Neighborhoods
DMISSA	Directorate of Modernisation, Computerisation, Simplification and Security of Acts
DX	Digital Transformation
ECOWAS	Economic Community of West African States
EES	
ERP	Electric Road Pricing
FDE	Water Development Fund
GAV	Greater Abidjan Vision
GCR	Ground Coverage Ratio
GDP	Gross Domestic Product
GIS	Geographic Information System
GPS	Global Positioning System
GZ	Green Zone
ICT	Information and Communication Technologies
ILA	Industrial Land Allocation
INS	National Institute of Statistics
JCC	Joint Coordination Committee
JICA	Japan International Cooperation Agency
LCD	Litters per Capita per Day
LE	Life Expectancy
LULC	Land Use and Land Cover
LVC	Land Value Capture
Maas	Mobility as a Service
MCAU	Ministry of Construction, Sanitation and Urban Planning
MCLU	Ministry of Construction, Housing and Urbanism
MEER	Ministry of Equipment and Road Maintenance
MEF	Ministry of Water and Forests
MH	Ministry of Hydraulics
MIF	Ministry of Economic Infrastructures
MINAS	Ministry of Sanitation and Salubrity
MINEF	Ministry of Water and Forestry
MMGA	Multimodal Model of Greater Abidjan
MRT	Mass Rapid Transit
MT	Ministry of Transport
MUCH	Ministry of Construction and Housing
NMT	Non Motorized Vehicle
NOP	National Office of Population
NUZ	Neighboring Urban Zone
OAP	Planning and Programming Guidelines
OD	Origine Destination
ONAD	National Office of Sanitation and Drainage
ONEP	National Office of Drinking Water

ONUCI	National Order of Urban Planners of Ivory Coast
OSM	OpenStreetMap
PACOGA	Greater Abidjan Competitiveness Support Project (World Bank)
PADD	Planning and Sustainable Development Project
PARU	Sanitation and Urban Resilience Project
PCU	Passenger Car Unit
PDM	Project Design Matrix
PGWRT	Protection areas and Grand-Bassam Wetland under Ramsar Treaty
PIDCUS	Infrastructure Project for Urban Development and Competitiveness of Secondary Agglomerations
PLU	Local Urban Plan (France)
PMUA	Abidjan Urban Mobility Project
PND	National Development Plan
PNUD/UNDP	United Nations Development Programme
POC	Proof of Concept
PPP	Public Private Partnership
PRICI	Côte d'Ivoire Infrastructure Renaissance Project
PTUA	Abidjan Urban Transport Project
PUd	Detailed Urban Plan
PUD	Urban Master Plan (Plan Directeur d'Urbanisme)
PZ	Peripherical Zone
RAM	Ramsar Advisory Mission
RCP	Representative Concentration Pathway
RD	Record of Discussion
RGU	General Urban Regulation
SDAD	Abidjan District Sanitation and Drainage Master Plan
SDG	Sustainable Development Goal
SDU	Urban Master Plan
SDUGA	Greater Abidjan Urban Master Plan
SEA	Strategic Environmental Assessment
SIGFU	Urban Land Simplification and Digital Transformation Project
SO	Strategic Orientation
SODECI	Water Distribution Company of Côte d'Ivoire
SOGEDI	Society of management and development of industrial infrastructures
SOTRA	Abidjan Transport Company
TBD	To Be Determined
TFS	Transit Fare System
TMF	Task Force Member
TOD	Transit-Oriented Development
TOR	Terms of Reference
UEMOA	West African Economic and Monetary Union
UGB	Urban Growth Boundary
UN	United Nations
UU	Urban Unit
WHO	World Health Organization
ZAD	deferred development zone
ZD	Enumeration areas

Chapter 1 Introduction

1.1 Background

Abidjan is a major city in West Africa with a population of about 7.19 million in 2021. Côte d'Ivoire has achieved annual economic growth of 6% or more except in 2020 since the end of the civil war in 2011. It is aiming to enter the middle-income country by 2035. Unlike many resource-dependent countries in Africa, the service sector and private investment are driving the economy, and Abidjan, which has the second-largest port in Africa after Durban, has the potential to lead the entire ECOWAS and UEMOA economy as a gateway to West Africa. On the other hand, various urban problems are becoming increasingly serious in Abidjan due to the rapid influx of population and the expansion of economic activity, threatening the sustainability of the city in terms of economic activity, living environment and natural environment.

Under these circumstances, JICA prepared the Urban Master Plan in Greater Abidjan (SDUGA) in 2015. SDUGA was approved in March 2016 after the addition of some missing information by MCLU. After SDUGA was prepared, urban development in Abidjan has been accelerating in various ways. The World Bank and the French government decided to provide support in the public transportation sector, MRT and BRT. The urban area is expanding due to the continuous influx of population and the living environment is deteriorating due to the delayed development of urban infrastructure. Regrettably, SDUGA has not been effective enough in controlling rapid urbanization due to the absence of binding tools such as detailed urban plans (PUd).

The Government of Côte d'Ivoire requested support from the World Bank (World Bank) and the African Development Bank (AfDB) for the preparation of PUds of 10 zones in Abidjan. Currently, a PUd is under preparation for one district with the AfDB's support. Preparations are underway for the other nine districts. With this background, the present technical cooperation project by JICA titled "the Project for the Operationalization of Urban Master Plan in Greater Abidjan (hereafter referred to as "the Project") was formulated in order to update SDUGA by reviewing the urban transport development plan and adding urban infrastructures and enhancing the capacities of related ministries and organizations as well as creating a mechanism for strengthening the effectiveness of SDUGA in controlling urban development.

1.2 Objective and Outputs

The Record of Discussion signed on October 30, 2020 by the Minister of Construction, Housing and Urbanization and the Resident Representative of the JICA Cote d'Ivoire office defines the objectives and outputs of the Project. The Project Design Matrix (PDM) attached to RD as Annex 2 define them as follows.

- Overall Goal (state to be achieved 3 to 5 years after the completion of the project)
  Sustainable urban development will be promoted in Greater Abidjan through the implementation and management mechanism of SDUGA.
- Project Purpose (state to be achieved by the end of the project)
  Capacity for effective implementation of SDUGA is strengthened and a model approach necessary for the promotion of sustainable urban development is established.
- Outputs (groups of activities to realize the project purpose)
  Output 1:The SDUGA Implementation and Monitoring Committee is established and major urban infrastructure plans will be adjusted and aligned to ensure consistency.
  Output 2:The effectiveness of urban development management at the district level for the implementation of SDUGA will be enhanced.

Output 3:Urban transport plan is assessed and updated in order to strengthen its effectiveness and accessibility of the people to the public transportation system

In consideration of the delay of the preparation of PUds, the detailed description part of RD related to Output-2 was modified, while the above description in the main part remained the same, as recorded in the minutes of meeting signed by the Director General of Urbanisms and Land Tenure of MCLU and the Chief Representative of JICA Cote d'Ivoire Office on December 12, 2022. The point was to clarify the deliverables of Output-2 in the circumstance in which only the PUd for Urban Unit 6 was close to completion, while the original plan was based on the assumption that all the PUds for 10 urban units are completed by the time when the Project starts, which actually did not take place. The following are the newly defined deliverables of Output-2.

- Recommendations of the measures to strengthen the effectiveness of PUds in Greater Abidjan
- PUds formulation guideline
- PUds application guideline

1.3 Overall Progress of the Project

(1) Project launch (June 2021)

The Project was scheduled to start in April-May 2021, but in light of the COVID-19 pandemic, vaccination delays, and other difficult circumstances, it was decided that the project would begin in the fall of 2021. Prior to this, the Deputy Team leader traveled to Abidjan in June 2021 and made the following preparations for the full-scale launch in October.

- Kick-off meeting with MCLU at Abidjan office
- Confirmation of the legal framework for the SDUGA Implementation Facilitation and Monitoring Committee ("CoFaMiSu" hereafter)
- Confirmation of MCLU focal point officer
- Visits to key partner institutions
- Initial appointment of task force members for the Project (7 MCLU, 5 DAA, 4 AMUGA)
- Check readiness of project office

(2) Full-scale launch (October 2021-April 2022)

The following activities were conducted in October 2021 and SDUGA 2040 was in full swing.

Joint Coordination (JCC) Meeting

The first Joint Coordination Committee (JCC) meeting was held on Friday, October 22, 2021. The participants agreed on the following points.

- Changing the final target year of SDUGA 2040 from 2030 to 2040
- Approval of Project Design Matrix and Plan of Operation (Attachment-1)
- Approval of the implementation structure and the participation of commune representatives in the SDUGA Implementation Facilitation and Monitoring Committee (CoFaMiSu)
- Increasing the frequency of JCC meetings from once a year as per the RD to twice a year

Formation of Task Force

The JICA Project Team ("JPT" hereafter) consulted with each of MCLU, AMUGA, and DAA to select task force members for the Project. Ultimately, a total of 19 members were nominated (7 MCLU, 6 AMUGA, and 6 DAA). Initially, 16 members were envisioned, but 3 members were added (1 from AMUGA and 2 from DAA) to reflect the request from these organizations. For each of the subjects to be studied in the Project, a three-member group was formed with one main member (two for GIS only) and two sub-members, with each group consisting of members from the three organizations Japanese

experts in charge of the selected subjects were assigned to each group to provide capacity-building support to the task force members. Table 1.3.1 shows taskforce members by thematic groups. Green, red, blue represent MCLU, DAA, and AMUGA respectively.

Table 1.3.1 Taskforce members by thematic groups

Thematic groups		Taskforce Responsible	
		Main Member	Associate members
Urbanism	Spatial planning	● Zahe AMOS	● Albéric ADJON ● Alex ADIKO
	Planning regulation	● Thierry NGUESSAN	● Albéric ADJON ● Alex ADIKO
Urban infrastructures	-	● YORO Romaric	● Prost Alban NIANDJI ● Edwige ADINGRA
Urban Transport	Survey and demand analysis	● Déborat OKAINGNI	● Albéric ADJON ● KRA Solange
	Transportation infrastructure planning	● Edwige ADINGRA	● Zahe AMOS ● Prost Alban NIANDJI
	Public transport operations/Pilot Projects	● Aristide GAHIE	● YORO Romaric ● Prost Alban NIANDJI
	Use of the database	● Alex ADIKO	● KOUAME Serge ● KRA Solange
Cadre socio-économique et finances	Socio-economics	● KASSIA Jean-Brice	● Thierry NGUESSAN ● Fanny DJAN*
	Finances	● N'CHO K. Olivier	● Fatim TRAORE ● OUATTARA Karamoko*
Governance		● Yao BOUATINI	● N'CHO K. Olivier ● Aristide GAHIE
Strategic Environmental Assessment		● Fatim TRAORE	● KASSIA Jean-Brice ● Edwige ADINGRA
GIS and cartographies		● KRA Solange ● DELBE Narcisse	● Serge KOUAME ● Edwige ADINGRA

Source: JICA Project Team

These task force members are the target of capacity development in the Project. A series of workshops for relevant subjects have been and will be offered to them. Certificates of participation in the workshops will be issued to those task force members who actively participated in the workshops at the end of the Project.

Data collection and initial analysis

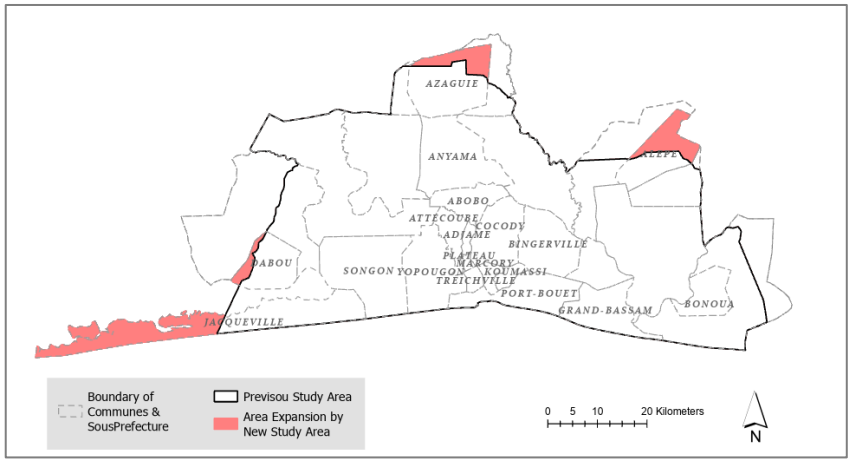
Data collection and initial analysis were undertaken for all the subjects of Output 1, 2 and 3.

(3) Full operation stage (May 2022-May 2023)

The major issues in this period included the following.

Expansion of the Target Area

In response to the request from communes, MCLU requested the JICA experts team to expand the target area for SDUGA 2040. The boundary of SDUGA runs through four communes of Jaqueville, Dabou, Azaguie and Alépè, separating them into those areas included in the SDUGA area and those not included. So the target area was expanded to include the entire commune areas of these four communes. The expansion of the target area is shown in Figure 1.3.1 below. This change was approved at the second CoFaMiSu held on December 7, 2022.



Plan	Area	Population in 2014 (thousand)
SDUGA-1	3,492 km²	4,968
SDUGA 2040	4,110 km²	5,036
Increase	618 km²	68
	17.7%	1.4%

Source: Map created by JICA Project Team using new boundary shared by MCLU

Figure 1.3.1 Expansion of the SDUGA Target Area

The socio-economic framework and the existing land cover/land use map were updated to reflect the expansion.

Integration of 2021 Census

The analysis of socioeconomic framework preparation proceeded with the data made available by INS, mainly the preliminary data of the 2021 Census and other project works proceeded with the draft socioeconomic framework. Then it was requested in the middle of 2022 by INS to update the preliminary population data by applying the latest data released then. The JICA experts team updated the socio-economic framework utilizing the latest population data and other works continued proceeding with adjustments following the renewed socio-economic framework integrating the updating of population data and the expansion of the target area.

Spatial Planning

Future possibilities of land development were analyzed by establishing four alternatives as detailed in 4.2 Spatial Framework and Land Use Plan: (Scenario A) Continuous Urbanization Scenario, (Scenario B) Multi-polar Development Scenario, (Scenario C) Corridor Development Scenario and (Scenario D) Balanced Development Scenario. The JICA experts team presented these four scenarios of spatial development at the second CoFaMiSu on December 7, 2022. Although it was requested that the participants make a selection of a desirable scenario in the meeting, they were not able to do so because of limited consideration time.

Then the JICA experts team proceeded to create a new scenario, Scenario E, integrating parts of the four scenarios. It, then, prepared the first version of the land use plan for 2040 based on Scenario E and shared it with MCLU. They received a comment from MCLU to consider planned urban development projects and reflect them in the 2040 land use plan. The second version of the 2040 land use plan was prepared in consideration of the planned urban development projects, while maintaining important planning principles such as avoiding urbanization in the areas which are environmentally sensitive, natural disaster-prone and farming activities are practiced, creating a compact city and achieving a balanced urban structure with major growth poles such as Bonua in the east, Azaguie in the north and Dabou in the west.

The second version 2040 land use plan was presented and discussed at the third CoFaMiSu held on May 17, 2023. It was agreed that the JICA experts team uses the second version 2040 land use plan for the integration with urban transportation plan and urban environmental infrastructure plan for 2040. It was, however, subject to further discussion with MCLU regarding the sharing of the second version 2040 land use plan with PACOGA consultant teams, which are working on preparing PUds for four urban units (UU 3, 4, 5 and 7).

PUd-related work under Output-2

After the first CoFaMiSu in April 27, 2022, the JICA experts team started discussing an appropriate way of undertaking Output-2 in a circumstance totally different from the original assumption. Originally it was assumed that all the PUds for ten urban units are completed by the time the Project starts in October 2021 and PUd-related Output-2 work was designed accordingly. It was found, however, that only PUd for Urban Unit 6, covering three communes of Koumassi, Trechville and Marcorry, was almost completed, while no work had started for other nine PUds. The JICA experts team proposed the following work for Output-2 in consultation with MCLU and JICA and started to work.

- Review of draft PUd for Urban Unit 6
- Preparation of a PUd guideline for formulation
- Preparation of a PUd guideline for application

RD was modified accordingly as explained earlier.

Preparatory works are going on for two candidate pilot projects for Output 2: preliminary preparation of general regulation for SDUGA 2040 and creation of a GIS dashboard for urban planning document sharing.

Urban transportation

The priority urban transport projects proposed by SDUGA for 2030 were reviewed and updated in consideration of recent traffic trends. The pilot project for traffic data collection and management is under preparation. The JICA experts team is ready to apply CUBE, which is a transportation demand forecast model requested by AMUGA to be used, for transportation demand forecast for 2040.

Urban Environmental Infrastructure

The urban environmental infrastructure covers water supply, sewerage and solid waste management. The JICA expert team on this issue identified the existing master plans for these sectors and confirmed their demand forecasts for the target year of 2025 or 2030. Then, the future demand for water supply and the generation of sewage and solid waste in 2040 was estimated, applying the socioeconomic framework for 2040. He found there are gaps between them at a range of 1.5 to 2.0 times, indicating that the level of development required to achieve SDUGA 2040 ranges between 1.5 and 2.0 times of the development level planned by the existing sector-wide master plans.

The progress of the Project is summarized in the Monitoring Sheets prepared every 6 months as attached in Appendix-1.

(4) Continuation of project work (June 2023-November 2023)

1) Overall

- French version of Progress Report-2 was submitted to MCLU in July, 2023.
- Data on the past public investment in Greater Abidjan and PPP was collected and analyzed.
- The draft socio-economic framework presented in Progress Report 2 was revised.
- Data on SDGs, informal settlements and Ramsal treaty were collected and analyzed concerning SDUGA 2040 vision.

2) Output-1

- The draft land use plan for 2040 was presented and discussed at the third CoFaMiSu meeting held on May 17, 2023. Discussions continued after this CoFaMiSu concerning the inclusion of the sub-division plans already approved by MCLU and other urban development projects as the areas to be newly urbanized by 2040.
- A new subject of Grand Bassam as a Ramsar Treaty area arose. JPT found that an area of about 40,000 ha (400 km^2) in and around Grand Bassam was designated as an important wetland of international importance and the Government of Cote d'Ivoire signed the Ramsal Treaty in 2005. MCLU, JPT, JICA and the World Bank supporting PUds exchanged views about an appropriate land use category of the wetland area and policies of JICA and the World Bank concerning wetland protection.
- The latest data on urban environmental infrastructures (water supply, sewerage and solid waste management) were collected and analyzed. Coordination was made between the proposed draft SDUGA 2040 land use plan and the existing master plans of each sector to ensure consistency between them.

3) Output-2

- A draft PUd formulation guideline was prepared and discussed with Task Force members at a workshop held in November.
- The geo-portal pilot project was prepared and started. It aims to create a first step toward disseminating information on urban plans to the general public by applying GIS. In this pilot project, the PUd for urban unit 6, which is about to be officially approved soon, will be integrated into a digital platform created under SIGFU for internal information sharing within MCLU. An organizational cooperation mechanism between DGUF and DEMISSA will also be established.
- The other pilot project for Output-2, a workshop for "preparation of the SDUGA general guideline table of contents" was undertaken in Grand Bassam at the end of October, 2023.
- Information-sharing sessions were held with PACOGA-PUd team and the World Bank Urban Resilience Program team.

4) Output-3

- Traffic demand forecast for 2030 and 2040 was completed. Based on its result and in coordination with the draft land use plan for 2040, a draft transportation master plan for 2040 was prepared.
- The transportation pilot project "traffic data collection and management" was prepared and initiated. Five cameras are to be installed to collect traffic information and transmit it to the AMUGA office in real-time for data analysis and actions.

(5) Continuation of project work (November 2023-May 2024)

1) Overall

- In December 2023, Progress Report 3 was prepared in English language and French language, presenting a draft of SDUGA 2040 and the progress of Output-2 concerning PUds. They were submitted to MCLU in January 2024.

- A CoFaMiSu/ JCC meeting was held on January 8, 2024. Presentations were made on SDUGA vision and socio-economic framework, 2040 land use plan, transportation master plan, urban environmental infrastructure plan, an investment plan for 2040 and investment promotion measures, the progress of Output-2 works related with PUd and the progress of the pilot activities. Discussions on these issues followed.
- The progress of the project work was reported to JCC in the same meeting.

2) Output-1

- Following the sharing of the interim result of the draft 2040 urban environmental infrastructure development preparation at CoFaMiSu, its implementation program for the long-term (2040) and an action plan for the short-term (2030) were drafted in the February-March period. They were shared and discussed with the relevant ministries and organizations on the Abidjan side in April for modification and further elaboration.

3) Output-2

- The approach to the preparation of the PUd formulation guideline and the SDUGA general regulations table of contents preparation (a pilot activity) was agreed upon with MCLU. Subsequently, workshops with the counterparts were held in November on these two subjects.
- The approach to the PUd application guideline preparation was explained to and agreed upon by MCLU. Subsequently, a workshop with the counterparts was held in February 2024 on the preparation of the PUd application guideline.
- A draft PUd preparation guideline was submitted to MCLU for review.

4) Output-3

- Following the sharing of the interim result of the draft 2040 urban transportation master plan at CoFaMiSu, its implementation program for the long-term (2040) and an action plan for the short-term (2030) were drafted in the February-April period. They were shared and discussed with AMUGA in May 2024 for modification and further elaboration.
- The traffic data collection and management pilot project was initiated in April, 2024 after straightening up several logistic difficulties on the Abidjan side in customs clearance and the provision of SIM cards to be installed on cameras. The training session on the usage of the facilities took place in the middle of May, followed by the handover ceremony of the facilities to AMUGA on May 21, 2024. The foundation for expanding the system to a full-scale operation was built as the output of SDUGA 2040. It is expected that AMUGA takes the initiative in developing the system to full operation for Greater Abidjan.

(6) Project finalization (June to July 2024)

- The last work in Abidjan took place in June 2024. The activities that took place in June included the third strategic environmental assessment workshop on June 5 and 6, CoFaMiSu/JCC meeting on June 12, the collection of information for the final evaluation of the Project, fine-tuning of the 2040 land use plan, a workshop on the PUd Application Guideline, and discussion on finalizing the transportation master plan, implementation plan for 2040 and action plan for 2030 with AMUGA.
- JPT closed the project office established in the MCLU building on June 28, 2024.

- JPT improved the Project Completion Report integrating the results of the last work in Abidjan in June. Although it was agreed in CoFaMiSu/JCC that the comments on the draft Project Completion Report from the Abidjan side be integrated and shared with JPT by June 28, it did not happen so. Upon receiving the comments on July 24, 26 days after the agreed due date, JPT integrated the comments, where possible, finalized the Project Completion Report and submitted it to JICA on August 19, 2024.

Chapter 2 Existing Condition of the Study Area

2.1 Urban Development

2.1.1 Urbanization Trends

In the SDUGA report, although examples of urban expansion areas are briefly mentioned in Section 1-4 of Volume II for each urban unit, the description of the historical foundation of the city and the evolution of the urban area of the capital of Côte d'Ivoire has not been analyzed globally. It is therefore appropriate, before introducing recent urbanization trends, to briefly review the urban development history of Abidjan in order to place the SDUGA 2040 study in a historical perspective.

(1) Brief Urbanization History of Abidjan

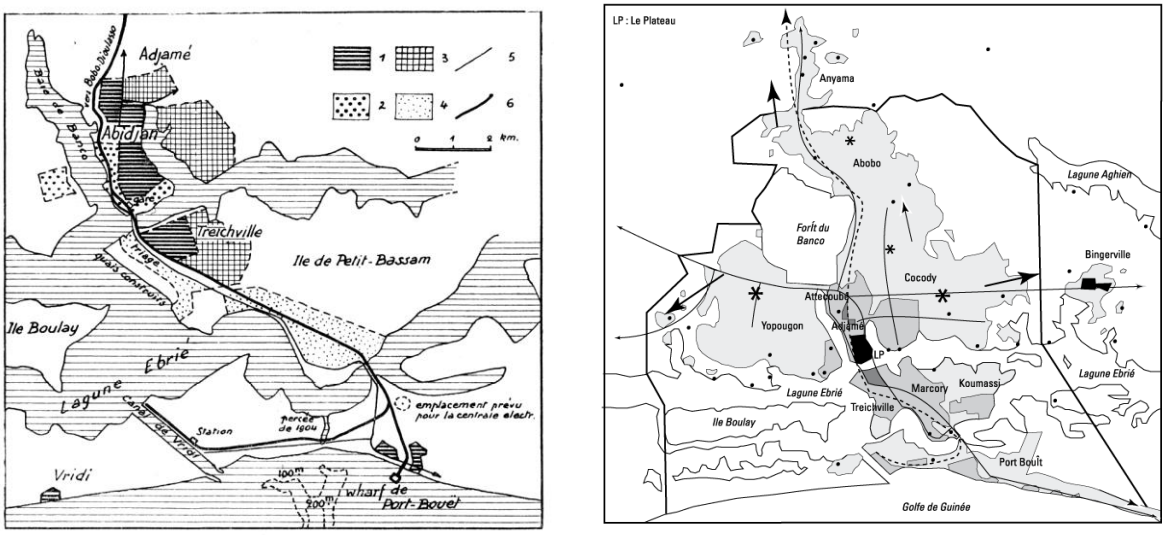
The city of Abidjan, which did not yet exist at the beginning of the 20th century, experienced strong demographic and spatial growth between 1965 and 1989. During this period, the city's urbanized area expanded as a result of the additional population that settled (3,685 ha in 1965, 8,145 ha in 1975, 13,540 ha in 1985 and 15,970 ha in 1989).

The first major change in Abidjan began in around 1903, when the city's first structuring construction projects began to be implemented, especially the construction of the railroad and of the inland port. It was also decided to build the railway terminal in Abidjan, which among other things attracted the first European settlements on the mainland, where several Ebrié villages were already existing (Anoumabo, Locodjro, Cocody, Attiécoubé).

In 1928, the first urban plan of Abidjan was established, with the objective of separating the various urban functions of the city, through the programming of industrial zones, residential zones and the reconstitution of indigenous villages for which a “living permit” was instituted in order to control spatial expansion.

At the end of the 1940s, the strong demographic pressure in Abidjan caused a total disruption of the city: with the influx of migrants, spontaneous housing areas multiplied, camps were set up on the outskirts of the urban center, and uncontrolled housing estates were established. The colonial administration’s priorities therefore changed, and it focused on the scale of the migratory phenomenon, which had previously been largely underestimated. In terms of urban composition, Abidjan is already at this time a particularly complex and varied ensemble, resulting from a strong political will for development but also from the dynamics of uncontrolled urbanization.

From the beginning of the 1950s, Abidjan entered an important phase of its economic and social development, with, on the one hand, the opening of the Port of Abidjan in 1951, which made it possible to intensify economic activity, and on the other hand, the Badini Plan, implemented in 1952, which put the emphasis on the concept of Abidjan as a "Great modern, administrative and port metropolis", promoted the Plateau district as the administrative center, and provided for the creation of new housing areas in Adjamé-Nord, Marcory and Koumassi. At the dawn of independence, the city experienced a new economic boom with the completion of the construction of the port and the Vridi Canal (the first deepwater canal in Africa), the opening of the Houphouët-Boigny Bridge and the inauguration of 1,152 kilometers of railways to Burkina Faso. The city thus became the place of exchange between West Africa and Europe, and the port experienced a perpetual growth in traffic.



Legend: (left) 1. Built-up Area, 2. Industrial Zones, 3. Extension zone planned for housing, 4. Extension zone planned for industrial estates, 5. Roads, 6. Railway
(right) Built-up area ■ colonial by 1910; ■ indigenous by 1910; ■ by 1960; ■ by 2000;
Source: (left) Barrère P. Le port d'Abidjan. In: Cahiers d'outre-mer. N° 14, 1951; (right) Steck, 2003

Figure 2.1.1 Urbanization History of Abidjan in 1901 (left) and in 2000 (right)

Since independence in 1960, the main objective of the Ivorian State's policy has been to fight against slums by the construction of fairly high standard housing (collective housing, villas, etc.), hence the almost five thousand dwellings were built between 1971 and 1977 by State real estate developers (notably SOGEFIHA and SICOGI).

Until the 1970s, the government developed a strict strategy to control urban planning rules, notably backed by the publication of Law No. 62-253 of July 31, 1962 related to urban plans, which enabled decision-makers to successfully develop urban projects with well-defined and respected standards: practical land developments in the city centers of the communes of Plateau, Treichville and Cocody were rigorously planned in order to accommodate the necessary missing facilities.

However, the 1980s were marked by a reapportion of rapid spatial extensions linked to the velocity of housing production, following the rapid creation of peripheral neighborhoods: the strong housing demand was recorded without the regulatory process and housing production mechanisms being able to adapt. This was followed, throughout the 1990s and into the 2000s, by a rapid expansion of urbanized areas and the proliferation of peripheral neighborhoods, resulting in large-scale land artificialization, the weakening of natural ecosystems and ever-increasing anthropic pressure.

(2) Recent Urbanization Trends

The various urban challenges facing Abidjan, together with the weakening of public urban development programs, led the public authorities, from the 1990s onwards, to rethink the urban planning system. This is how the 2000 Master Plan of Greater Abidjan was established. Developed by BNETD, its objective was to give new impetus to the planning process affected by the economic crisis. From then on, people began to talk about "Greater Abidjan" as a zone of economic and urban influence, with the Plateau as the center of Abidjan[1].

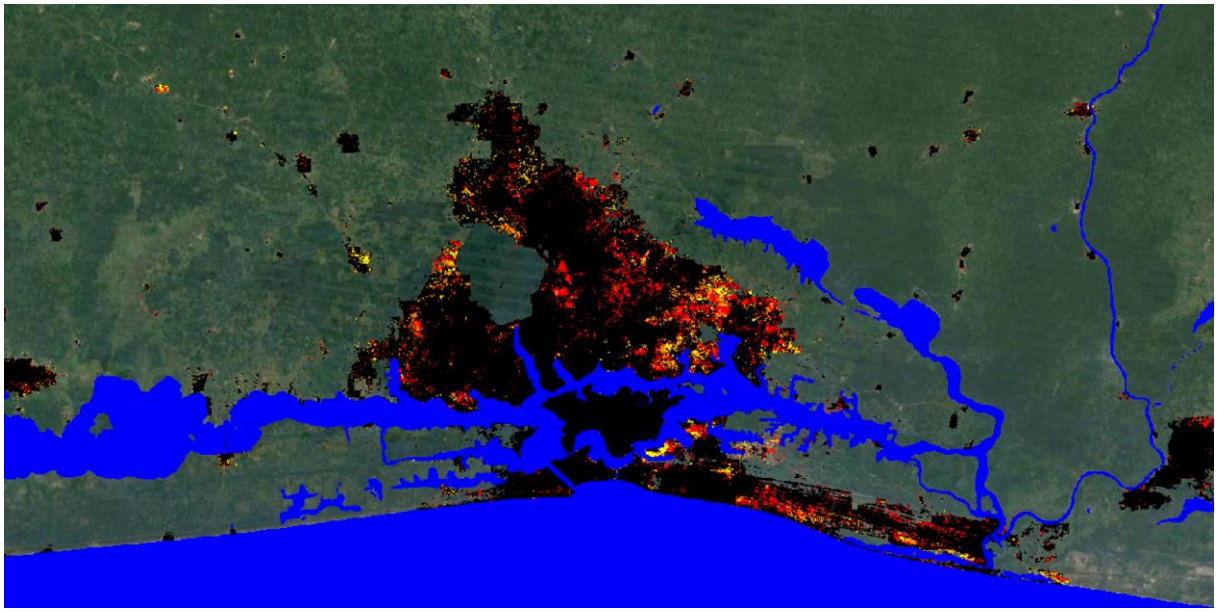
Subsequently, population growth, rural exodus as well as the military-political crisis of 2010, were factors in the acceleration of the urbanization of Greater Abidjan in the first decade of the 21st century. Indeed, the Greater Abidjan, consisting of 19 communes, was populated in 2014 by 5,309,485

[1] Koutoua, A., 2019, Planification urbaine et développement du Grand Abidjan: Cas des villes d'Anyama, de Bingerville et de Grand-Bassam. Abidjan, Université Felix Houphouet Boigny, Cocody, Thèse unique.

inhabitants with an average annual growth rate of 2.67%. The development of economic activities in the city of Abidjan, the installation of large commercial establishments, industrial companies and service activities, have encouraged young rural people to migrate to the city to improve their living conditions. According to the INS (2001), Côte d'Ivoire has gone from an embryonic urbanization situation to an explosive and remarkable urbanization situation in a few years.

Greater Abidjan is now made up of 6 urban peripheral cores to the main core formed by the city of Abidjan. The communes of Azaguié in the North, Grand-Bassam, Bonoua, Alépé in the East and Dabou and Jacqueville in the West, form these 6 other urban cores of Greater Abidjan. Anyama, Bingerville and Songon also represent important urban centers that are part of the Abidjan district (Koutoua, 2019). As part of the pursuit of national development plans, the State, through its technical structures and partners, has undertaken, at heavy investment cost, to strengthen and modernize the entire road network of Greater Abidjan. The reinforcement of the network of bus lines has been a central factor in the spatial evolution of Abidjan. It has enabled the city to expand beyond the boundaries of the historic center, which was once covered by small-scale transport, and to create links between these urban cores and the employment centers[2].

The urbanization of these Abidjan outskirts was also driven by private operators who, in partnership with the new local authorities (communes), invested massively in the real estate sector[3]. From the 1990s, the number of private real estate structures increased considerably. Several regulations were then put in place to govern and organize the real estate development sector, with a view to controlling Abidjan's urban growth and real estate construction.



Legend: Built-up area ■ before 2000; ■ by 2005; ■ by 2010; ■ by 2015
Source: Trends.Earth, Conservation International, 2018.

Figure 2.1.2 Recent Urbanization Trend of Abidjan

These promoters and real estate investors are interested in the immense land reserves of Bingerville, thus contributing to bringing it closer to the eastern part of the Abidjan agglomeration. Indeed, the relative availability of lands for urbanization, with relatively low land acquisition costs, the proximity of the city of Abidjan and the existence of a road network facilitating its access, have been factors that have favored the urbanization of this city. The scramble for urban land on the outskirts of the original

[2] Kassi-Djodjo, I., 2010, Rôle des transports populaires dans le processus d'urbanisation à Abidjan, *Les Cahiers d'Outre-Mer* [En ligne], 251 | document 6, mis en ligne le 01 juillet 2013, consulté le 01 mai 2019. URL : http://journals.openedition.org/com/6057 ; DOI : 10.4000/com.6057

[3] Loba, A., 2008. Dynamique de développement des villes côtières dans la région des lagunes : cas de Bingerville, Dabou et Grand-Lahou. Abidjan, Université de Cocody, Thèse unique, IGT, 389 p.

core of Bingerville is a strong trend in the post-SDUGA period. Indeed, at that time, the communes of Cocody, where construction was intended for a very wealthy clientele, and Yopougon, where self-construction dominated, had practically no more urban land available, and Bingerville, located in the extension of Cocody, became the ideal place of residence for a certain elite (executives and other civil servants) of society[4].

The urban structure of Greater Abidjan is thus characterized by various polarities, Bingerville, dormitory town and educational center par excellence, Anyma commercial city, Grand-Bassam, city with administrative and tourist vocation and Yopougon thought as a place par excellence intended for the Ivorian middle class, but which is isolated and enclosed because of the incompleteness of the road infrastructure[5]. The urban sprawl of Abidjan has been marked by the evolution and densification of the existing urban fabric but above all by the internal dynamics of the development of the communes most recently affected by urbanization, namely Abobo, Yopougon, Cocody, Grand-Bassam, Bingerville, etc.

Real estate development programs also generate several land conflicts related to speculation on the land market and others related to the issue of customary ownership of rural and urban land. This dynamic of demographic and urban growth is also at the origin of environmental degradation through water pollution due to the dumping of wastewater and household waste without any prior treatment, but also to the pressure on the ecosystem, especially the lagoon edges. (Brou, 2018)

2.1.2 Major Urban Development Projects

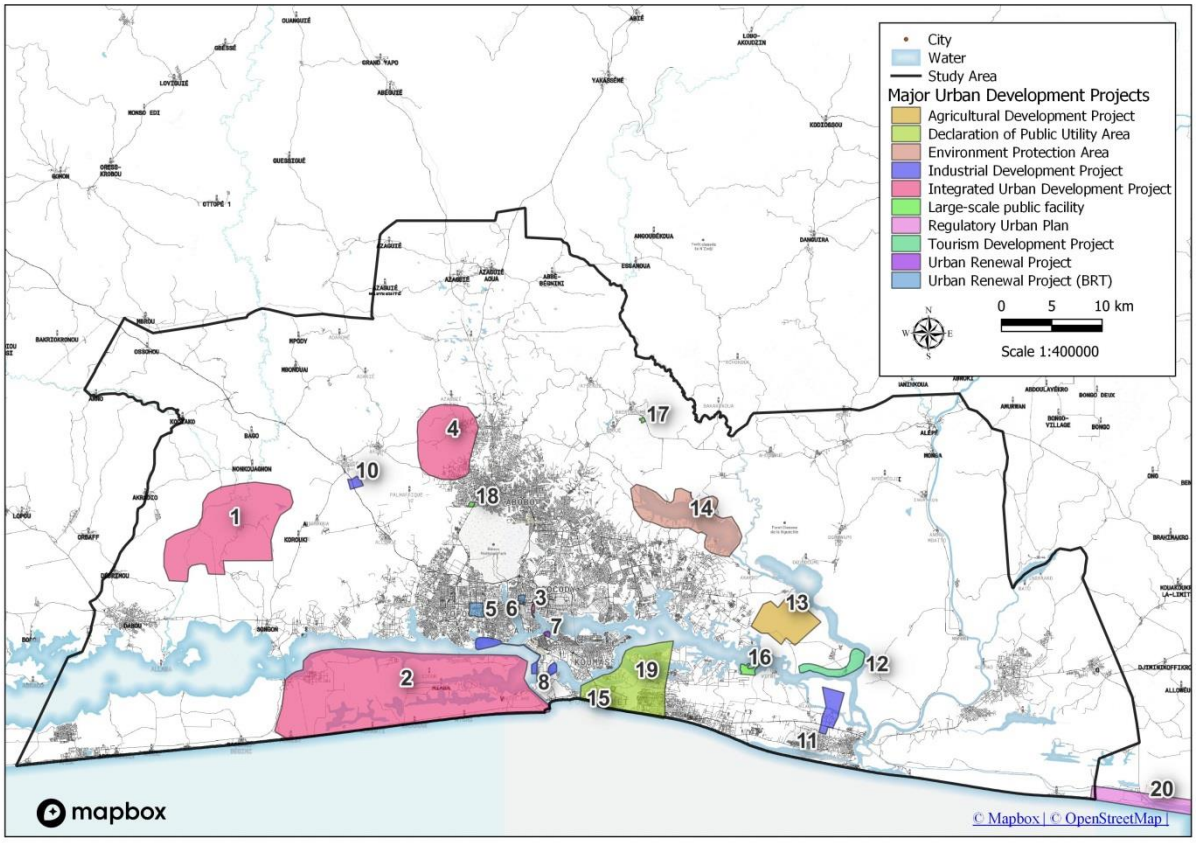
With the return of political stability since 2011 and the economic development of Côte d'Ivoire, many construction sites have emerged in the economic capital. At present, with regard to the important economic stakes related to the development of Côte d'Ivoire, Abidjan is concerned by many large-scale works on all its agglomeration.

In particular, among the many road infrastructure development projects, the city's flagship project is the development of the Abidjan metro, which is scheduled for delivery in the coming years. It is expected that this structuring infrastructure, which will considerably reduce travel times, will completely revolutionize the urban transport sector in Abidjan, with very significant impacts in terms of urban renewal on short term, and of real estate attractiveness and urban development around the future hubs on medium term.

Based on our consultations with Taskforce members, we were able to obtain information on the urban and spatial development projects that are currently ongoing or planned in the wake of the economic dynamism and urban transport revolution that the city will experience. These projects consist of new towns development plans in the peripheral areas, urban renewal operations in the city center, industrial or tourist development plans, environmental protection plans or even sectors of Declaration of Public Utility that will have to be freed from illegal occupations. The map and table below briefly present the major urban development projects in Abidjan.

[4] Brou, K. (2018), Aménagement urbain et dynamique foncière en contexte post- crise dans la commune de Bingerville, Rev. ivoir. anthropol. sociol. KASA BYA KASA, n° 38

[5] Steck, J. (2008). Yopougon, Yop city, Poy... périphérie et modèle urbain ivoirien. Autrepart, 47, 227-244. https://doi.org/10.3917/autr.047.0227



Source: JICA Expert Team

Figure 2.1.3 Map of Major Urban Development Projects in Study Area

Table 2.1.1 List of Major Urban Development Projects in Study Area

ID	Name of the project	Type	Status	Completion	Note
1	Tabadié New Town Development Project	Integrated Urban Development Project	Plans under approval (2nd half of 2022)	No information	-
2	Coastal Area Urban Development Project	Integrated Urban Development Project	Plans under elaboration (end of 2022)	Expected in 2025	MCLU has published an internal note to freeze the issuance of all permits until further notice in the area.
3	Cocody Bay Integrated Development Project	Integrated Urban Development Project	Under construction	Expected in 2024	Financed by Morocco, the planned development includes hotels, marina, exhibition center, public spaces, etc.
4	Akwaba City New Town Development	Integrated Urban Development Project	Plans under approval (end of 2022)	No information	Lands, under customary tenure, are being developed to create a modern new town.
5	Area of future BRT station of Yopougon	Urban Renewal Project (BRT)	Under study	Expected in 2025	Financed by World Bank
6	Area of future BRT station of Adjamé	Urban Renewal Project (BRT)	Under study	Expected in 2025	Financed by World Bank
7	“Smart Biafra” smart city redevelopment Project	Urban Renewal Project	Under study	No information	Proposition from a French-Chinese consortium of engineering companies
8	Autonomous Port of Abidjan Development Master Plan	Industrial Development Project	Under study	Expected in 2024	Dutch consultants have been hired for the study under program led by Port of Amsterdam

9	PK26 Industrial Zone Development Plan	Industrial Development Project	Under study	Expected in 2024	-
10	PK24 Industrial Zone Development Plan	Industrial Development Project	Under study	Expected in 2024	-
11	Technical Innovation Village (VITIB)	Industrial Development Project	Under construction	No information	
12	"Billionaires Bay" Tourism Development Project	Tourism Development Project	Plans did not start yet	Expected in 2025	PFO company is in charge of the Study.
13	Palmafrique plantations	Agricultural Development Project	Under implementation	Expected in 2025	Plantations are being converted.
14	Natural Reserve of Aghien	Environment Protection Area	Already defined by Decree	-	Natural Reserve has been promulgated to refrain urbanization on lagoon shore area
15	Exhibition center	Large-scale public facility	Under construction	Completed in 2023	
16	Future University	Large-scale public facility	Plans did not start yet	No information	Reserved land by Ministry of Higher Education. The latter shall purge customary rights.
17	Soccer training center	Large-scale public facility	ACD has been obtained	Expected in 2025	Private investment
18	Abobo New Car Wrecking Yard	Large-scale public facility	Under relocation	Expected in 2024	Abobo old car wrecking yard is being cleared out and population living there are relocated
19	Aerocity DUP Area	Declaration of Public Utility Area	Promulgated	-	3,200 ha
20	PUD of Assinie	Regulatory Urban Plan	Approved in 2020	-	

Source: JICA Expert Team
Note: Funding sources have been indicated for the projects for which information was made available.

2.1.3 Present Land Use and Land Cover

The land use land cover (LULC) map was updated as it has been more than seven years since the land use was prepared in SDUGA. In this project, JICA Project Team created a more detailed current LULC map at urban block level for the Study Area using the guidelines in Mapping Guide v6.2 for a European Urban Atlas[6].

The draft LULC map presented in Progress Report-1 has been updated reflecting the comments from MCLU and the expansion of the Project Area for SDUGA 2040.

(1) Land Use Land Cover Nomenclature

The LULC Nomenclature was determined through multiple working sessions with the GIS taskforce members and representatives of MCLU and CNTIG, resulting in a total of 37 categories and their definitions shown in Table 2.1.2 below.

[6] https://land.copernicus.eu/user-corner/technical-library/urban_atlas_2012_2018_mapping_guide

Table 2.1.2 Land Use Land Cover Nomenclature

Category	#	ID	Name			Definition
Unbuilt areas	1	EnB-1	Rural areas	Agriculture	Agricultural installation	Human planted/plotted cereals, grasses, and crops not at tree height. Example: Arable lands, permanent crops
	2	EnB-2			Hydromorphic agricultural installation	Areas of agricultural crops on hydromorphic land (soil that evolves in the presence of excess water), (Agriculture in wetlands).
	3	EnB-3			Arboriculture/ fruit plantations	Arboriculture includes all areas of fruit tree production.
	4	EnB-4		Industrial plantations	Coffee and cocoa plantations	Self-explanatory
	5	EnB-5			Rubber plantations	Self-explanatory
	6	EnB-6			Palm and coconut plantations	Self-explanatory
	7	EnB-7		Forest areas	Dense forest	A dense forest is a space where the vegetation is very important, implying a moist and humid heat. Rainfall is abundant. Dense forests are opposed to clear/open forests.
	8	EnB-8			Degraded forest	Degraded forests are forests characterized by a partial destruction of their canopy, they are transformed into open plant formations dominated by herbaceous plants including grasses; more or less dotted with trees or shrubs.
	9	EnB-9			Gallery forest	Gallery forest is a forest formation associated with streams, wetlands or other permanent water sources. We speak of gallery forest when the canopy is joined above a river or a small river, or a wetland (the presence of water may be temporary).
	10	EnB-10			Freshwater swamp forest	Swamp forests include mostly willow and alder stands. These woodlands (as close to water as possible) develop in wetlands from which water drains only very slowly: at springs, ponds or depressions on the edge of watercourses.
	11	EnB-10a			Mangrove	The mangrove is a maritime wetland ecosystem including a grouping of specific plants mainly woody.
	12	EnB-11		Grasslands	Shrubs/ thickets	vegetation dominated by shrubs, of variable size (roughly between 0.5 and 7 meters high), of dense and tangled appearance, most of the time difficult to penetrate on foot. It is commonly called "bushes" or "scrub".
	13	EnB-12			Herbaceous area	Vegetation formations dominated by grasses and woody plants.
	14	EnB-13		Vacant land	Bare ground	Bare soils, areas of earthworks in the hills in prospect of urban development. Construction Site and Vacant land are also included.
	15	EnB-15			Areas under subdivision	Areas in which subdivisions are being carried out: future urban blocks are appearing, roads are designed, constructions have started etc.
	16	EnB-16		Wetlands	Swamp areas	Swamp areas are characterized by a shallow, stagnant layer of water, modest in size and a marsh component, in which aquatic vegetation grows that can become very dense. Swamps include areas of land with marshes, with stagnant water. These areas are also considered a floodplain.
	17	EnB-17			Water	Self-explanatory
	18	EnB-18	Urban areas	Unbuilt areas in urban extent	Regularly-flooded vegetation	Flooded vegetations located on the shore of the lagoon or near bodies of water and irrigated agriculture
	19	EnB-19			Natural Green Area	Green spaces which are located inside the urban area, without specific use
	20	EnB-20			Cemetery	Self-explanatory
Built-up areas	21	EB-H1		Residential	Residential High Density	Area dominated with residential housing or human settlements with estimated population density higher than 260 per ha

	22	EB-H2			Residential Medium Density	Area dominated with residential housing or human settlements with estimated population density between 70 and 260 per ha
	23	EB-H3			Residential Low Density	Area dominated with residential housing or human settlements with estimated population density lower than 70 per ha
	24	EB-1			Informal Settlement	Areas with high density of small roofs made from different types of materials
	25	EB-2		Economic Activities	Mixed	Areas where shops, office and housing coexist. Typically buildings with first floor is shops or offices and upper floors are residential.
	26	EB-3			Commercial	Areas dominated with retails, shops, restaurants and commercial activities
	27	EB-4			Office	Areas dominated with offices or business district
	28	EB-5			Industrial	Areas for factories, industrial parks, warehouse
	29	EB-6		Public services and administration	Educational Facilities	primary schools, junior high schools, senior high schools, universities, colleges, vocational schools, other various schools
	30	EB-7			Health Facilities	Hospital, pharmacy, vaccination center, clinic
	31	EB-8			Government Facilities	offices for local, regional, national government and other public organizations such as government offices, city halls, town halls, post offices, courthouses, tax offices, revenue offices
	32	EB-9			Security Facilities	police stations, gendarmerie offices, military sites, prisons, fire stations
	33	EB-10			Transportation Facilities	stations, bus terminals, water-bus terminals, truck terminals, port facilities, airport facilities, car parks, depots, warehouses
	34	EB-11			Sports and Tourism Facilities	stadium, grounds, gymnasiums, pools, golf courses, parks, children's playgrounds, green zones, tourist facilities, historic sites, gardens
	35	EB-12			Utilities	wastewater treatment plants, power plant, water tanks, sanitary facilities, waste disposal sites, final landfill sites, substations, slaughterhouses, broadcast stations, telecommunications
	36	EB-13			Cultural Facilities	museum, art galleries, libraries
	37	EB-14			Places of worship	churches, mosques, temples

Source: JICA Project Team

(2) Data Source

The following five main sources were used in the production of the existing LULC. The number in parentheses indicates the year of data creation.

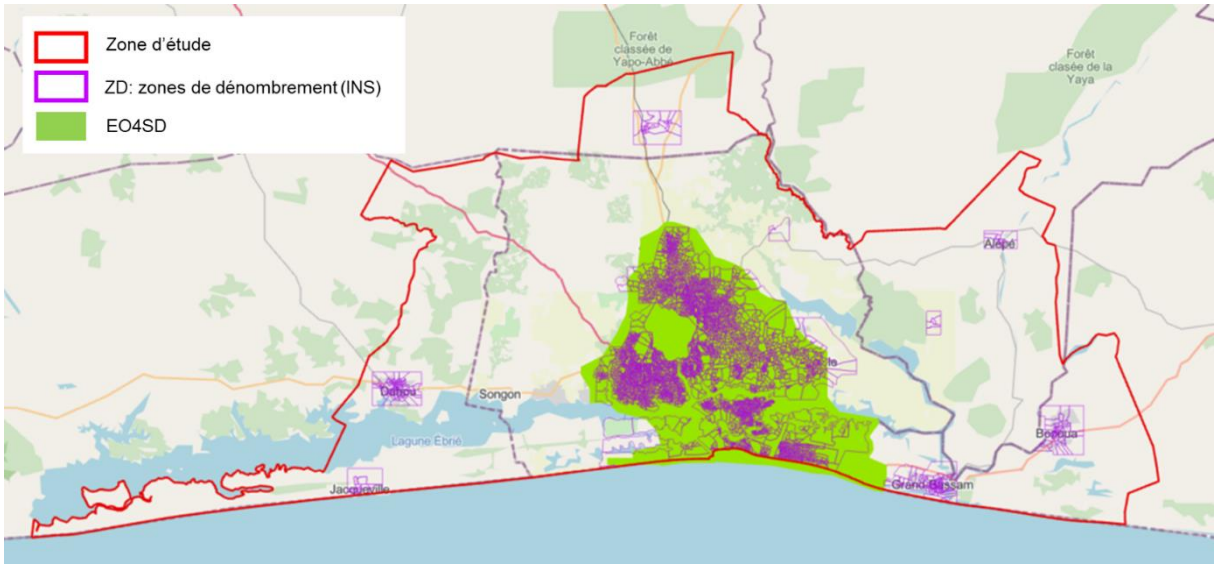
- EO4SD-Urban Project: Abidjan City Report (2019)[7]
- Esri 2020 Land Cover[8] using Sentinel-2
- Population Estimation by ZD: zones de dénombrement (INS) (2020)
- OpenStreetMap (2022)
- Spatial Land Surveillance; SST produced by IGN FI, CNTIG and BNEDT/CIGN for the Ministry of Environment and Sustainable Development (MINEDD) (2016)

Furthermore, SEA consultation workshops were held in all 19 communes in the Study Area from January 31 to February 23, 2022. The locations of LULC categories #20, 25-37 were identified by local residents, which were digitized afterward.

[7] https://www.thegpsc.org/knowledge-products/geospatial-data-and-indicators/eo4sd-urban-project-abidjan-city-report
[8] https://www.arcgis.com/home/item.html?id=d6642f8a4f6d4685a24ae2dc0c73d4ac, https://www.arcgis.com/home/item.html?id=fc92d38533d440078f17678ebc20e8e2

(3) GIS data processing

Figure 2.1.4 shows the areas of availability for INS ZD and EO4SD. Figure 2.1.5 shows the overall flow of GIS data processing, partly comprising two flows, one for central Abidjan where the EO4SD-Urban Project data is available and the other for the rest of the Study Area.



Source: Map created by JICA Project Team using OpenStreetMap basemap

Figure 2.1.4 Availability of Data Source

The procedures of the overall flow shown in Figure 2.1.5 are described below:

(a) For the area outside of the EO4SD-Urban Project, built-up areas and land cover classifications were identified using Esri 2020 Land Cover data

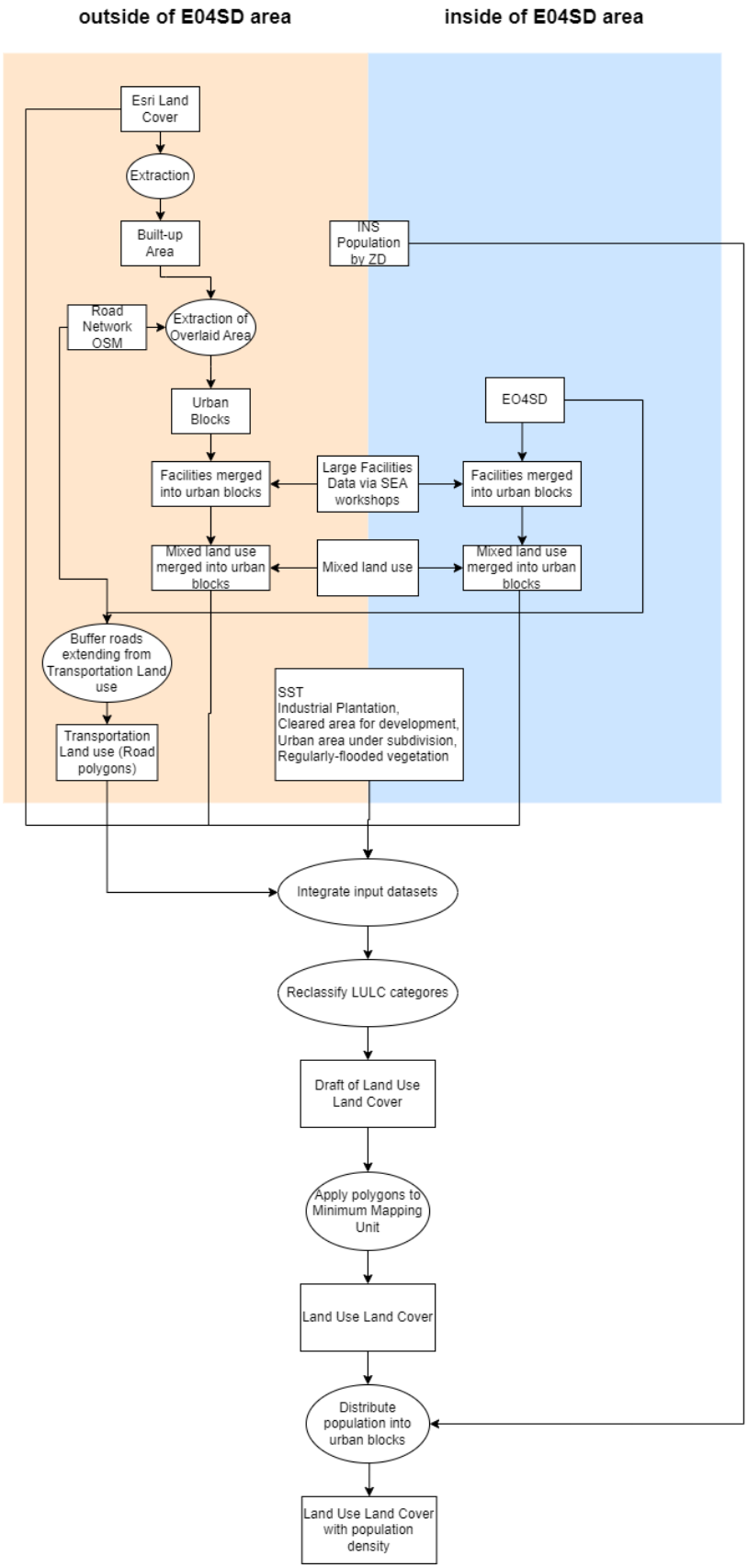
(b) For areas classified into Forest by (a), land cover classes and data were applied by the SST data from CNTIG.

(c) Facility data and mixed land use data were integrated into the built-up area extracted from Esri 2020 Land Cover data. The remaining areas were considered as residential area

(d) Road polygon data and other digitized data were integrated with the processed product and reclassified into the newly defined categories. The method of identifying areas of each nomenclature is described in Table 2.1.3. For roads outside the EO4SD area within the Project area, 8m and 12m road widths defined in the EO4SD were applied.

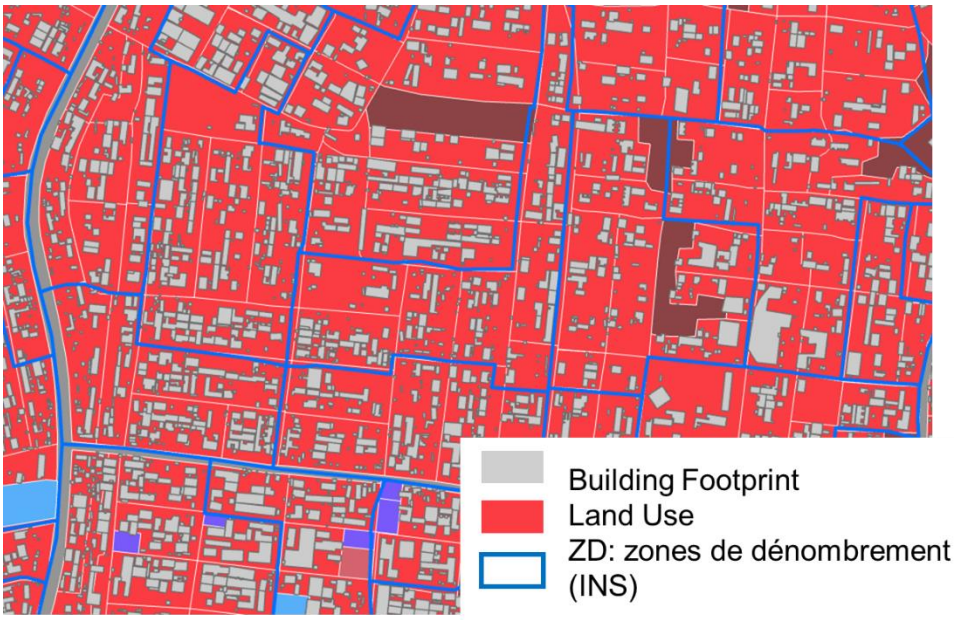
(e) In accordance with the Minimum Mapping Unit defined in the guideline, areas with a land cover of less than 2,500 sq. m within the EO4SD-Urban Project and 10,000 sq. m outside were merged into the classification of the neighboring area that shares the longest boundary.

(f) Figure 2.1.6 shows an example that the ZD, the unit area for INS population estimates, consists of several urban blocks. The population was distributed into urban blocks for residential, informal settlement, and mixed land uses. To distribute it to each urban block, additional GIS data on building footprint with height information was used. First, the gross floor area of each building (area per floor times the number of floors) was calculated and was accumulated in each urban block. A percentage was determined based on the gross floor area of urban blocks within the same ZD, and the population was divided by that percentage.



Source JICA Project Team

Figure 2.1.5 Overall flow of GIS Processing for the present LULC production



Source: JICA Project Team

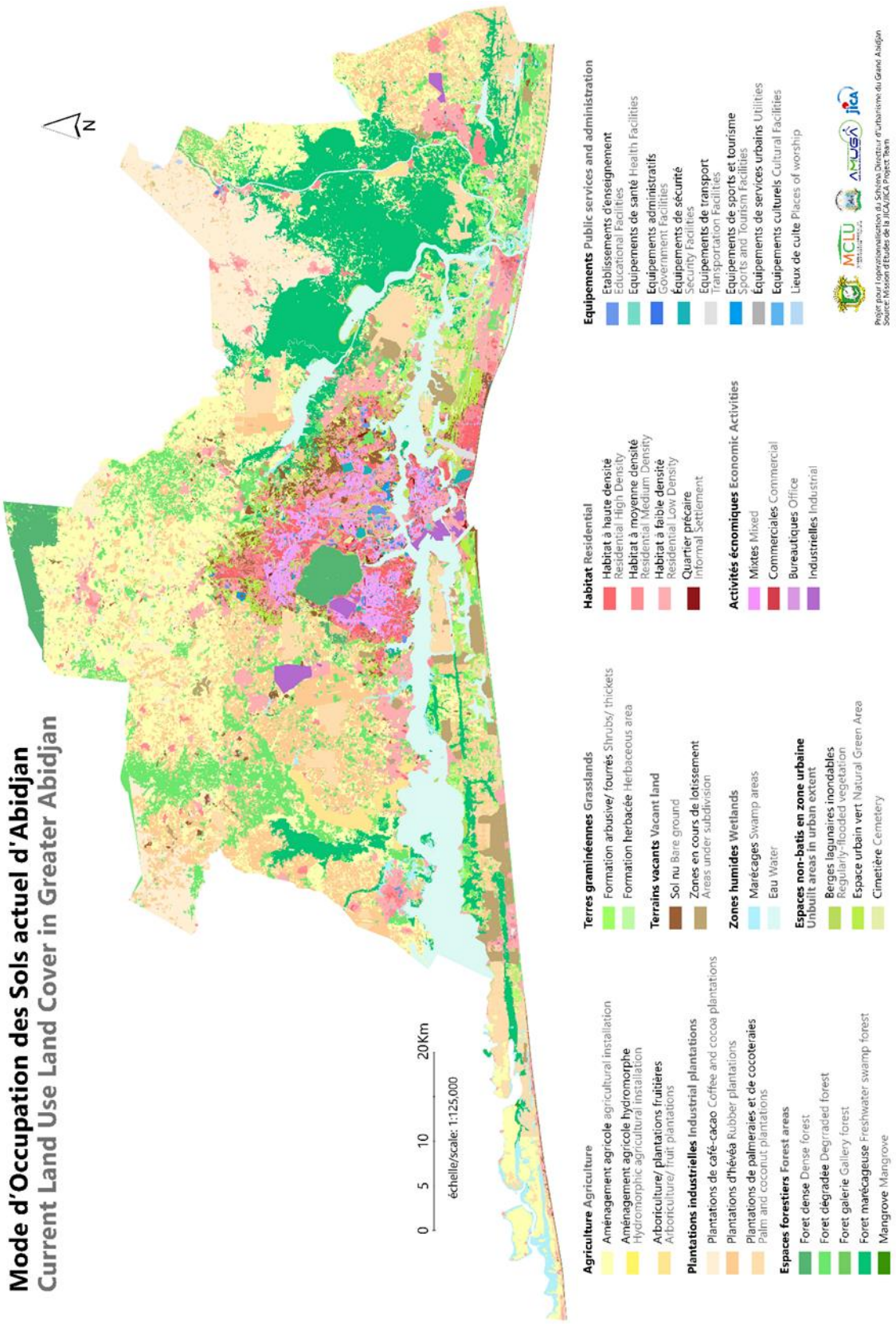
Figure 2.1.6 Boundaries of building footprints, urban blocks, and ZD

Table 2.1.3 Sources and Identification Methods of LULC

#	Name	Sources	Identification Methods
1	Agricultural installation	Esri Land Cover 2020 (Sentinel-2) EO4SD-Urban Project SST	Esri Land Cover 2020 (Sentinel-2) EO4SD-Urban Project SST
2	Hydromorphic agricultural installation		
3	Arboriculture/ fruit plantations		
4	Coffee and cocoa plantations	Online High-resolution Satellite Imagery SST	Manual Digitization of areas that meet the definition SST
5	Rubber plantations		
6	Palm and coconut plantations		
7	Dense forest	Esri Land Cover 2020 (Sentinel-2) SST	Forests from Esri source and EO4SD are merged except the area less than 50,000 sq. m in urban core. Excluded area goes to Natural Green Area SST
8	Degraded forest	Esri Land Cover 2020 (Sentinel-2) SST	Scrub/Shrub and Grass are integrated into this category. SST
9	Gallery forest	Esri Land Cover 2020 (Sentinel-2) SST	Forests from Esri source and EO4SD are merged except the area less than 50,000 sq. m in urban core. Excluded area goes to Natural Green Area SST
10	Freshwater swamp forest	Esri Land Cover 2020 (Sentinel-2) SST	Forests from Esri source and EO4SD are merged except the area less than 50,000 sq. m in urban core. Excluded area goes to Natural Green Area SST
11	Mangrove	SST	SST
12	Shrubs/ thickets		
13	Herbaceous area		
14	Bare ground	Online high-resolution Satellite Imagery & EO4SD-Urban Project & Esri Land Cover 2020 (Sentinel-2) SST	Manual Digitization of areas that meet the definition Bare land, Bare Ground, Construction Sites, Land without current use, Mineral Extraction and Dump Sites are integrated into this category. SST
15	Areas under subdivision	Online High-resolution Satellite Imagery	Manual Digitization of areas that meet the definition
16	Swamp areas	SST	SST

17	Water	Esri Land Cover 2020 (Sentinel-2) & EO4SD-Urban Project SST	Marine Water, Inland Water are integrated into this category. SST
18	Regularly-flooded vegetation	Online high-resolution Satellite Imagery & Esri Land Cover 2020 (Sentinel-2) &EO4SD-Urban Project	Manual Digitization of areas that meet the definition Flooded vegetation and Wetlands are integrated into this category.
19	Natural Green Area	EO4SD-Urban Project + SEA Consultation	Rename "Other Natural and Semi-natural areas (Savannah, Grassland)" of EO4SD.
20	Cemetery	Inputs from the locals in SEA consultation workshop & OSM	Digitization and editing of areas for given inputs
21	Residential High Density	EO4SD-Urban Project & Esri Land Cover 2020 (Sentinel-2 &Population Estimation by ZD (INS)	urbanizaed areas except the areas of economic activities and public services and administration
22	Residential Medium Density	EO4SD-Urban Project & Esri Land Cover 2020 (Sentinel-2) &Population Estimation by ZD (INS)	urbanizaed areas except the areas of economic activities and public services and administration
23	Residential Low Density	EO4SD-Urban Project & Esri Land Cover 2020 (Sentinel-2) &Population Estimation by ZD (INS)	urbanizaed areas except the areas of economic activities and public services and administration
24	Informal Settlement	Inputs from the locals in SEA consultation workshop & Manual digitization over online high-resolution satellite imagery &Population Estimation by ZD (INS)	Digitization and editing of areas for given inputs
25	Mixed	Inputs from the locals in SEA consultation workshop & Manual selection of residential areas &Population Estimation by ZD (INS)	Digitization and editing of areas for given inputs
26	Commercial	Inputs from the locals in SEA consultation workshop & EO4SD-Urban Project	Digitization and editing of areas for given inputs
27	Office	Inputs from the locals in SEA consultation workshop & EO4SD-Urban Project	Digitization and editing of areas for given inputs
28	Industrial	Inputs from the locals in SEA consultation workshop & OSM & EO4SD-Urban Project	Digitization and editing of areas for given inputs
29	Educational Facilities	Inputs from the locals in SEA consultation workshop & OSM	Digitization and editing of areas for given inputs
30	Health Facilities	Inputs from the locals in SEA consultation workshop & OSM	Digitization and editing of areas for given inputs
31	Government Facilities	Inputs from the locals in SEA consultation workshop & OSM	Digitization and editing of areas for given inputs
32	Security Facilities	Inputs from the locals in SEA consultation workshop & OSM	Digitization and editing of areas for given inputs
33	Transportation Facilities	Inputs from the locals in SEA consultation workshop & OSM	Digitization and editing of areas for given inputs
34	Sports and Tourism Facilities	Inputs from the locals in SEA consultation workshop & OSM	Digitization and editing of areas for given inputs
35	Utilities	Inputs from the locals in SEA consultation workshop & OSM	Digitization and editing of areas for given inputs
36	Cultural Facilities	Inputs from the locals in SEA consultation workshop & OSM	Digitization and editing of areas for given inputs
37	Places of worship	Inputs from the locals in SEA consultation workshop & OSM	Digitization and editing of areas for given inputs

Source: JICA Project Team

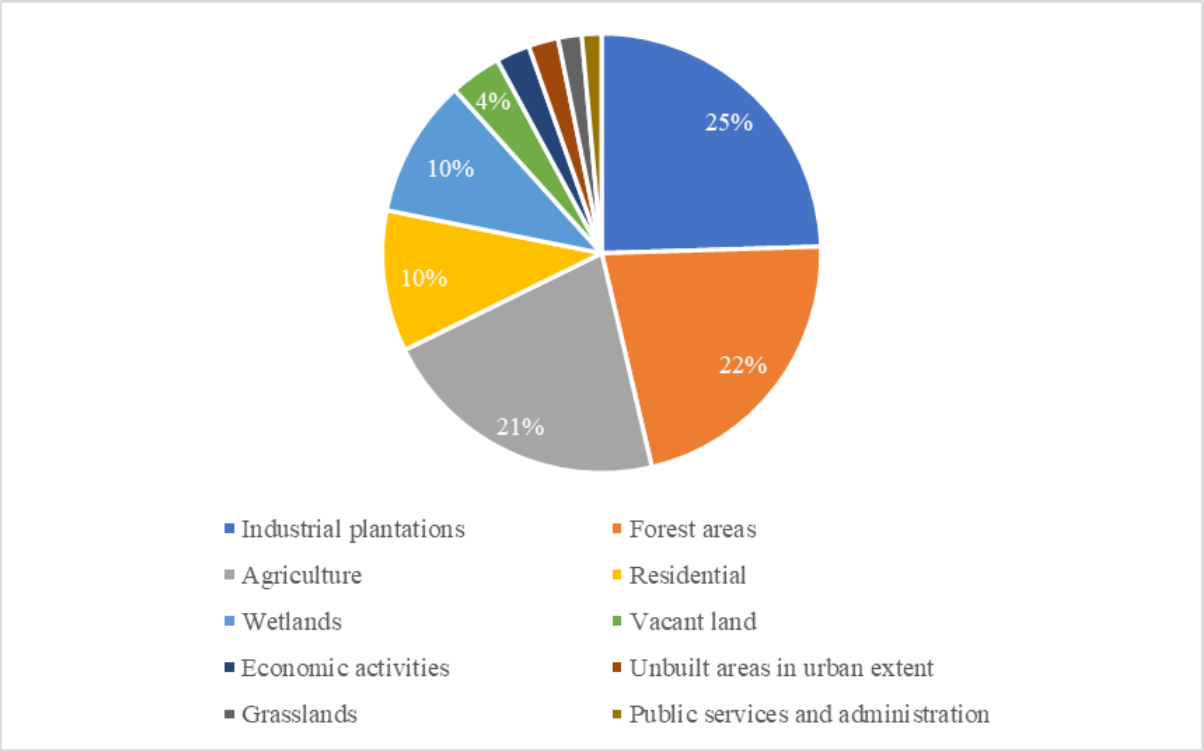


Source: JICA Project Team

Figure 2.1.7 The present Land Use Land Cover of the Greater Abidjan

(4) Area by Land Use Category

Figure 2.1.8 shows the area distribution of land use land cover by the main category for Greater Abidjan. Industrial Plantation, Forest Area, and Agriculture account for more than 20% respectively, and 68% of the Project Area. This suggests that 46% of the total area for Industrial Plantation and Agriculture is used for primary economic activities. Table 2.1.4 shows the area of land use land cover by category in hectare and percentage. Freshwater swamp forest accounts for the highest percentage of Forest category at 12.2%, indicating the likelihood of a large portion of the land as unsuitable for urbanization.



Source: JICA Project Team

Figure 2.1.8 Proportion of area by land use land cover subcategory for the Greater Abidjan

Table 2.1.4 Area of land use land cover by category for the Greater Abidjan

Main Category	Name	Area (ha)	Share (%)
Residential	Residential Low Density	25,246.39	6.14
	Residential Medium Density	11,350.20	2.76
	Residential High Density	5,975.65	1.45
	Informal Settlement	186.32	0.05
Economic activities	Mixed	7,241.80	1.76
	Industrial	2,637.99	0.64
	Commercial	322.96	0.08
	Office	75.27	0.02
Public services and administration	Educational Facilities	1,049.90	0.26
	Sports and Tourism Facilities	755.71	0.18
	Security Facilities	658.23	0.16
	Places of worship	426.25	0.1
	Health Facilities	378.9	0.09
	Government Facilities	172.62	0.04
	Utilities	42.22	0.01
	Cultural Facilities	18.46	0.00
	Transportation Facilities	2,485.66	0.60
Unbuilt areas in urban extent	Natural Green Area	6,820.52	1.66
	Regularly-flooded vegetation	2,019.43	0.49
	Cemetery	216.85	0.05

Vacant land	Areas under subdivision	8,564.82	2.08
	Bare ground	6,953.11	1.69
Agriculture	Agricultural installation	82,912.03	20.16
	Arboriculture/fruit plantations	5,012.37	1.22
	Hydromorphic agricultural installation	147.86	0.04
Forest areas	Freshwater swamp forest	50,285.05	12.23
	Degraded forest	31,172.37	7.58
	Dense forest	8,030.38	1.95
	Gallery forest	178.43	0.04
	Mangrove	16.54	0.00
Grasslands	Shrubs/ thickets	6,157.27	1.50
	Herbaceous area	1,009.24	0.25
Industrial plantations	Rubber plantations	40,098.48	9.75
	Palm and coconut plantations	36,070.13	8.77
	Coffee and cocoa plantations	24,672.25	6.00
Wetlands	Water	36,670.17	8.92
	Swamp areas	5,224.90	1.27
Total		411,256.71	100.00

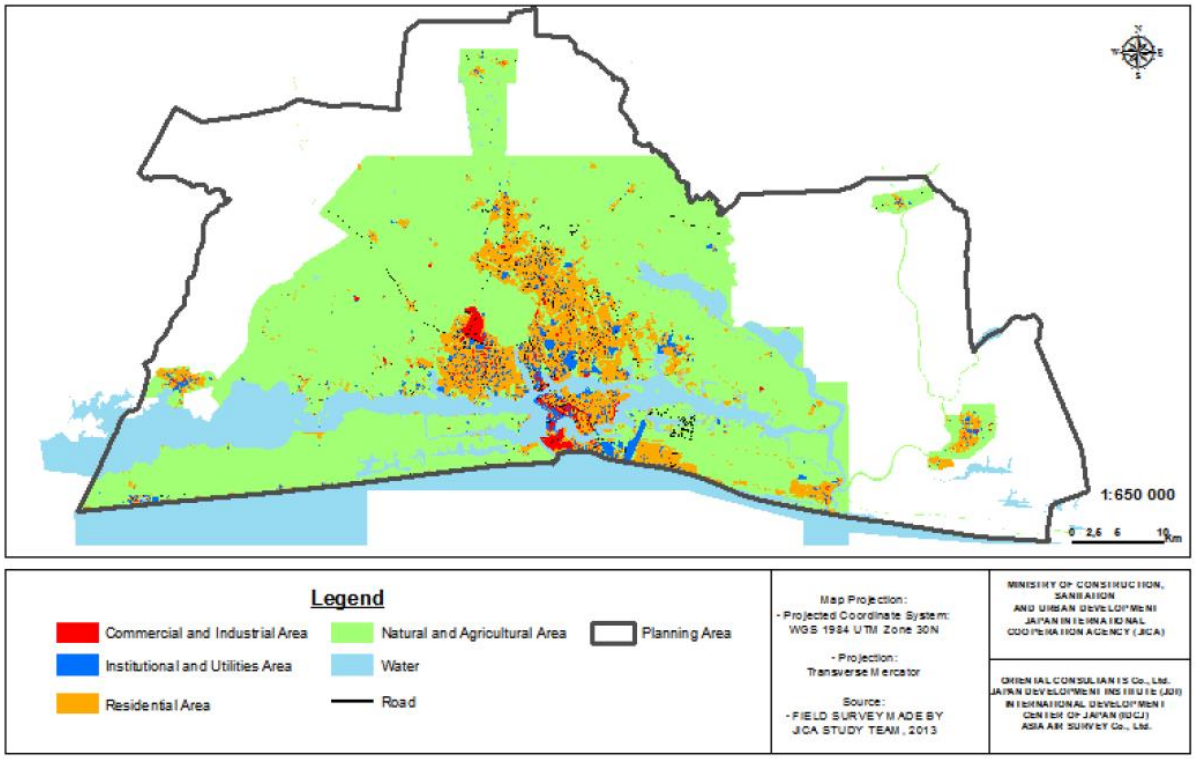
Source: JICA Project Team

(5) Change of Land Use Land Cover between SDUGA and SDUGA 2040

Table 2.1.5 Area by land use category of SDUGA

Main Category	Land Use Category	Area (ha)	Proportion (%)
Residential Areas	Informal Settlement	2,856	1.51
	Low Density Residential Area	14,957	7.93
	Medium Density Residential Area	3,901	2.07
	High Density Residential Area	4,710	2.50
Commercial and Industrial Areas	Industry	1,631	0.86
	Commercial/Office	1,077	0.57
Institutional and Utilities Areas	Health	365	0.19
	Education	1,801	0.95
	Government Offices	459	0.24
	Sports and Tourism	378	0.20
	Transport	644	0.34
	Security	860	0.46
	Utilities	158	0.08
	Cultural	757	0.40
	Cemeteries	347	0.18
	Roads	1,339	0.71
Other Land Use Areas	Other	8,145	4.32
Natural and Agricultural Areas	Agriculture	74,260	39.36
	Forest	42,466	22.51
	Grassland	24,817	13.15
	Riparian Land	2,737	1.45
	Other Natural and Agricultural Areas	12	0.01
Total		188,677	100.00

Source: SDUGA



Source: SDUGA

Figure 2.1.9 Existing Land Use Map of SDUGA

The total area of the existing land use of SDUGA is 189,000 ha, which accounts for 54% of the Study Area.

Table 2.1.6 Changes of Land Uses in Greater Abidjan from 2014 to 2022

SDUGA-1 (2014)			SDUGA 2040 (2022)			Change	
Land Use Category	Area (ha)	Proportion (%)	Land Use Category	Area (ha)	Proportion (%)	ha	%
Residential area	26,424	14.00	Residential	42,759	10.40	16,335	1.62
Commercial and industrial area	2,708	1.44	Economic activities	10,278	2.50	7,570	3.80
Institutional and utilities	7,108	3.77	Public services and administration	5,988	1.46	-1,120	0.84
Non-developed arras: • Agriculture • Forest • Grassland • Riparian Land • Other	144,292	76.48	Industrial plantations	100,841	24.52	-	-
			Agriculture	88,072	21.42	-	-
			Wetlands	41,895	10.19	-	-
			Grasslands	7,167	1.74	-	-
			Forest areas	89,683	21.81	-	-
			Vacant land	15,518	3.77	-	-
			Unbuilt areas in urban extent	9,057	2.20	-	-
			Sub-total	352,232	85.65	207,940	2.44
Others	8,145	4.32	N/A	411,257	100.00	222,580	2.18
Total	188,677	100.00	Total	100,841	24.52	207,940	2.44

Source: JICA Project Team

Table 2.1.6 shows the area of each land use category in the SDUGA. Due to the different data coverage between SDUGA and SDUGA 2040 and the updating of land use categories through discussions with the counterparts in SDUGA 2040, the land uses in the two SDUGAs cannot be compared directly. However, a common trend observed is that agriculture, forests, and grasslands account for a large portion,

followed by residential areas.

2.1.4 Precarious Neighborhoods

(1) Existing Condition

"Diagnostic du District Autonome d'Abidjan, Diagnostics et Plans D'Amélioration des Quartiers Précaires des 13 Communes du District D'Abidjan", May 2014, by Arc Ingénuerie and Synergie Expertise defines « precarious neighborhood» according to the following conditions.

- Lack of legal status for occupying the site (land title)
- Building densification (irregular grid)
- Difficult access to the inhabited site
- Lack of basic social facilities (water, electricity, sanitation, health canter, market etc.)
- Precarious building materials (cardboard roofs, sheet metal walls, wooden walls)
- The poverty of the inhabitants

This study identified 132 precarious neighborhoods within the Autonomous District of Abidjan in 2014 with a total area of 5,017 thousand hectares and a population of 1.3 million as shown in Table 2.1.5. Their locations are shown in Figure 2.1.9 in purple color.

Table 2.1.7 Precarious Neighborhoods in the Autonomous District of Abidjan in 2014

Commune	Precarious Neighborhood		Area		Estimated Population	
	Number	%	10^3 ha	%	thousand	%
Abobo	16	12.1	1,320	26.3	241	17.9
Adjamé	12	9.1	192	3.8	109	8.1
Anyama	6	4.5	116	2.3	124	9.2
Attécoubé	14	10.6	338	6.7	80	5.9
Bongerville	3	2.3	164	3.3	35	2.6
Cocody	14	10.6	198	3.9	256	19.0
Koumassi	8	6.1	258	5.1	94	7.0
Marcory	3	2.3	80	1.6	12	0.9
Tray	1	0.8	2	0.0	0.3	0.0
Port-Bouët	14	10.6	1,347	26.8	210	15.6
Songon	11	8.3	95	1.9	21	1.6
Trechville	3	2.3	31	0.6	26	1.9
Yopugon	27	20.5	876	17.5	137	10.2
Total	132	100.0	5,017	100.0	1,345	100.0

Source: "Diagnostic du District Autonome d'Abidjan, Diagnostics et Plans D'Amélioration des Quartiers Précaires des 13 Communes du District D'Abidjan" , May 2014, by Arc Ingénuerie and Synergie Expertise

The following issues were clarified.

- Land and site security is a problem for 41% of the precarious neighborhoods in DAA. The most affected communes are located in the northern part of DAA, on hilly sites that make it risky to set up a housing estate.
- Infrastructure-related problems are common to all precarious neighborhoods and essentially boil down to the non-availbiliuty of toilets (37.1%), the absence of sewage and rainwater drainage system (77.5%) and the absence or poor state of pipes and sewers.
- Difficulty of internal circulation in neighborhoods and no roads
- Insecurity issue: 54% of household heads are victims of theft, 38% flood victims and 20% fire victims
- 48% working in the informal sector

- Requirements for improvement in the social aspect: (improving living condition) financing income-generating activities, sanitation and hygiene, professional integration through job creation, electrification, demand for health services, food aid, security and protection, road development (conditions for leaving the neighborhood) provision of housing or social housing, compensation, professional intgration
- Requirements for improvements in infrastructure: (Needs No.1) catering facilities, play and entertainment areas, health centers, schools (Need No 2) marlet (Needs No. 3) installation of a sanitation system and garbage bins

This study classified the 132 precarious neighborhoods into those restucurable and those non-restructurable. The neighborhoods that can restructured were identified according to the following factors.

- A site without land dispute
- An approved or pending subdivision
- A site with no natural or human risks for the population
- A neighborhood location that does not hinder major national or district projects
- One or more neighborhoods with large surface areas and a large number of inhabitants
- A neighborhood in need of basic infrastructure and facilities

Table 2.1.8 Structurable and Non-structurable Precarious Neighborhoods in DAA

Item	Unit	Restructurable Neighborhoods	Non-restructurable Neighborhood	Total
Number	Number	78	54	132
Area	10^3 hectares	3,008	1,801	4,809
Population	10^3	837	419	1,256

Source: "Diagnostic du District Autonome d'Abidjan, Diagnostics et Plans D'Amélioration des Quartiers Précaires des 13 Communes du District D'Abidjan", May 2014, by Arc Ingénuerie and Synergie Expertise
Note. The gaps between the totals of Table 2.1.4 and 2.1.5 are not explained in the report.

(2) Proposed Program and Cost

Table 2.1.7 presents the summarized costs for the improvement of the precarious neighborhoods in DAA. "Infrastructure and rehabilitation", mainly for the non-restructurable neighborhoods, accounts for almost two-thirds of the total cost. The total cost of CFA 2,504,152 million or US$ 4,098 million is equivalent to the annual cost of CFA 125,205 million or US$ 204 million if this program is implemented over 20 years.

Table 2.1.9 Summarized Cost of DAA Precarious Neighborhood Improvement Program

Item	Cost		%
	10^6 CFA	10^6 US$	
Infrastructure development and rehabilitation	1,572,557	2,573.7	62.8
Short-term	*17,628*	*28.9*	*0.7*
Medium and long-term	*1,554,929*	*2,544.9*	*62.1*
Facilitating access to basic social services and facilities	902,605	1,477.3	36.0
Strenthening the technical and organizational capacity of players	20,735	33.9	0.8
Strengthening security, conflict management and social cohesion	8,255	13.5	0.3
Total	**2,504,152**	**4,098.4**	**100.0**

Source: ibid.

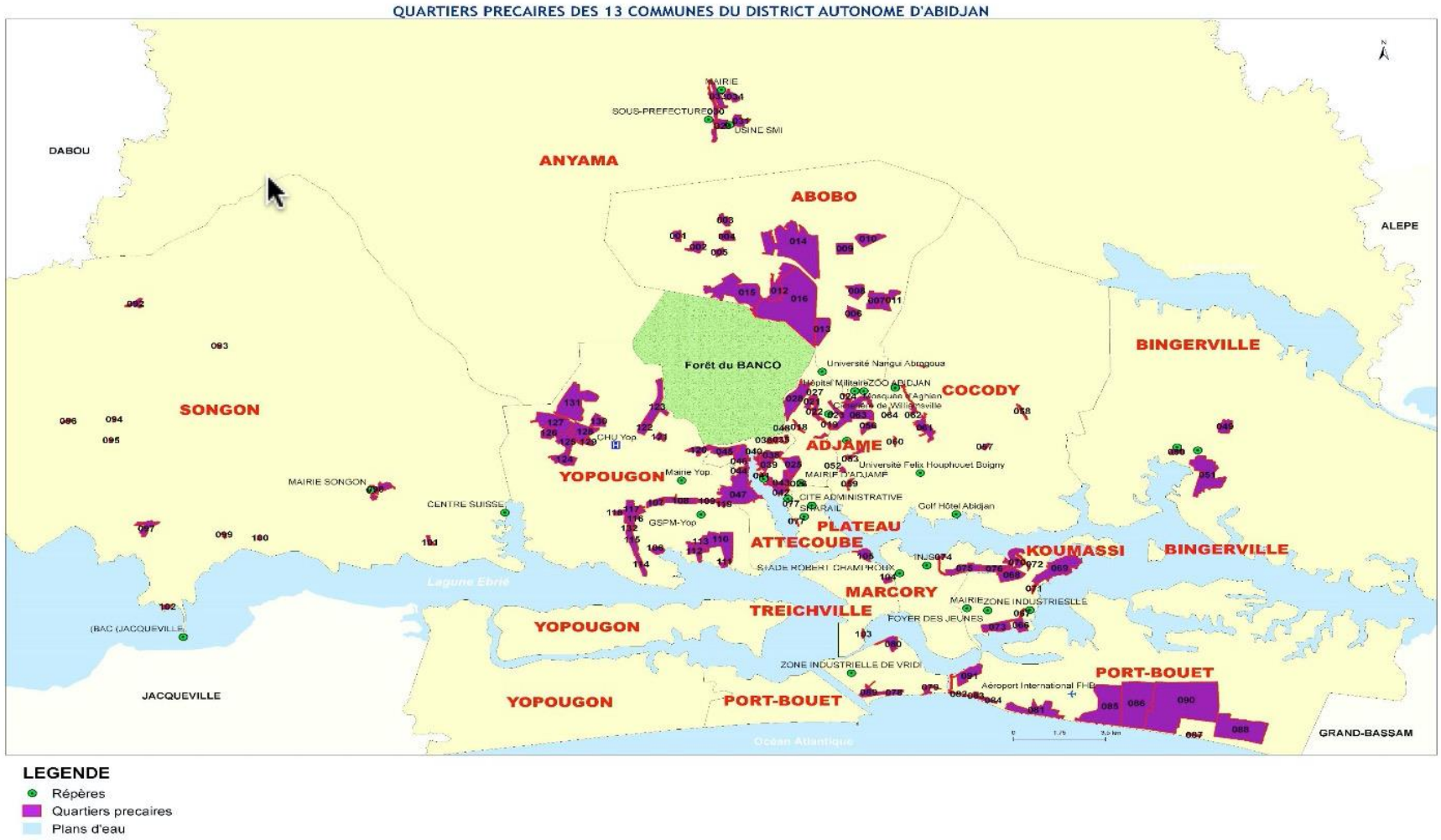


Figure 2.1.10 Locations of Precarious Neighborhoods

Sources: same as Table 2.1.5

Table 2.1.10 Cost of Improving Precarious Neighborhoods in the Autonomous District of Abidjan

Cost Item	Cost		%
	10^6 CFA	10^6 US$	
Priority 1: Infrastructure development and rehabilitation	**1,572,557**	**2,573.7**	**62.80**
Short-term	17,628	28.9	0.70
Land and site insecurity	*15,870*	*26.0*	*0.63*
Drinking water for relocated populations	*690*	*1.1*	*0.03*
Electricity for people to be relocated	*915*	*1.5*	*0.04*
Land title	*153*	*0.3*	*0.01*
Medium and long-term	1,554,929	2,544.9	62.09
Sanitation: wastewater and stormwater pipes	*4,140*	*6.8*	*0.17*
Drinking water: connection to the SODECI network	*2,940*	*4.8*	*0.12*
Electricity: connection to the CIE grid	*4,300*	*7.0*	*0.17*
Education: construction and rehabilitation of schools	*2,789*	*4.6*	*0.11*
Health: construction of health centers, hospitals, maternity wards and dispensaries	*1,440*	*2.4*	*0.06*
Roads, landscaping, various constructions	*30,260*	*49.5*	*1.21*
Social housing program and social actions	*1,509,060*	*2,469.8*	*60.26*
Axis2: Facilitating access to basic social services and facilities	**902,605**	**1,477.3**	**36.04**
Short, medium and long-term	902,605	1,477.3	36.04
Drinking water: easy access to drinking water	*5,413*	*8.9*	*0.22*
Electricity: easy access to electricity	*13,511*	*22.1*	*0.54*
Education: easy access to education	*824*	*1.3*	*0.03*
Health: easy access to healthcare	*6,710*	*11.0*	*0.27*
Sanitation: easy access to sanitation	*873,835*	*1,430.2*	*34.90*
Sanitation: household waste management	*508*	*0.8*	*0.02*
Site controls: Control backup	*1,804*	*3.0*	*0.07*
Focus3: Strengthening the technical and organizational capacity of players	**20,735**	**33.9**	**0.83**
Short, medium and long-term	20,735	33.9	0.83
Capacity-building for leaders of precarious neighborhoods in Abidjan District	*1,040*	*1.7*	*0.04*
Capacity-building for associations in precarious neighborhoods in Abidjan District	*5,330*	*8.7*	*0.21*
Capacity-building for residents' leaders in precarious neighborhoods in Abidjan District	*130*	*0.2*	*0.01*
Capacity-building for NGOs working in precarious neighborhoods in the Abidjan District	*650*	*1.1*	*0.03*
Capacity-building for PFS in Abidjan district town halls	*390*	*0.6*	*0.02*
Capacity-building for the technical departments of Abidjan district town halls	*13,915*	*22.8*	*0.56*
Axis 4: Strengthening security, conflict management tools and social cohesion	**8,255**	**13.5**	**0.33**
Short, medium and long-term	8,255	13.5	0.33
Public safety	*6,565*	*10.7*	*0.26*
Peace, social cohesion and conflict management	*1,690*	*2.8*	*0.07*
Grand Total	**2,504,152**	**4,098.4**	**100.00**
Exchange Rate: CFA 611/US$			

Source: "Diagnostic du District Autonome d'Abidjan, Diagnostics et Plans D'Amélioration des Quartiers Précaires des 13 Communes du District D'Abidjan" , May 2014, by Arc Ingénuerie and Synergie Expertise

2.2 Physical Conditions

2.2.1 Meteorology & Climate Change

The climate of the Greater Abidjan area is subequatorial. It is a humid climate with relatively regular high temperatures throughout the year, with an annual average of 26.4°C and an average minimum temperature of 22.1°C. Annual rainfall varies from 1,540 mm to 3,040 mm, with an average of about 2,000 mm.

It is a climate with 4 seasons including two rainy seasons and two dry seasons. These different seasons are broken down as follows:

- a long rainy season from March to July with rainfall above 700 mm;
- a short dry season from August to September ;
- a short rainy season covering the months of October and November ;
- a long dry season from December to mid-March.

The intensity of precipitation is very high and can reach 115 mm/h over a period of 15 minutes, and 71 mm over a period of 1 hour.

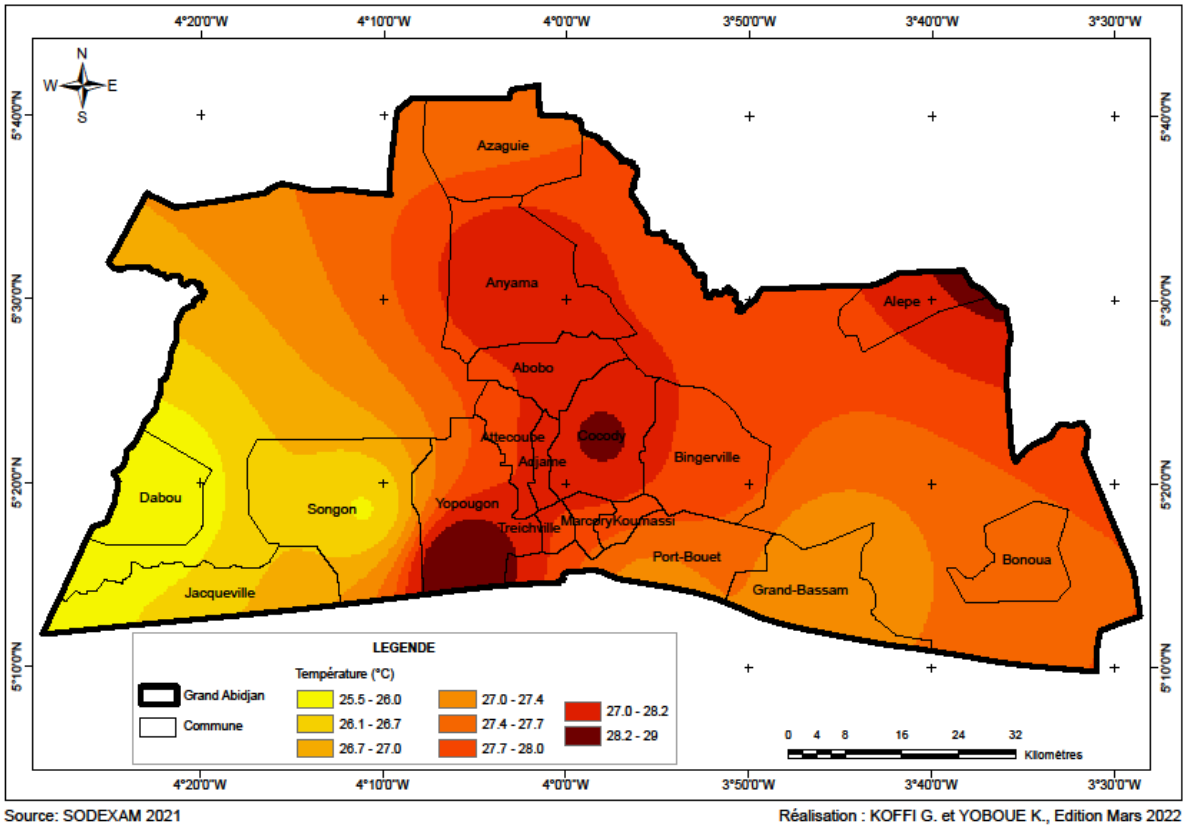
The humidity rate varies very little depending on the season, with an annual average of 84%. The permanent humidity in combination with the heat makes the “heavy weather” difficult to bear. It is a favorable climate for the decomposition of waste and the multiplication of disease vectors (mosquitoes, parasites and microbes).

In recent years, a noticeable upheaval in the seasons has been observed. The harmattan (a dusty trade wind blowing from the Sahara towards the west coast of Africa in winter) continues to blow longer and is now penetrating Greater Abidjan, causing higher than normal temperatures and a frequent shift in rainfall across the year. This upheaval is linked to disturbances in global climatology from which no country escapes. Like the whole of Côte d'Ivoire, Greater Abidjan is suffering the effects of climate change in recent decades.

Thus, today in the localities of Greater Abidjan, disturbances in terms of rainfall and heat are observed. A new distribution of climate data is now observed in Greater Abidjan. The temperature map highlights eight micro climatic zones in Greater Abidjan. These include, among others:

- Areas with temperatures between 25.5 and 26.0°C; 26.1 and 26.7 and between 26.7 and 27°C. These are areas of low temperatures. These temperatures are found in the western and southwestern part of Greater Abidjan, which includes Dabou, Jacqueville and Songon.
- Areas with temperatures between 27.0 and 27.4; 27.4 and 27.7 and between 27.7 and 28°C. These are medium temperature environments. These are the most common values in Greater Abidjan. They cover the north, center, east and north-east in localities such as Azaguié , Abobo, Bingerville and the northern sectors of the city of Abidjan.
- Zones of very high temperatures which represent pockets of heat are observed in the south (Treichville and Yopougon and in the extreme east of Alépé).

Also, on the scale of the city of Abidjan, temperature variations have also been observed for some time.



Source : SODEXAM, 2021

Figure 2.2.1 Distribution of heat in Greater Abidjan during the year 2021

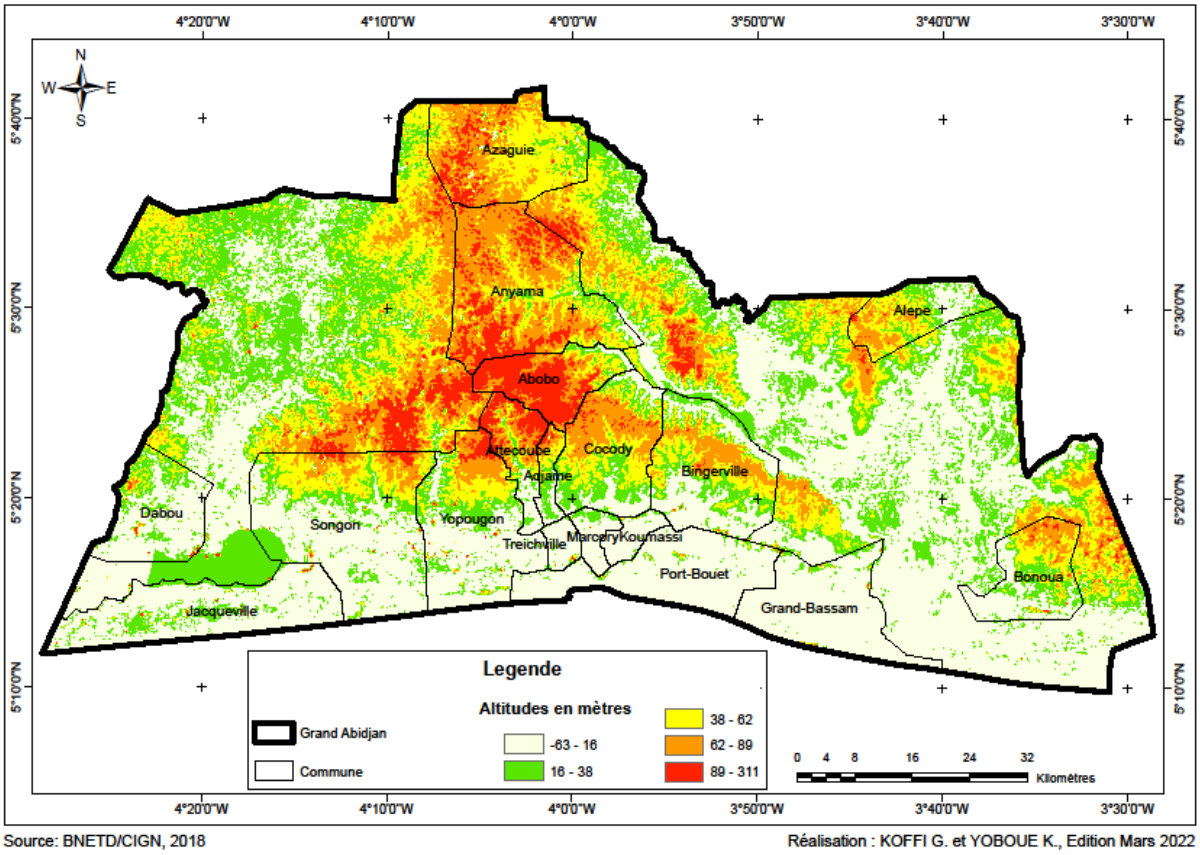
These average changes in temperature and precipitation will also result in changes in various types of climatic events, the probability of occurrence of which is more or less well known. It therefore seems very likely that the following events will be observed in the coming decades:

- a temperature increase of 3°C by 2100 over most of the country from north to south in view of the RCP4.5 scenario;
- an 8% daily decrease in rainfall during the April-July season for the next hundred years under the RCP4.5 scenario;

All this will cause extreme weather phenomena such as: drought, floods, coastal erosion etc. According to projections, the situation will continue to worsen. However, Côte d'Ivoire is currently feeling the impacts of climate change on its economy, its environment and its society. And taking into account the opportunities represented by actions to mitigate and adapt to climate change, the government has decided to adopt a national strategy to combat climate change. This policy aims to identify the challenges of climate change and response strategies.

2.2.2 Topography

The topography of Greater Abidjan is essentially composed of 4 parts succeeding from North to South. In the North, a line of high plateaus is present in two zones and their altitude hardly exceeds 100 meters for one (plateau of Azaguié), and between 40 and 50 m, for the other. However, there are summits of plateaus which sometimes reach 120 meters in altitude. This is the case of the Anyama and central and northern Abobo plateaus whose altitudes reach 127 meters. These elevated areas are cut by deep valleys. At the foot of the plateaus rise low altitudes which are floodplains located around the Ebrié lagoon and the coastal barrier. These are the preferred environments for flooding during rainy periods in Greater Abidjan. They extend from the south of Dabou and Songon (in the west) to Bonoua (east).



Source: BNETD/CIGN, 2018

Réalisation : KOFFI G. et YOBOUE K., Edition Mars 2022

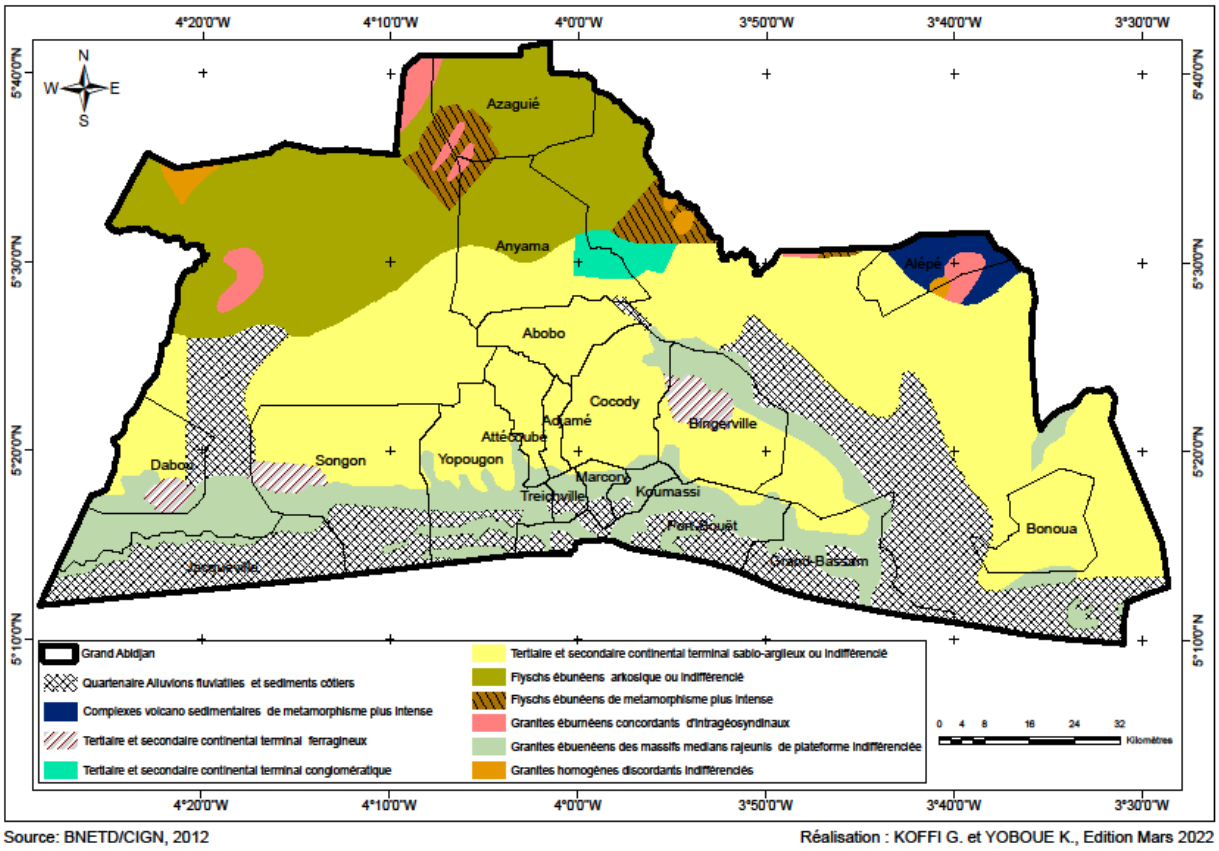
Figure 2.2.2 Topographic Map of Greater Abidjan

The Ebrié lagoon is the most characteristic part of its topography. It extends over more than 120 km on either side of Abidjan and isolates several islands including Déblay Island, Bouboury Island, Pigeon Island, Leydet Island, Désirée Island, Cinquante Huit Island, Boulay Island. The most important of these islands remain the Bassam, Boulay and Désirée islands. A coastal barrier isolates the lagoon from the ocean. The lagoon is a sinuous coastline, filled with islands and bays, moderated by its marshes and which contrasts an important development of the mangrove and a sandy maritime coast of low elevation, a favorite field for seaside tourism. This space occupies a good part of the coast of Greater Abidjan.

2.2.3 Geology

The geological structure of Greater Abidjan is limited to that of the Ivorian coastal sedimentary basin. From the lithostratigraphic point of view, the sedimentary basin presents important lateral and vertical variations of facies. This environment is characteristic of the continental terminal or mid-Pliocene formations (coarse sands, variegated clays, ferruginous sands and sandstones, etc.) to the north of the Ebrié lagoon. The geomorphology of this zone is limited to the plateaus of the Continental Terminal.

The sedimentary basin is composed of two distinct parts to the North and to the South. The northern part is a zone of a certain thickness, covered with sediments: the continental margin, represented mainly by the highlands, with a large proportion of more or less ferruginous sandstone, sands and clays. They are generally rocks from the Tertiary and from the sandy-clayey or undifferentiated terminal continental secondary. These plateaus are cut by deep valleys with flat bottoms and steep slopes. The surface of these plateaus is incised by a highly ramified network of thalwegs, some of which are temporarily drained.



Source: BNETD/CIGN, 2012 Réalisation : KOFFI G. et YOBOUE K., Edition Mars 2022

Figure 2.2.3 Geological Map of Greater Abidjan

The southern part is covered by quaternary sediments. These are fluvial alluvium and coastal sediments accompanied and sometimes punctuated by Eburnean granites and rejuvenated median massifs of undifferentiated platforms. They are of three forms:

- the lower continental shelf made up of clayey sands at an altitude varying from 8 to 20 m closer to the Ebrié lagoon;
- the conglomerate in the sand bars from Nouakchottian deposits ;
- depressions filled in by river and lagoon deposits composed mainly of mud resulting from sand washing.

The architecture of the sedimentary basin formations was determined by the main tectonic structure of the lagoon. It is an accident consisting of a major fault several km long, parallel to the coast and separating the two morphological units.

2.2.4 Soil

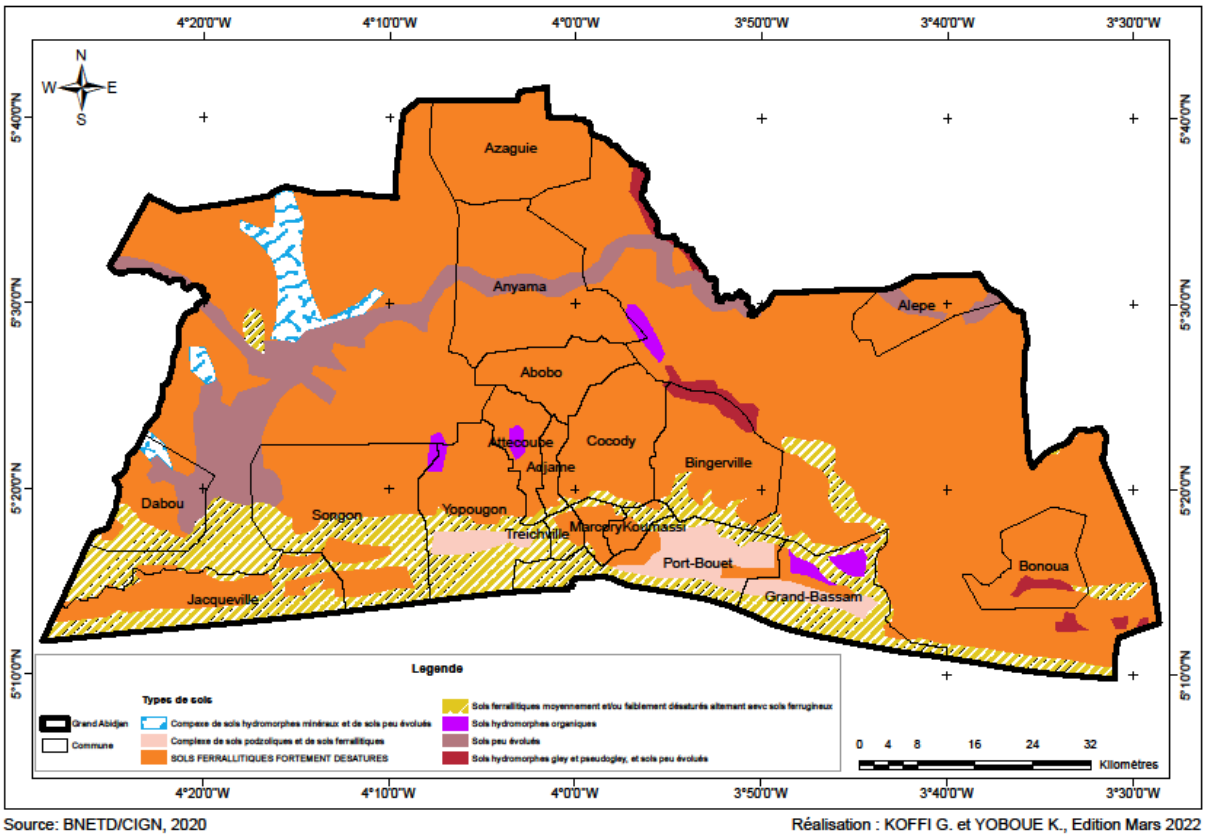
Greater Abidjan is characterized by several types of soil. They are almost exclusively composed of homogeneous lateritic sands to a depth of several tens of meters. The unaltered granite base is of a depth that can exceed 50 meters. The analysis of Figure 2.2.4 gives a clearer idea of the spatialization of soil types on the territory of Greater Abidjan:

- highly desaturated ferralitic soils. They are the most dominant. They represent about 80% of the land of Greater Abidjan. These soil formations are generally found on shales and cover the entire northern and central part of Greater Abidjan in localities such as Azaguié, Bingerville, the northern sectors of the city of Abidjan (Abobo, Yopougon, Cocody, Adjamé), Songon, Dabou, Boboua and the northern part of Jacqueville;

- ferralitic ferralitic soils moderately and/or weakly desaturated alternating with ferruginous soils. These soils cover the southern part of Greater Abidjan, more specifically in the southern sectors of Dabou, Yopougon, Jacqueville;
- organic hydromorphic soils, with small areas that dot the center and south of Greater Abidjan;
- poorly evolved soils: These soils form a sort of curvature stretching from Alépé to Dabou via Anyama and form a sort of meander;
- the complex of podzolic soils and ferralitic soils located in the south (Treichville, Port-Bouet and Grand-Bassam;
- the complex of mineral hydromorphic soils and poorly evolved soils, located in the western and northwestern part of Greater Abidjan;
- hydromorphic soils with gley and pseudogley and little evolved soils. These types of soils are found on the northern edge of Greater Abidjan and in the northern sectors of Bingerville. A few pockets are found south of Bonoua.

These hydromorphic soils are characterized by an excess of water due either to deep waterlogging or to temporary or permanent flooding. The hydromorphic of the alluvial plains of the southern sector of greater Abidjan is total and almost permanent.

These waters are exploited by SODECI (Ivory Coast Water Distribution Company) to provide drinking water in Abidjan. On the coast, the soils are composed of deposits of marine origin ranging from fine yellow sand to slightly light brown clayey silt, and mud containing a lot of organic matter.



Source: BNETD/CIGN, 2020

Réalisation : KOFFI G. et YOBOUE K., Edition Mars 2022

Figure 2.2.4 Soil Map of Greater Abidjan

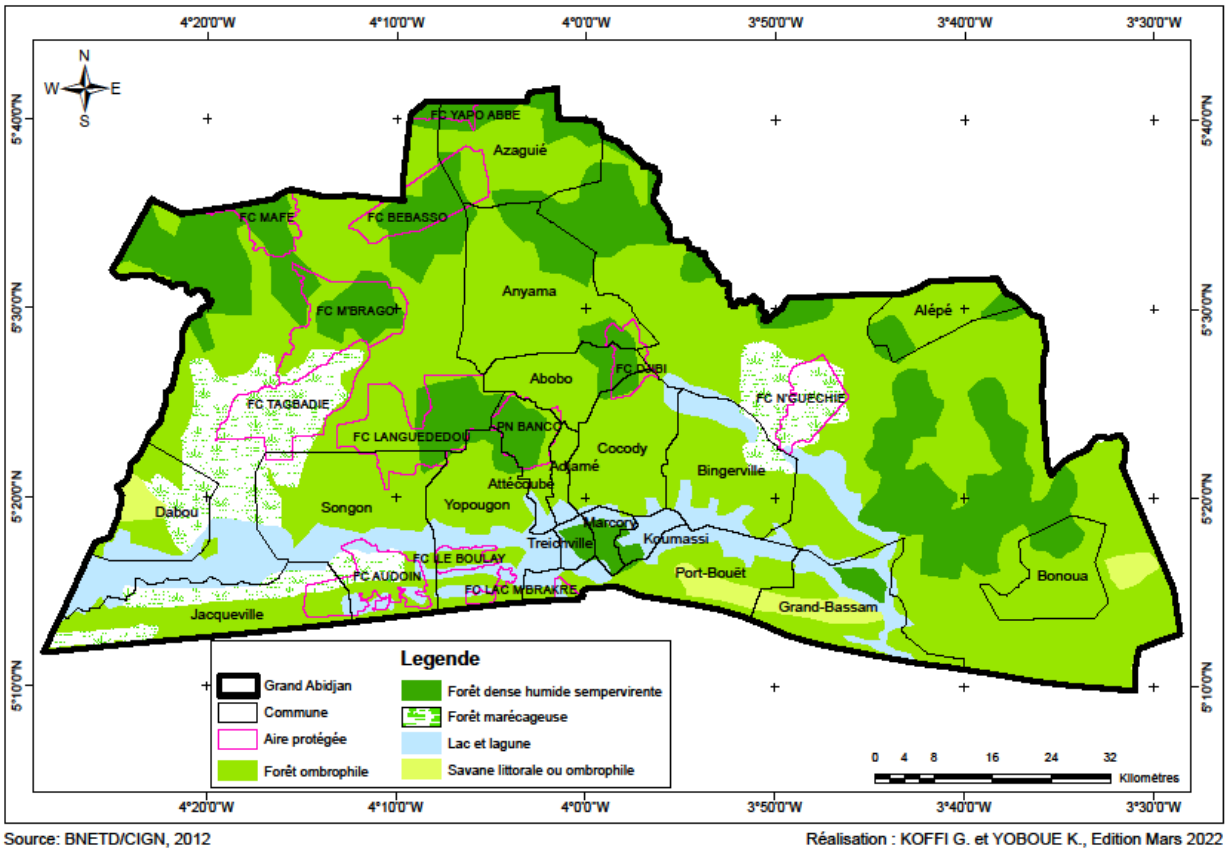
2.3 Environment

2.3.1 Vegetation

Three types of vegetation can be found on the waterlogged ground depressions. In the highlands, the predominant vegetation was the avodire (African chloroxydon, ornamental wood with a smooth texture, ranging from a whitish tint to pale yellow, of the large West African tropical tree *Turraeanthus africana*, from the ebony family, used in cabinetmaking). All these formations have been spatialized on Figure 2.3.1. The analysis of this map makes it possible to distinguish the following vegetation groups:

- the evergreen dense humid forest found in the north, center and east of Greater Abidjan. These types of formations are generally found only in protected areas outside the one located in the eastern part of Greater Abidjan;
- the ombrophile forest constitutes the most important whole of the environment. It surrounds evergreen formations;
- the marshy formations located on the edges of the lagoons, in the North-East sectors of Dabou and Bingerville;
- the coastal savannahs which meet to the south specifically at Port-bouet , Grand-Bassam and to the east of Bonoua.

Nowadays, all these natural areas are subject to human impacts through urbanization and agricultural activities. Thus, on the coastal fringe, coconut palms have replaced swamp forests in areas not yet built. In the highlands, virgin forest has been replaced by degraded secondary forest that supports agro-industrial plantations and food crop areas.



Source: BNETD/CIGN, 2012 Réalisation : KOFFI G. et YOBOUE K., Edition Mars 2022

Figure 2.3.1 Distribution of vegetation in Greater Abidjan

The Forest of Banco (3,474 ha), classified as a national park, testifies of primary vegetation. This park faces serious threats in places due to deforestation. In the periphery, only fragments of forest remain,

located mainly on the hillsides.

In addition to the pressure on the forest of the entire space of Greater Abidjan, the wooded areas inside of Abidjan urban area are also endangered. They are under human pressure through accelerated urbanization. Thus, in recent years, the economic capital, faced with land pressure, has experienced a sharp reduction in wooded areas. Indeed, the unbuilt peri-urban spaces have become in the space of a few years, vast residential districts. The easements of the thalwegs and the lagoon, the steep slopes of the storm basins which are non-built areas covered with vegetation, have also almost become residential areas. This is the preferred environment for the development of precarious neighborhoods. These areas have therefore become real places of disorder and poor development of the Abidjan megalopolis.

The analysis of current land use shows the virtual non-existence of wooded areas in the Abidjan conurbation. Indeed, in its growth, Abidjan has already encountered Bingerville, Anyama, Songon and soon Grand-Bassam. The peri-urban fringes are continuously deteriorating. The city seems to be expanding without any concern for the preservation or restoration of the natural heritage. This extension poses not only the problem of the preservation of biodiversity, but also and above all that of the restriction of the agricultural space of the local populations. The city is spreading out, reducing the possibilities of agricultural production which remains dependent on natural resources. Safeguarding the forest heritage on the outskirts of Abidjan constitutes a major challenge for the peasantry.

2.3.2 Urban Disasters & Hazards

Urban Disasters & Hazards are, by definition, natural events causing loss of life, destruction of livelihoods, and loss of economic production facilities and environment. They are not caused directly by human actions and intermediation, but these are factors favoring and aggravating their consequences. The most frequently observed natural disasters in Côte d'Ivoire are:

- flooding due to heavy rains ;
- movements and landslides, landslides ;
- bush fires (forest fires) ;
- drought.

Table 2.3.1 presents the climatic and geological disasters in the Greater Abidjan area over the past twelve years (2010-2021). There are no records of earthquakes, tidal waves or tropical cyclones. The area of Greater Abidjan has therefore experienced only a few natural disasters, but the consequences of which are significant.

Table 2.3.1 Urban Disasters & Hazards in Greater Abidjan (2010–2021)

Date	Location	Events	Consequences
Wednesday 2013/04/24	Abidjan Gonzacqueville	Slab collapse	1 death and major material damage
Saturday 2013/09/14	Abidjan Riviera palm grove face washing Ferrari	Collapse of a r+2 building under construction	significant material damage
Monday 2013/06/05	Abidjan Angré water tower near the 34th District	Collapse of a r+3 building under construction	1 death and major material damage
Sunday 2013/05/05	Abidjan Angré castle near the 34th arrondissement crossroads hotel Alladjé	Collapse of an R+3 building under construction	17 Victims not found
Thusday 2013/12/09	Adjame Williamsville	Building collapse	No victim
Thusday 2014/05/06 at 05:16	Abidjan Yopougon Mossikro near 23rd district	Landslide	4 dead
Thusday 2014/06/05 at 07:11	Abidjan Yopougon opposite OILYBIA station	Landslide	1 dead
Tuesday 2014/10/06 at 08:56	Abidjan Abobo 2nd stop opposite mobile station	Flood	No victim

Tuesday 2014/10/06 at 09:58	Abidjan Cocody Bonoumin behind Malraux College	Flood	No victim
Tuesday 2014/10/06 at 10:28	Abidjan Riviera palm grove minister street	Flood	No victim
Tuesday 2014/10/06 at 11:18 a.m.	Abidjan Plateau Dokui opposite Dokui pharmacy	Flood	No victim
Tuesday 2014/10/06 at 5:25 p.m.	Abidjan Plateau Dokui not far from the Nanty school group	Flood	No victim
Tuesday 2014/06/17 at 03:39	Riviera Bonoumin near petro ivoire station	Flood	0
Tuesday 2014/06/17 at 05:30	Adjamé quoted Fairmont terminus 02	Collapse of a wall	0
Tuesday 2014/06/17 at 06:02	Yopougon Mosikro safari	Landslide	4 dead
Tuesday 2014/06/17 at 06:29	Vridi CPMA near postal sorting	Flood	0
Tuesday 2014/06/17 at 07:11	Blondy residence	Flood	0
Tuesday 2014 at 07:30	Koumassi behind depot 09	Flood	-
Tuesday 2014/06/17 at 07:32	Koumassi opposite the post office	Flood	-
Thusday 2014/06/19 at 04:28	Riviera palmeraie facing the Methodist church	Flood	0
Thusday 2014/06/19 at 05:24	Riviera III crossroads ORCA DECO	Flood	0
Thusday 2014/06/19 at 06:02	Attécoubé	Collapse	6 dead
Thusday 2014/06/19 at 12:00 p.m.	Cocody Danga Cocody Tumbler	Flood	3 dead 3 dead
Thusday 2014/06/26 at 5:03 p.m.	Route d'Agboville enclosure company SOCIBAF	Flood	-
Sunday 2014/06/29 at 04:00	Adjame zoo road	Flood	-
Sunday 2014/06/29 at 04:15	Dokui plateau behind Fatima pharmacy	Flood	-
Sunday 2014/06/29 at 04:37	Cocody Angré behind 22nd arrondissement	Flood	-
Sunday 2014/06/29 at 04:48	Abobo behind gendarmerie brigade	Flood	-
Sunday 2014/06/29 at 06:05	Cocody Angré castle	Flood	-
Sunday 2014/06/29 at 06:15	Cocody riviera 2 behind home alpha blondy	Flood	-
Sunday 2014/06/29 at 06:43	Riviera Bonoumin opposite the Aboussouan hotel	Flood	-
Sunday 2014/06/29 at 07:10	Riviera 2 facing home Alpha Blondy	Pruning	-
Sunday 2014/06/29 at 10:37	Riviera Bonoumin opposite Bonoumin pharmacy	Flood	0
Sunday 2014/06/29 at 12:06	Abobo-Alépé road opposite monastery pharmacy	Collapse of a low house	-

p.m.			
Sunday 2014/06/29 at 5:58 p.m.	Cocody Angré Adjibi bus terminus 81-82	Collapse of a building	-
Monday 06/30/14/06/30 at 10:39	Abobo behind Houphouët Boigny hospital	Flood	-
Monday 2014/06/30 at 12:27 p.m.	Cocody Angré star 9b	Flood	-
Monday 2014/06/30 at 7:08 p.m.	Cocody Angré quotes Fandasso	Flood	-
Monday 2014/06/30 at 7:09 p.m.	Riviera 2 opposite the Alpha Blondy residence on the castle side	Flood	-
Tuesday 2014 at 8:24 p.m.	Abidjan Road Abatta quote cidex villa 161	Flood	No victim
Wednesday 2014/06/11 at 06:31	Abidjan Yopougon opposite Mamie Adjoua pharmacy	Flood	No victim
2015/06/22 at 05:52	In an Abobo Kennedy gutter	Flood	2 dead
2015-11:58	Entrance Bingerville quotes CIE CME	Flood	
2015-15:05	Biétry behind home Séry gnoleba	Flood	
2017-3:26 p.m.	Cocody Riviera Bonoumin	Flood	
2017/05/25	Abobo-baoulé after 342m ^{2} stop	Flood	
2019/11/05 at 09:50	Carrefour rejects Indénié	Flood (vehicles)	36 victims
2018/11/05 at 10:20 am	Cocody riviera" quotes SYNACACI	Flood	2 victims
02/06/18/02/06 at 11:11	Cocody Angré quoted Fandasso	Flood	
03/06/18/03/06 at 09:18	Riviera palmeraie minister street	Flood	
06/10/18/06/10 at 01:35	Abobo pk18 crossroads AGRIPAC opposite the bakery	Flood	
2018/06/19 at 02:12	Yopougon Abobo-Doumé road	Flood	
2018/06/19 at 02:43	Cocody riviera Faya direction landfill	Flood	
2018/06/19 at 02:58	Riviera 3 SIDECI not far from the 18th stop	Flood	1 Death
2018/06/19 at 04:08	Riviera palmeraie opposite Johns Wesley school	Flood	
2018/06/19 at 05:19	Riviera3 quotes Allabra behind north cap	Flood	
2018/06/19 at 07:15	Riviera Cocody riviera3 after dam	Flood	
2018/06/19 at 07:20	Riviera palmeraie pilot crossroads	Flood	1 Death
2018/06/19 at 07:40	Riviera palm grove height north cap	Flood	
2018/06/19 at 1143	Cocody riviera palmeraie face 35th stop program 2 barriers	Flood	
2018/07/09	Cocody riviera opposite the princes park	Flood	
2019/01/05-04:10	Yopougon SICOGI market pharmacy height	Flood	
2019/06/19-4:10 p.m.	Riviera palmeraie - Allabra - Riviera SODECI - Attécoubé Mossikro	Flood and collapse	18 Death
2019/10/05	Yopougon pineapple crossroads Sorbonne	Flood	
2019/10/05 1:20 p.m.	Yopougon red hare after the Bagnon market	Flood	
2019/10/05 11:32	Yopougon in a pineapple home at the	Flood	

	Sorbonne crossroads		
2019/10/05 1:20 p.m.	Yopougon red hare after the Bagnon market	Flood	
2019/10/18-01:51	Cocody riviera Faya height SODECI	Collapse	
2019/11/06-11:38	Cocody facing modern high school Dominique Ouattara	Collapse	
11/27/19/11/27-4:11 p.m.	Abobo-Kennedy Nabitou Cissé mosque height	Landslide	1 Death
	Vridi tri Postal company CEMAG	Collapse of a wall	1 Death
2020/06/13	Cocody Angré cites Fandasso behind Phcie les allées	Flood	
2020/06/13-07:20	Abobo Belleville opposite CDCI store	Flood	1 Death
2020/06/13 - 10:44 a.m.	Cocody Angré flood cites Fandasso facing Phcie les Allées	Flood	
2020-06-14-08:55	Yop Dabou road before corridor after Niangon-Adjamé school	Collapse of a building	
2020-06-14-09:57	Port-Bouët Akwaba Shell station university campus	Flood	
2020-06-14-1:34 p.m.	Cocody riviera palmeraie behind 35th stop	Flood	
2021/04/08 to 2021/06/05	Songon N'brathé , Songon Kassamblé , Songon Abban , Songon Dagbé, Abraythé , Abadjin Kouté, Bimbrinso	Flood	211 affected families
06/19/2021/06/19	Abidjan Adjamé, Cocody, Treichville facing modern high school	Flood	No loss of human life
2021/06/19 to 2021/06/20	Grand-Bassam district Petit Paris	Flood	No loss of human life
2021/06/21	Abidjan Cocody Corniche	Landslide	
2021/07/01	Attécoubé	Landslide	2 Deaths
2021/07/01 to 2021/07/02	Bingerville	Flood at CIE	No loss of human life
2021/07/08 to 2021/07/09	Yopougon, Port Bouet, Cocody	Flood	No loss of human life
2021/07/14	Dabu	Flood in the Cayman district	No loss of human life
2021/08/24	Abidjan Indenie	Flood	No loss of human life
2021/08/26	Abidjan Cocody Rue Minister, Palmeraie, Treichville CNPS	Flood	No loss of human life
2021/09/22	Abidjan Attécoube Yopougon Adjame	Collapse and flooding	7 deceased including 4 adults and 3 children
02/10/2021/10/02 to 2021/10/03	Abidjan Cocody- Riviéra Treichville GIMAT, descent from the De Gaulle bridge	Flood	No loss of human life
2021/11/8	Abidjan Cocody- Riviera St Viateur, Yopougon Mamie Adjoua, Kimi Adjamé district Nangui- Abogoua , Kouamassi Divo district	Flood	2 people washed away including a taxi driver and an 11-year-old girl
2021/11/9	Abidjan Yopougon granny Adjoua	Flood	1 Death

Source: ONPC (National Office for Civil Protection)/GSPM (Grouping of Military Firefighters), (Collection of Environmental Statistics in Côte d'Ivoire, 2021.

Table 2.3.2 shows the Urban Disasters & Hazards Prone Residential Areas in Abidjan, which corresponds to the lands exposed to natural risks. Those areas can be considered as precarious environments due to their geographical location. Abidjan has 72 Urban Disasters & Hazards Prone Residential Areas, totaling an area of 775 ha.

Table 2.3.2 Urban Disasters & Hazards Prone Residential Areas in Abidjan

Communes	Number of housing areas	Area of the zones in ha
Abobo	9	199
Adjame	8	20
attecoube	11	81
Cocody	8	54
Koumassi	6	82
Marcory	3	9
Plateau	0	0
Port Bouet	13	224
Treichville	1	9
Yopougon	13	97
Total	72	775

Source: ANDE (Collection of Environmental Statistics in Côte d'Ivoire)

2.4 Socio-Economy

2.4.1 Demography

(1) Demography of Côte d'Ivoire

The population, life expectancy (LE) and fertility rate (FR) of Cote D'Ivoire in the past are shown in Table 2.4.1 below. The population has been growing at a rate of 2.6% per year since 2014, which is almost same as those in Sub-Sharan Africa and West Africa as shown in table 2.4.2. The total fertility rate, which is the average number of children a woman gives birth to in her life, is lower in Cote D'Ivoire at 4.6 than those in West Africa (5.2) and Sub-Shara Africa (4.7). The life expectancy in Cote d'Ivoire at 58 years of age is lower than that in Africa at 62.

Table 2.4.1 Population and Life Expectancy in Côte d'Ivoire 2014-2020

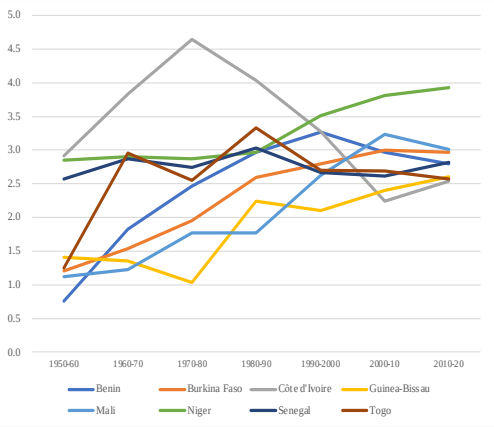
Item	2014	2015	2016	2017	2018	2019	2020
Population *(1)*	22,647,6	23,226,1	23,822,7	24,437,4	25,069,2	25,716,5	26,378,2
Growth %	-	2.6	2.6	2.6	2.6	2.6	2.6
LE*(1)*	55.508	56.065	56.567	57.017	57.422	57.783	-
FR*(2)*	4.87	4.81	4.76	4.70	4.65	4.59	-

Source: (1) Word bank (https://data.worldbank.org/indicator/SP.POP.TOTL?locations=C)
(2)https://www.statista.com/statistics/452058/fertility-rate-in-ivory-coast/

Table 2.4.2 Population Growth, TFR and LE of World, Africa, Sub-Sahara Africa and West Africa

Item	Population Growth 2014-2020 (%/year) *(1)*	TFR (2015-2020) *(1)*	LE *(2)*
World	1.1	2.47	73
Africa	2.6	4.44	n.a
Sub-Sahara	2.7	4.72	62
West Africa	2.7	5.18	n.a

Source:
(1)https://population.un.org/wpp/Download/Standard/Fertility/
(2) https://data.worldbank.org/indicator/SP.DYN.LE00.IN



Source: United Nations homepage "Department of Economic and Social Affairs - Population. Dynamics" https://population.un.org/wpp/Download/Standard/Population/

Figure 2.4.1 10-Year Period Population Growth Rates of 8 UEMOA Countries

Figure 2.4.1 shows that the average population growth rates for each ten-year period in Cote d'Ivoire had been surpassing those of the other seven countries until around 2000 ranging between 2.9 and 4.6% per year, indicating a possibility of migration of population from neighbor countries to Cote d'Ivoire seeking job opportunities. The trend changed downward since then, presumably as a result of the social and political turmoil.

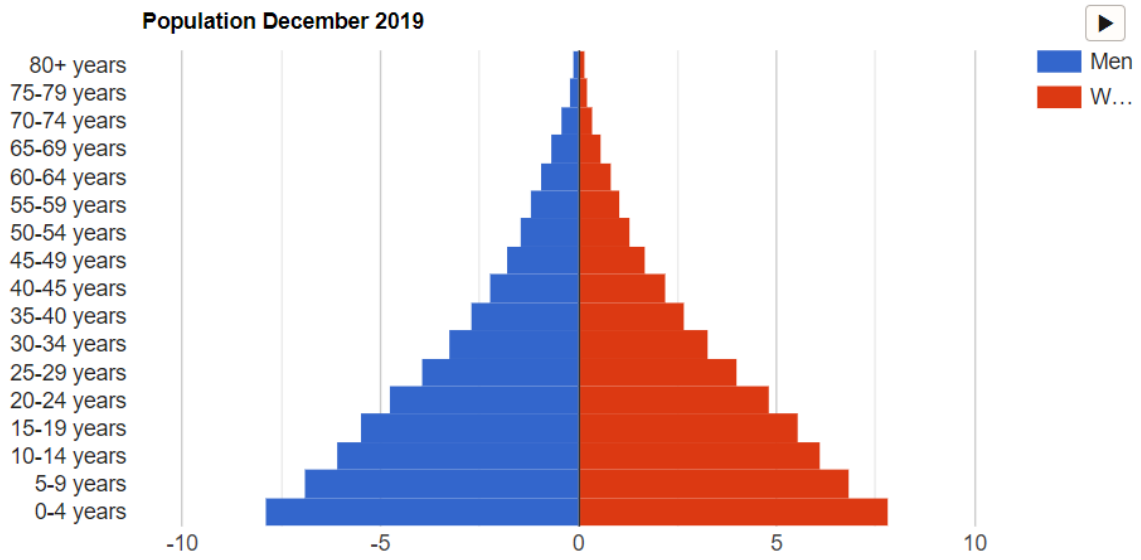
Population and its growth rate in the past three decades in Côte d'Ivoire are shown in Table 2.4.3. The five-year average growth rates have been declining until 2005, then started to rise gradually since then. The social and economic recovery since 2011 could have contributed to this upward trend.

Table 2.4.3 Population and Its Growth Rate in the Past Three Decades in Côte d'Ivoire

	1990	1995	2000	2005	2010	2015	2020
Population	11,924,877	14,199,762	16,454,668	18,354,514	20,532,950	23,226,143	26,378,275
Growth %	3.75	3.55	2.99	2.21	2.27	2.50	2.57

Source: https://www.worldometers.info/world-population/cote-d-ivoire-population/

The population pyramid is publicized on the website at the time of 2019 as shown in Figure 2.4.2.



Source: https://countryeconomy.com/demography/population-structure/ivory-coast

Figure 2.4.2 Population Pyramid in Côte d'Ivoire (2019)

Table 2.4.4 Population Structure in Côte d'Ivoire

Old	2015	2016	2017	2018	2019	2020
0-14 (%)	42.56	42.38	42.17	41.94	41.71	41.51
15-64 (%)	54.64	54.80	54.99	55.20	55.41	55.61
>64 (%)	2.80	2.82	2.84	2.86	2.87	2.88
Total (%)	100.00	100.00	100.00	100.00	100.00	100.00

Source: https://countryeconomy.com/demography/population-structure/ivory-coast

(2) Demography of Greater Abidjan

Demographic trends in Greater Abidjan is explained below. Greater Abidjan is defined in SDUGA 2040 as follows.

- Central urban areas (10 communes in the central area): Abobo, Adjame, Attecoube, Cocody, Koumassi, Marcoy, Plateau, Port-Bouet, Treichville and Yopougon
- Surrounding area (9 communes and 11 sub-prefectures): Anyama, Bingerville, Grand Bassam, Songon, Alepe, Azaguie, Bonoua, Dabou, Jaqueville (*commune only*), Brofodoume (*sub-prefecture only*), Oghlwpo (*same*)

The population and the number of households in Greater Abidjan are shown in Table 2.4.6 and Table 2.4.7 for 1998, 2014 and 2021 when census surveys were conducted. Table 2.4.5 below shows the summary.

Table 2.4.5 Population and the Number of Households in Greater Abidjan in 1998, 2014 and 2021 (Summary)

Item	Value (thousand)			Share (%)			Average Annual Growth Rate (%/year)	
	1998	2014	2021	1998	2014	2021	1998-2014	2014-2021
Central Urban Area*	2,878	4,395	5,617	82%	87%	82%	2.7	3.6
Surrounding Areas	640	642	1,223	18%	13%	18%	0.0	9.6
Surrounding Urban Areas **	*429*	*530*	*1,009*	*12%*	*11%*	*15%*	*1.3*	*9.6*
Surrounding Rural Areas ***	*211*	*112*	*214*	*6%*	*2%*	*3%*	*-3.9*	*9.7*
Total	**3,518**	**5,037**	**6,840**	**100%**	**100%**	**100%**	**2.3**	**4.5**

Note: *10 communes under a in Table 2.4.6. **11 communes under b. in Table 2.4.6 ***10 sub-prefectures under c. in Table 2.4.6

Source: INS

The total population of Greater Abidjan grew at an average rate of 2.2% per year between 1998 and 2014 reaching 5 million in 2014. The growth accelerated to 4.5% per year in the next 7 years between 2014 and 2021, resulting in the total population at 6.9 million in 2021. The acceleration of population growth was especially high in the surrounding areas where the population grew at 9.6% per year on average between 2014 and 2021 compared with 3.6% in the central urban area. As a result, the share of the population in the surrounding areas increased from 13% in 2014 to 18% in 2021.

The boundary of the SDUGA Study Area runs through four sub-prefectures of Alepe, Azaguie, Bonoua and Dabou. The population living within the SDUGA Study Area boundary was estimated to be 21.3%, 99.6%, 90.62% and 88.24% respectively of the total sub-prefecture population in Dabou, Azaguie, Alepe and Bonua according to the proportions of settled areas. The total population within the SDUGA Study Area is, thus, estimated to be 6,840 thousand in 2021.

Table 2.4.6 Population and the Number of Households in Greater Abidjan in 1998, 2014 and 2021 (1/2)

Administrative Area		Year							Annual Average Growth Rate of Population (%/year)		
		1998	2014			2021					
		Population	Population	Household	Houshold size	Population	Household	Houshold size	1998-2014	2014-2021	1998-2021
a. All Population/housholds living in Commune											
Abobo		638,237	1,030,658	208,683	4.9	1,340,083	280,206	4.8	3.0	3.8	3.3
Adjame		254,290	372,978	77,362	4.8	340,892	72,671	4.7	2.4	-1.3	1.3
Attecoube		207,586	260,911	56,952	4.6	313,135	67,683	4.6	1.4	2.6	1.8
Cocody		251,741	447,055	105,180	4.3	692,583	169,438	4.1	3.7	6.5	4.5
Koumassi		317,562	433,139	92,986	4.7	412,282	97,794	4.2	2.0	-0.7	1.1
Marcory		177,748	249,858	61,006	4.1	214,061	50,945	4.2	2.2	-2.2	0.8
Plateau		10,365	7,488	1,571	4.8	7,186	1,584	4.5	-2.0	-0.6	-1.6
Port-Bouet		211,658	419,033	102,013	4.1	618,795	146,903	4.2	4.4	5.7	4.8
Treichville		120,526	102,580	22,963	4.5	106,552	25,046	4.3	-1.0	0.5	-0.5
Yopougon		688,235	1,071,543	219,651	4.9	1,571,065	349,480	4.5	2.8	5.6	3.7
Sub-total		**2,877,948**	**4,395,243**	**948,367**	**4.6**	**5,616,634**	**1,261,750**	**4.5**	**2.7**	**3.6**	**2.9**
Population/Households living in Commune+Sub-Prfecture Areas											
Total Population/households											
Anyama		138,296	148,962	29,633	5.0	389,592	80,147	4.9	0.5	14.7	4.6
Bingerville		56,357	91,319	20,355	4.5	204,656	46,607	4.4	3.1	12.2	5.8
Brofodoume		-	15,842	3,895	4.1	20,357	5,088	4.0	-	3.6	-
Songon		53,289	56,038	14,136	4.0	89,778	20,544	4.4	0.3	7.0	2.3
Grand-Bassam		58,307	84,028	17,753	4.7	124,567	27,232	4.6	2.3	5.8	3.4
Alepe		96,219	40,480	6,743	6.0	60,648	11,141	5.4	-5.3	5.9	-2.0
Oghlwpo		10,512	9,668	2,157	4.5	17,041	3,154	5.4	-0.5	8.4	2.1
Azaguie		24,585	21,976	4,398	5.0	38,066	8,761	4.3	-0.7	8.2	1.9
Bonoua		78,682	69,983	15,473	4.5	118,388	27,302	4.3	-0.7	7.8	1.8
Dabou		138,869	88,430	18,167	4.9	138,083	29,086	4.7	-2.8	6.6	0.0
Jaqueville		52,871	32,288	6,398	5.0	49,694	11,327	4.4	-3.0	6.4	-0.3
Sub-total		**707,987**	**659,014**	**139,108**	**4.7**	**1,250,870**	**270,389**	**4.6**	**-0.4**	**9.6**	**2.5**
b. Commune Population/households											
Anyama	*	95,169	119,514	23,777	5.0	312,574	64,309	4.9	1.4	14.7	5.3
Bingerville	*	47,180	80,242	17,886	4.5	179,831	40,954	4.4	3.4	12.2	6.0
Brofodoume		-	0	0	-	0	0	-	-	-	-
Grand Bassam	*	58,307	84,028	17,753	4.7	124,567	27,232	4.6	2.3	5.8	3.4
Songon	*	39,982	47,516	11,987	4.0	76,125	17,421	4.4	1.1	7.0	2.8
Alepe	*	19,248	26,338	4,388	6.0	39,460	7,250	5.4	2.0	5.9	3.2
Oghlwpo		0	0	0	0.0	0	0	0.0	0.0	0.0	0.0
Azaguie	*	20,019	16,503	3,303	5.0	28,586	6,580	4.3	-1.2	8.2	1.6
Bonoua	*	43,728	52,312	11,566	4.5	88,495	20,408	4.3	1.1	7.8	3.1
Dabou	*	67,061	70,773	14,366	4.9	110,512	23,000	4.8	0.3	6.6	2.2
Jaqueville	*	38,415	32,288	6,398	5.0	49,694	11,327	4.4	-1.1	6.4	1.1
Total		**429,109**	**529,514**	**111,424**	**4.8**	**1,009,844**	**218,480**	**4.6**	**1.3**	**9.7**	**3.8**

Table 2.4.7 Population and the Number of Households in Greater Abidjan in 1998, 2014 and 2021 (2/2)

Administrative Area		Year							Annual Average Growth Rate of Population (%/year)		
		1998	2014			2021					
		Population	Population	Household	Houshold size	Population	Household	Houshold size	1998-2014	2014-2021	1998-2021
c. Sub-Prefecture Population/households (including outside the SDUGA Study Area)											
Anyama		43,127	29,448	5,856	5.0	77,018	15,838	4.9	-2.4	14.7	2.6
Bingerville		9,177	11,077	2,469	4.5	24,825	5,653	4.4	1.2	12.2	4.4
Brofodoume		-	15,842	3,895	4.1	20,357	5,088	4.0	-	3.6	-
Songon		13,307	8,522	2,149	4.0	13,653	3,123	4.4	-2.7	7.0	0.1
Alepe		76,971	14,142	2,355	6.0	21,188	3,891	5.4	-10.0	5.9	-5.5
Oghlwpo		10,512	9,668	2,157	4.5	17,041	3,154	5.4	-0.5	8.4	2.1
Azaguie		4,566	5,473	1,095	5.0	9,480	2,181	4.3	1.1	8.2	3.2
Bonoua		34,954	17,671	3,907	4.5	29,893	6,894	4.3	-4.2	7.8	-0.7
Dabou		71,808	17,657	3,801	4.6	27,571	6,086	4.5	-8.4	6.6	-4.1
Jaqueville		14,456	0	0	-	0	0	-	-	-	-
Total		**278,878**	**129,500**	**27,684**	4.7	**241,026**	**51,909**	4.6	**-4.7**	**9.3**	**-0.6**
d. Sub-Prefecture Population/households limited to the SDUGA Study Area											
Anyama		43,127	29,448	5,856	5.0	77,018	15,838	4.9	-2.4	14.7	2.6
Bingerville		9,177	11,077	2,469	4.5	24,825	5,653	4.4	1.2	12.2	4.4
Brofodoume		-	15,842	3,895	4.1	20,357	5,088	4.0	-	3.6	-
Songon		13,307	8,522	2,149	4.0	13,653	3,123	4.4	-2.7	7.0	0.1
Alepe	**	69,751	12,815	2,134	6.0	19,201	3,526	5.4	-10.0	5.9	-5.5
Oghlwpo		10,512	9,668	2,157	4.5	17,041	3,154	5.4	-0.5	8.4	2.1
Azaguie	**	4,548	5,452	1,091	5.0	9,443	2,173	4.3	1.1	8.2	3.2
Bonoua	**	30,843	15,593	3,448	4.5	26,378	6,083	4.3	-4.2	7.8	-0.7
Dabou	**	15,302	3,763	810	4.6	5,875	1,297	4.5	-8.4	6.6	-4.1
Jaqueville		14,456	0	0	-	0	0	-	-	-	-
Total		**211,024**	**112,180**	**24,008**	4.7	**213,791**	**45,936**	**4.7**	**-3.9**	**9.7**	**0.1**
Grand Total (a+b+c)		**3,585,935**	**5,054,257**	**1,087,475**	4.6	**6,867,504**	**1,532,139**	**4.5**	**2.2**	**4.5**	**2.9**
Total of SDUGA 2040 Study Area (a+b+d)		**3,518,081**	**5,036,937**	**1,083,799**	**4.6**	**6,840,269**	**1,526,166**	**4.5**	**2.3**	**4.5**	**2.9**

Source: INS

Note: (1)The values with * are the population and the number of household values estimated by applying the growth rates of corresponding sub-prefecture between 2014 and 2021. INS is waiting for the Ministry of Interior to send the data to them as of May 2023.
(2) The values with ** for sub-prefecture population are derived by multiplying the proportion of the urbanized areas within the new

2.4.2 Employment

(1) Whole of Côte d'Ivoire

The recent situation of the labor force, employment and unemployment in Cote d'Ivoire is summarized in Table 2.4.7 below. It is observed that the unemployment rate rose from 3.1% to 3.5% as a result of the widening gap between the increase in the labor force which grew at 2.7% per year and that in the employment which grew more slowly at 1.6% per year.

Table 2.4.8 Labor Force, Employment and Unemployment in Côte d'Ivoire from 2015 to 2020

Item	2015	2016	2017	2018	2019	2020	Average Annual Growth Rate (%/year), 2015-2020
Labor force (15+) *(1)*	13,536,373	13,877,659	14,240,840	14,622,970	14,951,025	15,435,803	2.7
Percentage to total population(%)	58.01%	57.94%	57.96%	58.04%	58.06%	58.35 %	-
Unemployment rate (%) *(2)*	3.1	2.6	3.3	3.2	3.2	3.5	-
Employment *(2)*	7,248,303	7,418,733	7,354,911	7,571,270	7,792,469	7,862,901	1.6

Source: (1) INS (2) *https://data.worldbank.org/indicator/SL.UEM.TOTL.ZS?locations=CI*

Table 2.4.8 compares the unemployment rates of the UEMOA countries and some neighboring countries. The unemployment rate in Cote d'Ivoire at 3.5% is the third-lowest among these ten countries. Those of the two countries located in the immediate inland of Cote d'Ivoire, which are Burkina Faso and Mali, are higher at 4.9% and 7.7% respectively, indicating an economic difficulty due to their land-locked positions. Cote d'Ivoire could support the economic growth of these two land-locked countries by enhancing its gateway function. The unemployment rate of Nigeria, which is the economic giant and the most populous country in West Africa, is very high at 9.7%, while that of Ghana, a regional rival for Cote d'Ivoire, is also higher at 4.7%.

Table 2.4.9 Unemployment Rates of UEMOA and Other Countries in 2020

Country	Unemloyment Rate (%)
UEMOA Members	
Benin	1.6
Burkina Faso	4.9
Cote d'Ivoire	3.5
Guinea-Bisau	6.7
Mali	7.7
Niger	0.6
Senegal	3.6
Togo	3.9
Non-UEMOA Neighbor Countries	
Nigeria	9.7
Ghana	4.7
Source: the World Bank homepage https://data.worldbank.org/indicator/SL.UEM.TOTL.ZS	

(2) Greater Abidjan

The total employment in Greater Abidjan is estimated to be 2,175 thousand with the following sector distribution.

- Agriculture: 13 thousand
- Industry: 433 thousand
- Commerce: 829 thousand
- Service: 900 thousand

The estimate was made based on the data available on the proportion of workers to the population and sector distribution of the employment in Greater Abidjan as shown in Table 2.4.10.

The total employment at 2,175 thousand was derived by applying the total population in Greater Abidjan in 2021 at 6,840 thousand and the proportion of workers to the population at 31.8%.

Table 2.4.10 Proportion of Workers to Population and Sector Distribution of Employment

Number of Workers in Greater Abidjan in 2014			Sector Distribution of Employment in Greater Abidjan in 2019	
Item	Value	Proportion	Sector	Proportion (%)
Population	5,309,404	100.0%	Agriculture	0.60
Housework	1,015,886	19.1%	Industry	19.90
Working	1,687,654	31.8%	Commerce	38.10
Student	1,246,181	23.5%	Service	41.40
Other	1,359,683	25.6%	Total	100.00
Source: INS			Source: Enquete Nationale sur L'employ en Cote d'Ivoire 2019	

2.4.3 Economy

(1) Cote d'Ivoire

The economy of Cote d'Ivoire is characterized as follows.

- The Gross Domestic Product (GDP) amounted to US$ 61 billion in current price in 2020, which was the largest among the eight UEMOA countries as shown in Table 2.4.9, indicating its leading role in francophone West Africa.
- Its economic size is similar to that of Ghana, one of the rivals in West Africa and 14% of Nigeria, the economic giant in West Africa.
- GDP per capita of Cote d'Ivoire at US$2,326 was the highest among the UEMOA plus two countries. It is similar to the average of the lower middle income countries (from US$1,026 to 3,955 in 2020 by the World Bank classification) at US$2,217 and 55% higher than the average of Sub-Sahara Africa at US$1,501.

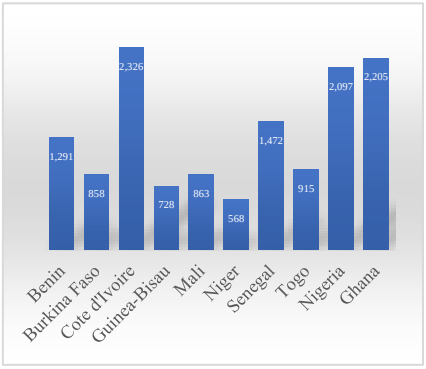


Figure 2.4.3 GDP per capita and of UEMOA Countries and Selected Neighboring Countries 2020

Table 2.4.11 GDP and GDP per capita of UEMOA Countries and Selected Neighboring Countries 2020

Country	GDP (US$ million, current price) *(1)*	GDP pe capita (US$, current price) *(2)*
UEMOA Members		
Benin	15,652	1,291
Burkina Faso	17,934	858
Cote d'Ivoire	61,349	2,326
Guinea-Bisau	1,432	728
Mali	17,465	863
Niger	13,741	568
Senegal	24,644	1,472
Togo	7,575	915
Non-UEMOA Neighboring Countries		
Nigeria	432,293	2,097
Ghana	68,532	2,205

Source: the World Bank homepages
(1) https://data.worldbank.org/indicator/NY.GDP.MKTP.CD
(2) https://data.worldbank.org/indicator/NY.GDP.PCAP.CD

[9] https://blogs.worldbank.org/opendata/new-country-classifications-income-level-2019-2020

- While the economy of Cote d'Ivoire grew favorably at 7.2%, 7.4%, 6.9% and 6.2% per year in 2016, 2017, 2018, and 2019 respectively, its growth shrank to 2.0% in 2020 due to COVID-19. In 2021, the country returned to its high-growth trajectory and continues to play a regional economic hub and host country for many nationals from ECOWAS countries. Its economic growth rates were 7.4% in 2021 and 6.7% in 2022[10]. Its strengths in the economy include a wide variety of export goods, a favorable relation with France, the former suzerainty country, and an increase in foreign direct investments.
- The Port of Abidjan is the third largest port in West Africa in terms of container handling volume in 2020: Tema in Ghana at 1.2 million TEUs, Lagos in Nigeria at 1.1 million TEUs and Abidjan at 0.8 million TEUs[11]. It is serving as a hub port and a gateway to the hinterland Sahel area including such countries as Mali, Burkina Faso and Niger. This aspect indicates the importance of guiding Abidjan's urban development from the perspective of enhancing the distribution function of the port and its hinterland. The competition with the other ports in West Africa for a hub port should be considered as well.
- The major export commodities in 2020 were cocoa beans (US$ 3.52 billion), rubber (US$ 1.27 billion), cocoa paste (US$ 1.04 billion), gold (US$ 987 million) and coconuts/Brazil nuts/cashew nuts (US$ 725 million). The major export destinations were Netherlands, Switzerland, USA, France and Malaysia.
- Cote d'Ivoire produces the largest amount of cocoa beans in the world: Cote d'Ivoire (2,230 thousand tons in 2022), followed by Ghana (1,109 thousand tons), Indonesia (667 thousand tons), Ecuador (337 thousand tons), Cameroon (300 thousand tons) and Nigeria (280 thousand tons)[12].
- The major import commodities were crude petroleum (US$ 913 million), rice (US$ 551 million), non-fillet frozen fish (US$ 417 million), packaged medicaments (US$ 270 million) and cars (US$ 172 million). The major source countries of import were China, France, Nigeria, India and Netherlands. The international trade balance was US$0.5 billion surplus with US$ 10.5 billion export and US$ 10.0 billion import in 2020[13].
- In terms of the structure of the economy, there has been a trend of the primary and secondary sectors increasing their shares from 2015 to 2020, from 18.4% to 21.5% for the primary sector and from 19.5% to 20.9% for the secondary sector according to PND 2021-2025.

(2) Greater Abidjan

The gross regional domestic product (GRDP) of Greater Abidjan was estimated by applying some indicators in the absence of official data. The following indicators were applied.

- Value added per worker in Cote d'Ivoire (labor productivity)
- Number of workers by sector in Greater Abidjan
- Prices indexes to adjust time differences of the above indicators

Table 2.4.12 below shows the result of the estimate.

[10] https://www.afdb.org/en/countries/west-africa/cote-d'ivoire/cote-divoire-economic-outlook
[11] https://www.statista.com/statistics/1380555/turnover-volume-largest-container-ports-africa/
[12] FAOSTAT https://www.fao.org/faostat/en/#data/QCL
[13] OEC homepage https://oec.world/en/profile/country/civ

Table 2.4.12 Gross Regional Domestic Product (GRDP) of Greater Abidjan in 2021

Sector *(1)*	Value Added per Worker in 2021 in 2021 Price				b. Number of workers in 2021 (thousand) *(5)*	GRDP of Greater Abidjan in 2021 in 2021 price	
	Value Added/worker in 2015 price (US$) *(2)*	GDP deflator (2015=1.00) *(3)*	a. Converted to 2021 price (US$)	Converted to CFA (10^3 CFA/worker) *(4)*		thousand US$ (a*b)	Million CFA *(4)*
Primary	2,906	1.051	3,054	1,698	13	39,702	22,074
Secondary	13,262		13,938	7,750	433	6,035,154	3,355,546
Tertiary	7,862		8,263	4,594	1,729	14,286,727	7,943,420
Total	-		**9,362**	**5,205**	**2,175**	**20,361,583**	**11,321,040**

Note/Sources: (1) Primary: Agrticu;ture, fishery, Secondary: manufacturing, mining, Tertiary: all kinds of services
(2) the World Bank, https://data.worldbank.org/indicator/NV.SRV.EMPL.KD?locations=CI
(3) the World Bank, https://data.worldbank.org/indicator/NY.GDP.DEFL.KD.ZG?locations=CI
(4) Exchange rate: 556 CFA as of June 30, 2021
(5) "Enquete Nationale sur L'employ en Cote d'Ivoire 2019" and INS

Greater Abidjan's GRDP in 2021 was estimated to be US$ 20,362 million or CFA 11,321 billion which was equivalent to 28.9% of Cote d'Ivoire's GDP at 39,926 billion.

2.5 Urban Transportation

2.5.1 Ministry and technical structures in charge of transport

(1) Related organizations and legal systems in the urban transportation sector

The organizations responsible for urban transportation administration in the Greater Abidjan area are classified as (1) Ministry of Transportation, (2) Ministry of Road Maintenance and Equipment, (3) Abidjan Autonomous Region, and (4) Others, with their respective roles and characteristics as shown in Table 2.5.1.

Table 2.5.1Organizations involved in urban transportation

related organizations	Main Functions and Roles
Ministry of Transport	The organizations of the railroads, airports, and ports sector, which belonged to the Ministry of Economy and Infrastructure when the SDUGA was formulated, were integrated into the Ministry of Transportation in 2017. The General Directorate of Land Transport and Traffic (DGTTC: Direction générale des transports terrestres et de la circulation) of the Ministry of Transportation is in charge of transportation policies and regulations. It is also in charge of all public transport in the Greater Abidjan area, and defines passenger boarding and alighting points, etc. The DGTTC is in charge of studying the introduction of new transportation modes, such as online on-demand transport services. Regarding transportation projects of various donors including the World Bank's PMUA, a new agency has been established within the Ministry of Transportation's Secretariat to serve as a contact point for monitoring and communicating with the relevant agencies.
Ministry of Road Maintenance and Equipment	The organization of the road sector, which was part of the Ministry of Economy and Infrastructure when the SDUGA was formulated, was separated in 2017 as the Ministry of Road Maintenance and Equipment. The Ministry of Road Maintenance and Equipment is in charge of road maintenance and is currently independently developing and advancing 80 road projects (18 of which are intersection improvement projects) to be developed by 2025 based on SDUGA road projects. The AGEROUTE (Agence de Gestion des Routes), under the Ministry of Road Maintenance and Equipment, is responsible for the construction and maintenance of roads, mainly national roads. Although the 1984 decree clearly divided the management of the existing road network between the national government, districts, and municipalities, AGEROUTE is involved in the maintenance and management of many roads beyond its scope. AGEROUTE also has a division responsible for traffic management of roads, including traffic signals.
District Autonome d'Abidjan	Since the Abidjan District became an autonomous region of Abidjan in 2011, many powers related to the transportation sector as well as urban planning are being devolved. In particular, a 2015 decree places the governor of Abidjan Autonomous District on the same level as ministers and makes him a member of the Cabinet of Ministers. The total number of employees in the District Autonome d'Abidjan is approximately 2,100, of which 150 are in the transportation sector (including traffic management and traffic safety). However, although the District Autonome d'Abidjan is legally in charge of traffic management, the road maintenance fund (FER), which provides financial resources, was not allocated to the District Autonome d'Abidjan, so AMUGA is in charge of controlling the signal while AGEROUTE installing and maintaining.
BNETD	BNETD is a national technology and development research institute established in 1964 to contribute to the development of countries and African nations. While it is a

	research institute under the Office of the Prime Minister (and sometimes under the Office of the President) and has close ties with a number of government agencies and local governments, it is not located under any ministry and maintains its independence. BNETD has a staff size of approximately 1,000, of which approximately 60% are engineers. The staff of the Transportation and Economic Infrastructure Department, which mainly undertakes work for the Ministry of Transportation and the Ministry of Road Maintenance and Equipment, is about 200, of which about 10 are engineers in transportation planning.
SOTRA	SOTRA is the only official transportation operator in the Greater Abidjan area in the land bus business, and a public company whose mission is to provide comfortable, safe, and on-time service to passengers by providing passenger transportation by road and water. SOTRA, as a public corporation, is under the Ministry of Economy and Finance, but the actual business management and improvement is now working with AMUGA rather than the Department of Transportation (DGTCC). SOTRA's staff size is 223 managers, 355 senior technicians, 1657 supervisors, and 1863 employees.

Source: JICA Project Team

(2) Major legal systems in the field of urban transportation

The main legislative system in the field of urban transportation is as follows

- Presidential Decree No 2019-99 (Positioning and Organization of Directions for Domestic Traffic)

The creation of the Urban Mobility Organizing Authorities (AOMU: Autorites organisatrices de la Mobilite urbaine) and the AMUGA (Autorite de la Mobilite urbaine) as the AOMU for the Greater Abidjan area, as an independent authority with legal and financial powers to regulate urban transportation throughout the country.

- Presidential Decree No 2019-100 (Organization and Work of AMUGA)

AMUGA's tasks include setting public transport tariffs, negotiating competition among urban transport operators, and monitoring the performance of the urban transport system.

- Presidential Decree No 201-794 (Personnel Composition of the Road Maintenance Fund (FER: Fonds d'Entretien Routier))

The personnel composition of the FER shall include the President, the Prime Minister, the Ministry of Economy and Infrastructure, representatives of transport operators, chambers of commerce, consumer associations, and drivers' unions.

- Decree No. 2014-812 (Domestic Traffic Guidance)

Regulatory authority for domestic transportation rests with the Regulatory Council, an eight-member body (six-year term (non-renewable)) consisting of the President and ministers concerned with the law. Other regulations include market entry conditions for transportation operators, contract details, and pricing.

- Decree No. 2015-18 of the Ministry of Transport (Organizational Changes within the Ministry of Transportation)

- Decree No. 2021-453 of September 08, 2021, on the organization of the Ministry of Transport

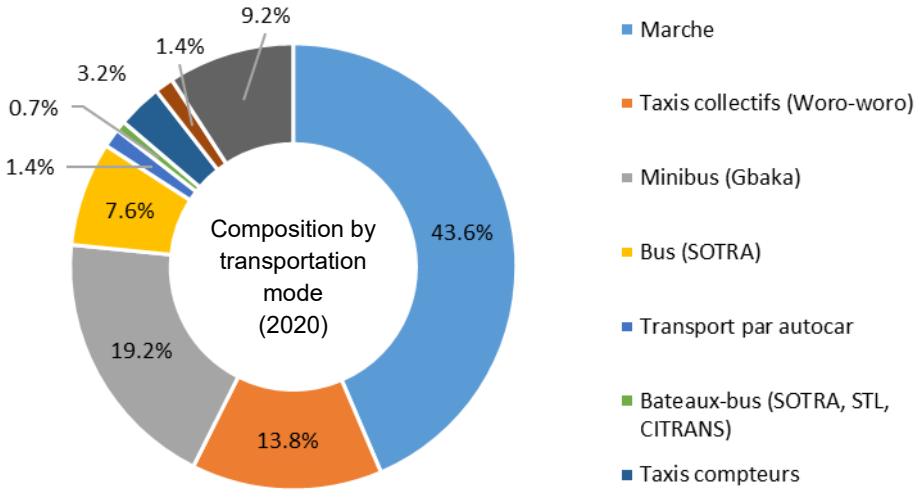
Provides for the establishment or modification of the Aviation Department, Finance Department, Human Resources Department, Planning and Statistics Department (e.g., preparation of the National Development Plan and Public Investment Program), IT and Library Management Office, Accident Investigation and Analysis Office, and the Ministerial Secretariat.

- National Safety Council Decree April 9, 2020 (limiting the number of passengers as a COVID-19 measure)

Limit the number of passengers on public transportation, including informal transportation and water transportation. From 5 seats to 4 seats, 9 seats to 6 seats, 15 seats to 10 seats, 17 seats to 11 seats, 22 seats to 15 seats, 26 seats to 20 seats, 32 seats to 24 seats, 36 seats to 27 seats, 26 seats to 20 seats, etc.

(3) Changes in transportation sharing

According to AMUGA's website, the average total number of trips per day in the Greater Abidjan area in 2020 was 16.9 million trips. Assuming that the population of the Greater Abidjan Area is around 6 million, the number of trips per capita is 2.8 trips/person, which is a little larger than that of Japan.[14] As shown in Figure 2.5.1 and Table 2.5.2, 43.6% of all trips are made on foot, 19.2% by Gbaka, 13.8% by Woro-woro, 9.2% by private car, and 7.6% by bus (SOTRA). Excluding walking, public transportation accounted for more than 80% of the total, with Gbaka (minibus) the most common form of public transportation, followed by Woro-woro (shared-ride cab). Together, they transport more than 70% of all public transportation users and are the main means of transportation in the Greater Abidjan area.



Source: AMUGA website

Figure 2.5.1 Composition by Transportation Mode (2020)

Table 2.5.2 Composition by Transportation Mode (2020)

	Trips per day	Composition by mode	Modal sharing in automobile transportation	Modal share in public transportation
Walking	7,363,330	43.6%		
Woro-woro	2,338,510	13.8%	24.5%	30.2%
Gbaka	3,241,111	19.2%	34.0%	41.8%
Bus (SOTRA)	1,276,090	7.6%	13.4%	16.5%
Enterprise Bus	229,606	1.4%	2.4%	3.0%
Water bus	125,109	0.7%	1.3%	1.6%
Meter cab	545,752	3.2%	5.7%	7.0%

[14] The survey results for the Tokyo metropolitan area show 2.5 trips/person, but this is based on ages 5 and older, so the value for the Greater Abidjan area is considerably larger.

Motorcycle	230,680	1.4%	2.4%	
Private automobile	1,549,812	9.2%	16.3%	
	16,900,000	100.00%	100.00%	100.00%

Source: AMUGA website

Table 2.5.3 shows a comparison with the results of the traffic survey conducted in SDUGA in 2013 (walking is excluded). Compared to 2013, the use of personal modes of transportation such as private cars and motorcycles has increased, while the ratio of Woro-woro use has decreased. In terms of public transportation, SOTRA (buses and water buses) and Gbaka have increased, indicating a shift to higher capacity public transportation.

Table 2.5.3 Composition by Mode of Transportation

Mode	2013	2020
Private automobile	10.0%	18.7%
Motorcycle		
Bus (SOTRA)	11.2%	14.7%
Water bus		
Gbaka	29.7%	34.0%
Woro-woro	39.1%	24.5%
Meter cab	8.1%	5.7%
Enterprise Bus	1.9%	2.4%
Total amount	100.0%	100.0%
Source.	SDUGA	AMUGA

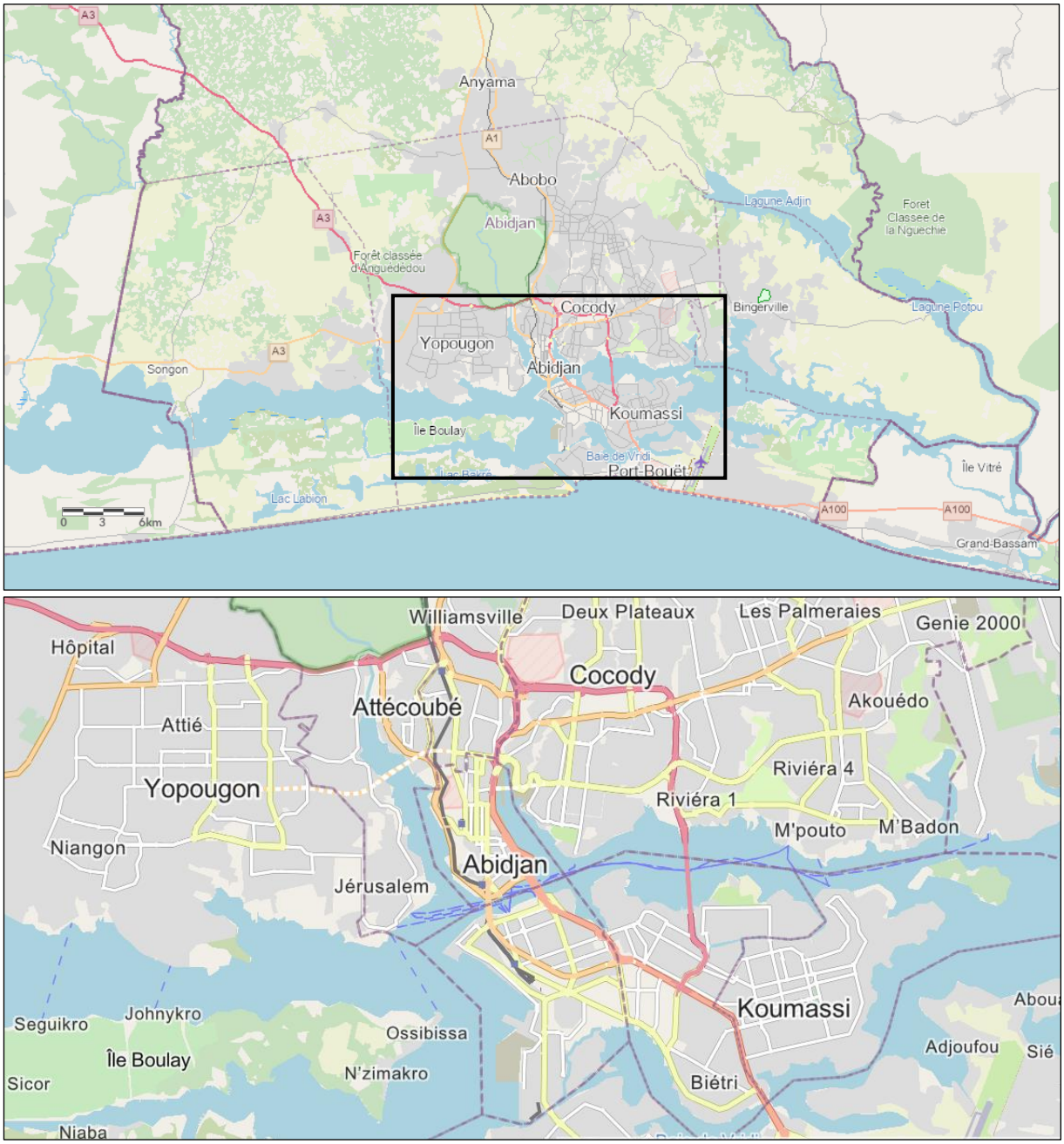
Source: JICA Project Team

2.5.2 Road Transportation

(1) Road Network

A road network of the Greater Abidjan Metropolitan Area is shown in Figure 2.5.2. The road network of Greater Abidjan is characterized by radial roads originating in the Plateau and the surrounding central area and running toward west and northwest (A3), toward north (A1) and toward east (A100).

The Central Business District (CBD) of Abidjan is concentrated in the entire area of Plateau Commune and some parts of Cocody, Adjame, and Treichville Communes. CBD is surrounded by the expressway and arterial national roads. Connectivity among the above communes of CBD is quite restricted due to topographical features. To connect these areas, which are economically important, but separated by lagoons, three long bridges have been constructed: Houphouet Boigny Bridge to connect the southern end of Plateau and Treichville Commune with the Port of Abidjan, General de Gaulle Bridge to connect the southeastern corner of Plateau and Marcoy with the active business/commercial and industrial areas and HKB (Henri Konan Bedie) Bridge located about 3.5 km east of General de Gaulle Bridge to connect Cocody Commune and Marcoy Commune. While all these tree bridges ensure connection in the north-south direction across the lagoons, a fourth bridge is under construction, which connects Attecoube/Plateau and Yopugon in the east-west direction.



Source: Map data © OpenStreetMap contributors, Microsoft, Esri Community Maps contributors, Map layer by Esri

Figure 2.5.2 Road Network in Greater Abidjan

(2) Traffic Survey

A traffic survey was conducted at the same survey locations as SDUGA to compare with the SDUGA survey results.

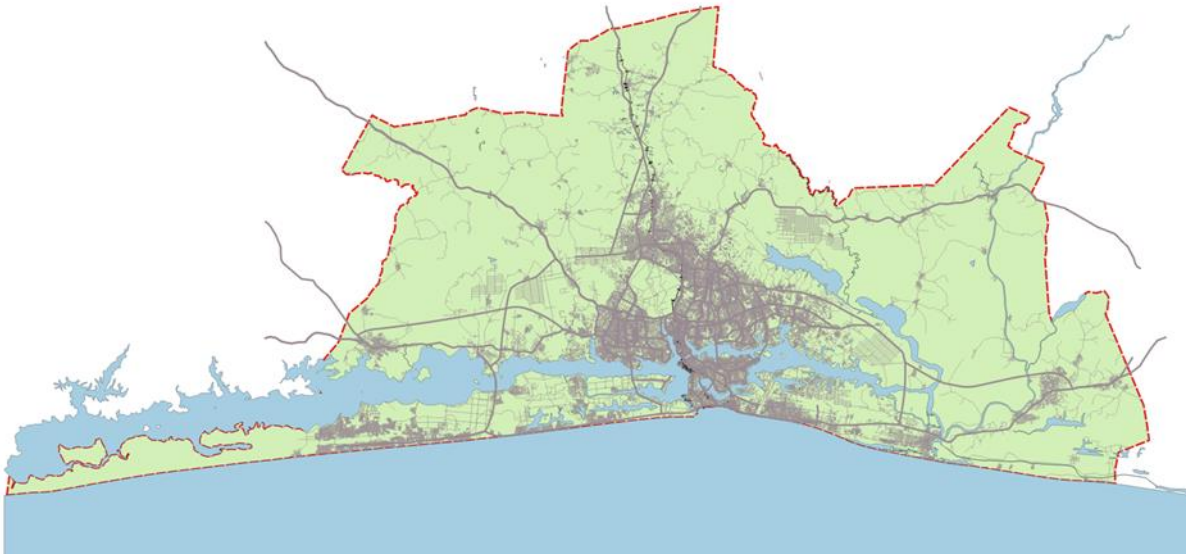
The obtained data will be used to make the present 2021 OD table by updating the existing OD tables mainly made by SDUGA.

1) Survey Type

Cordon Line Survey and Screen Line Survey were conducted.

2) Project Area

The project area consists of 13 communes of Abidjan Autonomous District (AAD) shown in red and the 6 communes lying outside AAD are shown in green around them on the map.



Source: SDUGA

Figure 2.5.3 The Project Area

3) Vehicle Type

Vehicle types are classified into 12 types as shown in Table 2.5.4 below.

Table 2.5.4 Vehicle Classification

No.	Vehicle Type	Remark
1	Motorcycle and tricycle	2 or 3 wheel motorized vehicle
2	Private car (sedan)	For private use (sedan, SUV, etc.)
3	Private car (van)	For private use
4	Taxi	Meter taxi
5	Woro-Woro	Intra-communal shared taxi (5 seats or 8 seats)
6	Gbaka/ Small Bus	Intra/ inter-communal mini-bus (approx. 12 – 18 seats)
7	Bus	SOTRA/ Private bus
8	Coupled-bus	Coupled SOTRA bus
9	Small Truck	Lightweight truck, pick-up truck
10	Medium Truck	2 axles
11	Large Truck	More than 2 axles
12	Trailer	Semi-trailer with a tractor unit

Source: JICA Project Team

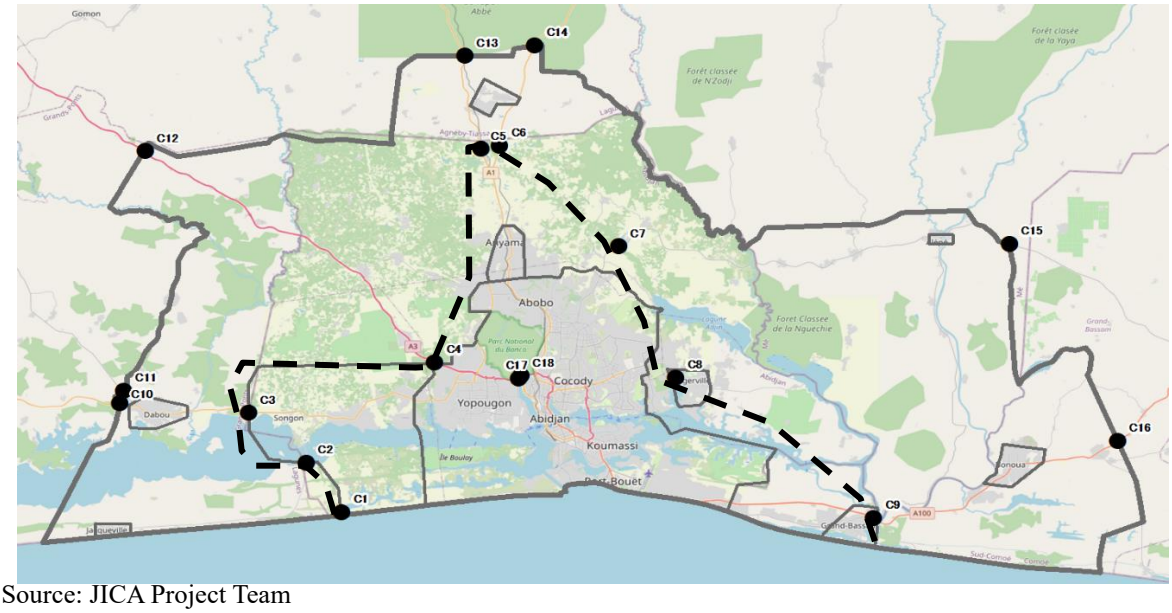
Vehicle types from No.1 to No. 3 are classified as “Private Vehicles”, and vehicle types from No.4 to No.8 are classified as “Bus”, and No.9 to No.12 are classified as “Truck”.

4) Location of Cordon Line Survey

Generally, a cordon line is set on the boundary of the project area. And the traffic survey is conducted on the road that passes through the cordon line.

Figure 2.5.4 below shows the survey locations of the Cordon line survey.

In SDUGA, the internal cordon line (from C1 to C9) and external cordon line (from C10 to C16) were set. In this survey, C17 and C18 were added to capture the traffic to enter the Plateau area.



Source: JICA Project Team

Figure 2.5.4 Location of Cordon Line Survey

Table 2.5.5 Location of Cordon Line Survey

N°	Emplacement	Durée (Heures)	Roadside OD interview
C1	Jacqueville – Yopougon	24	☑
C2	Jacqueville – Songon	24	☑
C3	A3 (Dabou – Songon)	24	☑
C4	Autoroute du Nord (Attinguie – Plateau)	24	☑
C5	B107 (Azaguie – Anyama)	24	☑
C6	Autoroute d'Abobo (Azaguie – Anyama)	24	☑
C7	Brofodoume – Abobo	24	☑
C8	Palmeraie – Bingerville	24	☑
C9	Bonoua – Grand Bassam	24	☑
C10	Dabou – Bouboury	24	
C11	Dabou – Lopou	24	
C12	Autoroute du Nord (Attinguie – Sahuye)	24	
C13	B107 (Azaguie – Agboville)	24	
C14	Autoroute d'Abobo (Azaguie – Yacasse)	24	
C15	Alepe – Aboisso	24	
C16	Bonoua – Aboisso	24	
C17	Yopgon – Ajame (highway)	24	☑
C18	Yopgon – Ajame	24	☑

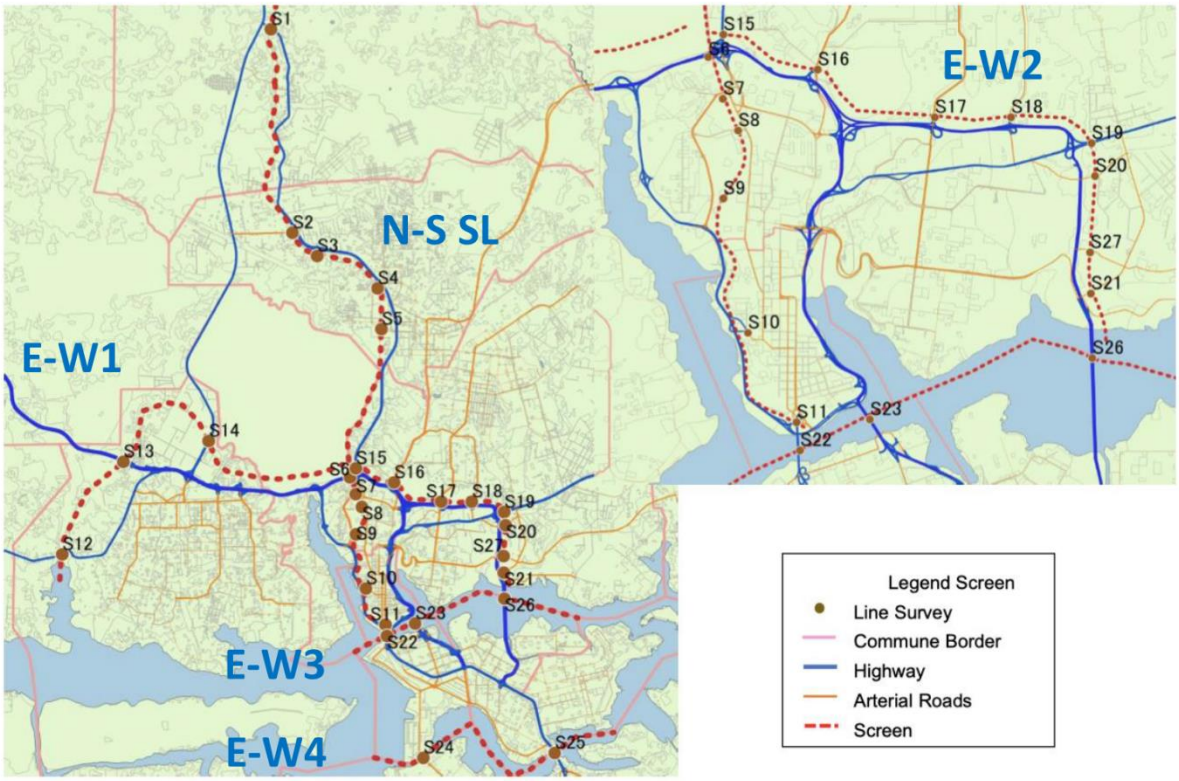
Source: JICA Project Team

5) Locations of Screen Line Survey

A screen line is a virtual line that divides the study area into two, and the volume of the traffic on the roads passing through the screen line was surveyed.

Screen lines are generally set in places that divide areas such as rivers, sea, mountain ridges, railways,

wide trunk roads and so on.



Source: JICA Project Team

Figure 2.5.5 Locations of Screen Line Survey

In this survey, five screen lines were set in the same way as SDUGA.

- North-South screen line (SL) (consisting of S1-S11 survey locations) was set on the existing railway to grasp the traffic movement between the west and east of Abidjan
- East-West 1 SL (consisting of S12-S15) was set to grasp the traffic movement between the western and northwestern part of Abidjan and the center of Abidjan.
- East-West 2 SL (consisting of S16-S21, S27) was set to grasp the traffic movement between the eastern and northeastern part of Abidjan and the center of Abidjan.
- East-West 3 SL (consisting of S22, S23, S26) was set to grasp the traffic movement between the southern part of Abidjan and rest of Abidjan, separated by Ebrie Lagoon.
- East-West 4 SL (consisting of S24, S25) was set to grasp the traffic movement between the international airport, southeastern Abidjan and rest of Abidjan, separated by Reconnaissance Bridge.

There are 27 locations. 16-hour traffic count surveys were conducted at 24 locations and at 3 locations (S1, S13, S16), 24-hour traffic count surveys were undertaken.

At the locations from S15 to S23, S26 and S27, 16-hour roadside OD interview surveys were conducted.

Table 2.5.6 Locations of Screen Line Survey

N°	Survey Location	Hour	Roadside OD
S1	Anyama - Agboville	24	-
S2	Ndotre - Agripac	16	-
S3	Gare International Abobo - Anokoi Koute	16	-
S4	Derreire Rail - Rond Point Gendarimerie	16	-
S5	Epp Bad - Anador Banco 1 West to East Inbound	16	-
S6	Yopougon - Adjame 1 West to East Inbound	16	-
S7	Pharmacie Agban - Adjame Nord 1 West to East Inbound	16	-
S8	Pharmacie Cha Teau - Mosque Adjame 1 West to East Inbound	16	-
S9	Bromacote - Nangui Abrogoua 1 South to North Inbound	16	-
S10	Carena - Plateau 1 West to East Inbound	16	-
S11	Carena - Plateau 1 West to East Inbound	16	-
S12	Dabou - Yopougon 1 West to East Inbound	16	-
S13	Autoroute du Nord - Attinguie 4 1 North to South Inbound	24	-
S14	Ndotre - Prison Civile 1 North to South Inbound	16	-
S15	Abobo - Adjame 1 North to South Inbound	16	☑
S16	Adjame - William Ville 1 North to South Inbound	24	☑
S17	Angre - Cocody 1 North to South Inbound	16	☑
S18	Ecole de Police - Deux Plateaux 1 North to South Inbound	16	☑
S19	Riviera II - Ecole de Police 1 West to East Inbound	16	☑
S20	Mosque - Universite 1 East to West Inbound	16	☑
S21	Golf - Cocody 1 East to West Inbound	16	☑
S22	Treichville - Plateau 1 South to North Inbound	16	☑
S23	Treichville - Plateau 1 South to North Inbound	16	☑
S24	Vridi - Treichville 1 South to North Inbound	16	
S25	Port Bouet - Koumassi 1 South to North Inbound	16	
S26	Mercory - Riviera South to North Inbound	16	☑
S27	Golf - Cocody 1 East to West Inbound	16	☑

Source: JICA Project Team

6) Result of Cordon Line Traffic Count Survey

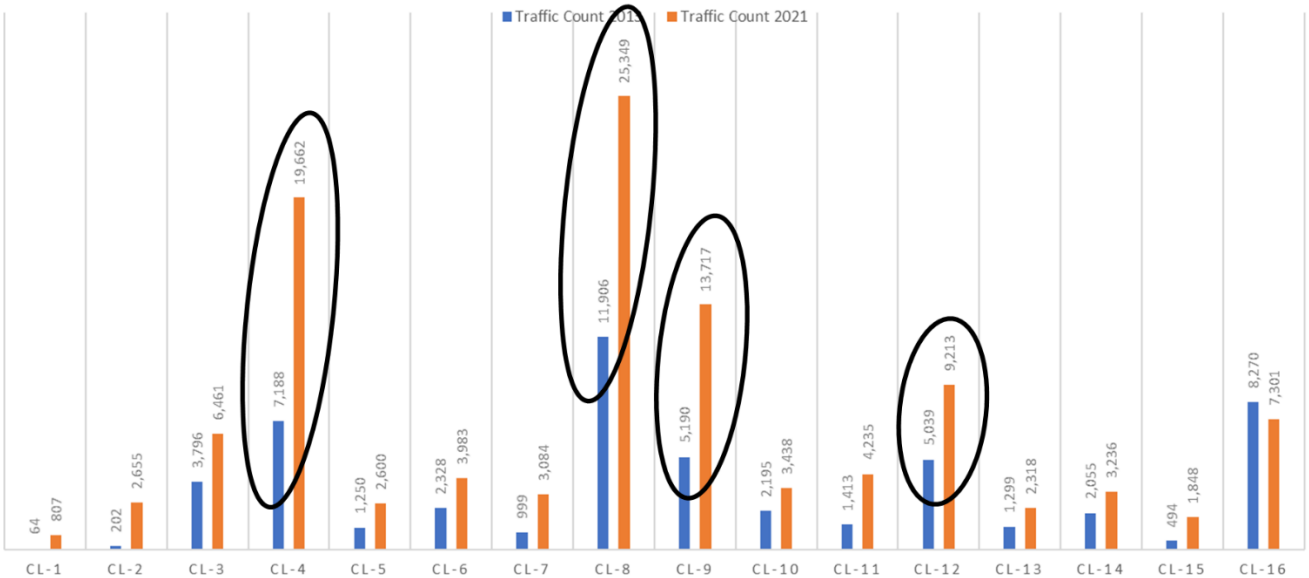
Table 2.5.7 shows the result of the codon line count survey, and Figure 2.5.6 shows the comparison with the result of SDUGA.

Traffic volume has increased significantly at C4, C8 and C9 points for the internal cordon line and C12 for the external cordon line, compared to the 2013 SDUGA result.

Table 2.5.7 Cordon Line Count (Veh/day)

		1	2	3	4	5	6	7	8	9	10	11	12						
		2 ou 3 Roues motorisées	Voiture Particulier (Sedan)	Voiture Particulier (Van)	Taxi compteurs	Taxi woro-woro	Gbaka Minicar	Bus standard Autocar	Bus articulé	Camionnette/ Pick up	Camion 2 Essieux	Camion plus de 2 essieux	Ensemble articulés	TOTAL			Private (1-3)	Public (4-8)	Truck (9-12)	Total
Internal	C1	597	70	20	8	1	9	0	0	38	33	23	8	807			687	18	102	807
	C2	370	1,063	525	36	164	380	35	0	329	325	42	52	3,321			1,958	615	748	3,321
	C3	1,272	2,210	52	83	220	630	347	4	878	149	289	327	6,461			3,534	1,284	1,643	6,461
	C4	1,553	6,860	291	381	0	1,835	1,003	0	604	1,295	2,540	3,300	19,662			8,704	3,219	7,739	19,662
	C5	516	905	14	18	80	236	85	0	467	95	83	101	2,600			1,435	419	746	2,600
	C6	256	1,287	18	32	13	797	224	0	536	187	198	435	3,983			1,561	1,066	1,356	3,983
	C7	474	1,054	34	99	47	484	4	0	553	158	114	63	3,084			1,562	634	888	3,084
	C8	3,284	11,039	186	4,107	96	4,538	345	19	822	421	363	129	25,349			14,509	9,105	1,735	25,349
	C9	1,420	4,429	80	9	2,018	2,621	190	0	1,474	359	547	570	13,717			5,929	4,838	2,950	13,717
External	C10	814	711	23	0	510	394	42	0	248	147	248	301	3,438			1,548	946	944	3,438
	C11	1,563	664	258	0	482	388	4	0	137	268	182	289	4,235			2,485	874	876	4,235
	C12	373	3,322	87	0	0	397	1,065	0	853	476	1,339	1,301	9,213			3,782	1,462	3,969	9,213
	C13	827	714	15	4	0	249	61	0	308	49	55	36	2,318			1,556	314	448	2,318
	C14	238	1,050	9	2	0	611	197	0	462	151	165	351	3,236			1,297	810	1,129	3,236
	C15	895	210	60	8	215	17	5	0	286	72	35	45	1,848			1,165	245	438	1,848
	C16	1,319	1,114	74	6	1,955	850	136	0	1,169	189	203	286	7,301			2,507	2,947	1,847	7,301
To Plateau	C17	9,596	43,240	1,031	16,024	8	9,076	3,148	141	3,447	2,722	3,320	2,610	94,363			53,867	28,397	12,099	94,363
	C18	2,528	4,429	161	3,869	87	6,609	134	0	1,271	237	153	84	19,562			7,118	10,699	1,745	19,562
Internal	C1-9	9,742	28,917	1,220	4,773	2,639	11,530	2,233	23	5,701	3,022	4,199	4,985	78,984			39,879	21,198	17,907	78,984
External	C10-16	6,029	7,785	526	20	3,162	2,906	1,510	0	3,463	1,352	2,227	2,609	31,589			14,340	7,598	9,651	31,589
To Plateau	C17, C18	12,124	47,669	1,192	19,893	95	15,685	3,282	141	4,718	2,959	3,473	2,694	113,925			60,985	39,096	13,844	113,925
															TOTAL	VEH	115,204	67,892	41,402	224,498

Source: JICA Project Team

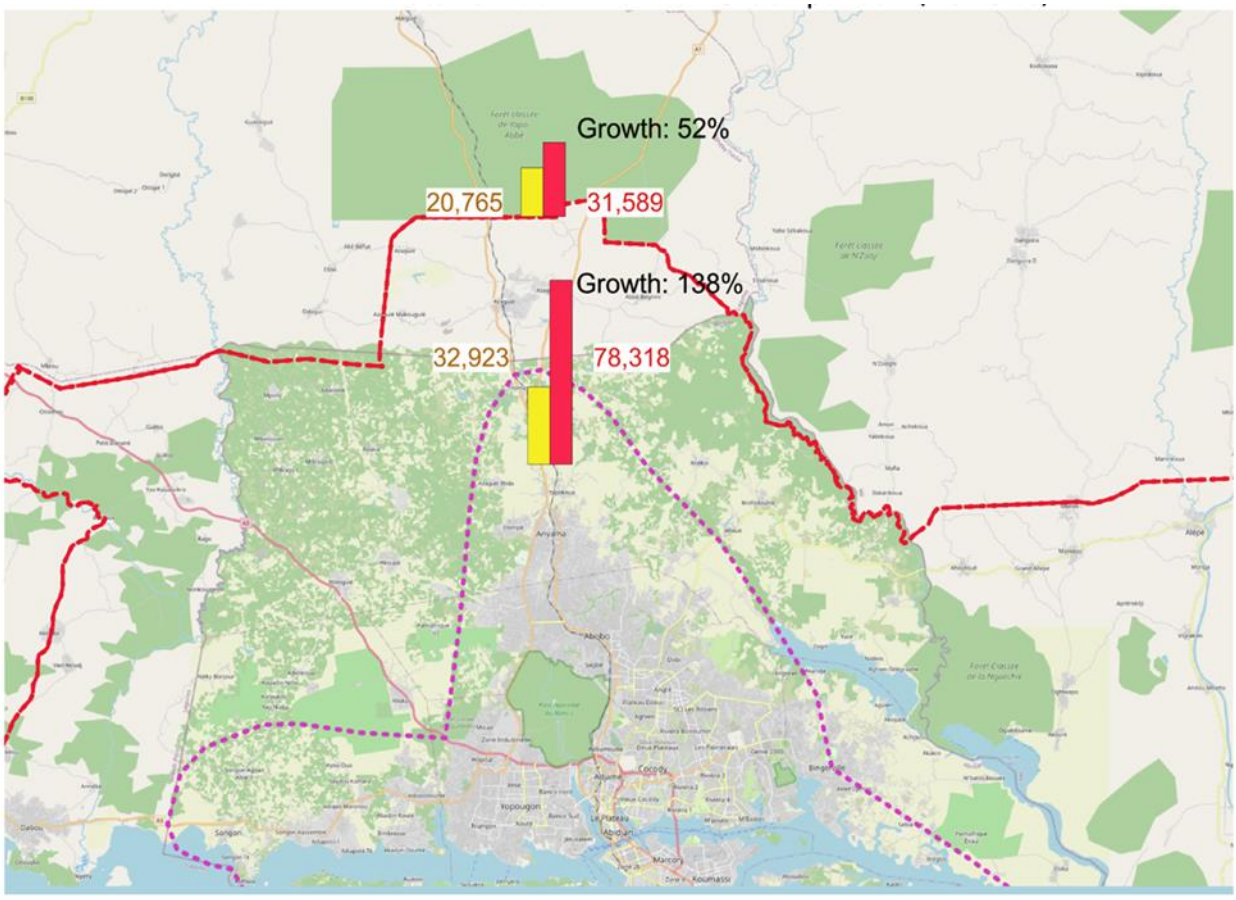


Source: JICA Project Team

Figure 2.5.6 Comparison with the result of SDUGA by each survey location

Figure 2.5.7 shows the comparison result of the total volume by cordon line with SDUGA.

The external trip increased by 52%, and the internal trip increased by 138%. From this result, it is considered that development has progressed at a higher rate outside the Internal Cordon line since 2013.



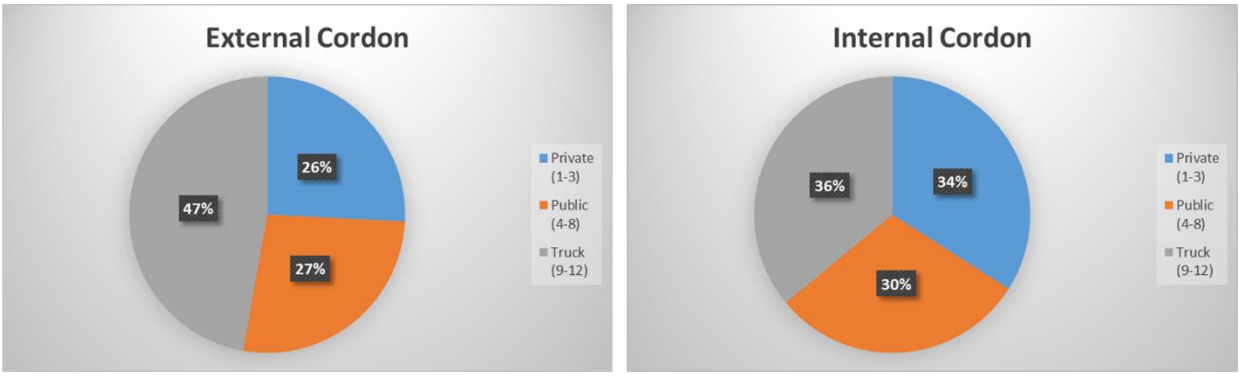
Source: JICA Project Team

Figure 2.5.7 Comparison with the result of SDUGA by each Cordon Line

Figure 2.5.8 shows the vehicle composition by pcu-unit base per day.

In the external cordon line, the ratio of trucks was the highest at 47%, followed by private cars and public transportations at 26% and 27%, respectively.

In the internal cordon line, the ratio of trucks was as high as 36%, and the ratios of private cars and public transportations were 34% and 30%, respectively.



Source: JICA Project Team

Figure 2.5.8 Vehicle Composition by each Cordon Line

Table 2.5.8 shows the traffic volume for each vehicle type of private vehicle and public transport at each

survey location. The unit of this traffic volume is the number of passengers per day.

The total traffic passing through the external cordon line is 180,000 passengers per day, and the traffic passing through the internal cordon line is 406,000 passengers per day.

The traffic to the Plateau is 555,000 passengers per day.

Overall, the number of passengers on public transport is more than four times higher than on private transport.

Table 2.5.8 Number of Passengers by Vehicle Type

		1	2	3	4	5	6	7	8					
		2 ou 3 Roues motorisées	Voiture Particulier (Sedan)	Voiture Particulier (Van)	Taxi compteurs	Taxi woro-woro	Gbaka Minicar	Bus standard Autocar	Bus articulé	TOTAL		Private (1-3)	Public (4-8)	Total
Internal	C1	960	141	74	16	2	200	0	0	1,393		1,175	218	1,393
	C2	562	2,280	2,436	85	629	6,804	750	0	13,546		5,278	8,268	13,546
	C3	1,957	4,945	182	197	720	9,952	18,339	0	36,292		7,084	29,208	36,292
	C4	2,136	13,607	1,311	722	0	24,652	49,276	0	91,704		17,054	74,650	91,704
	C5	741	1,749	64	30	183	5,493	2,795	0	11,055		2,554	8,501	11,055
	C6	335	2,070	116	60	33	16,148	10,561	0	29,323		2,521	26,802	29,323
	C7	630	2,090	140	246	109	9,794	45	0	13,054		2,860	10,194	13,054
	C8	4,306	18,500	627	8,424	177	79,056	13,179	1,400	125,669		23,433	102,236	125,669
	C9	3,090	11,377	196	29	7,169	51,978	10,337	0	84,176		14,663	69,513	84,176
External	C10	1,081	1,274	42	0	1,036	7,590	1,493	0	12,516		2,397	10,119	12,516
	C11	2,487	1,343	1,166	0	1,409	6,357	240	0	13,002		4,996	8,006	13,002
	C12	586	6,616	232	0	0	8,116	62,085	0	77,635		7,434	70,201	77,635
	C13	1,406	1,335	37	4	0	5,237	3,362	0	11,381		2,778	8,603	11,381
	C14	389	1,928	23	3	0	12,443	10,569	0	25,355		2,340	23,015	25,355
	C15	1,904	552	175	24	1,027	225	195	0	4,102		2,631	1,471	4,102
	C16	2,084	2,296	120	0	6,618	17,371	7,899	0	36,388		4,500	31,888	36,388
To Plateau	C17	12,353	77,318	6,009	38,268	33	155,072	132,016	10,511	431,580		95,680	335,900	431,580
	C18	3,260	7,589	719	7,739	178	98,804	5,332	0	123,621		11,568	112,053	123,621
Internal	C1-9	14,717	56,759	5,146	9,809	9,022	204,077	105,282	1,400	406,212		76,622	329,590	406,212
External	C10-16	9,937	15,344	1,795	31	10,090	57,339	85,843	0	180,379		27,076	153,303	180,379
To Platea	C17, C18	15,613	84,907	6,728	46,007	211	253,876	137,348	10,511	555,201		107,248	447,953	555,201
											Total passeng	210,946	930,846	1,141,792

Source: JICA Project Team

The average number of passengers is 1.4 passengers for motorcycles, 1.9 passengers for sedans, 4.7 passengers for vans for private vehicles. For public transportation, the average number of passengers excluding the driver is 1.3 passengers for taxis, 2.3 passengers for woro-woros, 16.1 passengers for Gbaka, 45.8 passengers for ordinary buses, and 71.6 passengers for articulated buses.

Table 2.5.9 Average Number of Passengers by Vehicle Type

			2 ou 3 Roues motorisées	Voiture Particulier (Sedan)	Voiture Particulier (Van)	Taxi compteurs	Taxi woro-woro	Gbaka Minicar	Bus standard Autocar	Bus articulé
Passengers	Internal	C1-9	14,717	56,759	5,146	9,809	9,022	204,077	105,282	1,400
	External	C10-16	9,937	15,344	1,795	31	10,090	57,339	85,843	0
	To Plateau	C17, C18	15,613	84,907	6,728	46,007	211	253,876	137,348	10,511
	Total		40,267	157,010	13,669	55,847	19,323	515,292	328,473	11,911
Vehicle	Internal	C1-9	9,742	28,917	1,220	4,773	2,639	11,530	2,233	23
	External	C10-16	6,029	7,785	526	20	3,162	2,906	1,510	0
	To Plateau	C17, C18	12,124	47,669	1,192	19,893	95	15,685	3,282	141
	Total		27,895	84,371	2,938	24,686	5,896	30,121	7,025	164
Avg. passengers	Internal	C1-9	1.51	1.96	4.22	2.06	3.42	17.70	47.15	60.87
	External	C10-16	1.65	1.97	3.41	1.55	3.19	19.73	56.85	-
	To Plateau	C17, C18	1.29	1.78	5.64	2.31	2.22	16.19	41.85	74.55
	Total		1.44	1.86	4.65	2.26	3.28	17.11	46.76	72.63

Source: JICA Project Team

7) Screen Line Survey Result

Table 2.5.10 shows the traffic volume for each vehicle type at each survey location.

There are 27 locations, and at 24 places, 16-hour traffic count surveys were conducted, while 24-hour traffic count surveys were undertaken at 3 locations (S1, S13, S16).

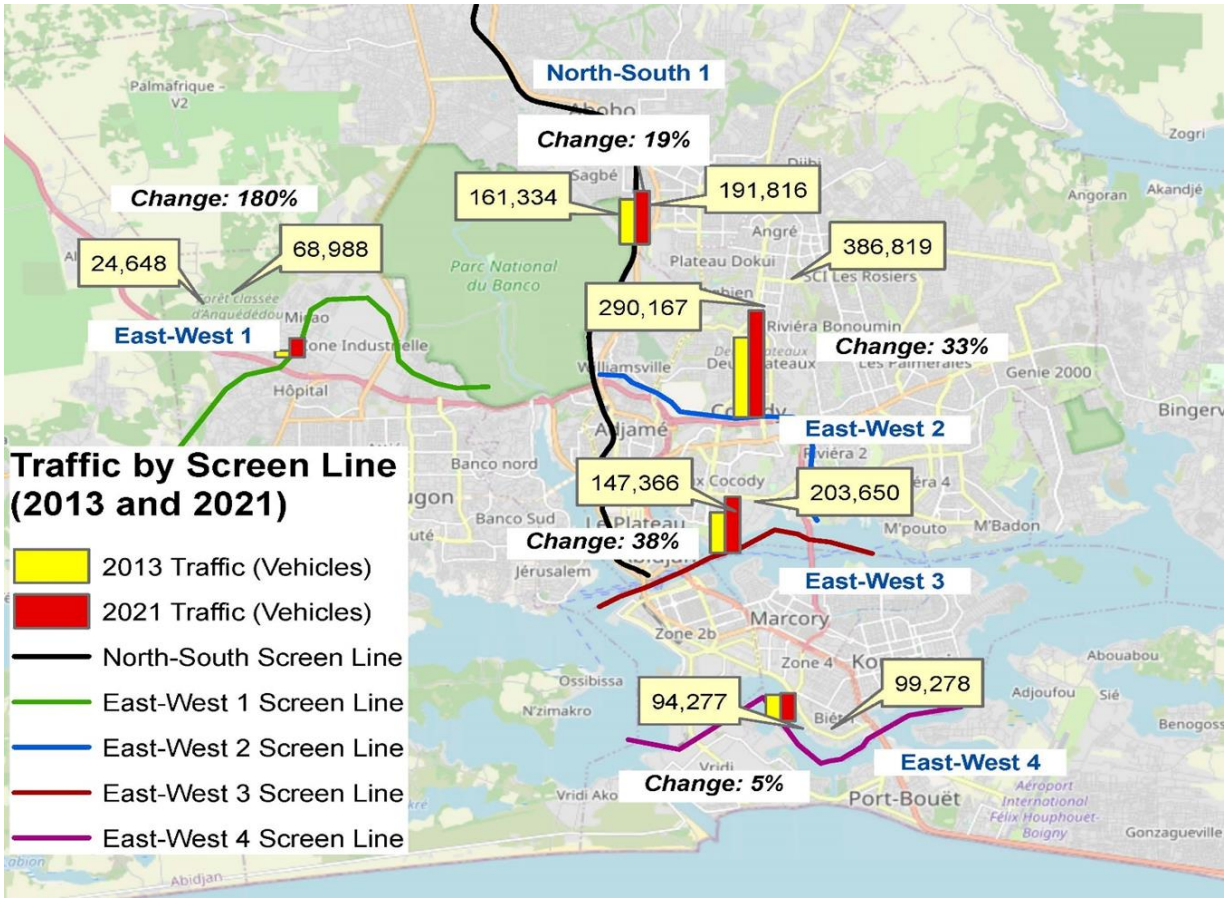
Table 2.5.10 Result of Screen Line Count by Vehicle Type

		2 ou 3 Roues motorisées	Voiture Particulier (Sedan)	Voiture Particulier (Van)	Taxi compteurs	Taxi woro-woro	Gbaka Minicar	Bus standard Autocar	Bus articulé	Camionnette/ Pick up	Camion 2 Essieux	Camion plus de 2 essieux	Ensemble articulés	TOTAL	Private (1-3)	Public (4-8)	Truck (9-12)	Total
S1	Total 6h-22h	2,678	1,976	360	452	4,012	142	26	0	807	123	83	43	10,702	5,014	4,632	1,056	10,702
	Total 24h	2,749	2,085	372	534	4,104	176	26	0	837	145	121	61	11,210	5,206	4,840	1,164	11,210
S2	Total 6h-22h	2,921	4,877	298	3,344	3,990	2,763	507	5	720	298	278	198	20,199	8,096	10,609	1,494	20,199
S3	Total 6h-22h	1,995	2,056	31	1,388	50	576	23	0	504	131	57	55	6,866	4,082	2,037	747	6,866
S4	Total 6h-22h	1,870	2,656	32	1,859	4,120	179	58	0	260	159	67	8	11,268	4,558	6,216	494	11,268
S5	Total 6h-22h	2,733	3,699	55	2,693	3,826	359	373	3	914	137	50	29	14,871	6,487	7,254	1,130	14,871
S6	Total 6h-22h	7,615	41,507	814	14,720	0	9,939	2,135	30	6,703	2,496	1,338	1,004	88,301	49,936	26,824	11,541	88,301
S7	Total 6h-22h	1,522	3,384	49	3,878	1,213	1,377	483	7	965	188	139	113	13,318	4,955	6,958	1,405	13,318
S8	Total 6h-22h	1,165	1,998	57	2,713	395	14	119	3	597	103	47	9	7,220	3,220	3,244	756	7,220
S9	Total 6h-22h	1,262	545	14	970	40	4	0	0	298	36	2	0	3,171	1,821	1,014	336	3,171
S10	Total 6h-22h	1,119	13,018	754	3,541	0	56	427	7	1,420	90	28	99	20,559	14,891	4,031	1,637	20,559
S11	Total 6h-22h	3,215	9,890	681	6,105	0	858	812	30	2,733	905	1,798	2,039	29,066	13,786	7,805	7,475	29,066
S12	Total 6h-22h	4,460	7,896	263	3,347	1,500	879	189	0	2,351	462	792	256	22,395	12,619	5,915	3,861	22,395
S13	Total 6h-22h	1,679	7,062	394	1,456	84	1,713	1,237	1	3,311	992	1,892	2,307	22,128	9,135	4,491	8,502	22,128
	Total 24h	1,726	7,377	481	1,601	86	1,896	1,253	1	3,346	1,166	2,602	2,974	24,509	9,584	4,837	10,088	24,509
S14	Total 6h-22h	3,803	6,919	148	3,300	945	2,122	378	4	1,818	789	1,011	847	22,084	10,870	6,749	4,465	22,084
S15	Total 6h-22h	5,706	16,109	721	12,031	5	10,305	2,385	94	5,092	744	502	373	54,067	22,536	24,820	6,711	54,067
S16	Total 6h-22h	5,980	8,798	560	5,586	2,258	2,865	471	49	1,601	277	124	23	28,592	15,338	11,229	2,025	28,592
	Total 24h	6,279	9,602	620	6,167	2,689	3,458	543	153	1,687	316	197	39	31,750	16,501	13,010	2,239	31,750
S17	Total 6h-22h	5,006	33,163	1,091	11,477	5,078	470	629	8	3,154	113	45	48	60,282	39,260	17,662	3,360	60,282
S18	Total 6h-22h	3,078	35,850	442	9,276	1,819	51	67	0	3,329	103	14	30	54,059	39,370	11,213	3,476	54,059
S19	Total 6h-22h	7,225	44,033	1,299	15,640	7	7,383	1,202	21	6,493	488	515	173	84,479	52,557	24,253	7,669	84,479
S20	Total 6h-22h	1,192	9,567	83	4,928	251	1,172	178	0	545	124	6	3	18,049	10,842	6,529	678	18,049
S21	Total 6h-22h	743	11,916	733	1,979	64	88	72	0	449	71	52	22	16,189	13,392	2,203	594	16,189
S22	Total 6h-22h	4,364	13,566	842	9,492	25	637	1,207	17	4,428	731	1,640	1,503	38,452	18,772	11,378	8,302	38,452
S23	Total 6h-22h	7,708	44,125	2,208	24,695	0	3,236	2,751	42	7,759	1,491	749	810	95,574	54,041	30,724	10,809	95,574
S24	Total 6h-22h	3,031	8,151	725	2,374	1,040	592	637	50	910	537	1,863	2,854	22,764	11,907	4,693	6,164	22,764
S25	Total 6h-22h	7,320	33,086	795	14,832	3,511	8,687	1,418	31	3,307	1,542	1,275	710	76,514	41,201	28,479	6,834	76,514
S26	Total 6h-22h	2,420	47,219	1,715	10,765	55	276	72	0	6,563	319	194	26	69,624	51,354	11,168	7,102	69,624
S27	Total 6h-22h	1,830	20,677	517	6,804	3,701	270	156	0	2,406	192	100	11	36,664	23,024	10,931	2,709	36,664

Source: JICA Project Team

Figure 2.5.9 shows the comparison with the result of SDUGA. The following are the major trends observed

- This time, the traffic passing through the North-South Screen Line was 192,000 vehicles, an increase of 19% compared to the time of SDUGA.
- On the East-West 1 Screen line, traffic increased by 180% but traffic was smaller than other screen line volumes.
- On the East-West 2 screen line, traffic increased by 33%,
- On the East-West 3, traffic increased by 38%,
- On the East-West 4, traffic increased by 5%, a rate of increase lower than other screen lines

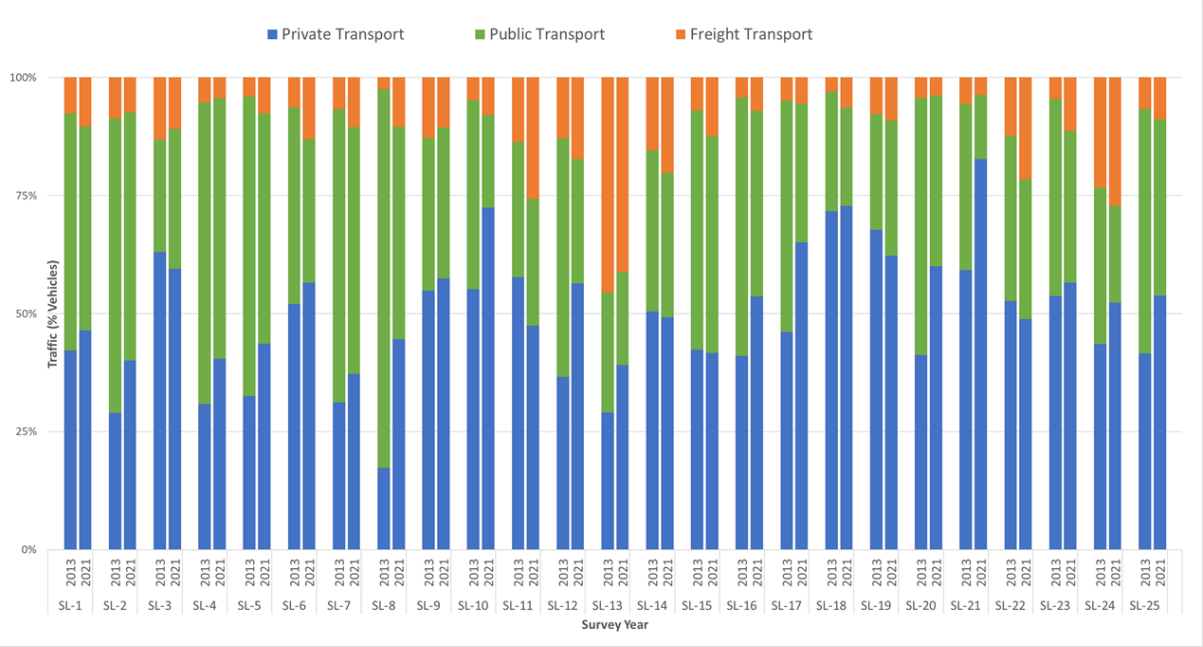


Source: JICA Project Team

Figure 2.5.9 Comparison with the result of SDUGA by each Screen Line

Figure 2.5.10 shows the comparison with the result of SDUGA by each survey location.

On the S8, S12, S17, S20 and S21 survey locations, the ratio of private cars has increased significantly compared to the time of SDUGA.

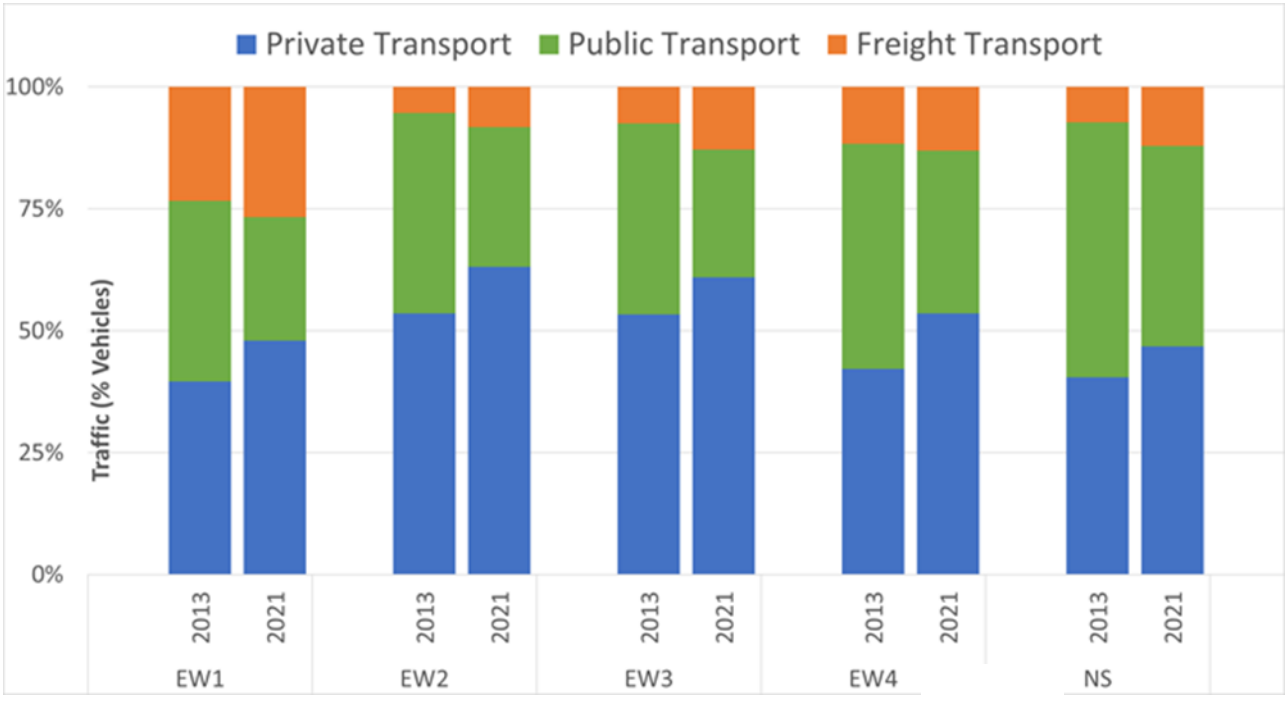


Source: JICA Project Team

Figure 2.5.10 Comparison with the result of SDUGA by each survey location

Figure 2.5.11 compares the composition of each vehicle type for each screen line with the result of SDUGA.

It is observed that the proportion of private car and truck traffic increased and the proportion of public transport decreased from the time of SDUGA on all screen lines.



Source: JICA Project Team

Figure 2.5.11 Comparison with the SDUGA for vehicle composition of each screen line

Table 2.5.11 shows the number of passengers for each vehicle type of private vehicle and public transportation at each survey location.

On the North-South Screen line, 1,286,000 passengers crossed the line and 76% of them were public transport users. On the East-West 1 screen line, 636,000 passengers crossed the line, and 84% of them were public transport users, which was the highest of the 5 screen lines.

Table 2.5.11 Number of passengers by vehicle type

		2 ou 3 Roues motorisées	Voiture Particulier (Sedan)	Voiture Particulier (Van)	Taxi compteurs	Taxi woro-woro	Gbaka Minicar	Bus standard Autocar	Bus articulé	TOTAL			Private (1-3)	Public (4-8)	Total
S1	Total 6h-22h	4,109	3,414	2,020	736	10,869	2,495	676	0	24,319			9,543	14,776	24,319
	Total 24h	4,218	3,602	2,087	870	11,118	3,092	676	0	25,663			9,907	15,756	25,663
S2	Total 6h-22h	3,931	10,659	1,179	7,613	14,867	56,450	18,899	0	113,598			15,769	97,829	113,598
S3	Total 6h-22h	3,108	3,581	65	2,885	97	5,883	255	0	15,874			6,754	9,120	15,874
S4	Total 6h-22h	2,240	4,324	88	3,503	13,017	1,135	2,095	0	26,402			6,652	19,750	26,402
S5	Total 6h-22h	4,179	6,366	154	4,801	13,752	2,515	9,741	0	41,508			10,699	30,809	41,508
S6	Total 6h-22h	10,152	79,904	3,633	40,192	0	245,893	118,689	1,422	499,885			93,689	406,196	499,885
S7	Total 6h-22h	1,858	5,527	153	8,684	2,708	15,431	15,161	330	49,852			7,538	42,314	49,852
S8	Total 6h-22h	1,485	3,343	178	4,984	1,118	394	4,213	0	15,715			5,006	10,709	15,715
S9	Total 6h-22h	9,179	78,565	8,442	35,324	12	166,281	46,106	2,270	346,179			96,186	249,993	346,179
S10	Total 6h-22h	1,315	24,081	3,843	8,969	0	1,337	17,580	144	57,269			29,239	28,030	57,269
S11	Total 6h-22h	3,988	18,217	3,739	15,139	0	16,199	35,998	1,680	94,960			25,944	69,016	94,960
S12	Total 6h-22h	7,336	16,021	1,055	10,375	4,358	11,292	8,874	0	59,311			24,412	34,899	59,311
S13	Total 6h-22h	2,708	14,180	1,395	4,224	279	19,658	60,338	0	102,782			18,283	84,499	102,782
	Total 24h	2,784	14,812	1,703	4,645	286	21,758	61,118	0	107,106			19,299	87,807	107,106
S14	Total 6h-22h	5,062	12,722	353	7,292	3,401	56,057	20,231	360	105,478			18,137	87,341	105,478
S15	Total 6h-22h	8,593	29,499	2,025	30,375	20	198,942	90,988	8,350	368,792			40,117	328,675	368,792
S16	Total 6h-22h	8,078	15,061	2,180	12,571	8,803	58,418	11,610	0	116,721			25,319	91,402	116,721
	Total 24h	8,482	16,437	2,414	13,878	10,483	70,510	13,385	0	135,589			27,333	108,256	135,589
S17	Total 6h-22h	6,300	63,926	5,143	27,812	22,391	6,612	30,860	930	163,974			75,369	88,605	163,974
S18	Total 6h-22h	3,688	70,728	1,095	19,000	6,171	771	2,165	0	103,618			75,511	28,107	103,618
S19	Total 6h-22h	9,179	78,565	8,442	35,324	12	166,281	46,106	2,270	346,179			96,186	249,993	346,179
S20	Total 6h-22h	1,305	15,674	236	8,780	916	24,648	7,346	0	58,905			17,215	41,690	58,905
S21	Total 6h-22h	882	20,928	5,026	4,106	156	1,293	2,734	0	35,125			26,836	8,289	35,125
S22	Total 6h-22h	5,220	21,239	5,224	24,050	125	11,272	47,085	551	114,766			31,683	83,083	114,766
S23	Total 6h-22h	9,930	82,701	14,995	66,128	0	77,164	174,904	4,194	430,016			107,626	322,390	430,016
S24	Total 6h-22h	3,967	14,624	3,782	5,895	4,219	11,080	24,387	4,526	72,480			22,373	50,107	72,480
S25	Total 6h-22h	9,244	63,895	3,150	36,095	12,027	185,881	64,151	2,374	376,817			76,289	300,528	376,817
S26	Total 6h-22h	3,021	80,314	10,203	32,373	48	5,339	2,948	0	134,246			93,538	40,708	134,246
S27	Total 6h-22h	2,089	34,527	2,517	13,260	13,881	2,569	5,086	0	73,929			39,133	34,796	73,929
									passengers/16h					passengers/16h	
N-S	S1-S11	45,544	237,981	23,494	132,830	56,440	514,013	269,413	5,846	1,285,561			307,019	978,542	1,285,561
E-W1	S12-S15	23,699	72,422	4,828	52,266	8,058	285,949	180,431	8,710	636,363			100,949	535,414	636,363
E-W2	S16-21,27	31,521	299,409	24,639	120,853	52,330	260,592	105,907	3,200	898,451			355,569	542,882	898,451
E-W3	S22,23,26	18,171	184,254	30,422	122,551	173	93,775	224,937	4,745	679,028			232,847	446,181	679,028
E-W4	S24,25	13,211	78,519	6,932	41,990	16,246	196,961	88,538	6,900	449,297			98,662	350,635	449,297
											TOTAL	Passe	1,095,046	2,853,654	3,948,700

Source: JICA Project Team

Table 2.5.12 shows the average number of passengers in the traffic passing through the screen line.

The average numbers of passengers per vehicle were 1.4 for motorcycles, 2.0 for sedans, 5.8 for vans, 1.6 for taxis, 2.5 for Woro-woros, 22.7 for Gbakas, 47.3 for buses, and 72.1 for articulated buses (passengers only without driver).

Table 2.5.12 Average Number of passengers by vehicle type

	2 ou 3 Roues motorisées	Voiture Particulier (Sedan)	Voiture Particulier (Van)	Taxi compteurs	Taxi woro-woro	Gbaka Minicar	Bus standard Autocar	Bus articulé
Pax/16h	132,146	872,585	90,315	470,490	133,247	1,351,290	869,226	29,401
veh/16h	93,640	433,743	15,681	179,645	37,989	57,013	18,012	402
Avg. passenge	1.41	2.01	5.76	2.62	3.51	23.70	48.26	73.14

Source: JICA Project Team

8) Roadside OD Interview Survey

Roadside OD interview surveys were conducted at the internal Cordon-line survey points (from C1 to C9, C17, C18) and at the East-West 2 Screen line survey points (from S15 to S23, S26 and S27)

In this survey, some cars were parked on the roadside and the drivers were asked questions about the origin, destination and others.

Figure 2.5.12 Survey Location for Roadside OD Interview Survey

Source: JICA Project Team

Table 2.5.13 shows the sample rate by each survey location.

Originally, the roadside OD survey was conducted only in the cordon line survey, not in the screen line survey. In the Project, roadside OD interview surveys were additionally conducted at each survey point on the E-W2 and E-W3 screen lines in order to capture the changes in traffic movements associated with the Henri Konan Bédié Bridge, which was put into service in 2014.

The sample rate of the cordon line survey was 1% for C17 and C8 because of the heavy traffic, but commonly 6% to 8%, and 26% for C1 point because of the low traffic.

Table 2.5.13 Sample Rate by Survey Location

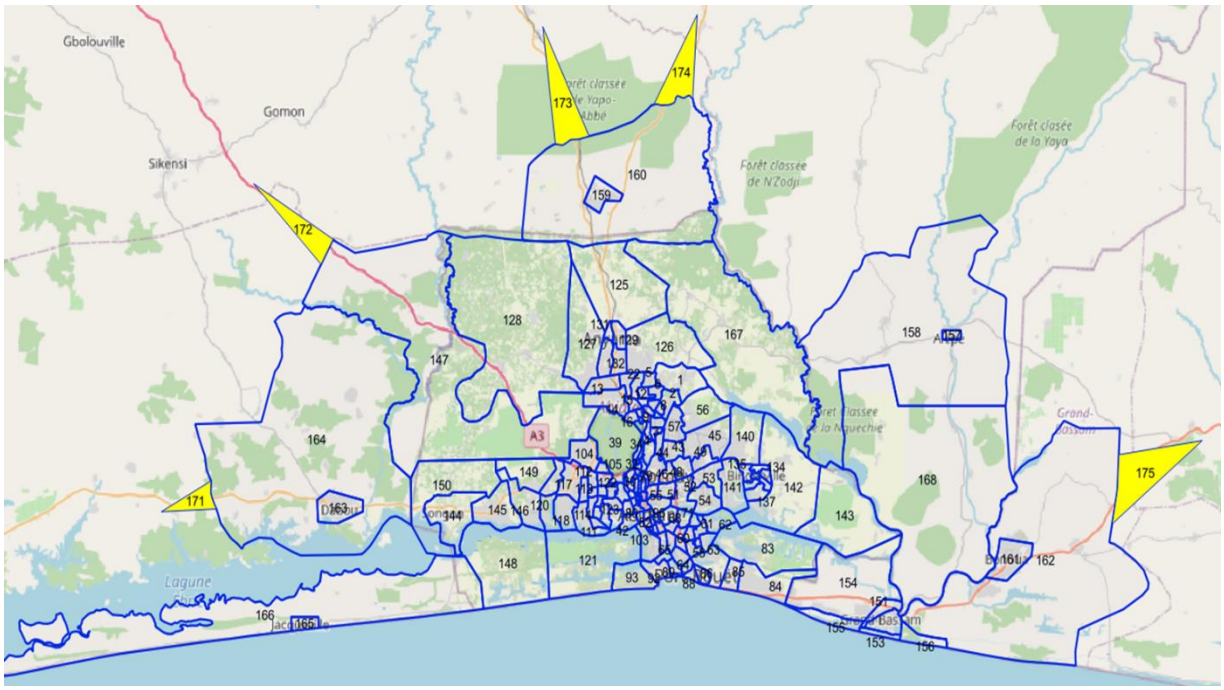
14 Hours OD Data for Cord Line Locations (6h-19h)				16 Hours OD Data for Screen Line Locations (6h-21h)			
Suvery Point	Number of Sample /14 hours	Total Volume /14h	Sampling rate	Suvery Point	Number of Sample /16 hours	Total Volume /16h	Sampling rate
C1	195	748	26%	S15	820	54,067	2%
C2	314	2,993	10%	S16	539	28,592	2%
C3	387	5,178	7%	S17	944	60,486	2%
C4	265	15,258	2%	S18	545	54,059	1%
C5	172	2,388	7%	S19	1,108	84,479	1%
C6	201	3,269	6%	S20	911	18,049	5%
C7	183	2,755	7%	S21	800	16,189	5%
C8	290	20,435	1%	S22	1,186	38,452	3%
C9	921	11,580	8%	S23	936	95,574	1%
C17	640	78,190	1%	S26	1,270	69,624	2%
C18	355	16,108	2%	S27	988	36,664	3%

Source: JICA Project Team

In the roadside OD survey, surveyors asked the drivers about their origin and destination addresses.

Those addresses were coded using a map illustrated in Figure 2.5.13.

The Study Area is divided into 170 zones following SDUGA and the origins and destinations outside the Study Area are assigned zone numbers from 171 to 175.

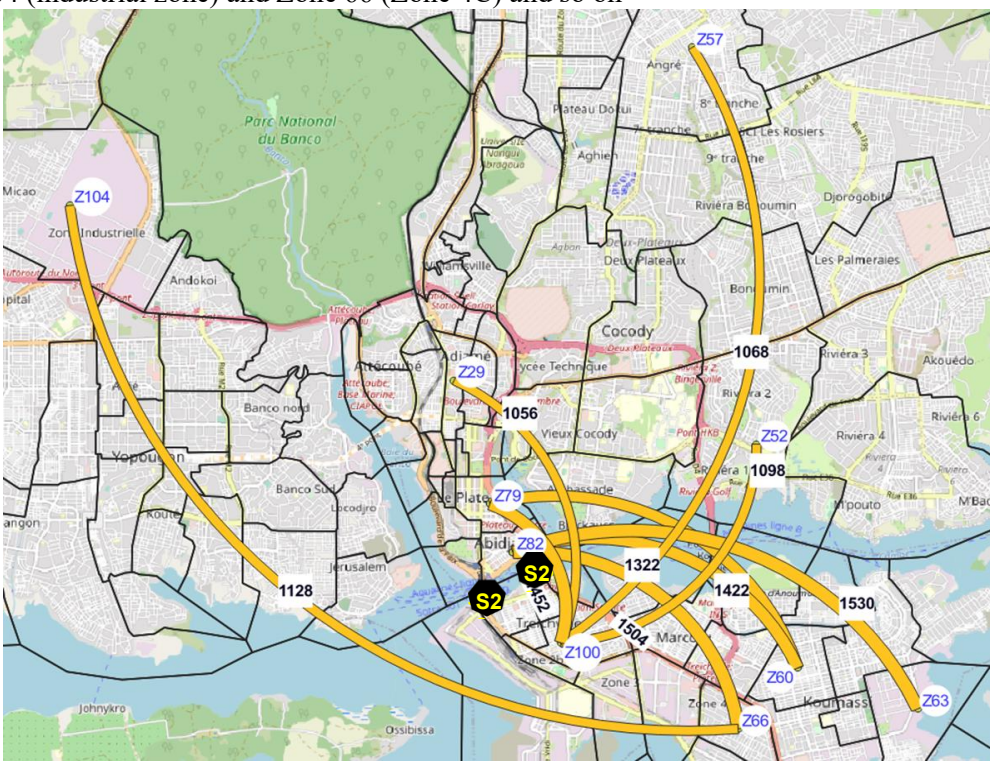


Source: JICA Project Team

Figure 2.5.13 Zoning Map

The traffic passing through S22 and S23 was examined. These points are located on the two bridges crossing the Ebrié lagoon, and by grasping the traffic at these two points, is possible to grasp the traffic between the southern part of Abidjan and the main part of Abidjan via Plateau Commune,

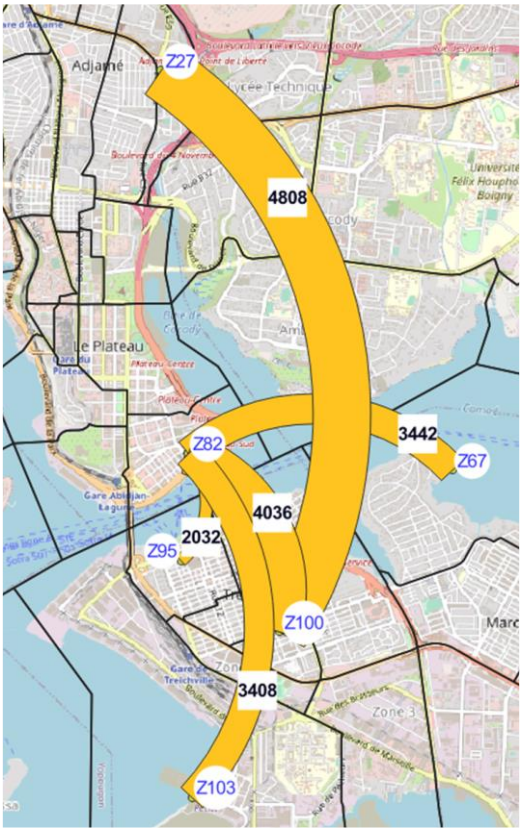
Figure 2.5.14 shows the desire lines (traffic flows between zones) passing through the S22+S23 points with a volume of 1,000-2,000 vehicles per 16 hours. According to this figure, it is observed that there is a high traffic volume between the Plateau and the Treichville center, but there is also traffic between Zone 104 (industrial zone) and Zone 66 (Zone 4C) and so on



Source: JICA Project Team

Figure 2.5.14 Desired Line for S22+S23 locations (1000-2000 veh/16h)

Figure 2.5.15 shows the desire lines passing through the S22 and S23 locations with a volume of 2,000 or more vehicles per 16 hours. Of these, the highest traffic is found between Zone 27 and Zone 100 with 4,808 vehicles per 16hours, followed by traffic between Zone 82 and Zone 100 with 4036 vehicles per 16 hours.



Source: JICA Project Team

Figure 2.5.15 Desired Line for S22+S23 locations (>=2000 veh/16h)

As far as the above results are seen, the traffic using these two bridges is more from other areas than the traffic to and from the Plateau. In other words, it turned out that those traffics do not have to go through the Plateau.

2.5.3 Public Transportation

(1) Types and characteristics of public transportation in the Greater Abidjan area

Public transportation in the Greater Abidjan area is roughly classified into formal and informal sectors. They are summarized in Table 2.5.16. As mentioned in "2.5.1 Overview," minibuses (Gbaka) and shared-ride cabs (Woro-woro) are the two main modes of public transportation in the Greater Abidjan area, transporting over 70% of all public transportation users.

(2) Status of SOTRA

SOTRA is the only official transportation operator in the Greater Abidjan area in the land bus business, and the only public company whose mission is to provide comfortable, safe, and on-time service to passengers by providing passenger transportation by road and water.

SOTRA has a bus network of 1,785 km (including about 7 km of dedicated lanes), 1,582 bus stops, 13 bus terminals (2 large and 11 small), 8 workshops, and 4 lagoon stations. Services include four bus routes (MONBUS, EXPRESS, WIBUS, and SHUTTLE (NAVETTE)) and a water bus. The number of buses is 1,584 as of 2021, with an average vehicle age of 3.24 years.

According to data from SOTRA, the annual number of passengers for the two years 2019 and 2020 were 207 million and 238 million passengers, respectively, as shown in Table 2.5.14, which are equivalent to 568 thousand and 653 thousand passengers per day. These data, however, need to be verified in consideration of the gap with the data shown in Table 2.5.2.

Table 2.5.14 SOTRA's Passenger Transportation Performance

	FY 2019	FY2020
Number of annual passengers (thousand persons/year)	207,178	238,369
Number of passengers per day (thousand persons/day)	568	653

Source: SOTRA

Fares are based on a flat fare system, with a basic fare of 200 CFA for regular buses and 150 CFA for water buses, and 300 to 500 CFA for express buses and other services such as air conditioning as shown in Table 2.5.15.

Table 2.5.15 SOTRA Fee Structure

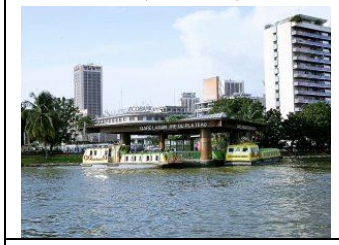
Type of Service	Fees (FCFA)	Remarks
MONBUS	200	General intra-city buses
Water bus 1	150	General water bus
Water Bus 2	200	VIP Boat
Express	500	Air-conditioning, seat assignments, Wifi (cash only)
WIBUS (Express)	500	
WIBUS (each station)	300	
NAVATTE	500	Large express bus, inter-commune

Source: SOTRA

Source: JICA Project Team

Figure 2.5.16 Location of dedicated bus lane

Table 2.5.16 List of public transportation in the Abidjan metropolitan area

	Picture	Outline		Picture	Outline
formal sector	Bus (SOTRA) 	It covers the entire city of Abidjan. It uses large buses, some of which are articulated buses capable of transporting up to 100 passengers; as of 2021, it had a fleet of about 1,500 buses, transporting about 1.3 million passengers per day.	informal sector	Pinnaes 	Transportation service by small handmade wooden or steel boats. Currently transports nearly 55% of waterborne traffic.
	Water Bus (SOTRA) 	Water buses with capacities of 94 and 144 seats. It connects Cocody, Treichville, Plateau, Attécoubé, etc., where stations are built. Daily transporting passengers are approximately 35,000.		Minibus (Gbaka) 	Serving mainly the suburban areas of Abidjan and operating primarily on the Abidjan-Gran Bassam route. It is the most popular public transportation system, in the Greater Abidjan area transporting approximately 3.2 million passengers per day.
	Water Bus (STL) 	STL has 20 boats and operates three types of vessels: (i) standard 110-passenger boats, (ii) standard 80-passenger boats, and (iii) 56-passenger VIP boats, transporting approximately 17,000 passengers per day.		Shared Ride Taxis (wôrô-wôrô) 	It only provides service inside the commune. It carries approximately 2.3 million passengers per day, making it the second largest carrier after Gbaka.
	Water Bus (CITRANS) 	CITRANS has 10 boats and operates four types of boats: (i) four 82-passenger boats, (ii) one 140-passenger boat, (iii) two 200-passenger boats, and (iv) three 240-passenger VIP boats. They transport approximately 12,000 passengers per day.		Taxicab with a meter 	It is operated by a five-seater vehicle. It can pass through the entire city; approximately 500,000 passengers per day.

Source: AMUGA website

Table 2.5.17 shows the ongoing projects by SOTRA.

The government's SOTRA bus procurement initiative from 2017 will soon be completed, with 2,000 new buses to be installed by the end of the fiscal year 2022 (№1). And, within the framework of the PMUA, the construction of bus centers, bus route reorganization, operation and passenger information support systems, and large stations are underway (№2-5). In addition, within the framework of PACOGA, the construction and rehabilitation of a lagoon station is underway (№7, 8). Furthermore, BRT construction and bus center rehabilitation by the Swedish company Scania is underway (№9, 10), both of which will be completed by 2025.

Table 2.5.17 Projects in progress

№	Project Description	End Date
1	Acquisition of 2000 new buses over the 2017-2020 period / ETAT de Côte d'ivoire	2022
2	Construction of two bus centers in Songon and Ebimpé / PMUA	2025
3	Global restructuring of the transmission network / PMUA	2023
4	Implementation of an Operations and Passenger Information Support System (SAEIV) (SAEIV)/ PMUA	2025
5	Construction of two major overland regulating stations at Cocody and Yopougon / PMUA	2025
6	Rehabilitation of infrastructure, upgrading of teaching materials and training of trainers at Institut SOTRA / PMUA	2025
7	Construction of the Plateau and Niangon Lokoa lagoon station / PACOGA	2024
8	Rehabilitation of the Abobo Doumé lagoon station / PACOGA	2024
9	Construction of a BRT line on boulevard Latrille / Projet SCANIA	2024
10	Refurbishment of two bus centers (Port-Bouët and Abobo) / Projet SCANIA	2023

Source: JICA Project Team

Table 2.5.18 shows the projects planned by SOTRA. As well as the projects by aforementioned Scania (№1-3), a number of water transportation-related projects are planned (№4-6, 8). In addition, SOTRA plans to renew its fleet of buses at a rate of 100 buses per year from the fiscal year 2023 onward (№7).

Table 2.5.18 Projects in planning

№	Project Description	Start Date
1	Construction of a bus center in Bingerville / SCANIA	2023
2	Equipping three maintenance workshops / SCANIA	2023
3	Technician training (GIZ) / SCANIA	2023
4	Rehabilitation of two (2) lagoon stations in Blockauss and Treichville	2025
5	Construction of four (04) pontoons (Adiopodoumé, Vridi, Koumassi campement and M'Braké)	2025
6	Construction of two (02) lagoon stations (Songon, Bingerville)	2025
7	Fleet renewal policy starting in 2023 at a rate of 100 buses per year	2023
8	Acquisition of 50 new high-capacity bus boats for SOTRA	2025
9	Shipyard construction project at SOTRA Industries	2023

Source: JICA Project Team

2.6 Urban Environmental Infrastructure

2.6.1 Water Supply

(1) Overall

The responsible ministry for water resources management in Côte d'Ivoire is the MEF (Ministère des Eaux et Forêts), and its department in charge is the DGPRE (Direction de la Gestion et de la Protection des Ressources en Eau). The monitoring of water resources in the water resource management has been handled by the DGIHH of the former MIE (Ministère des Infrastructures Economiques). The ONEP (Office National de l'Eau Potable) has been monitoring groundwater around Abidjan since the establishment in 2006, and the DGIHH has been monitoring surface water. With the independence of the MH (Ministère de l'Hydraulique) from the MIE in 2018, the authority to monitor surface water has been transferred to the DAEP.

The ministry in charge of the water supply sector is the MH. The MH outsources the supervision of water supply to the ONEP, a national corporation, and outsources the management of urban water supply operation to the SODECI (Société de Distribution d'Eau de Côte d'Ivoire) under a concession contract.

(2) Related laws and regulations of water supply sector

Laws, regulations and policies related to water resources and water supply management are listed below.

- Environmental Law (1996) stipulates the conservation of water resources and its methods.
- Water Recourses Law (1998) stipulates the protection of water resources through integrated water resource management.
- National Water Policy (2010) was formulated based on the Water Law, but has not been approved. It presents the National Water Vision 2040 and sets out 13 strategies for sustainable water resource management.
- National water supply policy (draft) (2015) was developed with the support of the EU PHAM program (le Programme Hydraulique et Assainissement pour le Millénaire). It describes the guidelines for improving the system of urban and local water supply, and for future facility maintenance.

(3) Responsible organization and division of roles

<u>Implementation system of the water supply sector</u>

In urban water supply, the MH outsources the operation of the urban water supply business to the SODECI under a national business consignment contract with the SODECI, and the ONEP manages the business operation by the SODECI. Urban water supply and sanitation infrastructure are the government's property, and the government entrusts their operational management to the SODECI via two affermage contracts, one for urban water supply and the other for sanitation. The affermage contract between the government and the SODECI was renewed in 2022.

<u>Relationship of urban water supply business consignment (affermage contract)</u>

The water supply sector is under the jurisdiction of the MH, while sewerage is under the jurisdiction of the MINASS (Ministère de l'Assainissement et de la Sablurité). They have signed management agency contracts with the national companies the ONEP and the ONAD (Office Nationnal de l'Assainissement et du Drainage) respectively. The ownership of water supply and sewerage facilities belongs to the government of Côte d'Ivoire, and the MH and the MINASS have signed business consignment contracts with the SODECI in order to rent the facilities and outsource the operation. The SODECI does not pay the government to use the facilities. The water tariff includes the FDE (Fonds de Développement de l'Eau) portion, which is used for investment in new and refurbished facilities. The government can use this to invest in new construction and renewal. While the profitability of the SODECI has declined due

to the deterioration of payment conditions during conflicts and delays in payment of water charges by government agencies, water tariffs have not been raised since 2004. As a result, the SODECI's payment of the FDE to the government has been delayed. Users of a water supply service contract with the SODECI. Collection of water tariffs is SODECI's business, and water tariffs are SODECI's revenue.

Ministère de l'Hydraulique (MH)

The MH which was the predecessor of the MIE under the Ministry of Water Resources Organization Ordinance in 2018 (Presidential Decree No. 2018-955 dated December 18, 2018) was organized independently.

Office National de l'Eau Potable (ONEP)

The ONEP is a national corporation established and organized by Presidential Decree No. 2006-274 dated August 23, 2006. There are currently eight members of the Board of Directors, appointed by Presidential Decree No. 2013-24 dated January 10, 2013.

Société de Distribution d'Eau de Côte d'Ivoire (SODECI)

Between 1959 and 1972, SODECI as a private company signed a concession contract with the government of Côte d'Ivoire to operate a water supply in Abidjan. After the PNHH (Programme National de l'Hydraulique Humaine) was commenced in 1973, the Government of Côte d'Ivoire and the SODECI signed an affermage contract to outsource the operations of water supply in the Côte d'Ivoire in addition to Abidjan. Then in 1987, an affermage contract was signed to outsource urban water supply projects, excluding rural water supply. The contract expired in 2007 and a new affermage contract was subsequently signed in 2008.

(4) Infrastructures of Urban Water Supply Sector

The numbers of urban water supply facilities in Abidjan Autonomous District (AAD) operated by SODECI are shown in Table 2.6.1 as of 2012. The total length of the pipeline network is 12,419 km throughout the country. Abidjan had 88 groundwater wells, while a total of 609 wells were in operation throughout the country. As of 2015, Abidjan had 93 groundwater wells, while a total of 728 wells were in operation throughout the country. As of 2019 the daily water production, the number of consumers and the non-revenue water by the SODECI was 781,085 m^3/day, 583,597 persons and 27.9 percent respectively. Post-conflict investments have led to a steady increase in the number of customers and the volume of water produced. Daily water production and the number of consumers in Abidjan increased by 1.6 and 1.5 times respectively between 2011 and 2019.

Table 2.6.1 Number of Urban Water Supply Facilities in 2012

Facility	Abidjan	Inland	Total
Water Distribution Area (Nos.)			824
Operational wells (Nos.)	88	521	609
Water treatment plants (Nos.)	9	74	83
Neutralization plants (Nos.)	4	-	4
Pipeline network (km)	2,924	9,495	12,419

Source: SODECI Activity Report (2012)

(5) Water Tariff

Table 2.6.2 shows water tariffs for urban drinking water. Since the tariff has not been increased since 2004, consideration of tariff increase is necessary. Tariffs are uniform throughout the country. Water production costs are lower in Abidjan because of the use of groundwater, and this helps to compensate for the higher production costs outside AAD. However, production costs of the Abidjan water supply could increase with the development of surface water resources in the near future.

Table 2.6.2 Water Tariff

Items	SODECI Revenue	VAT (18%)	Special Taxes		Total Unit Costs
			FDE	FNE	
Base service fee (inclusive of 9 m³)					2,115.0
1st Tier (social): 10-18 m³	228	0	7	0	235.0
2nd Tier: 19-90 m³	228	41	77.3	21	367.3
3rd Tier: 91-300 m³	228	41	271.3	46.5	586.8
4th Tier: <300 m³	228	41	331.3	84	684.3
Administrative Organization	228	41	141.3	113	523.3
Average / m³	228	31.2	121.1	44.2	424.5

Source: Presidential Decree No. 2004-378 dd 6 August 2004 fixing the price and water tariff for the period 2003-2007

Notes: Unit: FCFA/m³, VAT: value added tax, FDE: Water Development Fund, FNE: National Water Fund

(6) Policies and Plans of Urban Water Supply

PND (Plan National de Développement) 2016-2020

The PND 2016-2020 was drafted in 2015 based on reviews of the PND 2012-2015. Among the five strategies of the PND 2016-2020, "Strategy 4: Coordinated infrastructure development nationwide and environmental preservation. - Impact 1: Infrastructures of high quality are constructed sustainably. - Effect 2: Water supply infrastructures of high quality are constructed" are related to drinking water supply. The PND identifies six outputs for drinking water supply as shown in Table 2.6.3.

Table 2.6.3 Outputs and Budget for the Water Supply Sector in the PND 2016-2020

Output	Number of Actions	Budget (2016-2020) million CFAF
(i) Strengthen governance of the drinking water sector	5	-
(ii) Strengthen human, technical, and financial capacities of the drinking water sector	7	28,064
(iii) Secure available resources for drinking water	5	15,245
(iv) Rehabilitate water supply infrastructure	16	85,896
(v) Construct high quality water supply infrastructure	41	688,929
(vi) Promote technical innovations in the water supply sector	3	4,610
Total	77	822,744

Source: National Development Plan Volume 3 Action Plan

National Water Policy 2010

The national water policy was formulated in 2010 but has not been approved yet. However, the strategies listed below have been included in the PND 2016-2020.

- Strengthen the legal and regulatory framework;
- Expand the sector's financial base;
- Secure and develop water resources;
- Protect water supply facilities;
- Maintain the service continuity/reliability;
- Improve the level of urban service;
- Improve service coverage;

- Strengthen the capacities of the sector actors.

Water Supply Sector Strategic Plan (2011-2015)

This plan described the current conditions, challenges, and strategies regarding water resources management and urban and rural drinking water supply. It has not been revised and remains the latest strategic plan for the water supply sector yet.

Draft National Drinking Water Sector Policy 2015

It was drafted in 2015 with the support of the PHAM program, and the policy consisted of 8 principles and 23 strategies. The policy is based on the results of a diagnostic study of the urban and rural water supply subsectors. The policy has not been validated yet.

Master Plans of Urban Water Supply in Abidjan

The MIE and the ONEP have carried out several studies to formulate master plans and investment plans for drinking water supply sector in Abidjan since 2009.

1) STUDI's Master Plan Study of Abidjan Water Supply (Etude du Schéma Directeur de l'AEP de la Ville d'Abidjan par STUDI) (2009)

The outline of this master plan study is as shown in Table 2.6.4. Recommended projects for the development of water resources are a) Abidjan Aquifer, b) Bonoua Aquifer, c) Aghien Lagoon and d) Comoé River.

Table 2.6.4 Outline of STUDI's Master Plan Study of Abidjan Water Supply

	Items	Contents
1	Target Area	10 communes of Core AAC
2	Population projection	5.2 million in 2008, 8.7 million by 2028
3	Demand	334,000 m³/day in 2008, 797,000 m³/day by 2028

Source: Etude du Schéma Directeur de l'AEP de la Ville d'Abidjan par STUDI (2009)

2) TAHAL's Preliminary Studies for Abidjan Water Supply Projects Using Surface Water (Etudes Préliminaires (Pré-Aps) du Projet AEP de la Ville d'Abidjan à Partir d'une Eau de Surface par TAHAL) (2013)

The outline of this preliminary study is shown in Table 2.6.5. This preliminary quantitative and qualitative study results showed that the Aghien Lagoon and the Comoé River are not suitable for development as water resources, instead an intake at Tiassalé on the Bandama River is recommended.

Table 2.6.5 Outline of TAHAL's Preliminary Studies for Abidjan Water Supply Projects

	Items	Contents
1	Target Area	10 communes of Core AAC, Anyama, Bingerville, Songon, Adiake, Bonoua, and Grand Bassam
2	Population projection	6.2 million in 2015, 9.7 million by 2032
3	Demand	732,870 m³/day in 2015, 1,333,295 m³/day by 2032

Source: Etudes Préliminaires (Pré-Aps) du Projet AEP de la Ville d'Abidjan à Partir d'une Eau de Surface par TAHAL (2013)

3) Abidjan City Drinking Water Supply - First Programme of Water Supply Reinforcement - Emergency Projects (Desserte en Eau Potable de la ville d'Abidjan - Premiers programmes de renforcement de la desserte - travaux d'urgenc) (2014) (SAFEGE)

The outline of this project is shown in Table 2.6.6. The project involved development of a hydraulic model by dividing Abidjan into 15 areas. A water supply network reinforcement plan was formulated based on this model. Prioritized Project Areas are E-1 (North Niangon and Song On), E-11 (Abobo), E-15 Treichville/Port Bouet Sector) and E-4 (North Riviera).

Table 2.6.6 Outline of Abidjan City Drinking Water Supply - First Programme of Water Supply Reinforcement - Emergency Projects (2014)

	Items	Contents
1	Target Area	10 communes of Core AAC, Anyama, Bingerville, and Songon
2	Population projection	In accordance with the TAHAL report (2013)
3	Demand	386,301 m³/day on average, 463,562 m³/day on maximum in 2012 1,062,812 m³/day on average, 1,275,374 m³/ day on maximum in 2030

Source: Desserte en Eau Potable de la ville d'Abidjan - Premiers programmes de renforcement de la desserte - travaux d'urgenc) (2014)

4) Abidjan City Drinking Water Supply -Distribution Mains - Investment Programme (Desserte en Eau Potable de la Ville d'Abidjan - Réseaux structurants -Programme d'investissement) (2015 -2025) (SAFEGE)

The investment plan for 2015-2025 was formulated based on the 2014 report. The outline of this project is shown in Table 2.6.7. It follows the proposal by the Master Plan shown in Table 2.6.6.

Table 2.6.7 Outline of Abidjan City Drinking Water Supply -Distribution Mains - Investment Programme (2015 -2025)

	Items	Contents
1	Target Area	10 communes of Abidjan, Anyama, Bingerville, and Songon
2	Population projection	In accordance with the TAHAL report (2013)
3	Demand	386,301 m³/day on average, 463,562 m³/day on maximum in 2012 1,062,812 m³/day on average, 1,275,374 m³/ day on maximum in 2030

Source: Desserte en Eau Potable de la Ville d'Abidjan - Réseaux structurants -Programme d'investissement) (2015 -2025)

2.6.2 Sewerage

(1) Overall

The Unicef/WHO Joint Monitoring Programme reported that access to "safely managed sanitation" in Côte d'Ivoire in 2015 was 22%, at a very low level. In Abidjan, the rapid influx of people during the political crisis in Côte d'Ivoire between 2002 and 2011 led to the expansion called "Precarious Neighbourhood (Quartiers Précaires)" in Abidjan's peripheral communes, such as Abobo and Yopougon. The lack of basic sanitation infrastructure in these areas has led to concerns about poor living conditions and health impacts on the population.

In such circumstances, the Government of Côte d'Ivoire aimed to "increase access to sanitation facilities to 60% by 2030" through policies such as 1) Formulation of the Sanitation and Drainage Sector Policy Letter (approved in 2016), 2) Creation of the ONAD in 2011, the public corporation in charge of control

of sanitation and drainage sector, and 3) Creation of the FNAD (Fond National de l'Assainissement et du Drainage). These policies were incorporated into the National Development Plan 2016-2020 formulated in 2015.

The responsible ministry for the sewerage sector changed to the MUCH (Ministère de la Construction et de l'Habitat) in 2007 and to the MCAU (Ministère de la Construction, de l'Asssainissement et de l'Urbanisme) in 2011. It was further changed in 2018 to the MINASS (Ministère de l'Assainissement et de la Sablurité).

MINASS updated in 2019 the Master Plan of Sewerage in Abidjan District in order to proceed with the development of the infrastructures of sanitation and drainage for 8.06 million of the population estimated to reach in the target year of 2030.

As sewerage projects have a high environmental impact, the planning and implementation of the projects should comply with the relevant laws and regulations and should be carefully coordinated with other sectors such as urban planning, transport and urban water supply.

(2) Responsible organization and division of roles

The relationship among the MINASS, the ONAD and SODECI in the sewerage sector, is similar to that among the MH, ONEP and the SODECI for the water supply sector. SODECI is entrusted with the operation of the sewage and drainage system in Abidjan under an affermage contract with the Government. ONAD supervises the entire sewerage sector, including the operation of facilities by SODECI, under a Contrat-Plan with the Government.

MINASS

The MINASS was organized with the presidential decree in 2018.

MINASS is responsible for both the swerage sector and solid waste management sector, while department in charge is DAUP (Direction de l'Assainissement Urbain et du Drainage) under MINASS.

ONAD

The ONAD is a national company which was created and organized with the presidential decree No. 2011-482 on 28 December 2011.

SODECI

It is as described before for the water supply sector.

(3) Infrastructures of Sewerage Sector

Table 2.6.8 shows the numbers of sewerage facilities in Abidjan Autonomous District (AAD) operated by SODECI, to which the sewerage operation in Abidjan is delegated. In addition to these facilities, construction of an additional 2,099 km of sewage networks and 335 pump stations are planned in the master plan of sewerage in the AAD, which was updated in 2019.

Table 2.6.8 Number of Sewerage Facilities in AAD

Infrastructure	Qty.	Unit
Pump station	51	Nos.
Pretreatment Plant	1	Nos.
Odor Elimination Plant	1	Nos.
Activated Sludge Treatment Plant	1	Nos.
Screening Plant	4	Nos.
Urine Collection Station	3	Nos.
Storm Basin	9	Nos.
Storm Spillway	5	Nos.
Sanitary Sewer	745	km
Storm Sewer	650	km

Infrastructure	Qty.	Unit
Unitary Network	150	km
Marine Disposal	1.2km offshore, Depth 20m	

Source: SODECI

(4) Policies and Plans of Sewerage

PND (Plan National de Développement 2016-2020)

Sewerage infrastructures are developed according to the actions of outputs i) and ii) of "Strategy 4: Coordinated infrastructure development nationwide and environmental preservation - Impact 2: Environmental and sanitary living spaces are preserved - Effect 3: Systems of sanitation and drainage, and salubrity are improved." in PND 2016-2020. These outputs i) and ii) with their budgets are summarized in Table 2.6.9.

Table 2.6.9 Outputs of Action Plan of Sewerage Sector in PND 2016-2020

Output	Number of Actions	Budget (2016-2020) million FCFA
i) Institutional framework of sanitation and drainage sector is improved and planning tools are developed.	6	31,890
ii) Sanitation and drainage facilities are maintained and reinforced.	2	63,675

Source: PND 2016-2020

Policy Letter of Sewerage Sector

"Policy Letter of Sewerage Sector" describes the national development policy of sanitation and drainage sector up to 2030. This policy letter aims at increasing the access rate to improved sanitation facilities to 60 % by 2030 based on the following five strategic axes:

- Implement an infrastructure development program;
- Generate demand for sanitation and create a competition between local governments to promote autonomous sanitation;
- Strengthen coordination with public and private actors;
- Strengthen the implementation and operation capacities of public and private actors;
- Strengthen the sector's financial resources.

This policy letter was approved by the government of Cote d'Ivoire in 2016, after studies and inter-ministerial consultation between 2011 and 2015.

Master Plan of Sewerage in Abidjan

SDAD (Schéma Directeur d'Assainissement et de Drainage du District d'Abidjan) was formulated in 1974 and updated in 1981 and 1986. In 2019, the MCALU (Ministry of Construction, Lodgement, Sanitation and Urbnization) made further updating of SDAD. This is the latest master plan of the sewerage sector in Abidjan prepared according to the following steps.

- Mission A: Construction of Database - Data collection, household surveys, environmental inventory, surveys of polluting industries, design of a GIS;
- Mission B: Diagnosis of the existing situation - reconnaissance of the networks, visits to the pumping stations and the pre-treatment station of Koumassi Digue, measurement campaign, hydraulic modeling and operating diagnosis;

- Mission C: Intervention strategy and variants - establishment of development scenarios, comparison of envisaged solutions, technical studies, flood protection programme;
  - ✓ C-EU (Eaux Usées (Wastewater)): Comparaison of Wastewater Treatment Scenario
  - ✓ C-EP (Eaux Pluviales (Stormwater)): Comparaison of Stormwater Management Scenario
- Mission D: Formulation of the Master Plan - On the basis of the solution adopted, establishment of a costed and prioritised work programme; socio-economic and financial study, raising awareness among the population.
  - ✓ D-EU：Master Plan of Wastewater Treatment
  - ✓ D-EP：Master Plan of Stormwater Management

In SDAD 2019, five scenarios with different wastewater treatment zones were examined for the urbanized area of Abidjan Autonomous District (AAD), which consists of 12 communes excluding Songon and adding Grand Bassam commune. Based on the results of the study, Scenario 6 was developed and finally Scenario 7 consisting of five wastewater treatment systems was adopted. Upon the finalization of the scenario, two urbanized areas in Songon sub-prefecture were added to the master plan, resulting in a master plan consisting of seven wastewater treatment systems.

2.6.3 Solid Waste Management

(1) Overall

The amount of solid waste produced in Abidjan has increased in response to the rapid growth of the population, from 1.49 million tons per year (4.1 tons/day) in 2015 to 1.65 million tons/ per year (4.5 tons/day) in 2018. 97% of Abidjan's solid waste is household waste, according to a 2015 study by Gevalor. According to the African Waste Management Databook, Abidjan generated 0.8 kg of solid waste per person per day in 2016, and the improvement of the waste management systems in Greater Abidjan, for which the population was, then, expected to exceed 7 million by 2030, is an urgent issue.

The ministry in charge of environmental hygiene is responsible for the waste management sector in Cote d'Ivoire. This ministry was Ministère de l'Environnement, de la Salubrité et du Développement Durable between 2012 and 2017, Ministère de l'Environnement et du Développement Durable between 2017 and 2018, and from 2018 until now the MINASS.

Household solid waste in Abidjan is managed by the following process;

Production→Pre-collection→Grouping Centre→Collection and Transport→Final Disposal.

In each of the above-mentioned waste management processes, there are many problems in the waste management system, such as lack of basic infrastructure and equipment (dustbins, collection points, and waste collection vehicles), irregular collection and illegal dumping, and lack of capacity in final disposal sites. In addition, there are legal and institutional problems that need to be solved, such as the central government's management of the project which is not in line with the decentralization policy, the overlapping roles of the relevant actors etc.

In November 2017, Ms. Anne Desirée Ouloto, ex-Minister of Urban and Environmental Sanitation, Environment and Sustainable Development and the Minister of Sanitation, announced at a press conference before participating in the 23rd Conference of the Parties (COP23) to the United Nations Framework Convention on Climate Change (UNFCCC) in Bonn, the outline of a national waste policy to solve the above-mentioned waste management problems. At this press conference, Ms. Ouloto announced that the waste management sector, which accounts for 10% of Cote d'Ivoire's CO_2 emissions, will be the main pillar of the country's climate change strategy, which will include 1) the development of a vision and strategy based on cooperation with all stakeholders, 2) the optimization of waste management contracts and the proper selection and management of contractors, 3) modernization of collection, transport and disposal systems and technologies, including the construction of final disposal sites using the latest technology, and 4) legal reform, including the establishment of the ANAGED

(L'Agence Nationale de Gestion des Déchets), the elimination of multiple grants of competencies and improved financing management.

(2) Responsible organization and division of roles

In 2017, the ANAGED was established and leads the management of the implementation of projects in the solid waste management sector. The solid waste collection is currently divided into the following three sectors;

- North-East: Abobo, Anyama, Bingerville, Cocodi, Plateau
- North-West: Adjamé, Attécoubé, Yopougon, Songon
- South: Koumassi, Marcory, Port-Bouët, Treichville

Two delegated operators, the ECOTI SA in charge of the north-eastern part, and the EBURNIE in charge of the other two sectors conducting the services of collecting and transporting wastes, under the supervision of the ANAGED.

In terms of final disposal sites, the Akouédo landfill, which started operations in 1965 and was the only landfill in Abidjan, was shut down in 1998 due to limited capacity and inadequate sanitary management. As an alternative final disposal site, the Technical Recycling and Disposal Centre (CVET) was built in Kossihouen, north-east of Abidjan, with a modern waste management system and biogas extraction facilities. CLEAN EBURNIE has been contracted to build and operate the center, which became operational in 2019.

Ministère de l'Assainissement et de la Sablurité (MINASS)

It is as described above for the sewerage sector.

L'Agence Nationale de Gestion des Déchets (ANAGED)

The ANAGED was established was organized by the presidential decree No. 2017-692 on 25 October 2017. It has a commercial and industrial nature (EPIC).

(3) Policies and Plans of Solid Waste Management

PND (Plan National de Développement 2016-2020)

Infrastructures for solid waste management are being developed according to actions of outputs iii) to v) of "Strategy 4: Coordinated infrastructure development nationwide and environmental preservation - Impact 2: Environmental and sanitary living spaces are preserved - Effect 3: Systems of solid waste are improved." in PND 2016-2020. These outputs iii) and iv) with their budget are summarized in Table 2.6.10.

Table 2.6.10 Outputs of Action Plan of Solid Waste Management Sector in PND 2016-2020

Output	Number of Actions	Budget (2016-2020) million FCFA
iii) Infrastructures of urban and rural solid waste treatment are reinforced.	3	87,730
iv) Sustainable management of solid, liquid and dangerous waste is ensured.	4	17,295
v) Fights against the nuisances, urban pollutions, and urban disorder are reinforced.	3	39,500

Source: PND 2016-2020

Solid Waste Management Master Plan in Abidjan

A study for the development of a new waste master plan in Abidjan is developed under the PADSAD programme of Islamic Development Bank with ONAD as a project owner. The target year of the plan is 2030 in Abidjan.

2.7 Urban Governance

2.7.1 Legal and Institutional Framework related to Urban Development

In terms of urban governance, setting up land use planning, issuing land titles and building permits, and urban control, the Ministry of Construction, Housing and Urbanism (MCLU) is the main responsible agency in Abidjan. As mentioned, even if some competences were transferred from 2003 onwards, the recentralization of competences in this area took place in 2013, with:

- The launching of the Land and Housing Properties One-stop Desk (GUFH: Guichet Unique du Foncier et de l'Habitat) which participates in the issuance of land titles, and of the Building Permit One-stop Desk (GUPC: Guichet Unique du Permis de Construire) which participates in the issuance of urban planning authorizations;
- The promulgation of the 2013 Ordinance establishing the rules for the acquisition of urban land and its implementing Decree n°2013-482 of July 2, 2013 which made obsolete the 2003 Law on decentralization which had recognized the competences of the local authorities in this field.

Nowadays, the promulgation of the new Code of Construction and Housing in 2019, and of the new Code of Urban Planning and Urban Land Tenure in 2020 confirms the monopoly of central administration, and therefore the very low intervention of the Communes and the Abidjan Autonomous District on the entire cycle of urban development and land management.

(1) Legal Framework related to Urban Development

1) Legal Framework related to Urban Planning

In the 2010s, the MCLU sought to develop a strategic planning document for the entire Abidjan metropolitan area, including its immediate hinterland, through the formulation of an Urban Master Plan (SDU), which was not provided for in the legal provisions of Law n°62-253 of July 31, 1962 on urban plans. This same tools of strategic urban planning was also applied to the country's most important secondary cities, namely Yamoussoukro and Bouaké.

The Greater Abidjan Urban Master Plan horizon 2030 (SDUGA), prepared from 2013 to 2015 with the support of the Japanese Cooperation (JICA), was therefore prepared independently of the national legislative framework. It was therefore agreed that the SDU would include identical planning content to that of the PUD. However, the SDUGA plan did not include planning regulations such as in PUD, but only general guidelines for the strategic development of the Greater Abidjan area.

To remedy this legal shortcoming, Côte d'Ivoire enacted Law n°2020-624 instituting a new Urban Planning and Land Tenure Code of August 14, 2020. This law repeals all previous provisions including Law n°62-253 of July 31, 1962 and Ordinance n°2013-481 of July 2, 2013 setting the rules for the acquisition of urban land ownership (subsequently amended by Ordinance n°2018-357 of March 29, 2018). The implementation of this new legal framework therefore calls for the need to update the subsequent regulatory framework.

The new Code of Urban Planning and Urban Land Tenure completes the typology and nature of the **regulatory urban planning documents** to be established in Côte d'Ivoire:

- **Urban Master Plan** (SDU: Schéma Directeur d'Urbanisme): the initiative for the preparation of the SDU falls within the competence of the State; it is prepared by a certified urban planner registered with the National Order of Urban Planners of Côte d'Ivoire (ONUCI: Ordre National des Urbanistes de Côte d'Ivoire). Within the framework of external financing, the SDU may be elaborated by other organizations in association with an approved urban planning firm registered with ONUCI. The SDU is approved by a decree issued by the Council of Ministers and is binding to the government entities, local authorities and legal entities of public law, which are required to strictly enforce its provisions. The SDU may be revised every 15 years from the date of the approval decree.
- **Urban Plan** (PUD : Plan d'Urbanisme Directeur): the Law takes over the provisions of the former Law n°62-253 which fixes the content, the effects, the scope and the publicity of the PUD. It can be revised every 10 years. The PUD includes the following contents:
  - ✓ distribution of the lands in zones according to their assignment to various functions;
  - ✓ schematic layout of the main roads, to be maintained, modified or created with their width and their characteristics: main traffic routes for transit and connection between zones, districts or with the external network;
  - ✓ reserved lands for the main facilities of general interest and open spaces;
  - ✓ indication of the wooded areas to be maintained or created and those subject to special easements of appearance and protection;
  - ✓ indication of the parts of the territory in which Detailed Urban Plans will be formulated;
  - ✓ general layout of water supply, electrical energy supply and sanitation, indicating the framework and general works of those infrastructures;
  - ✓ building regulation which sets the rules and easements relating to the use of the land;
  - ✓ program justifying the solutions adopted describing the phases of future urbanization and proposing the staggering of operations.
- **Structure Plan** (Schéma de Structure): a new type of urban planning document provided for by the Law, it is a document with the same content, effects, scope and publicity obligations as the PUD. It can be formulated for areas that do not have an urban planning document (SDU or PUD).
- **Detailed Urban Plan** (PUd: Plan d'Urbanisme de détail): the new Law takes over the provisions of the former Law n°62-253 which sets the content, the effects, the scope and the publicity of the PUd. It can be revised every 10 years. If it is approved, a PUd must automatically be established on the land by an approved Surveyor, registered in the Order of Surveyors. A PUd shall include the following components:
  - ✓ distribution of the lands in zones according to their specific uses and functions;
  - ✓ configuration of the different districts (quartiers) to be organized with an indication of the desirable population densities;
  - ✓ layout of the main or secondary roads, excluding the roads that should only be used to serve the buildings;
  - ✓ locations of reserved lands for public services, facilities of general interest and open spaces;
  - ✓ indication of the wooded areas to be maintained or created and those subject to special easements of appearance and protection;
  - ✓ preliminary drafts maps for drinking water supply, electricity supply and sanitation infrastructure sectors;
  - ✓ building regulation which sets the rules and easements of constructions justified by the character of the places;

- ✓ program justifying the solutions adopted and proposing the order of urgency of the planned operations.

The new Code of Urban Planning and Urban Land Tenure also specifies the **urban development operations** possible in Côte d'Ivoire. These are initiated in accordance with the prescriptions of one of the four urban planning documents provided for by the Law. The perimeter of any urban planning operation is declared to be in the public interest as of right. The plans shall be formulated by one of the 44 approved urban planners registered at the National Order of Urban Planners of Ivory Coast (ONUCI : Ordre National des Urbanistes de Côte d'Ivoire). The five types of urban development operations provided for by the Code are as follows.

- **Urban Land Development** (Aménagement foncier urbain): Concerns the development of a subdivided site and the marketing of land belonging to the private domain of the State or to local authorities. The constitution of land reserves is provided for in urban development plans, according to identified administrative reserves which are plots of land reserved to serve as rights-of-way for public services and facilities of general interest. Land reserves are constituted by the purging of customary use rights, expropriation for public utility and the exercise by the State of its right of pre-emption.
- **Urban Restructuring** (Restructuration urbaine): Consists of the development and modernization as well as the equipment of a district or an existing sector but whose configuration, structuring and level of equipment do not meet the standards of modern urbanism. It allows the remodeling of urban fabrics and consists in the development of areas characterized by an anarchic occupation of space with enclosed or poorly served plots and a lack of collective facilities. The objective of this operation is to establish a more rational use and organization of space, to improve the living environment and to regularize the land situation of the occupants.
- **Urban Heritage Restoration** (Restauration immobilière): Consists in safeguarding and developing buildings in ruin or defective by works of restoration, modernization or demolition having for object or effect the transformation of the conditions of habitability of a building or a group of buildings.
- **Urban Renewal** (Rénovation urbaine): Consists of the redevelopment of an ancient neighborhood involving the buildings located in the targeted perimeter, their demolition and then a planned reconstruction of the whole. The objective of urban renewal is to transform neighborhoods with socio-economic difficulties. This transformation involves various demolition, reconstruction, rehabilitation or change of use of spaces, in particular for the realization of public development and equipment necessary for the inhabitants of the district.
- **Land Readjustment** (Remembrement urbain): Reunion of different parcels in one piece in order to make a rational redistribution for urban development.

2) Legal Framework related to Urban Development

Since the end of the 1990s and the elaboration of the last Urban Master Plan (PDU: Plan Directeur d'Urbanisme †) of the city of Abidjan, and due to the numerous failures encountered at the level of the State, the actors of urban land production, public or private authorities, have a preference for the direct elaboration of subdivision plans (as an instrument likely to frame the future extensions of the city), without referring beforehand to any urban plan. Many Ivorian cities, including Abidjan, have been built through a juxtaposition of subdivisions carried out without any overall vision translated into an urban plan.

The land legislation and town planning regulations in force preserve the role of the State and the deconcentrated administrations for the opening of a subdivision, regardless of the actor in question. This

was the case with Law n°62-253 of July 31, 1962 relating to urban plans, it is still the case today with Law n°2020-624 of August 14, 2020 instituting a new Code of Urban Planning and Urban Land Domain. As previously mentioned :

- any subdivision project is subject to obtaining the prior agreement of the MCLU;
- the procedures for approval of subdivision plans are determined by Decree; however these decrees have not yet been promulgated;
- the subdivision authorization order must be published in the sub-prefectures and town halls of the localities concerned until the end of the subdivision operations;
- the expert surveyors registered in the table of the order of the Expert Surveyors of Côte d'Ivoire and the competent technical services of the town planning are authorized to carry out the missions of implementation of the plans of allotment;
- the competent technical services of the town planning department proceed to the provisional and final acceptance of the said works.
- The plan is adopted by joint order of the MCLU and Ministry of Territorial Administration. The decree declares it to be of public utility and prescribes that it is equivalent to an alignment plan.

3) Legal Framework related to Public Domain

The regulatory framework governing the public domain in Côte d'Ivoire was put in place by the colonial administration in 1928. The Decree of September 29, 1928, regulating the public domain and public utility easements (modified by decrees of September 7, 1935, June 3, 1952 and May 5, 1955), provides the definition and gives the composition of this public domain. It should be noted that a law on the Domanial Code was voted on March 20, 1963 but was never promulgated.

The public domain is also governed by Law no. 2020-624 instituting a new Code of Urban Planning and Urban Land Tenure. This is a classic vision of the public domain, with all of its dependencies being subject to a legal regime characterized by inalienability, unseizability and imprescriptibility.

Due to the lack of available land and the poverty of a significant portion of population, Abidjan is, similarly to other developing cities, experiencing a strong problem of informal occupation of its public domain, whatever its type. We can cite, for example, the occupation of the public domain of easements (rights-of-ways of railway, road, high-voltage lines, aerial zone of the airport) and the natural public domain (sea fronts, lagoon shores, waterways, shallows).

4) Legal Framework related to Building

Urban planning rules are applicable to inhabited and habitable areas. They concern the location, serviceability, accessibility, layout, architecture of the various constructions, the type of fencing, the embellishment and the proper maintenance of the properties, constructions and other infrastructures. The urban planning and construction rules applicable to the parcel are based on the urban planning, subdivision and alignment regulations (road rules) issued from Urban Plan (PUD) and Detailed Urban Plan (PUd). In the absence of a PUD and PUd, general rules are applied. These are derived from:

- General Urban Planning Regulation (RGU: Règlement Général d'Urbanisme) set by the Decree n°508-MCU of December 23, 1970 on urban planning regulation. This text includes 22 articles and deals with the elements that any construction project must respect:
  - ✓ location and service of the constructions;
  - ✓ layout and volume (number of floors) of the buildings;
  - ✓ aspects of the buildings;
  - ✓ enforcement measures.

- General Building Regulations (RGC: Règlement Général de la Construction) enacted by Order No. 356-MCU of May 22, 1974, amended by Order No. 1089-MCU/CAB/DUA of December 22, 1976, which establishes the rules of height, layout, ventilation and equipment of buildings. This text includes 27 articles organized in 3 chapters:
  - ✓ general safety and hygiene requirements;
  - ✓ special requirements for residential buildings;
  - ✓ miscellaneous provisions.

Also, at the level of Abidjan and certain communes, internal documents of the MCLU (directives) have established general regulations and specific regulations by commune and by type of housing (residential, evolving), without being associated with a zoning or land use plan. These practices, however commendable they may be, contribute to the vagueness in which urban planning in Côte d'Ivoire has existed since the late 1990s. The rules that have been instituted relate mainly to:

- the minimum surface area of the parcels according to the desired housing topology in the neighborhood;
- maximum height of the buildings;
- floor area ratio;
- setback from the street and the setback from the side boundaries.

Regarding the field of Construction and Housing, which can act on the regulatory provisions of urban planning documents, a new legal framework has also been instituted in 2019 by the promulgation of Law No. 2019-576 of June 26, 2019 on the Construction and Housing Code. The purpose of this law is to govern certain rules enacted in terms of development and construction at the parcel level.

5) Legal Framework related to Land Tenure

In Côte d'Ivoire, as in other African countries, there is a legal pluralism between modern land tenure and customary land tenure. The Ivorian legal and regulatory framework is still based on old texts from the colonial era:

- Decree of July 24, 1906, organizing the system of land ownership in the Colonies and territories under the Governorate General of French West Africa;
- Decree of October 8, 1925, instituting a method of establishing the land rights of the natives in French West Africa;
- Decree of November 26, 1930 on expropriation for public utility and temporary occupation in French West Africa, amended by decree of June 16, 1931 and decree of December 20, 1933;
- and above all the Decree of July 26, 1932 reorganizing the land ownership system in French West Africa.

The land tenure system for urban land and the production of plots of land were instituted by Decree No. 71-74 of 16 February 1971 on state and land tenure procedures, recognizing customary land law. However, in practice, until the end of the 1980s and the beginning of the economic crisis, the State was the main actor in land management. In other words, it carried out the entire process: the constitution of land reserves and the marketing of housing within developed and equipped neighborhoods. To achieve this, the State set up real estate construction companies (such as SICOGI: Société Ivoirienne de Construction et de Gestion Immobilière), as well as companies responsible for supplying the land market (such as SETU: Société d'Equipment des Terrains Urbains). The State then practiced the "purge" of customary land (collective compensation of villagers) by integrating it into the State domain before offering it to the land market.

(2) Institutional Framework related to Urban Development

1) Central government

The role of the Ministry of Construction, Housing and Urban Development (MCLU) is to develop national policies related to urban planning, construction and housing and to carry out local strategies related to these subjects. It is responsible for drawing up urban plans and associated regulations, and for drawing up or carrying out technical control of subdivision plans. It approves all these strategic (SDU), regulatory (PDU, PUd) and operational (subdivision, development and structuring plans) urban planning documents. Through one-stop desks, such as GUFH and GUPC, MCLU issues certificates of definitive concession (ACD) on approved urban land as well as building permits. MCLU is also responsible for managing State-owned urban land and for monitoring urban planning and construction rules, although this is a daunting task that requires a strong presence of agents in the field.

The Ministry of Economy and Finance, which implements the government's economic, financial and monetary policy. It includes the General Directorate of Taxes and the Treasury Directorate, which are responsible, among other things, for fiscal and financial assistance to the cities and Land Registry (technical service in charge of managing land registries).

In addition, over the years, entities more or less linked to the government have been created to meet specific needs. In the housing sector, we can cite the Société de Gestion et de Financement de l'Habitat (SOGEFIHA) created in 1963; the Société Ivoirienne de Construction et de Gestion Immobilière (SICOGI) created in 1965; the Banque Nationale pour l'Épargne et le Crédit (BNEC) set up in 1968; and the Office de Soutien à l'Habitat Économique (OFHE) set up in 1957.

In 1970, in order to guarantee the quality of the important investment programs implemented at that time, the State created the National Office of Technical Studies and Development (BNETD). This design office had an urban planning workshop that was responsible for producing the first planning documents. The BNETD still carries out work related to urban planning and, above all, to the management of engineering and architectural projects on behalf of the Ivorian State.

Then in 1971, the State set up a land production structure called Société d'Équipement des Terrains Urbains (SETU). In the 1980s, faced with major economic difficulties, the State had to dissolve certain production structures, such as the SOGEFIHA in 1984 and the SETU in 1987. However, the latter was replaced by a financing mechanism for the production of urban land, called the Compte des Terrains Urbains (CTU).

In 1997, the government created a housing financing mechanism adapted to middle-income brackets, called the Compte de Mobilisation pour l'Habitat (CDMH). The Société d'Aménagement de Terrains en Côte d'Ivoire (SATCI), a private company created in the same year 1997, started to develop urban land. In 1999, the Agence de Gestion Foncière (AGEF) was created in an attempt to assert the State's control over all development operations and to constitute and manage land reserves.

The urban sector intervention system has been particularly rich in Côte d'Ivoire. However, it has to be said that most of the ad hoc entities created have not fully played their role, often because of externalities beyond their control. The recent crisis has only confirmed the need to clarify roles and to put the system back in order.

2) Metropolitan administration

Until 2001, Abidjan was administered by a central City Hall whose Mayor was elected by the Mayors of the communes that form the District office. In 2001, by Law n°2001-478 on the status of the District of Abidjan, the Central City Hall of Abidjan was officially replaced by a District, a new administrative level. The District of Abidjan is a specific territorial authority with legal personality and financial autonomy.

The implementation of the District has gone through 2 distinct phases:

- In the first phase, the District functioned on the same model as the previous Central City Hall: an entity emanating from the communes, with a Governor (of the "super-mayor" type) elected by the District Council, itself composed of representatives of the communes;
- Since 2011, the District has been called "autonomous", meaning that it does not belong to any entity other than the State, and operates according to very specific procedures.

The Autonomous District of Abidjan (DAA: District Autonome d'Abidjan) was created by Decree No. 2011-263 of September 28, 2011, organizing the national territory into Districts and Regions. Having a role of local authority according to the administrative organization of 2011, the DAA functions today in a mixed manner.

The DAA is made up of the 10 urban communes (Abobo, Adjamé, Attécoubé, Cocody, Koumassi, Marcory, Plateau, Port-Bouët, Treichville, Yopougon) and the 3 peripheral communes of Songon, Anyama and Bingerville. The territorial limits of the Autonomous District of Abidjan follow those of the department of Abidjan. They cover an area of 2,119 km2, of which 422 km² are the 10 urban communes.

One of the main political functions of the DAA is to provide a link with the traditional chieftaincies of the villages within the Abidjan area. Indeed, the Governor, who has the rank of minister, is in charge of a special mission to the villages and the chiefdoms. This privileged contact with this level of power, which is very present locally, gives the Autonomous District an important capacity for socio-community mediation and mobilization in the context of political activities, including with other local elected officials (mayors, deputies, etc.).

The role, functions and competencies of the DAA are defined in Law n°2014-453 of 05 August 2014 on the status of the Autonomous District of Abidjan. The DAA has 6 major competencies, which respect the attributions of other local authorities and follow national guidelines:

- environmental protection;
- planning of the Autonomous District territory;
- combating the adverse effects of urbanization;
- promotion and realization of economic, social and cultural development actions;
- combating insecurity;
- protection and promotion of traditions and customs.

These competencies cover fields of action related to the management of the metropolitan urban area (large-scale cross-cutting competencies), such as: territorial planning; economic, social and cultural promotion; environmental protection. The District may undertake actions that are complementary to those of the State and the local authorities, within the framework of its competencies and under the conditions set by the Law.

However, the DAA lacks the financial, technical and human means to act and also effective authority (administrative police power). Despite its strong legitimacy (the Governor is appointed by the President of the Republic and has the status of Minister), the District is still very "timid" in its operational actions and has difficulty finding its place between the central services of the State, the parastatal agencies under supervision and the communes.

3) Municipal administration

In accordance with the provisions of Law No. 2012-1128 of December 13, 2012 on the organization of local authorities, the decision-making bodies of the communes are:

- The City Council, a consultative body, composed of persons elected by direct universal suffrage;
- the Municipality, composed of the Mayor and his 6 deputies, for municipalities with more than 100'000 inhabitants;

- the Mayor, the executive body responsible for, among other things
  - ✓ provide municipal policing ;
  - ✓ directing communal works;
  - ✓ to award contracts for the municipality after they have been awarded by the municipal council;
  - ✓ maintain order, safety, tranquility, security and health.

Ivorian communes have their own tax system and can directly levy municipal taxes and fees. They should normally receive a global operating and investment grant from the state, but this has not been paid out since the beginning of the crisis in 2002. They can also, under certain conditions, resort to borrowing.

The Minister in charge of Local Government (MIS - DGDDL) or the Prefect supervises the actions of the communes if their budget is less than 150 million CFA francs, which is not the case for the 13 communes that make up the Autonomous District. The Commune must consult with government services to validate communal orientations and verify their consistency with national orientations and sectoral policies undertaken by the technical ministries locally.

As mentioned above, a number of competences have been transferred to the communes. However, due to a highly centralized institutional organization at the state level, the following competences can be said to be currently practiced more or less well by the services of a commune:

- urban planning and construction: proposals and opinions on the master urban plans; preparation of the detailed urban plan and financing of the works;
- management of market facilities and the public domain: construction and management of central and local markets; construction and management of slaughterhouses; construction and management of bus stations; levying of taxes on commercial and transport activities, including occupation of the public domain;
- environment and drinking water: creation, construction, equipment and management of green spaces, parks and gardens; creation, construction, equipment and management of fountains and water points;
- health and veterinary hygiene: creation, construction, equipment and management of dispensaries, health centers and maternity wards; sanitary control of the transport and sale of animal products and foodstuffs;
- education: creation, construction, equipment and management of nursery and elementary school, school canteens, staff housing and sports facilities;
- culture and social action: creation, construction, equipment and management of social and pre-school education centers, nurseries and women's homes, libraries, museums and theaters, as well as personnel management.

In order to plan the actions that fall within the scope of these competencies, the municipalities implement a three-year program every year, which is the usual name for the community's action and development program. It includes actions and operations whose objective is to improve the living environment of the inhabitants of the same territory, which a council proposes to carry out over a sliding period of 3 years.

In fact, the action of the communes suffers from a lack of human and technical capacities to develop and carry out projects, but also from a weak autonomy and investment capacity that allows the communes to be in the position of project owner and then investment manager (infrastructures and equipment).

This problem is more or less general to all the communes of the country, including those of Abidjan, whatever the area in question:

- in the area of roads: the communes are very rarely the contracting authority for operations (essentially AGEROUTE, which receives almost all of the national and external financing) and have great difficulty in maintaining the roads within their jurisdiction (including desilting and the creation of "time points"). Recently, the operations carried out by the World Bank through the PRICI have made it possible to redevelop this capacity through the city contracts (implementation of investment and communal maintenance plans);
- In the area of drainage, master plans are formulated on the initiative of MINASS and ONAD, and the most important investments are made either alongside road works (i.e., via AGEROUTE) or via ONAD programs. It is very difficult for the communes to carry out the task of cleaning gutters, even though this is a task historically assigned to the communes. The operations carried out by the World Bank through the PRICI have also made it possible to redevelop this capacity through the city contracts;
- in the area of drinking water supply: with the generalization of direct supply by the SODECI network throughout Abidjan, the communes are no longer involved in this area. In the area of solid waste management, ANAGED has taken over all the responsibilities that had been devolved to the communes. Due to technical vagueness and because of their social activities, the communes try to intervene at the level of pre-collection of solid waste;
- in terms of market facilities: the communes retain the legitimacy to manage these facilities (markets, slaughterhouses, bus stations, allocodrome), but their management essentially concerns the collection of taxes, without any real policy for improving services and maintaining existing facilities. This direct taxation is generally used to feed the general budgets of the communes, which are mainly used for operating expenses (salaries). In addition, the management of these facilities has very often been devolved to the private sector via PPP contracts, which have allowed the facilities to be built;
- in terms of school, health or public safety facilities: because of their strong social impact, these facilities are systematically included in the three-year plans of the communes, but they are unable to mobilize the funds to carry them out (except in a few rare cases). In the end, it is mainly the State services, via national and international sectoral financing, that carry out these facilities. In terms of management, the communes are also deficient;
- in terms of local facilities (sports, culture, public spaces): the municipalities suffer above all from their low investment capacity for their works, but also from their low financial capacity for their maintenance.

2.7.2 Capacity Development

(1) Assessment of Existing Capacity

1) At the Institutional Level

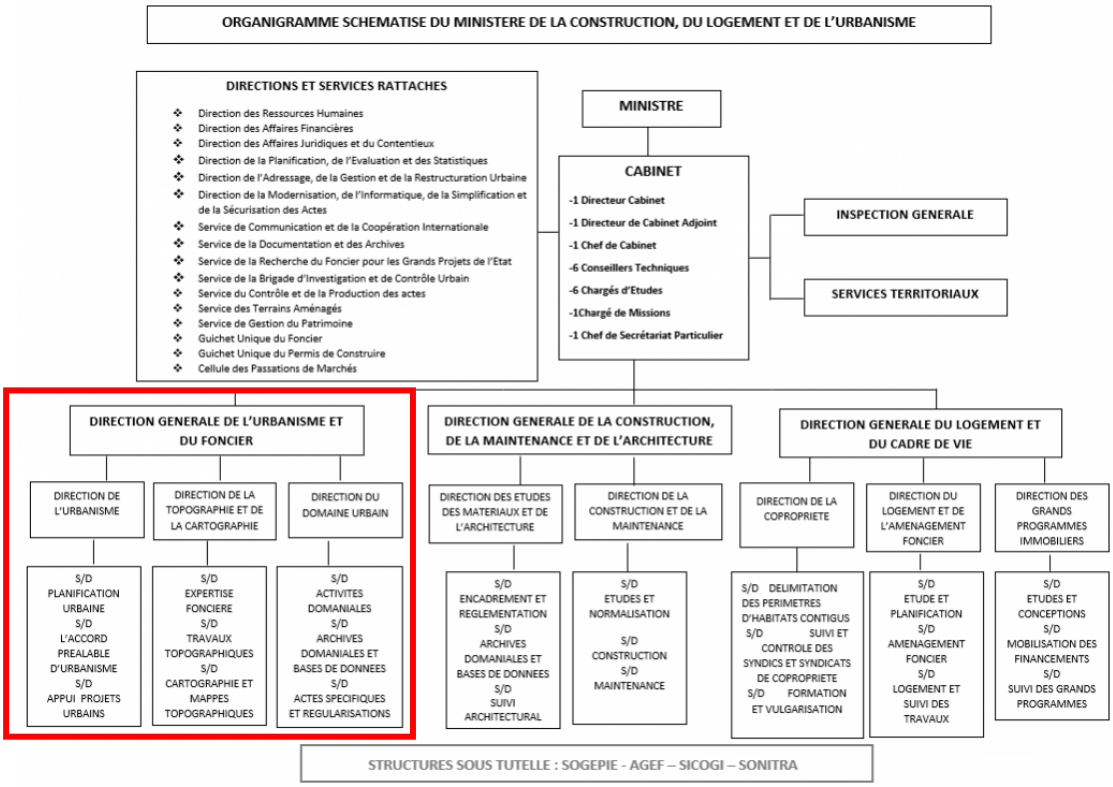
MCLU

Main roles and competences of the MCLU are described in the section above. The ministry is currently composed of:

- services directly attached to the Minister's office, including some services / directorates that may concern the elaboration of the SDUGA and its implementation:
  - ✓ Legal Affairs Department (evolution of the regulatory framework following the promulgation of the 2 codes);
  - ✓ Urban Restructuring Department (responsible for precarious neighborhoods);

- ✓ Department of Modernization, Information Technology, Simplification and Security of Acts (which is responsible for steering the SIGFU project);
- ✓ Brigade and urban control services;
- ✓ GUFH Services;
- ✓ GUPC Services;
- ✓ General Inspectorate of Urban Planning and Construction;

- 3 branches, themselves divided into directorates, themselves divided into sub-directorates:
  - ✓ Directorate General of Urban Planning and Land (DGUF);
  - ✓ Directorate General of Construction, Maintenance and Architecture (DGCMA);
  - ✓ General Directorate of Housing and Living Environment (DGLCV).



Source: MCLU website

Figure 2.7.1 Current MCLU Organization Chart

Among these Directorates General, the main administrative entity responsible for urban planning affairs is the DGUF, which will technically steer the updating and implementation of the SDUGA. It is divided into 3 operational directorates, each of which will be represented in the Task-Force:

i) **Direction de l'Urbanisme (DU) is** mainly responsible for monitoring the development of urban plans (SDU, PUd), and then for checking the conformity of development plans / subdivision plans in relation to the urban plans. As part of the process of verifying the conformity of subdivision plans, which are submitted by the developers to the GUFH, the role of the DU is well defined (visa) so that the Ministry ensures the final approval of the documents.

According to our first investigations, which will be completed later, it was found that the DU ensures a control essentially on the respect of easements and public domains, floodable and non-constructible zones, according to the national legislation and regulations in force. This control concerns both urban planning documents and development plans. However, its control to verify the conformity of the subdivisions with the development standards is still poorly known (calculation of the ratios of the rights-of-way to be returned to the public domain to implant infrastructures and equipment). As this data is not specified by existing regulatory documents, it is quite possible that DU does not have the capacity to require developers to return sufficient land rights-of-way (tertiary roads, reserves for equipment, etc.).

A particular investigation will take place in the next few months on this subject by JICA Project Team, because it is an important step in the urbanization processes of the cities, and therefore in the implementation of the SDUGA.

ii) **Topography and Cartography Department (DTC)** mainly in charge of checking the geodetic coherence of the different urban plans and development plans at different scales, in order not to create errors and duplications that can then impact the land management chain (especially with regard to urban areas) and construction.

Its daily tasks are still poorly perceived by JICA Project Team and deserve to be further developed. Its mode of operation is likely to be strongly impacted by the SIGFU project, which will put in place more efficient tools and processes for geographic and cartographic information. The implementation of the SDUGA will be based on these SIGFU reforms.

iii) **Direction du Domaine Urbain (DDU)**, which is mainly responsible for processing applications for ACD, at the request of the GUFH, which centralizes these applications. The DDU ensures the proper maintenance of the Urban Land Register, in addition to the Cadastre services (attached to the Ministry of the Budget) which only manage property documents.

Its role is decisive because it is the only actor to centralize all the information on urban land allocation and ownership, including with regard to the old documents for which a significant portion of urban land and the population of Abidjan is still concerned (ACP, Letter of Allocation, the management of which was shared between the State, the deconcentrated services of the sub-prefectures, but also the DAA and the communes prior to the 2013 reforms).

In addition, the DDU is the competent directorate for the monitoring, management and control of public parcels (administrative reserves) provided for in the subdivision plans, particularly with regard to the allocation of these parcels (e.g. reserves allocated to the "School" function).

A particular investigation will take place in the coming months by JICA Project Team on the specific tasks and competencies of the DDU, as this actor is also very important in the implementation of the SDUGA (monitoring of public rights of way).

On the face of it, the main challenges facing DDU are:

- This management is done only on the basis of the subdivision plans officially approved by the MCLU, but there are still many unapproved subdivision plans in the Abidjan area, especially in the periphery where the mode of creation of the soil is still strongly ensured by private and customary owners;

- the low level of computerization of geographical data and archiving of Urban Domain data means that the management of urban domains is very uncertain: the DDU should work on assembly plans of the city (validated by the DU on the technical aspects and by the DTC on the geodetic aspects), from which the blocks and lots of the urban domain are mentioned, which are attached to important attribute data (files in paper version to be digitized and attachment of information on database): content, allocation, level of attribution, level of land registration, etc.

  Like the DTC, its mode of operation is also likely to be strongly impacted by the SIGFU project, which will put in place more efficient tools and processes for managing geographical and administrative information relating to the Urban Areas.

DAA

JICA Project Team did not have access to a formal organization chart, validated by an internal legal text that sets out the actual organization and responsibilities of the DAA departments. More specifically, it should be explained that the tasks of planning and implementation of activities related to urban development are carried out by :

- 3 "agencies" directly attached to the Governor's Office:
  - ✓ Abidjan Urban Planning and Forecasting Agency (AUPA);
  - ✓ Abidjan Land Development Agency (AAFU);
  - ✓ Institute of Circular Economy of Abidjan (IECA)
- 1 General Directorate of Technical Services of the District, also attached to the Office of the Governor, comprising 9 operational departments:
  - ✓ Direction of Infrastructures and Equipment (roads and various networks) ;
  - ✓ Department of Urban Planning, Construction and Housing;
  - ✓ Sanitation and Drainage Department;
  - ✓ Department of Transportation and Urban Mobility;
  - ✓ Directorate of Health and Public Hygiene ;
  - ✓ Direction of Slaughterhouses and Food Hygiene ;
  - ✓ Environment and Sustainable Development Department ;
  - ✓ Parks and Gardens Department;
  - ✓ Directorate of Prevention and Civil Protection.

These nine directorates are organized into sub-directorates. Due to the recentralization of competencies at the State level and the logic of donor-funded projects, it appears that these operational directorates no longer have any specific prerogatives.

In the absence of funding, and consequently of human and material resources, the 3 agencies and 9 technical directorates of the DAA are only very weakly active:

- in planning: the departments are often asked by the State bodies to take part in meetings/commissions, or in the follow-up of certain studies. This is notably the case for the AUPA. But the DAA does not directly lead any specific planning study to date. The DAA is looking for institutional opportunities to be able to develop certain projects, this is notably the case of the ICEA which is positioned on the theme of "Circular Economy" (waste) with the support of decentralized international cooperation frameworks, for example the twinning with the agglomerations of Liege in Belgium or Montreal in Canada. It is therefore a situation of opportunity: what will happen to the ICEA if the State positions itself on this subject through ANAGED or the Ministry in charge of sustainable development?

- in the area of investment: the operational departments have very little control over works, by carrying out study and then works contracts. The budgets for works are in fact exsanguinated and most of the projects financed by the partners are carried out by the State;
- in terms of investment management/maintenance: the DAA ensures the maintenance of certain works (roads, gutters, green spaces), depending on budget availability;
- in terms of urban control, the DAA no longer "formally" controls building permits or subdivision plans (although these were key activities of the District before the 2013 reforms, in coordination with the State and the communes). As mentioned above, the DAA still carries out some field observations of illicit constructions through its internal brigade.

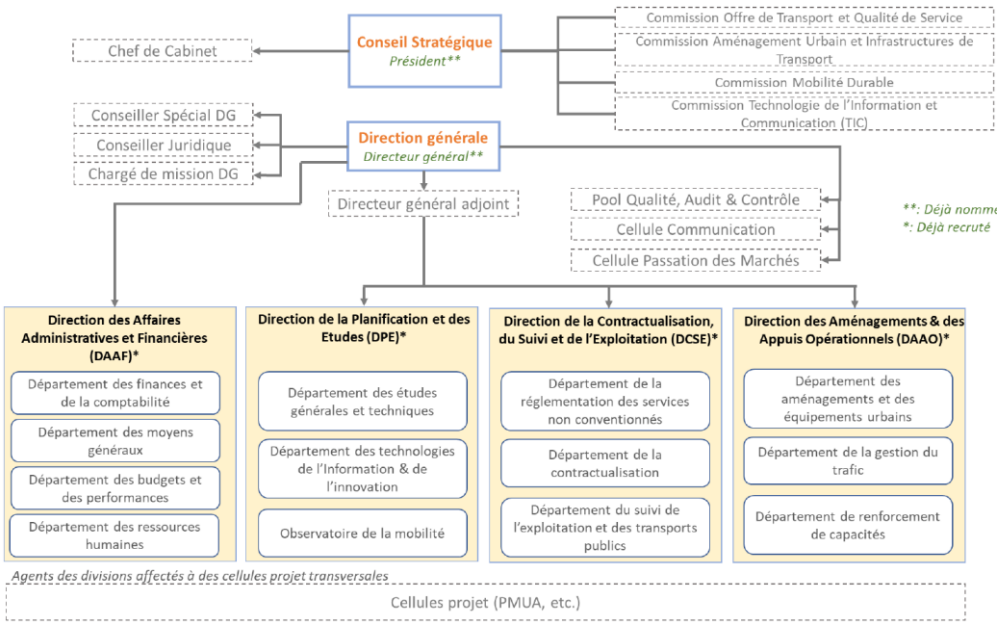
The Abidjan Urban Planning and Forecasting Agency (AUPA) was created in 2013 within the DAA to strengthen its capacities and interventions in urban planning, regulation and management. The development of the SDUGA indicated that support for this agency in terms of human, material and technical resources would be of paramount importance for the implementation of the SDUGA. This is why the DAA is an integral part of the two monitoring bodies (CCC and CoFaMiSu), as well as the Task Force for the Project.

AMUGA

AMUGA is an Independent Administrative Authority (IAA) with legal personality and financial autonomy. Its mission is to ensure the organization and coordination of the various modes of transport in the urban transport area under its jurisdiction. Thus, AMUGA ensures, in Greater Abidjan, the institutional governance of urban mobility defined as urban transport and the movement of people and goods within a defined territory, as well as the infrastructure and equipment necessary for transport, the means of transport, the services related to transport and travel in this territory.

Due to its recent creation (2019) and the youth of its staff (in place since 2020), AMUGA does not currently have a stabilized organizational chart. Many functions are still in the process of creating positions and hiring. It is not within the SDUGA's remit to draw up an organizational audit and recommendations for strengthening AMUGA, especially as the structure is supported by various partners on different projects. A technical assistance mechanism (Nodalis-Transitec consultant) was set up to operationalize AMUGA, with PACOGA (World Bank) funding. A target organization chart has been proposed (see Figure 2.7.2).

The Directorate of Planning, Studies and Projects (DPEP) is directly concerned with the follow-up of the updating of the SDUGA, and takes part in the Task Force. The DPEP is also involved in all other studies and projects related to urban development (e.g., preparation of the PUd of Unit n°6) and urban transport (see below).



Source: Prefiguration report of the Technical Assistance to AMUGA (Nodalis, April 2021)

Figure 2.7.2 AMUGA's target organization chart

2) At the Individual Level

The Task Force, which is involved in most of the Project activities together with JICA Project Team, is composed of 16 members from the 3 partner institutions of the Project, which are directly involved in the updating and implementation of the SDUGA, namely 7 members from MCLU, 5 members from DAA and 4 members from AMUGA. In order to strengthen inter-organizational coordination, members of the different institutions meet together in thematic groups.

The Task Force is composed of 16 members, 75% of whom are men. The gender approach will not necessarily be developed within the framework of the mission, and the predominance of men is a reality in the Ivorian administration where the majority of managers are men. However, the presence of women in these positions is tending to evolve; this is an overall evolution in Ivorian society. The Task-Force is relatively young (36 years old on average), which is why a majority of the members (9) have a fairly recent higher education degree, obtained after 2010. The majority of the members of the Task-Force (57%) have a higher education level: university graduates, engineers. This situation illustrates the ever-increasing quality of human resources in Ivorian administrations.

A self-assessment of skills was made by the members of the Task-Force based on a questionnaire made by JICA Project Team. This evaluation aims to highlight the areas of activities in which Task-Force members feel comfortable or, on the contrary, are not well equipped. These questions were asked by major themes for which a government official involved in urban development should have skills, or at least knowledge:

- General management and management: in general, managers from MCLU and AMUGA feel more comfortable with administrative management issues, due to the dynamism of their activities. MCLU executives also have more specific knowledge in the legal field;
- Urban planning, mobility, and urban design: In general, MCLU and AMUGA executives are more comfortable with urban planning and development issues. Due to the low level of involvement of the DAA in these issues, the Task Force members feel less comfortable;
- Planning and construction: questions were mainly directed at MCLU officers who have average to good skills in urban planning regulations and building rules at the parcel level;

- Land and urban property management: MCLU officers are comfortable with these issues, while DAA and AMUGA officers are less so. This situation is quite normal in relation to the interventions of each of the administrations;
- Mobility management: MCLU was not interviewed on these issues since it is not involved, unlike DAA and AMUGA. For these 2 administrations, the members of the Task-Force have skills that they consider average. A particular effort should be necessary, especially for AMUGA, whose sector of intervention is this;
- Project ownership/project management: Generally speaking, the skills are very well developed among AMUGA staff, a dynamic institution that currently manages a large number of projects and therefore contracts for intellectual services, supplies and works. The DAA staff seem to be the least comfortable with this, no doubt as a result of the DAA's lack of dynamism or the fact that AUPA/DAA is not competent to manage contracts.

A self-assessment of capacity building needs was made by Task-Force members based on a questionnaire conducted by JICA Project Team. This assessment aims at identifying the areas for which the Task-Force agents are waiting for specific training or capacity transfer. Generally speaking, the needs are strong in all the areas pre-identified by JICA Project Team. In general, the majority of Task-Force members consider that their needs in terms of project management are not problematic (needs evaluated as "average"). By structure, we can note the following:

- for the MCLU agents: the needs would be around operational urban planning subjects.
- for DAA officers: the needs are mainly in the areas of urban planning and development;
- for AMUGA agents: a global reinforcement is requested on all subjects related to urban mobility (planning, management), even if it is their field of competence, as well as on the use of computer software, especially GIS software;

2.8 Urban Finance

(1) Current situation of urban finance in Abidjan

In the Greater Abidjan, the infrastructure development is led by the central government rather than governments of district or communes. However, the capital expenditure (CAPEX) for developing infrastructure is generally funded by the private sector through Public-Private Partnerships (PPPs). Even in the public funded projects, donor countries and international financial institutions play important roles. As a result, only 18% of the CAPEX is covered by the government treasury[15].

On the other hand, operating expenditures (OPEX) are mainly secured through payment from users or subsidies from the central government in the case that the said infrastructure is managed by public owned companies invested. Table 2.8.1 shows the responsible organizations for construction and O&M in different sectors.

Table 2.8.1 Responsibilities for construction and O&M

Sector	Line Ministry	Construction	Main Financial Source for CAPEX	O&M
Urban Development (Housing and land development etc.)	MCLU	MCLU	Public [16]	-

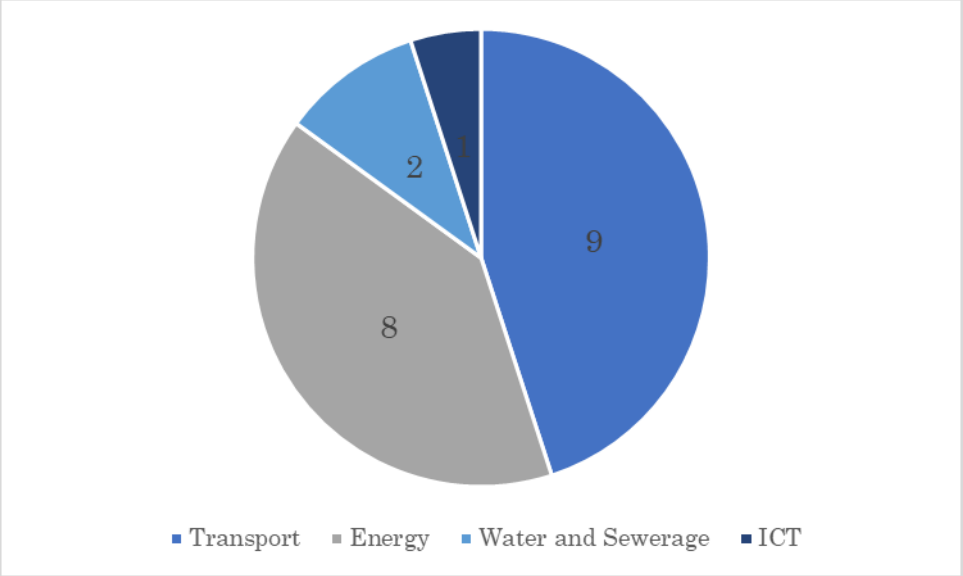
[15] Analyzed by JICA Project Team based on the data from Ministry of Budget and Portfolio
[16] Public includes government subsidies and sovereign international loans

Transportation	MT MEER	AGEROUTE (For most of public funded roads)	Public	FER
		Private Companies(For most of public funded roads)	Private	Private Companies
Water	MH	ONEP	Public	SODECI
Sanitation	MINASS	ONAD	Public	SODECI
Solid Waste	MINASS:	ANAGED	Public	ANAGED

Source: JICA Project Team

(2) Overview of Public Private Partnership (PPP) in Cote d'Ivoire

Cote d'Ivoire has successfully mobilized private finance for delivering infrastructure projects, and their institutional arrangement and enabling environment is in general highly evaluated. The Infrascope by Economist Intelligence Unit (2019)[17] shows that "Cote d'Ivoire has an attractive environment for PPP investment" as PPP legislation is clear and concise. The country has the longest history of PPP in Africa[18], with precedents in the forms of Build-Operate-Transfer (BOT), Build-Own-Operate (BOO), Rehabilitate-Operate-Transfer (ROT), and the like[19]. There have been 20 PPP projects reaching to financial closure since 1990, a total investment of which is 4,097 million USD[20]. The number of PPP projects that have been implemented per sector is shown in Figure 2.8.1 below.



Source: JICA Project Team

Figure 2.8.1: Number of PPP projects per sector that has reached financial closure since 1990

(3) Type of PPPs employed in Cote d'Ivoire

In some sectors such as water and sanitation, affermage contract[20] has been adopted. However, aside from these few cases, the PPP schemes that are employed in Cote d'Ivoire can be divided into user-paid PPP and Government-paid PPP. At this moment, the PPP cases that employ off-take scheme have not

[17] The Economist Intelligent Unit, Infrascope: The Enabling Environment for Public-Private Partnerships - Côte d'Ivoire, 2019, p. 1
[18] World Bank, Project Appraisal Document on a Proposed Scale-up Facility Credit in the Amount of Euro 260.5 Million to the Republic of Côte d'Ivoire for the Greater Abidjan Port - City Integration Project, 2018, p. 16
[19] World Bank, Private Participation in Infrastructure database, https://ppi.worldbank.org/en/customquery
PPP Knowledge Lab, https://pppknowledgelab.org/countries/c%C3%B4te-d%E2%80%99ivoire
[20] A lease type PPP contract where the public side lease the infrastructure asset and the private side carry out O&M

been confirmed.

1) User-Paid PPP

In User-Paid PPP projects, private operators manage projects through reimbursement from payments from users. This type is generally used for economic infrastructure that entails user payment system. The revenue from user payment is the main source of reimbursement. This is the case for most of the concession agreements like toll roads.

2) Government-Paid PPP

Government-Paid PPP projects tend to be adopted in social infrastructure like hospitals, universities, and schools, which are considered as vital for public needs, but as not financially viable with user payment. In this model, the private operator pre-finances the capital cost of the infrastructure construction and operate it for the government after its completion.

The government only starts paying for the private sector after the project has been operated. Pre-agreed payments are made by the government. For the government side, this has the advantage of not weighing on the public balance sheet over a single period.

(4) Legal Arrangement for PPPs

Cote d'Ivoire has only two decrees that governs PPPs. These decrees define overall directions of PPP procurement and responsibilities of relevant entities, but do not define the very details. Therefore the country has flexibly implemented PPPs depending on the condition of each project. The detail of each decree is as follows.

1) Decree 2018-358 of March 29, on PPP contracts.

This defines the definitions of PPPs and overall guides for PPP preparation, procurement and monitoring.

In this decree, PPP is contracts that cover the design, construction, transformation, rehabilitation, financing, operation, service, maintenance, and management of infrastructure, public infrastructure, buildings, equipment, or intangible property, as well as the creation or operation of public or private domains. However, the broad definition of PPPs leaves a lot of rooms for interpretation by government officials, industry, and other stakeholders as to what qualifies as a PPP and what can be created successfully under a PPP contract.

2) Decree 2018-359 on the powers, organization and functioning of the National Steering Committee managing (CNP-PPP), which is the PPP Unit.

This defines the institutional arrangement for PPPs and power and responsibility of each organization. The original decree is Decree No. 2012-1152, but there have been multiple revisions until 2018. The details of institutional arrangement are shown in the following section.

(5) Institutional Arrangement for PPPs

In Cote d'Ivoire, there are three key entities that regulate and support the PPPs. CNP-PPP is responsible for strategic oversight of the sector and approving new PPP projects. SE-PPP has a supporting role in administrative and technical support, outreach and training. Table 2.8.2 shows detailed roles and responsibilities in each organization.

Table 2.8.2 Organizations related to PPPs in Cote d'Ivoire

Organization	Roles and Responsibilities
CNP-PPP (Comité national de pilotage des PPP)	CNP-PPP is the main body of the decision and approval of the PPP project and directs the institutional framework of PPP promotion. The main roles are as follows: - Develop a PPP development strategy and submit it to presidency together with the regulatory document draft; - Approve the PPP project;

	- Approve bidding documents, budget, procurement method of PPP projects prepared by implementing agencies - Approve agreement and contract of PPP projects; - Set the framework for dialogue with external financial partners; - Monitor project implementation - Disseminate an annual report of the PPP project - Approve the annual action plan submitted by SE-PPP: and, - Seek necessary funding for PPP projects.
SE-PPP (Secrétariat exécutif des PPP)	SE-PPP assists CNC-PPP. The main roles are as follows: - Develop an annual action plan and obtain approval of CNP-PPP; - Prepare the CNP-PPP assembly - Monitor the implementation of decision of CNP-PPP policy and resolution; - Ensure the coordination between all PPP actors; - Prepare annual activity reports and periodical reports of CNP-PPP; - Develop and implement domestic actor training and capacity building strategies related to PPP; - Arrange dialogue with external investment partners; - Propose to CNP-PPP regarding strategy and implementation decisions - Monitor contracted project progress.

Source: Presidential Decree No. 2012-1152 on Dec 19, 2012, No. 2014-246 on May 8, 2014, and No 2018-359

Chapter 3 Major Issues and Directions for SDUGA Update

3.1 Urban Development

The following table shows a summary of the different issues related to urban development sector that has been identified at this stage based on the analysis of current baseline conditions in Abidjan and the SDUGA report. This work is currently ongoing and will be progressively enriched through all the consecutive spatial analysis and by a more in-depth assessment of the performance of the implementation of SDUGA propositions.

Table 3.1.1 Summary of Urban Development Issues

Theme	Summary of Issues at this Stage	Progress of Analysis and Direction for SDUGA update
Suitability and capacity of lands for urban extension	Even though Abidjan has been settled and has grown historically over a very suitable topographic and natural context, the city has reached limits in terms of suitable lands to develop. It is now growing on the hilly landscape of external communes, causing, landslip, runoff and destruction of natural ecosystems such as lagoons, wetlands and forest areas, but also the vanishing of precious productive cultivated areas. Even prior to the issue of suitability of lands, the issue of the capacity of peripheral lands to accommodate the important population growth expected at horizon 2040 is questionable, and densification and urban renewal seem inevitable for the metropolis's close future.	The issue of ecological equilibrium between urban development and conservation of natural areas at the scale of Greater Abidjan and even beyond, as well as densification and urban renewal are the key issues of SDUGA update and consecutive PUds. A proper GIS multi-criteria analysis of Greater Abidjan land suitability for urban development was undertaken. Its results are reflected in this Progress Report 3 and will constitute the basis of propositions in terms of spatial framework and land use planning for the different development alternatives in the SDUGA update at horizon 2040.

A new deal for urban growth direction and real-estate attractiveness?	Urban growth pressure is historically concentrated along main radial arterial roads from Abidjan to neighbouring cities and countries. During the two past decades, urban expansion to rural areas has been driven especially by the development of large-scale road and bridges infrastructures, notably directed by the SDUGA. In the close "bed-town" type outskirts of the city such as in Bingerville, this development has naturally led to land price increase but also speculation. In addition, as it could have been expected, the supply of new roads has facilitated access to new lands opportunities in new areas and has worsened the transportation demand and traffic congestion from those areas. This situation is greatly affecting the decision of households to choose to settle in close outskirts or in further surrounding villages or satellite cities. It is for example common for people departing from far Bonoua village in the morning for work in Plateau arrive earlier than those who come from Bingerville and who stay hours in traffic. Finally, alongside to the change of scale of the city because of congestion problems, it is expected that development of public transportation (BRT and Metro) will change the paradigm of the eternal "car-driven urban expansion in subdivisions in the periphery", to allow a more compact type of urbanization.	It will be needed to take into account in SDUGA update the two emerging phenomenon that seem to guide Abidjan urban growth and real-estate attractiveness in the near future: Firstly, the change of scale, the slow evolution of the city from a metropolis to a great urban region, including satellite cities, and secondly the development of BRT and Metro, which is expected to drastically change the investment landscape in the field of urban development. SDUGA 2040 and further PUds will need to introduce clear policies and incentives to support TOD approach in order for this "new deal" of urban growth to effectively happen. A study and analysis of the possible evolution scenarios for real-estate market attractiveness consecutive to the development of next generation public transportation infrastructure will be deepened to forecast the different possible development alternatives. Results are shown in this Progress Report 3.
Housing, residential typologies and opportunities for densification	In order to absorb the large amount of new expected population by 2040, both public and private housing sector will be required to surpass themselves to meet the housing demand, even though massive public housing development programs in the past were not be able keep pace with demand. To serve such additional housing demand while keeping the current urban typology of low-rise residential building will consume extensive land areas and require extended and expensive road and utility infrastructure. Changing to a new residential typology with higher buildings for more compact neighborhoods in both urban extensions and urban renewal areas will be required and will initiate a permanent change to the sustainability of the city. Nevertheless, those reforms towards the promotion of more compact residential typologies will be only possible after the improvement of building quality control, which is one of the most problematic obstacles to rational urban development nowadays in Abidjan.	The issue of densification being increasingly relevant in Abidjan, the SDUGA update will introduce a new approach that was not included in the first plan, namely the urban typology, which is needed in addition to the analysis of density to be able to propose new types of compact neighborhoods. Based on the analysis of existing land use patterns in Abidjan, combined with a study of building footprints and height, an analysis of residential typologies was conducted. The results of this analysis, which is shown in this Progress Report 3, will be used as a basis for the identification of opportunities of urban renewal and "soft" densification of urban fabrics.
Open spaces and public domain in	The public domain in Abidjan, whether natural public domain such as green spaces	SDUGA 2040 will need to put the emphasis on both the liberation and control of public

Abidjan	and lagoon shores or right-of-way of various infrastructures, is currently largely occupied by illegal activities. In the meantime, there is a lack of freely accessible green amenities such as green areas in the city. The liberation of illegal occupation of and the transformation of public domain towards a greener city is an important issue to be taken seriously by the authorities.	domain and on the promotion of green spaces, so that subsequent PUds will be able to identify concrete actions and detailed areas for implementation. The city will require a more comprehensive open space system to raise the overall quality of the urban environment.
Spontaneous urbanization / slums	MCLU stated that, in 2019, slums would account for more than 1.2 million inhabitants and cover a cumulative area of more than 5,000 hectares, representing around 20% of the population of Abidjan. Moreover, those neighborhoods, which do not cope with any urban planning rules and policies, suffer from the lack of basic urban services and infrastructure: sanitation networks, roads, drinking water, electricity, etc.	Issues related to spontaneous urbanization / slums will be studied further.
Social housing	The production of social housing for populations with the lowest incomes has never managed to keep up with the demographic explosion experienced by the capital city of Côte d'Ivoire. Even though the real estate production had been able to adapt, the poorest inhabitants, who are living outside the banking and formal systems, would not have been able to take advantage of these opportunities to acquire decent housing.	Issues related to the complex question of social housing will be studied further.
Initiatives towards smart city	Certain initiatives, such as SIGFU, a project for the simplification and digital transformation of urban land, implemented by DMISSA of the MCLU, can provide the necessary geographic database for Ivorian cities to carry out their transformation towards more intelligent and connected cities.	The Urban Planning Geoportal Pilot Project (see Section 6.1.2) was partly formulated on the basis of SIGFU data.

Source: JICA Project Team

3.2 Urban Transportation

3.2.1 Major urban transportation issues

(1) Road development

The major issues in road transportation are summarized as follows.

- Project delay due to the budget allocation constraint for many road projects, i.e., lack of other donors' support.
- Change of the Y4 ring road, the highest priority project, due to public opinions, i.e., land acquisition issue.
- Low progress of road projects in the districts/communes.
- A positive approach to the donors for financing is necessary for the improvement of intersections to follow the ongoing projects.

- A drastic change in road traffic volume in Abidjan during the initial preparation of SDUGA is the overall underlying factor that requires a review for updating SDUGA.

(2) Public transportation/ traffic control and management

The major issues in public transportation and traffic control and management are summarized as follows.

Strengthening the role of SOTRA.

- SOTRA is the only regular transportation operator in the Greater Abidjan area, and the number of users has been increasing in recent years due to the increase in the number of buses and the enhancement of various services. However, SOTRA users account for only a quarter of the number of users of informal minibuses (Gbaka) and shared-ride cabs (Woro-woro). It is desirable that the role of SOTRA buses be strengthened.
- SOTRA is discussing with related municipalities and other organizations to expand services on suburban routes. The major issue is, however, the poor road surface condition, and SOTRA has been proposing improvements to the relevant agencies. Another problem is that although a dedicated bus lane has been constructed, the presence of regular vehicles prevents the buses from operating at a smooth speed. Regarding water (lagoon) transportation, on the other hand, the expansion and rehabilitation of the water bus terminal are being planned as part of the World Bank's PACOGA, but the water bus itself is aging and needs to be upgraded, including capacity expansion.

Informal sector management.

- Within the framework of the PMUA, which is funded by the World Bank, support is provided to informal transportation operators, particularly minibuses (Gbaka) and shared-ride cabs (Woro-woro). Although these transportation services are called informal, they transport more than 70% of the public transport passengers in the Greater Abidjan area. They have established themselves as a provider of public transportation services for the citizens. With the introduction of new public transportation systems such as the railway and BRT, these means of transportation will have to be restructured, and their management should be given due consideration.

North - South Urban Railroad Line:

For Stage 1 (Anyama to Airport), detailed designs for the line and station are underway, as well as demand forecasts through 2052. Stage 1 of the Abidjan metro will link Anyama, a suburban center in the north, to Port-Bouët in the south in 50 minutes, passing through 20 stations. The distance between the two centres is about 47 km. The construction cost is estimated at €1.360 billion. The process of liberating the right of way of the metro line continues with compensation for those affected.

The STAR (SOCIETE DE TRANSPORTS ABIDJANAIS SUR RAIL) is the contractor responsible for the design, construction, operation and maintenance of Line 1 of the Abidjan Metro. This group of companies is composed of:

- BOUYGUES TRAVAUX PUBLICS: Infrastructure - Civil engineering - Structures - Buildings
- COLAS RAIL: Track-Energy-Catenary-Traction
- ALSTOM: Rolling Stock-Industrial workshop/depot equipment-Signalling CBTC-Weak current systems-Telecom-Ticketing
- KEOLIS: Pre-operations, Operations and Maintenance.

In addition, no study has been made on the Stage 2 plan to extend the line from the airport to Grand Bassam.

BRT East-West Line: (BRT)

Detailed planning for BRT project and plans for restructuring feeder routes are underway within the framework of PMUA, supported by the World Bank. Feasibility studies for implementing the East-West BRT line (Yopougon, Bingerville are completed. But, the plan is not yet definite as the Council of Ministers must validate the studies.

The parts of public infrastructure are financed by the WB and AFD, while the operation parts are financed by PPP. The company to operate BRT has not yet been selected as the preparation of the terms of reference is ongoing. The tender was scheduled for January-February 2023 and the operating company would be selected by July 2023. But that has not yet been done.

The following three projects will be implemented simultaneously with the BRT;

1) Integration of urban renewal in two communes (Yopougon and Adjamé) around two large BRT stations in order to give more value to these lands.
2) Feasibility studies on multimodal exchange hubs are underway.
3) The rehabilitation or construction of new roads (30 km) to feed the BRT line. The challenge is financing. The initial budget allocated to the project is no longer sufficient because where the studies envisaged rehabilitation at the beginning of the studies, the state now requires the construction of flyovers, for example.

PTUA (Abidjan Urban Transport Project):

After the preparation and authorization of SDUGA, the Ivorian government requested technical and financial support from donors for the implementation of its first phase in the master plan over the period 2015- 2030. It is in this context that the AfDB, JICA, and the GEF expressed their support to the Côte d'Ivoire in financing and implementation in the framework of PTUA.

The Project has been subdivided into several components:

1) The implementation of an intelligent transport system and the training of 50 young people in traffic management and traffic light maintenance (tenders in progress)
2) Supply and installation of 10 fixed radars, an operational center, and equipment for two (2) control and surveillance units (tender in progress)
3) The development of a road accident GIS (tender in progress)
4) Rehabilitation and development of 89 intersections to be equipped with intelligent traffic lights and Integrated Operational Command Centre. (tender in progress)
5) Elaboration of a Circulation Plan for Greater Abidjan (study in progress)
6) Preliminary and final design of the BRT line on the main road of Yopougon (study in progress)

QUIPUX:

A concession agreement for the design, financing, implementation, operation, and maintenance of an Integrated Management System for all road transport activities in Côte d'Ivoire, an Intelligent Transport System and a vehicle impoundment facility, was concluded on 4 November 2020 between the State of Côte d'Ivoire and the company QUIPUX AFRIQUE S.A

The objective of the project is to provide the Land Transport Administration with a decision-making tool, based on the latest generation of ICTs, consisting of the implementation of an integrated management system for all land transport services with a single, reliable database. This integrated system will ensure a computerized interconnection between all the structures of the Ministry of Transport in charge of the production of road transport tickets and the collection of data related to the land transport sector as well as the public, semi-public, and private bodies involved in the management procedures of land transport services.

Close monitoring of the progress of the public transportation plan:

As mentioned above, existing public transportation projects are closely related to SDUGA 2040, so it is important to continue to monitor the trends of those projects in the process of SDUGA 2040 formulation.

3.2.2 Directions for updating SDUGA

The directions for updating SDUGA are summarized as follows:

(1) Urban transportation in general

Comparing the results of the traffic survey conducted in the Project with the results of the SDUGA in 2013, a significant increase in traffic volume, mainly private cars, was observed, while stagnation in public transportation use was evident. In addition, the existence of urban transportation projects implementation and planning, which were not included in the SDUGA, was confirmed. Considering these circumstances, the basic policies for updating the SDUGA are summarized below.

- Updating transport master plan based on the latest traffic conditions
- Study of measures to promote conversion to public transportation based on MRT and BRT plans under implementation
- Propose measures to realize TOD (e.g., achieve high-density land use around transportation nodes, introduce DX technology to improve urban transportation mobility, etc.)
- Review and updating of the priority projects in accordance with the actual progress
- Practical selection of the priority projects shall be considered based on the review of the progress of the transport projects proposed by SDUGA. All activities at each stage for transport infrastructure projects so far, i.e., master planning and feasibility study, budget allocation including coordination with other donors, detailed design and public tender announcement and bidding, and project implementation should be evaluated in accordance with the actual process and progress situation so that a priority project list (project package itself and its contents) can be revised appropriately.
- Propose smart solutions using IT and big data

(2) Public transportation/ traffic control and management

The directions for updating SDUGA for public transportation and traffic control and management are summarized as follows:

- Accelerate implementation of traffic management projects in collaboration with and with appropriate demarcation with other donors
- Measures for effective use of all public transportation
- While MRT and BRT are being planned and studied, the perspective of measures and policies to enhance coordination among different transportation modes for the purpose of "improving convenience and accessibility of public transportation for users" was not sufficiently considered in SDUGA. It is important to identify and promote projects that contribute to this aspect in light of the latest progress of MRT and BRT projects.
- Expansion plan for the introduction of a new transportation system

New developments after SDUGA include those related to SOTRA improvement plans, but all are short- to medium-term projects in nature. The projects needed after 2030 are still likely to be the North-South Rail and BRT Phase 2 and the projects to follow them. As for the BRT routes, several different routes have been proposed as candidates in SDUGA and after SDUGA. It would be useful to analyze these alternative BRT routes and propose possible ones as the SDUGA 2040 proposal. In addition, since no study has yet been conducted on the North-South Railway Phase 2 (Airport to Grand Bassam), it is assumed that the route selection will be made in a manner consistent with the urban development plan

to be prepared as SDUGA 2040.

3.3 Urban Environmental Infrastructure

The major issues of urban environmental infrastructure broadly include the following.

- Ensuring consistency between the existing sector master plans for water supply, sewerage and solid waste management and the spatial and socio-economic frameworks proposed by SDUGA 2040 in terms of the target year, target area and basic planning factors (unit water demand, unit generation of wastewater and solid waste etc.)
- Ensuring sufficient water supply, sewerage and solid water management services to the rapidly growing population in the expanding urbanized areas
- Ensuring improved services of water supply, sewerage and solid water management to the population living in informal settlements: physically by developing the facilities at the relocation sites for the population to be relocated and expanding the facilities for the population living in the existing informal areas to be improved, and institutionally by offering affordable service prices for water supply, sanitation and solid waste management.
- Minimizing adverse environmental effects and flood risks on surface water, groundwater and lagoon water by expanding sewerage network, on-site sanitation facilities and solid waste collection service.
- A sector study on the storm drainage sector is needed to supplement SDUGA 2040, whose terms of reference does not include the storm drainage sector.

3.4 Urban Governance to Support the Development of the Legal and Regulatory Framework for Implementing SDUGA

3.4.1 Historical review

Historically, Côte d'Ivoire's legal arsenal in terms of urban planning and land-use regulations was developed around Law n°62-253 of July 31, 1962 on urban development plans.

This introduced two levels of urban planning document with regulatory scope as they set out the division of land into zones according to their allocation to various functions. The graphic documents were accompanied by a set of regulations setting out the rules and easements relating to land use. The only difference between these two documents was their scale of application and the level of detail on the graphics:

- the Plan d'Urbanisme Directeur (PUD): drawn up on the scale of a conurbation or town[1]. This tool was used for many years to draw up urban planning documents for Abidjan and the country's secondary towns (Bouaké, San Pedro, Yamoussoukro, etc.).
- the Plan d'Urbanisme de Détail (PD or PUd): drawn up on a smaller scale. This tool was notably used as a planning tool for each of Abidjan's communes. One of the last PUds drawn up before the recent reforms was the PUd for Port-Bouët, drawn up by BNEDT.

As these documents directly concern land use and have a regulatory scope, urban planning professionals and the Ivorian government wanted to develop longer-term and strategic urban foresight tools after the post-electoral crisis of 2010-2011. Hence, after 2013 a strategic planning document for Abidjan and its immediate hinterland was developed. This document is considered as the Schéma Directeur d'Urbanisme (SDU) which are not stipulated in the 1962 Law.

[1] content is similar to that of a Plan d'Occupation des Sols (POS) or Plan Local d'Urbanisme (PLU) in French-speaking countries, or an "Urban Regulatory Plan" in English-speaking countries

The Schéma Directeur d'Urbanisme du Grand-Abidjan à horizon 2030 (SDUGA), drawn up from 2013 to 2015 with the support of JICA, was therefore prepared independently from this legislative framework. To remedy this legal shortcoming, on August 14, 2020, Côte d'Ivoire promulgated Law n°2020-624 instituting a new Code de l'Urbanisme et du Domaine Foncier Urbain.

Willingness to add a regulatory scope to the SDU

The SDUGA approved in 2018 is a strategic planning document and contains general guidelines for the strategic development of the Greater Abidjan territory, but it does not have information of regulatory scope.

As usually defined in Europe and other African countries, the SDU is a major document providing a framework for urban planning and developing a strategic vision of development on a territory-wide scale with considerations of the main development guidelines and the major balances to be preserved[2]. It is normally intended to federate all public urban development policies and can be enforced against administrations (who must respect its guidelines within the framework of the various sectoral planning approaches) and not against third parties (the population).

The regulatory approach should rather concern the level of Detailed Urban Plans (PUd) which specifies land use conditions and are enforceable against all third parties since they directly condition the issuance of various urban planning acts (subdivision / development permits, building permits, etc.) according to a Specific Urban Planning Regulation (RPU).

However, Article 12 of Law no. 2020-624 of August 14, 2020 in the Urban Planning and Urban Land Code stipulates that Urban Master Plans (SDU) must comprise three separate documents: a report (written document), graphic documents and general urban planning regulations (RGU). This requirement that a document of regulatory scope (RGU) must be backed up by a strategic planning document is contradictory to the strategic spirit of an SDU. But it has its origins in the "highly regulatory" practice of urban planning in Côte d'Ivoire and Abidjan, which was inherited from the former PDU.

Backing an RGU with an SDU is a peculiarity to Côte d'Ivoire and legally enshrined in the 2020 Law and, which means no one can avoid. Determining this tool meets a structural need of Ivorian players in urban planning in Greater Abidjan and should encourage better operationalization of the SDUGA.

3.4.2 What content to give to the RGU?

In 2023, while the updating of the Schéma Directeur d'Urbanisme du Grand-Abidjan to 2040 (SDUGA 2040) is almost completed from a technical point of view (consolidation of assumptions and development orientations), one of the first challenges will be to accompany the operationalization of this document with the definition of a RGU that will be backed up by the SDUGA.

As few concrete examples exist around the world, the RGU is an innovative document. What would be the function and usefulness of such document although there are detailed urban development plans (PUds) ongoing for Abidjan's 10 urban units and special urban development regulations (RPU)? In other words, the following questions may be asked: for what purpose? according to what content? what level of precision and enforceability?

The challenge is to formulate two regulatory documents, the "RGU" and the "RPU", in a coherent and logical manner to avoid regulatory inconsistencies that make the SDUGA and the 10 PUd inapplicable due to a dispute in court. In this context, JICA proposed that MCLU supports the definition of a table of contents for the future RGU. A participatory workshop was held in October 2023 for the members of the Task Force to better understand the needs of Ivorian stakeholders and the vocation to the definition and roles of RGU.

As a link of content between "RGU" and "RPU", it is also important to remember that :

[2] Equivalent to Schéma de Cohérence Territorial (SCOT) in France, or "Masterplan" in English-speaking countries

- During the preparation of SDUGA (2013-2015), in the absence of any regulatory content, summary of urban planning regulations was prepared internally by MCLU with a limited number of communes (Marcory, Treichville, Koumassi, Yopougon, Abobo, Port Bouet, Cocody, Adjamé, Attécoubé) and implemented by ministerial decree. These regulations set out specific rules for the floor area ratio, height and setback of buildings from plot boundaries;
- There is no common normative framework for drawing up special urban planning regulations (RPU) for Abidjan's 10 PUd. According to MCLU, the RGU should provide a common basis for all these documents while JICA has undertaken to draw up a PUd formulation guide. It therefore seems necessary to clarify the role and scope of these two approaches (RGU / PUd formulation guideline), whose objectives remain quite similar.

3.4.3 Linkage between the SDUGA and Pud development

According to the MCLU's initial timetable, the 3-year JICA mission between 2021 and 2024 was to be carried out in conjunction with all the PUd development studies so that this mission could support (almost as a technical assistance) and ensure consistency between the specific approaches of these PUds and the general orientations of the SDUGA.

In order to better frame and make consistency for the formulation of the other PUd through the guide to be produced, it is necessary to optimize the prior formulation:

- the PUd of Urban Unit n°6 originally scheduled for 2020-2022 with funding from the PTUA project (ADB), which concerns a very central area of Abidjan (Marcory, Koumassi, Treichville) where certain issues on densification and urban renewal had been raised;
- the study to protect and enhance the Green Zone, carried out between 2022 and 2023 with funding from the PACOGA (BM) project, the main aim of which was to specify certain management procedures for the Zone d'Aménagement Différé (ZAD)[3].

However, this plan was not carried out due to significance delays in the implementation of the other nine PUds which were scheduled to be financed by other World Bank projects, namely the PACOGA project (UU3-4-5-7) and the PARU project (UU1-2-8-9-10). Validation of the ToRs for these studies and their release for consultation caused delays because coordination with tender is usually conducted by international calls.

Finally, almost all the consultants were recruited during 2023, and the link between the PUd and SDUGA teams has been established with the DGUF who is the main beneficiary of the development of all these urban planning documents and acts as "conductor". In particular, the DGUF assigned a focal point who is responsible for coordinating all the consultants and facilitating their mission such as access to data or meetings with stakeholders in urban development in Abidjan[4] .

The creation and running of technical meetings of the CCC/SDUGA and "steering" meetings of the CoFaMiSu between 2021 and 2023 have also been designed to bring together Ivorian urban development players around the SDUGA update project and its link with the progress of the PUd. During these regular exchanges, certain attentions were paid or anticipated, and better communication (transfer of information) was achieved between all these players.

Finally, it should be noted that the JICA project team members based in Abidjan:

- transfers information to DGUF and facilitate access to data (particularly GIS) for PUd consultants;

[3] Zones not open to urbanization during the SDUGA application period as they are not useful for accommodating population growth, but which could be opened up in the future as part of a subsequent SDUGA revision
[4] Other ministries, agencies, communes, District, AMUGA, etc.

- were occasionally asked by other partners and financiers (World Bank, AFD) to take part in strategic discussions on the future of Abidjan.

As part of the JICA project, the PUd formulation guideline is still under development. This document will make the future PUds documents more coherent and be available to MCLU in 2024, coinciding with the production of the PUd's graphic and regulatory documents (zoning plan and regulations). However, there are a number of points to watch out in coming months:

- consistency and uniformity of the graphic charter (color scheme of zoning plan; typology of other graphic rules: delimitation of easements, representation of specific elements, etc.);
- consistency and uniformity of zone headings and acronyms between graphic and written documents;
- consistency and uniformity in the nomenclature (table of contents) of the general and zone-specific provisions of the planning regulations, and application of a consistent level of detail.

3.5 Urban Finance

Although the Cote d'Ivoire central government has been successfully financing the infrastructure projects and they are deemed as the leading country for PPPs in Africa, there are still some potential issues on public finance and PPPs.

3.5.1 Major issues on public infrastructure finance

(1) Potential increase in national debt

Public finance funding for infrastructure mainly comes from central government through loans from donor countries, international financial organizations and private direct investment. Therefore, as loans increase, the international debt will increase. Currently, the total debt is well managed by Ministry of Finance, but as the country constantly postpones the reimbursement of its outstanding international debt, current and future loans from donors need to be carefully managed.

(2) Delay of budget distribution

There are some delays in budget distribution to some sectors, this was reported in the solid waste sector. This delay sometimes leads to negative impacts on infrastructure finance, delivery and even operation.

3.5.2 Major issues with PPPs

(1) Competitiveness in PPP

In Cote d'Ivoire, there has been no open bidding conducted for PPP projects, and all the PPP contracts were made based on direct negotiation between the government and the private entities based on unsolicited proposals. Therefore, it is difficult to confirm that there is competitive environment for PPP projects, and various opportunities for new private companies to participate in PPPs. This potentially leads to high cost of the government payment and overpriced tariff as a result of lack of competition.

(2) Lack of F/S budget

In Cote d'Ivoire, the line ministry needs to conduct feasibility studies (F/S) with their own budget for solicited PPP projects, whereas for unsolicited PPP projects the private sector needs to conduct F/S with their own spending. However, not all ministries have sufficient budget funds to conduct F/S. This primarily explains why open bidding is not yet properly implemented.

(3) Government financial support

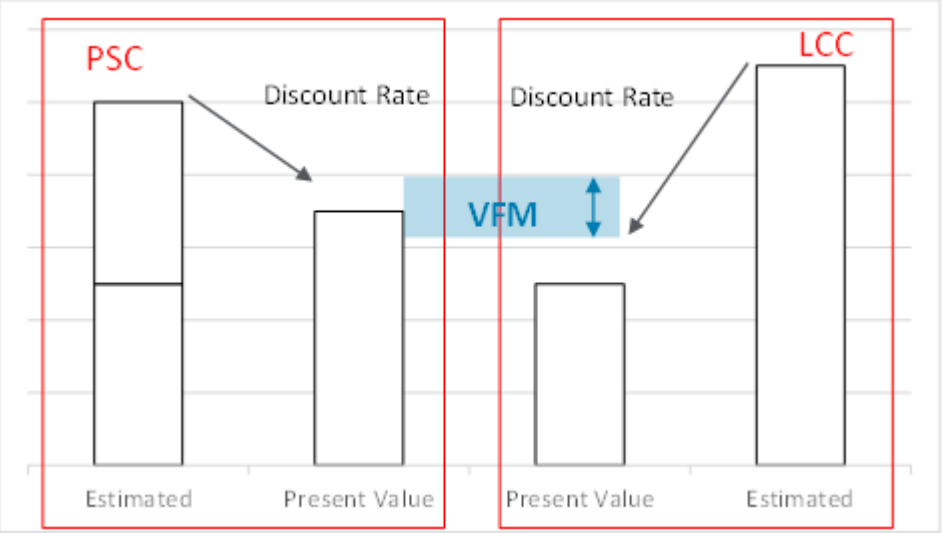
Although availability payment is employed for government-paid PPP schemes, there is no defined government support to user-paid PPP schemes, such as Viability Gap Funding (VGF). The case where government support of this nature was and is still being mobilized is the Henri Konan Bedie Bridge (HKB) PPP project in which the government covers the payment gap of 250 FCFA per car while the users pay 500 FCFA at the toll gate. However, this case happened because the actual traffic demand was lower than the forecasted demand. As a remedy to this, the government unexpectedly needed to pay the gap between expected revenue and actual one.

(4) Transparency and accountability

Given that the government relies on the direct negotiation with the private company that submits an unsolicited proposal, Value for Money (VfM) that is based on Public Sector Comparator and Life Cycle Cost as shown on Figure 3.5.1 is not always calculated. This leads to the lack of justification in project expenditure. Furthermore, the lack of transparency on PPP project expenditures increases the risk of overpriced projects and governments engaging in unnecessary debt.

$$VFM(\%) = \frac{PSC - LCC}{PSC} \times 100$$

*PSC: Public Sector Comparator, LCC: Life Cycle Cost



Source: JICA Project Team

Figure 3.5.1 Concept for VfM

(5) Securing budget for future government payment

The government needs to secure a budget for the entire project period to make payments to the private contractors and to fit the project lifecycle; this is particularly relevant for government-paid PPP schemes. However, budget is generally prepared on an annual basis and this leads to disparities in payments and increased risk identified for the private sector. Therefore, there needs to be a system enabling budget funds for the whole project period so that the private sector can participate in PPP projects with controlled and reduced risks.

(6) Consistency with SDUGA

In Cote d'Ivoire, unsolicited proposals and direct negotiations from the private sector are common as mentioned above. In this context, there is a risk that the private sector makes proposals on the projects where the financial return is maximized without paying attention to upstream urban plan such as SDUGA. In this case, there is a concern that the inconsistent projects might be implemented, and this leads to the failure of achieving overall goal of SDUGA. Therefore, there needs to be mechanisms that check the consistency between SDUGA and project proposals from the private sector even for unsolicited cases.

3.5.3 Directions for SDUGA update

As mentioned above, Cote d'Ivoire government has promoted private-financing for infrastructure development and this has largely contributed to the socio-economic development of the Greater Abidjan. In order to meet the increasing needs for infrastructure capacity and quality improvement, the government should follow this trend leveraging on private financing. However, there are still issues on PPPs such as implementation of open bidding, transparency and accountability. Therefore, in updated SDUGA, PPP schemes should be employed as much as possible with further potential actions.

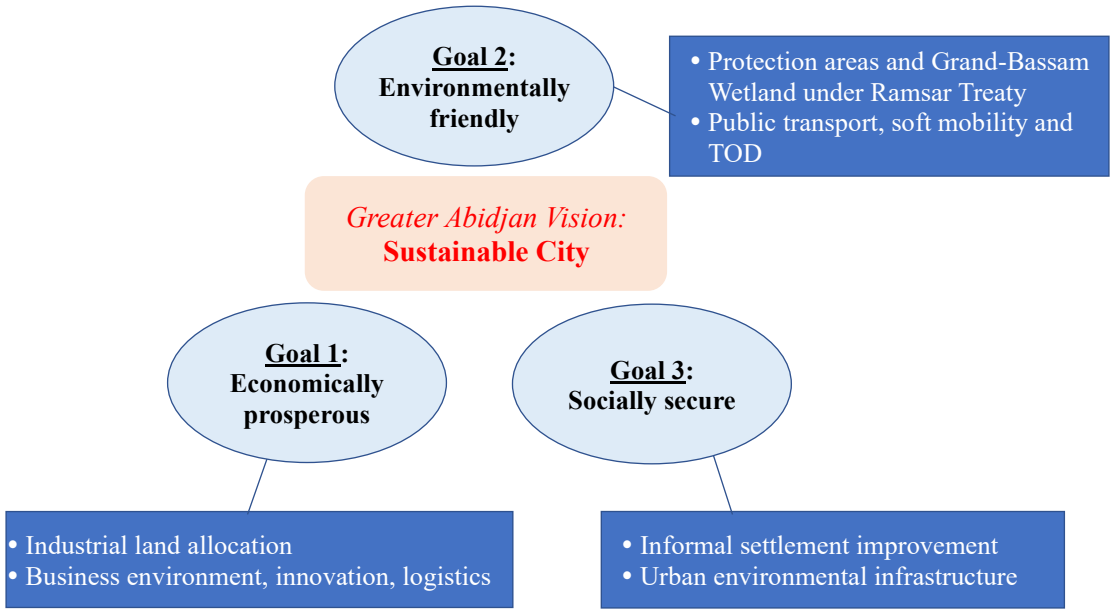
Chapter 4 Urban Development Master Plan for Greater Abidjan for 2040 (SDUGA 2040)

4.1 Vision and Socio-economic Framework

4.1.1 SDUGA 2040 Vision

(1) SDUGA Vision

Greater Abidjan will be a sustainable city by 2040. The three goals shown in Figure 4.1.1 will support the sustainable city vision: "economically prosperous", "environmentally friendly" and "socially secure".



Source: JICA Project Team

Figure 4.1.1 SDUGA 2040 Vision for Greater Abidjan

The three goals are supported by the important factors shown in the boxes attached to each goal. While there are numerous conditions required to be fulfilled to realize a sustainable city, the analysis here focused only on those factors that can be covered with the available technical resources of the JICA expert team. They are explained below in relation to SDGs and the paths to the realization of the vision shown.

(2) Goal 1: Economically prosperous

1) Related SDGs

The following sustainable development goals (SDGs) are related to economic prosperity.

- SDG-1: End poverty in its all forms everywhere
- SDG-8: Promote sustainable and inclusive economic growth, full and productive employment and decent work for all
- SDG-9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Two aspects have been looked into in realizing an economically prosperous Greater Abidjan: "business

environment, innovation and logistics" representing the institutional and organizational aspects and "industrial land allocation" representing the physical environment aspect.

2) Tertiary sector development: business environment, innovation and logistics

The tertiary sector comprising commercial and business activities is the leading economic sector of Greater Abidjan. Its strengthening is one of the strategic orientations pursued in preparing SDUGA 2040 land use plan. Transportation, logistics and tourism should be promoted in an environmentally friendly manner.

Côte d'Ivoire's position in the world is illustrated by some economic indicators representing the business environment, innovation, and logistics performance. Table 4.1.1 shows the current situation of Côte d'Ivoire in these aspects. As Greater Abidjan is the leading and most important area of economic activity in Côte d'Ivoire, it is reasonable to assume that these assessments accurately reflect the situation in Greater Abidjan.

Table 4.1.1 Cote d'Ivoire's Position in the World in Selected Economic Aspects

Item	Source	Cote d'Ivoire's Rank	Out of xx countries	Strengths*	Weaknesses*
Business Environment	Doing Business 2020 *(1)*	110	190	Starting business (29)	Dealing with construction permit (152)
				Getting credit (48)	Getting electricity (141)
				Enforcing contracts (94)	Registering property (112)
				Resolving insolvency (85)	Protecting minority investors (120)
					Paying taxes (114)
					Trading across borders (163)
Innovation Environment	Global Innovation Index 2020 *(2)*	112	131	Institutions (79)	Creative outputs (116)
				Market sophistication (92)	Human capital and research (117)
				Knowledge and technology output (98)	Infrastructure (121)
				Business sophistication (101)	
Logistics Performance	The Logistics Performance Index and its Indicators 2018 *(3)*	50	160	International shipments (45)	Customs (51)
				Logistic quality and competence (37)	Infrastructure (56)
				Tracking and tracing (49)	Timeliness (71)

* The numbers in parenthesis are the ranks for each factor. **Factors under "strengths" are those with scores higher than "Cote d'Ivoire's rank" and "weakness" are those lower.

Sources:

(1) Economy Profile Cote d'Ivoire Doing Business 2020 by the World Bank Group, https://www.doingbusiness.org/content/dam/doingBusiness/country/c/cote-divoire/CIV.pdf

(2) Global Innovation Index 2020 Cote d'Ivoire by The World Intellectual Property Organization, https://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2020/ci.pdf

(3) The Logistics Performance Index and its Indicators 2018 by the World Bank, https://lpi.worldbank.org

In terms of the overall business environment, Côte d'Ivoire ranks in the middle, 110th out of 190 countries. Improvements in the weak areas would help improve the overall score, such as construction permits, getting electricity, registering property, protecting minority investors and trading across borders. Among these factors, construction permits and property registration are urban planning issues, particularly in terms of legal/regulatory and organizational aspects.

In terms of innovation, Côte d'Ivoire ranks at the lower end of the scale, 112 out of 131 countries. The categories can be divided into "input" and "output". The input factors include 'institutions', 'human capital and research', 'infrastructure', 'market sophistication' and 'business sophistication', while the

output factors are 'knowledge and technology output' and 'creative output'. Improvements in the input factors under "Weaknesses" would contribute to improving the overall ranking.

Côte d'Ivoire belongs to the higher group with an overall score of 50 out of 160 countries in logistics performance. The issues that need improvement in logistics are "customs", "infrastructure" and "timeliness".

The targets shown in Table 4.1.2 are proposed for 2040 for the three rankings mentioned above.

Table 4.1.2 Proposed 2040 Targets for Cote d'Ivoire

Subject	Present Rank	2040 target
Business environment	110	50
Innovation environment	112	80
Logistics performance	50	20

Source: JICA Project Team

The business environment target is set at 50th, taking into account Kenya's ranking of 56th in 2020. Kenya is the leading country in East Africa. Côte d'Ivoire could take a similar position, representing West Africa by 2040. Similarly, the innovation environment target is set at 80th, taking into account Kenya's position at 86th in 2020. The logistics performance target for 2040 is set at 20th, taking into account South Africa's ranking of 24th in 2023. Côte d'Ivoire was unfortunately not included in the 2023 assessment, so its latest rank is not known. South Africa has improved its rank over 5 years from 33rd in 2018 to 24th in 2023. Côte d'Ivoire will have the highest logistics performance in Africa by 2040.

3) Industrial land allocation

A total area of 2,224 ha is proposed to be developed by 2040 as the industrial area in addition to the existing 2,639 ha. The allocation of industrial lands is planned according to the following strategic orientation and shown in Figure 4.2.9: alignment with the national industrialization policies, integration with the existing industrial hubs and better integration of the port function into the city.

(3) Goal 2: Environmentally friendly

1) Related SDGs

The following SDGs are related to environmental friendliness.

- SDG-14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development
- SDG-15: Protect, restore and promote sustainable use of terrestrial ecosystems, manage forests, combat desertification and halt and reverse land degradation and hold biodiversity loss
- SDG-11:
  - ✓ (Sub-goal 11.2): Access to safe, affordable and sustainable transport system for all, improving road safety, notably by expanding public transport
  - ✓ (Sub-goal 11.5) Reduce deaths by disasters, including water-related disasters

The following two aspects have been looked into: "protection areas and Ramsar Treaty area" and "Public transport and soft mobility"

2) Protection areas

SDUGA 2040 proposes the natural zone to be protected as shown in Figure 4.2.9. The following strategic directions are pursued as the basis for this proposal.

- Prohibit, control and support urbanization in risk areas and sensitive ecological zones
- Delimit, preserve and enhance the Green Belt of Greater Abidjan and its sensitive ecological components

- Promote the establishment of Green and Blue networks within the urban suburban areas
- Reduce all forms of pollution and related socio-environmental vulnerabilities

3) Grand-Bassam Wetland under Ramsar Treaty

The protection of the Grand-Bassam wetland is symbolic of the Cote d'Ivoire government's policy of protecting environmentally sensitive areas. The Grand-Bassam wetland was designated as a Ramsar Treaty protection area in 2005. It is located about 30 km east of central Abidjan and stretches over an area of about 40,000 hectares. The Grand-Bassam wetland is a complex system made up of freshwater, lagoon water and seawater. It is home to a rich and diverse flora and fauna of international importance.

Since 2005, domestic arrangements to formalize the Grand-Bassam wetland as a protection area have been inadequate, while due to its proximity to Abidjan the wetland is subject to a number of pressures such as water pollution, land grabbing and the exploitation of natural resources.

The Directorate of Fauna and Hunting Resources (DFRC) of the Ministry of Water and Forestry (MINEF) is mandated to manage the six wetlands in Cote d'Ivoire including Grand-Bassam. It explained its difficulties included a lack of budget, lack of transportation means to the sites, loss of habitat to urbanization, lack of a site management plan and a lack of national wetland policy.

Among the 17 recommendations proposed by the Ramsar Advisory Mission (RAM) in 2018, the following recommendation No. 10 is highly relevant to SDUGA 2040 and proposed to be integrated into it.

Recommendation No. 10 by RAM

Consider opportunities to integrate the planning process underway as part of the Greater Abidjan Master Plan, in order to highlight the specific features of the Ramsar site and promote their integration within an overall vision. With this in mind, the Grand Bassam site could be seen as an ideal testing ground for sustainable development solutions, and serve as a showcase for Cote d'Ivoire's international environmental commitments.

4) Public transport, soft mobility and TOD

Abidjan in 2040 will be a city where people' mobility is ensured by public transportation more than by individual transportation modes: the ratio of public transportation in person trips will increase from 46.5% in 2021 to 61.0% in 2040. Such new public transportation systems as MRT and BRT will have been operating since 2030 resulting in the shares of MRT and BRT accounting for 12.9% and 51.9% respectively of all the public transportation traffic in 2040. To realize this situation, it will be important to actively introduce various measures related to ''MaaS (Mobility as a Services)'' such as strengthening feeder networks to support MRT and BRT and offering an integrated pricing system to ensure the seamless use of different public transportation systems.

Soft mobility needs to be promoted by developing a physical environment suitable for no-motorized transportation means such as walking, cycling, skateboarding, running and roller skating. Electric cars, e-scooters and e-bikes are environmentally friendly transportation modes that are also required to be accelerated.

TOD is an approach essential for achieving Goal 2 of the SDUGA 2040 vision by integrating urban planning and transportation planning. High-density urban development around the new public transportation modes like MRT stations coupled with measures to restrict the use of private vehicles will contribute to the higher use of a new public transportation system.

(4) Goal 4: Socially secure

1) Related SDGs

The following SDGs are related to social security.

- SDG-6: water and sanitation

- SDG-11
  - ✓ (sub-goal 11.1) Access for all to adequate, safe and affordable housing and basic services and upgrade slums
  - ✓ (sub-goal 11.6) Reduce the adverse impact of air quality and municipal waste management

2) Precarious neighorhoods improvement

Concerning the SDGs sub-goal 11.1, the issue of precarious neighborhoods should be looked into from two perspectives.

- Perspective 1: How to prevent new precarious neighborhoods from popping up?
- Perspective 2: How to improve the existing precarious neighborhoods?

Perspective 1:How to prevent new precarious neighborhoods from popping up?

Both regulatory measures and supply-side measures would be needed to prevent new precarious neighborhoods from popping up. On the regulatory side, the administrative capacity should be strengthened to implement the zoning plans according to their requirements, not allowing people to settle in public lands and private vacant lands. The supply-side approach aims to provide an adequate number of housing for the population increasing within Abidjan and migrants from outside. It includes enhanced social housing programs, strengthening of a market mechanism for housing tailored to low-income people and strengthening and improvements of the existing precarious neighborhoods to accommodate more people under improved living environment.

Perspective 2:How to improve the existing precarious neighborhoods?

Improvements in physical infrastructure and social infrastructure are needed to improve the existing precarious neighborhoods. Physical infrastructure should be improved with a clear understanding of two types of precarious neighborhoods: those that can be restructured at the present locations and those whose locations are not suitable for continued habitation, for example, due to vulnerability to natural disaster risk, and need to be relocated. Various infrastructure facilities should be improved for the former neihborhoods at the present locations such as water, electricity, sanitation, roads, health and educational facilities. Same kinds of physical infrastructure facilities should be developed for the neighborhoods of the latter category at the new locations.

Soft infrastructure is equally important in maintaining the sustainability of precarious neighborhood improvement initiatives. It is important to create an environment in which people feel comfortable and safe in living in a neighborhood. Physical infrastructure alone is not able to create such an environment. Land title security is a very fundamental factor in the legal aspect for people to feel secure. The absence of conflict and crimes is also essential. A key factor that would bring about such a safe and secure neighborhod would be the local leaders and community-based organizations. It is rather on the people side than the government side, which can play an important role in enhancing the social infrastructure. What government can do is limited to such services as police service and facilitative function. The grass-root level efforts by the inhabitants themselves under good local leadership and cooperation guided by community-based organizations would bring about more stable, friendly and comfortable living environment.

The ongoing initiative such as "Étude de profilage des Quartiers Précaires du District Autonome d'Abidjan (Profiling study of precarious neighborhoods in the Autonomous District of Abidjan) recently initiated under PARU should be promoted to implementation according to these principles.

3) Urban environmental infrastructure

The people's lives will be improved by developing water supply, sewerage and solid waste management services as shown in Section 4.4.

4.1.2 Socio-economic Framework for 2040

(1) Socio-economic Framework for SDUGA 2040

Four scenarios of a socio-economic framework for SDUGA 2040 were prepared as shown in Table 4.1.3 below.

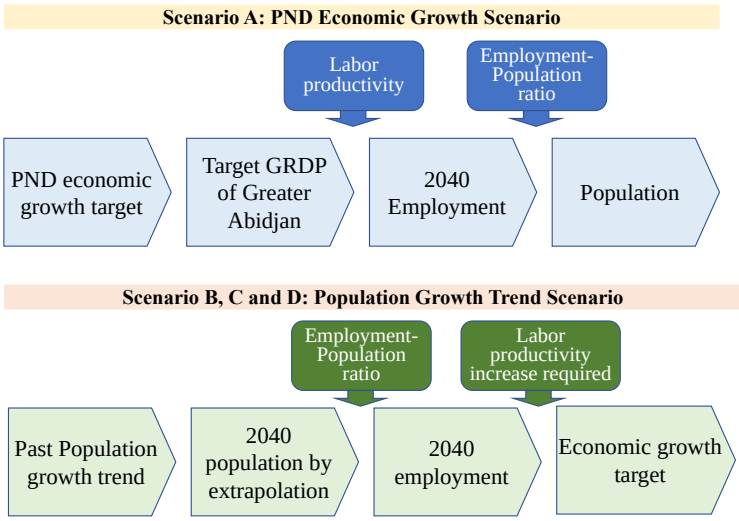
Table 4.1.3 Socio-Economic Framework for SDUGA 2040

Item	Unit	Scenario			
		Scenario A (PND Economic Growth Scenario)	Population Growth Trend Scenario		Scenario D (INS Projection)
			Scenatrio B (annual growth rate)	Scenatrio C (annual growth amount)	
Economy					
a. GRDP in 2021	10^9 CFA	11,321			
b. Labor productivity in 2021	10^3 CFA/worker	5,205			
c. Labor productivity increase	%/year	1.0	1.6	3.0	3.4
d. Labor productivityin 2040	10^3 CFA/worker	6,287	7,037	9,127	9,746
e. Economic Grwoth rate	%/year	6.9			
f. GRDP in 2040	10^9 CFA	40,222			
Employment					
g. Employment in 2021	thousand	2,175			
h. Employment in 2040	thousand	6,398	5,717	4,462	4,127
i. Employment-Population ratio in 2040	ratio	0.38			
Population					
j. Population in 2021	thousand	6,840			
k. Population in 2040	thousand	16,837	15,046	11,742	10,861
l. Annual growth in number	thousand	-	-	258	-
m. Annual growth rate					
2021-2030	%/year	4.9	4.5	2.9	2.5
2030-2040	%/year	4.9	4.0	2.9	2.5

Source: JICA Project Team

Four scenarios were established taking into consideration the economic, employment and population factors and the existing population projection by INS. Scenario A is the PND Economic Growth Scenario, under which the economic growth target stipulated in the National Development Plan (PND) 2020-2025 was referred to and employment and population growth required to support such a target economic growth rate were estimated. Scenarios B and C are the Population Growth Trend Scenario, under which either the past population growth rate was applied to extrapolate the population growth in the past to the year 2040 (Scenario B) or the past trend in the annual amount of population increase was applied annually until 2040 (Scenario C). In Scenario B and C, the levels of the rise in labor productivity required to achieve the PND economic growth target were estimated. Scenario D is the projection made by INS.

The conceptual flow of the four scenarios A, B, C and D is shown in Figure 4.1.2.



Source: JICA Project Team

Figure 4.1.2 Four Scenarios for Socio-economic Framework

(2) Methodology and Assumptions

The factors shown in Table 4.1.4 are set in the ways shown below.

Table 4.1.4 Methodology and Assumptions

a. GRDP in 2021	As shown in Table 2.4.1
b. Labor productivity in 2021	As shown in Table 2.4.1
c. Labor productivity increase	(Scenario A) set at 1.0% per year in consideration of the labor productivity increases in Cote d'Ivoire between 2008 and 2019 at 3.0% per year for the primary sector (mainly agriculture), 3.1 % per year for the secondary sector (mainly industry) and 1.1 % per year for the tertiary sector (commerce, business etc.). 1% per year is applied in consideration of the dominance of the tertiary sector economic activities in Greater Abidjan.
	(Scenario B) 1.6% is the rate that would make the PND economic growth target achieved with the estimated population and employment.
	(Scenario C) 3.4% per year increase in labor productivity is required to achieve the PND economic growth target.
	(Scenario D) 3.0% per year increase in labor productivity is required to achieve the PND economic growth target.
d. Labor productivity in 2040	Calculated based on b. and c.
e. Economic growth rate	(Scenario A) There were two target economic growth rates in PND 2020-2025: one at 6.9% per year and the other at 7.65% per year. The lower target at 6.9% per year was applied.
	(Scenario B, C, D) The labor productivity growth rates were adjusted to achieve 6.9% per year economic growth.
f. GRDP in 2040	Calculated based on a. and e.
g. Employment in 2021	As shown in (2) Greater Abidjan of 2.4.2 Employment
h. Employment in 2040	(Scenario A) f. divided by d.
	(Scenario B, C, D) Estimated by applying the total population and the employment-population ratio.
i. Employment-Population ratio	The employment-population ratio at 0.38 was applied for 2040. The proportion of employment to the population is assumed to

	increase by 0.33% per year based on the following data. - The employment-population ratio in 2021 was 0.318. - Proportion of working age (15-64 years of age) population: 55.55% in 2015 (1) and assumed same in 2021. - That for 2050 under Emergence Scenario 1: 65.24% *(1), (2)* - This increase between 2021 and 2050 is equivalent to an increase of 0.33% per year → (65.24%-55.55%)/29 years - It is assumed that the proportion of employment to the total population will grow at the same rate as that of the working-age population. *Source:* *(1)Office National de la Population homepage at http://www.onp.gouv.ci/index2.php?page=act&num2=8&num=37* *(2)Emergence Scenario 1 is judged to be most appropriate in consideration of its assumed population growth rate at 2.0% per year which coincides with the World Bank projection assumption.*
j. Population in 2021	As shown in Table 2.4.5
k. Population in 2040	(Scenario A) h. divided by i.
	(Scenario B) The 2021 population was extrapolated by applying 4.5% per year, which is the past trend as shown in Table 2.4.6, for the 2021-2030 period and 4.0% per year between 2030 and 2040 assuming the growth rate will decline as regional development outside Greater Abidjan proceeds resulting in lower rate of migration and limited availability of urban lands in Greater Abidjan.
	(Scenario C) The population in 2040 was derived by adding 258 thousand population every year between 2021 and 2040.
	(Scenario D) The population in 2040 was projected by INS by commune applying the common annual growth rates of around 2.5% per year.
l. Annual growth in number	(Scenario C only) The annual increase of the population had been 258 thousand per year between 2014 (5,037 thousand) and 2021 (6,840 thousand).
m. Annual growth rate	(Scenario A) Calculated based on j. and k.
	(Scenario B) As explained in k. above
	(Scenario C) Calculated based on j. and k.
	(Scenario D) Calculated based on j. and k.

Source: JICA Project Team

(3) Recommended Scenario and Supplementary Indicators

Scenario C "Population Growth Trend Scenario-Annual Growth Amount" is recommended for the following reasons:

- Scenario A is based on the future economic growth target. Although the recent economic performance of Cote d'Ivoire shows similar economic growth trends, it is not easy to assume the same level of economic growth will continue until 2040.
- Scenario B may happen, but the actual population growth may decelerate due to increasingly limited land available and accelerated regional development outside Abidjan leading to less migration.
- Scenario D may be a little too low compared with the average population growth rate between 1998 and 2021, which was 2.9% per year. In addition, the labor productivity required to increase at 3.4% per year to achieve the PND's economic growth target may be too ambitious considering the past trend in the labor productivity rise of 3.0% per year for the primary sector (agriculture, fishery etc.), 3.1% per year for the secondary sector (industry etc.) and 1.1% per year for the tertiary sector (service, business etc.) between 2008 and 2019.

- Scenario C is the most conservative and is likely to be close to reality. Its average growth rate of 2.9 % per year is consistent with the average growth rate between 1998 and 2021. Scenario C provides a general magnitude of population growth for land use, transportation and urban environmental infrastructure planning and is subject to adjustment through sector-wise and commune-based fine-tuning.

The following supplementary indicators were estimated within the framework of Scenario C for urban planning purposes.

Population in 2030

The Greater Abidjan population in 2030 is estimated to be 9,162 thousand.

Sector-wise employment for 2030 and 2040

The employment in 2030 and 2040 was estimated by category as shown in Table 4.1.5.

Table 4.1.5 Sector-wise Employment in 2030 and 2040

Year	Employment (10^3)	Sector Distribution (10^3)			
		Agriculture	Industry	Commerce	Service
2021	2,175	13	433	829	900
2030	3,179	13	634	1,213	1,319
2040	4,462	13	891	1,705	1,853

The sector distribution of employment is estimated based on the following assumptions.
(1) The number of employment in the agriculture sector remains constant through 2040.
(2) The employment in the other three sectors are estimated applying the same proportions to the total employment in 2021.

Distribution of employment among sectors in 2019 was 0.6% for agriculture, 19.9% for industry, 38.1% for commerce and 41.4% for service according to Enquete Nationale sur L'employ en Cote d'Ivoire 2019.

4.1.3 SDUGA 2040 Realization Strategy

Overall strategy

- Strengthen the link with the hinterland as the Western African gateway with a wide regional perspective by creating an urban structure to ensure the efficient function of the Abidjan Port and industrial areas
- Consider the planning of Greater Abidjan as a regional development planning with a wide perspective on multiple sectors such as economic sectors (industry, agriculture, service), various infrastructures (transportation, water supply, sewerage, solid waste, drainage) and social services (education, health) rather than planning just for a desirable distribution of land resources
- Pay attention to the implementation aspect of SDUGA 2040 by showing not only a desirable picture of the future, but also how to realize it by considering the recommendations proposed under Output-2

- Pay attention to the socially vulnerable populations such as those living in precarious neighborhoods and take action to improve their living environment with the SDGs concept of "no one left behind".
- Monitor the progress of SDUGA 2040 periodically by establishing a set of monitoring criteria

Urban development strategy

- Plan land uses for the future in consideration of the suitability of lands from the perspectives of natural disaster risk, natural resources protection, access etc.
- Create a new urban management governance structure that will be able to ensure coherent and consistent urban development and management beyond the boundary of the Autonomous District of Abidjan
- Improve the regulatory framework in consideration of decentralization and the enhanced roles of communes and the capacity development of communes and other stakeholders
- Take advantage of ICT to widely disseminate information on urban plans such as SDUGA 2040 to the public through various ICT tools such that the effectiveness of urban plans will be enhanced with better understanding of the people on urban plans

Urban transportation development strategy

- Promote the usage of public transportation based on the ongoing MRT and BRT initiatives and by developing various modern services to passengers to make transportation services easy to use and comfortable
- Promote soft mobility dependent on non-motorized power such as walking and bicycling and create a transportation system environment favorable for such soft mobility modes
- Expand the capacity of transportation facilities such as roads, bridges and tunnels to the extent required to meet traffic demands including the above new modes

Urban environmental infrastructure development strategy

- Coordinate SDUGA 2040 and the existing urban environmental infrastructure master plans and adjust their implementations accordingly
- Pay attention not only to the supply side but also to demand-side management such as a prohibitive tariff system for a large amount of water use and the participation of residents in solid waste management

Investment promotion strategy

- Ensure adequate coordination among different sectors to minimize investment requirements for infrastructure development
- Strengthen the Public-Private Partnership (PPP) scheme, which is already advanced in Cote d'Ivoire compared with other African countries, to expand the financial base for infrastructure development

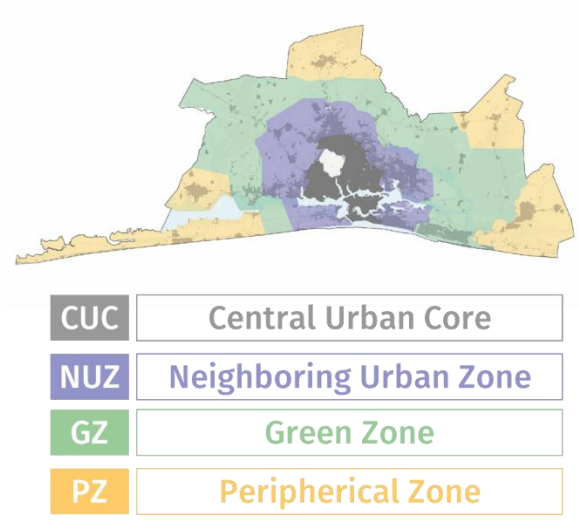
4.2 Spatial Framework and Land Use Plan

4.2.1 Spatial framework for Land Use Plan preparation

(1) Analysis of spatial development constraints and potential

The Greater Abidjan is a vast territory which has different spatial development constraints and potentials according to its various localities, that shall be taken into consideration in order to plan efficiently and realistically the future urbanization.

The 19 communes of the Greater Abidjan and other districts (Sous-Préfectures) that compose the administrative entities of the Target Area, have been classified into different zones according to their characteristics, development constraints and potential, especially their coverage in terms of urbanization, which has been extracted from Existing Land Use Land Cover (MOS) 2021 data and Housing Typology 2021 data produced in the framework of the Project. The following 4 zones, shown in Figure 4.2.1, have been delineated.



Zone	Total Area (ha)	Built-up Area 2021 (ha)	Non-Built-Up Area 2021 (ha)
Central Urban Core (CUC)	26,994	18,750 77%	5,526 23%
Neighboring Urban Zone (NUZ)	80,202	13,278 19%	58,026 81%
Green Zone (GZ)	160,134	6,912 5%	141,954 95%
Peripherical Zone (PZ)	124,998	8,958 8%	107,160 92%

Land Use Land Cover 2021 (JICA Project Team)

Source: JICA Project Team

Figure 4.2.1 Zonal Classification according to Spatial Development Potential

1) Central Urban Core (CUC)

This zone has been classified based on a high coverage of already built-up area of more than 75% and a low coverage of non-built-up area of less than 25%.

In the CUC, the land that can be used for urban extension (5,526 ha) is limited. Since there is a need to protect urban green areas (2,424 ha) and flood-prone lagoon banks (108 ha), the maximum usable land area for extension accounts for 2,994 ha. Within this figure, it is assumed that, due to the still growing attractiveness of the city centre, 70% of the barren urban lands (1,750 ha) will be built-up by horizon 2040 and that 50% of the other land uses such as farmlands, etc. (246 ha) will be urbanized. Therefore, the area for urban extension in CUC zone is assumed to be 998 ha.

The CUC, due to its economic attractiveness and the dynamism created by the introduction of public transportation infrastructure such as BRT and metro, is the only zone that has a potential for densification through urban renewal operations. The different urban fabrics that have a potential for urban renewal are, according to their low Ground Coverage Ratio (GCR), the Discontinuous Collective Housing type (239 ha, GCR: 0.1 or less), the Intermediate Discontinuous Housing type (650 ha, GCR: 0.2 to 0.3), and according to the dilapidated state of urban fabrics that will need to be rebuilt, the Grouped and Densified Individual Housing type (9,316 ha). It is assumed that 50% of the two collective housing types (445 ha) and only 25% of the individual housing type (2,329 ha) will be renewed and densified, accounting for a total of 2,774 ha of urban renewal in CUC zone.

2) Neighboring Urban Zone (NUZ)

This zone, which is surrounding the CUC zone, has a relatively high coverage of already built-up area (19%) as well as a vast amount of non-built-up area (81%) that can be used in urban extension. The NUZ is one of the most strategic areas of Greater Abidjan to receive future urbanization, due to the proximity of CUC and already built infrastructure, the concentration of economic opportunities, the access to urban services, the connectivity through transportation hubs etc.

3) Green Zone (GZ)

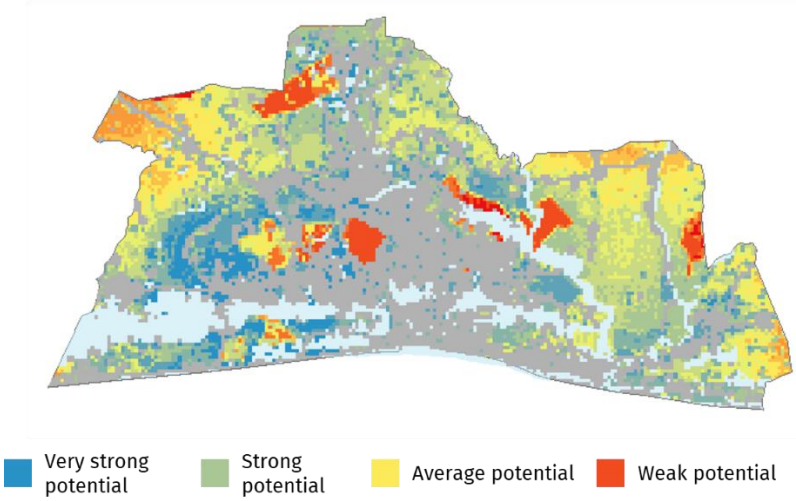
This zone has been classified based on a low coverage of already built-up area of 5% or less and a high coverage of non-built-up area of 95% or more. The GZ can be considered strategic to safeguard farmlands, natural environment for carbon sequestration and ecological connection such as the Green Belt.

4) Peripherical Zone (PZ)

This zone, which corresponds to the main peripherical cities, has a relatively high coverage of already built-up area (8%) compared to the GZ, as well as a relatively vast amount of non-built-up area (92%) that can be used in the urban extension.

(2) Multi-criteria Urbanization Potential Analysis

A geographic Multi-Criteria Urbanization Potential Analysis was conducted, incorporating factors such as environmental quality and socio-economic aspects, to identify optimal locations for future urban development. Through the analysis of spatial constraints, the aim was to pinpoint suitable areas, enabling the further formulation of realistic development alternatives. This approach ensures that future urbanization aligns with environmental and socio-economic considerations, facilitating efficient and mindful growth. The results provide valuable insights for strategic urban planning, simplifying the decision-making process for sustainable city development.



Criteria selected for the analysis

Name of the Criteria	Attraction/ Repulsion	Spatial influence	Weight (1 to 5)
Flat Land (slope < 5%)	+	Overlap	4
Flood Zones	-	Overlap	5
Protected green areas	-	Overlap	5
Proximity to green area	+	Proximity	1
Agricultural areas	-	Overlap	3
Industrial Zones	-	Proximity	3
Industrial Plantations	-	Overlap	3
Forests	-	Overlap	2
Existing Urban Front	+	Proximity	3
Y4 Bypass Road	+	Proximity	3
Other structuring future roads	+	Proximity	4
Public transport stations	+	Proximity	4

Source: JICA Project Team

Figure 4.2.2 Multi-criteria Urbanization Potential Analysis Results

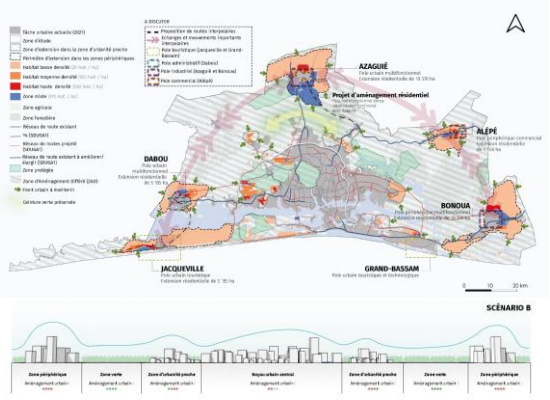
The criteria taken into consideration in the analysis are natural and human, and are either attractive or repulsive for urbanization. In methodological terms, a 500-meter mesh was first generated over the entire perimeter of the project. According to the aggregation method known as Weighted Linear Combination (CLP) or Weighted Linear Combination (WLC), each square of the grid receives an urbanization potential score calculated on the basis of, on the one hand, the attractive or repulsive nature of the

criterion, but also its weighting. The latter, established on a scale of 1 to 5, was set within the framework of working groups with the Ivorian side (Taskforce) in April 2022.

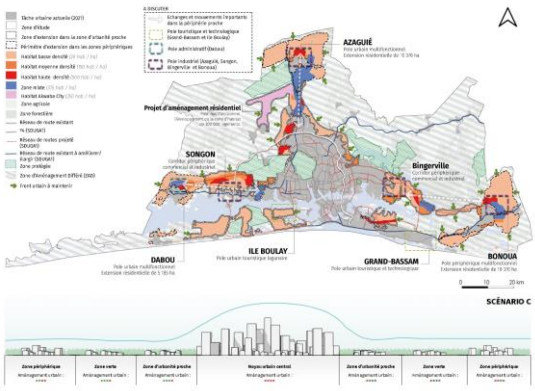
(3) Basis of the spatial framework: Synthesis Development Alternative E

Considering the spatial development constraints and potential detailed above, 4 different Development Alternatives have been formulated to reflect the different possible paths of urban development, and have been compared as part of the Strategic Environmental Assessment (SEA), as shown in Figure 4.2.3 below.

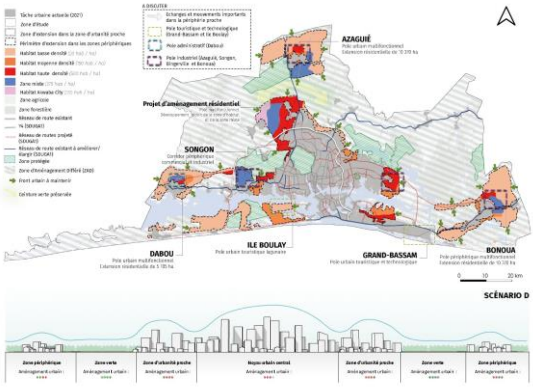
Development Alternative A: Compact City



Development Alternative B: Multipolar City



Development Alternative C: Corridor City



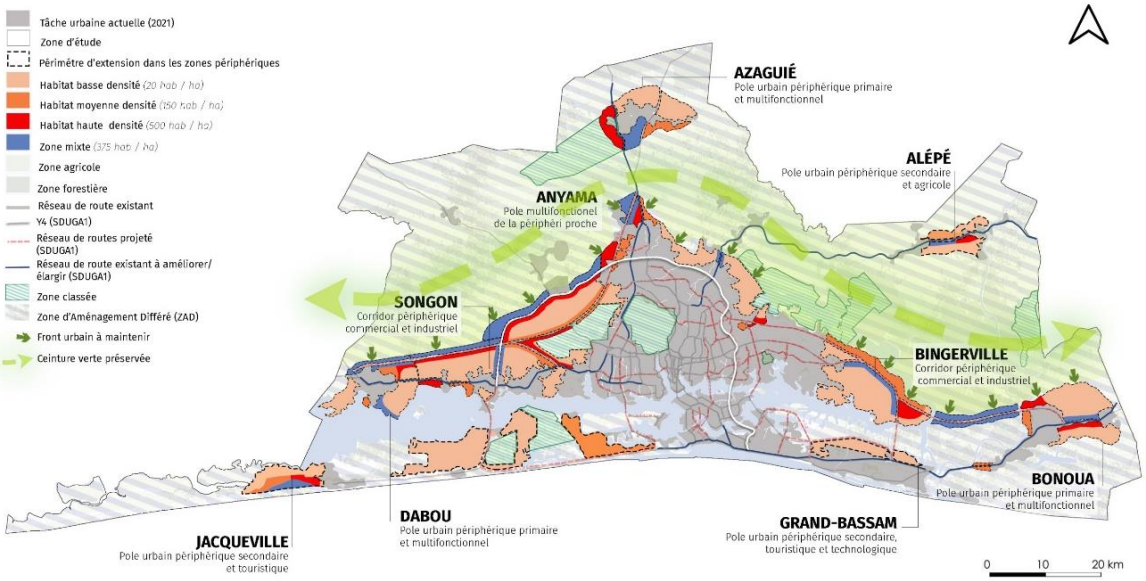
Development Alternative D: Balanced City

Source: JICA Project Team

Figure 4.2.3 The 4 Different Development Alternatives

Since a consensus could not be reached during SEA 2nd round of consultations and at the 3rd CoFaMiSu held on December 2022 on the selection of one of the four Development Alternatives, a fifth Alternative has been formulated as Synthesis Development Alternative E, shown in Figure 4.2.4 below. It has been elaborated mainly from the crossing and synthesis of the strong points of scenarios B and D, and after several meetings with urban planning specialists of Abidjan, putting an emphasis on the following points:

- An important development in all the peripheral communes with polarities of different weights: primary and secondary peripheral poles;
- Significant development along the main East-West and North-Central corridors and enhancement of the lagoon front;
- Significant development in nearby urban areas with significant potential and with the aim of ensuring urban continuity;
- Preservation and continuity of the Green Belt.



Source: JICA Project Team

Figure 4.2.4 Synthesis Development Alternative E

4.2.2 Strategic Orientations

On the basis of the development intentions contained in the Synthesis Development Alternative E, selected to become the foundation of the Land Use Plan of SDUGA 2040, several Strategic Orientations have been elaborated to tackle priority planning issues of the Greater Abidjan, as shown in Table 4.2.1 below. Strategic Orientations consist of defining objectives, intentions and actions consistent with the priorities, strategies or common vision of development of the Greater Abidjan. Strategic Orientations may be spatialized or apply to the whole target area, or can include quantitative and qualitative objectives. In that sense, Strategic Orientations can be considered in an operational way to localize and give reality to development Vision and SDGs, which coverage is mentioned indicatively in the table below.

Table 4.2.1 Strategic Orientations to Tackle Priority Planning Themes

Priority Planning Theme		Strategic Orientations of SDUGA 2040		SDG Coverage
1	Urbanization and densities	SO1-U	Compact and Multipolar Metropolis	11.3
2	Environment and Climate Change	SO2-E	Resilient, Preserved and Accessible Urban Environment	14.1, 14.2, 15.1, 15.5, 15.5, 6.3
3	Urban Functions and Economic Development	SO3-F	Balanced and Attractive Distribution of Economic Functions	8.5, 2.3 8, 1, 2, 12, 15
4	Mobility and Transportation	SO4-M	Integrated, Sustainable and Efficient Mobility	11.2 3, 5, 10, 13, 16
5	Social Implications	SO5-S	Pleasant, Accessible Living Environment that ensures Social Cohesion	11.1, 11.7 13, 15, 9, 10, 12

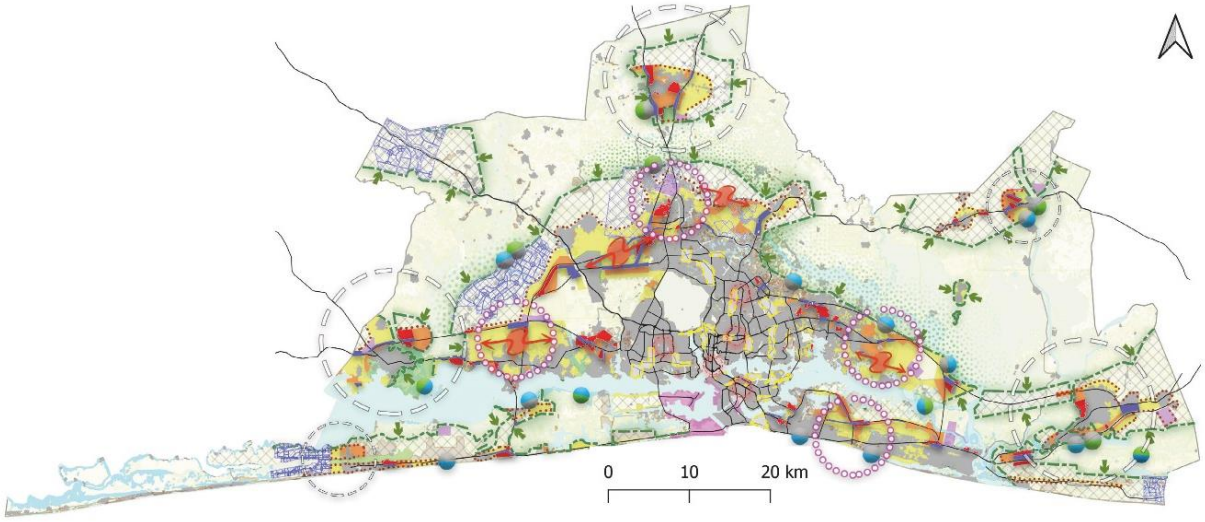
Source: JICA Project Team

(1) SO1: Compact and multipolar metropolis

This Strategic Orientation aims at controlling the urbanization of Greater Abidjan and articulating urban development in a new polycentric, intense and coherent model.

In order to reverse the trend of very low-density urban sprawl threatening the resilience and attractiveness of Greater Abidjan, the SDUGA 2040 relies on the definition of strategic and operational tools to control urban growth on the one hand and to develop new polarities to relieve congestion in the central urban core requiring intensification of its activities and its fabric.

Table 4.2.2 below describes the specific planning concepts included in Strategic Orientation 1, while Figure 4.2.5 summarizes it and shows its spatial implications.



Source: JICA Project Team

Figure 4.2.5 Map of SO1: Compact and Multipolar Metropolis

Table 4.2.2 Description of SO1: Compact and Multipolar Metropolis

SO1-U1	**Delimit, materialize and develop the Urban Growth Boundary (UGB) for better management of the city-nature interface and for a compact city**
U1-1	Consolidate existing UGB and plan their future in advance by 2040 and beyond
	Delimitation of the current and projected UGB to control the consumption of space by 2040. This frontage is destined to evolve in the future.
	Delimitation of the UGB beyond 2040 so that the future urban spot of Greater Abidjan does not compromise its resilience and territorial management.
U1-2	Identify areas for sustainable development in the vicinity of the UGB
	Identification of city-nature interface areas of metropolitan interest to be enhanced through development operations that preserve their spatial, landscape and functional qualities.
SO1-U2	**Strengthen and affirm the role of urban, peri-urban and peripheral polarities**
	Accentuate the role of existing urban centralities and promote the creation of new centralities
	Promote the urban integration of nearby peri-urban hubs
	Make satellite towns primary urban centres: Dabou, Azaguié and Bonoua

	Make satellite towns secondary urban centres: Jacqueville and Alépé
SO1-U3	**Guarantee measured land consumption by carrying out urban intensification and renewal integrating current urban dynamics**
U3-1	Distribute residential densities in urban extensions to meet housing needs by 2040
	Low density residential (50 inhab./ha) representing 63% of total residential areas
	Medium density residential (150 inhab./ha) representing 20% of total residential areas
	High density residential (500 inhab./ha) representing 8% of total residential areas
	Mixed use (375 inhab./ha) representing 9% of total residential areas
U3-2	Rebuild the city on itself primarily from urban renewal operations in attractive areas with high potential for urban renewal and land development within the central urban core (10% of the future population assumed to be housed in urban redevelopment areas)
	Perimeter of proposed urban renewal operation
U3-3	Promote a transition to forms of intermediate and collective housing.
U3-4	Integrate current urban dynamics (subdivisions, coup-parties, new towns and PUD) into medium and long-term urban planning
	Structure schemes of new towns integrated either into urban extension spaces by 2040 or into the land reserves of the Greater Abidjan The majority of MCLU-approved housing estates have also been incorporated in the same way
	Securing land reserves for the future long-term urban development needs of Greater Abidjan
SO1-U4	**Ensure the continuity and homogeneity of urban fabrics**
U4-1	Reduce urban disruptions and promote intermunicipal, compact and continuous urban development via urban corridors
	Points of recover of urban disruption and connection through urban corridor
U4-2	Enhance the complementarity of territories, urban spaces and green and blue spaces
	City-water complementarity
	City-nature complementarity
	Water-nature complementarity

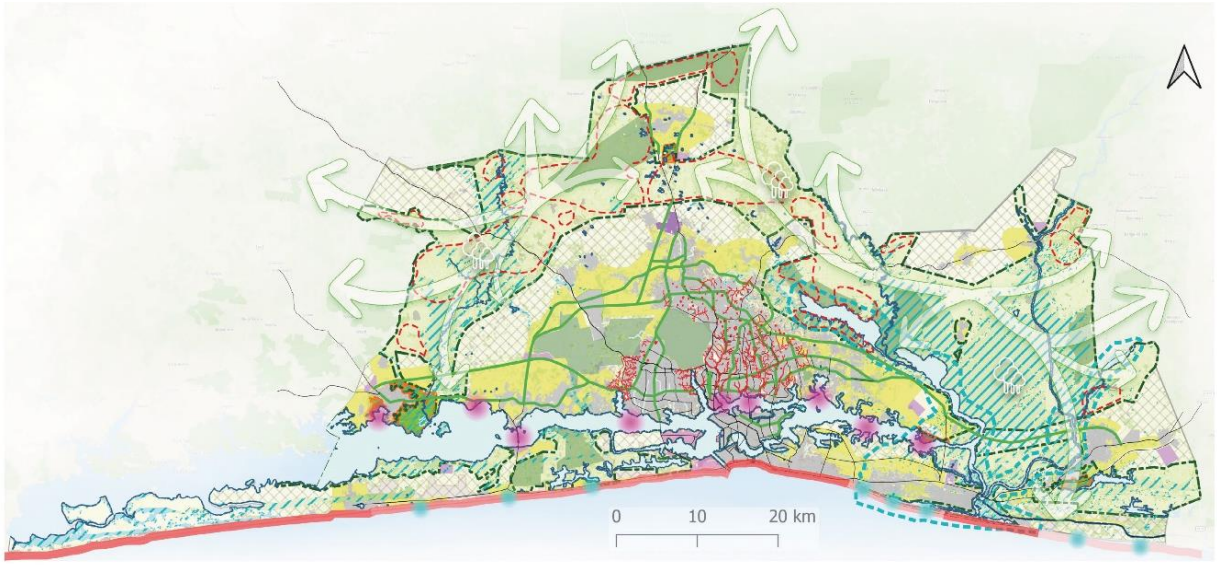
Source: JICA Project Team

(2) SO2: Resilient, preserved and accessible urban environment

This Strategic Orientation aims at accentuating the attractiveness and resilience of Greater Abidjan by curbing its urban sprawl and promoting ecological spaces accessible to the population.

In order to guarantee sustainable and resilient urban development in Greater Abidjan, the SDUGA is focusing on strengthening the green attractiveness of the metropolis. To this end, the preservation of the peri-urban green belt and its components of vital ecosystem interest is a priority. Accompanied by the accentuation of the presence and role of the green and blue fabric within urban spaces, Greater Abidjan will ensure the sustainability and resilience of its territory as well as the well-being of its population.

Table 4.2.3 below describes the specific planning concepts included in Strategic Orientation 2, while Figure 4.2.6 summarizes it and shows its spatial implications.



Source: JICA Project Team

Figure 4.2.6 Map of SO2: Resilient, Preserved and Accessible Urban Environment

Table 4.2.3 Description of SO2: Resilient, Preserved and Accessible Urban Environment

SO2-E1	**Prohibit, control and support urbanization in risk areas and sensitive ecological zones**
E1-1	Firmly prohibit construction in highly flood-prone areas, at significant risk of maritime erosion and with a slope greater than 30° and natural drains
	Areas with significant slopes greater than 30°
	Coastline with a low risk of erosion
	Coastline with a medium risk of erosion
	Coastline with a high risk of erosion
	Areas of natural drains very vulnerable to risks
E1-2	Propose a rational and controlled use of strategic wetlands
	Sensitive wetlands to avoid for urbanization
	Ramsar wetland of universal ecological value: propose a use not exceeding 25% of the total area of the zone
E1-3	Delineate the Hydraulic Public Domain (DPH) and prohibit its urbanization
	Lagoon, Maritime and River Public Domain (Domaine Public Lagunaire, Maritime et Fluvial)
SO2-E2	**Delimit, preserve and enhance the Green Belt of Greater Abidjan and its sensitive ecological components**
E2-1	Delimit the Green Belt based on the ecological specificities of the territorial components of Greater Abidjan and the national regulations in force
	Green Belt. The territory of this green belt is made up of several Sensitive Ecological Zones that should be further studied to determine the fine mapping of preservation, zoning and regulatory needs.
E2-2	Affirm the role of existing ecological corridors
	Ecological corridors
E2-3	Securing the boundaries of classified forest areas, promoting land uses compatible with their specificities and proposing forest areas to be classified
	Classified forest areas

	Unclassified forest areas offering important ecosystem services and which should benefit from a classification
E2-4	Promote initiatives for the circular and landscape economic enhancement of Green Belt spaces (ecotourism, agroecology, agroforestry, etc.)
SO2-E3	**Promote the establishment of Green and Blue Networks within the urban and suburban areas**
E3-1	Delimit, preserve and develop green spaces accessible to populations within urban areas
	New green spaces
E3-2	Encourage the revegetation of urban roads and the development of green public places
	Main roads that could benefit from operations to reinforce their revegetation. This operational orientation must benefit from a particular attention in the PUd which can regulate the needs for revegetation and implementation of green frames within the spaces already urbanized and to be urbanized.
E3-3	Revitalize the lagoon front and the coastal front The revaluation of the lagoon and coastline front allows on the one hand to increase the attractiveness of Greater Abidjan and on the other hand, to preserve and integrate these natural spaces. Particular attention must be given by the PUd to these spaces.
	Strategic lagoon front areas for development and enhancement operations
	Strategic coastal areas for development and enhancement operations
SO2-E4	**Reduce all forms of pollution and related socio-environmental vulnerabilities**
E4-1	Promote the development of industries and artisanal activity zones that respect the environment and the town planning code in terms of minimum distance from urban establishments According to article 141 of the Urban Planning Code: "Industrial zones must be located outside built-up areas, on the outskirts of cities and in such a way as not to compromise the health and safety of populations."
E4-2	Prioritize agricultural and agro-ecological practices compatible with the need to preserve natural resources
E4-3	Prioritize the equipment and connection of disadvantaged and under-equipped neighbourhoods to drinking water supply and sanitation networks and to the solid waste collection system
E4-4	Develop an attractive public transport and soft mobility offer that significantly reduces carbon emissions

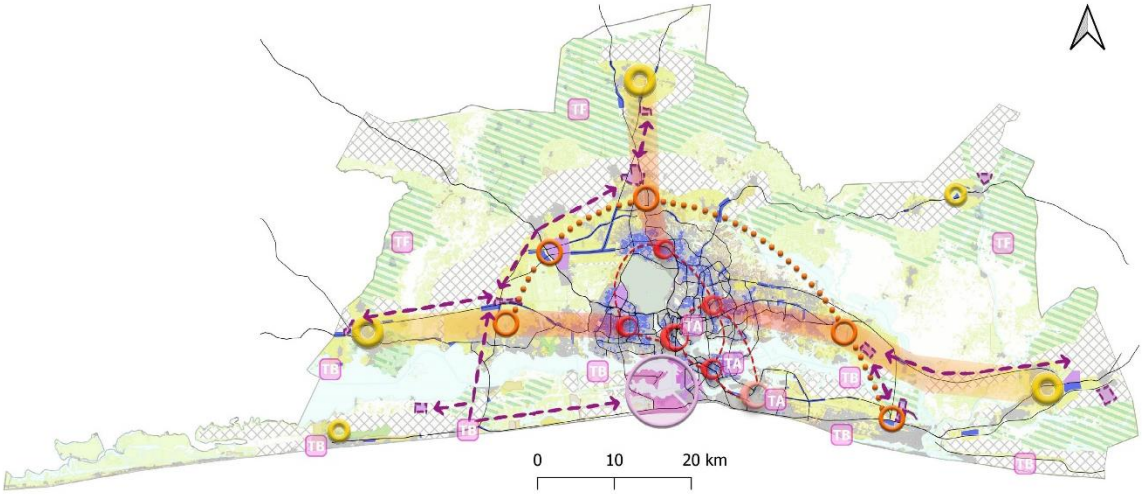
Source: JICA Project Team

(3) SO3: Balanced and attractive distribution of economic functions

This Strategic Orientation aims at strengthening the attractiveness and economic diversification of Greater Abidjan by focusing on the consolidation of existing central poles, the integration of the poles of the near periphery and the development of new satellite poles.

In order to affirm the place occupied by Greater Abidjan in the emergence of the Ivorian economy, the SDUGA aims to ensure urban development that promotes the maintenance of diversity and the complementarity of economic functions within the urban and peri-urban space, by reducing development disparities and encouraging the deployment of a circular and polarized economy.

Table 4.2.4 below describes the specific planning concepts included in Strategic Orientation 3, while Figure 4.2.7 summarizes it and show its spatial implications.



Source: JICA Project Team

Figure 4.2.7 Map of SO3: Balanced and Attractive Distribution of Economic Functions

Table 4.2.4 Description of SO3: Balanced and Attractive Distribution of Economic Functions

SO3-F1	**Strengthen and affirm the role of existing economic poles and support the development of new satellite polarities networked at the metropolitan level**
F1-1	Consolidate the existing hubs of the central urban core by focusing on the intensification of their functions and their attractiveness
	Strengthen the Plateau as a major international business district
	Enable central areas to revitalize by guaranteeing them a supply of basic equipment and infrastructure
	Take advantage of the Aerocity project to introduce activities related to airport transport (hotels, logistics, research, etc.) and conference tourism
	Facilitate and improve the connection between the poles
F1-2	Develop energizing and structuring balance poles in the vicinity of urban area
	Ensure the continuity of the development of the secondary centers in the vicinity of urban area
	Facilitate and improve the connection between the poles
F1-3	Highlight the important role of satellite cities in the territorial economic balance as primary and secondary peripheral poles
	Support the development of Bonoua, Azaguié and Dabou as primary satellite hubs
	Support the development of Jacqueville and Alépé as secondary satellite hubs
F1-4	Support economic development along the East-West and North-Centre corridors
	Economic development corridor
F1-5	Strengthen the multifunctionality and intensity of economic activities in urban spaces
SO3-F2	**Promote and secure suburban agricultural development as one of the pillars of the metropolitan economy**
F2-1	Support the role of agricultural and agroforestry areas as essential components of the Greater Abidjan green belt
F2-2	Preserve agricultural development areas important for socio-economic development as well as food security and resilience in Greater Abidjan
	Agricultural lands to preserve

F2-3	Securing peri-urban agricultural land, particularly around outlying towns
F2-4	Support projects and operations for the sustainable development and enhancement of agricultural and agroforestry areas
SO3-F3	**Support an eco-responsible, diversified and job-creating industrial offer**
F3-1	Plan and develop new industrial zones in continuity with national industrialization policies aimed at economic influence and job creation
	New industrial zones to create
F3-2	Promote the sustainable integration of existing industrial hubs in the Greater Abidjan metropolitan region and beyond, in particular through the establishment of connected industrial corridors
	Linkage to be established between industrial hubs
F3-3	Support the competitiveness of Greater Abidjan through better integration of the Port into the city and through capacity building for its sustainable growth
	Autonomous Port of Greater Abidjan to enhance
SO3-F4	**Boosting local economic development, tertiary and local job creation**
F4-1	Support the modernization and attractiveness of tertiary services to enable Greater Abidjan to strengthen its role as a gateway for West Africa, with improved transport, logistics and service functions
F4-2	Promote economic development along the BRT corridors and metro stations within neighbourhoods that are already mixed and have significant potential for land development and urban renewal in a Transit-Oriented Development (TOD) approach
	Mixed-use and Traffic-Oriented economic development corridor
F4-3	Encourage the development of a balanced, diversified and eco-responsible tourist offer
	TB Area with seaside and/or lagoon tourist potential
	TF Area with agricultural and/or agroforestry tourism potential
	TA Area with business tourism potential
F4-4	Promote the establishment of innovative and competitive economic hubs at national and regional level
F4-5	Promote the implementation of a circular economy at local level

Source: JICA Project Team

(4) SO4: Integrated, sustainable and efficient mobility

This Strategic Orientation aims at promoting sustainable mobility through the control of traffic and the implementation of carbon-free mobility based on public transport and active modes.

Table 4.2.5 below describes the specific planning concepts included in Strategic Orientation 4.

Table 4.2.5 Description of SO4: Integrated, Sustainable and Efficient Mobility

SO4-M1	**Control traffic and better distribute urban travel needs**
M1-1	Control travel needs by planning the complementarity of uses in urban centres (employment area/residential area) and by proposing a harmonious and decentralized distribution of urban services
M1-2	Limit distances and travel times by promoting a dense city and fighting against urban sprawl
M1-3	Promote mobility between peripheral towns and limit the concentration of flows in the central urban core
SO4-M2	**Territorializing travel: creating transport/urban planning integration**
M2-1	Set up the beginnings of a TOD approach in metro and BRT stations: densification, establishment of mixed zones in station districts, requalification of areas around mass transport lines
M2-2	Create economic corridors along major axes by promoting a mix of functions (activity zones, mixed zones, housing zones)

SO4-M3	Streamline travel and decongest the city
M3-1	Improve the existing road network and propose new infrastructures meeting future mobility needs
M3-2	Manage existing black spots: improved management of problematic intersections
M3-3	Organize, rationalize and consolidate car parking in order to free up the road
SO4-M4	**Develop the attractiveness of public transport and reduce the use of private cars**
M4-1	Structure a mass public transport network by extending lines and creating new lines to serve the extension areas
M4-2	Promote intermodality around BRT and metro stations (secure parking, transport service, etc.) including for active mode reductions (bicycle parking, comfortable pedestrian access, etc.)
M4-3	Develop lagoon public transportation
SO4-M5	**Promote soft modes of transport and improve the walkability of the city**
M5-1	Create the conditions for walkable urban centres
M5-2	Seize every opportunity to develop soft transport modes by promoting facilities for user safety: dense residential extension zone, station districts, urban renovation operation
M5-3	Integrate cycling facilities and comfortable sidewalks on major axes (creation of axis and redevelopment)

Source: JICA Project Team

(5) SO5: Pleasant, accessible living environment that ensures social cohesion

This Strategic Orientation aims at prioritizing inclusive urban development that meets the needs of all social categories in a logic of urban diversity and accessibility and with the aim of reducing disparities and considerably improving the living environment of the populations.

Table 4.2.6 below describes the specific planning concepts included in Strategic Orientation 5.

Table 4.2.6 Description of SO5: Pleasant, Accessible Living Environment that ensures Social Cohesion

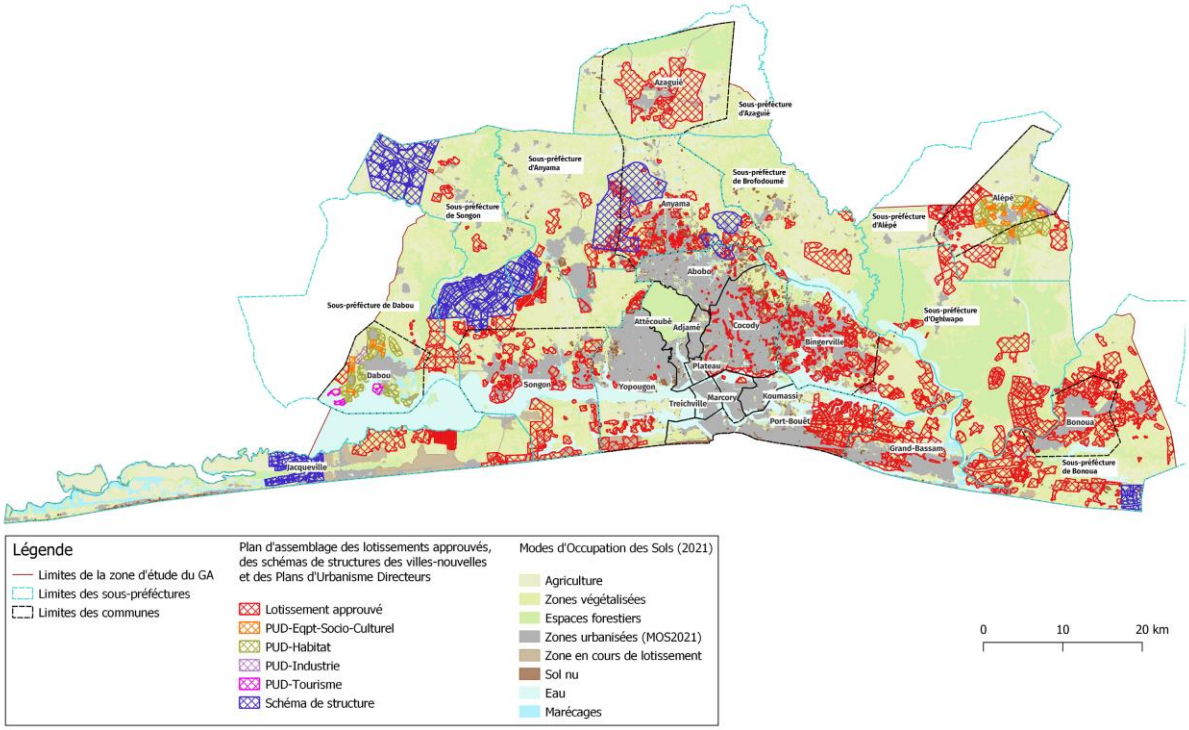
SO5-S1	Provide affordable housing for all
S1-1	Develop various tools for the production of an efficient supply of affordable housing, particularly in the municipalities of the near periphery and peripheral municipalities
S1-2	Integrate national objectives and policies in terms of social and affordable housing into urban planning at different scales
S1-3	Encourage the mobilization of actors in the city, construction and furniture, in particular the private sector, in the production of affordable housing
S1-4	Match the existing and planned supply of affordable housing to the objectives of diversity and urban accessibility
SO5-S2	**Address precarious neighbourhoods as integral parts of the territories of Greater Abidjan**
S2-1	Promote the participatory construction of interventions of resorption, renovation, restructuring of precarious neighbourhoods, adapted to the needs and specificities of the latter
S2-2	Prioritize the improvement of access for populations in precarious neighbourhoods to services, facilities and public spaces
S2-3	Improve the socio-economic development of populations in precarious neighbourhoods, in particular by supporting local initiatives and job creation
S2-4	Integrating precarious neighbourhoods into urban management and planning at different scales
SO5-S3	**Promote a peaceful, accessible and lively living environment for the citizens**
S3-1	Promote the population's access to a healthy and preserved urban and peri-urban environment
S3-2	Plan green spaces to be developed and public spaces within the urban space of the municipalities
S3-3	Strengthen the supply of facilities and places to live (cultural, leisure, tourism spaces, etc.)
S3-4	Strengthen urban and road safety
S3-5	Encourage the production of urban spaces based on social diversity

Source: JICA Project Team

4.2.3 Population distribution towards Land Use Plan formulation

(1) Areas currently under development and approved urban plans

It is assumed that a significant part of the urbanization and housing allocation that is expected to happen in the short term is the one which is contained in areas currently under development or subdivision, and in various types of urban plans already approved by MCLU, as shown in Figure 4.2.8 below.



Source: JICA Project Team

Figure 4.2.8 Areas Currently Under Development and Approved Urban Plans

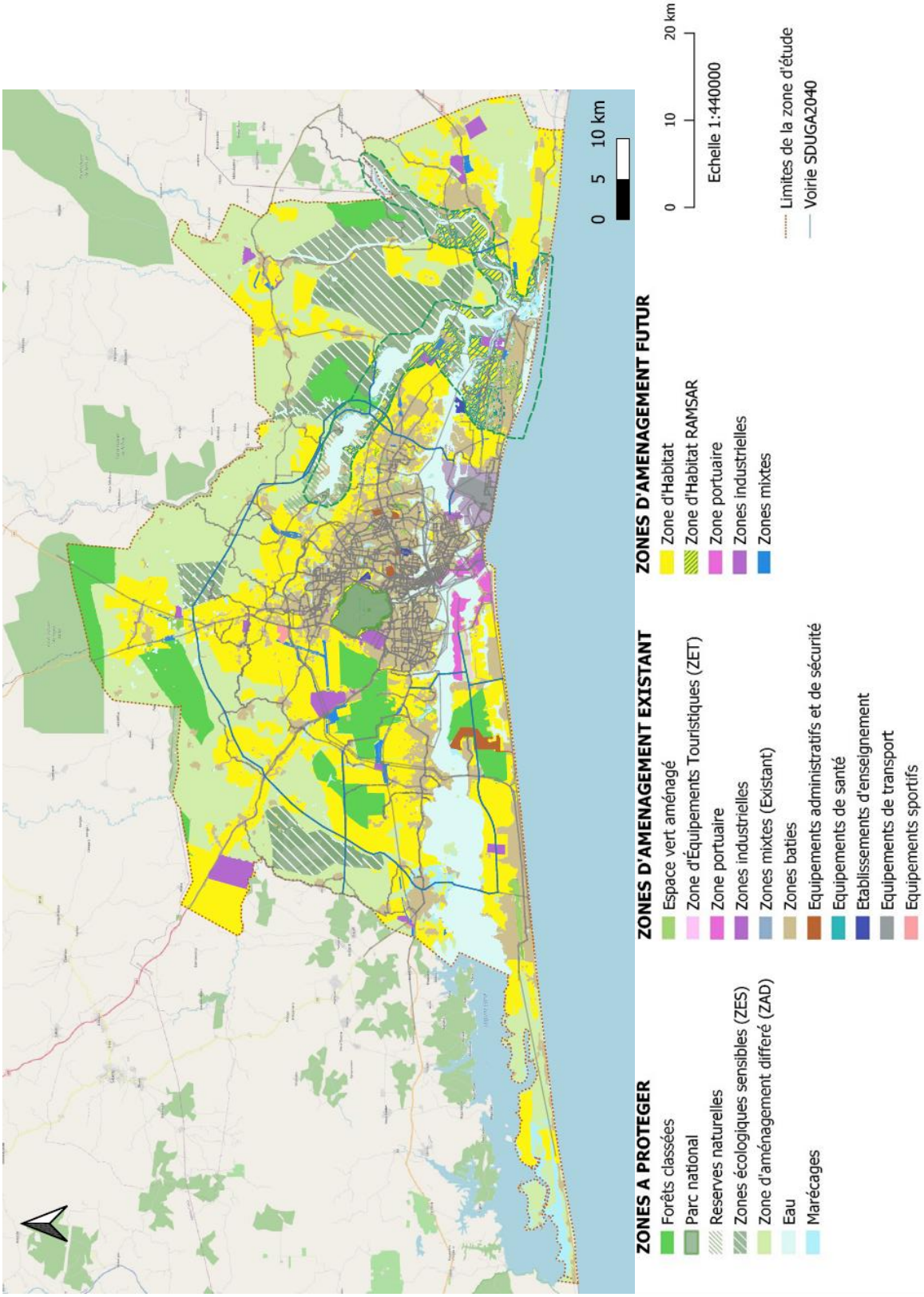
1) Areas currently under development (in light brown colour on Figure 4.2.5) have been extracted through satellite imagery analysis as part of the creation of Existing Land Use Land Cover (MOS) data, and is assumed to account for 6,240 ha in the Greater Abidjan. It is assumed as a prerequisite that those areas will be urbanized by 2040.

2) Urban plans approved by MCLU, which include subdivision plans, Urban Master Plans (PUD: Plan d'Urbanisme Directeur) and Structure Schemes (Schéma de Structure) of private initiative new town developments, accounts for a total of 82,076 ha of built-up area.

4.2.4 Land Use Plan of SDUGA Horizon 2040

On the basis of all the spatial studies and analysis mentioned in this current section, and thanks to the close collaboration of the MCLU and other associated Ivorian organizations, particularly in terms of institutional and field confirmation of the different existing and future land uses, the Version 7, considered as Draft Final Land Use Plan of SDUGA at horizon 2040 has been formulated as shown in Figure 4.2.9.

Compared to the Version 6, a refining of the legend has been done with the addition of the "administrative and security" land use category, based on working sessions with MCLU. This has no influence on the distribution of population or employment.



Source: JICA Project Team

Figure 4.2.9 Land Use Plan of SDUGA at Horizon 2040

Table 4.2.7 below show the distribution of population to be housed and the area to be urbanized for each Urban Unit and municipality of the Greater Abidjan based on the Land Use Plan at horizon 2040. The

average density of urban development until 2040 is of 43 inhabitants per hectare. The table below can be considered as the demographic and spatial development framework to be considered by each detailed urban plan (PUd) study.

Table 4.2.7 Statistics of Land Use Plan of SDUGA Horizon 2040

Urban Unit	Commune / Sous-préfecture	A. EXISTING POPULATION		B. ADDITIONAL POPULATION UP TO 2040					TOTAL Population in 2040 (A+B)	
				Urban Expansion Area (ha)			Urban Renewal Area (ha)	Total Additional Population up to 2040		
				Housing zones (ha)	Mixed zones (ha)	TOTAL Addition (ha)				
1	Plateau	7,186	661,213	4		4	32	1,579	8,765	672,049
	Adjamé	340,892		53		53	88	6,047	346,939	
	Attécoubé	313,135		9		9	66	3,210	316,345	
2	Port-Bouet	618,795	743,362	3,147	253	3,400	40	147,914	766,709	1,047,024
	Grand-Bassam	124,567		3,527	96	3,622		155,748	280,315	
3	Abobo	1,340,083	1,750,032	1,024	124	1,149	290	61,871	1,401,954	2,699,013
	Anyama	312,574		9,493	431	9,923		426,699	739,273	
	Anyama Ss-Pref	77,018		8,708	152	8,860		380,997	458,015	
	Brofodoumé	20,357		1,847	0	1,847		79,413	99,770	
4	Cocody	692,583	897,239	992	2	994	461	62,577	755,160	1,275,860
	Bingerville	179,831		3,847	185	4,033		173,408	353,239	
	Bingerville Ss-Pref	24,825		3,234	83	3,317		142,637	167,462	
5	Songon	76,125	1,660,843	9,522	372	9,894		425,459	501,584	2,777,585
	Songon Ss-Pref	13,653		13,571	520	14,091		605,918	619,571	
	Yopougon	1,571,065		1,611	21	1,632	353	85,365	1,656,430	
6	Treichville	106,552	732,895	0		0	37	1,598	108,150	756,013
	Marcory	214,061		56		56	280	14,457	228,518	
	Koumassi	412,282		4		4	160	7,063	419,345	
7	PAA					-		-	-	
8	Azaguié	28,586	28,586	4,967	329	5,296		227,712	256,298	256,298
9	Alépé	39,343	190,396	2,664	171	2,835		121,908	161,251	1,085,550
	Alépé Ss-Pref	19,139		2,050	0	2,050		88,169	107,308	
	Bonoua	88,495		2,837	147	2,984		128,328	216,823	
	Bonoua Ss-Pref	26,378		6,968	196	7,164		308,046	334,424	
	Oghlwapo	17,041		5,784		5,784		248,703	265,744	
10	Jacqueville	49,694	166,081	8,492	102	8,593		369,519	419,213	800,068
	Dabou	110,512		3,688	271	3,959		170,218	280,730	
	Dabou Ss-Pref	5,875		2,118	73	2,192		94,251	100,126	
	TOTAL	**6,830,647**	6,830,647	100,219	3,528	103,747	1,807	4,538,812	11,369,459	11,369,459

Source: JICA Project Team

4.3 Transportation Master Plan for 2040

4.3.1 Concept of transportation master plan formulation

Transportation system introduced to the Greater Abidjan Area shall be consistent and promoted with the SDUGA vision mentioned in chapter 4.1. The following are the principles of SDUGA 2040 transportation planning in consideration of the vision, efficiency, equality, and better environment.

- Enhancement of road network and capacity to support economic activities
- Public transport system development/improvement for all areas and all gender to secure mobility needs
- Intermodal development/transit-oriented development to promote public transport user
- Environmental-friendly transportation system

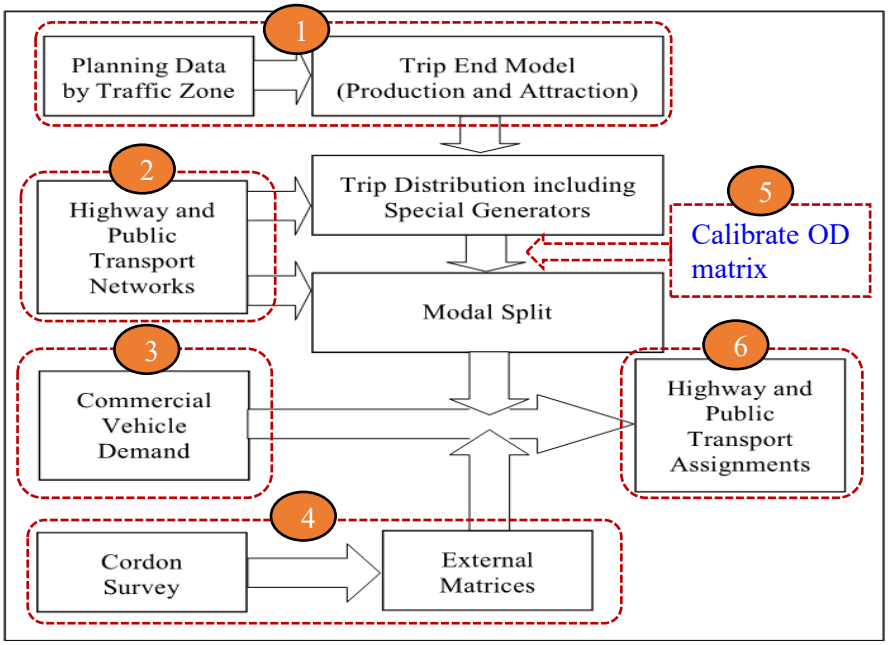
4.3.2 Traffic demand forecast for 2040

(1) Future Framework for Traffic Demand

The traffic demand model has fundamentally aimed at updating the SDUGA model. It has, however, integrated part of travel demand model developed by STRATEC, a Belgian consultant company, for the National Office for Technical Studies and Development (BNETD) in 2018. Mainly, the network and traffic analysis zoning system of this model are integrated.

The main changes are focused on updating the inputs and changing the traffic analysis zones. Figure 4.3.1 below shows the SDUGA model structure and areas of updates:

1) Updating the study area, increasing the number of zones, and estimating socioeconomic data
2) Updating the highway and public transport network
3) Updating commercial demand to the new zones and current demand level
4) Estimating external matrix based on traffic survey
5) Calibrating the OD matrix based on the traffic survey
6) Updating highway and public transport assignment

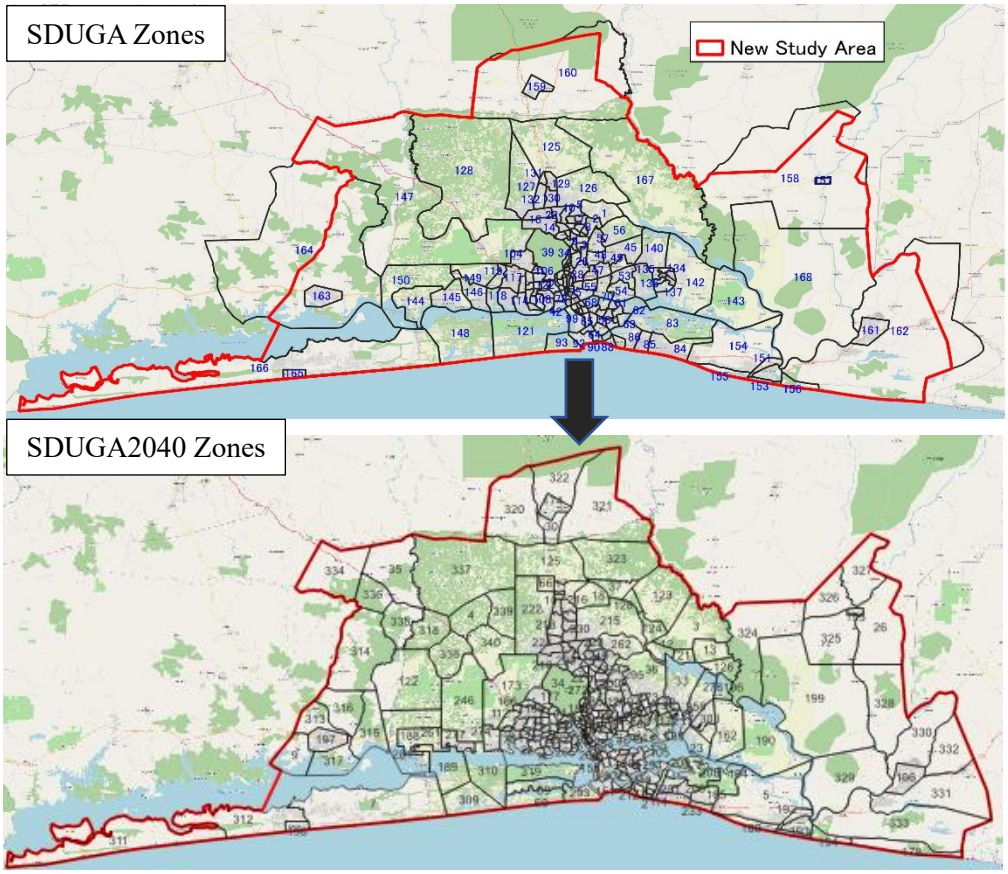


Source: Framework from SDUGA Report (step 5 is newly added to the model)

Figure 4.3.1 SDUGA Model Structure and main Update Areas

Regarding the zonal increase, the SDUGA model consisted of 173 (168 internal five external) zones,

which has been increased to 345 (340 internal and five external) zones and the study area has been updated. All are updated to the new study area (as shown in Figure 4.3.2). The new zoning is consistent with that of MMGA, but the large peripheral zones are subdivided considering future developments.



Source: JICA Project Team

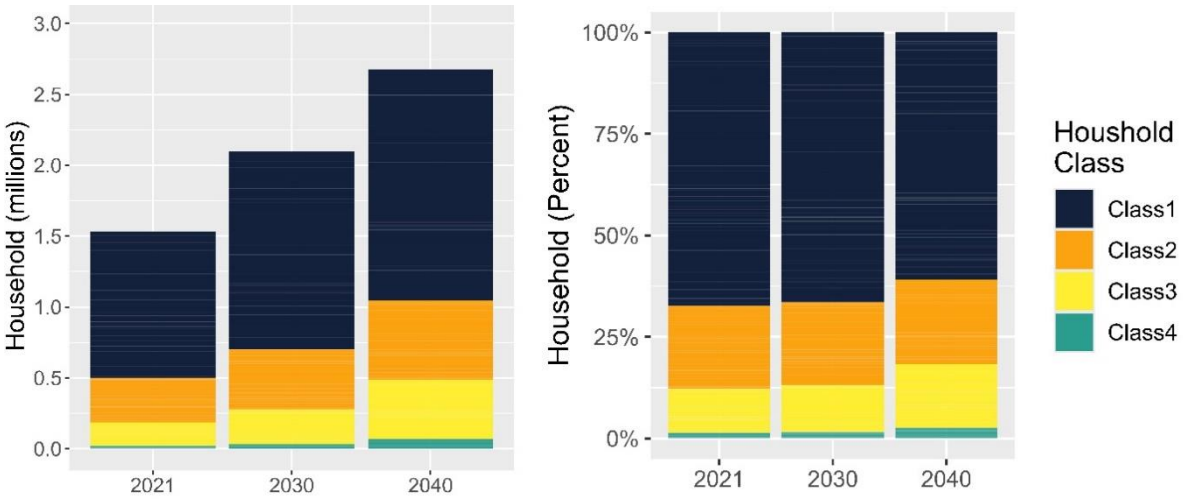
Figure 4.3.2 SDUGA2040 Traffic Analysis Zones

1) Socio-economic data

The main socio-economic data the model requires for updating is the household by income class and employment data. The current socio-economic data is estimated based on the 2021 census survey at census zone (zone de dénombrement, ZD) level, and existing land use, while that of the future is estimated based on future development plans and trend.

According to this result, the population in the study has increased from 5.54 million in 2013 (of SDUGA Model) to 6.84 million, and the households from 1.3 million to 1.53 million. The household number further increased to 2.1 million and 2.68 million in 2030 and 2040, respectively. The increase in the number of households from 2021 to 2040 is 1.8 times. Along with this, the proportion of the more mobile households (higher-class households: class 3 and 4) increases as Figure 4.3.3 shows.

In terms of the distribution of the population by zone, there is currently a high concentration in the central area zones. Since the future socio-economic framework closer to that trend of the National Institute of Statics (INS) is adopted, the future population remains concentrated in the central area, although there is a notable increase in the prethermal areas as Figure 4.3.4 and Figure 4.3.5 show.

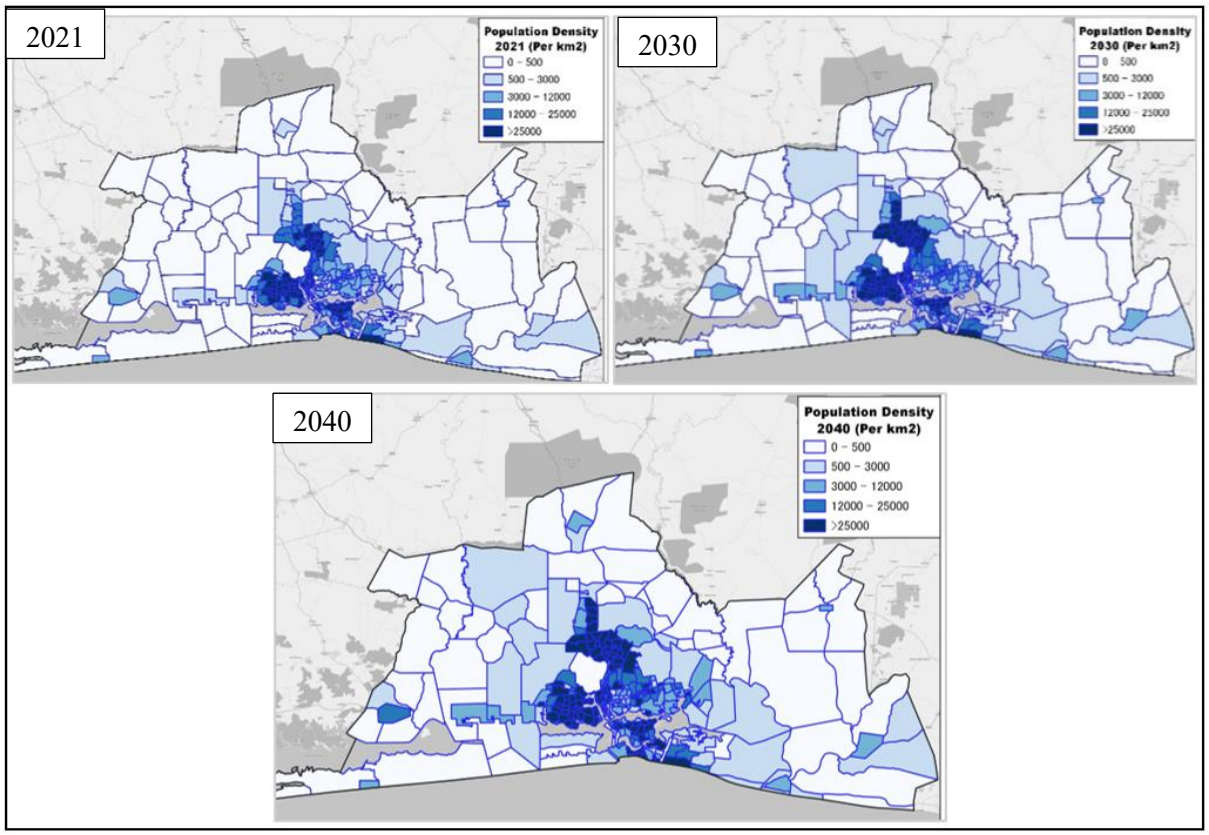


Source: JICA Project Team

Figure 4.3.3 Number of Households by Class and by Year

Source: JICA Project Team

Figure 4.3.4 Distribution of Population by Zone and by Year



Source: JICA Project Team

Figure 4.3.5 Distribution of Population by Zone and by Year

The employment data is updated based on the trend, and the income class and students are forecast based on the socio-economic framework for 2040 and growth trends.

(2) Transport Network

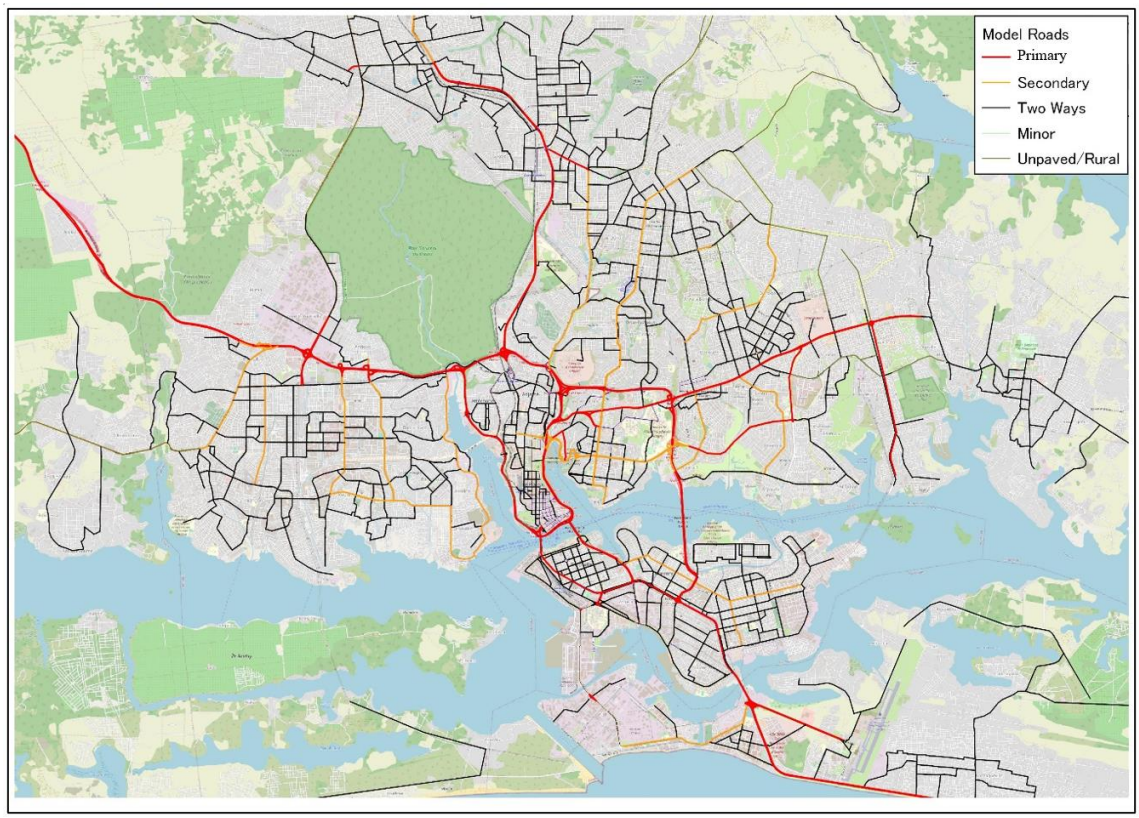
1) Road network

The road network is classified based on their characteristics, and the model covers about 1,700 km long roads. Two-way roads dominate, and Table 4.3.1 below summarizes the roads by their class.

Table 4.3.1 Road Network

Road Class	Length (Km)
Primary Roads	270.3
Secondary Roads	155.5
Other Roads	1270.4

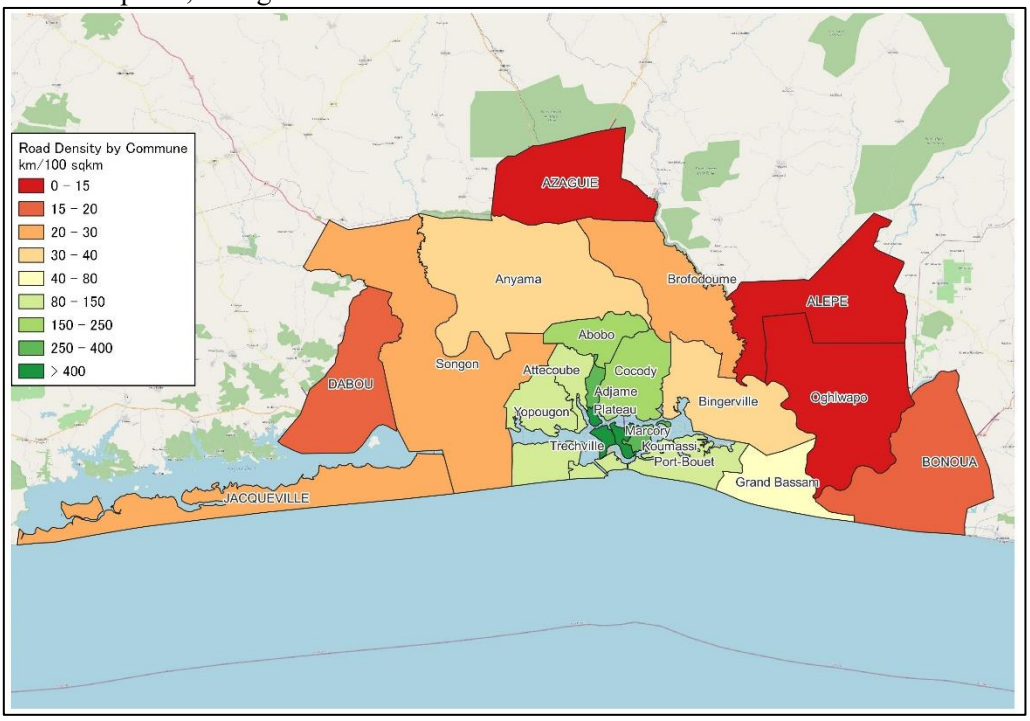
Source: JICA Project Team（Based on AMUGA data)



Source: JICA Project Team (Based on AMUGA data)

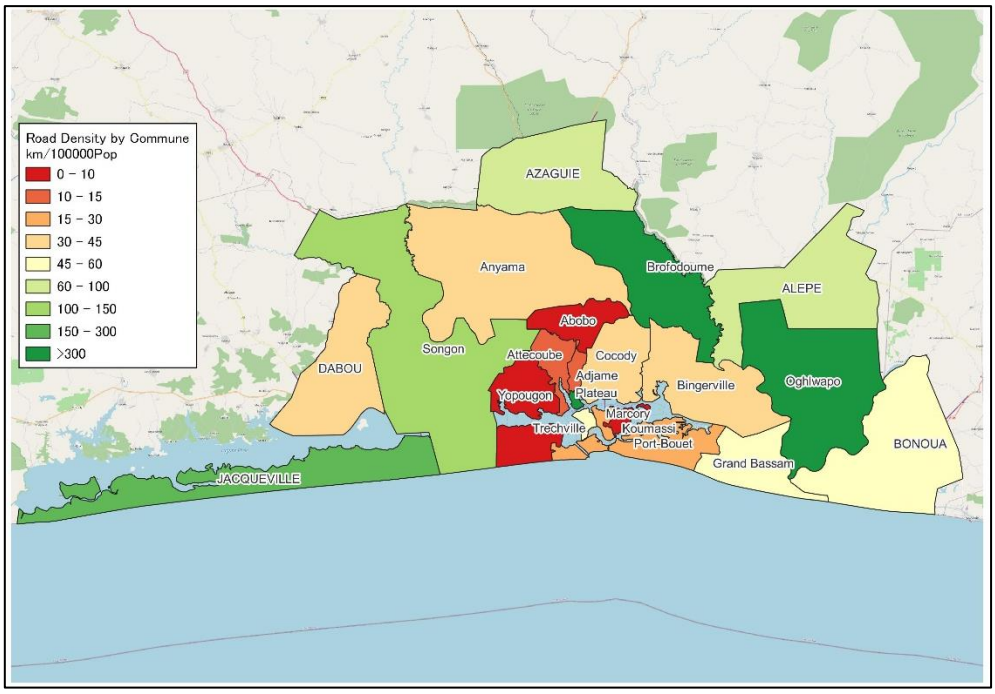
Figure 4.3.6 Road Network by Class

Figure 4.3.7 below shows commune-level road density situation. As expected, the central area where the network is concentrated shows high density. The result changes when the road density in terms of population is compared, as Figure 4.3.8 shows.



Source: JICA Project Team (Based on AMUGA data)

Figure 4.3.7 Road Density by Commune Area (2021)

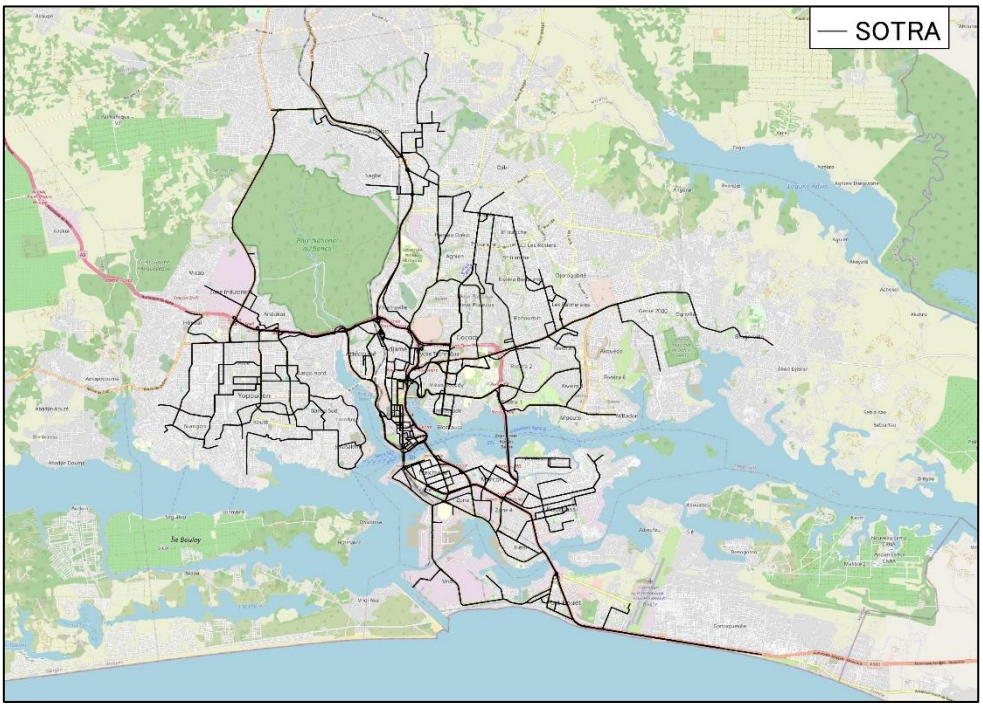


Source: JICA Project Team (Based on AMUGA data)

Figure 4.3.8 Road Density by Commune Population (2021)

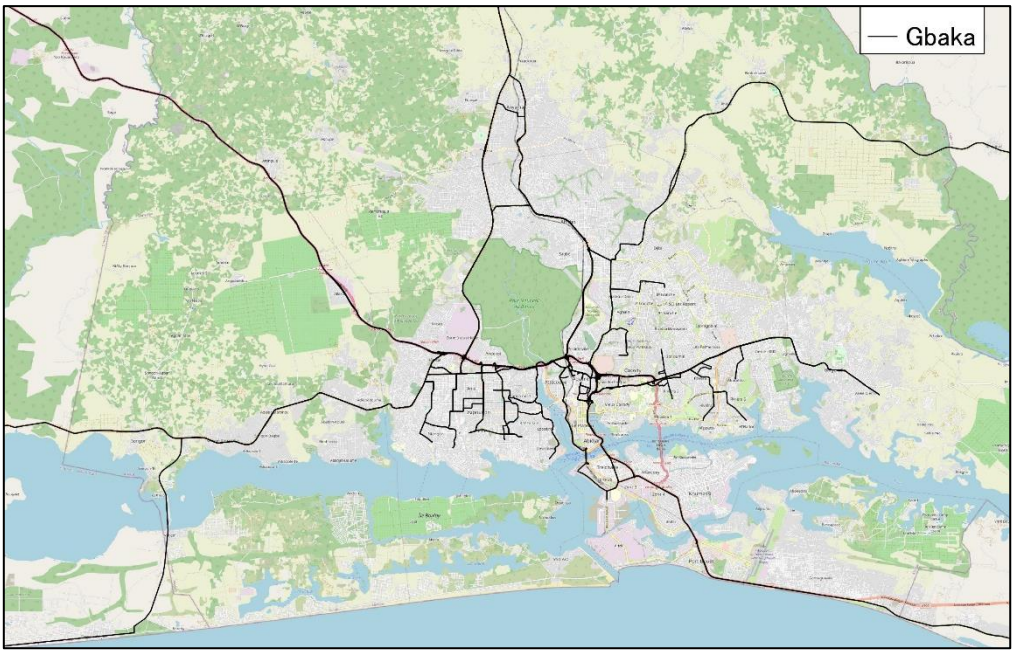
2) Public transport network

Figure 4.3.9 to 4.3.11 show the public transport network for SOTRA, Gbaka and woro-woro in the base year of 2021.



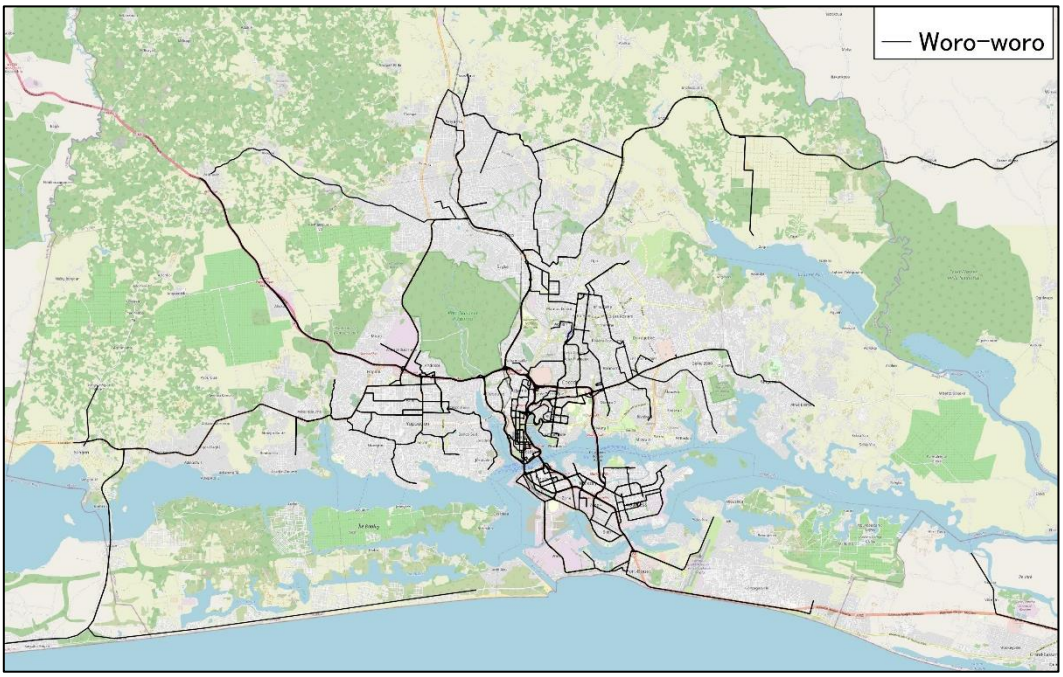
Source: JICA Project Team (Based on AMUGA data)

Figure 4.3.9 SOTRA Bus Network (2021)



Source: JICA Project Team (Based on AMUGA data)

Figure 4.3.10 Gbaka Network (2021)



Source: JICA Project Team (Based on AMUGA data)

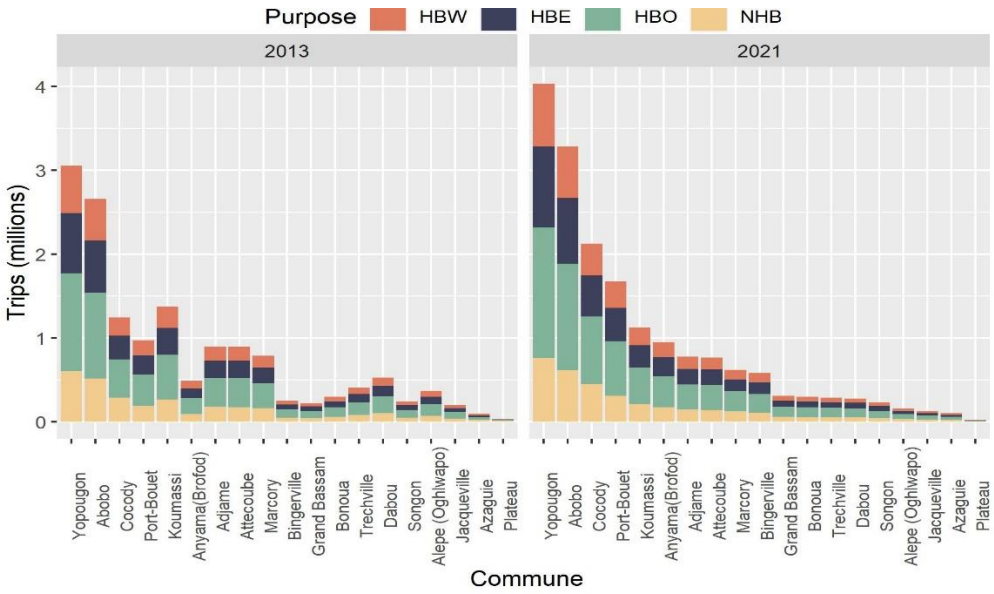
Figure 4.3.11 Woro-woro Network (2021)

(3) Traffic Demand Analysis by Development Scenario

1) Trip Generation and Modal Split

Current trip generation is estimated based on the socioeconomic framework updated based on the census 2021. The trip generated in the study area is estimated at 17.0 million person-trips, that is about 26% increase from 2013 (13.6 million trips from the report).

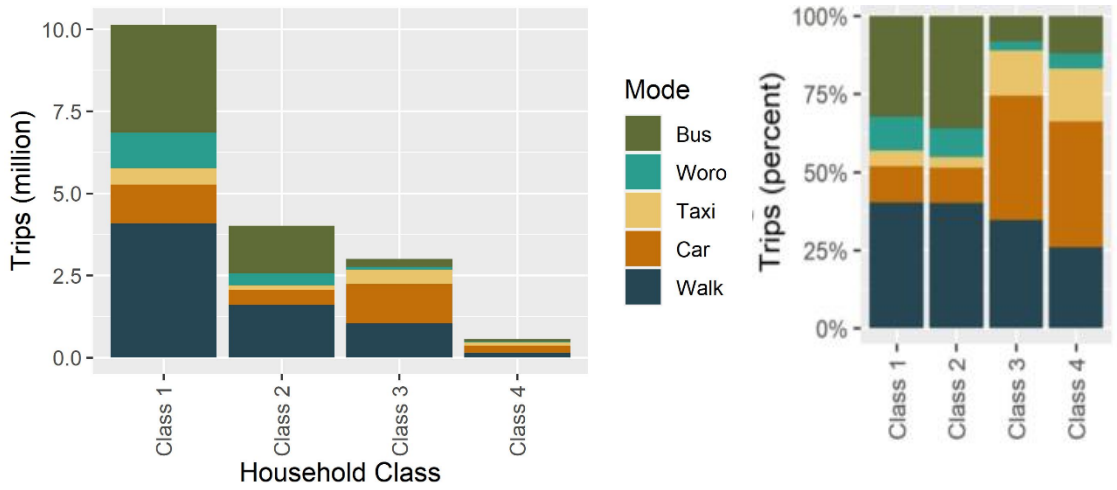
Though the trip has generally increased, it decreased in some communes. This may be attributed partly to the decline in population in the communities and the use of zonal socioeconomic data in 2013, which was available source before the 2014 Census.



Source: JICA Project Team

Figure 4.3.12 Trips of 2013 and 2021 by Commune (Macro-zone)

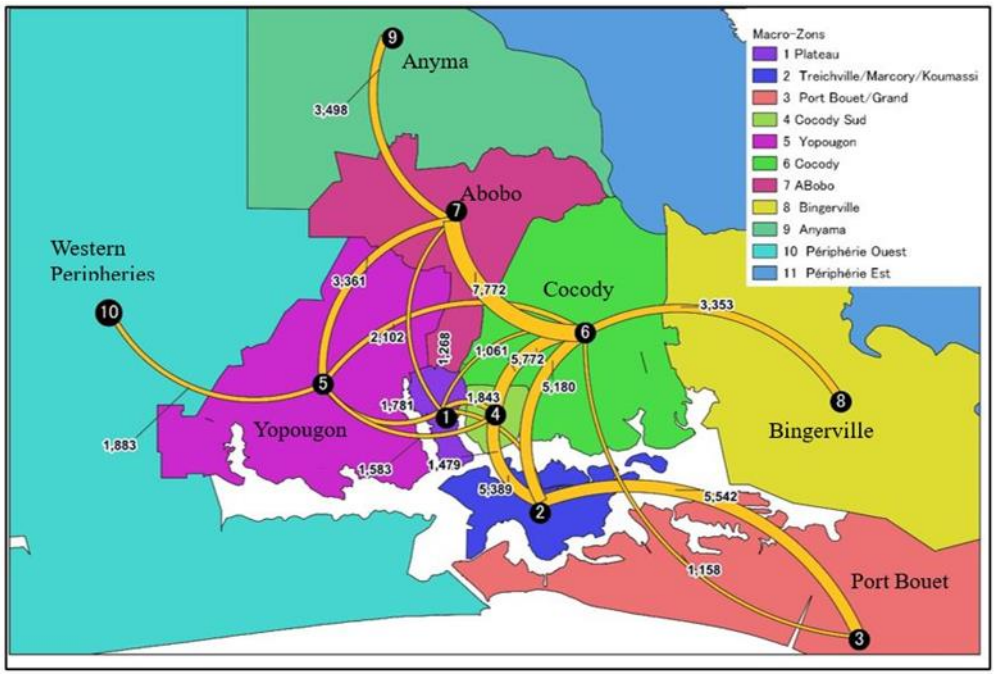
In terms of household classes, 80% of the current trips are made by Class 1 and 2, while the remaining 20% go to the Class 3 and 4 households accounting for about 15% of the total households. There is a clear distinction between the two groups in the mode choice. Public transport (PT) accounts for about 45% of the trips of the lower income households (Class 1 and 2) while private transport accounts for about 40% of the trips made by higher income households (Class 3 and 4). Walking accounts for about 39% of the trips, but the share decreases with the increase of the income. The share of the walk is significant and above 30% for each class except for Class 4.



Source: JICA Project Team

Figure 4.3.13 Trips by Household and Mode (2021)

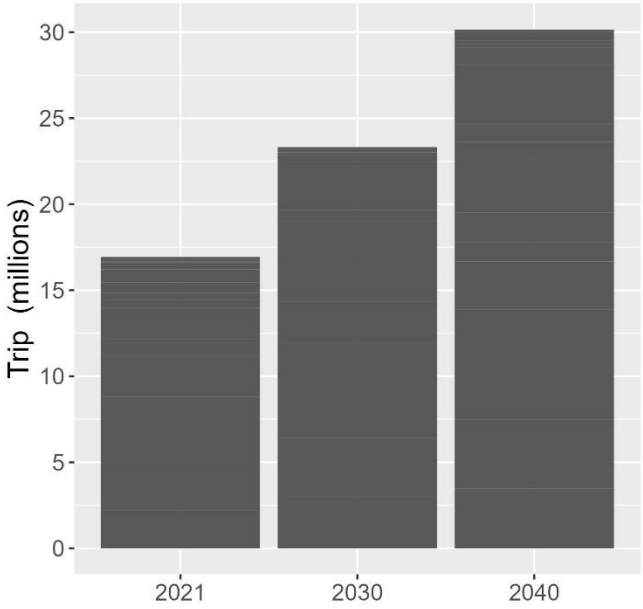
The OD trips between zones are estimated, and Figure 4.3.14 shows the peak hour passenger car unit (PCU) trips between macro-zones. The macro-zones aggregate the traffic analysis zones into 11 major areas, mainly based on communes.



Source: JICA Project Team

Figure 4.3.14 Macro-zones with OD Trips (Peak Hour Traffic in PCU)

The trips generated in 2030 and 2040 are estimated, and as a result, the total daily trips are expected to jump to 30 million by 2040, a 178% increase from the current.



Source: JICA Project Team

Figure 4.3.15 Daily Trips by Year

The future modal split trend is analysed by scenarios, and the result is as shown in the tables below. The number of trips by each mode increases at different rates, although the walk trip shows relatively the least growth.

As to be explained later, in the plan scenario, not only an increase in the public transport share but also a significant improvement in the network performance (average speed) which significantly drops in the don-nothing scenarios are observed.

Table 4.3.2 Estimated Person Trips by Mode, Year and Scenario

Unit: million trips/day

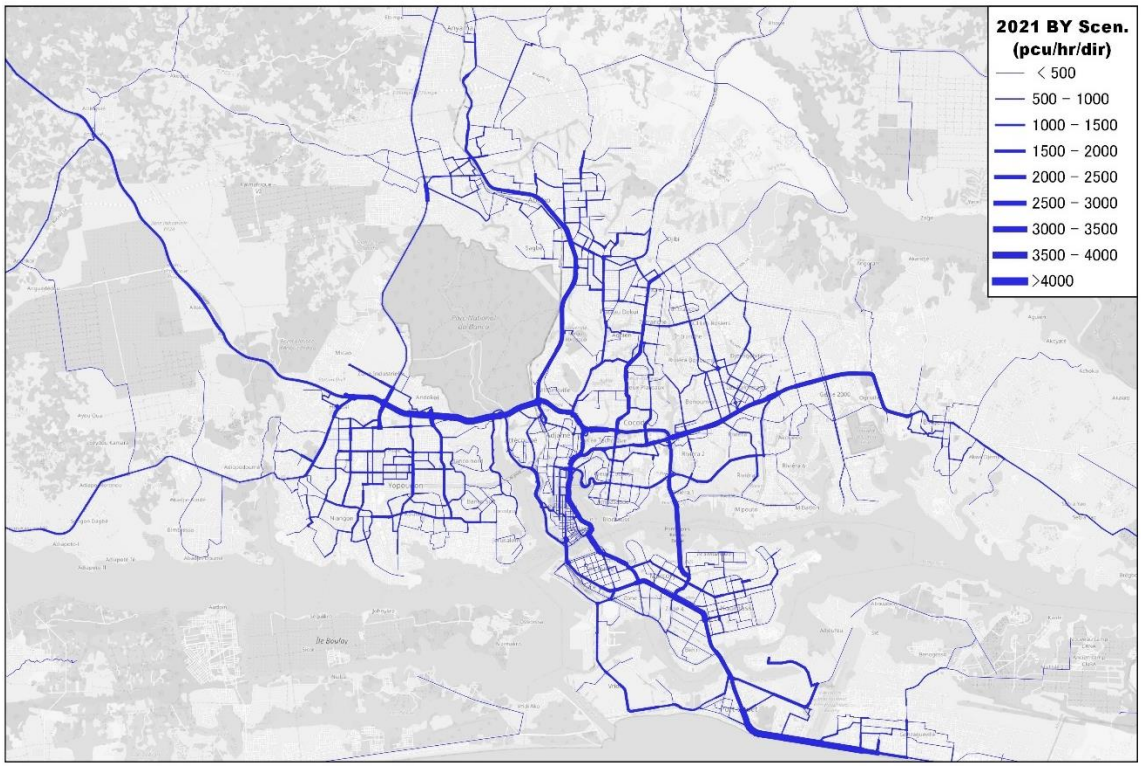
Mode	2021	2030	2040	
	Base Year	With Plan	SDUGA	SDUGA 2040
Walk	6.8 (39.9%)	8.8 (37.8%)	11.0 (36.3%)	11.0 (36.4%)
Public Transport	8.0 (47.3%)	11.0 (46.9%)	15.0 (49.8%)	15.0 (49.7%)
Private Vehicle	2.2 (12.8%)	3.6 (15.3%)	4.2 (13.8%)	4.2 (13.9%)
Total	17.0 (100%)	23.3 (100%)	30.2 (100%)	30.2 (100%)

Source: JICA Project Team

2) Traffic assignment

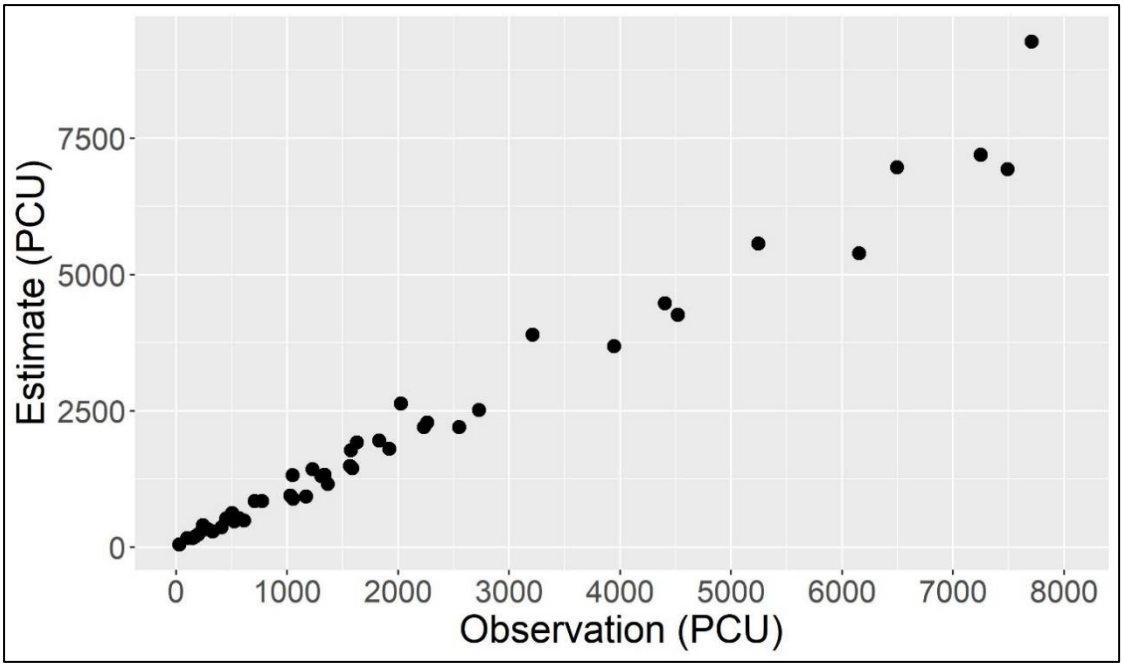
The traffic estimated for the situation is estimated and calibrated for existing situation. Figure 4.3.16 shows the peak-hour traffic.

For confirmation of whether the assigned traffic depicts the current traffic situation, the estimated traffic is compared with that actually observed. Figure 4.3.17 shows the observed and assigned traffic at 45 surveyed road locations, and Table 4.3.3 compares assigned and observed peak hour traffic across 8 screen lines. As can be seen, there is no significant difference between the estimated and observed traffic. This indicates that the model has satisfactorily reproduced the base-year traffic flow situation.



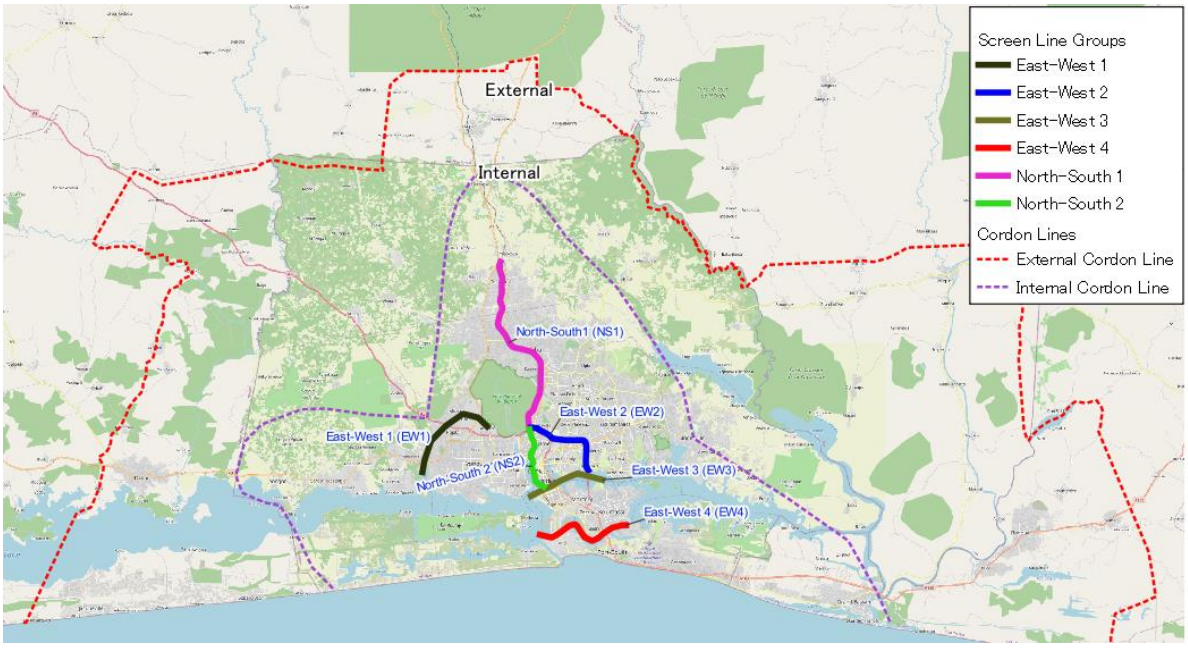
Source: JICA Project Team

Figure 4.3.16 Current Peak Hour Traffic Assignment



Source: JICA Project Team

Figure 4.3.17 Observation Traffic against Assignment Result (Peak Hour)



Source: JICA Project Team

Figure 4.3.18 Location of the Screen Lines

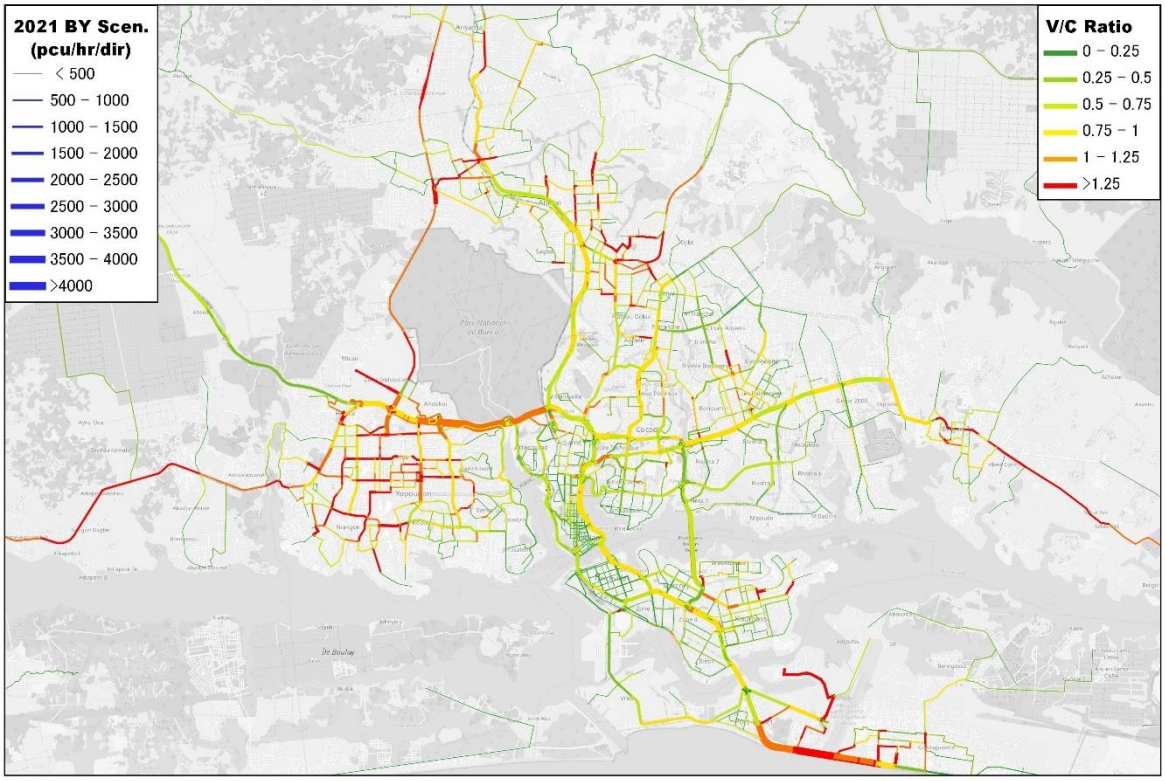
Table 4.3.3 Comparison of Traffic across Screen Lines (Peak Hour)

Screen Line	Traffic Count (PCU/hr)	Model Estimate (PCU/hr)	Estimate/Observation
North-South 1 Screen Line	4,557	4,617	101%
North-South 2 Screen Line	13,204	13,736	104%
East-West 1 Screen Line	6,011	6,073	101%
East-West 2 Screen Line	26,720	27,118	101%
East-West 3 Screen Line	15,950	16,400	103%
East-West 4 Screen Line	8,419	7,675	91%
Internal Cordon Line	7,032	6,780	96%
External Cordon Line	2,819	2,529	90%

Source: JICA Project Team

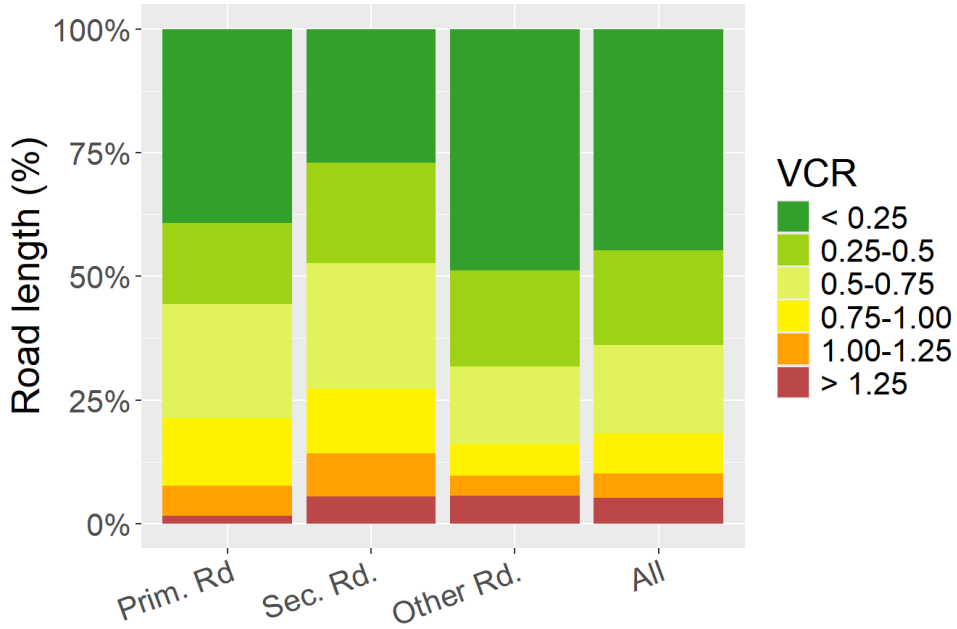
Figure 4.3.19 shows the traffic assignment result for the year 2021, and Figure 4.3.20 summarizes the demand and capacity situation by road class. The demand for about 10% of the road length exceeds the capacity, and that of 18% of the roads exceed 75% of the capacity. The demand for about half the primary roads exceeds 50% of the capacity, and that of about 20% exceeds 75%, with about 8% of the length already over capacity. This increases for rural roads with relatively lower capacity and mostly serving peripheral areas. Among all communes within the project area, Yopougon is the most congested area.

Figure 4.3.21 to 4.3.24 show the result of do-nothing scenarios (i.e., just maintaining the current network) scenario for the years 2030. As can be visually confirmed, the demand for significant part of the network gets close or exceeds the capacity. Roads with demand exceeding the capacity increases to about 30%, and close to half of the network has a demand exceeding 75% of the capacity by 2030. By 2040, the roads with demand exceeding the capacity increases to about of the total roads. In this don-nothing scenarios, primary roads with over capacity demand increases to about 30% by 2030, and over 40% by 2040.



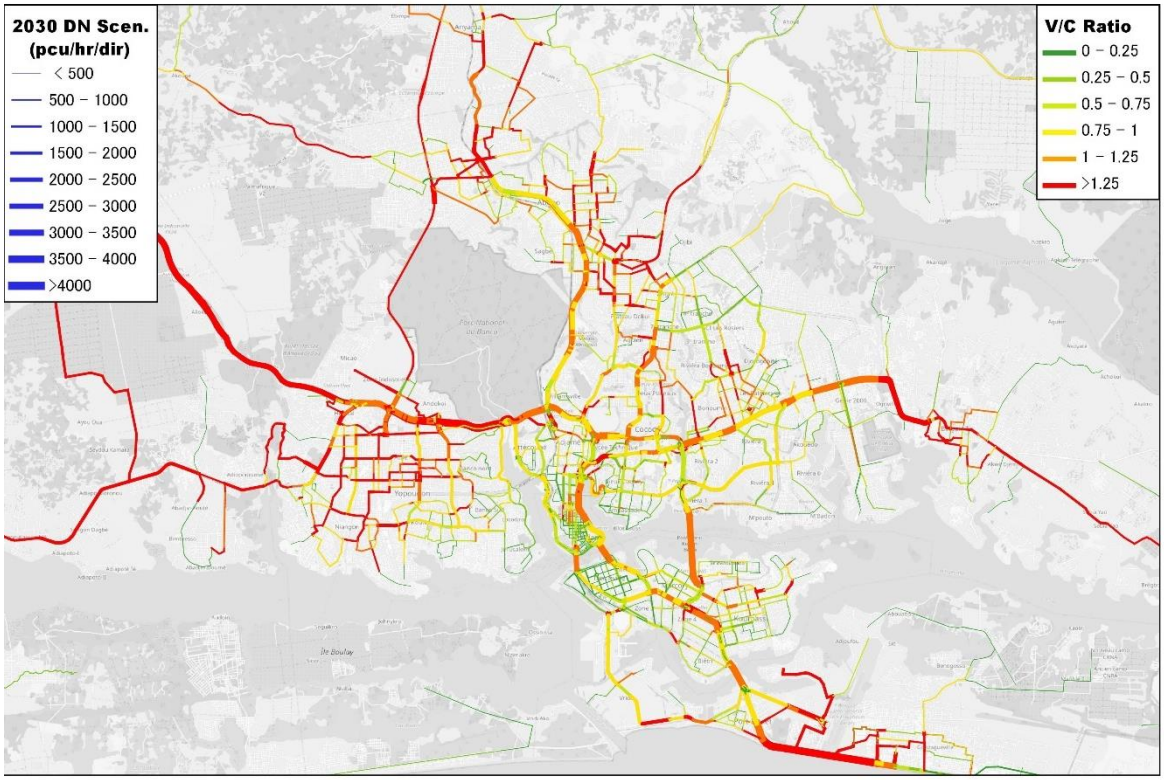
Source: JICA Project Team

Figure 4.3.19 Transport Demand (Base year scenario, 2021)



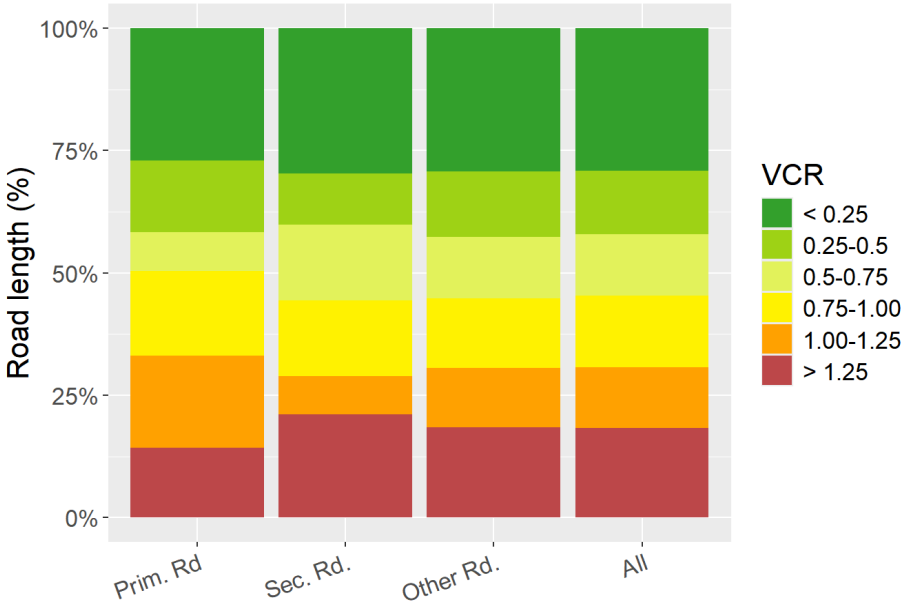
Source: JICA Project Team

Figure 4.3.20 Transport Demand and Capacity by Road Class (Base year scenario, 2021)



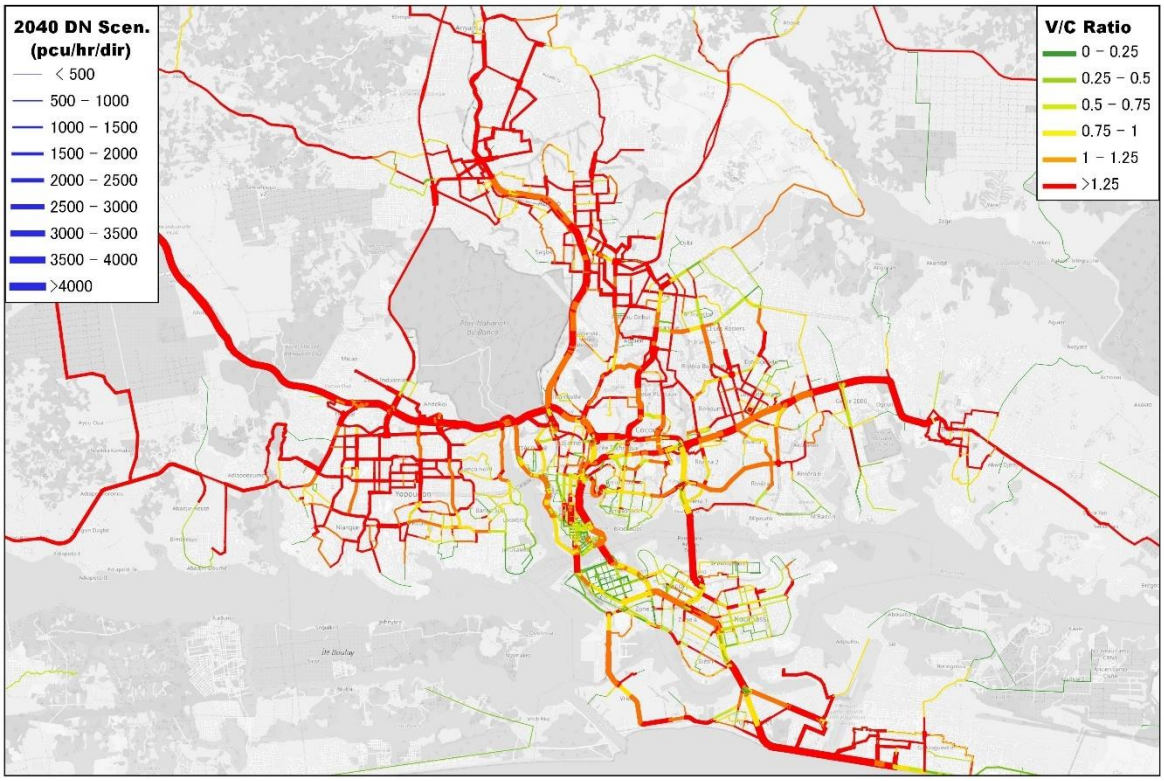
Source: JICA Project Team

Figure 4.3.21 Transport Demand (Do-nothing scenario, 2030)



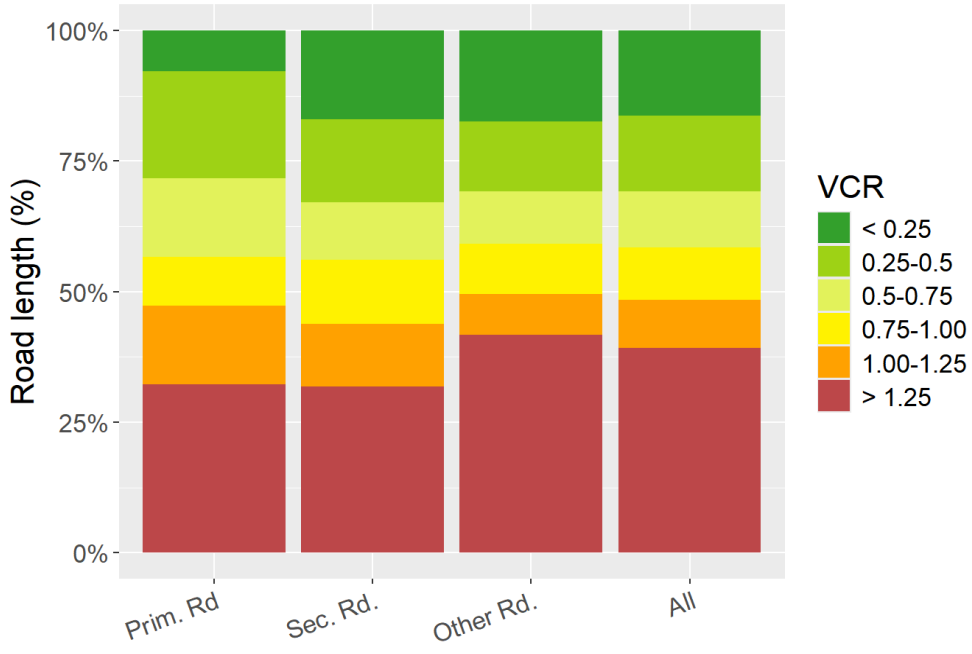
Source: JICA Project Team

Figure 4.3.22 Transport Demand and Capacity by Road Class (Do-nothing scenario, 2030)



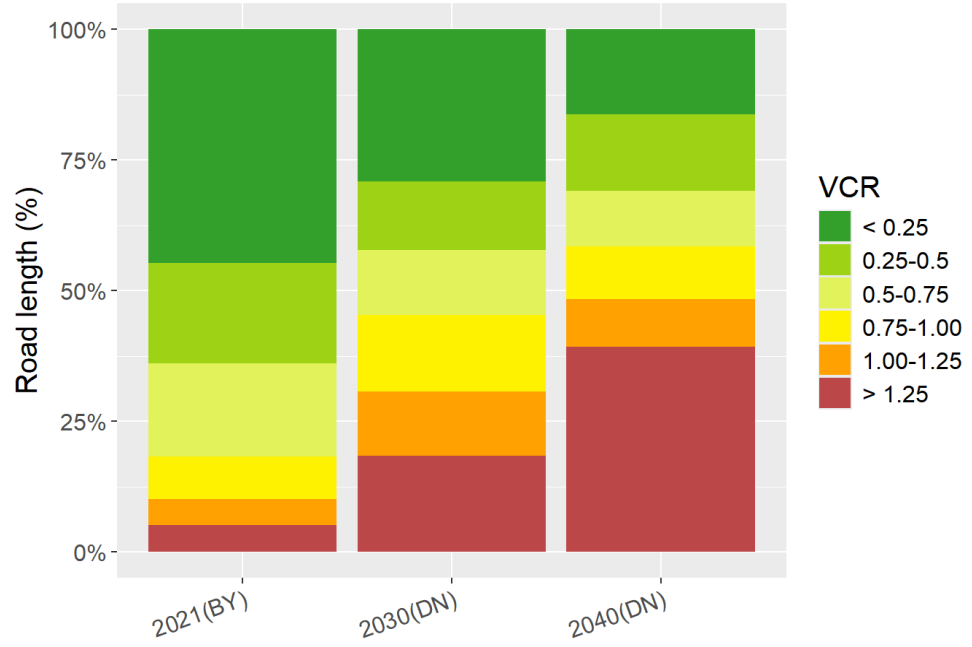
Source: JICA Project Team

Figure 4.3.23 Transport Demand (Do-nothing scenario, 2040)



Source: JICA Project Team

Figure 4.3.24 Transport Demand and Capacity by Road Class (Do-nothing scenario, 2040)



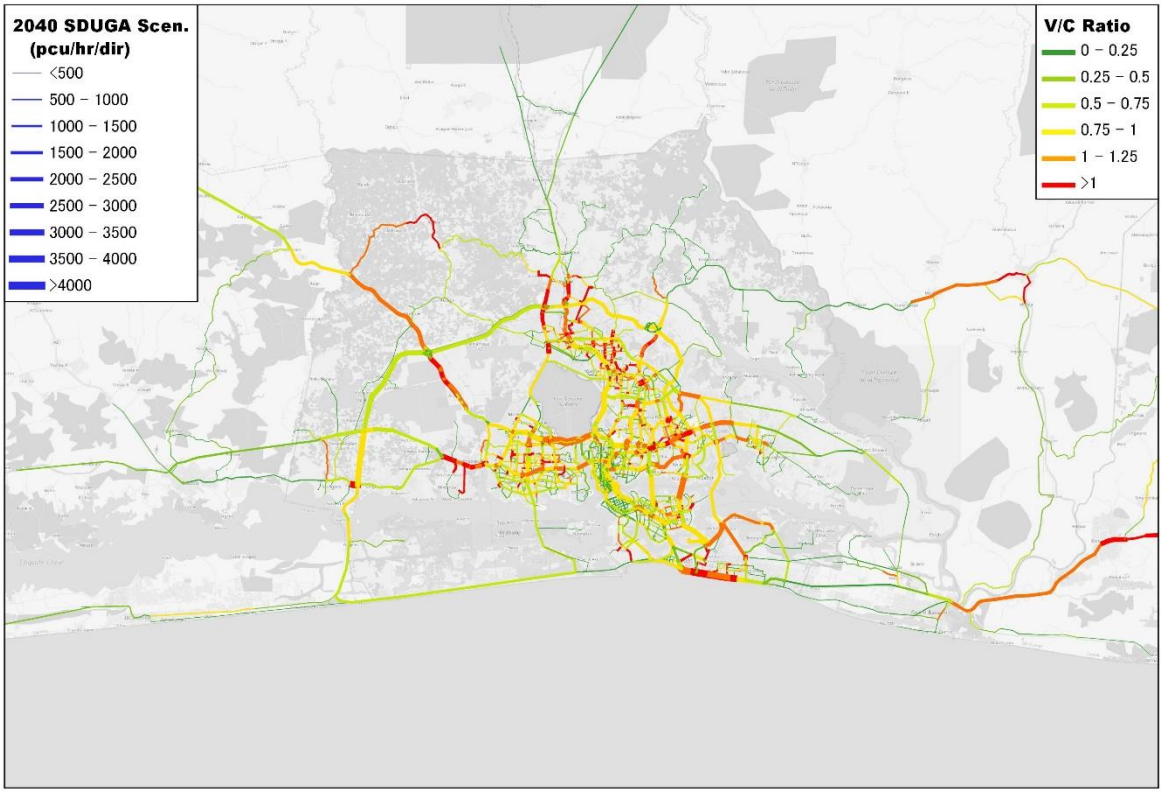
Source: JICA Project Team
BY: base year scenario; DN: Do-nothing scenario

Figure 4.3.25 Trend of Transport Demand and Capacity by Year of Do-nothing Scenarios

The changes with plane scenarios are summarized in the figures below. The overall performance of the roads has significantly improved, as the summary figure below shows. With the priority plan, the average speed of the network increases to over 16km/hr, almost a double of the do-nothing scenario. In the SDUGA scenario, the average speed of the network drops to about 6.5 km/hr by 2040, but this increases by more than two times with SDUGA plans, and to about three times by with SDUGA 2040 plans (Table 4.3.4).

Source: JICA Project Team

Figure 4.3.26 Transport Demand (Priority plan scenario, 2030)

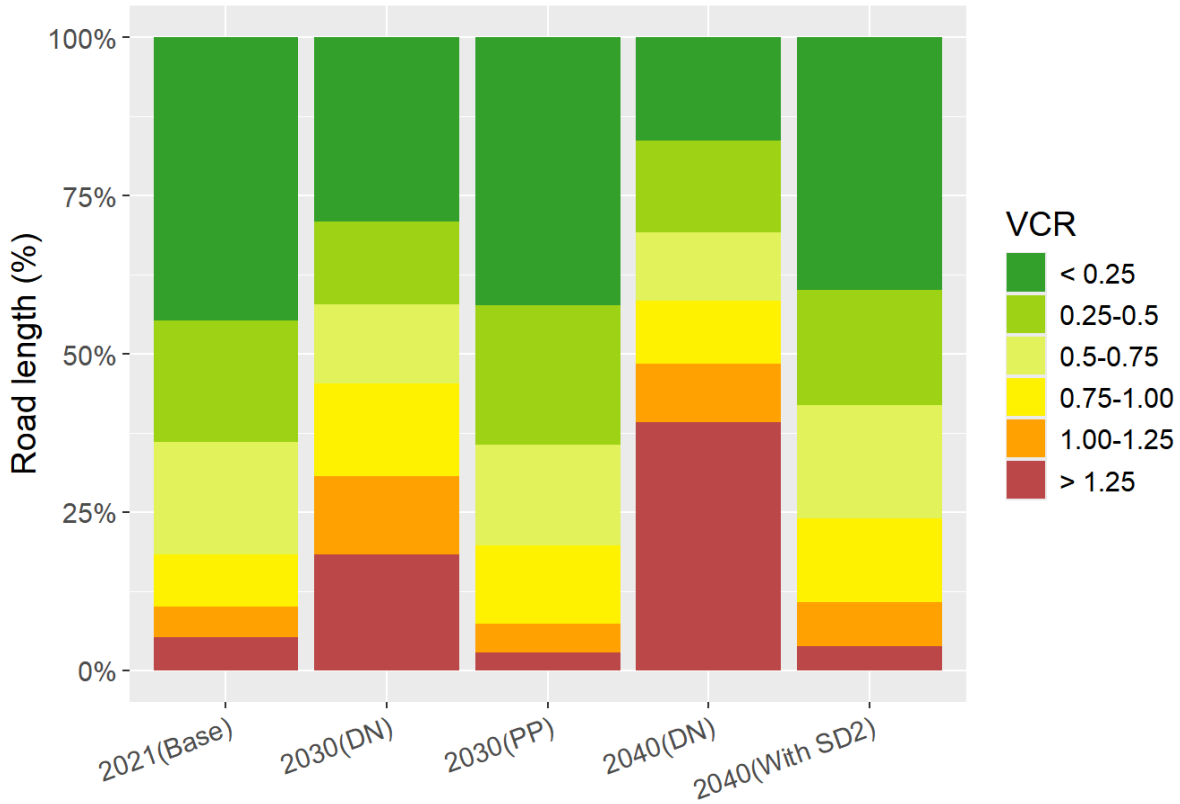


Source: JICA Project Team

Figure 4.3.27 Transport Demand (SDUGA scenario, 2040)

Source: JICA Project Team

Figure 4.3.28 Transport Demand (SDUGA 2040 scenario, 2040)



Source: JICA Project Team

Figure 4.3.29 Transport Demand by scenario (2040)

Table 4.3.4 Network Performance Indicators by Scenario

Peak hour

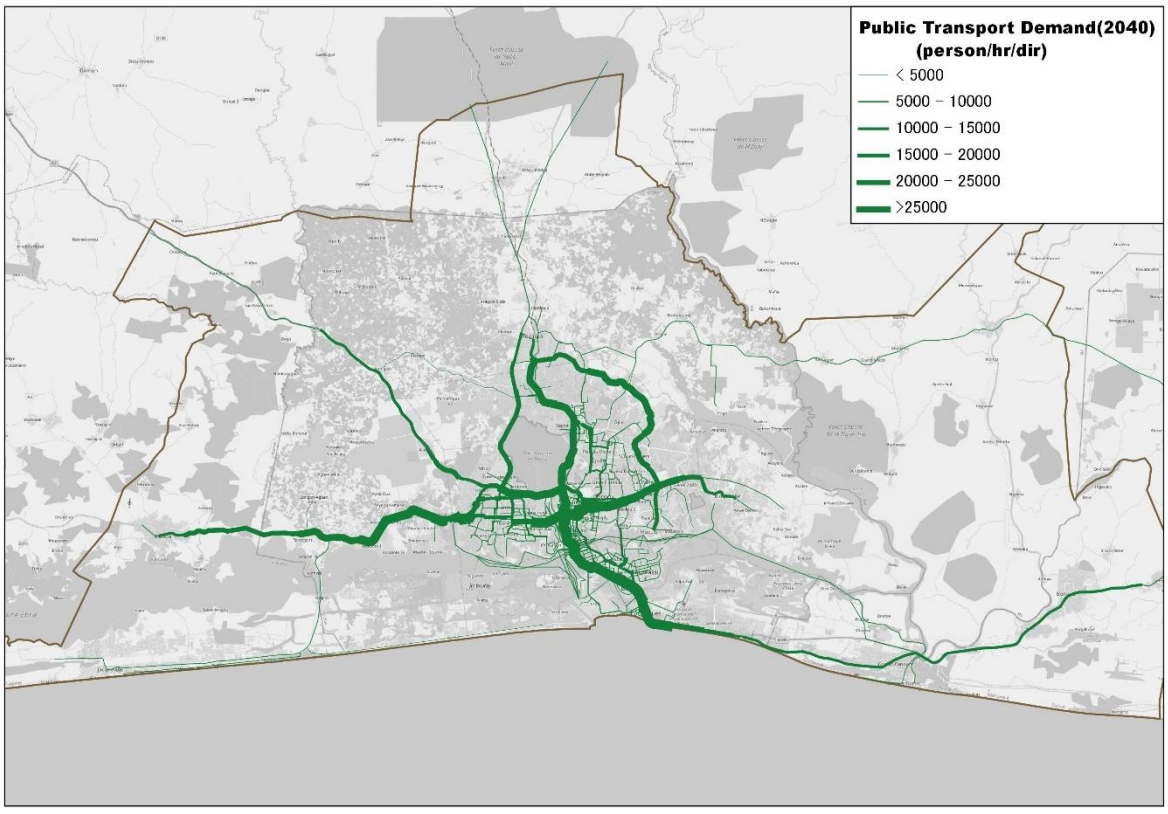
Indicator	2021	2030		2040		
	Base Year	Do-Nothing	With Plan	Do-Nothing	SDUGA	SDUGA 2040
Vehicle Kilometers of Travel (Million)	1.49	2.49	2.17	3.56	3.00	2.84
Vehicle Hours of Travel (Million)	0.11	0.30	0.13	0.55	0.21	0.15
Passenger Kilometers of Travel for private (Million)	3.81	5.54	4.96	7.28	6.29	6.03
Passenger Hours of Travel for private (Million)	0.27	0.65	0.30	1.12	0.45	0.34
Average Vehicle Speed (km/h)	13.45	8.23	16.25	6.42	14.16	18.50

Source: JICA Project Team

3) Public transport assignment

The figure below shows the result of the public transport assignment for 2040**.** Table 4.3.5 compares the traffic change before and after MRT introduction, and Table 4.3.6 shows the peak hour MRT traffic in the peak direction by route.

According to the expected passenger volume estimated by traffic simulation model of public transportation shown in Table 4.3.6, BRT of East - West line and Voie Express as of 2040 may be larger than the typical capacity of BRT.



Source: JICA Project Team

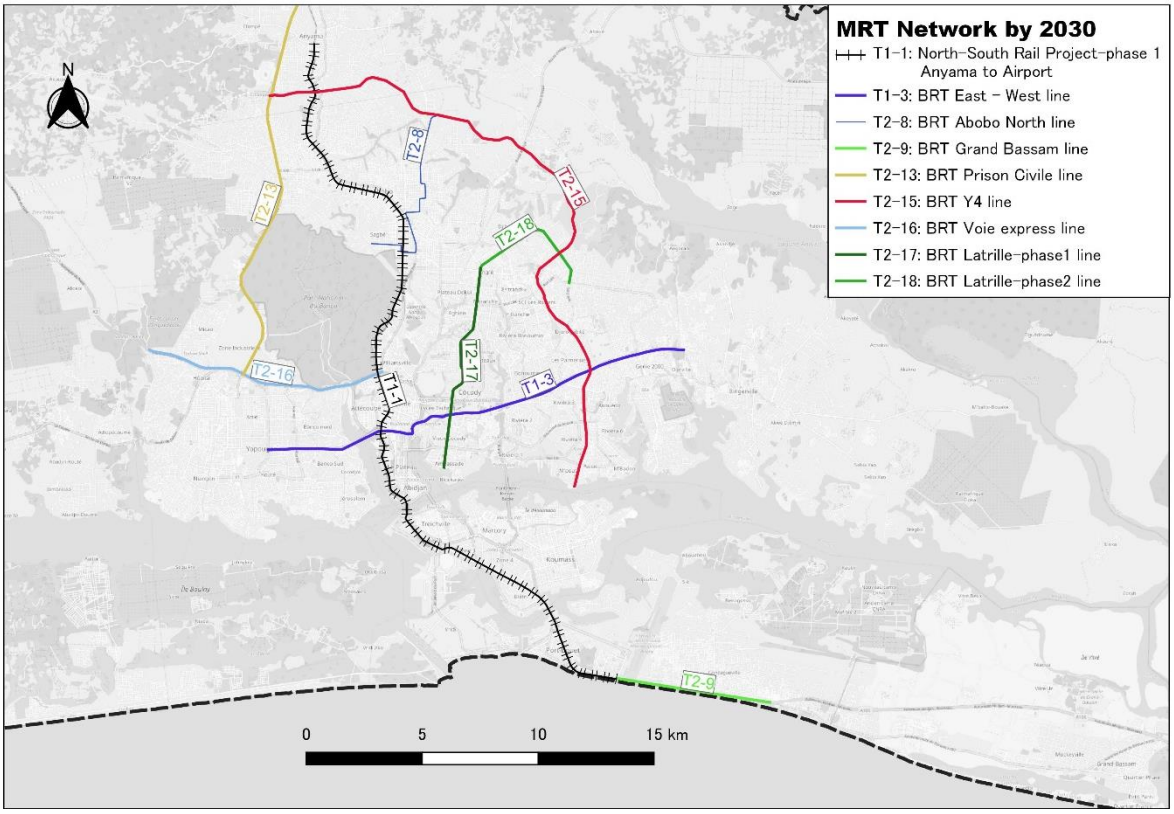
Figure 4.3.30 Public Transport Demand (2040)

Table 4.3.5 Public Transport Traffic by Mode and Scenario

Daily boardings

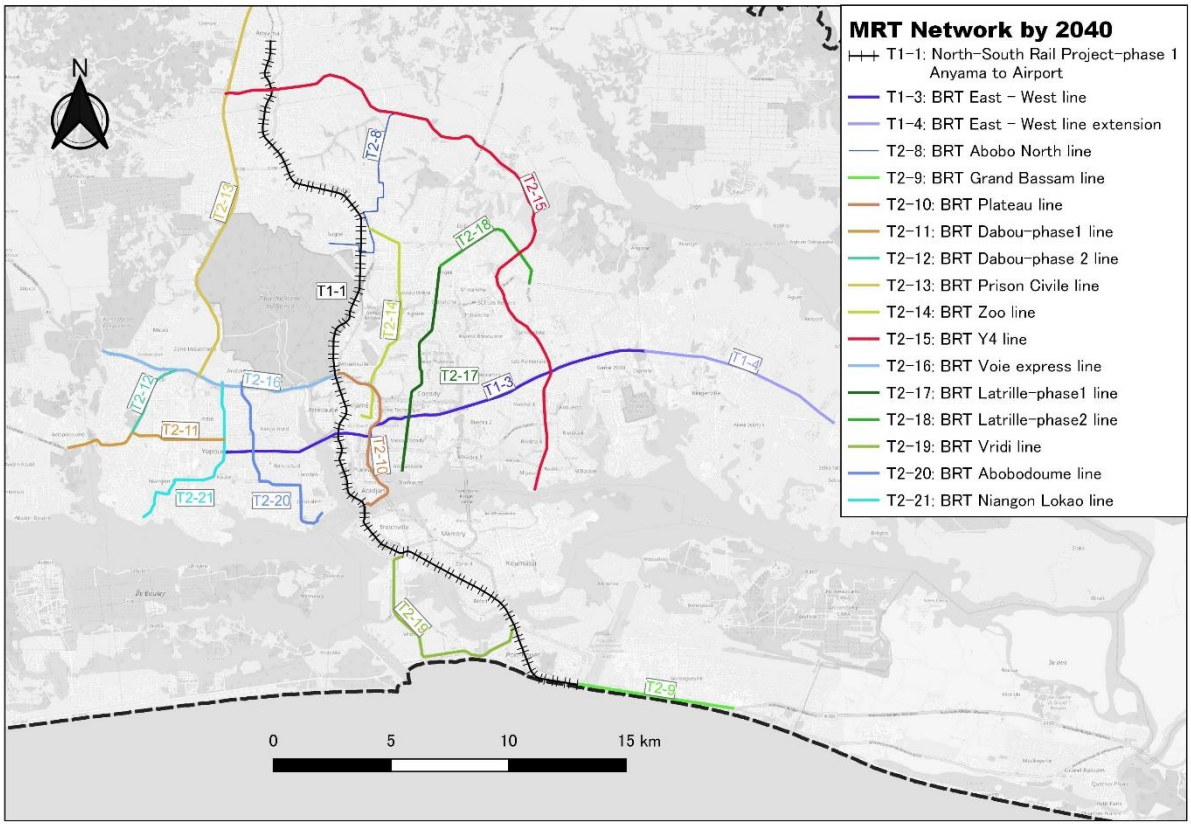
Mode	2021 (Base Year)		2030		2040	
	Million	%	Million	%	Million	%
Metro (NS)			1.15	9.52%	1.76	10.01%
BRT			2.48	20.47%	5.91	33.61%
SOTRA Bus	0.97	12.10%	1.35	11.13%	1.41	8.05%
Water	0.17	2.20%	0.49	4.06%	0.66	3.78%
Gbaka	6.39	79.10%	5.73	47.37%	6.64	37.79%
Woro-woro	0.54	6.70%	0.9	7.44%	1.19	6.77%

Source: JIICA Project Team



Source: JICA Project Team

Figure 4.3.31 MRT Network (Plan Scenario, 2040)



Source: JICA Project Team

Figure 4.3.32 MRT Network (Plan Scenario, 2040)

Table 4.3.6 MRT Demand at Peak Hour by Route (2040)

Unit: passenger

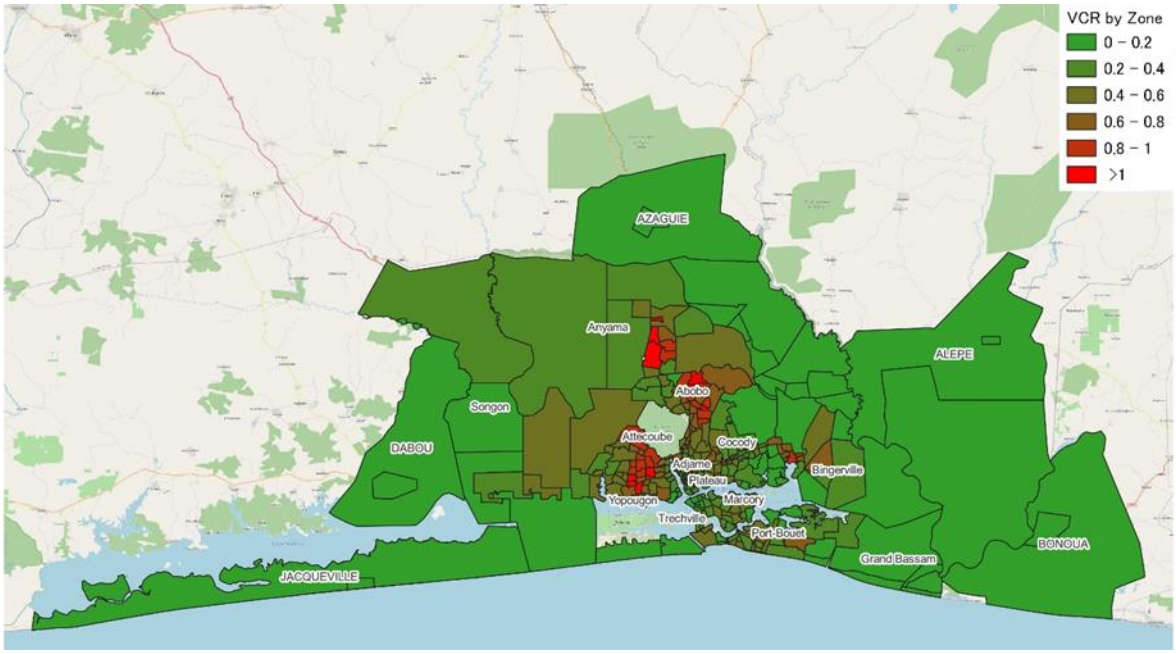
Route Name	Mode	PHPPD	
		2030	2040
T1-1: North-South Rail Project-phase 1 Anyama to Airport	Metro	27,695	37,599
T1-3: BRT East – West line	BRT	19,570	28,341
T1-4: BRT East – West line Extension			2,428
T2-8: BRT Abobo North line		4,828	4,373
T2-9: BRT Grand bassam line		5,723	8,266
T2-10: BRT Plateau line			6,223
T2-11: BRT Dabou-phase1 line			13,519
T2-12: BRT Dabou-phase 2 line			9,076
T2-13: BRT Prison civile line		9,339	14,186
T2-14: BRT Zoo line			5,065
T2-15: BRT Y4 line		8,262	16,157
T2-16: BRT Voie express line		15,057	21,731
T2-17: BRT Latrille-phase1 line		5,985	7,481
T2-18: BRT Latrille-phase2 line		3,146	4,990
T2-19: BRT Vridi line			2,650
T2-20: BRT Abobodoume line			7,772
T2-21: BRT Niangon lokao line			8,003
T2-22: BRT East-West Extention			2,428

Source: JICA Project Team

4.3.3 Review and Evaluation of SDUGA

(1) Evaluation of existing road network in Abidjan Metropolitan Area

Figure 4.3.33 shows the result of crowded index by micro traffic zone. Almost all congested areas against existing road capacity are located in Yopougon and Abobo communes as well as Anyama except certain micro zone in which only few low-capacity road is passing. Volume-capacity ratio (crowded index) of Banco area is higher (V/C ratio is 0.8−1.0) since connecting roads between CBD (Plateau, Adjamé, and Cocody) and Yopougon / Abobo is located in the area. This suggests that improvement of access road between CBD and Yopougon / Abobo and development/upgrade of roads in two communities be highly priotized.

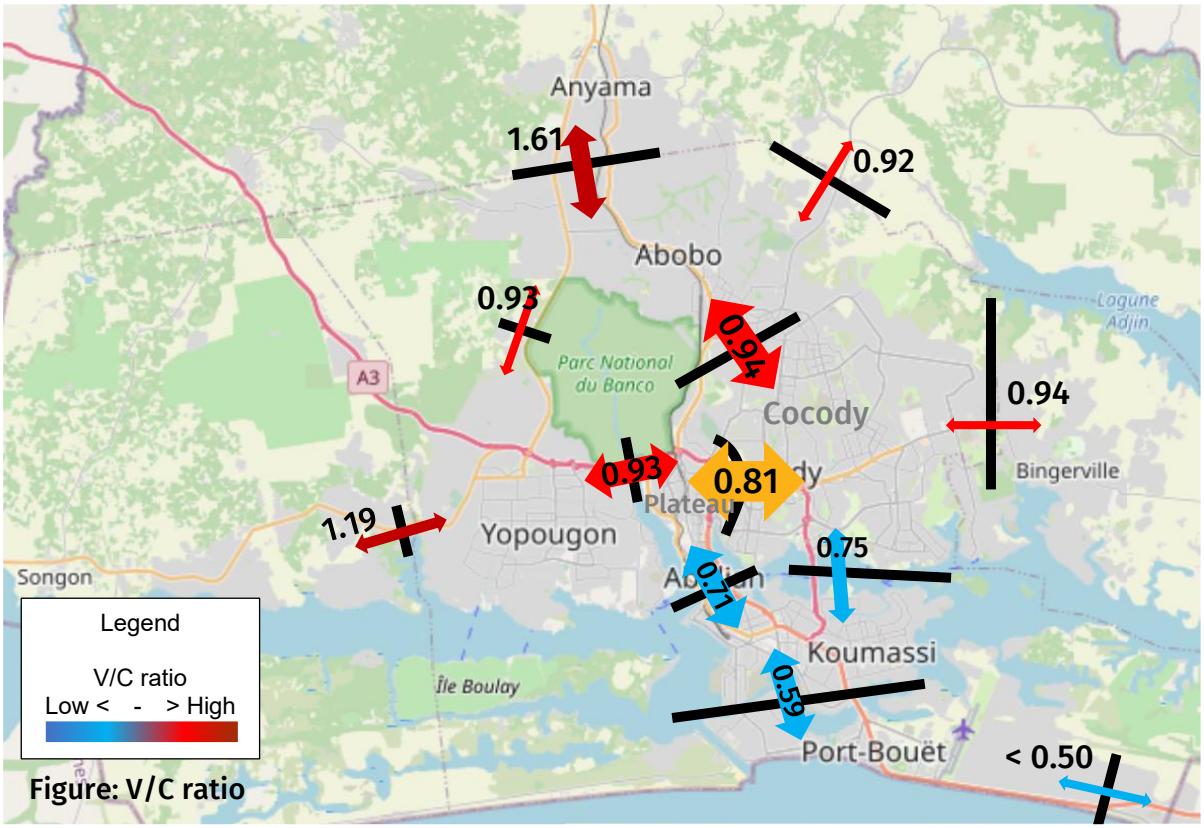


Source: JICA Project Team

Figure 4.3.33 Volume–capacity ratio by micro traffic zone in 2021

(2) Evaluation of existing road network in Abidjan Metropolitan Area by screens

Figure 4.3.34 shows traffic crowded condition at traffic peak hour by major screen line, e.g. screen between communes, as of 2021. The size of arrows means traffic volume, and colour means crowded level. The screens with the highest traffic volume at peak time are flows between CBD entrance, e.g. traffic between Plateau and Cocody, Abobo and Cocody, and Yopougon and Plateau. Capacity gaps at most of southern part of Abidjan is not crowded while the one at north part of Abidjan is crowded. The most congested screen is the area between Abobo and Anyama in which crowded level is over 1.6, and western screen in which crowded level is almost 1.2 due to shortage of road capacity against demand even at small traffic volume.

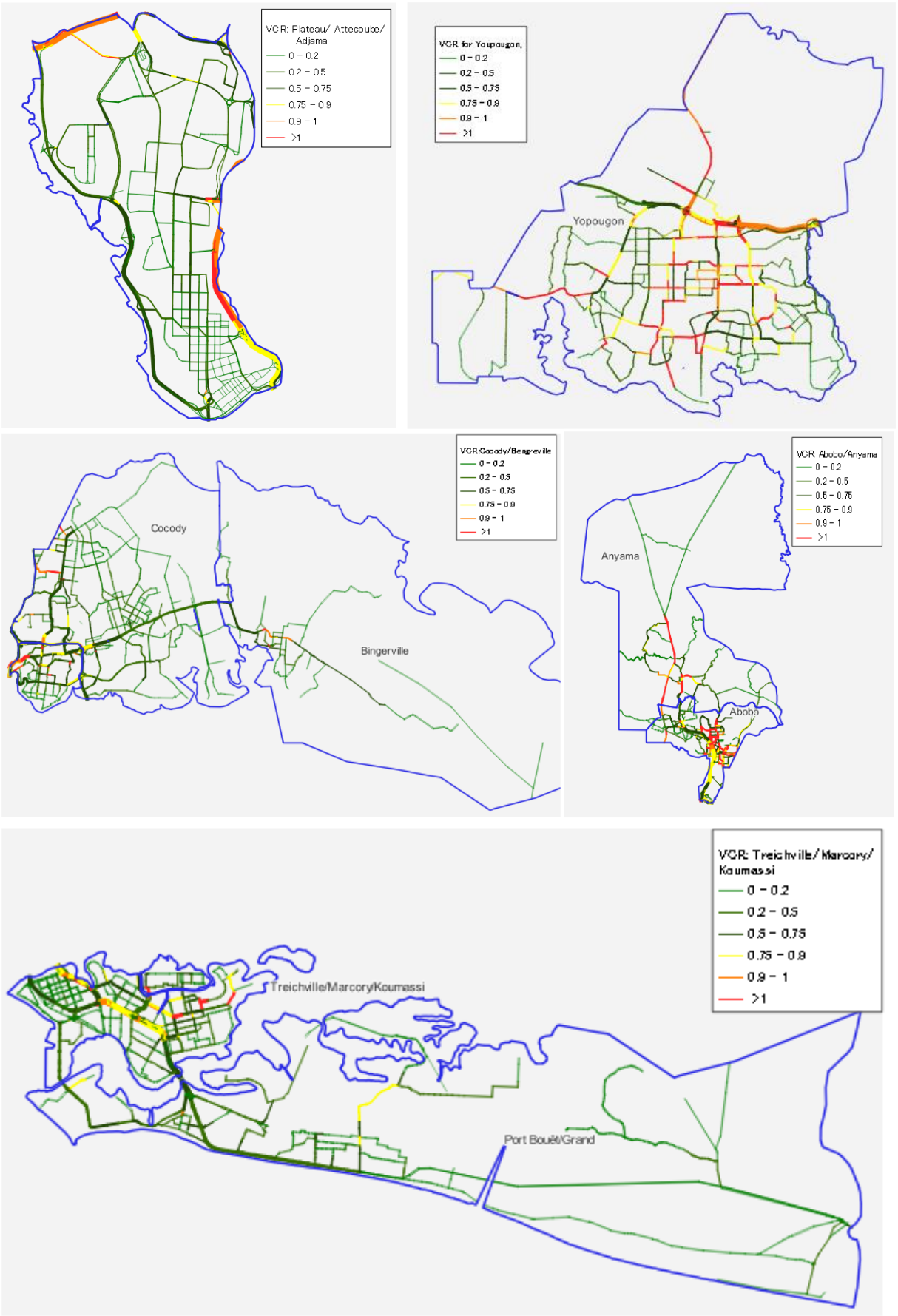


Source: JICA Project Team editing on OpenStreetMap

Figure 4.3.34 Volume – capacity ratio by roads in 2021

(3) Evaluation of existing road network in Abidjan Metropolitan Area by links

In relation to the results of volume-capacity ratio by zones and major screen in before, crowded links are concentrated in Yopougon and Abobo communes. A congestion level of roads in CBD is not so crowded comparing with the condition of both communes because of the good geometrical road structure. Several roads in CBD, Plateau and Adjamé, however, are extremely crowded due to traffic control issues, i.e. parking obstacles at roadside and pedestrian behaviour. It is true that the capacity of road geometrical factors itself can accommodate traffic demand.

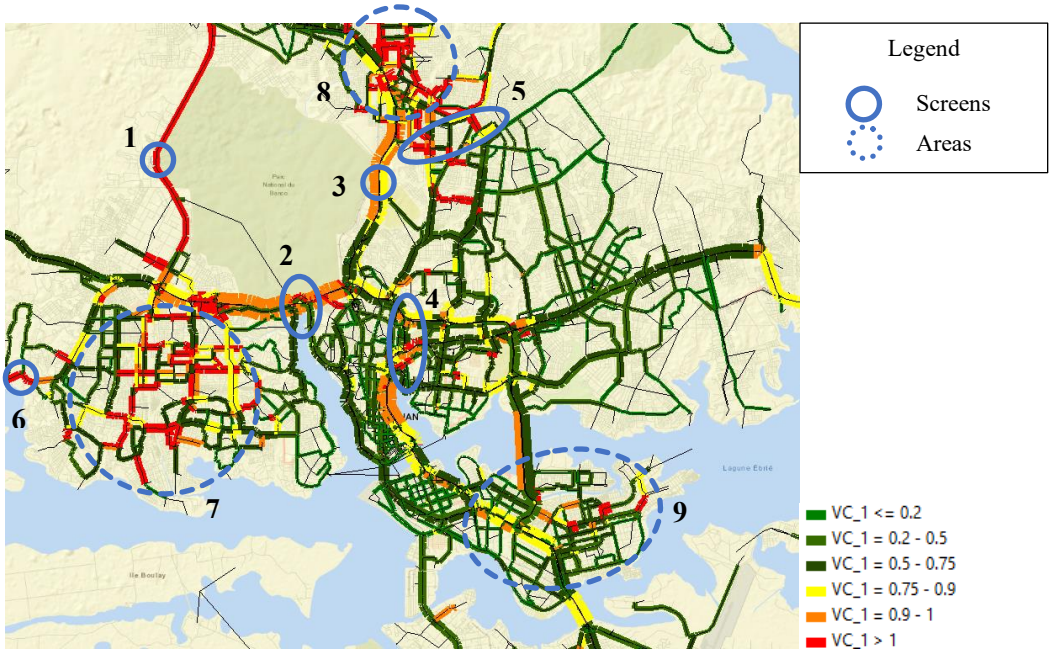


Source: JICA Project Team

Figure 4.3.35 Volume–capacity ratio by links by major commune blocks in 2021

(4) Critical screens and areas in Abidjan Metropolitan Area

Figure 4.3.36 shows summary of major critical screens and areas of heavy road traffic congestion evaluated by traffic simulation model and its factors in Abidjan metropolitan area.



Source: JICA Project Team

Figure 4.3.36 Traffic –capacity ratio by roads in 2021

Table 4.3.7 Major critical location on road traffic condition

No	Road section / area	Description
1	Yopougon – North area (Anyama) screen	Lack of road capacity due to insufficient number of lane and inadequate traffic management at junctions on the corridor
2	CBD (Plateau) – Yopougon screen	Lack of road capacity due to insufficient alternative routes between two areas
3	CBD (Plateau) – Abobo screen	Lack of road capacity due to many junction bottlenecks on the corridor and insufficient alternative routes between two areas
4	Plateau – Cocody screen	Few alternative routes between two areas due to geographical constraints
5	Cocody – Abobo screen	Few alternative routes between two areas due to difficulties of road development from aspect of social consideration
6	Yopougon – West area screen	Few alternative routes between two areas due to difficulties of road development/improvement from aspect of geographical issue
7	Yopougon area	Difficulty on social consideration due to most density area in Abidjan in terms of population
8	Abobo area	Ditto
9	Marcory area	Concentration of traffic flow according to drastic area development and insufficient traffic management at certain junction

Source: JICA Project Team

(5) Progress of transport projects in SDUGA

The general progress of transport projects proposed by SDUGA is 36.6% as of 2023. Most of institutional projects are on-going by donor's frameworks, but no progress is found for logistics projects. Progress of projects in other categories ranges 30% - 40%; however, construction of large-scale projects of MRT, BRT and several junction improvements have not started and are just in the financing phase.

Table 4.3.8 Progress of transport projects in SDUGA

Category	Number of projects	More funded status	Progress
Road network	67	21	31.3%
Improvement of junction/Traffic control	35	14	40.0%
Public transport	13	5	38.5%
Institutions/Logistics	8	5	62.5%
Total	123	45	36.6%

Source: JICA Project Team

(6) Evaluation of SDUGA

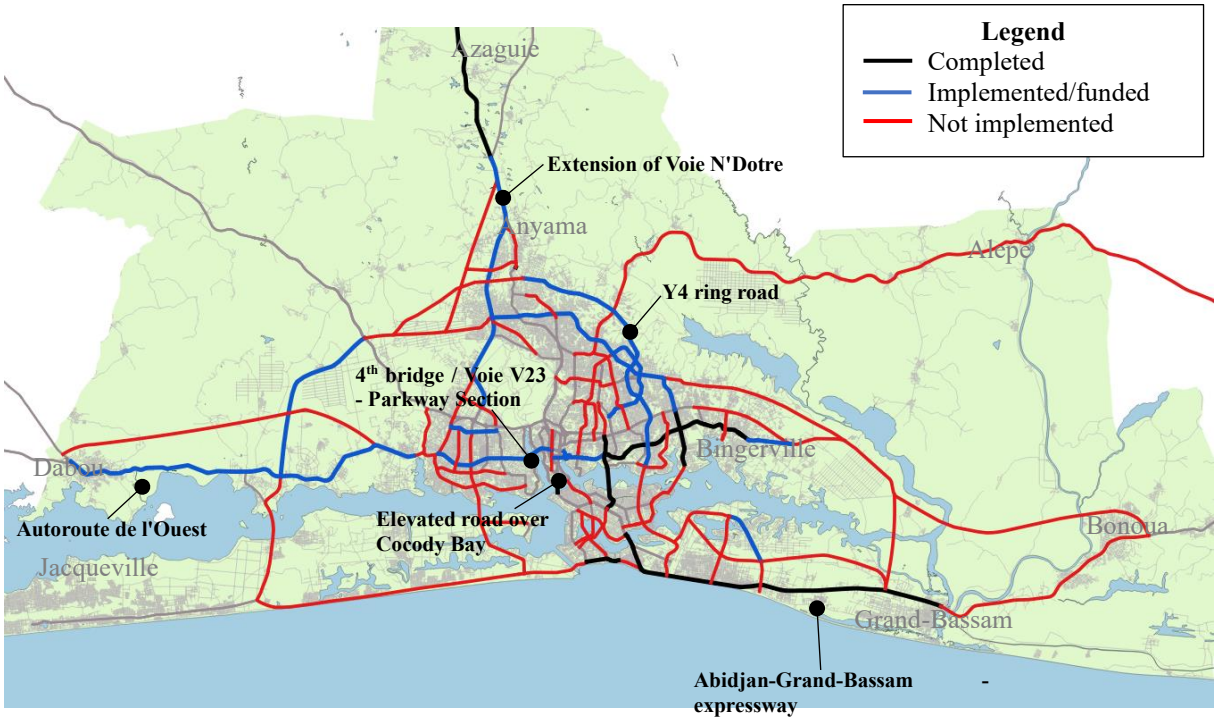
1) Road network

The progress of the road projects in SDUGA is shown below, and most of the ongoing projects covers the issues as critical points explained in the former section. However, project status of road capacity improvements between Cocody and Abobo except Y4 ring road (V-10-2) ; No.3 & 5 in Table 4.3.7), community-based road developments especially in Yopougon and Abobo; No.7 & 8 in Table 4.3.7), and improvements of junctions especially for Yopougon, Abobo and Marcory; No.7, 8 & 9 in Table 4.3.7) are still in slow progress.

Table 4.3.9 Major on-going/completed road projects in SDUGA to cope with critical issues

Project	Progress status	Contribution for critical location in Table 4.3.7
Y4 ring road (V-10-2)	Under construction for North-East part with minor alignment change from SDUGA	-
Abidjan- Grand Bassam expressway (V-3-1)	The highway section is completed as well as toll gate construction and operating	-
Autoroute de l'Ouest (V-4-10)	Under widening with minor alignment change just before Adiopodoumé	No.6
Extension of Voie N'dotré (V-5-3)	Under widening	No.1
4th bridge / Voie V23 - Parkway Section (V-4-1, V-4-2)	Under construction of bridge and approach road which is infrastructure for BRT route in future	No.2 (BRT route)
Elevated road over Cocody Bay (V-9-3)	Under construction of bridge and approach road	No.4

Source: JICA Project Team



Source: JICA Project Team

Figure 4.3.37 Location of on-going road projects

2) Improvement of junctions and other traffic management

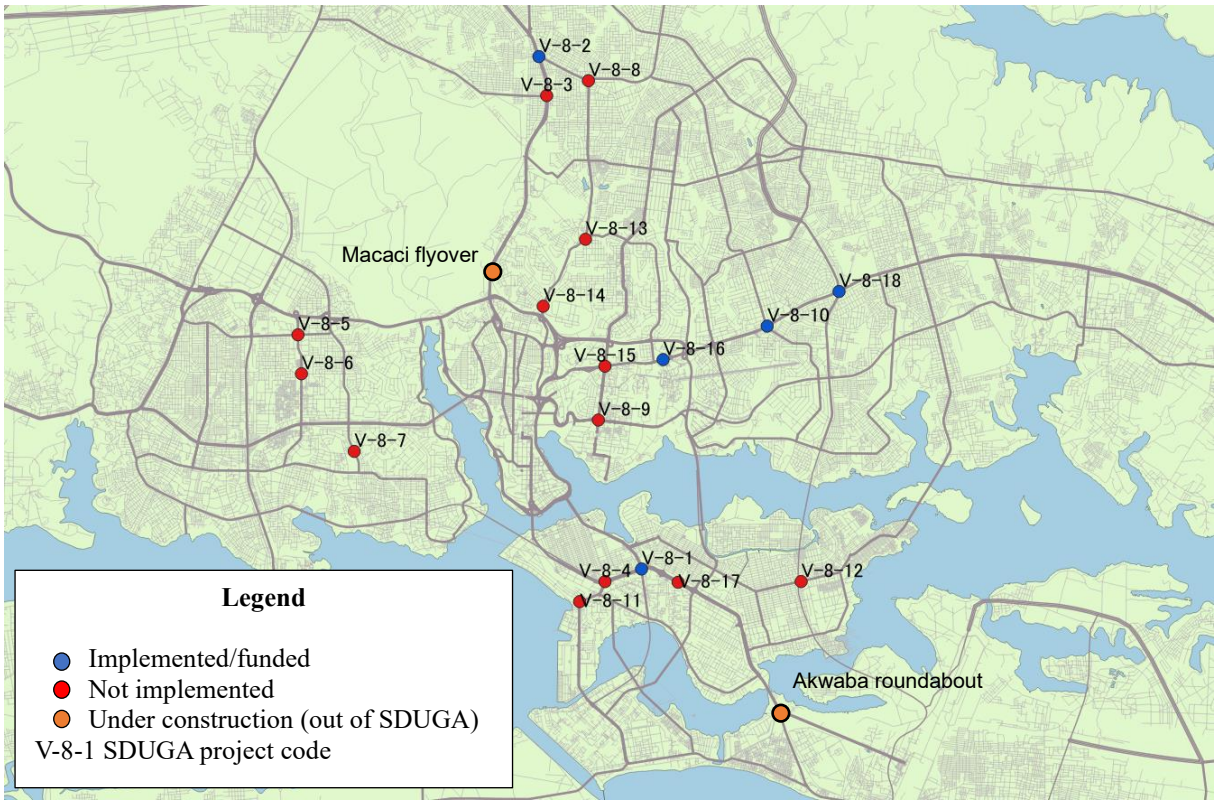
The progress of junction improvement in SDUGA is shown below. Most of the ongoing projects are expected to improve the traffic condition in the listed critical screens and areas. Several junctions are under improvement (most of them is flyover or underpass) for future BRT routes.

Table 4.3.10 Progress of road projects in SDUGA

Junction (SDUGA project code)	Progress status	Contribution for critical location in Table 4.3.7
Mairie d'Abobo junction (V-8-2)	Under construction	3, 5
Solibra junction (phase-2) (V-8-1)	Under construction	9
L'Ecole Nationale de Police junction (V-8-10)	Soon	(BRT rotue)
Palmeraie junction (V-8-16)	Soon	(BRT route)
Riviera 3 junction (V-8-18)	Soon	(BRT route)
Macaci roundabout (out of SDUGA)	Under construction	3, 5
Akwaba intersection (out of SDUGA)	Under construction	9

Source: JICA Project Team

Although improvement of Akwaba intersection and Macaci flyover is not officially stipulated in SDUGA, they are under construction.



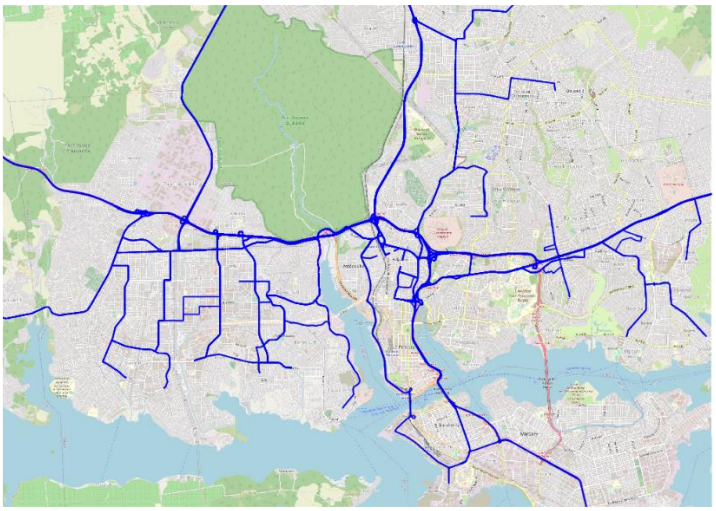
Source: JICA Project Team

Figure 4.3.38 Location of junction improvement in SDUGA

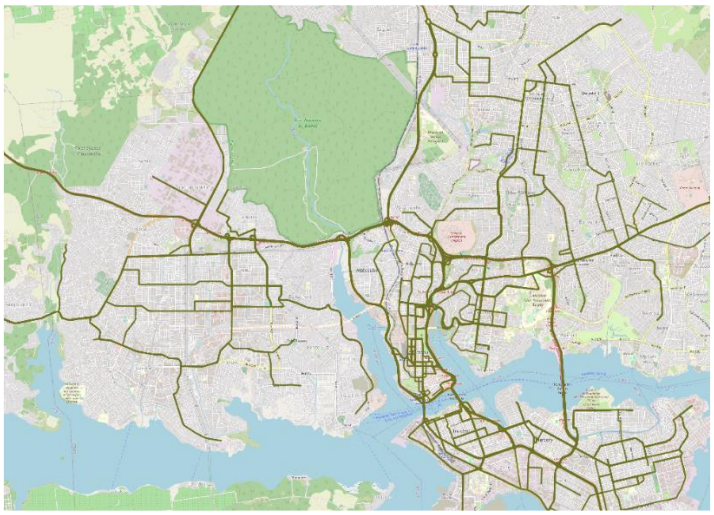
3) Public transport

Only three kinds of public transport, bus, mini-bus (Gbaka) and Wôrô-wôrô are available in Abidjan metropolitan area. Civil work has not started for the proposed public transport system, i.e. MRT and BRT.

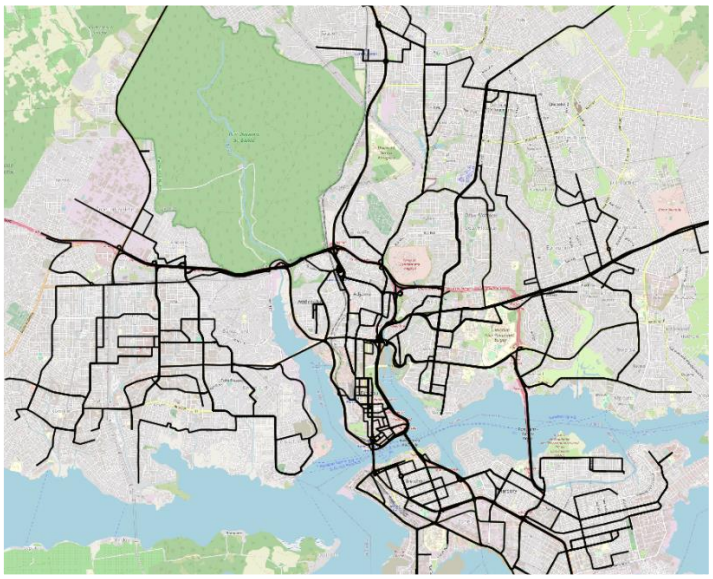
Figure 4.3.39 show the entire route maps of three existing public transportation modes. SOTRA bus covers mainly arterial road network in Abidjan while service of wôrô-wôrô covers wider area because they can access to narrow roads. Service by SOTRA bus in Treichville and Marcory area is quite limited so far. All the routes covered by SOTRA bus are operated by Gbaka and wôrô-wôrô as well. Thus, the hierarchy of the public transport system and their demarcation is not clear.



SOTRA bus



Gbaka



wôrô-wôrô

Source:JICA Project Team based on AMUGA reference

Figure 4.3.39 Current operation network by existing public transport modes

(7) Additional projects after SDUGA establishment

1) Road network

After SDUGA project, some changes have been made to several road projects proposed by SDUGA and new projects have been identified. Also updating the plan for roads and public transport projects proposed by SDUGA has been reconsidered in the framework of other donors' initiatives.

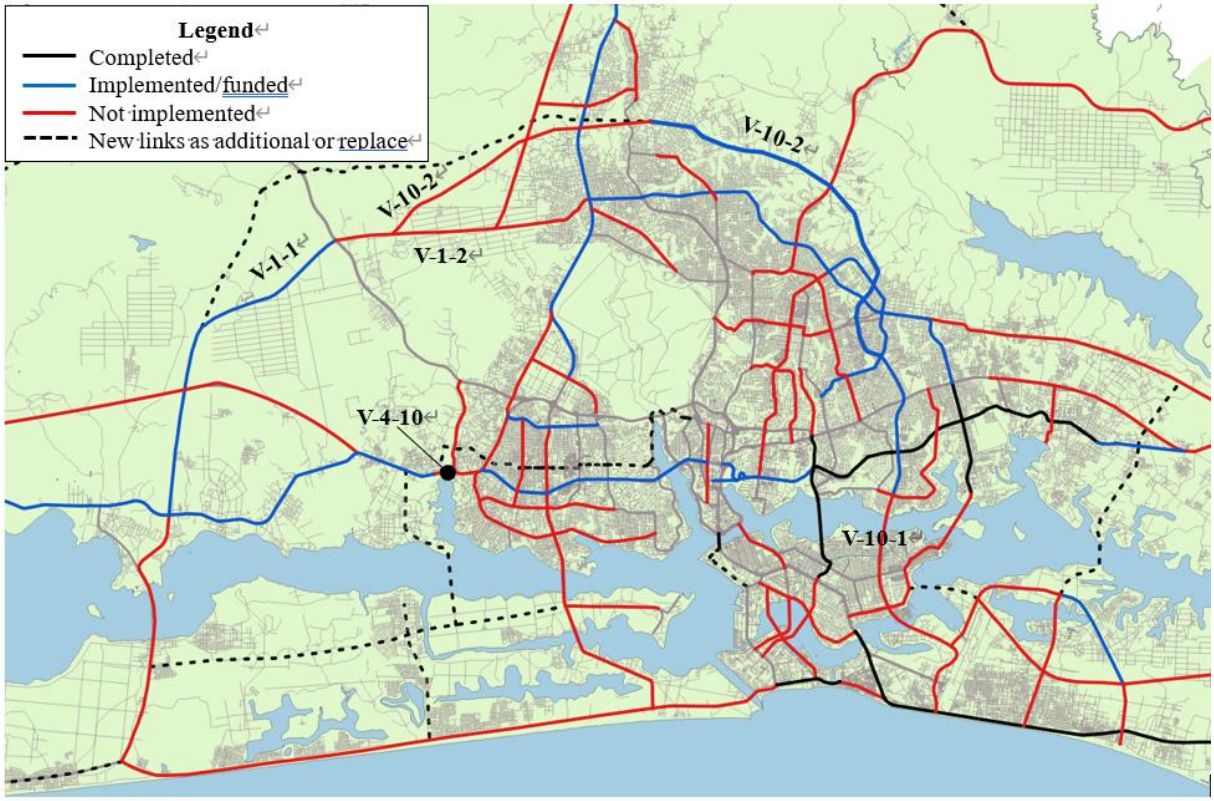
Alignment change of Y4 ring road and others

The alignment of a section of Y4 ring road (V-10-2) has been changed from SDUGA. The north-east part is under construction. Also, the next connecting part to the construction part (V-1-1 and V-10-1) has been changed in alignment, or a change is being studied. A section of the old Y4 ring road (V-1-2) is under consideration whether it will remain or be deleted.

Table 4.3.11 Probable abolishment or replacement of road projects in SDUGA

SDUGA code	Section	Description
V-1-1	A part of Y4 ring road (west-north part)	Alignment of a part of section has been changed from SDUGA and previous section is under considering whether alive of delete
V-1-2	A part of old Y4 ring road (north part)	Under considering whether alive of delete
V-4-10	A part of Autoroute de l'Ouest	Under consideration of minor alignment change for a part of section near Yopougon to improve better alignment
V-10-1	A part of Y4 ring road (east part)	Under study on alignment change by other framework
V-10-2	A part of Y4 ring road (north-east part)	Under construction by minor alignment change from SDUGA

Source: JICA Project Team based on AMUGA reference



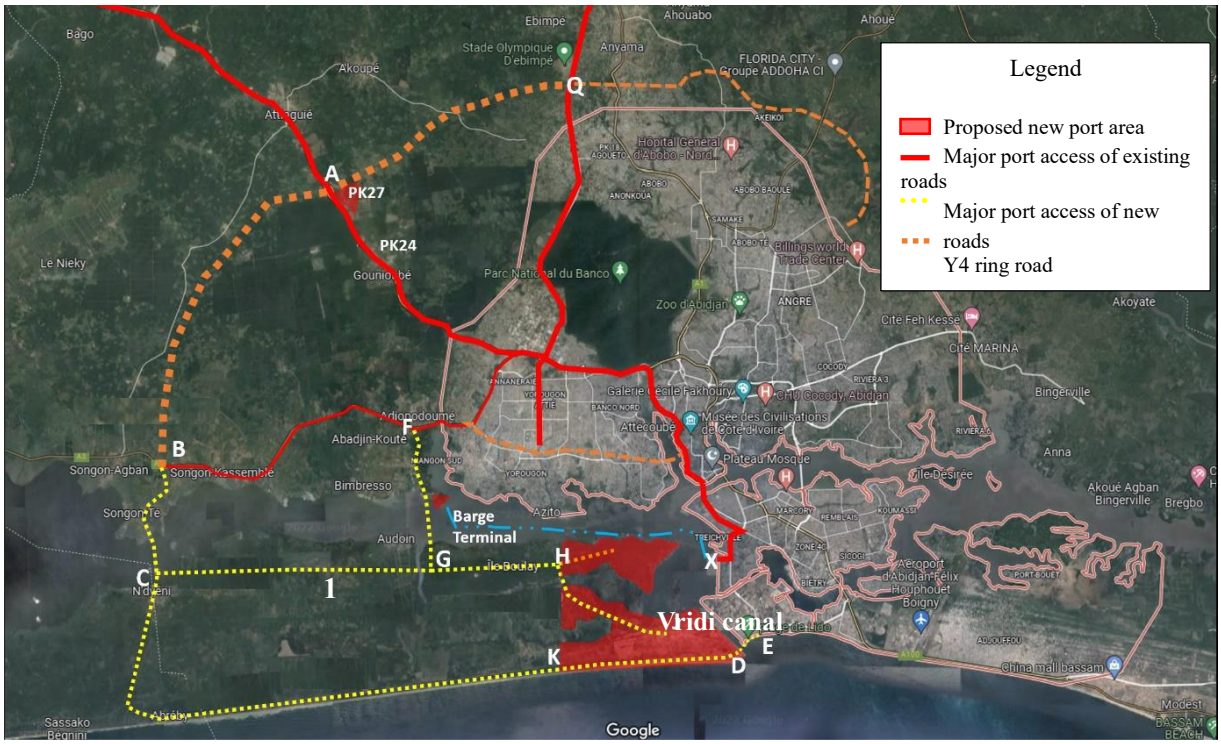
Source: JICA Project Team

Figure 4.3.40 Probable abolishment or replacement of road projects in SDUGA

Coordination with Abidjan port master plan

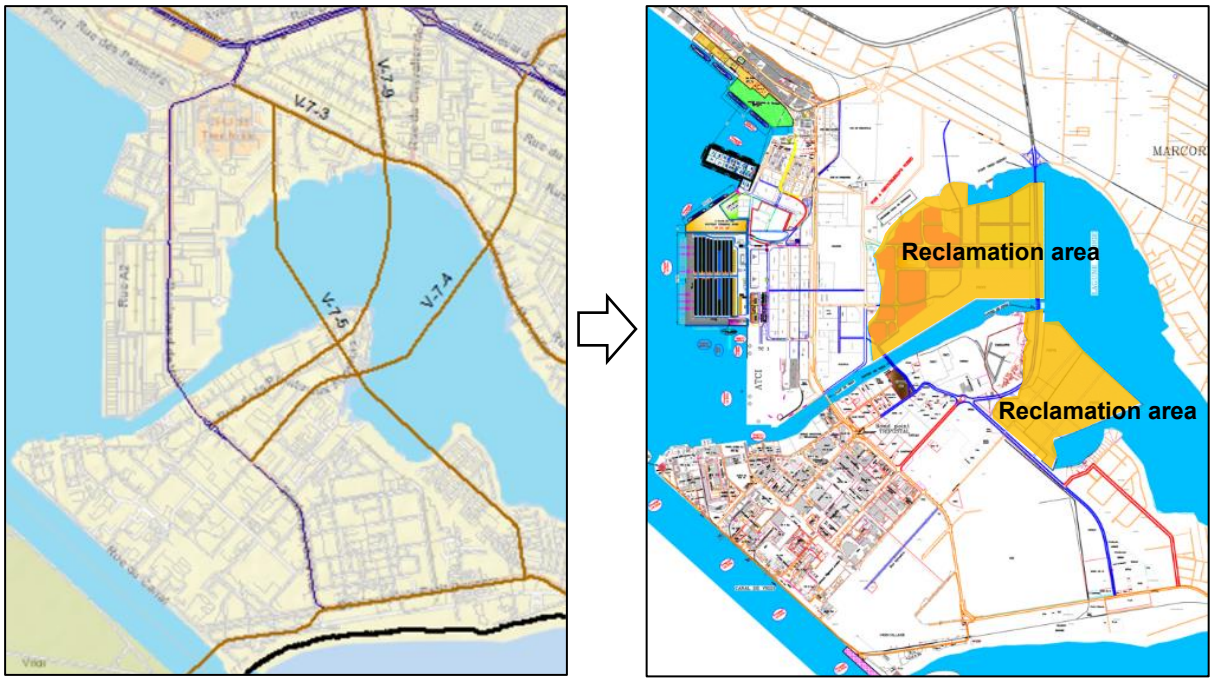
Land reclamation near the existing Abidjan port area and port area expansion toward the western part to enhance port activities are proposed in Abidjan port master plan in 2021. In relation to the new port development concept, strengthening the road network in the port area and improving accessibility to the port are proposed in the master plan. Thus, coordination between the road project plan in SDUGA 2040 and the port master plan is required.

- Enhancement of road network in relation to the port area expansion in the west of Vridi canal
- Reconsideration of crossing infrastructure for Vridi canal (bridge or undersea)
- Change of certain road network according to land reclamation for Vridi industrial zone



Source: Abidjan port masterplan 2021

Figure 4.3.41 Road network plan in port master plan 2021



Source: Abidjan port masterplan 2021

Figure 4.3.42 Road restructuring in land reclamation area

2) Improvement of junctions with new signalization system

A project to improve eighty-nine (89) additional intersections is underway under PTUA (Abidjan Transport Project). In order to observe the actual traffic flow, these intersections are being equipped with intelligent traffic lights and cameras. The location of the intersections that could potentially be improved is distributed as follows;

- 49 intersections in Plateau
- 17 intersection on boulevard latrille (Cocody)
- 06 intersections on Boulevard Mitterand (Cocody)
- 17 intersections DAA (Abidjan City)

3) Public transport

The transport system of the east-west rail project in SDUGA has been changed to BRT. Although there is no significant change in the north-south MRT plan since SDUGA, the study[1] for minor changing in station arrangement is under consideration by other donor programs. The study result will be integrated into SDUGA 2040 once they are made available.

On the other hand, the BRT network is under updating against the plan in SDUGA. It shall be reflected in SDUGA 2040. The final BRT network is not announced yet because a study is still underway. The BRT network has been publicized as shown in Figure 4.3.44.

There is no big change in the route of ferry transport since SDUGA. Terminals at eight locations for ferry transport are, however, under consideration under other donor's program.

A summary of the on-going studies related to updating the transport project against SDUGA is shown in Table 4.3.12.

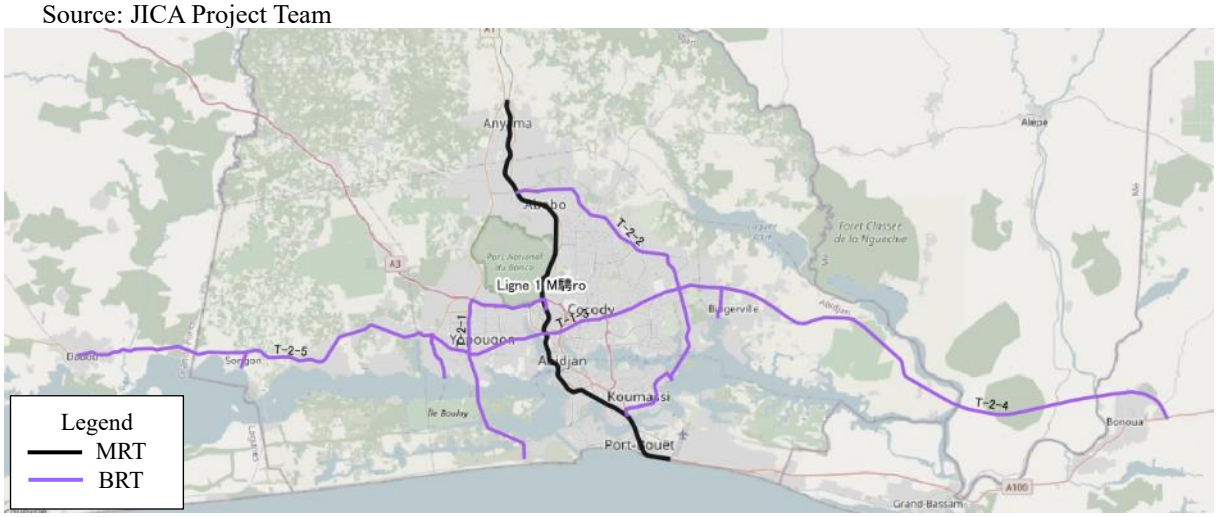
Table 4.3.12 Progress of public transport projects in SDUGA

Public transport	Study name	Progress
BRT	Study for the overall restructuring of public	On-going

[1] "Etude d' Interopérabilité du Système de Transport Public d' Abidjan y Compris sons Système d'Intégration Tarifaire et des Systèmes d'Aide a l' Exploitation et a l' Information Voyageurs" under the PMUA framework

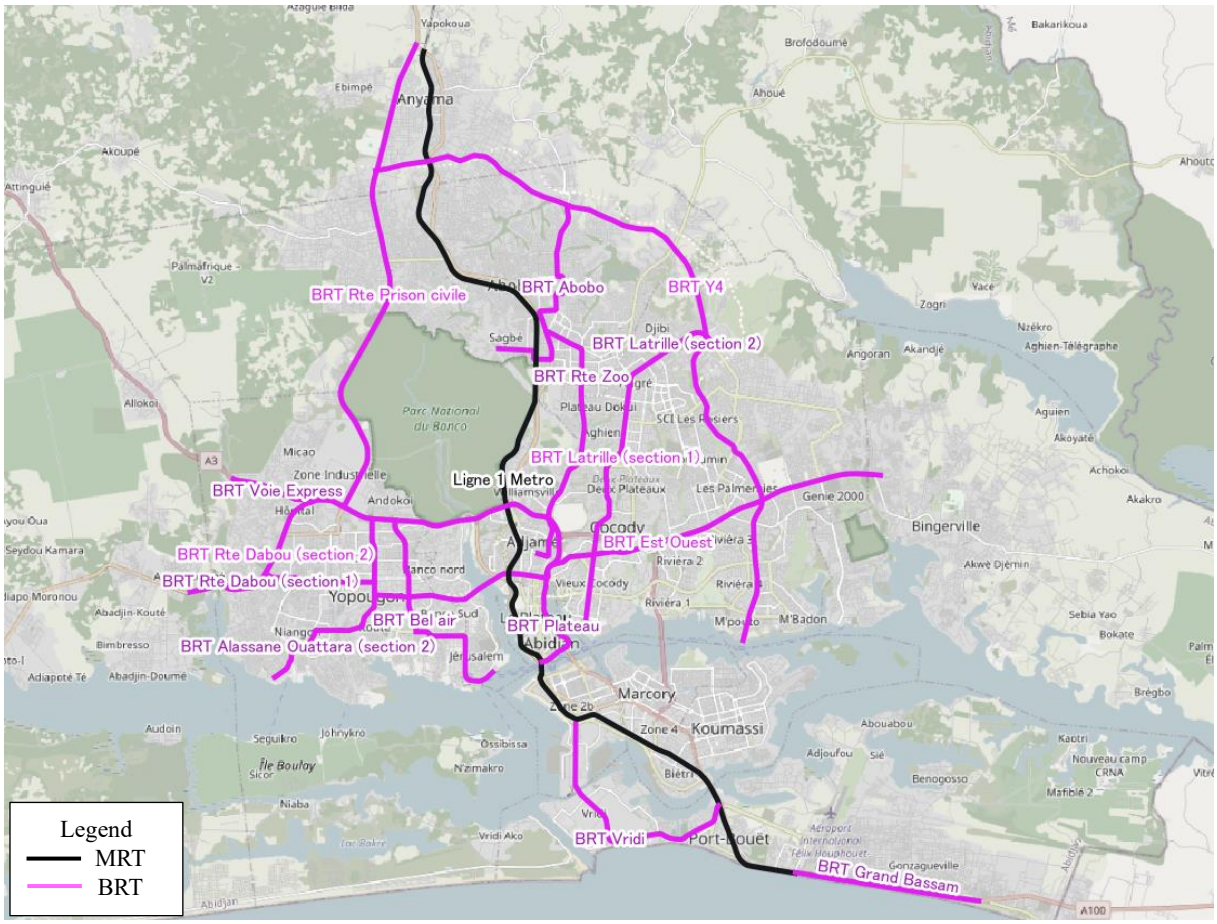
	transport in Abidjan (Transitec / Setec)	
Ferry transport	*Study* for the construction or rehabilitation of eight (8) lagoon stations in Greater Abidjan (AMUGA and construction by Jean Negri & Fils)	On-going
Integrated transport hub	Study for the feasibility of multimodal interchange hubs in Greater Abidjan (Bruno Remoué & Associat, Transitec, Suez, Terrabo)	On-going (final report in Feb. 2023 as original schedule)

Source: JICA Project Team



Source: AMUGA reference

Figure 4.3.43 BRT network in SDUGA (Year 2030)



Source: AMUGA reference

Figure 4.3.44 Restructuring BRT network (Year 2030)

Table 4.3.13 Section and length of proposed BRT routes

Category	Section	Length	SDUGA
MRT	1 North-South Rail Project-phase 1 Anyama to Airport	37.5 km	T-1-1
	2 North-South Rail Project-Stage 2 Airport to Grand-Bassam	73.0 km	T-1-2
Sub total		110.5 km	
BRT	1 East – West line	19.4 km	T-1-3
	2 Abobo north line	8.6 km	T-2-8
	3 Grand bassam line	6.6 km	T-2-9
	4 Plateau line	7.8 km	T-2-10
	5 Dabou-phase1 line	7.1 km	T-2-11
	6 Dabou-phase2 line	3.3 km	T-2-12
	7 Prison civile line	13.7 km	T-2-13
	8 Zoo line	7.9 km	T-2-14
	9 Y4 line	22.1 km	T-2-15
	10 Voie express line	7.9 km	T-2-16
	11 Latrille-phase1 line	8.9 km	T-2-17
	12 Latrille-phase2 line	3.6 km	T-2-18
	13 Vridi line	9.2 km	T-2-19
	14 Abobodoume line	4.2 km	T-2-20
	15 Niangon lokao line	3.5 km	T-2-21
	16 East – West Extension	10.2 km	T-1-4
Sub total		144.0 km	

Source:AMUGA reference

4.3.4 SDUGA 2040 transport master plan

The SDUGA 2040 transport master plan will be developed based on urban planning (the land use plan, the strategic urban structure - strategic center, all industrial areas, population distribution, etc.). A component of the transport master plan (a long project list), on the other hand, is being developed on the basis of the assessment of the existing road traffic situation and the information provided on public transport financed by other donors.

Table 4.3.14 Summary of proposed transport projects in SDUGA 2040

Category	Number of projects		Remarks
	SDUGA	SDUGA 2040 *	
Road network	66	79	12 projects in SDUGA was completed
Public transport	13	22	1 project in SDUGA was completed
Improvement of junction/Traffic control	32	42	1 project in SDUGA was completed
Soft mobility and smart solutions	3	4	
Institutions/Logistics	8	8	
Total	122	155	

*12 completed projects by end of 2023 are not counted in SDUGA 2040 (Completed projects of long list in Chapter 5)

Source: JICA Project Team

(1) Road network

Tentative road network in SDUGA 2040 is shown in Figure 4.3.45.

(2) Public transport

There is no change for MRT planning except several minor changes of station arrangement. On the other

hand, BRT network will be changed according to the result of the on-going study[2] by AMUGA and PTUA. While five main routes of BRT are stipulated in SDUGA, sixteen routes of updating BRT routes with a length of 144.0 km in total are under consideration as shown in Figure 4.3.44. In the SDUGA 2040, there will be same network in Figure 4.3.32. Also there is no change for MRT planning except several minor changes of station arrangement and BRT East – West Extension.

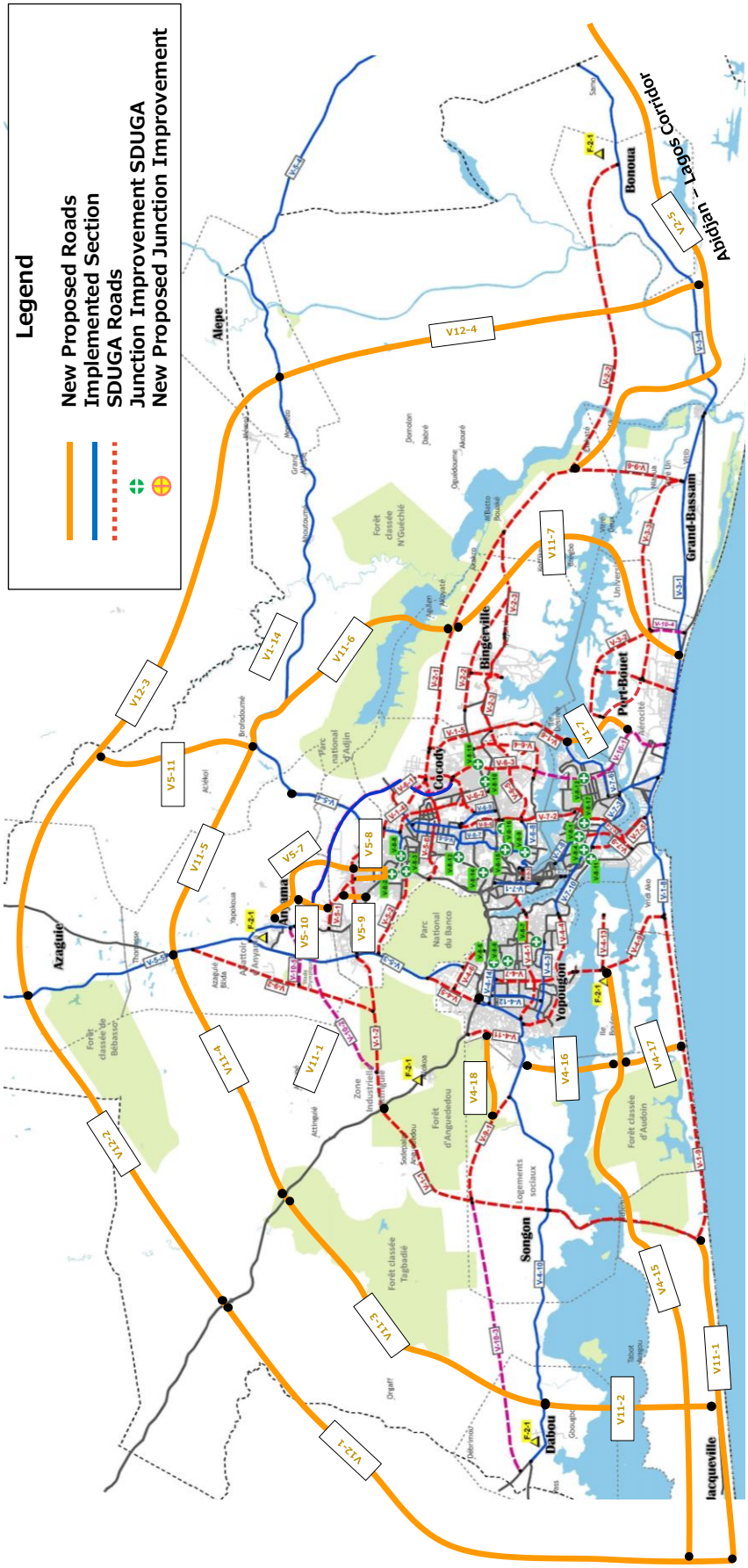
(3) Traffic control and demand management

Tentative junction improvement in SDUGA 2040 is shown in Figure 4.3.45.

(4) Soft mobilities and smart solutions

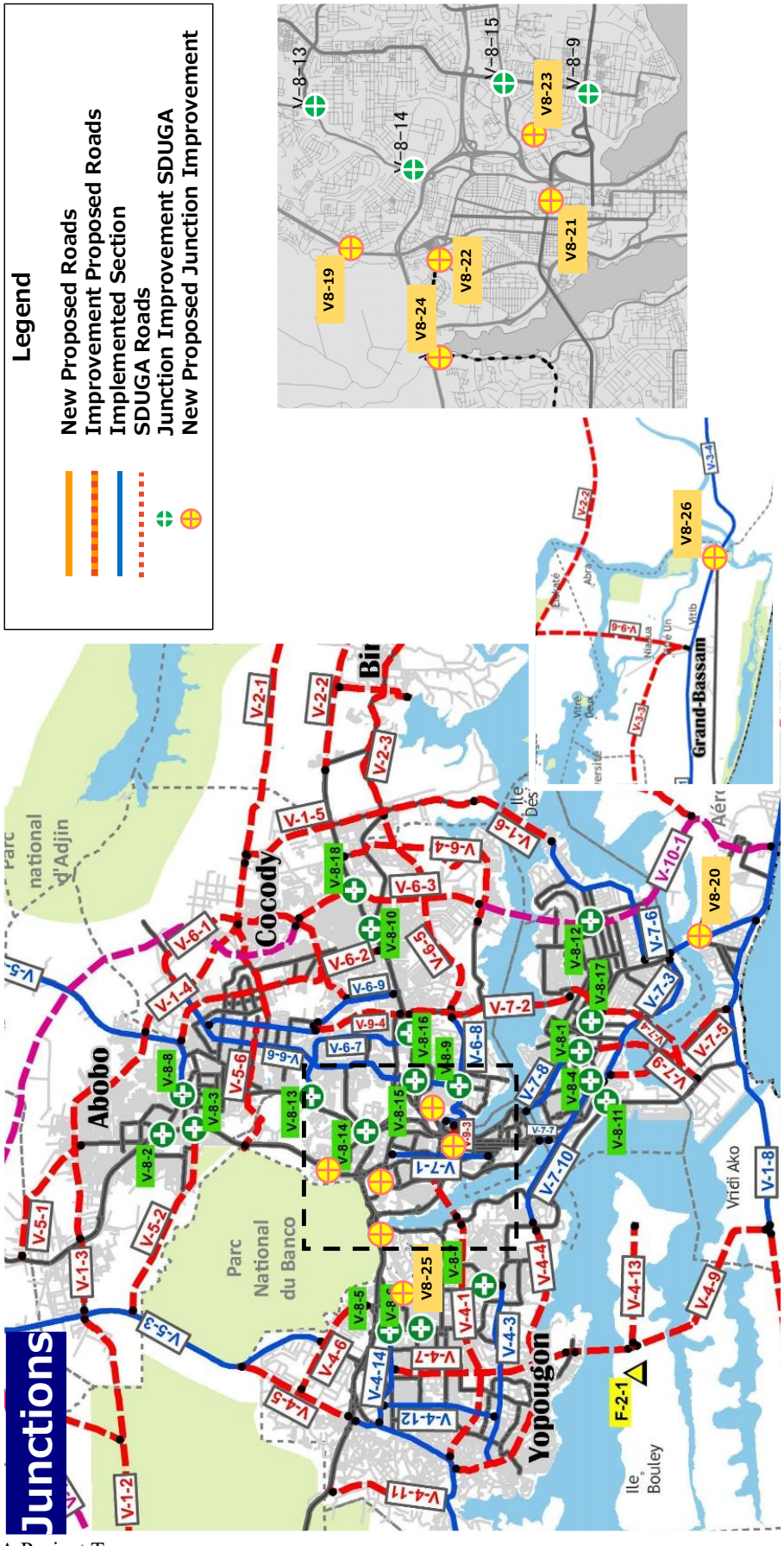
Pedestrian and cycle networks targeting year 2030 along arterial roads in the center area of Abidjan are under consideration in the framework of PACOGA financed by the World Bank. Specific targeted sections and pilot sections to be implemented are not identified yet in the above project. It is, however, expected that the mode share of non-motorized vehicles will be increased at the additional 1 – 5 points against the existing condition as well as the improvement of pedestrian safety.

[2] Study for the elaboration of a soft mobility plan for the city of Abidjan by 2030 (Stratec, Comète, Institut Paris Région, CEREMA, Pep's Communication) complementary to the network restructuring plan and the traffic plan of Egis



Source: JICA Project Team

Figure 4.3.45 Proposed road network in SDUGA 2040



Source: JICA Project Team

Figure 4.3.46 Proposed junction improvement in SDUGA 2040

4.3.5 Initial Step toward SDUGA Transportation Master Plan Implementation (Pilot Project)

(1) Selection process and outline of output-3 pilot project

The transportation issues to be solved in the Abidjan metropolitan area can be summarized into four major points.

(a) Reduction of road congestion

(b) Promotion of public transportation use (improving user convenience)

(c) Improving the efficiency of road maintenance and transportation operations

(d) Collection and utilization of traffic data for planning and infrastructure improvement in the transportation sector

The pilot projects to be implemented in the Project should address these transportation issues and be effectively utilized by infrastructure maintenance personnel, traffic managers, and users. It is then expected to provide direction for full-scale implementation after the pilot project is finished.

1) Identification of proposed pilot projects (long list)

Table 4.3.15 presents a long list of the proposed pilot projects that would contribute to solving the major issues in the transportation sector described above.

2) Evaluation of proposed pilot projects (short list)

The procedure for selecting a project to be implemented in the Project from the 12 long-listed pilot projects is shown in Figure 4.3.37. The evaluation is divided into two stages. The first stage is scoring based on 11 evaluation criteria established from the perspective of needs, feasibility, consistency with higher-level plans, relevance to other projects, and effectiveness. At this stage, priorities are determined based on the scoring, and pilot projects with serious concerns such as technical difficulties, procurement difficulties or duplication with other projects, are excluded from the candidates. In the second stage, for the remaining list, their appropriateness as "pilot projects" was examined in terms of two items (ease of implementation and time constraints), and prioritization was determined in the order of the scores of the list of projects that passed this examination.

Table 4.3.16 shows the evaluation results of the 12 projects on the long list, out of which five projects were eliminated as candidates due to "technical difficulty," "procurement difficulty," or "overlapping with other donors initiative, etc. The remaining seven projects were further evaluated in terms of "ease of implementation" and "time constraints," and the following five projects were finally selected.

Priority 1：1.Traffic Data Utilization
Priority 2：3.Strengthen of bus exclusive lane operation
Priority 3：6.Digital Boarding Ticket
Priority 4：10.MaaS
Priority 5：5.Cycle & Ride / 11.Smart Road Monitoring

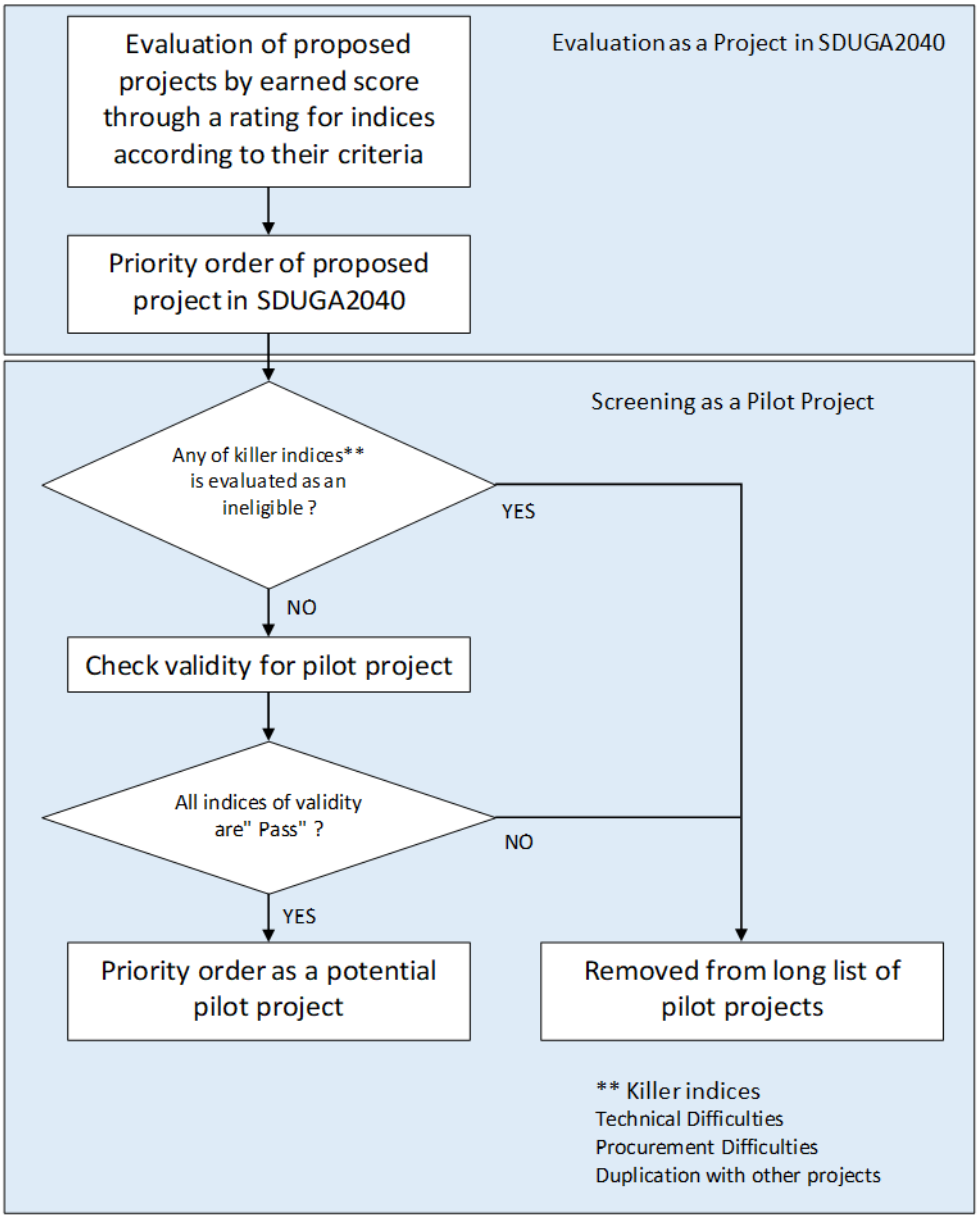
The top three projects were further outlined (see Tables 4.3.17 through 4.3.19). AMUGA wished to implement all three of these projects. However, time and budget constraints necessitated the selection of one, and finally "Priority 1: Traffic Data Utilization" was selected as the pilot project for the Project.

Table 4.3.15 Extraction of Pilot Project Proposals (Long List)

Problem-Solving Theme	Issue to be addressed (Number)	Project Name	Outline
I. Utilization of Traffic Data		1. Data collection (CCTV)	
	(d)	1-1. Data collection platform	Traffic data collection using CCTV

	(d)	1-2. Data utilization	Utilization of traffic data collected in the above
II. Introduction of Bus Operation Management System		2. Bus location system (SOTRA)	
	(c)	2-1. Bus operation management	Real-time operation management using GPS and optimization of operation schedules
	(b)	2-2. Information provision to users	Providing real-time estimated time of arrival, route search function, etc., in conjunction with mobile applications
III. Improvement of Bus Driving Environment	(b)(c)	3. Strengthen the bus-exclusive operation	Strengthen the operation of existing bus-exclusive lanes
	(b)	4. Bus priority signal	Introduction of bus priority signals in the above exclusive lanes
IV. Improvement of bus accessibility		5. Cycle & Ride	
	(b)	5-1. Suburban area	Installation of bicycle parking to improve access to buses in suburban areas (home ⇔ bus stop)
	(b)	5-2. Urban center	Introduction of shared bicycles to improve access to buses in the city center
V. Introduction of Automatic Fare Collection (AFC) System	(b)(c)	6. Digital boarding ticket	Ticket sales via mobile app and web page.
	(b)	7. AFC System	Fare collection system using contactless IC cards, etc.
	(b)(c)	8. Transit fare system	By using the AFC system together with the inter-operator settlement system, connecting fare systems, such as reduced transit fares, can be realized.
VI. Introduction of Road Pricing System	(a)	9. Charging for vehicles entering the city center	Installation of the next-generation ERP (Electric Road Pricing)
VII. Introduction of MaaS	(b)	10. Introduction of Maas App	Route search, electronic ticket sales, etc., through apps
VIII. Improving efficiency of road management	(c)	11. Smart Road Monitoring	A vehicle equipped with sensors quantitatively diagnoses road damage and assists in making repairs at the appropriate time.
IX. Advanced Traffic Management	(a)	12. Advanced Traffic Light Installation	Change from independent signal control system to link actuated system or area control system on the route with continuous intersections or in urban areas.

Source: JICA Project Team



Source: JICA Project Team

Figure 4.3.47 Evaluation flow of the pilot project

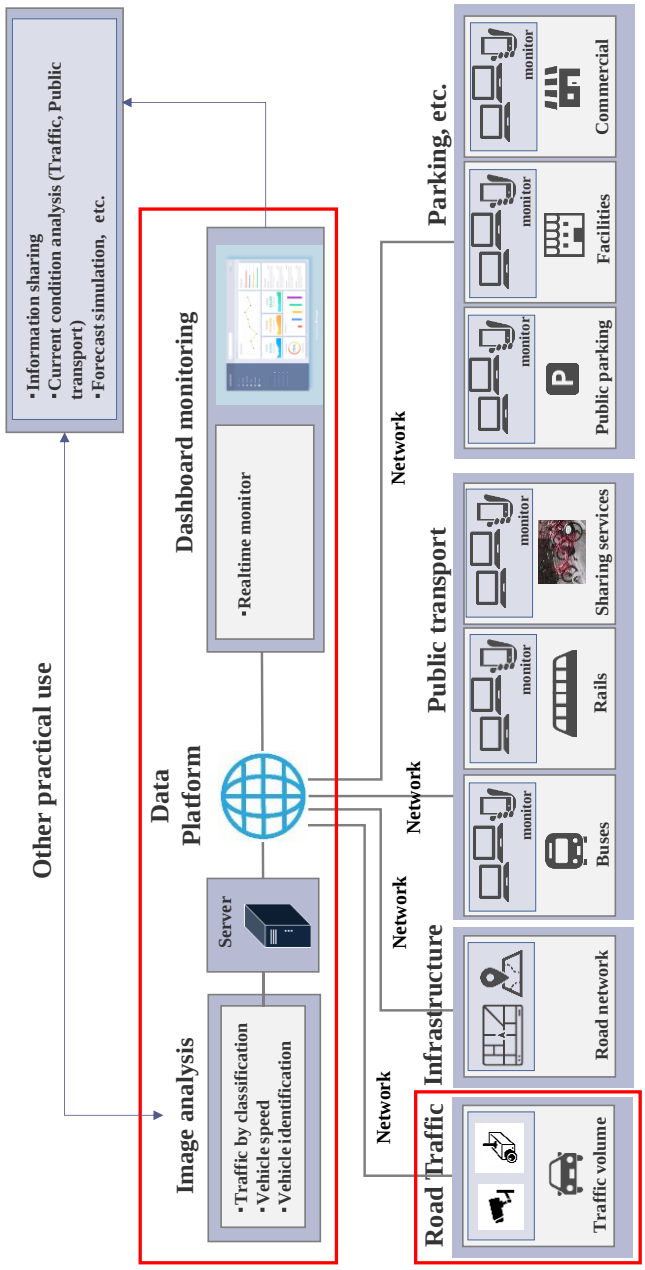
Table 4.3.16 Evaluation Results

No.	Project Name	Evaluation as a Project in SDUGA												Screening as a PP			Remarks
		Needs			Realization			Consistency/Relevance		Relation with others		Impact					
		Government	Transport Operators	Users	**Technical Difficulties**	Scale/Cost	**Procurement Difficulties**	Authorization in M/P	Study Scope	**Duplication**	Synergy Effect	Beneficial Population	Earned Score	SDUGA Project Priority	Complexity	Time constraints	PP Priority	
	(Weight)	-			-	-		-	-	-	-	-						
1-1	Data Collection Platform	3	1			-1		2	3	-1	3	1	11	**3**	Pass	Pass	**1**	Conducted as combined PP
1-2	Data Utilization	3	1	2				2	2	-1	3	1	13	**1**	Pass	Pass		
2-1	Real-time Bus Operation Management		3			-1		3	2	-2		1	6	**8**				
2-2	Real-time Bus Information Provision System		1	3		-1		3	2	-2		3	9	5				
3	Strengthen of bus exclusive lane operation		3	3				2	1	-1	1	3	12	**3**	Pass	Pass	**2**	
4	Bus Priority Signals		3	2	-1	-1	-1	3	3	-2		2	8	6				
5-1	Cycle & Ride (Suburban)		2	3		-1					3	2	9	5	Pass	Pass	5	Conducted as combined PP if conducted
5-2	Cycle & Ride (CBD)		1	2		-1					3	1	6	8	Pass	Pass		
6	Digital Boarding Ticket		2	3		-1	-1	2	2	-1	2	3	11	**3**	Pass	Pass	**3**	
7	Automated Fare Collection System		2	3	-1	-2	-1	3	3	-2		3	8	6				
8	Transit Fare System	3	2	3				1	2	-2		3	12	2				
9	Road Pricing	3	2		-2	-2	-2	3			1	1	4	9				
10	Maas		2	3	-1	-1		1	1	-1	3	3	10	4	Pass	Pass	4	Need clarification of duplication with private
11	Smart Road Monitoring	3		2	-1	-1		3		-1	2	1	8	6	Pass	Pass	5	
12	Advanced Traffic Light Installation		2	3	-1	-2	-1	3			3	3	10	**4**	**Fail**	**Fail**		
Evaluation Criteria		3: High 2: Middle 1: Small		Scale/Cost (empty):~0.5 million USD -1: 0.5~5.0 million USD -2: 5.0 million USD~ Technical/Procurement (empty):No any difficulties -1: Slight difficulty -2: Big difficulty				Authorization in M/P 3: As same project 2: As similar project 1: As relevant project Study Scope 3: To meet study output 2: To support study output 1: Possible support		(empty):No any duplication -1: Slight duplication but identify in some category -2: Completely duplication		3: High 2: Middle 1: Small		3: Affect on public and wide area 2: Affect on public but limited area 1: Affect on certain category				
Killer index				Project scored "-2" is removed from potential SDUGA projects						Project scored "-2" is removed from potential SDUGA projects								

Pass: No any serious difficulty on evaluation index
Fail: It is not applicable for evaluation index

Source: JICA Project Team

Table 4.3.17 Data Collection & Data Utilization

Project Overview	● To collect image data from newly installed CCTV along roads ● To transmit data by wire or wireless in real time and to stock those data to an installed server (e.g., cloud computing) ● To provide real-time image data on the dashboard as traffic condition monitoring ● (Immediate) To introduce an image analysis system to identify vehicles, count the number of vehicles, and stock data ● Other utilization methods will be considered in the future.
Effects / Impact	✓ Real-time remote monitoring of traffic conditions and traffic accidents is possible. ✓ Understanding traffic flow patterns and traffic forecast at target locations are possible by compiling and analyzing data by hour of the day and by day of the week. ✓ Traffic situation can be immediately assessed during an incident such as a traffic accident, and the information can be used to consider subsequent countermeasures.
Introduction Images	 Source: Prepared by the JICA Project Team
Target Area	TBD (assuming about 5 points at traffic bottlenecks or accident-prone areas)
Rough Cost Estimate	TBD (camera and other equipment and installation/server rental and maintenance costs/software development costs)
Implementation Issues	Confirmation of availability of existing CCTVs and sensors, permission from the related authorities such as the Ministry of Interior, etc.), coordination with Transitlab and Quipux projects
Remarks	Expansion in the number of locations and the integration with other data sources by using this platform can be proposed.

Source: JICA Project Team

Table 4.3.18 Strengthen Operation of Bus Exclusive Lanes & Bus Priority Signals

Project Overview	● Effective utilization of an approximately 1.5 km section of the exclusive bus lane on Abrogoua Street (partially used for bus vehicle stops, etc.) ● ● Restrictions on vehicle stops and pedestrian access in the dedicated lane section to improve the operating speed as a BRT model section. ● ● Bus priority signal system will be installed at the intersections on the dedicated lane section and the section before and after the dedicated lane section ● The vacant lot adjacent to the Adjamé District Office is a temporary bus terminal and transfer facility for other transportation.
Effects / Impact	✓ Improvement of the bus operating speed (improvement in punctuality) ✓ Demonstration of the BRT system to be introduced, and experiments of related measures can be conducted in advance. ✓ Expected to improve observance in traffic manners
Introduction Images	 Source: Map Google Earth, prepared by the JICA Project Team
Target Area	Adjamé: Nangui Abrogoua Street
Rough Cost Estimate	TBD (design costs/signal equipment and installation / exclusive lane management costs/road repair costs)
Implementation Issues	Various permits (use of dedicated lanes), availability of vacant land, procurement of priority signal systems, etc.
Remarks	Various demonstrations for future BRT introduction are possible, and many passengers are expected along the market and district office.

Source: JICA Project Team

Table 4.3.19 AFC System & Transit Fare System

Project Overview	● Introduction of an interoperable IC card or digital ticket system that can be used by SOTRA and other transportation systems ● Conduct social experiments in line with fare policies in the metropolitan area that AMUGA and others are considering (transit fare system, uniform/zoned fares, one-day passes, etc.)
Effects / Impact	✓ Increase in number of public transport users through improved transit service (preferential fares, payment diversification, etc.) ✓ Improve convenience for public transportation users in paying fares
Introduction Images	 QR code payment using MaaS application at Kyoto-Tango Railway Source: Prepared by JICA project team, Wheeler Corporation HP
Target Area	TBD (candidate area is one of the areas of Adjamé, Plateau, Cocody, Treichville, or Marcory)
Rough Cost Estimate	TBD (system design and development / server / AFC equipment (transportation operator side) / card issuance)
Implementation Issues	Compatibility with already installed IC cards, coordination with existing IC card management companies
Remarks	It is positioned as a demonstration project (POC: Proof of Concept) to install and verify the operation of the equipment, rather than as a social experiment.

Source: JICA Project Team

(2) Implementation plan of selected pilot project

Here is the proposed implementation plan at the beginning for the selected pilot project (transportation), which was adjusted in accordance with the final JICA budget and discussion with AMUGA.

1) Project overview

This project will install new CCTV and other equipment along the road and detect real-time traffic congestion and abnormal events such as accidents and violations by projecting images on screen monitors in the control center and implementing effective traffic control. The system also identifies and counts the number of vehicles by introducing an image analysis system and stores such data on an optional server (cloud computing, etc.) for use as primary data for analyzing the mechanism of traffic congestion and planning traffic congestion countermeasures. In addition, providing real-time information to users on a dashboard is expected to help users avoid congested sections of the road.

2) Major functions

The main functions of this system consist of the four functions shown in Figure 4.3.48.

Real-time traffic monitoring: Real-time traffic conditions are observed on monitors installed at the traffic management center. The cameras should be located mainly at significant traffic congestion points. And the project proposes to install them at the entrances to the city center.

Road traffic data collection: The traffic volumes by vehicle type and time of day are automatically counted by AI analysis of the camera video data. By accumulating these data, it is possible to clarify the mechanism of traffic congestion and contribute to planning effective countermeasures against traffic congestion.

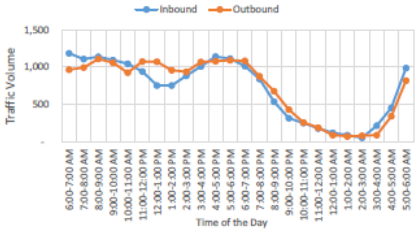
Emergency alert: This function automatically detects and notifies the driver of sudden events. This function can detect traffic congestion, violators, traffic accidents, etc. In this project, traffic congestion alerts will be focused.

Available statistics data: This is a system to disclose collected traffic-related data (traffic volume and traffic congestion) as open data. It is expected to be useful for road users to understand real-time traffic conditions and to help them select routes and plan commercial vehicle operations.

1) Real-time Traffic Monitoring

- CBD Entrance
- Traffic Bottlenecks
- Black Spots
- On-street Terminals
- Bus Lane

2) Road Traffic Data Collection

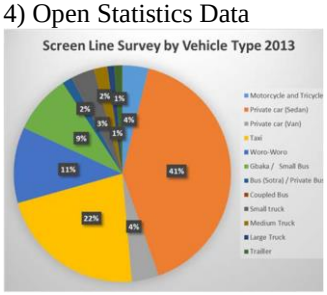


- By Classification
- Hourly
- Daily/Weekly/ Monthly
- By Direction

3) Emergency Alert

1. Traffic Congestion
2. Accident
3. Speed
4. Illegal Parking
5. Violation Trucks

4) Open Statistics Data



6. Traffic Survey Results
7. Person Trip Flow
8. Any Useful Database / Plan

Source: JICA Project Team

Note: The functions written in red letters are to be established by the pilot project.

Figure 4.3.48 Major Functions of the Data Collection & Data Utilization System

3) Consideration of camera locations

Currently, there are many cameras installed in Abidjan, but they are mainly installed for security reasons, and it is assumed that new cameras will be installed to monitor traffic flow. The location of the cameras depends on the purpose of the project. The locations and purposes of camera installations can be categorized as shown in Table 4.3.20.

Table 4.3.20 Locations and purposes of camera installations

Locations	Purposes	Priority
Around the city center (plateau)	Understand traffic flow in and out of the city center	High
Traffic bottlenecks / Black spots	Understand the time and situation of traffic congestion	Normal
Bus lanes	Grasp the status of bus lane compliance	Low
On-street terminals	Understand bus operation status	Low

Source: JICA Project Team

Figure 4.3.49 shows the candidate locations for the cameras. The cameras could be installed at major congestion points around and within the city center (Plateau), and discussions with AMUGA led to the conclusion that it is most important to install them on major road cross-sections entering and exiting the city center.

4) Future schedule

Table 4.3.21 shows the schedule for the pilot project prepared in November 2022. Discussions and coordination with related organizations began in May 2023, a draft implementation plan will be prepared by July, necessary equipment and materials will be procured and installed over the next three months, and the pilot project will begin in November. AMUGA intends to utilize this system during the Africa Cup of Nations in January-February 2024, and the pilot project should begin at least two months prior to that date. After evaluation, issues to be solved for full-scale introduction will be sorted out, implementation guidelines and manuals will be prepared, and technology will be transferred to those in

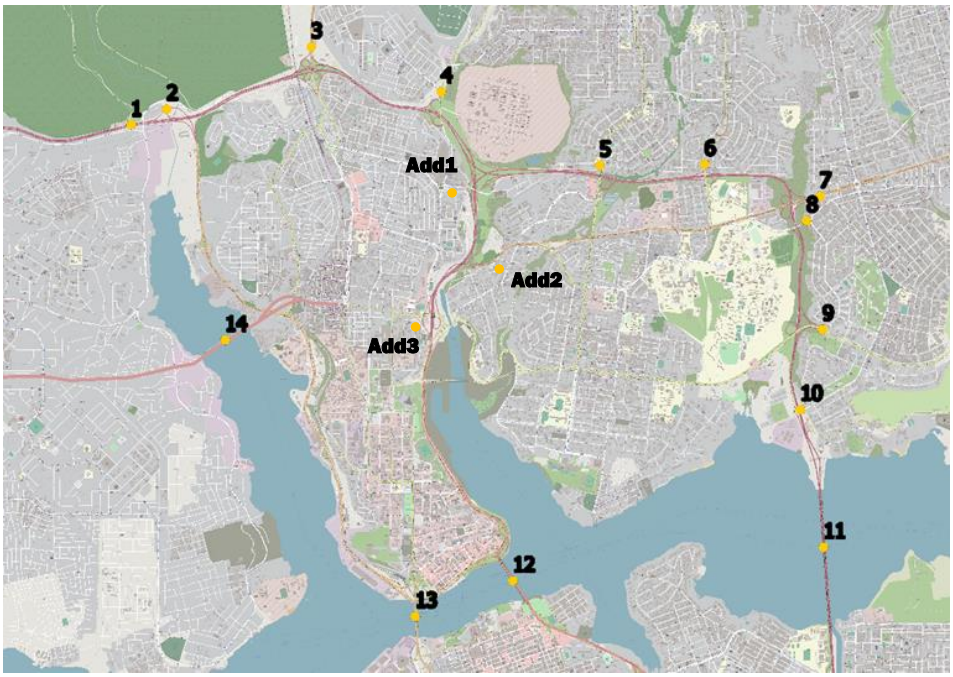
charge of the system operation.

Table 4.3.21 Pilot Project Schedule Prepared in November 2022

	1-2	3-4	5-6	7-8	9	10	11	12	13	14	15	16
	Nov Dec	Jan Feb	Mar Apr	Jun Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
	2022	2023								2024		
(i) Preparation of the mplementation plan												
(ii) Adjustment according to the budget												
(iii) Preparation for implementation												
(iv) implementation of the pilot project												
(v) Preparation of implementation guidelines and manuals												
(vi) Transfer of technology to the person in charge												
(vii) Evaluation of the pilot project												
(viii) Organize issues and basic policies for the full-scale introduction												

Africa Cup of Nations

Source: JICA Project Team



Around the city center (plateau) (Priority 1)

Other Locations (Traffic Bottlenecks/Black Spots/On-street Terminals)

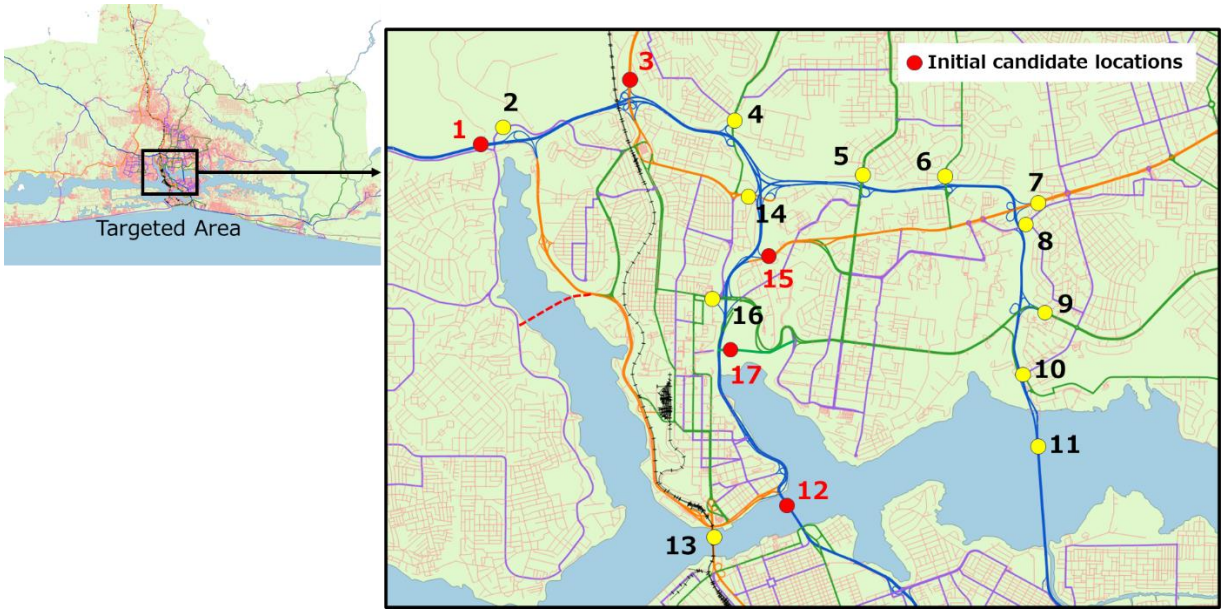
Source: JICA Project Team

Figure 4.3.49 Locations of Camera Installations

(3) Implementation of output-3 pilot activities

1) Discussion with AMUGA

August 2023: It was finally decided that the number of camera locations would be five due to budget and time constraints. A joint site survey was then conducted with AMUGA in early August, and five candidate sites were selected based on the feasibility of camera installation, wireless communication speed, and other factors (see Figure 4.3.50). In addition, an agreement was drafted with AMUGA regarding the contents of the pilot project (see Tables 4.3.22 and 4.3.23).



Source: JICA Project Team

Figure 4.3.50 Initially Approved Camera Locations

Table 4.3.22 Items discussed with AMUGA (August 10, 2023)

Items	Contents
Camera site	• 16 points were selected.
Data center	• Space in AMUGA is available. • Additional dedicated 19" racks, UPS, consoles, automatic shutdown function, etc. (Contractor) • Fix IP, at least one wall mount AC socket (AMUGA)
Operator's room (Operator)	• Two dedicated PCs with dual monitors • LAN cables from the operator's room to the server.
Construction works	• The work will be carried out at night to avoid traffic disruption. • The contractor will prepare the design and detailed plans of the installations per site required to obtain authorizations.
Internet subscription (AMUGA)	• 4G network, unlimited internet, fixed IP address, postpaid • AMUGA will sign the internet services contract. • The pilot project budget covers the cost of communication.
Schedule	• The project will be operational in December 2023.

Source: JICA Project Team

Table 4.3.23 Items discussed with AMUGA (August 10, 2023)

Items	Contents			
Camera site	5 locations			
Equipment	Equipment	Production/Specification		Unit
	Network camera	AXIS P1455-LE 29 mm		5
	Mobile router	TELTONIKA TRB140 4G(LTE)		5
	Solar power unit	Batterie Lithium Super Pack	12,8V/60Ah (M6) insert	5
		Panneaux monocrystalins BlueSolar	SPM040901200/90W-12V Mono 780 x 668 x 30mm série 4a	5
		Surveillance de la batterie	Victron Energy BMV-700	5
		BlueSolar & SmartSolar Contrôleur de charge MPPT	Victron Energy 75/10	5
	Control box	IP55 water proof control box		5
	Pole	9 m high I-shaped pole with IP55 control box		5

	Equipment	Production/Specification	Unit	Remarks
Data center	Video management system	Milestone NVR (Single)	1	
	Image analysis platform	BriefCam	1	
	Operation PC	General desktop PC	2	
	PC display	23-inch dual display	2	
	UPS	Incl. automatic shutdown	1	
	Rack	19" rack	1	

SIM Card	Items	Description	Remarks
	Carrier	Orange Côte d'Ivoire	
	Contract user	AMUGA	
	Fee payer	JPT	
	Period	90 days (maximum)	
	Nubmber of SIM card	5	1 SIM for 1 camera site
	Data capacity	30TB	5TB*6=30TB
	IP address type	Fixed IP address	Special customize
Schedule	Both parties agreed entire schedule of the pilot project as shown in Appendix 2.		

Source: JICA Project Team

November 2023: The study team applied for construction permits to AGEROUTE for the five locations established above, but the construction permits were not granted for the following reasons.

I. There is a future plan for the road.
II. This road falls on a presidential transit route.
III. The installation is planned in the center of the road. (i.e., safety cannot be ensured during construction)
IV. Installation on a new bridge is not allowed.

December 2023: A joint study was conducted again with AGEROUTE, and finally, construction was approved at the six locations. Finally, the number of sites was agreed to be 5 locations after discussions with AMUGA.

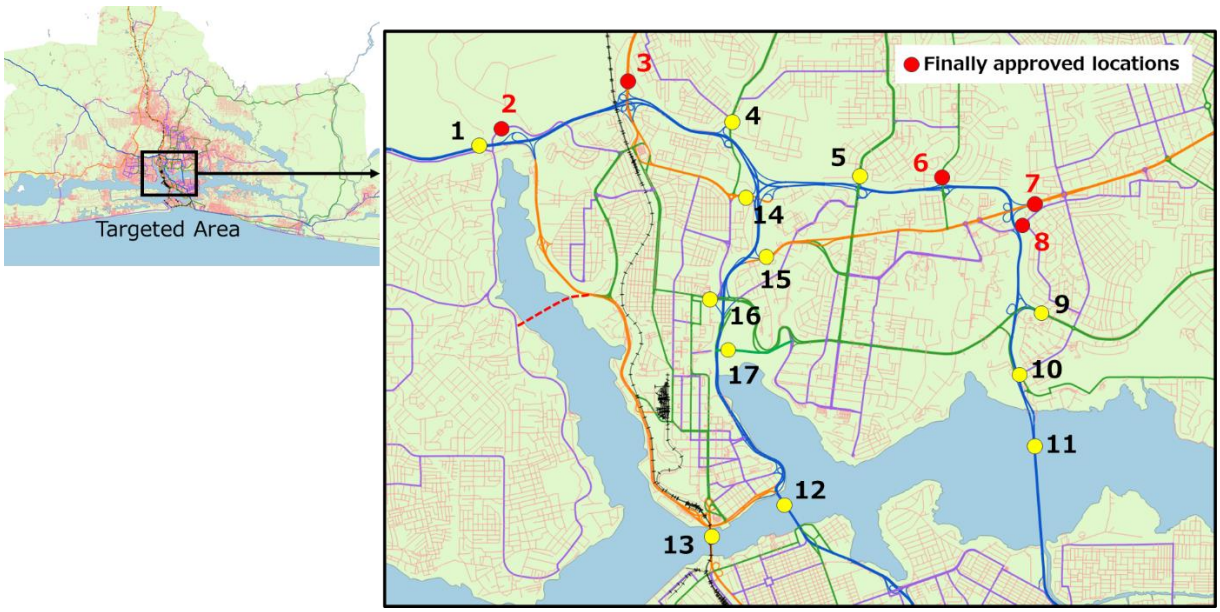


Figure 4.3.51 Finally Approved Camera Locations

2) SIM card contract

Due to time constraints, data transfer (images) in this pilot project was decided to be by wireless transfer using SIM cards. Through interviews with providers in Cote d'Ivoire, it was decided to contract with Orange, a company that can provide service according to the expected data transfer volume and whose service is stable (contractor: AMUGA, payment: survey team).

3) BriefCam recognition accuracy

The accuracy of vehicle type recognition by BriefCam was verified using test data. Traffic volume surveys in Abidjan are usually conducted for 12 vehicle types, but BriefCam's shape recognition can classify up to 6 vehicle types. Since meter taxis and Woro-woro have a certain color of the body, up to 8 vehicle types can be classified by color (see Table 4.3.24). The following are the issues in vehicle recognition.

- Minivans are used as general-purpose vehicles, and Gbaka cannot be classified. Some minivans are recognized as buses. However, most minivans are considered to be used as Gbaka.
- The same color as meter taxi and Woro-woro is used for general vehicles, but they are distinguished as meter taxi and Woro-woro.
- Some Gbaka are recognized as buses.
- Medium and larger trucks are difficult to be classified.

While recognizing these issues, the recognition accuracy will be verified using actual images in the pilot project.

Table 4.3.24 Vehicle Classification by BriefCam

Vehicle Type Classification

No.	Vehicle classification (12)	Explanation	Classification by shape (6)	Classification by color (6+2=8)	Comment
1	Motorcycle		motorcycle		detectable
2	Passenger cars (sedans/ SUVs)		Car (sedan)	Other than orange, yellow, blue, yellow-green, and red	Detectable, but sedans (taxi, Woro-Woro) with colors such as orange, yellow, blue, yellow-green, and red cannot be classified.
3	Passenger car (van)		Car (van)		The absolute number is small and it is impossible to distinguish it from Gbaka.
Four	Taxi	meter taxi	Car (sedan)	orange	Detectable, but orange private passenger cars cannot be excluded
Five	Woro-Woro	commune taxi		yellow, blue, yellow-green, red	Detectable, but yellow, blue, yellow-green, and red private passenger cars cannot be excluded.
6	Gbaka _	12 to 18 seats	Car (van)		It is impossible to differentiate between a private van and a commercial van. However, the quantity of private vans is small. There is also a possibility that some of them may be identified as buses.
7	Ordinary bus	SOTRA bus, Intercity bus	bus		Although it can be detected as a bus, there is a possibility that some of it may contain Gbaka .
8	Articulated bus	SOTRA articulated bus			
9	Small truck	Light truck, pickup truck	small truck		Can be detected as a small truck (pickup)
Ten	Medium truck	2 axle truck	ordinary truck		Although it can be detected as a truck, it is difficult to classify it in more detail.
11	Heavy truck	3 or more axle trucks			
12	Trailer	semi-trailer, trailer			

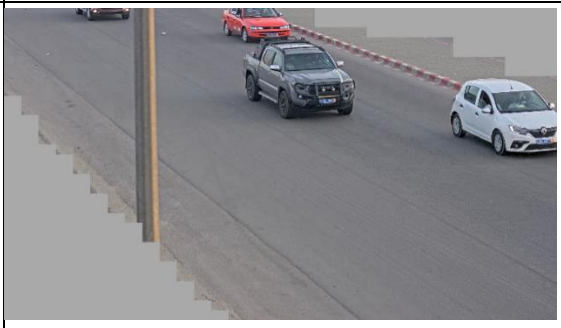
1

Source: JICA Project Team

(4) Evaluation for pilot system of traffic data collection

1) Live video display

- Objective: Image quality must be sufficient for visual detection of road congestion, unusual events, etc.
- Result: From the following sample photos, the traffic situation on the road and the occurrence of incidents are fully visible both during normal daytime and nighttime hours. Also, there is no problem during normal rainy weather as shown in the photos below.

	Daytime	Nighttime
Site-1		
Site-2		
Site-3		
Site-4		

Source: JICA Project Team

Figure 4.3.52 Sample photos both during normal daytime and night time

2) Accuracy evaluation of vehicle type sorting

Evaluation method

- Objective：
  - ✓ Evaluate identification systems for six types of vehicles: motorcycle, passenger car, van, pick-up truck, truck and bus.
- Method：
  - ✓ For each type identified by the system, a snapshot is visually checked for correctness of the sorting.
  - ✓ Time covered by the evaluation: 24/05/24 12:08:53 PM - 24/05/24 12:11:03 PM
  - ✓ Total number of vehicles during the time covered: 432
  - ✓ Confidence setting in image analysis software: Normal

Evaluation result

Table 4.3.25 Accuracy evaluation of vehicle type identification

Type	(A) Classified q'ty	(B) Error in classified	(C) Classified to other	(A-B)/(A+C) Accuracy of classification
Motorcycle	64	0	1	98.5%
Car	270	0	2	99.3%
Van	52	2	4	89.3%
Pickup	22	0	0	100.0%
Truck	20	5	0	75.0%
Bus	4	0	0	100.0%
Total	432	7	7	96.8%

Source: JICA Project Team

Consideration of differences

Based on the aforementioned accuracy evaluation results, the overall evaluation is close to 100%, but the cases of misidentification for each vehicle type will be reviewed.

- Motorcycle
  - ✓ In the case of Motorcycle towing a load, the system classifies the vehicle as Motorcycle from the front and Truck from the rear, but Motorcycle was assumed to be correct in this evaluation.

Source: JICA Project Team

Figure 4.3.53 Vehicle misidentified as Motorcycle

- Van
  - ✓ The majority of vans are Gbahka, but there are a small number of 4-wheel drive types, etc.
  - ✓ They were recognized as vans since they are similar in shape.

Source: JICA Project Team

Figure 4.3.54 Vehicle misidentified as Van

- Truck
  - ✓ Four cases are luggage storage on the roof of the Van and one case is a Motorcycle towing a load, the latter was included in this evaluation as a misclassification, as described above.

Source: JICA Project Team

Figure 4.3.55 Vehicle misidentified as Truck

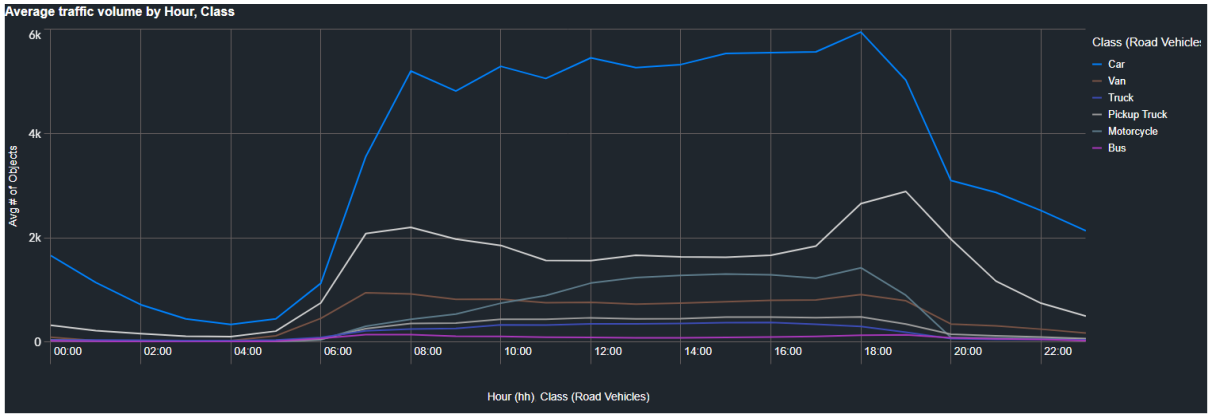
Woro-woro (communal taxi), metered cab and car (general passenger car) cannot be distinguished by their registration, but can be classified to some extent by color since there is a trend in the body color.

3) Examples of statistical aggregation of traffic volumes

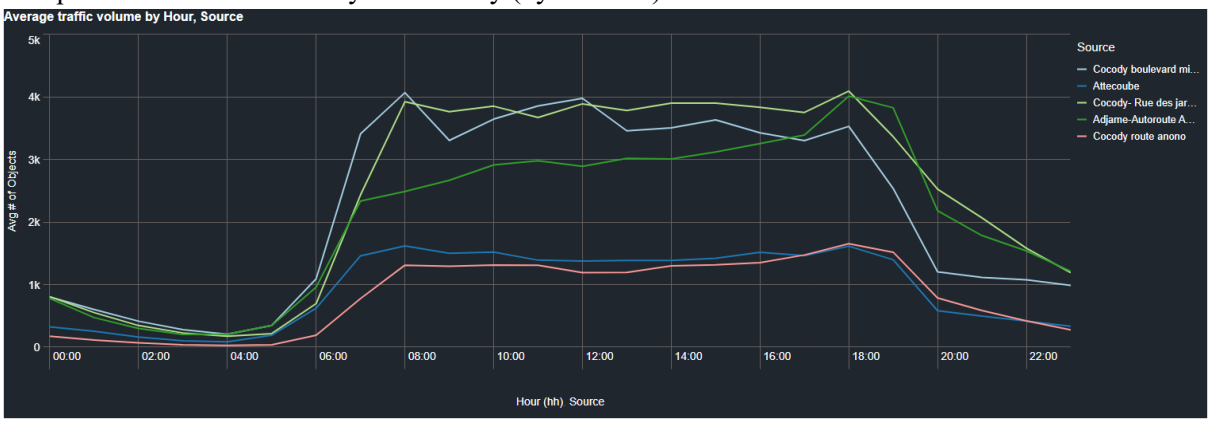
The system is able to show the traffic condition in various ways as shown in Figure ???.

- Sample-1A: Traffic volume by time of day (by vehicle type)
- Sample-1B: Traffic volume by time of day (by location)
- Sample-2A: Traffic volume by day of the week, by vehicle type
- Sample-2B: Traffic volume by day of the week, by location
- Sample-3: Composition of traffic volume by vehicle type
- Sample-4: Correlation between traffic volume and Speed per 15 min.
- Sample-5A: Sample-5A: Velocity distribution by location
- Sample-5B: Velocity distribution by day of week

Sample-1A: Traffic volume by time of day (by vehicle type)



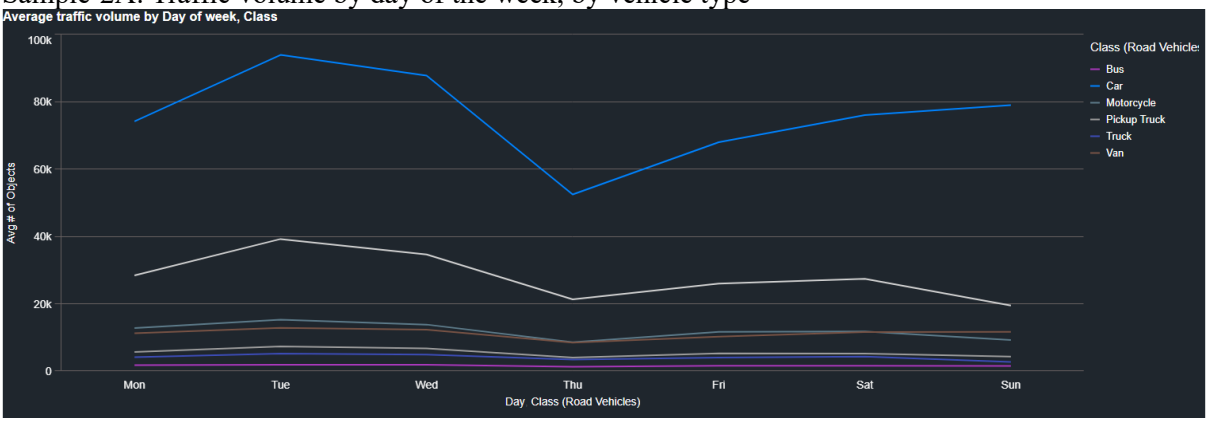
Sample-1B: Traffic volume by time of day (by location)



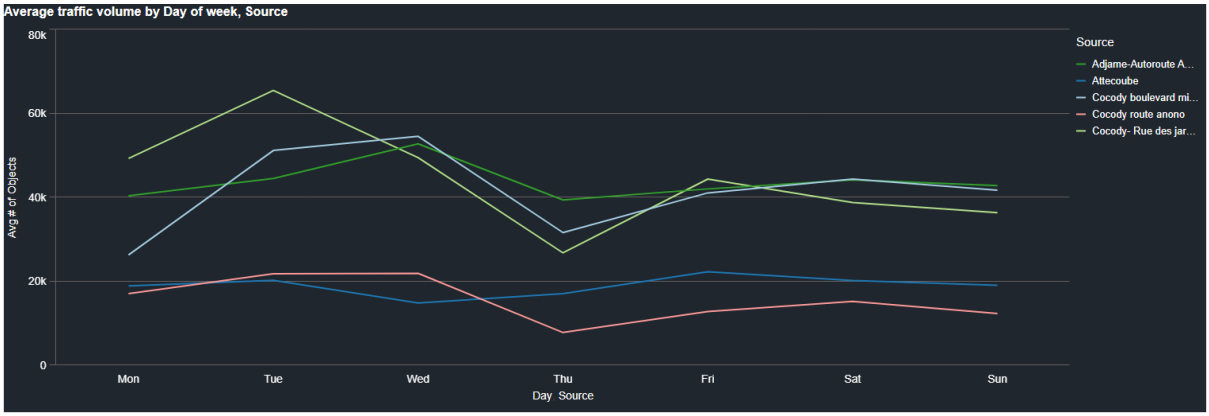
Source: JICA Project Team

Figure 4.3.56 Examples of statistical aggregation of traffic volumes (time of day)

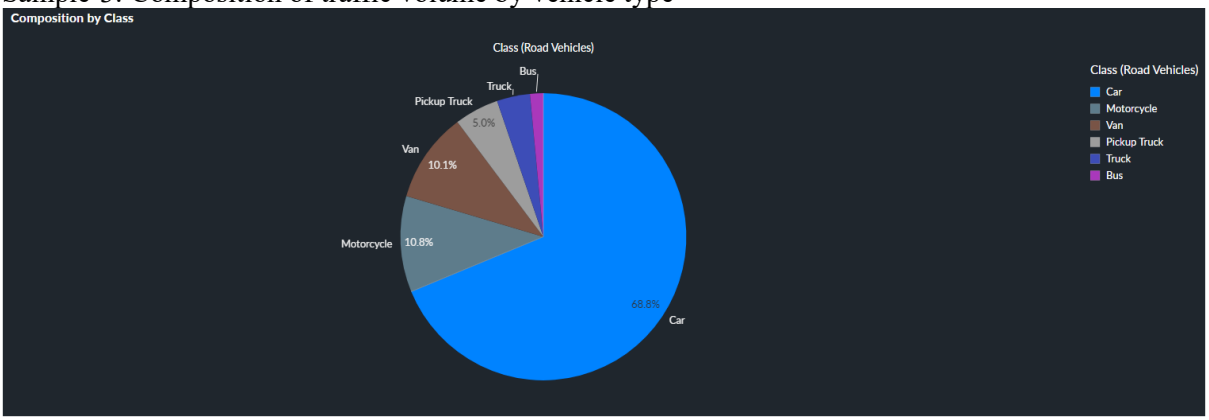
Sample-2A: Traffic volume by day of the week, by vehicle type



Sample-2B: Traffic volume by day of the week, by location



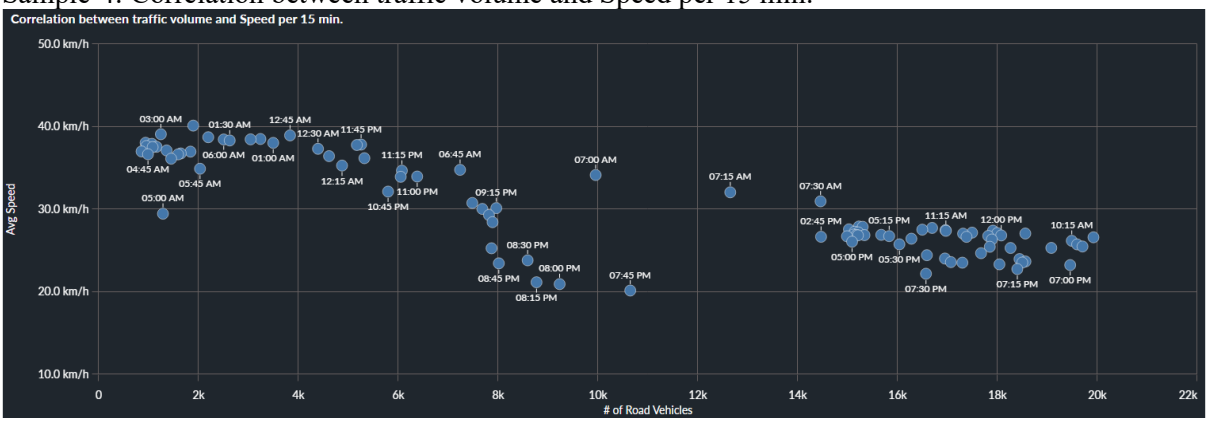
Sample-3: Composition of traffic volume by vehicle type



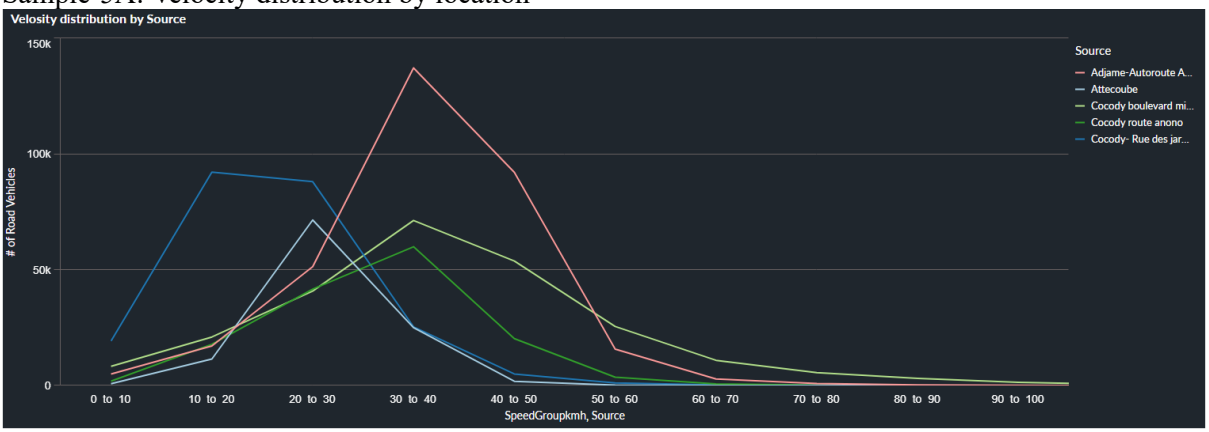
Source: JICA Project Team

Figure 4.3.57 Examples of statistical aggregation of traffic volumes (day of week)

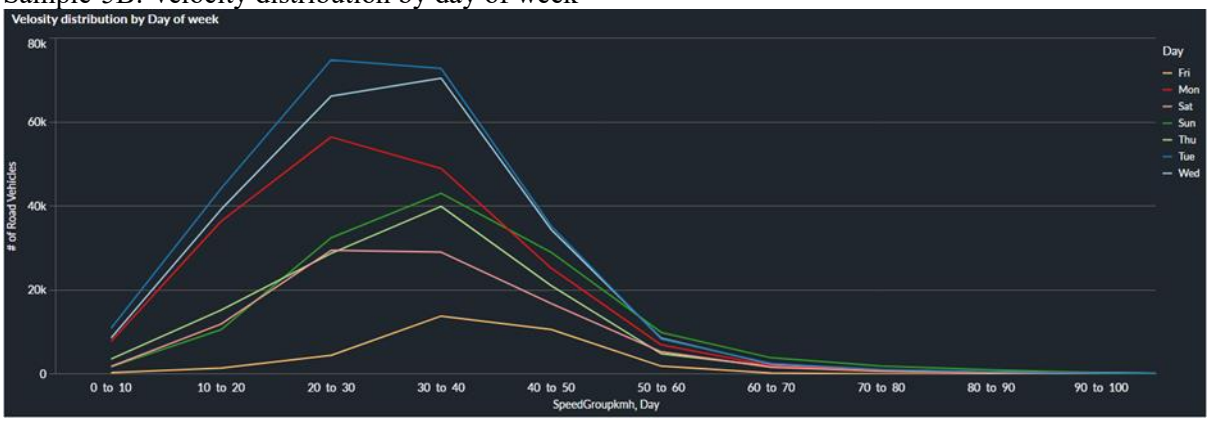
Sample-4: Correlation between traffic volume and Speed per 15 min.



Sample-5A: Velocity distribution by location



Sample-5B: Velocity distribution by day of week



Source: JICA Project Team

Figure 4.3.58 Examples of statistical aggregation of traffic volumes (velocity distribution)

4) System sustainability evaluation

Video transmission from camera site to the center

(a) Issues

- It was requested that the communication between the center facilities and the camera sites be 4G-based and that the camera sites be provided with a fixed IP and unlimited traffic. However, the mobile communication service currently used by the local ORANGE company does not provide unlimited traffic. Thus, video transmission has been suspended.
- The background is that the requirements were not fully understood by ORANGE and the technical know-how to realize the full system in ORANG's network was not sufficient. As the result, it took several months to realize them and caused the delay in the delivery of the products.

(b) Recommendations for the future

- The use of a wired network with fiber cables, etc. is recommended due to its stability in terms of video transmission.

Solar power supply

(a) Issues

- Although power supply capacity is not currently an issue, power supply cannot be guaranteed in the future, depending on weather conditions.
- In order to keep the equipment in operation, maintenance work may be required in the future, such as updating the software of the control equipment or component failure.

(b) Recommendations for the future

- It is recommended that a wired power line be run to the camera pole to provide a stable power supply and minimize the maintenance requirements.

5) System extension consideration

Expected effects by each system extension

(a) On wide roads where only one lane is monitored, install cameras in the opposite lane as well[3].

- Collect time trends of traffic reversal in the morning and evening

(b) Install cameras on all roads connecting to the CBD area.

- Collect time trends of traffic volumes in the entire CBD district
- Collect traffic volumes per direction entering and exiting the CBD district
- Collect congestion on all roads entering and exiting the CBD district

(c) Increased monitoring of traffic congestion and accident locations

- Install PTZ surveillance cameras which the operator can remotely change the camera's direction at a short distance from the traffic volume collection cameras, or at intermediate points, so that the causes or effects of incidents can be seen.
- Add a map linkage function to provide map-based information on which location an incident has occurred, and to be useful when selecting live video.

(d) Install number plate reading cameras at the entry and exit points to the Highway.

- Analysis of whether the destination is inside the CBD area or intended to pass through.
- Analysis of the route if it is intended to pass through.

[3] Currently, Site-1, 3, and 5 collect lanes in both directions, while Site-2 and 4 collect only one lane.

- Collection of time trends of transit times.

(e) Linkage with external systems

- By procuring hardware for intermediary equipment and developing the necessary applications, statistical information in the system and alert information such as traffic congestion can be transferred to external systems.

Budgetary scale for expansion

(a) Budget for adding one camera site

Table 4.3.26 Estimated costs for adding one camera site

Equipment		Cost (USD $)
With solar system	Equipment and civil works materials for camera site (including Solar)	9,700
	Equipment installation at camera site, civil works (including Solar)	3,100
	Additional Back Office licence	1,800
	Remote, server-side configuration and testing	1,500
	Total	**16,100**
Without solar system	Camera site equipment, civil works materials (not including Solar)	5,400
	Camera site equipment, civil works materials (not including Solar)	2,400
	Additional Back Office licence	1,800
	Remote, server-side configuration and testing	1,500
	Total	**11,100**

Note: Milestone and BriefCam device licenses (Back Office Licence) are required for the number of cameras.
Source: JICA Project Team

- Other considerations are whether the server hardware needs to be expanded to accommodate the increased number of cameras.
- Currently installed Milestone server can store up to 50 cameras for approximately one month of recorded video; the BriefCam server can ideally store up to 25 cameras and the DB for approximately one year.
- Assuming that the current processing capacity and data storage periods are maintained, the approximate budget for additional cameras is as follows.
  - ✓ USD 20,000 for each additional 25 cameras for the BriefCam server
  - ✓ USD 40,000 for every 50 cameras for the Milestone server

(b) Budgetary implications for design, project management and engineering costs

Expansion of servers and network and the addition of a large number of cameras impact the backbone of the system, requiring professional services.

- As a rough guide, the unit cost is USD 10,000 per month, which is budgeted by multiplying by the man-day or man-months required.
- Assuming that 100 cameras are to be added, the following process is expected to take approximately one year, and two people should be assigned to the project. Thus, a budget of USD 10,000 times 24 months (12 months times two pepolpe) would be the preferred size. The schedule for this additional installation work is estimated as follows:
  - ✓ Site survey 1 month
  - ✓ System design 1 month
  - ✓ Equipment procurement and installation planning 6 month
  - ✓ Installation 3 month
  - ✓ Test and handover 1 month

- Because professional services are required for a dispatch from outside the country to the site, travel expenses are required.

(c) Support costs

This cost does not include the procurement of replacement parts or repairs due to hardware failure.

- Remote support via email and chat USD 3,000
  - ✓ Up to 15 hours per year. Telephone from 9am to 6pm in Dubai time.
- On-site support USD 9,000
  - ✓ Up to five times per year (Minimum Contract)
  - ✓ USD 2,000 per visit beyond five visits per year.
  - ✓ If professional services are required onsite, additional costs for travel to the site will be charged.

(5) Issues to be cleared toward full operation of the traffic information collection and management system

The following issues need to be cleared to develop the traffic information collection and management system to a full operation stage.

Maintenance and management costs

How will the maintenance and management costs (electricity and communication fees) be covered after the SDUGA 2040 and the pilot project ends? It should, basically, be covered by the Ministry of Transportation budget, but other possibilities could be pursued.

Implementation and management system

Currently, an operation room is set up in AMUGA's office and a full-time operator is appointed. However, the system will need to be strengthened to accommodate future increases in the number of tasks, and the division of roles with other related agencies (e.g., police and AGEROUTE) and data-sharing methods with them should be established.

Technical issues

The following are the technical issues.

- Connecting to optical fiber and grid power sources and securing budgets
- Consideration of additional functions to be added to Dashboard
- Methods of providing information to relevant agencies and road users (information provided on website, information to be provided to users (variable information boards, SNS, radio, etc.))
- Consideration of how to handle accidents (cooperation with police)
- Methods of detecting violating vehicles (methods of cooperation with police)
- Methods to link with other similar systems (cameras for city security, cameras for ITS, etc.)
- Determination of future locations where cameras will be installed and the number of cameras required

4.4 Urban Environment Infrastructure Development Plan for 2040

4.4.1 Work Flow and 2040 Population

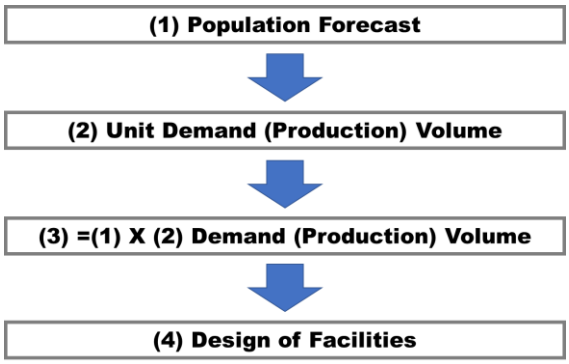
(1) Demand forecast for urban environment infrastructure sectors

1) Basic policy of demand forecast

The demands for urban environment infrastructure sectors have fundamentally aimed at updating the existing respective master plans for water supply, sewerage and solid waste management. Updating like the transportation sector was not undertaken, because SDUGA-1 did not include any urban environment infrastructure sectors.

2) SDUGA 2040 demand forecast update

A flowchart for planning urban environment infrastructure is shown in Figure 4.4.1. The facilities for urban environment infrastructure are designed based on the demand for water and the produced amounts of sewage and solid waste. The demands and production amounts are calculated by multiplying the forecasted population in the target year by unit demands or unit production amount.



Source: JICA Project Team

Figure 4.4.1 Flowchart for Planning of Urban Environment Infrastructure

The demands for urban environment infrastructure sectors have been forecasted based on the socio-economic framework in 2040. Population in 2040 by each commune has been forecasted as shown in Table 4.4.1. The total population in 2040 is estimated to be 11,351 thousand persons.

Table 4.4.1 Population Forecast in 2040

No.	Category	Commune	Population in 2040
1	Core Abidjan Autonomous District (AAD)	Abobo	2,019,713
2		Adjamé	340,892
3		Attécoubé	427,841
4		Cocody	1,231,868
5		Plateau	7,186
6		Port-Bouet	1,057,558
7		Yopougon	2,368,229
8		Koumassi	412,282
9		Marcory	214,061
10		Treichville	115,276
11	Periphery Abidjan Autonomous District (AAD)	Anyama (SP)	1,042,731
12		Songon (SP)	481,358
13		Bingerville (SP)	512,285
14	Outside Abidjan Autonomous District (AAD)	Grand-Bassam	234,601
15		Bonoua (SP)	249,773
16		Alépé (SP)	114,721
17		Azaguié (SP)	81,739
18		Dabou (SP)	272,855
19		Jacqueville	96,939
20		Oghlwapo (SP)	37,053
21		Brofodoumé (SP)	32,612
Total			11,351,574

Source: JICA Project Team

4.4.2 Water Supply

(1) Review of the existing master plan

The master plan named “ETUDES DU SCHEMA DIRECTEUR POUR L’ALIMENTATION EN EAU POTABLE DU GRAND ABIDJAN A L’HORIZON 2045” is currently under preparation, and land use plans are shown therein. However, water demands and detailed construction plans by each commune have not been prepared yet. Therefore, the preceding existing master plan for the water supply sector “Abidjan City Drinking Water Supply -Distribution Mains - Investment Programme (Desserte en Eau Potable de la Ville d'Abidjan - Réseaux structurants -Programme d'investissement) (2015 -2025) (SAFEGE)” is used as the basis for the current analysis. It covers 13 communes such as all the Core AAD and Periphery AAD. It includes an investment plan to secure a maximum daily water supply of approximately 1.04 million m^3 per day in the target year 2025. The unit water consumption rate is 153 liters per capita per day (LCD).

(2) Comparison between SAFAGE 2025 and SDUGA 2040

1) Comparison of forecast population

The comparison of population forecast between the SAFAGE 2025 and the SDUGA 2040 is shown in Table 4.4.2. The difference is approximately 4,541 thousand persons in total, meaning SDUGA 2040 will have to serve a population of 4.5 million more than assumed in SAFAGE.

Table 4.4.2 Comparison of Population Forecast between SAFAGE 2025 and SDUGA 2040

No.	Category	Commune	SAFAGE 2025	SDUGA 2040	Differences
1	Core AAD	Abobo	1,252,471	2,019,713	767,242
2		Adjamé	398,109	340,892	-57,217
3		Attécoubé	337,797	427,841	90,044
4		Cocody	766,880	1,231,868	464,988
5		Plateau	34,092	7,186	-26,906
6		Port-Bouet	697,013	1,057,558	360,545
7		Yopougon	1,452,778	2,368,229	915,451
8		Koumassi	472,787	412,282	-60,505
9		Marcory	321,323	214,061	-107,262
10		Treichville	190,866	115,276	-75,590
11	Periphery AAD	Anyama (SP)	416,418	1,042,731	626,313
12		Songon (SP)	261,139	481,358	220,219
13		Bingerville (SP)	209,178	512,285	303,107
14	Outside AAD	Grand-Bassam	-	234,601	234,601
15		Bonoua (SP)	-	249,773	249,773
16		Alépé (SP)	-	114,721	114,721
17		Azaguié (SP)	-	81,739	81,739
18		Dabou (SP)	-	272,855	272,855
19		Jacqueville	-	96,939	96,939
20		Oghlwapo (SP)	-	37,053	37,053
21		Brofodoumé (SP)	-	32,612	32,612
Total			6,810,851	11,351,574	4,540,723

Source: JICA Project Team

2) Comparison of water supply demand

The comparison of daily maximum water supply demands between the SAFAGE 2025 and the SDUGA 2040 is shown in Table 4.4.3. These demands are calculated by multiplying the forecasted population by 153 LCD of unit demand. The difference is approximately 0.70 million m^3/day in terms of maximum daily water supply in total. A plan to fulfil water demands in each commune needs to be prepared.

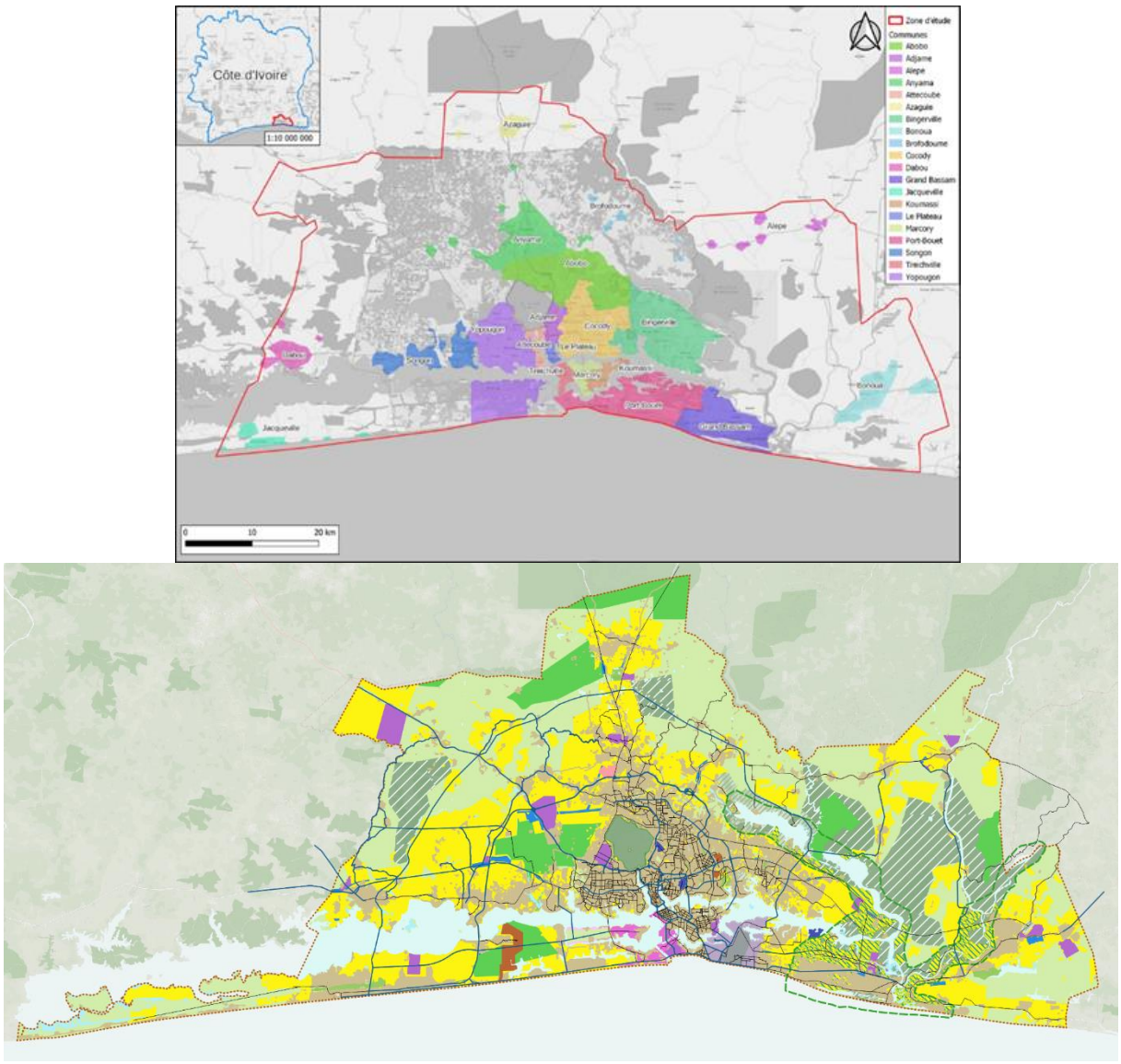
Table 4.4.3 Comparison of Water Supply Demand between SAFAGE 2025 and SDUGA 2040

No.	Category	Commune	SAFAGE 2025	SDUGA 2040	Differences
1	Core AAD	Abobo	191,914	309,478	117,563
2		Adjamé	61,002	52,234	-8,767
3		Attécoubé	51,760	65,558	13,797
4		Cocody	117,508	188,757	71,249
5		Plateau	5,224	1,101	-4,123
6		Port-Bouet	106,802	162,048	55,246
7		Yopougon	222,607	362,880	140,273
8		Koumassi	72,444	63,173	-9,271
9		Marcory	49,236	32,800	-16,436
10		Treichville	29,246	17,664	-11,583
11	Periphery AAD	Anyama (SP)	63,807	159,776	95,969
12		Songon (SP)	40,014	73,758	33,744
13		Bingerville (SP)	32,052	78,497	46,445
14	Outside AAD	Grand-Bassam	-	35,948	35,948
15		Bonoua (SP)	-	38,272	38,272
16		Alépé (SP)	-	17,579	17,579
17		Azaguié (SP)	-	12,525	12,525
18		Dabou (SP)	-	41,809	41,809
19		Jacqueville	-	14,854	14,854
20		Oghlwapo (SP)	-	5,678	5,678
21		Brofodoumé (SP)	-	4,997	4,997
Total			1,043,617	1,739,386	695,769

Note: Demand means maximum daily water supply (m^3/day)
Source: JICA Project Team

3) Comparison of land use

The SAFAGE's service coverage area in 2025 and the SDUGA 2040 draft land use plan is compared as shown in Figure 4.4.2. There are gaps between these two areas as well as the demands for water as shown in Table 4.4.3. Furthermore, the construction of water supply and sewerage facilities has been planned in Bingerville and Eloka by the Projet d'Appui à la Sécurité de l'Eau et à l'Assainissement (PASEA).



Source: [Upper] ETUDES DU SCHEMA DIRECTEUR POUR L'ALIMENTATION EN EAU POTABLE DU GRAND ABIDJAN A L'HORIZON 2045 (2015 -2025), [Lower] SDUGA 2040

Figure 4.4.2 Comparison of Land Use between SAFAGE 2025 and SDUGA 2040

4.4.3 Sewerage

(1) Review of the existing master plan

The existing master plan for sewerage sector is "Schéma Directeur d'Assainissement et de Drainage du District d'Abidjan (SDAD)". It covers 13 communes such as all the Core AAD, all the periphery AAD except Songon Commune and adding Grand-Bassam Commune outside AAD. It includes a facilities investment plan to secure a daily wastewater flow of approximately 1.00 million m^3/day in the target year 2030.

(2) Comparison between SDAD 2030 and SDUGA 2040

1) Comparison of forecast population

The comparison of the population forecast between the SDAD 2030 and the SDUGA 2040 is shown in Table 4.4.4. The difference is approximately 3,287 thousand persons in total, indicating that SDUGA 2040 will be required to serve 3.3 million more population than planned by SDAD.

Table 4.4.4 Comparison of Population Forecast between SDAD 2030 and SDUGA 2040

No.	Category	Commune	SDAD 2030	SDUGA 2040	Differences
1	Core AAD	Abobo	8,064,152	2,019,713	1,920,371
2		Adjamé		340,892	
3		Attécoubé		427,841	
4		Cocody		1,231,868	
5		Plateau		7,186	
6		Port-Bouet		1,057,558	
7		Yopougon		2,368,229	
8		Koumassi		412,282	
9		Marcory		214,061	
10		Treichville		115,276	
11	Periphery AAD	Anyama (SP)		1,042,731	
12		Bingerville (SP)		512,285	
13	Outside AAD	Grand-Bassam		234,601	
14	Periphery AAD	Songon (SP)	-	481,358	481,358
15	Outside AAD	Bonoua (SP)	-	249,773	249,773
16		Alépé (SP)	-	114,721	114,721
17		Azaguié (SP)	-	81,739	81,739
18		Dabou (SP)	-	272,855	272,855
19		Jacqueville	-	96,939	96,939
20		Oghlwapo (SP)	-	37,053	37,053
21		Brofodoumé (SP)	-	32,612	32,612
Total			8,064,152	11,351,574	3,287,422

Source: JICA Project Team

2) Comparison of sewerage production

The comparison of wastewater production between the SDAD 2030 and the SDUGA 2040 is shown in Table 4.4.5. These productions are calculated by multiplying the forecasted population by unit production rate. The difference is approximately 0.41 million m^3/day of daily wastewater flow in total. Treatment of sewage to be produced in each commune needs to be planned. It is assumed that 100% of the population has access to either sewerage connection or on-site sanitation in the planned area.

In addition, the comparison of sewerage facilities between the SDAD 2030 and the SDUGA 2040 is shown in Table 4.4.6. The number of sewerage facilities are roughly calculated based on the increment of wastewater production.

Table 4.4.5 Comparison of Wastewater Production between SDAD 2030 and SDUGA 2040

No.	Category	Commune	SDAD 2030	SDUGA 2040	Differences
1	Core AAD	Abobo	1,000,702	250,632	238,304
2		Adjamé		42,302	
3		Attécoubé		53,092	
4		Cocody		152,866	
5		Plateau		892	
6		Port-Bouet		131,235	
7		Yopougon		293,880	
8		Koumassi		51,161	
9		Marcory		26,563	
10		Treichville		14,305	
11	Periphery AAD	Anyama (SP)		129,395	
12		Bingerville (SP)		63,571	
13	Outside AAD	Grand-Bassam		29,112	
14	Periphery AAD	Songon (SP)	-	59,733	59,733
15	Outside AAD	Bonoua (SP)	-	30,995	30,995
16		Alépé (SP)	-	14,236	14,236
17		Azaguié (SP)	-	10,143	10,143
18		Dabou (SP)	-	33,859	33,859
19		Jacqueville	-	12,029	12,029
20		Oghlwapo (SP)	-	4,598	4,598
21		Brofodoumé (SP)	-	4,047	4,047
Total			1,000,702	1,408,647	407,945

Note: Production means daily wastewater flow (m^3/day)
Source: JICA Project Team

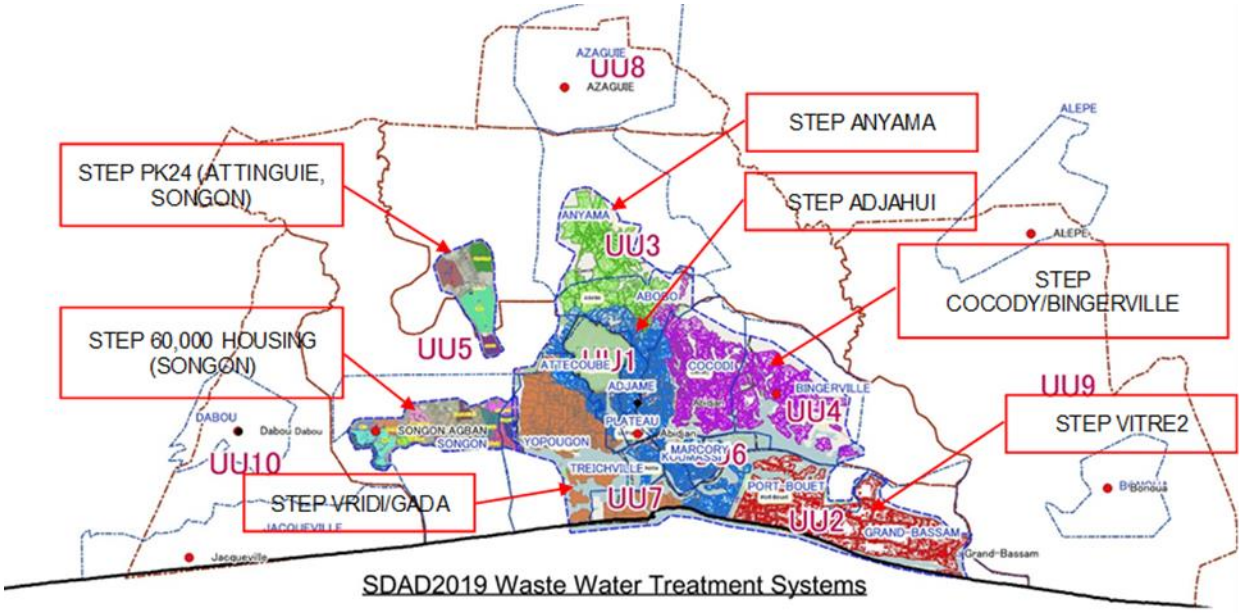
Table 4.4.6 Comparison of Sewerage Facilities between SDAD 2030 and SDUGA 2040

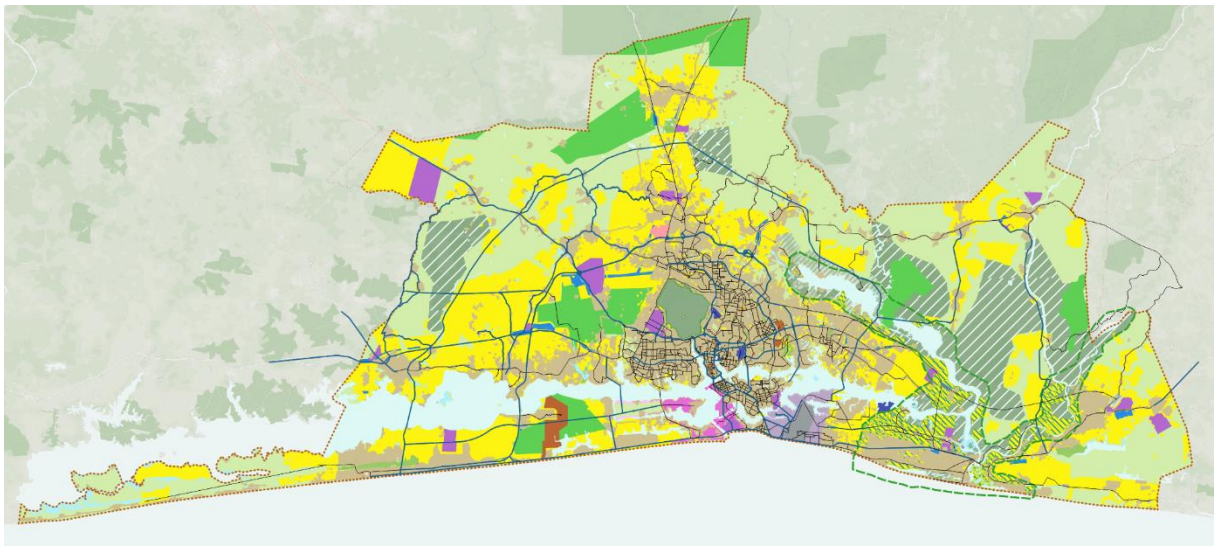
No.	Category	Commune	SDAD 2030	SDUGA 2040	Differences
1	Core AAD	Abobo	Wastewater Facilities [Networks/ WWTP/ PS] 2,099 km/ 7 nos./ 335 nos.	2,599 km/ 9 nos./ 415 nos.	500 km/ 2 nos./ 80 nos.
2		Adjamé			
3		Attécoubé			
4		Cocody			
5		Plateau			
6		Port-Bouet			
7		Yopougon			
8		Koumassi			
9		Marcory			
10		Treichville			
11	Periphery AAD	Anyama (SP)			
12		Bingerville (SP)			
13	Outside AAD	Grand-Bassam			
14	Periphery AAD	Songon (SP)	-	356 km/ 1 no./ 57 nos.	356 km/ 1 no./ 57 nos.
15	Outside AAD	Bonoua (SP)	-		
16		Alépé (SP)	-		
17		Azaguié (SP)	-		
18		Dabou (SP)	-		
19		Jacqueville	-		
20		Oghlwapo (SP)	-		
21		Brofodoumé (SP)	-		
Total			2,099 km/ 7 nos./ 335 nos.	2,955 km/ 10 nos./ 472 nos.	856 km/ 3 nos./ 137 nos.

Source: JICA Project Team

3) Comparison of land use

The comparison of land use between the SDAD 2030 and the SDUGA 2040 is shown in Figure 4.4.3. There are gaps between these two areas as well as the wastewater production volume as shown in Table 4.4.5.





Source: [Upper] Schéma Directeur d'Assainissement et de Drainage du District d'Abidjan (SDAD), [Lower] SDUGA2040

Figure 4.4.3 Comparison of Land Use between SDAD 2030 and SDUGA 2040

4.4.4 Solid Waste Management

(1) Review of the existing master plan

The existing master plan for solid waste management sector is "a study for the development of a new waste master plan in Abidjan developed under the PADSAD programme". It covers 13 communes such as all the core AAD and periphery AAD. It includes a facilities investment plan to deal with solid waste generation of approximately 2.52 million tons per year in the target year 2030. The unit solid waste production rate is assumed to be 0.281 tons per capita per year.

(2) Comparison between PADSAD 2030 and SDUGA 2040

1) Comparison of forecast population

The comparison of the population forecast between the PADSAD 2030 and the SDUGA 2040 is shown in Table 4.4.7. The difference is approximately 2,399 thousand persons in total, indicating that the solid waste management system in 2040 for the SDUGA 2040 area should serve 2.4 million population more than assumed by PADSAD 2030.

Table 4.4.7 Comparison of Population Forecast between PADSAD 2030 and SDUGA 2040

No.	Category	Commune	PADSAD 2030	SDUGA 2040	Differences
1	Core AAD	Abobo	8,952,734	2,019,713	1,278,547
2		Adjamé		340,892	
3		Attécoubé		427,841	
4		Cocody		1,231,868	
5		Plateau		7,186	
6		Port-Bouet		1,057,558	
7		Yopougon		2,368,229	
8		Koumassi		412,282	
9		Marcory		214,061	
10		Treichville		115,276	
11	Periphery AAD	Anyama (SP)		1,042,731	
12		Songon (SP)		481,358	
13		Bingerville (SP)		512,285	
14	Outside AAD	Grand-Bassam	-	234,601	234,601
15		Bonoua (SP)	-	249,773	249,773
16		Alépé (SP)	-	114,721	114,721
17		Azaguié (SP)	-	81,739	81,739
18		Dabou (SP)	-	272,855	272,855
19		Jacqueville	-	96,939	96,939
20		Oghlwapo (SP)	-	37,053	37,053
21		Brofodoumé (SP)	-	32,612	32,612
Total			8,952,734	11,351,574	2,398,841

Source: JICA Project Team

2) Comparison of solid waste production

The comparison of solid waste production between the PADSAD 2030 and the SDUGA 2040 is shown in Table 4.4.8. These productions are calculated by multiplying the forecasted population by unit solid waste production. The difference is approximately 1.72 million tons per year of solid waste volume in total. A solid waste management system in 2040 will need to serve the forecasted population in each commune.

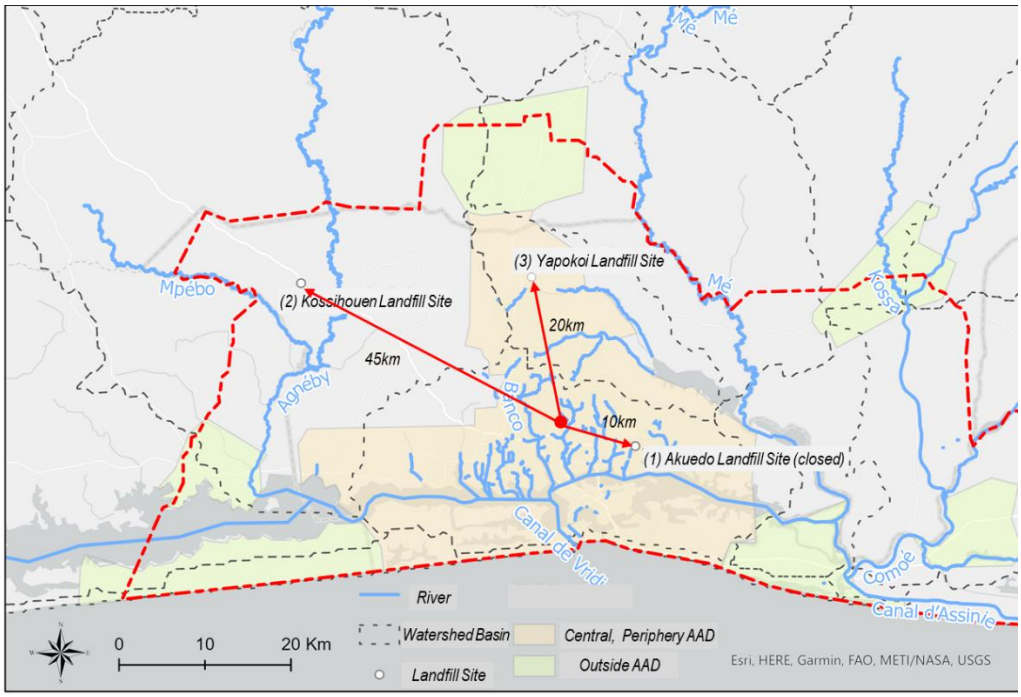
Table 4.4.8 Comparison of Solid Waste Production between PADSAD 2030 and SDUGA 2040

No.	Category	Commune	PADSAD 2030	SDUGA 2040	Differences
1	Core AAD	Abobo	2,516,166	2,875,502	359,336
2		Adjamé			
3		Attécoubé			
4		Cocody			
5		Plateau			
6		Port-Bouet			
7		Yopougon			
8		Koumassi			
9		Marcory			
10		Treichville			
11	Periphery AAD	Anyama (SP)			
12		Songon (SP)			
13		Bingerville (SP)			
14	Outside AAD	Grand-Bassam	-	314,859	314,859
15		Bonoua (SP)	-		
16		Alépé (SP)	-		
17		Azaguié (SP)	-		
18		Dabou (SP)	-		
19		Jacqueville	-		
20		Oghlwapo (SP)	-		
21		Brofodoumé (SP)	-		
Total			2,516,166	3,190,361	674,194

Note: Production means solid waste volume (ton/year)
Source: JICA Project Team

3) Plan of landfill site

There are three landfill sites located as shown in Figure 4.4.4. The Akuedo landfill site has already been closed since it became full. The Kossihouen landfill site is under operation. The area of the site is around 100 ha, and the capacity of its storage is expected to be for 7 years. The Yapokoi landfill site is currently under planning. Furthermore, a waste composting plant with a capacity of one ton per day will be operated under the funding by AfDB at a location between Grand-Bassam and Anani in 2024.



Source: JICA Project Team

Figure 4.4.4 Location of Landfill Site

4.5 Investment Trend for SDUGA 2040 and Investment Promotion Measure

4.5.1 SDUGA 2040 investment trend

To check whether the investment plan for SDUGA 2040 is realistic compared to the historical public expenditure, the expert team collected historical public expenditure in each infrastructure sector between 2018 and 2022 in Greater Abidjan as shown in Table 4.5.1. It should be noted that the cost shown includes the funding from international donors. Further, Figure 4.5.1 shows the percentage of total expenditure by sector, and it is found that road construction is the sector that has required the funding most.

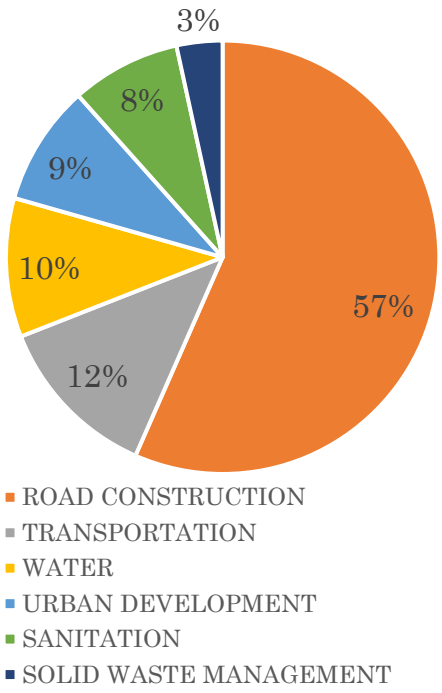
Table 4.5.1 Historical public expenditure in each sector between 2018 and 2022 in Greater Abidjan

(Million CFA)

Sector	2018	2019	2020	2021	2022	Total
Transportation	17,772	23,704	16,211	24,505	99,610	181,801
Urban development	18,601	15,147	34,389	21,910	41,222	131,269
Sanitation	1,056	3,326	8,932	51,128	54,893	119,334
Water	16,360	29,953	33,990	28,052	43,012	151,367
Solid waste	3,227	991	700	42,545	2,516	49,979
Road construction	205,016	202,125	134,492	142,315	142,218	826,166
Total	**262,032**	**275,245**	**228,713**	**310,455**	**383,470**	**1,459,916**

Source: Created by the expert team based on the data shared from Ministry of Budget and Portfolio

In SDUGA 2040, a set of projects for the transportation and urban environmental infrastructures have been formulated. A comparison of the past public investment performance and the proposed investment cost for SDUGA 2040 will be made and presented in the next Project Completion Report in June 2024 once the investment cost for the proposed projects is estimated.



Source: Created by the expert team based on the data shared from Ministry of Budget and Portfolio

Figure 4.5.1 The percentage of total expenditure by sector

4.5.2 Investment promotion measures

(1) Fund for feasibility studies

In Cote d'Ivoire, insufficient budget for feasibility studies is regarded as one of the reasons why solicited PPP projects are not developed. Thus, it is recommended that a budget for feasibility studies should be allocated to line ministries. For example, in Japan the subsidy for feasibility studies is provided from the cabinet office, or line ministries with local governments that have contract agencies for PPP projects if the proposed projects meet certain criteria. Furthermore, PPP development facilities are established in some countries by combining national budget and success fees to prepare financial resources for feasibility studies and provide transaction advisory. In this way, the formulation for PPP projects is promoted. If the winning contractors are selected through open bidding, the cost of government-paid and user-payment in PPP projects could be reduced due to increased competition and competitive pricing. This could lead to an increase in diversity in business plan propositions.

(2) VFM and monitoring system

As the government relies on direct negotiation with the private company that submits unsolicited proposal, VFM is not always calculated. This leads to lack of accountability and transparency. This could be solved if the VFM calculation is made compulsory with the introduction of open bidding mentioned above.

Furthermore, monitoring and publishing systems are important for ensuring accountability and transparency. In Japan, Board of Audit monitor and publish VFM of all the PPP projects that meet certain criteria. This ensures the transparency on how the public expenditure is saved by the PPP.

(3) Providing government financial support

As PPP projects have been historically implemented as results of unsolicited proposals and consequent direct negotiations, there have been few options for government financial support. Furthermore, in the future projects the financial return for the private side might decrease. This is because PPP projects tend

to be formulated where the financial return and bankability is higher. In order to promote solicited-based PPP projects that enhance more competitiveness and further formulate the PPP projects, government support such as viability gap funding (VGF) could be introduced.

(4) Introduction of Land Value Capture (LVC)

A possibility of introducing new forms of urban finance in the Greater Abidjan are to be considered in addition to the conventional methods. The cases of applying new approaches to financing urban infrastructure such as Land Value Capture (LVC) and Public Private Partnership (PPP) in the Cote d'Ivoire and other parts of the world are to be reviewed. Their adaptability to Greater Abidjan will, then, be analyzed in light of legal and regulatory frameworks and market conditions.

An uplift of land value is considered one of the effects of urban infrastructure projects. Installing a new infrastructure facility at a convenient and reliable location can make these locations more attractive to people and businesses, which, in turn, contributes to land value increase. LVC is a financing method that allows local governments to recover increased land value resulting from infrastructure investment. The World Bank (2015)[4] defines LVC as a public financing method, by which governments:

- trigger an increase in land values via regulatory decisions (e.g., change in land use or floor area ratio) and/or infrastructure investments (e.g., transit);
- institute a process to share this land value increment by capturing part or all of the change; and
- finance infrastructure investments (e.g., transit or TOD) or any other improvements required to offset impacts related to the changes (e.g., densification), and/or implement public policies to promote equity (e.g., provision of affordable housing to alleviate shortages and offset potential gentrification).

LVC instruments can be categorized into two groups: tax- or fee-based and development-based. Tax- or fee-based LVC uses indirect methods such as property taxes, betterment charges, special assessments, while development-based LVC captures land value gains through the direct transaction of properties. Table 4.5.2 below presents a variety of methods under these two instruments.

Table 4.5.2 LVC Instruments

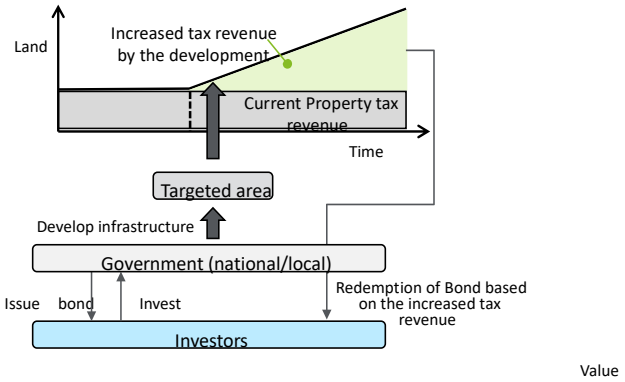
Instrument	Method	Description
Tax- or fee-based	Tax Increment Financing (TIF)	A surtax on properties within an area that will be redeveloped by public investment financed by municipal bonds against the expected increase in property taxes
	Property and land tax	A tax levied on the estimated value of land or land and buildings combined, with revenues usually going into budgets for general purposes
	Betterment charges and special assessments	Surtaxes imposed by governments on estimated benefits created by public investments, requiring property owners who benefit directly from public investments to pay for their costs
Development - based	Land sale or lease (development charge)	Governments sell developers' land or its development rights, whose value has increased thanks to a public investment or regulatory change, in return for an up-front payment, leasehold charge, or annual land rent payments through the term of the lease
	Joint development	A well-coordinated development of transit station facilities and adjacent private properties between transit agencies and developers, where the latter usually contribute physically or financially to the construction of the station facilities, as their property value will increase thanks to the transit investment
	Air rights sale	Governments sell development rights extended beyond the limits specified in land use regulations (such as floor area ratios) or created by regulatory changes to raise funds to finance public infrastructure and services

[4] World Bank, Financing Transit-Oriented Development with Land Values: Adapting Land Value Capture in Developing Countries, 2015, p. xxii

	Land readjustment	Landowners pool their land and contribute a portion of their land for sale to raise funds and partially defray public infrastructure development costs
	Urban redevelopment schemes	Landowners and a developer establish a cooperative entity to consolidate piecemeal land parcels into a single site that they then develop (such as a high-rise mixed-use building) with new access roads and public open spaces. The local government modifies zoning codes and increases maximum floor area ratios in the targeted redevelopment areas (typically around rail transit stations) and finances the infrastructure

Source: World Bank, Financing Transit-Oriented Development with Land Values: Adapting Land Value Capture in Developing Countries, 2015, Table O-1

Tax Increment Financing (TIF) is one of the most frequently used instruments of LVC. It uses tax revenue generated by infrastructure development, i.e., future gains from the increase in taxes due to property value increase, to repay loans or bonds used to fund new infrastructure. Hence, it minimizes up-front payments of the public sector. Some municipalities in the US have adopted this instrument.



Source: JICA Project Team

Figure 4.5.2 Structure of TIF

In terms of issuing municipal bonds in the country, the commune of Plateau is planning to raise a municipal bond on the WAEMU (West African Economic and Monetary Union or UEMOA in French) bond market, according to an online news article[5].

[5] Kapital Afrik, Côte d'Ivoire: launch of the first municipal bond by a community, 24 Dec 2021, https://www.kapitalafrik.com/2021/12/24/cote-divoire-launch-of-the-first-municipal-bond-by-a-community

Chapter 5 SDUGA 2040 Implementation Program and Action Plan

5.1 SDUGA 2040 Implementation Program

5.1.1 Transportation

(1) Long list of transport projects and selection of priority projects

A long list of transport projects was prepared considering two aspects: the development of transport infrastructure and services for "new urban areas" and the improvement of bottlenecks for "existing built-up areas" based on the current projects list prepared by the existing SDUGA.

The road network of Greater Abidjan is proposed by the concept of the current basic road network system "Radial-Circular Network" and paying attention to the existing SDUGA projects. Specific projects on public transport and soft mobility categories are integrated referring to the ongoing studies on transport infrastructure and services under other frameworks, PTUA, PACOGA, and others.

Table 5.1.1 Long list of transport project (1)

No.	Name of Projects	Progress as of 2023	Revised start year inSDUGA 2040	Revised completion year in SDUGA 2040	Donors	Remarks
V	**Road Development Plan**					
V1	**Development of Ring Road**					
1	Development of Y4 Ring Road - Songon / Autoroute du Nord Section	Implemented	2022	2026	World Bank	Alignment change from SDUGA
2	Development of Y4 Ring Road - Autoroute du Nord / Pk18	Not started			World Bank	Alignment change from SDUGA (cancelled)
3	Development of Y4 Ring Road - Pk18 to Abobo Baoulé Section	Funded	2022	2026	BAD, JICA	
4	Development of Y4 Ring Road - Abobo Baoulé / François Mitterand Section	Funded	2022	2026	BAD	
5	Development of Y4 Ring Road - François Mitterand / Rivièra 6 Section	Completed	2016	2018	BAD	
6	Development of Y4 Ring Road - Desirée Island Bridges Section	Not started	2027	2033	AFD	Changed after SDUGA with approval
7	Development of Y4 Ring Road - Aérocité Section	Not started	2030	2036		New proposal in SDUGA 2040
8	Development of Y4 Ring Road - Canal du Vridi Section	Not started	2027	2034		Under selection of alternatives
9	Development of Y4 Ring Road - Jacqueville Section	Not started	2035	2040		
V2	**Development of Bingerville Area Road Network (BiARN)**					
1	Development of BiARN - Bingerville Northern Bypass	Not started	2036	2039	BAD, JICA	Study implemented.
2	Development of BiARN - Extension of the Boulevard François Mitterand	Not started	2025	2028	BAD, JICA	Study implemented.
3	Development of BiARN - Widening of the Route de Bingerville	Completed				
4	Development of BiARN - Bingerville BHLS Road	Not started	2031	2034		
5	Development of BiARN - Abidjan - Lagos International Corridor	Not started	2027	2034		New proposal in SDUGA 2040
V3	**Development of Bassam Area Road Network (BaARN)**					
1	Development of BaARN - Abidjan-Bassam Expressway (under construction)	Completed			China	
2	Development of BaARN - Aérocité Area	Not started	2031	2035		
3	Development of BaARN - Bassam Northern Bypass	Not started	2030	2034		
4	Development of BaARN - Widening of the Route de Bonoua	Not started	2034	2036	China	Partial sections only
V4	**Development of Yopougon Area Road Network (YoARN)**					
1	Development of YoARN - Voie V23 - Parkway Section	Implemented	2018	2025	BAD	
2	Development of YoARN - Voie V23 - 4th Bridge Section	Completed	2017	2023	BAD	Almost complete as of early 2024
3	Development of YoARN - Voie V2	Not started	2031	2036		
4	Development of YoARN - Voie V6	Not started	2031	2036		
5	Development of YoARN - Voie V9	Not started	2027	2030		
6	Development of YoARN - Yopougon Industrial Zone Arterial Road	Not started	2031	2033		
7	Development of YoARN - Voie V28 - Northern Section	Implemented	2021	2027		
8	Development of YoARN - Voie V28 - Yopougon Koute	Not started	2027	2034		
9	Development of YoARN - Voie V28 - Southern Section	Not started	2027	2034		
10	Development of YoARN - Autoroute de l'Ouest	Completed	2017	2023	BAD	Almost complete as of end 2023
11	Development of YoARN - Yopougon Western Bypass	Not started	2036	2040		
12	Development of YoARN - Widening of the Voie V1	Not started	2031	2036		
13	Development of YoARN - Central Road of Boulay Island	Not started	2036	2040		
14	Development of YoARN - Widening of Siporex-Sable Link	implemented	2022	2027		
15	Development of YoARN - Boulay Island Road	Not started	2033	2038		
16	Development of YoARN - Boulay Bridge	Not started	2035	2040		
17	Development of YoARN - Lake Dadie Road	Not started	2036	2040		
18	Development of YoARN - Adiopodoumé Bypass	Not started	2037	2040		
V5	**Development of Abobo Area Road Network (AbARN)**					
1	Development of AbARN - Extension of Q1	Not started	2027	2030		
2	Development of AbARN - Western Abobo Bypass	Not started	2031	2036	BAD	Alignment changed to avoid the Banco National Park
3	Development of AbARN - Extension of Voie N'Dotre	Completed	2018	2023	BAD	
4	Development of AbARN - Widening of the Route d'Alépé	Not started	2031	2040		Under Studyfor the section from starting to 5km beyod Y4 (4 lanes)
5	Development of AbARN - Widening of the Autoroute d'Abobo	Completed	2020	2023	BAD	
6	Development of CoARN - East-West Abobo-Cocody Link	Implemented	2022	2025		Parcially completed
7	Development of CoARN - Abobo-Anyama Link	Not started	2030	2034		
8	Development of CoARN - Agbekoi area road	Not started	2031	2034		
9	Development of CoARN - Avocatie road	Not started	2032	2035		
10	Development of CoARN - Gare d'Anyama-Adjame road	Not started	2033	2037		
11	Development of CoARN - Atiekoi road	Not started	2036	2040		
V6	**Development of CoARN - East-West Abobo-Cocody Link**					
1	Development of CoARN - Extension of Boulevard Latrille	Implemented	2021	2025	BAD	
2	Development of CoARN - Voie Y3	Not started	2031	2034		
3	Development of CoARN - Inner Ring Road - Cocody section	Implemented	2022	2026	PTUA	
4	Development of CoARN - Extension of the Boulevard de France	Implemented	2019	2025	AFD	Completed as tempolary
5	Development of CoARN - Boulevard de France Redressé	Completed	2016	2023	World Bank	
6	Development of CoARN - Widening of the Boulevard Latrille	Not started	2027	2033	KOICA	Boulevard de Martyrs
7	Development of CoARN - Widening of the Rue des Jardins	Not started	2034	2037		
8	Development of CoARN - Widening of the Boulevard de la Corniche	Completed	2017	2022		
9	Development of CoARN - Widening of the Boulevard Attoban	Not started	2031	2035		Intiative by CI government
10	Development of CoARN - Widening of the Boulevard de la 7e Tranche	Not started	2031	2033		

Changed after SDUGA with approval
Change from SDUGA
New proposal in SDUGA 2040
Completed

Source: JICA Project Team

Table 5.1.2 Long list of transport project (2)

No.	Name of Projects	Progress as of 2023	Revised start year inSDUGA 2040	Revised completion year in SDUGA 2040	Donors	Remarks
V	**Road Development Plan**					
V7	**Development of Central Area Road Network (CeARN)**					
1	Development of CeARN - Voie Triomphale	Not started	2027	2034		
2	Development of CeARN - 3rd Bridge	Completed	2015	2017	PPP	Completed
3	Development of CeARN - Widening of the Boulevard de Marseille	Not started	2031	2036	BOAD	Changed from the initial plan and implemented
4	Development of CeARN - Widening of the Boulevard de Marseille	Not started	2027	2032	World Bank	Land fill is necessary before starting project
5	Development of CeARN - Vridi Northern Bypass	Not started	2027	2034		Land fill is necessary before starting project
6	Development of CeARN - Grand-Campement Arterial Road	Not started	2031	2036		
7	Development of CeARN - Upgrade of Felix Houphouet Boigny Bridge	Completed	2018	2022	AFD	Rehabilitation of Houpet-Boigny Bridge
8	Development of CeARN - Upgrade of General de Gaulle Bridge	Not started	2031	2036	Trésor	
9	Development of CeARN - Vridi-Bietry Bridge	Not started	2025	2030		Land fill is necessary before starting project
10	Development of CeARN - Yopougon-Treichville Tunnel	Not started	2031	2036		
V8	**Intersection Improvement**					
1	Intersection Improvement - Solibra (Treichville)	Implemented	2021	2026	JICA	
2	Intersection Improvement - Mairie d'Abobo (Abobo)	Implemented	2022	2025		
3	Intersection Improvement - Banco (Abobo)	Not started	2026	2030		
4	Intersection Improvement - Palais des Sports (Treichville)	Not started	2031	2036		Improvement as at-grade
5	Intersection Improvement - Siporex (Yopougon)	Not started	2026	2030	China	
6	Intersection Improvement - Kenaya (Yopougon)	Not started	2027	2030		
7	Intersection Improvement - Sapeur Pompiers (Yopougon)	Not started	2032	2035		Implemented as part of the Fourth Bridge
8	Intersection Improvement - Samake (Abobo)	Not started	2028	2032		
9	Intersection Improvement - St Jean (Cocody)	Not started	2026	2029		
10	Intersection Improvement - Palmeraie (Cocody)	Implemented	2023	2026	JICA	
11	Intersection Improvement - CHU Treichville (Treichville)	Not started	2031	2033		Implemented as part of improvement of Blvd. de Marseille
12	Intersection Improvement - Inchallah (Koumassi)	Not started	2031	2034		
13	Intersection Improvement - Zoo (Adjamé-Cocody)	Not started	2030	2033		
14	Intersection Improvement - Williamsville (Adjamé)	Not started	2028	2032		
15	Intersection Improvement - Carrefour de la Vie (Cocody)	Not started	2027	2030		
16	Intersection Improvement - Carrefour de L'Ecole Nationale de Police (Cocody)	Implemented	2023	2026	JICA	
17	Intersection Improvement - Carrefour de Marcory (Marcory)	Not started	2027	2032		
18	Intersection Improvement - Carrefour Riviela 3 (Cocody)	implemented	2023	2026	JICA	
19	Intersection Improvement - Macaci (Abobo)	Completed	2021	2023		Almost completed as of end 2023
20	Intersection Improvement - Akwaba (Port Buet)	implemented	2022	2025		New proposal in SDUGA 2040
21	Intersection Improvement - Fire station (Plateau)	Not started	2031	2036		New proposal in SDUGA 2040
22	Intersection Improvement - Pharmacie AGUBAN (Ajame)	Not started	2031	2036		New proposal in SDUGA 2040
23	Intersection Improvement - Rue du Lycee Technique (Cocody)	Not started	2028	2031		New proposal in SDUGA 2040
24	Intersection Improvement - Elitecamp (Yopougon)	Not started	2031	2036		New proposal in SDUGA 2040
25	Intersection Improvement - Pharmacie Ste Rita (Yopougon)	Not started	2030	2034		New proposal in SDUGA 2040
26	Intersection Improvement - AGRIPAC (Abobo)	Not started	2028	2032		New proposal in SDUGA 2040
27	Intersection Improvement - CMEAU (Yopougon)	Not started	2028	2032		New proposal in SDUGA 2040
28	Intersection Improvement - Abatta (Cocody)	Not started	2028	2032		New proposal in SDUGA 2040
29	Intersection Improvement - Carrefour Moossou (Grand-Bassam)	Not started	2030	2033		New proposal in SDUGA 2040
V9	**Development of Additional Roads in 2013**					
1	Development of an Alternative Road to the Route de Dabou	Not started	2031	2035		
2	Development of an Alternative Connection between Autoroute du Nord - Carrefour Thomasset	Not started	2032	2036		Changed after SDUGA with approval
3	Development of an Elevated Road over Cocody Bay	Completed	2018	2023	China	
4	Development of a Northern Extension of the 3rd Bridge	Not started	2030	2035		
5	Development of a Connection Road between Boulevard Mitterand and Grand Bassam	Not started	2027	2031		
V10	**Development of Additional Roads in 2015**					
1	Development of Inner ring road Airport - Koumassi section	Not started	2025	2030		Alighnment change from SDUGA
2	Development of Y4 Ring Road CHU d'Angré - PK18 section	Not started	2021	2027		Alighnment change from SDUGA
3	Development of Adiopodoumé - Dabou section	Not started	2036	2040		Changed after SDUGA with approval
4	Development of Modest section	Not started	2031	2033		
5	Development of North Anayama section	Not started	2030	2033		
6	Development of Northern Bypass	Not started	2036	2040		
V11	**Middle Ring Road**					
1	Development of Middle and Outer Ring Road Coastal section	Not started	2036	2040		New proposal in SDUGA 2040
2	Development of Middle Ring Road Dabou section	Not started	2036	2040		New proposal in SDUGA 2040
3	Development of Middle Ring Road Orgaff section	Not started	2036	2040		New proposal in SDUGA 2040
4	Development of Middle Ring Road Adake section	Not started	2036	2040		New proposal in SDUGA 2040
5	Development of Middle Ring Road Atiekoi section	Not started	2036	2040		New proposal in SDUGA 2040
6	Development of Middle Ring Road Lagunes section	Not started	2036	2040		New proposal in SDUGA 2040
7	Development of Middle Ring Road Vitore 2 section	Not started	2036	2040		New proposal in SDUGA 2040
V12	**Outer Ring Road**					
1	Development of Outer Ring Road Bouboury section	Not started	2036	2040		New proposal in SDUGA 2040
2	Development of Outer Ring Road Azaguie section	Not started	2036	2040		New proposal in SDUGA 2040
3	Development of Outer Ring Road Nsakoi section	Not started	2036	2040		New proposal in SDUGA 2040
4	Development of Outer Ring Road Yaou section	Not started	2036	2040		New proposal in SDUGA 2040

Changed after SDUGA with approval
Change from SDUGA
New proposal in SDUGA 2040
Completed

Source: JICA Project Team

Table 5.1.3 Long list of transport project (3)

No.	Name of Projects	Progress as of 2023	Revised start year inSDUGA 2040	Revised completion year in SDUGA 2040	Donors	Remarks
G	**Traffic Control and Management Plan**					
G1	**Development of Traffic Control System**					
1	Development of Area Traffic Control System	Not started				Replaced to G1-4 project
2	Development of Public Transport Priority System	Funded	2024	2027		PMUA
3	Development of Urban Traffic Information System	Not started	2030	2032		Suspended
4	Installing Traffic Lights with Camera (89 locations)	Implemented	2023	2025	PPP	Replaced from G1-1
5	Extention of Traffic Data Utilziation System (Pilot Project of SDUGA)	Not started	2025	2027		New proposal in SDUGA 2040
G2	**Development of Public Transportation System**					
1	Development of Dedicated Bus Lanes	Funded	2031	2034	World Bank, AfBD, SweedFound	PMUA and otheres
2	Implementation of Transportation IC-Card System	Not started	2025	2027		
3	Development of Bus Operation Monitoring and Control System	Funded	2022	2027		PMUA
4	Development of Public Transport Operation Information Provision System	Funded	2023	2027		PMUA
G3	**Parking System Development**					
1	Development of Parking Facilities/Parking Information System	Funded	2021	2026	AfBD	PTUA
G4	**Development of Expressway System**					
1	Development of Highway Traffic Control System	Implemented	2021	2026	PPP	A part of function has been developed in QuiPux
2	Development of Electronic Toll Collection System	Not started	2031	2035		
G5	**Traffic Enforcement Assistance**					
1	Development of Overloaded Truck Control System	Not started	2030	2032		
2	Development of Road Pricing System	Implemented	2030	2033		3rd bridge is one of the case
3	Supporting System for Control of Illegal Parking	Funded	2024	2026	PPP	Related to Quipux
G6	**Traffic Safety Assistance**					
1	Pedestrian Facility Development for Better Environment	Not started	2025	2027		
G7	**Road Management**					
1	Development of Road Surface Condition Survey System	Not started	2030	2033	MCC	
2	Management System of Information on Road Maintenance Works	Funded	2024	2026	MCC	
3	Development of Asset Management System	Not started	2034	2035		
T	**Public Transport Development Plan**					
T1	**Commuter Rail Development**					
1	North-South Rail Project-Stage 1 Anyama to Airport	Implemented	2023	2028	Trésor	Original plan: completed by 2026
2	North-South Rail Project-Stage 2 Airport to Grand-Bassam	Not started	2031	2037	Trésor	
3	East – West BRT Project (Yopougon to Bingerville)	Not started	2025	2028	Word Bank	Change from Rail to BRT
T2	**Bus Transportation Development**					
1	Development of BRT Service: Adjamé – Braké Industrial Zone	Not started	2025	2028		Restructure from SDUGA
2	Development of BRT Service: Abobo – Koumassi Phase 1	Not started	2025	2028		Restructure from SDUGA
3	Development of BRT Service: Abobo – Koumassi Phase 2	Not started	2025	2028		Restructure from SDUGA
4	Development of BHLS Service: Bingerville – Bonoua	Not started	2025	2028		Restructure from SDUGA
5	Development of BHLS Service: Yopougon – Dabou	Not started	2025	2028		Restructure from SDUGA
6	Purchase of Additional Buses for SOTRA	Completed	2016	2020	Scania, Swedfund	1000 buses have been acquired by the State of Côte d'Ivoire for SOTRA
7	Pilot project of communal transport	Not started	2025	2029		
8	Development of BRT Abobo North line	Not started	2026	2030		New proposal in SDUGA 2040 (other framework study)
9	Development of BRT Grand bassam line	Not started	2031	2036		New proposal in SDUGA 2040 (from other framework study)
10	Development of BRT Plateau line	Not started	2031	2036		New proposal in SDUGA 2040 (from other framework study)
11	Development of BRT Dabou-phase1 line	Not started	2031	2036		New proposal in SDUGA 2040 (from other framework study)
12	Development of BRT Dabou-phase 2 line	Not started	2031	2036		New proposal in SDUGA 2040 (from other framework study)
13	Development of BRT Prison civile line	Not started	2026	2030		New proposal in SDUGA 2040 (other framework study)
14	Development of BRT Zoo line	Not started	2031	2036		New proposal in SDUGA 2040 (from other framework study)
15	Development of BRT Y4 line	Not started	2026	2030		New proposal in SDUGA 2040 (other framework study)
16	Development of BRT Voie express line	Not started	2029	2033		New proposal in SDUGA 2040 (other framework study)
17	Development of BRT Latrille-phase1 line	Not started	2026	2030		New proposal in SDUGA 2040 (other framework study)
18	Development of BRT Latrille-phase2 line	Not started	2031	2036		New proposal in SDUGA 2040 (from other framework study)
19	Development of BRT Vridi line	Not started	2031	2036		New proposal in SDUGA 2040 (from other framework study)
20	Development of BRT Abobodoume line	Not started	2031	2036		New proposal in SDUGA 2040 (from other framework study)
21	Development of BRT Niangon lokao line	Not started	2031	2036		New proposal in SDUGA 2040 (from other framework study)
22	Development of BRT East-West Extention	Not started	2031	2036		New proposal in SDUGA 2040
T3	**Intermodal Transportation Terminal Development**					
1	Development/Improvement of Intermodal centers at Adjame, and Central/Southern	Not started	2025	2028		Looking fo finance
T4	**Water-based Transportation Development**					
1	East – West High Speed Ferry Service (Songon - Grand Bassam)	Funded	2024	2027	World Bank, PPP	PACOGA
2	Water Bus - Attecoube to Treichville	Not started	2026	2028		
F	**Freight Transport Development Plan**					
F1	**Railway Transport Services**					
1	Developing Direct Container Freight Loading & Unloading System	Not started				Cancelled
2	New Freight Railway Connecting to Western Part of Abidjan Port	Not started	2025	2034		
F2	**Truck Transport Services**					
1	Metropolitan Logistic Center Development	Implemented	2022	2025	RED CROSS	
O	**Organizational and Institutional Arrangements**					
O1	Establishment of Agency/Commision					
1	Establishment of Road Projects Implementation Commission	Not started	2024	2026		By DGTTC/ARTI/AMUGA
2	Establishment of ITS Cote d'Ivoire	Funded	2019	2026		PTUA
3	Establishment of Clearing House Organization	Funded	2022	2028		PTUA
4	Development of Transport Planning Centre of Excellence	Funded	2016	2027		PTUA
5	Establishment of inter-ministrial transport data platform	Not started	2025	2027		New Proposal from SDUGA
O2	**Public Transport Services**					
1	Reorganization of SOTRA Bus Services	Implemented	2021	2025	AFD	PMUA

Changed after SDUGA with approval
Change from SDUGA
New proposal in SDUGA 2040
Completed

Source: JICA Project Team

5.1.2 Urban Environment Infrastructure

(1) Water Supply

In the National Development Plan (PND) 2021-2025, an action plan for the water supply sector was prepared. The Ministry of Hydraulics (MH) summarized a list of projects for the water supply sector as a part of the Government Projects Summary. The list of projects of water supply sector in Abidjan is shown in Table 5.1.4.

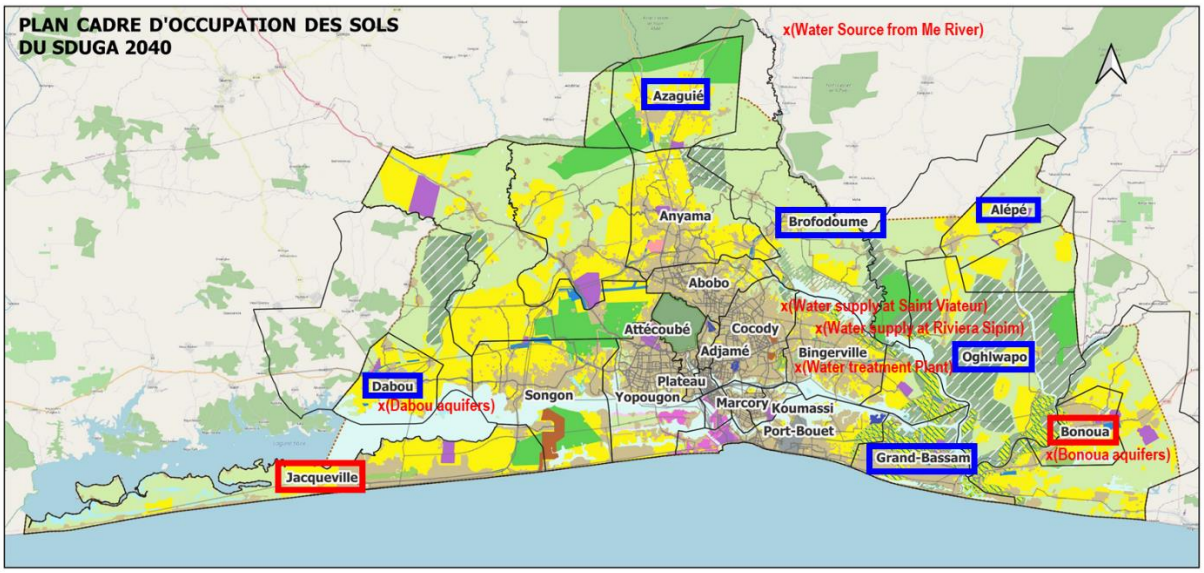
Table 5.1.4 Long List of Water Supply Project

No.	Programme / Project		Amount (million FCFA)
1	Extension and reinforcement works of the drinking water distribution network in Abidjan city	(Travaux d'extension et de renforcement du réseau de distribution d'eau potable de la ville d'Abidjan)	993
	Lot2: Reinforcement works for the drinking water network in Gonzaqueville	(Lot2: Travaux de renforcement du réseau d'eau potable de Gonzaqueville)	
2	Project to strengthen the drinking water supply of the city of Abidjan from the SONGON Aquifer (SONGON-C2D PROJECT)	(Projet de renforcement de l'alimentation en eau potable de la ville d'Abidjan à partir de la Nappe de SONGON (PROJET SONGON-C2D))	40,000
3	REINFORCEMENT OF THE DRINKING WATER SUPPLY OF THE CITY OF ABIDJAN (South Zone Supply) from the South Comoé water table. Phase 2.	(RENFORCEMENT DE L'ALIMENTATION EN EAU POTABLE DE LA VILLE D'ABIDJAN (Alimentation de la zone Sud) à partir de la nappe du Sud Comoé. Phase 2.)	48,490
4	REINFORCEMENT OF THE DRINKING WATER SUPPLY OF THE CITY OF ABIDJAN (Supply to the South zone) from the South Comoé Aquifer.	(RENFORCEMENT DE L'ALIMENTATION EN EAU POTABLE DE LA VILLE D'ABIDJAN (Alimentation de la zone Sud) à partir de la nappe du Sud Comoé.)	50,000
5	Reinforcement works of the YOPOUGON/ABOBO/ABIDJAN SUD/COCODY RIVIERA structuring networks	(Travaux de renforcement de réseaux structurant de YOPOUGON/ABOBO/ABIDJAN SUD/COCODY RIVIERA)	20,000
6	Construction works for a water tower of 5000 m3 at 35 m a n'dotre	(Travaux de construction d'un château d'eau de 5000 m3 a 35 m a n'dotre)	4,700
7	Construction of a drinking water supply system in the locality of Ayanma Débarcadaire (S/P Ayanma)	(Réalisation d'un système d'adduction en eau potable de la localité de Ayanma Débarcadaire (S/P Ayanma))	286
8	Extension and reinforcement works of the drinking water distribution network in Abidjan city	(Travaux d'extension et de renforcement du réseau de distribution d'eau potable de la ville d'Abidjan)	520
	Lot5: Reinforcement works for the drinking water network in Abobo	(Lot5: Travaux de renforcement du réseau d'eau potable de Abobo)	
9	Extension and reinforcement works of the drinking water distribution network in Abidjan city	(Travaux d'extension et de renforcement du réseau de distribution d'eau potable de la ville d'Abidjan)	741
	Batch3: Reinforcement works for the Cocody drinking water network	(Lot3: Travaux de renforcement du réseau d'eau potable de Cocody)	
10	Extension and reinforcement works of the drinking water	(Travaux d'extension et de renforcement du réseau de distribution d'eau potable de	458

No.	Programme / Project		Amount (million FCFA)
	distribution network in Abidjan city	la ville d'Abidjan)	
	Lot4: Bingerville Drinking Water Network Reinforcement Works	(Lot4: Travaux de renforcement du réseau d'eau potable de Bingerville)	
11	Abidjan North-East Water Supply Project (BADEA North-East PROJECT)	(Projet d'alimentation en eau du Nord Est d'Abidjan (PROJET BADEA Nord-Est))	9,000
12	Project to strengthen the drinking water supply of the city of Abidjan from the boreholes of AKANDJE and BIMBRESSO (PRICI PROJECT)	(Projet de renforcement de l'alimentation en eau potable de la ville d'Abidjan à partir des forages d'AKANDJE et de BIMBRESSO (PROJET PRICI))	5,800
13	Project to strengthen the drinking water supply in the city of Abidjan (NIANGON PROJECT 2)	(Projet de renforcement de l'alimentation en eau potable de la ville d'Abidjan (PROJET NIANGON 2))	14,000
14	Construction, rehabilitation and equipment of boreholes for the installation of a piezometric observation and warning network on the Abidjan, Dabou and Bonoua aquifers - Lot 1	(Travaux de réalisation, réhabilitation et équipement de forages pour la mise en place d'un réseau piézométrique d'observation et d'alerte sur les nappes d'Abidjan, de Dabou et Bonoua - Lot 1)	991
15	Drinking water supply for the Saint Viateur/Riviera Sipim area	(Alimentation en eau potable de la zone Saint Viateur/Riviera Sipim)	8,000
16	Reinforcement work on the Bingerville drinking water production facilities.	(Travaux de renforcement des installations de production d'eau potable de Bingerville.)	3,700
17	Project for the design, financing and implementation of works to reinforce the drinking water supply of the city of Abidjan from the river "Mé".	(Projet de conception, financement et réalisation des travaux de renforcement de l'alimentation en eau potable de la ville d'Abidjan à partir de la rivière la "Mé")	193,186
18	Project for the production of drinking water from the Aghien lagoon	(Projet de production d'eau potable à partir de la lagune Aghien)	125,000
19	Bandama drinking water production project (by an Independent Producer)	(Projet de production d'eau potable à partir du Bandama (par un Producteur Indépendant))	285,000
20	Drinking water supply for the city of Abidjan	(Alimentation en eau potable de la ville d'Abidjan)	15,000
		Total	825,865

Source: Government's Projects Summary – Ministry of Hydraulics, 2019

In addition, proposed urban environmental infrastructure implementation program of 2040 for water supply sector outside AAD such as Grand-Bassam, Bonoua, Alépé, Azaguié, Dabou, Jacqueville, Oghlwapo and Brofodoumé Commune, whose locations are shown in Figure 5.1.1, are 953 thousand m^3/day as daily maximum demand of water supply facilities in total. The investment cost in these areas are estimated as 754 billion FCFA. Adding this amount to the total cost at 825 billion CFA shown in Table 5.1.4, the total estimated programme cost for Greater Abidjan until 2040 is estimated to be 1,580 billion FCFA.



Notes: Enclosed texts mean the priority communes of outside AAD (implementation programme of 2040 in blue and priority programme in Red). "x" marks mean the priority projects of central and periphery AAD.
Source: JICA Project Team

Figure 5.1.1 Location of proposed Urban Environmental Infrastructure Implementation Program of 2040 for Water Supply Sector

(2) Sewerage

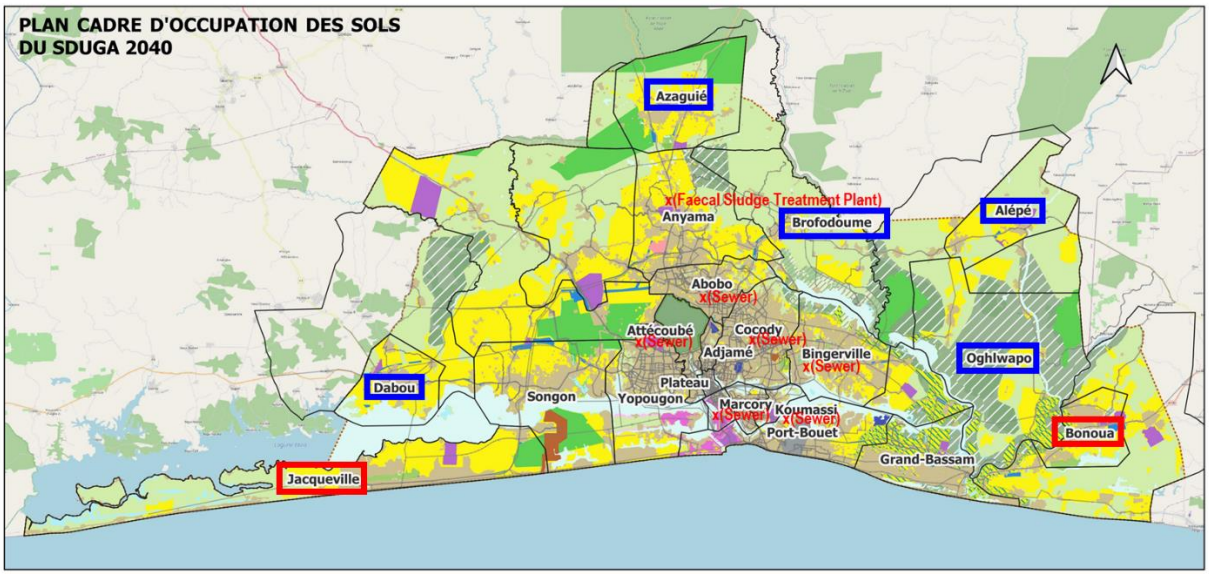
Based on hearing to ONAD, an action plan for the sewerage sector was prepared. The list of projects of sewerage sector in Abidjan is shown in Table 5.1.5.

Table 5.1.5 Long List of Sewerage Project

No.	Programme / Project	Contents	Amount (million FCFA)
1	Sanitation and Urban Resilience Project (PARU)	Sewer, drainage	192,150
2	Infrastructure Renaissance Project (PRICI)	Drainage, toilet	32,940
3	Project to Improve Sanitation and the Living Environment in the Autonomous District of Abidjan (PAACA)	Sewer (north, south area), drainage, pumping station (2 places), lateral connections	15,250
4	Programme for the Sustainable Improvement of the Sanitation and Drainage Situation (PADSAD)	Drainage, Faecal sludge treatment plant (Anyama), lateral connections	57,340
5	Project for the Improvement of Waste Material Management (PAGEMV)	Faecal sludge treatment plant (11 places)	32,940
6	Project du BV du Gourou	Drainage, sewer, lateral connections	29,280
7	Priority sanitation and drainage program for the District of Abidjan	Sewer, pumping station	16,470
		Total	376,370

Source: JICA Project Team

In addition, proposed urban environmental infrastructure implementation program of 2040 for sewerage sector outside AAD such as Bonoua, Alépé, Azaguié, Dabou, Jacqueville, Oghlwapo and Brofodoumé Commune (excluding Grand-Bassam Commune) whose locations are shown in Figure 5.1.2, are 1,863 thousand m^3/day as daily wastewater flow of sewerage supply facilities in total. These investment cost for these areas are estimated as 412 billion FCFA. Adding this amount to the total cost at 376 billion CFA shown in Table 5.1.5, the total estimated programme cost for Greater Abidjan until 2040 is estimated to be 788 billion FCFA.



Notes: Enclosed texts mean the priority communes of outside AAD (implementation programme of 2040 in blue and priority programme in Red). "x" marks mean the priority projects of central and periphery AAD.
Source: JICA Project Team

Figure 5.1.2 Location of proposed Urban Environmental Infrastructure Implementation Program of 2040 for Sewerage Sector

(3) Solid Waste Management

The project named "Sanitation and Urban Resilience Project" under the World Bank has been in progress. One of the project component is follows:

- Construction of waste transfer centres (Grand Bassam, Dabu and Sikeni)
- Construction of a recycling centre (site to be decided)
- Construction of a Centre de Valorisation et d'Enfouissement Technique (CVET)

5.2 Action Plan for 2030

5.2.1 Transportation

(1) Project evaluation

The short list and priority projects were selected through a multi-criteria analysis using several evaluation criteria as shown in Table 5.2.1 and 5.2.2 below. SDUGA made the selection of priority projects based on the first five criteria in the table below. In addition to the first five listed above, three more were added in SDUGA 2040.

Table 5.2.1 Evaluation criteria

Indices	Description	Criteria in SDUGA	Weight
Consistency	Consistency with upper-level development program in Abidjan metropolitan area and state level project including Abidjan port master plan	SDUGA factor plus additional consideration	10%
Emergency	Contribution for emergency issues on urban transport sector and/or urban planning, e.g. improvement impact on crowded road section at present	Same as SDUGA criteria	15%
Necessity / Relevance	Needs from Abidjan Metropolitan Area including aspect of citizen and government sectors, mainly traffic or passenger volume of urban transport infrastructure and public	Same as SDUGA criteria	10%

	transport system		
Acceptability	Impact on social consideration and simple cost size including land acquisition difficulty	Same as SDUGA criteria	15%
Investment efficiency	B/C (Benefit / Cost) ratio	Same as SDUGA criteria	20%
Project status (progress)	Under construction/funded project is respected as priority according to current status	Additional criteria from SDUGA	20%
Environment-friendly / Green mobility	Contribution for share improvement of NMT (Non Motorized Vehicle) to reduce private transportation modes	Additional criteria from SDUGA	5%
Promotion of public transport and/or contribution for realizing multimodal system	Not only integrated transport terminals as infrastructure project but also any soft component solutions using digital and ICT technologies to develop good services for public transport users	Additional criteria from SDUGA	5%
Total			100%

Source: JICA Project Team

Table 5.2.2 Evaluation methodology by criteria

Criteria	Weight (%)	Score			
		0	1	2	3
Consistency	10	None		Upper-level transport study, e.g. Abidjan port M/P or other transport study framework	SDUGA & Upper-level transport study, e.g. Abidjan port M/P or other transport study framework
Emergency	15	Low as of now	Low as of now but Bottleneck (BN) in near future	Existing BN	Critical BN
Necessity / Relevance	10	Passenger<3,000/PCU<3,000 or qualitative evaluation for non-physical infrastructure	Passenger<10,000/PCU<10,000 or qualitative evaluation for non-physical infrastructure	Passenger<20,000/PCU<20,000 or qualitative evaluation for non-physical infrastructure	Passenger>20,000/PCU>20,000 or qualitative evaluation for non-physical infrastructure
Acceptability	15	Heavy difficulty on land acquisition	Infrastructure with complicated or large-scaled structure	Infrastructure without complicated or large-scaled structure or database preparation	Compact infrastructure or smart solutions or soft mobility
Investment efficiency (B/C)	20	Less than 1.0	< 1.5	< 2.0	'2.0 < or Smart solutions
Project status	20	Under planning	F/S or Approval process	Financed	Implemented
Environment-friendly / Green mobility	5	Not concerned	Ring roads or bypass roads	Any mass rapid transit projects	Any project to increase NMT users
Promotion of public transport	5	Not concerned	BN improvement on routes of mass rapid transit	Infrastructure (physical or soft component) for public transport	Development of multi-modal hub for passenger or freight

and/or contribution for realizing multimodal system				development	

Source: JICA Project Team

(2) Priority projects

The number of priority projects to be started by 2030 is 72 (25 road projects, 10 public transport projects, 26 traffic control and demand management, 3 soft mobility and smart solutions, and 8 logistics and institutions). Their locations are shown in Figure 5.2.1 at the end of this sub-section. The total investment cost of priority projects is estimated to be 4,211 billion FCFA and its share is around 28% of the total investment cost of the long-list projects by 2040 for SDUGA 2040 (14,992 billion FCFA).

Table 5.2.3 Priority list of transport project

Categories	Number (Priority/Total)	Amount in million FCFA
Roads	25/78	2,352,088 (26%)
Public transport	10/22	1,268,966 (25%)
Traffic control and demand management	26/42	274,760 (61%)
Soft mobility and smart solutions	3/4	63,073 (97%)
Logistics and Institutions	8/8	263,063 (100%)
Total	72/155	4,221,950 (28%)

( ) shows the share in the total amount of SDUGA by category

Source: JICA Project Team

(3) Project packages and step-wise plan

The project package plan is as follows.

Table 5.2.4 Project package of priority projects (tentative)

Categories	Number	Amount in million FCFA
Ring road package	8	1,474,107 (35%)
Public transport package	10	1,268,195 (30%)
Logistics and institutions package	7	262,148 (6%)
Communal roads package	14	351,870 (8%)
Inter commune roads package	3	526,110 (13%)
Intersection improvement package	18	258,884 (6%)
Soft mobility and smart solutions package	12	80,635 (2%)
Total	72	4,221,950 (100%)

Source: JICA Project Team

(4) Implementation schedule

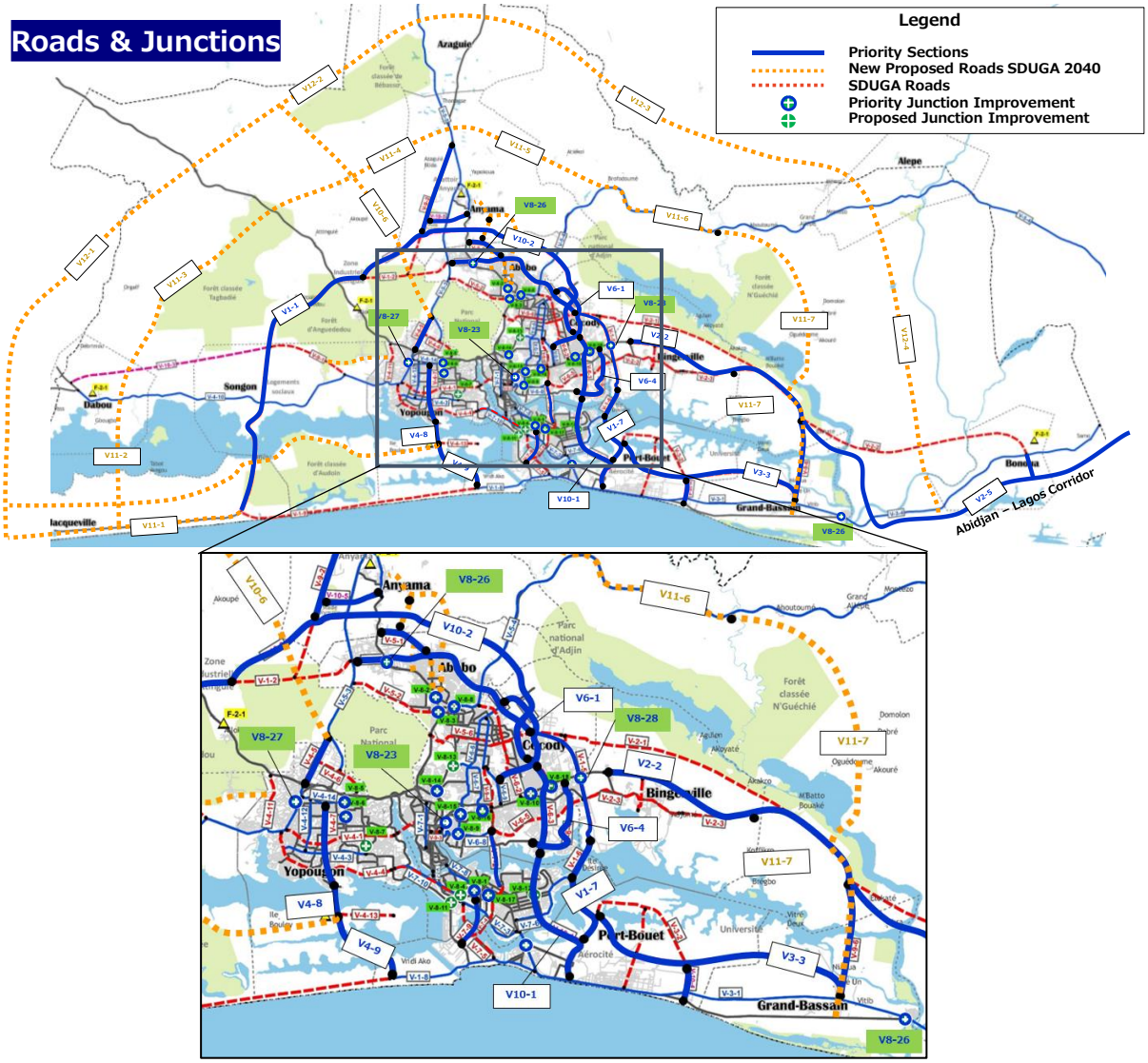
All the priority projects shall be commenced by 2030. Some of them will be completed beyond 2030 but before 2034. The priority projects and the proposed schedule is shown in Table 5.2.5.

Table 5.2.5 Priority list of transport project

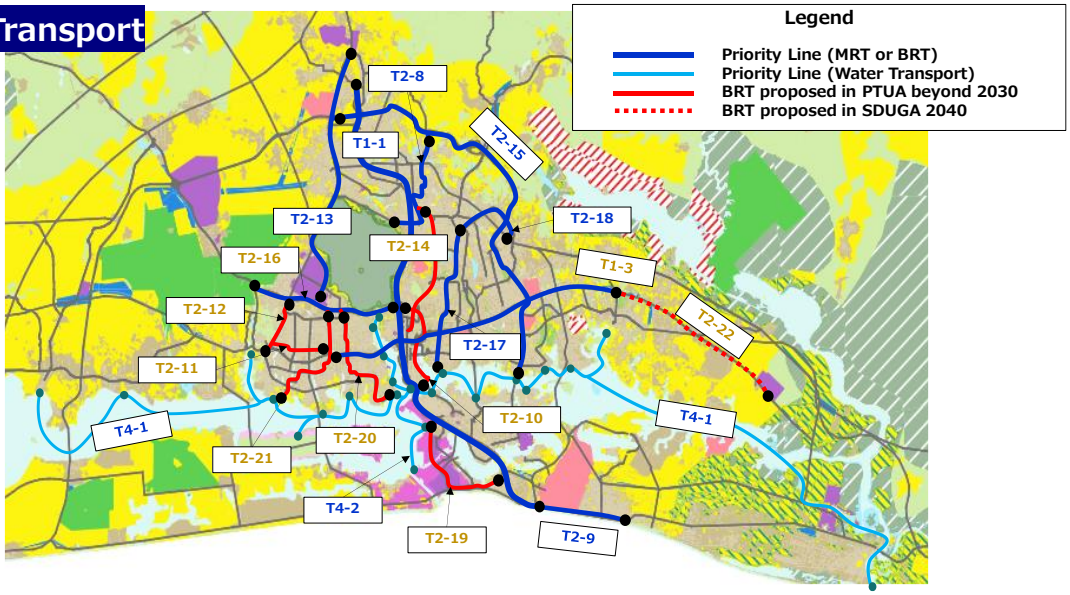
Priority ID	Project Title	Implementation Schedule						Total Investment Cost (10^6 FCA)	Total Investment Cost (10^6 USD)	Remarks
		2025	2026	2027	2028	2029	2030			
UT-01	Y4 Ring Road (Songon - Autoroute du Nord Section)	■	■					39,859	65	Implemented
UT-02	Y4 Ring Road (Pk18 - Abobo Baoulé Section)	■	■					152,563	250	Implemented
UT-03	Y4 Ring Road (Abobo Baoulé - François Mitterand Section)	■	■					161,182	264	Implemented
UT-04	Y4 Ring Road (Desirée Island Bridges)			■	■	■	■	565,109	926	By 2033
UT-05	Y4 Ring Road (Canal du Vridi Section)			■	■	■	■	236,330	387	By 2034
UT-06	Extension of the Boulevard François Mitterand	■	■	■	■			103,098	169	
UT-07	Abidjan - Lagos International Corridor			■	■	■	■	357,993	587	By 2034
UT-08	Voie V23 (Parkway Section)	■	■					3,965	7	Implemented
UT-09	Voie V9 Improvement			■	■	■	■	4,945	8	
UT-10	Voie V28 (Northern Section)	■	■	■				93,764	154	Implemented
UT-11	Voie V28 (Yopougon Koute)			■	■	■	■	69,124	113	By 2034
UT-12	Voie V28 (Southern Section)			■	■	■	■	7,956	13	By 2034
UT-13	Widening of Siporex (Sable Section)	■	■	■				4,923	8	Implemented
UT-14	Extension of Q1 Link			■	■	■	■	5,710	9	
UT-15	East-West Abobo-Cocody Link	■	■					2,883	5	Implemented
UT-16	Extension of Boulevard Latrille	■	■					5,199	9	Implemented
UT-17	Inner Ring Road (Cocody Section)	■	■					6,416	11	Implemented
UT-18	Extension of the Boulevard de France	■	■					3,355	6	Implemented
UT-19	Widening of the Boulevard Latrille			■	■	■	■	18,821	31	Completed a part
UT-20	Voie Triomphale			■	■	■	■	54,869	90	By 2034
UT-21	Vridi-Bietry Bridge	■	■	■	■	■	■	69,940	115	
UT-22	Carrefour de Solibra (Phase 2)	■	■					10,500	17	Implemented
UT-23	Carrefour de Mairie d'Abobo	■	■					6,104	10	Implemented
UT-24	Carrefour de Banco		■	■	■	■	■	15,664	26	
UT-25	Carrefour de Siporex		■	■	■	■	■	8,706	14	
UT-26	Carrefour de Kenaya			■	■	■	■	10,515	17	
UT-27	Carrefour de Samake				■	■	■	7,831	13	By 2032
UT-28	Carrefour de St Jean		■	■	■	■		7,481	12	
UT-29	Carrefour de Palmeraie	■	■					19,738	32	Implemented
UT-30	Carrefour de Williamsville				■	■	■	15,338	25	By 2032
UT-31	Carrefour de la Vie		■	■	■	■	■	11,861	19	
UT-32	Carrefour de L'Ecole Nationale de Police	■	■					12,634	21	Implemented
UT-33	Carrefour de Marcory			■	■	■	■	13,560	22	By 2032
UT-34	Carrefour de Riviela 3	■	■					18,720	31	Implemented
UT-35	Carrefour de Akwaba	■	■					12,987	21	Implemented
UT-36	Carrefour de Rue du Lycee Technique				■	■	■	12,987	21	By 2031
UT-37	Carrefour de AGRIPAC				■	■	■	25,197	41	By 2032
UT-38	Carrefour de CMEAU				■	■	■	19,580	32	By 2032
UT-39	Carrefour de Abatta				■	■	■	18,074	30	By 2032
UT-40	Connection between Boulevard Mitterand and Grand Bassam		■	■	■	■		65,020	107	
UT-41	Inner Ring Road (Airport - Koumassi Section)	■	■	■	■	■	■	254,272	417	
UT-42	Y4 Ring Road (CHU d'Angré - PK18 Section)	■	■	■				56,926	93	Implemented
UT-43	North Anayama section						■	7,865	13	
UT-44	Public Transport Priority System	■	■	■				7,069	12	Under study
UT-45	Traffic Lights with Camera (89 locations)	■	■					19,993	33	Implemented
UT-46	Extention of Traffic Data Utilziation System	■	■	■				16,848	28	
UT-47	Transportation IC-Card System	■	■	■				2,589	4	Under study
UT-48	Bus Operation Monitoring and Control System	■	■	■				8,409	14	Implemented
UT-49	Public Transport Operation Information Provision System	■	■	■				2,509	4	Implemented
UT-50	Parking Facilities/Parking Information System	■	■					2,692	4	Implemented
UT-51	Highway Traffic Control System	■	■					13,387	22	Implemented
UT-52	Supporting System for Control of Illegal Parking	■	■					1,023	2	Implemented
UT-53	Pedestrian Facility Development for Better Environment	■	■	■				2,964	5	Under study
UT-54	Management System of Information on Road Maintenance	■	■					1,466	2	Under study
UT-55	North-South Rail Project (Phase 1, Anyama - Airport)	■	■	■	■			793,294	1,301	Implemented
UT-56	East - West BRT Project (Yopougon - Bingerville)	■	■	■	■			160,000	262	Under study
UT-57	Pilot Project of Communal Transport (Woro-Woro)	■	■	■	■			40,397	66	Under study
UT-58	BRT Abobo North Line		■	■	■	■	■	28,807	47	
UT-59	BRT Prison Civile Line		■	■	■	■	■	45,890	75	
UT-60	BRT Voie Express Line				■	■	■	26,462	43	By 2033
UT-61	BRT Latrille Phase1 Line		■	■	■	■	■	29,812	49	
UT-62	Intermodal Centers at Adjame, and Central/Southern	■	■	■	■			3,360	6	
UT-63	East - West High Speed Ferry Service (Songon - Grand Bassam)	■	■	■				83,653	137	Implemented
UT-64	Water Bus (Attecoube - Treichville)		■	■	■			57,292	94	Under study
UT-65	New Freight Railway Connecting to Western Part of Abidjan Port	■	■	■	■	■	■	242,956	398	By 2034
UT-66	Metropolitan Logistic Center Development	■	■					16,387	27	Implemented
UT-67	Establishment of Road Projects Implementation Commission	■	■	■				1,133	2	Under study
UT-68	Establishment of ITS Cote d'Ivoire	■	■	■				315	1	Implemented
UT-69	Establishment of Clearing House Organization	■	■	■	■			378	1	Implemented
UT-70	Transport Planning Centre of Excellence	■	■	■				386	1	Implemented
UT-71	Establishment of Inter-ministrial Transport Data Platform	■	■	■				915	2	
UT-72	Reorganization of SOTRA Bus Services	■	■					593	1	Implemented
Total								4,210,542	6,902	

Remarks: Highlighted project is not implemented yet and project profile is prepared in chapter 5.2.4
Source: JICA Project Team

Roads & Junctions



Public Transport



Source: JICA Project Team

Figure 5.2.1 Location map of priority projects of transport sector

5.2.2 Urban Environment Infrastructure

All the priority projects shall be commenced by 2030.

(1) Water Supply

The priority projects are selected based on the urgency of fulfilling demand for water that depends on water resources availability, demands in the areas to be newly urbanized and population increase outside AAD.

The proposed priority projects in central and periphery AAD are No. 14, 15, 16 and No. 17 shown in Table 5.1.4. The projects from No. 1 to No. 13 in Table 5.1.4 have already been completed. The project cost of these priority-projects is estimated to be 206 billion FCFA.

In addition, the proposed priority projects ~~in~~ outside AAD at Bonoua and Jacqueville Commune, whose locations are shown in Figure 5.1.1, require the capacity to meet the daily maximum demand for water at 319 thousand m^3/day. The project cost for this part is estimated to be 312 billion FCFA. Adding this cost to the total cost of Project No 14, 15, 16 and 17, the total investment cost for the water supply sector until 2030 is estimated to be 515 billion FCFA, which is equivalent to around 33% of the total investment cost until 2040 for SDUGA 2040 (1,580 billion FCFA).

(2) Sewerage

The priority projects are selected based on the urgency of wastewater treatment service in consideration of demands in the areas to be newly urbanized and population increase outside AAD.

The proposed priority projects in central and periphery AAD are project No. 3, 4, 5 and 6 shown in Table 5.1.5. The projects No. 1 to No. 2 have been completed already. The total project cost of these four projects is estimated to be 135 billion FCFA.

The proposed priority projects outside AAD at Bonoua and Jacqueville Commune requires the capacity of daily wastewater flow at 319 thousand m^3/day. The total project cost for this portion is estimated to be 120 billion FCFA. The total program cost until 2030 is, therefore, estimated to be 255 billion FCFA, which is equivalent to around 32% of the total investment cost until 2040 for SDUGA 2040 (788 billion FCFA).

(3) Solid Waste Management

The project proposed until 2040 as shown in the sub-section 5.1.2 (3) should be initiated before 2030. It is, therefore, regarded as the priority project. The total project cost is estimated to be 192 billion FCFA.

5.2.3 Project Profiles of Priority Projects

(1) Transportation

Project ID: UT-04	**Project title:** Y4 Ring Road (Desirée Island Bridges)
Implementation Period: From_2027_to_2033	**Funding source:** AFD
Implementation Cost: (565,109 **)** 10^6 CFA **(** 926 **)** 10^6 US$	

Background:

The UT-04 is the section of SDUGA Code V-1-6 which is the east part including 2 long span bridges of the Y4 Ring Road. The section of the Y4 ring road has been planned for connectivity improvement between Cocody and Koumassi instead of existing main access through 3rd bridge.

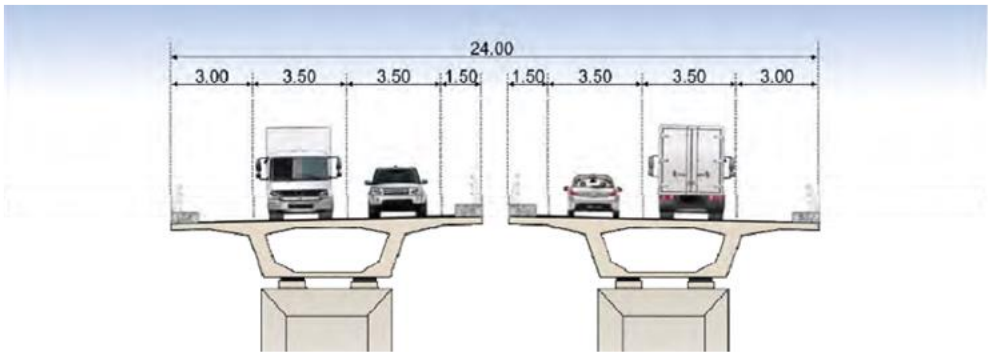
Objective:

- To improve traffic congestion of existing 3 bridges crossing the Ebrié lagoon
- To improve connectivity between Cocody and Koumassi
- To provide an alternative route to cross the Ebrié lagoon instead of 3rd bridge

Outline:

This link is an east part of Y4 ring road. This section becomes the alternative function for 3 existing bridges (Pont Félix Houphouët-Boigny, Bd. de Gaulle, 3rd bridge) crossing the Ebrié lagoon. The major specification and components are as following.

- Project length: 3.0 km
- Number of lanes: 4 lanes
- ROW: 24m
- Major structure: 2 new bridges (1100m and 910m).



Remarks:

- Simulated traffic volume: 46,000 pcu/day

Project ID: UT-05	**Project title:** Y4 Ring Road (Canal du Vridi Section)
Implementation Period: From_2027_to_2034	**Funding source:** Not decided
Implementation Cost: (236,330 **)** 10^6 CFA **(** 387 **)** 10^6 US$	

Background:

The UT-05 is the section of SDUGA Code V-1-7 which is the south-east part including 1 long span bridge of the Y4 Ring Road. The section of the Y4 ring road has been planned as direct link to Aérocité / Port-Buet from northern area via UT-04.

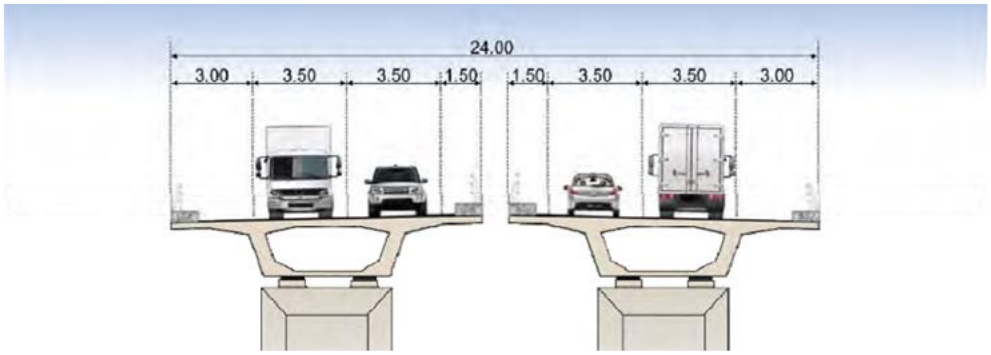
Objective:

- To improve traffic congestion of Akwaba road crossing the Vridi lagoon
- To improve connectivity between Port-Buet and Koumassi (and Cocody via UT-04)
- To provide an alternative route to cross the Vridi lagoon as well as Akwba road

Outline:

This link is a south-east part of Y4 ring road. This section becomes the alternative function for 2 existing links (Akwaba road and Vridi road) crossing the Vridi lagoon. The major specification and components are as following.

- Project length: 5.6 km
- Number of lanes: 4 lanes
- ROW: 24m
- Major structure: 1 new bridge (1800m).



Remarks:

- Bridge section was included in V-1-6 in original SDUGA
- Simulated traffic volume: 46,000 pcu/day

Project ID: UT-06	**Project title:** Extension of the Boulevard François Mitterrand
Implementation Period: From_2025_to_2028	**Funding source:** African Development Bank
Implementation Cost: (103,098 **)** 10^6 CFA **(** 169 **)** 10^6 US$	

Background:

The UT-06 is a part of section SDUGA Code V-2-2 which is the alternative access route between Abidjan central and Bonoua. This section becomes a function of arterial roads in Bingerville and used to be a potential corridor as Abidjan-Lagos International Corridor (ALIC) under the study by AfDB/ECOWAS .

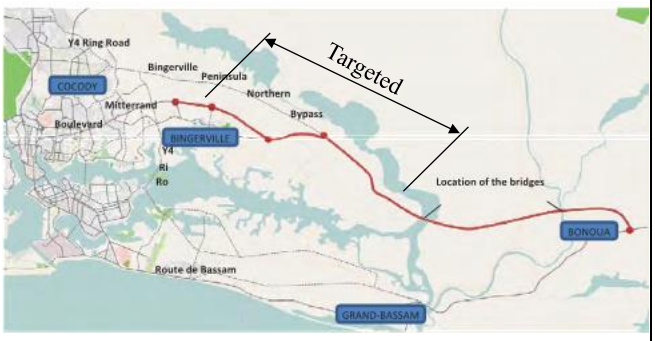
Objective:

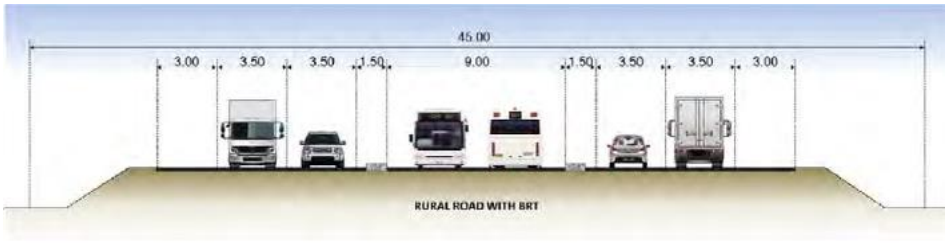
- To improve connectivity between Abidjan central and Bingerville commune
- To secure alternative network to Grand-Bassam and Bonoua with a link of UT-36
- To provide a main approach to the economic international corridor of Abidjan – Lagos Corridor

Outline:

This link is a function of arterial road in Bingerville commune and serve access road to Grand-Bassam as well as Bonoua Major specification and components are as following.

- Project length: 21.0 km
- Number of lanes: 4 lanes
- 2 additional BRT lane at west part (2.7 km)
- ROW: 24 m ～ 45 m (west part)
- Major structure: BRT lane (2.7 km).





Typical section of west part (BRT section only)

Remarks:

- Simulated traffic volume: 26,000 pcu / day

Project ID: UT-07	**Project title:** Abidjan – Lagos International Corridor
Implementation Period: From_2027_to_2034	**Funding source:** African Development Bank
Implementation Cost: (357,993 **)** 10^6 CFA **(** 587 **)** 10^6 US$	

Background:

The UT-07 is a beginning part of Abidjan – Lagos International Corridor (ALIC) and replacement from V-2-2 in SDUGA which is the original potential option of ALIC under study by AfDB/ECOWAS.

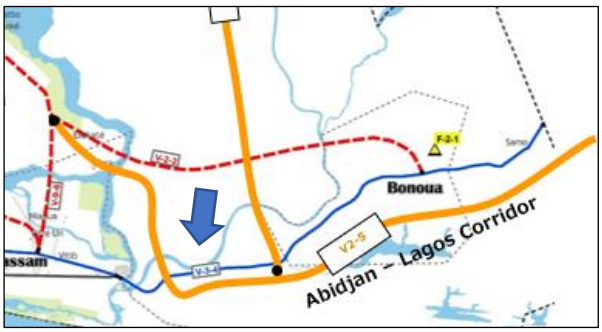
Objective:

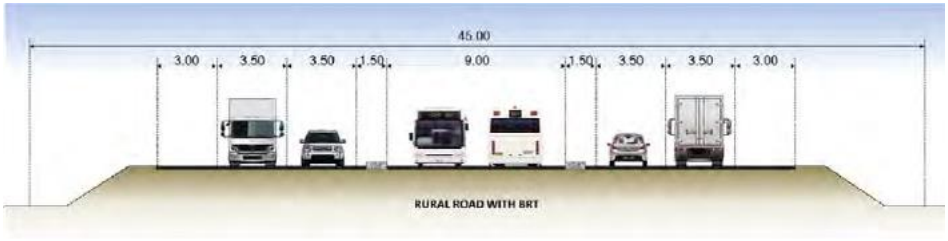
- To promote regional economic growth as a function of international corridor
- To secure alternative network between Abidjan/Grand-Bassam and Bonoua
- To attract future development in Bingerville area

Outline:

The major specification and components are as following.

- Project length: 40.0 km (only section through Abidjan Metropolitan Area)
- Number of lanes: 6 lanes
- ROW: 45 m
- Major structure: 2 river crossing bridges





Typical section of west part (BRT section only)

Remarks:

- Simulated traffic volume: 26,000 pcu / day

Project ID: UT-09	**Project title:** Development of YoARN - Voie V9 improvement
Implementation Period: From_2027_to_2030	**Funding source:** To be funded
Implementation Cost: (4,945 **)** 10^6 CFA **(** 8 **)** 10^6 US$	

Background:

The UT-09 is a section of SDUGA Code V-4-5 which is an alternative access to the industrial zone in Yopougon as well as Prison road and aims to ease a heavy traffic congestion around the area.

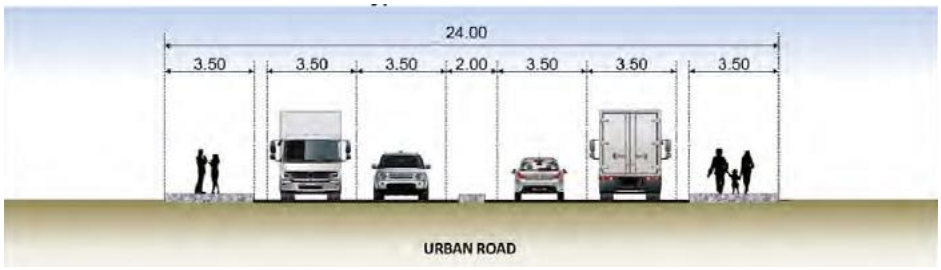
Objective:

- To secure alternative access to the Yopougon industrial zone
- To improve connectivity between Yopougon and northern part of Greater Abidjan via Prison road
- To improve traffic congestion on Autoroute du Nord

Outline:

The major specification and components are as following.

- Project length: 4.1 km
- Number of lanes: 4 lanes
- ROW: 24m
- Major structure: 1 junction with Autoroute du Nord



Remarks:

- Simulated traffic volume in 2030: 3,000 pcu/day

Project ID: UT-11	**Project title:** Development of YoARN - Voie V28 (Yopougon Koute)
Implementation Period: From_2027_to_2034	**Funding source:** To be funded
Implementation Cost: (69,124 **)** 10^6 CFA **(** 113 **)** 10^6 US$	

Background:

The UT-11 will cross the Ebrie lagoon and connecting north-south through Yopougon from the Autoroute du Nord to the southern section of the Y4 Ring Road in the western part of Abidjan. It will contribute to logistics activities from/to Abidjan port which will be newly developed in the Boulay Island.

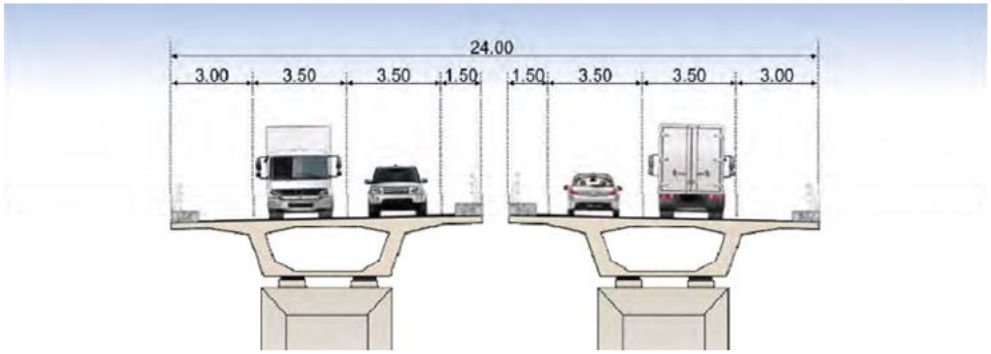
Objective:

- To improve direct access between new Abidjan port area (Boulay) and Yopougon
- To improve connectivity between northern part and southern part of Abidjan at west Abidjan area
- To secure alternative route to avoid crowded area via Vridi canal (V1-8)

Outline:

This link is a part of north - south section from coastal areal to Yopougon. This section becomes the main logistics route originating in new Abidjan port area in Boulay. The major specification and components are as following.

- Project length: 2.0 km
- Number of lanes: 4 lanes
- ROW: 24m
- Major structure: 1 bridge (1,200 m)



Remarks:

- Simulated traffic volume in 2030: 10,000 pcu/day

Project ID: UT-12	**Project title:** Development of YoARN - Voie V28 (Southern Section)
Implementation Period: From_2027_to_2034	**Funding source:** To be funded
Implementation Cost: (7,956 **)** 10^6 CFA **(** 13 **)** 10^6 US$	

Background:

The UT-12 will cross the Ebrie lagoon and connecting north-south through Yopougon from the Autoroute du Nord to the southern section of the Y4 Ring Road in the western part of Abidjan. It will contribute to logistics activities from/to Abidjan port which will be newly developed in the Boulay Island.

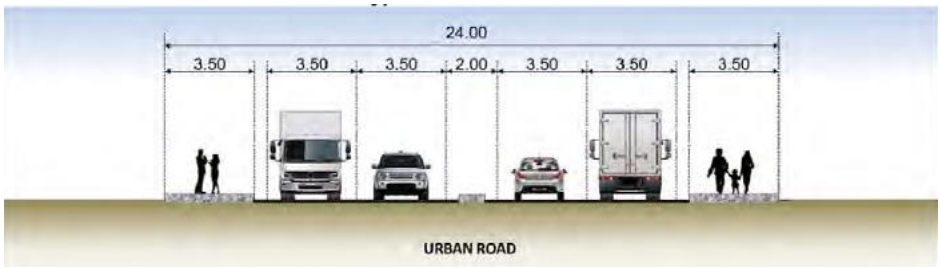
Objective:

- To improve direct access between the new Abidjan port area (Boulay) and Yopougon
- To improve connectivity between the northern part and southern part of Abidjan in the west Abidjan area
- To secure alternative route avoiding through crowded area via Vridi canal (V1-8)

Outline:

This link is a part of north - south section from coastal areal to Yopougon. This section becomes the main logistics route originating in new Abidjan port area in Boulay. The major specification and components are as following.

- Project length: 6.2 km
- Number of lanes: 4 lanes
- ROW: 24m
- Major structure: 1 bridge (600 m)



Remarks:

- Simulated traffic volume in 2030: 10,000 pcu/day

Project ID: UT-14	**Project title:** Development of AbARN - Extension of Q1
Implementation Period: From_2027_to_2030	**Funding source:** To be funded
Implementation Cost: (5,710 **)** 10^6 CFA **(** 9 **)** 10^6 US$	

Background:

The UT-14 is a kind of communal road in Abobo and Anyama area and will connect both areas, however, it will contribute to reducing traffic volume on Abobo expressway since most of traffic between Abobo and Anyama pass through the Abobo expressway which is always crowded.

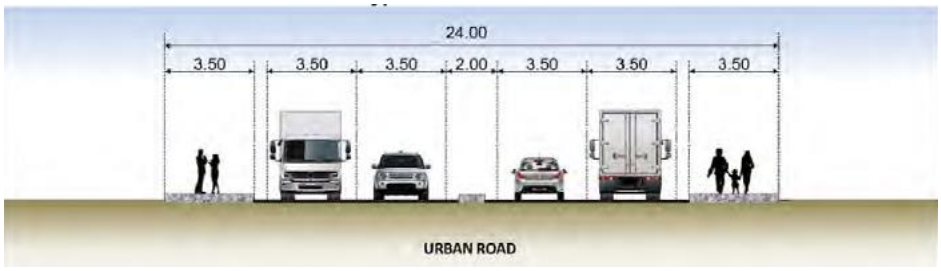
Objective:

- To improve traffic congestion on the Abobo expressway around north of Abobo community
- To improve connectivity between Abobo and Anyama community

Outline:

This road is a missing link between north Abobo and Anyama due to geographical issue in the Abobo area. This section may be an alternative route between both areas. The major specification and components are as following.

- Project length: 3.7 km
- Number of lanes: 4 lanes
- ROW: 24m
- Major structure: -



Remarks:

- Simulated traffic volume in 2030: 33,000 pcu/day

Project ID: UT-20	**Project title:** Development of CeARN - Voie Triomphale
Implementation Period: From_2027_to_2034	**Funding source:** To be funded
Implementation Cost: (54,869 **)** 10^6 CFA **(** 90 **)** 10^6 US$	

Background:

The UT-20 is a development of street in existing residential and commercial zone in Plateau and Adjame.

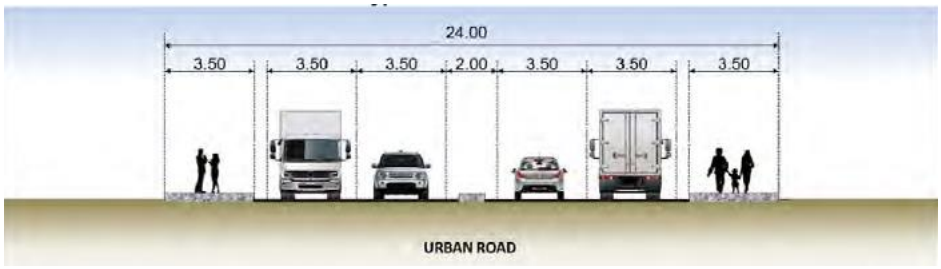
Objective:

- To provide a symbolic downtown status with commercial function
- To improve and secure pedestrian walkable environment in downtown commercial area
- To decrease traffic from crowded north – south street in parallel with the road in Plateau and Adjame

Outline:

This road will be constructed in a crowded residential and commercial area for some parts and may require land acquisition procedure. The major specification and components are as following.

- Project length: 3.3 km
- Number of lanes: 4 lanes
- ROW: 24m
- Major structure: -



Remarks:

- Simulated traffic volume in 2030: 13,000 pcu/day

Project ID: UT-21	**Project title:** Development of CeARN - Vridi-Bietry Bridge
Implementation Period: From_2025_to_2030	**Funding source:** To be funded
Implementation Cost: (69,940 **)** 10^6 CFA **(** 115 **)** 10^6 US$	

Background:

The UT-21 is a road crossing Vridi lagoon and on planned land fill area which will be the new industrial area related to various Abidjan port activities.

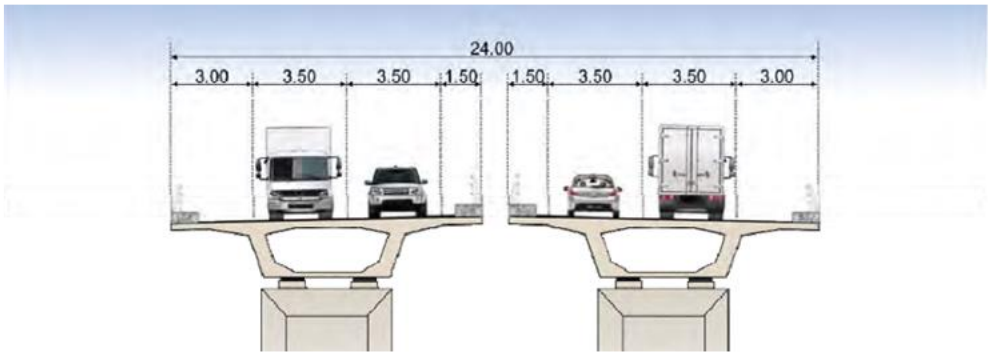
Objective:

- To cross Vridi lagoon and improve connectivity between Marcory and Port-Buet
- To support Vridi industrial zone near Abidjan port through a planned land fill area
- To secure alternative access between Port-Buet (Abidjan port, Airport, etc.) and Plateau area

Outline:

This road will cross the Vridi lagoon and connect Port-Buet and Marcory commune, and go straight to Plateau through the Solibra intersection. The major specification and components are as following.

- Project length: 2.7 km
- Number of lanes: 4 lanes
- ROW: 24m
- Major structure: 1 bridge crossing lagoon (370m) and 1 flyover crossing Abidjan Metro (700m)



Remarks:

- Coordination between land fill development and bridge construction in the lagoon
- Simulated traffic volume in 2030: 30,000 pcu/day

Project ID: UT-24	**Project title:** Carrefour de Banco
Implementation Period: From_2026_to_2030	**Funding source:** To be funded
Implementation Cost: (15,664 **)** 10^6 CFA **(** 26 **)** 10^6 US$	

Background:

The UT-24 is an intersection improvement and listed in SDUGA as V-8-3 to enhance traffic capacity at the bottleneck intersection in Abobo. Banco intersection is a roundabout with the main road going through it. The local traffic gathered by the roundabout stops the free flow of the traffic on the main road.

Objective:

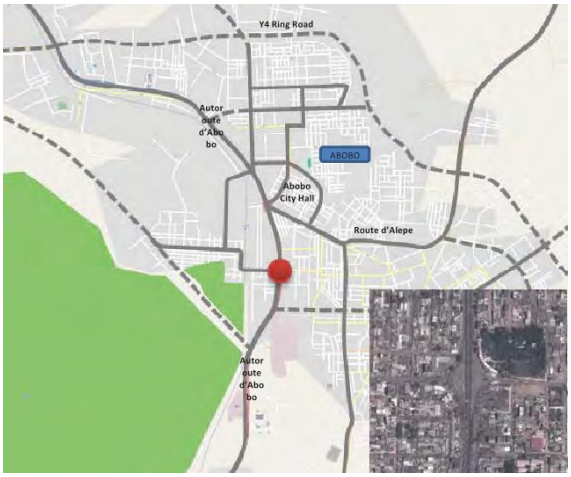
- To enhance traffic capacity at the bottleneck roundabout
- To improve smooth traffic flow on the main corridor between the central area and northern part
- To secure safety for road users including pedestrians

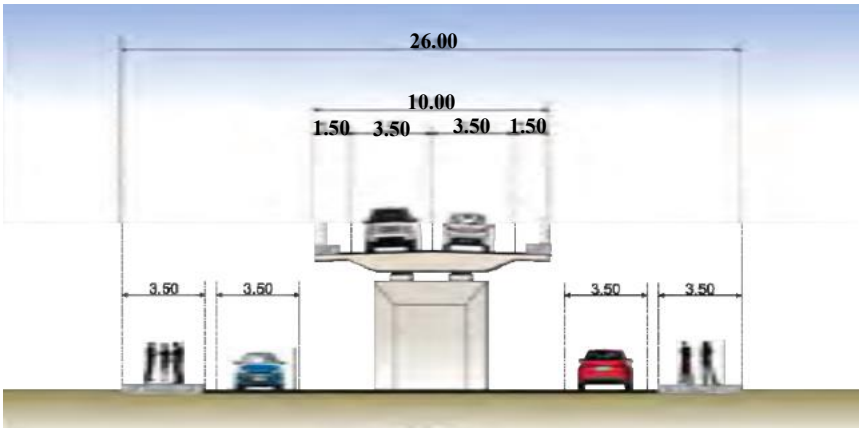
Outline:

The Project consists of the construction of a new flyover along the Autoroute d'Abobo:

- Project length: 500 m
- Flyover length: 300 m
- ROW: 26 m
- Installation of traffic signalization

The Flyover will be built in the middle of the road and will carry two traffic lanes.





Remarks:

Project ID: UT-25	**Project title:** Carrefour de Siporex
Implementation Period: From_2026_to_2030	**Funding source:** To be funded
Implementation Cost: (8,706 **)** 10^6 CFA **(** 14 **)** 10^6 US$	

Background:

The UT-25 is an intersection improvement to improve bottleneck which is one of the most congested intersections in Abidjan. It can no longer control the higher traffic volume due to geometrical capacity constraint. A North-South Flyover is expected to improve the targeted roundabout.

Objective:

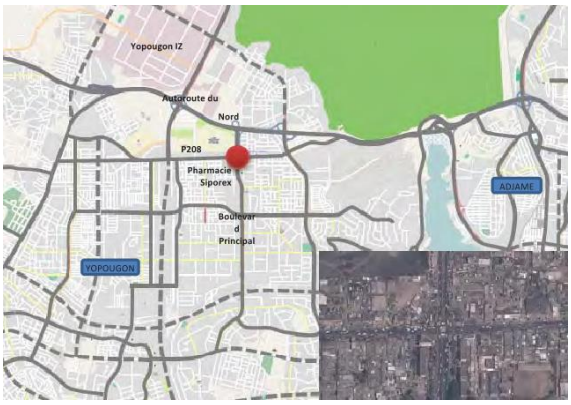
- To enhance traffic capacity at the bottleneck roundabout
- To improve smooth traffic flow on the collector road in Yopougon
- To secure safety for road users including pedestrians

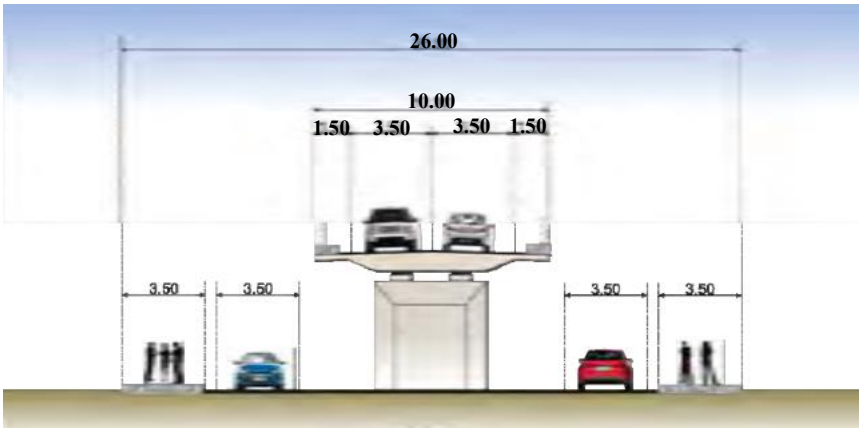
Outline:

The Project consists of the construction of a new flyover along the road:

- Project length: 370 m
- Flyover length: 200 m
- ROW: 26 m
- Installation of traffic signalization

The flyover will be built in the middle of the road and will carry two traffic lanes.





Remarks:

Project ID: UT-26	**Project title:** Carrefour de Kenaya
Implementation Period: From_2027_to_2030	**Funding source:** To be funded
Implementation Cost: (10,515 **)** 10^6 CFA **(** 17 **)** 10^6 US$	

Background:

The UT-26 is an intersection improvement of bottleneck in Kenaya junction which is similar to the Carrefour Siporex (V-8-5). A flyover will improve major North – South traffic flow.

Objective:

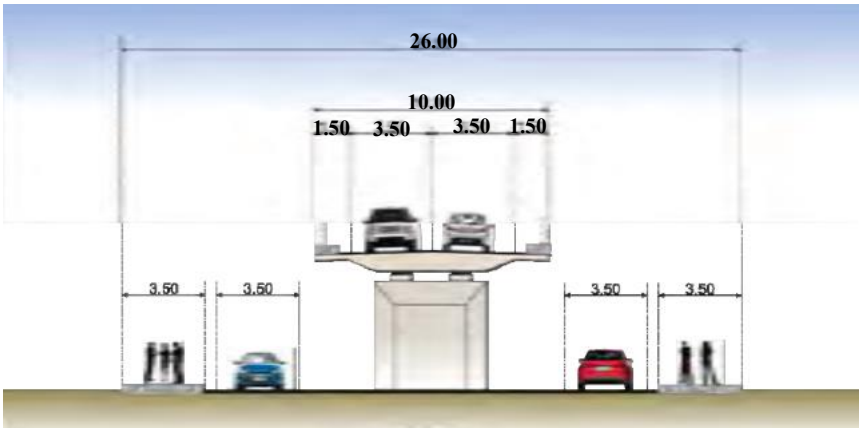
- To enhance traffic capacity at the bottleneck roundabout
- To improve smooth traffic flow on the collector road in Yopougon
- To secure safety for road users including pedestrians

Outline:

The Project consists of the construction of a new flyover along the road:

- Project length: 400 m
- Flyover length: 260 m
- ROW: 26 m
- Installation of traffic signalization

The Flyover will be built in the middle of the road and will carry two traffic lanes.



Remarks:

Project ID: UT-27	**Project title:** Carrefour de Semake
Implementation Period: From_2028_to_2032	**Funding source:** To be funded
Implementation Cost: (7,831 **)** 10^6 CFA **(** 13 **)** 10^6 US$	

Background:

The UT-27 is an intersection improvement for a highly congested junction with 5 outlets gathering at the roundabout. The shape of the intersection must be modified, signalization installed and a flyover may have to be built to control the traffic.

Objective:

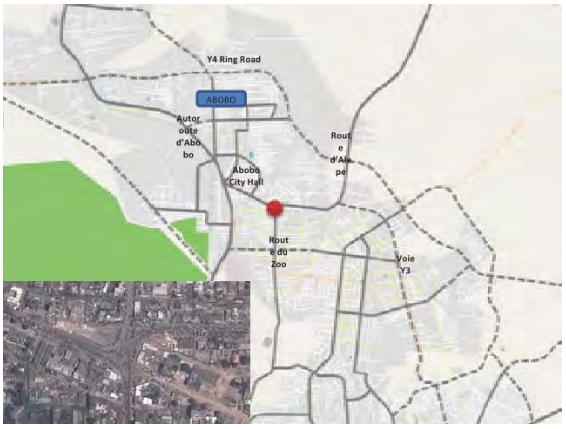
- To enhance traffic capacity at the bottleneck roundabout
- To improve smooth traffic flow on the collector road in Abobo
- To secure safety for road users including pedestrians

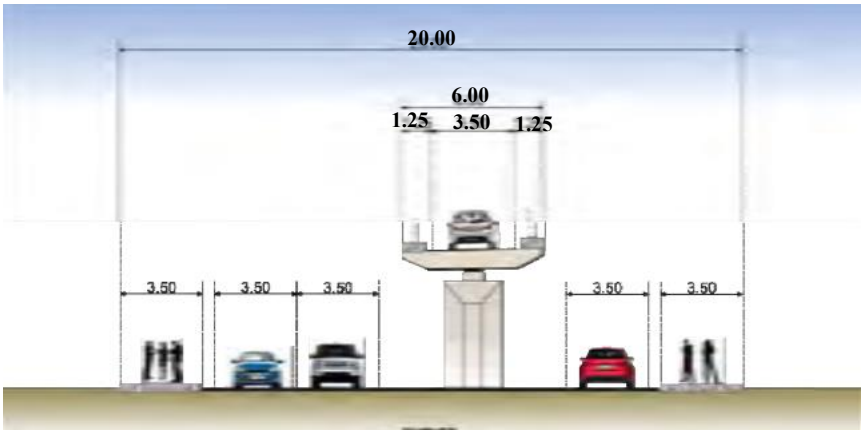
Outline:

The Project consists of the construction of a new flyover to secure main traffic flow.

- Project length: 500 m
- Flyover length: 300 m
- ROW: 20 m
- Installation of traffic signalization

The one direction of flyover will be built for a main traffic flow.





Remarks:

Project ID: UT-28	**Project title:** Carrefour de St. Jean
Implementation Period: From_2026_to_2029	**Funding source:** To be funded
Implementation Cost: (7,481 **)** 10^6 CFA **(** 12 **)** 10^6 US$	

Background:

The UT-28 is an improvement of the intersection which is located at the junction of the Boulevard de France and the Boulevard des Martyrs. The intersection will be further congested when the Boulevard de France Redressé (V-6-5) and the Extension of the Boulevard de France (V-6-4) are built, bringing some of the eastern traffic directly to this intersection. The underpass built along the Boulevard de France will allow the free flow of traffic in one direction, relieving the ground level intersection.

Objective:

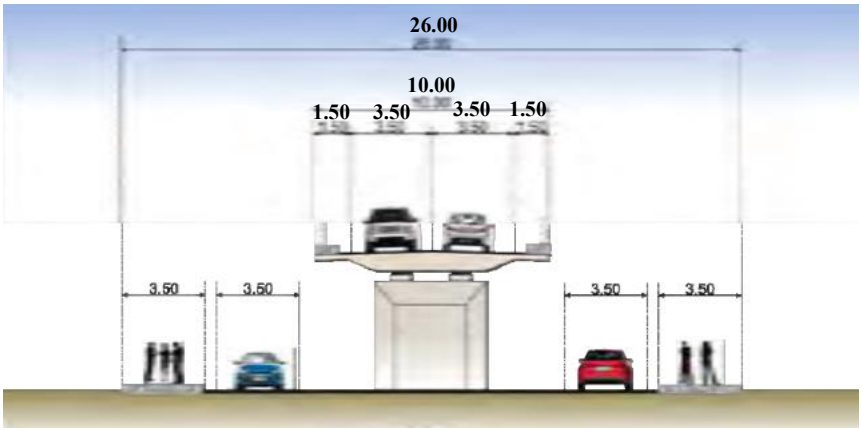
- To enhance traffic capacity at the bottleneck roundabout
- To improve smooth traffic flow on the collector road in Cocody
- To secure safety for road users including pedestrians

Outline:

The Project consists of the construction of a new flyover along the road:

- Project length: 750 m
- Flyover length: 400 m
- ROW: 26 m
- Installation of traffic signalization

The Flyover will be built in the middle of the road and will carry two traffic lanes.



Remarks:

Project ID: UT-30	**Project title:** Carrefour de Williamsville
Implementation Period: From_2028_to_2032	**Funding source:** To be funded
Implementation Cost: (15,338 **)** 10^6 CFA **(** 25 **)** 10^6 US$	

Background:

The UT-30 is an improvement of intersection which is a very congested intersection and located near an interchange giving access to the Autoroute du Nord and a parking area for Gbakas. Thus this complex situation is generating congestion, as traffic flow is being disturbed. The improvement of the Carrefour de Williamsville will help reduce congestion by funneling traffic flow in each direction.

Objective:

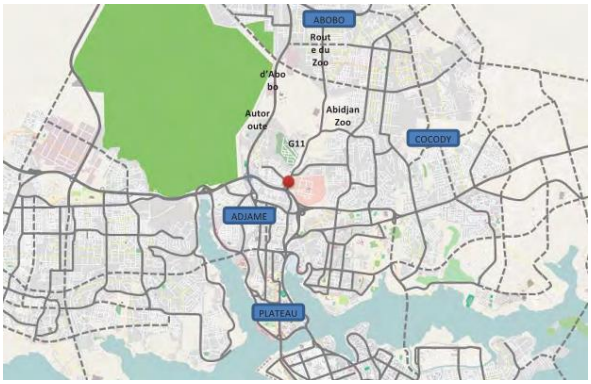
- To enhance traffic capacity at the bottleneck roundabout
- To improve smooth traffic flow on the arterial road in Cocody and Plateau
- To secure safety for road users including pedestrians

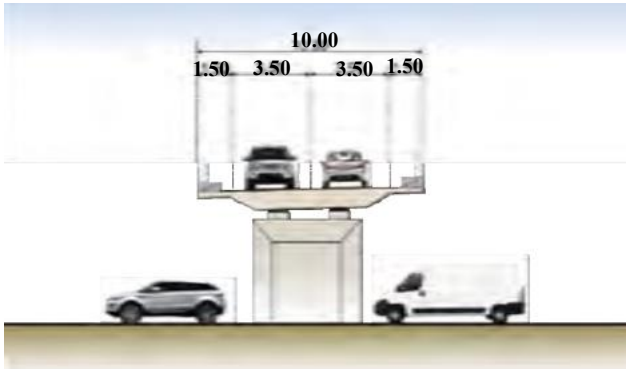
Outline:

The Project consists of the construction of a new flyover along the road:

- Project length: 1200 m
- Flyover length: 300 m
- ROW: 10 m
- Installation of traffic signalization

The Flyover will be built in the middle of the road and will carry two traffic lanes.





Remarks:

Project ID: UT-31	**Project title:** Carrefour de la Vie
Implementation Period: From_2026_to_2030	**Funding source:** To be funded
Implementation Cost: (11,861 **)** 10^6 CFA **(** 19 **)** 10^6 US$	

Background:

The UT-31 is an improvement of intersection which is located at the intersection of two major arterial roads, the East-West Boulevard Francois Mitterrand and the North-South Boulevard Latrille. It is currently a major bottleneck for all the traffic between Plateau and Cocody. The flyover would control the free traffic flow in each direction, reducing traffic congestion.

Objective:

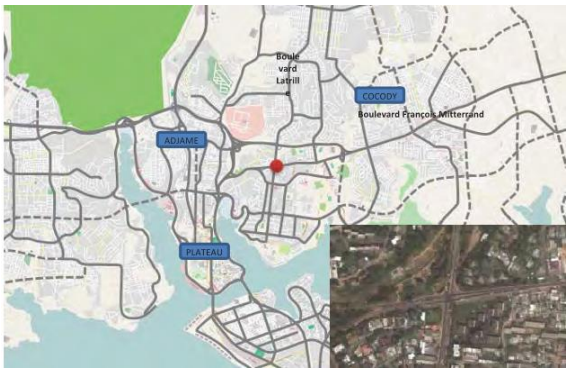
- To enhance traffic capacity at the bottleneck roundabout
- To improve smooth traffic flow on the arterial road in Cocody
- To secure safety for road users including pedestrians

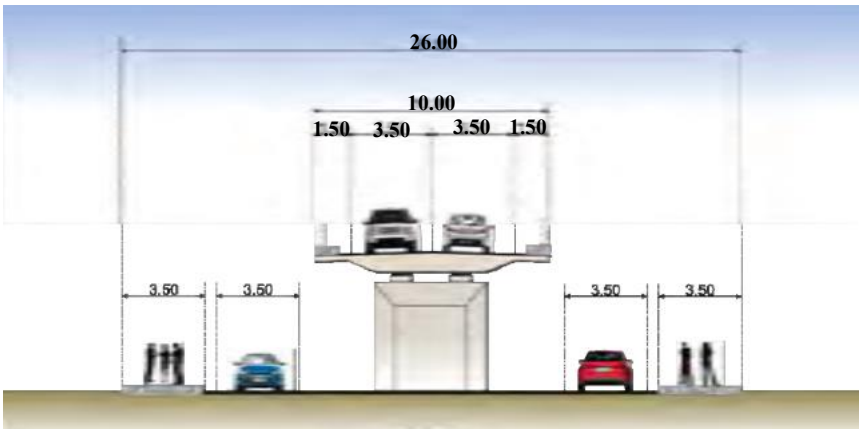
Outline:

The Project consists of the construction of a new flyover along the road:

- Project length: 400 m
- Flyover length: 200 m
- ROW: 26 m
- Installation of traffic signalization

The Flyover will be built in the middle of the road and will carry two traffic lanes.





Remarks:

Project ID: UT-33	**Project title:** Carrefour de Marcory
Implementation Period: From_2027_to_2032	**Funding source:** To be funded
Implementation Cost: (13,560 **)** 10^6 CFA **(** 22 **)** 10^6 US$	

Background:

The UT-33 is an improvement of intersection which is located at the intersection of the Boulevard Valery Giscard d'Estaing and the Rue du Chevalier de Clieu. It is expected that the improvement of the Solibra Flyover will shift the traffic to this intersection. Thus the intersection improvement would control the free traffic flow from the Carrefour Solibra to the VGE Interchange.

Objective:

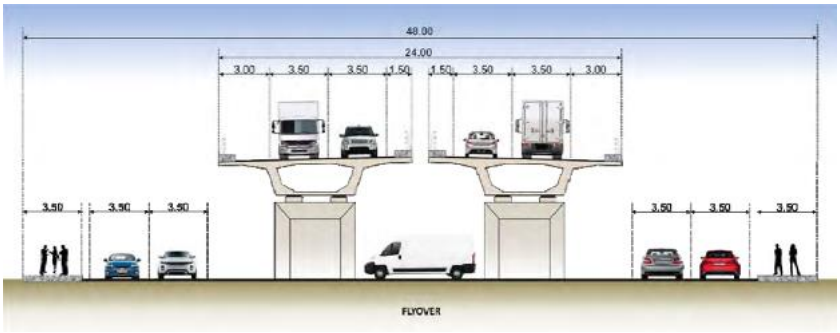
- To enhance traffic capacity at the bottleneck roundabout
- To improve smooth traffic flow on the arterial road in Marcory
- To secure safety for road users including pedestrian

Outline:

The Project consists of the construction of a new flyover along the road:

- Project length: 400 m
- Flyover length: 200 m
- ROW: 48 m
- Installation of traffic signalization

The Flyover will be built in the middle of the road and will carry two traffic lanes.



Remarks:

Project ID: UT-36	**Project title:** Carrefour de Rue du Lycee Technique
Implementation Period: From_2028_to_2031	**Funding source:** To be funded
Implementation Cost: (12,987 **)** 10^6 CFA **(** 22 **)** 10^6 US$	

Background:

The UT-36 is an improvement of intersection which is located at the intersection on the Rue du Lycee Technique in Cocody and connect between Bd. De Gaude and Bd. Mitterrand. One way flyover ramp will be constrccted for main traffic flow at the intersection.

Objective:

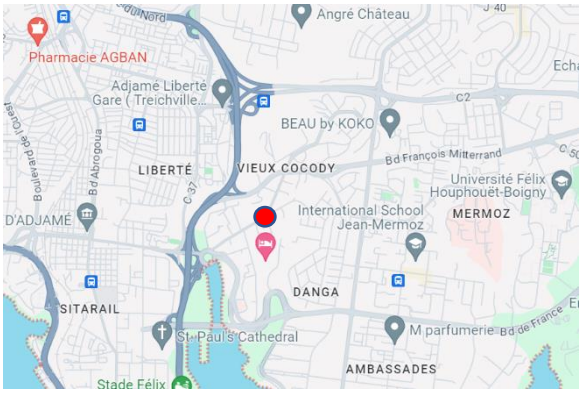
- To enhance traffic capacity at the bottleneck intersection
- To improve smooth traffic flow on the collector road in Cocody
- To secure safety for road users including pedestrians

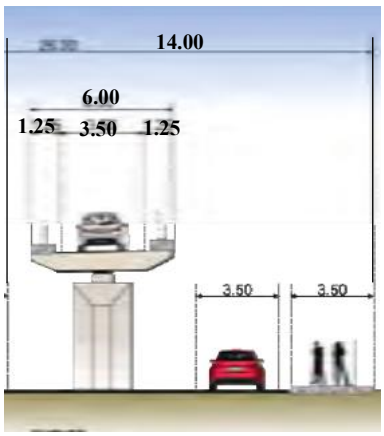
Outline:

The Project consists of the construction of a new flyover along the road:

- Project length: 300 m
- Flyover length: 120 m
- ROW: 10 m
- Installation of traffic signalization

The Flyover will be built in the middle of the road and will carry one traffic lanes.





Remarks:

Project ID: UT-37	**Project title:** Carrefour de AGRIPAC
Implementation Period: From_2028_to_2032	**Funding source:** To be funded
Implementation Cost: (27,997 **)** 10^6 CFA **(** 46 **)** 10^6 US$	

Background:

The UT-37 is an improvement of intersection which is located at the intersection on the Abobo Highway and crossing with new proposed road V1-3 in SDUGA. There are several flyover projects on the highway to secure smooth traffic between central district and norther part of Abidjan.

Objective:

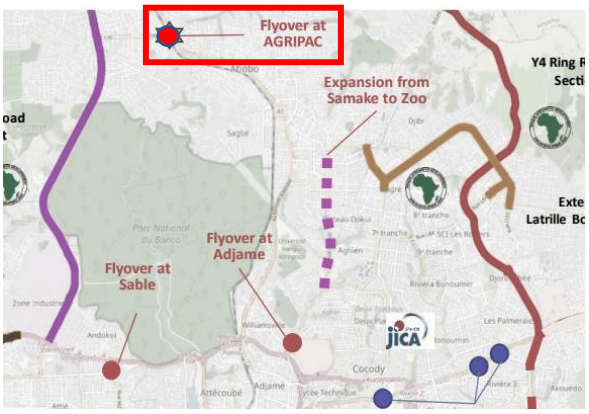
- To enhance traffic capacity at the bottleneck intersection on the highway
- To make smooth traffic flow across the section between central district and north part of Abidjan
- To secure safety for road users including pedestrian in crowded area

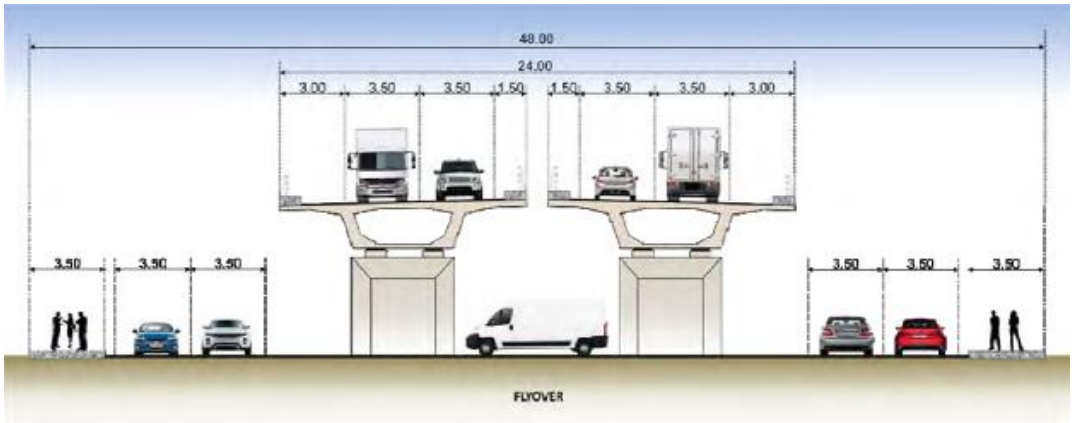
Outline:

The Project consists of the construction of a new flyover along the road:

- Project length: apprx. 350 m
- Flyover length: apprx. 150 m
- ROW: 48 m
- Installation of traffic signalization

The flyover will be built in the middle of the road and will carry bot direction two traffic lanes.





Remarks: Crossing V1-3 and Abobo Highway

Project ID: UT-38	**Project title:** Carrefour de CMEAU
Implementation Period: From_2028_to_2032	**Funding source:** To be funded
Implementation Cost: (15,061 **)** 10^6 CFA **(** 25 **)** 10^6 US$	

Background:

The UT-38 is an improvement of intersection which is located at the intersection on the Dabou road in Yopougon which is main corridor connecting central district and west part of Abidjan through the major trunk road, Autoroute du Nord. A widening of Dabou road is under construction for western part and it will enhance more smooth traffic for entire section of the corridor.

Objective:

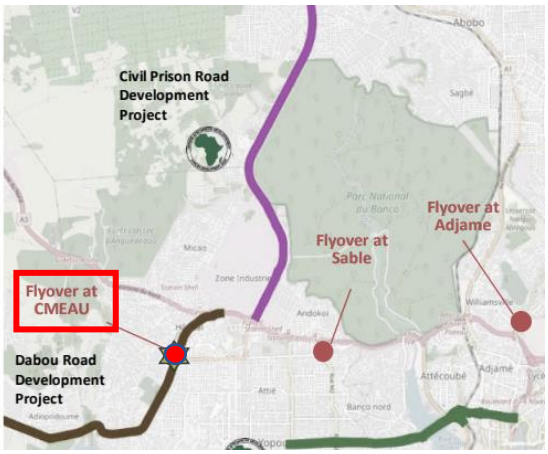
- To enhance traffic capacity at the bottleneck intersection on the Dabou road
- To make smooth traffic flow across the section between central district and west part of Abidjan
- To secure safety for road users including pedestrian in crowded area

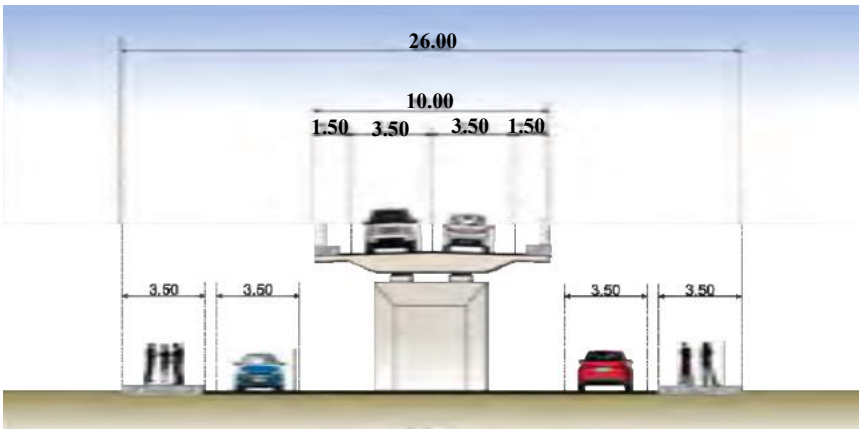
Outline:

The Project consists of the construction of a new flyover along the road:

- Project length: 300 m
- Flyover length: 150 m
- ROW: 26 m
- Installation of traffic signalization

The Flyover will be built in the middle of the road and will carry one traffic lane each direction.





Remarks:

Project ID: UT-39	**Project title:** Carrefour de Abatta
Implementation Period: From_2028_to_2032	**Funding source:** To be funded
Implementation Cost: (31,201 **)** 10^6 CFA **(** 51 **)** 10^6 US$	

Background:

The UT-39 is an improvement of intersection which is located at the intersection on the Bd. Mitterrand in Cocody. The Bd. Mitterrand is one of the major corridor and crowded in Abidjan Metropolitan Area. The BRT east west line will be installed on the corridor in near future, thus, improvement of bottleneck on the corridor has been implemented including 3 junctions improvement by the JICA which has been commenced since 2023.

Objective:

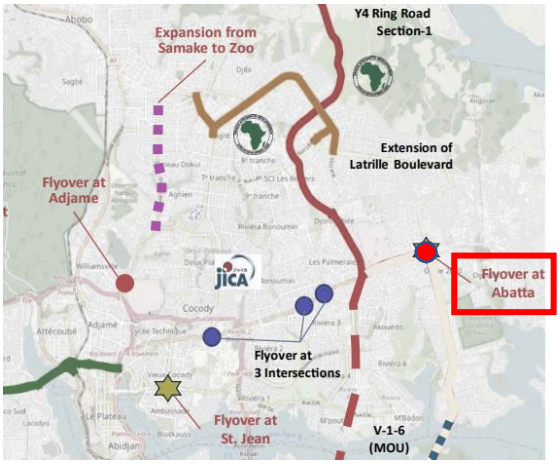
- To enhance traffic capacity at the bottleneck intersection on the Bd. Mitterrand
- To secure smooth and steady traffic flow on the corridor especially for BRT operation in future
- To secure safety for road users including pedestrian

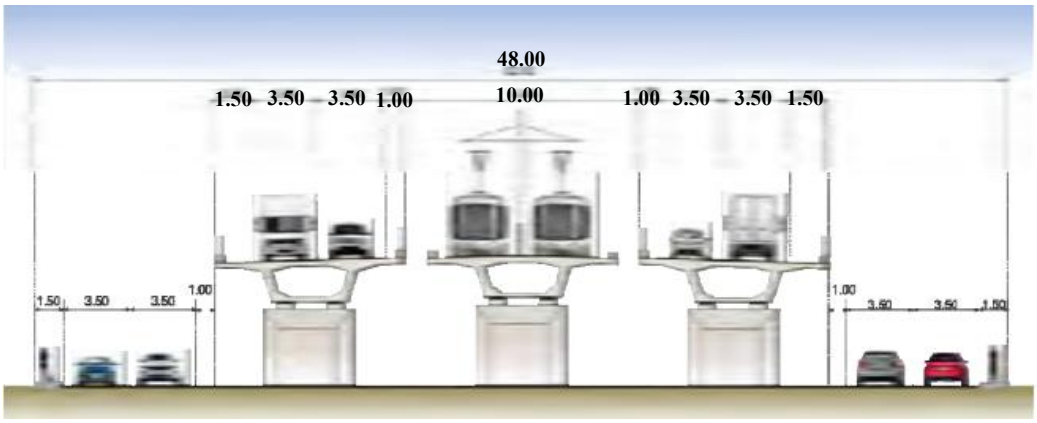
Outline:

The Project consists of the construction of a new flyover along the road:

- Project length: 500 m
- Flyover length: 300 m
- ROW: 48 m
- Installation of traffic signalization

The Flyover will be built in the middle of the road and will carry both direction two traffic lanes.





Remarks: same structure of V8-10, V8-16 and V8-18

Project ID: UT-40	**Project title:** Connection between Boulevard Mitterand and Grand Bassam
Implementation Period: From_2026_to_2029	**Funding source:** To be funded
Implementation Cost: (65,020 **)** 10^6 CFA **(** 107 **)** 10^6 US$	

Background:

The UT-40 is the route to connect between the Extension of the Boulevard Francois Mitterand and Grand Bassam. This route also contributes to development in the eastern Bingerville area in which new city and industrial zone will be developed.

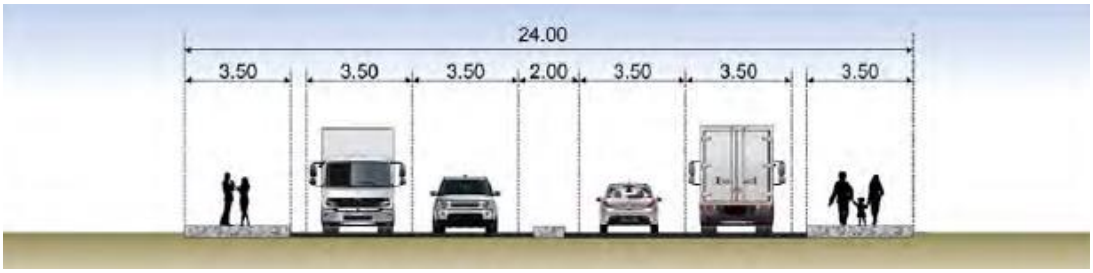
Objective:

- To connect between Bingerville and Grand Bassam
- To support new city and industrial development in east area of Abidjan Metropolitan area
- To secure alternative route to connect from central area to Grand Bassam

Outline:

The Project consists of new road construction including bridge section crossing lagoon:

- Project length: 8.7 km
- Flyover length: 1.0 km
- ROW: 24 m
- Major Infrastructure: 2 interchanges



Remarks:

Project ID: UT-41	**Project title:** Inner Ring Road (Airport - Koumassi Section)
Implementation Period: From_2025_to_2030	**Funding source:** To be funded
Implementation Cost: (254,272 **)** 10^6 CFA **(** 417 **)** 10^6 US$	

Background:

The UT-38 is the route to connect between the Extension of the Boulevard Francois Mitterand and Grand Bassam. This route also contributes to development in the eastern Bingerville area in which new city and industrial zone will be developed.

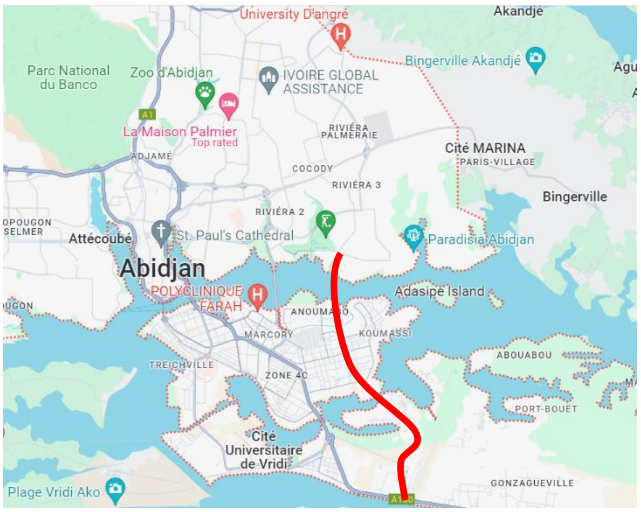
Objective:

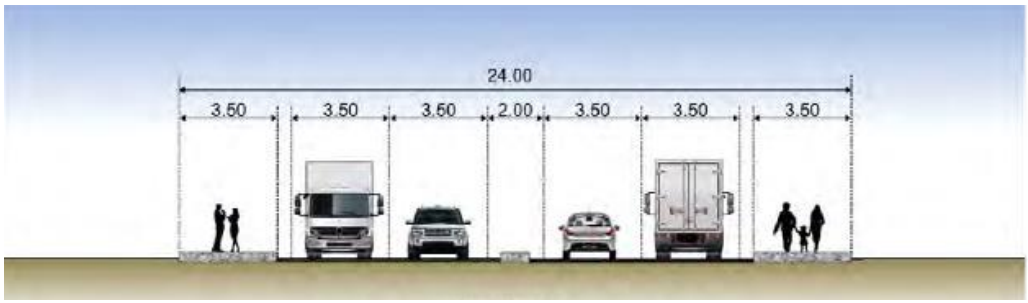
- To connect between Bingerville and Grand Bassam
- To ease traffic concentration around Plateau and Cocody for crossing lagoon
- To secure alternative route to connect from central area to Grand Bassam

Outline:

This link is a part of eastern section of Inner ring road. This section becomes one of the main line connecting between Cocody and Port-Buet via Koumassi and contribute to traffic mitigation to cross the lagoon in future:

- Project length: 10.0 km
- Number of lane: 4 lanes
- ROW: 24 m
- Major Infrastructure: 2 bridges





Remarks: The relation and demarcation with 3rd bridge which has the same function should be considered.

Project ID: UT-46	**Project title:** Extension of Traffic Data Utilization System
Implementation Period: From_2025_to_2027	**Funding source:** To be funded
Implementation Cost: (16,848 **)** 10^6 CFA **(** 28 **)** 10^6 US$	

Background:

The UT-43 is the extension for traffic data utilization system implemented in the framework of pilot project in SDUGA 2040 for capacity development. The system consists of network roadside cameras and data management server including video management system and traffic counting software. Only five cameras at five locations were installed along highway to count and monitor traffic flow condition from/to CBD at pilot works.

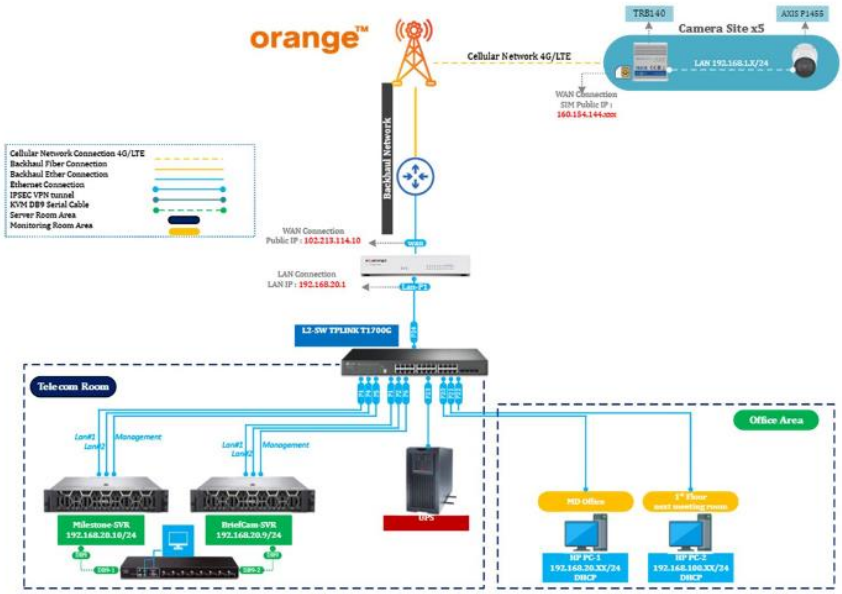
Objective:

- To monitor traffic condition in real time and alert for certain targeted incidents
- To stock traffic count data for any transport infrastructure and service planning
- To control appropriate traffic flow for road management

Outline:

This project is to expand the system installed as a pilot project work under SDUGA 2040. The scale of the location and equipment will be decided according to the function required for the project, however, the system as described below is a tentative specification for the project:

- Number of location: around 100 – 300 locations in Abidjan Metropolitan Area
- Number of cameras: 200 – 600 cameras (2 cameras per location)
- Video management system
- Traffic counting software (License)
- Soler power unit in case of cable less



System Configuration for Pilot Project

Remarks: 5 network cameras were installed in the pilot project work in 2023

Project ID: UT-58-61	**Project title:** BRT priority 4 lines (Abobo North, Prison Civile, Voie Express and Latrille Phase1)
Implementation Period: From_2026_to_2033	**Funding source:** To be funded
Implementation Cost: (130,970 **)** 10^6 CFA **(** 215 **)** 10^6 US$* *excluding water transport	

Background:

The UT-58-61 is the BRT line operation as priority line in terms of passenger volume. All BRT lines including these priority lines as well as East – West line is underway by other framework.

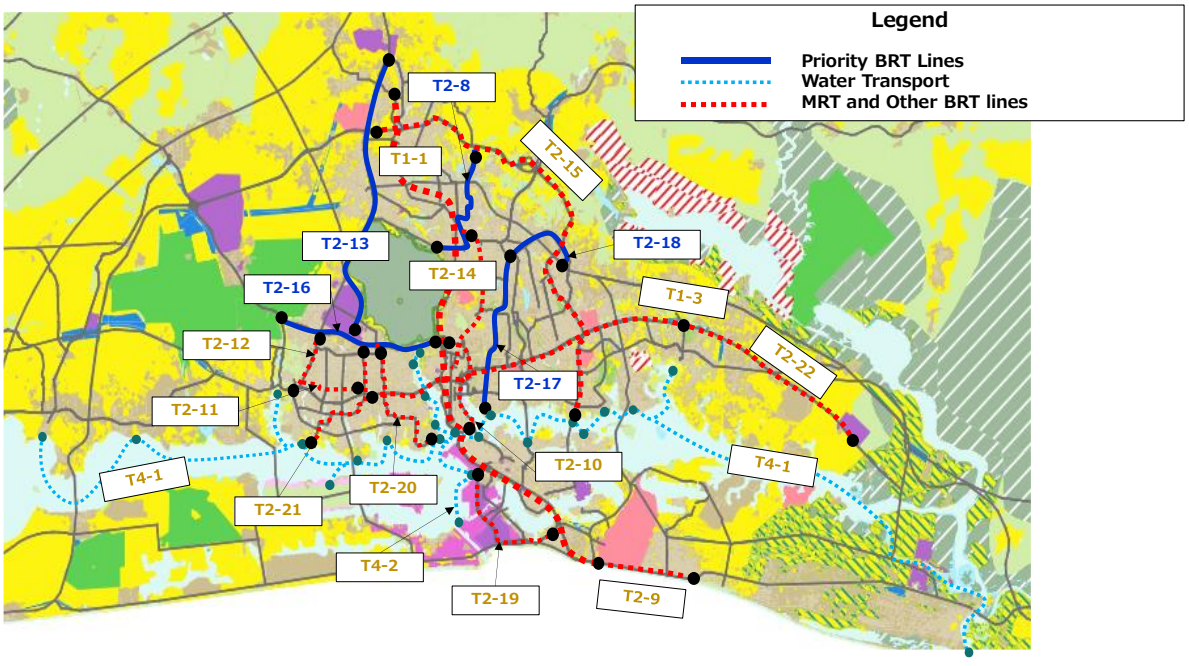
Objective:

- To accommodate increasing passenger demand in Abidjan Metropolitan Area in future
- To shift trip demand by private cars to the public transport modes for sustainable urban mobility
- To realize eco-friendly urban transportation system and overcome environmental issue

Outline:

According to expected passenger volume by traffic simulation model, four priority BRT lines are selected as well as advanced East – West line.

- Widening of ROW, if necessary (depend on planning under other framework)
- Construction for exclusive BRT lane
- Installation of public transport priority system including GPS tracking system
- Procurement of BRT fleets
- IC system and other digital devices for operation



System Configuration for Pilot Project

Remarks:

- T 1-1 (MRT) and T 1-3 (BRT East -West) are advanced lines

Project ID: UT-62	**Project title:** Intermodal Centers at Adjame, and Central/Southern
Implementation Period: From_2025_to_2028	**Funding source:** To be funded
Implementation Cost: (3,360 **)** 10^6 CFA **(** 6 **)** 10^6 US$	

Background:

The UT-59 is the comprehensive transport terminal for multi modal promotion in Abidjan Metropolitan Area. There are existing transport hub in Adjame where there is the three Bus and Gbaka and MRT in near future, and in south Plateau where there is the Bus and Ferry and MRT in near future.

Objective:

- To improve transport user's satisfaction for transit
- To promote modal shift from private cars to the public transportation
- To realize eco-friendly urban transportation system and overcome environmental issue

Outline:

According to future public transport network, there are several interchange which multi modal will connect at same area. In these condition, Adjame and south Plateau are quite important transport hub since not only road public transport but also MRT, BRT and Ferry will be accommodated in same area.

Potential Intermodal Transport Terminals and location of other 2 priority

Remarks: Proposed in SDUGA1

Project ID: UT-71	**Project title:** Establishment of Inter-ministrial Transport Data Platform
Implementation Period: From_2025_to_2027	**Funding source:** To be funded
Implementation Cost: (915 **)** 10^6 CFA **(** 2 **)** 10^6 US$	

Background:

The UT-68 is the establish of new organization which could coordinate all available transport data on the universal platform. Road side CCTV is managed by multiple ministries for different reason in Abidjan Metropolitan Area, i.g., security for local area, real-time traffic monitoring and so on. It is still inconvenient for management, operators, and transport users that data is not opened for public in spite of efficient information.

Objective:

- To coordinate and manage all available transport data across relevant stakeholders
- To organize and maintain a platform on which all members could access the transport data
- To minimize cost and maximize benefit for collecting transport data and practical use

Outline:

Public and private sectors who own any useful transport data will share their information under the open data policy. All data will be collected on shared platform or mutual linked by any block chain technology. All members, data supplier and registered members could access the data on the platform for any practical use within data usage agreement.

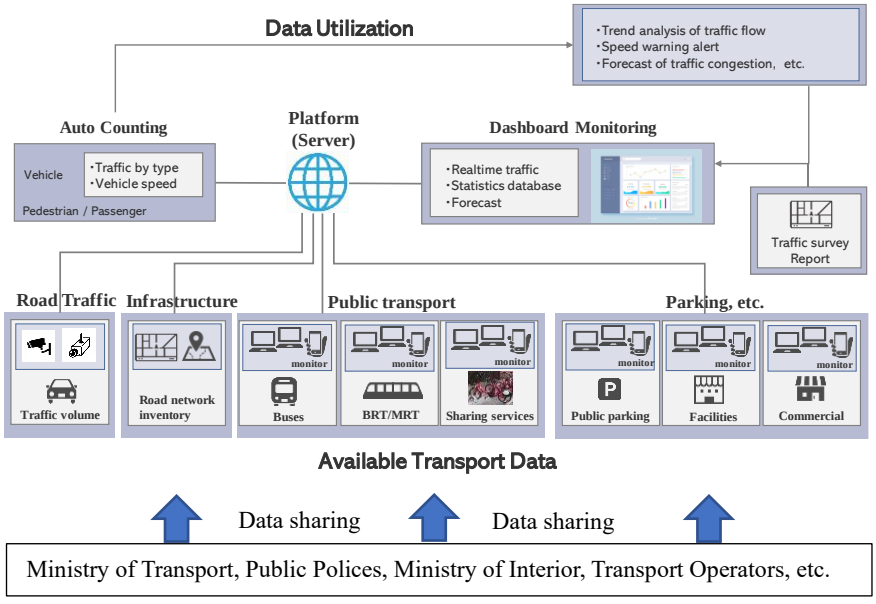


Image of Data Platform and Relevant Stakeholders

Remarks:

(2) Urban Environmental Infrastructure

1) Water supply sector

Project ID: Water Supply-5	**Project title:** Water supply development program at Bonoua and Jacqueville Commune outside AAD
Implementation Period: From 2025 to 2030	**Funding source:** To be funded
Implementation Cost: 312,000 10^6 CFA, 515 10^6 US$	
Background and Objective: This priority projects are selected based on the urgency of enhancing the water supply service in response to an expansion of the areas to be urbanized by 2040 and population increase outside AAD.	
Outline: This priority project outside AAD at Bonoua and Jacqueville Commune assumes 394 thousand m^3/day as daily maximum demand of water supply facilities in total. These program cost are estimated as 312 billion FCFA.	
Remarks: None	

Source: JICA Project Team

2) Sewerage sector

Project ID: Sewerage Sector-1	**Project title:** Project to Improve Sanitation and the Living Environment in the Autonomous District of Abidjan (PAACA)
Implementation Period: From 2021 to 2025	**Funding source:** African Development Bank
Implementation Cost: (15,250) 10^6 CFA, (25) 10^6 US$	
Background and Objective: For decades, Côte d'Ivoire has experienced recurrent floods with negative consequences on the population and the economy, often causing significant material and even human losses. The effects of these recurrent floods are more profound in urban areas, especially in the capital, Abidjan, and its environs, owing to rapid urbanization and other factors. To find lasting solutions to this recurrent problem, the Government decided to address the major challenge of flood control within the framework of the National Development Programme NDP 2016-2020, and draft NDP 2021-2025 and provided for the realization of significant investments to build infrastructure and sensitize the population for a change in behaviour.	
Outline: Sewer (north, south area), drainage, pumping station (2 places), lateral connections	
Remarks: None	

Source: JICA Project Team

Project ID: Sewerage Sector-2	**Project title:** Programme for the Sustainable Improvement of the Sanitation and Drainage Situation (PADSAD)
Implementation Period: From 2020 to 2030	**Funding source:** Islamic Development Bank
Implementation Cost: (54,340) 10^6 CFA, (90) 10^6 US$	
Background and Objective: The Programme for the Sustainable Improvement of the Sanitation and Drainage Situation (PADSAD) was launched on October 13th, 2020 in Abidjan, the economic capital of Ivory Coast. The programme launch ceremony was chaired by the Ivorian Minister of Sanitation and Hygiene, Anne Désirée Ouloto. The initiative aims to improve the health of people in the Abidjan district, particularly those in the communes of Cocody, Yopougon, Abobo, Adjamé, Anyama, Koumassi, Marcory and Treichville. PADSAD should also help prevent deadly floods such as those of 2018 in Ivory Coast.	
Outline: Drainage, Faecal sludge treatment plant (Anyama), lateral connections	
Remarks: None	

Source: JICA Project Team

Project ID: Sewerage Sector-3	**Project title:** Project for the Improvement of Waste Material Management (PAGEMV)
Implementation Period: From 2022 to 2025	**Funding source:** Islamic Development Bank
Implementation Cost: (32,940) 10^6 CFA, (55) 10^6 US$	
Background and Objective: Projet d'Amelioration de la Gestion des Matieres de Vidange (PAGEMV) en Cote d'Ivoire: Construction of septage treatment plants in twelve (12) cities in the Republic of Côte d'Ivoire, namely: Abidjan, Bouaké, Daoukro, Dimbokro, Abengourou, Bondoukou, Daloa, Gagnoa, Man, Soubré, Séguéla and Odienné.	
Outline: Faecal sludge treatment plant (12 places)	
Remarks: None	

Source: JICA Project Team

Project ID: Sewerage Sector-4	**Project title:** Project du BV du Gourou
Implementation Period: From 2020 to 2030	**Funding source:** Islamic Development Bank
Implementation Cost: (29,280) 10^6 CFA, (48) 10^6 US$	
Background and Objective: This project will, in particular, reduce wastewater discharges into rainwater canals and surface waters and reduce sediment deposits in Cocody Bay from 40% today to 10% in 2023. These infrastructures are intended to strengthen and secure the sanitation network of the Abidjan district and will contribute, according to Anne Désirée Ouloto, to improving the socio-economic conditions of the populations living in the four municipalities which cover the Gourou watershed (Abobo , Adjamé, Cocody and Plateau). The Guru watershed covers 28.6 km^2. It extends from North to South in the commune of Abobo at the Indénié interchange. It is limited to the east by the extension of Boulevard Latrille towards Deux-Plateaux and to the west by the railway line (Adjamé-Anyama).	
Outline: The works include the construction of a sanitation system with 16,864 km of wastewater networks, two lifting stations and a pumping station, the development of 2,105 km of rainwater channels and the asphalting of 8,753 km of dirt tracks as well as routine maintenance of 12,035 km of paved tracks, drainage, sewer, and lateral connections.	
Remarks: None	

Source: JICA Project Team

Project ID: Sewerage Sector-5	**Project title:** Sewerage development program at Bonoua and Jacqueville Commune outside AAD
Implementation Period: From 2025 to 2030	**Funding source:** To be funded
Implementation Cost: (120,000) 10^6 CFA, (198) 10^6 US$	
Background and Objective: This priority projects are selected based on the urgency of wastewater treatment service in consideration of the forecast expansion of the areas to be urbanized by 2040 and population increase uutside AAD.	
Outline: This priority project outside AAD at Bonoua and Jacqueville Commune assumes 319 thousand m^3/day as daily wastewater flow of sewerage facilities in total. These program cost are estimated as 120 billion FCFA.	
Remarks: None	

Source: JICA Project Team

3) Solid waste sector

Project ID: Solid Waste Sector-1	**Project title:** Sanitation and Urban Resilience Project
Implementation Period: From 2020 to 2026	**Funding source:** World Bank
Implementation Cost: (192,000) 10^6 CFA, (315) 10^6 US$	
Background and Objective: The development objectives of the Urban Resilience and Solid Waste Management (SWM) Project for Cote d'Ivoire are to reduce vulnerability to flooding in selected urban areas and improve SWM in targeted municipalities. The project comprises of four components. The first component, flood risk mitigation infrastructure and services focus on mitigating the negative impacts of recurrent flooding through a hybrid approach that combines green and grey infrastructures, including urban drainage and associated roadworks, and nature-based solution (NBSs) for erosion control and water retention. It consists of following sub-components: (i) urban drainage and associated roadworks; (ii) nature-based solutions for erosion and landslide control; (iii) emergency preparedness and early warning system; and (iv) resilient urban planning. The second component, improvement of SWM infrastructure and services aims to help further improve the SWM system in the Abidjan Autonomous district, expand the model to other secondary cities, and optimize the systems through better governance, reducing waste quantities buried, and use of digital technology. It consists of following sub-components: (i) strengthening solid waste management capacities in the Abidjan autonomous district and two selected intercommunal groups of secondary cities; (ii) strengthening sector governance, institutional capacity, and citizen engagement; and (iii) improving solid waste management through citizen engagement, recycling, reuse, composting, and digital technology. The third component will support project management activities. The fourth component, contingent emergency response component will allow for rapid reallocation of project funds in the event of a natural or artificial crisis during the implementation of the project.	
Outline: One of the project component for SWM is follows: ● Planning of landfill site at Yapojoi ● Construction of waste transfer centres (Yaou, Dabu and Sikeni) ● Construction of a recycling centre (site to be decided) ● Construction of a Centre de Valorisation et d'Enfouissement Technique (CVET)	
Remarks: None	

Source: JICA Project Team

5.2.4 Investment Program for Priority Projects until 2030

The investment costs required to implement the projects proposed until 2040 to realize SDUGA 2040 are compared with fund availability as shown in Table 5.2.6.

The fund requirement to implement the proposed projects is estimated to be CFA 14,918 billion between 2025 and 2040. The road and transport sector accounts for 73% of the total fund requirement.

Fund availability was estimated by clarifying the past public investment trend, the future prospects of its growth and private fund requirements. The idea is that past investments indicate the capacity of the government to allocate the same level of government budget in the future. It is assumed that it will grow at 5.5% based on 6.9% per year of PND 2021-2025 economic growth target and 79% of average historical tax elasticity between 1984 and 2016. Tax elasticity indicates the proportion of the level of tax revenue growth to that of economic growth. The shortfall is required to be covered by private investments, although the public investment available is expected to suffice the required investment after 2038.

The proportion of private investment to fulfil the gap between the total investment requirement and the public fund is estimated to be more than a half of the total investment requirement as shown in Table 5.2.6. In PND, the government declared that 74% of the total investment is expected to be covered by private money in the entire Côte d'Ivoire. This means that private money is a critical source to successfully implement the activities proposed by SDUGA 2040.

Table 5.2.6 Investment Requirement Fund Availability Balance for the Projects Proposed for SDUGA 2040 until 2040

(Unit: billion CFA)

Sector	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	Total
Development Fund Requirement																	
Urban development*	157	157	157	157	157	157	157	157	157	157	157	157	157	157	157	157	2,504
Road and Transportation	1,044	1,070	1,144	1,080	364	406	925	919	900	832	737	761	346	105	98	89	10,820
Water supply	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	962
Sewerage	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	440
Solid waste management	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	192
Total	1,300	1,326	1,400	1,336	620	662	1,181	1,175	1,156	1,088	993	1,017	602	362	354	345	14,918
Development Fund Availability																	
Public investment available**	292	308	325	342	361	381	401	423	446	471	496	523	552	582	614	647	7,166
Private investment required	1,008	1,018	1,076	994	259	281	780	752	710	618	496	493	50	(221)	(260)	(303)	7,752
Total	1,300	1,326	1,400	13,36	620	662	1,181	1,175	1,156	1,088	993	1,017	602	362	354	345	14,918

*Precarious neighborhood improvement will continue until 2040 with a total cost of CFA 2,504 billion.
** Past public investment trend is assumed to grow at 5.5% based on 6.9% per year of PND 2021-2025 economic growth target and 79% of average historical tax elasticity between 1984 and 2016 (https://academicjournals.org/journal/JEIF/article-full-text-pdf/FD862DE6479)
Source: JICA Project Team

Chapter 6 Strategic Environmental Assessment of SDUGA 2040

6.1 1st SEA Workshop

6.1.1 Workshop Outline

The first strategic environmental assessment (SEA) workshops for SDUGA 2040 took place in 2022 from January 31 to February 23 for a total of 19 workshops. JPT visited communes and held SEA workshops in each commune.

The total number of participants was 447, including commune officers and representatives of local people, with an average of 23 participants per workshop and 4,005 opinions were collected.

The objectives of the workshops were the following.

- To inform local authorities about the SDUGA 2040 project
- To identify current environmental issues and expectations regarding living conditions in the future of Abidjan in 2040 in each of the 19 communes of Greater Abidjan.
- To understand the living environment of Abidjan's inhabitants by confirming land use and urban development in the neighborhoods of each commune.
- To establish a solid partnership with the municipal administration in order to prepare further collaborations within the framework of the SDUGA Horizon 2040 revision project.

The following were considered in arranging the workshops.

- In order to grasp as fully as possible the diversity of concerns and expectations of the inhabitants of Greater Abidjan, workshops were arranged at the communal level.
- The focal points of each commune were mobilized to ensure organization at commune level (room, etc.).
- Between 10 and 20 participants were expected in each commune including representatives of local residents who took part on a voluntary basis.
- The social and geographical diversity of the commune was reflected in the panel of participants (participants from every district and every social class).
- Apart from the venue and invitations for participants, the Project team has taken care of everything else (facilitators, materials, cards, etc.)

6.1.2 Workshop Procedure

To identify current environmental issues and expectations for future living conditions in 2040 in each of the 19 communes of Greater Abidjan, the 1st cycle of consultation workshops proposed the following activities:

- A debate session on the definition of the environment and living conditions in the city
- An individual expression session on post-it notes to encourage all opinions to be taken into account, concerning the commune's current problems and assets (in 2022) as well as its fears and hopes for the future (in 2040)
- A participatory mapping session to spatialize current environmental and living environment issues in each neighborhood.

6.1.3 Result of the workshops

Interest of People

Distribution of the total answers at 4,005 among “existing problems”, “current assets”, “fears for the future” and “hopes for the future” were 38%, 17%, 25% and 21%. Participants gave priority to current problems (38%), and said little about the commune's assets (17%).

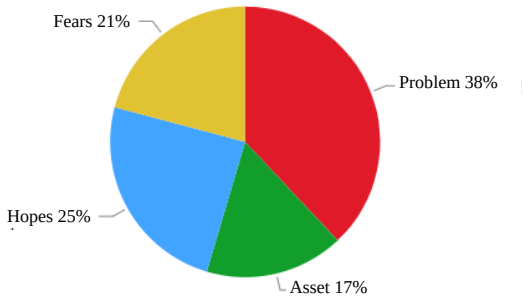


Figure 6.1.1 Distribution of Answers into “Problems”, “Assets”, “Hopes and “Fears”

Environmental issues

Top four environmental issues are mobility and transport (14.9%), urban planning (13.9%), safety (11.5 %) and social facilities (10.6%), which combined accounted for the majority of the environmental issues.

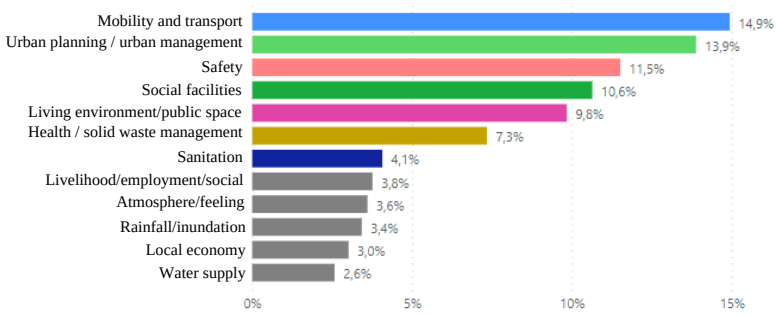


Figure 6.1.2 Ranking of Environmental Issues

Mobility and transport

Within the mobility and transport theme (580 opinions), the most represented sub-themes are asphalting (18%), traffic flow/congestion (16%) and accessibility (14%).

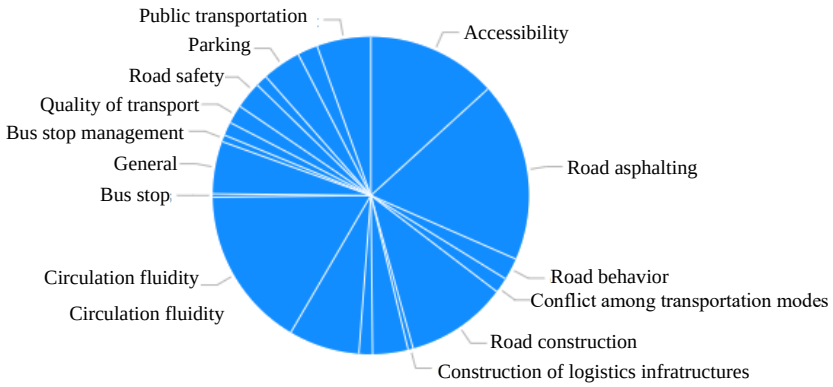


Figure 6.1.3 Breakdown of Mobility and Transport Issues

Urban planning and management

Many topics (20) concern urban planning and management. Within this, anarchic urbanization is seen as the main problem (28%), followed by land security/fear of eviction (15%).

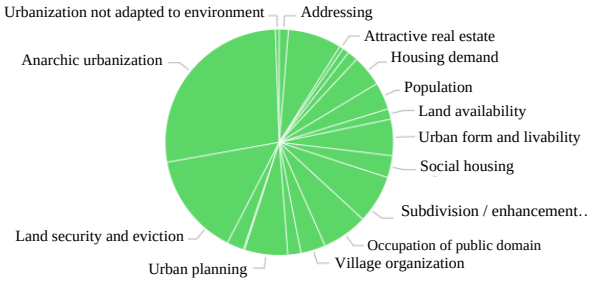


Figure 6.1.4 Breakdown of Urban Planning and Management Issues

Safety theme

Within this theme, the vast majority of opinions (66%) focus on crime problems, followed by drug abuse (22%).

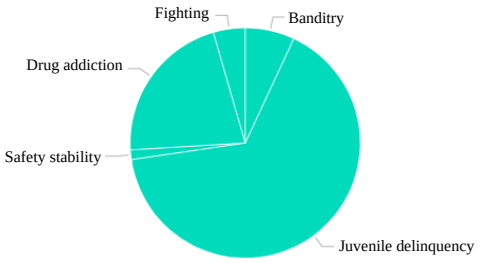


Figure 6.1.5 Breakdown of Safety Issues

Problems recognized by communes

The problems recognized people differ from commune to commune. The annex provides the results of the workshops by commune.

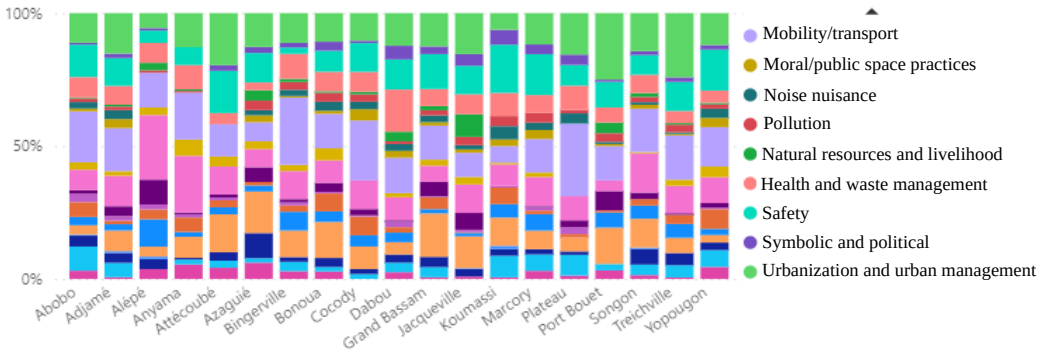


Figure 6.1.6 Breakdown of Environmental Issues by Commune

6.2 2nd SEA Workshop

6.2.1 Outline of the 2nd SEA Workshop

In January 2023, a series of consultation workshops were held in Dabou, Bonoua and Azaguié, to assess the development scenarios for the SDUGA 2040 plan. These workshops involved diverse stakeholders including regional directors, NGO representatives, local chiefs, and community members.

The choice of those three venues was made to be able to invite the participants from all the communes of the Target Area located in the West part of the Target Area in Dabou, East part in Banoua and other parts in Azaguié.

The main focus was on evaluating the environmental and strategic impacts of proposed urban development scenarios on the communes and Greater Abidjan. The outline of the 2nd SEA Workshop is as follows:

- Time and date : January 4, 5 and 6, 2023
- Venue : Dabou, Bonoua and Azaguié
- Participants : 19 in Dabou, 21 in Bonoua and 43 in Azaguié. The participants were composed of the following representatives :
  - ✓ representatives of youth associations
  - ✓ representatives of women's associations
  - ✓ representatives of local environmental associations
  - ✓ representatives of customary authorities (central chiefdom)
  - ✓ representatives of the city council
- Objective : Collective evaluation of the different development Scenarios of Greater Abidjan at horizon 2040 (see Section 4.2.1 (3)).

6.2.2 Results of the 2nd SEA Workshop / Feedback from the Participants

(1) Results Overview

The results from the 2nd SEA Workshop highlight a strong preference for scenarios that promote balanced urban development, protect agricultural land, improve infrastructure, and create employment opportunities. The importance of public awareness and coordination with detailed urban plans was consistently emphasized. The evaluations showed a clear inclination towards scenarios B and D, indicating a preference for development strategies that balance growth with sustainability and connectivity.

(2) Results by Venue

1) Dabou Workshop (January 4, 2023)

Figure 6.2.1 below shows scenes of 2nd SEA Workshop held in Dabou, while major feedbacks from participants are mentioned below.

Source: JICA Project Team

Figure 6.2.1 Scenes of 2nd SEA Workshop held in Dabou

- Scenario D Preference: Many participants favoured Scenario D for its balanced approach to urban development across Greater Abidjan.
- Decentralization and Corridor Development: There was strong support for decentralizing urban development and developing corridors alongside satellite cities.
- Agricultural Land Protection: Protecting rural agricultural land was emphasized, with suggestions to focus on high-rise urban development to minimize land consumption.
- Feasibility and Coordination: Concerns were raised about the feasibility of the proposed projects by 2040 and the need for coordination with detailed urban plans.
- Public Awareness: Effective dissemination of the SDUGA plan to the public was considered crucial.

2) Bonoua Workshop (January 5, 2023)

Figure 6.2.2 below shows scenes of 2nd SEA Workshop held in Banoua, while major feedbacks from participants are mentioned below.


Source: JICA Project Team

Figure 6.2.2 Scenes of 2nd SEA Workshop held in Bonoua

- Road Network Improvements: Participants highlighted the need for improvements in the road network, particularly between satellite cities.
- Scenarios B and D: These were identified as the best scenarios for Bonoua, emphasizing interconnection of cities and territorial governance.
- Agricultural Land Preservation: Maintaining agricultural land in Greater Abidjan was a key concern to avoid its disappearance by 2040.
- Cemeteries and Territorial Equity: The necessity to reserve space for cemeteries and ensure equitable consideration of all communes, including Jacqueville, was discussed.

3) Azaguié Workshop (January 6, 2023)

Figure 6.2.3 below shows scenes of 2nd SEA Workshop held in Azaguié, while major feedbacks from participants are mentioned below.

Source: JICA Project Team

Figure 6.2.3 Scenes of 2nd SEA Workshop held in Azaguié

- Scenario B and Corridor Development: Scenario B was preferred for the development of Azaguié, with support for corridor development enhanced by railroads.
- Farmland Maintenance: The importance of addressing farmland grabbing and maintaining agricultural land for local production was stressed.
- Population Needs: Participants called for the inclusion of population needs identified in previous sessions.
- Urbanization Management: Managing urbanization along transportation axes was seen as critical to prevent sprawl.

(3) Quantitative Evaluations of Scenarios

The scenarios were evaluated quantitatively, through participants' raised hand method, based on their perceived impact, and the results are shown in Table 6.2.1 below and can be summarized as follows.

- Dabou: Scenario B received the highest positive impact rating (79.5%), followed by Scenario D (61.6%).
- Bonoua: Scenario D was overwhelmingly favoured with a 97.7% positive impact rating.
- Azaguié: Scenario B was preferred with a 74.5% positive impact rating.

Table 6.2.1 Results of Quantitative Evaluations of Scenarios during 2nd SEA Workshop

DABOU					
Rank	Scenario	Impact negative	Impact neutral	Impact positive	Abstention
❹	A	26,8%	24,1%	36,6%	12,5%
❶	B	8,9%	6,3%	79,5%	5,4%
❸	C	2,7%	36,6%	52,7%	8%
❷	D	5,4%	30,4 %	61,6%	2,7%
BONOUA					
Rank	Scenario	Impact negative	Impact neutral	Impact positive	Abstention
❹	A	54,9%	2,3%	26,3%	16,6%
❷	B	0,8%	12,8%	82,7%	3,8%
❸	C	1,5%	26,3%	66,2%	6%
❶	D	0%	0,8%	97,7%	1,5%
AZAGUIÉ					
Rank	Scenario	Impact negative	Impact neutral	Impact positive	Abstention
❹	A	59%	10,6%	14,9%	15,5%
❶	B	11,2%	5%	74,5%	9,3%
❸	C	1,2%	6,8%	62,1%	29,8%
❷	D	0,6%	4,3%	72%	23%

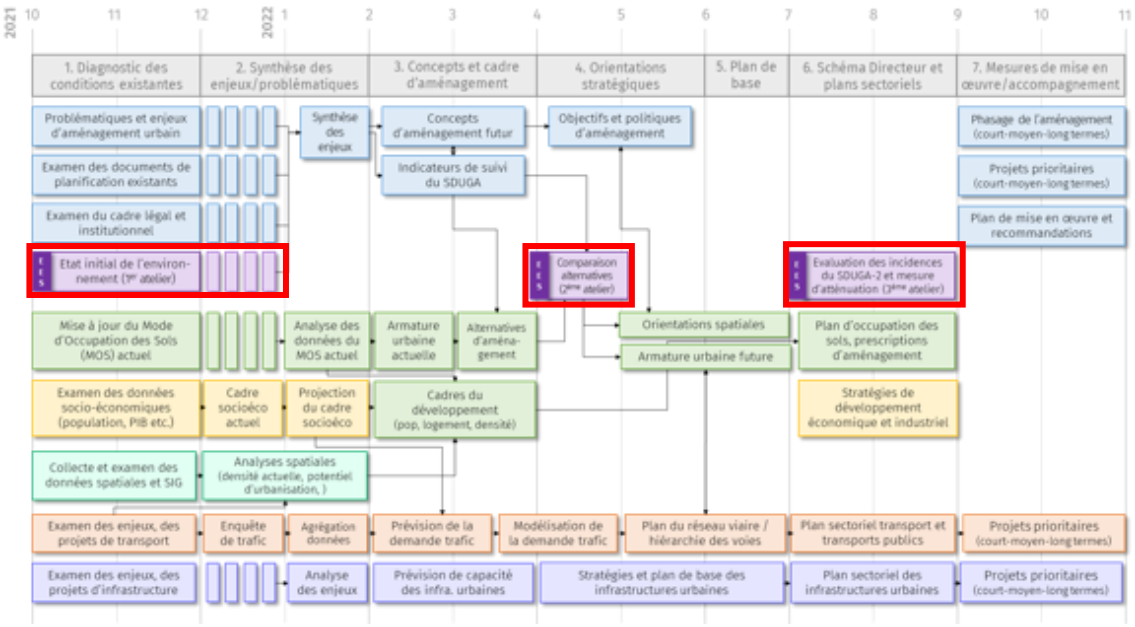
Source: JICA Project Team

6.3 3rd SEA Workshop

6.3.1 Introduction

As part of the project to operationalize the Schéma Directeur d'Urbanisme du Grand-Abidjan (SDUGA), supported by the Japanese Cooperation Agency (JICA), and according to the general timetable for the implementation of activities, 3 stages of strategic environmental assessment (SEA) had been planned. To date, 2 workshops have been held:

- At the start of the process, the 1st event took place in January-February 2022 in each of the 19 communes of Greater Abidjan to identify local conditions and environmental issues;
- midway through the project, in January 2023, the 2nd workshop was held to discuss alternative land-use scenarios (urban sprawl scenarios) based on Greater Abidjan's population growth assumptions, the density targets that could be assigned to urban areas and the major natural areas to be protected.

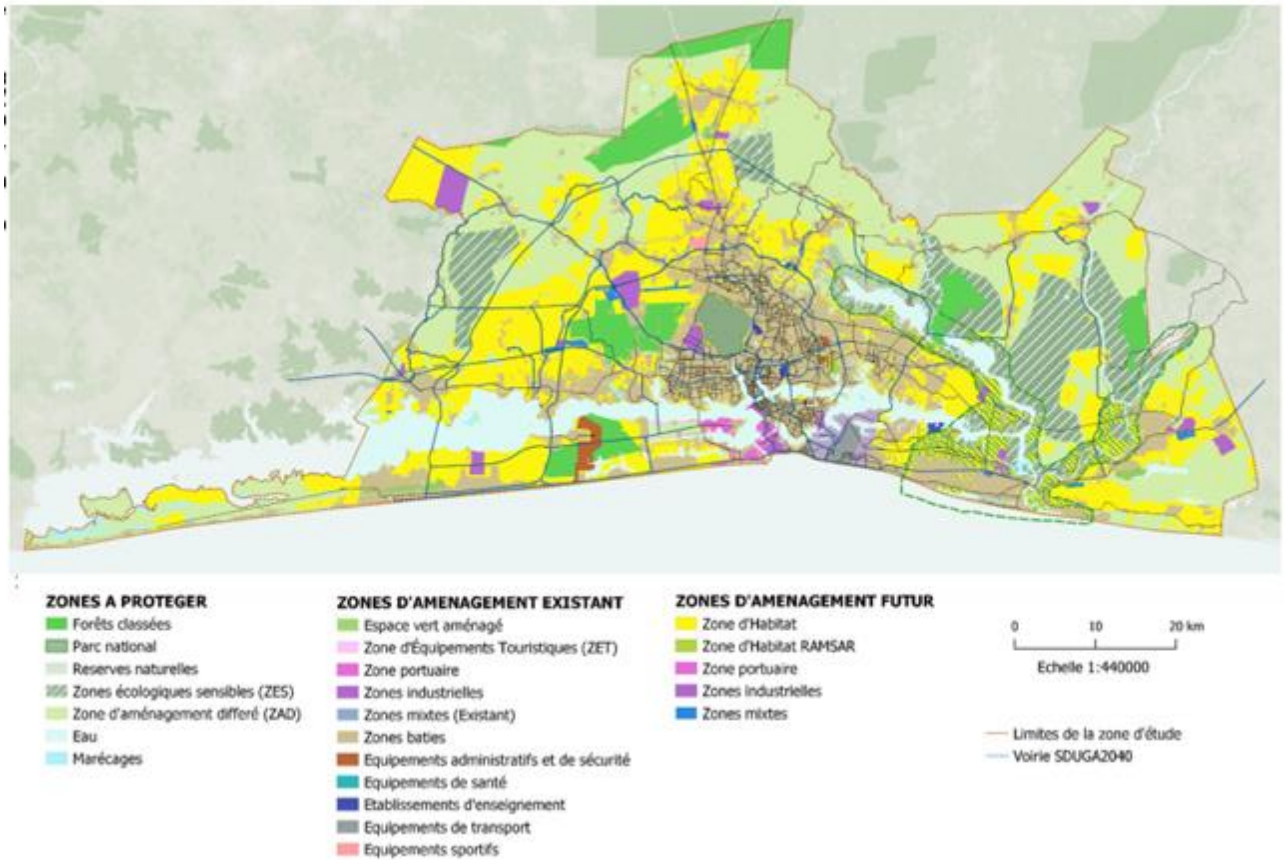


Source: JICA Project Team

Figure 6.3.1 General chronogram of SDUGA operationalization activities (RECS)

Towards the end of the project, when the SDUGA-2040 Master Plan was being consolidated, a 3rd workshop was therefore planned to assess the strategic environmental impacts of the SDUGA-2040 and identify mitigation measures. At the very macro scale of the Master Plan (1:400,000e), the main impacts to be discussed are :

- impacts of urban sprawl and the siting of business parks, between urbanizable areas and agricultural zones (deferred development zones);
- impacts of urban sprawl and the establishment of business parks on protected natural areas and sensitive perimeters;
- impacts of major mass transportation infrastructures, visible on the PCOS (freeways, primary roads, railroads, metro / BRT lines, structures crossing a natural environment, etc.).



Source: JICA Project Team

Figure 6.3.2 SDUGA land-use framework plan (provisional version)

6.3.2 Background and rationale

It should also be remembered that the process of updating and operationalizing the SDUGA comes at a time when the Ivorian authorities, through the MCLU and donor-funded projects (including the World Bank and the African Development Bank), have begun the process of drawing up Detailed Urban Plans (PUd) for the 10 urban units of Greater Abidjan.

At this stage, therefore, it is important to be able to draw up a strategic environmental assessment of the SDUGA that can guide the summary prescriptions for the definition of the PUd. These documents, with their regulatory scope and greater level of detail (1:5,000 to 1:10,000 scale[e]), will have a direct impact on land use and construction conditions at plot level, and will therefore influence the granting of subdivision and building permits. These PUd will include :

I. A graphic part - the zoning plan, whose main functions are :

- be a technical and legal tool enabling public authorities to protect existing and planned public domains, in particular through subdivision permits and verification of their conformity, in particular by acting on :
  - ✓ protect the public or private domains of the State or local authorities (natural and artificial public domain, easements, private domain of a registered public reserve);
  - ✓ plan and protect future infrastructure rights-of-way (roads, HV lines, primary drains, drinking water catchment areas) and easements.

It should be remembered that this function should be primary and indispensable for the Ivorian state, in order to ensure its challenging mission of protecting public domains. To date, in the context of sub-Saharan African cities, this protection of spaces to be protected is far from being effective in the field!

- To be a regulatory tool to reinforce the issuance of building permits, and thus to influence the constructability of private land. Pragmatically speaking, this function is currently "secondary", as urban control is not yet efficient. However, with the capacity-building of those in charge of urban management and the introduction of new digital tools for issuing building permits and monitoring the conformity of private constructions, the zoning plan is set to become an increasingly respected tool in sub-Saharan African cities.

II. regulatory documents defining the land-use and planning rules applicable to each zone, with direct impact on :

- authorized or prohibited constructions ;
- rules governing the layout of buildings on plots of land (setback from the public domain or boundary lines, joint ownership, etc.);
- building dimensions and volumes (footprint, height, etc.);
- the urban functioning of the plot (access, urban water and electricity services, etc.).

As part of the 3rd workshop to assess the strategic environmental impact of the SDUGA-2040, it is necessary to make the various stakeholders aware of the dual issue of impacts on public and private property, with a view to identifying mitigation measures to be formulated as points of attention, so that they can be taken into account in future PUd.

6.3.3 Workshop objectives and organization

The objectives assigned to the 3rd SDUGA-2040 SEA workshop and the results sought from its organization were threefold:

- **bring together urban development players (MCLU, AMUGA, DAA, Communes) and environmental protection players** to raise awareness of the common challenges they will have to face together in the coming years, particularly in terms of urban planning to deal with the effects of climate change, natural hazards and limiting the negative impact of the human environment on the natural environment;
- **reinforce the operationalization of the SDUGA-2040, currently being finalized, by presenting and discussing certain environmental prescriptions that could possibly be integrated into future PUd**, currently being drawn up. But also by evoking certain points of attention to which the actors will have to pay attention in the margin of the PUd elaboration
- **participate indirectly in capacity-building for the managers invited,** in particular to raise their awareness of cross-cutting environmental issues for Greater Abidjan and the role of urban planning tools in minimizing the impact on the natural environment.

To ensure a fully operational approach at this stage, the JICA expert focused the content of the 2-day workshop on the following topics:

I. Day 1: Presentation and discussion of the vulnerability of the Grand-Abidjan region to planned development within the framework of the SDUGA 2040 :

- presentation of adaptation measures to cope with the consequences of climate change (flooding; gullying/landslides; heat wave/urban heat island; drought; rising sea levels);
- presentation of mitigation measures to limit greenhouse gas emissions responsible for global warming;

II. Day 2: presentation and specific challenges of natural areas and sensitive ecological zones (wetlands, etc.), including the RAMSAR zone in Grand-Bassam. Then group work to co-construct summary prescriptions that could be integrated into future PUd to reinforce the protection and enhancement of these areas.

The workshop was attended by the following institutions:

- MCLU : Urban Planning Department;
- District Autonome d'Abidjan (DAA): Urban planning and foresight workshop ;
- AMUGA: Research and Planning Department ;
- Ministry of Water and Forests (MEF) :
  - ✓ Department in charge of the National Strategy for the Preservation, Rehabilitation and Extension of Forests (SPREF) ;
  - ✓ Direction de la Faune et des Ressources Cynégétiques in charge of protecting wetlands, including the RAMSAR zone;
- Structures under the supervision of MEF :
  - ✓ Société de Développement des Forêts - SODEFOR in charge of managing classified forests;
  - ✓ Office Ivoirien des Parcs et Réserves - OIPR in charge of managing national parks (Banco forest) and nature reserves (Dahliafleur and Aghien lagoon partial reserves)
- Ministry of the Environment and Sustainable Development (MEDD) in charge of developing and implementing public policies in the fields of nature protection, climate change and risk prevention;
- Structures under the supervision of the MEDD :
  - ✓ Agence Nationale de l'Environnement (ANDE) in charge of environmental and social monitoring of development projects, and compliance control of E&S assessment through impact studies;
  - ✓ Center Ivoirien Antipollution (CIAPOL) in charge of monitoring and controlling all forms of pollution in the natural and human environment.
- Ministère en charge de l'Assainissement et de la Salubrité (MINASS) through the Direction de l'Assainissement Urbain et du Drainage (DAUD) for issues related to compliance with the Schéma Direction d'Assainissement des eaux usées et de Drainage (SDAD-2016);
- Agence Nationale de Gestion des Déchets (ANAGED) ;
- A number of municipal technical managers from neighboring towns, where urbanization is more exposed to risk and where the natural environment, including lagoons, is most affected:
  - ✓ West Abidjan: Dabou-Songon (Ebrié lagoon; Agnéby river)
  - ✓ East Abidjan: Grand-Bassam (Comoé estuary; RAMSAR zone)
  - ✓ South Abidjan: Port-Bouët.

The workshop was organized as follows:

- Workshop chair: MCLU Urban Planning Department
- Vice-presidency: representative of the Ministry in charge of Water and Forests ;
- Moderated by District Autonome d'Abidjan (DAA) ;

6.3.4 Topics covered on Day 1

The SDUGA 2040 PCOS therefore highlights a number of issues affecting urban development conditions and environmental protection/enhancement. These elements form the basis of the environmental assessment work to be developed as part of the SDUGA. This assessment will be refined when the next PUd is formulated, with the preparation of strategic environmental studies (SEA), in accordance with the Ivorian regulatory framework for environmental and social assessment[1] .

According to the specifications of the consultants in charge of the PUd, an SEA is to be carried out according to a typical process:

[1] Decree no. 96-894 of November 08, 1996 determining ESIA rules and procedures

- Elaboration of the ToR of the SEA by the MCLU then validation by the ANDE by starting the process;
- Start SEA at the stage of formulating strategic orientations and development scenarios for the urban unit in question, with a view to orienting the scenario that may or may not be the least impacting possible;
- Finalization of the SEA when the zoning plan and urban planning regulations are drawn up, and validation of the deliverable by ANDE.

Part 1: Summary of the effects of urban sprawl

The 1ère day focused on the impact of urbanization (urban sprawl) on the natural environment, and the implications for climate change, territorial vulnerability and risk management. The JICA expert gave a rather "ex-cathedra" presentation on these subjects, and reserved a question-and-answer session for the end of the session.

The session began by highlighting the various major environmental issues relating to urban sprawl (only), on the scale of Greater Abidjan. To summarize, these are the following 6 points:

- Continued urban sprawl, mainly through subdivisions and the prevalence of single-family housing;
- Land pressure and urbanization of peri-urban agricultural areas, particularly to the north (Anyama) and west (Songon), a phenomenon accentuated by the future dynamics of the Y4 ;
- Progressive urban sprawl in agricultural and natural areas, including certain forests and reserves that need to be protected;
- Anthropogenic pressure on the lagoon environment (Aghien, Potou, Jacqueville) - Amplification of the phenomenon of hydraulic embankment around the city center (Cocody, Unité 6, Port) - Urban pollution of lagoon waters, with extreme cases in the port and industrial zone (Baie de Biétry-Vridi);
- Poor consideration of relief (slopes, low-lying areas) and climatic vulnerabilities, leading to worsening soil stability and flooding problems, particularly in new urbanization zones (relief on the north-west front: Anyama, Gesco, Djorobité; low-lying areas and swamps in the Port-Bouët / Bassam flood zone).
- Sensitivity of the coastline to marine erosion and submersion - Coastline retreat of 1 to 3m per year in some areas (Port-Bouët; Grand Bassam) - Settlement of fishing villages, informal settlements and tourist facilities - Building and economic impacts in the event of storms and submersion.

Source: JICA Project Team

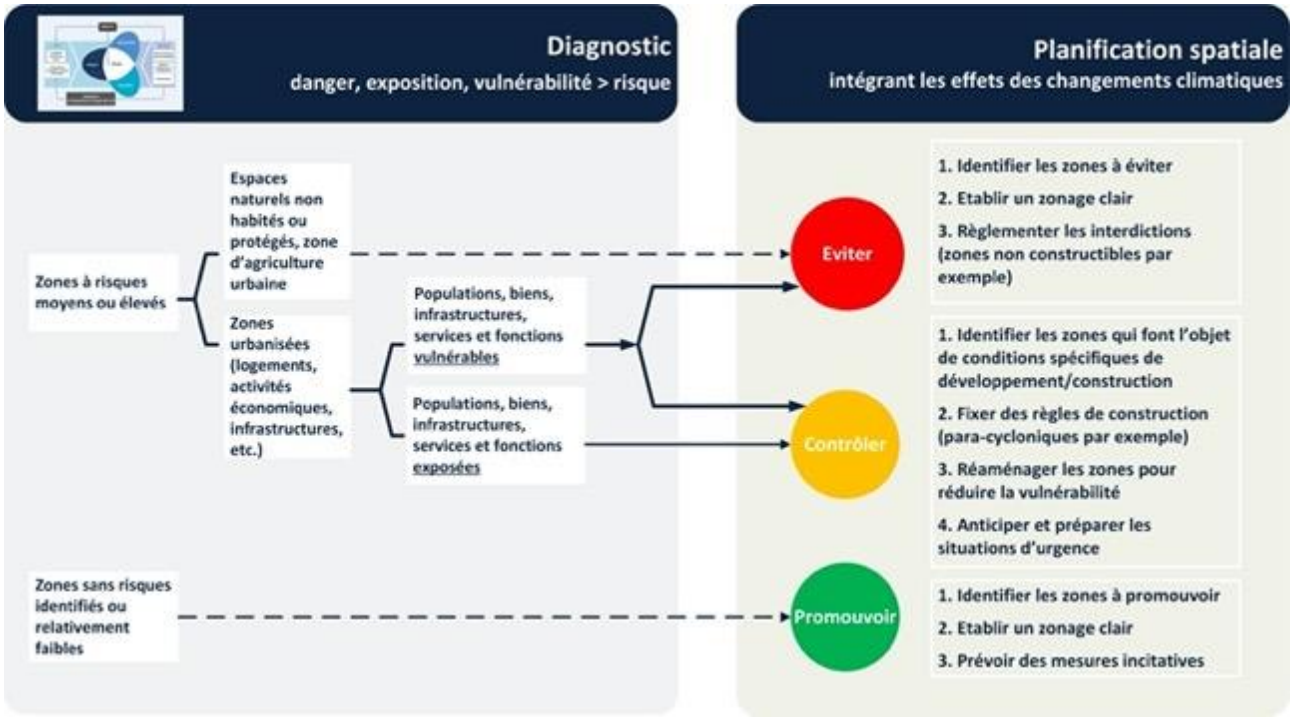
Figure 6.3.3 Summary of the effects of climate change on a city like Abidjan

Part 2: Absence of a document analyzing the vulnerability of the territory and conditioning the prospects for urbanization and land use

Secondly, it was reminded that the absence of a comprehensive study of the Greater Abidjan region's vulnerability to natural and climatic hazards. Only the Schéma Directeur d'Assainissement et de Drainage (SDAD-2016) had made it possible to carry out a study of this type (partial identification of flood risk), but within a very restricted perimeter.

This kind of study is necessary to characterize current climate changes: description of the current climate; highlighting of climate changes observed to date; description of expected climate change for the 21st century (hypothesis, scenarios); characterization of present and future hazards in the area.

The aim of such a study is to first establish a matrix that cross-references major climatic phenomena with potential issues in order to identify vulnerabilities, despite uncertainties about future climatic assumptions: rise in average annual temperatures, increase in seasonal contrasts for precipitation, and so on.



Source: JICA Project Team

Figure 6.3.4 Vulnerability analysis matrix and impact on spatial planning

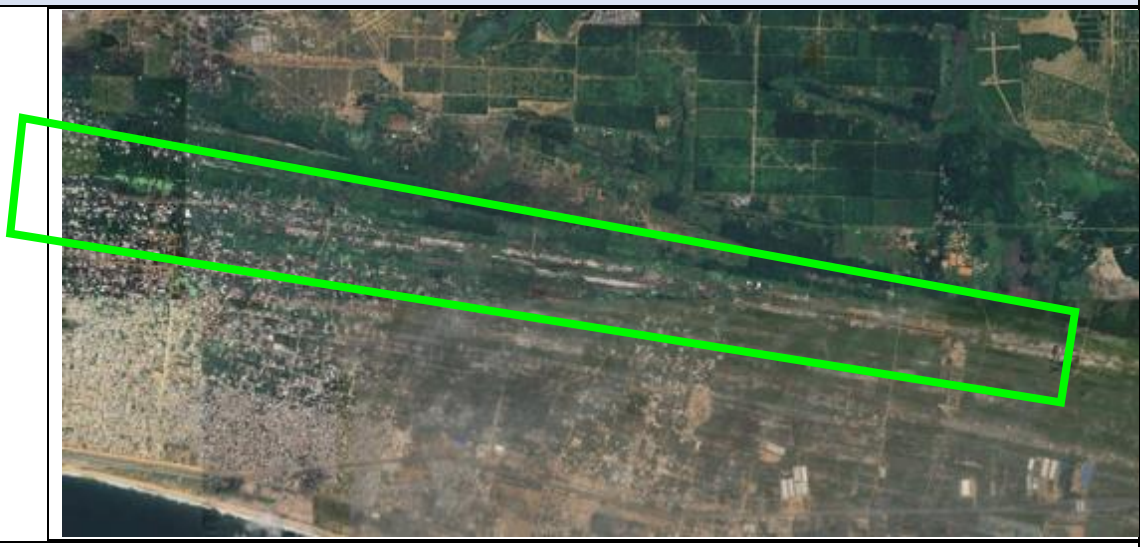
This type of study and analysis of the vulnerability of the Greater Abidjan area should make it possible to :

- Take into account the challenges of resilience and adaptation to climate change when defining precise land-use patterns;
- Draw up a vulnerability profile for all or part of the Greater Abidjan area;
- Identify options for adapting to the effects and mitigating the causes of climate change;
- Integrate these options-measures in all planning documents, including the SDUGA and then the PUd ;
- Identify priority measures, both "hard" (e.g. drainage or protection infrastructure works) and "soft" (e.g. setting up an early warning system).

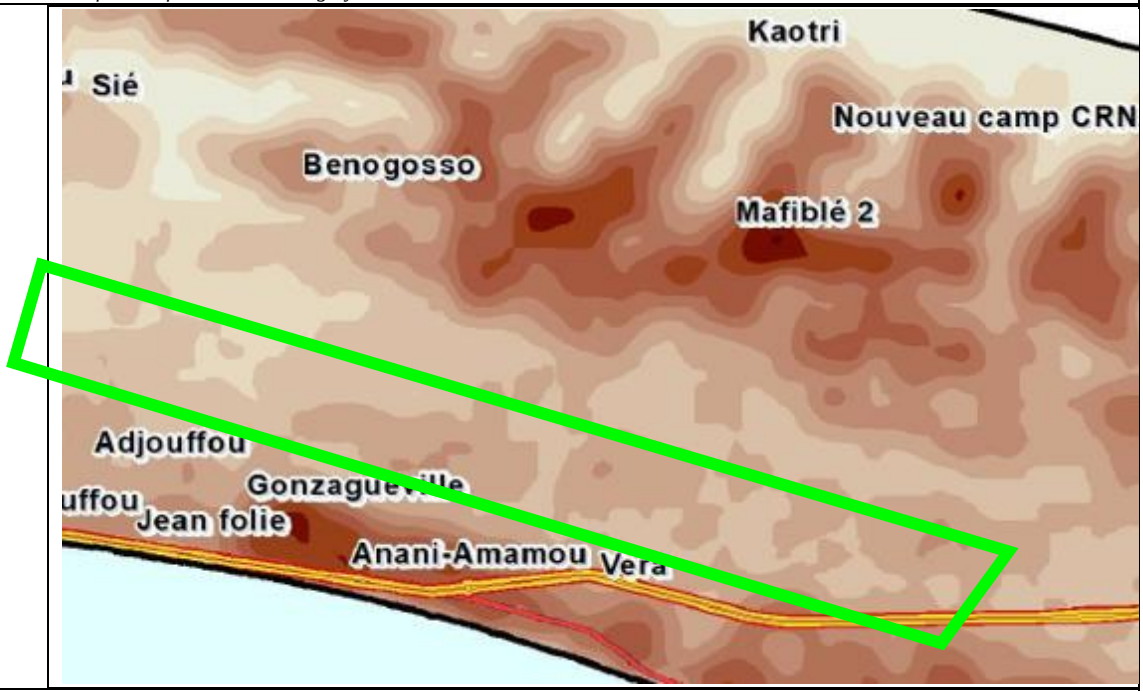
Ideally, this study should be based on the mapping of areas at risk, using topographic data (LiDAR SIGFU DTM) and new hydraulic and rainfall studies on the scale of Greater Abidjan (by sub-catchment):

- For flood risk: low-lying areas (points-bas) and protection perimeter ;
- For landslide risk: identification of low-risk areas for slopes <15% and high-risk areas for slopes >30% ;
- For submergence risk: with assumptions of rising sea levels.

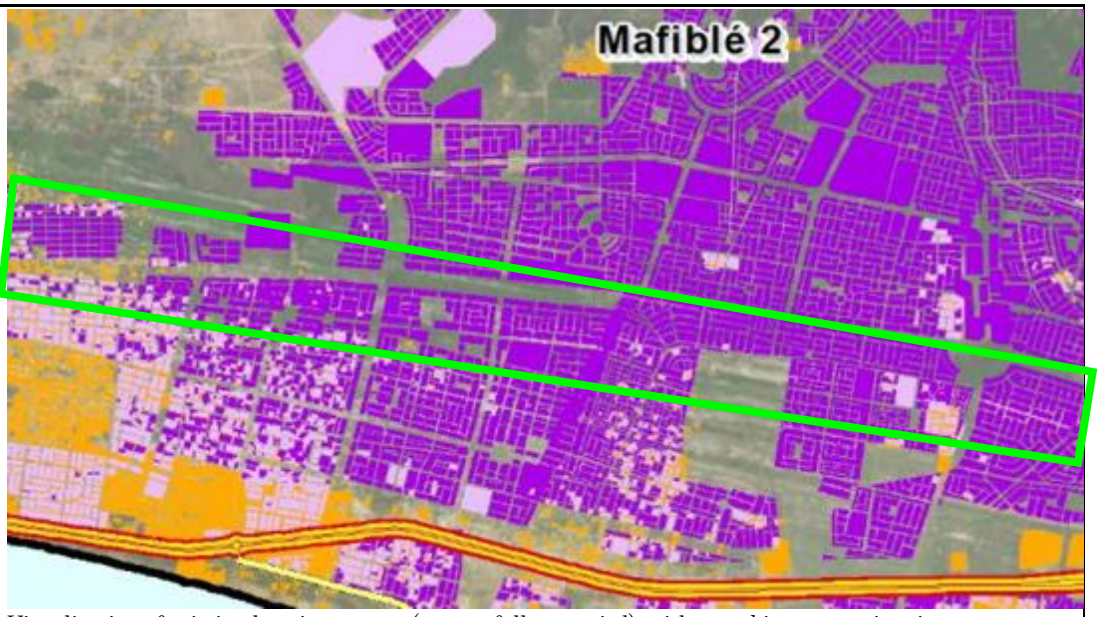
The Port-Bouët / Grand-Bassam flood zone, located on either side of the freeway (within Unité Urbaine n°2), was presented in order to operationalize the discussions. There is a topographical depression visible from satellite images and SRTM data. Here, urbanization should be preceded by a topographical, hydraulic and climatic vulnerability study to identify areas unsuitable for construction, and areas that should be left natural to encourage runoff and rainwater infiltration. However, this preliminary study does not exist (the SDAD-2016 perimeter did not include this zone). Housing estates have been produced-implanted-sold without taking these constraints into account, and today a detailed Urban Development Plan (PUd) is being drawn up.



Depression identification from satellite imagery



Confirmation of depression from SRTM data (relief)



Visualization of existing housing estates (not yet fully occupied), without taking constraints into account

Source: JICA Project Team

Figure 6.3.5 Urbanization of the Port-Bouet / Gd-Bassam flood depression

In the course of the discussions, and by way of contributions :

- The World Bank representative said:
  - ✓ a consultant (BRLi - Predict) has been recruited in 2023 to carry out a vulnerability study and set up an early warning system (SAP). It would be interesting for the JICA team to have access to the ToR of this mission to verify its objectives and expected results, and thus know whether there will be a truly operational impact for the SDUGA and PUd ;
  - ✓ a workshop was to be held in July-August, on the initiative of the Projet d'Assainissement et de Résilience Urbaine (PARU), on urban planning for disaster risk reduction.
- The representative of the town of Grand-Bassam indicated that a Master Plan for Drainage of the town of Grand-Bassam was carried out in 2018 by the consultant Terrabo. It was pointed out by the JICA expert that this study had a restricted scope on the existing town of Grand-Bassam, and that its results were very much geared towards "identifying a drainage works program", and not towards vulnerability analysis and land use recommendations.

Source: SDD Grand-Bassam - Cabinet Terrabo - 2018

Figure 6.3.6 Intervention perimeter of the Grand-Bassam Drainage Master Plan

Part 3: Presentation and discussion of general measures applicable to urban planning for adapting to the effects and mitigating the causes of climate change

Table 6.3.1 Discussions on Recommendations and Measures in Urban Planning for Mitigation of Effect of Climate Change

	Objectives	Recommendations / summary measures	Questions/answers from participants
Adapting the region to the consequences of climate change (adaptation)			
	Protect against more intense and frequent flooding	● Recommendation 1: Update the SDAD and extend its scope of intervention to a larger territory, on the scale of major river basins: ✓ Level of precision to be adapted initially (analysis of risk areas and treatment, do not deal with wastewater) ✓ Priority to areas undergoing urbanization or in line with the SDUGA 2040 urban task: Port-Bouët / Bassam area; Songon / Dabou; Djorobité (Aghien watershed)	● MINASS and ONAD must be made accountable for this proposal. ● The PUd must also recall certain measures to accompany their implementation: the updating of an SDAD per urban unit could be necessary?
		● Recommendation 2: Gain a better understanding of climate risks and impacts by carrying out a vulnerability study and setting up early warning systems. ✓ Back up the document to be produced with a contingency or emergency plan (using SAP-type tools) for Civil Protection (check work in progress with ONAD-PARU). ✓ Establishment of flood risk prevention plans and specific prescriptions for the next SDUGA and PUd updates	● Verify the ToR of the consultant (BRLi - Predict) recruited in 2023 to carry out a vulnerability study and set up an early warning system (SAP) to really know the desired results and their impacts on the SDUGA and PUd.
		● Recommendation 3: Delimit the Public Hydraulic Domain (PHD) using topographical markers and include it on the zoning plan for the PUd. ✓ The topography and size of drainage basins play a major role in determining the risk of flooding in the vicinity of a watercourse. ✓ Applying the legal rules of 25m inconstructibility on either side of watercourses ✓ Accept the risk of flooding by making provision for the development of public spaces and revocable occupancy of the public domain (leisure activities, soft mobility, river mobility if possible).	● The rule of the public domain has always existed, in ancient legal texts, since colonization. ● Application and control are the real key issues
		● Recommendation 4: Define flooded zones for return periods of 20-50-100 years and propose regulations differentiating land use according to these zones: ✓ Establish, in addition to the DPH, a safety perimeter that cannot be built on or left natural (agricultural and market gardening zone)	● Need to carry out a vulnerability study beforehand to define hypotheses: a town planner can't do this with a "wet finger". ● Possible for medium- to high-end housing, more complicated for low-income housing

		✓ Prescribe conditionally buildable zones and accept a tolerance to flood risk => resilience of urban areas to exceptional events: location of public facilities, particularly sports facilities; low-density urban areas; multi-storey buildings; construction with a crawl space ("pilotis")	
		● Recommendation 5: adapt road structure schemes to improve the permeability of roadways and limit the need for drainage structures (collectors): ✓ Primary roadway (+32m): allow for additional widths of 4 to 8m to create naturally draining features on central islands or on the surrounding area (such as "valleys"). ✓ Secondary roadway (+/- 20m) inserted into a dense urban fabric: a priori, considering also the issues of transport, soft mobility, greening, public lighting and street furniture (...) complicated to do without the usual drainage structures. ✓ Tertiary access road (-15m) + parking: linear pedestrian mobility and traffic calming, possibly work on the design of absorbent pavements.	● Acting on road right-of-way standards, but the next step will be to monitor the construction project (project management studies).
		● Recommendation 6: For private plots, include in the PUd the principle of limiting outflows onto the public domain in order to limit the size of drainage systems on public roads: ✓ Building regulations capable of imposing retention basins or roof water recovery tanks on the plot (e.g. 1 m3 per 100 m2 of waterproofed surface). Interest for the owner/resident in storing water for domestic use (washing, watering). ✓ Introduction of a Coefficient de Pleine Terre (bare surface) to limit soil sealing. E.g.: (plot surface - CES) x 50%. ✓ Encourage the planting of trees on plots to promote water infiltration and evapotranspiration (natural cooling).	● Possible for medium- to high-end housing, more complicated for low-income housing
		● Recommendation 7: for private plots, include in the PUd the principle of building on a crawl space (foundation on "pilotis"), which limits waterproofing of the land, but is more expensive to build (possible incentive by granting additional COS).	● Possible for medium- to high-end housing, more complicated for low-income housing
	Protect against gullying /	● Recommendation 1: Include sloping areas in the DPN : ✓ Legal rule that areas with a slope of +30% cannot be built on (in compliance with the Decree establishing Ecologically Sensitive Areas).	● At the SDUGA scale: difficult to map precisely contour lines (MNT) to delimit non-constructible zones

	landslides		● At PUd scale, draw up a topographic map (ideally based on LiDAR - DTM from SIGFU)
		● Recommendation 2: on the natural public domain, secure the stability of slope failures through reinforcement operations, ideally natural (NBS): ✓ Support by gabion, or possibly by masonry riprap ✓ Planting of trees and low, long-rooted vegetation (pollution control, soil stabilization)	● Need to target priority sectors as part of the vulnerability study, mobilize substantial funding and undertake project management studies. ● PARU seems to be mobilized on this issue (e.g.: development of the Yopougon and Abobo sectors), as is the World Bank. ● Problem exacerbated by the DAA's March 2024 eviction initiatives
		● Recommendation 3 on PUd zoning: in urban areas, propose regulations differentiating land use according to different levels of slope and therefore risk. ✓ Normal building regulations with shallow foundations for zones <15%. ✓ Building regulations requiring special foundations (piles, micropiles) for zones between 15 and 30%.	● The building permit decree already includes specific provisions (project certified by an architect or consulting engineer). ● Requirement to submit a G2 geotechnical study to define foundation construction method. ● Make the text on SEZs setting out unbuildable zones applicable and represent them on PUd ● Follow up or require the consultants in charge of the PUd to set an intermediate value (+ or - 15%) of constructibility under condition, depending on the topographical context. ● Check the texts to find out whether the applicable unit of measurement is expressed in "%" or "°".
	Protecting against heat waves / urban heat island	● Recommendation 1: Draw up a greening plan (increase canopy, green spaces, ground shading, green corridors, etc.).	● Inexpensive, but requires a project owner and available land (green spaces) to implement the study. ● Definition of specifications by a contracting authority: involvement of a landscape architect and a botanist

			• Difficult to impose on private individuals, and should be reserved for natural and artificial public domains (roads), protected natural areas and public spaces in housing estates.
		• Recommendation 2: Preservation and reinforcement of tree cover in protected natural areas: ✓ Provide cool areas with the capacity to infiltrate rainwater. Protect steep slopes and coastlines from erosion. Store carbon. ✓ Protection and reinforcement of plant density in Banco National Park, classified forests, nature reserves (OIPR - SODEFOR) and sensitive ecological zones (ZES) ✓ Tree planting on all public natural areas that cannot be built on: DPM, DPL, DPH, steeply sloping areas (pollution control, urban comfort, CO2 capture, soil stabilization). ✓ Replanting mangroves to regenerate or recreate mangroves in lagoon systems and estuaries (Comoé)	• Apply the recommendations of the Zones Vertes study initially 1er , then identify more localized measures to revegetate and protect natural areas. • Need for better coordination between institutional players: State (MEF), DAA (initiator of the "Green Zones" study), parapublic management agencies (SODEFOR, OIPR), communes to identify, size and implement projects. • Need for awareness-raising and training of public domain managers to initiate comprehensive reforestation operations in the city.
		• Recommendation 3: Increase the use of vegetation on artificial public areas, particularly urban roads: ✓ Providing places for people to cool off and spaces for soft mobility ✓ Reduce the need for drainage infrastructure, as vegetated soils have the capacity to infiltrate rainwater. ✓ Landscaping and aesthetic enhancement ✓ Ensure adequate shoulder widths for new roads, to enable the development of tall trees (systematize a 2x4m min sidewalk in the right-of-way).	• Need for awareness-raising and training for owners and contractors (architect-engineer + landscape architect) • Need for strong commitment from project owners (e.g. Parkway - PTUA) to translate the urban plan into a development project, and to draw up specifications that take this integrated, landscape approach into account.
		• Recommendation 4: Influence development standards for subdivisions to include public recreational spaces. ✓ Have a landscaping plan attached to the subdivision plan: create green spaces in future urbanization zones, plan planted walkways to reinforce natural continuity and improve pedestrian mobility (greater comfort). ✓ Encourage the planting of medium-sized trees to facilitate rooting.	• The old housing estates in Abidjan (Cocody) respected these standards, but today green spaces are (i) either not provided for in the developer's plans; (ii) or provided for in the plan, but quickly divided up and sold by the developer.

		✓ Creating sports and recreational facilities to give green spaces a function	● The need for a set of development standards for allotments, unless these are spelled out in the specific urban planning regulations for PUDs. ● E.g.: 1 ha of land set aside for a green space for a community of 5,000 to 6,000 inhabitants.
		● Recommendation 5: Revegetation of private plots ✓ Introduction of a Coefficient de Pleine Terre (bare surface) to limit soil sealing. E.g.: (plot surface - CES) x 50%. ✓ Act on the CES and setbacks to confirm these undeveloped spaces on the plot ✓ Encourage the planting of trees on plots to promote water infiltration and evapotranspiration (natural cooling).	● A priori, feasible for medium to high standing areas, with minimum plots of 1'000m2.
		● Recommendation 7: Implement building regulations to promote albedo and thermal design ✓ Mastered techniques (reflective paints, bioclimatic architecture and materials) ✓ Architectural design: avoid direct sunlight on glazed surfaces/ limit glazed curtain walls ✓ Improving the thermal insulation of buildings: the need to introduce thermal regulations (MCLU) that are difficult to control	● Need for awareness-raising and training for owners and project managers (architect-engineer) ● Difficulty of acting on private property, depending on the petitioner's purchasing power (additional costs borne by private developers). ● A priori, possible for medium-to-high-rise housing, but inapplicable for popular housing.
		● Recommendation 8: Open up urban forms towards natural environments to encourage wind flow ✓ Notion of katabatic winds from the sea, talwegs and valleys to help the city breathe and evacuate pollution ✓ Orientation of buildings to allow for this penetration	● Need for awareness-raising and training for owners and project managers (architect-engineer) ● A priori, possible for medium-to-high-rise housing, but inapplicable for popular housing. ● Building regulations to be introduced in high-rise collective housing zones, particularly on the seafront (Port-Bouët, Grand-Bassam, possibly Jacqueville).
	Protect against drought	● Recommendation 1: Improve the safety of drinking water resources by securing extraction areas ✓ Develop the Schéma Directeur d'Adduction en Eau Potable (SDAEP - drinking water supply master plan) in line with SDUGA demographic and spatial projections.	● Little risk of drinking water supply disruption in the Abidjan area ● Strong links with the Ministry in charge of hydraulic infrastructures and the MCLU, particularly during the future updating of the SDAEP.

		✓ Water management in catchment areas including Abidjan (regulation dams, storage, pumping, irrigation, production improvement, leak detection campaign on water supply networks). ✓ Preservation of all protected sites around the large basin formed by the Comoé and Mê estuaries, Potou lagoon and Aghien lagoon (RNP, ZES, RAMSAR zone).	
		● Recommendation 2: Improve the safety of food resources ✓ Maintain farming activities in outlying areas as a means of supplying towns directly, maintaining jobs linked to agriculture, draining floodwaters and preserving aquifers... Including livestock farming (north Abidjan): pork, chicken, rabbit, snail... ✓ Encourage the use of agriculture and forestry in classified natural areas: Zones d'Aménagement Différé, National Parks, Classified Forests, Nature Reserves, Ecologically Sensitive Areas, etc. ✓ Promote fishing and fish farming in rivers and lagoons, while limiting liquid and solid pollution from the urban environment (importance of mangrove areas and the RAMSAR perimeter). ✓ Encourage urban market gardening on natural public domains: DPM, DPL, DPH, etc., but also on flood expansion perimeters following vulnerability analysis (tolerance of flooding), and in low-lying areas and other hydraulic basins not visible on the SDUGA plan.	● Strong links between MCLU and the Ministry of Agriculture ● Agricultural areas are no match for land pressure and the rising cost of rural land in urban areas (it is unlikely that there will be a policy to safeguard agricultural land on the outskirts, as agricultural areas will gradually retreat). ● Measures for the management and use of protected natural areas: to be discussed between institutional players, civil society and private operators in the agricultural sector. ● Urban market gardening: runoff water and soil must be cleaned beforehand to obtain healthy produce.
	Protecting against sea-level rise and flooding	● Recommendation 1: Gain a better understanding of risk and impact, and set up early warning systems: ✓ Integrate maritime vulnerability into the vulnerability study for Greater Abidjan, and use LiDAR-SIGFU data, coupled with analysis of climate projections of rising sea levels (RCP 2.6 to 8.5). ✓ Ideally, set up a "Plan de Prévention des Risques de Submersion Marine (PPRSM)" for the next update of the SDUGA and PUd (urban units in contact with the sea coast: 2, 5, 7, 9 and 10).	● Check with the WACA project whether steps will be taken to implement a PPRSM-type document. ● Good coordination between the MCLU, the Ministry of Maritime Affairs, and the Ministry of the Interior in charge of Civil Protection (+ supervision of prefects and sub-prefects).

		✓ As for the "Flooding" risk, define potentially "drownable" zones and propose regulations differentiating land use. ✓ Establishment of a contingency or emergency plan (SAP) for Civil Protection	
		● Recommendation 2: fix the Public Maritime Domain (DPM) on the PUd and free illegal occupations (precarious neighborhoods, traditional fishermen's dwellings). ✓ Implementing Resettlement Action Plans: politically and socially sensitive ✓ Establishment of a coastal setback in addition to the 100m strip at Pas du Roi	● A socially and politically sensitive issue in light of the DAA's eviction operations in March 2024.
		● Recommendation 3: Tolerate the development of public spaces on the DPM (public spaces that can be impacted by extreme weather events), taking as an example the development of the Port-Bouët corniche (project financed by Morocco).	● Strong will on the part of project owners (State / coastal municipalities) to mobilize (budget-intensive) funding and implement this type of development project. ● Draw up specifications that take account of this integrated and landscape approach ● Issues of attractiveness, occupancy and financial profitability ("Moroccan" development is not yet very dynamic).
		● Recommendation 4: Physical development of the coastline with hard solutions (breakwaters, groins, dikes) and soft solutions (vegetation of the dune cordon, preservation and reinforcement of the mangrove swamp).	● Strong will on the part of project owners (State / coastal municipalities) to mobilize (budget-intensive) funding and implement this type of development project. ● Drawing up specifications with strong expertise in marine geomorphology
Reduce greenhouse gas emissions responsible for global warming (mitigation)			
	Limiting urban sprawl, promoting poly-centrality and the functionality of urban spaces	● Recommendation 1: Adopt spatial growth scenarios and densification targets in the SDUGA and PUd that limit urban sprawl and its impact on the urban and natural environment (soil artificialisation, pollution and health impacts, need for public utilities). ✓ Adopt ambitious densification targets that are compatible with lifestyles and household purchasing power ✓ Promoting poly-centrality and the functionality of urban spaces ✓ Promote the 1/4-hour city: ensure that all amenities and services are within walking distance (concept of catchment area).	● Strict application of the ZAD without derogations ● Socially and culturally difficult to set up: price of concrete to build high, price and difficult access to urban land already subdivided and registered (new buyers cannot access land ownership via new subdivisions). ● The people of Abidjan are increasingly affected by the time it takes to get to work, and their mentality is changing with regard to moving their household closer to their place of work (preference for rental property).

	Promoting soft modes of transport and public transport	• Recommendation 1: Draw up one or more comprehensive public transport planning documents, including lagoon modes and soft modes ✓ Existence of a Transport Plan attached to the SDUGA, but a macro document essentially focused on mass infrastructure and service needs. ✓ Review with AMUGA the various types of existing, current and planned documents. Establish an overall vision including soft modes and TOD issues (polarities). ✓ Operationalize the principles of highly localized feeder transport, parking and soft mobility in PUd documents, then in development plans. ✓ Incorporate TOD principles into the PUd, based on the current PMUA project (identification, multifunctionality).	• MCLU, DAA and AMUGA OK overall on recommendations • Closely monitor the coherence of all ongoing studies at the level of the Research Department / AMUGA • Attention should be paid to the effective transposition of these principles into the PUd (the PUd will not necessarily be sufficient and exhaustive on the subject!).
		• Recommendation 2: Launch urban renewal projects (ORU) around areas where the TOD approach has been developed (mass transit corridors): ✓ On the basis of the TOD nodes defined by the SDUGA, PUd and transport planning documents, prioritize station hubs where urban renewal operations are desired. ✓ In accordance with the French Urban Planning Code, promulgate the Decree specifying the procedures for drawing up and implementing Urban Renewal Schemes (ORU). ✓ For each site, mobilize partners (institutional and private) to carry out a feasibility study of real estate, land, financial and institutional programming. ✓ Mobilize financing to gradually launch operations	• Capitalize on ongoing PMU-financed study (Yopougon-Selmer; Adjamé-Réunification) • Focus on the effective transposition of these principles into PUd: identification of ORU sectors • Strong will on the part of project owners (State / local authorities) to mobilize (budget-intensive) funding and implement this type of project with real-estate implications (public-private partnership). • Long-term projects, incompatible with political agendas: 10-15-20 years or more
	Promoting bioclimatic architecture and energy efficiency in construction	• Recommendation 1: Promote bioclimatic architecture and energy efficiency in construction. Grant additional building rights • Recommendation 2: Promote renewable energy production: optimize solar capture (PV production) on private plots and on administrative and economic rooftops (industry, logistics).	• Need for awareness-raising and training for public and private project owners (owners) and project managers (architects-engineers) • Difficulty of acting on private property, depending on the petitioner's purchasing power (additional costs borne by private developers). • A priori, possible for medium-to-high-rise housing, but inapplicable for popular housing.

			● To be developed in the VITIB zone in Grand Bassam (ecological business zone)
		● Recommendation 3: Draw up a Solid Waste Management Plan to improve waste collection, sorting and treatment, encapsulation and methane recovery (ANAGED).	● Monitoring of the Waste Management Master Plan being implemented with financing from the Islamic Development Bank ● How can we preserve sites in neighborhoods to build intermediate centers? ● Verify the SDUGA's general recommendations regarding the need for and location of a new landfill and technical recovery center (CEVT) => North zone (Anyama); East zone (Bonoua)
Non-climatic issues that could have an impact on land use in Greater Abidjan			
	Improved wastewater treatment management	● Recommendation 1: Update a "Wastewater" SDA for the generalization of a wastewater management system throughout the conurbation, taking into account ✓ central areas with a collective network: mandatory connection in central areas connected to a WWTP system (2 planned: Adjahui / Anyama) ✓ outlying areas with individual systems (septic tanks): obligation to install an autonomous system complying with current standards (to be specified), depending on the type of building (a real issue with densification) ● Recommendation 2: then include the requirements of the SDA "Wastewater" in the PUd regulations under the heading "urban services": obligation to connect to the SODECI network; obligation to build a watertight tank with a capacity depending on the built area ● Recommendation 2: Improve the system for discharging and treating septage (to be verified with NADO).	● MINASS and ONAD must be made accountable for this proposal. ● The PUd must also recall certain measures to accompany their implementation: updating an SDA for each urban unit might be necessary? or do we remain with a global plan for Greater Abidjan? ● Don't forget the DEWATS system, which can be used around watercourses and talweg bottoms, where rainwater can carry wastewater.
	Integrating technological risk into urban regulations	● Recommendation 1: Set up a Technological Risk Prevention Plan tool, and back them up with the future updating of the SDUGA and PUd + Strengthen the early warning system (SAP) with the Civil Protection. For : ✓ Inexistence of tools enabling the Ivorian government to determine prohibition and prescription perimeters in the face of these risks.	● Good coordination between the MCLU, the Ministry of Economic Infrastructures, the Industrial Management and Development Agency (AGEDI), and the Ministry of the Interior in charge of Civil Protection (+ supervision of prefects and sub-prefects).

		✓ Important issue for Unit 2 and Unit 7 around the Port's industrial and petrochemical facilities (possibly Unit 6).	

Source: JICA Project Team

6.3.5 Topics covered on Day 2

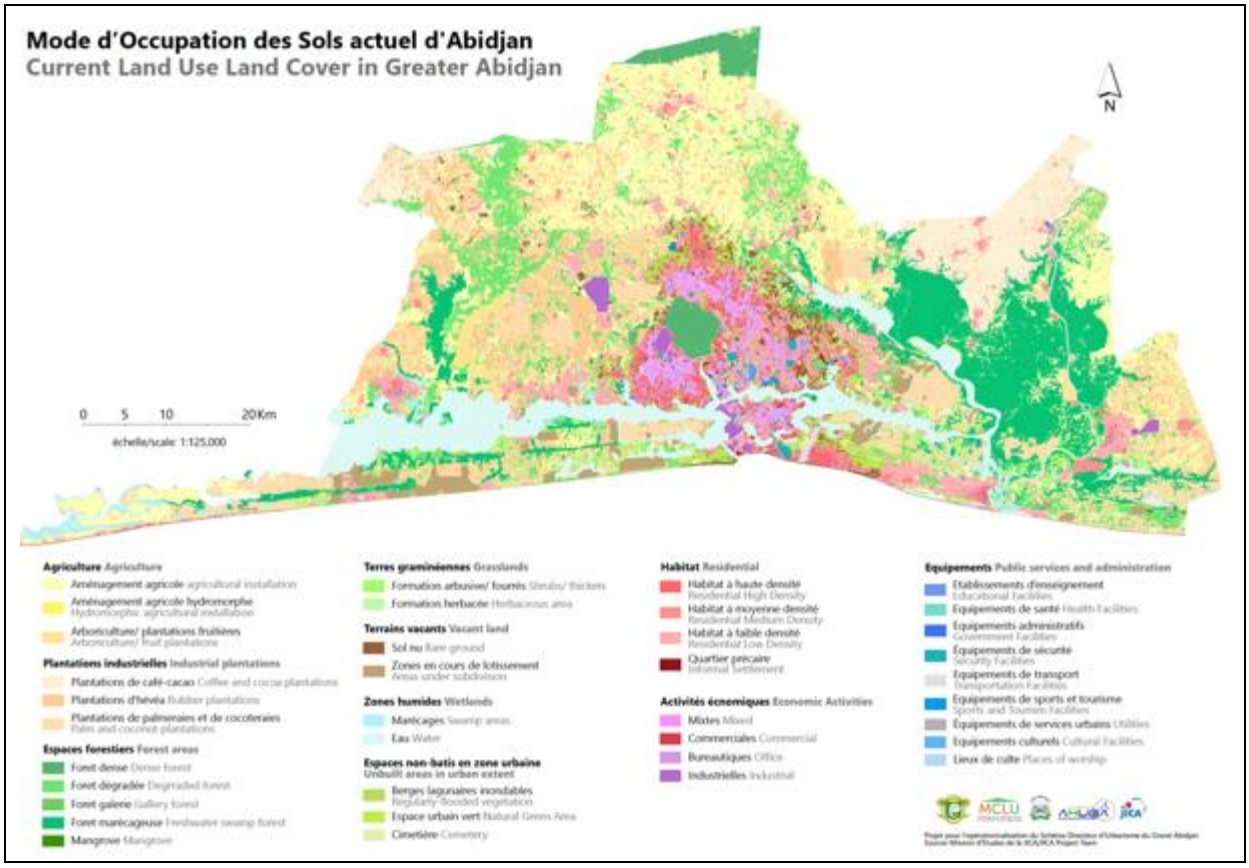
In many urban areas of sub-Saharan Africa, issues of recognition, protection and preservation of natural areas and ecologically sensitive zones are still being debated. Faced with growing urbanization and land pressure, these areas are often "neglected" in the face of major human development needs (housing estates, infrastructure). On the outskirts of towns and cities, there is also a high level of urban sprawl, with natural and ecologically sensitive areas falling victim.

Respecting these natural environments promotes the resilience of territories in the face of urban vulnerabilities, particularly those linked to climate change. Preserving natural areas has several objectives:

- prevent the loss and fragmentation of the land needed for agriculture, while promoting it as a predominant activity;
- ensure the permanent protection of natural heritage systems and water resources that maintain ecological and human health: natural areas are a refuge for living ecosystems and can have positive interactions with certain human activities (impact of biodiversity on agriculture, fishing, etc.) or on the health of populations (natural treatment of water, air and soil pollution; regulation of harmful animal species);
- to host a wide range of economic and social activities, and to make efficient use of resources: natural areas can have functions that are directly exploited by man: economic development through tourism and leisure activities ;
- strengthen resilience in the face of climate change and mitigate its effects: areas left natural can have an impact on hydraulic flows, soil stability in the face of erosion, the capacity of soils to absorb rainfall runoff and thus limit the need for protective infrastructure, but also the risks associated with flooding.

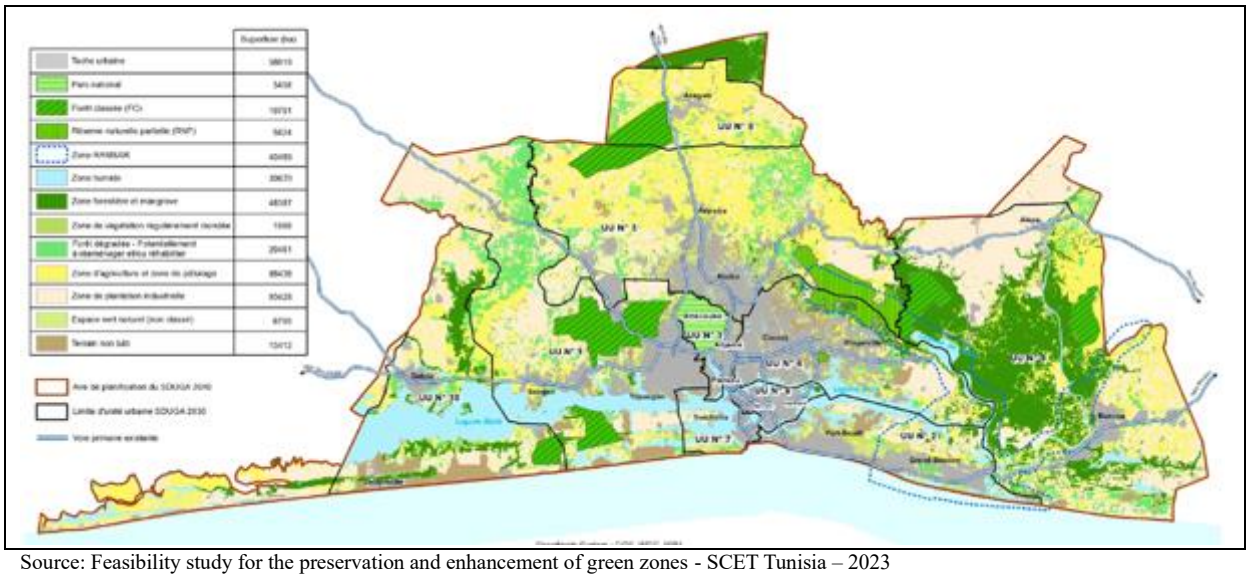
As far as the SDUGA is concerned, the current land-use pattern, updated to 2022 by the JICA-commissioned team, reveals different types of natural land-use (see figure 6.3.7): these are essentially blue and green belts, as well as agricultural areas, which urbanization should impact as little as possible through appropriate measures.

The analysis of these natural occupations was refined in 2023 (see figure 6.3.8) by the SCET-Tunisia design team as part of the feasibility study for the project to preserve and enhance the green zone of the Greater Abidjan Urban Master Plan (SDUGA), financed by the PACOGA project (World Bank). This work identified land-use typologies.



Source: JICA Project Team

Figure 6.3.7 Current land use in Greater Abidjan



Source: Feasibility study for the preservation and enhancement of green zones - SCET Tunisia – 2023

Figure 6.3.8 Distinguishing between urban land use and different types of natural areas

The 2nd day therefore provided an opportunity to discuss these various points of attention which emerge from the formulation of the SDUGA-2040, and whose challenge will be their implementation within the framework of future PUd. During the day, the JICA expert developed a summary presentation to reintroduce the issues relating to the preservation of natural environments, and then led a working session on an area that crystallizes these different issues: the RAMSAR zone of Grand-Bassam.

Part 1: Introduction to the challenges of preserving natural environments

By juxtaposing the 2 MOS maps with the SDUGA 2024 PCOS map (see figure 6.3.2), a number of

issues emerge concerning the protection and preservation of natural areas and sensitive ecological zones. These were the subject of a presentation by the JICA expert, followed by reactions/comments from participants, summarized in the table below.

Specifically, then, the unprotected natural environments that could be impacted by urbanization if they are classified as buildable urban zones by the SDUGA and the PUDd are :

- degraded forests and forest and mangrove areas, i.e. areas that are currently forested and provide ecosystem services to the natural and human environment;
- unclassified natural green spaces, which can be characterized as residual vegetation cover in and around the city;
- regularly flooded vegetation zones, which can be characterized as low-lying areas (hydraulic basins, valley bottoms, talweg) generally used for stormwater runoff, within an overall watershed, and often bordered by more or less steep slopes (slope breaks, gullies). It should be possible to identify these zones precisely by means of a topographical (DTM), hydraulic (rainfall calculation) and vulnerability analysis, often undertaken as part of a Master Drainage Plan;
- areas used for farming (crops, livestock) or industrial plantations.

Ultimately, therefore, given the challenge of urbanization and the categorization of the territory as an Urbanizable Zone by the SDUGA and PUd, natural areas that are not protected by regulatory tools could therefore be the subject of special treatment under the SDUGA and PUd by classifying them :

- or in a ZAD (Zone d'Aménagement Différé), defined by the SDUGA and to be recognized by the PUd;
- or in classified and protected areas, as specified by the PUd: public hydraulic domain; private State domain (classified forests); Sensitive Ecological Zone (ZES). The SDUGA was unable to meet the challenge of preserving these sites, because the scale of the SDUGA maps was too large;
- or in Urbanizable Zones if urban sprawl justifies it, but with development conditions that respect the green fabric, the presence of vegetation, rainwater runoff and soil sealing. This aspect will have to be clarified by the PUd, which operate on a smaller scale;
- or as urban green spaces to protect any forest residues: at this scale, even the PUd is not precise enough, and prescriptions should be drawn up to ensure that they are taken into account in development and subdivision operations, particularly if Administrative Reserves for Green Spaces are to be set up

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Table 6.3.2 Comments by the Participants on MOS and PCOS

Types of zones shown in the MOS and PCOS	Comments
● protected areas recognized by national regulatory tools as being in the private domain of the Ivorian State (classification decree, demarcation by demarcation), which should de facto be considered as unbuildable natural areas in urban planning documents: ✓ national parks ; ✓ classified forests ; ✓ partial nature reserves (RNP).	● Protected (non-urbanizable) perimeters in the PUd zoning plan and regulations ● A "Green Zones" study formulating specific recommendations for implementation: monitoring the implementation of these recommendations by the relevant players: DAA, MEF, OIPR, SODEFOR, Ministère de l'Environnement and other environmental agencies under their authority. ● Update of regulatory limits and effective implementation of SPREF (Stratégie de Préservation, de Réhabilitation et d'Extension des Forêts) guidelines to protect and enhance forest areas (SODEFOR + OIPR): ✓ Banco National Park: updated regulatory boundaries ✓ Anguededou classified forest: regulatory limit updated and incompatible activities relocated ✓ Audoin classified forest: forest reinforcement ✓ N'Guéchié classified forest: precise demarcation by regulation and forestry reinforcement ✓ Bébasso classified forest: precise delimitation by regulation ✓ Comoé 2 classified forest: precise delimitation by regulation ✓ Dalhiafleur partial nature reserve: shallow reforestation ✓ Aghien partial nature reserve: total protection from urbanization, and limitation of upstream effluent pollution ● Implementation and monitoring procedures need to be included in the SDUGA and the various PUd frameworks, in particular to promote advocacy for access to new financing ("green finance") and strengthen the role of MEF - SODEFOR - OIPR. ● It is important to set deadlines for these approaches, and commitments on the part of these players, otherwise it is highly likely that nothing will get done.
● **zones recognized by a new regulatory status relating to sensitive ecological zones - ZES** (Decree no. 2021-583 of October 06, 2021 setting out the terms and conditions for the management and use of sensitive ecological zones). SEZs have never been operationalized, and the SDUGA and the PUd will be the 1ers planning documents to respect this status.	● Since no zone has yet been designated an SEZ, SDUGA has proposed 5 perimeters, which were validated by MCLU when the PCOS was formulated. ● The MEF, OIPR, SODEFOR, Ministry of the Environment and other environmental agencies under its authority welcome the MCLU's recognition of certain natural areas to be protected from urbanization. ● the operationalization of the SEZs still raises questions: what recognition in the PUd? a proposal to classify these perimeters as part of the State's private forest estate in order to make them more secure? ● What is the timeframe? What commitments are required from the relevant players? These implementation and monitoring procedures need to be included in the SDUGA and the various PUd frameworks.

● **natural areas not recognized by national regulatory tools, but which complete the Grand-Abidjan Green Grid** and whose challenge would be to preserve ecological corridors for the preservation of flora and fauna in the face of urbanization (thus classifying them as unbuildable or conditionally buildable): ✓ non-classified forests with no regulatory protection tools (decree); ✓ Grand-Bassam RAMSAR zone, which has no national regulatory status; ✓ areas of forest or shrub residue ; ✓ lagoon mangrove areas or hydromorphic agricultural development zones.	● The consultants in charge of the PUd will need to do more detailed work, particularly in the Jacqueville (unit 10), Grand-Bassam (unit 2) and Bonoua (unit 9) areas; ● The MEF and the department in charge of managing RAMSAR zones point out that mangroves and swamps represent rich ecosystems of great ecological value, helping to mitigate the effects of climate change. Even if they are not protected by law, these areas should ideally be protected in urban planning documents. ● To be concrete, the JICA Consultant recommends that these zones should : ✓ be clearly identified and classified as non-constructible areas; ✓ The remainder, based on an analysis of climatic and flooding risks, could be constructible under certain conditions (houses on stilts, ground floor height, large plot and very low ESC, development project accompanied by an ESIA, etc.). ● for non-classified forest areas, MEF reiterates its desire to develop urban agroforestry areas in line with the SPREF. To this end, the JICA Consultant recommends : ✓ to identify them and classify them as non-constructible spaces by integrating them into the State's private domain; ✓ that the PUd classify them as Public Green Spaces within an urban zone, to turn them into an urban park, preserving the existing forest footprint as far as possible.
● wetlands, which are in a way the Blue Fabric of Greater Abidjan, i.e. : ✓ the entire aquatic environment (sea, lagoons, rivers), which comes under the Domaine Public Naturel (DPH, DPL, DPM), inalienable and protected according to the principles of public utility easements laid down by law;	● The MEF and the Department in charge of managing RAMSAR zones recall that the Ramsar Convention was ratified by the State of Côte d'Ivoire in 1996. These are wetlands recognized for their international importance in terms of their biodiversity and the services they provide to human populations. Installation by decree (2004) of a National Ramsar Committee comprising government authorities, researchers, academics and heads of non-governmental organizations (attached to the Direction de la Faune et des Ressources Cynégétiques). The Grand-Bassam RAMSAR area covers 402.1 km2 within the SDUGA perimeter. ● the MEF and the department in charge of managing RAMSAR zones point out that RAMSAR status is not recognized by Ivorian regulatory instruments, and that there are no legal constraints on urbanization. ● The participants therefore wondered how this zone could be classified, according to a specific allocation. MEF informed the audience that the Ivorian government is seeking to develop a regulatory tool to protect/recognize RAMSAR zones from development. In this context, it will be important for the MEF to work closely with the MCLU to develop the land use conditions of the RAMSAR perimeter. ● The MCLU points out that it is currently seeking to harmonize the special requirements of the PUd of the 4 urban units affected by the RAMSAR zone (UU 2-3-4-9).

✓ possibly additional protection perimeters (depending on flood risks) which will be considered as unbuildable or buildable under certain conditions, depending on the results of a vulnerability study and the PUd's prescriptions; ✓ and also, among these wetlands, the RAMSAR zone of Grand-Bassam, which has no national regulatory status, and the mangrove areas already mentioned above, which may be swamps that can be classified as non-constructible or constructible under certain conditions.	

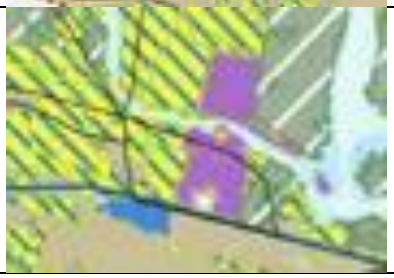
Source: JICA Project Team

Part 2: Group work to reflect on specific land-use conditions in the RAMSAR zone

For 2-3 hours, the JICA expert and the participants were able to work in groups to reflect on the specific land-use conditions of the RAMSAR zone, conditions that could be transcribed in future PUd concerned by the RAMSAR zone (UU 2-3-4-9). For 1 hour, participants exchanged their ideas and opinions in 4 groups. The recommendations were then presented by a group leader, followed by a discussion.

These groups were able to draw up their recommendations for the 4 types of area concerned by the RAMSAR perimeter, shown as a green dotted line on the PCOS-SDUGA 2040:

Table 6.3.3 Zone Typology and Current Occupancy of the Ramsar Wetland Area

Zone typology according to PCOS	Graphical representation on the PCOS	Current occupancy (satellite image)
Protected areas : - Public domain DPL-DPH - Protected areas (RNP Lagune Aghien; FC N'Guéchié) - Non-urbanizable areas declared as SEZs - Non-urbanizable zones declared as ZADs		
Already urbanized areas : - Urban center of Grand-Bassam and Yaou-Bonoua - Villages along the Comoé River and the Ebrié-Potou-Aghien lagoons (e.g. Ebrah, Eloka, Akandjé, Mbato-Bouaké)		
Urban areas already subdivided (but not developed) and new areas open to urbanization (yellow, green hatching) - Abouabou, CNRA, Mafiblé, Vitré 1&2, Vitré Island		
Polarized equipment zones (blue) and economic activity zones (mauve) - VITIB + VITIB extension on Vitré island		

Source: JICA Project Team

Table 6.3.4 JPT's Proposal and Participants' Feedback on the Management of the Ramsar Wetland Area by Zone Typology

Zone typology according to PCOS	JICA consultant's opinion	Summary of participants' opinions
Protected areas : - Public domain DPL-DPH - Protected areas (RNP Lagune Aghien; FC N'Guéchié) - Non-urbanizable areas declared as SEZs - Non-urbanizable zones declared as ZADs	● Think of functions that could be accepted: ✓ Farming and fish farming ✓ Open-air/traditional hotels (e.g. Domaine Bini) ✓ Sports and leisure areas, ecotourism: botanical garden / eco-educational trail; open-air bar / maquis; vitaa / health trail; walking and cycling trail; acrobranch course; paintball. ✓ Development: hiking trail, wooden pontoon for pinasse / pirogue access? Access to lagoon transport? If so, what type? ● Formulate total bans: quarries, garbage dumps and wastewater treatment plants ● Prohibit any land use that is not intended to enhance or restore the preserved natural area: ✓ Residential buildings prohibited ✓ Existing traditional buildings ✓ Buildings for craft or commercial use accepted ● Authorize, insofar as their occupation does not adversely affect the quality of the landscape or the biodiversity of the land and subject to proper integration into the site: ✓ Parking areas, fences, janitor buildings (...) if perfectly integrated into the environment? ✓ Criteria such as height, footprint, distance between buildings or setbacks from public roads? ● Propose other actions to protect and safeguard ecologically sensitive environments, sites and landscapes.	● Generally speaking, the MCLU is very uncomfortable with defining special conditions of occupation for these protected areas, considering that tolerating uses can lead to numerous abuses by local populations. ● The MCLU considers that this is a matter of very specific conditions that may be dictated by the consultants in charge of PUd, but draws the audience's attention to the application of these prescriptions ● The MCLU believes that some of these provisions, even if they do not exist on the PUd, are applied by protected area managers (e.g.: construction of a SODEFOR or OIPR service building in classified forests or nature reserves, with parking, etc.). ● On the other subjects relating to the use of these protected areas for leisure and outdoor activities, participants unanimously agreed that it was not necessarily necessary to include this in the PUd (management / use). ● The JICA Consultant responded by reiterating that it would be interesting for the PUd to formalize certain principles in the regulations, without going into too much detail to avoid being counterproductive.
Already urbanized areas : - Urban center of Grand-Bassam and Yaou-Bonoua	● Recognition of the "protected" character of traditional villages? Registration of the Gd-Bassam heritage and historical preservation perimeter (UNESCO) in the PUd.	● Generally speaking, participants agreed on the need to introduce quality regulations to preserve the traditional character of certain villages or the historic town of Bassam, in particular through landscape and ecological approaches.

- Villages along the Comoé River and the Ebrié-Potou-Aghien lagoons (e.g. Ebrah, Eloka, Akandjé, Mbato-Bouaké)	● Special planning regulations for public infrastructure areas ? Pavement design ? Revegetation ? Street lighting ? Street furniture charter ? ● Densification objective accepted? Or preservation of existing character? ● Willingness to respect alignments and epannelages to create uniform building fronts? Shopping arcades and other specific features? Implementation of party walls? ● What are the conditions for building on existing private plots?	● But in concrete terms, how will this be achieved within the PUd framework? Participants stuck to generalities and did not raise the possibility of classifying these perimeters with a specific zoning (e.g. ZUT / Traditional urban zone). This question will have to be addressed by each of the consultants in charge of PUd. ● The UNESCO zone of Grand-Bassam is unequivocal, and participants are particularly concerned about how to implement the PUd prescriptions: this requires public and private funding (owners, foundations) to carry out urban renewal operations and preserve public and private buildings.
Urban areas already subdivided (but not developed) and new areas open to urbanization (yellow, green hatching) - Abouabou, CNRA, Mafiblé, Vitré 1&2, Vitré Island	● What functions are authorized and prohibited? Obligation to carry out a topographical and hydraulic study for subdivisions in order to define non-constructible perimeters (blue/green fabric/ecological corridors)? Should an ESIA be attached to the development project? ● Rules for the development of public roadways (valleys, absorbent pavements, etc.), hydraulic basins, the development of public spaces, etc. ● What urban forms and types of housing should be promoted? Should we focus solely on medium-to-high-rise housing? ✓ Individual or collective housing? ✓ Low or medium density (low CES) to increase soil permeability? What impact on setbacks? Acceptance of joint ownership? ✓ Introduction of an open-ground coefficient? Greening rules? ✓ Building form - height (ground floor, multi-family?) ? Orientation and energy-efficient construction ? Use of PV? ✓ Generalized use of crawl spaces under houses (BA stilts?) ✓ Wastewater treatment: no collective network if no WWTP in the area? septic tank sizing? ● Or should we plan several urban forms with different densities?	● Generally speaking, the participants agreed that a vulnerability study should be carried out on areas that have been developed but are not occupied because they are subject to flooding. It's necessary to recreate linear stormwater flows, and therefore free up rights-of-way. ● The MCLU pointed out that there are already subdivisions in these areas that have not been approved by the Ministry, and that the State therefore has full power to develop them as it sees fit. ● the JICA consultant and some of the participants pointed out that there are also de facto owners, some of whom have legal papers. So the question is far from obvious... ● Generally speaking, the participants agree with the principles of the special requirements mentioned by the Consultant, but it will be up to the PUd consultants to confirm them and include them in the regulations. ● As already mentioned, the participants felt that it would be possible to impose these specific requirements (low floor area, open-plan ratio, built on concrete stilts) for medium- to high-end housing, but that this would be more complicated for low-income housing.

	• Bioclimatic construction rules for local public buildings (schools, health centers, markets): specific materials/energy approach?	• As a result, are these zones intended to be only medium-high standing areas?
Polarized equipment zones (blue) and economic activity zones (mauve) - VITIB + VITIB extension on Vitré island	• What functions are permitted and prohibited? Generalize the principle of eco-parks like VITIB (new technologies, information, tertiary services)? • Tolerance or not of logistics activities (storage, warehouses, deliveries) and other commercial activities (including crafts?) that may generate vehicle flows and solid waste collection requirements? • Prohibit all or some of the industrial processing activities that can generate pollution? Ban quarries and other extraction activities? Prohibit wastewater treatment facilities (WWTP? intermediate waste transit center?) • Generalize the principle of requiring an ESIA for all development projects: more precise definition of exploitable surfaces and surfaces to be kept bare (limiting the need for hydraulic structures, development of retention basins)? • Rules for the development of public roadways (turning lanes if access for heavy goods vehicles, passage for public transport buses: dedicated lanes, etc.). Rules for parking areas for customers/employees/users (valleys, absorbent pavement, other surfacings, etc.). Promotion of vegetation on undeveloped areas? • Acceptance of housing in the equipment or activity zone: linked to site operations? • Specific rules for buildings: maximum height? light colors (albedo)? obligation to install photovoltaic roofs? rainwater recovery for internal use?	• Generally speaking, the participants agreed with the principles of the specific prescriptions mentioned by the Consultant for the economic zones, but it will be up to the PUd consultants to confirm them and include them in the regulations. • The participants then stuck to generalities and did not want to discuss a few management details that go beyond town planning: photovoltaics, access for heavy goods vehicles, parking, etc. These subjects are too technical to be discussed in detail. These subjects are too technical • According to MCLU, the areas concerned are already considered ecoparks by VITIB, so the principles will de facto be applied. • ANAGED informs that in the Grand-Bassam area, a project to build an intermediate transit center is underway, while solid waste storage should be limited. A point of attention has therefore been identified by the stakeholders: it will be necessary to limit the negative impacts of this project as much as possible.

Source: JICA Project Team

6.3.6 Conclusion

During the 2 days available, the workshop took place in a cordial atmosphere conducive to reflection and exchange on the issues of vulnerability of the Greater Abidjan region to climate change and natural hazards, and the consideration of natural and ecologically sensitive areas in urban planning documents (SDUGA + PUd).

In addition to training and raising participants' awareness of the cross-cutting environmental issues that concern them as development professionals and as residents of Abidjan, the workshop enabled these players, with their different sensibilities ("planners vs. environmentalists"), to exchange views on the environmental issues facing their territory. But it also confirmed that everyone is concerned by these issues, because it's all about preserving "Mother Earth" for themselves and for future generations.

The workshop brought together professionals from a variety of backgrounds, either working in administrations to develop and implement public policies, or in operational departments to implement projects (UGP PARU).

The workshop was also attended by the World Bank, 1st contributor to urban and climate projects in Abidjan. Inter-donor coordination is a major challenge for Abidjan, if environmental and climate issues are to be addressed in a comprehensive and coherent manner. The rapprochement between JICA and the World Bank (and, by extension, other contributors to urban projects: AfDB, AFD, etc.) is therefore a very good signal for public aid to the Ivorian government.

During the workshop, consensus was largely reached between all these participants, and the challenge now is for them to act at their own level on the transposition of certain measures within the framework of their activities:

- directly via the operationalization of the SDUGA, the formulation of PUd and then development (subdivision) and/or urban infrastructure (construction) operations. This responsibility is mainly assumed by the MCLU and the other stakeholders associated with the SDUGA: AMUGA, DAA and Communes;
- indirectly via all related activities concerning urban management, urban service management (notably rainwater, liquid and solid sanitation) and the management/preservation of protected natural areas (implementation of the recommendations of the "Green Zones" study by MEF - SODEFOR - OIPR).

Chapter 7 SDUGA 2040 Effectiveness Enhancement Measures

7.1 Overall Activities and Outputs of SDUGA 2040 Effectiveness Enhancement (OUTPUT 2)

7.1.1 OUTPUT-2 Framework

OUTPUT-2 of the SDUGA Operationalization Project (the Project) involves Activity 2-1 for review of the formulated PUd[1]expected to be undertaken by the three projects for the urban improvements in Greater Abidjan. Based on Activity 2-1, their measures and schemes were examined and are recommended as Activity 2-2 of OUTPUT-2.

During the course of the Project, the component of the detailed urban plan (PUd) formulation by three projects of PTUA[2], PACOGA[3], and PARU[4] has been delayed, therefore, the activity for review of PUd has been affected due to the untouched or incompletion status of PUd formulation. As a result, only one PUd by PTUA has been nearly finalized by the end of 2022. Coping with those conditions, the scope for Activity 2-1 was modified officially through the Minutes of Meeting. In addition, all PUds (PTUA, PACOGA and PARU) are expected to be approved in 2025.

7.1.2 Activities and Outputs of OUTPUT-2

Based on this framework, OUTPUT-2 has implemented the following activities and outputs taking into account the development of enhancement measures of SDUGA by two stages of urban planning stage (SDUGA 2040 and PUd formulation) and application stage of the plans (SDUGA and PUds) as listed below and shown in Figure 7.1.1.

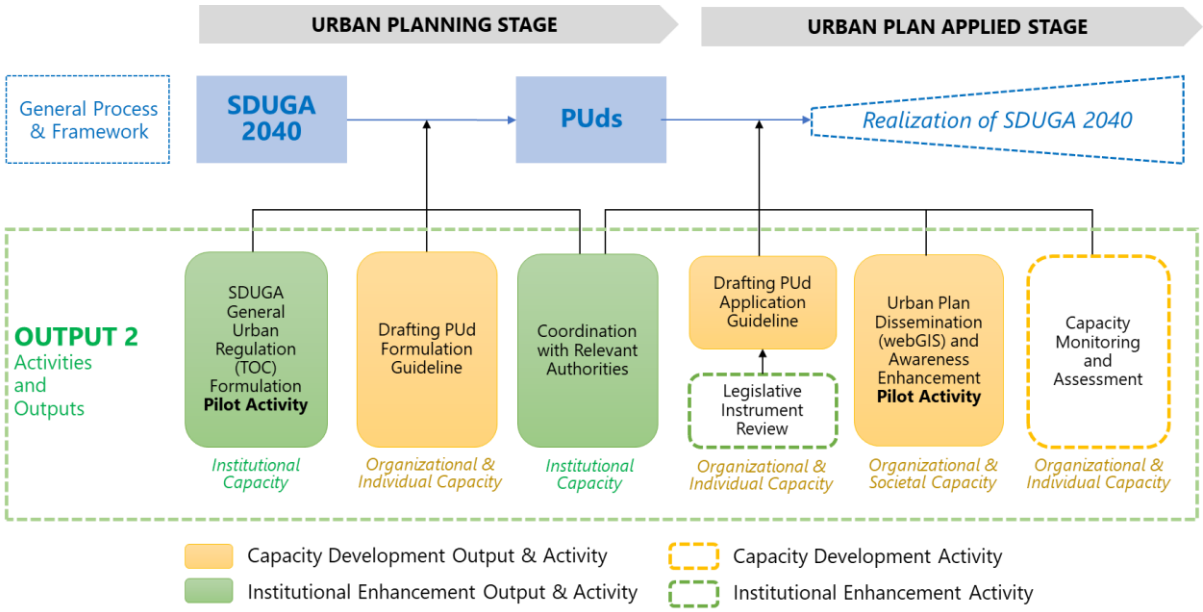
<u>For Urban Planning Stage</u>

- Drafting PUd Formulation Guideline
- Pilot Activity: Formulation of Table of Contents of “General Urban Regulation” for SDUGA 2040
- Activities on necessary coordination with relevant authorities and capacity monitoring and assessment

<u>For Urban Plan Application Stage</u>

- Drafting PUd Application Guideline
- Pilot Activity: Establishment of WebGIS platform for ICT-oriented Information Dissemination on Urban Plans
- Activities on necessary coordination with relevant authorities and capacity monitoring and assessment

[1] Plan d'Urbanisme de détail
[2] PTUA: Projet de Transport Urbain d’Anidjan (funded by AfDB, implemented by AGEROUTE)
[3] PACOGA: Projet d’Appui à la Compétitivité du Grand Abidjan (funded by WB, implemented by AMUGA)
[4] PARU: Projet d’Assainssement et de Resilience Urbaine (funded by WB, implemented by MHAS)



Source: JICA Project Team

Figure 7.1.1 Activities and Outputs of SDUGA 2040 Effectiveness Enhancement (OUTPUT 2)

7.2 SDUGA 2040 General Urban Regulation

7.2.1 Rationale

This activity to formulate "Table of Contents for SDUGA 2040 General Urban Regulation (TOC-RGU)" was implemented as one of the pilot activities to enhance the project Task Force Members` (TFMs) capacity in urban management and control for SDUGA 2040 by an intensive training program to nurture an understanding of the contents and the way of general regulation formulation of SDUGA-2040. The background for the selection of this pilot activity and the objectives are described below.

- The Urban Code (Law 2020-624: Article 23) stipulates that General Urban Regulation (RGU) is required to be formulated as one of the planning outputs of SDU and PUD. RGU has not been developed yet as a legitimate document for SDUGA 2030 (SDUGA-1) till now.
- The zoning regulation in the current PUd formulation under the Bank's projects in Greater Abidjan has to be formulated by each PUd without a common or general regulatory framework for Greater Abidjan. This situation may lead to discrepancies between the basic regulations in each PUd. Local conditions could be reflected in each PUd within a common framework provided by RGU.
- TFMs suggested SDUGA 2040 needs to contain a RGU (General Urban Regulations) which may be one of the conditions for the approval of SDUGA 2040.
- The urban control and management are one of the essential elements for the implementation of SDUGA 2040. It is required to enhance the administrative capacities to daily deal with urban development issues in Greater Abidjan. Capacity development on legal works should be promoted and enhanced as an essential tool to undertake legitimate administrative actions of urban control and management.
- To cope with rapid changes of urban development and its issues, administrative capacity for urban control and management is required to be improved constantly in a sustainable manner. This program is expected to be a trigger and contribute to the establishment of a legal works capacity development system in the urban planning and management sector.

7.2.2 Implementation of Pilot Activity

(1) Activity program of pilot activity for formulation of TOC-RGU

1) Target group and program method

The target groups were composed of TFMs (18 members), five advisors for the formulation of TOC-RGU (mainly Councillors of Minister-MCLU) and two additional members from BNEDT (National Office of Technical Studies and Development) as substitutes for some TFM members.

The program was conducted during 24th October ~ 26th October, 2023 by the intensive three (3) days training program including lectures, drilling the formulation of TOC for RGU, presentation and assessment, and group discussion for selecting the best proposal.

2) Program module and themes

- Module1: Introductory lectures about legal aspects on urban control and management and discussion on urban control and management issues in Greater Abidjan
- Module 2: Group work for drafting a TOC of RGU per group and presentation and assessment to select the best
- Module 3: Finalizing a draft of TOC for RGU and formulating an Action Plan

Table 7.2.1 Three Days' Program by Modules (24th~26th October 2023)

Module	Theme	Program Theme and Activities	Activity Method	Responsibility
Module 0 (Before 23rd October)	01 Homework	0-0 Preparation homework on list making of relevant legislation for urban control and management by TFMs	Research	JPT
	02 Program Orientation	0-1 Program schedule	Facilitation	JPT
		0-2 Program activities & requirement		JPT
Module 1 (24th October, 2023	11 Introductory Lectures	1-1 A legal approach to urban issues	Lecture	Legal (L-) Expert or/and JPT
		1-2 Legal challenges in Greater Abidjan		L-Expert or/and JPT
		1.3 Real estate development and legal practices in GA		L-Expert or/and JPT
	13 Discussion and Presentation	1-4 Group Discussion for SDUGA 2040 with required legal enhancement issues	Exercise	JPT
		1-5 Presentation for required legal enhancement		L-Expert or/and JPT
Module 2	20 Group Work	2-1 Group work for making a draft of Table of Contents for RGU	Exercise	JPT
		2-2 Presentation of each draft by the groups with L-expert advices		L-Expert or/and JPT
		2-3 Discussion and assessment to select the best draft	Discussion and building consensus	L-Expert or/and JPT
Module 3	31 Group Work	3-1 Group work for reviewing the selected draft of Table of Contents for RGU for improvement	Exercise	L-Expert or/and JPT
	32 Discussion	3-2 Validation session of the final draft of Table of Contents for RGU	Discussion	MCLU(DG/DU)/JPT/ L-Expert
	33 Group Work	3-2 Orientation of formulation of Action Plan for the further activities	Facilitation	JPT
		3-3 Plenary discussion and drafting an Action Plan for a statutory RGU formulation	Exercise	JPT
Wrap-up	Closing remark	WU-1 Wrap-up of the result and achievement of the training workshop	Administration	JPT
	Questionnaire	WU-2 Training result self-assessment		JPT
	Certificate	WU-3 Conferment of Certificate for Training Program		JPT

Source: JICA Project Team

(2) Results of pilot project for formulation of TOC-RGU

1) Module 1 Program: Panel Discussions on Urban Planning and Development and its Legal Issues

The program of Module-1 aimed at stimulating discussions on urban planning and development and their legal issues through "panel discussion" as an introductory activity. Three lectures were given by three experts, Mr. Jerome Chenal (JPT), Mr. Roland Bini (Private Advisor of MCLU) and Mr. Chales Akrong (Lawyer for Real Estate Business).


Lecture by Mr. Jerome Chenal


Lecture by Mr. Roland Bini


Lecture by Mr. Charles Akrong sitting on the corner of the desk

2) Module 2 Program: Three Group Works for formulating each TOC-RGU of SDUGA 2040

The Module-2 program aimed at formulating the table of contents for General Urban Regulations (TOC-RGU) by group work method as the most important module in the three-day program. Three groups (A, B, and C) composed of Task Force Members and advisors formulated their TOC-RGUs by applying a popular workshop method of posting cards on a big sheet of paper on the wall (Post-it method) and discussions.


Group Work by Group A


Group Work by Group B


Group Work by Group C


Plenary discussions on outputs by the post-it presentation by each Group Work through presentation by a representative of the groups

3) Module 3 Program: Drafting TOC-RGU through validation and its Action Plan

The Module-3 aimed at drafting the TOC-RGU as an integrated contents of three propositions by the group work and validating the draft through plenary discussions. The participants formulated a preliminary action plan to materialize TOC-RGU. In the end of the program, the certificates of the program completion for all participants excluding JPT members were awarded


Plenary discussions on the drafting TOC-RGU


Ceremony for Certificate Award


Plenary photo session for the program participants


Ceremony for Certificate Award

(3) Training post-assessment of the training program

During the program, daily post-assessments by participants were conducted by the questionnaire. Accordingly, the majority of participants assessed positively three days' program. Actually, the participants shared that their participation and involvement were very active in the program and the content and exercises used in training helped them understand the topic and its significance. Other factors such as time allocation and topics covered during the training were well-received by the participants.

Especially Module 2 was evaluated with higher appreciation because of an essential part of the three day's program to formulate the TOC-RGU by the group work of all participants involvement, although several participants commented more time was needed to formulate TOC-RGU and discuss it.

7.2.3 Lessons Learnt

This pilot program was carried out as one of the capacity development programs to improve the operationalisation of SDUGA in the final stage of the formulation of SDUGA 2040. Considering the requirement of the Urban Code (Article 12) through the twin outputs of an SDU report and a General Urban Regulation, this output of the draft Table of Contents of the General Urban Regulation (TOC-RGU) and the involvement of the participants would become a strong trigger to enable the promotion and establishment of the RGU for SDUGA 2040. Through observation of their draft TOC-RGU and action plan, the following considerations for further activities are itemized as a preliminary recommendation for RGU formulation.

1) Basic considerations in drafting RGU

<u>Defining the roles of RGU</u>

A general urban regulation can be defined as principles and norms with specific measures to implement an SDU (SDUGA 2040) by guiding and controlling various planning and management activities under the SDU framework towards its appropriate achievement. From this point of view, RGU could include not only regulations but also core implementation policies and strategies to ensure the implementation

of the SDU.

Greater Abidjan Context

The physical and socio-economic character of Abidjan is an essential backbone for the urban planning and management of Greater Abidjan. It is the economic capital and largest city of Côte d'Ivoire, located on the southern coast of the country. The long coastline with an intricate plateau as one of the strong physical environments and highly dense urbanization area with commercial and business accumulation and ports and transport networks are the essential features to be considered in the rules and management for their protection and promotion.

Providing common rules for PUd formulation including regulatory plan

In Greater Abidjan, the MCLU has currently made efforts to establish PUds through urban projects funded by the banks (World Bank and AfDB). Unfortunately, they are being developed without specific guidelines to guide the appropriate formulation of PUds in each urban unit of the area for SDUGA. In particular, the separate formulation of PUds by each project faces difficulties in formulating common rules or regulations in an integrated manner under SDUGA. Common rules and regulations such as parking requirements, infrastructure easements, etc. can be established in an RGU to ensure the efficient application of regulations to all relevant planning and management in Greater Abidjan.

2) Technical considerations in drafting RGU

Basic technical standards and norms to be applied in physical planning as common regulations

Competent physical planning requires the adoption of appropriate technical standards and norms for the planning of infrastructure networks, taking into account their necessary land provision through rules of expropriation or easement on the ground where settlement or socio-economic activities are supported by infrastructure services. RGUs would play an important role in helping people (not only planners and engineers, but also ordinary citizens) to understand and cooperate with implementation. The standard for infrastructure, however, should be prepared in each sector for the entire country rather than included in RGU.

Zoning rules in RGU as a core planning element of PUd

Zoning with the application of urban regulations is one of the most important roles in the formulation of PUd as an implementation tool of SDUGA. Under the current circumstances without common norms and rules in Greater Abidjan, the common rules for any zoning works of RGU would play an important role in guiding their formulation and achieving efficient management in terms of standard zoning classification, rules of urban form regulations, building or land use norms by type of use, etc. to fit the Abidjan context.

Necessary rules addressing contemporary urban agenda to be defined in RGU

In particular, contemporary urban agendas such as climate change, disaster risk management, transit-oriented development and participatory planning measures (e.g. SEA) have become indispensable planning elements to be treated as essential norms in any development planning and management, especially in Greater Abidjan. Although these approaches can be included in the terms of reference of a project, the RGU for Greater Abidjan would play an important role in guiding relevant plans and projects as inescapable requirements.

Important application rules for non-conformity to control regulations

The management of out-of-rule cases, including exceptions or deviations, becomes one of the challenges of urban control and management for administrative authorities. Variance, in the context of zoning regulation, refers to an exception or deviation from the standard land use regulations and restrictions imposed by the local zoning plan of the PUd. When zoning regulations are implemented by local governments to control and guide the development of land and buildings in a community, RGU could play an important role in managing such exceptions and deviations in land use variance (e.g. commercial activities in residential areas), in dimensional variance with the required approval by a specific review

organization (e.g. committee).

7.2.4 Proposed Draft Table of Contents of General Urban Regulation (RGU) for SDUGA 2

Through a three-day pilot activity, the table of contents of the General Urban Regulation (RGU) for SUDGA 2 was drafted through review and discussions among participants. Further improvements and refinements are required to establish the RGU, but it is expected that this draft will serve as a starting point for future concrete development of the RGU. This draft consists of six "Titles", each of which defines planning standards for PUd formulation, matters to be considered in sector planning, and basic or common matters to be handled in Zoning. The following Table 7.3.2 shows the structure of the RGUs and their itemization.

Table 7.2.2 Proposed Draft "Table of Contents" of General Urban regulations for SDUGA 2

Category	PUd Formulation Guidelines
TITLE 1: General Provision	1.1 Purpose and scope (application, territory, definitions and terms)
	1.2 Legal and regulatory framework
	1.3 Governance
TITLE 2: Provisions Common to all Zones	2.1 General information for the public domain
	2.2 Transport and mobility
	2.3 Water, sanitation and drainage
	2.4 Energy and telecommunication
	2.5 Public facilities
	2.6 Protection of historical, cultural and architectural heritages
	2.7 Advertisements and signs
	2.8 Addressing new urban agenda in Greater Abidjan
TITLE 3: Specific Provisions	3.1 Zoning provisions
	3.2 Protection areas use classification and controls
	3.3 Urbanized area use classifications and their controls
	3.4 Urban planning standards and norms
TITLE 4: Governance	4.1 Urban management governance structure
TITLE 5: Control and Sanctions	5.1 Responsible organizations and urban surveillance
	5.2 Building control and permit and its reorganization
	5.3 Specific planning and building consent
TITLE 6: Final Provisions	6.1 General planning approval process
	6.2 Publication and dissemination of documents
Appendices	A.1 Classification of zones
	A.2 Typical graphic standards and deliverables
	A.3 PUd terminology

Source: JPT (JICA Project Team)

7.3 PUd Guidelines

7.3.1 Rationale

1) Background and objectives

PUd formulation has been carried out to be applied to ten (10) Urban Units (UUs) in the Greater Abidjan as one of the components of three Banks' urban improvement projects (PTUA, PACOGA, and PARU). Each component of the PUd formulation for 10 UUs has a different implementation schedule, and their time-tables have also affected the PUd formulation.

The PUd guidelines are one of the concrete deliverables of OUTPUT-2 activities, which was not

stipulated in the original Record of Discussion (RD/October 2020), but added later with the modification of RD (August 2022) and the Project Design Matrix (PDM). The following are the objectives of the expected PUd guidelines to be formulated in this project.

- To strengthen the function of PUd as one of the tools for effective implementation of SDUGA through appropriate guidance on the preparation and operation of PUd.
- To enhance the technical skills and capacities of relevant officers as supervisors (trainers of trainees) in PUd formulation and operation, who have a responsibility to guide and instruct appropriate PUd formulation and operation at the local level (Communes) in Greater Abidjan

2) Consideration

As Activity 2-1 of OUTPUT-2 aimed at reviewing the formulated PUd expected to be undertaken by the three urban improvement projects in Greater Abidjan, the completion of PUds was a precondition for the preparation of the guidelines. However, during the course of the project, only one PUd for UU6 (PTUA) was almost completed in time to formulate the PUd guidelines due to delays in the PUd formulation components of others (PACOGA and PARU). Therefore, the review of the guidelines was based on the PUd (UU6) where the planning area covers one of the urban centers of Greater Abidjan, although other planning areas in suburban and rural areas were taken into account where possible.

3) Guidelines needs assessment

PUd guidelines are expected to play an important role in enhancing the technical skills and capacities of relevant officials in the preparation and operation of PUd. The contents of the guidelines need to take into account the supportive roles in overcoming the weaknesses in the existing planning and management system. With this in mind, a needs assessment of the guidelines was conducted for the members of the Task Force (TFMs).

The assessment was carried out by means of a questionnaire survey to TFMs (response 9 out of 18 members), and the findings below were identified by the result of assessments on PUd guidelines formulation and capacity development.

- **Zoning and regulation skills as important parts to be enhanced:** The result of the assessment shows that the most important part in the PUd Guidelines is the section on "Zoning and Regulation", while it was one of the least experienced subjects in urban planning and management. Zoning and regulation works would play an essential role in PUd formulation. In the PUd formulation guideline, an understandable and attentive explanation needs to be considered.
- **Other skills to be enhanced in PUd planning elements:** The planning tools of Strategic Environmental Assessment (SEA) and participatory planning were found to be other elements with less experience and insufficient knowledge. They are the contemporary techniques in recent decades and one of the most important parts in PUd formulation.
- **Management skills in land management and public domain to be enhanced:** Land management, including subdivision development and securing the public domain for public facilities and infrastructure, was identified as the critical areas of urban management and control in Greater Abidjan. In addition, process management such as ACD[5] for land titles and enforcement, in addition to zoning and control, were identified as important parts of management.

4) A key framework of the guidelines

The formulation of guidelines composes of two guidelines of “PUd Formulation Guideline” and “PUd Application Guideline”. The contents and way of formulating guidelines highly depend on the operational conditions such as, who uses the guideline, where the guidelines are to be applied, and what the basis of the contents are. Table 7.3.1 defines the framework of the two guidelines. It should be noted

[5] ACD: Arrete de Concession Definitive (Definitive Concession Order)

that these guidelines may involve desirable tasks or activities to supplement the existing legislative documents.

Table 7.3.1 Operational Framework of the Guidelines in the Greater Abidjan Area

Category	PUd Formulation Guidelines	PUd Application Guidelines
Objectives	• To show how to formulate a PUd by step-wise planning tasks with necessary planning techniques and considerations	• To guide key instruments for implementation of PUd showing standard tasks and steps to promote effective implementation of SDUGA
Target Users	• Officers of MCLU primarily • Regional Officers of MCLU	• Officers of MCLU • Relevant officers who manage and control urban development
Target Area Coverage	• Greater Abidjan area primarily • Applicable to outside of Greater Abidjan but necessary to be modified to fit with local context	• Greater Abidjan area and, • Outside of Greater Abidjan
Range of Description	• Contents are based on the Urban Code (Loi 2020-624) in principle. • Some improvements or recommended items under the urban code framework	• Contents are based on relevant legislations and rules of the government in principle. • Some improvements or recommended items concerning the legislation

Source: JICA Project Team

7.3.2 PUd formulation guideline

1) Structure of PUd Formulation Guidelines

The draft PUd Formulation Guidelines comprises five (5) parts excluding the appendices. Five parts are described below and Table 7.3.2.

- **PART 1: Introduction:** This part presents an overview of the background including the current status of PUd formulation and this SDUGA Operationalization project in terms of its needs, issues, government efforts, definitions, legislative context, etc.
- **PART 2: Challenges of Urban Agenda in Greater Abidjan:** This part is to direct required planning elements of PUd in Greater Abidjan to address the issues of weak development control and management, and the issues on global urban development agenda such as climate change adaptation, resilient city, etc.
- **PART 3: PUd Project Preparation:** As the beginning of planning activities of the PUd formulation including the administrative process, preparatory activities for the guideline's formulation are described such as organization, planning implementation organization, general procurement process, etc.
- **PART 4: PUd Development:** As the main technical part of the PUd formulation, technical texts based on the planning steps of PUd are described in eight steps from the data collection and surveys to the implementation plan formulation.
- **PART 5: Approval and Dissemination:** This part describes the administrative process for the statutory plan with the approval process, and management for their activities including publicizing the report and their dissemination to promote effective implementation of PUd.
- **Appendices:** This part covers technical and supplemental elements for the main parts of PUd formulation such as glossary, terminology of planning, outputs standard of maps, etc.

Table 7.3.2 Structure of the PUd Formulation Guidelines in Greater Abidjan Area

Category	PUd Formulation Guidelines
PART 1: Introduction	1.1 Background
	1.2 Roles and functions of Detailed Urban Plan (PUd)
PART 2: Challenges of Urban Agenda in Greater Abidjan	2.1 Addressing the urban control and management in Greater Abidjan
	2.2 Addressing new urban agenda in Greater Abidjan
PART 3: Preparation Work for the PUd	2.1 Project preparation
	2.2 Procurement process
	2.3 Administrative support for the implementation
PART 3: PUd Development	3.1 Survey and Data Collection
	3.2 Diagnosis of existing conditions
	3.3 Elaboration of development frameworks
	3.4 Strategic environmental assessment (SEA)
	3.5 Sector Plans
	3.6 Zoning plan (by-law draft)
	3.7 Considerations for the Implementation of the PUd
	3.8 Updating and modifying the PUd
PART 4: PUd Approval and Dissemination	4.1 General approval process
	4.2 Publication and dissemination of documents
Appendices	A.1 Classification of zones
	A.2 Typical graphic standards and deliverables
	A.3 PUd terminology

Source: JPT (JICA Project Team)

2) Key discussions on the draft of PUd Formulation Guideline

After drafting a PUd Formulation Guideline (PUd-FG), the technical workshop with TFMs was held in November 2023. During the workshop, JPT presented the draft PUd-FG and discussed the key areas that needed clarification with the TFMs. The main points of discussion are described below.

- **Period of planning works for a PUd formulation**: Although it would be necessary to take into account the lessons learned from the most recent PUd formulation (UU6: scope=8 months, outcome=24 months), the opinion suggested that a scope of work duration would be adapted to the level of requirements, the level of detail, the size of the study area and the availability of data, and the financial framework of the PUd project. However, in addition to this, a standard duration for a desirable scope of work needs to be established and an actual project may need to adapt based on variable conditions.
- **Appropriate validation committee members:** After a typical organizational presentation to the Validation Committee as part of the draft guidelines, based on the current performance of PUd projects (PTUA, PACOGA, PARU), TFM commented on the need to consider how to involve sector members at an early stage. In the explanation regarding the Draft Guidelines for the Formulation of PUd at the workshop with TFMs, it was mentioned that members from a wide range of sectors (e.g., medical and education-related) should be included and the need to select the necessary members as appropriate, taking into consideration important sectors based on the characteristics of the project.

- **Planning norms and standards for public infrastructure and facilities:** TFMs commented that planning standards for public infrastructure and facilities are dealt with on a case-by-case basis, sometimes referring to the cases of other countries, due to the lack of contemporary planning standards, such as an old dated standard by BNETD not in use (November 1998). To address the issue of the lack of unified or comprehensive planning standards for infrastructure and public facilities, it is desirable (due to the nature of facility planning standards, to which many institutions are also related) to develop a separate comprehensive collection of planning standards or other systematic document by each sector, while the PUd guidelines should be treated as a tentative partial reference material.
- **Level of scope for sector plan:** The TFMs agreed that sectoral plans in a PUd should be drawn up by an area-wide network, which may sometimes extend beyond a PUd's planning area. The PUd should play an important role in interpreting sectoral plans drawn up by other competent authorities in the land use plan (easements, right of way reserved for facilities, etc.)
- **Non-conformity development/construction management:** Against a case of non-conformity status of development or construction and its management raised by JPT, the TFMs explained that they are treated on a case-by-case basis by evaluating whether or not to grant an exemption by the Minister. However, with the increase in the non-conformity cases against older regulations, the discussion concluded that it is necessary to establish a permanent evaluation committee for exemptions with technical and objective criteria to avoid the discretionary aspect of decisions.

3) Drafting PUd Formulation Guideline

Based on several discussions with TFMs on the guideline, a zero draft of PUd Formulation Guideline (French version) has been drafted and submitted to MCLU to obtain their comments in order to finalize it with necessary modifications.

7.3.3 PUd application guideline

1) Structure of PUd Application Guidelines

The draft PUd Application Guidelines comprises six (6) parts excluding the appendices. Six parts are described below and Table 7.3.3.

- **PART 1: Introduction:** This part describes the background and objectives of the guideline for applied measures and operational techniques for PUd implementation.
- **PART 2: Urban Control and Management with PUd:** Based on a zoning scheme, development control and permit play an essential role in guiding and managing urban activities. This guide explains how to operate a zoning scheme effectively through permission of development and construction including current legislation and desirable instruments
- **PART 3: Zoning Operation for Development Control and Management:** For the implementation of PUd, zoning would play a core tool in controlling and managing urban development and construction in the target planning area. This part shows management activities for development control based on the zoning including building permits, actions required to cope with negative activities against the zoning, necessary change and its monitoring, etc.
- **PART 4: Public Domain and Land Management:** As one of the important issues in Greater Abidjan, land management is focused to guide appropriate development and protect vulnerable environment in association with the required administrative processes based on the relevant legislation. On the other hand, the public domain for infrastructure or public facilities development has to be secured in the zoning. This part describes the administrative process and necessary norms to guide and manage public domain, and touches on the current land management information system, which is currently underway, and its importance as a part of land management systems.

- **PART 5: Toward Innovative Implementation:** In line with the Urban Code (Planning Operation), this part focuses on innovative urban development and implementation measures for contemporary urban challenges including "Transit Oriented Development" and others.
- **Appendices:** This part covers technical and supplemental elements for the main parts of PUd operation such as glossary, terminology of urban management, etc.

Table 7.3.3 Draft Structure of the PUd Application Guidelines in Greater Abidjan Area

Category	PUd Application Guidelines
PART1: Introduction	1.1 Background
	1.2 Objectives
	1.3 Scope and limits (role and conditions)
PART2: Urban Control and Management with PUd	2.1 Scope of urban control and management
	2.2 Legal framework and considerations for control and management
	2.3 Role and function of PUd in urban management
	2.4 Actors and responsibilities
PART3: Zoning Operation for Development Control and Management	3.1 Premise of zoning operation and management
	3.2 Preparing a monitoring plan for zoning operation and management
	3.3 Zoning adaptation to CU and PC
	3.4 Non-conformity and enforcement
	3.5 Zoning update and modification
	3.6 Zoning committee (standing)
PART4: Public Domain and Land Management	4.1 Public domain securement
	4.2 Infrastructure easement assurance (DPU)
	4.3 Land registration (ACD)
	4.4 Land development validation
	4.5 Subdivision management
	4.6 Land information management (IDFUCI, others)
PART5: Toward Innovative Implementation	5.1 Directions for innovative implementation of PUd
	5.2 Promotion and measures for Transit-oriented Development
	5.3 Viable urban regeneration measures
	5.4 Urban management with DX
Appendices	A.1 Glossaries and terminologies

Source: JICA Project Team

2) Key discussions on the structure of PUd Application Guideline

After presenting the table of contents and PUd Application Guideline (PUd-AG), the technical workshops with TFMs were held in November 2023 and June 2024. During the workshops, JPT presented the draft PUd-AG and discussed the key contents that needed clarification with the TFMs. The main points of discussion are described below.

- **Necessary enhancement of local authority's urban management**: A member of TFMs suggested the important role and necessary enhancement and empowerment of local authorities to implement PUds especially for urban growth control from reflections on past problems in development control and management where they failed to work such as in Yopougon and Bingerville. JICA Project Team (JPT) commented that good practices in urban growth control in other countries could be referred to in introducing such legislative instruments.

- **Financial preparedness as one of the essential implementation measures:** A member of TFMs suggested that the budgeting of projects was a very important element, which guaranteed the preparation of the PUd and its implementation. But as it stands, many, including heads of municipalities, could not have sufficient budget for effective implementation. JPT responded that although urban planners were not policymakers, there was a need to strengthen their role in the key budgeting process, including providing technical advice, and also capacity development (coach and training) would be important not only for urban planners but also decision-makers.
- **Flexible treatment for the contents of control and management for the guideline:** Regarding the range of description of this guideline, rules and norms should be based on the existing legal framework in principle. However, there are some legislations with processes or tasks that may not be able to cope with current urban issues. Therefore, improvements of procedure or tasks of the current legislations can be proposed if they are necessary, taking into account the need to move towards shorter and more efficient administrative procedures.
- **Important coordination body for PUd implementation to be established:** Regarding the standing "zoning committee" in the proposed implementation tool, the TMFs agreed on this proposed idea as one of the important tools to be achieved for monitoring and technical validation of the implementation activities based on PUds, especially zoning and its management. It was discussed whether the body should be at the level of Greater Abidjan like a CoFaMiSu or at the level of each municipality.

3) Drafting PUd Application Guideline

The PUd Application Guideline was drafted and submitted to MCLU in July 2024 after discussion with TFMs to obtain their comments in order to finalize it with necessary modifications.

7.3.4 Lessons Learnt

The PUd guideline formulation was carried out under the circumstances that only one Urban Unit 6 (as an urban center) out of 10 Urban Units for the PUd formulation in Greater Abidjan had been almost completed as the first time PUd in Greater Abidjan. Therefore, the analysis, evaluation, and lessons learned in the formulation and content of the PUd were limited. The environment was not desirable in terms of maintaining a certain degree of commonality, standardization, or consideration of special characteristics. The following part describes the lessons learned on each theme in this guideline development.

1) From activities of formulation of the guidelines

Adaptable capacity development process of the formulation of guidelines

The guideline development was carried out using orthodox approaches and procedures from the perspective of capacity development. The outline of the process included: 1) identification of needs for the guidelines through a questionnaire (Guideline Needs Assessment); 2) promotion and sharing of understanding of the contents through discussions with TFMs regarding each stage of the development process; and 3) detailed discussions and necessary improvements ~~activities~~ regarding the drafts. These processes, which were based on the understanding and agreement of the TFMs, are desirable processes to involve relevant stakeholders to ensure replicability in future updates and improvements of the guidelines.

Ideal process with appropriate time-frame to formulate a guideline

While guidance is generally intended to promote the proper application of the existing legal system, interpretation and strategies for dealing with the current situation, including cases where the law is not adequate, are also important. In cases where zoning (the core element of PUd) is being applied for the first time in this project and the legal system is not yet sufficient, adequate time and effort (e.g., pilot operations and refinements) are ideally needed to develop guidelines, and such a time framework for guideline development will be needed in future efforts.

Replicable process through the validation committee for effective implementation of PUd

The CoFaMiSu has a key role in coordination and decision-making in the urban development and management of Greater Abidjan. As the agenda of the CoFaMiSu is mainly an inter-municipal coordination for Greater Abidjan, it may not be appropriate or effective to discuss detailed agendas in each Urban Unit of Greater Abidjan or in each municipality dealing with a zoning scheme of each PUd in the CoFaMiSu. However, this kind of institutional system by standing organization could be applicable at a lower level of administration (DAA or each municipality) to monitor, validate solutions and decision making in urban control and management issues under each approved zoning scheme.

2) From technical considerations of the guidelines

Required inclusive zoning classification in the guideline

During the preparation of the PUd Formulation Guideline based on the PUd (UU6-PTUA), joint discussions were held to coordinate desirable zoning classification with another PUd project (PACOGA) simultaneously underway with the MCLU, consultants for the PUd project, and the JICA Project Team. And even in the final stages of this guideline preparation process, the required zoning classifications were pointed out in another PUd formulation projects (PARU) with different urban characteristics.

Taking into account these circumstances, the standard zoning in the guidelines would be required 1) to present inclusiveness or maximum common denominator of classifications integrating all regional characteristics after the completion of all PUd formulation projects, and 2) to review and update the appropriate classifications to address new urban development trends with diligent monitoring activity.

Required institutional consistency with the guideline framework

Although the guidelines specify the tasks and procedures for their development, their implementation requires the necessary budgetary measures and institutional arrangement. Establishment of an institutional structure would be indispensable to guarantee the effectiveness of the contents of the guidelines.

7.4 ICT-oriented Information Dissemination on Urban Plans

7.4.1 Rationale

1) Background of Pilot Program for Formulation of Urban Planning WebGIS Platform

- The Pilot Program for Formulation of Urban Planning WebGIS Platform is part of an in-depth approach to drawing up urban planning documents for Greater Abidjan and Côte d'Ivoire. Various large-scale projects are currently underway: updating of the SDUGA 2040, production of detailed urban development plans (PUd) for the 10 urban units in Greater Abidjan, production of urban development master plans (Schéma Directeur d'Urbanisme, Plan Directeur d'Urbanisme) in some of the country's cities (Bouaké, San Pedro).
- Currently, finalized urban planning documents (for example: PUd of UU6, PUd of Bouaké or San Pedro) are accessible to ministry agents and stakeholders only in paper and/or PDF format. There is a need for Digital Transformation of the urban planning sector.
- Internally, MCLU agents have commented on the difficulty of accessing and using these documents in paper form. Dissemination to other stakeholders outside the MCLU who are already involved or are likely to be involved in the near future, in the implementation of urban planning documents (Autonomous District of Abidjan, communes, urban services agencies, population representatives) should be considered.

2) Institutional Anchorage

- This Pilot Program is part of the synergy between the SDUGA-2040 Project (JICA, DGUF/MCLU, RECS International Inc.) and the SIGFU Project (DMISSA/MCLU, IGN FI). While the present geoportal development is financed by JICA and implemented by RECS International, aiming to strengthen the capacity of the DGUF, technical support for the DMISSA is provided by IGN FI through the Proof of Concept (POC) of the SIGFU: Plateforme de partage des données urbaines et foncières.
- The Urban Planning WebGIS to be developed in the Pilot Program makes access to urban planning documents and related regulations simple and easy to all, taking inspiration from the France's Géoportail de l'urbanisme, which has been ongoing from since more than a decade ago.

3) General objectives of Pilot Program for Formulation of Urban Planning WebGIS Platform

- To strengthen the effectiveness of the implementation of urban planning documents in Côte d'Ivoire, in particular, the SDUGA 2040 and its subordinate plans;
- Promote the dissemination of the SDUGA 2040 and the Urban Unit 6 Detailed Urban Plan (PUd UU6) to all the urban planning stakeholders thereby providing them with online consultation via a closed-access geoportal (WebGIS) as a first step;
- To prepare the DGUF/MCLU through Institutional Capacity Development activities, for the future deployment of the geoportal to all urban plans in Côte d'Ivoire and free access for all citizens.

4) Features of the Urban Planning WebGIS Platform

- The Urban Planning WebGIS Platform makes it possible to consult spatial data (land use plans, zoning, etc.) and text documents linked to these plans (PDFs of urban planning regulations, presentation reports, etc.) for two types of planning document:
  - ✧ Large-scale strategic urban plans of the SDU and PUD type (SDUGA 2040 in the Pilot), and
  - ✧ PUd-type regulatory urban development plans (PUd for Urban Unit 6 of Greater Abidjan in the Pilot).

- Spatial data is displayed using:
  - ✧ A checkbox that allows the user to select the display of strategic urban plans and/or regulatory urban plans and
  - ✧ 4 levels of information, appearing according to the zoom level:
    - – National coverage of urban planning documents;
    - – Strategic planning level (SDU/PUD) - SDUGA 2040 Land Use Plan in the Pilot;
    - – Regulatory planning level (PUd) - Urban Unit 6 PUd zoning in the Pilot;
    - – Cadastral level: Textual information such as planning regulations and other easements or reports applying to the plot or locality.

5) Specific Objectives of the Functions of the Urban Planning WebGIS Platform

Specific Objectives of the Functions of the Urban Planning WebGIS Platform for users and decision makers of the Urban Planning WebGIS Platform are summarized in Table 7.4.1 below.

Table 7.4.1 Specific Objectives of the Functions of the Urban Planning WebGIS Platform

Function		Objective for Users	Objective for Decision-makers
Consultation of spatial information	Status of formulation of urban planning documents	Allow the general public to know the plan(s) in force in their local community.	Allow authorities to monitor the evolution of spatial coverage in approved urban planning documents, speed up late processes.
	Land use plan for strategic urban planning documents (SDU type)	Allow the general public to consult the various regulations (RGU, RPU, etc.) on land use, urban form or constructability in force at their place of residence, in the event of work or litigation, etc.	Allow authorities to impose enforceability of urban planning documents and public utility easements on administrations but also on private third parties (institutionalization of the Platform by decree).
	Zoning of regulatory urban planning documents (PUd type)		
	Superimposed zoning (protection zones)		
	Public utility easements*		
	Linkage with Cadastral Registry / Topographic Database	Same but “in force on their parcel”, locate and verify the legality of their plot.	Allow the authorities to guarantee the imposition of enforceability within the legal land framework.
Update and management	Different types of access or authorization	-	Allow the central authority in charge of the Platform (MCLU) to manage authorizations for uploading urban planning documents by different agencies or local authorities within the framework of decentralized or deconcentrated governance.
	Upload by central authority	-	
	Uploading by local authorities*	-	
Authorization	Validation of a standard of urban planning documents or easements*	-	Allow all urban planning documents, and in particular the zoning nomenclature, to be standardized across Côte d’Ivoire.
	Automatic validator*	-	
	Approval of urban planning documents through the Platform*	-	Enable a complete digital transformation through the dematerialization of urban planning document authorization procedures.

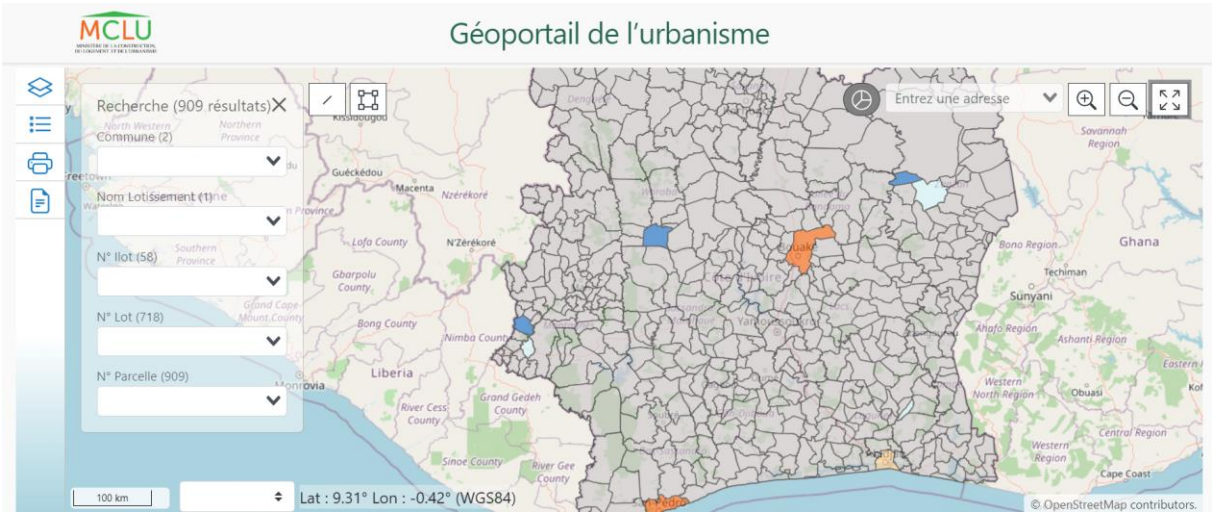
Source: JICA Project Team
Note: (*) Feature not implemented in the Pilot, shall be implemented in further stages

7.4.2 Pilot activity implementation

The Pilot Urban Planning WebGIS Platform has been developed from fall 2023 to spring 2024 and the result has been shared to MCLU/DGUF and MCLU/DMISSA on May 3, 2024 during a Presentation and Brainstorming Workshop. Figures 7.4.1 to 7.4.3 below show the different levels of information contained in the implemented Pilot Urban Planning WebGIS Platform, appearing according to the zoom level.

1) National Coverage of Urban Planning Documents

Upon accessing the Pilot Urban Planning WebGIS Platform on internet restricted area, users are first presented with the National Coverage of Urban Planning Documents, as shown in Figure 7.4.1 below. This feature is designed to allow authorities to effectively monitor the spatial coverage and evolution of the status of approval of urban planning documents across the nation. It serves as a vital tool for identifying areas with outdated or missing plans, thereby facilitating the acceleration of processes that are lagging behind. Legend includes “no existing urban planning document” in grey, “approved urban planning document” in navy blue, “urban planning document under approving processing” in light blue and “urban planning document under formulation” in orange. The applied status of approved urban planning documents has been done indicatively for illustration purpose and does not reflect the reality.



Source: JICA Project Team

Figure 7.4.1 Pilot WebGIS: National Coverage of Urban Planning Documents

2) Strategic Planning Level (SDU/PUD) - SDUGA 2040 Land Use Plan in the Pilot

Since the Land Use Plan (PCOS) of SDUGA 2040 is still not finalized and approved, it has not been reflected in the Pilot Urban Planning WebGIS Platform as of May 2024. It was ultimately reflected therein by August 2024 upon its finalization.

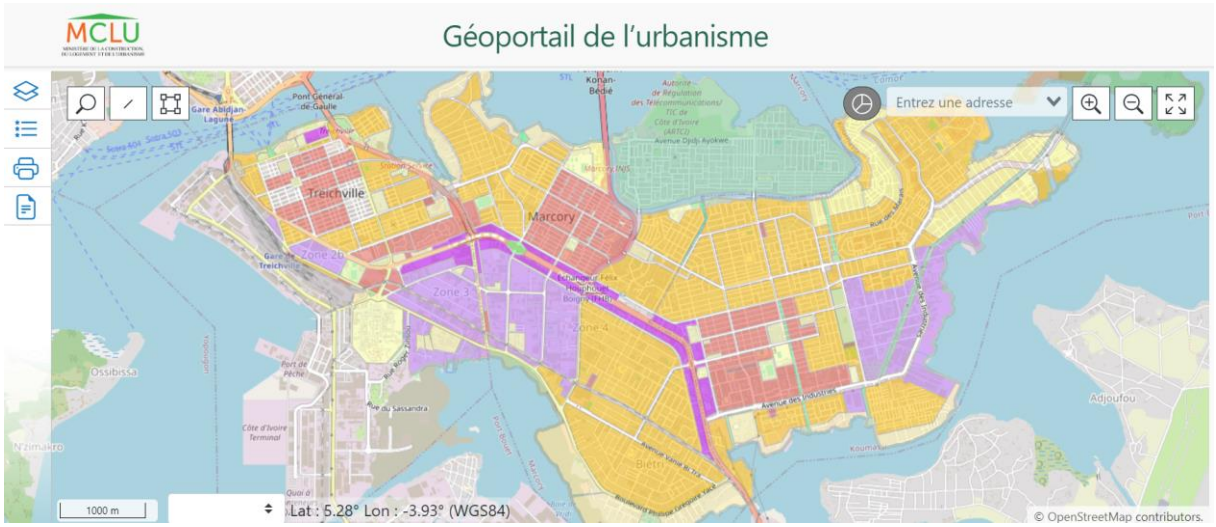
3) Regulatory planning level (PUd) - Urban Unit 6 PUd Zoning in the Pilot

After zooming within the Greater Abidjan, the Zoning plan of the PUd of Urban Unit 6 is displayed, as shown in Figure 7.4.2 below.

4) Cadastral level: access to PUd regulations

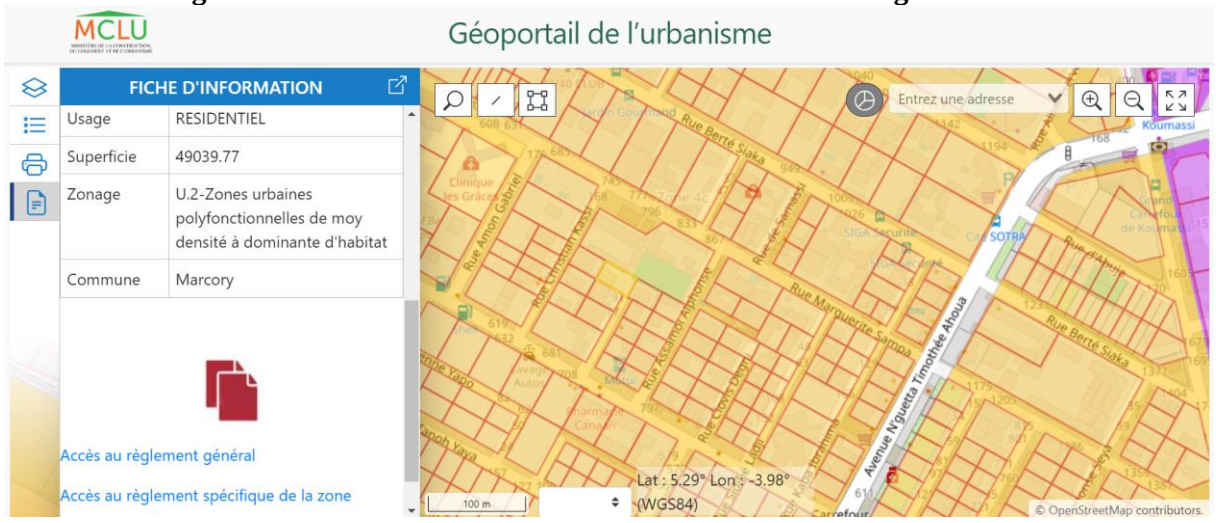
At the maximum level of zoom, the parcels of the Cadastre is shown in transparency of the Zoning classes, as shown in Figure 7.4.3 below. At this scale, the Urban Planning WebGIS Platform showcases a user-friendly map feature targeting the general public. By clicking on their parcel on the map, users can quickly download a PDF file including all the relevant regulations on land use, urban form, and building rules, such as General Urban Regulation (RGU) and Specific Urban Regulation (RPU), etc. that apply to their location. This information is especially useful for users planning construction or

involved in legal matters, helping them easily understand and follow the local planning laws.



Source: JICA Project Team

Figure 7.4.2 Pilot WebGIS: Urban Unit 6 PUd Zoning in the Pilot



Source: JICA Project Team

Figure 7.4.3 Pilot WebGIS: Cadastral Level and PUd Regulation

7.4.3 Lessons Learnt

The implementation of the Pilot Urban Planning WebGIS Platform has been the occasion, during the Presentation and Brainstorming Worshop of May 3, 2024, to consider and discuss future challenges of the national deployment of such a tool at the scale of the whole country, in terms of digital transformation, standardization of urban planning documents, and decentralization of planning prerogatives. The results of the discussions show the necessary institutional reforms to undertake in order to be able to implement the deployment of Urban Planning Platform at the national scale. The results of the discussions are shown in Table7.4.2 below, concerning the necessary institutional reforms to undertake in order to be able to implement the deployment of Urban Planning Platform at the national scale.

Table 7.4.2 Developments and reforms required for GPU deployment

GPU functions		Necessary reforms	Current situation in Côte d'Ivoire	Priority / Deadline
Consulting cartographic documents	Status of urban planning documents	Raising the issue of open-data access for citizens	Little progress in opening up data to citizens	High priority Medium-term
	Strategic land-use plans (SDU type)			
	Zoning of regulatory urban planning			

	documents (PUd type)			
	Overlapping zones (protection zones)			
	Public utility easements			
	Cadastre / Topographic database link	Availability of cadastral parcels?	SIGFU progress to be monitored	High priority Medium-term
Update and management	Different types of access or authorization	Raising the question of institutional reform and decentralization of urban planning	Little progress in decentralizing urban planning	Low priority Long term
	Download from central authority			
	Local authority download			
Authorization	Validation of a standard urban planning document or easement	The question of standardizing the content of DUs and SUPs arises.	Certain progress (SDUGA 2040 PUd guidelines)	High priority Short term
	Automatic validator			
	Approval of urban planning documents via GPU			

Source: JICA Project Team

7.5 Investment promotion programme

Among the investment promotion measures that was shown in the section 4.5.2, there needs to be a priority list so that SDUGA 2040 is successfully implemented. In PPP Workshop that was held on 28th May, the impacts and urgency was discussed with the stakeholders and considering both, the expert team put the priory on each measure. Table 7.5.1 shows the priorities of the investment promotion programmes. As discussed in the previous sections, private investment is quite important for implementing various projects in SDUGA 2040, and this momentum, where unsolicited proposals are regarded as a key proposal scheme, should be kept at least in the short-term. However, for monitoring if the unsolicited project is along the SDUGA 2040, there needs to be a coordination mechanism first. The details of programmes in the "High" priority list are shown in the following sections.

Table 7.5.1 Priority of Investment Promotion Measure

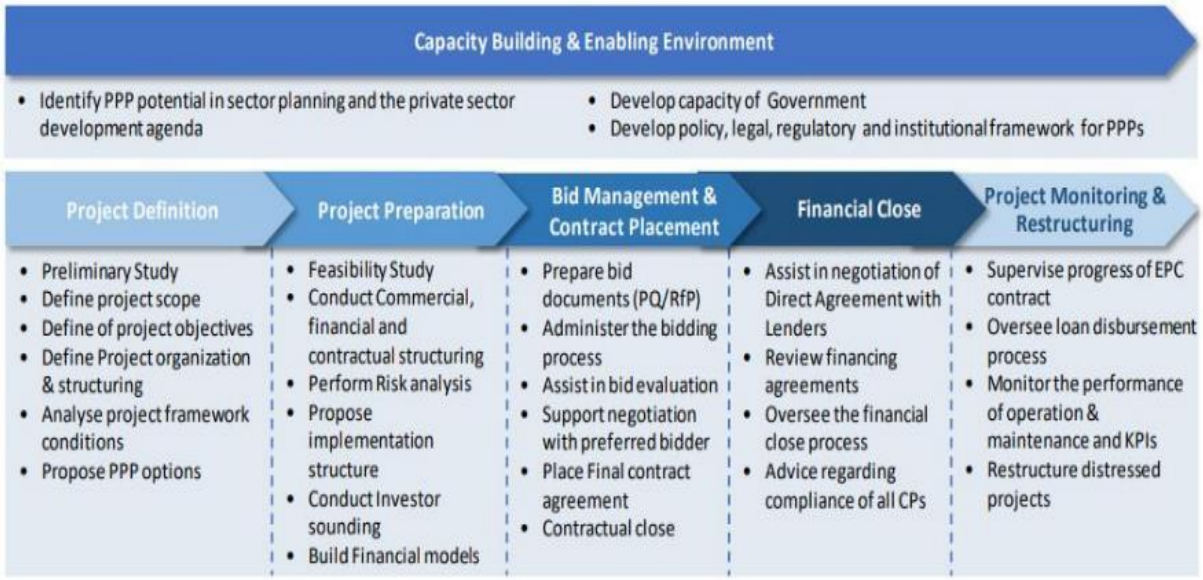
Measure	Description	Urgency	Impact	Priority
Fund for F/S	The budget for F/S should be allocated to line ministries/ the F/S fund should be established in order to promote solicited proposals.	Middle	High	High
VFM and Monitoring System	Monitoring mechanism based on VFM calculation is obligated with the introduction of open bidding.	Low	Middle	Low
Introduction for support scheme	In the future projects where the financial return for the private side might decrease. This is because PPP projects tend to be formulated where the financial return is higher. To formulate more solicited-based PPP, government support such as VGF and its combination with other schemes could be introduced.	Low	Low	Low
Coordination Mechanism	There need to be mechanisms such as CoFaMiSu involving PPP related entity like CNP-PPP that check the consistency between SDUGA and project proposals from the private sector even for unsolicited cases.	High	High	High
Introduction of Land Value Capture (LVC)	A possibility of introducing new forms of urban finance in the Greater Abidjan are to be considered in addition to the conventional methods. One of the potential schemes is LVC. Their adaptability to Greater Abidjan will, then, be analyzed in light of legal and regulatory frameworks and market conditions.	Low	High	Middle

"Fund for F/S" and "coordination mechanism" are the two most important measures in terms of "urgency", "impact", and "priority". They are described below.

Source: JICA Project Team

(1) Fund for feasibility studies

Rather than just providing subsidy to line ministries for F/S, it should be better to establish the fund for F/S considering the circularity of money. One of the examples is the Asia Pacific Project Preparation Fund in Asian Development Bank (ADB). In ADB there is a section called Office of PPPs (OPPP), which is the specialized section for PPPs. This assists public and private sector clients in structuring and procuring viable projects from project definition to commercial close (concession agreement) or financial close (financing documents). Further, clients can utilize the funding from the Asia Pacific Project Preparation Fund (AP3F), which is a grant-based trust fund administered by ADB to cover initial project support and/or monitoring. OPPP usually seeks cost recovery plus fee for the service provided to make the fund more sustainable

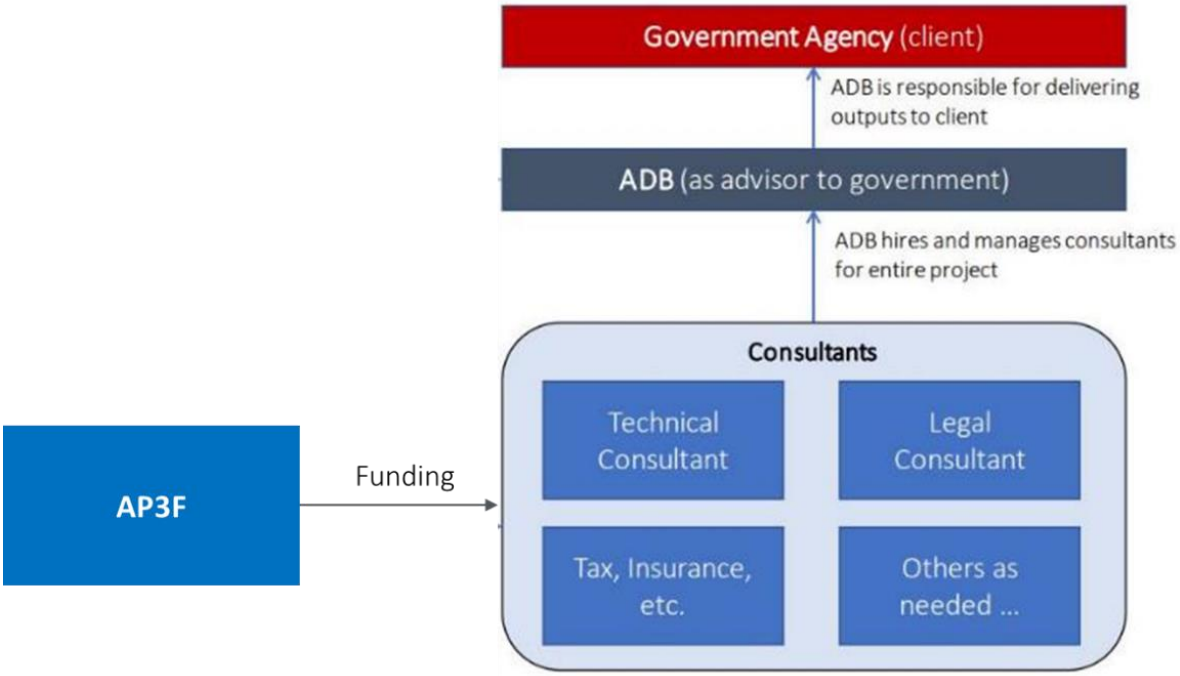


Source: ADB

Figure 7.5.1 Task of OPPP in ADB

AP3F plays an important role in minimizing financial burden on client side and has remuneration mechanism through success fees. ADB as the transaction advisor is responsible to client for consultants' outputs (quality and process). Use of AP3F funds minimizes financial burden on the clients for project development. Further, ADB is remunerated primarily through success fee from the winning or milestone payments from government depending on the case. In some cases, this remuneration and success fee is covered by the private side if PPP project is successfully contracted, and then comes to AP3F as a revolving money.

Further, the Philippines has introduced a similar facility called Project Development and Monitoring Facility (PDMF). It is under PPP Centre which has similar function to CNP-PPP and provides technical and financial support for project formulation including Pre-F/S, F/S and transaction advisory. They also act as revolving fund for F/S, being managed by PPP center. These examples could be a relevant model for Cote d'Ivoire, although a detailed study is needed first.



Source: Created by JICA Project Team based on ADB

Figure 7.5.2 Mechanism of AP3F

(2) Collaboration mechanism

In Cote d'Ivoire, unsolicited proposals and direct negotiations from the private sector is common. Promoting unsolicited proposals itself is a reasonable strategy considering that private money is needed for implementing many projects for SDUGA 2040. Therefore, there is a risk that the private side proposes the scope that is more profitable without paying attention to universal access and upstream urban plan such as SDUGA.

In PPP Workshop, the involvement of PPP-related organizations such as CNP-PPP was discussed. As a result, there were positive opinions on involving CNP-PPP in CoFaMiSu and other key implementing stages of SDUGA 2040. Therefore, it is highly recommended that the information should be mutually shared with CNP-PPP and CoFaMiSu members on the progress of SDUGA 2040 and pipelines of PPP projects

7.6 Recommendations for SDUGA 2040 Effectiveness Enhancement Measures

(1) Establishing General Urban Regulations (RGU) as a strong instrument for effective implementation of SDUGA 2040

The importance of the General Urban Regulations for SDUGA 2040, was shared strongly among the participants of the pilot program and the need for their early establishment was confirmed positively by them. On the other hand, during the projects for PUd formulation, relevant stakeholders have pointed out some difficulties of zoning scheme of PUds in Greater Abidjan without clear standards and unified regulations generating inconsistent formulation of regulations in PUd.

In the context, an RGU would be one of the important legal frameworks to guide and control relevant planning such as PUd with zoning regulations or implementation projects and programs under the SDUGA framework. Therefore, it is envisaged that an RGU is required to be promulgated as a "Decree"

approved by the Council of Ministers, while wider stakeholder involvement in conjunction with their understanding and consent is to be encouraged. In this context, institutional arrangements will be urged through budget preparation, responsible body formulation and coordination and validation by relevant authorities.

Due to the predominance of technical considerations in legislative work, and the lack of sufficient current legislation to address the current development agenda and critical control management issues in Greater Abidjan, technical assistance would be effective in formulating RGUs through advisory services, taking into account international transfer of 'best practice', including referenced international legal instruments in conjunction with local practice, and through effective review and adaptation.

(2) Effective utilization of the guidelines for PUd formulation and application

While guidance is generally intended to promote the proper application of the existing legal system, interpretation and strategies for dealing with the current situation, including cases where the law is not adequate, are also important. In cases where zoning (the core element of PUd) is being applied for the first time-and the legal system is not yet sufficient, adequate time and effort (e.g., pilot operations and refinements) are ideally needed to develop and improve guidelines, and such a time framework for guideline development will be needed in future efforts.

The fact that only a few examples of PUds were available negatively affected TFMs ability to understand and grasp planning tasks and techniques with insufficient and comparable information. From this perspective, constant efforts are required for updating and improving the PUd guidelines in consideration of the status of ongoing PUds formulation and new urban issues to be challenged. The prepared guidelines are recommended to be periodically updated for them to be utilized as the basis of planning and management of PUd.

(3) Roadmap for National Deployment of Urban Planning Platform

The Figure 7.6.1 below outlines the proposed incremental implementation phasing of the National Deployment (ND) of the Urban Planning WebGIS Platform, beginning with the pilot phase carried out under the JICA SDUGA 2040 Project.

1) Preliminary Study (Q4 2024 or Q1 2025)

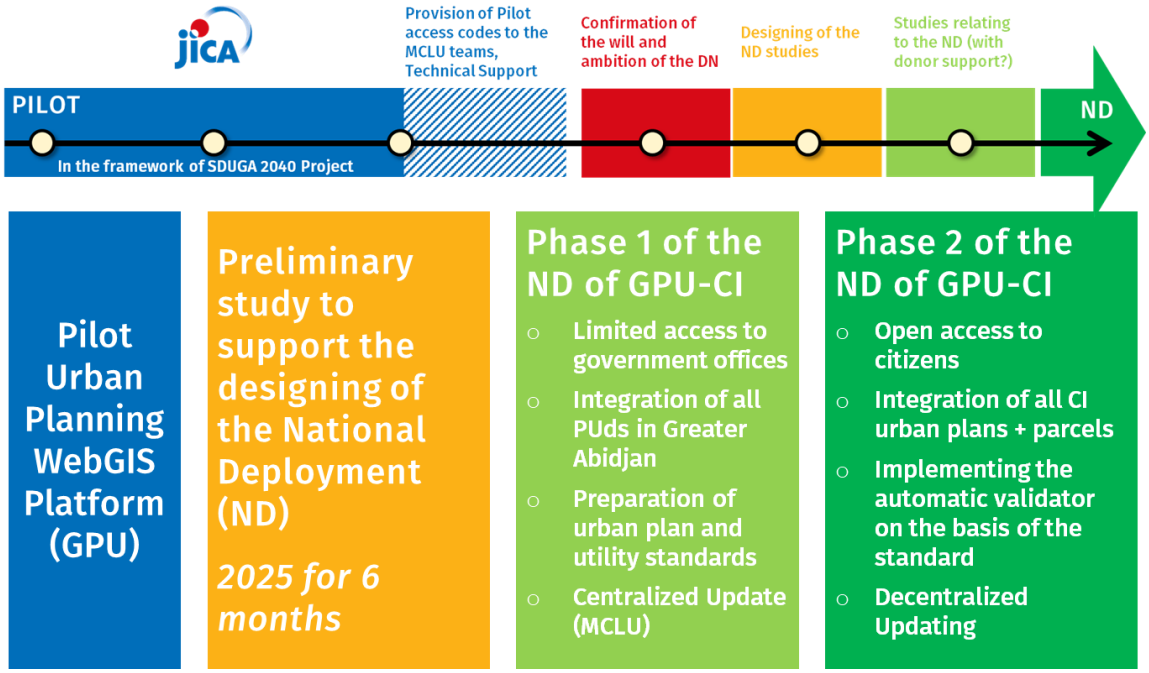
It is proposed to hold a preliminary study ideally starting in Q4 2024 or Q1 2025 and lasting six months, aimed at designing the ND Project. This study, implemented by one urban planning consultant who has experience of Digital Transformation in urban planning, will be the occasion to confirm the ambition of Ivorian administration in terms of technical, legal and institutional reforms. Accordingly, the consultant will draft the Terms of reference of the National Deployment Project and will support the signing of the Record of Discussion between donor and the related organization of the Ivorian side.

2) National Deployment (from mid-2025)

Even though the National Deployment will be defined in detail as an output of the preliminary survey explained above, it is expected to be implemented incrementally into two main phases.

The Phase 1 would primarily focus on integrating all zoning of the PUds currently under planning in the Greater Abidjan, preparing all standards for PUd zoning and utility. At this phase, it is expected that the updates will still be centralized at the MCLU, and that there will be a limited access to the Platform for governmental organizations only.

The Phase 2 would expand the access to the Platform to all citizens, would introduce the integration of all parcels to the zoning of urban plans, would implement an automatic validation system based on standards established during Phase 1, and would facilitate updating from stakeholders other than central government, such as local government, in the perspective of decentralization.



Source: JICA Project Team

Figure 7.6.1 Proposed Roadmap for National Deployment of Urban Planning Platform

Chapter 8 Way Forward

8.1 Overall

The current position of urban development planning in Greater Abidjan as of August 2024 can be summarized as the completion of SDUGA 2040 in August 2024 and the finalization of all the PUds by November 2024. Its position is shown by the red triangle mark in Figure 8.1.1.

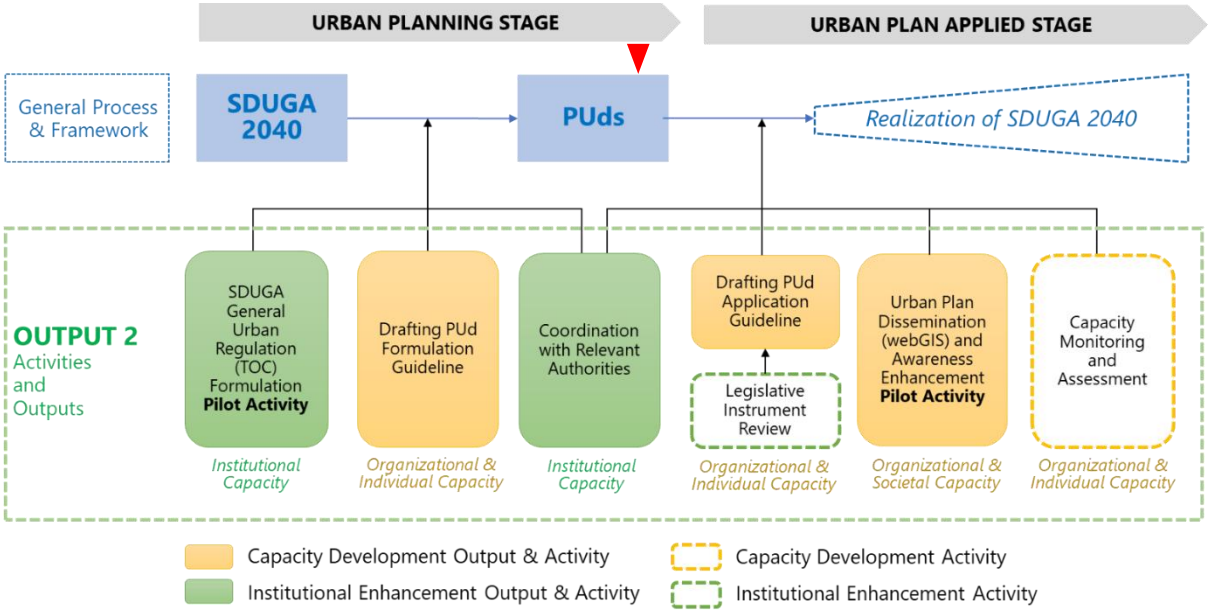


Figure 8.1.1 Current Position of Urban Planning in Greater Abidjan and Way Forward

A series of actions need to be undertaken for SDUGA 2040 to be realized in the short, medium and long-term as shown below.

8.2 Short-term Actions (0-2 years)

Approval of SDUGA 2040 by MCLU

A public administrative inquiry will be held to review the final version of SDUGA 2040 submitted by JICA first. Upon making the necessary improvements, it will be finalized and a decree will be issued to approve SDUGA 2040 officially. This process normally takes about three months at least. MCLU is expected to take action swiftly for this process.

Completion of SDUGA 2040 General Urban Regulation (RGU)

One of the pilot activities for Output-2 was the preparation of a table of contents for SDUGA General Urban Regulation (RGU). A workshop was held in October 2023 on this subject, and intensive and active discussions took place. The agreement reached was that MCLU would take the initiative in preparing a full version of RGU following the table of contents.

Ideally, RGU must have been prepared before the preparation of PUds starts so that all the PUds would be prepared within a common framework. Unfortunately, the PUds preparation in Greater Abidjan started under the three programs of PTUA, PACOGA and PARU supported by the World Bank and African Development Bank in parallel with the preparation of SDUGA 2040. Since the PUds preparation proceeded without a common standard, there are some inconsistencies among the PUds such as the use

of different colours for land use. It is highly desirable that MCLU swiftly prepares RGU and applies it to the PUds to enhance their mutual consistency.

Application of PUd Guideline to Improve PUds

The PUd Preparation Guideline prepared as a deliverable of Output-2 in SDUGA 2040 can be used in enhancing the consistency of PUds. It should be useful as a reference document for improving the prepared PUds, because it presents the important factors that should be considered in preparing PUds.

Integration of Urban Environmental Infrastructure Plans into Sector Master Plans

The development plans for urban environmental infrastructure including water supply, sewerage and solid waste management were prepared based on the socio-economic framework for 2040 presented as part of SDUGA 2040. They indicated the demands based on the 2040 population, the need for expanding the capacities of the water supply, sewerage and solid waste management facilities and required investment costs until 2040 and those of priority projects until 2030. It was found that there are gaps in the target years and planning coverage areas between those of SDUGA 2040 and the existing master plans of water supply and sewerage. The existing plan for solid waste management was found to be able to accommodate the demands estimated by SDUGA 2040.

It is highly recommended that relevant ministries and organizations such as the Ministry of Hydraulics (water supply) and the National Office of Sanitation and Drainage (ONAD for sewerage) review the SDUGA 2040 urban environmental infrastructure proposals closely and update their existing master plans. Such an update is needed to develop the SDUGA 2040 proposals into plans with an adequate level of detail for promoting the proposed projects to feasibility study and implementation stages.

Continuation of CoFaMiSu to make coordination among different sectors by all the relevant stakeholders

It is recommended that the CoFaMiSu structure be maintained to continue coordination among different sectors, providing a venue to discuss and reach a consensus on the issues mentioned above: “approval of SDUGA 2040”, “preparation of SDUGA RDU”, “application of PUd guideline to improve PUds” and “integration of SDUGA 2040 into urban environmental infrastructure master plans”. Participation of the CoFaMiSu members in improving the PUds, especially, would contribute to enhancing the effectiveness of SDUGA 2040 and PUds.

Participation of communes in CoFaMiSu should be considered to strengthen the coordination function of CoFaMiSu in the vertical direction in addition to the horizontal coordination, which has been taking place in CoFaMiSu held for SDUGA 2040. Involvement of communes will become increasingly important as SDUGA 2040 proceeds toward implementation through the application of PUds soon to be completed.

8.3 Medium- to Long-term Actions (2-10 years)

Development and expansion of SDUGA 2040 pilot activities to a full-scale

It is recommended that the two pilot activities in SDUGA 2040, which are “Geo-Portal System Application” and “Traffic Information Collection and Management”, are promoted to a full-scale operation.

The Geo-Portal system was introduced on a pilot basis in SDUGA 2040 in cooperation with SIGFU for Urban Unit 6 and internal use within MCLU. This system should be expanded to the entire Greater Abidjan and opened for sharing with the general public. It can be a useful tool for nurturing an understanding on the urban plans such as SDUGA 2040 and PUds for ordinary people and business people such as developers and real estate agencies. An adequate understanding of urban plans makes people pay respect to and follow them, which is an important basis for urban plans to be effective.

While the Geo-Portal system is a platform for sharing information on urban plans, it can serve as a springboard for enhancing the qualities of urban plans. The urban plans to be opened to the public must have integrity and consistency. Without them, they could create confusion and conflicts once opened to

the public. It is recommended, therefore, that the two initiatives, one for expanding the Geo-Portal system and the other to prepare urban plans of high quality, be promoted in parallel. Greater Abidjan will be ready for these two initiatives once PUds are completed and mutual consistency among them is ensured. This approach could be replicated in other parts of Côte d'Ivoire so that the entire country is covered by this system ultimately.

The "Traffic Information Collection and Management" pilot project was implemented as an endeavor to strengthen the capacity of AMUGA to collect traffic data and analyze them. 5 cameras were installed at selected locations and the images on traffic began to be sent to the AMUGA control center in May 2024. Training sessions were provided to AMUGA officers on how to use the system. It is recommended that this traffic information collection and management system be expanded to cover the entire Greater Abidjan area to realize efficient real-time traffic management and transportation planning.

Promotion of long-list and high-priority projects proposed by SDUGA 2040

A set of long-tern projects are proposed for the transportation sector and urban environmental infrastructure sector for 2040, out of which those projects with high priority are selected to be implemented by 2030.

The transportation projects were formulated based on a review of the projects proposed by SDUGA and by other initiatives such as PTUA and PACOGA, especially for public transportation and soft mobility. Two perspectives of solving the current bottlenecks and serving new urban areas were applied to project formulation. The projects with high priority to be implemented by 2030 were selected according to eight criteria as explained in Chapter 5. These high-priority projects are recommended to be promoted swiftly to implementation. The long-list projects by 2040 are to be reviewed periodically, priority assessed and those with higher-priority to be promoted to implementation.

The high-priority projects for urban environmental infrastructure to be implemented by 2030 were selected in consideration of the severity of service-demand gap. They should be promoted to implementation swiftly. Those under the long-list to be implemented by 2040 should be reviewed periodically in consideration of the actual urbanization trends and their priorities need to be assessed accordingly.

Strengthening of the legal and regulatory system to support SDUGA 2040

It is necessary to strengthen the legal and regulatory system to support various aspects of SDUGA 2040. For example, promulgating a decree to protect the Grand Bassam Wetland under Ramsar Treaty would be needed. It is recommended that the legal and regulatory aspects of SDUGA 2040 be thoroughly analyzed and the relevant subjects requiring strengthening be identified and actions taken.

Strengthen of the organizational capacities:

The capacities of local government authorities such as communes need to be strengthened for the effective implementation of the PUds by utilizing the PUd Application Guideline prepared in SDUGA 2040. It is the local authorities such as communes that are most familiar with the local conditions and they are in the best position to implement the PUds in such a manner as to meet the requirements of inhabitants. Their existing capacities in urban planning and application, however, are still not adequate to play such a role.

A stronger organizational frame should be created to effectively manage urban development at a scale of Greater Abidjan. Various developments such as sub-division projects and other forms of urban development are already taking place beyond the existing boundary of the Autonomous District of Abidjan containing 13 communes. The SDUGA 2040 assumes the growth of three poles, Dabou, Azaguié and Bonua, located in the periphery of Greater Abidjan in the west, north and east. A balanced development of Greater Abidjan is anticipated by promoting both economic and residential functions in these growth poles. Effectively connecting all these growth poles with the central Abidjan would be important in creating an efficient urban environment. The urban areas in Greater Abidjan under separate administrative units at present should be effectively linked to integrate all the urban development efforts from a wide regional perspective. Different options ranging from creating one administrative entity to forming a more loosely linked commission-type structure could be considered.

The financial management capability, especially that for fund-raising, needs to be strengthened to meet increasing demands for development funds for infrastructures, for example, through the improvement of the Public-Private Partnership scheme.